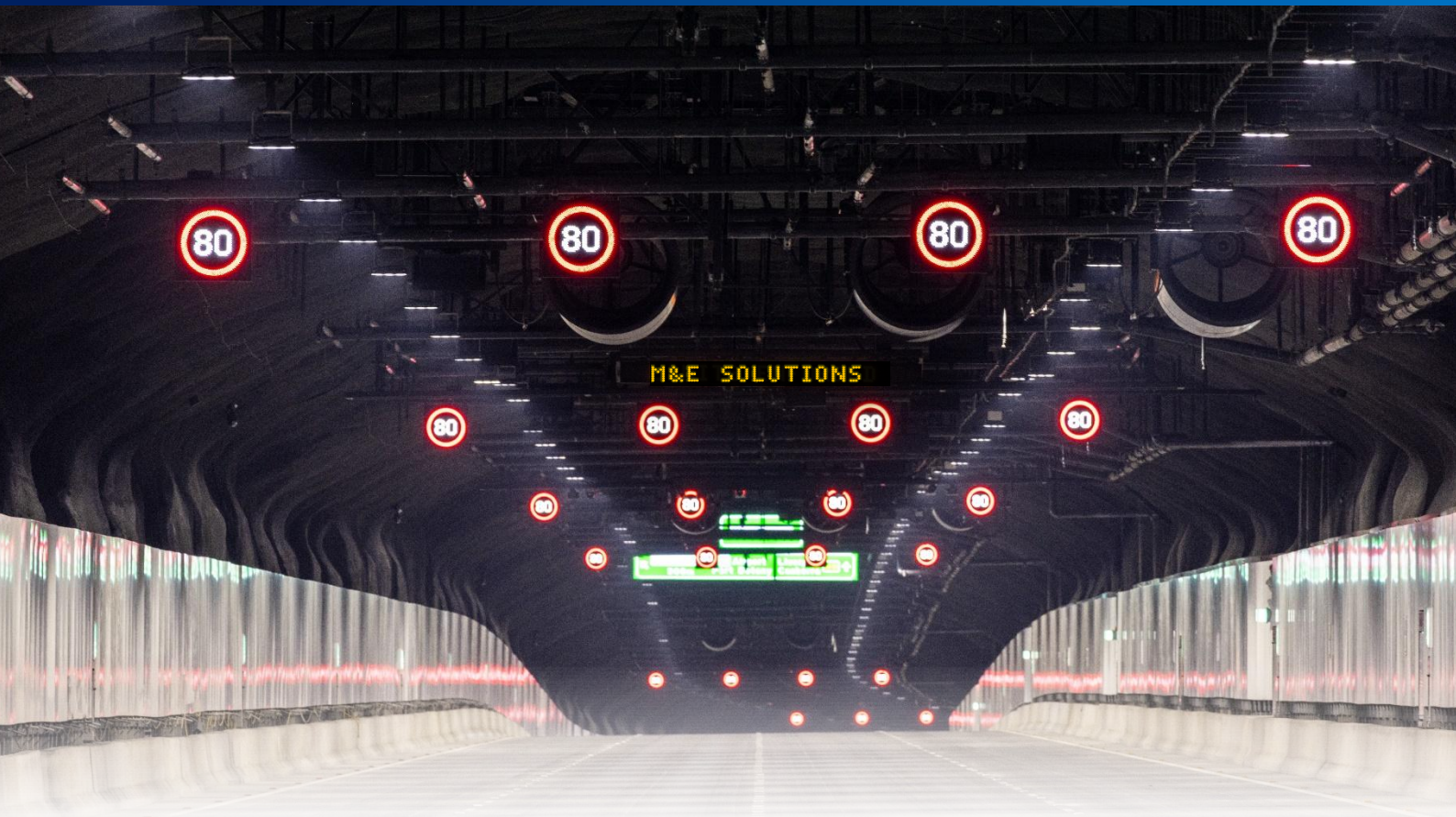


Credence

OMCS by M&E Solutions



ELECTRICAL & MECHANICAL ENGINEERING | CONTROL SYSTEMS
DESIGN | PROJECT DELIVERY & MANAGEMENT | COMMISSIONING

Innovating with Purpose

Adding Value with Impact



We are M&E Solutions.

We deliver engineering solutions, purpose-built control and electrical and mechanical systems that are adaptable, efficient, and **built to perform**.

By staying **agile and focused**, we simplify complexity, reduce risk, and add value at every stage — from design through to commissioning.

Our solutions are engineered to respond to change and **scale with your needs**.

Efficiency, adaptability, value
— wired in from day one.

50+ Handpicked
Engineers, Specialists,
Technicians and
Project Managers





Industry Recognition

Core platform products are well-known and trusted in the industry. Globally deployed on over 15+ Motorways & Tunnels.



Whole-of-Life Cost Savings

Reduced ownership costs by eliminating the need for lifelong lock-in with the original OMCS provider.

A Future-proofed,
PLC built,
COTS-based
Operational Management
& Control System



Maintenance Options

The system can be maintained by the owner or a preferred integrator with minimal outages and asset user disruptions.



Expansion and Transition

Designed with distributed architecture, parallel testing capabilities, and minimal in-tunnel fieldwork.

Engineered with
Safety, Security,
and **Assurance**
as core priorities

Developed in accordance with AS/NZS 12207 and AS 61508-3:2011 standards.

Compliance to Transport for NSW specifications including TS902 and all OMCS standards

Embedded AVEVA Cybersecurity and M&E Solutions compliance to ISO45001.

Traffic Management



- **Incident Detection and Management:** Efficiently detect and manage traffic incidents to maintain smooth operations.
- **Travel Times:** Monitor and report travel times for better traffic flow management.
- **Traffic Monitoring:** Keep a close watch on traffic conditions in real-time.
- **Third-Party Notifications:** Integrate with third-party systems to send and receive notifications.
- **CCTV Management:** Manage and control CCTV systems for enhanced surveillance.
- **Motorist Communication Systems Integration:** Seamlessly integrate with systems that communicate directly with motorists.
- **GIS Maps:** Utilize GIS maps for a comprehensive spatial overview of traffic and plant operations.

Plant Management

- **Plant Control:** Control various plant systems efficiently.
- **Plant Monitoring and Diagnostics:** Monitor plant operations and diagnose issues promptly.
- **Fault Reporting:** Report faults quickly for immediate attention and resolution.
- **Fire Systems Interface:** Interface with fire systems to ensure safety and rapid response.
- **Emergency Management:** Manage emergency situations effectively.
- **Emissions Control:** Monitor and control emissions to adhere to environmental standards.



Platform Details

AVEVA System Platform

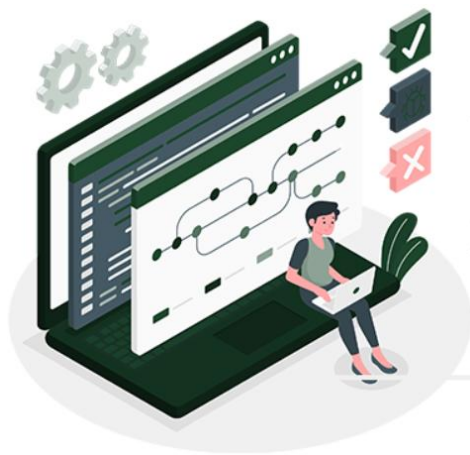
Globally deployed on 15+ Motorways & Tunnels

- **Operations Management Interface:** Interface designed for comprehensive operations management.
- **Historian & Analytics:** Advanced data logging and analysis capabilities.
- **Communications Drivers:** Robust drivers for effective communication across systems.
- **Hardware Agnostic:** Compatible with a variety of hardware solutions.
- **Template-Based Engineering:** Simplifies engineering tasks with reusable templates.
- **Task and Role-Based Design:** Integrates operations, engineering, maintenance, and corporate requirements.



Rockwell AB PLC

- **Robust Functionality:** Ensures all critical functionalities are managed within reliable PLCs.
- **Extensive User Base:** Benefit from a vast user and knowledge base for support and innovation.



Single pane of glass visibility

- **Unified Operations Centre:** From a single control room to a unified
- **Drill-down multi-site operations performance visibility**
- **Consistent view of business across functional groups**
- **Hierarchies of linked objectives, KPIs, targets, plans, and alerts**
- **Real-time monitoring operational performance metrics**
- **Out-of-the-box integrated performance management (industry-specific reports, metrics, analysis, and planning tools)**
- **Enterprise Integration leveraging existing IT and OT infrastructure**

Graphical User Interface – Screens

- Devices actively running are highlighted in aqua for intuitive visual status.
- Faulty devices are displayed in red to enable immediate identification and troubleshooting.
- Inactive elements use greyscale backgrounds for visual clarity.
- The color-coded system provides a clear and efficient operational overview.
- Visual cues facilitate prompt operator action.
- The interface design supports high performance and system reliability.

The navigation bar allows for easy search of devices and screens. Screens open as new tabs, enabling operators to seamlessly jump from one to another to view different systems

The menu bar provides quick access to key operational tools, including mapping, simulation, events, camera management, and traffic plans.

The screenshot displays the 'TUG - Electrical Schematic' interface. On the left is a navigation bar with a search field and a tree view of system components. A central panel shows detailed data for 'TUG_MSB1_PowerXpert', including communication status, average 3-phase current and voltages, total power (Real, Reactive, Apparent), and total energy usage. The main area features a complex electrical schematic with three bus sections (MSB-1, MSB-2, MSB-3) fed from HV-1 and HV-2 transformers. Each bus section contains multiple circuit breakers (CB) and loads (General, Fan). A 'Tunnel Essentials' component is shown at the bottom. A red warning icon is visible on the MSB-1 bus, and a yellow icon is on the MSB-3 bus.

Category	Value
Average 3-Phase Current & Voltages	
Average Current	147.6 A
Average L-N Voltage	245.3 V
Average L-L Voltage	424.9 V
Total Power	
Total Real Power	101.0 kW
Total Reactive Power	38.0 kVAr
Total Apparent Power	108.6 kVA
Total Power Factor	
Power Factor (Cos Theta)	0.9
Total Energy Usage	
Total kWh Hours	7,692,000.0 kWh
Total kVA Hours	8,243,973.0 kVAh

Graphical User Interface – Faceplates

- Each device features a detailed faceplate showing real-time status and key monitoring variables.
- The **Events tab** highlights active faults, alarms, and significant events for quick issue resolution.
- The **Interlocks tab** identifies conditions preventing device operation.

- The **Hierarchy tab** displays upstream communication and power supply dependencies.
- Together, these features enable effective monitoring, management, and troubleshooting of each device.

TUG_NBO_NPL_DPP_PUMP02

MAIN | ILOCKS | ALARMS | HIERARCHY

Device Name: TUG_NBO_NPL_DPP_PUMP02
 Device Type: Drainage System Pump
 Device Sub-Type: Dry Chamber Pump
 Location: Northbound Open Road
 Sub-Location: North Portal

P2
 Stopped

Remote Mode: Manual Automatic

Actions

PLC Communications	Online
RIO Communications	Online
Control Mode	Remote
Interlocks	Healthy
Health Status	Healthy

Additional Information:

Operating Hours: 355

Section that contains relevant information about the device, such as location, device type, and other critical details.

Summary icon for each device, providing a quick status overview at a glance. This icon includes indicators for interlocks, availability, local control, and health status, allowing operators to easily identify any conditions preventing the operation of the equipment

If the function of a specific device is not available it will be greyed out, ensuring that operators understand why the device is not performing the expected operation. This intuitive visual system enhances operational efficiency by providing clear and immediate status information, facilitating prompt and informed decision-making.

Best View Command triggers camera display in Genetec.

The faceplate includes a "+/-" button that reveals an extended faceplate with supplementary information. The default faceplate presents essential data tailored for operators, while the extended faceplate provides detailed maintenance-specific information for comprehensive analysis.

MAIN | ILOCKS | ALARMS | HIERARCHY

Interlocks:

- Low Level detected
- Two other pumps running
- Forced to Manual Mode due to Water Quality (High/Low pH and/or High HC)

● Interlock Not Active
 ● Interlock Active
 (O) = Interlock is Overridable

MAIN | ILOCKS | ALARMS | HIERARCHY

Device Name: TUG_NBO_MDN_VSL_VSN1_2
 Device Type: Variable Speed Limit Sign
 Location: Northbound Open Road
 Control Line: TBD
 Chainage: 84,615

Power Feed Level:

Device	Communications	Health
Level 1 Power Device	● Online	● Healthy
Level 2 Power Device	● Online	● Healthy
Level 3 Power Device	● Online	● Healthy
Level 4 Power Device	● Online	● Healthy

Communications Level:

Device	Communications	Health
PLC_TMPLC	● Online	● Healthy
ISC_VSLN01	● Online	● Healthy

Graphical User Interface – Driver Advisory Signage Control

- A manual window is available to manage DAS devices per gantry, including CMS, VMS, TMS, ISLUS, LUS, and VSLS.
- Users can view and modify each device's message queue by deleting or editing entries.
- New messages can be selected for implementation.
- The window also displays current field feedback from each device.

Current field feedback: Displays message being shown in the sign as reported by sign controller.

Message configuration options

Message library: Set of stored messages ready to be displayed in the field. Frames will be grouped per device type.

Device queue: displays all messages waiting to be shown, ordered by priority. It also shows the time of implementation and the user who sent the request.

New message request

Sign Status

Sign Edition

Device Queue

Events

Panel: TUG_NBO_VER_VMS_VMSN01

Sign Library

Dimming Mode: Auto

Power Status: Off

Beacons: Off

Priority: Local Area Incidents

Frames: 1 2 3 4 5 6

Edit Text Line

Requestor: vipopescu

TIMP: 0

Requestor: TTS

TIMP: 0

Date From: 08/08/2024 16:35

Date To: 08/08/2025 16:35

Date From: 08/08/2024 16:40

Date To: 08/08/2025 16:35

Date From: 07/08/2024 14:20

Date To:

Showing: TUG_NBO_VER_VSC_VM

Battery failure

Power Failure

Memory error

Battery failure

Sign lamp failure

Sign single-LED failure

Sign multi-LED failure

Over-temperature alarm

Under-temperature alarm

Set Sign

Traffic Plan Management

- A single window is provided for managing all traffic plans.
- Users can implement and unimplement traffic plans.
- Plans in the library can be edited, added, or removed.
- Access to these functions is based on user privileges.

Plan filtering menu

Viewing a plan: Operators can view and modify traffic plans stored in the PLC library before implementation by clicking on desired plan. Content will be displayed in top grid for preview. Operator will be able to edit plan prior to implementation

Result Preview: Operators can preview the traffic plan results considering other requests and their priorities, receiving notifications of any interlocks.

Implement: The Traffic Plan Manager assesses, and queues plans based on priorities, checking for invalid values and interlocks. Operators are prompted to address any issues identified.

Un-implement: The process for un-implementing follows the same validation as implementation, ensuring any interlocks are addressed before removing the plan from the queue.

Traffic Plan Management
✕

Search for Traffic Plans

Filter: Northbound Between Tweed: ⌵

Proposed Traffic Plans List

- 102 - Northbound Tube Left Lane Closure
- 202 - Northbound Tube Right Lane Closure
- 302 - Emergency Northbound Tunnel Closure
- 400 - Emergency Full Tunnel Closure
- 2202 - Full Northbound Closure & Partial Southbound (F
- 2402 - Full Northbound Closure for Emergency Vehicle (
- 2501 - [Description Pending]
- 2502 - [Description Pending]
- 3402 - Northbound Bypass Closure (Not Tunnel)
- 3403 - Full Bypass Closure (Not Tunnel)
- 3501 - NB Sequence Plan - Overheight
- 9019 - Insert Plan Description
- 9020 - Insert Plan Description

Preview Selected Implement Selected

Update Add Remove

Implemented Traffic Plans

Preview Unimplementation Unimplement Selected

Add: Used to add a new plan to the library.

Add New Traffic Plan

New Plan Configuration

Zone: Northbound Between Tweed: ⌵

Plan ID: None Generate Plan ID

Plan Description:

Copy Plan Data

Create Traffic Plan Result: Unknown

Exit

Event Management

- The faceplate displays all active events for a device.
- The event banner uses alarm suppression and considers communication and power supply hierarchy to highlight relevant information.

Events are grouped into sections containing alarms, faults, and incidents, shown in order of priority, with a primary section for any event active in the last two minutes. Depending on the user's role, each section can be hidden.

- Credence categorises events into three types:
 - **Faults:** Indicate abnormal conditions or defects at the component, equipment, or sub-system level; require maintenance support.
 - **Alarms:** Signal operational issues needing operator attention; may result from abnormal process values or unavailable device events.
 - **Incidents:** Safety-critical events (e.g. gas leaks, fires) requiring immediate action; trigger automatic pop-up alerts on operator workstations.

The screenshot displays the 'Latest Active' section with a table of events. Below it are sections for 'Alarms', 'Faults', and 'Incidents', each with its own table. A dialog box titled 'Severity Colors' is open, showing a table for configuring event colors and status animations.

Severity	Description	Colour
1	Critical	
2	High	
3	Medium	
4	Low	

Status	Is Active	Is Flashing	Opacity
ACK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
NOT_ACK	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Validated	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Terminated	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Rejected	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Unmanaged	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
NOT_ACK	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Unmanaged	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

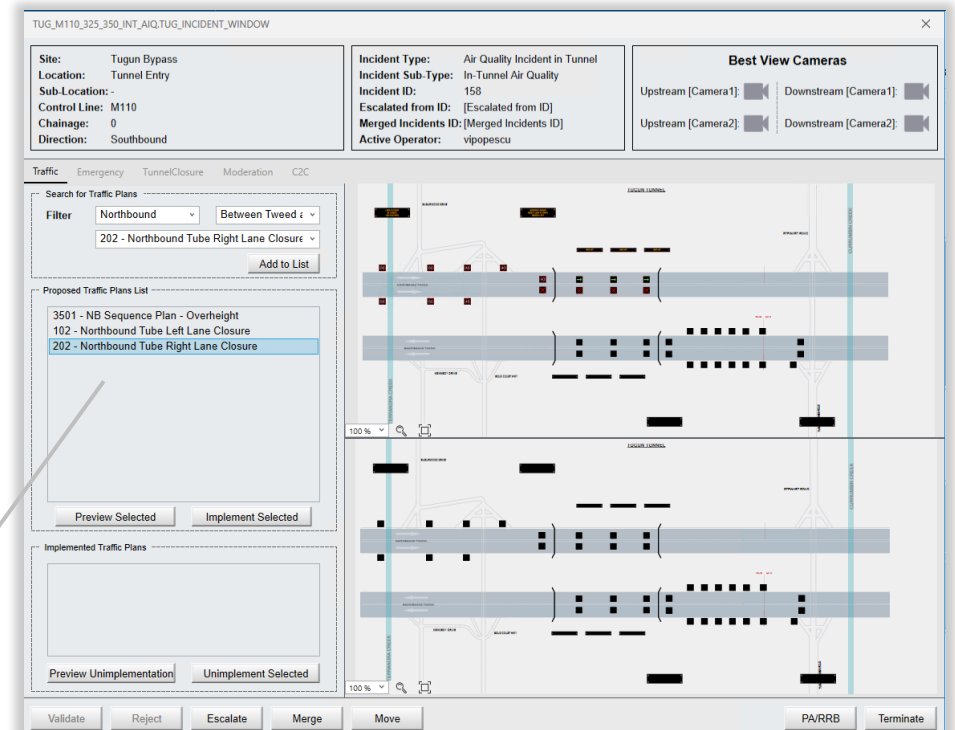
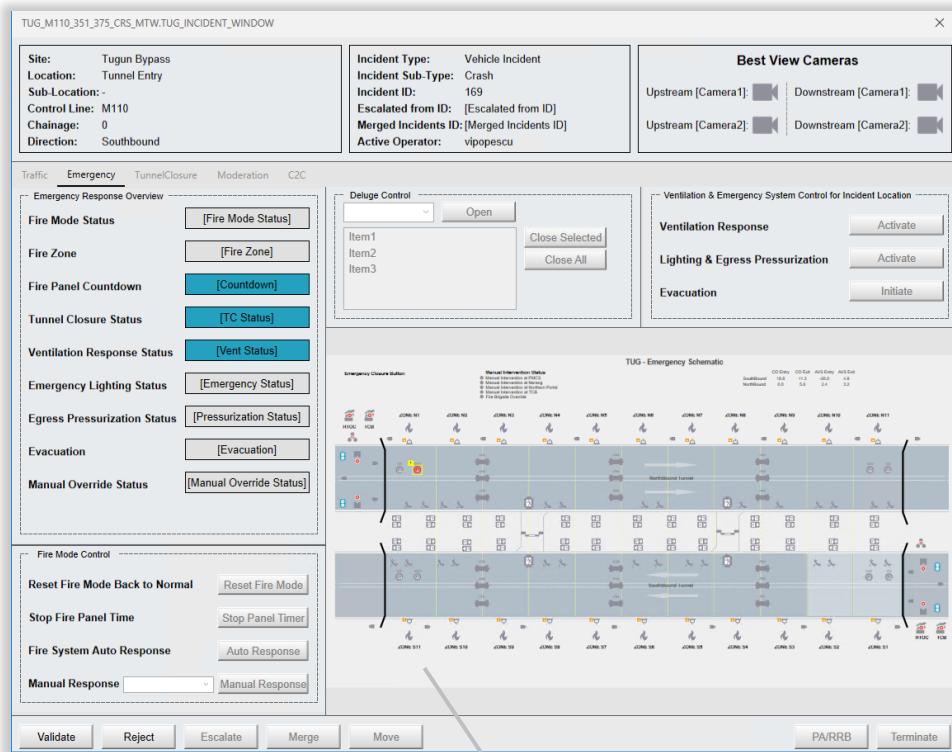
Each user can customize the colour, opacity, and flashing behaviour of events according to their preferences. These settings are stored individually for each user, ensuring they are retained upon subsequent logins.

Event Management (cont.)

- Events are shown on both the device faceplate and the Events Banner.
- Events are sorted by priority and activation time.

Priority levels include:

- **Severity 1 (Critical):** Major safety risks requiring immediate action.
- **Severity 2 (High):** Issues affecting automatic tunnel operations.
- **Severity 3 (Medium):** Operational issues without immediate threat.
- **Severity 4 (Low):** Informational only, with no operational impact.

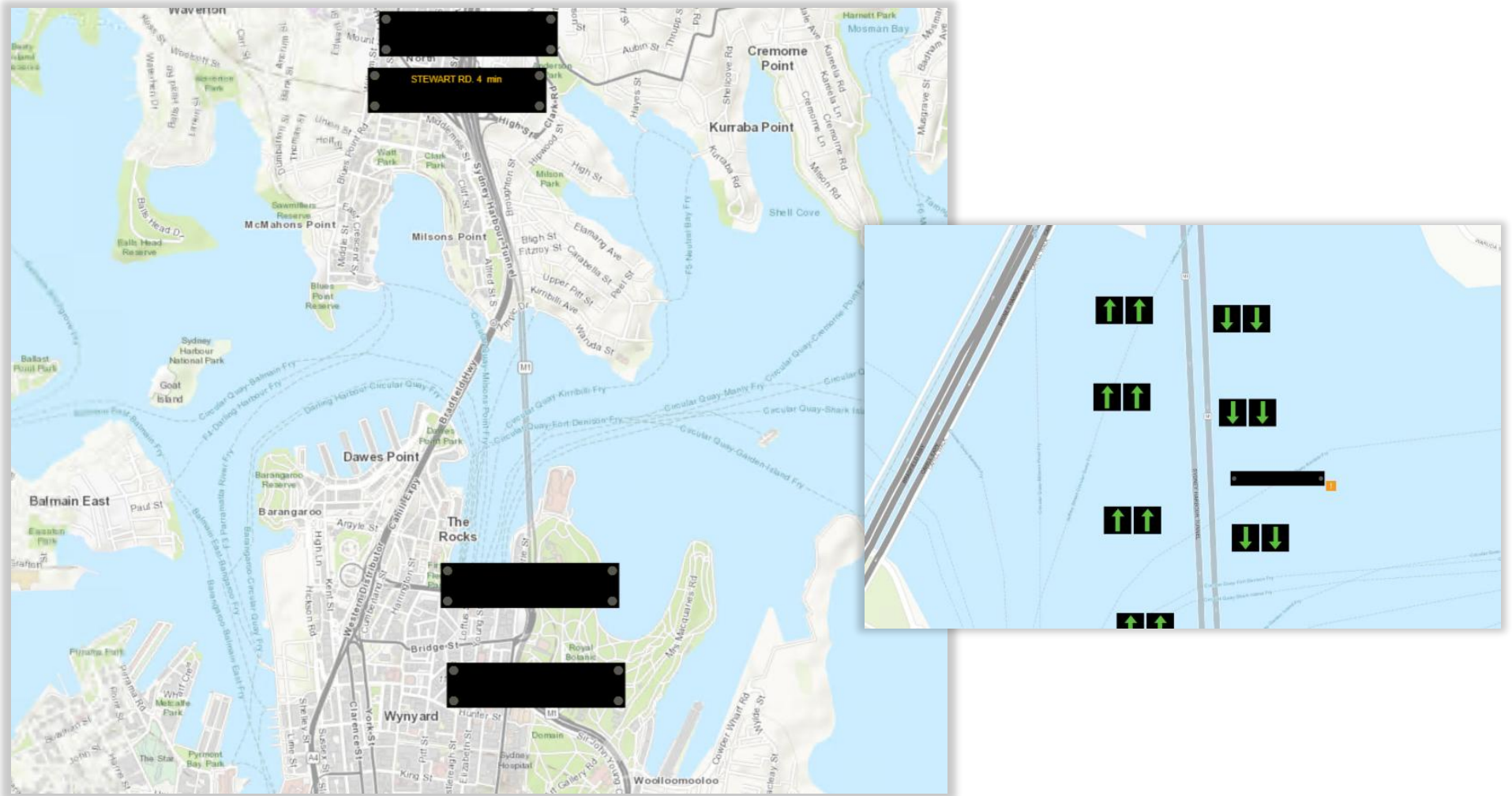


The Incident Management Window will also have the capability to implement and unimplement plans. A pre-selection of plans will be shown to the operator based on the location and type of incident. Additionally, dynamic plans tailored to the specific location will be displayed.

The Incident Management Window tab is used to manage emergency situations, such as a fire in the tunnel. It provides easy access to plant equipment essential for handling incidents, including emergency lighting, ventilation, and fire suppression systems.

Geographic Information Systems and Representation

- High performance GIS functionality; supports multiple views - “Street View”, “Satellite View”, “Terrain View” or other custom views.
- GIS functionality works using online maps and offline maps.
- Full control: Zoom, Scroll, Layer Reveal and other usability features for complete control





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