Broward MPO
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COMMITMENT 2045
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Broward Metropolitan Planning Organization
Commitment 2045
Metropolitan Transportation Plan

Technical Report #16
Equity Analysis

February 24, 2020

MPO MISSION STATEMENT

To collaboratively plan, prioritize, and fund the delivery of diverse transportation options.

MPO VISION STATEMENT

Our work will have measurable positive impact by ensuring transportation projects are well selected, funded, and delivered.

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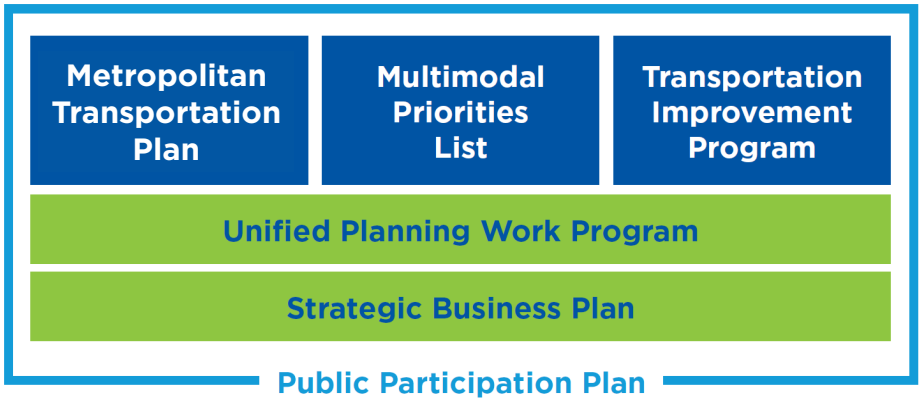
Core Products of the Broward MPO



Introduction

Report Purpose

The Broward Metropolitan Planning Organization (MPO) has created a standardized process to use in evaluating its plans, programs, and projects and to make informed decisions regarding equity in Broward County's communities. The goal of equity implementation is to create an approach that is fair, inclusive, and proactive during all phases of the planning process. In this context, equity seeks to ensure that the benefits and impacts of plans, programs, and projects undertaken by the Broward MPO and its partner agencies are understood and that populations protected under Federal non-discrimination laws and other authorities, including Title VI and Environmental Justice, are not disproportionately burdened during the planning process. In essence, the Broward MPO is looking to go above and beyond the requirements to consider equity in a more comprehensive manner. Collectively, this effort is referred to as the Transportation Planning Equity Assessment.

This Technical Report #16 documents the Broward MPO's equity assessment process, including the methodology and resulting equity area map. The final section discusses specific application of the equity assessment process to *Commitment 2045*, the Broward MPO's 2045 Metropolitan Transportation Plan (MTP). The *Commitment 2045* MTP equity assessment process consists of the five steps, as illustrated to the right. The intent is that the comprehensive equity assessment completed for the *Commitment 2045* MTP will be continued as projects resulting from this MTP are further reviewed and refined over time.

Title VI and Environmental Justice Overview

Title VI of the Civil Rights Act of 1964 states that "no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation I, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." Title VI laid the foundation for Environmental

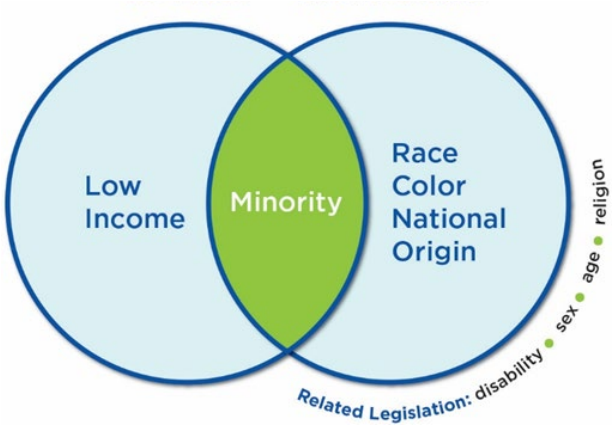
Justice, most notably through Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." This Executive Order, issued by President Clinton in February 1994, directs Federal departments and agencies to identify and address disproportionately high and adverse human health or environmental effects of their policies, programs, and activities on minority and/or low-income populations.

Environmental Justice is the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of Federal laws, regulations, and polices.

As shown in Figure 1, Title VI and Environmental Justice both address non-discrimination, identify minority populations and are rooted in the constitutional guarantee that all citizens are created equal, and both address involvement of affected citizens in the decision-making process.

Title VI addresses race, color, national origin, gender, age, and persons with a disability, and Environmental Justice covers minority and low-income populations. Title VI prohibits discrimination, and Environmental Justice mandates a process for inclusive decision-making.

Figure 1: Title VI & Environmental Justice Comparison



Source: Federal Highway Administration (FHWA)

The U.S. Department of Transportation (DOT) issued Order 5610.2 in April 1997 in response to Executive Order 12898. Order 5610.2 stresses the importance of addressing Environmental Justice concerns early in the development of a program, policy, or activity.

Equity Assessment Process

As previously noted, the Broward MPO is developing a process to more consistently and comprehensively evaluate its plans and programs regarding Title VI, Environmental Justice, and other Federal non-discrimination authorities. This section documents the objectives driving the development of the Broward MPO's equity assessment process. The equity assessment completed for *Commitment 2045*, which sets the long-range vision for the multimodal transportation system in Broward County, is one component of this overall process.

Equity Assessment Working Group

The entirety of this process has been overseen by a Working Group comprising Broward MPO staff who have knowledge of the different planning and programmatic areas that fall under or relate to the equity assessment process. The Working Group met six times over a two-year period to review progress on this effort.

Equity Assessment Objectives

As a requirement for receiving Federal funding and in good planning practice, the Broward MPO has incorporated Title VI requirements and Environmental Justice principles into its planning programs. However, the methods used and extent to which this has been done vary by plan, program, or project depending on the scope of work or the leading agency (Broward MPO staff, consultant, other public agency, etc.). It is the Broward MPO's goal that the equity assessment process, once applied at the various planning stages of project development and funding, will produce a systematic process that meets the following five objectives:

1. Consistently evaluate transportation plans and programs against Federal and State nondiscrimination authorities.
2. Improve efficiency in planning processes and programs.
3. More effectively satisfy Federal requirements.
4. Produce meaningful outcomes for the community through MPO transportation planning programs, particularly for protected populations.
5. Identify adverse impacts early at the planning level rather than later at the project funding and delivery level.

Equity Area Identification

As noted in the previous section, the first step in the equity assessment process was to develop a methodology to consistently identify areas of Broward County that have a higher proportion of populations protected under Title VI and other Federal and State non-discrimination authorities. This methodology is not intended to definitively identify areas of concern or satisfy Title VI, Environmental Justice, or other similar Federal or State requirements; it is intended to be an initial method to identify such areas as part of a broader non-discriminatory assessment process. This process is complemented with local knowledge of the community and pubic outreach efforts, as appropriate, to confirm or refute quantitative data findings.

The outcome of this process is an equity area data file that generates assignment of equity area scores to geographies within the county. The equity scores are then mapped to visually display the assigned scores at the appropriate geographic level. The objectives used to guide development of the equity area data file, methodology used to calculate the equity area scores, and resulting equity area map are discussed in the remainder of this section.

Equity Area Methodology Objectives

At the onset of this work, five objectives for the methodology were identified and vetted with the Working Group. These objectives served as a guideline and checklist during equity area methodology development to ensure that it meets the broader equity assessment goals described in the previous section. The five methodology objectives and discussion of how each were met are provided in Table 1.

Table 1: Equity Area Methodology Objectives

Equity Area Methodology Objective	Description of How Met
Objective 1: *Use available and accessible data from standard, easily-obtainable, and frequently-updated sources such as the U.S. Census, the American Community Survey (ACS), etc.*	All selected indicators are data obtained from the ACS Five-Year Estimates.
Objective 2: *Be flexible for MPO/local plans and programs such that resulting outputs can be modified to accommodate different planning efforts, if needed.*	Methodology can be used to develop either an overall composite equity index or an index based only on selected variables. Data analysis file also can be scaled to other geographies, including by Census tract or other defined regions/subareas comprising a specific collection of block groups or tracts, if appropriate for a particular plan or program.
Objective 3: *Be simple to use, providing a methodology and analysis file that is user-friendly and easy to understand.*	Data analysis file was designed with simplicity and user-friendliness in mind with clear instructions so anyone will be able to use it.
Objective 4**:** *Be objective so results are transparent and cannot be manipulated by the perspective or opinion of the person developing the model or by the user.*	Data analysis file does not require scores or weights be input by the developer/user. Other than using statistical analysis or other similar approaches, developing and applying scores and weights can be subjective. Data analysis file uses statistical analyses to derive all scores, eliminating user subjectivity.
Objective 5: *Be open-sourced such that MPO staff can maintain, update, or modify the data as necessary.*	Data analysis file is an Excel-based file that can be modified/updated by MPO staff or others in the future.

Equity Area Methodology

This section summarizes the methodology used to produce the equity area scores assigned to each block group in the county. A more detailed explanation of the equity area methodology can be found in Appendix A.

Methodology Overview

Following review of the potential approaches, it was determined that a quantitative, statistically-driven, threshold-based approach would best satisfy the methodology objectives previously presented. To align with the overall objectives of this process, the equity area methodology was designed to consider various demographic indicators that address Title VI, Environmental Justice, and other Federal non-discrimination authorities. To accomplish this, it also was determined that the methodology should produce a composite score comprising multiple indicators (or demographic variables) with Broward County as the reference area. As previously noted, it is the intent that any equity areas produced by this analysis are fact-checked using local knowledge.

The methodology used to develop the equity areas includes five steps:

1. Calculate the countywide average threshold for each indicator (demographic variable).
2. Assign indicator categories to block groups based on the standard deviation of the indicator's dataset.
3. Calculate the comparative score for each indicator.
4. Calculate the equity composite score.
5. Assign the equity composite score category to each block group.

Indicator Selection

A series of demographic indicators was discussed with the Working Group to determine the appropriateness of including each in the equity area methodology. This evaluation included:

- Examining the indicator's relationship to Title VI and Environmental Justice (and related non-discrimination authorities).

- Understanding potential correlation between indicators to avoid unintentional weighting of the data.
- Reviewing historical use of indicators included in previous Broward MPO plans and programs.
- Discussions with peer agencies conducting similar efforts to understand and consider the indicators used and rationale for inclusion.
- Examining the margin of error data provided by the ACS for each indicator.

The above evaluation determined that a set of core indicators would be used in the equity area score calculation; optional indicators are also available, if desired for another purpose. The data analysis file is flexible in that the composite index can be recalculated based on selected core or optional indicators.

Table 2 summarizes the core and optional indicators included in the data analysis file. For purposes of the MTP, reference to the equity area scores means that all core indicators described below are used in the MTP equity assessment process.

Table 2: Transportation Planning Equity Areas – Final Indicators

Core Indicators	Core Indicator Protected Class	Optional Indicators
Racial Minority[1]	Race and minority	Zero Vehicle Household
Ethnic Minority[2]	Minority and national origin	Female Head of Household
Youth (ages 10–17)	Age	No high school diploma (age 25 & older)
Older Adults (age 65 & older)	Age	Minority (race/ethnicity combined)[4]
Population Below Poverty[3]	Low-income	
Limited English Proficiency (LEP) Population	Minority and national origin	
Population with a Disability	Disability	

1. Racial minority defined by US Census Bureau as person who is Black/African American, American Indian/Alaska Native, Asian, Native Hawaiian/other Pacific Islander, some other non-White race, or combination of two or more races.
2. Ethnic minority defined by US Census Bureau as person who is Hispanic or Latino. Hispanic/Latino is considered minority but defined as ethnicity rather than race; people who identify as Hispanic or Latino may be of any race.
3. To determine poverty status, person's total family income in last 12 months is compared with poverty threshold appropriate for family size and composition. If total family income less than appropriate threshold, then person is considered "below poverty level" together with every member of his/her family. If not living with anyone related by birth, marriage, or adoption, then person's own income compared with his/her poverty threshold. Poverty status determined for all people except those who are institutionalized, in military group quarters, in college dormitories, and unrelated under age 15.
4. Indicator used only if racial and ethnic minority indicators under core indicator category not used.

For core indicators listed in the table, the relationship of protected class and reference documentation are as follows:

- Racial minority, ethnic minority, and LEP indicators tie to protected classes of race and ethnicity, as detailed in Title VI of the Civil Rights Act of 1964.
- Youth and older adult indicators address inclusion of these populations as protected classes to not discriminate based on age under related non-discrimination legislation, the Age Discrimination Act of 1975. The Federal Highway Administration (FHWA) also published Environmental Justice guidelines to include children and older adults as "traditionally underserved" population groups when conducting equity analyses.
- Low-income indicator relates to the requirements of DOT Order 5610.2(a) and FHWA Order 6640.23A to consider impacts on low-income populations.
- Persons with disabilities are protected under related non-discrimination legislation, the Americans with Disabilities Act (ADA) of 1990.

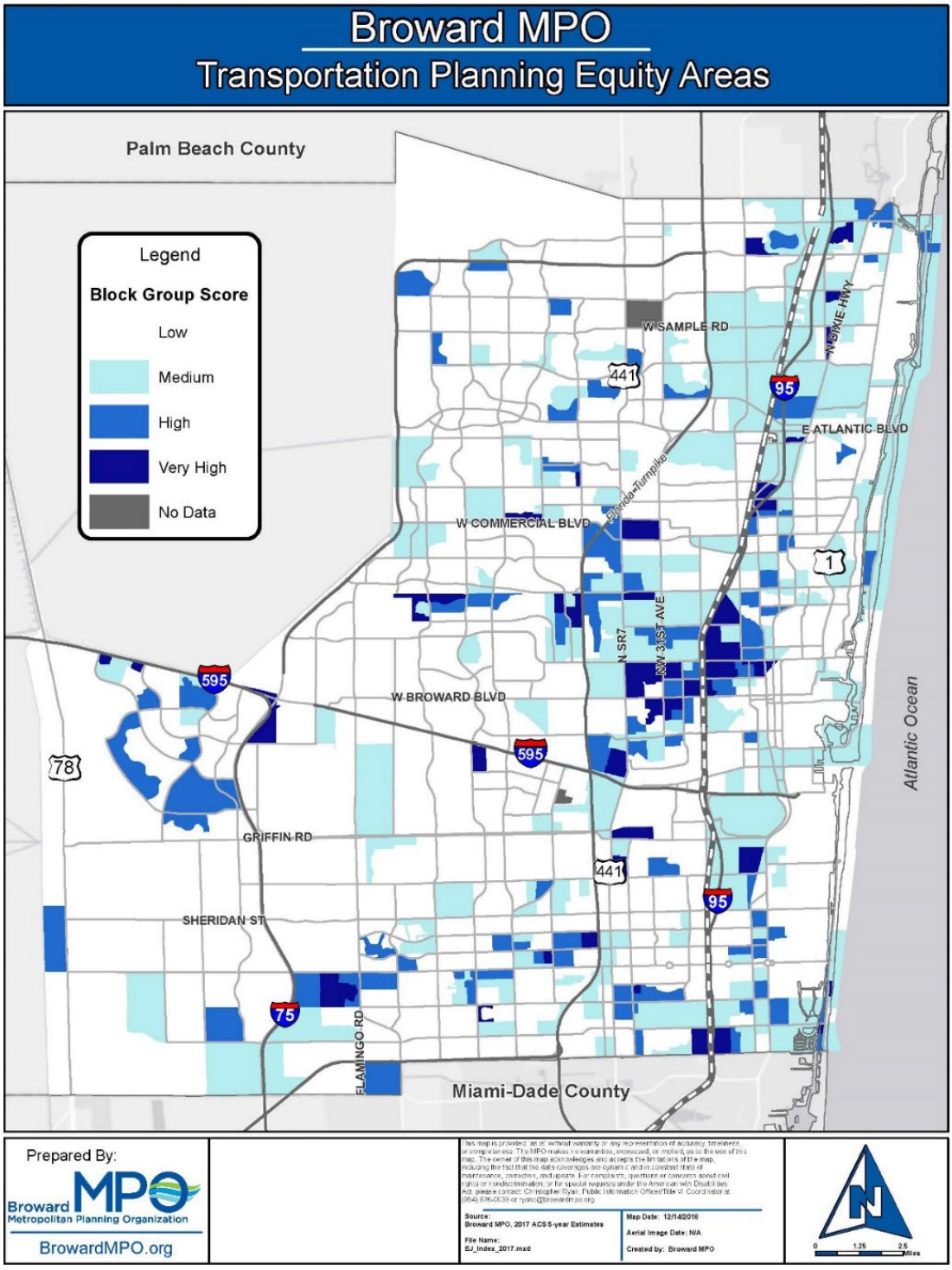
Equity Area Map

The five-step process outlined earlier (and described in detail in Appendix A) assigns one of four composite score categories to each block group. This assignment is based on the block group's final composite score relative to the average composite score for all block groups in the county:

- Category 4 (Very High) = equal to or greater than +2 standard deviation from average composite score for all block groups
- Category 3 (High) = equal to or greater than +1 standard deviation but less than +2 standard deviation from average composite score for all block groups
- Category 2 (Medium) = equal to or greater than countywide average but less than +1 standard deviation from average composite score for all block groups
- Category 1 (Low) = less than average composite score for all block groups

The equity area composite score for a given block group reflects the relative concentration of population groups compared to the county overall when considering all core indicator categories.

Map 1: Equity Area Map (2013–2017 ACS Five-Year Estimates)



Commitment 2045 Equity Assessment

Scenario Planning Equity Evaluation

In long-range transportation planning, scenario planning evaluates the effects of alternative policies, plans, or programs on the future of the community and/or region. It also can provide insight to stakeholders and decisionmakers as they develop transportation plans. The scenarios allow stakeholders to explore and consider alternatives by evaluating the implications of alternative approaches to the transportation system.

A goal of *Commitment 2045* was to develop five scenarios to evaluate different levels of transit investment and focus on key issues being faced in the Broward region today and expected in the future. The comparative evaluation of these five scenarios was then used to develop a hybrid scenario that informed the Needs Plan. The five scenarios identified for this effort are briefly described below. Additional information about the scenarios is provided in Technical Report #6.

- **Trend Scenario** continues recent trends in growth and transportation investments. Improvements included in this scenario were minor roadway projects that did not provide significant expansions of capacity. Transit improvements were not included, as the ability to significantly expand the transit system was not a possibility. In essence, this represented a cost-constrained scenario.
- **Compact Development Scenario** aggressively pursues high-density development, infill, and redevelopment within key corridors. Improvements in this scenario were based on the Transit Vision and refocused growth projections to the corridors where investments in high-capacity transit were proposed. This scenario was not constrained by funding availability.
- **Technology Scenario** aggressively pursues the advancement of emerging transportation technologies. Improvements in this scenario include conversion of existing managed lanes to technology corridors and the identification of additional arterial corridors that would accommodate automated, connected, electric, and shared (ACES) vehicles. Additional modifications to model variables were made to better reflect the benefits associated with the implementation of autonomous and connected vehicles, including increasing roadway capacity,

reducing traffic signal delay, and reducing transit wait times. This scenario was not constrained by funding availability.

- **Resiliency Scenario** responds to sea-level rise, severe weather events, and other forces. The approach for this scenario was to use the same projects as the Trend Scenario and remove any that were located on facilities identified as vulnerable in the Extreme Weather and Climate Change Risk study. This scenario was not constrained by funding availability.
- **Community Vision Scenario** integrates individual community and agency visions. The improvements included in this scenario were projects submitted by local governments and partner agencies that could be coded as part of the transportation network. This scenario was not constrained by funding availability.

Six factors (see Table 3) were identified to evaluate the performance of each scenario, which are also linked to the project prioritization process discussed later in this report. As shown, for *Commitment 2045,* equity was elevated to its own planning factor with multiple criteria under it. Collectively, the equity-related criteria could then influence the overall project score similar to the other five planning factors. In more traditional transportation planning approaches where projects are prioritized using a similar quantitative process, equity is typically considered through one or two criteria, which can significantly dilute its affect on the prioritization outcomes.

The evaluation criteria listed in Table 3 are based on outputs from the Southeast Florida Regional Planning Model (SERPM) Version 8. To determine the score for the equity factor, a composite ranking was developed by evaluating the results of other criteria within equity areas compared with non-equity areas. The model uses Traffic Analysis Zones (TAZs), which is the unit of geography most commonly used in conventional transportation planning models and usually consists of one or more census blocks, block groups, or census tracts.

To tie the model outputs for each criterion listed back to the equity areas previously defined in Map 1, the equity block groups were converted to a TAZ geography. To accomplish this, the TAZs in Broward County that contain at least one block group identified as having a “high” or “very high” equity score are tagged as “equity subareas” within the model.

Table 3: Scenario Planning Evaluation Factors and Criteria

Planning Factor	Evaluation Criteria
Mobility – Provide high speed and reliable travel between major activity centers and destinations. Focus is to get from one place to another as quickly as possible; typically characterized by longer trips.	Hours of peak period delay
Accessibility – Provide access and circulation within higher-density, mixed-use places; tend to be shorter trips.	Number of jobs within 30-min travel time for cars and transit
Safety – Reduce number and severity of crashes.	Annual fatalities
Equity – Ensure that benefits and impacts are shared among Broward's population.	Composite of other measures
Environmental Stewardship – Protect natural and built environment.	Daily carbon monoxide (CO) emissions
Economic Vitality – Support economic activity and businesses.	Daily vehicle hours on roadways with >5% trucks

For each performance measure under the other five planning factors, a score was assigned as follows:

- +1 if measure moved in positive direction
- 0 if measure was unchanged
- -1 if measure moved in negative direction

For each scenario, the total score calculated for equity areas was compared to the total score previously calculated for non-equity areas. A composite ranking was established based on the difference between the total scores. The composite ranking for the Compact Development, Technology, and Community Vision scenarios was then compared to that for the Trend scenario to understand the performance of each relative to the transportation network and equity impacts if no considerable changes to Broward

County's transportation network were to occur. The Resiliency scenario could not be modeled, as there were no improvements proposed to identified vulnerable facilities.

Tables 4 and 5 summarize the scenario planning evaluation results for the equity vs. non-equity subareas of the county. The results suggest that the Technology and Community Vision scenarios provide the best results, as they involved a combination of roadway and transit improvements. There are also similar benefits and impacts observed in the equity vs. non-equity areas for these two scenarios.

The Compact Development scenario provided different results compared to the other two. This scenario focused on transit-only improvements and growth was redirected along premium transit corridors where existing (or future) densities are better able to support premium transit services. These corridors are also located primarily within equity areas. Under this analysis, concentrating growth within a smaller geographic area and focusing on transit improvements moderately impacts the safety, environmental stewardship, and economic vitality indicators compared to the Community Vision or Technology scenarios, where growth is allocated around the county consistent with the Trend scenario. A higher increase in vehicle delay during peak periods under the Compact Development scenario is expected due to a larger future population concentrated within a smaller geographic area; however, under this scenario the number of jobs accessible by transit inceases signficantly.

The results from the scenario planning analysis informed the list of needs both directly and indirectly. In some instances, projects identified in a specific scenario were included in the list of needs, whereas in other instances, the results influenced the approach to Broward Vision 2100.

Key takeaways from the effort are that 1) a mixture of roadway and transit capacity improvements achieve better results than investing in one option over another, 2) technology enhancements such as connected vehicles improve travel times by reducing peak hour delay, and 3) transit use increases when growth is concentrated around high-capacity lines.

Table 4: Scenario Planning Equity Evaluation – Equity Subarea Results

Planning Factor	Performance Measure	Trend Scenario Value	Community Vision Scenario		Compact Development Scenario		Technology Scenario	
			Value/ % from Trend	*Equity Score*	*Value/ % from Trend*	*Equity Score*	*Value/ % from Trend*	*Equity Score*
Mobility[1]	Vehicle delay during peak periods (hours)	24,874	23,474 / -5.6%	1	26,996 / 8.5%	-1	21,212 / -14.7%	1
Accessibility[2]	Number of jobs accessible by **car** within 30 min	922,127	932,118 / 1.1%	1	913,384 / -0.9%	-1	948,255 / 2.8%	1
	Number of jobs accessible by **transit** within 30 min	572,805	914,893 / 59.6%	1	853,272 / 49.0%	1	736,862 / 28.6%	1
Safety[3]	Annual fatalities due to motor vehicle crashes	32.8	32.5/ -0.9%	1	33.0 / 0.7%	-1	32.5/ 0.8%	1
Environmental Stewardship	Daily carbon monoxide (CO) emissions (kg)	3,340	3,272/ -2.0%	1	3,360 / 0.6%	-1	3,272 / -2.0%	1
Economic Vitality[4]	Average auto travel time to activity centers with > 5,000 employees per sq mi (min)	23.3	23.1/ -0.9%	1	23.4 / 0.6%	-1	22.8 / -1.9%	1
Equity	**Composite score of other measures**			**6**		**-4**		**6**

Notes: 1) Delay is defined as excess travel time relative to free-flow conditions. 2) Population-weighted average of jobs from a TAZ; In-vehicle time excludes terminal time (auto modes), and access/egress/transfer walk and drive time and wait time (transit modes). 3) Based on 1.42 annual fatalities per 100 million VMT (2015 Traffic Crash Facts, Florida Department of Highway Safety and Motor Vehicles). 4) Population-weighted average of travel time from a TAZ.

Table 5: Scenario Planning Equity Evaluation – Non-Equity Subarea Results

Planning Factor	Performance Measure	Trend Scenario Value	Community Vision Scenario		Compact Development Scenario		Technology Scenario	
			Value/ % from Trend	*Equity Score*	*Value/ % from Trend*	*Equity Score*	*Value/ % from Trend*	*Equity Score*
Mobility[1]	Vehicle delay during peak periods (hrs)	102,242	94,694 / -7.4%	1	105,905 / 3.6%	-1	85,278 / -17.3%	1
Accessibility[2]	Number of jobs accessible by **car** within 30 min	907,148	918,716 / 1.3%	1	906,917 / 0%	0	938,359 / 3.4%	1
	Number of jobs accessible by **transit** within 30 min	534,191	880,434 / 64.8%	1	824,361 / 54.3%	1	705,154 / 32.0%	1
Safety[3]	Annual fatalities due to motor vehicle crashes	138.3	136.5 / -1.3%	1	136.8 / -1.1%	1	136.5 / -1.1%	1
Environmental Stewardship	Daily carbon monoxide (CO) emissions (kg)	14,264	14,040 / -1.6%	1	14,116 / -1.0%	1	13,996 / -1.9%	1
Economic Vitality[4]	Average auto travel time to activity centers with > 5,000 employees per sq mi (min)	24.0	23.8 / -1.1%	1	23.8 / -0.7%	1	23.4 / -2.1%	1
Equity	**Composite score of other measures**			**6**		**3**		**6**

Notes: 1) Delay is defined as excess travel time relative to free-flow conditions. 2) Population-weighted average of jobs from a TAZ; In-vehicle time excludes terminal time (auto modes), and access/egress/transfer walk and drive time and wait time (transit modes). 3) Based on 1.42 annual fatalities per 100 million VMT (2015 Traffic Crash Facts, Florida Department of Highway Safety and Motor Vehicles). 4) Population-weighted average of travel time from a TAZ.

2045 Needs Plan System Evaluation

The 2045 Needs Plan comprises projects identified through a call for projects, the scenario planning analysis, the transit vision, a review of previous plans and studies, collaboration with partners, a review of the travel demand model results for 2045, coordination among Broward MPO staff, and public participation.

Using selected performance measures, outputs from the SERPM model were used to evaluate the performance of the 2045 Needs Plan compared to the 2015 baseline network in equity areas compared to non-equity areas. From this, observations for key measures related to the three MTP goals were identified:

- **Goal 1: Move People & Goods** (Figure 2) – Transit supply increases more in equity areas, but transit use increases more in non-equity areas as the transit system expands and becomes competitive with or more attractive than driving.
- **Goal 2: Create Jobs** (Figure 3) – Access to jobs by premium transit increases at twice the level within equity areas compared to non-equity areas. Average travel time to work by transit decreases and by car increases at nearly the same rate for equity areas and non-equity areas.
- **Goal 3: Strengthen Communities** (Figure 4) – The percentage of population near transit service in equity areas increases at nearly twice that of non-equity areas. A generally similar performance for vehicle miles of travel (VMT) and air quality in equity areas vs. non-equity areas and only a slightly greater decrease in vehicle hours of travel (VHT) in equity areas is observed.

Appendix B provides additional detail on the 2045 Needs Plan System Equity Assessment results.

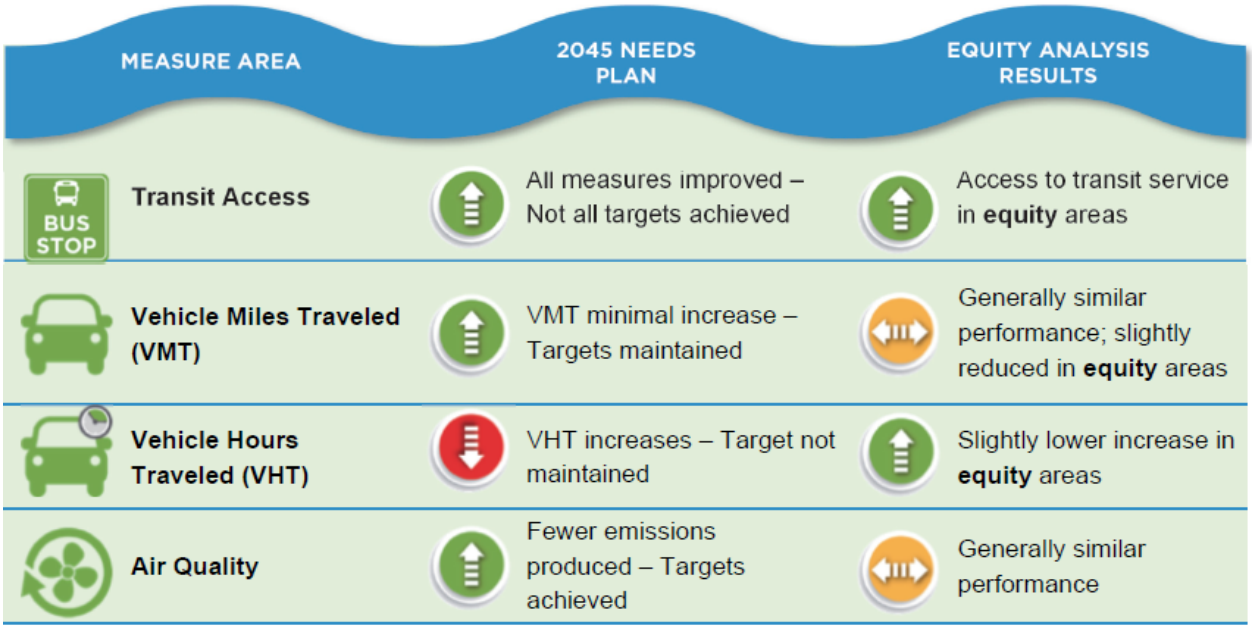
The 2045 Needs Plan equity assessment results will be compared to the 2045 Cost Feasible Plan equity assessment results to ascertain any differences in performance of the funded projects.

Figure 2: 2045 Needs Plan Equity Assessment (Goal 1: Move People & Goods)

MEASURE AREA	2045 NEEDS PLAN	EQUITY ANALYSIS RESULTS
Congestion Management	Generally, congestion is worse	Generally similar performance
Safety	Serious crashes increase with growth in travel – Targets not achieved	Generally similar performance
Delay	**Delay** is worse	Less delay in **equity** areas
Mode Share	Fewer SOV trips and more transit trips – Not all targets achieved	Greater increase in **non-equity** areas
Transit Supply	More transit is provided – Not all targets achieved	Greater improvement in **equity** areas
Transit Used	More transit is used – Targets achieved	Greater improvement in **non-equity** areas
System Capacity	More capacity is provided – Targets achieved	Greater percent change in **equity** areas; more absolute growth in non-equity areas

Figure 3: 2045 Needs Plan Equity Assessment (Goal 2: Create Jobs)

Figure 4: 2045 Needs Plan Equity Assessment (Goal 3: Strengthen Communities)



Project Prioritization

To ultimately determine which projects in the 2045 Needs Plan should receive funding for inclusion in the 2045 Cost Feasible Plan, they were prioritized. Commitment 2045 used a performance-based, mode-neutral approach to project prioritization in an effort to better align funded projects with the federally-required and regional performance measure. Prior to prioritizing them, projects were separated into the six funding programs established for the MTP—Roadway, Transit, Systems Management/Safety, Complete Streets and Localized Initiatives (CSLIP), Complete Streets Master Plan, and Mobility Hubs.

Only projects assigned to the Roadway and Transit funding programs were prioritized through the *Commitment 2045* process, as the remaining four funding programs have their own prioritization criteria and process established or in development on an annual or periodic basis. Equity assessment considerations have been (or will be) established for these other funding programs. For example, the Broward MPO recently updated its CSLIP program to include the equity areas in the project prioritization process for consistency (previously only proximity to low-income population was considered). This is also one example of how the equity assessment process is being used across several MPO plans and programs.

To provide for consistency between the earlier scenario planning effort and project prioritization process, it was decided that the prioritization criteria would be grouped into the same six planning factors used for the scenario evaluation—Mobility, Accessibility, Safety, Equity, and Environmental. Each was given a weighted value to align it with its importance to the community. The weighting values were determined through an interactive polling process with the Technical Advisory Committee (TAC), Citizens Advisory Committee (CAC), Local Coordinating Board (LCB), and the MPO Board. The values obtained were averaged and are presented in Table 6.

Table 6: Planning Factor Prioritization Weights

Planning Factor	Prioritization Weight
Mobility	20.5
Accessibility	20.8
Safety	18.7
Equity	14.3
Environmental Stewardship	12.8
Economic Vitality	13.0

In total, 21 criteria under the 6 planning factors were identified for prioritizing projects in an approach that was designed to be mode-neutral by focusing on the movement of people and goods as opposed to vehicles. Of these 21 criteria, 5 were included under the equity planning factor of "Ensuring that benefits and impacts are shared among Broward's population" (see Table 7).

Since multiple criteria related to equity were included in the project prioritization process, equity had a very meaningful impact in how the projects were prioritized. In more traditional project prioritization methods during the long-range transportation planning process, equity is included as a single criterion among many and typically relates to whether a project is located within an area of high proportion of minority and low-income populations. The relatively low weight this carries often means that equity has a minimal impact on the prioritization outcomes. **For *Commitment 2045*, a potential 8 points for equity out of the 37 points maximum allowed equity to be influential in the overall planning process.**

Table 7: Equity Planning Factor Project Prioritization Criteria

Criteria	Score	Description
Distribution of Transit Service Frequency	2	Project will add high-quality transit service to multiple new communities.
	1	Project will add high-quality transit service to one new community.
	0	Project will not add high-quality transit to any new communities.
	-1	Project may degrade transit service to a community.
Transit Services within Equity Areas	2	Project will provide more direct transit service between equity area and key activity center(s).
	1	Project will provide new transit service within equity area.
	0	Project will not provide new transit service within equity area.
	-1	Project may degrade transit service within an equity area.
Travel Time Savings within Equity Areas	2	Project may improve peak period travel time between equity area and key activity center(s).
	1	Project may improve peak period travel times within equity area.
	0	Project has no impact on travel times within equity area.
	-1	Project may degrade travel times within equity area.
Multimodal Safety within Equity Areas	2	Project will directly improve safety through improvements at a high-crash location within an equity area.
	1	Project may directly improve safety through improvements (regardless of existing crash situation) within an equity area.
	0	Project has no impact on safety within an equity area.
	-1	Project may introduce factors (higher speeds, higher traffic volumes, design features) that could adversely impact multimodal safety within an equity area.
Community Impacts	0	Project has no disproportionate impacts (physical and/or economic) on existing residences or businesses.
	-1	Project may have disproportionate impacts (physical and/or economic) on existing residences or businesses.
	-2	Project may have disproportionate impacts (physical and/or economic) on existing residences or businesses with an equity area.

2045 Cost Feasible System Evaluation

Between 2020 and 2045, $12.75 billion will be available to fund *Commitment 2045* transportation improvements throughout the Broward region. The initial five years of *Commitment 2045* (2020–2024) reflect the MPO's adopted and committed Transportation Improvement Program (TIP); the remaining 21 years (2025–2045) reflect the transportation improvements that can be funded with revenues that are reasonably expected to be available over this time period.

Major funding programs include major transportation investments in specific projects that are itemized in the *Commitment 2045* MTP. The MPO maintains two major funding programs—the Roadway Program and the Transit Program. Other funding programs are set up in the MTP to allocate funding to various types of projects that are to be identified and prioritized annually or every two or three years following adoption of the MTP. This means that specific projects are not identified in the 2045 MTP for these programs.

Based on the project prioritization results and available funding, roadway and transit projects were assigned to the appropriate funding programs to determine how many projects can be funded. The resulting funded projects are included in the 2045 Cost Feasible Plan.

The equity assessment for the 2045 Needs Plan was conducted for the 2045 Cost Feasible Plan to understand potential equity impacts of the funded transit and roadway projects. Generally, the same trends observed for the 2045 Needs Plan are also observed for the 2045 Cost Feasible Plan, indicating that there are no significantly different benefits or potential impacts to the equity vs non-equity areas based on the funded transit and roadway projects.

Figures 5, 6, and 7 summarize the trends observed in the 2045 Cost Feasible Plan equity assessment for Goals 1, 2, and 3, respectively. Following these figures is a summary of the changes observed for each performance measure for equity vs. non-equity areas when comparing the two system assessments.

Appendix C provides additional detail on the 2045 Cost Feasible System Equity Assessment.

Figure 5: 2045 Cost Feasible Plan Equity Assessment (Goal 1: Move People and Goods)

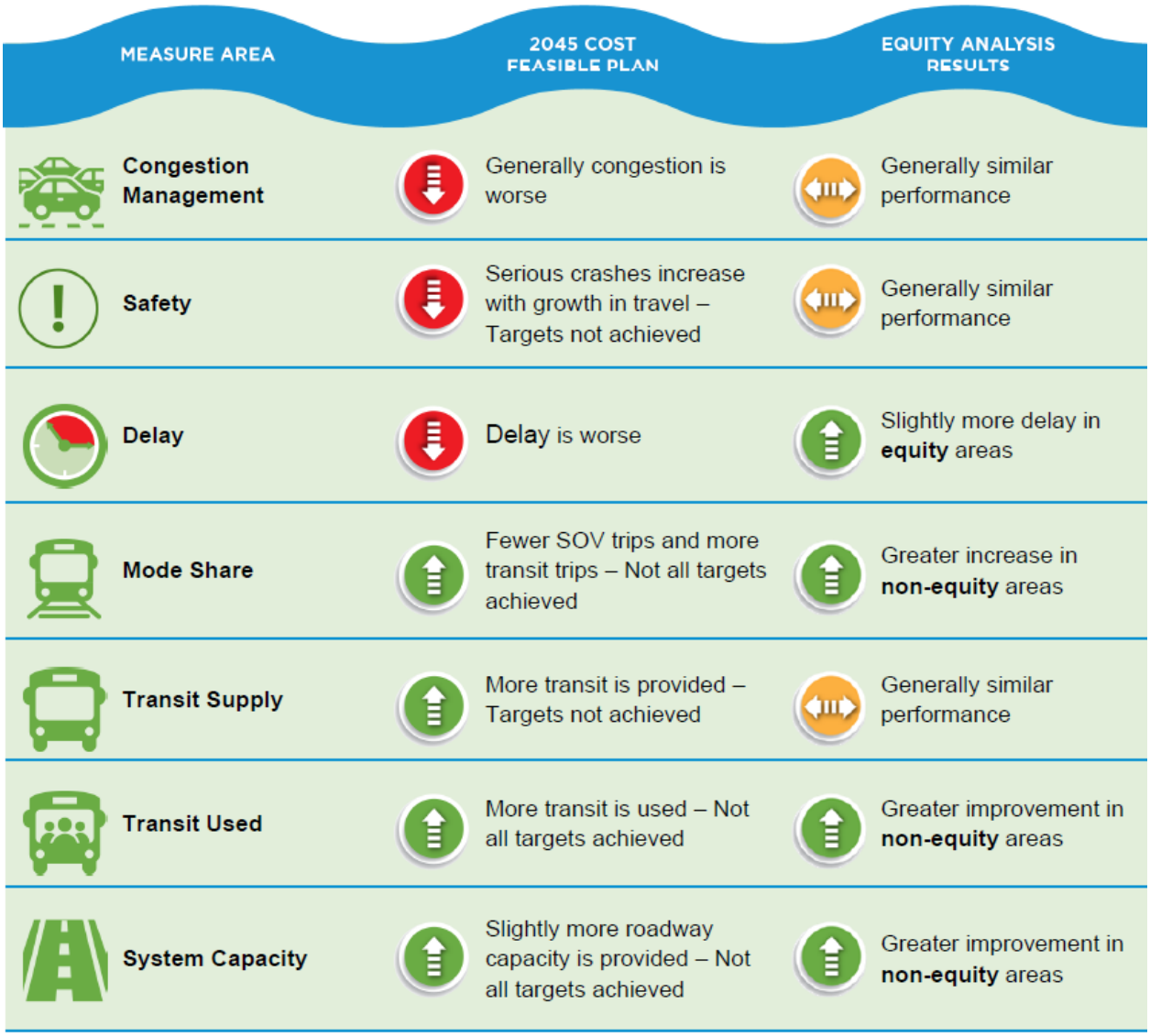


Figure 6: 2045 Cost Feasible Plan Equity Assessment (Goal 2: Create Jobs)

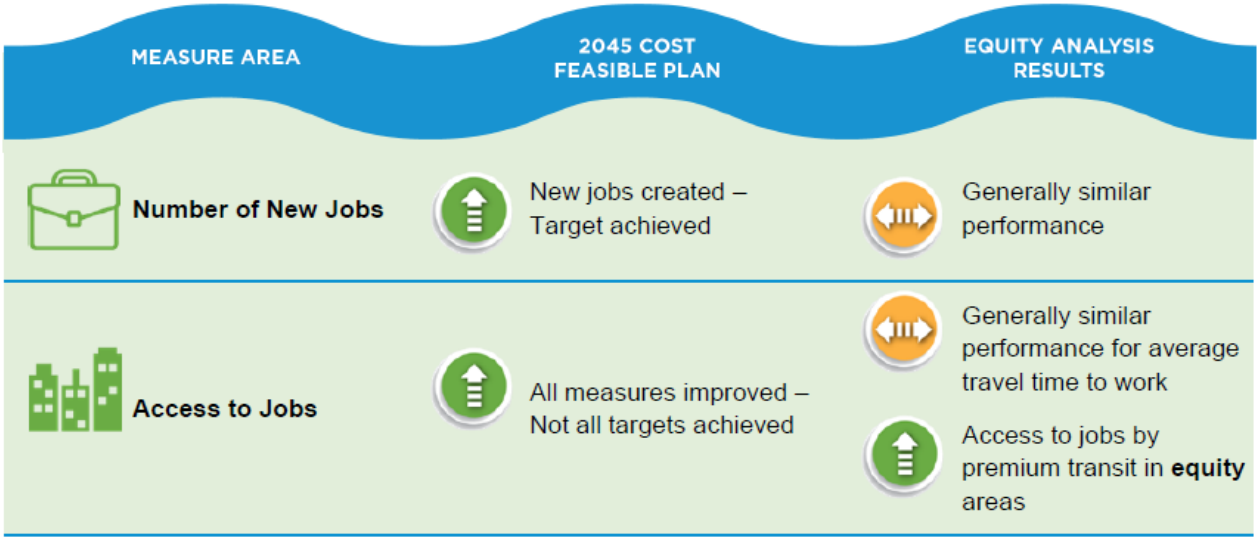
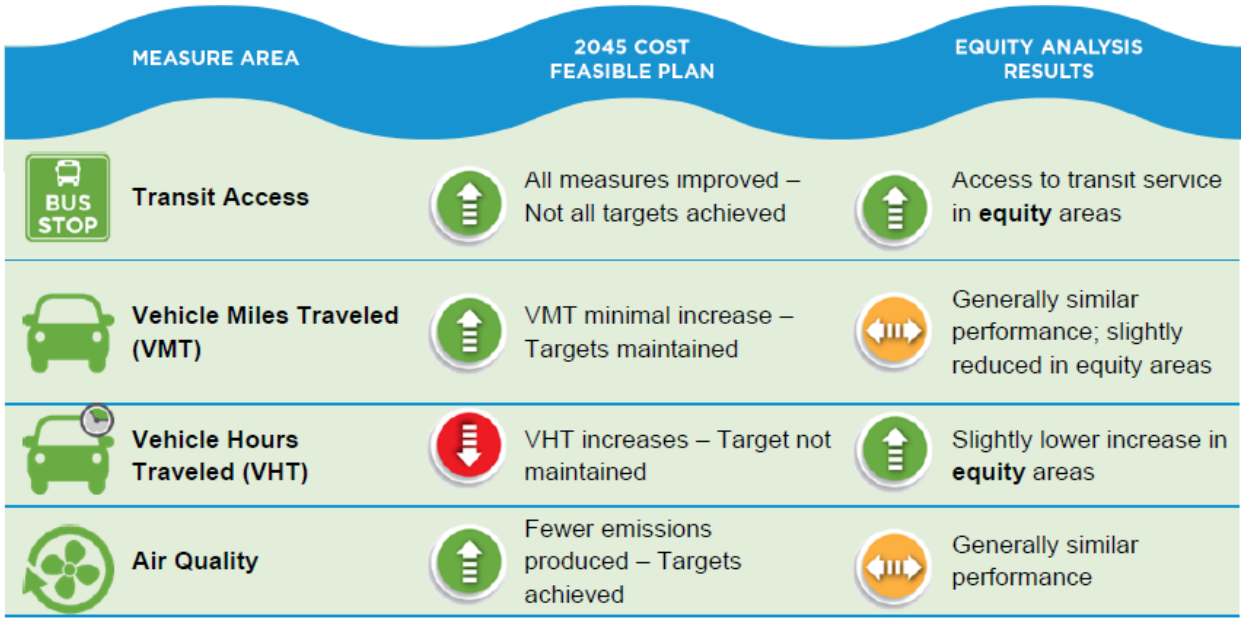


Figure 7: 2045 Cost Feasible Plan Equity Assessment (Goal 3: Strengthen Communities)



Observed differences in the equity assessment completed for the 2045 Needs Plan and 2045 Cost Feasible Plan are summarized below.

Performance Measures for Goal 1: Move People & Goods

- *Congestion Management* – similar trends were observed for the 2045 Needs vs. Cost Feasible systems, although the percentage of other roadways (non-freeway, uninterrupted roads, and high-speed arterials) operating at or above the level of service (LOS) standard for the AM peak period is reduced in equity areas.
- *Safety* – serious crashes increase with growth in travel, but performance measures generally did not change when comparing the 2045 Needs and Cost Feasible Plans.
- *Delay* – the level of delay worsens with the 2045 Cost Feasible Plan in both equity and non-equity areas; however, the delay is slightly worse in equity areas (as opposed to slightly better for equity areas in the 2045 Needs Plan system).
- *Percent of Mode Share* – the percent of transit mode share resulting from the 2045 Cost Feasible Plan is significantly lower than compared to the 2045 Needs Plan and is reduced proportionally across equity and non-equity areas.
- *Transit Supply* – the average transit system service headways and annual revenue hours of service per capita perform slightly better in non-equity areas compared to equity areas for the 2045 Cost Feasible Plan.
- *Transit Used* – passenger trips do not increase as much in the 2045 Cost Feasible Plan compared to the 2045 Needs Plan for both equity and non-equity areas, which is expected, given that fewer transit projects are funded than needs identified. However, the metrics generally performed better for non-equity areas in the 2045 Cost Feasible Plan and were achieved for the passenger trips per revenue hour metric for non-equity areas.
- *System Capacity* – the proposed miles of dedicated transitways are not funded in the 2045 Cost Feasible Plan. Lane miles have minimal increases across the board with a slightly higher increase in non-equity areas.

Performance Measures for Goal 2: Create Jobs

- *Number of New Jobs* – the number of new jobs is not influenced by the funded projects and is assumed the same for the 2045 Needs Plan and 2045 Cost Feasible Plan. Performance measures related to percent of employment within ¼-mile of transit service and the average auto and transit travel times to employment centers were fairly consistent for both equity and non-equity areas. However, the percent of employment within ¼-mile of premium transit service (defined as >50% fixed guideway) was reduced significantly in the 2045 Cost Feasible Plan based on the premium transit projects identified for funding. The increase in this performance measure is greater in equity areas than non-equity areas, which is expected given that the highest priority premium transit projects are located within equity areas.

Performance Measures for Goal 3: Strengthen Communities

- Performance measures related to transit access, VMT, VHT, and air quality generally did not change when comparing the 2045 Needs and Cost Feasible Plans, and the results were very similar when comparing equity vs. non-equity areas.

Appendix A: Equity Area Methodology

Broward MPO
Metropolitan Planning Organization

Transportation Planning Equity Assessment Equity Score Calculation Methodology

Revised December 2018

Move People & Goods | Create Jobs | Strengthen Communities

BrowardMPO.org

Broward MPO
Metropolitan Planning Organization

Move People & Goods. Create Jobs. Strengthen Communities.

Our Mission: To collaboratively plan, prioritize, and fund the delivery of diverse transportation options.

Our Vision: Our work will have measurable positive impact by ensuring transportation projects are well selected, funded, and delivered.

CONTENTS

Section 1 Introduction

The Broward Metropolitan Planning Organization (Broward MPO) is developing a process to more consistently and comprehensively evaluate its plans and programs against Title VI and other Federal and state nondiscrimination authorities, including Environmental Justice (EJ). This effort is driven by the following goals, designed to develop a systemic process that:

- **Consistently evaluates** transportation plans and programs against Federal and state nondiscrimination authorities.
- **Improves efficiency** in planning processes and programs.
- **More effectively satisfies** Federal Title VI and EJ requirements.
- **Produces meaningful outcomes** for the community through MPO transportation planning programs, particularly for Title VI and EJ populations.
- **Identifies adverse impacts early** at the planning level rather than later at the project funding and delivery level

One of the initial steps in this process is preparing a methodology that provides a consistent approach for identifying areas of Broward County that have a higher proportion of populations protected under Title VI and other Federal and state nondiscrimination authorities. This methodology is not intended to definitively identify areas of concern or satisfy EJ requirements; it is intended to be an initial method to identify such areas as part of a broader EJ assessment process. This process should be complemented with local knowledge of the community and fact checking and discussion with the Broward MPO's Citizens Advisory Committee (CAC), local stakeholders/community organizations, and others, as appropriate, to confirm or refute quantitative data findings.

This methodology is not intended to definitively identify areas of concern or satisfy EJ requirements; it is intended to be an initial method to identify such areas as part of a broader EJ assessment process.

This report documents the methodology used to define equity areas in Broward County based on the concentration of populations protected under Title VI and other Federal and state nondiscrimination authorities. Equity areas are defined by an equity score, which is calculated using a methodology contained in an Excel-based data analysis file ("Data Analysis File") described herein. The methodology used to develop the Data Analysis File has been reviewed and approved by the Broward MPO Working Group. The Working Group was established for the duration of this effort and consists of a diverse mix of staff responsible for various MPO functions and core products, such as the Metropolitan Transportation Plan, Transportation Improvement Program, public outreach, data and information systems, etc.

1.1 Overview of Title VI & Environmental Justice

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Executive Order (EO) 12898 calls on each Federal agency to achieve "environmental justice ... by identifying and addressing, as

appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations…." U.S Department of Transportation (DOT) Order 5610.2(a) and Federal Highway Administration (FHWA) Order 6640.23A sets forth the DOT policy to consider EJ in all DOT programs, policies, and activities. As a recipient of U.S. DOT funds, the Broward MPO is required to comply with EO 12898 and U.S. DOT Order 5610.2(a) and FHWA Order 6640.23A by incorporating EJ principles into its transportation decision-making processes.

Title VI of the Civil Rights Act of 1964 states that "no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance."

As a recipient of Federal funds, the Broward MPO is required under the Federal Transit Administration (FTA) Title VI Circular 4702.1B to prepare a Title VI Program demonstrating compliance with Federal regulations. The Broward MPO also is responsible for monitoring any subrecipients to ensure their compliance with Title VI concerning Federal funds received through the Broward MPO. The Broward MPO's current Title VI Program update was approved by the MPO Board on October 12, 2017.

Title VI and EJ are similar, in that they both:

- Address non-discrimination
- Identify minorities as a protected population
- Are rooted in the constitutional guarantee that all citizens are created equal
- Address involvement of affected community members in the decision-making process

Although similar, there are some distinctive differences between Title VI and EJ (see Figure 1). Title VI is a Federal statute that prohibits discrimination based on race, color, national origin (as well as gender, age, and persons with disability through other Federal and state nondiscrimination authorities), whereas EJ is directive to Federal agencies to achieve environmental justice by addressing disproportionately high and adverse effects of activities on minority and low-income populations. Title VI prohibits discrimination by law, and EJ mandates a process for inclusive decision-making.

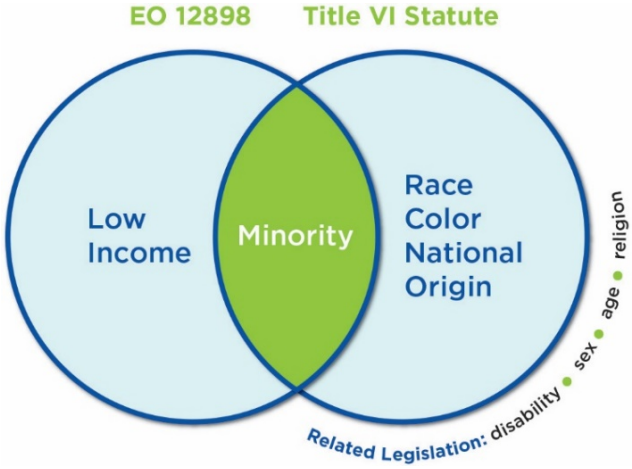


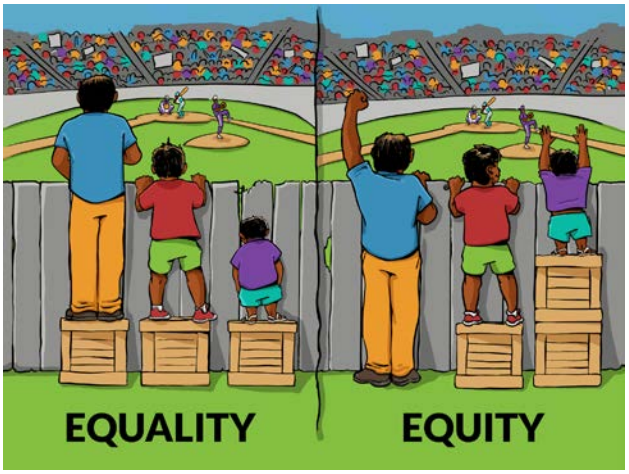
Figure 1: Relationship between Title VI & Environmental Justice

Source: Federal Highway Administration (FHWA)

1.2 Current Title VI & Environmental Justice Efforts

As a requirement to receive Federal funding and in good planning practices, the Broward MPO has incorporated Title VI requirements and EJ principles into its various planning programs. However, the methods used and extent to which this has been done varies by plan, program, or project, depending on the scope of work or the leading agency (Broward MPO staff, consultant, other agency, etc.). Upon completion of this effort, the Broward MPO will have established a consistent process to evaluate Title VI/EJ principles across its different plans and programs, demonstrating nondiscrimination and providing a process that is equitable for all communities. This process will also consider how impacts, both positive and negative, are distributed. This process and supporting deliverables will also be available for use by municipalities and other agencies in Broward County and beyond.

Upon completion of this effort, the Broward MPO will have established a consistent process to evaluate Title VI/EJ principles across its different plans and programs.



Credit: Interaction Institute for Social Change | Artist: Angus Maguire

Prior to developing this initial assessment methodology, it is important to understand the historical context of Title VI/EJ analysis or evaluations previously undertaken by the Broward MPO. This section summarizes related highlights noted by Broward MPO Working Group members at the initial project meeting held on October 11, 2017.

Long-Range Transportation Plan (LRTP)/ Metropolitan Transportation Plan (MTP)

- The 2040 LRTP included a ½-mile buffer to identify potential impacts on low-income, minority, and Limited English Proficiency (LEP) populations.
- Actions were taken if adverse impacts were identified and prompted the MPO to either look further into the project to resolve impacts, not include the project, or flag for more analysis later.
- The LRTP/MTP is not the appropriate planning level to identify detailed impacts that may result from environmental assessments, potential takings, etc. However, the LRTP/MTP does provide opportunities to eliminate, alter, or reprioritize projects whose adverse impacts are presumed.
- This current process for EJ assessment will be considered in the 2045 LRTP development.

Transportation Improvement Program (TIP)

- The FY 2018–2022 TIP includes an EJ analysis section that maps line and point projects over block groups containing various demographic information (minority, low income, etc.). The threshold used to identify if a block group is "above average" for each demographic variable mapped is the county average.
- A "distribution of investment" approach was used to determine where projects fall in relation to identified EJ communities and the investment resulting from these projects within EJ communities versus non-EJ communities. It was noted that public outreach conducted for projects included in the TIP had separate EJ assessments to varying degrees to help determine if community needs are addressed by these projects.

Complete Streets

- The Bicycle/Pedestrian Safety Action Plan has a formula that correlates identified areas of high EJ populations with crash hot spots.
- The Complete Streets Master Plan is using the same methodology as the Bicycle/Pedestrian Safety Action Plan and uses a statistically-driven calculation of selected demographic indicators to produce a four-tier concentration scale for identifying historically-vulnerable populations at the block group geography. The Complete Streets Master Plan methodology has been reviewed in detail as part of this methodology development process.

Complete Streets and other Localized Initiatives Program (CSLIP)

- Project selection for CSLIP grant funds incorporates equity and nondiscrimination principles by using the presence of low-income populations in the project area as part of the evaluation process.
- Cities are required to conduct outreach and identify impacts of proposed CSLIP projects.
- City policy leaders are required to adopt a resolution demonstrating support for the project prior to receiving funds.

Multimodal Corridor Studies

- Past corridor studies have included Title VI/EJ in the project prioritization process (although no standardized approach has been used).
- Some corridor studies have used Title VI/EJ areas to evaluate the project's public outreach success (e.g., Hollywood Pines Corridor Project and State Road 7 Multimodal Improvements Corridor Study).
- Projects resulting from these studies may have both positive and adverse impacts on a community. How the range of impact can be determined and addressed to assess overall benefit and general community consensus should be addressed as part of this methodology.

Public Outreach

- The Broward MPO has a robust program with different types of outreach (e.g., in-person, social media-based, project-based, etc.).
- *Speak Up Broward*, led by the Broward MPO, was developed and branded as an outreach effort to engage people in a conversation about transportation issues in Broward as well as raise the awareness of the Broward MPO.
- The Broward MPO has a traveling booth that goes to different communities. Reaching all communities is attempted, but a challenge remains that, outreach into some communities, especially smaller ones with limited staff resources is difficult. Partnering with agencies is a key to success in getting into a new community.
- The Broward MPO uses its website, which was recently redesigned to be more user-friendly, and social media to engage stakeholders.
- The Broward MPO recently acquired the My Sidewalk to initially develop a safety dashboard that will be integrated into the MPO's website. Discussion of how the equity scores can be integrated into My Sidewalk and how My Sidewalk can further support Broward MPO's EJ assessment efforts is ongoing.
- The Broward MPO mapped outreach locations in its last two annual reports. These data were also mapped over minority/LEP data in the Title VI Program and identified communities that can be emphasized for future engagement by the Communications and Outreach team. The data can be an important resource, as they are collected and maintained over time.

My Sidewalk is an interactive online platform that tracks and analyzes data and communicates this information to the public through user-friendly visual reports and dashboards.

Section 2 Methodology and Data Analysis File Development

This section documents potential approaches evaluated during this process and the methodology used develop the Data Analysis File. Examples illustrating potential applications of the final methodology also are provided.

2.1 Potential Methodological Approaches

Based on research conducted at the start of this process, three primary methodologies for locating population-based areas of concern were identified and evaluated – threshold-based approach, population-weighted approach, and community-based approach.

Threshold-Based Approach

The threshold-based approach is the most common approach for identifying a concentration of a specific population within a certain geographic area (such as a Census tract or block group) relative to a larger reference area (such as a county or region); however, there is no standard method to follow for determining the threshold. The most common methods encountered include:

- Identifying areas with populations above the reference area average. For example, if a block group contains 25% low-income population and the county, as the reference area, has an overall average of 20% low income-population, then the block group has a higher percentage of low-income population than the county and the block group would be identified as such.
- Identifying areas with majority (≥50%) of a given population present.
- Identifying areas with a percentage of the population greater than a statistically-derived number (e.g., percentage greater than standard deviation greater from the reference area average)

Results derived from this approach are only as accurate as the data used. Certain demographic variables can contain significant inconsistencies and should be verified through a detailed analysis and further vetted using local knowledge of the community.

Composite indices also can be used as an extension of the threshold method, which combines multiple demographic variables, or indicators, into a single measure or score. Although this method can be effective in identifying areas of particular concern, it risks obscuring the needs of individual demographic groups. Therefore, it is important that a potential methodology using this approach has the ability to evaluate individual demographic variables as well as the overall composite index.

Population-Weighted Approach

The population-weighted approach does not identify discrete geographic areas, such as Census tracts or block groups. Rather, the outcome for a particular group is calculated as the weighted mean of that demographic variable over all areas. The methods used in this approach are more limited and less subjective than the threshold approach.

Community-Based Approach

The community-based approach involves talking to community members and stakeholders to identify the locations of specific population groups. Challenges to this method are that it does not rely on a standardized quantitative process and it risks biased identification of population groups or other communities; however, it can serve as a crucial part of involving and co-empowering these communities.

2.2 Methodology Objectives

Prior to developing the Data Analysis File, five objectives for the methodology were identified and vetted with the Working Group. These objectives served as a guideline and checklist during the methodology development to ensure that it meets the broader project goals described in the introduction. The five methodology objectives and discussion of how each were met is provided below.

The Working Group identified five key objectives to serve as guidelines during the Data Analysis File development process in support of the overall project goals.

- ***Objective 1: Use available and accessible data*** *from standard, easily-obtainable, and frequently-updated sources such as the U.S. Census, the American Community Survey (ACS), etc*. All selected indicators are data obtained from the American Community Survey (ACS) Five-Year Estimates.
- ***Objective 2: Be flexible for MPO/local plans and programs*** *where resulting outputs can be modified to accommodate different planning efforts, if needed.* The methodology can be used to develop either an overall composite equity index or an index based only on selected variables. The Data Analysis File also can be scaled to other geographies, including by Census tract or other defined regions/subareas comprising a specific collection of block groups or tracts, if appropriate for a particular plan or program.
- ***Objective 3: Be simple to use****, providing a methodology and analysis file that is user-friendly and easy to understand.* The Data Analysis File was designed with simplicity and user-friendliness in mind with clear instructions so that anyone will be able to use it.
- ***Objective 4: Be objective*** *so results are transparent and cannot be manipulated by the perspective or opinion of the person developing the model or by the user.* The Data Analysis File does not require any scores or weights be input by the developer/user. Outside of using statistical analysis or other similar approaches,

developing and applying scores and weights can be subjective. The Data Analysis File uses statistical analyses to derive all scores, eliminating user subjectivity.

- ***Objective 5: Be open-sourced*** *such that MPO staff can maintain, update, or modify the data as necessary.* The Data Analysis File is an Excel-based file that can be modified/updated by MPO staff or others in the future.

2.3 Methodology Overview

Following review of the potential approaches, it was determined that a quantitative, statistically-driven threshold-based approach would best satisfy the methodology objectives previously presented. Since this overall effort is looking at a range of potential equity indicators, it also was determined that a methodology to develop a composite score comprising multiple indicators (with Broward County as the reference area) would be most appropriate. As previously stated any results produced by the Data Analysis File will be fact checked and discussed using local knowledge of the community.

The Data Analysis File uses a threshold-based approach, building on a methodology used in Florida transportation and transit plans since 1995.

The Transportation Planning Equity Data Analysis File methodology presented to the Working Group is based on the Transit Orientation Index (TOI) methodology. This methodology was first developed by the University of South Florida's Center for Urban Transportation Research (CUTR) and has since been enhanced by Tindale Oliver and used in transportation and transit projects (including Transit Development Plans) throughout Florida and beyond over the last 20 years.

Using the TOI methodology as a framework, the methodology used to develop the Data Analysis File includes the following five steps:

1. Calculate the countywide average threshold for each indicator.
2. Assign indicator categories to block groups based on the standard deviation of the indicator's dataset.
3. Calculate the comparative score for each indicator.
4. Calculate the equity composite score.
5. Assign the equity composite score category to each block group.

This methodology was designed to meet the five methodology objectives, as described in Section 2.2 on page 8.

2.4 Indicator Selection

This section documents the preliminary equity indicators initially considered, the process for evaluating the potential indicators, and the final equity indicators to be used in the methodology.

Preliminary Equity Indicators

As part of the methodology review process completed with the Working Group, preliminary equity indicators (presented in Table 1) were identified based on Title VI/EJ and related non-discrimination authorities, a review of the MPO's existing plans and programs, and data available from sources such as the ACS.

Table 1: Preliminary Equity Indicators

Equity Indicator	Countywide Average (Source)
Minority Population(1)	59.6% (ACS)
Non-Hispanic Minority Population	32.7% (ACS)
Low-Income Households	14.5% (ACS)
Household and Transportation (H + T) Affordability	See individual indicators through (H + T Affordability Index)
Older Adult Population (65+)	15% (ACS)
Limited English Proficiency (LEP) Population	15.3% (ACS)
Female Head of Household with Children	13% (ACS)
Single Parent Household	16.4% (ACS)
Persons with a Disability	8.3% (ACS)
Households Receiving Food Stamps	13.5% (ACS)
Population without a High School Diploma	11.8% (ACS)
Zero Vehicle Households	7.7% (ACS)
Zero Vehicle + Low-Income Households (multiple indicators)	See individual indicators (ACS)
Limited English Proficiency (LEP) + Low-Income Households (multiple indicators)	See individual indicators (ACS)
Population Below Poverty with a Disability	2.2% (ACS)

ACS=American Community Survey

(1) Based on race and ethnicity; minority defined as non-White, non-Hispanic

Each indicator from this list was initially identified as primary or secondary. Primary indicators provide overall information related to the demographic category being considered and secondary indicators provide information about a subset of the primary indicator. For example, minority population is considered the primary indicator when quantifying the minority population of an area. Non-Hispanic minority population is a secondary indicator, as these data are a subset of the minority population data (the primary indicator).

The primary single indicators were initially explored for inclusion in the methodology, as noted in Table 2. Multiple indicators are not recommended for inclusion, as they are already represented by other single indicators. Final preliminary indicators were selected for the methodology when they tie back to the Title VI statute or DOT Order 5610.2(a) and FHWA Order 6640.23A, or when they could potentially enhance the representation of traditionally transportation-dependent populations not included under these requirements.

Table 2: Evaluation of Preliminary Indicators

Category	Indicator	Primary/ Secondary	Potential Inclusion in Methodology?
Income	Households defined as below poverty level	Primary	Yes
	Household and transportation affordability	Secondary	No
	Households receiving food stamps	Secondary	No
Minority Population	Minority population (defined as non-White)	Primary	Yes
	Non-Hispanic minority population	Secondary	No
Age	Older adults (65+ years)	Primary	Yes
	Independent youth (10-17 years) *Span of years noted above based on age categories available in ACS	Primary	Yes
Limited English Proficiency (LEP)	LEP population	Primary	Yes
Vehicle Access	Zero vehicle households	Primary	Yes
Educational Attainment	Population without a high school diploma	Primary	Yes
Disability Status	Persons with a disability	Primary	Yes
Household Composition	Female head of household with children	Primary	Yes
	Single parent household	Secondary	No
Multiple Indicators Combined	LEP + low-income households	N/A	No
	Zero vehicle + low-income households	N/A	No
	Population below poverty with a disability	N/A	No

Final Equity Indicators

The preliminary indicators were then further assessed to determine if appropriate to include in the final methodology. This evaluation included:

- Examining the indicator's relationship to Title VI or EJ (and related nondiscrimination authorities).
- Understanding any potential correlation between indicators to avoid unintentional weighting of the data.
- Reviewing historical use of indicators included in previous Broward MPO plans and programs.
- Discussions with Working Group members.
- Discussions with peer agencies conducting similar efforts to understand and consider the indicators used and rationale for inclusion.
- Examining the margin of error data provided by the ACS for each indicator.

The final equity indicators in the Data Analysis File include two sets. The core indicators tie directly to Title VI & EJ. Other optional indicators are available for use on a case-by-case basis.

Based on the comprehensive assessment completed, the following recommendations were made to guide inclusion of the indicators:

- **Identify a "core" set of indicators that tie directly to Title VI and other Federal and state nondiscrimination authorities.** Other indicators will then be identified as "optional" and available for use in the Data Analysis File on a case-by-case basis.
- **Examine ACS margin of error data to maintain integrity of the data.** This examination should include a periodic calculation of the percentage of block groups where the margin of error exceeds 100% or more of the block group estimate. If a core indicator has more than 30% of the block groups where this occurs, then it should be moved to the "optional" indicator list to be used on a case-by-case basis with caution, as the data may not be as reliable.
- **Include separate race and ethnicity indicators in the model rather than a combined minority indicator.** Including both race and ethnicity data as separate indicators allows more flexibility in the model for how minorities can be defined and allows the analysis and scoring methodology to account for race (i.e., Black, White, Asian, American Indian/Alaska Native, Native Hawaiian/Other Pacific Island, Other Race) separately from ethnicity (Hispanic or Latino). This addresses concerns by Working Group members as to how "minority" should be defined within Broward County, which is a minority-majority county. A comparison of the Data Analysis File outputs including both the race and ethnicity indicators as opposed to the consolidated minority indicator confirms there is no significant change to the analysis.
- **Use a consistent denominator across all core indicators.** Although the methodology presented in the next section normalizes the indicator's dataset regardless of the denominator, it is recommended that all core indicators have a population-based denominator for consistency purposes. A comparison of the model outputs using the individuals below poverty indicator rather than households below poverty confirms there is no significant change to the analysis results.

Table 3 summarizes the final core versus optional indicators recommended for inclusion in the Data Analysis File, followed by a discussion of the legislation governing the protected class(es) identified for each core indicator.

Table 3: Transportation Planning Equity Areas – Final Indicators

Core Indicators	Core Indicator Protected Class	Optional Indicators
Racial Minority	Race and minority	Zero Vehicle Household
Ethnic Minority	Minority and national origin	Female Head of Household
Youth (age 10–17 years)	Age	No High School Diploma (25 years & older)
Older Adults (65 years & older)	Age	Minority (both race/ethnicity combined)*
Population Below Poverty	Low-income	
LEP Population	Minority and national origin	
Population with a Disability	Disability	

*This indicator should be used only if the racial and ethnic minority indicators under the core indicator category are not used.

- The racial minority, ethnic minority, and LEP indicators tie to protected classes of race and ethnicity, as detailed in Title VI of the Civil Rights Act of 1964.
- The youth and older adult indicators address inclusion of these populations as protected classes to not discriminate based on age under related nondiscrimination legislation, the Age Discrimination Act of 1975. The Federal Highway Administration (FHWA) has also published EJ guidelines to include children and older adults as "traditionally underserved" population groups when conducting equity analyses.
- The low-income indicator relates to the requirements of DOT Order 5610.2(a) and FHWA Order 6640.23A to consider impacts on low-income populations.
- Persons with disabilities are protected under related nondiscrimination legislation, the Americans with Disabilities Act (ADA) of 1990.

Indicator Data Sources

All selected core and optional indicators are data obtained from the ACS Five-Year Estimates. A summary of the final indicators and their data tables are provided in Table 4.

Table 4: Final Indicator Data Sources

Indicator	ACS Data Table
Core Indicators:	
Racial Minority	B03002: Hispanic or Latino Origin by Race
Ethnic Minority	B03002: Hispanic or Latino Origin by Race
Youth	B01001: Sex by Age
Older Adults	B01001: Sex by Age
Population Below Poverty	B17021: Poverty Status of Individuals in Past 12 Months by Living Arrangement
LEP population	B16004: Age by Language Spoken at Home by Ability to Speak English for the Population 5 Years and Over
Population with a Disability	B23024: Poverty Status in Past 12 Months by Disability Status by Employment Status for the Population 20 to 64 Years
Optional Indicators:	
Zero Vehicle Households	B25044: Tenure by Vehicles Available
No High School Diploma	B15003: Educational Attainment for Population 25 Years and Over
Female Head of Household	B11003: Family Type by Presence and Age of Own Children Under 18 Years
Minority	B03002: Hispanic or Latino Origin by Race

2.5 Index Methodology

The methodology used to calculate the composite scores to identify Transportation Planning Equity Areas in Broward County consists of five steps, as previously noted. These steps are further explained in this section, with example applications provided for illustrative purposes.

Step 1: Calculate the countywide average for each indicator.

A benefit of this methodology is that it does not rely on establishing an arbitrary threshold (i.e., anything ≥50% or over the countywide average for an indicator is flagged as an area of concern). Rather, the methodology relies on calculating standard deviations so that resulting scores are based on the extent to which an indicator in any given block group conforms or diverges with the countywide norms. Since the data determine the breakpoints, this eliminates any potential subjectivity.

The countywide average threshold for each indicator was calculated and are shown in Table 5.

Table 5: Countywide Average Threshold by Indicator

Equity Indicator	Countywide Average Threshold
Core Indicators:	
Race	31.04%
Ethnicity	25.67%
Youth	9.02%
Older Adults	17.01%
Below Poverty	14.83%
Limited English Proficiency	14.98%
Persons with a Disability	8.87%
Optional Indicators:	
No High School Diploma	12.41%
Female Head of Household	12.54%
Zero Vehicle Households	7.64%
Minority	55.69%

Source: ACS 2012–2016 Five-Year Estimates for Broward County.
*Threshold is calculated by averaging block group estimates. Averages may differ from estimates calculated at County level.

Step 2: Assign indicator categories to block groups based on standard deviation.

In this step, one of four categories is assigned to each block group for each indicator based on the standard deviation (distance from countywide average) of the indicator's dataset.

- Category 4 (Very High) = equal to or greater than +2 standard deviation from countywide average
- Category 3 (High) = equal to or greater than +1 standard deviation but less than +2 standard deviation from countywide average
- Category 2 (Medium) = equal to or greater than countywide average but less than +1 standard deviation from countywide average
- Category 1 (Low) = less than countywide average

Using the *population with a disability* indicator as an example, the resulting percentages based on the countywide dataset used to assign the categories for this indicator are:

- Category 4 (Very High) = equal to or greater than **21.58%**
- Category 3 (High) = equal to or greater than **15.23%** but less than **21.58%**
- Category 2 (Medium) = equal to or greater than **8.87%** but less than **15.23%**
- Category 1 (Low) = less than countywide average of **8.87%**

Using four block groups in Broward County as an example, the resulting indicator categories assigned for the *population with a disability* indicator are shown in Table 6.

Table 6: Category Assignment Determination (Example Application)

Block Group	% Population with a Disability	Category Assigned
1021	7.49%	Low
1042	12.90%	Medium
9021	21.06%	High
3052	26.93%	Very High

Step 3: Calculate the comparative score for each indicator.

This step assigns discrete numerical scores to each of the four indicator categories assigned to the dataset. These scores serve two purposes – to provide a uniform ranking for all block groups and to numerically differentiate among the four categories for each indicator.

To calculate the comparative score for each indicator, first, the total number of block groups that fall within each category under Step 2 is divided by the total number of block groups in the dataset to determine the comparative percentages of the categories (see Table 7). For example, of the 940 block groups in Broward County, 44 are assigned to the "very high" category for the *population with a disability* indicator. This results in a comparative percentage of 4.68% for the "very high" category in Broward County for this specific indicator. The results of this analysis may indicate that the transportation needs of Broward County may be vastly different than a neighboring community.

Table 7: Comparative Percentage Determination (Example Application)

Category	Count of Block Groups Assigned	Comparative Percentage
Low	550	58.51% (550/940)
Medium	255	27.13% (255/940)
High	91	9.68% (91/940)
Very High	44	4.68% (44/940)

Then using the percentage of block groups included under the "low" category in the numerator and the percentage specific to the indicator category assigned to the block group in the denominator (from Table 7), the comparative score for each block group is determined. This ensures that a block group categorized as "low" will always have a base score of 1.00.

Using the *population with a disability* indicator, the four example block groups are assigned one of four comparative scores, as shown in Table 8.

Table 8: Comparative Score Determination (Example Application)

Block Group	Category Assigned	Comparative Percentage Based on Category Assigned*	Comparative Score
1021	Low	58.51%	**1.00** (58.51/58.51)
1042	Medium	27.13%	**2.16** (58.51/27.13)
9021	High	9.68%	**6.04** (58.51/9.68)
3052	Very High	4.68%	**12.50** (58.51/4.68)

*Note: Sum of comparative percentages for all four categories should equal 100%, as in this example.

Step 4: Calculate the equity composite score.

To calculate the composite equity score for each block group, the scores for each core indicator are summed. Carrying forward the example from the previous step, the individual indicator scores and resulting composite equity score for the four selected block groups are shown in Table 9.

Table 9: Composite Equity Core Indicator Score Determination (Example Application)

Block Group	Individual Core Indicator Score							Composite Score
	Race	*Ethnicity*	*Youth*	*Age 65+*	LEP	Disability	Below Poverty	
1021	1.00	1.00	1.00	3.37	1.99	1.00	1.00	10.35
1042	1.00	1.00	1.00	12.47	1.00	2.16	2.31	20.94
9021	8.95	1.00	1.41	3.37	1.99	6.04	2.31	25.06
3052	3.28	1.00	1.00	12.47	5.76	12.50	5.38	41.40

Note: Composite score may be off by 0.01 due to rounding

Step 5: Assign equity composite score category to each block group.

Using the same methodology as in Step 2, an equity composite score category is assigned to each block group based on the standard deviation from the average composite score for all block groups in the dataset. The final composite equity score categories are assigned as follows:

- Category 4 (Very High) = equal to or greater than +2 standard deviation from average composite score for all block groups
- Category 3 (High) = equal to or greater than +1 standard deviation but less than +2 standard deviation from average composite score for all block groups
- Category 2 (Medium) = equal to or greater than countywide average but less than +1 standard deviation from average composite score for all block groups
- Category 1 (Low) = less than average composite score for all block groups

Following are the resulting final equity composite score categories assigned to the block groups based on a standard deviation of 11.20 from the average countywide score:

- Category 4 (Very High) = greater than **32.54**
- Category 3 (High) = equal to or greater than **24.48** but less than **32.54**
- Category 2 (Medium) = equal to or greater than **16.41** but less than **24.48**
- Category 1 (Low) = less than countywide average composite score of **16.41**

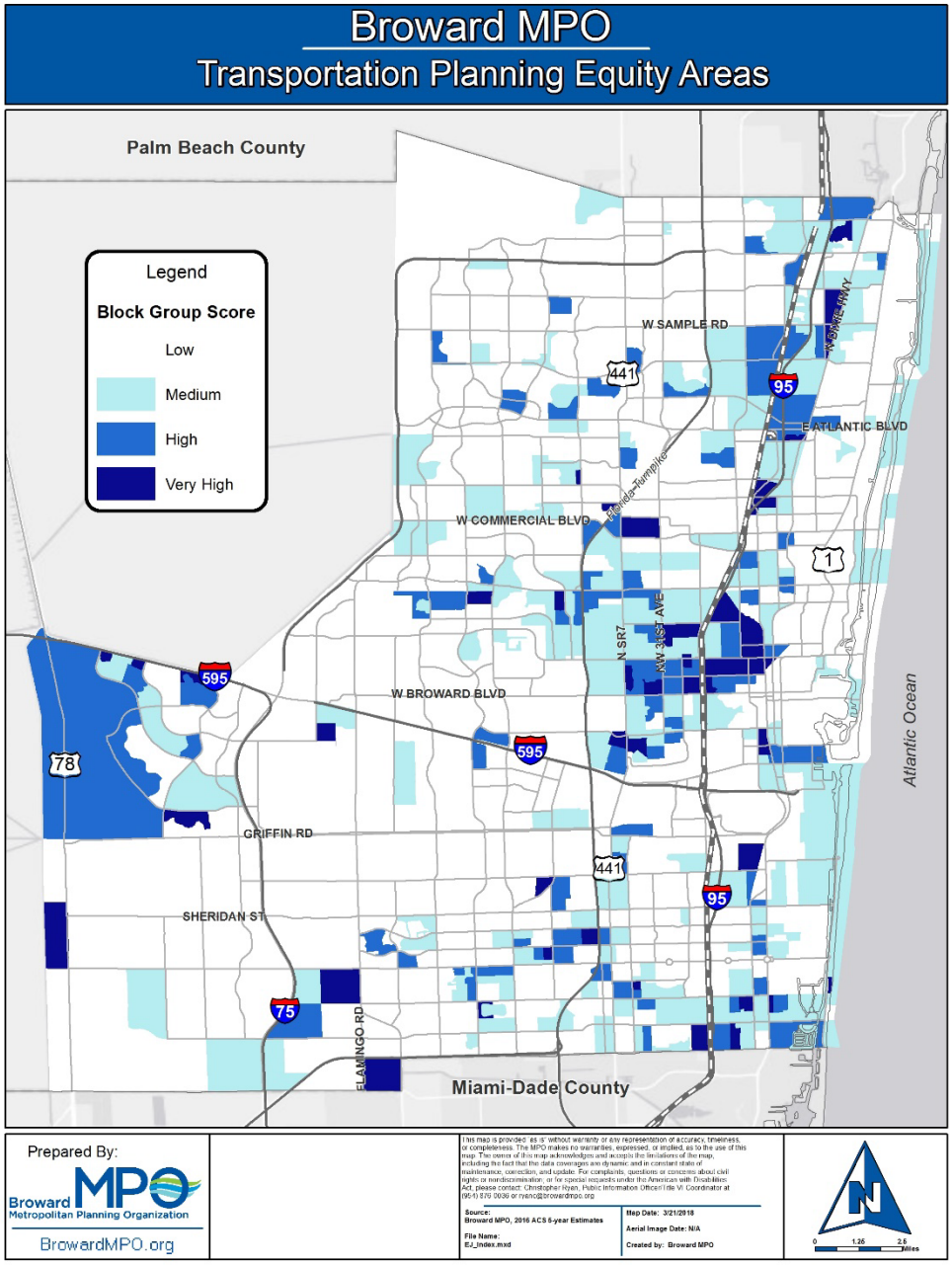
The final categories assigned to the four example block groups, based on the equity composite scores previously identified, are presented in Table 10.

Table 10: Final Equity Composite Score Categories (Example Application)

Block Group	Equity Composite Score	Final Composite Score Category Assigned
1021	10.35	Low
1042	20.94	Medium
9021	25.06	High
3052	41.40	Very High

Map 1 shows the final Transportation Planning Equity Area composite score for all block groups within Broward County based on the core indicators identified herein.

Map 1: Transportation Planning Equity Areas

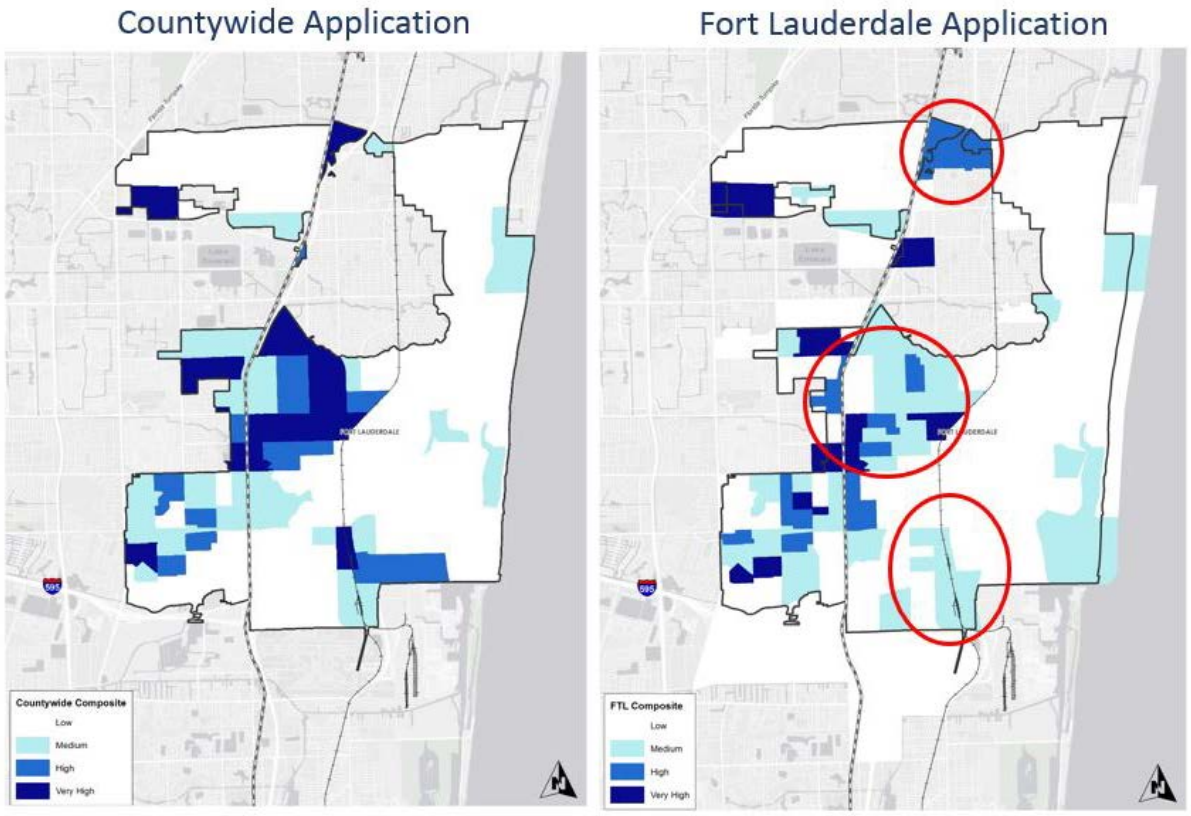


2.6 Subarea Application

Consistent with the methodology goals previously outlined, the Data Analysis File is also flexible in that it can recalculate scores based on a new defined dataset. For example, if a city-level analysis were to be completed for Fort Lauderdale, the composite equity scores will be calculated based on only the block groups within the city instead of the countywide data. Figure 2 shows how scores will differ between the countywide application and the city-level application. The red circles highlight major changes in block group scores.

The Data Analysis File can easily be applied at a sub-county geography, such as a city or other sub-area.

Figure 2: Countywide vs. City-Level Application (Example)



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Move People & Goods | Create Jobs | Strengthen Communities

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Appendix B: 2045 Needs Plan System Equity Assessment Results

Table B-1: 2045 Needs Plan Equity Assessment (Goal 1: Move People & Goods)

Measure Area	Performance Measure	Performance Measure Target (As Compared to 2015 Levels)	Desired Trend	Equity Areas	Non-Equity Areas
Reference Variables	Population	-	--	11.9%	22.9%
	Employment	-	--	29.1%	29.1%
System Safety	Annual Fatalities due to Motor Vehicle Crashes[1]	Reduce by 100% by 2045	↘	12.9%	22.7%
	Annual Incapacitating Injuries due to Motor Vehicle Crashes[2]	Reduce by 100% by 2045	↘	9.9%	23.4%
Congestion Management	Percent of Freeways Operating At or Above LOS Standards -- AM Peak	Improve by 5% or more by 2045	↗	-7.7%	2.6%
	Percent of Freeways Operating At or Above LOS Standards -- PM Peak	Improve by 5% or more by 2045	↗	-16.2%	-1.5%
	Percent of Freeways Operating At or Above LOS Standards -- Off- Peak	Improve by 5% or more by 2045	↗	-6.0%	-5.1%
	Percent of Uninterrupted Roads and High-speed Arterials Operating At or Above LOS Standards -- AM Peak	Improve by 2% or more by 2045	↗	-9.2%	-4.1%
	Percent of Uninterrupted Roads and High-speed Arterials Operating At or Above LOS Standards -- PM Peak	Improve by 2% or more by 2045	↗	-27.3%	-19.6%
	Percent of Uninterrupted Roads and High-speed Arterials Operating At or Above LOS Standards -- Off-Peak	Improve by 2% or more by 2045	↗	-1.0%	-1.0%
	Percent of Other Roadways Operating At or Above LOS Standards -- AM Peak	Improve by 2% or more by 2045	↗	-13.3%	-4.1%
	Percent of Other Roadways Operating At or Above LOS Standards -- PM Peak	Improve by 2% or more by 2045	↗	-18.9%	-15.8%
	Percent of Other Roadways Operating At or Above LOS Standards -- Off-Peak	Improve by 2% or more by 2045	↗	0.0%	-2.0%
	Percent of All Roadways Operating At or Above LOS Standards -- AM Peak	Improve by 5% or more by 2045	↗	-7.3%	-4.2%
	Percent of All Roadways Operating At or Above LOS Standards -- PM Peak	Improve by 5% or more by 2045	↗	-22.5%	-15.7%
	Percent of All Roadways Operating At or Above LOS Standards -- Off-Peak	Improve by 5% or more by 2045	↗	-2.0%	-2.0%
	Percent of National Highway Freight Network (NHFN) Operating At or Above LOS Standards -- AM Peak	Improve by 5% or more by 2045	↗	-7.5%	-13.6%
	Percent of National Highway Freight Network (NHFN) Operating At or Above LOS Standards -- PM Peak	Improve by 5% or more by 2045	↗	-10.9%	-22.0%
	Percent of National Highway Freight Network (NHFN) Operating At or Above LOS Standards -- Off-Peak	Improve by 5% or more by 2045	↗	-14.0%	-15.6%
Level of Delay	Total Daily Hours of Delay (Vehicle Hours)[4] Per Capita	Reduce by 10% or more by 2045	↘	92.1%	98.9%
Mode Share	Percent of Single Occupancy Vehicles (SOV) Mode Share	Reduce to 47% or less by 2045	↘	-1.1%	-0.9%
	Percent of Transit Mode Share	Increase to 2% or more by 2045	↗	50.6%	71.9%
Transit Supplied	Average Transit System Service Headways (Minutes)	Reduce by 20% or more by 2045	↘	-14.4%	-12.8%
	Annual Revenue Hours of Service per Capita (working days[5] only)	Increase by 20% or more by 2045	↗	11.4%	8.0%
	Annual Revenue Miles of Service per Capita (working days only)	Increase by 35% or more by 2045	↗	35.4%	28.1%
Transit Consumed	Transit Passenger Trips	Increase by 75% or more by 2045	↗	70.4%	115.3%
	Annual Transit Passenger Trips per Capita (working days only)	Increase by 50% or more by 2045	↗	52.3%	75.2%
	Transit Passenger Trips per Revenue Hour	Increase by 20% or more by 2045	↗	36.8%	62.2%
System Capacity	Miles of Dedicated Transitways[6]	Increase by 250% or more by 2045	↗	1100.0%	312.5%
	Lane Miles	Maintain or increase by 2045	↗	2.1%	8.7%

Notes: [1]Based on 1.42 annual fatalities per 100 million VMT (2015 Traffic Crash Facts, Florida DHSMV); [2]Based on 10.48 annual incapacitating injuries per 100 million VMT (2015 Traffic Crash Facts, Florida DHSMV); [3]The standard LOS for rural and urban areas are C and D, respectively. *Highway Capacity Manual* used to determine LOS. Total length of links operating at LOS standards divided by total length of all links to estimate percent of links operating at LOS standards; [4]Delay defined as excess travel time relative to free-flow conditions; [5]Number of working days in 2018 (261) used. [6]Includes Tri-Rail, LRT and BRT with >50% Fixed Guideway

Table B-2: 2045 Needs Plan Equity Assessment (Goal 2: Create Jobs)

Measure Area	Performance Measure	Performance Measure Target (As Compared to 2015 Levels)	Desired Trend	Equity Areas	Non-Equity Areas
Employment	Number of New Jobs relative to 2015	Increase by 25% by 2045	↗	29.1%	29.1%
Access to Jobs	Percent of Employment within 1/4 Miles of Transit Service	Increase to 70% by 2045	↗	3.1%	21.8%
	Percent of Employment within 1/4 Miles of Premium Transit Service (>50% Fixed Guideway)	Increase by 30% by 2045	↗	924.3%	410.5%
	Average Transit Travel Time[1] to Employment Activity Centers with >5,000 Employees per Square Mile[2]	Maintain or improve by 2045	↘	-7.9%	-8.4%
	Average Auto Travel Time to Employment Activity Centers with >5,000 Employees per Square Mile[2]	Maintain or improve by 2045	↘	7.5%	6.8%
	Average Total Transit Trip Time[2] for Daily Job Commute	Improve by 2045	↘	-6.4%	-7.2%
	Average Vehicle Travel Time for Daily Job Commute	Improve by 2045	↘	4.9%	4.8%

Notes: [1]Total travel time including in-vehicle and out-of-vehicle time (access/egress/transfer walk and drive time, wait time), [2]Population-weighted average of travel time from a TAZ.

Table B-3: 2045 Needs Plan Equity Assessment (Goal 3: Stregthen Communities)

Measure Area	Performance Measure	Performance Measure Target (As Compared to 2015 Levels)	Desired Trend	Equity Areas	Non-Equity Areas
Transit System Access	Percent of Population within 1/4 Miles of Transit Service	Increase to 60% by 2045	↗	21.3%	12.0%
VMT	Vehicle Miles Traveled (VMT) per Capita	2045 VMT grows by 10% or less	↘	-1.7%	0.4%
VHT	Vehicle Hours Traveled (VHT) per Capita	2045 VHT grows by 5% or less	↘	8.5%	10.0%
Air Quality / Pollutant Emissions	Total Daily Carbon Monoxide (CO) Emissions (kg)	Reduce by 10% or more	↘	-78.9%	-73.1%
	Total Daily Nitrogen Oxide (NO) Emissions (kg)	Reduce by 10% or more	↘	-96.8%	-96.2%
Transportation System Vulnerability & Resiliency	Lane Miles of Evacuation Routes per 100,000 Population	Maintain or increase by 2045	↗	-4.9%	-7.8%
	Miles of Public Roads and Rail Forecasted to be Permanently Inundated by between 1 ft. and 2 ft. of Sea Level Rise	Decrease by 2045	↘	52.6%	105.8%

Notes: [1]Total travel time including in-vehicle and out-of-vehicle time (access/egress/transfer walk and drive time, wait time).

Appendix C: 2045 Cost Feasible Plan System Equity Assessment Results

Table C-1: 2045 Cost Feasible Plan Equity Assessment (Goal 1: Move People and Goods)

Measure Area	Performance Measure	Performance Measure Target (As Compared to 2015 Levels)	Desired Trend	Equity Areas	Non-Equity Areas
Reference Variables	Population	-	--	11.9%	22.9%
	Employment	-	--	29.1%	29.1%
System Safety	Annual Fatalities due to Motor Vehicle Crashes[1]	Reduce by 100% by 2045	↘	12.9%	24.4%
	Annual Incapacitating Injuries due to Motor Vehicle Crashes[2]	Reduce by 100% by 2045	↘	11.6%	25.0%
Congestion Management	Percent of Freeways Operating At or Above LOS Standards -- AM Peak	Improve by 5% or more by 2045	↗	-10.3%	3.9%
	Percent of Freeways Operating At or Above LOS Standards -- PM Peak	Improve by 5% or more by 2045	↗	-16.2%	1.5%
	Percent of Freeways Operating At or Above LOS Standards -- Off- Peak	Improve by 5% or more by 2045	↗	-5.0%	-4.1%
	Percent of Uninterrupted Roads and High-speed Arterials Operating At or Above LOS Standards -- AM Peak	Improve by 2% or more by 2045	↗	-10.2%	-4.1%
	Percent of Uninterrupted Roads and High-speed Arterials Operating At or Above LOS Standards -- PM Peak	Improve by 2% or more by 2045	↗	-28.4%	-20.7%
	Percent of Uninterrupted Roads and High-speed Arterials Operating At or Above LOS Standards -- Off-Peak	Improve by 2% or more by 2045	↗	-2.0%	-1.0%
	Percent of Other Roadways Operating At or Above LOS Standards -- AM Peak	Improve by 2% or more by 2045	↗	-5.1%	-5.1%
	Percent of Other Roadways Operating At or Above LOS Standards -- PM Peak	Improve by 2% or more by 2045	↗	-21.1%	-16.8%
	Percent of Other Roadways Operating At or Above LOS Standards -- Off-Peak	Improve by 2% or more by 2045	↗	0.0%	-2.0%
	Percent of All Roadways Operating At or Above LOS Standards -- AM Peak	Improve by 5% or more by 2045	↗	-8.3%	-4.2%
	Percent of All Roadways Operating At or Above LOS Standards -- PM Peak	Improve by 5% or more by 2045	↗	-23.6%	-16.9%
	Percent of All Roadways Operating At or Above LOS Standards -- Off-Peak	Improve by 5% or more by 2045	↗	-2.0%	-2.0%
	Percent of National Highway Freight Network (NHFN) Operating At or Above LOS Standards -- AM Peak	Improve by 5% or more by 2045	↗	-7.5%	-11.9%
	Percent of National Highway Freight Network (NHFN) Operating At or Above LOS Standards -- PM Peak	Improve by 5% or more by 2045	↗	-10.9%	-22.0%
	Percent of National Highway Freight Network (NHFN) Operating At or Above LOS Standards -- Off-Peak	Improve by 5% or more by 2045	↗	-11.0%	-14.6%
Level of Delay	Total Daily Hours of Delay (Vehicle Hours)[4] Per Capita	Reduce by 10% or more by 2045	↘	107.9%	112.1%
Mode Share	Percent of Single Occupancy Vehicles (SOV) Mode Share	Reduce to 47% or less by 2045	↘	0.3%	0.4%
	Percent of Transit Mode Share	Increase to 2% or more by 2045	↗	3.3%	13.3%
Transit Supplied	Average Transit System Service Headways (Minutes)	Reduce by 20% or more by 2045	↘	-6.4%	-5.4%
	Annual Revenue Hours of Service per Capita (working days[5] only)	Increase by 20% or more by 2045	↗	0.0%	-8.0%
	Annual Revenue Miles of Service per Capita (working days only)	Increase by 35% or more by 2045	↗	-1.8%	-9.6%
Transit Consumed	Transit Passenger Trips	Increase by 75% or more by 2045	↗	16.9%	42.4%
	Annual Transit Passenger Trips per Capita (working days only)	Increase by 50% or more by 2045	↗	4.6%	15.9%
	Transit Passenger Trips per Revenue Hour	Increase by 20% or more by 2045	↗	4.5%	26.0%
System Capacity	Miles of Dedicated Transitways[6]	Increase by 250% or more by 2045	↗	0.0%	0.0%
	Lane Miles	Maintain or increase by 2045	↗	2.0%	8.0%

[1]Based on 1.42 annual fatalities per 100 million VMT (2015 Traffic Crash Facts, Florida DHSMV); [2]Based on 10.48 annual incapacitating injuries per 100 million VMT (2015 Traffic Crash Facts, Florida DHSMV); Standard LOS for rural and urban areas are C and D, respectively. *Highway Capacity Manual* used to determine LOS. Total length of links operating at LOS standards was divided by total length of all links to estimate percent of links operating at LOS standards; [4]Delay defined as excess travel time relative to free-flow conditions; [5]Number of working days in 2018 (261) used. [6]Includes Tri-Rail, LRT and BRT with >50% Fixed Guideway.

Table C-2: 2045 Cost Feasible Plan Equity Assessment (Goal 2: Create Jobs)

Measure Area	Performance Measure	Performance Measure Target (As Compared to 2015 Levels)	Desired Trend	Equity Areas	Non-Equity Areas
Employment	Number of New Jobs relative to 2015	Increase by 25% by 2045	↗	29.1%	29.1%
Access to Jobs	Percent of Employment within 1/4 Miles of Transit Service	Increase to 70% by 2045	↗	2.8%	21.5%
	Percent of Employment within 1/4 Miles of Premium Transit Service (>50% Fixed Guideway)	Increase by 30% by 2045	↗	41.5%	13.2%
	Average Transit Travel Time[1] to Employment Activity Centers with >5,000 Employees per Square Mile[2]	Maintain or improve by 2045	↘	-2.8%	-3.9%
	Average Auto Travel Time to Employment Activity Centers with >5,000 Employees per Square Mile[2]	Maintain or improve by 2045	↘	7.9%	6.8%
	Average Total Transit Trip Time[2] for Daily Job Commute	Improve by 2045	↘	-3.9%	-5.3%
	Average Vehicle Travel Time for Daily Job Commute	Improve by 2045	↘	6.1%	4.8%

[1]Total travel time including in-vehicle and out-of-vehicle time (access/egress/transfer walk and drive time, wait time).
[2]Population-weighted average of travel time from a TAZ.

Table C-3: 2045 Cost Feasible Plan Equity Assessment (Goal 3: Stregthen Communities)

Measure Area	Performance Measure	Performance Measure Target (As Compared to 2015 Levels)	Desired Trend	Equity Areas	Non-Equity Areas
Transit System Access	Percent of Population within 1/4 Miles of Transit Service	Increase to 60% by 2045	↗	21.3%	12.0%
VMT	Vehicle Miles Traveled (VMT) per Capita	2045 VMT grows by 10% or less	↘	-0.1%	1.7%
VHT	Vehicle Hours Traveled (VHT) per Capita	2045 VHT grows by 5% or less	↘	10.6%	12.0%
Air Quality / Pollutant Emissions	Total Daily Carbon Monoxide (CO) Emissions (kg)	Reduce by 10% or more	↘	-78.5%	-72.8%
	Total Daily Nitrogen Oxide (NO) Emissions (kg)	Reduce by 10% or more	↘	-96.7%	-96.1%
Transportation System Vulnerability & Resiliency	Lane Miles of Evacuation Routes per 100,000 Population	Maintain or increase by 2045	↗	-4.9%	-90.8%
	Miles of Public Roads and Rail Forecasted to be Permanently Inundated by between 1 ft. and 2 ft. of Sea Level Rise	Decrease by 2045	↘	47.4%	96.4%

[1]Total travel time including in-vehicle and out-of-vehicle time (access/egress/transfer walk and drive time, wait time).

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