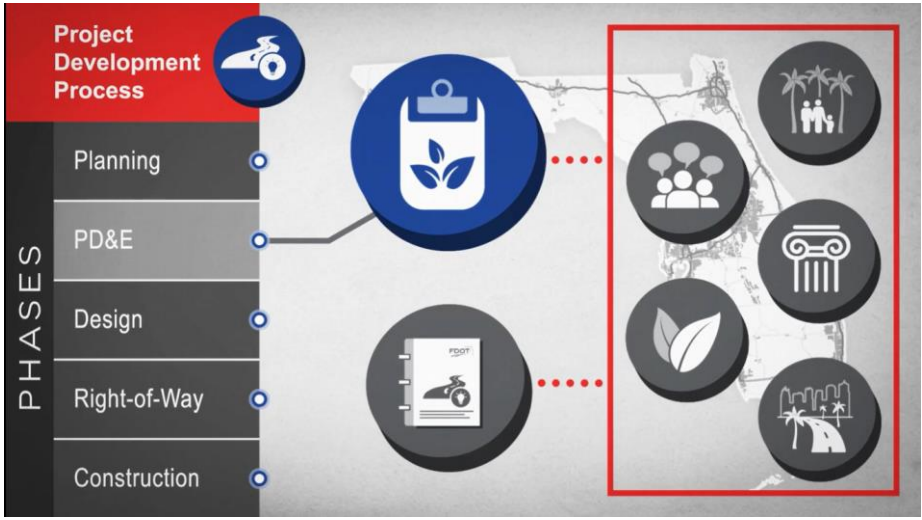
Environmental Training for Florida Turnpike Enterprise

Engineering Analysis



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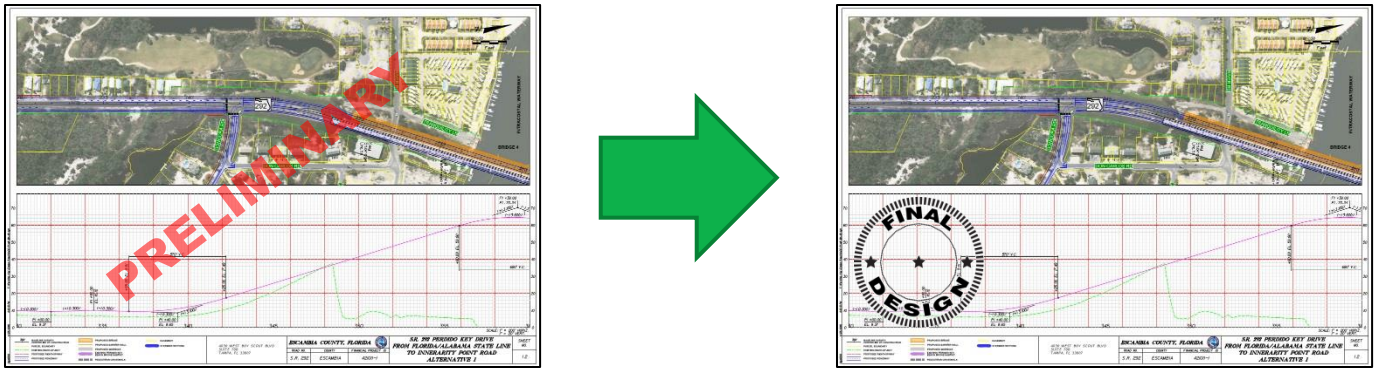
Purpose of Engineering Analysis

- Support the development of project location and design concepts
- Identify project features
- Balance project needs with costs and environmental impacts
- Support the progression from conceptual and preliminary design to final design



Engineering Analysis Process in PD&E

- Understand project needs
- Data collection
- Design controls and criteria
- Existing conditions analysis
- Development of alternatives and analysis of impacts
- Comparative analysis of alternatives
- Selection of the preferred alternative

Level of Analysis

- Depends on the size and complexity of the project
- Depends on the Class of Action
- Analysis must be performed to a level of detail sufficient to assess effects on the social, economic, natural, cultural, and physical environment.
- Must ensure all alternatives are developed to the same level of detail

Coordination Required

District Engineering and Environmental Staff

- Appropriate staff to ensure commitments are viable and are approved by the appropriate offices. (See ***Part 2, Chapter 22 Commitments***)

Resource Agencies

- Resource agencies identify potentially significant environmental issues to be avoided or minimized through the ETDM process.
- If permits are scheduled during the PD&E phase, additional engineering may be required. See ***Part 1, Chapter 12 Environmental Permits***

Other District Offices

Planning
Traffic Operations
Modal (Transit)
Roadway Design
Structures
Drainage
Freight/Port
Aviation
Scenic Highways
Right-of-Way
Landscape
Permits

United States Coast Guard
U.S. Department of Homeland Security

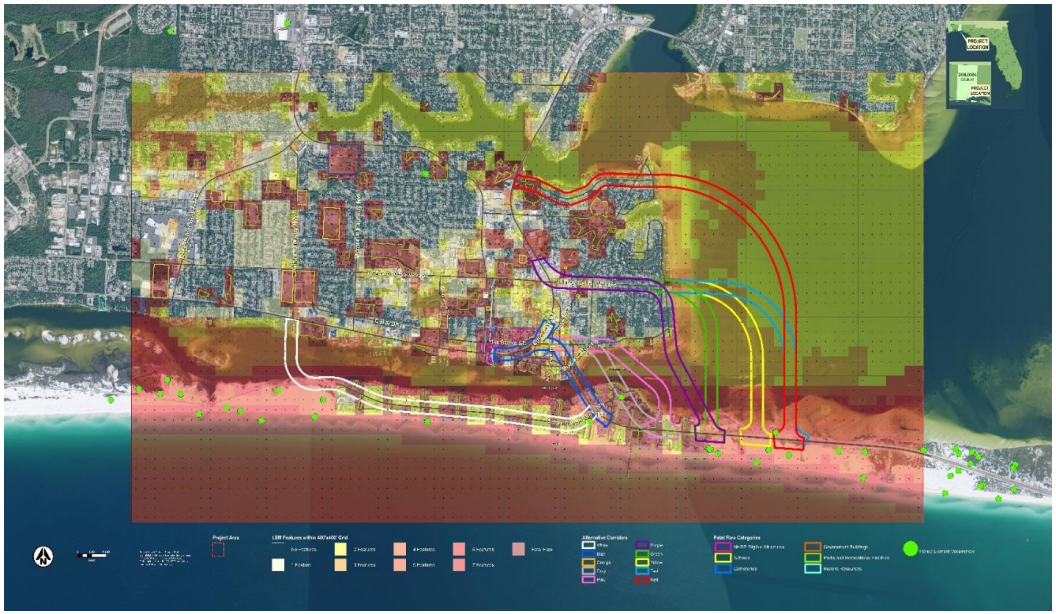
FDOT

OEM Office of Environmental Management

Alternatives Analysis

The process of developing, evaluating, and eliminating potential alternatives based on the purpose and need for the project. It requires:

- Close coordination between District engineering and environmental staff, and
- Input from the public and stakeholders (see ***Part 1, Chapter 11 Public Involvement***)



Alternatives to be Considered

1. No-Action Alternative, or No-Build Alternative
2. Transportation Systems Management and Operations (TSM&O) Alternative
3. Multimodal Alternative
4. Build Alternative(s)

Project Manager reviews planning studies previously completed for the project, and document the alternatives that have already been considered, screened, and eliminated through a planning process.

No Action, or No Build, Alternative

- The alternative in which the proposed project does not take place.
- Serves as the baseline for comparison with the environmental effects of the Build Alternatives
- Must be analyzed to the same level of detail as the Build Alternatives
- Analysis must include impacts to surrounding areas
- Documentation must include the advantages and disadvantages
- Remains under consideration throughout the PD&E Study, including the public hearing

Transportation Systems Management & Operations Alternative (TSM&O)

- Improvements that extend the acceptable service life of the facility by optimizing the performance and utilization of the existing infrastructure while minimizing the environmental impacts
- Must demonstrate that maximization of the existing system through various TSM&O strategies will not meet the purpose and need for the project prior to evaluating Build Alternatives
- Documentation of the TSM&O alternative evaluation must include a description of the strategies considered and, if the TSM&O alternative does not meet Purpose and Need, explain why
- Applies to rural areas as well as urban areas

Multimodal Alternatives

- Considered when consistent with the Project Purpose and Need
- Non-motorized facilities required to meet purpose and need include facilities that are planned in the Local Government Comprehensive Plans (LGCP)
- Include cost factors (monetary and environmental) required to meet the local needs

Build Alternatives

Build Alternatives are construction alternatives proposed to address the project's purpose and need. Each Build Alternative should have the following characteristics:

- Must address the transportation problem
- Must be reasonable
- Must avoid or minimize impacts to the environment
- Must have logical termini
- Must have independent utility or independent significance.
- May incorporate TSM&O strategies and/or multimodal options with the Build Alternative (hybrid alternative)

Design detail should be commensurate with the information needed to define and evaluate environmental impacts or define right-of-way

Number of Build Alternatives to be Considered

Environmental Document	Minimum Number of Alternatives	Comment
Type 2 Categorical Exclusion or State Environmental Impact Report	One Build Alternative and a No Action Alternative	Number depends on complexity, environmental controversy, results from planning studies, and public input.
Environmental Assessment	One Build Alternative and a No Action Alternative	EA does not need to evaluate in detail all reasonable alternatives. Any alternative considered but eliminated prior to preparing the EA should be documented.
Environmental Impact Statement	Reasonable alternatives or a "reasonable range" of alternatives and a No Action Alternative	"Reasonable" is defined as those technically and economically feasible project alternatives that would satisfy the primary objectives of the project defined in the project purpose and need

Elimination of Alternatives

Basis for Eliminating Alternatives

- Fails to meet the project purpose and need
- Not economically or technically feasible (determined through analysis)

Documenting the Elimination of Alternatives

- Include a section discussing the alternatives (including TSM&O) considered but eliminated in the PER/Project Design Documentation and Environmental Document.
- Summarize the rationale for eliminating alternatives
- Document why the alternatives were eliminated
- Identify the criteria used to eliminate alternatives and who was involved in establishing the criteria
- Specify when, in the process, alternatives were eliminated

Interchanges on Interstates

- The approved interchange alternative must be included as one of the PD&E study alternatives.
- Safety, Operational and Engineering (SO&E) acceptability should be obtained before the NEPA document approval
- Traffic, safety and conceptual design analysis support both the Interchange Access Request and PD&E study
- Preliminary engineering analysis for PD&E study satisfies the old FHWA policy requirements.
- If preferred alternative is different from the approved alternative than the IAR must be re-evaluated.
- PM coordinate with the District Interchange Review Coordinator (DIRC)

Comparative Evaluation

- Objectively compare and contrast the performance of each alternative, including the No-Action, in meeting evaluation criteria
- A number of metrics should be used for comparison
- Always assess ability to meet purpose and need and quantify environmental impacts
- Multimodal projects should include measures such as increased ridership, connectivity and accessibility, etc.
- Freight-focused project should have freight related performance measures (travel-time savings, reduction in trips, etc.)
- Comparison presented in a matrix format tailored to the individual project

Suggested Metrics for Comparison of Alternatives

Project Cost
- Design
- Construction
- Construction Engineering Inspection
- Wetland Mitigation
- Utility Relocation
- Operations and Maintenance

Social Environment
- Number of parcels (business and residential)
- Number of relocations (business and residential)
- Parks, recreation areas
- Churches, Synagogues, Mosques, etc.
- Cemeteries
- Schools
- Hospitals, Medical Centers

Cultural Environment
- Historic Cemeteries
- Archaeological Sites
- Native American Lands
- Historic Bridges
- Historic Properties

Natural Environment
- Wetlands
- Endangered Species Habitat
- Farmlands
- Wellfield Protection Areas

Physical Environment
- Contamination/Hazardous Waste Sites
- Number of Impacted Noise Receptors
- Water Quality and Quantity
- Air Quality
- Utilities

Traffic Operations and Safety
- Level of Service
- Throughput
- Delay
- Travel Time
- Safety
- Vehicle Hours Traveled/Vehicle Miles Traveled
- Travel Time Reliability

Value Engineering (VE)

- VE studies are required for projects having an estimated cost of $25,000,000 or more
- A minimum of one VE study must be conducted during either PD&E or Preliminary Engineering Design
- If conducted during PD&E, it must occur after the alternative analysis but before the public hearing
- Project Manager coordinates with the District Value Engineer to schedule the VE Study and provides the draft Environmental Document, PER/Project Design Documentation, Public Involvement Summary, and other technical documents for review by the VE team
- All VE issues/recommendations should be resolved prior to scheduling the public hearing
- VE study recommendations are incorporated into the comparative alternatives evaluation and documented in the PER/Project Design Documentation.
- D/B Projects and projects waived by the Director of Transportation Development are exempt from a VE Study

Preferred Alternative

- Identification of the Preferred Alternative is based on the analysis of project costs, environmental impacts, engineering analysis, and public input
- PER should discuss in detail the preliminary design features of the preferred alternative.

Documenting the Preferred Alternative

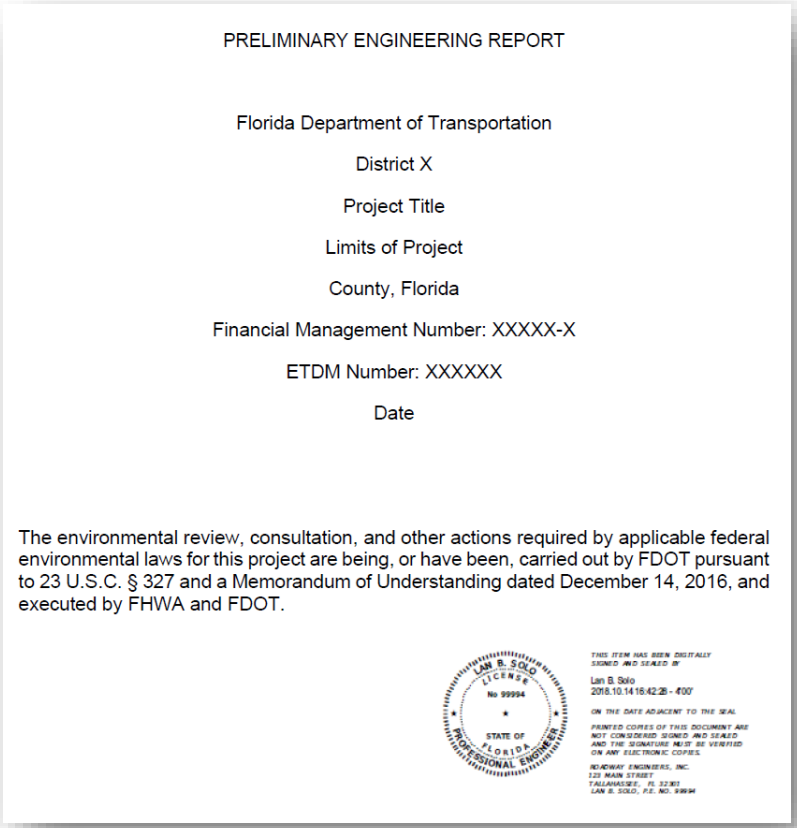
- After public hearing:
  - Appropriate section of the Environmental document are updated to include information received from the public hearing process
  - PER is updated to include preliminary design details associated with the preferred alternative.

Design Elements of Preferred Alternative in PER

- Typical Section(s) (TPS)
- Project Traffic Volumes
- Horizontal and Vertical Geometry
- Intersection/Interchange Concepts and Signal Analysis
- Bridge Analysis
- Access Management
- Variations and Exceptions
- Right of Way
- Utilities
- Transportation Management Plan
- Bicycle and Pedestrian Accommodations
- Preliminary Drainage Analysis
- Floodplain Analysis
- Special Features
- Cost Estimates
- Schedule
- Construction Impacts
- Landscape and Beautification

Engineering Documentation

Preliminary Engineering Report – required for a Type 2 CE, EA, EIS



PRELIMINARY ENGINEERING REPORT

Florida Department of Transportation

District X

Project Title

Limits of Project

County, Florida

Financial Management Number: XXXXX-X

ETDM Number: XXXXXX

Date

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by FDOT pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated December 14, 2016, and executed by FHWA and FDOT.

LAN B. SOLO LICENSE No 99994 STATE OF FLORIDA PROFESSIONAL ENGINEER

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY

Lan B. Solo

2018.10.14 16:42:26 -4'00'

ON THE DATE ADJACENT TO THE SEAL

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

ROADWAY ENGINEERS, INC.
123 MAIN STREET
TALLAHASSEE, FL 32301
LAN B. SOLO, P.E. NO. 99994

PER Contents

Cover Page (signed and sealed by a Florida registered professional engineer)

Project Summary

Existing Conditions

Future Conditions

Design Controls and Criteria

Alternatives Analysis

Public Involvement/Project Coordination

Preferred Alternative

Conclusion

- A successful PD&E Study requires orderly and continuous coordination between planning, engineering, environmental, public involvement and other staff from various FDOT offices throughout the study
- The existing conditions analysis identifies the design and operational deficiencies of existing roadways and structures in the study area and supports the purpose and need
- Alternatives must be developed to the same level of detail in order to perform a meaningful comparative evaluation
- Unreasonable or nonviable alternatives must be summarized in the engineering and environmental documentation
- The development, analysis , and evaluation of alternatives must be presented in sufficient detail so that the reader can understand the selection of the preferred alternative