



WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN



FINAL
October 2025



WMPO Kimley»Horn



Table of Contents

Executive Summary.....	i
Project Overview.....	1
Introduction.....	1
Regional Boundary.....	2
Core Team and Stakeholder Representation.....	3
Vision, Guiding Principles, and Goals.....	4
Existing Plan Review.....	4
Core Themes	4
Wilmington Regional ITS Strategic Deployment Plan Vision	5
Vision Statement.....	5
Guiding Principles.....	5
Goals	5
Existing Conditions	6
Capability Maturity Model	6
Active Demand Management	9
Traffic Management Centers.....	11
Parking Management.....	12
Emergency Response & Resiliency	13
Traffic Incident Management	14
Project Development.....	15
Project Process	15
Core Team and Stakeholder Engagement.....	15
Best Practices	16
Project Identification	17
Project Sheets.....	18
Implementation and Funding Guidance	37
ITS Project Process	38



EXECUTIVE SUMMARY

The Wilmington Regional Intelligent Transportation Systems (ITS) Strategic Deployment Plan (SDP) focuses on assembling a multiagency strategy for investing in transportation technologies. The region has shown impactful investments in technology; however, the previous strategic deployment plan for the region was completed in 2001. The purpose of this plan is to serve as a roadmap for implementing and investing in ITS technologies and strategies based on the existing infrastructure, current conditions, and needs of the region.

The development of the SDP was guided by a multiagency Core Team through several stages that are outlined in the following sections.

- **Vision, Guiding Principles, and Goals:** leveraged existing planning documents to derive a regional direction for transportation projects that include technology.
- **Existing Conditions:** applied the Capability Maturity Model (CMM) framework to summarize existing conditions and needs in the region.
- **Project Development:** description of the process followed, assessment applied, and the derivation of projects that are presented in the plan.
- **Implementation and Funding Guidance:** identified guidance for how stakeholder agencies can leverage the contents of the plan and important considerations related to ITS project process.

The area comprising the Wilmington Urban Area Metropolitan Planning Organization (WMPO) is known for its vibrant coastal cities and beach towns, lively riverfront walkways and venues, historic downtown, active transportation, and thriving port. The study area was defined by the WMPO boundary, which is a federally designated transportation planning area. This approach maintains alignment with regional plans and funding priorities. Additional focus was given to regionally significant corridors including I-40, US 74, and US 17.

When evaluating the region, the project team completed a comprehensive review and considered all features of transportation. To collect existing information and assess current conditions, there were one-on-one meetings with Core Team members to discuss day-to-day operations, active agreements, funding challenges and opportunities, pinch points in the network or communications, and any data usages.

This plan also highlights recent technology investments such as the Port of Wilmington's North Gate grant implementation, City of

Vision Statement

Integrate Transportation Systems Management and Operations (TSMO) strategies that provide a safe and efficient regional transportation system, move people and goods, and promote health and a sense of place.

Guiding Principles



Integrate strategies with positive impacts on public health and improve quality of life for all transportation users, including pedestrians, cyclists, drivers, and public transit passengers.



Implement accessible and equitable strategies for communities when addressing regional goals.

Goals



Align with Vision Zero initiatives by leveraging TSMO strategies to create a **safe and fair** transportation system for all users.



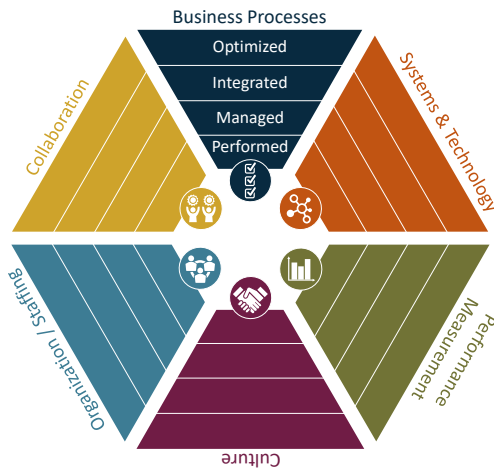
Promote the use of technologies that support **mobility and reliable** transportation while improving resiliency and long-term environmental viability.



Invest in TSMO strategies that promote **multimodal** transportation throughout the region and preserve a sense of place.



Foster **economic success** in the region through investing in TSMO strategies and providing access to resources for all communities.



Wilmington's emergency vehicle preemption, and recent funding for broadband communications on I-40 and US 74.

Using the existing conditions, the Capability Maturity Model (CMM) Assessment guides agencies through a self-evaluation regarding key processes and capabilities related to their effectiveness. The CMM can look beyond systems and technology projects to focus on defining strategies that support the maturation of agencies and Stakeholders in delivering improved operations to the transportation network.

Based on the summary of the capability maturity model, the project team worked with the Core Team and Stakeholders to develop strategies as potential solutions to the challenges limiting the technology growth in the region. The project team assembled industry research on successful strategy implementations across the country. This context supported project refinement and priority designations. The team defined projects in a manner that could support the Stakeholders' abilities to carry them forward into implementation. The project process is summarized below.



The Strategic Deployment Plan provides project recommendations that allow agility in implementation based on when funding may be available. The priority of each project is based on level of readiness, regional interest, and level of effort to implement. Quick wins are noted for projects that have existing momentum that can be easily advanced with a focus on coordination or smaller funding commitments.

The project team utilized all collected information throughout the project process to create project sheets that provide a more detailed look at the benefits, challenges, and resources required for implementation. The sheets also include performance measures project owners can use to evaluate the impacts of each project over time. The following projects and their priorities were identified.

Active Demand Management

- Real-Time Navigation
- Freight Mobility and Truck Parking
- Signal System Upgrade
- Driver Education and Engagement Program
- Safety Technologies for Vulnerable Road Users

Traffic Management Centers

- Resiliency Improvement Plan

Parking Management

- Parking Space Management
- Regional Parking Management Plan
- Park and Ride to Key Destinations

Emergency Response and Resiliency

- Flood Impact Management System
- Wide Area Alert System
- Centralized Emergency Management Plans

Traffic Incident Management

- Emergency Vehicle Preemption
- IMAP Expansion
- IMAP Vehicle Technology

Quick Win ✓ Medium Priority !!
High Priority !!! Low Priority !





PROJECT OVERVIEW

Located in southeastern North Carolina, the area comprising the Wilmington Urban Area Metropolitan Planning Organization (WMPO) is known for its vibrant coastal cities and beach towns, lively riverfront walkways and venues, historic downtown, active transportation, and thriving port. As growth in the area continues, the region aims to leverage advanced technologies and innovations to better manage its transportation network and systems.

INTRODUCTION

The Wilmington Regional Intelligent Transportation Systems (ITS) Strategic Deployment Plan (SDP) focuses on assembling a multiagency strategy for investing in transportation technologies. The region has shown impactful investments in technology; however, the previous strategic deployment plan for the region was completed in 2001. The purpose of this plan is to serve as a roadmap for implementing and investing in ITS technologies and strategies based on the existing infrastructure, current conditions, and needs of the region. The recommendations made within this document support opportunities for funding technology-focused projects and provide guidance for preliminary scoping content for strategies aligned with regional goals.

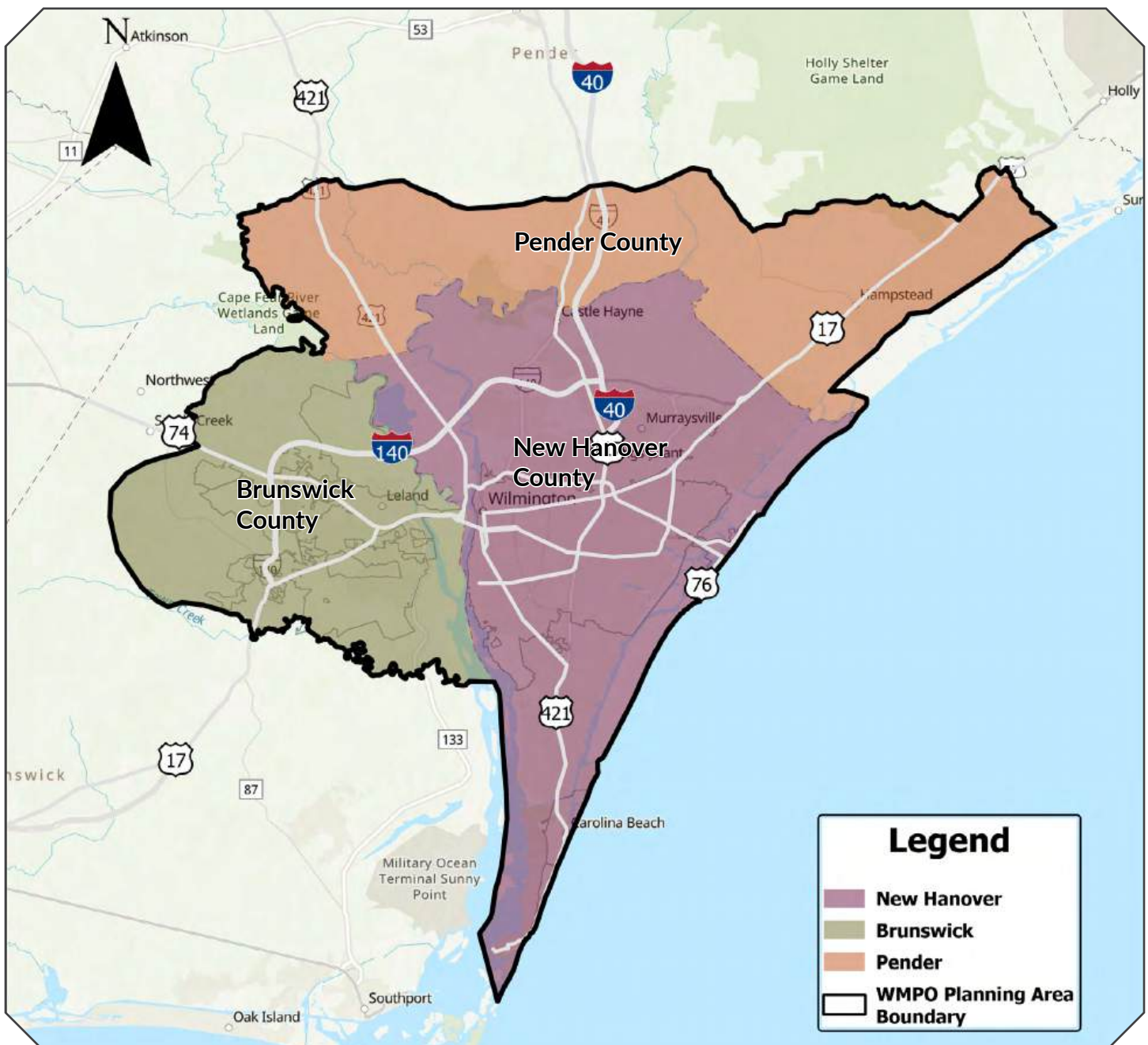
The project management team led the development of the plan with representation from the WMPO and NCDOT.

Project Timeline



REGIONAL BOUNDARY

For the purpose of this project, the WMPO boundary was used to define the study area. The WMPO region was selected as it is a federally designated transportation planning area and would allow for consistency with the existing regional plans and funding priorities. The boundary supports the inclusion of key Stakeholders, including local governments, NCDOT, transit providers, and can leverage existing data used for regional transportation plans and analysis. While this plan focuses on the WMPO region, it is important to note regionally significant corridors that extend beyond the boundary such as US 17, US 74, US 421, and I-40. These routes are critical for connecting to adjacent counties and play key roles for freight, evacuations, and inter-regional travel. Acknowledging these connections strengthens the development of the regional plan and promotes a more integrated and efficient transportation network.



CORE TEAM AND STAKEHOLDER REPRESENTATION

CORE TEAM MEMBERS

The project team coordinated with a broad range of participants throughout the development of the project for feedback and regional alignment. Individuals were identified to participate as either a Core Team member or a Stakeholder. Core Team members included technical representatives from each of the agencies involved and were responsible for participating in more detailed discussions, workshop prep, and comment resolutions.

Regional ITS Strategic Deployment Plan Core Team Members

Agency	Name	Title
Port of Wilmington	Stephanie Ayers	North Carolina State Ports Authority
Pender County	Tommy Batson	Pender County Emergency Management Director
WMPO	Carolyn Caggia	Associate Transportation Planner/Go Coast Coordinator
NCDOT	Dominic Ciaramitaro	State Traffic Systems Operations Engineer
NCDOT	Adrienne Cox	Division 3 Planning Engineer
City of Wilmington	Chance Dunbar	Director of Downtown Coordination and Parking
NCDOT	Allen Hancock	Assistant Traffic Engineer
NCDOT	Tracey Helms	Eastern Regional Incident Management Engineer (IME)
NCDOT	Natasha Henderson	Senior Traffic Operations Engineer
NCDOT	Michelle Howes	Division 3 Corridor Development Engineer
NCDOT	Ross Kimbro	Deputy Division Traffic Engineer
WMPO	Beth King	Assoc. Transportation Planner
WMPO	Mike Kozlosky	Executive Director
WMPO	Abby Lorenzo	Deputy Director
NCDOT	Stoney Mathis	Division Traffic Engineer
Brunswick County	David McIntire	Brunswick Emergency Management Director
New Hanover County	Anna McRay	Deputy Coordinator of Emergency Management
NCDOT TPD	Nazia Sarder	NCDOT WMPO Coordinator
NCDOT	Jeff Scott	Eastern Regional ITS Engineer
NCDOT	Andrew Skuce	ITS Development & Design Project Engineer
New Hanover County	Steven Still	New Hanover Emergency Management Director
WMPO	Greer Templer	Senior Transportation Planner
City of Wilmington	Denys Vielkanowitz	City of Wilmington Traffic Engineer
NCDOT	Courtney Weeter	State Traffic Operations Engineer
NCDOT	Shannon Whaley	Eastern Regional TIM Coordinator

PARTICIPATING STAKEHOLDERS

In addition to the Core Team, the project team also provided multiple opportunities for other stakeholders to engage in the planning process. Stakeholders included a comprehensive representation from each of the agencies within the WMPO boundary. Stakeholders provided input at key milestones of the strategic deployment plan development. A detailed list of stakeholder invitees is included in Appendix A.

VISION, GUIDING PRINCIPLES, AND GOALS

The Core Team examined the vision, guiding principles, and goals of 22 existing planning documents to identify common themes. By creating a matrix of the documents' goals, six core themes were identified. Using these themes, the project team developed the following vision statement, guiding principles, and goals.

CORE THEMES



EXISTING PLAN REVIEW

The six core themes take elements from each of the 22 plans referenced. A full list of the plans can be found below. A table illustrating how each of the Core Themes relates to each plan can be found in the Appendix B.

- Create Wilmington Comprehensive Plan (2016)
- Transit Needs Study for the Wilmington Multimodal Transportation Center (2009)
- Wilmington/New Hanover County Comprehensive Greenway Plan (2013)
- Cape Fear Moving Forward: 2045 Metropolitan Transportation Plan (2020)
- Cape Fear Change in Motion: Short Range TDM Plan (2020)
- Wave Locally Coordinated Public Transportation Plan (2021)
- Reimagine: WAVE Short Range Transit Plan (2024)
- Walk Wilmington Pedestrian Plan (2023)
- Comprehensive Parks, Recreation + Open Space Master Plan (2022)
- Wilmington Harbor Navigation Improvement Project (2023)
- Plan NHC Comprehensive Plan (2016)
- Pender 2.0 Comprehensive Land Use Plan (2018)
- Cape Fear Transportation 2040: Metropolitan Transportation Plan (2015)
- Cape Fear Regional Bike Plan (2017)
- Brunswick County Comprehensive Transportation Plan (2024)
- Brunswick County Comprehensive Land Use Plan (2023)
- Leland 2045: Comprehensive Land Use Plan (2021)
- Carolina Beach 2020 Land Use Plan (2020)
- Carolina Beach Master Development Plan (2008)
- Wrightsville Beach CAMA Land Use Plan Update (2019)
- Kure Beach 2022 Comprehensive Land Use Plan (2022)
- Belville Vision 2030 Plan (2021)

WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN VISION

VISION STATEMENT

Integrate Transportation Systems Management and Operations (TSMO) strategies that provide a safe and efficient regional transportation system, move people and goods, and promote health and a sense of place.

GUIDING PRINCIPLES



Integrate strategies with positive impacts on public health and improve quality of life for all transportation users, including pedestrians, cyclists, drivers, and public transit passengers.



Implement accessible and equitable strategies for communities when addressing regional goals.

GOALS



Align with Vision Zero initiatives by leveraging TSMO strategies to create a **safe and fair** transportation system for all users.



Promote the use of technologies that support **mobility and reliable** transportation while improving resiliency and long-term environmental viability.



Invest in TSMO strategies that promote **multimodal** transportation throughout the region and preserve a sense of place.



Foster **economic success** in the region through investing in TSMO strategies and providing access to resources for all communities.



EXISTING CONDITIONS

A regional assessment of existing conditions, needs, and challenges includes stakeholder coordination to understand agency level investments, direction, and pain points. When evaluating the region, the project team completed a comprehensive review, and considered all modes of transportation. To collect existing information and assess current conditions, there were one-on-one meetings with Core Team members to discuss day-to-day operations, active agreements, funding challenges and opportunities, pinch points in the network or communications, and any data usages.

Examples of the notable efforts towards implementing innovative solutions and infrastructures from these discussions are below.

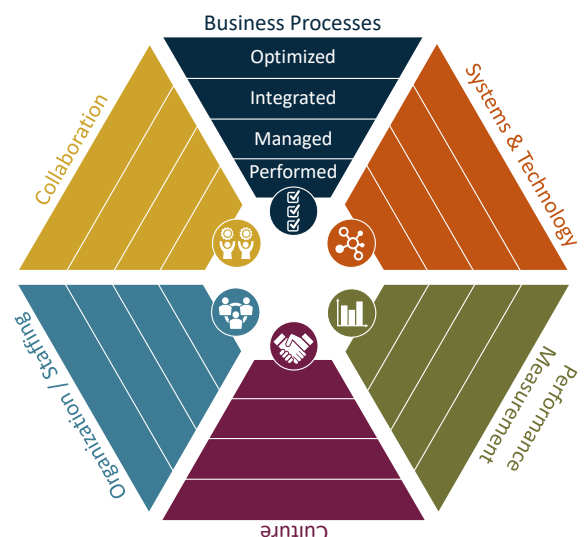
Recent Investments in Transportation Technology

- ✓ The Port of Wilmington was awarded grant funding to relocate the North Gate. This relocation will expand truck access and support improvements to the port's capacity and mobility.
- ✓ The City of Wilmington is actively advancing emergency vehicle preemption. Phase 1, which focused exclusively on fire services to ensure rapid response, is complete.
- ✓ NCDOT is leveraging grant funding for broadband expansion on I-40 and US 74 into Wilmington.
- ✓ Updated routes by Wave Transit with input from WMPO are providing more consistent and convenient transit times across the region.
- ✓ NCDOT is committing resource to support more consistent Incident Management Assistance Patrol (IMAP) coverage within the region.
- ✓ UNCW campus garages are equipped with technology for monitoring and sharing parking capacity.
- ✓ Wilmington Beltline project is currently improving at-grade rail crossings.

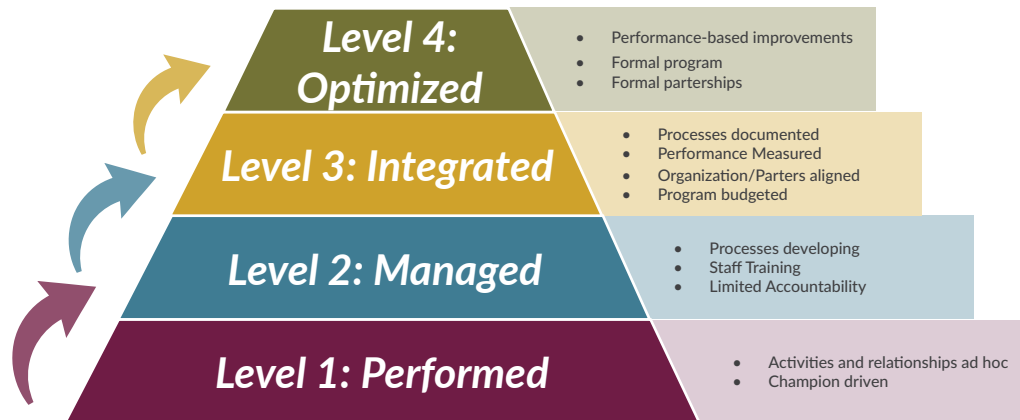
The project team summarized the information collected during the one-on-one meetings to establish a baseline of how the region is performing operationally and determine the maturity of the processes and technologies currently in place. The capability maturity model, discussed in the following section, could then be used to determine the regional gaps and begin identifying potential solutions.

CAPABILITY MATURITY MODEL

The Capability Maturity Model (CMM) Assessment guides agencies through a self-evaluation regarding key processes and capabilities related to their effectiveness. The CMM can look beyond systems and technology projects to focus on defining strategies that support the maturation of agencies and Stakeholders in delivering improved operations to the transportation network. **The six CMM dimensions include:**



Implementing the CMM Involves assessing each of these six dimensions over four levels of maturity that range from performed or ad hoc procedures (Level 1) to fully optimizing TSMO processes (Level 4). The graphic below shows details of those four levels. As part of the gap assessment, the region provided input on existing conditions and needs that were used to apply within the CMM framework. The CMM maturity levels include:



CMM Assessment Focus Areas

- Active Demand Management
- Traffic Management Centers
- Parking Management
- Emergency Response & Resiliency
- Traffic Incident Management

The following sections present a high-level summary of the maturity for **five distinct focus areas** for the region. The information includes a description of the focus area, a highlight of the existing conditions and gaps, and a graphical representation of the maturity for each dimension.

It is important to note that two of the focus areas vary from the typical structure of six dimensions: the Traffic Incident Management (TIM) has been structured around only four dimensions, whereas Active Demand Management (ADM) includes nine dimensions. Appendix C includes the detailed matrices for each of the focus areas that were assessed for the region. These capture a summary of existing conditions ("What is placing us in our current tier?") and a summary of the identified gaps ("What is keeping us from advancing to the next level?").

The following map highlights some of the key locations, critical infrastructure, and pinch points for traffic in the region. These geographic locations were referenced as part of the gap assessment and project development.



Needs Map

The following map summarizes some of primary points of interest and the critical needs identified for the region.



MAP LEGEND

EVACUATION ROUTES

- I-40 Corridor
- US 74 Corridor
- US 17 Corridor

ICONS & SYMBOLS

- Private Terminals
- Colleges & Universities
- NCDOT Ferry Terminals
- Beaches
- US Military
- Hospitals
- Regional Pinch Points

ACTIVE DEMAND MANAGEMENT

Active Demand Management uses information and technology to dynamically manage demand, which could include redistributing travel to less congested times of day or routes or reducing overall vehicle trips by influencing a mode choice. Active Demand Management includes both a multimodal subsection and a port and freight subsection. The following section explains the existing opportunities and identified gaps of the current system.

Multimodal

Existing Opportunities

- Regional multimodal services, include UNCW's bike share system, Wave Transit's RideMICRO on-demand service, Go Coast Travel Demand Management (TDM) for educating vulnerable road users
- Go Coast Program has formalized a program that focuses on traveler choices

Identified Gaps

- Integrated multimodal travel and passenger rail service
- E-bike and scooter support
- Enforcement of multimodal regulations
- Procurement for micromobility programs and operational staff
- Funding for bike paths and transit improvements
- RideMICRO is not instant
- Multimodal parking infrastructure

- 1 Supportive Policies and Flexibility in Existing Programs
- 2 Inter- and Intra- Agency Communication and Collaboration Capabilities
- 3 Regional Data Sharing
- 4 Focus on Traveler Choices
- 5 Dynamic Management of Facilities/Corridors
- 6 Integration with Regional Goals, Plans, and Operational Functions
- 7 Marketing of Travel Services
- 8 Consideration of Multimodal Options
- 9 Considerations of Access and Equity



Port and Freight

Existing Opportunities

- The N4 system collects pre-registered truck data to shorten wait times at the port, allowing commercial vehicle drivers to stay in their vehicles at the south gate
- The port maintains continuous internal operations

Identified Gaps

- Recent grant funding is implementing new technologies for port ingress and access management
- Real time parking availability and navigation data for freight
- Real time at-grade rail crossing status
- Truck parking enforcement
- Predictive route data for freight navigation



Cape Fear
Memorial Bridge



TRAFFIC MANAGEMENT CENTERS

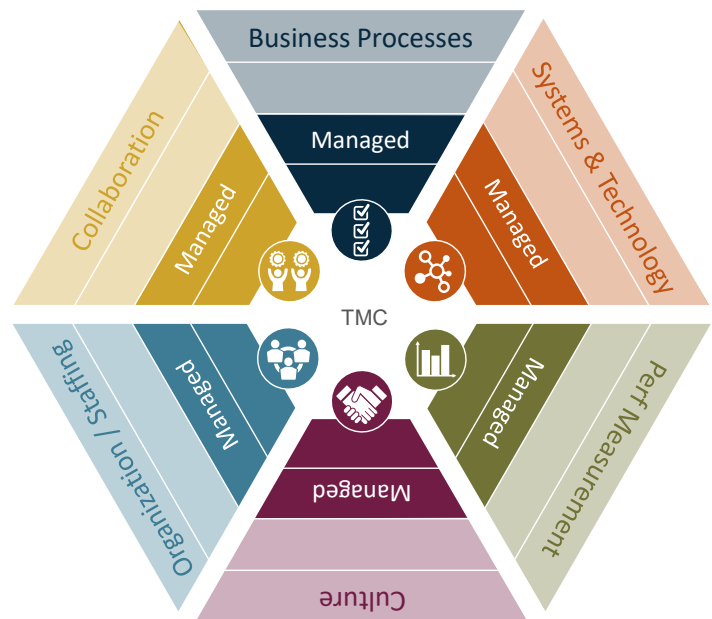
Traffic Management Centers (TMCs) have two key operational functions: real-time active monitoring and coordination and traffic management strategy implementation. These functions are accomplished by staff and systems. TMCs provide a safer transportation system for users by being both responsive to incidents and innovative in technologies to accomplish that goal.

Existing Opportunities

- Recent investments in broadband along major highways
- Strategically placed dynamic message signs (DMS)
- Access to state and city traffic management data
- A new Eastern Region TMC provides the ability to better manage traffic across the eastern region

Identified Gaps

- Gaps in fiber optic communications east of I-40
- DMS at key decision points
- Procurement options for freeway infrastructure



Eastern Regional Transportation Management Center



PARKING MANAGEMENT

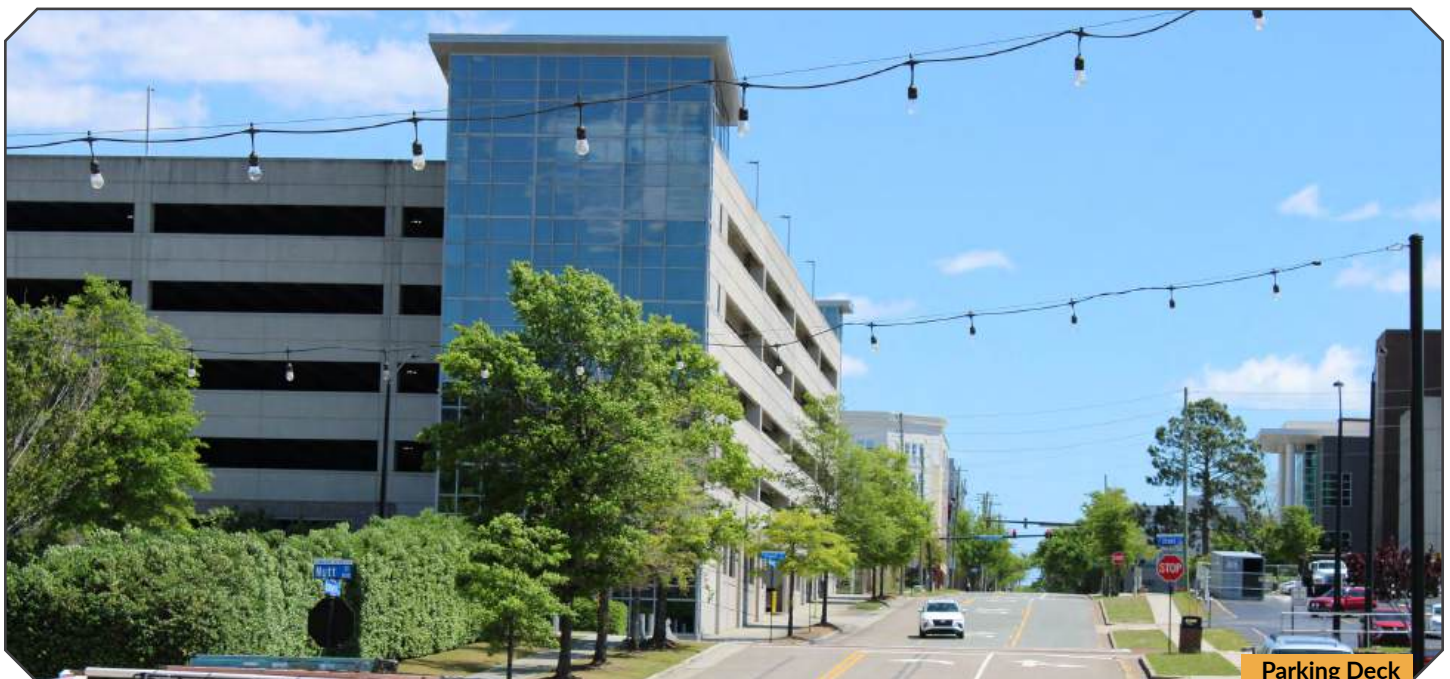
Parking Management addresses the management of parking operations for space and regional management between equipped parking facilities and traffic and transit management systems. Parking management can include monitoring and managing parking capacity in lots, garages, and other parking facilities.

Existing Opportunities

- Brunswick County's Comprehensive Transportation Plan outlines future locations and investments for park-and-ride facility cameras
- Currently, Park and Ride spaces are designated in Leland, but there is no existing service to connect those spaces with New Hanover County

Identified Gaps

- Regional park-and-ride options
- Parking capacity data at beach destinations
- Parking and curb management for commercial loading zones, downtown taxi spots, residential-focused parking management
- On-street parking capacity data
- Centralized database of parking availability
- Event parking management coordination with venues and events
- Pre-purchasing parking options prior to events

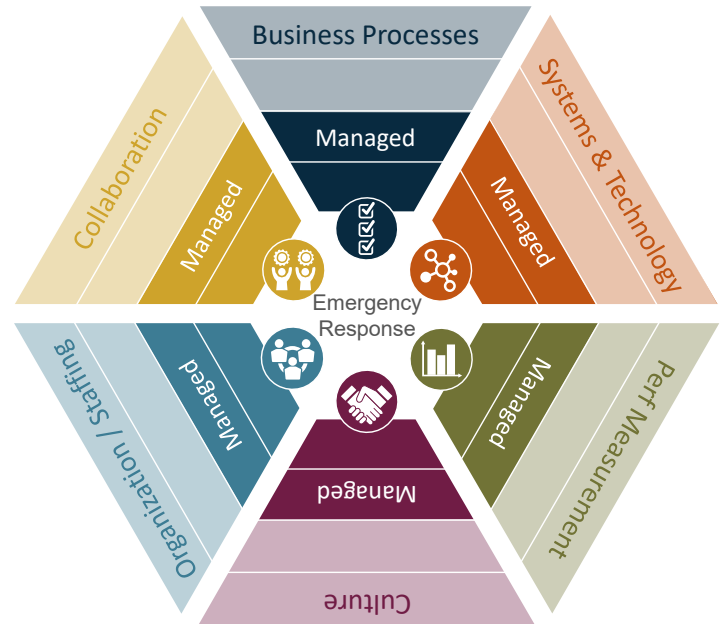


Parking Deck
in Wilmington



EMERGENCY RESPONSE & RESILIENCY

Emergency Response and Resiliency includes the region's preparedness for impacts from significant weather or unplanned events. This includes activities that should occur prior to, during, and after the event. Agencies typically involved are transportation agencies, emergency management, state police, local law enforcement, and others that can provide real-time data related to impacts or resources during different phases of the event. This initiative establishes effective communication for storm identification and response within the region, with coordinated evacuation plans such as the "Know Your Zone" maps and adaptable strategies in place. Hydrology tools and flood models help manage water surges and pinpoint flood-prone areas. Additionally, proactive measures, including "what-if" planning and real-time monitoring systems, enhance the region's preparedness for emergency situations.



Existing Opportunities

- Brunswick County requires an emergency preparedness zone
- Regional support for funding an update the "Know Your Zone" maps
- With coordinated evacuation plans such as the "Know Your Zone" maps and adaptable strategies in place, hydrology tools and flood models help manage water surges and pinpoint flood-prone areas

Identified Gaps

- Regional mobility challenges during evacuations
- Limitations on infrastructure capacity
- Access to response plan documents during events
- Gaps in flood gauge locations, mapping capabilities, and infrastructure for flood-prone areas



Kure Beach Flooding
(Source: WECT News 6)



TRAFFIC INCIDENT MANAGEMENT

Traffic Incident Management (TIM) is the intersection of many different TSMO strategies to safely and efficiently respond to and manage incidents on roadways. TIM can be implemented at any setting or location and involves high levels of collaboration between agencies. A maximized TIM program includes rapid detection and verification of an incident's location and severity, quick response to the scene, safe management at the scene, and quick clearance of the incident to reopen travel lanes.

Existing Opportunities

- TIM and the new Eastern TMC will enhance traffic incident management and reporting
- County-level team meetings allow agencies, NCDOT, and the WMPO to collaborate on regional TIM strategies
- NCDOT's Incident Management manual provides documented scenarios and contacts
- The region focuses on incident management with the City of Wilmington's Phase 1 emergency vehicle preemption for fire services and the deployment of some IMAP routes

Identified Gaps

- IMAP route coverage
- Aging IMAP vehicle fleet
- Network congestion and pinch points, like bridges, hinder EMS and fire mobility



IMAP Patrol Vehicle

PROJECT DEVELOPMENT

The development phase of the project was tactically structured to involve engagement from both Core Team members and Stakeholders. Through this phase, the project team collaborated closely with these groups to address the needs identified in the gap analysis. This strengthens the project's foundations and facilitated the identification of crucial elements that will drive the next steps toward scoping and implementation.

PROJECT PROCESS

Based on the summary of the capability maturity model, the project team worked with the Core Team and Stakeholders to develop strategies as potential solutions to the challenges limiting the technology growth in the region. The project team began researching industry successes where similar strategies were implemented and could be used to filter into project recommendations. The project team defined projects that were technically defined in a manner that would allow Stakeholders to carry them forward into implementation. The project process is summarized below.



CORE TEAM AND STAKEHOLDER ENGAGEMENT

Core Team

The project team collaborated with agency representatives through five Core Team meetings over the course of the project. This included discussing the project's progress, gathering feedback, and leveraging local knowledge specific to the project development. Core Team meetings included a combination of technical presentations and work sessions with the attendees to garner comprehensive input into the projects. The following list provides insight into each meeting and the topics discussed. Core Team Meeting Minutes and presentation materials are included in Appendix D.

- **Core Team Meeting #1** - Vision and Goals Review, TSMO & CMM Education, Existing Conditions
- **Core Team Meeting #2** - CMM Matrices and Gap Assessment
- **Core Team Meeting #3** - Draft Projects and Best Practice Review
- **Core Team Meeting #4** - Draft Strategic Deployment Plan, RAD-IT Database, Project Sheets
- **Core Team Meeting #5** - Comment Resolution on Draft Strategic Deployment Plan

Stakeholder Engagement

In addition to Core Team involvement, there were two Stakeholder workshops. The structure of these workshops facilitated participation and engagement through conversations focused on collecting local input. During Workshop #1, Stakeholders discussed topics including freeway management, arterial management, ports & freight, incident management, parking and tourism, multimodal facilities, and emergency management. Stakeholders had the opportunity to share their local insights for each of these topics and provide feedback on the presented materials. For Workshop #2, the project team created boards based on the list of projects that were derived with input from the Core Team. These boards covered all of the topics listed previously and focused on the details of the projects and collecting feedback that could be integrated into the refined project descriptions.

The physical gaps and needs for the region were summarized in a Needs Map at the beginning of the project sheets. Elements of this map were referenced within the relative project sheets and connected to the proposed technologies and strategies. The meeting materials and feedback from Stakeholder Workshop #1 are included in Appendix E. Stakeholder Workshop #2 project boards and meeting materials are provided in Appendix F.



BEST PRACTICES

The project team researched and assembled a series of best practices to represent existing deployments that reflect the strategies defined for the region. The Core Team refined the strategy list before the collection of best practices. This process allowed the project team to focus on high-priority strategies that the Core Team deemed important for the region and that would receive regional support for implementation. The best practices included assessments of proven methodologies, technologies, plans, interactive websites, and processes from successful plans within coastal regions facing similar challenges to Wilmington. These best practices provided a resilient framework for performance measures, feasibility, funding, and implementation considerations. Appendix G includes the high-priority best practices chosen for the region. The project team presented the best practices in the following high-level strategy categories during Core Team Meeting #3.

PROJECT IDENTIFICATION

The Core Team held Meeting #3 virtually using Microsoft Teams and sent out a Microsoft Forms survey with the meeting minutes soon after to capture feedback from the group. Attendees from the Core Team Meeting provided weighted input into the project priority to help narrow down the most important and feasible projects for the region. Additionally, Stakeholder Workshop #1 took place in Wilmington, North Carolina, and the project team distributed a written survey to capture additional feedback. The Stakeholders ranked each draft project from No Priority/Not Beneficial to High Priority/Most Beneficial. Each Stakeholder was also given the chance to write down any challenges/obstacles for the draft projects to help identify the feasibility for each project. The comprehensive input provided insight to help align projects with a focus on mitigating risks, optimizing resources, and enhancing project outcomes. Integrating the best practice review into the project development process supported a data-driven and informed approach to developing effective recommendations within the project definitions.

The Stakeholder conversation supported the development of clear and consistent challenges in the region. The project development fell into the following focus areas.

Improvements and expansion to **traffic incident management** strategies

Improvements to **freight movement**, primarily in the vicinity of the port, including ingress around gates

Improvements to **parking management** and **park and ride** strategies

Focus on safety for **vulnerable road users** through driver education and safety focused solutions

The following list summarizes the projects resulting from the deployment plan process. The projects are presented in more detail on individual project sheets including benefits, challenges, and proposed technology to accomplish the project. Additionally, the projects are ranked according to ease of implementation and regional priority - Quick Win, High, Medium, and Low. Quick Wins were tagged as opportunities where the region can leverage existing investments to expand proven technologies or projects currently in process.

Active Demand Management

- Real-Time Navigation
- Freight Mobility and Truck Parking
- Signal System Upgrade
- Driver Education and Engagement Program
- Safety Technologies for Vulnerable Road Users



Traffic Management Centers

- Resiliency Improvement Plan



Parking Management

- Parking Space Management
- Regional Parking Management Plan
- Park and Ride to Key Destinations



Emergency Response and Resiliency

- Flood Impact Management System
- Wide Area Alert System
- Centralized Emergency Management Plans



Traffic Incident Management

- Emergency Vehicle Preemption
- IMAP Expansion
- IMAP Vehicle Technology



Quick Win ✓ Medium Priority !!
High Priority !!! Low Priority !



Real Time Navigation

Traveler information and real time navigation based on planned and unplanned impacts to the transportation network.

GOALS ADDRESSED



**SAFE &
FAIR**



**MOBILITY &
RELIABILITY**



**INVEST IN TSMO
& MULTI-MODAL**



**ECONOMIC
SUCCESS**



BENEFITS

- + Reduce congestion
- + Enhance mobility
- + Improve travel time reliability
- + Improve road safety
- + Lowers emissions



CHALLENGES

- Choke points on key routes with limited alternate routes
- Queuing from at-grade rail crossings
- Major interstates and routes terminate in Wilmington
- Gaps in DMS coverage



Dynamic Message Sign (DMS) on I-40 Eastbound



Queuing During the Cape Fear Memorial Bridge Rehabilitation Project

PROPOSED TECHNOLOGY

- Pre-determined detour and alternate routes
- Dynamic Message Signs at key decision points
- Agency coordination to improve information sharing
- Integration with navigation companies

PERFORMANCE MEASURES

- Travel time
- Travel time reliability
- Congestion
- Reduce secondary crashes



INDUSTRY SUCCESSES:

Hampton Roads 2045 Long Range Transportation Plan

- "Reach the Beach" initiative provides users information on the fastest routes to the Virginia Beach Oceanfront

MnDOT Arterial Traffic Management Concept of Operations

- Defines tools to manage the traffic on MnDOT arterial roadways, who will use the tool, what the tools are, and how to use them

MnDOT Bridge Scour Plan of Action

- Plan of Action (POA) documents customizable for any bridge closures





Freight Mobility and Truck Parking

Freight navigation technology provides both pre-trip and en route travel planning, routing, and commercial vehicle related traveler information. The information can be provided directly to fleet managers, to mobile devices used by commercial vehicle operators, or directly to in vehicle systems. Truck parking strategies focus on optimizing commercial vehicle parking by connecting drivers to available parking capacity. This includes systems to monitor and share information about truck parking capacity and destinations. This strategy involves the use of advanced technologies, such as automated parking solutions, to ensure safe and accessible parking options for freight vehicles.

GOALS ADDRESSED



**SAFE &
FAIR**



**MOBILITY &
RELIABILITY**



**INVEST IN TSMO
& MULTI-MODAL**



**ECONOMIC
SUCCESS**

+ BENEFITS

- + Reduce congestion
- + Enhance mobility
- + Reduce excessive truck parking
- + Cost savings (from increased efficiency)
- + Improve driver safety
- + Lower emissions
- + Improve security

- CHALLENGES

- Parking availability data
- Centralized database for parking information
- Central platform to support data integration

PROPOSED TECHNOLOGY

- Real time traffic conditions on freight routes
- Commercial motor vehicle (CMV) focused navigation (i.e., DriveWyze)
- Real time wayfinding signage
- Regional Truck Parking Plan ingress/egress sensors
- Detection to monitor mparking conditions (i.e., CCTV cameras, radar, LIDAR)
- Central CMV parking database
- Parking reservation system



DriveWyze app in CMV



Freight Signal Priority

POTENTIAL FUNDING OPPORTUNITIES

- FMCSA High Priority Grants
- USDOT SMART Grants Program
- Infrastructure for Building America (INFRA) Program
- Surface Transportation Block Grant Program (STBG)
- Carbon Reduction Program

PERFORMANCE MEASURES

- Cost-benefit analysis
- Reduction in idle time
- On-time delivery rate
- Parking utilization
- Travel time reliability
- Congestion levels
- Driver satisfaction





Signal System Upgrade

A centralized signal system upgrade would modernize communications infrastructure, central equipment, and field equipment for the existing signal system. New signal system infrastructure would improve the overall resiliency and reliability of traffic signal operations for the region. The communications upgrades would improve data sharing, including video, with other agencies. It would better align the City with NCDOT standards and promote better coordination for evacuations and other strategies such as integrated corridor management (ICM). Lastly, upgrading to an Ethernet based communications backbone will better support the integration of future technologies.

GOALS ADDRESSED



**SAFE &
FAIR**



**MOBILITY &
RELIABILITY**



**INVEST IN TSMO
& MULTI-MODAL**



**ECONOMIC
SUCCESS**

+ BENEFITS

- + Improve mobility
- + Reduce congestion
- + Remote monitoring from external agencies
- + Improve safety
- + System resiliency and reliability

- CHALLENGES

- Mobility during evacuations
- Aging signal system and local controller software
- Older serial communication technology
- Camera access by external partners
- Older detection technology



NCDOT Traffic Signal Controller

PROPOSED TECHNOLOGY

- Current NCDOT standard hardware and software

POTENTIAL FUNDING OPPORTUNITIES

- **Grants**
 - USDOT Highway Safety Improvement Program (HSIP)
 - USDOT Surface Transportation Block Grant Program for traffic signal updates
 - USDOT Safe Streets for All (SS4A) Program
- **Budget Allocations**
 - Signal System upgrade is programmed in the adopted MPO/ State TIP (U-6199) for ROW in 2028 and CON in 2030

PERFORMANCE MEASURES

- Travel time
- Delay
- Signal progression
- Split failures
- Maintenance response times
- Equipment uptime





Driver Education and Engagement Program

Comprehensive educational programs and interactive engagement strategies focused on improving overall traffic safety and promoting responsible driving behavior.

GOALS ADDRESSED



**SAFE &
FAIR**



**MOBILITY &
RELIABILITY**



**INVEST IN TSMO
& MULTI-MODAL**



**ECONOMIC
SUCCESS**



BENEFITS

- + Improve road safety
- + Increase public engagement
- + Lower emissions



CHALLENGES

- Public education around VRU laws
- Drivers distractions

PROPOSED TECHNOLOGY

- E-Learning Platforms and App
- VR technology
- Public education campaigns (DMS, social media, other platforms)

POTENTIAL FUNDING OPPORTUNITIES

- NCSU Vision Zero Technical and Program Support Grant

PERFORMANCE MEASURES

- Before/After surveys on knowledge retention
- Crash rates
- Traffic violations
- Program participation and completion rates
- Citizen satisfaction survey for VRU's



The Keep Georgia Safe Program provides free education resources like interactive games, lesson plans, posters, and videos for K-12 students to learn road safety in a fun and engaging way.



Georgia DOT Driver Education Tool





Safety Technologies for Vulnerable Road Users

The WMPO has published 15 bicyclist and pedestrian focused documents to their websites with project and location specific recommendations. Considering the areas in these studies leverages ready-made priorities and can assist in streamlining smart intersection technology locations and corridors. Using new technologies helps improve detection of vulnerable road users and gather data for future safety improvements. Including these initiatives in the SDP ensures technology investments align with community priorities.

WILMINGTON WALK STUDY RECOMMENDATIONS PAGE EXAMPLE



Advanced Pedestrian Detection:

Detection of pedestrians can be used to inform signal timing. For example, the detection of a pedestrian in a crosswalk can trigger an extension of the walk time improving the safety for the pedestrian.



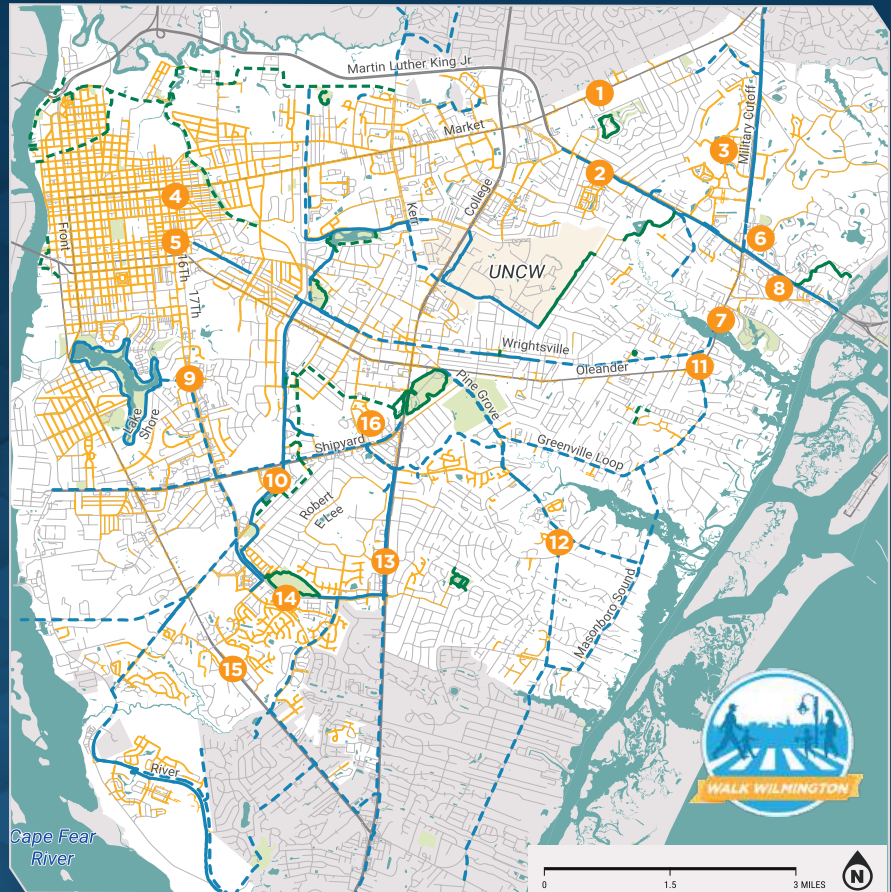
Bicycle Detection:

Detection of bicycles can be used to inform signal timing. This can improve the safety of bicyclists approaching or leaving a transit stop.



Bicycles, E-Bikes, and Scooters:

Popularity of bike and scooter ride programs have increased in recent years. The GO COAST Cape Fear Change in Motion 2020 document identifies a bike share program as a potential way to shift users from vehicles to alternative modes and reduce vehicle miles traveled.



MAP LEGEND

RECOMMENDATIONS



Additional Priority Projects



Recommended Greenways
(from 2013 Comprehensive Greenway Plan)



Recommended Sidepaths
(from 2013 Comprehensive Greenway Plan)

EXISTING CONDITIONS



Existing Sidewalks



Existing Sidepaths



Existing Parks and Greenways



UNC Wilmington



Wilmington

Resiliency Improvement Plan

A Regional Resiliency Improvement Plan will support the WMPO region to address risks and vulnerability from a variety of challenges. It focuses on regional resilience in response to growing traffic demands, extreme weather impacts, and aging infrastructure. The plan would address evacuation plans in response to both natural and man-made disasters and improve technology integration on regionally significant corridors: US 17, US 74, US 421, and I-40. By infilling gaps along the network with surveillance and communication infrastructure the Eastern Region TMC can better serve as a coordination hub to disseminate information, manage traffic, and support emergency officials during incidents or evacuations.

GOALS ADDRESSED



**SAFE &
FAIR**



**MOBILITY &
RELIABILITY**



**INVEST IN TSMO
& MULTI-MODAL**



**ECONOMIC
SUCCESS**

+ BENEFITS

- + Improve emergency response coordination
- + Enhance public safety
- + Reduce evacuation time
- + Improve traveler information

- CHALLENGES

- Gaps in infrastructure
- Real-time information of traffic conditions
- Infrastructure and communications resiliency

PROPOSED TECHNOLOGY

- DMS for real-time traveler information
- CCTV cameras for situational awareness on critical corridors
- Fiber optic communications
- Interactive map of zones for public awareness
- GIS for locating gaps in the maps
- Public education campaigns (DMS, social media, other platforms)



Citizen Mobile App

POTENTIAL FUNDING OPPORTUNITIES

- TSMO Program Budget
- State Transportation Innovation Council (STIC) Funding
- FEMA Emergency Management Performance Grant
- PROTECT Grant
- WMPO Direct Attributable Funding (STBG-DA)

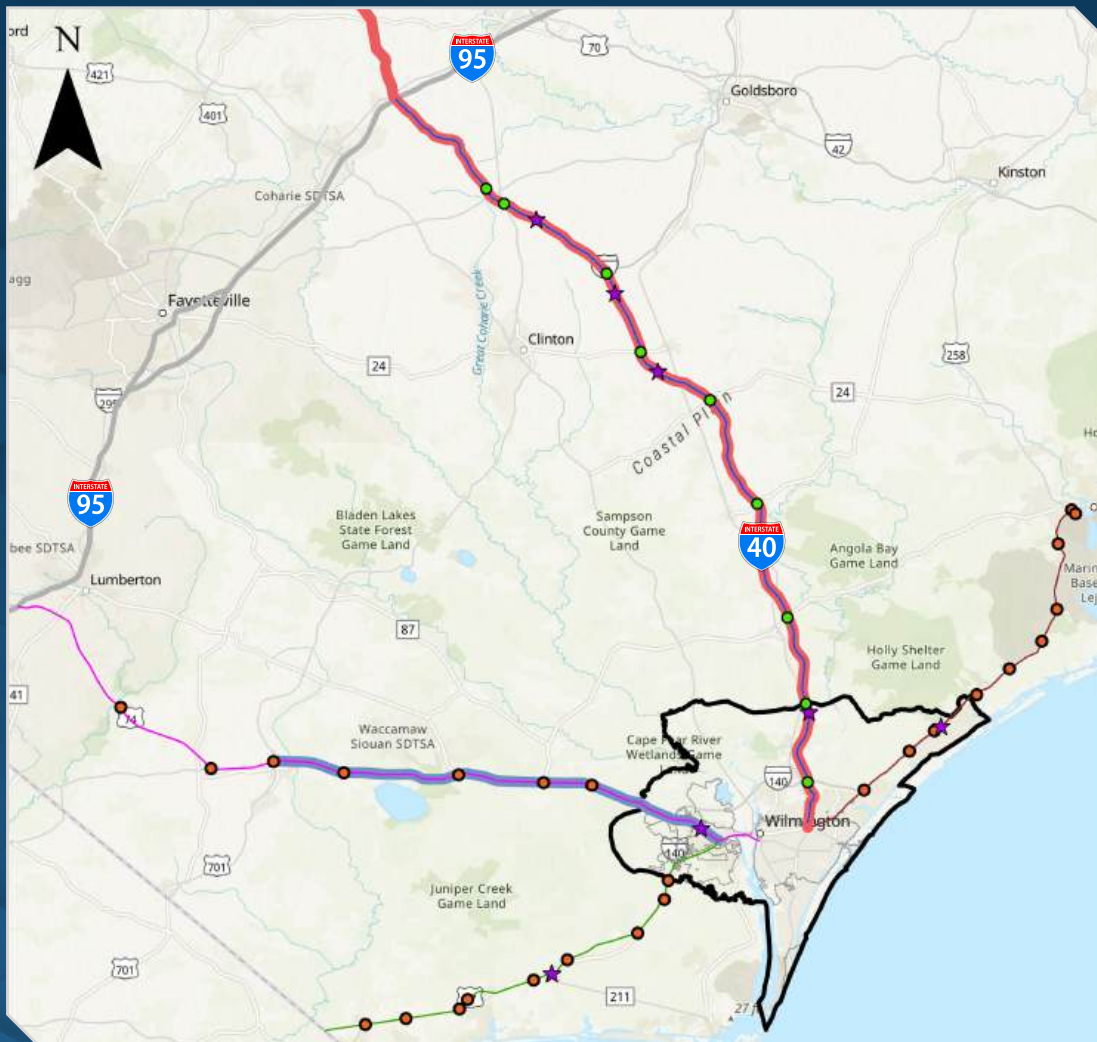
PERFORMANCE MEASURES

- Evacuation times
- Incident clearance time
- Traveler information coverage
- Roadway clearance time

Resiliency Improvement Plan (Continued)

Regionally Significant Corridors

The primary corridors serving the region (US 17, US 74, and I-40) were evaluated for device infill and strategic planning of infrastructure where traveler information gaps were identified. Through a series of one-on-one meetings with Core Team members feedback was shared on key locations along these routes that would improve safety, mobility, and traveler information.



MAP LEGEND

KEY MOBILITY CORRIDORS

- I-40 (Wilmington to I-95)
- US 17 (Wilmington to Jacksonville)
- US 17 (Wilmington to SC State Line)
- US 74 (Wilmington to I-95)

EVACUATION ROUTES

- I-40 Corridor
- US 74 Corridor

PROPOSED INFRASTRUCTURE

- Proposed Camera
- Proposed DMS
- Funded Camera



Parking Space Management

This technology monitors and manages parking spaces in lots, garages, and other parking areas and facilities. It assists in the management of parking operations by monitoring parking lot ingress and egress, parking space occupancy and availability. Infrastructure-based detectors and/or connected vehicles may be used to monitor parking occupancy. Technology shares parking information with local drivers and information providers for broader distribution.

GOALS ADDRESSED



**SAFE &
FAIR**



**MOBILITY &
RELIABILITY**



**INVEST IN TSMO
& MULTI-MODAL**



**ECONOMIC
SUCCESS**



BENEFITS

- + Reduce congestion
- + Improve adherence to legal parking
- + Improve customer satisfaction when attending events
- + Improve ingress efficiency prior to an event



CHALLENGES

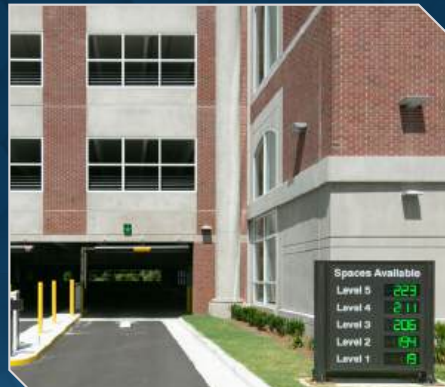
- Maintaining parking capacity data in real time
- Parking during special events
- Event and venue coordination

PROPOSED TECHNOLOGY

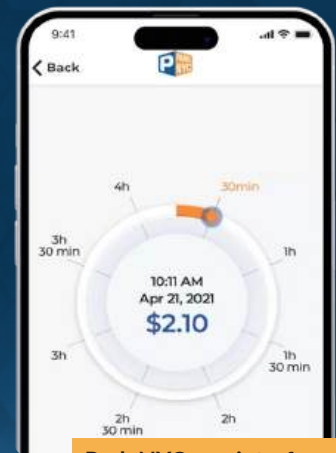
- Ticket vending machines
- Payment readers
- Cloud database: Park NYC app
- Dynamic Wayfinding



Regional collaboration can support a more seamless experience with coordinated pricing strategies and real-time parking availability. Dynamic trailblazers currently are used by some agencies including Cape Fear Community College, UNC Wilmington, and the City of Wilmington. These regional success cases can be leveraged in areas like the Town of Wrightsville Beach where parking demand is a challenge.



Dynamic Parking Messaging at UNCW



Park NYC app interface

POTENTIAL FUNDING OPPORTUNITIES

- USDOT SMART Grants Program
- USDOT Advanced Transportation Technologies and Innovative Mobility Deployment Grant

PERFORMANCE MEASURES

- User satisfaction
- Parking utilization
- Enforcement / parking violations
- Parking capacity accuracy
- Travel time to destination
- Usage rates during events, peak periods





Regional Parking Management Plan

This plan establishes protocols for the efficient selection, allocation, monitoring, and maintenance of parking spaces, ensuring optimal use of facilities and enhancing overall parking availability and convenience. Additionally, it evaluates location feasibility and provides regional parking solutions.

GOALS ADDRESSED



**SAFE &
FAIR**



**MOBILITY &
RELIABILITY**



**INVEST IN TSMO
& MULTI-MODAL**



**ECONOMIC
SUCCESS**

+ BENEFITS

- + Planning for future parking needs
- + More efficient use of parking infrastructure
- + Reduce congestion
- + Reduce Travel time to destination
- + Improve user satisfaction

- CHALLENGES

- Parking and curb management
- Commercial loading zone management
- Taxi loading zone management
- Maintaining parking capacity data in real time
- Performance based decisions regarding parking needs

PROPOSED TECHNOLOGY

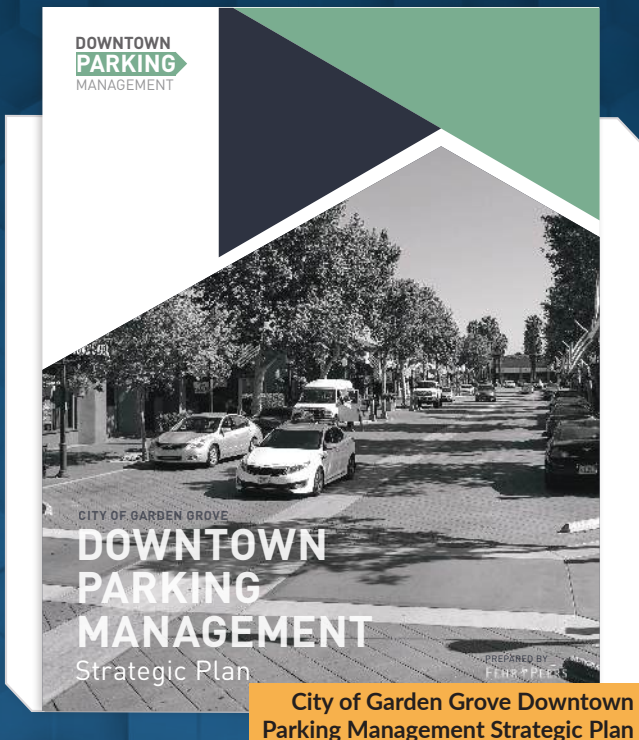
- Centralized databases
 - Flowbird
 - ParkMobile
- Navigation/Wayfinding signs to available parking
- License Plate Readers

POTENTIAL FUNDING OPPORTUNITIES

- USDOT SMART Grants Program

PERFORMANCE MEASURES

- Capacity to demand
- Rate of expansion toward goal
- User satisfaction



Plan Content:

- Existing Conditions
- Land Use Assessment
- Demand Analysis
- Parking Policies and Regulation Review
- Management Strategies
- Infrastructure Recommendations
- Implementation Plan

Key Partnerships:

- Local Municipalities
- Third-party Parking Vendors
- Property Owners and Developers
- Entertainment Venues



Park and Ride for Key Destinations

Park and ride services integrate with shuttles to move people to key destinations with limited parking infrastructure. For the Wilmington region, this strategy could support connecting users to transit facilities, public beach access points, and special event locations. Coordination and support for each local jurisdiction is important to the success for defining and implementing each park and ride route. This includes defining the parking locations, drop-off destinations, routes, trip frequencies, and hours of operation.

GOALS ADDRESSED



**SAFE &
FAIR**



**MOBILITY &
RELIABILITY**



**INVEST IN TSMO
& MULTI-MODAL**



**ECONOMIC
SUCCESS**



BENEFITS

- Reduce congestion
- Optimize limited parking capacity
- Improve user satisfaction



CHALLENGES

- Parking capacity at key destinations
- Transportation options for key destinations

PROPOSED TECHNOLOGY

- Real time data (e.g., parking capacity, shuttle capacity, real time arrival)
- Third party cloud based solutions (e.g., Flowbird, ParkMobile)

POTENTIAL FUNDING OPPORTUNITIES

- USDOT SMART Grants Program

PERFORMANCE MEASURES

- User satisfaction
- Parking and shuttle utilization
- Capacity accuracy
- Travel time to destination



LOCATION CONSIDERATIONS:

- Interest from local jurisdiction
- Capacity & Infrastructure
- Accessibility
- Transit Connections
- Safety & Security
- User Amenities
- Proximity to Key Destinations/Special Events



Park and ride shuttle



Flowbird and Parkmobile app icons



Park and Ride for Key Destinations (Continued)

Park and Ride Map

Fort Myers Beach offers a park and ride network for seasonal and local guest to the beaches and other destinations of interest. The infographic below provides users with key information on where individuals can access the park and ride network, service areas and drop-offs, adjoining routes, suggested apps and where to download. Users can plan their trips using the fare information page that provides service times and trolley fees.



Flood Impact Management System

Integrated system that uses comprehensive sensor coverage, data analysis, and information sharing to mitigate flooding impacts to the transportation network.

GOALS ADDRESSED



SAFE & FAIR



MOBILITY & RELIABILITY



INVEST IN TSMO & MULTI-MODAL



ECONOMIC SUCCESS

+ BENEFITS

- + Improve road safety
- + Real time data on localized impacts
- + Reduce crashes

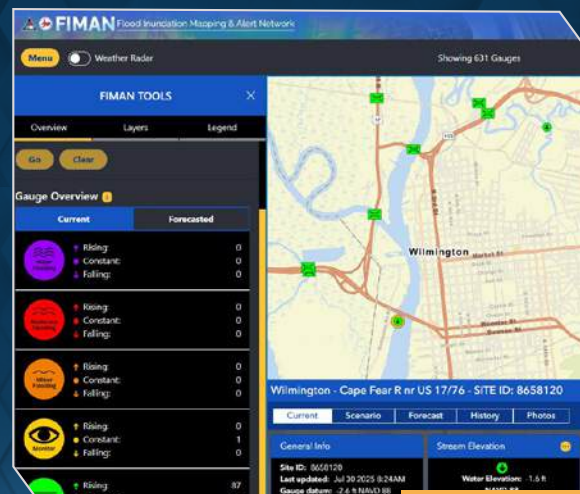
- CHALLENGES

- Comprehensive coverage with gauges
- Mitigating flood prone areas
- Communicating pending threats

PROPOSED TECHNOLOGY

- Flood gauges at critical locations
- GIS mapping of flood-prone areas
- Predictive data analysis for risk locations
- Drones for situational awareness
- Integration with traveler information and wide area alerts
- Flood warning systems
- Local infrastructure to alert motorists

The Flood Inundation Mapping and Alert Network (FIMAN) tool is successfully used by NCDOT Hydraulics team in response to major flooding events.



FIMAN System

POTENTIAL FUNDING OPPORTUNITIES

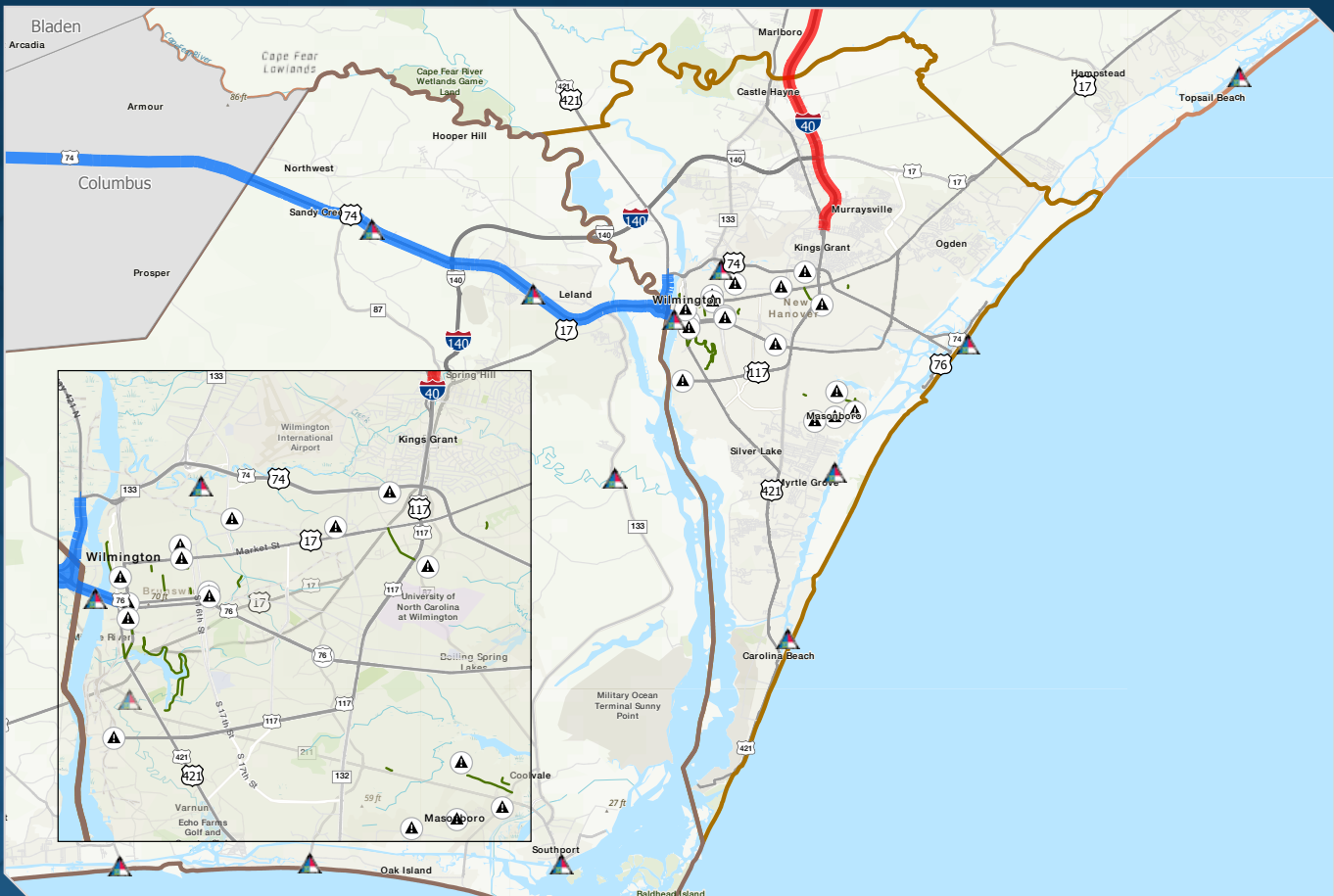
- Community Infrastructure Fund USDOT
- FEMA Flood Mitigation Assistance Grant Program
- Duke Energy Foundation Grant

PERFORMANCE MEASURES

- Flood related crashes
- Infrastructure damage
- Reduced congestion in affected areas

Flood Impact Management System (Continued)

Flood Prone Areas



MAP LEGEND

EVACUATION ROUTES

- I-40 Corridor
- US 74 Corridor
- Flood Prone Segments

- Flood Prone Locations
- FIMAN Gauge Locations

MPO COUNTIES

- New Hanover
- Brunswick
- Pender
- Adjacent County Boundaries

Wide Area Alert System

Wireless emergency alerts (WEA) deliver emergency notifications directly to mobile devices within a specific geographic area.

GOALS ADDRESSED



**SAFE &
FAIR**



**MOBILITY &
RELIABILITY**



**INVEST IN TSMO
& MULTI-MODAL**



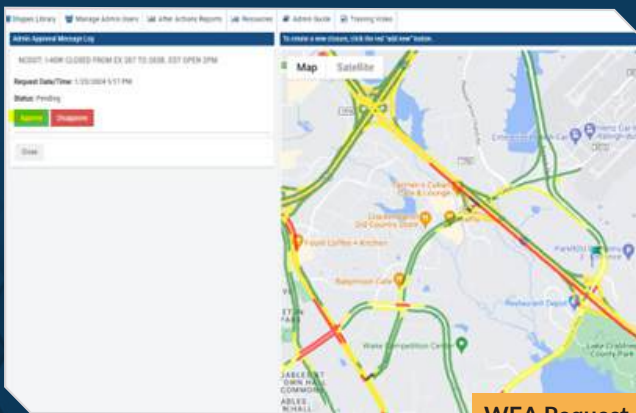
**ECONOMIC
SUCCESS**

+ BENEFITS

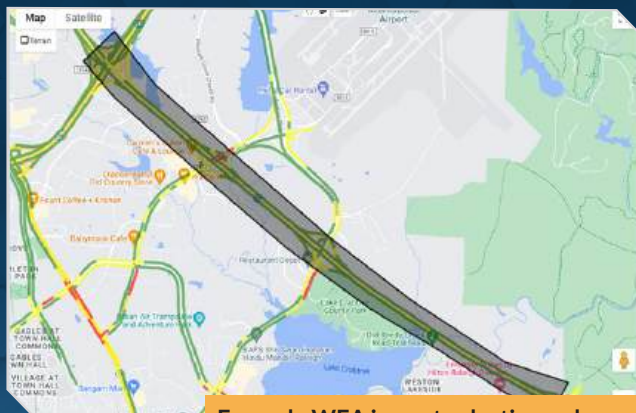
- + Real-time notification that requires no app or subscription
- + Notifies only those in an impacted area
- + Improves public safety during time sensitive threats
- + Resilient to network congestion

- CHALLENGES

- Communicating localized threats



WEA Request



Example WEA impact selection polygon

PROPOSED TECHNOLOGY

- NCDOT WEA

PERFORMANCE MEASURES

- Geographic accuracy
- Alert dissemination time

SPECIAL CASES USES

- Port emergencies or threats
- Infrastructure failures or road closures
- Hazardous waste or chemical spills
- Public safety threats
- Natural disaster warnings, advisories, and evacuations



NCDOT has developed the processes for requesting and sending WEA to be leveraged at the port.



Centralized Emergency Management Plans

Centralized location where all emergency response plans are managed. NCDOT, Emergency Management, municipalities, and other agencies can access their roles, responsibilities, and activation protocols for when emergencies occur.

GOALS ADDRESSED



**SAFE &
FAIR**



**MOBILITY &
RELIABILITY**



**INVEST IN TSMO
& MULTI-MODAL**



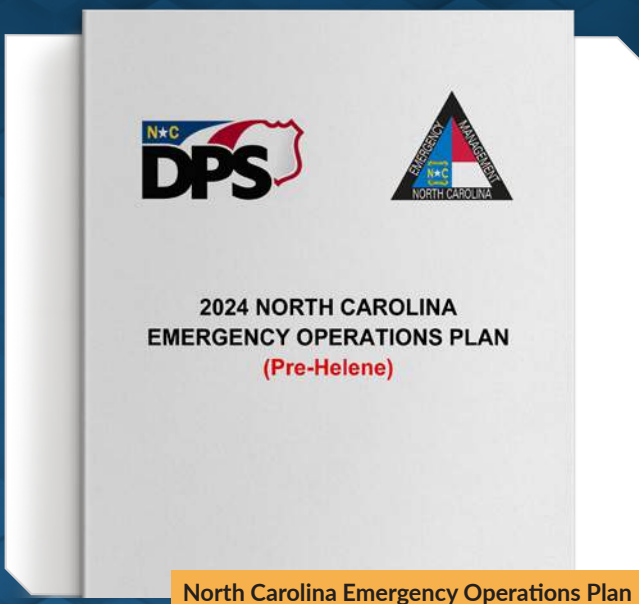
**ECONOMIC
SUCCESS**

+ BENEFITS

- + Improves interagency coordination
- + Improves public safety
- + Improve mobility
- + Organize and optimize response

- CHALLENGES

- Limited mobility during evacuations
- Large number of agencies involved



North Carolina Emergency Operations Plan

PROPOSED TECHNOLOGY

- Secure central repository
- Online credential controlled access to plans
- Digitized response plans for easier distribution and reference

POTENTIAL FUNDING OPPORTUNITIES

- FEMA Emergency Management Performance Grant

PERFORMANCE MEASURES

- Evacuation time
- Traffic congestion/crashes
- Public transportation usage
- Benefit-Cost Analysis (BCA)
- Feedback from EMS, organizations, and the public



In 2024, the North Carolina Department of Public Safety published the North Carolina Emergency Operations Plan.



POTENTIAL OWNERS:

- Eastern TMC
- Police/Fire/EMS Services
- Division 3
- WMPO



Emergency Vehicle Preemption

Adjust signal timing to clear traffic in the direction of emergency vehicle travel, as they approach the intersection. EVP provides faster response time and safer travel for all motorists.

GOALS ADDRESSED



SAFE &
FAIR



MOBILITY &
RELIABILITY



INVEST IN TSMO
& MULTI-MODAL



ECONOMIC
SUCCESS



BENEFITS

- + Improve response time for EMS and Fire Services
- + Reduce crash risk at intersections



CHALLENGES

- Large capital investment
- Funding

PROPOSED TECHNOLOGY

- Installation of EVP devices in EMS vehicles
- Installation of EVP devices in traffic signals

POTENTIAL FUNDING OPPORTUNITIES

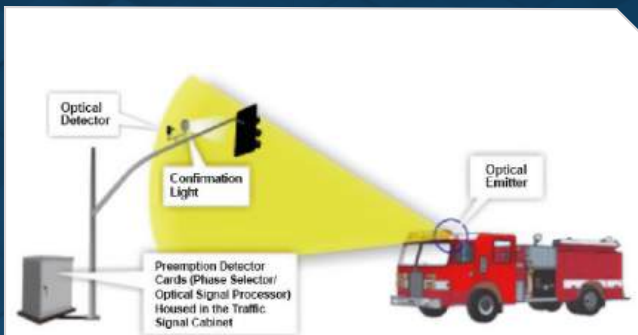
- USDOT Safe Streets for All (SS4A) Planning and Demonstration Activities Grant
- USDOT SMART Grant Program
- Surface Transportation Block Grant (STBG)

PERFORMANCE MEASURES

- Response time
- Number of emergency vehicle related crashes



While EVP Phase 1, which focused exclusively on fire services, has been completed, EVP Phase 2 has been awarded and will add 50 more intersections and 50 more vehicles with EVP capabilities including ambulances.



Fire EVP





IMAP Expansion

Incident Management Assistance Patrol (IMAP) deploys emergency traffic control in response to crashes or other incidents, provides roadside assistance to motorists, and supports during emergency response and recovery. Expansion is planned to provide more consistent patrol and staffing across the region.

GOALS ADDRESSED



**SAFE &
FAIR**



**MOBILITY &
RELIABILITY**



**INVEST IN TSMO
& MULTI-MODAL**



**ECONOMIC
SUCCESS**



BENEFITS

- + Reduce congestion
- + Reduce roadway clearance time after an incident
- + Lower emissions
- + Support emergency operations during major weather events



CHALLENGES

- Staff recruitment and retention
- Aging IMAP vehicles

PROPOSED TECHNOLOGY

- Fleet upgrades
- Additional Staff
- IMAP Technology White Paper (Appendix H)

POTENTIAL FUNDING OPPORTUNITIES

- TSMO Program Budget

PERFORMANCE MEASURES

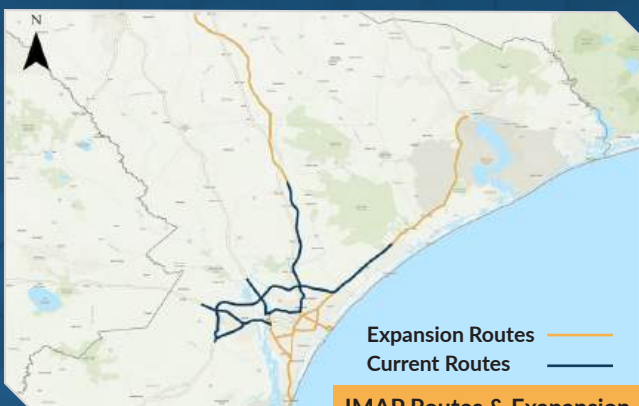
- Average travel time
- CO2 Emissions
- Response time
- Roadway clearance time
- Incident clearance time



NCDOT has committed to secure dedicated funding and a prioritized expansion plan for adding additional coverage.



Fleet Upgrades



IMAP Routes & Expansion



IMAP Vehicle Technology

Technologies focused on vehicle tracking, dispatching, emergency traffic control, queue management, and incident clearance. NCDOT is focused on upgrading this technology based on proven technologies that add value to IMAP program.

GOALS ADDRESSED



**SAFE &
FAIR**



**MOBILITY &
RELIABILITY**



**INVEST IN TSMO
& MULTI-MODAL**



**ECONOMIC
SUCCESS**

+ BENEFITS

- + Improve driver safety
- + Enhance situational awareness
- + Streamline reporting process, data collection, and trend analysis
- + Reduce incident and roadway clearance times

- CHALLENGES

- Procurement process for technology



Technology supporting IMAP's primary focus areas

PROPOSED TECHNOLOGY

- In-Vehicle Tablets
- Dash cameras
- CCTV cameras for queue monitoring
- Smart lighting
- Synchronized lighting
- Tethered drones
- Technology for electric vehicles
- Support for autonomous vehicles

POTENTIAL FUNDING OPPORTUNITIES

- TSMO Program Budget
- State Transportation Innovation Council (STIC) Funding

PERFORMANCE MEASURES

- Average stop duration
- Response time
- Roadway clearance time
- Incident clearance time



Pi-lit smart sequential road flares use a radio-linked network to automatically sequence the flash so approaching drivers see a sequentially-lit string of flares to guide traffic around incidents.



Pi-lit Smart Sequential Road Flares

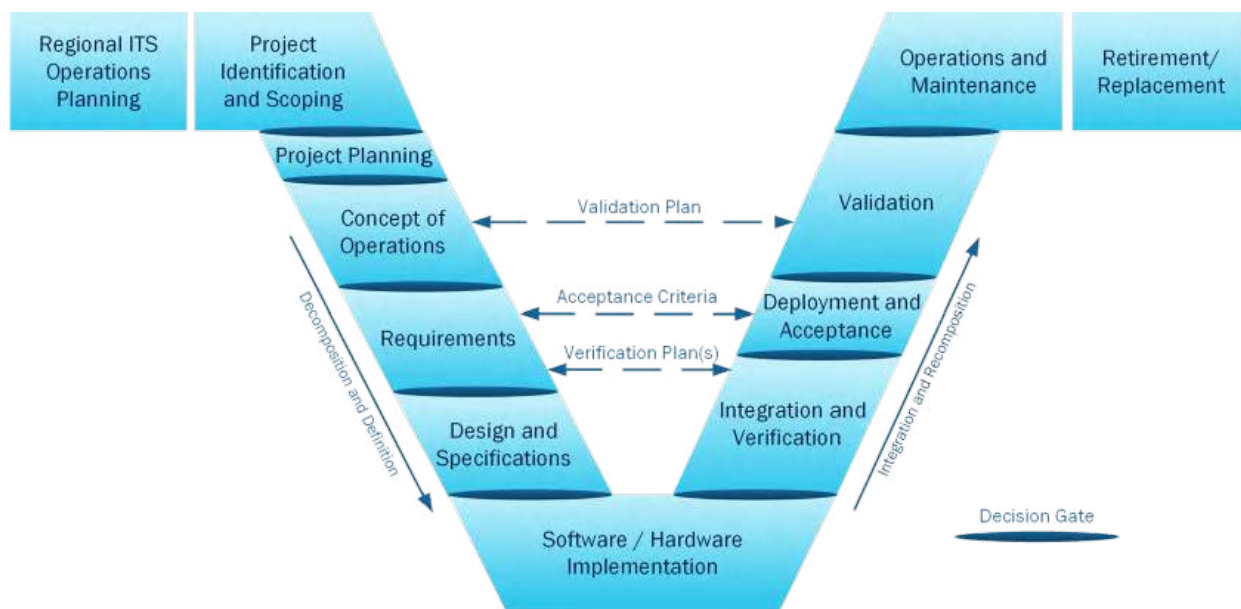
IMPLEMENTATION AND FUNDING GUIDANCE

The Wilmington Regional ITS SDP outlines guidance for the deployment and integration of technology-based transportation systems within the region. Users of this plan include local municipalities, county agencies, metropolitan planning organizations, the Port of Wilmington, and NCDOT representatives. This section is intended to provide Stakeholders with relevant guidance on navigating ITS deployments, securing necessary funding, and implementing intelligent transportation infrastructure.

The AASHTO Transportation Operations Manual (the TOM) is an extensive resource that Stakeholders can reference for guidance on all phases of implementing technology solutions. It includes education on developing, deploying, and sustaining TSMO strategies.

ITS projects using federal funding are required to follow the Systems Engineering (SE) process. If no federal funds are involved, agencies are still encouraged to follow the SE process for projects that include ITS. SE methodologies are intended to ensure decisions to invest in ITS are founded in local or regional needs and that all Stakeholders are committed to the success of the project, both fiscally and organizationally. Detailed guidance and education on the full SE process can be found on the [FHWA Systems Engineering web site](#).

Systems Engineering Process



Source: FHWA



ITS PROJECT PROCESS

Stakeholders are often intimidated by implementing projects that involve technology. This can be driven by limited knowledge of the identified technology or anticipated complications with procurement methods.

Step 1 - Project Identification: Identify projects that align with regional priorities, funding availability, and agency readiness.

- Identify potential partners and collaboration opportunities.
- Confirm regional support or interest in the project.
- Determine the need for or value of partnering with other agencies.
- Determine similar regional implementations that can be integrated or leveraged as part of the project delivery.
- Empower a champion to take on the project to move from idea into concept.

Step 2 - Concept of Operations Development: Define the concept of operations of the project to confirm the solution can align with the anticipated intent. This should include:

- **Use Cases:** Define scenarios of how the project will be used once implemented.
- **Roles and Responsibilities:** Clearly document all agencies that will have a role in the success of the project, including resource allocation, staffing commitments, and funding.
- **Anticipated Costs:** Refine the cost estimate of the project for both capital expenditures and funding for operations and maintenance.
- **Return on Investment:** Conduct a benefit cost analysis of the anticipated return on investment (ROI). This will help in gaining support from leadership and decision makers. This also is often required as part of grant applications or as part of a prioritization process.

Step 3 - Funding Determination: Work with partners to determine viable funding strategies to support the implementation and the operations and maintenance phase of a project.

- **Federal Funding:** Reminder that any ITS project using federal funding must conform to the Regional ITS Architecture and follow the Systems Engineering process. Federal funding is most often achieved through TIP projects but also can be awarded through grants.

TIP Projects: When feasible, there is a benefit to integrating ITS components within a TIP project. The challenges with this approach are the length of time to actual deployment, increasing construction costs requiring agencies to tighten costs, and getting engaged early enough in the project development to get ITS included within the scope of project.

- **State Funding**

TSMO Budget: NCDOT currently manages a Statewide TSMO budget that is centrally managed and Division led. This means there is dedicated funding for the TSMO program and close coordination is maintained between the TSMO Unit and Division leadership to invest at the regional level. The majority of this funding is in support of operations and maintenance, while some portions of the budget are focused on system improvements. Each year, more of this funding is secured through federal dollars.

Spot Safety and Spot Mobility: There are other limited funds managed by NCDOT in support of Spot Safety and Spot Mobility improvements. These funds are very limited, competitive, and more challenging to leverage for ITS investments.





- **Regional Funding:** MPOs are tasked with facilitating regional collaboration, adhering to federal requirements for planning purposes, and overseeing the distribution of certain funding sources. They do not direct project implementation but can often serve as a catalyst to help secure funding, gain support, and move projects forward.

Locally Administered Projects Program: Overview of projects overseen by the MPO, including timeline and guidance on the process (<https://www.wmpo.org/stp-datap-da/>).

MPO/State Transportation Improvement Program (TIP): Overview of regional plans that feed into the Statewide TIP (<https://www.wmpo.org/mpo-state-transportation-improvement-program/>).

NCDOT Prioritization: Overview of the NCDOT Strategic Prioritization Process from the MPO perspective (<https://www.wmpo.org/ncdot-prioritization/>).

- **Local Funding:** Some local agencies may have dedicated funding to support project implementation and deployment. While these projects are not required to follow the Systems Engineering process, it is still recommended for any technology project. Local agencies are encouraged to partner with regional Stakeholders and NCDOT to identify opportunities for shared funding methods.

- **Grants**

USDOT Grants: A comprehensive website of USDOT grants is maintained and can be referenced for possible funding sources. (<https://www.transportation.gov/grants/dashboard>)

State Level Grants: NC maintains a website (<https://www.nc.gov/your-government/all-nc-state-services/grant-opportunities>) for a broad view of state level grant programs.

ATTAIN: “Advanced Transportation Technologies and Innovative Mobility Deployment (ATTAIN) provides funding to deploy, install, and operate advanced transport technologies to improve safety, mobility, efficiency, system performance, intermodal connectivity, and infrastructure return on investment.”

- Last posting: Opened November 2023 – Closed February 2024
- 2024 funding amount: \$12,000,000
- \$60,000,000 per year from 2021-2026
- Federal Share is now up to 80% of the project

Innovative Coordinated Access and Mobility Grants: “Access and Mobility Partnership Grants seek to improve access to public transportation by building partnerships among health, transportation and other service providers.”

- June 6, 2024 – FTA awarded 17 projects in 15 states a total of \$7.8 million for FY 2023, 2024, and prior years

Reconnecting Communities and Neighborhoods Grant Program: Program is “dedicated to reconnecting communities that were previously cut off from economic opportunities by transportation infrastructure. Funding supports planning grants and capital construction grants, as well as technical assistance, to restore community connectivity through the removal, retrofit, mitigation, or replacement of eligible transportation infrastructure facilities.”

- \$1B of funding for FY 2022 – 2026





Strengthening Mobility and Revolutionizing Transportation (SMART): “The SMART program was established to provide grants to eligible public sector agencies to conduct demonstration projects focused on advanced smart community technologies and systems in order to improve transportation efficiency and safety.”

- \$100M of funding for FY 2022 - 2026

Step 4 - Determination of the Most Effective Procurement Method: The cost of ITS projects can vary greatly and therefore are accessible through a variety of procurement methods. Some ITS projects do not require a full set of Plans, Specifications and Engineering Estimate (PS&E), but every project should include a clear set of requirements defining the end goal and the performance expectations of the solution.

NCHRP Project 3-77, Considerations for a Guide to Contracting ITS Projects, summarizes seven different “packages” that can be used for ITS project implementation. A detailed table with these packages to consider is provided in Appendix I.

NEXT STEPS

The Strategic Deployment Plan is structured to provide flexibility for project implementation. As Stakeholders identify opportunities, the project sheets are developed to provide sufficient context that support agencies to evolve concepts into reality. Regional Stakeholders should coordinate on a recurring basis to determine appropriate opportunities to mature projects to the next level. Some projects will move into the prioritization process whereas others could pursue dedicated grant funding





APPENDIX A - STAKEHOLDER LIST

Agency	First	Last	Title
Town of Carolina Beach	Gloria	Abbotts	Senior Planner
Town of Wrightsville	Scott	Andersen	C-Shift Captain
Port of Wilmington	Stephanie	Ayers	North Carolina State Ports Authority
Pender County	Tommy	Batson	Pender Emergency Management Director
Town of Carolina Beach	Brandon	Benegasi	Senior Plant Operator
Town of Wrightsville	Jason	Bishop	Interim Police Chief
Town of Kure Beach	Mike	Bowden	Police Chief
WMPO	Carolyn	Caggia	Associate Transportation Planner/Go Coast Coordinator
NCDOT	Dominic	Ciaramitaro	State Traffic Systems Operations Engineer
City of Wilmington	David	Cowell	City Engineer
NCDOT	Adrienne	Cox	Division 3 Planning Engineer
Town of Carolina Beach	Larry	Denning	Harbor Master
City of Wilmington	Chance	Dunbar	Director of Downtown Coordination and Parking
Town of Kure Beach	Lindsay	Emaile	Police Department, AA
New Hanover County	Jason	Fuller	Emergency Management Operations
Town of Carolina Beach	Alan	Griffin	Fire Chief
Town of Leland	John	Grimes	Emergency Management Chief
Town of Belville	Jeff	Gruenewald	Chief Maintenance Engineer
NCDOT	Allen	Hancock	Assistant Traffic Engineer
Town of Leland	Ronnie	Hayes	Fire Chief
NCDOT	Tracey	Helms	Eastern Regional Incident Management Engineer
NCDOT	Natasha	Henderson	Senior Traffic Operations Engineer
Town of Carolina Beach	Scott	Hettinger	Police Captain
Town of Navassa	Landin	Holland	Town Planner
Town of Wrightsville	Matt	Holland	A-Shift Captain
NCDOT	Michelle	Howes	Division 3 Corridor Development Engineer
Town of Leland	Jeremy	Humphries	Police Chief
Town of Leland	Shelton	James	Deputy Fire Chief - Operations
Town of Kure Beach	Ed	Kennedy	Fire Chief
NCDOT	Ross	Kimbro	Deputy Division Traffic Engineer
WMPO	Beth	King	Assoc. Transportation Planner
Town of Leland	Kevin	Knapp	Town Engineer
WMPO	Mike	Kozlosky	Executive Director
WMPO	Abby	Lorenzo	Deputy Director
Town of Wrightsville	Wendi	Marsh	Executive Assistant to Chief of Police
NCDOT	Stoney	Mathis	Division Traffic Engineer
Brunswick County	David	McIntire	Brunswick Emergency Management Director
New Hanover County	Anna	McRay	New Hanover Emergency Management
Town of Kure Beach	Jimmy	Mesimer	Director of Public Works
City of Wilmington	Thom	Morton	City of Wilmington Deputy Manager
Town of Wrightsville	Robert	Pugh	B-Shift Captain
NCDOT	Nazia	Sarder	Transportation Planning Branch
NCDOT	Jeff	Scott	Eastern Regional ITS Engineer
NCDOT	Andrew	Skuce	State TSMO Planning Engineer
Town of Leland	Josh	Spence	Deputy Police Chief
Town of Belville	Chad	Staradumsky	Planner
New Hanover County	Steven	Still	New Hanover Emergency Management Direct
WMPO	Greer	Templer	Senior Transportation Planner
Town of Navassa	Dale	Thomas	Police Chief
Town of Carolina Beach	Buddy	Thompson	Deputy Fire Chief /Fire Marshal
City of Wilmington	Denys	Vielkanowitz	City of Wilmington Traffic Engineer
Town of Carolina Beach	Vic	Ward	Police Chief
NCDOT	Courtney	Weeter	State Traffic Operations Engineer
NCDOT	Shannon	Whaley	Regional TIM Coordinator
Town of Wrightsville	Tony	Wilson	Planning & Parks Director



APPENDIX B - EXISTING PLAN REVIEW

Area/Agency	Document	Principles					
		Multi-Modal	Safety	Equity	Environmental Sustainability	Economic Sustainability	Sense of Place
City of Wilmington	Create Wilmington Comprehensive Plan		✓	✓		✓	✓
City of Wilmington	Transit Needs Study for the Wilmington Multimodal Transportation Center	✓				✓	✓
City of Wilmington/ New Hanover County	Wilmington/New Hanover County Comprehensive Greenway Plan	✓	✓				
WMPO	Cape Fear Moving Forward: 2045 Metropolitan Transportation Plan	✓	✓		✓		
WMPO	Cape Fear Change in Motion: Short Range TDM Plan	✓	✓	✓		✓	
City of Wilmington/ Wave Transit	Wave Locally Coordinated Public Transportation Plan	✓		✓			
City of Wilmington/ Wave Transit	Reimagine: WAVE Short Range Transit Plan	✓					
City of Wilmington	Walk Wilmington Pedestrian Plan	✓	✓	✓	✓	✓	
City of Wilmington	Comprehensive Parks, Recreation + Open Space Master Plan			✓			
North Carolina Ports	Wilmington Harbor Navigation Improvement Project					✓	
New Hanover County	Plan NHC Comprehensive Plan			✓			
Pender County	Pender 2.0 Comprehensive Land Use Plan				✓		✓
WMPO	Cape Fear Transportation 2040: Metropolitan Transportation Plan	✓	✓				✓
WMPO	Cape Fear Regional Bike Plan	✓	✓			✓	
Brunswick County	Brunswick County Comprehensive Transportation Plan	✓	✓		✓	✓	✓
Brunswick County	Brunswick County Comprehensive Land Use Plan					✓	✓
Town of Leland	Leland 2045: Comprehensive Land Use Plan		✓	✓	✓	✓	✓
Town of Carolina Beach	Carolina Beach 2020 Land Use Plan	✓	✓		✓		✓
Town of Carolina Beach	Carolina Beach Master Development Plan				✓	✓	
Town of Wrightsville Beach	CAMA Land Use Plan Update		✓		✓	✓	
Town of Kure Beach	2022 Comprehensive Land Use Plan	✓			✓		✓
Town of Belville	Vision 2030 Plan	✓					✓
Total Mentions		13	11	7	9	11	10



APPENDIX C - CMM MATRICES





TRAFFIC INCIDENT MANAGEMENT

Definition: **Traffic Incident Management** is the intersection of many different TSMO strategies to respond to and manage incidents on the roadways safely and efficiently. Traffic Incident Management can be implemented at any setting or location and involves high levels of collaboration between agencies. A maximized TIM program includes rapid detection and verification of an incident's location and severity, quick response to the scene, safe management at the scene, and quickly clearing the incident to reopen the lanes. Each of these tasks can take many forms and includes various activities.

	What is placing us in our current tier?	What is keeping us from advancing to the next level?
	- City of Wilmington emergency vehicle preemption is currently in Phase 1; exclusive to fire - Some IMAP routes are in place - NCDOT has an Incident Management manual with documented scenarios, contacts, and evacuations 911 is primary method of incident reporting - TIMS is a statewide platform used to report incidents - Newly opened Eastern TMC will provide more focused attention on TIM - City of Wilmington has CCTV cameras at a majority of intersections	- Comprehensive and consistent coverage of IMAP routes - Aging IMAP vehicle fleet - Need for better technology on IMAP vehicles - Vehicle location - Surveillance capabilities - Lighting - EMS and fire mobility limitations – network congestion does not allow room to pass or go through traffic and bridges create pinch points for responding to incidents - Ability to proactively identify choke points

TRAFFIC INCIDENT MANAGEMENT

	Level 1	Level 2	Level 3	Level 4
Strategic	TIM activities are ad hoc, and no formal TIM program exists. Activities are reactive only. TIM activities are only independently funded from the operational budgets of partner agencies.	A TIM program has been established by a single agency with one or two key initiatives. TIM planning is mostly ad-hoc.	There is a multidisciplinary TIM program that meets at a semi-regular interval. The leadership is clear with routine participation from key agencies. TIM is included in regional transportation plans at a high level. Some activities are annually funded.	A formalized multidisciplinary TIM program is supported by dedicated staff, and routinely meets. There is a full-time position dedicated to the TIM program. Regional planning is routine and integrated. The TIM program is well-funded.
Performance Measures	Performance measures are not typically measured. Data are present but not accessible or useful. No performance targets have been established. Status quo is generally acceptable.	Some performance measures (RCT, ICT) are routinely measured. Some data is integrated but only for a small subset of incidents. Subjective or qualitative targets for RCT and ICT are established.	Performance measures are routinely measured and reported. Data is collected for a significant proportion of incidents. Quantitative, data-driven performance targets are established.	Performance measures are routinely measured, reported, and used to improve the system or region-wide outcomes.
Tactical	There is no authority removal law or driver removal law in place. There is minimal outreach and education. There is no formalized incident response program or procedures.	An authority removal law and driver removal law is in place but may not be ideally worded or complete. A simple SSP provides motorist assistance only along some major roadways based on volumes or incident frequency. Some consideration is given to incident response procedures.	An authority removal law and driver removal law is in place but may not be well understood or enforced. A mid-level SSP is in place that provides services beyond motorist assistance. Procedures for incident response are well-documented though not universally understood or followed.	An authority removal and driver removal law is integrated and utilized on a regular basis. There is a sustained and fully functional SSP that provides motorist assistance, clearance and recovery services, and emergency traffic control assistance. Procedures for incident response are well-documented and adopted.
Support	Minimal investment is made into public safety agency coordination and incident monitoring. There is no preplanned alternate routing or support for signal timing adjustments. Detour planning happens on-scene and is based on responder knowledge of the area.	There is some video sharing with the public but no or minimal NCDOT access to CAD software and systems. There is some pre-planning for alternate routes.	Video sharing is available between agencies, but not all agencies are aware. CAD information is viewed by the TMC on a dedicated system or monitor. A standard policy is in place for alternate routing and signal timing but might not be widely distributed or viewed.	TIM related data/video is routinely shared among all responding agencies. CAD data is electronically transmitted to TMC/TOC and can populate data fields in TMC/TOC software. Alternate route and signal timing policies are widely known, and comprehensive guides are followed.



EMERGENCY RESPONSE & RESILIENCY

Definition: **Emergency Response and Resiliency** includes the region's preparedness for impacts from significant weather or unplanned events. This includes activities that should occur prior to, during, and after the event. Agencies typically involved are transportation agencies, emergency management, state police, local law enforcement, and others that can provide real time data related to impacts or resources during different phases of the event.

	What is placing us in our current tier?	What is keeping us from advancing to the next level?
	• Open communication when a named storm is identified • Emergency response plan partnered with NCDOT is in place • Basic "Know your zone maps" system is in place • Master plan was devised including 12 contingencies within each plan • City of Wilmington has evacuation timings built into their system and can include different parts of the network as conditions change • NCDOT hydrology can process data from flood gauges • NCDOT models potential surges in water depths • Flood prone locations pinpointed (can impact evacuations) • Access to flood gauge data • BridgeWatch system in place that notifies STOC when water is at the bottom of a bridge • Counties have taken a lot of proactive measures by conducting "what-if" planning	• Mobility challenges during evacuations ◦ Infrastructure only allows 10% of population to be evacuated at once ◦ Evacuation plans lack detail • Region not leveraging emergency response technology for uses outside of emergencies • Improve coordination and collaboration ◦ Lack of consistent access to current documentation for required communications during event (person of contact, chain of communication) ◦ No formal recurring meeting between key stakeholders • Brunswick County needs an emergency preparedness zone (EPZ) – nuclear emergency plan • Support for funding an update to the "Know Your Zone" maps • Flood mitigation is limited ◦ Gaps in flood gauge locations and mapping capabilities ◦ Infrastructure to mitigate flood prone areas • Challenges with infrastructure accommodating current population when evacuating ◦ No longer have the ability to shelter coastal populations

EMERGENCY RESPONSE & RESILIENCY

	Level 1	Level 2	Level 3	Level 4
Business Processes	The region's response is informal and reactive to major events. There is little to no information on the documentation process.	While the response to smaller events is more reactive, major events are nominally assessed and planned for. The documentation process is outlined but not consistently used throughout the region.	A formal process for emergency response has been established. There is a standardized documentation process. Funding and other institutional barriers prohibit the region from addressing the immediate needs post-event.	A formal documentation process is widely used for multiple agencies and a database or platform is used to archive historic information. The historic information is reassessed annually to identify outstanding needs.
Systems and Technology	No standard protocol or systems exists for emergency management or coordination across agencies.	Technology is available to support planning but is inconsistently used. There is a standard protocol for emergency response management.	Technology is used for situational awareness and verification. Available technologies are widely used and coordination between partnering agencies is established.	All available technologies are used to the fullest extent. Information sharing is common practice between agencies.
Performance Measurement	There is no formal coordination after major events. The data that is collect is not applied or stored adequately.	There is some coordination after major events with multiple agencies involved. There is adequate review of data for pre-event, during, and post-event. The data is used to track progress.	There is a formal coordination process during and after major events with multiple agencies involved. The data is used to set pre- and post-goals for the agencies.	Formally coordination process is common practice. All available data sources are used to drive multiagency decisions.



EMERGENCY RESPONSE & RESILIENCY				
Culture	The value of multiagency coordination is not a priority. There is no adequate funding in place to respond to major events.	Leadership sees the value in multiagency response. There is still need for funding resources (staff, technology, etc.). While resiliency is considered, it is not a high priority region wide.	Leadership recognizes and actively funds resources to enhance emergency response needs. The region recognizes and actively advocates for resilient planning and standards.	Leadership advocates for more funding to further enhance emergency response needs. Planning for resiliency is a cornerstone of the region's standards.
Organization and Staffing	There are few, if any, tools in place that allow for expansion of staffing during a major event. There are little to no training tools available.	There are some tools in place that allow for expansion of staffing during an event, but mostly rely on internal staff. There are informal exercises in place to train new staff.	There are tools in place that allow for expansion of staffing levels—internal, partner agencies, and volunteers—during an event. Training tools are reassessed after each event for future responses. There are formalized exercises in place to train new staff.	Response tools are common practice and allow for expansion of staffing levels—internal, partner agencies, and volunteers—during an event. Training tools are reassessed frequently, and all relevant staff participates in these exercises.
Collaboration	The After-Action Review (AAR) includes some key, internal staff. There is limited partnership between agencies.	The AAR includes a few agencies. There is some partnership to balance responsibilities and information sharing.	The AAR includes most agencies involved. There is strong partnership to balance responsibilities and information sharing.	The AAR includes all agencies involved. Strong partnerships exist between agencies and are not dependent on individuals. Agency partnerships leverage well-coordinated information sharing.



ACTIVE DEMAND MANAGEMENT

Definition: **Active Demand Management** uses information and technology to dynamically manage demand, which could include redistributing travel to less congested times of day or routes or reducing overall vehicle trips by influencing a mode choice.

	What is placing us in our current tier?	What is keeping us from advancing to the next level?
	Multi-Modal: • UNCW uses Bird bike share program • New Hanover County has high ridership with Ride Micro curb to curb service • Go Coast TDM is education system currently in place to teach vulnerable users how to travel on the roads safely • Some bike path infrastructure is currently in place • Wave Transit system in place and has updated routes (30-minute transit time) Port and Freight: • N4 system in place that collects preregistered truck data and shortens wait time at port • Commercial Vehicle Drivers can remain in vehicles at south gate • Infrastructure that aids freight transportation (US 140) • Connected with Military Ocean Terminal Sunny Point (MOTSP) • Port maintains continuous internal operations • Port participates in nuclear task force exercises	Multi Modal: • Existing infrastructure to support multimodal travel • Regulation and management of e-bikes and scooters • Limited staff and resources to enforce multi-modal regulations • Major corridors lack infrastructure for vulnerable road users • Passenger rail currently not available • Procurement and sponsorship challenges for micro-mobility programs • Educational issues; professional drivers on road that do not follow roadway laws • Ride Micro service is not instant (can only plan ahead) and challenges with first-last mile connectivity • Need to consider multimodal parking infrastructure • Funding challenges (specific for multimodal – bike paths, transit) Port and Freight: • Ingress limitations cause excessive queuing on external routes • No safety system to alert all individuals at the port property • CFMB bridge closures reroute trucks through neighborhoods • Limited truck infrastructure and technology around port • Limited tools to manage increased congestion in region that is impacting freight mobility • Queue management for at-grade rail crossings • Truck parking enforcement • Challenges with at grade crossings on key commercial vehicle routes in region • Limited network freight data usage and predictions • Challenges with communicating effective navigation to CMV



ACTIVE DEMAND MANAGEMENT			
	Level 1	Level 2	Level 3
Supportive Policies and Flexibility in Existing Programs	Traffic demand management (including pedestrian and bicycle), and transit agencies operate separately and in silos as normal practice (the status quo) with limited ability to change practices and policies to deal with changes in travel demand.	Regional agencies have some ability to modify operating or enforcement practices in response to demand surges, to maintain travel reliability but largely implemented in ad-hoc manner.	Regional agencies and groups work together cohesively and utilize policies that specifically allow for modifying operating or enforcement practices. Emerging mobility services are utilized as partners to support a specific event or project.
Inter- and Intra-Agency Communication and Collaboration Capabilities	Communications between planners, operators, and TDM managers is limited and largely focused on crises.	Internal communications between traffic managers and transit managers to bridge different areas are effective only for certain projects and programs.	Traffic managers, transit managers, and TDM managers have effective, ongoing internal communications and forums within and outside the agency
Regional Data Sharing	Data is not shared outside the agency that collects the data. Demand management programs and partners have very little visibility of traffic operations data.	Data is shared between traffic operations entities but limited exposure to other partners (like transit and TDM). Traveler information services provide some multimodal information and regional overview of conditions.	Region includes multimodal and multi-agency data exchange systems for real-time situational awareness of conditions for the entire region's transportation network.
Focus on Traveler Choices	Limited use of pricing, travel time messaging and communications to enable increased awareness of existing travel choices.	Some projects and programs provide solutions to help maintain travel choices during disruptions including pricing, support for alternate modes and parking.	Behavioral economics used to impact behavior through implementation of various targeted initiatives, pricing, incentive strategies to promote alternate choices to affected modes/routes.
Dynamic Management of Facilities/Corridors	Limited ability to prioritize treatments for vehicle categories (transit priority, queue jumpers, high occupancy), routes and traffic management, parking strategies as part of actively managing demand.	Extensive monitoring of travel conditions on freeways through fixed infrastructure. Active Traffic Management strategies are starting to be deployed but limited to no coordination with arterial or parking management systems.	Full network coverage is available combining fixed, crowdsourced, and 3rd party sources of data. Integrated corridor management systems are deployed with integration of parking, traffic and priority treatment strategies.
Integration with Regional Goals, Plans, and Operational Functions	Regional plans do not include goals that support transit or higher occupancy shared modes, incident management, or an overall TDM vision. There is no sustained TDM program in the region.	Regional plans include a demand management program supporting higher occupancy shared modes through implementation of carpool/vanpool/mass transit programs.	A Transportation Systems Management and Operations (TSMO) Plan exists that fully covers how to use supply and demand strategies to address the entire transportation system.
Marketing of Travel Services	Marketing and outreach not considered cost effective and not implemented as a strategy to promote transportation options beyond the typical or recurring schedule.	Marketing and outreach included largely as a construction mitigation strategy. Some regional coordination of marketing services. Organizations apply multiple media/channels; ongoing relationships with media partners.	Marketing and outreach is customized to specific audiences or in specific corridors and coordinated across the region. Marketing and outreach messages are agreed to and reinforced across organizational functions and support organizational brand identity.
Consideration of Multimodal Options	While multi-modal transportation options are mentioned, there is no strategic vision on how that would be applied among the various agencies. Travel options are focused primarily on SOV reduction and do not include expanding travel options.	Multimodal travel options are available but segmented, disconnected from each other, and not widely available throughout the region.	A suite of multimodal choices (transit, shared use, biking, walking, first and last-mile services etc.) are fully integrated in most projects and programs.
Considerations of Access	Accessibility concerns are mentioned, but there are no strategies in place to address them in planning for events or operational projects.	Accessibility integrated into other capability areas so that event management plans consider impacts across population groups and communities. Populations that require special assistance are identified and some outreach performed to inform specific communities of providers and users.	Accessibility is an established component of planning and operational projects and is considered early in terms of implementation. Clear process to identify populations that require special assistance are identified and extensive outreach performed to inform specific communities of providers and users.

ARTERIAL MANAGEMENT		
Definition: Arterial Management focuses on signalized arterial routes which play a significant role in the performance of the region’s comprehensive transportation network. Some of these arterial networks are managed through a centralized signal system that spans intersections on multiple corridors, while others are managed by interconnected coordinated signal systems optimizing a single corridor. Arterial management emphasizes signal operations, timing strategies, and performance measures.		
	What is placing us in our current tier?	What is keeping us from advancing to the next tier?
	• City of Wilmington has access to Econolite and Centrac's data • Isabelle Holmes Bridge is communicating with connected system • City of Wilmington is able to access NCDOT cameras • Locations for placement of new cameras have been identified • City of Wilmington signal system has the ability to collect data • WMPO has public website providing access to annual traffic counts and has special counts for rezoning • WMPO had StreetLight subscription for 1 year (stopped due to unfriendly user platform) • WMPO has access to RITIS data • Communities are able to request traffic data • High congestion areas have been pinpointed	• Outdated signal system ○ Older serial communication technology ○ Need better network resiliency and redundancy for signal system ○ Better method for external partners to access cameras ○ Older detection technology in place • Funding and procurement challenges with exploring new signal technologies • Traveler information and signage at key choke points (can cause gridlocks) • Consistent travel times on bridges and communicating rerouting information • Increasing traffic congestion across the region ○ Major routes terminate in Wilmington with limited outlets along the coast



ARTERIAL MANAGEMENT				
	Level 1	Level 2	Level 3	Level 4
Business Processes	Traffic signal management program business decisions and resource allocations are ad hoc and/or compliant driven. Allocation of resources is focused primarily on keeping the traffic signal system functioning, but not necessarily at its optimum level of performance.	Traffic signal management planning, design, operations, and maintenance decision-making generally operate in silos and are not well integrated. Resource allocation decisions are focus primarily on maintaining reliability of infrastructure.	Traffic signal management decision-making is objective-based. The region has business processes that are flexible to adjust and trade-off resource allocations to extend good basic service beyond traditional operating conditions.	Traffic signal management decision-making is performance-based and multimodal. The region has the ability to replace equipment and systems technologies based on end-of-life predictions.
Systems and Technology	Traffic signal systems and technologies limit the region's ability to provide good basic service. Systems and technologies have limited capabilities to remotely manage, operate, and maintain the system. Limited use of system engineering concepts has resulted in the procurement of an array of systems and technologies with incompatible features and functions. Management and maintenance of systems and technologies is primarily complaint-driven.	The region has the capability to identify malfunctions and manage operations limited to specific intersections or corridors. The region can achieve consistency in design and operations through standard practice. The region routinely deploys advanced signal timing concepts (such a volume density, traffic responsive, actuated coordination, etc.) to achieve operational objectives and can implement pre-planned responses to planned and unplanned events. Tracking of assets and work items performed primarily through spreadsheets.	Traffic signal infrastructure is connected to a management system which can alert operators to equipment malfunctions as assist with managing timing plans. The region has capability to remotely manage that system, but management decisions are operator-driven with little automated decision support. Consistency in design and operations is achieved through the use of standard designs and hardware specifications. Systems and technology can support pre-planned responses and advanced concepts such as transit signal priority, work zone management, etc.	The region has the capability to dynamically respond to changing operational conditions to support the needs of all stakeholders to meet operational objectives. The region is able to automatically identify and respond to service disruptions and can reestablish continuity of service remotely. Procurement policies and practices support the procurement products and technologies that represent "best value" for achieving design and functional consistency. Consistency of design and operations is achieved the application of system engineering processes.
Performance Measurement	Performance measures are not connected to regional goals and objectives. Instead, use of performance measures is limited to special studies (upon request by administration or confirm reported operational deficiency). Performance measures are not used to proactively locate where operations and maintenance issues exist. Productivity is evaluated by tracking activities (e.g., number of maintenance call received, number of signals retimed, etc.)	The region has defined performance measures to assess project implementations (such as before/after evaluations). The region may collect output-oriented performance measures for operations and maintenance activities. Operational and management decisions are based on periodic manual observations in the field.	The region has defined performance measures to assess project implementations. The region uses outcome-oriented performance measures for operations and maintenance activities. Operational and management decisions are based on real-time, high-quality data accessible from remote locations.	Region has defined performance measures to assess system performance. System performance is monitored on regular, on-going basis. Automated systems are often used to collect and assess system performance. Performance data is used to identify performance and efficiency trends. The region uses performance to better allocate resources, identify maintenance deficiencies, and equipment failures, etc.
Culture	Traffic signal management does not have a champion or core group within the region that can promote traffic signal operations and maintenance concerns and priorities. Leaders have shared responsibilities with other core agency functions. Outreach to stakeholders and media occurs on an ad hoc basis. Region does not any have standardized approaches for communicating with public and policy makers	Traffic signal management is recognized as one of many functions within the region, but no special emphasis placed on performance. The region supports teams dedicated traffic management functions, but no broad acknowledgement or awareness by leadership as to what they do. Outreach to the public and policy maker regarding traffic signal operations occurs on an as needed basis, primarily related to projects.	Traffic signal management acknowledged as important function by regional decisions makers. Traffic signal management champion resides at decision-making level. Regular outreach occurs to communicate with policymakers regarding traffic signal operations through traditional means (reports, fact sheets, etc.).	Region viewed as a progression region by peers and the entire program staff can serve as a champion for the traffic signal operations issues and concerns. Regional staff is unified as to the goals, objectives, and priorities of the region and uses them to drive decision-making. Programs can still function at high level, even with the departure of key leaders. The region seeks opportunities to proactively promote region's mission, goals, and objectives in person before advisory groups, citizenry, and policymakers through both traditional and non-traditional (social media, dashboards, etc.) communications media.



ARTERIAL MANAGEMENT				
Organization and Staffing	Staff maintains minimum level capabilities necessary to do the job. This limits the agencies to assign staffing resources only to limited number of activities. Often, engineering and technical staff have other responsibilities other than traffic signal operations.	Key staff is well versed on basic signal timing design and operational concepts. Work force development efforts are focused on raising the level of competency of the staff. Programs within agencies reside in structured silos (planning, design, maintenance, operations, etc.) with limited coordination between silos.	Staff is well versed in both basic and advanced traffic signal control and management concepts and can execute solutions on existing technologies. Workforce development efforts focus on expanding breadth of competencies and providing redundancy in core competencies. The agencies can dedicate staff resources to high priority corridors/areas on a limited basis.	Staff is highly motivated and qualified and has the capability to develop and deploy innovative solutions to complex operational situations. Workforce development efforts focus on providing a nimble workforce that has the ability to adapt to different situations, depending on the needs of the region. The region uses a matrix approach to managing traffic signal operations. Staff has capability to perform activities across network and across functional units.
Collaboration	No data sharing exists between regional partners. Collaboration with internal and external stakeholders is rare, often forced upon agencies by policymakers or administrators.	Information and data are archived internally and shared upon request with other stakeholders. The agency collaborates with internal and external stakeholders on a case-by-case or project basis, but these collaborations are not sustained over time.	Formal and well-documented archiving system is used to store collected data. Data can be quickly and easily accessed through well-documented and standardized electronic format, easy to use by all partners. The regional agencies seek collaborations with other transportation stakeholders that to capitalize on opportunities to satisfy needs of operational objectives.	The regional agencies routinely collaborate with internal and external stakeholders (e.g., fire, police, transit, advocacy groups, etc.) that allow them to capitalize on opportunities to satisfy needs of multiple stakeholder objectives. Data is shared in real-time with regional operating partners and is used to support numerous regional activities (such as regional planning models, support real-time traveler information displays, etc.).

**PARKING MANAGEMENT**

Definition: **Parking management** addresses the management of parking operations for space and regional management between equipped parking facilities and traffic and transit management systems. Parking management can include monitoring and managing parking capacity in lots, garages, and other parking facilities.

	What is placing us in our current tier?	What is keeping us from advancing to the next tier?
	- Commuter park and rides facilities have high usage between Leland and destinations in New Hanover County - Brunswick County Comprehensive Transportation Plan (CTP) plans for locations and investments in park and ride facilities - UNCW campus garages have technology for monitoring and sharing parking capacity - Multiple tools are currently in use across the region to manage parking information	- No real time data for parking capacity at beach destinations - Lack of coordinated park and ride options - Parking and curb management - Need for commercial loading zones - Need for taxi spots downtown - Need for residential focused parking management program - Need technology/infrastructure to manage on-street parking capacity - Lack of data analytics for making decisions around parking needs - Need for a centralized database for parking information - Strategies for event parking management - Communication and coordination with venues and concerts - Options for pre-purchasing parking prior to event

PARKING MANAGEMENT

	Level 1	Level 2	Level 3	Level 4
Business Processes	Parking needs are managed reactively with no standardized procedures. No coordination present between local jurisdictions, venues, and parking information systems.	Some planning for parking management but is typical for high generating event. Consistent parking management agreements and strategies are not documented, encouraged, or utilized.	Parking is currently locally managed. Parking infrastructure and technology needs are captured in within individual agencies.	Formal process is in place and documented for assessing needs, contingencies, and planning. Planning is proactive and funding sources are considered in early development planning.
Systems and Technology	Parking technologies non-existent or outdated, with no integration between systems.	Individual systems monitor parking capacity individually within silos. No system integration or centralized database of parking information available to users. Information available upon request.	Parking availability is displayed to users with some integration with a centralized database. Limited parking network information available to users.	A centralized database for parking information exists with accurate and continuous real time parking data. Technologies are up to date and allow users to predict when and where parking will be available.
Performance Measurement	Performance measures for parking are non-existent or only output based with little or no data driven decisions.	Basic performance measurement systems are in place to monitor parking, mostly at the facility level only. Limited data driven decisions.	Advanced performance measurement system in place that integrates multiple facilities, but agency level segmentation may exist. Data supports end user decision making and some program level data driven decisions are implemented based on system performance.	Institutional processes that ensure effective use across multiple agencies are data driven based on clearly defined regional level performance measures..
Culture	Parking needs are not a priority. Culture is reactive to parking needs. Work is done independently with no collaboration between venues and local jurisdiction.	Some support in parking management for recurring seasonal demands and special events. Parking availability and processes are mostly managed at the local level and integration is not a priority.	Support for parking management system is regionally integrated and focus is broader than seasonal demands and special events.	Parking management and system integration is a priority and supported throughout the region by agencies, event coordinators, and other stakeholders.



PARKING MANAGEMENT				
Organization and Staffing	Limited staffing and training opportunities. Organizational structure and roles related to parking management are ad hoc. Efforts to identify, develop, retain, and enhance workforce skills are limited or non-existent.	Staffing structure and some roles are organized around seasonal demands and special events. Standardized training is limited with minimal documentation of processes.	Organization of staffing structure is well defined including roles and responsibilities. Staff is supported through appropriate training. Documentation of training and standard processes are well documented and updated.	Organizational structure with well-defined roles exist across multiple agencies within the region. Proactive workforce planning and team management is present in multiple agencies. Continual professional development and training programs support continuous workforce development.
Collaboration	Coordination and collaboration on parking availability with external entities are non-existent or ad-hoc.	Parking management agreements are in place for seasonal demands and special events. Local jurisdiction, venues, and parking management systems are collaborating and planning for significant events with high parking demands.	Formally documented standard processes and parking agreements are in place between management systems, venues, and local jurisdiction. Limited capabilities for accessing and sharing parking information.	Real-time coordination of parking management data is well integrated between parking facilities, local jurisdictions, and users. Parking system and data is centralized and accessible to responsible parties.



TRAFFIC MANAGEMENT CENTERS

Definition: **Traffic Management Centers** have two key operational functions: real-time active monitoring and coordination, and traffic management strategy implementation. These functions are accomplished by both staff and systems. TMCs provide a safer transportation system for users by being both responsive to incidents and innovative in technologies to accomplish that goal.

	What is placing us in our current tier?		What is keeping us from advancing to the next level?	
	- Broadband is currently funded on I-40 and US 74 - NCDOT has cameras installed along specific freeway routes - TMC can manage use of DMS and cameras - DMS currently located at key locations in the region - City of Wilmington TOC has access to Econolite and Centrac's data - Statewide Transportation Operations Center (STOC) has generic messaging policy - Soft opening of the eastern TMC		- Network resiliency and redundancy - Gaps in fiber communication east of I-40 - Gaps in DMS on key routes - Funding challenges procuring additional DMS and freeway infrastructure devices - Limited resources for maintenance of DMS - Relaying traveler information or route updates during bridge closures	
TRAFFIC MANAGEMENT CENTERS				
	Level 1	Level 2	Level 3	Level 4
Business Processes	Ad-hoc planning for TMC functions, vision not well defined; TMC processes specific to NCDOT are not documented	Some planning for asset management; processes for specific corridors or region, but not consistent regionwide; some TMC processes documented	TMC operations needs captured in budget, standardized processes, consistent review/update of TMC strategic direction	TMC vision is integrated in all aspects of DOT business; Planning for Operations is standard practice; asset lifecycle cost is part of five-year programming processes; processes are regional
Systems and Technology	Ad hoc approaches to system implementation; systems engineering (SE) not applied consistently; procurement processes; ITS architecture is outdated; individual systems that are not integrated	Some elements of SE are used, including ConOps, architectures, developed and documented with costs included; TMC monitors some field systems; SE process applied to some aspects of TMC operations; some emerging technology considerations	Systems, technology standardized and integrated on a regional/corridor basis; regionwide SOPs used; integrated regionwide network; SE process is mainstreamed into TMC business practices; integrated systems	Architectures and technology routinely upgraded to improve performance; systems integration/ interoperability maintained on continuing basis; Strong support for adopting advanced technologies
Performance Measurement	Some outputs measured and reported for some aspects of TMC operations; typically, historical performance information	Some elements of TMC performance are tracked and reported; focus is primarily on usage/activity reports assessing trends; some real-time data is used for operational decision-making at the TMC	Performance outcomes guide recommended operational improvements; real-time data routinely used for decision-making; TMC uses some real-time data from other centers/sources	Operational decisions based on multi-jurisdictional real-time information; performance management strategy guides innovation at the TMC.
Culture	Individual staff champions promote operations; TMC operations priorities based primarily on champion focus areas; TMC not often included in work zone (WZ) or event planning, incident debriefing, etc.	Role of TMC acknowledged but connection to core ops areas is not always recognized; TMC engaged in pre-planning for WZ, TIM and PSE based on individual relationships	TMC is a core program, region values TMC role and input to key processes, TMC operating needs factored in early as part of other planning/scoping decisions	TMC highly integrated with many processes, region sees TMC as a valuable asset, high value on TMC data
Organization and Staffing	Individual staff champions promote operations; TMC functions learned mostly OJT; career path for TMC is limited and not well defined	Core KSA's identified and help support TMC ConOps; roles for in-house and contractor staff are defined; some training, but limited external training opportunities; communication between DOT and contractors is fragmented and event-based	TMC career path is clearly defined; established and successful training program; performance standards are clear and documented; good communication between staff and contractors	Commitment to ongoing training and professional development; strong retention of staff due to career path and advancement opportunities; strong and well-known performance standards
Collaboration	Relationships ad hoc, and on personal basis (public-public, public-private)	Collaboration with external partners is formal, and usually driven by specific needs, TMC roles still fragmented and event-based; real-time collaboration with public safety for incidents	Multi-agency and coordinated operations for planned events; some partnerships for key corridors; TMC role defined and understood	Multi-agency response strategies are mainstreamed into TMC operations; operating processes and procedures documented and used frequently





APPENDIX D - CORE TEAM MEETING MINUTES



Core Team Meeting 1 – Minutes

Date: January 27, 2025

Time: 10:30 AM – 12:30 PM

Attendees

Abby Lorenzo (WMPO)	Dominic Ciaramitaro (NCDOT)
Adrienne Cox (NCDOT)	Jeff Scott (NCDOT)
Allen Hancock (NCDOT)	Mike Kozlosky (WMPO)
Carolyn Caggia (WMPO)	Natasha Henderson (NCDOT)
Chance Dunbar (City of Wilmington)	Stephanie Ayers (Port of Wilmington)
Courtney Weeter (NCDOT)	Stoney Mathis (NCDOT)
David McIntire (Brunswick County)	Tommy Batson (Pender County)
Denys Vielkanowitz (City of Wilmington)	Tracey Helms (NCDOT)

Meeting Notes

1. Welcome and Introductions

The group introduced themselves and shared one goal for the project. These goals are summarized below:

- Have an updated regional SDP for the core team to own and maintain in support of expanding ITS developments aligned with local needs.
- Education and using this project as an opportunity to further learn about ITS deployments and better understand roles and responsibilities related to ITS projects and how to better support them (CQI).
- Improved tools and systems that promote better communication to the public in support of better safety and mobility
- Develop a fully integrated system that is compatible throughout the entire network and can work across jurisdictional boundaries.
- Evaluate how ITS planning and data can be incorporated into other long-term planning documents and the potential impact to other modes.
- Create an implementable plan that is sustainable and consistent with Wilmington's growth and development.

2. Project Overview

KH presented on the project overview sharing the scope, project workflow, regional boundary, and asks of the core team. The regional boundary for the Wilmington ITS Strategic Deployment Plan will be the same boundary as the WMPO.

3. Vision and Goals Review

KH shared the sources of 22 existing planning documents referenced in the development of the vision and goals. Key themes were extracted from the 22 existing regional plans and were used to develop technology focused vision, goals, and guiding principles. The draft goals, vision, and guiding principles are below. No comments were provided during the meeting on these items.

Goals

- Invest in TSMO strategies that promote multi-modal transportation throughout the region.
- Align with Vision Zero initiatives by leveraging TSMO strategies to create safe and equitable transportation system for all users.
- Promote the use of technologies that support resiliency and environmental sustainability.
- Foster economic sustainability in the region through investing in TSMO strategies and providing access to resources for all communities.
- Invest in TSMO strategies to support local needs and preserve a sense of place.

Vision

Integrate technologies and TSMO strategies that provide a safe and efficient regional transportation system, moving goods and people, and promotes health and a sense of place.

Guiding Principles

- Consider accessible and equitable strategies for communities when addressing regional goals.
- Consider integrating strategies with positive impacts on public health and improve quality of life.

4. TSMO & CMM Education

KH presented on what TSMO is and how it will be used during the development of the Strategic Deployment Plan. The concept of the capability maturity model (CMM) was presented and KH explained how it will be used to identify gaps in the region. An example matrix was provided to show the different dimensions used when evaluating the region's maturity in different functional areas.

Next a matrix of potential challenges and corresponding TSMO or ITS strategies was presented.

5. Existing Conditions Feedback

Prior to the Core Team Meeting, KH conducted a series of one-on-one meetings with core team members. The information collected during those meetings was summarized into the following categories: freeway management, arterial management, port and freight, incident management, multi-modal, parking and tourism, and emergency response. KH facilitated a discussion within each of these categories and captured additional details from the Core Team members.

Freeway Management

- Broadband is currently funded on I-40 and US 74
- Limited to no fiber communication east of I-40
- NCDOT has cameras installed along certain freeway route
- Adaptive is being considered in Brunswick County but seeing some cost challenges

- New camera and DMS locations have been identified in the region
- Eastern TMC will take over messaging signs and cameras (oppose to STOC)

Arterial Management

- At least 28 at-grade crossings in downtown
- Flooding
 - Flood prone locations within the region include:
 - Water Street
 - S Front Street
 - NC 133 in Brunswick County
 - Carolina Beach (pumps aren't working)
 - Near the port
 - Flood gauges are proposed around the state with many located in/around Wilmington
 - First year will work on installing devices
 - Second year will focus on mapping locations
 - NCDOT hydrology can process data from gauges and model potential surges in water depth that can threaten the infrastructure
 - Port impacts
 - During emergency response, the port becomes a critical hub for the delivery of fuel and other critical resources
 - Gauges located around the port but not confirmed what they are/data they are collecting
 - Gauge near Cape Fear Memorial Bridge – unconfirmed whose owns and operates
 - Want to merge water depth data with main Wilmington GIS information
- Communications
 - No fiber included in the bypass project – Need to confirm we are not missing other opportunities to improve the communications network
 - Network redundancy concerns with signal system communications network
- Frequent request from the county requesting to access the city cameras
- Goal of providing and accessing data publicly
- Higher interest in non-intrusive detection with future signal system enhancements
- Gateways to downtown in addition to the bridges that create pinch points:
 - MLK to 3rd St (at Holmes Bridge)
 - Market St (16th & 17th)
 - Down 3rd towards port

Action Items

- a. WMPO will provide flood data and GIS shapefiles to KH.
- b. KH to reach out to Craig Harris at the City of Wilmington with Emergency Management.
- c. KH to follow up with NCDOT to confirm what gauges are around the port.
- d. KH to meet with NCDOT for potential STIP projects that could include fiber.
 - i. US 74 bypass
- e. KH to confirm if Hamstead has fiber.

- f. KH to follow up on CCTV camera locations being purchased by the county to get access/fill network gaps.

Port and Freight

- Vehicle locations are not currently by the port
 - No active mapping currently
 - Drivers and trucks could be completely unknown
- Port has the ability to estimate container trips better with new N4 system through preregistration and system automation
- Connected with Military Ocean Terminal Sunny Point (MOTSP)
 - Rail line comes in through Navassa into downtown and circles back around
- Carolina Beach Road and Front Street closures push freight trucks onto local roads in town.
 - Challenges with communicating effective navigation to CMV to better mitigate impacts to surface streets. They can ignore specific CMV routes.
- Need to ensure effective coordination with the port during emergencies or evacuations
- Ingress and Egress at the gates are not 24/7; however the port maintains continuous internal operations
- The port participates in Nuclear task force exercises
- Multiple private ports that support military and local resources

Action Items

- g. KH to add commercial vehicle data/volume available.
- h. KH to add rail lines to layers for mapping needs.
- i. KH to reach out to Craig Harris at the City of Wilmington with Emergency Management.
- j. KH follow up with Allen Hancock for evacuation plans to share with Stephanie Ayers.
- k. NCDOT confirm participation in port exercises.
- l. KH to add fuel terminals at ports.

Incident Management

- Coordination with public works for inclement weather or severe weather needs
- EVP currently in place mainly got fire. Expanding to EMS.
- IMAP routes in place, but need to expand

Multi-modal

- Challenges with regulating and managing the use of e-bikes with their growing popularity
 - No formal terminology defining different classes of e-bikes
 - Priority to the County Commissioners for defining
 - Enforcement is difficult with limited staff and resources
- Legislation does not clearly define different types of scooters and e-bikes
 - Ride share scooters are prohibited in the City of Wilmington
 - Personal scooters are okay
- Many major corridors are difficult for vulnerable road users (VRU) to cross
 - Recommendations made within Bike Walk Wilmington for improvements
 - GIS layer with recommendations and study locations



- Consider non-traditional integrated corridor managements (ICMs) with use of the ferry
 - Operate almost as a “Seasonal ICM”
- NCDOT assisting with scope of services for future project to potentially reestablish passenger rail
 - Identify local funding and partnering with the state
- Need to confirm airport technology in use: parking technology, wayfinding
- Building new parking deck but unsure of the technologies planned

Action Items

- m. KH to confirm industry best practices with regulating and managing e-bikes.
- n. KH coordinate with WMPO on Bike Walk Wilmington plan and GIS features for recommendations.
- o. KH to add airport to the list of Stakeholders.
- p. KH to relocate UNCW campus location.
- q. KH to confirm community colleges
 - i. Cape Fear Community College
 - ii. Brunswick Community College
- r. KH to add Fort Fisher Ferry to map

Parking and Tourism

- Beach communities frequently have challenges with parking
- Possibly assess potential benefits for more formal way finding
- UNCW campus garages have technology for monitoring and sharing parking capacity
- Potential for park and rides to support key destination such as beaches

Action Items

- s. KH to add the following attractions/destinations to map
 - i. Strategic Highway Network (STRAHNET)
 - ii. Military Power Platform Projection
 - iii. Beach destinations

Emergency Response

- New Hanover Wilmington Emergency Center is a critical location
- When a named storm is identified phone call around the region start
 - One of the first calls is to Horry County in South Carolina
 - Potential one-on-one call with South Carolina to explore planning and evacuation strategies?
- Can no longer shelter the populations coming off the coast
 - When Hurricane Fran hit the area was roughly 10% was residential; now, less than 10% is rental
- During Hurricane Florence I-40 and US 74 had issues with flooding
- Typically, 20-25% of residents do not leave during a mandatory evacuation



Action Items

- t. KH to confirm hospitals are on map and correct locations.
 - i. New Hanover Regional (2131 S 17th St)
 - ii. Cape Fear Memorial (5301 Wrightsville Ave)
- 6. Stakeholder Workshop #1 Overview
KH provided an overview of the stakeholder workshop and technical group sessions.



WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

CORE TEAM MEETING #1

JANUARY 27, 2025



WMPO

Kimley»Horn

Agenda



- Welcome and Introductions
- Project Overview
- TSMO & CMM Education
- Core Team Input
- Existing Vision and Goals Review
- Project Vision and Goals Draft Discussion
- Stakeholder Workshop #1 Overview
- Next Steps

Welcome and Introductions

- Name
- Agency
- What is your number one goal for this project?

Project Overview



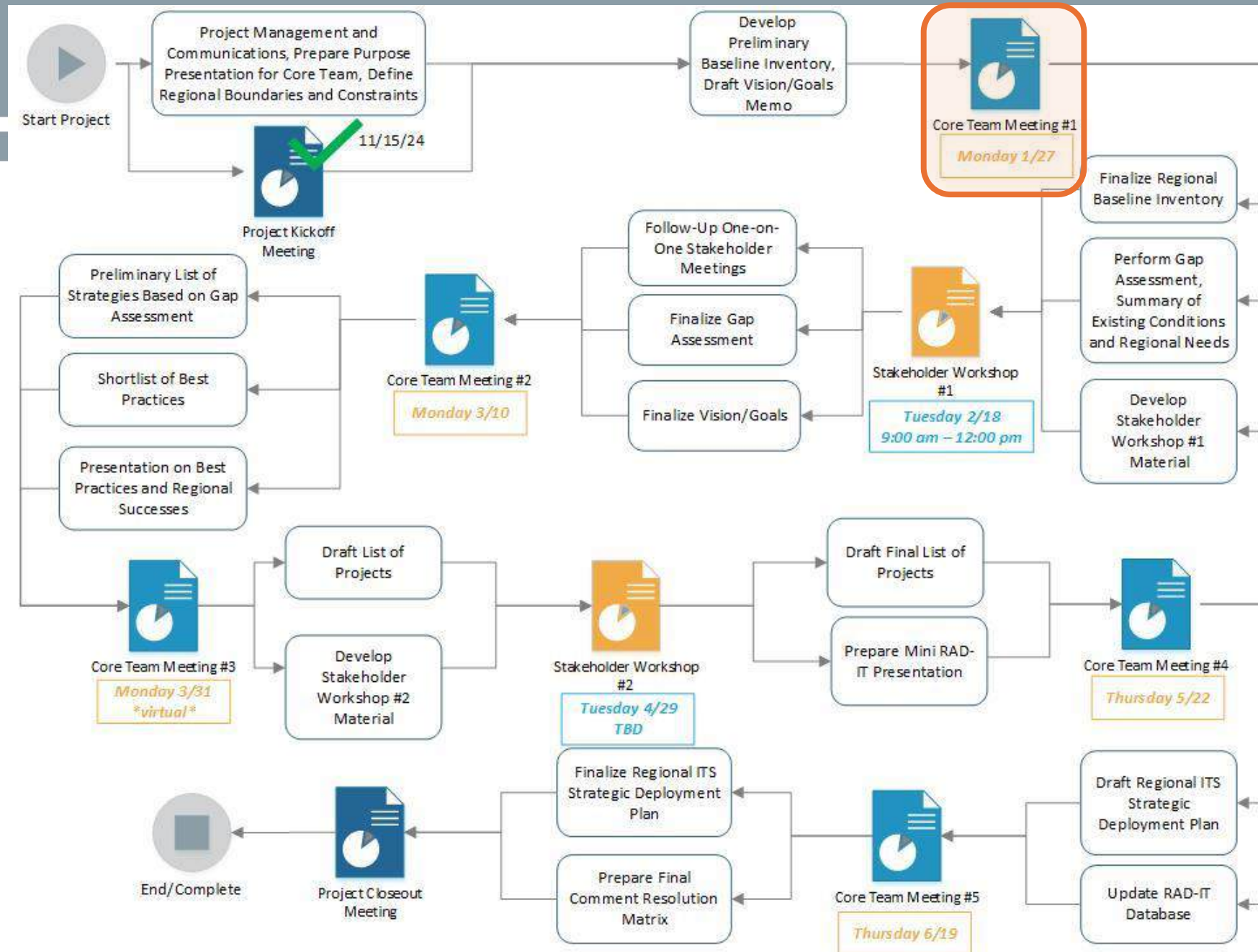
Scope

- Stakeholder Identification and Outreach Plan
- Vision, Goals, and Objectives
- Gap Assessment
- Best Practices and Project Identification
- ITS Regional Strategic Deployment Plan (SDP)

Workflow

Scope Summary

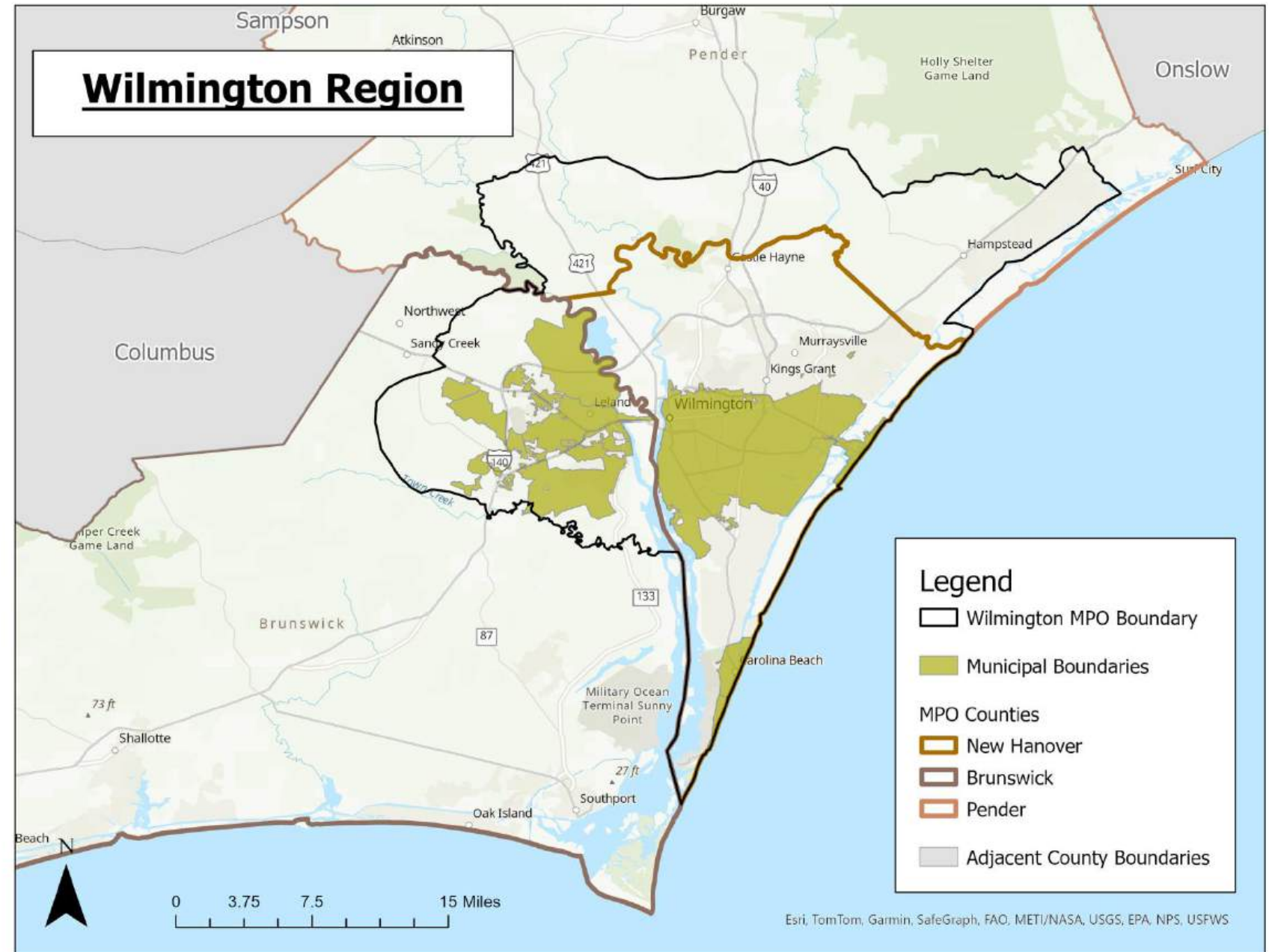
1. Stakeholder Identification and Outreach Plan
2. Vision, Goals, and Objectives
3. Gap Assessment
4. Best Practices and Project Identification
5. ITS Regional Strategic Deployment Plan (SDP)



Core Team

Representation From:

- WMPO
- City of Wilmington
- New Hanover County
- Pender County
- Brunswick County
- Port of Wilmington
- NCDOT



Asks of the Core Team

- Actively participate in (5) Core Team Meetings
- Serve as agency's subject matter expert
- Recruit and engage Stakeholders
 - (2) Stakeholder Workshops
- Provide feedback on key deliverables

Vision and Goals Review

Regional Vision and Goals Sources

- City of Wilmington
 - Comprehensive Plan (2016)
 - Transit Needs Study (2009)
 - Comprehensive Greenway Plan (2013)
 - Wave Locally Coordinated Public Transportation Plan (2021)
 - Reimagine: WAVE Short Range Transit Plan (2024)
 - Walk Wilmington Pedestrian Plan (2023)
 - Comprehensive Parks, Recreation & Open Space Master Plan (2022)
- WMPO
 - Cape Fear 2040 MTP (2015)
 - Cape Fear Moving forward 2045 MTP (2020)
 - Cape Fear Change in Motion: Short Range Transit Plan (2020)
 - Cape Fear Regional Bike Plan (2020)
- Brunswick County
 - Comprehensive Transportation Plan (2024)
 - Comprehensive Land Use Plan (2023)
- New Hanover County
 - Comprehensive Plan (2016)
- Pender County
 - Comprehensive Land Plan (2018)
- Town of Leland
 - Leland Comprehensive Land Plan (2021)
- Town of Carolina Beach
 - Carolina Beach 2020 Land Use Plan (2020)
 - Carolina Beach Master Development Plan (2008)
- Town of Wrightsville Beach
 - CAMA Land Use Plan Update (2019)
- Town of Kure Beach
 - Comprehensive Land Use Plan (2022)
- Town of Belville
 - Vision 2030 Plan (2021)
- North Carolina Ports
 - Harbor Navigation Improvement Project (ongoing)

22 Total Existing Planning Documents Referenced

Core Themes

Area/Agency	Source	Principles											
		Safety	Health	Environment	Quality of Life	Effective	Sense of Place	Community	Accessibility				
City of Wilmington	Create Wilmington Comprehensive Plan	1					1	1					
City of Wilmington	Transit Needs Study for the Wilmington Multimodal Transportation Center				1	1		1	1				
City of Wilmington/New Hanover County	Wilmington/New Hanover County Comprehensive Greenway Plan	1	1										
WMPO	Cape Fear Moving Forward: 2045 Metropolitan Transportation Plan	1		1			1						
WMPO	Cape Fear Change in Motion: Short Range TDM Plan	1	1		1	1	1	1					
City of Wilmington/Wave Transit	Wave Locally Coordinated Public Transportation Plan						1						
City of Wilmington/Wave Transit	Reimagine: WAVE Short Range Transit Plan						1						
City of Wilmington	Walk Wilmington Pedestrian Plan	1	1	1									
City of Wilmington	Comprehensive Parks, Recreation + Open Space Master Plan		1				1						
North Carolina Ports	Wilmington Harbor Navigation Improvement Project												
New Hanover County	Plan NHC Comprehensive												
Pender County	Pender 2.0 Comprehensive Land Use Plan												
WMPO	Cape Fear Transportation 2040: Metropolitan Transportation Plan	1				1		1					
WMPO	Cape Fear Regional Bike Plan								1				
Brunswick County	Brunswick County Comprehensive Transportation Plan							1			1		
Brunswick County	Brunswick County Comprehensive Land Use Plan							1			1		
Town of Leland	Leland 2045: Comprehensive Land Use Plan	1	1	1	1	1	1	1	1	1			
Town of Carolina Beach	Carolina Beach 2020 Land Use Plan	1	1					1			1		
Town of Carolina Beach	Carolina Beach Master Development Plan												
Town of Wrightsville Beach	CAMA Land Use Plan Update	1	1										
Town of Kure Beach	2022 Comprehensive Land Use Plan			1		1		1					
Town of Belville	Vision 2030 Plan					1		1		1			
Total Mentions		11	9	9	11	12	7	10	4	3	10	5	3

multi-modal

safety

equitable

environmentally sustainable

economic sustainable

sense of place

Draft Goals

- Invest in TSMO strategies that promote **multi-modal** transportation throughout the region.
- Align with Vision Zero initiatives by leveraging TSMO strategies to create **safe and equitable** transportation system for all users.
- Promote the use of technologies that support resiliency and **environmental sustainability**.
- Foster **economic sustainability** in the region through investing in TSMO strategies and providing access to resources for all communities.
- Invest in TSMO strategies to support local needs and preserve a **sense of place**.

Draft Vision

- Integrate technologies and TSMO strategies that provide a safe and efficient regional transportation system, moving goods and people, and promotes health and a sense of place.

Draft Guiding Principals

- Consider accessible and equitable strategies for communities when addressing regional goals.
- Consider integrating strategies with positive impacts on public health and improve quality of life.

TSMO & CMM Education

What is TSMO?

Transportation Systems Management and Operations

A strategic approach dedicated to optimizing the performance of an existing transportation system.

A TSMO Plan will:

- Provide the framework for a more sustainable, efficient, and safe transportation network
- Provide direction toward incorporating TSMO principles into regional and local programs
- Guide stakeholders through the deployment of TSMO strategies, projects, and programs

What is the Capability Maturity Model (CMM)?

A framework that supports the evolution of TSMO through self-evaluation of the process and capabilities needed to execute a successful TSMO program.

CMM assesses the systems maturity by:

- Evaluating the agencies current state
- Identifying gaps and needs for improvement
- Collaborative assessment of the region's maturity level
- Deriving priorities that elevate the regional maturity



Capability Maturity Dimensions

CATEGORY				
Definition:				
	What is placing us in our current tier?		What is keeping us from advancing to the next level?	
	Level 1 Ad Hoc	Level 2 Managed	Level 3 Integrated	Level 4 Optimizing
Business Processes				
Systems and Technology				
Performance Measurement				
Culture				
Organization and Staffing				
Collaboration				
Workshop Actions to Advance to Next Level				

TSMO Strategy Examples

		Potential Solutions						
		Closed Circuit Television Cameras (CCTV)	Dynamic Message Signs (DMS)	Integrated Corridor Management (ICM)	Advanced Traffic Signal Systems	Transit Signal Priority	Real-time Traffic Data	Quick Clearance Strategies
Challenges	Lack of arterial and interstate surveillance	X						
	Lack of real-time traveler information	X			X		X	
	Major routes over capacity with parallel routes or multi-modal options under utilized	X	X	X	X	X	X	
	Poor progression along major corridors	X			X	X	X	
	Heavy peak hour congestion	X	X	X		X	X	
	Cumbersome clearance policies and procedures for interstate and arterials	X						X
	Difficulties adhering to transit schedules				X	X	X	

Existing Conditions Feedback

Wilmington Region

Notes:

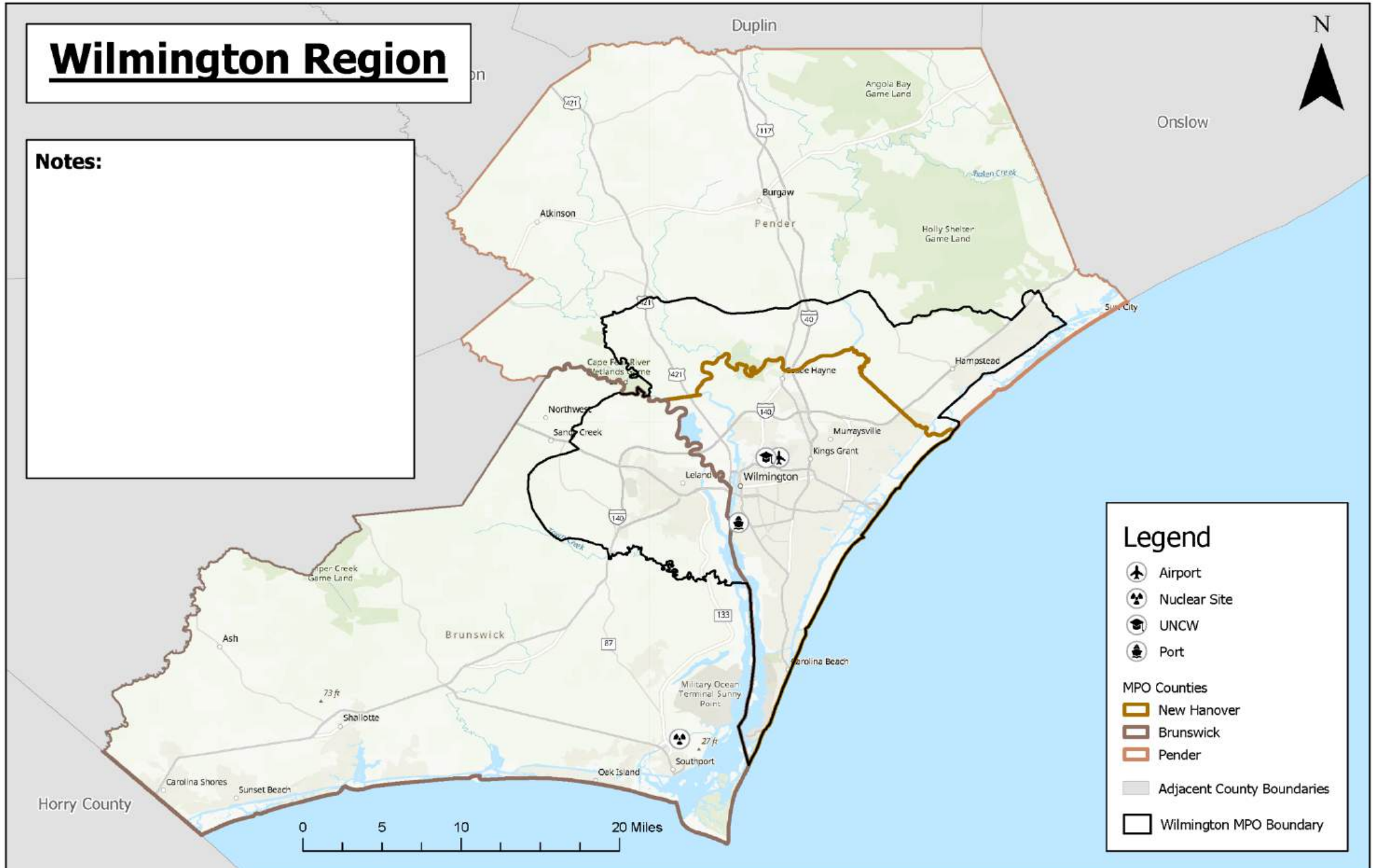
Legend

-  Airport
-  Nuclear Site
-  UNCW
-  Port

MPO Counties

-  New Hanover
-  Brunswick
-  Pender

-  Adjacent County Boundaries
-  Wilmington MPO Boundary



Existing Conditions – Freeway Management

- DMS at entry points to the city
 - 3 additional DMS were planned but never happened
- Fiber
 - String architecture – straight line out and dead ends
 - Need for redundancy in system
- Looking into new detection types – leaning away from inductive loops
- Brunswick County is looking at adaptive signal system
 - Challenges with cost estimates
- US 17 median project submitted separate portion for signal fiber
- City of Wilmington has access to Econolite and Centrac data

Existing Conditions – Arterial Management

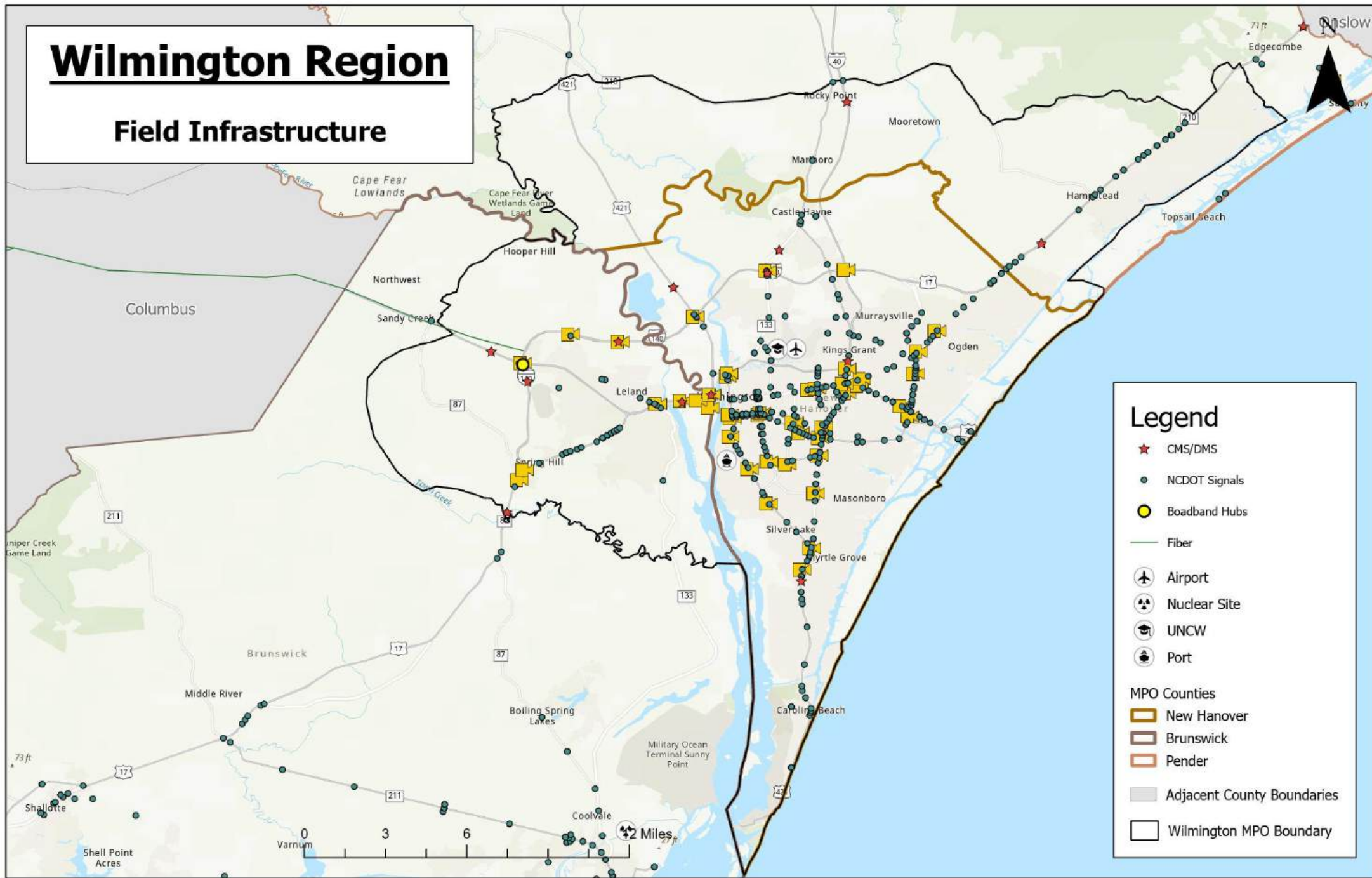
- Wilmington Citywide Signal System Update | ROW 2028 | CON 2030 |
- Looking into new detection types – leaning away from inductive loops
- Brunswick County is looking at adaptive signal system
 - Challenges with cost estimates
- US 17 median project submitted separate portion for signal fiber
- City of Wilmington has access to Econolite and Centracs data
- Water Street floods often – no flooding system in place
- Camera placements added to logical locations but run on serial communication system
 - Sense of disconnect/inability to view the field
- Isabelle Holmes Bridge is the only bridge communicating with connected system

Existing Conditions – Arterial Management (2)

- TMC soft opening 1/6/2025 out of the STOC
 - Should be going live in the next month or so
- NCDOT and City of Wilmington system are not compatible with on another limiting camera access
- City of Wilmington can access NCDOT cameras
- Locations identified for new cameras

Wilmington Region

Field Infrastructure



Existing Conditions – Port and Freight

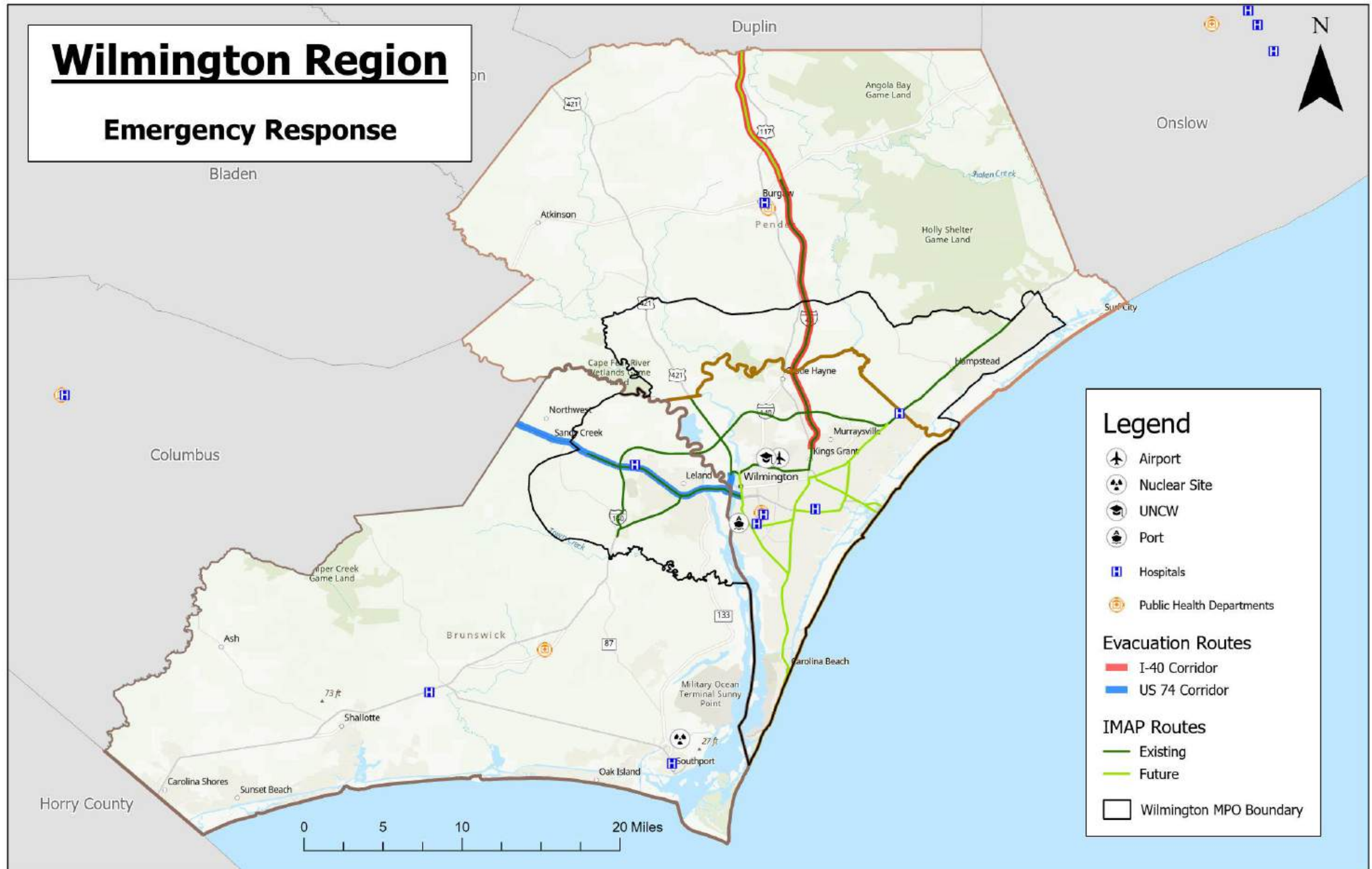
- South gate operates containers and was improved in 2021
 - Steady flow at south gate – drivers do not have to get out of trucks
 - Funding for new north gate improvements that will connect to Cape Fear Bridge
 - Trucks can register prior to coming to port to improve time at gate
- Truck data collected through upgraded N4 system when preregistered
- New north gate improvements will connect to Cape Fear Bridge
- Queuing can back up to a mile on city roads
- Interest in safety system to alert all individuals at the port
- Port operates as an enterprise agency and is not funded with state operated dollars
- Multiple at-grade crossing in region
 - Upgrading all at-grade crossing to have gates (P-5740)
- Closure of Cape Fear Bridge sends trucks into neighborhoods

Existing Conditions – Incident Management

- City of Wilmington EVP moving to Phase 2 (awarded)
 - Exclusive to fire but is expanding to EMS in phase 2
 - Anticipated to add ~50 intersections and ~50 vehicles
- IMAP trucks are some of the oldest in the region
 - Need for additional truck lighting
 - Interest in cameras on trucks
- Need for IMAP personnel tracking (many workers are alone) and currently using personal cell phones/apps
- Incident management manual with documented scenarios, contacts, and evacuations

Wilmington Region

Emergency Response



Existing Conditions – Multi-Modal

- Wave Transit recently updated routes to 30 minutes
- RideMICRO – rideshare service offered in smaller vehicle and passenger scheduled within a RideMICRO 'zone'

Existing Conditions – Parking and Tourism

- Parking downtown lacks data analytics
- Multiple platforms to pull parking information
 - Need for a centralized database
- On-street parking is difficult to capture and track
- Reconfiguring on-street parking for front licenses plate readers
 - Mobile LPR
 - Capture on-street parking by foot and card tally counts
- Coordination with venues and concerts to pre-purchasing parking prior to event

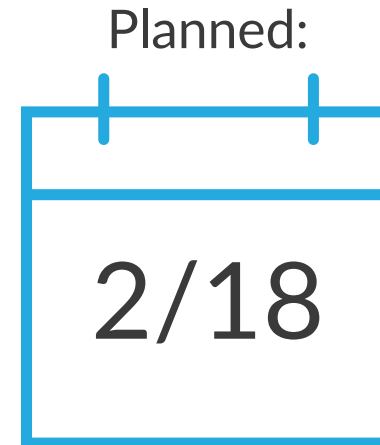
Existing Conditions – Emergency Response

- Evacuation plans are a few paragraphs long explaining what to do
- Have done a lot of “what if” planning
- Emergency management is beyond only the MPO
 - Consider state partners and adjacent counties for planning
- No formal recurring meetings between key players

Stakeholder Workshop #1 Overview

Stakeholder Workshop #1

- Provide project overview and goals to Stakeholders
- Lead large group technical sessions
 - Freeway Management
 - Arterial Management
 - Multi-Modal
 - Port and Freight
 - Incident Management
 - Parking
 - Emergency Management
- Gain feedback on barriers that limit implementation or integration of transportation related technologies



Next Steps

Next Steps

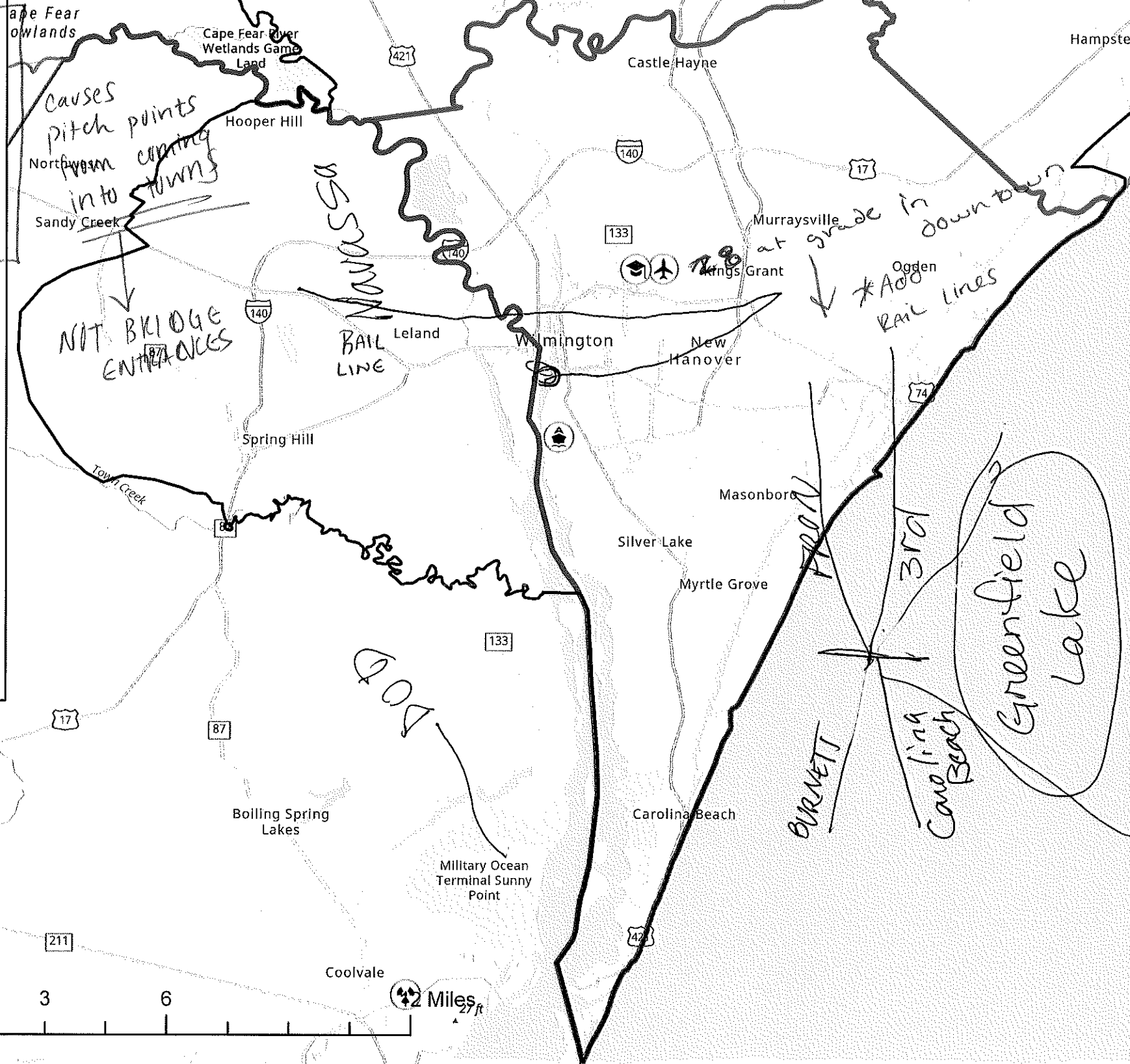
- Consultant Team
 - Preliminary existing conditions and needs
 - Prepare for Stakeholder Workshop #1
 - Finalize vision and goals from Core Team feedback
- Core Team
 - Provide feedback on Stakeholders lists by 1/31
 - Provide existing conditions
 - Provide feedback on draft vision and goals

Wilmington Region

w/ Adrienne Cox

Notes:

- gateways to downtown
- MLK to 3rd (at Holmes Bridge)
- Market (17 & 16) - gateway
- down 3rd (towards port) at Burnette



Legend

- Airport
- Nuclear Site
- UNCW
- Port

MPO Counties

- New Hanover
- Brunswick
- Pender
- Adjacent County Boundary
- Wilmington MPO Boundary

Wilmington Region

Notes:

(Shannon Whaley)

* Hospitals
① New Hanover Regional
2131 (S) 17th St
Wilm.

② Cape Fear Memorial
5301 Wrightsville Ave.
Wilm.

* Community Colleges

① Cape Fear Comm.

② Brunswick Comm.

* Relocate UNCW

* Include Hydraulics in Workshop

Note: Camera-sharing

* Railroad ?? (Add to Map?)

* Add Fuel Terminal - At Ports?
Private Terminals that Support

* Evacuation Routes ??

* Ferry Svc. Added?

Brunswick

Middle River

73 ft

Shallotte

Shell Point
Acres

Varnum

0

3

6

Coolvale

2 Miles

27 ft

Military Ocean
Terminal Sunny
Point

42

Carolina Beach

Myrtle Grove

Silver Lake

Masonboro

New
Hanover

Kings Grant

Murraysville

Ogden

Topsail Beach

Hampstead

Castle Hayne

Marlboro

Mooretown

Rocky Point

Edgecombe

St. Mary

Onslow

71 ft

Legend

 Airport

 Nuclear Site

 UNCW

 Port

MPO Counties

 New Hanover

 Brunswick

 Pender

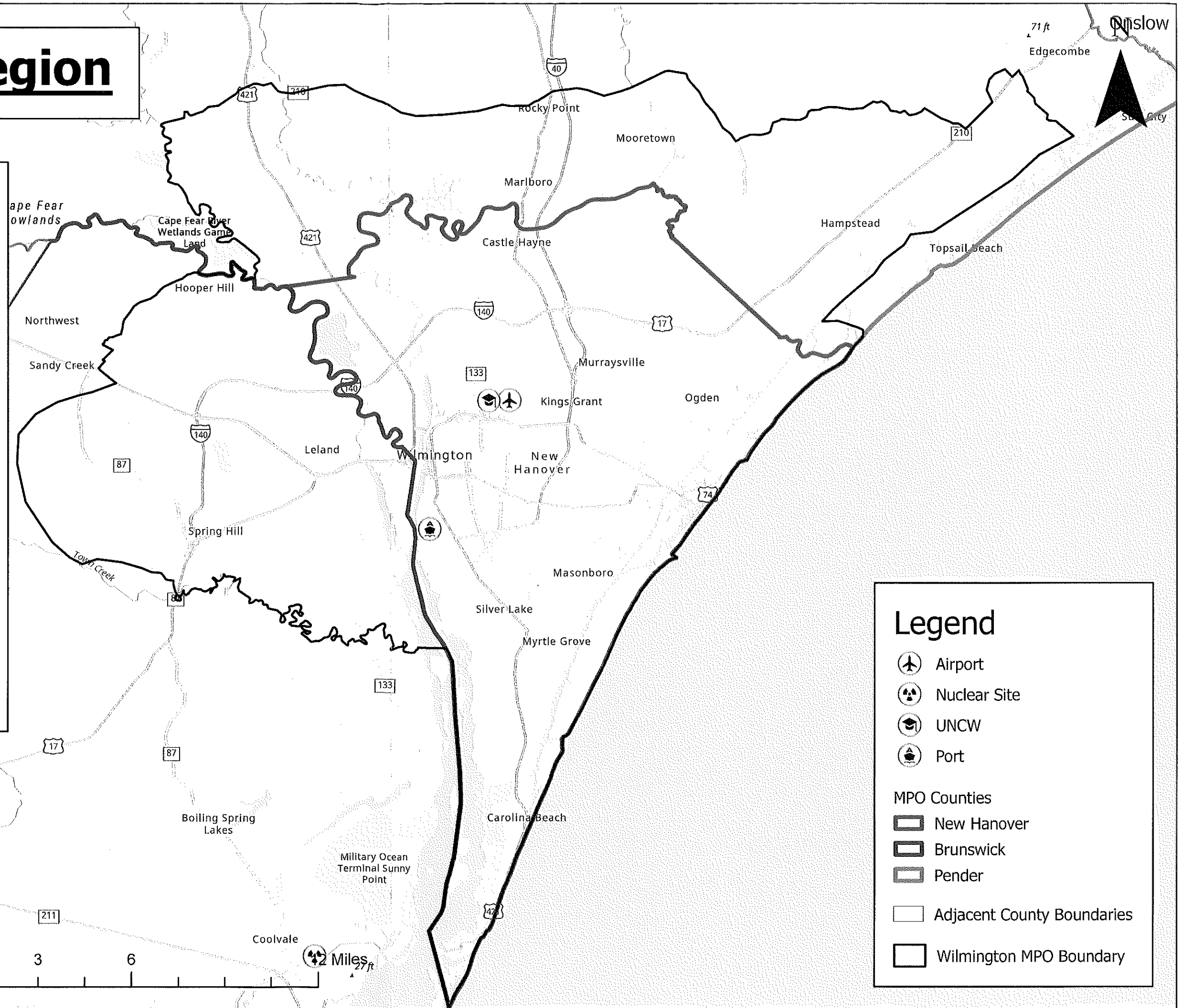
 Adjacent County Boundaries

 Wilmington MPO Boundary

Wilmington Region

Notes:

-Rail crossing



Legend

- Airport
- Nuclear Site
- UNCW
- Port

MPO Counties

- New Hanover
- Brunswick
- Pender

Adjacent County Boundaries

Wilmington MPO Boundary

ITS { Plan

60

- Projects : corridor projects : Rev. Lane

Frequency Mgmt: DMS, Fiber, Detection, Adaptive, MAP, ^{Dynamic} LMAP, ^{Control} LMAP

Arterial Hypert : ~~80~~ WLM TMC (Soluna)

Port: Freight: new south gate if across port
new north gate if S. front widening

Incident Agent: EWP; LMP
↳ WPD

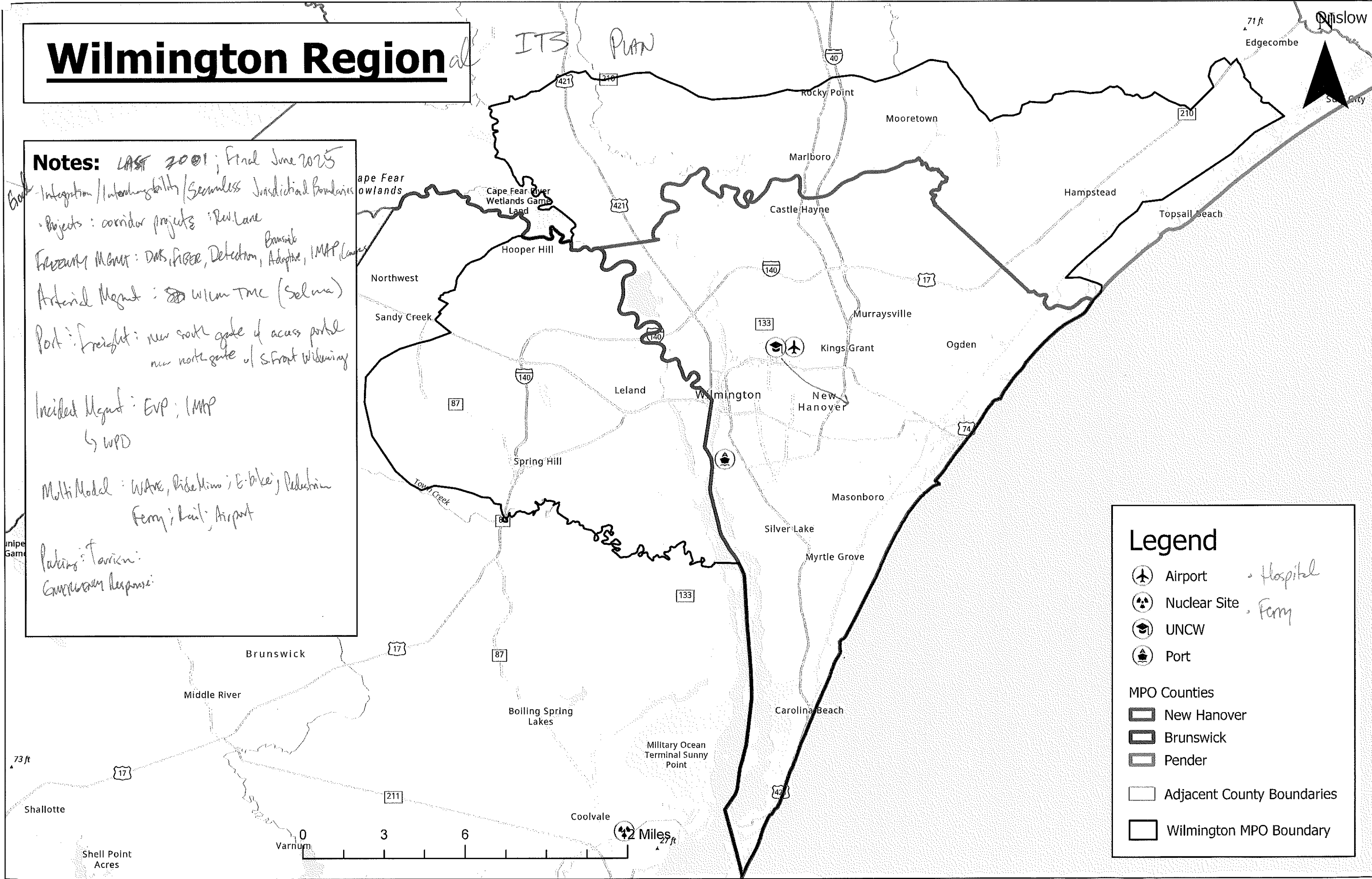
Multi Modal : Water, Bikes, E-bike, Pedestrian
Ferry, Rail, Airport

Pakins: Tourism:
Emergency Response:

- Hospital
- Ferry


Port Pender

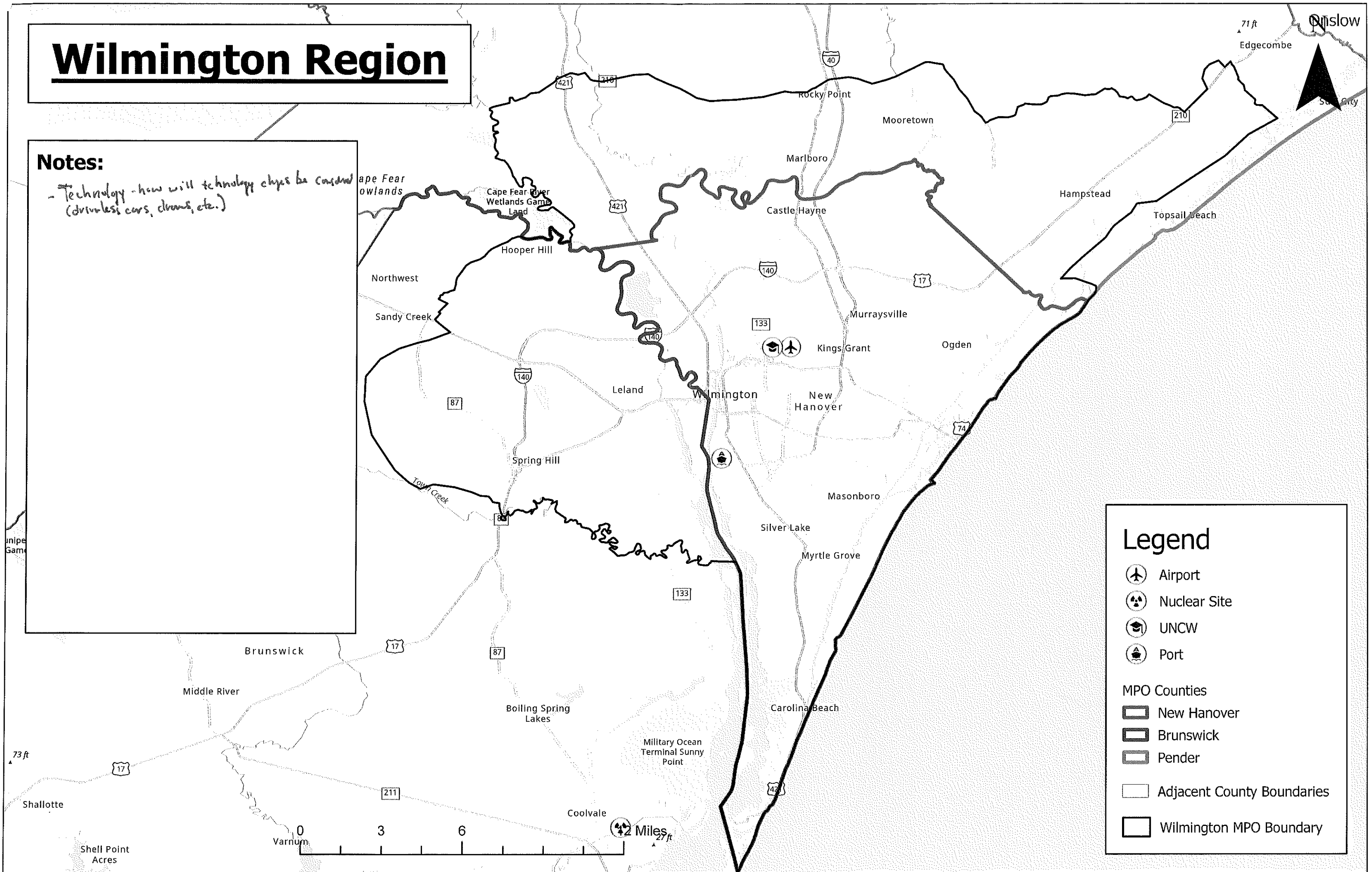
 Wilmington MPO Boundary



Wilmington Region

Notes:

- Technology - how will technology changes be considered (driverless cars, drones, etc.)



Wilmington Region

Notes:

Greer to send road flooding data set

Cape Fear
Wetlands

Cape Fear River
Wetlands Game
Land

Hooper Hill

Northwest

Sandy Creek

Town Creek

Spring Hill

Leland

Wilmington

New
Hanover

Masonboro

Silver Lake

Myrtle Grove

Carolina Beach

Boiling Spring
Lakes

Military Ocean
Terminal Sunny
Point

Coolvale

Rocky Point

Mooretown

Marlboro

Castle Hayne

Murraysville

Kings Grant

Ogden

Hampstead

Topsail Beach

71 ft

Edgecombe

Wilmington

Seaside City

Legend



Airport



Nuclear Site



UNCW



Port

MPO Counties



New Hanover



Brunswick



Pender



Adjacent County Boundaries



Wilmington MPO Boundary

73 ft

Shallotte

Shell Point
Acres

0
Varnum

3

6

2 Miles

27 ft

Wilmington Region

Notes:

Attractions/
Destination

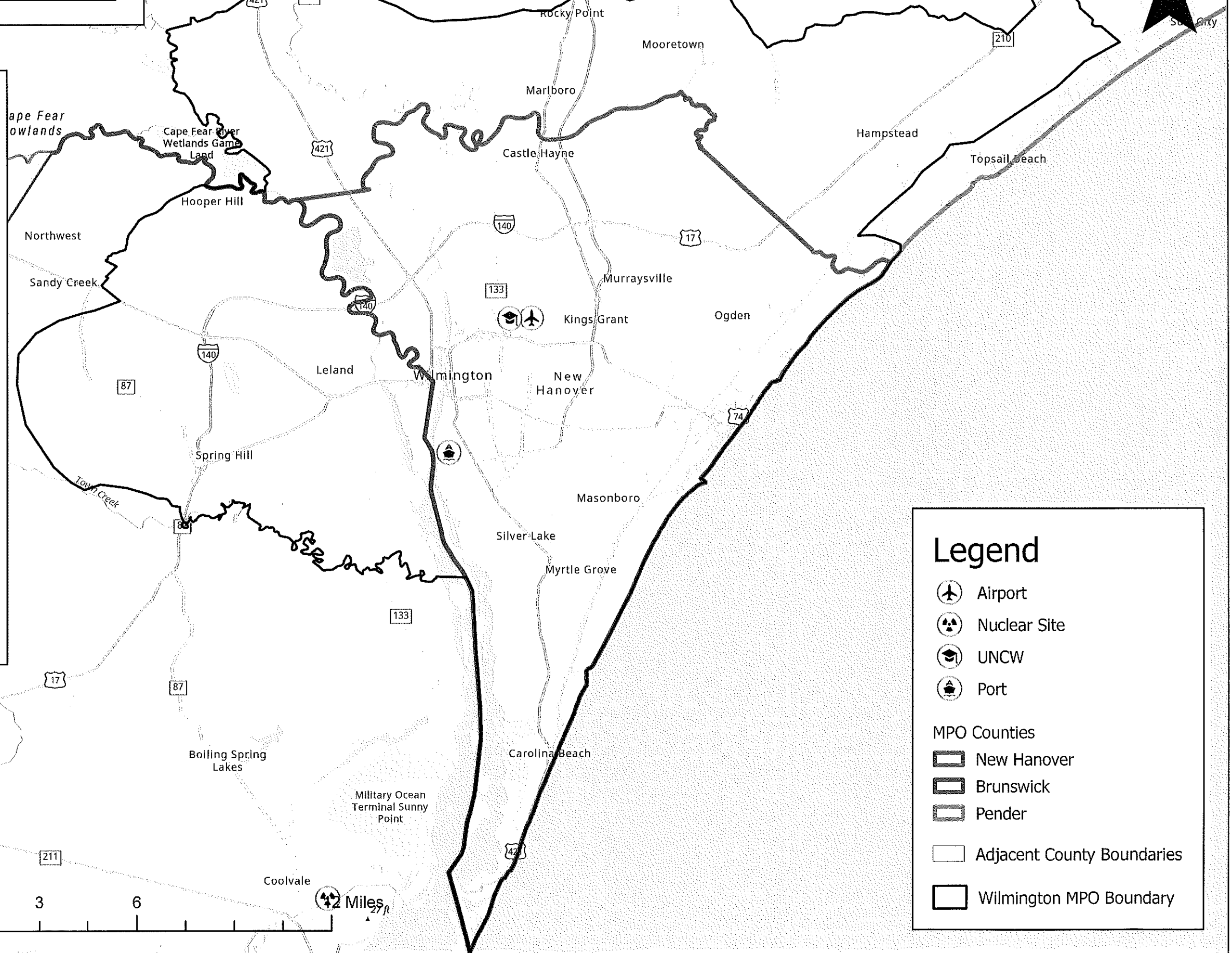
Medical Center
Community College
Fort Fisher Ferry
STRAHNET
Military Power Platform Projection
Beach destinations

Includerail lines
to maps

Floods:
Water Street
South Front Street
NC 133 / River Road
Carolina Beach
Near Port

Detailed
evac routes

Resiliency of
communication



Legend

- Airport
- Nuclear Site
- UNCW
- Port

MPO Counties

- New Hanover
- Brunswick
- Pender

Adjacent County Boundaries

Wilmington MPO Boundary

Core Team Meeting 2 – Minutes

Date: March 10, 2025

Time: 10:30 AM – 11:30 PM

Attendees

Carolyn Caggia (WMPO)	Beth King (WMPO)
Jeff Dale (Kimley-Horn)	Abby Lorenzo (WMPO)
Emily Giampietro (Kimley-Horn)	Jeff Scott (NCDOT)
Allen Hancock (NCDOT)	Greer Templer (WMPO)
Tracey Helms (NCDOT)	Denys Vielkanowitz (WMPO)
Natasha Henderson (NCDOT)	Shannon Whaley (NCDOT)

Meeting Notes

1. Project Status

KH presented on the project status sharing the scope, workflow, and the progress made on the main deliverables.

2. Vision, Goals, and Guiding Principles Review

KH shared the revised vision, guiding principles, and goals based on feedback received during Workshop 1. The core team provided additional feedback that will be integrated to establish the final set.

Vision

- Integrate TSMO strategies that provide a safe and efficient regional transportation system, moving people and goods, and promotes health and a sense of place.

Guiding Principles

- Integrate strategies with positive impacts on public health and improve quality of life for all transportation users, including pedestrians, cyclists, drivers, and public transit passengers.
- Implement accessible and equitable strategies for communities when addressing regional goals.

Goals

- Align with Vision Zero initiatives by leveraging TSMO strategies to create a safe and fair transportation system for all users.
- Promote the use of technologies that support mobility and reliable transportation while improving resiliency and long-term environmental viability.
- Invest in TMSO strategies that promote multi-modal transportation throughout the region and preserve a sense of place.

- Foster economic sustainability in the region through investing in TSMO strategies and providing access to resources for all communities.

3. Recap of Stakeholder Workshop #1

KH gave a recap of what was presented during the first stakeholder workshop. General feedback from the workshop was presented to the core team.

4. CMM Matrices and Gap Assessment

The concept of the capability maturity model (CMM) was presented and KH explained how it will be used to identify gaps in the region. An example matrix was provided to show the different dimensions used when evaluating the region's maturity in different functional areas. KH then presented the gaps for the categories listed below. KH captured additional feedback from the Core Team members within each of the categories.

Port and Freight

- Consider freight priority as a mobility tool to extend green times on key corridors accessing the port

Multimodal

- Need to be consistent with how the word multimodal is used
- Lack of funding to improve infrastructure and enforcement of vulnerable road users
- Need to consider multimodal parking infrastructure

Freeway Management

- Relaying of reliable traveler information around critical choke points in the region (not just during bridge closures)
- Dynamic signage to reroute motorists to I-140 on Cape Fear Memorial Bridge
-

Parking and Tourism

- Wayfinding to guide users to available parking capacity
- Live Oak Bank Pavilion generates major parking problems
- Outdated parking systems, decks, and infrastructure
- Lack of data analytics for reliable traveler information
- Need for a centralized database of parking capacity

Emergency Response and Resiliency

- Educate the public on "Know Your Zone" and evacuation routes (solution)
- Create "playbook" – routes that could be used during evacuation; depending on the location of the storm
- Pender County's current infrastructure cannot handle full population evacuation
- Public is hesitant to evacuate when an emergency event occurs
- EOC is notified when event occurs and starts chain of communication once they receive a call



- Consistent collaboration can improve knowledge transfer as individuals change roles within agencies
 - Where will the information be held and how will it be accessed
 - Eastern TMC or STOC could be the primary holder of this information

5. Draft Strategies

KH provided an overview of potential solutions for the categories listed above and captured additional details from the Core Team members.

Traffic Incident Management

Port and Freight

Traffic Management

- Traveler information should not be limited to only DMS

Multimodal

- Use more specific language to define a ride share program vs a park-and-ride (goal is to shift modes and get more travelers out of individual cars)

Arterial Management

Freeway Management

Parking and Tourism

Emergency Response and Resiliency

6. Next Steps

KH presented both the next steps for the project and the core team.

- Core Team to provide CMM matrix comments (attached)
- KH to explore best practices for the draft list of strategies
- KH to develop potential projects based on best practice reviews
- KH to prepare Core Team Meeting #3 materials on industry best practices



WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

CORE TEAM MEETING #2

March 10, 2025



WMPO

Kimley»Horn

Agenda



- Project Status
- Recap of Vision, Goals, and Guiding Principles
- Recap of Stakeholder Workshop #1
- CMM Matrices and Gap Assessment
- Draft Strategies
- Next Steps

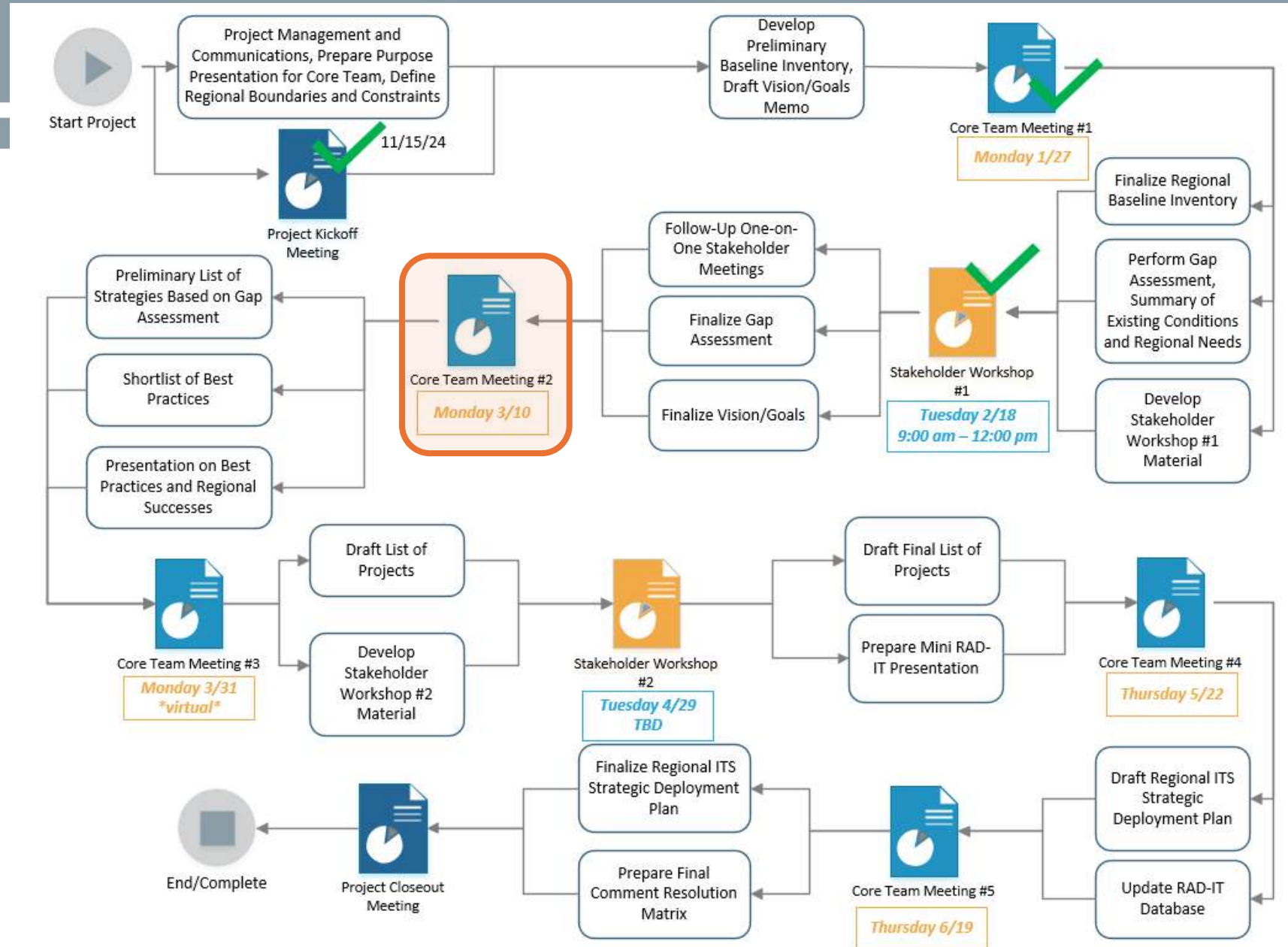
Project Status



Workflow

Scope Summary

1. Stakeholder Identification and Outreach Plan
2. Vision, Goals, and Objectives
3. Gap Assessment
4. Best Practices and Project Identification
5. ITS Regional Strategic Deployment Plan (SDP)



Main Deliverables

- ✔ Stakeholder Identification and Outreach Plan
- ✔ ITS Vision, Goals, and Objectives
- ✔ Baseline Inventory
- ✔ CMM Assessment
- Gap Assessment
- Best Practices and Project Identification
- Regional ITS Architecture
- Regional ITS Strategic Deployment Plan and Implementation Guide

Recap of Vision, Goal, and Guiding Principles

Project Vision

Integrate TSMO strategies that provide a safe and efficient regional transportation system, moving goods and people, and promotes health and a sense of place.

Project Guiding Principals

Implement accessible and equitable strategies for communities when addressing regional goals.

Integrate strategies with positive impacts on public health and improve quality of life for all transportation users, including pedestrians, cyclists, drivers, and public transit passengers.

Project Goals

Invest in TMSO strategies that promote **multi-modal** transportation throughout the region and preserve a **sense of place**.

Align with Vision Zero initiatives by leveraging TSMO strategies to create a **safe and equitable** transportation system for all users.

Promote the use of technologies that support **mobility and reliability** while improving resiliency and long-term environmental viability.

Foster **economic success** in the region through investing in TSMO strategies and providing access to resources for all communities.

Recap of Stakeholder Workshop #1

Workshop Recap

- Provided project overview and goals to Stakeholders
- Led large group technical sessions
 - Freeway Management
 - Arterial Management
 - Multi-Modal
 - Port and Freight
 - Incident Management
 - Parking
 - Emergency Management
- Gained feedback on barriers that limit implementation or integration of transportation related technologies

General Feedback

- Lack of funding to invest in technology
- Increasing congestion
- Flood prone areas
- Regional growth driving need for infrastructure improvements
- Strong emphasis on open communication between counties

CMM Matrices and Gap Assessment

What is the Capability Maturity Model (CMM)?

A framework that supports the evolution of TSMO through self-evaluation of the process and capabilities needed to execute a successful TSMO program.

CMM assesses the systems maturity by:

- Evaluating the agencies current state
- Identifying gaps and needs for improvement
- Collaborative assessment of the region's maturity level
- Deriving priorities that elevate the regional maturity



Capability Maturity Dimensions

CATEGORY				
Definition:				
	What is placing us in our current tier?		What is keeping us from advancing to the next level?	
	Level 1 Ad Hoc	Level 2 Managed	Level 3 Integrated	Level 4 Optimizing
Business Processes				
Systems and Technology				
Performance Measurement				
Culture				
Organization and Staffing				
Collaboration				
Workshop Actions to Advance to Next Level				

Gaps – Traffic Incident Management

What is keeping us from advancing to the next tier?

- Comprehensive and consistent coverage of IMAP routes
- Aging IMAP vehicle fleet
- Need for better technology on IMAP vehicles
 - Vehicle location
 - Surveillance capabilities
 - Lighting
- EMS and fire mobility limitations – network congestion does not allow room to pass or go through traffic and bridges create pinch points for responding to incidents
- Ability to proactively identify choke points

Gaps – Port and Freight

What is keeping us from advancing to the next tier?

- Ingress limitations cause excessive queuing on external routes
- No safety system to alert all individuals at the port property
- CFMB bridge closures route trucks through neighborhoods
- Designated truck infrastructure and technology around port
- Increase congestion in region impacts freight mobility
- Queue management for at-grade rail crossings
- Truck parking enforcement
- Network freight data usage and predictions
- Challenges with communicating effective navigation to CMV

Gaps – Multimodal

What is keeping us from advancing to the next tier?

- Existing infrastructure to support multimodal travel
- Regulation and management of e-bikes and scooters
- Limited staff and resources to enforce multi-modal regulations
- Major corridors lack infrastructure for vulnerable road users to cross
- Passenger rail currently not available
- Procurement and sponsorship challenges for micro-mobility programs
- Educational issues; professional drivers on road that do not follow roadway laws
- Ride Micro service is not instant (can only plan ahead) and has difficulty with first-last mile

Gaps – Arterial Management

What is keeping us from advancing to the next tier?

- Outdated signal system
 - Network resiliency and redundancy for signal system
 - External partners access to cameras
 - Limited detection technology
 - Serial communication technology
- Funding and procurement challenges with exploring new signal technologies
- Need for cell phone distraction education
- Traveler information and signage – key areas of the regional network do not follow typical a grid layout
- Routes over bridges have unreliable timing

Gaps – Freeway Management

What is keeping us from advancing to the next tier?

- Network resiliency and redundancy
 - Gaps in of fiber communication east of I-40
- Gaps in DMS on key routes
- Funding challenges procuring additional DMS and freeway infrastructure devices
- Limited resources for maintenance of DMS
- Increasing traffic congestion across the region
 - Major routes terminate in Wilmington with limited outlets along the coast
- Effective traveler information for commercial vehicles
- Relaying traveler information or route updates during bridge closures

Gaps – Parking and Tourism

What is keeping us from advancing to the next tier?

- Parking capacity at beach destinations
- Lack of park and ride options
- Need for non car-centric strategies and infrastructure
- Parking management
 - Commercial loading zones; taxi spots downtown; residential only parking program; on-street parking capacity management
- Lack of data analytics for parking needs
- Need for a centralized database for parking information
- Strategies for event parking management
 - Communication and coordination with venues and concerts
 - Options for pre-purchasing parking prior to event

Gaps – Emergency Response and Resiliency

What is keeping us from advancing to the next tier?

- Mobility challenges during evacuations
- Region not leveraging emergency response technology for secondary uses
- Improve coordination and collaboration
- Brunswick is in need of an emergency preparedness zone (EPZ) – nuclear emergency plan
- Support for funding an update to the “Know Your Zone” maps
- Flood mitigation is limited
- Challenges with infrastructure accommodating current population when evacuating

Draft Strategies

Strategies – Incident Management

- IMAP Expansion
- IMAP Vehicle Technologies
- EVP Expansion
- Dynamic routing for major incidents at choke points
- Collaboration for evacuation coordination
- More detail within Evacuation plans (hurricane, radiological)
- Rerouting plans for CFMB impacts

Strategies – Traffic Management

- Signal System upgrade
- Flood mitigation system
- Expand and improve communication infrastructure
- Expand DMS coverage

Strategies – Freight

- Port Ingress Management
- Wide Area Alert for port property
- Freight mobility technologies (active mapping for CMV, freight signal priority)
- Truck parking management

Strategies – Multimodal

- Educational Partnerships with Go Coast TDM
- Non-traditional ICM (integration with ferry system)
- Regulation and management for VRU (e-bikes and scooters)
- Education tools (distracted driving, safety for VRU)
- Parking Management
- Ride Share for beach destinations

Next Steps

Project Next Steps

- Draft List of Strategies
- Preparation for Core Team Meeting #3
- Preparation for Stakeholder Workshop #2

Core Team Next Steps

- Provide feedback on CMM Assessment
- Core Team Meeting #3 – Virtual (March 31th 2025)
- Stakeholder Workshop #2 Prep – (April 29th 2025)

Questions

Natasha Henderson (NCDOT Project Manager)
nehenderson@ncdot.gov

Jeff Dale (Kimley-Horn Project Manager)
jeff.dale@kimley-horn.com



Core Team Meeting 3 – Minutes

Date: March 31, 2025

Time: 3:00 PM – 4:00 PM

Location: Microsoft Teams

Attendees

Stephanie Ayers (Port of Wilmington)	Mike Kozlosky (WMPO)
Carolyn Caggia (WMPO)	Beth King (WMPO)
Adrienne Cox (NCDOT)	Stoney Mathis (NCDOT)
Jeff Dale (Kimley-Horn)	Andrew Skuce (NCDOT)
Emily Giampietro (Kimley-Horn)	Brandon Stokes (Kimley-Horn)
Allen Hancock (NCDOT)	Greer Templer (WMPO)
Tracey Helms (NCDOT)	Denys Vielkanowitz (WMPO)
Natasha Henderson (NCDOT)	Courtney Weeter (NCDOT)

Meeting Notes

1. Project Status

KH presented on the project status sharing the scope, workflow, and the progress made on the main deliverables.

2. Draft Strategy and Best Practice Review

KH presented the draft strategies and associated best practice research to garner Core Team member feedback on the direction of the project development. This feedback is being integrated into the project development for what will be presented as part of Workshop 2.

In addition to the high-level overview of the Best Practices research, Core Team members can review more specific details from the best practices research in the following SharePoint folder –

[Wilmington ITS Best Practices](#).

The attached PDF of the PPT includes the Focus Areas, Strategies, and Best Practices research that being referenced.

The following feedback was documented based on the conversation during the Core Team Meeting.

Core Team Feedback:

- Mike Kozlosky highlighted Senate Bill 576, a newly introduced E-bike legislation designed to classify various types of E-bikes and establish regulations for their use

3. Next Steps

KH presented both the next steps for the project and the core team.

- Core Team to provide feedback on best practices and draft projects
- Core team to promote and encourage attendance at Stakeholder Workshop #2
- KH to draft list of potential projects based on best practice reviews
- KH to prepare Stakeholder Workshop #2 materials on industry best practices



WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

CORE TEAM MEETING #3

March 31, 2025



WMPO

Kimley»Horn

Agenda



- Project Status
- Draft Projects and Best Practice Review
- Next Steps

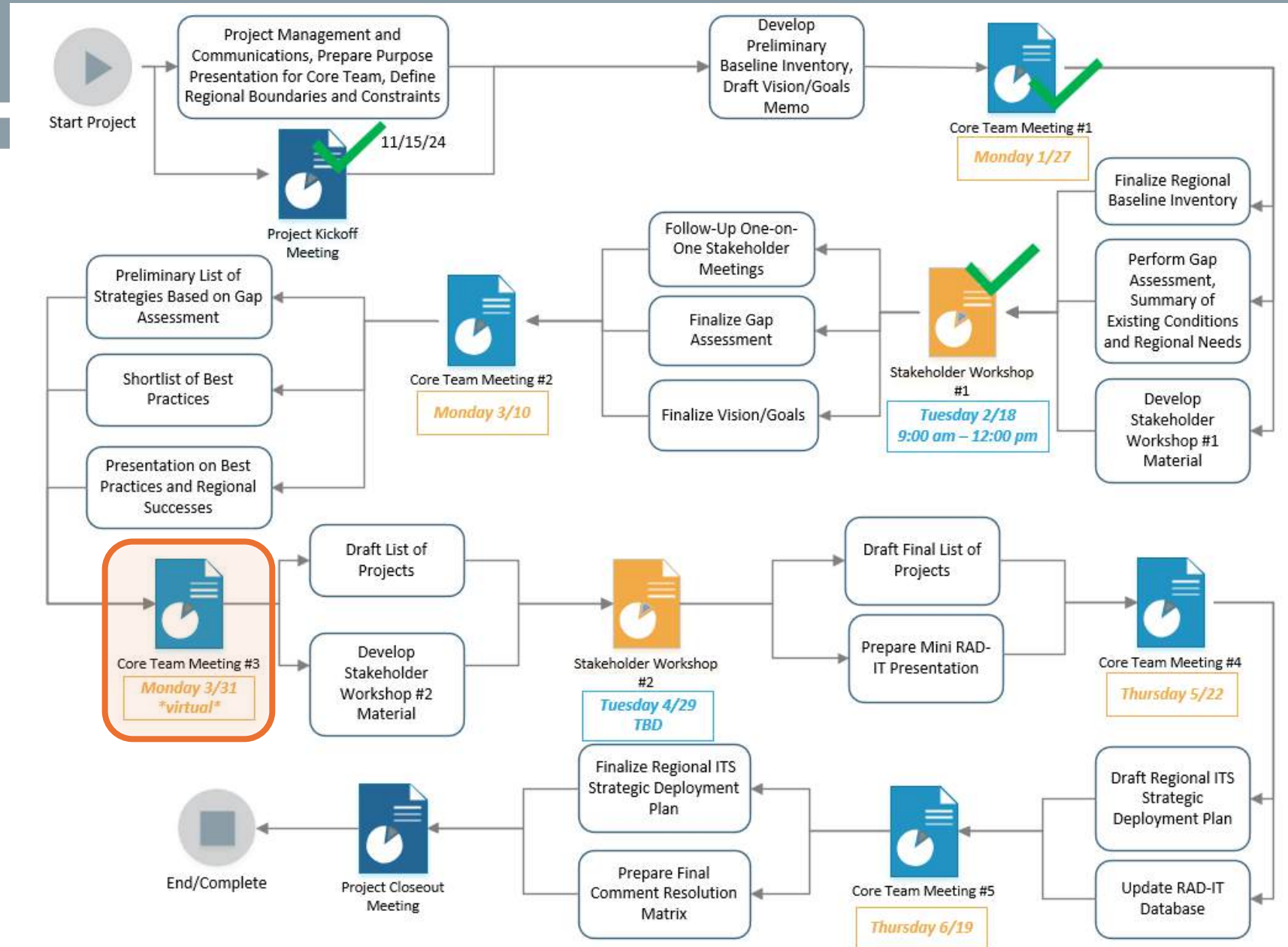
Project Status



Workflow

Scope Summary

1. Stakeholder Identification and Outreach Plan
2. Vision, Goals, and Objectives
3. Gap Assessment
4. Best Practices and Project Identification
5. ITS Regional Strategic Deployment Plan (SDP)



Main Deliverables

- ✔ Stakeholder Identification and Outreach Plan
- ✔ ITS Vision, Goals, and Objectives
- ✔ Baseline Inventory
- ✔ CMM Assessment
- ✔ Gap Assessment
- ✔ Best Practices and Project Identification
- Regional ITS Architecture
- Regional ITS Strategic Deployment Plan and Implementation Guide

Draft Strategy and Best Practice Review

Arterial Management

Dynamic Routing

- Hampton Roads 2045 LRT Plan
 - “Reach the Beach” initiative uses DMS to provide users information on the fastest routes to the Virginia Beach Oceanfront
- Systems Engineering Analysis for MnDOT Arterial Traffic Management Concept of Operations
 - Defines ITS tools to manage traffic on MnDOT arterial roadways, who will use the tools, why the tools are or will be used, and how to use the tools

Cape Fear Memorial Bridge Detour

- MnDOT Bridge Scour Plan of Action
 - Plan of Action (POA) document to be customized for any bridge closures and includes the sections for history, recommended actions, monitoring plan, and

Arterial Management

Funding Signal System Upgrades

- U.S. Federal Highway Administration
 - Congestion Mitigation and Air Quality Improvement Program (CMAQ)
 - Highway Safety Improvement Program (HSIP)
 - Surface Transportation Block Grant Program for traffic signal updates
- U.S Department of Transportation SS4A (Safe Streets for All) Program

Emergency Response & Resiliency

Evacuation Plans and Centralized Location

- Orange County, NY – Indian Point Emergency Guide
 - “Are You Ready” guide and app communicates to citizens information about radiation, how to stay informed, evacuation bus routes, and frequently asked questions
- Pilgrim Nuclear Power Station Emergency Plan (PNPS)
 - Provides a detailed list of roles and responsibilities of major departments (Police, Fire, EMS, etc.) as well as a communication plan
 - The PNPS Emergency Response Organization uses Everbridge notification system to alert all members of the organization that a nuclear event is occurring
- South Carolina Hurricane Guide
 - The evacuation website provides a detailed list of detour routes for each evacuation area

Emergency Response & Resiliency

Flood Impact Management System

- NCDOT Flood Warning System
 - Flood Inundation Mapping and Alert Network for Transportation
 - BridgeWatch
 - Transportation Surge Analysis Predictive Program
- Virginia Flood Risk Information System
 - Flood map with gauge locations, elevations, flood risk, and detailed information

Active Demand Management

Driver Education and Engagement

- Keep Georgia Safe- GDOT
 - Interactive website that providing games, books, classroom posters, and Kahoot quizzes to inform teen drivers on safe driving topics
- What Drives You Iowa
 - Communicates fatality statistics and safe driving behaviors to citizens
- Florida “Put It Down: Focus On Driving” Initiative
 - Brochures, information, and quizzes on vulnerable road user safety and dangerous driving safety tips

Active Demand Management

Vulnerable Road Users Management

- FHWA Future of E-Bikes on Public Lands: How to Effectively Manage a Growing Trend
 - Guidance and considerations on safety and social impacts of e-bikes and process for e-bike management
- TxDOT Bicycle and Pedestrian Program – Educational Series
 - Bicycle and pedestrian infrastructure coordination, advisory committee, education, grant programs, and statewide initiatives
- NYC DOT's Public E-Bike Charging Pilot
 - Pilot implemented e-bike charging docks and battery-swapping cabinets from and showed users are willing to pay for these services
- TxDOT Vulnerable Road User Assessment
 - Assists with the assessment of vulnerable road user infrastructure needs and provides education plan with emphasize on safe crossings, safe driving behaviors, and the impact of distracted driving

Active Demand Management

Truck Parking and Freight Mobility Resources

- 2024 Atlanta Regional Freight Mobility Plan Report
 - Regional industrial land use assessment and economic analysis to develop needs and recommendations
- Commercial Truck Parking Charlotte
 - Interactive page for commercial truck drivers to find user submitted parking lots (approved by City of Charlotte) and provides truck parking regulations and restrictions
- WSDOT Freight Signal Priority
 - Defines freight signal priority, when to use the strategy, and the policy, planning, and equipment needs for implementing
- California Statewide Truck Parking Study
 - Guidance on collecting data for determining where trucking parking supply is, trucking parking needs and priorities, and strategies for addressing parking needs

Active Demand Management

Wide Area Alert System

- Federal Communications Commission Wireless Emergency Alerts
 - Expand existing WAE calls to port area and collaborate with NCDOT for setting up geofencing and responses

Integrated Corridor Management (ICM)

- FDOT District 5 – ICM Operations Standard Operating Procedures (SOPs)
 - Serves as the SOPS for the ICM operations with defined roles and responsibilities for monitoring the freeway and notifying the appropriate personal

Traffic Management Centers

Communication Infrastructure Improvement Plan

- Bay Area Regional Broadband Communication Strategic Investment Plan
 - Framework to enable regional and local stakeholders to develop a regional communication network and prioritize projects base on benefits cost analyses
- City of Buckeye ITS Strategic Plan
 - Detailed guidance on expanding and connecting communication infrastructure existing infrastructure and other ITS technologies

DMS Expansion

- MDOT Quantifying Effectiveness and Impacts of Digital Message Signs on Traffic Flow
 - Technical review of messaging signs usage to determine improvements in communicating information to drivers and make recommendations to maximize the effectiveness of DMSs

Parking Management

Parking Management

- San Francisco Municipal Transportation Agency
 - Demand-responsive pricing program adjusts hourly meter prices to go up, down, or stay the same depending on the demand
- WSDOT Active Parking Management
 - Explains the strategy of using new parking technologies to better utilize available parking inventories and defines the policy needs, coordination, and equipment for implementation
- LA Express Park
 - Integrated parking app showing available spots between third party users with city agreement (separate fare systems between third parties)

Parking Management

Park and Ride Implementation

- Coast RTA Entertainment Shuttle
 - Myrtle Beach seasonal entertainment shuttle providing free transportation services to local attractions and beaches
 - Runs every 30-35 minutes and can be tracked in real-time through the app
- City of St. Augustine Shuttle Services
 - Park and ride shuttles are organized for popular weekend events, festivals, holiday fireworks, or season peaks

Traffic Incident Management

IMAP Existing Infrastructure/Expansion

- Continual expansion to NCDOT IMAP program

First Responder Vehicle Technology Improvement

- NCDOT
 - Tethered Drones on IMAP trucks help fill gaps in camera system
- Greater Philadelphia
 - Responder-to-Vehicle Technology alerts motorists of the presence and location of emergency vehicles to help them abide by the Move Over, Slow Down law

Emergency Vehicle Pre-emption Expansion

- Continual expansion on existing EVP program to EMS

Next Steps

Project Next Steps

- Draft List of Projects
- Preparation for Stakeholder Workshop #2

Core Team Next Steps

- Provide feedback on best practices and draft projects
- Promote and encourage attendance at Stakeholder Workshop #2

Questions

Natasha Henderson (NCDOT Project Manager)
nehenderson@ncdot.gov

Jeff Dale (Kimley-Horn Project Manager)
jeff.dale@kimley-horn.com

Core Team Meeting #3 - Best Practice Review Survey Results

Responses Overview Active



1. Arterial Management - Dynamic Routing



2. Arterial Management - Dynamic Routing



3. Arterial Management - Cape Fear Memorial Bridge Detour



Core Team Meeting #3 - Best Practice Review Survey Results

4. Arterial Management - Funding Signal System Upgrades



5. Arterial Management - Funding Signal System Upgrades



6. Arterial Management - Funding Signal System Upgrades



7. Arterial Management

1

Responses

Latest Responses

"Do not restrict the bridge detour plan to the Cape Fear Bridge only, use for every ..."

Core Team Meeting #3 - Best Practice Review Survey Results

8. Emergency Response & Resiliency - Evacuation Plans and Centralized Location



9. Emergency Response & Resiliency - Evacuation Plans and Centralized Location



10. Emergency Response & Resiliency - Evacuation Plans and Centralized Location



11. Emergency Response & Resiliency - Flood Impact Management System



Core Team Meeting #3 - Best Practice Review Survey Results

12. Emergency Response & Resiliency - Flood Impact Management System



13. Emergency Response & Resiliency



14. Active Demand Management - Driver Education and Engagement



15. Active Demand Management - Driver Education and Engagement



Core Team Meeting #3 - Best Practice Review Survey Results

16. Active Demand Management - Driver Education and Engagement



17. Active Demand Management - Vulnerable Road Users Management



18. Active Demand Management - Vulnerable Road Users Management



19. Active Demand Management - Vulnerable Road Users Management



Core Team Meeting #3 - Best Practice Review Survey Results

20. Active Demand Management - Vulnerable Road Users Management



21. Active Demand Management - Truck Parking and Mobility Resources



22. Active Demand Management - Truck Parking and Mobility Resources



23. Active Demand Management - Truck Parking and Mobility Resources



Core Team Meeting #3 - Best Practice Review Survey Results

24. Active Demand Management - Truck Parking and Mobility Resources



25. Active Demand Management - Wide Area Alert System



26. Active Demand Management - Integrated Corridor Management



27. Active Demand Management



Core Team Meeting #3 - Best Practice Review Survey Results

28. Traffic Management Centers - Communication Infrastructure Improvement Plan



29. Traffic Management Centers - Communication Infrastructure Improvement Plan



30. Traffic Management Centers - DMS Expansion



31. Traffic Management Centers

1

Responses

Latest Responses

...

Core Team Meeting #3 - Best Practice Review Survey Results

32. Parking Management - Parking Management



33. Parking Management - Parking Management



34. Parking Management - Parking Management



35. Parking Management - Parking and Ride



Core Team Meeting #3 - Best Practice Review Survey Results

36. Parking Management - Parking and Ride



37. Parking Management



38. Traffic Incident Management - IMAP Existing Infrastructure/Expansion



39. Traffic Incident Management - First Responder Vehicle Technology Improvement



Core Team Meeting #3 - Best Practice Review Survey Results

40. Traffic Incident Management - First Responder Vehicle Technology Improvement



41. Traffic Incident Management - Emergency Vehicle Pre-emption Expansion



Core Team Meeting 5 – Minutes

Date: August 21, 2025

Time: 11:00 AM – 12:30 PM

Location: Microsoft Teams

Attendees

Stephanie Ayers (Port of Wilmington)	Abby Lorenzo (WMPO)
Carolyn Caggia (WMPO)	Nazia Sarders (NCDOT)
Jeff Dale (Kimley-Horn)	Stoney Mathis (NCDOT)
Emily Giampietro (Kimley-Horn)	Nazia Sarder (NCDOT)
Allen Hancock (NCDOT)	Jeff Scott (NCDOT)
Natasha Henderson (NCDOT)	Andrew Skuce (NCDOT)
Beth King (WMPO)	Greer Templer (WMPO)
Mike Kozlosky (WMPO)	Shannon Whaley

Meeting Notes

1. Project Status

KH presented on the project status sharing the scope, workflow, and the progress made on the main deliverables.

2. Comment Review

KH presented the comments received on the draft document during the meeting. The additional feedback discussed in response to the draft comments is summarized below.

- Resiliency Improvement Plan (Previously Regional Evacuation Routes)
 - o Update project sheet name from *Regional Evacuation Routes* to *Resiliency Improvement Plan*
 - o Move nuclear response plan information to this project sheet
 - o Focus on looking forward to with a focus network and infrastructure resilience
 - o Understand what areas could benefit from risk mitigation strategies
- Emergency Vehicle Preemption expansion
 - o List as a quick win; full project sheet may not be needed
- Parking Space Management
 - o Identify preemption traveler information (use of phones prior to arriving)
 - o Dynamic type of communications (towns have issues with weekend parking and interested in the ability to notify people as capacity is reduced)

- o Provide Wrightsville Beach as an example for need and application
 - Park and Ride for Key Destinations
 - o Add context highlighting that the locations and solutions would be up determined and coordinated with each specific local agency
 - ITS Project Process
 - o Update content referencing procurement table and its use
 - o Move detailed table to appendix for reference
3. Next Steps
- KH presented the next steps for completing the project.
- Address comments received
 - Finalize plan with executive summary for submission to Core Team in September
 - WMPO presentations (TCC and Board) – recently moved to October meetings



WILMINGTON REGIONAL ITS
STRATEGIC DEPLOYMENT PLAN

CORE TEAM MEETING #5

August 21, 2025



WMPO Kimley»Horn

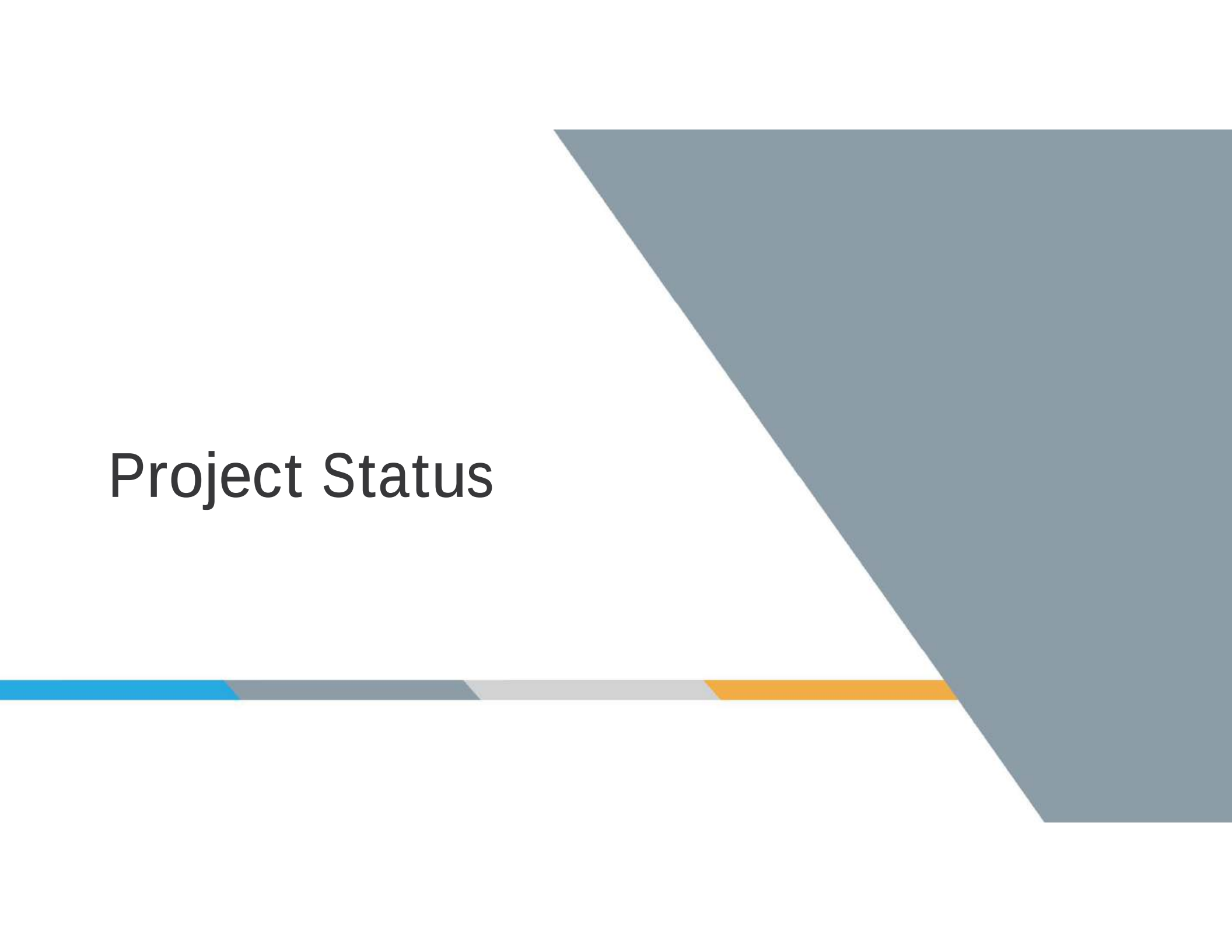


Agenda



- Project Status
- Comment Review
- Next Steps

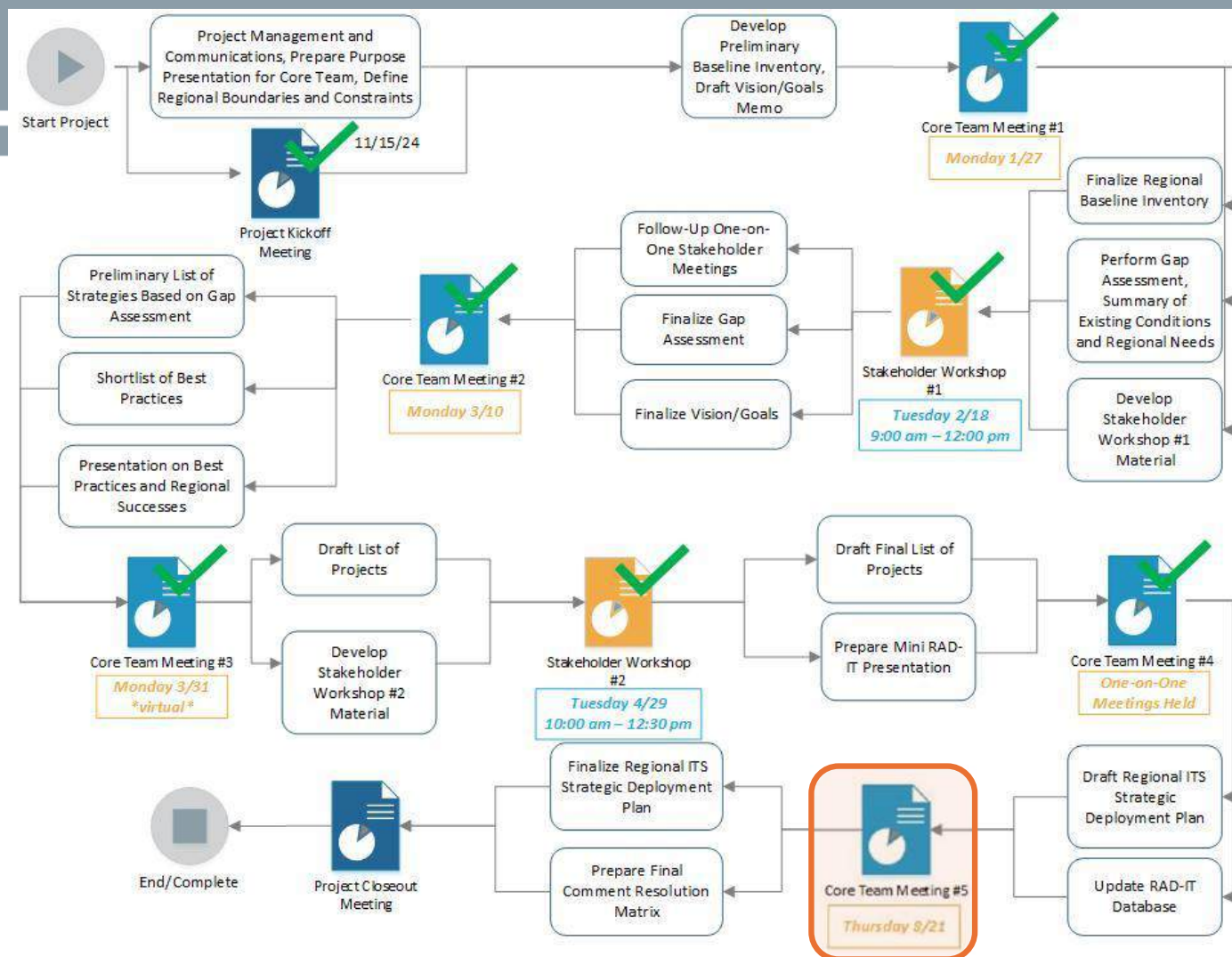
Project Status

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Workflow

Scope Summary

1. Stakeholder Identification and Outreach Plan
2. Vision, Goals, and Objectives
3. Gap Assessment
4. Best Practices and Project Identification
5. ITS Regional Strategic Deployment Plan (SDP)



Main Deliverables

- ✔ Stakeholder Identification and Outreach Plan
- ✔ ITS Vision, Goals, and Objectives
- ✔ Baseline Inventory
- ✔ CMM Assessment
- ✔ Gap Assessment
- ✔ Best Practices and Project Identification
- ✔ Regional ITS Architecture
- ✔ Regional ITS Strategic Deployment Plan and Implementation Guide

Comment Review



Comment Review

- General Report
 - Add acronym page and confirm all are defined within the report in first time use
 - Update photos to show Wilmington region and infrastructure
 - Confirm all tables and graphics have captions and titles
 - Simplify text
 - Confirm federal compliancy in language
 - Add a section highlighting existing conditions and current investments in technology
 - Review gap language tone

Comment Review

- Core Team and Stakeholder Representation
 - Include Project Management representation
 - Include all staff members under Core Team
 - Update Stakeholder list with specific departments and offices

Comment Review

- Plans Referenced
 - Add year of adoption and jurisdiction
- Vision, Guiding Principles, and Goals
 - Update icons to match project sheets

Comment Review

- Project Identification
 - Explain correlation of Stakeholder engagement with federal requirements
- Project Sheets
 - Create a category of quick wins
 - WEA can be done easily with limited to no cost and does not require a full project sheet
 - Nuclear Response Plan: Do we want to keep?
 - Revise tone and text used for gaps as noted

Comment Review

- Multimodal
 - Update multimodal existing conditions with Wave Transit and RideMICRO-on demand service
- Port and Freight
 - Port does not participate in nuclear task force exercises
 - Revise gaps

Comment Review

- Traffic Management Centers (CMM)
 - Reword existing conditions bullet discussing broadband funding
 - Add preemption at some signals to identified gaps
 - Reword gaps to be comprehensive when discussing bridge closures
- Parking Management (CMM)
 - Update park and ride text in Leland to clarify service is not operational between the town and New Hanover County
 - Include MPO parking plans

Comment Review

- Repurpose into *Freight Navigation and Truck Parking*
- Freight Navigation (Project Sheet)
 - Challenges – need to discuss
 - Remove port specific bullets here
- Port Ingress (Project Sheet)
 - Revise sheet to focus on external infrastructure around the port
 - Update proposed technology text for traffic signals
- Truck Parking (Project Sheet)
 - Confirm challenges for truck parking based on existing conditions
 - Explore safety opportunities to quality for SS4A
 - Add information bubble with truck parking plan needs

Comment Review

- Signal System Upgrade (Project Sheet)
 - Update TOC to TMC to be consistent with language Wilmington uses
 - Add Wilmington Beltline project to information call out
- Driver Education and Engagement Program
 - Explore additional proposed technology
 - Rework potential owners to show partnership opportunities between NCDOT/NCDMV with Go Coast/WMPO

Comment Review

- Smart Moves: From Plans to Pavement (Project Sheet)
 - Add additional technology context to project description
 - Scooters and E-bikes (add bicycles)
 - Classify and allow local regulations for e-bikes (reference WMPO legislative agenda)
- Regional Evacuation Routes (Project Sheet)
 - Include call out to support a Resiliency Impact Plan
 - Rename map with more encompassing title

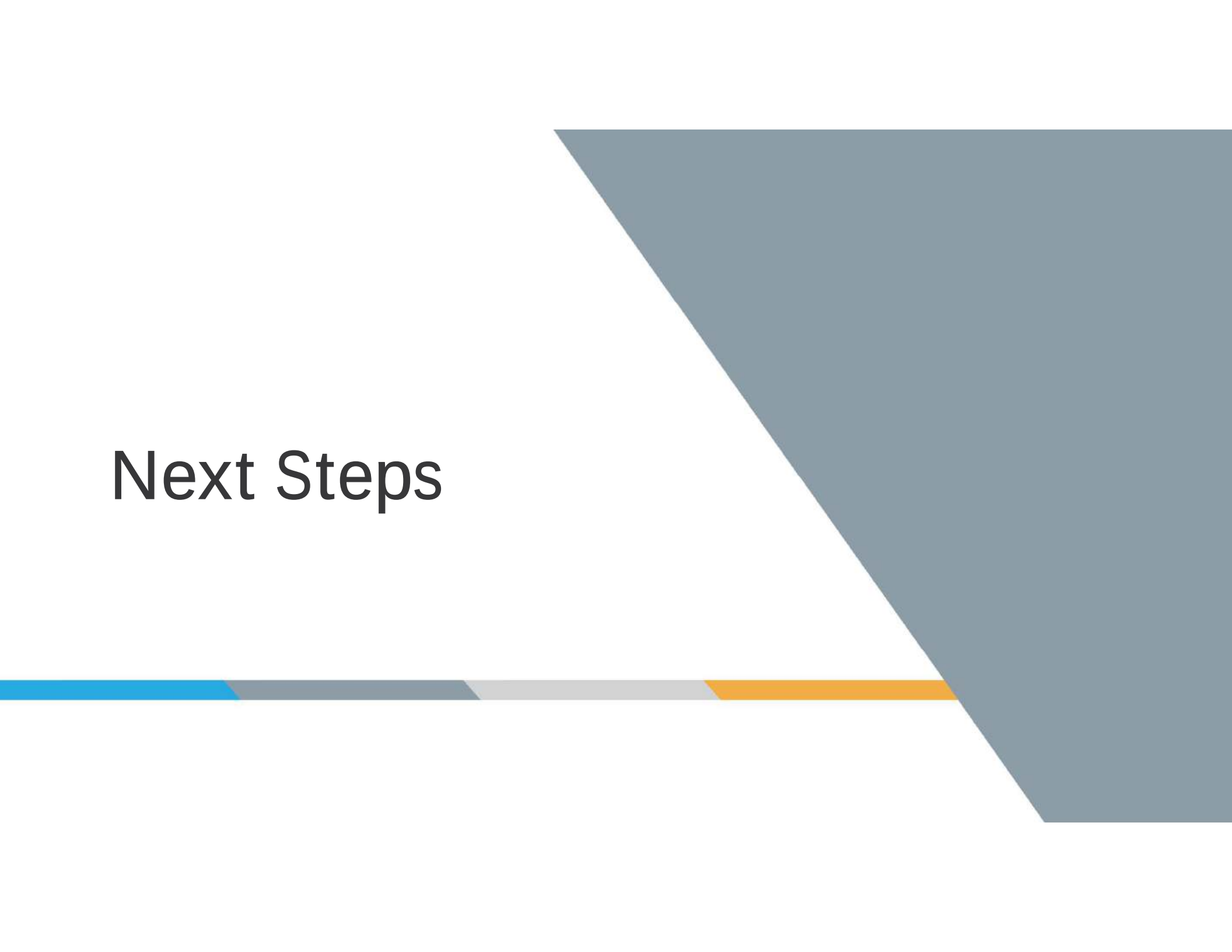
Comment Review

- Emergency Vehicle Preemption (Project Sheet)
 - Add Surface Transportation Block Grant to potential funding
 - Add information bubble with summary of existing status
- IMAP Vehicle Technology (Project Sheet)
 - Explore technology to support increase in EV

Comment Review

- ITS Project Process
 - Provide additional context to procurement package table
- Next Steps
 - Provide guidance on prioritization to projects

Next Steps

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Next Steps

- Address comments received
- Finalize plan with executive summary
- WMPO Presentations (TCC and Board)

Questions

Natasha Henderson (NCDOT Project Manager)
nehenderson@ncdot.gov

Jeff Dale (Kimley-Horn Project Manager)
jeff.dale@kimley-horn.com



APPENDIX E - STAKEHOLDER WORKSHOP 1



Stakeholder Workshop 1 – Minutes

Date: February 18, 2025

Time: 9:00 AM – 12:00 PM

Attendees

Abby Clayboss (Town of Leland)	Jeremy Humphries (Town of Leland)
Abby Lorenzo (WMPO)	John Grimes (Town of Leland)
Alex Stewart (NCDOT-ITS)	Mike Kozlosky (WMPO)
Allen Hancock (NCDOT)	Nazia Sarder (NCDOT)
Allison Fluit (Kimley-Horn)	Shannon Whaley (NCDOT)
Blake Stevens (Town of Leland)	Stephanie Ayers (Port of Wilmington)
Chad Staradumsky (City of Wilmington)	Steve Wardle (NCDOT)
David McIntire (Brunswick County)	Stoney Mathis (NCDOT)
Denys Vielkanowitz (City of Wilmington)	Thomas Robinson (City of Wilmington Fire Department)
Eleni Nakos (Kimley-Horn)	Tommy Batson (Pender County)
Emily Giampietro (Kimley-Horn)	

Meeting Notes

1. Welcome and Introductions

Each attendee introduced themselves including their name, agency, and role.

2. Project Overview

KH presented on the project overview sharing the scope, project workflow, regional boundary, and asks of the stakeholders. The regional boundary for the Wilmington ITS Strategic Deployment Plan will be the same boundary as the WMPO.

3. Vision and Goals Review

KH referenced 22 existing planning documents as part of the development of the vision and goals. Key themes were extracted from the 22 existing regional plans and were used to develop technology focused vision, goals, and guiding principles. The draft goals, vision, and guiding principles are listed below along with the comments for each in *italics*.

Goals

- Invest in TSMO strategies that promote multi-modal transportation throughout the region.
 - Potential of condensing goals together.*
- Align with Vision Zero initiatives by leveraging TSMO strategies to create safe and equitable transportation system for all users.
 - Consider buzz words that align better with the current administration for the purpose of grant pursuits (safe and equitable).*

- Promote the use of technologies that support mobility and reliability while improving resiliency and long-term environmental viability.
 - *Consider buzz words that align better with current administration for the purpose of grant pursuits (environmental sustainability).*
 - *Buzz words such as environmental sustainability do not hold weight with current administration and could cause difficulty in pursuing grants.*
 - *Hard emphasis on resiliency in terms of the environment; system needs to be resilient in cases of extreme weather/hurricanes.*
 - *Define sustainability; put it into context.*
- Foster economic success in the region through investing in TSMO strategies and providing access to resources for all communities.
 - *Replaced sustainability with success.*
- Invest in TSMO strategies to support local needs and preserve a sense of place.
 - *This goal was rolled into the first goal, leaving us with four.*

Vision

Integrate TSMO strategies that provide a safe and efficient regional transportation system, moving goods and people, and promotes health and a sense of place.

- *Consider adding innovation and resiliency as buzzwords.*
- *Add “with a vibrant community” at the end of the vision statement?*

Guiding Principles

- Consider accessible and equitable strategies for communities when addressing regional goals.
 - *Accessible could be removed (redundant as it should always be considered).*
 - *Remove consider making a stronger statement.*
 - *Potential new guiding principle: Implement accessible and equitable strategies for communities when addressing regional goals.*
- Consider integrating strategies with positive impacts on public health and improve quality of life.
 - *Remove “consider” to make a stronger statement.*
 - *Add language that includes all transportation users.*
 - *Potential new guiding principal: Integrate strategies with positive impacts on public health and improve quality of life for all transportation users, including pedestrians, cyclists, drivers, and public transit passengers.*

4. TSMO & ITS Education

KH presented on what TSMO is and discussed a matrix of potential challenges and corresponding strategies. KH defined what ITS is and provided example benefits of ways implementing ITS strategies can impact a community or region.

5. Existing Conditions Feedback

Prior to the Core Team Meeting, KH conducted a series of one-on-one meetings with core team members. The information collected during those meetings was summarized into the following categories: freeway management, arterial management, port and freight, incident management, multi-modal, parking and tourism, and emergency management. KH facilitated a discussion within each of these categories and captured additional details from the stakeholders.

Freeway Management

- Keeping up with technology (cannot get parts for Dynamic Message Signs (DMS))
 - *Limiting funds make it hard to keep up with maintenance/replacing old technology*
 - *DMS cost*
- Traffic overload
 - *I-140, US 74, and US 76 terminate in at Wilmington gets backed up needs rerouting dependent on trip study*
 - *US 17 is only outlet along the coast*
 - *Need rerouting capabilities for traffic during backups*
 - *Complete trip studies (use data driven metrics to determine where and when people are traveling)*
- New Hanover County has experienced extreme growth in population (difficult serving growth and are at capacity)
- Truck congestion along and at US 74 and US 77 interchanges
- Passenger car congestion at US 17 and NC 133
 - *US 17 northbound has extreme congestion*
- Freight users use Waze
 - *Waze combines DOT data with user data (can be in accurate for commercial vehicles)*
 - *Need to shift freight users from using Waze – does not include truck routes*
- Cape Fear Memorial Bridge between Leland and Wilmington (avg. of 60K+ vehicles/day)
 - *Need for traveler information to re-direct people to I-140 when issues occur*
- From I-40 north
 - *Daily 1-1.5 mile back up*
 - *Use DMS to direct on how to get around*
 - *Depending on where the accident occurs DMS might not be seen*
- Statewide Transportation Operations Center (STOC) has messaging policy
- Want additional DMS at key interstate exits



Arterial Management

- Cell phones are major issue causing crashes due to distracted driving
- Geography of the region creates challenging choke points for traffic
 - *Freeways transition into arterials*
- Arterial flooding
 - *Flooding can create an island for the northern portions of New Hanover County near the county boundary*
 - *US 17 floods frequently and causes a 56-mile detour dividing the counties*
- Brunswick and Pender Counties have challenges handling extreme residential growth
- Currently using portable radar signs to capture average speeds and volumes
- City of Wilmington signal system has the capability to collect data through detection
- Town of Leland has portable radar signs with speed and frequency capabilities
- WMPO data
 - *Public website provides access to annual traffic counts and has special counts for rezoning*
 - *Had StreetLight subscription for 1 year (stopped due to unfriendly user platform)*
 - *Have access to RITIS data*
- High congestion areas
 - *S Front Street closures cause major congestion (flooding or special events)*
 - *Access to and from Carolina Beach*
 - *Oleander Drive and College Street*
 - *School zones cause major congestion*
 - *Old Fayetteville Road (2 schools on a 2-lane road with 2,000 students)*
 - *The use of staggered releases was tried, but did not effectively mitigate the congestion impacts*
 - *Drawbridge from Wrightsville Beach to Wilmington*
 - *Christian Academy (does not have busses and not designed for pick up traffic)*
 - *One marathon can affect all 3 counties; events pick the most inopportune time and place; generates 4-10 million attendees per race*
 - *Rail incident would be highly impactful and would cut Wilmington in half due to many crossings*
 - *College Street at Carolina Beach Road*
 - *US 74 at US 17*

Port and Freight

- S Front Street is part of a designated truck route
 - *Port moved the access gate location to help mitigate queueing outside of the port property*
 - *Disseminating truck route information to the commercial vehicle drivers is challenging*
- Truck only lanes could help mitigate the impacts on arterials (international and domestic freight)
- Growth in underdeveloped areas will cause additional chokepoints (Leland and US 421)



- *Trains can block multiple intersections simultaneously when crossing through downtown (16th and 17th street)*
- Burnett Boulevard has truck parking challenges (trucks park on the side of the road)
 - *Additional parking infrastructure is a challenge as fuel and real estate are valuable in the area*
 - *Coca-Cola District on Princess Street will become one lane because of truck deliveries*
 - *Have to find good balance of enforcement of this issue and allowing businesses to get their deliveries*
- Associated with parking, trucks should be considered 3 passenger cars
- Freight priority to extend green
 - *Denys from the city occasionally helps by manually altering signal timing*
- Not currently running adaptive or responsive

Incident Management

- Incident hot spots
 - *US 17 corridor at Waterford through US 74 merger and across the bridge, daily commercial deliveries in this section; day to day traffic is awful*
 - *Lone Pine Drive from Brunswick Forest to US 74/US 76*
 - *Any crash that occurs on US 17 backs up to US 74*
 - *Secondary and primary roads back up quickly which traps everyone; there are no outlets*
 - *After closing a road for 15 minutes it almost guarantees a second incident*
- EMS cannot get around traffic or around the network
 - *US 17 is a primary route to New Hanover Trauma Center; when it gets shut down it requires EMS to detour around the road*
- 911 is primary method of contact, Drive NC from STOC is another
 - *Use crash detection through google and cell phone data; also On Star*
- Bridges cause lots of problems for users
 - *Hamstead, Leland, and Wilmington traveling between each other*
 - *Hamstead bypass will hopefully relieve US 17*
 - *Reliability, mainly for trucks (want to travel from point A to B in the same time every time, even if it is longer route)*
- Fire department response time is 4.5 minutes
- Strong emphasis on open communication

Multimodal

- Ride Micro curb to curb service is used in New Hanover County and has high ridership
 - *Need to assess fixed route system*
 - *Door to door services are available but require advances reservations*
 - *Difficulty with first-last mile connection to transit services*
- Micromobility vendor was selected for City of Wilmington, but sponsorship was not feasible
- UNCW uses Bird (Pedal bikes, not scooters)
- Concerns with e-bikes on multi use paths, intersections, driveways
 - *Concerned with how to regulate and enforce*



- Go Coast TDM is an education program to teach people about bike travel
- Grant \$ supposed to come soon for construction of new shared use paths
- Strategic signage placement for multimodal (receive complaints from lack of signage but are many posted)
- Educational challenges with drivers not following laws
- Some bike infrastructure is located on dangerous roadways increasing the risks to the cyclists

Parking and Tourism

- Parking challenges at the beach
- Parking challenges downtown
 - *Live Oak Bank Pavilion (Base of Isabelle Holmes bridge)*
 - *Users try to get free parking for concerts on 4th and 2nd street during PM peak hour (5 PM)*
 - *Parking is difficult to find so frustrated users park wherever they want*
- Some parking decks have capacity
 - *Cape Fear parking deck*
 - *Land development code does not require parking downtown, good to know for development*
- Park and Rides
 - *Beach town citizens have no interest, but general public is in favor*
 - *Carolina Beach is more open to one than Wilmington beach*
 - *Facilities provided for UNCW students on College Street*
 - *Azalea Festival uses shuttle from Independence Mall to downtown*
 - *Space/cost is biggest issue along with location of stops*
 - *Parking/tourism challenges can be alleviated through investment in non-car-centric strategies or infrastructure*
 - *Brunswick County CTP (adapted in 2024) included locations and support for investment in park and ride facilities*
- Deliveries and parking competing for curb space
 - *Need commercial loading zones*
- Residential parking program suggested where community can apply to have resident only parking areas
- Taxi spots needed downtown

Emergency Management

- Communicating between the 3 counties is key
 - *Encourage full inclusion for all stakeholders to be “at the table” to talk*
 - *Counties communicate with towns*
- Pender County concerned that current infrastructure could not support a full evacuation
- Evacuation due to incident at nuclear power plant in Brunswick County is a concern
 - *Ferry system cannot be used for evacuation during these events*
- Brunswick County needs an EPZ (emergency preparedness zone)
 - *If evacuation is needed it will cause gridlock*



- Limited routes to and from Carolina Beach and Fort Fisher areas
- Emergency response plan activation begins with a phone call
 - *DOT is a part of partner calls in which all information is shared during the moment; on call to make sure municipalities are on same page*
- US 17 flooding is likely and can significantly impact evacuation routes
- Floodwater affects counties for 3 days after event when the water is heading back to ocean
 - *Modeling could be done to predict how rainfall will move downstream*
 - *Need to be proactive rather than reactive*
 - *Communication with hydro group is key*
 - *BridgeWatch is a system that would send a notification to STOC when water gets to the bottom of the bridge in order to be proactive*
- The region has not experienced a significant hurricane since 1990s (Floyd and Fran)
- Evacuation plans are constantly being updated based on local occurrences like road closures from construction
- “Know your zone maps” are outdated
 - *Need funding to update these maps and make sure citizens know about them*
- Division started to pull a master plan but number of contingencies with each scenario was never complete
 - *Example: Needed a plan when Cape Fear Bridge was being worked on*
- City of Wilmington has evacuation timings built into their system and can include different parts of the network as conditions change
- Hazardous material incidents create significant impacts to network mobility
 - *Example: June 2024 hazardous material incident shut down I-140 from US 74 to US 421*

6. Next Steps

KH provided an overview of the next steps of the project.

- *Summarize existing conditions and needs*
- *Finalize vision and goals*
- *Follow up one-on-one stakeholder meetings*
- *Begin preparing gap assessment*



WILMINGTON REGIONAL ITS
STRATEGIC DEPLOYMENT PLAN

STAKEHOLDER MEETING #1

FEBRUARY 17, 2025



WMPO

Kimley»Horn

Agenda



- Welcome and Introduction
- Project Overview
- Vision and Goals Review
- TSMO & ITS Education
- Existing Conditions Feedback
- Next Steps

Welcome and Introductions

- Name
- Agency

Project Overview

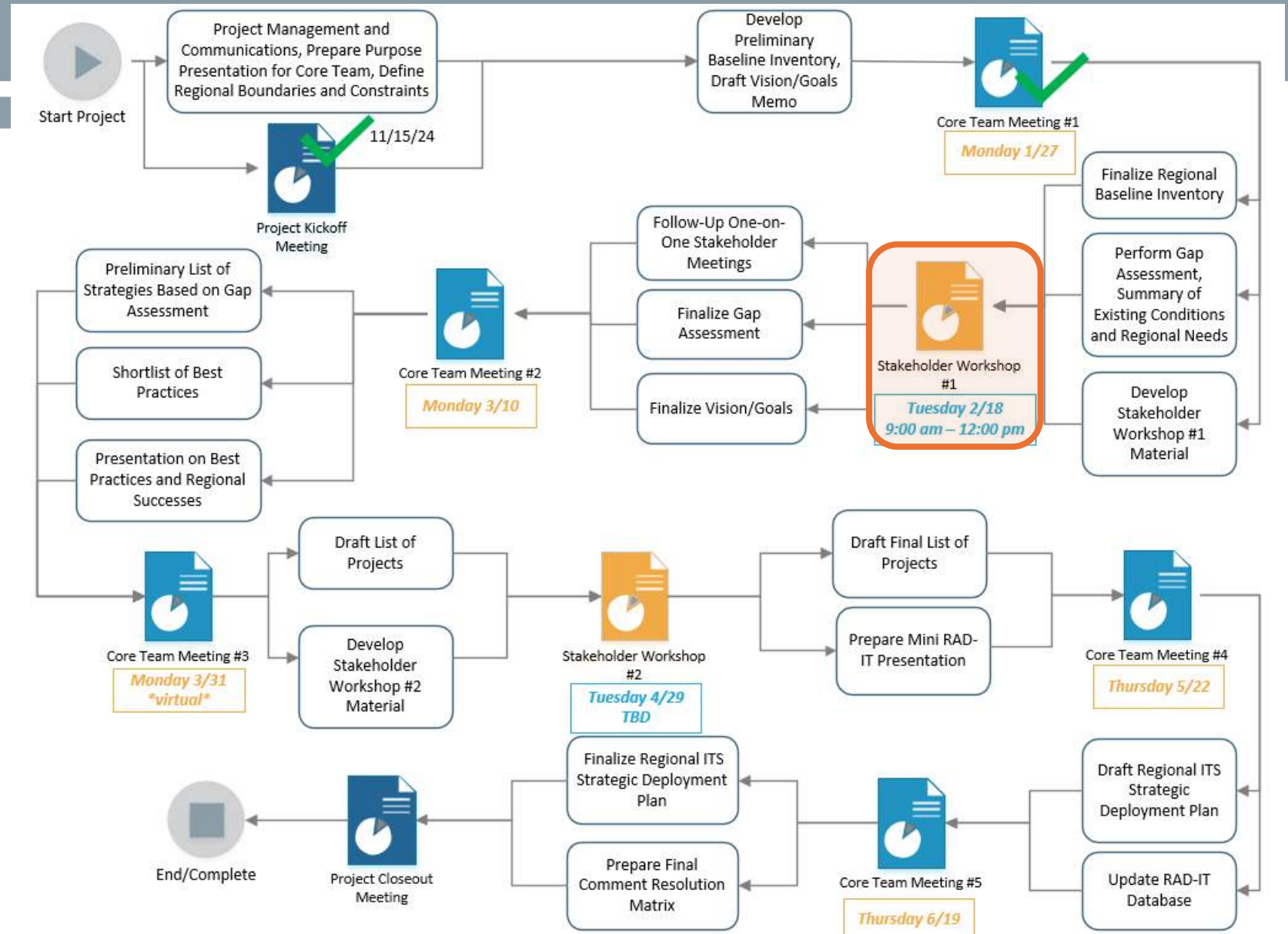
Scope

- Stakeholder Identification and Outreach Plan
- Vision, Goals, and Objectives
- Gap Assessment
- Best Practices and Project Identification
- ITS Regional Strategic Deployment Plan (SDP)

Workflow

Scope Summary

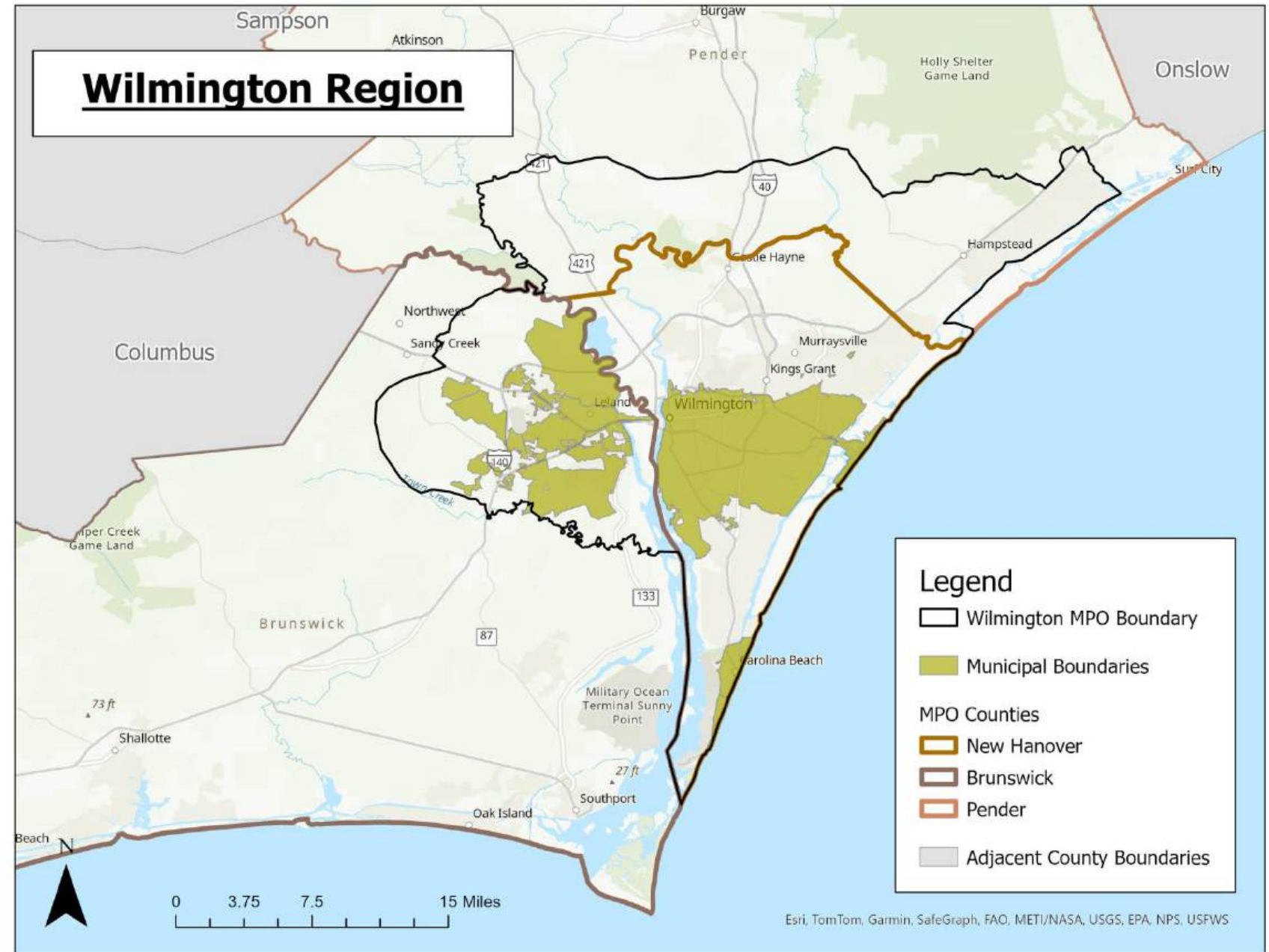
1. Stakeholder Identification and Outreach Plan
2. Vision, Goals, and Objectives
3. Gap Assessment
4. Best Practices and Project Identification
5. ITS Regional Strategic Deployment Plan (SDP)



Stakeholders

Representation From:

- Town of Leland
- Town of Carolina Beach
- Town of Wrightsville
- Town of Kure Beach
- Town of Belville
- Town of Navassa
- Emergency Management



Stakeholder Responsibilities

- Stakeholder Workshop Attendance
- Participate in sharing agencies transportation successes and challenges
- Provide feedback on Vision, Goals, and Objectives
- Provide agency existing conditions and needs
- Provide feedback on potential strategies

Vision and Goals Review

Regional Vision and Goals Sources

- City of Wilmington
 - Comprehensive Plan (2016)
 - Transit Needs Study (2009)
 - Comprehensive Greenway Plan (2013)
 - Wave Locally Coordinated Public Transportation Plan (2021)
 - Reimagine: WAVE Short Range Transit Plan (2024)
 - Walk Wilmington Pedestrian Plan (2023)
 - Comprehensive Parks, Recreation & Open Space Master Plan (2022)
- WMPO
 - Cape Fear 2040 MTP (2015)
 - Cape Fear Moving forward 2045 MTP (2020)
 - Cape Fear Change in Motion: Short Range Transit Plan (2020)
 - Cape Fear Regional Bike Plan (2020)
- Brunswick County
 - Comprehensive Transportation Plan (2024)
 - Comprehensive Land Use Plan (2023)
- New Hanover County
 - Comprehensive Plan (2016)
- Pender County
 - Comprehensive Land Plan (2018)
- Town of Leland
 - Leland Comprehensive Land Plan (2021)
- Town of Carolina Beach
 - Carolina Beach 2020 Land Use Plan (2020)
 - Carolina Beach Master Development Plan (2008)
- Town of Wrightsville Beach
 - CAMA Land Use Plan Update (2019)
- Town of Kure Beach
 - Comprehensive Land Use Plan (2022)
- Town of Belville
 - Vision 2030 Plan (2021)
- North Carolina Ports
 - Harbor Navigation Improvement Project (ongoing)

22 Total Existing Planning Documents Referenced

Core Themes

Area/Agency	Source	Principles											
		Safety	Health	Environment	Quality of Life	Effective	Sense of Place	Community	Accessibility				
City of Wilmington	Create Wilmington Comprehensive Plan	1					1	1					
City of Wilmington	Transit Needs Study for the Wilmington Multimodal Transportation Center				1	1	1	1					
City of Wilmington/New Hanover County	Wilmington/New Hanover County Comprehensive Greenway Plan	1	1										
WMPO	Cape Fear Moving Forward: 2045 Metropolitan Transportation Plan	1		1		1	1						
WMPO	Cape Fear Change in Motion: Short Range TDM Plan	1	1		1	1	1	1					
City of Wilmington/Wave Transit	Wave Locally Coordinated Public Transportation Plan					1							
City of Wilmington/Wave Transit	Reimagine: WAVE Short Range Transit Plan					1	1						
City of Wilmington	Walk Wilmington Pedestrian Plan	1	1	1									
City of Wilmington	Comprehensive Parks, Recreation + Open Space Master Plan		1				1						
North Carolina Ports	Wilmington Harbor Navigation Improvement Project												
New Hanover County	Plan NHC Comprehensive Land Use Plan												
Pender County	Pender 2.0 Comprehensive Land Use Plan												
WMPO	Cape Fear Transportation 2040: Metropolitan Transportation Plan	1			1	1	1	1					
WMPO	Cape Fear Regional Bike Plan								1				
Brunswick County	Brunswick County Comprehensive Transportation Plan							1			1		
Brunswick County	Brunswick County Comprehensive Land Use Plan							1			1		
Town of Leland	Leland 2045: Comprehensive Land Use Plan	1	1	1	1	1	1	1	1	1			
Town of Carolina Beach	Carolina Beach 2020 Land Use Plan	1	1					1			1		
Town of Carolina Beach	Carolina Beach Master Development Plan												
Town of Wrightsville Beach	CAMA Land Use Plan Update	1	1										
Town of Kure Beach	2022 Comprehensive Land Use Plan			1	1	1	1	1					
Town of Belville	Vision 2030 Plan				1			1	1				
Total Mentions		11	9	9	11	12	7	10	4	3	10	5	3

multi-modal

safety

equitable

environmentally sustainable

economic sustainable

sense of place

Draft Goals

- Invest in TSMO strategies that promote **multi-modal** transportation throughout the region.
- Align with Vision Zero initiatives by leveraging TSMO strategies to create **safe and equitable** transportation system for all users.
- Promote the use of technologies that support resiliency and **environmental sustainability**.
- Foster **economic sustainability** in the region through investing in TSMO strategies and providing access to resources for all communities.
- Invest in TSMO strategies to support local needs and preserve a **sense of place**.

Draft Vision

- Integrate technologies and TSMO strategies that provide a safe and efficient regional transportation system, moving goods and people, and promotes health and a sense of place.

Draft Guiding Principals

- Consider accessible and equitable strategies for communities when addressing regional goals.
- Consider integrating strategies with positive impacts on public health and improve quality of life.

TSMO & ITS Education

What is TSMO?

Transportation Systems Management and Operations

A strategic approach dedicated to optimizing the performance of an existing transportation system.

A TSMO Plan will:

- Provide the framework for a more sustainable, efficient, and safe transportation network
- Provide direction toward incorporating TSMO principles into regional and local programs
- Guide stakeholders through the deployment of TSMO strategies, projects, and programs

TSMO Strategy Examples

		Potential Solutions						
		Closed Circuit Television Cameras (CCTV)	Dynamic Message Signs (DMS)	Integrated Corridor Management (ICM)	Advanced Traffic Signal Systems	Transit Signal Priority	Real-time Traffic Data	Quick Clearance Strategies
Challenges	Lack of arterial and interstate surveillance	X						
	Lack of real-time traveler information	X			X		X	
	Major routes over capacity with parallel routes or multi-modal options under utilized	X	X	X	X	X	X	
	Poor progression along major corridors	X			X	X	X	
	Heavy peak hour congestion	X	X	X		X	X	
	Cumbersome clearance policies and procedures for interstate and arterials	X						X
	Difficulties adhering to transit schedules				X	X	X	

What is ITS?

Intelligent Transportation System

Advanced technologies aimed to improve the efficiency, coordination, and safety of transportation networks through the use of historical and real-time data.

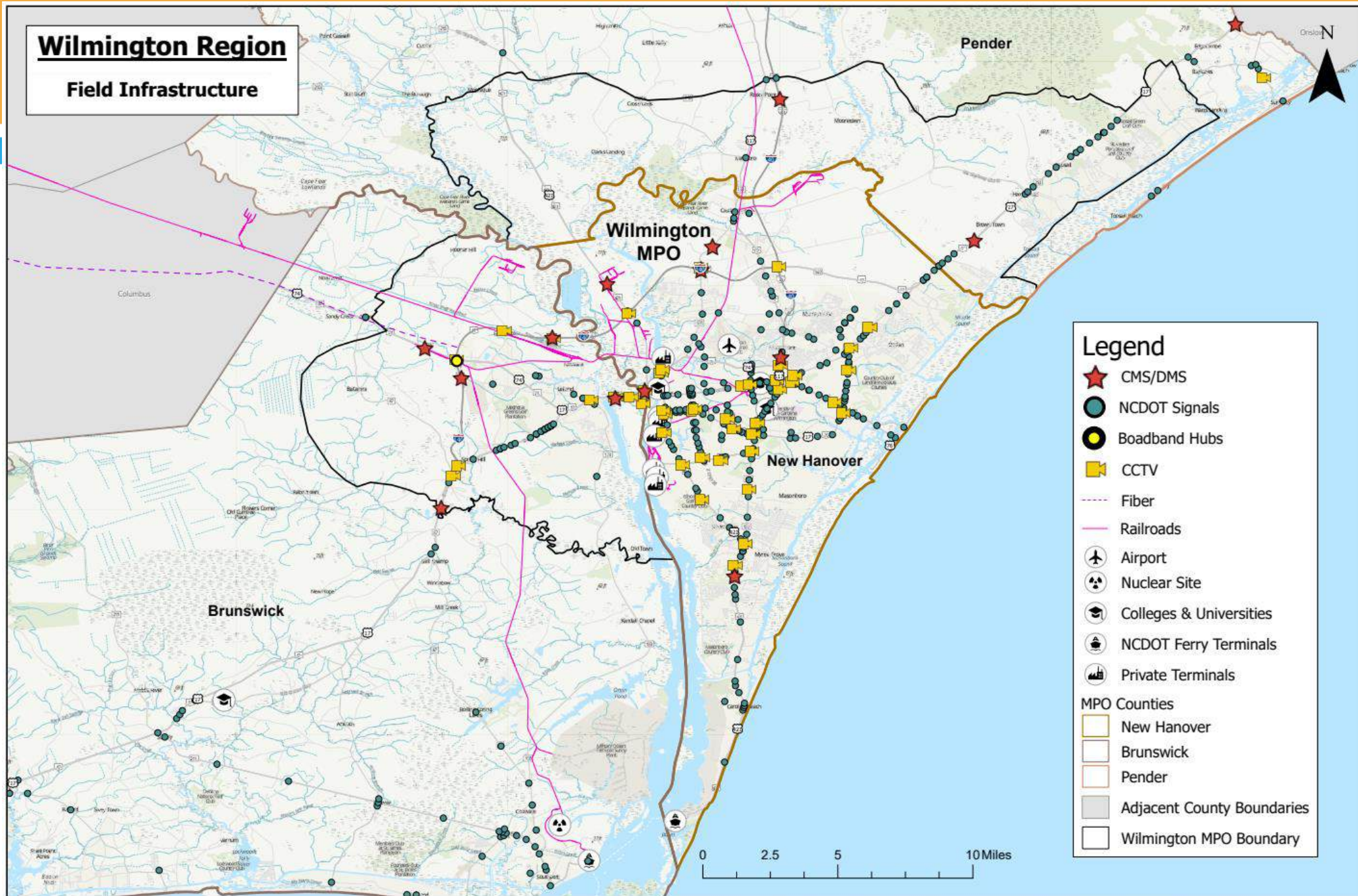
Benefits of ITS include:

- **Enhanced Safety:** Dynamic warning signs (DWS) and real-time incident alerts can reduce the likelihood of accidents
- **Improved Traffic Flow:** Adaptive signal control, real-time traffic information, and dynamic signage helps to manage traffic more efficiently
- **Better Incident Management:** Advanced traffic monitoring and response systems allow for quicker detection and management of traffic incidents, minimizing their impact on traffic.

Existing Conditions Feedback

Wilmington Region

Field Infrastructure



Legend

CMS/DMS

NCDOT Signals

Broadband Hubs

CCTV

Fiber

Railroads

Airport

Nuclear Site

Colleges & Universities

NCDOT Ferry Terminals

Private Terminals

MPO Counties

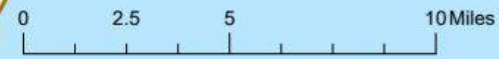
New Hanover

Brunswick

Pender

Adjacent County Boundaries

Wilmington MPO Boundary



Existing Conditions – Freeway Management

- What are challenges do you face with maintenance and operations?
- What collaboration exists when managing freeways between stakeholders?
- How are systems and technologies used related to freeway management?
- Is real-time information available and accessible?
- What areas or exits cause pinch points?

Existing Conditions – Arterial Management

- What are the main challenges related to traffic flow and congestion on arterials?
- What data is collected from arterial roads and how is this data used?
- Are weather devices existing and utilized?
- Does coordination across jurisdictions occur?
- What arterial road are most prone to flooding?
- How does recurring and nonrecurring congestion impact arterials?

Existing Conditions – Port and Freight

- How does freight traffic impact arterials and freeways?
- Is truck parking a challenge within the region?
- How is freight data collected and utilized?
- How do road closures impact freight movement throughout the region?
- Is data collected at the port utilized?
- Any technologies utilized between the port and freight (goods transfer)?

Existing Conditions – Incident Management

- Where are hot spot incident locations?
- How are incidents detected and responded to?
- Are incident response time protocols in place?
- What challenges are faced when responding to incidents?
- How is collaboration used with other jurisdiction used when responding to incidents?
- Is technology used for incident detection and management?

Existing Conditions – Multi-Modal

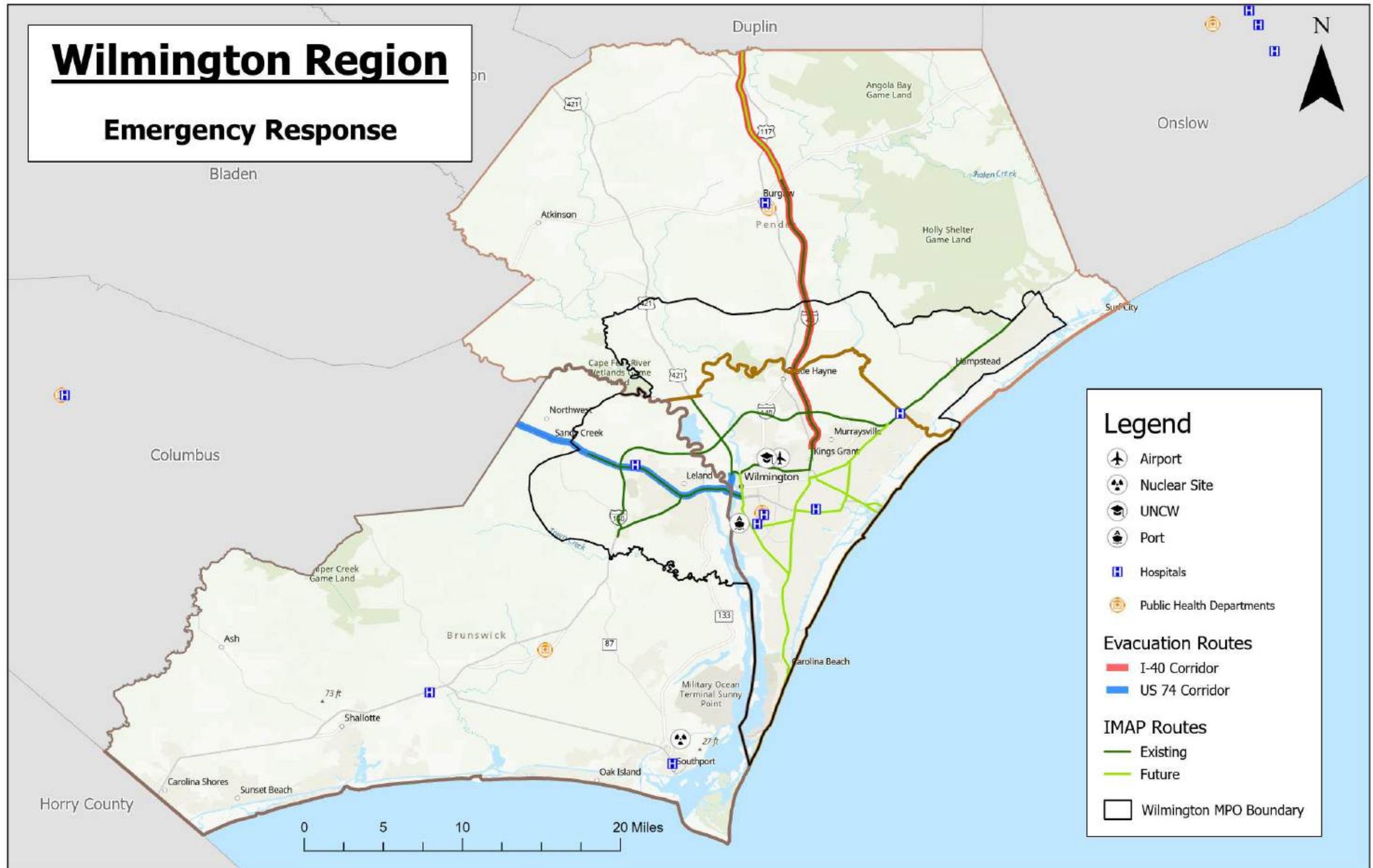
- Is there interest in the region for micromobility programs?
- How has the use of e-bikes impacted your community?
- What challenges do you face with multi-modal management?
- What infrastructures are available to support multi-modal transportation?
- Is multi-modal data collected and utilized?

Existing Conditions – Parking and Tourism

- What areas have the most challenges with parking?
- How is parking data collected and utilized?
- Are park and rides an interest in the region?
- How do special events impact parking?
- Is real-time parking availability available and communicated to visitors?
- How well is public transit integrated with parking facilities to encourage park-and-ride options for tourists?
- How does the seasonal attractions impact parking and mobility?

Wilmington Region

Emergency Response



Existing Conditions – Emergency Response

- What communication methods are used during emergency situations?
- What policies and procedures are in place in case of an emergency?
- Are evacuation plans communicated throughout the region?
- Is a system in place in the case of an emergency?
- What metrics are used to evaluate the effectiveness of emergency response?
- How are lessons learned from previous emergency events utilized for future planning?
- What coordination occurs in the event of an emergency?

Next Steps

Next Steps

- Summarize existing conditions and needs
- Finalize vision and goals
- Follow-up one-on-one stakeholder meetings
- Begin preparing gap assessment

Wilmington Region

Emergency Response

Notes:

*Refer to Brunswick County CTP for park and ride ideas (Rail & Transit meetings). This is on the NCDOT TPD site.

Legend

- Airport
- Nuclear Site
- Colleges & Universities
- NCDOT Ferry Terminals
- Private Terminals
- Hospitals
- Public Health Departments

IMAP Routes

Ftr_Class

- Existing
- Future

Evacuation Routes

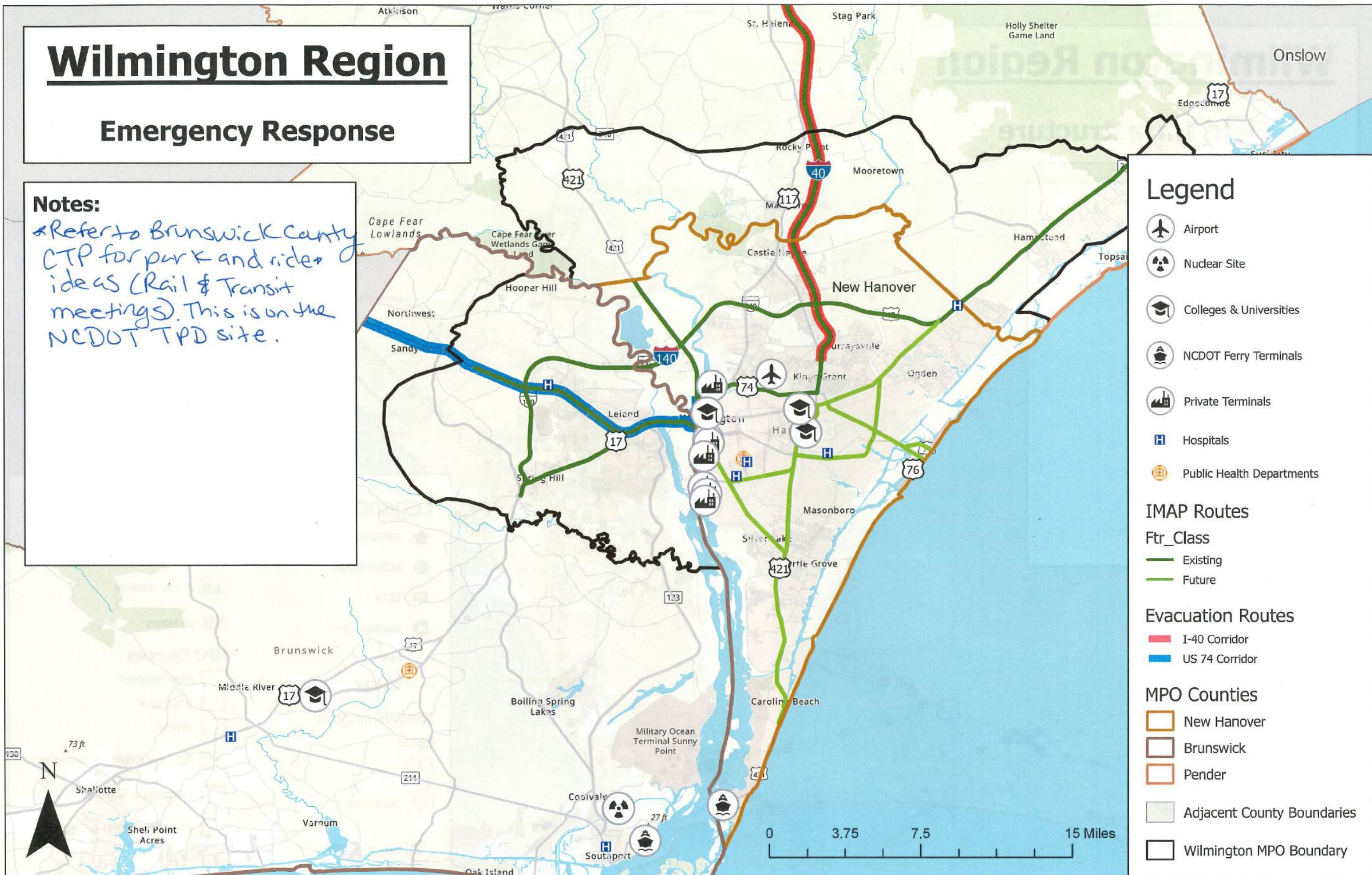
- I-40 Corridor
- US 74 Corridor

MPO Counties

- New Hanover
- Brunswick
- Pender

Adjacent County Boundaries

Wilmington MPO Boundary



Wilmington Region

Emergency Response

Notes:

- Freight - 1st & last mile
- Reliability most imp.
 - other users
 : marathons
 need to be re-located
 when possible
- Road:
- Elevating new gate : adding
 better tech for general cargo
 trucks at new gate being built
 @ Greenfield St.

Legend

- Airport
- Nuclear Site
- Colleges & Universities
- NCDOT Ferry Terminals
- Private Terminals
- Hospitals
- Public Health Departments

IMAP Routes

Ftr_Class

- Existing
- Future

Evacuation Routes

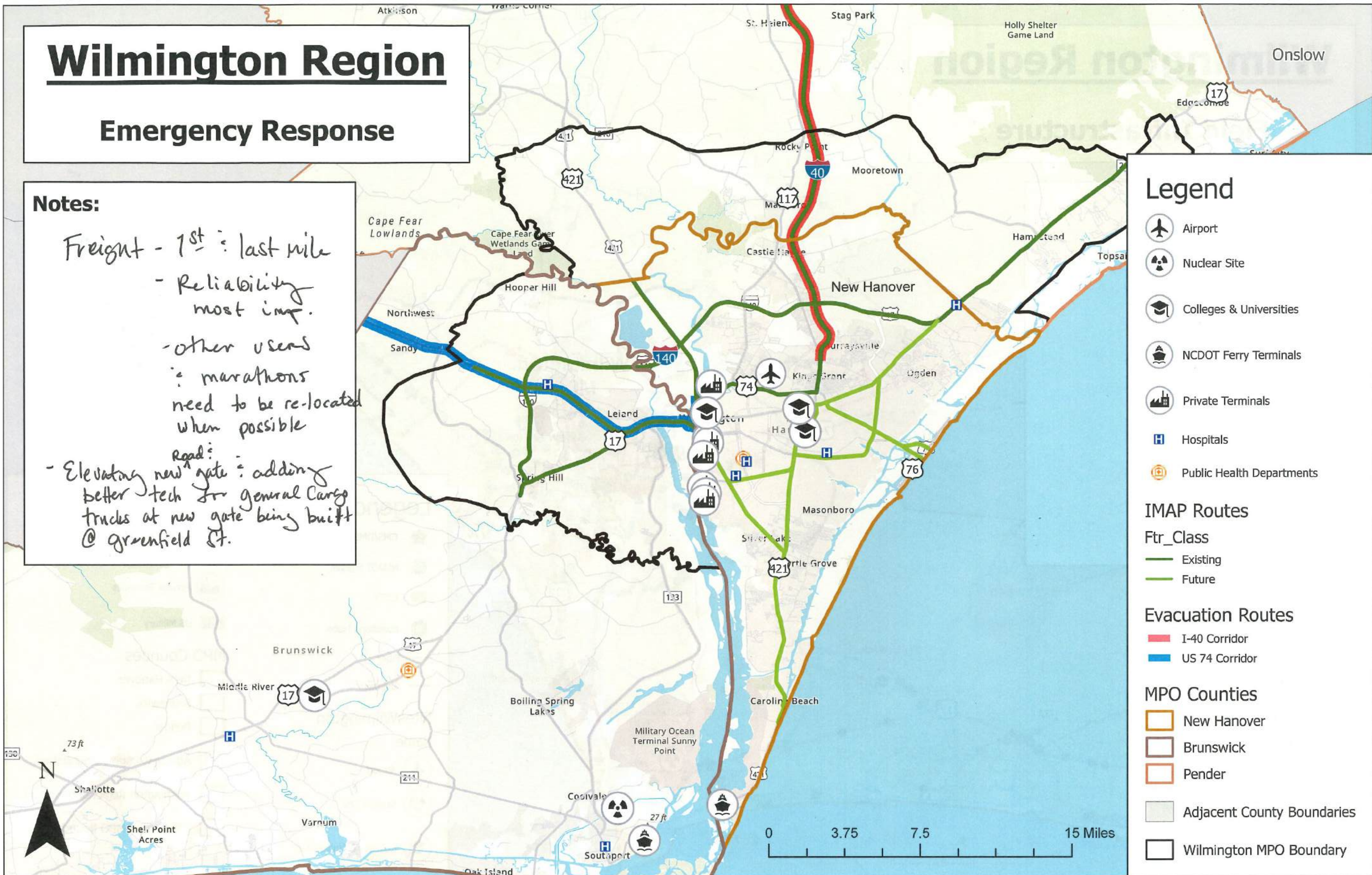
- I-40 Corridor
- US 74 Corridor

MPO Counties

- New Hanover
- Brunswick
- Pender

Adjacent County Boundaries

Wilmington MPO Boundary



Wilmington Region

Emergency Response

Notes:

FREEWAY - TRUCK/FREIGHT - CONGESTION - HWY 74/76
- PASSENGER CAR - CONGESTION - HWY 17
- PASSENGER CAR - CONGESTION - HWY 133
DELIVERY TRUCKS
ARTERIALS - HIGH VOLUME - HANDABLE
2 SCHOOLS - OLD FAYETTEVILLE
- SCHOOLS - 2000 STUDENTS

Legend

- Airport
- Nuclear Site
- Colleges & Universities
- NCDOT Ferry Terminals
- Private Terminals
- Hospitals
- Public Health Departments

IMAP Routes

Ftr_Class

- Existing
- Future

Evacuation Routes

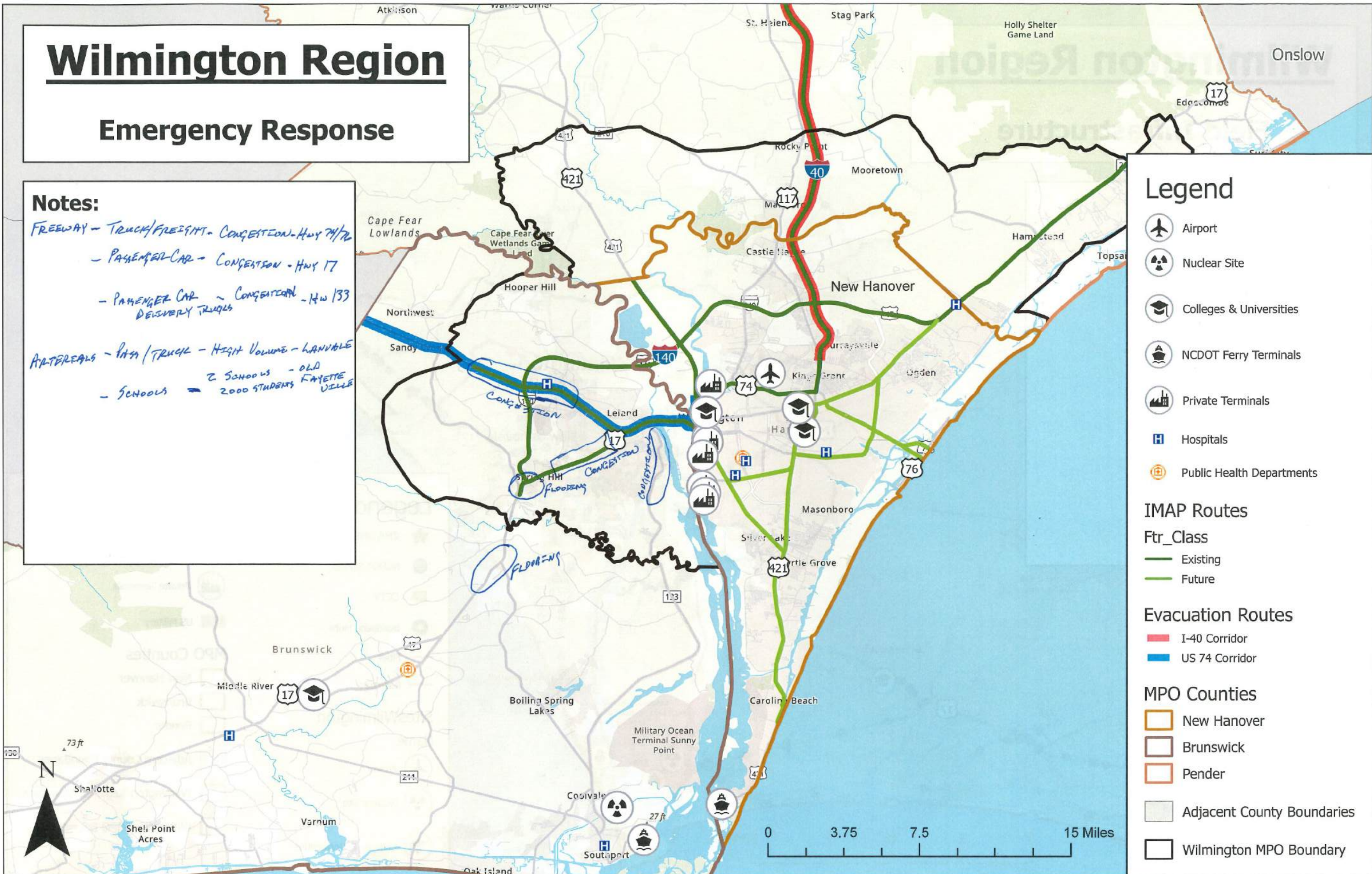
- I-40 Corridor
- US 74 Corridor

MPO Counties

- New Hanover
- Brunswick
- Pender

Adjacent County Boundaries

Wilmington MPO Boundary



Wilmington Region

Emergency Response

Notes:

- Impacts to major evac. routes from flooding related to tropical cyclone systems.
- Limited evacuation routes that became very congested due to regional reliance on them.
 - Brunswick, NHC, Pender + others all rely on I-40, I-140, 74/76 & 17 to move out of area during evacs.
- Very limited routes to & from Carolina Beach & Fort Fisher areas. Pinch point coming from CB due to only 1 bridge.
- Ferry System cannot be used to evac during Radiological incidents @ Brunswick Plant.
- Hwy 17 NB has re extreme amount of traffic & dumps into Wilmington.

Legend

- Airport
- Nuclear Site
- Colleges & Universities
- NCDOT Ferry Terminals
- Private Terminals
- Hospitals
- Public Health Departments

IMAP Routes

Ftr_Class

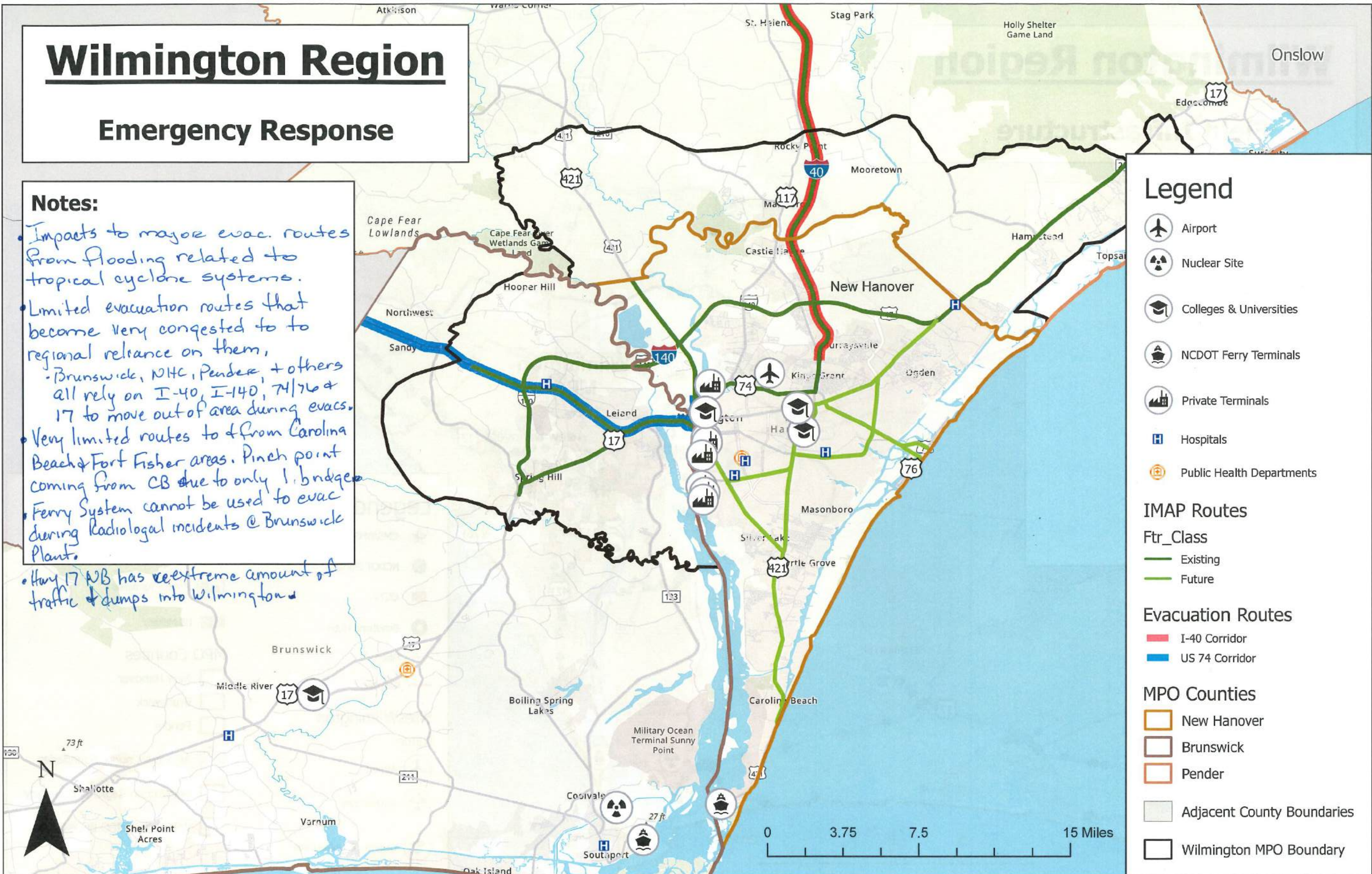
- Existing
- Future

Evacuation Routes

- I-40 Corridor
- US 74 Corridor

MPO Counties

- New Hanover
- Brunswick
- Pender
- Adjacent County Boundaries
- Wilmington MPO Boundary



Wilmington Region

Shannon Whaley Emergency Response

Notes: *Need for TIM-Relationships*

Concern for Evacuation

- Brunswick Nuclear
- All Coastal Areas - Beaches

Communication

- Between All Partners!
- encourage full inclusion for all groups (stakeholders) to be "At Table"

* Educating Public

- update Know Zones
- update Technology
- Capacity + Infrastructure
- Contingency Plans/Models

Legend

- Airport
- Nuclear Site
- Colleges & Universities
- NCDOT Ferry Terminals
- Private Terminals
- Hospitals
- Public Health Departments

IMAP Routes

Ftr_Class

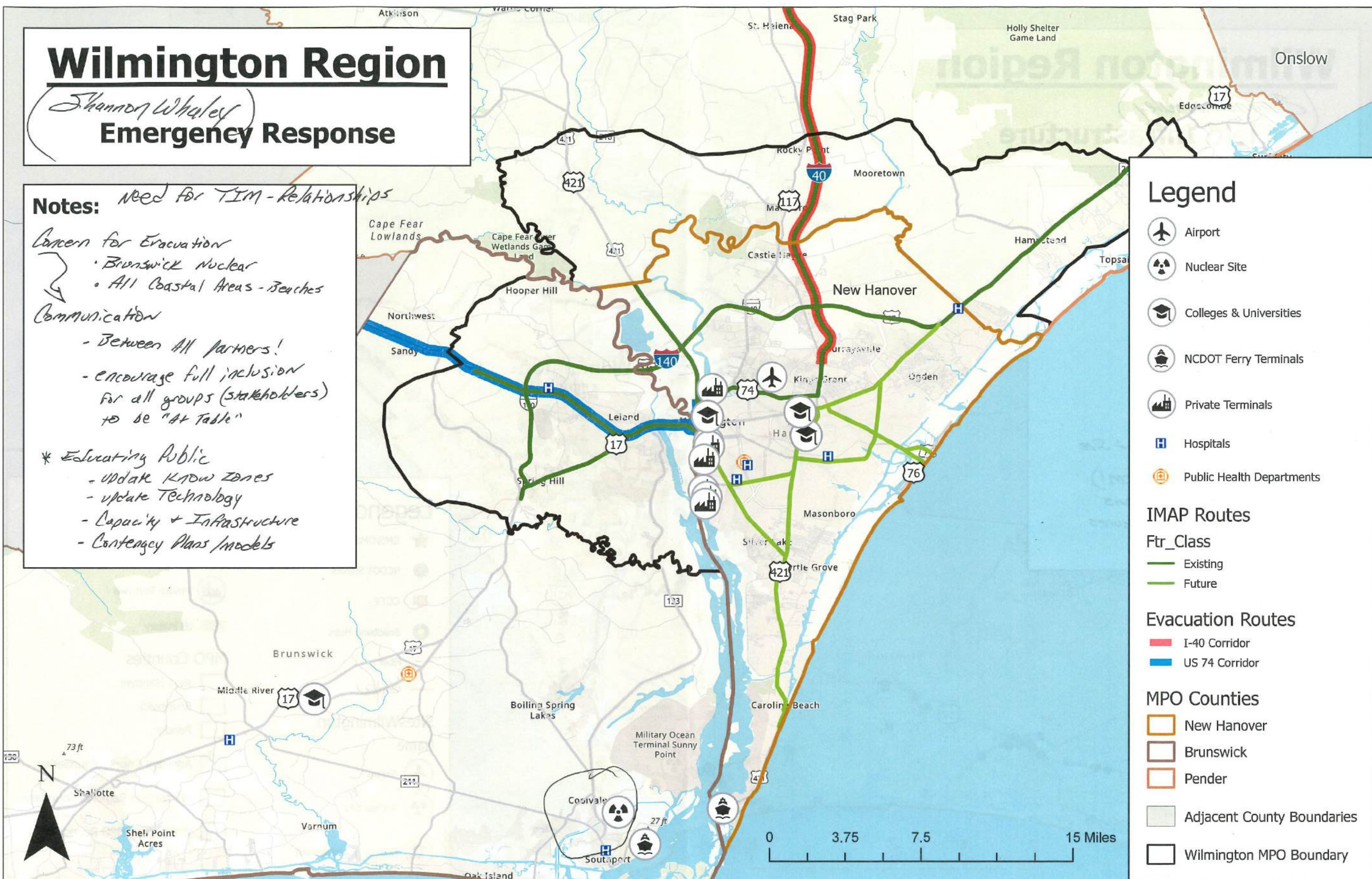
- Existing
- Future

Evacuation Routes

- I-40 Corridor
- US 74 Corridor

MPO Counties

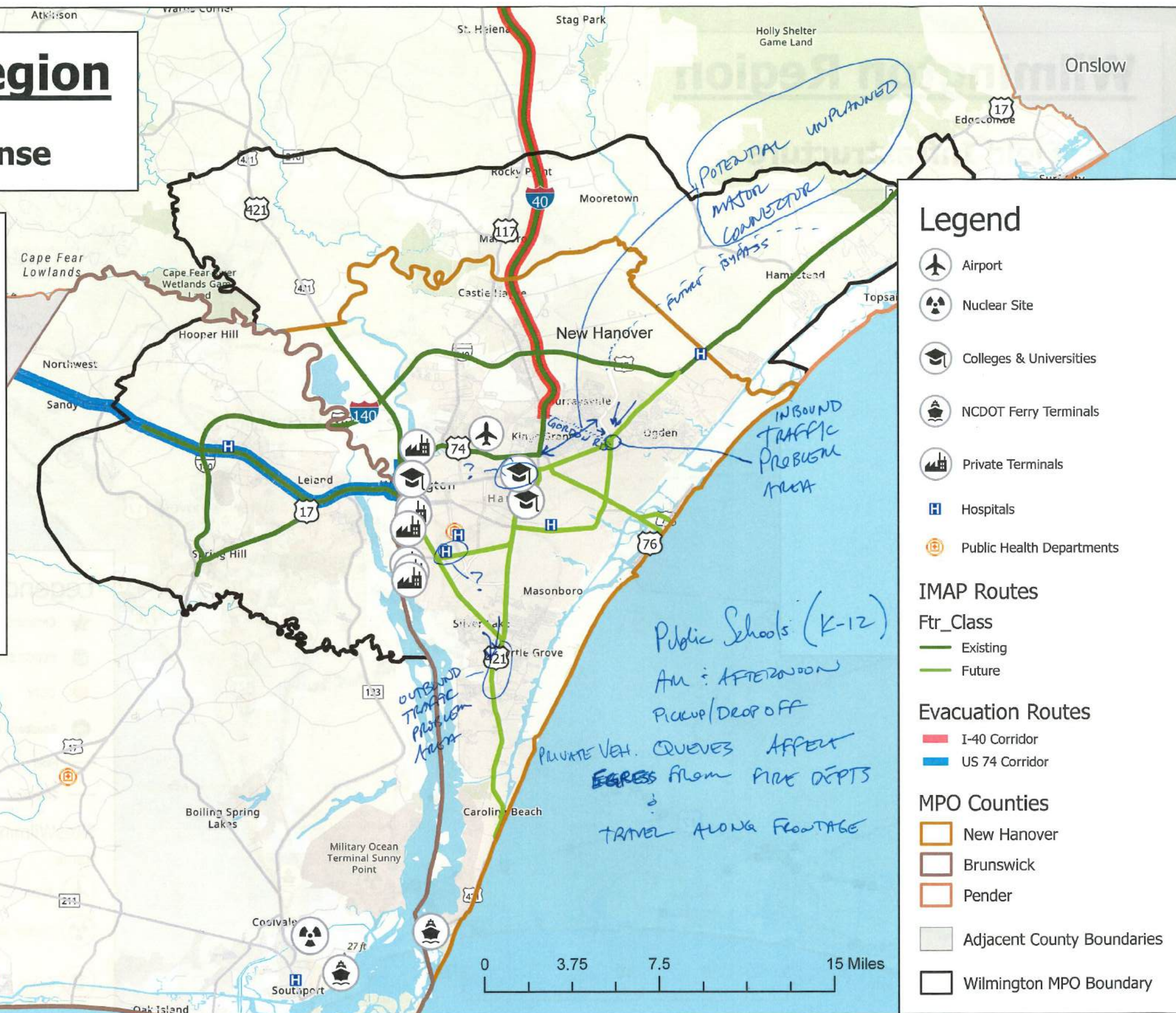
- New Hanover
- Brunswick
- Pender
- Adjacent County Boundaries
- Wilmington MPO Boundary



Wilmington Region

Emergency Response

Notes:



Wilmington Region

Field Infrastructure

Notes:

Legend

- ★ CMS/DMS
- NCDOT Signals
- 📹 CCTV
- Boadband Hubs
- Fiber
- Railroads
- ✈ Airport
- ☢ Nuclear Site
- 🎓 Colleges & Universities
- ⚓ NCDOT Ferry Terminals
- 🏭 Private Terminals
- 🇺🇸 US Military
- MPO Counties**
 - 🟡 New Hanover
 - 🟤 Brunswick
 - 🟠 Pender
- ▭ Adjacent County Boundaries
- 🔴 Wilmington Regional Boundary
- 🟦 Wilmington MPO Boundary

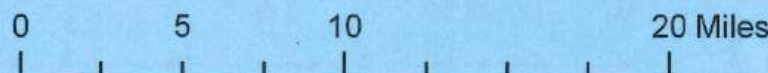
SitesWilmington

Name

- ✈ Airport
- ☢ Nuclear Site
- 🎓 Colleges & Universities

Notes:

BALANCE NOTICE
ADVANCED vs
DEVELOPMENT
PROVIDE BOTH (\$)



Wilmington Region

Shannon Whaley

Field Infrastructure

Notes:

* Arterial
- Dispatchers
- Cell phones

* Port & Freight
- Rail
- CMUS = Parking?

Incident Management

- US 17 - Leland - regardless of Incident Size
- Partnerships are KEY (TIM!)
- enhance communications
- ETP data - responder measures

N

Horry

0 5 10 20 Miles

Legend

- ★ CMS/DMS
- NCDOT Signals
- CCTV
- Broadband Hubs
- Fiber
- Railroads
- ✈ Airport
- ☢ Nuclear Site
- 🎓 Colleges & Universities
- ⚓ NCDOT Ferry Terminals
- ⚓ Private Terminals
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SitesWilmington

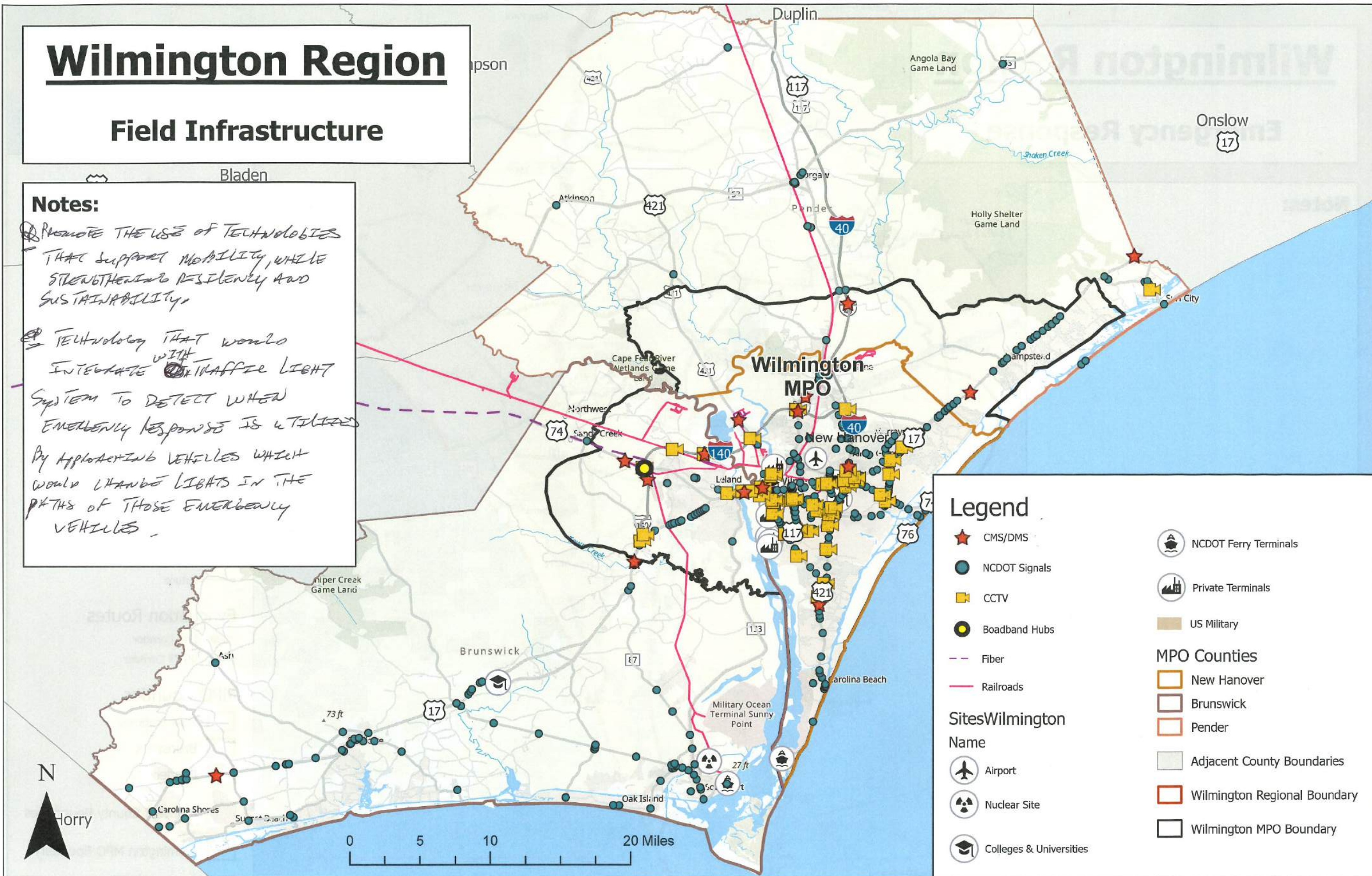
Name

Wilmington Region

Field Infrastructure

Notes:

- PROMOTE THE USE OF TECHNOLOGIES THAT SUPPORT MOBILITY, WHILE STRENGTHENING RESILIENCE AND SUSTAINABILITY.
- TECHNOLOGY THAT WOULD INTEGRATE WITH TRAFFIC LIGHT SYSTEM TO DETECT WHEN EMERGENCY RESPONSE IS UTILIZED BY APPROACHING VEHICLES WHICH WOULD CHANGE LIGHTS IN THE PATHS OF THOSE EMERGENCY VEHICLES.



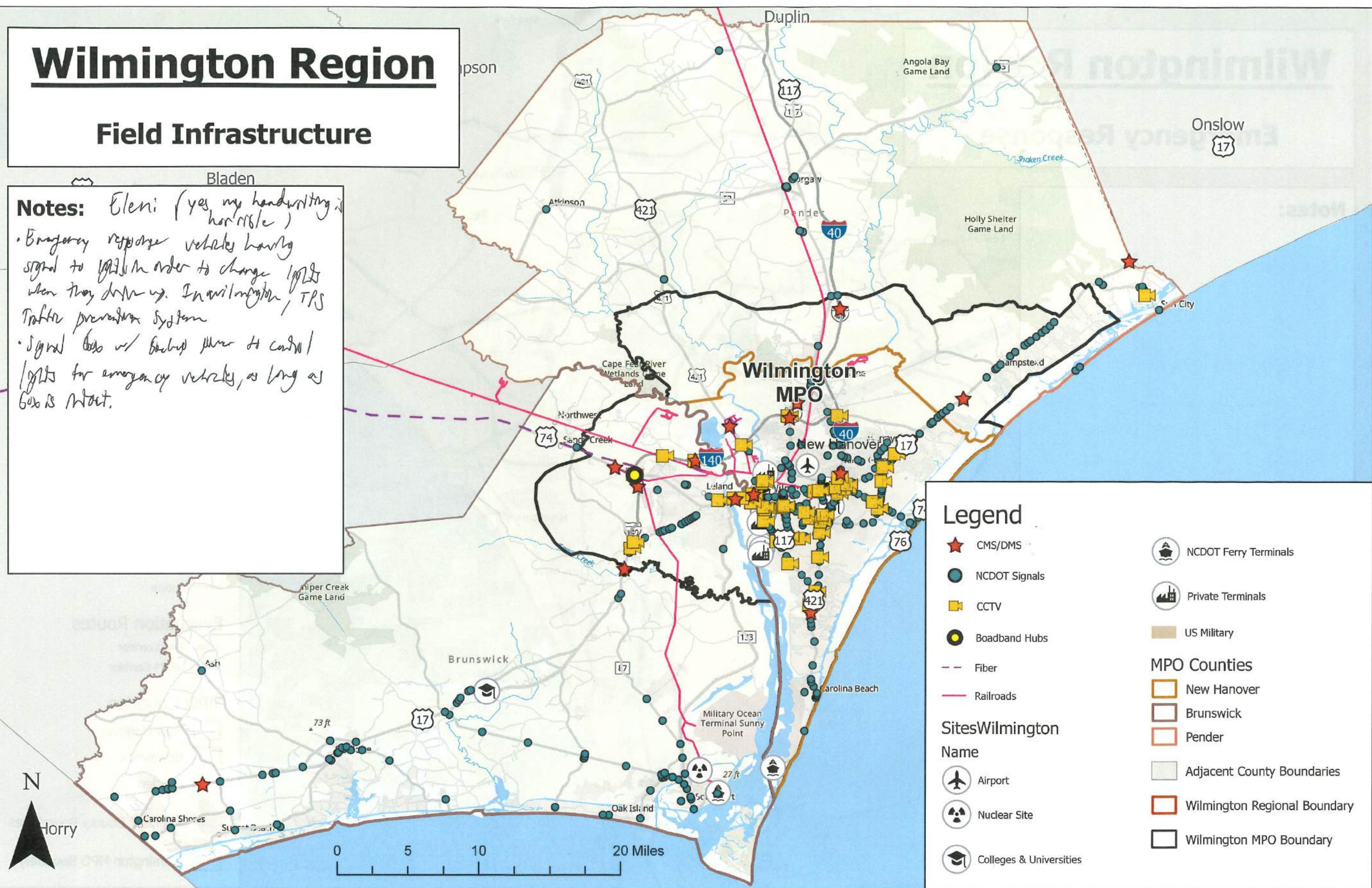
Legend

- ★ CMS/DMS
- NCDOT Signals
- CCTV
- Boadband Hubs
- Fiber
- Railroads
- ⚓ NCDOT Ferry Terminals
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- Wilmington Regional Boundary
- Wilmington MPO Boundary
- SitesWilmington**
 - ✈ Airport
 - ☢ Nuclear Site
 - 🎓 Colleges & Universities

Wilmington Region

Field Infrastructure

Notes: Eleni (yes my handwriting is horrible)
• Emergency response vehicles having signal to 911 in order to change lights when they drive up. In Wilmington, TRS Traffic prevention system
• Signal box w/ backup plan to control lights for emergency vehicles, as long as box is intact.



Field Infrastructure

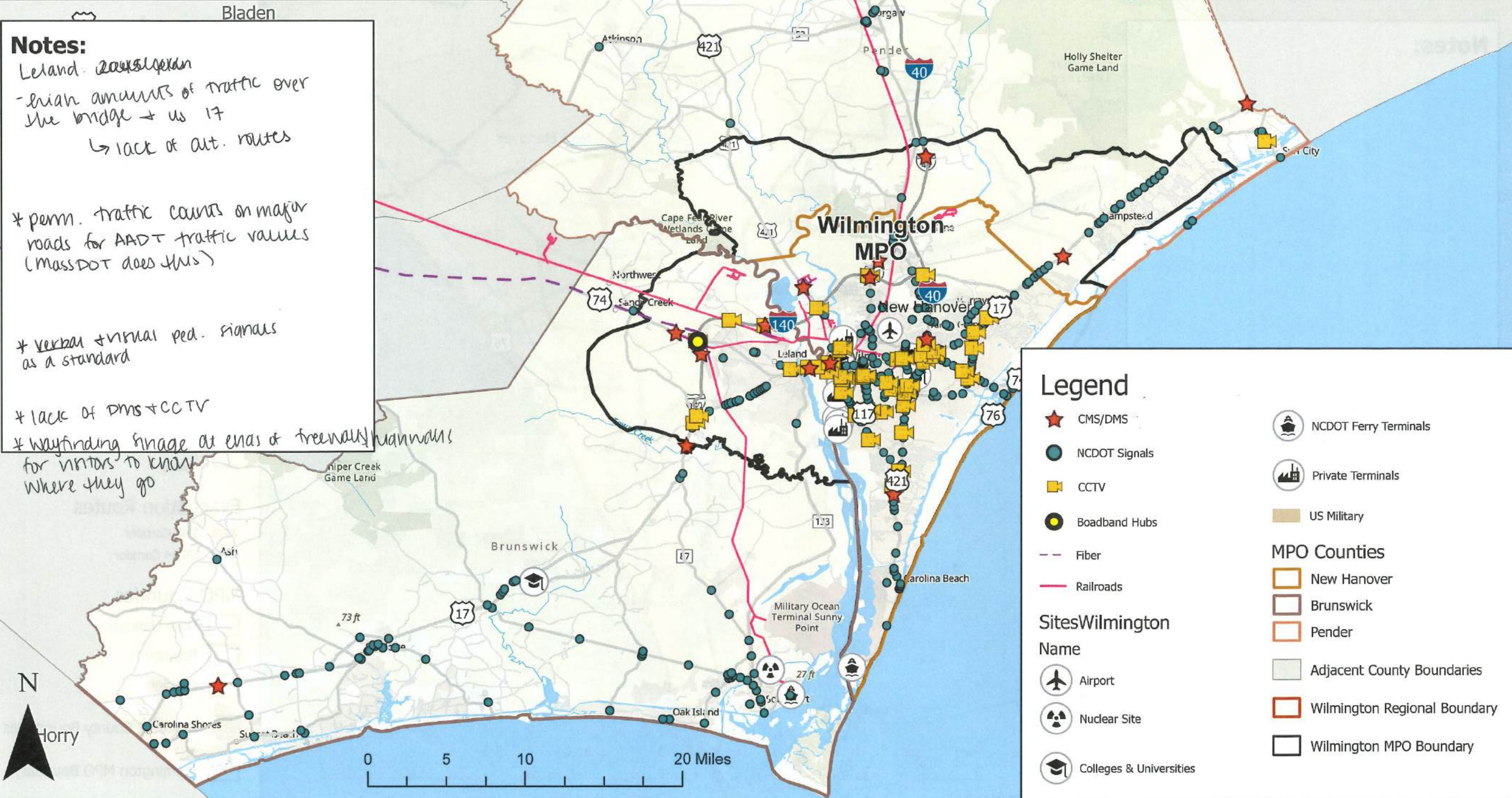
Leland: 2005/2006
- high amounts of traffic over the bridge + us 17
↳ lack of alt. routes

* perm. traffic counts on major roads for AADT traffic values (MassDOT does this)

- * Verbal + visual ped. signals as a standard

* lack of DMS + CCTV

* wayfinding signage at ends of freeways
for visitors to know where they go



Wilmington Region

Field Infrastructure

Notes:

Beach towns not as open to Park & Ride
 ↳ Carolina Beach/Kure Beach might be more open than Wrightsville Beach
 ↳ General public more in favor
 ↳ space/cost is an issue (where would people get picked up/dropped off?)
 Parking/tourism issues could be alleviated through investment in strategies/modes that are not car-centric



0 5 10 20 Miles

Legend

- ★ CMS/DMS
- NCDOT Signals
- CCTV
- Broadband Hubs
- Fiber
- Railroads
- ⚓ NCDOT Ferry Terminals
- ⚓ Private Terminals
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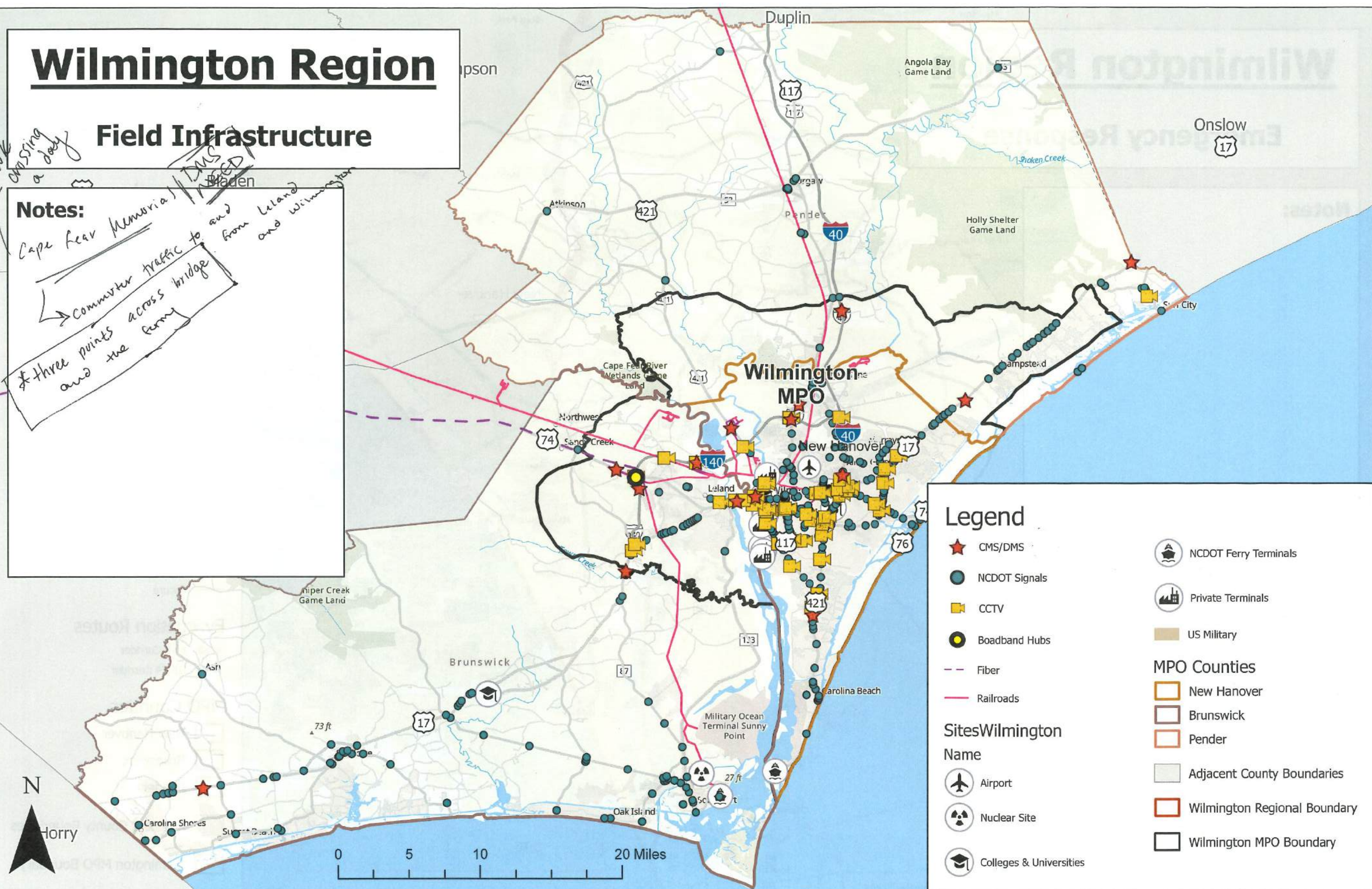
Wilmington Region

Field Infrastructure

Notes:

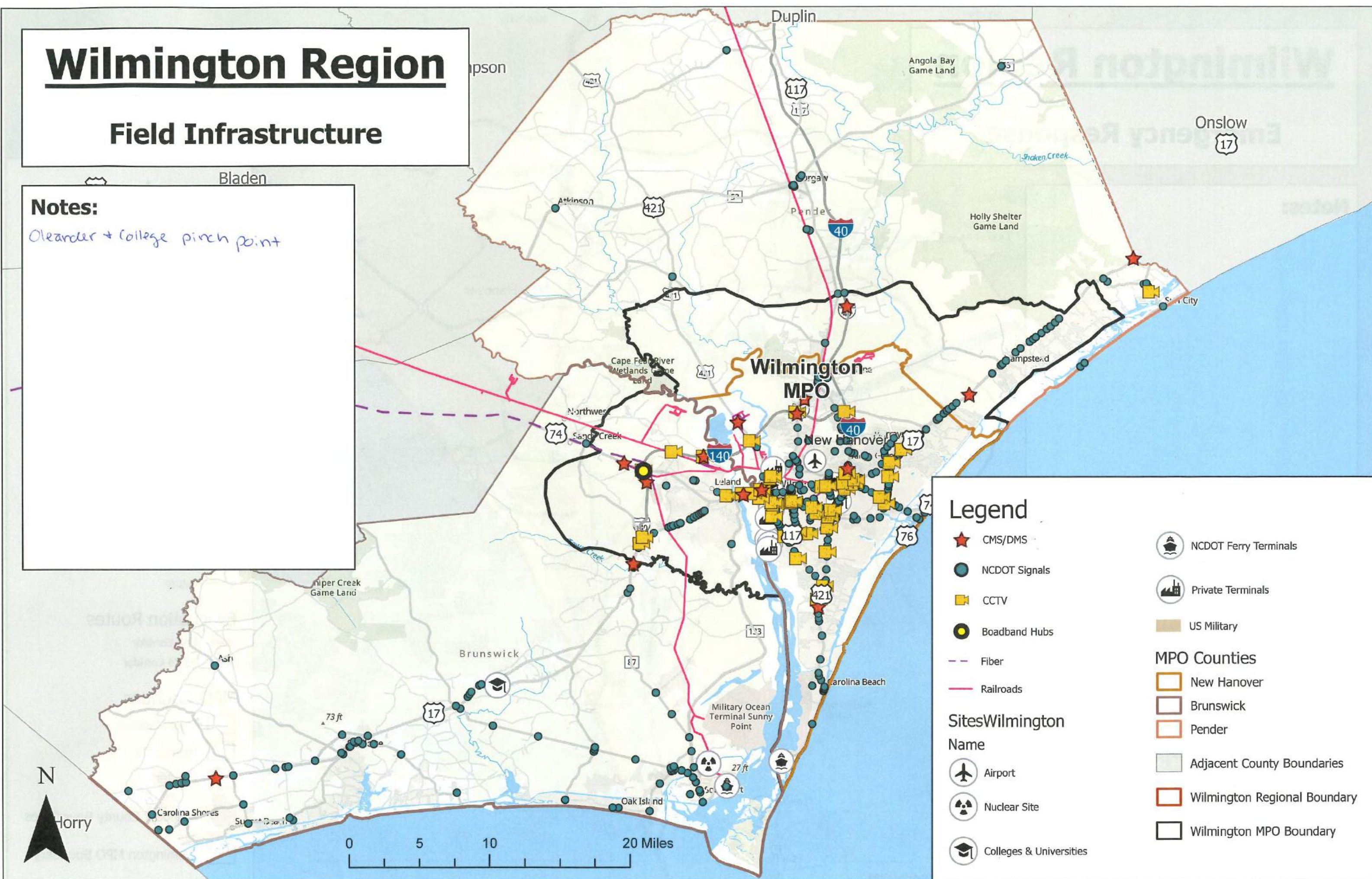
Cape Fear Memorial ~~THIS~~
Commuter traffic to and from Leland and Wilmington
*Three points across bridge and the ferry

Woke crossing a day



Field Infrastructure

Oleander + college pinch point

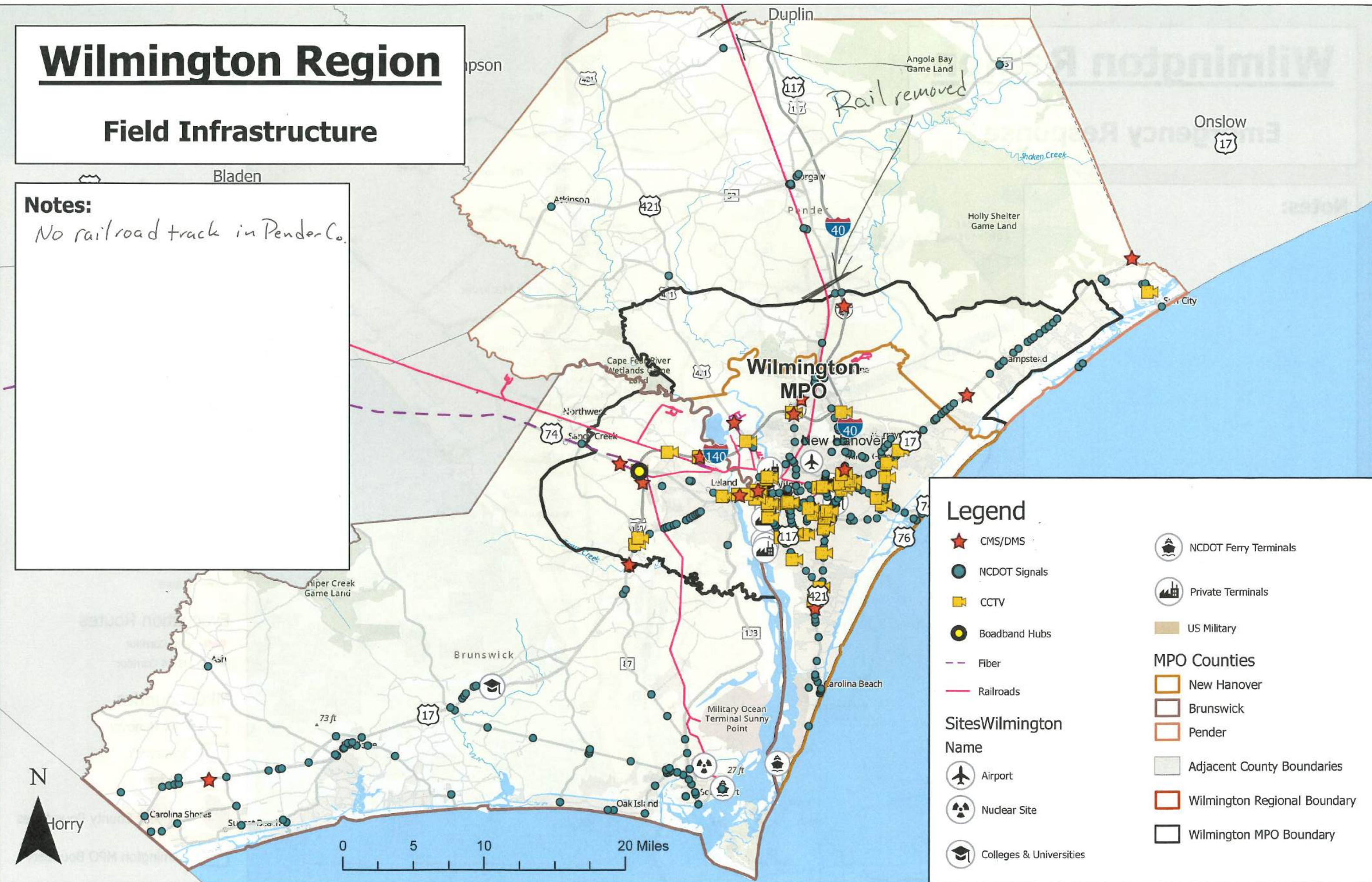


Wilmington Region

Field Infrastructure

Notes:

No railroad track in Pender Co.





APPENDIX F - STAKEHOLDER WORKSHOP 2



Stakeholder Workshop 2 – Minutes

Date: April 29, 2025

Time: 10:00 AM – 12:30 PM

Attendees

Abby Lorenzo (WMPO)	Emily Giampietro (Kimley-Horn)
Allen Hancock (NCDOT)	Jeff Dale (Kimley-Horn)
Amanda Good (Kimley-Horn)	Jeff Scott (NCDOT)
Beth King (WMPO)	Natasha Henderson (NCDOT)
Carolyn Caggia (NCDOT)	Shannon Whaley (NCDOT)
Chad Staradumsky (City of Wilmington)	Stephanie Ayers (Port of Wilmington)
Courtney Weeter (NCDOT)	Sam Albino (NCDOT)
Craig Harris (City of Wilmington)	Stoney Mathis (NCDOT)
Denys Vielkanowitz (City of Wilmington)	Tracy Helms (NCDOT)
Dominic Ciaramitaro (NCDOT)	

Meeting Notes

1. Workshop Structure

KH discussed some housekeeping items about the formatting of the workshop. Each attendee introduced themselves including their name, agency, and role.

2. Project Overview

KH presented on the project overview sharing the scope and updates on the project workflow.

3. Strategy Deployment

KH presented on the identification of strategies based on regional needs and gaps.

4. Project Boards

Prior to the Stakeholder workshop, KH presented on and confirmed projects based on regional needs at the 3rd Core team meeting. The information and feedback collected during the meeting was summarized and displayed on the following project boards: active traffic management, signal system project, freight, parking management, safety applications, flood impact management system, evacuation plans, and traffic incident management. KH dismissed the attendees to review each board, and had employees manned to talk through each board with the attendees. Below is the feedback received for each project board.

Active Traffic Management

- Dynamic Rerouting
 - o Average Ranking: 3
 - o Challenges/Obstacles



- Public following the routes
 - Lack of network redundancy
 - Training
 - Standard messaging system
 - Heavy vehicles
 - Pinch points (circled on project board)
 - Update with new and existing bypasses
- Wide Area Alert System
 - o Average Ranking: 2
 - o Challenges/Obstacles
 - Identifying factors/events that would utilize the system
 - Securing agreement from local jurisdictions
 - Public interaction
 - Additional texts with accident updates
 - Bottlenecks due to mass migration

Signal System Project

- Funding
 - o Average Ranking: 3
 - o Challenges/Obstacles
 - Delays in STIP are making it unlikely that local funding will be secured
 - Low cost compared to other STI projects has caused funding delays

Freight

- Truck Parking
 - o Average Ranking: 1
 - o Challenges/Obstacles
 - Lack of freight parking spaces
- Port Ingress
 - o Average Ranking: 2
 - o Challenges/Obstacles
 - Improved management at and near port entry
 - o Potential Solutions
 - Connect North Gate and Main Gate so all port traffic enters at Green Field
- Freight Navigation
 - o Average Ranking: 3
 - o Challenges/Obstacles
 - Funding
 - More platforms for drivers
 - May require additional legislation
 - GPS routing





- New executive order for CDL (commercial drivers license) required for English proficiency
- Speed of traffic updates

Parking Management

- Centralized Parking Database
 - o Average Ranking: 2
 - o Challenges/Obstacles
 - Funding
 - Incorporate in a single app or location
 - o Questions from stakeholders
 - Who will maintain this?
 - What will this cost?
- Regional Parking Management Plan
 - o Average Ranking: 2.5
 - o Challenges/Obstacles
 - Funding
 - o Suggestions
 - Include priority spaces for carpooling
 - Incorporate transportation options to be able to “park once”
 - Have management information system for the local level to address niche needs
- Park and Ride for Key Destinations
 - o Average Ranking: 2.5
 - o Challenges/Obstacles
 - Funding
 - Co-ordination for event parking
 - Getting buy-in from many stakeholders
- Parking Management Strategies
 - o Average Ranking: 2.5
 - o Challenges/Obstacles
 - Funding
 - o Suggestions
 - Use the Regional Parking Management Plan to enforce these strategies

Safety Applications

- Driver Education and Engagement
 - o Average Ranking: 2
 - o Challenges/Obstacles
 - Public Support
 - Funding
 - Driver license renewals are too easy (does not require review/testing of the handbook that is now updated with new technology)



- o Suggestions
 - Target schools/new drivers
- Vulnerable Road User Management
 - o Average Ranking: 2
 - o Challenges/Obstacles
 - Funding
 - Enforcement
 - Creating a dynamic. ongoing, responsive plan

Flood Impact

- Flood Impact Management System
 - o Average Ranking: 3
 - o Challenges/Obstacles
 - Funding for projects to mitigate foreseen vulnerabilities
 - Staff resources to implement and monitor the system
 - Inability to predict impacts with 100% accuracy
 - Consistency (Plans are always changing depending on the storm)
 - Detours/capacity – evac plans
 - Surrounding areas that impact flooding such as parts of Pender county and Middle Brunswick County
 - o Suggestions
 - Continue to work with Kurt from NCDOT and FIMAN

Evacuation Plans

- Nuclear Plan
 - o Average Ranking: 3
 - o Challenges/Obstacles
 - Effective communication
 - Multi-agency training
 - Improved information provided to the public
 - Evacuation plans are not available to the public
 - o Questions from stakeholders
 - Are we starting this plan from scratch?
- “Know Your Zone” Update
 - o Average Ranking: 3
 - o Challenges/Obstacles
 - Effective communication
 - Finding better ways to reach the public
 - Improve coordination with the order of evacuation (people need to evacuate in the proper order based on their zone)
 - Unclear information
 - o Questions from stakeholders

- Who would oversee the education aspect, and do we have the capacity for that?
- Centralizing Emergency Management Plans
 - o Average Ranking: 3
 - o Challenges/Obstacles
 - Being proactive
 - NCDOT division sharing and documenting critical information/preliminary plans
 - Consistency within plans
 - o Questions from stakeholders
 - Where would these be kept/maintained?

Traffic Incident Management

- IMAP Existing Infrastructure Expansion
 - o Average Ranking: 2
 - o Challenge/Obstacles
 - Funding
 - Additional staff (recruitment/retention)
 - Additional training (Supervision)
 - Communication with traffic control to re-open roads faster
- IMAP Vehicle Technology
 - o Average Ranking: 3
 - o Challenge/Obstacles
 - Funding
 - Keeping technology up to date
 - Wifi connected dashboard cameras that display active conditions and/or approaching active crash/event
- Emergency Vehicle Preemption
 - o Average Ranking: 3
 - o Challenge/Obstacles
 - Funding
 - o Questions from stakeholders
 - What in-vehicle technology is needed?

5. Next Steps

KH provided an overview of the next steps of the project.

- *Summarize Core Team and Stakeholder Feedback*
- *Draft Strategic Deployment Plan*
- *Address comments*
- *Final Strategic Deployment Plan*

DYNAMIC ROUTING

What

Real-time adjustments of travel routes based on current traffic conditions, road closures, incidents, weather, and other factors that could impact.

Challenges/Needs

- CFMB bridge closures reroute trucks through neighborhoods
- Queue management for at-grade rail crossings
- Traveler information and signage at key choke points (can cause gridlocks)
- Inconsistent travel times on bridges and communicating rerouting information
- Major interstates and routes terminate in Wilmington with limited outlets along the coast
- Funding challenges procuring additional DMS and freeway infrastructure devices
- Gaps in DMS on key routes
- Limited resources for maintenance of DMS
- Relaying traveler information or route updates during bridge closures

Benefits

- Reduce congestion
- Improve travel time reliability
- Enhance road safety
- Lowers emissions by reducing idling and stop-and-go traffic

Rerouting Applications

- Integrated Corridor Management (ICM):
 - ICM is a smart transportation strategy that focuses on the management of ALL elements of a transportation corridor to provide mode choice decisions to travel. ICMs promote treating a corridor as a connected ecosystem not just optimizing one mode.
- Bridge Closures or Significant Incidents
 - Pre-plan and routes in combination with real-time adaptive traffic signals, dynamic messaging systems, and navigation integration can assist with diverting vehicles to alternate routes.
 - Strategically place infrastructure at chokepoints where it can be used during multiple situations.
- Construction or Maintenance
 - Providing traveler information for alternative routes around construction for long durations.
- Special Events
 - Seasonal attractions and [CONTENT MISSING FROM DOC]

Goals Addressed

-  **SAFE & EQUITABLE**
-  **MOBILITY & RELIABILITY**
-  **INVEST IN TSMO & PROMOTE MULTI-MODAL**
-  **ECONOMIC SUCCESS**

Successful Practices Include

- Strong understanding of how road users interact with the transportation network
- Dynamic messaging signs for traveler information
- Integration with navigation apps
- Pre-determined detour routes
- Agency coordination

WIDE AREA ALERT SYSTEM

What

Wireless emergency alerts deliver emergency notifications directly to mobile devices within a specific geographic area.

Challenges/Needs

- No safety system to alert all individuals at the port property
- Traveler information and signage at key choke points (can cause gridlocks—especially during the peak hours)
- Consistent travel times on bridges and communicating rerouting information
- Relaying traveler information or route updates during bridge closures

Benefits

- Real-time notification that requires no app or subscription
- Notifies only those in an impacted area
- Enhances public safety during time sensitive threats
- Resilient to network congestion

Special Case Uses

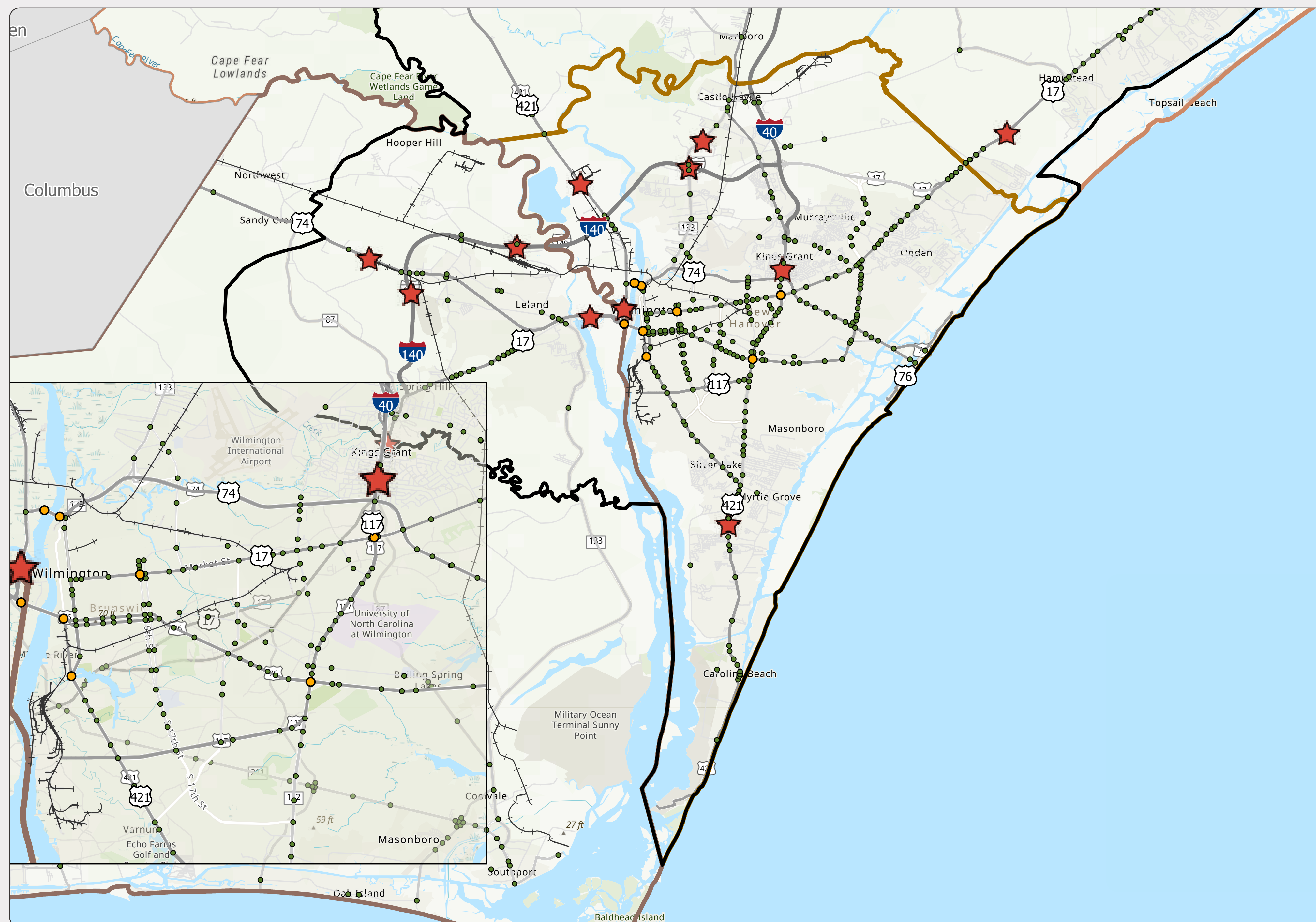
- Port emergencies or threats
- Infrastructure failures or road closures
- Hazardous waste or chemical spills
- Public safety threats
- Law enforcement situations
- Natural disaster warnings, advisories, and evacuations

Goals Addressed

-  **SAFE & EQUITABLE**
-  **MOBILITY & RELIABILITY**
-  **INVEST IN TSMO & PROMOTE MULTI-MODAL**
-  **ECONOMIC SUCCESS**



ATM MAP



Map Description

DO WE WANT TO PLACE ANY CONTENT HERE FOR CONTEXT ON THE MAP? Bit, sim laut lautea boreicae lam dolum rere labor aut etur? Volores idelit aut ipsam quidita tionsendant doluptat que ident, omniataspes eos accus alis iniatur eriat, cusdae estectus a conserati que dit venia sus ullupta in nem quis rem dem es int que dolum in cor aut am exeribus ideligende nullabo rehent veliquam, te qui cus, odi utat exces moditata comnient alit quamus sunt laniam rem voluptat volora derum aperum erferist fugiti temostem quatibus, te comnimp edicius aboria con ent.

Map Legend

- Regional Pinch Points
 - NCDOT Traffic Signals
 - Wilmington MPO Boundary
- MPO COUNTIES**
- New Hanover
 - Brunswick
 - Pender
 - Adjacent County Boundaries



NUCLEAR EMERGENCY RESPONSE PLAN

What

Detailed plan that defines specialized protocols for handling nuclear incidents. Coordination and communication needs are clearly defined in response to specific nuclear threats, incidents, or emergencies. Scenario planning assesses multiple risk types and provides detailed steps to mitigate risk and protect communities.

Goals Addressed



Challenges/Needs

- Brunswick County has identified the specific need for an emergency preparedness zone (EPZ) and a nuclear emergency plan.

Benefits

- Enhances communication/coordination between agencies
- Improves public safety
- Organizes the response and reduces confusion
- Provides strategies to better manage congestion during an evacuation

Potential Funding Opportunities

- FEMA Building Resilient Infrastructure and Communities (BRIC) Program
- FEMA Emergency Management Performance Grant

Proposed Technology

- Emergency notification system
- Radiation detectors
- Cameras along evacuation routes to monitor congestion/crashes

Performance Measures

- Evacuation time
- Response time
- Participation rate
- Traffic congestion/crashes
- Percent of people that received alert
- Public transportation usage
- Cost-benefit analysis
- Feedback from EMS, organizations, and the public

UPDATE THE “KNOW YOUR ZONES” REGIONAL SYSTEM



What

Comprehensive and up-to-date evacuation zone maps that are easily accessible through a centralized platform and share all zone-related information such as zone boundaries, evacuation routes, and shelter locations.

Challenges/Needs

- A majority of the population is unaware of “Know Your Zone” or what their zone is

Potential Funding Opportunities

- FEMA Building Resilient Infrastructure and Communities (BRIC) Program
- FEMA Emergency Management Performance Grant

Proposed Technology

- Interactive map of zones for public awareness (Figure 1)
- GIS for locating gaps in the maps
- Social Media
- DMS signs to spread awareness

Performance Measures

- Public feedback (percent of people who know their zones)
- Evacuation time

Goals Addressed



Benefits

- Enhances preparation
- Reduces panic and confusion
- Leads to more efficient evacuation
- Improves safety

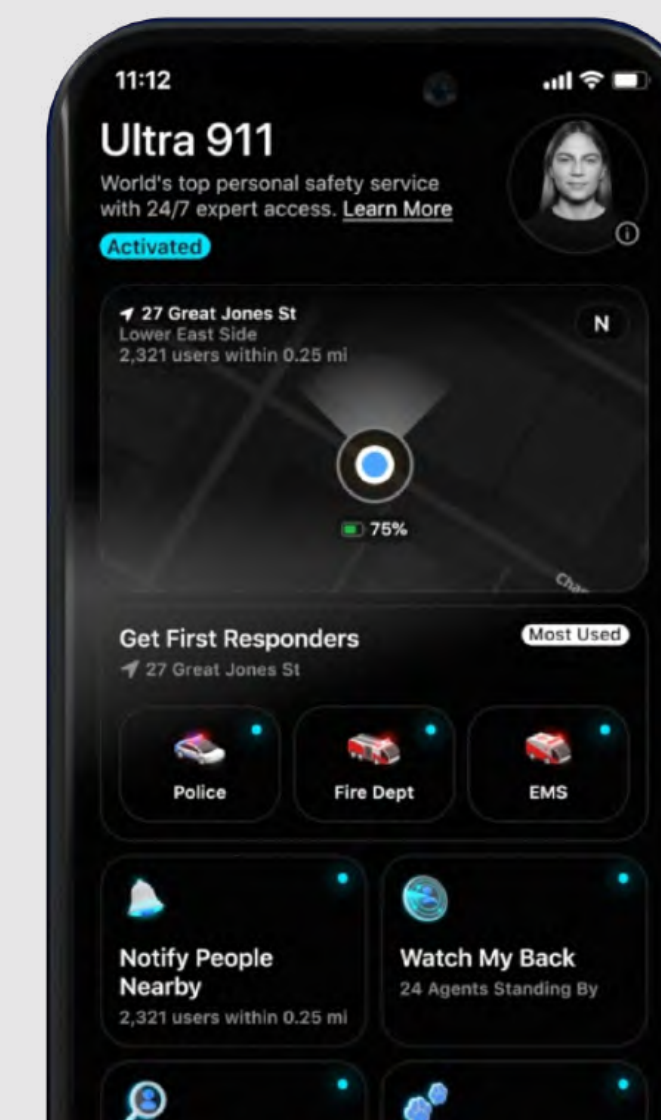


Figure 1: The Citizen app is a safety-focused mobile app that provides real-time alerts and helps users locate emergency shelters, keeping them informed and connected to safe locations during emergencies.

CENTRALIZING EMERGENCY MANAGEMENT PLANS

What

Centralized location where all emergency plans are stored. Municipalities and local jurisdictions can access their roles, responsibilities, and activation protocols for when emergencies occur.

Challenges/Needs

- Limited mobility during evacuations
 - Infrastructure limits evacuation to 10% of the population at a time
 - Evacuation plans lack detail
- Gaps in coordination and collaboration
 - Inconsistent access to up-to-date communication protocols (POCs, chain of command, etc.)
 - No recurring meetings or mock exercises to build stakeholder relationships

Goals Addressed



Benefits

- Enhances communication/coordination between agencies
- Improves public safety
- Reduces congestion/crashes during evacuation
- Allows for a faster, more organized response

Potential Funding Opportunities

- FEMA Building Resilient Infrastructure and Communities (BRIC) Program
- FEMA Emergency Management Performance Grant

Potential Owners

- Eastern TMC
- Police/Fire/EMS Services
- Division 3
- WMPO

Performance Measures

- Evacuation time
- Traffic congestion/crashes
- Public transportation usage
- Shelter utilization rates
- Cost-benefit analysis
- Feedback from EMS, organizations, and the public

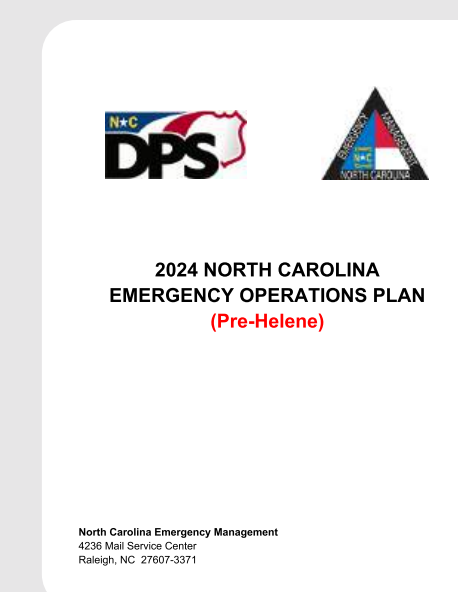
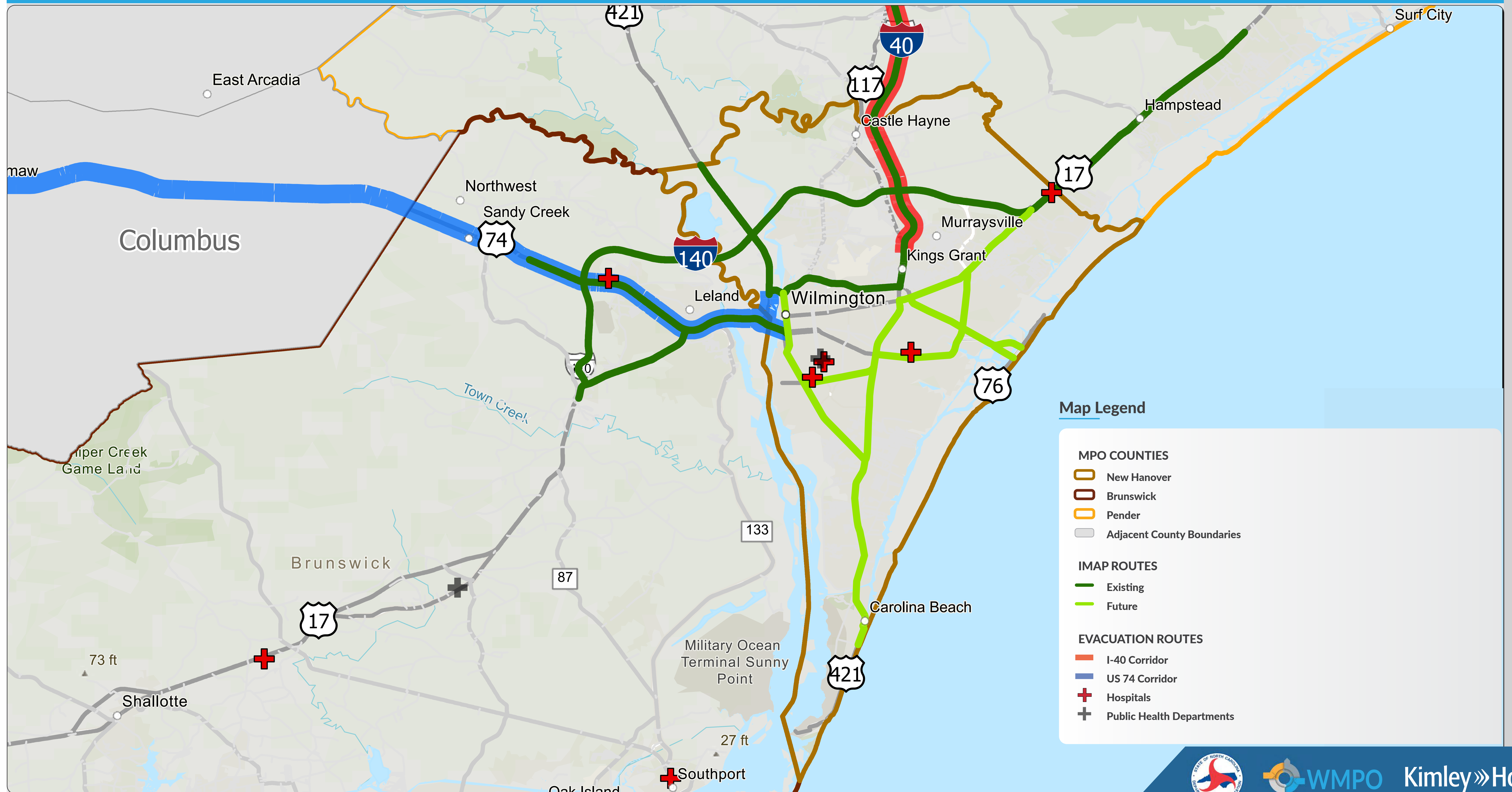


Figure 2: In 2024, the North Carolina Department of Public Safety published the North Carolina Emergency Operations Plan.



EMERGENCY RESPONSE LAYERS





FLOOD IMPACT MANAGEMENT SYSTEM

What

Integrated system that uses comprehensive sensor coverage, data analysis, and information sharing to mitigate flooding impacts to the transportation network.

Challenges/Needs

- Flood mitigation is limited
- Gaps in flood gauge locations and mapping capabilities
- Infrastructure to mitigate flood prone areas

Benefits

- Allows for quicker and more organized responses to flooding events
- Enhances public safety
- Improves centralized emergency plan
- Improves public awareness of flooding impacts
- Creates proactive response
- Sustainability

Potential Funding Opportunities

- Community Infrastructure Fund USDOT
- FEMA Flood Mitigation Assistance Grant Program

Proposed Technology

- GIS for mapping flood-prone areas (provide ArcGIS maps to the public)
- Flood gauges to monitor water depth at critical locations
- Data analytics to predict future impacts and at risk locations
- Environmental sensors
- Drones to assess flood damage/monitor infrastructure
- Emergency notification system
- Green infrastructure to help prevent floods
- Flood warning systems

Performance Measures

- Flood detection effectiveness
- Damage to critical infrastructure
- Message reach (percent of people that receive alert)
- Casualty rates for flood events
- Restoration of services
- Environmental health

Goals Addressed



SAFE & EQUITABLE



MOBILITY & RELIABILITY

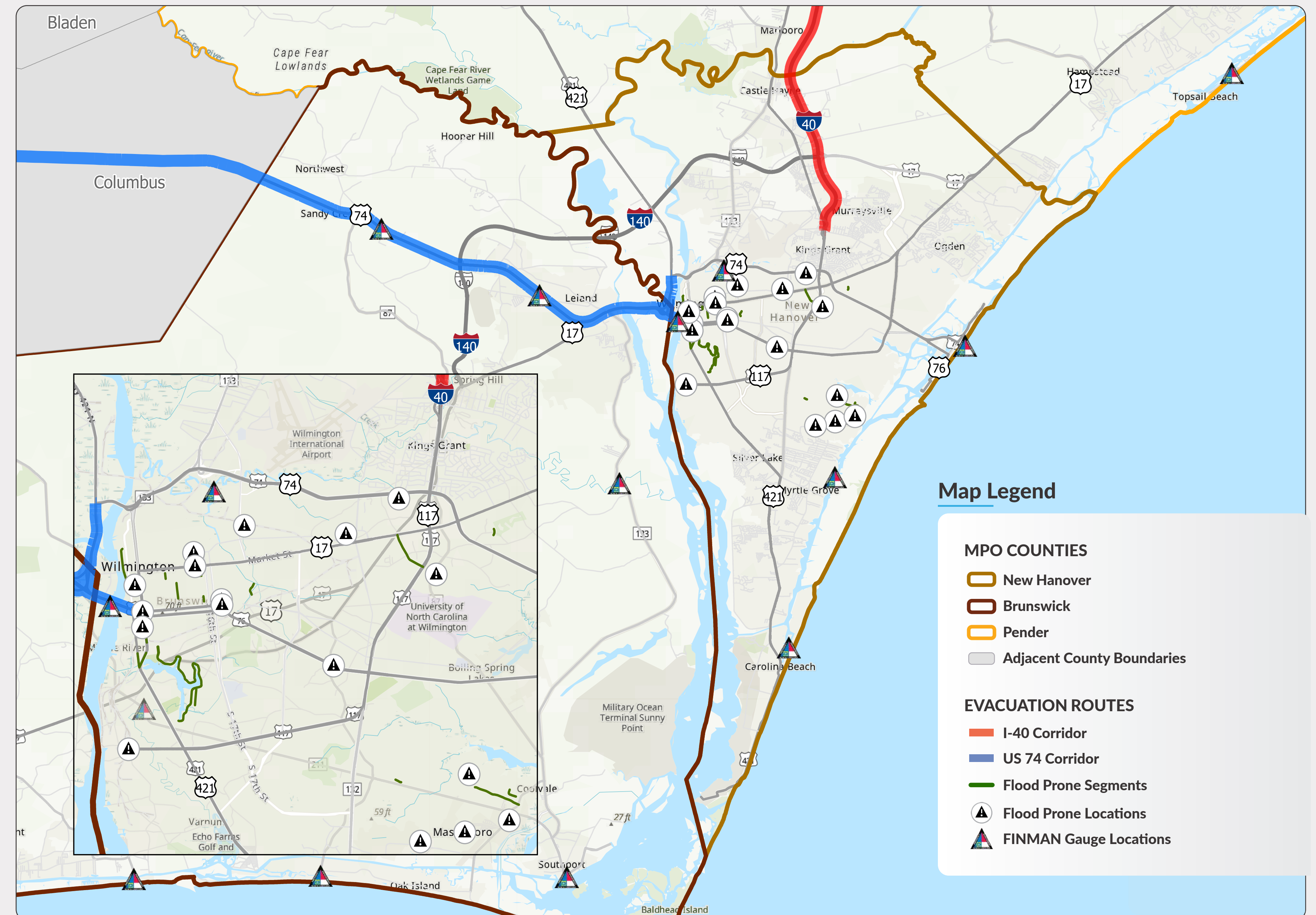


INVEST IN TSMO &
PROMOTE MULTI-MODAL



ECONOMIC SUCCESS

FLOOD PRONE AREAS





TRUCK PARKING

What

Truck parking strategies that focus on optimizing commercial vehicle parking by connecting drivers to available spaces. This includes systems to monitor and share information about truck parking capacity and destinations. This strategy involves the use of advanced technologies, such as automated parking solutions, to ensure safe and accessible parking options for freight vehicles.

Goals Addressed

-  **SAFE & EQUITABLE**
-  **MOBILITY & RELIABILITY**
-  **INVEST IN TSMO & PROMOTE MULTI-MODAL**
-  **ECONOMIC SUCCESS**

Challenges/Needs

- Lack of data for making decisions around parking availability
- Need for a centralized database for parking information
- Need for truck parking enforcement

Benefits

- Reduces truck parking on shoulder/ramps
- Cost savings
- Enhances driver safety

Potential Funding Opportunities

- USDOT SMART Grants Program
- Congestion Mitigation and Air Quality (CMAQ) Improvement Program
- FMCSA High Priority Grants

Proposed Technology

- DMS signs for parking
- Central parking database and automated parking detection to display real-time parking availability
 - » Flowbird HUB
- App such as Flowbird to reserve parking spots
- Wayfinding signs



Performance Measures

- Parking utilization
- Revenue
- Reduction in idle time
- Peak usage times

PORT INGRESS

What

Port Ingress is physical infrastructure and supporting technologies to support CMV access into the port property. This technology improves efficiency and secure freight movement into ports while considering the design and regulation of access routes, checkpoints, and entry gates.

Goals Addressed

-  **SAFE & EQUITABLE**
-  **MOBILITY & RELIABILITY**
-  **INVEST IN TSMO & PROMOTE MULTI-MODAL**
-  **ECONOMIC SUCCESS**

Challenges/Needs

- Ingress limitations cause excessive queuing on external routes
- Limited truck infrastructure and technology around port
- Limited tools to manage increased congestion in regions that are impacting freight mobility
- Queue management for at-grade rail crossings
- Challenges with at-grade crossings on key commercial vehicle routes in region

Benefits

- Reduces congestion
- Increases efficiency
- Improves security
- Cost savings (from increased efficiency)

Potential Funding Opportunities

- Congestion Mitigation and Air Quality (CMAQ) Improvement Program
- Infrastructure for Building America (INFRA) Program

Proposed Technology

- Freight signal priority
- Cloud database for real-time data
- Integrated and adaptable gate system
- DMS signs for detours/traffic conditions
- Intrusion detection systems for security

Performance Measures

- Driver satisfaction
- Congestion levels
- Travel time reliability
- Queue length
- Gate processing time
- Operational costs

FREIGHT NAVIGATION

What

Freight navigation and parking is a comprehensive strategy designed to optimize the movement of commercial vehicles. This strategy involves the use of advanced technologies, such as real-time navigation systems, to facilitate efficient routing and reduce congestion. These systems should integrate incident management and emergency response plans and guide CMVs on predetermined detours and alternate routes.

Goals Addressed

-  **SAFE & EQUITABLE**
-  **MOBILITY & RELIABILITY**
-  **INVEST IN TSMO & PROMOTE MULTI-MODAL**
-  **ECONOMIC SUCCESS**

Challenges/Needs

- Ingress limitations cause excessive queuing on external routes
- Limited truck infrastructure and technology around port
- Limited tools to manage increased congestion within the region which is impacting freight mobility
- CFMB bridge closures reroute trucks through neighborhoods
- Limited network freight data usage and predictions
- Challenges with communicating effective navigation to CMV

Benefits

- Reduces crashes
- Enhances mobility
- Reduces truck parking on shoulder/ramps
- Cost savings (from increased efficiency)
- Enhances driver safety

Potential Funding Opportunities

- Congestion Mitigation and Air Quality (CMAQ) Improvement Program
- FMCSA High Priority Grants
- USDOT SMART Grants Program

Proposed Technology

- DMS signs
- CCTV cameras
- Wayfinding signs
- Dynamic routing and navigation system

Performance Measures

- Cost-benefit analysis
- Reduction in idle time
- On-time delivery rate
- Travel time reliability
- Congestion levels
- Driver satisfaction



CENTRALIZED PARKING DATABASE

What

A centralized database that integrates real-time regional parking data.

Challenges/Needs

- No real-time data for parking capacity
- Lack of data for making decisions around parking needs

Benefits

- Better data for agencies and the public

Proposed Technology

- Cloud databases: Flowbird (Figure 1) and ParkMobile (Figure 2)

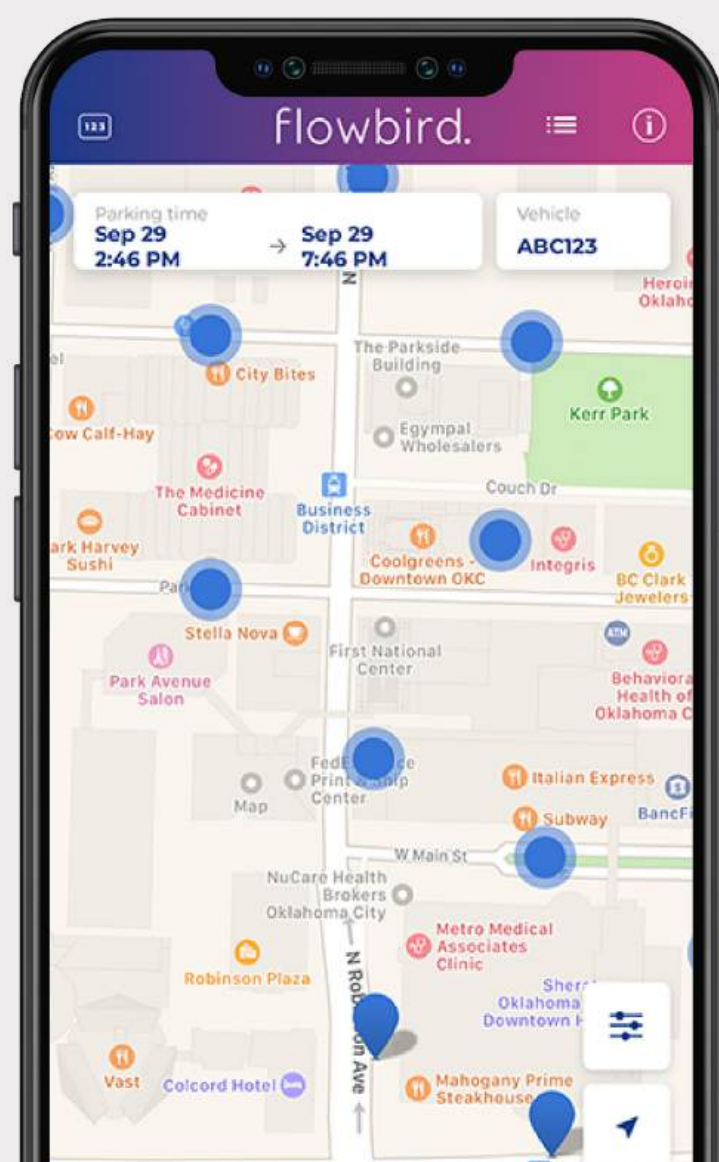


Figure 1: The Flowbird app is a mobile parking solution that allows users to pay for parking through their smartphone, avoiding cash and lines at parking meters.

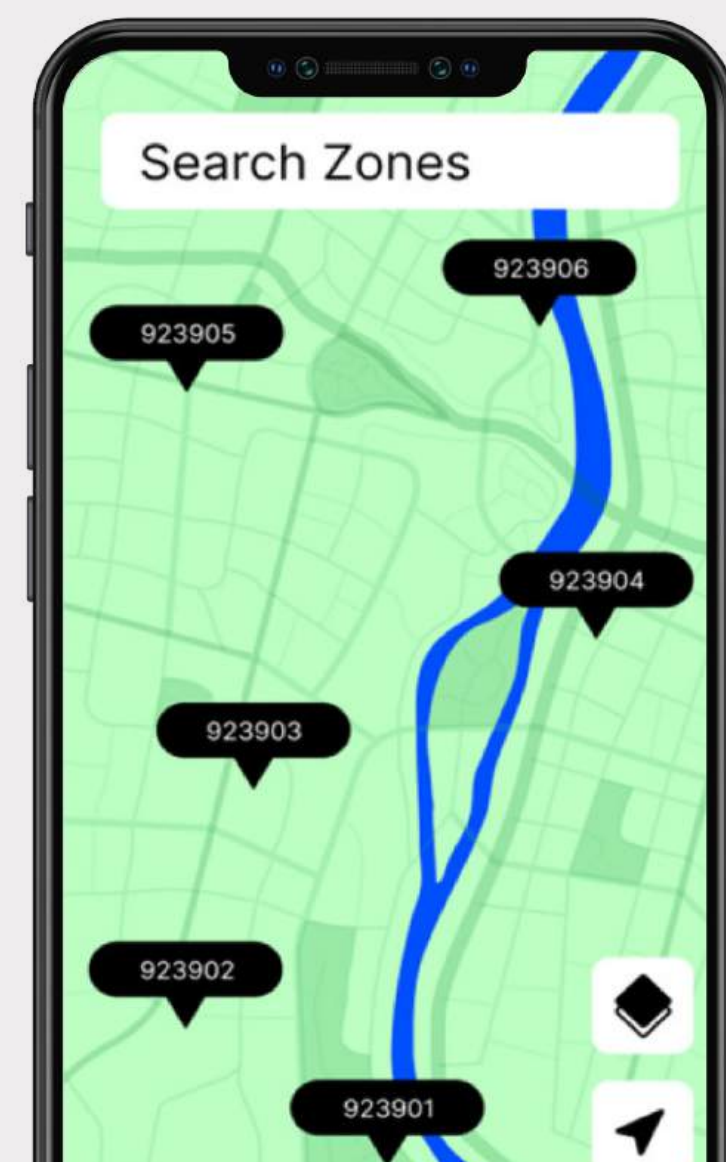


Figure 2: The ParkMobile app is designed to facilitate parking payments and reservations, offering users a convenient way to pay for street, garage, and event venue parking.

Goals Addressed

- SAFE & EQUITABLE
- MOBILITY & RELIABILITY
- INVEST IN TSMO & PROMOTE MULTI-MODAL
- ECONOMIC SUCCESS

REGIONAL PARKING MANAGEMENT PLAN

What

This plan establishes protocols for the efficient selection, allocation, monitoring, and maintenance of parking spaces, ensuring optimal use of facilities and enhancing overall parking availability and convenience. Additionally, it evaluates location feasibility and provides regional parking solutions.

Challenges/Needs

- Lack of ability for parking and curb management
- Need for commercial loading zones
- Need for taxi spots downtown
- Need for residential focused parking management program

Potential Funding Opportunities

- SMART Grants Program USDOT

Plan Content

- Existing Conditions
- Land Use Assessment
- Demand Analysis
- Parking Policies and Regulation Review
- Management Strategies
- Infrastructure Recommendations
- Implementation Plan

Key Partnerships

- Local Municipalities
- Third-party Parking Vendors
- Property Owners and Developers
- Entertainment Venues

Goals Addressed

- SAFE & EQUITABLE
- MOBILITY & RELIABILITY
- INVEST IN TSMO & PROMOTE MULTI-MODAL
- ECONOMIC SUCCESS

Benefits

- Planning for future parking needs
- More efficient use of parking infrastructure

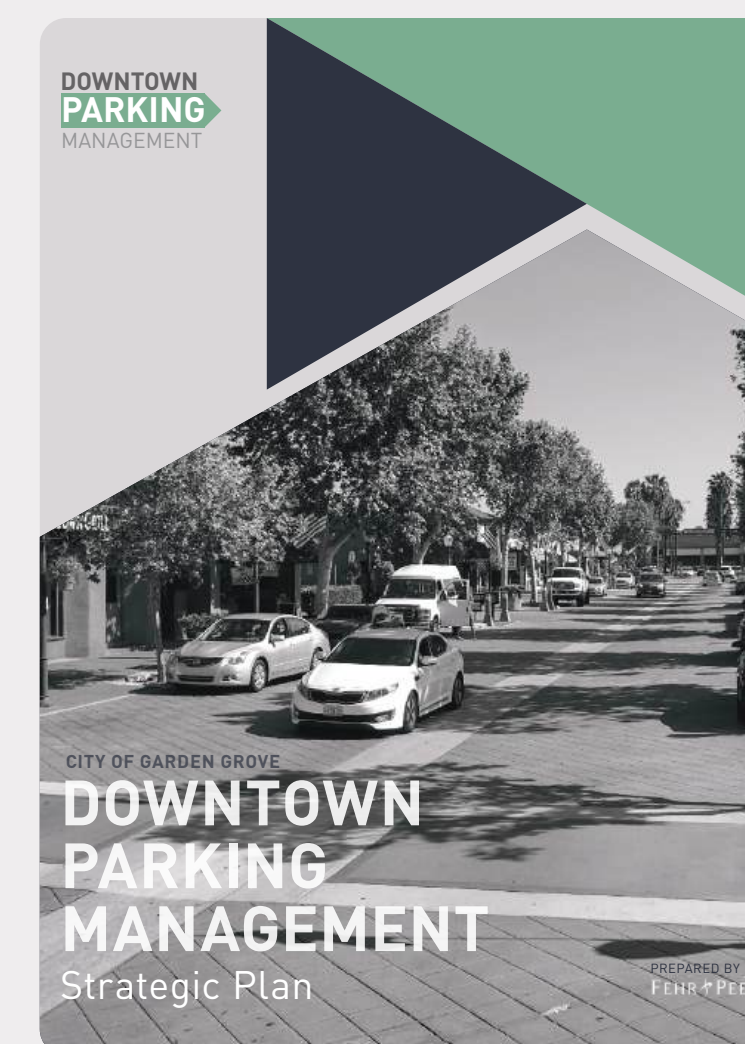


Figure 3: City of Garden Grove Downtown Parking Management Strategic Plan

PARK AND RIDE FOR KEY DESTINATIONS

What

Park and ride services integrate with shuttles to move people to key destinations with limited parking infrastructure. For the Wilmington region, this includes key public beach access points and special event locations.

Challenges/Needs

- Lack of coordinated park and ride options
- Limited parking capacity at destinations

Benefits

- Reduces congestion
- Optimizes limited parking capacity

Proposed Technology

- Shuttle capacity
- Real-time arrival information
- Parking detection sensors
- Cloud databases: Flowbird and ParkMobile (Figure 4)

Location Characteristic Considerations

- Capacity & Infrastructure
- Accessibility
- Transit Connections
- Safety & Security
- User Amenities
- Proximity to Key Destinations

Goals Addressed

- SAFE & EQUITABLE
- MOBILITY & RELIABILITY
- INVEST IN TSMO & PROMOTE MULTI-MODAL
- ECONOMIC SUCCESS

Potential Funding Opportunities

- SMART Grants Program USDOT

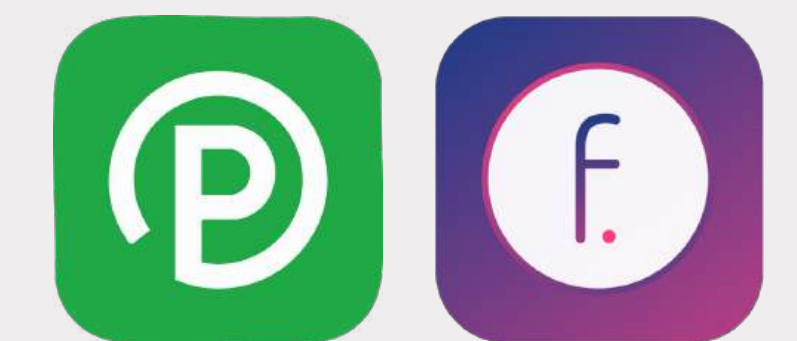


Figure 4: Flowbird and ParkMobile app icons.



Figure 5: Park and Ride Station.



PARKING MANAGEMENT STRATEGIES

What

This technology focuses on monitoring parking capacity for both enforcement and traveler information purposes. This includes surface lots, decks, on-street, and special event parking.

Challenges/Needs

- Lack ability to monitor on-street parking capacity
- Abuse of parking during special events
- Lack of communication and coordination with venues and concerts

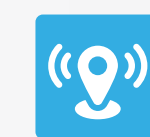
Benefits

- Reduces congestion
- Improves adherence to legal parking
- Raises customer satisfaction when attending events
- More efficient ingress prior to an event

Goals Addressed



SAFE & EQUITABLE



MOBILITY & RELIABILITY



INVEST IN TSMO &
PROMOTE MULTI-MODAL



ECONOMIC SUCCESS

Proposed Technology

- Ticket vending machines (Figure 3)
- Payment readers (Figure 4)
- Cloud database: Flowbird and ParkMobile (Figure 5)



Figure 3



Figure 4

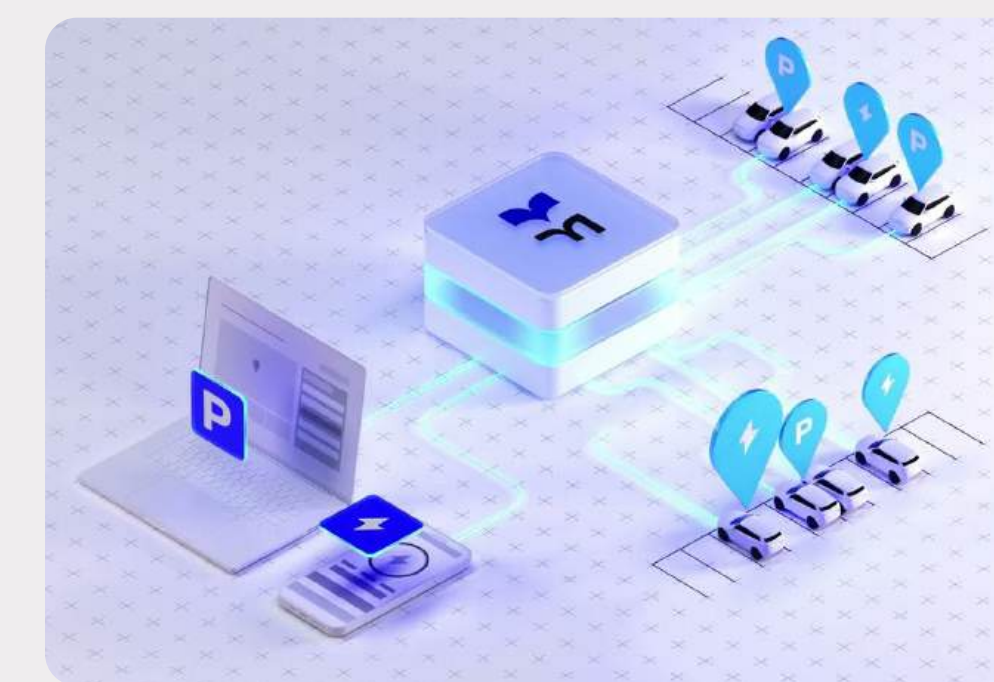


Figure 5

Potential Funding Opportunities

- SMART Grants Program USDOT

Performance Measures

- User adoption/satisfaction
- Revenue
- Parking utilization
- Turnover rate
- Enforcement efficiency
- Response time (app)
- Amount of errors
- Reduction in idle time
- ROI
- Peak usage times

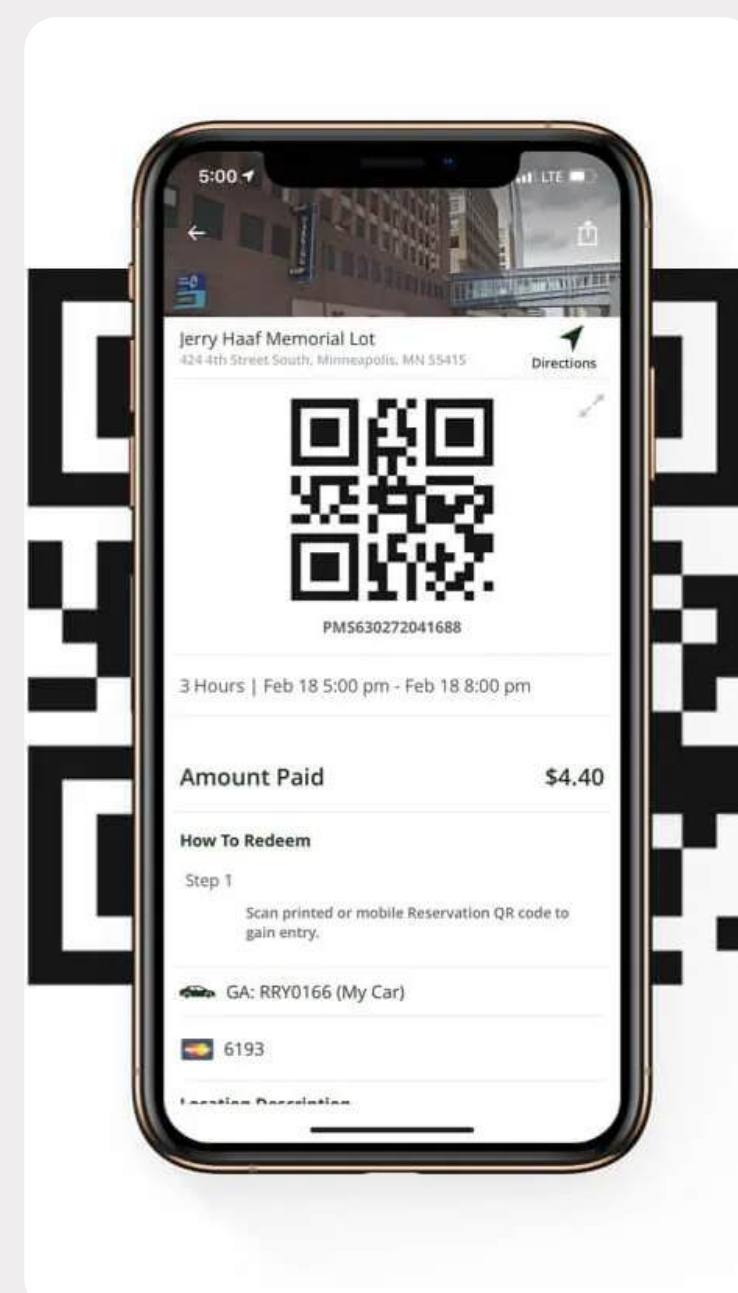


Figure 1

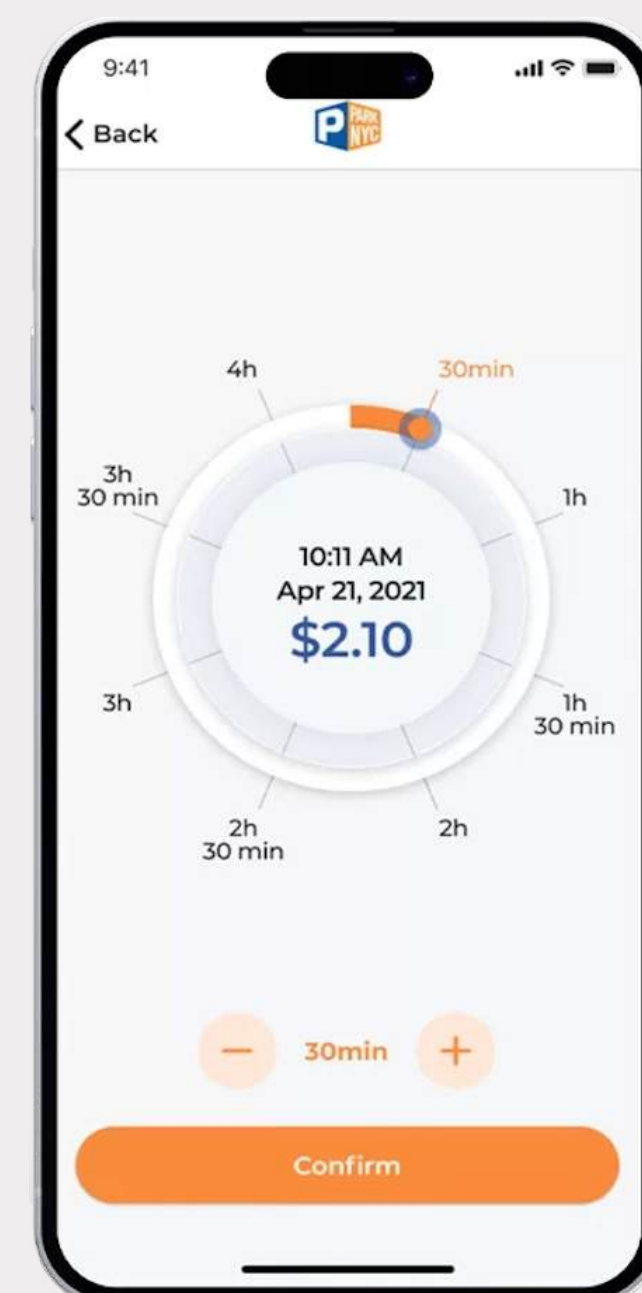


Figure 2



DRIVER EDUCATION AND ENGAGEMENT PROGRAM

What

Comprehensive educational programs and interactive engagement strategies focused on improving overall traffic safety and promoting responsible driving behavior.

Challenges/Needs

- Drivers lack of knowledge around the laws for vulnerable road users

Benefits

- Improved road safety
- Reduction in traffic violations
- Increased public engagement
- Environmental benefits (promote use of other modes - bikes, walking, scooters)

Proposed Technology

- E-Learning Platforms and App (Figure 1)
- VR technology
- DMS such as You drink. You drive. You die.
- Social media
- Seminars with tech companies such as google to implement safety information into navigation apps

Performance Measures

- Before/after surveys to understand knowledge retention/behavioral changes
- Crash rates
- Traffic violations
- Program participation and completion rates
- Citizen satisfaction survey for VRU's (do they see an improvement from drivers)
- Driving test pass rates
- Reduction in insurance claims

Goals Addressed



SAFE & EQUITABLE



MOBILITY & RELIABILITY



INVEST IN TSMO &
PROMOTE MULTI-MODAL



ECONOMIC SUCCESS

Potential Funding Opportunities

- NCSU Vision Zero Technical and Program Support Grant

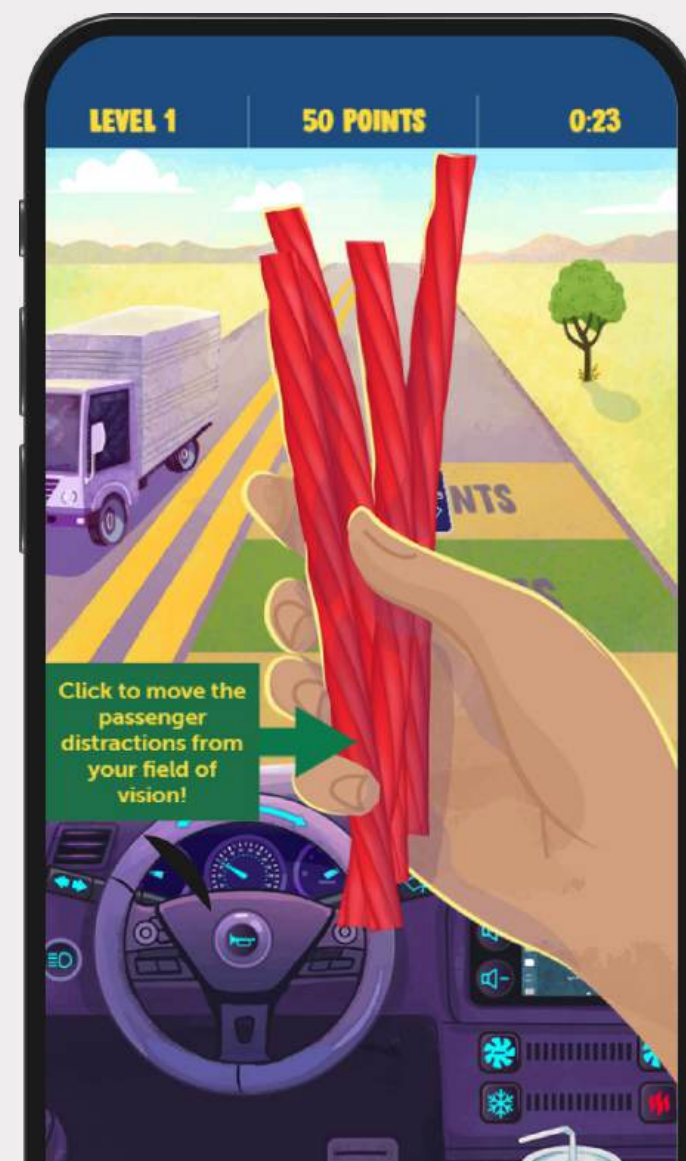
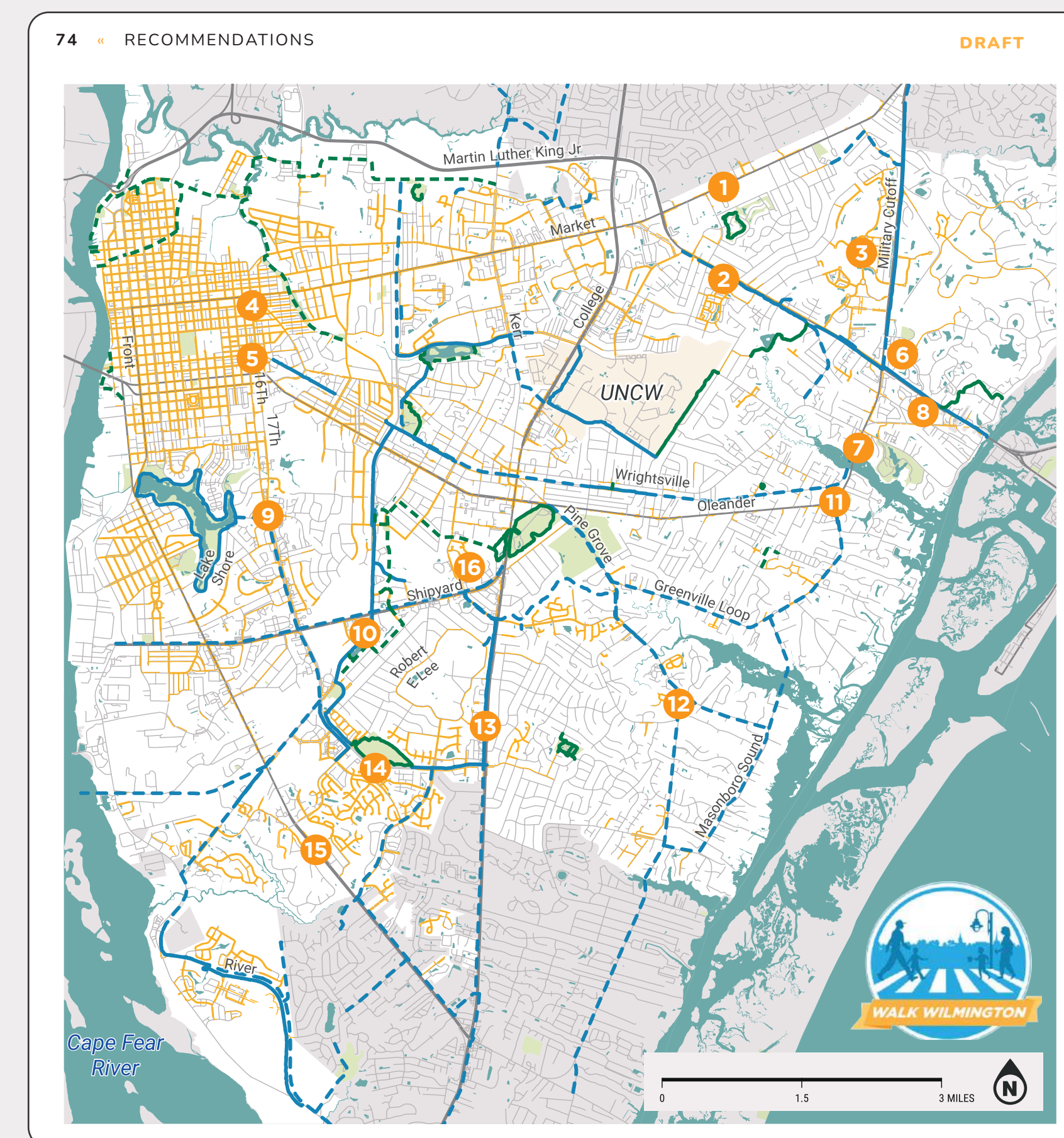


Figure 1: Incorporate Go Coast TDM into an app and use this to educate drivers, promote learning opportunities, etc.

SMART MOVES: FROM PLANS TO PAVEMENT

The WMPO has published 15 bicyclist and pedestrian focused documents to their websites with project and location specific recommendations. Considering the areas in these studies leverages ready-made priorities and can assist in streamlining smart intersection technology locations and corridors.

Wilmington Walk Study Recommendations Page Example



Map Legend

RECOMMENDATIONS



Additional Priority Projects



Recommended Greenways
(from 2013 Comprehensive
greenway Plan)



Recommended Sidepaths
(from 2013 Comprehensive
greenway Plan)

EXISTING CONDITIONS

Existing Sidewalks

Existing Sidepaths

Existing Parks and
Greenways

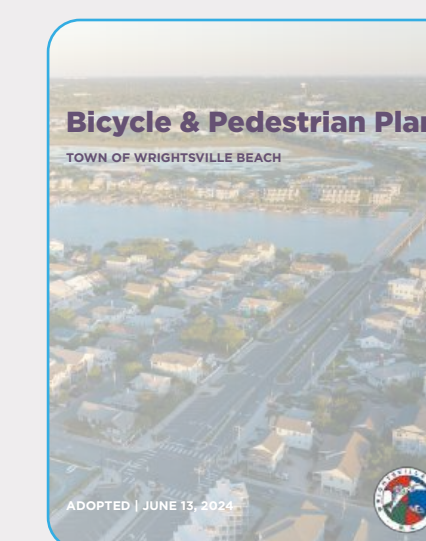
UNC Wilmington

Wilmington

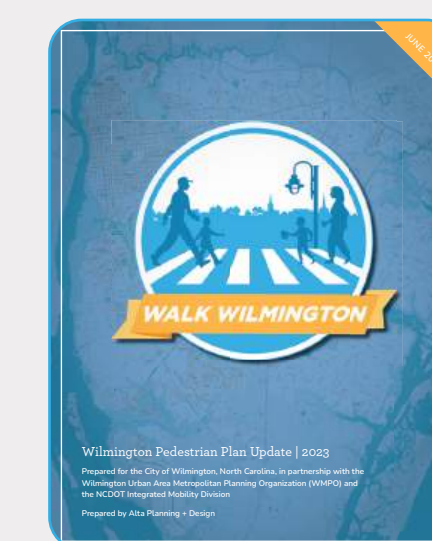
Existing Plans



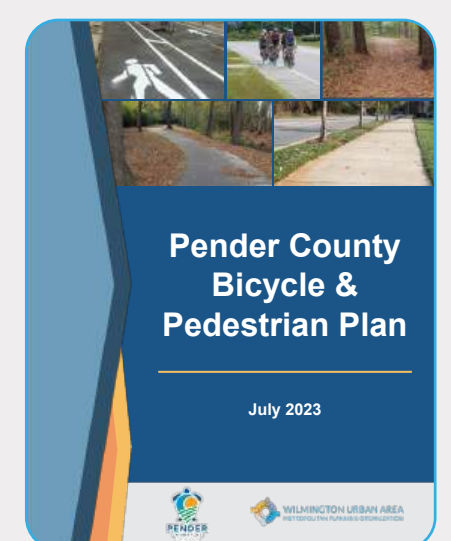
Carolina Beach Bicycle and Pedestrian Plan (to be adopted June 2025)



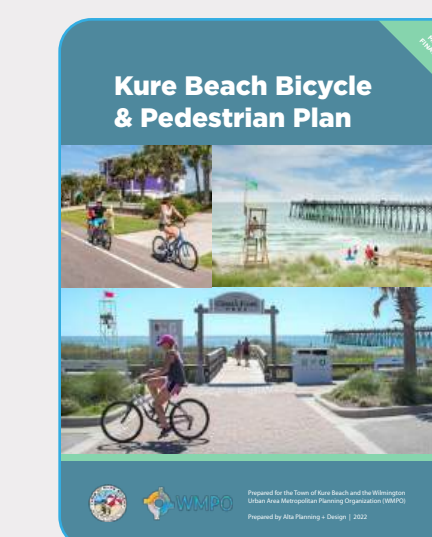
Wrightsville Beach Bicycle and Pedestrian Plan (2024)



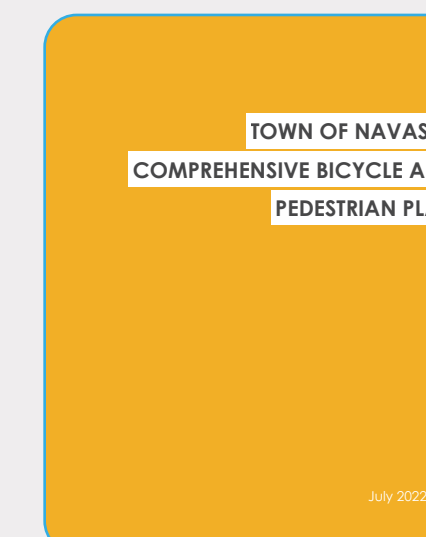
Walk Wilmington Pedestrian Plan Update (2023)



Pender County Bicycle and Pedestrian Plan (2023)



Kure Beach Bicycle & Pedestrian Plan (2022)



Town of Navassa Comprehensive Bicycle and Pedestrian Plan (2022)



Wilmington Rail Trail Master Plan (2020)

Additional Bike and Pedestrian Plans Published

- Carolina Beach Pedestrian Plan (2019)
- Leland Pedestrian Plan (2016)
- River to Sea Bikeway Master Plan (2013)
- Wilmington-New Hanover County Comprehensive Greenway Plan (2013)
- Cross-City Trail Master Plan (2012)
- Carolina Beach Bicycle Multi-Use Transportation Plan (Carolina Beach Bicycle Multi-Use Transportation Plan (2011)
- Pelican Drive/Salisbury Street Bicycle Plan for the Town of Wrightsville Beach (2009)
- Walk Wilmington: A Comprehensive Pedestrian Plan (2009)



SIGNAL SYSTEM UPGRADE

What

NCDOT is currently implementing a statewide Advanced Traffic Management System (ATMS) software to improve coordination of incident and traffic management tools on NCDOT roadways. The new ATMS software is merging existing software tools and procedures. When implemented, the software will streamline the ability of NCDOT to share real time data.

Goals Addressed



SAFE & EQUITABLE



MOBILITY & RELIABILITY



INVEST IN TSMO &
PROMOTE MULTI-MODAL



ECONOMIC SUCCESS

Challenges/Needs

- Ability to proactively identify choke points
- Mobility challenges during evacuations
- Ingress limitations cause excessive queuing on external routes
- Outdated signal system
- Older serial communication technology
- Need better network resiliency and redundancy for signal system
- Better method for external partners to access cameras
- Older detection technology in place
- Funding and procurement challenges with exploring new signal technologies
- Increasing traffic congestion across the region
- Consistent travel times on bridges and communicating rerouting information

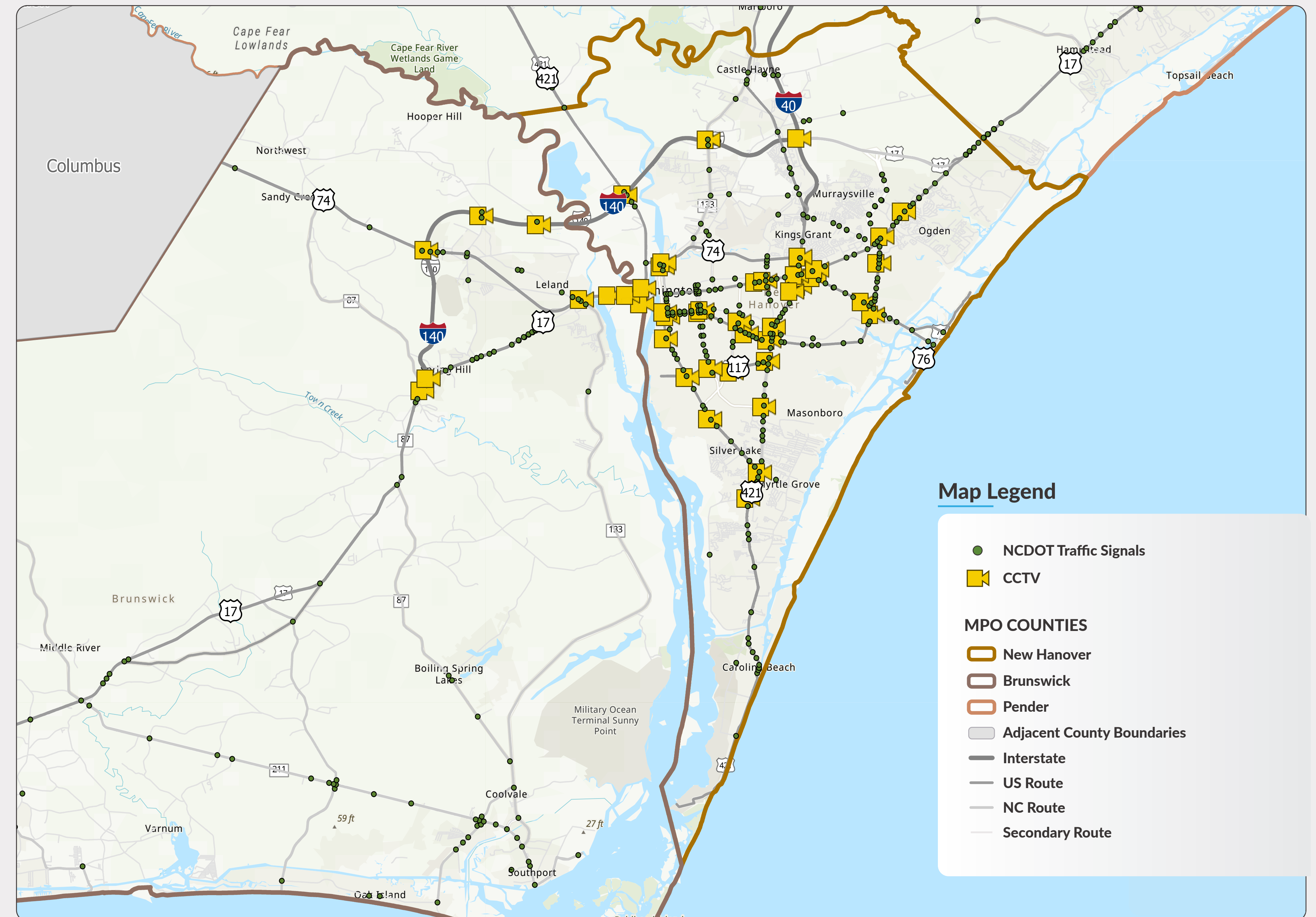
Benefits

- Improve traffic flow
- Reduce congestion
- Remote monitoring for real-time adjustments
- Safety improvements reducing stop-and-go traffic
- Build credibility for the region showing the commitment to innovation and safety
- Free local and municipal funds for other critical projects
- Accelerate project timelines when funding is secured

Potential Funding Opportunities

- Grants
 - U.S. Federal Highway Administration
 - Congestion Mitigation and Air Quality Improvement Program (CMAQ)
 - Highway Safety Improvement Program (HSIP)
 - Surface Transportation Block Grant Program for traffic signal updates
 - U.S. Department of Transportation Safe Streets for All (SS4A) Program
- Budget Allocations
- Public-private partnerships

MAP OF CURRENT SIGNAL SYSTEM





IMAP EXISTING INFRASTRUCTURE & EXPANSION

What

Incident Management Assistance Patrol (IMAP) provides roadside assistance to motorists, clears debris from the road, and deploys emergency traffic control.

Challenges/Needs

- Recruitment and retention of IMAP personnel
- Aging IMAP vehicles

Goals Addressed

- SAFE & EQUITABLE**
- MOBILITY & RELIABILITY**
- INVEST IN TSMO & PROMOTE MULTI-MODAL**
- ECONOMIC SUCCESS**



Figure 1: NCDOT IMAP Vehicle

Benefits

- Provides roadside assistance for drivers
- Improves roadway clearance after an incident
- Reduces CO₂ emissions and fuel consumption from waiting in traffic
- Reduces travel time

Potential Funding Opportunities

- TSMO Program Budget

Proposed Solutions

- Fleet upgrades
- Additional Staff

Performance Measures

- Average travel time
- CO₂ Emissions
- Response time
- Roadway clearance time
- Incident clearance time



Figure 2: IMAP Logo

IMAP VEHICLE TECHNOLOGY

What

Technology used on IMAP trucks to improve safety and efficiency.

Challenges/Needs

- Secure funding to acquire technology
- Resistance to change
- Compatibility between vehicles and technology

Goals Addressed

- SAFE & EQUITABLE**
- MOBILITY & RELIABILITY**
- INVEST IN TSMO & PROMOTE MULTI-MODAL**
- ECONOMIC SUCCESS**

Benefits

- Improves driver safety
- Enhances situational awareness
- Streamlines reporting processes

Potential Funding Opportunities

- TSMO Program Budget

Proposed Technology

- Tablets
- CCTV/dash cameras
- Smart lighting
- Tethered drones
- Smart phones

Performance Measures

- Responses per day
- Location tracking
- Time spent stuck in traffic
- Response time
- Roadway clearance time
- Incident clearance time

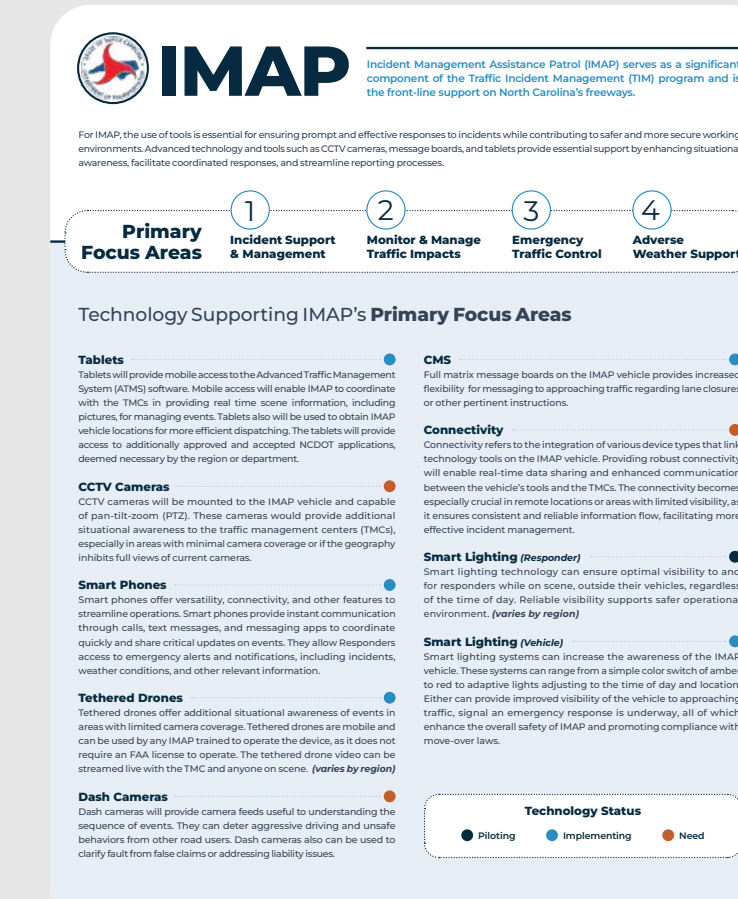


Figure 1: Technology supporting IMAP's primary focus areas

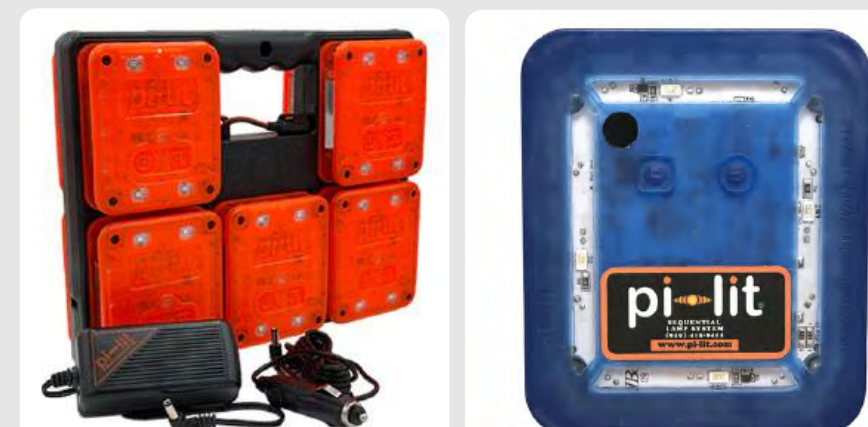


Figure 2: Pi-lit smart sequential road flares use a radio-linked network to automatically sequence the flash so approaching drivers see a sequentially-lit string of flares to guide traffic around incidents.

EMERGENCY VEHICLE PREEMPTION

What

A traffic signal override system that grants emergency vehicles a green light to safely and quickly navigate intersections.

Challenges/Needs

- Currently only installed for Fire Services
- Identifying funding to implement EVP system

Goals Addressed

- SAFE & EQUITABLE**
- MOBILITY & RELIABILITY**
- INVEST IN TSMO & PROMOTE MULTI-MODAL**
- ECONOMIC SUCCESS**

Benefits

- Improve response time for EMS and Fire Services
- Decrease risk of EMS or Fire Service accidents at intersections
- Encourages drivers to yield to approaching EMS vehicles

Potential Funding Opportunities

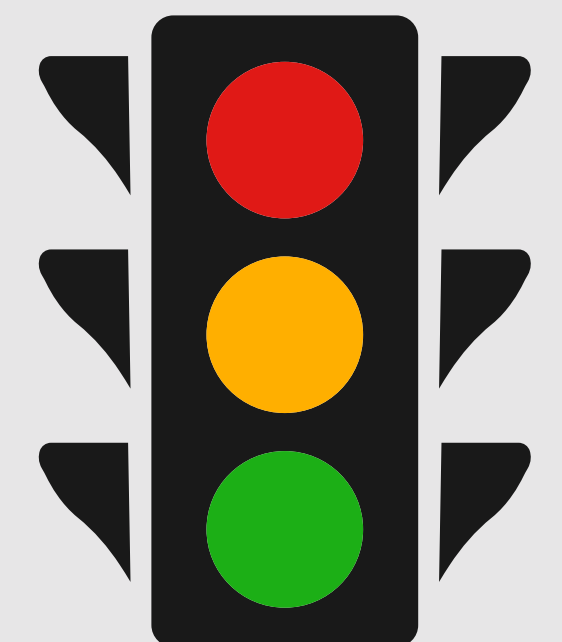
- TSMO Program Budget

Proposed Technology

- Installation of EVP devices in EMS vehicles
- Installation of EVP devices in traffic signals

Performance Measures

- Response time
- Number of crashes at intersections





WILMINGTON REGIONAL ITS
STRATEGIC DEPLOYMENT PLAN

STAKEHOLDER MEETING #2

April 29, 2025



WMPO Kimley»Horn

Agenda



- Workshop Structure
- Project Status
- Strategy Development
- Project Boards
- Next Steps

Workshop Structure

The slide features a large orange parallelogram on the right side. A horizontal bar at the bottom is composed of four segments: blue, dark grey, light grey, and orange. The orange segment of the bar aligns with the bottom-left corner of the large orange parallelogram.

Housekeeping

- Thank you WMPO for hosting!
- Quick tee-up presentation
- Remaining time for board review and feedback
 - Handout
 - Sticky notes
 - Questions
- Introductions
 - Facilitators
 - Core Team
 - Stakeholders

Project Overview

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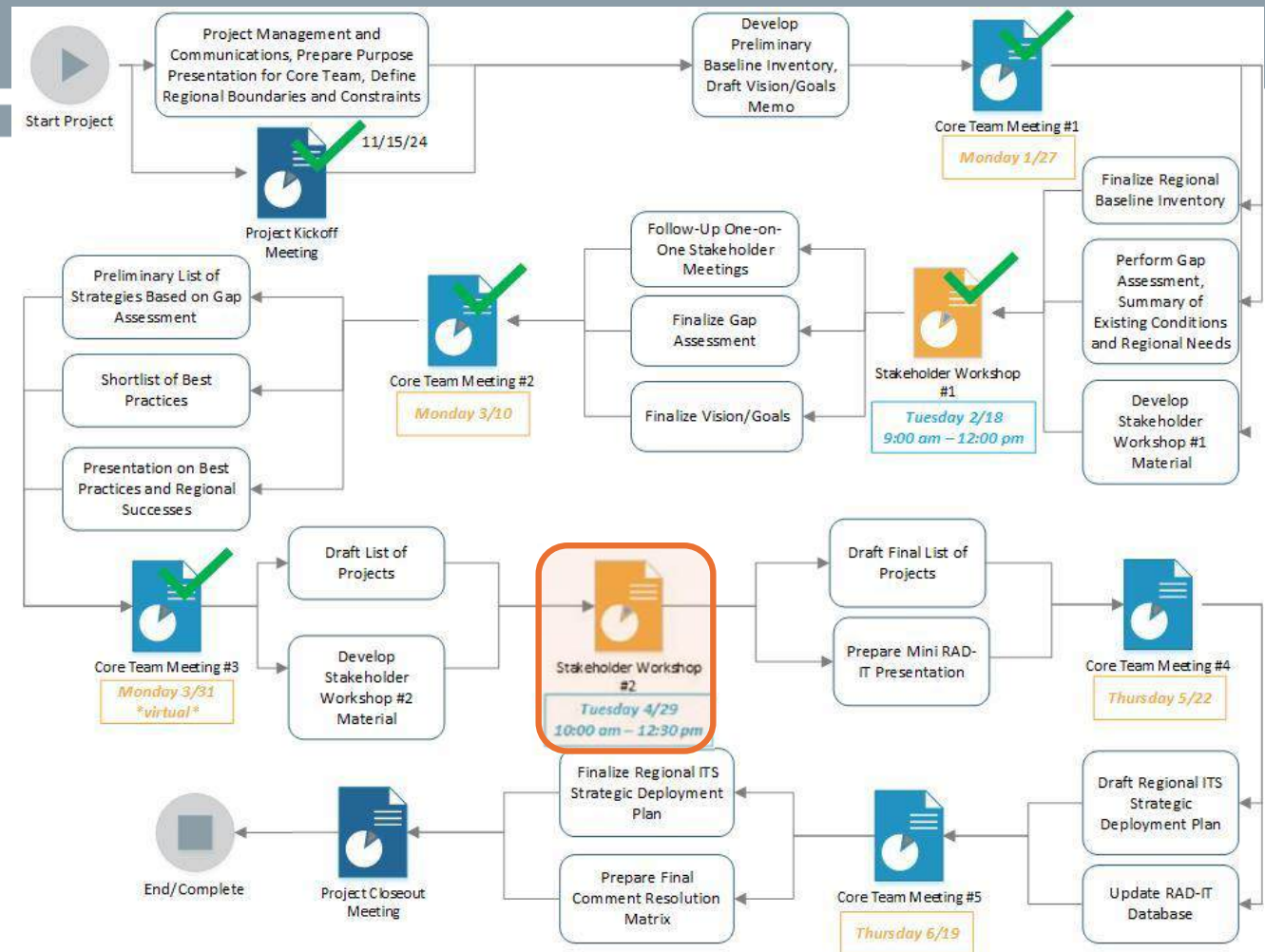
Scope

- Stakeholder Identification and Outreach Plan
- Goals, Vision, and Guiding Principles
- Gap Assessment
- Best Practices and Project Identification
- ITS Regional Strategic Deployment Plan (SDP)

Workflow

Scope Summary

1. Stakeholder Identification and Outreach Plan
2. Vision, Goals, and Objectives
3. Gap Assessment
4. Best Practices and Project Identification
5. ITS Regional Strategic Deployment Plan (SDP)



Strategy Development

The slide features a large, light gray triangle on the right side, pointing towards the bottom right corner. A horizontal bar at the bottom is composed of four segments: blue, dark gray, light gray, and orange. The text 'Strategy Development' is positioned on the left side of the slide.

Capability Maturity Model

Capability Maturity Model (CMM) was used to identified gaps in the region

CMM assesses the systems maturity by:

- Evaluating the agencies current state
- Identifying gaps and needs for improvement
- Collaborative assessment of the region's maturity level
- Deriving priorities that elevate the regional maturity



Strategy Identification

- Identification of Regional Needs
- Existing conditions and needs used to identify gaps
- Determine strategies to address gaps
- Research industry success relevant to the Wilmington region
- Draft strategies reviewed with the Core Team
- Draft regional projects to prioritize (today)

Project Boards

The slide features a large orange triangle on the right side. At the bottom, there is a horizontal bar composed of four segments: blue, dark grey, light grey, and orange.

Project Stations

- Active Traffic Management
- Signal System Project
- Freight
- Parking Management
- Safety Applications
- Flood Impact Management System
- Evacuation Plans
- Traffic Incident Management

Next Steps

The slide features a large, light gray triangle on the right side, pointing towards the bottom right corner. A horizontal bar at the bottom is composed of four segments: blue, dark gray, light gray, and orange. The text 'Next Steps' is positioned on the left side of the slide.

Next Steps

- Summarize Core Team and Stakeholder Feedback
- Draft Strategic Deployment Plan
- Comments
- Final Strategic Deployment Plan



Stakeholder Workshop #2 – Project Review Survey

Name: Abby Lorenzo

Agency: WMPO

Please review the projects below and their respective project boards. Provide a priority rating in the designated column and/or challenges you foresee with this project (i.e., staffing/training, technology, funding, locations).

3 – High Priority/Most Beneficial

2 – Medium Priority/Beneficial

1 – Low Priority/Least Beneficial

0 – No Priority/Not Beneficial

Draft Projects

Project	Ranking	Challenges/Obstacles
Active Traffic Management		
Dynamic Rerouting	2	Public following reroutes Lack of network redundancy (only 2 roads between Bruns. & NHC)
Wide Area Alert System	3	Identifying factors/events when it would be used and securing agreement from all local jurisdictions
Signal System Project		
Funding	3	Funding - keeps getting delayed in STP. Unlikely to secure local funds
Evacuation Plans		
Nuclear Plan	2	Communicating effectively
"Know Your Zone" Update	3	Communicating effectively - reaching the public can be difficult. Need to consider non-typical
Centralizing Emergency Management Plans	3+	Being proactive, NCEM Div. Sharing/documenting critical info/prelim plans
Flood Impact		
Flood Impact System Management	3	Funding, staff resources to implement/monitor. Funding for projects to mitigate foreseen vulnerabilities. Inability to 100% accurately predict impacts





WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

Project	Ranking	Challenges/Obstacles
Safety Applications		
Driver Education and Engagement	1	public support
Vulnerable Road User Management	3	very important but funding to implement, monitor, etc a major obstacle
Freight		
Truck Parking	1	
Port Ingress	2	
Freight Navigation	3	Funding
Parking Management		
Centralized Parking Database	1	↑
Regional Parking Management Plan	1	
Park and Ride for Key Destinations	2	Funding
Parking Management Strategies	1	↓
Traffic Incident Management		
IMAP Existing Infrastructure Expansion	3	↓ Funding
IMAP Vehicle Technology	3	
Emergency Vehicle Preemption	3	





WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

364-86060
OFFICE

Stakeholder Workshop #2 - Project Review Survey

Name: M. Shannon Whaley

Agency: NCDDT

Please review the projects below and their respective project boards. Provide a priority rating in the designated column and/or challenges you foresee with this project (i.e., staffing/training, technology, funding, locations).

- 3 - High Priority/Most Beneficial
- 2 - Medium Priority/Beneficial
- 1 - Low Priority/Least Beneficial
- 0 - No Priority/Not Beneficial

Draft Projects

Project	Ranking	Challenges/Obstacles
Active Traffic Management		
Dynamic Rerouting	3	Dynamic Rerouting could be a problem?
Wide Area Alert System	3	easy to implement
Signal System Project		
Funding	—	
Evacuation Plans		
Nuclear Plan	3	• more training - Multi-agencies included • better info provided re Public awareness
"Know Your Zone" Update	2	
Centralizing Emergency Management Plans	3	consistency is important / across board
Flood Impact		
Flood Impact System Management	3	Very important - Netours / capacity - Evac. Plans



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WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

Project	Ranking	Challenges/Obstacles
Safety Applications		
Driver Education and Engagement	1	<i>Funding / participation</i>
Vulnerable Road User Management	1	—
Freight		
Truck Parking	2	
Port Ingress	2	<i>Better management Near and at Port entry.</i>
Freight Navigation	3	<i>critical - more Platforms for Drivers - Mandated onboard</i>
Parking Management		
Centralized Parking Database	2	<i>(may require add. legislation)</i>
Regional Parking Management Plan	2	
Park and Ride for Key Destinations	1	<i>Events - co-ordination -</i>
Parking Management Strategies	2	
Traffic Incident Management		
IMAP Existing Infrastructure Expansion	3	<i>*more staffing* - more/additional training / "supervision"</i>
IMAP Vehicle Technology	3	<i>should - Always strive to enhance & keep up.</i>
Emergency Vehicle Preemption	3	



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WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

Stakeholder Workshop #2 - Project Review Survey

Name: DENYS VIELKANOWITZ

Agency: CITY OF WILMINGTON

Please review the projects below and their respective project boards. Provide a priority rating in the designated column and/or challenges you foresee with this project (i.e., staffing/training, technology, funding, locations).

- 3 - High Priority/Most Beneficial
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- 0 - No Priority/Not Beneficial

Draft Projects

THEY ARE ALL IMPORTANT

Project	Ranking	Challenges/Obstacles
Active Traffic Management		
Dynamic Rerouting		TRAINING & CONSISTENT/STD MESSAGING
Wide Area Alert System		
Signal System Project		
Funding		LOW COST (RELATIVE) TO MOST STI PROJECTS THIS HAS RESULTED IN LOW PRIORITY/DELAYS
Evacuation Plans		
Nuclear Plan		
"Know Your Zone" Update	3	MANAGE WHAT WE HAVE NOW
Centralizing Emergency Management Plans	3	AS BEST AS POSSIBLE
Flood Impact		
Flood Impact System Management		





WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

Project	Ranking	Challenges/Obstacles
Safety Applications		
Driver Education and Engagement		DRIVER HANDBOOK IS UPDATED W/ "NEW" TECH, HOWEVER DRIVER LICENSE RENEWALS ARE TOO EASY : DON'T REQUIRE REVIEW/TESTING
Vulnerable Road User Management		
Freight		
Truck Parking		
Port Ingress		* CONNECT NORTH GATE + MAIN GATE SO ALL PORT TRAFFIC ENTERS @ GREENFIELD
Freight Navigation		TRUCKS ON NON-THRU STREETS B/C SHORTEST ROUTE : GPS ROUTING
Parking Management		
Centralized Parking Database		} INCORPORATE IN A SINGLE APP OR LOCATION
Regional Parking Management Plan		
Park and Ride for Key Destinations		
Parking Management Strategies		
Traffic Incident Management		
IMAP Existing Infrastructure Expansion		
IMAP Vehicle Technology		WIFI DASH CAMS TO DISPLAY ACTIVE CONDITIONS AND/OR APPROACHING ACTIVE EVENT.
Emergency Vehicle Preemption		





Stakeholder Workshop #2 - Project Review Survey

Name: _____

Agency: _____

Please review the projects below and their respective project boards. Provide a priority rating in the designated column and/or challenges you foresee with this project (i.e., staffing/training, technology, funding, locations).

- 3 - High Priority/Most Beneficial
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- 1 - Low Priority/Least Beneficial
- 0 - No Priority/Not Beneficial

Draft Projects

Project	Ranking	Challenges/Obstacles
Active Traffic Management		
Dynamic Rerouting	3	
Wide Area Alert System	2	Getting people to pay attention
Signal System Project		
Funding	3	
Evacuation Plans		
Nuclear Plan	3	
"Know Your Zone" Update	2	
Centralizing Emergency Management Plans	3	
Flood Impact		
Flood Impact System Management	3	





WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

Project	Ranking	Challenges/Obstacles
Safety Applications		
Driver Education and Engagement	3	
Vulnerable Road User Management	2	
Freight		
Truck Parking	1	
Port Ingress	2	
Freight Navigation	3	Drivers can't don't pay attention
Parking Management		
Centralized Parking Database		
Regional Parking Management Plan		
Park and Ride for Key Destinations		
Parking Management Strategies		
Traffic Incident Management		
IMAP Existing Infrastructure Expansion		
IMAP Vehicle Technology		
Emergency Vehicle Preemption		





WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

Stakeholder Workshop #2 - Project Review Survey

Name: Allen Hancock

Agency: NCDOT

Please review the projects below and their respective project boards. Provide a priority rating in the designated column and/or challenges you foresee with this project (i.e., staffing/training, technology, funding, locations).

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- 0 - No Priority/Not Beneficial

Draft Projects

Project	Ranking	Challenges/Obstacles
Active Traffic Management		
Dynamic Rerouting	3	Volumos
Wide Area Alert System	2	mass text with accident updates
Signal System Project		
Funding	2	
Evacuation Plans		
Nuclear Plan	3	Evac. plans not available to public let agencies distribute to public
"Know Your Zone" Update	3	Need to evacuate in proper order to avoid traffic shutdown
Centralizing Emergency Management Plans	3	
Flood Impact		
Flood Impact System Management	3	Plans are always changing depending on storm





WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

Project	Ranking	Challenges/Obstacles
Safety Applications		
Driver Education and Engagement	3	
Vulnerable Road User Management		
Freight		
Truck Parking	1	No area for freight parking
Port Ingress	2	Roads for use for freight traffic
Freight Navigation	3	Quicker updates for traffic
Parking Management		
Centralized Parking Database		
Regional Parking Management Plan		
Park and Ride for Key Destinations		
Parking Management Strategies		
Traffic Incident Management		
IMAP Existing Infrastructure Expansion	3	They can address incidents quicker and back up IED with traffic control to re-open roads faster
IMAP Vehicle Technology	3	
Emergency Vehicle Preemption	3	





WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

Stakeholder Workshop #2 - Project Review Survey

Name: Chad Stachurski

Agency: Town of Belville

Please review the projects below and their respective project boards. Provide a priority rating in the designated column and/or challenges you foresee with this project (i.e., staffing/training, technology, funding, locations).

- 3 - High Priority/Most Beneficial
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Draft Projects

Project	Ranking	Challenges/Obstacles
Active Traffic Management		
Dynamic Rerouting	3	* Pinch points circled on board
Wide Area Alert System		* Update those with new & existing bypasses
Signal System Project		
Funding		
Evacuation Plans		
Nuclear Plan		
"Know Your Zone" Update		
Centralizing Emergency Management Plans		
Flood Impact		
Flood Impact System Management	3	* Add surrounding areas that affect the area with flooding. Example: Middle Brunswick Co, parts of Hunter Co.





WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

Project	Ranking	Challenges/Obstacles
Safety Applications		
Driver Education and Engagement		
Vulnerable Road User Management		
Freight		
Truck Parking		
Port Ingress		
Freight Navigation		
Parking Management		
Centralized Parking Database		
Regional Parking Management Plan		
Park and Ride for Key Destinations		
Parking Management Strategies		
Traffic Incident Management		
IMAP Existing Infrastructure Expansion		
IMAP Vehicle Technology		
Emergency Vehicle Preemption		





WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

Stakeholder Workshop #2 – Project Review Survey

Name: Carolyn Caggia

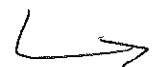
Agency: WMPO - Go Coast

Please review the projects below and their respective project boards. Provide a priority rating in the designated column and/or challenges you foresee with this project (i.e., staffing/training, technology, funding, locations).

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- 1 – Low Priority/Least Beneficial
- 0 – No Priority/Not Beneficial

Draft Projects

Project	Ranking	Challenges/Obstacles
Active Traffic Management		
Dynamic Rerouting		
Wide Area Alert System		
Signal System Project		
Funding		
Evacuation Plans		
Nuclear Plan		
"Know Your Zone" Update		
Centralizing Emergency Management Plans		
Flood Impact		
Flood Impact System Management		





WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

Project	Ranking	Challenges/Obstacles
Safety Applications		
Driver Education and Engagement	3	
Vulnerable Road User Management	3	Enforcement (Challenges)
Freight		
Truck Parking		
Port Ingress		
Freight Navigation		
Parking Management		
Centralized Parking Database	2	
Regional Parking Management Plan	3	Including priority spaces for carpooling and incorporating transportation options
Park and Ride for Key Destinations	3	to be able to "park once"
Parking Management Strategies	3	
Traffic Incident Management		
IMAP Existing Infrastructure Expansion		
IMAP Vehicle Technology		
Emergency Vehicle Preemption		

Thank you!





Stakeholder Workshop #2 - Project Review Survey

Name: Beth King

Agency: WMPO

Please review the projects below and their respective project boards. Provide a priority rating in the designated column and/or challenges you foresee with this project (i.e., staffing/training, technology, funding, locations).

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- 0 - No Priority/Not Beneficial

Draft Projects

Project	Ranking	Challenges/Obstacles
Active Traffic Management		
Dynamic Rerouting	2	Really like Hampton Roads Reach the Beach Initiative
Wide Area Alert System	2	What happens when an alert goes out? Thinking about mass movement to avoid areas/evacuate causing bottlenecks?
Signal System Project		
Funding	2	Funding is uncertain/unstable at times Prioritizing these kinds of projects within budget
Evacuation Plans		
Nuclear Plan	2	Has This been done before? Starting from scratch?
"Know Your Zone" Update	3	Who would be in charge of the education aspect? Is there capacity for that?
Centralizing Emergency Management Plans	3	Capacity building Where would these be kept/managed?
Flood Impact		
Flood Impact System Management	3	Continued coordination w/ PIMAN & NCEM (Kurt) would be helpful





WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

Project	Ranking	Challenges/Obstacles
Safety Applications		
Driver Education and Engagement	3	Target schools / new drivers
Vulnerable Road User Management	3	Needs to be dynamic, ongoing, responsive
Freight		
Truck Parking	2	
Port Ingress	1	
Freight Navigation	1	
Parking Management		
Centralized Parking Database	2	who maintains? cost?
Regional Parking Management Plan	3	Also important to have something like this on local level to address niche needs
Park and Ride for Key Destinations	3	Requires buy-in from many stakeholders but could see this being a great strategy
Parking Management Strategies	3	Needs → use that to inform this
Traffic Incident Management		
IMAP Existing Infrastructure Expansion	1	Recruitment / Retention
IMAP Vehicle Technology	2	Funding is very up in the air now.
Emergency Vehicle Preemption	2	Could see this challenging to implement region-wide Not sure what tech is needed in vehicle?



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WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

Stakeholder Workshop #2 - Project Review Survey

Name: Emily Giampietro

Agency: _____

Please review the projects below and their respective project boards. Provide a priority rating in the designated column and/or challenges you foresee with this project (i.e., staffing/training, technology, funding, locations).

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- 0 - No Priority/Not Beneficial

Draft Projects

Project	Ranking	Challenges/Obstacles
Active Traffic Management		
Dynamic Rerouting		
Wide Area Alert System		
Signal System Project		
Funding		
Evacuation Plans		
Nuclear Plan		
"Know Your Zone" Update		
Centralizing Emergency Management Plans		
Flood Impact		
Flood Impact System Management		

Notification
set up

Craig

HARRY

City of
Wilmington
GMS
won

Duke's grant

resiliency
repairs



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WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

Project	Ranking	Challenges/Obstacles
Safety Applications		
Driver Education and Engagement		
Vulnerable Road User Management		
Freight		
Truck Parking		
Port Ingress		
Freight Navigation		
Parking Management		
Centralized Parking Database		
Regional Parking Management Plan		
Park and Ride for Key Destinations		
Parking Management Strategies		
Traffic Incident Management		
IMAP Existing Infrastructure Expansion		
IMAP Vehicle Technology		
Emergency Vehicle Preemption		





Stakeholder Workshop #2 - Project Review Survey

Name: Courtney Wecker

Agency: NC DOT

Please review the projects below and their respective project boards. Provide a priority rating in the designated column and/or challenges you foresee with this project (i.e., staffing/training, technology, funding, locations).

3 - High Priority/Most Beneficial

2 - Medium Priority/Beneficial

1 - Low Priority/Least Beneficial

0 - No Priority/Not Beneficial

Draft Projects

Project	Ranking	Challenges/Obstacles
Active Traffic Management		
Dynamic Rerouting	2	Trucks
Wide Area Alert System	1	Already have ability in place
Signal System Project		
Funding	3	
Evacuation Plans		
Nuclear Plan	2	
"Know Your Zone" Update	3	Not clear info currently
Centralizing Emergency Management Plans	3	
Flood Impact		
Flood Impact System Management	3	





WILMINGTON REGIONAL ITS STRATEGIC DEPLOYMENT PLAN

Project	Ranking	Challenges/Obstacles
Safety Applications		
Driver Education and Engagement	1	
Vulnerable Road User Management	2	
Freight		
Truck Parking		
Port Ingress		
Freight Navigation	3	Trucks using correct nav + not google maps
Parking Management		
Centralized Parking Database		
Regional Parking Management Plan		
Park and Ride for Key Destinations		
Parking Management Strategies		
Traffic Incident Management		
IMAP Existing Infrastructure Expansion	2	contract staff willingness
IMAP Vehicle Technology	2	
Emergency Vehicle Preemption	2	

Truck signing
ED for CDL
req. for English
proficiency



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APPENDIX G - BEST PRACTICES



Arterial Management		
Project Type	Source	Description
Dynamic Routing	Hampton Roads 2045 LRT Plan	"Reach the Beach" initiative uses DMS to provide users information on the fastest routes to the Virginia Beach Oceanfront
	Systems Engineering Analysis for MnDOT Arterial Traffic Management Concept of Operations	Defines ITS tools to manage traffic on MnDOT arterial roadways, who will use the tools, why the tools are or will be used, and how to use the tools
Cape Fear Memorial Bridge Detour	MnDOT Bridge Scour Plan of Action	Plan of Action (POA) document to be customized for any bridge closures and includes the sections for history, recommended actions, monitoring plan, and closure plan
Funding Signal System Upgrades	Funding Signal System Upgrades	Congestion Mitigation and Air Quality Improvement Program (CMAQ) Highway Safety Improvement Program (HSIP) Surface Transportation Block Grant Program for traffic signal updates
	U.S Department of Transportation SS4A (Safe Streets for All) Program	N/A

Emergency Response and Resiliency		
Project Type	Source	Description
Evacuation Plans and Centralized Location	Orange County, NY – Indian Point Emergency Guide	"Are You Ready" guide and app communicates to citizens information about radiation, how to stay informed, evacuation bus routes, and frequently asked questions
	Pilgrim Nuclear Power Station Emergency Plan (PNPS)	Provides a detailed list of roles and responsibilities of major departments (Police, Fire, EMS, etc.) as well as a communication plan The PNPS Emergency Response Organization uses Everbridge notification system to alert all members of the organization that a nuclear event is occurring
	South Carolina Hurricane Guide	The evacuation website provides a detailed list of detour routes for each evacuation area
Flood Impact Management System	NCDOT Flood Warning System	Flood Inundation Mapping and Alert Network for Transportation
		BridgeWatch
	Virginia Flood Risk Information System	Transportation Surge Analysis Predictive Program Flood map with gauge locations, elevations, flood risk, and detailed information

Active Demand Management		
Project Type	Source	Description
Driver Education and Engagement	Keep Georgia Safe- GDOT	Interactive website that providing games, books, classroom posters, and Kahoot quizzes to inform teen drivers on safe driving topics
	What Drives You Iowa	Communicates fatality statistics and safe driving behaviors to citizens
	Florida “Put It Down: Focus On Driving” Initiative	Brochures, information, and quizzes on vulnerable road user safety and dangerous driving safety tips
Vulnerable Road Users Management	FHWA Future of E-Bikes on Public Lands: How to Effectively Manage a Growing Trend	Guidance and considerations on safety and social impacts of e-bikes and process for e-bike management
	TxDOT Bicycle and Pedestrian Program – Educational Series	Bicycle and pedestrian infrastructure coordination, advisory committee, education, grant programs, and statewide initiatives
	NYC DOT’s Public E-Bike Charging Pilot	Pilot implemented e-bike charging docks and battery-swapping cabinets from and showed users are willing to pay for these services
	TxDOT Vulnerable Road User Assessment	Assists with the assessment of vulnerable road user infrastructure needs and provides education plan with emphasize on safe crossings, safe driving behaviors, and the impact of distracted driving
Truck Parking and Freight Mobility Resources	2024 Atlanta Regional Freight Mobility Plan Report	Regional industrial land use assessment and economic analysis to develop needs and recommendations
	Commercial Truck Parking Charlotte	Interactive page for commercial truck drivers to find user submitted parking lots (approved by City of Charlotte) and provides truck parking regulations and restrictions
	WSDOT Freight Signal Priority	Defines freight signal priority, when to use the strategy, and the policy, planning, and equipment needs for implementing
	California Statewide Truck Parking Study	Guidance on collecting data for determining where trucking parking supply is, trucking parking needs and priorities, and strategies for addressing parking needs
Wide Area Alert System	Federal Communications Commission Wireless Emergency Alerts	Expand existing WAE calls to port area and collaborate with NCDOT for setting up geofencing and responses
Integrated Corridor Management (ICM)	FDOT District 5 – ICM Operations Standard Operating Procedures (SOPs)	Serves as the SOPs for the ICM operations with defined roles and responsibilities for monitoring the freeway and notifying the appropriate personal

Traffic Management Centers		
Project Type	Source	Description
Communication Infrastructure Improvement Plan	Bay Area Regional Broadband Communication Strategic Investment Plan	Framework to enable regional and local stakeholders to develop a regional communication network and prioritize projects base on benefits cost analyses
	City of Buckeye ITS Strategic Plan	Detailed guidance on expanding and connecting communication infrastructure existing infrastructure and other ITS technologies
DMS Expansion	MDOT Quantifying Effectiveness and Impacts of Digital Message Signs on Traffic Flow	Technical review of messaging signs usage to determine improvements in communicating information to drivers and make recommendations to maximize the effectiveness of DMSs

Parking Management		
Project Type	Source	Description
Parking Management	San Francisco Municipal Transportation Agency	Demand-responsive pricing program adjusts hourly meter prices to go up, down, or stay the same depending on the demand
	WSDOT Active Parking Management	Explains the strategy of using new parking technologies to better utilize available parking inventories and defines the policy needs, coordination, and equipment for implementation
	LA Express Park	Integrated parking app showing available spots between third party users with city agreement (separate fare systems between third parties)
Park and Ride Implementation	Coast RTA Entertainment Shuttle	Mrytle Beach seasonal entertainment shuttle providing free transportation services to local attractions and beaches
		Runs every 30-35 minutes and can be tracked in real-time through the app
	City of St. Augustine Shuttle Services	Park and ride shuttles are organized for popular weekend events, festivals, holiday fireworks, or season peaks

Traffic Incident Management		
Project Type	Source	Description
IMAP Existing Infrastructure/Expansion	Continual expansion to NCDOT IMAP program	N/A
First Responder Vehicle Technology Improvement	NCDOT	Tethered Drones on IMAP trucks help fill gaps in camera system
	Greater Philadelphia	Responder-to-Vehicle Technology alerts motorists of the presence and location of emergency vehicles to help them abide by the Move Over, Slow Down law
Emergency Vehicle Pre-emption Expansion	Continual expansion on existing EVP program to EMS	N/A



APPENDIX H - IMAP TECHNOLOGY WHITE PAGE





IMAP

Incident Management Assistance Patrol (IMAP) serves as a significant component of the Traffic Incident Management (TIM) program and is the front-line support on North Carolina's freeways.

For IMAP, the use of tools is essential for ensuring prompt and effective responses to incidents while contributing to safer and more secure working environments. Advanced technology and tools such as CCTV cameras, message boards, and tablets provide essential support by enhancing situational awareness, facilitate coordinated responses, and streamline reporting processes.

Primary Focus Areas

1

Incident Support & Management

2

Monitor & Manage Traffic Impacts

3

Emergency Traffic Control

4

Adverse Weather Support

Technology Supporting IMAP's Primary Focus Areas

Tablets

Tablets will provide mobile access to the Advanced Traffic Management System (ATMS) software. Mobile access will enable IMAP to coordinate with the TMCs in providing real time scene information, including pictures, for managing events. Tablets also will be used to obtain IMAP vehicle locations for more efficient dispatching. The tablets will provide access to additionally approved and accepted NCDOT applications, deemed necessary by the region or department.

CCTV Cameras

CCTV cameras will be mounted to the IMAP vehicle and capable of pan-tilt-zoom (PTZ). These cameras would provide additional situational awareness to the traffic management centers (TMCs), especially in areas with minimal camera coverage or if the geography inhibits full views of current cameras.

Smart Phones

Smart phones offer versatility, connectivity, and other features to streamline operations. Smart phones provide instant communication through calls, text messages, and messaging apps to coordinate quickly and share critical updates on events. They allow Responders access to emergency alerts and notifications, including incidents, weather conditions, and other relevant information.

Tethered Drones

Tethered drones offer additional situational awareness of events in areas with limited camera coverage. Tethered drones are mobile and can be used by any IMAP trained to operate the device, as it does not require an FAA license to operate. The tethered drone video can be streamed live with the TMC and anyone on scene. *(varies by region)*

Dash Cameras

Dash cameras will provide camera feeds useful to understanding the sequence of events. They can deter aggressive driving and unsafe behaviors from other road users. Dash cameras also can be used to clarify fault from false claims or addressing liability issues.

CMS

Full matrix message boards on the IMAP vehicle provides increased flexibility for messaging to approaching traffic regarding lane closures or other pertinent instructions.

Connectivity

Connectivity refers to the integration of various device types that link technology tools on the IMAP vehicle. Providing robust connectivity will enable real-time data sharing and enhanced communication between the vehicle's tools and the TMCs. The connectivity becomes especially crucial in remote locations or areas with limited visibility, as it ensures consistent and reliable information flow, facilitating more effective incident management.

Smart Lighting (Responder)

Smart lighting technology can ensure optimal visibility to and for responders while on scene, outside their vehicles, regardless of the time of day. Reliable visibility supports safer operational environment. *(varies by region)*

Smart Lighting (Vehicle)

Smart lighting systems can increase the awareness of the IMAP vehicle. These systems can range from a simple color switch of amber to red to adaptive lights adjusting to the time of day and location. Either can provide improved visibility of the vehicle to approaching traffic, signal an emergency response is underway, all of which enhance the overall safety of IMAP and promoting compliance with move-over laws.

Technology Status

● Piloting ● Implementing ● Need



APPENDIX I - PROCUREMENT TABLE

Package Number	Work Allocation (Package Name)	Method of Award	Contact Form	Contract Type	Comments
1	Commodity supplier	Low-bid selection of prequalified packages	Single phase or purchase order	Fixed price	Used for COTS procurements
2	Low-bid contractor with consultant design	Low-bid for contractor	Phased or task order	Fixed price for contractor, incentives optional	Consultant performs 100% design. May provide additional services during implementation
3	Systems manager	Quality-based selection (negotiated procurement)	Phased or task order	Fixed price, cost plus, or time & materials, incentives optional	Field equipment procured by agency using low-bid process
4	Design-build contractor with design consultant	Best-value selection (based on consideration of price and quality)	Phased	Usually fixed price, cost plus, or time & materials, incentives optional	Consultant provides 30% design
5	Consultant	Negotiated	Phased or task order	Fixed price, cost plus, or time & materials, incentives optional	Used for system design and many other consultant services
6	Outsourcing agency activity	Low-bid, may be based on rates	Usually single phase	Fixed price, cost plus, or time & materials, incentives optional	Typical activities include maintenance, operations, signal timing, etc.
7	Outsourcing agency activity	Best value or low-bid	Single phase	Fixed price, cost plus, or time & materials, incentives optional	Typical functions include traveler information and toll collection. May be public-private partnership

Source: NCHRP Project 3-77; Section 16.9

