

Managing Traffic During Flood Events

Delaware Department of Transportation's Experience

U.S. DOT T3 Webinar

March 6, 2014

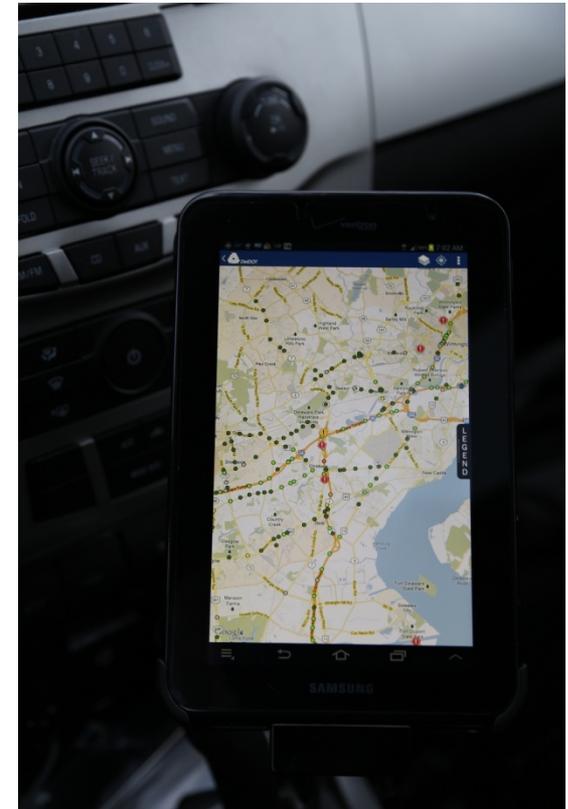
Gene Donaldson

Delaware Department of Transportation



IF YOU GET BORED WITH THE
PRESENTATION DOWNLOAD THE
DELDOT APP. IT IS **FREE!**

SEARCH FOR “DELDOT”





Hurricane Sandy

October 28th – 31st 2012

Prepared 1030 AM EDT – Friday October 26, 2012

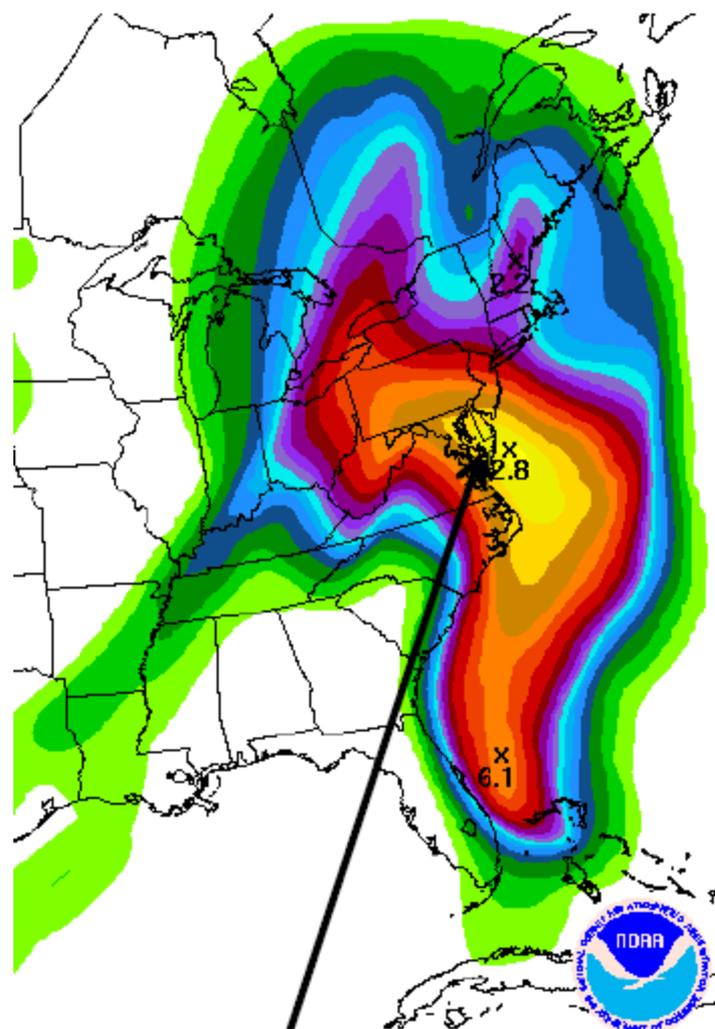
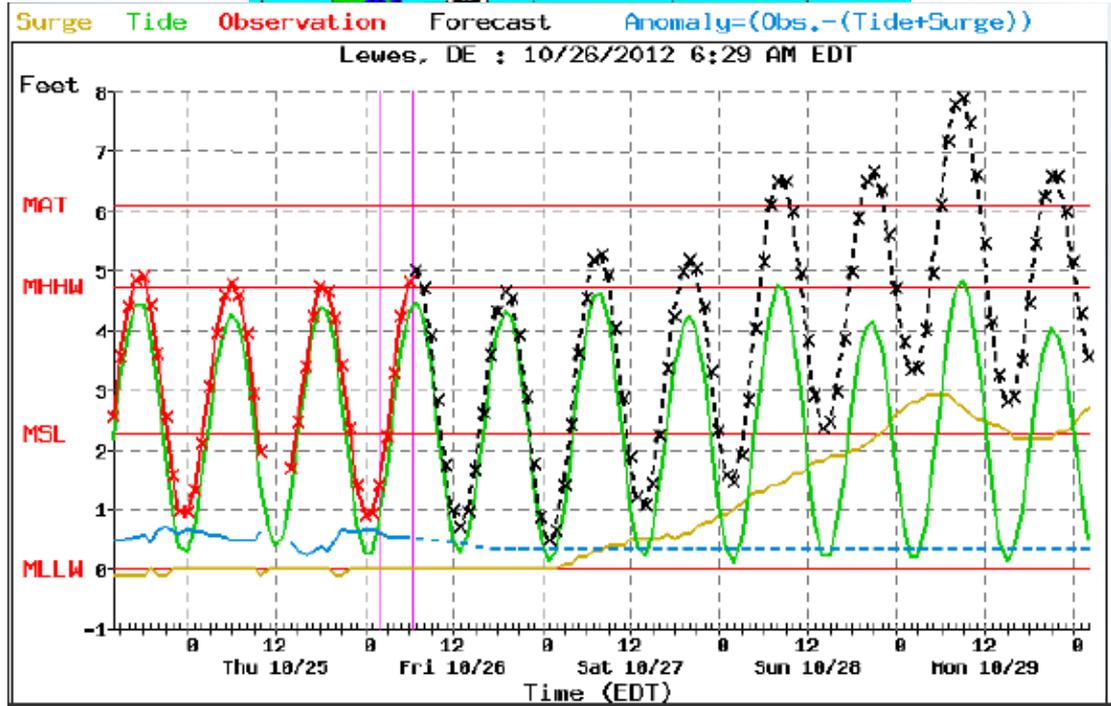
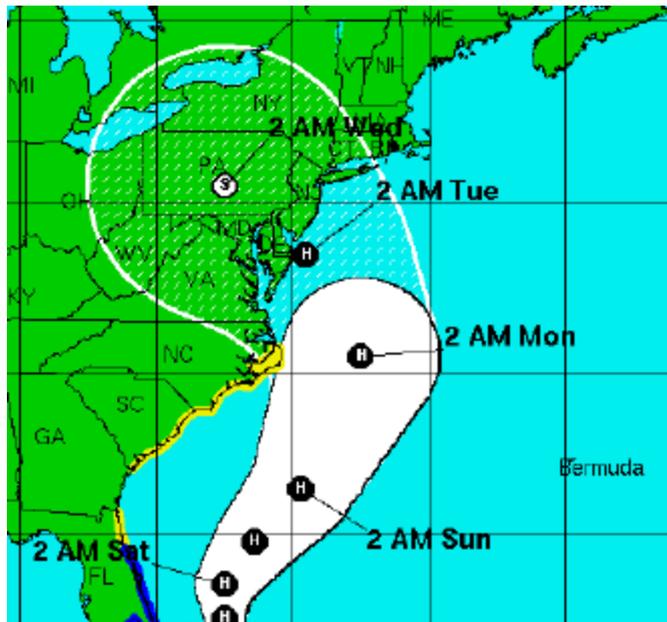
Gary Szatkowski

NOAA's National Weather Service

Philadelphia/Mt. Holly NJ Forecast Office

Weather.gov/phi





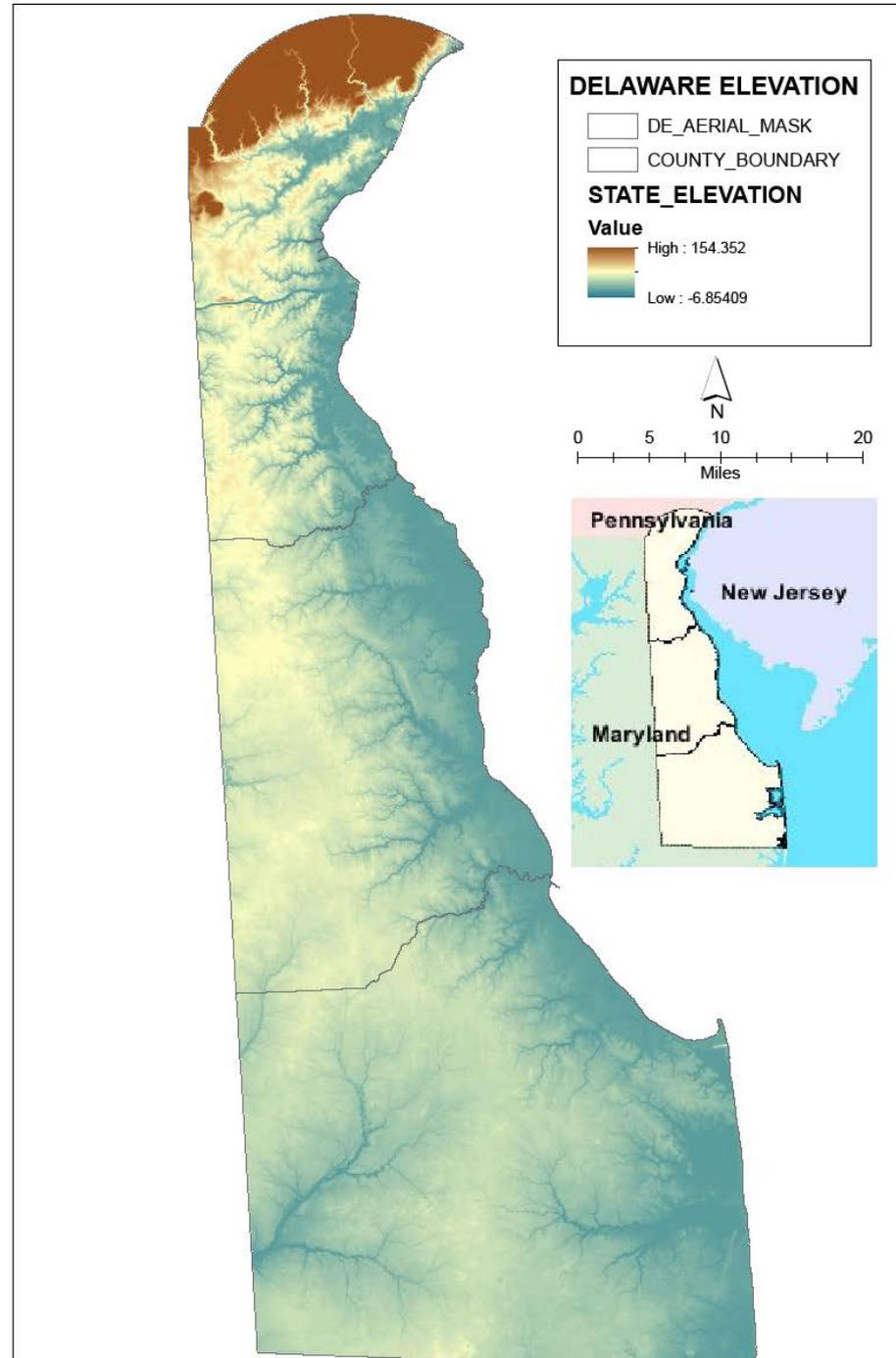
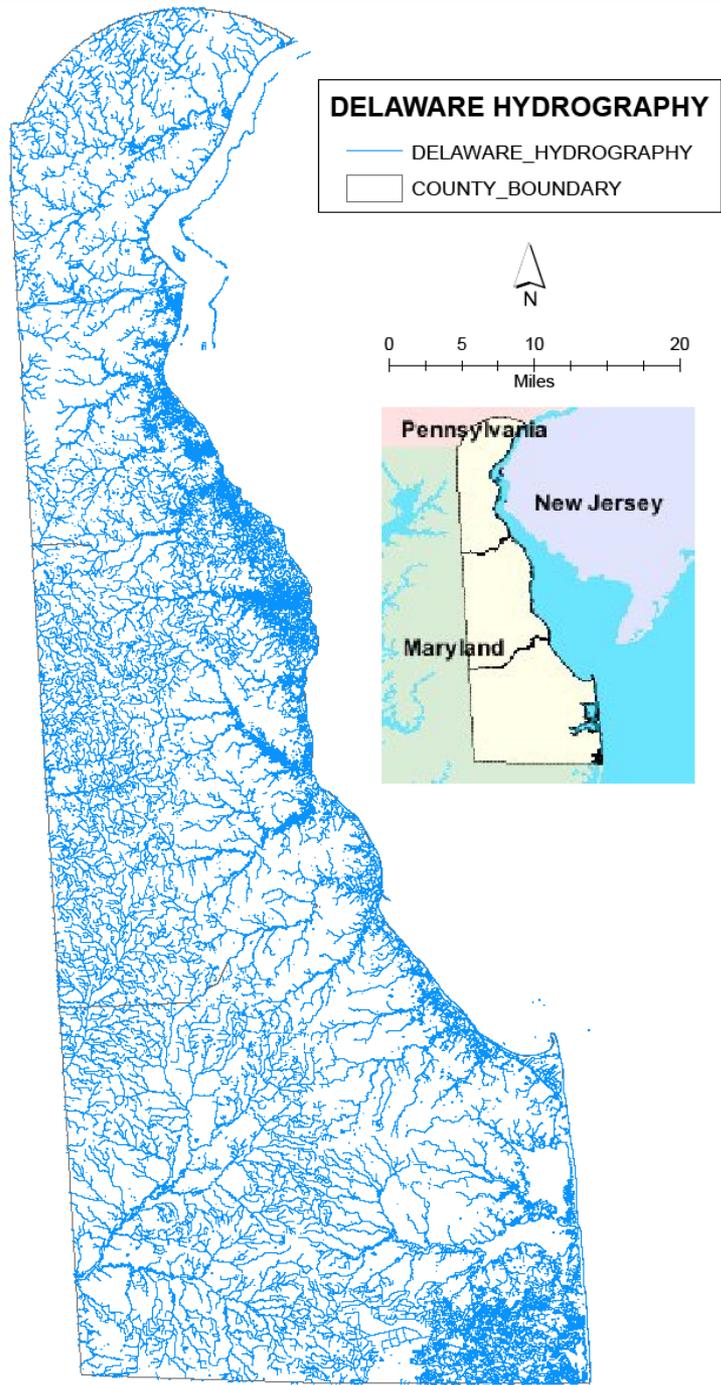
12.8 inches

Delaware has 13,731 lane miles of roads, and DeIDOT is responsible for 89%. The national average of state maintained roads is approximately 20%

The Delaware Transit Corporation is a DeIDOT subsidiary and provides statewide:

- Fixed route bus service
- Paratransit service
- Commuter rail service

- Delaware has the lowest mean elevation of any state in the nation.
- Highest point in Delaware is 450 ft. above sea level



Delmarva Peninsula



Image © 2013 TerraMetrics

C&D Canal



Maryland Bay Bridge



Virginia Bay Bridge & Tunnel



Water is the biggest threat to Delaware's transportation system.



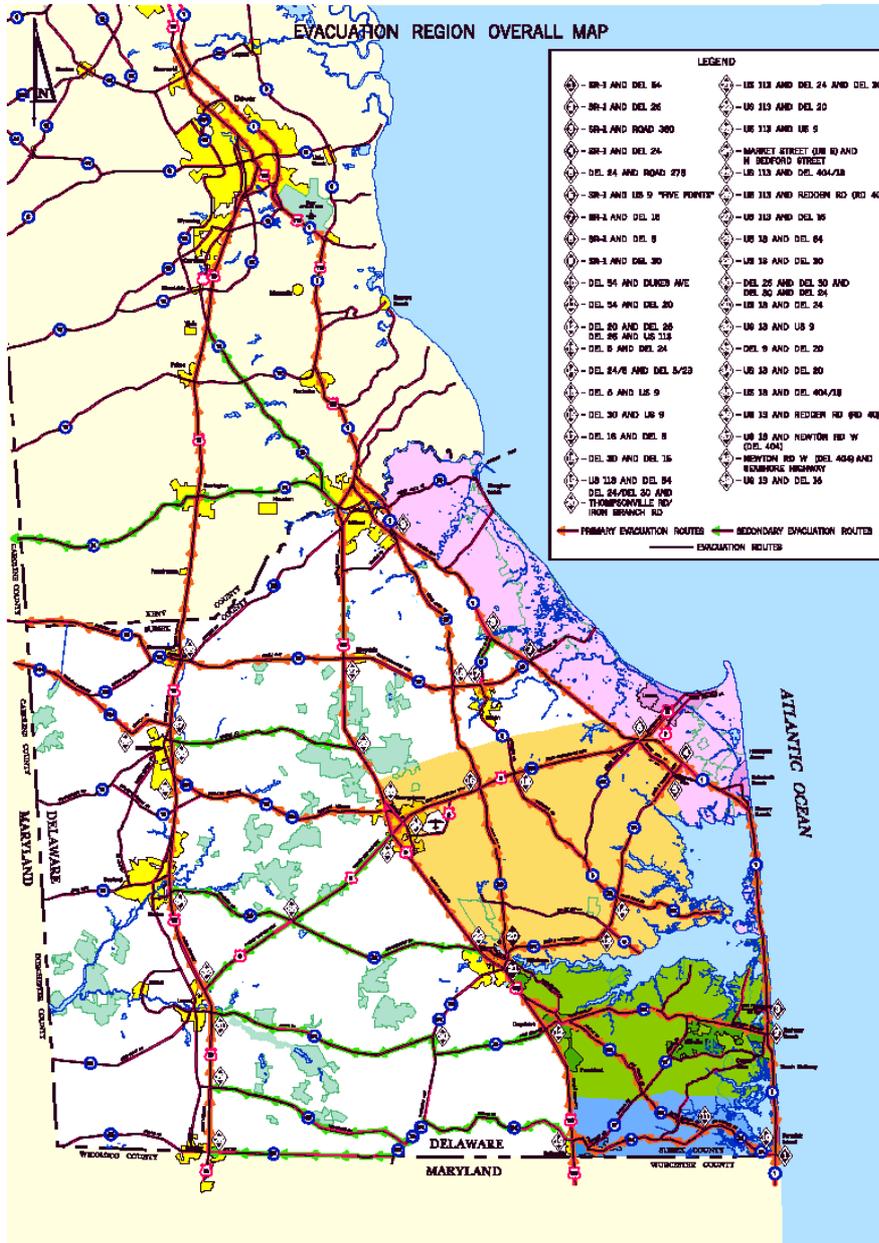
Aftermath – Route 1 N. of IRIB



Aftermath – Tuckers Road



Aftermath – West Line Road



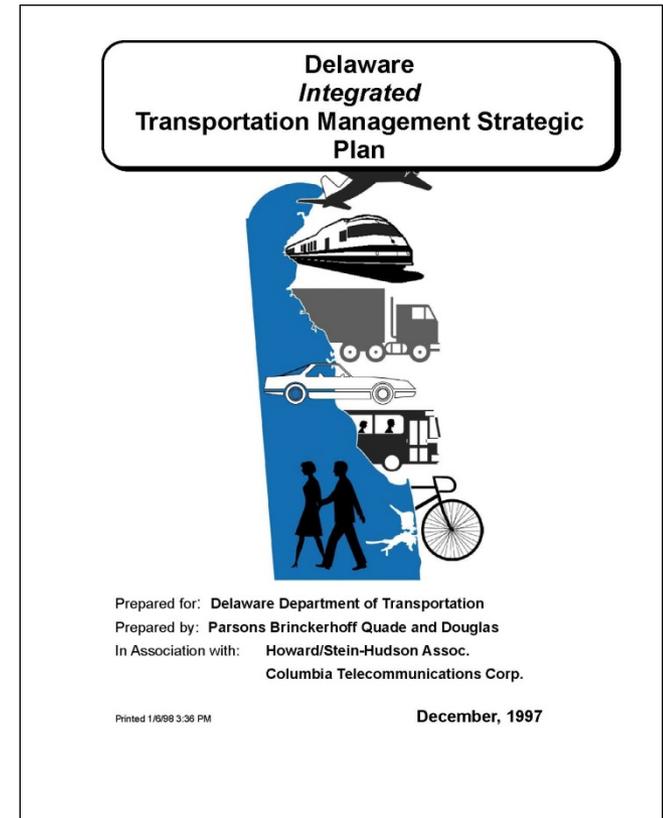
Sussex County Evacuation Areas & Routes

Background

Delaware's Transportation Management Program

Integrated Transportation Management Strategic Plan (1997)

- Required a foundation for a shared mission and vision between all of Delaware's Transportation Management System stakeholders.
- The plan defined Delaware's Transportation Management:
 - Mission
 - Vision
 - Goals
 - Strategies for Implementation
- Defined a Statewide Transportation Management Program managed from a central transportation management center (TMC).



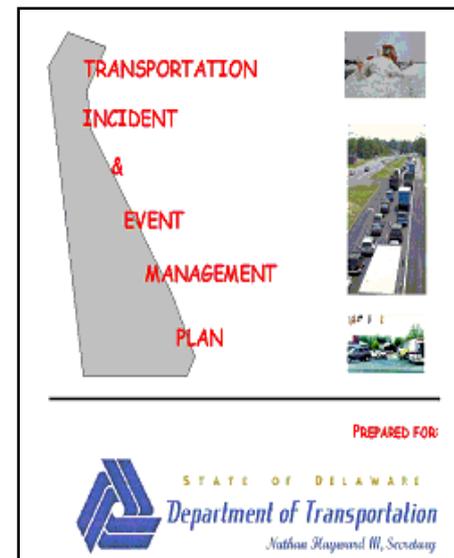
DEOP

Delaware Emergency Operations Plan managed
by
Delaware Emergency Management Agency
DEMA

Transportation Management Operational Concept:

Transportation Incident and Event Management Plan (TIEMP)

- Defines how DeIDOT will operate during an incidents and events
- Establishes the Transportation Management Team (TMT) Concept.
 - Provides for the safe movement of persons and vehicles from the affected area(s).
 - Provides access for emergency responders.
- Defines the responsibilities and guidelines for TMTs.
 - Communication
 - Response
 - Resources



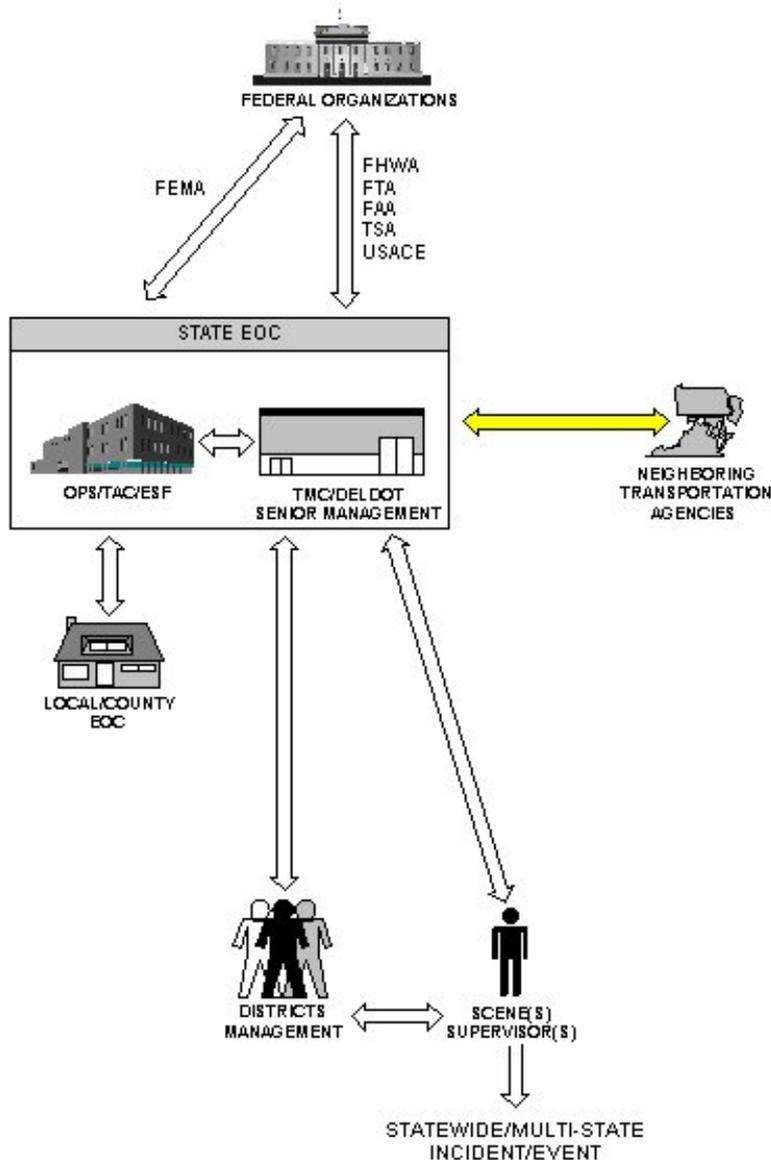
TIEMP Levels of Response

Table 5-1. Levels of Response for Planned/Unplanned Incidents/Events

Level	Area of Impact	Resources	Emergency Operation Centers (EOC) Activation for unplanned events	Highest Level of Decision Making	Examples
1	Site/Area specific	Normal staffing.	Normal interagency communication – No EOC activation.	Normal operations.	Day-to-day operations.
2	District wide or Multi-district	Limited re-assignment of personnel and equipment – greater expertise may be needed. Primary agencies notified or activated.	Elevated communications, local/county EOCs maybe partially or fully activated. State EOC on notice.	District Managers/ Chief Traffic Engineer/ Operations Managers.	Traffic may need to be diverted to other roads (i.e. blockage on main road); major accident; closing of a road; injuries; isolated road flooding; HAZMAT incident; power outage; bridge structural damage; large planned events (i.e., Dover Downs Races).
3	Multi-Districts	Reassignment of personnel and equipment – greater expertise needed. Primary agencies activated. Support agencies notified. Federal agencies notified (FHWA, USACE). Contractors may be activated.	Higher elevated communications, impacted local /county EOCs maybe activated if human needs are required (i.e. shelter, mass care). State EOC maybe partially or fully activated – DeIDOT liaison to county EOC and maybe to state EOC, if activated.	Division Director or Department Secretary.	Coastal storm; high volumes of rain or snow; major HAZMAT incident; limited evacuation.
4	Statewide/ Multi-State	Total activation of personnel and equipment. Primary, contract, and support agencies activated. Ongoing federal coordination.	Impacted local/county & state EOCs activated – DeIDOT liaison to county EOC and state EOC if state EOC activated.	Governor or DEMA or Cabinet Members.	Hurricanes; floods; blizzards; catastrophic HAZMAT incident; biological incident; weapons of mass destruction; acts of terrorism.

* Homeland security advisory codes are not dependent on the size or duration of a transportation event. It is very possible to have a level high or severe at a level 1 or 2. However, a set of protective measures and steps to reduce vulnerability should be taken based on code (to be added later).

Established Communication Procedures



TIEMP Level 4

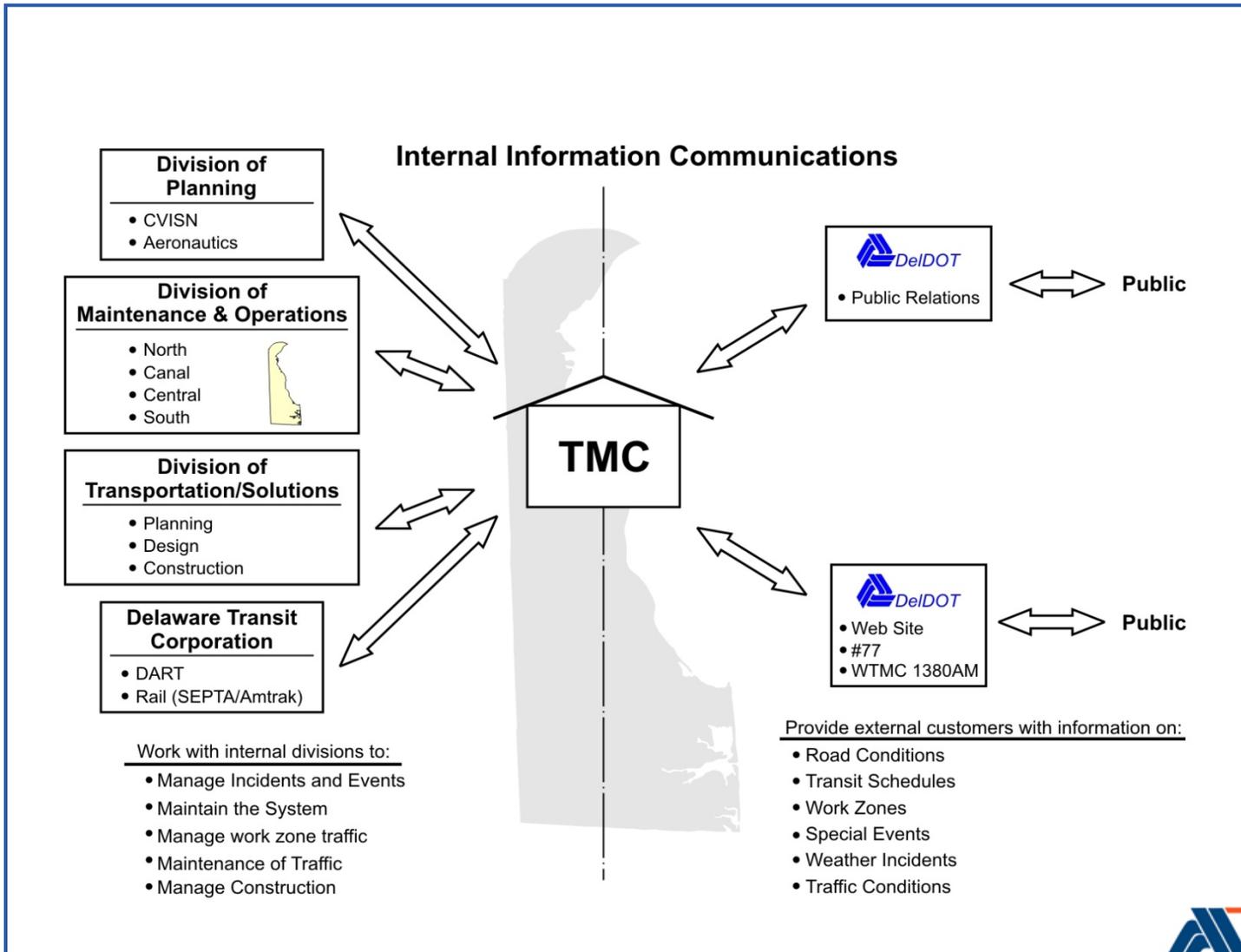
TMC/Districts Communications during a Multi-District Incident/Event with Federal Organizations Activated Local/County EOC
“Emergency” Requests can go direct to TMC

Transportation Management Center (TMC)

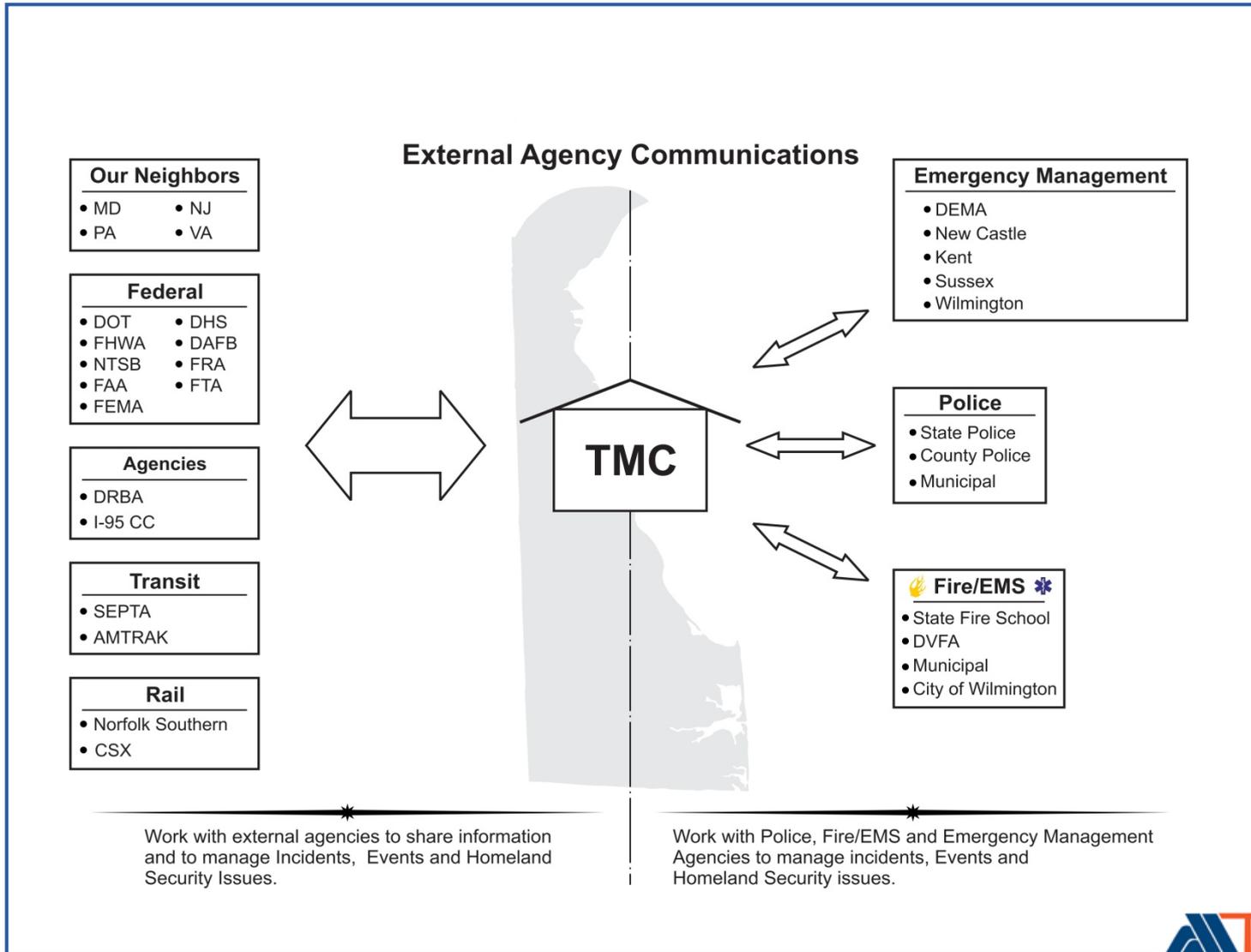
- 24/7 Statewide Operation
- Coordinates and Manages DelDOT's response to any incident or event that impacts Delaware's multimodal transportation system
- Monitors and Controls all ITMS intelligent transportation systems
- Transportation Incident and Emergency Management Planning and Operations
- Transportation Homeland Security Planning and Operations



TMC Relationships - Internal



TMC Relationships - External

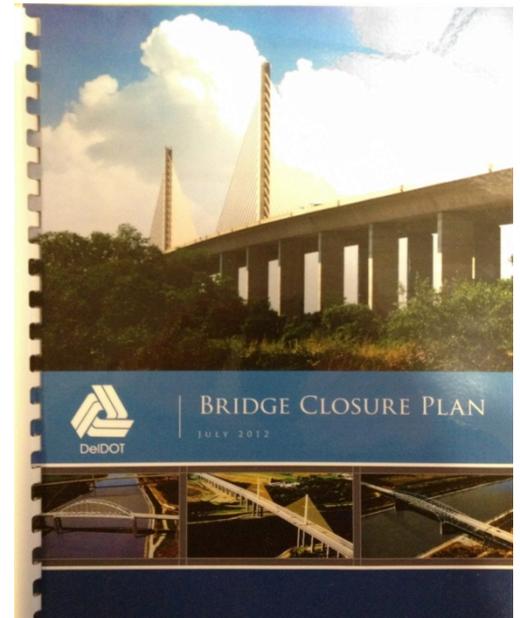


All Hazard Planning

- DeIDOT is the lead state agency for evacuation planning and operations.
- All hazard evacuation plans for:
 - New Castle County
 - Kent County
 - Sussex County
 - Individuals Requiring Special Assistance
 - Salem Creek Nuclear Power Plant
 - Dover International Speedway

All Hazard Planning

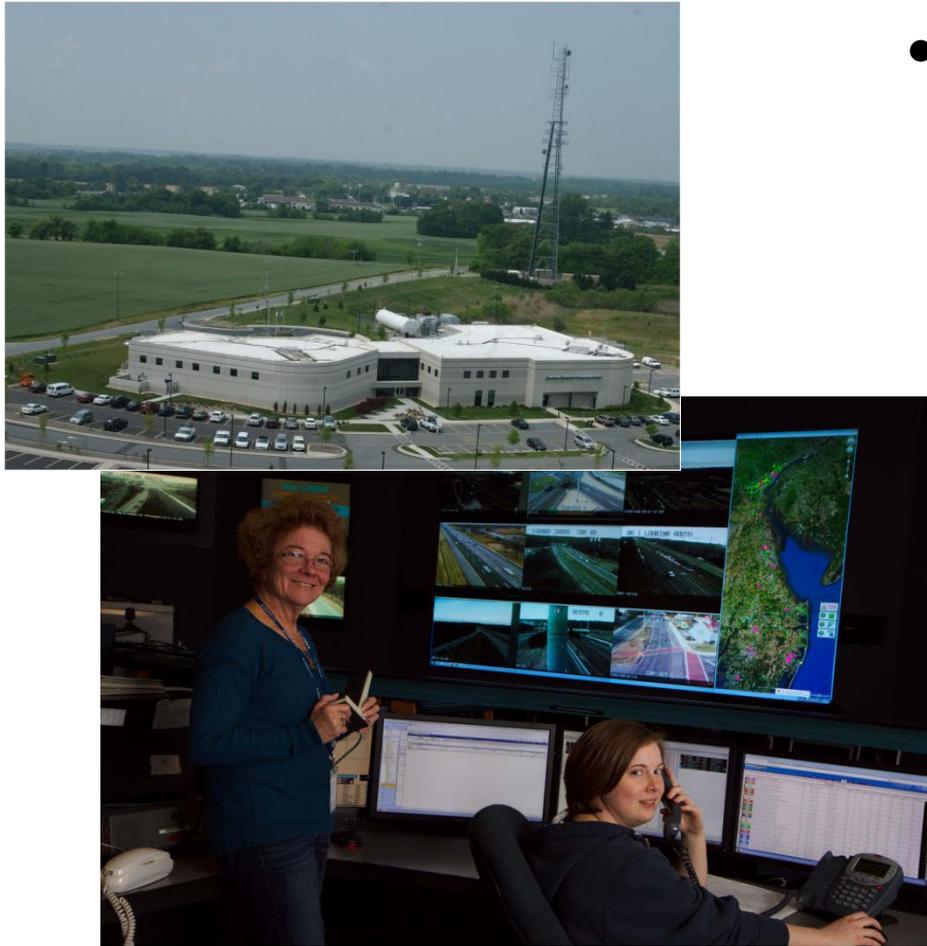
- Other related plans:
 - Debris Management Plan
 - Toll Plaza Modified Operations Plan
 - Bridge Closure Plan
 - Snow Emergency Plan
 - Dover Air Force Base Incident Response Plan



Storm Information

- **DEMA Severe Weather Conference Calls**
 - Governor's Office
 - DEMA
 - National Weather Service
 - Other State Agencies
 - DeIDOT TMC
 - County EOCs
 - Municipalities
- **TMC E-Mail Updates**
- **DeIDOT Internal Conference Calls**
 - Secretary, Deputy Secretary, Chief Engineer
 - Chief Traffic Engineer
 - Maintenance and Operations Director and District Engineers
 - Delaware Transit Corporation
 - Division of Motor Vehicles
 - Toll Operations
 - Bridge Maintenance Engineer
 - Public Relations

During the Storm

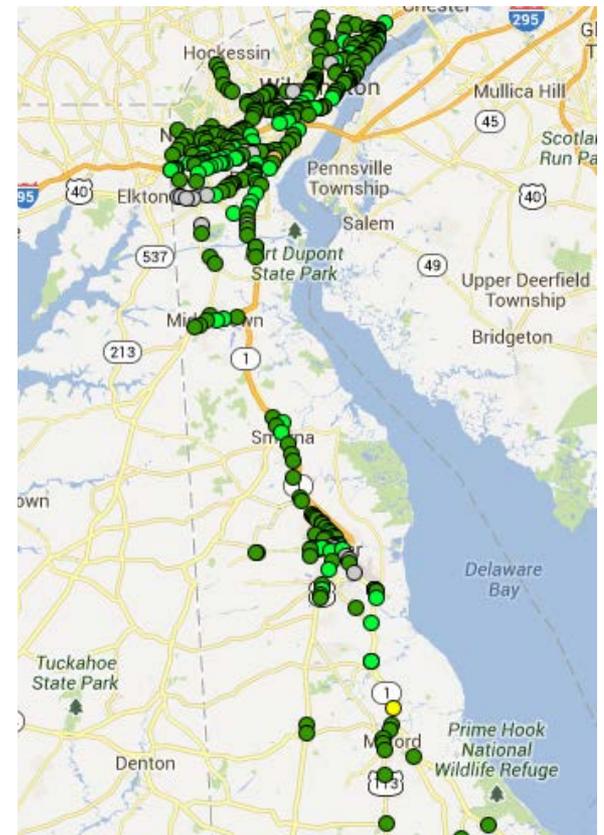


- TMC Coordinates DeIDOT's Response
 - US DOT
 - Regional
 - Coordination with MD, PA, NJ
 - DEMA
 - Other State Agencies
 - County and Municipal EOCs
 - Maintenance Districts
 - Other DeIDOT Divisions
 - Media

Monitoring System

Statewide Electronic Monitoring Network – Fixed and Portable:

- Video Monitoring System
 - Permanent
 - Portable
 - Dash Cams (Live Video)
- **Roadway Weather Information System (RWIS)**
- Signal System Loop Detectors
- Microwave (Radar) Detection on Freeways
- Bluetooth Detection
- Near real-time transportation system status
- 400+ locations and growing
- **Hydrology monitoring system Phase 1 FY14/15**



Portable Control, Monitoring, Information Capability

- Portable Monitoring and Control
- of Work Zones, Emergencies and
- Planned Events



Electronic Message Sign



Radar Detector



Video Camera



WTMC 1380 AM

Hydrology Monitoring System

- Expansion of Delaware's hydrology monitoring system.
- DeIDOT established multiagency and academia working group to provide input into the planning, design, implementation, operation and maintenance of an enhance weather/flood statewide flood monitoring system.
- Phase One includes 6 sites that represent the required types of hydrology data and equipment to be used in the state.
- Working with USGS to determine what is required to improve the timeliness of data from their sensors.

Electronic Operations

Operations Management Application

- Home
- Call List
- Schedule
- Emergency
- Search
- Resource
- Traffic
- Comm
- Asset
- Safety
- Log Out

Resources

- Camera
- Sign & Gate
- Project Detour
- WTMC
- Weather
- Web
- Detour Plans

- DeIDOT
- accuweather
- intellicast
- wboc
- weather.com
- weather.gov
- wunderground
- RWIS
- RWIS Summary
- Tide Gauges
- Clarus

Prime Hook National Wildlife Refuge Marsh & Water Monitoring Network
[Main Site](#) | [Program Overview](#)

You are here: US Fish & Wildlife Service



No Alarm: 2
 Low: 2
 Medium: 0
 High: 0
 Sensor hardware failure: 0
 Local Action: 0
 [Redraw Map](#)



... DeIDOT TMC | Electronic Operations :: Resources - Mozilla Firefox

File Edit View History Bookmarks Tools Help

... DeIDOT TMC | Electronic Operations :: ... x Delaware Department of Transportation ... x +

eops.dot.state.de.us/eops/app/secure/resources?4

Most Visited DEMAIL IMAPS Live Traffic Mt Holly EOPS DEOS OC G'town Dover Wilm NHC NOAA Dover Radar NWS Radar RWIS Probe OMB Delmarva Power Detours VPN RITIS

ElectronicOperations

Operations Management Application

Home Call List Schedule Emergency Search Resource Traffic Comm Asset Safety Log Out Resources

Camera Sign & Gate Project Detour WTMC Weather Web Detour Plans

DeIDOT accuweather intellicast wboc weather.com weather.gov wunderground RWIS RWIS Summary Tide Gauges Clarus

Prime Hook National Wildlife Refuge Marsh & Water Monitoring Network

Main Site | Program Overview

You are here: US Fish & Wildlife Service / Coastal Delaware NWR Complex / Prime Hook NWR / Prime Hook Rd

Name: Prime Hook Rd
Description:

Last read: 04/23/2013 09:45 AM

<p>North Water Level [m] 0.716</p>	<p>North Salinity [ppt] 23.10</p>	<p>North Temp [C] 9.44</p>
<p>South Water Level [m] 0.368</p>	<p>South Salinity [ppt] 21.96</p>	<p>South Temp [C] 9.37</p>

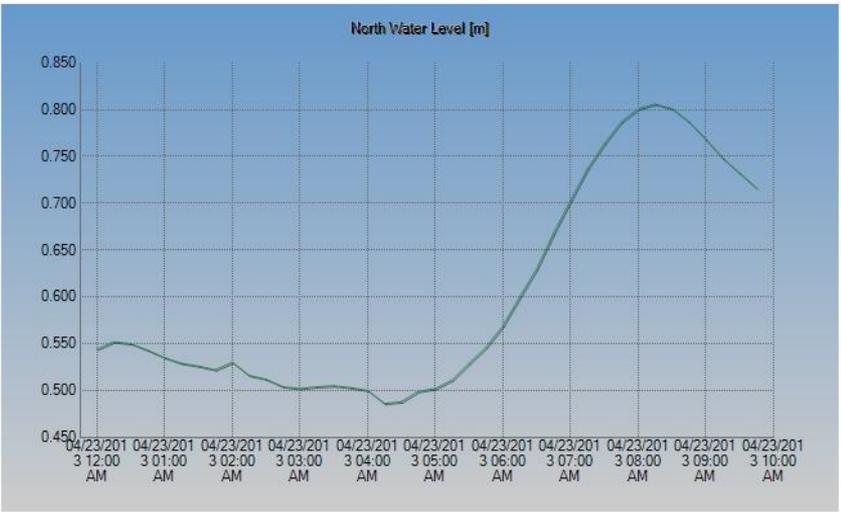
start Siemens ITS Service ... DeIDOT TMC | Elec... gauge_primehook - P... lte2013 11:00 AM

Prime Hook National Wildlife Refuge Marsh & Water Monitoring Network Main Site | Program Overview

You are here: US Fish & Wildlife Service / Coastal Delaware NWR Complex / Prime Hook NWR / Prime Hook Rd

Parameter: North Water Level [m] Start Date: 4/23/2013 End Date: 4/24/2013 Submit

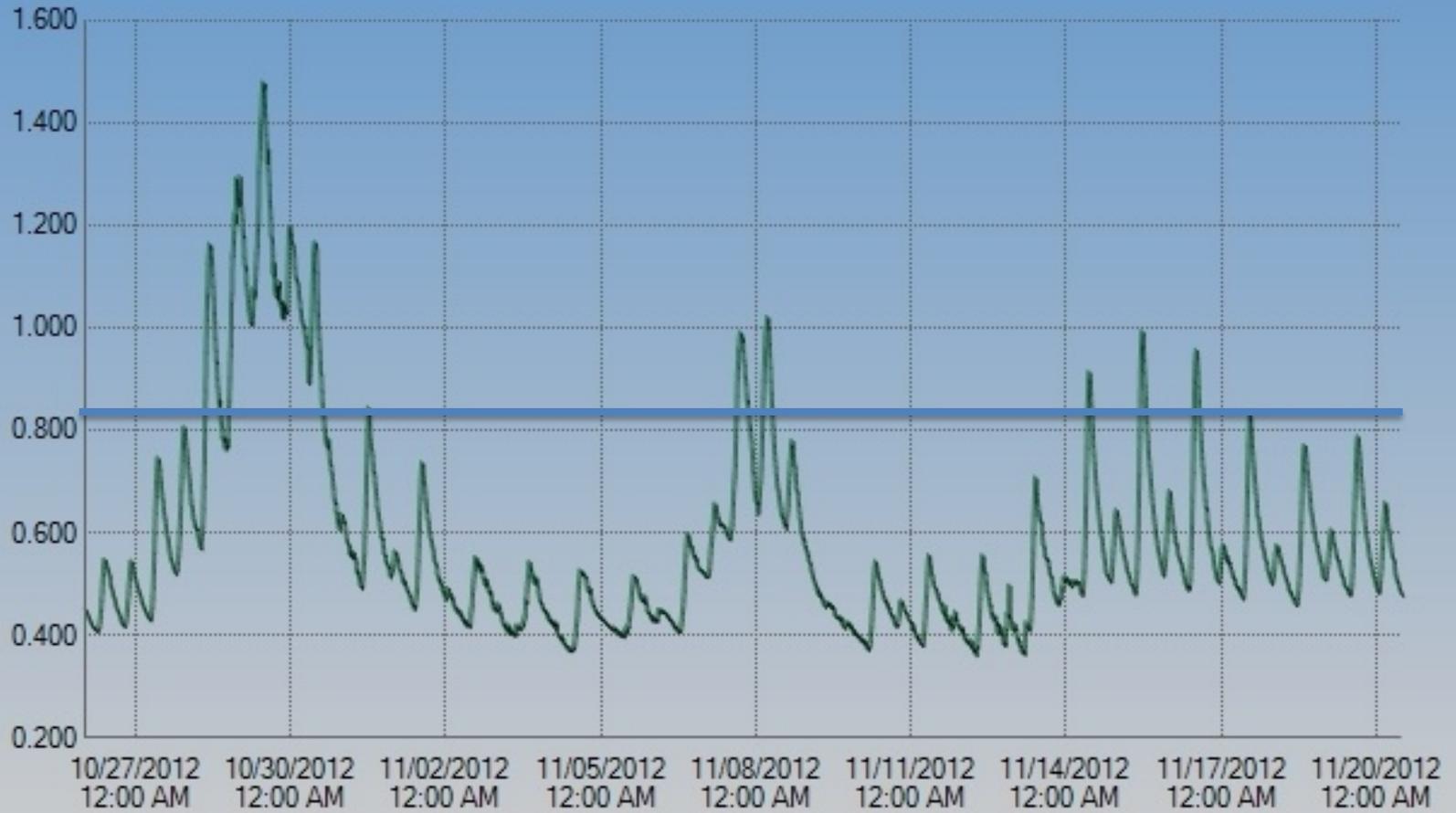
Table with 2 columns: Local Time and Value. Contains 24 rows of data for April 23, 2013, showing water level values ranging from 0.502 to 0.716.



Previous Next



North Water Level [m]





Aftermath – Prime Hook Rd

Travel Information

**WTMC 1380 AM – FCC primary licensed
Synchronized Repeater Sites being installed
statewide**

Real Time Web Site

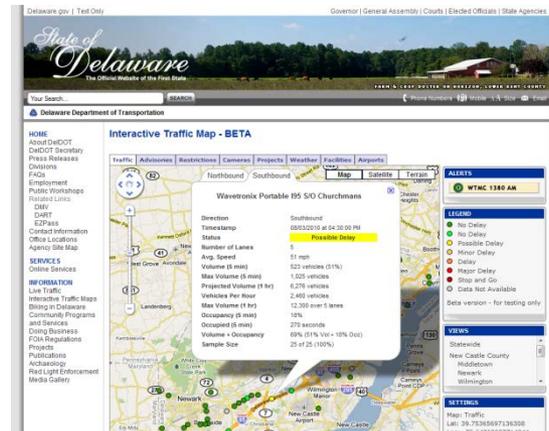
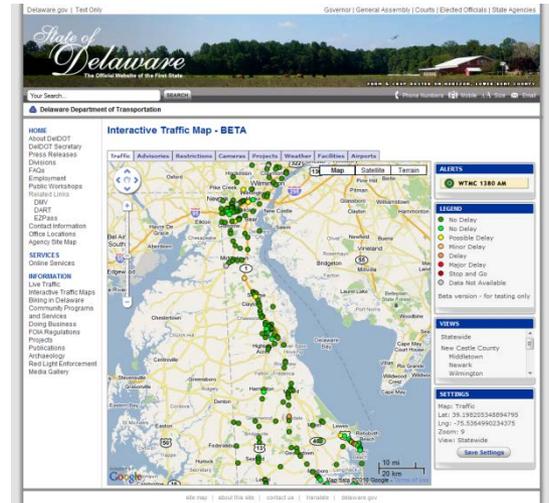
<http://www.deldot.gov>

Electronic Changeable Message Signs

Email Updates

Twitter, Facebook

Smartphone and Tablet Application



Visitors Overview

Oct 20, 2012 - Oct 30, 2012

Advanced Segments | Email | Export | Add to Dashboard | Shortcut ^{BETA}

% of visits: 100.00%

Overview

Visits vs. Select a metric

Visits

140,000

70,000



Normal Website Traffic
Friday, October 26, 2012
5,462 visitors

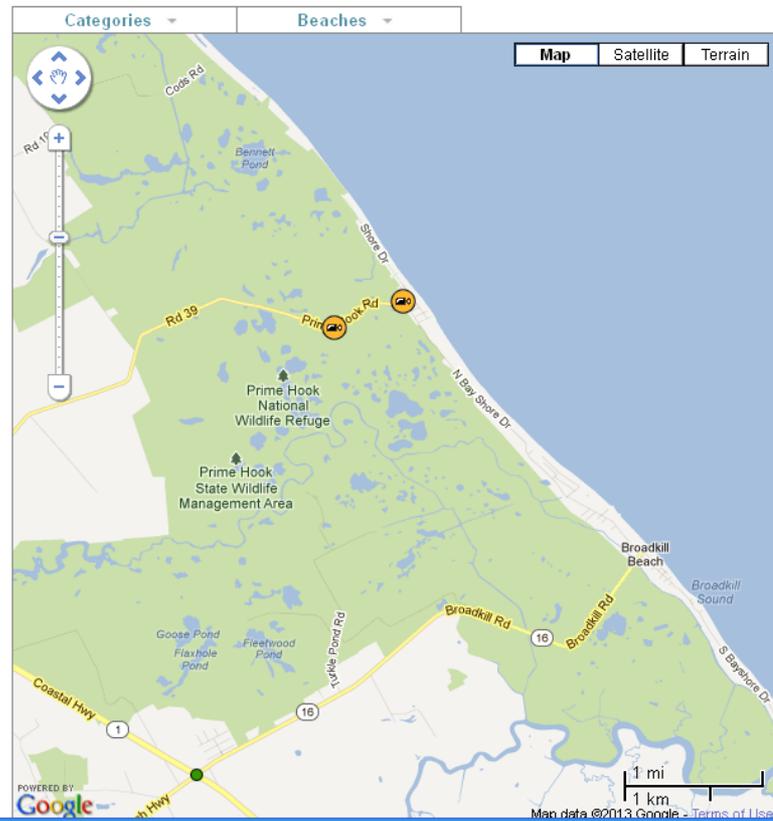
Hurricane Sandy Website Traffic
Sunday, October 29, 2012
130,791 visitors

Hourly | Day | Week | Month



- HOME**
 - About DeIDOT
 - Secretary Message
 - Press Releases
 - Divisions
 - FAQs
 - Employment
 - Public Workshops
 - Related Links
 - DMV
 - DART
 - EZPass
 - Contact Information
 - Office Locations
 - Agency Site Map
- SERVICES**
 - Online Services
- INFORMATION**
 - Live Traffic
 - Interactive Maps
 - Biking in Delaware
 - Community Programs and Services
 - Doing Business
 - FOIA Requests
 - Legislation
 - Projects
 - Publications
 - Archaeology
 - Red Light Enforcement

Interactive Map



ALERTS

- Special Travel Alert**
- WTMC 1380 AM**

LEGEND

- Traffic Flow
- Traffic Cameras
- Enabled Camera
- Disabled Camera

SETTINGS

Map: Traffic Cameras
 Lat: 38.84117838251043
 Lng: -75.245361328125
 Zoom: 13
 View: Beaches

[Save Settings](#)



Delaware Department of Transportation

SHRRE

HOME

- About DelDOT
- Secretary Message
- Press Releases
- Divisions
- FAQs
- Employment
- Public Workshops
- Related Links
- DMV
- DART
- EZPass
- Contact Information
- Office Locations
- Agency Site Map

SERVICES

- Online Services

INFORMATION

- Live Traffic
- Interactive Maps
- Biking in Delaware
- Community Programs and Services
- Doing Business
- FOIA Requests
- Legislation
- Projects
- Publications
- Archaeology
- Red Light Enforcement

Interactive Map

Categories | Beaches

Map | Satellite | Terrain

CAM4064
PRIME HOOK RD @ WILKERSON RD

Map controls: Home, Pan, Zoom, Full Screen, Print, Refresh, Close

Map labels: Rd 166, Coles Rd, Rd 99, Prime Hook Rd, N Bay Shore Dr, Broadkill Rd, Broadkill Beach, Broadkill Sound, Goose Pond Flaxhole, Fleetwood Pond, Pansy Rd

Geographic labels: Prime Hook National Wildlife Refuge, Prime Hook State Wildlife Management Area

Scale: 1 mi, 1 km

Map data ©2013 Google - Terms of Use

ALERTS

- Special Travel Alert
- WTMC 1380 AM

LEGEND

- Traffic Flow
- Traffic Cameras
 - Enabled Camera
 - Disabled Camera

SETTINGS

Map: Traffic Cameras
 Lat: 38.84117838251043
 Lng: -75.245361328125
 Zoom: 13
 View: Beaches

[Save Settings](#)

Wireless Network Connection Not connected. Right-click here for more options.





Managing Information

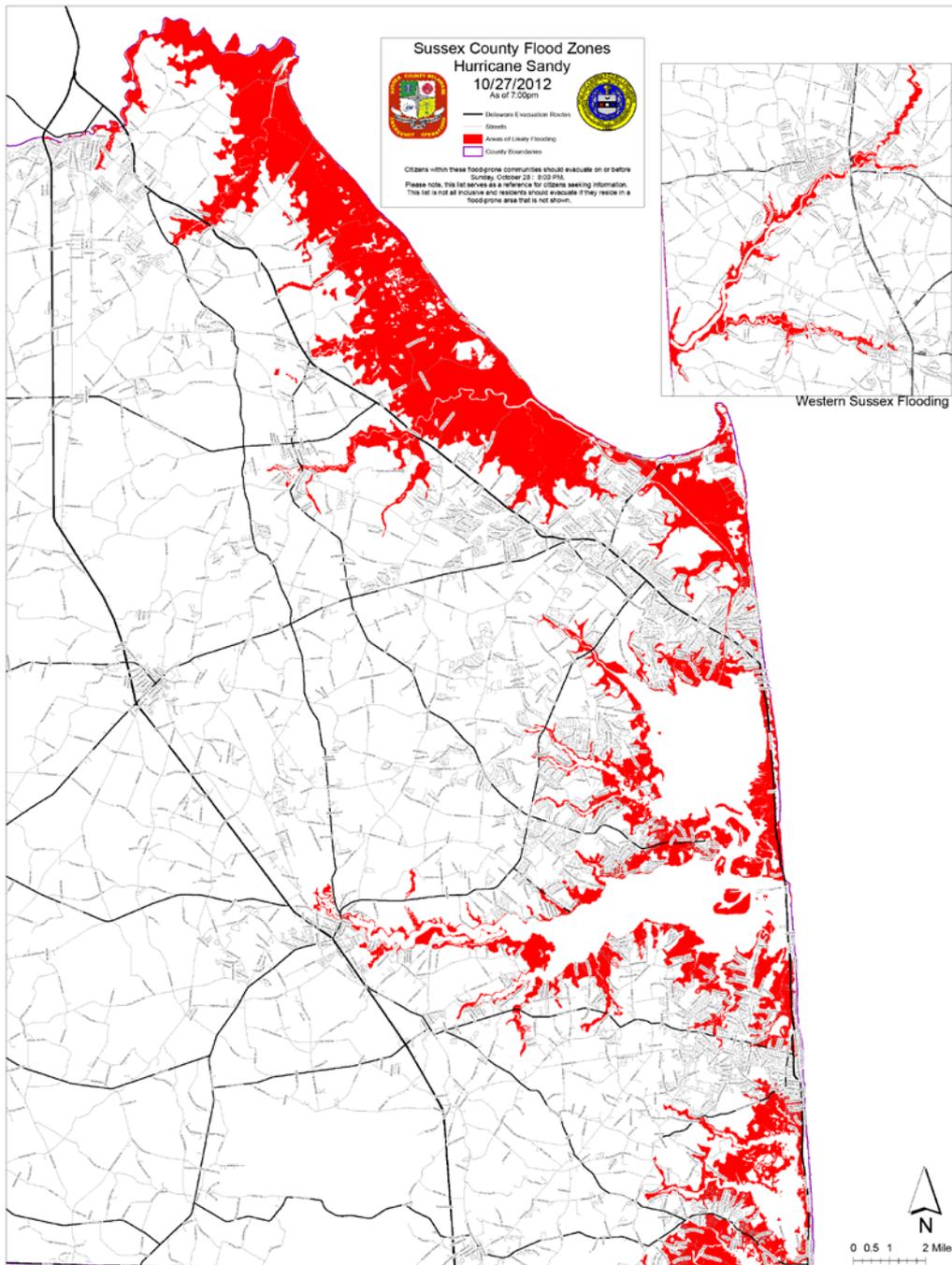


2 to 3 feet of sand across DE1



DE1 Closure Detour





Mandatory Evacuation Areas

Statewide Computerized Signal System

- 750 of the 1000 DeIDOT maintained signalized intersections are on the computerized signal system.
- Goal to have every traffic signal on system within 3 years.
- System automatically adjusted to evacuation traffic.**
- No Police Officer had to direct traffic.**

Evacuations and Shelters

- Dover & Biddles Plazas tolls waived for evacuation order
- Tolls waived for I-95
- TMC monitoring cameras and detection systems at key locations

Shelters

- 49 requests for transportation support to 5 shelters
 - 55 people transported to shelters
 - 5 dogs and 2 birds
- Primary transport: 15 passenger vans, bus, Emergency Response Unit (ERU) pick-ups
- Traffic section support with drivers and dispatchers
- 6 requests for DTC Support with Paratransit

Bridge Closures

- Indian River Bridge closed due to water and sand across DE1.
- Policy to close bridges when sustained winds reach 50 MPH.
- Closely monitored winds on bridges crossing C&D Canal.
- University of Delaware input.

WHEREAS, regardless of the exact rainfall totals and wind speed calculations, it is clear that reasonable statewide driving restrictions are necessary to protect public safety.

NOW THEREFORE, I, JACK A. MARKELL, pursuant to Title 20, Chapter 31 of the Delaware Code, do hereby declare that the previously issued executive orders shall remain in effect until further notice, with the following modifications:

1. A Level 2 Driving Restriction (the "Restriction") is hereby ordered beginning as of **5:00 a.m. tomorrow, Monday, October 29, 2012**. The Restriction shall remain in effect until further notice. As of the time set forth above, no motor vehicles should be operated on any road in the State of Delaware unless operated by essential personnel, which shall mean those employees and/or personnel who are necessary to maintain the core functions of a government body or entity, and to maintain the health and safety of the people in Delaware by providing services provided by public utilities as defined in § 102(2) of Title 26, healthcare services, and food and fuel deliveries, as well as members of the media. Persons with a waiver granted by the Delaware Emergency Management Agency are exempt from this Restriction.

2. Notwithstanding the requirements of Chapter 47 of Title 21 of the Delaware Code, for the duration of the state of emergency, any utility driver engaging in the provision or restoration of utility services and any driver making food and fuel deliveries shall be exempt from the hours of service requirements of 49 C.F.R. Part 395 in its entirety.

3. Except as set forth above, all provisions of the previously issued Executive Orders shall remain in effect. Those provisions include, but are not limited to, the following:

a. The Delaware Department of Transportation and the Delaware State Police, in consultation with the Delaware Emergency Management Agency and the Secretary of Safety and Homeland Security, may order such bridge and road closures as necessary to protect the health and safety of the public. This authority is in addition to the above Restriction.

b. State and local officials may remove abandoned vehicles from roads in the State of Delaware at the expense of the vehicle owner.

APPROVED this 28th day of October, 2012 at 10:15 p.m.

Jack Markell

Governor

Driving Restrictions

Issued by the Governor
from recommendations
from DEMA, DSP and
DeIDOT.

Personnel

- Availability of Employees
 - Essential
 - Report When Contacted (RWC)
 - Volunteers
 - 2nd Role
- Safety
- Family Evacuation Plans

After the Storm

- Damage Assessments
 - Assess Roadway Conditions and Begin Addressing Issues
 - Bridge Inspections
 - Debris Removal
- TMC E-Mail Updates
 - Road/Bridge Closure Status
 - Maintenance Districts Staffing and Activities
- Continued DeIDOT Internal Conference Calls

Hurricane Sandy After Action Meeting





Thank You

Gene Donaldson
302-659-4601
gene.donaldson@state.de.us

