AGENDA

Introduction

Express Lanes Manual

Planning and Development of Express Lanes

Questions
EXPRESS LANES IN FLORIDA

- In Operation | 59 miles
- Under Construction | 107 miles
- In Planning/Design | 326 miles

Jacksonville

Orlando

Tampa

Southeast Florida
EXPRESS LANES IN FLORIDA

Strategy

• Long Term Congestion Management Thru Dynamic Tolling
• Efficient Use of Remaining New Capacity

Provide Drivers with Travel Choices
Offer a More Predictable Travel Time
Deliver a Long-Term Solution to Manage Congestion
Reduce Fuel Consumption
Decrease Air Pollution
Provide Transit Options
EXPRESS LANES PLANNING

- Restructure of Turnpike Staff
- Supports Express Lanes Project Development Statewide
- Provides Project Coordination
- Efficient Project Delivery
- Statewide Consistency
FDOT EXPRESS LANES MANUAL

- **FELM** Replaces Express Lanes Handbook
- Similar Look to FDM
- Project Experience = Policies, Procedures, Processes
- Statewide Approach
TECHNICAL DISCIPLINES & STAFF

- Planning
- Design
- Traffic Engineering & Operations
- Finance
- Traffic & Revenue
- Tolling
- Operations
- Maintenance
- Public Outreach

Coordination: 3 Core Editors

FDOT Management Review (PIMS)
- 8 Districts
  - 10 people

FDOT Statewide Review (PIMS)
- 7 people

Core Technical Team (FTE + CO)
- 15 People

Core Editors
- 3 People

FDOT Management Review (PIMS)
- 7 people

FDOT Management Review (PIMS)
- 10 people

FTE Management Review
- 7 people

PMs, Writers, Reviewers
## CROSS REFERENCES & ADDITIONS

### Additions to Manuals
- FDOT Design Manual (FDM) 2018
- Traffic Engineering Manual (TEM) 2018
- Turnpike Design Handbook (TDH)

### Future Additions
- FDOT Project Traffic Forecasting Handbook (*on going revisions*)
- General Tolling Requirements (GTR) (*on going revisions*)
- FDOT Traffic Analysis Handbook (*future update*)
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APPENDICES
Chapter 2

PROJECT PLANNING
PROJECT IDENTIFICATION

Decision Tree & Checklist Example

- Planning Considerations
- Operational/Geometric Considerations
- Funding
- Public Support
- Other Project-Specific Considerations
- Recommendation

Decision Tree:

1. Widening Need Identified on Corridor
   - YES: Supports Regional EL Network?
   - NO: No Capacity Improvements Needed

2. Are There Existing ROW Constraints?
   - NO: Proceed with General Purpose Lane Alternative and/or Implement TSM&O Solution
   - YES: Are EL Viable?

3. Are EL Viable?
   - YES: Proceed with EL Alternative
   - NO: Proceed with General Purpose Lane Alternative and/or Implement TSM&O Solution

4. Widening Meets Design Year LOS?
   - NO: Proceed with General Purpose Lane Alternative and/or Implement TSM&O Solution
   - YES: Are EL Viable?
EL Project Development Process

1. **Origin & Destination Study**
2. **Begin Planning/Initial Concept (Develop Corridor Express Lanes Diagram) / PD&E Study**
3. **Initiate T&R Scoping**
4. **Review Ingress, Egress, Toll Points and Toll Amount Signs**
5. **Revised Concept**
6. **Investigate Possible Design Constraints (Constructability)**
7. **Approved Concept/Preferred Alternative (Interim & Ultimate Phases)**
8. **Begin T&R**
9. **Begin Design**

Expect Multiple Iterations

Revise
CORRIDOR DEVELOPMENT

Data Collection

• Traffic Volume
  – Vehicle Classification Counts
  – Peak Period and Daily
  – Sub-Area including Arterials & Highways

• Travel Speeds
  – Peak Periods

• O-D Data
  – Early Project Stage
  – Identify Major Travel Movements
  – Movements between Interchanges in a Corridor
  – Consideration of EL Ingress/Egress &/or Direct Connections to other Arterials/Highways
CORRIDOR DEVELOPMENT

Express Lanes Diagram

- Access Locations and Types
- Number of Lanes
- Ingress / Egress
- Destination Signs
- Project Limits
- Toll & Data Gantry Locations
Factors for Determining Access Location (Entry, Intermediate, Termination)

1. Analysis of O-D Data
2. Spacing & Geometry of Interchanges
3. Length of Segment(s)
4. Geometric Characteristics
5. Operational Characteristics
6. ITS/Signage
7. Tolling Infrastructure
8. Park-and-Ride Lot Locations
9. Transit Service
10. Availability of ROW
11. Environmental Impacts
12. Cost
CORRIDOR DEVELOPMENT

Access Plan Key Characteristics

• Number of Lanes
  – 2 EL per direction (where feasible)

• Segment Lengths
  – 1 EL per Direction (3 to 7 Miles)
  – 2 EL per Direction (4 to 10 Miles)
  – Bypasses at Least 2 Interchanges

• Lane Change Distance
  – Minimum 1,000 Feet per Lane Change for Ingress / Egress Locations

• Eligible Trips
  – > 40% of Total Corridor Trips for Each Segment
Express Lanes Demand
Analysis from a Systemwide Perspective

- Express Lanes Corridor Traffic Forecasts
- Type of Forecast is Dependent on Study Purpose

Regional Model
- Corridor Demand

Express Lanes Time of Day (ELToD) Model
- Split between GUL/GTL and EL
- Traffic By Time of Day and Direction
- Initial EL Toll Rates

Project Traffic: PD&E and Design ≠ Revenue Traffic: Traffic & Revenue Study
ELToD (Express Lanes Time of Day) Model is a traffic assignment model built to forecast traffic volume and toll amounts for Express Lanes.

WHAT IS ELTOD?

Four-Step Model / Activity-Based Model

1. Trip Generation
2. Trip Distribution
3. Mode Choice
4. Traffic Assignment

Subarea Corridor Trip Table & Network

ELToD Model

Express Lanes

General Purpose Lanes
WHAT IS ELTOD?

Traffic & Network Input
- O-D Traffic Matrix
  - Hourly Distribution
- Highway Network & Geometry
  - GP link data
  - EL link data
  - Other links data
  - Assumed tolls

Pricing Input
- Minimum/Maximum tolls
- Toll escalation curve

Model Parameters
- Volume-Delay function
- Choice Model Coefficients
  - Value of Time
  - Reliability
  - Other reasons

ELToD Equilibrium Assignment

Output Data by Hour
- Volumes, toll rates, revenues
- Speeds, travel times
- V/C ratios

Optional Feedback to Travel Demand Model

Notes:
- Blue boxes are input from travel demand model
- Green boxes are other ELToD inputs
- Orange boxes are ELToD applications

Report
ELTOD VS OTHER MODELS

• Other Models May Consider Only Time and Toll
• ELToD Considers Reliability
• Other preferences are considered - left lane bias, no trucks, perceived safety

Express Lane Share =

\[
\frac{1}{1 + e^{(-1*(\beta_{Constant} + \beta_{Time}*Time + \beta_{Toll}*Toll + \beta_{Reliability}*Reliability))}}
\]
CORRIDOR DEVELOPMENT

Traffic Analysis

• Traffic Volume Forecast
  - Design Horizon (20-Year)
  - Express Lanes
  - Adjacent GU/GTL
  - Interchange Ramps & Intersections

• Operational Impacts
  - Merge/Diverge & Weave Analysis
  - Mainline Operations
  - Interchange & Intersection Operations
  - Geometric Constraints (Bottlenecks)
The direct connection provides a seamless network to improve regional mobility by more effectively serving high-volume traffic movements.

- Ramps Evaluation
- Toll Plan Considerations for EL-to-EL Connections
EL-TO-EL DIRECT CONNECTIONS

Ramp Evaluation
Regional Travel Demand Models and ELToD Model are used to determine hourly demand for the EL-to-EL ramps

• EL-to-EL Ramps are Feasible
  – Ramp DDHV Exceeds 400 Vehicles/Hour

• Dual Lane Ramps
  – Warranted if DDHV is Greater than 1,700 Vehicles/Hour

• Benefits

• Cost
Determination of Benefits

- Comparison to a Slip Ramp Connection
- Demand Projections for Each Scenario
- Operation Analysis
  - Reduced Weaving Volumes
  - Improved Speeds
  - Improved Level of Service
EL-TO-EL DIRECT CONNECTIONS – PREFERRED TOLL PLAN

- **Ingress** to EL Provided before EL-to-EL Ramp
- **Egress** from EL Provided on Both Sides of EL-to-EL Ramp
- **Toll Gantry** on Both Sides of EL-to-EL Ramp & per GTR

Legend:
- Ingress
- Egress
- Toll Gantry
- Express Lanes
PROJECT PHASING

• Interim & Ultimate Configuration Diagrams
  – Part of a Larger Corridor
  – Part of Regional Network Connection

• Separate Diagrams for each Interim Phase

• Complete Segments (Ingress followed by Egress) for Each Interim Phase
  – Project can be Opened as a Stand Alone EL Facility

• Same Access Point Locations

Legend

- Ingress
- Egress
- Toll Gantry
- Express Lanes
QUESTIONS

Andrew Velasquez, P. E., P.T.O.E.  
Program Manager  
AECOM – FTE Traffic & Revenue Consultants  
Office: (954) 934 – 1161  
andrew.velasquez@dot.state.fl.us

Genoveva Fruet, Ph.D., AICP  
Senior Project Manager  
AECOM - FTE Traffic & Revenue Consultants  
Office: (407) 264 - 3996  
genoveva.fruet@dot.state.fl.us

www.floridaexpresslanes.com