Memorandum of Reversible Lanes Operating Procedure and Responsibilities (Ops Manual/SOP) for the Tampa Hillsborough County Expressway Authority (THEA) Reversible Express Lanes (REL)

TAMPA-HILLSBOROUGH EXPRESSWAY AUTHORITY

CITY OF TAMPA

HNTB

TRANSDYN

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Version Control Panel

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This Memorandum of Reversible Lanes Operating Procedure and Responsibilities (Ops Manual/SOP) for the Tampa Hillsborough County Expressway Authority (THEA) Reversible Express Lanes (REL) is referenced in the Interlocal Agreement by and Between The City of Tampa, Florida and the Tampa-Hillsborough County Expressway Authority. That Interlocal Agreement requires that this Memorandum of Reversible Lanes Operating Procedure and Responsibilities (Ops Manual/SOP) be recorded in the Office of the Clerk of Circuit Court for Hillsborough County and that each revision shall contain the signature of the Chief Executive of Each agency.

City of Tampa: _____ _____
Bob Buckhorn Date
Mayor

THEA: _____ _____
Joseph C. Waggoner Date
Executive Director

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1 Background

1-1 Introduction

This document serves as the Standard Operating Procedures (SOP) for opening, closing and maintaining the Tampa Hillsborough County Expressway Authority (THEA) Reversible Express Lanes (REL) between downtown Tampa and Brandon east of I-75 at the Brandon Parkway. The REL are generally in the median of the Selmon Expressway and provide additional traffic capacity by being able to reverse in direction to serve the peak direction of travel. The REL tolling is accomplished by means of an open road tolling gantry.

The SOP addresses both automatic and manual REL opening and closing. It also addresses trouble-shooting and maintenance responsibilities and procedures. It is intended to be a guide to the operators who are working with the system day-to-day and ultimately will have the best working knowledge of the system and how it works. It is intended, however, to be as accurate as possible to ensure consistency of operations and maintenance and to assist training of new operators and maintainers.

The SOP does not address traffic incident management. The City of Tampa will follow their own procedures for traffic incident management including contacting 911, Florida State Highway Patrol and other emergency responders.

It is intended that the SOP will be updated and/or amended from time to time as conditions change or new systems are added to the THEA Intelligent Transportation System (ITS) network.

1-2 Description of Operation and Schedule for Operations Changes

Daily Operations: The SOP addresses both central and manual/field opening and closing of the REL. Typical Monday through Friday operations for the REL are as follows:

- 5:00 am to 10:00 am:
  - All Westbound Entrances (Brandon Portal and 78th Street Slip Ramp) OPEN
  - All Eastbound Entrances (Downtown Portal, 34th Street Slip Ramp, 301 Slip Ramp) CLOSED
- 10:00 am to 1:00 pm:
  - Downtown Entrance CLOSED
  - 34th Street Slip Ramp CLOSED
  - 301 Slip Ramp OPEN
  - Brandon Entrance CLOSED
  - 78th Street Slip Ramp OPEN
- 1:00 pm, overnight to 5:00 am:
  - All Westbound Entrances (Brandon Portal, 78th Street Slip Ramp) CLOSED
  - All Eastbound Entrances (Downtown Portal, 34th Street Slip Ramp, 301 Slip Ramp) OPEN
- Weekends until 5:00 a.m. Monday
  - All Westbound Entrances (Brandon Portal, 78th Street Slip Ramp) CLOSED
  - All Eastbound Entrances (Downtown Portal, 34th Street Slip Ramp, 301 Slip Ramp) OPEN

Opening and closing times are approximate in that it is recognized that the procedure to open or close the REL may take up to 30 minutes depending on the extent of the operations change and whether the opening is in Automatic Mode or Manual Mode.

Monthly Maintenance Operations: Non-scheduled routine and emergency and scheduled routine maintenance are performed by THEA Maintenance. During the month, THEA Maintenance will perform scheduled routine maintenance activities on the REL that will require extended closures of some portions of the REL. These scheduled maintenance activities include cleaning ACN and ENC (Ethernet Node Cabinet) cabinets, cleaning CCTV domes and other routine maintenance items. Portions of the REL will remain closed while maintenance is performed. THEA Maintenance will coordinate the maintenance activities with the City of Tampa operators to avoid any conflicts.

Special/Event Operations: Special events, particularly at Tampa sports venues, downtown and Ybor City may necessitate alternative REL operations for weekdays or weekends. THEA and the City of Tampa will jointly develop the operations plan for each special event on a case by case basis. The special event operations plan may be requested by an event promoter, the City or other organization wishing to use the REL for non-transportation purposes or to support a major traffic-generating event at a downtown venue.

Types of Operations: The REL Entrances may be opened in Automatic Mode using DYNAC and DynGate from the TMC or in Manual Mode by physically accessing each ACN and changing signs and opening/closing gates as appropriate. The SOP addresses fully Automatic, Partially Automatic/Partially Manual, and Fully Manual Modes operations changes.

1-3 Roles and Responsibilities

Several organizations are contracted by THEA for operations and maintenance of the REL. These organizations and roles are shown in the following table:

Organization	Role(s)
THEA	❖ Oversee REL operations ❖ Oversee REL ITS maintenance ❖ Provide and maintain contracts for operations ❖ Provide and maintain contracts for maintenance ❖ Provide accountability to Board, FDOT and others as required
City of Tampa Traffic Operations	❖ Staff the TMC ❖ Open and close REL entrances from the TMC ❖ Open and close REL entrances in the field when required ❖ Provide staff, vehicles and communications for TMC automatic and manual operations ❖ Report operations and maintenance problems to THEA ITS General Manager ❖ Support resolution of operations and maintenance problems ❖ Request updates to SOP as needed to reflect current conditions
THEA Maintenance	❖ Perform planned routine REL ITS maintenance ❖ Maintain the REL fiber-optic Ethernet communication network ❖ Perform unplanned routine and emergency maintenance of REL ITS ❖ Maintain spare parts warehouse and inventory ❖ ❖ Respond and locate in the field any locate requests from Sunshine State One Call of Florida ❖ Redline "As-Built" Plans with any changes or discrepancies from locates
Transdyn	❖ Provide on-call support for maintenance of • The Ethernet communication network • The Central and Local Software package (DYNAC/DynGate) • The System Hardware ❖ Provide design and support for integration of REL ITS system revisions and expansion into the communication network and DYNAC
HNTB	❖ Update and maintain SOP ❖ Assist THEA Maintenance concerning REL ITS maintenance activities ❖ Monitor TMC maintenance activities ❖ Provide design and oversight for REL ITS system revisions and expansion ❖ Review and integrate engineering changes into the "As-Built" Plans.
Florida Turnpike Enterprise	❖ Operate the REL toll collection system including the interface for the reversing the REL tolling system and interface with DYNAC ❖ FTE used TransCore to support operations and maintenance of toll collection DYNAC, reverse lane operations and the toll system

1-4 Contacts

Primary contact persons and phone numbers for operations and maintenance are as follows:

Organization	Contact(s)	Role(s)	Phone	E-Mail

Note – When gates hit Call Contacts Hi-Lited first

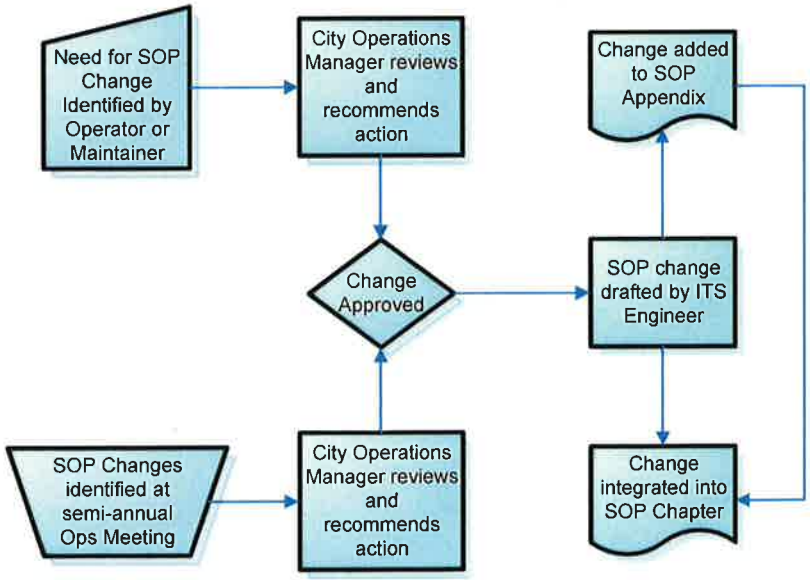
1-5 Required Manuals, Equipment and Appurtenances

The following equipment and appurtenances are required. Each operator must have the following:

- Cabinet Key – Access to ACN, Device Cabinets, Traffic Control Cabinets
- Transdyn "Missile Key" – ACN Panel Control Key
- Handheld Two-Way Radio or cellular phones
- Battery Powered Right-Angle Drill for emergency opening closure of barrier gates
- ADDCO Portable Hand-Held Sign Controller
- This SOP, including checklists
- DYNAC Training Manual
- DYNAC Work Stations and Graphic User Interface

1-6 Updating the SOP

The SOP should be reviewed continuously and revised on an as-needed basis. At a minimum, the SOP should be evaluated semi-annually for consistency and efficiency. As needs for updates are identified by City of Tampa Operators, THEA maintenance staff or others, they should be reviewed by the TMC Operations Manager, HNTB's ITS Engineer, and THEA's ITS General Manager and incorporated into the SOP as appropriate. An SOP/Operations meeting will be conducted two times per year to review operating procedures and the needs for updates. After this meeting, the SOP will be revised as appropriate. Between regular updates, the interim updates should be included in the Appendix F. At regular updates, interim updates should be incorporated into the appropriate section of the SOP. HNTB's ITS Engineer will be responsible for drafting SOP updates for review and approval of THEA and the City of Tampa. The following flowchart typifies management of the SOP change process.



2 Description of REL ITS Equipment, Network and DYNAC

The REL ITS consists of entrances controlled by warning and resistance barrier gates, variable and changeable message signs (VMS & CMS), CCTV traffic monitoring cameras, Access Control Nodes (ACN), Ethernet Network Cabinets (ENC), fiber optic communication infrastructure, 10/100 Megabit and Gigabit Ethernet Communication network protocols, power supply, backup generators and associated equipment. The following sections describe the function of each of these devices:

2-1 REL Entrances

There are five (5) gate controlled entrances to the THEA REL system. These entrances are as follows:

- Downtown Portal – Located at the intersection of Twiggs and Meridian, the Downtown Portal collects and distributes traffic to the street system in downtown Tampa.
- 34th Street Slip Ramp – Located east of the Downtown Portal, the 34th Street Slip Ramp allows eastbound traffic using the Selmon Expressway lower/local lanes to enter the REL.
- 78th Street Slip Ramp – Located east of the 34th Street Slip Ramp, the 78th Street Slip Ramp allows westbound traffic using the Selmon Expressway lower/local lanes to enter the REL.
- US 301 or 301 Slip Ramp – Located east of the 78th Street Slip Ramp, the 301 Slip Ramp allows eastbound traffic using the Selmon Expressway lower/local lanes to enter the REL.
- Brandon Portal – Located at the Intersection of Brandon Parkway and Town Center Boulevard, the Brandon Portal collects and distributes traffic for the local street system in Brandon.

2-2 Warning Gates

Warning gates are intended to warn traffic that the REL entrance they are approaching is CLOSED. Warning Gates are intended to be used in combination with barrier gates, VMS and CMS to provide a complete guide to travelers that an entrance is either OPEN or CLOSED. It is important the Warning Gates function properly for each OPEN and CLOSED Entrance change.

Proper operation of Warning Gates is verified both through the DYNAC user interface and through visual observation via either CCTV or field observation. Proper operation of Warning Gates can be prevented if the gate has been struck by an automobile or if communication has been lost between the ACN and the gate or power has been lost. A colored warning "Do Not Enter" banner has been added to all gates resulting in fewer gate hits.

The Warning Gates are controlled by the REL direction control feature in DynGate. If a Warning Gate does not respond properly to an OPEN or CLOSED command from DYNAC, the automatic, or TMC automatic, operation will cease and the REL Operator will be required to complete the action manually from the ACN Should this fail, the Operator will complete the action manually at each device.

The Warning Gates will break away if impacted by an automobile and consequently they must be repaired immediately after impact so that they function properly. The length of each gate is customized for each location. Gates have diagonal reflective striping, red flashing lights, wiring, colored warning flags and chevron warning signs. The attachment of the gate to the gate cabinet includes two sheer pins. All of these items must be checked and repaired or replaced after each gate impact. Gate replacement will be typically performed by THEA Maintenance but the City Operators may tie a gate in the open position to accommodate OPEN of a particular entrance. The Operator must report the broken gate to THEA's ITS General Manager immediately upon discovery. THEA's ITS General Manager will notify THEA Maintenance to repair the gate and will request a copy of any crash reports prepared by the police.

Warning and Barrier Gates are equipped with a cabling lockdown system in the event of severe weather or a natural disaster. THEA's ITS General Manager is responsible for the application of this system, as well as returning all portals to their normal status.

2-3 Barrier or Resistance Gates

Barrier gates are intended to physically prevent a car from using an entrance when it is closed. A barrier gate is fixed at both ends and is intended to stop a moving vehicle. The barrier is intended to prevent a severe head-on collision resulting from a vehicle entering a CLOSED entrance striking a vehicle on the REL traveling in the opposite direction. Because the barrier gate is a physical obstacle it is placed behind two or more warning gates and several VMS and CMS are present to warn motorists.

The Barrier Gates are controlled by the REL direction control feature in DynGate. If a Barrier Gate does not respond properly to an OPEN or CLOSED command from DYNAC, the operation will cease and the REL Operator will be required to complete the action manually.

As determined by observation or DYNAC alarms, an impacted Barrier Gate will need to be replaced immediately. Each gate is custom designed for each location and the replacement needs to be exactly as originally constructed to ensure the Gate will provide the crash impact resistance originally intended. Gate replacement will be typically performed by THEA Maintenance personnel. The Operator must report the broken gate to THEA'S ITS GENERAL Manager immediately upon discovery. THEA's ITS General Manager will notify THEA MAINTENANCE to repair the gate and will request a copy of any crash reports prepared by the police.

2-4 CCTV Cameras

CCTV Cameras serve two important roles. Primarily they are used to ensure that the REL is clear of opposing traffic before a reversing operation is started. Depending on the Operations Change that is planned, all or a portion of the REL cameras will begin an automatic tour of the REL so that the Operator can verify that all opposing traffic is clear before commencing the direction change and allowing an Entrance to OPEN. If for any reason, such as a communication or Network failure, the City of Tampa Operators will be required to drive the entire REL or the section for which Operations is being changed.

The second role of the CCTV Cameras is to allow the TMC Operators to monitor traffic conditions and support incident detection, verification and management.

Cameras are connected to the Fiber Optic Communication Network.

The Operators are to report any CCTV problems identified through DYNAC error logs or observation to THEA's ITS General Manager. THEA's ITS General Manager will notify THEA Maintenance to make necessary repairs or Transdyn if errors are related to the REL management software.

2-5 Changeable Message Signs (CMS)

Each CMS provides two messages, one when the REL is OPEN and another when the REL is CLOSED. CMS are strategically placed so they can be observed by motorists approaching any of the REL entrances. The DYNAC user interface identifies CMS as either "Critical" or "Non-Critical." Most CMS are considered Critical. The REL direction control feature of DynGate poles each ACN to ensure communication is active and to activate the applicable message for the upcoming operations change.

Some CMS display arrows depending on REL OPEN or CLOSED status. Some provide a text message "OPEN" or "CLOSED."

CMS are connected to the ACN via copper communication cables and may be controlled from the ACN

Messages that should be visible on each CMS during OPEN or CLOSED status are shown in Appendix B. The screen captures in this appendix also note whether each sign is Critical or Non-Critical. DYNAC is programmed to prevent a change of direction from OPEN to CLOSED if the corresponding signs can not also be changed. In no case will a message corresponding to OPEN conditions be allowed to exist on the approach to a CLOSED Entrance on a "Critical" sign.

2-6 Variable Message Signs (VMS)

VMS support three functions.

- Primarily they are used to alert drivers when the REL is CLOSED. When the REL is closed the VMS continuously displays a CLOSED message.

- VMS provide various messages that can be displayed when an entrance is OPEN.
- VMS can be use to provide other traveler information while the entrance is OPEN.

Portal VMS located adjacent to Barrier Gates and each Entrance are considered "Critical VMS." If any VMS is not functioning, the direction control feature in DynGate will stop the closing operation unless the City of Tampa Operator selects the option to ignore the problematic VMS. When a VMS is determined to be non-functioning either by DYNAC error report or observation, the Operator will notify the THEA ITS General Manager immediately.

VMS are connected to the ACN via copper communication cables and may be controlled from the ACN

A second use of the VMS is to advise motorists about changes to REL operations such as operations for monthly maintenance. These secondary messages and other messages associated with REL operations such as notifications about toll price changes are only displayed when the associated REL Entrance is OPEN.

A third use of the VMS is to advise motorists of traffic incidents or delays. Again, these messages will only be displayed on a specific VMS when the associated REL entrance is OPEN.

VMS message associated with REL CLOSED operations are controlled by the REL reversing feature in DYNAC. If the appropriate message fails to display when an entrance is changed from OPEN to CLOSED, DYNAC will halt the automatic change and require the Operator to complete the operation manually. When a VMS is determined to be non-functioning either by DYNAC error report or observation, the Operator will notify the HNTB Maintenance Manager immediately. DYNAC is programmed to prevent a change of direction from OPEN to CLOSED if the corresponding signs can not also be changed. In no case will a message corresponding to OPEN conditions be allowed to exist on the approach to a CLOSED Entrance on a "Critical" sign.

The following table describes all the VMS and CMS in the REL network and whether the sign is Critical or Non-Critical. Critical Signs are those that must be changed with each direction reversal action. If one of the Critical Signs can not be changed through DYNAC a decision must be made to either complete the reversal in the field or cancel or delay the reversal until the correct message can be displayed.

Gate Location	**Critical Signs** (*configurable*)	**Non-Critical Signs** (*configurable*)	**Non-Critical Signs** (*not configurable*)
78th Street Westbound	78-C01 78-CO2 618-DW05 (*VMS*)		
Brandon Westbound	BRN-C04 BRN-C05 BRN-C06 BRN-C07 618-DW07 (*VMS*)	BRN-C08	BRN-N09 BRN-N10 BRN-NC11 BRN-N13 BRN-N14

Gate Location	Critical Signs (*configurable*)	Non-Critical Signs (*configurable*)	Non-Critical Signs (*not configurable*)
			BRN-N15 BRN-N16
US 301 Eastbound	301-C01 301-C03 618-DE06 (*VMS*)		
34th Street Eastbound	34-C01 34-C02 618-DE04 (*VMS*)	618-VE04 (*VMS*)	
Downtown Eastbound	DT-C02 DT-C03 DT-C04 DT-C05 DT-C01 (*VMS*)	DT-N06	

2-7 Access Control Nodes (ACN)

Each REL Entrance is equipped with an ACN. The ACN communicates with and controls all Warning Gates, Barrier Gates, CMS and VMS associated with the REL Entrance. There are five (5) ACN's, one at each REL Entrance. The ACN is equipped with a dedicated power supply, uninterrupted power supply (UPS) and a backup generator. The ACN is connected to the Fiber-Optic Ethernet Network. All commands by the Operator by means of DYNAC to change an Entrance to OPEN or CLOSED are accomplished through the ACN

If for any reason, the central system is unable to complete an automatic change to OPEN or CLOSED, the REL Operator is able to perform these tasks manually at the ACN or manually at each gate and sign. When an ACN is determined to be non-functioning either by DYNAC error report or observation, the Operator will notify the THEA ITS General Manager immediately. The THEA ITS General Manager contacts the THEA Maintenance personnel to perform the work.

2-8 Gate Control Software (DynGate)

DynGate is the component of DYNAC that controls the opening and closing of the REL gates. DYNAC ensures safe REL operating conditions. DynGate provides the user interface for the REL Operators to request and authorize changes to REL operations. DynGate includes checklists that are completed with each operation.

2-9 Operator User Interface Software (DYNAC)

DYNAC provides the user interface for DynGate and for viewing and controlling CCTV and VMS and CMS on the REL. DYNAC provides error logs as well as graphics depicting REL current operations and availability of communication segments. Many of these graphics are shown in the various appendices to this SOP.

2-10 Portable VMS

THEA owns two portable VMS. These signs may be used to supplement VMS in the corridor. The Portable VMS are not controlled by DYNAC or REL communication network and are thus not part of normal operations. When these signs are deployed for any reason, the REL Operators are requested to observe them periodically and report any problems noted to the THEA ITS General Manager.

2-11 Florida's Turnpike Enterprise (FTE) Reversible Gantry Operation for Open Road Tolling (OTR)

FTE is responsible for the system that reverses the tolling operation when the REL operations are reversed. DYNAC communicates with the reversible ORT gantry. During reverse operation, DYNAC requests for direction changes. DYNAC monitors the status of the gantry for direction and health of the Violation Enforcement System (VES), Automatic Vehicle Identification (AVI) and Automatic Vehicle Classification (AVC) subsystems. DYNAC will report that this operation has occurred with each reversal. If tolling reversal is shown as an error in DYNAC, the REL Operator will notify Esteban Gomez with Transcore. No additional daily interaction between the operators and the FTE will be required unless the FTE has a problem with the tolling system and cannot begin tolling operations in time for an EB or WB opening. In the event this was to happen, FTE will contact the City of Tampa at least 1 hour before the scheduled operation is to begin.

3 Step by Step Procedures – Automatic Operations

Automatic operations are accomplished through DYNAC and DynGate User Interface through terminals located in the Traffic Management Center. In summary each opening or closure of the REL reversible lanes will consist of verification that all conflicting traffic has been cleared and implementation of specific steps for changing signs and opening gates, completed in a very specific order to ensure public safety.

The User Interface has options for selection of the desired operational scenario. Along with each scenario, the Operator will be prompted to complete a checklist to verify that each required step has been completed by DYNAC and witnessed by the Operator.

3-1 WB Opening 5:00 a.m. Monday through Friday

Typically the REL is operating in the east bound direction overnight. The 5:00 a.m. weekday opening will be a 100% reversal to the west bound direction to serve the morning peak traffic.

Select the proper options from DYNAC user interface. Specific steps are as follows:

- Close Downtown Portal – Signs, warning gates and resistance barrier gate
- Close 34th Street Slip Ramp – Signs, warning gates and resistance barrier gate
- Close 301 Slip Ramp – Signs, warning gates and resistance barrier gate
- Verify signal interface function
- Conduct camera tour of REL from Downtown Portal to Brandon Portal, verify that all opposing traffic and stalled vehicles are cleared
- Open 78th Slip Ramp – Barrier Gate, Warning Gates, and Signs
- Open Brandon Portal – Barrier Gate, Warning Gates, and Signs
- Verify correct operations, complete opening checklist, send status failure report to THEA ITS General Manager and Transdyn if needed.

Performance Measure: The target is to open the REL in the west bound direction no later than 6:00 a.m. Monday through Friday, except holidays. Typically, City of Tampa REL Operators begin the morning REL reversal at about 5:00 a.m. to allow time for manual operations if necessary.

3-2 Normal Split Mode Operations 10 a.m. to 1:00 p.m. Monday through Friday

During typical daily operations, the REL will be operated in split-mode during mid-day. The REL will be operated eastbound from the 301 Slip Ramp to the Brandon Portal and operated westbound from the 78th Street Slip Ramp to the Downtown Portal.

The Operator will select the correct applications from the DYNAC User Interface. Specific steps for the mid-day opening are:

- Close the Brandon Portal – Signs, Warning Gates, Barrier Gate

- Conduct camera tour from 301 Slip Ramp to Brandon Portal to ensure all opposing traffic and stalled vehicles are cleared
- Open 301 Slip Ramp – Barrier Gate, Warning Gates, Signs
- Verify correct operations, complete opening checklist, send status failure report to THEA ITS General Manager and Transdyn if needed.

Performance Measure: The target is to complete mid-day opening by 10:30 a.m. Monday through Friday, except holidays.

3-3 Maintenance Split Mode Operations 10 a.m. to 1:00 p.m. for Construction or Maintenance Activities

Once per month, the REL ITS Maintenance personnel will perform maintenance of ITS field devices and cabinets. During this time the REL split mode operations will be modified. The Maintenance personnel, THEA ITS General Manager will verify and notify the City of Tampa Operations Manager the maintenance schedule each month at least three (3) working days in advance.

Following is a listing of typical maintenance arrangements. The THEA ITS General Manager may request changes as needed.

- 301 Slip Ramp to Brandon Portal – Only the 78th Street Slip Ramp can be open, all other Slip Ramps and Portals must be closed
- 78th Street Slip Ramp to 301 Slip Ramp – The entire REL will need to be closed
- 34th Street Slip Ramp to 78th Street Slip Ramp – Only the 301 Slip Ramp can be opened
- 34th Street Slip Ramp to Downtown Portal – Only the 301 Slip Ramp can be open, all other Slip Ramps and Portals must be closed

The DYNAC User Interface has selections for each mid-day operation option. The Operator will use the appropriate settings and implement complete closures or partial openings based on the Maintenance Contractor's schedule.

The City of Tampa REL Operator, the Operations Manager and/or the THEA ITS General Manager will notify the THEA public information officer about openings and closures during the maintenance week, both the plan for the week and any deviations for the plan that arise during the week do to slower or faster than anticipated maintenance progress.

Performance Measures:

- Keep the public informed about mid-day operations
- Provide four (4) hours each day for Maintenance activities

3-4 EB Opening 1:30 p.m. Monday through Friday

Starting at 1:00 p.m. the Operators will begin implementation of the Evening/Overnight REL Opening. Typically the REL will fully open to Eastbound traffic during Evening/Overnight Operations.
The Operator will use the DYNAC User Interface to implement the Evening/Overnight Opening. Typically this process includes:

- Close 78th Street Slip Ramp – Signs, Warning Gates, Barrier Gate
- Camera Tour 301 Slip Ramp to Downtown Portal to ensure all opposing traffic and stalled vehicles are clear
- Open 34th Street Slip Ramp – Barrier Gate, Warning Gates, Signs
- Open Downtown Portal – Barrier Gate, Warning Gates, Signs
- Verify correct operations, complete opening checklist, send status failure report to THEA ITS General Manager and Transdyn if needed.

3-5 Normal Weekend and Holiday Operations

On weekends and holidays the REL will remain open in the Eastbound Direction until the weekday non-weekend/holiday morning Westbound Opening.

3-6 Special Event Operations

Each Special Event will require a specific Opening Plan that is coordinated with THEA Management, City Management and THEA Public Information. The responsibility for implementing the special event operations plans will be with the City of Tampa Operations Manager who will assign staff and ensure the plan is implemented as planned.

4 Step by Step Procedures – Manual Operations

In general Manual Operations will accomplish the same objectives as Automatic Operations except opening or closing of some or all devices will be accomplished in the field at the ACN or at each device rather than in the TMC using the DYNAC User Interface. Each opening will be done in the same order. Each device will be opened or closed in the same order. However, there are multiple variables to manual opening. Manual opening is preferably accomplished at the ACN. At times opening or closing of an Entrance or control a specific VMS, CMS or gate from the ACN is not functional. When this occurs, it is always possible to manually OPEN/CLOSE gates using the Right-Angle Drill and the fitting in the gate cabinet. Signs may need to be controlled using the one of the two Portable Controllers furnished by ADDCO.

Rather than repeating the order and sequence of each OPEN and CLOSE operations, this section describes each possible manual operation.

4-1 Manual Control of an Entrance from an ACN

If communication is lost between the TMC and an ACN, all elements associated with an entrance can be controlled from the ACN. See Appendix A for a checklist for manual operations showing the specific order of operations for manual opening and closing of each entrance. Also see Transdyn's ACN Operations Manual for more detailed instructions for opening each entrance from the ACN

4-2 Manual Control of a Barrier Gate from the Gate Cabinet

If communication is lost between an ACN and any barrier gate, the resistance barrier can be controlled from the gate cabinet. See Appendix A for a checklist for manual operations showing the specific order of operations for manual opening and closing of each entrance.

4-3 Manual Control of a Warning Gate from the Gate Cabinet

If communication is lost between an ACN and any warning gate, the warning gate can be controlled from the gate cabinet. See Appendix A for a checklist for manual operations showing the specific order of operations for manual opening and closing of each entrance.

4-4 Manual Control of an ADDCO CMS or VMS from the ENC using the ADDCO Portable Controller

If communication is lost between an ACN and any ADDCO CMS or VMS, the sign can be controlled from the sign cabinet. See Appendix A for a checklist for manual operations showing the specific order of operations for manual opening and closing of each entrance.

4-5 Normal Weekend Operations

On weekends and holidays the REL will remain open in the Eastbound Direction until the weekday morning following the weekend or holiday. The City does not staff the TMC on

weekends except during some special events. It is possible the Tampa Police will notify the City that a Gate has been hit and is interfering with traffic or some other REL ITS malfunction. The City will relay the reported problem(s) to THEA ITS General Manager who will in turn relay the problem to THEA Maintenance personnel or Transdyn along with an "emergency" or "non-emergency" classification. Depending on the classification of the problem, THEA Maintenance and/or Transdyn will respond in accordance with the provisions of their respective Contracts.

4-6 Special Event Operations

Each Special Event will require a specific Opening Plan that is coordinated with THEA Management, City Management and THEA Public Information.

5 Maintenance and Problem Resolution Procedures

Timely maintenance of the REL ITS software, hardware and communication network is critical to effective and efficient automatic operations from the TMC. There are five (5) partners for on-going operations and maintenance:

- THEA: Provides operations and maintenance funding, coordination, oversight and performance expectations;
- City of Tampa: The City operates the REL systems either from the TMC or remotely in the field. The City is responsible for monitoring the System Error Logs and reporting problems to THEA or THEA's Owner's Representative;
- HNTB: Assists THEA as the "Owner's Representative" for coordination and oversight of operations and maintenance; THEA Maintenance: Maintains the ITS field infrastructure and the THEA Communication Network. THEA Maintenance is on-call 24x7x365 to respond to maintenance needs. THEA Maintenance includes THEA employees and possible other contractors. THEA Maintenance provides both recurring (planned) and non-recurring maintenance.
- Transdyn: Supports and maintains the central systems software (DYNAC) and provides technical support for maintenance of the THEA Communication Network. Transdyn can remotely monitor the communication network and provide on-site staff needed to resolve issues.

Like any system involving field technology, field cabinets and multiple communication media, problems will occur that negatively impact the system performance and usability. The process for identifying, trouble-shooting and resolving system problems generally follows the steps:

- City of Tampa Operators provide a daily report, if needed, to the THEA ITS General Manager about device and communication problems identified through the DYNAC error logs, through the video wall or through visual observation in the field. At any time during the day that a problem is identified, the Operators will notify the THEA ITS General Manager.
- City of Tampa will notify HNTB with copies to Transdyn and THEA Maintenance about any problems identified within the TMC including any problems to the DYNAC package, servers or workstations even if the City fixes the problem on their own.

EXHIBIT C –PREVENTATIVE MAINTENANCE SCHEDULE

	Maintenance Frequency				
Activity	**Monthly**	**Semi-Annually**	**Annually**	**Bi-Annually**	**Other as Shown**
Common Equipment - Conduit Plant/Raceways					
Inspect all conduits for proper mounting and environmental damage.				X	
Check for broken and damaged pull boxes.				X	
Common Equipment - Local Cabinets					
Check cabinet for proper conduit and base seals.	X				
Check fan and thermostat operation.	X				
Lubricate doors and locks if required.	X				
Check cabinet lights for operation and replace if required.	X				
Inspect cabinet for environmental damage.	X				
Inspect and Test UPS and batteries	X				
Replace door filters as needed	X				
Vacuum cabinets and dust equipment.				X	
Inspect Ground/Lightning System				X	
Communications Network Including: Central Switch, ACN. Field Hubs, Local Switches and Modems, FO Cable Plan					
Check transmitters, receivers, modulators, demodulators, multiplexers, de-multiplexers, switches, routers, CSU/DSU and repeaters for proper operation.	X				
Check fiber, twisted pair and coax cable connections.	X				
Inspect equipment for environmental damage.	X				
Check optical output of transmitters, if required.			X		
Tune modulators and demodulators, if required.			X		
Dust and clean equipment.	X				
Perform Fiber Optic (FO) Optical Time Delay Recorder (OTDR) Tests and Document, if required			X		
CCTV Including Dome Assembly					

	Maintenance Frequency				
Activity	Monthly	Semi-Annually	Annually	Bi-Annually	Other as Shown
Inspect camera housing for environmental damage.	2 Month Cycle				
Inspect camera housing seals.	2 Month Cycle				
Clean housing dome/face	2 Month Cycle				
Check thermostat, heater, (and blower) for proper operation.	2 Month Cycle				
Test/Inspect pan-tilt function for proper operation.	2 Month Cycle				
Test/Inspect camera for proper operation.	2 Month Cycle				
Inspect cable for proper connections.	2 Month Cycle				
Inspect assembly for environmental damage.	2 Month Cycle				
Adjust camera if necessary.	2 Month Cycle				
Clean camera lens.	2 Month Cycle				
Reversible Lane Including Slip Ramp Gates (B&B HW-4 Swing Gates) and Barrier Gates (B&B VR-7)					
After 3 Month then Every 2 Months					
Resistance Barrier Lock Down Arms Inspect and tighten, check shear pin.	Bi-Monthly				
Visually Inspect for Corrosion, Loose Connections, Wires and Physical Appearance	Bi-Monthly				
Transmission	X				
Check Oil Level	X				
Check for Contamination	X				
Arm Shaft Bearing and Rod Ends	X				
Grease Shaft Bearings as Required	X				
Grease Rod Ends as Required	X				
Limit Switch	X				
Lubricate Roller Chain as Required	X				
Check/Tighten Chain Tension	X				
Shorten Chain as Needed	X				
Motorist Information, Including ADDCO Brick VMS and CMS					

Activity	Maintenance Frequency				
	Monthly	Semi-Annually	Annually	Bi-Annually	Other as Shown
Brick Sign Message Display (Every Two Months)	2 Month Cycle				
Clean to Remove Dirt or Contaminants	2 Month Cycle				
Remove Dirt/Dust with Soft Cloth, Sponge and Water	2 Month Cycle				
Wiring - Check for Cracked/Frayed Insulation and Moisture Damage. Repair or Replace as Part of Routine Maintenance if Extensive		X			
Electric Power Plant, Including Line Power Services from Service Pole/Pedestal to Equipment, Transformers					
Inspect Pole, Meter, Ground and Service Disconnect for corrosion, loose wires and connections	X				
Replace Fuses/Circuit Breakers, as Needed	X				
Emergency Generators – Generac, Inc. Power Systems - 24 Month Warranty					
Scheduled Maintenance for Engine and Alternator					
Lightning, Surge and Grounding, TVSS – Atlantic Scientific					
Inspect connections monthly as part of Cabinet Inspection	X				
Repair loose wires as needed	X				
Lightning Suppression Devices – Air Terminals UL96A					
Visually Inspect for loose air terminal or ground wire connections – Repair as needed	X				
Ground Readings				X	
Inspect Monthly for loose wires or connections – repair as needed	X				

Scope of work for DYNAC maintenance is included in Appendix D of this SOP. This is an excerpt from the maintenance contracts currently in place with Transdyn.

Appendix A – Partially automatic, fully manual Operations Log

These Partially Automatic or Fully Manual Operations Logs are provided for reference only. The actual logs used are part of the DYNAC software user interface. Should DYNAC become unavailable, these logs could be used on an interim basis.

5:00 A.M. (Morning) WB Opening Log

Partially Automatic, Fully Manual Operations Log 5:00 A.M. (Morning) EB Opening			
Date:	(MM/DD/YY)	**Operator Name:**	
Activity Log			
Step #	**Step Description**	**Complete (Y/N)**	**Comments** (If step was not accomplished from the ACN, note how step was accomplished and other notes.)
01	CLOSE EB Downtown Portal changing signs, closing gates in order defined in SOP.		
02	Drive East to 34th Street Slip Ramp; verify no opposing traffic, no stalled vehicles.		
03	CLOSE EB 34th Street Slip Ramp changing signs, closing gates in order defined in SOP.		
04	Drive East on REL from 34th Street to 78th Street Slip Ramp,		
05	OPEN 78th Street Slip Ramp opening gates and changing signs in order defined in SOP.		
06	Drive EAST on REL to 301 Slip Ramp, verify no opposing traffic, no stalled vehicles.		
07	CLOSE 301 Slip Ramp changing signs and closing gates in order defined in SOP.		
08	Drive East to Brandon Portal, verify no opposing traffic or stalled vehicles.		
09	OPEN Brandon EB Portal following steps in order defined in SOP.		
10	Drive West on REL to return to TMC.		
11	Complete This Log		
12	Report any problems to William Holland per SOP.		

10:00 A.M. (Mid-Day) Opening Log

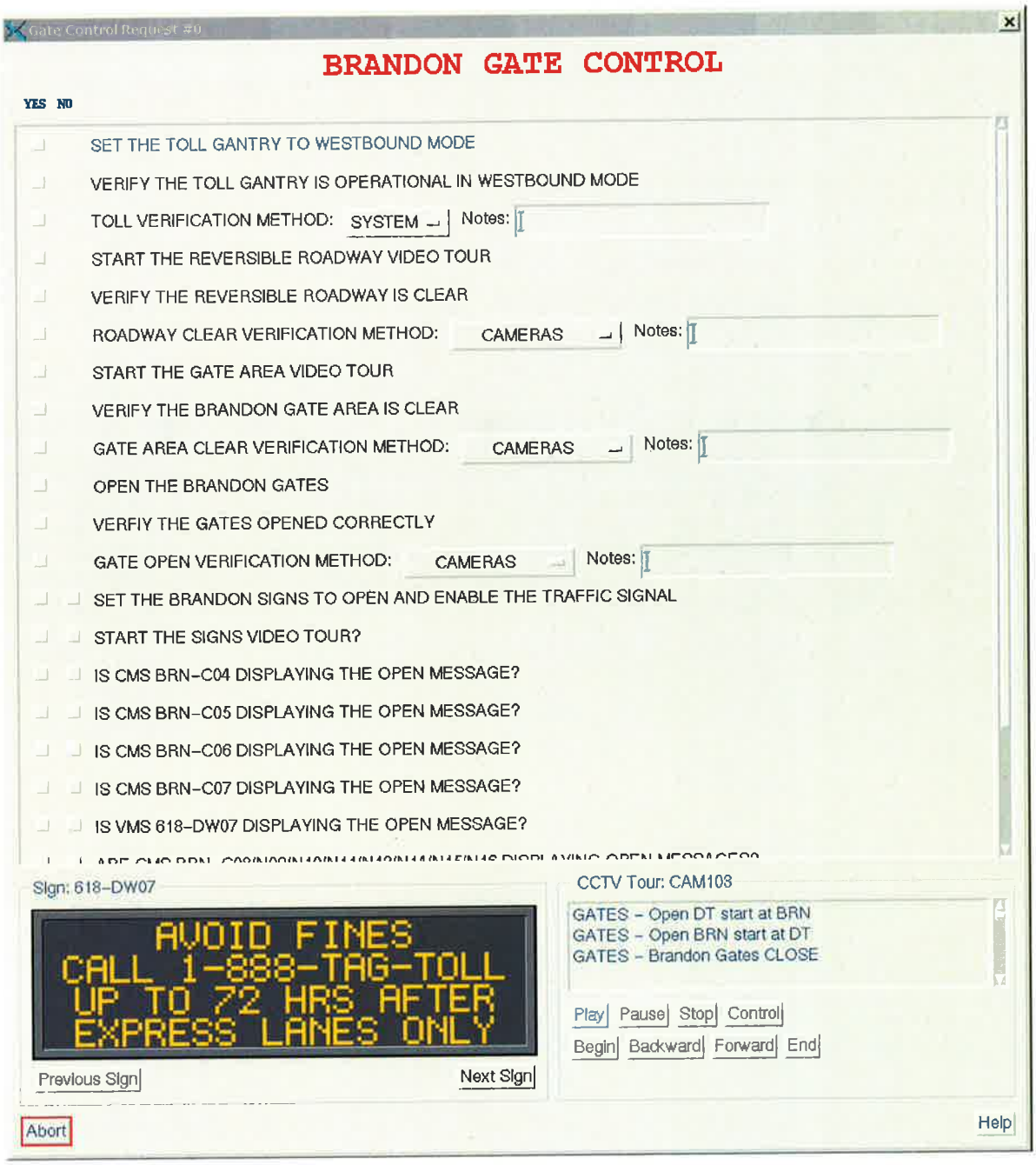
Partially Automatic, Fully Manual Operations Log 10:00 A.M. (Split Mode) Opening			
Date:	(MM/DD/YY)	**Operator Name:**	
Activity Log			
Step #	**Step Description**	**Complete (Y/N)**	**Comments** (If step was not accomplished from the ACN, note how step was accomplished and other notes.)
01	Drive West to Brandon Portal (Use local streets)		
02	CLOSE Brandon Portal changing signs and closing gates in order described in SOP.		
03	Drive West on REL to 301 Slip Ramp, verify no opposing traffic or stalled vehicles		
04	OPEN 301 Slip Ramp opening gates and changing signs in order described in SOP.		
05	Drive West on REL to Downtown Portal to exit REL		
06	Intentionally left blank		
07	Intentionally left blank		
08	Intentionally left blank		
09	Intentionally left blank		
10	Complete This Log		
11	Report any problems to THEA ITS General Manager per SOP.		

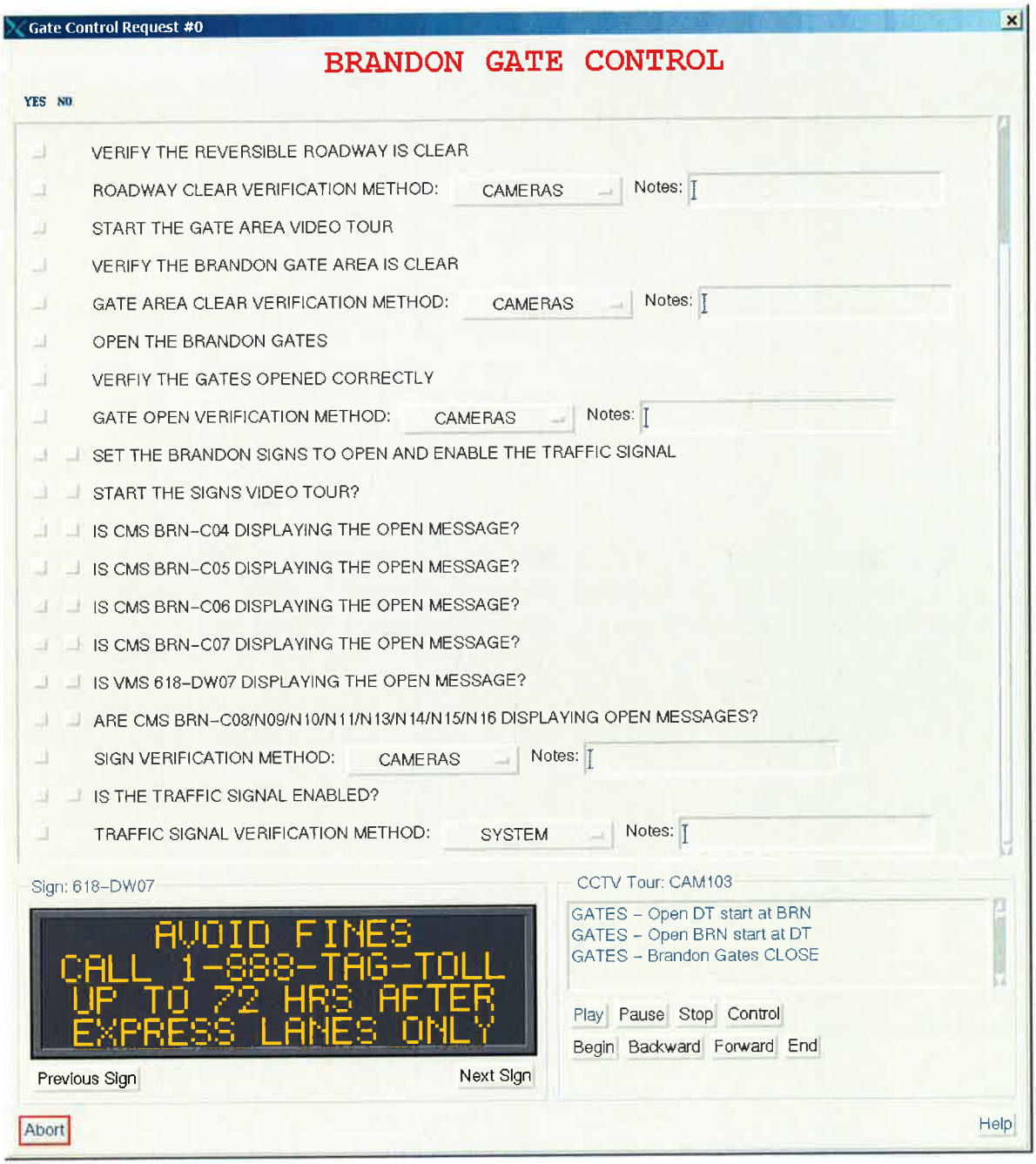
1:30 P.M. (Afternoon, Evening, Overnight) Opening Log

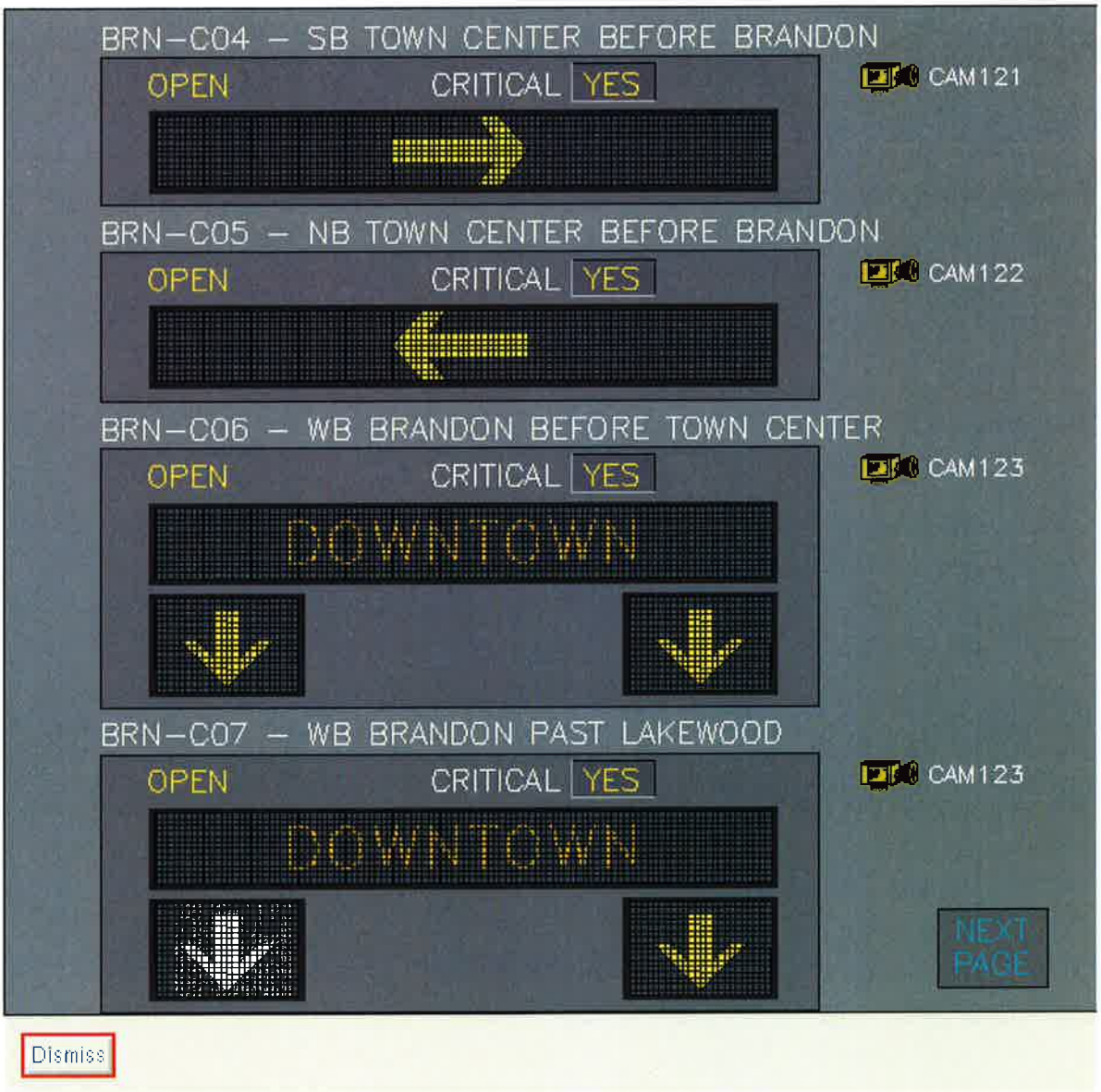
Partially Automatic, Fully Manual Operations Log 1:00 P.M. (Afternoon/Evening/Overnight) Opening			
Date:	(MM/DD/YY)	**Operator Name:**	
Activity Log			
Step #	**Step Description**	**Complete (Y/N)**	**Comments** (If step was not accomplished from the ACN, note how step was accomplished and other notes.)
01	Drive East to 78th Street Slip Ramp (using local streets)		
02	CLOSE 78th Street Slip Ramp, changing signs and closing gates in order described in SOP		
03	Drive East to 301 Slip Ramp, verify no opposing traffic or stalled vehicles.		
04	Drive West to 34th Street Slip Ramp, verify no opposing traffic or stalled vehicles		
05	OPEN 34th Street Slip Ramp, opening gates and changing signs in order described in SOP.		
06	Drive West to Downtown Portal, verify no opposing traffic or stalled vehicles.		
07	OPEN Downtown Portal opening gates and changing signs in order described in SOP.		
08	Intentionally left blank		
09	Intentionally left blank		
10	Complete This Log		
11	Report any problems to THEA ITS General Manager per SOP.		

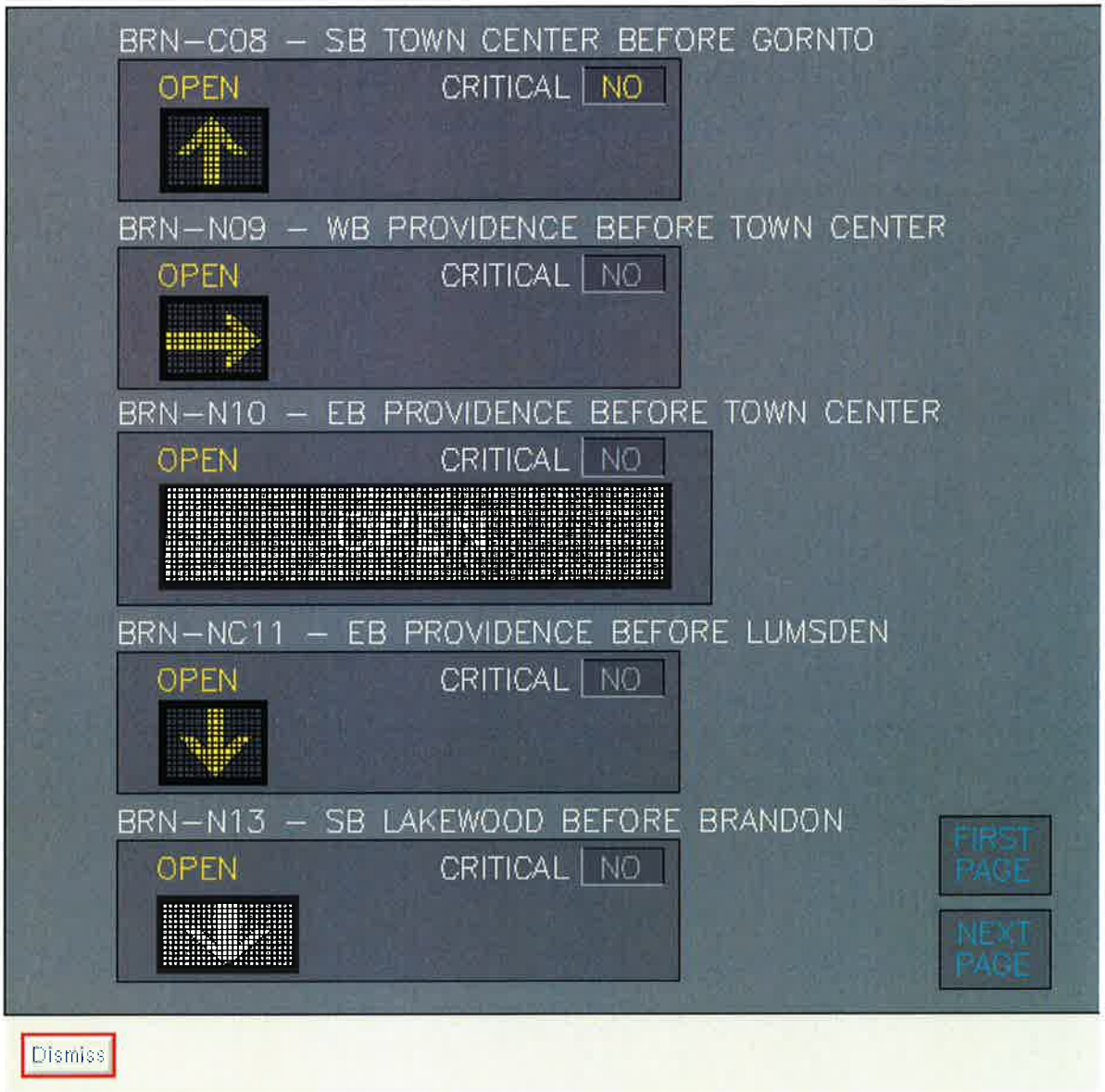
Appendix B –DynGate Entrance Checklists and CMS Screenshots

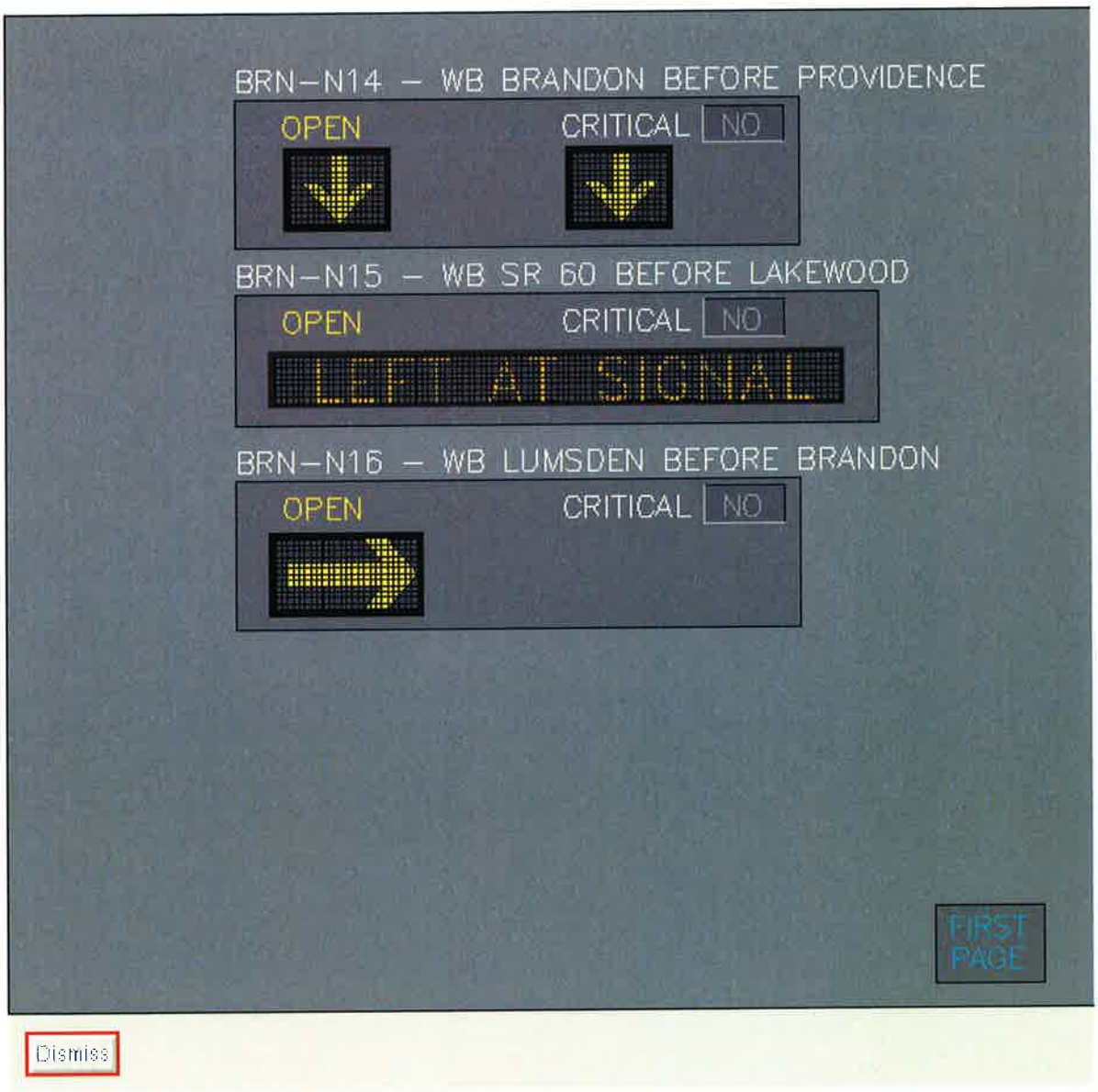
OPEN Brandon Entrance



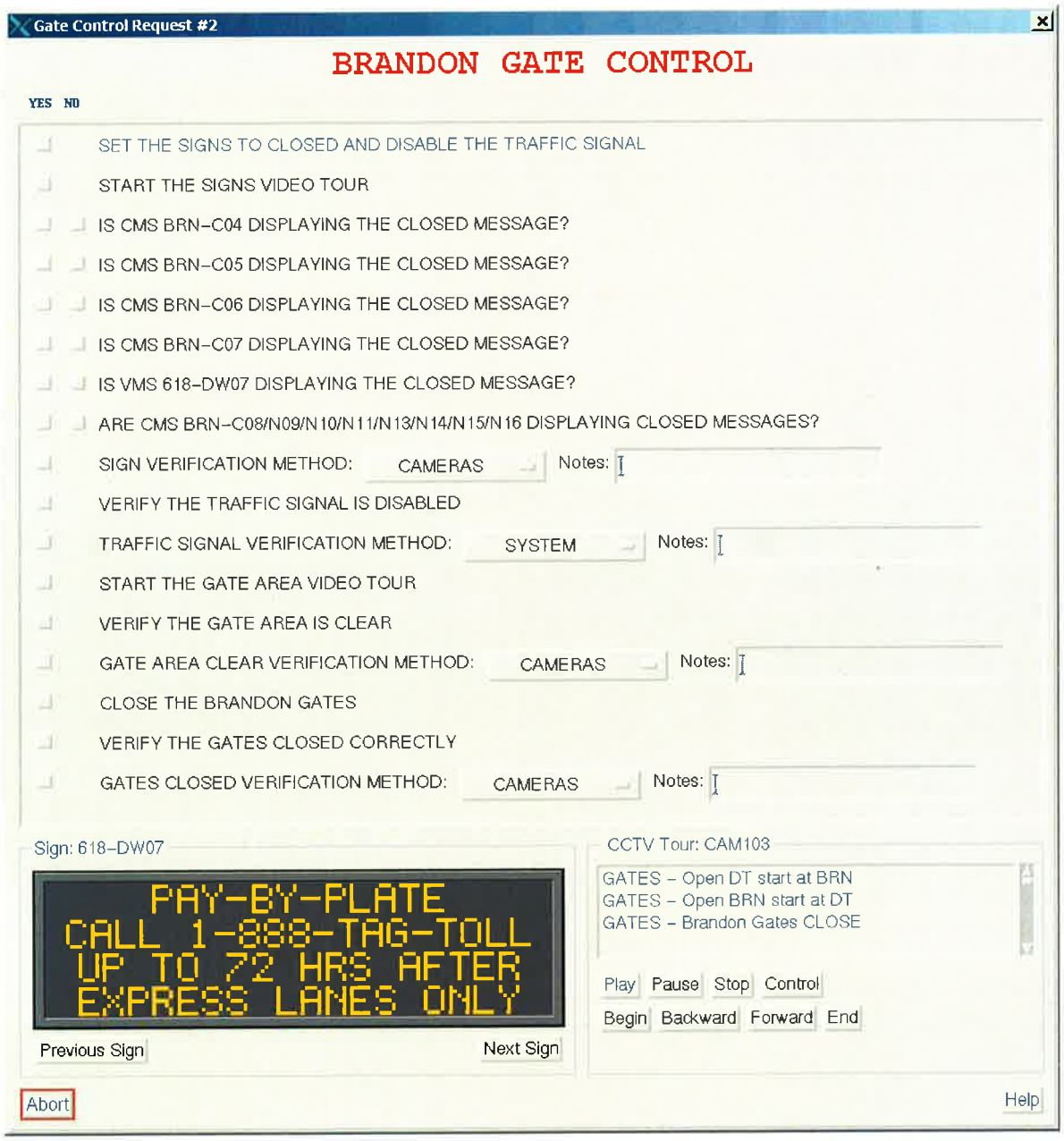

Gate Control Request #0
BRANDON GATE CONTROL
YES NO
VERIFY THE REVERSIBLE ROADWAY IS CLEAR
ROADWAY CLEAR VERIFICATION METHOD: CAMERAS Notes:
START THE GATE AREA VIDEO TOUR
VERIFY THE BRANDON GATE AREA IS CLEAR
GATE AREA CLEAR VERIFICATION METHOD: CAMERAS Notes:
OPEN THE BRANDON GATES
VERFIY THE GATES OPENED CORRECTLY
GATE OPEN VERIFICATION METHOD: CAMERAS Notes:
SET THE BRANDON SIGNS TO OPEN AND ENABLE THE TRAFFIC SIGNAL
START THE SIGNS VIDEO TOUR?
IS CMS BRN-C04 DISPLAYING THE OPEN MESSAGE?
IS CMS BRN-C05 DISPLAYING THE OPEN MESSAGE?
IS CMS BRN-C06 DISPLAYING THE OPEN MESSAGE?
IS CMS BRN-C07 DISPLAYING THE OPEN MESSAGE?
IS VMS 618-DW07 DISPLAYING THE OPEN MESSAGE?
ARE CMS BRN-C08/N09/N10/N11/N13/N14/N15/N16 DISPLAYING OPEN MESSAGES?
SIGN VERIFICATION METHOD: CAMERAS Notes:
IS THE TRAFFIC SIGNAL ENABLED?
TRAFFIC SIGNAL VERIFICATION METHOD: SYSTEM Notes:
Sign: 618-DW07
AVOID FINES
CALL 1-888-TAG-TOLL
UP TO 72 HRS AFTER
EXPRESS LANES ONLY
Previous Sign
Next Sign
CCTV Tour: CAM103
GATES - Open DT start at BRN
GATES - Open BRN start at DT
GATES - Brandon Gates CLOSE
Play Pause Stop Control
Begin Backward Forward End
Abort
Help

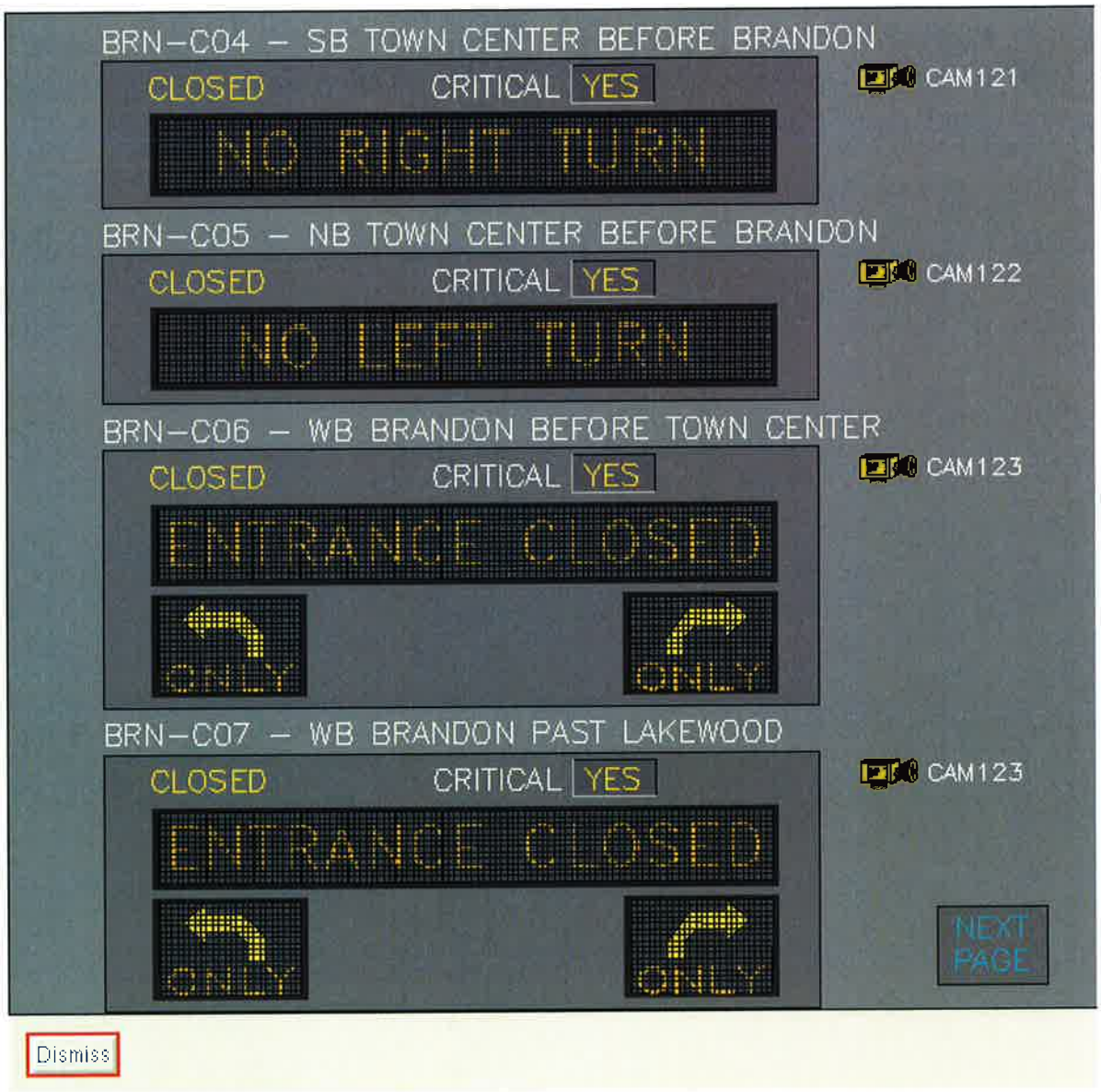

BRN–C04 – SB TOWN CENTER BEFORE BRANDON
OPEN
CRITICAL YES
CAM121
BRN–C05 – NB TOWN CENTER BEFORE BRANDON
OPEN
CRITICAL YES
CAM122
BRN–C06 – WB BRANDON BEFORE TOWN CENTER
OPEN
CRITICAL YES
CAM123
DOWNTOWN
BRN–C07 – WB BRANDON PAST LAKEWOOD
OPEN
CRITICAL YES
CAM123
DOWNTOWN
NEXT PAGE
Dismiss

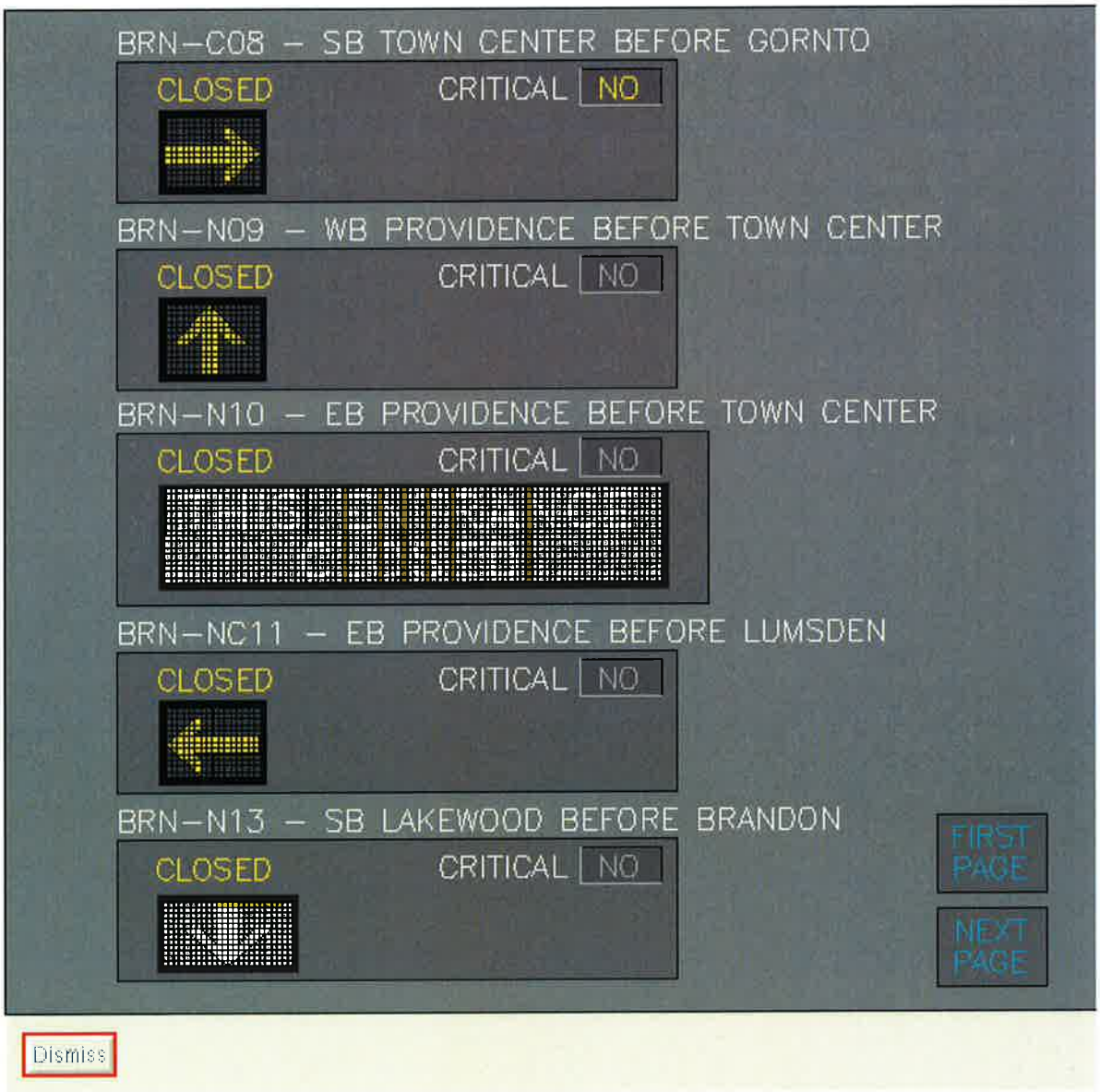

BRN–C08 – SB TOWN CENTER BEFORE GORNTO
OPEN
CRITICAL NO
BRN–N09 – WB PROVIDENCE BEFORE TOWN CENTER
OPEN
CRITICAL NO
BRN–N10 – EB PROVIDENCE BEFORE TOWN CENTER
OPEN
CRITICAL NO
BRN–NC11 – EB PROVIDENCE BEFORE LUMSDEN
OPEN
CRITICAL NO
BRN–N13 – SB LAKEWOOD BEFORE BRANDON
OPEN
CRITICAL NO
FIRST PAGE
NEXT PAGE
Dismiss

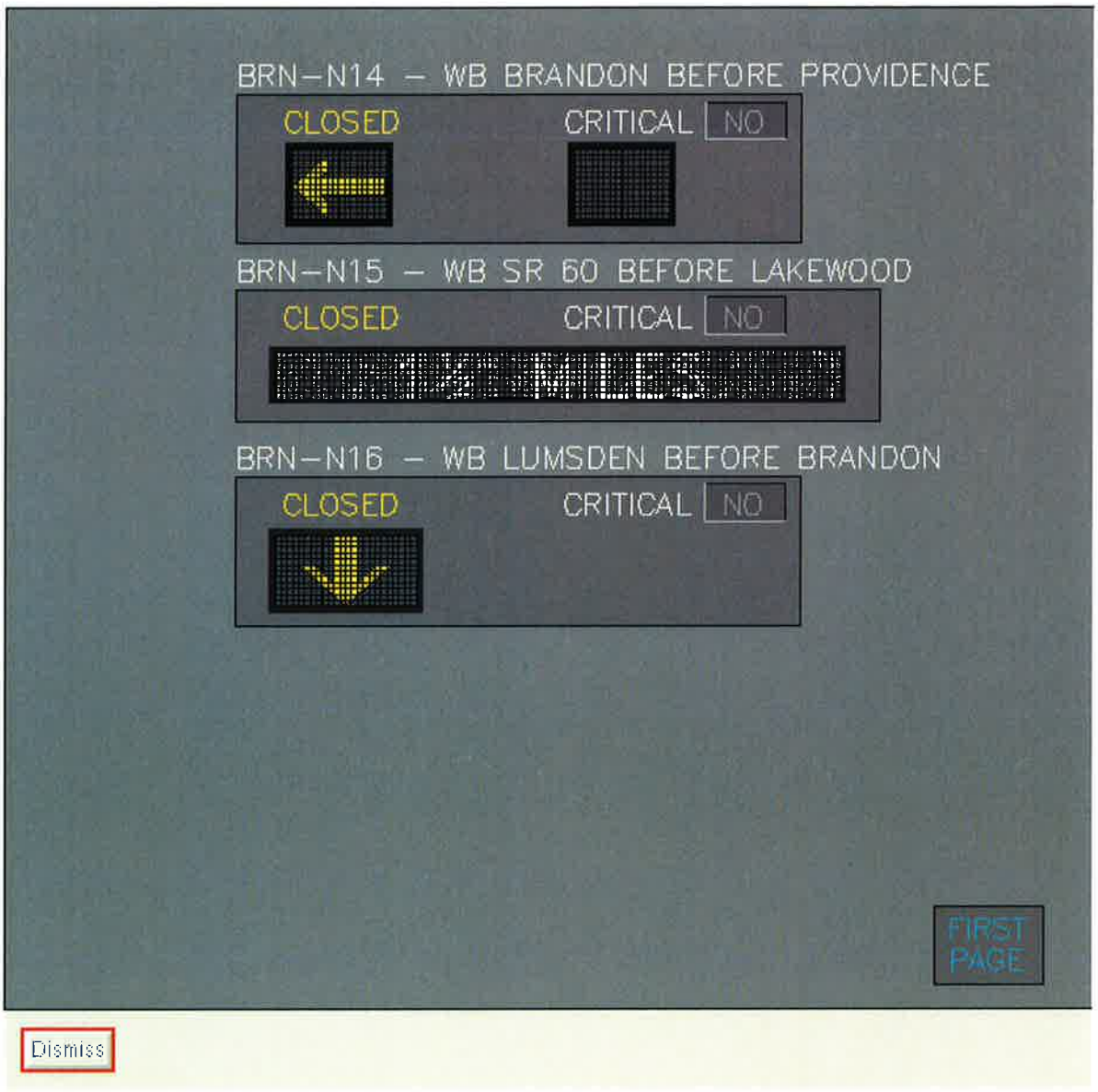

BRN–N14 – WB BRANDON BEFORE PROVIDENCE
OPEN
CRITICAL NO
BRN–N15 – WB SR 60 BEFORE LAKEWOOD
OPEN
CRITICAL NO
LEFT AT SIGNAL
BRN–N16 – WB LUMSDEN BEFORE BRANDON
OPEN
CRITICAL NO
FIRST PAGE
Dismiss

CLOSE Brandon Entrance

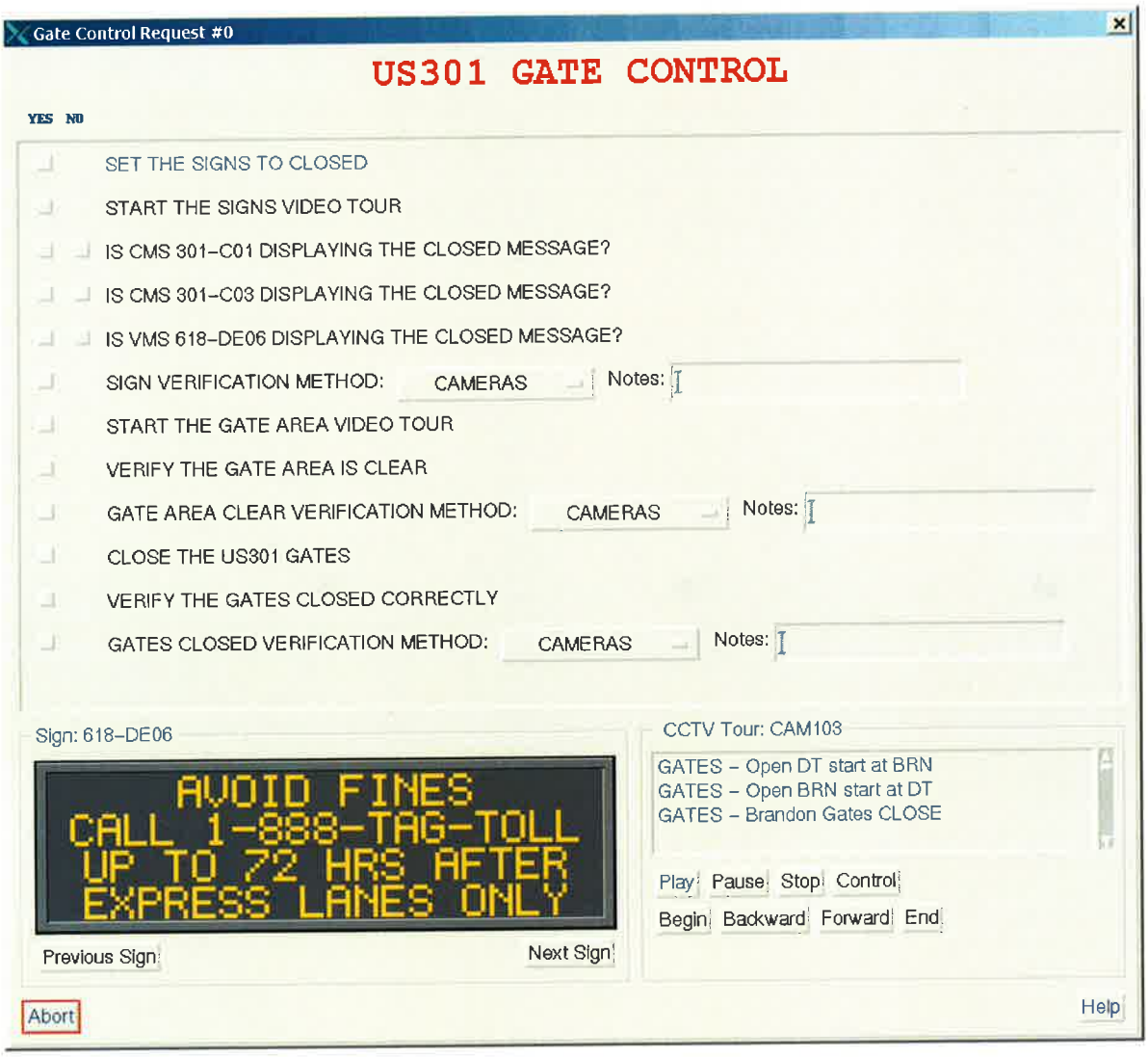


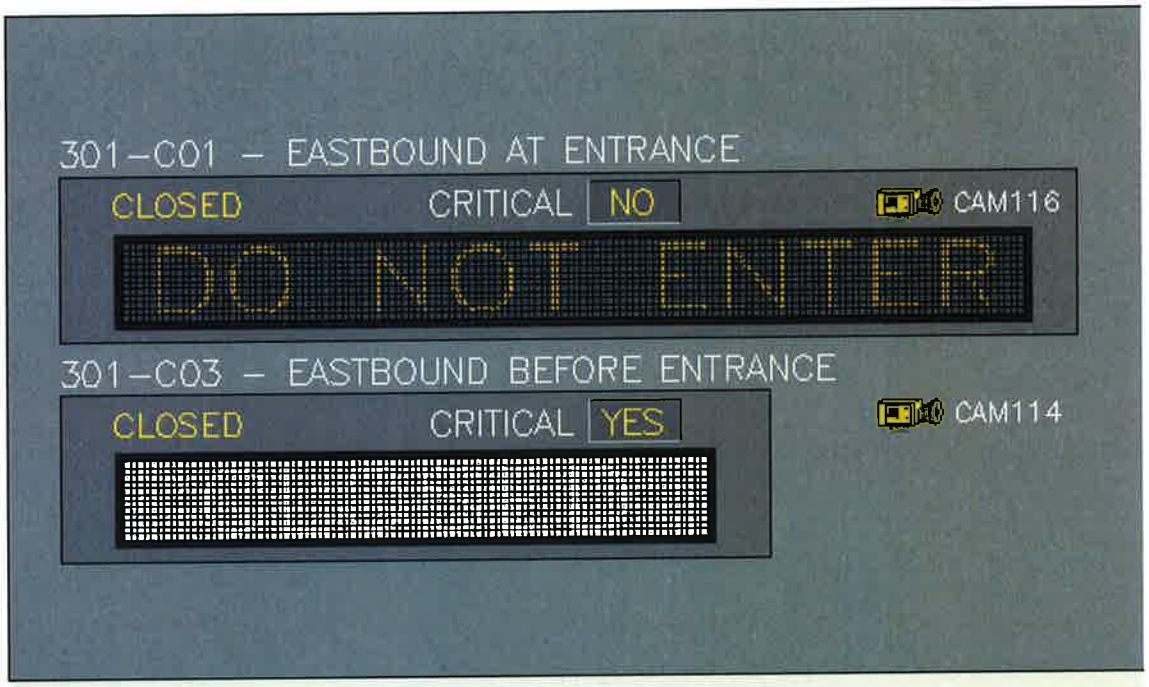

BRN-C04 - SB TOWN CENTER BEFORE BRANDON
CLOSED
CRITICAL YES
NO RIGHT TURN
CAM121
BRN-C05 - NB TOWN CENTER BEFORE BRANDON
CLOSED
CRITICAL YES
NO LEFT TURN
CAM122
BRN-C06 - WB BRANDON BEFORE TOWN CENTER
CLOSED
CRITICAL YES
ENTRANCE CLOSED
ONLY
ONLY
CAM123
BRN-C07 - WB BRANDON PAST LAKEWOOD
CLOSED
CRITICAL YES
ENTRANCE CLOSED
ONLY
ONLY
CAM123
NEXT PAGE
Dismiss

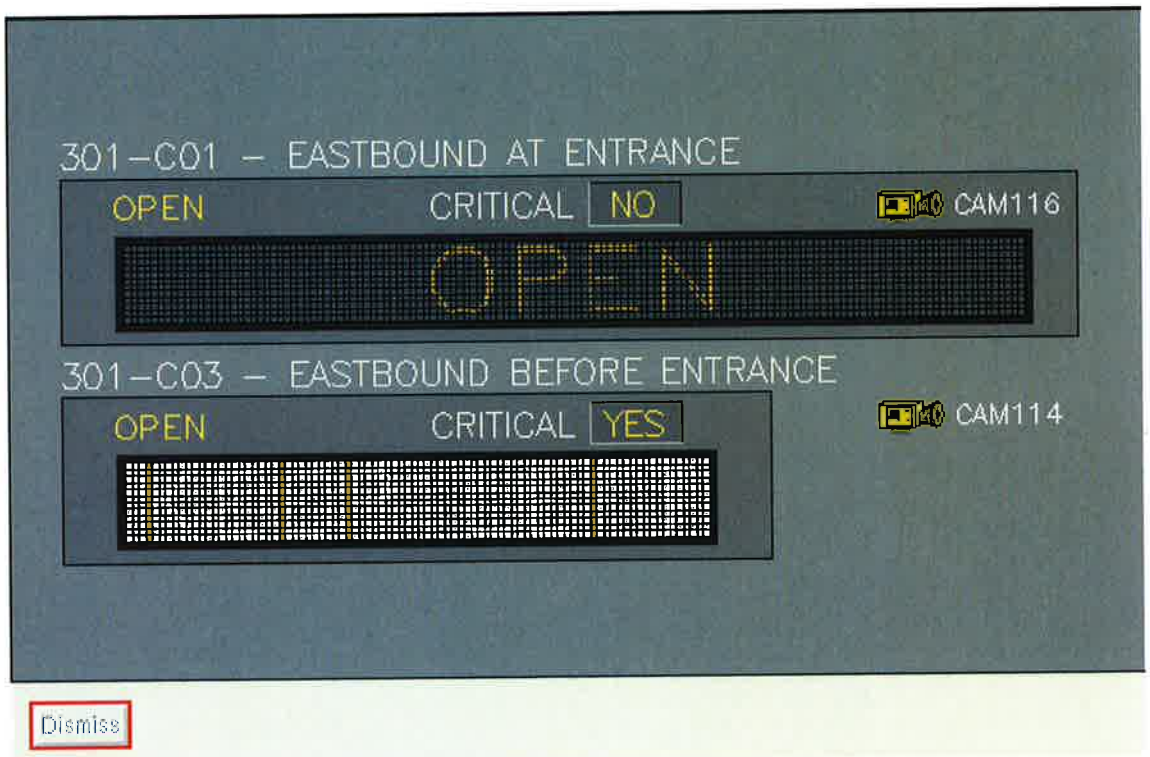

BRN–C08 – SB TOWN CENTER BEFORE GORNTO
CLOSED
CRITICAL NO
BRN–N09 – WB PROVIDENCE BEFORE TOWN CENTER
CLOSED
CRITICAL NO
BRN–N10 – EB PROVIDENCE BEFORE TOWN CENTER
CLOSED
CRITICAL NO
BRN–NC11 – EB PROVIDENCE BEFORE LUMSDEN
CLOSED
CRITICAL NO
BRN–N13 – SB LAKEWOOD BEFORE BRANDON
CLOSED
CRITICAL NO
FIRST PAGE
NEXT PAGE
Dismiss


BRN–N14 – WB BRANDON BEFORE PROVIDENCE
CLOSED
CRITICAL NO
BRN–N15 – WB SR 60 BEFORE LAKEWOOD
CLOSED
CRITICAL NO
BRN–N16 – WB LUMSDEN BEFORE BRANDON
CLOSED
CRITICAL NO
FIRST PAGE
Dismiss

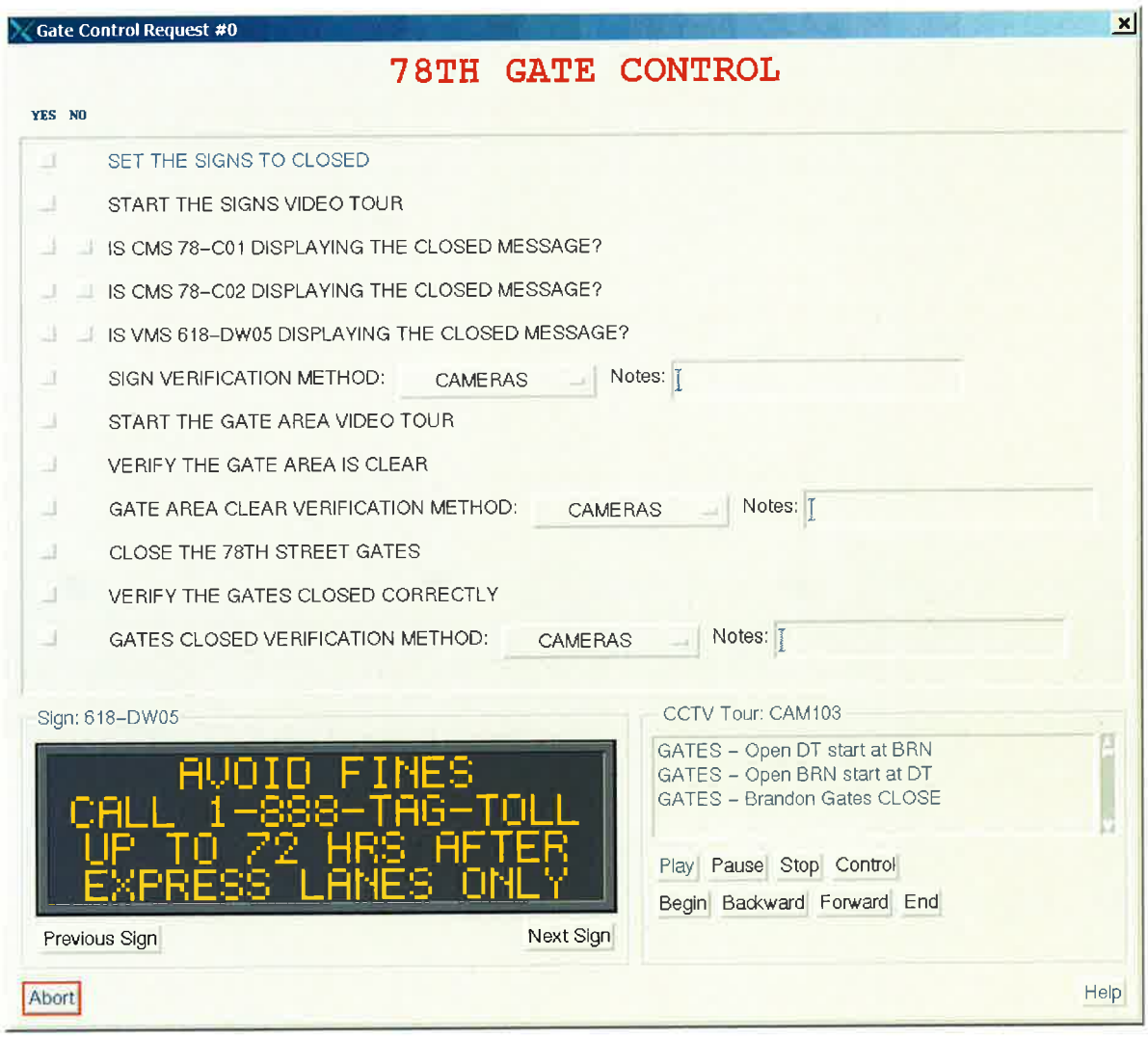
301 Entrance

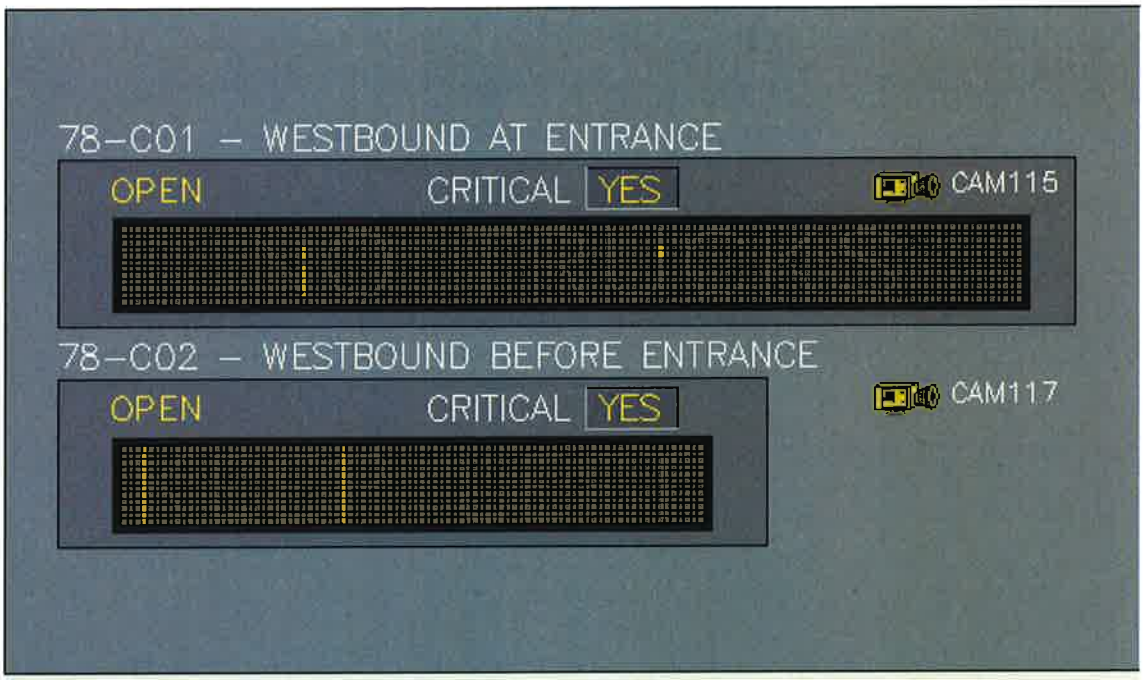


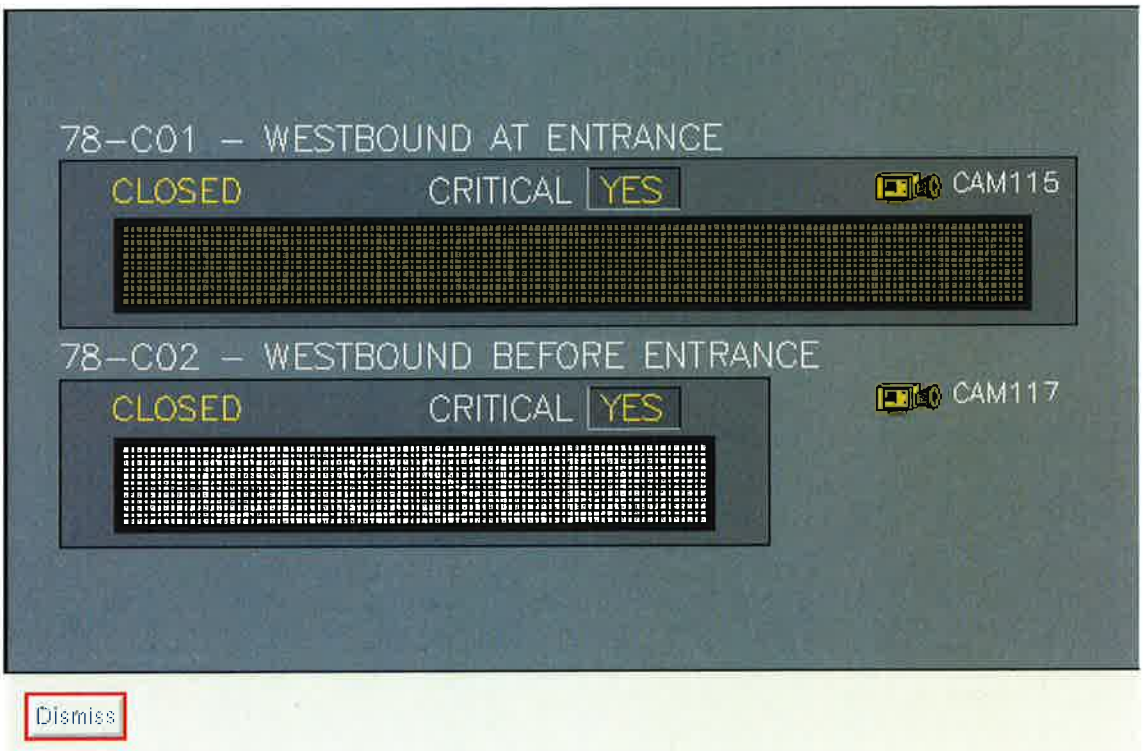

301-C01 - EASTBOUND AT ENTRANCE
CLOSED
CRITICAL NO
CAM116
DO NOT ENTER
301-C03 - EASTBOUND BEFORE ENTRANCE
CLOSED
CRITICAL YES
CAM114
Dismiss


301-C01 - EASTBOUND AT ENTRANCE
OPEN
CRITICAL NO
CAM116
OPEN
301-C03 - EASTBOUND BEFORE ENTRANCE
OPEN
CRITICAL YES
CAM114
Dismiss

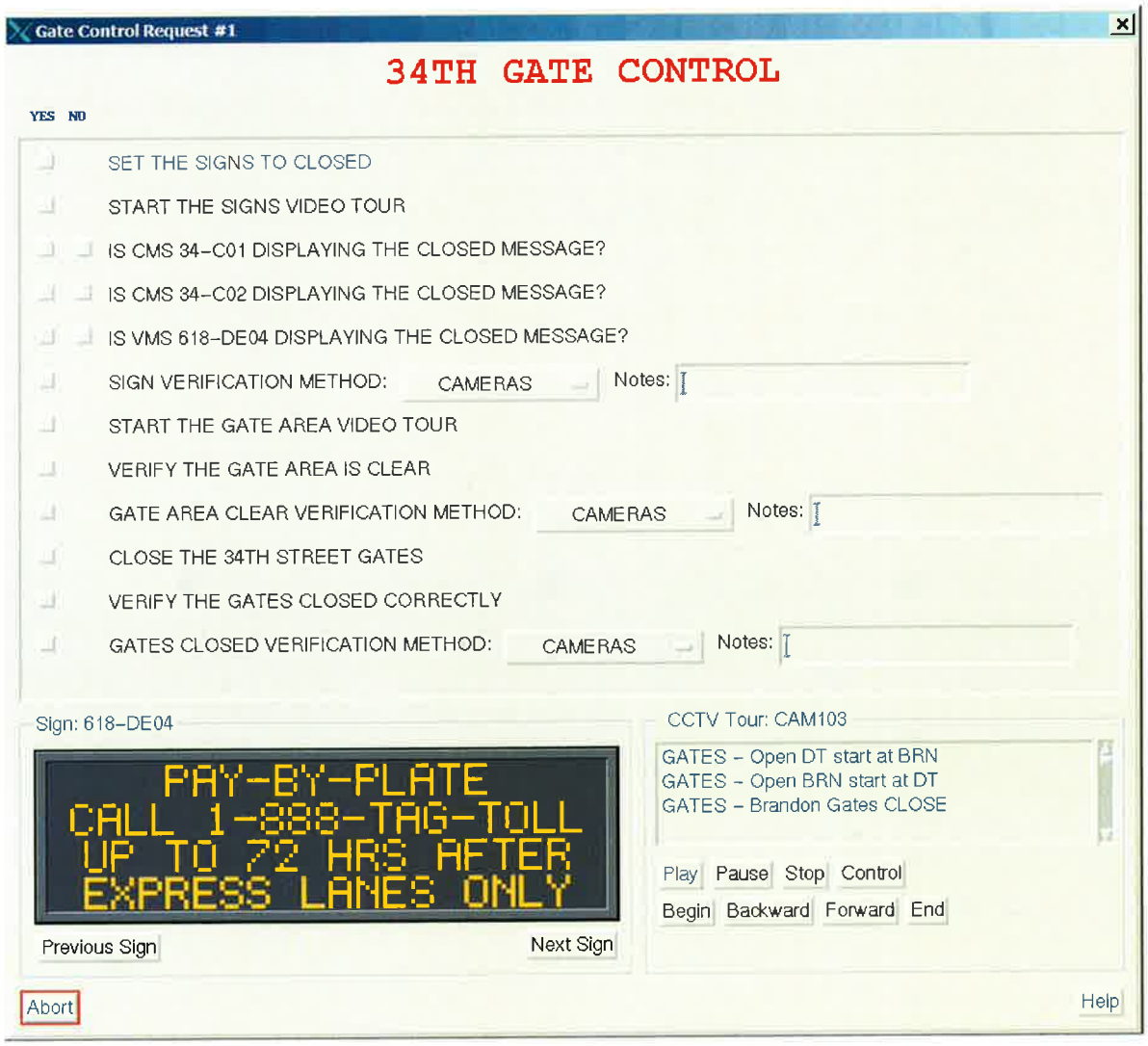
78th Street Entrance

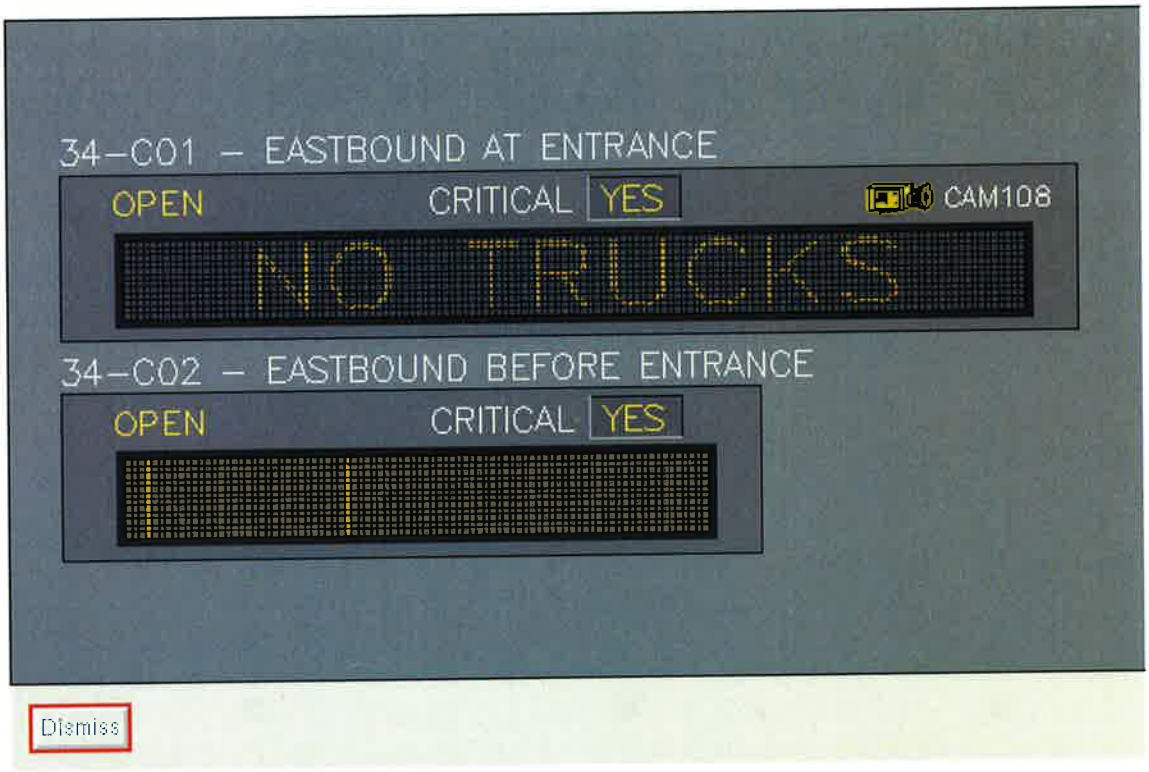



78-C01 – WESTBOUND AT ENTRANCE
OPEN
CRITICAL YES
CAM115
78-C02 – WESTBOUND BEFORE ENTRANCE
OPEN
CRITICAL YES
CAM117
Dismiss


78-C01 – WESTBOUND AT ENTRANCE
CLOSED
CRITICAL YES
CAM115
78-C02 – WESTBOUND BEFORE ENTRANCE
CLOSED
CRITICAL YES
CAM117
Dismiss

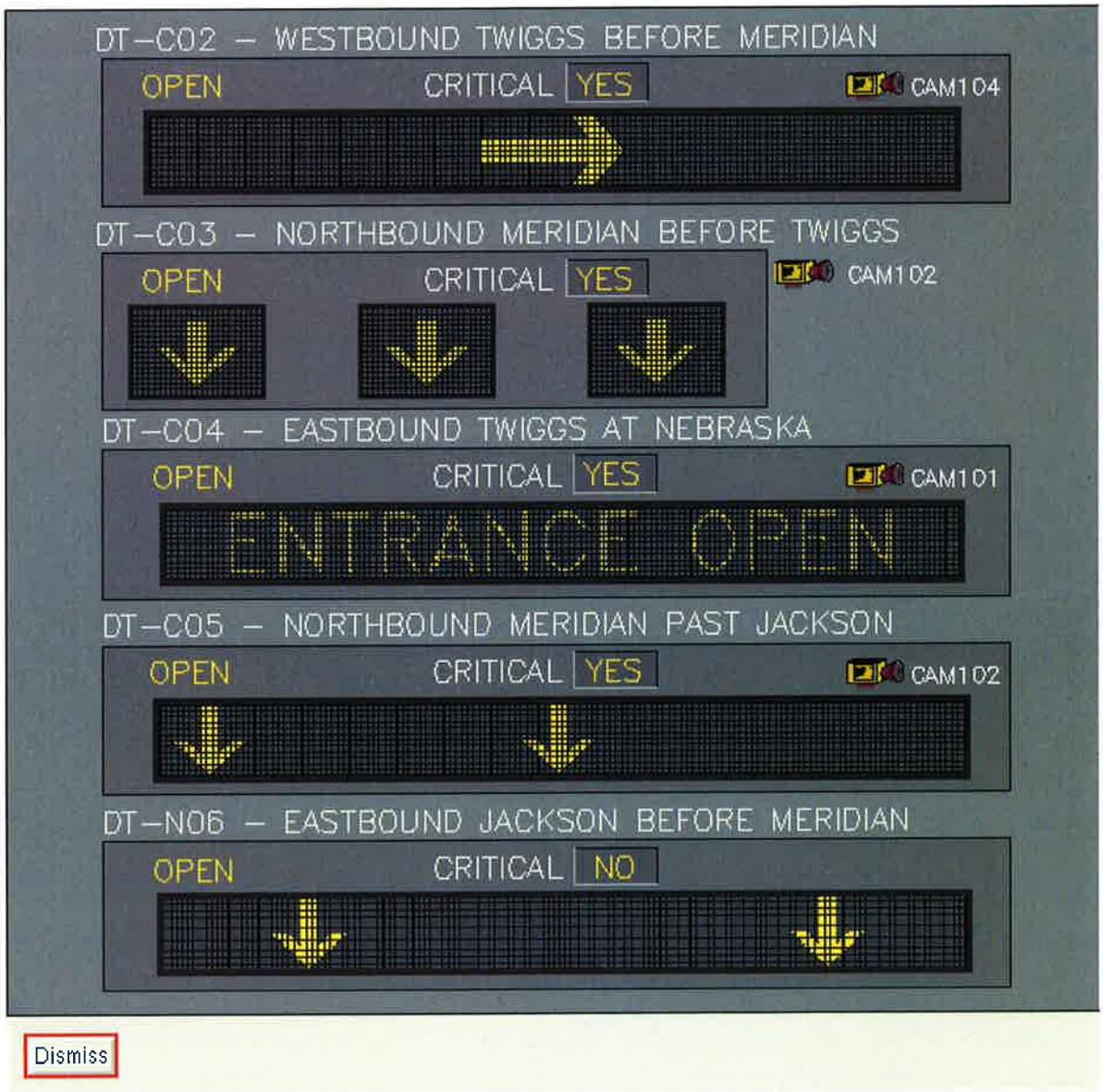
34th Entrance

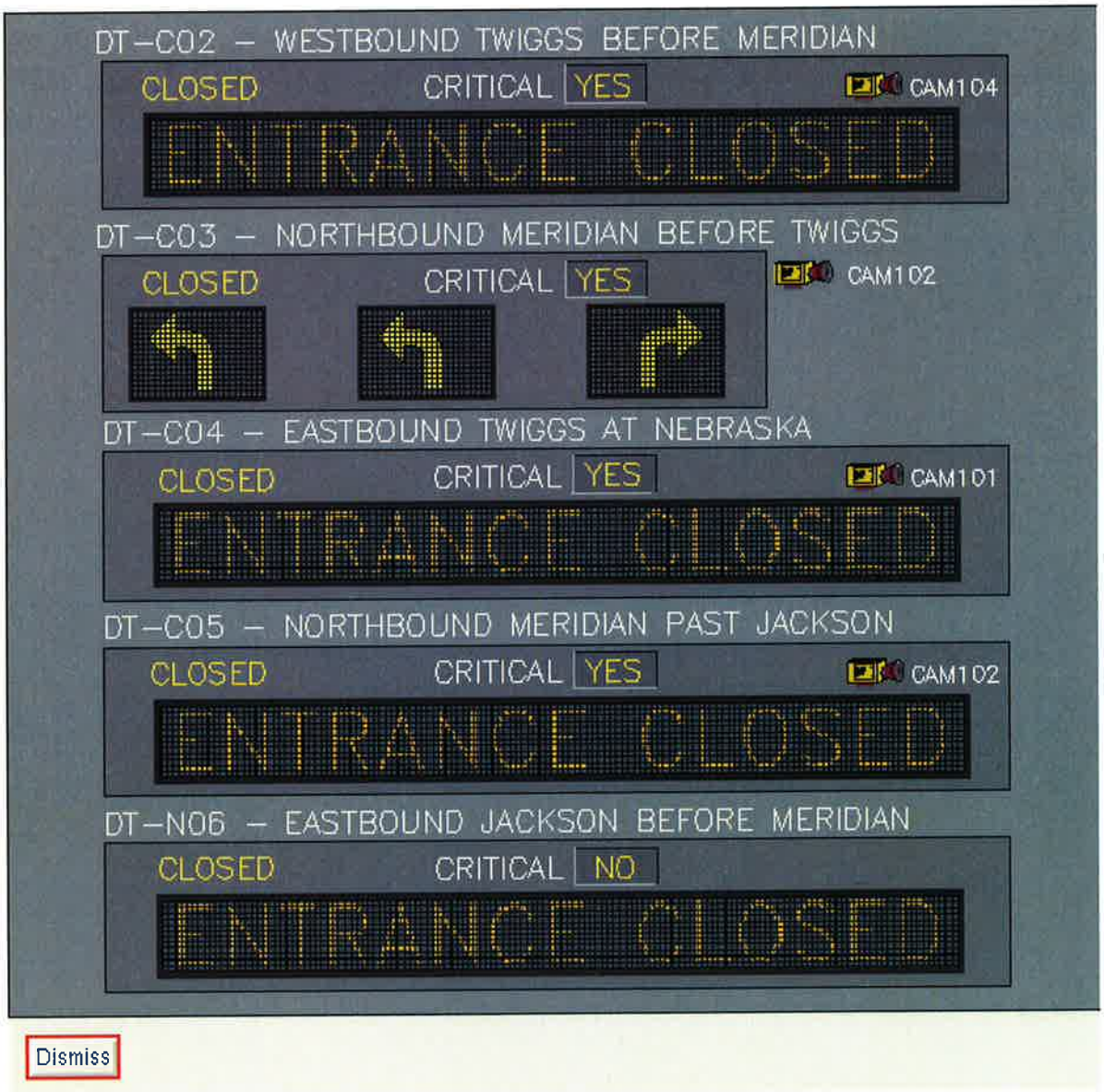



34-C01 - EASTBOUND AT ENTRANCE
OPEN
CRITICAL YES
CAM108
NO TRUCKS
34-C02 - EASTBOUND BEFORE ENTRANCE
OPEN
CRITICAL YES
Dismiss

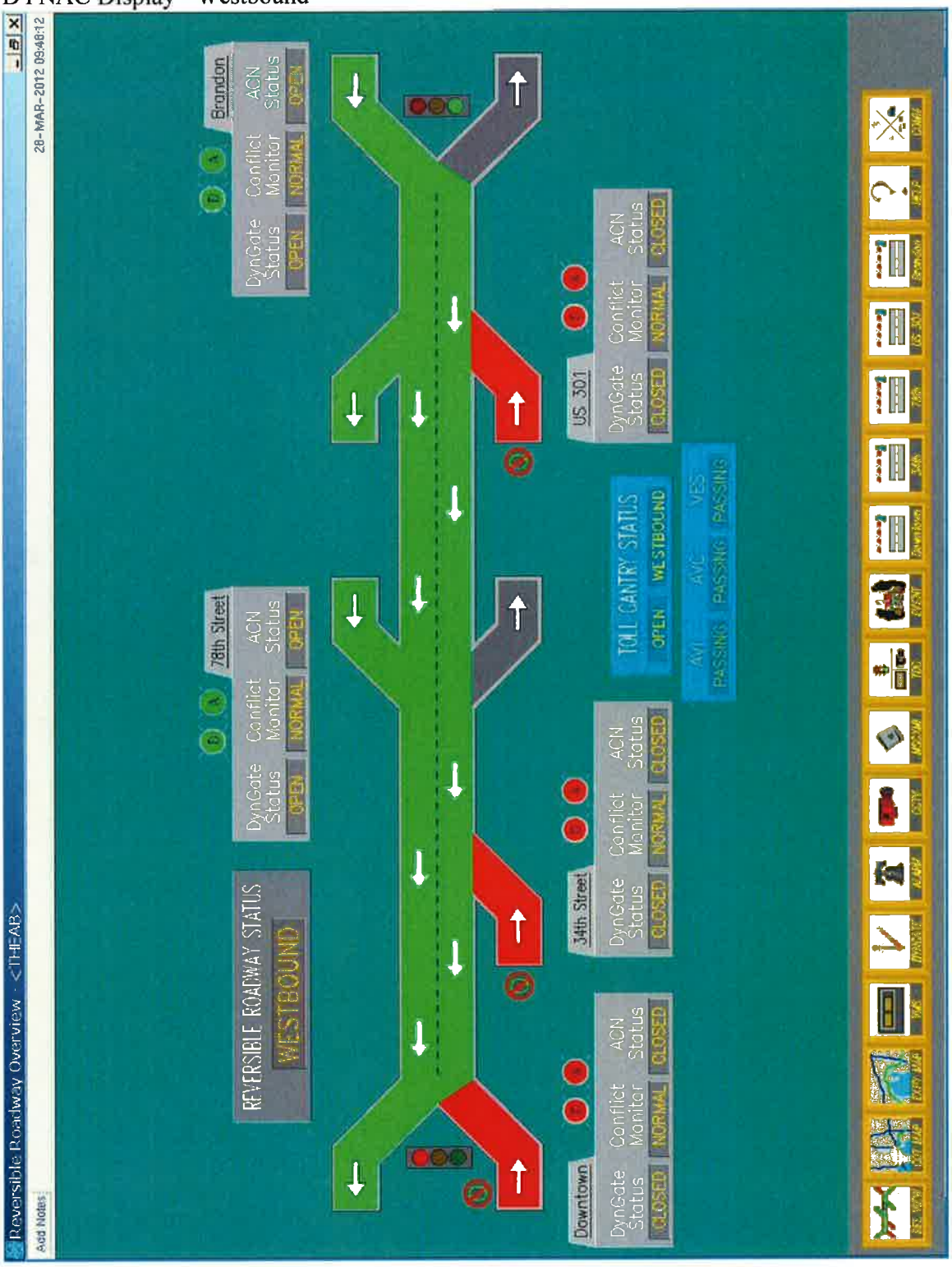

34-C01 - EASTBOUND AT ENTRANCE
CLOSED
CRITICAL YES
CAM108
CLOSED
34-C02 - EASTBOUND BEFORE ENTRANCE
CLOSED
CRITICAL YES
Dismiss

Downtown Entrance

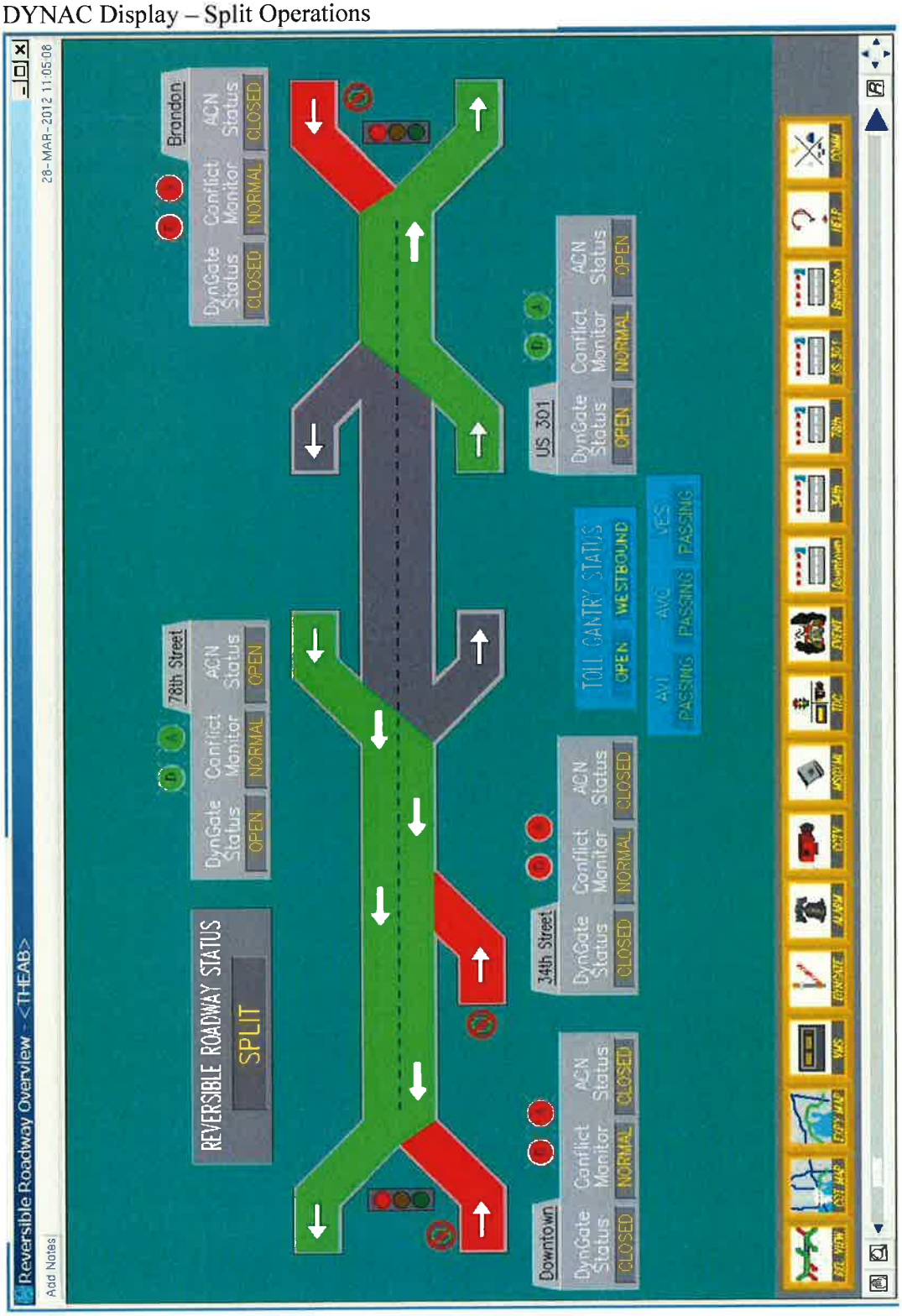



DT-C02 - WESTBOUND TWIGGS BEFORE MERIDIAN
CLOSED
CRITICAL YES
CAM104
ENTRANCE CLOSED
DT-C03 - NORTHBOUND MERIDIAN BEFORE TWIGGS
CLOSED
CRITICAL YES
CAM102
DT-C04 - EASTBOUND TWIGGS AT NEBRASKA
CLOSED
CRITICAL YES
CAM101
ENTRANCE CLOSED
DT-C05 - NORTHBOUND MERIDIAN PAST JACKSON
CLOSED
CRITICAL YES
CAM102
ENTRANCE CLOSED
DT-N06 - EASTBOUND JACKSON BEFORE MERIDIAN
CLOSED
CRITICAL NO
ENTRANCE CLOSED
Dismiss

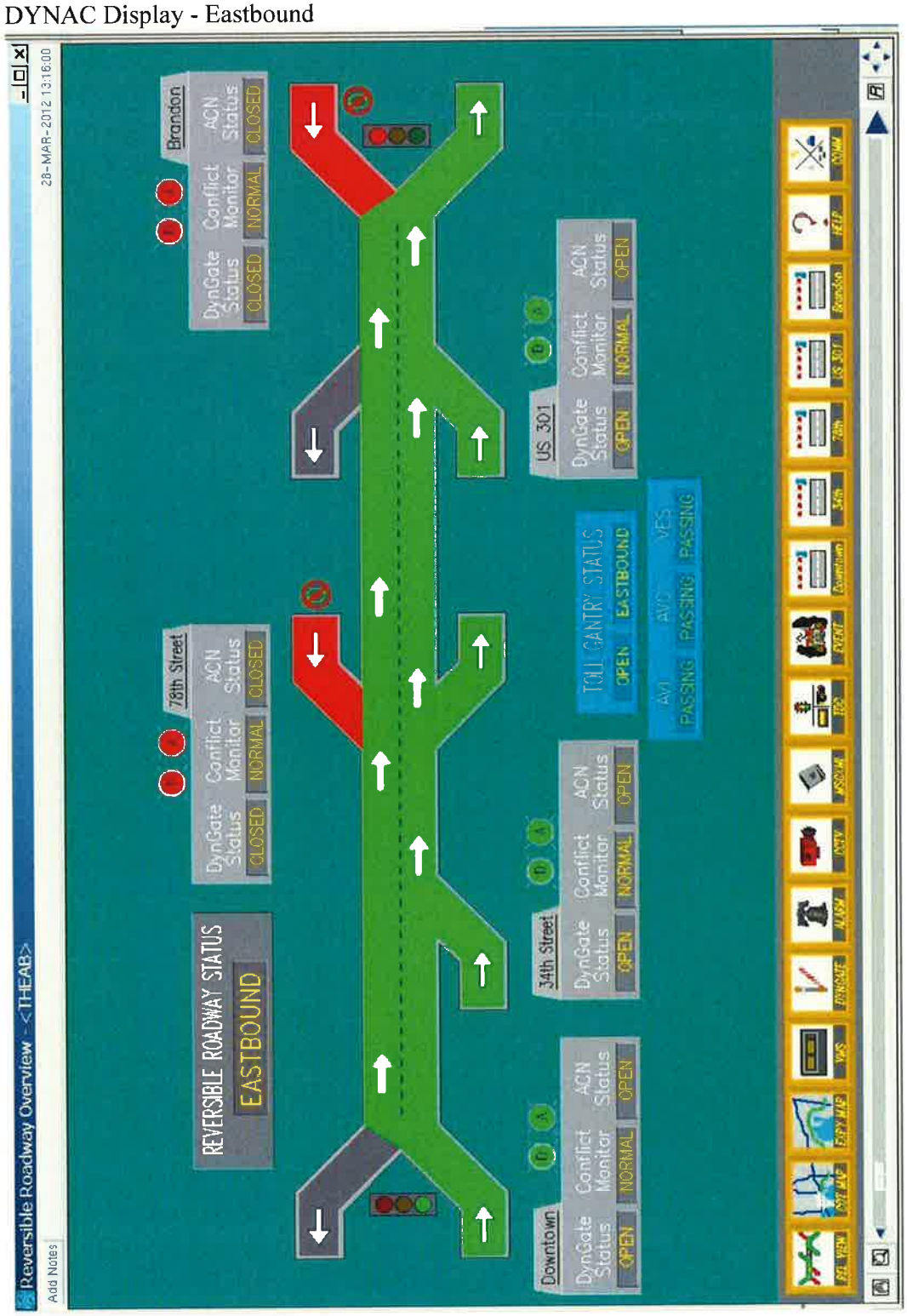
DYNAC Display - Westbound



DYNAC Display – Split Operations



DYNAC Display - Eastbound



Appendix D – Maintenance Scope of Work (Transdyn)

Tampa Hillsborough Expressway Authority (THEA) Reversible Express Lanes ITS Maintenance Program

Version 3.0

Submitted by

TRANSDYN

March 2007

MAINTENANCE PROGRAM

Approach

Transdyn will furnish 24 X 7 DYNAC ATMS™ Helpdesk support in addition to Owner-requested Emergency Maintenance Support.

Term

The initial maintenance program duration will be approximately one (1) year. The program will commence at final systems acceptance and includes the specified 180-warranty period. Thereafter, and for no more than six (6) months, the "24x7 DYNAC ATMS™ Support" services will commence. The maintenance program timetable follows:

- Following System acceptance completion: 180 days of warranty coverage plus Owner-requested Emergency Maintenance Support (estimated to be May 1, 2007 through October 27, 2007).
- Following Warranty completion: Six (6) months of maintenance including "24x7 DYNAC Helpdesk" plus Owner-requested Emergency Maintenance Support (estimated to be Oct. 28, 2007 through April 27, 2008)

Pursuant to future negotiations and mutual acceptance by THEA and Transdyn, this maintenance program may be modified and/or extended as needed.

Scope

The scope of this program is broken down into three major areas:

- Warranty
- 24 x 7 DYNAC™ Support
- Emergency Maintenance Support

The specified scope of each is described below.

Warranty Maintenance

Warranty maintenance will be provided in accordance with ITS Final Design and Integration Agreement no. 51.31.01. Transdyn will warrant the Software Work Product, equipment and services of its own manufacture will operate in accordance with the plans and specifications for a period of one hundred eighty (180) days from the date of acceptance by the Authority.

If the Authority notifies Transdyn of any significant or material error or failure of the Software Work Product or equipment to perform as required by the plans and specifications during the warranty period, Transdyn will correct any such error or failure within three (3) business days of receiving such notice.

Warranty Maintenance scope excludes equipment damage resulting from abuse, accident, alteration or repair by anyone other than Transdyn's authorized representatives, improper storage, misuse, improper maintenance, or failure to observe instructions.

Any manufacturers warranties still in effect at the end of the warranty period will be registered in the Authority's name.

24 x 7 DYNAC™ Support

Full Service Plan

Transdyn will provide our Full Service Plan. This portion of the program will begin at the end of the 180-day warranty period. This plan offers the highest level of support with the fastest response time available. This plan includes 24-hour, 7-days per week support through a dedicated toll free customer service number. Immediate response is provided with a maximum of a 4-hour telephone response time. With our Full Service Plan, customers are given the highest priority for emergency site visits and phone support to minimize any down time. Please note, emergency site visits will be billed at Transdyn's then-current Professional and Support Services rates.

The full service plan is designed for our clients, whose system requirements demand immediate response time and minimum system downtime. The full service plan requires a service contract.

Client personnel are requested to work with Transdyn personnel via telephone as required to ensure that any reported problem may be accurately diagnosed.

Transdyn's Software Engineering staff will be available for telephone support to answer questions regarding the use, modification or troubleshooting of the DYNAC SCADA software provided by Transdyn to THEA.

Transdyn personnel will perform dbcc checks, space checks and log reviews on the Sybase database on a monthly basis via remote connection.

Over the course of the maintenance period, new versions of software (both OS and application) and hardware will become available. Transdyn will analyze and report on the benefits and potential effects of these upgrades and enhancements on the system. The report will include:

- compatibility
- effect on system performance

- benefit of new feature or function
- costs
- schedule
- availability of support for older software versions, and;
- regression testing requirements.

Emergency Maintenance Support

Hardware
Any maintenance required for hardware originally provided by Transdyn can be handled either directly between THEA's personnel and the manufacturer or via Transdyn at THEA's option. If repair or replacement of hardware is handled via Transdyn, billing will be based on Transdyn's then-current Professional and Support Services rates.

On-Site Services
As directed by THEA, Transdyn will perform on-site preventive and corrective maintenance of Transdyn-furnished Reversible Express Lane ITS hardware and software components. These services will be provided on an as-needed time and material basis and will be per Transdyn's then-current Professional and Support Services rates.

Maintenance and Service Request
All maintenance and service requests must be documented and submitted by THEA (i.e., Fax, memo, email, etc.) to facilitate proper and timely delivery of services. All maintenance and service requests shall be acknowledged in writing by Transdyn and transmitted to THEA's authorized representative, including diagnosis and corrective actions taken.

Maintenance Program Cost

Excluding Owner-requested Emergency Maintenance Support, the total cost of this Maintenance Program is **$9,320.00**.

Location of Support Centers

Transdyn's Hampton Roads, VA facility will serve as the primary Support Center for the THEA Reversible Express Lanes project;

Transdyn, Inc.
970 Reon Drive
Virginia Beach, VA 23464
Phone: (757) 424-6755
Fax: (757) 424-6757

Procedures For Questions

General questions and help on software and system operation can be obtained from the Transdyn Hampton Roads, VA operations facility. Transdyn also maintains help-line facilities at both its Duluth, GA and Pleasanton, CA offices. These help-lines are manned during normal business hours and connect to a paging system at nights and weekends. A service technician is available 24 hours a day, 7 days a week, 365 days a year to support any critical problem with the Transdyn installed system.

The service technician will evaluate the problem and determine what resources are required to resolve the problem. Software problems can typically be resolved remotely using the diagnostic modem provided at each site. A software engineer is always available if the service technician determines that the problem is related to software.

Procedures For Reporting Hardware And Software Problems

Problems will be reported to the Hampton Roads, VA office via telephone or facsimile. Emergency contact numbers will be provided to THEA to facilitate after-hours contact. The time of transmission establishes the beginning of the response period. The on-site response period for all subsystems will be four hours.

A System Problem Report Database will be maintained to track reported problems and verify their resolution.

Software problems will be reported and characterized using the following form which will be tailored to the specific THEA Reversible Express Lanes ITS software modules:

System Problem Request Form

ITEM	FILL IN YOUR INFO HERE
Requester (You)	
Job Number	
Application Type (See list below)	
SPR Type (See list below)	
DYNAC Version	
Due Date	
Problem Description	
Solution Description	

SPR TYPES

1. Enhancement
2. Major Fault
3. Minor
4. Documentation
5. New Feature
6. Opr/Config Err
7. DYNAC Failure
8. Port
9. Critical Fault

APPLICATION CATEGORIES

1. Session Manager
2. Dyndisplay
3. Dyndraw
4. Alarm
5. Dynview
6. Point Log
7. Event Log
8. Comm Monitor
9. Process Monitor
10. PCL
11. DBE – Point/RTU/DEV
12. Device Config
13. Alarm Summary
14. Graph
15. History
16. Scheduler
17. Xess Spreadsheet
18. Copy Page
19. Group Editor
20. System Monitor
21. User Edit
22. View Edit
23. XMI Edit
24. Clock
25. Helpbuilder
26. HAR
27. VMS
28. Failover
29. X-term
30. Dyncreate
31. Comm - MODBUS
32. Comm - LFC
33. Comm - AB
34. Message Logging
35. Doc - ref manual
36. Doc - config manual
37. SPR system
38. OpenVMS
39. X-windows
40. Terminal Server
41. Printer
42. Compiler
43. Linker
44. Database Loaders
45. Database Savers
46. VCS
47. General
48. Archive
49. Equipment Monitor
50. DATAP
51. CMS
52. Operator log
53. Spooler
54. Parcre
55. Dynac Mail
56. IRM
57. CCVE
58. Loop Processing
59. Incident detection
60. System Setup

HOW TO USE THIS FORM

1. FILL IN ABOVE-REQUESTED INFORMATION. THE SPACE TO BE FILLED IN WILL AUTOMATICALLY ENLARGE TO FIT YOUR TEXT.
2. SEND THE COMPLETED FORM VIA E-MAIL
   a) SELECT FILE FROM TOOLBAR.
   b) SELECT SEND FROM THE DROP-DOWN MENU.
   c) FOLLOW THE USUAL E-MAIL PROCEDURE FROM THERE.

Appendix E– Maintenance Authorization Form

Tampa Hillsborough County Expressway Authority
Reversible Express Lanes
ITS Maintenance Authorization

	Date	Time		
Draft Authorization			Trouble Report Reference Number	
Final Authorization			Authorization Number	
Sent to Contractor			Contract Task Number	
Estimated Start			Emergency Repair	Yes / No (Circle One)
Estimate Completion			Person Reporting Problem	
Actual Start				
Actual Completion				

Description of Trouble Being Reported
(Describe Nature of Problem, Specific Equipment Malfunction (If Known).

General Nature of Problem (e.g., No Message on CMS)	
Specify Equipment Malfunction, If Known (e.g., Power Failure)	
General Location of Problem (e.g. Brandon Portal)	
Specific Location of Problem (e.g., CMS ###)	

CONTRACTOR'S ESTIMATE
(Provided only if Repairs Will Take Longer Than One (1) Hour)

			Hours		Rate		
Labor	Name	Classification	Regular	Premium	Regular	Premium	Total

	Part #	Description	From Inventory Y/N*	# of Parts	Loaded Unit Price (N/A if from Inventory)	Total (N/A if from Inventory)
Parts						

	Equipment ID #	Description (Including MOT Items)	Units (Hrs/Days)	# of Units	Loaded Unit Price	Total
Equipment						

	Total Labor	
	Total Materials	
	Total Equipment	
	Total Estimate	

* If part not from inventory, show evidence of how price was obtained (including bids, if applicable)

Owner's Representative Name _____ Owner's Representative Signature _____ Date _____

Appendix F – Interim SOP Updates

From time to time it will be desirable to update sections of the SOP to reflect actual procedures or to change a specific process. Interim updates will be placed in Appendix F until they are incorporated into the specific section of the SOP. It is anticipated that the SOP will be formally evaluated on a six month schedule.