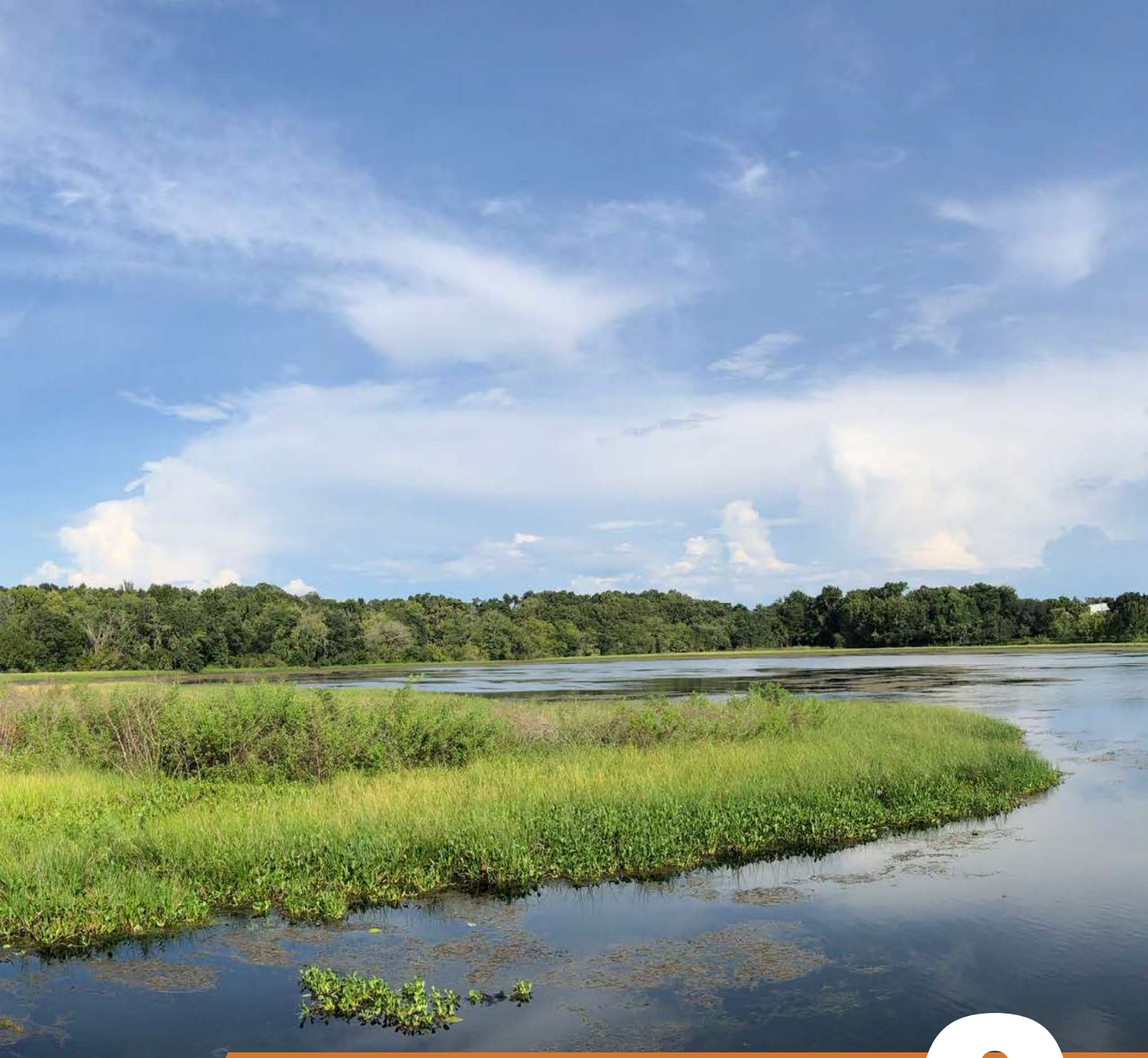

Appendix O

HERNANDO/CITRUS MPO PUBLIC PARTICIPATION PLAN

PUBLIC PARTICIPATION PLAN

HERNANDO/CITRUS

METROPOLITAN PLANNING ORGANIZATION

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WHAT IS THE HERNANDO/CITRUS METROPOLITAN PLANNING ORGANIZATION (MPO)?

The Hernando/Citrus Metropolitan Planning Organization (MPO) coordinates transportation plans for Hernando and Citrus County. All Federally supported transportation projects and programs for the Hernando County Board of County Commissioners, City of Brooksville, Citrus County Board of County Commissioners, City of Crystal River, and the City of Inverness go through the metropolitan planning process.

The Hernando/Citrus MPO is created by agreement between local governments and the Governor of the State of Florida. The obligation to provide information and consider public input in the decision-making process is part of the federal regulations.

The Hernando/Citrus MPO Board is composed of representatives from each of the respective governments within the MPO boundary. A current membership listing can be found on the Hernando Citrus MPO website.

An MPO is required to have committees which serve at the pleasure of the MPO. The Hernando/Citrus MPO has a Technical Advisory Committee (TAC), a Citizens' Advisory Committee (CAC), a Bicycle Pedestrian Advisory Committee (BPAC) and a Transportation Disadvantaged Local Coordinating Board (TDLCB). The members of the TAC are designated representatives with planning, engineering or another agency affiliation. The members of the CAC, BPAC and TDLCB are appointed by the MPO Board. Applications for these committees can be found online at www.hernandocitrusmpo.us.

All meetings of the MPO and the committees are open to the public. Public comment is invited as part of the process. MPO meetings are alternately conducted between Hernando County and Citrus County on an annual basis. TAC, CAC and BPAC meetings are also conducted between Hernando County and Citrus County; however, meetings are alternated on a quarterly basis. The MPO website includes the latest agendas with meeting locations identified.

PUBLIC PARTICIPATION PLAN POLICY STATEMENT

It is the policy of the Hernando/Citrus Metropolitan Planning Organization (MPO) to support and encourage early and continuous public participation and input to the planning process and to adhere to the principles of Environmental Justice and Title VI of the 1964 Civil Rights Act as part of the Transportation "3-C" planning process relating to transportation systems and facilities. The MPO's Participation Plan is designed to ensure early and continuous opportunities for the public to express

its views on transportation issues and to become active participants in the regional planning and transportation “3-C” decision making process.

A 1994 Presidential Executive Order directed every Federal agency to make Environmental Justice part of its mission by identifying and addressing the effects of all programs, policies, and activities on "minority populations and low-income populations.” The MPO's Environmental Justice initiatives will strive to accomplish this by involving the potentially affected public through a Citizens Outreach Program. This program consists of MPO staff activities designed to develop partnerships with, and enhance the participation in the transportation planning process, by groups and individuals of “traditionally underserved” communities.

These communities include minorities, transit dependent public, low income, the elderly, persons with disabilities and other vulnerable public. Staff activities include, but are not limited to, MPO staff participation in groups and coalitions serving within these communities, targeted communications with local media outlets, conducting meetings at times and locations that are accessible to transit dependent or non-driving individuals when possible, and publication of MPO documents in non-technical, web-based or other easily accessible formats as necessary and appropriate for purposes of obtaining input and comment into the long range transportation planning process and for Transportation Improvement Program updates. In carrying out the participation plan, the MPO shall, to the maximum extent practical, (i) hold any public meetings at convenient and accessible locations and times; (ii) employ visualization techniques to describe long range transportation plans; and (iii) make public information available in electronically accessible format and means, such as the MPO website, as appropriate to afford reasonable opportunities for consideration of public comment and opinion. The goal of the MPO’s Outreach Program is to ensure that all members of the public, regardless of race, color, religion, income status, national origin, age, gender, disability, marital status, or political affiliation, have an equal opportunity to participate in the MPO’s decision-making process.

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I. BACKGROUND

With the Federal Aid Highway Act of 1962, Congress passed legislation making urban transportation planning a condition for receipt of federal highway funds in urban areas. This legislation encouraged "a *Continuing*, *Comprehensive* transportation planning process carried on *Cooperatively* by the states and local communities," thus, the "3-C" planning process evolved.

An array of subsequent and current highway bills further increased the need for the transportation planning process. These bills were/are:

- Federal Highway Act of 1970FHWA/UMTA Joint Regulations (1975)
- Federal Aid Highway Act of 1982
- Revised FHWA/UMTA Joint Regulations (1983)
- Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)
- Transportation Equity Act of the 21st Century (TEA-21)
- Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)
- Moving Ahead for Progress in the 21st Century Act (MAP-21)
- Fixing America's Surface Transportation Act (FAST Act)

The Transportation Policy Committee structure is outlined in the 1973 Designation Agreement and its roles reiterated in the 1988 Designation Agreement, Under I. Organization, Section C, which declares, "Use the Committee structure established pursuant to Section 134 of Chapter 1 of Title 23 U.S.C. as the group responsible for giving the Metropolitan Planning Organization overall transportation policy guidance." The principal responsibilities of the MPO include the development of a 20-year Long Range Transportation Plan (LRTP) for the Hernando/Citrus Transportation Planning area that is unconstrained financially, and a Long-Range Transportation Plan (LRTP) for the urbanized area that is fiscally constrained within the projected federal funds available. Planning activities also include a Congestion Management Process (CMP) system, a five-year Transportation Improvement Program (TIP), and related planning studies and projects deemed necessary to address transportation issues in the area. Local transportation needs are reevaluated annually. Based on this evaluation, project priorities are established and made part of the MPO's Transportation Improvement Program (TIP).

This information is forwarded to the Florida Department of Transportation (FDOT) for inclusion into its State TIP (STIP). The FDOT then programs these projects, by priority, giving consideration to production schedules and funding constraints. By Federal and State law, all regionally significant multi-modal transportation improvement projects (regardless of funding source) must be included in and be consistent (to the maximum extent feasible) with the MPO's TIP and LRTP to be eligible for federal and state funding. Therefore, the regional element of the MPO's TIP and LRTP provide guidance on state and federally funded transportation improvements in the urbanized area.
The MPO is committed to maintaining a Public Participation Process that is responsive to and

consistent with the changing makeup and needs of the community. It will continue to seek new and innovative ways to engage the public and keep them informed as the plans, programs and policies that are under consideration by the MPO. Additionally, its process will conform to the current federal legislation under MAP-21 and all its requirements.

II. FIXING AMERICA'S SURFACE TRANSPORTATION ACT (FAST Act) OVERVIEW

On December 4, 2015, President Obama signed into law Public Law 114-94, the Fixing America's Surface Transportation Act (FAST Act). The FAST Act funds surface transportation programs—including, but not limited to, Federal-aid highways—at over $305 billion for fiscal years (FY) 2016 through 2020. It is the first long-term surface transportation authorization enacted in a decade that provides long-term funding certainty for surface transportation. This summary reviews the policies and programs of the FAST Act administered by the Federal Highway Administration (FHWA).
The Moving Ahead for Progress in the 21st Century Act (MAP-21), enacted in 2012, included provisions to make the Federal surface transportation more streamlined, performance-based, and multimodal, and to address challenges facing the U.S. transportation system, including improving safety, maintaining infrastructure condition, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery. The FAST Act builds on the changes made by MAP-21.

Setting the course for transportation investment in highways, the FAST Act –

- ***Improves mobility on America's highways***
  The FAST Act establishes and funds new programs to support critical transportation projects to ease congestion and facilitate the movement of freight on the Interstate System and other major roads. Examples include developing a new National Multimodal Freight Policy, apportioning funding through a new National Highway Freight Program, and authorizing a new discretionary grant program for Nationally Significant Freight and Highway Projects (FASTLANE Grants).

- ***Creates jobs and supports economic growth***
  The FAST Act authorizes $226.3 billion in Federal funding for FY 2016 through 2020 for road, bridge, bicycling, and walking improvements. In addition, the FAST Act includes a number of provisions designed to improve freight movement in support of national goals.

- ***Accelerates project delivery and promotes innovation***
  Building on the reforms of MAP-21 and FHWA's Every Day Counts initiative, the FAST Act incorporates changes aimed at ensuring the timely delivery of transportation projects. These changes will improve innovation and efficiency in the development of projects, through the planning and environmental review process, to project delivery.

MAP-21 made a number of reforms to the metropolitan and statewide transportation planning processes, including incorporating performance goals, measures, and targets into the process of identifying needed transportation improvements and project selection. The FAST Act includes provisions to support and enhance these reforms. Public involvement remains a hallmark of the planning process.

The FAST Act continues requirements for a long-range plan and a short-term transportation improvement program (TIP), with the long-range statewide and metropolitan plans now required to include facilities that support intercity transportation, including intercity buses. The statewide and

metropolitan long-range plans must describe the performance measures and targets that States and MPOs use in assessing system performance and progress in achieving the performance targets. Additionally, the FAST Act requires the planning process to consider projects/strategies to: improve the resilience and reliability of the transportation system, stormwater mitigation, and enhance travel and tourism.

Finally, in an effort to engage all sectors and users of the transportation network, the FAST Act requires that the planning process include public ports and private transportation providers, and further encourages MPOs to consult during this process with officials of other types of planning activities, including tourism and natural disaster risk reduction. MAP-21 and the FAST Act also change criteria for MPO officials to provide transit provider representatives with equal authority and allow the representative to also serve as the representative of a local municipality.

The MPO shall provide communities, affected public agencies, representatives of public transportation employees, freight shippers, providers of freight transportation services, private providers of transportation, representatives of users of public transportation, representatives of users of pedestrian walkways and bicycle transportation facilities, representatives of the disabled, vulnerable population, and other interested parties with a reasonable opportunity to comment on the LRTP, TIP and major revisions.

This MPO's participation plan shall be developed in consultation with all interested parties and shall provide that all interested parties have reasonable opportunities to comment on the contents of the LRTP, TIP updates and major revisions.

The participation plan is a living document and will be continually reviewed for possible revisions.

III. PARTICIPATION PROCESS

A. General Guidelines

This participation plan is intended to provide direction for public involvement activities to be conducted by the MPO and contains the policies, goals, objectives, and techniques used by the MPO for public involvement. In its public participation process, the MPO will:

1. Provide timely information about transportation issues and processes to communities, affected public agencies, representatives of transportation agencies, private providers of transportation, other interested parties and segments of the community affected by transportation plans, programs and projects (including, but not limited to, local jurisdiction concerns).

2. Provide reasonable public access to technical and policy information used in the development of the LRTP, the TIP, and other appropriate transportation plans and projects, and conduct open public meetings where matters related to transportation programs are being considered.

3. Give adequate public notice of public participation activities and allow time for public review and comment at key decision points, including, but not limited to, approval of the LRTP, the TIP, and other appropriate transportation plans and projects. If the final draft of any transportation plan differs significantly from the one available for public comment by the MPO and raises new material issues, which interested parties could not reasonably have foreseen, an additional opportunity for public comment on the revised plan shall be made available.

4. All transportation plans and project documents are posted to the MPO's website to ensure reasonable access to the information by the public during the review period. Hard copy of the materials will be available for public review in our office or upon request.

5. Respond in writing, when applicable, to public input. When significant written and oral comments are received on the draft transportation plan (including the financial plan for the TIP and LRTP developed in cooperation with the West Central Florida MPOs Chairs Coordinating Committee (CCC) as a result of the public participation process or the interagency consultation process required under FAST Act, report on the disposition of comments shall be made part of the final plan.

6. Solicit the needs of those under-served by existing transportation systems, including, but not limited to, the transportation disadvantaged, minorities, elderly, persons with disabilities, and low-income households. FAST Act requires that the MPO shall provide reasonable opportunities for affected public agencies, representatives of public transportation employees, freight shippers, providers of freight transportation services, private providers of transportation, representatives of users of public transportation, representatives of users of pedestrian walkways and bicycle transportation facilities, representatives of the disabled, and other interested parties with a reasonable opportunity to comment on the transportation planning process via 23 U.S.C. 104(d)1.

7. Provide a public comment period of 45 calendar days prior to the adoption of the participation plan and/or any amendments. Notice of the comment period will be advertised in local newspapers of general circulation and various other publications prior to the commencement of the 45-day comment period. Notice will also be emailed to the entire MPO mailing list prior to the start of the 45-day comment period.

8. Provide a public comment period of 15–30 calendar days prior to adoption of the LRTP, TIP, Transit Development Plan (TDP), and/or UPWP.

9. Provide a public comment period of not less than 10 days for any formal amendments or updates to the LRTP, TIP, TDP, UPWP, and other relevant transportation plans and projects.

LRTP Amendment

An amendment is a major revision to the LRTP, such as adding or deleting a project, a major change in project costs, initiation dates, and/or design concept and scope, such as changing

project locations or the number of through traffic lanes. An amendment requires public review and comment, and formal action by the MPO Board.

LRTP Administrative Modification
An administrative modification is a revision to the LRTP for minor changes to a project including project phase costs, funding sources, and/or initiation dates. An administrative modification does not require public review and comment.

TIP Amendments
A TIP amendment is a revision that involves a major project change, including addition or deletion of a project, or a major change in cost, phase, initiation date, or design concept or scope (i.e., changing project termini, or the number of through traffic lanes). An amendment requires public review and comment, and formal action by the MPO Board.

TIP Modification
A modification includes minor changes to project phases, costs, funding sources of previously included projects, or initiation dates. A TIP modification does not require public review and comment.

UPWP Amendment
Change to approved FHWA budget for the UPWP; and/or scope of task; and addition or deletion of a task. An amendment requires public review and comment, and formal action by the MPO Board.

UPWP Modification
Does not change the FHWA approved FHWA and FTA budget or scope of the FHWA funded work tasks. An UPWP modification does not require public review and comment.

TDSP Amendment
Change to a service plan element affecting program operations requires public review and comment, and formal action by the TDLCB.

TDSP Modification
Change to Plan narrative, descriptions or corrections does not require public review and comment.

10. Coordinate the public participation process with statewide and regional public participation processes wherever possible to enhance public consideration of the issues, plans and programs, to minimize redundancies and costs.

B. Participation Goals, Objectives, and Policies

Goal: To provide the public with thorough information on transportation planning services and project development in a convenient and timely manner.

OBJECTIVE 1

The MPO shall actively engage the public in the transportation planning process according to the policies contained in this participation plan and State and Federal law.

Policy 1.1: The MPO shall maintain an up-to-date database of contacts including, at a minimum, the following persons and agencies to provide that all interested parties have reasonable opportunities to comment on the transportation planning process and products:

A. Elected Officials
B. Local Government Staff
C. Transportation Agencies (Port, Airports, Transit, etc.)
D. Law enforcement and emergency services management, emergency operations centers, chambers of commerce, and economic development agencies.
E. Local Media (TV, Radio, Print, etc.)
F. Homeowners Associations
G. Civic Groups
H. Special Interest Groups (Other Interested Parties)
I. Libraries (for Public Display)
J. Federal, State and local agencies responsible for land use management, natural resources, environmental protection, conservation and historic preservation, and other environmental issues
K. Other parties that would have an interest in the planning and development of the transportation network, including affected public agencies in the transportation planning area
L. Native American Tribal Council
M. Private Freight Shippers
N. Representatives of Public Transportation Employees
O. Providers of Freight Transportation Services
P. Private Providers of Transportation
Q. Representatives of Users of Public Transportation
R. Representatives of Users of Pedestrian Walkways
S. Representatives of Users of Bicycle Transportation Facilities
T. Representatives of the Disabled

Policy 1.2: The MPO shall, when feasible, electronically mail meeting announcements to the MPO contact list or to targeted groups for upcoming activities.

Policy 1.3: The MPO shall employ visualization techniques to depict transportation plans. Examples of visualization techniques include charts, graphs, photo interpretation, maps, use of GIS systems, artist renderings, physical models, and/or computer simulation.

OBJECTIVE 2

The MPO shall keep the public informed of on-going transportation related activities on a continuous basis.

Policy 2.1: The MPO shall make all publications and work products available electronically to the public via the MPO's home page website (via internet) and at the MPO office and employ visualization techniques whenever possible to describe transportation actions as part of the long-range plan.

Policy 2.2: MPO staff shall be available to provide general and project-specific information at a central location during normal business hours and after hours at the request of community interest groups with reasonable notice.

Policy 2.3: The MPO shall produce a newsletter for distribution to the MPO contact list.

Policy 2.3.1: The newsletter shall be produced a minimum of two times in a year and will be sent out electronically or in print to all interested parties upon request.

Policy 2.3.2: The newsletter should include, at a minimum, updates on current or recently completed projects, design projects, announcements of upcoming meetings, and contact information.

Policy 2.4: The MPO shall maintain an internet website.

Policy 2.4.1: The website shall be updated and maintained to provide the most current and accurate transportation planning information available.

Policy 2.4.2: The website will be updated to include the following information:

A. Contact information (mailing address, phone, and email)
B. Current MPO committee membership
C. Meeting calendars and agendas
D. Work products and publications (TIPs, LRTPs, Unified Planning Work Programs, etc.)
E. Comment/Question Form
F. Links to related agencies and a Facebook link
G. Current Bylaws and Operating Procedures (including the participation plan and updates)

OBJECTIVE 3

The MPO shall encourage the involvement of all area communities and any affected stakeholders in the transportation planning process.

Policy 3.1: Target audiences shall be identified for each planning study conducted by the MPO, including affected stakeholders, residents, business and property owners, and those traditionally under-served and under-represented populations including, but not limited to, low income and minority households, within the study area.

Policy 3.2: The MPO shall, whenever feasible, hold public meetings or forums at sites convenient to potentially affected public.

OBJECTIVE 4

The MPO shall strive to continuously improve public participation.

Policy 4.1: The MPO shall continuously evaluate public involvement techniques.

Policy 4.2: This participation plan shall be reviewed and adopted, with revisions if necessary, at approximately 3 year intervals in order to improve the effectiveness of public involvement.

Policy 4.3: The MPO shall use Measures of Effectiveness (MOEs) to monitor and assure program performance. These MOEs can be quantitative or qualitative, as appropriate to the application.

MOE 4.3.1	Has a checklist been prepared to apply to public documents and materials? (Y/N) How many documents have followed the checklist?
MOE 4.3.2	Has our website been updated each month?
MOE 4.3.3	How many issues of the newsletters have been produced this year? How many electronic copies of each issue were distributed?
MOE 4.3.4	Does composition of citizen advisory groups reflect the region's demographic makeup? (Y/N)
MOE 4.3.5	How many complaints were received regarding the notification process or timing?
MOE 4.3.6	Has the public participation database been kept up-to-date? (Y/N) How many people have participated in engagement activities, submitted comments, and received responses?

OBJECTIVE 5

The MPO shall participate in public participation activities for individual transportation improvement projects from the planning phase through construction.

Policy 5.1: The MPO shall actively assist the Florida Department of Transportation, local government, and transportation agencies in the development and implementation of public involvement techniques for planning and other studies, including Major Corridor/Feasibility Studies, and Project Development and Environmental Studies or other documents to support planning.

Policy 5.2: To the extent feasible, the Environmental Screening Tool (EST) of the Efficient Transportation Decision Making (ETDM) process will be used to distribute planning level notifications of Long Range Transportation Plan (LRTP) documentation and public meetings.

C. Participation Techniques

Public participation is an ongoing activity of the MPO. Public participation is also an integral part of

one-time activities such as corridor studies and recurrent activities such as the annual Transportation Improvement Program (TIP) process and Long Range Transportation Plan (LRTP) updates.

This section contains descriptions of public participation tools currently being used by the MPO:

MPO Website

Description: The site was established to provide basic information about the MPO process, members, meeting times, and contact information. Work products such as the draft and adopted, Participation Plan, Unified Planning Work Program, Transportation Improvement Program, and Long-Range Transportation Plan are available from the site. Also, the public can submit comments and sign up to the social media platforms maintained by the MPO. Demographic information may be requested from the public for planning purposes; however, no other identifying information will be included. The site provides many links to other transportation related sites at the local and national level.

The website address is www.HernandoCitrusMPO.us.

Activities: The site is used to list current and topical information on regular and special meetings, planning studies, publications, related public events, public hearings, and work products. It also includes an active link to the ETDM public access site at https://etdmpub.fla-etat.org/est/.

MPO Master Database

Description: MPO staff maintains a master database of business, federal, state and local agencies, and interested public. The database includes committee membership, mailing information, phone numbers, fax numbers, email addresses and websites. The database is used for maintaining up-to-date committee membership lists, special interest groups and homeowner's association contacts, and is the foundation of the newsletter mailing list. The database will be used to establish and maintain a list of email contacts for electronic meeting notification and announcements.

Activities: The database is used to enhance public involvement activities.

Legal Advertisements

Description: Chapter 50 of the Florida Statutes will be adhered to with regard to publication requirements for all legal notices as well as website publications.

Activities: Regular and other meetings seeking public input are posted.

Semi-Annual Newsletter

Description: MPO staff produces a semi-annual newsletter that is distributed to communities, municipalities, media and other agencies. The Public is added to the distribution list by their own request.

Activities: The newsletter is used to promote regular and special meetings, planning studies, publications, work products, and committee memberships.

Display Ads

Description: Publication of ads that are used to promote meetings that are not regularly scheduled,

such as corridor study workshops. They are published in selected local newspapers to reach a larger audience than those that typically read legal notices.

Activities: Public awareness of project-specific meetings, workshops or open houses.

Other Media

Description: Opportunities are sought for articles in other newsletters produced by municipalities, homeowner's associations, church groups, civic groups, or others that may have an interest in the MPO. Opportunities are also sought to present to civic and social agencies, participate on radio talk shows, provide television news highlights, and to utilize public service notices to create community awareness of planning activities.

Activities: Increased opportunities to make public aware of corridor studies, small-area studies, and other planning studies and/or major activities.

Direct Mailings

Description: Used to announce upcoming meetings or activities or to provide information to a targeted area or group of people. Direct mailings can be letters, postcards, or flyers. An area may be targeted for a direct mailing because of potential impacts from a project. Groups may be targeted that may have an interest in a specific issue, for example, avid cyclists and pedestrians may be targeted for pathways and trail projects.

Activities: Project-specific meetings, workshops, open houses, corridor studies, small-area studies, other planning studies, and/or major activities.

Press Releases

Description: Formal press releases are sent to local media (newspaper, TV and radio) to announce upcoming meetings and activities and to provide information on specific issues being considered by the MPO and its committees.
Activities: Corridor or other planning studies, workshops, open houses, public hearings, and other MPO activities.

Project Workshops/Open Houses

Description: These are targeted public meetings that are generally open and informal, with project team members interacting with the public on a one-on-one basis. Short presentations may be given at these meetings. The purpose of project-specific meetings is to provide project information to the public and to solicit public comment and a sense of public priorities.

Activities: Long range planning studies, prioritization of projects, and other major MPO activities.

Email Announcements/Internet Message Boards

Description: Meeting announcements and MPO information are emailed to interested persons that have submitted their email address to MPO staff. Interactive social media platforms are used to facilitate discussion and solicit public comment regarding specific MPO projects or issues.

Activities: Corridor studies, small-area studies, other planning studies, regular meetings, public hearings, workshops, open houses, and other major MPO activities.

MPO Logo

Description: A logo representing the MPO is used to identify products and publications of the MPO. A logo helps the public become familiar with the different activities of the MPO by providing a means of recognizing MPO products.

Activities: A logo is used on all MPO publications, including those developed by consultants working on MPO-sponsored projects to create a community awareness of the MPO deliverables.

Public Hearings

Description: These are public meetings used to solicit public comment on a project or issue being considered for adoption by the MPO. Hearings provide a formal setting for the public to provide comments to the MPO or another decision-making body. They are recorded and transcribed for the record.

Activities: Long Range Transportation Plans, Transportation Improvement Program, corridor studies, Project Development and Environmental studies, and other planning studies as needed for other MPO activities.

Public Forums

Description: These are public meetings held in a less formal setting than public hearings to solicit public comment on a project or issue being considered for adoption by the MPO. Forums provide an informal setting for the public to provide comments to the MPO or another decision-making body. They are not recorded or transcribed for the record, but comment forms are available.

Activities: Long Range Transportation Plans, Transportation Improvement Program, corridor studies, Project Development and Environmental studies, and other planning studies as needed for other MPO activities.

Comment Forms

Description: Comment forms are used to solicit public comment on specific issues being presented at a workshop or other public meeting. Comment forms can be very general in nature or can ask for very specific feedback. For example, a comment form may ask for comments on specific alignment alternatives being considered during a corridor study or may ask for a person's general feelings about any aspect of transportation. Comment forms can also be included in publications and on websites to solicit input regarding the subject of the publication and/or the format of the publication or website. Comment forms will never request personal identification information; however, we may request demographic identifiers, such as zip code, to assist in identifying context information regarding comments provided.

Activities: Public workshops, open houses, hearings, other meetings, and/or general MPO activities.

Surveys

Description: Surveys are used when very specific input from the public is desired. A survey can be used in place of comment cards to ask very specific questions such as whether a person supports a specific alignment in a corridor study. Surveys are also used to gather technical data during corridor and planning studies. For example, participants may be asked about their daily travel patterns.

Activities: Conduct on-line surveys on issues and needs to provide input into the plans, as needed. Stakeholder interviews are also conducted in order to provide targeted information and data.

Posters and Flyers

Description: Posters and flyers are used to announce meetings and events and are distributed to public places such as county halls, libraries, and community centers for display. The announcement may contain a brief description of the purpose of a meeting, the time(s) and location(s), and contact information. Posters and flyers may be used to reach a large audience that cannot be reached using direct mailings and/or newsletters.

Activities: Corridor studies, small-area studies, other planning studies, regular and special MPO activities.

D. Summary Participation Policy Table

The following table highlights requirements for public review periods and notices. The MPO's practice is to meet or exceed these minimum requirements

Program or Plan (Adoption)	Minimum Public Notice	Review Period	Public Hearing(s)
Long Range Transportation Plan (LRTP)	5-10 days	30 Days	2
Transit Development Plan (TDP)	5-10 days	30 Days	1
Transportation Improvement Program (TIP) - Final	5-10 days	30 Days	1
Public Participation Plan (PPP)	5-10 days	45 Days	1
Unified Planning Work program (UPWP)	5-10 days	30 Days	
Program or Plan (Amendments)	Prior Public Notice	Review Period	
Long Range Transportation Plan (LRTP)	5-10 days	10 Days	1
Transit Development Plan (TDP)	5-10 days	10 Days	
TIP Priorities	5-10 days	10 Days	1

Transportation Improvement Program (TIP)	5-10 days	10 Days	
Public Participation Plan (PPP)	5-10 days	45 Days	
Unified Planning Work program (UPWP)	5-10 days	10 Days	

E. Short Notice/Special Meetings

Periodically, the MPO staff is requested to hold a public hearing or special meeting on short notice to address an item that requires immediate MPO Board action. In such cases, the MPO may need to advertise the public hearing/meeting in a shorter period of time, or provide a shorter review and comment period than is reflected in the summary above for each of the major plans and programs. All possible effort will be made to adhere to the MPO's notification requirements, but if necessary the MPO staff will place the notices regarding short notice meetings and special meetings on the MPO's website.

IV. COMMONLY USED TRANSPORTATION TERMS AND ACRONYMS

ADA – Americans with Disabilities Act of 1990: *Federal law that requires public facilities (including transportation services) to be accessible to persons with disabilities including those with mental disabilities, temporary disabilities, and the conditions related to substance abuse.*

AADT – Average Annual Daily Traffic: *The number of vehicles passing a fixed point in a day, averaged over a number of days. The number of count days included in the average varies with the intended use of data.*

AMPO – Association of Transportation Planning Organizations: *A national nonprofit membership organization serving the interests of transportation planning organizations nationwide.*

BPAC - Bicycle/Pedestrian Advisory Committee: *The Bicycle/Pedestrian Advisory Committee (BPAC) was established to provide a continuing forum with which to analyze and promote bicycle and pedestrian issues and projects as an integral part of a multi-modal transportation planning process. The BPAC initiates updates on the prioritization of transportation enhancement projects. The BPAC meets on a quarterly basis.*

CAC - Citizens Advisory Committee: *The Citizens Advisory Committee (CAC) provides a formal framework for continuing public input on the UPWP, the Transportation Improvement Program (TIP), and the Long-Range Transportation Plan (LRTP), as well as other elements of the transportation planning process. The CAC meets on a quarterly basis to provide public input at all stages of the planning process.*

CCC – West Central Florida MPOs Chairs Coordinating Committee: *The West Central Florida MPOs Chairs Coordinating Committee is a regional transportation committee consisting of chairpersons from the seven-member MPOs and TPOs in the greater Tampa Bay area of West Central Florida. The Florida Department of Transportation (FDOT) Secretaries (District 1 and District 7), Florida's Turnpike Enterprise, four regional planning councils, and the Tampa Bay Area Regional*

Transit Authority (TBARTA) are represented on the CCC in a non-voting capacity.

CIA – Community Impact Assessment: *Community impact assessment is "a process to evaluate the effects of a transportation action on a community and its quality of life." It is a way to incorporate community considerations into the planning and development of major transportation projects. From a policy perspective, it is a process for assessing the social and economic impacts of transportation projects as required by the National Environmental Policy Act (NEPA). The assessment may address a variety of important community issues such as land development, aesthetics, mobility, neighborhood cohesion, safety, relocation, and economic impacts.*

CMAQ – Congestion Mitigation and Air Quality Improvement Program: *A categorical funding program created under ISTEA, and continued under MAP-21, to provide a flexible funding source for state and local governments to help meet the requirements of the Clean Air Act.*

CMP – *Congestion Management Process:* *A systematic process required under MAP-21 for all TMAs that shall address congestion management through the transportation planning process that provides for effective management and operation, based on a cooperatively developed and implemented transportation-wide strategy of new and existing transportation facilities eligible for funding under Title 23 and Chapter 53 of Title 49 through the use of travel demand reduction and operational management strategies. The CMP is required under 23 C.F.R. 500.109 and shall include methods to monitor and evaluate the performance of the multi modal transportation system, identify causes of congestion, identify and evaluate alternative actions, provide information supporting the implementation of actions, and evaluate the efficiency and effectiveness of implementation actions. The CMP is periodically reviewed for efficiency and effectiveness of the implemented strategies, and the results of the evaluation shall be provided to decision-makers to provide guidance on selection of effective strategies for future implementation purposes.*

CTD – Commission for the Transportation Disadvantaged: *State level policy board for the coordination of transportation services for persons who because of disability, age or income are unable to transport themselves. The CTD adheres to the policies and procedures as set out in Chapter 427 F.S. and Rule 41-2, F.A.C.*

CUTR – Center for Urban Transportation Research: *A legislatively created research center, located at the University of South Florida, whose purpose is to conduct and facilitate research and serve as an information exchange on issues related to urban transportation problems in Florida.*

EIS – Environmental Impact Statement: *A National Environmental Policy Act (NEPA) document that explains the purpose and need for a project, presents project alternatives, analyzes the likely impact of each, explains the choice of a preferred alternative, and finally details measures to be taken in order to mitigate the impacts of the preferred alternative.*

FDOT – Florida Department of Transportation: *The State of Florida's multimodal transportation agency. Organizationally, it is composed of one Central Office in Tallahassee, seven District Offices, and the Florida's Turnpike Enterprise.*

EJ - Environmental Justice: *Describes the impact of transportation plans or projects, either positive or negative, on a particular community or population, as derived from Title VI of the Civil Rights Act of 1964. Environmental Justice strives to ensure public involvement of low income and minority groups in decision making, to prevent disproportionately high and adverse impacts on low income and minority groups, and to assure that these groups receive equal benefits from transportation improvements.*

EST – Environmental Screening Tool: *An internet-accessible interactive database tool implemented by FDOT. The EST provides tools to input and update information about transportation projects, perform standardized analyses, gather and report comments about potential project effects, and provide information to the public.*

ETDM – Efficient Transportation Decision Making: *Florida's ETDM process defines the procedures for planning transportation projects, conducting environmental reviews, and developing and permitting projects.*

FIXING AMERICA'S SURFACE TRANSPORTATION ACT (FAST Act): *On December 4, 2015, President Obama signed into law Public Law 114-94, the Fixing America's Surface Transportation Act (FAST Act). The FAST Act funds surface transportation programs—including, but not limited to, Federal-aid highways—at over $305 billion for fiscal years (FY) 2016 through 2020. It is the first long-term surface transportation authorization enacted in a decade that provides long-term funding certainty for surface transportation.*

FHPP – Federal High Priority Projects: *Discretionary projects earmarked by the U.S. Congress as high priorities at the Federal level during the Congressional appropriations and reauthorization process. This amounts to roughly 5% of the total transportation budget.*

FHWA – Federal Highway Administration: *Division of the U.S. Department of Transportation responsible for administrating federal highway transportation programs under Title 23 U.S.C. and Title 49 U.S.C.*

FTC – Florida Transportation Commission: *Reviews major transportation policy initiatives or revisions submitted by the Department pursuant to law, recommends major transportation policy to the Governor and Legislature, serves as an oversight body for the Department of Transportation, serves as an oversight body for transportation authorities created under Chapters 343 and 348, Florida Statutes, serves as nominating Commission in the selection of the Secretary of Transportation.*

FTA – Federal Transit Administration*: Federal entity responsible for transit planning and programs under Title 49 U.S.C.*

Functional Classification: *Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to*

provide. Basic to this process is the recognition that individual roads and streets do not serve travel independently in any major way. Rather, most travel involves movement through a network of roads. It becomes necessary then to determine how this travel can be channelized within the network in a logical and efficient manner. Functional classification defines the nature of this channelization process by defining the part that any particular road or street should play in serving the flow of trips through a highway network.

FY – Fiscal Year: *A Federal fiscal or budget year; runs from October 1 through September 30 for the MPO and the Federal government.*

HOV – High Occupancy Vehicle*: In Florida, vehicles carrying two (2) or more people receive this designation and may travel on freeways, expressways and other large volume roads in lanes designated for high occupancy vehicles.*

IMS – Incident Management System: *A systematic process required under MAP-21 to provide information on accidents and identify causes and improvements to the transportation system to increase safety of all users.*

ITE – Institute of Transportation Engineers: *An international society of professionals in transportation and traffic engineering, publishes Trip Generation (a manual of trip generation rates by land use type).*

ITS – Intelligent Transportation System: *Use of computer and communications technology to facilitate the flow of information between travelers and system operators to improve mobility and transportation productivity, enhance safety, maximize the use of existing transportation facilities, conserve energy resources and reduce adverse environmental effects; includes concepts such as "freeway management systems," "automated fare collection," and "transit information kiosks."*

Intergovernmental Agreement: *Legal instrument describing tasks to be accomplished and/or funds to be paid between government agencies.*

LOS – Level of Service: *A qualitative assessment of a road's operating condition, generally described using a scale of A (little congestion) to E/F (severe congestion).*

LRTP – Long Range Transportation Plan: *A 25-year forecast plan required of state planning agencies and MPOs, which must consider a wide range of social, environmental, energy, and economic factors in determining overall regional goals and consider how transportation can best meet these goals.*

MG – Minimum Guarantee: *A funding category created in TEA-21 that guarantees a 90% return of contributions on formula funds to every state.*

MAP-21 – Moving Ahead for Progress in the 21st Century: *Federal legislation enacted July 6, 2012, as Public Law 112-141, it authorizes federal surface transportation programs for highways,*

safety, transit and transportation alternatives for fiscal years (FY) 2013 and 2014.

MPO Activities: *Plans, programs and projects related to the MPO process.*

MPO – Metropolitan Planning Organization: *The forum for cooperative transportation decision-making, required for urbanized areas with populations over 50,000.*

MPOAC – Florida Metropolitan Planning Organization Advisory Council: *A statewide transportation planning and policy organization created by the Florida Legislature to augment the role of individual MPOs in the cooperative transportation planning process. The organization is made up of a Governing Board (26 members) consisting of local elected officials from each of the MPOs and a Staff Directors Advisory Committee consisting of the staff directors from each of Florida's MPOs.*
NHS – National Highway System: *Specific major roads to be designated September 30, 1995; the NHS will consist of 155,000 (plus or minus 15%) miles of road and represents one category of roads eligible for Federal funds under ISTEA.*

Officials: *Persons who have governmental decision-making, planning or administrative responsibilities that relate to MPO activities.*

PMS – Pavement Management System: *A systematic process utilized by state agencies and MPOs to analyze and summarize pavement information for use in selecting and implementing cost-effective pavement construction, rehabilitation, and maintenance programs, required for roads in the NHS as a part of ISTEA; the extent to which the remaining public roads are included in the process is left to the discretion of State and local officials, criteria found in 23 C.F.R. 500.021-209.*

Public Participation Plan: *One of the required elements under MAP-21 that (i) shall be developed in consultation with all interested parties, and (ii) shall provide that all interested parties have reasonable opportunities to comment on the contents of the transportation plan.*

ROW – Right-of-Way: *Real property that is used for transportation purposes, defines the extent of the corridor that can be used for the road and associated drainage.*

RTDM – Regional Travel Demand Model: *This is a tool for forecasting impacts of urban developments on travel patterns as well as testing various transportation alternative solutions to traffic patterns. The travel patterns are determined from U.S. Census results and in simple terms tell where residents live and where they go to work or school on a regional wide basis.*

SIS – Strategic Intermodal System: *The SIS is a Florida network of high-priority transportation facilities, including the State's largest and most significant commercial service airports, spaceport, deepwater seaports, freight rail terminals, passenger rail and intercity bus terminals, rail corridors, waterways and highways.*

Sponsoring Agencies: *Organizations or governmental units which enter into agreements with the MPO to undertake transportation related activities, which will be part of the MPO planning process.*

SMP – Statewide Mobility Plan: *The FDOT's 10-year plan for adding capacity to the transportation system using the Mobility Category Funds of Federal and State Transportation funding.*

SPP – Statewide Preservation Plan: *The FDOT's 10-year plan for maintaining the transportation system using the preservation categories of Federal and State Transportation funding.*

STIP – State Transportation Improvement Program: *The FDOT's Five-Year Work Program as prescribed by Federal law.*

TAC – Technical Advisory Committee: *A standing committee of most MPOs, function is to provide advice on plans or actions of the MPO from planners, engineers and other staff members (not general public).*

TBARTA – Tampa Bay Area Regional Transit Authority: *The legislatively created regional entity tasked with the development and implementation of a Regional Transit Master Plan for the seven county West Central Florida region consisting of Citrus, Hernando, Hillsborough, Manatee, Pasco, Pinellas and Sarasota counties.*

TIFIA – Transportation Infrastructure Finance and Innovation Act: *Provides Federal credit assistance in the form of direct loans, loan guarantees, and standby lines of credit to finance surface transportation projects of national and regional significance.*

Transportation Alternatives: *As defined under 23 U.S.C. 101(a)(29) (MAP-21 1103), these are specific activities which can be funded with Surface Transportation Program (STP) funds; activities include pedestrian/bicycle facilities, recreational trails program, Safe Routes to School (SRTS) activities, railway corridor preservation, construction of turnouts, overlooks and viewing areas, control/removal of outdoor advertising, historic preservation and rehabilitation of historic transportation facilities, invasive species control, archeological activities relating to impacts from eligible transportation projects, mitigation of highway stormwater runoff water pollution, and reduce vehicle-caused wildlife mortality, planning, designing and construction of boulevards and other roadways largely in the right-of-way of former Interstate System routes or other divided highways.*

Transportation Disadvantaged: *Persons who are unable to transport themselves or to purchase transportation due to disability, income status or age.*

TDLCB - Transportation Disadvantaged Local Coordinating Board: *The Transportation Disadvantaged Local Coordinating Board (TDLCB) is the technical level review Board established, consistent with Florida Statute, Chapter 427. The TDLCB oversees the activities of the Community Transportation Coordinator (CTC) and the overall Transportation Disadvantaged (TD) service program. The MPO serves as the Official Planning Agency (OPA) for the transportation disadvantaged program and functions as the appointing authority for the TDLCB. The TDLCB meets on a quarterly basis.*

The Public: *Includes community, public agencies, advocacy groups and the private sectors that have*

an interest in or may be affected by MPO activities.

TIP – Transportation Improvement Program: *A priority list of transportation projects developed by an MPO that is to be carried out within the four (4)-year period following its adoption; must include documentation of Federal and State funding sources for each project and be consistent with adopted MPO Long Range Transportation Plan and local government comprehensive plans.*

TMA – Transportation Management Area: *An area designated by the U.S. Department of Transportation given to all urbanized areas with a population over 200,000 (or other area when requested by the Governor and MPO); these areas must comply with special transportation planning requirements regarding congestion management systems, project selection and certification, requirements identified in 23 C.F.R. 450.300-33.6.*

TSOC - Transportation Systems Operations Committee: *The Transportation Systems Operations Committee (TSOC) is a subcommittee of the TAC providing support in identifying deficiencies, developing mitigative strategies, and ensuring effective intergovernmental coordination for the efficient operation of the Hernando County transportation system. This committee focuses on highway operation improvements, congestion and safety management, mobility management and intergovernmental coordination. The TSOC generally meets on a semiannual basis.*

UPWP – Unified Planning Work Program: *Developed by MPOs, identifies all transportation and planning activities anticipated within the next one to two years, including a schedule for the completion of the identified tasks and activities.*

V/C Ratio – Volume over Capacity Ratio: *This is a roadway performance measure to show how a highway volume compares with a highway's capacity.*

VMT – Vehicle Miles Traveled: *This is an output of the travel demand model and is a measure of traffic flow over a highway segment. While 1000 vehicles traveling over a mile road and 1 vehicle traveling over 1000 miles are mathematically equal only the former 1000 vehicle mile means anything to the transportation planner.*

V. PARTICIPATION PLAN EVALUATION

A. Introduction

The Federal Highway Administration (FHWA) and the Florida Department of Transportation (FDOT) require that the Hernando/Citrus Metropolitan Planning Organization (MPO) continuously evaluate the effectiveness of public involvement activities. By continuously evaluating public involvement activities, it is possible to improve or add new public involvement activities to the MPO program and to discontinue activities that are ineffective. The purpose of this plan is to provide guidelines for the evaluation of public involvement techniques. The MPO's public involvement activities are contained in the Participation Plan.

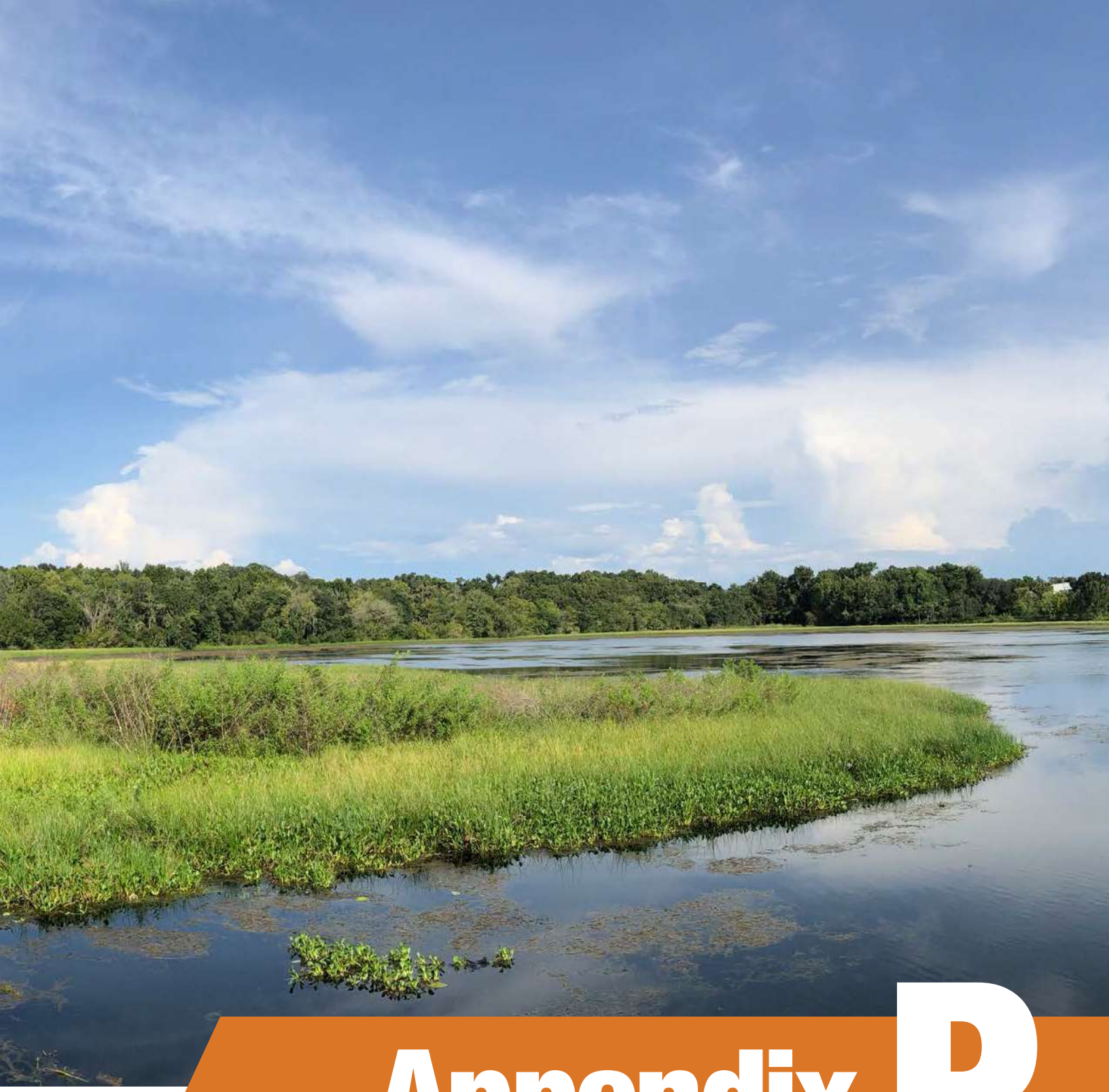
The Participation Plan includes descriptions of the roles and responsibilities of the MPO and other agencies in the public involvement process. Also included in the Participation Plan are descriptions of various public involvement techniques that could be used by the MPO. This plan will be reviewed at approximately three year intervals to ensure that appropriate processes are being implemented by the MPO.

B. Improvement Strategies

The MPO continually strives for improved public involvement. Improvements should be made to increase public awareness and to improve the quantity and quality of information provided to the public. The decisions made by the MPO affect the entire population, both residents and visitors, of Hernando and Citrus Counties and surrounding areas. Therefore, seeking public input on those decisions is vital to the success of the MPO as the agency responsible for transportation planning. Each time a public involvement evaluation is performed, a list of improvement strategies needed should be identified for implementation. If improvement is needed for an ongoing public involvement task, such as the MPO website, a reasonable completion date should be established.

ACKNOWLEDGEMENTS:

The Hernando/Citrus MPO Public Participation Plan (PPP) amendment was developed collectively with the Technical Advisory Committee (TAC), Citizen's Advisory Committee (CAC), Bike Pedestrian Advisory Committee (BPAC), Transportation Disadvantaged Local Coordinating Board (TDLCB) Florida Department of Transportation Staff, Federal Highway Administration, MPO staff and the MPO Board.



Appendix P

2045 LRTP PUBLIC INVOLVEMENT REVIEW

METROPOLITAN PLANNING ORGANIZATION
HERNANDO/CITRUS

Volume 11, Issue 1 Winter 2019

TRANSPORTATION TALK

A newsletter about Transportation Planning in Hernando and Citrus Counties

IT'S A NEW YEAR—SO TIME FOR NEW PLANS AND PROGRAMS

2045 Hernando/Citrus MPO TRANSPORTATION PLAN

2045 LONG RANGE TRANSPORTATION PLAN (LRTP)

The Long Range Transportation Plan (LRTP) is prepared by the Hernando/Citrus MPO and its consultant, Kimley-Horn and Associates, Inc. It is a multi-modal plan to help guide the various transportation systems in both Hernando and Citrus Counties over the next twenty-five years. It is consistent with the Comprehensive Plans for each county and meets the standards established in federal law for metropolitan transportation planning.

Over the course of the year, the plan will evaluate existing conditions, gather socio-economic data, identify future needs for highways, transit, bicycle and pedestrian facilities and safety improvements.

Recently added federal requirements will also evaluate safety and performance measures and require targets for the following areas: Safety (fatalities and severe injuries), System Performance (reliable travel time), Goods Movement (reliable travel time for trucks), System Preservation (pavement and bridge condition), and Transit Asset Management.

On the next page, there is a diagram of the Goals and Objectives for the 2045 LRTP that address the federally-required goals, objectives and performance measures that will provide a basis for performance-based planning that will best serve the community and the environment currently and for the future.

These goals and objectives will be presented to the MPO's technical advisory, citizen advisory and bicycle pedestrian advisory committees in March before it is reviewed and action taken by the MPO.

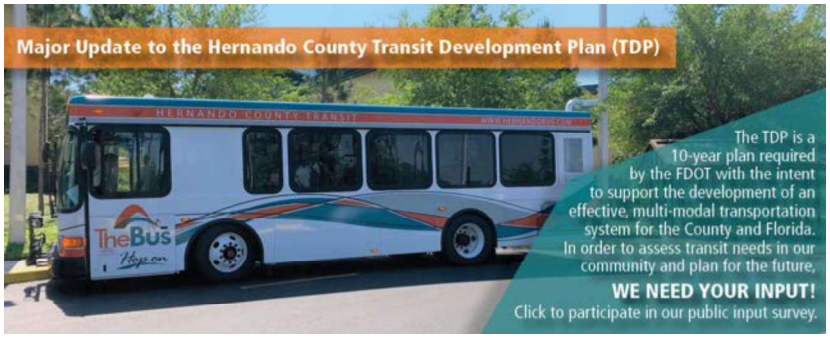
The new 2045 LRTP will be adopted by the MPO in December of 2019.

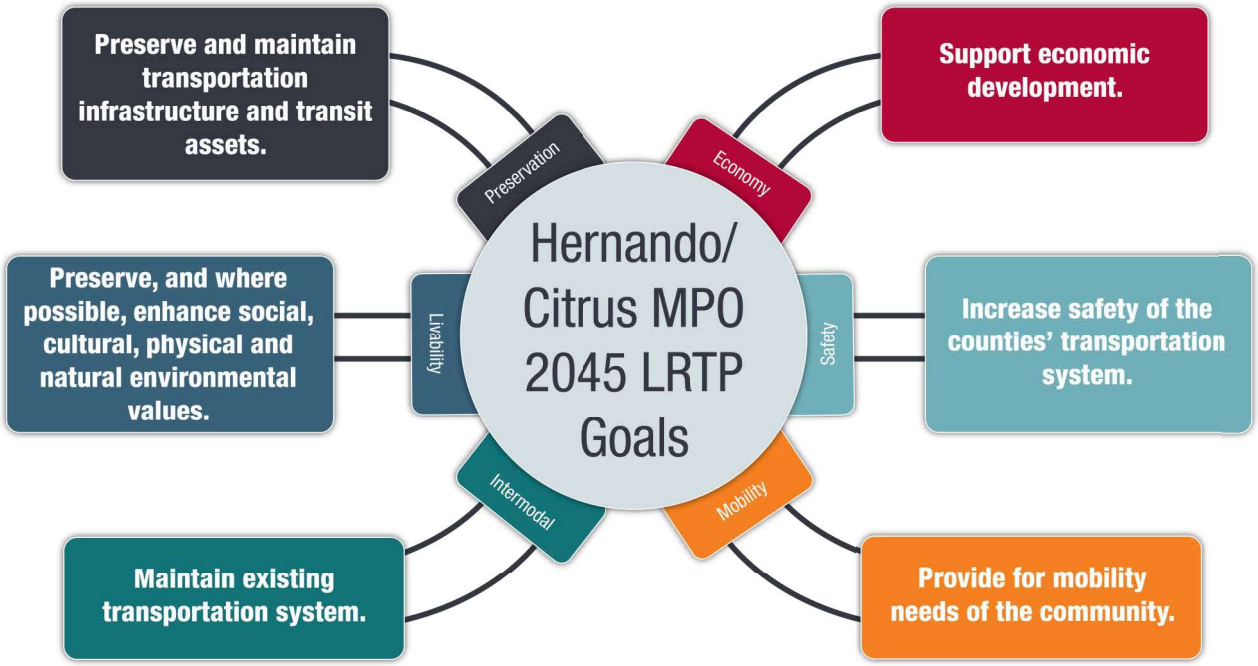
TRANSIT DEVELOPMENT PLAN (TDP) FOR HERNANDO COUNTY

The TDP Major update for Hernando County is underway as the MPO and its Consultant, Tindale Oliver and Associates, Inc., are working with the Hernando County Planning Department and the Transit Agency (TheBus) are developing the plan.

This update is required every five years as part of the overall ten-year plan for the transit system in Hernando county.

This TDP will involve substantial public input to help determine the mobility needs for the County, will evaluate cost and revenue projections, and help to define the community transit goals, objectives and policies. This plan represents the transit agency's vision for public transportation in the service area for the ten-year horizon. The TDP is required to be delivered to FDOT by September 1st.





Hernando/Citrus MPO's 2045 Long Range Transportation Plan Goals, Objectives and Performance Measures

The federal legislation established specific planning factors that call for the recognition and address the relationship between transportation, land use, and economic development. The federal planning factors form the cornerstone for the 2045 LRTP and include:

1) Support the **economic vitality** of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.

2) Increase the **safety** of the transportation system for motorized and non-motorized users.

3) Increase the **security** of the transportation system for motorized and non-motorized users.

4) Increase **accessibility and mobility** of people and freight.

5) Protect and enhance the **environment**, promote energy conservation, improve quality of life, and promote consistency between transportation improvements and state and local growth and economic development patterns.

6) Enhance the **integration and connectivity** of the transportation system, across and between modes, for people and freight.

7) Promote **efficient system management** and operation.

8) Emphasize the **preservation** of the existing transportation system.

9) Improve the **resiliency and reliability** of the transportation system and reduce or mitigate stormwater impacts of surface transportation.

10) Enhance **travel and tourism.**

The Hernando/Citrus MPO is now the official Planning Agency for both the Hernando and Citrus Counties Transportation Disadvantaged Programs.

While each county will still operate separate transit systems, the TD program will continue to integrate its services with the respective transit operations.

Did you know? A regional farebox system to be called "Flamingo" will be instituted in Pinellas, Hillsborough, Pasco and Hernando Counties beginning in late 2019.

This system will allow for a reloadable Smartcard and a phone application as well.

For more information, please visit:

www.hernandobus.com or www.citruscountytransit.com

WE NEED YOU

The MPO has current agency and citizen vacancies on its committees:

Please go to the MPO's website at:

http://www.hernandocounty.us/hernandocitrusmpo to obtain an application.

The **LRTP** and the **TDP** updates will be among items discussed at our upcoming meetings:

TAC: 3/7/19, 5/8/19 - 10:00

CAC: 3/7/19, 5/8/19 - 1:00

BPAC: 3/7/19, 5/8/19 - 3:30

TDLCB: 5/22/19 - 10:00 Hernando

MPO: 3/19/19, 5/15/19 - 1:00

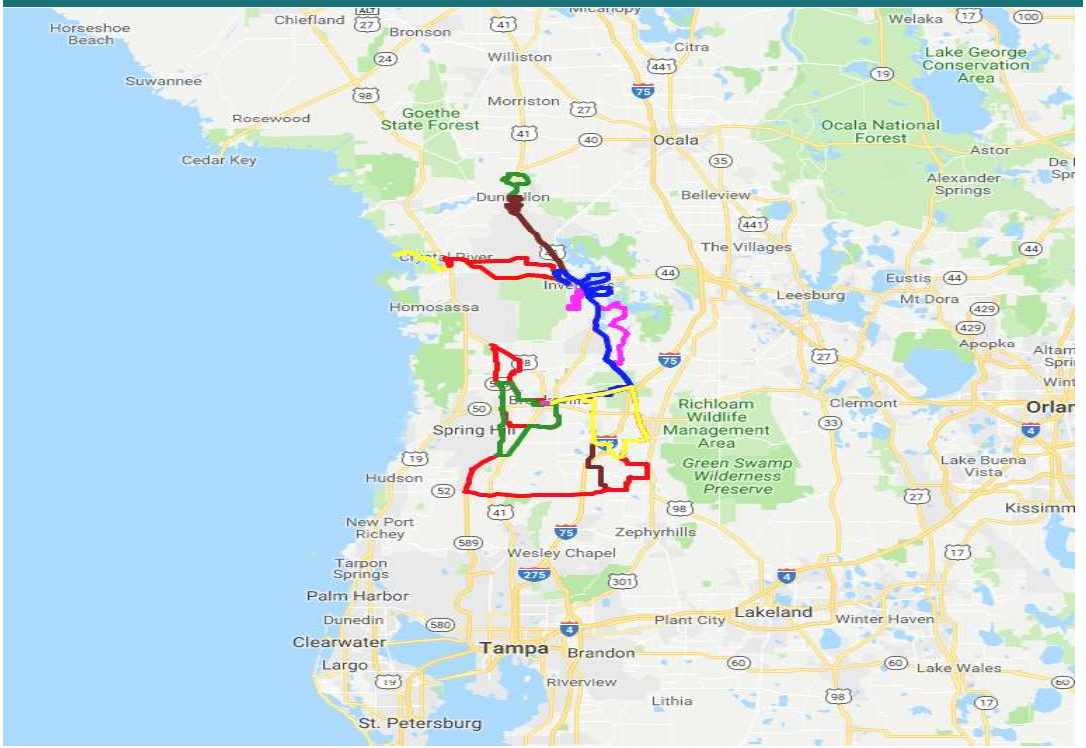
LCB: 5/23/19 - 10:30 Citrus

For more detail, please go to: http://www.hernandocounty.us/hernandocitrusmpo

Bike Florida 25th Anniversary Spring Tour

March 29-April 3

Brooksville & Inverness



More Bike news:

The Hernando and Citrus Counties bicycle maps can still be found at local bike shops and online at:

For Hernando: https://floridasadventure-coast.com/bike-trails-brochure-map/

For Citrus: http://www.tampabayrideshare.org/CitrusCounty-BikingMap.pdf

Bike Florida will be rolling into Brooksville and Inverness in March this year to mark their Silver Anniversary. You can still register for this years event, go to: https://bikeflorida.org/ but after March 28th, you are not guaranteed a t-shirt or a goody bag, so register now!.

While this event is noteworthy by itself, it also will be the last time that Bike Florida puts on its week-long tours. Moving forward, Bike Florida plans to hold mini-tours of 2-3 days at locations around the state. This is more in keeping with the Bike Florida mission "to help Florida communities improve their economic growth, bicycle infrastructure, and safety through bicycle tourism." So come on out and put some miles on your bike. and some smiles on your face.

MPO Documents on the Web

Visit the MPO's website at - http://www.hernandocounty.us/hernandocitrusmpo and check out the following documents under "Programs & Plans."

NEW

- **Unified Planning Work Program (UPWP)** - https://www.hernandocounty.us/departments/departments-f-m/metropolitan-planning-organization/programs-and-plans/unified-planning-work-program-upwp-documents
- **Transportation Improvement Program (TIP)** - https://www.hernandocounty.us/departments/departments-f-m/metropolitan-planning-organization/programs-and-plans/transportation-improvement-tip-documents
- **2040 Long Range Transportation Plan (LRTP)** - https://www.hernandocounty.us/departments/departments-f-m/metropolitan-planning-organization/programs-and-plans/long-range-transportation-plan-lrtp-documents

What are your opinions about transportation in the Hernando/Citrus area?

- Write us at Hernando/Citrus MPO, 1661 Blaise Dr., Brooksville, FL 34601; or let us know by email at mpo@hernandoccitrusmpo.us; or call the MPO office at (352) 754-4082.

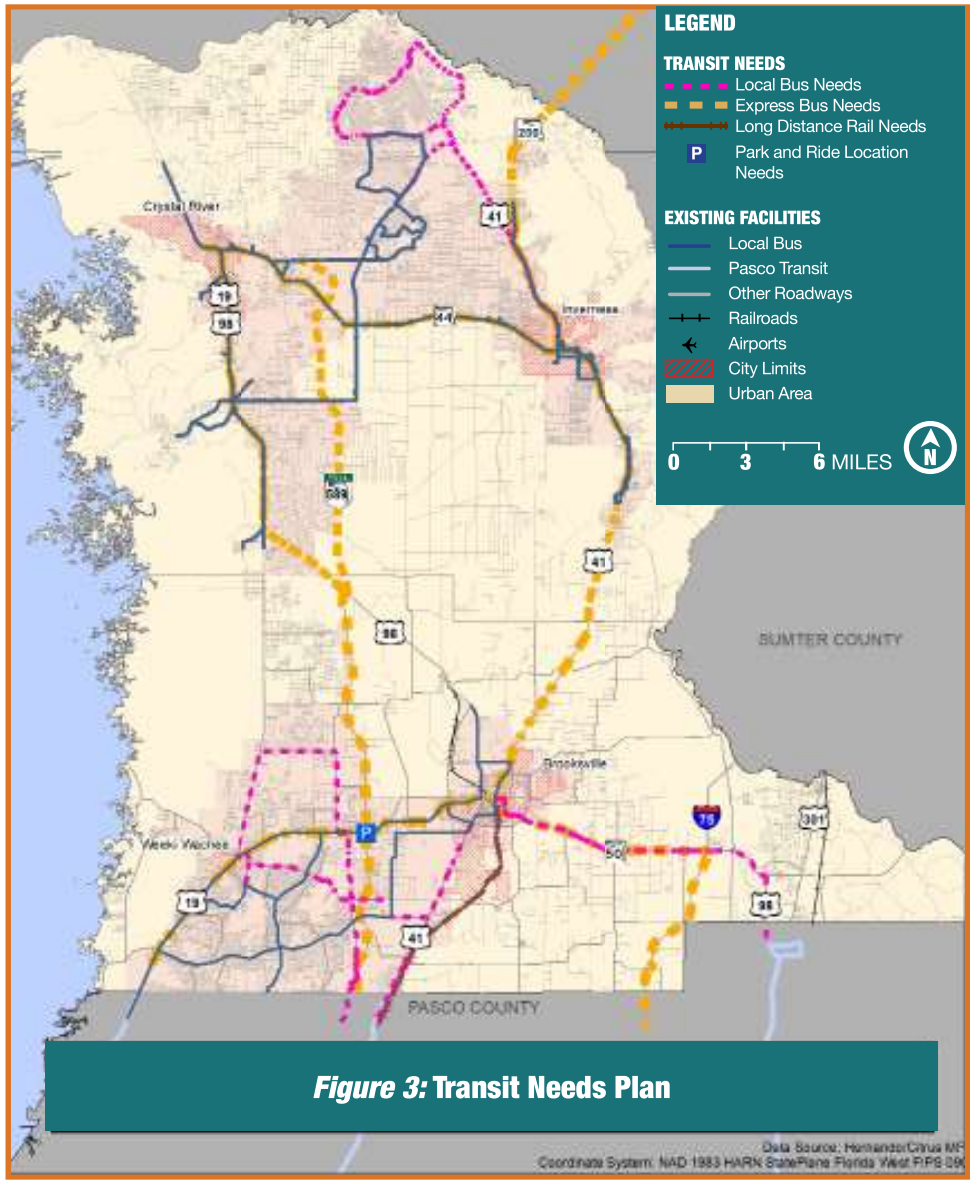


Figure 3: **Transit Needs Plan**

2045 Hernando/Citrus MPO TRANSPORTATION PLAN

HERNANDO/CITRUS METROPOLITAN PLANNING ORGANIZATION

WORKSHOPS

Hernando County

April 16, 2019
3:30 pm - 5:30 pm
Spring Hill Library,
9220 Spring Hill Drive, Spring Hill, FL

Citrus County

April 24, 2019
3:30 pm - 5:30 pm
City of Inverness City Hall
212 W. Main Street, Inverness, FL

Guiding Principles

The MPO has developed a series of goals, objectives, and performance targets to guide the development of the Plan and measure success. The figure below describes the Plan's goals.

Schedule

- **Spring 2019**
  Needs Assessment
  Initial Public Outreach
- **Summer 2019**
  Cost Feasible Plan
  Public Workshops
- **Fall 2019**
  Finalize Plan
  Public Hearing
- **November 2019**
  Plan Adoption

Stay Connected

For additional information, please visit the Hernando/Citrus MPO website at
www.HernandoCitrusMPO.us

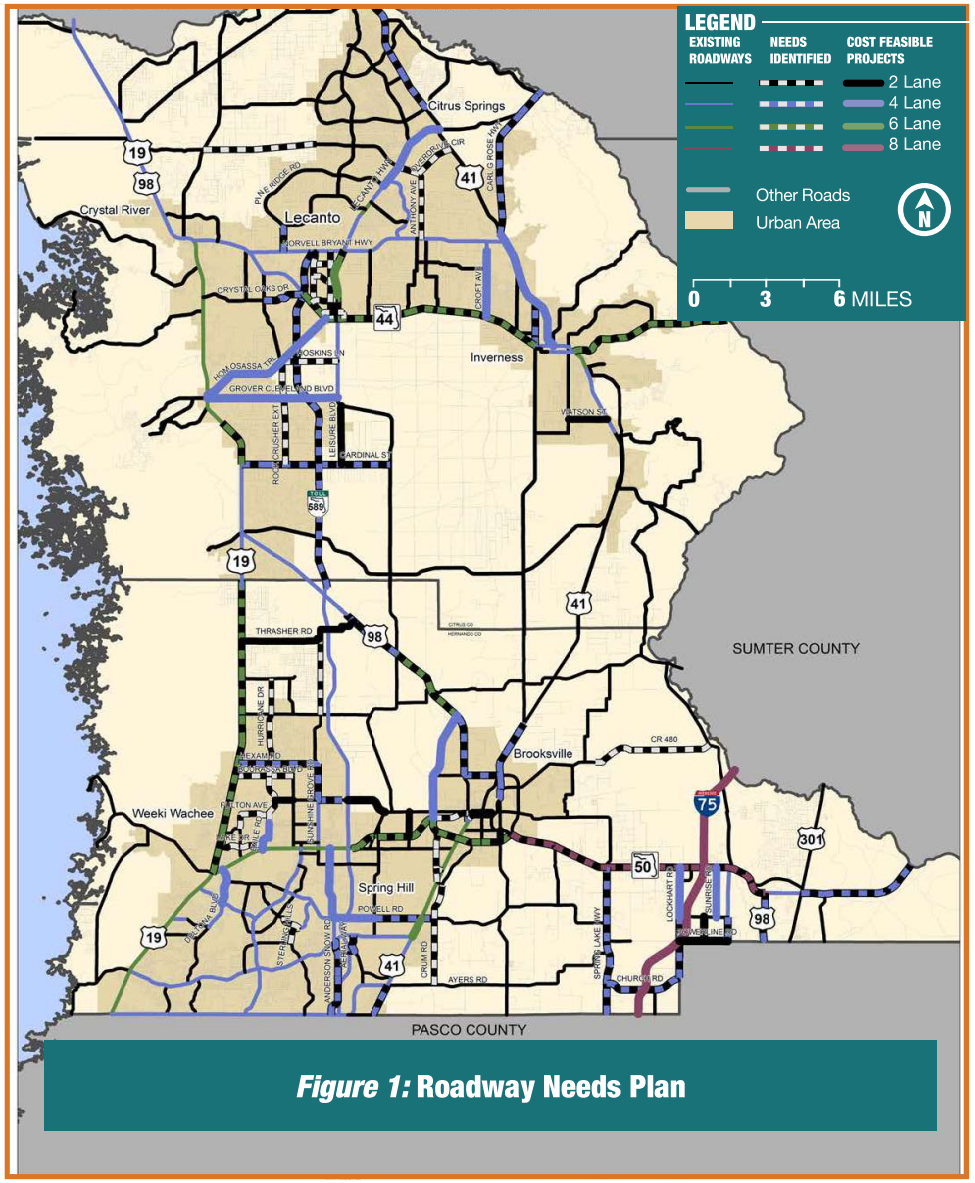


Figure 1: **Roadway Needs Plan**

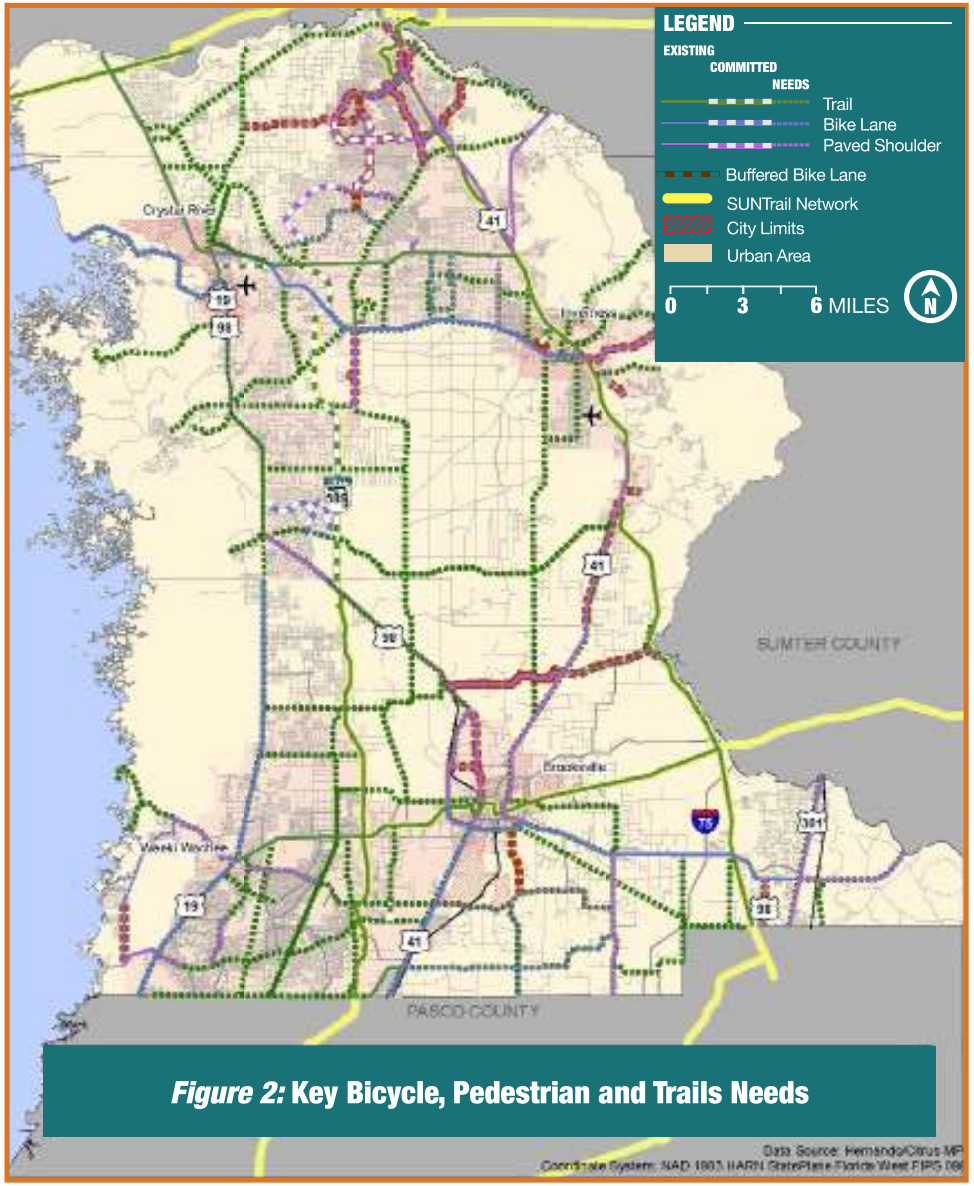


Figure 2: **Key Bicycle, Pedestrian and Trails Needs**

What improvements are needed that are ***NOT CURRENTLY INCLUDED*** in the plan?

1. _____
2. _____
3. _____

Looking at Figures 1-3, what should be the ***3 HIGHEST PRIORITY*** projects?

1. _____
2. _____
3. _____

PLEASE PROVIDE ADDITIONAL COMMENTS:

_____

CONTACT

Name: _____ **E-mail:** _____

Phone: *(OPTIONAL)* _____

Organization: _____ **Address:** *(OPTIONAL)* _____

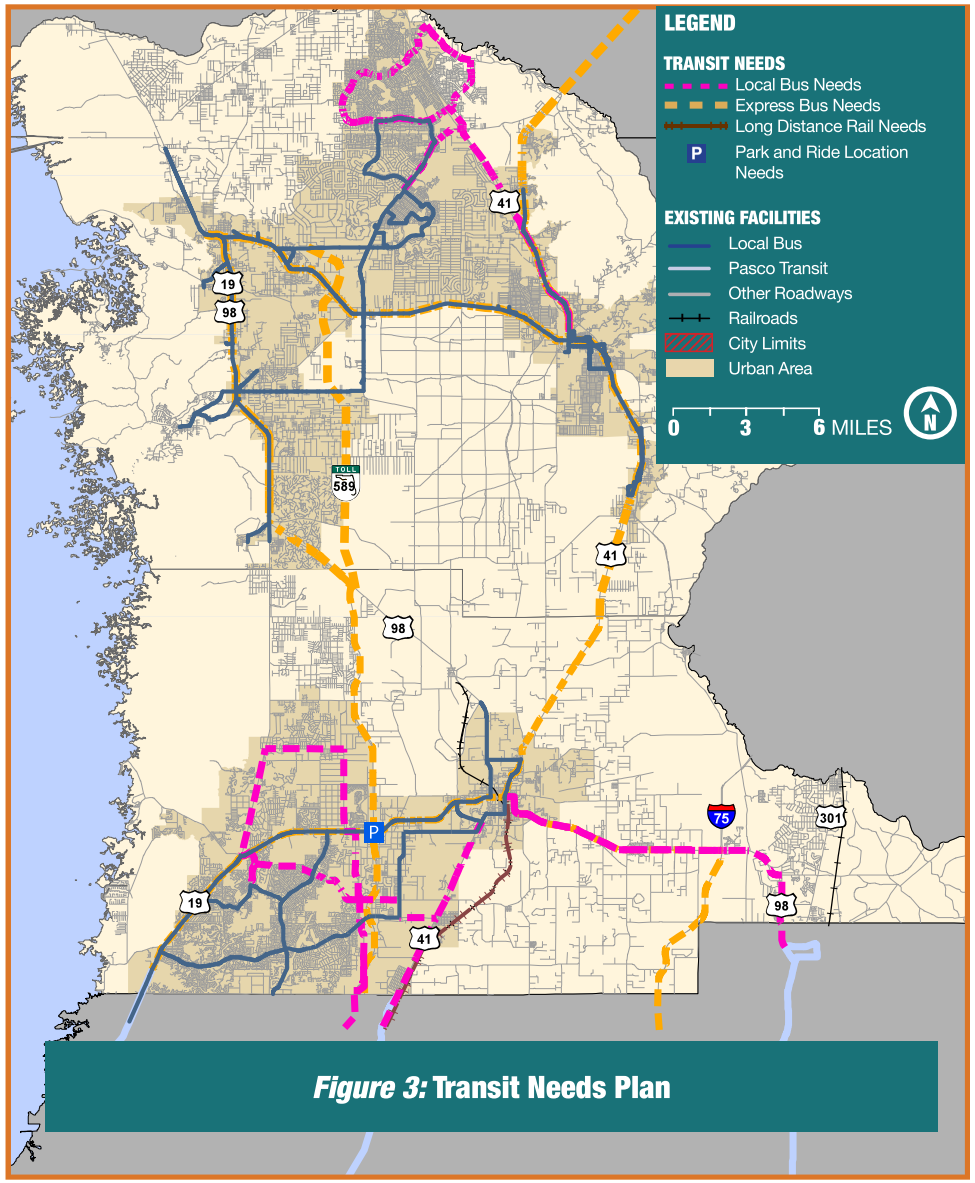


Figure 3: **Transit Needs Plan**

2045 Hernando/Citrus MPO TRANSPORTATION PLAN

HERNANDO/CITRUS METROPOLITAN PLANNING ORGANIZATION

ENVIRONMENTAL JUSTICE WORKSHOPS

Citrus County
April 24, 2019
10:00 am - 12:00 pm
Inverness City Hall,
212 W. Main Street, Inverness, FL

Hernando County
May 2, 2019
3:30 pm - 5:30 pm
Hernando Building Training Facility
1661 Blaise Drive, Brooksville, FL

Guiding Principals

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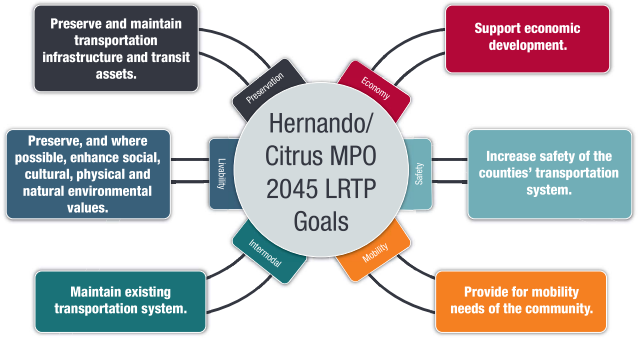

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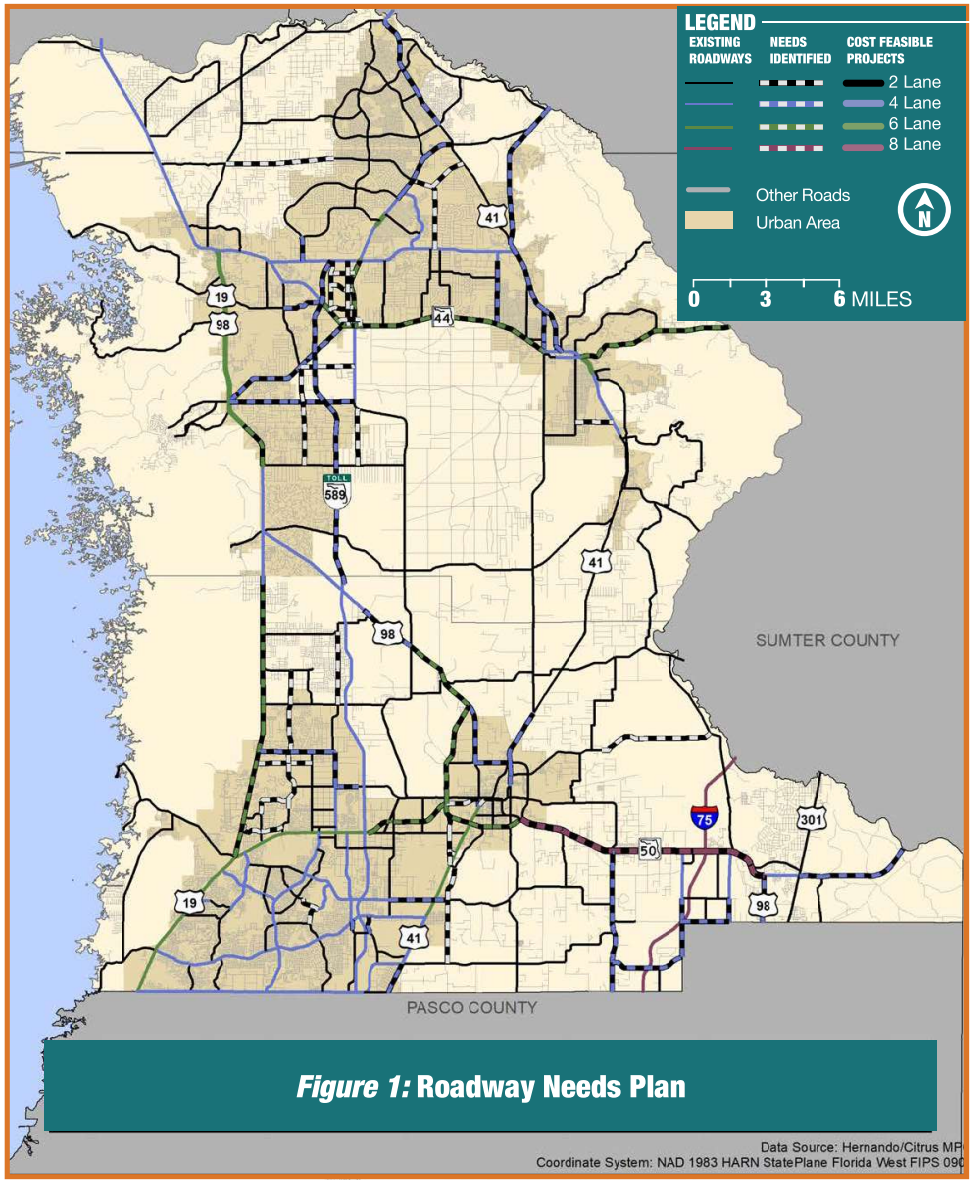


Figure 1: **Roadway Needs Plan**

Data Source: Hernando/Citrus MP
Coordinate System: NAD 1983 HARN StatePlane Florida West FIPS 090

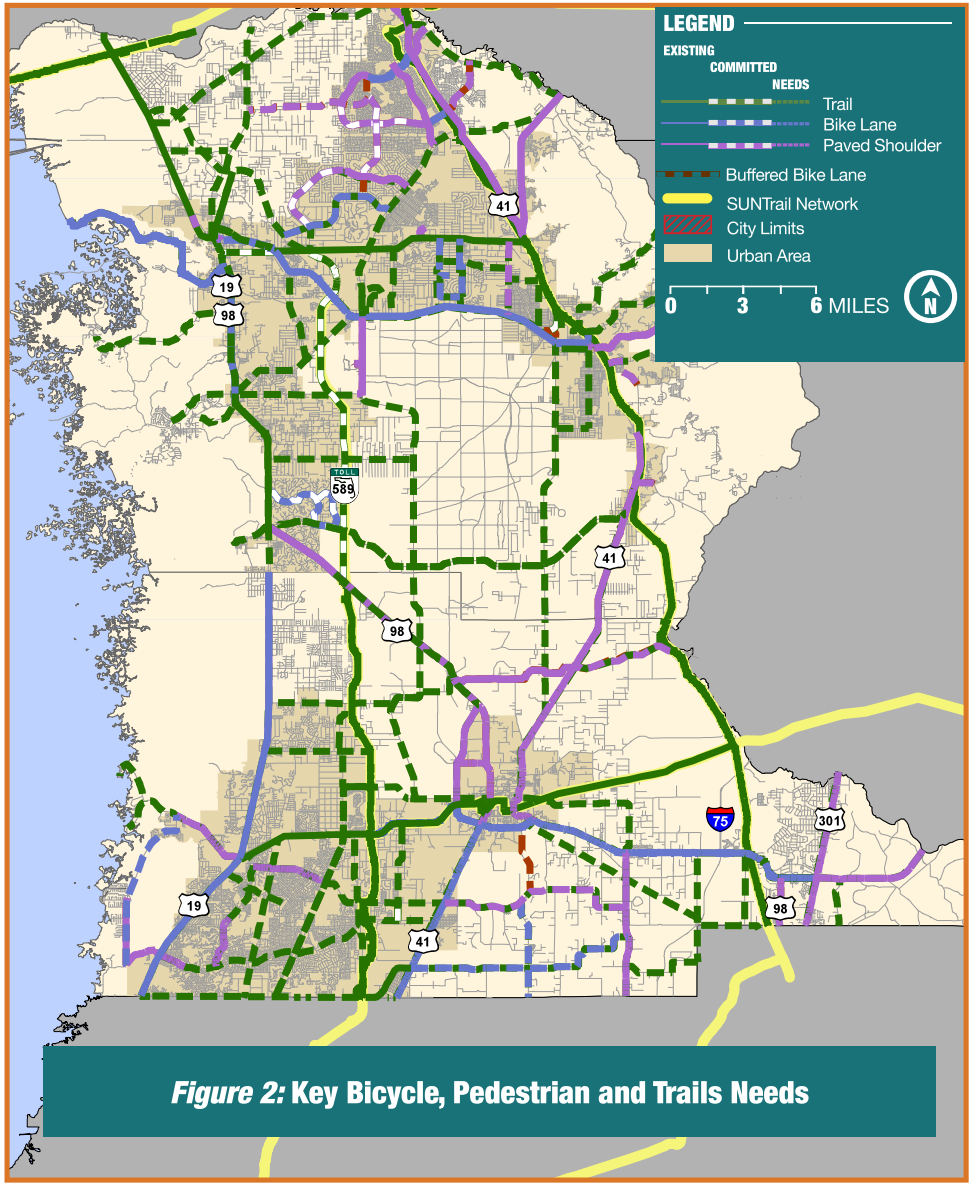


Figure 2: **Key Bicycle, Pedestrian and Trails Needs**

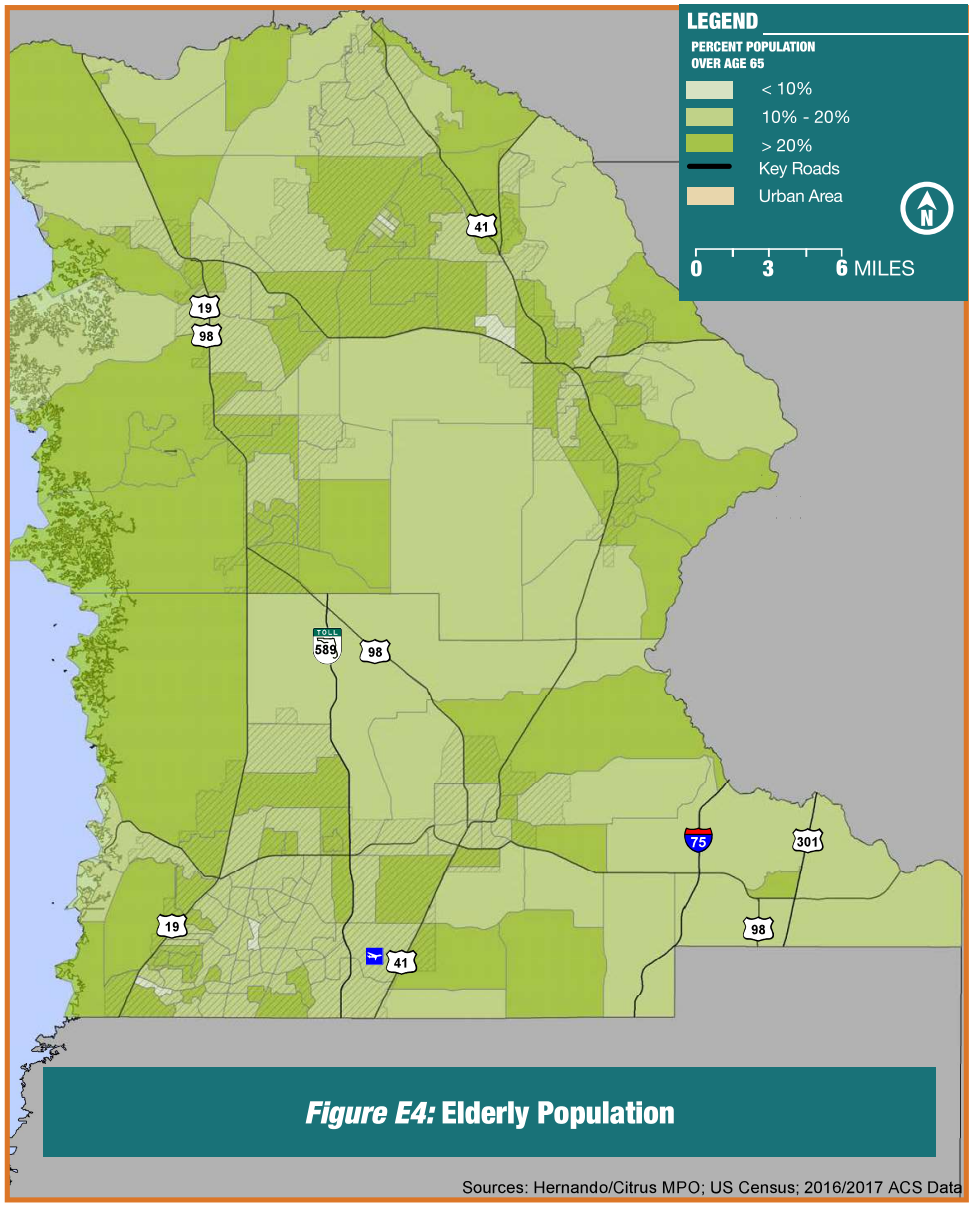


Figure E4: **Elderly Population**

Sources: Hernando/Citrus MPO; US Census; 2016/2017 ACS Data

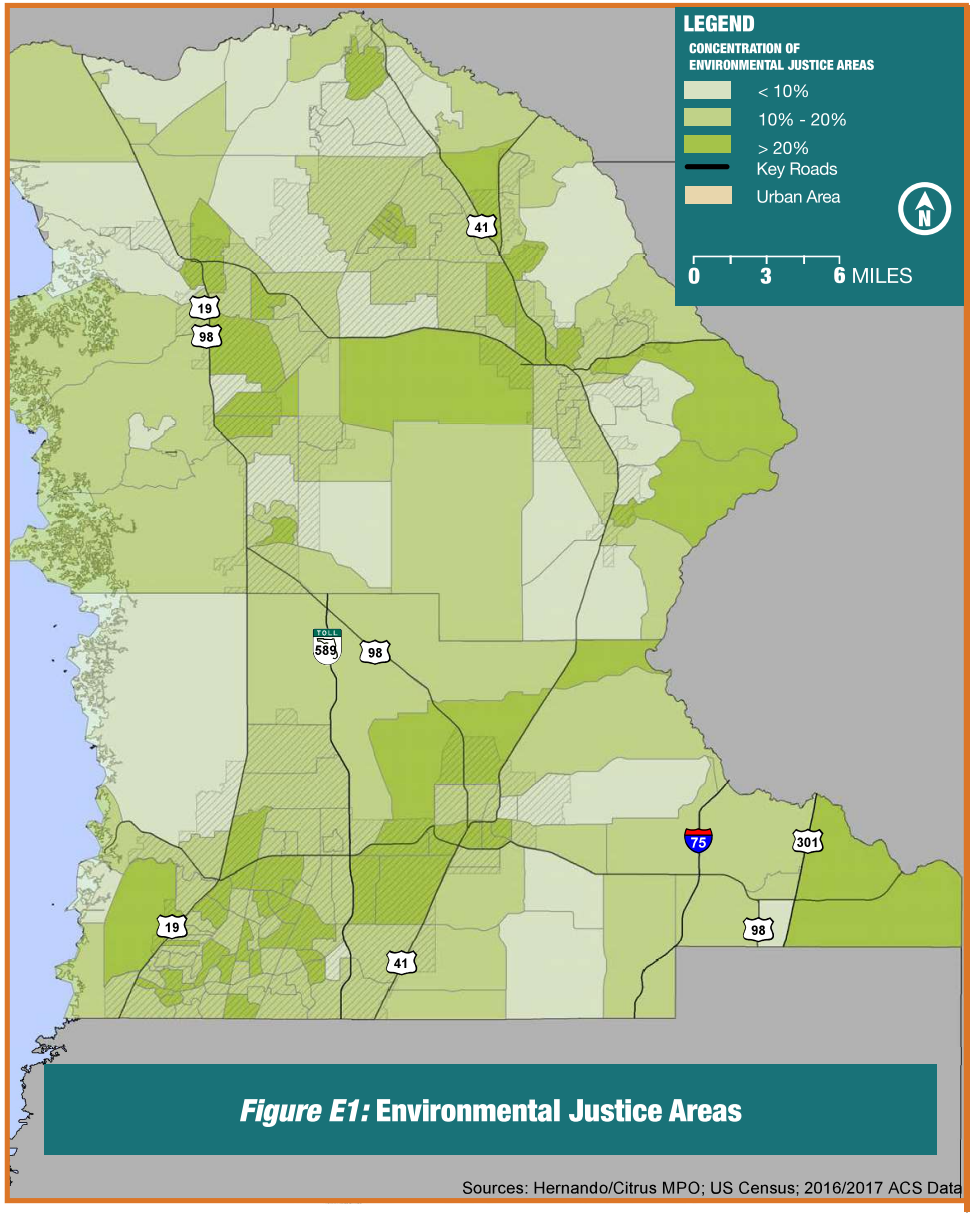


Figure E1: **Environmental Justice Areas**

Sources: Hernando/Citrus MPO; US Census; 2016/2017 ACS Data

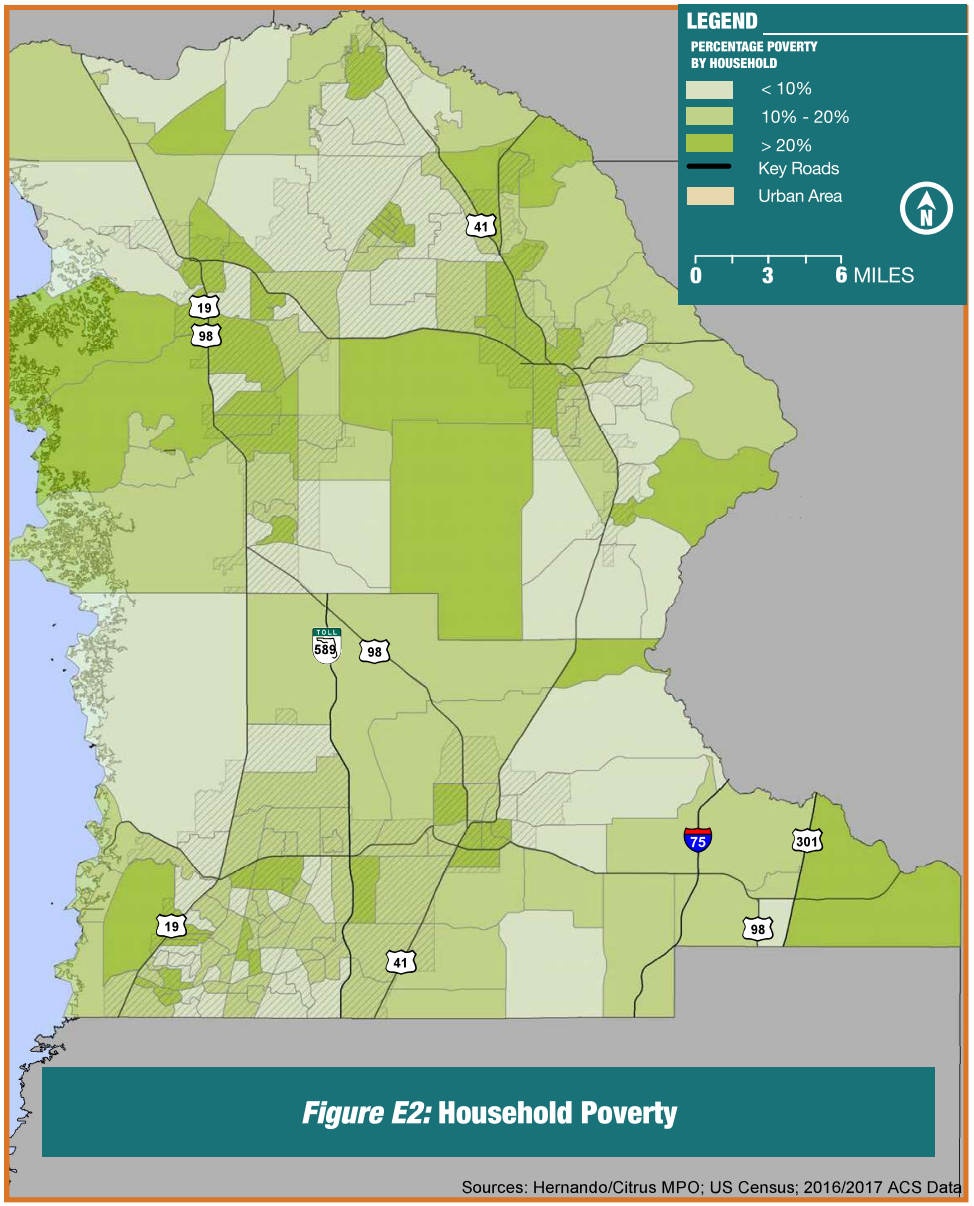


Figure E2: **Household Poverty**

Sources: Hernando/Citrus MPO; US Census; 2016/2017 ACS Data

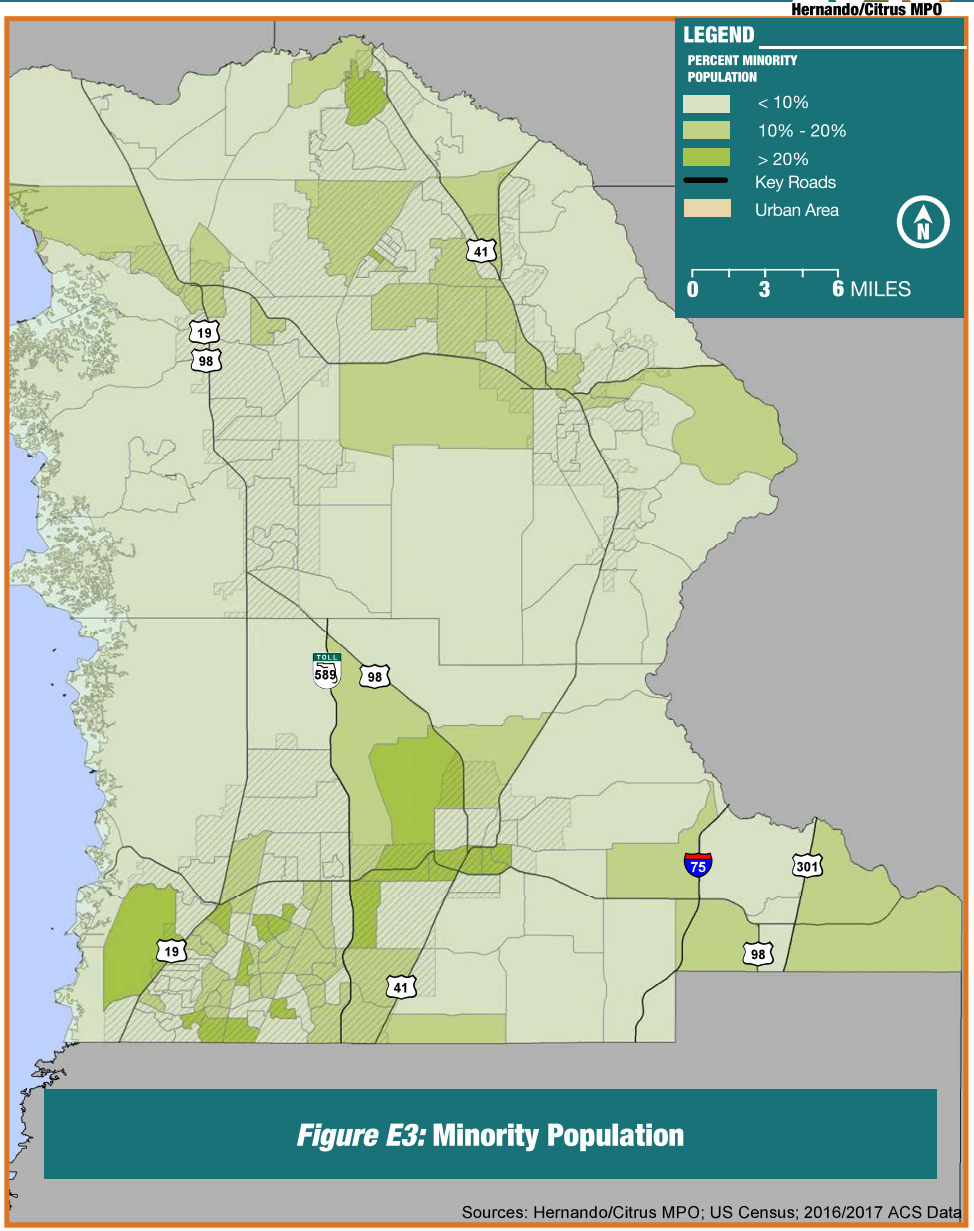


Figure E3: **Minority Population**

Sources: Hernando/Citrus MPO; US Census; 2016/2017 ACS Data

What improvements would you consider to have ***POSITIVE IMPACTS?***

Are any projects especially positive?

What improvements would you consider to have ***NEGATIVE IMPACTS?***

Are any projects especially negative?

What improvements are needed that are ***NOT CURRENTLY INCLUDED*** in the plan? (Figures 1-3)

Are there any improvements that are not included that would have a significant positive impact?

Who else should be contacted for ***IDENTIFYING EJ ISSUES?***

PLEASE PROVIDE ADDITIONAL COMMENTS:

CONTACT

Name: _____ **E-mail:** _____

Phone: *(OPTIONAL)* _____

Organization: _____ **Address:** *(OPTIONAL)* _____

HERNANDO/CITRUS METROPOLITAN PLANNING ORGANIZATION

2045 Hernando Citrus MPO TRANSPORTATION PLAN

Agenda

Consensus Building Workshop on Future Transportation Issues

WEDNESDAY, MAY 29, 2019
1:00 p.m. to 4:00 p.m.
Hernando County Utilities Building – Training Room
15365 Cortez Blvd., Brooksville, FL 34613

Objectives

1) Provide educational information on the LRTP process
2) Identify transportation priorities
3) Identify preferred implementation actions

Agenda

1) Introductions
2) Presentation
3) Rules and Directions
4) Breakout Group Exercises
   - Exercise 1: Roadway Priorities
   - Exercise 2: Public Transportation Priorities
   - Exercise 3: Bicycle/Pedestrian & Trails Priorities
   - Exercise 4: Implementation Actions
6) Present Group Consensus
7) Next Steps
8) Adjourn

The Transportation Plan

Who?

Hernando/Citrus Metropolitan Planning Organization (MPO) is a local agency, formed by federal mandate. The MPO provides a cooperative and comprehensive transportation planning process.

What?

The Long Range Transportation Plan (LRTP) is developed to provide guidance for transportation system improvements throughout Hernando and Citrus counties for the next *25 years.*

Why?

The Plan provides consistency with state and local plans, allowing for coordination between the counties, the region and beyond.

When?

Adopting an updated plan every five years is required in order to continue receiving federal funding. *The 2045 LRTP is anticipated to be adopted by the MPO Board November 2019.*

Workshop Rules and Etiquette

Consensus-Building Workshops involve extensive interaction and discussion with your group members. Each member will likely hear some opinions on topics that he or she disagrees with. As such, it is important that we all follow a set of basic ground rules. These rules are designed to make your consensus-building workshop experience smooth and productive.

Below are the rules:

- Each small group should **elect a leader**;
- Each topic should be discussed so that all participants have at least a **general understanding** of the topic;
- Each small group should **designate someone to write down** and/or summarize comments from all participants;
- Each participant must be **allowed to express an opinion** without interruption;
- If necessary, **limit the amount of time** each participant has to express an opinion;
- Identify and **agree on elements and concepts that are not in dispute**;
- If consensus cannot be reached on a particular topic, **try to compromise**. If you cannot agree, **take a vote** and agree that the majority rules. Remember, you cannot all agree on every topic all the time;
- If you have problems or questions, please **ask a Facilitator** to assist in answering the question or resolving the problem.

Schedule

Spring 2019
Needs Assessment
Initial Public Outreach

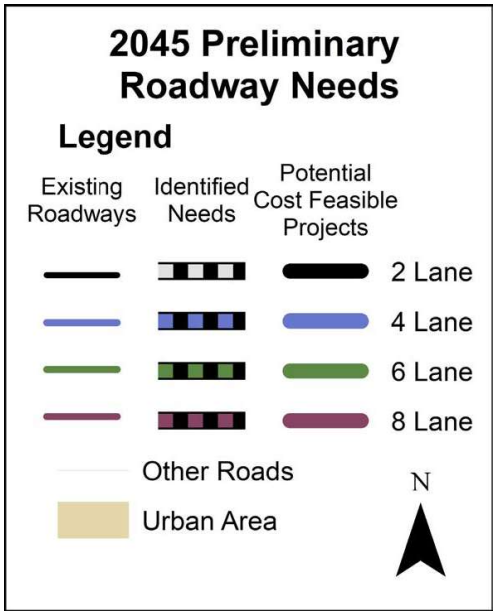
Summer 2019
Cost Feasible Plan
Public Workshops

Fall 2019
Finalize Plan
Public Hearing

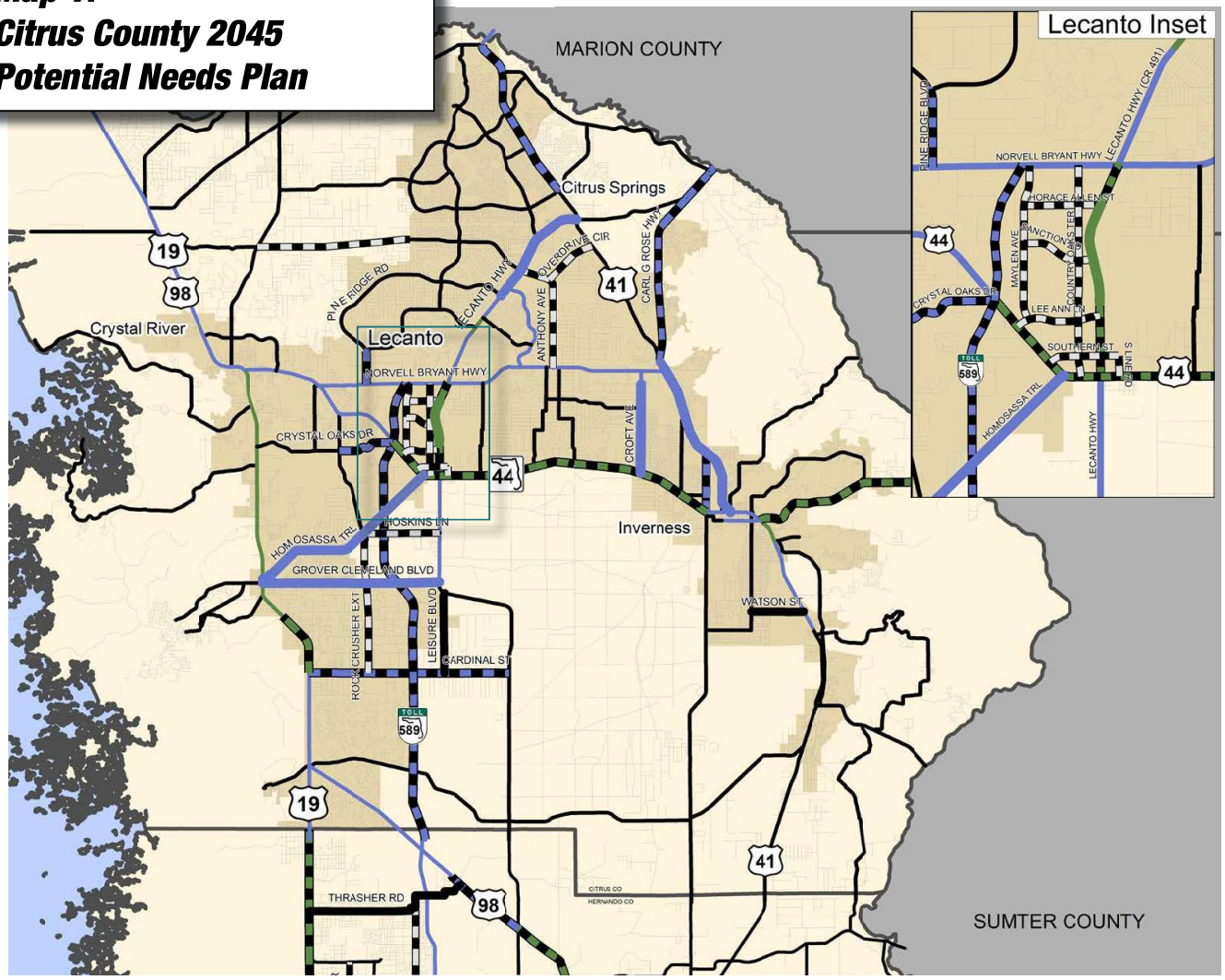
November 2019
Plan Adoption

This map of ***ROADWAY NEEDS*** illustrates all potential needs without regard to funding.

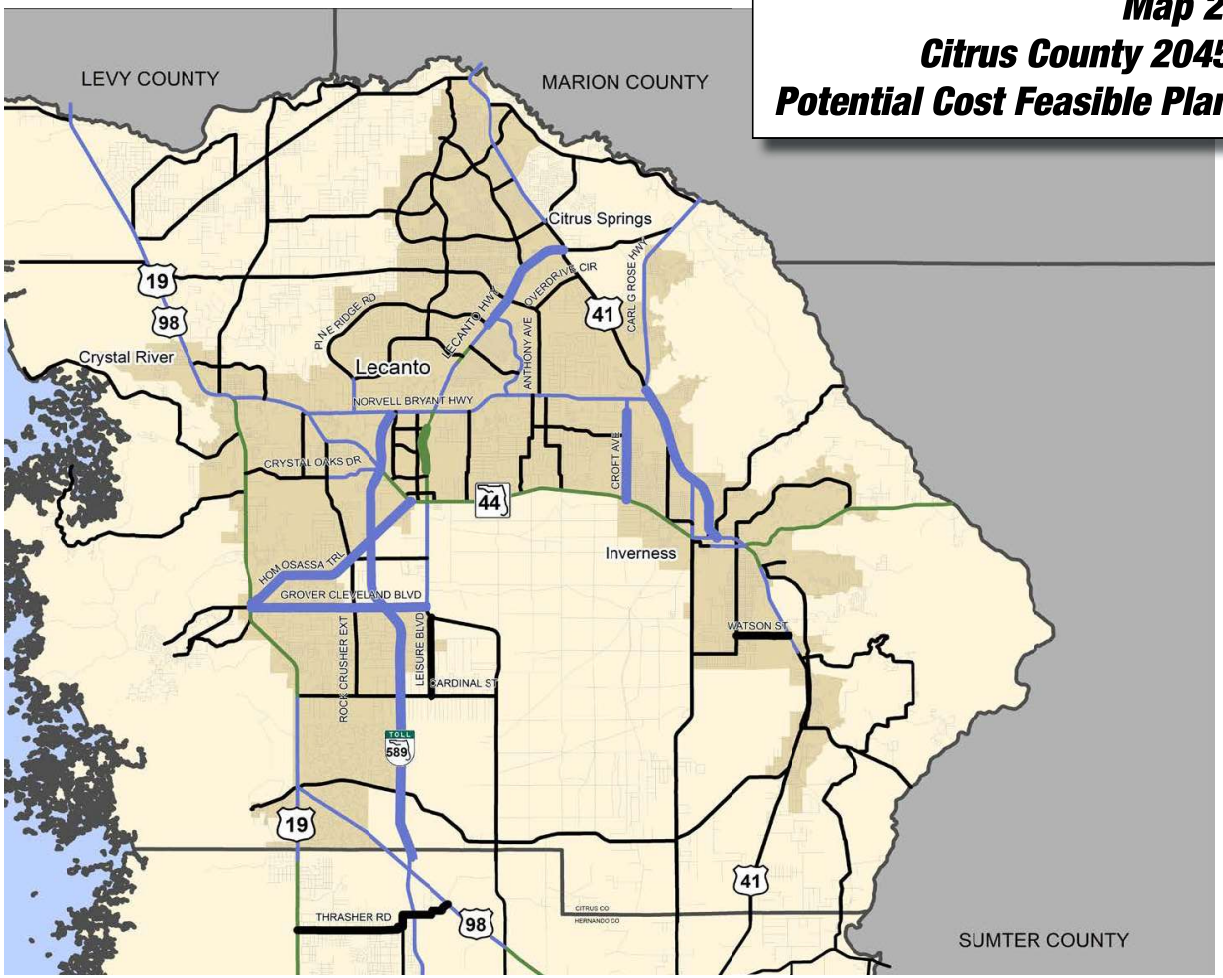
The map on Page 3 (opposite) shows the Cost Feasible improvements, which are those projects likely to receive funding to move forward.



Map 1:
Citrus County 2045 Potential Needs Plan



Map 2: Citrus County 2045 Potential Cost Feasible Plan



Question 1:
Do you agree that the improvements identified in ***Map 1 (above)*** are needed ***ROADWAY IMPROVEMENTS*** in Citrus County?

YES **NO**

Question 2:
Do you agree that the improvements indicated with bold segments in ***Map 2 (left)*** are the top priority ***ROADWAY IMPROVEMENTS*** to be funded in Citrus County?

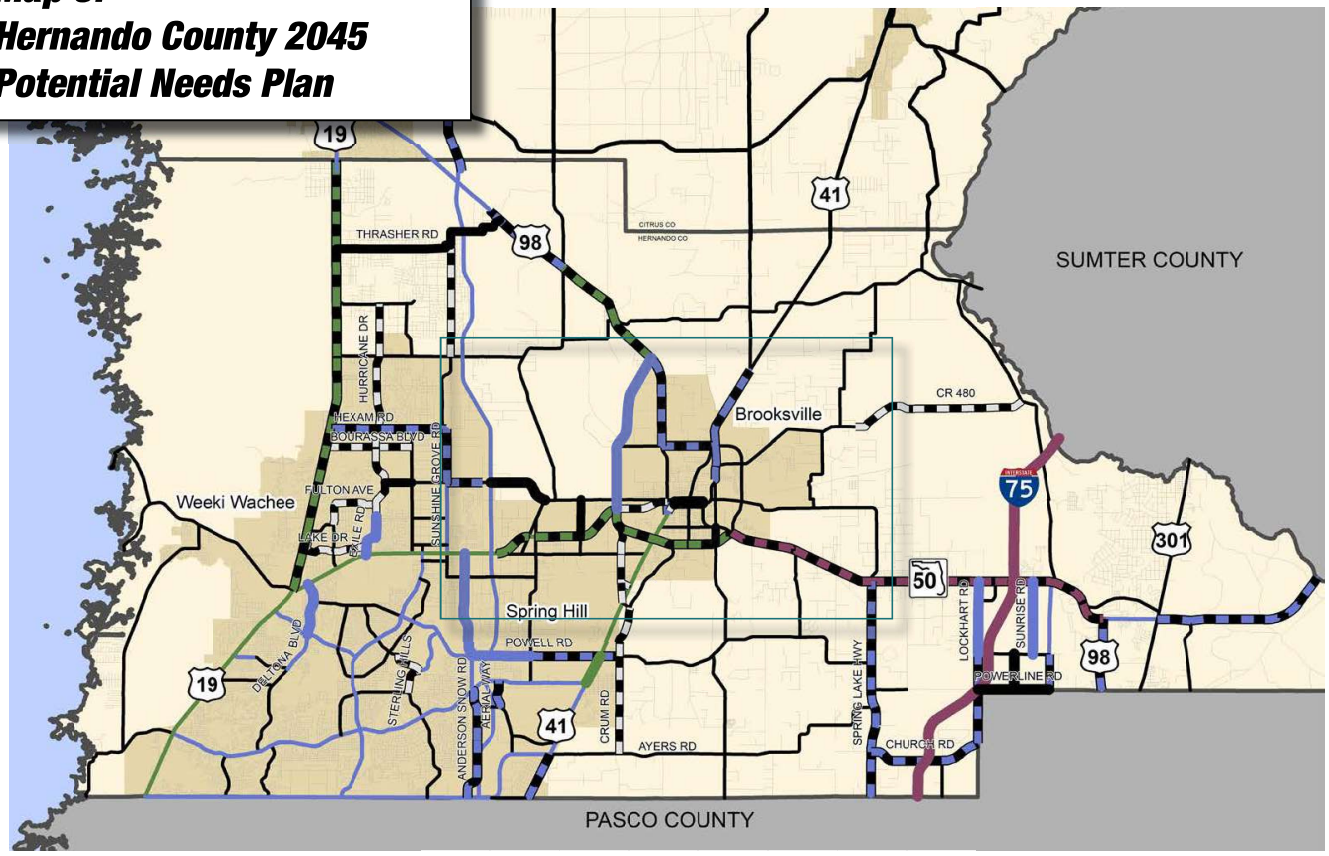
YES **NO**

Are there any improvements that should be added, removed, or modified? Please show this on the map here and/or describe below.

This map of ***ROADWAY NEEDS*** illustrates all potential needs without regard to funding.

The map on Page 5 (opposite) shows the Cost Feasible improvements, which are those projects likely to receive funding to move forward.

Map 3: Hernando County 2045 Potential Needs Plan



Legend

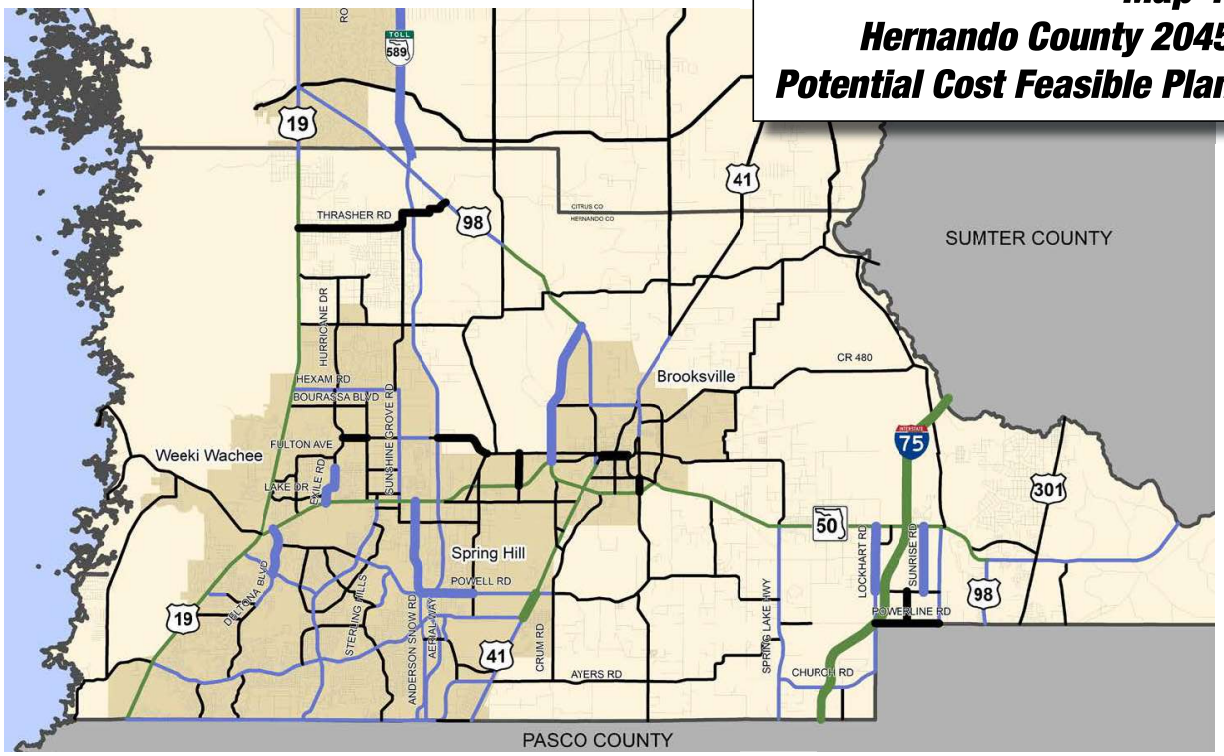
Existing Roadways	Identified Needs	Potential Cost Feasible Projects	
			2 Lane
			4 Lane
			6 Lane
			8 Lane

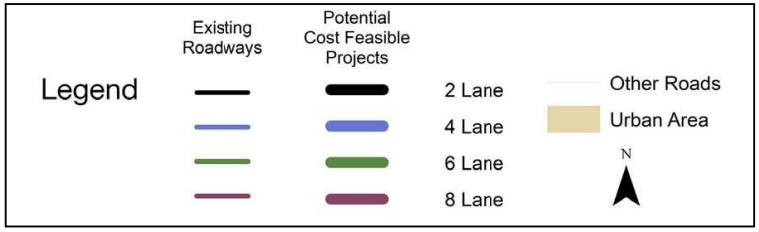
Other Roads

Urban Area

N

Map 4: Hernando County 2045 Potential Cost Feasible Plan





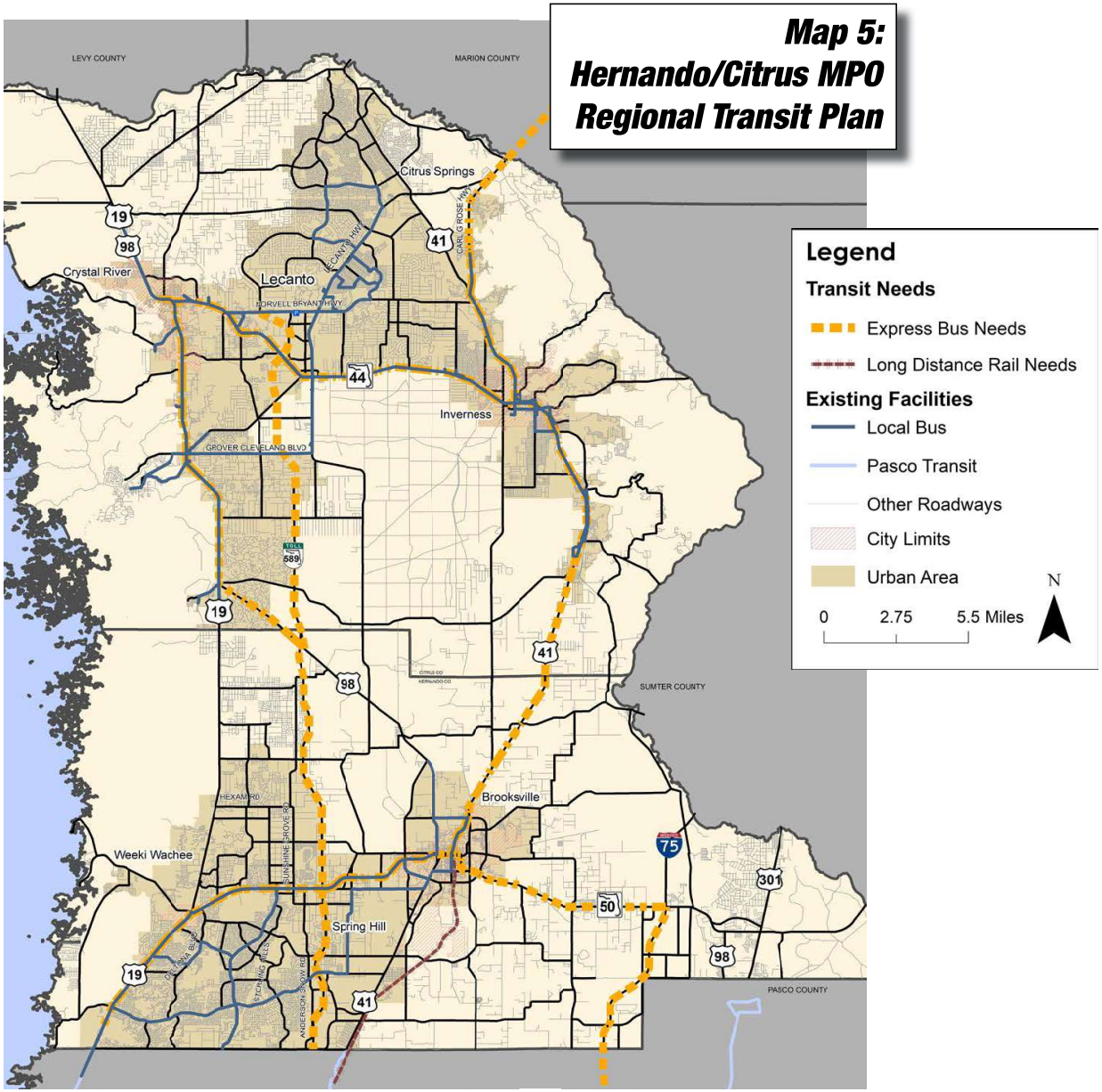
Question 3:
Do you agree that the improvements identified in ***Map 3 (above)*** are needed ***ROADWAY IMPROVEMENTS*** in Hernando County?

YES **NO**

Question 4:
Do you agree that the improvements indicated with bold segments in ***Map 4 (left)*** are the top priority ***ROADWAY IMPROVEMENTS*** to be funded in Hernando County?

YES **NO**

Are there any improvements that should be added, removed, or modified? Please show this on the map here and/or describe below.

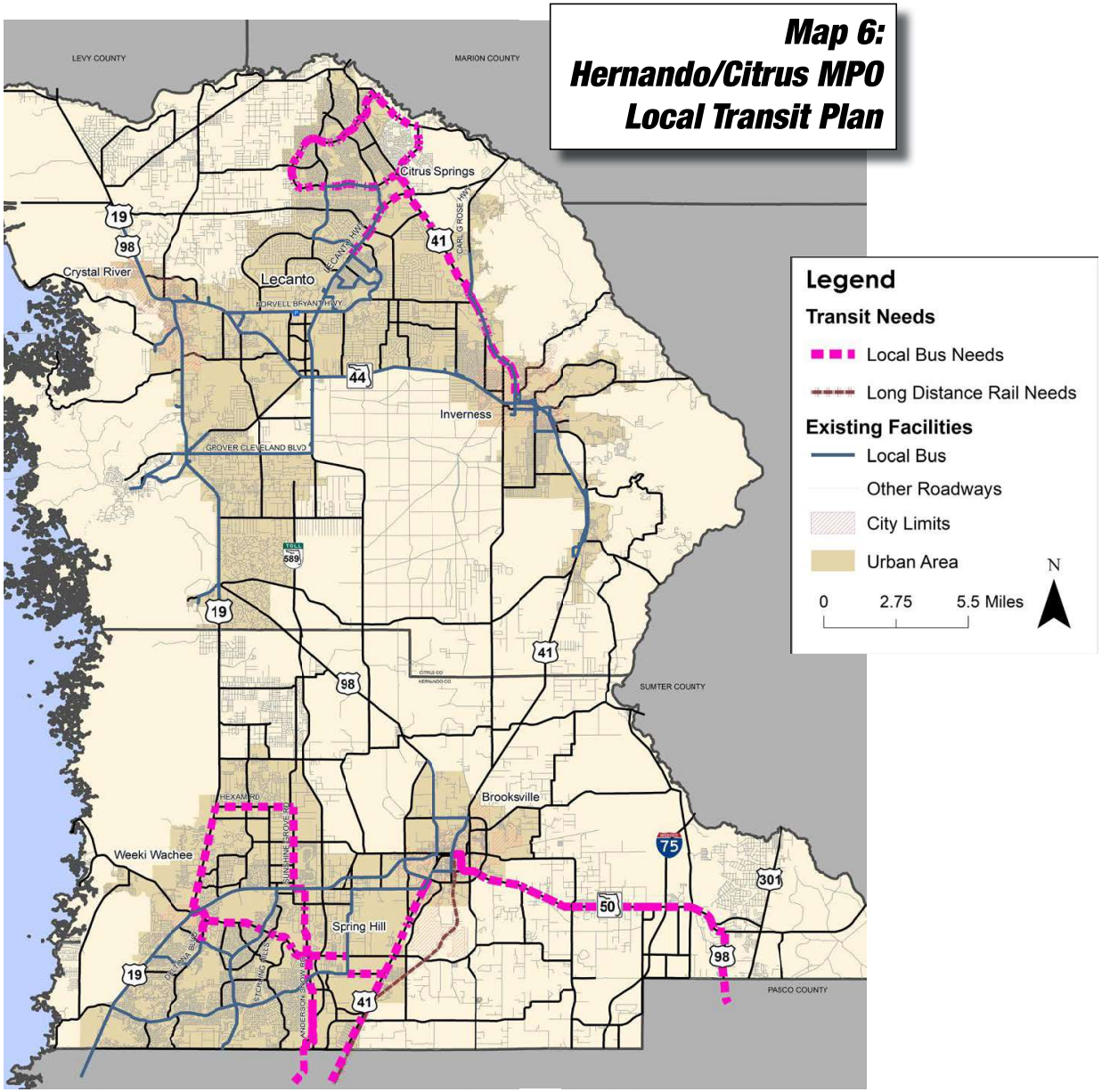


Question 5:

Do you agree that the routes indicated in the map to the left are the highest priority needed ***REGIONAL TRANSIT*** routes?

YES **NO**

What changes would you make? Please show this on the map and/or describe below.



Map 6: Hernando/Citrus MPO Local Transit Plan

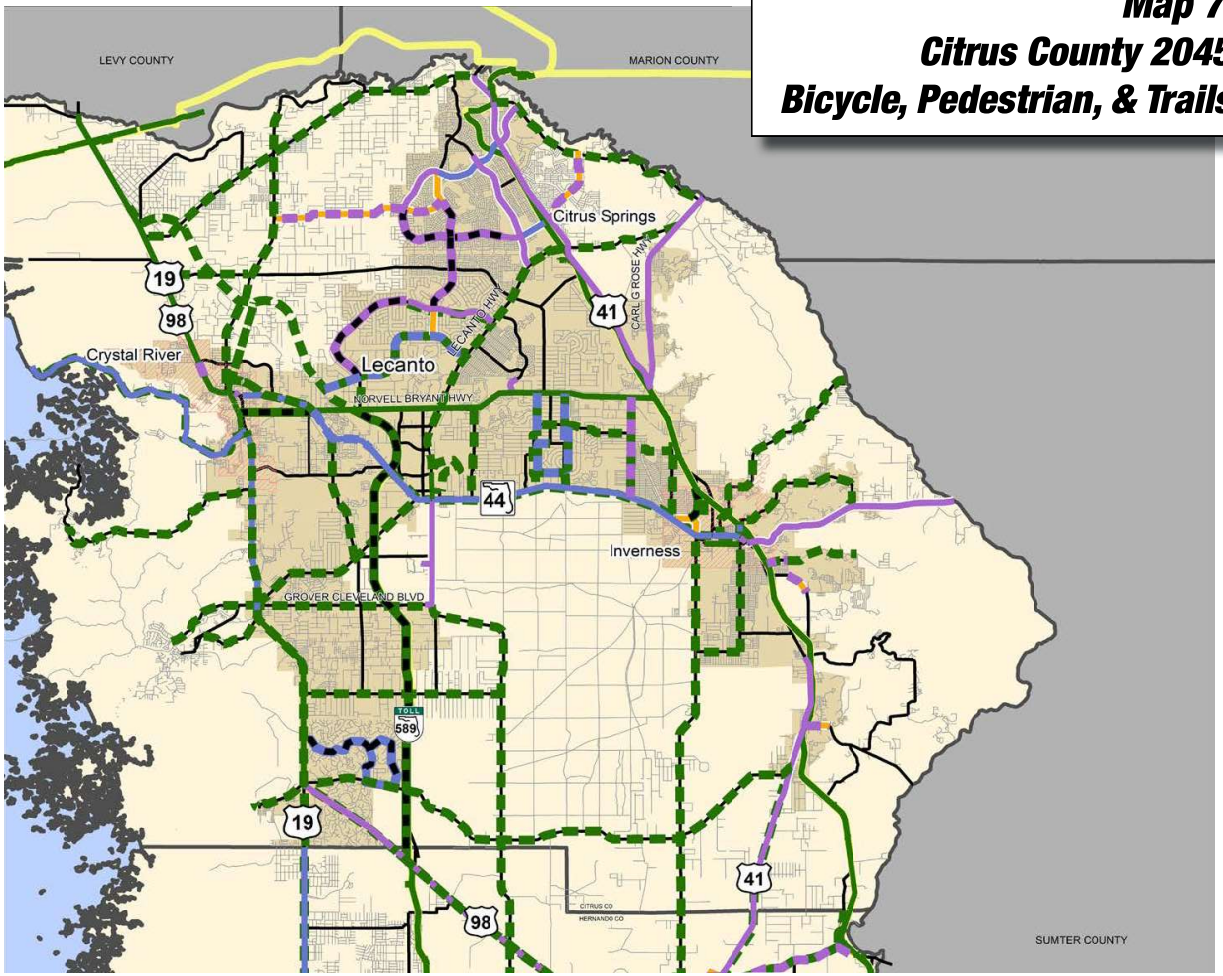
Question 6:

Do you agree that the routes indicated in the map to the left are the highest priority needed ***LOCAL TRANSIT*** routes?

YES **NO**

What changes would you make? Please show this on the map and/or describe below.

Map 7: Citrus County 2045 Bicycle, Pedestrian, & Trails



Legend

Existing Committed Needs

- Trail
- Bike Lane
- Paved Shoulder
- Buffered Bike Lane
- SUNTrail Network
- City Limits
- Urban Area
- N

Question 7:

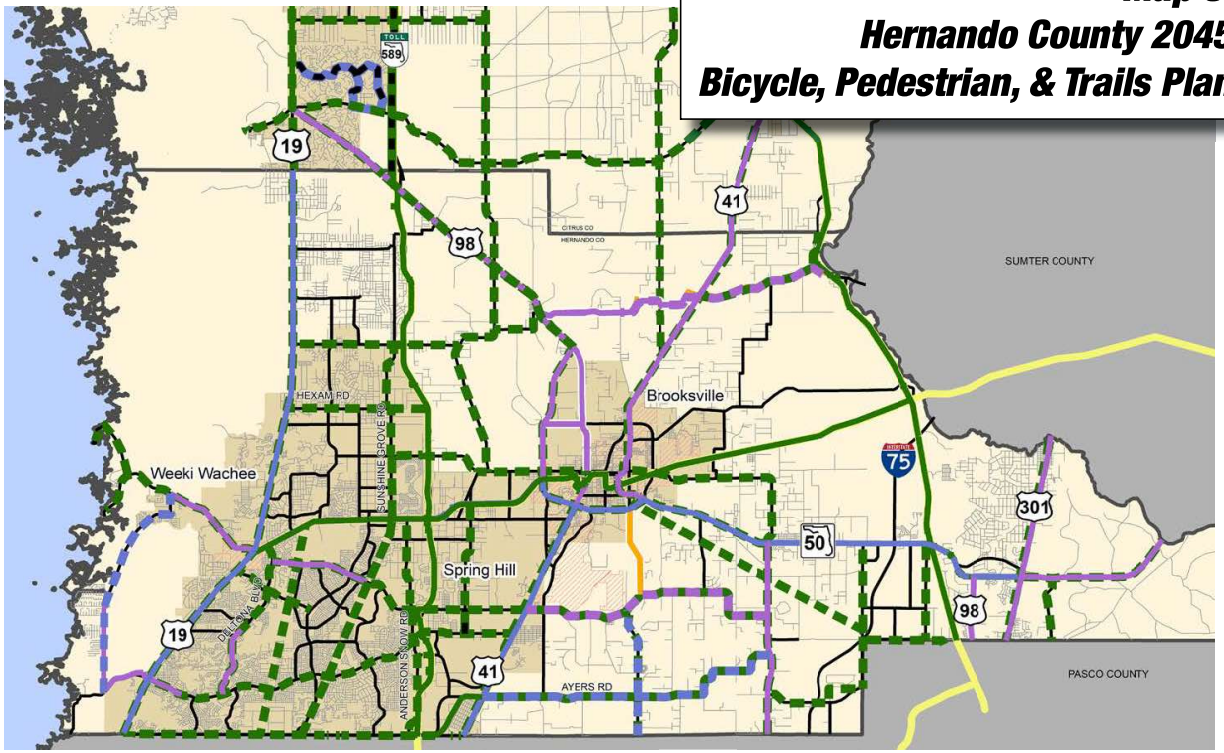
Do you agree that the ***BICYCLE, PEDESTRIAN, and TRAIL*** improvements indicated with bold segments in the map to the left are the top priority needed improvements to be funded in Citrus County?

YES **NO**

Are there any improvements that should be added, removed, or modified?

Please show this on the map and/or describe below.

Map 8: Hernando County 2045 Bicycle, Pedestrian, & Trails Plan



Legend

Existing	Committed	Needs			
			Trail	Buffered Bike Lane	
			Bike Lane	SUNTrail Network	
			Paved Shoulder	City Limits	N
				Urban Area	

Question 8:

Do you agree that the ***BICYCLE, PEDESTRIAN, and TRAIL*** improvements indicated with bold segments in the map to the left are the top priority needed improvements to be funded in Hernando County?

YES **NO**

Are there any improvements that should be added, removed, or modified? Please show this on the map and/or describe below.

Revenue Sources

Rank the revenue sources listed below in order from 1– 5, with 1 being the most-preferred and 5 being the least-preferred means of implementing transportation projects.

Source: Hernando County

Funding Type & Current Status	Description	Rank	Implementation Issues?
Sales Tax (Paid by residents and visitors)	• Can be used for Capital and Operation • Enacted by referendum • Potential large revenue source • Cost burden shared by residents and non-residents • Use limited to specific programs • Bondable Revenues		
Impact Fees/Mobility Fees (Paid by developers and new home buyers)	• Can be used for Capital **ONLY** • Enacted by Commission • Must be proportionate to benefit • Revenues fluctuate with development activity		
Municipal Service Benefit Unit (Non-Ad Valorem Assessment) (Paid by property-owners)	• Can be used for Capital and Operation • May levy fees and/or assessments • Revenues must be spent to benefit assessed properties • Bondable Revenues		
Municipal Service Tax Unit (Paid by property-owners)	• Can be used for Capital and Operation • Stable revenue sources • Ties fiscal burden to geographic area • Can't be used for existing deficiencies • Bondable Revenue		
Gas Tax (Paid by vehicle operators)	• Can be used for Capital and Operation • Enacted (and capped) by statute • Cost burden shared by residents and non-residents • Bondable Revenues		
Tolls (Paid by users)	• Can be used for Capital and Operation • Enacted by tolling authority • Cost burden shared by residents and non-residents • Use limited to specific programs • Bondable Revenues		
Other Sources			

MEETING MINUTES
HERNANDO CITRUS MPO 2045 LRTP CONSENSUS BUILDING WORKSHOP
HERNANDO COUNTY UTILITIES BUILDING, 15365 CORTEZ BOULEVARD, BROOKSVILLE, FL
WEDNESDAY, MAY 29, 2019, 1:00 PM - 4:00 PM
ATTENDEES:[SEE ATTACHED]

Breakout Group Discussion

Citrus County Potential Needs/Cost Feasible Plans

- Bottlenecks within the county should be addressed.
- Venable St/Crystal Oaks Dr should be four lanes from US-19 to SR-44.
- Cardinal St should be four lanes from US-19 to Lecanto Hwy rather than four laning Grover Cleveland Blvd.
- Lecanto Hwy should be four lanes between SR-44 and FL-200 to accommodate new industrial development in the northeast part of the county.
- Do not widen to six lanes between SR-44 and Norvell Bryant Hwy.
- US-41 should be widened between SR-200 and Lecanto Hwy to accommodate the industrial development.
- Supportive of six lanes on CR-491.
- Widen SR-200 from US-41 to county line.
- Keep Grover Cleveland widening in addition to widening Cardinal St.; extend Emerald Oaks Dr to connect east; widen Dunklin St. based on anticipated increased traffic from Suncoast Parkway.
- Grover Cleveland already had a development, but Cardinal St is identified to have the Suncoast Parkway connection.
- CR-488 from 19 to 41 for future widening based on potential Suncoast connection.
- Widen US-41 from CR-486 to CR-491.
- Widen US-19 from Hernando C/L to Cardinal St.
- Disagree with a Suncoast terminus at CR-486 (preferred at SR-44), but supportive of it continuing northward.
- Rock Crusher Extension should Grover Cleveland to Cardinal St.
- CR-491 between Holder and SR-200 to be increased to four lanes.
- Increase network rather than widen existing.

Hernando County Potential Needs & Cost Feasible Plans.

- Traffic calming on Powell Rd and Barclay Ave due to existing school (Powell MS).
- Centralia Rd exit from Suncoast Parkway.
- Spring Lake Hwy four lanes is not feasible
- Need more east-west connections
- Widen Ayers Rd and Church Rd to four lanes.
- Widen Seville Pkwy rather than Thrasher Rd.
    - Originally was not going to be a through street, because of gates, but that may have changed.
- Do not need to widen US-41 north of Yontz Rd.

- Additional east-west connections.
- Supportive of Lockhart Rd and Sunrise Rd widening using private funding, but not if solely public funding.
- Powell Rd widening all the way to US-41.
- Widen County Line Rd.
- Question about north-south road above Fort Dade Ave. (Hospital Rd)
    - *Hospital Rd, in combination with Star Rd/Rester Rd. east extension would provide significant additional access to Brooksville Regional Hospital*.
- Exile Rd
- Widen County Line Rd from Cobblestone Rd to Anderson Snow Rd
- US-41 north of Brooksville should be four lanes to the county line.
- Ayers Rd widening.

Regional Transit

- Express routes from both counties to Turnpike (along SR-44 and SR-50).
- Need route between Weeki Wachee and Homosassa on US-19.
- Add route from Weeki Wachee to US-98.
- Convert Brooksville rail to a trail.
- Spend more money on local transit rather than regional
- Some support for commuter rail to Tampa Bay
- Run rail within Suncoast Parkway corridor
- Add Park and Ride locations
- Add Hernando Airport on the map with connections

Local Transit

- Add transit on County Line Rd from US-19 to US-41.
- Powell Rd from US-41 to California Rd
- Include transit on CR-486 from Forest Ridge Blvd to CR-481 and on CR-491 from Grover Cleveland Blvd to Cardinal St
- Provide evening and weekend bus availability
- Provide transit west of US-19 (e.g., Pine Island, Rogers Park)
- Local route continuing up US-19 to Centralia to access the school
- Route along Blanks St/Exile Rd because there's anticipation of 2000-3000 homes.

Bike/Ped/Trail

- SR-44 needs a dedicated multi-use trail rather than a bike lane
- Lecanto Hwy from SR 44 to Grover Cleveland should have a bike lane as opposed to a paved shoulder to connect to the trail at 589.
- Can we run the trails that run along 491 and Pleasant Grove into the forest? We want to connect areas rather than provide a recreational trail. Base it on how people want to use it. Design and implementation should be part of the studies with which these projects move forward.

- Fund bike trail on Norvell Bryant Hwy from SR-44 to Three Sisters Trail

Funding

- Sales Tax
    - 1 (ranked relatively)
    - 1 (ranked on importance)
    - 1 (ranked on importance)
    - 6 (ranked relatively)
    - 1 (ranked relatively)
- Impact Fees/Mobility Fees
    - 2 (ranked relatively)
    - 1 (ranked on importance)
    - 2 (ranked on importance)
    - 2 (ranked relatively)
    - 2 (ranked relatively)
- Municipal Service Benefit Unit
    - 5 (ranked relatively)
    - 3 (ranked on importance)
    - 5 (ranked on importance)
    - 5 (ranked relatively)
    - 4 (ranked relatively)
- Municipal Service Tax Unit
    - 6 (ranked relatively)
    - 3 (ranked on importance)
    - 5 (ranked on importance)
    - 4 (ranked relatively)
    - 5 (ranked relatively)
- Gas Tax
    - 3 (ranked relatively)
    - 1 (ranked on importance)
    - 3 (ranked on importance)
    - 1 (ranked relatively)
    - 3 (ranked relatively)
- Tolls
    - 4 (ranked relatively)
    - 2 (ranked on importance)
    - 1 (ranked on importance)
    - 7 (ranked relatively)
    - 6 (ranked relatively)
- Other Sources

From:	Steven Diez
To:	Leslie Barras
Cc:	Roll, William; Ispass, Marc
Subject:	RE: Comments on 2045 LRTP Planning
Date:	Thursday, August 22, 2019 10:13:58 AM

Ms. Barras,

Thank you for attending the workshop and thank you for your comments as well. I have forwarded these to our consultant, and they will be incorporated into the public comments.

Steve Diez
Executive Director
Hernando/Citrus MPO
1661 Blaise Dr.
Brooksville, FL 34601
Phone: 352-754-4082
Email: stevend@hernandocounty.us

From: Leslie Barras <lebarras@gmail.com>
Sent: Thursday, August 22, 2019 9:59 AM
To: Steven Diez <StevenD@hernandocounty.us>
Subject: Comments on 2045 LRTP Planning

Dear Mr. Diez,

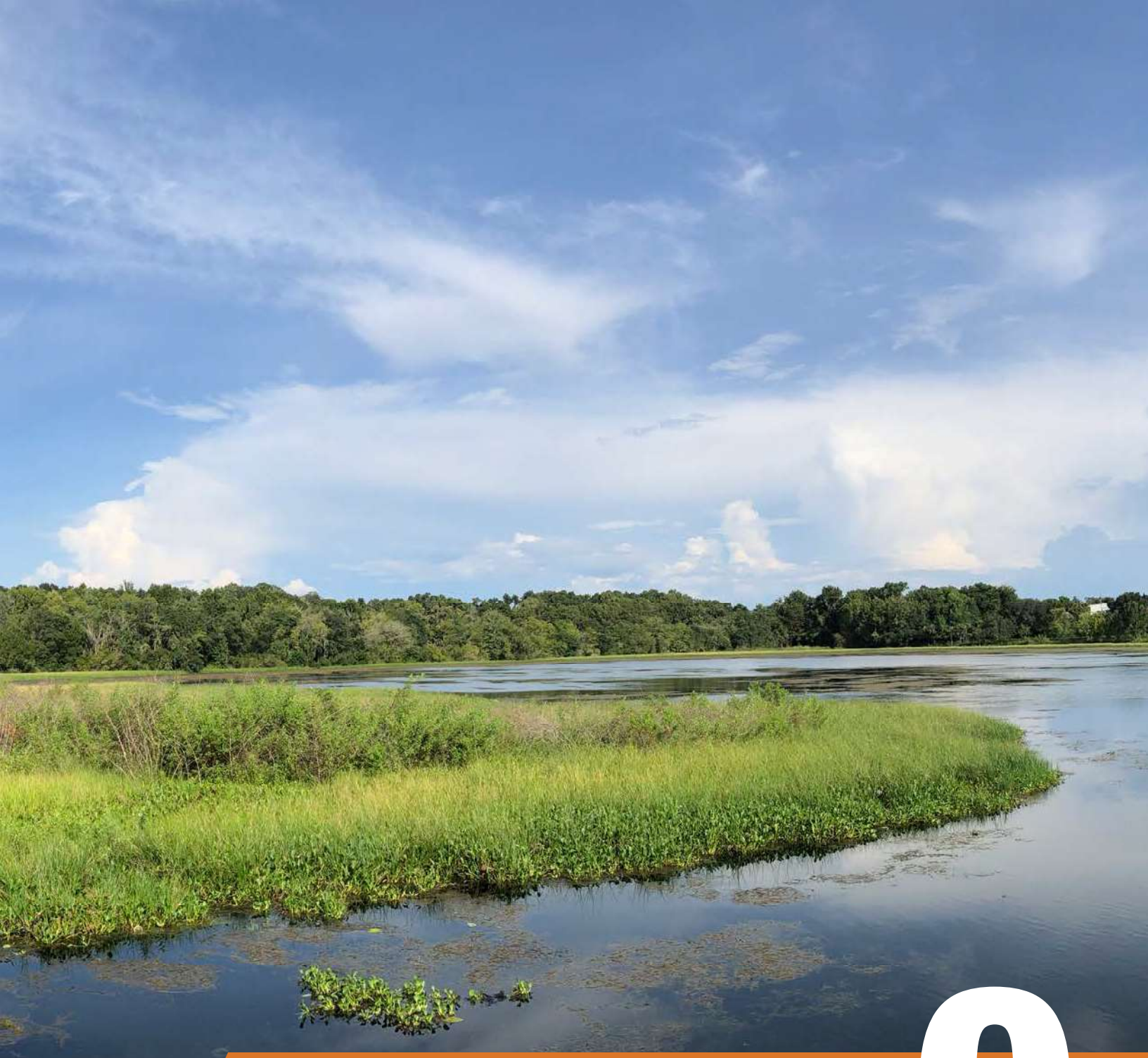
These comments serve as a formal response to the public open house at the National Guard Armory on August 14th.

The priorities I'd like to see reflected in the next long-range transportation plan are:

1. Completion of the Withlacoochee-Dunnellon Bike Trail Connector, with a tunnel underneath US 41.
2. Connection of the Withlacoochee Trail with Whispering Pines Park.
3. Asset preservation of existing bike trails and vehicular roads, including resurfacing.

I do not support extending the Suncoast Parkway north of US 44 in Citrus County. From the analyses I've seen, there is not sufficient traffic demand. It seems designed to fulfill development wishes and desires.

Thank you,
Ms. Leslie Barras
Inverness



Appendix Q

2045 ENVIRONMENTAL JUSTICE REVIEW

2045 LRTP Environmental Justice Review

Introduction

Environmental Justice is the fair treatment of all groups within the community. In 1994, Presidential Executive Order 12898 directed every Federal agency to make environmental justice (EJ) part of its mission by identifying and addressing the effects of all programs, policies, and activities on "minority populations and low-income populations." This order was consistent with Title VI of the Civil Rights Act of 1964 which prohibits discrimination on the basis of race, color, or national origin. Environmental Justice provides a framework for conducting assessments pertaining to matters of equity and nondiscrimination.

It is the policy of the Hernando/Citrus Metropolitan Planning Organization (MPO) to support and encourage early and continuous public participation and input to the planning process and to adhere to the principles of Environmental Justice and Title VI of the 1964 Civil Rights Act as part of the Transportation planning process relating to transportation systems and facilities. The MPO's Participation Plan is designed to ensure early and continuous opportunities for the public to express its views on transportation issues and to become active participants in the regional planning and transportation decision making process.

EJ Approach

Effective transportation planning involves an understanding of and strategies to address the varying needs of different socioeconomic persons throughout the MPO communities. Plans that the MPO establishes today will directly and indirectly influence the health of the area's people and their environment. There is potential to impact the quality of the natural environment, including air and water, to increase noise, and to both positively or negatively affect community connections between neighborhoods and regions. Efforts were made to identify Environmental Justice populations and their locations within the Hernando/Citrus MPO planning area. In the decision-making process, the Hernando/Citrus MPO seeks to achieve the following:

- Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations
- Ensure the full and fair participation by all potentially affected communities in the planning process
- Prevent delay or denial of benefits to all disadvantaged population

An Environmental Justice approach to transportation planning and project development recognizes the fair treatment of all groups within the community. This includes ensuring the involvement of the entire community in public outreach and participation efforts. The Department of Transportation is the lead agency charged with ensuring non-discrimination stemming from Environmental Justice issues, related to transportation planning. The statutory language of DOT Order 5610.2(a) focuses on minority and low-income populations. Steps shall be taken to provide the public, including members of minority populations and low-income populations, access to public information relevant to human health or environmental impacts stemming from programs, policies, and activities, including information that will address the concerns of minority and low-income populations regarding the health and environmental impacts of the proposed action.

Data Evaluation

The Hernando/Citrus Metropolitan Planning Organization (MPO 2045) Long Range Transportation Plan (LRTP) performed an Environmental Justice analysis to be consistent with the MPO's mission as well as the goals and objectives of the 2045 LRTP. The analysis used data provided by the U.S. Census Bureau, 2013-2017 American Community Survey (ACS) 5-Year Estimates, which are the most recent data available at the time of this analysis. The ACS 5-year Estimates are more reliable than the more current 1-year estimates.

The two driving characteristics of EJ areas in the MPO Planning Area are percentage of households at or below poverty level and percentage of minority population. **Table 1** shows the data comparing the Citrus County, Hernando County to the Statewide data. **Appendix A** of this memo includes the US Census Bureau data used regarding poverty status, while **Appendix B** includes the US Census Bureau data used to determine minority populations.

Table 1: Hernando/Citrus MPO Environmental Justice Populations by County

	Citrus County	Hernando County	Florida Statewide
Estimate; Population for whom poverty status is determined	*138,743*	*176,462*	*19,858,469*
Population Below Poverty Level	24,123	25,322	3,070,972
Percent Below Poverty Level	17.39%	14.35%	15.46%
Estimate; Population for whom race is determined	*141,373*	*179,144*	*20,278,447*
Minority Population	9,774	18,520	4,934,450
Percent Minority Population	6.91%	10.34%	24.33%

Source: American Community Survey, U.S. Census Bureau

Percentages of population meeting the criteria were compared to the countywide average. Those Census Tracts that were estimated to have levels of EJ populations that were equal to or exceeded 150% of the countywide average were highlighted and considered to be potential areas for Environmental Justice considerations throughout the LRTP process. These considerations included additional outreach efforts to those living in these areas and additional consideration to serve the areas with alternate transportation modes. **Figures 1** and **Figure 2** show where these Census Tracts are located within Hernando County and Citrus County, respectively.

Figure 1: Hernando County EJ Areas

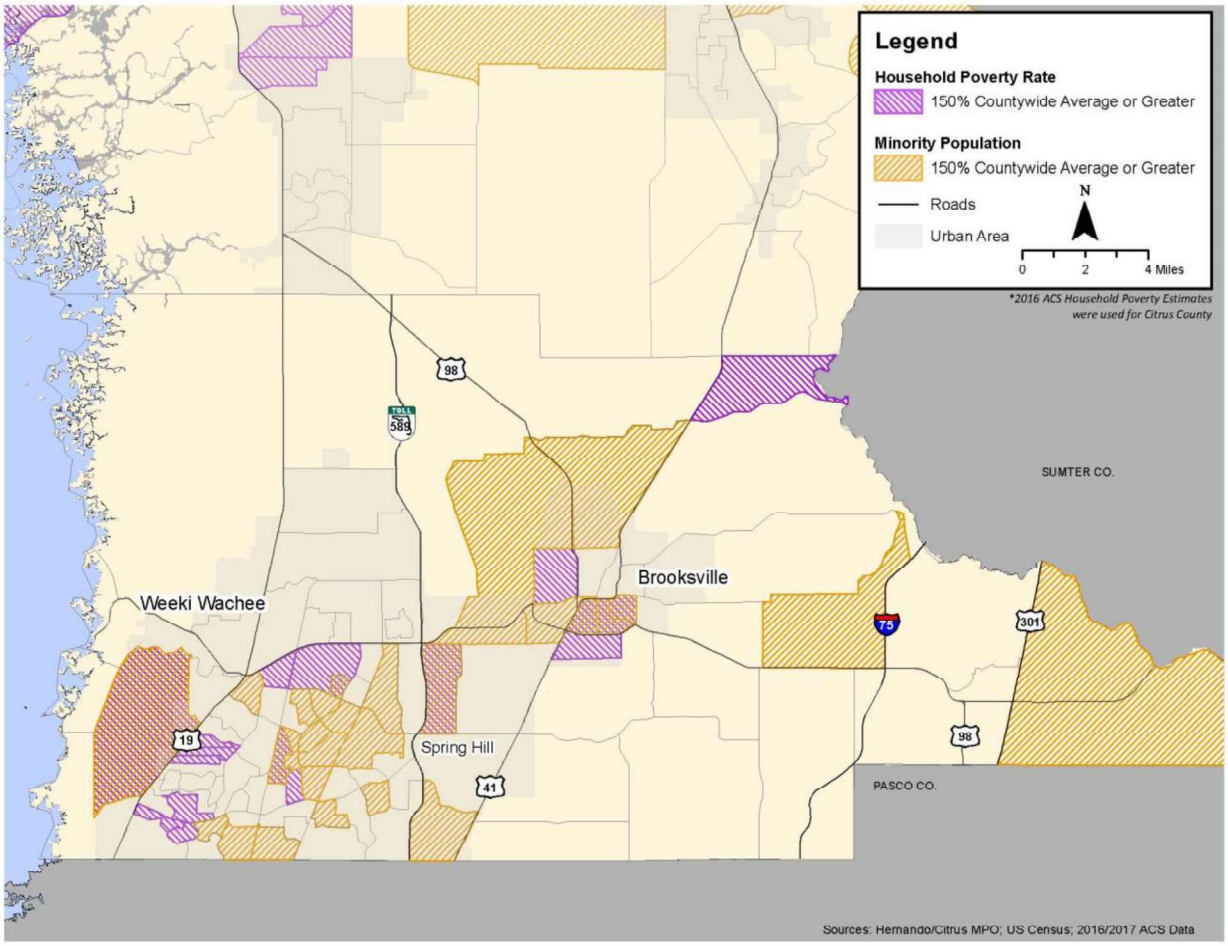
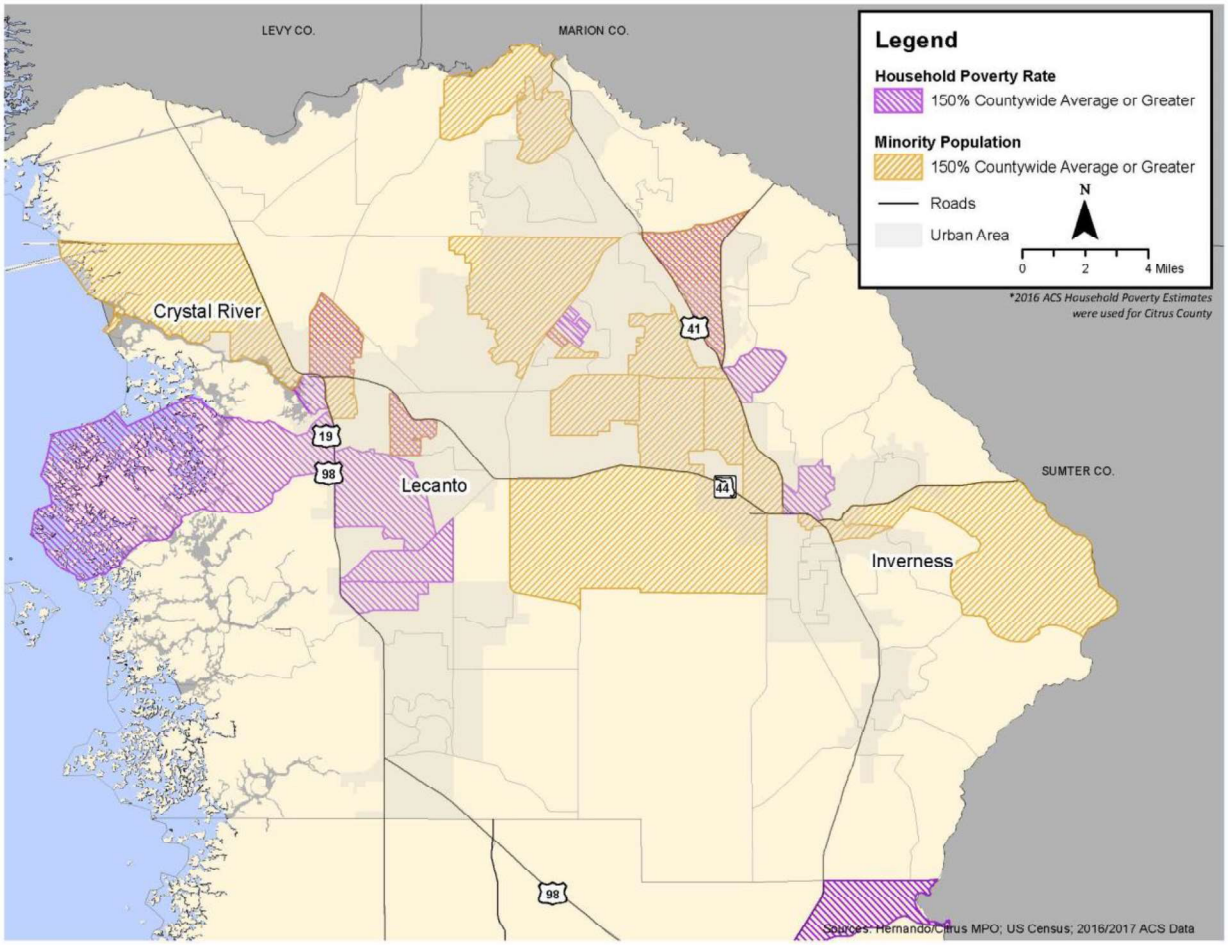


Figure 2: Citrus County EJ Areas



Additional Activities and Considerations

Two Environmental Justice workshops were conducted during the development of the plan—one focusing on each county. The Hernando County EJ Workshop was held April 24, 2019, and the Citrus County EJ Workshop was held May 2, 2019. Items that were discussed included the initial transportation Needs Assessment and potential effects to the areas identified as Environmental Justice Areas as described above. The environmental justice workshops were held during the Needs Assessment phase of plan development. The workshop shared information about the establishment and importance of environmental justice and held discussion about potential impacts of transportation improvements on elderly, minority, and low-income populations throughout the Hernando/Citrus MPO jurisdiction.

Input received at these workshops helped guide and prioritize needs and future projects in the LRTP, with the goal of minimizing negative impacts to those areas identified as having a higher proportion of populations included in environmental justice considerations.

Environmental Justice is an ongoing concern that the MPO will continually consider in all of it's planning and implementation efforts.

Appendix A – US Census Bureau Data

POVERTY STATUS

2013-2017 American Community Survey 5-Year Estimates

Citrus County, Hernando County, The State of Florida

AMERICAN FactFinder

S1701 | POVERTY STATUS IN THE PAST 12 MONTHS

2013-2017 American Community Survey 5-Year Estimates

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

Subject	Florida				
	Total		Below poverty level		Percent below poverty level
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Population for whom poverty status is determined	19,858,469	+/-2,826	3,070,972	+/-25,205	15.5%
AGE					
Under 18 years	4,044,879	+/-2,738	901,772	+/-12,004	22.3%
Under 5 years	1,087,492	+/-1,591	267,394	+/-4,629	24.6%
5 to 17 years	2,957,387	+/-2,396	634,378	+/-9,576	21.5%
Related children of householder under 18 years	4,027,068	+/-3,180	885,256	+/-11,866	22.0%
18 to 64 years	11,954,525	+/-1,162	1,769,880	+/-16,001	14.8%
18 to 34 years	4,187,260	+/-1,969	765,562	+/-8,696	18.3%
35 to 64 years	7,767,265	+/-1,904	1,004,318	+/-10,961	12.9%
60 years and over	5,122,813	+/-6,513	559,828	+/-5,639	10.9%
65 years and over	3,859,065	+/-1,074	399,320	+/-4,879	10.3%
SEX					
Male	9,644,955	+/-2,582	1,387,764	+/-14,239	14.4%
Female	10,213,514	+/-2,621	1,683,208	+/-13,036	16.5%
RACE AND HISPANIC OR LATINO ORIGIN					
White alone	15,073,714	+/-14,058	2,000,476	+/-19,345	13.3%
Black or African American alone	3,149,614	+/-7,460	781,928	+/-12,021	24.8%
American Indian and Alaska Native alone	54,897	+/-2,340	11,233	+/-1,256	20.5%
Asian alone	536,922	+/-3,318	67,789	+/-3,520	12.6%
Native Hawaiian and Other Pacific Islander alone	12,093	+/-1,038	3,035	+/-870	25.1%
Some other race alone	528,909	+/-11,336	115,941	+/-5,500	21.9%
Two or more races	502,320	+/-9,263	90,570	+/-4,021	18.0%
Hispanic or Latino origin (of any race)	4,944,502	+/-1,953	981,013	+/-12,668	19.8%
White alone, not Hispanic or Latino	10,910,869	+/-3,923	1,192,478	+/-13,244	10.9%
EDUCATIONAL ATTAINMENT					
Population 25 years and over	14,173,181	+/-1,616	1,800,954	+/-13,989	12.7%
Less than high school graduate	1,718,028	+/-13,295	461,454	+/-6,127	26.9%
High school graduate (includes equivalency)	4,080,730	+/-24,558	638,178	+/-9,198	15.6%
Some college, associate's degree	4,295,542	+/-13,924	458,255	+/-5,476	10.7%

Subject Hernando/Citrus MPO 2045 LRTP	Florida				
	Total		Below poverty level		Percent below poverty level
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Bachelor's degree or higher	4,078,881	+/-23,958	243,067	+/-4,272	6.0%
EMPLOYMENT STATUS					
Civilian labor force 16 years and over	9,692,436	+/-15,969	911,191	+/-8,431	9.4%
Employed	8,997,256	+/-16,416	669,263	+/-7,405	7.4%
Male	4,692,675	+/-11,064	308,644	+/-5,240	6.6%
Female	4,304,581	+/-10,635	360,619	+/-5,252	8.4%
Unemployed	695,180	+/-7,220	241,928	+/-4,410	34.8%
Male	364,479	+/-4,716	116,958	+/-2,759	32.1%
Female	330,701	+/-5,171	124,970	+/-3,125	37.8%
WORK EXPERIENCE					
Population 16 years and over	16,285,703	+/-3,529	2,259,640	+/-17,201	13.9%
Worked full-time, year-round in the past 12 months	6,390,911	+/-13,400	211,553	+/-4,021	3.3%
Worked part-time or part-year in the past 12 months	3,460,912	+/-18,702	631,110	+/-6,999	18.2%
Did not work	6,433,880	+/-19,404	1,416,977	+/-13,227	22.0%
ALL INDIVIDUALS WITH INCOME BELOW THE FOLLOWING POVERTY RATIOS					
50 percent of poverty level	1,344,631	+/-15,710	(X)	(X)	(X)
125 percent of poverty level	4,109,839	+/-29,623	(X)	(X)	(X)
150 percent of poverty level	5,162,521	+/-33,482	(X)	(X)	(X)
185 percent of poverty level	6,628,819	+/-36,708	(X)	(X)	(X)
200 percent of poverty level	7,225,020	+/-38,840	(X)	(X)	(X)
300 percent of poverty level	10,827,573	+/-38,890	(X)	(X)	(X)
400 percent of poverty level	13,512,030	+/-37,744	(X)	(X)	(X)
500 percent of poverty level	15,412,948	+/-32,559	(X)	(X)	(X)
UNRELATED INDIVIDUALS FOR WHOM POVERTY STATUS IS DETERMINED	4,016,608	+/-18,841	1,070,378	+/-10,389	26.6%
Male	1,957,358	+/-13,814	483,171	+/-6,856	24.7%
Female	2,059,250	+/-9,582	587,207	+/-6,190	28.5%
15 years	4,589	+/-461	4,474	+/-464	97.5%
16 to 17 years	12,237	+/-1,018	11,633	+/-1,013	95.1%
18 to 24 years	360,656	+/-5,122	188,166	+/-4,192	52.2%
25 to 34 years	702,601	+/-7,797	161,588	+/-3,782	23.0%
35 to 44 years	479,241	+/-8,222	110,588	+/-3,063	23.1%
45 to 54 years	608,269	+/-7,456	162,049	+/-3,562	26.6%
55 to 64 years	681,367	+/-6,685	196,543	+/-3,757	28.8%
65 to 74 years	581,292	+/-4,438	120,229	+/-2,615	20.7%
75 years and over	586,356	+/-5,542	115,108	+/-2,417	19.6%
Mean income deficit for unrelated individuals (dollars)	6,980	+/-35	(X)	(X)	(X)
Worked full-time, year-round in the past 12 months	1,613,792	+/-14,306	64,218	+/-2,349	4.0%
Worked less than full-time, year-round in the past 12 months	821,684	+/-8,424	322,459	+/-4,957	39.2%
Did not work	1,581,132	+/-9,621	683,701	+/-8,157	43.2%

Subject	Florida	Citrus County, Florida			
Hernando/Citrus MPO 2045 LRTP	Percent below poverty level	Total		Below poverty level	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Population for whom poverty status is determined	+/-0.1	138,743	+/-453	24,123	+/-1,659
AGE					
Under 18 years	+/-0.3	20,568	+/-253	6,285	+/-842
Under 5 years	+/-0.4	5,310	+/-110	1,773	+/-379
5 to 17 years	+/-0.3	15,258	+/-220	4,512	+/-636
Related children of householder under 18 years	+/-0.3	20,499	+/-260	6,216	+/-839
18 to 64 years	+/-0.1	68,766	+/-387	13,709	+/-1,118
18 to 34 years	+/-0.2	18,450	+/-245	4,868	+/-549
35 to 64 years	+/-0.1	50,316	+/-289	8,841	+/-826
60 years and over	+/-0.1	60,789	+/-581	5,541	+/-609
65 years and over	+/-0.1	49,409	+/-180	4,129	+/-539
SEX					
Male	+/-0.1	66,843	+/-439	10,271	+/-881
Female	+/-0.1	71,900	+/-304	13,852	+/-1,077
RACE AND HISPANIC OR LATINO ORIGIN					
White alone	+/-0.1	129,456	+/-599	22,565	+/-1,563
Black or African American alone	+/-0.4	3,737	+/-333	579	+/-282
American Indian and Alaska Native alone	+/-1.9	494	+/-104	116	+/-90
Asian alone	+/-0.6	2,336	+/-122	152	+/-159
Native Hawaiian and Other Pacific Islander alone	+/-6.3	0	+/-31	0	+/-31
Some other race alone	+/-1.0	631	+/-314	145	+/-127
Two or more races	+/-0.7	2,089	+/-351	566	+/-248
Hispanic or Latino origin (of any race)	+/-0.3	7,328	+/-88	1,959	+/-488
White alone, not Hispanic or Latino	+/-0.1	123,292	+/-397	20,936	+/-1,485
EDUCATIONAL ATTAINMENT					
Population 25 years and over	+/-0.1	110,312	+/-431	15,688	+/-1,116
Less than high school graduate	+/-0.3	13,755	+/-973	3,515	+/-552
High school graduate (includes equivalency)	+/-0.2	41,479	+/-1,301	6,830	+/-705
Some college, associate's degree	+/-0.1	35,131	+/-1,239	4,342	+/-529
Bachelor's degree or higher	+/-0.1	19,947	+/-1,203	1,001	+/-246
EMPLOYMENT STATUS					
Civilian labor force 16 years and over	+/-0.1	50,220	+/-1,037	6,703	+/-806
Employed	+/-0.1	45,271	+/-1,029	4,283	+/-617
Male	+/-0.1	22,891	+/-858	1,771	+/-337
Female	+/-0.1	22,380	+/-787	2,512	+/-459
Unemployed	+/-0.5	4,949	+/-604	2,420	+/-438
Male	+/-0.7	3,030	+/-517	1,403	+/-344
Female	+/-0.7	1,919	+/-299	1,017	+/-225
WORK EXPERIENCE					
Population 16 years and over	+/-0.1	120,874	+/-463	18,606	+/-1,231
Worked full-time, year-round in the past 12 months	+/-0.1	29,783	+/-1,135	1,118	+/-301
Worked part-time or part-year in the past 12 months	+/-0.2	21,713	+/-970	4,687	+/-613
Did not work	+/-0.2	69,378	+/-1,134	12,801	+/-885
ALL INDIVIDUALS WITH INCOME BELOW THE FOLLOWING POVERTY RATIOS					
50 percent of poverty level	(X)	9,337	+/-1,263	(X)	(X)
125 percent of poverty level	(X)	31,699	+/-1,814	(X)	(X)
150 percent of poverty level	(X)	39,930	+/-1,892	(X)	(X)
185 percent of poverty level	(X)	50,058	+/-2,112	(X)	(X)
200 percent of poverty level	(X)	55,282	+/-2,162	(X)	(X)

Subject Hernando/Citrus MPO 2045 LRTP	Florida	Citrus County, Florida			
	Percent below poverty level	Total		Below poverty level	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
300 percent of poverty level	(X)	83,191	+/-2,260	(X)	(X)
400 percent of poverty level	(X)	104,201	+/-1,866	(X)	(X)
500 percent of poverty level	(X)	116,368	+/-1,812	(X)	(X)
UNRELATED INDIVIDUALS FOR WHOM POVERTY STATUS IS DETERMINED	+/-0.2	29,865	+/-1,436	8,525	+/-779
Male	+/-0.3	13,421	+/-840	3,489	+/-458
Female	+/-0.2	16,444	+/-882	5,036	+/-544
15 years	+/-1.4	14	+/-21	14	+/-21
16 to 17 years	+/-1.4	55	+/-52	55	+/-52
18 to 24 years	+/-0.8	1,699	+/-350	960	+/-288
25 to 34 years	+/-0.5	2,476	+/-445	917	+/-225
35 to 44 years	+/-0.5	2,004	+/-408	940	+/-267
45 to 54 years	+/-0.4	3,772	+/-498	1,192	+/-273
55 to 64 years	+/-0.4	6,187	+/-548	2,095	+/-392
65 to 74 years	+/-0.4	6,191	+/-502	1,109	+/-203
75 years and over	+/-0.4	7,467	+/-526	1,243	+/-229
Mean income deficit for unrelated individuals (dollars)	(X)	6,494	+/-350	(X)	(X)
Worked full-time, year-round in the past 12 months	+/-0.1	6,676	+/-682	438	+/-169
Worked less than full-time, year-round in the past 12 months	+/-0.4	5,410	+/-642	2,090	+/-418
Did not work	+/-0.4	17,779	+/-936	5,997	+/-581

Subject Hernando/Citrus MPO 2045 LRTP	Citrus County, Florida Percent below poverty level		Hernando County, Florida Total		Below poverty level
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Population for whom poverty status is determined	17.4%	+/-1.2	176,462	+/-459	25,322
AGE					
Under 18 years	30.6%	+/-4.1	32,634	+/-308	6,758
Under 5 years	33.4%	+/-7.2	7,779	+/-133	1,876
5 to 17 years	29.6%	+/-4.1	24,855	+/-293	4,882
Related children of householder under 18 years	30.3%	+/-4.1	32,328	+/-416	6,462
18 to 64 years	19.9%	+/-1.6	95,246	+/-296	14,333
18 to 34 years	26.4%	+/-2.9	29,196	+/-194	5,053
35 to 64 years	17.6%	+/-1.6	66,050	+/-267	9,280
60 years and over	9.1%	+/-1.0	61,146	+/-563	5,616
65 years and over	8.4%	+/-1.1	48,582	+/-189	4,231
SEX					
Male	15.4%	+/-1.3	84,441	+/-319	11,556
Female	19.3%	+/-1.5	92,021	+/-300	13,766
RACE AND HISPANIC OR LATINO ORIGIN					
White alone	17.4%	+/-1.2	158,421	+/-897	21,332
Black or African American alone	15.5%	+/-7.1	8,932	+/-568	2,209
American Indian and Alaska Native alone	23.5%	+/-17.1	506	+/-191	23
Asian alone	6.5%	+/-6.7	2,166	+/-234	332
Native Hawaiian and Other Pacific Islander alone	-	**	30	+/-26	5
Some other race alone	23.0%	+/-17.7	2,838	+/-761	738
Two or more races	27.1%	+/-11.0	3,569	+/-597	683
Hispanic or Latino origin (of any race)	26.7%	+/-6.7	21,597	+/-136	4,278
White alone, not Hispanic or Latino	17.0%	+/-1.2	140,124	+/-513	17,830
EDUCATIONAL ATTAINMENT					
Population 25 years and over	14.2%	+/-1.0	131,741	+/-369	16,597
Less than high school graduate	25.6%	+/-3.3	15,792	+/-842	3,858
High school graduate (includes equivalency)	16.5%	+/-1.6	48,420	+/-1,134	6,789
Some college, associate's degree	12.4%	+/-1.4	44,832	+/-1,073	4,547
Bachelor's degree or higher	5.0%	+/-1.2	22,697	+/-1,042	1,403
EMPLOYMENT STATUS					
Civilian labor force 16 years and over	13.3%	+/-1.6	70,172	+/-1,001	6,252
Employed	9.5%	+/-1.4	63,962	+/-1,030	4,169
Male	7.7%	+/-1.5	33,052	+/-728	1,901
Female	11.2%	+/-2.0	30,910	+/-744	2,268
Unemployed	48.9%	+/-6.3	6,210	+/-613	2,083
Male	46.3%	+/-7.6	3,269	+/-407	1,100
Female	53.0%	+/-9.3	2,941	+/-392	983
WORK EXPERIENCE					
Population 16 years and over	15.4%	+/-1.0	147,916	+/-403	19,160
Worked full-time, year-round in the past 12 months	3.8%	+/-1.0	44,535	+/-1,168	1,141
Worked part-time or part-year in the past 12 months	21.6%	+/-2.5	27,467	+/-1,049	4,947
Did not work	18.5%	+/-1.2	75,914	+/-1,009	13,072
ALL INDIVIDUALS WITH INCOME BELOW THE FOLLOWING POVERTY RATIOS					
50 percent of poverty level	(X)	(X)	11,247	+/-1,043	(X)
125 percent of poverty level	(X)	(X)	34,008	+/-2,124	(X)
150 percent of poverty level	(X)	(X)	45,104	+/-2,301	(X)
185 percent of poverty level	(X)	(X)	60,476	+/-2,378	(X)
200 percent of poverty level	(X)	(X)	66,315	+/-2,369	(X)

Subject Hernando/Citrus MPO 2045 LRTP	Citrus County, Florida Percent below poverty level		Hernando County, Florida Total		Below poverty level
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
300 percent of poverty level	(X)	(X)	104,654	+/-2,262	(X)
400 percent of poverty level	(X)	(X)	132,418	+/-2,016	(X)
500 percent of poverty level	(X)	(X)	150,758	+/-1,695	(X)
UNRELATED INDIVIDUALS FOR WHOM POVERTY STATUS IS DETERMINED	28.5%	+/-2.1	32,686	+/-1,201	8,720
Male	26.0%	+/-3.2	15,234	+/-696	3,947
Female	30.6%	+/-2.6	17,452	+/-794	4,773
15 years	100.0%	+/-87.9	101	+/-77	101
16 to 17 years	100.0%	+/-44.4	186	+/-129	186
18 to 24 years	56.5%	+/-11.3	1,566	+/-330	640
25 to 34 years	37.0%	+/-7.2	3,256	+/-426	1,204
35 to 44 years	46.9%	+/-10.3	2,889	+/-385	924
45 to 54 years	31.6%	+/-5.9	4,379	+/-430	1,410
55 to 64 years	33.9%	+/-4.9	6,304	+/-517	2,020
65 to 74 years	17.9%	+/-3.0	6,731	+/-458	1,214
75 years and over	16.6%	+/-3.0	7,274	+/-404	1,021
Mean income deficit for unrelated individuals (dollars)	(X)	(X)	7,008	+/-322	(X)
Worked full-time, year-round in the past 12 months	6.6%	+/-2.5	8,733	+/-761	246
Worked less than full-time, year-round in the past 12 months	38.6%	+/-5.8	5,114	+/-448	2,035
Did not work	33.7%	+/-2.6	18,839	+/-830	6,439

Subject Hernando/Citrus MPO 2045 LRTP	Hernando County, Florida		
	Below poverty level	Percent below poverty level	
	Margin of Error	Estimate	Margin of Error
Population for whom poverty status is determined	+/-1,645	14.3%	+/-0.9
AGE			
Under 18 years	+/-858	20.7%	+/-2.6
Under 5 years	+/-380	24.1%	+/-4.8
5 to 17 years	+/-623	19.6%	+/-2.5
Related children of householder under 18 years	+/-863	20.0%	+/-2.6
18 to 64 years	+/-949	15.0%	+/-1.0
18 to 34 years	+/-592	17.3%	+/-2.0
35 to 64 years	+/-616	14.0%	+/-0.9
60 years and over	+/-468	9.2%	+/-0.8
65 years and over	+/-415	8.7%	+/-0.9
SEX			
Male	+/-929	13.7%	+/-1.1
Female	+/-943	15.0%	+/-1.0
RACE AND HISPANIC OR LATINO ORIGIN			
White alone	+/-1,519	13.5%	+/-0.9
Black or African American alone	+/-516	24.7%	+/-5.5
American Indian and Alaska Native alone	+/-34	4.5%	+/-6.4
Asian alone	+/-159	15.3%	+/-7.0
Native Hawaiian and Other Pacific Islander alone	+/-9	16.7%	+/-30.0
Some other race alone	+/-563	26.0%	+/-15.7
Two or more races	+/-329	19.1%	+/-8.0
Hispanic or Latino origin (of any race)	+/-886	19.8%	+/-4.1
White alone, not Hispanic or Latino	+/-1,245	12.7%	+/-0.9
EDUCATIONAL ATTAINMENT			
Population 25 years and over	+/-985	12.6%	+/-0.7
Less than high school graduate	+/-548	24.4%	+/-3.2
High school graduate (includes equivalency)	+/-612	14.0%	+/-1.3
Some college, associate's degree	+/-508	10.1%	+/-1.1
Bachelor's degree or higher	+/-283	6.2%	+/-1.2
EMPLOYMENT STATUS			
Civilian labor force 16 years and over	+/-620	8.9%	+/-0.9
Employed	+/-539	6.5%	+/-0.8
Male	+/-338	5.8%	+/-1.0
Female	+/-325	7.3%	+/-1.1
Unemployed	+/-344	33.5%	+/-4.4
Male	+/-236	33.6%	+/-5.5
Female	+/-212	33.4%	+/-5.7
WORK EXPERIENCE			
Population 16 years and over	+/-1,109	13.0%	+/-0.7
Worked full-time, year-round in the past 12 months	+/-249	2.6%	+/-0.6
Worked part-time or part-year in the past 12 months	+/-522	18.0%	+/-1.8
Did not work	+/-810	17.2%	+/-1.0
ALL INDIVIDUALS WITH INCOME BELOW THE FOLLOWING POVERTY RATIOS			
50 percent of poverty level	(X)	(X)	(X)
125 percent of poverty level	(X)	(X)	(X)
150 percent of poverty level	(X)	(X)	(X)
185 percent of poverty level	(X)	(X)	(X)
200 percent of poverty level	(X)	(X)	(X)

Subject Hernando/Citrus MPO 2045 LRTP	Hernando County, Florida		
	Below poverty level	Percent below poverty level	
	Margin of Error	Estimate	Margin of Error
300 percent of poverty level	(X)	(X)	(X)
400 percent of poverty level	(X)	(X)	(X)
500 percent of poverty level	(X)	(X)	(X)
UNRELATED INDIVIDUALS FOR WHOM POVERTY STATUS IS DETERMINED	+/-608	26.7%	+/-1.6
Male	+/-431	25.9%	+/-2.6
Female	+/-451	27.3%	+/-2.1
15 years	+/-77	100.0%	+/-31.5
16 to 17 years	+/-129	100.0%	+/-19.2
18 to 24 years	+/-162	40.9%	+/-8.1
25 to 34 years	+/-234	37.0%	+/-5.3
35 to 44 years	+/-210	32.0%	+/-6.7
45 to 54 years	+/-249	32.2%	+/-5.0
55 to 64 years	+/-308	32.0%	+/-4.4
65 to 74 years	+/-262	18.0%	+/-3.5
75 years and over	+/-158	14.0%	+/-2.1
Mean income deficit for unrelated individuals (dollars)	(X)	(X)	(X)
Worked full-time, year-round in the past 12 months	+/-132	2.8%	+/-1.5
Worked less than full-time, year-round in the past 12 months	+/-301	39.8%	+/-5.2
Did not work	+/-499	34.2%	+/-2.1

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

While the 2013-2017 American Community Survey (ACS) data generally reflect the February 2013 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

Explanation of Symbols:

1. An '**' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
2. An '-' entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.
3. An '-' following a median estimate means the median falls in the lowest interval of an open-ended distribution.
4. An '+' following a median estimate means the median falls in the upper interval of an open-ended distribution.
5. An '***' entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
6. An '*****' entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
7. An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
8. An '(X)' means that the estimate is not applicable or not available.

Appendix B – US Census Bureau Data

RACE

2013-2017 American Community Survey 5-Year Estimates

Citrus County, Hernando County, The State of Florida

U.S. Census Bureau

AMERICAN FactFinder

B02001

RACE

Universe: Total population

2013-2017 American Community Survey 5-Year Estimates

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

	Florida		Citrus County, Florida		Hernando County, Florida
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	20,278,447	*****	141,373	*****	179,144
White alone	15,343,997	+/-14,002	131,599	+/-356	160,624
Black or African American alone	3,270,863	+/-7,591	4,165	+/-284	9,288
American Indian and Alaska Native alone	56,730	+/-2,379	499	+/-103	516
Asian alone	543,394	+/-3,300	2,354	+/-119	2,190
Native Hawaiian and Other Pacific Islander alone	12,342	+/-1,040	7	+/-14	30
Some other race alone	536,298	+/-11,404	631	+/-314	2,848
Two or more races:	514,823	+/-9,516	2,118	+/-341	3,648
Two races including Some other race	89,900	+/-3,707	236	+/-126	343
Two races excluding Some other race, and three or more races	424,923	+/-7,874	1,882	+/-292	3,305

Hernando/Citrus MPO 2045 LRTP	Hernando County, Florida Margin of Error
Total:	*****
White alone	+/-802
Black or African American alone	+/-563
American Indian and Alaska Native alone	+/-192
Asian alone	+/-231
Native Hawaiian and Other Pacific Islander alone	+/-26
Some other race alone	+/-764
Two or more races:	+/-587
Two races including Some other race	+/-144
Two races excluding Some other race, and three or more races	+/-566

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

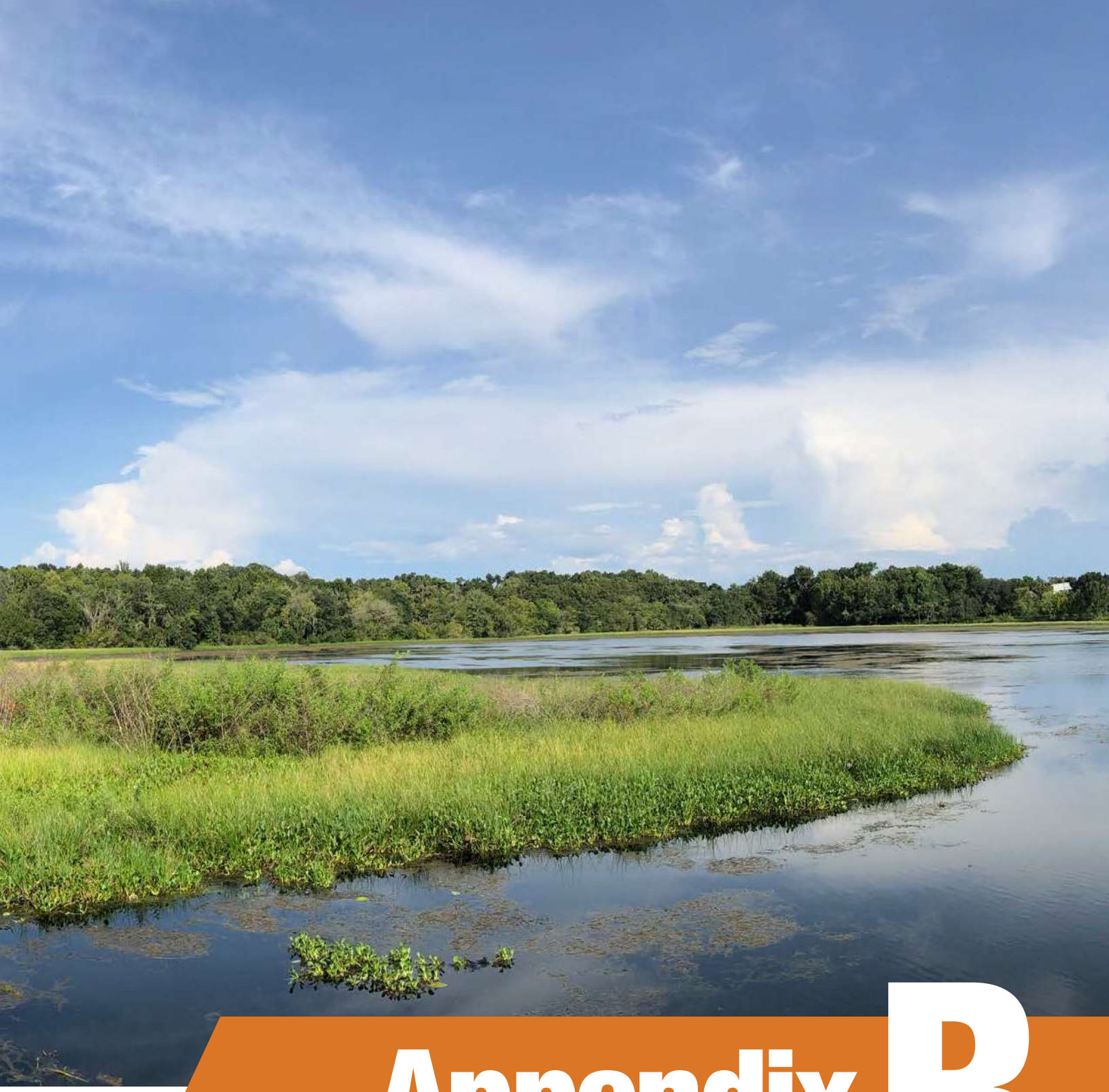
While the 2013-2017 American Community Survey (ACS) data generally reflect the February 2013 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

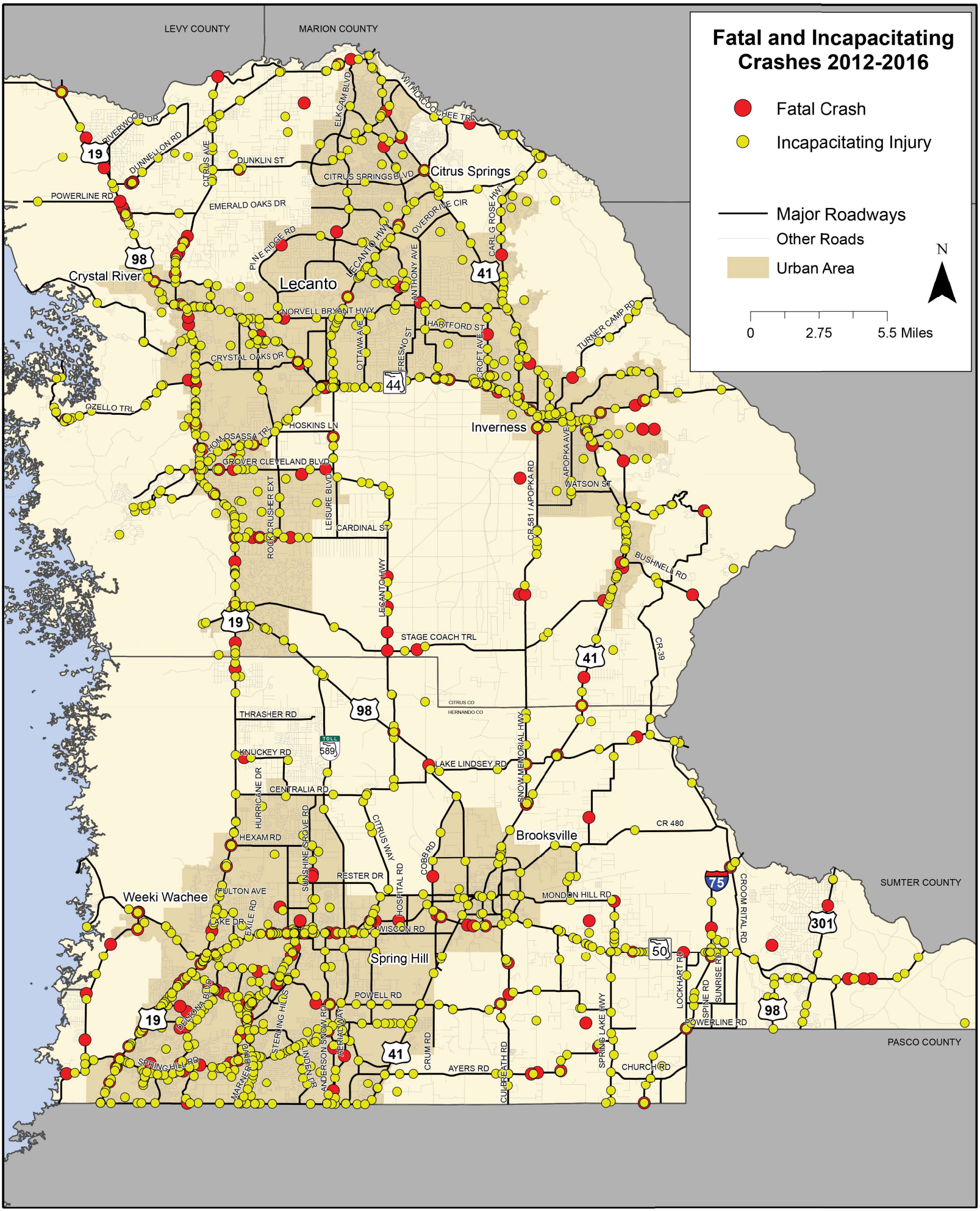
Explanation of Symbols:

1. An '**' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
2. An '-' entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.
3. An '-' following a median estimate means the median falls in the lowest interval of an open-ended distribution.
4. An '+' following a median estimate means the median falls in the upper interval of an open-ended distribution.
5. An '***' entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
6. An '*****' entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
7. An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
8. An '(X)' means that the estimate is not applicable or not available.



Appendix R

2045 LRTP CRASH DATA MAPS


Fatal and Incapacitating Crashes 2012-2016
Fatal Crash
Incapacitating Injury
Major Roadways
Other Roads
Urban Area
N
0
2.75
5.5 Miles
LEVY COUNTY
MARION COUNTY
SUMTER COUNTY
PASCO COUNTY
Citrus Springs
Lecanto
Crystal River
Inverness
Brooksville
Weeki Wachee
Spring Hill
RIVERWOOD DR
DUNNELLON RD
CITRUS AVE
DUNKLIN ST
CITRUS SPRINGS BLVD
POWERLINE RD
EMERALD OAKS DR
ELKCAM BLVD
WITHLACOOCHEE TRL
OVERDRIVE CIR
CARL G ROSE HWY
PINE RIDGE RD
LECANTO HWY
ANTHONY AVE
NORVELL BRYANT HWY
HARTFORD ST
TURNER CAMP RD
CRYSTAL OAKS DR
OTTAWA AVE
FRESNO ST
CROFT AVE
OZELLO TRL
HOSKINS LN
HOMOSASSA TR
GROVER CLEVELAND BLVD
ROCK CRUSHER EXT
LEISURE BLVD
CARDINAL ST
CR 581 / APOPKA RD
APOPKA AVE
WATSON ST
BUSHNELL RD
LECANTO HWY
STAGE COACH TRL
CR-39
CITRUS CO
HERNANDO CO
THRASHER RD
KNUCKEY RD
589
TOLL
LAKE LINDSEY RD
SNOW MEMORIAL HWY
CENTRALIA RD
HURRICANE DR
SUNSHINE GROVE RD
CITRUS WAY
COBB RD
HEXAM RD
CR 480
RESTER DR
HOSPITAL RD
FULTON AVE
LAKE DR
EXILE RD
MONDON HILL RD
CROOM RITAL RD
WISCON RD
POWELL RD
LOCKHART RD
SUNRISE RD
SPINE RD
POWERLINE RD
SPRING HILL RD
DELTONA BLVD
STERLING HILLS
ANDERSON SNOW RD
CRUM RD
AYERS RD
CULBRETH RD
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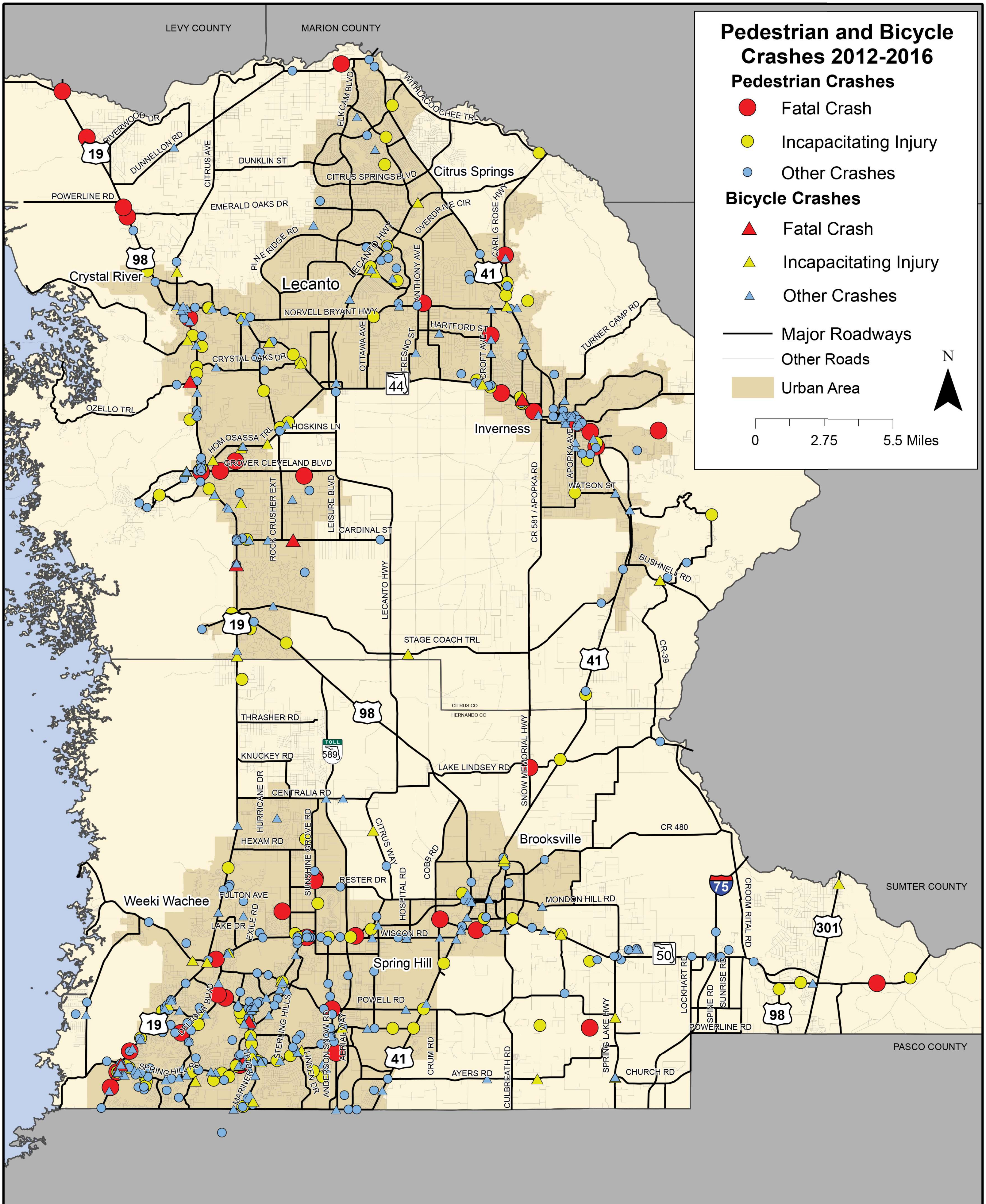
Pedestrian and Bicycle Crashes 2012-2016
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Fatal Crash
Incapacitating Injury
Other Crashes
Bicycle Crashes
Fatal Crash
Incapacitating Injury
Other Crashes
Major Roadways
Other Roads
Urban Area
N
0
2.75
5.5 Miles
LEVY COUNTY
MARION COUNTY
SUMTER COUNTY
PASCO COUNTY
Citrus Springs
Crystal River
Lecanto
Inverness
Brooksville
Weeki Wachee
Spring Hill
19
98
41
44
589
50
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301
RIVERWOOD DR
DUNNELLON RD
CITRUS AVE
DUNKLIN ST
POWERLINE RD
EMERALD OAKS DR
ELKCAM BLVD
WITHLACOOCHEE TRL
CITRUS SPRINGS BLVD
OVERDRIVE CIR
CARL G ROSE HWY
PINE RIDGE RD
LECANTO HWY
ANTHONY AVE
NORVELL BRYANT HWY
HARTFORD ST
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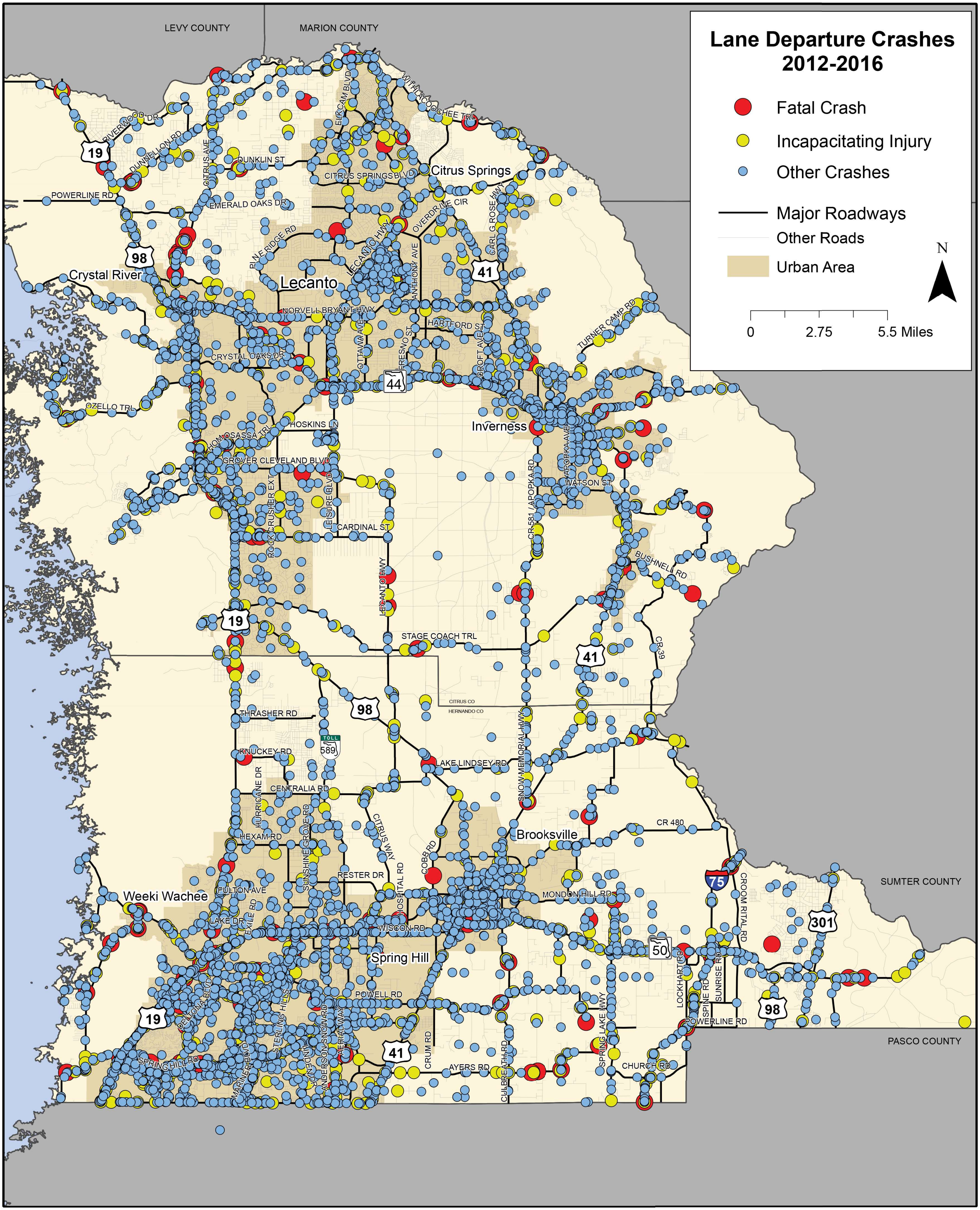
CHURCH RD


Lane Departure Crashes
2012-2016
Fatal Crash
Incapacitating Injury
Other Crashes
Major Roadways
Other Roads
Urban Area
N
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2.75
5.5 Miles
LEVY COUNTY
MARION COUNTY
SUMTER COUNTY
PASCO COUNTY
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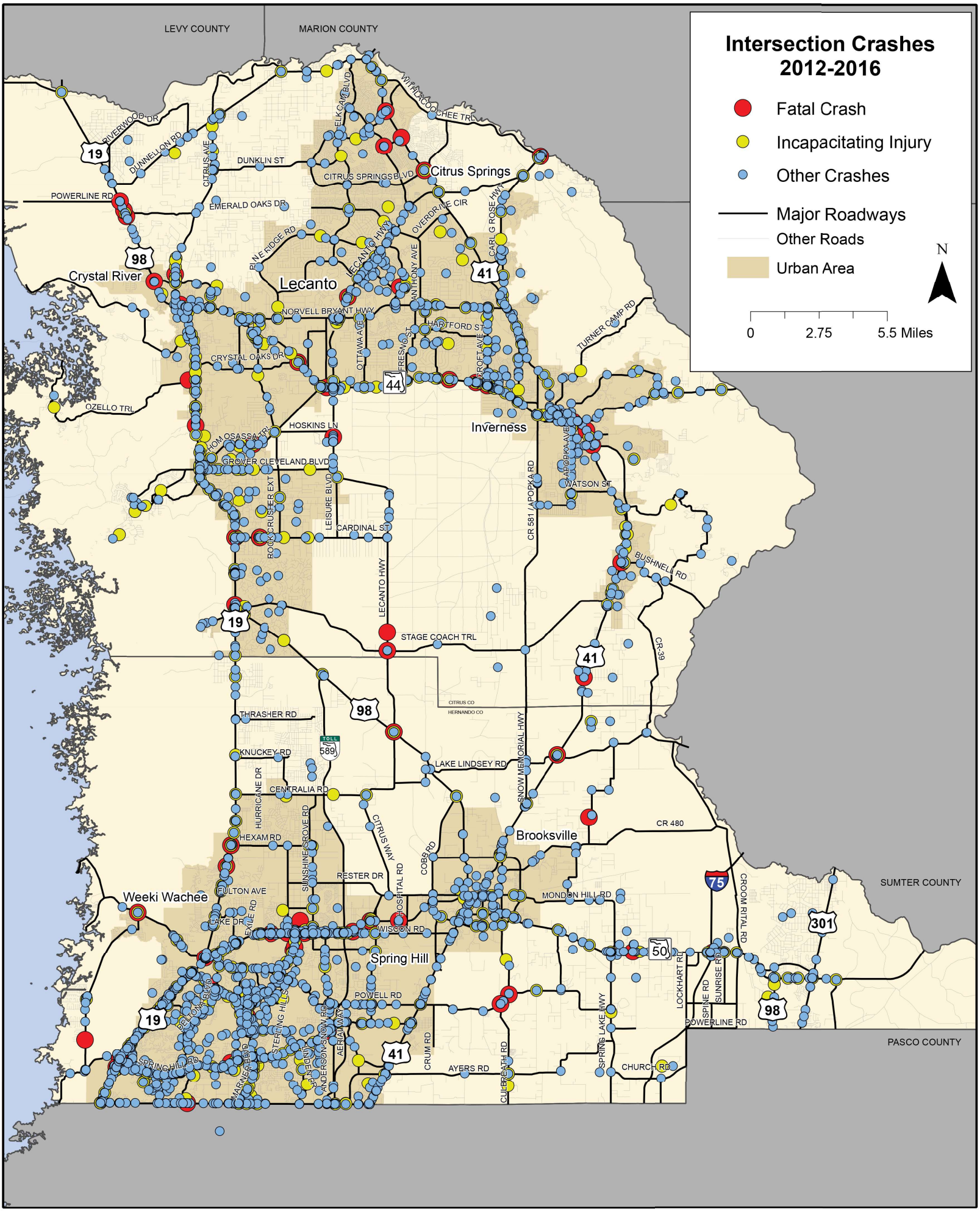
Weeki Wachee
Spring Hill
CITRUS CO
HERNANDO CO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Incapacitating Injury
Other Crashes
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Other Roads
Urban Area
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5.5 Miles
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MARION COUNTY
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Lecanto
Inverness
Brooksville
Weeki Wachee
Spring Hill
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OVERDRIVE CIR
CARL G ROSE HWY
ANTHONY AVE
FRESNO ST
OTTAWA AVE
CROFT AVE
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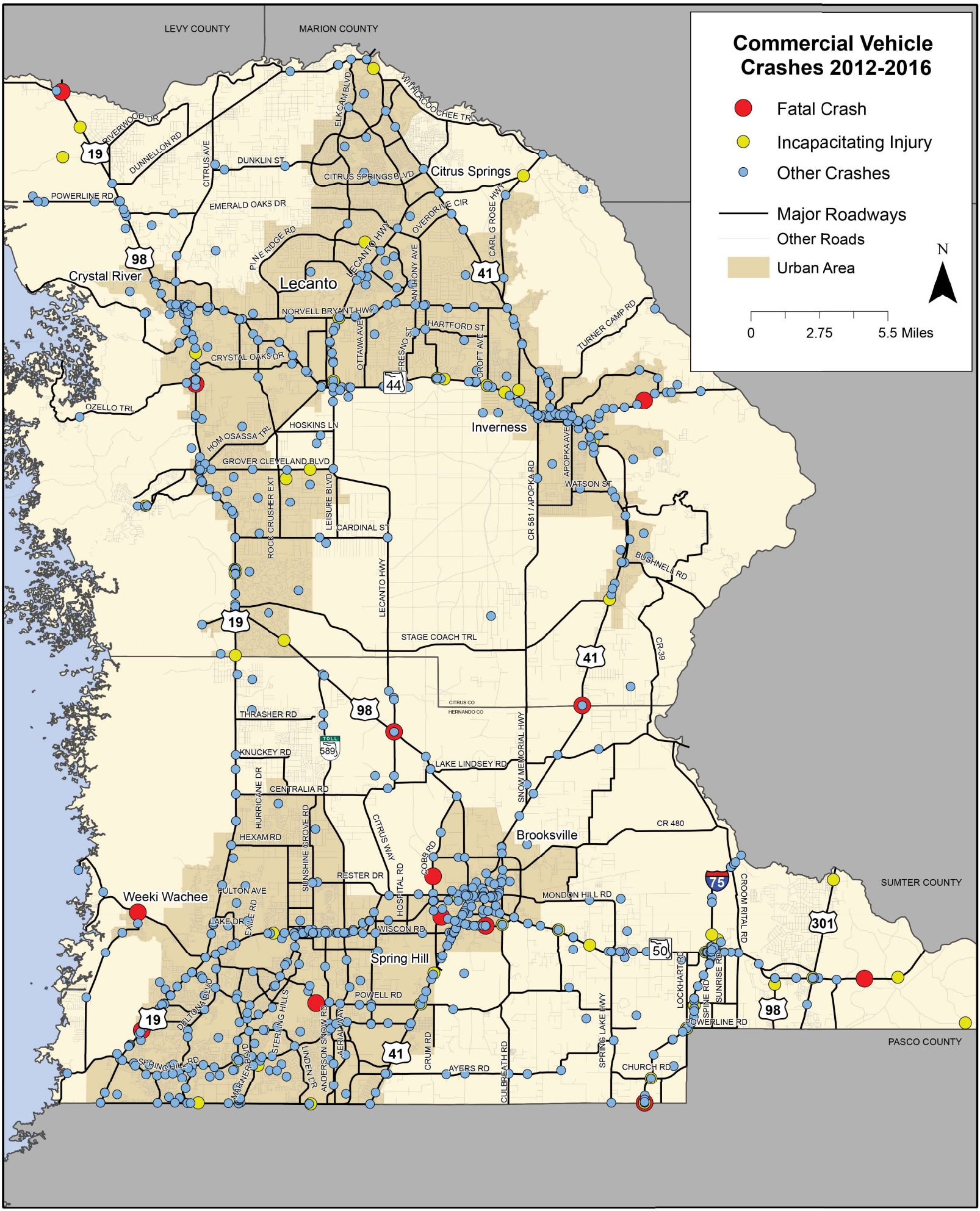
Commercial Vehicle Crashes 2012-2016
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Incapacitating Injury
Other Crashes
Major Roadways
Other Roads
Urban Area
N
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5.5 Miles
LEVY COUNTY
MARION COUNTY
SUMTER COUNTY
PASCO COUNTY
Citrus Springs
Lecanto
Crystal River
Inverness
Brooksville
Weeki Wachee
Spring Hill
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OVERDRIVE CIR
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ANTHONY AVE
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OZELLO TRL
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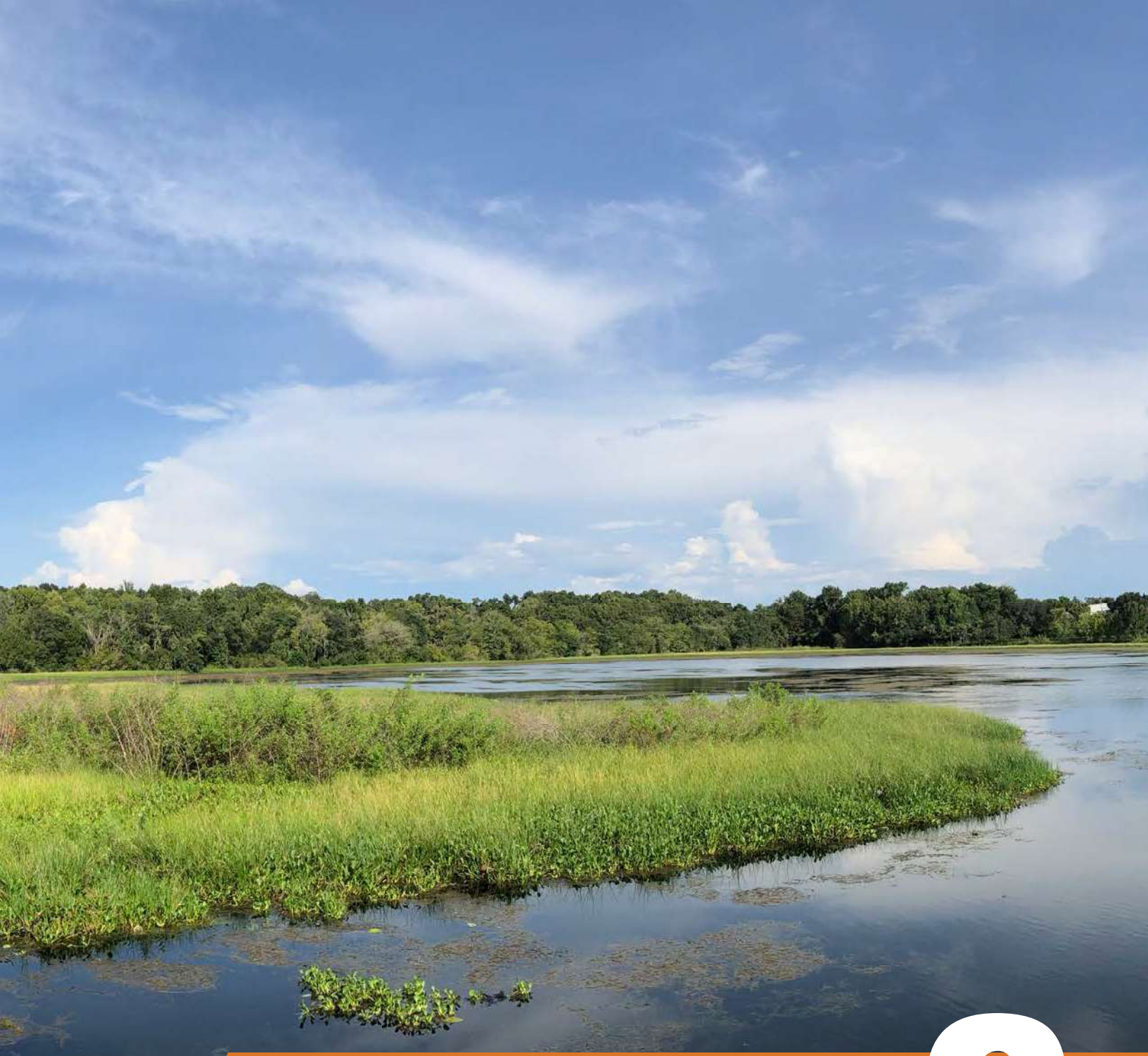
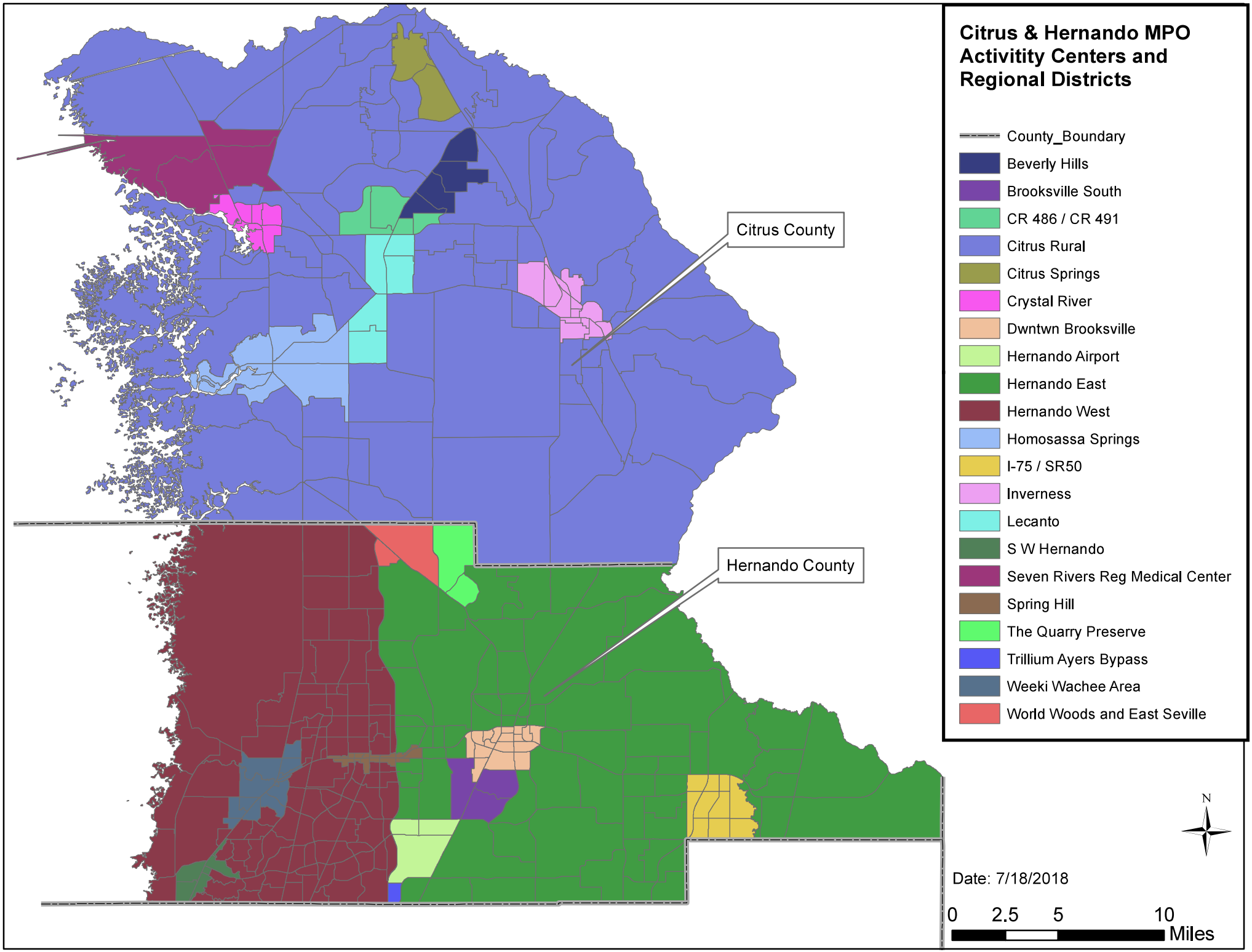


Appendix S

HERNANDO/CITRUS ACTIVITY CENTERS


Citrus & Hernando MPO
Activitity Centers and
Regional Districts
County_Boundary
Beverly Hills
Brooksville South
CR 486 / CR 491
Citrus Rural
Citrus Springs
Crystal River
Dwntwn Brooksville
Hernando Airport
Hernando East
Hernando West
Homosassa Springs
I-75 / SR50
Inverness
Lecanto
S W Hernando
Seven Rivers Reg Medical Center
Spring Hill
The Quarry Preserve
Trillium Ayers Bypass
Weeki Wachee Area
World Woods and East Seville
Citrus County
Hernando County
N
Date: 7/18/2018
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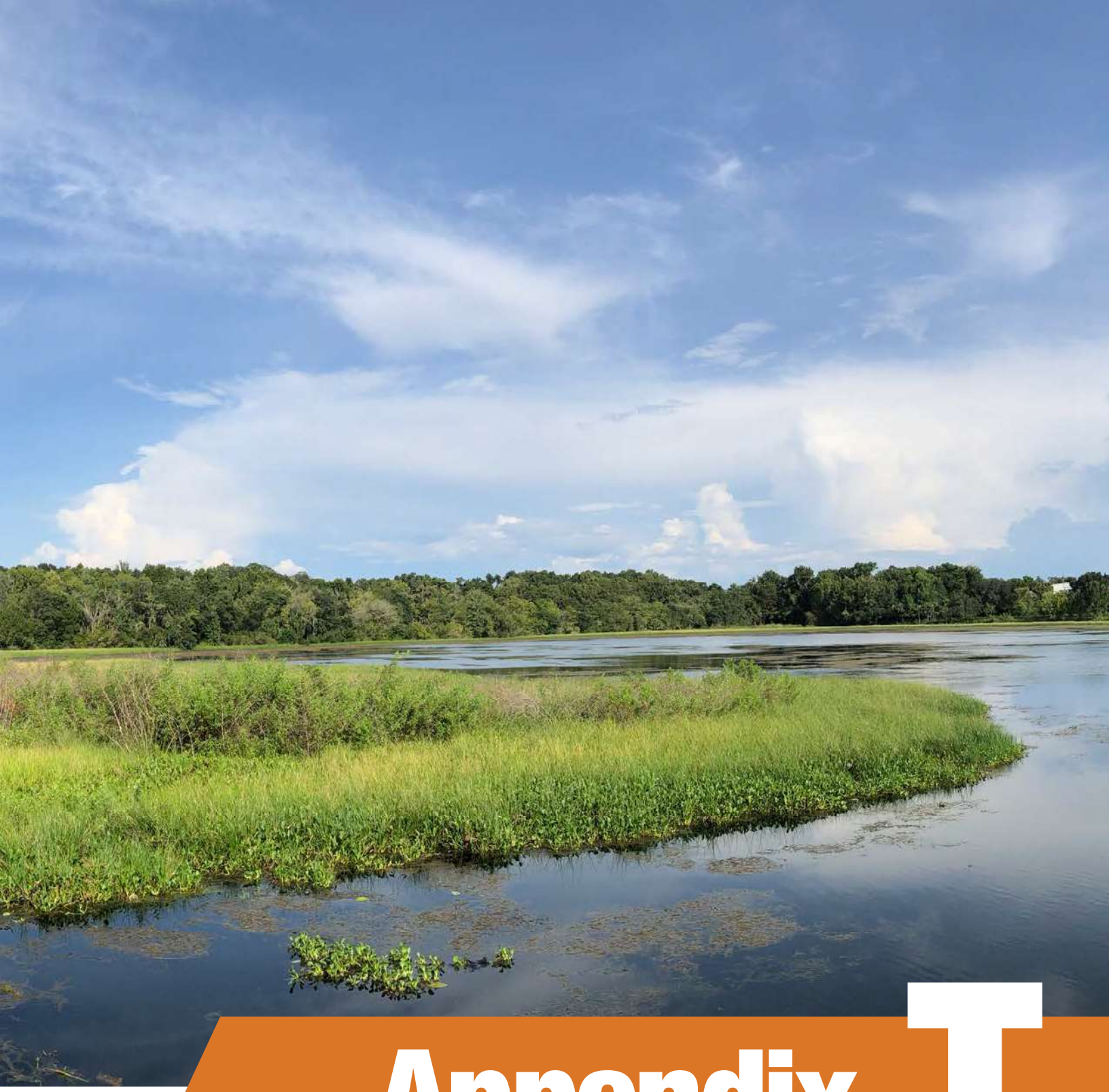
5
10
Miles



Appendix T

TTAMPA BAY REGIONAL EVACUATION PLAN

Florida Statewide Regional Evacuation Study Program

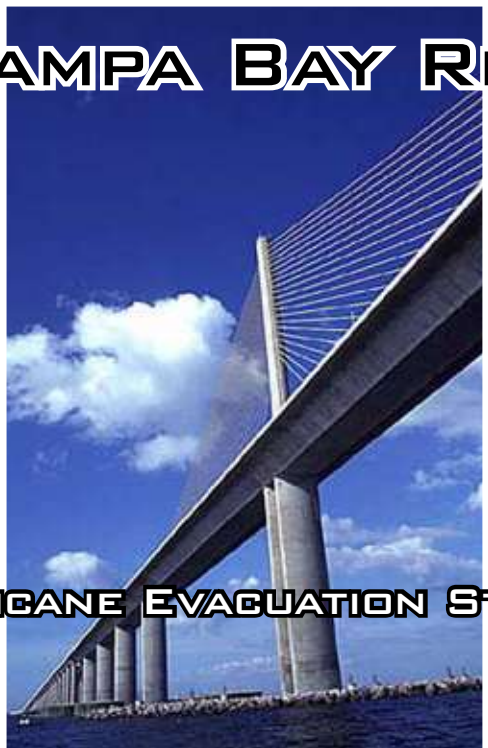
Evacuation Transportation Analysis

Volume 4-8

Florida Division of Emergency Management

Tampa Bay Planning Regional Council

Tampa Bay Region



2017

Includes Hurricane Evacuation Study

Statewide Regional Evacuation Study Program

Volume 4-8

Tampa Bay Region

EVACUATION TRANSPORTATION ANALYSIS

Executive Summary

(UPDATED 2017)

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CHAPTER VI
EVACUATION TRANSPORTATION ANALYSIS

The evacuation transportation analysis discussed in this chapter documents the methodology, analysis, and results of the transportation component of the Statewide Regional Evacuation Study Program (SRESP). Among the many analyses required for the SRESP study, transportation analysis is probably one of the most important components in the process. By bringing together storm intensity, transportation network, shelters, and evacuation population, transportation analysis explicitly links people's behavioral responses to the regional evacuation infrastructure and helps formulate effective and responsive evacuation policy options. Due to the complex calculations involved and numerous evacuation scenarios that need to be evaluated, the best way to conduct the transportation analysis is through the use of computerized transportation simulation programs, or transportation models.

A. Background and Purpose

Over the years, different planning agencies have used different modeling approaches with varying degrees of complexity and mixed success. Some have used full-blown conventional transportation models such as the standard Florida model FSUTMS; others have used a combination of a simplified conventional model and a spreadsheet program, such as the Abbreviated Transportation Model (ATM) as in the 2006 Tampa Bay Study Update. These models have different data requirements, use different behavioral assumptions, employ different traffic assignment algorithms, and produce traffic analysis results with different levels of detail and accuracy. These differences make it difficult for planning agencies to share information and data with each other. They also may produce undesirable conditions for staff training and knowledge sharing.

One of the objectives of the SRESP is to create consistent and integrated regional evacuation data and mapping, and by doing so, to facilitate knowledge sharing between state, regional, county, and local partners. To achieve this objective, it is important for all Regional Planning Councils to adopt the same data format and to use the same modeling methodologies for their transportation analyses. The primary purpose of the transportation component of the SRESP is to develop a unified evacuation transportation modeling framework that can be implemented with the data collected by the Regional Planning Councils.

B. Study Area

The study area for this analysis includes the six county Tampa Bay Regional Planning Council area. The transportation modeling methodology includes some processes that are performed at the statewide level, in order to determine the impacts of evacuations from other regions impacting the evacuation clearance times in the Tampa Bay region. While the impact of other regions is included in the Tampa Bay analysis, it is important to note that the results of the transportation analysis presented in this document are only reported for the six counties included in the Tampa Bay RPC. Transportation analysis results for other regions and counties are reported in the corresponding Volume 4 report for those regions.

C. Input and Coordination

The development of the transportation methodology and framework required coordination and input from all eleven regional planning councils in Florida, along with the Division of Emergency Management, Department of Transportation, Department of Community Affairs, and local county emergency management teams. At the statewide level, the transportation consultant, Wilbur Smith Associates, participated in SRESP Work Group Meetings which were typically held on a monthly basis to discuss the development of the transportation methodology and receive feedback and input from the State agencies and RPCs.

At the local and regional level, Wilbur Smith Associates conducted a series of four regional meetings to coordinate with and receive input from local county emergency management, the regional planning council, local transportation planning agencies and groups, as well as other interested agencies.

D. Transportation Study Comparisons

It is important to note that this study contains significant updates and revisions in comparison to the 2010 and 2015 SRESP study for the Tampa Bay Region. These revisions include new evacuation zones for most of the counties, and the addition of two counties to the previous 4-county region, and updates to the transportation model TIME. These revisions have noticeable impacts on evacuating vehicle behavior for the region and caused changes to the calculated clearance times in each county. These updates and revisions make comparisons to the previous original 2010 study difficult.

First, the population and demographic data that is used in this 2017 update are much more up-to-date than the data used in the original 2010 Study. This updated population data was accrued and compiled in 2015 and more accurately represents the actual population distribution and demographic characteristics across the Tampa Bay region. Because work on the 2010 Study began as early as 2006, population/demographic projections used for that Study did not account for the severe economic downturn (aka the "Great Recession"), which slowed population growth in the Tampa Bay region and throughout Florida beginning in 2007 and continuing well into the next decade. As the economy recovered and population growth rates increased, the actual geographic distribution of the population in 2015 may not match the geographic distribution of the population as forecast in the original 2010 Study. The population/demographic data used for this 2017 update to the Study is based on the 2010 Census, and are validated to 2014 Florida Department of Transportation (FDOT) and area Metropolitan Planning Organization (MPO) projections. Therefore, the population/demographic data used in this 2017 Study more accurately represent the actual population/demographic characteristics of a given geographic area. This provides a more accurate representation of traffic loading at specific locations on the regional roadway network, which may differ significantly from the 2010 Study and cause changes in evacuation clearance times. The geographic area has also increased significantly, although population in the new additional counties is not as dense or high as our two most populous counties, Hillsborough and Pinellas.

Second, the 2017 Update uses the updated modifications to the regional and statewide roadway networks from 2015. In part because of the "Great Recession" and lingering economic downturn that followed, some planned road construction projects that were represented in the transportation model for the 2010 Study were not completed, and other projects were accelerated because of increased Federal stimulus funding. The transportation modelling for the 2015 Update accounts for these changes, and provides a more accurate representation of the current and planned roadway network.

Finally, some changes were made in the evacuation transportation model for the 2017 Update to better handle evacuation zone importation as well as processing improvements. These model improvements for the 2017 Update did not alter the overall model framework as described in the following section, but may contribute to differences in evacuation clearance times compared with the original 2010 Study.

E. Evacuation Modeling Methodology and Framework

The evacuation modeling methodology and framework was developed during 2008 and 2009 in coordination with all eleven Regional Planning Councils and the Division of Emergency Management. The methodology used in the Tampa Bay RPC Evacuation Transportation Analysis is identical to the methodology used for all eleven Regional Planning Councils and includes the following components:

Behavioral Assumptions – In 2008, the Statewide Regional Evacuation Study Program (SRESP) commissioned a survey of Florida residents. The purpose of this survey was to develop an understanding of the behavior of individuals when faced with the prospect of an impending evacuation. These data were used to develop a set of "planning assumptions" that describe the way people respond to an order to evacuate and are an important input to the SRESP Evacuation Model. The behavioral data provides insights into how people respond to the changing conditions leading up to and during an evacuation. The primary application of the survey data was to help anticipate how people would respond with respect to five behaviors:

- How many people would evacuate?
- When they would leave?
- What type of refuge they would seek?
- Where they would travel for refuge?
- How many vehicles would they use?

These evacuation behaviors are distinguished based on several descriptive variables as listed below:

- Type of dwelling unit (site-built home versus mobile home);
- The evacuation zone in which the evacuee reside; and,
- The intensity of the evacuation that has been ordered.

Zone System and Highway Network - The SRESP evacuation model relies upon data that covers the entire State of Florida as well as areas covering the States of Georgia, Alabama, Mississippi, South Carolina, North Carolina, and Tennessee. While the primary focus of the model is with evacuation behavior within Florida, areas outside of the state

had to be considered in order to allow a more precise routing of evacuation traffic. This allows the model to measure the flow of traffic across the state line if needed.

The data included in this system contain the demographic information crucial to modeling evacuation traffic. The demographic information is labeled as "small area data". These data provide population and dwelling unit information that will identify where the individuals in the region reside. The planning assumptions developed from the behavioral analysis conducted for this study were applied to these demographic data. The result is a set of evacuation trips generated by the evacuation model. The number of these trips will vary depending on the hazard conditions that prompt the evacuation. Small area data geographies were aggregated into larger units known as Traffic Evacuation Zones (TEZ). These TEZ form the basic unit of analysis in the evacuation model. The final TEZ system for the State of Florida has 8,829 zones. This number provides sufficient detail to accurately accommodate the assignment of evacuation trips onto an evacuation network.

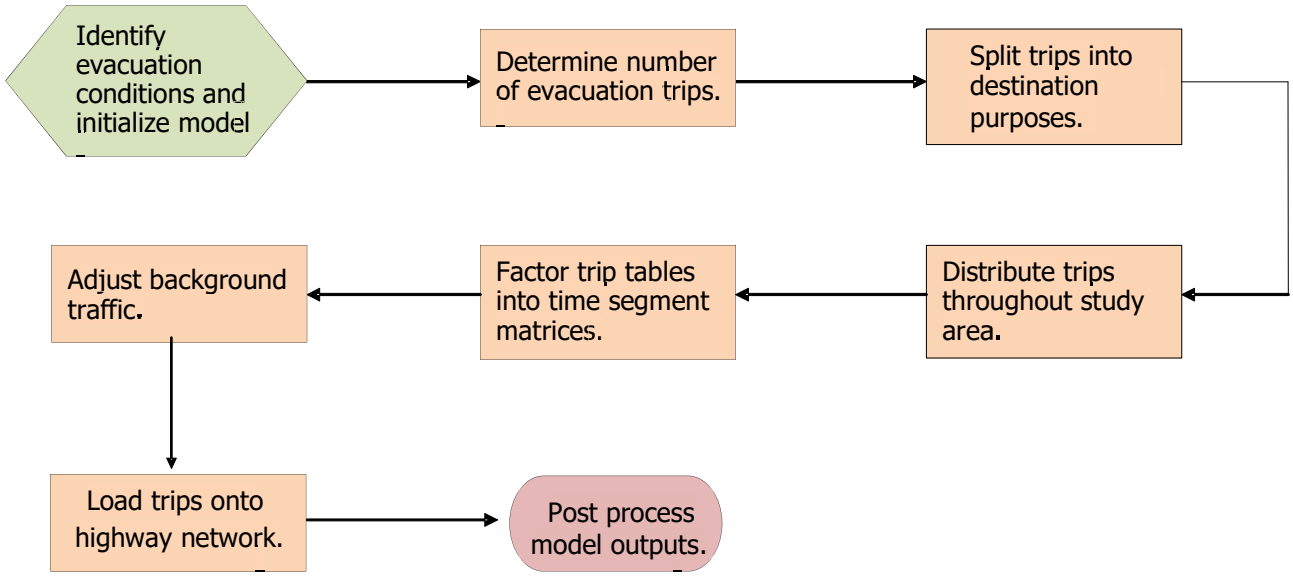
Background Traffic - The traffic that consumes the roadway capacity of a transportation system during an evacuation can be divided into two groups. The first group is the evacuation traffic itself. Once the evacuation demand is determined, this information is converted into a number of vehicles evacuating over time. These evacuation trips are then placed on a representation of the highway network by a model. The model determines the speed at which these trips can move and proceeds to move the evacuation trips accordingly. The result is a set of clearance times.

The second group of traffic is known as background traffic. Background traffic, as its name implies, is not the primary focus of an evacuation transportation analysis and is accounted for primarily to impede the movement of evacuation trips through the network. These trips represent individuals going about their daily business mostly unconcerned with the evacuation event. For the most part, background traffic represents trips that are relatively insensitive to an order to evacuate and are thus said to be occurring in the "background." Even though background traffic is relatively insensitive to evacuation orders, it is important to account for background traffic since it can have a dramatic impact on available roadway capacity. This in turn can severely affect evacuation clearance times.

Evacuation Traffic - The model flow for the evacuation model is divided into a total of eight modeling steps. The following eight steps are represented graphically in the flowchart in Figure ES-1:

1. Identify evacuation conditions and initialize model;
2. Determine number of evacuation trips;
3. Split trips into destination purposes;
4. Distribute trips throughout study area;
5. Factor trip tables into time segment matrices;
6. Adjust background traffic;
7. Load trips onto highway network; and,
8. Post process model outputs.

Figure ES-1 - General Model Flow



Dynamic Traffic Assignment - Dynamic traffic assignment (DTA) was utilized in the evacuation methodology because it is sensitive to individual time increments. DTA works by assigning a certain number of vehicles to the highway network in a given interval of time. The model then tracks the progress of these trips through the network over the interval. Another set of vehicles is assigned during the following time interval. The model then tracks the progress of these trips through the network along with the progress of the trips loaded in the previous time interval. As vehicles begin to arrive at the same segments of roadway, they interact with one another to create congestion. When vehicles that were loaded to the network in subsequent intervals of time arrive at the congested links, they contribute to the congestion as well. This results in a slowing down of the traffic and eventually spill-backs and queuing delays. It is this time dependent feature of DTA that makes it well suited to evacuation modeling. By dynamically adjusting the travel times and speeds of the vehicles moving through the network as they respond to congestion the model is able to do the following:

- The evacuation model is able to estimate the critical clearance time statistics needed for this study;
- The model takes into account the impact of compounded congestion from multiple congestion points;
- The model is able to adjust the routing of traffic throughout the network as a function of congestion as it occurs throughout the evacuation; and,
- The model is capable of adjusting its capacities from time segment to time segment, making it possible to represent such phenomena as reverse lane operations and background traffic.

Prototype Model Development - Wilbur Smith Associates (now CDM-Smith) developed a prototype model to test the modeling methodology used to calculate evacuation clearance times. The prototype model demonstrated the viability of the methodology developed for this study. This included the use of dynamic traffic

assignment, background traffic curves, regional sub-area trip balancing, the use of survey rates, the use of 100% participation rates, response curves, and county-by-county phasing of evacuations. The prototype model served as the backbone for all regional evacuation models that have been developed for this study. The models implemented for each RPC use a structure similar to the prototype with identical methodology.

F. Regional Model Implementation

The regional model developed for the Tampa Bay Region used a series of input data provided by the RPC, including the following:

Regional Model Network - The regional model network consists of the RPC designated evacuation routes as well as a supporting roadway network that facilitates movement of evacuation traffic. The 2005 Florida Department of Transportation (FDOT) Statewide Model Network was used as a basis for developing the original regional model network, and has been updated to a 2010 base network, while the evacuation routes were obtained from the Tampa Bay RPC. The RPC relied on the emergency managers of its constituent counties to provide it with information on which roads were to be included as evacuation routes. The resulting model network was updated to model timeframe conditions and is referred to as the base model network. **Figure ES-2** identifies the model network and evacuation routes for the TBRPC. County level details of the regional model network are provided in the Volume 5-8 report. The regional model network for the Tampa Bay region includes key roadways within the six county region, including I-4, I-75, I-275, US 301, US 19, SR 589, SR 39, SR 64, SR 70, SR 52, and SR 54.

Regional Zone System - The regional zone system is based on Traffic Evacuation Zones (TEZ) and contains the regional demographic information, which includes housing and population data that is essential to modeling evacuation traffic. There are 1,673 TEZs located within the six county Tampa Bay region, as illustrated in **Figure ES-3**. In the Tampa Bay region, Pinellas County has the largest number of TEZs with 631, with Hillsborough following 505 TEZs. Manatee and Pasco Counties are next with 332 and 205 zones, and rounding out the region, Hernando with 71 and Citrus with 55. The larger numbers of TEZs generally reflect counties with dense urban structure and higher population densities.

Regional Demographic Characteristics - Demographic data was updated for the following years: 2015, and 2020. A snapshot of the key demographic data for each county in the Tampa Bay RPC for 2015 and 2020 is summarized in **Table ES-1**. The tables list the number of occupied dwelling units for site built homes, the permanent population in site-built homes, as well as the number of occupied dwelling units for mobile homes and the permanent population in mobile homes. The mobile home

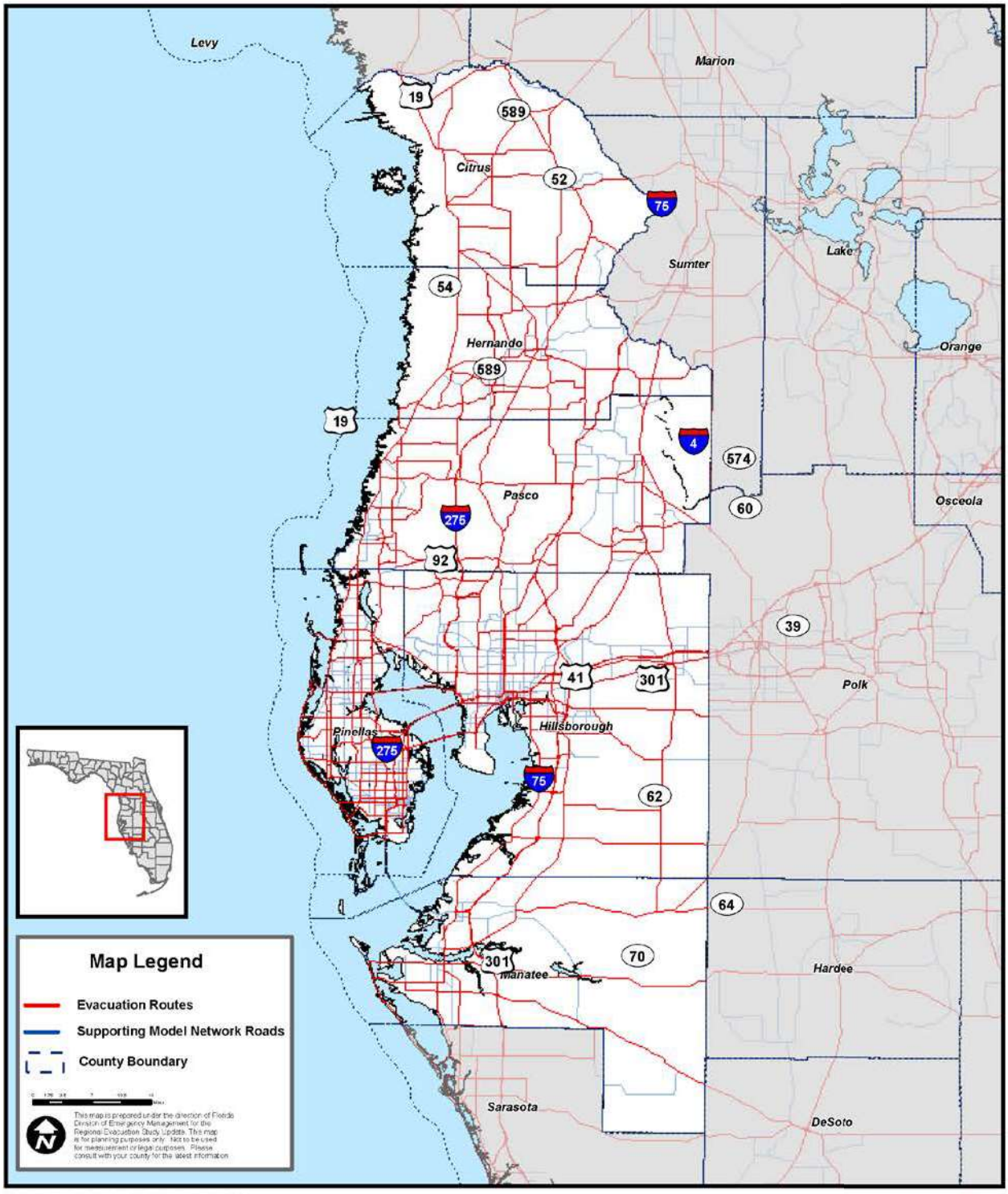
category includes RVs and boats and the permanent population in those housing options. The demographic characteristics summary also includes hotels and motels because many of these units are in vulnerable areas, and the proportion of seasonal units and hotel/motel units that are occupied at any point in time will have an important impact on the total population that may participate in an evacuation.

Hillsborough County has the largest population in the region during both periods. The county is expected to reach over 1.4 million people by 2020. Pinellas County has the second largest population in the region, and this county is far more densely populated than the other counties, including Hillsborough. This is very significant in the behavior of the evacuation transportation model because most of the population in Pinellas lives close to a coastline and in an evacuation zone.

The Figures and Table follow immediately…..

Figure ES-2

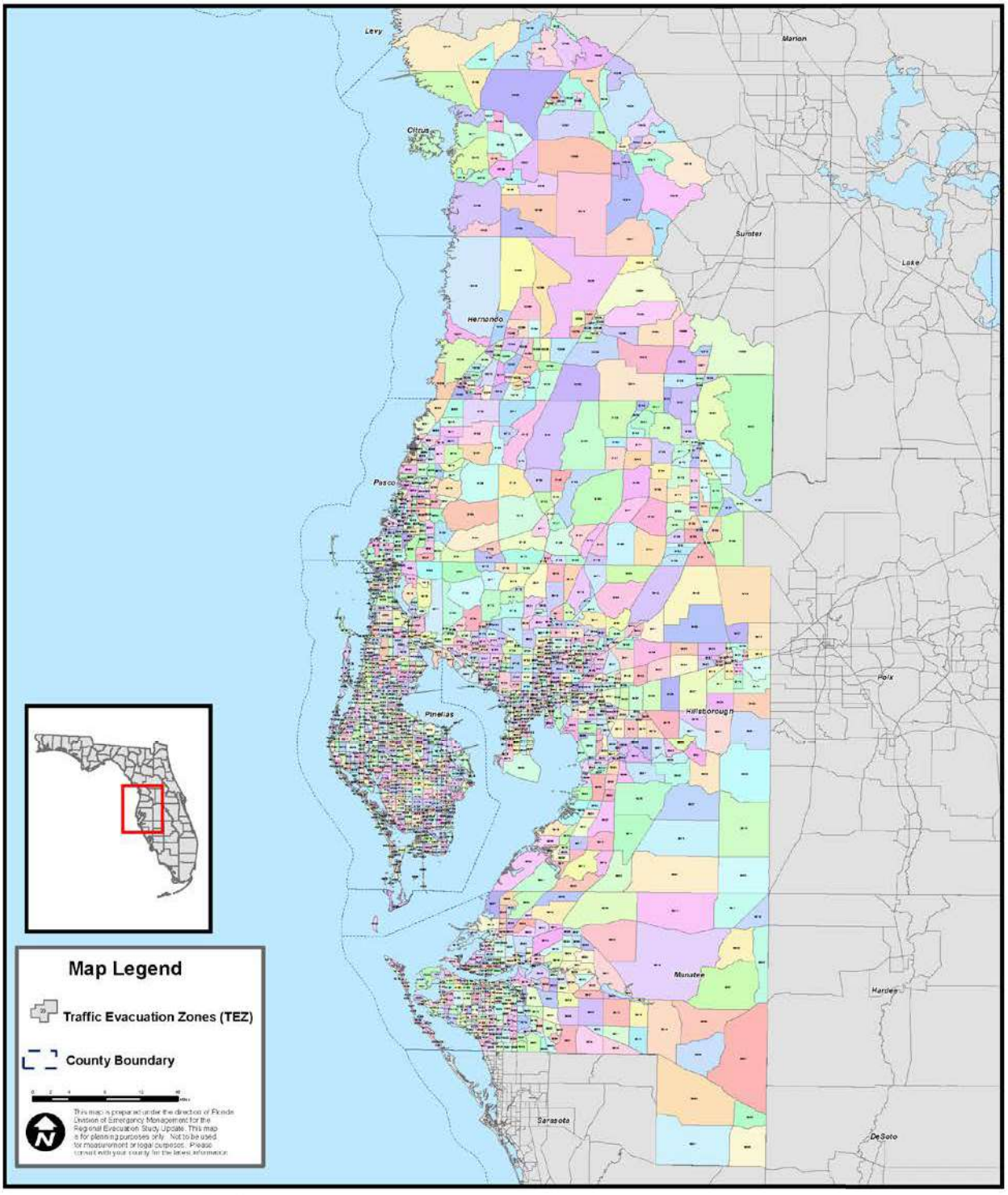
Tampa Bay Regional Model Network



Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

Figure ES-3
Tampa Bay Regional Model Transportation Evacuation Zone System (TEZ)



Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

Table ES-1 - Tampa Bay Demographic Characteristic Summary

County	Characteristic	Year	
		2015	2020
Citrus	Occupied site-built homes	50,073	53,715
	Population in site-built homes	107,457	115,243
	Occupied mobile homes	15,186	16,296
	Population in mobile homes	35,824	38,474
	Hotel/motel units	2,185	2,218
Hernando	Occupied site-built homes	63,012	69,461
	Population in site-built homes	153,599	169,294
	Occupied mobile homes	12,707	14,006
	Population in mobile homes	26,822	29,591
	Hotel/motel units	3,102	3,116
Hillsborough	Occupied site-built homes	477,120	515,727
	Population in site-built homes	1,219,576	1,320,729
	Occupied mobile homes	35,083	35,205
	Population in mobile homes	95,704	96,011
	Hotel/motel units	16,769	20,576
Manatee	Occupied site-built homes	120,987	126,729
	Population in site-built homes	284,827	300,548
	Occupied mobile homes	23,349	22,947
	Population in mobile homes	46,698	45,959
	Hotel/motel units	13,535	14,117
Pasco	Occupied site-built homes	195,253	225,087
	Population in site-built homes	467,959	531,523
	Occupied mobile homes	24,789	24,788
	Population in mobile homes	57,818	57,813
	Hotel/motel units	1,834	2,712
Pinellas	Occupied site-built homes	400,874	421,621
	Population in site-built homes	875,362	918,307
	Occupied mobile homes	35,909	36,451
	Population in mobile homes	51,271	52,047
	Hotel/motel units	13,603	16,037

Source: Tampa Bay Regional Planning Council, FDOT, MPOs

Planned Roadway Improvements - To correspond to the different sets of demographic data, two model networks were updated from original 2010 Study. The two networks to correspond to the 2015 demographic data and the 2020 demographic data. The 2010 base model network was updated to reflect roadway capacity improvement projects completed between 2011 and 2015 to create the 2015 network. The 2010 network was then updated to reflect planned roadway capacity improvement projects expected to be implemented between 2016 and 2020 to create the 2020 network.

The planned roadway improvements that were added to the network generally include only capacity improvement projects such as additional through lanes. **Table ES-2** identifies capacity improvement projects completed between 2010 and 2015 that were included in the 2015 network. Likewise, **Table ES-3** identifies capacity improvement projects planned for implementation between 2016 and 2020. The tables identify each roadway that will be improved as well as the extent of the improvement. For example, by the end of 2015 in Hillsborough County, US 301 from Balm Road to SR 674 will be widened to 8 lanes.

For this 2017 Update, FDOT reviewed the roadway network and deemed the 2015 network data fit for 2017 modeling. It is important to note that Tables IV-2 and IV-3 are not intended to be all inclusive of every transportation improvement project completed within the region. The tables only identify key capacity improvement projects that impact the evacuation model network and are anticipated to have an impact on evacuation clearance times.

Behavioral Assumptions - For the Tampa Bay Region, all six counties within the region have evacuation zones corresponding to five categories of storm surge. Evacuation rates for site-built homes and mobile/manufactured homes are provided by county and summarized in **Figure ES-4** through **Figure ES-11**. Other rates, such as out of county trip rates, vehicle use rates, public shelter use rates, friend/relative refuge use rates, hotel/motel refuge use rates, and other refuge use rates, are detailed by county, storm threat, and evacuation zone in Volume 5-8.

A review of the evacuation rates for the Tampa Bay region illustrates that evacuation participation rates increase as the evacuation level increases, and participation rates for persons living in mobile/manufactured homes are generally higher than for persons living in site-built homes. It should be noted that a certain percentage of the population evacuates, even when they are not living in an area that is ordered to evacuate. These people are commonly referred to as shadow evacuees. Shadow evacuation rates are also included in Figure ES-4 through Figure ES-11.

Shelters - In order for the transportation model to accurately assign public shelter trips to the correct location, a complete list of available public shelters needs to be available. The shelters were categorized as either primary or other, with primary indicating that the shelter is compliant with American Red Cross standards for a shelter and other indicating all other shelters. In the six county region there are a total of 182 shelters, including 27 in Citrus County, 20 in Hernando County, 47 in Hillsborough County, 25 in Manatee County, 29 in Pasco County, and 34 in Pinellas County, all of which are classified as primary shelters. Altogether, the 182 shelters located within the six county region can host more than 198,900 persons during an evacuation event.

Table ES-2 - Tampa Bay Region Roadway Improvements, 2011-17

County	Roadway	From	To	No. Lanes
Citrus	CR 486	SR 44	Ottawa Ave	4
	US 19 (SR 55)	W Cornflower Dr	W Foss Grove Path	6
Hernando	SR 50 (Cortez Blvd)	US 19 (SR 55)	W of Mariner Blvd	6
	I-75 (SR 93)	N of SR 50	Hernando/Sumter County Lines	6
	I-75 (SR 93)	S of US 98/SR 50/Cortez	N of US 98 – SR 50 Cortez	6
	I-75 (SR 93)	Pasco/Hernando County Lines	S of US 98 – SR 50 Cortez	6
	SR 50 (Cortez Blvd)	W of Mariner Blvd	SR 589 (Suncoast Pwy)	6
Hillsborough	Lutz Lake Fern Rd	Suncoast Parkway	TPC Blvd	4
	Lutz Lake Fern Rd	TPC Blvd	Dale Mabry Highway	2
	SR 574	W of Highview	E of Parsons Ave	4
	I-4/Selmon Expressway	S of Selmon Expresswy	7th Ave	4
	I-4/Selmon Expressway	7th Ave	I-4	4
	I-275	Tampa CBD Interchange	ML King Blvd	8
	I-275	MLK	Fowler	6
	N 21st St/N 22nd St	SR 60	I-4	4
	US 301	Balm Rd	SR 674	2
Manatee	I-75	Fruitville Rd	N of University Prkwy	8
Pasco	Clinton Ave.	Ft. King Hwy	U.S.301	4
	Denton Ave	US 19	Shady Hills	2
	CR 587 (Mass Ave)	Congress St	Little Rd (CR 1)	4
	CR 587 (Mass Ave)	Little Rd (CR 1)	SR 52	2
	CR 518 (Trouble Creek Rd)	US 19	Rowan Rd	2
	Mitchell Blvd	CR 77	CR 1	4
	Trinity Blvd	Little Rd (CR 1)	SR 54	2
	I-75	I-275/Pasco County Line	SR 56	10
	I-75	SR 56	SR 54	6
	I-75	SR 54	Hernando County Line	4
Pinellas	Keystone Rd	US 19	East Lake Rd	4
	Bryan Dairy Rd	Starkey Rd	72nd St	6
	US 19 (SR 55)	N of Whitney Rd	S of Seville Rd	10
	US 19 (SR 55)	S of Seville Blvd	N of SR 60	10
	SR 688 (Ulmerton Rd)	W of 38th ST	W of I-275	6
	SR 688 (Ulmerton Rd)	E of 119th ST	W of Seminole Bypass	6
	SR 688 (Ulmerton Rd)	E of Wild Acres Road	El Centro / Ranchero Blvd	6
	SR 688 (Ulmerton Rd)	El Centro Ranchero	W of US 19	6

County	Roadway	From	To	No. Lanes
	Starkey Rd (Park Street)	84th Lane	Tyrone Blvd	4
	Gandy Blvd	4th Street North	28th St (Ext)	4
	Pinellas Bayway/54th Ave South	Gulf Blvd	Bahia Del Mar	4
	Trinity Blvd	East Lake Rd	Little Rd (CR 1)	4

Sources: FDOT,MPOs,Tampa Bay Regional Planning Council
Note: Only projects which added roadway capacity, such as additional through lanes, were included. The list is not intended to be all inclusive of every transportation improvement project completed within the region.
** 10 lanes includes 6 partially controlled lanes w/ 4-lane service roads*

Table ES-3 - Tampa Bay Planned Roadway Improvements, 2018-20

County	Roadway	From	To	Number of Lanes
Citrus	US 19 (SR 55)	W Green Acres St	W Jump Ct	6
	US 19 (SR 55)	W Jump Ct	W Fort Island Trail	6
Hernando	Suncoast Pkwy	US 98	Hernando/Citrus County Lines	4
	SR 50	Lockhart Rd	E of Remington Rd	6
Hillsborough	US 301	Balm Rd	SR 674	6
	Bruce B. Downs Blvd	Pebble Creek Dr	Pasco County	8
	I-275 (SR 93)	Himes Ave	Hillsborough River	8
	I-275 (SR 93)	SR 60 (Memorial Hwy)	Himes Ave	8
	I-275 (SR 93)	Howard Frankland	Himes Ave	8
	I-75	S of Fowler Ave	N of CR-581	8
	I-75	N of Fowler Ave	Bruce B Downs	8
	I-275	SR 60/Memorial Interchange	Tampa CBD Interchange	8
	I-75	Bruce B Downs	I-275/Pasco County Line	6
	SR 589 (Veteran's Expy)	S of Gunn Hwy	Sugarwood Mainline Plaza	6
	SR 589 (Veteran's Expy)	Sugarwood Mainline Plaza	Van Dyke Rd	8
	SR 589 (Veteran's Expy)	Memorial Hwy	Barry Rd	6
	SR 589 (Veteran's Expy)	Barry Rd	S of Gunn Hwy	8
	SR 60 (Adamo Dr)	E of US 301	W of FlakenBurg Rd	6
Manatee	I-75	N SR 64	N of 301 Interchange	8
Pasco	SR 52 (Schrader Hwy)	E of Old Pasco Rd	McKendree Rd	4
Pinellas	Starkey Rd	84th Lane	Flamevine Rd	6
	US 19 (SR 55)	N of SR 580 (Main St)	Northside Dr	6

County	Roadway	From	To	Number of Lanes
	I-275 (SR 93)	S of 118th Ave	S of 4th St N	8
	Gateway Expy	SR 690 at US 19/ SR 686 Ext at CR 611	W of I-275	4
	SR 688 (Ulmerton Rd)	E of 49th St	W of 38th St N	6

Sources: FDOT,MPOs,Tampa Bay Regional Planning Council
Note: Only projects which added roadway capacity, such as additional through lanes, were included. The list is not intended to be all inclusive of every transportation improvement project completed within the region.

Figure ES-4 - Evacuation Participation Rates: Citrus County - Site-Built Homes

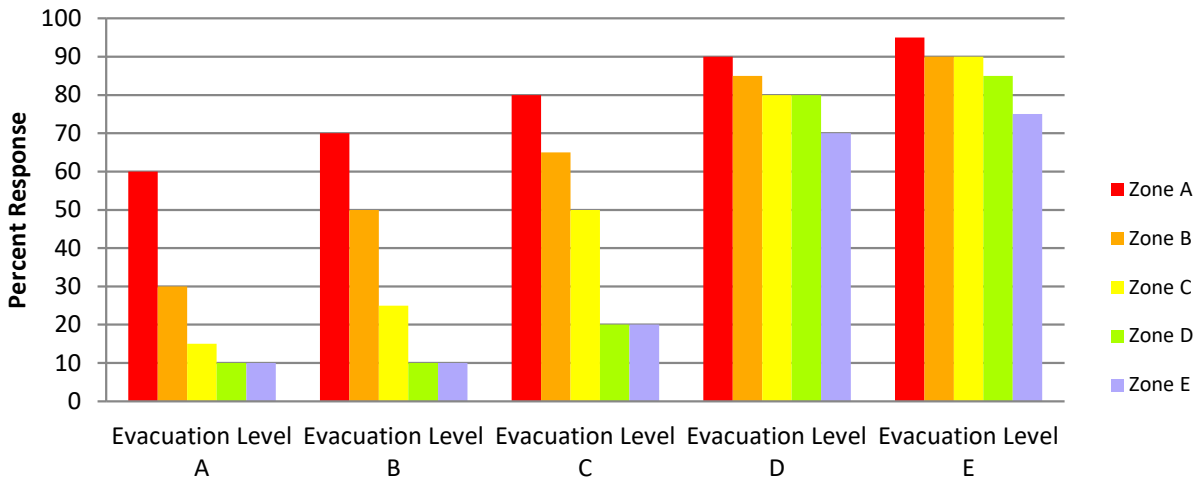


Figure ES-5 - Evacuation Participation Rates: Citrus County - Mobile Homes

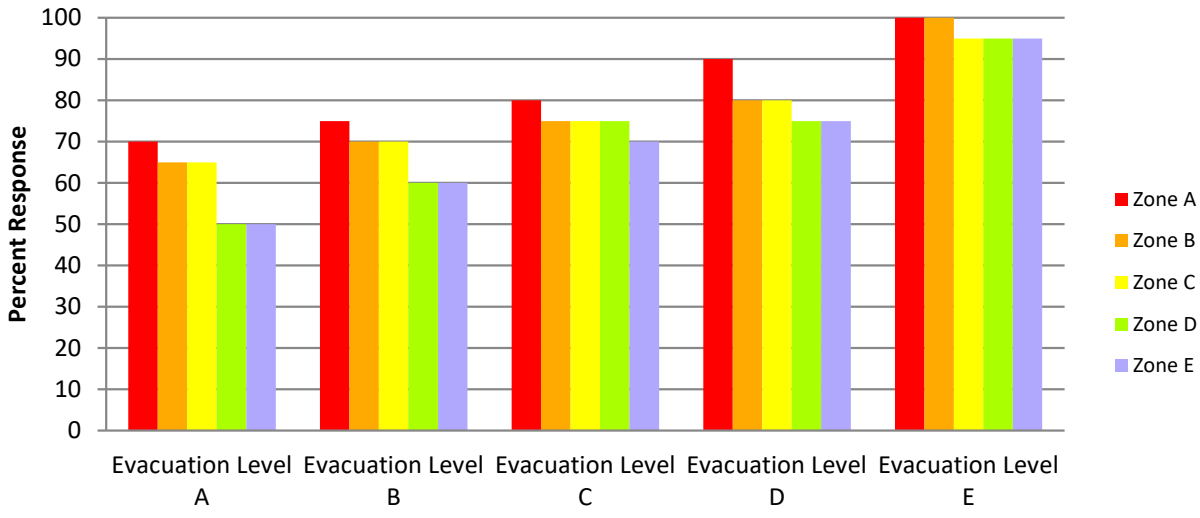


Figure ES-6 - Evacuation Participation Rates: Hernando County - Site-Built Homes

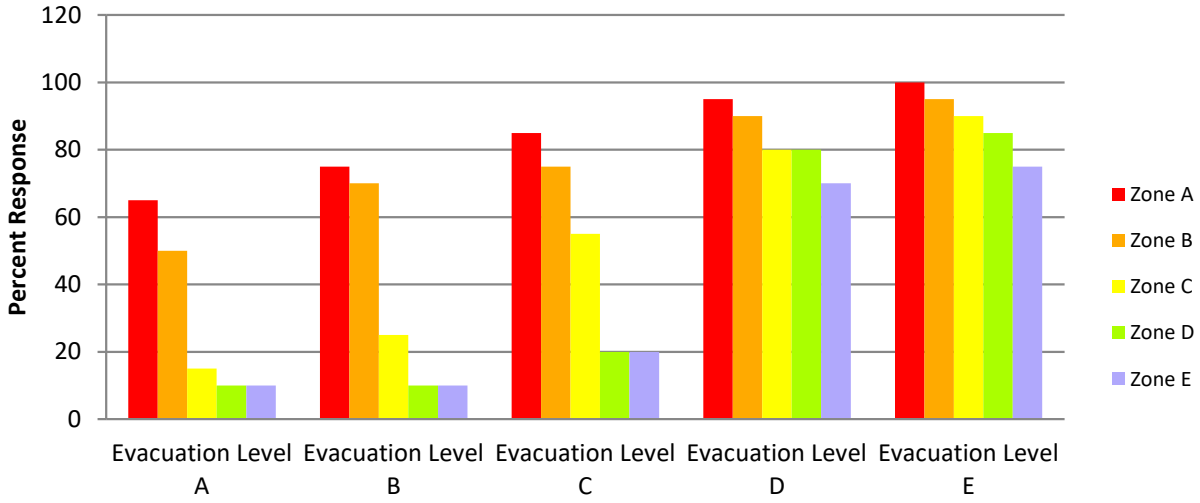
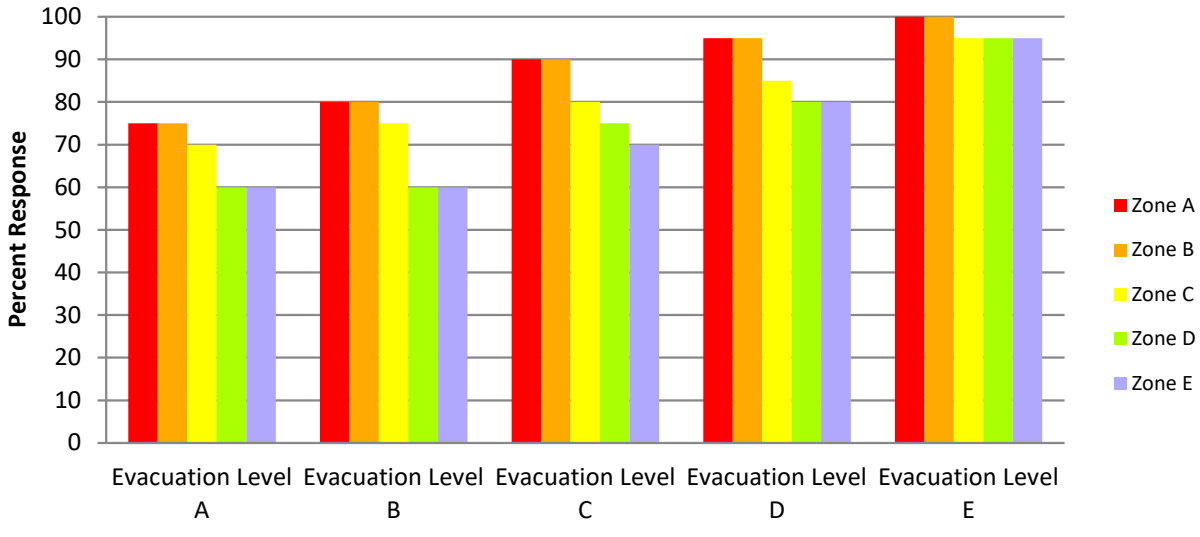


Figure ES-7 - Evacuation Participation Rates: Hernando County - Mobile Homes



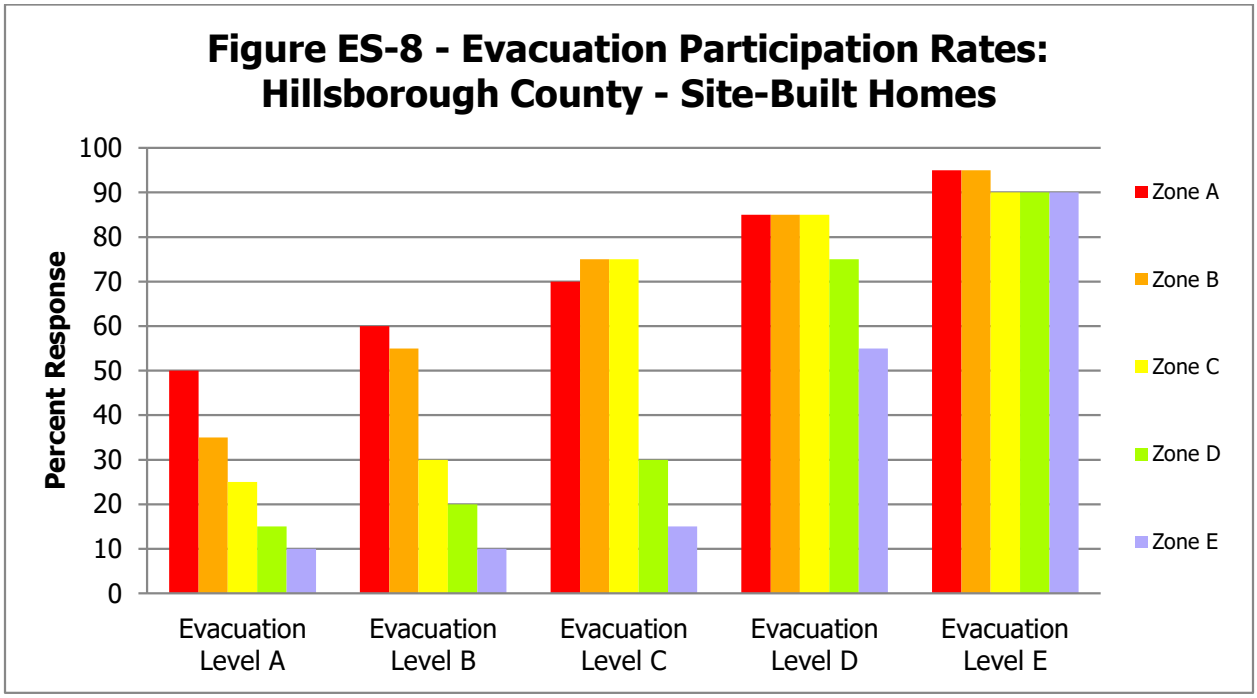


Figure ES-8 - Evacuation Participation Rates:
Hillsborough County - Site-Built Homes
Percent Response
100
90
80
70
60
50
40
30
20
10
0
Evacuation Level A
Evacuation Level B
Evacuation Level C
Evacuation Level D
Evacuation Level E
Zone A
Zone B
Zone C
Zone D
Zone E

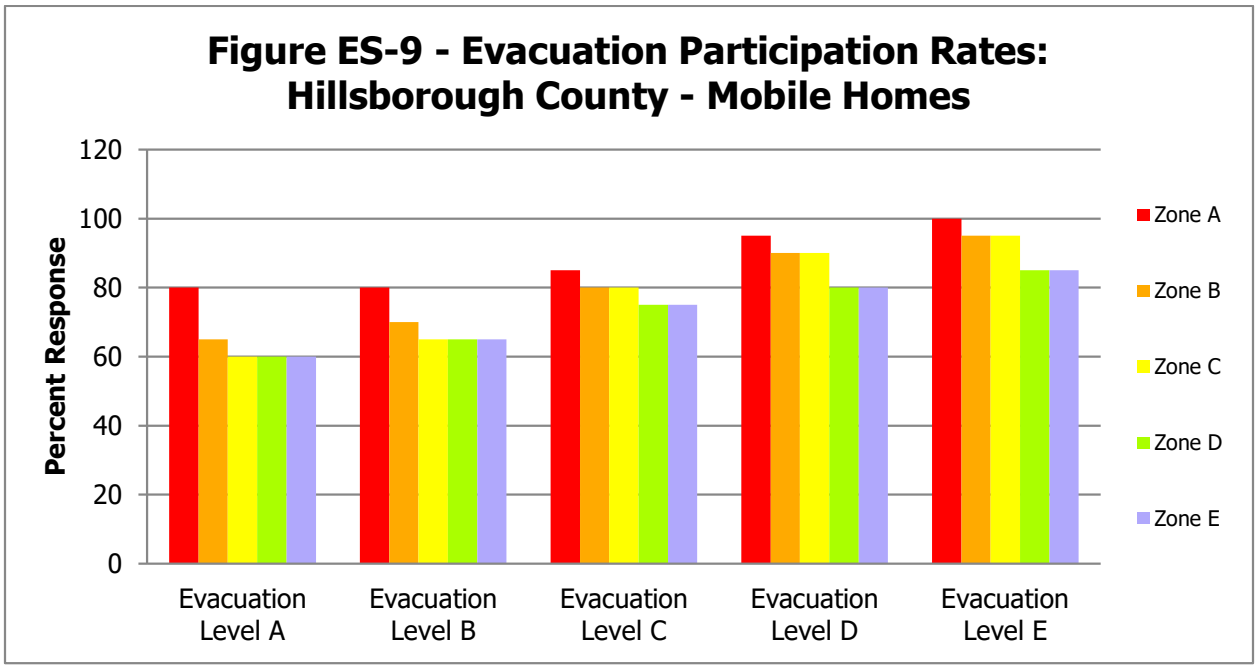


Figure ES-9 - Evacuation Participation Rates:
Hillsborough County - Mobile Homes
Percent Response
120
100
80
60
40
20
0
Evacuation Level A
Evacuation Level B
Evacuation Level C
Evacuation Level D
Evacuation Level E
Zone A
Zone B
Zone C
Zone D
Zone E

Figure ES-10 - Evacuation Participation Rates: Manatee County - Site-Built Homes

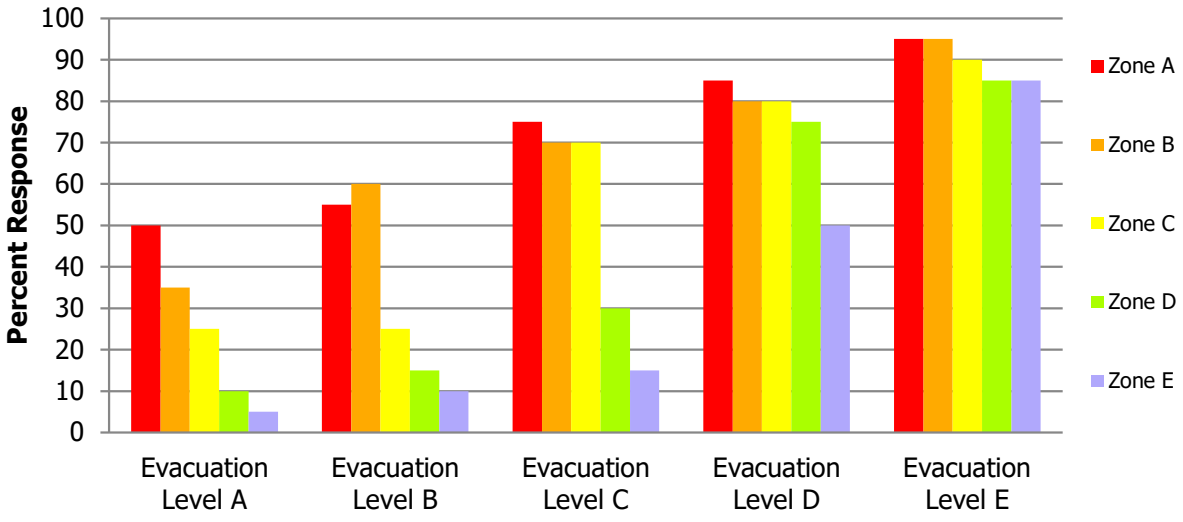


Figure ES-11 - Evacuation Participation Rates: Manatee County - Mobile Homes

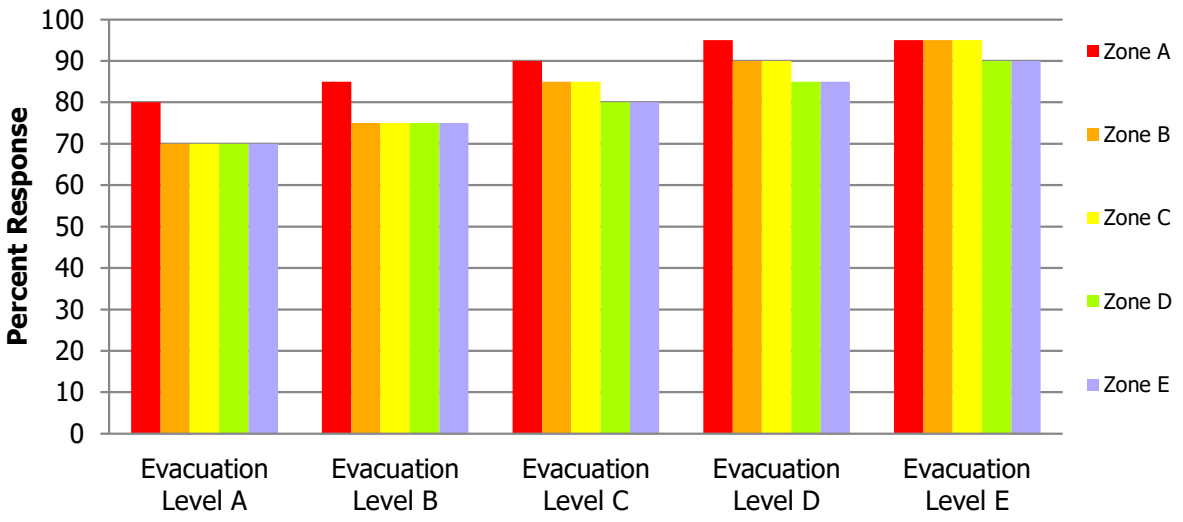


Figure ES-12 - Evacuation Participation Rates: Pasco County - Site-Built Homes

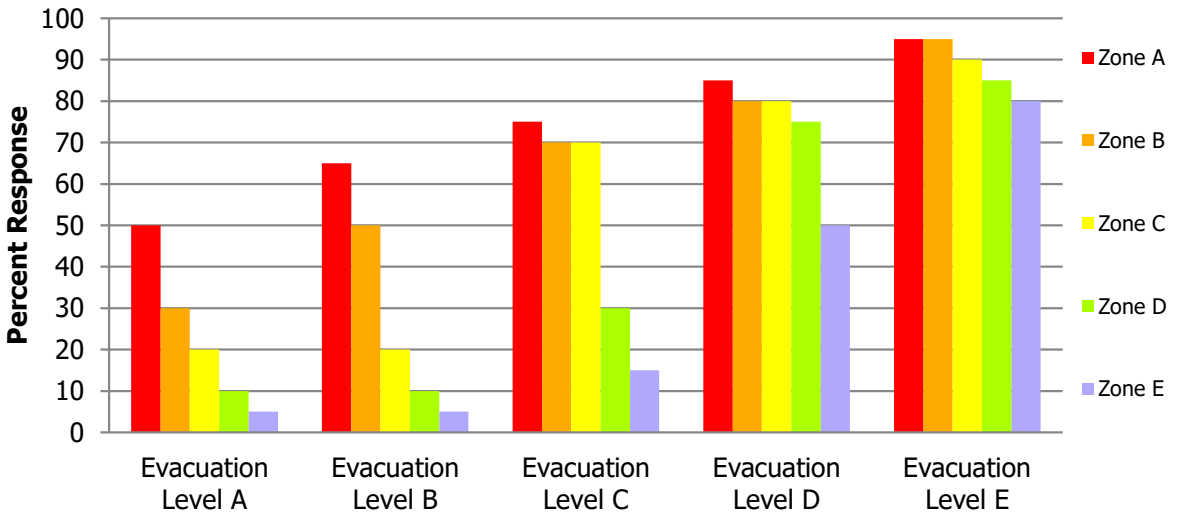


Figure ES-13 - Evacuation Participation Rates: Pasco County - Mobile Homes

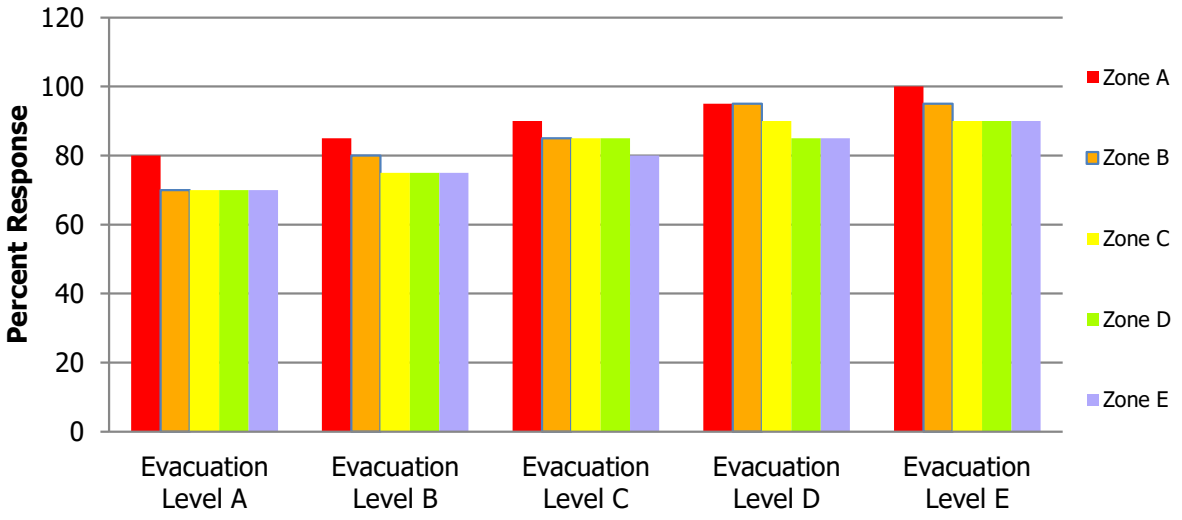


Figure ES-14 - Evacuation Participation Rates: Pinellas County - Site-Built Homes

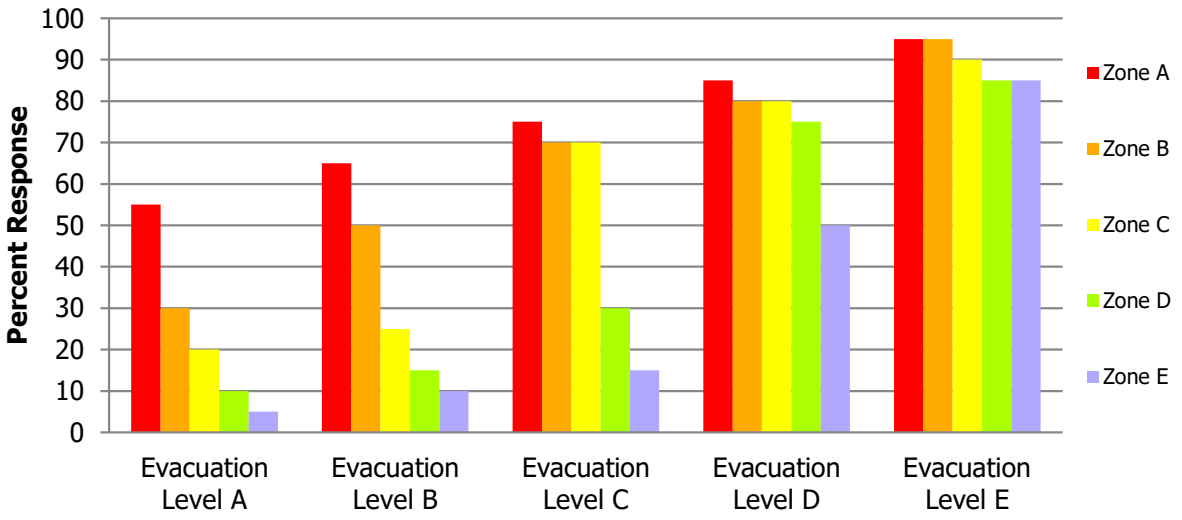
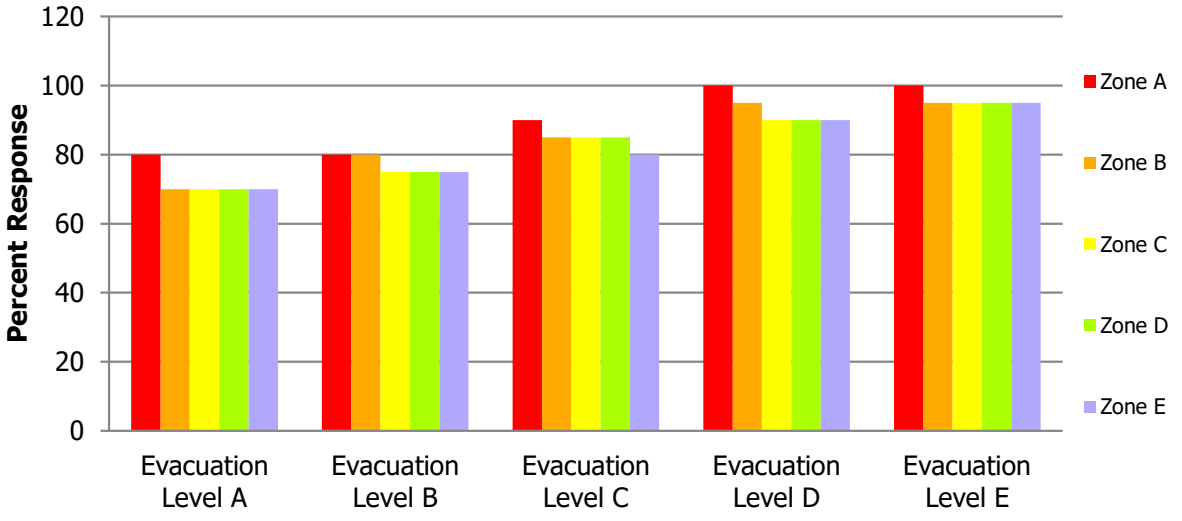


Figure ES-15 - Evacuation Participation Rates: Pinellas County - Mobile Homes



Evacuation Zones - The final input variable that is needed to complete the transportation evacuation model is the delineation of evacuation zones for all coastal counties. Local county emergency managers have the responsibility of identifying and defining evacuation zones for their county. Three out of six counties within the Tampa Bay region updated and established their evacuation zones in 2017 based on the results of the data output derived from the new NHC SF1 SLOSH basin that covers the southern half of Florida. County level evacuation zones are included in Volume 5-8.

G. TIME User Interface

Wilbur Smith Associates (now CDM-Smith) developed the Transportation Interface for Modeling Evacuations (TIME) to make it easier for RPC staff and transportation planners to use the model and implement the evacuation methodology. The TIME interface is based on an ArcGIS platform and is essentially a condensed transportation model, which provides a user friendly means of modifying input variables that would change the clearance times for various evacuation scenarios.

The evacuation model variables include a set of distinguishing characteristics that could apply to evacuation scenarios as selection criteria. These following variables may be selected using the TIME interface and allow the user to retrieve the best results from various evacuation alternatives:

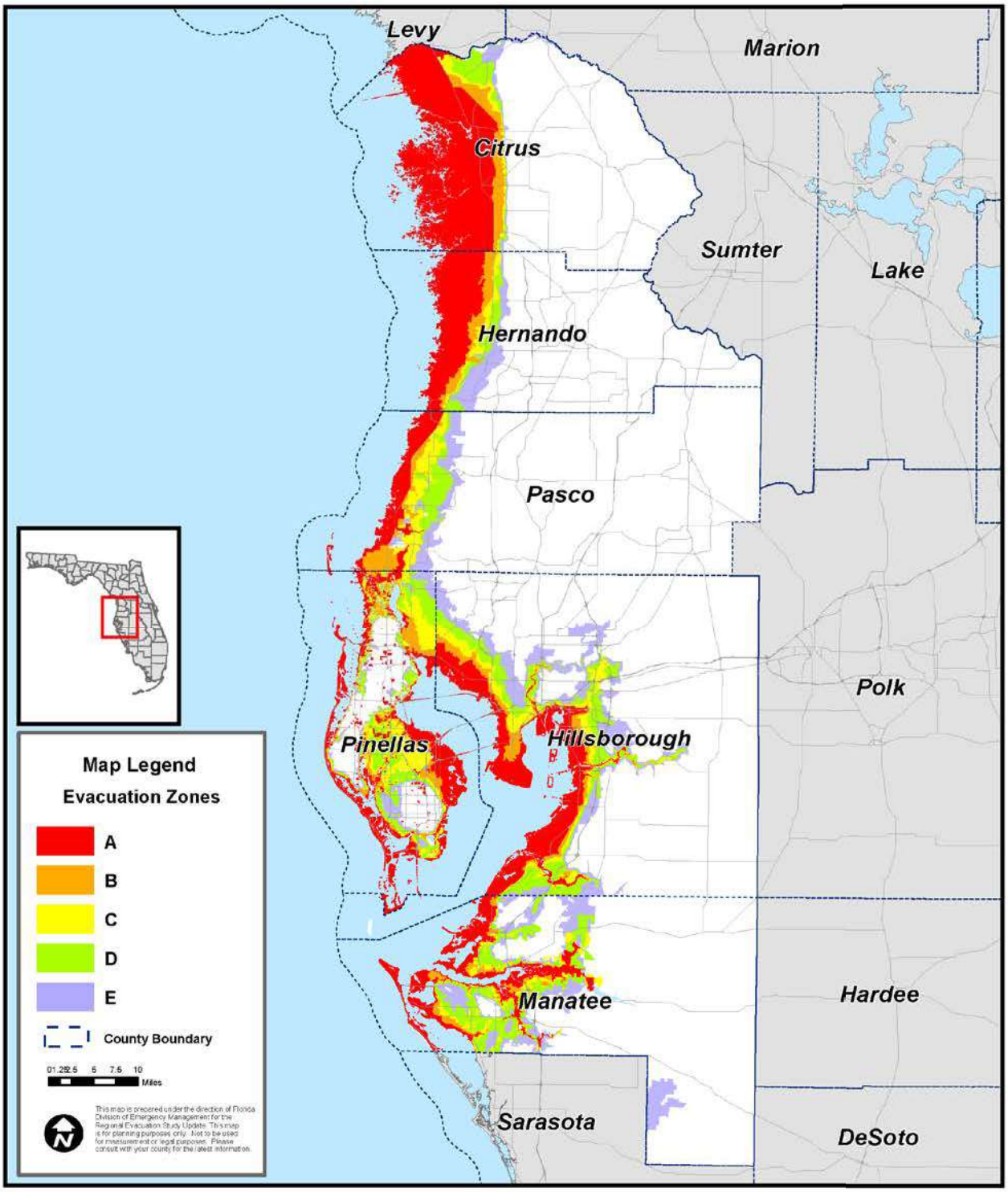
- Analysis time period;
- Highway network;
- Behavioral response;
- One-way evacuation operations;
- University population;
- Tourist occupancy rates;
- Shelters;
- Counties evacuating;
- Evacuation level;
- Response curve hours; and,
- Evacuation Phasing.

H. Vulnerable Population

Using a combination of the demographic data, behavioral assumptions, and evacuation zones, the vulnerable population in each county could be determined by evacuation level. For the purposes of the transportation analysis, the vulnerable population, or population-at-risk, is defined as the total population living within the county designated evacuation zones for each evacuation level. This population is living in an area that is at risk for severe storm surge flooding during a storm event. The vulnerable population for the Tampa Bay Region for 2017 is identified in **Table ES-4**, summarized by evacuation zone and split between site-built homes and mobile/manufactured homes. Vulnerable population for 2020 is summarized in **Table ES-5**.

Figure ES-16

Tampa Bay Regional Evacuation Zones



Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

Table ES-4 – Vulnerable Population in the Tampa Bay Region for 2017

	Evacuation Zone A	Evacuation Zone B	Evacuation Zone C	Evacuation Zone D	Evacuation Zone E
Citrus County					
Site-built Homes	17,755	8,717	6,812	15,037	8,297
Mobile/Manuf. Homes	12,937	7,069	5,149	12,904	16,941
TOTAL	30,692	15,786	11,961	27,941	25,237
Hernando County					
Site-built Homes	7,630	9,632	10,035	11,936	25,358
Mobile/Manuf. Homes	35,224	17,250	19,420	25,684	29,319
TOTAL	42,854	26,882	29,454	37,620	54,677
Hillsborough County					
Site-built Homes	142,882	66,420	71,252	98,003	152,285
Mobile/Manuf. Homes	12,311	5,075	4,774	7,395	6,060
TOTAL	155,193	71,495	76,026	105,399	158,345
Manatee County					
Site-built Homes	53,574	19,822	32,257	74,951	39,571
Mobile/Manuf. Homes	11,262	4,526	6,870	13,109	2,537
TOTAL	64,836	24,348	39,127	88,060	42,108
Pasco County					
Site-built Homes	38,087	46,788	63,053	31,235	22,881
Mobile/Manuf. Homes	3,320	4,359	3,335	3,212	2,103
TOTAL	41,407	51,146	66,388	34,446	24,985
Pinellas County					
Site-built Homes	191,509	60,186	74,910	96,645	37,877
Mobile/Manuf. Homes	14,611	4,172	3,984	6,524	1,696
TOTAL	206,120	64,359	78,894	103,168	39,573

Table ES-5 – Vulnerable Population in the Tampa Bay Region for 2020

	Evacuation Zone A	Evacuation Zone B	Evacuation Zone C	Evacuation Zone D	Evacuation Zone E
Citrus County					
Site-built Homes	25,058	12,332	10,602	25,896	24,106
Mobile/Manuf. Homes	6,028	3,951	1,619	3,139	1,754
TOTAL	31,085	16,283	12,221	29,035	25,860
Hernando County					
Site-built Homes	9,993	11,499	11,840	19,542	31,591
Mobile/Manuf. Homes	2,751	2,126	1,974	2,992	2,185
TOTAL	12,744	13,625	13,814	22,535	33,775
Hillsborough County					
Site-built Homes	124,274	58,869	62,838	95,433	138,492
Mobile/Manuf. Homes	11,123	4,841	4,174	6,868	5,624
TOTAL	135,396	63,710	67,013	102,301	144,116
Manatee County					
Site-built Homes	45,051	17,982	29,391	68,576	41,056
Mobile/Manuf. Homes	9,495	3,781	5,793	11,159	2,434
TOTAL	54,546	21,763	35,184	79,735	43,490

	Evacuation Zone A	Evacuation Zone B	Evacuation Zone C	Evacuation Zone D	Evacuation Zone E
Pasco County					
Site-built Homes	41,718	48,809	66,917	34,890	25,423
Mobile/Manuf. Homes	3,320	4,359	3,334	3,212	2,103
TOTAL	45,038	53,168	70,251	38,102	27,526
Pinellas County					
Site-built Homes	199,428	63,021	80,133	101,367	39,502
Mobile/Manuf. Homes	39,502	14,847	4,242	4,054	6,611
TOTAL	214,275	67,263	84,187	107,978	41,224

Note: Vulnerable population determined using SRESP behavioral data and county provided evacuation zones. Vulnerable population numbers are not inclusive, meaning population numbers listed for a higher zone are not included in the lower zone. For example, vulnerable population listed for Evacuation Zone B does not include vulnerable population listed for Evacuation Zone A.

In addition, based again on the demographic data, behavioral assumptions, and evacuation zones, the planned destinations of vulnerable population in each county could be determined by evacuation level. Destinations include friends and family, hotel/motel, public shelter, and other locations. Vulnerable population destinations for the Tampa Bay Region are identified in **Table ES-6** for 2017 and in **Table ES-7** for 2020.

The vulnerable shadow population is provided in **Table ES-8** for both 2017 and 2020. The vulnerable shadow population was determined using the behavioral assumptions for evacuating shadow population and is based on evacuation level (storm category), not evacuation zone.

Table ES-6 – Vulnerable Population by Destination for 2017

	Evacuation Zone A	Evacuation Zone B	Evacuation Zone C	Evacuation Zone D	Evacuation Zone E
Citrus County					
To Friends and Family	11,923	7,729	1,426	3,369	2,001
To Hotel/ Motel	2,531	1,598	292	791	472
To Public Shelter	1,226	854	201	387	224
To Other Destination	3,104	2,080	349	724	451
Hernando County					
To Friends and Family	3,085	1,282	2,218	5,996	22,305
To Hotel/ Motel	712	296	512	1,384	5,147
To Public Shelter	288	112	279	762	2,783
To Other Destination	661	282	403	1,082	4,080
Hillsborough County					
To Friends and Family	100,875	46,472	49,417	68,509	102,924
To Hotel/ Motel	30,423	14,045	14,966	15,440	23,449
To Public Shelter	8,375	3,829	4,040	10,910	16,137
To Other Destination	15,519	7,149	7,603	10,540	15,834
Manatee County					
To Friends and Family	39,465	14,750	23,690	53,491	25,391
To Hotel/ Motel	12,404	3,632	5,839	13,209	6,316
To Public Shelter	3,805	2,245	3,581	8,806	4,211
To Other Destination	9,162	3,721	6,017	12,554	6,189

	Evacuation Zone A	Evacuation Zone B	Evacuation Zone C	Evacuation Zone D	Evacuation Zone E
Pasco County					
To Friends and Family	26,417	30,470	39,666	18,785	13,636
To Hotel/ Motel	10,020	10,011	13,111	6,729	4,892
To Public Shelter	2,402	2,775	6,639	3,605	2,604
To Other Destination	2,568	7,890	6,972	5,328	3,853
Pinellas County					
To Friends and Family	142,823	41,624	51,082	66,733	25,638
To Hotel/ Motel	31,649	12,872	15,779	15,801	6,021
To Public Shelter	11,037	3,427	4,144	8,384	3,200
To Other Destination	20,612	6,436	7,889	12,250	4,715

Note: Vulnerable population destinations determined using SRESP behavioral data and county provided evacuation zones. Vulnerable population numbers are not inclusive, meaning population numbers listed for a higher zone are not included in the lower zone. For example, vulnerable population listed for Evacuation Zone B does not include vulnerable population listed for Evacuation Zone A.

Table ES-7 – Vulnerable Population by Destination for 2020

	Evacuation Zone A	Evacuation Zone B	Evacuation Zone C	Evacuation Zone D	Evacuation Zone E
Citrus County					
To Friends and Family	12,790	8,292	1,530	3,614	2,147
To Hotel/ Motel	2,715	1,715	313	848	507
To Public Shelter	1,315	916	215	416	241
To Other Destination	3,330	2,232	374	777	484
Hernando County					
To Friends and Family	3,400	1,413	2,445	6,609	24,586
To Hotel/ Motel	785	326	564	1,525	5,674
To Public Shelter	318	124	308	840	3,068
To Other Destination	728	311	444	1,193	4,497
Hillsborough County					
To Friends and Family	107,301	50,164	53,998	77,298	109,586
To Hotel/ Motel	30,423	14,045	14,966	15,440	23,449
To Public Shelter	8,872	4,113	4,393	12,263	17,164
To Other Destination	16,508	7,718	8,307	11,892	16,859
Manatee County					
To Friends and Family	40,459	15,255	24,625	55,851	26,819
To Hotel/ Motel	12,748	3,760	6,075	13,802	6,673
To Public Shelter	3,879	2,305	3,697	9,201	4,449
To Other Destination	9,423	3,877	6,298	13,157	6,549
Pasco County					
To Friends and Family	27,117	29,285	40,150	19,190	13,983
To Hotel/ Motel	10,928	10,416	13,884	7,460	5,400
To Public Shelter	2,584	2,876	7,025	3,971	2,858
To Other Destination	2,750	8,193	7,359	5,876	4,234

	Evacuation Zone A	Evacuation Zone B	Evacuation Zone C	Evacuation Zone D	Evacuation Zone E
Pinellas County					
To Friends and Family	102,059	83,358	84,943	63,488	35,300
To Hotel/ Motel	32,884	13,453	16,837	16,527	6,270
To Public Shelter	11,456	3,575	4,412	8,770	3,332
To Other Destination	21,428	6,726	8,419	12,825	4,912

Note: Vulnerable population destinations determined using SRESP behavioral data and county provided evacuation zones. Vulnerable population numbers are not inclusive, meaning population numbers listed for a higher zone are not included in the lower zone. For example, vulnerable population listed for Evacuation Zone B does not include vulnerable population listed for Evacuation Zone A.

Table ES-8 – Vulnerable Shadow Evacuation Population

	Evacuation Level A	Evacuation Level B	Evacuation Level C	Evacuation Level D	Evacuation Level E
2017					
Citrus County	42,489	35,806	39,118	46,416	51,889
Hernando County	42,346	41,868	50,012	73,954	60,351
Hillsborough County	197,767	185,005	211,964	237,718	219,874
Manatee County	74,021	71,834	77,001	64,061	45,816
Pasco County	99,037	81,078	87,355	82,755	82,492
Pinellas County	118,049	108,861	124,061	102,136	123,347
2020					
Citrus County	45,569	38,383	41,935	49,751	55,616
Hernando County	46,709	46,164	55,148	81,537	66,495
Hillsborough County	208,465	195,914	225,524	251,365	233,790
Manatee County	75,735	73,909	80,019	67,445	48,284
Pasco County	103,423	84,933	93,928	89,165	90,053
Pinellas County	124,293	114,881	130,596	107,883	130,388

Note: Vulnerable shadow population determined using SRESP behavioral data and county provided evacuation zones.

I. Evacuation Model Scenarios

There are literally thousands of possible combinations of variables that can be applied using the evacuation transportation model, which will result in thousands of possible outcomes. For the purposes of this analysis, two distinct sets of analyses were conducted using the SRESP evacuation transportation model, including one set of analysis for growth management purposes and one set of analysis for emergency management purposes. The two sets of analysis include the following:

Base Scenarios – The base scenarios were developed to estimate a series of worst case scenarios and are identical for all eleven RPCs across the State. These scenarios assume 100 percent of the vulnerable population evacuates and includes impacts from counties outside of the RPC area. These scenarios are generally designed for growth management purposes, in order to ensure that all residents that choose to evacuate during an event are able to do so. The base scenarios for the Tampa Bay region are identified in **Table ES-9**; and,

Operational Scenarios – The operational scenarios were developed by the RPCs in coordination with local county emergency managers and are designed to provide important information to emergency management personnel to plan for different storm events. These scenarios are different from region to region and vary for each evacuation level. The operational scenarios for the Tampa Bay region are identified in **Table ES-10**.

Because of the numerous possible combinations of variables that can be applied in the model, the TIME evacuation transportation model is available for use through the Tampa Bay RPC to continue testing combinations of options and provide additional information to emergency managers. The latest version of this modeling software is expected to be available by October 2015.

J. Clearance Time Results

Each of the ten base scenarios and ten operational scenarios were modeled for the Tampa Bay Region using the regional evacuation model. Results were derived from the model to summarize the evacuating population, evacuating vehicles, clearance times, and critical congested roadways. Detailed results are discussed in Chapter IV. Clearance times are presented in this chapter, since the determination of clearance time is one of the most important outcomes from the evacuation transportation analysis.

Calculated clearance times are used by county emergency managers as one input to determine when to recommend an evacuation order. This calculation can include the population-at-risk, shadow evacuees, as well as evacuees from other counties anticipated to pass through the county. Clearance time is developed to include the time required for evacuees to secure their homes and prepare to leave, the time spent by all vehicles traveling along the evacuation route network, and the additional time spent on the road caused by traffic and road congestion. Clearance time does not relate to the time any one vehicle spends traveling along the evacuation route network, nor does it guarantee vehicles will safely reach their destination once outside the County. The four clearance times that are calculated as part of the evacuation transportation analysis include the following:

Table ES-9 – Base Scenarios

	Scenario 1 Level A 2017	Scenario 2 Level B 2017	Scenario 3 Level C 2017	Scenario 4 Level D 2017	Scenario 5 Level E 2017
Demographic Data	2015	2015	2015	2015	2015
Highway Network	2015	2015	2015	2015	2015
One-Way Operations	None	None	None	None	None
University Population	Fall/Spring	Fall/Spring	Fall/Spring	Fall/Spring	Fall/Spring
Tourist Rate	Default	Default	Default	Default	Default
Shelters Open	Primary	Primary	Primary	Primary	Primary
Response Curve	12-hour	12-hour	12-hour	12-hour	12-hour
Evacuation Phasing	None	None	None	None	None
Behavioral Response	100%	100%	100%	100%	100%
Evacuation Zone	A	B	C	D	E
Counties Evacuating	Citrus	Citrus	Citrus	Citrus	Citrus

	Scenario 1 Level A 2017	Scenario 2 Level B 2017	Scenario 3 Level C 2017	Scenario 4 Level D 2017	Scenario 5 Level E 2017
	Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota	Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota	Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota	Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota	Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota
	Scenario 6 Level A 2020	**Scenario 7 Level B 2020**	**Scenario 8 Level C 2020**	**Scenario 9 Level D 2020**	**Scenario 10 Level E 2020**
Demographic Data	2020	2020	2020	2020	2020
Highway Network	2020	2020	2020	2020	2020
One-Way Operations	None	None	None	None	None
University Population	Fall/Spring	Fall/Spring	Fall/Spring	Fall/Spring	Fall/Spring
Tourist Rate	Default	Default	Default	Default	Default
Shelters Open	Primary	Primary	Primary	Primary	Primary
Response Curve	12-hour	12-hour	12-hour	12-hour	12-hour
Evacuation Phasing	None	None	None	None	None
Behavioral Response	100%	100%	100%	100%	100%
Evacuation Zone	A	B	C	D	E
Counties Evacuating	Citrus Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota	Citrus Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota	Citrus Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota	Citrus Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota	Citrus Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota

Table ES-10 – Operational Scenarios

	Scenario 1 Level A 2017	Scenario 2 Level B 2017	Scenario 3 Level C 2017	Scenario 4 Level D 2017	Scenario 5 Level E 2017
Demographic Data	2015	2015	2015	2015	2015
Highway Network	2015	2015	2015	2015 and Skyway Bridge closes at hour 18	2015 and Skyway Bridge closes at hour 18
One-Way Operations	None	None	None	None	None
University Population	Summer	Summer	Summer	Summer	Summer
Tourist Rate	Default	Default	Default	Default	Default
Shelters Open	Primary	Primary	Primary	Primary	Primary
Response Curve	9-hour	12-hour	18-hour	24-hour except Levy 18-hour	24-hour except Level 18-hour
Evacuation Phasing	None	None	None	1hr – Citrus & Hernando start in hour 6	1hr – Citrus & Hernando start in hour 6

	Scenario 1 Level A 2017	Scenario 2 Level B 2017	Scenario 3 Level C 2017	Scenario 4 Level D 2017	Scenario 5 Level E 2017
Behavioral Response	Planning	Planning	Planning	Planning	Planning
Evacuation Zone	A	B	C	D	E
Counties Evacuating	Citrus Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota Charlotte	Citrus Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota Charlotte	Citrus Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota Charlotte	Citrus Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota Charlotte	Citrus Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota Charlotte
	Scenario 6 Level A 2020	**Scenario 7 Level B 2020**	**Scenario 8 Level C 2020**	**Scenario 9 Level D 2020**	**Scenario 10 Level E 2020**
Demographic Data	2020	2020	2020	2020	2020
Highway Network	2020	2020	2020	2020 and Skyway Bridge closes at hour 18	2020 and Skyway Bridge closes at hour 18
One-Way Operations	None	None	None	Yes, I-4 & I-75	Yes, I-4 & I-75
University Population	Summer	Summer	Summer	Summer	Summer
Tourist Rate	Default	Default	Default	Default	Default
Shelters Open	Primary	Primary	Primary	Primary	Primary
Response Curve	9-hour	12-hour	18-hour	24-hour except Levy 18-hour	24-hour except Levy 18-hour
Evacuation Phasing	None	None	None	1hr – Levy start in hour 6	1hr – Levy start in hour 6
Behavioral Response	Planning	Planning	Planning	Planning	Planning
Evacuation Zone	A	B	C	D	E
Counties Evacuating	Citrus Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota Charlotte	Citrus Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota Charlotte	Citrus Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota Charlotte Polk	Citrus Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota Charlotte	Citrus Hernando Hillsborough Manatee Pasco Pinellas Levy Sarasota Charlotte

Clearance Time to Shelter - The time necessary to safely evacuate vulnerable residents and visitors to a "point of safety" within the county based on a specific hazard, behavioral assumptions and evacuation scenario. Calculated from the point in time when the evacuation order is given to the point in time when the last vehicle reaches a point of safety within the county. Key points to remember for clearance time to shelter include:

- All in-county trips reach their destination within the county outside of an evacuation zone A-E; and,
- This definition does not include any out of county trips.

In-County Clearance Time - The time required from the point an evacuation order is given until the last evacuee can either leave the evacuation zone or arrive at safe shelter within the county (which is not in an A-E evacuation zone). This does not include those evacuees leaving the county on their own. Key points to remember for in-county clearance time include:

- All in-county trips reach their destination within the county;
- All out of county trips exit the evacuation zone, but may still be located in the county and not left yet; and,
- This definition does not include out-of-county pass-through trips from adjacent counties, unless they evacuate through an evacuation zone.

Out of County Clearance Time - The time necessary to safely evacuate vulnerable residents and visitors to a "point of safety" within the county based on a specific hazard, behavioral assumptions and evacuation scenario. Calculated from the point an evacuation order is given to the point in time when the last vehicle assigned an external destination exits the county. Key points to remember for out of county clearance time include:

- The roadway network within the county is clear;
- All out of county trips exit the county, including out of county pass-through trips from adjacent counties; and,
- All in-county trips reach their destination.

Regional Clearance Time - The time necessary to safely evacuate vulnerable residents and visitors to a "point of safety" within the (RPC) region based on a specific hazard, behavioral assumptions and evacuation scenario. Calculated from last vehicle assigned an external destination exits the region. Key points to remember for regional clearance time include:

- The roadway network within the RPC region is clear;
- All out of county trips exit the RPC region, including out of county pass-through trips from adjacent counties;
- All in-county trips reach their destination; and,
- Regional clearance time is equal to the largest out of county clearance time for a given scenario for any of the counties within the RPC, since the out of county clearance time includes out of county pass through trips from adjacent counties.

Calculated clearance times are used by county emergency managers as one input to determine when to recommend an evacuation order. Clearance times for each of the base scenarios are summarized in **Table ES-11** and **ES-12**, while clearance times for each of the operational scenarios are summarized in **Table ES-13** and **Table ES-14.** Clearance time includes several components, including the mobilization time for the evacuating population to prepare for an evacuation (pack supplies and personal belongs, load their vehicle, etc.), the actual time spent traveling on the roadway network, and the delay time caused by traffic congestion.

Base Scenarios

In-county clearance times for the 2017 base scenarios range from 21 hours to 55.5 hours, depending upon the evacuation level. Citrus County has the highest in-county clearance time of 55.5 hours for the level E scenario due to the influence of trips evacuating from other counties within the region in a northbound direction. Clearance time to shelter shows a similar pattern, with clearance times ranging from 13.5 to 47 hours.

In 2020, in-county clearance times for the base scenarios vary between 21.5 hours for Pinellas evacuation level A and 58 hours shared between Hernando and Pasco County for the evacuation level E scenario. This shows a slight increase in clearance time from 2017 due to the increasing volume of vehicles from a larger region than a few years ago. Completion of several roadway improvement projects throughout the region may have shifted increased clearance time southward slightly. Clearance Time to Shelter shows a similar pattern, with clearance times for the base scenarios ranging from 13.5 hours for Manatee evacuation level A to 57 hours for the same Manatee County for evacuation level E in 2020. This marked increase over 2017 (2015 demographics) clearance times for level E, is most likely due to the increase in population in the rural areas of Manatee and the population increases in Sarasota County just south.

Out of county clearance times for the 2017 base scenarios range from 21 to 55.5 hours, while in 2020 they range from 21.5 hours for Pinellas County again for the base evacuation level A scenario to 58 hours in Pasco and Hernando Counties for the evacuation level E scenario. Again, the slight increase would be due to population increases in rural areas and increased number of counties in regional model with tendency to head north during evacuation.

Operational Scenarios

In-county clearance times for the 2017 operational scenarios range from 17 hours to 53.5 hours depending upon the scenario. Clearance Time to Shelter shows a similar pattern, although much reduced on the low end, with clearance times for the operational scenarios ranging from 10 hours to 51 hours depending upon the county and the scenario.

In 2020, in-county clearance times for the operational scenarios vary from 17.5 hours to 55 hours for the level E evacuation shared between Hillsborough and Pinellas Counties. Clearance Time to Shelter shows a similar pattern, with clearance times for the base scenarios ranging from 10 hours to 54.5 hours depending upon the scenario.

Out of county clearance times for the 2017 operational scenarios, range from 17 hours to 53.5 hours for the evacuation level E scenario. The 9-hour response curve for the level A evacuation helps in reducing the clearance time from the base scenario. Out of county clearance times increase for all counties in 2020 to between 17.5 and 55 hours depending upon the scenario. Regional clearance time for the six county TBRPC region ranges from 17.5 hours to 53.5 hours in 2017. This time increases to between 18.5 and 55 hours in 2020.

Table ES-11 – 2017 Clearance Times for Base Scenario

	Evacuation Level A Base Scenario	Evacuation Level B Base Scenario	Evacuation Level C Base Scenario	Evacuation Level D Base Scenario	Evacuation Level E Base Scenario
Clearance Time to Shelter					
Citrus	19	24	21	25	20.5
Hernando	14.5	15	16	19.5	21
Hillsborough	20.5	21.5	24	27.5	45
Manatee	13.5	14	23.5	43.5	47
Pasco	23.5	27	34	40.5	46
Pinellas	14.5	17.5	22.5	27.5	45.5

	Evacuation Level A Base Scenario	Evacuation Level B Base Scenario	Evacuation Level C Base Scenario	Evacuation Level D Base Scenario	Evacuation Level E Base Scenario
In-County Clearance Time					
Citrus	23.5	28.5	34.5	47	55.5
Hernando	23	27	34	45.5	49.5
Hillsborough	22.5	24.5	30	43.5	48.5
Manatee	21.5	23.5	30.5	43.5	47.5
Pasco	23.5	27	34	44	47.5
Pinellas	21	23.5	26.5	43	48
Out of County Clearance Time					
Citrus	23.5	28.5	34.5	47	55.5
Hernando	23	27	34	45.5	49.5
Hillsborough	22.5	24.5	30	43.5	48.5
Manatee	21.5	23.5	30.5	43.5	47.5
Pasco	23.5	27	34	44	47.5
Pinellas	21	23.5	26.5	43	48
Regional Clearance Time					
TBRPC	23.5	28.5	34.5	41.5	55.5

Table ES-12 – 2020 Clearance Times for Base Scenario

	Evacuation Level A Base Scenario	Evacuation Level B Base Scenario	Evacuation Level C Base Scenario	Evacuation Level D Base Scenario	Evacuation Level E Base Scenario
Clearance Time to Shelter					
Citrus	18.5	23	20.5	23	21.5
Hernando	14	15	16.5	19	22
Hillsborough	21	22	24.5	35	43
Manatee	13.5	15	27.5	45	57
Pasco	24.5	29	37	42.5	45.5
Pinellas	15	18	23.5	30	45
In-County Clearance Time					
Citrus	24.5	30	37	46	57.5
Hernando	24.5	29	37	46	58
Hillsborough	23	26	34.5	45.5	57
Manatee	22	25	30.5	45	57
Pasco	24.5	29	37	46	58
Pinellas	21.5	24.5	28.5	44	57.5
Out of County Clearance Time					
Citrus	24.5	30	37	46	57.5
Hernando	24.5	29	37	46	58
Hillsborough	23	26	34.5	45.5	57

	Evacuation Level A Base Scenario	Evacuation Level B Base Scenario	Evacuation Level C Base Scenario	Evacuation Level D Base Scenario	Evacuation Level E Base Scenario
Manatee	22	25	30.5	45	57
Pasco	24.5	29	37	46	58
Pinellas	21.5	24.5	28.5	44	57.5
Regional Clearance Time					
TBRPC	24.5	30	37	46	58

Table ES-13 – 2017 Clearance Times for Operational Scenarios

	Evacuation Level A Operational Scenario	Evacuation Level B Operational Scenario	Evacuation Level C Operational Scenario	Evacuation Level D Operational Scenario	Evacuation Level E Operational Scenario
Clearance Time to Shelter					
Citrus	12	15.5	24.5	31.5	30
Hernando	11	13.5	19.5	25.5	31
Hillsborough	15.5	18.5	24	35.5	40
Manatee	10	13	19.5	38.5	51
Pasco	17.5	21.5	32	44	48
Pinellas	10	13	19	25	30
In-County Clearance Time					
Citrus	17	19	27.5	44	53.5
Hernando	17.5	21.5	32	44	52
Hillsborough	17	21.5	29.5	40.5	51.5
Manatee	17.5	20.5	27.5	41	51
Pasco	17.5	21.5	32	44	52
Pinellas	17	20	27	38.5	52
Out of County Clearance Time					
Citrus	17	19	27.5	44	53.5
Hernando	17.5	21.5	32	44	52
Hillsborough	17	21.5	29.5	40.5	51.5
Manatee	17.5	20.5	27.5	41	51
Pasco	17.5	21.5	32	44	52
Pinellas	17	20	27	38.5	52
Regional Clearance Time					
TBRPC	17.5	21.5	32	44	53.5

Table ES-14 – 2020 Clearance Times for Operational Scenarios

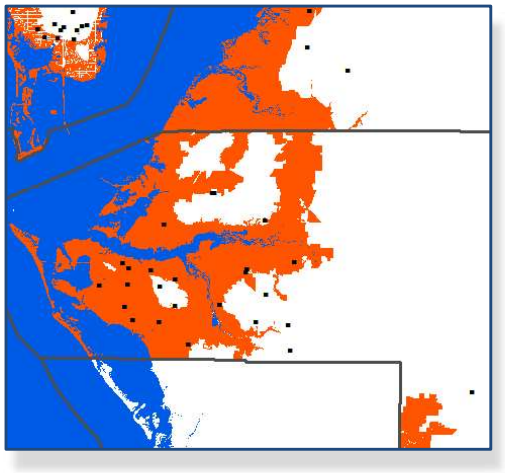
	Evacuation Level A Operational Scenario	Evacuation Level B Operational Scenario	Evacuation Level C Operational Scenario	Evacuation Level D Operational Scenario	Evacuation Level E Operational Scenario
Clearance Time to Shelter					
Citrus	12.5	17	25.5	37.5	34.5
Hernando	10.5	13	20	24.5	33
Hillsborough	16.5	19	24.5	42	48.5
Manatee	10	13.5	23.5	39.5	54.5
Pasco	18.5	23	34.5	45.5	50.5
Pinellas	10.5	13.5	19	25	35
In-County Clearance Time					
Citrus	18.5	20	33	51.5	54
Hernando	18.5	23	34.5	45.5	51
Hillsborough	18	22	31.5	45	55
Manatee	18	21.5	28.5	45.5	54.5
Pasco	18.5	23	34.5	45.5	53
Pinellas	17.5	21	28	42.5	55
Out of County Clearance Time					
Citrus	18.5	20	33	51.5	54
Hernando	18.5	23	34.5	45.5	51
Hillsborough	18	22	31.5	45	55
Manatee	18	21.5	28.5	45.5	54.5
Pasco	18.5	23	34.5	45.5	53
Pinellas	17.5	21	28	42.5	55
Regional Clearance Time					
TBRPC	18.5	23	34.5	51.5	55

Clearance Time Analysis

With all things being equal, the clearance times can be the single most useable collection of data regarding evacuation planning. The Base scenarios, or 100% response are the best way to compare evacuation clearance times among regions and counties, as all the parameters are kept standardized. 100 percent compliance for site-built homes in evacuation zones ordered to evacuate, and 100 percent compliance for all mobile homes. The Planning Assumptions scenarios or Operational scenarios are quite a bit more flexible from region to region. Participation rates are based on the current behavioral analysis. Built into the model is the assumption that some population ordered to evacuate will not, and some population not ordered to evacuate will evacuate. On top of that backdrop, many other variables can be adjusted like participating counties, response curve, one-way roads, road closures and the like.

Using the base Scenarios first gives us an opportunity to compare the evacuation clearance times among the counties in the region along with the evacuation level. All the parameters are the same in the base scenarios except for the evacuation level. In the 2017 base model run, we can see that when evaluating time to shelter, storm surge areal coverage has an impact on time to shelter because the model will not try to place destination termination points in shelters that inside any evacuation level A-E. Those counties that have few shelters outside of

evacuation zones will be routed further inland upon capacity saturation of the shelters. That further inland routing will bring destination points further afield and into adjacent counties. In previous versions of TIME, the evacuees were permitted to evacuate to a shelter if it was in an evacuation zone that was not active. So in an A event, the evacuees could evacuate to a shelter in a B zone since that zone was not active. This is no longer the case. They will now evacuate inland of evacuation zones (not in a zone A-E area). This was done since in certain parts of the state there were odd cross-town evacuations that were creating higher clearance times in lower storm scenarios. Notice to the right how many shelters in Manatee are affected.

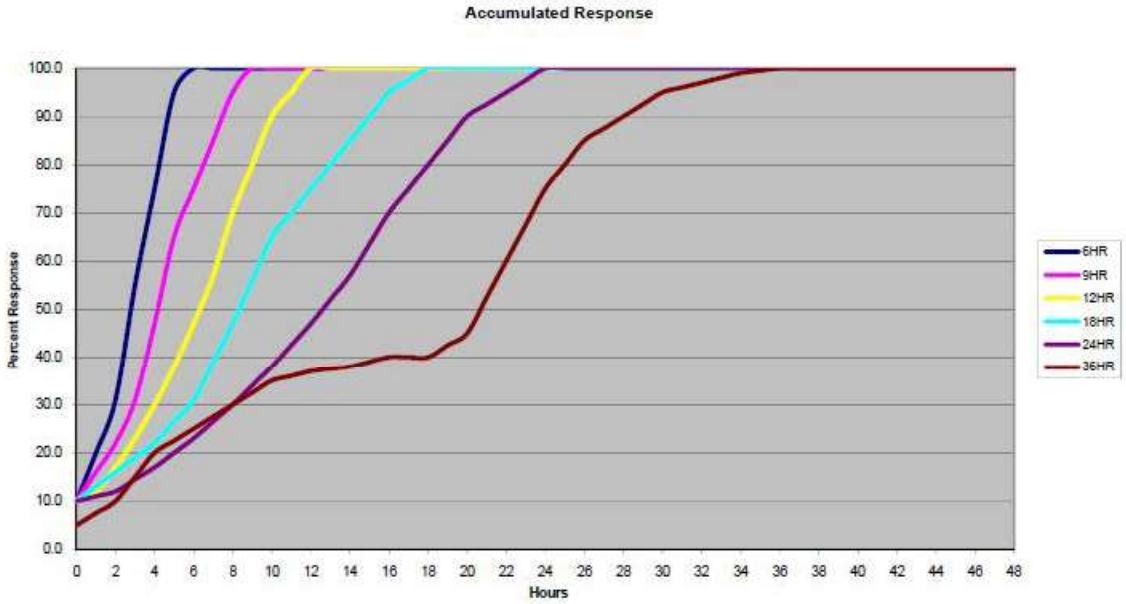


The Operational scenarios open up a little experimenting with variables which may change or be controlled. With the model being a simulation of vehicle behavior during evacuations, some of the things one can change are the response curves of how long the population and vehicles will take to get on the road and eventually reach final destination, road closings due to realistic events and procedures, and phasing of the start of the evacuations. One example that was used in the Operational or Assumption scenarios is closing of the Sunshine Skyway. The Emergency Managers had decided to plug that realistic variable into the model to see how this would affect evacuation timing. The fact of the matter is that FDOT closes the Skyway Bridge during high wind events due to the height of the bridge. The response curves were also adjusted based on evacuation level, something which the Base or 100% scenarios do not do. The Base responses assume 12 hours for every evacuation level. Lowering the response curve to 9 hours has a significant effect on the clearance time of level A. Lowering it to that also is within the realm of possibility for a lower volume evacuation. Due to the time needed to announce an evacuation, higher volume evacuations, or levels C, D, and E would necessarily have longer response times from the public. A known threat of a higher potential surge height would typically demand an earlier evacuation order, and for that reason response curve times are increased to 18 hours, 24 hours, and 24 hours for levels C, D, and E, respectively. That being said, the Tampa Bay Region uses the same 24 hours and Levy County which is north of the Tampa Bay Region remains at the 18 hour response curve. Because of that the phasing option was used to start the evacuation order for Levy 6 hours into the Tampa Bay Region evacuation (24 – 18 = 6 hours).

In addition to the changed response curves, as mentioned above, the Skyway Bridge was modeled to close, as it most likely would at some point. The thinking between the Emergency Managers of the region and the consultant was to close the bridge at 18 hours into the evacuation. This only occurred at levels D and E, which used a 24 hour behavioral response time due to larger population evacuated compared to lower storm surge threats. Since these level evacuations would not be ordered last minute, many hours would pass before bridges would become impassable (traditionally winds at 39 – 49 MPH). These scenarios used 18 hours past the first evacuation order when the Skyway Bridge would close to traffic. Looking at the graph below, 18 hours into an ordered evacuation has approximately 90% of the evacuating population mobilized and on the road network.

Weighing the clearance time with respect to arrival of pre-landfall hazards is an important issue. This can be exaggerated with a large diameter storm, so timing the order is crucial for the

safety of the population to clear the evacuation zones (in this case, zone D and/or E). If enough time in watching the movement of the storm allows for an evacuation order to be given say, 24 – 40 hours out, a 24 hour response curve means it uses 24 hours to simulate population gathering family members, collecting personal belongings, and securing the homestead before becoming part of the evacuation traffic on the network.



The above graph shows how response curves track. In a 24 hour curve (dark purple), it takes 22-24 hours to get 100% of the evacuating population on the network and moving toward safety. In all scenarios depicted in the model, a default assumption of 10% of all evacuation trips have vacated the area prior to when the evacuation order is given.

The model runs show us that using the Operation Scenario variables does decrease the time it takes to clear the evacuating population in time to shelter, except for Manatee County. Let us take evacuation level E with 2017 (2015) population to compare. The Base Scenario uses 12 hour response curves for all levels. The Operational Scenario uses a 24 hour response curve. Some interesting results occur between the two types of scenarios. Citrus County has the fastest clearance time in the Base Scenario Time to Shelter with 20.5 hours and Manatee the slowest with 47 hours. For the Operational Scenario for the same year, Time to Shelter clearance is tied between Citrus and Pinellas for fastest at 30 hours. Manatee is again the slowest clearance time at 51 hours. The general rule-of-thumb regarding response time is the shorter the time, the faster the population gets on the network and arrives at destination of safety. Since the Operational Scenarios use 24 hour responses for level D and E, the time to network is not compressed into half of that time like the Base Scenarios. That is why higher level (C, D, and E) evacuations are fairly close to those times from the Base runs. Pinellas County however has significantly lower clearance times for level E, most likely due to enough shelters with sufficient capacity are outside evacuation zones, and the physical size of the county allows faster access to those shelters. In the model, hotel rooms are considered a viable destination for shelter if the rooms are not in an evacuation zone ordered to evacuate. This may play a part in the decreased clearance in 'time to shelter' numbers for Pinellas, as there are a high number of hotels in the county, even though the majority is on the coast. Manatee County experiences a slightly higher clearance time to shelter mainly because a larger portion of shelters are in evacuation zones, and the storm surge inundates a fairly sizable

portion of the residential population that is not rural. The model treats destinations not recognized as a public shelter by the SRESP as an evenly distributed background attractor. This is the way friends and families are also handled in the behavioral assumption modeling. Every household in the model will generate one attraction for those trips headed to "other" shelter. This ensures that these trips are evenly distributed around the area with some clumping occurring in highly residential areas. Since churches are the typical "other" shelter that individuals evacuate to and since churches tend to locate in areas with high residential populations this results in reasonable destination locations for these evacuees. If most of the highly residential areas for Manatee County are in zones ordered to evacuate, those "other" shelter destinations cannot be utilized. The same can be said for hotels within evacuation zones, as well.

The Operational In-County and Out-of-County Clearance Times are a little different. The times have generally decreased for all evacuation levels except for a few counties in level D and most counties in level E. For level D, all counties decreased by about 2-3 hours except for Hernando and Hillsborough, and Pasco which remained the same 44 hours as the Base Scenario. For level E, the clearance times all increased by 2-4 hours with the exception is Citrus County where the clearance time decreased to 53.5 hours from 55. We have to remember that for level D and E, the response time is set at 24 hours as well as forcing the inclusion of Charlotte County as well as Sarasota in the evacuation trip loading. The response curve choice alone for D and E can account for 90% of the evacuating 'behavioral assumption population' taking 20 hours to 'get on the road' towards their destination of safety. That can mean if the evacuating population could possibly do better than 'prepping and getting ready to evacuate' within a 24 hour period, the clearance times could be lower than is shown in these higher level model simulations.

K. Maximum Evacuating Population Clearances

From an emergency management standpoint, it is important to get an understanding of the maximum proportion of the evacuating population that can be expected to evacuate at various time intervals during an evacuation. Should storm conditions change during an evacuation, emergency managers will need to be able to estimate what portion of the evacuating population is estimated to still remain within the county trying to evacuate.

Using the base scenarios, which assume 100% of the vulnerable population is evacuating, along with shadow evacuations and evacuations from adjacent counties, an estimate was made of the evacuating population actually able to evacuate out of each county by the time intervals of 12, 18, 24, and 36 hours. The estimated maximum evacuating population by time interval for 2017 is identified in **Table ES-15** and for 2020 in **Table ES-16**. From a transportation standpoint, the number of evacuating vehicles is equally as important as the evacuation populations. Evacuating vehicles for the base scenarios are summarized by county for 2017 in **Table ES-17** and for 2020 in **Table ES-18**.

It is important to note that these estimates take into account many variables, including roadway capacity, in-county evacuating trips, out of county evacuating trips, evacuating trips from other counties, and background traffic that is impeding the evacuation trips. For this reason, the maximum evacuation population by time interval will vary slightly between evacuation level and either increase or decrease from one evacuation level to the next.

L. Sensitivity Analysis

As discussed previously, there are literally thousands of possible combinations of variables that can be applied using the evacuation transportation model, which will result in thousands of possible outcomes. As part of the analysis process, a sensitivity analysis was conducted using the prototype model to evaluate the effect of different response curves on the calculated evacuation clearance times. Calculated clearance times will never be lower than the designated response time, since some evacuating residents will wait to evacuate until near the end of the response time window. For example, *using a 12-hour response curve in the analysis means that all residents will begin their evacuation process within 12-hours, and some residents will choose to wait and begin evacuating more than 11.5 hours from when the evacuation was ordered*. This will generate a clearance time of more than 12 hours.

The sensitivity analysis identified that clearance times will vary by scenario and by any of the numerous parameters that can be chosen in a particular scenario model run (demographics, student population, tourist population, different counties that are evacuating, response curve, phasing, shadow evacuations, etc.). A few general rules of thumb did emerge from the sensitivity analysis that can provide some guidance to the region regarding the sensitivity of the response curve to the calculated clearance times:

- For low evacuation levels A and B, clearance time will vary by as much as 40 percent depending on the response curve. Low evacuation levels A and B have fewer evacuating vehicles that can be accommodated more easily on the transportation network.

- In most cases, clearance times typically exceed the response curve by one to two hours. Thus, a 12 hour response curve may yield a clearance time of 13 or 14 hours while an 18 hour response curve may yield a clearance time of 19 or 20 hours. This leads to a higher level of variability than larger evacuations;

  For mid-level evacuations such as C and sometimes D, clearance time varied by as much as 25 percent during the sensitivity analysis. The number of evacuating vehicles is considerably higher than for levels A and B, and lower response curves tend to load the transportation network faster than longer response curves. The variability in clearance times is less in these cases than for low evacuation levels; and,

- For high-level evacuations such as some level D evacuations and all E evacuations, clearance time variability is reduced to about 10 to 15 percent. Large evacuations involve large numbers of evacuating vehicles, and even though the sensitivity test identified that clearance times are not as dependent on the response curve as lower level evacuations, some variability is possible with the higher response times greater than 18 hours.

Table ES-15 – Maximum Evacuating Population by Time Interval for 2017

	Evacuation Level A	Evacuation Level B	Evacuation Level C	Evacuation Level D	Evacuation Level E
Estimated Evacuating Population Clearing Citrus County					
12-Hour	31,288	28,148	25,193	21,702	20,243
18-Hour	46,933	42,222	37,790	32,553	30,364
24-Hour	62,577	56,296	50,387	43,404	40,485
36-Hour	61,273	66,851	72,431	85,000	93,622
Estimated Evacuating Population Clearing Hernando County					
12-Hour	24,570	21,594	21,227	24,609	27,641
18-Hour	36,855	32,391	31,840	36,913	41,462
24-Hour	47,092	43,188	42,453	49,218	55,283
36-Hour		48,586	60,142	93,309	114,021
Estimated Evacuating Population Clearing Hillsborough County					
12-Hour	188,245	201,646	205,871	178,160	194,556
18-Hour	282,368	302,468	308,806	267,240	291,834
24-Hour	376,491	403,291	411,742	356,320	389,112
36-Hour	352,960	411,693	514,677	645,830	786,331
Estimated Evacuating Population Clearing Manatee County					
12-Hour	77,502	82,222	80,778	77,361	76,874
18-Hour	116,252	123,333	121,168	116,041	115,311
24-Hour	155,003	164,444	161,557	154,721	153,749
36-Hour	138,857	161,018	205,312	280,432	304,294
Estimated Evacuating Population Clearing Pasco County					
12-Hour	71,716	77,169	86,928	75,312	76,008
18-Hour	107,574	115,754	130,392	112,968	114,012
24-Hour	143,432	154,339	173,856	150,623	152,015
36-Hour	140,444	173,631	246,296	276,143	300,864
Estimated Evacuating Population Clearing Pinellas County					
12-Hour	185,239	193,705	214,385	154,794	153,865
18-Hour	277,859	290,558	321,577	232,190	230,798
24-Hour	370,479	387,410	428,770	309,587	307,731
36-Hour	324,169	379,339	473,433	554,677	615,461

Table ES-16 – Maximum Evacuating Population by Time Interval for 2020

	Evacuation Level A	Evacuation Level B	Evacuation Level C	Evacuation Level D	Evacuation Level E
Estimated Evacuating Population Clearing Citrus County					
12-Hour	32,189	28,675	25,191	23,777	20,951
18-Hour	48,283	43,013	37,787	35,665	31,426
24-Hour	64,378	57,350	50,382	47,553	41,901
36-Hour	65,719	71,688	77,673	91,144	100,388
Estimated Evacuating Population Clearing Hernando County					
12-Hour	25,440	22,166	21,507	26,836	25,997
18-Hour	38,160	33,249	32,260	40,254	38,996
24-Hour	50,880	44,332	43,014	53,672	51,994
36-Hour	51,940	53,568	66,313	102,871	125,653

	Evacuation Level A	Evacuation Level B	Evacuation Level C	Evacuation Level D	Evacuation Level E
Estimated Evacuating Population Clearing Hillsborough County					
12-Hour	194,892	202,231	191,601	183,458	178,238
18-Hour	292,338	303,347	287,402	275,188	267,357
24-Hour	389,784	404,463	383,202	366,917	356,477
36-Hour	373,543	438,168	550,853	695,613	846,632
Estimated Evacuating Population Clearing Manatee County					
12-Hour	77,588	79,496	83,575	77,829	66,776
18-Hour	116,382	119,244	125,363	116,743	100,164
24-Hour	155,176	158,991	167,150	155,657	133,552
36-Hour	142,245	165,616	212,420	291,857	317,186
Estimated Evacuating Population Clearing Pasco County					
12-Hour	72,716	75,782	85,098	77,145	67,063
18-Hour	109,073	113,672	127,647	115,718	100,595
24-Hour	145,431	151,563	170,196	154,291	134,126
36-Hour	148,461	183,139	262,385	295,724	324,138
Estimated Evacuating Population Clearing Pinellas County					
12-Hour	188,968	194,164	208,977	158,614	134,674
18-Hour	283,452	291,247	313,466	237,922	202,011
24-Hour	377,936	388,329	417,955	317,229	269,348
36-Hour	338,568	396,419	496,321	581,586	645,314

Note: These estimates take into account many variables, including roadway capacity, in-county evacuating trips, out of county evacuating trips, evacuating trips from other counties, and background traffic that is impeding the evacuation trips. Maximum evacuation population by time interval will vary between evacuation level and either increase or decrease from one evacuation level to the next.

Table ES-17 – Evacuating Vehicles by Base Scenario for 2015

	Evacuation Level A Base Scenario	Evacuation Level B Base Scenario	Evacuation Level C Base Scenario	Evacuation Level D Base Scenario	Evacuation Level E Base Scenario
Citrus County					
Site-built Homes	14,457	17,705	20,906	27,933	32,791
Mobile/Manuf. Homes	21,603	21,603	21,603	21,603	21,603
Tourists	638	746	746	847	858
TOTAL	36,698	40,054	43,255	50,383	55,252
Hernando County					
Site-built Homes	11,095	11,864	18,220	36,041	46,615
Mobile/Manuf. Homes	15,742	15,742	15,742	15,742	15,742
Tourists	90	213	213	290	564
TOTAL	26,927	27,819	34,175	52,073	62,921
Hillsborough County					
Site-built Homes	120,213	156,498	207,602	270,395	337,848
Mobile/Manuf. Homes	50,751	50,751	50,751	50,751	50,751
Tourists	3,361	6,024	6,714	7,537	8,991
TOTAL	184,325	213,273	265,067	328,683	397,590
Manatee County					
Site-built Homes	41,828	51,956	69,956	101,286	112,897
Mobile/Manuf. Homes	26,812	26,812	26,812	26,812	26,812
Tourists	4,111	4,234	5,613	8,927	9,244
TOTAL	72,751	83,002	102,381	137,025	148,953
Pasco County					
Site-built Homes	47,633	65,945	105,823	121,772	135,392
Mobile/Manuf. Homes	44,232	44,232	44,232	44,232	44,232
Tourists	210	415	608	609	609
TOTAL	92,075	110,592	150,663	166,613	180,233
Pinellas County					
Site-built Homes	153,636	181,731	229,498	271,455	302,416
Mobile/Manuf. Homes	46,655	46,655	46,655	46,655	46,655
Tourists	6,030	7,133	7,652	7,827	8,020
TOTAL	206,321	235,519	283,805	325,937	357,091

Table ES-18 – Evacuating Vehicles by Base Scenario for 2020

	Evacuation Level A Base Scenario	Evacuation Level B Base Scenario	Evacuation Level C Base Scenario	Evacuation Level D Base Scenario	Evacuation Level E Base Scenario
Citrus County					
Site-built Homes	15,510	18,995	22,429	29,968	35,178
Mobile/Manuf. Homes	23,193	23,193	23,193	23,193	23,193
Tourists	655	763	763	868	878
TOTAL	39,358	42,951	46,385	54,029	59,249
Hernando County					
Site-built Homes	12,248	13,100	20,110	39,761	51,416
Mobile/Manuf. Homes	17,347	17,347	17,347	17,347	17,347
Tourists	90	213	213	290	566
TOTAL	29,685	30,660	37,670	57,398	69,329
Hillsborough County					
Site-built Homes	140,034	168,627	224,210	293,676	365,858
Mobile/Manuf. Homes	50,916	50,916	50,916	50,916	50,916
Tourists	3,740	6,835	7,820	8,953	10,861
TOTAL	194,690	226,378	282,946	353,545	427,635
Manatee County					
Site-built Homes	43,254	53,931	72,963	106,026	118,334
Mobile/Manuf. Homes	26,726	26,726	26,726	26,726	26,726
Tourists	4,305	4,434	5,890	9,394	9,728
TOTAL	74,285	85,091	105,579	142,146	154,788
Pasco County					
Site-built Homes	52,218	71,287	114,574	131,949	147,706
Mobile/Manuf. Homes	44,226	44,226	44,226	44,226	44,226
Tourists	352	624	889	890	890
TOTAL	96,796	116,137	159,689	177,065	192,822
Pinellas County					
Site-built Homes	159,940	189,289	239,862	283,752	316,033
Mobile/Manuf. Homes	47,392	47,392	47,392	47,392	47,392
Tourists	6,840	8,100	8,831	9,090	9,344
TOTAL	214,172	244,781	296,085	340,234	372,769

The counties within the Tampa Bay Region are encouraged to test additional scenarios beyond what has been provided in this study. Each model run will provide additional information for the region to use in determining when to order an evacuation. Due to advancements in computer technology and the nature of the developed transportation evacuation methodology, this study includes a more detailed and time consuming analysis process than used in previous years studies. Counties interested in testing various response curves for each scenario can easily do so using the TIME interface to calculate clearance times for different response curves.

M. Summary and Conclusions

Through a review of the results of the 20 different scenarios (10 base and 10 operational), several conclusions could be reached regarding the transportation analysis, including the following:

- Critical transportation facilities within the TBRPC region include I-75, I-275, and I-4. For large storm events, such as level D and E evacuations, other State facilities also play an important role in evacuations, such as SR 52 and 54 in Pasco County, SR 60 in Pinellas County, and SR 64 in Manatee County. Outside the region, the Turnpike/I-75 interchange in Sumter County is clearly an issue in all evacuation scenarios;

- During the level A and B evacuation scenarios, the roadway segments with the highest vehicle queues are primarily concentrated along the major Interstate and State Highway system. During these levels of evacuation, state county, and municipal officials should coordinate personnel resources to provide sufficient traffic control at interchanges and major intersections along these routes;

- In contrast, for the higher level C, D, and E evacuation scenarios, many other roadway facilities, both within and outside of the region, will require personnel resources for sufficient traffic control at interchanges and major intersections;

- The TBRPC counties, in coordination with the State, should continue public information campaigns to clearly define those that are vulnerable and should evacuate verses those who choose to evacuate on their own. During large storm events in the operational scenarios, evacuations by the vulnerable population in the six TBRPC Counties are impacted by shadow evacuations occurring in other parts of the counties and in areas outside the TBRPC region;

- The Florida Department of Transportation should continue to work with local counties on implementing intelligent transportation system (ITS) technology, which will provide enhanced monitoring and notification systems to provide evacuating traffic with up to date information regarding expected travel times and alternate routes;

- A comparison of the 2017 and 2020 base scenarios indicate that the roadway improvement projects planned for implementation by 2020 have an impact in handling evacuation clearance times. Despite the increased population levels in 2020 within the TBRPC region, clearance times were generally slightly higher between the 2017 and 2020 time periods. An increase slightly less than what the population growth alone would contribute. The roadway improvement projects were effective in keeping clearance times within a reasonable increase. FDOT, MPOs within the region, and county governments should continue funding roadway improvement projects within the region;

- State agencies can use the data and information provided in this report (specifically the evacuating vehicle maps in Volume 5-8) to estimate fuel and supply requirements along major evacuation routes to aid motorists during the evacuation process;

  For major evacuation routes that have signalized traffic control at major intersections, traffic signal timing patterns should be adjusted during the evacuation process to provide maximum green time for evacuating vehicles in the predominate north and west directions; and,

  The counties within the Tampa Bay Region are encouraged to test additional transportation scenarios beyond what has been provided in this study. Each model run will provide additional information for the region to use in planning for an evacuation. Counties interested in testing various response curves for each scenario can easily do so using the TIME interface to calculate clearance times for different evacuation conditions, such as different evacuation levels, different behavioral response assumptions, and different response curves.

  The catalyst behind this new update is the new SLOSH Basin from the National Hurricane Center. The west coast of Florida had a generally overall increase in surge inundation due to the updated parameters in the SLOSH model, including the use of Kelvin Wave dynamics. Despite this fact, the evacuating population and the clearance times for them did not increase as much as feared. The vulnerable population shifted around between evacuation zones. For instance in the last Study with the previous SLOSH basin, Pinellas County vulnerable population in zone E was numbered at 52,000 while the population in zone A was 141,000. The new basin brings new inundation limits and the Pinellas zone E population totals 39,000 while the zone A population grew to 216,000. Hillsborough County fared worse as the previous basin vulnerable population in zone E was 75,000 while zone A was 82,000. This new basin pushed considerable more water into the bay and Hillsborough County bears the brunt of this outcome. This new basin vulnerable population for zone E is 158,000 while zone A is 155,000.

  Whether it is the way the new basin seems to bring more surge to the A zone, or the fact that a few roadway projects are finished since the last Transportation Update with the previous SLOSH basin, it appears from the modeling that clearance times have been improved since the previous Update. In-County Clearance Times Base Scenario for Hillsborough level A was 22 hours and level E 65 hours. The same In-County Times with this new basin are 22.5 for level A and 48.5 for level E. For Pinellas County, similar

results can be seen. For the previous basin, level A was 21 hours while level E was 64. Fast-forward to the new SLOSH basin and level A is 21 hours and level E just 48. That is an overall reduction for larger threat storms. Keep in mind that we are comparing Base Scenario times which means we are using the same parameters for all evacuation levels and time periods.

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CHAPTER I
INTRODUCTION

The evacuation transportation analysis discussed in this volume documents the methodology, analysis, and results of the transportation component of the Statewide Regional Evacuation Study Program (SRESP). Among the many analyses required for the SRESP study, transportation analysis is probably one of the most important components in the process. By bringing together storm intensity, transportation network, shelters, and evacuation population, transportation analysis explicitly links people's behavioral responses to the regional evacuation infrastructure and helps formulate effective and responsive evacuation policy options. Due to the complex calculations involved and numerous evacuation scenarios that need to be evaluated, the best way to conduct the transportation analysis is through the use of computerized transportation simulation programs, or transportation models.

A. Background and Purpose

Over the years, different planning agencies have used different modeling approaches with varying degrees of complexity and mixed success. Some have used full-blown conventional transportation models such as the standard Florida model FSUTMS; others have used a combination of a simplified conventional model and a spreadsheet program, such as the Abbreviated Transportation Model (ATM). These models have different data requirements, use different behavioral assumptions, employ different traffic assignment algorithms, and produce traffic analysis results with different levels of detail and accuracy. These differences make it difficult for planning agencies to share information and data with each other. They also may produce undesirable conditions for staff training and knowledge sharing.

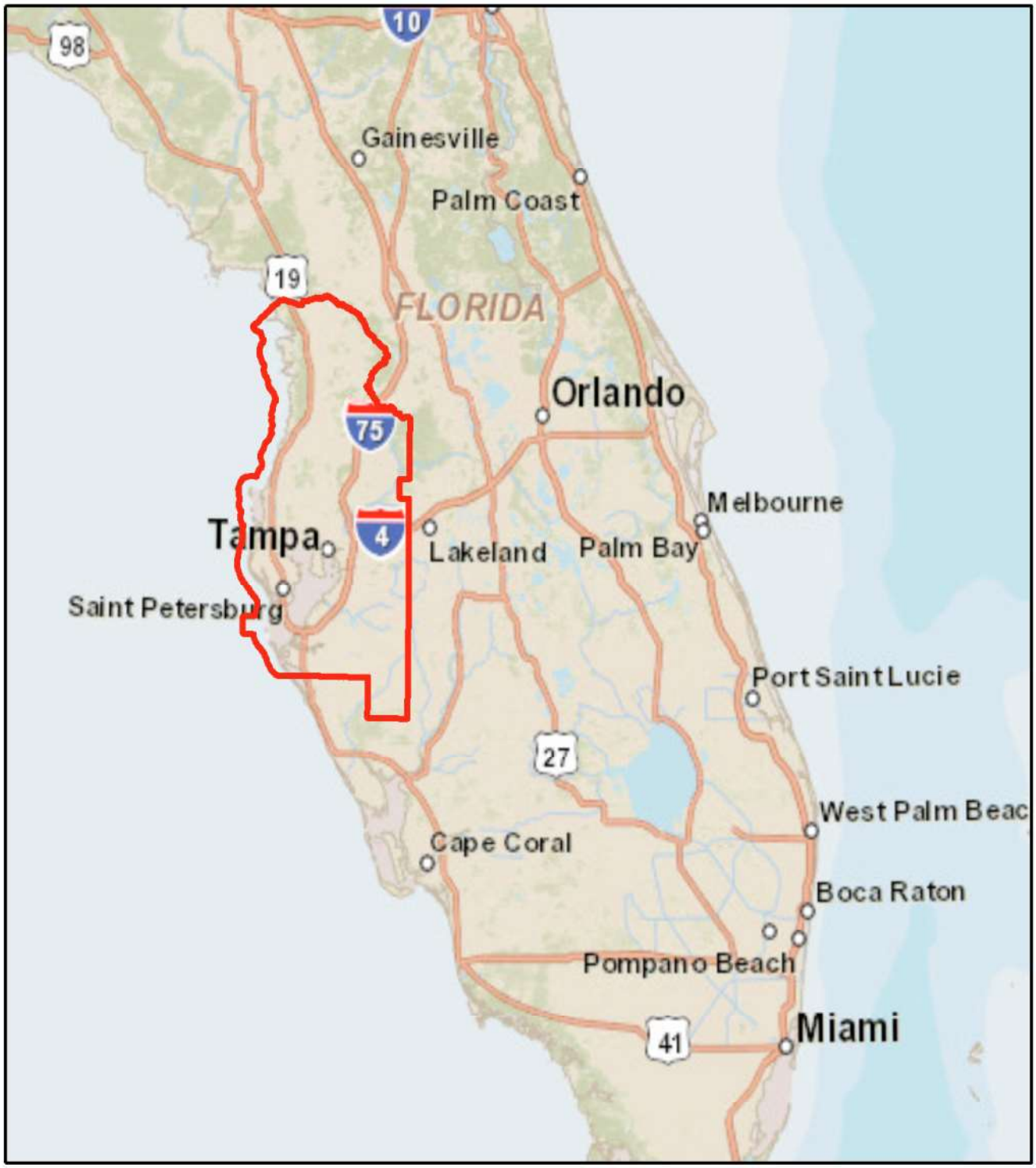
One of the objectives of the SRESP is to create consistent and integrated regional evacuation data and mapping, and by doing so, to facilitate knowledge sharing between state, regional, county, and local partners. To achieve this objective, it is important for all Regional Planning Councils to adopt the same data format and to use the same modeling methodologies for their transportation analyses. The primary purpose of the transportation component of the SRESP is to develop a unified evacuation transportation modeling framework that can be implemented with the data collected by the Regional Planning Councils.

B. Study Area

The study area for this analysis includes the six-county Tampa Bay Regional Planning Council area, as illustrated in **Figure I-1**. The transportation modeling methodology includes some processes that are performed at the statewide level, in order to determine the impacts of evacuations from other regions impacting the evacuation clearance times in the Tampa Bay region. While the impact of other regions is included in the Tampa Bay analysis, it is important to note that the results of the transportation analysis presented in this document are only reported for the six counties included in the Tampa Bay RPC. Transportation analysis results for other regions and counties are reported in the corresponding Volume 4 report for those regions.

Figure I-1

Tampa Bay Regional Planning Council



Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: July, 2015

C. Input and Coordination

The SRESP transportation methodology and framework was developed during 2008 and 2009 in coordination with all eleven regional planning councils in Florida, along with the Division of Emergency Management, Department of Transportation, Department of Economic Opportunity (formerly the Department of Community Affairs), and local county emergency management teams with CDM-Smith serving as the transportation consultant.

During the updates to SRESP in 2015, two meetings were held at the local and regional level to receive updated input from local county emergency management and the regional planning council. The two meetings held in the region included the following:

Regional Meeting No. 1 – Scenario Development Update Meeting
The first regional meeting for the Tampa Bay region was held on March 10, 2015 at 1:30 PM. The purpose of the scenario development update meeting was to discuss small area demographics of the Tampa Bay Region, discuss the base scenarios for the region for growth management purposes, and discuss and receive input on the operational scenarios to be evaluated for emergency management purposes. It was decided to keep the same parameters as the 2010 Evacuation Study.

Regional Meeting No. 2 – Transportation Analysis Update Meeting
The second and final regional meeting for the Tampa Bay Region will be held on August 20, 2015 at 2:00 PM. The purpose of the transportation analysis meeting was to review the draft results of the transportation analysis and receive feedback on the draft final report.

2017 Interim Transportation Analysis Update
The national Hurricane Center completed the first of three new 'Superbasin' SLOSH basins for the state of Florida in 2016. This basin covers the southern half of Florida and incudes new modeling parameters and higher resolution than was available previously. Because the basin resulted in changes in surge zones, many counties needed to update their evacuation zones. After the new evacuation zones were created, transportation analysis with evacuation clearance times and shelter demand have to be replaced and updated. Due to the approach of the hurricane season, an 'all-hands on deck' approach was undertaken at FDEM to complete the transportation modeling runs. As this is in between designated Evacuation Study Update cycles, importance was given to fast dissemination of the data to the end users (county emergency managers). The results have been incorporated into this document which was updated only two years ago.

D. Study Comparisons

It is important to note that this study contains significant updates and revisions in comparison to the 2010 SRESP study for the TBRPC region and the most recent 2015 Update. These revisions include updates to the transportation modeling software, TIME. A significant change to the Tampa Bay Region is the inclusion of two new counties, Citrus and Hernando. Most parameters stayed the same due to the recent update in 2015; however, the surge zone changes and consequently the evacuation zone changes in many of the counties influenced the evacuation population. Modifications to the roadway network were captured in the 2015 update. These updates and revisions make comparisons to the original 2010 study difficult.

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CHAPTER II
EVACUATION MODELING METHODOLOGY AND FRAMEWORK

The evacuation modeling methodology and framework was developed during 2008 and 2009 in coordination with all (then) eleven Regional Planning Councils and the Division of Emergency Management, and periodically from this time to incorporate features. The methodology used in this Tampa Bay Region Evacuation Transportation Analysis was updated to accommodate new versions of Cube Voyager and Cube Avenue software and is summarized in the following sections.

A. Behavioral Assumptions

In 2008, the Statewide Regional Evacuation Study Program (SRESP) commissioned a survey of Florida residents. The purpose of this survey was to develop an understanding of the behavior of individuals when faced with the prospect of an impending evacuation. These data were used to develop a set of "planning assumptions" that describe the way people respond to an order to evacuate and are an important input to the SRESP Evacuation Model. The behavioral data provides insights into how people respond to the changing conditions leading up to and during an evacuation.

The primary application of the survey data was to help anticipate how people would respond with respect to five behaviors:

- How many people would evacuate?
- When they would leave?
- What type of refuge they would seek?
- Where they would travel for refuge?
- How many vehicles would they use?

These evacuation behaviors are distinguished based on several descriptive variables as listed below:

- Type of dwelling unit (site-built home versus mobile home);
- The evacuation zone in which the evacuee reside; and,
- The intensity of the evacuation that has been ordered.

How many people?

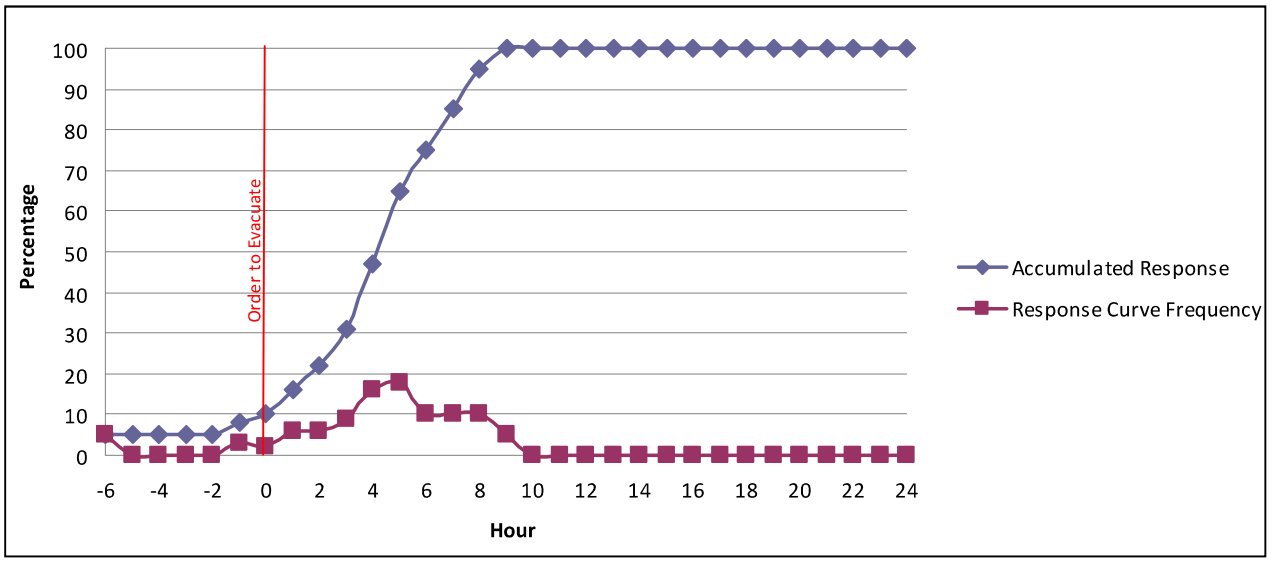
The evacuation rate indicates the percent of residents who will leave their homes to go someplace safer in each storm threat scenario. The evacuation rates are based on the following assumptions: that the storm track passes very close to the area being evacuated; and officials order evacuation for surge evacuation zones corresponding to storm category. Under the 100 percent response scenario, this rate will default to 100 percent.

When will they leave?

Consistent with behavior observed in past evacuations, evacuees do not begin their journey toward safety all at the same time. Rather, evacuees each begin their trips at different times based on their unique characteristics and constraints. Some individuals will prefer to evacuate soon after an order is given. Others may need to spend time securing personal property or seeing to the welfare of their relatives before they feel comfortable evacuating. Yet others will underestimate the threat posed to them by an oncoming storm and may not evacuate until very late. A set of evacuation response curves show the proportion of evacuation by increment of time for evacuation orders that were issued.

Each curve represents a different assumption on the amount of time it will take for an evacuating population to fully mobilize. The curves reflect the sense of urgency with which the population perceives the impending evacuation. Faster curves represent more urgent circumstances and slower curves represent less urgent circumstances. These curves are used by the model to divide the total number of evacuating trips into segments representing each hour that evacuating trips begin their journey. For example, a nine hour curve will place a certain number of evacuating trips in the first segment. These trips will represent those evacuees leaving in the first hour of an evacuation. The curve will then place another number of trips in the second segment representing the number of people leaving in the second hour of an evacuation. This process continues until all evacuees have begun their journey, which in a nine hour curve occurs during the ninth segment. All of the curves developed for the SRESP assume that some portion of the evacuating population leave before an order to evacuate is given. Typically, this is ten percent of the evacuating population. The nine hour response curve used in the model is depicted in **Figure II-1**. Response curves are available in the model to evaluate six, nine, twelve, eighteen, twenty-four, and thirty-six hour responses.

Figure II-1 – Nine Hour Response Curve



What type of refuge would be sought?
The survey data identified four types of refuge sought by evacuees. Specific rates were developed that identified the number of evacuees seeking shelter at each of these following different types of refuge:

- Friends and family;
- Hotel or motel;
- Public shelter; and,
- Other types of refuge not covered elsewhere in the list including, but not limited to, office space, churches, civic organization halls, and club houses.

Where will they travel?
The behavior survey distinguishes between trips that leave the county where an evacuation journey begins and trips that stay within the county. The out-of-county trip rate indicates the percent of evacuees who will seek refuge outside their county of residence. The in-county trip rate will determine how many of the evacuating trips are destined to remain within the county.

How many vehicles are used?
The vehicle use rate indicates the percentage of vehicles available to the evacuating household(s) that will be used in evacuation in each storm threat scenario. This rate ultimately determines the number of vehicles on the highways during an evacuation.

B. Zone System and Highway Network

The SRESP evacuation model relies upon data that covers the entire State of Florida as well as areas covering the States of Georgia, Alabama, Mississippi, South Carolina, North Carolina, and Tennessee. While the primary focus of the model is with evacuation behavior within Florida, areas outside of the state had to be considered in order to allow a more precise routing of evacuation traffic. This allows the model to measure the flow of traffic across the state line if needed.

Zone System
The data included in this system contain the demographic information crucial to modeling evacuation traffic. The demographic information is labeled as "small area data". These data provide population and dwelling unit information that will identify where the individuals in the region reside. The planning assumptions developed from the behavioral analysis conducted for this study were applied to these demographic data. The result is a set of evacuation trips generated by the evacuation model. The number of these trips will vary depending on the hazard conditions that prompt the evacuation.

The Tampa Bay Regional Planning Council developed their small area data by utilizing MPO 2014 TAZ geography. Data were developed for the following years: 2015 and 2020.

Traffic Evacuation Zones (TEZ)
Small area data geographies were aggregated into larger units known as Traffic Evacuation Zones (TEZ). These TEZ form the basic unit of analysis in the evacuation model similar to how traffic analysis zones form the basic unit of analysis in a standard travel demand model. The TEZ system was developed so that the small area geographies will nest completely within one TEZ or another. This eliminates any potential for split data and will ensure that data in the TEZ system can always be updated with relative ease.

The final TEZ system for the State of Florida has 8,829 zones. This number provides sufficient detail to accurately accommodate the assignment of evacuation trips onto an evacuation network. Furthermore, additional roadway segments have been included in the model's highway network to facilitate the movement of evacuation trips onto and off of the evacuation network. Each TEZ has a unique identification number that will be used by the model to connect evacuation trip generation to the evacuation highway network.

Highway Network

A highway network is used to represent the roads that evacuees travel along as they journey toward safety. Various datasets were used to develop the highway network database as follows:

- Florida Statewide Model Network – The 2005 base year statewide model (latest model available) was used as a basis for developing the evacuation model. The statewide model was obtained from the Florida Department of Transportation (FDOT) Systems Planning Office;

- Evacuation Routes – Evacuation routes in each Regional Planning Council (RPC) area were obtained from the RPCs themselves. The RPCs relied on their constituent counties to provide them with information on which roads were to be included as evacuation routes;

- Florida Highway Data Software (FHD) – The 2006 Florida Highway Data software was obtained from FDOT. This software was used to view and query data extracted from the Roadway Characteristics Inventory (RCI) which includes number of lanes, facility types, speed limits, etc.;

- FDOT Quality/Level of Service Handbook – The 2002 FDOT Quality/Level of Service Handbook (QLOS) and the 2007 LOS Issue Papers (2002 FDOT QLOS addendum) were obtained from the FDOT Systems Planning Office website. The QLOS handbook and the LOS tables were used to establish roadway capacities for evacuation purposes; and,

- Microsoft and Google aerials and maps – These aerial maps were used to identify and clarify roadway alignments. Whenever questions concerning the existence of particular facilities, their characteristics, or their alignments arose, aerials were referenced.

Changes to the Florida Statewide Model Network

Some modifications to the Florida Statewide Model network were necessary in order to make the data usable for evacuation modeling purposes:

- The original database, which was coded for a 2005 base year, was updated to 2010 conditions to correspond to the SRESP base year, and ultimately 2015 and 2020;
- Additional facilities had to be added to the network to accommodate evacuation traffic behavior;
- Many attributes from the original data set were removed and new ones were added specifically tailored for trip activity for evacuation modeling purposes;
- Based on RPC input, any missing facilities instrumental for evacuations were coded into the highway network database;
- The highway network database was extensively reviewed for the correct coding of one-

way links;
- The 2006 FHD software was used to verify the highway network database number of lanes for the state roads, US highways, and major county roads. For other roads Microsoft and Google aerial maps were used;
- The area type and facility type attributes for each roadway segment were verified for their consistency with existing conditions; and,
- The network attributes were modified to the specific needs of evacuation modeling and reporting purposes. The evacuation routes designated by the RPC were flagged for reporting purposes. The County name attribute and the RPC number attributes were checked and modified accordingly.

Capacities

Network capacities for the evacuation model are based on facility type and area type. The network facility type classification and the area type classification were retained from the existing Florida Statewide Model highway network database.

FDOT's 2002 Quality/Level of Service (QLOS) generalized level of service volume tables were used for estimating the link capacity for each combination of functional class and area type. The generalized level of service volume tables were generated from conceptual planning software which is based on the 2000 edition of the Highway Capacity Manual (HCM). Using statewide default values for each of these roadway characteristics, the generalized LOS volume tables were developed from the conceptual planning software.

The peak hour volume represents the most critical period for traffic operations and has the highest capacity requirements. Many urban routes are filled to capacity during each peak hour, and variation is therefore severely constrained. The peak hour directional volumes at LOS E, closely represent the maximum volume (capacity) that can be accommodated through a given roadway. In some cases the Peak Hour Two-Way LOS tables do not show the maximum services volumes at the LOS E. For example, the four-lane Class I arterial service volumes are only shown from LOS A to LOS D, This indicates that the maximum volume thresholds (capacity) are reached at LOS D and these volumes represent the capacity of the roadway.

A lookup table was created with facility type, area type, number of lanes, and capacities by comparing model network characteristics to the roadway characteristics in the QLOS manual. The lookup table is shown in **the Transportation Supplemental Data Report**. The capacity attribute in the network was automatically assigned for any given link with a specific facility type, area type and number of lanes during the network preparation process.

Speeds

The existing highway network database link speeds were verified for their reasonableness and their suitability for evacuation modeling purpose. The speed values of the existing statewide model database were reasonable and therefore retained in for evacuation modeling.

Roadway Attributes

The roadway attributes contain the highway characteristics for each link in the highway network. Some of the attributes like DISTANCE, FTYPE, ATYPE, etc., were retained from the highway network database and other attributes like DENSITY and EVAC_RTE are specific to the evacuation modeling and were included in the network.

Reverse Lane Operations

Additional changes were also made in order to accommodate reverse lane operations in an evacuation scenario. Most of the facilities that would be subject to a reverse lane operations scenario were coded as a pair of one-way links. Additional attributes were added to the network in order to allow for the correct calculation of capacity in the reverse lane direction. The configurations of reverse lane facilities reflect the reverse lane operations plans established by the State.

C. Background Traffic

The traffic that consumes the roadway capacity of a transportation system during an evacuation can be divided into two groups. The first group is the evacuation traffic itself. Once the evacuation demand is determined, this information is converted into a number of vehicles evacuating over time. These evacuation trips are then placed on a representation of the highway network by a model. The model determines the speed at which these trips can move and proceeds to move the evacuation trips accordingly. The result is a set of clearance times.

The second group of traffic is known as background traffic. Background traffic, as its name implies, is not the primary focus of an evacuation transportation analysis and is accounted for primarily to impede the movement of evacuation trips through the network. These trips represent individuals going about their daily business mostly unconcerned with the evacuation event. For the most part, background traffic represents trips that are relatively insensitive to an order to evacuate and are thus said to be occurring in the "background." Even though background traffic is relatively insensitive to evacuation orders, it is important to account for background traffic since it can have a dramatic impact on available roadway capacity. This in turn can severely affect evacuation clearance times.

Methodology used to Account for Background Traffic

There are two dynamics at work when evacuation traffic and background traffic interact with one another. The first is the effect of background traffic displacing evacuation traffic as background traffic attempts to use the same roads as the evacuation traffic. The second is the effect of evacuation traffic displacing background traffic. As vehicles move along the network and try to get onto certain roads they leave less room for other vehicles to use those same roads. As background traffic builds up there is less room for evacuation traffic to move, and vice versa. While the effect that evacuation traffic has on background traffic may be of some interest to those who are concerned with disruptions in daily trip making behavior during an evacuation event, for the purposes of this study we are much more interested in the effect that background traffic has on evacuation clearance times.

The effect that background traffic has on evacuation traffic can be stated in terms of available capacity. The more background traffic there is on a segment of road, the less capacity is available for evacuation traffic to use. Following this logic, it becomes apparent that by causing the available capacity to fluctuate throughout the evacuation event, one is able to sufficiently account for the impact of background traffic. FDOT's Florida Traffic Information DVD was used to develop average peaking characteristics for various functional classes of roadways throughout the state. These characteristics were analyzed to determine how much capacity is available throughout a given day during an evacuation.

Two sets of curves were developed, one for coastal evacuating counties that represent lower

background traffic and one for all other counties representing greater background traffic. The model then adjusts capacities up and down consistent with these curves as it simulates the evacuation.

Figure II-2 illustrates the set of curves showing the percentage of available capacity throughout a 24 hour period for a coastal evacuating county after the model accounts for background traffic. **Figure II-3** illustrates the set of curves showing the percentage of available capacity throughout a 24 hour period for all other counties after the model accounts for background traffic.

Figure II-2 – Percent of Available Capacity for Coastal Counties

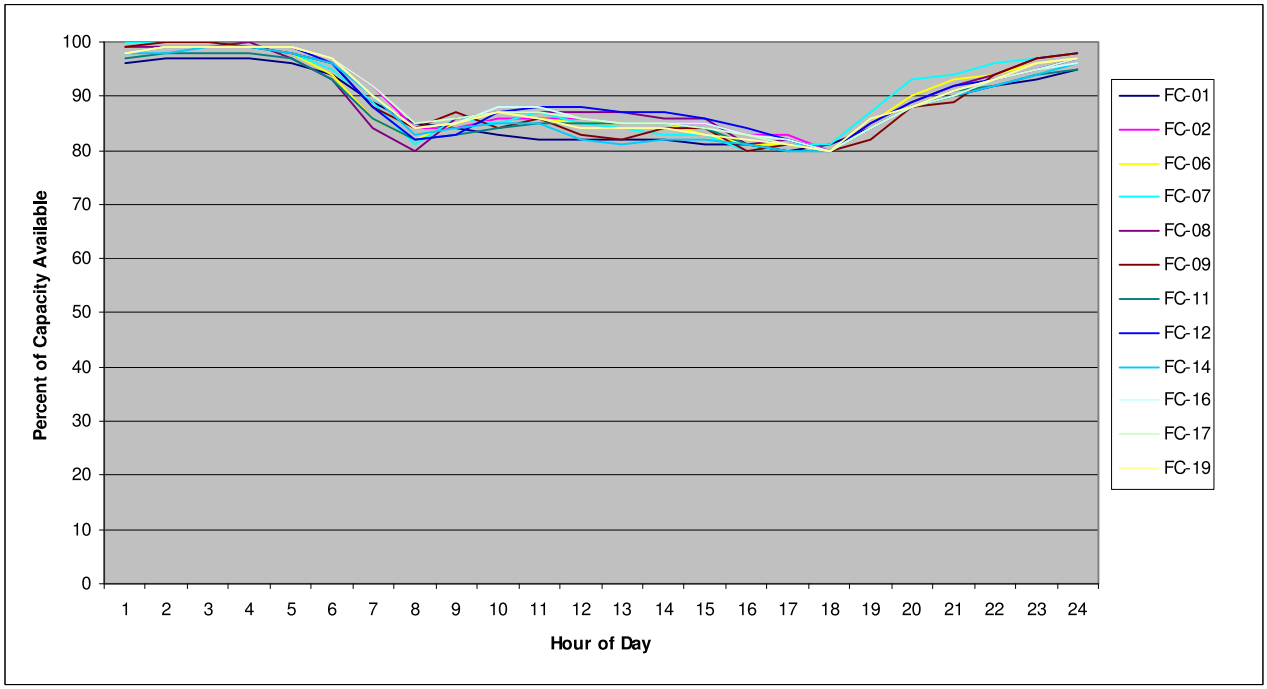
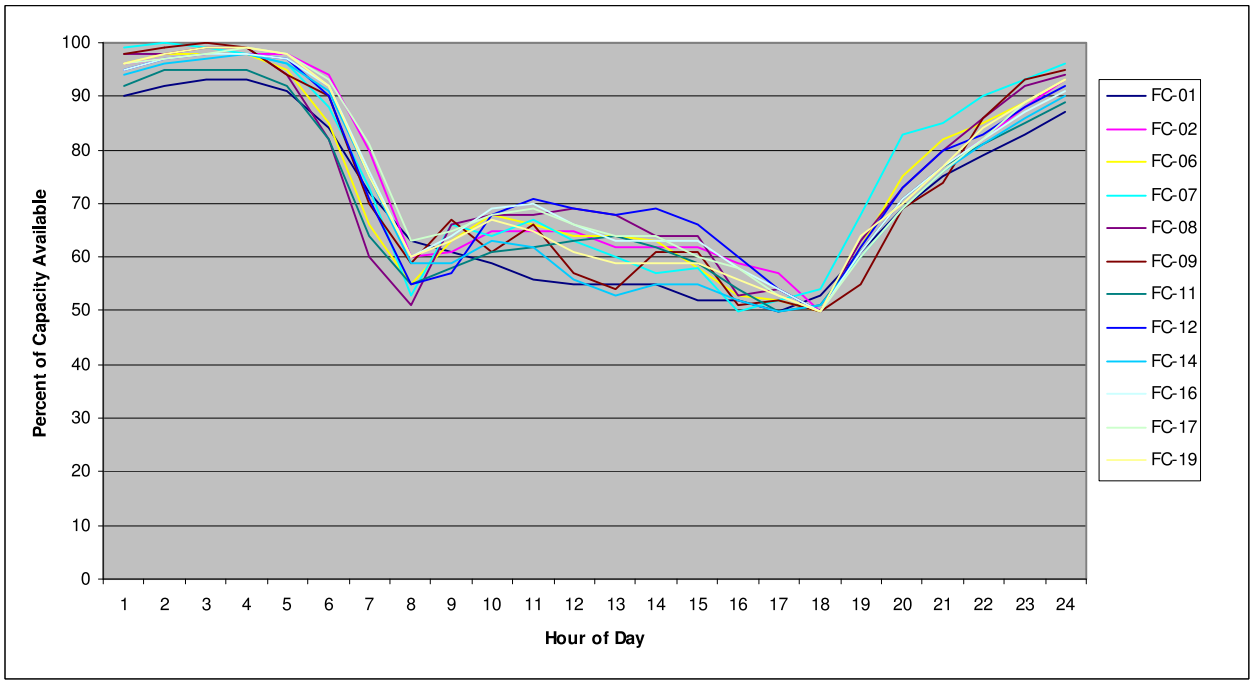


Figure II-3 – Percent of Available Capacity for Other Counties

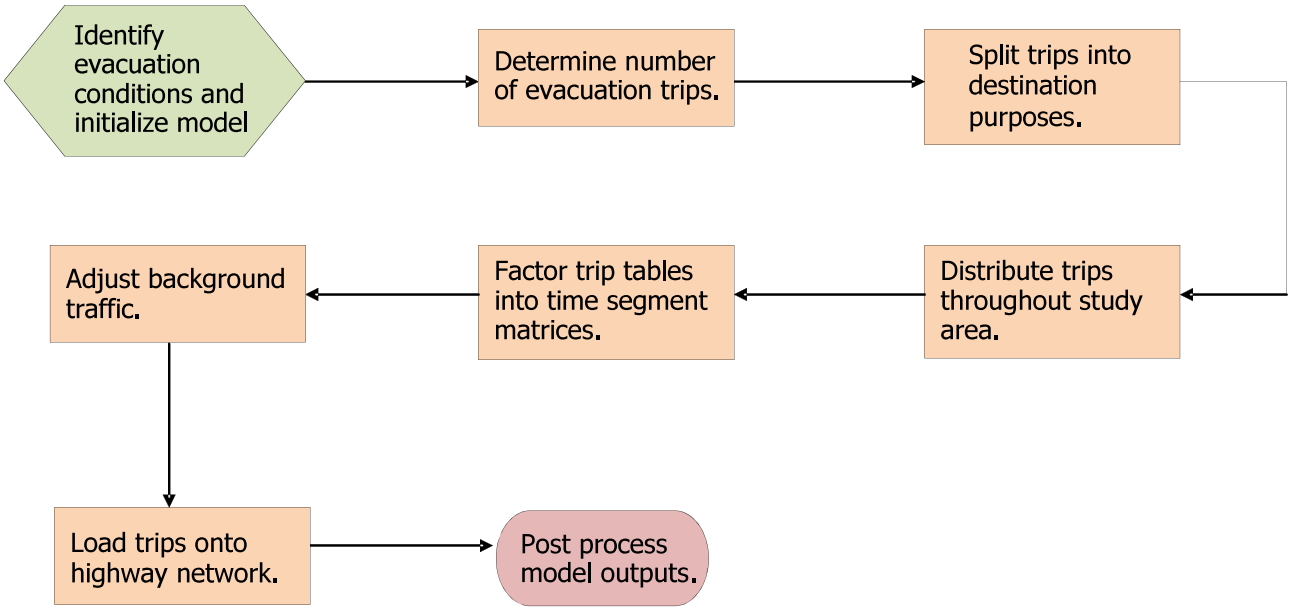


D. Evacuation Traffic

The model flow for the evacuation model is divided into a total of eight modeling steps. The following eight steps are represented graphically in the flowchart in **Figure II-4**:

1. Identify evacuation conditions and initialize model;
2. Determine number of evacuation trips;
3. Split trips into destination purposes;
4. Distribute trips throughout study area;
5. Factor trip tables into time segment matrices;
6. Adjust background traffic;
7. Load trips onto highway network; and,
8. Post process model outputs.

Figure II-4 - General Model Flow



Initializing the Model

At the beginning of the model flow, the model will need to determine the hazard conditions representing the particular scenario that will be analyzed. This will allow the model to accurately identify the areas that will be subject to evacuation and to determine the intensity of the evacuation event. This process will then establish the appropriate rates that will be used to determine the number of evacuation trips that will be generated.

Number of Evacuating Trips

After the model has finished initializing it will begin to calculate the number of evacuation trips that are generated. Estimating an appropriate number of trips is essential to ensuring that the behavior expressed on the highway network during trip assignment is reflective of likely conditions during a real world evacuation event.

The planning assumptions developed by the behavioral analysis were translated into a master rates file that can be referenced by the model in order to determine the number of evacuation trips that a particular scenario can be expected to generate.

Production Ends

Every trip has two ends. One end represents where a trip begins its journey and is typically referred to as the production end. The other end represents where a trip finishes its journey and is typically referred to as the attraction end. The calculation of the production end of each evacuation trip in the model is driven by the master rates file mentioned above.

Attraction Ends

The other end of an evacuation trip, the attraction end, is calculated using a much more simplified methodology. Public shelters have clearly defined capacities. For hotels and motels,

each room will be designated as an attraction. Trips destined to shelter with friends and family or in other unspecified destinations will have an attraction generated at each non-evacuating household in the model. This will ensure that these trips are evenly distributed around the area with some clumping occurring in highly residential areas.

Splitting Trips into Destination Purposes
Once the number of evacuation trips has been determined it will be necessary to divide the trips into various trip purposes. These purposes are based on the type of destination that an evacuee is headed to and the relative location of that destination. There are four types of destinations and two relative locations for a total of eight trip purposes, as identified below:

- Friends & Family – In County;
- Public Shelter – In County;
- Hotel/Motel – In County;
- Other – In County;
- Friends & Family – Out of County;
- Public Shelter – Out of County;
- Hotel/Motel – Out of County; and,
- Other – Out of County.

The same behavioral analysis that establishes the evacuation and vehicle use rates used to determine the number of evacuation trips that are being generated by the model is also a source of data for determining the various destinations where these evacuation trips are heading.

Trip End Balancing
Once the model has finished splitting the trip ends into their respective purposes, it will commence the process of balancing trip ends. The balancing of trip ends is critical so that the trip distribution process which is to follow this step will be able to tie every trip production to every trip attraction. A surplus or deficit of one trip end or the other may cause complications in the evacuation model that can lead to overestimating the model, underestimating the model, or aborting the model process.

In County Balancing - The trip balancing procedure begins by considering each purpose individually. If the trip purpose under consideration is an In County purpose the model compares the number of productions to the number of attractions. If the number of attractions is greater than the number of productions, the model will simply apply a universal adjustment of all attraction trip ends in the county down to the number of productions. The end result should be an equal number of In County productions and attractions.

If, on the other hand, the productions should exceed attractions the excess productions are shifted over to the corresponding Out of County purposes. For example, if the model estimates using the behavioral planning assumptions that there will be 3,000 evacuees destined In County to Hotel/Motel destinations, but there are only 2,500 Hotel/Motel attraction ends available in the county, the excess 500 trips will become Out of County Hotel/Motel trips.

Out of County Balancing - If the purpose under consideration is an Out of County purpose the model will balance the attractions regionally. Using data derived from the behavioral study, a certain percentage of each out of county trip will be destined to a particular region. If a

particular region is prohibited by the model from receiving evacuation trips, the model will reallocate the portion of evacuation trips originally destined for that regional equally among all other regions. **Table II-1** identifies the percentages of out of county trips destined from each region and to each region. When the model has finished balancing the evacuation productions and attractions, the model will then proceed with trip distribution.

Table II-1 – Out of County Trip Destinations by Region

To / From	Apalachee	Central	East Central	North Central	Northeast	South	Southwest	Tampa Bay	Treasure Coast	West	Withla-coochie	Out-of-State
Apalachee	31.2%	0.1%	1.1%	2.3%	2.1%	0.0%	0.1%	0.7%	0.3%	3.5%	0.8%	57.8%
Central	5.9%	9.8%	13.0%	4.4%	4.7%	0.0%	4.2%	5.9%	5.4%	0.7%	1.7%	44.2%
East Central	2.5%	1.7%	27.1%	5.4%	5.9%	1.5%	2.6%	6.7%	0.8%	1.4%	3.1%	41.2%
North Central	5.2%	0.7%	3.6%	15.2%	6.3%	0.3%	0.3%	3.1%	0.2%	1.3%	2.0%	61.8%
Northeast	3.7%	0.7%	4.2%	6.6%	10.3%	0.6%	0.6%	1.8%	0.2%	1.9%	2.0%	67.4%
South	2.0%	3.4%	20.9%	2.1%	3.4%	24.5%	5.7%	2.1%	9.0%	0.5%	3.1%	23.4%
Southwest	1.4%	5.2%	15.9%	3.9%	3.3%	4.6%	11.0%	8.4%	3.2%	0.8%	5.4%	37.0%
Tampa Bay	3.2%	3.7%	14.1%	2.8%	4.5%	2.2%	1.3%	15.7%	2.0%	0.5%	7.3%	42.6%
Treasure Coast	2.8%	1.5%	22.8%	3.0%	4.4%	4.5%	4.0%	9.4%	11.5%	0.2%	2.0%	34.0%
West	6.3%	0.2%	2.1%	0.9%	3.5%	0.4%	0.1%	0.3%	0.3%	8.7%	0.8%	76.4%
Withla-coochee	2.4%	1.7%	12.4%	7.4%	3.3%	1.0%	0.7%	6.5%	0.5%	1.2%	15.0%	48.0%

Source: Derived from SRESP Behavioral Data and Planning Assumptions

Trip Distribution

After the model has determined how many evacuation trips there will be in a given scenario, split those trips into purposes, and balanced the trip ends for those purposes, it will be necessary for the model to perform a trip distribution. The trip distribution step in the model connects each production end to a unique attraction end. The end result is a trip table containing origins and destinations for each trip in the model. Typically, origin zones are referred to by the letter I and destination zones are referred to by the letter J. An Origin-Destination matrix, also known as an OD matrix, is one of the principal inputs into trip assignment. This matrix tells the model where each trip is coming from and where it is going to.

The trip distribution process begins by looping through each trip purpose and determining whether the purpose is In County or Out of County. In County trips are restricted to destination TEZs within the same county as the trip origin. Out of County trips are restricted to TEZs not in the same county as the trip origin. The trip distribution is conducted using a gravity model that relies on distances as the chief measure of impedance.

Time Segmentation

The final step of the model prior to initiating the trip assignment sequence is to segment the trip table into discreet time periods. This segmentation determines at what point in time each trip begins its evacuation. The model is set up to process a set of evacuation response curves with a period resolution of one-half hour. The model uses a set of factors developed from the behavioral response curves to divide the evacuation trip tables into the different segments.

The model makes the following assumptions. Due to limitations in the model, these assumptions cannot be adjusted. The analyst should keep these assumptions in mind when using results developed by the model:

- All evacuations begin when an order to evacuate has been issued;
- All evacuations begin during the first hour of daylight, approximately 7:00 AM;
- All evacuations begin during an average weekday;
- Some portion of evacuation trips, typically ten percent, leaves prior to the beginning of an evacuation; and,
- Those evacuation trips that leave prior to the beginning of an evacuation leave no later than the previous evening and have already cleared the network by the time an evacuation order is given.

E. Dynamic Traffic Assignment

Dynamic traffic assignment (DTA) was utilized because it is sensitive to individual time increments. DTA works by assigning a certain number of vehicles to the highway network in a given interval of time. The model then tracks the progress of these trips through the network over the interval. Another set of vehicles is assigned during the following time interval. The model then tracks the progress of these trips through the network along with the progress of the trips loaded in the previous time interval. As vehicles begin to arrive at the same segments of roadway, they interact with one another to create congestion. When vehicles that were loaded to the network in subsequent intervals of time arrive at the congested links, they contribute to the congestion as well. This results in a slowing down of the traffic and eventually spill-backs and queuing delays.

It is this time dependent feature of DTA that makes it well suited to evacuation modeling. By dynamically adjusting the travel times and speeds of the vehicles moving through the network as they respond to congestion the model is able to do the following:

- The evacuation model is able to estimate the critical clearance time statistics needed for this study;
- The model takes into account the impact of compounded congestion from multiple congestion points;
- The model is able to adjust the routing of traffic throughout the network as a function of congestion as it occurs throughout the evacuation; and,
- The model is capable of adjusting its capacities from time segment to time segment, making it possible to represent such phenomena as reverse lane operations and background traffic.

Parameters of the Evacuation Assignment

The DTA for the evacuation model makes use of certain parameters which dictate how the assignment will function. The parameters that were established are:

- **Capacity -** The SRESP evacuation model uses hourly lane capacities derived from the Florida Department of Transportation Quality/Level-of-Service Handbook. These capacities are initially set to represent Level-of-Service E conditions. These capacities are then further increased by an additional 20 percent for freeway links and 10 percent for non-freeway links. These increases in capacity are meant to reflect high volume usage typically found during an evacuation, optimal green timing of traffic signals and traffic control typically controlled during an evacuation by law enforcement personnel, and the use of shoulder and emergency lanes;

- **Storage -** Storage determines how many vehicles can remain standing on a length of roadway at any moment in time. The evacuation model assumes that storage is set to 250 vehicles per lane per mile. This assumes approximately 21 feet of space are "occupied" by any given vehicle. Given the mix of vehicles on a roadway network (including compacts, SUVs, trailers, and trucks) this spacing appears to be reasonable for stand-still traffic;

- **Time Intervals -** In order to properly implement a DTA model, the assignment process needs to be segmented according to a set of time intervals. Half-hour intervals provide sufficient detail to satisfy the planning needs of both emergency management and growth management concerns. The model calculates vehicle assignments over 192 such intervals for a 96 hour model period. This is sufficient to capture all evacuation activity during an event and allows sufficient time for the evacuation traffic to clear at both the county and regional level; and,

- **One-Way Evacuation Operation -** The State of Florida has recently published a series of one-way evacuation operation plans for major corridors throughout the state. The intention of these plans is to fully maximize the available capacity on a freeway by using all lanes to move evacuees away from danger. The model will emulate one-way operations by simultaneously increasing the capacity of links headed away from the threatened area and eliminating the capacity of links headed toward the threatened area. The capacity of links headed away from the threatened area will increase by 66 percent, which is consistent with capacity increases used by Florida's Turnpike Enterprise. Past experience of reverse lane operations have shown that capacities do not double, as is commonly assumed, but increase by a lower percentage of about two thirds.

F. Prototype Model Development

CDM Smith developed the prototype model to test the modeling methodology used to calculate evacuation clearance times. The prototype model demonstrated the viability of the methodology developed for this study. This included the use of dynamic traffic assignment, background traffic curves, regional sub-area trip balancing, the use of survey rates, the use of 100% participation rates, response curves, and county-by-county phasing of evacuations.

The prototype model served as the backbone for all regional evacuation models that have been developed for this study. The models implemented for each RPC use a structure similar to the prototype with identical methodology.

The SRESP evacuation model relies upon data that covers the entire State of Florida as well as areas covering the States of Georgia, Alabama, Mississippi, South Carolina, North Carolina, and Tennessee. While the primary focus of the model is with evacuation behavior within Florida, areas outside of the state had to be considered in order to allow a more precise routing of evacuation traffic. This allows the model to measure the flow of traffic across the state line if needed.

CHAPTER III
REGIONAL MODEL IMPLEMENTATION

The evacuation transportation model discussed in Chapter II includes several components that are completed using a statewide dataset (determine number of evacuation trips, split trips into destination purposes, and distribute trips throughout state) and several components that can only be completed at the regional level (factor trip tables into time segment matrices, adjust background traffic, and load trips onto the highway network) due to computer run time limitations with the model software. Thus, for the regional level steps, each RPC throughout the State needed to decide on a regional model network to complete the analysis in their region. For the Tampa Bay Region, the regional model network includes the six counties within the Tampa Bay Regional Planning Council area plus 11 other counties surrounding the region, as illustrated in **Figure III-1**.

This chapter discusses the input data used in evaluating evacuation transportation conditions for the Tampa Bay Region. It is important to note that the input data discussed in this chapter is included only for the counties within the Tampa Bay Region, as these are the counties that the Tampa Bay Regional Planning Council has direct responsibility for the data. Data for the adjacent counties included in the Tampa Bay Regional model were provided by the corresponding RPC in which the counties belong. The model data for these counties is discussed in the corresponding Volume 4 report for those respective RPCs.

A. Regional Model Network

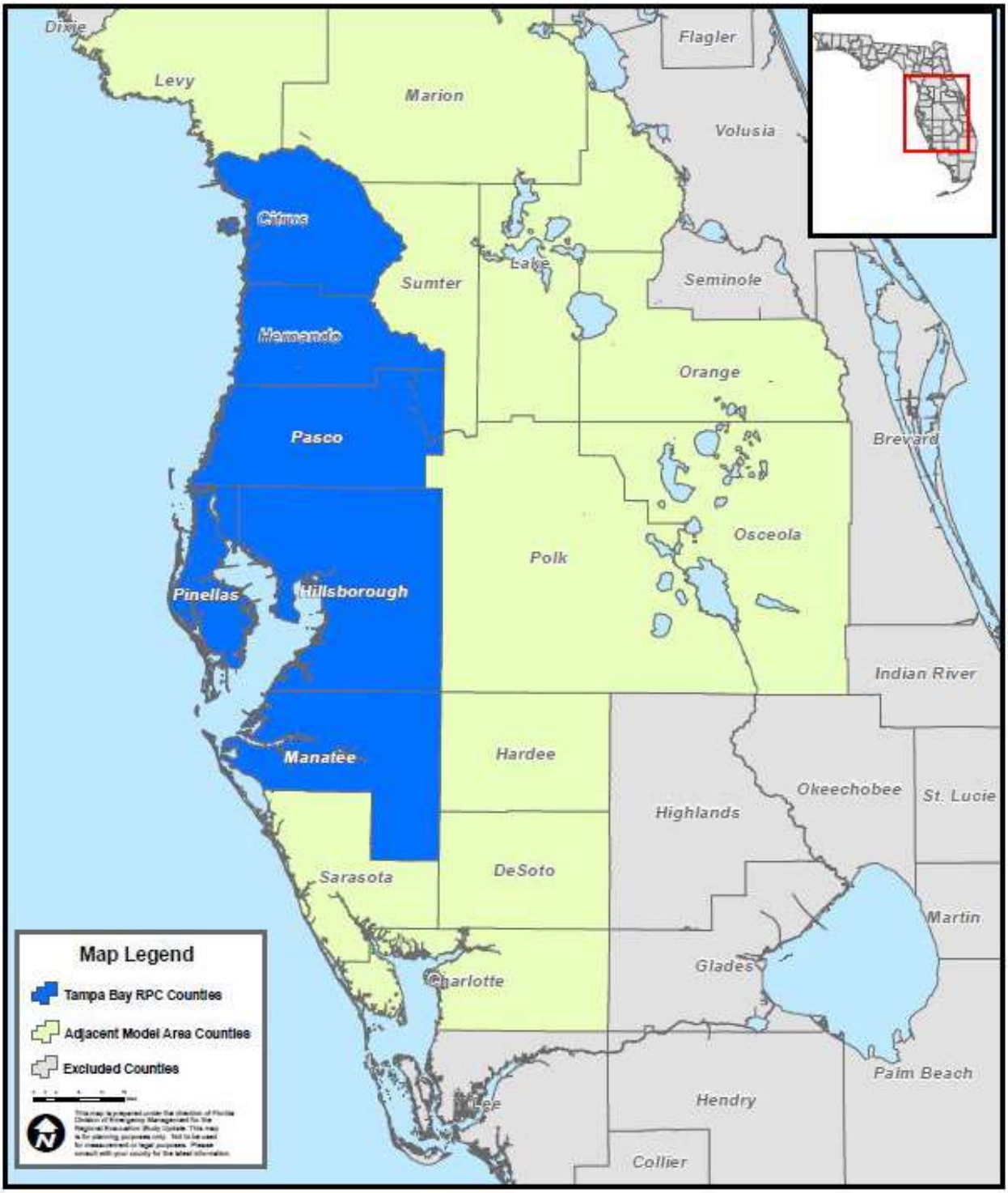
The road network is a key component of the evacuation model. The roadway variables in the network include area type, functional class, number of through lanes, capacity, speed, and several others. The regional model network consists of the RPC designated evacuation routes as well as a supporting roadway network that facilitates movement of evacuation traffic. The 2005 Florida Department of Transportation (FDOT) Statewide Model Network was used as a basis for developing the regional model network, while the evacuation routes were obtained from the Tampa Bay RPC. The RPC relied on the emergency managers of its constituent counties to provide it with information on which roads were to be included as evacuation routes. The resulting model network was updated to 2010 conditions and is referred to as the base model network. The previous Study used 2006. **Figure III-2** identifies the model network and evacuation routes for the TBRPC. County level details of the regional model network are provided in the Volume 5 report. The regional model network for the Tampa Bay region includes key roadways within the six-county region, including I-4, I-75, I-275, US 19, US 41, US 92, US 98, US 301, SR 39, SR 44, SR 50, SR 52, SR 54, SR 60, SR 62, SR 64, SR 70, SR 589 (Veterans Expressway/Suncoast Parkway), and SR 618 (Selmon Expressway).

B. Regional Zone System

The regional zone system is based on Traffic Evacuation Zones (TEZ) and contains the regional demographic information, which includes housing and population data that is essential to modeling evacuation traffic, as discussed in Chapter II. The regional demographic characteristics identify where the individuals in the region reside, as well as where the

Figure III-1

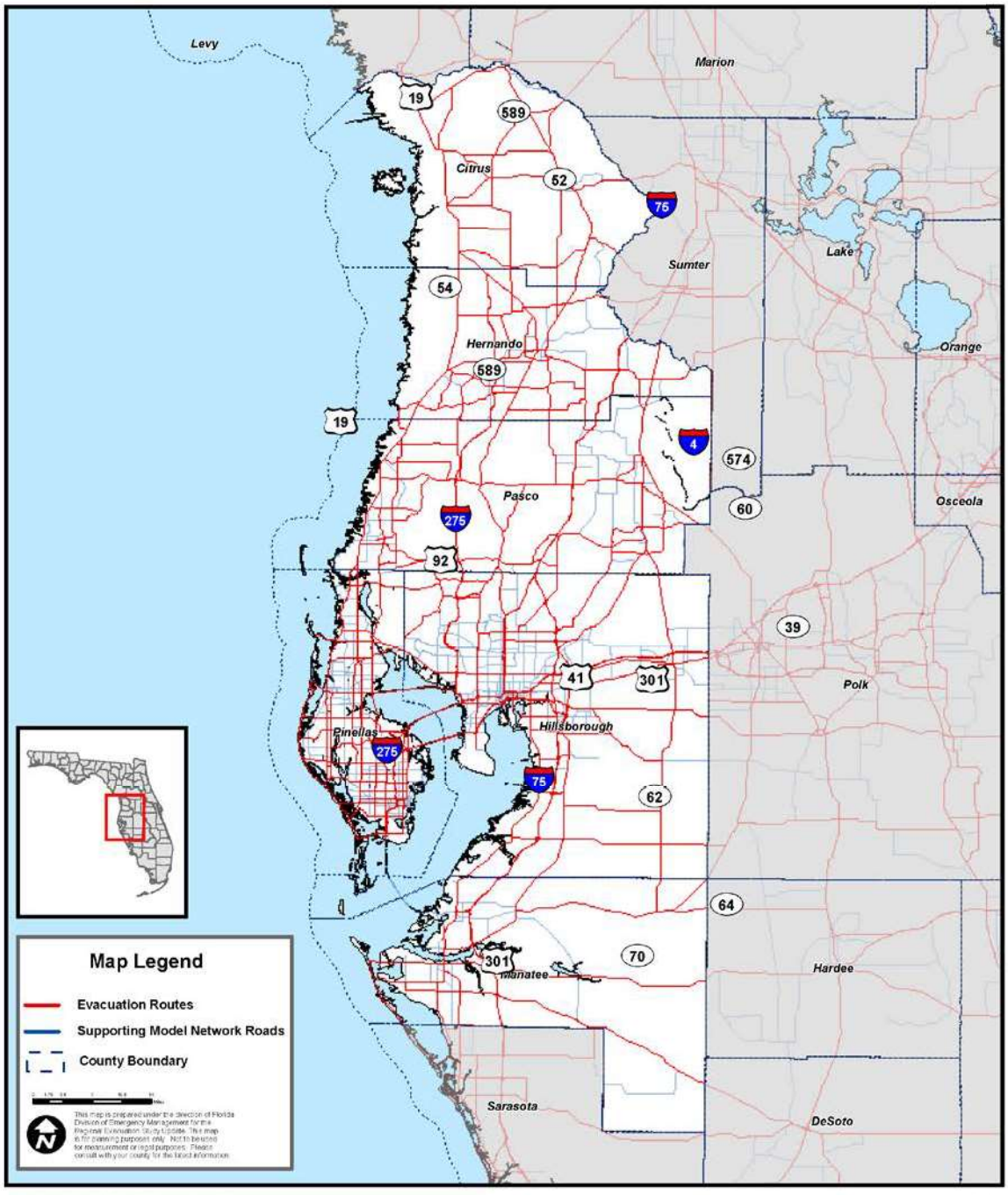
Tampa Bay Regional Model Area



Sources: Tampa Bay Regional Planning Council, CDM Smith

Figure III-2

Tampa Bay Regional Model Network



Sources: Tampa Bay Regional Planning Council, CDM Smith

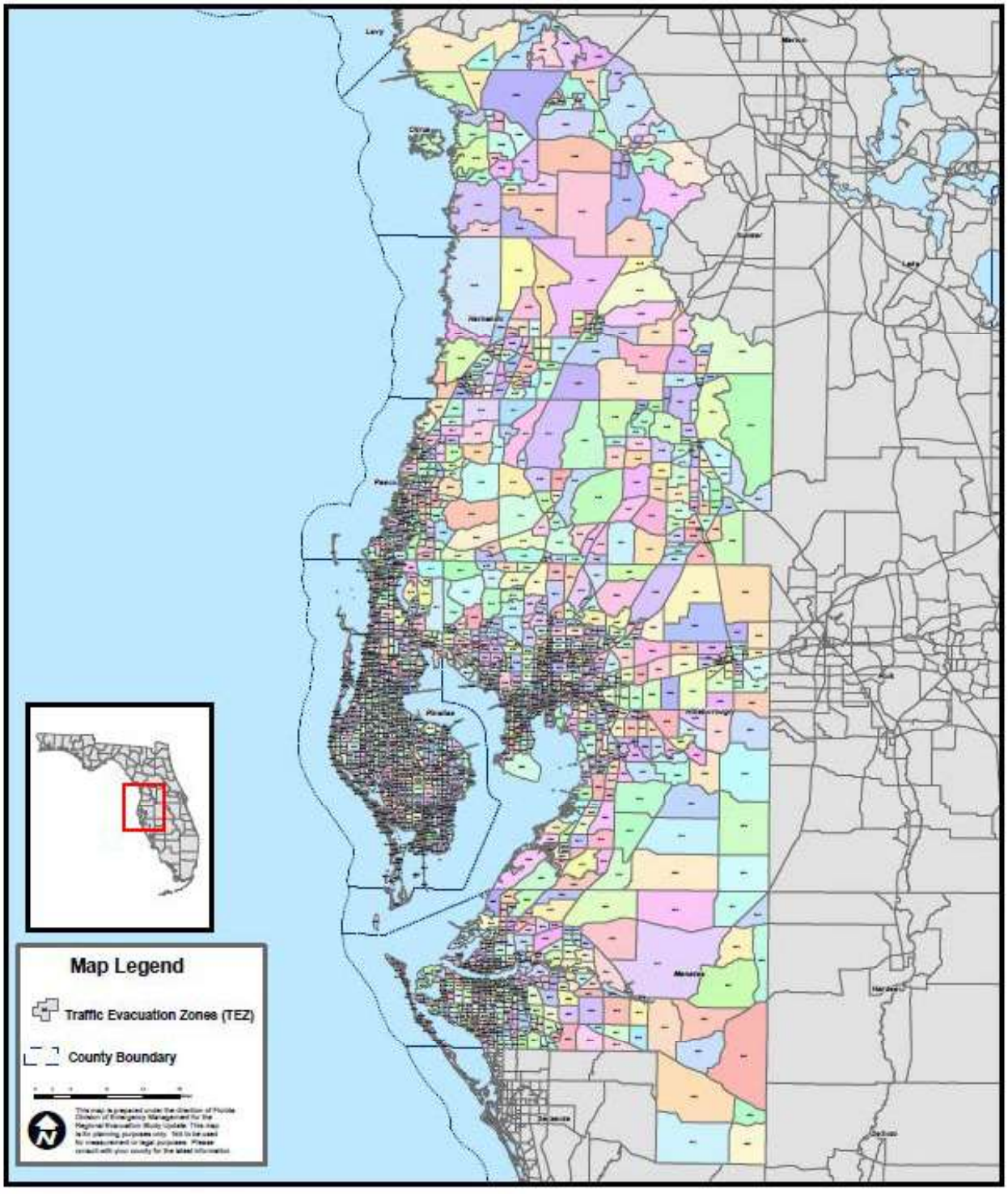
Map Printed: June, 2017

vulnerable populations are located. The TEZs are aggregations of the smaller small area data geographies provided by the RPC. Each traffic evacuation zone has a unique identification number that is used by the model to connect evacuation trip generation to the evacuation highway network. There is a buffer in zone numbering between counties to allow for future growth in each county.

The final TEZ system for the State of Florida has 8,829 zones. Of the total number of zones in Florida, 1,673 of the zones are located within the six-county Tampa Bay Region, as illustrated in **Figure III-3**. In the Tampa Bay region, Pinellas County has the largest number of TEZs with 631, and Hillsborough County follows with 505 TEZs. Citrus and Hernando Counties by far have the lowest number of TEZs within the RPC with 55 and 71 TEZs, respectively. The larger number of TEZs generally reflects counties with denser urban form and higher population densities. The number of TEZs for each county in the region is listed below:

- Citrus - 55
- Hillsborough – 505
- Manatee – 332
- Hernando - 71
- Pasco – 205
- Pinellas – 631

Figure III-3
Tampa Bay Regional Model Transportation Evacuation Zone System (TEZ)



Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

C. Regional Demographic Characteristics

As discussed in Chapter II, the evacuation model uses the demographic information as input for generating a set of evacuation trips. The demographic data were developed for the following years: 2015 and 2020.

A snapshot of the key demographic data for each county in the Tampa Bay RPC for 2015 and 2020 is summarized in **Table III-1**. The tables list the number of occupied dwelling units for site built homes, the permanent population in site-built homes, as well as the number of occupied dwelling units for mobile homes and the permanent population in mobile homes. The mobile home category includes RVs and boats and the permanent population in those housing options. The demographic characteristics summary also includes hotels and motels because many of these units are in vulnerable areas, and the proportion of seasonal units and hotel/motel units that are occupied at any point in time will have an important impact on the total population that may participate in an evacuation. Detailed demographic data for each individual TEZ within the region is included in Volume 5.

Hillsborough County has the largest population in the region for both the 2015 and 2020 time periods. The county's population is expected to reach over 1.4 million people by 2020. Pinellas County has the second largest population in the region, and this county is far more densely populated than the other counties, including Hillsborough. This is very significant in the behavior of the evacuation transportation model because most of the population in Pinellas lives close to a coastline, and just over half of all residents live in an evacuation zone. Pasco County is forecasted to experience an almost 12% increase in population between 2015 and 2020; Hernando is not far behind with having a 10% increase, and Hillsborough, Citrus, and Manatee are close with 8%, 7%, and 6%, respectively. The lowest rate, Pinellas County is expected to have a nominal 5% increase.

For modeling purposes, the RPC kept the number of mobile homes and population in mobile homes reasonably static for each of the time horizons. The number of actual mobile homes remained the same or decreased slightly. The occupied mobile homes are referenced in the table, which are a portion of the total units in each county. Pinellas County has nearly 36,000 occupied mobile home units, followed closely by Hillsborough County with just over 35,000. Pasco County has nearly 25,000 occupied mobile home units, and Manatee County has over 23,000. Citrus County has just over 15,000 occupied mobile home units, and Hernando County has over 12,000.

Table III-1 - Tampa Bay Demographic Characteristic Summary

County	Characteristic	Year	
		2015	2020
Citrus	Occupied site-built homes	50,073	53,715
	Population in site-built homes	107,457	115,243
	Occupied mobile homes	15,186	16,296
	Population in mobile homes	35,824	38,474
	Hotel/motel units	2,185	2,218
Hernando	Occupied site-built homes	63,012	69,461
	Population in site-built homes	153,599	169,294
	Occupied mobile homes	12,707	14,006
	Population in mobile homes	26,822	29,591
	Hotel/motel units	3,102	3,116
Hillsborough	Occupied site-built homes	477,120	515,727
	Population in site-built homes	1,219,576	1,320,729
	Occupied mobile homes	35,083	35,205
	Population in mobile homes	95,704	96,011
	Hotel/motel units	16,769	20,576
Manatee	Occupied site-built homes	120,987	126,729
	Population in site-built homes	284,827	300,548
	Occupied mobile homes	23,349	22,947
	Population in mobile homes	46,698	45,959
	Hotel/motel units	13,535	14,117
Pasco	Occupied site-built homes	195,253	225,087
	Population in site-built homes	467,959	531,523
	Occupied mobile homes	24,789	24,788
	Population in mobile homes	57,818	57,813
	Hotel/motel units	1,834	2,712
Pinellas	Occupied site-built homes	400,874	421,621
	Population in site-built homes	875,362	918,307
	Occupied mobile homes	35,909	36,451
	Population in mobile homes	51,271	52,047
	Hotel/motel units	13,603	16,037

Source: TBRPC, FDOT, MPOs

D. Planned Roadway Improvements

To correspond to the different sets of demographic data, three model networks were ultimately developed. The base 2010 network, discussed in section A, and two future year networks to correspond to the 2015 demographic data and the 2020 demographic data. The 2010 base model network was updated to reflect roadway capacity improvement projects completed between 2011 and 2015 to create the 2015 network. The 2015 network was then updated to reflect planned roadway capacity improvement projects expected to be implemented between 2016 and 2020 to create the 2020 network.

The planned roadway improvements that were added to the network generally include only capacity improvement projects such as additional through lanes. **Table III-2** identifies capacity improvement projects completed between 2011 and 2015 that were included in the 2015 network. Likewise, **Table III-3** identifies capacity improvement projects planned for implementation between 2016 and 2020. The tables identify each roadway that will be improved as well as the extent of the improvement.

It is important to note that **Tables III-2 and III-3** are not intended to be all inclusive of every transportation improvement project completed within the region. The tables only identify key capacity improvement projects that impact the evacuation model network and are anticipated to have an impact on evacuation clearance times.

Table III-2 - Tampa Bay Region Roadway Improvements, 2011-2017

County	Roadway	From	To	No. Lanes
Citrus	CR 486	SR 44	Ottawa Ave	4
	US 19 (SR 55)	W Cornflower Dr	W Foss Grove Path	6
Hernando	SR 50 (Cortez Blvd)	US 19 (SR 55)	W of Mariner Blvd	6
	I-75 (SR 93)	N of SR 50	Hernando/Sumter County Lines	6
	I-75 (SR 93)	S of US 98/SR 50/Cortez	N of US 98 – SR 50 Cortez	6
	I-75 (SR 93)	Pasco/Hernando County Lines	S of US 98 – SR 50 Cortez	6
	SR 50 (Cortez Blvd)	W of Mariner Blvd	SR 589 (Suncoast Pwy)	6
Hillsborough	Lutz Lake Fern Rd	Suncoast Parkway	TPC Blvd	4
	Lutz Lake Fern Rd	TPC Blvd	Dale Mabry Highway	2
	SR 574	W of Highview	E of Parsons Ave	4
	I-4/Selmon Expressway	S of Selmon Expresswy	7th Ave	4
	I-4/Selmon Expressway	7th Ave	I-4	4
	I-275	Tampa CBD Interchange	ML King Blvd	8
	I-275	MLK	Fowler	6
	N 21st St/N 22nd St	SR 60	I-4	4
	US 301	Balm Rd	SR 674	2
Manatee	I-75	Fruitville Rd	N of University Pkwy	8
Pasco	Clinton Ave.	Ft. King Hwy	U.S.301	4
	Denton Ave	US 19	Shady Hills	2

County	Roadway	From	To	No. Lanes
	CR 587 (Mass Ave)	Congress St	Little Rd (CR 1)	4
	CR 587 (Mass Ave)	Little Rd (CR 1)	SR 52	2
	CR 518 (Trouble Creek Rd)	US 19	Rowan Rd	2
	Mitchell Blvd	CR 77	CR 1	4
	Trinity Blvd	Little Rd (CR 1)	SR 54	2
	I-75	I-275/Pasco County Line	SR 56	10
	I-75	SR 56	SR 54	6
	I-75	SR 54	Hernando County Line	4
Pinellas	Keystone Rd	US 19	East Lake Rd	4
	Bryan Dairy Rd	Starkey Rd	72nd St	6
	US 19 (SR 55)	N of Whitney Rd	S of Seville Rd	10
	US 19 (SR 55)	S of Seville Blvd	N of SR 60	10
	SR 688 (Ulmerton Rd)	W of 38th ST	W of I-275	6
	SR 688 (Ulmerton Rd)	E of 119th ST	W of Seminole Bypass	6
	SR 688 (Ulmerton Rd)	E of Wild Acres Road	El Centro / Ranchero Blvd	6
	SR 688 (Ulmerton Rd)	El Centro Ranchero	W of US 19	6
	Starkey Rd (Park Street)	84th Lane	Tyrone Blvd	4
	Gandy Blvd	4th Street North	28th St (Ext)	4
	Pinellas Bayway/54th Ave South	Gulf Blvd	Bahia Del Mar	4
	Trinity Blvd	East Lake Rd	Little Rd (CR 1)	4

Sources: FDOT, MPOs, Tampa Bay Regional Council
Note: Projects included in this table are roadway improvement projects completed between 2011 and 2017 on roadways that are included in the regional transportation model network. Only projects which added roadway capacity, such as additional through lanes, were included. The list is not intended to be all inclusive of every transportation improvement project completed within the region. A list of historical projects completed during the last five years was included in this report because the base regional network developed for the study, along with the base demographic data, is prior to 2015.

Table III-3 - Tampa Bay Planned Roadway Improvements, 2018-2020

County	Roadway	From	To	Number of Lanes
Citrus	US 19 (SR 55)	W Green Acres St	W Jump Ct	6
	US 19 (SR 55)	W Jump Ct	W Fort Island Trail	6
Hernando	Suncoast Pkwy	US 98	Hernando/Citrus County Lines	4
	SR 50	Lockhart Rd	E of Remington Rd	6
Hillsborough	US 301	Balm Rd	SR 674	6
	Bruce B. Downs Blvd	Pebble Creek Dr	Pasco County	8
	I-275 (SR 93)	Himes Ave	Hillsborough River	8
	I-275 (SR 93)	SR 60 (Memorial Hwy)	Himes Ave	8
	I-275 (SR 93)	Howard Frankland	Himes Ave	8
	I-75	S of Fowler Ave	N of CR-581	8
	I-75	N of Fowler Ave	Bruce B Downs	8
	I-275	SR 60/Memorial Interchange	Tampa CBD Interchange	8
	I-75	Bruce B Downs	I-275/Pasco County Line	6
	SR 589 (Veteran's Expy)	S of Gunn Hwy	Sugarwood Mainline Plaza	6
	SR 589 (Veteran's Expy)	Sugarwood Mainline Plaza	Van Dyke Rd	8
	SR 589 (Veteran's Expy)	Memorial Hwy	Barry Rd	6
	SR 589 (Veteran's Expy)	Barry Rd	S of Gunn Hwy	8
	SR 60 (Adamo Dr)	E of US 301	W of FlakenBurg Rd	6
Manatee	I-75	N SR 64	N of 301 Interchange	8
Pasco	SR 52 (Schrader Hwy)	E of Old Pasco Rd	McKendree Rd	4
Pinellas	Starkey Rd	84th Lane	Flamevine Rd	6
	US 19 (SR 55)	N of SR 580 (Main St)	Northside Dr	6
	I-275 (SR 93)	S of 118th Ave	S of 4th St N	8
	Gateway Expy	SR 690 at US 19/ SR 686 Ext at CR 611	W of I-275	4
	SR 688 (Ulmerton Rd)	E of 49th St	W of 38th St N	6

Sources: FDOT, MPOs, Tampa Bay Regional Council
Note: Projects included in this table are roadway improvement projects completed between 2018 and 2020 on roadways that are included in the regional transportation model network. Only projects which added roadway capacity, such as additional through lanes, were included. The list is not intended to be all inclusive of every transportation improvement project completed within the region. A list of historical projects completed during the last five years was included in this report because the base regional network developed for the study, along with the base demographic data, is prior to 2015.

E. Behavioral Assumptions

The behavioral assumptions provide important information on the way people respond to an evacuation order and are an important input to the SRESP transportation evacuation model. For the Tampa Bay Region, evacuation rates for site-built homes and mobile/manufactured homes are summarized by county in **Figure III-4** through **Figure III-15**. Other rates, such as out-of-county trip rates, vehicle use rates, public shelter use rates, friend/relative refuge use rates, hotel/motel refuge use rates, and other refuge use rates, are detailed by county, storm threat, and evacuation zone in Volume 5-8.

A review of the evacuation rates for the Tampa Bay Region illustrates that evacuation participation rates increase as the evacuation level increases, and participation rates for persons living in mobile/manufactured homes are generally higher than for persons living in site-built homes. It should be noted that a certain percentage of the population evacuates, even when they are not living in an area that is ordered to evacuate. These people are commonly referred to as shadow evacuees. Shadow evacuation rates are also included in Figure III-4 through Figure III-15.

For example, if an evacuation order was issued for Hillsborough County for persons living in evacuation zone A, the county could expect a 50 percent participation rate from persons living in site-built homes in evacuation zone A (Figure III-4) and an 80 percent participation rate from persons living in mobile/manufactured homes in evacuation zone A (Figure III-5). In addition, Hillsborough County can expect shadow evacuations to occur for persons living in site-built homes at a rate of 35 percent from evacuation zone B, 25 percent from evacuation zone C, 15 percent from evacuation zone D, and 10 percent from evacuation zone E (Figure III-4). Likewise, for persons living in mobile/manufactured homes, Hillsborough County can expect shadow evacuations to occur at a rate of 65 percent from evacuation zone B, and 60 percent each from evacuation zones C, D, and E (Figure III-5).

The evacuation zone systems for Citrus, Hernando, Hillsborough, Manatee, Pasco, and Pinellas are listed below:

- Citrus – 5 zones: Zone A, Zone B, Zone C, Zone D, Zone E;
- Hernando – 5 zones: Zone A, Zone B, Zone C, Zone D, Zone E;
- Hillsborough – 5 zones: Zone A, Zone B, Zone C, Zone D, Zone E;
- Manatee – 5 zones: Zone A, Zone B, Zone C, Zone D, Zone E;
- Pasco – 5 zones: Zone A, Zone B, Zone C, Zone D, Zone E;
- Pinellas – 5 zones: Zone A, Zone B, Zone C, Zone D, Zone E;

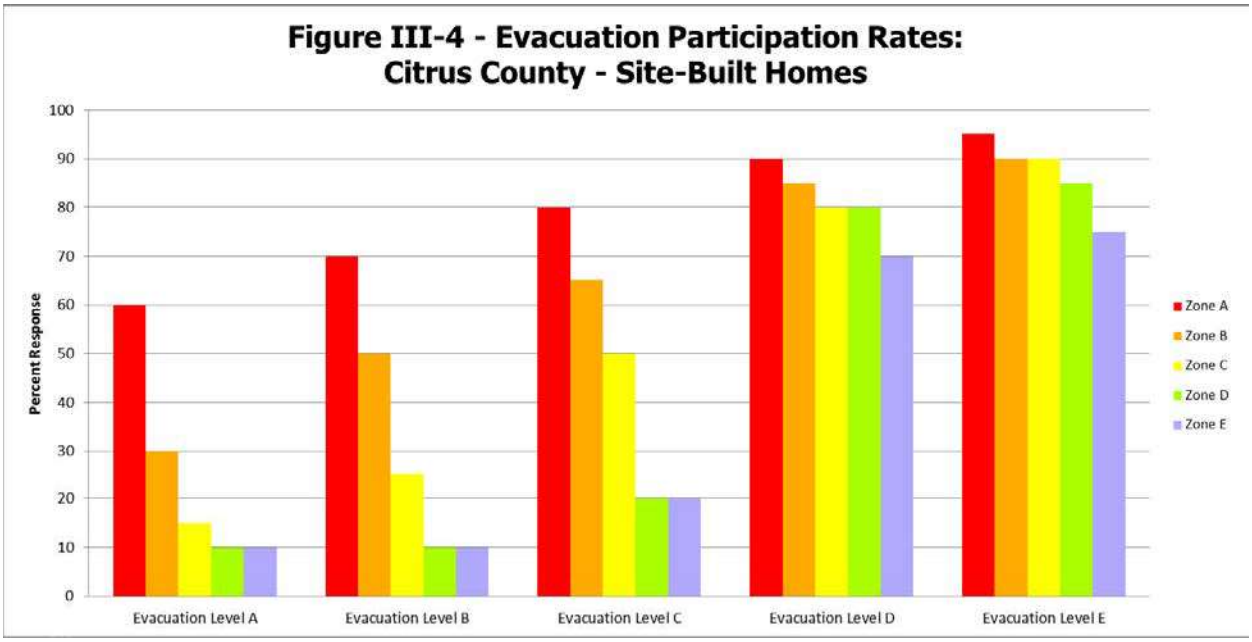


Figure III-4 - Evacuation Participation Rates:
Citrus County - Site-Built Homes
Percent Response
100
90
80
70
60
50
40
30
20
10
0
Evacuation Level A
Evacuation Level B
Evacuation Level C
Evacuation Level D
Evacuation Level E
Zone A
Zone B
Zone C
Zone D
Zone E

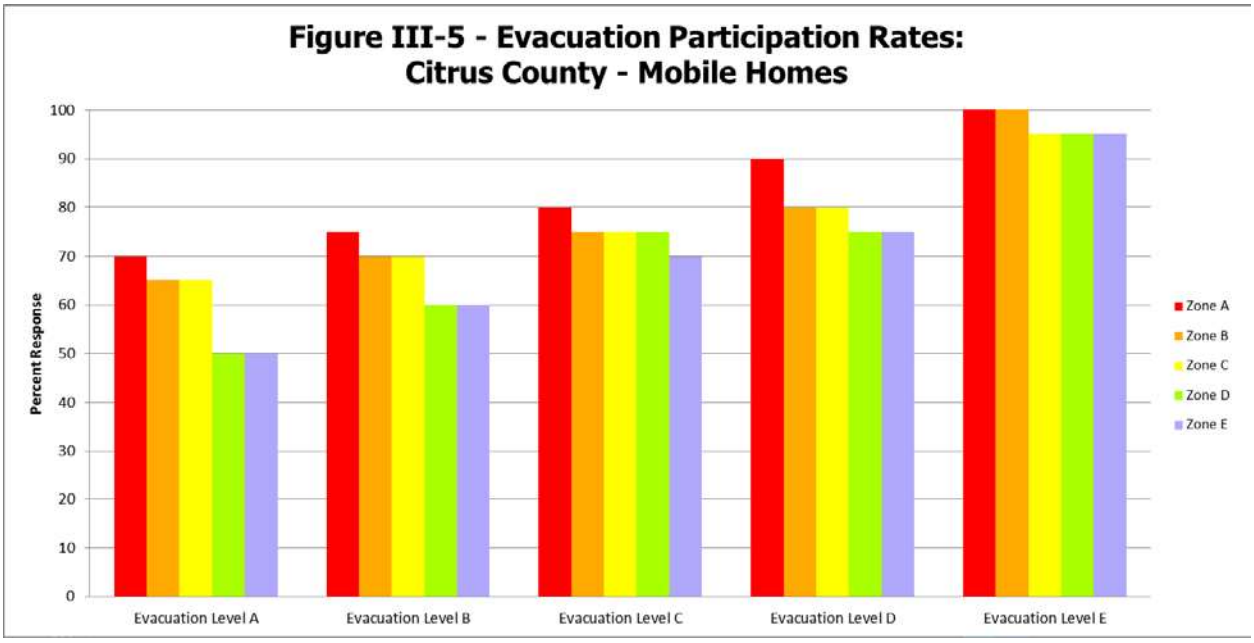


Figure III-5 - Evacuation Participation Rates:
Citrus County - Mobile Homes
Percent Response
100
90
80
70
60
50
40
30
20
10
0
Evacuation Level A
Evacuation Level B
Evacuation Level C
Evacuation Level D
Evacuation Level E
Zone A
Zone B
Zone C
Zone D
Zone E

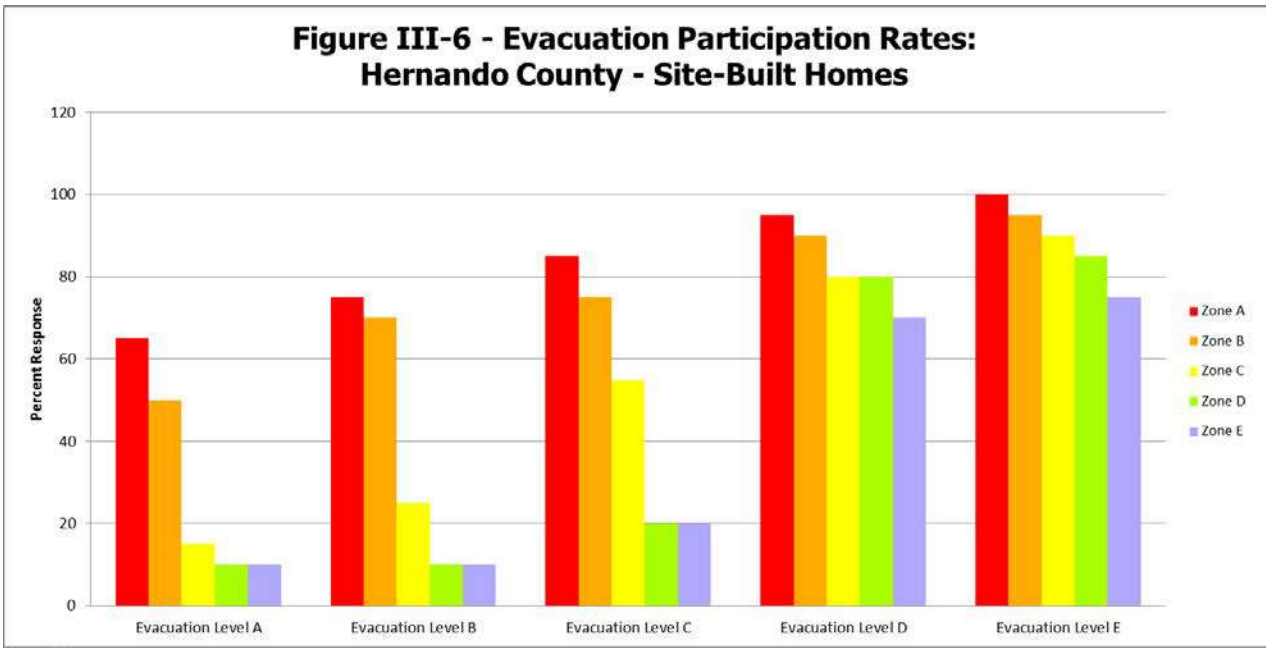


Figure III-6 - Evacuation Participation Rates:
Hernando County - Site-Built Homes
Percent Response
120
100
80
60
40
20
0
Evacuation Level A
Evacuation Level B
Evacuation Level C
Evacuation Level D
Evacuation Level E
Zone A
Zone B
Zone C
Zone D
Zone E

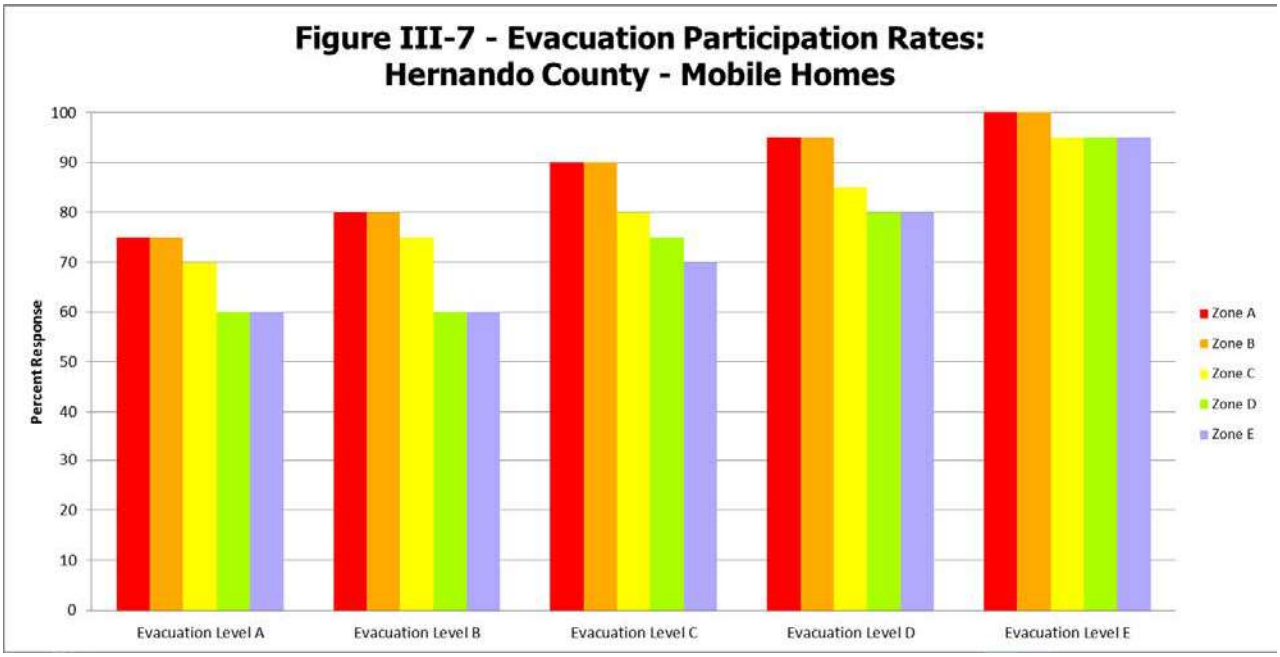


Figure III-7 - Evacuation Participation Rates:
Hernando County - Mobile Homes
Percent Response
100
90
80
70
60
50
40
30
20
10
0
Evacuation Level A
Evacuation Level B
Evacuation Level C
Evacuation Level D
Evacuation Level E
Zone A
Zone B
Zone C
Zone D
Zone E

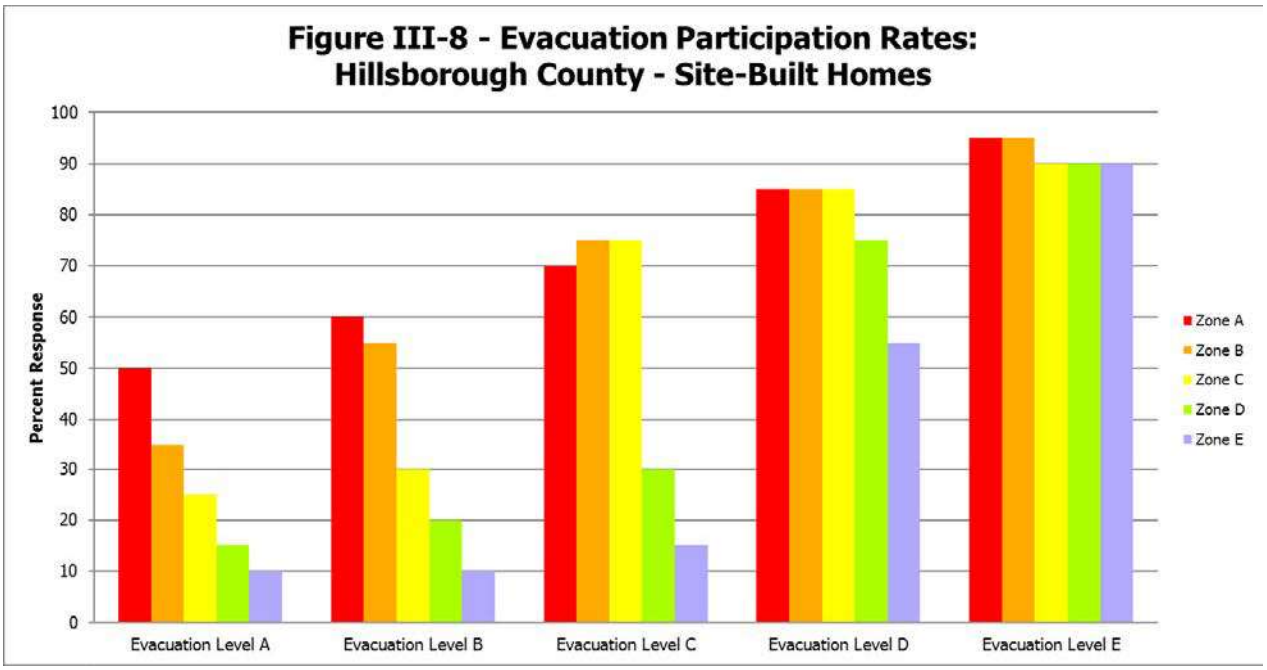


Figure III-8 - Evacuation Participation Rates:
Hillsborough County - Site-Built Homes
Percent Response
100
90
80
70
60
50
40
30
20
10
0
Evacuation Level A
Evacuation Level B
Evacuation Level C
Evacuation Level D
Evacuation Level E
Zone A
Zone B
Zone C
Zone D
Zone E

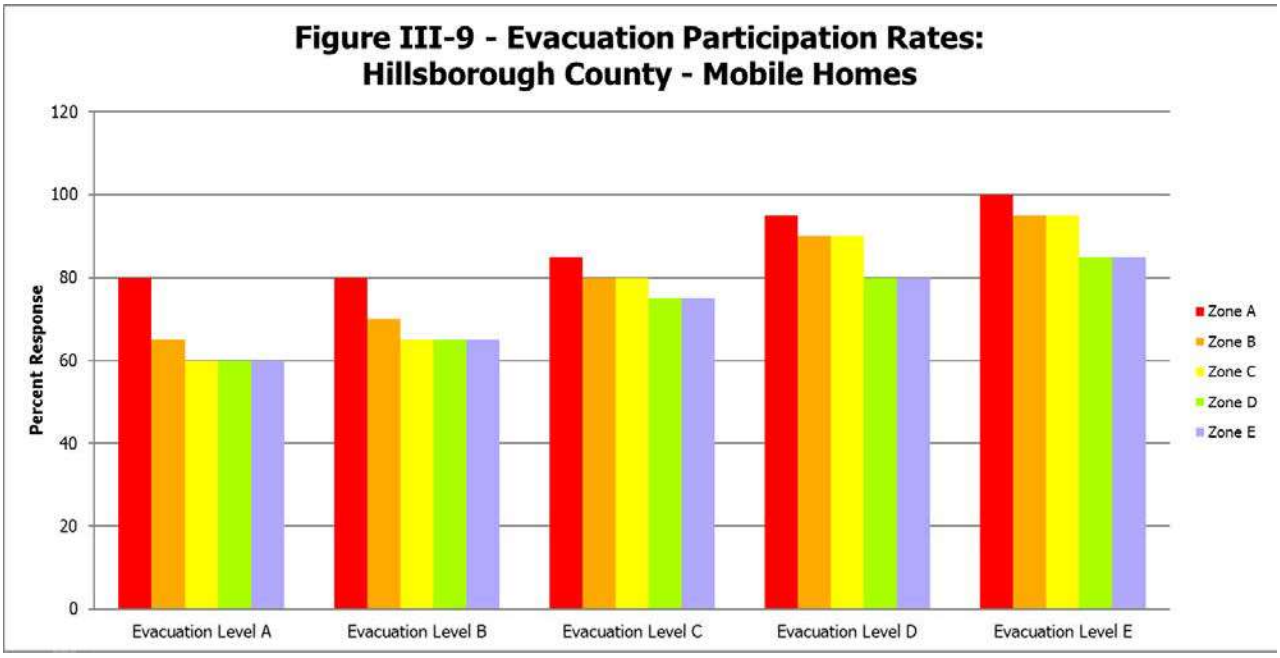


Figure III-9 - Evacuation Participation Rates:
Hillsborough County - Mobile Homes
Percent Response
120
100
80
60
40
20
0
Evacuation Level A
Evacuation Level B
Evacuation Level C
Evacuation Level D
Evacuation Level E
Zone A
Zone B
Zone C
Zone D
Zone E

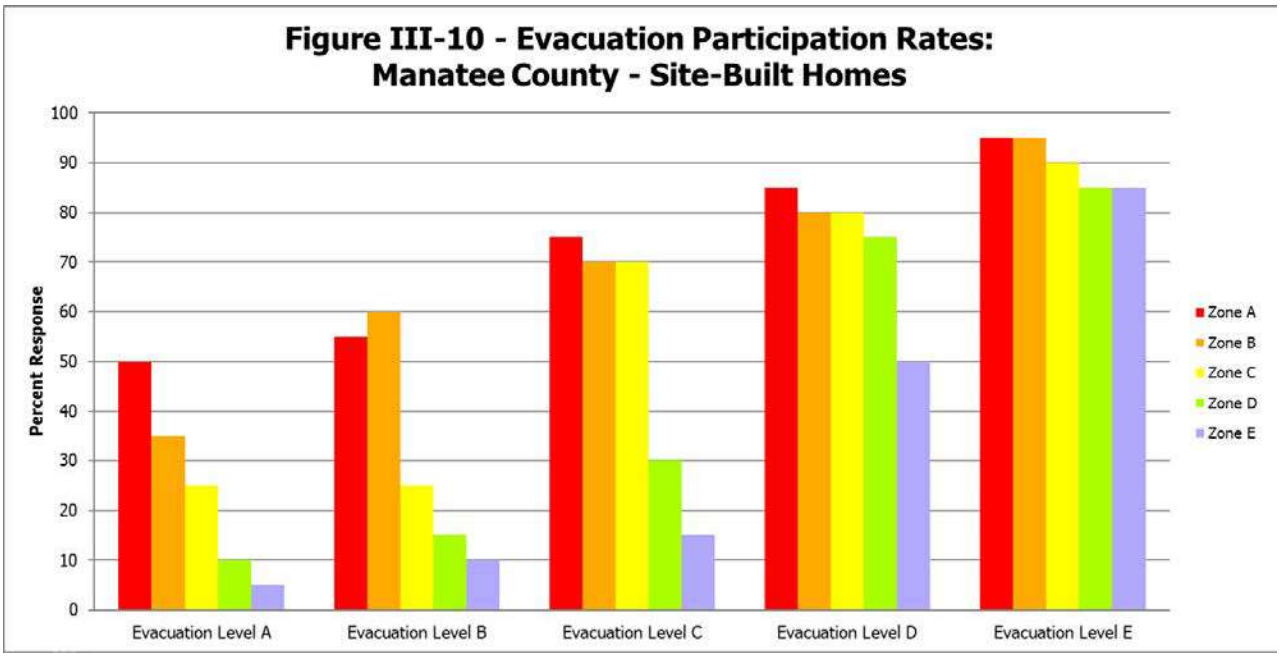


Figure III-10 - Evacuation Participation Rates:
Manatee County - Site-Built Homes
Percent Response
100
90
80
70
60
50
40
30
20
10
0
Evacuation Level A
Evacuation Level B
Evacuation Level C
Evacuation Level D
Evacuation Level E
Zone A
Zone B
Zone C
Zone D
Zone E

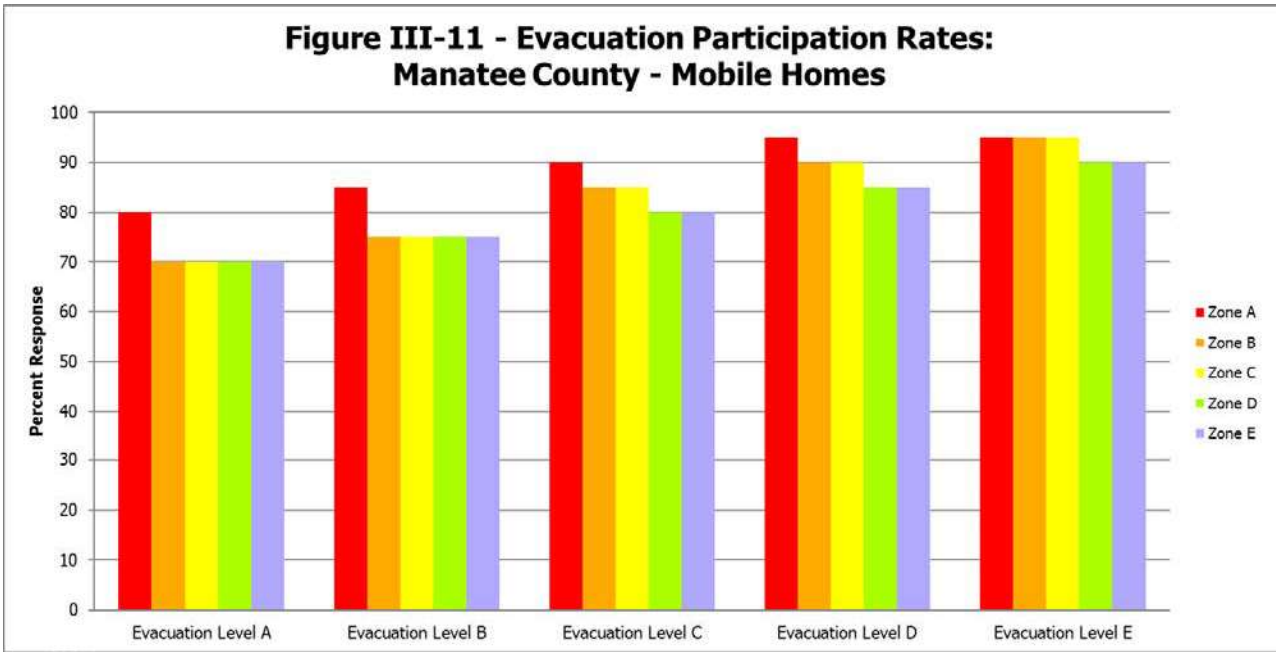


Figure III-11 - Evacuation Participation Rates:
Manatee County - Mobile Homes
Percent Response
100
90
80
70
60
50
40
30
20
10
0
Evacuation Level A
Evacuation Level B
Evacuation Level C
Evacuation Level D
Evacuation Level E
Zone A
Zone B
Zone C
Zone D
Zone E

Figure III-12 - Evacuation Participation Rates: Pasco County - Site-Built Homes

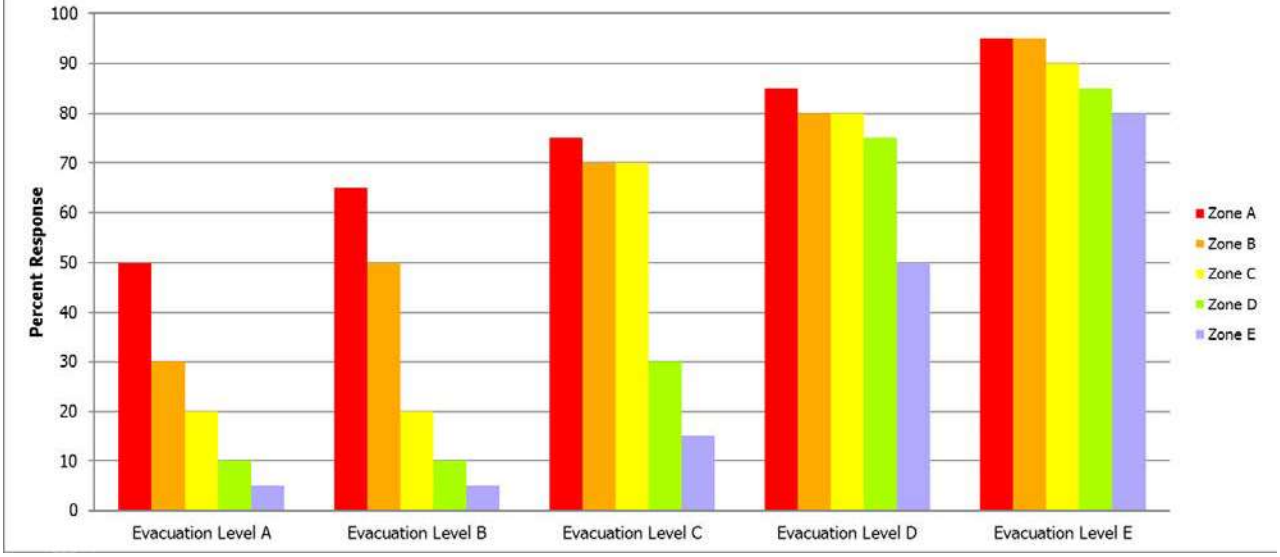
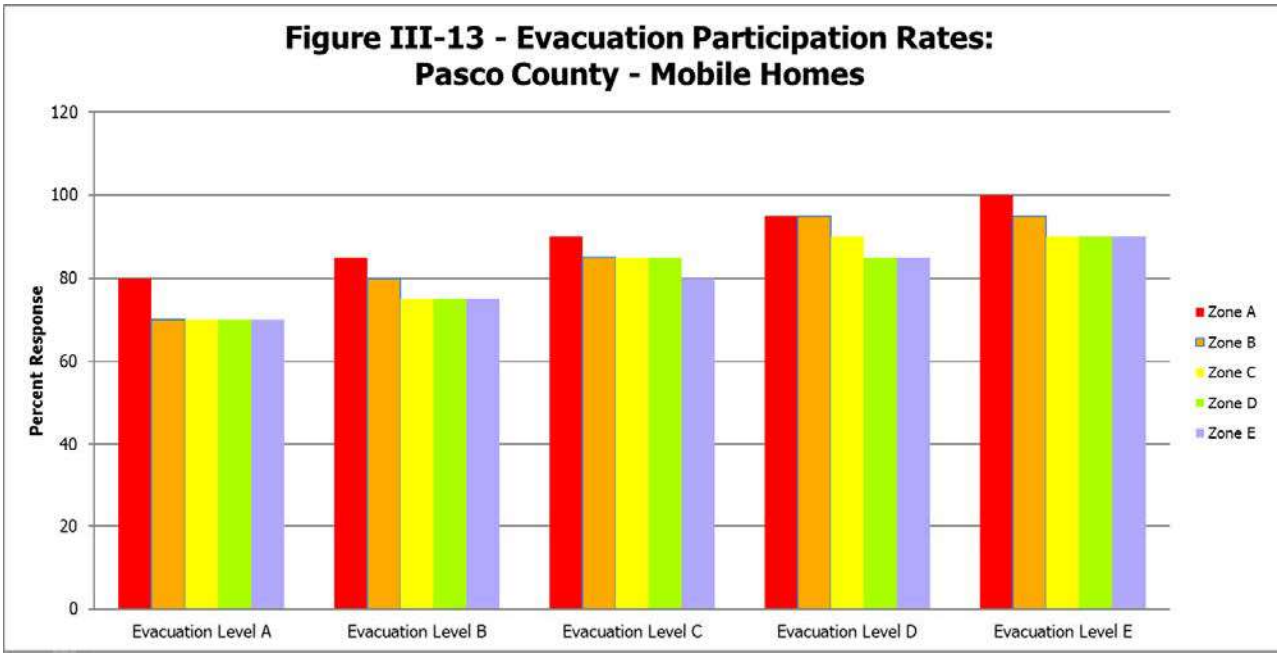


Figure III-13 - Evacuation Participation Rates: Pasco County - Mobile Homes



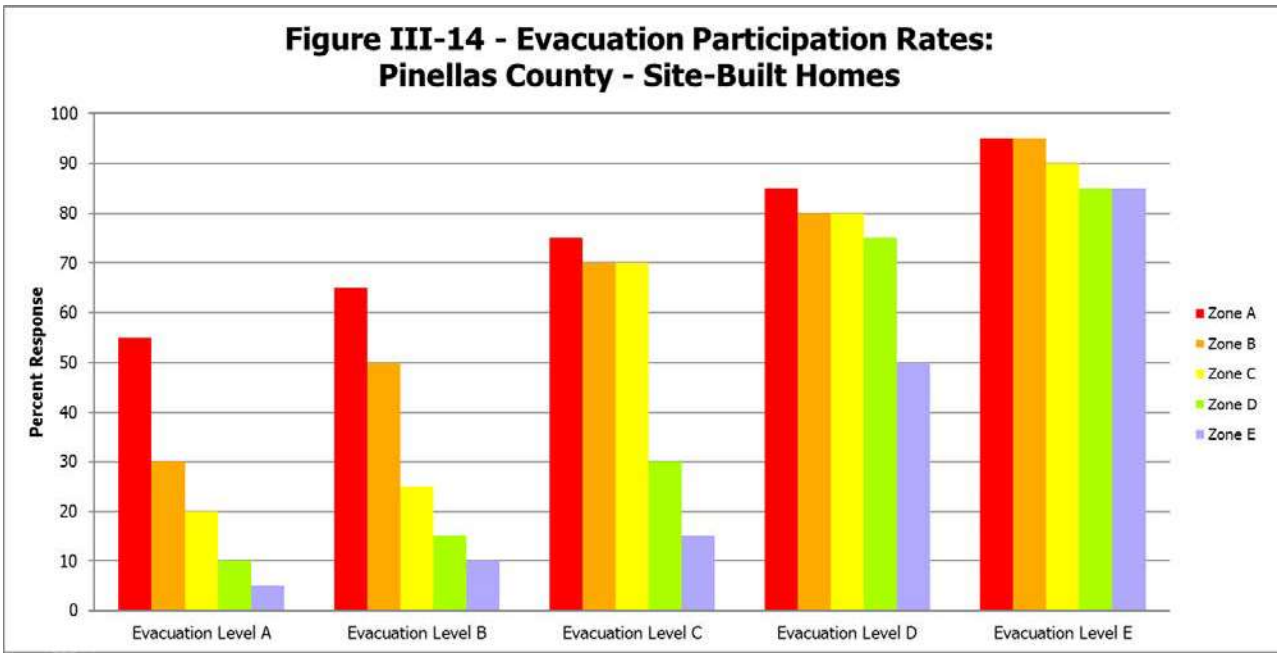


Figure III-14 - Evacuation Participation Rates:
Pinellas County - Site-Built Homes
Percent Response
100
90
80
70
60
50
40
30
20
10
0
Evacuation Level A
Evacuation Level B
Evacuation Level C
Evacuation Level D
Evacuation Level E
Zone A
Zone B
Zone C
Zone D
Zone E

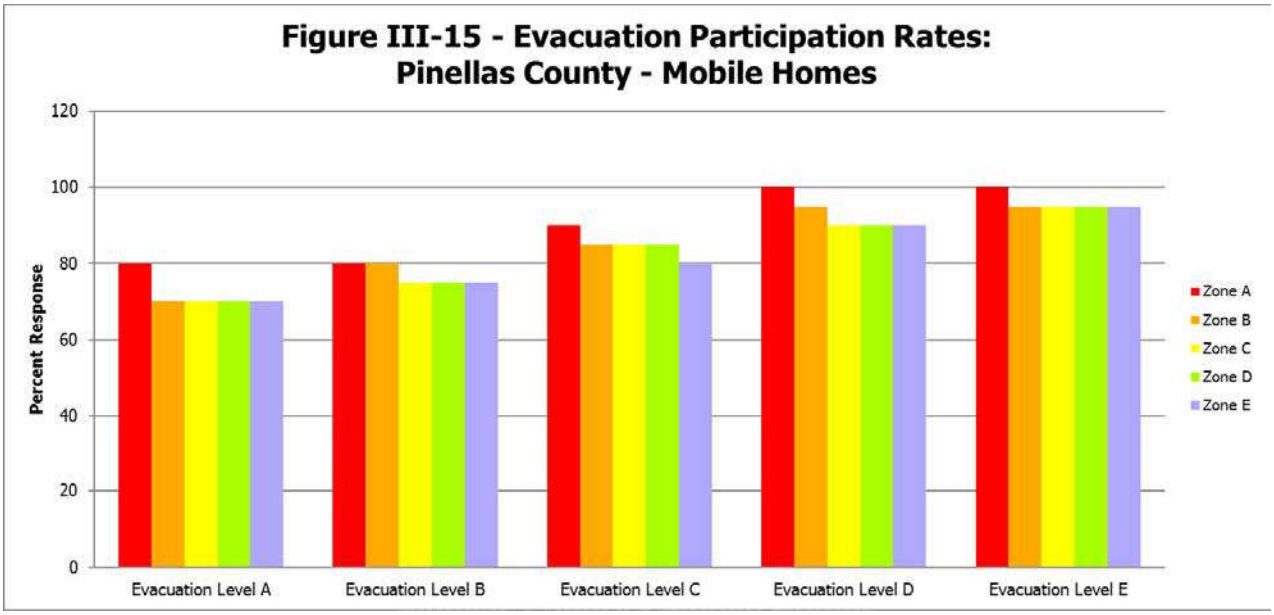


Figure III-15 - Evacuation Participation Rates:
Pinellas County - Mobile Homes
Percent Response
120
100
80
60
40
20
0
Evacuation Level A
Evacuation Level B
Evacuation Level C
Evacuation Level D
Evacuation Level E
Zone A
Zone B
Zone C
Zone D
Zone E

F. Shelters

For the transportation model to accurately assign public shelter trips to the correct location, a complete list of available public shelters needs to be available. The Tampa Bay RPC compiled the list of available public shelters using information provided by the local county emergency managers. The shelters were categorized as either primary or other, with primary indicating that the shelter is compliant with American Red Cross standards for a shelter and other indicating all other shelters.

In the six-county region there are a total of 135 shelters, including 27 in Citrus County, 20 in Hernando, 47 in Hillsborough County, 25 in Manatee County, 29 in Pasco County, and 34 in Pinellas County, almost all of which are classified as primary shelters. Altogether, the 135 shelters located within the six-county region can host more than 180,000 persons during an evacuation event. Detailed lists of the available public shelters by county are included in Volume I, Chapter 5 and Volume 5-8.

G. Evacuation Zones

The final input variable that is needed to complete the transportation evacuation model is the delineation of evacuation zones for all coastal counties. Local county emergency managers have the responsibility of identifying and defining evacuation zones for their county. All six counties within the Tampa Bay region have established their evacuation zones based on the results of storm surge inundation modeling for the west coast of Florida. Evacuation zones for the Tampa Bay Region are illustrated in Figure III-12. County level evacuation zones are included in Volume 5-8.

H. TIME User Interface

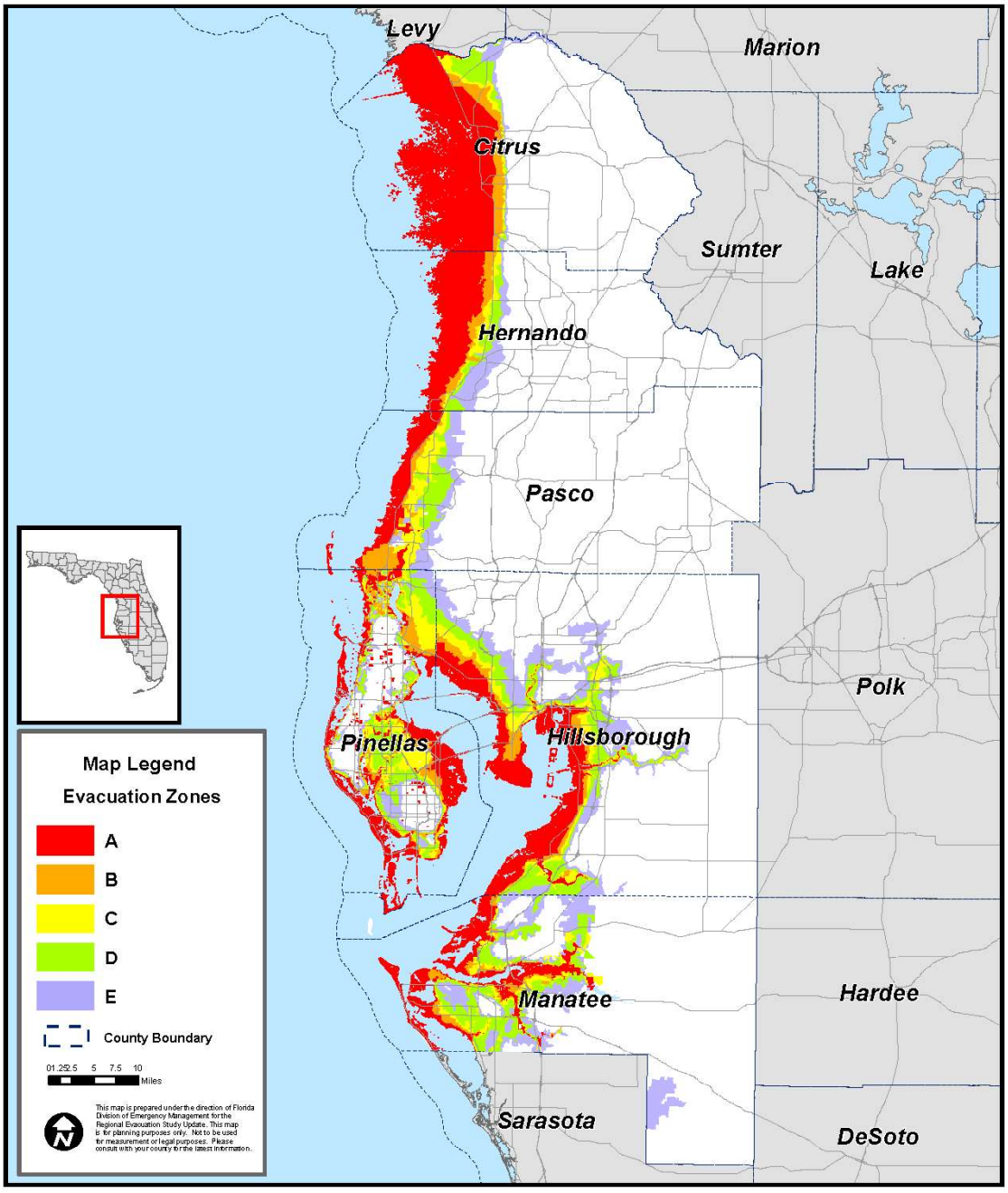
CDM Smith developed the Transportation Interface for Modeling Evacuations (TIME) to make it easier for RPC staff and transportation planners to use the model and implement the evacuation methodology. The TIME interface is based on the ESRI ArcGIS platform and is essentially a condensed transportation model, which provides a user-friendly means of modifying input variables that would change the clearance times for various evacuation scenarios.

The evacuation model variables include a set of distinguishing characteristics that could apply to evacuation scenarios as selection criteria. These following variables may be selected using the TIME interface and allow the user to retrieve the best results from various evacuation alternatives:

- **Analysis time period -** The first input variable is the evacuation analysis time period. The time period selections include 2015 and 2020. The time period determines which set of demographic data and which version of the model network will be used.

Figure III-16

Tampa Bay Regional Evacuation Zones



Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

- **Highway network -** Once the time period is selected, the user must pick either the default highway network or a modified network. The default includes the network corresponding to the selected time period and also incorporates planned highway improvement projects from the Florida Department of Transportation Work Program. In the case that there are any new projects or changes need to be considered, the modified network would be chosen. These changes could include possible road or bridge closures because of storm conditions or any managed traffic diversions or traffic control measures.

- **Behavioral response -** The next variable is behavioral response, which is a set of "planning assumptions" that describe the way people respond to an order to evacuate and are an important input to the SRESP Evacuation Model. A user may choose 100% or the survey response. The 100% response indicates that 100% of people in evacuation zones will evacuate, while the survey response uses the percentage of people from the behavioral planning assumptions corresponding to the evacuation level for each county.

- **One-way evacuation operations -** Another variable for consideration is whether or not to allow one-way evacuation operations. One-way evacuation operations take into account one-way evacuation operations plans for major facilities.

- **University population -** The model permits the user to incorporate the population in university housing since this data is not included in the regular population numbers. The default assumption is that the region's universities are at the maximum housing capacity housing during the Fall/Spring semester. The other options available are the summer university population, which is generally much less than the fall or spring university population, and an option for no school in session.

- **Tourist occupancy rates -** The RPC has the option to choose the default rates or to modify those rates based on any special circumstance they may have for tourist rates since there are different tourist seasons, sectors and special events. For example, the Tampa Bay RPC may want to consider additional traffic that would be generated by visitors for a large sporting event. If modified rates are desired, then the user may select no tourist occupancy or modify the rates on a county-by-county basis.

- **Shelters -** When choosing which shelters are open to the public during an evacuation event, the user may select either primary shelters or other shelters, both primary and other shelters, and/or modified. In many situations, the shelters category may need to be modified because of availability or capacity changes.

- **Counties evacuating -** The evacuating counties are the counties within the geographic extent of Tampa Bay's model network and include both coastal and inland counties. The coastal counties include Charlotte, Citrus, Hernando, Hillsborough, Levy, Manatee, Pasco, Pinellas, and Sarasota Counties. The inland counties are DeSoto, Hardee, Lake, Marion, Orange, Osceola, Polk, and Sumter Counties. The user can pick which of the counties in the network actually evacuate.

- **Evacuation level -** Once the evacuating counties are chosen, the evacuation level is designated. The evacuation levels range from A to E and represent the evacuation zones that are ordered to evacuate. The user may also select "none", which assumes that no evacuations are made within the selected county; only regular background traffic will occur.

- **Response curve hours –** The user must define which evacuation response curve will be applied to each evacuating county in the area. The evacuation response curves show the proportion of evacuation by increment of time for evacuation orders that were issued. There are six different curves from which to choose: a 6-hour curve, 9-hour curve, 12-hour curve, 18-hour curve, 24-hour curve, and a 36-hour curve. The faster curves represent more urgent circumstances and slower curves represent less urgent circumstances.

- **Evacuation Phasing –** The phase selection indicates when an evacuation would begin in each county. There are ten different options beginning in hour 1 and extending to hour 27. After hour 3, the other phasing options follow in 3-hour increments.

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CHAPTER IV
TRANSPORTATION ANALYSIS

The transportation analysis brings together key factors such as evacuation level, transportation network, shelters, and evacuation population, and explicitly links people's behavioral responses to the regional evacuation infrastructure. The results of this analysis help to formulate effective and responsive evacuation policy options. Two distinct sets of analyses were conducted using the SRESP evacuation transportation model, including one set of analysis for growth management purposes and one set of analysis for emergency management purposes. The results of this analysis are discussed in this chapter.

A. Vulnerable Population

Using a combination of the demographic data, behavioral assumptions, and evacuation zones, the vulnerable population in each county could be determined by evacuation level. For the purposes of the transportation analysis, the vulnerable population, or population-at-risk, is defined as the total population living within the county designated evacuation zones for each evacuation level. This population is living in an area that is at risk for severe flooding during a storm event. The vulnerable population for the Tampa Bay Region for 2017 is identified in **Table IV-1**, summarized by evacuation zone and split between site-built homes and mobile/manufactured homes. Vulnerable population for 2020 is summarized in **Table IV-2**.

The vulnerable population in the Tampa Bay Region varies by evacuation zone by county. In all counties in the region, the vulnerable population living in site-built homes far exceeds the vulnerable population living in mobile/manufactured homes.

In addition, based again on the demographic data, behavioral assumptions, and evacuation zones, the planned destinations of vulnerable population in each county could be determined by evacuation level. Destinations include friends and family, hotel/motel, public shelter, and other locations. Vulnerable population destinations for the Tampa Bay Region are identified in **Table IV-3** for 2017 and in **Table IV-4** for 2020.

In all cases in the Tampa Bay Region, the vulnerable population is far more likely to stay with friends and family during an evacuation. This is followed by hotel/motel as the second choice and other locations as the third. In all cases, public shelter destinations are identified as the least likely destination of the vulnerable population during an evacuation event.

The vulnerable shadow population is provided in **Table IV-5** for both 2017 and 2020. The vulnerable shadow population was determined using the behavioral assumptions for evacuating shadow population and is based on evacuation level (storm category), not evacuation zone.

Table IV-1 – Vulnerable Population in the Tampa Bay Region for 2017

	Evacuation Zone A	Evacuation Zone B	Evacuation Zone C	Evacuation Zone D	Evacuation Zone E
Citrus County					
Site-built Homes	17,755	8,717	6,812	15,037	8,297
Mobile/Manuf. Homes	12,937	7,069	5,149	12,904	16,941
TOTAL	30,692	15,786	11,961	27,941	25,237
Hernando County					
Site-built Homes	7,630	9,632	10,035	11,936	25,358
Mobile/Manuf. Homes	35,224	17,250	19,420	25,684	29,319
TOTAL	42,854	26,882	29,454	37,620	54,677
Hillsborough County					
Site-built Homes	142,882	66,420	71,252	98,003	152,285
Mobile/Manuf. Homes	12,311	5,075	4,774	7,395	6,060
TOTAL	155,193	71,495	76,026	105,399	158,345
Manatee County					
Site-built Homes	53,574	19,822	32,257	74,951	39,571
Mobile/Manuf. Homes	11,262	4,526	6,870	13,109	2,537
TOTAL	64,836	24,348	39,127	88,060	42,108
Pasco County					
Site-built Homes	38,087	46,788	63,053	31,235	22,881
Mobile/Manuf. Homes	3,320	4,359	3,335	3,212	2,103
TOTAL	41,407	51,146	66,388	34,446	24,985
Pinellas County					
Site-built Homes	191,509	60,186	74,910	96,645	37,877
Mobile/Manuf. Homes	14,611	4,172	3,984	6,524	1,696
TOTAL	206,120	64,359	78,894	103,168	39,573

Table IV-2 – Vulnerable Population in the Tampa Bay Region for 2020

	Evacuation Zone A	Evacuation Zone B	Evacuation Zone C	Evacuation Zone D	Evacuation Zone E
Citrus County					
Site-built Homes	25,058	12,332	10,602	25,896	24,106
Mobile/Manuf. Homes	6,028	3,951	1,619	3,139	1,754
TOTAL	31,085	16,283	12,221	29,035	25,860
Hernando County					
Site-built Homes	9,993	11,499	11,840	19,542	31,591
Mobile/Manuf. Homes	2,751	2,126	1,974	2,992	2,185
TOTAL	12,744	13,625	13,814	22,535	33,775
Hillsborough County					
Site-built Homes	124,274	58,869	62,838	95,433	138,492
Mobile/Manuf. Homes	11,123	4,841	4,174	6,868	5,624
TOTAL	135,396	63,710	67,013	102,301	144,116
Manatee County					
Site-built Homes	45,051	17,982	29,391	68,576	41,056
Mobile/Manuf. Homes	9,495	3,781	5,793	11,159	2,434
TOTAL	54,546	21,763	35,184	79,735	43,490
Pasco County					
Site-built Homes	41,718	48,809	66,917	34,890	25,423
Mobile/Manuf. Homes	3,320	4,359	3,334	3,212	2,103
TOTAL	45,038	53,168	70,251	38,102	27,526
Pinellas County					
Site-built Homes	199,428	63,021	80,133	101,367	39,502
Mobile/Manuf. Homes	39,502	14,847	4,242	4,054	6,611
TOTAL	214,275	67,263	84,187	107,978	41,224

Note: Vulnerable population determined using SRESP behavioral data and county provided evacuation zones. Vulnerable population numbers are not inclusive, meaning population numbers listed for a higher zone are not included in the lower zone. For example, vulnerable population listed for Evacuation Zone B does not include vulnerable population listed for Evacuation Zone A.

Table IV-3 – Vulnerable Population by Destination for 2017

	Evacuation Zone A	Evacuation Zone B	Evacuation Zone C	Evacuation Zone D	Evacuation Zone E
Citrus County					
To Friends and Family	11,923	7,729	1,426	3,369	2,001
To Hotel/ Motel	2,531	1,598	292	791	472
To Public Shelter	1,226	854	201	387	224
To Other Destination	3,104	2,080	349	724	451
Hernando County					
To Friends and Family	3,085	1,282	2,218	5,996	22,305
To Hotel/ Motel	712	296	512	1,384	5,147
To Public Shelter	288	112	279	762	2,783
To Other Destination	661	282	403	1,082	4,080
Hillsborough County					
To Friends and Family	100,875	46,472	49,417	68,509	102,924
To Hotel/ Motel	30,423	14,045	14,966	15,440	23,449
To Public Shelter	8,375	3,829	4,040	10,910	16,137
To Other Destination	15,519	7,149	7,603	10,540	15,834
Manatee County					
To Friends and Family	39,465	14,750	23,690	53,491	25,391
To Hotel/ Motel	12,404	3,632	5,839	13,209	6,316
To Public Shelter	3,805	2,245	3,581	8,806	4,211
To Other Destination	9,162	3,721	6,017	12,554	6,189
Pasco County					
To Friends and Family	26,417	30,470	39,666	18,785	13,636
To Hotel/ Motel	10,020	10,011	13,111	6,729	4,892
To Public Shelter	2,402	2,775	6,639	3,605	2,604
To Other Destination	2,568	7,890	6,972	5,328	3,853
Pinellas County					
To Friends and Family	142,823	41,624	51,082	66,733	25,638
To Hotel/ Motel	31,649	12,872	15,779	15,801	6,021
To Public Shelter	11,037	3,427	4,144	8,384	3,200
To Other Destination	20,612	6,436	7,889	12,250	4,715

Table IV-4 – Vulnerable Population by Destination for 2020

	Evacuation Zone A	Evacuation Zone B	Evacuation Zone C	Evacuation Zone D	Evacuation Zone E
Citrus County					
To Friends and Family	12,790	8,292	1,530	3,614	2,147
To Hotel/ Motel	2,715	1,715	313	848	507
To Public Shelter	1,315	916	215	416	241
To Other Destination	3,330	2,232	374	777	484
Hernando County					
To Friends and Family	3,400	1,413	2,445	6,609	24,586
To Hotel/ Motel	785	326	564	1,525	5,674
To Public Shelter	318	124	308	840	3,068
To Other Destination	728	311	444	1,193	4,497
Hillsborough County					
To Friends and Family	107,301	50,164	53,998	77,298	109,586
To Hotel/ Motel	32,398	15,181	16,375	17,467	24,985
To Public Shelter	8,872	4,113	4,393	12,263	17,164
To Other Destination	16,508	7,718	8,307	11,892	16,859
Manatee County					
To Friends and Family	40,459	15,255	24,625	55,851	26,819
To Hotel/ Motel	12,748	3,760	6,075	13,802	6,673
To Public Shelter	3,879	2,305	3,697	9,201	4,449
To Other Destination	9,423	3,877	6,298	13,157	6,549
Pasco County					
To Friends and Family	28,777	31,683	41,984	20,796	15,034
To Hotel/ Motel	10,928	10,416	13,884	7,460	5,400
To Public Shelter	2,584	2,876	7,025	3,971	2,858
To Other Destination	2,750	8,193	7,359	5,876	4,234
Pinellas County					
To Friends and Family	148,508	43,509	54,519	69,855	26,709
To Hotel/ Motel	32,884	13,453	16,837	16,527	6,270
To Public Shelter	11,456	3,575	4,412	8,770	3,332
To Other Destination	21,428	6,726	8,419	12,825	4,912

Note: Vulnerable population destinations determined using SRESP behavioral data and county provided evacuation zones. Vulnerable population numbers are not inclusive, meaning population numbers listed for a higher zone are not included in the lower zone. For example, vulnerable population listed for Evacuation Zone B does not include vulnerable population listed for Evacuation Zone A.

Table IV-5 – Vulnerable Shadow Evacuation Population

	Evacuation Level A	Evacuation Level B	Evacuation Level C	Evacuation Level D	Evacuation Level E
2017					
Citrus County	42,489	35,806	39,118	46,416	51,889
Hernando County	42,346	41,868	50,012	73,954	60,351
Hillsborough County	197,767	185,005	211,964	237,718	219,874
Manatee County	74,021	71,834	77,001	64,061	45,816
Pasco County	99,037	81,078	87,355	82,755	82,492
Pinellas County	118,049	108,861	124,061	102,136	123,347
2020					
Citrus County	45,569	38,383	41,935	49,751	55,616
Hernando County	46,709	46,164	55,148	81,537	66,495
Hillsborough County	208,465	195,914	225,524	251,365	233,790
Manatee County	75,735	73,909	80,019	67,445	48,284
Pasco County	103,423	84,933	93,928	89,165	90,053
Pinellas County	124,293	114,881	130,596	107,883	130,388

Note: Vulnerable shadow population determined using SRESP behavioral data and county provided evacuation zones.

B. Clearance Time Definitions

The determination of clearance time is one of the most important outcomes from the evacuation transportation analysis. Calculated clearance times are used by county emergency managers as one input to determine when to recommend an evacuation order. This calculation can include the population-at-risk, shadow evacuees, as well as evacuees from other counties anticipated to pass through the county. Clearance time is developed to include the time required for evacuees to secure their homes and prepare to leave, the time spent by all vehicles traveling along the evacuation route network, and the additional time spent on the road caused by traffic and road congestion. Clearance time does not relate to the time any one vehicle spends traveling along the evacuation route network, nor does it guarantee vehicles will safely reach their destination once outside the County. The four clearance times that are calculated as part of the evacuation transportation analysis include the following:

- **Clearance Time to Shelter** - The time necessary to safely evacuate vulnerable residents and visitors to a "point of safety" within the county based on a specific hazard, behavioral assumptions and evacuation scenario. Calculated from the point in time when the evacuation order is given to the point in time when the last vehicle reaches a point of safety within the county. Key points to remember for clearance time to shelter include:
  - All in-county trips reach their destination within the county; and,
  - This definition does not include any out of county trips.

- **In-County Clearance Time** - The time required from the point an evacuation order is given until the last evacuee can either leave the evacuation zone or arrive at safe shelter within the county. This does not include those evacuees leaving the county on their own. Key points to remember for in-county clearance time include:
  - All in-county trips reach their destination within the county;
  - All out of county trips exit the evacuation zone, but may still be located in the county; and,
  - This definition does not include out-of-county pass-through trips from adjacent counties, unless they evacuate through an evacuation zone.

- **Out of County Clearance Time** - The time necessary to safely evacuate vulnerable residents and visitors to a "point of safety" within the county based on a specific hazard, behavioral assumptions and evacuation scenario. Calculated from the point an evacuation order is given to the point in time when the last vehicle assigned an external destination exits the county. Key points to remember for out of county clearance time include:
  - The roadway network within the county is clear;
  - All out of county trips exit the county, including out of county pass-through trips from adjacent counties; and,
  - All in-county trips reach their destination.

- **Regional Clearance Time** - The time necessary to safely evacuate vulnerable residents and visitors to a "point of safety" within the (RPC) region based on a specific hazard, behavioral assumptions and evacuation scenario. Calculated from last vehicle assigned an external destination exits the region. Key points to remember for regional clearance time include:
  - The roadway network within the RPC is clear;
  - All out of county trips exit the RPC, including out of county pass-through trips from adjacent counties;
  - All in-county trips reach their destination; and,
  - Regional clearance time is equal to the largest out of county clearance time for a given scenario for any of the counties within the RPC, since the out of county clearance time includes out of county pass through trips from adjacent counties.

C. Evacuation Model Scenarios

There are literally thousands of possible combinations of variables that can be applied using the evacuation transportation model, which will result in thousands of possible outcomes. For the purposes of this analysis, two distinct sets of analyses were conducted using the SRESP evacuation transportation model, including one set of analysis for growth management purposes and one set of analysis for emergency management purposes. The two sets of analysis include the following:

- **Base Scenarios** – The base scenarios were developed to estimate a series of worst case scenarios and are identical for all eleven RPCs across the State. These scenarios assume 100 percent of the vulnerable population evacuates and includes impacts from counties outside of the RPC area. These scenarios are generally designed for growth management purposes, in order to ensure that all residents that choose to evacuate during an event are able to do so; and,

- **Operational Scenarios** – The operational scenarios were developed by the RPCs in coordination with local county emergency managers and are designed to provide important information to emergency management personnel to plan for different storm events. These scenarios are different from region to region and vary for each evacuation level.

Because of the numerous possible combinations of variables that can be applied in the model, the evacuation transportation model is available for use through the Tampa Bay RPC to continue testing combinations of options and provide additional information to emergency managers.

D. Base Scenarios

A total of ten base scenarios were developed through discussions with the SRESP Statewide Work Group and are identical for all eleven RPCs. The SRESP requires a consistent set of base scenarios that will be used by all regions across the State to provide a consistent background between regions. The base scenarios also allow the results to be used consistently from region to region for other purposes, such as growth management. The ten base scenarios were developed to include the following assumptions:

- **Analysis Time Period** – Five scenarios for the 2017 time period and five scenarios for the 2020 time period. The five scenarios for each time period include one for each of the five evacuation levels, A, B, C, D, and E;

- **Highway Network** – The five 2017 scenarios use the 2015 network and the five 2020 scenarios use the 2020 network, which includes planned roadway capacity improvement projects expected to be implemented by 2017;

- **One-Way Evacuation Operations** – The base scenarios do not include implementation of any one-way evacuation operations;

- **University Population** – The base scenarios use the fall/spring semester data to estimate evacuation trips by the student population. This data was provided by each RPC as part of the demographic small area data;

- **Tourist Occupancy Rates** – The base scenarios use the default hotel/motel occupancy rates to estimate tourist evacuation trips. This data was provided by each RPC as part of the demographic small area data;

- **Shelters** – The base scenarios assume all designated primary shelters within each county in the model network are open. The base scenarios do not include shelters that are designated as other shelters, only primary shelters;

- **Response Curve** – The 12-hour response curve is used for all ten base scenarios;

- **Evacuation Phasing** - All counties that are evacuating begin at same time, within 1 hour of the evacuation order being given;

- **Behavioral Response** - For all five evacuation levels (A, B, C, D, or E) in both the 2017 and 2020 time periods, the behavioral response for the base scenarios includes the following:
  - 100% response in evacuation zones for both mobile homes and site built homes for the counties in the RPC, plus one coastal county on either side of the region (includes Hillsborough, Manatee, Pasco, Pinellas, Sarasota, and Hernando Counties);
  - 100% response for mobile homes in inland areas for the counties in the RPC, plus one coastal county on either side of the region;
  - Planning Assumption response (shadow evacuation) for site built homes in inland areas for the counties in the RPC plus one coastal county on either side of the region; and,
  - For the remaining counties in the Tampa Bay model network, no evacuations are assumed, including shadow evacuations.

The ten base scenarios are summarized in **Table IV-6**.

Table IV-6 – Base Scenarios

	Scenario 1 Level A 2017	Scenario 2 Level B 2017	Scenario 3 Level C 2017	Scenario 4 Level D 2017	Scenario 5 Level E 2017
Demographic Data	2015	2015	2015	2015	2015
Highway Network	2015	2015	2015	2015	2015
One-Way Operations	None	None	None	None	None
University Population	Fall/Spring	Fall/Spring	Fall/Spring	Fall/Spring	Fall/Spring
Tourist Rate	Default	Default	Default	Default	Default
Shelters Open	Primary	Primary	Primary	Primary	Primary
Response Curve	12-hour	12-hour	12-hour	12-hour	12-hour
Evacuation Phasing	None	None	None	None	None
Behavioral Response	100%	100%	100%	100%	100%
Evacuation Zone	A	B	C	D	E
Counties Evacuating	Hillsborough Manatee Pasco Pinellas Sarasota Hernando	Hillsborough Manatee Pasco Pinellas Sarasota Hernando	Hillsborough Manatee Pasco Pinellas Sarasota Hernando	Hillsborough Manatee Pasco Pinellas Sarasota Hernando	Hillsborough Manatee Pasco Pinellas Sarasota Hernando
	Scenario 6 Level A 2020	**Scenario 7 Level B 2020**	**Scenario 8 Level C 2020**	**Scenario 9 Level D 2020**	**Scenario 10 Level E 2020**
Demographic Data	2020	2020	2020	2020	2020
Highway Network	2020	2020	2020	2020	2020
One-Way Operations	None	None	None	None	None
University Population	Fall/Spring	Fall/Spring	Fall/Spring	Fall/Spring	Fall/Spring
Tourist Rate	Default	Default	Default	Default	Default
Shelters Open	Primary	Primary	Primary	Primary	Primary
Response Curve	12-hour	12-hour	12-hour	12-hour	12-hour
Evacuation Phasing	None	None	None	None	None
Behavioral Response	100%	100%	100%	100%	100%
Evacuation Zone	A	B	C	D	E
Counties Evacuating	Hillsborough Manatee Pasco Pinellas Sarasota Hernando	Hillsborough Manatee Pasco Pinellas Sarasota Hernando	Hillsborough Manatee Pasco Pinellas Sarasota Hernando	Hillsborough Manatee Pasco Pinellas Sarasota Hernando	Hillsborough Manatee Pasco Pinellas Sarasota Hernando

E. Base Scenario Results

Each of the ten base scenarios were modeled for the Tampa Bay Region using the regional evacuation model. Results were derived from the model to summarize the evacuating population, evacuating vehicles, clearance times, and critical congested roadways. Each of these results are discussed in the following sections.

Evacuating Population

It is important to determine the evacuating population for each of the base scenarios in order to understand the magnitude of the evacuation effort, including estimated population that is evacuating and the county level shelter demand. Evacuating population for the base scenarios is summarized by county for 2017 in **Table IV-7** and for 2020 in **Table IV-8**.

Within the six-county region, total evacuating population ranges from more than 1.06 million persons for a base scenario level A evacuation to more than 2.21 million persons for a base scenario level E evacuation in 2017. By 2020, the evacuating population of the six counties increases to more than 1.12 million persons for a base scenario level A evacuation and nearly 2.36 million persons for a base scenario level E evacuation.

Evacuating Vehicles

From a transportation standpoint, the number of evacuating vehicles is more important than the evacuating population. Evacuating vehicles for the base scenarios is summarized by county for 2017 in **Table IV-9** and for 2020 in **Table IV-10**.

The total number of evacuating vehicles within the six-county region for the base scenarios also varies by evacuation level. A total of more than 619,000 vehicles evacuate from the six-county RPC for a base scenario level A evacuation in 2017, and this number increases to more than 1.2 million evacuating vehicles from the six-county region for a base scenario level E evacuation in 2017. By 2020, the number of evacuating vehicles is expected to increase to nearly 649,000 vehicles for a base scenario level A evacuation and more than 1.27 million evacuating vehicles for a base scenario level E evacuation.

Shelter Demand

Shelter demand is another critical piece of the evacuating population, and shelter demand estimates by county are summarized for each of the base scenarios in **Table IV-11**. Shelter demand is the population in each county who will seek public shelter during their evacuation, either at an in-county shelter or an out of county shelter.

Public shelter demand in the six-county region ranges from more than 86,000 persons for the base scenario level A evacuation in 2017 to nearly 190,000 persons for the base scenario level E evacuation. By 2020, the public shelter demand is expected to increase to nearly 90,000 persons for the level A evacuation and more than 201,000 persons for the level E evacuation.

Table IV-7 – Evacuating Population by Base Scenario for 2017

	Evacuation Level A Base Scenario	Evacuation Level B Base Scenario	Evacuation Level C Base Scenario	Evacuation Level D Base Scenario	Evacuation Level E Base Scenario
Citrus County					
Site-built Homes	24,050	29,390	34,970	47,317	55,915
Mobile/Manuf. Homes	35,819	35,819	35,819	35,819	65,819
Tourists	1,404	1,642	1,642	1,864	1,888
TOTAL	61,273	66,851	72,431	85,000	93,622
Hernando County					
Site-built Homes	20,032	21,256	32,812	65,810	85,919
Mobile/Manuf. Homes	26,862	26,862	26,862	26,862	26,862
Tourists	198	468	468	637	1,240
TOTAL	47,092	48,586	60,142	93,309	114,021
Hillsborough County					
Site-built Homes	248,355	300,004	401,776	531,421	668,891
Mobile/Manuf. Homes	95,732	95,732	95,732	95,732	95,732
Tourists	8,873	15,957	17,169	18,677	21,708
TOTAL	352,960	411,693	514,677	645,830	786,331
Manatee County					
Site-built Homes	81,270	103,103	143,730	210,033	233,052
Mobile/Manuf. Homes	46,652	46,652	46,652	46,652	46,652
Tourists	10,935	11,263	14,930	23,747	24,590
TOTAL	138,857	161,018	205,312	280,432	304,294
Pasco County					
Site-built Homes	82,306	115,042	187,292	217,138	241,859
Mobile/Manuf. Homes	57,840	57,840	57,840	57,840	57,840
Tourists	298	749	1,164	1,165	1,165
TOTAL	140,444	173,631	246,296	276,143	300,864
Pinellas County					
Site-built Homes	257,031	309,603	402,845	483,720	544,081
Mobile/Manuf. Homes	51,246	51,246	51,246	51,246	51,246
Tourists	15,892	18,490	19,342	19,711	20,134
TOTAL	324,169	379,339	473,433	554,677	615,461

Table IV-8 – Evacuating Population by Base Scenario for 2020

	Evacuation Level A Base Scenario	Evacuation Level B Base Scenario	Evacuation Level C Base Scenario	Evacuation Level D Base Scenario	Evacuation Level E Base Scenario
Citrus County					
Site-built Homes	25,795	31,256	37,511	50,753	59,973
Mobile/Manuf. Homes	38,482	38,482	38,482	38,482	38,482
Tourists	1,442	1,680	1,680	1,909	1,933
TOTAL	65,719	71,688	77,673	91,144	100,388
Hernando County					
Site-built Homes	22,113	23,471	36,216	72,605	94,779
Mobile/Manuf. Homes	29,629	29,629	29,629	29,629	29,629
Tourists	198	468	468	637	1,245
TOTAL	51,940	53,568	66,313	102,871	125,653
Hillsborough					
Site-built Homes	267,648	323,977	435,284	578,390	726,002
Mobile/Manuf. Homes	96,006	96,006	96,006	96,006	96,006
Tourists	9,889	18,185	19,563	21,217	24,624
TOTAL	373,543	438,168	550,853	695,613	846,632
Manatee County					
Site-built Homes	84,682	107,707	150,608	220,655	245,090
Mobile/Manuf. Homes	46,025	46,025	46,025	46,025	46,025
Tourists	11,538	11,884	15,787	25,177	26,071
TOTAL	142,245	165,616	212,420	291,857	317,186
Pasco County					
Site-built Homes	90,214	124,353	203,092	236,429	264,843
Mobile/Manuf. Homes	57,831	57,831	57,831	57,831	57,831
Tourists	416	955	1,462	1,464	1,464
TOTAL	148,461	183,139	262,385	295,724	324,138
Pinellas County					
Site-built Homes	268,467	323,623	422,637	507,402	570,639
Mobile/Manuf. Homes	52,068	52,068	52,068	52,068	52,068
Tourists	18,033	20,728	21,616	22,116	22,607
TOTAL	338,568	396,419	496,321	581,586	645,314

Table IV-9 – Evacuating Vehicles by Base Scenario for 2017

	Evacuation Level A Base Scenario	Evacuation Level B Base Scenario	Evacuation Level C Base Scenario	Evacuation Level D Base Scenario	Evacuation Level E Base Scenario
Citrus County					
Site-built Homes	14,457	17,705	20,906	27,933	32,791
Mobile/Manuf. Homes	21,603	21,603	21,603	21,603	21,603
Tourists	638	746	746	847	858
TOTAL	36,698	40,054	43,255	50,383	55,252
Hernando County					
Site-built Homes	11,095	11,864	18,220	36,041	46,615
Mobile/Manuf. Homes	15,742	15,742	15,742	15,742	15,742
Tourists	90	213	213	290	564
TOTAL	26,927	27,819	34,175	52,073	62,921
Hillsborough County					
Site-built Homes	120,213	156,498	207,602	270,395	337,848
Mobile/Manuf. Homes	50,751	50,751	50,751	50,751	50,751
Tourists	3,361	6,024	6,714	7,537	8,991
TOTAL	184,325	213,273	265,067	328,683	397,590
Manatee County					
Site-built Homes	41,828	51,956	69,956	101,286	112,897
Mobile/Manuf. Homes	26,812	26,812	26,812	26,812	26,812
Tourists	4,111	4,234	5,613	8,927	9,244
TOTAL	72,751	83,002	102,381	137,025	148,953
Pasco County					
Site-built Homes	47,633	65,945	105,823	121,772	135,392
Mobile/Manuf. Homes	44,232	44,232	44,232	44,232	44,232
Tourists	210	415	608	609	609
TOTAL	92,075	110,592	150,663	166,613	180,233
Pinellas County					
Site-built Homes	153,636	181,731	229,498	271,455	302,416
Mobile/Manuf. Homes	46,655	46,655	46,655	46,655	46,655
Tourists	6,030	7,133	7,652	7,827	8,020
TOTAL	206,321	235,519	283,805	325,937	357,091

Table IV-10 – Evacuating Vehicles by Base Scenario for 2020

	Evacuation Level A Base Scenario	Evacuation Level B Base Scenario	Evacuation Level C Base Scenario	Evacuation Level D Base Scenario	Evacuation Level E Base Scenario
Citrus County					
Site-built Homes	15,510	18,995	22,429	29,968	35,178
Mobile/Manuf. Homes	23,193	23,193	23,193	23,193	23,193
Tourists	655	763	763	868	878
TOTAL	39,358	42,951	46,385	54,029	59,249
Hernando County					
Site-built Homes	12,248	13,100	20,110	39,761	51,416
Mobile/Manuf. Homes	17,347	17,347	17,347	17,347	17,347
Tourists	90	213	213	290	566
TOTAL	29,685	30,660	37,670	57,398	69,329
Hillsborough County					
Site-built Homes	140,034	168,627	224,210	293,676	365,858
Mobile/Manuf. Homes	50,916	50,916	50,916	50,916	50,916
Tourists	3,740	6,835	7,820	8,953	10,861
TOTAL	194,690	226,378	282,946	353,545	427,635
Manatee County					
Site-built Homes	43,254	53,931	72,963	106,026	118,334
Mobile/Manuf. Homes	26,726	26,726	26,726	26,726	26,726
Tourists	4,305	4,434	5,890	9,394	9,728
TOTAL	74,285	85,091	105,579	142,146	154,788
Pasco County					
Site-built Homes	52,218	71,287	114,574	131,949	147,706
Mobile/Manuf. Homes	44,226	44,226	44,226	44,226	44,226
Tourists	352	624	889	890	890
TOTAL	96,796	116,137	159,689	177,065	192,822
Pinellas County					
Site-built Homes	159,940	189,289	239,862	283,752	316,033
Mobile/Manuf. Homes	47,392	47,392	47,392	47,392	47,392
Tourists	6,840	8,100	8,831	9,090	9,344
TOTAL	214,172	244,781	296,085	340,234	372,769

Table IV-11 – Shelter Demand by Base Scenario

	Evacuation Level A Base Scenario	Evacuation Level B Base Scenario	Evacuation Level C Base Scenario	Evacuation Level D Base Scenario	Evacuation Level E Base Scenario
2017					
Citrus	4,891	5,207	7,218	12,062	13,373
Hernando	5,842	5,936	6,976	9,819	11,608
Hillsborough	22,429	25,343	32,530	47,451	63,296
Manatee	10,462	12,277	15,505	21,878	24,200
Pasco	17,680	19,394	26,790	29,739	32,260
Pinellas	24,742	27,641	33,563	39,790	45,175
2020					
Citrus	5,246	5,583	7,744	12,940	14,346
Hernando	6,441	6,543	7,688	10,824	12,792
Hillsborough	23,658	26,858	34,693	51,116	68,117
Manatee	10,662	12,574	15,990	22,701	25,164
Pasco	18,311	20,104	28,137	31,352	34,266
Pinellas	25,598	28,638	34,904	41,425	47,047

Note: Shelter demand is the population in each county who will seek public shelter during their evacuation, either at an in-county shelter or an out of county shelter.

Congested Roadways

Another important component of the transportation analysis is the identification of critical roadway segments for evacuation traffic. This analysis includes a review of vehicle flows during the evacuation period, along with excessive vehicle queues. A summary of the total number of evacuating vehicles for each of the base scenarios is presented in **Table IV-12**. It is important to note that the total number of evacuating vehicles in the table below includes vehicles evacuating from the two coastal counties on either side of the RPC (Levy and Sarasota), in addition to the six counties within the RPC (Citrus, Hernando, Hillsborough, Manatee, Pasco and Pinellas), for a total of eight evacuating counties.

Table IV-12 – Total Evacuating Vehicles for Base Scenarios

	Evacuation Level A Base Scenario	Evacuation Level B Base Scenario	Evacuation Level C Base Scenario	Evacuation Level D Base Scenario	Evacuation Level E Base Scenario
2017	702,399	812,914	1,029,318	1,248,191	1,401,452
2020	740,195	858,341	1,092,571	1,330,399	1,495,918

The identification of critical roadways in the evacuation network is also important to assist emergency managers with identifying roadways that have the greatest impact on clearance times. Critical roadways were identified by reviewing roadways in the model network that have the highest vehicle queues for extended periods of time during an evacuation. Due to the nature of a major evacuation in general, nearly all roadway facilities will have extended vehicle queues at some point during the evacuation process. The point of this analysis is to identify those roadway facilities that have vehicle queues for the longest time periods during each of the evacuation scenarios. Critical roadway segments for the Tampa Bay Region are identified in **Figures IV-1** through **IV-10** for each of the base scenarios for 2017 and 2020.

Through a review of the critical roadway segment figures, it is clear that I-75, I-4, and portions of I-275 are critical facilities for all evacuation scenarios. During the level A evacuation scenarios, the roadway segments with the highest vehicle queues are primarily located in the northern part of the six-county region, including portions of State Road 52 in Pasco County, I-75 in Hernando County, and County Road 491 in Citrus County. In contrast, for the level E evacuation scenarios, the roadway segments with the highest vehicle queues extend throughout the region, including I-275 in Hillsborough and Pinellas Counties, I-4 throughout Hillsborough County, and several US and State Highways as well. The Turnpike/I-75 interchange in Sumter County is clearly an issue in all evacuation scenarios.

In addition to the identification of critical roadway segments, the total number of evacuating vehicles entering and exiting each county by evacuation scenario was also determined. Evacuating vehicles exiting each county by major evacuation route are identified in **Table IV-13** for 2017 and **Table IV-14** for 2020. In addition, evacuating vehicles entering each county by major evacuation route are identified in **Table IV-15** for 2017 and **Table IV-16** for 2020. Detailed volume figures for all evacuation routes in the Tampa Bay Region for each base scenario are included in Volume 5-8. The number of vehicles entering and exiting each county during an evacuation varies widely depending upon the scenario, roadway, and county. As expected, major interstates and state highways generally carry larger volumes of evacuating traffic. The vehicle flows into and out of each county generally follow the same pattern as the critical segment figures, as locations with higher queues generally have higher traffic volumes.

Figure IV-1

Critical Roadway Segments with Excessive Vehicle Queues for 2017 Base Scenario Evacuation Level A

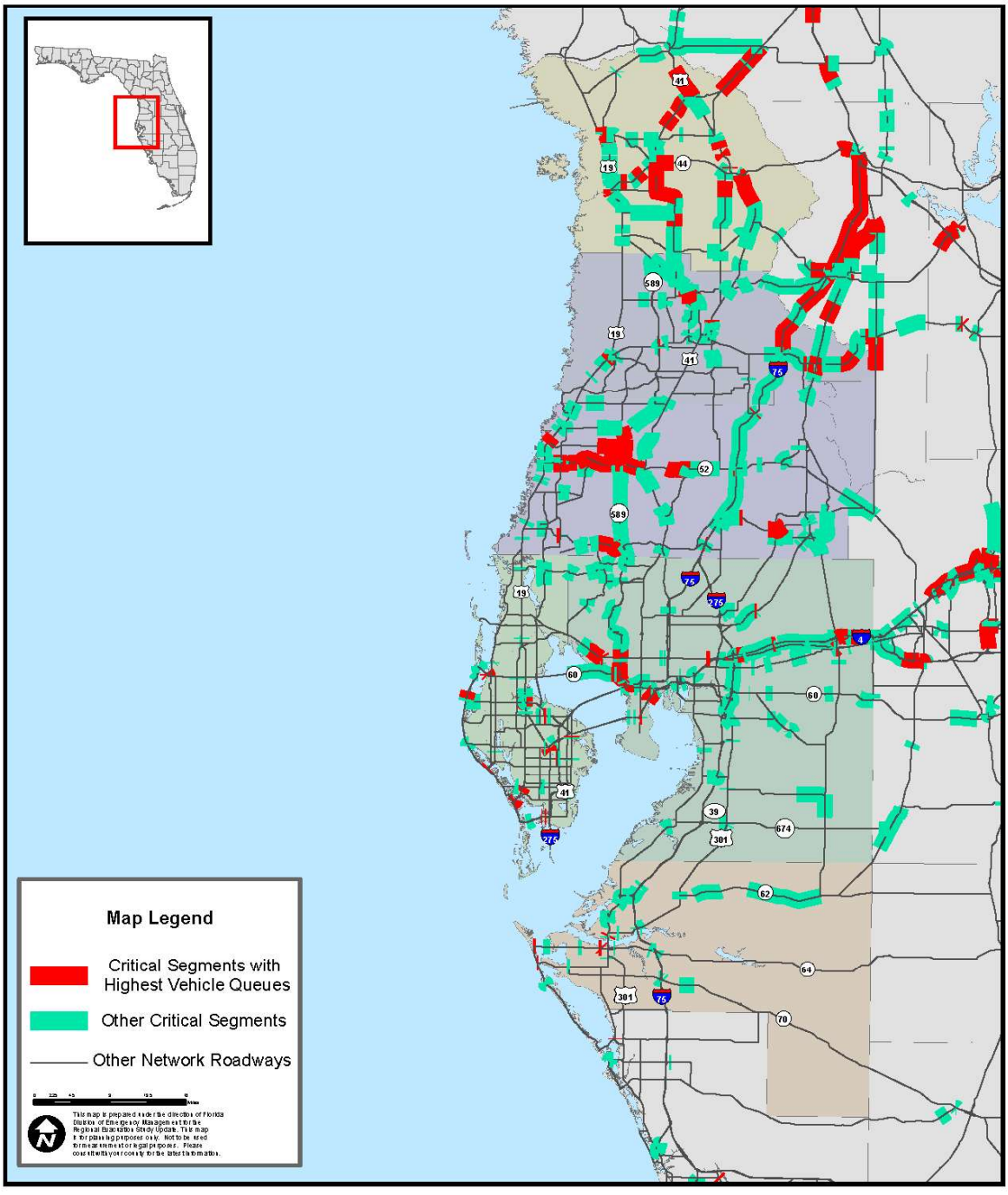
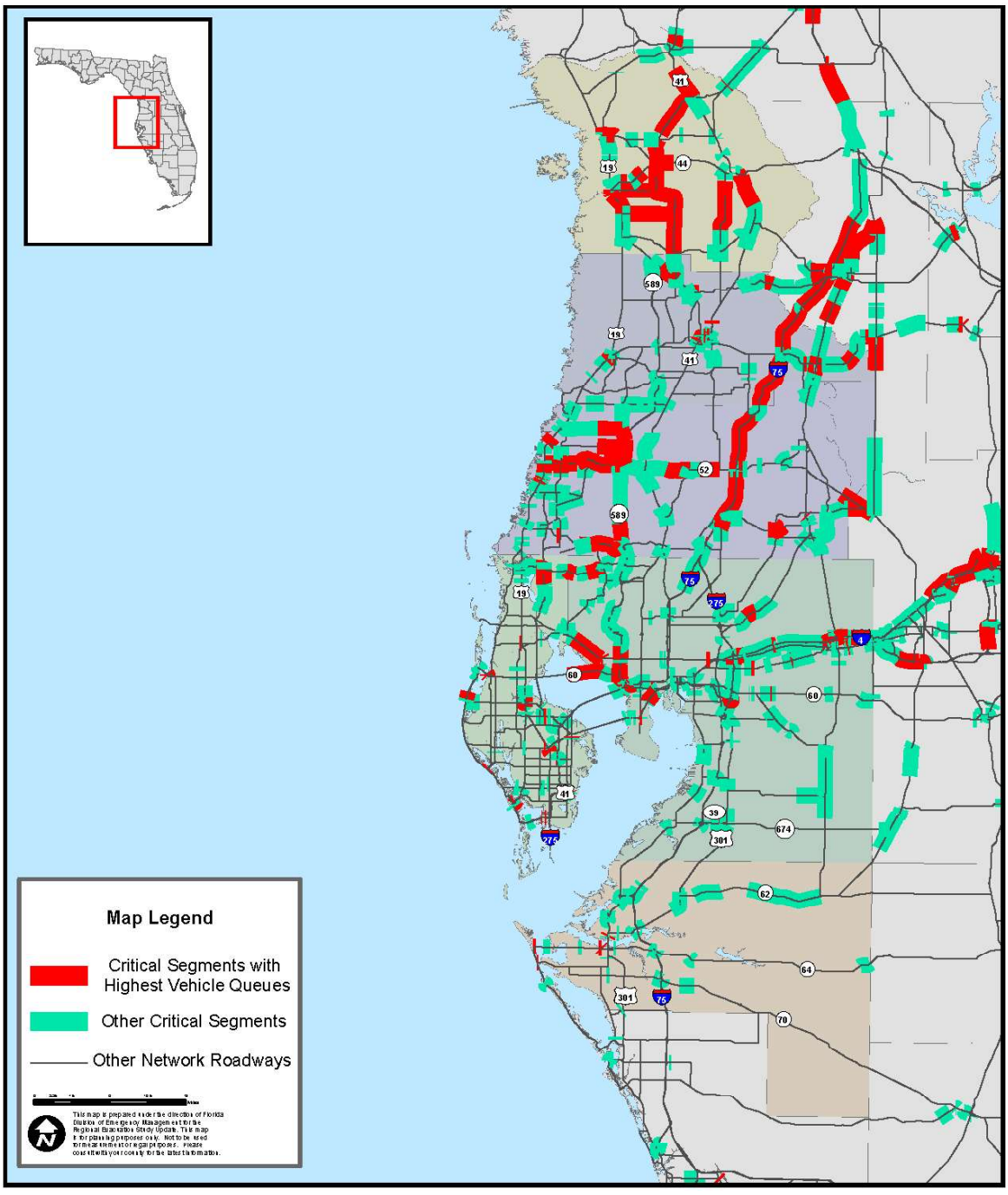


Figure IV-2

Critical Roadway Segments with Excessive Vehicle Queues for 2017 Base Scenario Evacuation Level B



Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

Figure IV-3

Critical Roadway Segments with Excessive Vehicle Queues for 2017 Base Scenario Evacuation Level C

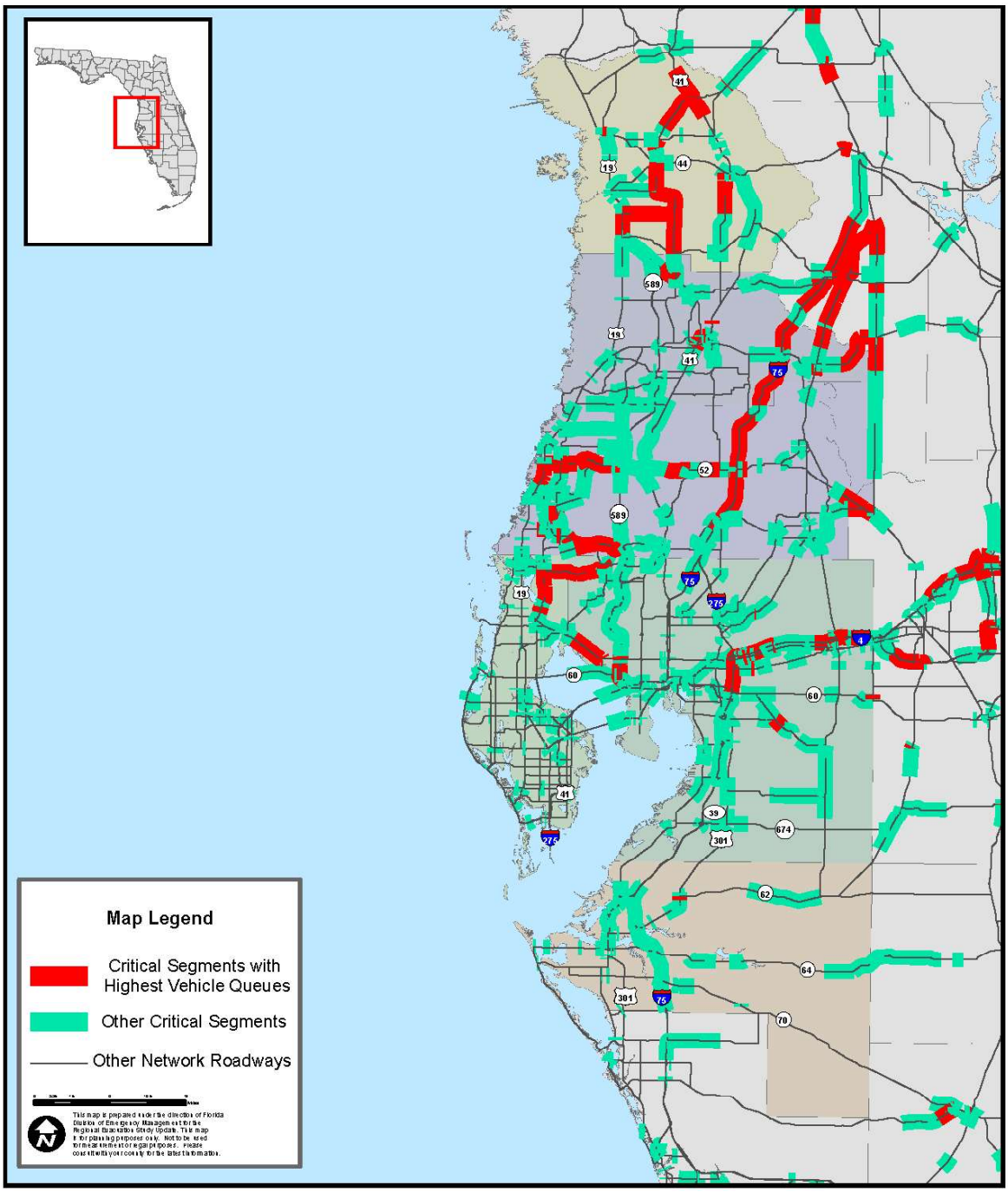


Figure IV-4

Critical Roadway Segments with Excessive Vehicle Queues for 2017 Base Scenario Evacuation Level D

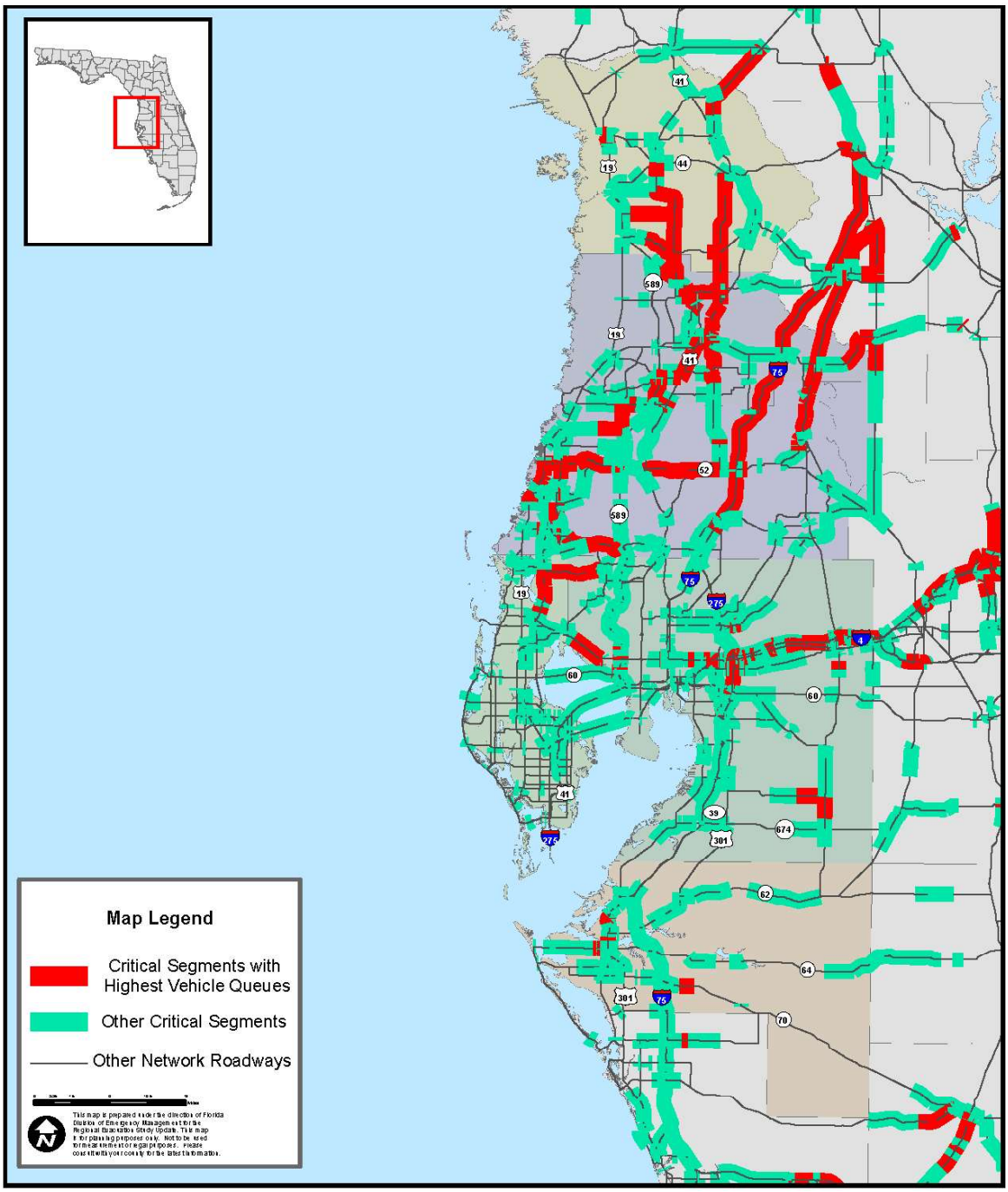


Figure IV-5

Critical Roadway Segments with Excessive Vehicle Queues for 2017 Base Scenario Evacuation Level E

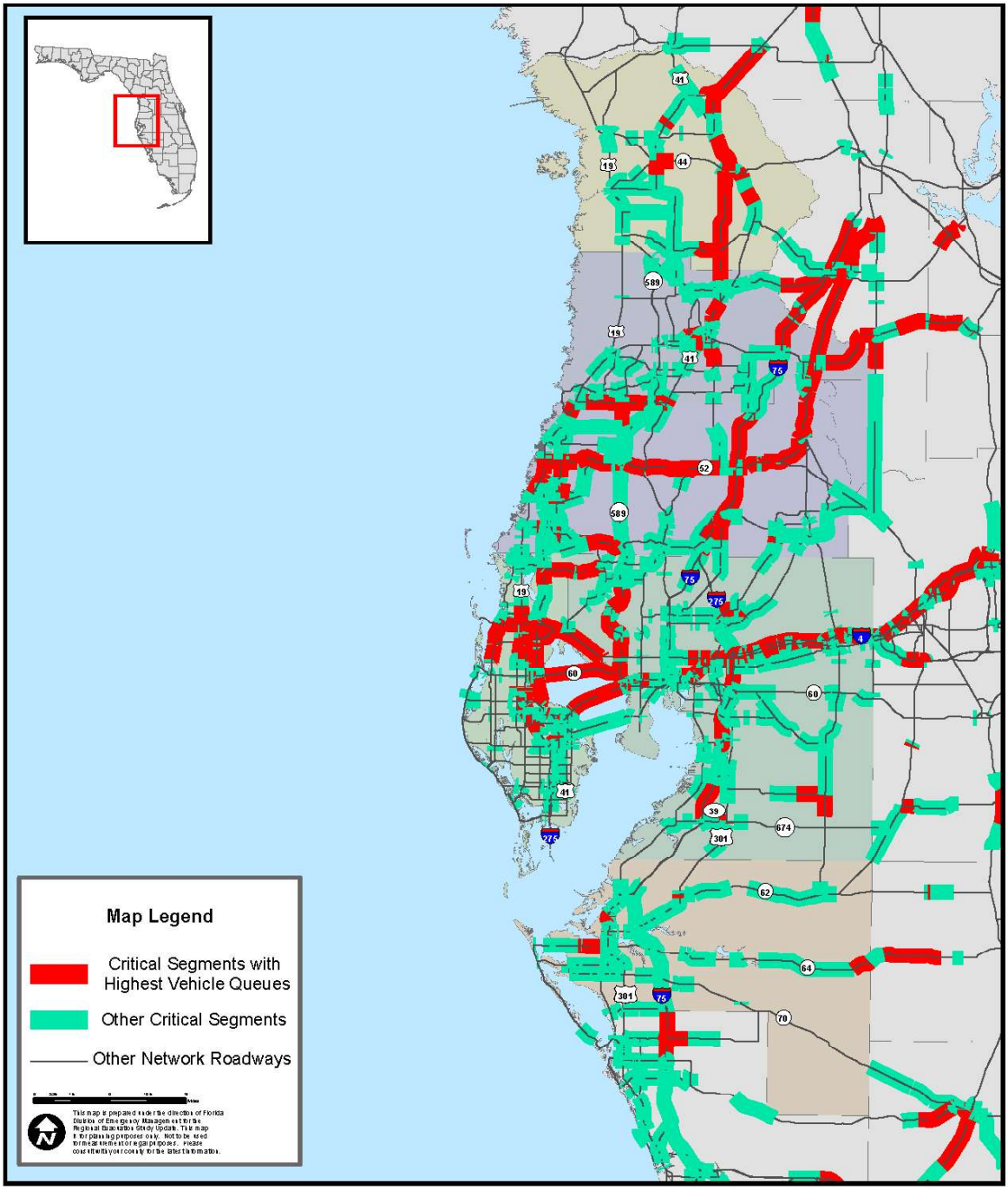
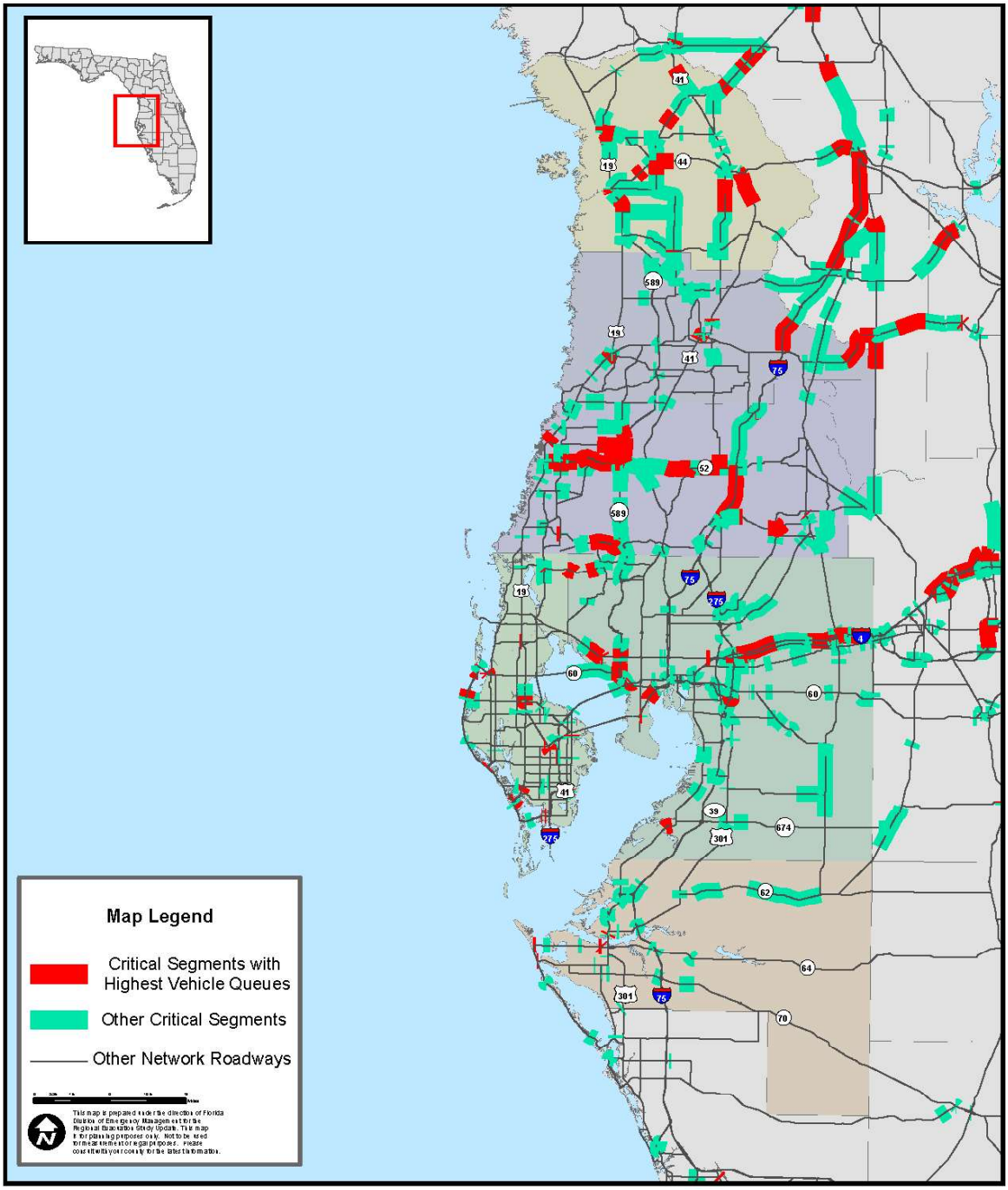


Figure IV-6

Critical Roadway Segments with Excessive Vehicle Queues for 2020 Base Scenario Evacuation Level A

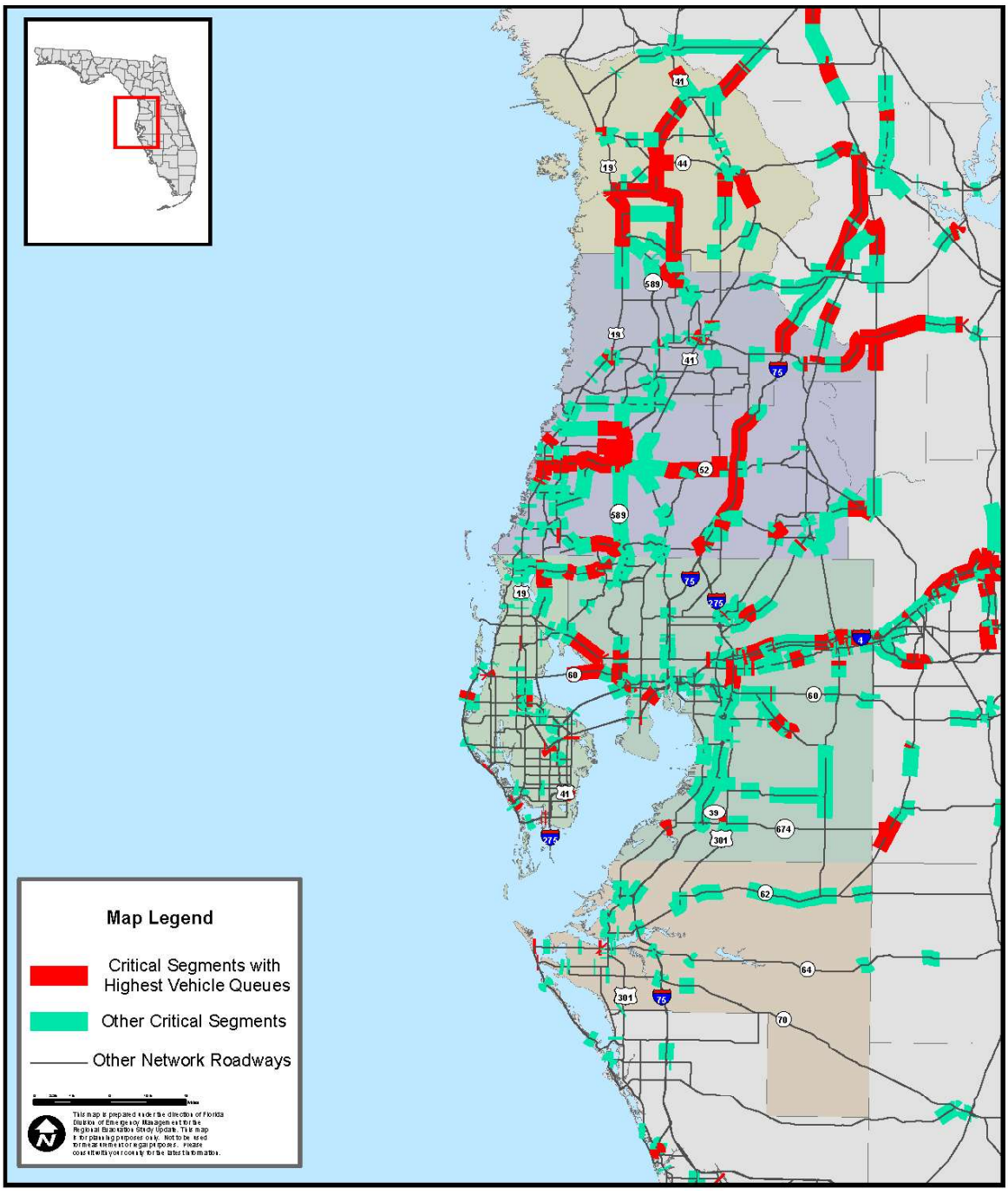


Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

Figure IV-7

Critical Roadway Segments with Excessive Vehicle Queues for 2020 Base Scenario Evacuation Level B



Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

Figure IV-8

Critical Roadway Segments with Excessive Vehicle Queues for 2020 Base Scenario Evacuation Level C

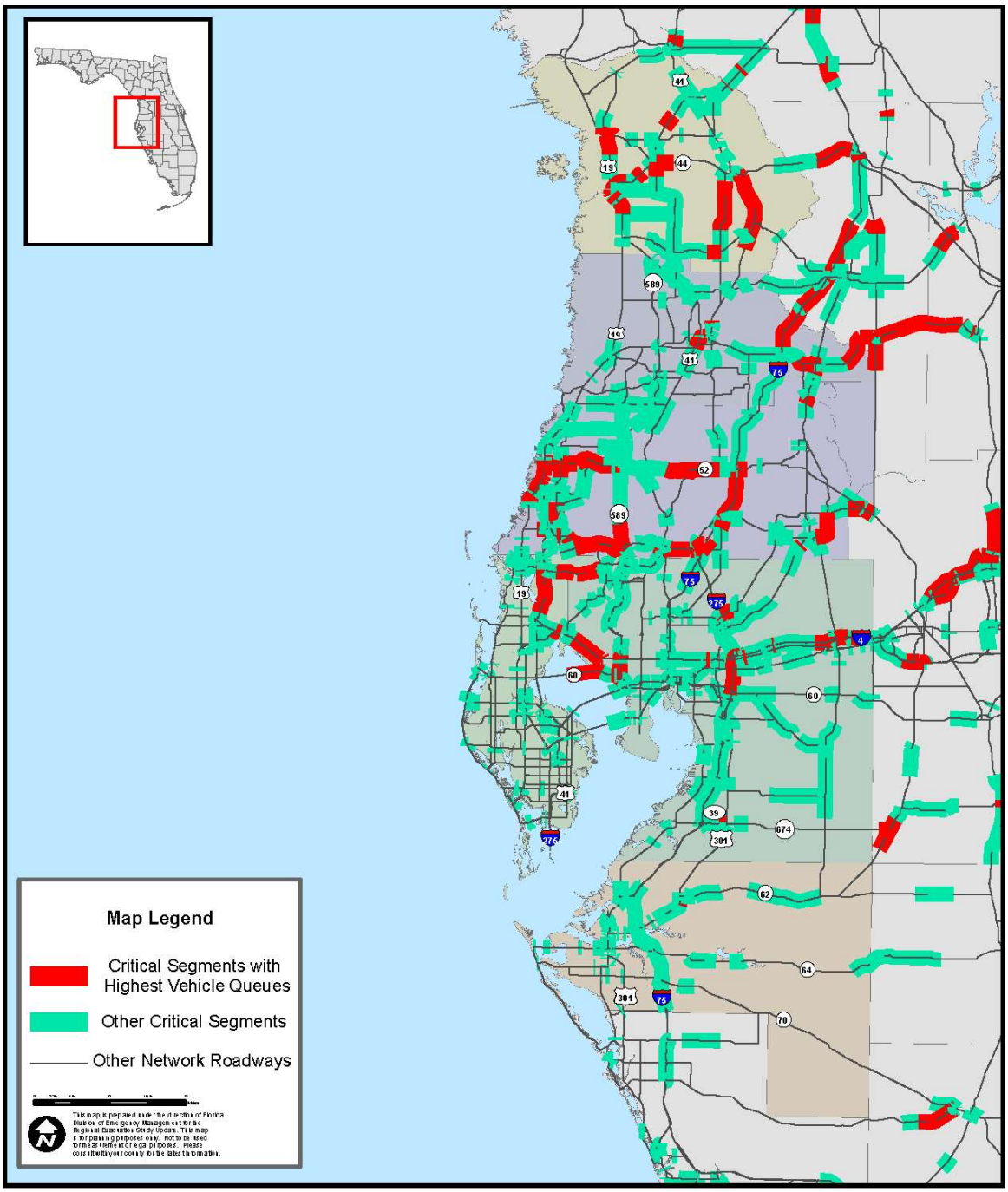
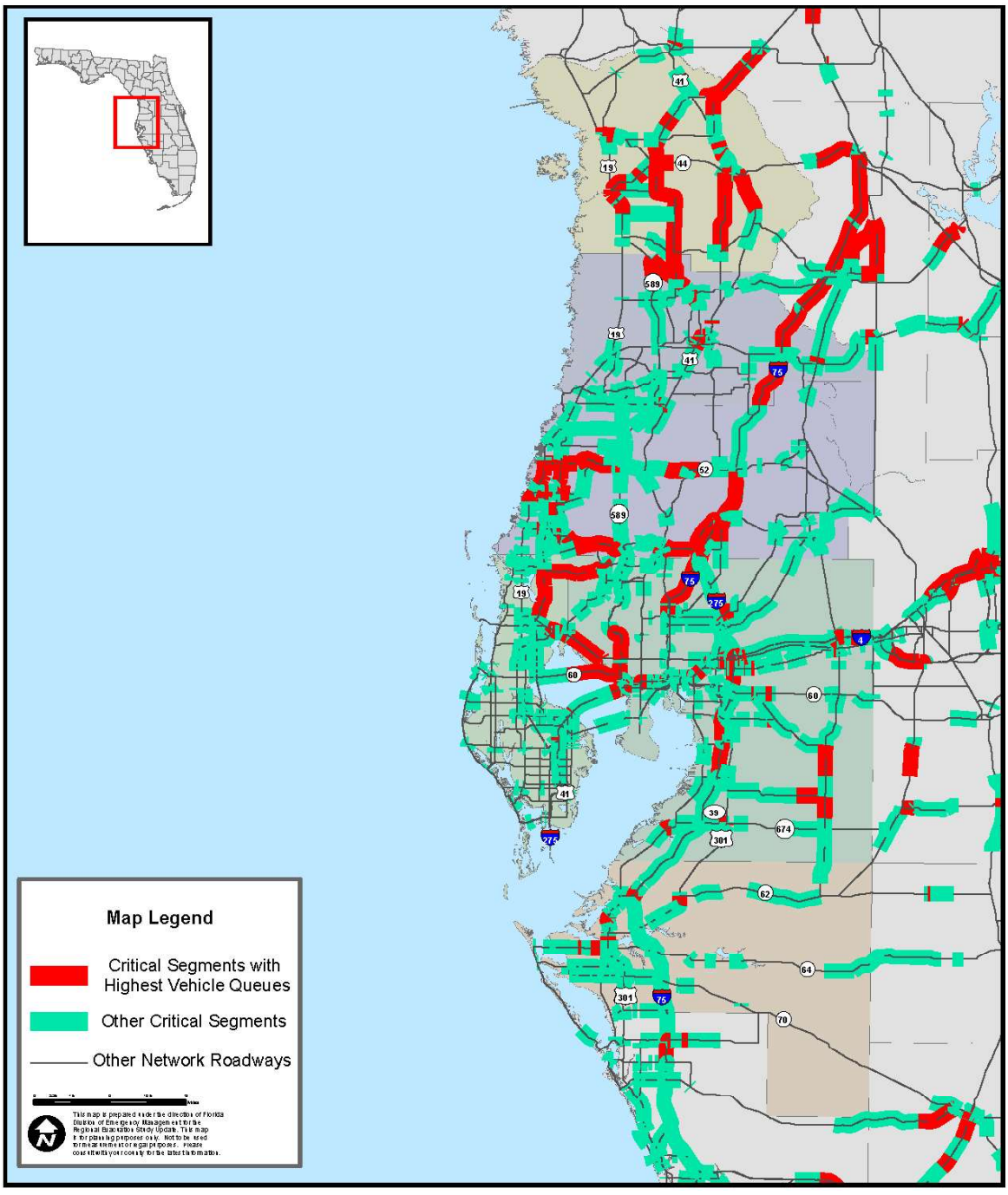


Figure IV-9

Critical Roadway Segments with Excessive Vehicle Queues for 2020 Base Scenario Evacuation Level D

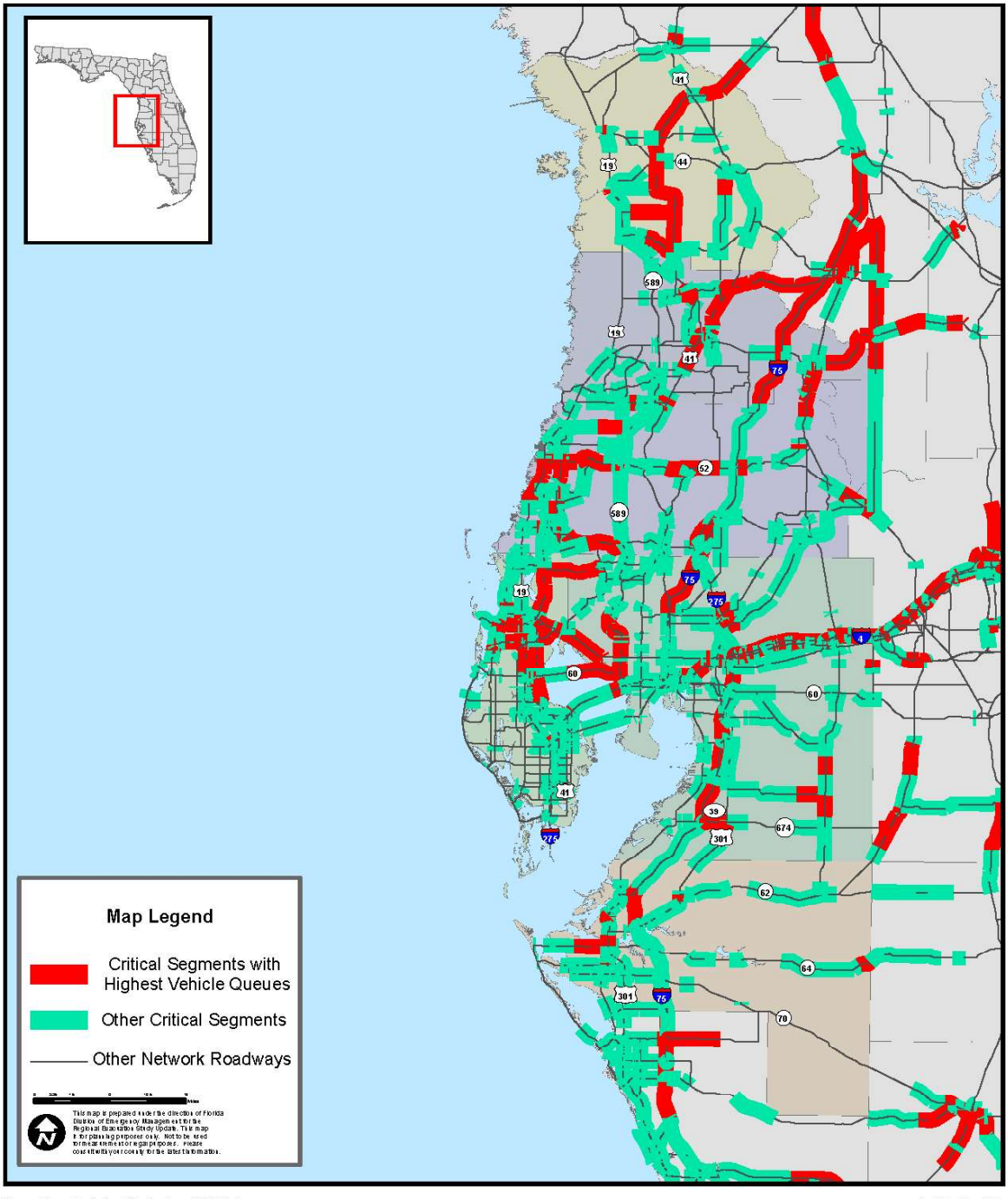


Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

Figure IV-10

Critical Roadway Segments with Excessive Vehicle Queues for 2020 Base Scenario Evacuation Level E



Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

Table IV-13 – Evacuating Vehicles Leaving Each County by Evacuation Route for the 2017 Base Scenario

Hillsborough County	EVAC A	EVAC B	EVAC C	EVAC D	EVAC E
SR 589 Northbound	27,000	34,900	49,300	65,900	51,500
US 41 Northbound	3,500	5,200	5,600	11,800	10,100
I-75 Southbound	4,400	5,400	4,700	6,000	9,100
I-275 Northbound	27,800	30,900	34,600	34,800	37,600
I-75 Northbound	8,600	9,500	14,900	20,700	23,600
US 301 Northbound	5,200	7,000	9,300	11,800	17,800
SR 60 Eastbound	6,000	6,600	8,200	9,800	10,600
SR 674 Eastbound	3,000	3,100	4,100	4,700	7,300
I-4 Eastbound	65,400	74,700	93,300	118,400	135,000
SR 92 Eastbound	3,900	4,800	6,900	9,100	11,200
SR 597 Northbound	7,100	10,600	13,200	19,300	21,700
Manatee County					
I-275 Northbound	3,200	4,400	7,600	13,000	13,400
US 41 Southbound	1,200	1,800	3,200	7,600	8,700
US 41 Northbound	500	2,600	7,700	14,100	17,500
I-75 Northbound	38,100	43,400	53,500	64,900	69,100
I-75 Southbound	8,900	11,400	14,900	18,200	25,500
US 301 Northbound	1,500	2,900	4,800	9,400	9,300
SR 70 Eastbound	600	600	3,700	7,600	9,400
SR 62 Eastbound	3,200	4,100	5,200	6,800	12,100
SR 64 Eastbound	1,700	3,400	9,000	14,000	20,300
CR 39 Northbound	-	500	4,100	6,800	11,400
SR 37 Northbound	2,400	3,400	6,100	9,100	9,200
Pasco County					
SR 589 Northbound	23,400	33,500	47,200	53,000	36,900
US 41 Northbound	3,200	3,000	4,100	6,200	7,700
I-75 Northbound	32,000	39,300	51,500	55,900	66,900
US 98 Eastbound	6,100	6,900	10,700	12,400	16,700
US 19 Northbound	17,100	21,500	32,700	41,200	30,200
US 301 Northbound	7,300	9,800	12,100	16,200	20,200
US 98 Northbound	4,300	4,300	8,000	8,800	7,400
Pinellas County					
Alt US 19 Northbound	3,700	3,300	2,600	2,600	2,000
SR 60 Eastbound	6,000	6,600	8,200	9,800	10,600
I-275 Southbound	14,800	18,300	17,800	20,500	25,300
SR 582 Eastbound	5,300	10,400	15,200	18,200	20,900
SR 580 Eastbound	11,400	15,400	22,500	24,700	31,800
I-275 Eastbound	48,100	52,000	60,800	77,000	72,600
US 92 Eastbound	6,200	10,500	15,600	20,700	22,200
US 19 Northbound	3,700	3,300	2,600	2,600	2,000
CR 611 Northbound	1,100	700	1,000	1,000	1,000

Table IV-13 – Evacuating Vehicles Leaving Each County by Evacuation Route for the 2017 Base Scenario (continued)

Citrus County	EVAC A	EVAC B	EVAC C	EVAC D	EVAC E
US 19 Southbound	400	400	400	400	300
US 41 Southbound	100	100	200	200	100
SR 44 Eastbound	1,900	2,400	3,700	7,200	10,000
US 41 Northbound	4,500	5,500	7,300	9,200	15,800
US 19 Northbound	11,700	13,300	15,500	17,300	19,400
Hernando County					
US 19 Southbound	100	100	100	100	100
US 41 Southbound	200	300	700	1,100	200
I-75 Southbound	3,100	3,700	4,200	5,600	3,200
US 301 Southbound	-	100	-	100	100
SR 589 Southbound	1,600	1,800	2,800	4,300	1,300
US 301 Northbound	100	300	500	700	13,500
I-75 Northbound	12,900	14,700	19,500	22,600	27,900
US 41 Northbound	100	400	1,100	2,400	9,200
US 19 Northbound	10,000	11,600	13,200	14,100	13,700

Table IV-14 – Evacuating Vehicles Leaving Each County by Evacuation Route for the 2020 Base Scenario

Hillsborough County	EVAC A	EVAC B	EVAC C	EVAC D	EVAC E
SR 589 Northbound	27,700	32,200	54,100	60,800	64,300
US 41 Northbound	3,400	5,700	9,100	11,900	11,000
I-75 Southbound	4,600	5,700	4,800	6,700	10,000
I-275 Northbound	28,500	32,400	35,700	41,300	35,300
I-75 Northbound	8,500	10,300	17,300	24,600	24,000
US 301 Northbound	4,400	7,900	8,300	10,100	10,500
SR 60 Eastbound	6,100	6,600	8,300	9,800	10,900
SR 674 Eastbound	3,000	3,800	4,300	6,800	11,100
I-4 Eastbound	74,700	79,900	104,200	125,600	143,500
SR 92 Eastbound	4,600	7,900	7,300	11,300	10,800
SR 597 Northbound	9,000	13,600	18,800	19,700	24,300
Manatee County					
I-275 Northbound	3,800	6,000	13,700	15,600	13,600
US 41 Southbound	1,200	2,100	3,000	6,700	8,800
US 41 Northbound	1,100	2,800	10,200	15,800	14,400
I-75 Northbound	38,400	44,300	52,400	65,600	72,800
I-75 Southbound	9,400	11,500	15,200	19,000	27,000
US 301 Northbound	2,300	3,300	5,000	10,100	11,600
SR 70 Eastbound	500	600	3,400	8,100	11,400
SR 62 Eastbound	3,200	4,600	6,400	7,800	10,500
SR 64 Eastbound	2,000	3,500	7,300	13,400	21,700
CR 39 Northbound	-	400	1,900	8,100	6,900
SR 37 Northbound	2,600	3,000	7,000	8,800	13,700
Pasco County					
SR 589 Northbound	25,400	27,300	47,700	50,200	39,300
US 41 Northbound	1,600	4,300	2,800	4,800	10,000
I-75 Northbound	42,500	52,200	60,300	65,900	76,900
US 98 Eastbound	5,700	9,100	13,100	15,000	20,600
US 19 Northbound	16,600	23,500	35,400	44,300	34,900
US 301 Northbound	5,900	7,800	15,700	21,800	23,000
US 98 Northbound	900	1,200	7,600	9,500	11,900
Pinellas County					
Alt US 19 Northbound	2,600	2,300	1,900	2,100	2,100
SR 60 Eastbound	6,100	6,600	8,300	9,800	10,900
I-275 Southbound	15,100	18,600	15,700	18,000	24,800
SR 582 Eastbound	5,300	10,400	15,200	18,200	20,900
SR 580 Eastbound	10,900	15,400	23,700	27,900	33,500
I-275 Eastbound	56,400	62,900	71,800	87,800	81,600
US 92 Eastbound	4,200	7,000	15,200	18,400	16,800
US 19 Northbound	2,600	2,300	1,900	2,100	2,100
CR 611 Northbound	500	800	900	1,100	1,100

Table IV-14 – Evacuating Vehicles Leaving Each County by Evacuation Route for the 2020 Base Scenario (continued)

Citrus County	EVAC A	EVAC B	EVAC C	EVAC D	EVAC E
US 19 Southbound	400	500	400	400	100
US 41 Southbound	100	100	200	300	400
SR 44 Eastbound	2,300	2,800	4,600	7,700	10,700
US 41 Northbound	4,900	6,000	7,400	10,600	11,800
US 19 Northbound	12,400	14,500	16,900	18,100	19,600
Hernando County					
US 19 Southbound	100	100	100	100	100
US 41 Southbound	200	300	800	1,500	1,900
I-75 Southbound	3,600	4,200	5,300	6,500	7,400
US 301 Southbound	100	100	100	100	100
SR 589 Southbound	1,800	2,200	3,400	4,800	6,100
US 301 Northbound	200	200	400	800	1,200
I-75 Northbound	13,100	14,900	18,600	22,700	25,200
US 41 Northbound	200	400	1,400	2,800	3,800
US 19 Northbound	10,200	11,700	14,600	15,100	16,500

Table IV-15 – Evacuating Vehicles Entering Each County by Evacuation Route for the 2017 Base Scenario

Hillsborough County	EVAC A	EVAC B	EVAC C	EVAC D	EVAC E
SR 580 Eastbound	11,400	15,400	22,500	24,700	31,800
SR 60 Eastbound	6,000	6,600	8,200	9,800	10,600
I-275 Eastbound	43,900	46,200	51,500	61,400	58,200
US 41 Northbound	500	2,600	7,700	14,100	17,500
I-75 Northbound	38,100	43,400	53,500	64,900	69,100
US 301 Northbound	1,500	2,900	4,800	9,400	9,300
US 92 Eastbound	6,200	10,500	15,600	20,700	22,200
Manatee County					
I-275 Southbound	15,200	18,700	18,300	21,600	26,100
US 41 Northbound	600	700	900	600	1,000
US 301 Northbound	200	200	3,100	9,800	10,400
US 41 Southbound	1,200	1,600	1,500	1,800	1,900
I-75 Southbound	4,400	5,400	4,700	6,000	9,100
I-75 Northbound	19,500	24,600	33,800	36,800	39,700
US 301 Southbound	-	400	200	300	500
Pasco County					
Alt US 19 Northbound	2,400	2,300	1,700	2,300	2,100
SR 589 Northbound	27,000	34,900	49,300	65,900	51,500
US 41 Northbound	3,500	5,200	5,600	11,800	10,100
I-275 Northbound	27,800	30,900	34,600	34,800	37,600
I-75 Northbound	8,600	9,500	14,900	20,700	23,600
CR 581 Northbound	400	5,400	11,900	9,200	17,700
CR 579 Northbound	2,600	2,100	5,200	8,000	13,800
US 301 Northbound	5,200	7,000	9,300	11,800	17,800
US 19 Northbound	3,700	3,300	2,600	2,600	2,000
CR 611 Northbound	1,100	700	1,000	1,000	1,000
SR 597 Northbound	2,600	2,100	5,200	8,000	13,800
Pinellas County					
I-275 Northbound	3,800	4,900	7,900	12,800	13,400
Citrus County					
US 41 Northbound	400	9,200	5,200	9,700	11,300
US 19 Northbound	7,700	13,700	12,300	22,200	14,600
US 41 Southbound	300	300	300	400	400
US 19 Southbound	300	300	400	400	300
Hernando County					
US 19 Southbound	5,800	15,800	9,000	15,700	19,300
US 41 Southbound	100	100	100	200	200
I-75 Southbound	2,400	4,100	5,500	6,800	8,300
US 19 Northbound	9,800	20,000	13,200	28,800	15,900
US 41 Northbound	2,100	4,700	2,800	8,000	8,800
I-75 Northbound	15,200	29,400	22,900	31,600	18,700
US 301 Northbound	2,300	12,500	4,100	9,800	7,000
SR 589 Northbound	14,000	28,100	18,500	36,800	30,400

Table IV-16 – Evacuating Vehicles Entering Each County by Evacuation Route for the 2020 Base Scenario

Hillsborough County	EVAC A	EVAC B	EVAC C	EVAC D	EVAC E
SR 580 Eastbound	10,900	15,400	23,700	27,900	33,500
SR 60 Eastbound	6,100	6,600	8,300	9,800	10,900
I-275 Eastbound	53,300	61,400	68,300	81,900	71,900
US 41 Northbound	1,100	2,800	10,200	15,800	14,400
I-75 Northbound	38,400	44,300	52,400	65,600	72,800
US 301 Northbound	2,300	3,300	5,000	10,100	11,600
US 92 Eastbound	4,200	7,000	15,200	18,400	16,800
Manatee County					
I-275 Southbound	15,200	18,700	18,300	21,600	26,100
US 41 Northbound	700	800	2,900	900	1,500
US 301 Northbound	300	400	3,600	14,800	8,500
US 41 Southbound	1,500	1,800	2,300	2,300	2,800
I-75 Southbound	4,600	5,700	4,800	6,700	10,000
I-75 Northbound	22,400	28,100	38,200	39,200	42,700
US 301 Southbound	-	700	200	600	800
Pasco County					
Alt US 19 Northbound	2,000	1,800	1,500	1,500	1,900
SR 589 Northbound	27,700	32,200	54,100	60,800	64,300
US 41 Northbound	3,400	5,700	9,100	11,900	11,000
I-275 Northbound	28,500	32,400	35,700	41,300	35,300
I-75 Northbound	8,500	10,300	17,300	24,600	24,000
CR 581 Northbound	400	3,000	10,200	16,500	19,900
CR 579 Northbound	1,900	3,000	6,300	9,300	13,800
US 301 Northbound	4,400	7,900	8,300	10,100	10,500
US 19 Northbound	2,600	2,300	1,900	2,100	2,100
CR 611 Northbound	500	800	900	1,100	1,100
SR 597 Northbound	1,900	3,000	6,300	9,300	13,800
Pinellas County					
I-275 Northbound	4,500	6,600	14,000	15,900	13,900
Citrus County					
US 41 Northbound	4,100	4,100	8,600	25,000	18,600
US 19 Northbound	8,500	9,200	16,800	25,900	24,100
US 41 Southbound	300	400	400	300	400
US 19 Southbound	200	300	400	300	400
Hernando County					
US 19 Southbound	300	300	400	400	300
US 41 Southbound	100	100	100	200	200
I-75 Southbound	3,300	4,100	5,800	4,700	7,500
US 19 Northbound	11,700	14,100	21,800	32,200	32,600
US 41 Northbound	1,100	900	1,800	6,700	8,600
I-75 Northbound	15,400	16,200	18,300	35,100	37,200
US 301 Northbound	3,700	4,300	4,400	13,300	10,100
SR 589 Northbound	16,000	20,900	31,700	47,300	45,200

Clearance Times

Calculated clearance times are used by county emergency managers as one input to determine when to recommend an evacuation order. Clearance times for each of the base scenarios are summarized in **Table IV-17** and **IV-18**, as well as **Figures IV-11, IV-12,** and **IV-13**. Clearance time includes several components, including the mobilization time for the evacuating population to prepare for an evacuation (pack supplies and personal belongs, load their vehicle, etc.), the actual time spent traveling on the roadway network, and the delay time caused by traffic congestion.

In-county clearance times for the 2017 base scenarios range from 21 hours to 55.5 hours, depending upon the evacuation level. Citrus County has the highest in-county clearance time of 55.5 hours for the level E scenario due to the influence of trips evacuating from other counties within the region. Clearance times to shelter range from 13.5 to 47 hours in 2017.

In 2020, in-county clearance times for the base scenarios vary between 21.5 hours and 24.5 hours for the evacuation level A scenarios and range from 57 to 58 hours for the evacuation level E scenarios. Clearance time to shelter shows a similar pattern, with clearance times for the base scenarios ranging from 13.5 hours for the evacuation level A scenario in Manatee County to 57 hours for Manatee County for the evacuation level E scenario in 2020.

Out of county clearance times for the 2017 base scenarios range from 21 to 48 hours for Pinellas County and from 23.5 to 55.5 hours for Citrus County. In 2020, out of county clearance times range from 21.5 hours for the base evacuation level A scenario in Pinellas County to 58 hours in Pasco and Hernando counties for the evacuation level E scenario. Regional clearance times for the six-county TBRPC region range from 23.5 hours for evacuation level A to 55.5 hours for evacuation level E in 2017, and from 24.5 hours for evacuation level A to 58 hours for evacuation level E in 2020.

Table IV-17 – 2017 Clearance Times for Base Scenario

	Evacuation Level A	Evacuation Level B	Evacuation Level C	Evacuation Level D	Evacuation Level E
Clearance Time to Shelter					
Citrus	19.0	24.0	21.0	25.0	20.5
Hernando	14.5	15.0	16.0	19.5	21.0
Hillsborough	20.5	21.5	24.0	27.5	45.0
Manatee	13.5	14.0	23.5	43.5	47.0
Pasco	23.5	27.0	34.0	40.5	46.0
Pinellas	14.5	17.5	22.5	27.5	45.5
In-County Clearance Time					
Citrus	23.5	28.5	34.5	47.0	55.5
Hernando	23.0	27.0	34.0	45.5	49.5
Hillsborough	22.5	24.5	30.0	43.5	48.5
Manatee	21.5	23.5	30.5	43.5	47.5
Pasco	23.5	27.0	34.0	44.0	47.5
Pinellas	21.0	23.5	26.5	43.0	48.0
Out of County Clearance Time					
Citrus	23.5	28.5	34.5	47.0	55.5
Hernando	23.0	27.0	34.0	45.5	49.5
Hillsborough	22.5	24.5	30.0	43.5	48.5
Manatee	21.5	23.5	30.5	43.5	47.5
Pasco	23.5	27.0	34.0	44.0	47.5
Pinellas	21.0	23.5	26.5	43.0	48.0
Regional Clearance Time					
TBRPC	23.5	28.5	34.5	41.5	55.5

Table IV-18 – 2020 Clearance Times for Base Scenario

	Evacuation Level A	Evacuation Level B	Evacuation Level C	Evacuation Level D	Evacuation Level E
Clearance Time to Shelter					
Citrus	18.5	23.0	20.5	23.0	21.5
Hernando	14.0	15.0	16.5	19.0	22.0
Hillsborough	21.0	22.0	24.5	35.0	43.0
Manatee	13.5	15.0	27.5	45.0	57.0
Pasco	24.5	29.0	37.0	42.5	45.5
Pinellas	15.0	18.0	23.5	30.0	45.0
In-County Clearance Time					
Citrus	24.5	30.0	37.0	46.0	57.5
Hernando	24.5	29.0	37.0	46.0	58.0
Hillsborough	23.0	26.0	34.5	45.5	57.0
Manatee	22.0	25.0	30.5	45.0	57.0
Pasco	24.5	29.0	37.0	46.0	58.0
Pinellas	21.5	24.5	28.5	44.0	57.5
Out of County Clearance Time					
Citrus	24.5	30.0	37.0	46.0	57.5
Hernando	24.5	29.0	37.0	46.0	58.0
Hillsborough	23.0	26.0	34.5	45.5	57.0
Manatee	22.0	25.0	30.5	45.0	57.0
Pasco	24.5	29.0	37.0	46.0	58.0
Pinellas	21.5	24.5	28.5	44.0	57.5
Regional Clearance Time					
TBRPC	24.5	30.0	37.0	46.0	58.0

Figure IV-11 - Clearance Time to Shelter Base Scenarios

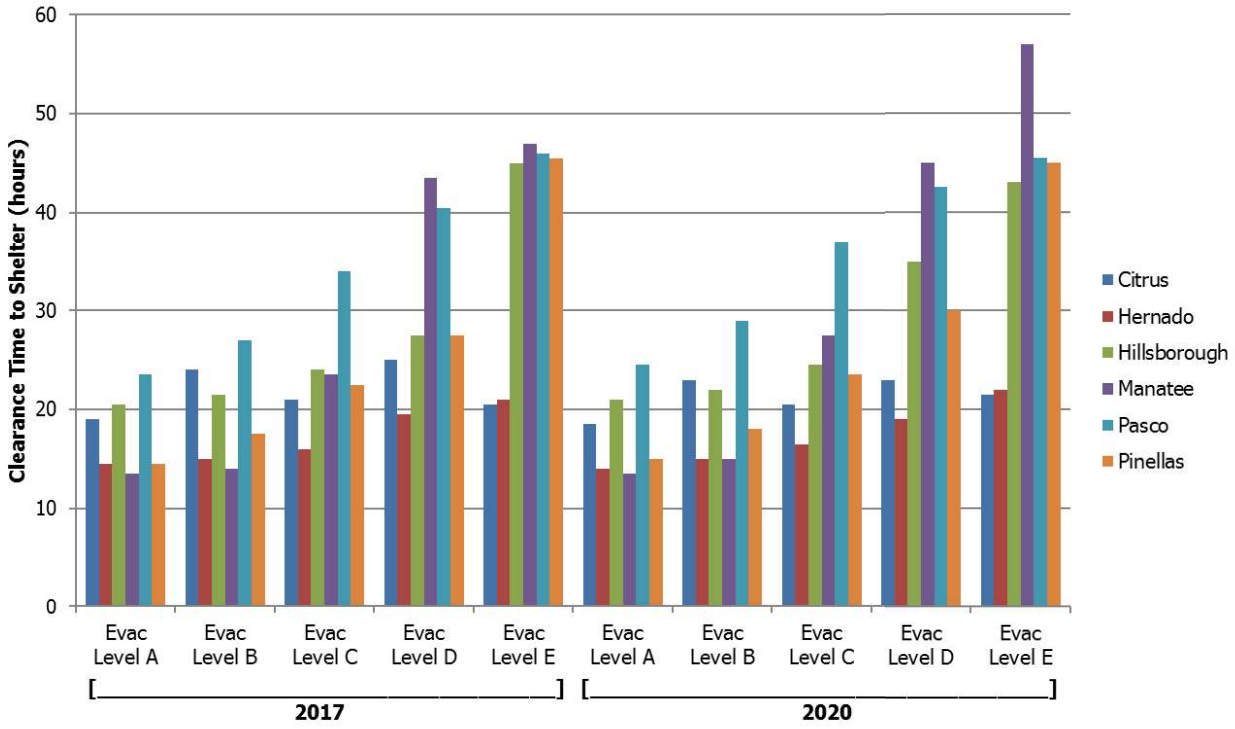


Figure IV-12 - In-County Clearance Times Base Scenarios

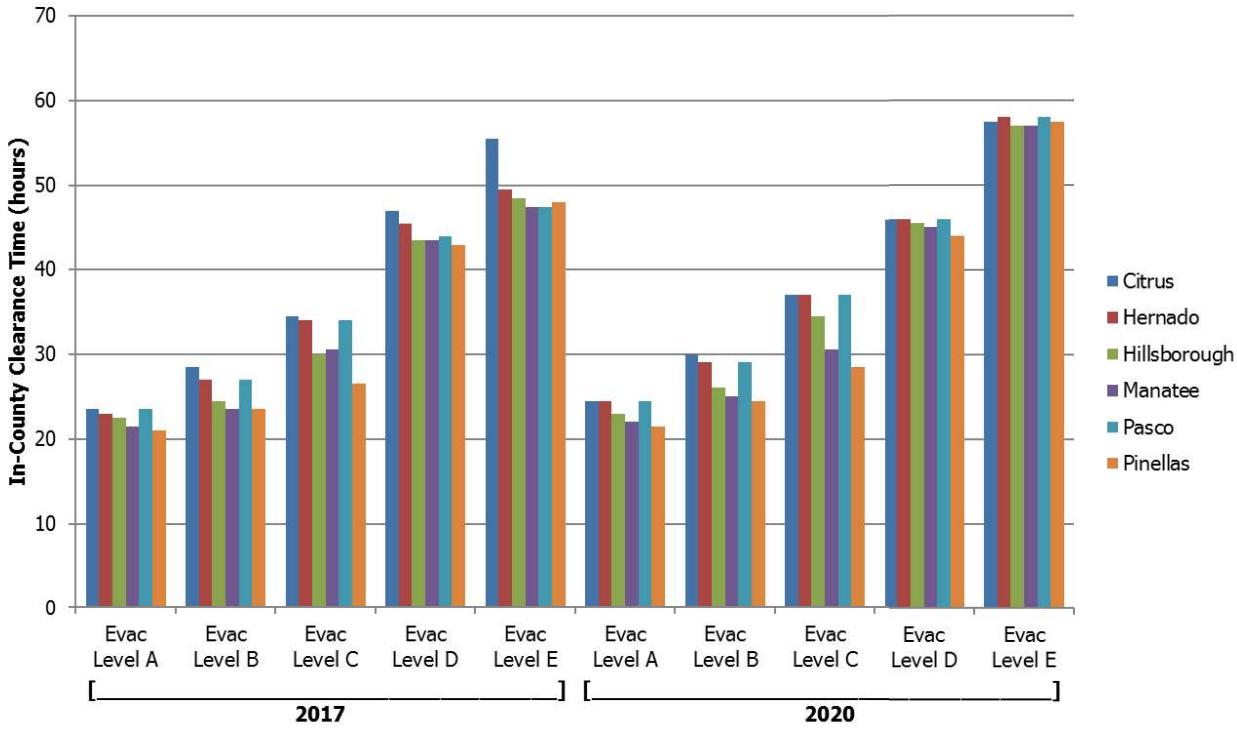
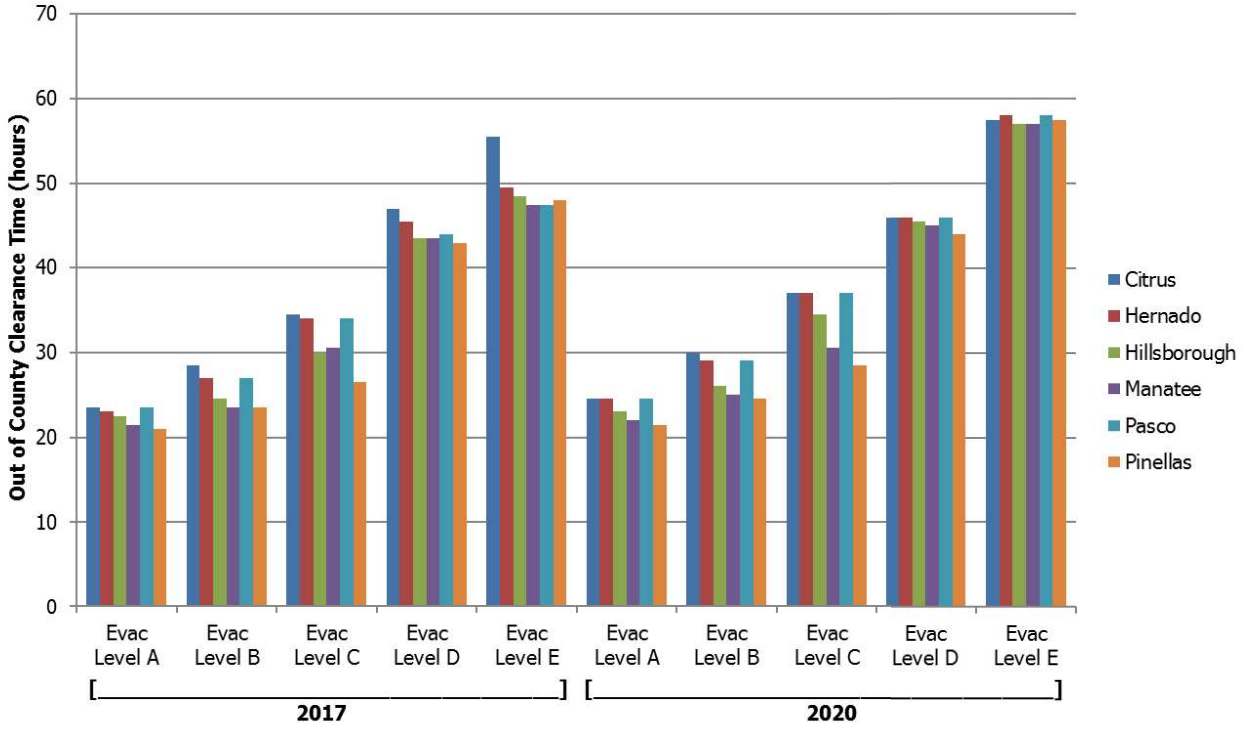


Figure IV-13 - Out of County Clearance Times Base Scenarios



F. Operational Scenarios

The transportation analysis also included ten region wide operational scenarios selected by the county emergency managers and RPC staff for the Tampa Bay Region. While the base scenarios required that the basic assumptions were consistent between scenarios except for the year and the evacuation level, this is not the case for the operational scenarios. The only requirement for each region is that two operational scenarios are developed for each evacuation level (two for Level A, two for Level B, etc.). Otherwise, the assumptions and characteristics between the ten operational scenarios can be different for each scenario.

The ten operational scenarios selected for analysis in the Tampa Bay Region are illustrated in **Table IV-19**. All ten operational scenarios used the planning assumptions rates, along with the summer session university population. In addition, each of the scenarios used a different response curve, with the level A evacuations using a 9-hour response curve, the level B evacuations using a 12-hour response curve and the level C evacuations using an 18-hour response curve. The level A, B, and C evacuation scenarios also assumed evacuations were ordered in nine counties (Citrus, Hernando, Hillsborough, Manatee, Pasco, Pinellas, Sarasota, Levy, and Charlotte), except for the level C evacuation for 2020, which also added shadow evacuations in Polk County.

The level D and level E evacuation scenarios both used a 24-hour response curve for all counties except Levy, which used an 18-hour response curve. A phased evacuation was simulated for Levy County for both the level D and E evacuation scenarios which started in hour 6 after the rest of the counties began evacuations. Thus, the 18-hour response curve was used for Levy County.

The level D and E evacuation scenarios assumed evacuations were ordered in nine counties (Citrus, Hernando, Hillsborough, Manatee, Pasco, Pinellas, Sarasota, Charlotte, and Levy). In addition, the level D and E evacuation scenarios included an assumption that the Skyway Bridge (I-275) was closed at hour 18 due to the arrival of tropical storm force winds. The level D and E evacuation scenarios also included a test of the one-way operation of both I-4 and I-75 during the 2020 time period.

(Table follows this page)

Table IV-19 – Operational Scenarios

	Scenario 1 Level A 2017	Scenario 2 Level B 2017	Scenario 3 Level C 2017	Scenario 4 Level D 2017	Scenario 5 Level E 2017
Demographic Data	2015	2015	2015	2015	2015
Highway Network	2015	2015	2015	2015 and Skyway Bridge closes at hour 18	2015 and Skyway Bridge closes at hour 18
One-Way Operations	None	None	None	None	None
University Population	Summer	Summer	Summer	Summer	Summer
Tourist Rate	Default	Default	Default	Default	Default
Shelters Open	Primary	Primary	Primary	Primary	Primary
Response Curve	9-hour	12-hour	18-hour	24-hour except Levy 18-hour	24-hour except Levy 18-hour
Evacuation Phasing	None	None	None	1hr – Levy starts in hour 6	1hr – Levy starts in hour 6
Behavioral Response	Planning	Planning	Planning	Planning	Planning
Evacuation Zone	A	B	C	D	E
Counties Evacuating	Citrus Hernando Hillsborough Manatee Pasco Pinellas Sarasota Charlotte Levy	Citrus Hernando Hillsborough Manatee Pasco Pinellas Sarasota Charlotte Levy	Citrus Hernando Hillsborough Manatee Pasco Pinellas Sarasota Charlotte Levy	Citrus Hernando Hillsborough Manatee Pasco Pinellas Sarasota Charlotte Levy	Citrus Hernando Hillsborough Manatee Pasco Pinellas Sarasota Charlotte Levy
	Scenario 6 Level A 2020	**Scenario 7 Level B 2020**	**Scenario 8 Level C 2020**	**Scenario 9 Level D 2020**	**Scenario 10 Level E 2020**
Demographic Data	2020	2020	2020	2020	2020
Highway Network	2020	2020	2020	2020 and Skyway Bridge closes at hour 18	2020 and Skyway Bridge closes at hour 18
One-Way Operations	None	None	None	Yes, I-4 & I-75	Yes, I-4 & I-75
University Population	Summer	Summer	Summer	Summer	Summer
Tourist Rate	Default	Default	Default	Default	Default
Shelters Open	Primary	Primary	Primary	Primary	Primary
Response Curve	9-hour	12-hour	18-hour	24-hour except Levy 18-hour	24-hour except Levy 18-hour
Evacuation Phasing	None	None	None	1hr – Levy starts in hour 6	1hr – Levy starts in hour 6
Behavioral Response	Planning	Planning	Planning	Planning	Planning
Evacuation Zone	A	B	C	D	E
Counties Evacuating	Citrus Hernando Hillsborough Manatee Pasco Pinellas Sarasota Charlotte Levy	Citrus Hernando Hillsborough Manatee Pasco Pinellas Sarasota Charlotte Levy	Citrus Hernando Hillsborough Manatee Pasco Pinellas Sarasota Charlotte Levy Polk	Citrus Hernando Hillsborough Manatee Pasco Pinellas Sarasota Charlotte Levy	Citrus Hernando Hillsborough Manatee Pasco Pinellas Sarasota Charlotte Levy

G. Operational Scenario Results

Each of the ten operational scenarios were modeled for the Tampa Bay Region using the regional evacuation model. Results were derived from the model to summarize the evacuating population, evacuating vehicles, clearance times, and critical congested roadways. The results are discussed in the following sections.

Evacuating Population

Similar to the base scenarios, the evacuating population was estimated for the six-county region. Evacuating population for the operational scenarios is summarized by county for 2017 in **Table IV-20** and for 2020 in **Table IV-21**.

Within the six-county region, total evacuating population ranges from more than 734,000 persons for the operational scenario level A evacuation to more than 2.04 million persons for the operational scenario level E evacuation in 2020. By 2020, this total evacuating population increases within the six counties to more than 775,000 persons for the operational scenario level A evacuation and nearly 2.18 million persons for the operational scenario level E evacuation.

Evacuating Vehicles

From a transportation standpoint, the number of evacuating vehicles is more important than the evacuating population. Evacuating vehicles for the operational scenarios are summarized by county for 2017 in **Table IV-22** and for 2020 in **Table IV-23**.

The total number of evacuating vehicles within the six-county region for the operational scenarios also varies by evacuation level. A total of nearly 419,000 vehicles evacuate from the six-county region for the operational scenario level A evacuation in 2017, and this number increases to more than 1.11 million evacuating vehicles from the six-county region for the operational scenario level E evacuation in 2017. By 2020, the number of evacuating vehicles is expected to increase to nearly 441,000 vehicles for the operational scenario level A evacuation to nearly 1.18 million evacuating vehicles for the operational scenario level E evacuation.

Shelter Demand

Shelter demand estimates by county are summarized for each of the operational scenarios in **Table IV-24**. Shelter demand is the population in each county who will seek public shelter during their evacuation, either at an in-county shelter or an out of county shelter.

Public shelter demand in the six-county region ranges from more than 60,000 persons for the operational scenario level A evacuation in 2017 to nearly 176,000 persons for the operational scenario level E evacuation. By 2020, the public shelter demand is expected to increase to more than 63,000 persons for the level A evacuation and nearly 187,000 persons for the level E evacuation.

Table IV-20 – Evacuating Population by Operational Scenario for 2017

	Evacuation Level A Operational Scenario	Evacuation Level B Operational Scenario	Evacuation Level C Operational Scenario	Evacuation Level D Operational Scenario	Evacuation Level E Operational Scenario
Citrus County					
Site-built Homes	18,826	21,751	29,100	43,808	53,208
Mobile/Manuf. Homes	19,918	22,926	25,990	29,124	33,440
Tourists	1,404	1,642	1,642	1,864	1,888
TOTAL	40,148	46,319	56,732	74,796	88,536
Hernando County					
Site-built Homes	18,554	19,652	30,329	63,195	76,217
Mobile/Manuf. Homes	13,969	15,156	17,887	23,879	25,551
Tourists	198	468	468	637	1,240
TOTAL	32,721	35,276	48,684	87,711	103,088
Hillsborough County					
Site-built Homes	176,896	212,940	324,448	464,764	626,171
Mobile/Manuf. Homes	54,144	61,321	67,512	76,413	81,199
Tourists	8,873	15,957	17,169	18,677	21,708
TOTAL	239,913	290,218	409,129	559,854	729,078
Manatee County					
Site-built Homes	54,483	71,072	114,725	172,856	208,984
Mobile/Manuf. Homes	32,909	35,242	38,562	40,895	42,665
Tourists	10,935	11,263	14,930	23,747	24,590
TOTAL	98,327	117,577	168,217	237,498	276,239
Pasco County					
Site-built Homes	63,246	78,317	144,817	181,657	222,054
Mobile/Manuf. Homes	36,669	41,854	47,149	48,022	52,605
Tourists	298	749	1,164	1,165	1,165
TOTAL	100,213	120,920	193,130	230,844	275,824
Pinellas County					
Site-built Homes	170,665	212,321	314,295	403,682	503,690
Mobile/Manuf. Homes	36,319	38,360	43,191	46,777	48,400
Tourists	15,892	18,490	19,342	19,711	20,134
TOTAL	222,876	269,171	376,828	470,170	572,224

Table IV-21 – Evacuating Population by Operational Scenario for 2020

	Evacuation Level A Operational Scenario	Evacuation Level B Operational Scenario	Evacuation Level C Operational Scenario	Evacuation Level D Operational Scenario	Evacuation Level E Operational Scenario
Citrus County					
Site-built Homes	20,193	23,331	31,213	46,988	57,071
Mobile/Manuf. Homes	21,400	24,631	27,923	31,290	35,927
Tourists	1,442	1,680	1,680	1,909	1,933
TOTAL	43,035	49,642	60,816	80,187	94,931
Hernando County					
Site-built Homes	20,477	21,693	33,470	69,718	84,077
Mobile/Manuf. Homes	15,408	16,716	19,729	26,339	28,183
Tourists	198	468	468	637	1,245
TOTAL	36,083	38,877	53,667	96,694	113,505
Hillsborough County					
Site-built Homes	191,307	230,474	351,866	505,022	679,451
Mobile/Manuf. Homes	54,308	61,502	67,711	76,636	81,451
Tourists	9,889	18,185	19,563	21,217	24,624
TOTAL	255,504	310,161	439,140	602,875	785,511
Manatee County					
Site-built Homes	56,958	74,437	120,312	181,611	219,722
Mobile/Manuf. Homes	32,455	34,736	38,034	40,336	42,082
Tourists	11,538	11,884	15,787	25,177	26,071
TOTAL	100,951	121,077	174,133	247,124	287,875
Pasco County					
Site-built Homes	69,340	85,356	157,953	198,307	243,302
Mobile/Manuf. Homes	36,663	41,847	47,142	48,015	52,597
Tourists	416	955	1,462	1,464	1,464
TOTAL	106,419	128,158	206,557	247,786	297,363
Pinellas County					
Site-built Homes	178,528	222,133	329,665	423,363	528,227
Mobile/Manuf. Homes	36,906	38,978	43,886	47,531	49,179
Tourists	18,033	20,728	21,616	22,116	22,607
TOTAL	233,467	281,839	395,167	493,010	600,013

Table IV-22 – Evacuating Vehicles by Operational Scenario for 2017

	Evacuation Level A Operational Scenario	Evacuation Level B Operational Scenario	Evacuation Level C Operational Scenario	Evacuation Level D Operational Scenario	Evacuation Level E Operational Scenario
Citrus County					
Site-built Homes	11,196	12,997	17,290	25,803	31,158
Mobile/Manuf. Homes	12,020	13,834	15,678	17,581	20,168
Tourists	638	746	746	847	858
TOTAL	23,854	27,577	33,714	44,231	52,184
Hernando County					
Site-built Homes	10,160	10,852	16,650	34,461	41,296
Mobile/Manuf. Homes	8,257	8,952	10,548	14,002	14,985
Tourists	90	213	213	290	564
TOTAL	18,507	20,017	27,411	48,753	56,845
Hillsborough County					
Site-built Homes	91,491	110,239	166,846	236,172	316,526
Mobile/Manuf. Homes	28,586	32,423	3,715	40,418	42,955
Tourists	3,361	6,024	6,714	7,537	8,991
TOTAL	123,438	148,686	209,275	284,127	368,472
Manatee County					
Site-built Homes	27,205	35,203	55,854	83,698	101,398
Mobile/Manuf. Homes	18,798	20,139	55,007	23,347	24,374
Tourists	4,111	4,234	5,613	8,927	9,244
TOTAL	50,114	59,576	83,474	115,972	135,016
Pasco County					
Site-built Homes	36,106	44,796	81,777	101,960	124,504
Mobile/Manuf. Homes	28,134	32,068	36,095	36,799	40,252
Tourists	210	415	608	609	609
TOTAL	64,450	77,279	118,480	139,368	165,365
Pinellas County					
Site-built Homes	99,702	123,537	178,274	226,708	280,393
Mobile/Manuf. Homes	33,113	34,956	39,350	42,635	44,096
Tourists	6,030	7,133	7,652	7,827	8,020
TOTAL	138,845	165,626	225,276	277,170	332,509

Table IV-23 – Evacuating Vehicles by Operational Scenario for 2020

	Evacuation Level A Operational Scenario	Evacuation Level B Operational Scenario	Evacuation Level C Operational Scenario	Evacuation Level D Operational Scenario	Evacuation Level E Operational Scenario
Citrus County					
Site-built Homes	12,011	13,943	18,549	27,683	33,426
Mobile/Manuf. Homes	12,906	14,852	16,833	18,875	21,653
Tourists	655	763	763	868	878
TOTAL	25,572	29,558	36,145	47,426	55,957
Hernando County					
Site-built Homes	11,212	11,979	18,373	38,015	45,550
Mobile/Manuf. Homes	9,099	9,865	11,624	15,429	16,513
Tourists	90	213	213	290	566
TOTAL	20,401	22,057	30,210	53,734	62,629
Hillsborough County					
Site-built Homes	98,686	119,017	180,371	256,063	342,650
Mobile/Manuf. Homes	28,686	32,533	35,836	40,553	43,099
Tourists	3,740	6,835	7,820	8,953	10,861
TOTAL	131,112	158,385	224,027	305,569	396,610
Manatee County					
Site-built Homes	28,270	36,674	58,313	87,614	106,238
Mobile/Manuf. Homes	18,719	20,055	21,923	23,260	24,288
Tourists	4,305	4,434	5,890	9,394	9,728
TOTAL	51,294	61,163	86,126	120,268	140,254
Pasco County					
Site-built Homes	39,621	48,848	89,126	110,875	136,025
Mobile/Manuf. Homes	28,130	32,064	36,091	36,794	40,247
Tourists	352	324	889	890	890
TOTAL	68,103	81,356	126,106	148,559	177,162
Pinellas County					
Site-built Homes	103,923	128,784	186,287	236,923	292,977
Mobile/Manuf. Homes	33,641	35,511	39,975	43,314	44,796
Tourists	6,840	8,100	8,831	9,090	9,344
TOTAL	144,404	172,395	235,093	289,327	347,117

Table IV-24 – Shelter Demand by Operational Scenario

	Evacuation Level A Operational Scenario	Evacuation Level B Operational Scenario	Evacuation Level C Operational Scenario	Evacuation Level D Operational Scenario	Evacuation Level E Operational Scenario
2017					
Citrus	3,494	3,875	5,794	10,604	12,684
Hernando	3,755	4,034	5,392	9,153	10,625
Hillsborough	15,954	18,620	26,844	41,854	59,243
Manatee	7,576	9,252	12,909	18,513	21,802
Pasco	12,317	14,190	21,429	24,858	29,409
Pinellas	17,248	20,095	27,473	34,210	42,084
2020					
Citrus	3,748	4,156	6,216	11,378	13,607
Hernando	4,138	4,443	5,946	10,090	11,707
Hillsborough	16,931	19,817	28,714	45,046	63,779
Manatee	7,742	9,492	13,324	19,205	22,664
Pasco	12,852	14,778	22,594	26,285	31,285
Pinellas	17,873	20,844	28,577	35,611	43,827

Note: Shelter demand is the population in each county who will seek public shelter during their evacuation, either at an in-county shelter or an out of county shelter.

Congested Roadways

A summary of the total number of evacuating vehicles for each of the operational scenarios is presented in **Table IV-25**. It is important to note that the total number of evacuating vehicles in the table below includes vehicles evacuating from all of the counties included in the operational scenario, as identified in Table IV-19. All of the operational scenarios include nine counties (Citrus, Hernando, Hillsborough, Manatee, Pasco, Pinellas, Sarasota, Charlotte, and Levy) except for the operational scenario for evacuation level C in 2020, with also includes shadow evacuees from Polk County.

Table IV-25 – Total Evacuating Vehicles for Operational Scenarios

	Evacuation Level A Operational Scenario	Evacuation Level B Operational Scenario	Evacuation Level C Operational Scenario	Evacuation Level D Operational Scenario	Evacuation Level E Operational Scenario
2017	504,121	611,090	860,704	1,130,144	1,370,506
2020	534,042	648,904	1,004,424	1,207,445	1,465,044

As with the base scenarios, critical roadways were identified by reviewing roadways in the model network that have the highest vehicle queues for extended periods of time during an evacuation. Due to the nature of a major evacuation in general, nearly all roadway facilities will have extended vehicle queues at some point during the evacuation process. The point of this analysis is to identify those roadway facilities that have vehicle queues for the longest time periods during each of the evacuation scenarios. Critical roadway segments for the Tampa Bay Region are identified in **Figures IV-14** through **IV-23** for each of the operational scenarios for 2017 and 2020.

I-75, I-4, and portions of I-275 are critical facilities for the operational scenarios as well. Like the base scenarios, the roadway segments with the highest vehicle queues during the level A evacuation scenarios are primarily located in the northern part of the six-county region, including portions of State Road 52 in Pasco County, I-75 in Hernando County, and U.S Highway 41 in Citrus County. In contrast, for the level E evacuation scenarios, the roadway segments with the highest vehicle queues extend throughout the region, including I-75 in Hillsborough, Pasco, and Hernando Counties, I-4 throughout Hillsborough county, and several US and State Highways as well.

Evacuating vehicles exiting each county by major evacuation route are identified in **Table IV-26** for 2017 and **Table IV-27** for 2020. In addition, evacuating vehicles entering each county by major evacuation route are identified in **Table IV-28** for 2017 and **Table IV-29** for 2020. Detailed volume figures for all evacuation routes in the Tampa Bay Region for each operational scenario are included in Volume 5-8.

The number of vehicles entering and exiting each county during an evacuation varies widely depending upon the scenario, roadway, and county. As expected, major interstates and state highways generally carry larger volumes of evacuating traffic. The vehicle flows into and out of each county also generally follow the same pattern as the critical segment figures, as locations with higher queues and congestion generally have higher traffic volumes.

Figure IV-14

Critical Roadway Segments with Excessive Vehicle Queues for 2017 Operational Scenario Evacuation Level A

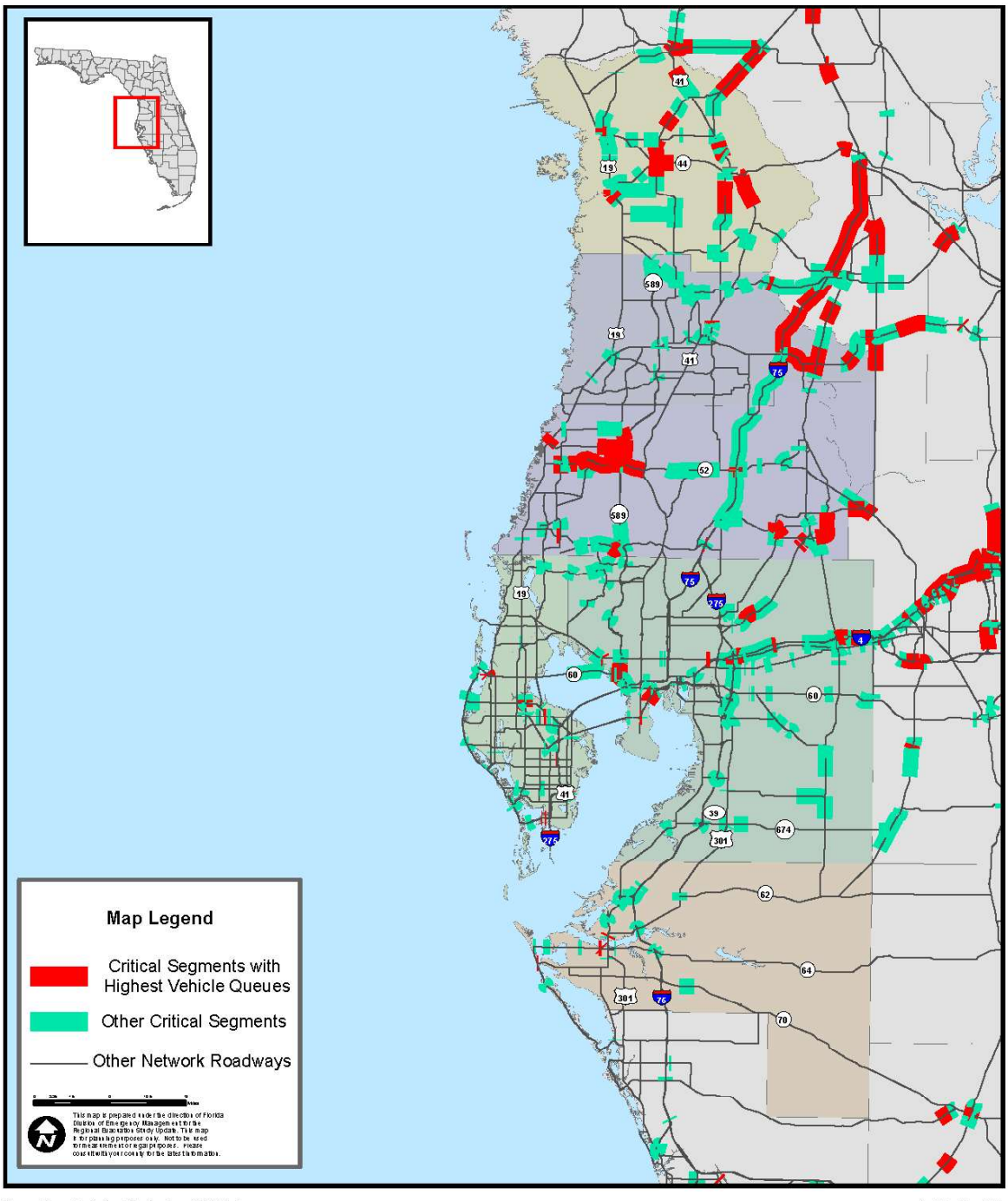
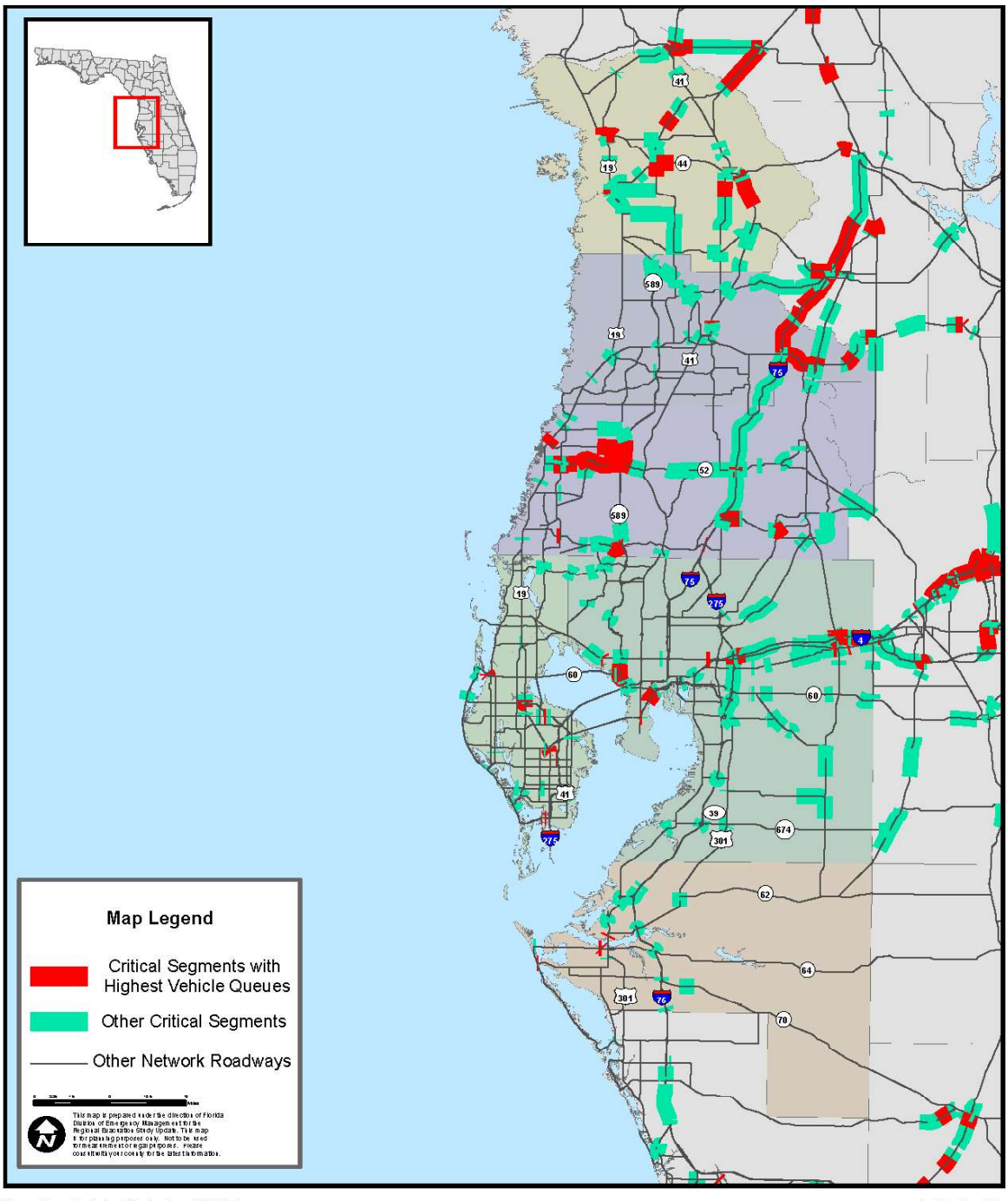


Figure IV-15

Critical Roadway Segments with Excessive Vehicle Queues for 2017 Operational Scenario Evacuation Level B



Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

Figure IV-16

Critical Roadway Segments with Excessive Vehicle Queues for 2017 Operational Scenario Evacuation Level C

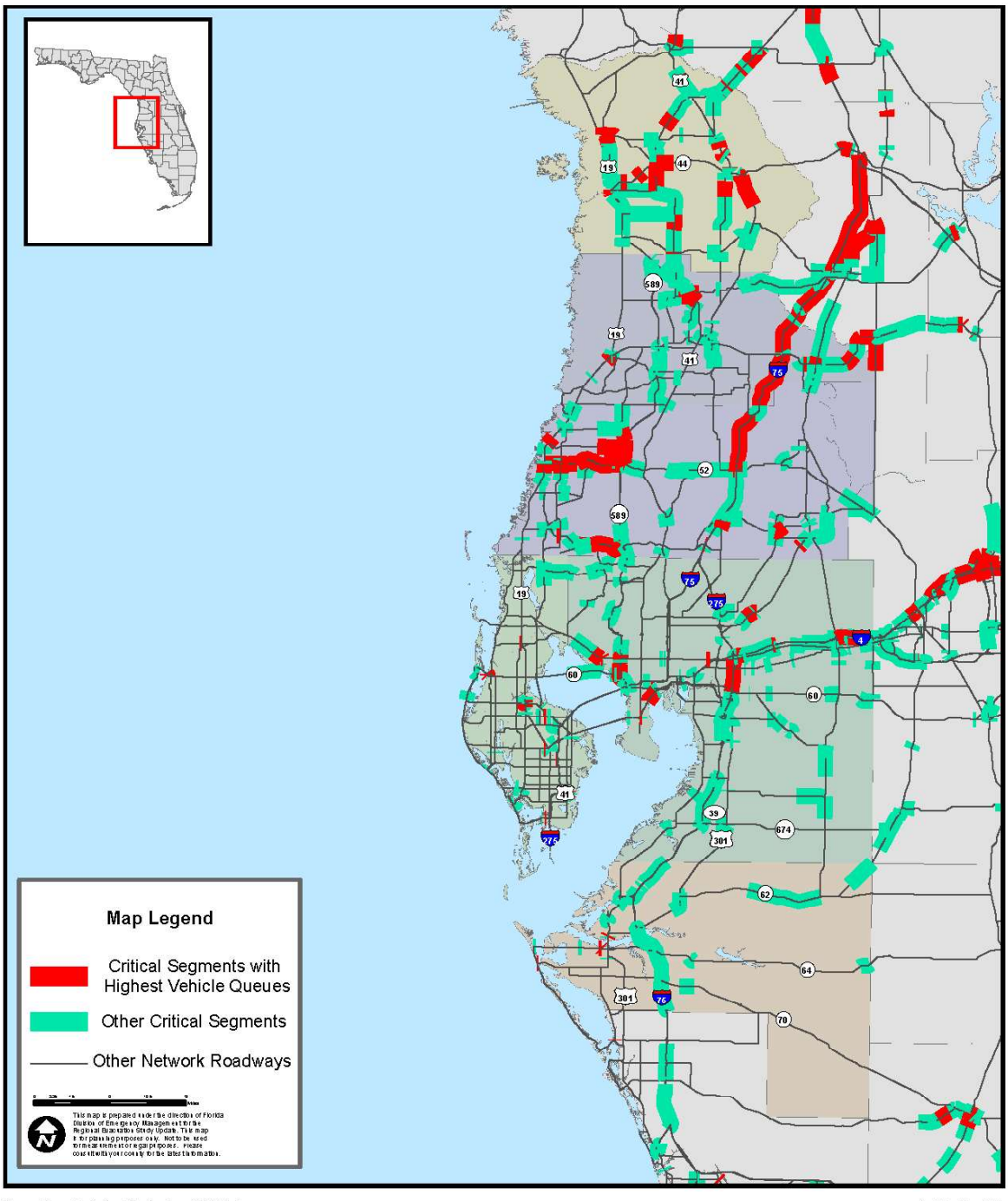
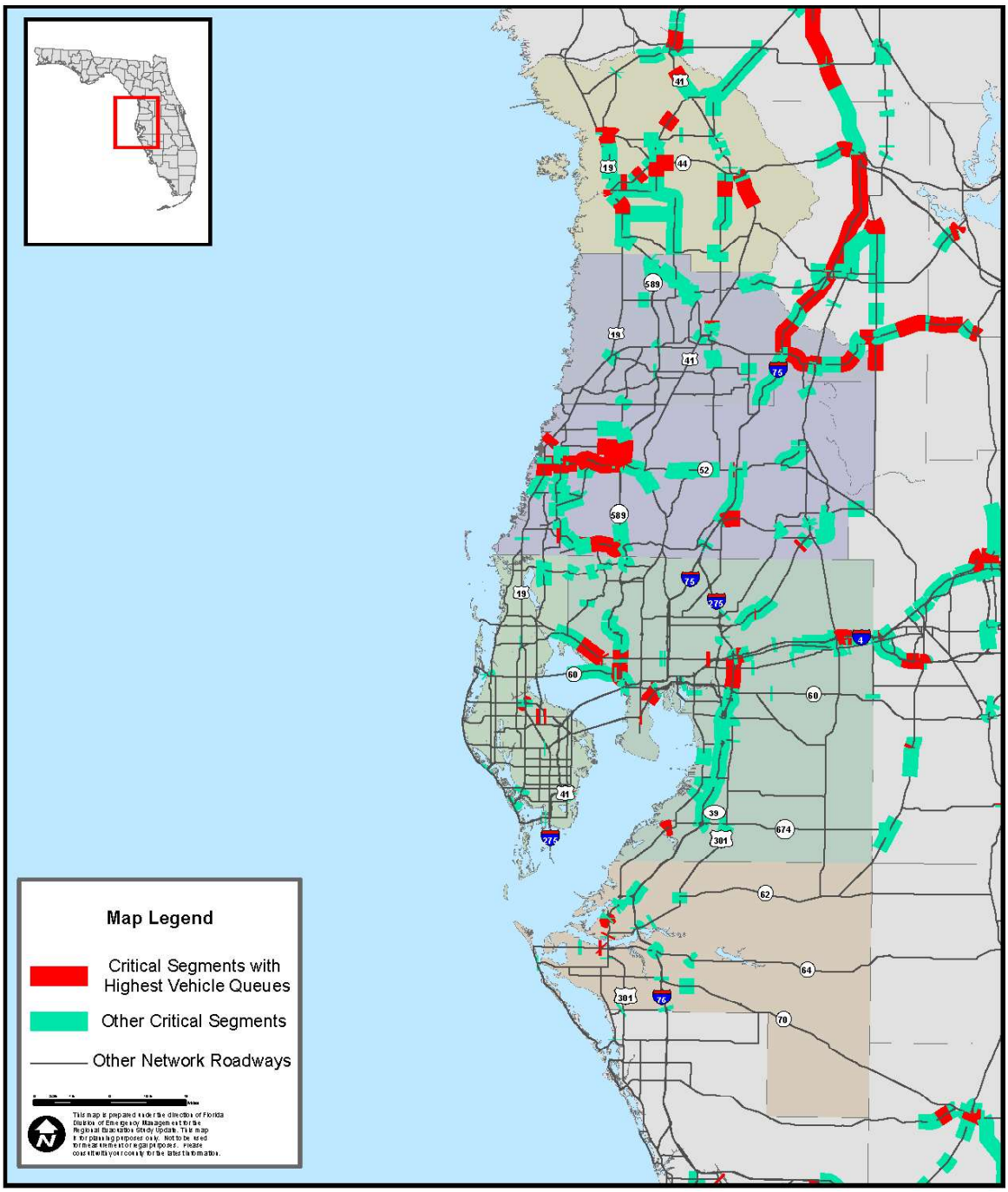


Figure IV-17

Critical Roadway Segments with Excessive Vehicle Queues for 2017 Operational Scenario Evacuation Level D

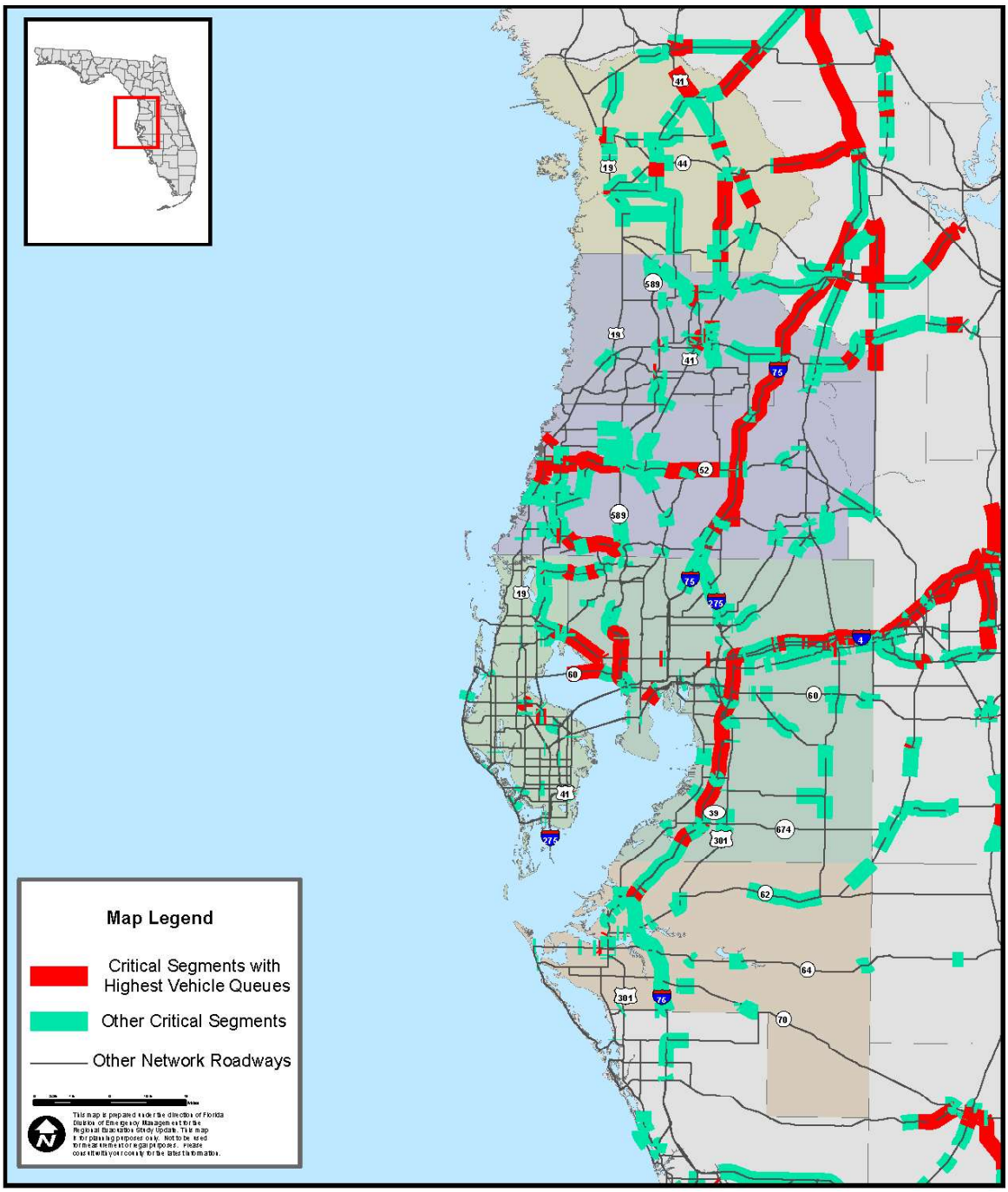


Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

Figure IV-18

Critical Roadway Segments with Excessive Vehicle Queues for 2017 Operational Scenario Evacuation Level E

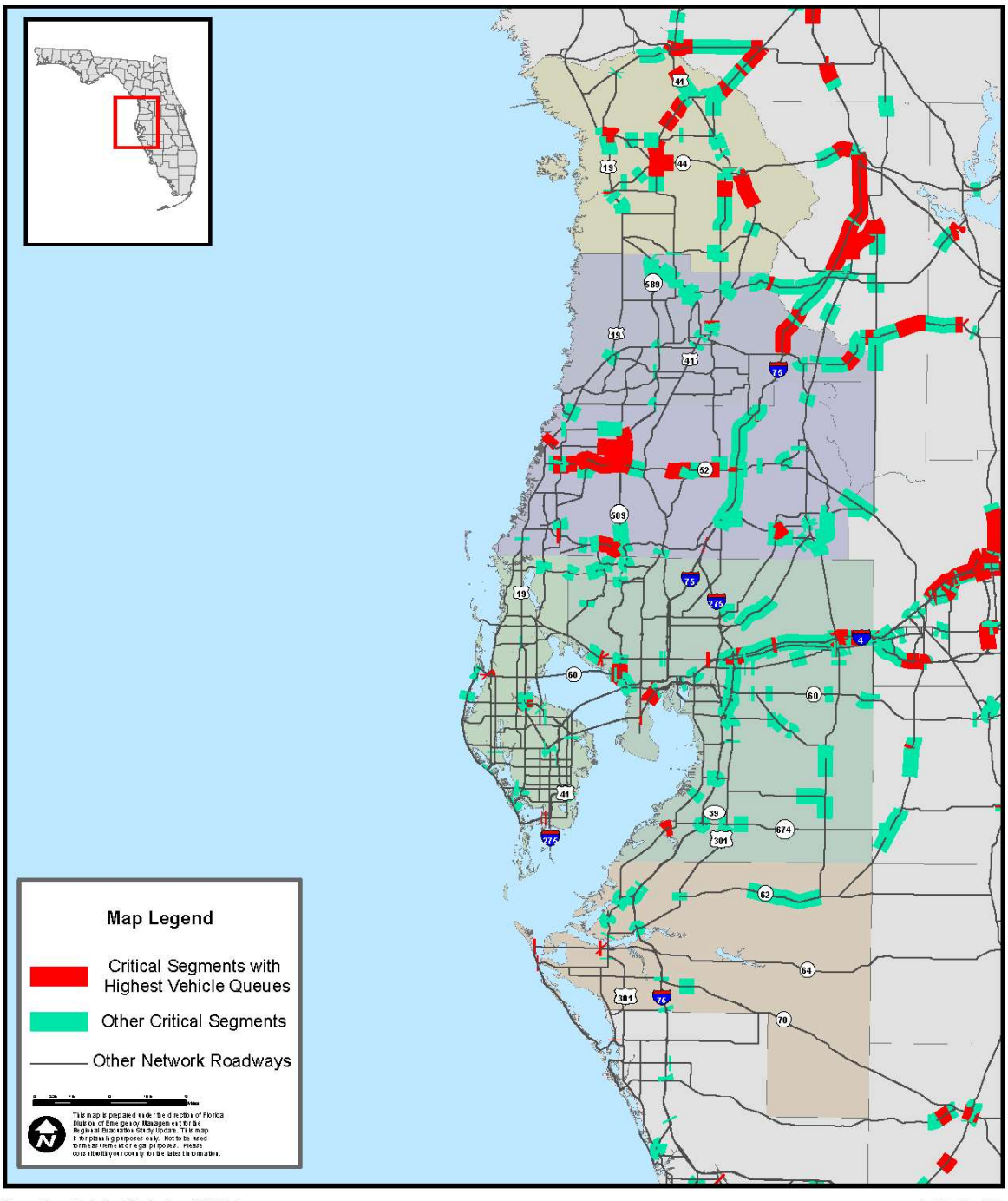


Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

Figure IV-19

Critical Roadway Segments with Excessive Vehicle Queues for 2020 Operational Scenario Evacuation Level A

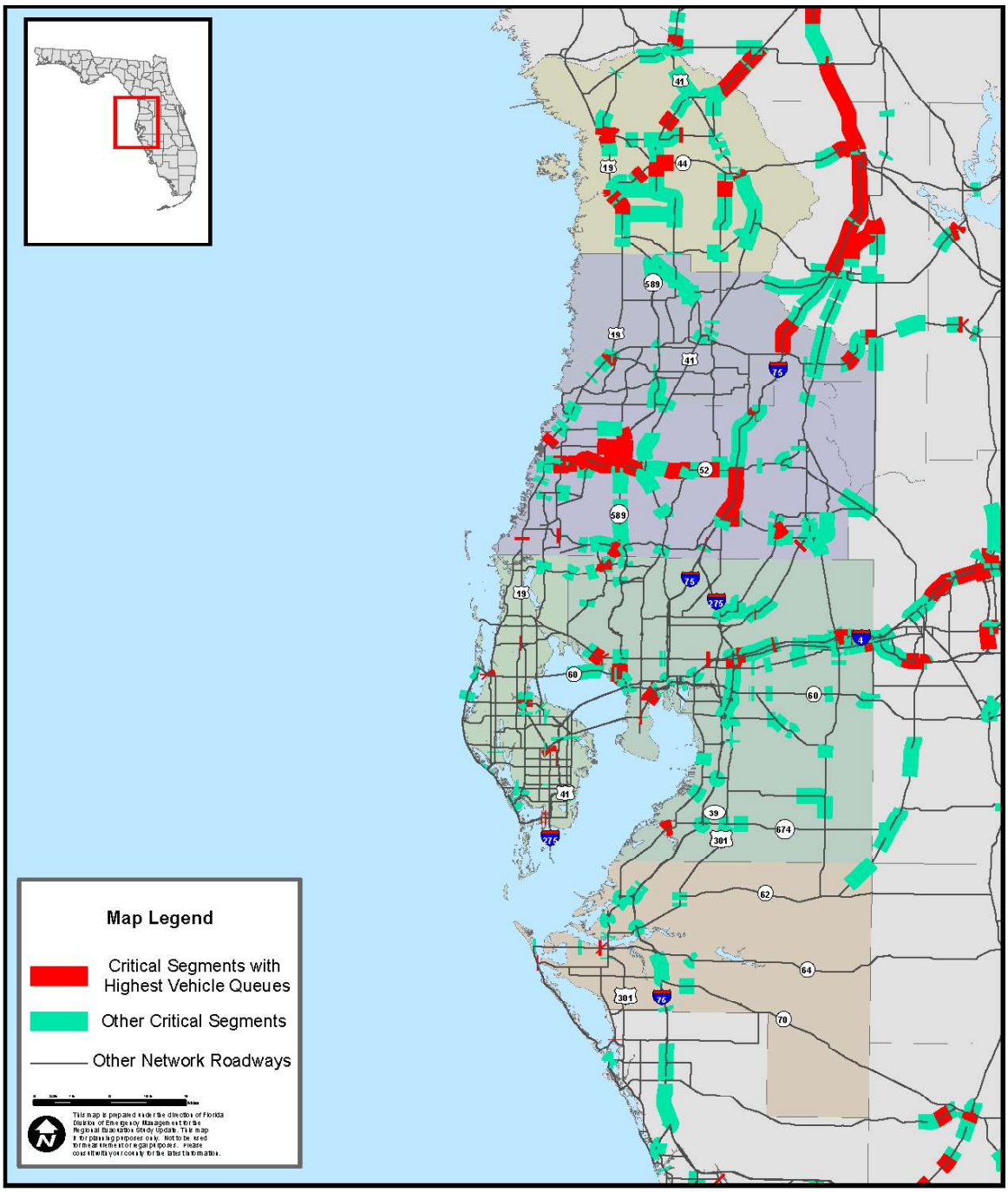


Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

Figure IV-20

Critical Roadway Segments with Excessive Vehicle Queues for 2020 Operational Scenario Evacuation Level B

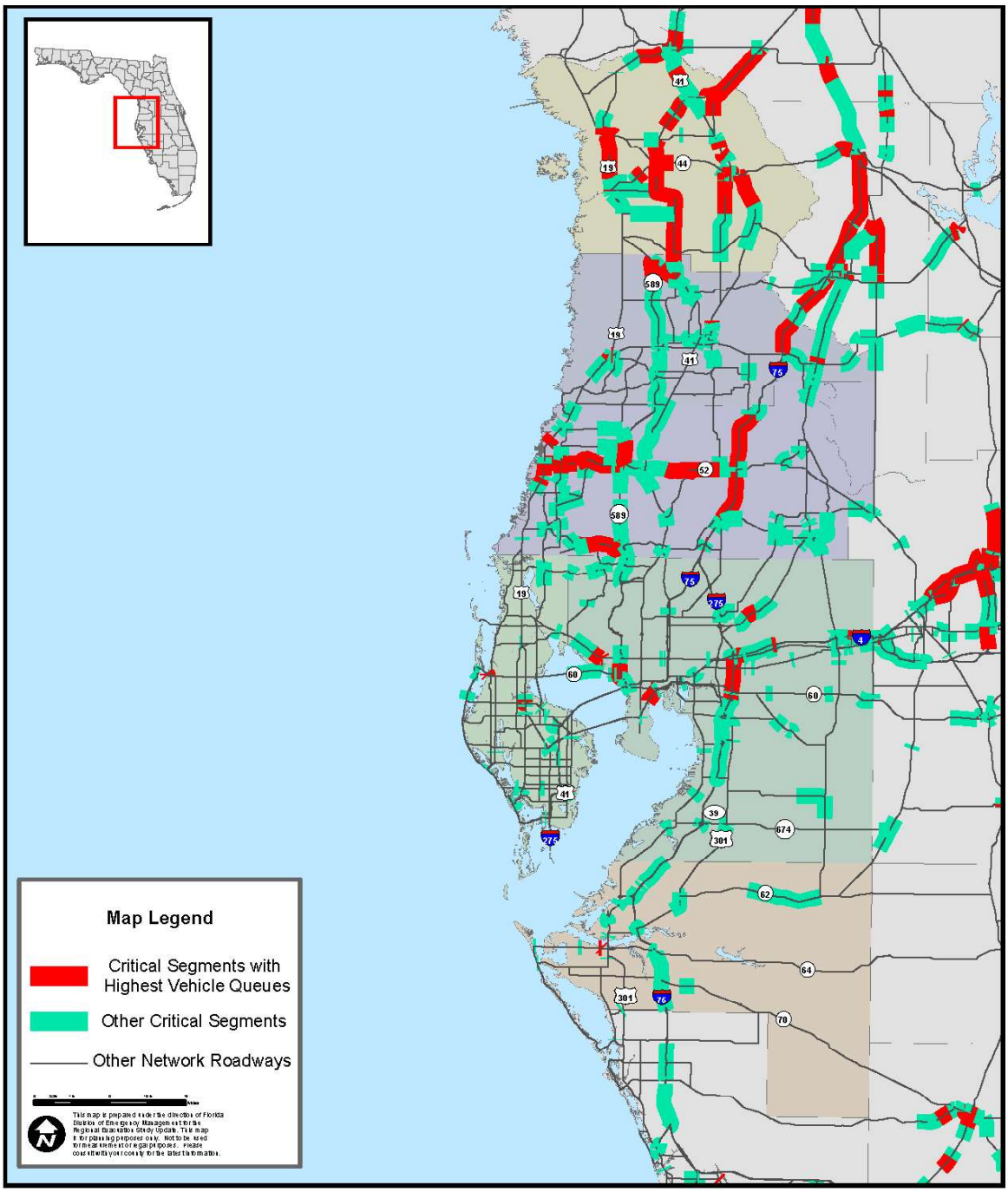


Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

Figure IV-21

Critical Roadway Segments with Excessive Vehicle Queues for 2020 Operational Scenario Evacuation Level C

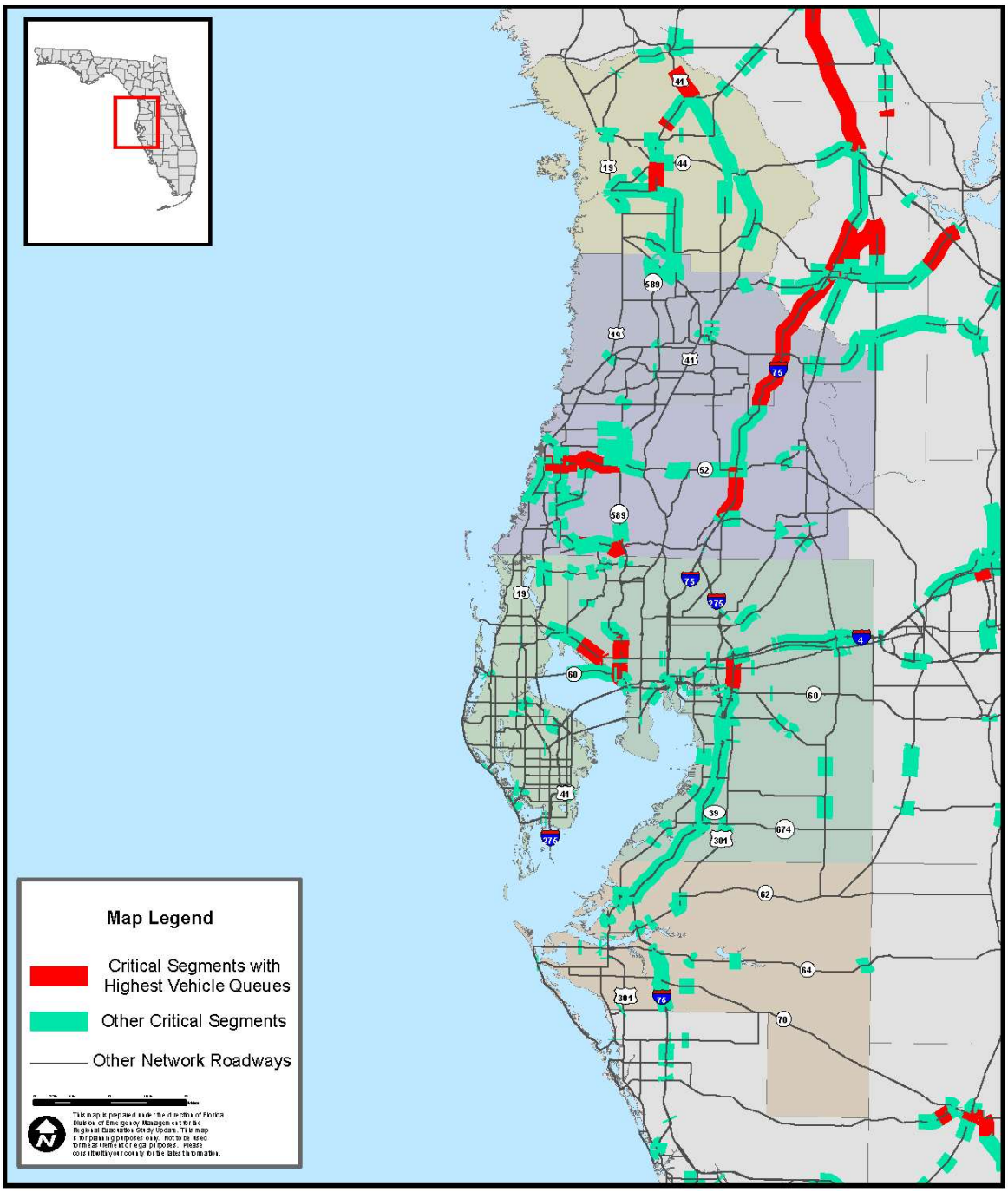


Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

Figure IV-22

Critical Roadway Segments with Excessive Vehicle Queues for 2020 Operational Scenario Evacuation Level D

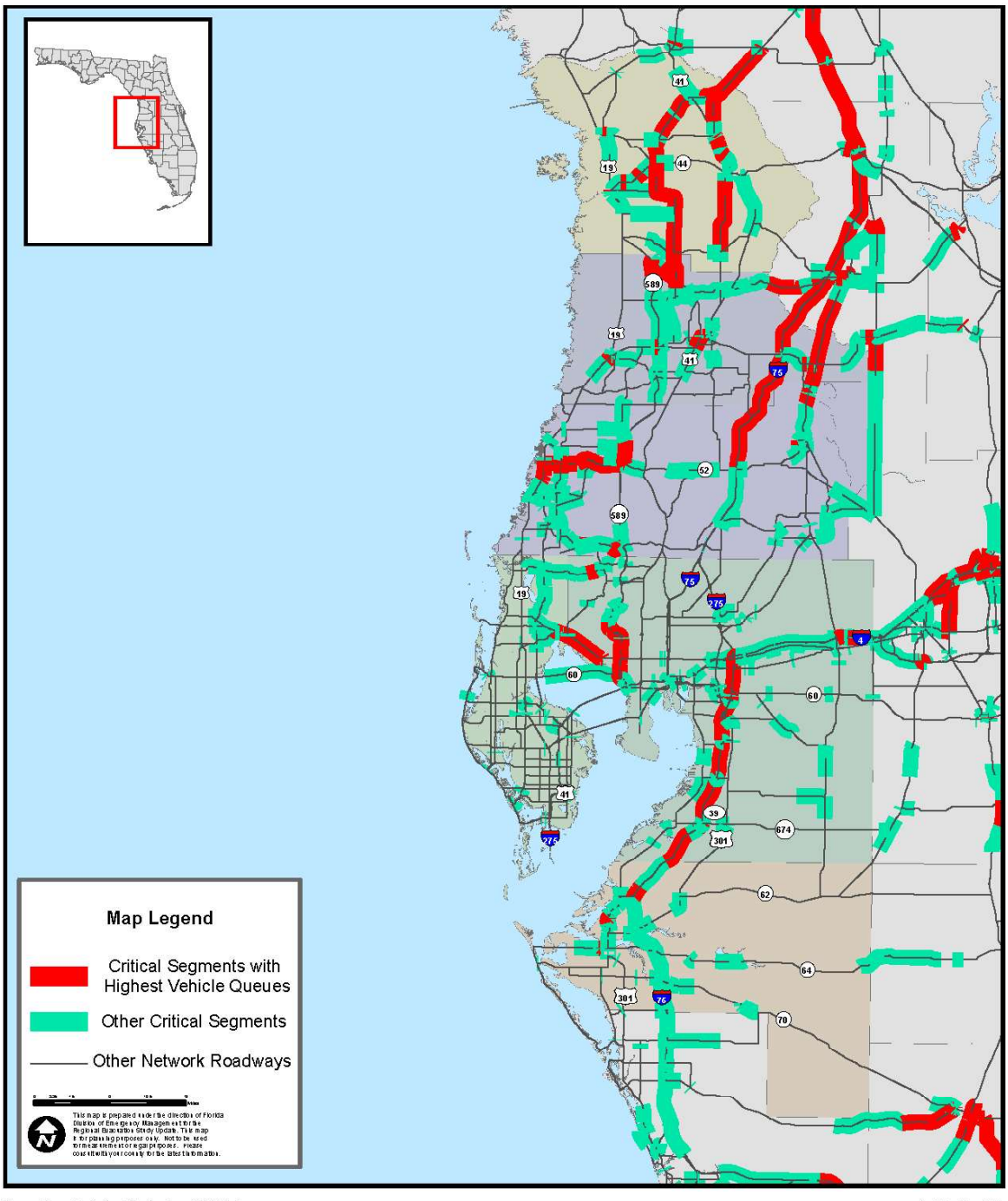


Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

Figure IV-23

Critical Roadway Segments with Excessive Vehicle Queues for 2020 Operational Scenario Evacuation Level E



Sources: Tampa Bay Regional Planning Council, CDM Smith

Map Printed: June, 2017

Table IV-26 – Evacuating Vehicles Leaving Each County by Evacuation Route for the 2017 Operational Scenarios

Hillsborough County	EVAC A	EVAC B	EVAC C	EVAC D	EVAC E
SR 589 Northbound	19,200	24,300	41,900	63,800	74,900
US 41 Northbound	300	1,000	3,200	5,900	9,900
I-75 Southbound	2,300	3,400	4,900	14,400	15,000
I-275 Northbound	19,800	24,800	33,800	49,300	47,100
I-75 Northbound	7,700	11,500	17,200	30,100	36,200
US 301 Northbound	4,200	4,800	7,700	12,400	12,400
SR 60 Eastbound	4,500	5,600	8,100	11,000	13,400
SR 674 Eastbound	1,400	2,500	2,100	4,000	5,200
I-4 Eastbound	50,100	64,200	96,700	137,700	154,500
SR 92 Eastbound	3,500	4,600	5,000	7,800	13,300
SR 597 Northbound	7,100	10,600	13,200	19,300	21,700
Manatee County					
I-275 Northbound	4,000	4,400	10,800	1,500	2,500
US 41 Southbound	800	1,000	1,600	3,900	6,800
US 41 Northbound	300	500	3,300	11,900	14,700
I-75 Northbound	31,500	44,000	62,800	97,300	109,600
I-75 Southbound	5,400	7,100	11,900	17,000	19,700
US 301 Northbound	1,100	1,800	4,200	7,200	11,600
SR 70 Eastbound	300	300	600	1,300	5,400
SR 62 Eastbound	1,500	2,600	3,200	2,300	5,100
SR 64 Eastbound	1,200	1,800	3,900	7,000	14,900
CR 39 Northbound	-	-	300	1,900	2,200
SR 37 Northbound	2,500	2,700	5,300	9,800	12,600
Pasco County					
SR 589 Northbound	17,800	22,800	38,200	61,600	67,500
US 41 Northbound	200	400	1,700	2,500	6,600
I-75 Northbound	26,300	34,400	56,500	71,000	77,900
US 98 Eastbound	5,900	5,400	9,300	13,700	18,000
US 19 Northbound	10,500	14,000	22,200	28,600	39,400
US 301 Northbound	4,500	6,800	7,700	13,700	16,800
US 98 Northbound	1,100	1,900	3,700	7,600	8,300
Pinellas County					
Alt US 19 Northbound	1,500	2,200	2,900	3,600	6,100
SR 60 Eastbound	4,500	5,600	8,100	11,000	13,400
I-275 Southbound	7,800	11,800	13,800	2,100	2,400
SR 582 Eastbound	2,800	3,600	6,700	9,700	15,600
SR 580 Eastbound	7,100	9,000	13,500	16,600	20,600
I-275 Eastbound	36,200	41,900	63,500	84,200	95,800
US 92 Eastbound	3,800	5,600	7,400	11,300	16,000
US 19 Northbound	1,500	2,200	2,900	3,600	6,100
CR 611 Northbound	400	600	1,200	900	1,200

Table IV-26 – Evacuating Vehicles Leaving Each County by Evacuation Route for the 2017 Operational Scenarios (continued)

Citrus County	EVAC A	EVAC B	EVAC C	EVAC D	EVAC E
US 19 Southbound	5,800	15,800	9,000	15,700	19,300
US 41 Southbound	100	100	100	200	200
SR 44 Eastbound	4,700	10,000	6,900	12,400	10,900
US 41 Northbound	5,800	15,900	9,000	15,100	19,300
US 19 Northbound	11,300	19,400	20,300	25,800	23,800
Hernando County					
US 19 Southbound	200	-	100	100	100
US 41 Southbound	100	200	200	300	300
I-75 Southbound	1,700	3,200	4,400	5,800	7,600
US 301 Southbound	100	100	100	300	300
SR 589 Southbound	800	1,300	1,400	2,400	3,600
US 301 Northbound	3,200	13,500	4,600	10,700	8,800
I-75 Northbound	16,700	27,900	21,900	40,400	28,800
US 41 Northbound	400	9,200	5,200	9,700	11,300
US 19 Northbound	7,700	13,700	12,300	22,200	14,600

Table IV-27 – Evacuating Vehicles Leaving Each County by Evacuation Route for the 2020 Operational Scenarios

Hillsborough County	EVAC A	EVAC B	EVAC C	EVAC D	EVAC E
SR 589 Northbound	19,900	26,100	40,800	52,600	62,400
US 41 Northbound	900	3,100	5,200	600	3,100
I-75 Southbound	2,300	3,700	5,800	15,000	18,100
I-275 Northbound	19,300	25,700	42,300	56,100	59,100
I-75 Northbound	7,800	11,000	20,500	37,200	39,100
US 301 Northbound	3,300	5,000	8,800	10,200	10,200
SR 60 Eastbound	4,500	5,700	8,100	10,900	12,600
SR 674 Eastbound	1,500	2,400	2,700	2,700	4,800
I-4 Eastbound	53,400	63,700	95,800	179,500	204,000
SR 92 Eastbound	3,700	4,000	6,600	7,000	10,500
SR 597 Northbound	9,000	13,600	18,800	19,700	24,300
Manatee County					
I-275 Northbound	4,600	7,200	14,800	2,800	4,900
US 41 Southbound	800	1,000	2,100	3,900	7,600
US 41 Northbound	600	1,000	4,100	16,300	19,900
I-75 Northbound	33,400	45,200	65,500	95,500	111,100
I-75 Southbound	5,700	7,400	12,300	17,800	23,600
US 301 Northbound	1,700	2,400	4,100	9,500	10,600
SR 70 Eastbound	300	300	700	4,200	7,900
SR 62 Eastbound	1,700	2,200	3,100	2,300	4,000
SR 64 Eastbound	1,600	1,700	3,700	10,300	17,700
CR 39 Northbound	-	500	800	4,700	2,600
SR 37 Northbound	2,800	2,900	5,700	8,500	11,500
Pasco County					
SR 589 Northbound	18,400	25,100	34,600	46,400	52,600
US 41 Northbound	400	2,300	2,700	500	4,200
I-75 Northbound	30,000	40,000	66,300	96,600	103,400
US 98 Eastbound	4,000	4,500	8,500	10,900	18,800
US 19 Northbound	11,300	15,400	27,000	27,600	36,500
US 301 Northbound	4,400	6,700	10,900	13,300	14,800
US 98 Northbound	800	1,000	5,500	1,600	4,500
Pinellas County					
Alt US 19 Northbound	1,800	2,300	3,600	2,900	5,200
SR 60 Eastbound	4,500	5,700	8,100	10,900	12,600
I-275 Southbound	7,600	12,200	14,400	2,300	3,000
SR 582 Eastbound	2,900	3,800	6,900	9,700	15,600
SR 580 Eastbound	6,500	8,700	12,100	15,500	18,400
I-275 Eastbound	38,500	47,500	71,100	99,300	112,000
US 92 Eastbound	3,900	4,200	7,300	9,600	14,700
US 19 Northbound	1,800	2,300	3,600	2,900	5,200
CR 611 Northbound	600	1,500	2,200	600	800

Table IV-27 – Evacuating Vehicles Leaving Each County by Evacuation Route for the 2020 Operational Scenarios (continued)

Citrus County	EVAC A	EVAC B	EVAC C	EVAC D	EVAC E
US 19 Southbound	300	300	400	400	300
US 41 Southbound	100	100	100	200	200
SR 44 Eastbound	4,800	5,000	8,200	16,600	24,500
US 41 Northbound	10,300	7,700	16,100	25,300	31,300
US 19 Northbound	13,700	18,500	28,600	31,400	36,700
Hernando County					
US 19 Southbound	100	100	100	100	100
US 41 Southbound	100	100	500	500	900
I-75 Southbound	2,600	3,100	4,700	3,600	6,400
US 301 Southbound	100	100	100	400	400
SR 589 Southbound	1,000	1,400	1,900	2,200	3,000
US 301 Northbound	4,100	5,400	6,400	12,400	11,200
I-75 Northbound	17,300	19,500	24,100	51,500	66,200
US 41 Northbound	4,100	4,100	8,600	25,000	18,600
US 19 Northbound	8,500	9,200	16,800	25,900	24,100

Table IV-28 – Evacuating Vehicles Entering Each County by Evacuation Route for the 2017 Operational Scenarios

Hillsborough County	EVAC A	EVAC B	EVAC C	EVAC D	EVAC E
SR 580 Eastbound	7,100	9,000	13,500	16,600	20,600
SR 60 Eastbound	4,500	5,600	8,100	11,000	13,400
I-275 Eastbound	32,800	39,800	60,000	81,200	88,400
US 41 Northbound	300	500	3,300	11,900	14,700
I-75 Northbound	31,500	44,000	62,800	97,300	109,600
US 301 Northbound	1,100	1,800	4,200	7,200	11,600
US 92 Eastbound	3,800	5,600	7,400	11,300	16,000
Manatee County					
I-275 Southbound	7,900	12,000	14,000	2,100	2,400
US 41 Northbound	400	600	1,100	1,200	3,100
US 301 Northbound	200	300	2,100	3,500	9,300
US 41 Southbound	300	500	500	500	2,200
I-75 Southbound	2,300	3,400	4,900	14,400	15,000
I-75 Northbound	22,700	34,500	52,000	70,700	78,200
US 301 Southbound	-	-	100	-	100
Pasco County					
Alt US 19 Northbound	1,100	1,500	1,700	3,000	3,100
SR 589 Northbound	19,200	24,300	41,900	63,800	74,900
US 41 Northbound	300	1,000	3,200	5,900	9,900
I-275 Northbound	19,800	24,800	33,800	49,300	47,100
I-75 Northbound	7,700	11,500	17,200	30,100	36,200
CR 581 Northbound	300	300	5,900	2,500	3,600
CR 579 Northbound	1,800	1,500	3,100	5,100	7,000
US 301 Northbound	4,200	4,800	7,700	12,400	12,400
US 19 Northbound	1,500	2,200	2,900	3,600	6,100
CR 611 Northbound	400	600	1,200	900	1,200
SR 597 Northbound	1,800	1,500	3,100	5,100	7,000
Pinellas County					
I-275 Northbound	4,300	4,800	11,200	2,000	3,100
Citrus County					
CR 611 Northbound	400	600	1,200	900	1,200
SR 597 Northbound	1,800	1,500	3,100	5,100	7,000
Hernando County					
US 19 Southbound	5,800	15,800	9,000	15,700	19,300
US 41 Southbound	100	100	100	200	200
I-75 Southbound	2,400	4,100	5,500	6,800	8,300
US 19 Northbound	9,800	20,000	13,200	28,800	15,900
US 41 Northbound	2,100	4,700	2,800	8,000	8,800
I-75 Northbound	15,200	29,400	22,900	31,600	18,700
US 301 Northbound	2,300	12,500	4,100	9,800	7,000
SR 589 Northbound	14,000	28,100	18,500	36,800	30,400

Table IV-29 – Evacuating Vehicles Entering Each County by Evacuation Route for the 2020 Operational Scenarios

Hillsborough County	EVAC A	EVAC B	EVAC C	EVAC D	EVAC E
SR 580 Eastbound	6,500	8,700	12,100	15,500	18,400
SR 60 Eastbound	4,500	5,700	8,100	10,900	12,600
I-275 Eastbound	36,100	45,400	67,400	97,900	108,200
US 41 Northbound	600	1,000	4,100	16,300	19,900
I-75 Northbound	33,400	45,200	65,500	95,500	111,100
US 301 Northbound	1,700	2,400	4,100	9,500	10,600
US 92 Eastbound	3,900	4,200	7,300	9,600	14,700
Manatee County					
I-275 Southbound	7,600	12,300	14,700	2,400	3,100
US 41 Northbound	500	900	1,700	1,700	4,000
US 301 Northbound	300	400	3,600	7,100	16,500
US 41 Southbound	300	600	1,300	900	3,000
I-75 Southbound	2,300	3,700	5,800	15,000	18,100
I-75 Northbound	25,900	38,900	55,600	71,400	70,300
US 301 Southbound	-	-	100	-	100
Pasco County					
Alt US 19 Northbound	1,500	1,700	2,600	1,600	2,000
SR 589 Northbound	19,900	26,100	40,800	52,600	62,400
US 41 Northbound	900	3,100	5,200	600	3,100
I-275 Northbound	19,300	25,700	42,300	56,100	59,100
I-75 Northbound	7,800	11,000	20,500	37,200	39,100
CR 581 Northbound	300	500	1,400	2,400	3,800
CR 579 Northbound	1,600	2,300	3,900	3,000	5,000
US 301 Northbound	3,300	5,000	8,800	10,200	10,200
US 19 Northbound	1,800	2,300	3,600	2,900	5,200
CR 611 Northbound	600	1,500	2,200	600	800
SR 597 Northbound	1,600	2,300	3,900	3,000	5,000
Pinellas County					
I-275 Northbound	5,000	7,600	15,200	3,400	5,500
Citrus County					
US 41 Northbound	4,100	4,100	8,600	25,000	18,600
US 19 Northbound	8,500	9,200	16,800	25,900	24,100
US 41 Southbound	300	400	400	300	400
US 19 Southbound	200	300	400	300	400
Hernando County					
US 19 Southbound	300	300	400	400	300
US 41 Southbound	100	100	100	200	200
I-75 Southbound	3,300	4,100	5,800	4,700	7,500
US 19 Northbound	11,700	14,100	21,800	32,200	32,600
US 41 Northbound	1,100	900	1,800	6,700	8,600
I-75 Northbound	15,400	16,200	18,300	35,100	37,200
US 301 Northbound	3,700	4,300	4,400	13,300	10,100
SR 589 Northbound	16,000	20,900	31,700	47,300	45,200

Clearance Times

Clearance times for each of the operational scenarios are summarized in **Table IV-30** and **IV-31**, as well as **Figures IV-24, IV-25,** and **IV-26**. Clearance times include several components, including the mobilization time for the evacuating population to prepare for an evacuation (pack supplies and personal belongs, load their vehicle, etc.), the actual time spent traveling on the roadway network, and the delay time caused by traffic congestion.

In-county clearance times for the 2017 operational scenarios range from 17 hours to 53.5 hours depending upon the county and the scenario. Clearance time to shelter shows a similar pattern, with clearance times for the operational scenarios ranging from 10 hours to 51 hours depending upon the county and the scenario.

In 2020, in-county clearance times for the operational scenarios vary from 17.5 hours for the level A evacuation in Pinellas County to 55 hours for the level E evacuation in Pinellas and Hillsborough counties. Clearance time to shelter shows a similar pattern, with clearance times for these scenarios ranging from 10 hours to 54.5 hours depending upon the scenario and county.

Moreover, out-of-county clearance times for the 2017 operational scenarios range from 17 to 17.5 hours for the level A evacuation, up to 51 to 53.5 hours for the evacuation level E scenario. The 9-hour response curve for the level A evacuation helps in reducing the clearance time from the base scenario in 2017. Out of county clearance times increase for all counties in 2020 to between 17.5 to 18.5 hours for the level A evacuation scenario, up to 51 to 54.5 hours for the level E evacuation. Regional clearance time for the six-county TBRPC region ranges from 17.5 hours to 53.5 hours in 2017. The clearance time increases to between 18 and 55 hours in 2020.

Table IV-30 – 2017 Clearance Times for Operational Scenarios

	Evacuation Level A	Evacuation Level B	Evacuation Level C	Evacuation Level D	Evacuation Level E
Clearance Time to Shelter					
Citrus	12.0	15.5	24.5	31.5	30.0
Hernando	110.	13.5	19.5	25.5	31.0
Hillsborough	15.5	18.5	24.0	35.5	40.0
Manatee	10.0	13.0	19.5	38.5	51.0
Pasco	17.5	21.5	32.0	44.0	48.0
Pinellas	10.0	13.0	19.0	25.0	30.0
In-County Clearance Time					
Citrus	17.0	19.0	27.5	44.0	53.5
Hernando	17.5	21.5	32.0	44.0	52.0
Hillsborough	17.0	21.5	29.5	40.5	51.5
Manatee	17.5	20.5	27.5	41.0	51.0
Pasco	17.5	21.5	32.0	44.0	52.0
Pinellas	17.0	20.0	27.0	38.5	52.0
Out of County Clearance Time					
Citrus	17.0	19.0	27.5	44.0	53.5
Hernando	17.5	21.5	32.0	44.0	52.0
Hillsborough	17.0	21.5	29.5	40.5	51.5
Manatee	17.5	20.5	27.5	41.0	51.0
Pasco	17.5	21.5	32.0	44.0	52.0
Pinellas	17.0	20.0	27.0	38.5	52.0
Regional Clearance Time					
TBRPC	17.5	21.5	32.0	44.0	53.5

Table IV-31 – 2020 Clearance Times for Operational Scenarios

	Evacuation Level A	Evacuation Level B	Evacuation Level C	Evacuation Level D	Evacuation Level E
Clearance Time to Shelter					
Citrus	12.5	17.0	25.5	37.5	34.5
Hernando	10.5	13.0	20.0	24.5	33.0
Hillsborough	16.5	19.0	24.5	42.0	48.5
Manatee	10.0	13.5	23.5	39.5	54.5
Pasco	18.5	23.0	34.5	45.5	50.5
Pinellas	10.5	13.5	19.0	25.0	35.0
In-County Clearance Time					
Citrus	18.5	20.0	33.0	51.5	54.0
Hernando	18.5	23.0	34.5	45.5	51.0
Hillsborough	18.0	22.0	31.5	45	55.0
Manatee	18.0	21.5	28.5	45.5	54.5
Pasco	18.5	23.0	34.5	45.5	53.0
Pinellas	17.5	21.0	28.0	42.5	55.0
Out of County Clearance Time					
Citrus	18.5	20.0	33.0	51.5	54.0
Hernando	18.5	23.0	34.5	45.5	51.0
Hillsborough	18.0	22.0	31.5	45.0	55.0
Manatee	18.0	21.5	28.5	45.5	54.5
Pasco	18.5	23.0	34.5	45.5	53.0
Pinellas	17.5	21.0	28.0	42.5	55.0
Regional Clearance Time					
TBRPC	18.5	23.0	34.5	51.5	55.0

Figure IV-24 - Clearance Time to Shelter Operational Scenarios

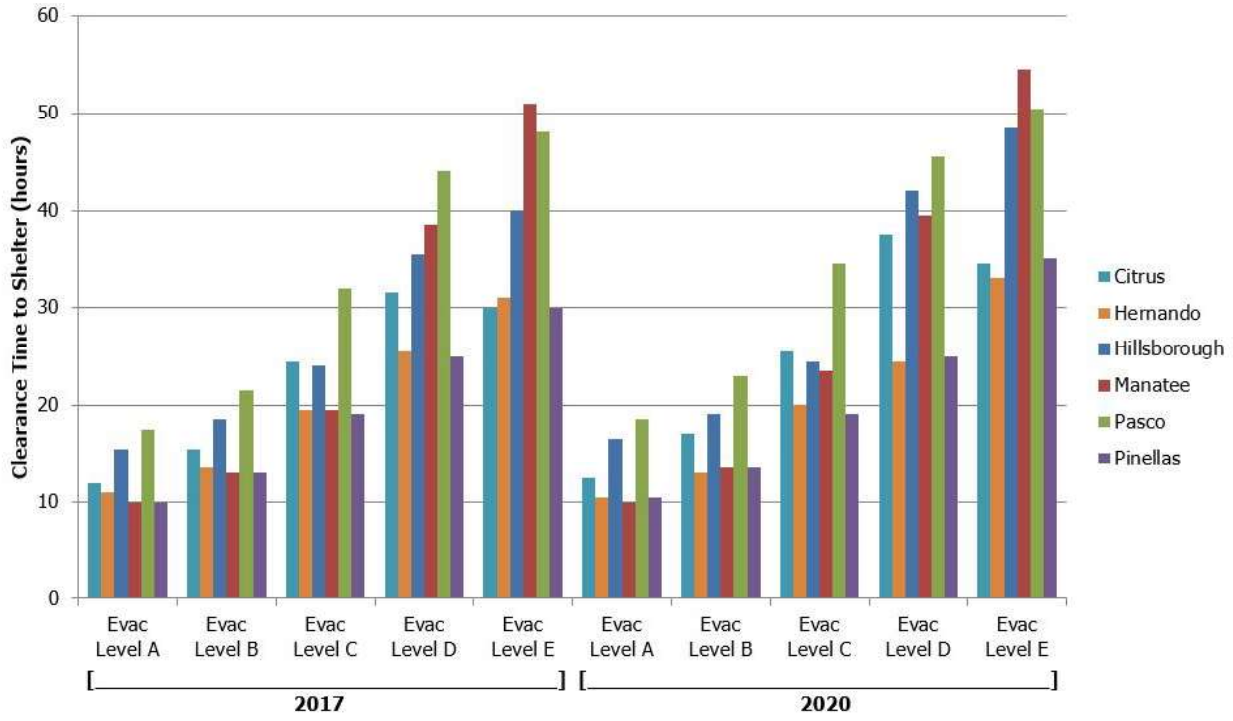
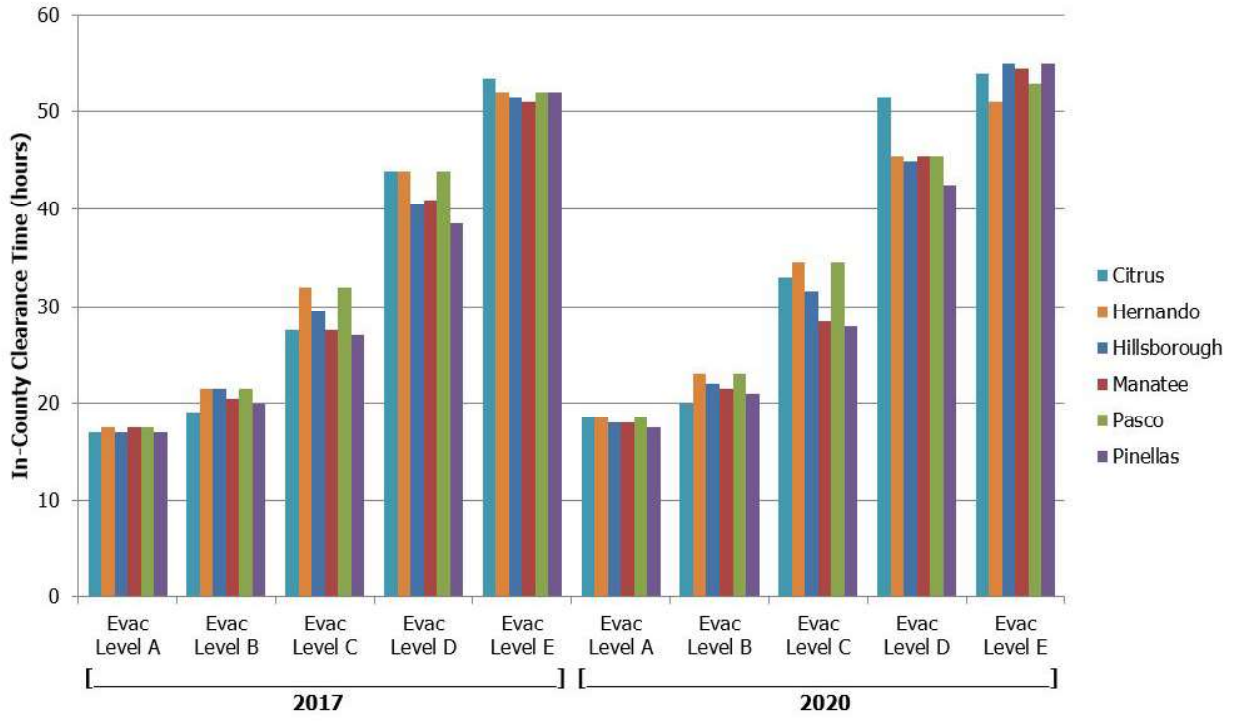


Figure IV-25 - In-County Clearance Times Operational Scenarios



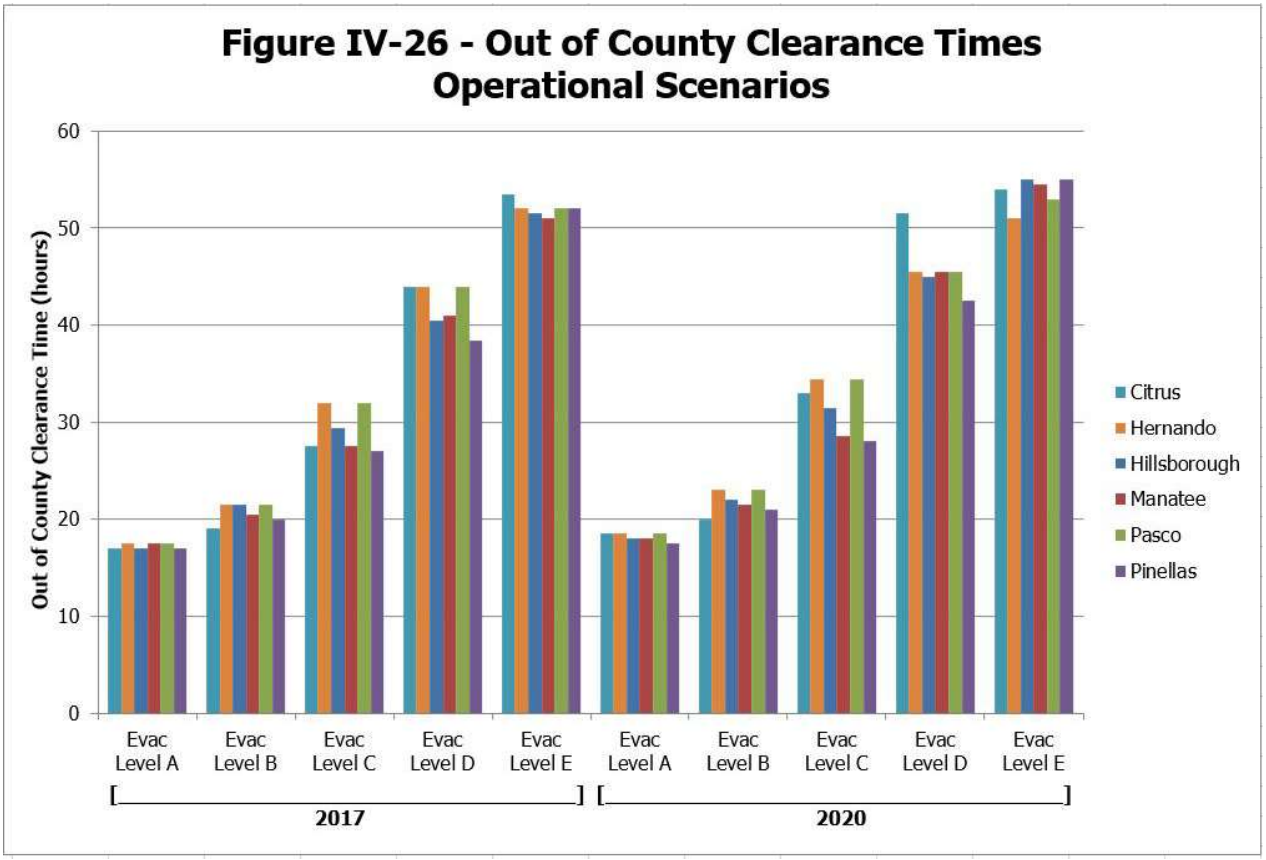


Figure IV-26 - Out of County Clearance Times
Operational Scenarios
Out of County Clearance Time (hours)
60
50
40
30
20
10
0
Evac Level A
Evac Level B
Evac Level C
Evac Level D
Evac Level E
Evac Level A
Evac Level B
Evac Level C
Evac Level D
Evac Level E
2017
2020
Citrus
Hernando
Hillsborough
Manatee
Pasco
Pinellas

H. Maximum Evacuating Population Clearances

From an emergency management standpoint, it is important to get an understanding of the maximum proportion of the evacuating population that can be expected to evacuate at various time intervals during an evacuation. Should storm conditions change during an evacuation, emergency managers will need to be able to estimate what portion of the evacuating population is estimated to still remain within the county trying to evacuate.

Using the base scenarios, which assume 100% of the vulnerable population is evacuating, along with shadow evacuations and evacuations from adjacent counties, an estimate was made of the evacuating population that is actually able to evacuate out of each county by the time intervals of 12, 18, 24, and 36 hours. The estimated maximum evacuating population by time interval for 2017 is identified in **Table IV-31** and for 2020 in **Table IV-32**.

It is important to note that these estimates take into account many variables, including roadway capacity, in-county evacuating trips, out of county evacuating trips, evacuating trips from other counties, and background traffic that is impeding the evacuation trips. For this reason, the maximum evacuation population by time interval will vary slightly between evacuation level and either increase or decrease from one evacuation level to the next.

I. Sensitivity Analysis

As discussed previously, there are literally thousands of possible combinations of variables that can be applied using the evacuation transportation model, which will result in thousands of possible outcomes. As part of the analysis process, a sensitivity analysis was conducted using the prototype model to evaluate the effect of different response curves on the calculated evacuation clearance times. Calculated clearance times will never be lower than the designated response time, since some evacuating residents will wait to evacuate until near the end of the response time window. For example, using a 12-hour response curve in the analysis means that all residents will begin their evacuation process within 12-hours, and some residents will choose to wait and begin evacuating more than 11.5 hours from when the evacuation was ordered. This will generate a clearance time of more than 12 hours.

The sensitivity analysis identified that clearance times will vary by scenario and by any of the numerous parameters that can be chosen in a particular scenario model run (demographics, student population, tourist population, different counties that are evacuating, response curve, phasing, shadow evacuations, etc.). A few general rules of thumb did emerge from the sensitivity analysis that can provide some guidance to the region regarding the sensitivity of the response curve to the calculated clearance times:

- For low evacuation levels A and B, clearance time will vary by as much as 40 percent depending on the response curve. Low evacuation levels A and B have fewer evacuating vehicles that can be accommodated more easily on the transportation network. In most cases, clearance times typically exceed the response curve by one to two hours. Thus, a 12 hour response curve may yield a clearance time of 13 or 14 hours while an 18 hour response curve may yield a clearance time of 19 or 20 hours. This leads to a higher level of variability than larger evacuations;

Table IV-32 – Maximum Evacuating Population by Time Interval for 2017

	Evacuation Level A	Evacuation Level B	Evacuation Level C	Evacuation Level D	Evacuation Level E
Estimated Evacuating Population Clearing Citrus County					
12-Hour	31,288	28,148	25,193	21,702	20,243
18-Hour	46,933	42,222	37,790	32,553	30,364
24-Hour	62,577	56,296	50,387	43,404	40,485
36-Hour	61,273	66,851	72,431	85,000	93,622
Estimated Evacuating Population Clearing Hernando County					
12-Hour	24,570	21,594	21,227	24,609	27,641
18-Hour	36,855	32,391	31,840	36,913	41,462
24-Hour	47,092	43,188	42,453	49,218	55,283
36-Hour		48,586	60,142	93,309	114,021
Estimated Evacuating Population Clearing Hillsborough County					
12-Hour	188,245	201,646	205,871	178,160	194,556
18-Hour	282,368	302,468	308,806	267,240	291,834
24-Hour	376,491	403,291	411,742	356,320	389,112
36-Hour	352,960	411,693	514,677	645,830	786,331
Estimated Evacuating Population Clearing Manatee County					
12-Hour	77,502	82,222	80,778	77,361	76,874
18-Hour	116,252	123,333	121,168	116,041	115,311
24-Hour	155,003	164,444	161,557	154,721	153,749
36-Hour	138,857	161,018	205,312	280,432	304,294
Estimated Evacuating Population Clearing Pasco County					
12-Hour	71,716	77,169	86,928	75,312	76,008
18-Hour	107,574	115,754	130,392	112,968	114,012
24-Hour	143,432	154,339	173,856	150,623	152,015
36-Hour	140,444	173,631	246,296	276,143	300,864
Estimated Evacuating Population Clearing Pinellas County					
12-Hour	185,239	193,705	214,385	154,794	153,865
18-Hour	277,859	290,558	321,577	232,190	230,798
24-Hour	370,479	387,410	428,770	309,587	307,731
36-Hour	324,169	379,339	473,433	554,677	615,461

Note: These estimates take into account many variables, including roadway capacity, in-county evacuating trips, out of county evacuating trips, evacuating trips from other counties, and background traffic that is impeding the evacuation trips. For this reason, the maximum evacuation population by time interval will vary between evacuation level and either increase or decrease from one evacuation level to the next.

Table IV-33 – Maximum Evacuating Population by Time Interval for 2020

	Evacuation Level A	Evacuation Level B	Evacuation Level C	Evacuation Level D	Evacuation Level E
Estimated Evacuating Population Clearing Citrus County					
12-Hour	32,189	28,675	25,191	23,777	20,951
18-Hour	48,283	43,013	37,787	35,665	31,426
24-Hour	64,378	57,350	50,382	47,553	41,901
36-Hour	65,719	71,688	77,673	91,144	100,388
Estimated Evacuating Population Clearing Hernando County					
12-Hour	25,440	22,166	21,507	26,836	25,997
18-Hour	38,160	33,249	32,260	40,254	38,996
24-Hour	50,880	44,332	43,014	53,672	51,994
36-Hour	51,940	53,568	66,313	102,871	125,653
Estimated Evacuating Population Clearing Hillsborough County					
12-Hour	194,892	202,231	191,601	183,458	178,238
18-Hour	292,338	303,347	287,402	275,188	267,357
24-Hour	389,784	404,463	383,202	366,917	356,477
36-Hour	373,543	438,168	550,853	695,613	846,632
Estimated Evacuating Population Clearing Manatee County					
12-Hour	77,588	79,496	83,575	77,829	66,776
18-Hour	116,382	119,244	125,363	116,743	100,164
24-Hour	155,176	158,991	167,150	155,657	133,552
36-Hour	142,245	165,616	212,420	291,857	317,186
Estimated Evacuating Population Clearing Pasco County					
12-Hour	72,716	75,782	85,098	77,145	67,063
18-Hour	109,073	113,672	127,647	115,718	100,595
24-Hour	145,431	151,563	170,196	154,291	134,126
36-Hour	148,461	183,139	262,385	295,724	324,138
Estimated Evacuating Population Clearing Pinellas County					
12-Hour	188,968	194,164	208,977	158,614	134,674
18-Hour	283,452	291,247	313,466	237,922	202,011
24-Hour	377,936	388,329	417,955	317,229	269,348
36-Hour	338,568	396,419	496,321	581,586	645,314

Note: These estimates take into account many variables, including roadway capacity, in-county evacuating trips, out of county evacuating trips, evacuating trips from other counties, and background traffic that is impeding the evacuation trips. For this reason, the maximum evacuation population by time interval will vary between evacuation level and either increase or decrease from one evacuation level to the next.

- For mid-level evacuations such as C and sometimes D, clearance time varied by as much as 25 percent during the sensitivity analysis. The number of evacuating vehicles is considerably higher than for levels A and B, and lower response curves tend to load the transportation network faster than longer response curves. The variability in clearance times is less in these cases than for low evacuation levels; and,

- For high-level evacuations such as some level D evacuations and all E evacuations, clearance time variability is reduced to about 10 to 15 percent. Large evacuations involve large numbers of evacuating vehicles, and the sensitivity test identified that clearance times are not as dependent on the response curve as lower level evacuations since it takes a significant amount of time to evacuate a large number of vehicles.

The counties within the Tampa Bay Region are encouraged to test additional scenarios beyond what has been provided in this study. Each model run will provide additional information for the region to use in determining when to order an evacuation. Due to advancements in computer technology and the nature of the developed transportation evacuation methodology, this study includes a more detailed and time-consuming analysis process than used in previous years studies. Counties interested in testing various response curves for each scenario can easily do so using the TIME interface to calculate clearance times for different response curves.

J. Summary and Conclusions

Through a review of the results of the 20 different scenarios (10 base and 10 operational), several conclusions could be reached regarding the transportation analysis, including the following:

- Critical transportation facilities within the TBRPC region include I-75, I-275, and I-4. For large storm events, such as level D and E evacuations, other State facilities also play an important role in evacuations, such as SR 52 and 54 in Pasco County, SR 60 in Pinellas County, and SR 64 in Manatee County. Outside the region, the Turnpike/I-75 interchange in Sumter County is clearly an issue in all evacuation scenarios;

- During the level A and B evacuation scenarios, the roadway segments with the highest vehicle queues are primarily concentrated along the major Interstate and State Highway system. During these levels of evacuation, State and County officials should coordinate personnel resources to provide sufficient traffic control at interchanges and major intersections along these routes;

- In contrast, for the higher-level C, D, and E evacuation scenarios, many other roadway facilities, both within and outside of the region, will require personnel resources for sufficient traffic control at interchanges and major intersections;

- The TBRPC counties, in coordination with the State, should continue public information campaigns to clearly define those that are vulnerable and should evacuate versus those who choose to evacuate on their own. During large storm events in the operational scenarios, evacuations by the vulnerable population in the six TBRPC Counties are impacted by shadow evacuations occurring in other parts of the counties and in areas outside the TBPRC region;

- The Florida Department of Transportation should continue to work with local counties on implementing intelligent transportation system (ITS) technology, which will provide enhanced monitoring and notification systems to provide evacuating traffic with up to date information regarding expected travel times and alternate routes;

- A comparison of the 2017 and 2020 base scenarios clearly indicate that the roadway improvement projects planned for implementation between 2015 and 2017 have an impact in reducing evacuation clearance times. Despite the increased population levels in 2020 within the TBRPC region, clearance times were generally stable between the 2017 and 2020 time periods. The roadway improvement projects were effective in keeping clearance times constant. FDOT, MPOs within the region, and county governments should continue funding roadway improvement projects within the region;

- The State can use the data and information provided in this report (specifically the evacuating vehicle maps in Volume 5-8) to estimate fuel and supply requirements along major evacuation routes to aid motorists during the evacuation process;

- For major evacuation routes that have signalized traffic control at major intersections, traffic signal timing patterns should be adjusted during the evacuation process to provide maximum green time for evacuating vehicles in the predominate north and west directions; and,

- The counties within the Tampa Bay Region are encouraged to test additional transportation scenarios beyond what has been provided in this study. Each model run will provide additional information for the region to use in planning for an evacuation. Counties interested in testing various response curves for each scenario can easily do so using the TIME interface to calculate clearance times for different evacuation conditions, such as different evacuation levels, different behavioral response assumptions, and different response curves.

- It is important to note that this study contains significant updates and revisions in comparison to the original 2010 SRESP study for the Tampa Bay Region. Also of note is the fact the Tampa Bay region gained two counties (Citrus and Hernando), which has an effect on the evacuating population numbers for the regions. These new revisions include updated population projections, modifications to the roadway network due to addition of more roads on the network, and changes to the location and size of available shelters. These revisions have significant impacts on evacuating vehicle behavior for the region and caused changes to the calculated clearance times in each county. These updates and revisions make comparisons to the previous 2010 study difficult.

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2045
Hernando/Citrus MPO
TRANSPORTATION PLAN

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