

Traffic Control Devices and Warning Signage at HLCT and QMT to Mitigate Over-Height Vehicles Incidents

Presenter:

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Agenda

- MTA Bridges & Tunnels- ITS
- OHVD Operations at Tunnels
- Need-Traffic Control Devices & Warning Signage
- Project Design Features
- Key Takeaways



Bronx-Whitestone Bridge



Cross Bay Veterans Memorial Bridge



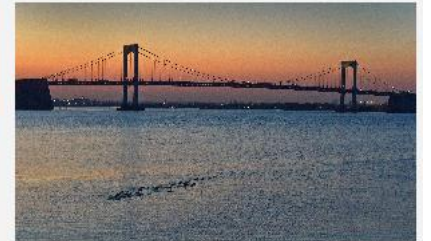
Henry Hudson Bridge



Marine Parkway-Gil Hodges Memorial Bridge



Robert F. Kennedy Bridge



Throgs Neck Bridge



Verrazzano-Narrows Bridge



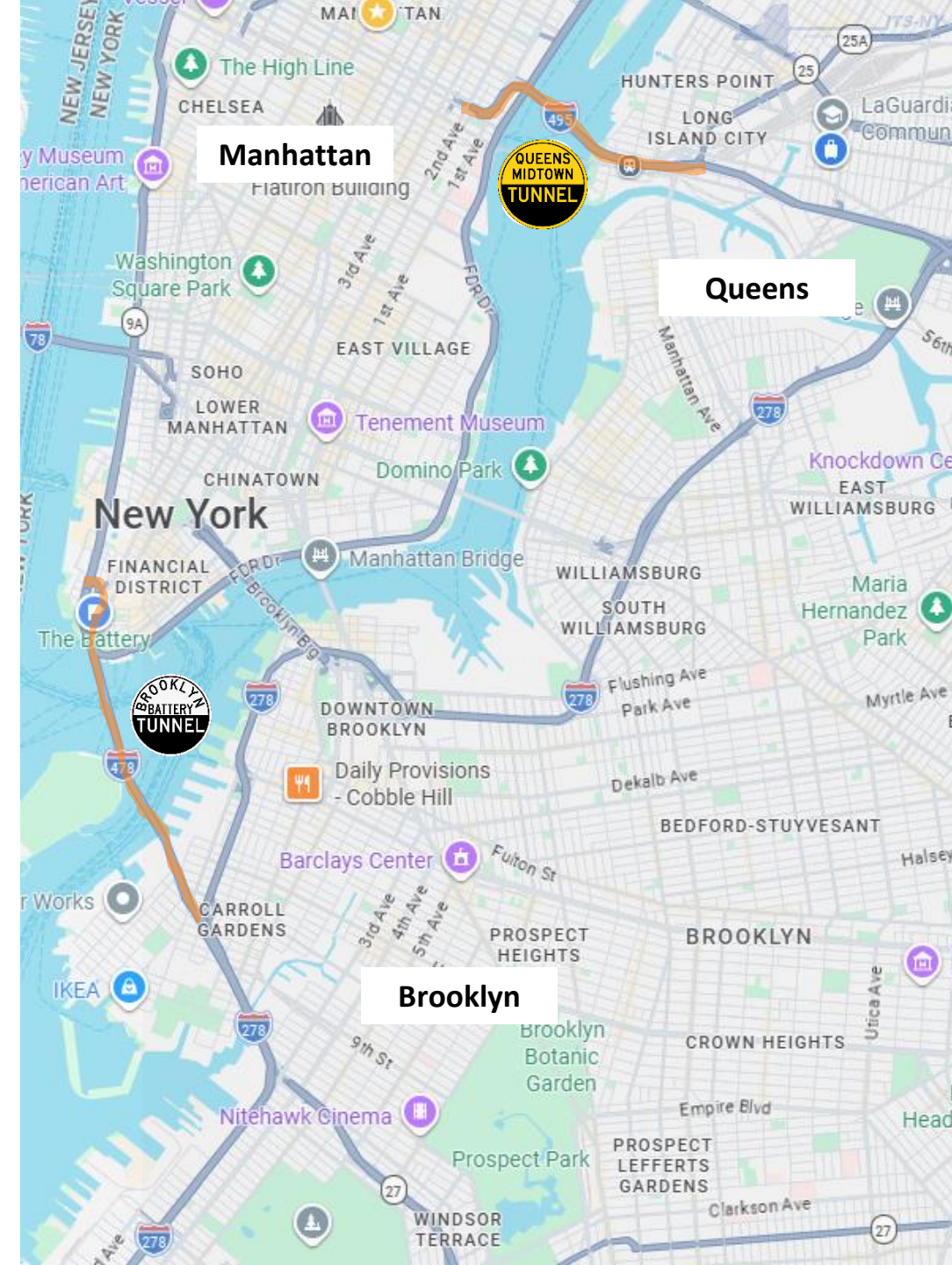
Hugh L. Carey Tunnel



Queens Midtown Tunnel

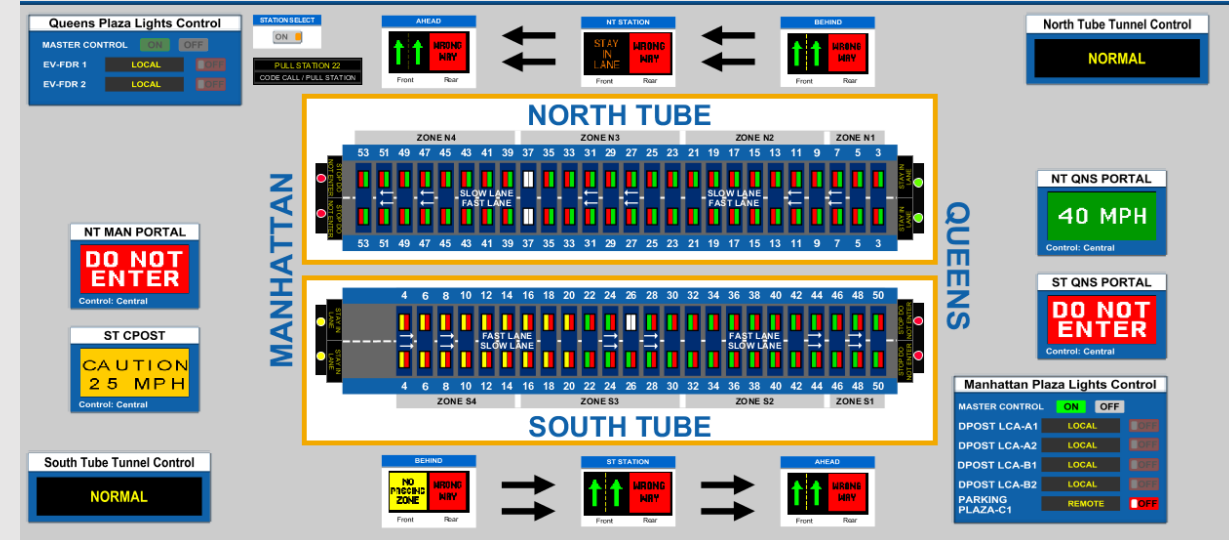
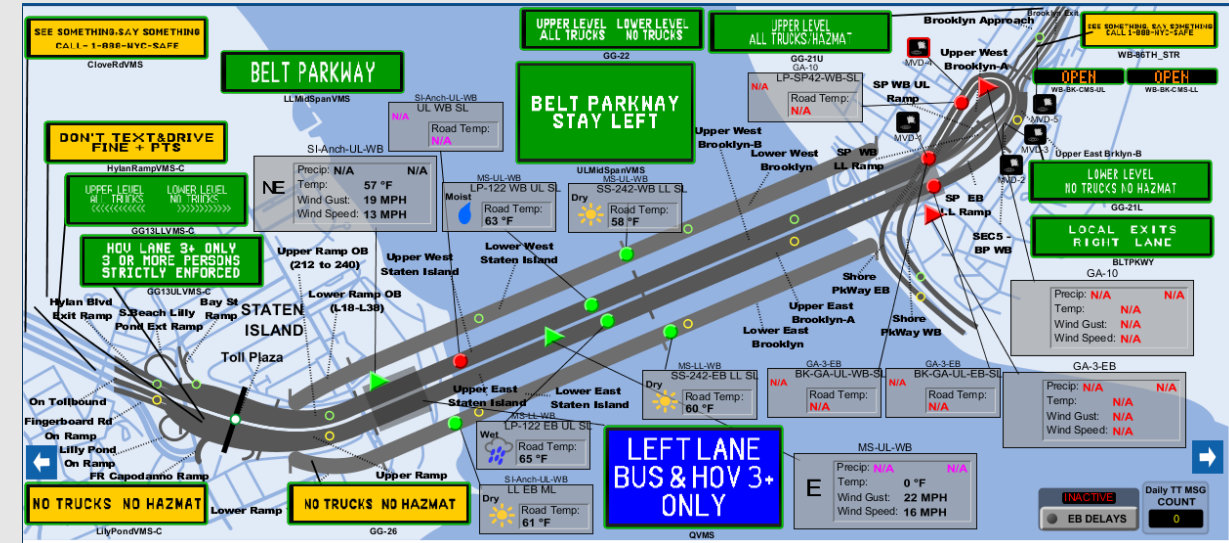
MTA Tunnels – HLCT & QMT

- **Queens Midtown Tunnel**
 - 1940, 1.2 miles
 - I-495 (LIE)
- **Hugh L. Carey Tunnel**
 - 1950, 1.73 miles,
 - Longest UW vehicular tunnel in North America
 - I-478 (I-278/ BQE)
- **Tunnel Restrictions**
 - Height limit- **12 ft 1 in**
 - Width limit- 8 ft 6 in
 - Hazmat not allowed
- **Interstate Vertical Clearance (14-16 ft)**
- **NYC Through Truck Routes**
- **CMV traffic - 6%-8%**
 - **QMT-5,400 CMVs/day**
 - **HCT-3,800 CMVs/day**
- **Twin tube design, two lanes per tube**
- **Reversible operations**



MTA B&T ITS

- Advanced Traffic Management System (DYNAC)
- Facility Control Rooms, OCC, MTA HQ
- TRANSMIT & TRANSCOM- Facility Link Travel Time
- VMS, VSLS, Cameras, RWIS, LUS, Traffic detection
- OT/Traffic Networks- Tunnels, VNB & BWB, Fiber
- Tunnel SCADA Systems
 - **Traffic Control Systems:** In-tunnel LUS, VMS, Way Finding Light, Portal VMS & LUS.
 - **Lighting, Drainage & Fire Safety:** In-tunnel Lighting Control, QMT Code Call, HCT heat trace, Drainage pump monitoring
 - **Over Height Vehicle Detection & Warning**
 - **Traffic Control Signals**



Over-Height Vehicle Detection at Tunnels

Over-Height Vehicles (OHV)

- Threats to underwater vehicular tunnels
 - Structural integrity
 - Water ingress, flooding
 - Fires (Vehicle malfunction, **Vehicular collisions, Hazmat explosions**)
- Most CMV are OHV - box trucks (10'-13"), , tractor trailers (13.5'), flatbeds- oversized cargo, construction vehicles, double-decker buses
- Impacts on Safety, Traffic operations, Asset Integrity
- Threat at the tunnel portals
- Even serious threat if stuck inside tubes
- Low probability- High severity



2007: Newhall Pass Tunnel, Santa Clarita, CA

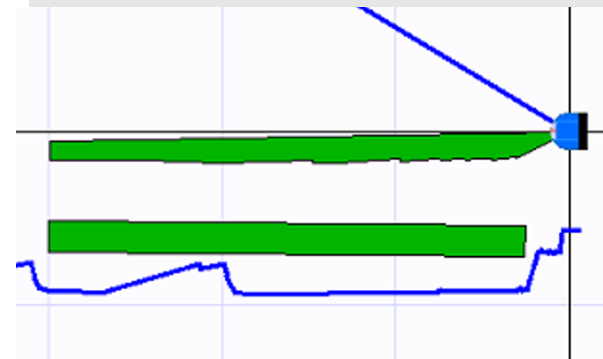
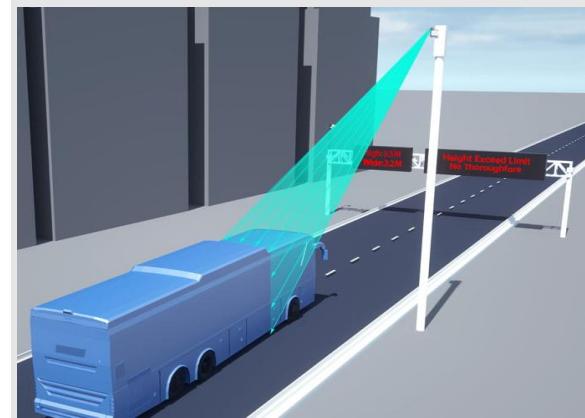
"..The tunnel fire was a result of a truck accident that led to a 34-vehicle pile-up.."

<https://www.ocregister.com/2007/10/13/santa-clarita-fatal-truck-crash-closes-i-5-in-both-directions/>

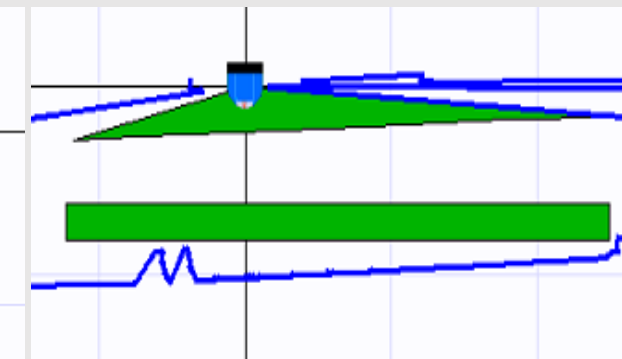
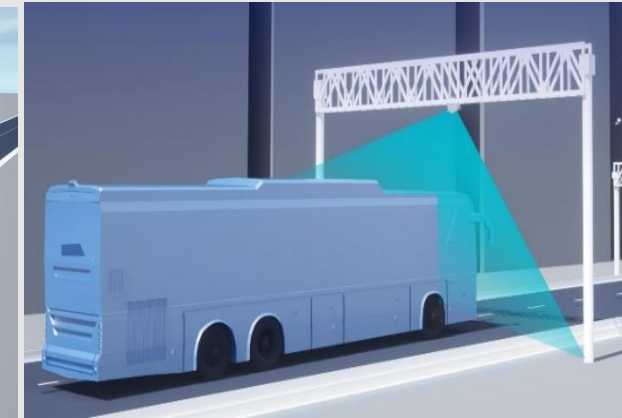
OHV – Detection (OHVD)

- **Legacy OHVD Systems:** Single beam/ dual beam OHVD- hardwired, standalone, backup
- **2019- First of its kind LiDAR based OHVD system**
- Multiple OHVD stations, VMS, Warning Beacons before portals and approach roadways
- 2-D scanners, rangefinders -LiDAR sensors, PLC-SCADA, integrated to ATMS, Side-fired, Overhead
- Direction discernment, Lane based detection, real-time photo, video alerts, redundant sensors, negligible false alarms, PLC logic (secret sauce), remote configuration & troubleshooting
- New OHVD system has **no false negatives**
- **2025: 2,907 OHV strikes prevented**

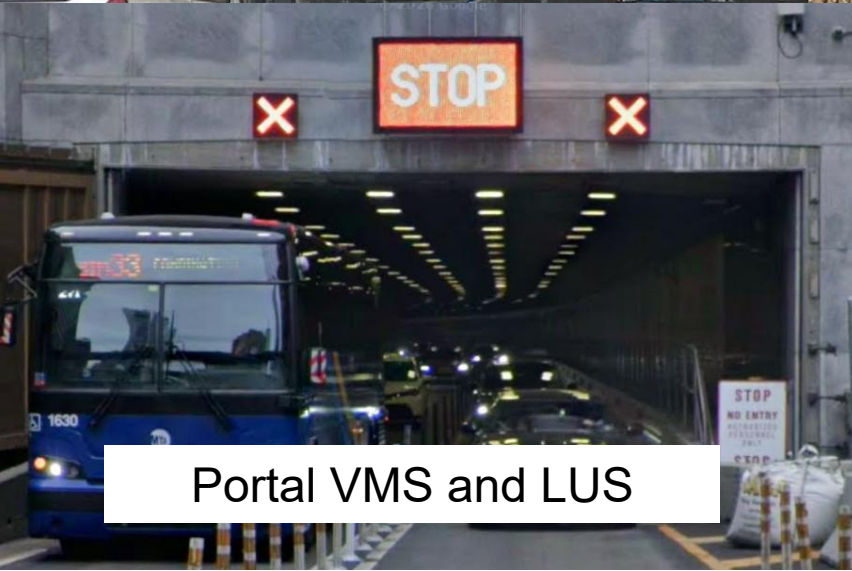
Side-fired OHVD



Overhead OHVD



OHV Dynamic Warning



Portal VMS and LUS

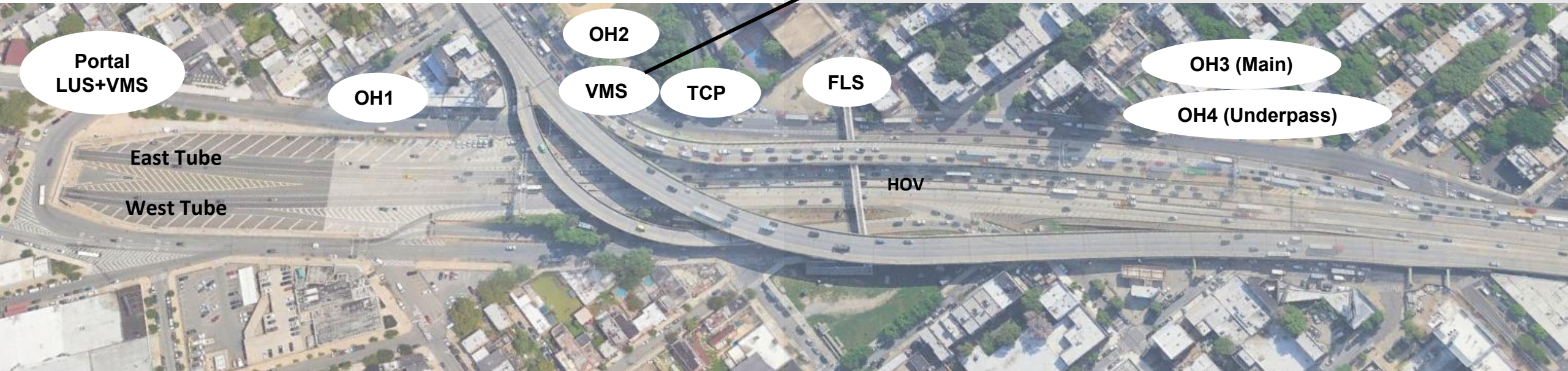


Flashing Beacons



OHV VMS

HCT- Brooklyn OHV Detection & Warning



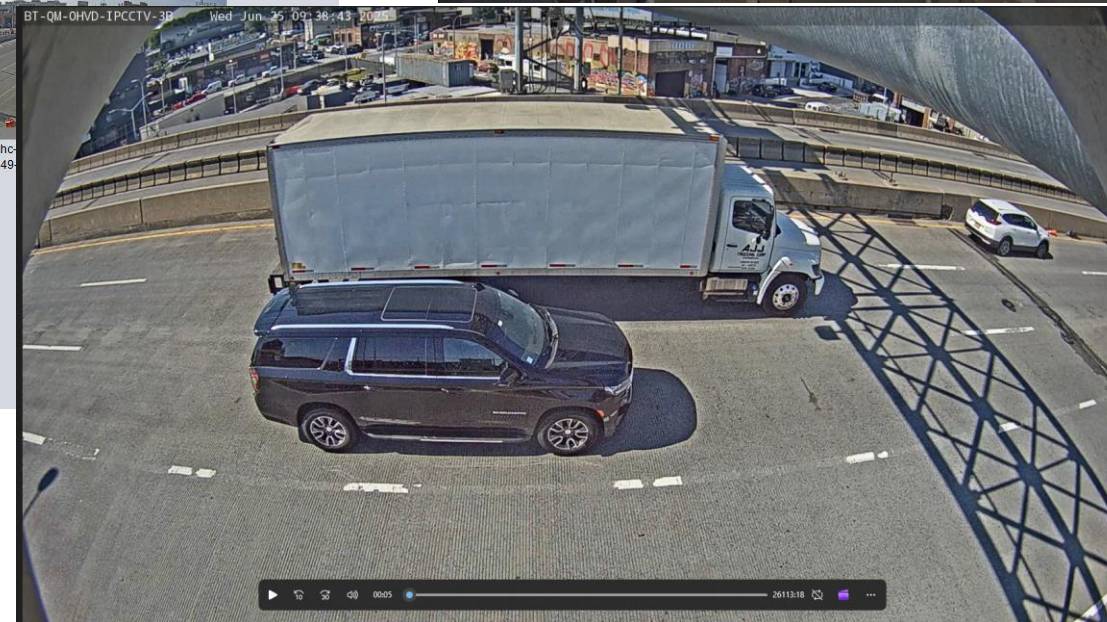
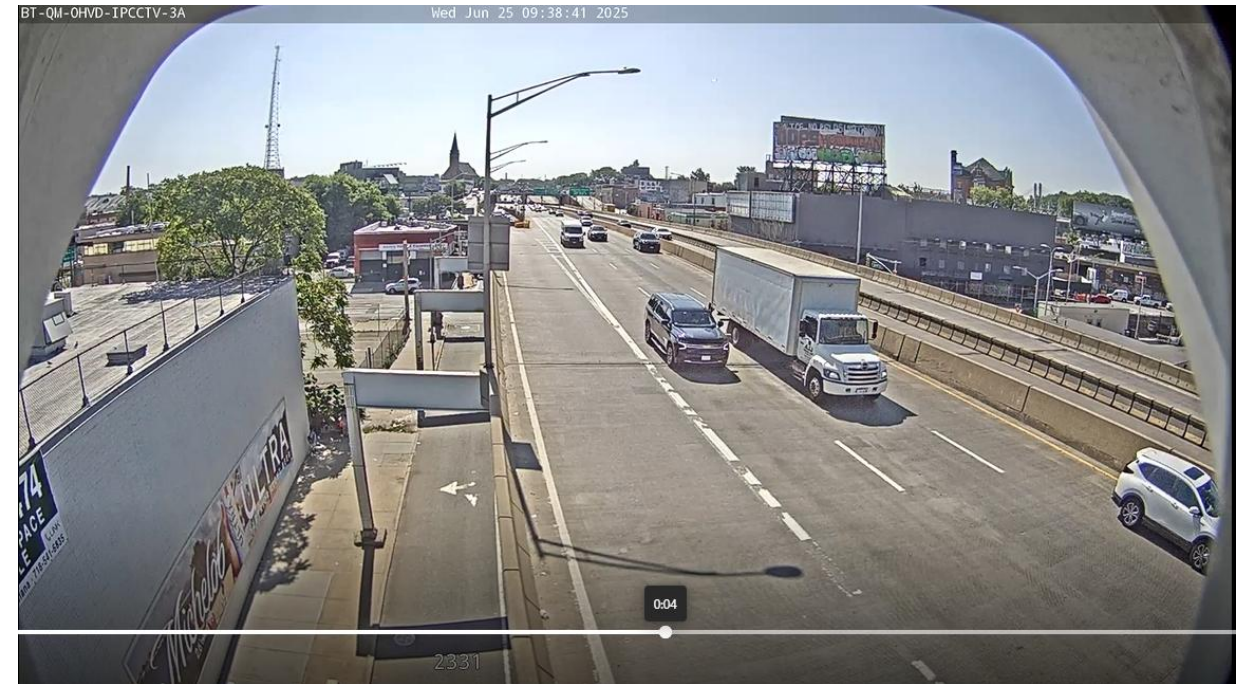
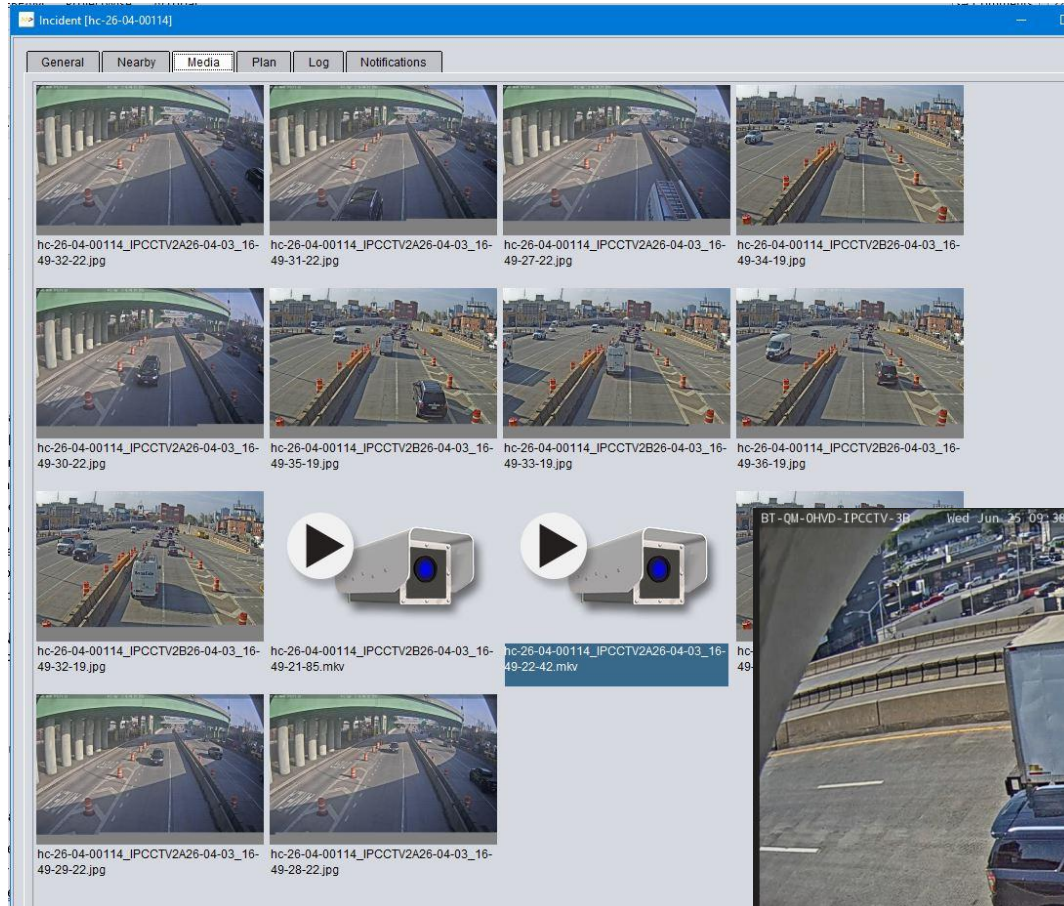
- East & West Tubes - Two Way (AM & PM)
- HOV lane- Gowanus Expy (Two Way)- No CMV allowed
- **Detect, Distract, Detour**
- Multiple OHVD Stations – All Traffic inbound
- FLS, OHV VMS Warnings
- Designated Truck Check point (TCP)
- Bridge Tunnel Officers – Boots on the ground
- Portal VMS and LUS- Close all lanes

HCT ATMS- OHV Detection

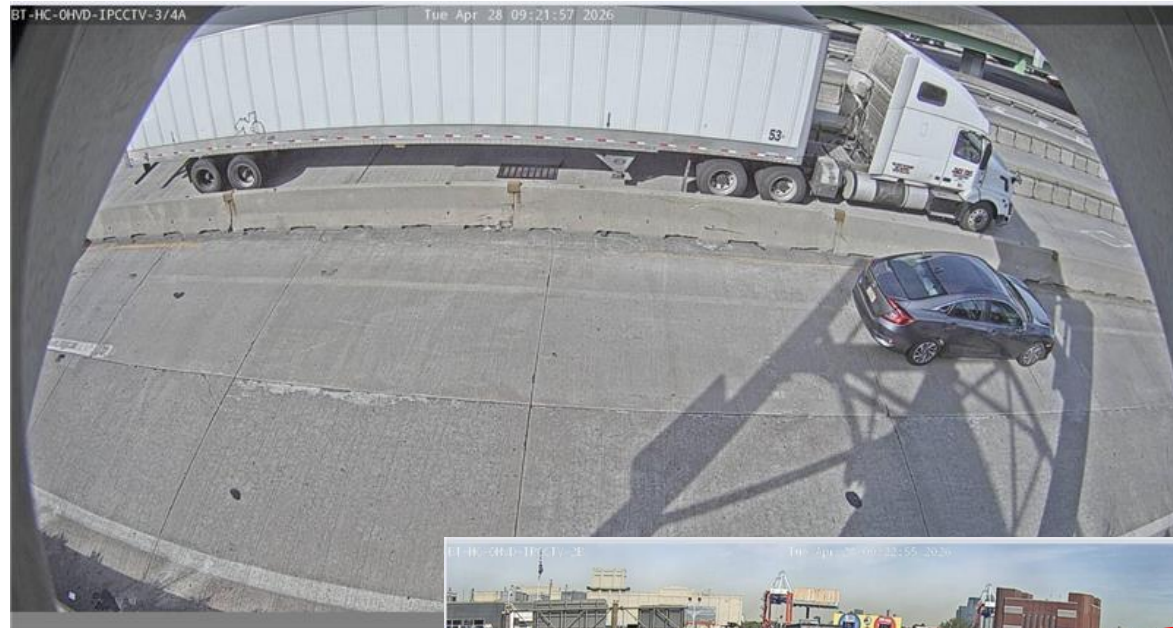
- Facility Desk Areas
- Real Time OHVD Station Status
- Audible & Graphical alerts on OHV detection
- Mandatory OHV Pop-up alert
- OHV Cameras – Real-time Photos & Videos
- OHV VMS – Warning to Pull over
- Desk notifies BTOs in field to intercept
- Portal LUS, Portal VMS – Close Tunnel Traffic
- Alarm banner, Database, Reporting tools



OHV Detection- Photos-Videos



OHV in HOV?



Plazas & TCP- OHV Pull over & U-turn



Need - Traffic Control Devices & Warning Signage Improvements

Need

- Since 2017- only 6 OHV incidents
- **Major OHV incident in 2023 @ HCT**
- Manhattan bound North tube
- Morning rush hour, tunnel in two-way mode
- 18-wheeler Tractor-Trailer OHV
- **OHV in HOV lane- illegal**
- **Ignored OHVD system warnings (FLS, OH VMS, Portal LUS and VMS)**
- **Did not stop when intervened by BTO at plaza**
- 1 mile in-stuck in mid river

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Truck stuck in Brooklyn-Battery Tunnel after driver ignored officer warnings



Marc A. Hermann / MTA

*“The driver was hit with multiple summonses as a result, including **traveling in an HOV lane, disobeying posted over-height warning signs, damage to property, failure to obey an officer, driving an unregistered vehicle, and operating with a flat tire.**”*

Need

Brooklyn

Truck stuck! Driver ticketed after wedging tractor trailer in Hugh Carey Tunnel, causing traffic nightmare

By Emily Davenport-Salcedo

Posted on September 28, 2023



TBTA and FDNY respond to the west tube of the Hugh L. Carey Tunnel where an overheight Manhattan-bound tractor-trailer became stuck on Thursday, Sep 28, 2023.
Marc A. Hermann / MTA



- Dismantle (FDNY) and towed-2.5 hrs to remove
- **Million \$ damage to ceiling**, Structural inspection- 3 hours
- Brooklyn Bound tube- operated in two-way
- Massive backups on BQE & Gowanus Expy
- Carrying paint – undisclosed (HAZMAT-class 3 DOT)
- **No Fatalities, No Injuries, No Traffic incidents**

Need- Traffic Control Devices & Warning Signage Improvements

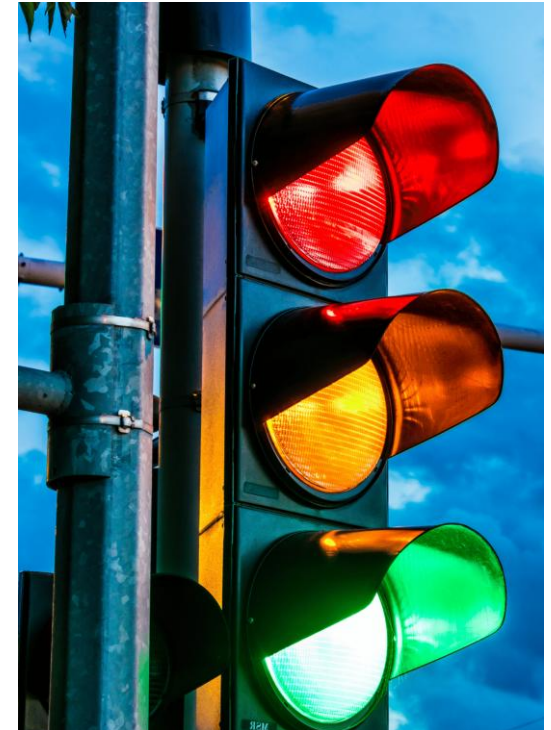
- OHV Detection & Warning technology is reliable but not **enforceable**
- **Project Objectives**
 1. **Safely stop the OHV before reaching portals** without increasing risk of rear-end collisions.
 - Create well-defined Traffic stops using Traffic Control Signals
 - Facilitate OHVD enforcement, BTO response times, Vehicle Screening
 - Safe stoppage all traffic, OHV turn-around & exit maneuvers
 2. OHVD actuated control: Provides **automatic input** for OHV stop condition.
 3. Manual ATMS control: Stop **all traffic on-demand** for any **emergency scenario**.
 4. Identify gaps in existing OHVD coverage– Enhance functionalities



Project Design Features

Project Design Features

- Installation of **Traffic Control Signals (TCS)**
 - Brooklyn & Queens - Redundant Traffic Stops (Approach & Plazas)
 - Manhattan – Primary (Plaza) Traffic stops
- TCS SCADA Control Cabinets
- TCS advance warning signs, OHV Flashing Beacon Signs, Pavement Markings, Stop bars & static signage.
- TCS poles & mast arms, barriers, attenuators, Custom foundations

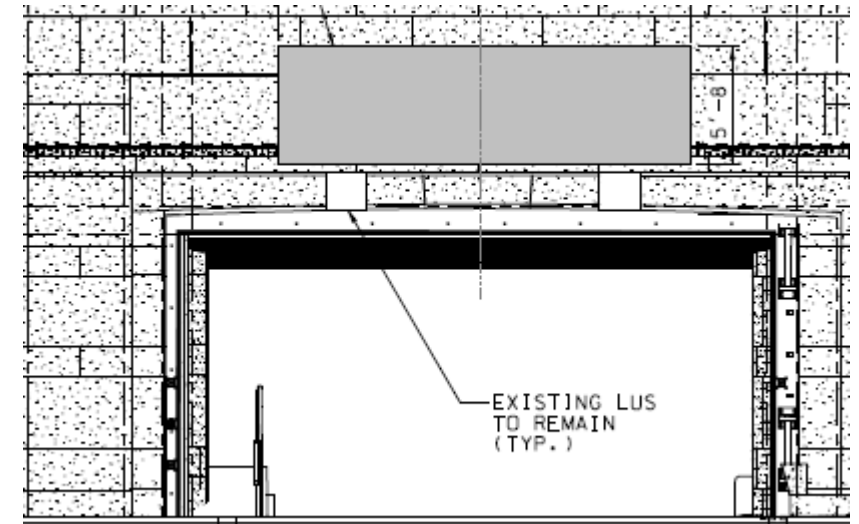


Project Design Features

- **Replace (8) portal VMS** with larger size VMS, Custom portal supports
- **Add (3) OHVD stations, Cameras** to cover plaza ramps
- **Enhance existing OHVD stations** (Relocate, Replace, Re-configure)
- OHVD SCADA Control Cabinets & foundations, OHVD Poles
- Power distribution and fiber design
- Integration to B&T Operations network
- Integration to exist. OHVD & Tunnel SCADA & Tunnel ATMS
- Multidisciplinary & System based design
- Live tunnel operations & restricted work hours



- Existing Portal VMS

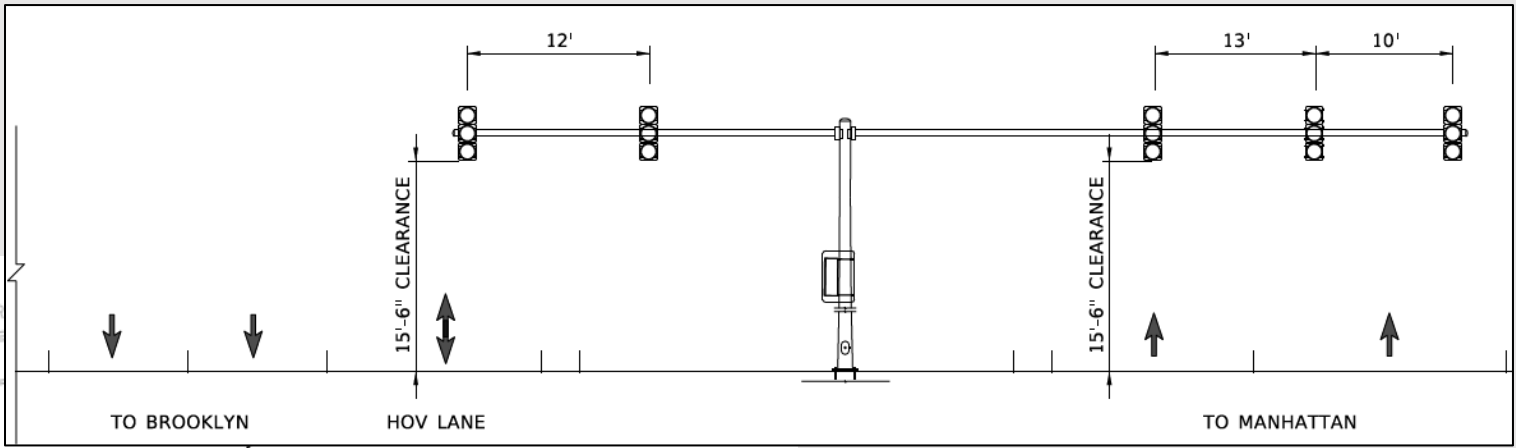
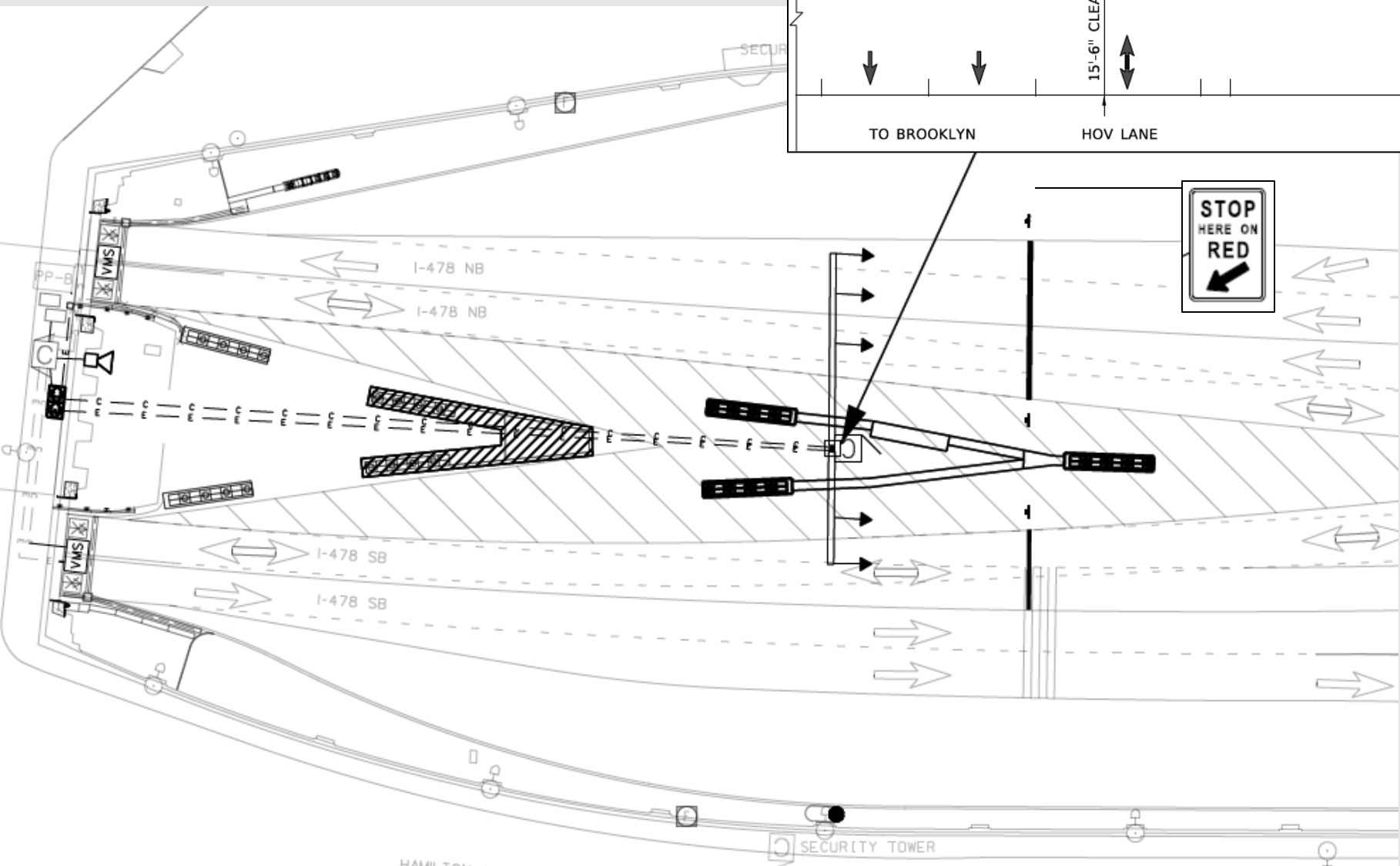


- Proposed Portal VMS

HCT Brooklyn Portal- Proposed Rendering



HCT Brooklyn Portal - Plan



Next Steps

- Design-Bid-Build delivery
- PSE Design
- Bid package
- Procurement- BOD June 2026
- CCM RFP selection
- Construction Award- Q3, 2026
- Construction Duration (18 months)



Key Takeaways

Key Takeaways

- Significant risks posed by OHV to tunnels
- LiDAR based OHV detection technology is very reliable
- Defense in depth- Multiple layers of OHV detection and warning
- Need to enforce the OHV stop condition, supplement OHV turn around operations & implement emergency closures.
- Implementing traffic stops (TCS) as additional protection layer
- Risk mitigation- High impact on Safety, Traffic & Asset preservation goals.

How to stop over height vehicle collisions with tunnels?

*“Stopping over-height vehicle collisions with tunnels requires a **layered** system of truck-route navigation, advance low-clearance signage, laser/LiDAR over-height detection sensors, flashing dynamic warning signs, protective strike beams, and **enforcement** integrated through Intelligent Transportation Systems”*

-ChatGPT

Questions

- What threats are posed by over-height vehicles to tunnels?
- Which technology was implemented by MTA B&T in 2019 to detect Over-height vehicles?
- What is the biggest drawback of existing over-height vehicle detection approach?
- Is it possible to eliminate over-height vehicle incidents completely?

Thank You

Questions?

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