

Connect 2045 Technology/ACES Scenario

Background

Technology is transforming transportation in new ways and the pace of change is accelerating, so it is more important than ever to understand how emerging technologies will shape transportation in the TPO area. Recognizing the importance of preparing for this technological change, the River to Sea TPO (R2CTPO) has completed an *Intelligent Transportation System (ITS) Master Plan* and *Transportation System Management and Operations (TSM&O) Master Plan* that include and recommend technology-related strategies. In addition, the Federal Highway Administration (FHWA) defined six scenarios for automated, connected, electric and shared mobility (ACES) for planning purposes. These scenarios model possible transportation outcomes of emerging transportation technology, policy decisions, and changes in infrastructure:

- **Slow Roll:** Nothing beyond currently available technology and investments already in motion
- **Niche Service Growth:** Innovation proliferates, but only in special purpose zones identified for automated vehicle use
- **Ultimate Traveler Assist:** Connected Vehicle technology progresses rapidly, but AV stagnates
- **Managed Automated Lane Network:** Special lanes with Connected Vehicle/Automated Vehicle integration
- **Competing Fleets:** Automated TNC-like (Transportation Network Companies such as Uber, Lyft) service proliferate
- **Robo Transit:** On-demand shared services proliferate and integrate with other modes

FDOT developed guidance for TPO/MPO long range transportation plans recommending consideration of the FHWA scenarios. FDOT District 5 advanced this recommendation by creating ACES scenarios within the Central Florida Regional Planning Model version 7 (CFRPM) to reflect the six FHWA categories.

Approach

Because of the growing importance of technology and ACES to transportation, it is important that these issues become increasingly integrated into long range planning. As part of developing Connect 2045, R2CTPO has set the stage for this transition through the following steps:

1. Review of the ITS Master Plan and TSM&O Master Plan
2. Analysis of results of the ACES scenarios from FDOT (CFRPM v7)
3. Identification of corridors based upon the ITS/TSM&O Master Plans and results of the ACES scenarios
4. Prioritization of corridors as candidates for future technology investments and/or pilot projects

Identification and Prioritization

An evaluation was performed to identify and prioritize potential corridors for future infrastructure technology improvements. This evaluation was based on the River to Sea TPO TSM&O Master Plan Phase 2, successor to the TPO ITS Master Plan Phase 1, and the ACES Scenario of the CFRPM v7. The TSM&O Master Plan assessed the current state of intelligent transportation assets in the region and identified corridors recommended for deployment of fiber, closed-circuit cameras, and other technologies based on

need and access to existing networks, and to support corridor management and operation. It provided a thorough assessment of roadway characteristics that are also relevant to the deployment of ACES technologies, such as congestion, safety, and existing assets. The data, scoring system, and recommendations provided in that document were used extensively in this analysis. The CFRPM model output identified 2045 projected volume to capacity ratios (V/C) of the regional roadway system based on the Federal Highway Association's (FHWA) six scenarios of ACES technology integration (see attached CFRPM v7 (2045) ACES Scenarios map set).

This evaluation used the following criteria to identify and propose prioritization of corridors for further evaluation as potential areas to focus future technology investments and/or pursue pilot projects, if desired:

- Worst-case V/C from the CFRPM 2045 ACES scenarios that exceeds 0.9 V/C
- Corridor is a designated Strategic Intermodal System (SIS) facility
- Corridor is a designated evacuation route
- Fiber infrastructure is installed or available for extension within the corridor

Twenty-one corridor segments were identified for further review and prioritization based on the metrics listed above. The following contributing factors to the proposed prioritization process are provided for each corridor segment in the table below.

- **Roadway Classification** described the segment's role in providing transportation among population centers in the state, region, or urban area. Most notably, if a facility was designated SIS it was given increased priority as a vital link in statewide traffic.
- **Length** was considered as the centerline distance of the segment in miles and was used to determine the scale of the improvement effort required.
- **Volume** documented in the TSM&O Master Plan was used to quantify use or significance of corridors. This value was provided as Annual Average Daily Traffic (AADT).
- **PM Peak Volume-to-Capacity** was averaged along the corridor length for each of the six CFRPM 2045 scenarios. Generally, V/C was used to quantify need for additional improvements with CFRPM ACES scenarios.
- **Fiber Significance** was developed by overlaying the FDOT fiber network map available on cflsmarthroads.com with each corridor to determine the relative presence or adjacency of fiber optic cable that could be used for ACES infrastructure improvements. This was cross referenced with documented existing conditions in the TSM&O Master Plan.
- **TSM&O Significance** indicated if the corridor segment was identified by the TSM&O Master Plan as a proposed improvement location to upgrade or add infrastructure.
- **Evacuation Routes** described the corridors designated as evacuation routes. Roadway that was designated as a primary evacuation route could be a higher priority for ACES technology to improve rapid movement of large volumes of traffic in emergency situations.

The following table includes each of the 21 corridors identified and the associated prioritization determined from this analysis. The resulting set was divided into three priority tiers that can generally be approached as near-term, mid-term and long-term needs respectively.

Table: ACES Corridor Prioritization

Segment #	Segment Description	Roadway Classification	Length (mi)	Volume (AADT)	PM Volume/Capacity by CFRPM Scenario						Significance			Explanation
					1	2	3	4	5	6	Fiber	TSMO	Evacuation	
Priority 1 – Near-term														
1	US 92 from Indian Lake Rd to SR A1A	Regional	11.1	29400	0.97	0.97	0.86	0.98	1.02	0.92	Yes	Yes	Yes	Congested, high volume evacuation route with existing FOC
2	US 17/92 from Seminole County to Taylor Rd	SIS	11.4	28800	1.18	1.18	1.03	1.16	1.17	1.10	Yes	Yes	Yes	Congested, high volume SIS evacuation route with existing FOC
3	US 1 from N Nova to I-95	Regional	3.9	25800	1.24	1.24	1.09	1.17	1.23	1.15	Some	Yes	Yes	Highly congested, high volume evacuation route with adjacent FOC
4	SR 40 from S Tymber Creek Rd to SR A1A	SIS	6.2	30600	1.03	1.03	0.90	1.06	1.09	0.99	Some	Yes	Yes	High volume evacuation route with existing FOC and identified for TSM&O improvements
5	SR 44 from US 1 to S Atlantic Ave	Regional	2.2	22400	0.89	0.87	0.73	0.90	0.94	0.80	Yes	Yes	Yes	Evacuation route with existing FOC that connects key corridors
6	US 1 from SR 442 to Washington St.	Regional	4.0	25800	0.92	0.94	0.65	0.85	0.93	0.74	Some	Yes	Yes	High volume evacuation route with adjacent FOC and identified for TSM&O improvements
Priority 2 – Mid-term														
7	US 17/92 from Taylor Rd to Glenwood Rd	Regional	5.0	23700	0.96	0.95	0.82	0.91	0.97	0.88	Yes	Yes	Yes	Evacuation route with existing FOC and moderate congestion
8	CR 415 / Tomoka Farms Rd from SR 44 to Taylor Rd	Non-Regional	5.0	9400	1.41	1.43	1.35	1.41	1.54	1.46	No	Yes	Yes	Extremely congested evacuation route with adjacent FOC
9	SR 44 from I-4 to CR 415	Regional	10.2	18500	0.88	0.90	0.74	0.87	0.91	0.81	No	Yes	Yes	Evacuation route with adjacent FOC. Long corridor without severe congestion
10	SR 472 / Howland Blvd from Dr. Martin Luther King Beltway to Catalina Blvd	Non-Regional	2.7	30500	1.04	1.04	0.97	1.04	1.09	1.02	No	Yes	Yes	Congested, high volume evacuation route with adjacent FOC
11	SR 15 from Beresford Ave to US 92	SIS	2.8	24300	1.09	1.09	0.98	1.07	1.10	1.05	No	Yes	No	Congested SIS corridor with no existing FOC and identified for TSM&O improvements

Segment #	Segment Description	Roadway Classification	Length (mi)	Volume (AADT)	PM Volume/Capacity by CFRPM Scenario						Significance			Explanation
					1	2	3	4	5	6	Fiber	TSMO	Evacuation	
12	Saxon from I-4 to Doyle Rd	Non-Regional	4.6	21200	0.99	0.96	0.77	0.91	0.96	0.86	No	Yes	No	Moderate congestion and volume connecting critical corridors, identified for TSM&O improvements
13	Saxon from US 17/92 to I-4	Non-Regional	1.9	31500	0.94	0.98	0.74	0.95	0.98	0.84	No	No	No	High volume with some congestion, connects critical corridors, not identified for TSM&O improvements and no existing FOC
14	Doyle Rd / Debary Ave from the I-4 WB ramps to SR 415	Non-Regional	8.5	17500	0.96	0.98	0.83	0.96	1.03	0.93	No	Yes	Yes	Congested evacuation route with no existing FOC, connecting significant corridors
15	LPGA from US 92 to N Clyde	Non-Regional	6.5	17700	1.17	1.18	1.05	1.20	1.24	1.16	Some	No	Yes	Heavily congested evacuation route, not identified for TSM&O improvements with existing FOC at east end
Priority 3 – Long-term														
16	Dirksen from US 17/92 to I-4	Non-Regional	2.0	12300	1.03	1.14	0.62	0.84	0.78	0.69	No	No	No	Connects critical corridors, not identified for TSM&O improvements and no FOC
17	SR 15 from US 17/92 to Beresford	Collector	2.9	2800	1.05	1.04	0.94	1.02	1.06	1.03	No	No	No	Congested and connects critical corridors, not identified for TSM&O improvements and no FOC
18	SR 15 from US 92 to US 17	SIS	2.3	12800	0.88	0.88	0.70	0.81	0.96	0.82	No	No	No	SIS and connects critical corridors, not identified for TSM&O improvements and no FOC
19	Howland Blvd from Catalina Blvd to SR 415	Non-Regional	7.1	17400	0.84	0.85	0.65	0.83	0.88	0.73	No	Yes	No	Identified for TSM&O improvements and moderately congested, no existing FOC
20	Tomoka Farms from Taylor Rd to US 92	Non-Regional	6.0	7700	1.14	1.15	0.97	1.10	1.21	1.05	No	No	Yes	Congested evacuation route, not identified for TSM&O improvements and no FOC
21	SR 415 from Seminole Co to SR 44	Regional	17.6	14000	1.15	1.17	1.02	1.13	1.13	1.06	No	No	Yes	Congested evacuation route, not identified for TSM&O improvements and no FOC

Recommended Next Steps

Considerations discussed by the LRTP Subcommittee include:

- Document this information in Connect 2045
- Recommend \$40 million set-aside for local initiatives which could include technology projects identified in the ACES Corridor Prioritization
- Establish an ACES committee or working group to provide guidance regarding the approach to future technology investments and potential pilot projects

PM Volume-to-Capacity (V/C) Ratio*

- < 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

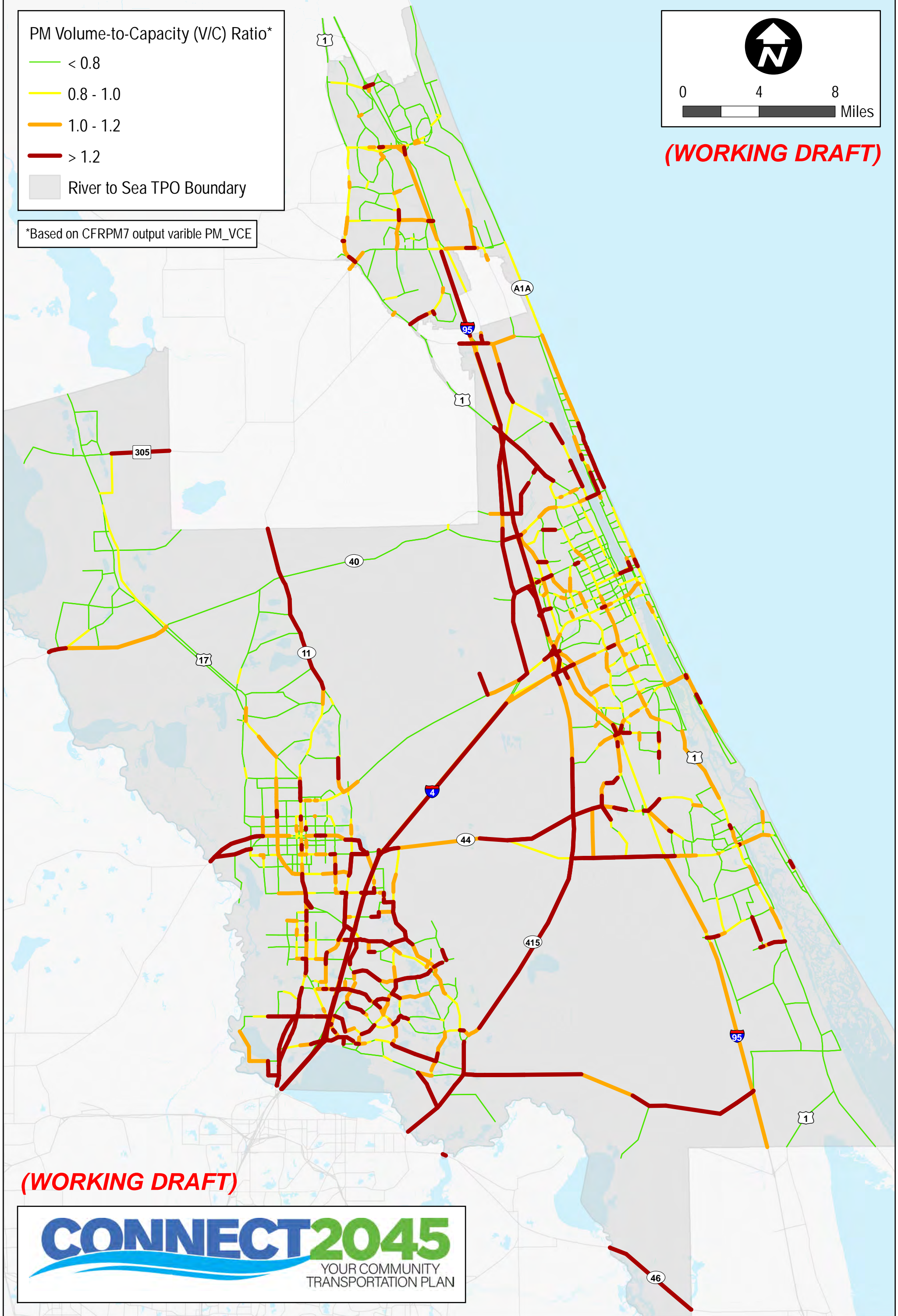
River to Sea TPO Boundary

*Based on CFRPM7 output variable PM_VCE



0 4 8 Miles

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ACES Scenario 1 | Slow Roll

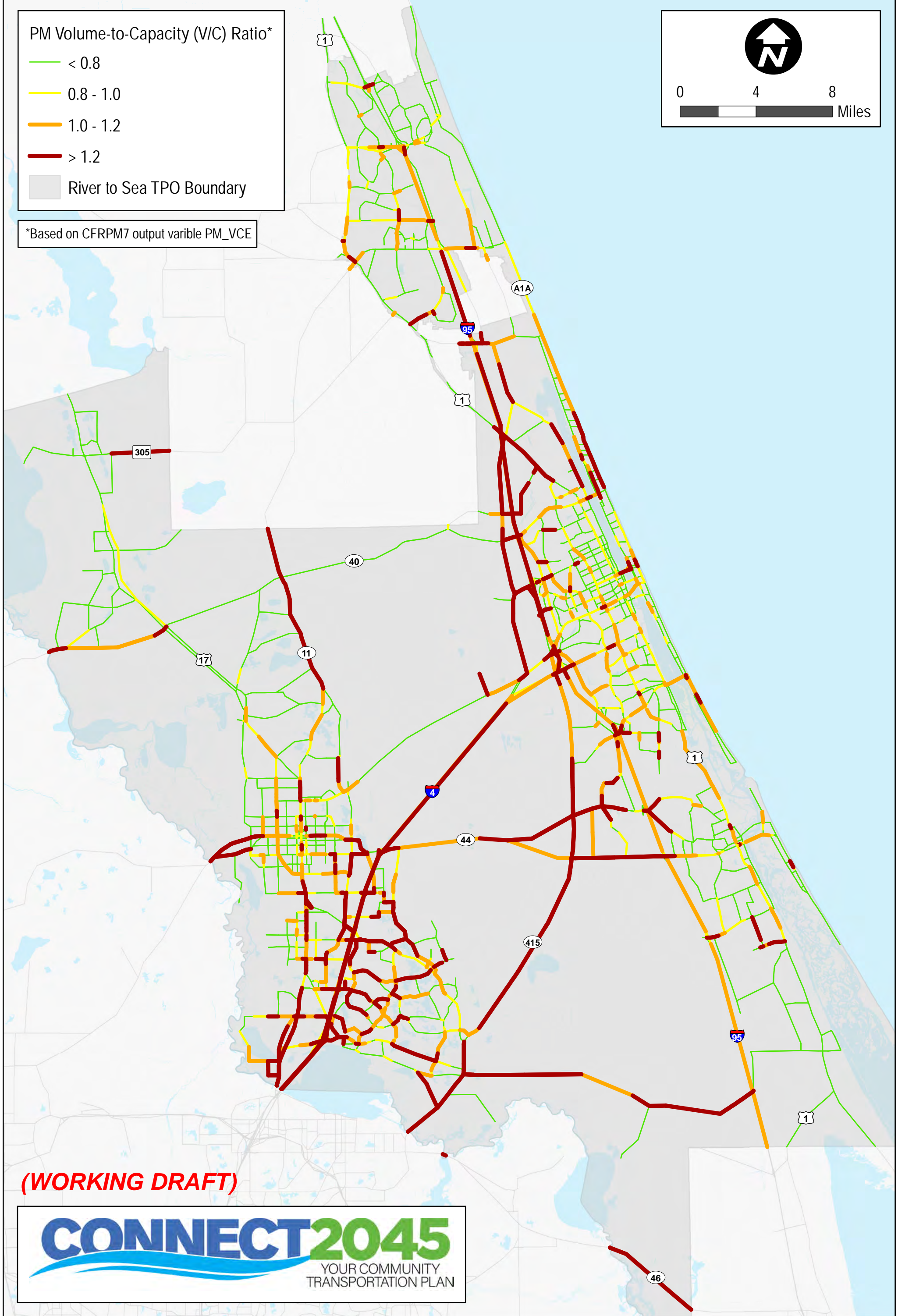
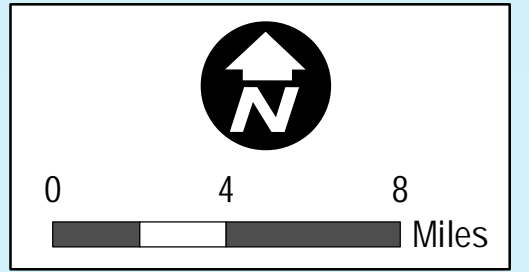
Minimum plausible change - Nothing beyond currently available technology and investments already in motion is adopted. (Baseline for comparison)

PM Volume-to-Capacity (V/C) Ratio*

- < 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

River to Sea TPO Boundary

*Based on CFRPM7 output variable PM_VCE



(WORKING DRAFT)



ACES Scenario 2 | Niche Service Growth

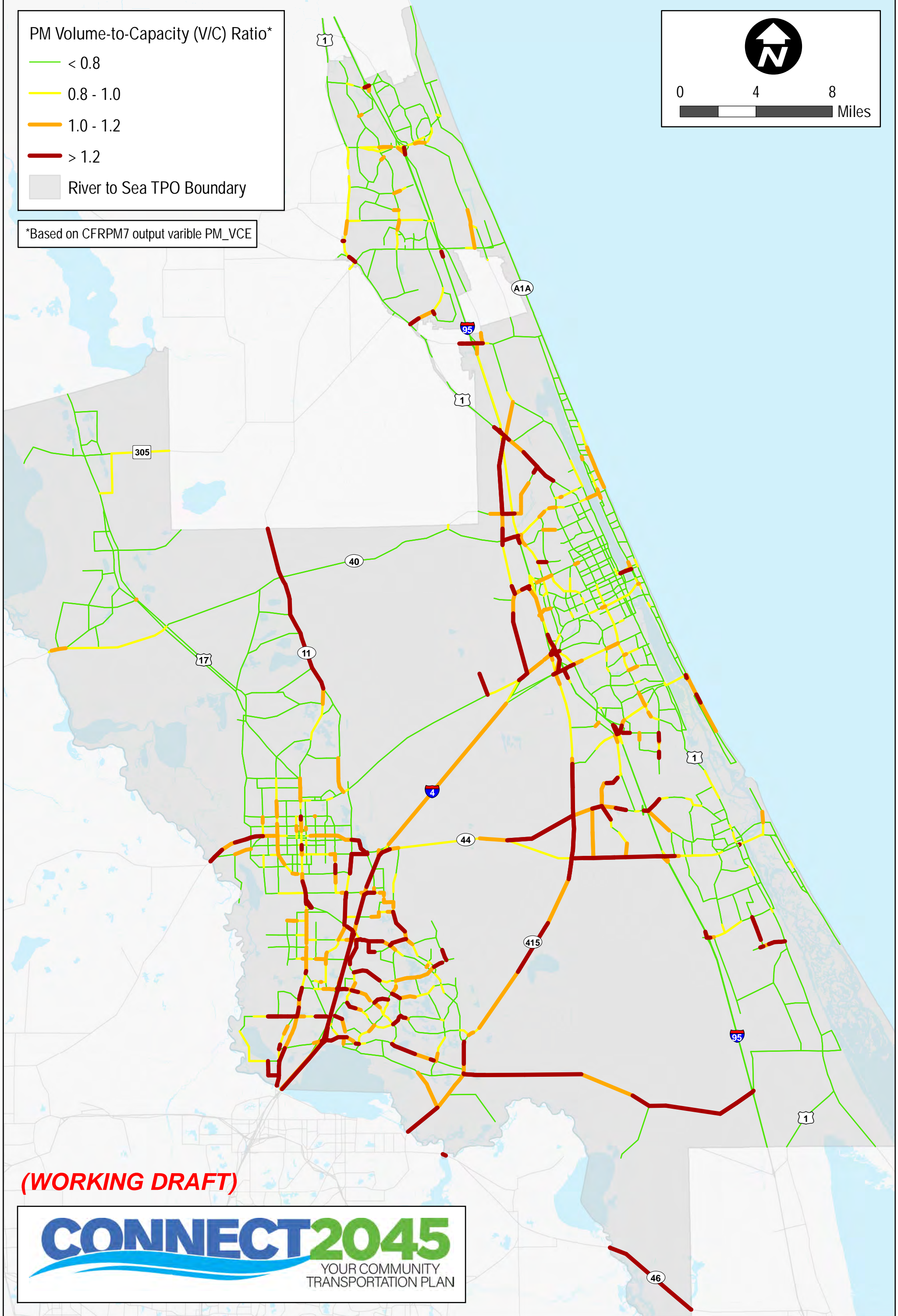
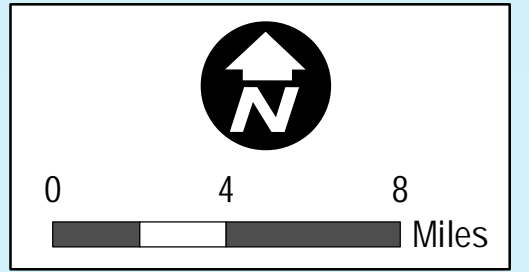
Innovation proliferates, but only in special purpose or "niche" AV zones, including retirement communities, campuses, transit corridors, urban cores, and ports.

PM Volume-to-Capacity (V/C) Ratio*

- < 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

River to Sea TPO Boundary

*Based on CFRPM7 output variable PM_VCE



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ACES Scenario 3 | Ultimate Traveler Assist

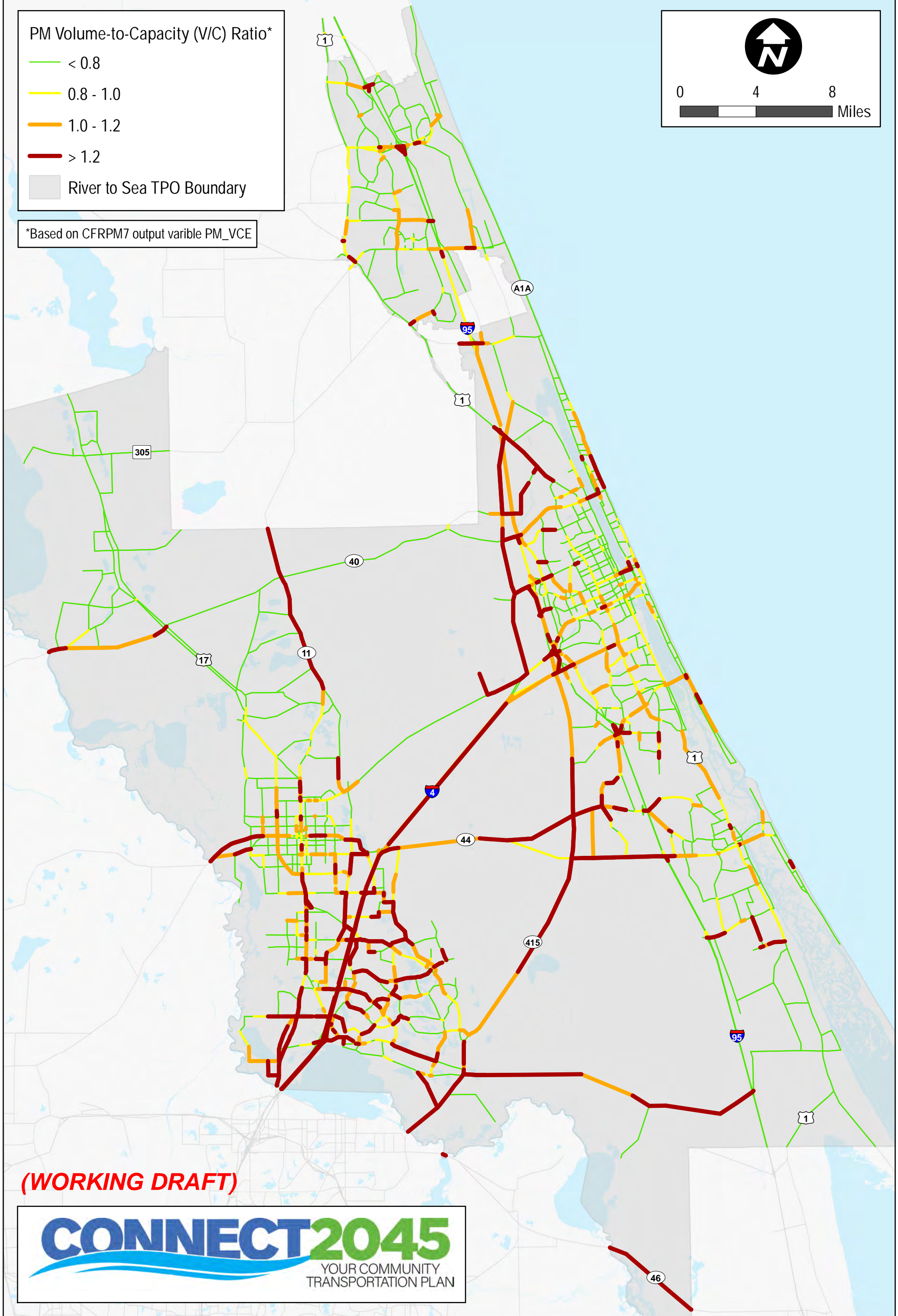
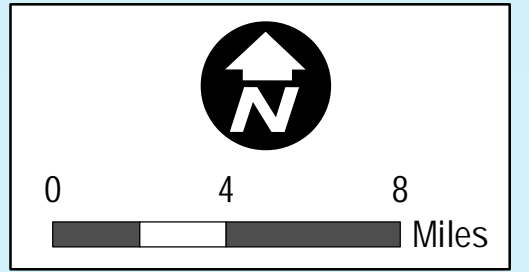
CV technology progresses rapidly, but AV stagnates - 85% of vehicles have V2X capability by 2035 due to NHTSA mandate allowing DOTs to manage congestion aggressively.

PM Volume-to-Capacity (V/C) Ratio*

- < 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

River to Sea TPO Boundary

*Based on CFRPM7 output variable PM_VCE



(WORKING DRAFT)



ACES Scenario 4 | Managed Automated Lane Network

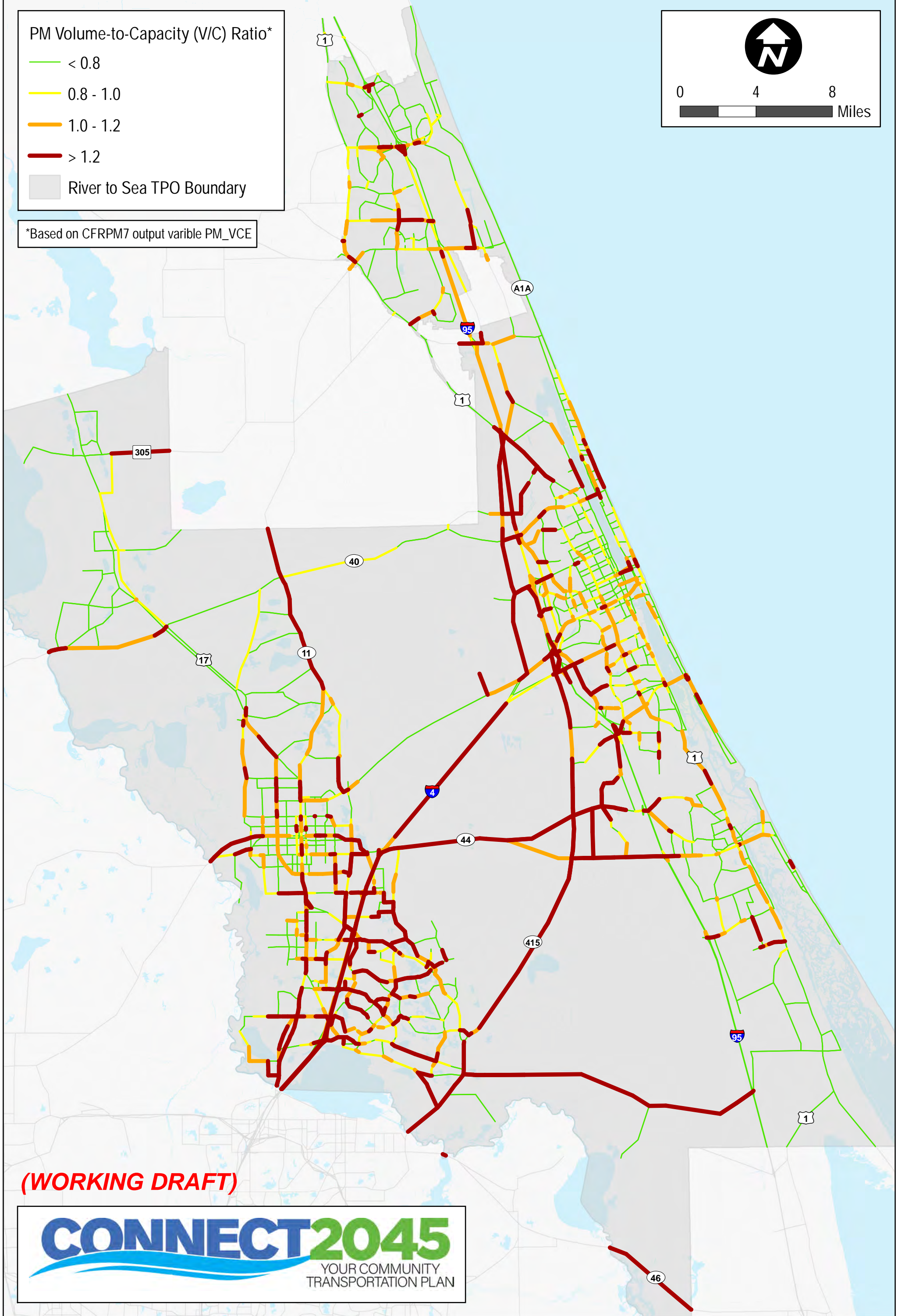
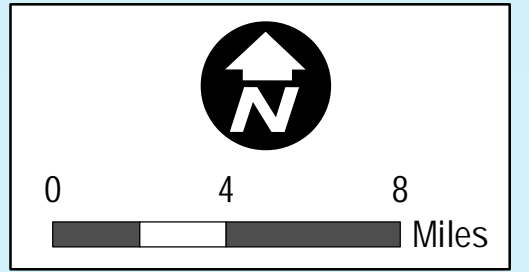
Certain lanes become integrated with CV and AV - 50-60% of vehicles (75% of trucks) have automation capability for platooning in controlled settings.

PM Volume-to-Capacity (V/C) Ratio*

- < 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

River to Sea TPO Boundary

*Based on CFRPM7 output variable PM_VCE



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ACES Scenario 5 | Competing Fleets

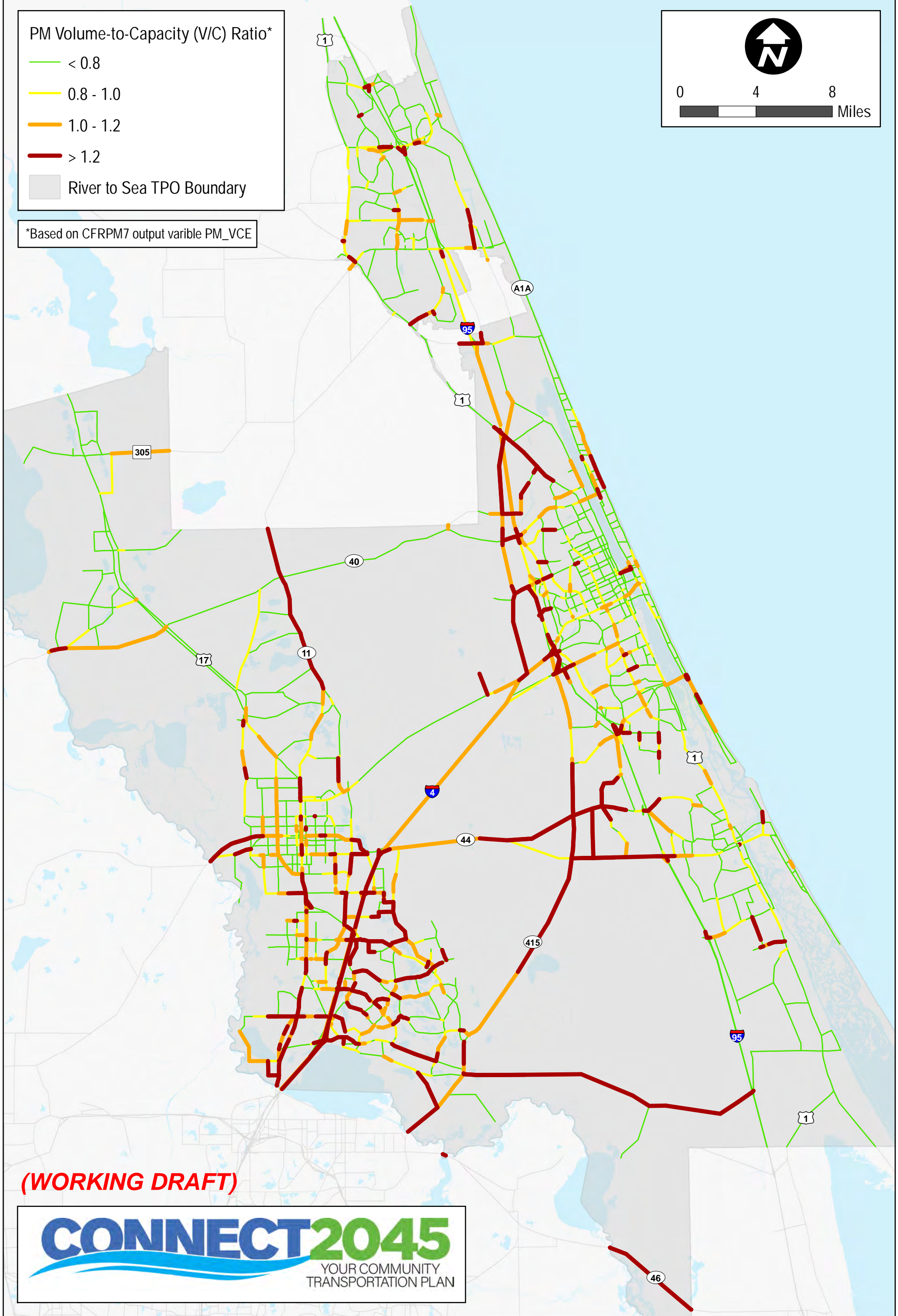
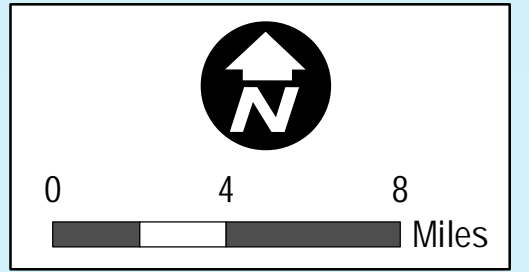
Automated TNC-like services proliferate rapidly, but do not operate cooperatively. VMT doubles due to induced demand and empty vehicle repositioning.

PM Volume-to-Capacity (V/C) Ratio*

- < 0.8
- 0.8 - 1.0
- 1.0 - 1.2
- > 1.2

River to Sea TPO Boundary

*Based on CFRPM7 output variable PM_VCE



(WORKING DRAFT)



ACES Scenario 6 | Robo Transit

On-demand shared services proliferate and integrate with other modes via cooperative data sharing, policies, and infrastructure.