SAFE SYSTEM PILOT APPLICATION SUMMARY

BROWARD MPO'S ROAD SAFETY ANALYSIS PROCESS AND THE SAFE SYSTEM APPROACH

CASE STUDY | **AUGUST 2024**

To advance implementation of the Safe System Approach (SSA), Federal Highway Administration (FHWA) developed three (3) resources for measuring SSA alignment—Safe System Project-Based Alignment Framework, Safe System Policy-Based Alignment Framework, and Safe System Roadway Design Hierarchy. These resources were introduced, applied, and refined through a series of eight (8) pilot workshops. The Safe System Pilot Application Summaries provide an overview of each pilot application, the approach used to assess Safe System alignment and outcomes from the pilot effort.

The _Safe System Policy-Based Alignment Framework_ offers a series of questions and considerations to help agencies assess policy and program alignment with the SSA. The Framework is based on seven criteria. These criteria include the SSA principles: 1) death and serious injury are unacceptable; 2) humans make mistakes; 3) humans are vulnerable; 4) responsibility is shared; 5) safety is proactive; and 6) redundancy is crucial, as well as equity. A series of prompts guide the user to evaluate the level to which the policy or program is aligned with each criterion. Similar to the _Highway Safety Improvement Program Self Assessment Tool_, there are five levels of alignment—Initiation (an agency has started to address the initiative), Development (an agency has developed a plan or approach to address the initiative), Execution (an agency has executed a plan or approach to address the initiative), Evaluation (an agency has assessed performance of the initiative), and Integration (an agency has integrated the initiative into agency culture). The user assigns a score within the appropriate level.

The Policy-Based Alignment Framework can be used to:

- ✓ **BENCHMARK PROGRESS** toward improving the SSA alignment of agency policies.
- ✓ **RAISE THE LEVEL OF AWARENESS** and promote adoption of SSA-related practices and strategies.
- ✓ **IDENTIFY GAPS** in existing policy and program efforts.
- ✓ **GENERATE STRATEGIES** to improve SSA alignment in agency policies and programs.
- ✓ **TRACK PROGRESS** of SSA alignment.
- ✓ **INFLUENCE A CHANGE** in agency business practices.

U.S. Department of Transportation
Federal Highway Administration

ZERO IS OUR GOAL
A SAFE SYSTEM IS HOW WE GET THERE

BROWARD MPO PILOT BACKGROUND

The Broward Metropolitan Planning Organization (MPO) serves the community within Broward County, Florida. The MPO includes 31 local governments and municipalities and more than 1.9 million residents. Broward MPO developed a *Road Safety Analysis Framework* to create an innovative, centralized, and equitable off-system safety study process; expedite the identification of crash hot spots and effective countermeasures on behalf of municipalities; and create a backlog of safety projects ready for design and construction (figure 1). The purpose of the pilot workshop was to review Broward MPO's Off-System Road Safety Analysis (RSA) Framework through a Safe System lens. As part of the review, the MPO and regional partners discussed the following:

▶ Aligning RSA guidance with the SSA.

▶ Providing a clear framework for conducting RSAs utilizing SSA principles.

▶ Prioritizing equity.

▶ Scaling different levels of pedestrian and bicycle improvements (e.g., bike lane protection versus separation) in the Project-Based Alignment Framework.
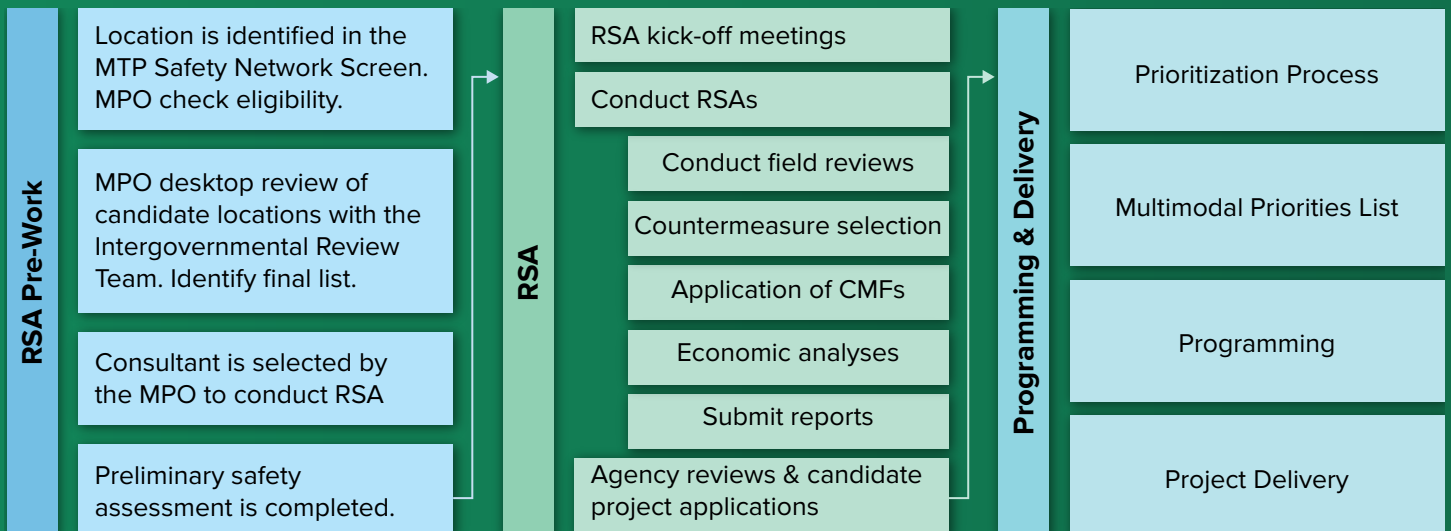
▶ Considering context in risk and solution identification.

RSA Pre-Work
- Location is identified in the MTP Safety Network Screen. MPO check eligibility.
- MPO desktop review of candidate locations with the Intergovernmental Review Team. Identify final list.
- Consultant is selected by the MPO to conduct RSA
- Preliminary safety assessment is completed.

RSA
- RSA kick-off meetings
- Conduct RSAs
  - Conduct field reviews
  - Countermeasure selection
  - Application of CMFs
  - Economic analyses
  - Submit reports
- Agency reviews & candidate project applications

Programming & Delivery
- Prioritization Process
- Multimodal Priorities List
- Programming
- Project Delivery

Figure 1. Broward MPO's Annual Roadway Safety Analysis Cycle

Source: Broward MPO.

THE APPROACH

The day-long pilot workshop included representatives from Broward MPO, Miami-Dade County Transportation Planning Organization (TPO), Palm Beach Transportation Planning Agency (TPA), Florida Department of Transportation (FDOT), and local consultants. As a result, this workshop functioned more like a peer exchange with the sharing of ideas. Perspectives outside of the Broward MPO provided unbiased ideas and opinions for improvement. Additionally, the peer agencies were able to take information back to apply to their policies and programs.

Throughout the workshop, participants identified opportunities to better align Broward MPO's Off-System RSA Policy with the SSA using the Safe System Policy-Based Alignment Framework. **Organized by the Framework criteria, and building upon participants feedback, the following describes FHWA's best practice ideas to enhance alignment of Broward MPO's Off-System RSA Policy with the SSA.**

Death and Serious Injury are Unacceptable

The policy could focus on eliminating fatal and serious injury crashes versus all crashes. The first line in the policy states that the Broward MPO is committed to *ELIMINATING* fatalities and serious injuries. However, the prioritization process outlined within the policy accounts for all crashes rather than just serious and fatal injuries. This prioritization process used to select intersections and corridors for further study is based on a severity index, which does prioritize severe crashes by utilizing a weighted average (higher score for incapacitating and fatal crashes) to rank locations. To align with the SSA principle "death and serious injuries are unacceptable," participants suggested modifications include adoption of methods that consider only fatal and serious injury crashes in analyses and prioritization procedures or providing a more significant weight for serious and fatal crashes. Reviewing all crashes, including those that did not result in a serious injury or fatality, can provide insights to contributing factors and generate improvement ideas but should not be the focus of a prioritization process. Additionally, to further encourage the goal of zero deaths and serious injuries, Broward MPO is advancing the development of a plan to address these crash severities outside of just conducting RSAs. The plan will include the tasks and strategies to accomplish this goal and implementation, and how member agencies can support this goal on the local level.

Humans Make Mistakes

The policy could acknowledge that humans make mistakes and that systems could be built to make sure that when they occur, the crashes do not yield fatal and serious injuries. Additionally, human factors and behavior generally play a significant role in crashes; thus, developing strategies and policies to accommodate human behavior is critical to creating a safe system. The RSA Framework could be modified to include language regarding observing road user behavior. For example, explicitly stating that rumble strips are provided to alert the driver when they have erroneously departed the roadway lane could better align the policy with the SSA. In the *Field Review* section, the policy states that field reviews are required to "compare crash trends with field conditions and observe road user behavior contributing to the crashes." Additionally, the guidance in the *Countermeasure Selection* section provides resources and improvements that accommodate human error behavior; however, more explicit references to human factors analysis and diagnosis could be incorporated.

A reference to the *National Cooperative Highway Research Program (NCHRP) Report 600: The Human Factors Guidelines for Road Systems* could be included to help practitioners account for human mistakes when conducting RSAs.

Humans are Vulnerable

The policy could recognize that the human body can only withstand a certain amount of kinetic energy which is directly affected by speed and angle of collision. It may identify strategies that discuss vulnerable road users (e.g., pedestrians, bicyclists), speed management (e.g., policy improvements, design improvements, etc.), and angle of collision. The RSA Framework details improvements and countermeasures that align with the Safe System principle for human vulnerability; however, explicit relationships to road user mix, speed, and angle of impact could be added to the policy to better align with SSA. Additionally, including infographics or information on these areas can help to educate users of the RSA Framework and instill safety culture around the SSA. Another area of focus for the Broward MPO is the overrepresentation of serious injuries and fatalities on arterials within the county. Speed management countermeasures based on appropriate context and road user considerations could be recommended through RSAs or other plans, policies, and programs within the MPO.

Responsibility is Shared

The policy could address how the responsibility of eliminating fatalities and serious injuries can be shared among all roadway users. As evident by the workshop participants and discussion in the RSA Framework surrounding RSA team identification, Broward MPO understands that many parties should be involved to improve safety on their roadways. The policy states *"The owning agency(ies) is/are encouraged to invite participants that can offer insight into the issues at the study location. This can include representatives from law enforcement, schools, transit agencies, bicycle and pedestrian advocacy groups, public health agencies, neighborhood groups, and other stakeholder groups."* However, the policy could be revised to explicitly detail the importance of these multi-disciplinary insights. The language could state that collaborative and comprehensive approaches are the best way to reach zero fatalities and serious injuries. Education, enforcement, and behavioral strategies could be integrated to complement engineering and infrastructure improvements.

Safety is Proactive

The policy could proactively account for risks and behaviors that could lead to fatal and serious injury crashes. Broward MPO's RSA Framework includes a discussion on safety analysis and practices that aim to implement solutions to reduce risks on the roadways; however, the risks could be more explicitly defined and details on how mitigating or eliminating those risks will yield a reduction in fatal and serious injury crashes could be included. Another consideration for the RSA Framework includes adding an approach to facilitate systemic safety practices as part of RSAs. This process could include implementation of the Project-Based Framework Alignment and the *Safe System Roadway Design Hierarchy* to consider risks that often contribute to fatal and serious injury crashes or developing a systemic or proactive checklist to include as part of the RSA analysis to ensure that risks are being considered. The FHWA's Systemic Safety User Guide is another resource that could be referenced and implemented in Broward MPO RSAs.

Redundancy is Crucial

The policy language could highlight how various infrastructure elements provide layers of protection and how behavioral, education, and enforcement strategies provide another layer of protection if the infrastructure fails. This principle can be integrated into Broward's RSA policy in several ways. Explicit discussion around redundancy and how multiple layers support each other so when one layer fails, the system does not fail to protect users from fatal or serious injury crashes could be incorporated into the Countermeasure Selection section. FHWA's *Proven Safety Countermeasures* and the *Safe System Roadway*

Design Hierarchy provide examples of such countermeasures. Including a graphic that highlights the importance of the layers of protection and the role they play in providing redundancy on the system (i.e., the Swiss Cheese Model) could be considered to explain the concept. Additional language on non-infrastructure improvements, policies, and programs can be integrated into the policy to demonstrate layers of redundancy. References to the National Highway Traffic Safety Administration's (NHTSA) Countermeasures that Work provides practitioners with real examples of non-engineering countermeasures that can complement and supplement infrastructure solutions could be considered.

Equity

The policy could prioritize communities and users of the transportation network that are disproportionately impacted by safety challenges and include solicitation of input from those communities and users. Additionally, policy language may include considerations and strategies for addressing inequities in transportation safety investments for all users. Broward MPO's RSA Framework provides equity considerations for those users not in a motor vehicle, specifically bicyclists and pedestrians, by detailing specific information, tools, and references for improving pedestrian and bicycle safety. However, other equity measures could be implemented into the policy. When prioritizing locations for RSAs or implementation of infrastructure improvements, Broward MPO may consider incorporating an environmental justice measure such as percentage of low income households, percentage of users over 65, or people of color to the evaluation process.

OUTCOMES

As a result of the Safe System pilot and related efforts, Broward MPO is doing the following:

Aligning the policy with the Safe System Approach

Broward MPO updated their RSA Framework document to better align with the SSA. The revisions focused on emphasizing the goal of eliminating fatalities and injuries and the fact that human mistakes are made and are preventable. In the Countermeasure Selection section, the following paragraph was added:

> *Sites can also be assessed to reduce crashes due to human error and behavior. The Human Factors Guidelines for Road Systems (NCHRP 600) provides a guide to design roadways in order to reduce human error crashes. Driver mistakes frequently result in crashes, but these crashes can be reduced in severity and number by how we design our roadways.*

Additionally, an entire section on managing speed and the angle of a crash was included in the update.

Being proactive with RSAs

After being introduced to the Project-Based Alignment Framework, Broward MPO plans to use the tool to further assess possible safety projects in a more proactive approach. The Project-Based Alignment Framework evaluates the presence of risk factors, rather than historical crash data, to determine how a location (i.e., intersection or roadway segment) aligns with the SSA. Analyzing land use and roadway characteristics with the Project-Based Alignment Framework is a good steppingstone to deploying countermeasures before crashes happen.

Looking at the Bigger Safety Picture

Broward MPO along with Broward County was awarded a $5 million Safe Streets and Roads for All grant through the U.S. Department of Transportation (USDOT) to develop a Safety Action Plan. The plan will develop county-wide implementation strategies to prevent roadway deaths and serious injures with an emphasis on underserved communities. As part of this effort, a Safe Speeds Strategy and Countermeasures Policy and Plan is being developed along with countermeasures that could be implemented to combat excessive speeding and reckless driving within residential neighborhoods. Another task includes identifying a "High-Risk Network" which summarizes locations that may be prone to fatal and serious injury crashes based on driver behaviors or roadway characteristics.

Source: FHWA.

APPLYING THE SAFE SYSTEM POLICY-BASED ALIGNMENT FRAMEWORK IN YOUR AGENCY

The _Safe System Policy-Based Alignment Framework_ can be used to assess Safe System alignment of any policy, procedure, program, or plan. The following is a summary of the lessons learned from the Broward MPO pilot that may benefit other agencies applying the Policy-Based Framework.

▶ **COORDINATION IS IMPORTANT**—Getting the State DOT, counties, and other local municipalities on board when developing a safety strategy can unite everyone under one goal – zero fatalities and serious injuries. Furthermore, because the workshop operated like a peer-exchange, ideas were shared across agencies and potential obstacles and challenges were solved or overcome through brainstorming and sharing of personal experiences. Including input from peer agencies also allows for unbiased feedback and ideas for improvement. Learning from one another and capitalizing on proven successes will drive an agency toward eliminating fatalities and serious injuries.

▶ **LEVERAGE FHWA RESOURCES**—In addition to measuring SSA alignment, the Frameworks developed by FHWA can also serve to help agencies understand processes for project identification and prioritization. Many agencies do not have a safety prioritization method and only address crash hotspots when they receive a call from an elected leader or citizen. The strategic manner in which the Frameworks can help an agency identify and address safety problems demonstrates the importance of data-driven project processes.

> _"The FHWA Policy-Based Alignment Framework can help metropolitan planning agencies **address safety problems in a proactive and strategic manner.** It can also help agencies understand the MPO's process when project coordination is needed."_
>
> **– MARK BROWN**
> Senior Planner at Broward
> Metropolitan Planning Organization