California Department of Transportation
District 4

ADVANCED TRANSPORTATION MANAGEMENT SYSTEM

OPERATOR'S MANUAL

Revision 1.2

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REVISION TABLE

DATE	VERSION	DESCRIPTION	AUTHOR
9/2010	1.0	Initial Draft Version for D4 ATMS	Delcan
11/2010	1.1	Final Version for D4 ATMS	Delcan
3/2011	1.2	Revised Version (RMS and MLMS Metering Status)	Delcan

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1 INTRODUCTION

The Caltrans District 4 Advanced Transportation Management System (D4 ATMS) is designed to assist in collection and dissemination of traffic information in order to effectively manage the existing Caltrans District 4 transportation system. The activities in the Transportation Management Center (TMC) reduce traffic congestion and increase safety through rapid detection of, response to, and removal of incidents on the freeway. The TMC operators also manage recurring congestion through ramp metering, and traffic engineers analyze the efficiency of the freeway system through the historical reports.

D4 ATMS provides this functionality through a user interface for a real-time traffic data views, event entry, response plan creation, historical reports, control of various field devices, database editing, system configuration as well as system administration functions. Field device controls include Changeable Message Signs (CMS), Closed Circuit Television (CCTV) cameras, Highway Advisory Radio (HAR) transmitters and HAR Extinguishable Message Signs (EMS), Mainline Meter Stations (MLMS), Ramp Meter Stations (RMS), and Vehicle Detection Stations (VDS).

1.1 Purpose

The purpose of this document is to provide assistance in the use of D4 ATMS. The document is intended for use by TMC operational staff. With the help of this document and other user manuals, a TMC operator will have a reference to manage/operate D4 ATMS. This document has been designed for the operator who has basic computer/workstation operator skills and an understanding of D4 Transportation Management policies and operations.

The following is a description of this document:

- Section 1 - provides an introduction to the system and the subsystems that are integrated with D4 ATMS
- Section 2 - describes the workstation environment
- Section 3 - describes the D4 ATMS map display and its functions
- Section 4 - contains descriptions of the field devices for D4 ATMS
- Section 5 – contains descriptions of the event management functions
- Section 6 - explains the Reports function
- Section 7 - explains the Browser/Editor capabilities
- Appendix A - contains a list of acronyms
- Appendix B – contains sample reports

1.2 Referenced Documents

The following documents have been references for this manual. Please refer to the specific manual when additional detail is needed.

- D4 ATMS Traffic Engineer's Manual – September 2010

- D4 ATMS Database Manual – November 2010
- D4 ATMS Maintenance Manual – November 2010
- D4 ATMS Maintenance Manual Browser/Editor – November 2010

1.3 ATMS Subsystems

The following sections provide basic information for each subsystem integrated into D4 ATMS.

1.3.1 CCTV

Closed Circuit Television (CCTV) cameras provide a means of verifying and monitoring freeway traffic conditions. The cameras allow freeway surveillance from the TMC, providing coverage of up to half a mile in each direction. Full camera and lens capabilities are available from the TMC (pan, tilt, zoom, focus, iris, lens speed adjustments).

1.3.2 CMS

Changeable Message Signs (CMS) are instrumental in providing motorists with information concerning existing traffic conditions. CMS serve as a means of informing motorists of unusual or unsafe road conditions and may alert drivers about potential problems ahead. The use of CMS also enables traffic diversions to be implemented.

The CMS technologies used in D4 are:

- Caltrans Model 500, 510, and 520 signs
- Addco portable signs
- Vermac signs
- Vermac portable signs

1.3.3 Controller

Controllers are located throughout D4 and its adjacent counties. The ATMS map allows the operators to view Cabinet Relay Trip Alarm status at each controller.

1.3.4 HAR EMS

HAR EMS are used to alert motorists that the nearby HAR transmitter is broadcasting a message.

1.3.5 HAR Transmitter

HAR Transmitters are vital to providing to motorists information concerning existing traffic conditions. HAR messages are an element of the ATMS events, as well as being used for general-purpose messages.

1.3.6 MLMS

MLMS provides real-time metering capability for the mainline meters from the TMC. Typically, MLMS are located at bridge entrances.

1.3.7 RMS

RMS provides real-time metering capability for the ramp meters from the TMC. The RMS collects the metering mode, metering rate, and other parameters, which are transmitted back to the TMC for display and data archival. From the TMC, the operator can change the metering rate, the metering mode, or other parameters in order to override the existing operation.

1.3.8 VDS

VDS provides real-time traffic information on a lane-by-lane basis. Each VDS consists of a number of detectors embedded into the pavement, located on the mainline, high occupancy vehicle lanes (HOV), on- and off-ramps, and freeway-to-freeway connector ramps. Each VDS collects volume, occupancy, and speed data, which is transmitted back to the TMC for display and data archival.

1.3.9 Communication Subsystem

Currently, communications between the TMC and the subsystems is a hybrid of leased lines, dial-up lines, and fiber optic communications.

1.3.10 Central Computer Subsystem

The operator interfaces with the central computer system through the operations workstation. The central computer system processes, stores, and presents collected traffic data via Graphical User Interfaces (GUI) to the operator. The system analyzes traffic data for incident detection and other monitoring activities and it allows recommendations and implementation of traffic control and motorist advisory strategies. Also provided by the system is access to a number of administrative functions.

2 WORKSTATION ENVIRONMENT

The operations workstation runs on a standard Windows/PC-based platform. The operations workstation or workstation, as it will be referred to for the remainder of this document, is equipped with:

- One (1) Central Processing Unit (CPU)
- Two (2) monitors
- One (1) keyboard
- One (1) mouse

From this workstation, an operator with proper access privileges can access all applicable system applications. The following sections describe general workstation features.

D4 ATMS allows the operator to access and control field elements, generate and implement traffic control and advisory strategies, and perform administrative functions. Through the Home Page dialog, shown in Figure 2-1, the operator is able to access the following applications:

- ATMS Map (Real-time): View current traffic conditions, detect incidents, access and control CMS, and survey traffic conditions using CCTV cameras
- Configuration: Provide access to Browser/Editor functions
- Reports: Allow the operator to generate reports
- Administration: Provide access to general administration functions, such as operator account creation / modification / deletion and operator with correct privileges can start / stop processes

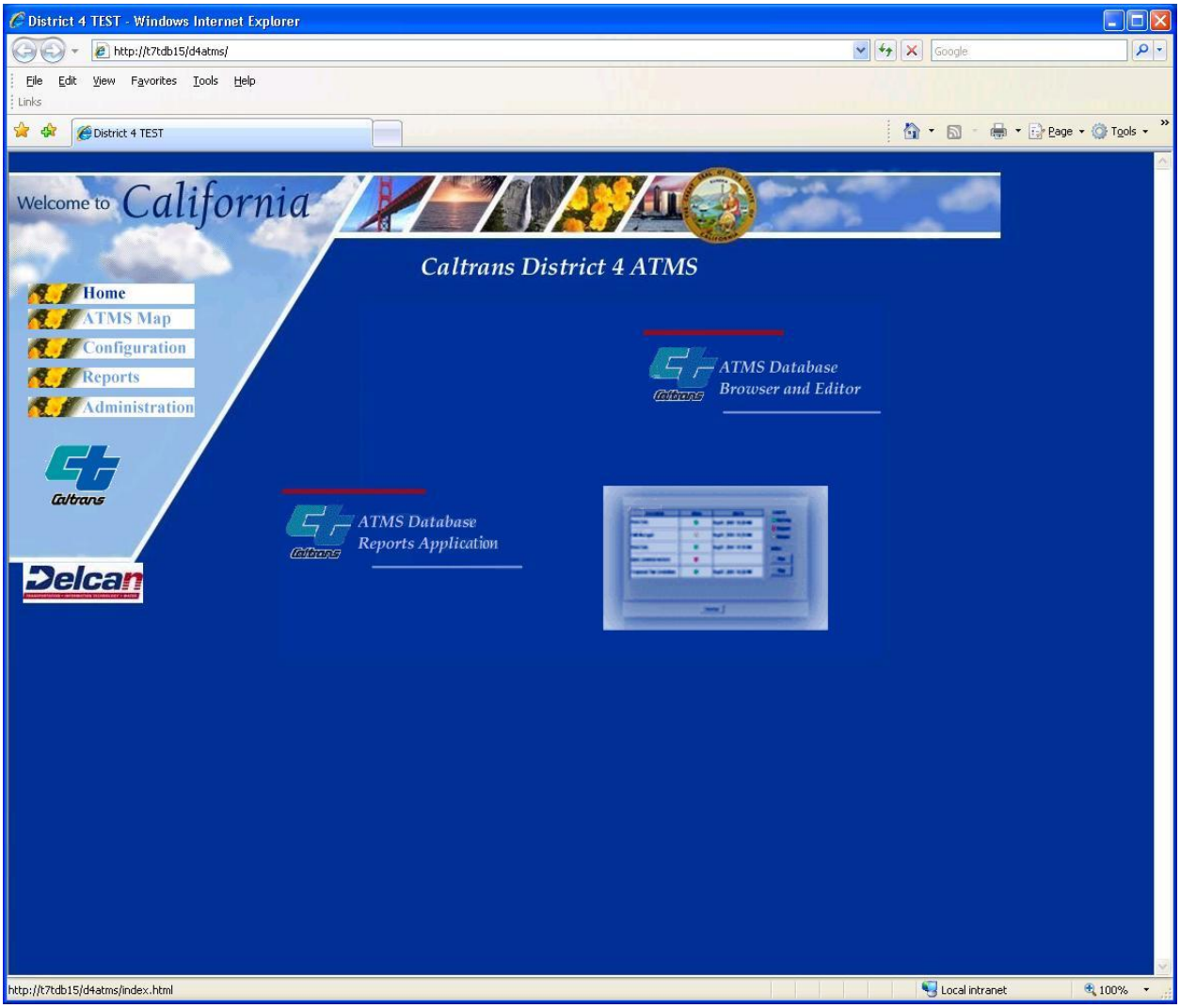


Figure 2-1: D4 ATMS Home Page Dialog

2.1 Computer Mouse

The application-related functions are primarily accessed by means of the mouse, with a 2-button mouse used in conjunction with the keyboard. The majority of the windows require a single click of the left mouse button. When a double-click is needed, it is indicated in the text.

The primary button is the left mouse button. When functions require the right mouse button, those functions will specifically reference the right mouse button. Please note that within the Windows Control Panel, the mouse properties can be customized for right or left handed operations.

The following mouse operations are valid:

- Click: Press and release the primary button without moving the mouse.

- Double-Click: Press and release the primary mouse button twice in rapid succession.
- Click-and-Drag: Press and hold the primary button while moving the mouse to create a box or to move an icon to a different location, then release the mouse button.

2.2 General Window Features

A window frames a software application, and has controls to change its size and to perform other window control functions. This section discusses the different elements of a window, as well as window tasks that are frequently performed.

A window, shown in Figure 2-2, includes several elements that allow the operator to quickly perform window tasks.

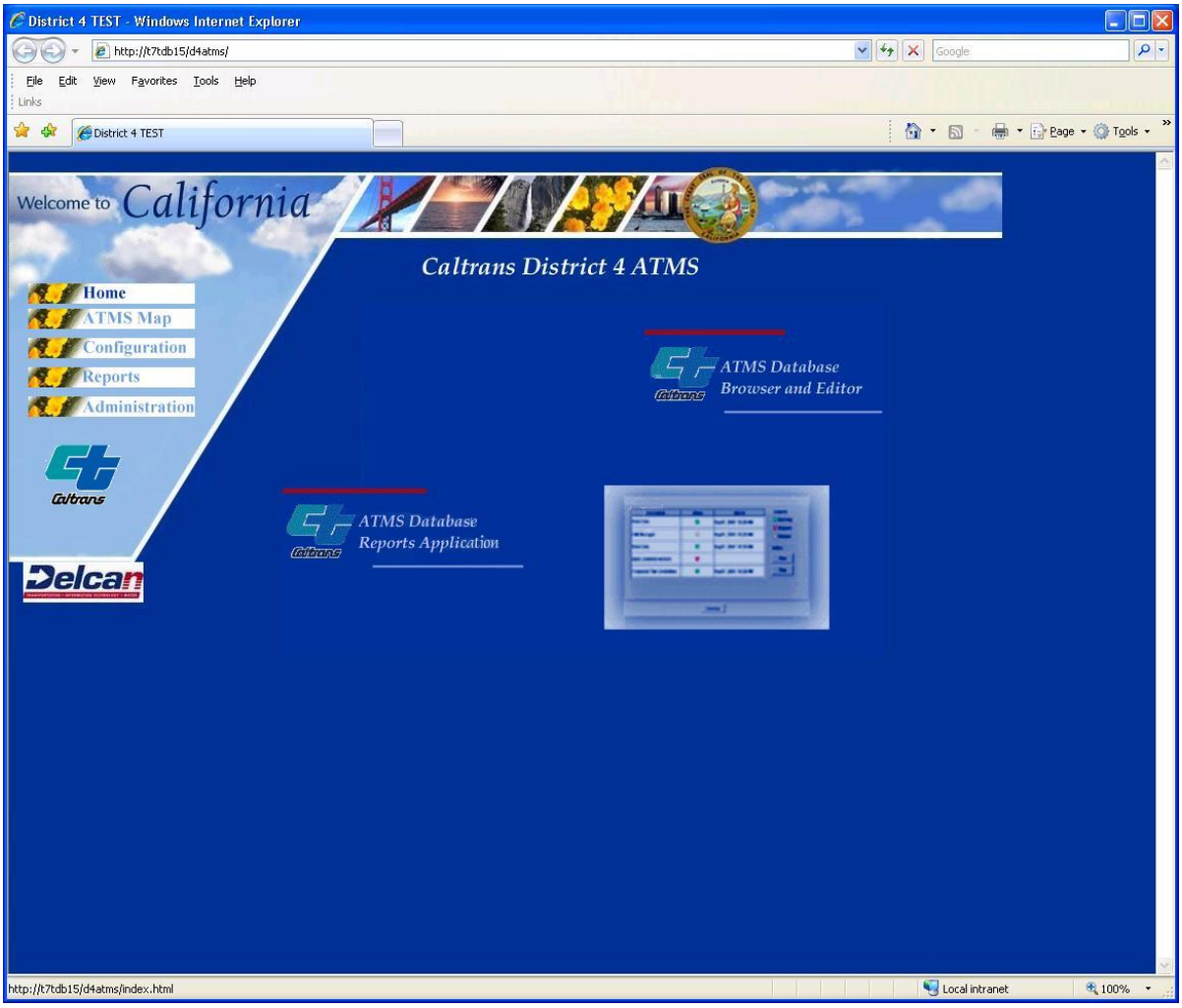


Figure 2-2: Typical Program Window

- Title Bar — Located at the upper edge of a window. It displays a title that describes the window contents. Dragging it moves the window to a different location.
- Minimize Button — The first of three buttons located at the upper right-hand corner of a window. Clicking on the button reduces the window to an icon at the bottom of the screen.
- Maximize/Restore Button — The second button located at the upper right-hand corner toggles the window between two states. Maximize enlarges the window to its largest possible size. The Restore Down state places the window in a mode where the operator can resize the dialog by dragging an edge or corner.
- Close Button — The last of the three buttons located at the upper right-hand corner of a window. Clicking on this button closes the window.
- Scroll Bar — Located on the bottom or right side of a window (when the screen content is too large to fit in the window). It allows the operator to scroll the contents of a window.
- Program Tray — Contains the Windows start button and the icons for any programs that have been minimized.

The following are general notes concerning this document:

- Function buttons — When a function button is described, it is assumed that the operator will select the function button before the actions associated with the function are performed. For example, there is a description of a map Zoom In function. The operator must select the Zoom In button prior to performing the actions described. Buttons will be indicated in **bold** throughout this document and pull-down menu selections will be shown in *italic*.

2.3 Workstation Login

The operator logs in to D4 ATMS using the typical Windows login screen. After the initial login, which requires a valid operator name and password, the operator must then log into the ATMS Map. The ATMS Map login is discussed in Section 2.4.

2.4 ATMS Map Login

Shown in Figure 2-3 is the ATMS Map Login dialog. The operator is required to enter a valid user name and password to access the ATMS Map. Upon a successful login, the main ATMS Map dialog will appear.

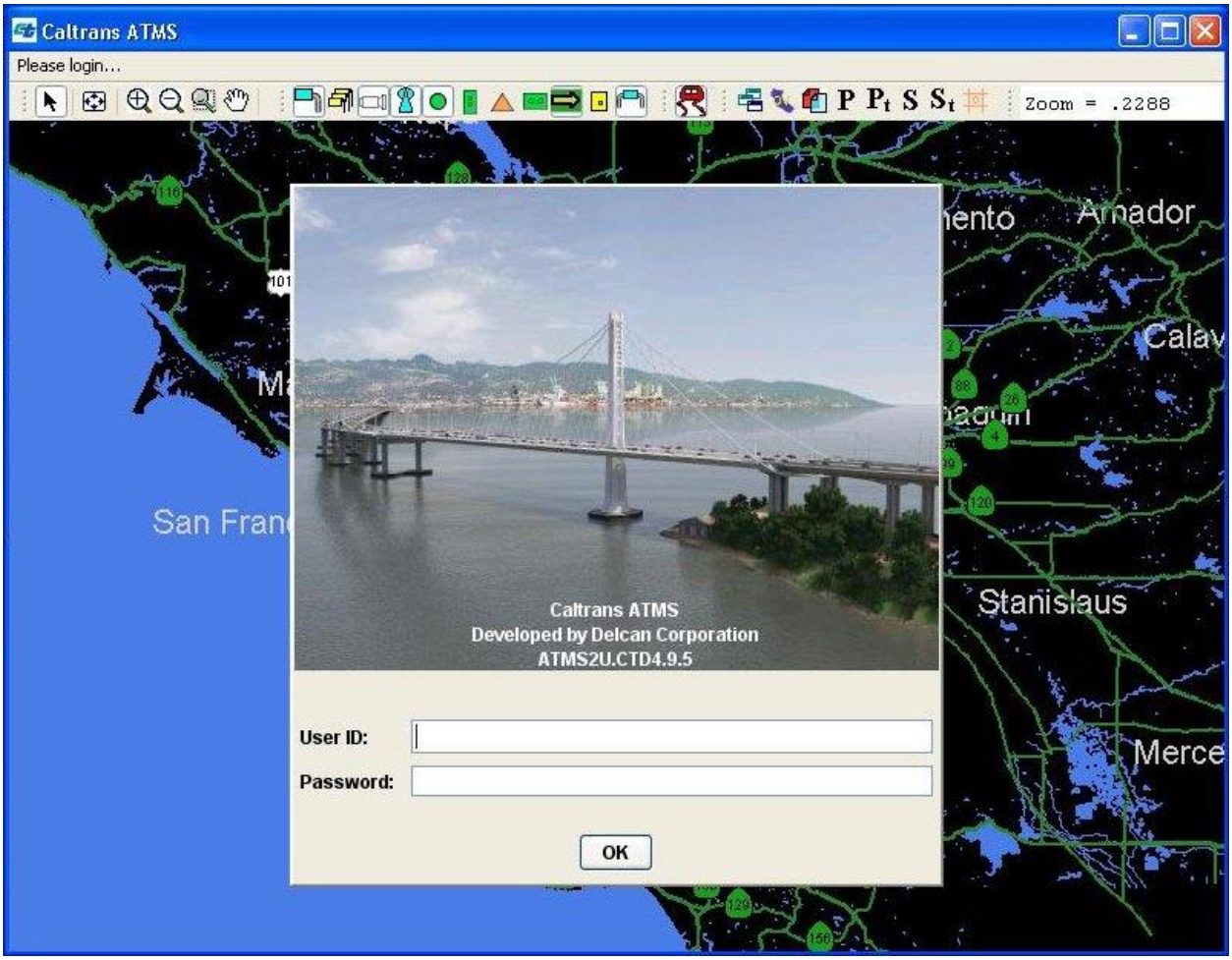


Figure 2-3: ATMS Map Login Dialog

3 ATMS MAP OVERVIEW

D4 ATMS is accessible by selecting the ATMS icon from the Front Panel. Figure 3-1 illustrates the main ATMS Map window. D4 ATMS can be broken up into the following key components, which are further detailed in this section and the following sections:

- Map Display Functions
- Field Device Control
- Event Management Functions
- Configuration Functions

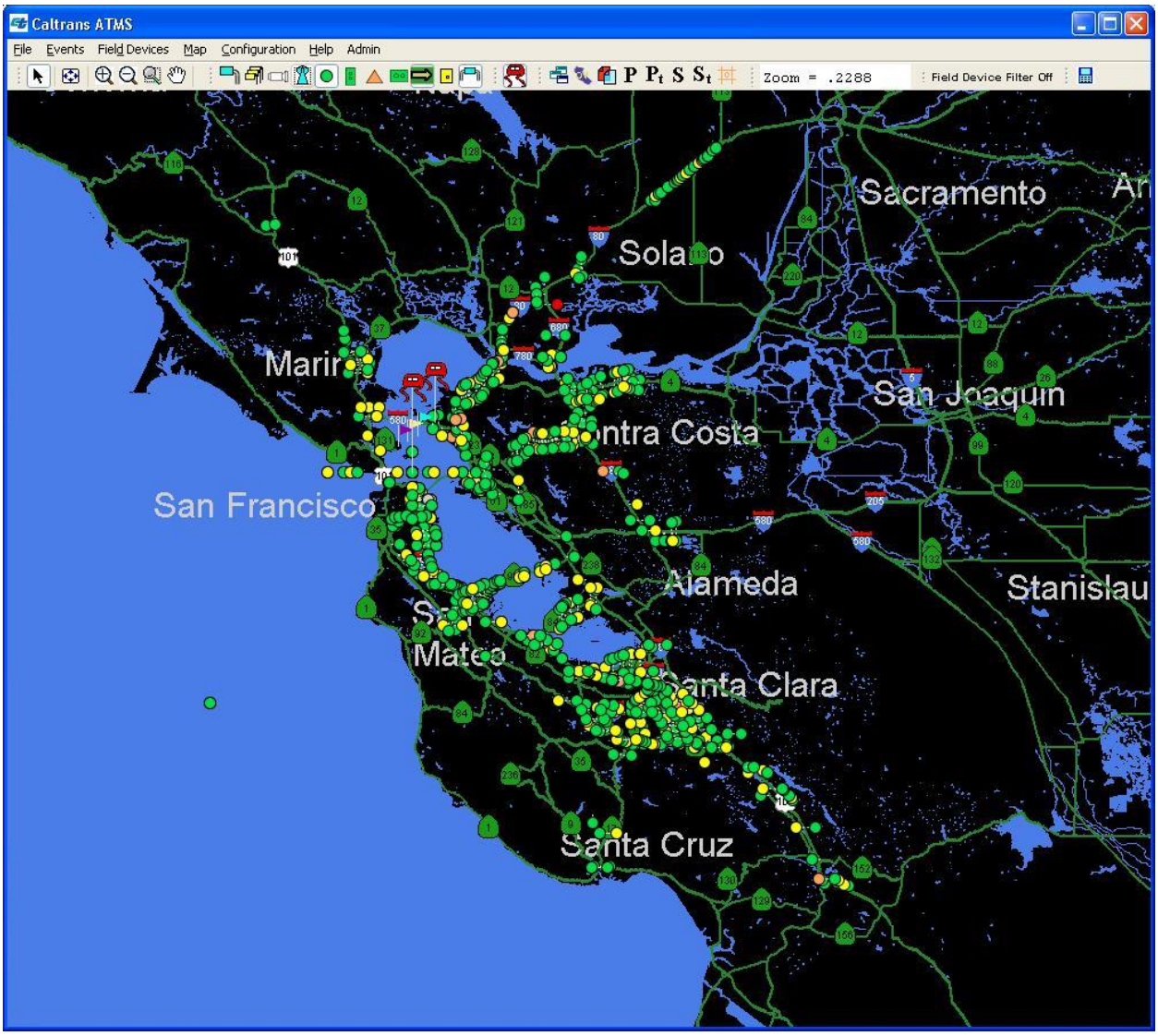


Figure 3-1: Main ATMS Map Window

3.1 Map Display

The ATMS map provides the main access to the capabilities of D4 ATMS. Map displays consist of static and dynamic objects. Static objects include the freeways, roadways, street names, landmarks and county and city boundaries, while dynamic objects are the incidents and field device elements. Dynamic data from the incident detection algorithm, event management, and the field device equipment are displayed as they are received.

Table 3-1 illustrates the graphics symbols and their state and color representation.

Table 3-1: Graphics Symbol Display

TYPE		SYMBOL		COLOR	STATE
Events	Incident		Car	Red	Unconfirmed: Flashing Confirmed: Solid
	Emergency Closure		Cone	Orange	
	Special Event		Flags	Purple/Pale Yellow/Cyan	
	CHP		Car	Blue	
Field Devices	CCTV		Camera	Good: Yellow Unavailable (Failed Equipment): Red Unavailable (Unknown Status): White Failed: Grey	
	CMS		Sign	Idle: Yellow Active: Cyan Active(TT): Orange Failed: Grey	
	Controller		Controller	Good: Yellow Relay Alarm: Red Failed: Grey	
	HAR EMS		2-legged Sign	Idle: Yellow Active: Cyan Failed: Grey	

TYPE		SYMBOL		COLOR	STATE
	HAR Transmitter		Transmitter	Idle: Yellow Active: Cyan Failed: Grey	
	RMS		Signal head	Metering: Yellow Not Metering: Green TMC Meter: Orange TMC Non-Meter: Blue Failed: Grey	
	MLMS		Horizontal Signal Head	Metering: Yellow Not Metering: Green TMC Meter: Orange TMC Non-Meter: Blue Failed: Grey	
	Tow Service		Tow Truck	Caltrans – In Service: Yellow FSP – In Service: Blue Caltrans – No GPS Data: Yellow Arrow/Grey FSP – No GPS Data: Blue/Grey	
	Ramp VDS		Triangle	Good: Orange Failed: Grey	
	VDS (Mainline)		Circle	Conditions Poor: Red Medium: Orange Light: Yellow Good: Green Failed: Grey	
			Stacked Rectangles		

The field device element states are defined as:

- Idle: The device is available for use by the system but is currently not active. The ramp meter is currently not metering or there is no message on the CMS.
- Active: The element is currently active in the field; the VDS is collecting data; the CMS is displaying a message; the HAR is broadcasting a message; the CCTV camera is transmitting a live image to the TMC; the RMS is metering; and the MLMS is metering.
- Failed: An equipment or communication failure has been detected.

Table 3-2 summarizes the default zoom level for each icon. This refers to the zoom levels at which the icons are displayed on the map. When in default zoom level mode, an icon with display settings from 0.01 to 1.0 will appear on the map from the zoom level where the operator zooms in as far as possible (0.01) to the top view where an operator has zoomed out as far as possible (1.0). Display settings can be manually overridden as discussed in Section 4.2 and Section 5.2, but the default zoom levels cannot be changed from the map display or its associated pull-down options.

Table 3-2: Default Zoom Level

Icon Type	Default Zoom Level	
	From	**To**
Incident	0.01	1.0
Emergency Closure	0.01	1.0
Special Event	0.01	1.0
CHP	0.01	1.0
CCTV	0.01	0.5
CMS	0.01	0.6
Controller	0.01	0.6
HAR EMS	0.01	0.6
HAR Transmitter	0.01	0.6
MLMS	0.01	0.2
RMS	0.01	0.2
Tow Service	0.01	0.6
VDS Station Display	0.10	1.0
Lane Display	0.01	0.10

3.1.1 General Map Information

There are several functions that are similar to the majority of the icons. These functions are described in this section.

When an operator wishes to view the textual display of a device or to control a device, clicking on the icon from the map will open the corresponding the textual window. When a device's textual window is opened, a cyan circle appears around the icon.

Icons are shown on the map with leash or lead lines. These lines identify the location of the icon to the freeway. In the case of the VDS, RMS, MLMS, and Ramp VDS, the leash/lead lines closest to the freeway indicates lane 1.

3.1.2 CCTV Icons

Each CCTV camera is indicated by the "camera" symbol. Clicking on a CCTV icon allows the operator to view a live video image of freeway traffic conditions from that camera (see Section 4.4).

3.1.3 CMS Icons

Each CMS is indicated by the "sign" symbol. Its appearance depends on whether the operator chooses the "CMS Detail" or "CMS Normal" option in the Icons Pull-down menu.

When the display is in "CMS Normal" mode, each CMS icons is the same size. When the operator specifies the "CMS Detail" mode, the icon for each CMS that is currently displaying a message is enlarged in order to display those messages on the graphical display.

The operator can also view a CMS message by clicking on a CMS icon (see Section 4.6..

3.1.4 Controller Icons

Each controller is indicated by the "rectangle" icon. As the icon is a tooltip display, mousing over the icon will indicate whether the cabinet has an active cabinet relay trip alarm.

3.1.5 Event Icons

Event locations are represented by the four different icons: incidents, emergency closures, special events, or CHP. Unconfirmed events are illustrated by a flashing icon. Once the event has been confirmed, the flashing icon becomes a steady symbol. Clicking on an event icon provides the Event Management screen (see Section 5.)

3.1.6 MLMS Icons

Each MLMS is indicated by the horizontal signal head icon. Selecting an MLMS icon allows the operator to control the mainline meter.

3.1.7 RMS Icons

Each RMS is indicated by the vertical signal head icon. Selecting an RMS icon allows the operator to control the ramp meter and/or modify its parameters.

3.1.8 Mainline VDS Icons

Each mainline VDS is represented by either a circle or a stacked rectangle bar symbol.

The operator can choose which traffic parameter –volume, occupancy or average speed – is used for the icon color code via the Legend dialog. Please see Section 3.2.4.3.

Table 3-3 summarizes typical threshold values in relation to the color display. These threshold values are settable by a System Administrator. The operator can view actual threshold values through the ATMS Browser/Editor features (Section 7).

Table 3-3: Typical Mainline VDS Parameter Thresholds

COLOR	SPEED RANGE (miles/hour)	OCCUPANCY (%)	VOLUME (veh/30 sec/lane)
RED	0 to 19	30.0 to 99.9	18 to < 1000
ORANGE	20 to 34	N/A	N/A
YELLOW	35 to 49	15.0 to 29.9	9 to 17
GREEN	50 to <70	0 to 14.9	0 to 8

3.1.8.1 Zoomed Out

At zoom levels between 0.10 to 1.0, the VDS is shown using the circle symbol. The color of the icon represents the state of traffic at that station, averaged over mainline lanes with working detectors.

3.1.8.2 Zoomed In

At zoom levels between 0.01 to 0.10, the VDS is shown using stacked rectangle bars, with one bar per lane. The color of each bar represents the state of traffic for that lane.

3.1.9 Ramp VDS Icons

Each Ramp VDS is represented by a triangle icon. The color of these icons corresponds to the current status of the location, i.e. good data or failed.

3.2 Pull-Down Menus

From the ATMS main window, which includes the map, the operator also views a number of menu selections. These menu selections allow control of the map display and provide access to various other functions. The selections, as shown in Figure 3-2, consist of *File, Events, Field Devices, Map, Configuration, Help* and *Admin*, each of which has an associated pull-down menu. Each of the menu selections and their corresponding pull-down menus are discussed in the following sections.

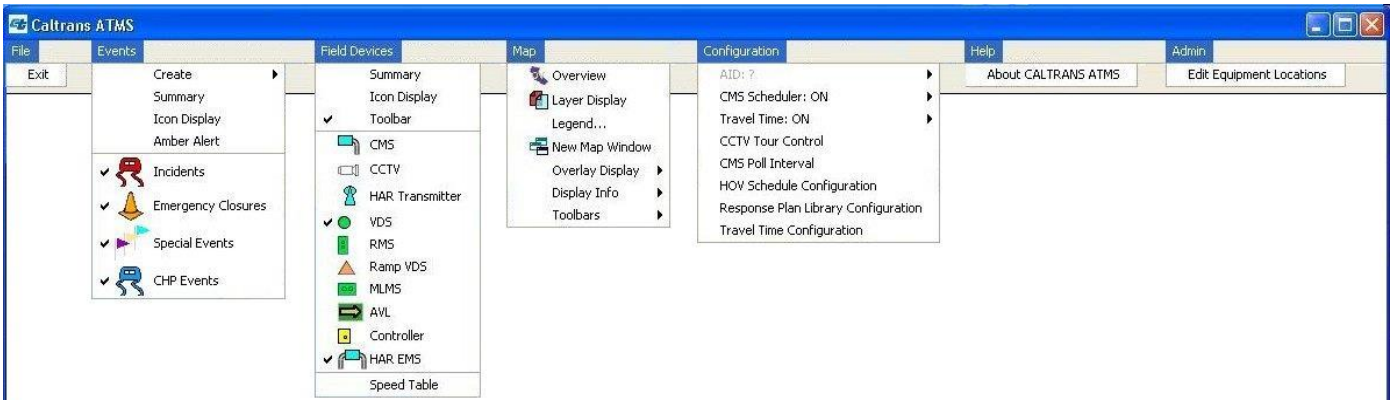


Figure 3-2: Pull-down Menus

3.2.1 File Pull-Down Menu

File allows the operator to:

- Exit — Exit D4 ATMS

3.2.2 Events Pull-Down Menu

Events allows the operator to:

- Create — Create a new event
- Summary — Display the summary listing of all events
- Icon Display — Show the event types and their zoom display level
- Amber Alert — Create an Amber Alert
- Incidents — Turn on or turn off the visibility of incidents
- Emergency Closures — Turn on or turn off the visibility of emergency closures
- Special Events — Turn on or turn off the visibility of special events
- CHP Events — Turn on or turn off the visibility of CHP events

These features are discussed more thoroughly in Section 5.

3.2.3 Field Devices Pull-Down Menu

Field Devices allows the operator to:

- Summary — Display the summary listing of all the various field device elements
- Icon Display — Show the field device types and their zoom display level
- Toolbar — Activate the field device toolbar
- CMS — Turn on or turn off the display of all CMS
- CCTV — Turn on or turn off the display of all CCTV cameras
- HAR Transmitter — Turn on or turn off the display of all HAR Transmitters
- VDS — Turn on or turn off the display of all Mainline VDS
- RMS — Turn on or turn off the display of all RMS
- Ramp VDS — Turn on or turn off the display of all Ramp VDS
- MLMS — Turn on or turn off the display of all MLMS
- Tow Service — Turn on or turn off the display of all Tow Service vehicles
- Controller — Turn on or turn off the display of all Controllers
- HAR EMS — Turn on or turn off the display of all HAR EMS

- Speed Table — Display the Speed Table

These features are discussed in Section 4.

3.2.4 Map Layers Pull-Down Menu

Map allows the operator to access the following capabilities:

- Overview — Open a small version of the entire map in a secondary window
- Layer Display — Show the static map layers and activate them
- Legend — Display the legend on the map
- New Map Window — Open a new window over the primary map window
- Overlay Display — Show various overlay elements
- Display Info — Show the various display information
- Toolbars — Turn on or turn off the display of various toolbars

These features are discussed in the following sections.

3.2.4.1 Map Overview

Map Overview opens a small map of the entire district on the secondary monitor that highlights the area displayed on the primary map (See Figure 3-3). The operator may modify the primary map display area by moving or reshaping the highlighted box from this overview map. For example, dragging the highlighted box moves the primary map display area to a new location.

Figure 3-3: Map Overview

3.2.4.2 Layer Display

The base map includes the following static layers:

- Freeway/Highway Shield
- Map Grids
- Minor Streets
- Minor Street Text

- Freeway/Highway/Ramps
- Freeway/Highway/Ramp Text
- Primary Streets
- Primary Street Text
- Secondary Streets
- Secondary Street Text
- County Label
- Creeks/Streams/Rivers
- Pacific Ocean
- Parks, Military Bases, National Forests, etc
- City Area
- County Boundaries

Upon login to D4 ATMS, the visibility of these layers defaults to one of two settings: default or off. Figure 3-4 shows the map layer display window. The operator can adjust the visibility to default, off, or on for each layer or all layers at one time. This visibility setting affects the operator workstation and the primary map only. The layer display window also shows the default zoom levels, which are configurable at the system level only and cannot be altered through the layer display function.

The default zoom levels were configured to provide a de-cluttering option for any of these map details. This is used to help prevent a cluttered map display caused by showing too many details. The default settings for each map detail are such that additional details are displayed to the operator as the map is zoomed in.

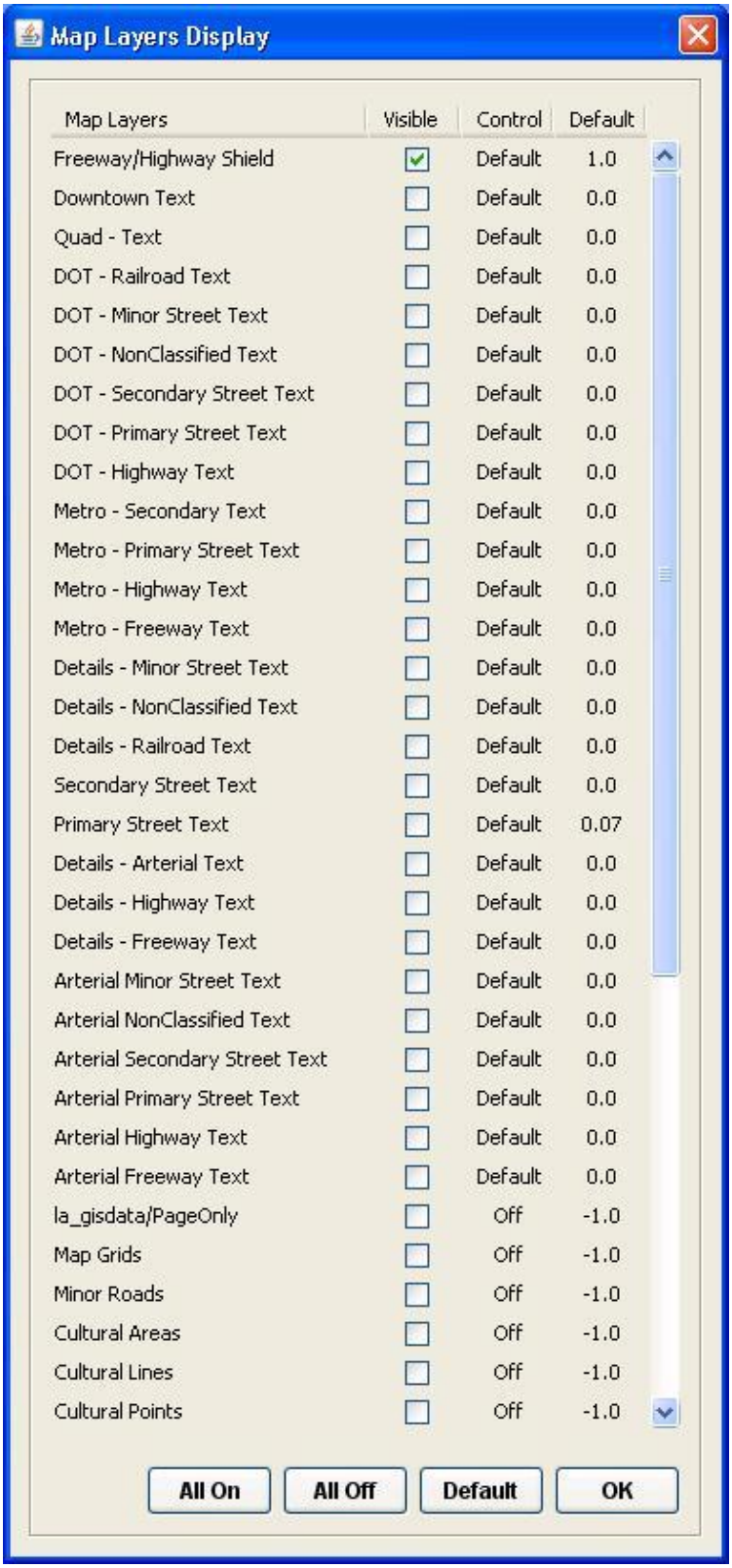


Figure 3-4: Map Layer Display Window

3.2.4.3 Map Legend

Through the map legend function, the operator can view the various field device icons and their color ranges. These thresholds can be modified at a system level from the Browser/Editor function (Section 7).

The operator has the ability to select which mainline VDS traffic parameter to use on the map display. This does not change the legend or the thresholds, it merely changes the data view. By selecting from the drop-down box, the operator can change the data from speed, volume, or occupancy. Figure 3-5 illustrates the legend window.

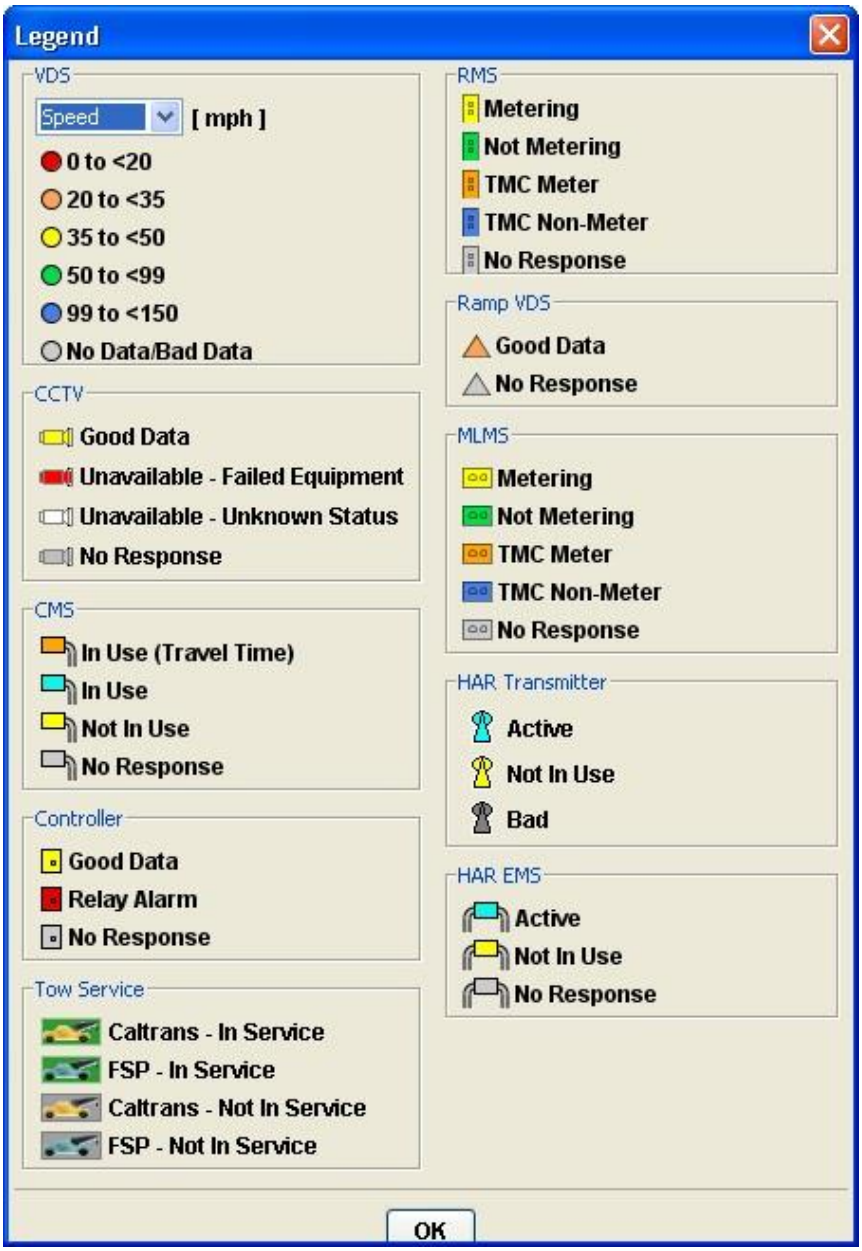


Figure 3-5: Map Legend Window

3.2.4.4 New Map Window

The new map window, Figure 3-6, function allows the operator to display a new window over the primary map window. Unlike the primary map window, however, the layer visibility is governed by the default settings and there is no map manipulation in the new window.

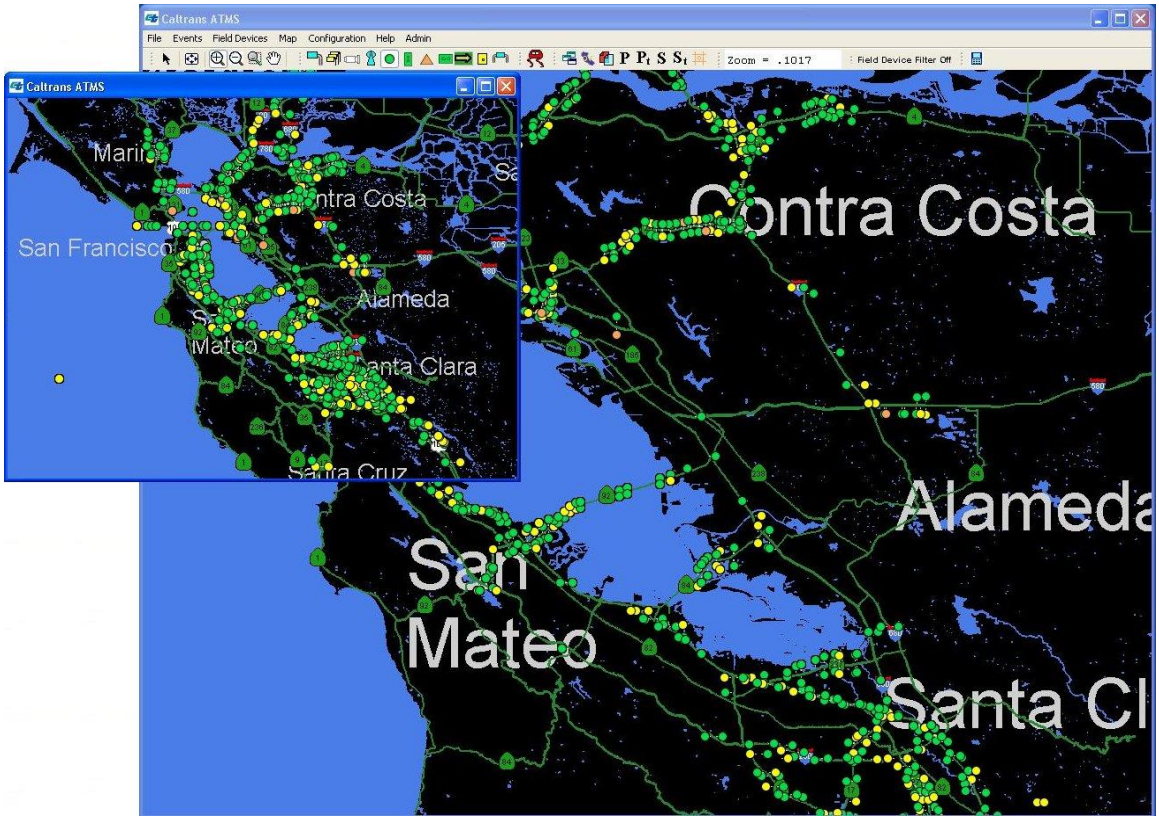


Figure 3-6: New Map Window

3.2.4.5 Map Overlay Display

The map overlay display, shown in Figure 3-7, allows the operator to turn on or off overlay elements on the map. These elements include the compass and map logos.

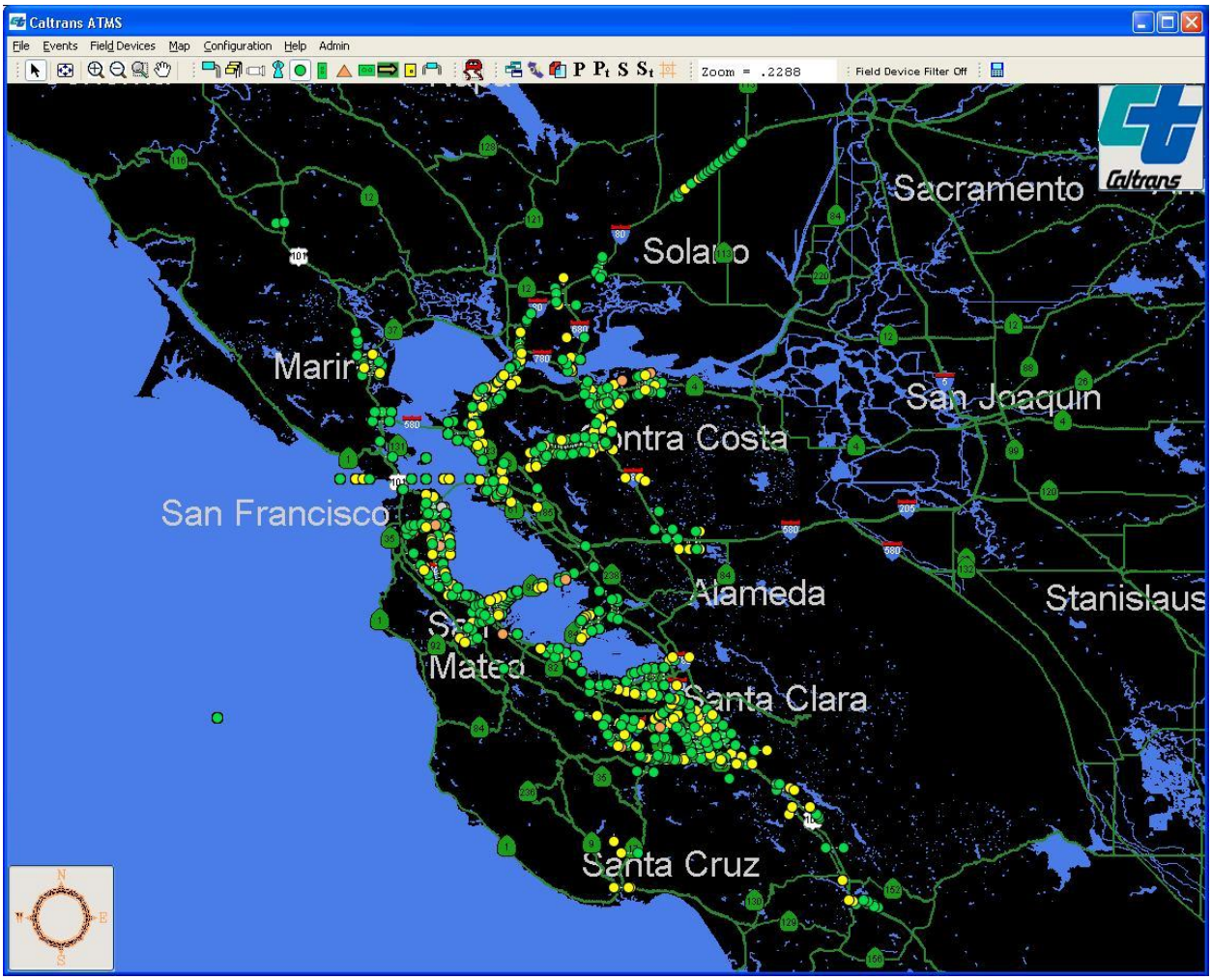


Figure 3-7: Map Overlay Display

3.2.4.6 Map Display Info

For the display info function, the operator can change the information displayed in the status bar between the map location (x,y coordinates), the scale (1”=x miles) or the zoom levels (1 to 0.01). The default setting is the zoom level of the map.

3.2.4.7 Toolbars

The Toolbars function allows the operator to toggle the display on or off of the toolbars. There are five toolbars: Control, Zoom, Filter, Map, and Event. By default, all but the Filter toolbar are active.

3.2.5 Configuration Pull-Down Menu

Configuration provides the means by which several functions can be enabled or disabled. These functions include:

- Automatic Incident Detection (AID) — Enable or disable the AID function. Automatic Incident Detection allows the system to be alerted to a possible incident occurrence by means of VDS information, and to automatically indicate it on the map display. AID is discussed in Section 5.
- CMS Scheduler — Globally enable or disable the CMS scheduler functions. This is discussed further in Section 4.6.3.
- Travel Time — Globally enable or disable the Travel Time function. This is discussed in Section 4.6.7.
- CCTV Tour Control — Open the CCTV Tour GUI allowing an operator to select live images to specific media tours.
- CMS Poll Interval — Open the CMS Poll Interval GUI allowing an operator to modify the polling interval for the CMS devices.
- HOV Schedule — Opens the HOV Schedule Group GUI for review.
- Response Plan Library Configuration — Open the Special Event Response Plan Library window allowing an operator to create, modify, or delete response plans.
- Travel Time Configuration — Opens the Travel Time Configuration GUI allowing the operator to modify the threshold for travel time message display, as well as enable/disable signs for travel time messages. This is discussed in Section 4.6.7.

When the operator enables or disables any of these features, it affects the entire system and all workstations.

3.3 Toolbar

The Toolbar, located along the top of the map display, provides map manipulation tools, includes shortcut buttons, and indicates the modes that D4 ATMS is set. The Toolbar is, in actuality, several toolbars. As indicated in Figure 3-8, Figure 3-9, and Figure 3-10, the following functions are available through these Toolbars:

1. Object Select/Default Mode — Return cursor back to default (Object Selection). Another way to return to object select mode is by selecting the right mouse button.
2. Full Extent View — Return map to full view zoom level (= 1.0).

3. Continuous Zoom In	Zoom map in on each left mouse button click. Hold the left mouse button down for continuous zooming. Exit by using right mouse button or by clicking on the object select icon.
4. Continuous Zoom Out	Zoom map out on each left mouse button click. Hold left mouse button down for continuous zooming. Exit by using right mouse button or by clicking on the object select icon.
5. Zoom Rectangle	Define 2 corners of box to zoom into. To define the zoom area: • Click once on the upper left-hand corner of the area • Release the left mouse button • Click once on the lower right-hand corner of the area • Exit by using right mouse button or by clicking on the object select icon.
6. Pan	Grab and drag the map view in any direction. Click and hold on a location, drag the left mouse to move map display, then release the left mouse button. Exit by using right mouse button or by clicking on the object select icon.
7. CMS	Toggle on or off the display of all CMS
8. Multiple CMS	Open a blank Multiple CMS window
9. CCTV	Toggle on or off the display of all CCTV cameras
10.HAR Transmitter	Toggle on or off the display of all HAR transmitters
11.VDS	Toggle on or off the display of all Mainline VDS
12.RMS	Toggle on or off the display of all RMS
13.Ramp VDS	Toggle on or off the display of all Ramp VDS
14.MLMS	Toggle on or off the display of all MLMS
15.Tow Service	Toggle on or off the display of all Tow Service vehicles
16.Controller	Toggle on or off the display of all Controllers
17.HAR EMS	Toggle on or off the display of all HAR EMS
18.Events	Toggle on or off the display of all Events

19.New Map Window	Open a map view in a new window. To define the new map area: • Click once on the upper left-hand corner of the area • Release the left mouse button • Click once on the lower right-hand corner of the area • Exit by using right mouse button or by clicking on the object select icon.
20.Overview Map	Provide an overview map defining the area shown on the primary map area (See Section 3.2.4.1).
21.Map Layers Window	Open Map Layer Visibility Window (See Section 3.2.4.2).
22.Primary Street	Toggle on or off the display of all Primary Streets
23.Primary Street Text	Toggle on or off the display of all Primary Street text
24.Secondary Street	Toggle on or off the display of all Secondary Streets
25.Secondary Street Text	Toggle on or off the display of all Secondary Street text
26.Thomas Brothers Grid	Toggle on or off the display of the Thomas Brothers Map grid
27.Location/Zoom	Display one of the following: location (xy coordinates) or zoom level (from 0.01 to 1.0). Default setting is zoom level.
28.Field Device Filter	Indicate if a field device filter is ON or OFF.
29.Duty Page	Open the Duty Page control/status window

Figure 3-8: Map Navigation Toolbar

Figure 3-9: Field Device Toolbar

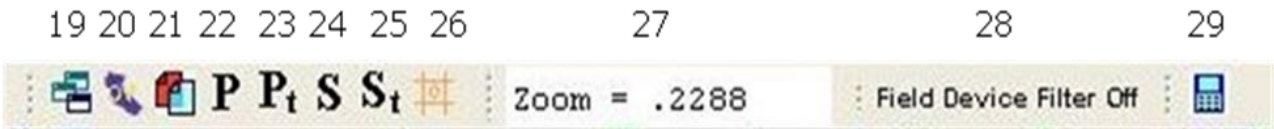


Figure 3-10: Map Layers Toolbar

4 FIELD DEVICE CONTROL

Control of the field devices can be accessed either from the Field Device pull-down menu or from the map display itself. From the pull-down menu, the operator can access the following options:

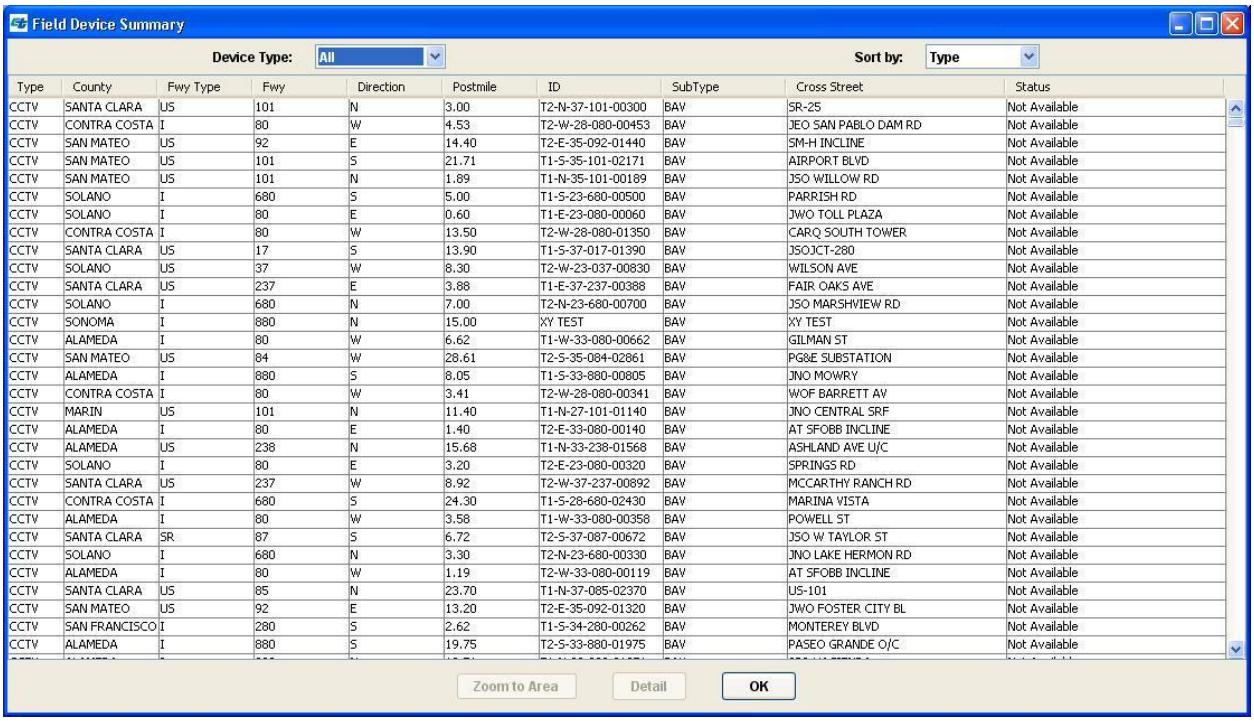
- Summary
- Icon display
- Toolbar
- Speed Table

Alternatively, the data/control window may be directly accessed from the map display by clicking on the field device icon. The data/control window for that field device will be displayed on the monitor.

4.1 Summary

In selecting the Summary option from the Field Devices menu, the operator chooses a type of field device (CCTV, CMS, Controller, HAR, HAR EMS, MLMS, RMS, Ramp VDS, and Mainline VDS) and the order by which the data is to be displayed as shown in Figure 4-1. Once these have been specified, the data/control window for that field device is displayed.

The data is able to be sorted via the individual column headings or by using the "Sort By" selection. Each column is listed in the "Sort By" selection.



Type	County	Fwy Type	Fwy	Direction	Postmile	ID	SubType	Cross Street	Status
CCTV	SANTA CLARA	US	101	N	3.00	T2-N-37-101-00300	BAV	SR-25	Not Available
CCTV	CONTRA COSTA	I	80	W	4.53	T2-W-28-080-00453	BAV	JEO SAN PABLO DAM RD	Not Available
CCTV	SAN MATEO	US	92	E	14.40	T2-E-35-092-01440	BAV	SM-H INCLINE	Not Available
CCTV	SAN MATEO	US	101	S	21.71	T1-S-35-101-02171	BAV	AIRPORT BLVD	Not Available
CCTV	SAN MATEO	US	101	N	1.89	T1-N-35-101-00189	BAV	JSO WILLOW RD	Not Available
CCTV	SOLANO	I	680	S	5.00	T1-S-23-680-00500	BAV	PARRISH RD	Not Available
CCTV	SOLANO	I	80	E	0.60	T1-E-23-080-00060	BAV	JWO TOLL PLAZA	Not Available
CCTV	CONTRA COSTA	I	80	W	13.50	T2-W-28-080-01350	BAV	CARQ SOUTH TOWER	Not Available
CCTV	SANTA CLARA	US	17	S	13.90	T1-S-37-017-01390	BAV	JSOJCT-280	Not Available
CCTV	SOLANO	US	37	W	8.30	T2-W-23-037-00830	BAV	WILSON AVE	Not Available
CCTV	SANTA CLARA	US	237	E	3.88	T1-E-37-237-00388	BAV	FAIR OAKS AVE	Not Available
CCTV	SOLANO	I	680	N	7.00	T2-N-23-680-00700	BAV	JSO MARSHVIEW RD	Not Available
CCTV	SONOMA	I	880	N	15.00	XY TEST	BAV	XY TEST	Not Available
CCTV	ALAMEDA	I	80	W	6.62	T1-W-33-080-00662	BAV	GILMAN ST	Not Available
CCTV	SAN MATEO	US	84	W	28.61	T2-S-35-084-02861	BAV	PG&E SUBSTATION	Not Available
CCTV	ALAMEDA	I	880	S	8.05	T1-S-33-880-00805	BAV	JNO MOWRY	Not Available
CCTV	CONTRA COSTA	I	80	W	3.41	T2-W-28-080-00341	BAV	WOF BARRETT AV	Not Available
CCTV	MARIN	US	101	N	11.40	T1-N-27-101-01140	BAV	JNO CENTRAL SRF	Not Available
CCTV	ALAMEDA	I	80	E	1.40	T2-E-33-080-00140	BAV	AT SFOBB INCLINE	Not Available
CCTV	ALAMEDA	US	238	N	15.68	T1-N-33-238-01568	BAV	ASHLAND AVE U/C	Not Available
CCTV	SOLANO	I	80	E	3.20	T2-E-23-080-00320	BAV	SPRINGS RD	Not Available
CCTV	SANTA CLARA	US	237	W	8.92	T2-W-37-237-00892	BAV	MCCARTHY RANCH RD	Not Available
CCTV	CONTRA COSTA	I	680	S	24.30	T1-S-28-680-02430	BAV	MARINA VISTA	Not Available
CCTV	ALAMEDA	I	80	W	3.58	T1-W-33-080-00358	BAV	POWELL ST	Not Available
CCTV	SANTA CLARA	SR	87	S	6.72	T2-S-37-087-00672	BAV	JSO W TAYLOR ST	Not Available
CCTV	SOLANO	I	680	N	3.30	T2-N-23-680-00330	BAV	JNO LAKE HERMON RD	Not Available
CCTV	ALAMEDA	I	80	W	1.19	T2-W-33-080-00119	BAV	AT SFOBB INCLINE	Not Available
CCTV	SANTA CLARA	US	85	N	23.70	T1-N-37-085-02370	BAV	US-101	Not Available
CCTV	SAN MATEO	US	92	E	13.20	T2-E-35-092-01320	BAV	JWO FOSTER CITY BL	Not Available
CCTV	SAN FRANCISCO	I	280	S	2.62	T1-S-34-280-00262	BAV	MONTEREY BLVD	Not Available
CCTV	ALAMEDA	I	880	S	19.75	T2-S-33-880-01975	BAV	PASEO GRANDE O/C	Not Available

Figure 4-1: Field Device Summary Window

Once a field device and location are selected from the summary listing the data/control window for that device is displayed. The VDS Data/Control window is shown as an example, in the following Figure 4-2. The operator is also able to select the **Zoom to Area** button and the map will refresh to have the selected device in the center of the map display.

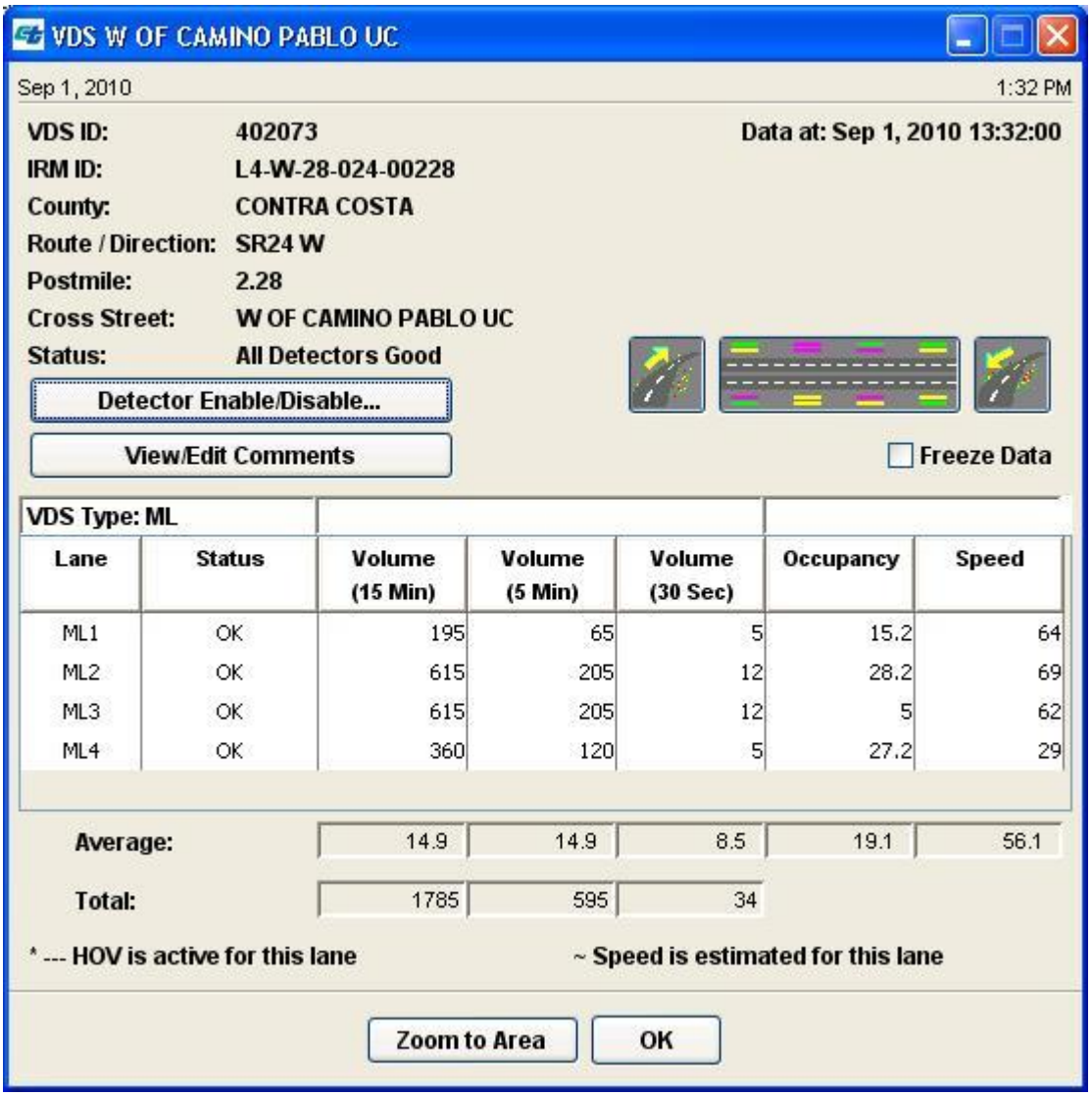


Figure 4-2: Field Device Data/Control Window

4.2 Icon Display

The Icon Display option under the Field Device pull-down menu allows the operator to control the display of objects on the map. This is shown in Figure 4-3. This window displays the device, visibility, default zoom level, display mode if applicable, and filter. The visibility portion of the window allows the operator to turn on/off the icons, or set to default mode. The display mode portion of the window allows the operator to change details on how icons are displayed for VDS and CMS icons. Similar to the map layer display window the default zoom levels, which are configurable at the system level only and cannot be altered through this display function.

The following selections are available:

- Devices — CMS, CCTV, HAR Transmitter, Mainline VDS, RMS, Ramp VDS, MLMS, Tow Service, Controller, HAR EMS
- Visibility — Default, On, Off
- Control — Modify visibility among default, on, and off
- Default Zoom Level — Display the preset default zoom level for all icons
- Display Mode — Modify the appearance of icons on the map. For CMS, the selection is "Normal" or "Detail". For Mainline VDS, the selection is "Speed", "Volume", or "Occupancy"
- Filter — Allow the operator to filter the display of icons on the map for the different devices. Typically, the filters limit the display based on the current status of the field device
- **All On** — Turn on the display of all device icons
- **All Off** — Turn off the display of all device icons
- **Default** — Set the display of all device icons to their specific default display level
- **OK** — Close the window

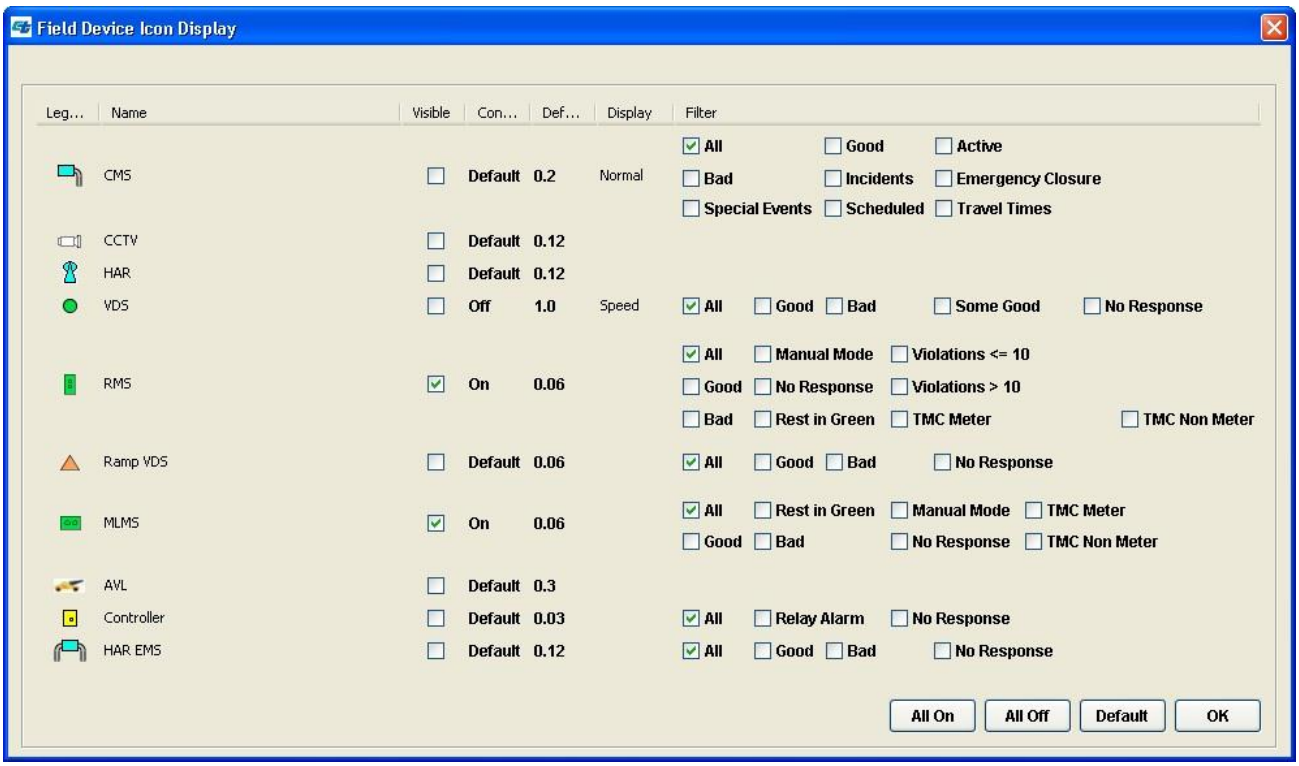


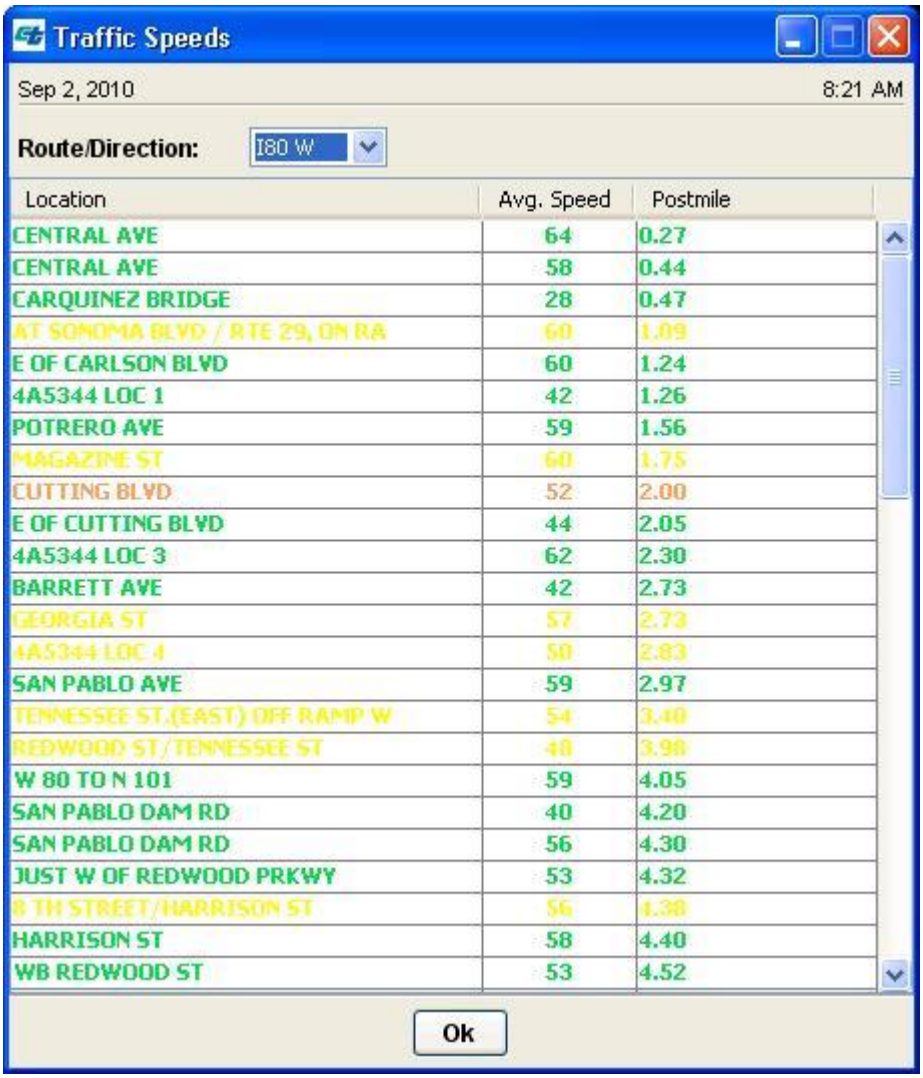
Figure 4-3: Icon Display Window

4.3 Toolbar

The Toolbar option from the Field Device menu allows the operator to switch on/off the display of field device icons on the map.

4.4 Speed Table

The Speed table option allows the operator to select a route and direction of travel and view the real-time speeds at the various Mainline VDS, sorted from upstream (top) to downstream (bottom). This display is in a text format and the names of the VDS locations are shown in the corresponding speed colors, i.e. red, yellow, orange, green, or grey.



Location	Avg. Speed	Postmile
CENTRAL AVE	64	0.27
CENTRAL AVE	58	0.44
CARQUINEZ BRIDGE	28	0.47
AT SONOMA BLVD / RTE 29, ON RA	60	1.09
E OF CARLSON BLVD	60	1.24
4A5344 LOC 1	42	1.26
POTRERO AVE	59	1.56
MAGAZINE ST	60	1.75
CUTTING BLVD	52	2.00
E OF CUTTING BLVD	44	2.05
4A5344 LOC 3	62	2.30
BARRETT AVE	42	2.73
GEORGIA ST	57	2.73
4A5344 LOC 4	50	2.83
SAN PABLO AVE	59	2.97
TENNESSEE ST.(EAST) OFF RAMP W	54	3.40
REDWOOD ST/TENNESSEE ST	48	3.98
W 80 TO N 101	59	4.05
SAN PABLO DAM RD	40	4.20
SAN PABLO DAM RD	56	4.30
JUST W OF REDWOOD PRKWY	53	4.32
8 TH STREET/HARRISON ST	56	4.38
HARRISON ST	58	4.40
WB REDWOOD ST	53	4.52

Figure 4-4: Speed Table Window

4.5 CCTV Control

The CCTV Control Window allows the operator to control a selected camera, monitor displays, and view the video image. This allows the operator to have two (2) CCTV

Control windows active simultaneously. A CCTV Control window is illustrated in Figure 4-5.

The following features appear in a CCTV Control Window:

- "Time 1" — Displays current date/time
- Header — Displays:
  - Camera ID
  - IRM ID
  - County
  - Location (Route/Direction)
  - Postmile
  - Cross Street Information
- Camera Type — Camera type, i.e. BAVU, Javelin, COHU
- Camera Status
- Controlling Operator — Identification of the operator controlling the camera
- **Auto Iris** — Allow the operator to set the iris function to auto or manual mode
- **Open Iris** — Sharpen the background image
- **Close Iris** — Sharpen the foreground image
- **Zoom: In** — Allow the camera image to be made larger in the field of view
- **Zoom: Out** — Allow the camera image to be made smaller in the field of view
- **Auto Focus** — Allow the operator to set the iris function to auto or manual mode
- **Focus Near** — Sharpen the background camera image
- **Focus Far** — Sharpen the foreground camera image
- **Direction Buttons** — Allow the operator to pan and tilt the camera
- **Previous** — Display the previous camera in the list (doesn't matter which side of the freeway)
- **Next** — Display the next camera in the list (doesn't matter which side of the freeway)
- **Video Wall** — Allow the operator to display the current camera image to a specific monitor on the video wall display
- **Zoom to Area** — Shift to that specific device on the map
- **OK** — Close the window

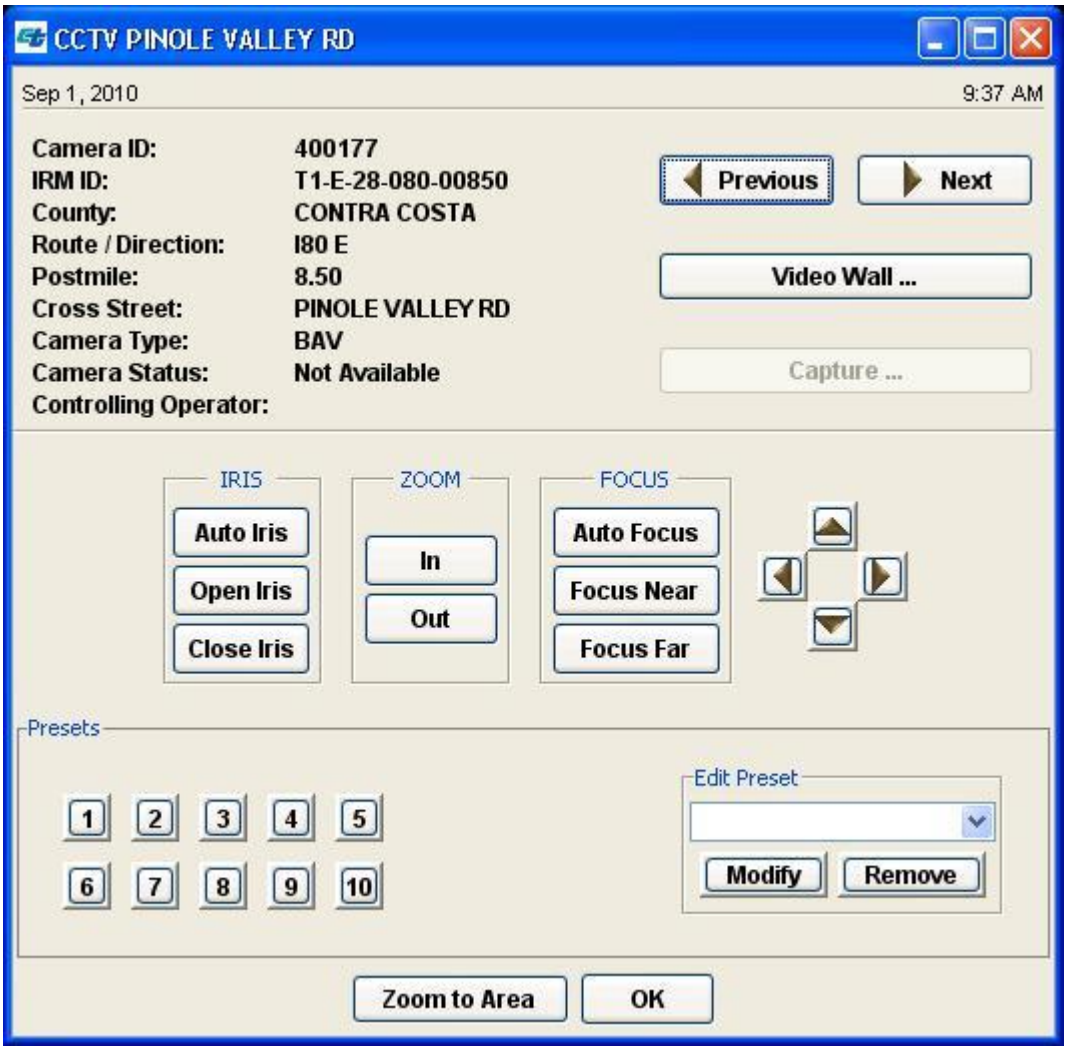


Figure 4-5: CCTV Control Window

4.5.1 CCTV Preset

There are ten (10) CCTV presets available for each camera. The operator, with preset appropriate privileges is able to modify or delete a preset. To modify a preset, the operator positions the camera to the desired location, selects the preset and clicks the **Modify** button. The operator is then able to enter a title or description for the preset. This is shown in Figure 4-6.

Figure 4-6: CCTV Preset Entry Window

4.5.2 Video Wall Display

The video wall display accesses monitors that display the CCTV video images. The operator can specify specific monitors on which to display the current image that is displayed on the operator workstation. The figure below, Figure 4-7, illustrates the D4 TMC Video Wall Display.

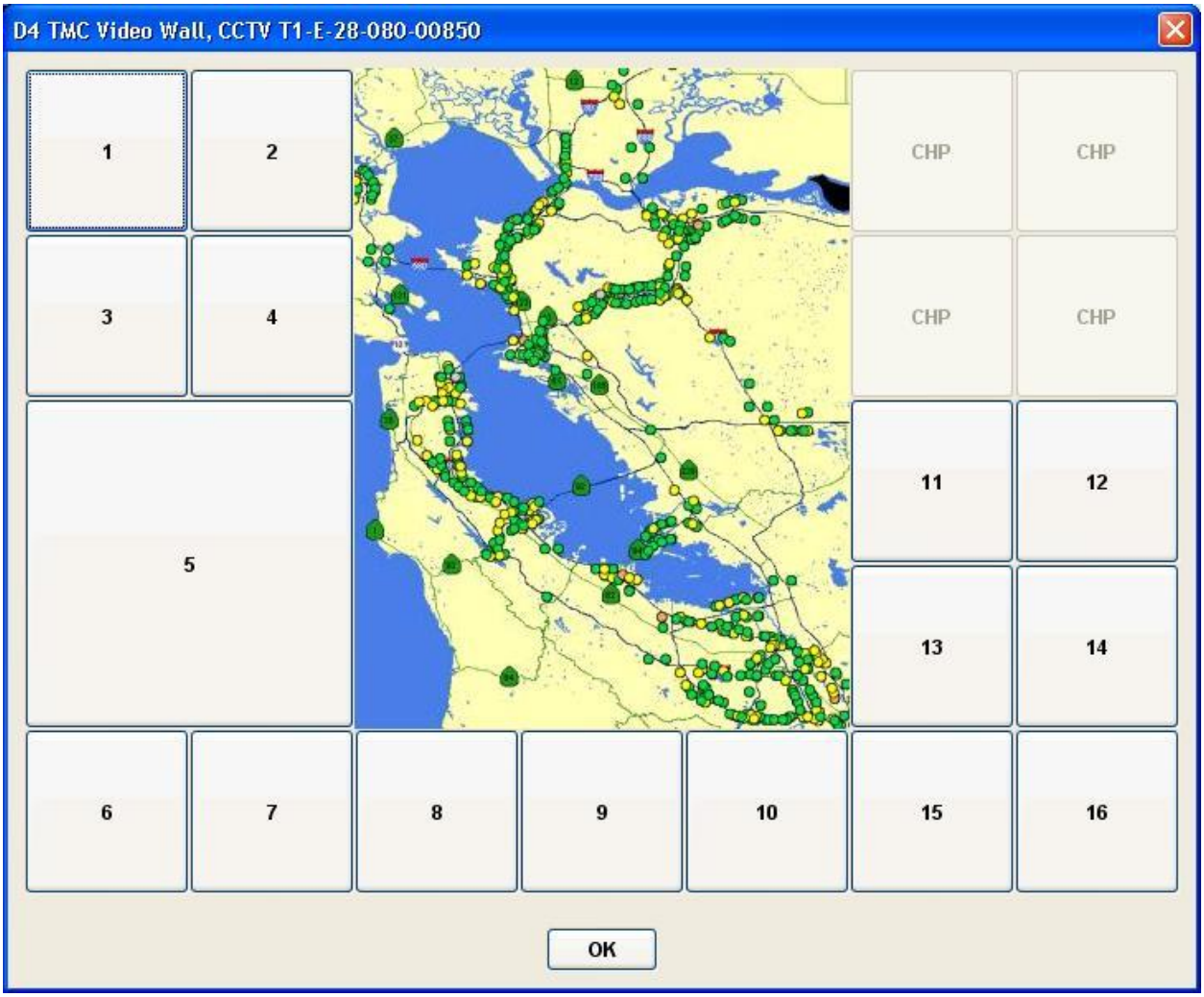


Figure 4-7: D4 TMC Video Wall Display

4.6 CMS Control

The CMS Control Window allows the operator to control the sign display. This comprises the communications status of the sign, and viewing and editing of sign messages. By choosing from the two options provided at the top of the CMS Control Window, D4 ATMS provides the ability to send messages to a single CMS or to send the same message simultaneously to multiple CMS.

4.6.1 Single CMS

Figure 4-8 shows the look of window after the Single CMS Detail option has been chosen. The following features are found in this single CMS Control Window:

- "Time 1" — Displays the current date/time
- Multiple/Single CMS — Allows the operator to switch between the single CMS Control dialog and multiple CMS Control dialog
- Header — Display:
  - CMS ID
  - IRM ID
  - County
  - Location (Route/Direction)
  - Postmile
  - Cross Street Information
- Type — Display the CMS type
- Status — Display the current operational status of CMS
- **Zoom to Area** — Shift to that specific device on the map
- Proposed Message Window — Display the proposed CMS message
- Current Message Window — Display the current CMS message
- **Send** — Send the proposed message to the CMS in the field
- **Blank** — Clear the current message from the CMS in the field
- **Reset** — Reinitialize the sign controller
- **Poll** — Poll the sign for the current message content
- Edit Message Phase 1 and 2 — Allow the operator to compose messages line by line and/or messages with two phases. By clicking on the relevant line box, a prompt appears in the box, allowing the operator to type in the message from the keyboard
- Display Time Per Phase — Allow the operator to control the amount of time each phase is displayed in a multi-phase message. Available selection is 2.0, 3.0, or 4.0 seconds. Default is 2.0 seconds
- Immediate/Schedule — Allow the operator to send the message for immediate display or schedule. For information concerning the scheduler, see Section 4.6.3
- Low Priority — Set the priority of the scheduled message to be the lowest CMS message priority. Current priority order of messages is: Operator/event (immediate), scheduled, travel time, and low priority scheduled.

- **Preview** — Allow a preview of the edited message by moving text in the Edit Message Lines into the Proposed Message Window
- **Clear** — Clear the Edit Message Lines
- **History** — Open the CMS History Log window. Refer to Section 4.6.4 for additional information
- **Library** — Open the CMS Message Library window. Refer to Section 4.6.5 for further information
- **OK** — Close the window

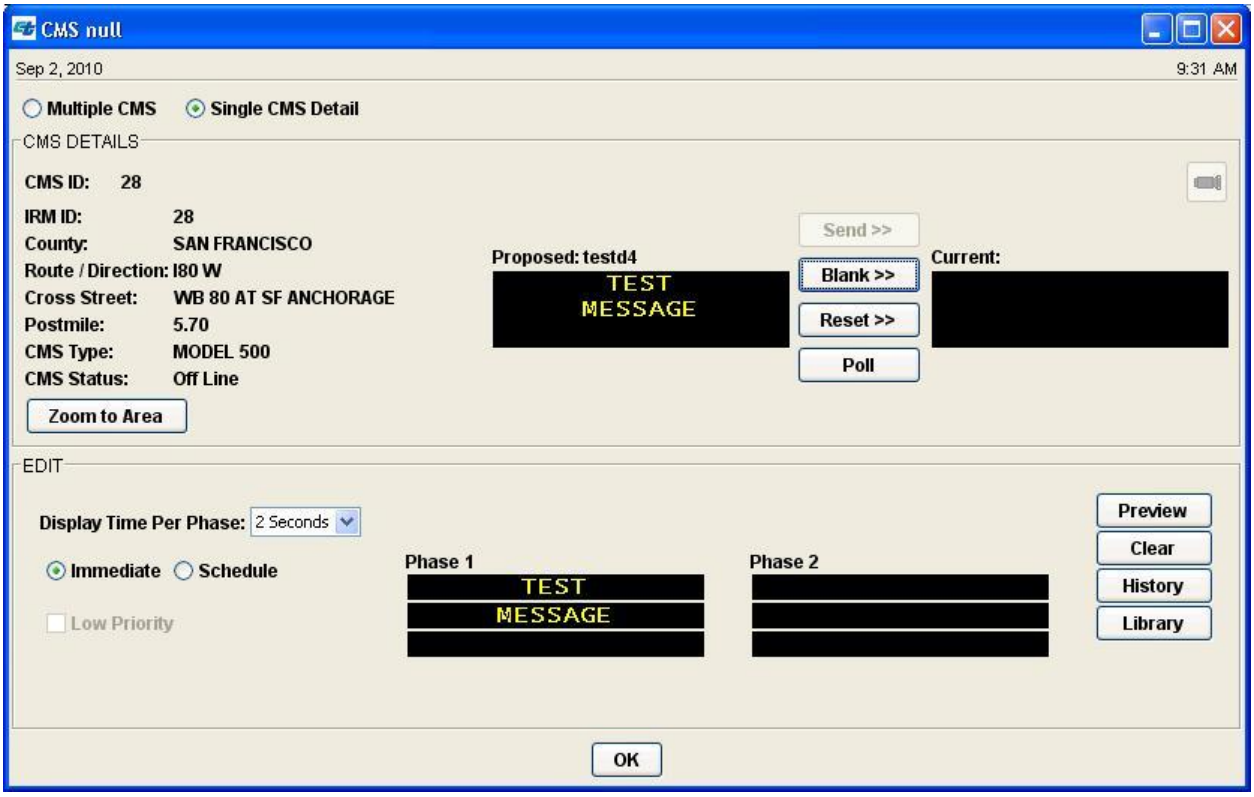


Figure 4-8: Single CMS Control Window

The following procedures should be used to send a manual message to the CMS for immediate display:

1. Open the CMS Control Window by either selecting a CMS from the map or using the Summary pull-down menu.
2. Type in the message in the Edit portion of the window.
3. Select the **Preview** button to view the message in the Proposed message window.
4. Select the **Send** button to send the proposed message to the CMS in the field. The proposed message will appear in the Current Message portion of the CMS Control Window.

5. To close the window, select the **OK** button. Any current messages will remain displayed in the field even though the window is closed.

To use the CMS Library function, please refer to Section 4.6.5.

To remove a message from a CMS, the following steps should be followed:

1. Open the CMS Control Window by either selecting the CMS from the map or using the Summary pull-down menu.
2. Select the **Blank** button to send the blank message to the CMS in the field. The blank message will appear in the Current Message portion of the CMS Control Window.
3. To close the window, select the **OK** button.

4.6.2 Multiple CMS

Multiple CMS control allows the operator to send a message to multiple CMS. The dialog consists of a list of CMS; details for the selected CMS; and edit capabilities.

When the Multiple CMS option is selected on the CMS Control window, the window changes to multiple control and an expanded CMS Control window appears, as shown in Figure 4-9.

Control commands are located to the right of the listing of CMS. The Send, Blank, and Reset commands are executed on all selected CMS in the same manner as the single CMS Control window.

To create a message to be sent to multiple signs, the appropriate signs must be selected from the list. Then, similar to the single CMS, the message is typed in the edit portion of the window and previewed. The message can then be sent to all selected CMS by selecting the **Send** button.

When the multiple CMS control is first opened, the list of CMS are displayed in the Summary view. This view lists the CMS in numerical order and the following information is displayed for each CMS listed:

- CMS number
- Location
- Cross Street
- Status
- Beginning of proposed message
- Beginning of current message
- CCTV access

The operator can change this view to show the message detail view or the schedule view. In the detail view, the window displays the CMS numbers, complete text for proposed messages, and the complete text for current messages. In the schedule view, the window displays the CMS numbers, CMS location, complete message, scheduled start and end time, and operator who initiated the scheduled message.

The following features are found in the multiple CMS Control Window:

- "Time 1" — Display the current date/time
- Multiple/Single CMS — Allow the operator to switch between the single CMS Control dialog and multiple CMS Control dialog
- Show — Display specific signs, in this window, based on the show or "filter" selected. "Show" includes the following:
  - All — All CMS
  - Good — Each CMS with a status of "Good"
  - Active — Each CMS with a message currently being displayed
  - Bad — Each CMS with a "Failed" status
  - Incidents — Each CMS displaying an incident message
  - Emergency Closure — Each CMS displaying an Emergency Closure message
  - Special Events — Each CMS displaying a Special Event message
  - Scheduled — Each CMS displaying a scheduled message
  - Travel Times — Each CMS displaying a travel time message
- **Add** — Add a CMS to the plan list
- **Delete** — Delete the specific CMS from the plan list
- **Select All** — Select all CMS in the plan list
- **Deselect All** — Deselect all the CMS in the plan list
- **Clear Sched** — Clear the scheduler of all messages (only available when in Schedule view)
- **Send** — Send the proposed message to the CMS in the field
- **Blank** — Clear the current message from the CMS in the field
- **Reset** — Reinitialize the controller
- CMS Count — Provide a summary of the number of CMS in the window

- Edit Message Phase 1 and 2 — Allow the operator to compose messages line by line and/or messages with two phases. By clicking on the relevant line box, a prompt appears in the box, allowing the operator to type in the message from the keyboard
- Display Time — Allow the operator to control the amount of time each phase is displayed in a multi-phase message. Available selection is 2.0, 3.0, or 4.0 seconds. Default is 2.0 seconds
- Immediate/Schedule — Allow the operator to send the message for immediate display or schedule. For information concerning the scheduler, see Section 4.6.3
- Low Priority — Allow the operator to set the priority of the scheduled message to be the lowest CMS message priority. Current priority order of messages is: Operator/event (immediate), scheduled, travel time, and low priority scheduled.
- **Preview** — Allow a preview of the edited message by moving text in Edit Message Lines into the Proposed Message Window
- **Clear** — Clear the Edit Message Lines
- **History** — Open the CMS History Log window. Refer to Section 4.6.4 for additional information
- **Library** — Open the CMS Message Library window. Refer to Section 4.6.5 for further information
- **OK** — Close the window

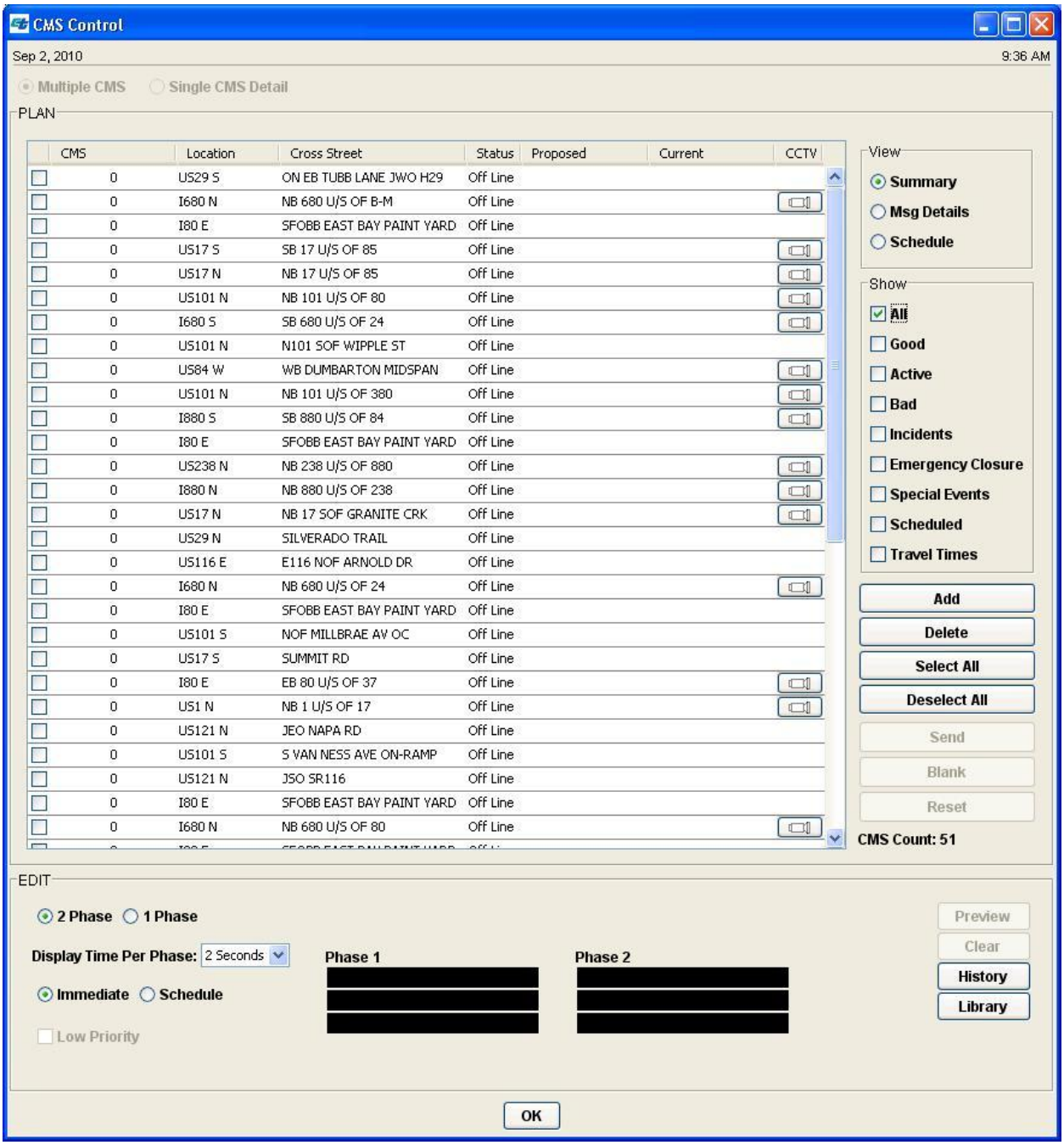


Figure 4-9: Multiple CMS Control Window

4.6.3 CMS Scheduler

The CMS scheduler is able to be globally activated/deactivated from the *Configuration* pull-down. If deactivated, then no CMS messages are able to be scheduled.

The CMS scheduler, shown in Figure 4-10, is available to the operator from the single CMS control window or the multiple CMS window. The scheduler allows the

operator to schedule a message to occur within the seven (7) day time period, starting from the current time.

The operator enters a message in the proposed area, whether by manually typing the message, selecting from the library, or selecting from the history. At that time, the operator selects the schedule button.

When the scheduler window appears, the operator can set the start date/time using the pull-downs. The end date/time can be set either by using the calendar selection or the text entry selection. This is shown in Figure 4-11. The duration indicates the amount of time that the message will be active. Select **OK** to accept the information and return to the CMS control window. The CMS Control window will then indicate that a message has been scheduled for this sign.

When the scheduled time occurs, the scheduler icon changes to say "NOW" and the message is sent to the sign.

If there is an event message active on that sign, the scheduled message will not override that message. When the event message is removed from the sign and the scheduled message is still within the time period, it will then be sent to the sign for display.

If the message scheduled has been designated as a "low priority" scheduled message, then the message will not be sent to the sign, if there is a travel time message available for display on the sign.

When the end time is reached, the message is removed from the sign.

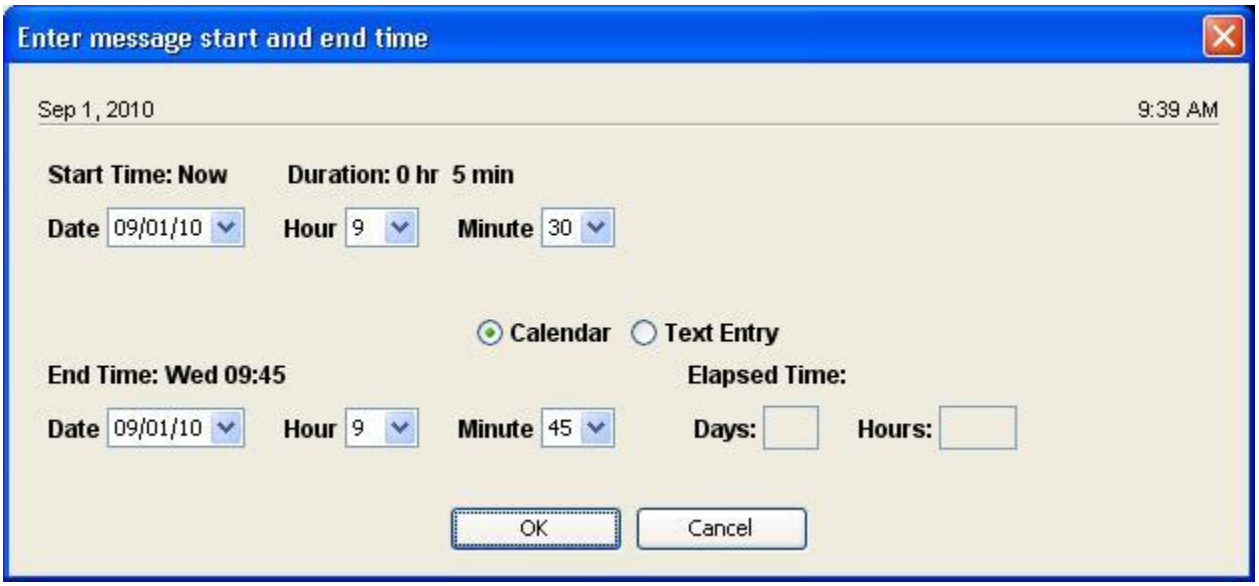


Figure 4-10: CMS Scheduler w/Calendar Entry Window

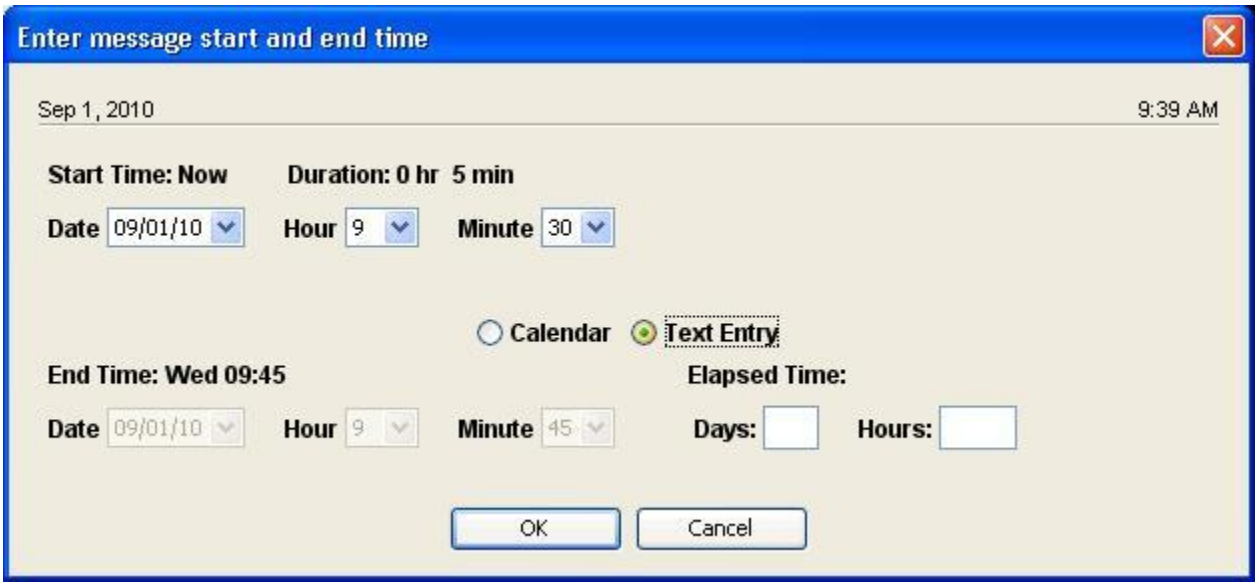


Figure 4-11: CMS Scheduler w/Text Entry Window

4.6.4 CMS Message History Log

For each individual CMS, a history log of the last 40 messages is available for review. From the CMS Control window, the operator selects the **History** button. This will launch the CMS Message History window, shown in Figure 4-12. The operator is able to select (highlight) a specific message and return to the CMS Control window. That selected message will then be shown in the Edit portion of the CMS control window. The operator may then make any modifications or preview the message and then send the message to the sign.

The operator is also able to select from the Multiple CMS Control window, the message history log. The operator selects the specific CMSs and then views the Message History Log for those signs. Similar to the CMS Control window, the operator can select a specific message to preview and send to the selected signs.

The following information is shown in the CMS Message History window:

- CMS — CMS ID number
- Location — Route and direction of the CMS
- Cross Street — Cross street associated with the CMS
- Phase 1 — Complete phase 1 message
- Phase 2 — Complete phase 2 message
- Start — Time when message was sent to the sign
- End — Time when message was deactivated
- Duration — Amount of time the message was on the CMS
- Operator — ID of the operator who activated the message
- **OK** — Close the window

- **Cancel** Closes the window with no selection

...	Location	Cross Street	Phase1	Phase2	Start	End	Du...	Operator
56	I680 N	NB 680 U/S OF B-M	TESTING AAA		2005.06.27 11:48	2005.06.27 13:23	01:35	testd4
56	I680 N	NB 680 U/S OF B-M	TEST AMBER ALERT		2005.06.27 13:38	2005.06.27 13:39	00:01	testd4
56	I680 N	NB 680 U/S OF B-M	TEST TEST		2005.06.27 14:00	2005.06.27 14:06	00:06	testd4
56	I680 N	NB 680 U/S OF B-M	TEST1		2005.06.27 17:04	2005.06.27 19:00	01:55	testd4
56	I680 N	NB 680 U/S OF B-M	TESTING AMBER ALERT		2005.07.07 17:40	2005.07.07 19:18	01:38	testd4
35	US17 S	SB 17 U/S OF 85	TESTING AAA		2005.06.27 11:48	2005.06.27 13:23	01:35	testd4
35	US17 S	SB 17 U/S OF 85	TEST AMBER ALERT		2005.06.27 13:38	2005.06.27 13:39	00:01	testd4
35	US17 S	SB 17 U/S OF 85	TEST1		2005.06.27 17:04	2005.06.27 19:00	01:55	testd4
35	US17 S	SB 17 U/S OF 85	TT OVERIDE MY MSG HERE		2005.06.28 16:30	2005.06.28 16:30	00:00	testd4
35	US17 S	SB 17 U/S OF 85	TT OVERRIDE 2		2005.06.28 16:32	2005.06.28 16:33	00:00	testd4
35	US17 S	SB 17 U/S OF 85	SLOT 30 1 PHASE LIB MESSAGE		2005.06.28 17:02	2005.06.28 17:02	00:00	testd4
35	US17 S	SB 17 U/S OF 85	TESTING AMBER ALERT		2005.07.07 17:40	2005.07.07 19:18	01:38	testd4
3	US101 N	N101 SOF WIPPLE ST	TESTING AAA		2005.06.27 11:48	2005.06.27 13:24	01:35	testd4
3	US101 N	N101 SOF WIPPLE ST	TEST AMBER ALERT		2005.06.27 13:38	2005.06.27 13:39	00:01	testd4
3	US101 N	N101 SOF WIPPLE ST	TEST LAST MESSAGE		2005.06.27 18:21	2005.06.27 18:30	00:08	testd4
3	US101 N	N101 SOF WIPPLE ST	TESTING AMBER ALERT		2005.07.07 17:40	2005.07.07 19:18	01:38	testd4

Figure 4-12: CMS Message History Window

4.6.5 CMS Message Library

From the CMS Control window, the operator is able to access the CMS Message Library. This is shown in Figure 4-13. There are 50 available library messages.

The following functions are included in this window:

- ID — Identification of the library message
- Title — Title of the library message
- Phase 1 — Complete phase 1 of the message
- Phase 2 — Complete phase 2 of the message
- Last Modified — Date and time stamp of last modification of the library message
- Operator — ID of the operator who entered the message
- **Modify** — Modify selected library message

- **New** Create new library message
- **Delete** Delete selected library message
- **OK** Close the window
- **Cancel** Close the window with no selection

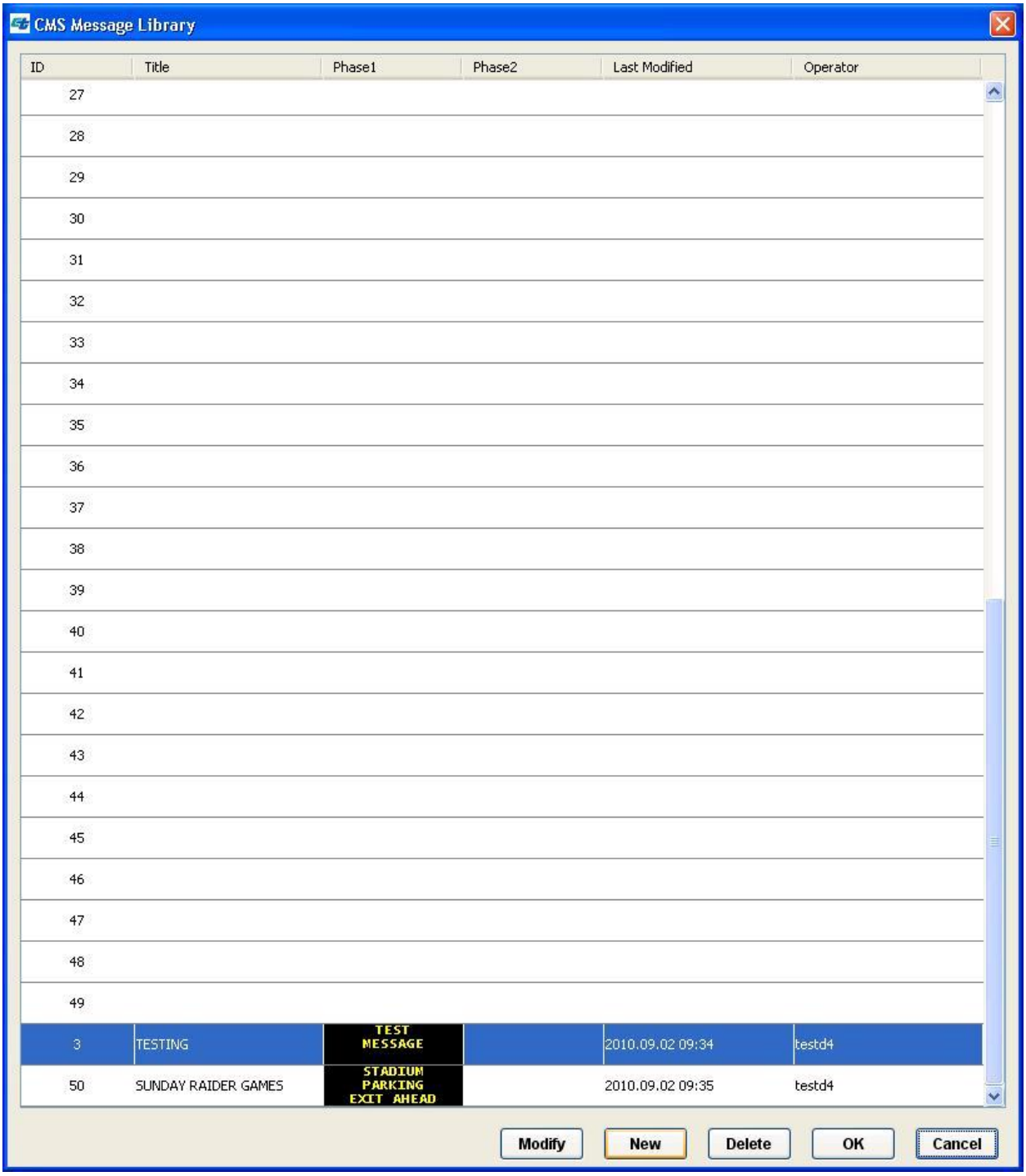


Figure 4-13: CMS Library Window

To select an existing library message to preview, the operator highlights the library message and selects the **OK** button to return to the CMS Control window. The selected library message is shown in the Edit area allowing the operator to make any desired modifications, prior to previewing the message. The operator can then preview the message and send the message to the sign for display. Or the operator can schedule the library for display.

4.6.5.1 Create/Modify/Delete a Library Message

From the CMS Message Library window, the operator can create a new message. The operator selects an empty library message slot, and then selects the New button. At that time, the Library Editor window will appear. This is shown in Figure 4-14.

The operator selects the number of phases for the message and enters the desired message. The operator is also able to assign a title to the specific message. When complete, the operator selects the **OK** button and returns to the CMS Message Library window. If the Cancel button is selected, no modifications are saved and the operator is returned to the CMS Message Library window.

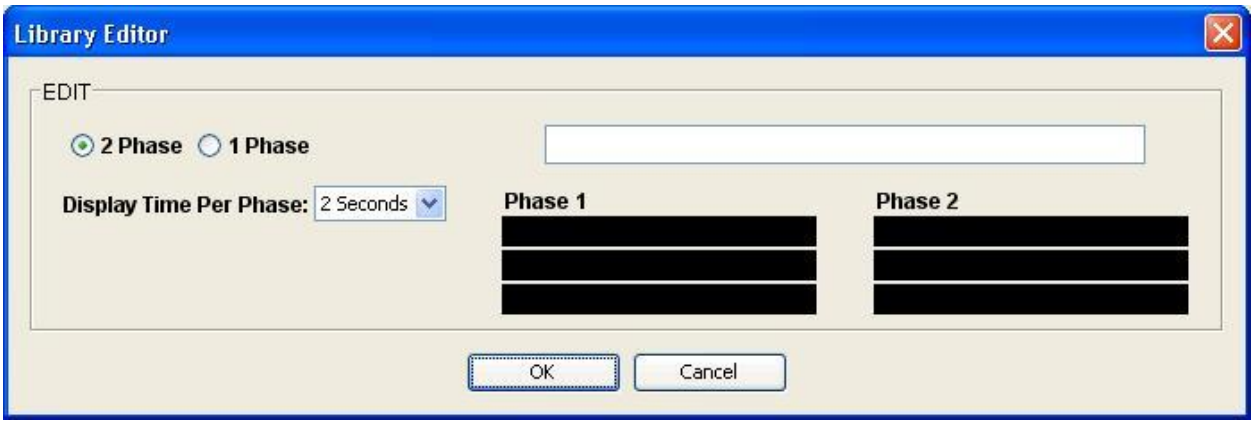


Figure 4-14: CMS Library Editor – New Message Window

To edit an existing library message, the operator selects the message from the CMS Message Library window, and then selects the **Modify** button. At this time, the Library Editor window opens with the selected message available for modification. This is shown in Figure 4-15.

The operator is able to modify the message and/or the title. When complete, selecting the **OK** button will return the operator to the CMS Message Library window. **Cancel** button will reject any modifications and return the operator to the CMS Message Library window.

To delete an existing library message, the operator selects the desired library message and selects the **Delete** button. At this time, the message is removed from the CMS Message Library and the space is available for another message.

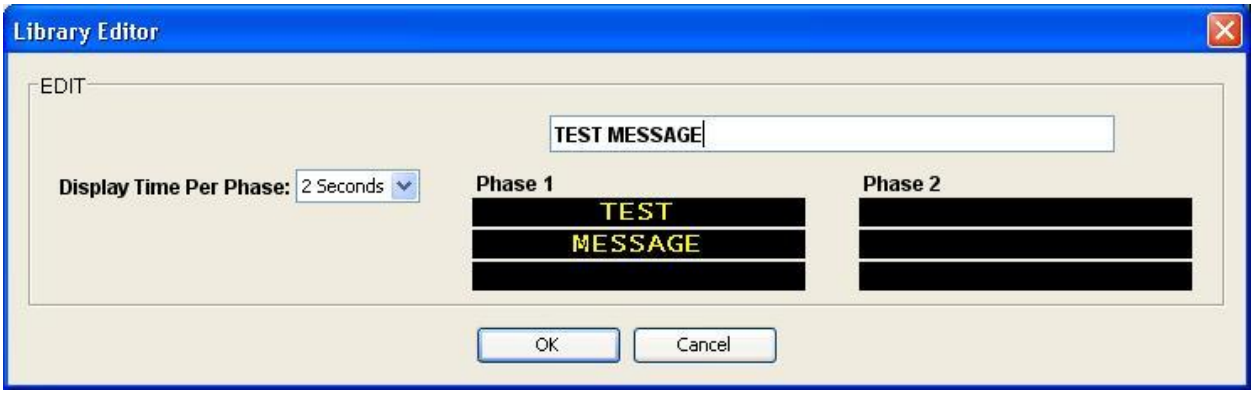


Figure 4-15: CMS Library Editor – Modify Message Window

4.6.6 CMS Poll Interval

From the *Configuration* pull-down menu selection, administrators and/or operators with appropriate privileges are able to specify poll intervals for the CMS. This is shown in Figure 4-16. Interval rates are between 30 seconds to 24 hours.

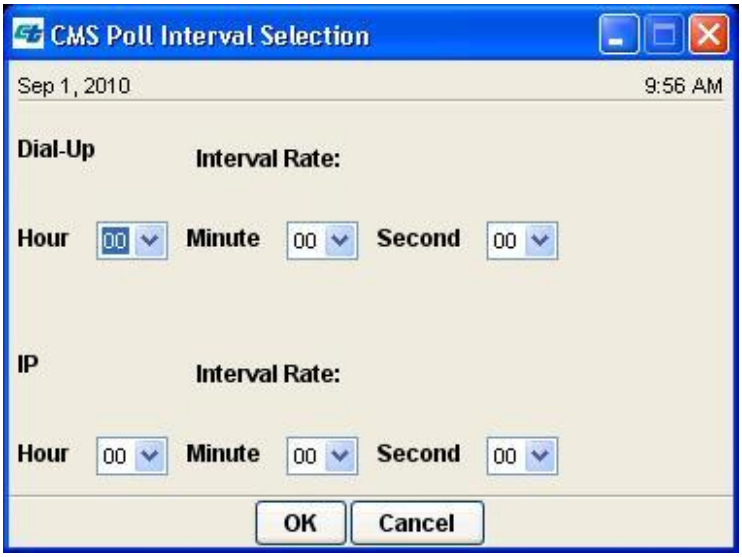


Figure 4-16: CMS Poll Interval Window

4.6.7 CMS Travel Time

Travel Time messages are received from the Messaging Infrastructure for Travel Time Estimates to a Network of Signs (MITTENS) system and will be displayed on specific signs. During normal operations, the administrator/operator defines which CMS display travel times.

The MITTENS system generates the messages and their targets or destinations. It then sends to the D4 ATMS these messages. Using the Travel Time Configuration, the ATMS verifies whether the message is able to be displayed on the designated sign. The Travel Time scheduler is also checked to determine the current schedule for messages. These are described in the following sections.

4.6.7.1 CMS Travel Time Configuration

The display of travel times on specific signs is controlled via the Travel Time configuration window, shown in Figure 4-17. Operators with associated privileges are able to select specific CMS to disable travel time message display for.

Also available on this window is the option to modify the Travel Time Difference Threshold value. This value is used to determine whether similar travel time messages with the same target destinations, but slightly different destination times should be modified, i.e. does the sign receive a new travel time message for a target that has only a one minute change?

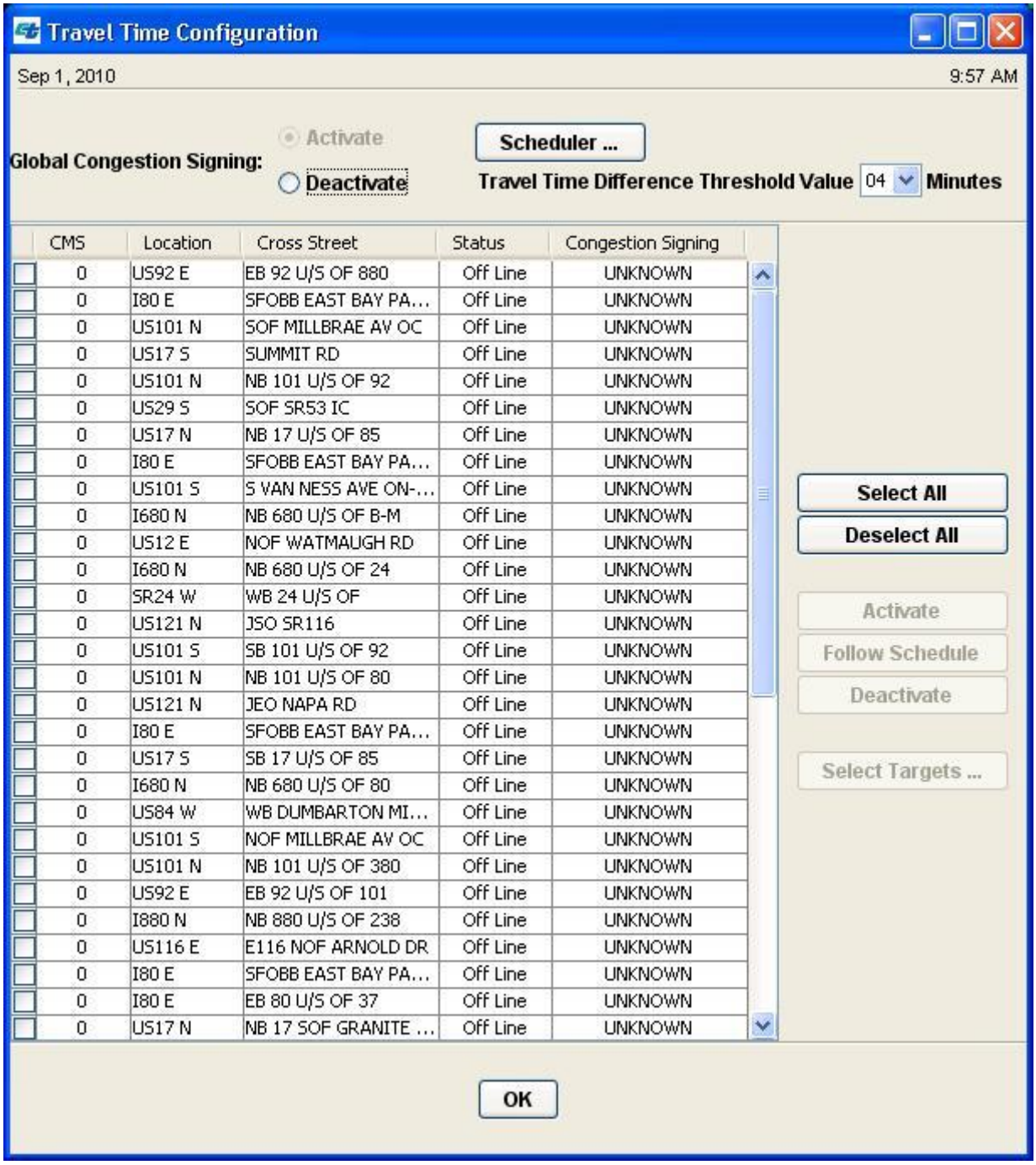


Figure 4-17: CMS Travel Time Window

4.6.7.2 CMS Travel Time Scheduling

The displaying of Travel Times is also subject to the Time-of-Day and Day-of-Week Scheduler. Figure 4-18 shows the Scheduler window. Control is accomplished as follows:

- From the Travel Time Configuration window, Figure 4-17, select "Scheduler"

- Check (or uncheck) the desired hours and days of operation, as shown in Figure 4-18
- Select **Apply**
- Select **OK** on the scheduler dialog box to accept the change

NOTE: Checking a box means that CMS messages are allowed starting from the time indicated to the time in the next box {Example: checking 19:00 means the Scheduler allows congestion signing from 19:00 to 19:59:59}.

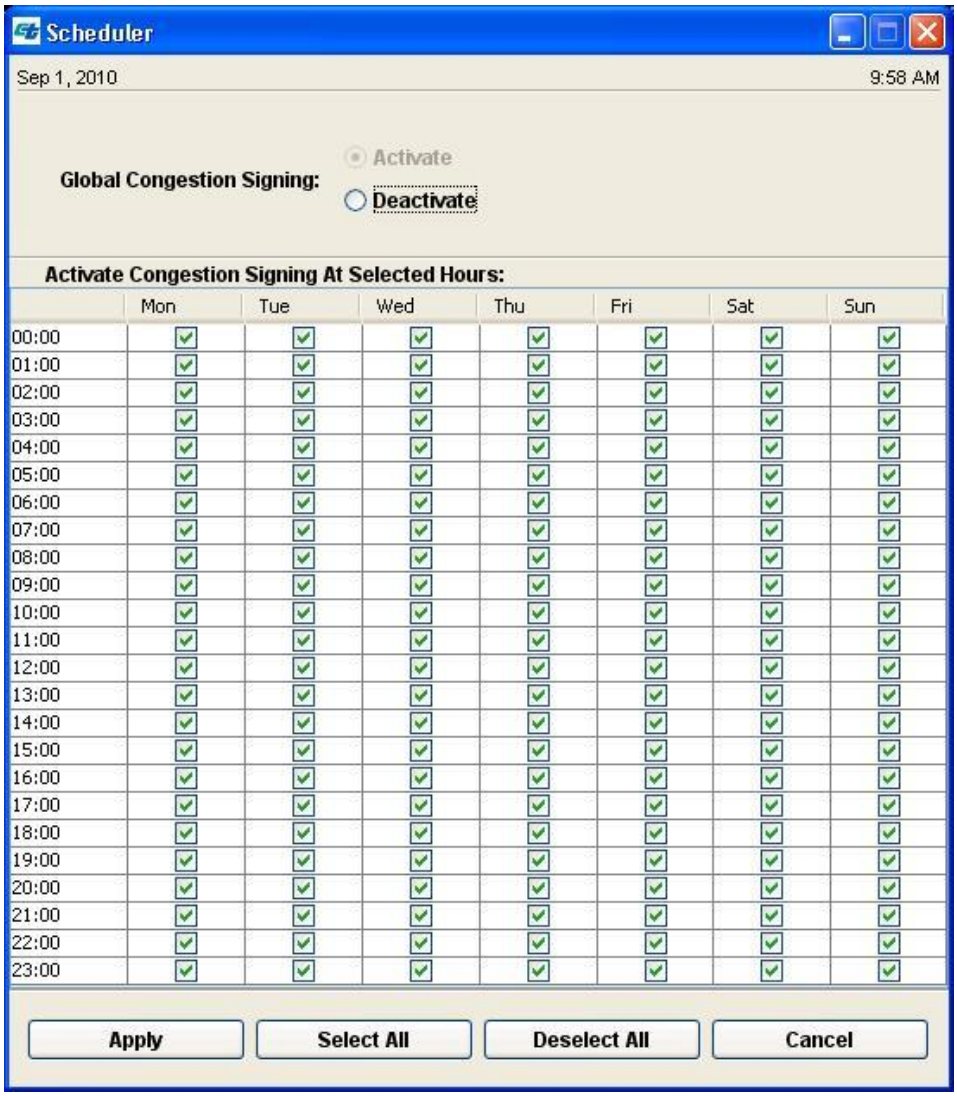


Figure 4-18: CMS Travel Time Scheduler Window

4.7 Controller

Controllers are displayed on the map, but have no control/status windows. They display a "tooltip" functionality. This is shown in Figure 4-25. The controller tooltip provides the controller location information, as well as the Cabinet Relay Trip Alarm status.

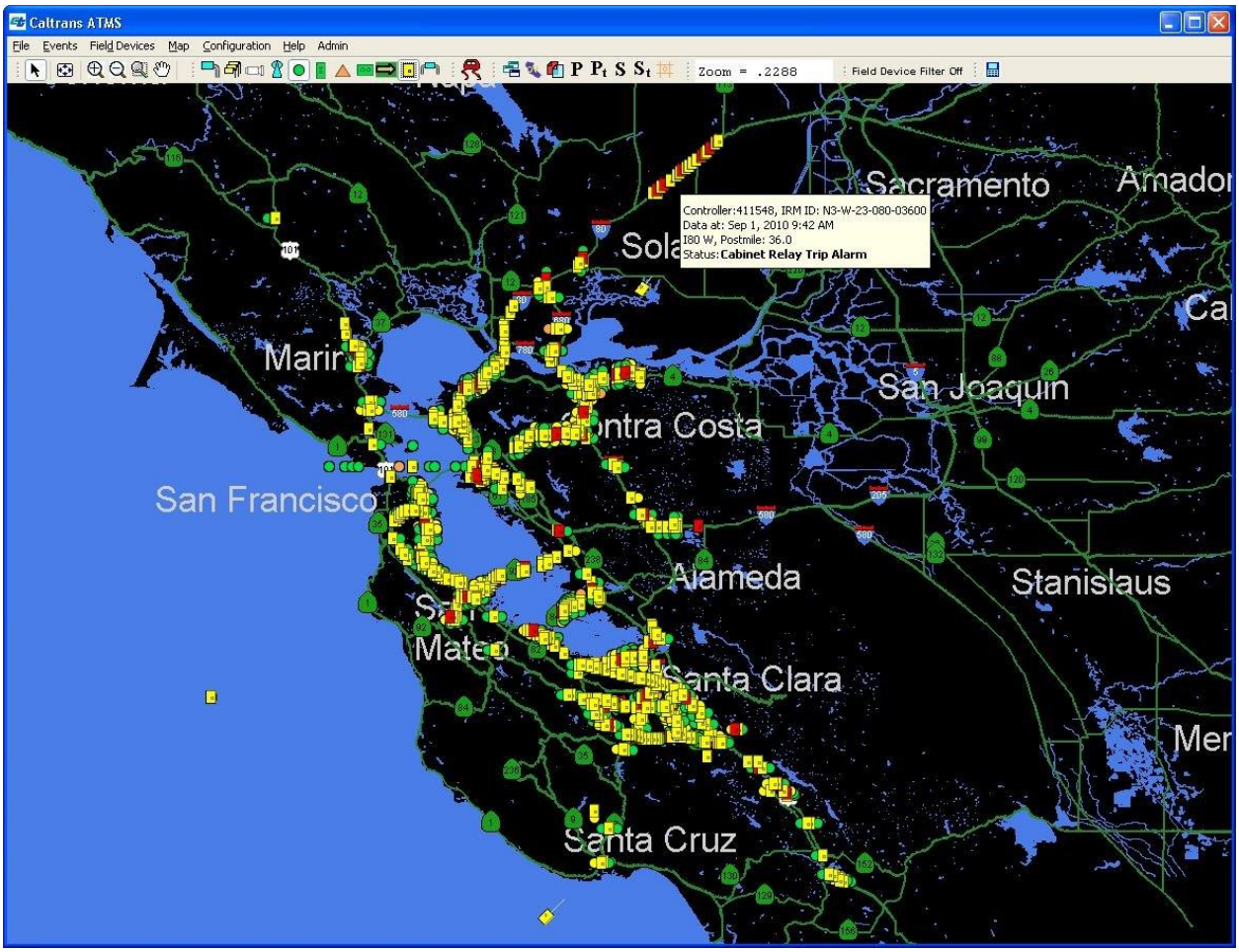


Figure 4-19: Controller Map Tooltip Overview

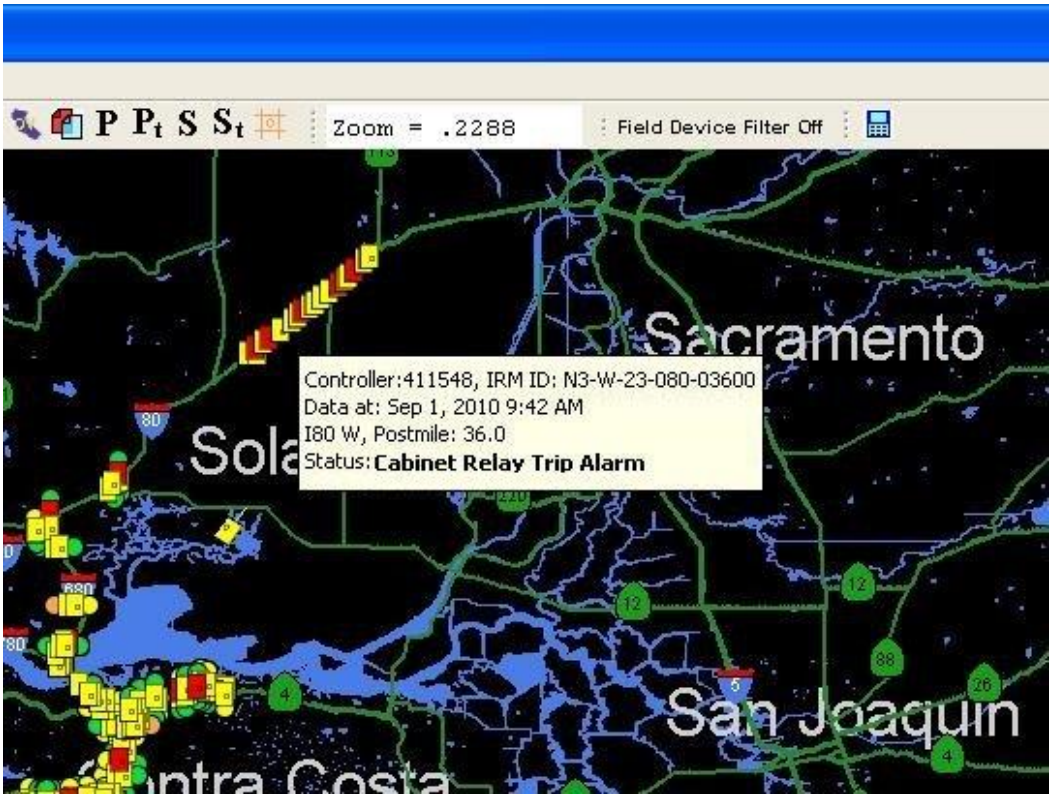


Figure 4-20: Controller Map Tooltip - Smaller

4.8 HAR EMS

Each HAR EMS is associated with one or more HAR transmitters. These devices provided a warning to motorists that there is a message being broadcast on the nearby HAR. When a HAR EMS icon is selected from the map or from the field device summary window, the associated HAR transmitter window is opened. Please see Section 4.9 for details concerning the HAR transmitters.

4.9 HAR Transmitter

HAR transmitters allow operators to enter a text messages and preview an audio file before sending the message to the transmitter. This window is shown in Figure 4-21.

The following features are found in this Window:

- "Time 1" — Display the current date/time
- Header — Display:
  - HAR ID
  - IRM ID
  - County
  - Location (Route/Direction)
  - Postmile
  - Cross Street Information
- Type — Display the HAR type

- Status — Display the current operational status of HAR transmitter
- Frequency — Specific frequency of this HAR transmitter
- Call Sign — Specific call sign of this HAR transmitter
- Zoom To Area — Shift to that specific device on the map
- Proposed Message Window — Display the proposed HAR message and the associated HAR EMS. Operator is able to select which HAR EMS are to be activated for this message
- Current Message Window — Display the current HAR message and the activated HAR EMS
- **Send** — Send the proposed message to the HAR transmitter
- **Blank** — Clear the current message on the HAR transmitter
- Edit Message — Allow the operator to compose messages. By clicking in the box, a prompt appears, allowing the operator to type in the message from the keyboard
- **Preview** — Allow a preview of the edited message by moving text in the Edit Message Lines into the Proposed Message Window
- **Clear** — Clear the Edit Message Lines
- **OK** — Close the windows

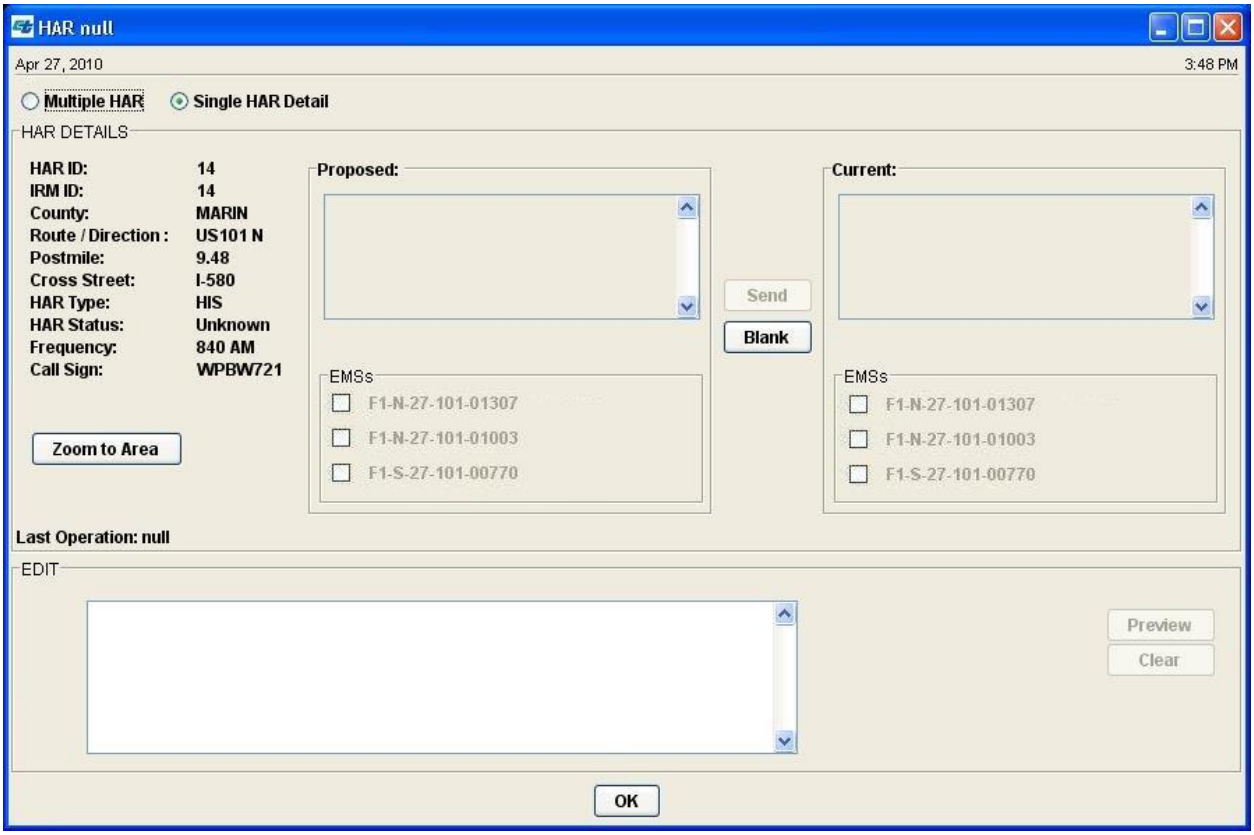


Figure 4-21: HAR Transmitter Control/Status Window

4.10 MLMS

Mainline metering is monitored and controlled through the MLMS Control window shown in Figure 4-22. The MLMS windows provide access to meter data for each MLMS.

The following features are found in this Window:

- "Time 1" — Display the current date/time
- Header — Display:
  - MLMS ID
  - IRM ID
  - County
  - Location (Route/Direction)
  - Postmile
  - Cross Street Information
- Status — Display the current operational status of MLMS meter
- **Select Metering Mode** — Open the metering selection window (See Section 4.10.1)
- **View/Edit Comments** — Open the comments window (See Section 4.10.2)

- Data — Data window includes the following information:
  - Command Source
  - Active Action
  - Metering Rate (vpm)
  - Metering Sequence Table Number
  - 1-Minute Skip Count
  - Vehicle Count per group
  - Downstream Station Average Volume and Occupancy
- **Freeze Data** — Freeze the displayed data
- **Zoom to Area** — Shift to that specific device on the map
- **OK** — Close the window

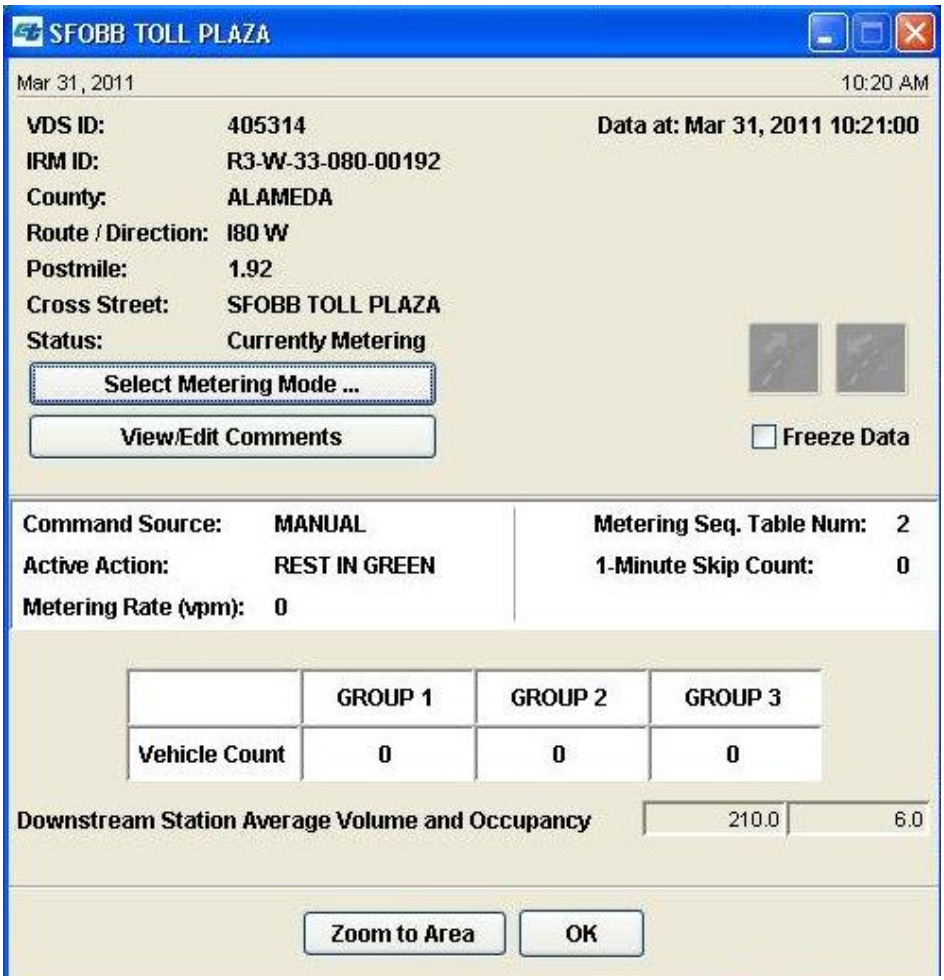


Figure 4-22: MLMS Control/Status Window

4.10.1 Select Metering Mode

Similar to the RMS metering selection, the operator is able to command the MLMS via this window, shown in Figure 4-23.

The following features are found in this window:

- "Time 1" — Display the current date/time
- Header — Display:
  - MLMS ID
  - IRM ID
  - County
  - Location (Route/Direction)
  - Postmile
  - Cross Street Information
- Status — Display the current operational status of MLMS meter
- Metering Action — Selections include:
  - Rest-in-Dark
  - Rest-in-Green
  - Fixed Rate
  - Traffic Responsive
- Metering Plan — Operator-selected plan
- Metering Rate — Operator-selected rate
- Metering Sequence Table — Operator-selected table
- **Send** — Send the specified operation to the MLMS
- **OK** — Close the window

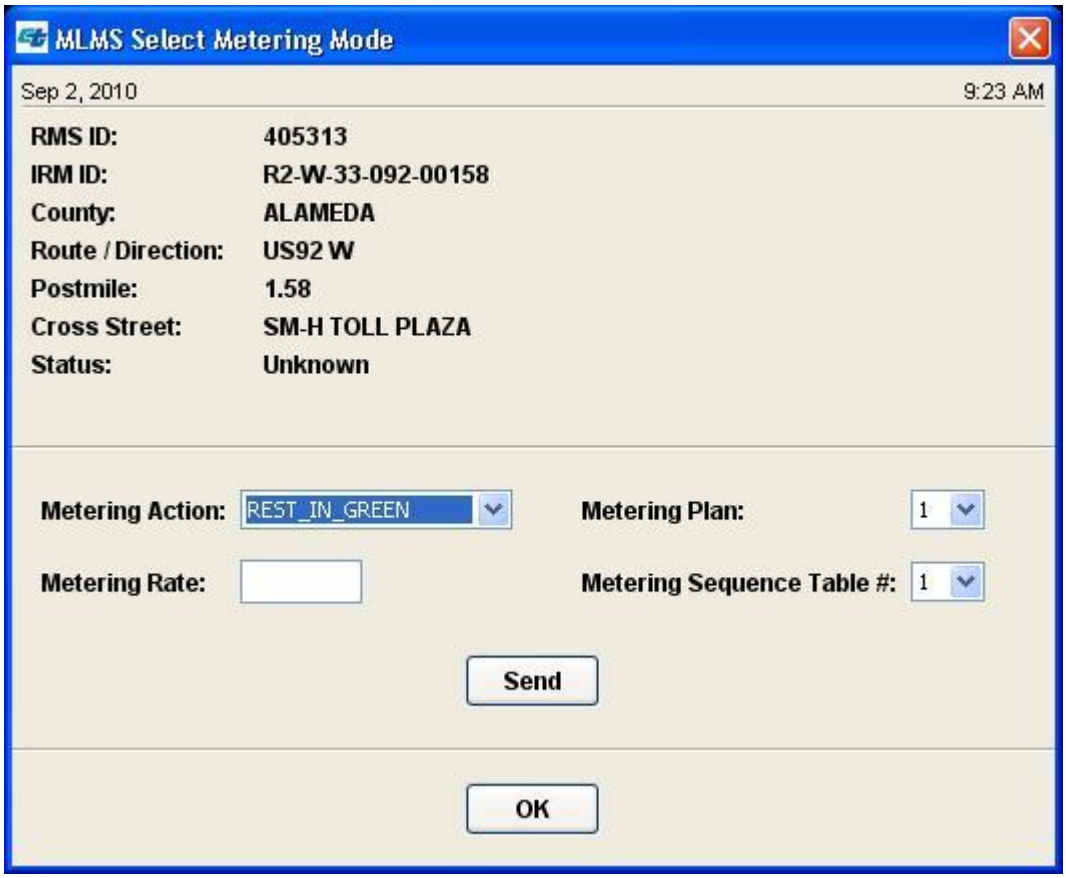


Figure 4-23: MLMS Select Metering Mode Window

4.10.2 View/Edit Comments

The MLMS View Comment window allows the Traffic Engineer or Ramp Metering Engineer to enter a comment or description about the mainline meter. This functionality is similar to the Event Comment entry as it maintains a log of all the entries. Each entry is automatically date-and time-stamped, and includes the operator identification. This is shown in Figure 4-24.

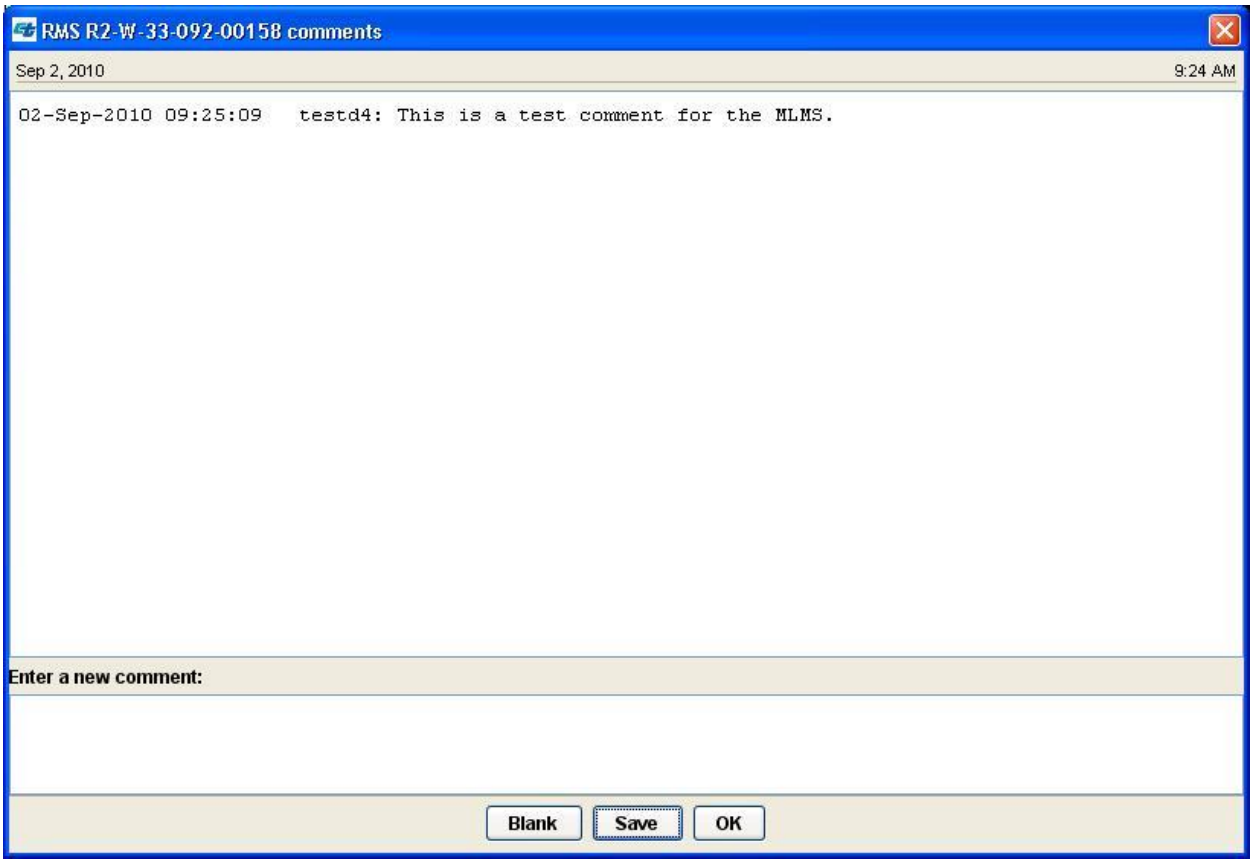


Figure 4-24: MLMS View Comments Window

4.11 RMS

Ramp metering is monitored and controlled through the RMS Control window shown in Figure 4-25. The ramp metering windows provide access to controller data for each RMS. Figure 4-26 shows the navigational flow between the different windows and menus for ramp metering. From the RMS Control window, any of the following actions can be performed:

- Select Metering Mode
- Configure RMS Parameters
- View/Edit Comments

The following is a description of the fields and the buttons in the RMS Control/Status window:

- "Time 1" — Display the current date/time
- Header — Display:
  - RMS ID
  - IRM ID
  - County
  - Location (Route/Direction)
  - Postmile
  - Cross Street Information

- Status — Display the current operational status of the RMS
- Data — Data window includes the following information on a lane by lane basis:
  - Command Source
  - Active Action
  - Metering Rate (vph)
  - Passage Count (veh)
  - Violation Count (veh)
  - Queue Detected Flag
  - Queue Length (veh)
  - 1-Minute Average Queue Occupancy
  - Mainline Station Average Volume and Occupancy
- **Freeze Data** — Freeze the displayed data
- **Zoom to Area** — Shift to that specific device on the map
- **OK** — Close the window

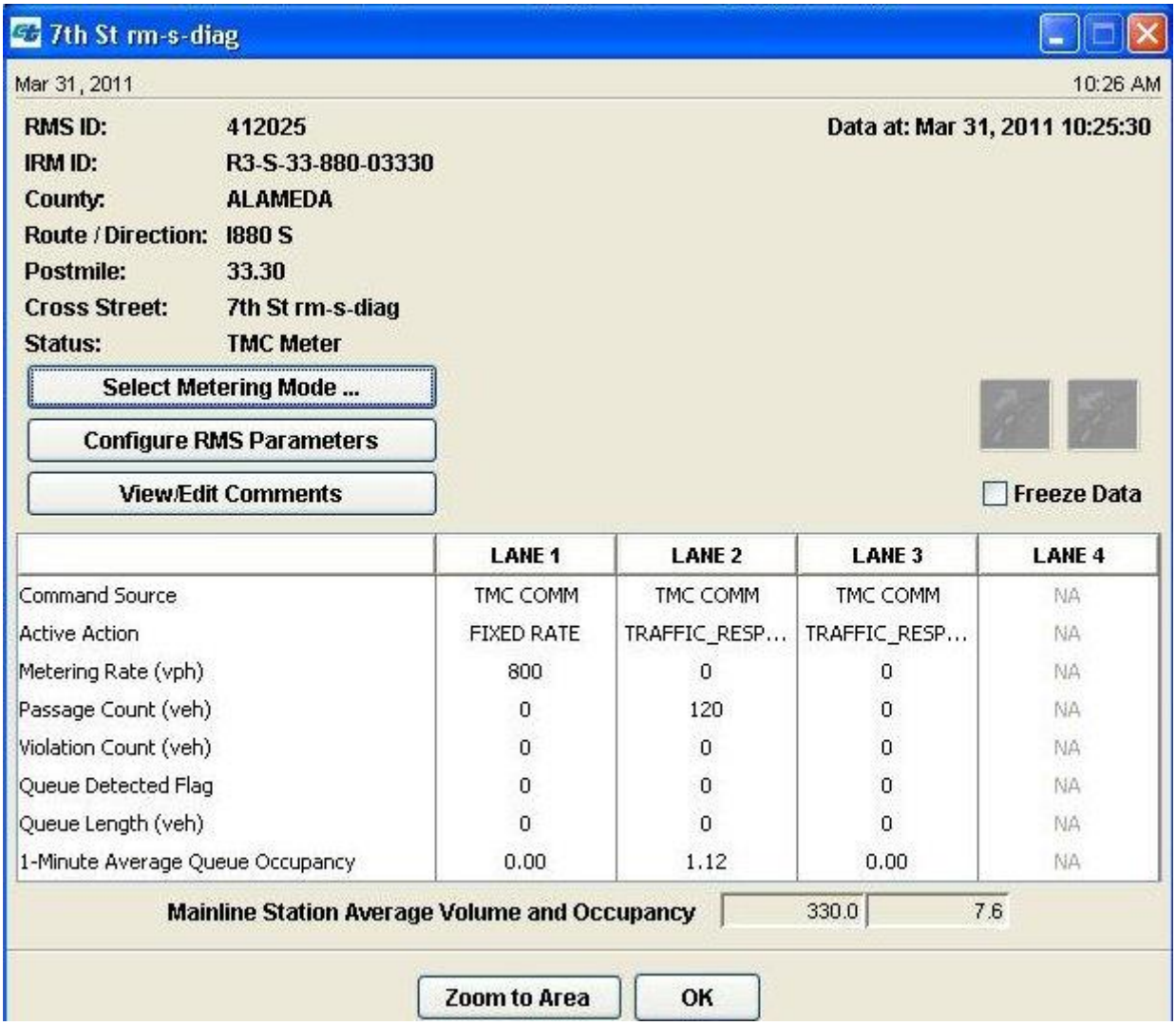


Figure 4-25: RMS Control/Status Window

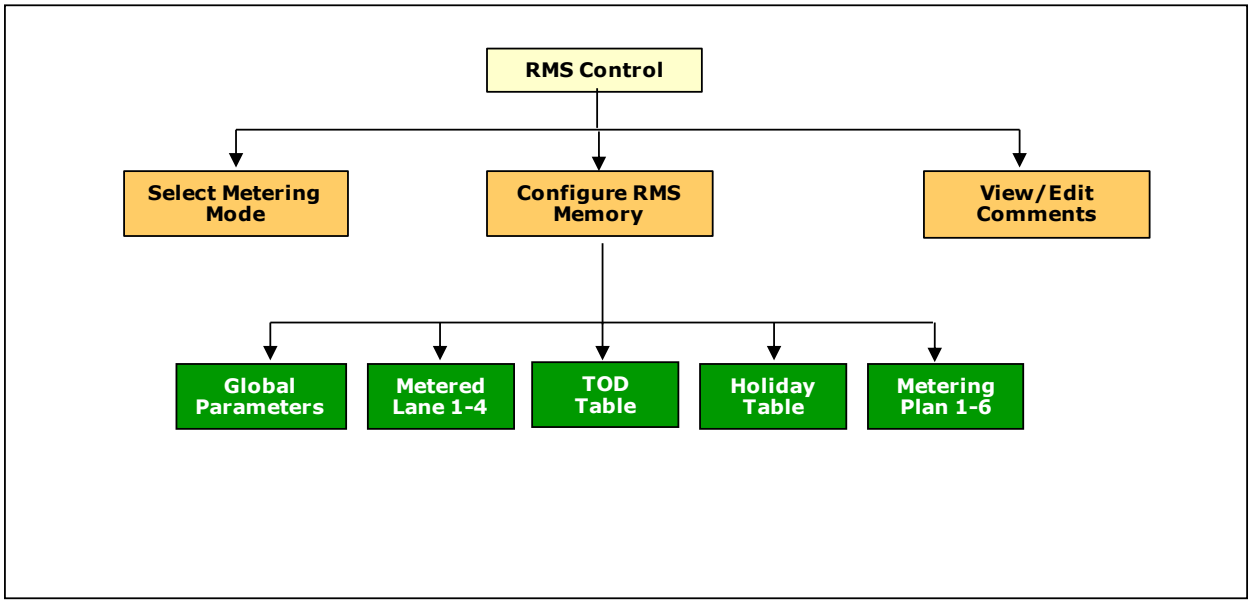


Figure 4-26: Flow of RMS Windows

4.11.1 Select Metering Mode

The Select Metering Mode window allows the operator to change the current metering action, the current metering rate, and/or the current metering plan for the specific ramp. This window is shown in Figure 4-27.

The following is a description of the fields and the buttons in the window.

- "Time 1" — Display the current date/time
- Header — Display:
  - RMS ID
  - IRM ID
  - County
  - Location (Route/Direction)
  - Postmile
  - Cross Street Information
- Action — Allowable actions include:
  - Skip or No Action
  - Rest-in-Dark
  - Rest-in-Green
  - Fixed Rate
  - TR-Occupancy
  - TR-Flow
  - TR-Occupancy-Flow
- Rate — Operator-selected rate
- Plan — Operator-selected plan

- **Send** Send the specified operation to the RMS
- **OK** Close the window

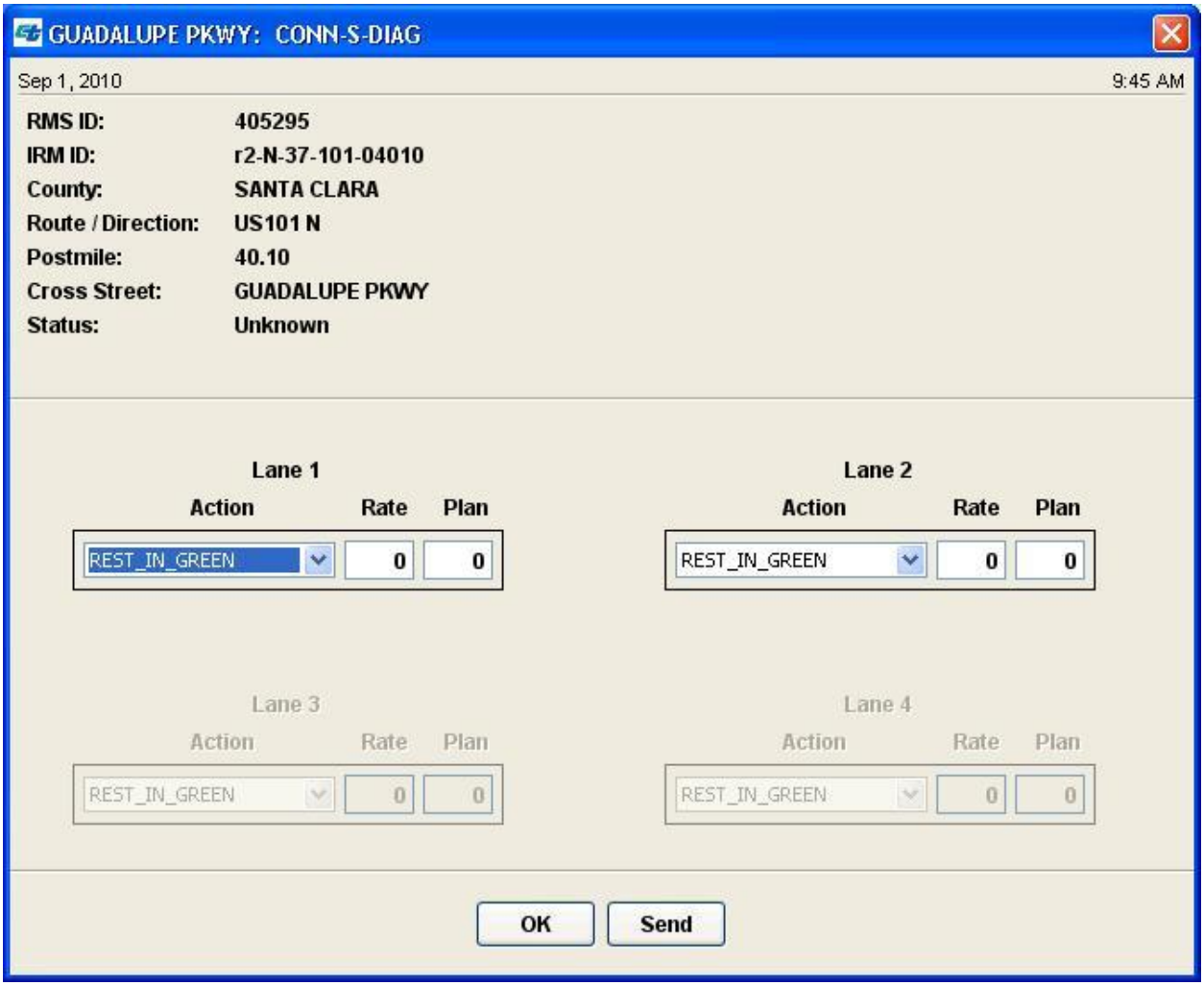


Figure 4-27: RMS Metering Mode/Scheduler Window

4.11.2 Configure RMS Parameters

As shown in Figure 4-28, the Configure RMS Parameters window provides the operator the choice of the following parameter blocks:

- Global Parameters Display Global parameters
- Metered Lane 1 Display Metered Lane 1 parameters
- Metered Lane 2 Display Metered Lane 2 parameters
- Metered Lane 3 Display Metered Lane 3 parameters
- Metered Lane 4 Display Metered Lane 4 parameters
- TOD Table Display the Time-of-Day (TOD) Table
- Holiday Table Display the Holiday Table

- Metering Plan 1 Display Metering Plan 1
- Metering Plan 2 Display Metering Plan 2
- Metering Plan 3 Display Metering Plan 3
- Metering Plan 4 Display Metering Plan 4
- Metering Plan 5 Display Metering Plan 5
- Metering Plan 6 Display Metering Plan 6

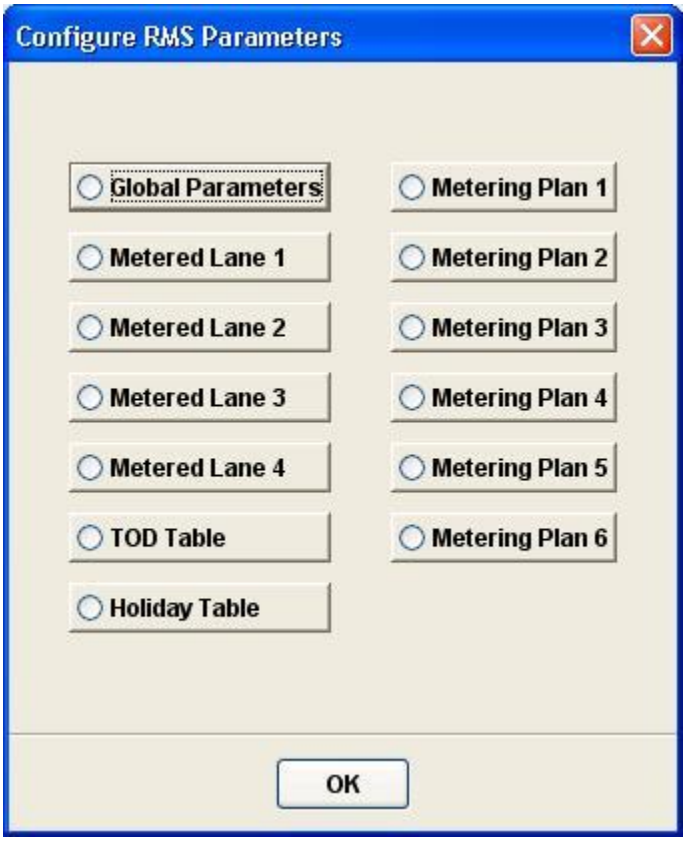


Figure 4-28: RMS Configure RMS Parameters Window

When one of these windows is initially opened, both the Proposed and the Most Recent Data areas are populated from the data saved in the configuration database.

4.11.2.1 Global Parameters

Selecting the Global Parameters button in the Configure RMS Parameters window will open the Global Parameters window, with both the Proposed and Most Recent Data areas populated with the data from the configuration database. The following is a description of the fields, buttons in this window, shown in Figure 4-29.

- Header Display:
  - RMS ID
  - IRM ID
  - Location (Route/Direction)
  - Postmile

	• County • Cross Street information
• Status	Display the operational status of the RMS
• Last Download at	Display the last date and time that the Global Parameter block was downloaded to the RMS. If unknown, the field will be populated with "Unavailable"
• Operator ID	Display the identification of the operator that made the last change to any parameter in the Global Parameter block. If unknown, the field will be populated with "Unavailable"
• Proposed	Each difference between parameter values in this area and the Most Recent Data area is highlighted in yellow
• Most Recent Data	Set of parameters most recently saved to the configuration database, whether through a controller memory upload or by way of the **Save** button on this window
• **Edit**	Open the Edit window to allow the operator to modify the parameters. This window is shown in Figure 4-30
• **Revert**	Repopulate the Proposed area with the data from the configuration database
• **Save**	Write the data from the Proposed area to the configuration database
• **Download**	Send the data in the Proposed area to the RMS AND write the data to the configuration database
• **Upload**	Receive the Global Parameters block from the RMS AND populate the Most Recent Data area
• **OK**	Close the window

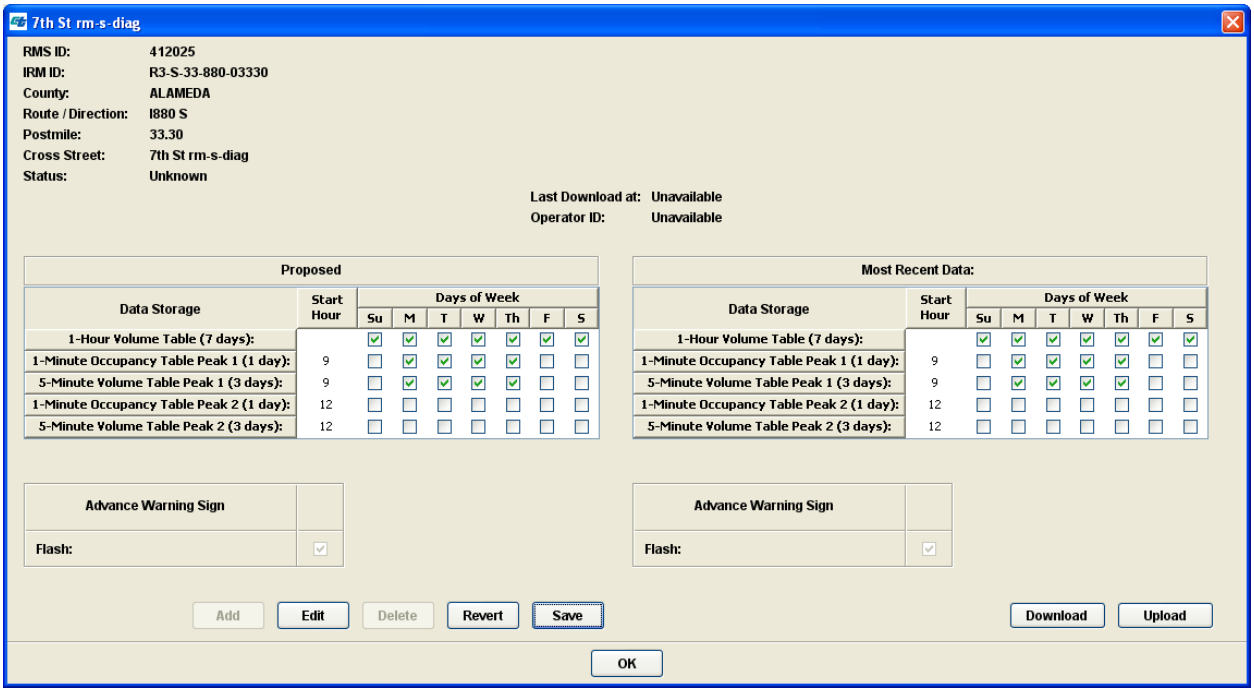


Figure 4-29: RMS Global Parameters Window

Selecting the Edit button in the Global Parameters window will open the Global Parameters Edit window populated with the data from the Proposed area of the Global Parameters window. The operator can modify the value of any parameter in the window. The following is a description of the buttons in this window, shown in Figure 4-30.

- **Cancel** — Close the window but do NOT populate the Proposed area of the Global Parameters window with the data from the Global Parameters Edit window.
- **OK** — Close the window AND populate the Proposed area of the Global Parameters window with the data from the Global Parameters Edit window.

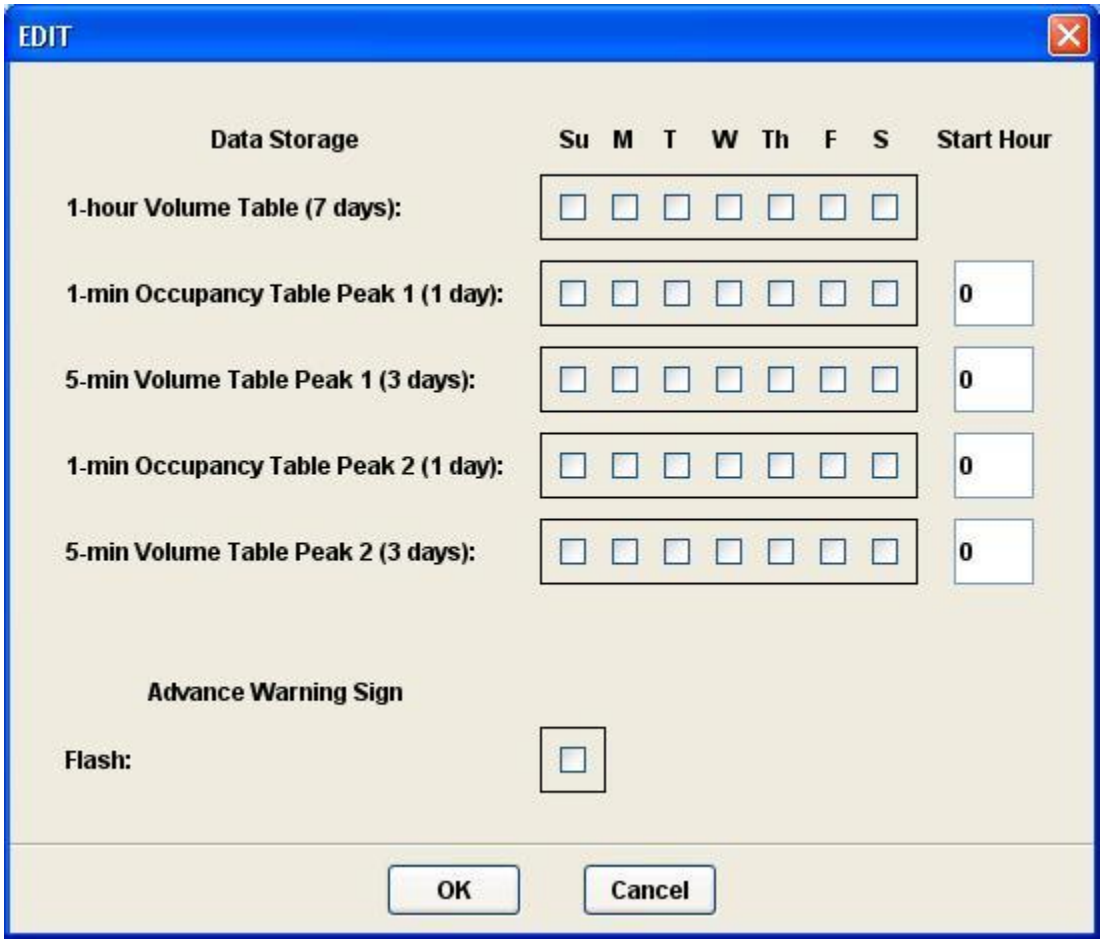


Figure 4-30: RMS Global Parameters Edit Window

4.11.2.2 Metered Lane

Selecting one of the individual Metered Lane buttons from the Configure RMS Parameters window opens the specific Metered Lane parameters window. Through this window the operator can view and update the individual lane parameters. Figure 4-31 shows one of these windows.

The following is a description of the fields, buttons and windows in the Metered Lane window.

- Header — Display:
  - RMS ID
  - IRM ID
  - County
  - Location (Route/Direction)
  - Postmile
  - Cross Street information
- Status — Display the operational status of the RMS

- Last Download at — Display the last date and time that the Metered Lane block was downloaded to the RMS. If unknown, the field will be populated with "Unavailable"
- Operator ID — Display the identification of the operator that made the last change to any parameter in the Metered Lane block. If unknown, the field will be populated with "Unavailable"
- Proposed — Each difference between parameter values in this area and the Most Recent Data area is highlighted in yellow
- Most Recent Data — Set of parameters most recently saved to the configuration database, whether through a controller memory upload or by way of the **Save** button on this window
- **Edit** — Open the Edit window to allow the operator to modify the parameters. This window is shown in Figure 4-32
- **Revert** — Repopulate the Proposed area with the data from the configuration database
- **Save** — Write the data from the Proposed area to the configuration database
- **Download** — Send the data in the Proposed area to the RMS AND write the data to the configuration database
- **Upload** — Receive the Metered Lane block from the RMS AND populate the Most Recent Data area
- **OK** — Close the window

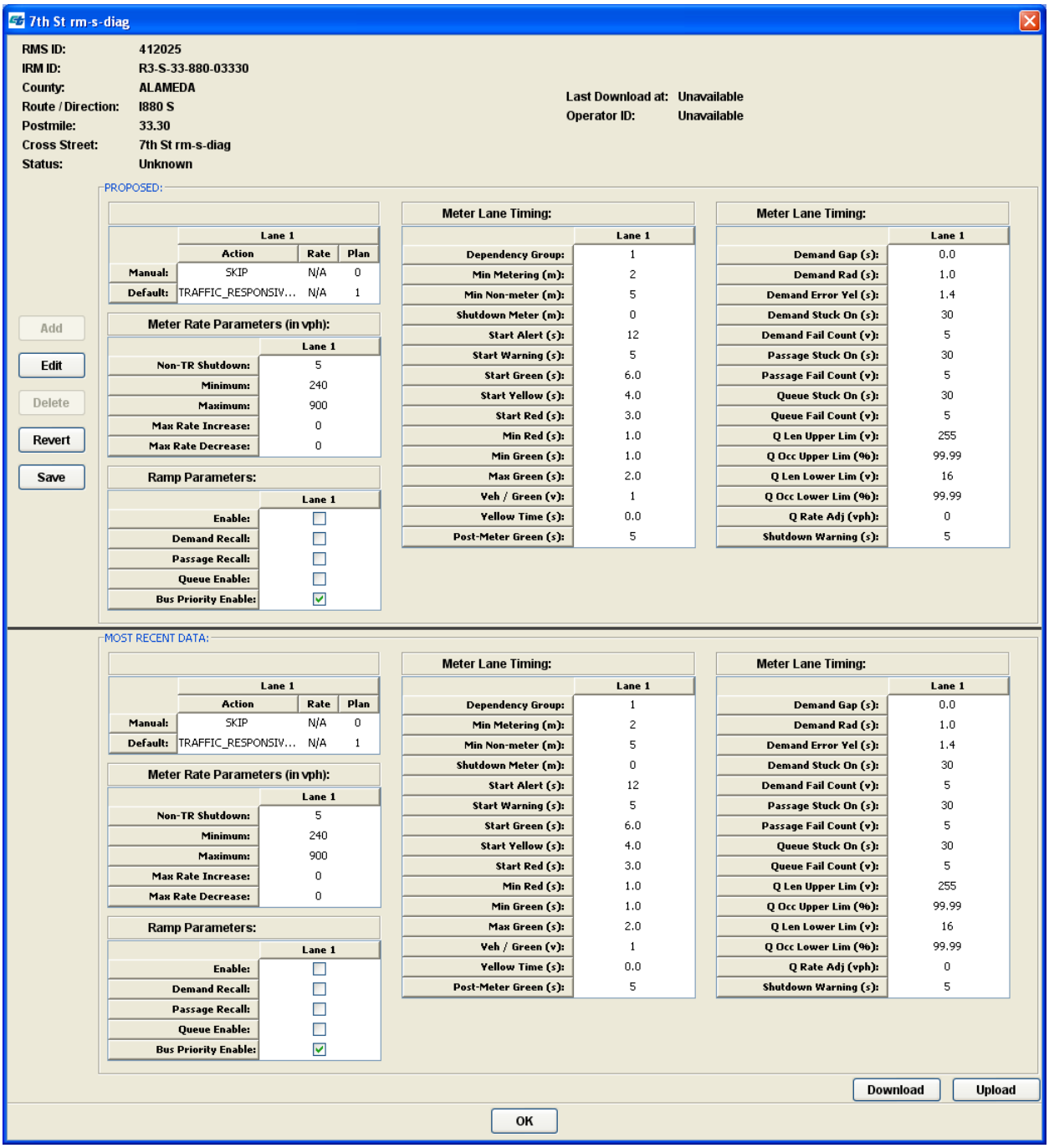


Figure 4-31: RMS Metered Lane Parameter Window

Selecting the Edit button in the Metered Lane Parameters window will open the associated Edit window populated with the data from the Proposed area of the associated Metered Lane window. The operator can modify the value of any parameter in the window. The following is a description of the buttons in this window, shown in Figure 4-32.

- **Cancel** — Close the window but do NOT populate the Proposed area of the associated Metered Lane window with the data from the associated Metered Lane Edit window.
- **OK** — Close the window AND populate the Proposed area of the associated Metered Lane window with the data from the associated Metered Lane Edit window.

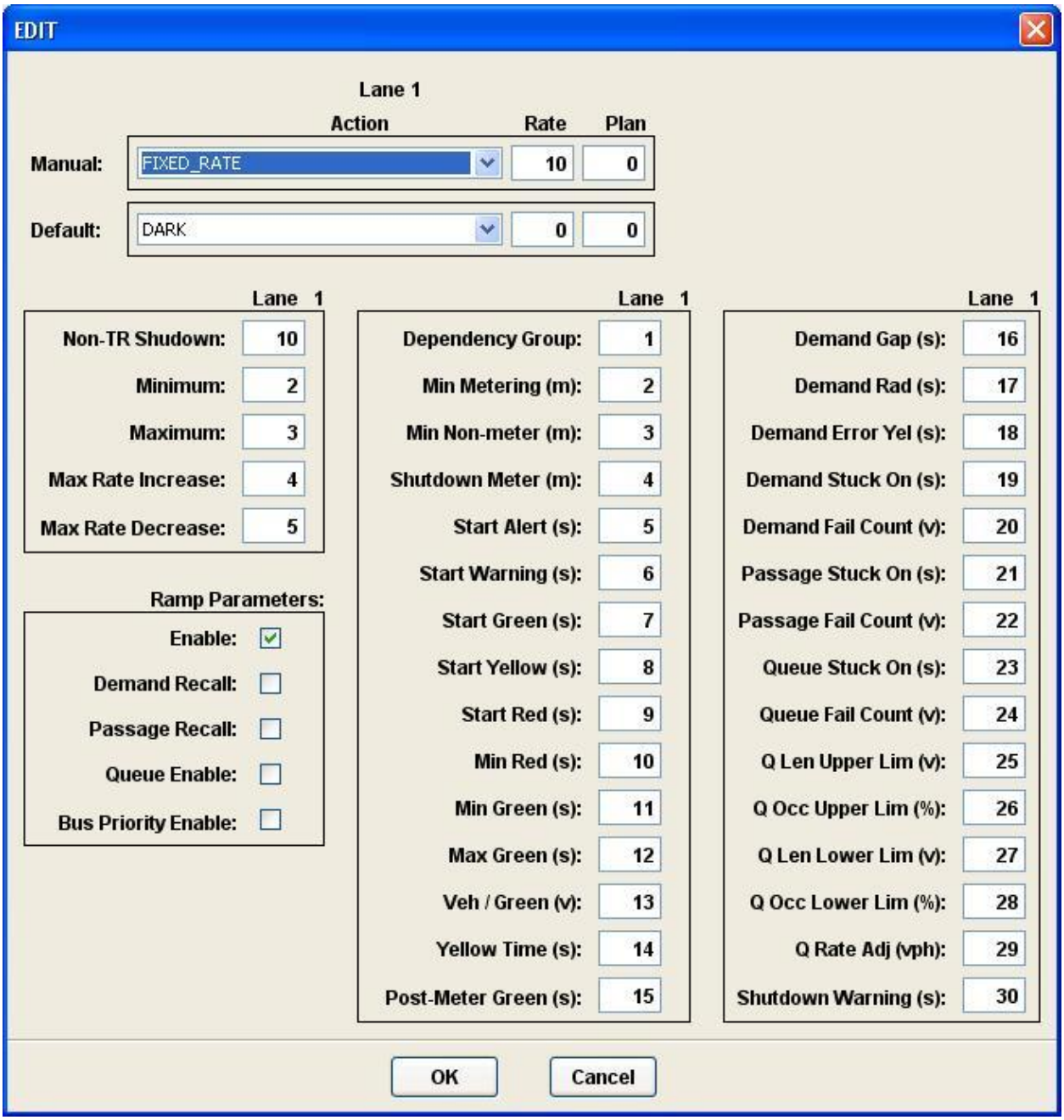


Figure 4-32: RMS Metered Lane Parameter Edit Window

4.11.2.3 Time-of-Day Table

Selecting the TOD Table button in the Configure RMS Parameters window opens the TOD Table window. This displays the Time of Day metering schedule for the selected controller. Through this window the operator can view and update the TOD table in the controller memory. Figure 4-31 shows this window.

The following is a description of the fields, buttons and windows in the TOD Table window.

- Header — Display:
  - RMS ID
  - IRM ID
  - County
  - Location (Route/Direction)
  - Postmile
  - Cross Street information
- Status — Display the operational status of the RMS
- Last Download at — Display the last date and time that the TOD Table was downloaded to the RMS. If unknown, the field will be populated with "Unavailable"
- Operator ID — Display the identification of the operator that made the last change to any parameter in the TOD Table. If unknown, the field will be populated with "Unavailable"
- Proposed — Each difference between parameter values in this area and the Most Recent Data area is highlighted in yellow
- Most Recent Data — Set of parameters most recently saved to the configuration database, whether through a controller memory upload or by way of the **Save** button on this window
- **Edit** — Open the Edit window to allow the operator to modify the parameters. This window is shown in Figure 4-34
- **Revert** — Repopulate the Proposed area with the data from the configuration database
- **Save** — Write the data from the Proposed area to the configuration database
- **Download** — Send the data in the Proposed area to the RMS AND write the data to the configuration database
- **Upload** — Receive the TOD Table from the RMS AND populate the Most Recent Data area
- **OK** — Close the window

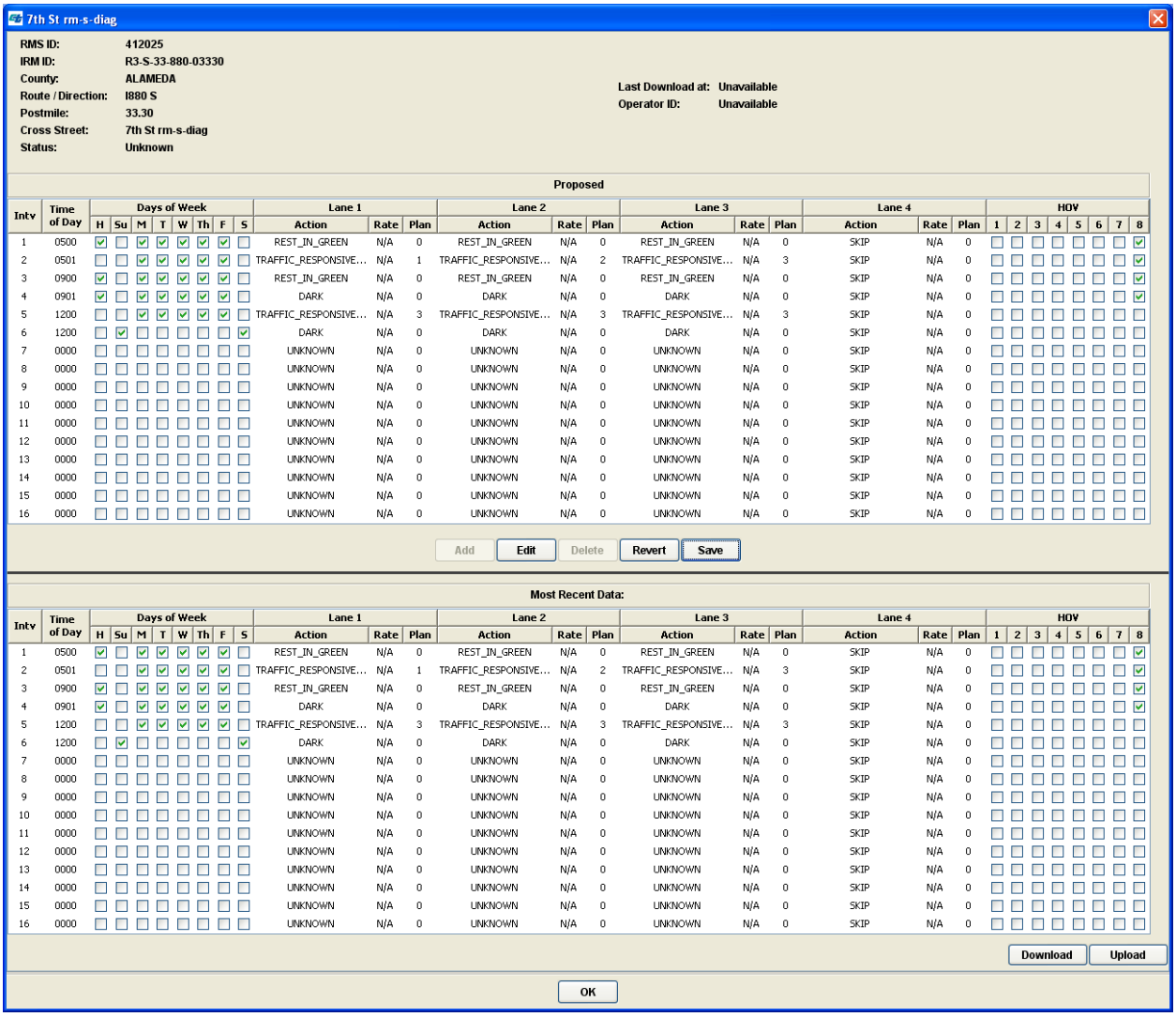


Figure 4-33: RMS TOD Table Window

Selecting the Edit button in the TOD Table window will open the associated Edit window populated with the data from the Proposed area of the TOD Table window. The operator can modify the value of any parameter in the window. The following is a description of the buttons in this window, shown in Figure 4-34.

- **Cancel** — Close the window but do NOT populate the Proposed area of the TOD Table window with the data from the TOD Table Edit window.
- **OK** — Close the window AND populate the Proposed area of the TOD Table window with the data from the TOD Table Edit window.

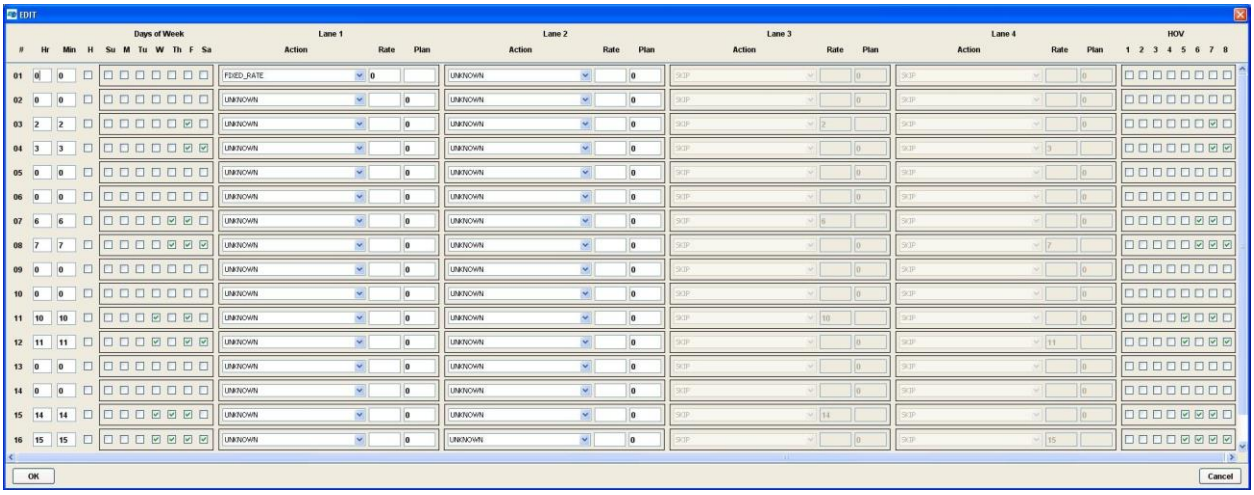


Figure 4-34: RMS TOD Table Edit Window

4.11.2.4 Holiday Table

Selecting the Holiday button in the Configure RMS Parameters window opens the Holiday Table Schedule window. This displays the holiday schedule for the selected RMS. The holiday schedule is sometimes a modified metering schedule. Figure 4-35 shows this window.

The following is a description of the fields, buttons and windows in the Holiday Table window.

- Header — Display:
  - RMS ID
  - IRM ID
  - County
  - Location (Route/Direction)
  - Postmile
  - Cross Street information
- Status — Display the operational status of the RMS
- Last Download at — Display the last date and time that the Holiday Table was downloaded to the RMS. If unknown, the field will be populated with "Unavailable"
- Operator ID — Display the identification of the operator that made the last change to any parameter in the Holiday Table. If unknown, the field will be populated with "Unavailable"
- Proposed — Each difference between parameter values in this area and the Most Recent Data area is highlighted in yellow

• Most Recent Data	Set of parameters most recently saved to the configuration database, whether through a controller memory upload or by way of the **Save** button on this window
• **Edit**	Open the Edit window to allow the operator to modify the parameters. This window is shown in Figure 4-36
• **Revert**	Repopulate the Proposed area with the data from the configuration database
• **Save**	Write the data from the Proposed area to the configuration database
• **Download**	Send the data in the Proposed area to the RMS AND write the data to the configuration database
• **Upload**	Receive the Holiday Table from the RMS AND populate the Most Recent Data area
• **OK**	Close the window

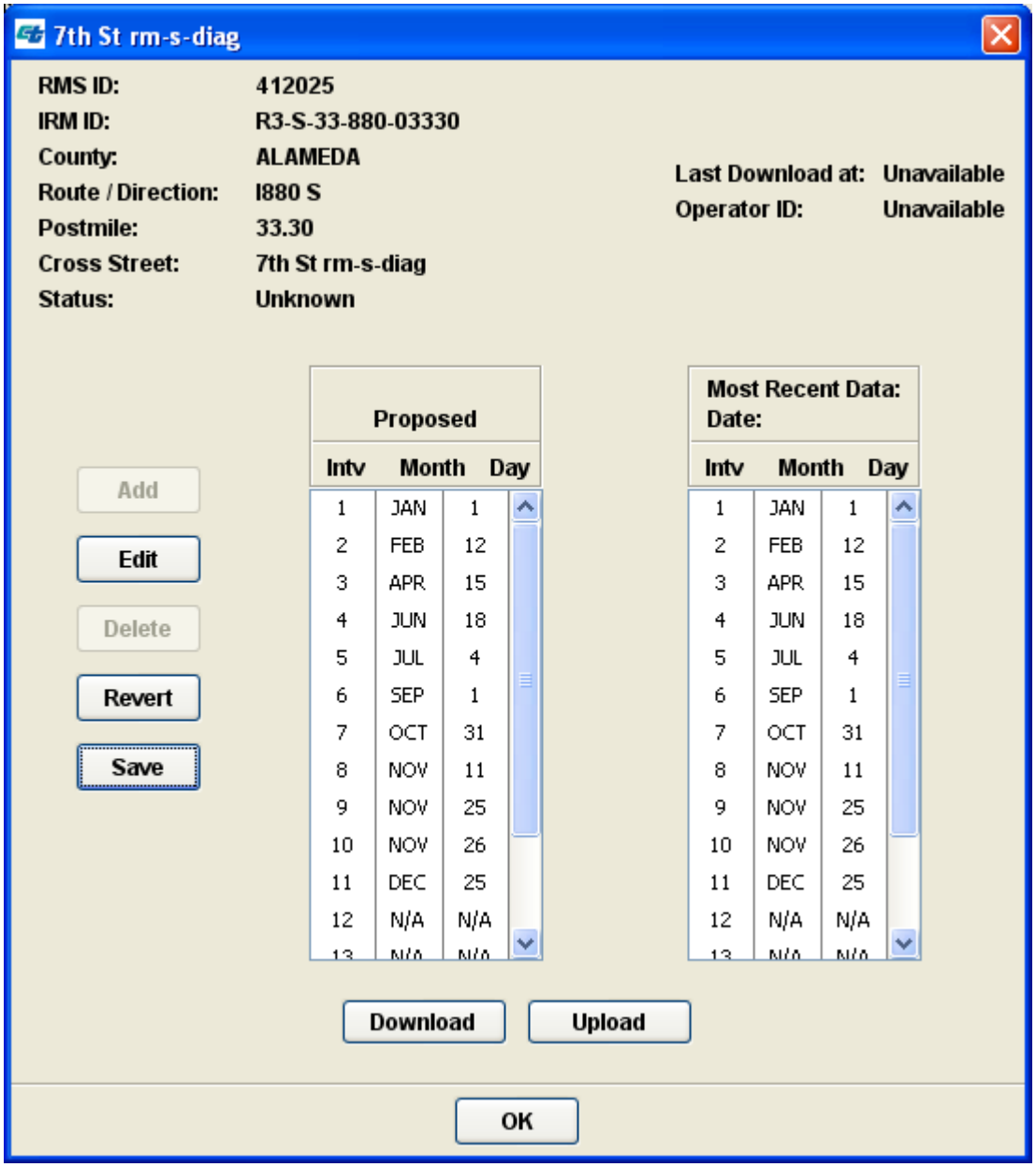


Figure 4-35: RMS Holiday Table Window

Selecting the Edit button in the Holiday Table window will open the associated Edit window populated with the data from the Proposed area of the Holiday Table window. The operator can modify the value of any parameter in the window. The following is a description of the buttons in this window, shown in Figure 4-36.

- **Cancel** Close the window but do NOT populate the Proposed area of the Holiday Table window with the data from the Holiday Table Edit window.

- **OK** — Close the window AND populate the Proposed area of the Holiday Table window with the data from the Holiday Table Edit window.

Figure 4-36: RMS Holiday Table Edit Window

4.11.2.5 Metering Plan Tables

The Metering Plan tables allow the operator to view and update parameters for the local mainline response algorithm in the controller memory. This window is shown in Figure 4-37.

The following is a description of the fields, buttons and windows in the Metering Plan Table window.

- Header — Display:
  - RMS ID
  - IRM ID
  - Location (Route/Direction)
  - Postmile

	• County • Cross Street information
• Status	Display the operational status of the RMS
• Last Download at	Display the last date and time that the Metering Plan Table was downloaded to the RMS. If unknown, the field will be populated with "Unavailable"
• Operator ID	Display the identification of the operator that made the last change to any parameter in the Metering Plan Table. If unknown, the field will be populated with "Unavailable"
• Proposed	Each difference between parameter values in this area and the Most Recent Data area is highlighted in yellow
• Most Recent Data	Set of parameters most recently saved to the configuration database, whether through a controller memory upload or by way of the **Save** button on this window
• **Edit**	Open the Edit window to allow the operator to modify the parameters. This window is shown in Figure 4-38
• **Revert**	Repopulate the Proposed area with the data from the configuration database
• **Save**	Write the data from the Proposed area to the configuration database
• **Download**	Send the data in the Proposed area to the RMS AND write the data to the configuration database
• **Upload**	Receive the Metering Plan Table from the RMS AND populate the Most Recent Data area
• **OK**	Close the window

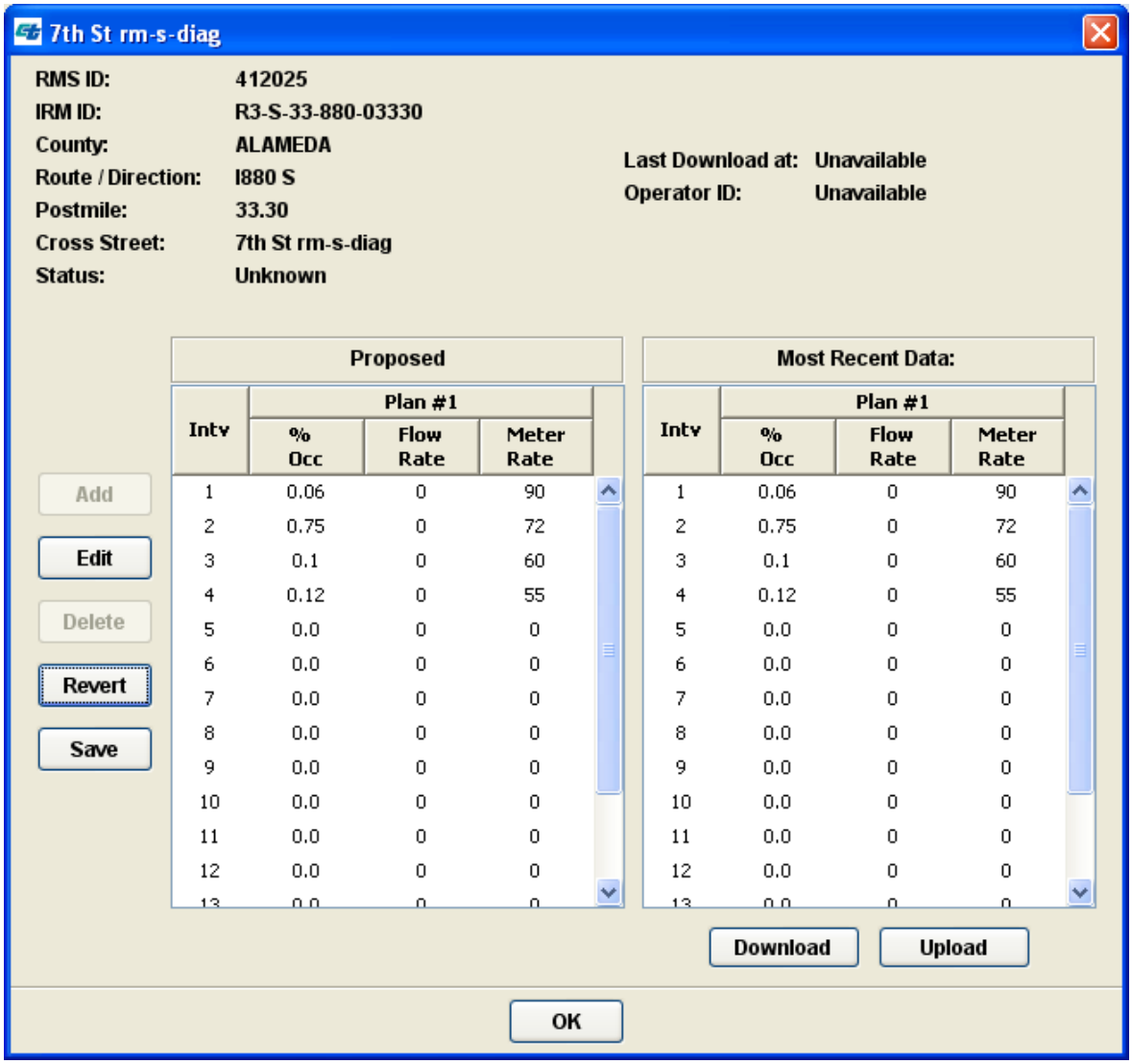


Figure 4-37: RMS Metering Plan Table Window

Selecting the Edit button in the Metering Plan Table window will open the associated Edit window populated with the data from the Proposed area of the associated Metering Plan window. The operator can modify the value of any parameter in the window. The following is a description of the buttons in this window, shown in Figure 4-38.

- **Cancel** — Close the window but do NOT populate the Proposed area of the associated Metering Plan window with the data from the associated Metering Plan Edit window.
- **OK** — Close the window AND populate the Proposed area of the associated Metering Plan window with the data from the associated Metering Plan Edit window.

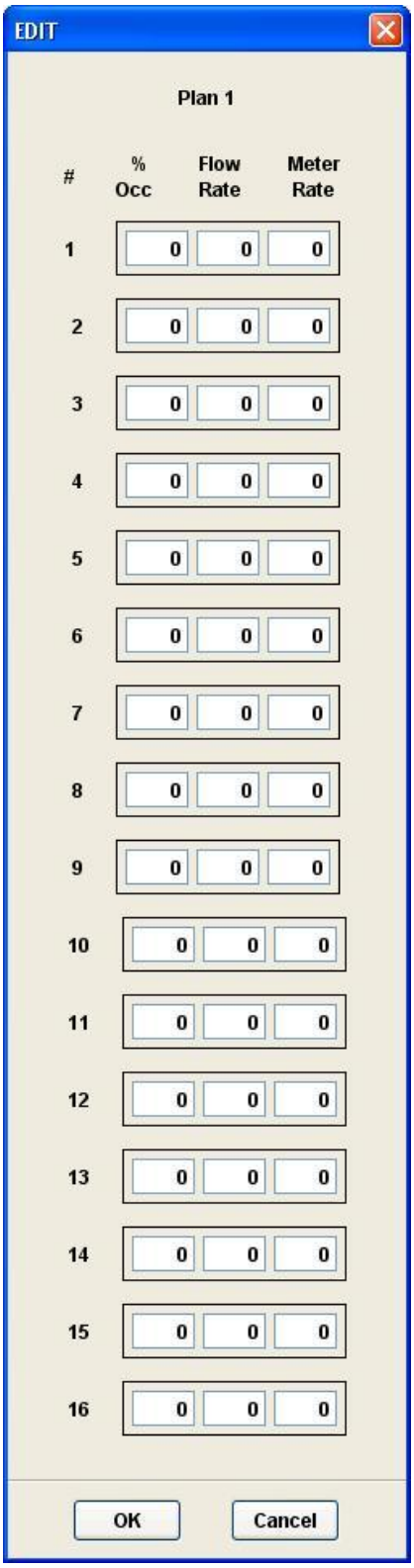


Figure 4-38: RMS Metering Plan Edit Window

4.11.3 View Comment

The View Comment window allows the operator/engineer to enter a comment or description about the ramp. This functionality is similar to the Event Comment entry as it maintains a log of all the entries. The entry is automatically date/time stamped, as well includes the current operator identification for each entry. This window is shown in Figure 4-39.

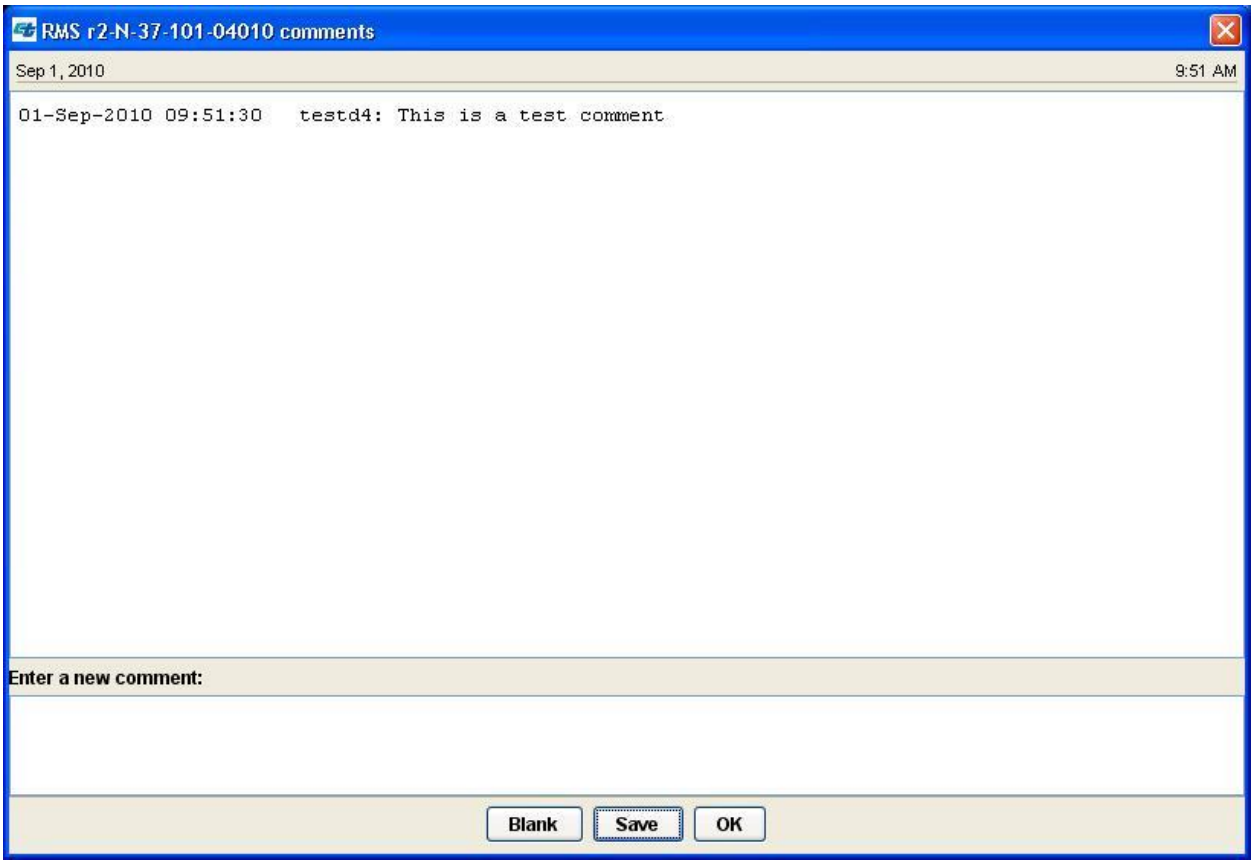


Figure 4-39: RMS View Comment Window

4.12 Tow Service

Under the *Field Device* pull-down menu is the Tow Service icon. For D4 ATMS, there is an interface with the Tow Service AVL system to locate Tow Service vehicle locations and display these icons on the map. This window is shown in Figure 4-40.

The following information is included in this window:

- "Time 1" Displays current date/time
- Vehicle ID # Specific vehicle identification number
- Contractor ID Contractor identification
- Status Current status
- Latitude Directional latitude of vehicle
- Longitude Directional longitude of vehicle

- Speed — Current speed of vehicle
- Direction — Current direction of travel of vehicle
- Time — Last date/time of data received from vehicle
- GPS Lock — Is GPS valid for vehicle?

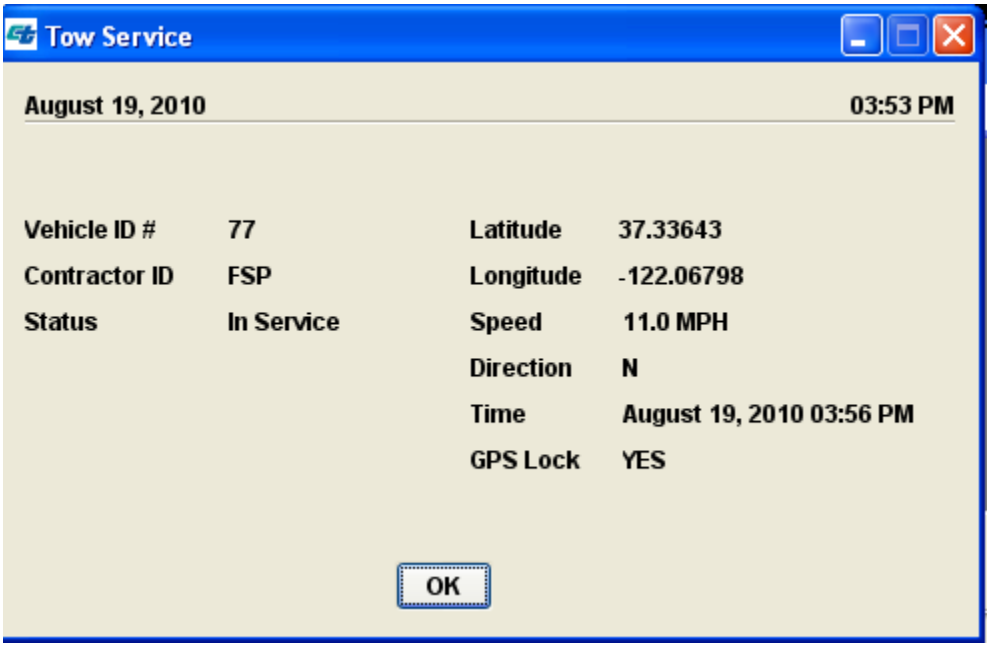


Figure 4-40: Tow Service Status Window

4.13 Mainline VDS

Traffic data collected from the detectors in the field is displayed in the real-time ATMS and finally stored in the database to be accessed by historical reports. To read details about the available D4 ATMS reports, see Section 6.

The real-time map display includes VDS icons that represent, at an overview level, the congestion on the freeways. Traffic data displayed on the map automatically updates every polling cycle (30 seconds). At the highest map level (zoom level 1.0), a circular icon is colored green, yellow, orange, or red, representing the station average estimated speed, volume, or occupancy. At the zoomed-in level, a rectangular icon shows lane-by-lane data, using the same color code. A grey icon represents that no valid data is available for the lane or station (lane status is not OK or Suspect).

4.13.1 VDS Data

The VDS Data/Control Window allows the operator to access lane data (status, volume, occupancy, and speed) for any VDS station, organized in table format as shown in Figure 4-41.

The following features are found on the VDS Data/Control Window:

- "Time 1" — Display current date/time

- Data at — Display date/time to which data applies
- Header — Display:
  - VDS ID
  - IRM ID
  - County
  - Location (Route/Direction)
  - Postmile
  - Cross Street information
- Status — Display the operational status of VDS
- **Upstream** — View the VDS data upstream of the current VDS
- **Adjacent VDS** — Open the Adjacent VDS Data Window (see Section 4.13.3)
- **Downstream** — View the VDS data downstream of the current VDS
- **Freeze Data** — Freeze the displayed data
- **Detector Enable/Disable** — Open VDS Detector Enable/Disable window
- **View/Edit Comments** — Open the Comment window (See 4.13.5)
- VDS Data Window — List the VDS data by lane and provide the following information:
  - Lane — Physical lane number
  - Status — Current status of the lane
  - Volume (15 Min) — Accumulated volume from the last 30 polls (based on good data)
  - Volume (5 Min) — Accumulated volume from the last 10 polls (based on good data)
  - Volume (30 Sec) — Volume from the most recent poll
  - Occupancy — Normalized occupancy from the most recent poll
  - Speed — Average speed for lane from the most recent poll
- Mainline Average Fields — Display traffic data averaged across the lanes based on good data
- Mainline Total Fields — Display total volumes from all of the lanes based on good data
- Scroll Bar — Allow scrolling through displayed data
- **Zoom to Area** — Shift to that specific device on the map
- **OK** — Close the window

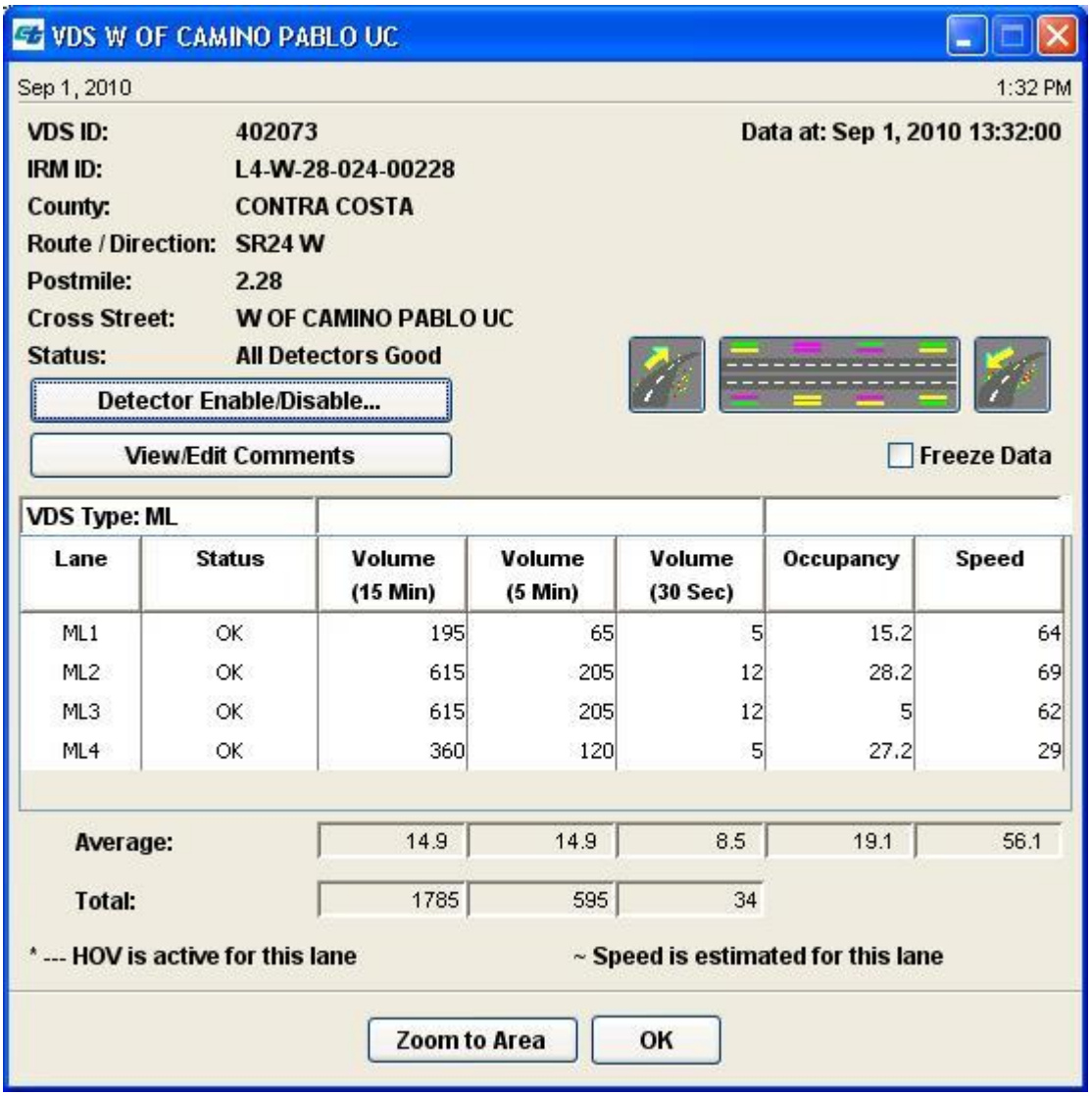


Figure 4-41: VDS Data/Control Window

4.13.2 Detector Enable/Disable

The Detector Enable/Disable button on the VDS Data/Control window launches the Detector Enable/Disable window. This is shown in Figure 4-42.

The following features are found on the VDS Detector Enable/Disable window:

- "Time 1" — Display current date/time
- Header — Display:
  - VDS ID
  - IRM ID
  - County
  - Location (Route/Direction)
  - Postmile
  - Cross Street information
- Status — Display the operational status of VDS

- VDS Data Window — List the VDS data by lane and provide the following control:
  - Lane — Physical lane number
  - Status — Current status of the lane
  - Enable Both — Enable the leading and trailing detectors
  - Leading Only — Enable the leading detector only
  - Trailing Only — Enable the trailing detector only
  - Disable Both — Disable the leading and trailing detectors
- **OK** — Close the window
- **Cancel** — Close the window but do NOT change any values
- **Apply** — Send the enable/disable values to the VDS via the PCDC

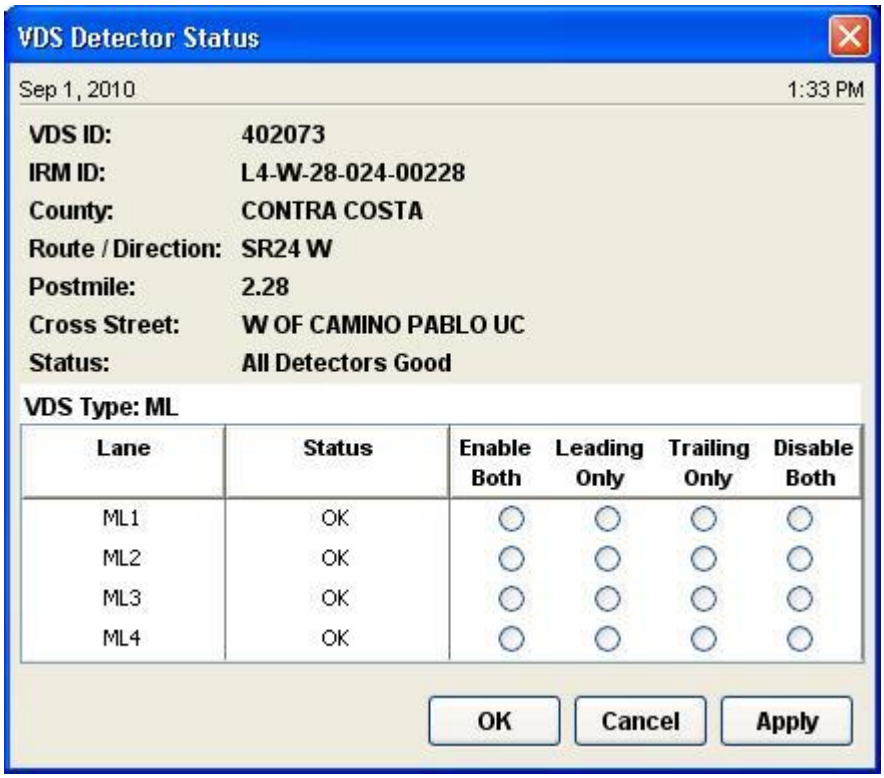


Figure 4-42: VDS Detector Enable/Disable Window

4.13.3 Adjacent VDS Window

From this window, shown in, the operator can view the occupancy, volume, speed, and detector status for four (4) adjacent VDS (two (2) upstream and two (2) downstream). The primary VDS is always displayed in the middle.

Similar to the VDS Data/Control window the operator can freeze the data display and can view other VDSs upstream or downstream by selecting the corresponding button.

To change the data information viewed, the operator selects the Data Display drop down list. This enables the operator to choose which information is to be shown in the data columns. Available selections include the following:

- Occupancy
- 30 Second Volume
- 5 Minute Volume
- 15 Minute Volume
- Speed
- Status

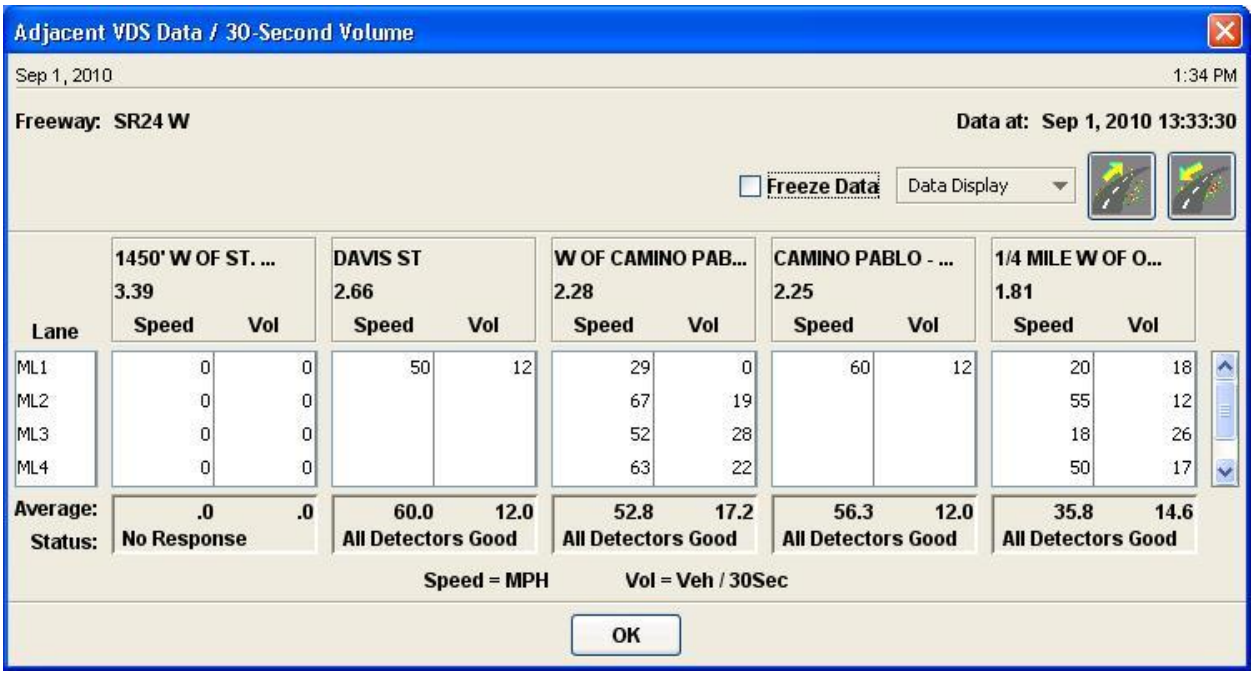
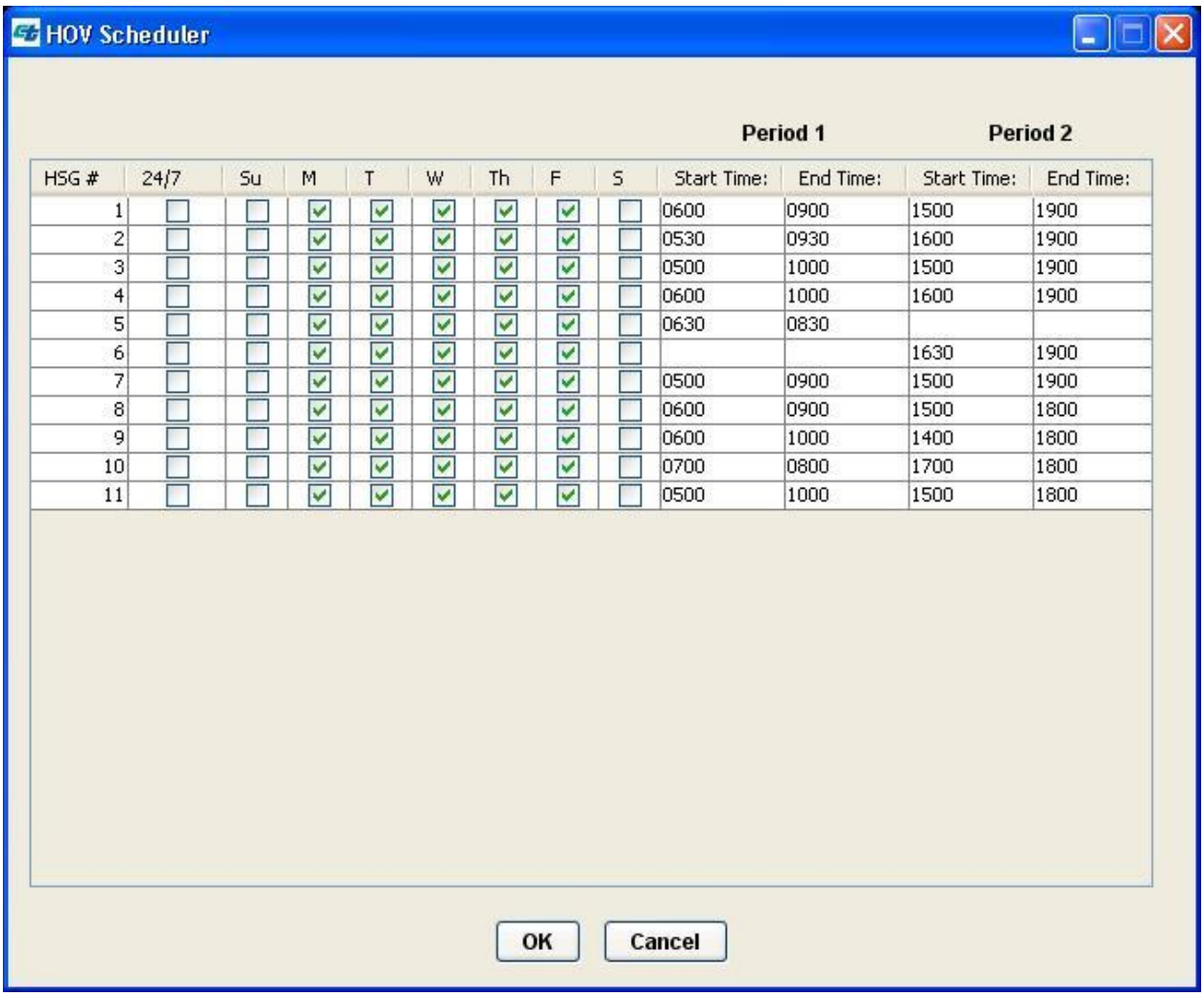


Figure 4-43: Adjacent VDS Display Window

4.13.4 HOV Schedule

This window allows the operator to review the currently defined HOV Group schedule. This is shown in Figure 4-44. Information on this window includes the following:

- HSG # — HOV Schedule Group number
- 24/7 — Is this group active for 24/7?
- S/M/T/W/Th/F/S — Day(s)-of-week selections
- Period 1 Start Time — Period 1 start time
- Period 1 End Time — Period 1 end time
- Period 2 Start Time — Period 2 start time
- Period 2 End Time — Period 2 end time
- **Cancel** — Close the window
- **OK** — Close the window



HSG #	24/7	Su	M	T	W	Th	F	S	Start Time:	End Time:	Start Time:	End Time:
1	☐	☐	☑	☑	☑	☑	☑	☐	0600	0900	1500	1900
2	☐	☐	☑	☑	☑	☑	☑	☐	0530	0930	1600	1900
3	☐	☐	☑	☑	☑	☑	☑	☐	0500	1000	1500	1900
4	☐	☐	☑	☑	☑	☑	☑	☐	0600	1000	1600	1900
5	☐	☐	☑	☑	☑	☑	☑	☐	0630	0830		
6	☐	☐	☑	☑	☑	☑	☑	☐			1630	1900
7	☐	☐	☑	☑	☑	☑	☑	☐	0500	0900	1500	1900
8	☐	☐	☑	☑	☑	☑	☑	☐	0600	0900	1500	1800
9	☐	☐	☑	☑	☑	☑	☑	☐	0600	1000	1400	1800
10	☐	☐	☑	☑	☑	☑	☑	☐	0700	0800	1700	1800
11	☐	☐	☑	☑	☑	☑	☑	☐	0500	1000	1500	1800

Figure 4-44: HOV Schedule Window

4.13.5 View/Edit Comments

This window, View Comment, allows the operator to enter a comment or description about the mainline VDS. This functionality is similar to the Event Comment entry as it maintains a log of all the entries. The entry is automatically date/time stamped, as well includes the current operator identification for each entry. This is shown in Figure 4-45.

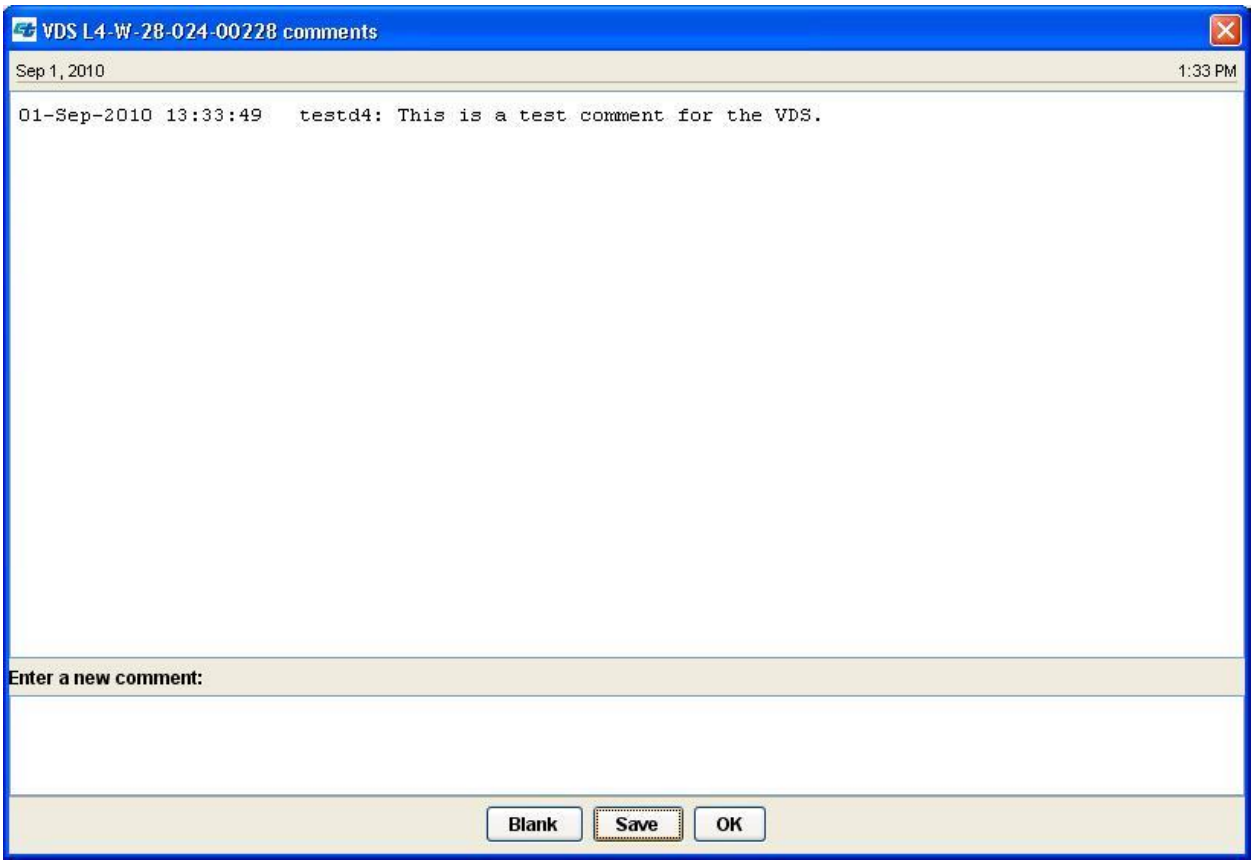


Figure 4-45: VDS Comment Window

4.13.6 Ramp VDS Data

The Ramp VDS Data/Control Window allows the operator to access lane data (status, volume, occupancy, and speed) for any Ramp VDS station, organized in table format as shown in Figure 4-41.

The following features are found on the Ramp VDS Data/Control Window:

- "Time 1" — Display current date/time
- Data at — Display date/time to which data applies
- Header — Display:
  - VDS ID
  - Location (Route/Direction)
  - IRM ID
  - Postmile

- County
- Cross Street information

- Status — Display the operational status of VDS
- **Upstream** — View the VDS data upstream of the current VDS
- **Downstream** — View the VDS data downstream of the current VDS
- Freeze Data — Freeze the displayed data
- **Detector Enable/Disable** — Open the Ramp VDS Detector Enable/Disable window
- VDS Data Window — List the Ramp VDS data by lane and provide the following information:
  - Lane — Physical lane number
  - Status — Current status of the lane
  - Volume (15 Min) — Accumulated volume for the last 30 polls (based on good data)
  - Volume (5 Min) — Accumulated volume for the last 10 polls (based on good data)
  - Volume (30 Sec) — Volume from the most recent poll
  - Occupancy — Normalized occupancy from the most recent poll
  - Speed — Estimated average speed for lane from the most recent poll
- Mainline Average Fields — Display traffic data averaged across the lanes based on good data
- Mainline Total Fields — Display total volumes from all of the lanes based on good data
- Scroll Bar — Allow scrolling through displayed data
- **Zoom to Area** — Shift to that specific device on the map
- **OK** — Close the window

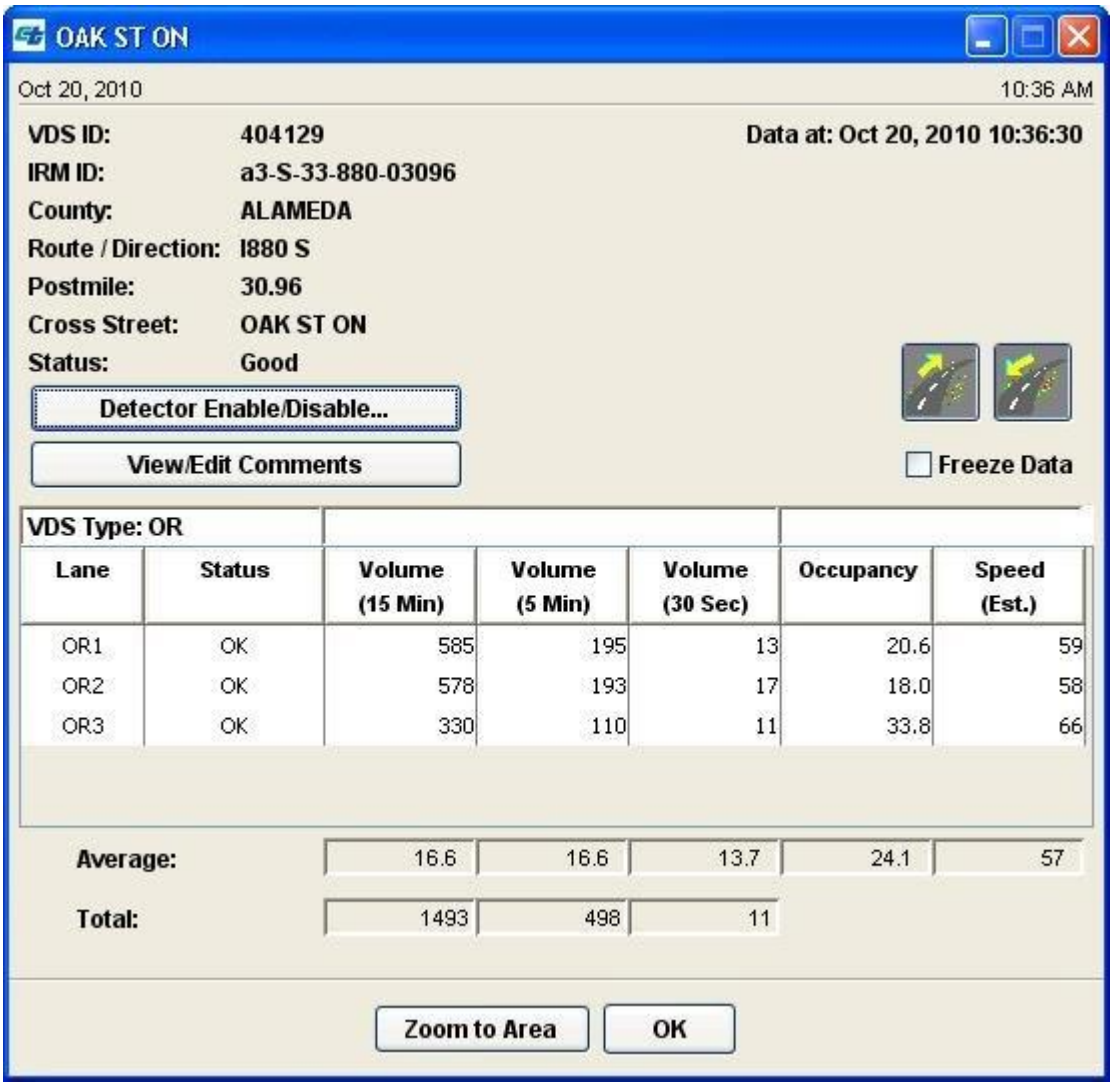


Figure 4-46: Ramp VDS Data/Control Window

4.13.7 Ramp VDS Detector Enable/Disable

The Detector Enable/Disable button on the Ramp VDS Data/Control window launches the Ramp VDS Detector Enable/Disable window. This is shown in Figure 4-47.

The following features are found on the Ramp VDS Detector Enable/Disable window:

- "Time 1" — Display current date/time
- Header — Display:
  - VDS ID
  - IRM ID
  - County
  - Location (Route/Direction)
  - Postmile
  - Cross Street information

- Status — Display the operational status of VDS
- VDS Data Window — List the VDS data by lane and provide the following control:
  - Lane — Physical lane number
  - Status — Current status of the lane
  - Enable — Enable the detector
  - Disable — Disable the detector
- "**OK** — Close the window
- **Cancel** — Close the window but do NOT change any values
- **Apply** — Send the enable/disable values to the VDS via the PCDC

Figure 4-47: Ramp VDS Detector Status Window

4.13.8 View/Edit Comments

This window, View Comment, allows the operator to enter a comment or description about the ramp VDS. This functionality is similar to the Event Comment entry as it maintains a log of all the entries. The entry is automatically date/time stamped, as well includes the current operator identification for each entry. This is shown in Figure 4-48.

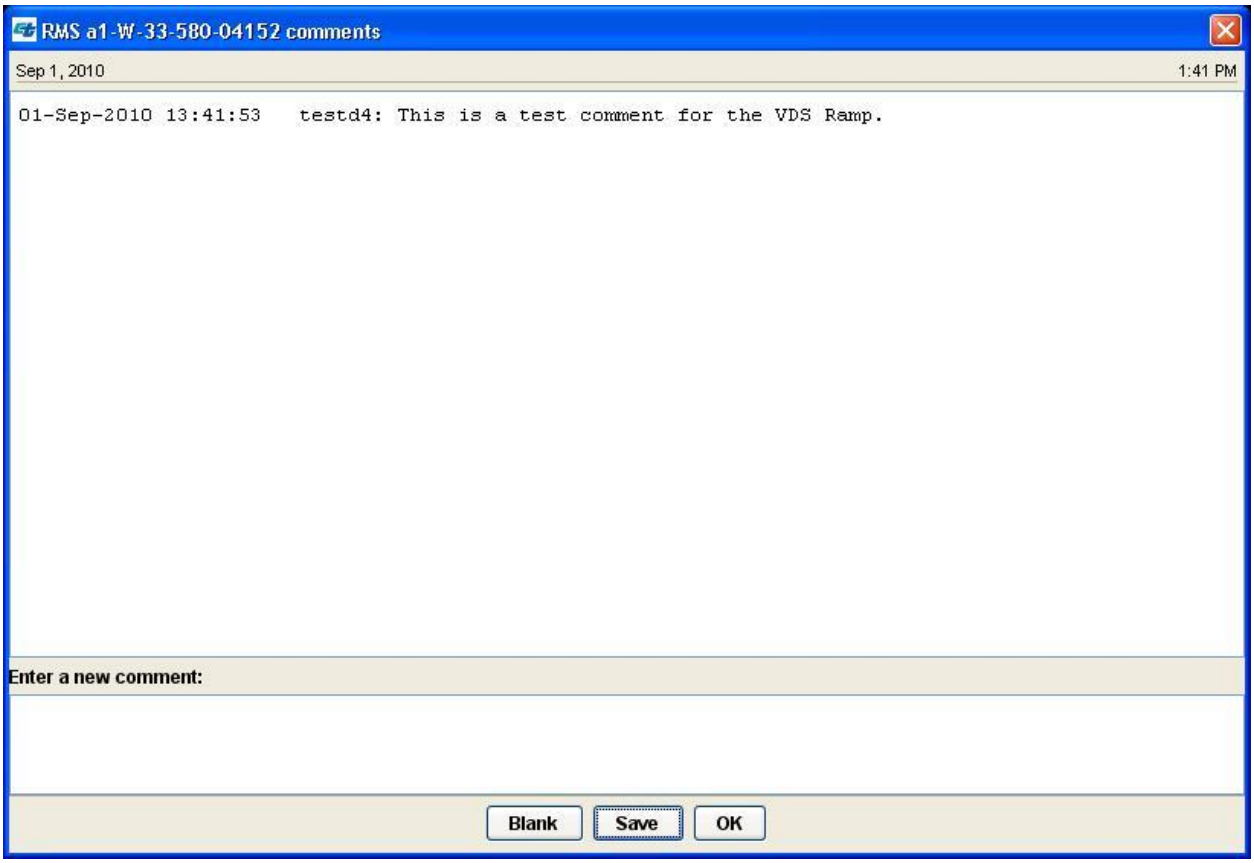


Figure 4-48: Ramp VDS Comment Window

5 EVENT MANAGEMENT

Event management handles a number of functions. These are:

- Identification of incidents that occur in the freeway system,
- Gathering of information about these incidents,
- Assessment of their impact on traffic flow,
- Formulation of strategies that will prevent worsening of the situation and eventually lead to resolution of the problem,
- Implementation of these strategies.

This section discusses the details involved in the accomplishment of these tasks.

Through the Events pull-down menu shown in Figure 5-1, the operator can access the following functions related to event management:

- Create — Create a new event (Incident, Emergency Closure, or Special Event)
- Summary — Display a summary event window which lists any unconfirmed, confirmed, scheduled and preconfirmed events already entered into the system
- Icon Display — Provide visibility and filter capabilities to the operator regarding the display of incidents, emergency closures, and special events
- Amber Alert — Provide the operator the ability to create an Amber Alert
- Incidents — Switch on/off the visibility of incidents
- Emergency Closures — Switch on/off the visibility of emergency closures
- Special Events — Switch on/off the visibility of special events
- CHP Events — Switch on/off the visibility of CHP events

Figure 5-1: Events and Configuration Pull-down Menus

From the Configuration pull-down menu, shown in Figure 5-1, the operator can control the operation of the Automatic Incident Detection (AID) algorithm, by enabling or disabling it.

The following sections describe the Event Summary window and the Event Icon Display window. Following that, a discussion about the lifecycle of an event is described.

5.1 Event Summary

The Event Summary window, as shown in Figure 5-2 lists all events in D4 ATMS. The only events not shown in this window are those events that have been terminated. The operator is able to sort the summary lists by Time Ascending or Time Descending. This is accomplished with the **Sort by** button in the upper right corner of the window.

The operator is also able to sort the events based upon the event state. This is performed by clicking on the View by button in the upper left corner of the window and selecting type. The event state includes Unconfirmed Events, Confirmed Events, and CHP Events.

Each event entry consists of a unique identification number, date and time of detection (unconfirmed events), date and time of occurrence (confirmed events), route, direction, location, and event type.

The operator is able to view the details about the entry by highlighting it, then selecting the **Details** button, else the operator can double-click on the entry and view the Event Management window for that event. The Event Management window is described in the creation of an event.

The operator is also able to terminate an existing event from this window. This is accomplished by the selection of the event and then selecting the **Terminate** button. A termination confirmation window is shown to the operator. If there are any active CMS messages in response to this event, the operator is shown a CMS termination window. The operator must then blank the CMS.

Previously terminated events are also able to be retried and modified from this window. The operator enters the desired event identification after selecting the **Terminated Event Lookup** button. The operator may modify most of the details of the event EXCEPT response plan elements and the location of the event.

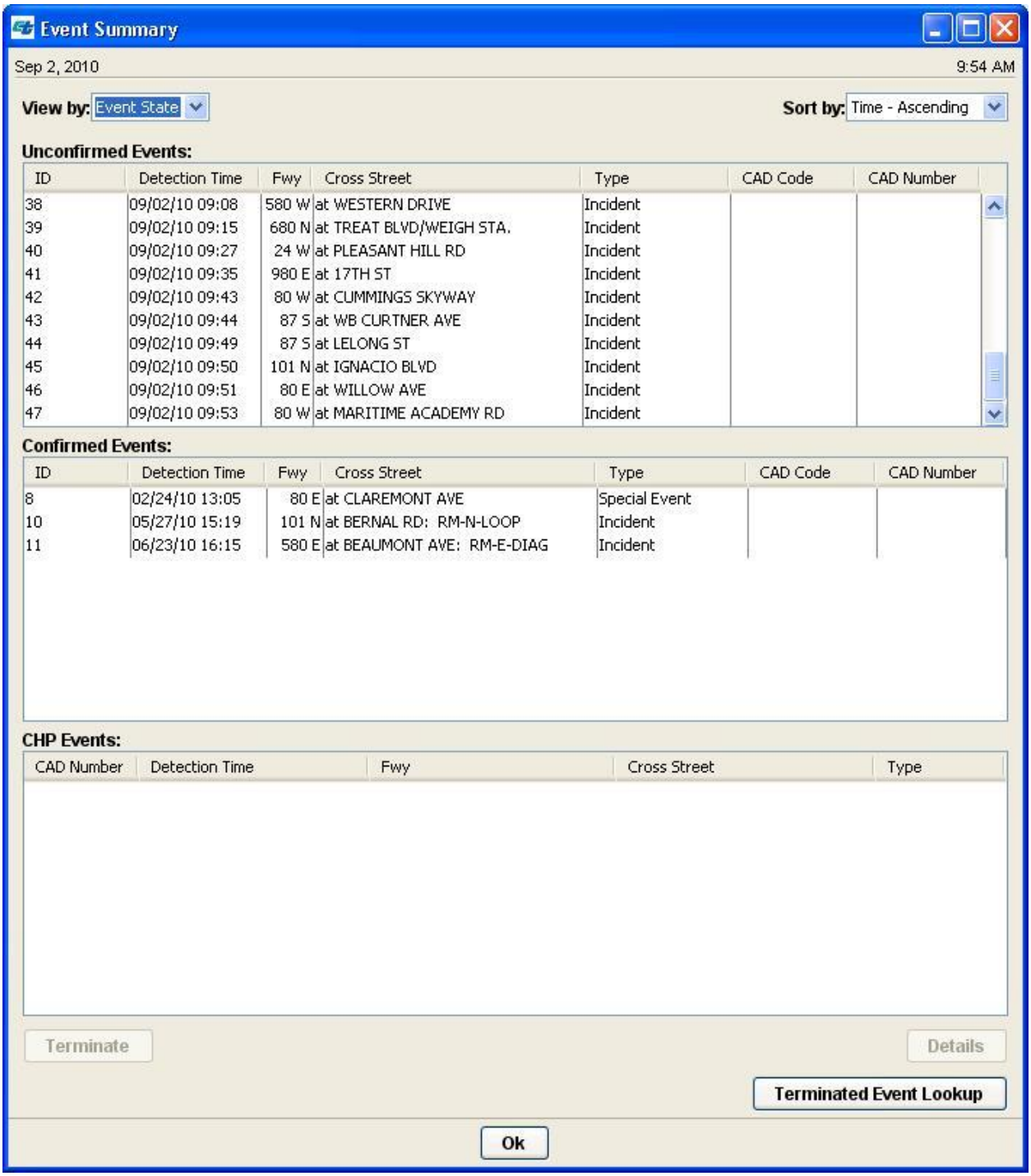


Figure 5-2: Event Summary Window

5.2 Event Icon Display

The Icon Display window, shown in Figure 5-3, is very similar to the Field Devices Icon Display window. This window displays the icon, visibility, and default zoom level for each event type. The visibility portion of the window allows the operator to turn on/off the icons and set to default mode.

The following selections are available:

- Event Type — Incidents, Emergency Closures, and Special Events
- Visibility — On, Off
- Control — Default, On, Off
- Default Zoom Level — Displays the preset default zoom level for all icons

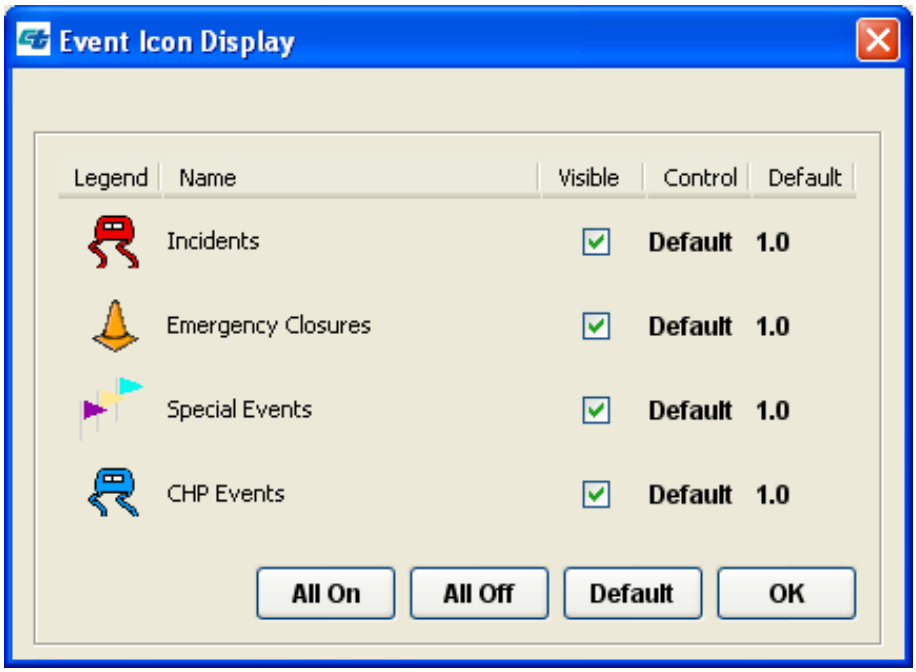


Figure 5-3: Event Icon Display

5.3 Special Event Response Plan Library

From the Configuration pull-down selection, the administrator/operator has the ability to create pre-defined response plans for Special Events. This window is shown in Figure 5-4. For each response plan, there are three available response plan elements: CMS, HAR, and Duty Page.

The operator may modify an existing plan or an element of a plan at any time simply by selecting the entry and then clicking on the **Modify** button. The library editor window, shown in Figure 5-5 is now available to the operator. The operator can modify the title or select the response plan element to modify. The CMS Response Plan is shown in Figure 5-6. When complete, the operator selects the **OK** button on the windows to save the entries.

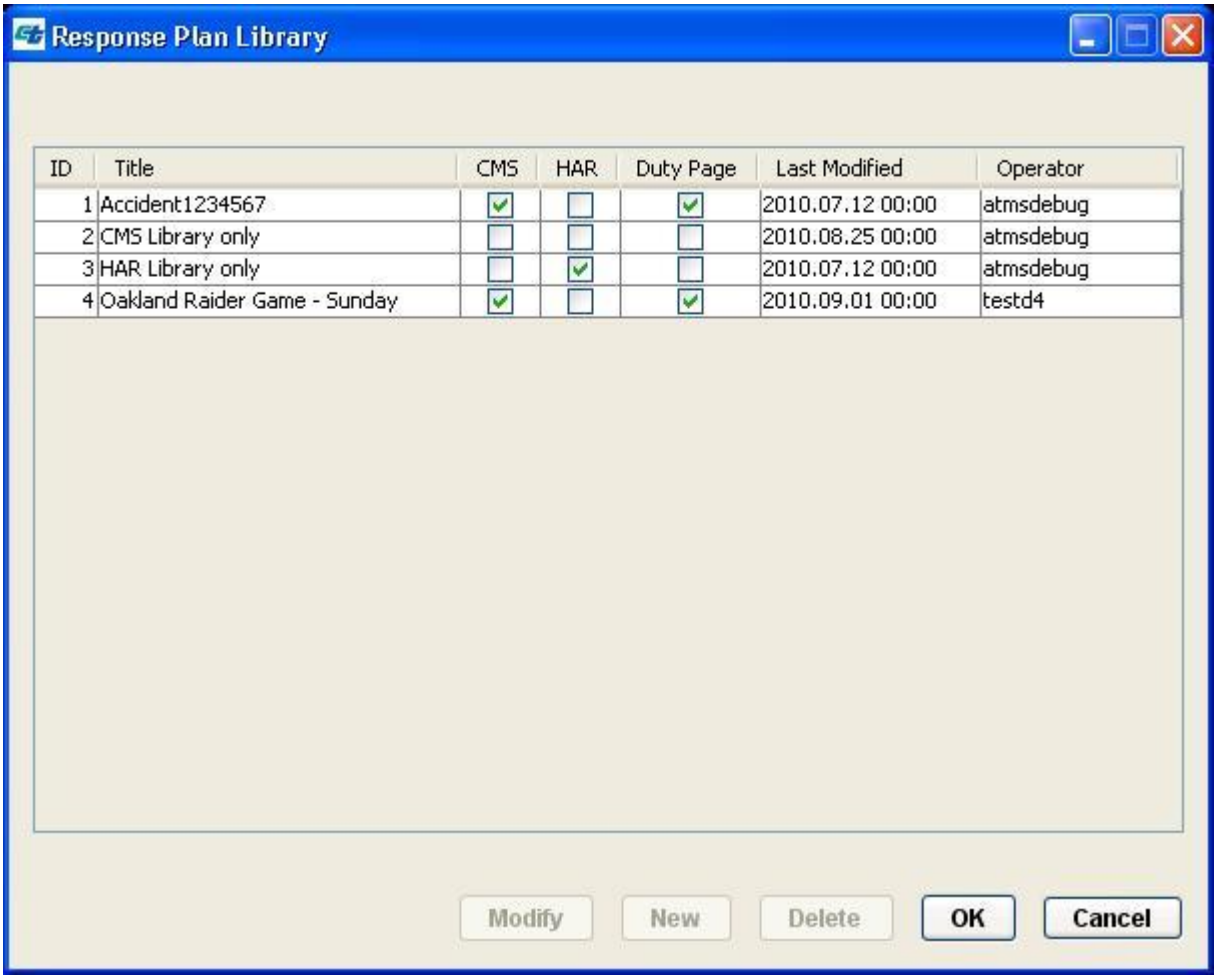


Figure 5-4: Special Event Response Plan Library Window

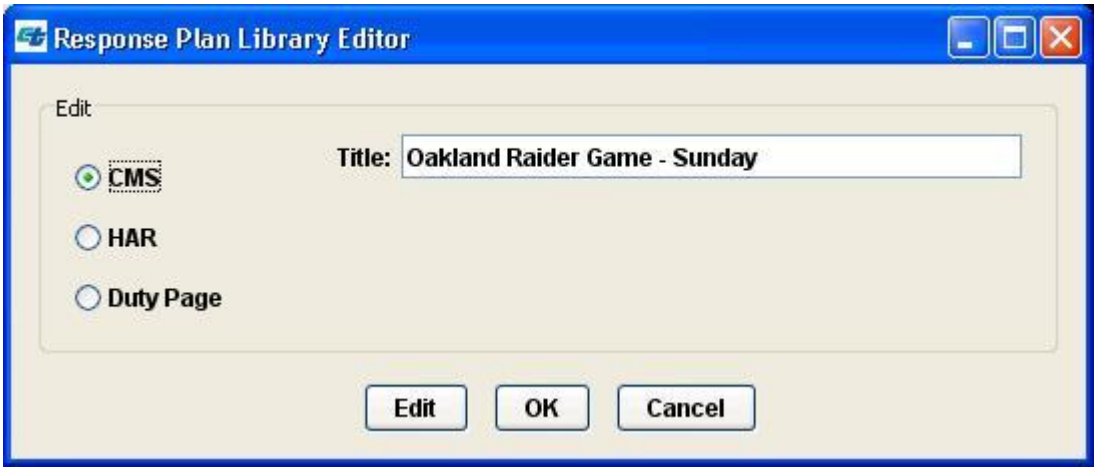


Figure 5-5: Special Event Response Plan Library Editor Window

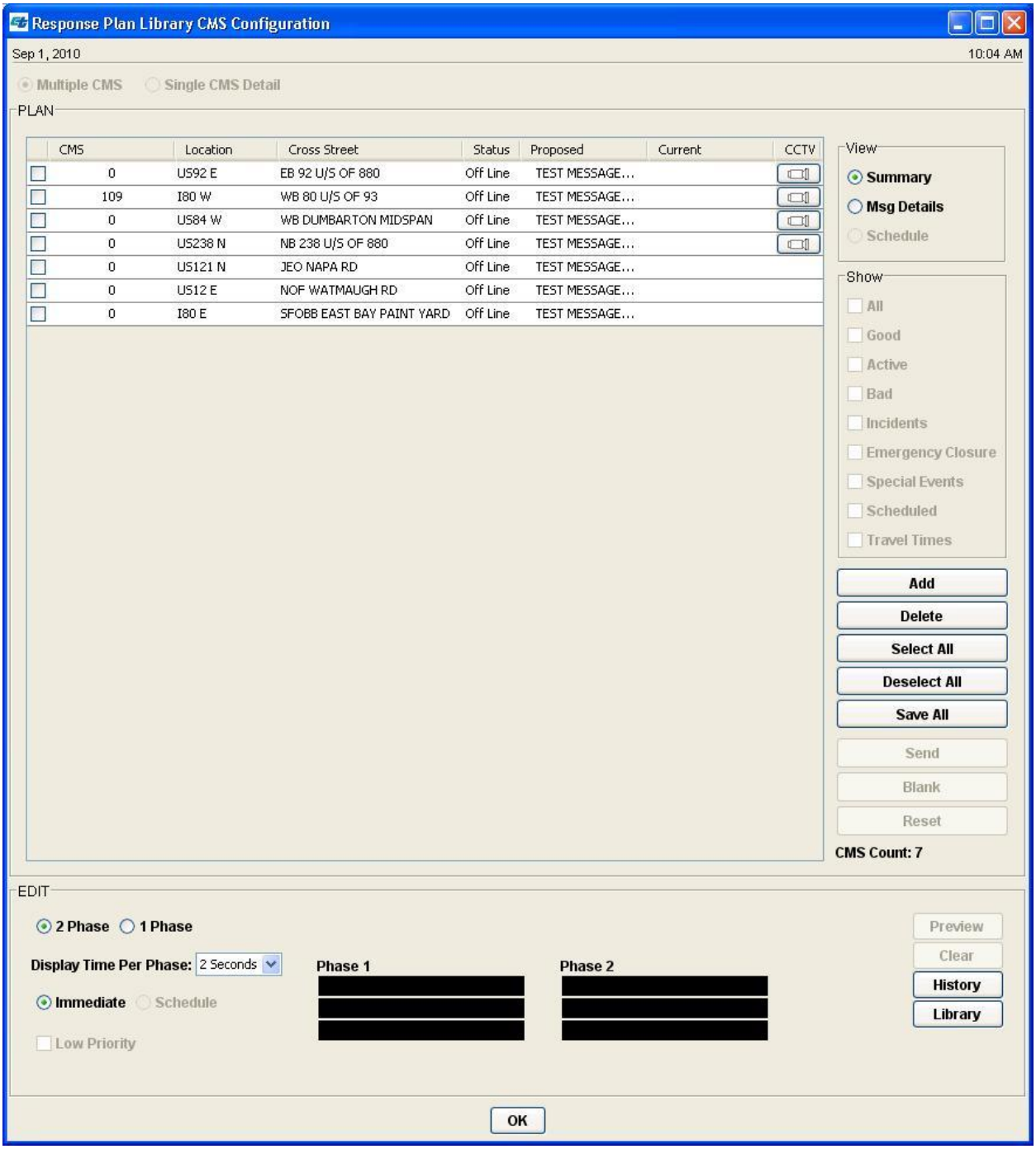


Figure 5-6: Special Event Response Plan CMS Library Window

5.4 Event Lifecycle

The following sections describe the lifecycle of an event. This discussion will be from the creation of an incident to the termination of the incident.

There are several ways by which a traffic incident may be detected and declared. The AID feature of D4 ATMS calls attention to probable incidents based on VDS

Data. Operators can detect incidents by monitoring video images from CCTV cameras located along the various freeways. Commuters can report incidents by using their cellular phones or callboxes located along the freeway. These calls are handled by CHP Computer-Aided Dispatch (CAD). Third-party traffic reports, the CHP, Freeway Service Patrol (FSP), Traffic Management Team (TMT), and Maintenance units are other means of detecting and declaring incidents.

5.4.1 Creation, Detection, and Verification

When an incident is reported, an operator must first verify its occurrence, then either confirm or deny it. To do this, the operator must first use the map display to zoom into the area where the incident is suspected to be. Then, with the aid of video images from nearby available CCTV cameras and external sources, if available, the operator determines if the suspected incident exists.

The procedure for manually creating, verifying, and confirming an incident is as follows:

- From the *Events* pull-down menu, select the Create option, then select Incident from the submenu. This opens the Event Management window, as seen in Figure 5-7.
- From this window the operator must indicate the road type, the route number, the direction, and the location (off-ramp) closest to the suspected incident.
- After selecting a location from the list, the **Zoom to Area** button is enabled. Selecting this button allows the operator to zoom into that general area, with the location in the center of the map display. Below the Zoom to Area button is the Map Point Pick Enable check box. This box allows the operator to indicate the incident location on the map. Clicking on the location of the incident on the map prompts a small red circle to highlight the location. The system then determines the corresponding postmile and location name based on the coordinates selected from the map. The CCTV button also selects up to two cameras closest to the location. This location is able to be moved simply by clicking another location on the map. This is available until the event is confirmed.
- The **Apply** button is then selected. This button is located at the lower left corner of the Event Management window and its selection causes a flashing unconfirmed incident icon to appear at that location and causes any associated CCTV cameras to be selected.
- At this time, the operator is still able to view the Event Management window. The operator then determines if this is a true incident or not. If this incident is true, the operator selects the **Confirm** button on the Placement/Confirmation tab. Once the Incident Confirmation is made, images from two (2) CCTV cameras at the selected location also appear (if available). These are used to assist in the verification of the incident.
- If no traffic problem exists, the operator selects the **Deny** button in the Event Management window. The operator then views the Deny confirmation

window and selects the **OK** button to deny this incident. At that time, the incident is removed from the map display and the Event Summary window.

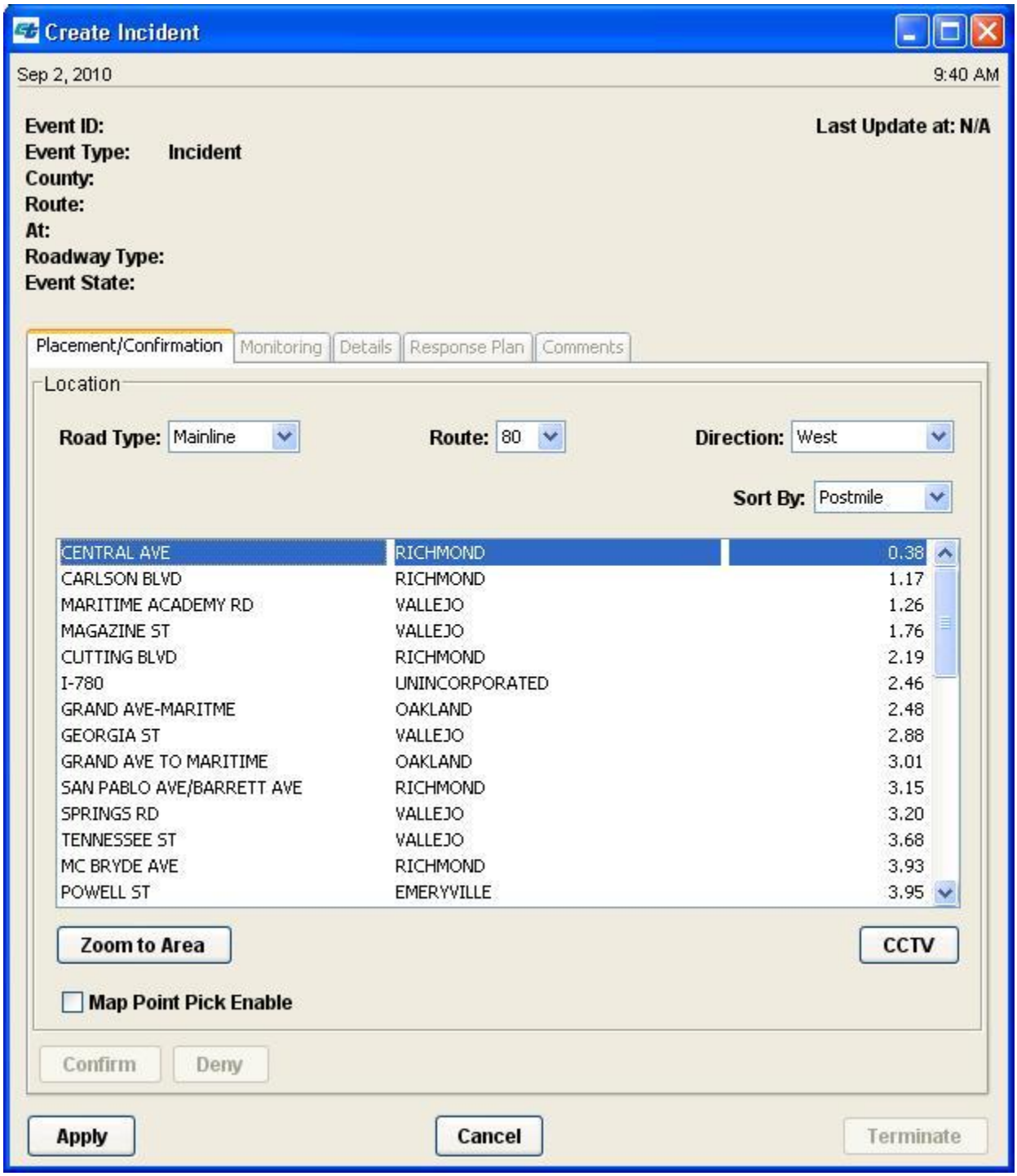


Figure 5-7: Event Management Window

5.4.2 Incident Details

Now that the incident has been confirmed, information on the incident must be provided to determine the response necessary to mitigate its impact and resolve the situation as soon as possible. This information is entered through the Incident Details tab, Figure 5-8, in the Event Management window. The following information should be entered. Any of the details listed below can be modified at any time during the incident lifecycle.

As a safe practice measure, the operator should select the **Apply** button before leaving the Incident Details tab. This confirms that the incident information is saved to the system database.

5.4.2.1 Background Information

Through the Event Details window, the operator enters the background information for the incident. The operator manually enters the CAD # and CAD Code, as well as field command post and phone number, if desired. These are not required unless the source and verification of the incident are via the CAD unit.

The Source and Weather conditions are entered by selecting from the choices listed in a pull-down list. These are as follows:

<u>Source:</u>

- CHP Dispatch/CAD
- System Algorithm
- FSP
- TMT
- Maintenance
- Operator/CCTV
- Public
- Media
- Other

<u>Weather:</u>

- No Factor
- Rain
- Snow
- Heavy Wind
- Fog
- Flood
- Blowing Sand
- Dust

- Smoke

5.4.2.2 Attributes

Attributes include a series of buttons for incident type, vehicles, injuries, fatalities, Caltrans property damage and other attributes. When selected, each attribute opens a corresponding dialog window, as described below.

Incident Type

Figure 5-9 displays the incident type dialog. From this window, the operator selects the incident type from the choices offered (i.e. collision, big rig, spill, etc.).

Vehicles

Figure 5-10 displays the vehicles dialog. From here, the operator selects the number of vehicles involved, as well as the type of vehicle (motorcycle, bus, recreation vehicle, etc.).

Injuries

Figure 5-11 displays the injuries dialog. From this window the operator enters the number and type of injuries.

Fatalities

Figure 5-11 displays the fatalities dialog. From this window the operator enters the number and type of fatalities.

Caltrans Property Damage

Figure 5-12 displays the Caltrans property damage dialog. If there was any Caltrans equipment or property damage due to the incident, the operator selects from a listing of various Caltrans equipment and property if any were damaged in the incident.

Other attributes that are available to the operator, contain general information like the following:

- Construction Zone
- Maintenance Responding
- TMT Responding
- Gawking

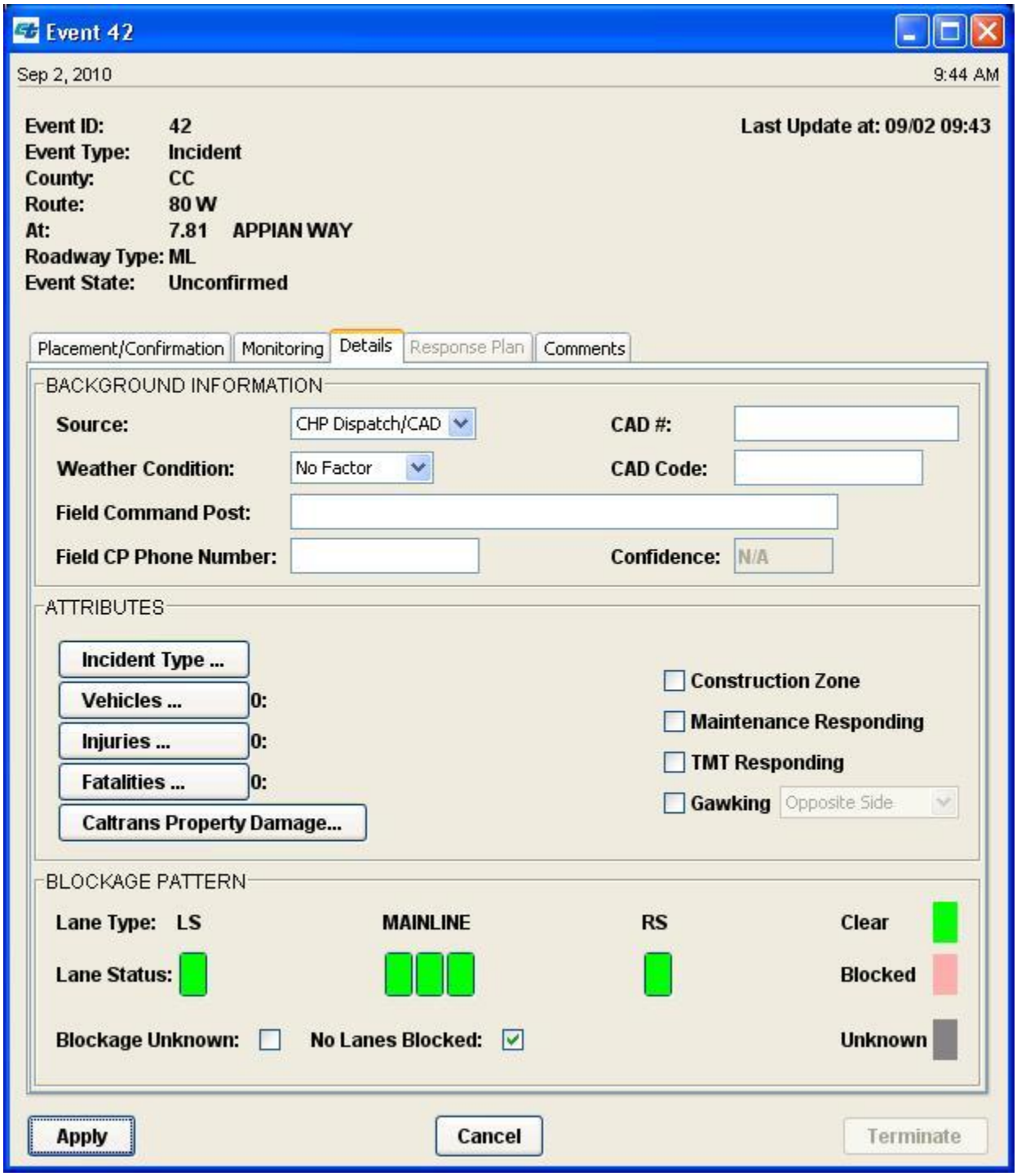


Figure 5-8: Event Details on Event Management

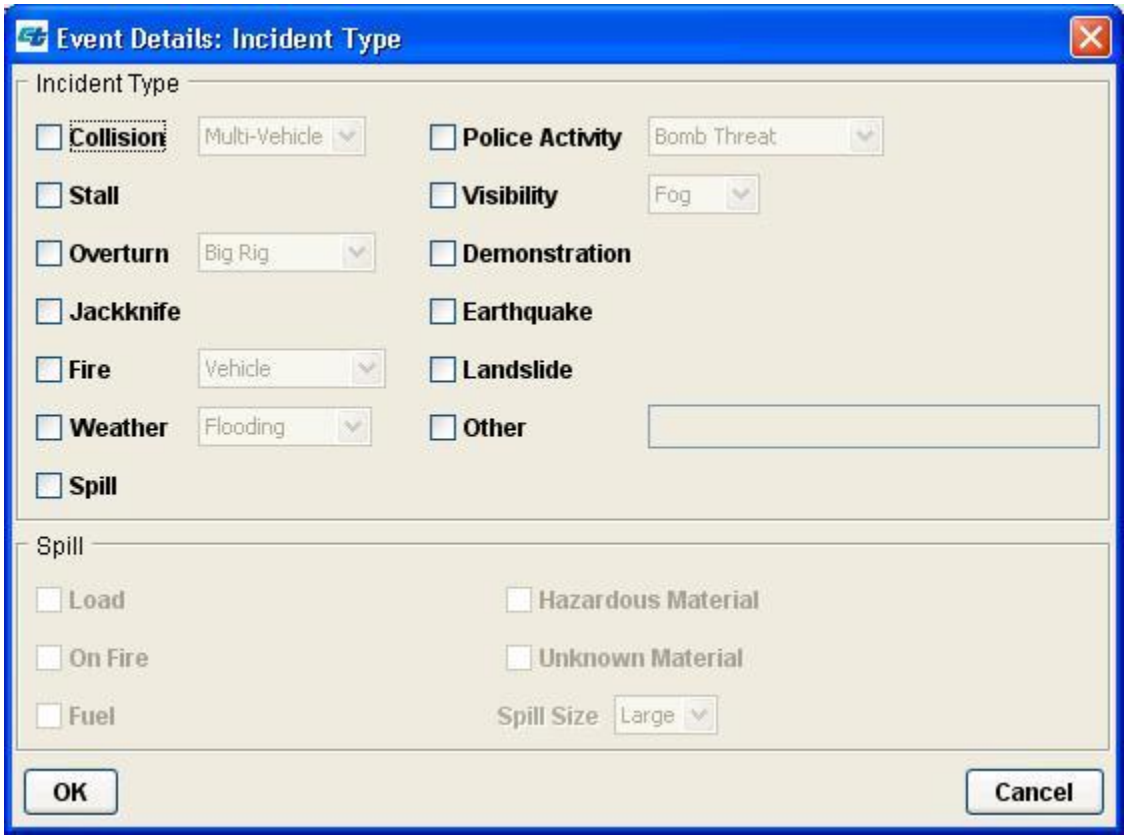


Figure 5-9: Event Attributes: Incident Type Window

Figure 5-10: Event Attributes: Vehicles Window

Figure 5-11: Event Attributes: Injuries and Fatalities Windows

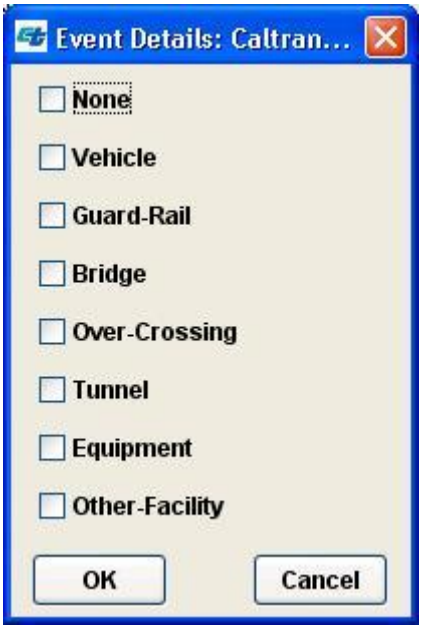


Figure 5-12: Event Attributes: Property Damage Window

5.4.2.3 Blockage Pattern

From the Event Details tab the operator also must indicate the blockage pattern. In Figure 5-8, the blockage pattern is located at the bottom of the window. The operator clicks on the lane to indicate the lane is blocked. The blockage pattern also indicates the shoulder lanes, as well as the mainline lanes. If the blockage patter is unknown, the operator can select unknown.

5.4.3 Incident Duration

To determine the estimated duration of the incident, the operator selects the Monitoring tab in the Event Management Window, Figure 5-13. The operator is able to select a time from the drop-down list or allow the system to estimate it by choosing System Generated from the drop-down list and then selecting the **Generated Duration** button.

If desired, the operator is still able to view the nearest CCTV cameras. The Monitoring tab displays the applicable CCTV cameras.

Any of the information on the Monitoring tab can be modified at any time during the incident lifecycle. Similar to the Details tab, the operator should select the **Apply** button before exiting this tab.

Figure 5-13: Monitoring Tab on Event Management Dialog

5.4.4 Event Comments

The Event Comments tab, Figure 5-14, allows the operator to add new comments about the event and also view all previously entered comments. The top part of the window is the history screen, which displays all previously entered comments. The bottom portion of the window, titled new, allows the operator to enter new comments. The operator has the capability of adding comments to the historical section by clicking on the **Add** button. Or the operator can clear the newly entered comments by clicking on the **Clear** button. The operator has no capability of deleting comments that have been added. Comments do not affect response plans.

Comments can be up to 2,000 characters in length. This includes the date and time stamp that is automatically appended to the comment when the Add button is selected. For the entire history of the incident, the comments' history can be up to 10,000 characters.

Again similar to the Monitoring and Details tabs, the operator should select the **Apply** button before exiting this tab.

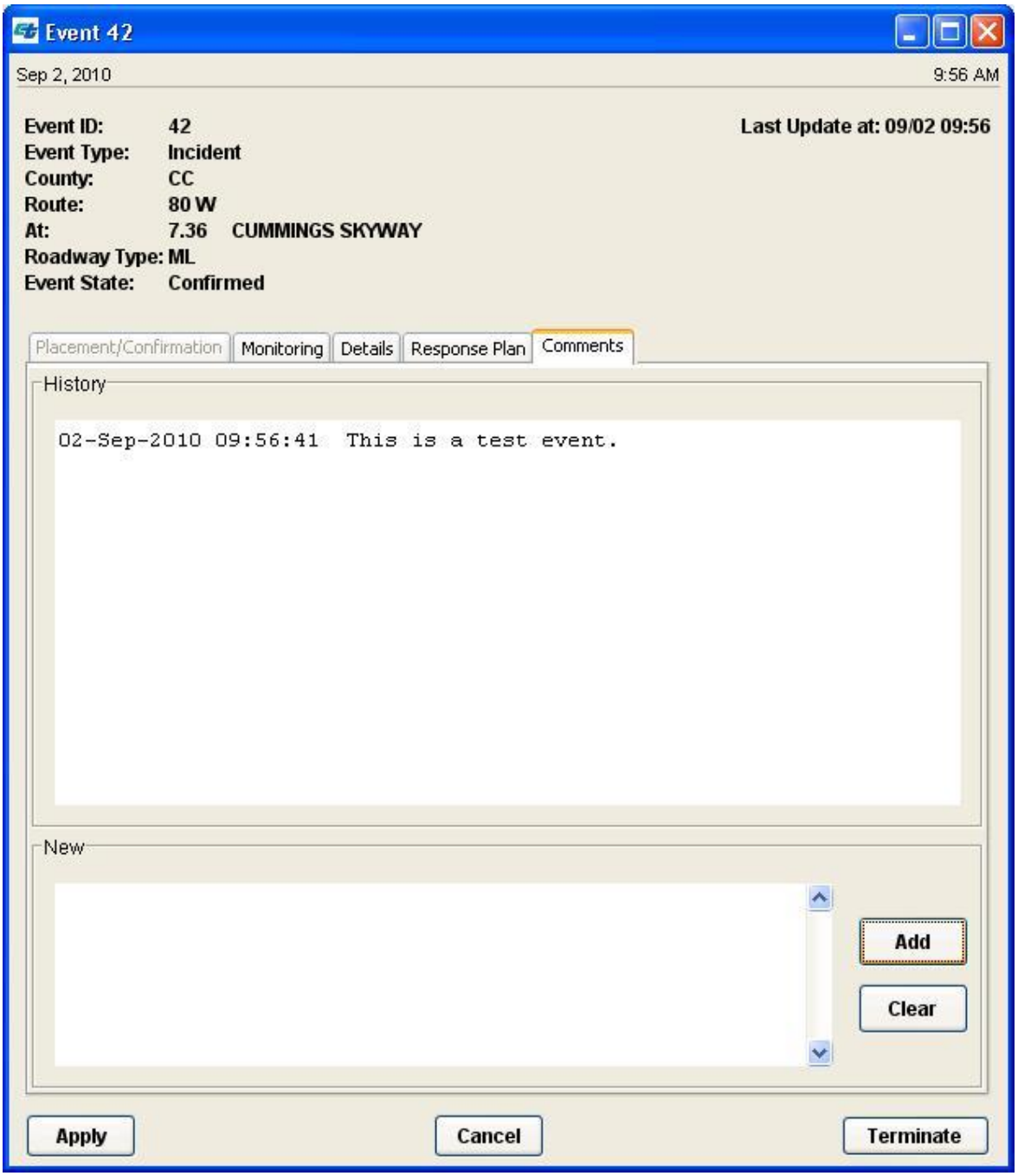


Figure 5-14: Comments Tab on Event Management Dialog

5.4.5 Response Plan Management

Generation of a response plan becomes available when the required event details have been entered. The system requires the following information to be entered before a response plan is generated. This information is:

- Incident type
- Blockage pattern
- Attributes

By selecting the Response Plan tab, Figure 5-15, from the Event Management window, the operator selects the **Generate Expert Plan** for the system to determine a response plan. A window appears informing the operator that a response plan is being generated and provides a dismiss option for the operator.

For Special Events, the operator has the option of selecting a response plan from the response plan library. This is accomplished by selecting the Response Plan Library button. The operator will view the library selections, select the desired plan, then implement the plan.

Also located on the Response Plan tab, are the Responders. These include the following:

- TMT/MIRT
- MTCE
- MTCE Callout
- Sigalert
- Major Delays
- CT 1097 Response
- CT 1098 Response

These responders allow the operator to incorporate additional information to the event, i.e., was a Sigalert issued? Were Caltrans personnel on-site? If so, when did they arrive? When did they leave the event?

Following the completion of the response plan generation, the operator selects the control buttons one at a time to execute different components of the plan. The following control buttons are available to the operator:

- **Operator Actions**
- **CMS**
- **HAR**
- **Duty Page**

Each of these response plan components is described in the following sections.

Figure 5-15: Response Plan Tab

5.4.5.1 CMS Response Plan

The Control section of the Response Plan tab provides a means of viewing, editing, and sending CMS messages. Also indicated in the Control section of the Response Plan tab is the status of the various components. Once the response plan has been generated, the status changes to System Generated. If a modification has been made to the response plan, the status indicates modified.

When the **CMS** Control button is selected, the operator views the CMS Control window, Figure 5-16. This window displays each CMS that is recommended to be used in response to the incident, as well as its corresponding message. The first time this window is opened for a specific incident, all recommended messages are

displayed in the proposed message column, and any messages currently displayed on a sign are indicated.

The following procedures can be used to send or modify the messages:

- If the system-generated messages are accepted as is, the operator can send all the messages to the field by clicking the **Select All** button, then the **Send** button.
- If the operator desires not to send all the proposed messages to the CMS, the operator selects the toggle box next to the sign number, then selects the **Send** button. Only those CMS with its toggle box checked will have its proposed messages sent.
- To modify a message, select the particular CMS and type in the message in the Edit area of the window. Select the **Preview** button to view the message in the Proposed message area. Select the **Send** button to send the proposed message to the field. The message is then sent to the CMS in the field and appears in the Current Message portion of the CMS Control Window.
- To remove a message from a CMS, send a blank message by selecting the **Blank** button from the Send portion of the window.
- If it is deemed necessary for more CMS to be used in response to a specific incident, the CMS can be added by pressing the **Add** button. This opens a CMS List from which additional CMS can be selected. Or the operator can select to add all the CMS by selecting the **Add All** button.
- If use of a specific CMS is considered unnecessary for the incident, it can be removed by clicking on the CMS and then selecting the **Delete** button.

After modifications to the CMS response plans, the **Save All** button must be selected.

To close the window, select the **OK** button. Any current messages remain displayed in the field even though the window is closed.

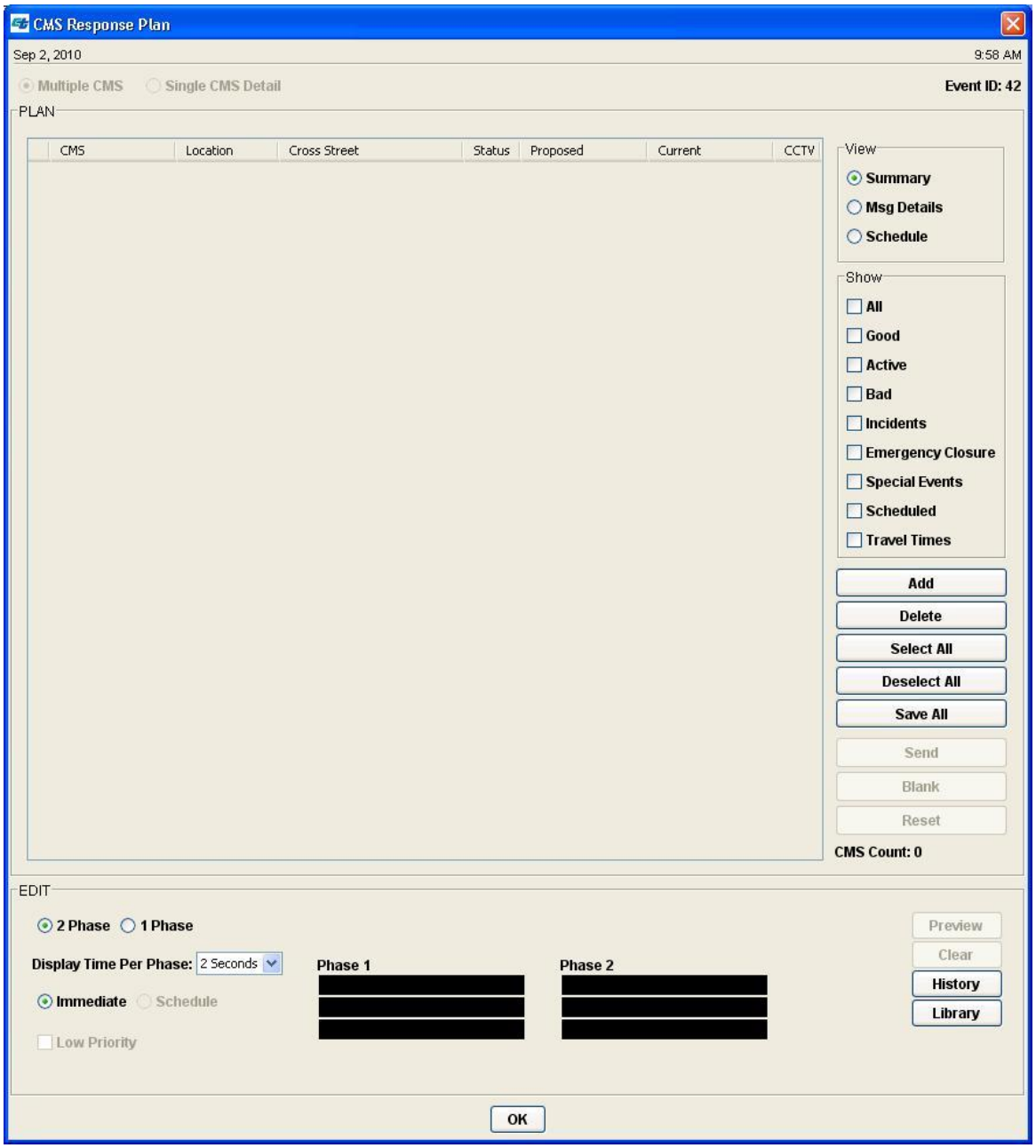


Figure 5-16: CMS Response Plan Window

5.4.5.2 Operator Actions

The Operator Actions section in the Response Plan tab provides other system recommended responses to help mitigate the impact of a given incident (Figure 5-17). These recommendations are not related to field element control. Several of these tasks involve notification of agencies/personnel that can directly manage the situation, as well as warn commuters who may be traveling toward, or near, the incident.

Upon accessing the Operator Action Details Window, a list of recommended actions appears. These actions can include the following:

- Issue Sigalert
- Issue Traffic Advisory
- Advise TMT Team Leader
- Alert Caltrans Organization
- Advise Maintenance
- Contact TMC Supervisor
- Notify Duty Officer
- Put Incident on CHIN
- Advise Local Agencies
- Advise Adjacent District

The status of each action (e.g., Completed, Not Completed) is displayed next to its corresponding item. Selecting the **operator action** button yields further specific information in the Operator Action Details window. Some actions may not have further information, so therefore will not indicate any additional information.

Also on this window are the three buttons. The first two buttons allow the operators to indicate that the selected actions have been completed or not completed. The operator also has the ability to indicate that all the actions have been completed by selecting the **Complete All** button. The **OK** button closes the window, but does not delete an operator action.

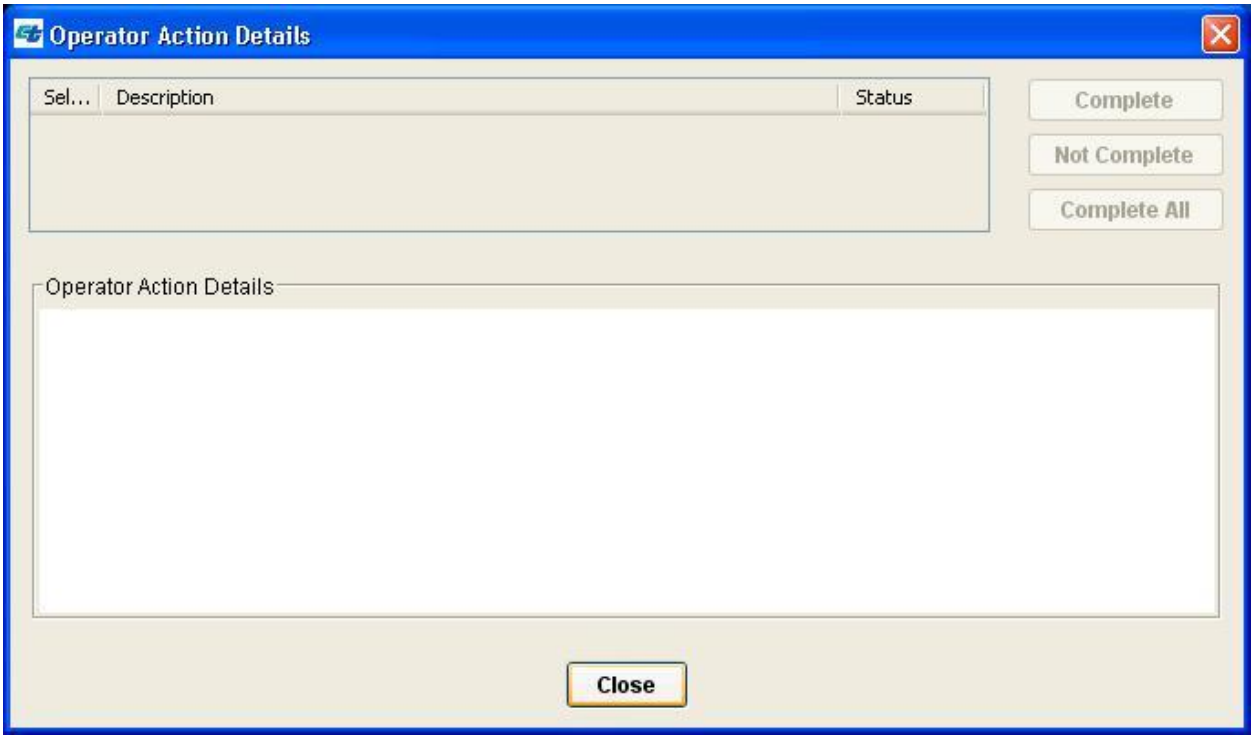


Figure 5-17: Operator Action Window

5.4.5.3 HAR Response Plan

Figure 5-18 displays the HAR Response Plan window. Upon opening this window, the system automatically generates a proposed message to display on the recommended HAR transmitters. Similar to the CMS response plan, the operator

can modify the recommended message before sending or can accept the recommendation.

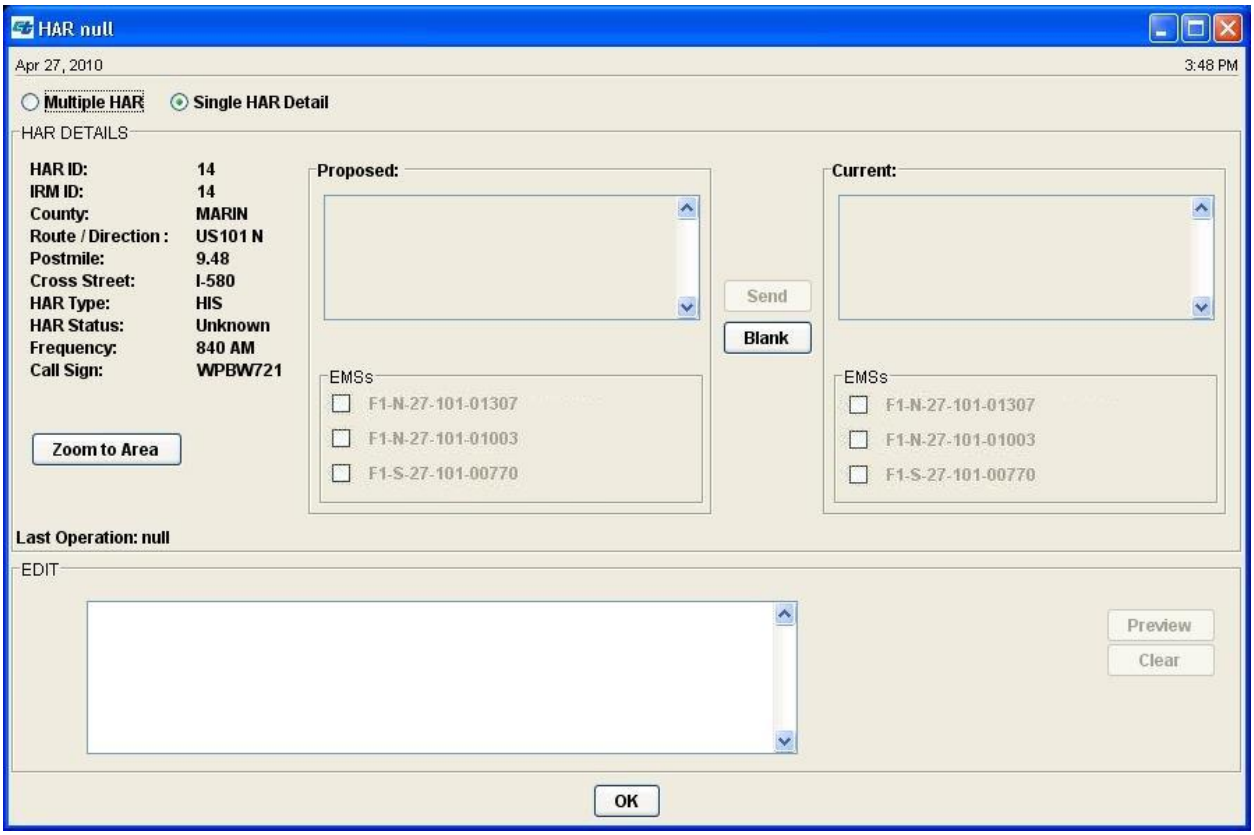


Figure 5-18: HAR Response Plan

5.4.5.4 Duty Page Response Plan

Figure 5-19 displays the Duty Page Response Plan window. Upon opening this window, the system automatically selects the recipients who will receive the email alert for this event. Similar to all response plan elements, the operator has the ability to accept the recommendations or modify the recommendations prior to sending.

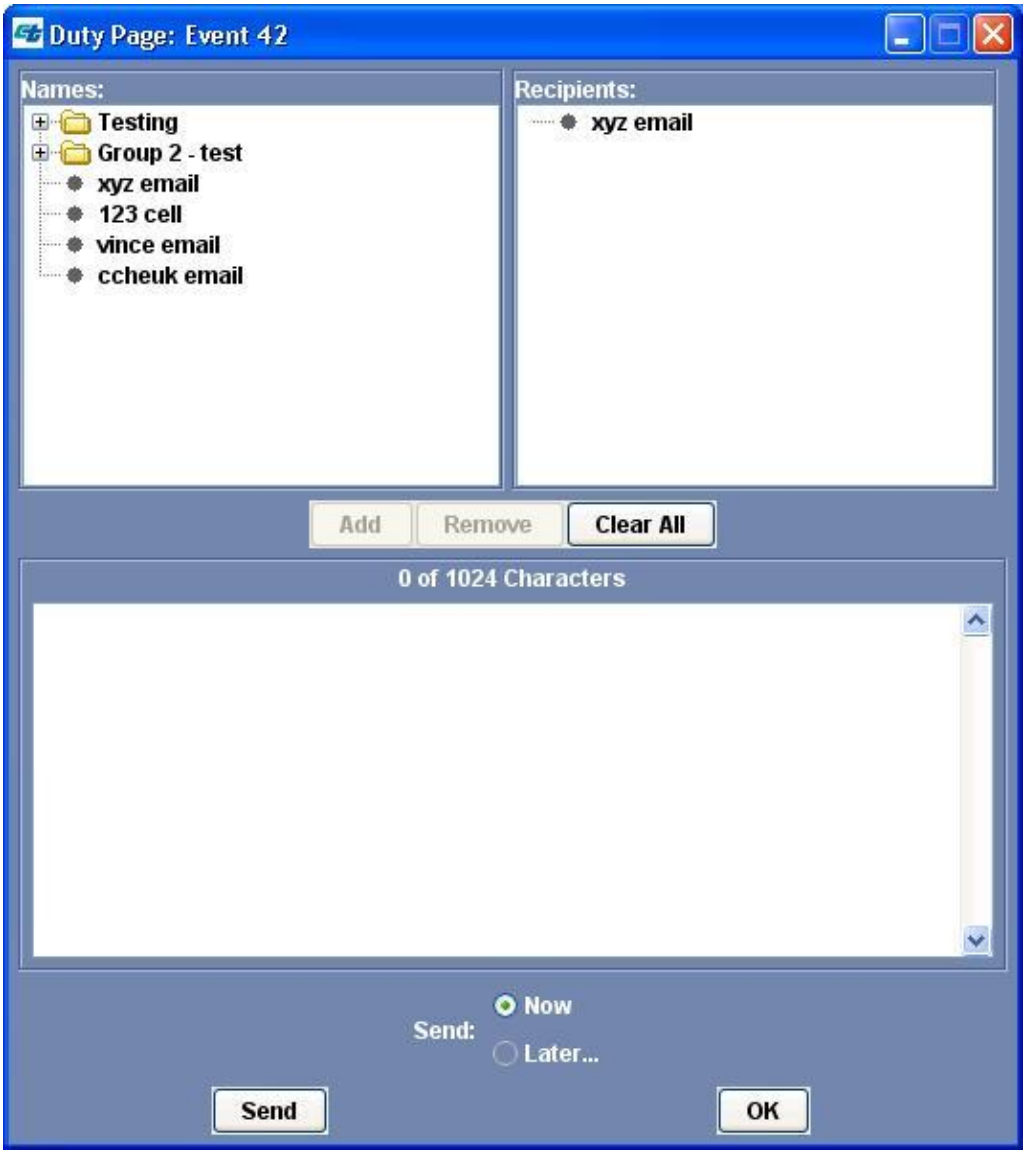


Figure 5-19: Duty Page Response Plan

5.4.6 Event Termination Procedures

Terminating an event can be accomplished from either the Event Summary or the Event Management window.

From the Event Summary Window, the operator selects the incident. The operator then clicks on the **Terminate** Button. This causes the entry and the icon representing the incident to be removed from the system.

An event management question window appears requesting confirmation of the termination of the selected event. This is shown in Figure 5-20.

The CMS Response Plan window opens and the operator is prompted to approve a termination response plan for any CMS response plan that was implemented. In

this process, the operator selects the appropriate replacement message for each of the activated CMS.

The other procedure to terminate an incident is as follows:

- Through the Event Management Window, the operator selects the Response Plan tab and selects the terminate button.
- An event management question window appears requesting confirmation of the termination of the selected event.
- The CMS Response Plan window opens and the operator is prompted to approve a termination response plan for any CMS response plan that was implemented. In this process, the operator selects the appropriate replacement message for each of the activated CMS.
- The HAR Response Plan window opens and the operator is prompted to approve a termination response plan for any HAR transmitters that were implemented.
- The Duty Page Response Plan window opens and the operator is prompted to approve the "final" message to be sent regarding the event.

Figure 5-20: Event Termination Window

6 REPORTS

The ATMS Reports function is a means of generating reports for a given freeway location over a specific time period. These reports can be used for the management and improvement of freeway traffic, as well as the system itself. Most of the reports are presented in tabular form, but certain data such as volume, occupancy, and average speed also may be represented symbolically. A list of reports is summarized in Table 6-1.

The different reports are selected from the main reports page, as shown in Figure 6-1, via pull-down menus. The operator then enters specific information concerning the desired report into the report query form. Once the necessary information is processed, the operator has the option of viewing the report in pdf, rtf, or html format. The operator can then choose to save it to a file or print the report.

The following sections discuss the various report options that are in the ATMS Reports main menu. Sample reports are included in Appendix C.

Table 6-1: ATMS Reports

Traffic Data	
30 Second Loop Data	30 Second Station Data
5 Minute Loop Data	5 Minute Station Data
15 Minute Loop Data	15 Minute Station Data
1 Hour Loop Data	1 Hour Station Data
Daily Loop Data	Monthly Station Data
Monthly Loop Data	Hourly Data
	Daily Volume
System Performance	
Freeway Delay	Current Equipment Failures – CCTV
Equipment Failures History – VDS	Equipment Failures History – HAR
Current Equipment Failure – VDS	Current Equipment Failure – HAR
Equipment Failures History – CMS	Equipment Repair
Current Equipment Failures – CMS	Event Summary
Equipment Failures History – CCTV	Workload Summary

Plots	
5 Minute Volume	15 Minute Volume
5 Minute Occupancy	15 Minute Occupancy
5 Minute Occupancy	15 Minute Speed
Special Applications	
CCTV Activity	CMS System Log
CCTV Preset	Duty Page
CMS Messages Approval	HAR Message
CMS Percent Usage	Event Details
Ramp Metering (RM) Analysis	
Queue Backup	Metering History
Metering Rate Performance	

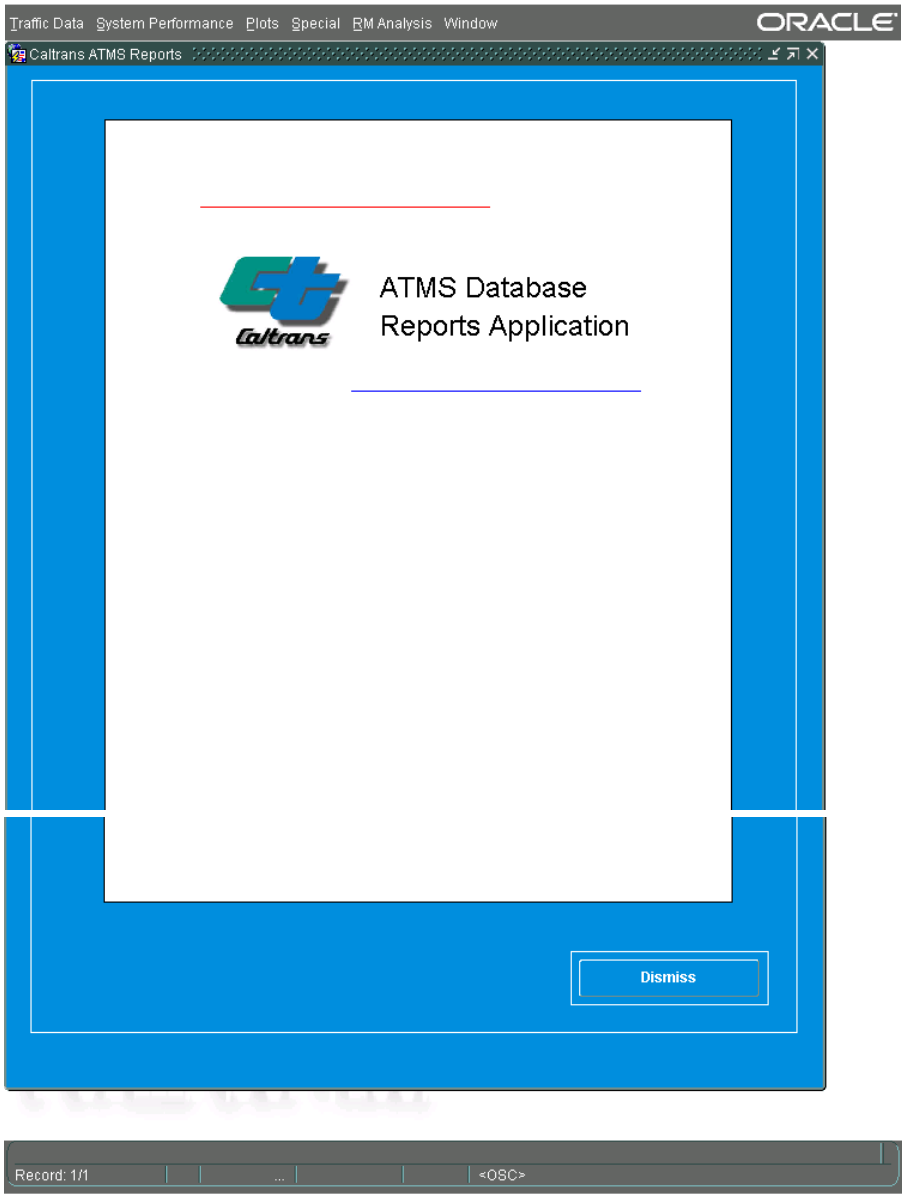


Figure 6-1: Reports Main Page

6.1 General Report Parameters

While each report is different, the process to generate a report is very similar. Each report requires a specific set of data that the operator must enter. Below is a listing of the various report parameters that are similar for all reports, and are illustrated in Figure 6-2 and Figure 6-3.

- Parameter Set — Create a data set. This data set could be reused for reports at a later date and time
- Delete — Delete the specific parameter set
- Save — Save current data into the specific named parameter set

- Destination Type — Determine the format in which the current report will be viewed
- Time Frame — Enter a start date and time and an end date and time. The end date/time must be later than the start date/time, else the system will indicate an error to the operator
- VDS Selection — Select which VDS by selecting the freeway, direction, minimum and maximum postmile, and specific VDS
- Del Rec — Delete a specific record from the Selected VDS list
- Del All — Delete all records currently displayed in the Selected VDS list
- Add All — Add all records to the Selected VDS list within the specific postmile range
- Clear — Clear the form of any and all data
- Run — Run the report (at least one (1) VDS must be in selected)
- Cancel — Close the report window

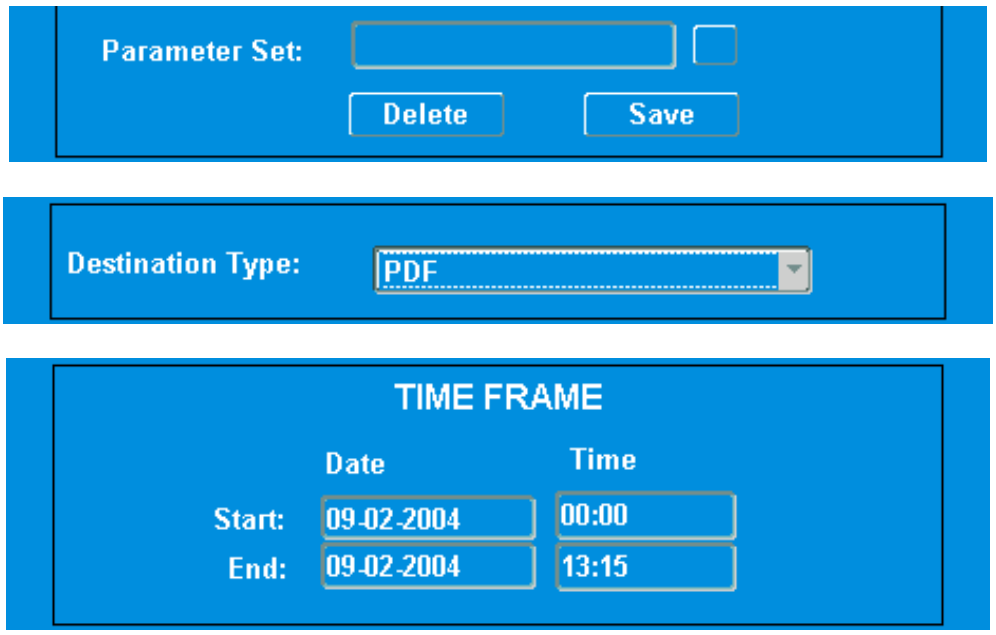


Figure 6-2: General Report Parameters

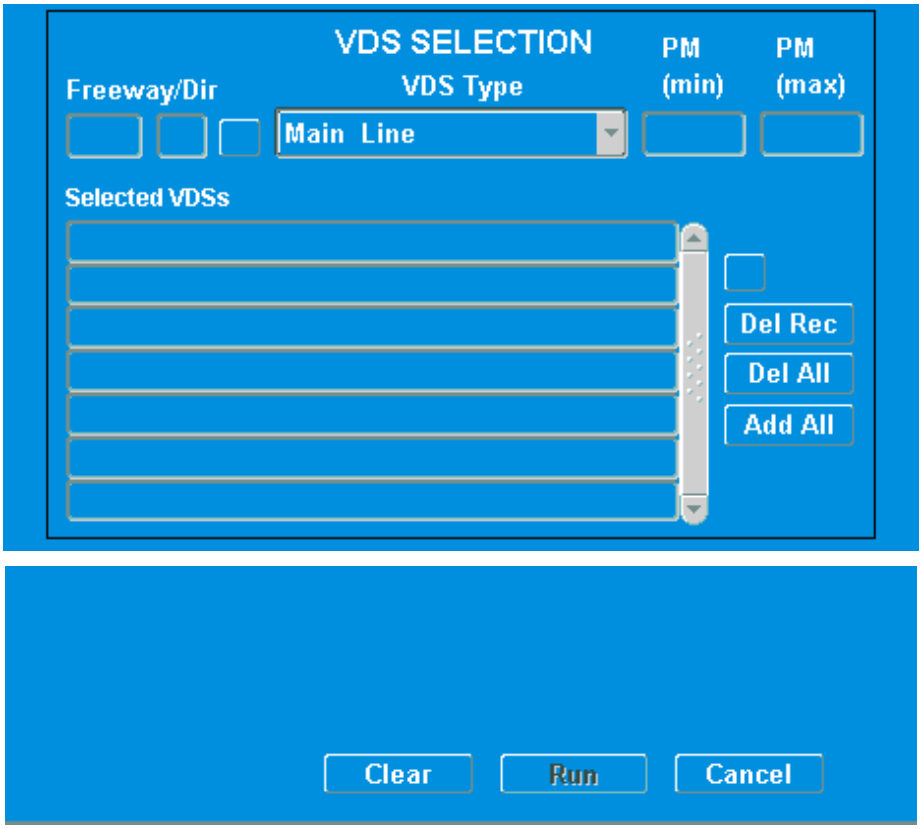


Figure 6-3: General Report Parameters

6.1.1 Traffic Data

As shown in the Figure 6-4, the Traffic Data option provides access to lane, station, and volume data for various time intervals. Lane and Station data are available in the form of daily and monthly traffic reports, and also at 30 second, 5 minute, 15 minute, and 1 hour intervals. Volume data is available in the form of monthly, hourly and daily volume traffic summary reports, as well as 30 second, 5 minute, 15 minute and 1 hour station data.

A report input screen for traffic data is shown in Figure 6-5. In general, the steps to generate a traffic report are as follows:

- Select the report from the Traffic Data pull-down menu in the Reports Application. This opens the input window.
- Optionally choose a parameter set that has been used previously. The parameter set can be chosen from a list or the operator can save the current setup to be used in the future.
- Select the format in which the report will be viewed.
- Select the time frame on which to run the report.
- Select the equipment for the report. To narrow down the list, the operator can filter based on freeway, direction, equipment type, minimum postmile, and maximum postmile. The operator can add all of the equipment within

the range or select from the list the equipment to be added. To view the list of equipment within the stated range, click on the box to the right of the list of selected equipment.

- Run the report. After searching the database, the reports' application will open the report in the requested format.

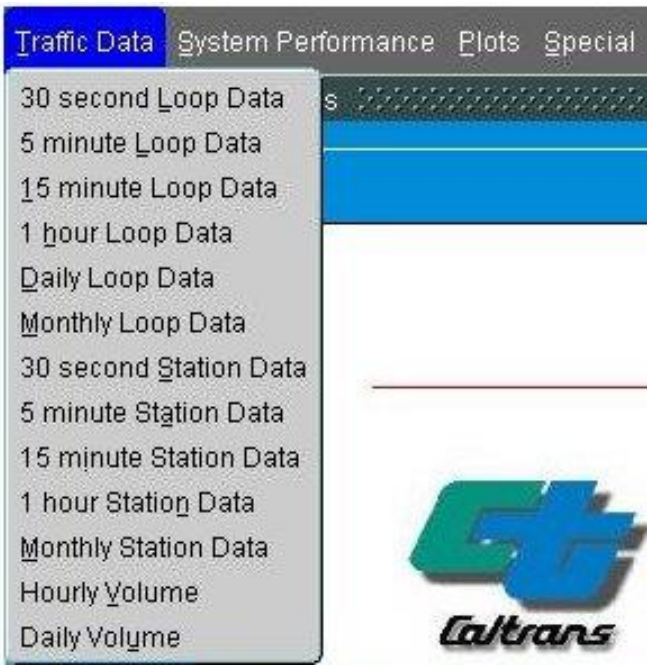


Figure 6-4: Traffic Data Reports Pull-down Menu

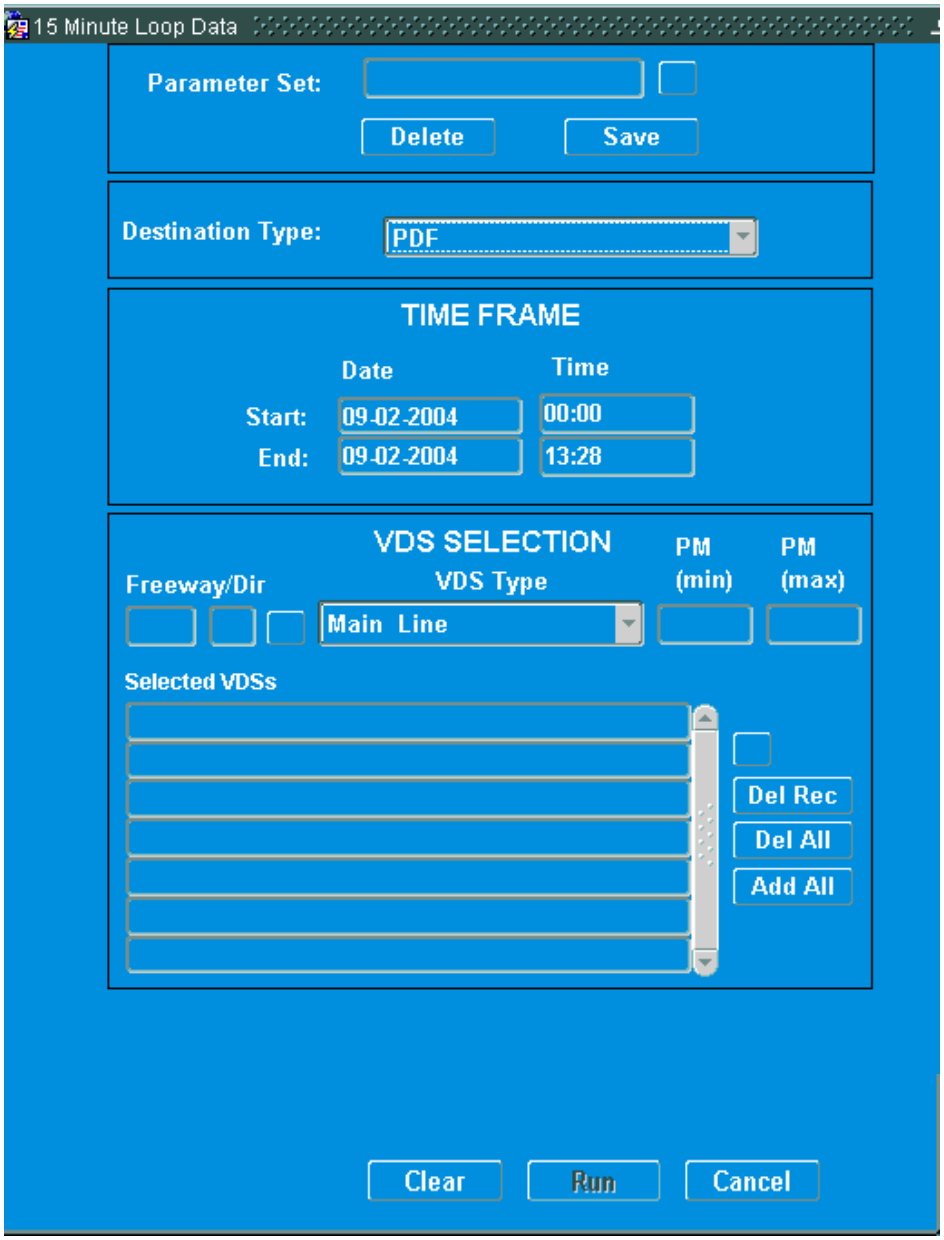


Figure 6-5: Sample Reports Input Window for Traffic Data

6.1.2 System Performance

The System Performance option provides access to data that traffic analysts can use to assess the efficiency and effectiveness of the system. Data may come in the form of daily performance reports, which is comprised of incident management, congestion management, and equipment failure reports, as seen in Figure 6-6.

A reports input screen for system performance is shown in Figure 6-7. In general, the steps to generate a system performance report are as follows:

- Select the report from the System Performance pull-down menu in the Reports Application. This opens the input window.

- Select format in which the report will be viewed.
- Select the time frame on which to run the report. The current failure reports automatically default to the current date and time.
- Run the report. After searching the database, the reports' application will display the report in specified format.

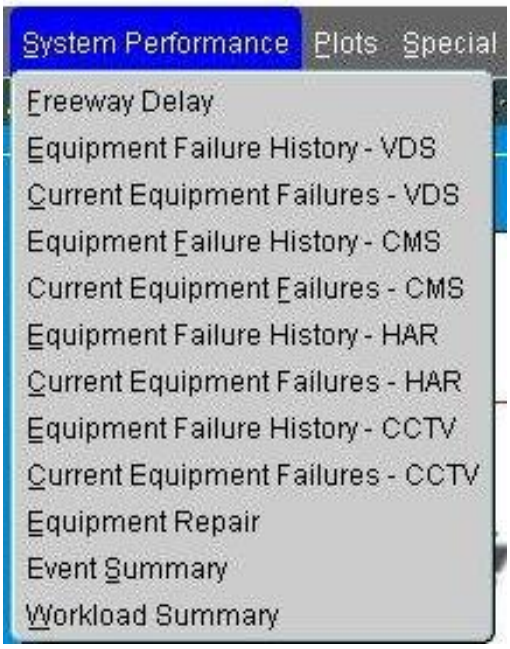


Figure 6-6: System Performance Reports Pull-down Menu

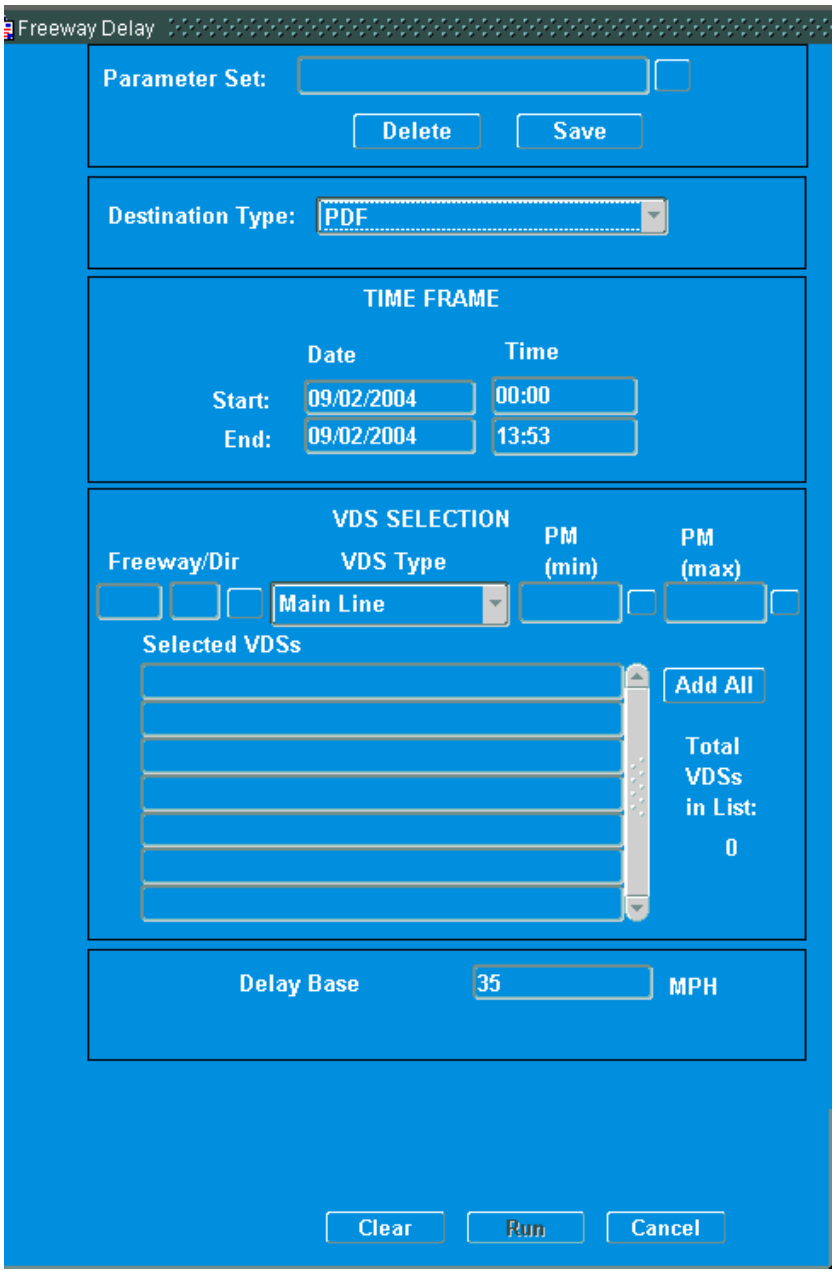


Figure 6-7: Sample Reports Input Window for System Performance

6.1.3 Plots

The Plots option, Figure 6-8, allows the operator to generate reports that graphically illustrate the variation of a given traffic variable (volume, speed, or occupancy) with time at one or more VDS. In these plots, symbols are used to indicate ranges of magnitude of a given traffic variable. These ranges can be specified by the operator. Plot reports can now be generated in a graphic chart depiction. This is selected in the destination type drop-down list.

A plot input screen for traffic data is shown in Figure 6-9. In general, the steps to generate a plots report are as follows:

- Select the report from the Plots pull-down menu in the Reports Application. This opens the input window.
- Optionally choose a parameter set that has been used previously. The parameter set can be chosen from a list or the operator can save the current setup to be used in the future.
- Select the format in which the report will be viewed.
- Select the time frame on which to run the report.
- Select the equipment for the report. To narrow down the list, the operator can filter based on freeway, direction, equipment type, minimum postmile, and maximum postmile. The operator can add all of the equipment within the range or select from the list the equipment to be added. To view the list of equipment within the stated range, click on the box to the right of the list of selected equipment.
- Adjust the threshold values for each symbol on the report, if necessary.
- Run the report. After searching the database, the reports will be displayed in the specified format.

Figure 6-8: Traffic Plots Reports Pull-down Menu

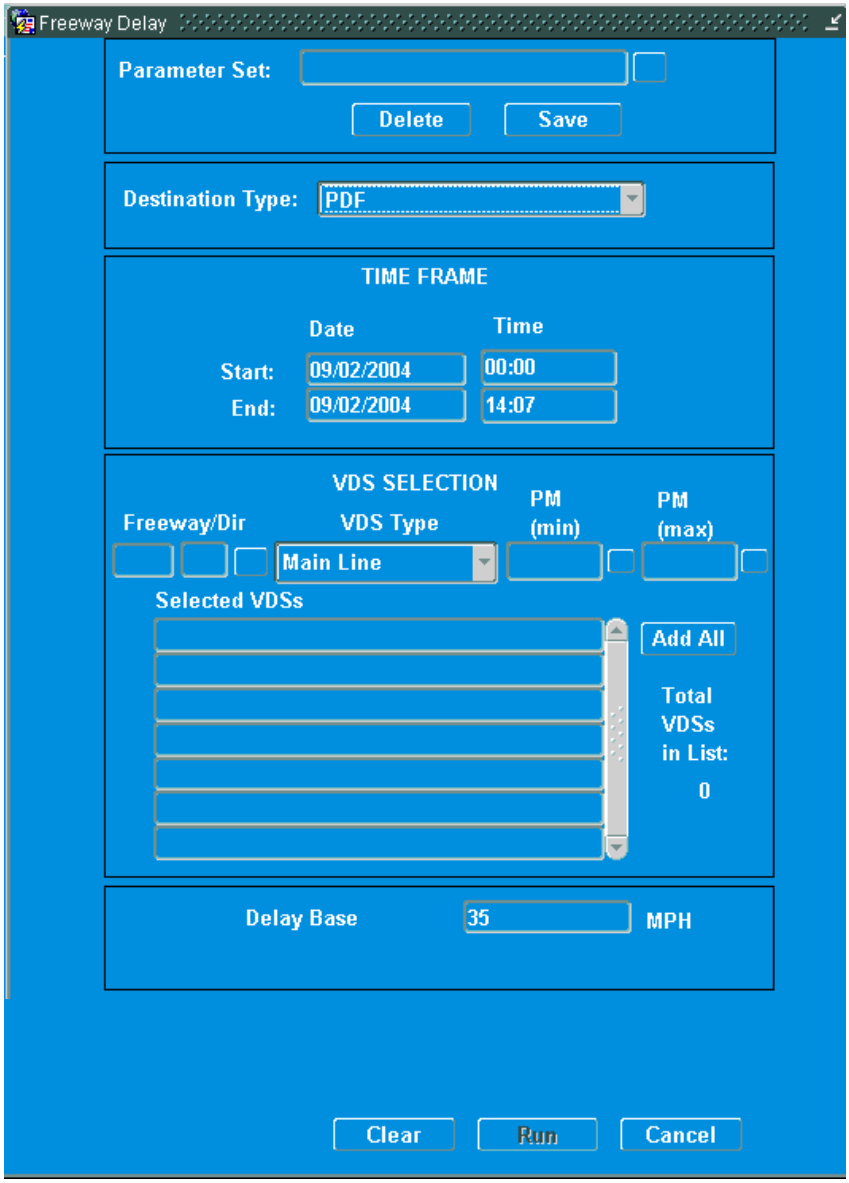


Figure 6-9: Sample Reports Input Window for Plots

6.1.4 Special Applications

The Special Applications, Figure 6-10, option is used to access applications-related information which, in most cases, is of interest to special operators only. Examples of these are Incident Details reports, which specify an event's function, time of activation, and function components involve, and CMS Message Approval histories, which log the activation/deactivation times of displayed CMS messages.

Report input screens for special applications are shown in Figure 6-11. In general, the steps to generate a special applications report are as follows:

- Select the report from the Special pull down menu in the Reports Application. This will open the input window.

- Optionally choose a parameter set that has been used previously. The parameter set can be chosen from a list, or the operator can save the current setup to be used in the future.
- Select the format in which the report will be viewed.
- Select the time frame on which to run the report.
- Select the equipment for the report. To narrow down the list, the operator can filter based on freeway, direction, equipment type, minimum postmile, and maximum postmile. The operator can add all of the equipment within the range or select from the list the equipment to be added. To view the list of equipment within the stated range, click on the box to the right of the list of selected equipment.
- Run the report. After searching the database, the report will be displayed in the specified format.

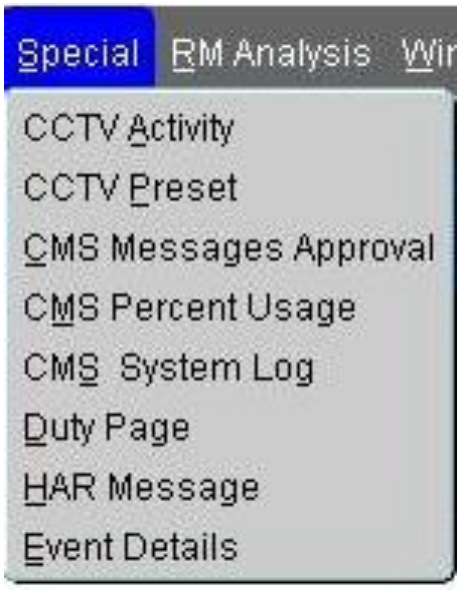
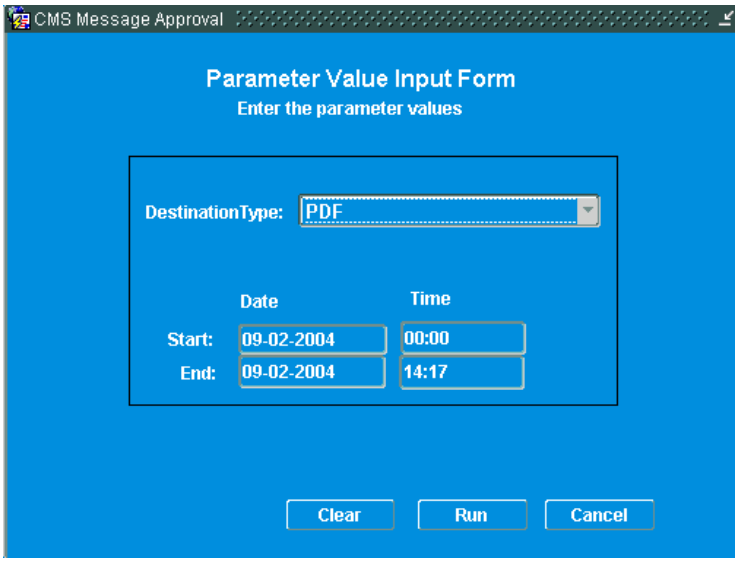


Figure 6-10: Special Reports Pull-down Menu



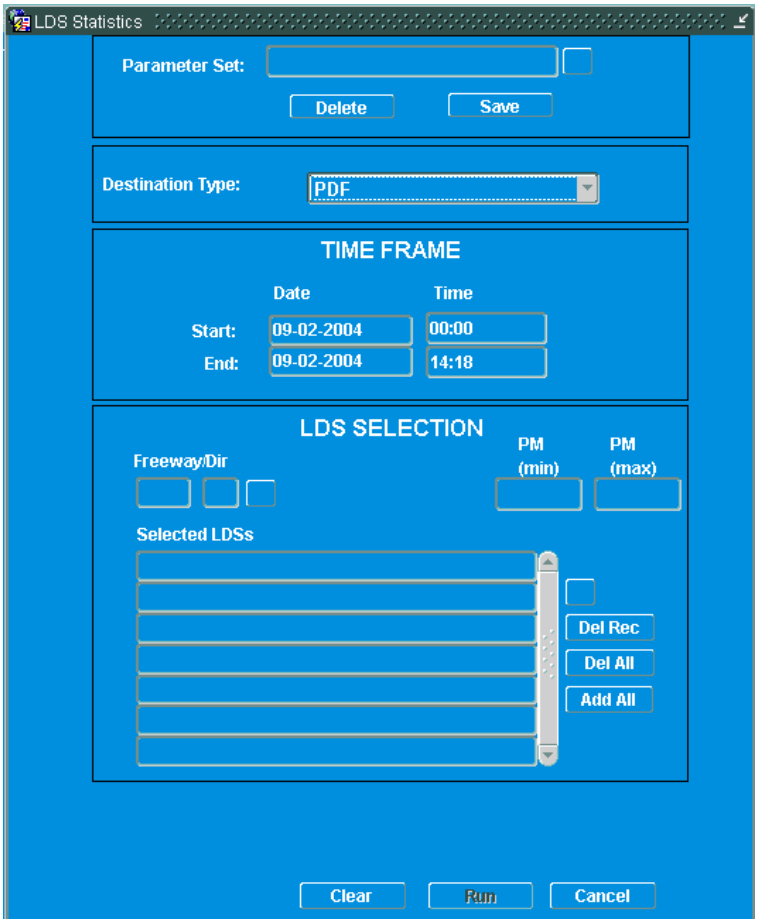


Figure 6-11: Sample Reports Input Window for Special Applications

6.1.4.1 Ramp Metering Analysis

The Ramp Metering (RM) Analysis option provides a variety of information about conditions at ramp meter locations. This includes failure information, metering mode of operation history, and metering and rate history, shown in Figure 6-12. The operator also enters selectable threshold values, which are filters for the reports.

A report input screen for RM analysis is shown in Figure 6-13. In general, the steps to generate a ramp metering analysis report are as follows:

- Select the report from the RM Analysis pull-down menu in the Reports Application. This opens the input window.
- Optionally choose a parameter set that has been used previously. The parameter set can be chosen from a list, or the operator can save the current setup to be used in the future.
- Select the format in which the report will be viewed.
- Select the time frame on which to run the report.
- Select the equipment for the report. To narrow down the list of ramps, the operator can filter based on freeway, direction, minimum postmile, and maximum postmile. To view the list of ramps within the stated range, click on the box to the right of the list of selected equipment.
- Run the report. After searching the database, the report will be displayed in the specified format.

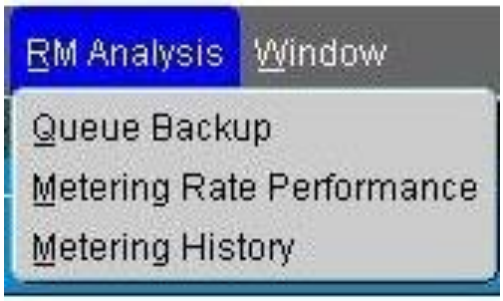


Figure 6-12: Ramp Metering Analysis Reports Pull-down Menu

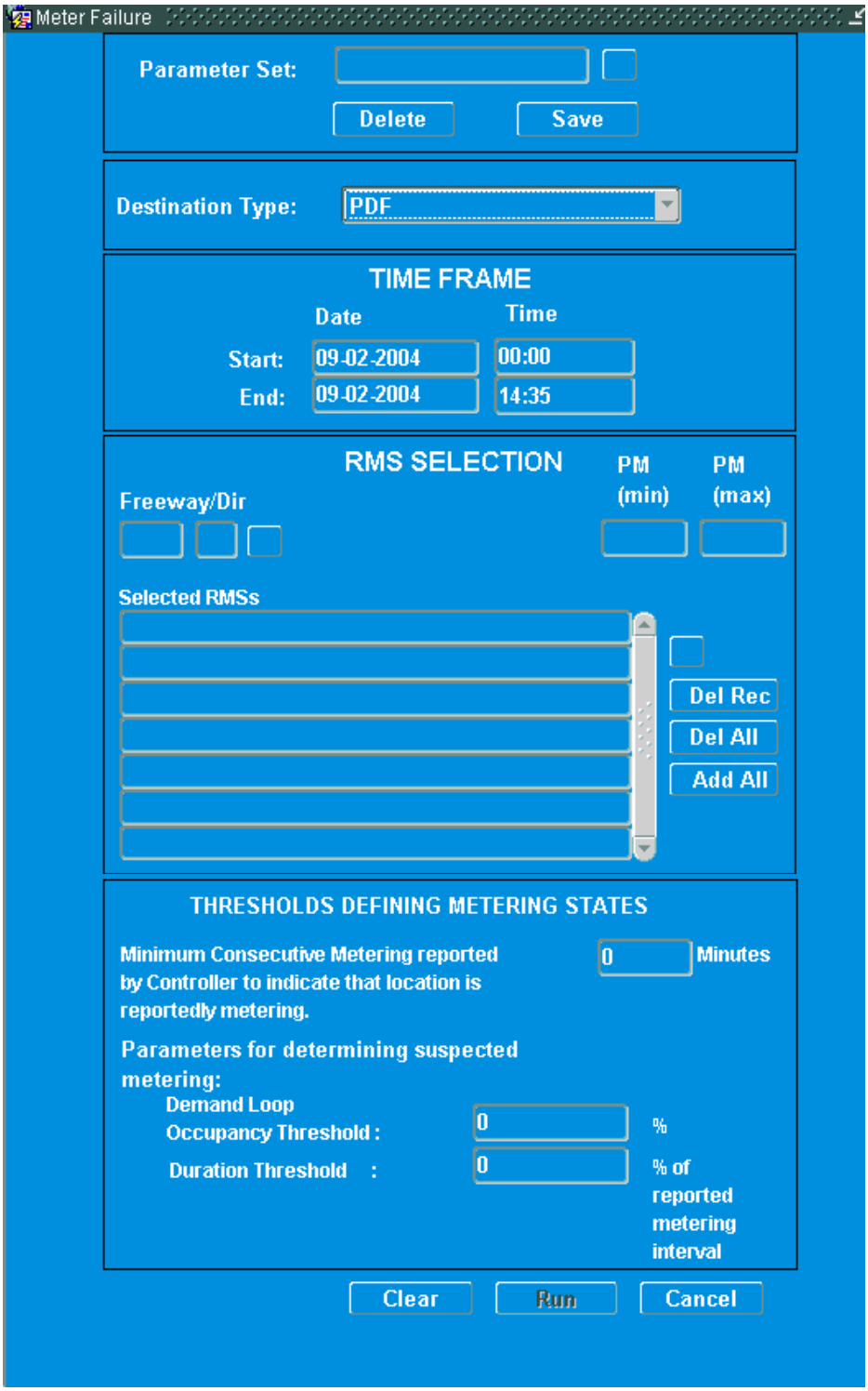


Figure 6-13: Sample Reports Input Window for RM Analysis

7 CONFIGURATION

The Configuration application allows the operator to view the Browser/Editor information in the configuration database. Data for each record is displayed and the operator can view all data, apply a filter, or sort records. Operators with certain privileges may also insert, update or delete a record or information pertaining to that record. The Browser/Editor application main page is shown in Figure 7-1. The information to be viewed is selected by means of pull-down menus.

The detailed step-by-step instructions for this application are provided in the D4 ATMS Maintenance Manual, Section 2. This chapter provides a brief overview of the functions available through this application. For further instruction, please refer to the D4 ATMS Maintenance Manual, Section 2.

7.1 Browser/Editor Access

Access to the Browser/Editor application is controlled through database security by the assignment of database roles. Since operators may have different levels of functionality within the Browser/Editor application, it is important that each operator be aware of the database role that has been assigned.

7.2 Starting the Application

The operator can run the application by clicking the Browser/Editor Icon button that appears on the front panel of the system, Figure 2-1. This will bring up the applications' title screen, Figure 7-1.

Within the Browser/Editor application, the availability of Browser/Editor functions can be determined from messages displayed on the title screen.

Accessible Function	Title Screen Message
Browse	No message
Browse, Insert, Edit	Edit Privileges Active
Delete	Caution: Delete Capabilities Active

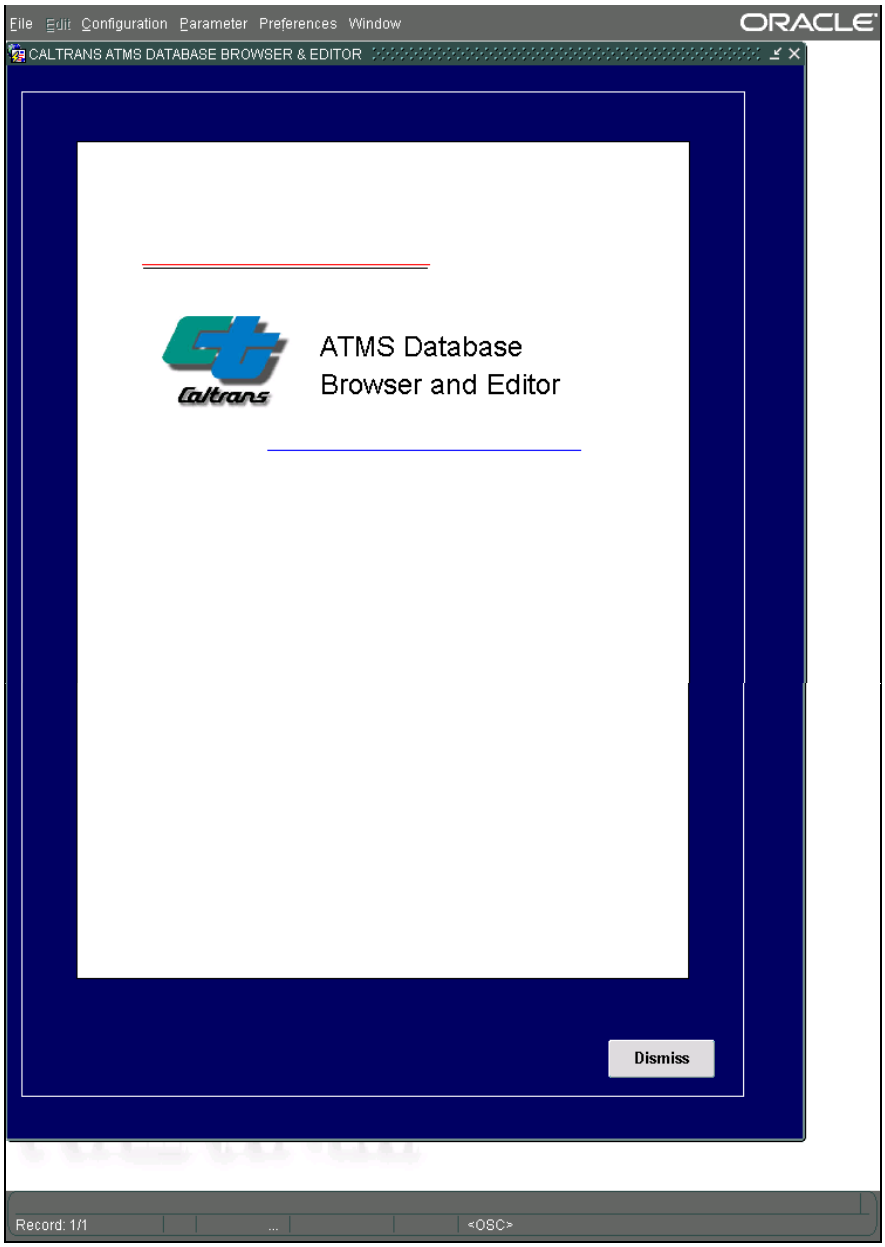


Figure 7-1: Browser/Editor Application Main Page

7.3 Pull-down Menus

The pull-down menus are accessed from the menu bar located immediately below the title bar. The Configuration and Parameter menus allow the operator to select specific types of database records for record viewing, editing, and creation. The File, Edit, and Preferences menus provide the operator with tools for use within the Browser/Editor application.

7.3.1 File Pull-down Menu

This selection, File, allows the operator to perform general file operations and exit the Browser/Editor application.

- Report — Creates a report from the queried data that can be viewed, printed to the printer or to a postscript file
- Exit — Exits Browser/Editor application.

7.3.2 Edit Pull-down Menu

Edit is only available after a Configuration or Parameter menu item has been selected. Edit allows the operator to perform the following functions where the Browser/Editor application and operator privileges allow:

- Cut — Removes selected data
- Copy — Copies selected data
- Paste — Inserts cut or copied data at the current cursor location

7.3.3 Configuration Pull-down Menu

The Configuration Pull-down menu allows access to the following Browser/Editor forms:

- Agency, Contact, Jurisdiction — Accesses data for agencies and employees that might need to be contacted for incidents
- CCTV — Accesses data defining location and setup of CCTV cameras
- Channel — Accesses configuration data for the communication channels used for field element setup
- City — Accesses data defining all cities in the district. Including city boundaries and the extents of freeways located in each city
- CMS — Accesses data defining location and setup of CMS
- County — Accesses data defining all counties within the state
- District — Accesses data defining all Caltrans districts
- EMS — Access data defining location and setup of HAR EMS
- Freeway — Accesses data defining to freeway configuration, including names, extents within counties (postmiles), and primary and secondary directions
- Freeway Crossing — Accesses data defining all roads, creeks, and railroad tracks which cross over or under the freeway

- HAR — Access data defining location and setup of HAR transmitters and HAR EMS
- LDS — Accesses data defining controller (loop detector station) configuration within D4 ATMS. Including detector configuration for the loops belonging to the LDS and VDS associations
- Monitor — Accesses configuration data defining the video monitors within the TMC
- Office — Accesses data defining all field offices within the district and the regions that they monitor
- Ramp — Accesses ramp roadway configuration data and ramp metering locations within the freeway network
- Section — Accesses data defining the individual sections that make up the freeway network
- Switch — Accesses data defining switches that connect field equipment and TMC equipment together
- VDS — Accesses VDS configuration data including detector and LDS associations

7.3.4 Parameter Pull-down Menu

The Parameter pull-down menu offers access to the Browser/Editor forms listed below:

- APID — Accesses parameters used by the All Purpose Incident Detection (APID) algorithm
- Color Mapping — Shows assigned colors for numeric color identification, color ranges for speed, occupancy, and volume by the ATMS map
- Duty Page — Access parameters used by the Duty Page

7.3.5 Preferences Pull-down Menu

The Preferences pull-down menu offers access to the following types of information:

- Auto Re-query — This tool is designed for use when performing record updates to Configuration menu items. When enabled, the operator can use this tool to save search criteria from a record search until new search criteria are applied. This prevents the operator from having to re-enter search criteria and performing a new record search after every record update.

- Sort — Operator enters in particular search criteria – route, direction, PM, and City. This feature is only valid when using Configuration menu items CCTV, CMS, LDS, RAMP, SECTION, and VDS.

7.4 BASIC BROWSER/EDITOR OPERATIONS

7.4.1 Introduction

In general, four operations are involved when managing configuration records: browsing, adding, updating, and deleting records.

7.4.2 Browsing Records

Browsing records (database queries) may be performed with or without entering search criteria (filters). Without specifying search criteria, the query will search the database for all records relating to the database configuration item form from which the query is executed. If search criteria is specified, the scope of the query is narrowed to include only those records containing the specified criteria for the selected configuration item.

These search criteria are specified through the data fields found in the Browser window. Some data fields allow information to be typed in data entry boxes. Other data fields have corresponding select buttons that, when clicked, reveal selection lists. For such cases, the search criterion is specified by clicking on an item in the list. When search criteria is specified, queries may be performed on all Configuration menu items and Parameter menu items APID and Color Mapping. Data for other Parameter menu items may be viewed by selecting the item from the menu.

To browse records with no search criteria specified:

- Choose Configuration or Parameter from the menu bar.
- Select the desired element from the Configuration or Parameter menu, e.g., CCTV.
- Click on the **Go** button.
- To browse records by specifying search criteria:
- Choose Configuration or Parameter from the menu bar.
- Select the desired element from the Configuration or Parameter menu, e.g., CCTV.
- Select search criteria (e.g., to search by the freeway and direction, supply the freeway route information in the Route field and the direction information in the Direction field).
- Click on the **Go** button.

7.4.3 Sorting records

A query may also be performed with or without sorting applied to the search results. Without a sort applied, the query will return records in the same order that

they occur in the database tables. In the database the records are listed in the tables in the order that they were entered into the database. If sorting is desired, the sort criteria must be applied prior to initiating the query.

The sort feature can only be used with Configuration menu items CCTV, CMS, Freeway Crossing, LDS, Ramp, Section, and VDS.

To sort records:

- Select Sort from the Preference Menu, as shown in Figure 7-2
- Click on the sort criterion list box to select the search criterion. The operator can select up to four sort criteria, Route, Direction, Postmile, and City as shown in Figure 7-3. For example, a operator may specify that records be sorted initially by Route, then by Direction, and by Postmile
- Click on the **Apply** button
- Select any desired search criteria
- Click **Go**

Note: To navigate between records, use the following navigation buttons, shown in :

|<< go to the first record

<< go to the preceding record

>> go to the next record

>>| go to the last record

A box at the bottom left of the Browse window indicates the number of the record currently shown, as well as the number of records retrieved by the search, seen in Figure 7-4. Also shown in this window is an indication of whether any search criteria were used or a sort order was applied.

To start another query:

- Click on the **New Query** button to clear the browse form of the current search criteria.
- The operator can follow the steps described in Section 7.4.2 when a new query is desired.

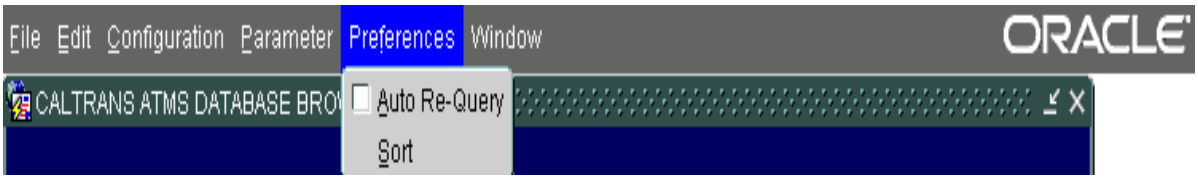


Figure 7-2: Preferences Menu

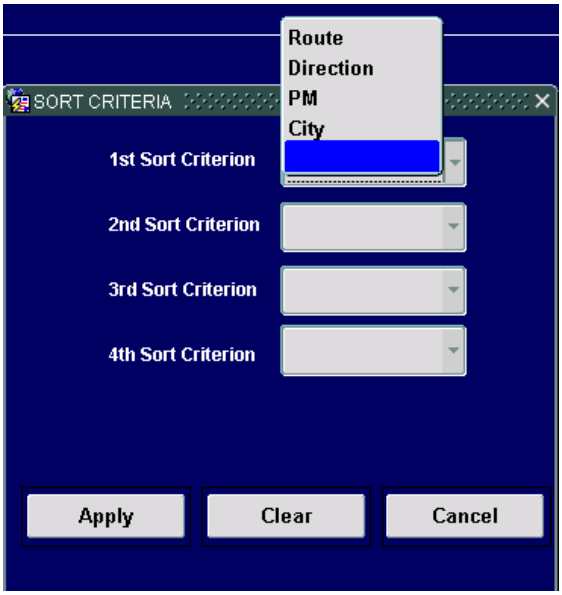


Figure 7-3: Sort Criteria

Figure 7-4: Browse Window Controls

7.4.4 Adding Records

The following procedure applies to all Configuration menu items and to Parameter menu items APID and Color Mapping. Other Parameter menu items may only be updated.

To add a record:

- Choose Configuration or Parameter from the menu bar.
- Select the element that needs to be added from the Configuration or Parameter menu (e.g., CMS).
- Click on the **Insert New Record** button.

To add CCTV, Monitor, or Switch records:

- CCTV: Click on the **Insert New Camera** button.
- Monitor: Click on the **Insert New Host** button.
- Switch: Click on the **Insert New Switch** button.
- At the new window, supply the available information in the corresponding data fields. Information can be entered either by directly typing it in or by clicking on a list button and selecting from the displayed list.

- Click on the **Save** button when done. A message will appear at the bottom of the window to let the operator know that the new record has been saved, Figure 7-7.
- When more new records are to be added, click on the **Clear & Insert new Record** button and repeat step 4 and 5.
- Click on the **Return to Browse Screen** button to return to the Browse window.

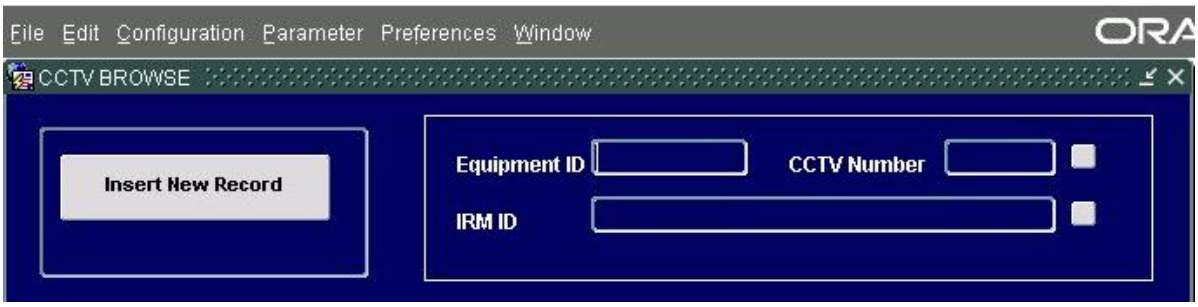


Figure 7-5: Insert New Record Button

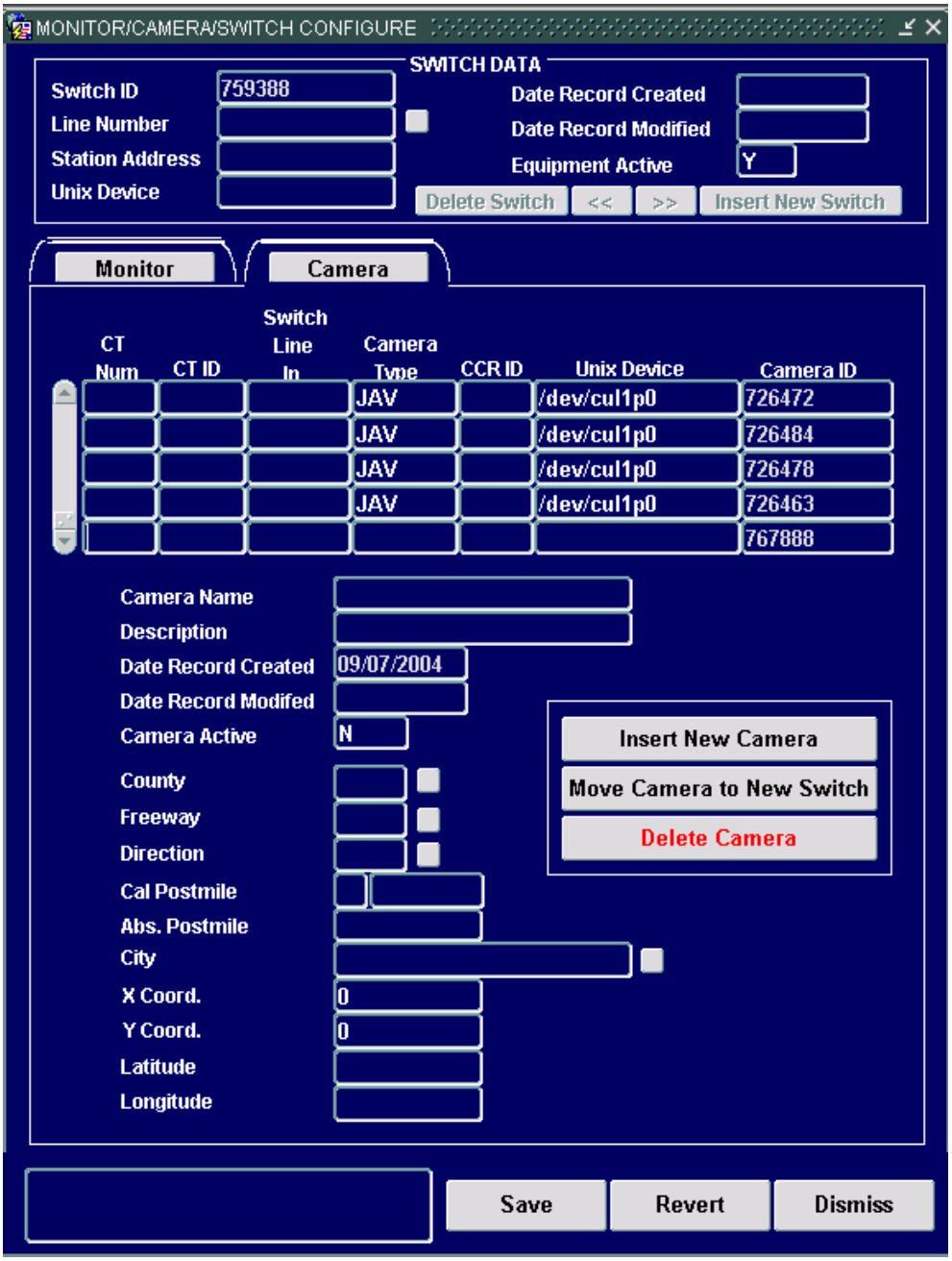


Figure 7-6: CCTV Update Window

Figure 7-7: Record Save Controls/Messages

7.4.5 Updating Records

The following procedure applies to all Configuration menu items and to Parameter menu items APID and Color Mapping. Other Parameter menu items may be accessed for update by selecting the item from the pull-down menu then editing the data and clicking the **Save** button.

To update a record:

- Choose Configuration or Parameter from the menu bar.
- Select the element that is to be updated from the Configuration or Parameter menu (e.g., CMS).
- At the Browse window, seen in Figure 7-8, supply the information of the record that needs to be updated (e.g., freeway route and direction).
- Click on the **Go** button.
- Once the record appears in the Browse window, click on the **Update Record** button (replaces the 'Insert New Record' button after the record search has been performed). If more than one record is retrieved, use the navigation buttons to select the record that is to be updated. At the update window, edit/enter the required data fields. Information can be entered by either manually typing in or clicking on a list button, then selecting from the displayed list.
- Click on the **Save** button when done. A message will appear at the bottom of the window to let the operator know that the updated record has been saved.
- Click on the **Return to Browse Screen** button to return to the Browse window.

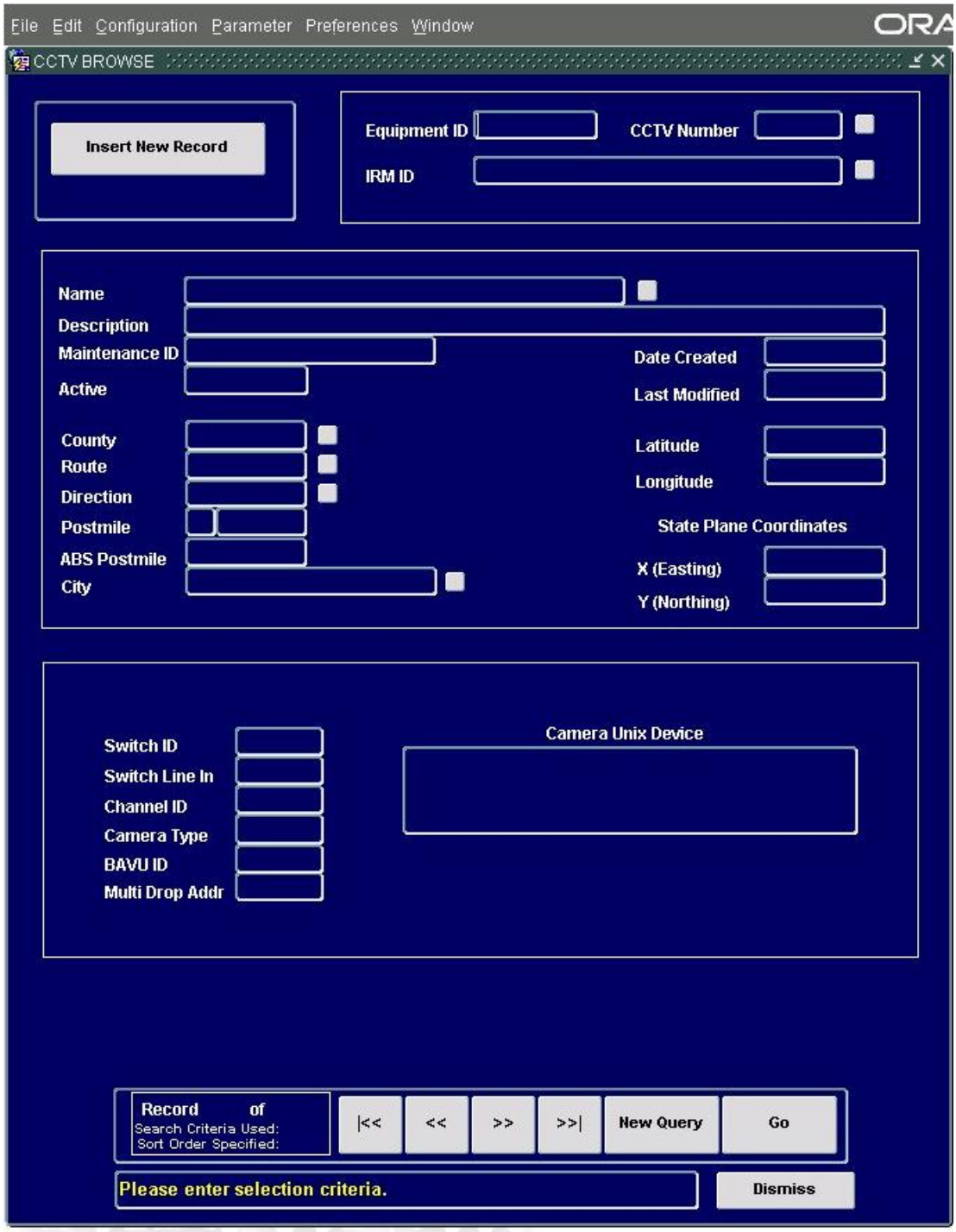


Figure 7-8: CCTV Browse Window

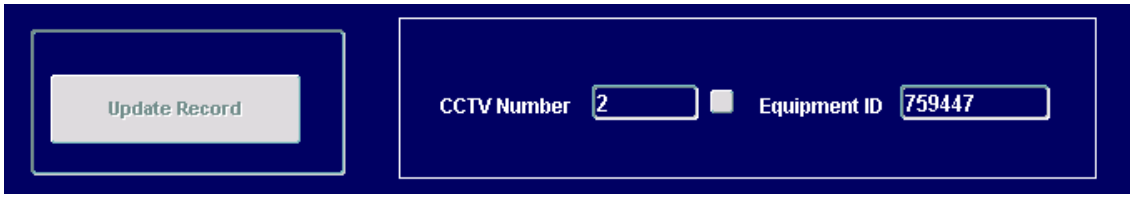


Figure 7-9: Update Record Button / CMS Browse Window

7.4.6 Deleting Records

The delete function is available to authorized operators only. The delete function deletes all records in all configuration database tables for the selected item. Deleted records cannot be restored. The delete function is available for the following *Configuration* menu items:

Table 7-1: Delete Capabilities

Menu	Item	Screen	Button Label	Function
Configuration	CCTV	Monitor/Camera /Switch Configure	Delete Camera	[1]Deletes the selected Camera record.
Configuration	CMS	CMS Update	DELETE	Deletes the selected CMS record.
Configuration	Office	Office Update	DELETE	Deletes the selected Office record.
Configuration	LDS	LDS Update	DELETE (LDS)	Deletes the selected LDS record after all associated loops have been deleted.
Configuration	LDS	LDS Update	DELETE (Loop)	[1]Deletes the selected loop record.
Configuration	Monitor	Monitor/Camera /Switch Configure	Delete Monitor	[1]Deletes the selected Monitor record.
Configuration	Monitor	Monitor/Camera /Switch Configure	Delete Window	[1]Deletes the selected Window record.
Configuration	Ramp	Ramp Update	DELETE	Deletes the selected ramp record and all associated section links.
Configuration	Ramp	Ramp Update	Delete Link (To or From)	[1]Deletes the selected link.
Configuration	Section	Section Update	DELETE	Deletes the selected Section record and all associated links.

Menu	Item	Screen	Button Label	Function
Configuration	Section	Section Update	Delete Link (To or From)	[1]Deletes the selected link.
Configuration	Switch	Monitor/Camera /Switch Configure	Delete Switch	[1]Deletes the selected Switch record.
Configuration	VDS	VDS Update	DELETE	Deletes the selected VDS and all associated detectors.

[1] Indicates that the cursor must be placed somewhere in one of the data fields of the record to be deleted prior to clicking the delete button.

To delete a record:

- Choose Configuration from the menu bar.
- Select the item to be deleted from the Configuration menu (e.g., LDS).
- Supply the information in the fields that are required to perform the record search (e.g., freeway route and direction).
- Click on the **Go** button.
- Once the record appears in the Browse window, click on the **Update Record** button. This replaces the **Insert New Record** button after the record search has been performed. If more than one record was retrieved, use the navigation buttons to select the record to be deleted, then click on the **pdate Record** button.
- Click on the **Delete** Button, Figure 7-10. Note that some items that can be deleted require further selection prior to performing the delete, as shown in Table 7-1.
- A confirmation window will pop up. Click on **Yes** to confirm the deletion or click on **No** to cancel the deletion.
- Click on the **Return to Browse Screen** button to return to the Browse window.

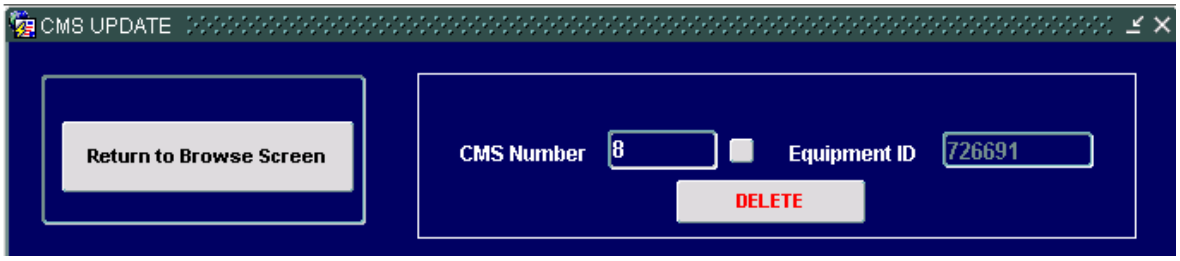


Figure 7-10: Delete Button/CMS Update Window

APPENDIX A

LIST OF ACRONYMS

LIST OF ACRONYMS

AID	Automatic Incident Detection
APID	All Purpose Incident Detection
ATMS	Advanced Transportation Management System
CAD	Computer-Aided Dispatch
CCTV	Closed Circuit Television
CHP	California Highway Patrol
CMS	Changeable Message Sign
CP	Command Post
CP Number	Command Post Phone Number
CPU	Central Processing Unit
EMS	Extinguishable Message Sign
GUI	Graphical User Interface
HAR	Highway Advisory Radio
HOV	High Occupancy Vehicle
ID	Identification
M	Minutes (used in RMS windows)
MITTENS	Messaging Infrastructure for Travel Time Estimates to a Network of Signs
ML	Mainline
MLMS	Mainline Metering Station
RMS	Ramp Metering Station
S	Seconds (used in RMS windows)

TMC	Transportation Management Center
TMT	Traffic Management Team
TOD	Time-of-Day
UI	User Interface
V	Vehicles
VDS	Vehicle Detection Station
VPH	Vehicles Per Hour

APPENDIX B

SAMPLE REPORTS