SOUTH FLORIDA EAST COAST
CORRIDOR TRANSIT ANALYSIS STUDY

www.sfeccstudy.com

Phase 2 Environmental Screening Methodology Technical Memorandum

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1.0 Introduction

The purpose of this technical memorandum is to describe the environmental screening process completed in Phase 2 of the South Florida East Coast Corridor Transit Analysis (SFECCTA) study. The environmental screening was designed to help transportation engineers and planners identify early in the planning process major issues that may arise with the proposed transportation improvements. Once identified, these issues may be addressed with appropriate stakeholders such as resource agencies, local governmental officials, and community groups before additional time and resources are invested into the project. In addition, the environmental screening will assist transportation planners in making informed decisions on the selection of a Locally Preferred Alternatives (LPA) in Phase 2. Building consensus on fundamental issues early in the planning process streamlines project development and implementation, and minimizes or eliminates conflicts when it comes to permitting and obtaining public consensus.

This memorandum also describes how Geographic Information System (GIS) tools and techniques was used in refining the affected environment or baseline conditions identified during the first phase of the study and how it was used in the Phase 2 environmental screening of alternative elements. The environmental screening was accomplished using a workflow data model or Environmental Screening Model developed specifically for this project as a tool to assist in the alternatives decision-making process during Phase 2 and subsequent phases.

The refinement of the baseline conditions, environmental screening and documentation for Phase 2 of the study will be consistent with the guiding principles of the Council on Environmental Quality (CEQ) as implemented through the National Environmental Policy Act (NEPA), Federal Transit Administration (FTA) New Starts program and the Florida Department of Transportation (FDOT) Project Development and Environment (PD&E) process.

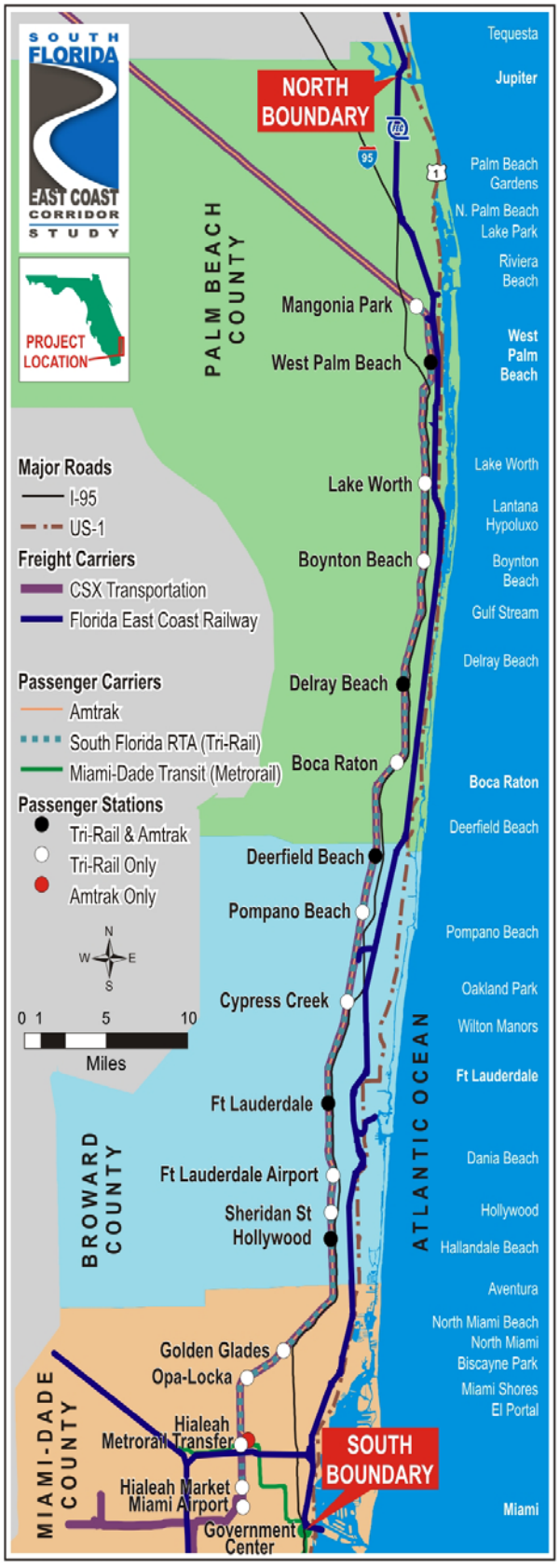
2.0 Project Background

The FDOT initiated the SFECCTA, a multi-phased study, in December 2005 recognizing that the Florida East Coast (FEC) Railway was and is a unique transportation asset that should be evaluated and developed in the context of regional transportation issues, priorities and needs. Although this study was recently initiated, interest in reintroducing passenger transit service on the FEC Railway stems back to the late 1980's.

During Phase 1 of this multi-phased Alternatives Analysis (AA), three primary north/south alignments and a broad range of modal technologies were screened through an iterative process to determine which were most suitable for providing premium transit service within the study area consistent with the project's purpose and need. At the conclusion of the Phase 1 AA, five viable candidate modes and two viable alignments were identified for further refinement during the second phase of the study.

The modal technologies identified included Regional Rail (RGR also known as Commuter), Light Rail (LRT), Rail Rapid Transit (RRT), Bus Rapid Transit (BRT), and Regional Bus (RGB). The two alignments included the FEC Railway alignment from Miami to Jupiter and Interstate 95 (I-95) as an extension of Tri-Rail passenger service from Mangonia Park north to the Town of Jupiter. A discussion of the AA and environmental screening and review process conducted in the first phase of the study may be found in the Phase 1 Conceptual Alternatives Analysis/Environmental Screening Report (AA/ESR) on the project website at: http://www.sfeccstudy.com/.

Figure 1. Project location map



3.0 Study Area

The SFECCTA study area is centered along the FEC Railway corridor, bounded on the south by the Central Business District (CBD) of the City of Miami in Miami-Dade County and on the north by the

Town of Jupiter in Palm Beach County, for a linear distance of approximately 83 miles (**Figure 1**). In addition, several proposed connection alternatives to the South Florida Rail Corridor (SFRC) where Tri-Rail operates, referred to as SFRC-FEC Railway connections, are included within the project study area. There are 13 potential SFRC-FEC Railway connections being considered for a total linear distance of 24 miles. The SFECCTA study area also includes a proposed connection to the Miami Intermodal Center (MIC), located adjacent to Miami International Airport (MIA), and a Transportation System Management (TSM) alternative proposed for the northern portion of the study area. The entire SFECCTA study area, which includes the FEC Railway corridor, proposed SFRC-FEC Railway connection alternatives, proposed MIC connection and the TSM alternative, totals 127 linear miles and is located within the highly urbanized eastern portions of Miami-Dade, Broward, and Palm Beach Counties. Collectively, the three counties constitute Southeast Florida also referred to as the Tri-County area. The project corridor traverses 28 municipalities and three major CBDs; the City of Miami, the City of Fort Lauderdale and the City of West Palm Beach. This corridor represents the historic economic core of Southeast Florida that developed along the FEC Railroad. The proposed project could link the highly urbanized CBDs of Miami, Ft Lauderdale, and West Palm Beach to their corresponding employment, recreational, cultural, educational, medical, retail, tourist activities as well as the area's major seaports and airports.

Due to these significant connections, the FEC Railway corridor is included as part of Florida's Strategic Intermodal System (SIS). Florida's SIS is made up of statewide and regionally significant facilities and services for moving both people and goods, and includes linkages that provide for seamless and efficient transfers between modes and major facilities.

4.0 Phase 2

Phase 2 of the SFECCTA, initiated in January 2009, will build upon the Phase 1 AA and conceptual environmental screening to refine and further develop through an iterative process the alternatives identified at the conclusion of the first phase.

Phase 2 of the study will primarily focus on identifying a modally specific project within the study area. The field of modal alternatives will be narrowed and an LPA mode will be identified and advanced for further refinement in accordance with FTA project development and the FDOT PD&E processes. Other equally important decisions to be made during Phase 2 of the study include refining the number of possible station area locations as well as identifying possible transitway-highway grade crossing treatments, potential locations for operation and maintenance (O&M) facilities, potential SFRC-FEC Railway connections, and evaluating waterway-crossing options.

At the conclusion of Phase 2, an LPA may be submitted to FTA for federal assistance in the form of New Starts funding as described in the public transportation statute: the Safe, Accountable, Flexible, and Efficient Transportation Equity Act–A Legacy for Users (SAFETEA-LU). In addition, the LPA(s) would be submitted for adoption into the applicable Metropolitan Planning Organizations (MPO) Long Range Transportation Plans (LRTP) and a plan for financing the project's capital and operating costs would be identified. During Phase 3 of the SFECCTA study, the LPA would be advanced for further refinement through the appropriate NEPA process.

4.1 Conceptual Alternative Elements

Phase 2 of the study built upon the iterative alternative development and screening process initiated in the first phase of the study. Under this approach, individual alternative components or elements were identified and screened separately. Ultimately, these alternative elements were combined to develop an LPA. Each alternative element was evaluated against the environmental factors/criteria listed in Appendix A.

Key findings of the Phase 1 study carried forward into Phase 2 form the basis for the Phase 2 detailed alternative or LPA. The LPA will consist of the FEC Railway for the length of the corridor and I-95 in the northern section and may contain some or all of the following elements:

- *Modal Technology*
- *SFRC-FEC Railway Connections*
- *Transit Stations*
- *Transitway-Highway Crossings*
- *Waterway Crossings*
- *O&M Facilities*
- *TSM Alternative*

The primary focus of the Phase 2 environmental screening was to assist in the identification of a modally specific LPA within the study area. The decision on the type of technology (RGR, LRT, RRT, BRT, and/or RGB) was based on varying characteristics including capacity, the desires of the community, and environmental considerations. Additional factors considered in the selection of a modal technology included capital and operating costs, service distance, station spacing, service frequency, power source, speeds, right-of-way requirements, vehicle life, accessibility, maneuverability, and ability to integrate with other transportation modes, and flexibility.

5.0 Affected Environment

The Phase 2 alternatives evaluation commenced with a GIS spatial analysis to refine the affected environment identified during Phase 1 of the study. The affected environment is defined as the natural, social and physical resources within the study area that may be affected by proposed improvements and provide the context for evaluating environmental consequences. The affected environment will generally represent those resources within the study area that are considered legislatively significant, locally important, and may have social or environmental value to surrounding communities.

Important environmental and community issues identified during the first phase of the project through input from federal, state, and local agencies, the public as well as other interested stakeholders have been carried forward and considered with additional comments/input obtained during early agency and public coordination efforts in Phase 2. These coordination efforts have included circulating project documents, kick-off meetings, webinars, workshops, charrettes, one-on-one meetings, etc. Key environmental resources or issues identified during these agency and public coordination efforts include:

- *Visual/Aesthetics*
- *Air Quality*
- *Noise and Vibration*
- *Wildlife/Habitat*
- *Historic and Cultural Resources*
- *Section 4(f)*
- *Environmental Justice*
- *Land Use Changes*
- *Waterways*
- *Mobility (i.e. traffic)*
- *Safety*
- *Community Cohesion*
- *Wetlands*

A comprehensive list of natural, physical, and social resources considered in the Phase 2 environmental screening has been appended to this document.

6.0 Environmental Screening Process

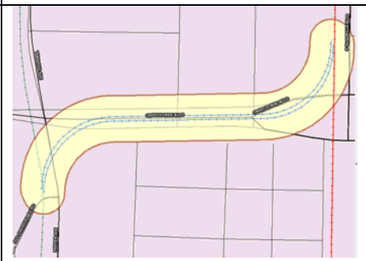
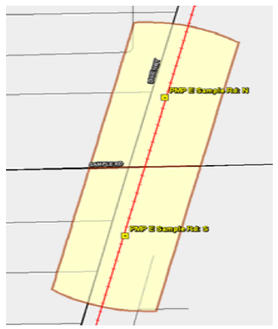
6.1 Phase 2 application of a Geographic Information Systems (GIS)

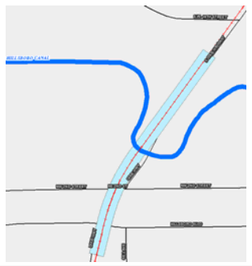
A GIS spatial analysis is the process of examining locations, attributes, and relationships of features through overlay of regions of primary or secondary impact with natural, cultural or social features to create extracts of data for evaluation. The process involves generating an overlay region, or series of "buffers," around existing geographic features and then identifying or selecting pertinent features based on whether they fall inside or outside the boundary of these proximity buffers.

Linear buffers are measured from the centerline of existing or proposed alignments. For example, a 150-foot buffer around the FEC Railway alignment indicates a distance of 150 feet on either side of the FEC Railway right-of-way centerline. Generally, the FEC Railway right-of-way is 100 ft wide throughout the project corridor. At specific points, such as proposed transit station areas or transitway-highway crossings, the buffer width becomes a radial distance measured from the center (i.e., "centroid") of the location.

A series of buffers have been designed to define the affected environment surrounding each of the individual alternative elements described earlier. It is from these alternative specific buffers that the screening process was based. This approach avoids a "one size fits all" screening and prevents over estimating the potential for impacts to environmental resources. Table 1 defines the various buffers designed for the Phase 2 environmental screening of alternative elements and summarizes the screening approach for each alternative element.

Table 1. Summary of Screening Buffer Widths per Alternative Element and Screening Approach

ALTERNATIVE ELEMENTS	*SCREENING BUFFERS (Feet, except where noted)*	*BUFFER IMAGE*	*NOTES*
MODAL TECHNOLOGIES	Affected Environment**: 80' to 154'** (based on modal technology typical sections) Visual and Aesthetics**: 600'** Noise**: 2' to 1815'** Vibration**: 141' to 316'**		The affected environment immediately adjacent to the FEC right-of-way does not serve well as differentiators since they could all be affected similarly by each of the proposed technologies. Primary differentiators among the alternative modal technologies include noise/vibration, visual/aesthetics, and typical sections/footprint within the FEC Railway and at station areas. Typical sections/footprint will vary according to technology in particular at station areas where, in some cases, it may extend outside of the FEC Railway right-of-way. A narrow typical section will be assumed to have less potential to affect resources within the right-of-way (e.g. floodplains, wellfields, and utilities) and at station areas compared to wider typical sections. As such, a separate buffer analysis will be conducted for each technology based on each technology's typical section. Additional buffer analysis will be applied to define the viewshed as well as noise and vibration sensitive receivers along the FEC Railway alignment. Potential visual and aesthetic impacts will primarily be associated with elevated technologies such as Metrorail, power or catenary poles for electric technologies (e.g. LRT) and vehicle height for at-grade technologies. Noise and vibration sensitive receivers will be defined with a buffer of variable width based on several modal characteristics* and surrounding land use.
SFRC-FEC Railway CONNECTIONS	Affected Environment**: 150'** (based on two-track typical section) Visual and Aesthetics**: 600'** Noise**: 2' to 1815'** Vibration**: 141' to 316'**		The 150' buffer is based on the centerline of proposed SFRC-FEC Railway connections and is designed to define and screen the affected environment immediately adjacent to each of the proposed connections. Additional buffer analysis will be applied to define the viewshed as well as noise and vibration sensitive receivers along the SFRC-FEC Railway connections. Potential visual and aesthetic impacts will primarily be associated with the modal technology operating along the various connections. A Diesel Multiple Unit (Type 1 DMU) will serve as a representative mode to define the viewshed within a 600' buffer and noise and vibration sensitive receivers along each of the proposed connections.
TRANSIT STATION AREAS	Affected Environment (First Screening)**: ½-mile radius** Affected Environment (Second Screening): **1000' X 300'** Visual and Aesthetics**: 600'**		Initially, a ½-mile buffer analysis was designed to screen the number of station area locations from 96 down to 66 location areas. The 66 locations include eight proposed stations along the proposed or existing SFRC-FEC Railway connections or off-corridor (OC). A second, site specific environmental screening will be conducted based on 1000' X 300' buffers to compare the affected environment on the north side of selected intersections to the affected environment on the south side of selected intersections. The second screening assists in selecting a station site on either the north or south side of a selected intersection. Potential visual and aesthetic impacts will primarily be associated with station height. Generally, transit stations may be elevated or built at-grade/ground level depending on the modal technology and other factors. For this screening, the visual and aesthetic viewshed will be defined based on at-grade transit stations within a 600' buffer. Secondary or indirect effects were screened primarily around proposed station areas, assuming the greatest potential for changes to land use due to encouraged development (e.g. TOD) around transit stations. Indirect effects were considered within a 1/2 –mile buffer around proposed station areas.

ALTERNATIVE ELEMENTS	SCREENING BUFFERS (Feet, except where noted)	BUFFER IMAGE	NOTES
TRANSITWAY-HIGHWAY CROSSINGS	Affected Environment**:** Rail over Road: **2400' X 150'** (N/S orientation) Road over Rail: **2700' X 150'** (E/W orientation) Crossing Closures: **¼-mile radius**		Transit-highway crossings have undergone an initial screening based on FDOT/FRA criteria to guide crossing treatment recommendations (e.g. elimination/closure or improvement/separation). Preliminary recommendations will undergo public and agency review and environmental screening to establish final recommendations for Phase 2 of the study. The environmental screening will only be applied to transitway-highway crossings recommended for elimination or improvement. All other transitway-highway crossings will be assumed to remain in their current state except for possible minor modifications such as Quiet Zones, changes in signaling, signage, etc. Separate buffers will be designed to define and screen the affected environment for various situations. Two buffers will be designed to compare the affected environment for rail-over-road to road-over-rail alternatives at crossings recommended for separation. The affected environment surrounding recommended crossing closures will be defined with a ¼-mile buffer. All buffers will be centered on the FEC Railway right-of-way. Primary concerns with crossing closures are related to mobility, economic, visual and community cohesion issues. Potential visual and aesthetic impacts will primarily be associated with the height of road/rail overpasses. For this screening, the visual and aesthetic viewshed will be defined by the height of proposed overpasses within a 600' buffer.
WATERWAY CROSSINGS	Affected Environment**:** New River: **7400' X 150'** Dania-Cutoff Canal: **5300' X 150'** Hillsboro Canal: **4850' X 150'**		The affected environment at the various waterway crossings within the study area will be screened based on proposed improvements at each crossing. For example, a fixed new bridge over the New River in Ft Lauderdale will require a vertical clearance of no less than 55'. Therefore, a unique buffer analysis will be conducted specifically for the New River crossing. Visual and aesthetic issues related to waterway crossing improvements will only be screened at the three navigable waterways (e.g. New River, Dania-Cutoff and Hillsboro Canals) where existing vertical clearances are likely to increase. The vertical clearance of FEC Railway bridges over non-navigable waterways is not likely change. Any changes, if any, in vertical clearances over non-navigable waterways would be minimal. For this screening, the visual and aesthetic viewshed will be defined by the height of proposed bridges over navigable waterways within a 600' buffer.
OPERATIONS & MAINTENANCE (O&M) FACILITY / INSPECTION/STORAGE YARDS	Affected Environment: **Variable (based on lot size)** Visual and Aesthetics**: 600'** Noise**: 1000'**		Four alternative sites ranging in size from 15 to 45 acres will be screened to identify a potential O&M site within the City of Pompano Beach, FL. The Inspection/Storage Yards are smaller facilities typically used to store and inspect vehicles. Seven Inspection/ Storage Yard alternative sites ranging in size from 2 to 15 acres will be screened. For this screening, the visual and aesthetic viewshed will be defined by the height of proposed O&M facility within a 600' buffer. Noise sensitive receptors will be defined within a 1000' buffer from the perimeter of each proposed site.

ALTERNATIVE ELEMENTS	*SCREENING BUFFERS (Feet, except where noted)*	*BUFFER IMAGE*	*NOTES*
TRANSPORTATION SYSTEM MANAGEMENT ALTERNATIVE	Affected Environment: I-95: **150'** (4) Proposed Station Sites: **500' X 200'** Visual and Aesthetics: **600'** Noise: **2' to 192'**		The TSM Alternative includes four proposed Tri-Rail Stations and a proposed regional bus service from Tri-Rail's Mangonia Park Station in West Palm Beach to Jupiter via I-95. The proposed Tri-Rail stations are similar to the physical footprint of existing Tri-Rail Stations (Length: 500' x Width: 200'). Noise sensitive receptors will be defined within buffers ranging from 2' for bus technologies along roadways to 192' for push-pull technologies at stations. Vibration effects are considered negligible at station areas and for regional bus technology. Potential visual and aesthetic impacts will primarily be associated with the proposed stations' heights. For this screening, the visual and aesthetic viewshed will be defined based on existing Tri-Rail station's height within a 600' buffer.

*Modal Characteristics included in noise and vibration buffer width determinations:

- Height of support tracks/pavement (at-grade, elevated/grade-separated, depressed/below grade)
- Vehicle operating speed
- Frequency (headways) and span of transit service
- Propulsion (diesel, diesel-electric, overhead electric, electrified third rail, etc)
- Vehicle capacity and length

6.2 Data Collection and Management

The most current environmental and social datasets were mainly obtained from the Florida Geographic Data Library (FGDL), an internet-based data clearinghouse for Florida as well as from federal, state and local regulatory agencies. Data collected from source agencies are time stamped and updated as needed. Previous versions of the data are maintained for corresponding decision-making based on the time of download and evaluation. Each GIS dataset serves a specific purpose and a specific resolution or scale that will determine its usefulness on this project. Organizing hundreds of GIS datasets into a single repository/geodatabase for use on this project was done using Environmental Systems Research Institute, Inc. (ESRI) ArcGIS© Desktop version 9.3.

Several tools were developed specifically for the SFECCTA study to provide environmental analysts with a means to manage field data collection and data entry efficiently and consistently. These tools include a predesigned geodatabase and a Graphic User Interface (GUI) for data collection based on the functional and technical requirements for each dataset.

The geodatabase is a schema (e.g., diagram or plan) for collection of geographic datasets used by ArcGIS. The geodatabase for this project was designed to efficiently organize and update or archive data as needed. The GUIs were designed for field data collection and verification. These front end programs interact with the GIS through remote hand held devices. Controls for efficient and consistent data entry were programmed into each GUI such as:

- *Single select options or radio buttons*
- *Dropdown selection lists or menus*
- *Logical or "if then" parameters*

Two GUIs were developed for the collection and verification of social/community resources as well as for potential wetland resources within the study area. The GUI developed specially for wetland data collection, known as the Wetland Data Collection Tool (WDCT), was based on the Uniform Mitigation Assessment Method (UMAM) developed by the Florida Department of Environmental Protection (FDEP) pursuant to Section 373.414(18) Florida Statutes and outlined in Chapter 62-345, Florida Administrative Code. The WDCT allowed the user to complete Part I (Qualitative) and Part II (Quantitative) UMAM forms digitally through a GIS supported GUI.

This approach allowed field crews to collect and store wetland related data electronically in the field. In Phase2, the WDCT was used to assess functional scores of potential wetlands based on a site's Location and Landscape Support, Water Environment, and Community Structure. Other values such as preservation, time lag factor, mitigation, etc. were not assessed. Nor were jurisdictional wetland delineations conducted. Sites assessed using the WDCT were assumed wetlands based on National Wetland Inventory GIS data. Jurisdictional delineations will be conducted as applicable in subsequent phases. Ultimately, wetland functional values were translated into a weighted score and incorporated into the Environmental Screening Model.

6.3 Data Verification

Data verification during Phase 2 of the study was accomplished through various means including in-office and field methods. Validation or verification of the data was considered both temporally (appropriate up to date information used at the time of decision-making) and spatially (geographic resolution). Temporal verification of GIS spatial datasets is periodically updated by the agency or office that originated the data. The time lapse between data updates may range from several months to several years based on the type of data and need for modification. Subsequently, individual GIS data records require they be periodically verified to ensure important or significant environmental and/or social resources are correctly identified within a study area.

Data verification of selected environmental databases was conducted during Phase 2 to a reasonable extent in order to provide a greater level of detail and confidence in the data and corresponding analysis. The degree of spatial verification and collection of new data varied according to the type and proximity of resources to the project corridor. For example, environmental and social resources immediately adjacent to the FEC Railway right-of-way are more likely to be directly affected by proposed improvements than those resources on the outer fringes of a study area. Therefore, a higher percentage of these "adjacent" features were verified compared to features further from the right-of-way. With more than 10,000 various records in the databases within the study area, this scaled verification effort was determined necessary and appropriate.

Data was verified in the most efficient, consistent, and effective manner including using methods such as aerial photography interpretation, researching available information through the internet, telephone communication, and field verification or "ground truthing." Initially, data was verified in the office to the extent possible followed by field verification of data that could not be verified in the office. New data collected through office or field verification efforts were added to existing GIS project databases.

Data verification provides a great level of confidence to the AA process by providing decision-makers with reliable GIS datasets to assist in reaching important decisions regarding the selection of an LPA. An updated and accurate dataset helps to ensure decisions are supported by data of the type and quality needed and expected for the Phase 2 Detailed ESR.

6.4 Workflow Model/ModelBuilder© Application

During Phase 2 of the SFECCTA study, the environmental screening was accomplished using ESRI ArcGIS ModelBuilder© (version 9.3). ModelBuilder© or the Environmental Screening Model is a program designed to develop the visual interface between database and GIS analysis.

The process begins with the design of a workflow model. A workflow model is a depiction of a sequence of operations, much like a flowchart, that represent exploratory project work for further assessment (e.g., for describing a reliably repeatable sequence of operations) and quantifies and compares resources that may be affected by proposed improvements.

The workflow model and the logic it contains is the critical portion of the assessment, ModelBuilder© is simply the tool for performing the analysis. A key feature of the workflow model is the ability to "pick up where the study left off" without starting the assessment over again should the need arise for further evaluation at a particular site/location later in the study or subsequent phases. Specific versions of models can be saved that correspond to events or activities in the project. This archive of the workflow, variables and data used in decision-making helps to document the record of each result. The workflow model describes:

- *The relative importance/weight each resource has on the overall decision*
- *GIS datasets used in the environmental screening*
- *The area of potential effect to be measured for each evaluation*
- *The mechanism for testing the sensitivity of each element in the overall evaluation*

6.5 Weighting of the Affected Environment for the Environmental Screening

Relative weights or values were assigned to environmental resources making up the affected environment within the study area and incorporated into Environmental Screening Model to formulate the logic for an evaluation of alternatives for a particular decision (e.g., station locations). These weighted values served to better differentiate the alternative elements from one another.

Natural, physical and social resources were assigned a weighted value of one (1), three (3), or five (5) based on various factors including legislative importance of the resource(s) and community concerns (**Table 2**). Higher weighted values imply a greater avoidance measure would be applied during the decision-making process. Results can be calculated utilizing spatial data, spatial geo-processes, mathematical/logical expressions, and a specific study area for specific decisions or alternatives analysis (e.g., waterway crossings).

Table 2. Environmental Screening Criteria and Feature Class Weighted Values

Environmental Screening Criteria	*Station Areas*	*Modal Technologies*	*O & M Facilities*	*Grade Crossings*	*SFRC-FEC Railway Connections*	*Waterway Crossings*
Social/Cultural						
Cultural/Historic/Archaeological (*Section 106*), National Register of Historic Places (NRHP)						
● NRHP-Listed/Eligible/Potentially Eligible & Archaeological Sensitive	5	5	5	5	5	5
● Locally-Listed/Recognized	3	3	3	3	3	3
● Previously Recorded/Ineligible	1	1	1	1	1	1
Public Parks/Lands/Recreation (*Section 4(f)*)[1]	5	5	5	5	5	5
Utilities	1	1	1	1	1	1
Demographics (*Executive Order 12898*)[2]	5	5	5	5	5	5
Community Facilities/Services	1	1	1	1	1	1
Mobility						
● Average Daily Traffic Volume at the Grade Crossing						
Greater than 2000 Vehicles per Day	5	5	5	5	5	5
Between 1000 and 2000 Vehicles per Day	3	3	3	3	3	3
Less than < 1000 Vehicles per Day	1	1	1	1	1	1
● Public School Bus Route (*Elementary, Junior High, or High Schoo*l)						
Two or More Schools within ¼ mile	5	5	5	5	5	5
One School within ¼ mile	3	3	3	3	3	3
No School within ¼ mile	1	1	1	1	1	1
● Transit Bus Route						
Two or More Transit Bus Routes	5	5	5	5	5	5
One Transit Bus Route	3	3	3	3	3	3
No Transit Bus Route(s)	1	1	1	1	1	1

Environmental Screening Criteria	*Station Areas*	*Modal Technologies*	*O & M Facilities*	*Grade Crossings*	*SFRC-FEC Railway Connections*	*Waterway Crossings*
● Emergency Services Route						
Two or More Facilities within ¼ mile	5	5	5	5	5	5
One Facility within ¼ mile	3	3	3	3	3	3
No Facilities within ¼ mile	1	1	1	1	1	1
Potential Acquisitions/Displacement/Relocations	5	5	5	5	5	5
Visual & Aesthetics (Land Use)						
● Residential	5	5	5	5	5	5
● Commercial/Institutional	3	3	3	3	3	3
● Industrial	1	1	1	1	1	1
Economic (Residential, Commercial, Industrial Land Uses)	1	1	1	1	1	1
Natural						
Wetlands (*Section 404 of the Clean Water Act)*						
● UMAM Score: 0.9 to 0.7	5	5	5	5	5	5
● UMAM Score: 0.6 to 0.4	3	3	3	3	3	3
● UMAM Score: 0.3 to 0	1	1	1	1	1	1
Special Designated Waters[1,3]	5	5	5	5	5	5
Water Quality[4]	5	5	5	5	5	5
Critical Habitat (*Endangered Species Act of 1973*)[1,5]	5	5	5	5	5	5
Floodplains -100 Year (*Executive Order 11988*)	1	1	1	1	1	1

Environmental Screening Criteria	*Station Areas*	*Modal Technologies*	*O & M Facilities*	*Grade Crossings*	*SFRC-FEC Railway Connections*	*Waterway Crossings*
Physical						
Noise Sensitive Receptors						
● Residential/Commercial/Institutional (Severe)	5	5	5	5	5	5
● Residential/Commercial/Institutional (Moderate)	3	3	3	3	3	3
Vibration Sensitive Receptors	5	5	5	5	5	5
Potentially Contaminated Sites						
● High	5	5	5	5	5	5
● Medium	3	3	3	3	3	3
● Low	1	1	1	1	1	1
Navigable Waterways[1]	5	5	5	5	5	5

[1] This criterion was assigned variable weights to reflect differences in how effective that factor may be in informing a decision for a particular alternative element (e.g. station areas, modal technologies, etc.)

[2] Census tracts comprised of low income or minority populations to comply with EO 12898 – Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

[3] Outstanding Florida Waters, Aquatic Preserves

[4] Wellfield Protection Zones

[5] Essential Fish Habitat, Strategic Habitat/Conservation Areas

The overlapping of features/resources was taken into consideration were incorporated into the workflow model using "If/Then" variables. For example, privately owned cemeteries were assigned a low weighted value (i.e., "1") and historic cemeteries listed on the National Register of Historic Places were assigned a high weighted value (i.e., "5"). "If" these two features overlap or are a "one-in-the-same" feature, "Then" the combination of the two criteria creates a high level of avoidance and more than the sum of the individual areas (**Figure 4**). Therefore, the "If/Then" criteria can evaluate the presence of one or more criteria and reflect those occurrences when they are present. **Figure 4** below provides an example of how the relative scores of two features, area of potential effect, and overlap of those features are combined and taken into account in the Environmental Screening Model to calculate an overall assessed value for an alternative that can be measured against other alternatives.

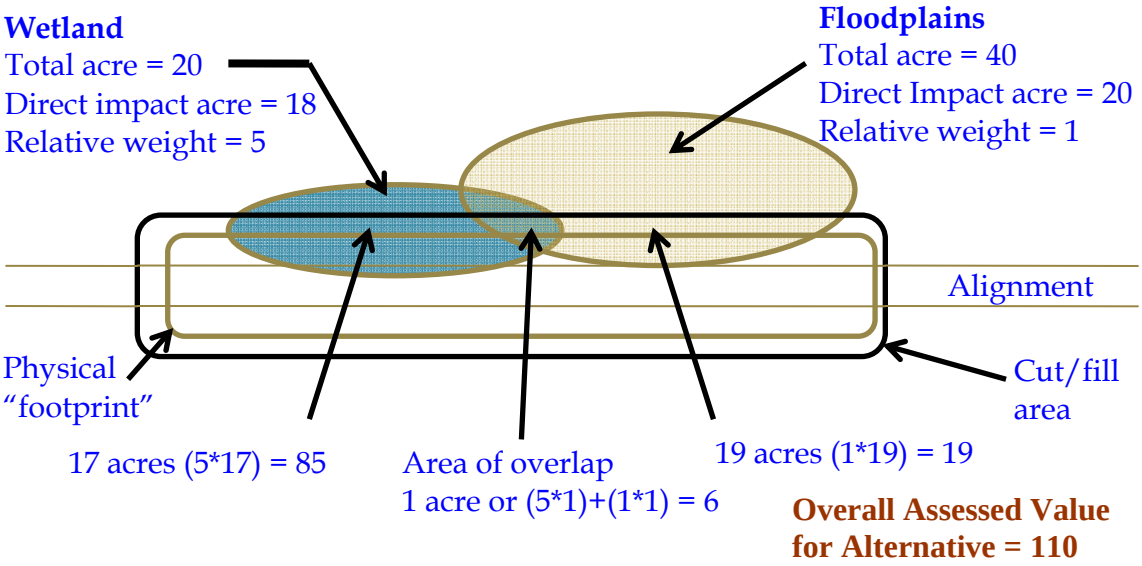


Figure 4. Example of how ModelBuilder© incorporates various values to calculate overall value of two 2 resources.

The results of the data model can be expressed in tabular form or graphically. **Figure 5** displays a hot-to-cold schema where the lighter colors such as yellow or green indicate few or no environmental resources that may be affected by proposed improvements. Red and orange, on the other hand, indicate potentially sensitive environmental and/or social resources that would require a greater level of consideration and avoidance measures where possible.

Individual feature or specific category results may also be obtained on a case-by-case basis where trade-offs among specific environmental resources can be made. This can be accomplished by "tagging" specific features (e.g. wetlands) and performing a specific modification based on the need. This level of modeling may be useful by showing potential impacts to specific resources.

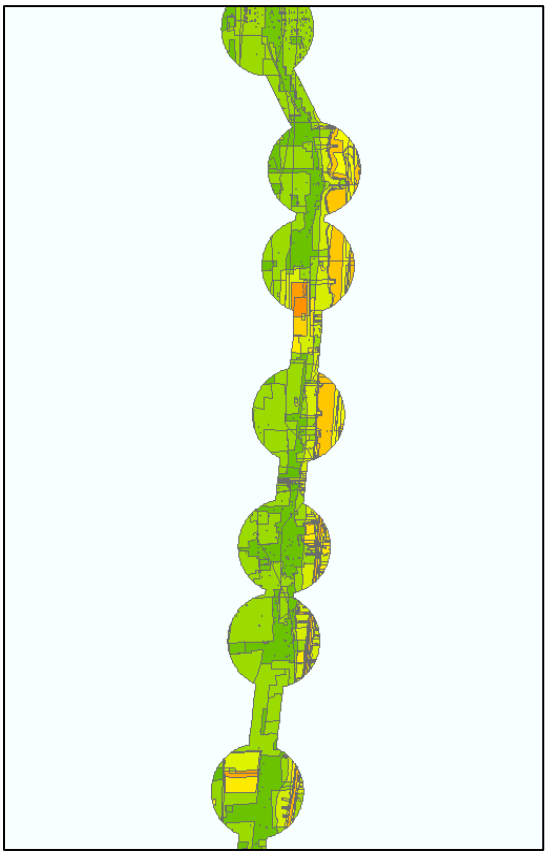


Figure 5. Hot–to-Cold schema of resources.

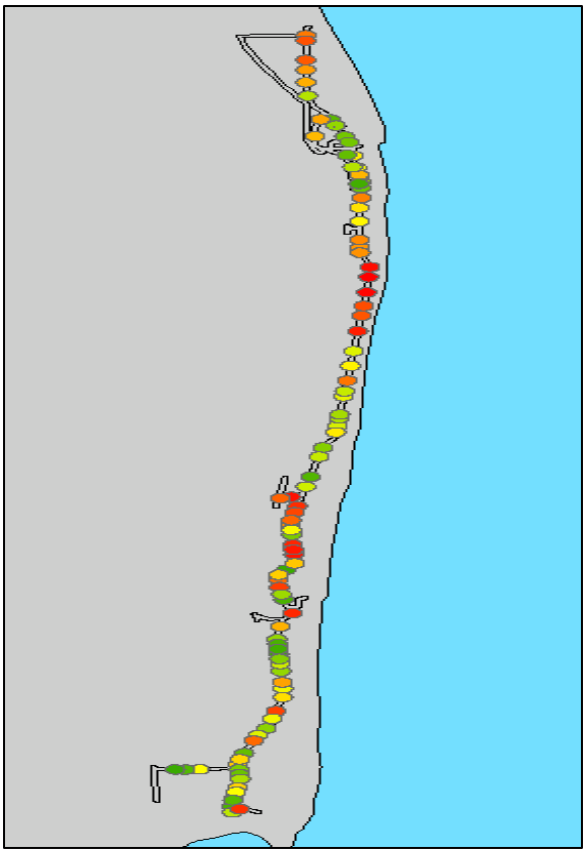


Figure 6. Station area ranking and Hot–to-Cold schema.

Another important feature of the data model is the ability to compare alternatives or alternative elements as was done in Phase 2. Station area locations, for example, can be directly compared to each other and ranked over the entire study area (**Figure 6**). The same may be done for each of the various alternatives analysis (e.g., modal technology, grade crossings, O&M facility locations, etc.).

6.6 Viewshed Analysis

A viewshed analysis was conducted during Phase 2 to assess the visual influences of the various alternative elements along the project corridor on the affected environment.

The affected environment for this analysis was defined by parcels that may be able to see the proposed improvements. The viewshed analysis uses elevation data in GIS and determines whether an object can be seen (line of sight) from another location.

The first step in the viewshed analysis was to acquire and modify the format of existing elevation data. Detailed elevation data was available from the Florida Division of Emergency Management (http://mapping.ihrc.fiu.edu/fldemlidar/Default.aspx). This elevation data contained all ground objects (buildings, trees, etc.) as "mass points" from a collection of Light Detection and Ranging (LiDAR) data collected in July 2007.

Next, the native format (LAS) for each tile was converted to a format that is compatible with the spatial analysis program (ESRI Spatial Analysis extension). This conversion process was conducted using LP360, a GIS extension developed by QCoherent Software LLC (QCoherent©) that is used extensively for LiDAR manipulation. Data was then converted an "ASCII" surface, which were then merged into a single "surface" or mosaic. The process of making the single mosaic for the entire proposed transitway allowed the analysis to be conducted over multiple tiles. While it is possible that an object could be seen from great distances in very flat and unobserved areas, the maximum distance for influence was determined to be 600 feet (approximately two city blocks).

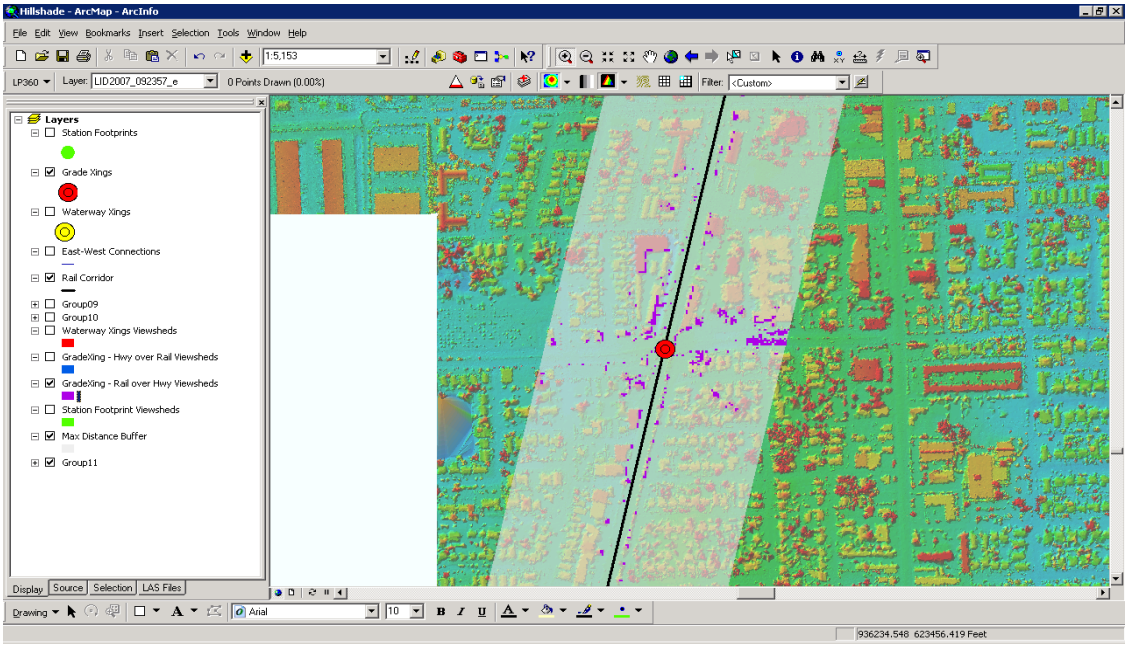
Once the ground surface was prepared, the alternative elements were developed as "points" or "lines" and assigned a representative height. For example, proposed transit stations were assigned a height of 20 feet for purposes of the viewshed analysis and modal technologies were assigned a height based on vehicle type. Table 3 provides the maximum heights/elevations used in the viewshed analysis for each alternative element considered in Phase 2.

Next, each alternative element was assessed to determine how far it could be seen from the surrounding area (note: the analysis used what is known as a "fully-populated ground clutter elevation data", not a "bald-earth elevation" that best approximates landscapes found in the corridor). This type of elevation data implies the line of sight is completely blocked by ground objects such as trees and buildings. The results produced a "surface" GIS layer that displayed areas that could and could not be seen from the alternative elements (**Figure 7**).

Table 3. Settings of Alternative Elements used in Viewshed Analysis

Alternative Element	Sub-Option	Maximum Height (feet)	Notes
Station Areas	-	20	Height of facility (at-grade)
Transitway-Highway Crossings	Transitway Over Highway	25	Height of structure
	Highway Over Transitway	33	
SFRC-FEC Railway Connections	RGR/Push-Pull	15	Height of vehicle
Waterway Crossings	New River	73	Height of structure
	Dania Cut-Off Canal	30	
	Hillsboro Canal	30	
Modal Technologies	RGR/Push-Pull	15	Height of vehicle
	RGR/DMU	17	
	LRT	12	
	RRT	36	
	RRT/fixed guideway	25	Height of elevated guideway
	BRT	12	Height of vehicle
	Overhead Electric/Catenary Poles	18	Catenary pole spacing every 150ft
O&M Facilities	-	30	Height of facility
TSM	RGB	12	Height of vehicle

Figure 7. Viewshed Analysis Results: Transitway-Highway Crossing



Note: Purple indicates areas within view of the proposed grade-separated transitway-highway crossing

Lastly, the results were combined with other GIS layers (i.e., land use) by conducting a spatial overlay of the positive view areas with land use. Specific land uses (e.g., residential) that could see the alternative elements under consideration were assigned relative weights and incorporated into the Environmental Screening Model as part of the environmental screening of

alternative elements. The results of the viewshed analyses represent those parcels that could be visually affected by the proposed improvements.

7.0 Conclusion

A primary goal of the Phase 2 environmental screening was to help inform decisions being made regarding the alternative elements so as to avoid or minimize potential future impacts, where possible, to social and natural resources and steer improvements towards areas that are likely to benefit from proposed alternatives. For example, transit stations are designed to benefit commuters, in particular, those commuters that largely depend on transit. The ModelBuilder© or Environmental Screening Model provides decision-makers with a visual representation of environmentally or culturally sensitive areas that should be avoided while displaying areas that are likely to benefit from a transit station or any of the proposed alternatives. The environmental screening results were not used to quantify impacts of natural or social resources as may be done in project-level NEPA studies such as Environmental Impact Statements but rather served as an assessment of potentially affected environmental resources for comparing alternative elements in this planning-level NEPA screening.

The use of the ModelBuilder© application in the screening of alternative elements offered other important features that may be carried forward into subsequent phases of the SFECCTA study. ModelBuilder© offers the flexibility of easily varying the assessment methodology at any time during the alternatives screening to allow the inclusion of additional features or modifying weighted values based on agency and/or public input, discussions, or suggestions. This allows the model to adjust to the AA and the project development as it evolves.

Just as important is the ability to produce consistent and repeatable results that are easy to visualize and interpret by decision-makers, regulatory agencies, and the public. In addition, this application makes the environmental screening process transparent by allowing interested stakeholders the ability to interact with the data and view the output or results. These attributes combined lend value to and support decisions made regarding the selection of an LPA, thereby allowing preservation of decisions made as the project progresses into subsequent phases.

Appendix

GIS Data Library

GIS Data Library

GIS Data Layer Categories	Geometry Type	GIS Data Layer Description	Date Acquired	Originating Agency
Social Resources				
Public Parks/Lands/Recreation (Section 4(f))	Polygon	FWC Managed Areas	9/10/2008	FWC
	Polygon	Save Our Rivers	2/29/2008	SFWMD
	Polygon	Parks /4(f) Resources	8/18/2009	Gannett Fleming, Inc.[1]
	Polygon	Section 6(f) Resources	9/2/2009	Gannett Fleming, Inc.[1]
	Polygon	Public Lands (Conservation Purposes)	7/29/2009	FNAI
	Polygon	Hiking Trails	3/26/2009	FDEP
	Polygon	Water Trails	11/4/2008	UF GeoPlan Center
	Polygon	Multi-Use Trails	11/4/2008	UF GeoPlan Center
	Polygon	Trails - Priority	11/4/2008	UF GeoPlan Center
	Polygon	Critical Linkages	11/4/2008	UF GeoPlan Center
	Polygon	Park Boundaries	5/22/2008	NPS
	Polygon	State Forests	8/6/2009	FDF
	Polygon	Natural Area Projects	7/29/2009	FNAI
	Polygon	CERP Projects	6/12/2008	SFWMD
	Polygon	Wildlife Refuge Locations	2/28/2008	USFWS
	Polygon	Military Land	3/31/2009	FMRI
	Polygon	Restoration Projects	2/29/2008	FDEP
	Line	Trails	5/5/2009	UF GeoPlan Center
	Line	Scenic Trail Locations	2/28/2008	UF GeoPlan Center
	Point	Short Trail Locations	2/28/2008	UF GeoPlan Center
	Polygon	Indian Reservations	6/24/2008	UF GeoPlan Center
	Polygon	Aquatic Preserves	1/20/2008	FDEP
	Polygon	Reserves	2/28/2008	ANERR
	Polygon	National Marine Sanctuary Area	5/27/2008	NOAA
	Polygon	Restoration Projects	5/21/2008	SFWMD
	Polygon	Water Mngt. Dist. Lands	3/18/2009	UF GeoPlan Center
Utilities	Point	Sewage Facility Locations	2/28/2008	FDEP
	Point	Waste Facility Locations	5/1/2008	FDH
	Point	Permitted Facility	7/29/2009	EPA
	Point	Water Treatment Locations	2/28/2008	FDEP
	Point	Power Plants	11/20/2008	EPA
	Line	Power Line Locations	2/28/2008	UF GeoPlan Center
	Polygon	Utility Owned Parcels	10/20/2009	Gannett Fleming, Inc.[1]
Demographics (Executive Order 12898)	Polygon	Environmental Justice Areas	8/18/2009	Gannett Fleming, Inc.[1]
	Polygon	Enterprise Locations	1/20/2008	FDEP
	Polygon	Empowerment Zones	2/28/2008	HUD
Community Facilities/Services	Polygon	Assisted Rental Housing Locations	5/1/2009	UF GeoPlan Center
	Polygon	Social Resources[3]	9/2/2009	Gannett Fleming, Inc.[1]
	Polygon	Regional Developments (DRI)	3/27/2009	UF GeoPlan Center
	Polygon	Planned Developments	5/21/2008	UF GeoPlan Center
	Polygon	Community Redevelopment Area - MD	6/9/2008	Miami-Dade County
	Polygon	Community Redevelopment Area - BR	6/22/2005	Broward County
	Polygon	Community Redevelopment Area - PB	6/4/2008	Palm Beach County
Mobility	Line	Evacuation Routes - MD	8/18/2009	SFRPC
	Line	Evacuation Routes - BR	8/18/2009	TCRPC
	Line	Evacuation Routes - PB	8/18/2009	SFRPC
	Line	Bus Routes - BR	8/18/2009	Broward County
	Line	Community Bus Routes - BR	8/18/2009	Broward County
	Line	Bus Routes - MD	8/18/2009	Miami-Dade County
	Line	Bus Routes - PB	8/18/2009	Palm Beach County
	Line	Bicycle Facilities - MD	12/9/2009	Miami-Dade County
	Line	Bicycle Facilities - BR	12/8/2009	Broward County
	Line	Bicycle Facilities - PB	12/16/2009	FDOT District 4
	Polygon	Intermodal facility	7/29/2009	FDR
	Point	AADT	11/18/2009	Gannett Fleming, Inc.[1]
	Point	School Bus Routes	11/18/2009	Gannett Fleming, Inc.[1]
	Point	Transit Bus Routes	11/18/2009	Gannett Fleming, Inc.[1]
	Point	Emergency Service Routes	11/18/2009	Gannett Fleming, Inc.[1]
Potential Acquisitions/Displacement/Relocations	Polygon	Constrained Areas	10/9/2009	Gannett Fleming, Inc.[1]
Visual & Aesthetics	Polygon	Viewsheds (Stations)	12/15/2009	Gannett Fleming, Inc.[1]
	Polygon	Viewsheds (Modal Technologies)	12/15/2009	Gannett Fleming, Inc.[1]
	Polygon	Viewsheds (Waterway Bridges)	12/15/2009	Gannett Fleming, Inc.[1]
	Polygon	Viewsheds (O&M Facilities)	12/15/2009	Gannett Fleming, Inc.[1]
	Polygon	Viewsheds (TSM)	12/15/2009	Gannett Fleming, Inc.[1]
	Polygon	Viewsheds (SFRC-FEC Railway Connections)	12/15/2009	Gannett Fleming, Inc.[1]
Economic	Polygon	Economic Parcels	10/20/2009	Gannett Fleming, Inc.1

[1] Data layer created by staff at Gannett Fleming for purposes of the SFECC Study Revised 02-03-10

GIS Data Library

GIS Data Layer Categories	Geometry Type	GIS Data Layer Description	Date Acquired	Originating Agency
Cultural Resources				
Historic/Archaeological (Section 106)	Line	Historic Bridges	10/20/2009	Janus Research Inc.[2]
	Point	Historic Structures	10/20/2009	Janus Research Inc.[2]
	Polygon	Historic Districts	10/20/2009	Janus Research Inc.[2]
	Polygon	Historic Cemetery	10/20/2009	Janus Research Inc.[2]
	Line	Scenic Roads	12/16/2008	FDOT
	Polygon	Archaeological Sites	10/20/2009	Janus Research Inc.[2]
	Polygon	Archaeological Zones	10/20/2009	Janus Research Inc.[2]
Natural Resources				
Wetlands	Polygon	Wetlands	9/2/2009	Gannett Fleming, Inc.[1]
Special Designated Waters / Coastal Resources	Line	Scenic Rivers	2/28/2008	SFWMD
	Polygon	Special Outstanding Florida Waters	9/10/2008	FDEP
	Polygon	Outstanding Florida Waters	7/29/2009	FDEP
	Polygon	Coastal Barrier Resources	5/5/2009	FEMA
Water Quality - Wellfield Protection Zones	Polygon	Well Protection Zones - MD	6/10/2008	Miami-Dade County
	Polygon	Well Protection Zones - BR	11/22/2008	Broward County
	Polygon	Well Protection Zones - PB	6/5/2008	Palm Beach County
Water Quality - Waterbodies / Impairment / Drinking Water Supply	Polygon	Other Surface Waters	9/2/2009	Gannett Fleming, Inc.[1]
	Polygon	Impaired Waters	7/29/2009	FDEP
	Polygon	Water Quality	3/10/2009	FDEP
	Point	Drinking Wells	2/28/2008	FDH
	Polygon	Aquifers	9/25/2008	USGS
	Polygon	Water Protection Areas/Wells	3/18/2009	FDEP
Critical Habitat (Endangered Species Act of 1973) - Essential Fish Habitat (EFH) / Rare and Imperiled Species	Polygon	Fish Management Areas (public)	7/29/2009	FWC
	Polygon	Fish EFH	4/10/2009	NOAA
	Polygon	Coral EFH	4/10/2009	NOAA
	Polygon	Dolphin EFH	4/10/2009	NOAA
	Polygon	Acropora EFH	5/28/2009	NOAA
	Polygon	Green Sea Turtle EFH	5/28/2009	NOAA
	Polygon	Gulf Sturgeon EFH	5/28/2009	NOAA
	Polygon	Hawksbill Turtle EFH	5/28/2009	NOAA
	Polygon	Johnson Seagrass EFH	5/28/2009	NOAA
	Polygon	Leatherback Turtle EFH	5/28/2009	NOAA
	Polygon	North Atlantic Right Whale EFH	7/29/2009	FWC
	Point	Scrub Jay Observations	3/6/2009	FWC
	Polygon	Scrub Jay Habitat	3/6/2009	FWC
	Point	Sand Skink	3/6/2009	FWC
	Point	Red Cockaded Woodpecker	3/6/2009	FWC
	Point	Pines Barren Tree Frog	3/6/2009	FWC
	Polygon	Panther Focus Area	3/6/2009	FWC
	Point	Panther Observations	3/6/2009	FWC
	Polygon	Panther Habitat Zone	3/6/2009	FWC
	Point	Eagle Nest Locations	2/28/2008	FWC
	Polygon	Manatee Zones	1/7/2009	FDEP
	Polygon	Mitigation Areas	2/29/2008	FDEP
	Polygon	Scrub Habitat	3/5/2009	FWC
	Point	Bog Frog	3/6/2009	FWC
	Point	Critical Wildlife Areas	3/6/2009	FWC
	Point	Flatwoods Salamander	3/6/2009	FWC
	Point	Snowy Plover Nests	3/6/2009	FWC
	Point	Listed Species Locations	3/6/2009	FWC
	Polygon	Biological Hot Spots	3/3/2007	FWC
	Point	Wood Stork Colonies	6/16/2009	USFWS
	Polygon	Intergrated Wildlife Habitat Ranking System	3/3/2007	FWC
	Polygon	Priority Wetland Habitat	3/3/2007	FWC
	Polygon	Strategic Habitat/Conservation Areas	3/5/2009	FWC
Wild / Natural Areas / Consultation Areas / Potential Habitat	Point	Sinkhole Locations	2/28/2008	FDEP
	Point	Wildlife Crossing Locations	7/29/2009	FDOT
	Polygon	Conservation Interest Areas	3/5/2009	FWC
	Polygon	Potential Natural Areas	3/5/2009	FWC
	Polygon	Crocodile Consultation Area	2/28/2008	USFWS
	Polygon	Manatee Consultation Area	2/29/2008	USFWS
	Polygon	Caracara Consultation Area	2/28/2008	USFWS
	Polygon	Snail Kite Consultation Area	2/28/2008	USFWS
	Point	Black Bear Reports	6/24/2008	FWC
	Polygon	Stock Island Snail Consultation Area	2/28/2008	USFWS
	Polygon	Butterfly (Schaus) Consultation Area	2/28/2008	USFWS
	Polygon	Black Bear Range	3/6/2009	FWC
	Polygon	Wood Stork Core Foraging Areas	8/4/2009	USFWS
	Polygon	Potential Habitat	8/18/2009	Gannett Fleming, Inc.[1]
	Point	Wading Bird Rookeries	3/3/2007	FWC
Floodplains / Floodways	Polygon	Flood Zones	9/11/2009	FEMA

[1] Data layer created by staff at Gannett Fleming for purposes of the SFECC Study

Revised 02-03-10

[2] Data layer created by staff at Janus Research, Inc for purposes of the SFECC Study

GIS Data Library

GIS Data Layer Categories	Geometry Type	GIS Data Layer Description	Date Acquired	Originating Agency
Physical Resources				
Noise and Vibration Sensitive Areas	Polygon	Vibration (DMU)	9/3/2009	Gannett Fleming, Inc.[1]
	Polygon	Vibration (FEC)	9/3/2009	Gannett Fleming, Inc.[1]
	Polygon	Vibration (PushPull)	9/3/2009	Gannett Fleming, Inc.[1]
	Polygon	Vibration (RapidRail)	9/3/2009	Gannett Fleming, Inc.[1]
	Polygon	Noise (DMU)	9/14/2009	Gannett Fleming, Inc.[1]
	Polygon	Noise (PP)	9/14/2009	Gannett Fleming, Inc.[1]
	Polygon	Noise (FEC)	9/14/2009	Gannett Fleming, Inc.[1]
	Polygon	Noise (LR)	9/14/2009	Gannett Fleming, Inc.[1]
	Polygon	Noise (BRT)	9/14/2009	Gannett Fleming, Inc.[1]
	Polygon	Noise (RRT)	9/14/2009	Gannett Fleming, Inc.[1]
Potetnially Contaminated Sites	Polygon	NPL Sites	3/10/2009	FDEP
	Point	NPL and State Cleanup Sites	3/10/2009	FDEP
	Point	Hazardous Treatment Facilities	3/10/2009	FDEP
	Point	Property Restrictions (contamination)	3/10/2009	FDEP
	Point	RCRA Site	7/29/2009	EPA
	Point	Solid Waste Disposal Locations	3/10/2009	FDEP
	Point	Abandoned Stations	2/28/2008	FDH
	Point	Registered Tanks	3/10/2009	FDEP
	Point	Petroleum Well Locations	2/28/2008	FDH
	Point	Contamination Discharges from STCM	3/10/2009	FDEP
	Point	Toxic Relapse Inventory	3/10/2009	FDEP
	Point	Dry Cleaning Program Sites	3/10/2009	FDEP
	Point	Site Investigation Sites	3/10/2009	FDEP
	Polygon	State Funded Cleanup Sites	3/10/2009	FDEP
	Point	Emissions Facility Locations	7/29/2009	EPA
	Polygon	Brownfield Areas	7/29/2009	FDEP
Navigable Waterways	Line	Navigable Waterways	11/4/2008	USDOT

Notes:
Data Layer - GIS Shapefile or GIS Dataset considered in Environmental Screeing Model or Process
[1] Data layer created by staff at Gannett Fleming for purposes of the SFECC Study
[2] Data layer created by staff at Jacobs Engineering for purposes of the SFECC Study
[3] Includes, schools, hospitals, social service centers, emergency services, religious institutions, retail/business, daycares, colleges, etc.
List of Agency Acronyms:
FDEP - Florida Department of Environmental Protection
HUD - Housing and Urban Development, Department of
FDOT - Florida Department of Transportation
SFWMD - South Florida Water Management District
FEMA - Federal Emergency Management Agency
FDH - State of Florida Department of Health Care Administration
USGS - United States Geological Survey
FWC - Florida Fish and Wildlife Conservation Commission
NOAA - National Oceanic and Atmospheric Administration
ANERR - Apalachicola National Estuarine Research Reserve
FNAI - Florida Natural Areas Inventory
NPS - National Park Service
FDF - Florida Division of Forestry
FMRI - Florida Marine Research Institute
USFWS - United States Fish and Wildlife Service
SFRPC - South Florida Regional Planning Council
TCRPC - Treasure Coast Regional Planning Council
FDR - Florida Department of Revenue
USDOT - United States Department of Transportation
EPA - Environmental Protection Agency

Lis of GIS Data Layer Description Acronyms:
MD - Miami-Dade County
BR - Broward County
PB - Palm Beach County
DRI - Development of Regional Impact
EFH - Essential Fish Habitat
CFR - Core Foraging Area
DMU - Dielsel Multiple Unit
FEC - Florida East Coast (Railway Authority)
LR- Light Rail
RRT - Rail Rapid Transit
AADT - Annual Average Daily Traffic
BRT - Bus Rapid Transit
NPL - National Priorities List
RCRA - Resource Conservation and Recovery Act
SCTM - State Storage Tank and Petroleum Contamination Monitoring Database
O&M - Operations and Maintenance
TSM - Transportation Safety Management
SFRC - South Florida Rail Corridor

[1] Data layer created by staff at Gannett Fleming for purposes of the SFECC Study Revised 02-03-10