BABA Implementation Plan for FDOT: BABA for Non-Motorized Traffic Monitoring

Program Meeting, September 2025

Presenters: Karen Byram, Sarah Smith & Melissa Hollis

Product Evaluation Office

State Materials Office

September 2025

Meet the Product Evaluation Team

Product.Evaluation@dot.state.fl.us

- Group email; the appropriate person will respond

Karen Byram

- Product Evaluation Administrator
- Karen.Byram@dot.state.fl.us

Melissa Hollis

- Product Related Specification and Project Issues
- Melissa.Hollis@dot.state.fl.us

Sarah Smith

- APL/PATH Administrator and Manufacturer Coordinator
- Sarah.Smith@dot.state.fl.us

Outline- Quick Session

Federal Rules

- Old Rules, New Rules
- Obligation Date vs Letting Dates
- All Construction Contracts
- Implementation Plan Overview

Waivers

- Manufactured Products Waiver rescinded
- Non-Availability Waiver Requests
- Public Interest Waivers

FDOT's Implementation Plan

- Manufacturer's Guidance: Submit APL Applications now
- Designer's Guidance: Standard Specs vs Non-Standard Specs
- Local Agency Requests: Domestic Products vs Non-Domestic Products
- Construction Responsibilities
- Utilities

Extended Questions and Answers

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FDOT

The Big Picture for FDOT BABA Compliance

Manufacturer	Design	Construction	Maintenance
Product Pre-Approvals Submit product applications to list on **APL- FOR STANDARD AND DEVELOPMENTAL SPECIFICATIONS** Approved Products are assigned an APL#	**Standard Specs:** Products on APL **TSPs/MSPs:** Designer must submit products with specs for review. Non-standard products will be added to APL as project specific	**Approved Producer:** no changes **APL Product:** document the APL# (watch comments & limitations) **Not currently on the APL:** Submit product information to request an APL#	**Warranty Tracking** **Report premature failures through APL as possible deficiencies** (to be investigated and tracked)

Everyone must do their part to make compliance easy!

Current Federal Guidance

(simplified view, as applicable for most FDOT projects)

1983

23 CFR 635: FHWA Rule for Iron, Steel, and Manufactured Products (waiver)

- Buy America (Reauthorized in 1993):

Aug 2023

- **2 CFR 184: Updated BABA**
- FDOT January 2024 lettings
- Construction Materials: Plastic, Polymer, Non-Ferrous Metals, etc.

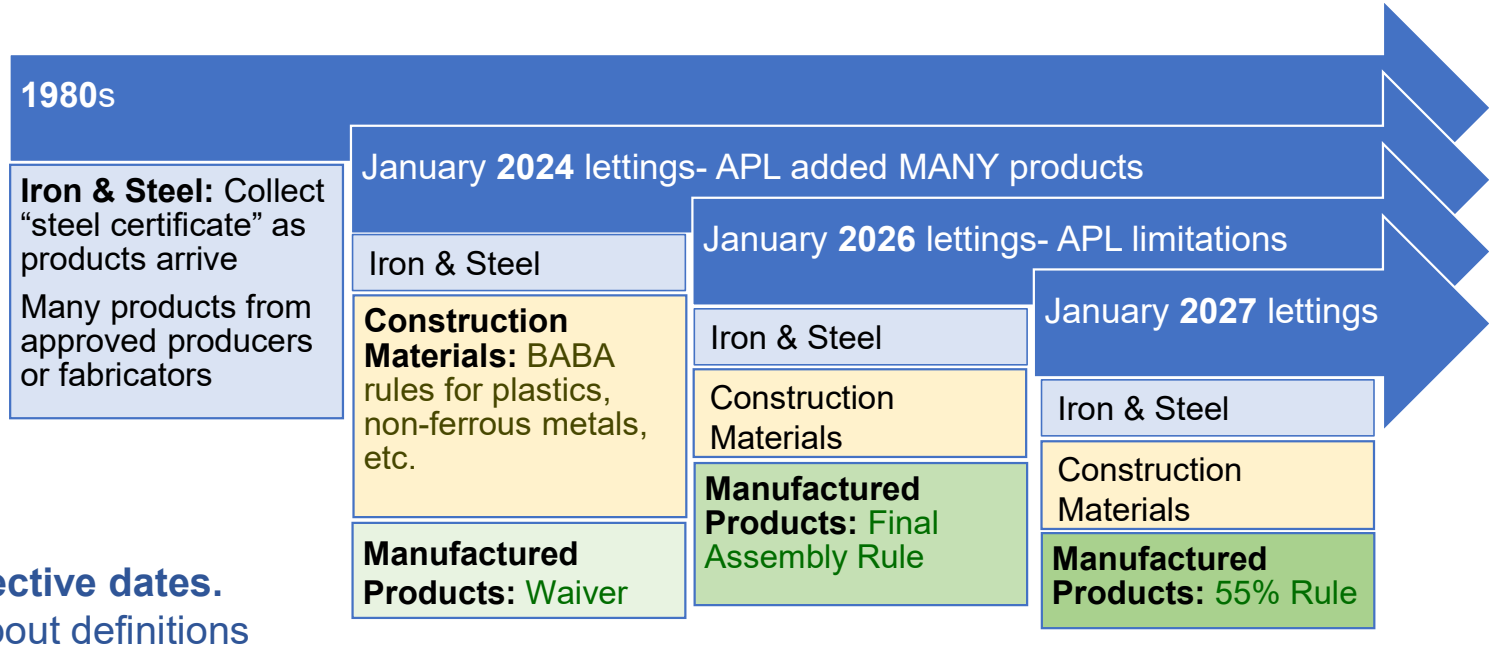
March 2025

- **23 CFR 635.410: Waiver Rescinded**
- FDOT January 2026 lettings
- Manufactured Products: Electronics, assembled products

Obligation Date vs Letting Date

While the Federal Government works on an “Obligation Date” for the funding, FDOT Projects are based on a “Letting date” for applicable Specifications, Standards, and APL Items.
See the FDOT Contracts Administration schedule for exact dates and deadlines.

Letting Date is important!



Notice the effective dates.
More details about definitions and categories in a moment.

Categorizing: Federal Guidance

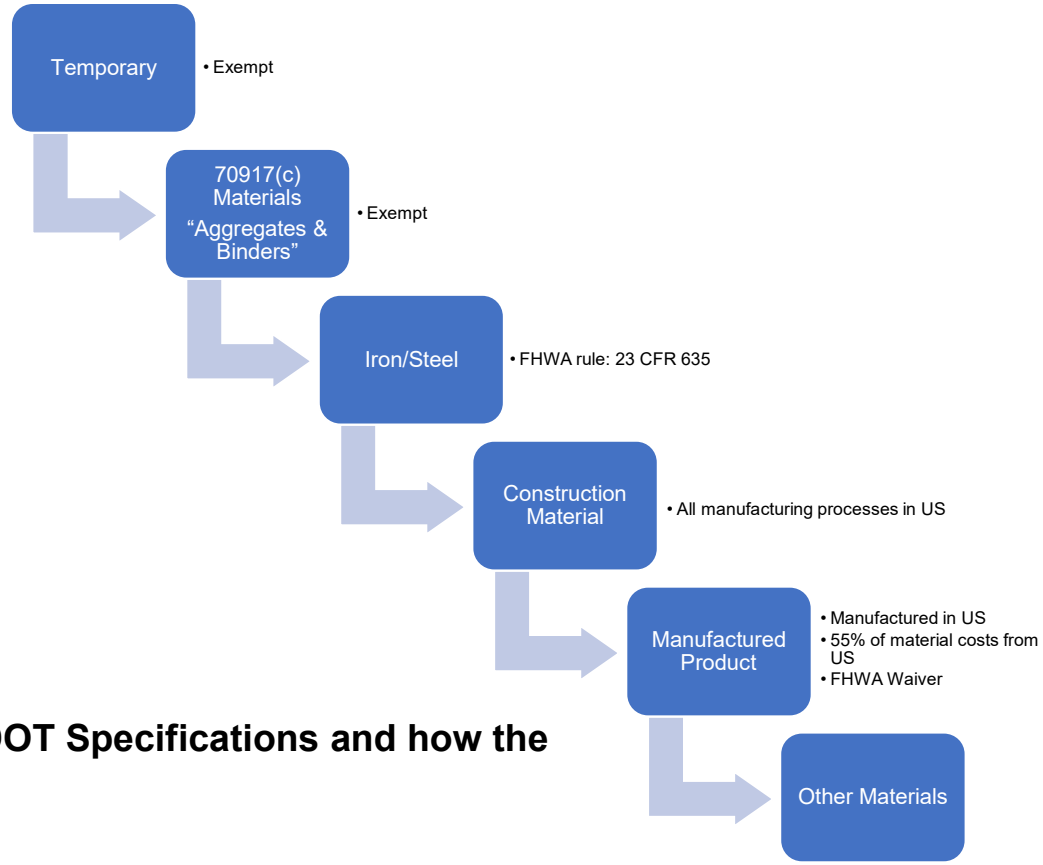
Iron and Steel

Construction Material

- Non-Ferrous metals
- Plastics/Polymers, composites
- Glass
- Fiber Optic Cable, optical fiber
- Lumber
- Engineered Wood, Drywall
- **ALL US manufactured**

Manufactured Product

- Electronics
- FHWA Waiver (ends 2025)
- Final Assembly (2026), 55%+ mined, produced, or manufactured in US (2027)



Predominate material, by cost of components

For most items, BABA classification is based on FDOT Specifications and how the product or material arrives at the construction site.

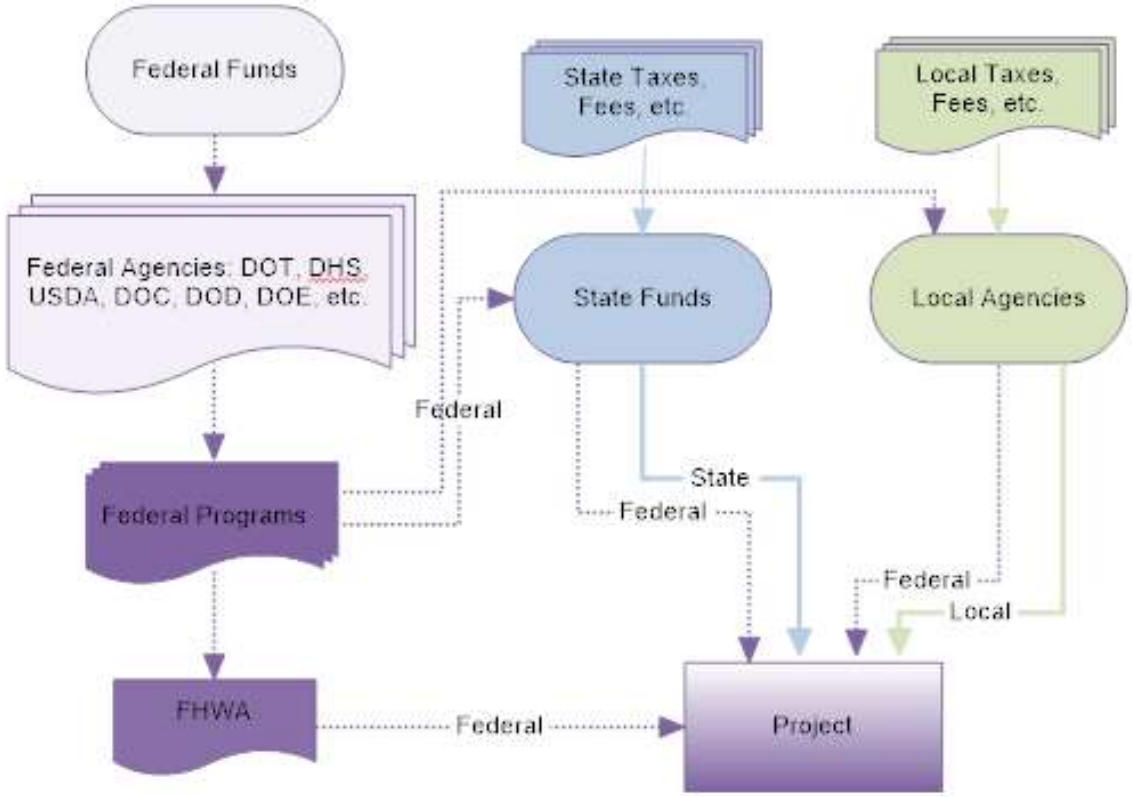
Federal Funds…

…more than Federal Highway Funds through FHWA!

DHS: Transportation related Cybersecurity
FEMA: Federal Emergency Management Agency
USDA: Landscape, Forest Restoration
USDOT: Safety, Safe Paths to School, Rail Programs, Mass Transit
HUD: Housing & Urban Development- Local Programs
Homeland Security: Local Programs
EPA: Environmental Protection Agency (ponds, drainage, wetlands)

BABA rules are applicable to ALL Construction PROJECTS.

Any exceptions must modify Section 6 of the specifications, AFTER review by Product Evaluation and approval by the State Construction Engineer.



Important: FHWA Federal Aid ≠ Federal Funds.

Federal Aid is generally the FHWA funding. Many designers recognize this as project with a Federal Aid Project Number in addition to the FPID number.

Federal Funds (FHWA, DHS, HUD, or other) may come through the State or Local Funds. The fund codes/sources are identified within the normal FPID number 123456-1-52-01.

FDOT's Implementation Plan:

1. Implementation based on FDOT Letting Date

2. Applicable for All Construction Projects

3. BABA Eligibility of Products will be listed on the APL

No BABA determinations in the field

No conflicts from District, Designer, Contractor, or CEI

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Everyone must do their part to make compliance easy!

Rules for a reason…

- You are special!
- You do a great job!
- You are loved by family, friends, and co-workers!

- Waivers are NOT automatic

- Your project must follow Federal Rules!
- In most cases, the rules are easier than the exception or waiver efforts!

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Extended Questions and Answers

Non-Domestic Iron/Steel

For use by the Contractor

Incidental Non-Domestic Iron/Steel:
Follow the specification (Section 6) and CPAM for small quantities

Record the $ amount of non-domestic steel.

This is not an option for the Manufacturer or Designer!
No change from current practice for Construction.

Large Items of Non-Domestic Iron/Steel:

- Redesign with other materials or products
- Contact Product Evaluation for guidance with Public Interest Waiver

De Minimus (small amount) Waiver

De Minimis, Construction Materials:

- BABA is intended to apply a domestic procurement preference.
- Develop and Sustain Domestic Manufacturing
- Identify areas for Domestic growth

Solutions:

- Redesign with other materials/products
- Cannot use alternate funds within the project to “circumvent” the Federal Rules

Do not use for any FDOT administered projects or contracts.

- FDOT Project amounts too large
- Required cost tracking (materials only) not possible with current specifications and pay items (furnish & install)

Local agency use of De Minimis waiver for stand alone projects will require the local agency to maintain all documentation (material costs separate from labor/equipment)

Non-Availability Waiver

- FDOT Standard Specs (FHWA approved)
- No domestic products available
- Limited domestic products (supply not able to meet demand)
- Verify current Manufacturers' Domestic Status & product availability
- Research other potential manufacturers nationally (NIST & Florida Makes)
- Waiver process may take 6+ months; options pending

Public Interest Waiver

- Non-Standard Specification (TSP or MSP)
- Non-Domestic product requested
- Why is it in the Public Interest to use a non-domestic product?
- Why is it in the Public Interest NOT to use a domestic product?
- Waiver reviewed by FDOT Directors, FHWA-FL Division, FHWA-DC, and OMB
- Process may take up to 24 months

Comparing Waivers

	Non-Availability Waiver	Public Interest Waiver
Specification Type	**Standard:** Standard Spec or Developmental Spec (FHWA approved)	**Project Specific:** Technical Special Provision or Modified Special Provision
Designer	No Action; drafted by Product Evaluation	Designer submits support documentation & waiver draft
Delays	**None anticipated**; FHWA approved specification	**Up to 24 months**; not guaranteed

Non-Availability Waivers: Additional considerations

	Local Agency Request	Project Specific- FDOT Performance Requirement	Statewide, Non-Availability "Blanket" Waiver
Initiated by	Local Agency	Project Manager	Technical Expert
Requirements	Varies; may require Public Interest finding if domestic or design alternatives are available	Domestic Products will not meet the FDOTperformance requirements	Domestic Products are not available nationwide
Availability of Domestic Products	Varies; consider alternative products or designs	Must consider alternative designs	Must contact manufacturer to determine when domestic products will become available
Timeline	Anticipated 6 months to 2 years; waiver must be approved by Federal Agency prior to letting	Anticipated up to 18 months; waiver must be approved by FHWA prior to letting	Varies, depending upon national availability
Notes	Existing waivers possible. Local "preferences" are unlikely.	Alternative Design vs Performance Needs	More likely for short-term needs

- Local Agency must prepare waivers for local requests.
- Contact Product Evaluation for guidance and form to be used for Project Specific or Statewide requests.
- Product Evaluation will process requests for FDOT and LAP projects.

Waiver Tracking: APL Product Types included in current FDOT Waiver Requests

620 UPS

620-002-xxx Surge Protective Device for 120V or 120_240V Power
620-003-xxx Surge Protective Device at Point of Use
620-004-xxx Surge Protective Device for Low Voltage Power, Control, Data and Signal Systems

650 Signals

650-001-xxx 12"" Polycarbonate Vehicle Signal
650-002-xxx 12"" Die Cast Vehicle Signal
650-005-xxx 12"" Die Cast Optically Programmable Signal Head
650-007-xxx 8"" Polycarbonate Vehicle Signal
650-008-xxx Plastic Vehicle Signal Assembly
650-010-xxx 12"" LED Red Signal
650-011-xxx 12"" LED Red Arrow Signal
650-012-xxx 12"" LED Yellow Signal
650-013-xxx 12"" LED Green Signal
650-014-xxx 12"" LED Yellow Arrow Signal
650-015-xxx 12"" LED Green Arrow Signal
650-016-xxx 12"" Die Cast All LED Vehicle Signal Assembly
650-018-xxx Programmable Visibility Red LED Lamp for Optically Programmable Signal
650-019-xxx Programmable Visibility Yellow LED Lamp for Optically Programmable Signal
650-020-xxx Programmable Visibility Green LED Lamp for Optically Programmable Signal
650-025-xxx Light Rail Transit Signal"

653-009-xxx International Symbol Pedestrian Signal
653-022-xxx Countdown Pedestrian Signal

715-010-xxx LED Luminaire Wildlife (Conventional)

676 Small Cabinets

676-001-xxx Wired Cabinet Assembly Type II
676-009-xxx Wired Cabinet Assembly Type III

678 Cabinet Items

678-003-xxx Conflict Monitor Type 12
678-005-xxx Transfer Relay
678-006-xxx Flasher Type 1
678-007-xxx Flasher Type 3
678-008-xxx Time Switch Type 1
678-016-xxx Malfunction Management Unit Type 16
678-017-xxx Cabinet Power Supply (TS2)
678-021-xxx Cabinet Power Supply (170)
678-022-xxx Conflict Monitor for 170 Controllers
678-023-xxx Conflict Monitor for 170/2070 Controllers"

682 CCTV Cameras

682-001-xxx Camera - External Positioner
682-002-xxx Camera – PTZ
682-005-xxx Camera - Fixed

684-011: Cellular Modem

684-008-xxx Managed Hub Ethernet Switch

685-003-xxx Uninterruptible Power Supply (Real-Time Active Power Conditioner)

695 TDA

695-001-xxx Vehicle: Class II Piezoelectric Axle Sensor
695-004-xxx Adhesive Bonding Agent
695-012-xxx Vehicle: Quartz Piezoelectric Sensor
695 others

932-005-xxx Pre-Cured Silicone Sealant

Waiver Reminders

"…as domestic supply becomes available, domestic producers will have prompt access to the market created by the program."

Agencies should always issue, construe, and apply waivers to ensure the maximum utilization of goods, products, and materials produced in the United States, consistent with applicable law.

-From OMB, M-24-02

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FDOT's Implementation Plan by Group

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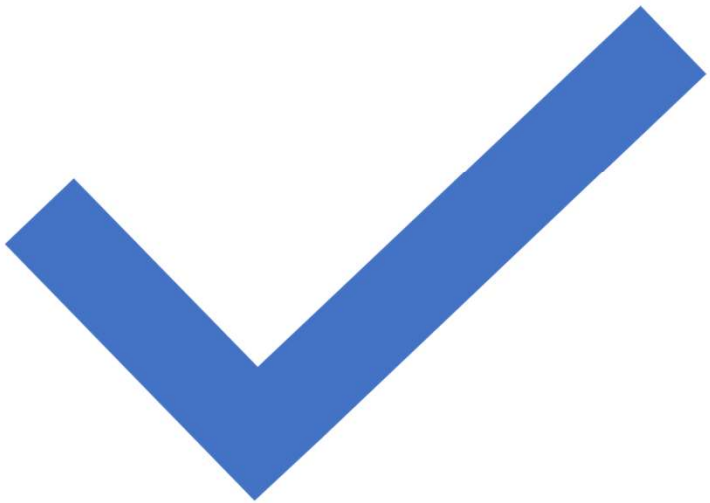
FDOT's Implementation Plan: APL



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Everyone must do their part to make compliance easy!

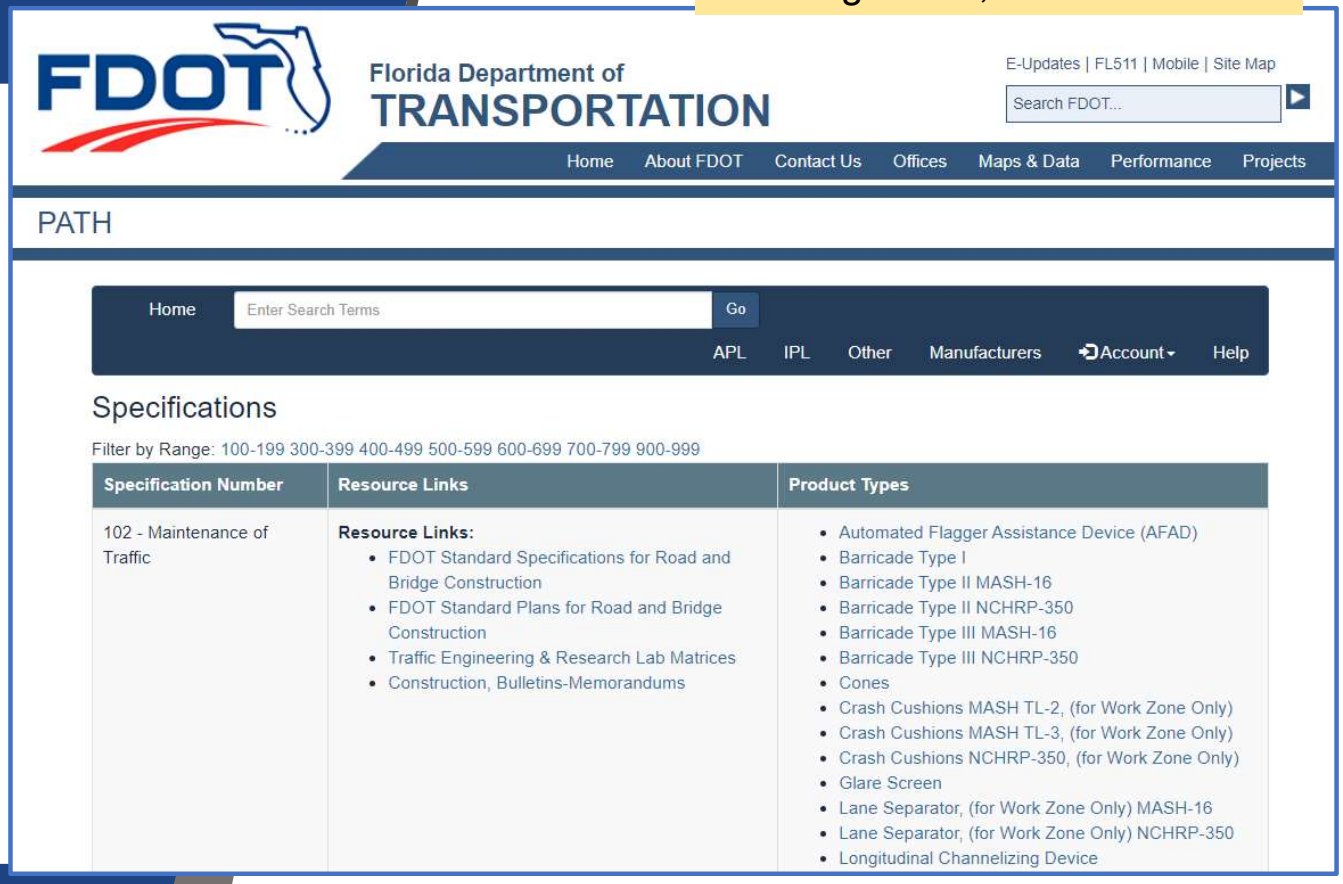
FDOT's APL

Used by Designers, Inspectors, Contractors, Manufacturers, Local Agencies, and others!

PATH (Product Application Tracking History) system includes the product type listing, applications, and the **APL (Approved Product List)**

Manufacturers submit documentation

- Product & Packaging Photos
- Label Photos
- Installation Instructions
- Warranty information
- Product Data Sheets
- BABA compliance*
- Other documents, per specifications



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Sample Product HD Series (APL Product)

Vendor: FDOT Product

- Model Number: Sample model
- **APL Number:** 682-002-987
- **Specification:** Video Equipment
- **Product Type:** Camera – PTZ
- **BABA Eligible:** Eligible
- **Limitation:** BABA Approved for FDOT project lettings on or before December 31, 2025.
- **Comment:** Tested with F/W version 4.00.426; Sunguide Version 9.0.0, Build 14720; POE Injector Model # 7412007-003; Compatible with Sunguide using NTCIP
- **Fabrication:** Electrical/Electronic, Manufactured Product

Vendors:
Manufacturers, Approved Producers, Fabricators

APL Products
Approved Producers (MAC) for Materials

Manufacturer's Guide

Contact Product.Evaluation@dot.state.fl.us to request a copy of our brochure.

Submitting an APL Application

- Review the applicable Specification
- Create an account (if you don't already have one)
- Gather your documents, photos, test reports, etc. as required by spec

Submitting an APL Application

- Sign-in
- Begin the application
- Upload documents
- Answer the BABA questions
- Submit the application

BABA Questions

Not all questions will appear for all products

Questions
Is this product predominantly made of Iron or Steel, where the cost of the iron and steel content exceeds 50% of the total cost of all its components?
Is this product predominantly made of non-ferrous metals, where the cost of the non-ferrous metal content exceeds 50% of the total cost of all its components?
Is this product predominantly made of plastic or polymer-based products, with or without minor additions of articles, materials, supplies, or binding agents, where the cost of the plastic or polymer-based product content exceeds 50% of the total cost of all its components?
Is this product predominantly made of glass, fiber optic cable, or optical fiber products, with or without minor additions of articles, materials, supplies, or binding agents, where the cost of the glass, fiber optic cable, or optical fiber product content exceeds 50% of the total cost of all its components?
Is this product predominantly made of lumber, Engineered Wood, or drywall products, with or without minor additions of articles, materials, supplies, or binding agents, where the cost of the lumber, Engineered Wood, or drywall product content exceeds 50% of the total cost of all its components?

BABA Questions

Questions
Does **final assembly** of this product occur outside of the United States?
By cost of components or ingredients, is **45% or more of your product currently sourced outside** of the United States?
Is this **product's enclosure or cabinet made of plastic or polymer-based materials**?
Is this **product's enclosure or cabinet made of Iron or Steel**?
Is this **product's enclosure or cabinet made of non-ferrous metal**?

Categorizing: Federal Guidance

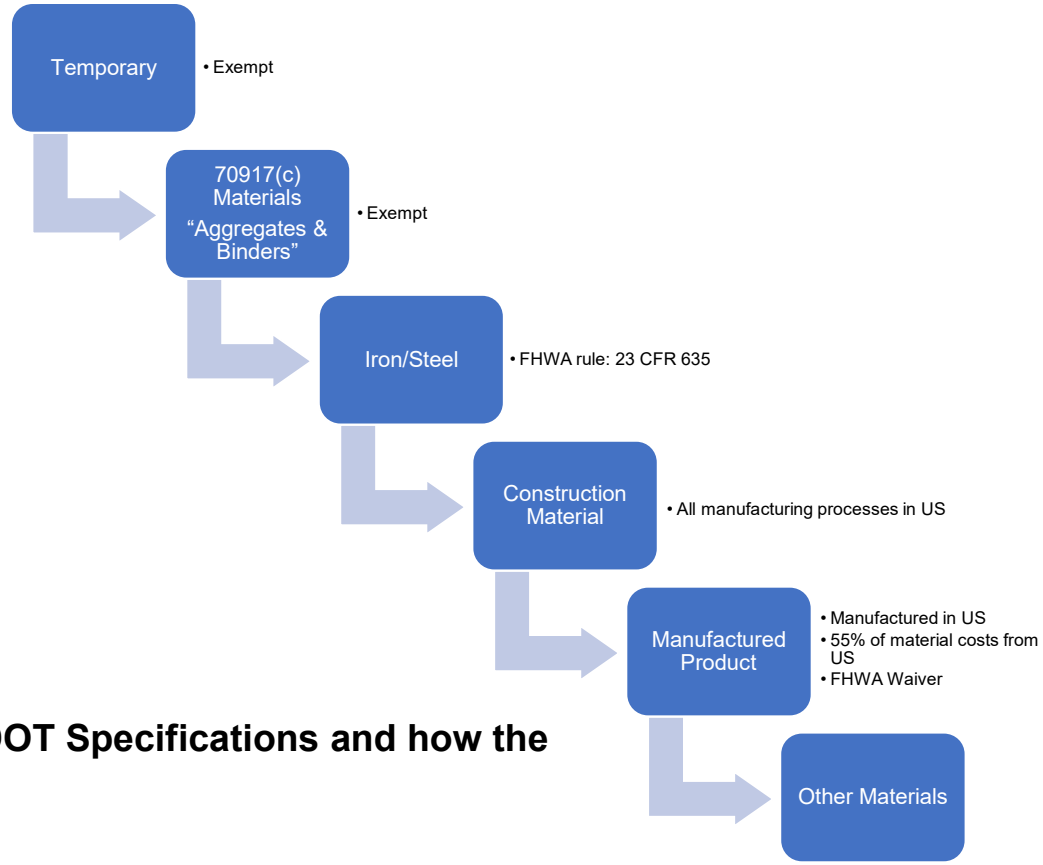
Iron and Steel

Construction Material

- Non-Ferrous metals
- Plastics/Polymers, composites
- Glass
- Fiber Optic Cable, optical fiber
- Lumber
- Engineered Wood, Drywall
- **ALL US manufactured**

Manufactured Product

- Electronics
- FHWA Waiver (ends 2025)
- Final Assembly (2026), 55%+ mined, produced, or manufactured in US (2027)



Predominate material, by cost of components

For most items, BABA classification is based on FDOT Specifications and how the product or material arrives at the construction site.

Photos, Drawings, and other Documents

Photos in .jpg or .png

- Used to help distinguish your product from others
- Clearly show the Product & details
- Label and/or Packaging- as it arrives in the field

Documents in .pdf format

- Test Reports
- Product Data Sheets
- Technical Information

The Big Picture for FDOT BABA Compliance: APL Pre-approval

Manufacturer

Product Pre-Approvals

Submit product applications to list on **APL- FOR STANDARD AND DEVELOPMENTAL SPECIFICATIONS**

Approved Products are assigned an APL#

Design

Standard Specs: Products on APL

TSPs/MSPs: Designer must submit products with specs for review.

BABA compliant non-standard products will be added to APL as project specific

Construction

Approved Producer: no changes

APL Product: document the APL# (watch comments & limitations)

Not currently on the APL: Submit product information to request an APL#

Maintenance

Warranty Tracking

Report premature failures through APL as possible deficiencies (to be investigated and tracked)

Designer Responsibilities

FDOT Designer

Consultant Designer

Local Agency Requests

Reviews and Pre-letting activities

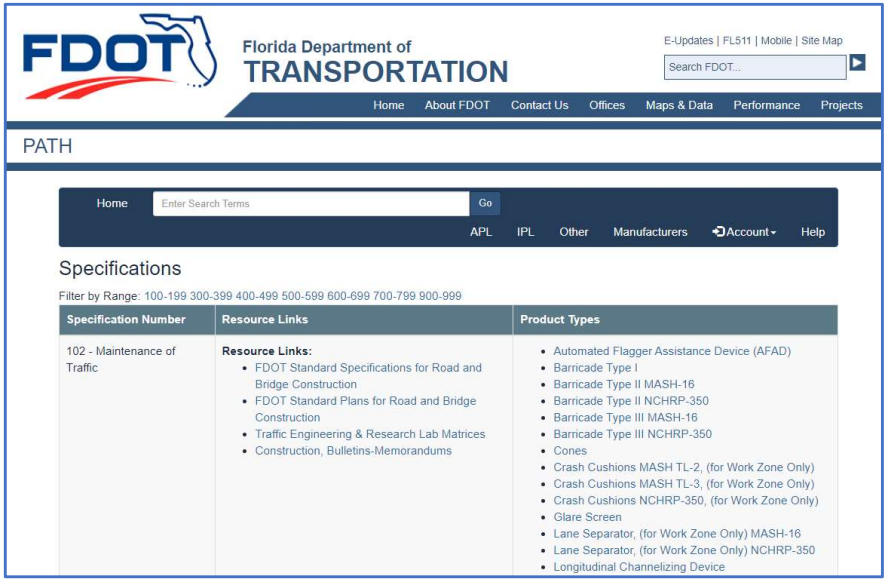
FDOT Implementation- What does the DESIGNER need to do?

APL Products: Use the standard specs, whenever possible!

- **Not Sole Sourced: No action needed**
- **Sole Sourced?** Get approvals per the FDM, update the applicable specification to name the product, determine if a waiver is needed.

Non-APL Products: Follow the FDM

- **Not Sole Sourced?** Update spec requirements (multiple products allowed); ensure that there is at least one project specific item on the APL. Update the applicable specification with material properties.
- **Sole Sourced?** Get approvals per FDM, update the applicable specification to name the product, determine if a waiver is needed.



Product Evaluation Review:

Is it constructable with a BABA eligible product?

Designer- Requesting an APL number

Standard Product Types

- Requirements included in the Standard Specifications
- Do not add “optional equipment” to APL product description
- Manufacturers must submit documentation, per the Specifications

Designer or Product Evaluation may **invite manufacturer** to submit an APL application

Non-Standard Product Types

- Follow the FDM
  - Form 110 with justification
  - MSP (expanding/limiting APL)
  - TSP (spec Section not in book)
- Product Evaluation will review documents, with input from applicable Technical Experts
- **TERL will review any non-standard Traffic Ops equipment**, per FS 316.0745
- Assign an APL# for specific Project numbers

Next Specification cycle: Technical Expert may consider need for future specification changes

FDOT Implementation-
What does the DESIGNER need to do?

PSEE- Sole Source Reviews

FDM Form 110

Justification and Supporting documentation:

- Draft of MSP
- Draft of Plan Detail, if applicable

Reviewers: Verify APL# on form

This should NOT be a “rubber stamp” type of approval. Read the justification.

Verify BABA eligibility

Agency-EOR-FDOT approval; NOT contract language

Contract Package

Plans: Show the location and/or dimensions

Specifications:

- MSP for changing Material Requirements to naming the product
- Local Agency List specification

Estimates (EQ Report): Document quantities by location

FDOT-Contractor legal language

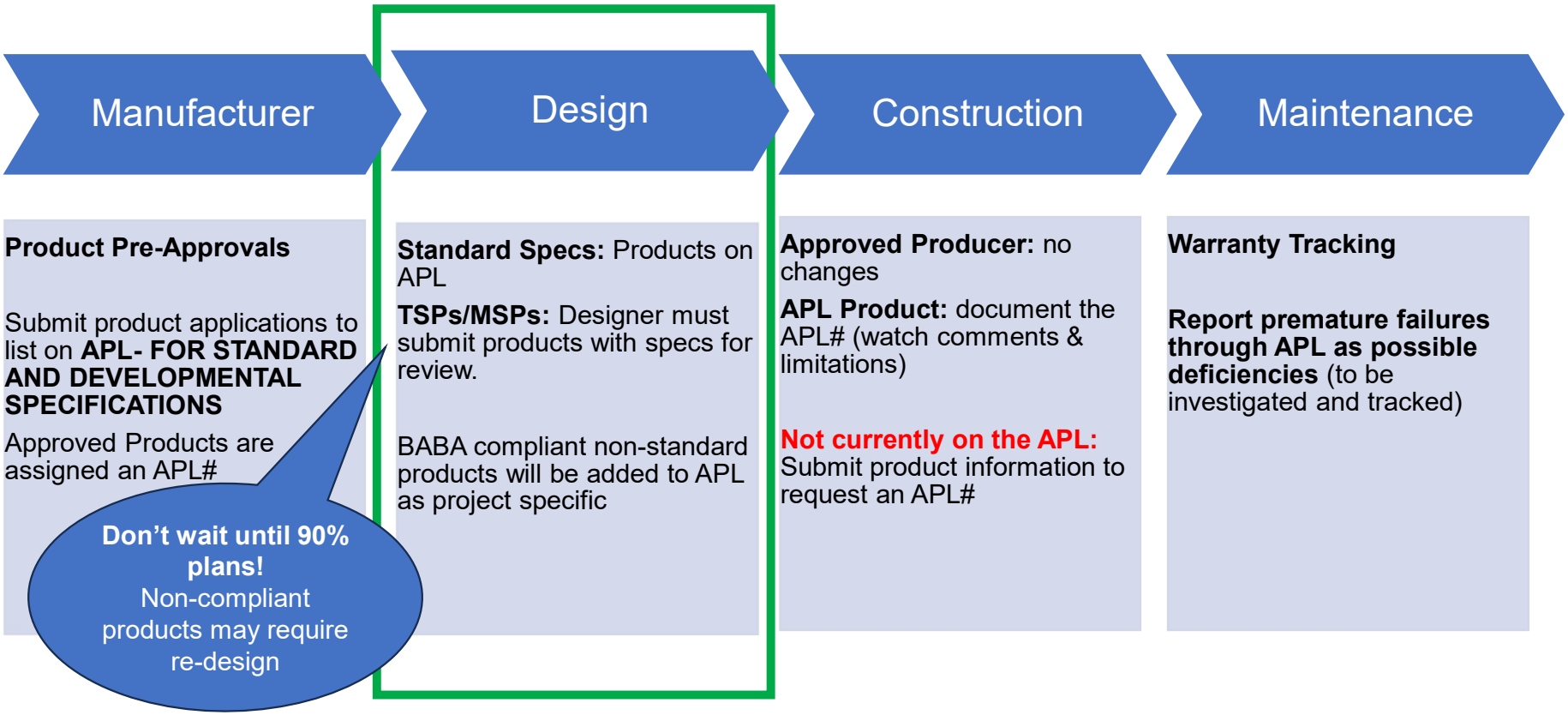
BABA Rules

23 CFR 635.410 and 2 CFR 184

FDM 110 & Constructability Review:

"No Federal-aid highway construction project is to be authorized for advertisement or otherwise authorized to proceed unless the manufactured products used and permanently incorporated in such project are produced in the United States."

The Big Picture for FDOT BABA Compliance



Constructability Reviews

Constructability Reviews during design: Ensure products are available on the APL prior to approval.

Products and/or Materials Identified during Construction (may include Supplemental Agreements, Work Orders, Shop Drawings, and Push Button Contracts):

Designers must ensure that at least one APL product is available for any products detailed by Shop Drawings.

During Construction, comply with all Division I specifications, including

- Section 5 Control of the Work (5.1.2 Shop Drawings)
- Section 6 Control of Materials (Source of Supply and BABA)

Non-Motorized Locations

How many products are used on a typical installation?

Non-Motorized Locations

How many products are used on a typical installation?

- Sensor
- Loop Sealant, Grout
- Concrete
- Post
- Anchor Bolts
- Solar panel
- Battery
- Voltage regulator
- Cabinet
- Modem or other communication
- Others?

Light Pole Complete

- How many products can you identify?

Light Pole Complete Products

- Luminaire
- Aluminum Arm
- Aluminum Pole
- Transformer Base
- Wiring & fuse holders
- Anchor Bolts
- Precast Concrete Foundation (option)
- Wet Concrete & Rebar Foundation (producer supplied)

Each item has a separate APL number!

Identifying products and materials in Specs:

Standard specs, TSPs, and MSPs

- Have all products and materials been identified in the Materials article?
  - Are there any material (spec requirements) hidden in plan notes/details? Adhesives? Hardware? Concrete?
- What is the BABA classification for each material?
  - Are all Construction Materials and Manufactured Products addressed on the APL?
  - Plastics, Polymers, Aluminum, and Electronics
  - Other product types or materials not on APL
- Any APL/BABA issues that might affect Construction?

Failure to comply with FDM 110 will be documented as Design Errors.

Shop Drawings

FDM 110: It is the Designer's responsibility to ensure that eligible products are available for any non-standard specs.

Shop Drawings: Great for location or project specific dimensions, colors, or features. **Read Section 5** for situations normally requiring shop drawings.

- NOT intended as a substitution or "easy button" for failure to design.
- Not intended for Contractor's product selection.
- Do require an APL# for all products, per new Section 5.
- Construction delays may result from a failure to comply.

Local Agency Responsibilities

FDOT Designer

Consultant Designer

Local Agency Requests

Reviews and Pre-letting activities

Local Agencies- limiting APL items

See the FDM for coordination activities during Design phases

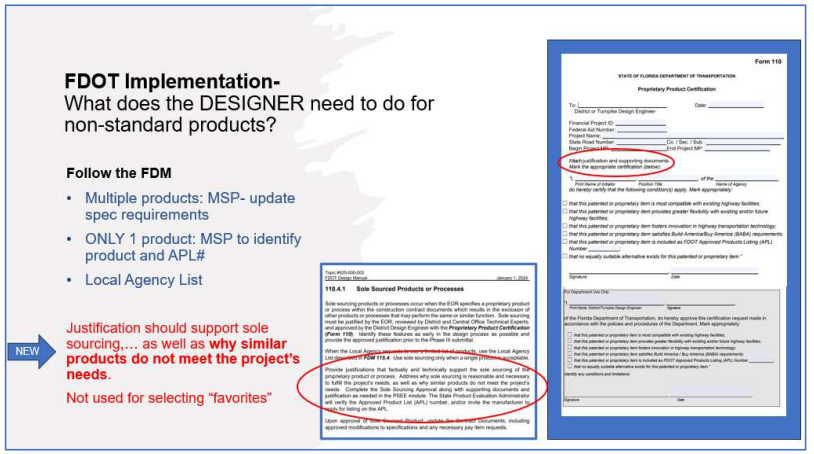
See the Designer Instructions for non-standard products or materials

2025 Proprietary Product Certification Form

- Justification should support sole sourcing,… as well as **why similar products do not meet the project's needs**.
- Not used for selecting "favorites"
- **Waiver may be needed** for non-domestic products

Remember to update the specification:

- MSP to change from "use any APL…" to "use the following APL item…"



Local Agencies- Unique Products

See the FDM for coordination activities during Design phases

- **Unique Products may require further review.**
- BABA classification of the proposed product or material?
- Where is it produced/manufactured- not just sold/distributed?
- What is the source of materials? Made from domestic materials?
- Are other similar domestic products available?

Failure to identify a domestically sourced product may require a design change.

Separate funds cannot be used to circumvent BABA requirements.

What does the DESIGNER need to do with Local Agency requests?

Do not over-promise! We want to be able to fulfill our commitments.

Ensure that Domestic Products are available on the APL

Request the addition of products early- as soon as the need is identified

If no domestic products are available, plan for Public Interest waivers (up to 24 months)

PSEE- Sole Source Reviews

Use FDM Form 110

Justification and Supporting documentation:

- Draft of MSP or TSP
- Draft of Plan Detail, if applicable

Reviewers: Verify APL# on form, **verify BABA eligibility, comments or limitations**

This should NOT be a “rubber stamp” type of approval. Read the justification.

Local Agency Requests and Florida Statute 316.0745

http://www.leg.state.fl.us/statutes/index.cfm?App_mode=Display_Statute&URL=0300-0399/0316/Sections/0316.0745.html

(3) ***All official traffic control signals or official traffic control devices purchased and installed in this state*** *by any public body or official shall conform with the manual and specifications published by the Department of Transportation pursuant to subsection (2).*

(4) It shall be ***unlawful*** *for any public body or official to purchase, or for anyone to sell,* ***any traffic control signal or device unless it conforms with the manual and specifications published by the Department of Transportation and is certified*** *to be of such conformance prior to sale. Any manufacturer or vendor who sells any traffic control signal, guide, or directional sign or device without such certification shall be ineligible to bid or furnish traffic control devices to any public body or official for such period of time as may be established by the Department of Transportation; however, such period of time shall be for not less than 1 year from the date of notification of such ineligibility.*

(8) The Department of Transportation is authorized to ***permit traffic control devices*** *not in conformity with the uniform system upon showing of good cause.*

Local Agency Projects

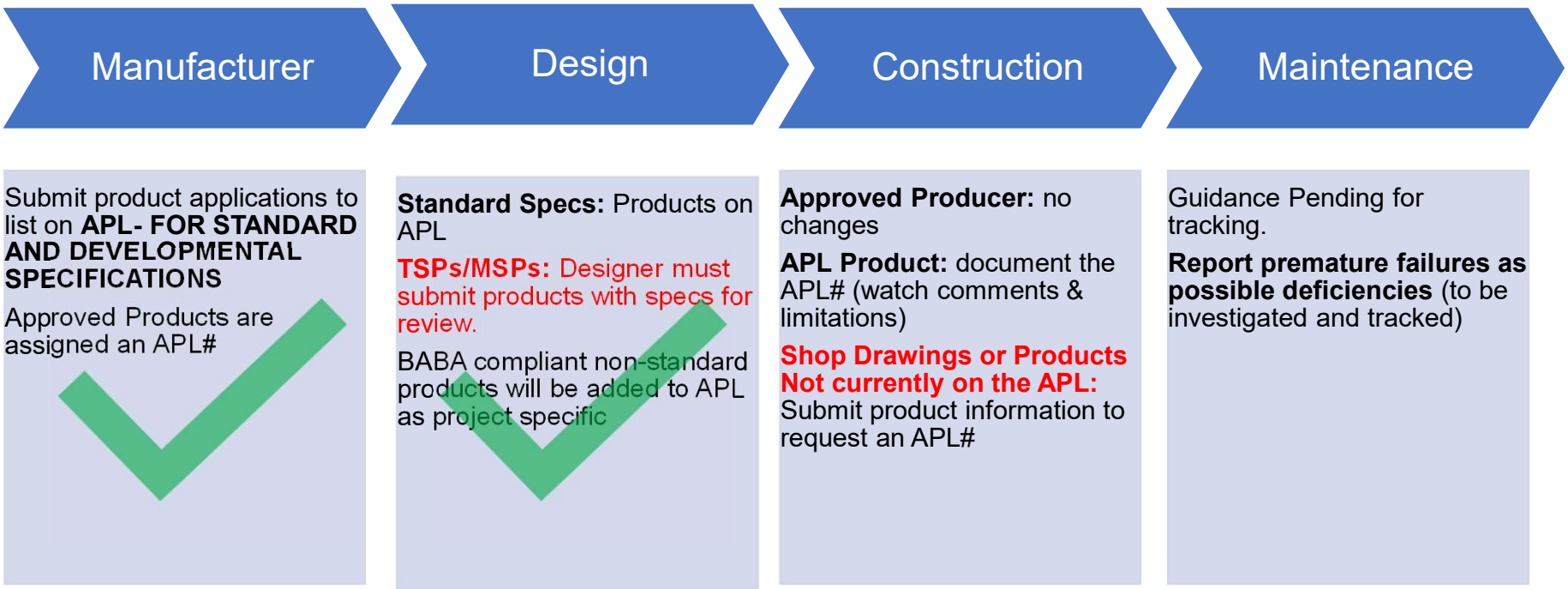
Let with FDOT Project

- **Any FHWA funding**, the entire Contract is Federalized
- **Other Federal Funds (PDE, R/W, etc.)**, the entire Contract is Federalized
  - Majority FHWA funds, see above
  - Majority Other Federal Funds- rules from other Agency apply. FHWA Waiver for Manufactured Products is NOT applicable. Need to determine domestic compliance for all Manufactured Products.
- No known Federal Funds, Section 6 and APL still apply.

Let by Local Agency

- **Any Federal Funds-** follow the rules of the agency with the greatest Federal Funding.
- **No Federal Funds-** follow the Local Agency's specs.

The Big Picture for FDOT BABA Compliance: Products Available on the APL

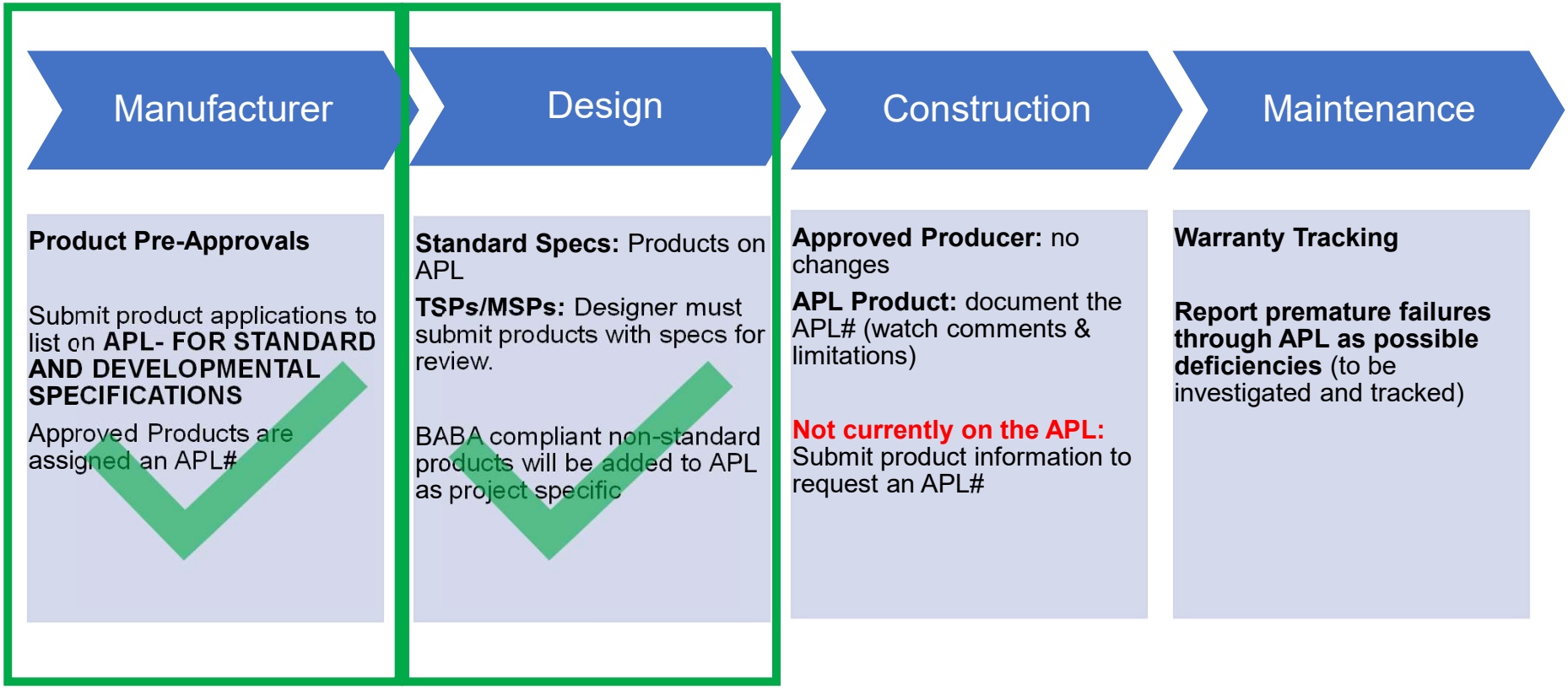


Construction

FDOT Engineer

Construction Engineering Inspector (CEI)

The Big Picture for FDOT BABA Compliance:



Field Acceptance: 2 primary questions

Does it meet the FDOT Contract Documents: Specs, Standard Plans, Project Plans, other?

- Is it on the APL?
- Does the product photo, label, or other identifying feature match the APL?
- Was it installed correctly, whether by spec or Manufacturer's Instructions?
- Other Spec requirements?

Is it BABA Compliant?

- BABA Eligibility as shown on the APL; no Field Acceptance permitted.
- Any comments or limitations for the APL#?

Document the product acceptance!

Report an APL Problem:

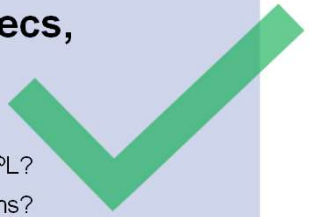
- Photo doesn't match the product label or packaging
- Generic or poor-quality photo, not enough detail
- Missing photo, drawing, or label
- Missing/Incomplete Manufacturer's Instructions

Rejecting Products

Options vary by product type!

Does it meet the Contract Documents: Specs, Standard Plans, Project Plans, other?

- Is it on the APL?
- Does the product photo, label, or other identifying feature match the APL?
- Was it installed correctly, whether by spec or Manufacturer's Instructions?
- Other Spec requirements?



Is it BABA Compliant?

- BABA Eligibility as shown on the APL; no Field Acceptance permitted.
- Any comments or limitations for the APL#?

Product meets spec, but not on APL:

Do not automatically reject!

Contact Product Evaluation

- Manufacturer name
- Product Name, model/size
- website or other info

Product Evaluation will reach out to manufacturer to invite them to submit an APL application; **project specific approval may be an option, depending on letting date.**

MAC:
Record the APL numbers!

PAST: MAC is used for documenting Concrete, Asphalt, and other producer provided materials

PRESENT: MAC is used for documenting APL numbers, including APL numbers for Construction Materials

FUTURE:

- MAC will continue to be used for Concrete, Asphalt, and other **producer provided materials** with samples and/or delivery tickets
- other systems, possibly with a bar code reader, will be used to verify **APL products** and document location

Construction Engineer/CEI

ALL Items: Refer to the specification for

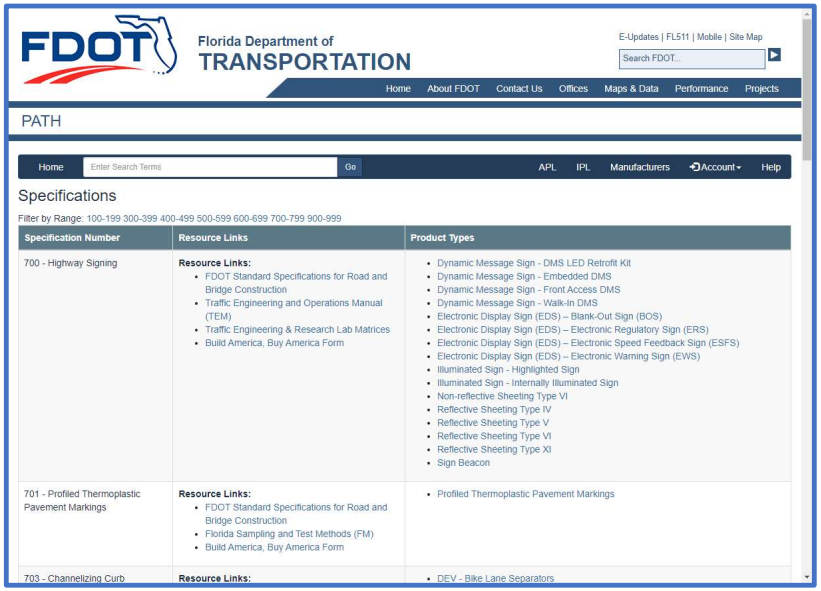
- Acceptance requirements (field acceptance)
- Warranty requirements
- Measurement & Payment

APL Products: Document APL# and quantity in MAC

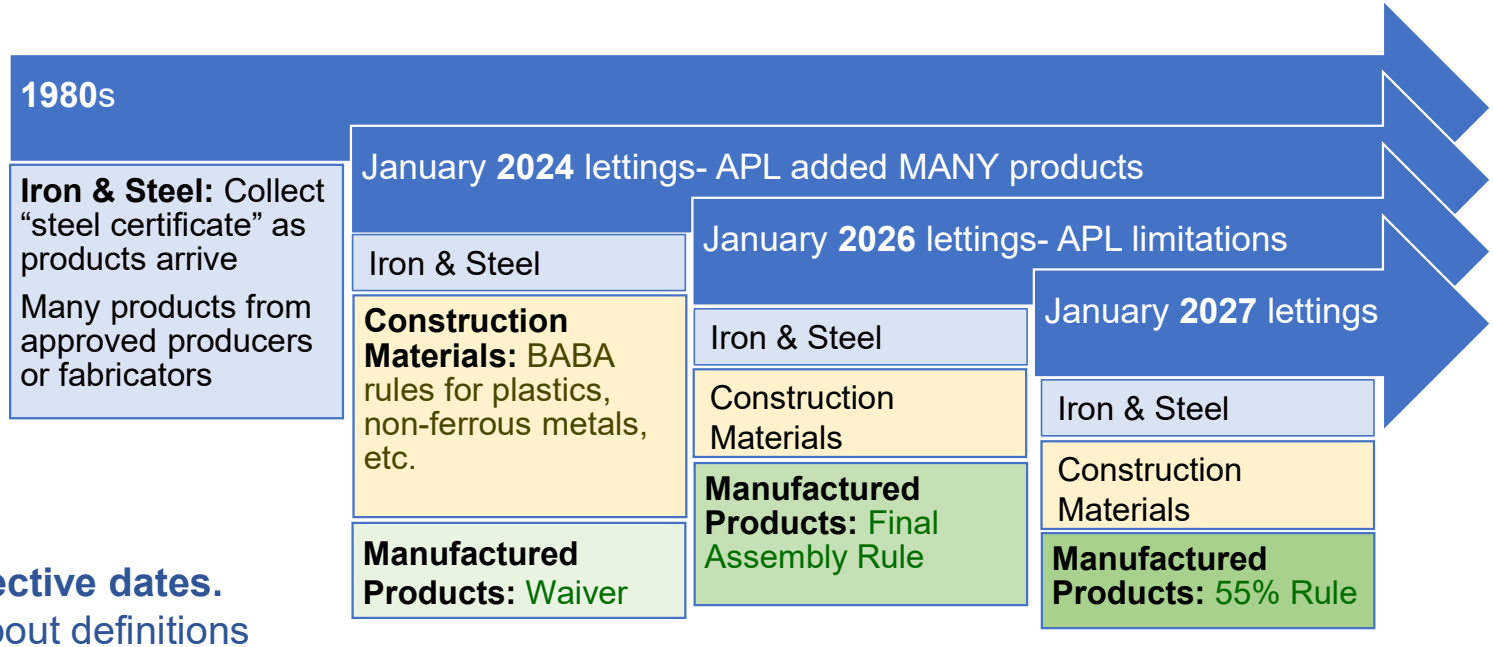
- Products listed by Brand/Model Number
- Product Type (group) listed by one number for exempt products
- **Review Comments and Limitations** for the APL#. Note any restrictions to size, model, software version, etc.
- **Verify the product/label images with the product supplied** in the field

Non-APL Products: Contact Product.Evaluation@dot.state.fl.us

- FDOT Project number
- Applicable specification section number
- Product name and/or model number
- Technical Data Sheet
- Other details showing materials, if available
- Manufacturer and website, if available



Letting Date is important!



Notice the effective dates.
More details about definitions and categories in a moment.

Field Acceptance

1. Does the product meet the applicable FDOT Specification?

No- reject

Yes- proceed…

2. Is it BABA Eligible?

Read the product's comments and limitations!

Yes: Record the APL number in MAC

No or Not listed: Contact Product Evaluation; manufacturer may be invited to submit an APL application.

For non-domestic products, a product specific waiver may be available.

Field Acceptance Methods:

any combination of methods may be applicable, per the specs

Visual Inspection-Approved Product:

Product matches label and/or photos on the APL

Visual Inspection-Installation:

Product was installed according to Spec, Standard Plans, and/or Manufacturer's Instructions

APL Number:

BABA and other Federal Rule compliance (manufacturer's documentation is stored in PATH/APL system)

Field Testing and/or Sampling:

Tested per specification; documented in MAC system

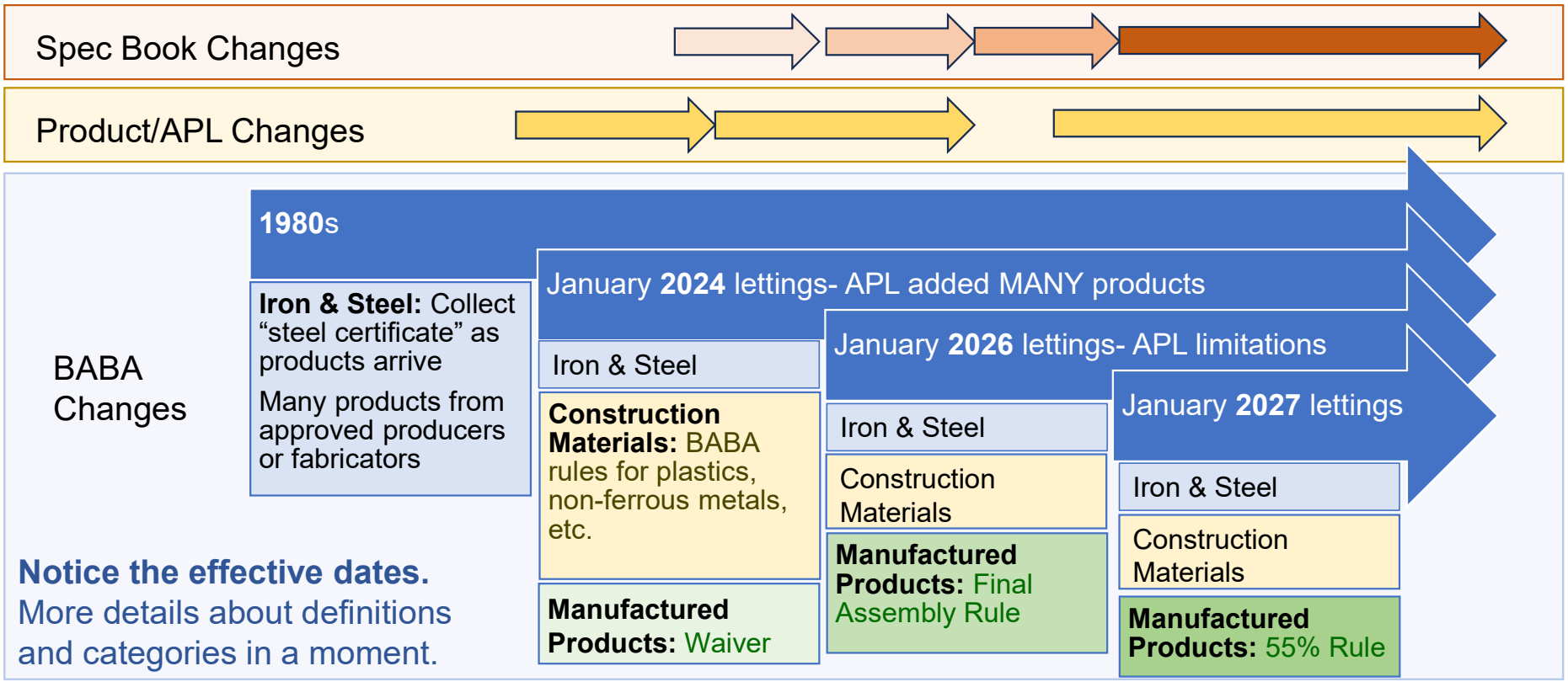
Manufacturer's Certification:

- **Steel: Required-** material properties and source of materials
- **Other Products and Materials: See APL number**

Contractor's Certification:

- **Used for Quantities**
- **NOT used for Manufactured Products;** see APL for compliance with spec or BABA rules

Letting Date is important!



The Herd…

Technical Expert guidance

Occasional concerns

Can I accept it in the field?

Is it BABA compliant?

Compliance is NOT determined in the field.

Manufacturers MUST answer several questions through PATH/APL to properly identify the product's classification and BABA compliance.

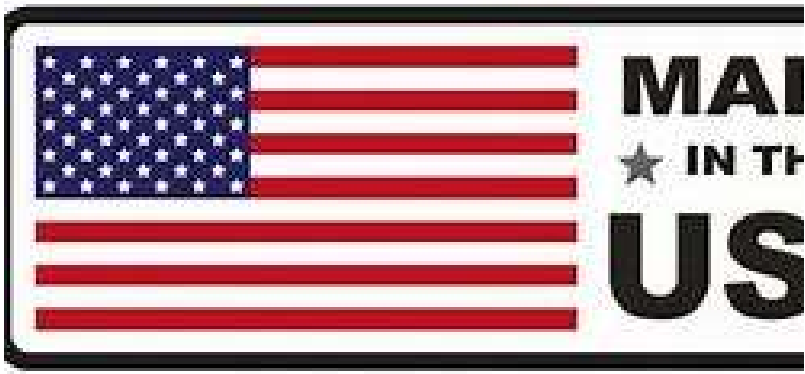
Great Marketing logos…

Not legally enforced.

Product Evaluation will work with the Manufacturers to determine if the applicable Federal Rules have been met.

Compliance will be shown on the APL

Do not accept BABA statements in the field.



Summary- Construction

All Permanently Installed products on the APL

Specification will determine acceptance method for each product or material

- APL + Visual
- APL + Lot Certification
- APL + Field Testing

Document APL# for products in MAC

APL "pre-approval" = combination of

- BABA compliance
- Spec compliance
- Manufacturer Certification
- Tested materials or components

Contractor

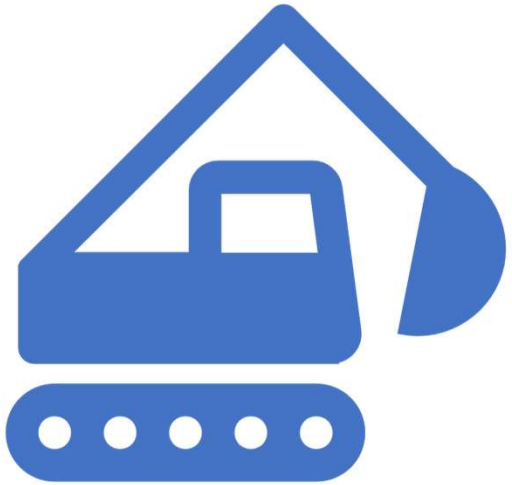
FTBA Partners, Contractors, Subcontractors, and others performing work on FDOT Contracts

Contractor: Approved Producer Materials

No changes.

For products requiring an approved producer, continue to follow the specification and producer requirements!

- Concrete (wet)
- Asphalt
- Precast Structures
- Pipe
- Structural Steel
- others, per specs



Soon… watch for details.
Mass produced products (only those not required from approved producer) **move to the APL:** poles, posts, fence materials, mast arms, j-arms, railings, drainage castings, etc.

Product Types added to the APL

Product Types have been added to the APL

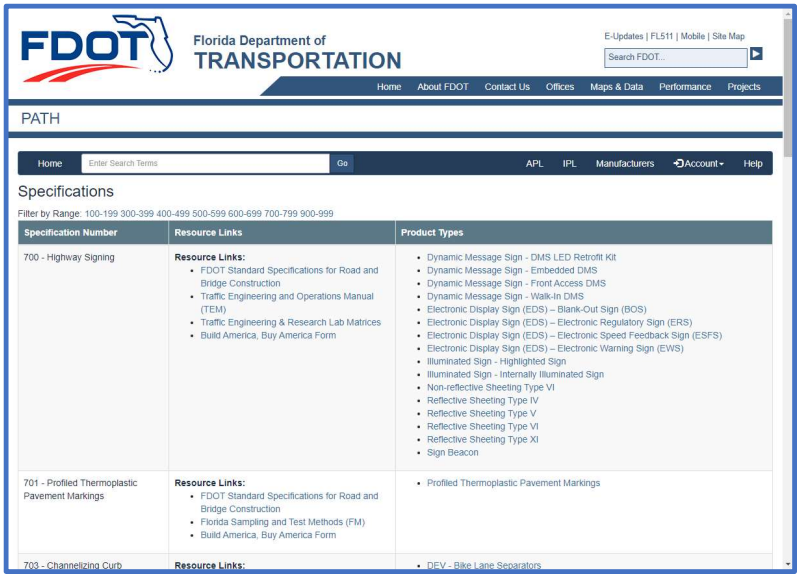
- Common Construction Materials

  Metal & Plastic Pipe*, Wire/Conductors*, Guardrail*, Poles*, Sign Structures*, Bridge Bearings*, Forgings*, Machinery*, Timber*, Fence Fabric*, Railings*, Conduit*, Fiber Optic Cable*

- Non-Standard Products: Project Specific Approvals
- Other

  Hardware and Incidentals may be associated with other APL products, per the specifications

Additional product types and/or products added upon request, pending BABA and Spec compliance



Contractor using the APL

Sample Product HD Series (APL Product)

Vendor: FDOT Product

- Model Number: Sample model
- **APL Number:** 682-002-987
- **Specification:** Video Equipment
- **Product Type:** Camera – PTZ
- **BABA Eligible:** Eligible
- **Limitation:** BABA Approved for FDOT project lettings on or before December 31, 2025.
- **Comment:** Tested with F/W version 4.00.426; Sunguide Version 9.0.0, Build 14720; POE Injector Model # 7412007-003; Compatible with Sunguide using NTCIP
- **Fabrication:** Electrical/Electronic, Manufactured Product

- Verify the product and model
- Note the eligibility
- Watch for any Comment or Limitation affecting use by letting date

Contractor- Requesting Additional Products

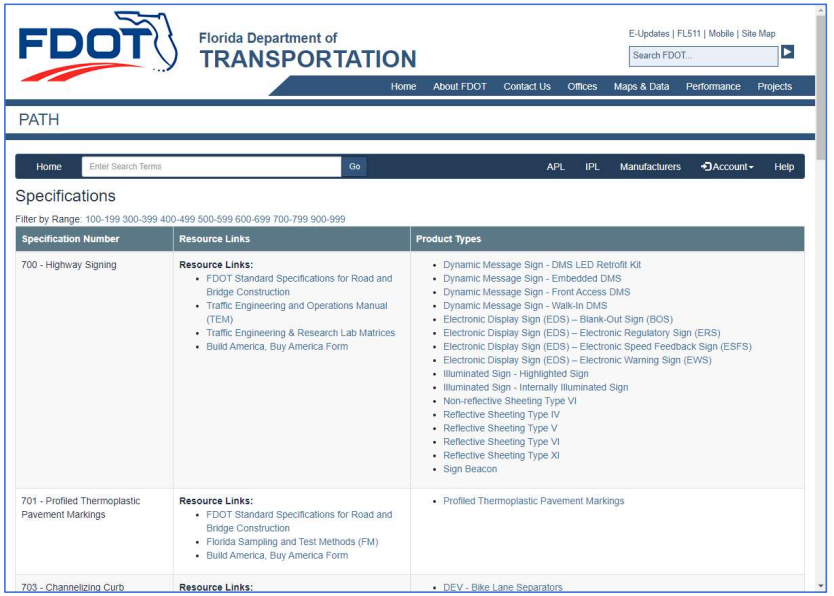
Contractors are invited to submit names of products, and manufacturers not currently listed on the APL.

For Common/Standard Products, Product Evaluation will reach out to verify BABA compliance, and/or **invite the manufacturer to submit an APL application**.

Product.Evaluation@dot.state.fl.us :

- FDOT Project number
- Applicable specification section number
- Product name and/or model number
- Technical Data Sheet or other details showing materials, if available
- Manufacturer and website, if available

For Non-Standard Products, project specific specifications are applicable; products may receive project specific approval, after verifying BABA compliance.



Utilities

Unique rules apply, as products/materials may be purchased & installed with Federal Funds, but remain the property of the utility upon acceptance

Funding related to Utility Work

Reimbursable: the state or a highway agency will cover the costs of relocating utilities

Non-reimbursable: costs that the utility company must bear themselves

Utility Work by Highway Contractor (UWHC): Work that will be performed by the Highway Contractor, usually while other roadway work is being completed.

If ANY part of the Contract has Federal Funds, the ENTIRE Contract is Federalized!

Certification & BABA compliance

Water & Sewer: UWHC

- List items on the APL
- BABA compliance will be verified by Product Evaluation
- Designer must ensure that products are available prior to letting: Constructability

Power & Communications

- Utility may self-certify or choose to work with FDOT to maintain documentation
- Highway Lighting: work with Product Evaluation

Utilities- Self Certification for materials

For Power and Communications

Rights & Responsibilities

- Utility may certify products meet Federal Rules
- Utility must retain documentation for any Federal audit

Optional for Commonly used items

- Pipe, conduit, conductors, etc.
- Contact Product Evaluation about adding product types to the APL; ongoing discussions between FDOT and Utilities

Designers preparing TSPs For Water & Sewer UWHC

See the Specs Office's website for Specification Guidance.

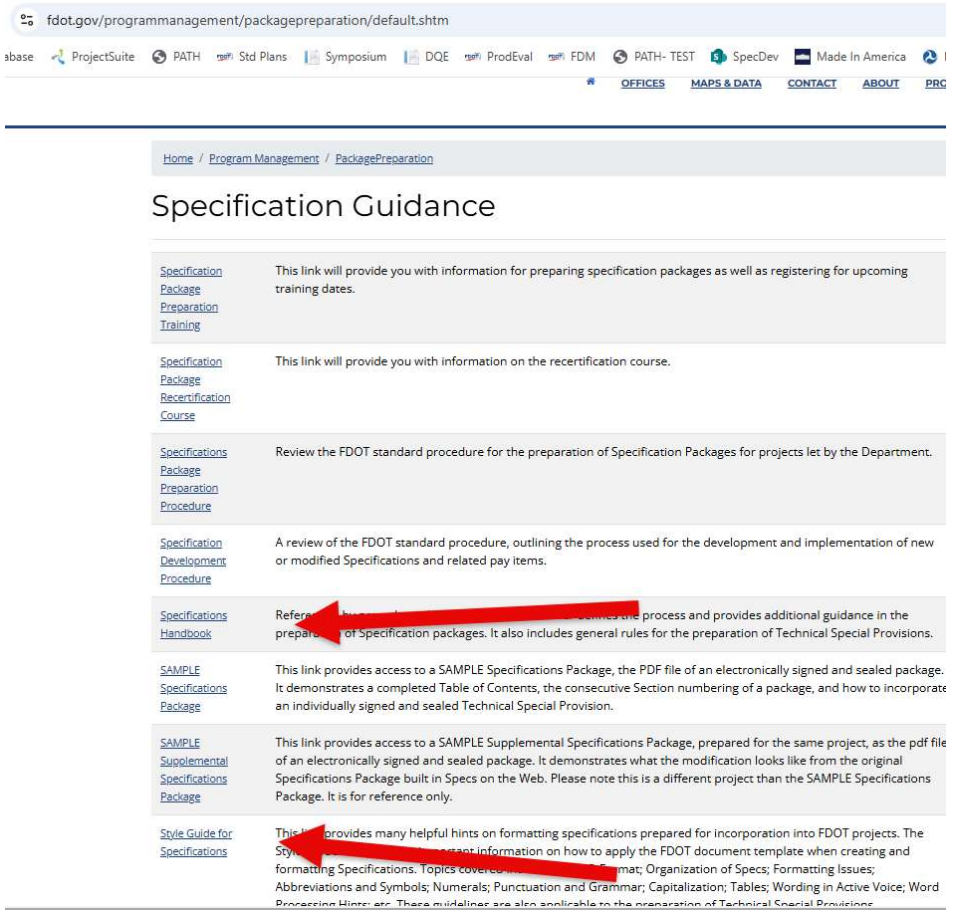
Specs Handbook:

- Work NOT covered by Standard Specs
- Do not conflict or modify Standard Specs
- See APL. Utility items under 999- group

Specs Style Guide:

- Outline: Description, Materials, Installation/Construction…
- Article & Subarticle numbering
- Separating Contractor and Manufacturer/Producer requirements

Ensure that products are on the APL



Outline- Extended Session

Federal Rules

- Old Rules, New Rules
- Obligation Date vs Letting Dates
- All Construction Contracts
- Implementation Plan Overview

Waivers

- Manufactured Products Waiver rescinded
- Non-Availability Waiver Requests
- Public Interest Waivers

FDOT's Implementation Plan by Group

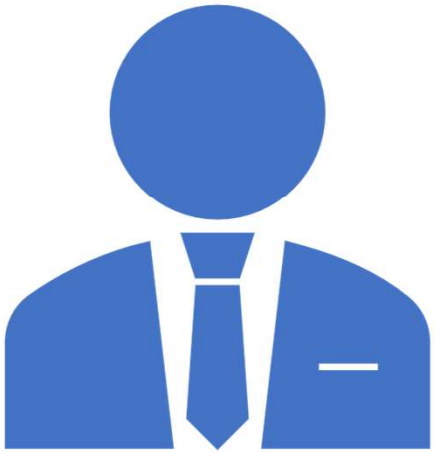
- Manufacturer's Guidance: Submit APL Applications now
- Designer's Guidance: Standard Specs vs Non-Standard Specs
- Local Agency Requests: Domestic Products vs Non-Domestic Products
- Construction Responsibilities
- Utilities

Extended Questions and Answers

Notifications from FDOT Product Evaluation: BABA & Spec updates

Manufacturers within PATH
Current contact(s) will be notified, per the Manufacturer's preferences

Materials Acceptance and Certification System (MAC)
https://www.fdot.gov/materials/mac/default.shtm



Notifications from FDOT Product Evaluation: BABA & Spec updates

Designers, Contractors, FDOT Staff, and all others:

FDOT Contact Management “E-Updates” Contact Database/Mailer will be used

https://cma.fdot.gov/

Contact Us:

Product.Evaluation@dot.state.fl.us

Product Evaluation group email

Karen.Byram@dot.state.fl.us
Administrator

Melissa.Hollis@dot.state.fl.us
Product Related Specification and Project Issues

Sarah.Smith@dot.state.fl.us
PATH System Support & Manufacturer Coordinator

Iron and Steel

Certification collected in the field!

- 1983 Buy America Rule in effect (Reauthorized in 1993)
- No recent changes to FHWA waiver or requirements

Per FDOT specifications,

6-5.2.1 Steel and Iron: *Use steel and iron manufactured in the United States, in accordance with the Buy America provisions of 23 CFR 635.410, as amended. Ensure that all manufacturing processes for this material occur in the United States.*

Soon: Documentation for Mass Produced Iron and Steel Products will be collected through the APL. Examples- Chain link fence, Guardrail, straps, metal pipe

Construction Material

Certification collected through APL!

- Produced in the US
- …minor additions to a construction material do not change the categorization of the construction material.

Per FDOT specifications,

6-5.2.3 Construction Materials: *Use non-ferrous metals, plastic and polymer based products, glass, lumber, and drywall articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project that are manufactured in the United States, in accordance with BABA requirements.*

Manufactured Product

Certification collected through APL!

- Not classified as Iron/steel, Construction Material, or aggregates/binder
- Produced in the US
- Cost of Components that are “mined, produced, or manufactured is greater than 55% of the total cost of all components”
- FHWA waiver may by applicable

Per FDOT specifications,

6-5.2.2 Manufactured Products: *Use Manufactured Products that are consumed in, incorporated into, or affixed to an infrastructure project that are manufactured in the United States, in accordance with BABA requirements and applicable waivers.*

Exceptions… within the rules

Product Types may have multiple material classifications, when allowed by Spec

527/974 Detectable Warnings- composite products vs cast iron tiles (materials permitted to vary)

Products “with additional materials” does not change the classification

715 Light pole- Aluminum pole with wires does not change the light pole from a Construction Material to a Manufactured Product

Special Rules for Coatings, incidental components, and kits

OMB M-24-02 (replaces M-22-11) Guidance

FDOT Specifications define “included materials”

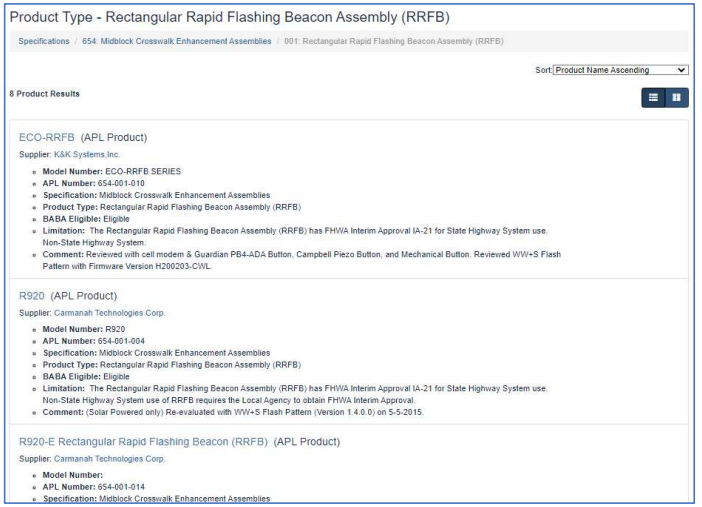
FDOT’s APL will be updated as Specifications, FHWA guidance, and/or Federal Rules are updated. Contact Product.Evaluation@dot.state.fl.us regarding any product classifications.

APL Product Example:
viewing products

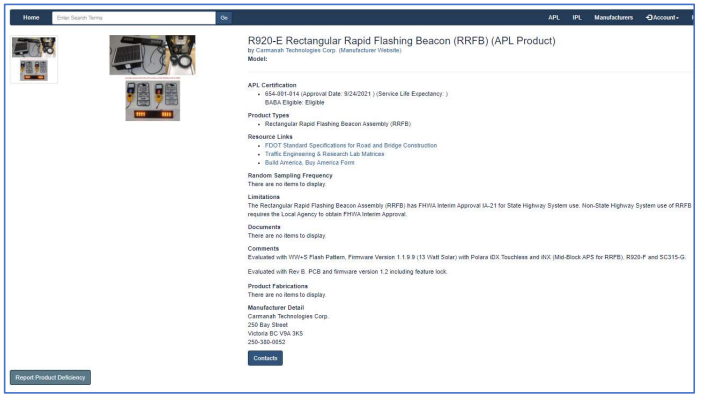
- Product Name
- APL# and Eligibility
- Limitations
- Comments

Reminder: **Contractor selects from all acceptable products**, unless there is an approved Sole Source and specification change.

1. Select Product Type from Spec Section



2. Review or Select Product



3. Review Product details, instructions, warranty, and/or photos

FDOT Implementation-
What does the DESIGNER need to do for non-standard products?

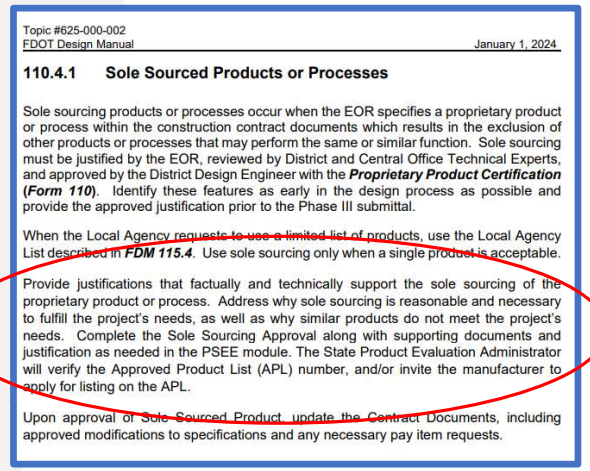
Follow the FDM, Chapter 110

- Multiple products: MSP- update spec requirements
- ONLY 1 product: MSP to identify product and APL#

NEW

Justification should support sole sourcing,… as well as **why similar products do not meet the project's needs**.

Not used for selecting "favorites"



Topic #625-000-002
FDOT Design Manual January 1, 2024

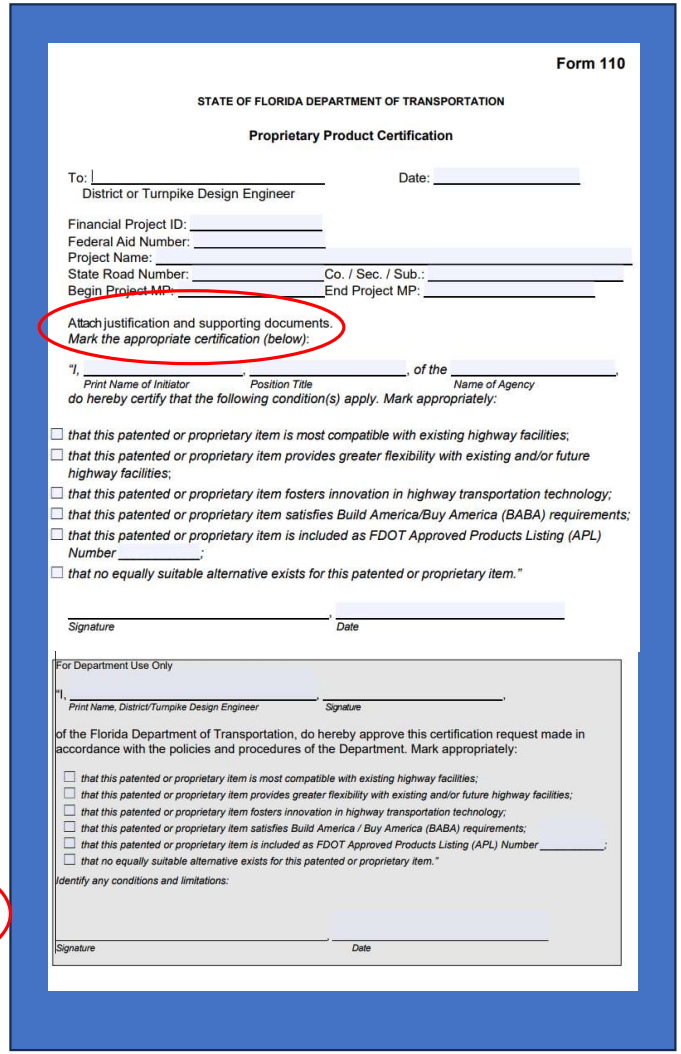
110.4.1 Sole Sourced Products or Processes

Sole sourcing products or processes occur when the EOR specifies a proprietary product or process within the construction contract documents which results in the exclusion of other products or processes that may perform the same or similar function. Sole sourcing must be justified by the EOR, reviewed by District and Central Office Technical Experts, and approved by the District Design Engineer with the ***Proprietary Product Certification*** ***(Form 110)***. Identify these features as early in the design process as possible and provide the approved justification prior to the Phase III submittal.

When the Local Agency requests to use a limited list of products, use the Local Agency List described in ***FDM 115.4***. Use sole sourcing only when a single product is acceptable.

Provide justifications that factually and technically support the sole sourcing of the proprietary product or process. Address why sole sourcing is reasonable and necessary to fulfill the project's needs, as well as why similar products do not meet the project's needs. Complete the Sole Sourcing Approval along with supporting documents and justification as needed in the PSEE module. The State Product Evaluation Administrator will verify the Approved Product List (APL) number, and/or invite the manufacturer to apply for listing on the APL.

Upon approval of Sole Sourced Product, update the Contract Documents, including approved modifications to specifications and any necessary pay item requests.



Form 110

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

Proprietary Product Certification

To: _____ Date: _____
District or Turnpike Design Engineer

Financial Project ID: _____
Federal Aid Number: _____
Project Name: _____
State Road Number: _____ Co. / Sec. / Sub.: _____
Begin Project MP: _____ End Project MP: _____

Attach justification and supporting documents.
Mark the appropriate certification (below):

"I, _____ (*Print Name of Initiator*), _____ (*Position Title*), *of the* _____ (*Name of Agency*),
do hereby certify that the following condition(s) apply. Mark appropriately:

- ☐ *that this patented or proprietary item is most compatible with existing highway facilities;*
- ☐ *that this patented or proprietary item provides greater flexibility with existing and/or future highway facilities;*
- ☐ *that this patented or proprietary item fosters innovation in highway transportation technology;*
- ☐ *that this patented or proprietary item satisfies Build America/Buy America (BABA) requirements;*
- ☐ *that this patented or proprietary item is included as FDOT Approved Products Listing (APL) Number _____;*
- ☐ *that no equally suitable alternative exists for this patented or proprietary item."*

_____ (*Signature*), _____ (*Date*)

For Department Use Only

"I, _____ (*Print Name, District/Turnpike Design Engineer*), _____ (*Signature*),
of the Florida Department of Transportation, do hereby approve this certification request made in accordance with the policies and procedures of the Department. Mark appropriately:

- ☐ *that this patented or proprietary item is most compatible with existing highway facilities;*
- ☐ *that this patented or proprietary item provides greater flexibility with existing and/or future highway facilities;*
- ☐ *that this patented or proprietary item fosters innovation in highway transportation technology;*
- ☐ *that this patented or proprietary item satisfies Build America / Buy America (BABA) requirements;*
- ☐ *that this patented or proprietary item is included as FDOT Approved Products Listing (APL) Number _____;*
- ☐ *that no equally suitable alternative exists for this patented or proprietary item."*

Identify any conditions and limitations:

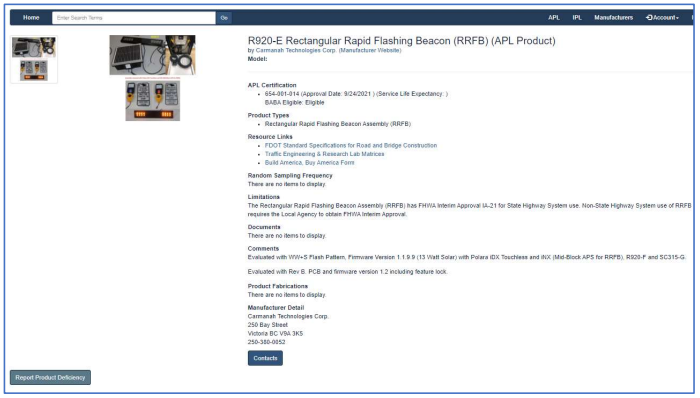
_____ (*Signature*), _____ (*Date*)

APL Product Search- by number

- Product Name
- APL# and Eligibility
- Limitations
- Comments

1. Enter APL number

2. Review Product details, instructions, warranty, and/or photos

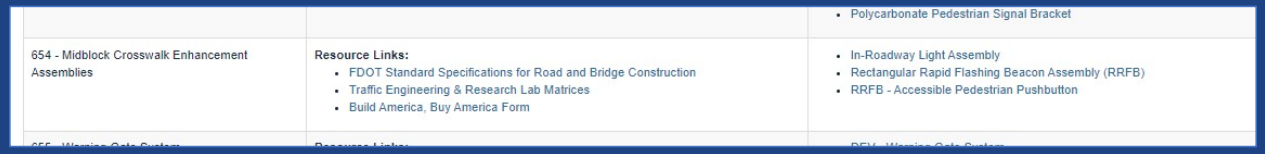


Search will also accept key words in product name, model, comments, etc.

Reminder: **Contractor selects from all acceptable products**, unless there is an approved Proprietary Product/Sole Source and specification change.

APL Product Search- by Spec and Product Type

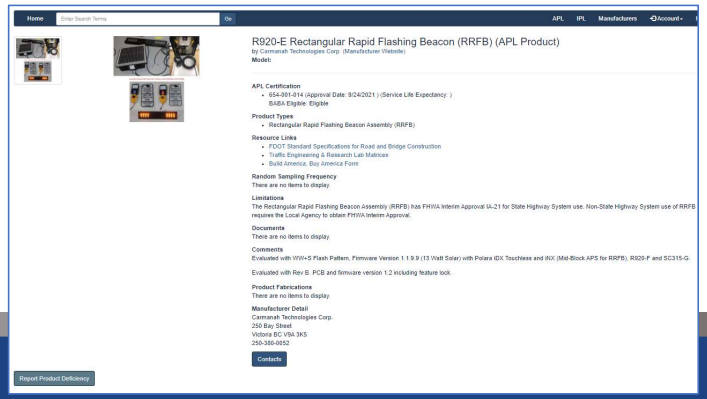
- Product Name
- APL# and Eligibility
- Limitations
- Comments



		• Polycarbonate Pedestrian Signal Bracket
654 - Midblock Crosswalk Enhancement Assemblies	**Resource Links:** • FDOT Standard Specifications for Road and Bridge Construction • Traffic Engineering & Research Lab Matrices • Build America, Buy America Form	• In-Roadway Light Assembly • Rectangular Rapid Flashing Beacon Assembly (RRFB) • RRFB - Accessible Pedestrian Pushbutton

1. Select Product Type from Spec Section

2. Review or Select Product



3. Review Product details, instructions, warranty, and/or photos

Reminder: **Contractor selects from all acceptable products**, unless there is an approved Proprietary Product/Sole Source and specification change.

Construction Engineer/CEI

Document in MAC

Refer to MAC web pages for complete instructions and training

Sample Login

- Contract/Project
- Pay Item
- Method of Acceptance
- APL#
- Date, Quantity, Unit
- Batch #, Wall #, Bridge # if applicable

Perform Test, Result Entry: Yes- meets APL requirements

See MAC instructions for pay items with multiple APL#s

Construction Engineer/CEI

~~Monthly~~ Daily Estimates

Verify that all APL#s have been recorded in MAC for Items and Quantities.

Failure to document products installed on the project could result in loss of federal funds (FHWA and other Federal Funds) for the **entire contract**.

Manufacturer

Temporary Product or Tool: [1]Exempt from BABA; APL still applies

Aggregate & Binders: [1]Exempt from BABA; specs still apply

Iron or Steel[1,2]

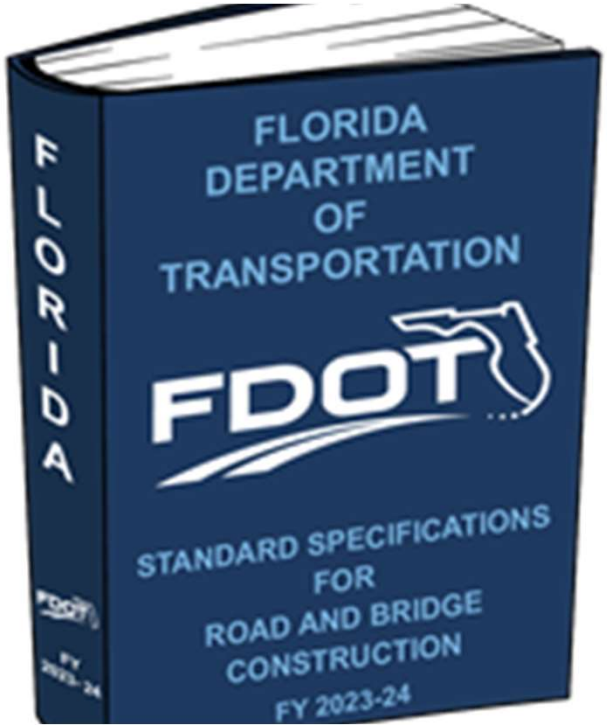
Construction Material[1,2]

Manufactured Product[1,3]

Electronics

Non-electronics

Unlisted Products (Plants, Natural rubber): [1]Exempt from BABA



Requirements

[1]See the Specifications (book or Contract Documents) for the applicable use

[2]Approved Fabricator requirements may apply

[3]Per the specification, additional production facility requirements may apply

Manufacturer

Read the Specification to identify Product/Material Requirements

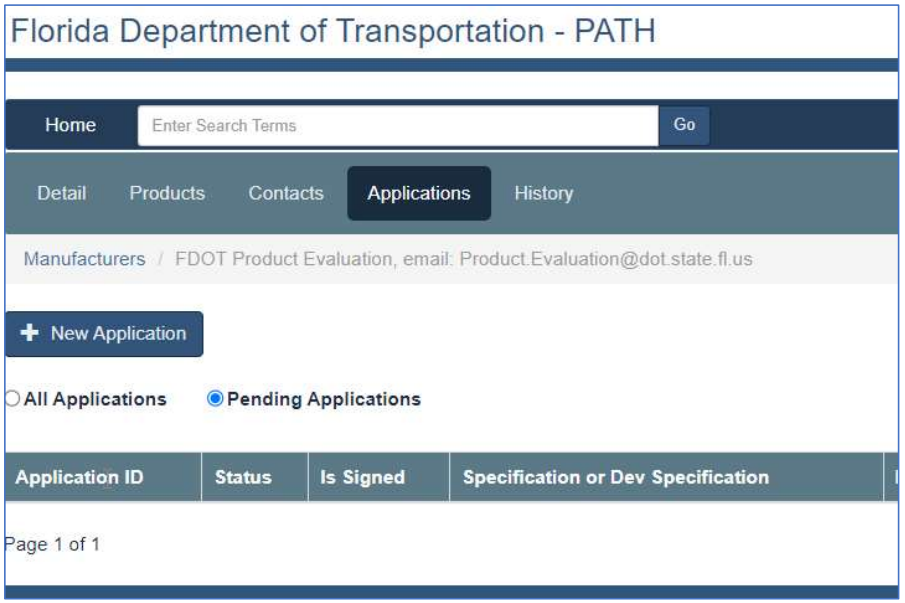
Sign-in to your account

Submit an Application

Helpful Hints:

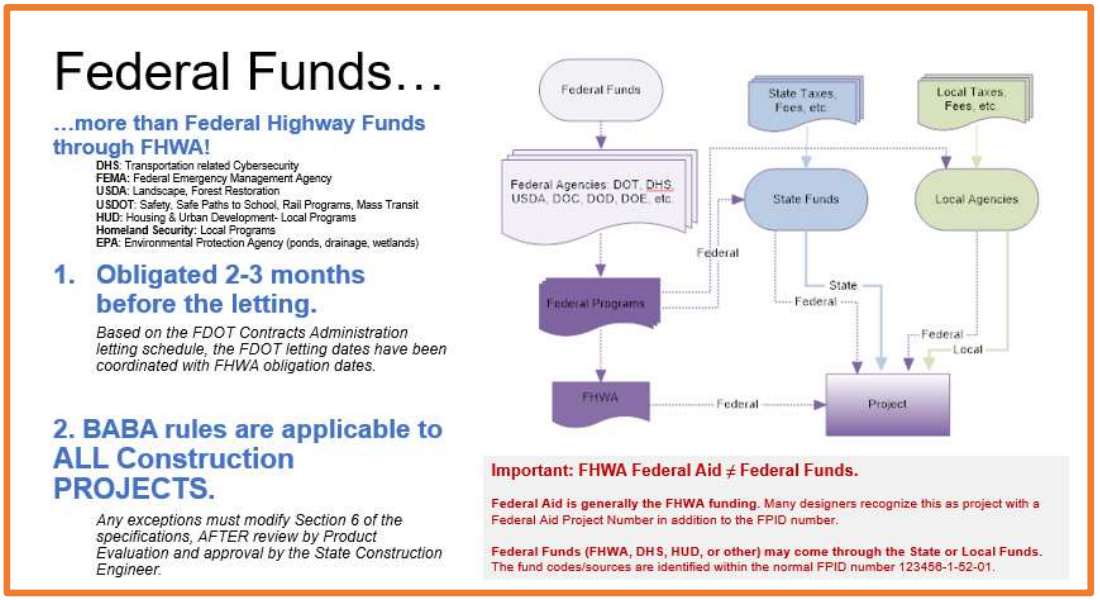
- Include requested documents & photos
- Include requested test reports
- Include requested manufacturer's installation instructions

Application will be reviewed by Product Evaluation and/or the Technical Expert for that specification



State Funded Projects

1. Verify if there are any “goes with” projects that may Federalize the Contract.
2. Check ALL State and Local funding sources.
3. Contact Product Evaluation; we’ll coordinate with State Construction Engineer.
4. Upon approval, use the MSP to modify Section 6 BABA requirements.

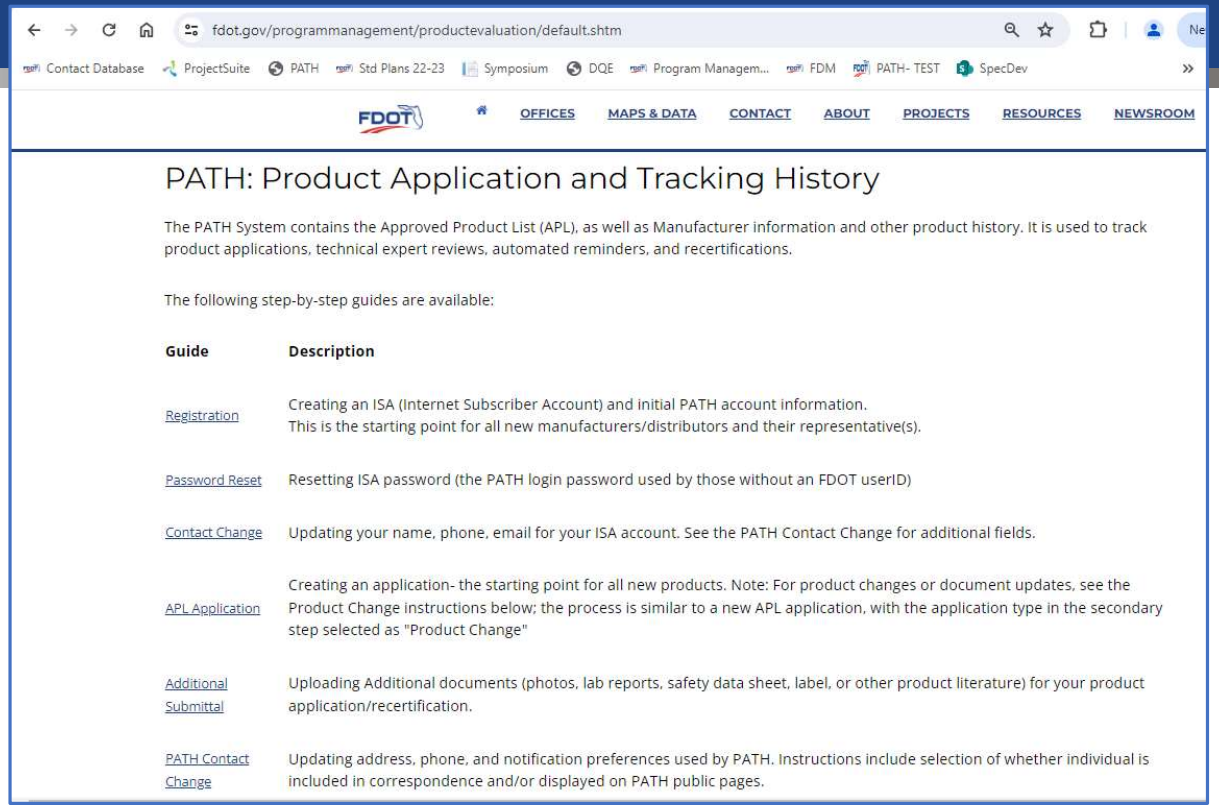


This is not an easy button.
Per FDOT policy, projects are designed to be compliant with FHWA rules, so that they remain eligible for future federal funds.

Manufacturer

See the Product Evaluation web page for helpful step-by-step guides

- Registration- new accounts
- APL application
- Product Details Form (BABA category help)



Specs Outline: Articles for all specs

AASHTO "outline for Div II":

Description

- Normally one or two sentences that describe the Section. Don't start adding requirements here!

Materials

- Use the table format, whenever possible.
- Refer to manufactured products and producer items in Division III.

Construction or Installation

- This may be one article or many, as needed. Use active voice for instructions to the Contractor: do this…

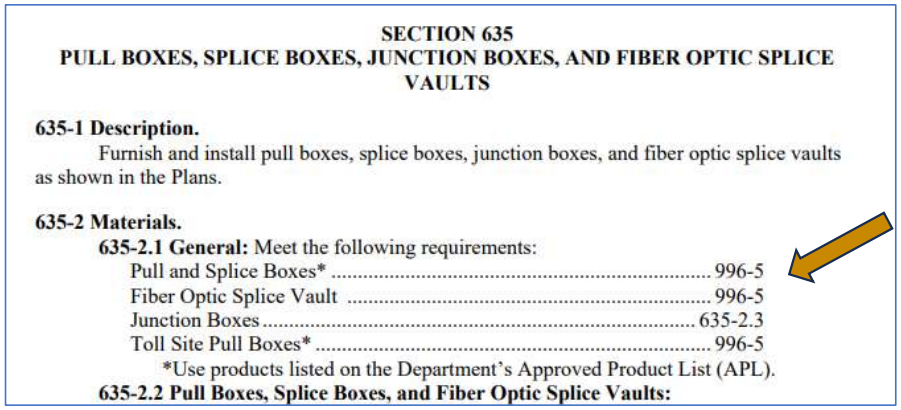
Method of Measurement

- How is it measured?

Basis of Payment

See Specs Office Style Guide for additional details

Example, Div II "contractor requirements":



SECTION 635
PULL BOXES, SPLICE BOXES, JUNCTION BOXES, AND FIBER OPTIC SPLICE VAULTS

635-1 Description.
Furnish and install pull boxes, splice boxes, junction boxes, and fiber optic splice vaults as shown in the Plans.

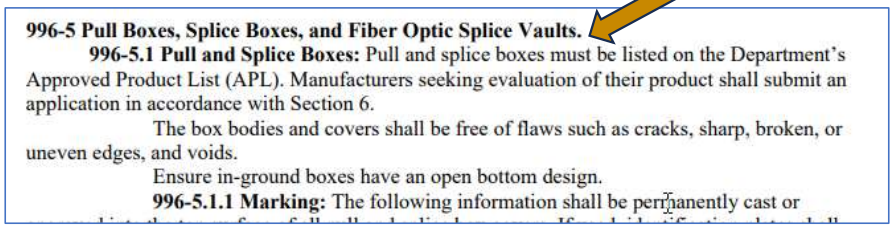
635-2 Materials.
635-2.1 General: Meet the following requirements:

Pull and Splice Boxes*	996-5
Fiber Optic Splice Vault	996-5
Junction Boxes	635-2.3
Toll Site Pull Boxes*	996-5

*Use products listed on the Department's Approved Product List (APL).

635-2.2 Pull Boxes, Splice Boxes, and Fiber Optic Splice Vaults:

Example, Div III "manufacturer requirements":



996-5 Pull Boxes, Splice Boxes, and Fiber Optic Splice Vaults.
996-5.1 Pull and Splice Boxes: Pull and splice boxes must be listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6.

The box bodies and covers shall be free of flaws such as cracks, sharp, broken, or uneven edges, and voids.

Ensure in-ground boxes have an open bottom design.

996-5.1.1 Marking: The following information shall be permanently cast or

Pay Items vs Materials

Pay Item	**Materials** *APL (some pending) ^Fabricator or Producer	**BABA Concern**
700-xxx Single Post Sign	• Sheeting* • Aluminum Panel* • Aluminum post* • Concrete foundation^	Aluminum
715-xxx Light Pole	• Luminaire* • Arm, Post^, Non-Standard Post*, Base* • Concrete foundation^, rebar^	Electronics, Aluminum, Steel
590-xxx Irrigation System	• Plastic heads*, pipe* • Controller*, Pump*, • Cabinet*, Boxes*	Plastics, Electronics, Aluminum, other

One pay item, many products!

Additional TSP & MSP reminders

See the Specs Style Guide

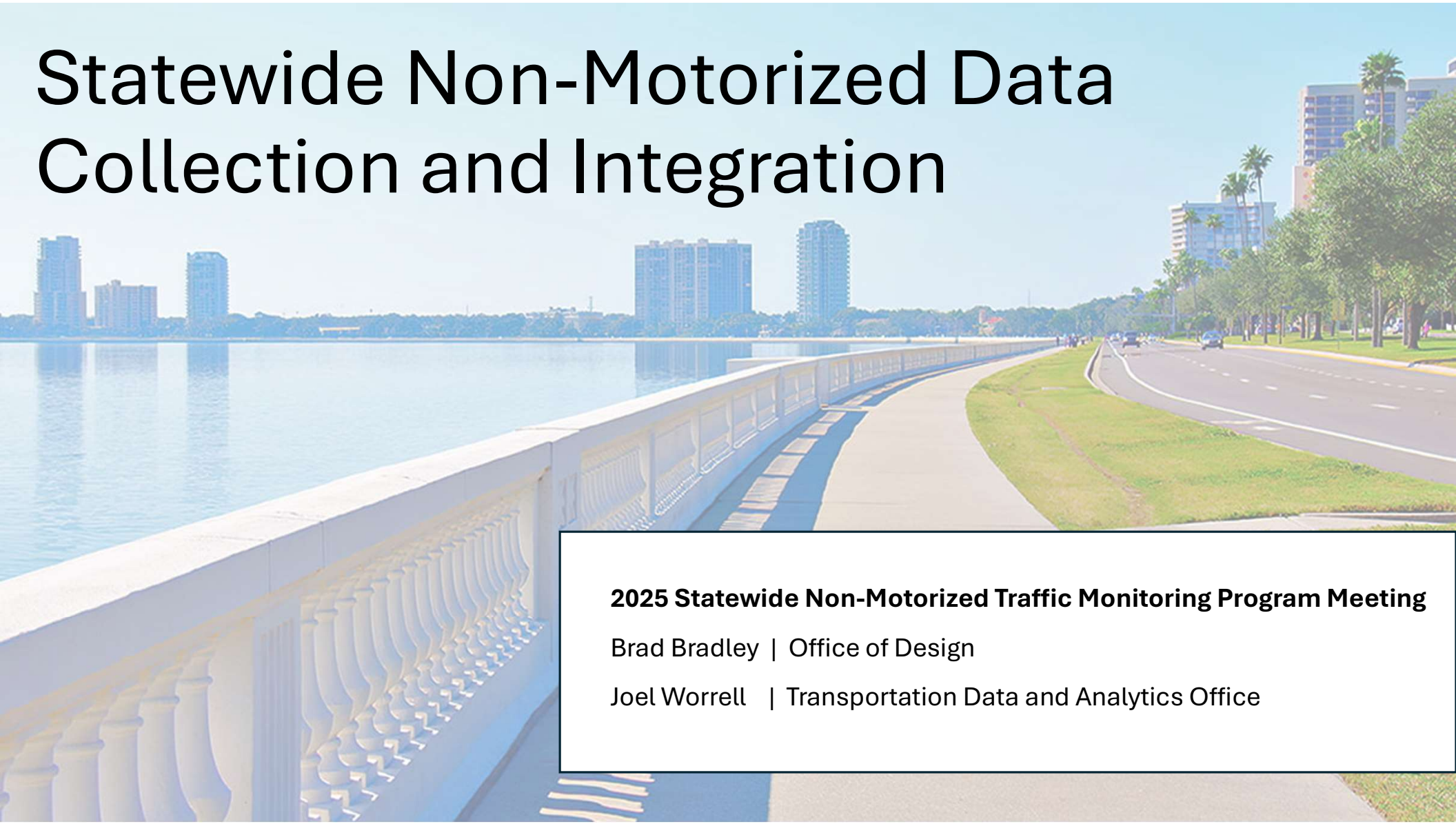
Div II: Contractor Requirements

- Outline, Active Voice
- Work controlled by the Contractor
- Enforceable and measurable: No “best quality”, “Engineer’s satisfaction”
- Whenever possible, use “Install in accordance with Manufacturer’s Instructions”

Division III: Products & Materials

- **Produced for FDOT** (concrete & asphalt) , with ingredients and processes reviewed by SMO
- **Manufactured items** (available from manufacturer or retailer), listed on the APL
  - Photo, Label
  - Manufacturer’s Instructions
  - Certifications and Test Reports- collected from manufacturer, NOT Contractor!

Statewide Non-Motorized Data Collection and Integration



2025 Statewide Non-Motorized Traffic Monitoring Program Meeting

Brad Bradley | Office of Design

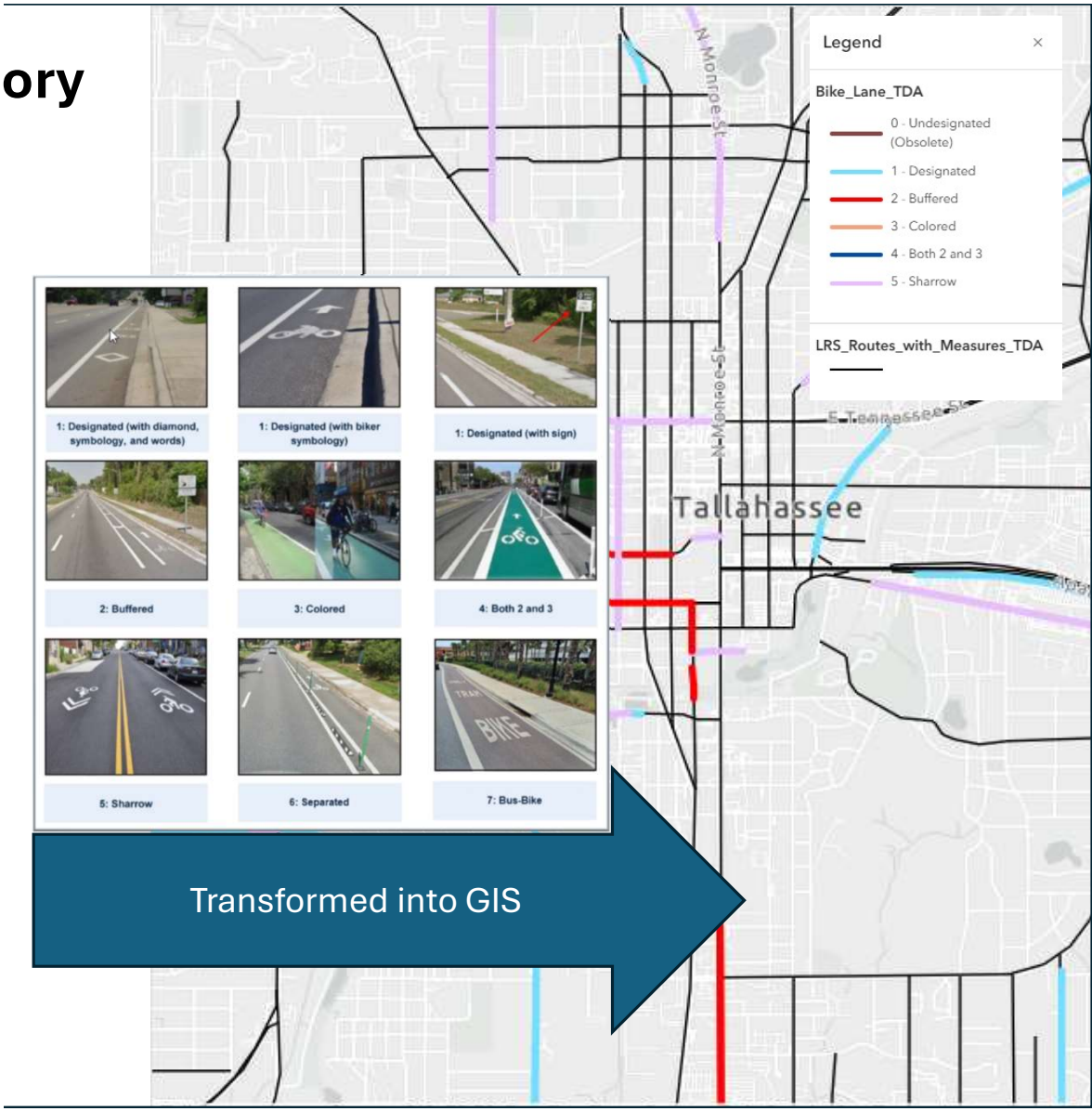
Joel Worrell | Transportation Data and Analytics Office

Background

- Evolution from Roadway to Multimodal
- Integration into Roadway Characteristics Inventory (RCI)
- Collecting data to support Roadway Design
- Automation and Machine Learning
- Future in Digital Asset Management

Roadway Characteristics Inventory

- FDOT Asset System of Record Database
- Supports sidewalk, bicycle lanes, and SUNTrail assets
  - Extents and Locations
  - Widths
  - Offsets
  - Side of Road
  - Barriers
- Field collected data system mapped to the GIS Linear Referencing System (LRS) for mapping and analysis
- Data Uses:
  - Work Program Integration
  - Transportation Statistics and Analytics
  - State and Federal Reporting
  - Asset Maintenance Budgets
  - FDOT Sourcebook

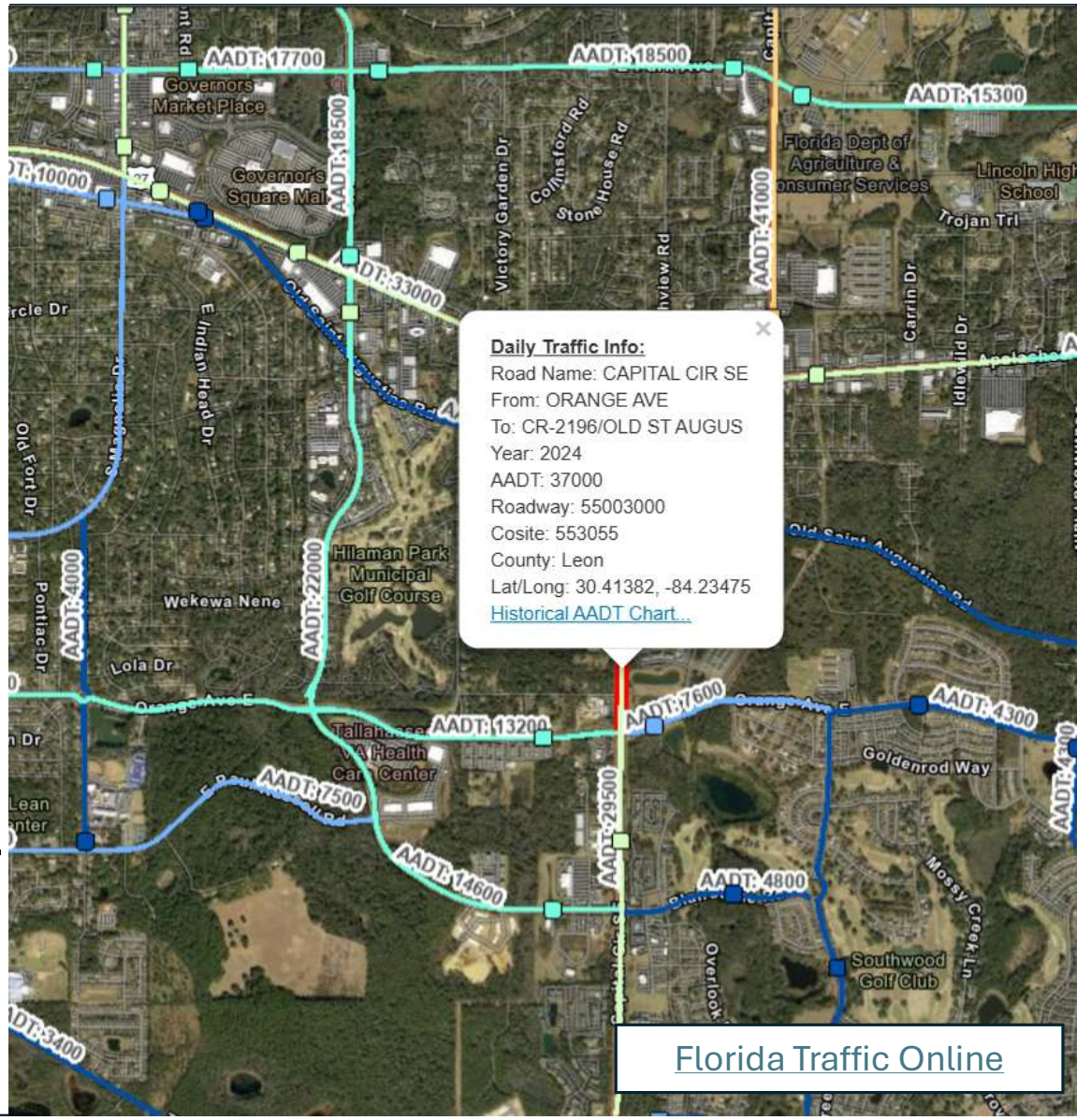


Integrated with Traffic

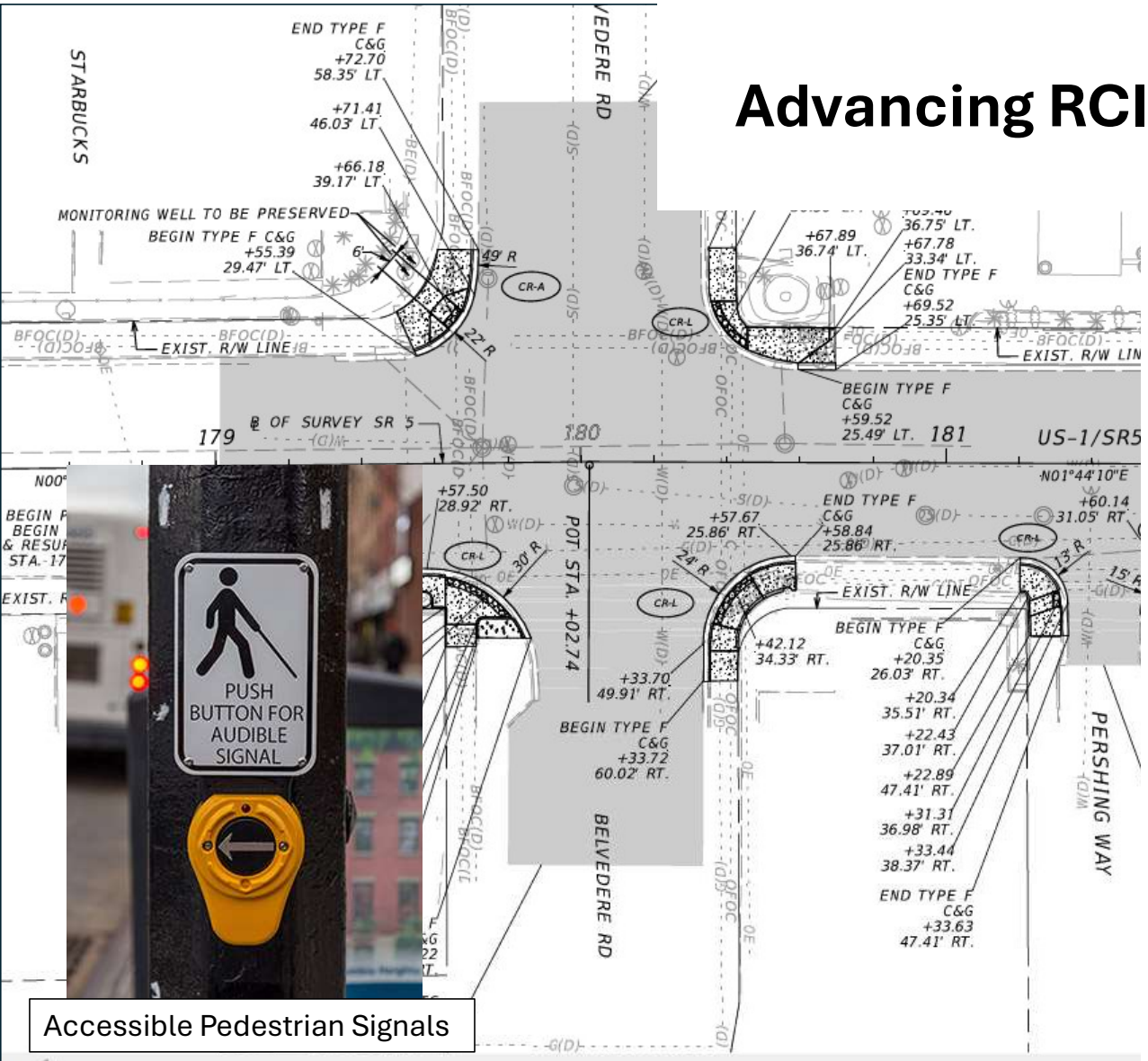
- Annual integration of Traffic Monitoring Data
  - Roadway Section AADT
  - Traffic Flow Breaks
  - Vehicle Miles Traveled
  - Truck Volumes (AADTT)
  - Realignments/Bypasses

- Loaded into Florida Traffic Online every year
- FDOT provides reports by law

Future integration with the Non-Motorized System?

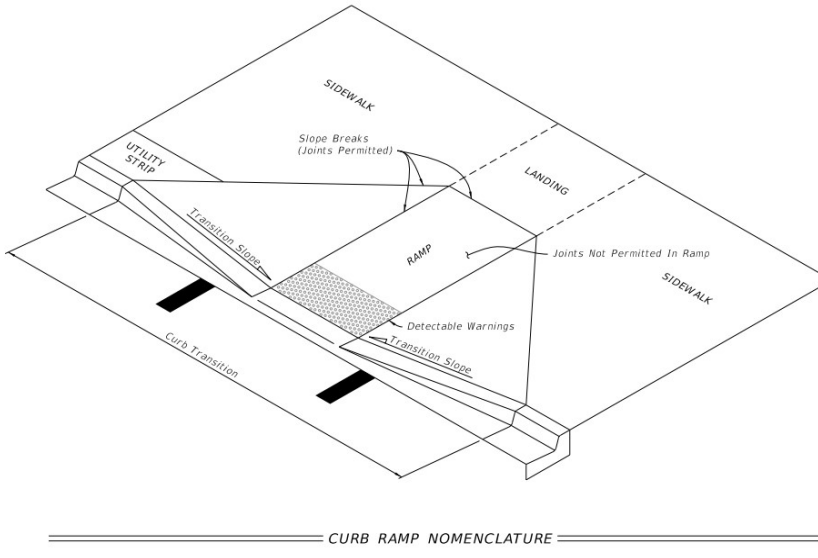


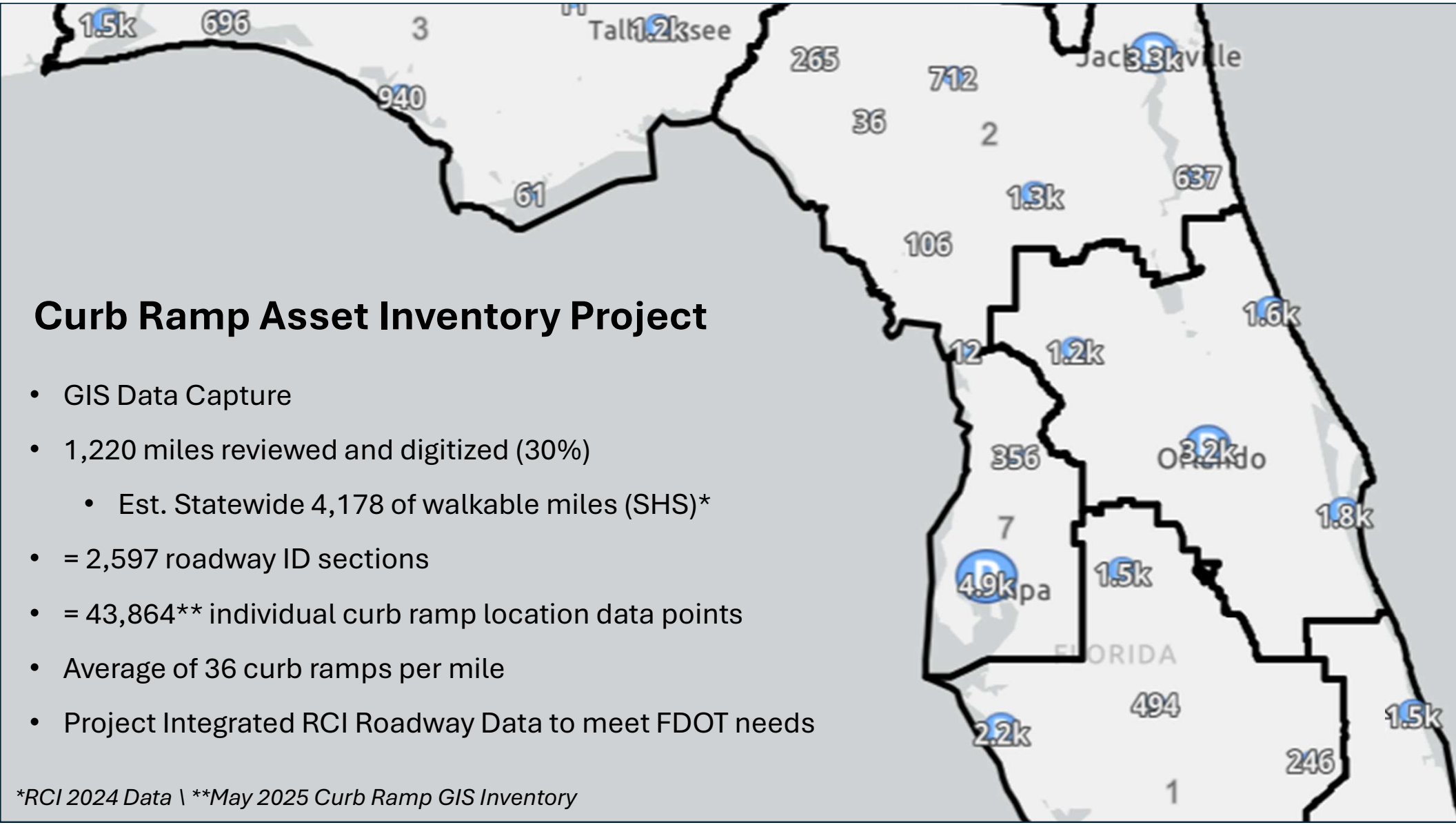
Advancing RCI Data for Roadway Design



Accessible Pedestrian Signals

- Roadway Design Elements for Non-Motorized and ADA Compliance
- New data needed for FDOT & FHWA ADA Transition Plan

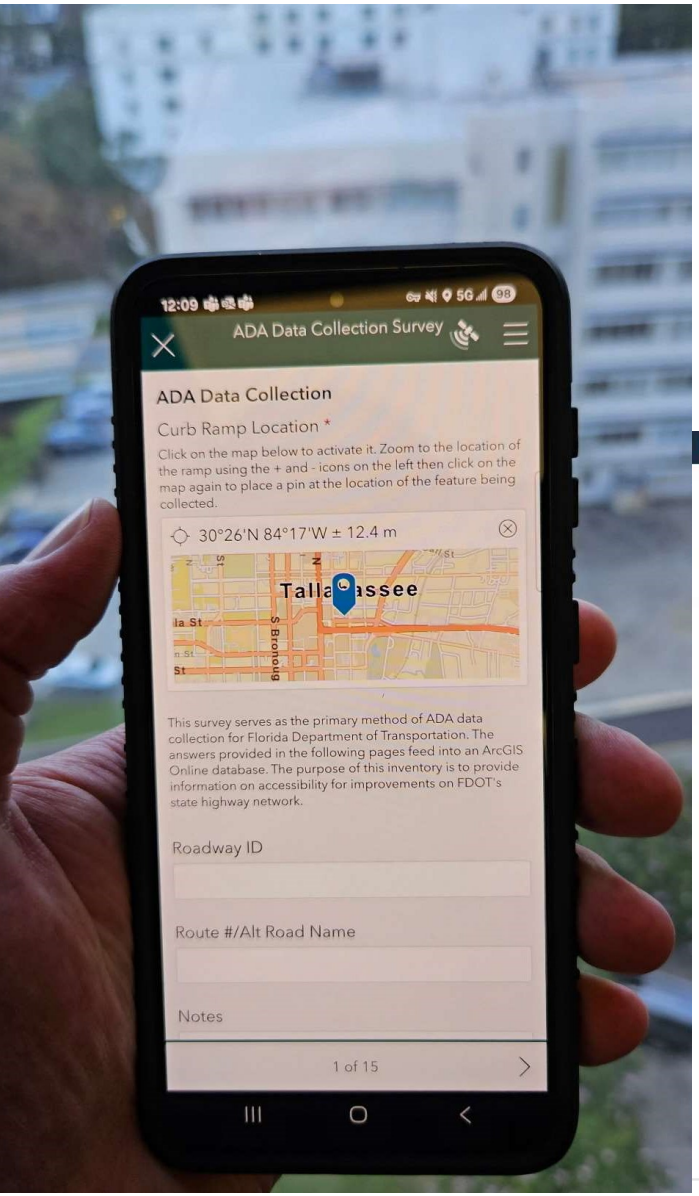




Curb Ramp Asset Inventory Project

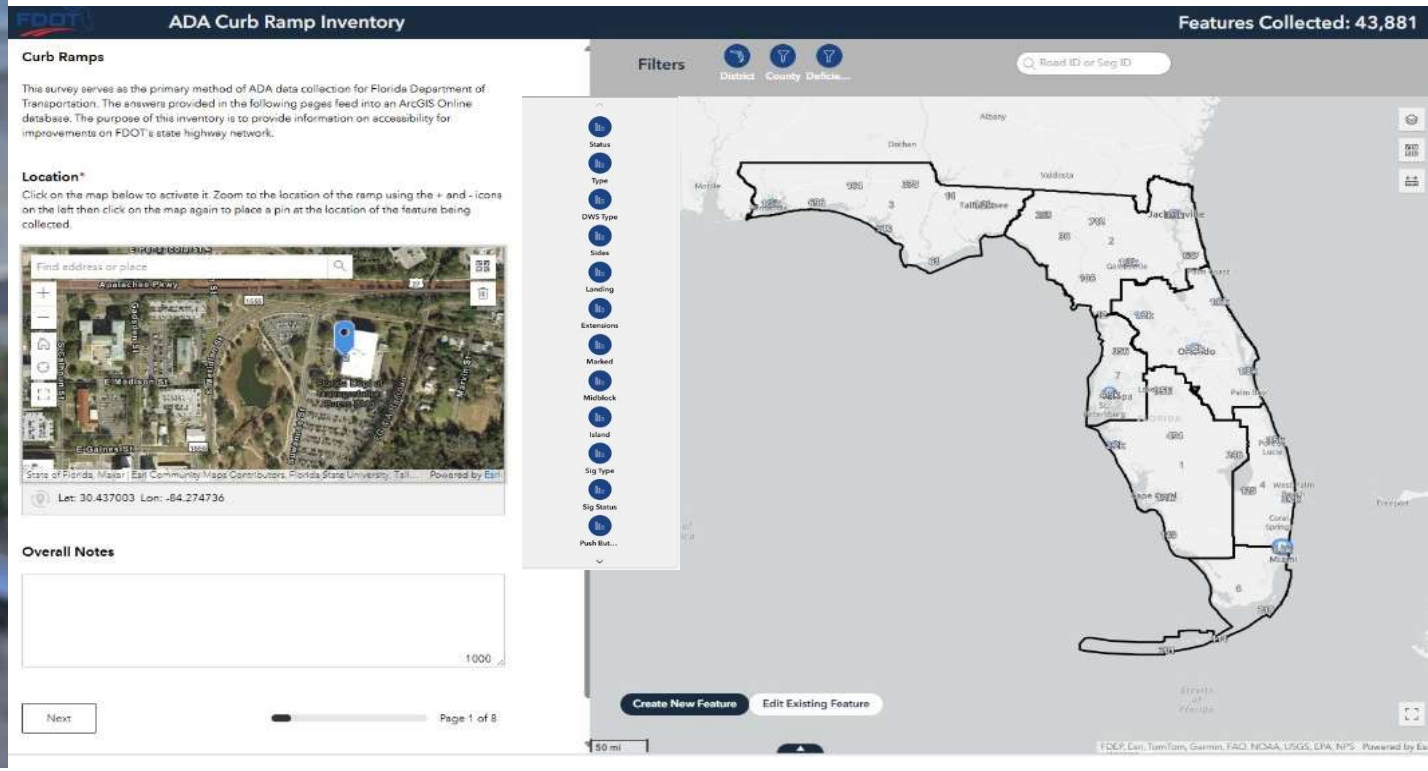
- GIS Data Capture
- 1,220 miles reviewed and digitized (30%)
  - Est. Statewide 4,178 of walkable miles (SHS)*
- = 2,597 roadway ID sections
- = 43,864** individual curb ramp location data points
- Average of 36 curb ramps per mile
- Project Integrated RCI Roadway Data to meet FDOT needs

**RCI 2024 Data \ **May 2025 Curb Ramp GIS Inventory*

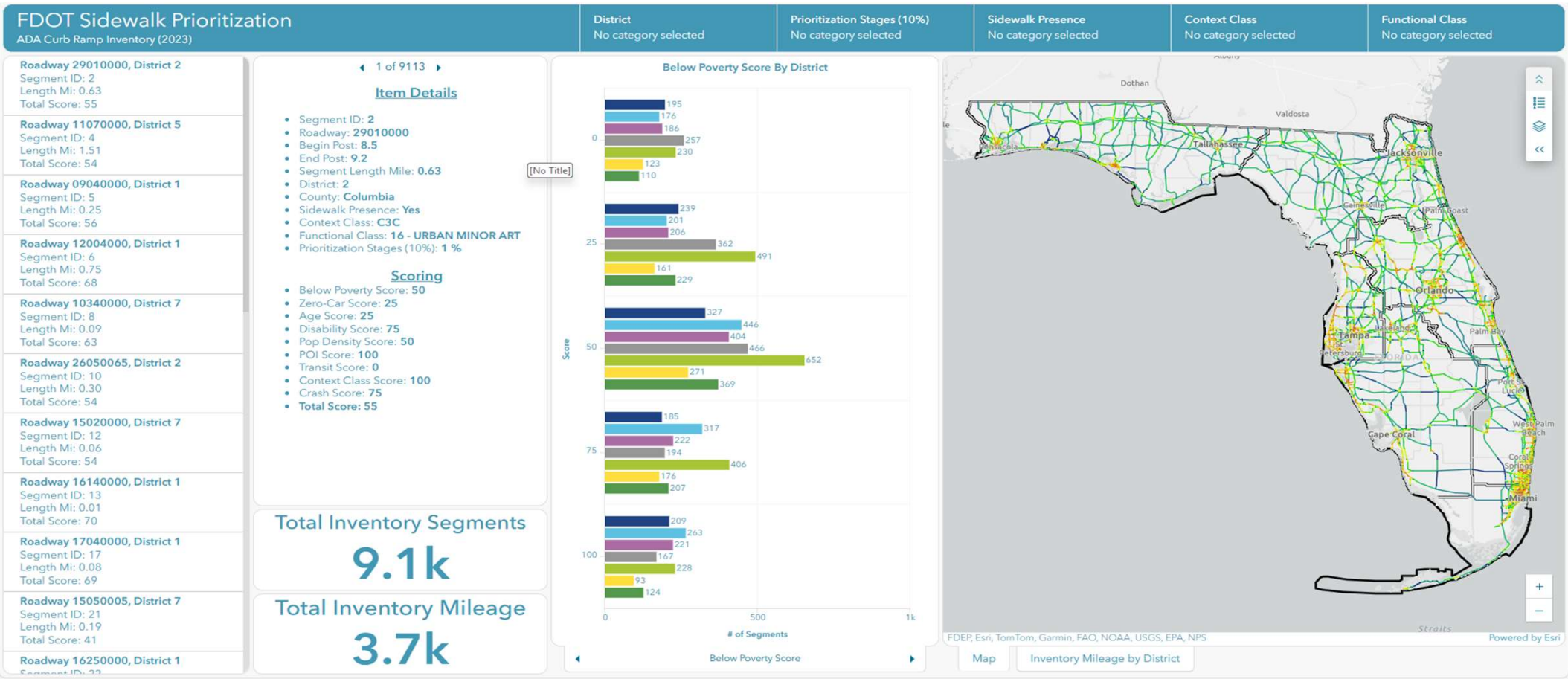


Curb Ramp Asset Inventory Tools

- Desktop and Field Data Collection
- Tool and data available on FDOT GIS Enterprise
- FDOT shared tool design with Puerto Rico



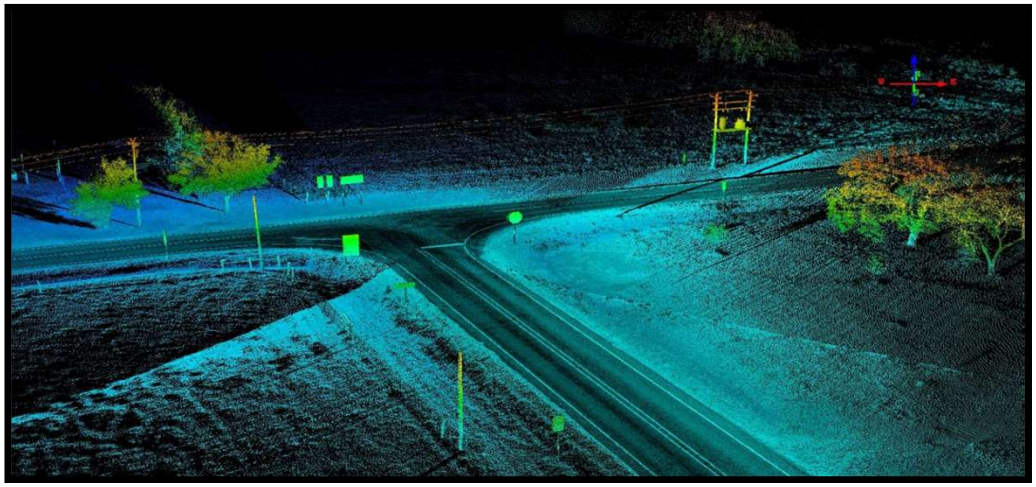
Sidewalk Prioritization for Inventory



Automated Data Collection Methods

360 LiDAR/Video Mapping

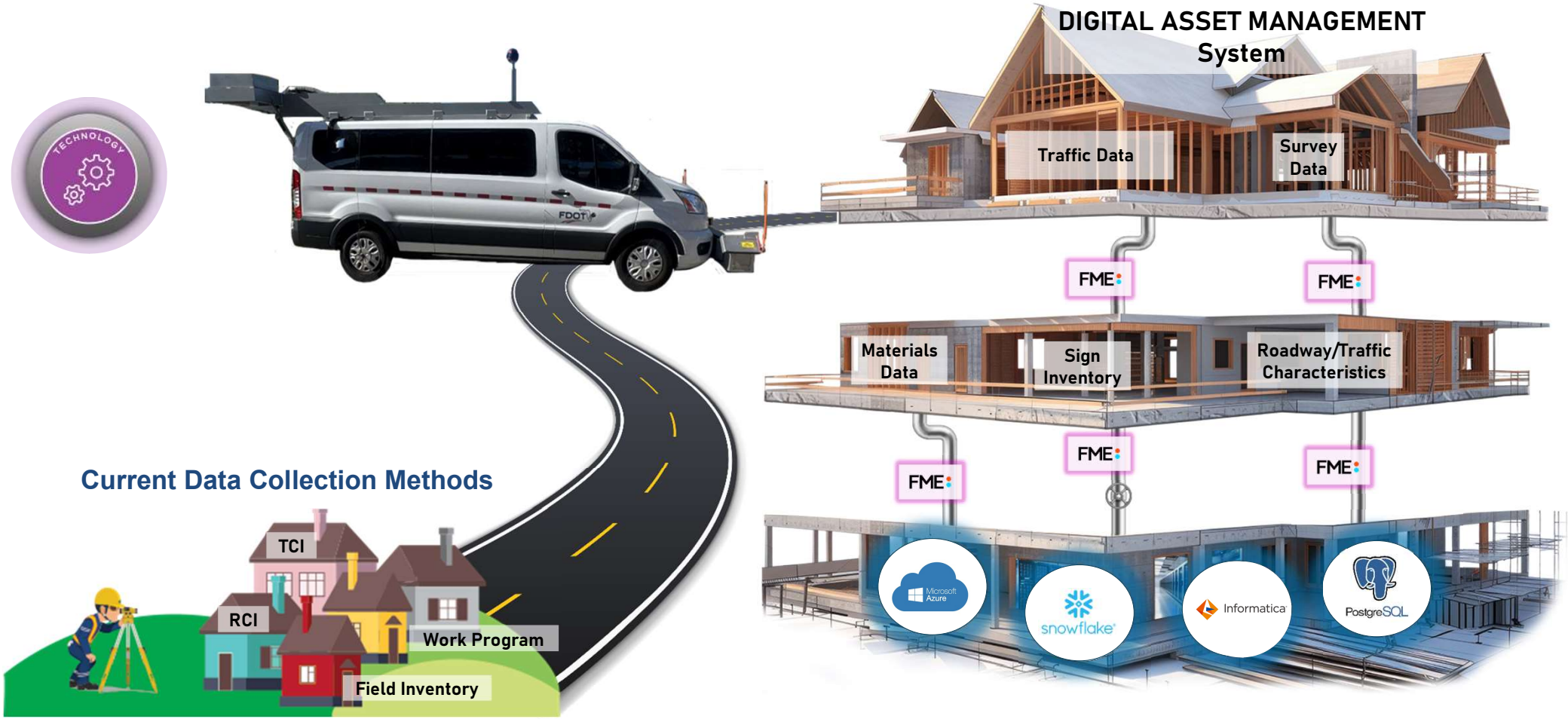
D2 and D3 Pilots

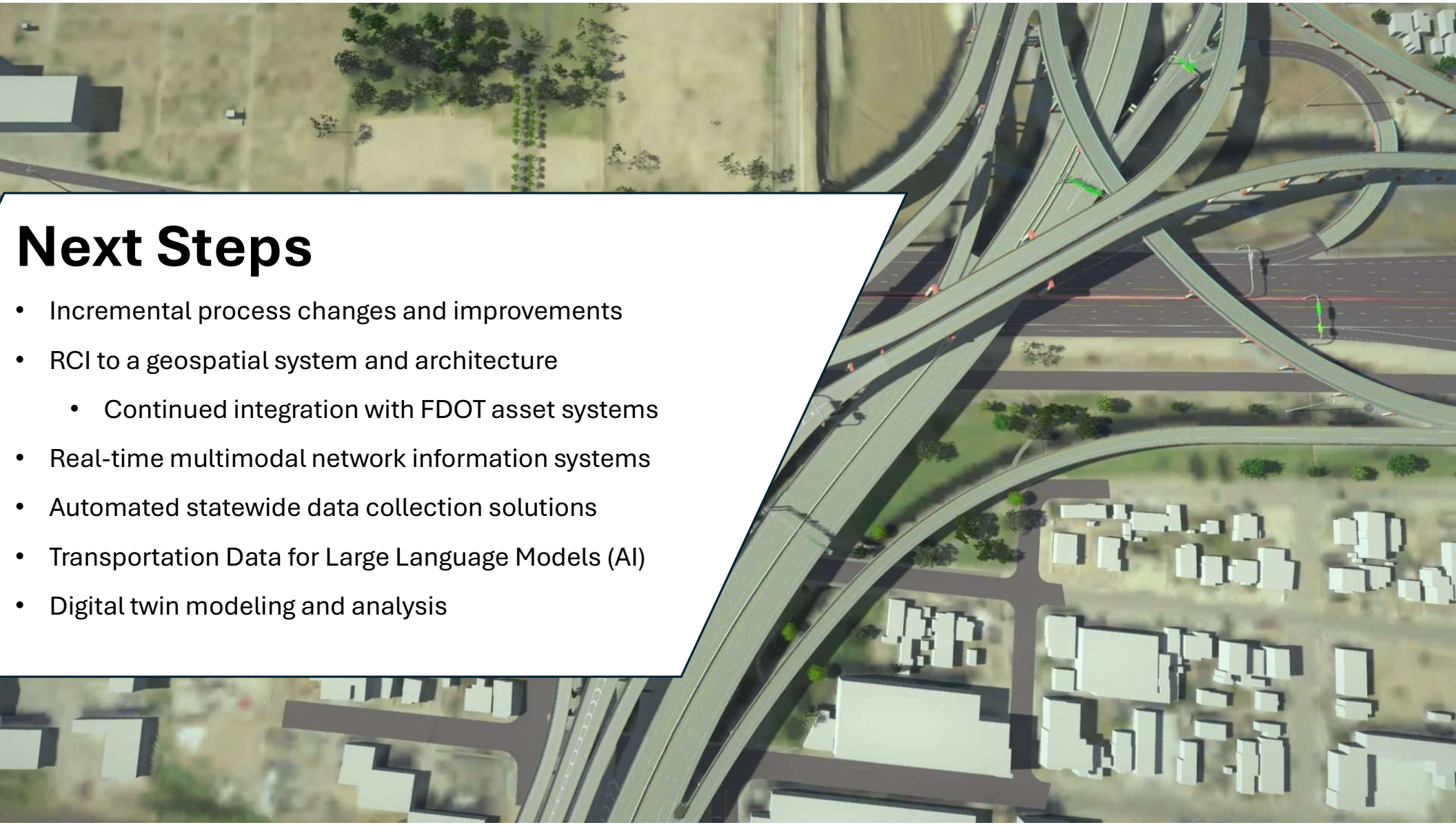


Machine Learning through Computer Vision

Tallahassee/Gainesville Pilots

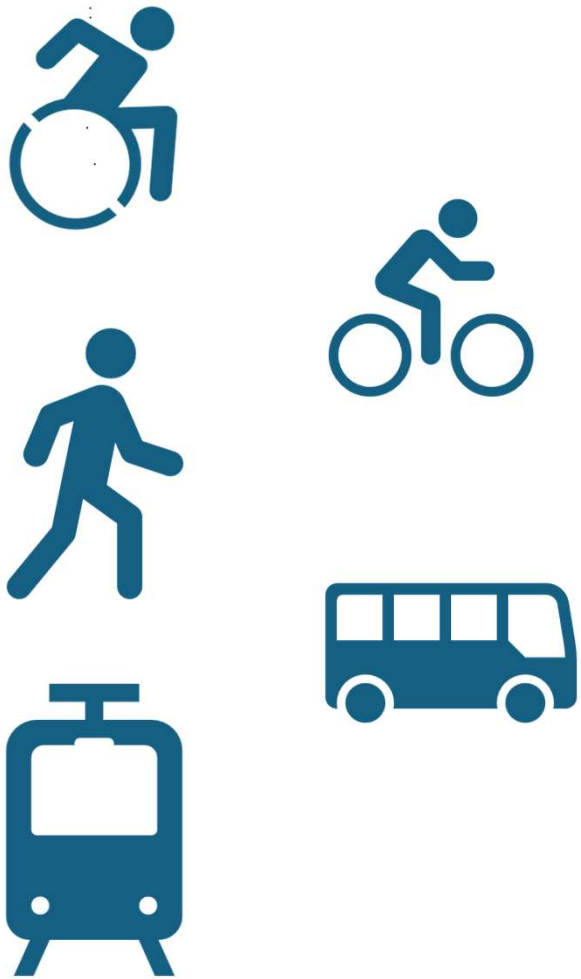
Building a Modern Digital Asset Management System





Next Steps

- Incremental process changes and improvements
- RCI to a geospatial system and architecture
  - Continued integration with FDOT asset systems
- Real-time multimodal network information systems
- Automated statewide data collection solutions
- Transportation Data for Large Language Models (AI)
- Digital twin modeling and analysis



Brad Bradley | Brad.Bradley@dot.state.fl.us

Joel Worrell | Joel.Worrell@dot.state.fl.us

Thank you!

Shared-Use Nonmotorized (SUN) Trail Program

2025 Statewide TDA meetings

September 16, 2025

Robin Birdsong, Coordinator

Shared-Use Nonmotorized (SUN) Trail and Transportation Alternatives Set-Aside (TA) programs

FDOT

STRATEGIC DEVELOPMENT

SUN Trail Background

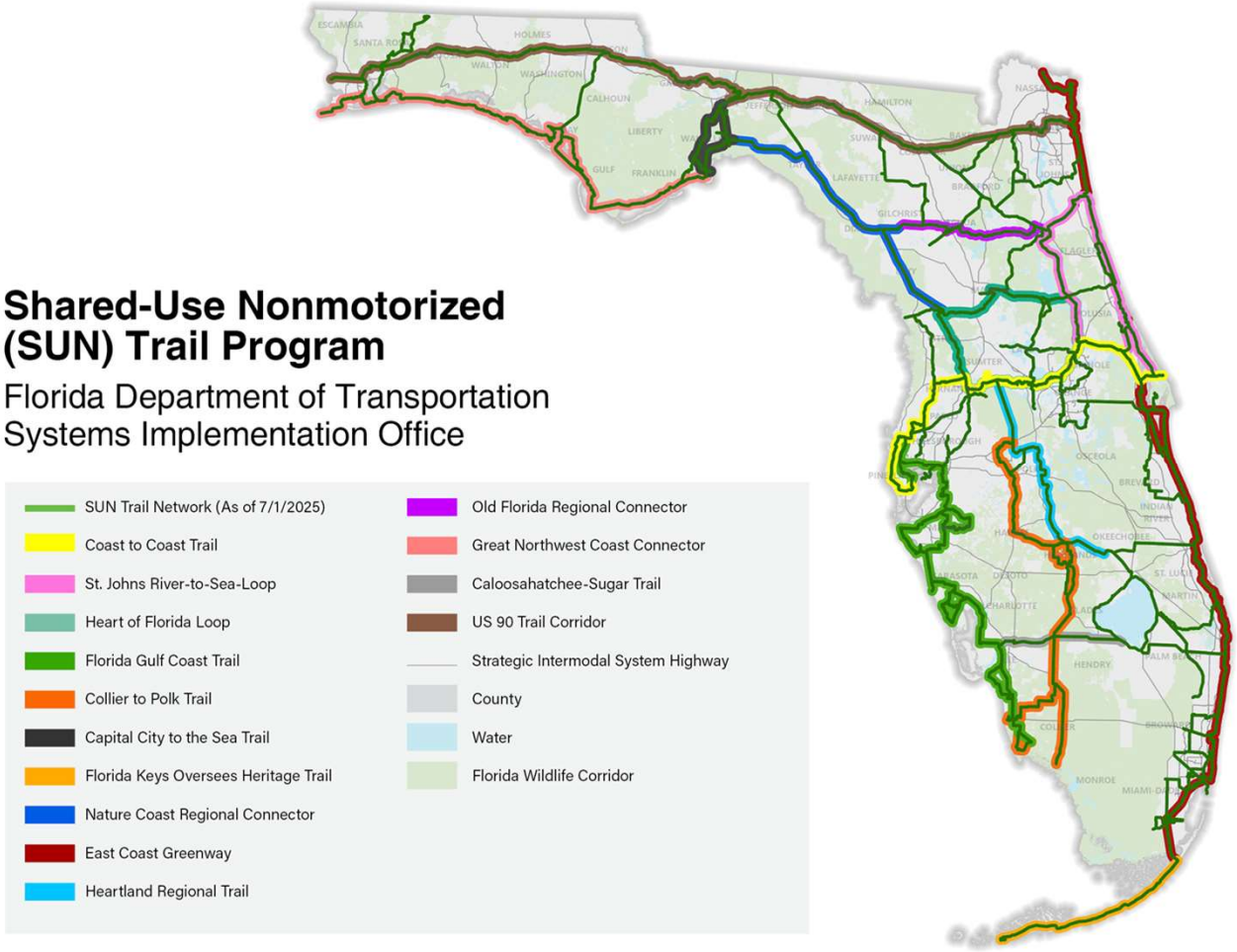
- Section 339.81, Florida Statutes (F.S.), guides the SUN Trail program to fund nonmotorized paved trails for bicyclists and pedestrians within the network
- SUN Trail network aligns with the Florida Greenways and Trails System (FGTS) Plan's Land Trail Priority Network overseen by the Department of Environmental Protection's Office of Greenways and Trail (Chapter 260, F.S.)
- 2023 enacted changes to Section 339.81, F.S., expanded the network to include connections to and through lands of the Florida Wildlife Corridor Act (Section 259.1055, F.S.) priorities 1, 2, and 3 of the Ecological Greenways Network (FEGN).

Statewide Vision

SUNTRAIL FLORIDA est 2015

Florida Greenways & Trails System Plan

Florida WILDLIFE CORRIDOR Foundation



Reporting: *Overview*

Every 3rd year thereafter

Submittal of report to the Governor and Legislature summarizing the status of the SUN Trail network

Mileage related attributes

Program expenditures

Trail operational and performance measures

Reporting Mileage

Mileage related attributes

Strategic Plan Completed

Feb 2024

Framework for Trail Asset inventory

Asset Inventory (Feb 2024 – May 2025)

June 2025

Asset Inventory

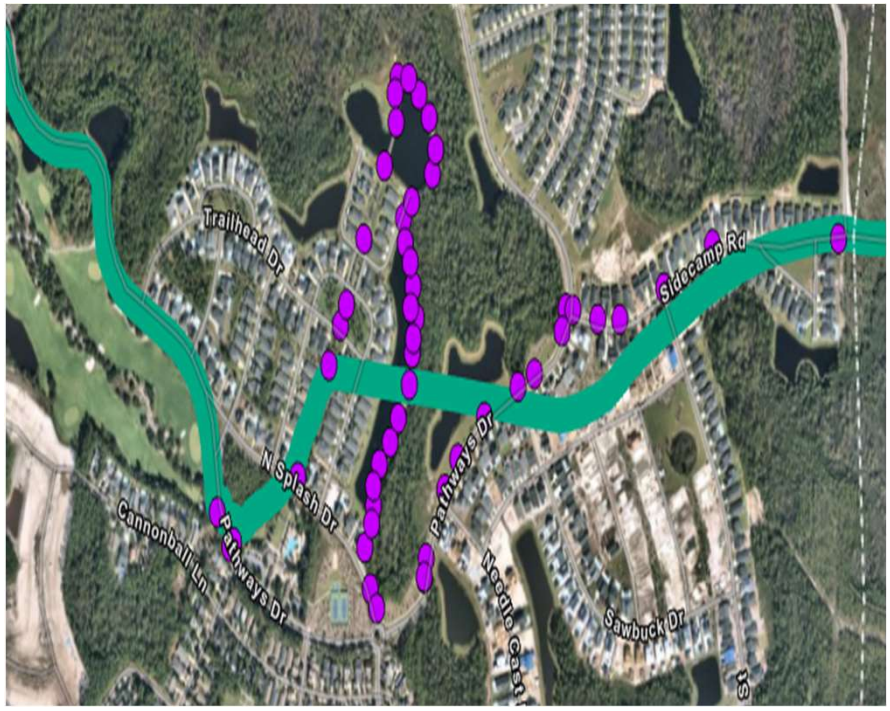
field collection and data processing

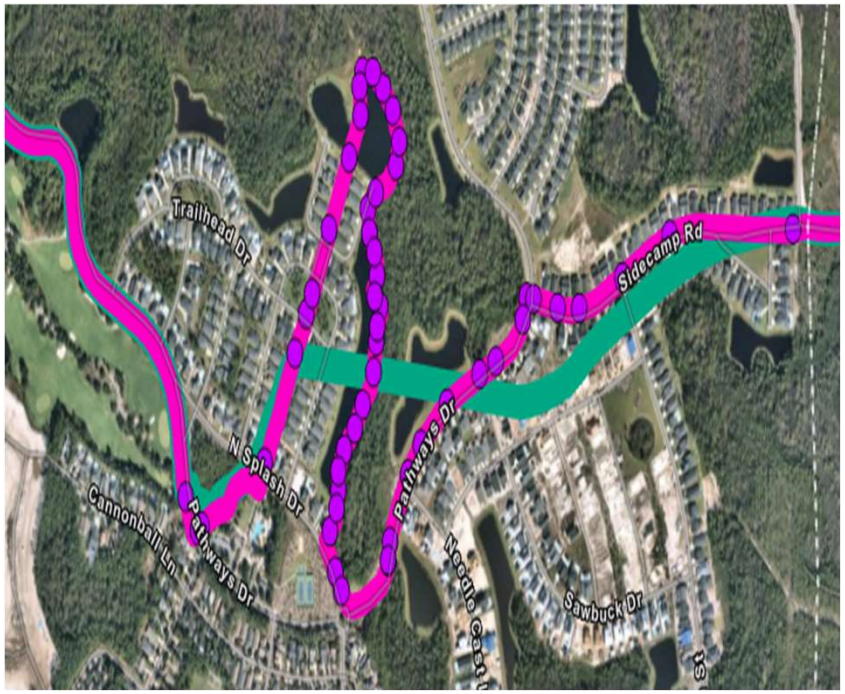
Ongoing Data

SUN Trail mapping tools maintained by SIO, TDA LRS (map) / RCI (data)

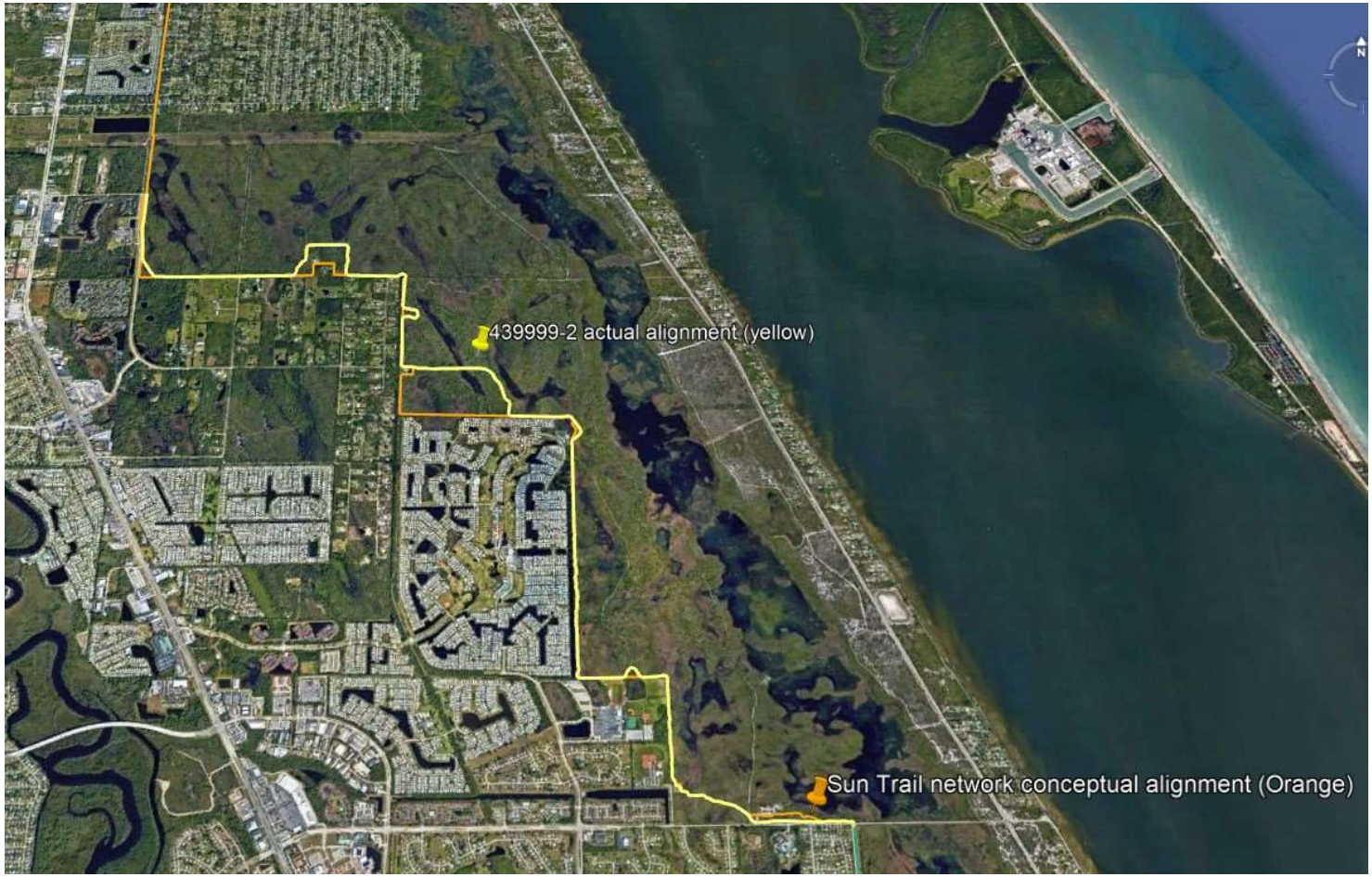
Example Realignment

Quality Assurance / Quality Control

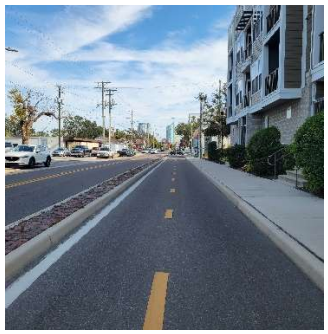




Example Realignment

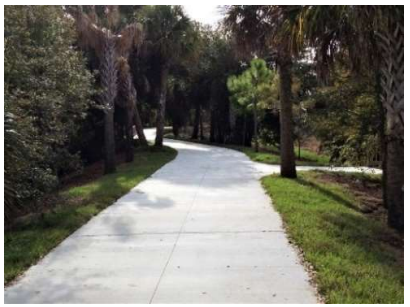


Example Segment Types and Surfaces






Collaborating

Lynn Haven Rails-to-Trails

Withlacoochee-Dunnellon Trail Connector

Legacy Trail – Overpasses

SUN Trail Contacts

Ongoing assistance – project identification, evaluation, prioritization, programming, mapping, implementation…

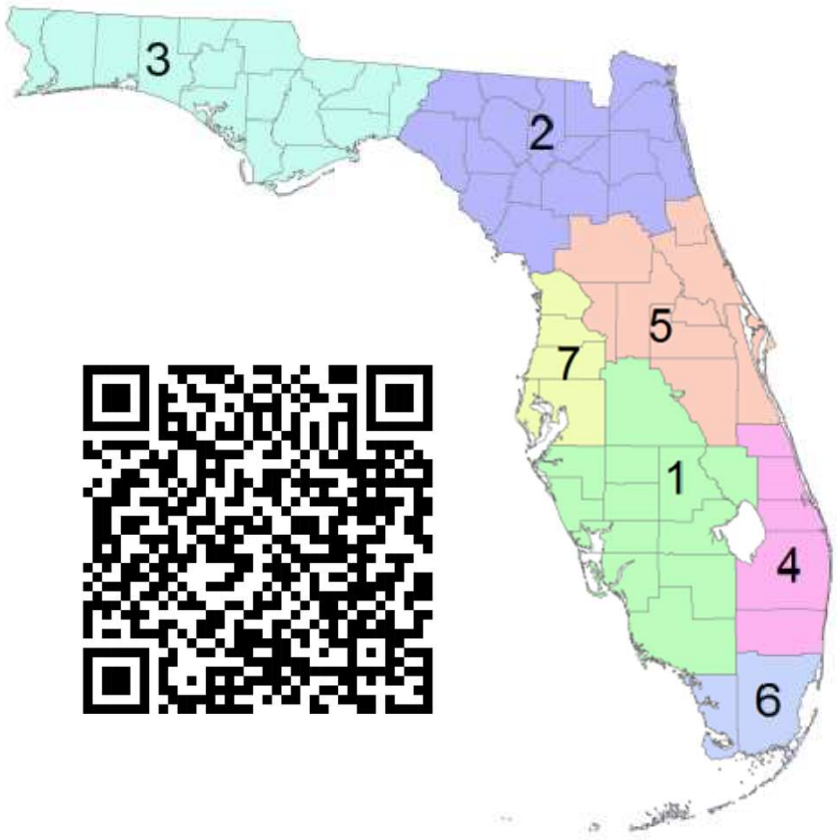
DISTRICT 1
Tanya Merkle
Alternate: **Vitor Suguri**

DISTRICT 2
Amy Roberson
Alternate: **Lacey Boatright**

DISTRICT 3
Tanya Branton
Alternate: **Olen Pettis**

DISTRICT 4
Modeline Acreus

DISTRICT 5
Aish Sandineni
Alternate: **Alice Giuliai**



DISTRICT 6
Elvira Astorga
Alternate: **Shereen Yee Fong**

DISTRICT 7
Jensen Hackett
Alternate: **Suzanne Monk**

TURNPIKE ENTERPRISE
Katina Kavouklis
Alternate: **Daniel Kastelic**

CENTRAL OFFICE
Robin Birdsong

https://www.fdot.gov/planning/systems/systems-management/SUNTrail/contacts.shtm

Safety is Everyone's Responsibility

QUESTIONS

Systems Implementation Office

850-414-4922

Robin.Birdsong@dot.state.fl.us

Impacts of Pedestrian and Bicycle Infrastructure on Safety and Economic Growth

FDOT Non-Motorized Traffic Monitoring Program Meeting

September 18, 2025

Miami-Dade Transportation Planning Organization

Agenda

- Introduction
- Study Area
- Transit and the Bike Network
- Snapshot of Ridership in Miami-Dade
- Bike Trends
- Crashes Involving Bicyclists
- Key Safety Insights

Background

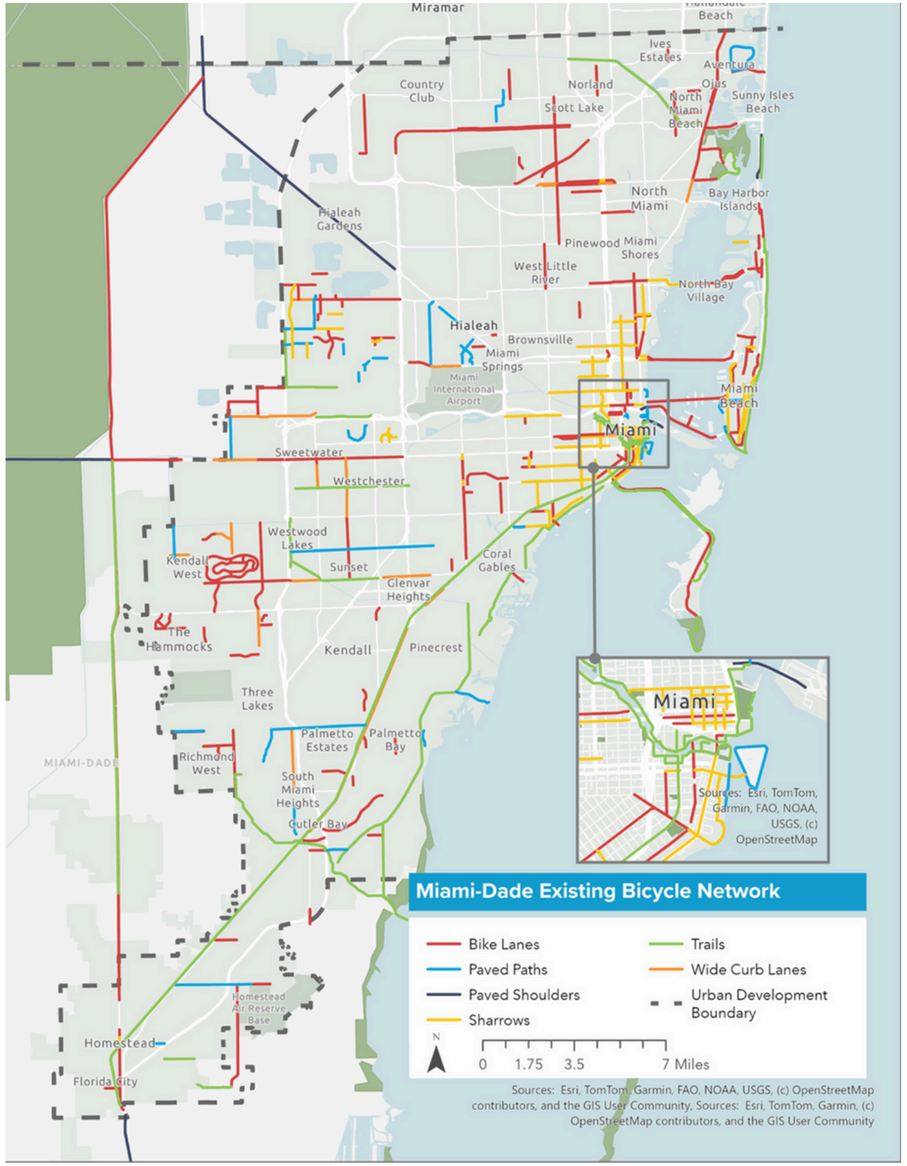
Bicycle infrastructure affects the safety and economic vitality of Miami-Dade County

- Investing in bicycle infrastructure supports:
  - Contributing to safer facilities and lowering the risk of crashes.
  - Offering more transportation choices.
  - Boosting local economies by attracting visitors and increasing foot traffic to nearby businesses.

TPO
Miami-Dade Transportation Planning Organization

Study Area

- All of Miami Dade County's bicycle facilities are included in this study.
- Approximately 439 miles of facilities are planned in the 2050 Bicycle and Pedestrian Master Plan, a component of the 2050 Long-Range Transportation Master Plan (LRTP)
- There are approximately 525 miles of bicycle facilities in Miami-Dade County.



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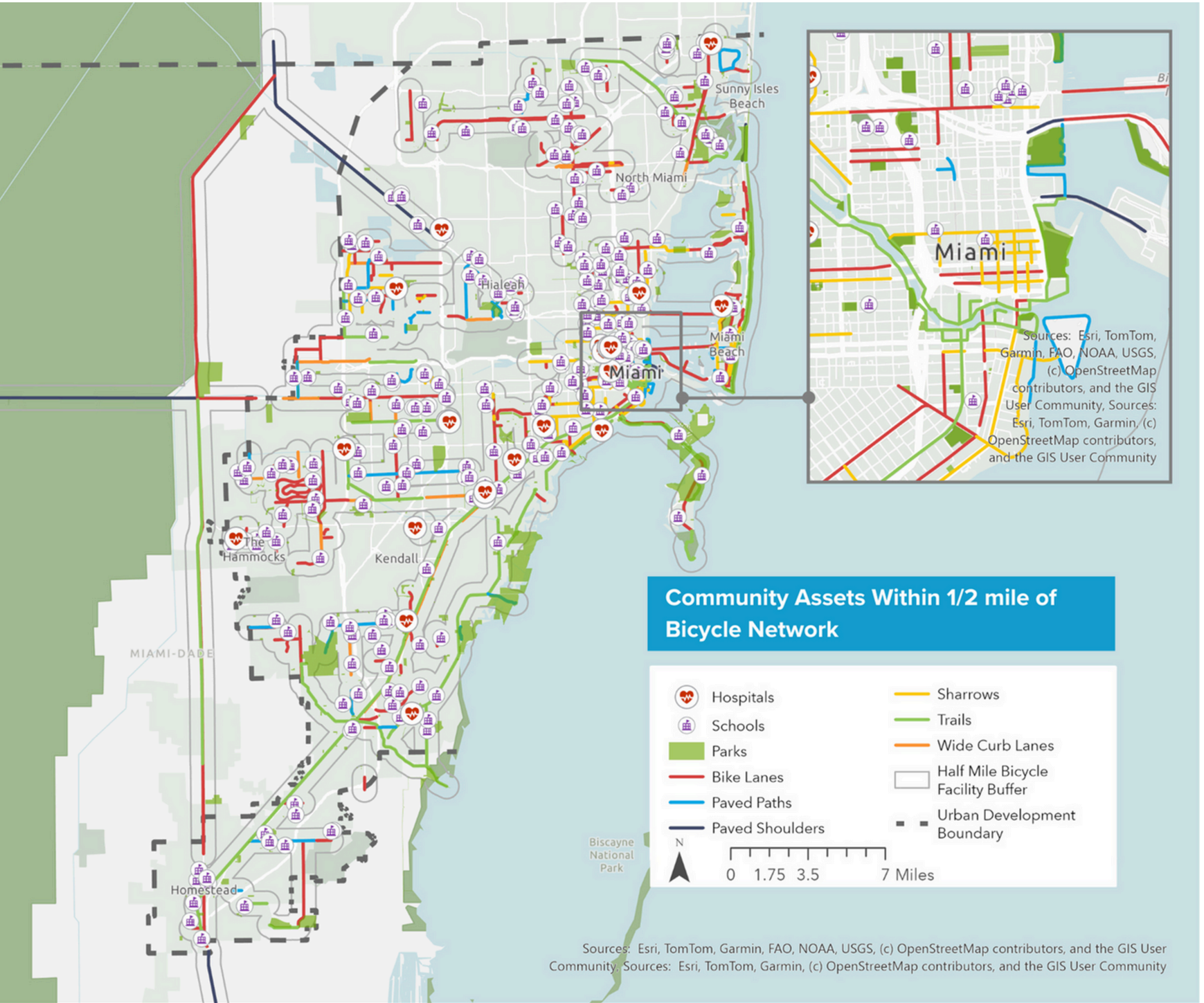
Miami-Dade Transportation Planning Organization

Community Assets within ½ mile of the Bicycle Network

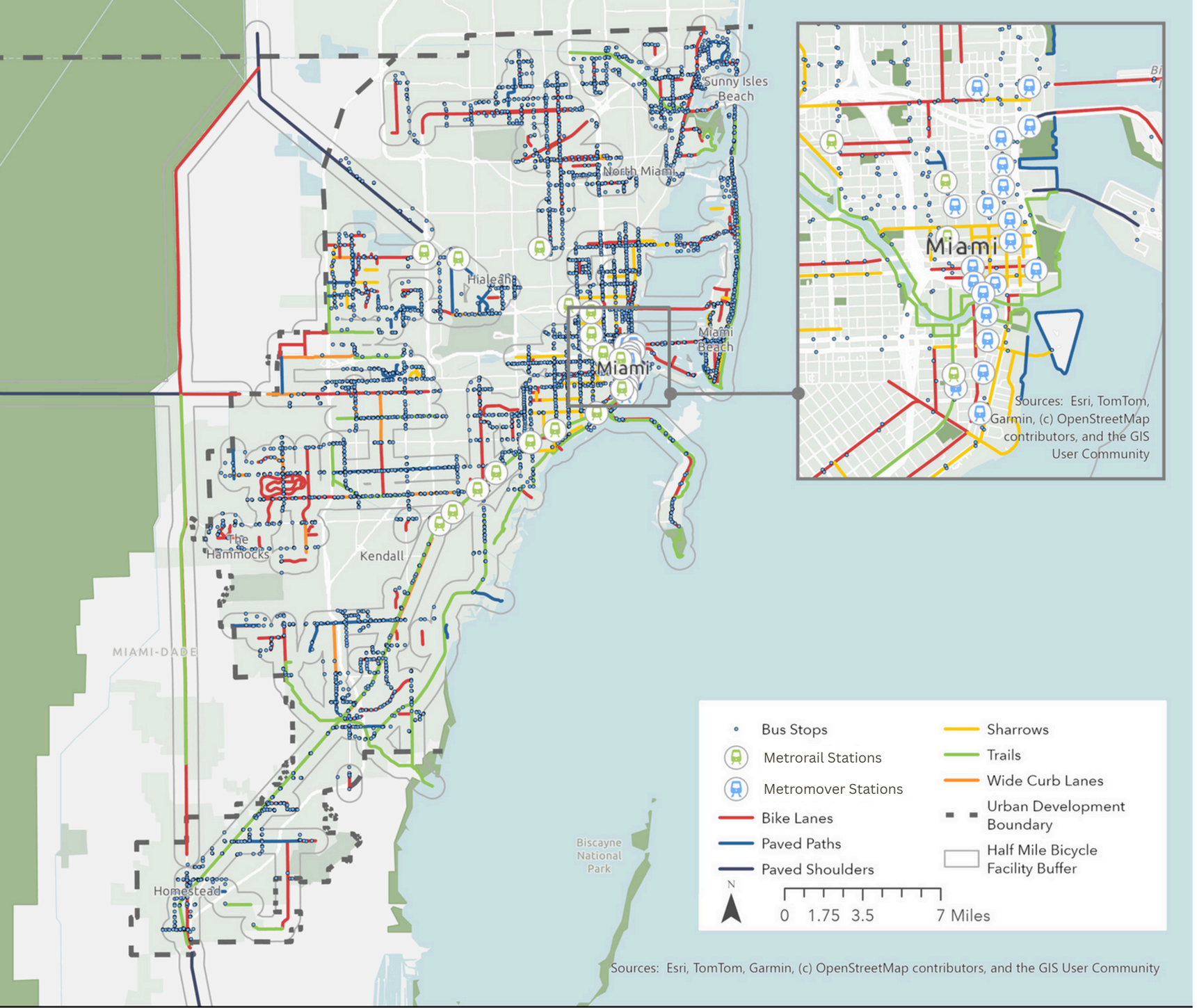


633 Parks

908 schools

24 hospitals

TPO
Miami-Dade Transportation Planning Organization



Transit and the Bike Network

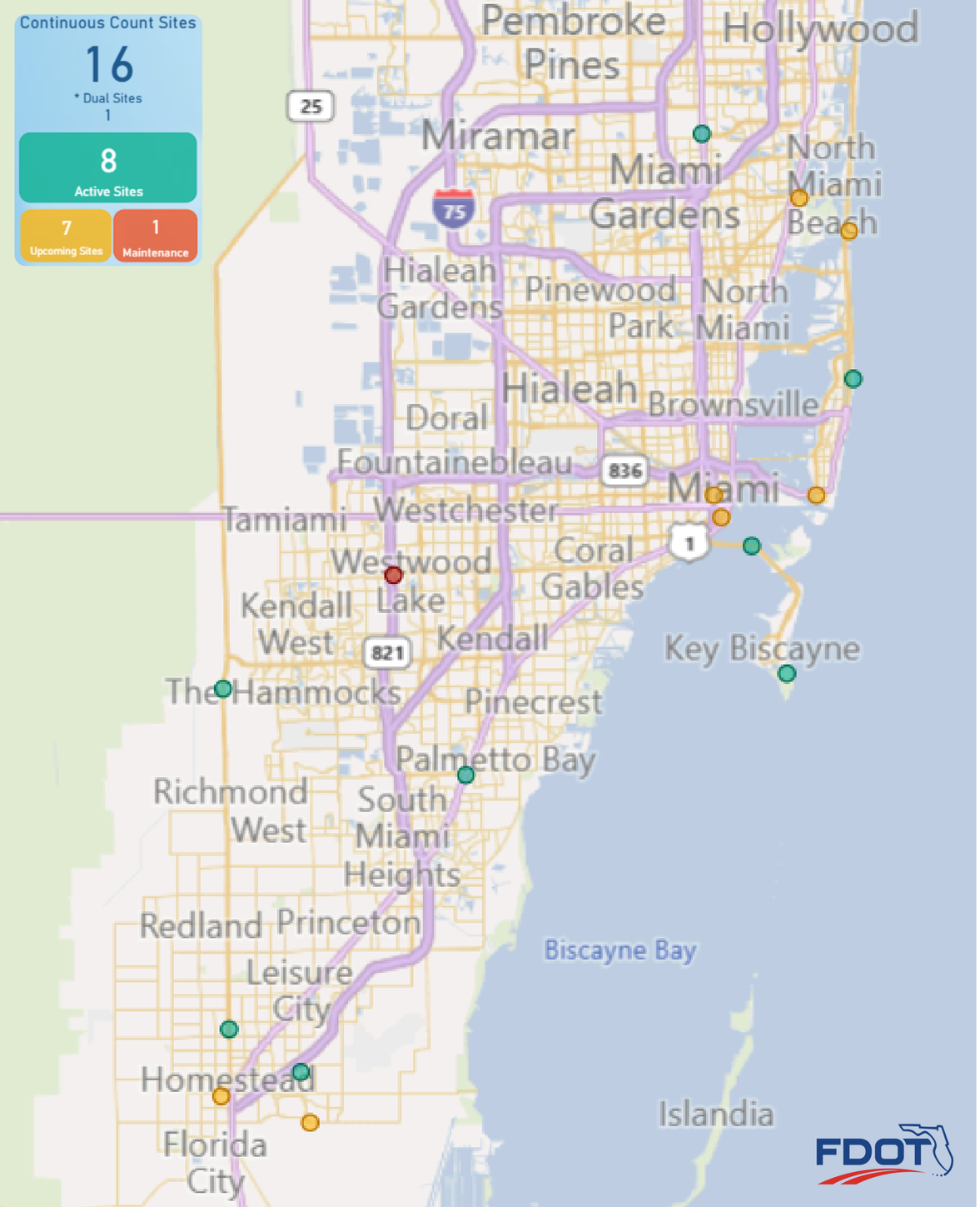
Transit Stations within ½ a mile

- 18 Metrorail
- 21 Metromover
- 4,419 Metrobus
- 3 Tri-Rail
- 2 Brightline
- 1 Amtrak

Transit Stations within 500 feet

- 13 Metrorail
- 16 Metromover
- 1,066 Metrobus
- 1 Tri-Rail
- 1 Brightline

TPO
Miami-Dade Transportation Planning Organization



FDOT Non-Motorized Traffic Monitoring Program

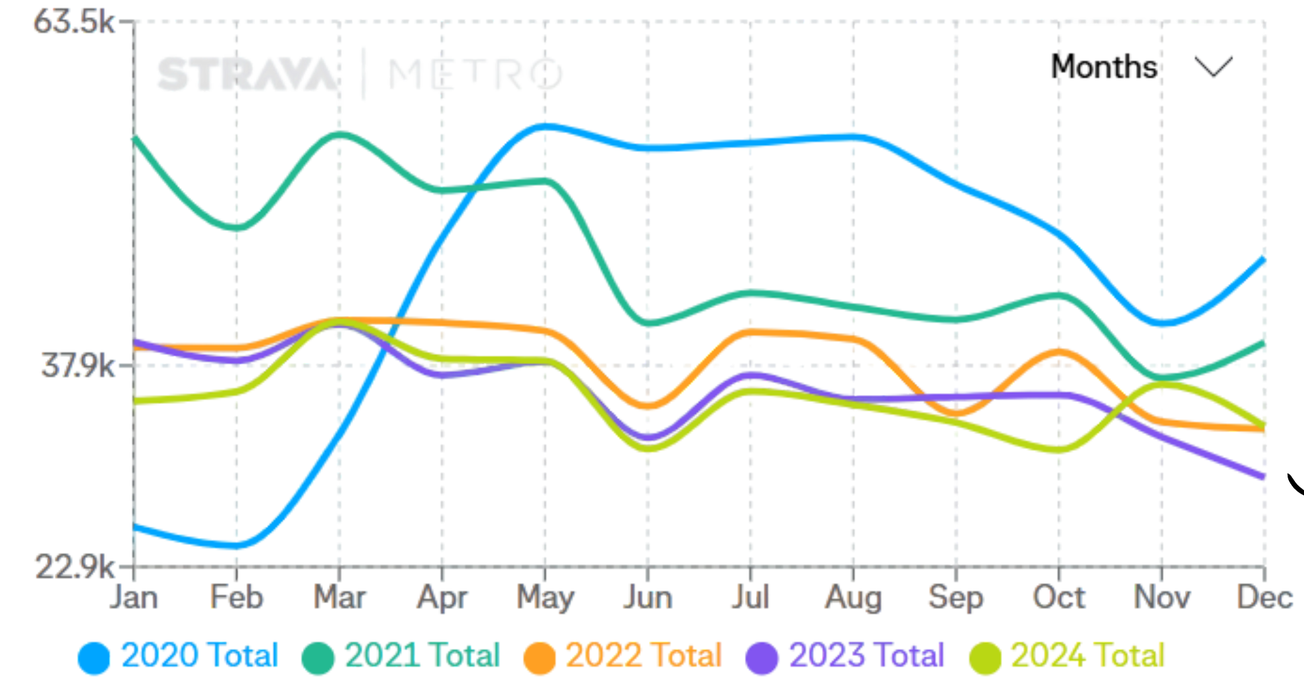
Facilities part of the SUN Trail Network

Trail Name	ADT (2024)
Atlantic Greenway Trail	2,617
Rickenbacker Causeway at William Powell Bridge (Dual Site)	1,438
Rickenbacker Trail at Bill Baggs Cape Florida State Park	333
Snake Creek Trail south of SR 7	188
South Dade Trail at SW 152 Street	108
Biscayne-Everglades Greenway at Kingman Road	80
Krome Path	48
Snapper Creek Trail at SW 40 Street	11

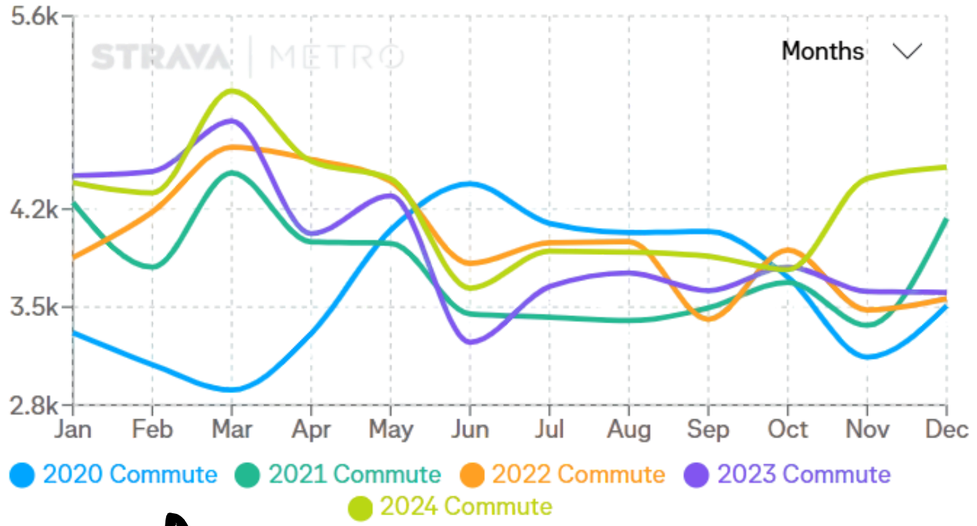
TPO
Miami-Dade Transportation Planning Organization

Snapshot of Ridership in Miami-Dade

2024 Total	2023 Total	2022 Total	2021 Total	2020 Total
426,818	432,729	456,497	548,452	535,835



Total Trip Counts in Miami-Dade

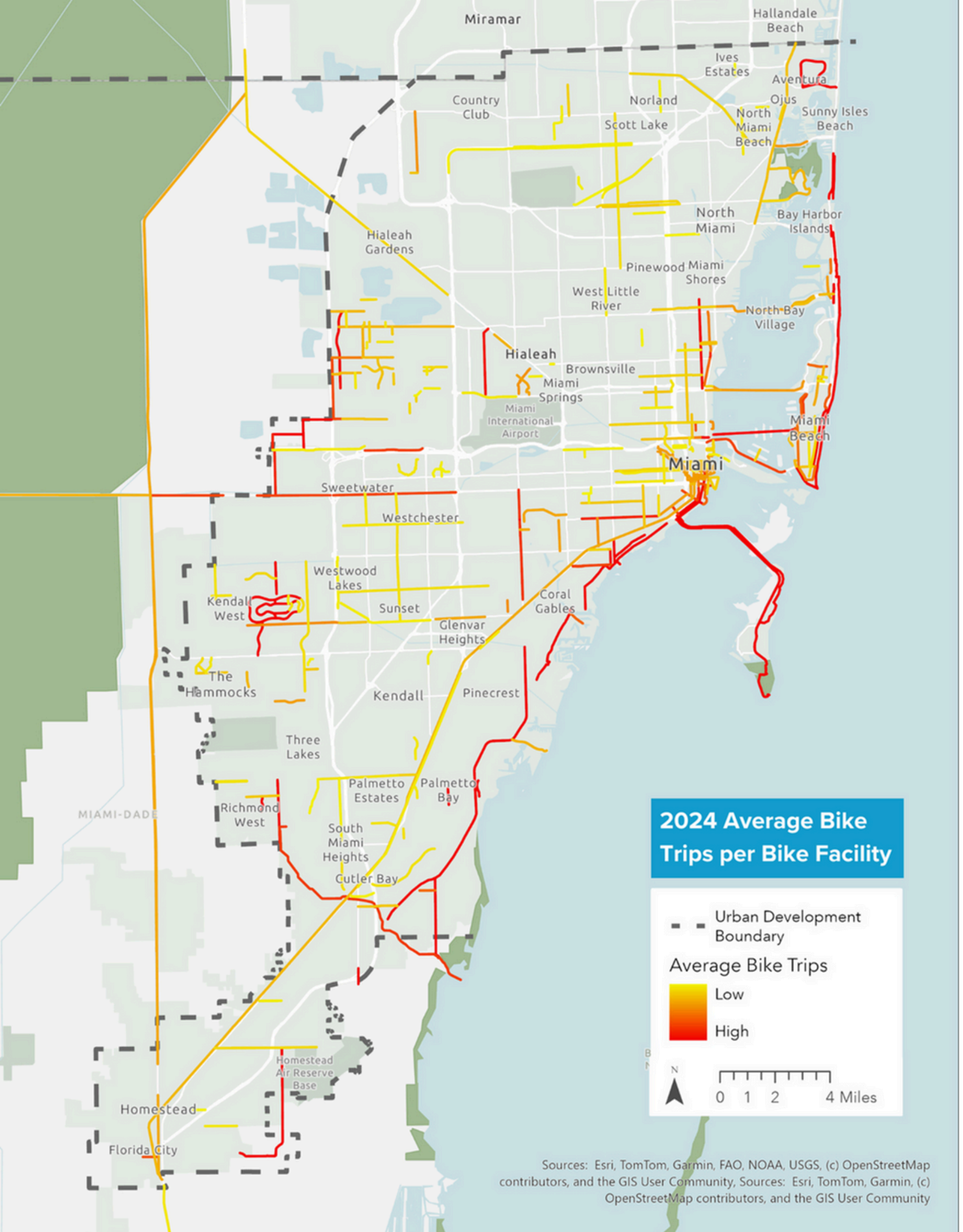


Total Commuting Trip Counts in Miami-Dade

STRAVA™

Strava is a fitness app with social networking features that logs users' walking and cycling trips allowing users to track metrics such as mileage, elevation gain, and trip duration.

TPO
Miami-Dade Transportation Planning Organization



Average Bike Trips per Bicycle Facility

Facilities part of the SUN Trail Network

Trail Name	Total Annual Bike Traffic (2024)
Rickenbacker Trail MOST POPULAR	158,063
Atlantic Greenway MOST POPULAR	129,150
Biscayne-Everglades Greenway	10,341
Snake Creek Trail	12,376
Krome Path	6,933
South Dade Trail	4,579
Snapper Creek Trail	744

Source: STRAVA Metro
SFRPC Analysis

TPO
Miami-Dade Transportation Planning Organization

Bicycle Lanes in Miami-Dade

Facility Name	Type of Protection	Average Annual Bike Trips (2024)
Crandon Boulevard 	Buffered	152,380
Rickenbacker Causeway 	Unprotected	122,875
SW 137 Court	Unprotected	46,179
SW 146 Avenue	Unprotected	37,533
SW 68 Street	Unprotected	34,036
SW 62 Street	Unprotected	33,484
SW 66 Street	Unprotected	30,525
SW 59 Street	Unprotected	24,288
SW 26 Road	Unprotected	22,086
Venetian Causeway	Unprotected	16,172

Average Bike Trips per Bicycle Facility (2024)

- Bicycle ridership was highest on lanes and trails with protected infrastructure.
- Crandon Boulevard recorded the most trips at 152,380.
- Shared lanes, though not formal bike facilities, are used where network gaps exist.

Source: STRAVA Metro
SFRPC Analysis

TPO
Miami-Dade Transportation Planning Organization

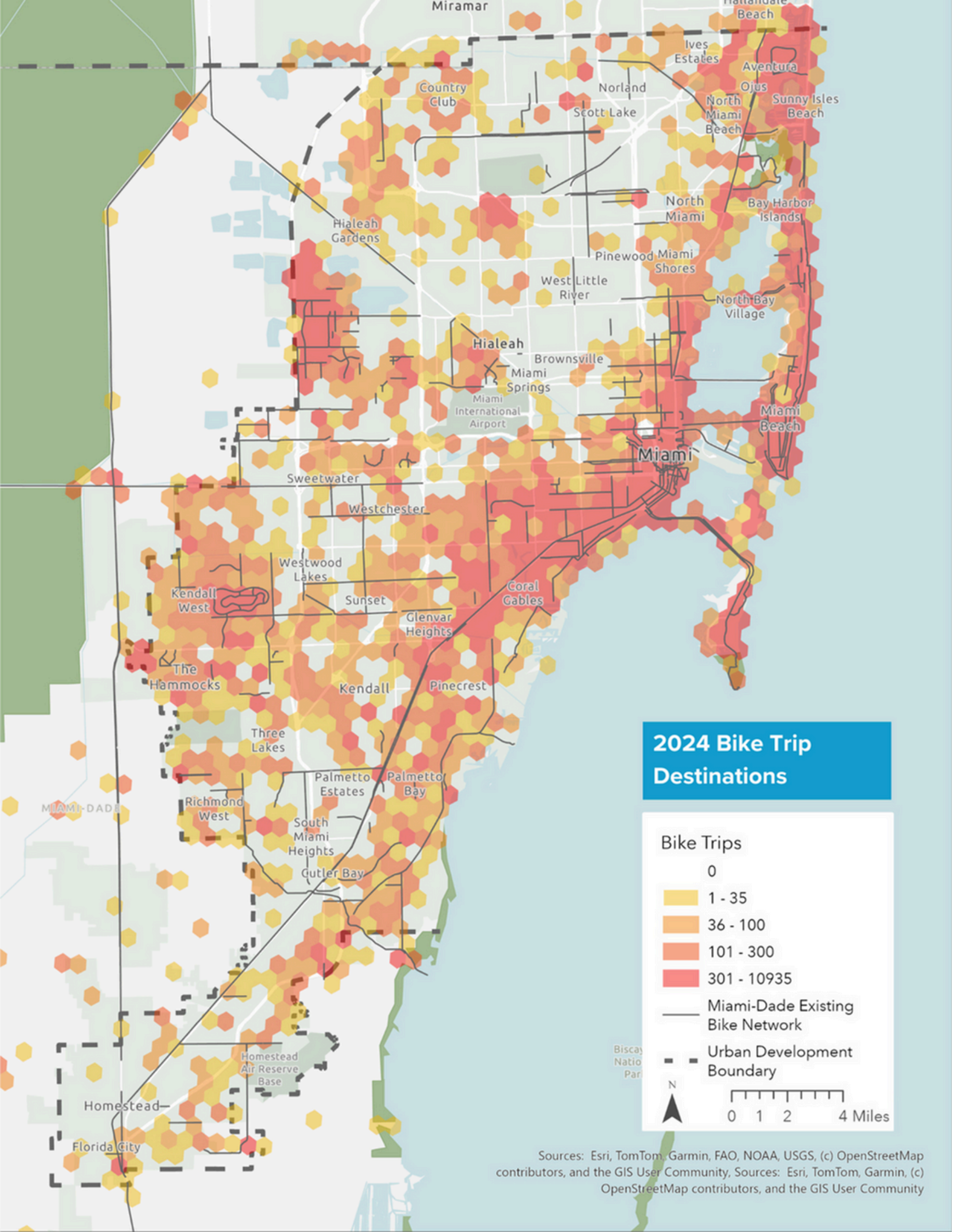
Shared Lanes in Miami-Dade

Facility Name	Average Annual Trips (2024)
Tiger Tail Avenue	21,461
Brickell Avenue	12,692
Grand Avenue	7,107
SE 15th Road	5,876
Mary Street	4,533
SW 57 Avenue	3,812
NW 114 Avenue	3,074
NE 14 Street	2,899
SW 22 Street	2,548
NE 4 Street	2,441

Miami-Dade Trail Network

Trail Name	Average Annual Trips (2024)
Rickenbacker Trail MOST POPULAR	39,169
Commodore Trail MOST POPULAR	30,721
Biscayne Trail	18,774
Atlantic Greenway	16,701
Old Cutler Trail	11,199
Miami Riverwalk	5,563
Biscayne-Everglades Greenway	2,937
Black Creek Trail	2,279
Kitty Roedel Trail	2,217
Turnpike Trail	2,088

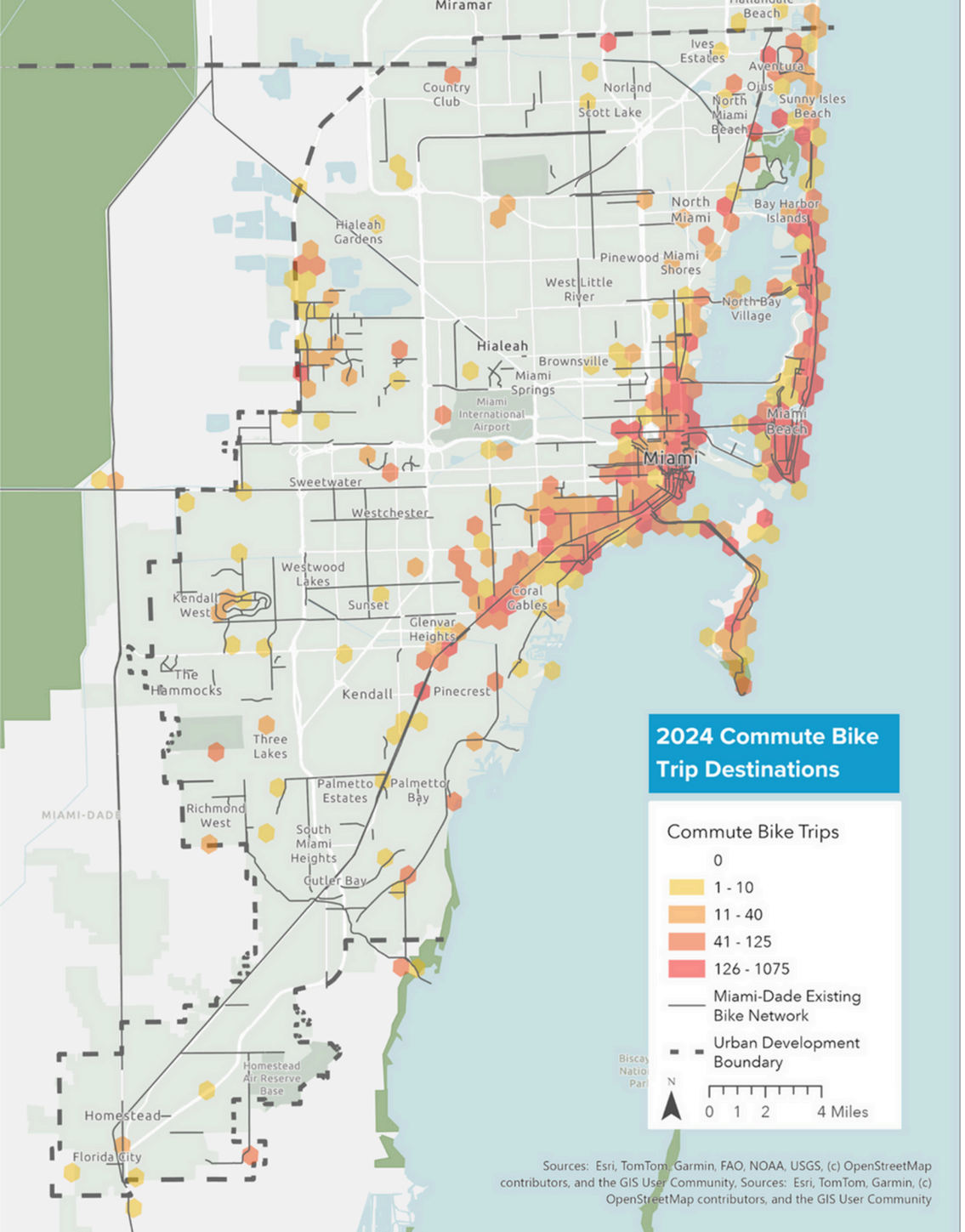

The Underline, Miami



Overall Trip Destinations

- A total of **425,635 bicycle trips** were recorded by STRAVA users in Miami-Dade County in 2024.
- Highest concentrations of trips occurred in **North Miami Beach**, **Miami**, and **Miami Beach**.
- Trips were generally spatially dispersed, with notable gaps in areas like **North Miami** and **West Little River**.
- Lower ridership in gap areas correlates with limited bicycle infrastructure.

TPO
Miami-Dade Transportation Planning Organization



Commuting Trip Destinations

- Commuting levels were highest in **Downtown Miami** and **Miami Beach**.
- Dense, mixed-use areas with extensive bike networks support commuting.
- Upcoming commuting areas in **North Miami Beach** and **Doral** could be supported by further investment.
- Overall, **11.7%** of all STRAVA Metro bicycle trips were commutes.

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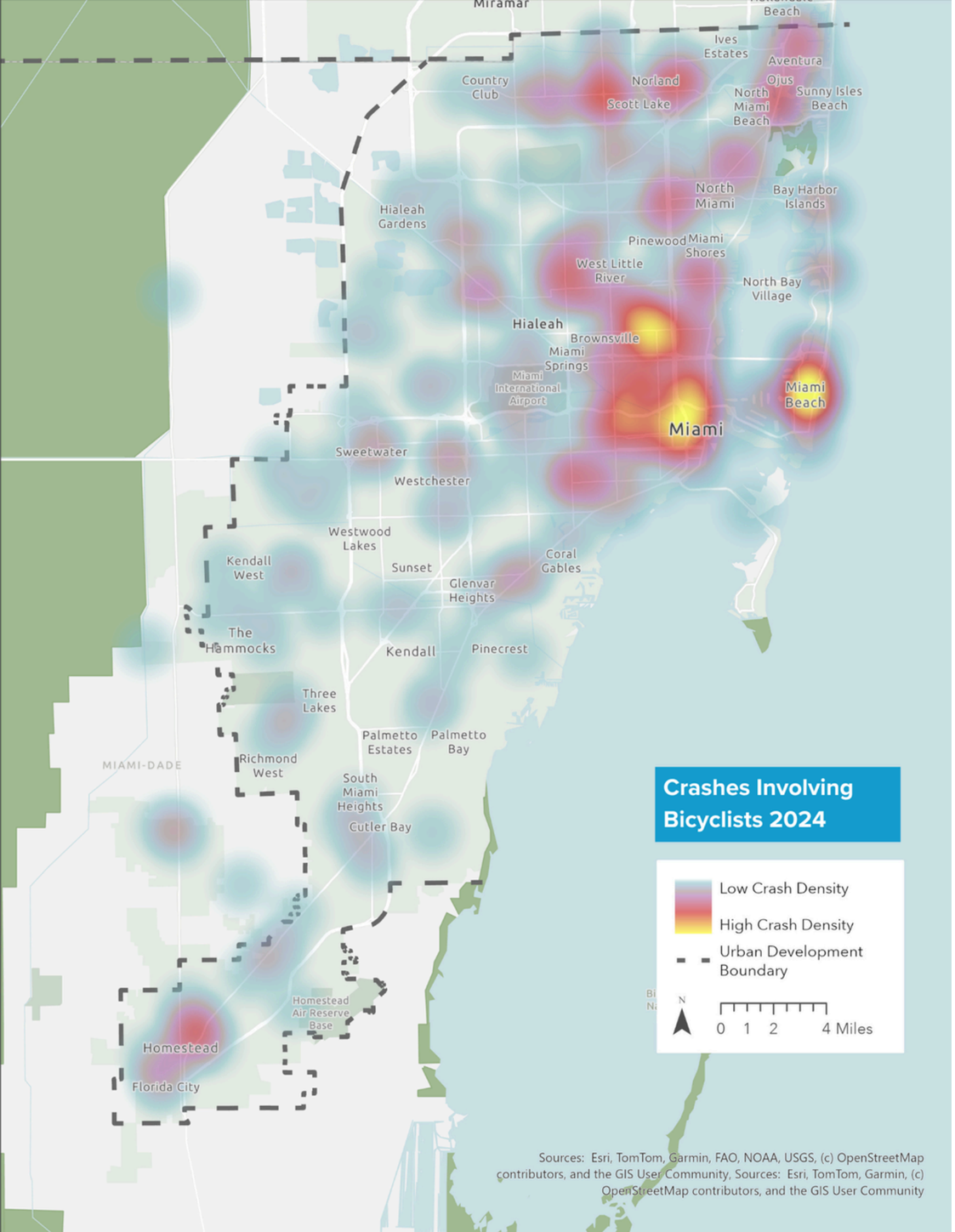
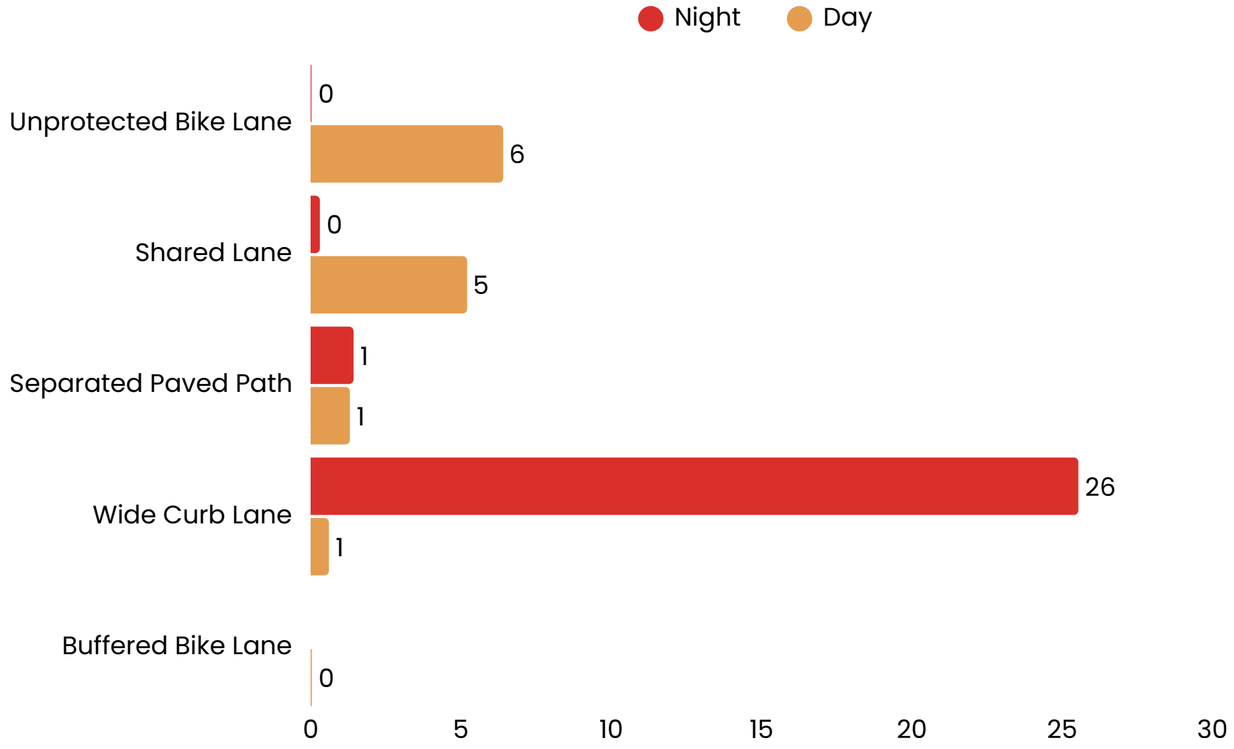


Crashes involving Bicyclists

Bicycle Crashes per 1,000 Trip-Miles by Facility Type (2024)



Source: STRAVA Metro
SFRPC Analysis
Signal 4 Analytics

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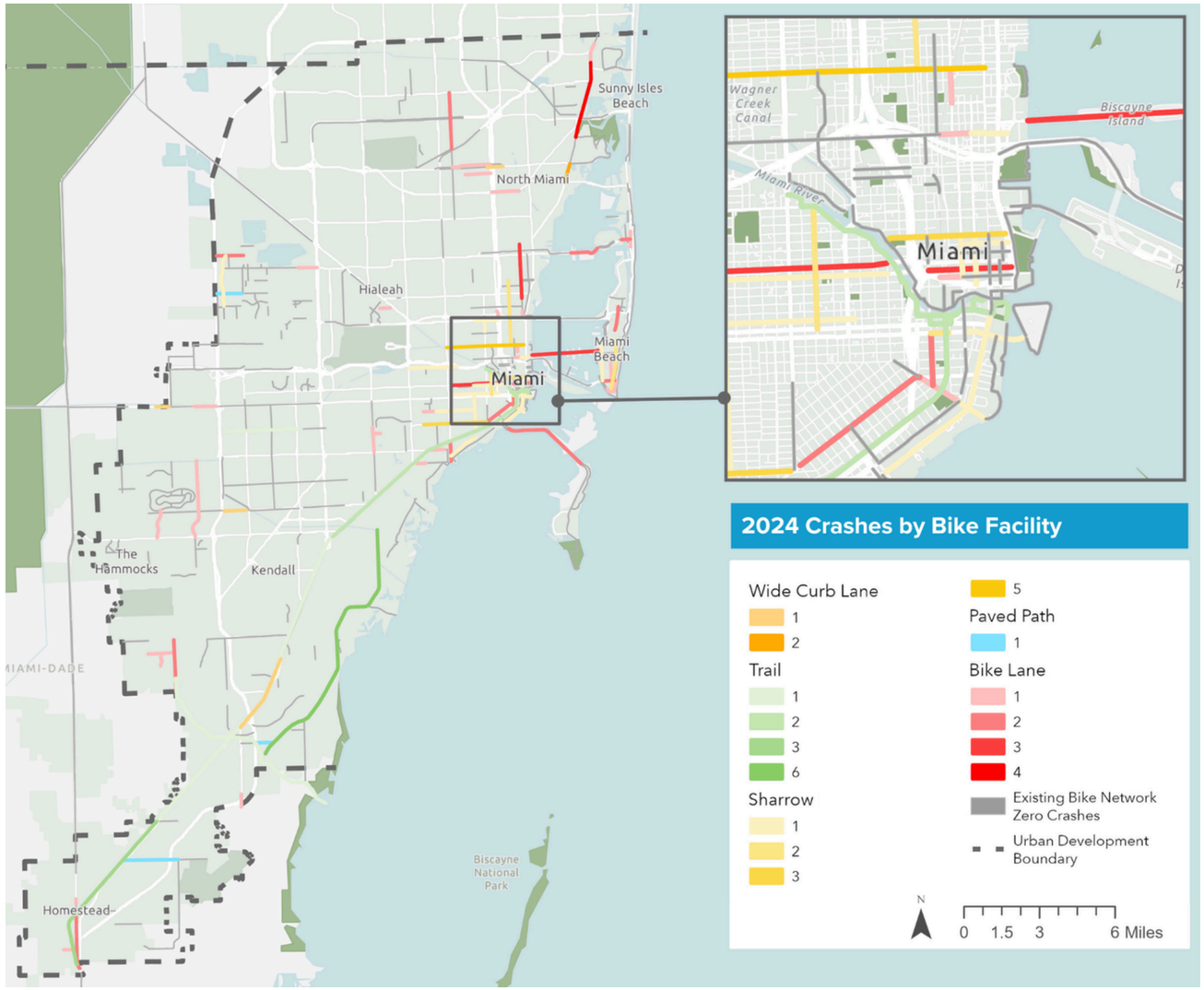
Key Safety Insights



Buffered Bike Lanes

- Lowest daytime crash rate: **0.25 per 1,000 trip-miles**
- No crashes reported at night
- Suggests high protection and visibility

Wide Curb Lanes

- Daytime crash rate: **0.56 per 1,000 trip-miles**
- Nighttime crash rate: **25.54 (45× higher) per 1,000 trip-miles**
- Indicates high vulnerability under low visibility

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Key Safety Insights (continued)

Separated Paved Paths

- Daytime crash rate: **1.29 per 1,000 trip-miles**
- Nighttime crash rate: **1.42 per 1,000 trip-miles**
- Consistent safety due to separation from traffic

Shared Roads

- Daytime crash rate: **5.18 per 1,000 trip-miles**
- Nighttime crash rate: **0.30 per 1,000 trip-miles**
- Risk drops at night, possibly due to lower volumes

Unprotected Bike Lanes

- Highest daytime crash rate: **6.41 per 1,000 trip-miles**
- Nighttime crash rate: **0.02 per 1,000 trip-miles**
- May reflect low ridership or underreporting at night

Thank you!

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Evaluation of Midblock Pedestrian Signals (MPS)

BED26 TWO 977-12

Principal Investigator:
Mohamed Abdel-Aty, PhD, PE

Project Manager:
Mariano Amicarelli, PE

Different Mid-block Pedestrian Signals

Mid-block Pedestrian Signals (MPS)

Rectangular Rapid Flashing Beacon (RRFB)

Pedestrian Hybrid Beacon (PHB)

Flashing Beacon

Midblock Pedestrian Signals (MPS)

- ✓ FDOT has recently introduced a new mid-block signal system known as the Mid-block Pedestrian Signal (MPS), starting its implementation in late 2022.
- ✓ Its implementation is still in the early stages, with 14 locations currently using this system across Florida.
- ✓ While the MPS shares some similarities with the PHB, it differs notably in signal phase management.
- ✓ Unlike the PHB, which remains dark when not activated, the MPS continuously displays a green light, operating like a standard traffic signal.
- ✓ Upon activation, the MPS transitions to a solid yellow light (instead of the flashing yellow seen in PHBs), followed by a solid red light, and finally a flashing red light.
- ✓ In this way, the MPS integrates features of both PHBs and traditional traffic signals

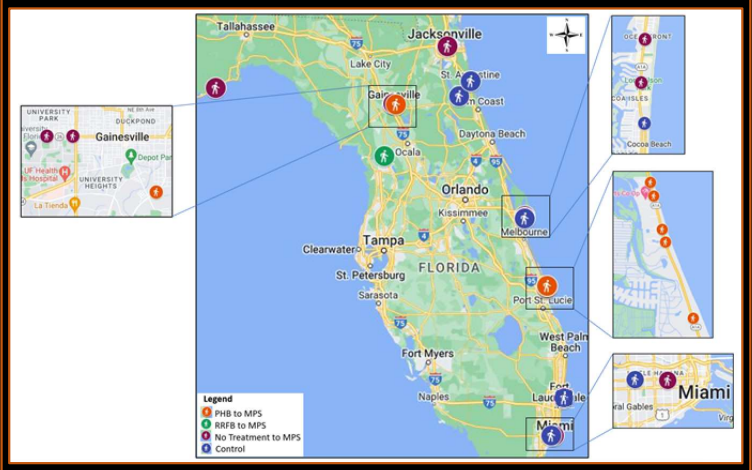
Mid-block Pedestrian Signals (MPS)

Project Objectives

- ✓ Conduct a comprehensive evaluation of the effectiveness of newly implemented Midblock Pedestrian Signals (MPSs).

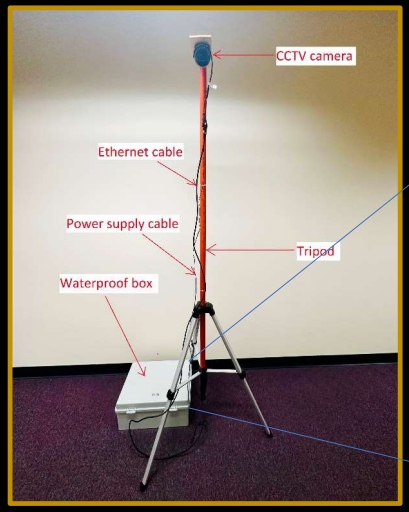
Data Collection

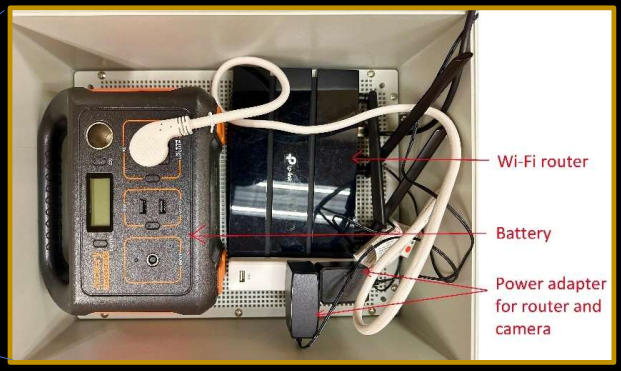
Study locations



- ✓ Data were collected from **19 locations** across Florida including 5 reference sites
- ✓ Collected about **700 hours** of video data, captured vehicle-pedestrian interactions.
- ✓ Recordings were conducted for 10-12 hours per day, including one weekday and one weekend, both before and after MPS installation, covering the period from morning to evening

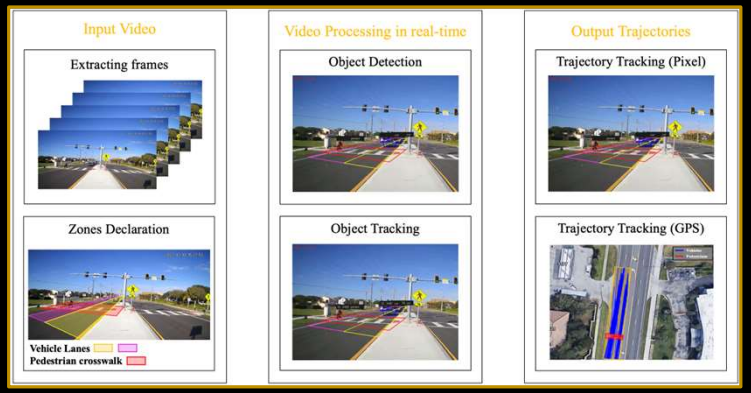
Data collection using CCTV camera



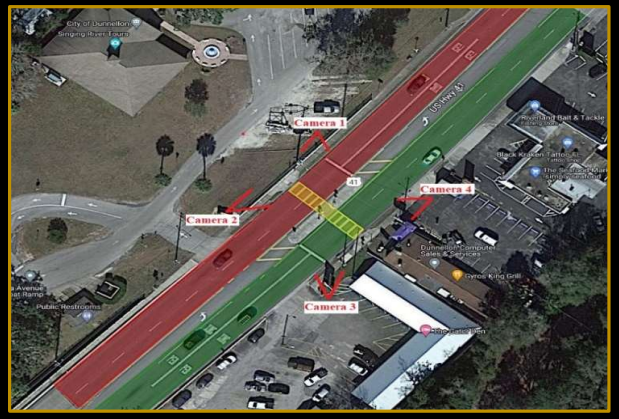


- ✓ For video data collection, we have developed a portable CCTV camera setup that is both easy to deploy and cost-effective

Data Processing



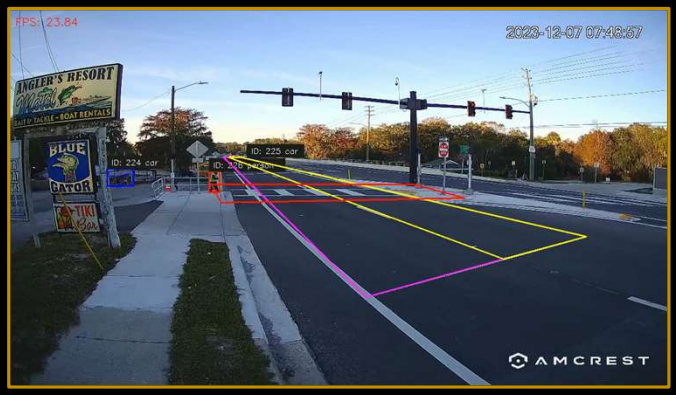
- ✓ State-of-the-art computer vision technology was employed for processing
- ✓ **RT-DETR** model for detection and the **ByteTrack** algorithm for tracking were used
- ✓ The transformed **trajectories** with GPS points were used to calculate speed, heading, and other variables required for the study



Different camera position with defined area

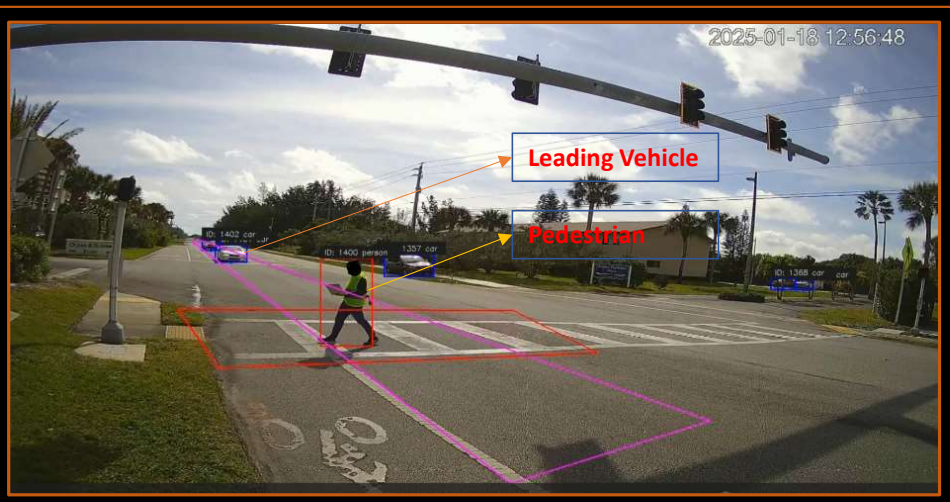
Trajectory of pedestrians (red) and vehicles (green)

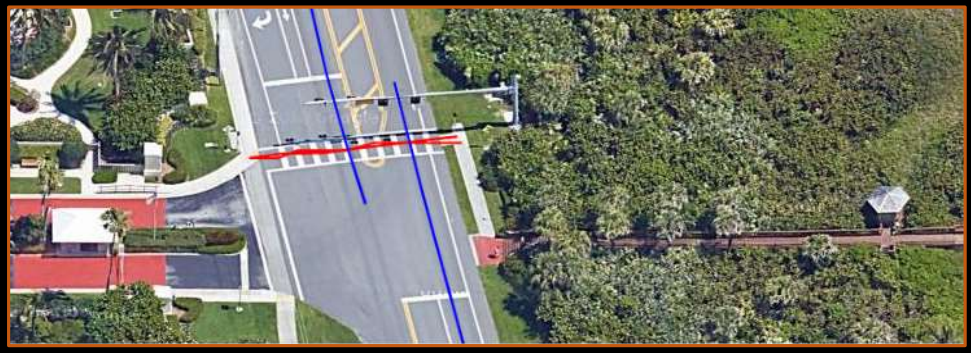
Sample captured video from a camera



Automated object detection and tracking model

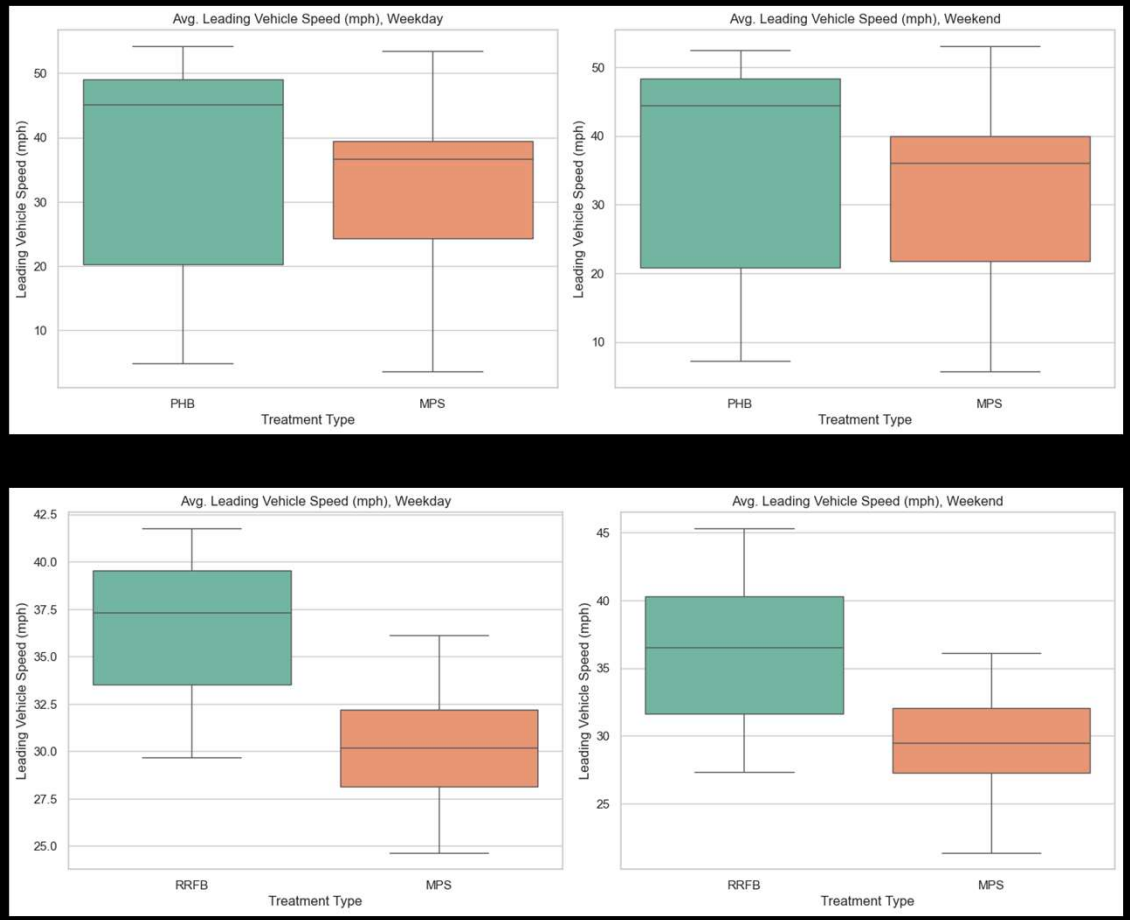
Data Processing for SSMs (cont.)





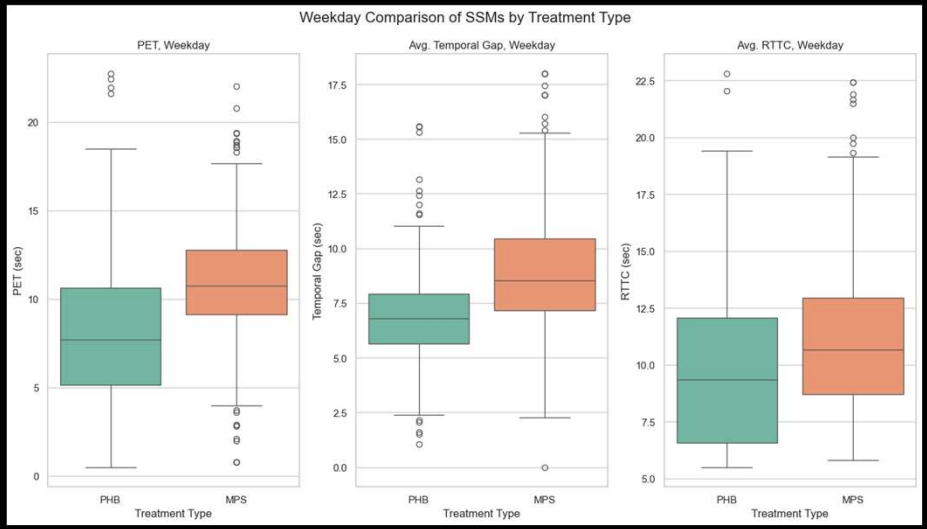
Leading vehicle speed

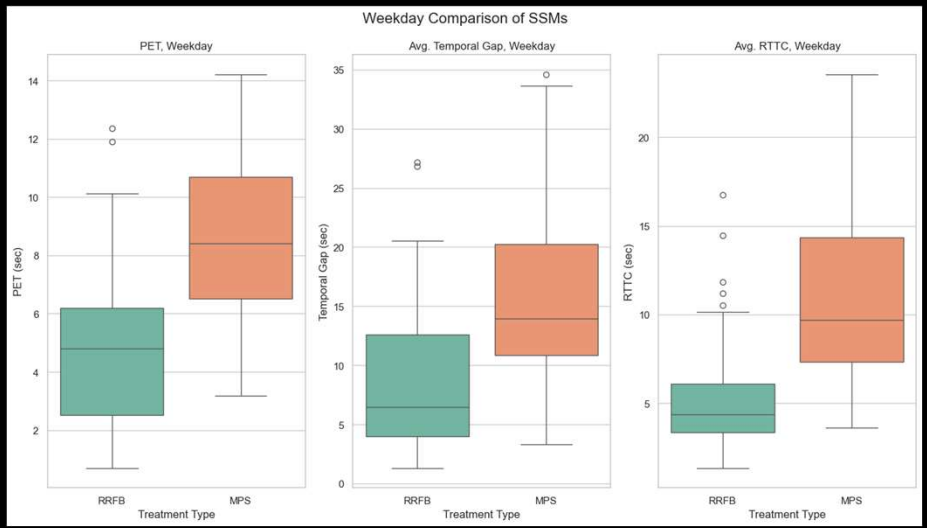
- ✓ Before MPS installation, the average speed of leading vehicles that first interacted with pedestrians exceeded the speed limit — 45 mph at PHB sites and 35 mph at RRFB sites.
- ✓ After MPS installation, these speeds dropped below the posted limits, indicating improved compliance.
- ✓ MPS is more effective in maintaining vehicle speeds within legal limits, thereby enhancing pedestrian safety.



Surrogate Safety Measures (SSMs)

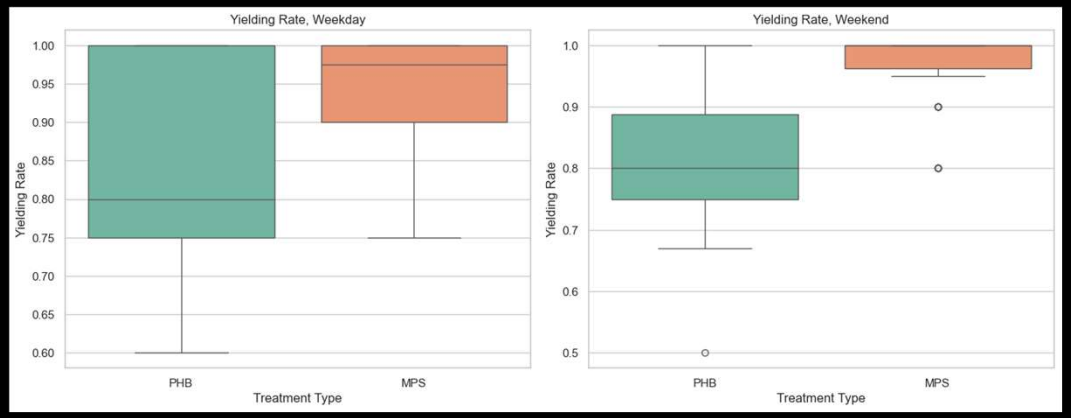
- ✓ Analysis revealed that, for both weekdays and weekends, the MPSs, which were previously controlled by PHB/RRFB/uncontrolled, have higher values of the SSM.
- ✓ This implies that MPS provides greater safety margins and enhances pedestrian safety by allowing more time and space for vehicles to respond to pedestrians.

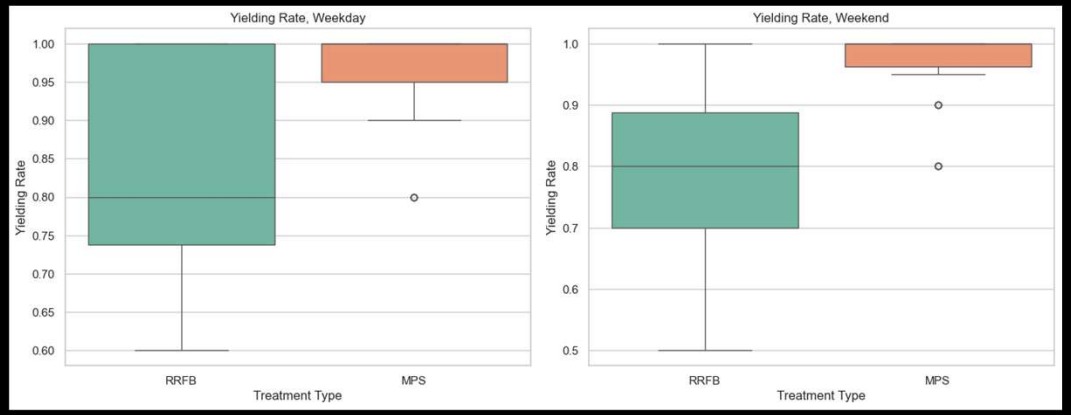




Driver yielding behavior

- ✓ Driver yielding rate for at MPS sites is consistently higher and more stable, with an average 0.97 and minimal variation, indicating that most drivers yield almost all the time when encountering an MPS.
- ✓ In contrast, the PHB and RRFB show a much wider range of yielding rates, with an average of 0.84 and 0.81, respectively.





Results (CoMF)

Conflict Modification Factors (CoMFs) of MPSs based on different methods and control groups

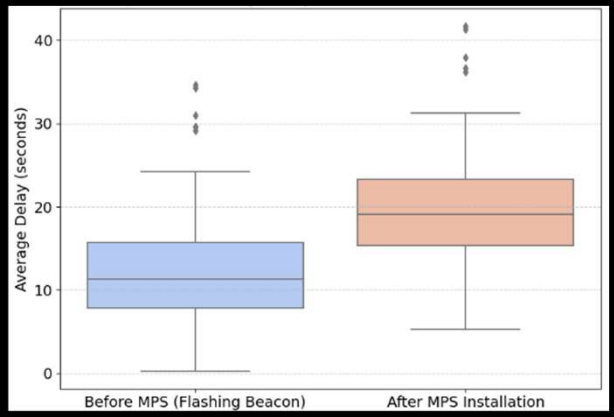
Conflict Type	CoMF (std. error) of MPSs based on different reference groups										
	Empirical Bayes				Comparison Group			Cross Sectional			
	All	PHBs, RRFB	PHBs	RRFB	PHBs and RRFB	PHBs	RRFB	All	PHBs, RRFB	PHBs	RRFB
Serious	0.55 (0.03)	0.67 (0.07)	0.73 (0.04)	0.53 (0.06)	0.62 (0.13)	0.67 (0.16)	0.45 (0.17)	0.55 (0.01)	0.68 (0.06)	0.74 (0.02)	0.54 (0.07)
Serious+ Moderate	0.52 (0.04)	0.62 (0.03)	0.67 (0.03)	0.46 (0.02)	0.63 (0.09)	0.69 (0.11)	0.47 (0.12)	0.50 (0.09)	0.49 (0.03)	0.64 (0.08)	0.47 (0.09)

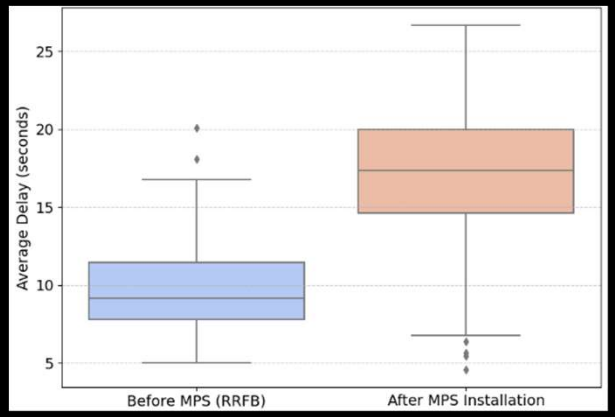
*All: PHB, RRFB and uncontrolled combined

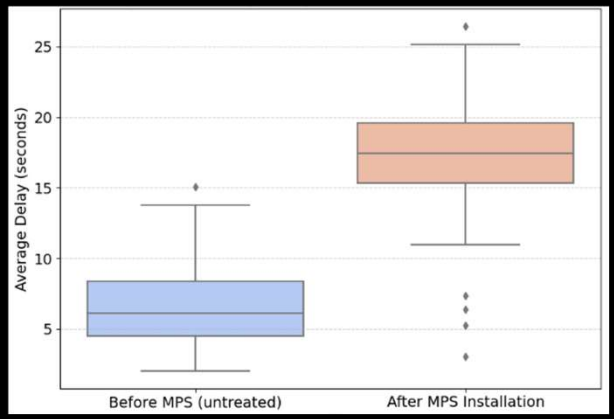
- ✓ Across all control groups and methods, MPSs demonstrated consistent reductions in serious and moderate conflicts.
- ✓ Notably, when compared to PHBs which share similar functionalities but differ in signal phase management; MPSs provided additional safety benefits by reducing both serious and total conflicts.
- ✓ Compared to PHBs, MPSs reduced serious and total conflicts by up to 33% and 35%, respectively.

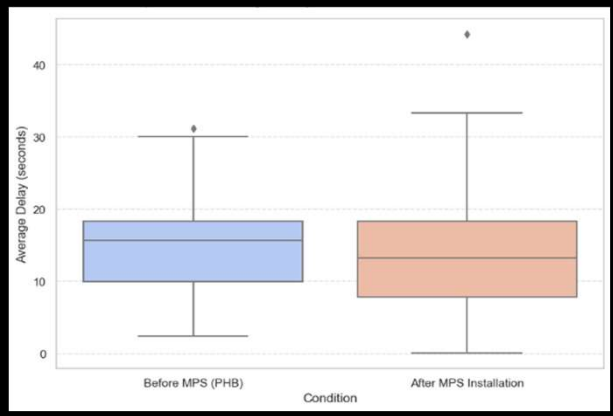
Vehicle Delay

- ✓ Vehicle delays at MPS locations are higher compared to Flashing Beacon, RRFB, and untreated sites.
- ✓ Delay after MPS installation is slightly lower and more concentrated compared to PHB.









Results (DMF)

Delay Modification Factors (DMFs) of MPSs based on different methods and control groups

Reference Group	DMF (std. error) of MPSs		
	Empirical Bayes	Comparison Group	Cross Sectional
All	0.98 (0.06)	1.01 (0.11)	1.02 (0.05)
PHBs, RRFB	1.02 (0.04)	1.03 (0.10)	1.03 (0.06)
PHBs	0.95 (0.03)	0.93 (0.08)	0.94 (0.04)
RRFB	1.08 (0.04)	1.11 (0.09)	1.14 (0.08)

*All: PHB, RRFB and uncontrolled combined

- ✓ Findings from all three methods (EB, CG, and CS) indicate that when considering all reference sites together and comparing MPSs to PHBs, RRFBs, and Flashing Beacons, MPSs do not lead to significant delay improvements.
- ✓ MPSs do not reduce vehicle delays compared to RRFBs and Flashing Beacons; MPSs lead to 8% to 14% more delay.
- ✓ The study found that compared to PHBs, MPSs reduced vehicle delays by 5% to 7%.

Rear-End Conflicts

- ✓ Analyzed vehicle–vehicle rear-end conflicts at two sites transitioned from PHB to MPS, two sites transitioned from untreated to MPS, one site transitioned from a RRFB to MPS.
- ✓ MPS implementation consistently reduced both serious and moderate rear-end conflicts across all treatment transitions.
- ✓ The most notable improvements were observed at sites that transitioned from RRFB and Flashing Beacon and from untreated conditions to MPS.

SSMs	Signal types	Serious conflicts (%)	Moderate conflicts (%)
TTC	PHB	4.8	7.6
	MPS	3.3	4.2
DRAC	PHB	4.1	6.9
	MPS	2.9	4.8
TTC	RRFB and Flashing Beacon	9.3	15.5
	MPS	3.6	5.6
DRAC	RRFB and Flashing Beacon	10.2	14.8
	MPS	3.8	11.7
TTC	Untreated	10.9	15.8
	MPS	2.7	6.1
DRAC	Untreated	9.8	13.8
	MPS	2.5	7.7

Conclusions

- ✓ This study compared the safety performance of MPSs against different reference groups, including PHBs, RRFB, combinations of PHBs, RRFB and Flashing Beacon.
- ✓ Across all control groups and methodologies, MPSs demonstrated consistent reductions in serious and moderate pedestrian-vehicle conflicts.
- ✓ MPSs do not reduce vehicle delays compared to RRFBs and Flashing Beacons. However, when comparing MPSs to PHBs, the study found that MPSs reduced vehicle delays by 5% to 7% compared to PHB.
- ✓ MPS implementation consistently reduced both serious and moderate rear-end conflicts across all treatment transitions.
- ✓ Both driver yielding and pedestrian compliance rate were improved significantly after MPS implementation.

Recommendations

✓ Replace PHBs with MPSs:

- Due to improved safety, operational efficiency, and lower implementation costs, it is recommended to replace all PHBs with MPSs.

✓ Replace RRFBs with MPSs:

- For locations with more than 2 lanes and high pedestrian activity, it is advised to upgrade RRFBs to MPSs and convert uncontrolled sites to MPSs.

✓ Low-Risk Locations:

- Sites with fewer lanes, lower speed limits, and low pedestrian volumes may retain RRFBs or upgrade uncontrolled sites to RRFBs, depending on context.

✓ Driver Education

- Many drivers are unfamiliar with the flashing red phase of MPS: Some fail to yield to pedestrians. Others stop unnecessarily even when no pedestrians are present.

✓ Visibility Issues at RRFBs

- On sunny days, flashing LED lights at RRFBs are often hard to see, leading to driver confusion or intentional non-compliance.

Project Benefits

Qualitative Results

- ✓ MPSs demonstrated consistent reductions in serious and moderate pedestrian-vehicle conflicts
- ✓ MPSs reduce vehicle delays compared to PHB.
- ✓ MPSs consistently reduced both serious and moderate rear-end conflicts.
- ✓ Vehicle yielding rate increased compared to other signal system.
- ✓ Almost all pedestrian follow signal rules and cross after activating the signal.

Quantitative Results

- ✓ MPSs consistently reduced both serious and total pedestrian-vehicle conflicts above 50% compared to RRFB; and compared to PHB reduced serious and total conflicts by up to 33% and 35%, respectively.
- ✓ MPSs introduce 8% to 14% more delays than RRFBs and Flashing Beacons. Compared to PHBs, MPSs demonstrated improved efficiency, reducing vehicle delays by 5% to 7%.
- ✓ Driver yielding rate at MPS locations was observed to be about 97%.
- ✓ Pedestrian compliance was also above 95%, as most pedestrians followed traffic rules and crossed only after activating the signal.

Research Update
BED31-977-23

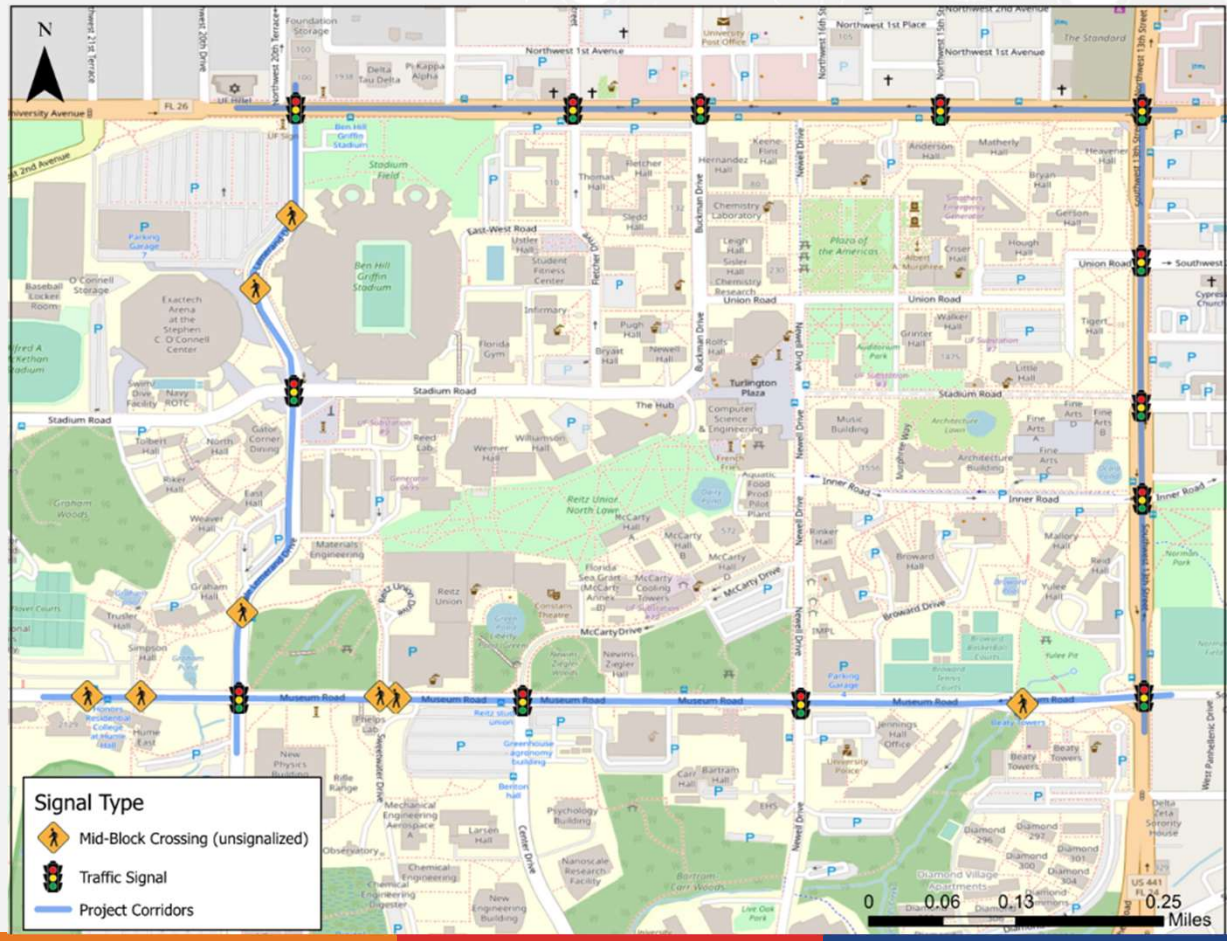
Evaluation of Gainesville Pedestrian-Bicyclists Connected Vehicle Pilot

James Landini, P.E.
TSM&O Program Development Engineer
Traffic Engineering & Operations

2025 STATEWIDE
NON-MOTORIZED TRAFFIC MONITORING
PROGRAM MEETING
September 16 to 18th 2025

Project Background

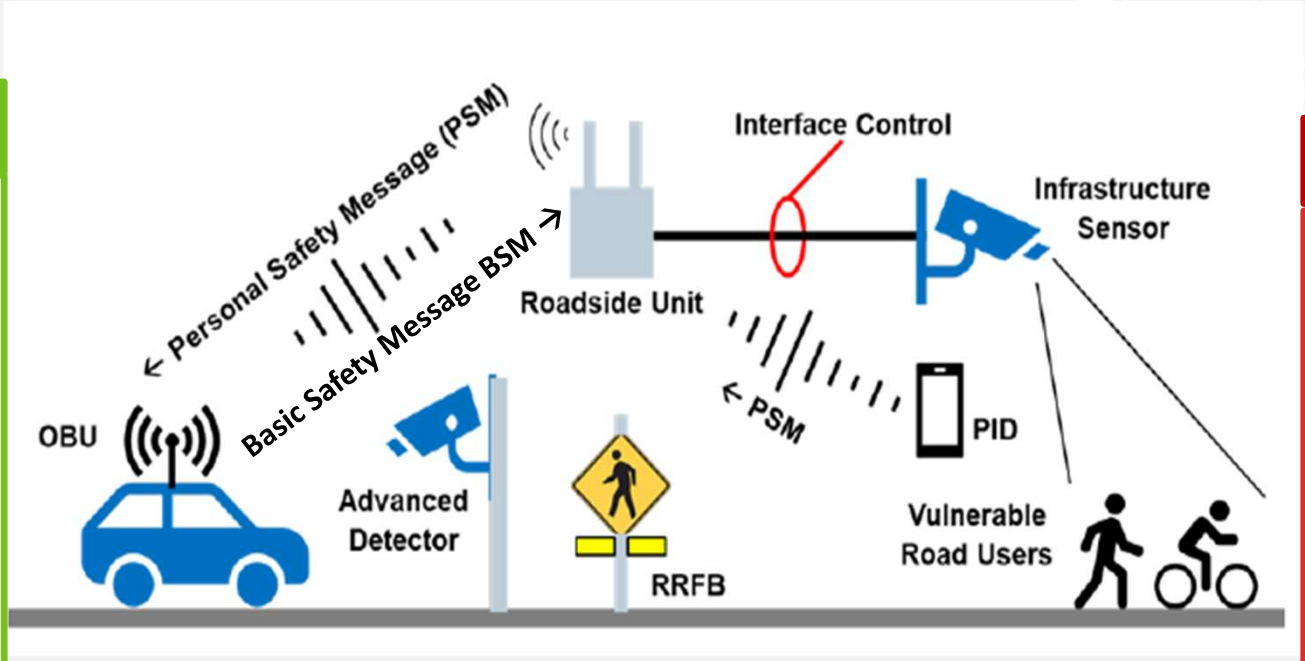
- Funded through FDOT and FHWA's AID program
- **Goal:** Implement connected vehicle and pedestrian/bicyclist safety applications
- **Original Scope**: 13 signalized intersections and 8 mid-block locations.
- In and around the University of Florida Campus



Concept of Operations

BSM Data

- Message Count and ID
- Time
- Location
  - Latitude,
  - Longitude
  - Elevation
- Speed
- Heading
- Steering Wheel Angle
- Acceleration
- Vehicle Size



PSM Data

- Message Count and ID
- Time
- Device User Type
  - Pedestrian
  - Bicyclist
  - Road Worker
- Location
  - Latitude,
  - Longitude
  - Elevation
- Speed
- Heading

Research

- ✓ Task 1 - Evaluation of Hardware and Software for Passive Pedestrian Detection
- ✓ Task 2 - Evaluation of Hardware and Software for the Smartphone Application
- ✓ Task 3 - Behavioral Observation (Based Evaluations through Focus Groups, Participant Experiments, and Surveys)
- ✓ Task 4 - Field Observation-Based Evaluation via Video Monitoring
- ✓ Task 5 - "After" Data Collection for Network Performance
- ✓ Task 6 - Hardware and Software Platform
- ➔ Task 7 – Evaluating the effects of the deployment
- ✘ Task 8 - Draft Final and Closeout Teleconference
- ✘ Task 9 - Final Report

LEGEND

✓ Completed

➔ Under Review

✘ Not yet submitted

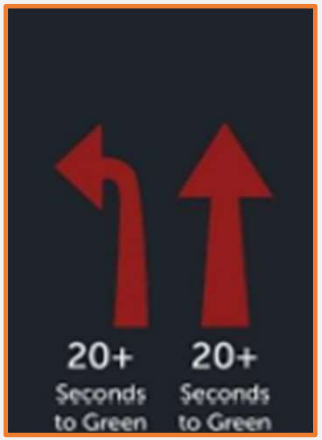
Videos and Images (Ped Warning)

OBU Video Pedestrian Warning

Phone App Images

Videos and Images (Signal Phase and Timing)

OBU Video – SPaT Countdown



Phone App Image

Thank you and Safety Message

James Landini, P.E.
TSM&O Program Development Engineer
Traffic Engineering & Operations

InNovo
Engineering, Technology Solutions, & Planning

Computer Vision – Non-Motorized Video Analysis and Evaluation

Statewide Non-Motorized Traffic Monitoring Meeting 2025

Agenda

Introduction to Computer Vision

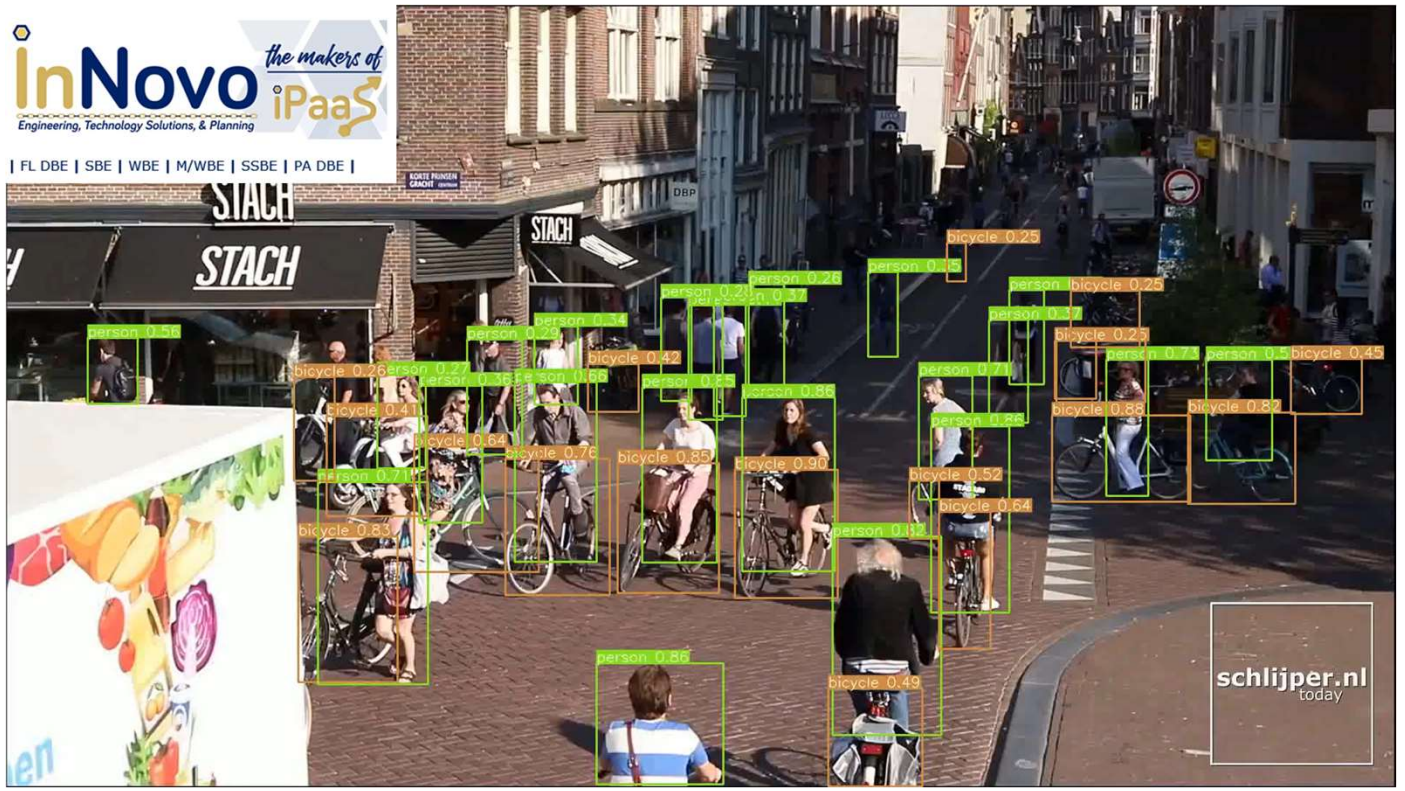
Computer Vision as a Tool

Project Purpose & Overview

Conclusions & Findings

Introduction to Computer Vision

- Introduction to Computer Vision
- Computer Vision as a Tool
- Project Purpose & Overview
- Conclusions & Findings



Project Purpose & Goal

- Introduction to Computer Vision
- Computer Vision as a Tool
- Project Purpose & Overview
- Conclusions & Findings

Purpose 1: To provide the FDOT with an unbiased evaluation of a vendor system that provide trail counts for pedestrians and bicyclists using computer vision.

Purpose 2: To analyze pedestrian and bicycle movements using computer vision and JTA transit locations.

Goal: To support FDOT's determination for implementing AI at Traffic Monitoring Sites and prove best practices for camera selection, placement, installation, and operation for future implementation of computer vision and AI solutions.

Project Site Locations

- Introduction to Computer Vision
- Computer Vision as a Tool
- Project Purpose & Overview
- Conclusions & Findings

Transit Station Sites

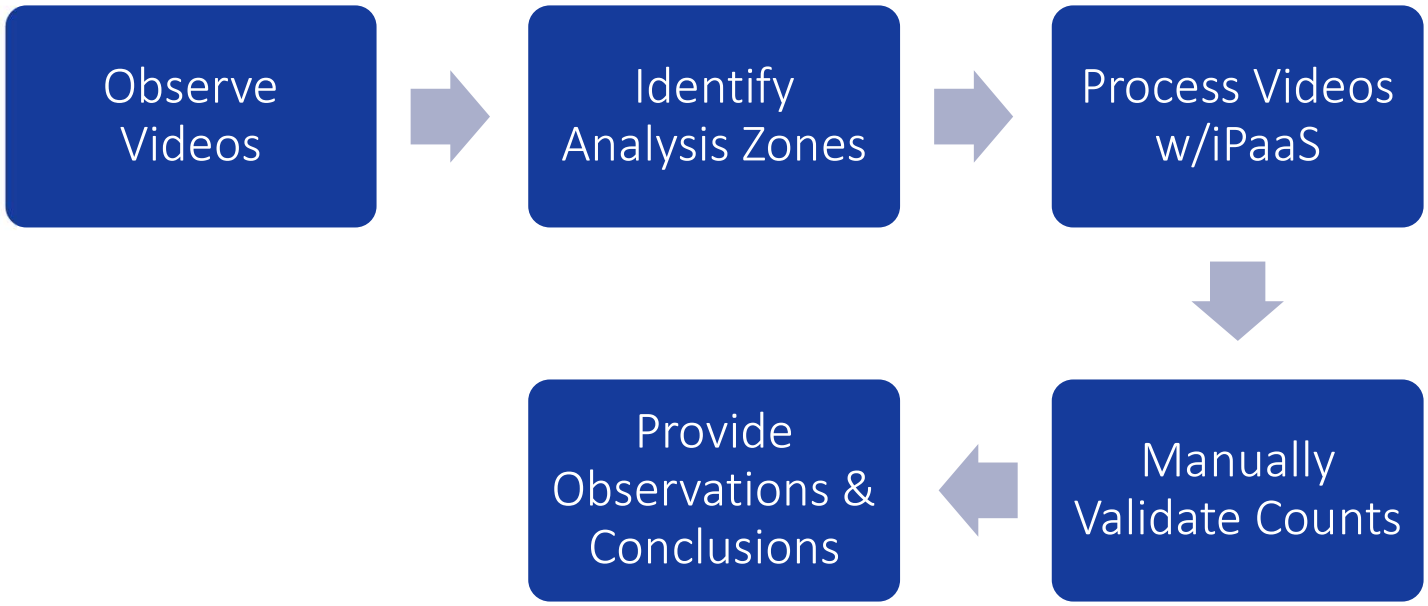
- Gateway Bus Hub (two cameras, facing the bus bays and facing the ticket kiosk).
- Regency Square Hub (two cameras, facing the front and rear of the bus loading zones).
- Rosa Parks Station (two cameras, facing the station entrance across a roadway, and facing crosswalks).
- Soutel Bus Hub (one camera, facing the front of the bus loading zone).

Trail Site

- Baldwin Trail

Project Methodology

- Introduction to Computer Vision
- Computer Vision as a Tool
- Project Purpose & Overview
- Conclusions & Findings



Project Overview – Video Review

- Introduction to Computer Vision
- Computer Vision as a Tool
- Project Purpose & Overview
- Conclusions & Findings

JTA Hub Location	Naming Convention for Provided Videos	Video Length	Cameras Position
Gateway Hub	Video1, Video2, Video3, Video4	24 hours	Multiple
Regency Mall Hub	Video5, Video6, Video7, Video8	24 hours	Multiple
Rosa Parks Station	Video9, Video10, Video11, and Video12	24 hours	Multiple
Soutel Hub	Video13, and Video14	24 hours	Single

Project Overview – Analysis Zone Example

- Introduction to Computer Vision
- Computer Vision as a Tool
- Project Purpose & Overview
- Conclusions & Findings

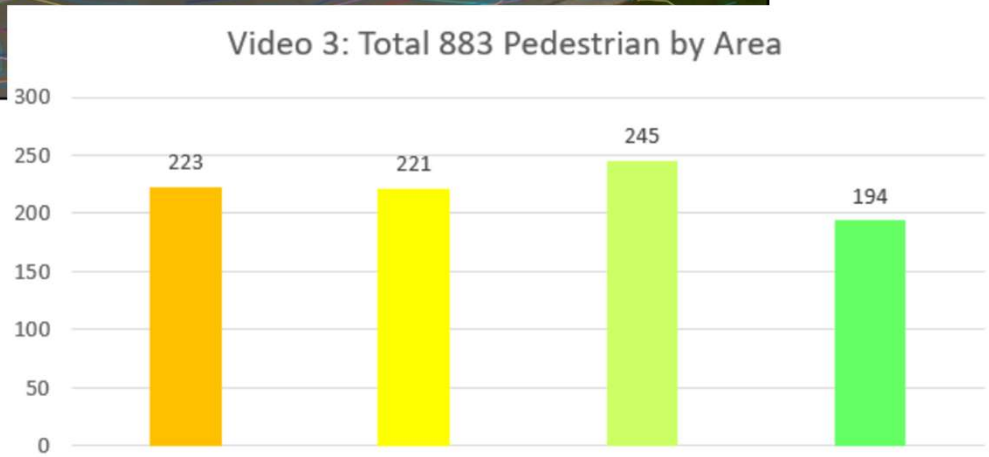
Location 1: Gateway Hub Ticket Kiosk

Location 1: Gateway Hub Bus Bay

InNovo

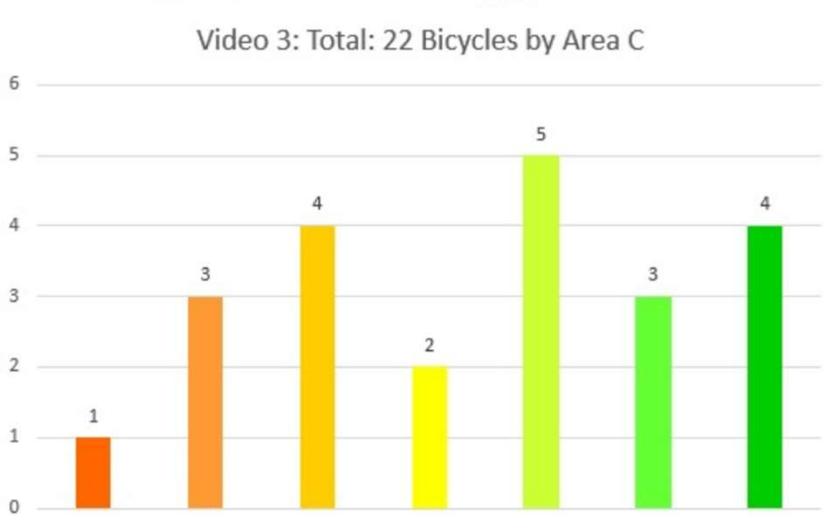
Gateway Hub Video 3 – Pedestrian Volumes

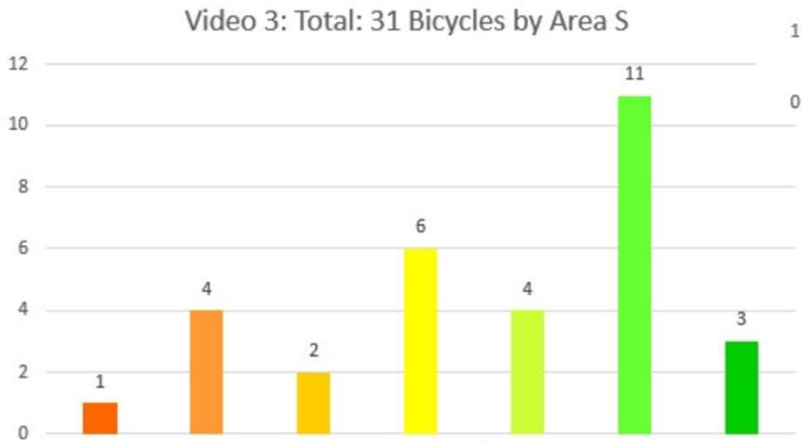
- Introduction to Computer Vision
- Computer Vision as a Tool
- Project Purpose & Overview
- Conclusions & Findings



Gateway Hub Video 3 – Bicycle Volumes

- Introduction to Computer Vision
- Computer Vision as a Tool
- Project Purpose & Overview
- Conclusions & Findings





Gateway Hub Video 3 – Bicycle Validation

- Introduction to Computer Vision
- Computer Vision as a Tool
- Project Purpose & Overview
- Conclusions & Findings

Video 3_0700_1900.mp4 - 2023 - 10 - 05					
Area_S	**Area _C**	**Area _N**	**Area_S**	**Area _C**	**Area _N**
7:36:33	7:36:29	8:33:24	G	G	P
8:13:50	8:13:49	11:45:12	P	P	P
8:59:13	8:33:10	11:53:50	G	G	P
11:45:08	11:45:10	12:33:23	G	G	P
12:33:42	12:33:39	13:48:00	G	G	P
1:59:41	14:08:09	14:08:21	P	P	P
14:52:52	14:52:55	14:09:37	G	G	P
15:12:11	15:12:14	14:25:58	G	G	P
15:15:32	15:15:30	14:50:52	G	G	P
15:42:47	15:42:52	14:42:59	G	G	P
15:53:38	15:53:34	15:12:16	P	P	P
16:05:54	16:05:57	15:15:25	G	G	P
17:12:33	17:12:40	15:42:56	G	G	P
17:41:40	17:42:44	15:53:29	G	G	P
17:42:52	17:43:32	16:05:58	G	G	P

Baldwin Trail Analysis

- Introduction to Computer Vision
- Computer Vision as a Tool
- Project Purpose & Overview
- Conclusions & Findings

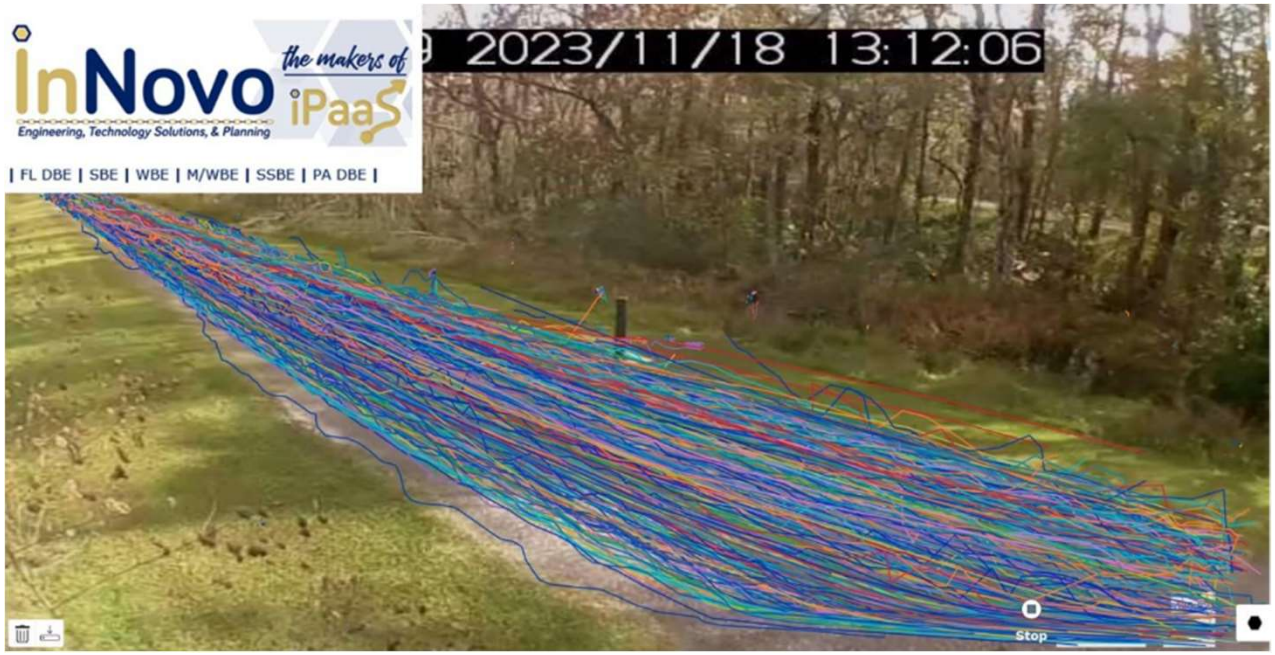
Baldwin Trail Video	Name Convention for Report	Date Recorded	Cameras Position
Video 1	Video 1b	November 15, 2023 12h	Single
Video 2	Video 2b	November 16, 2023 12h	Single
Video 3	Video 3b	November 17, 2023 12h	Single
Video 4	Video 4b	November 18, 2023 12h	Single
Video 5	Video 5b	November 19, 2023 6h	Single

Baldwin Trail Analysis Zones & Trajectory

- Introduction to Computer Vision
- Computer Vision as a Tool
- Project Purpose & Overview
- Conclusions & Findings

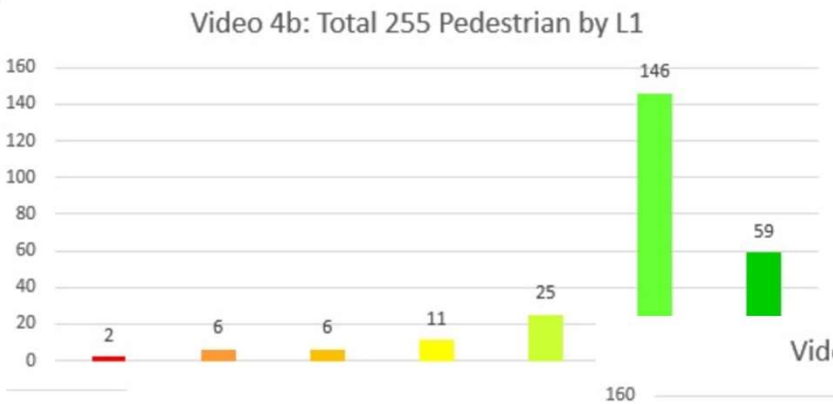
Baldwin Trail Analysis Trajectory

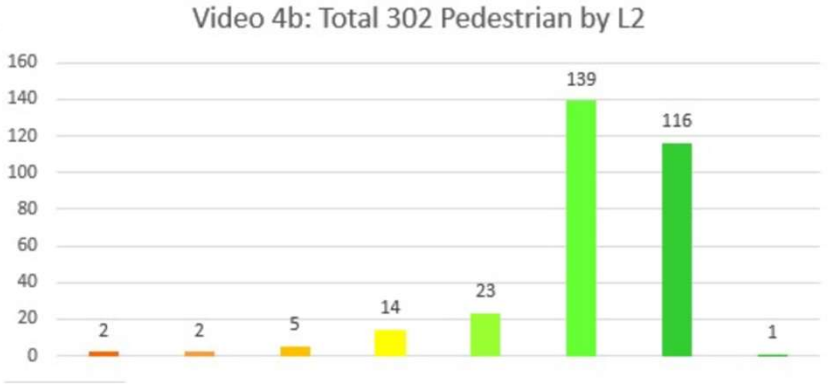
- Introduction to Computer Vision
- Computer Vision as a Tool
- Project Purpose & Overview
- Conclusions & Findings



Baldwin Trail Pedestrian Volume – Video 4b

- Introduction to Computer Vision
- Computer Vision as a Tool
- Project Purpose & Overview
- Conclusions & Findings

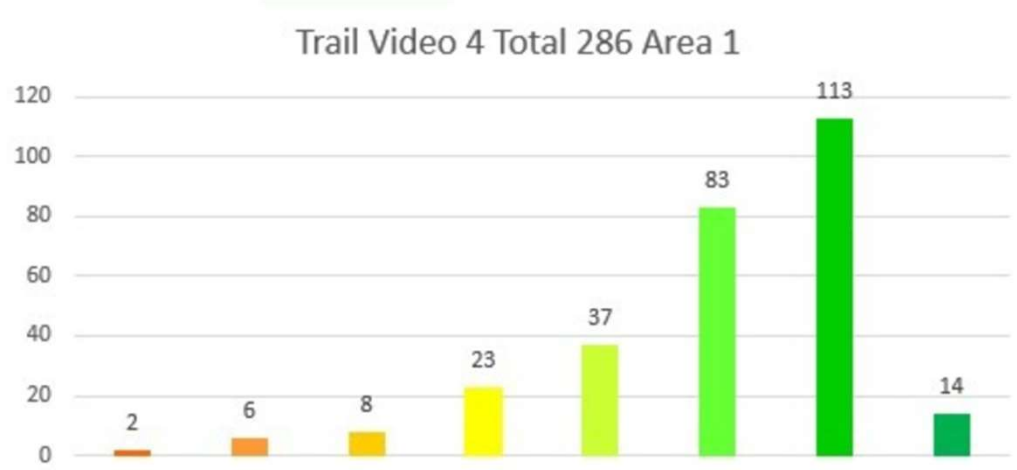




Video	Area1	Area2	L1	L2	L1-M	L2-M	Total Manual
Video4b	492	545	255	302	260	311	571

Baldwin Trail Bicycle Volume – Video 4b

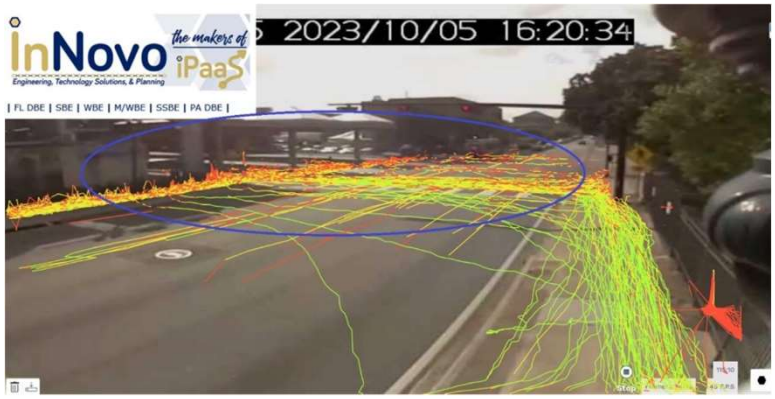
- Introduction to Computer Vision
- Computer Vision as a Tool
- Project Purpose & Overview
- Conclusions & Findings

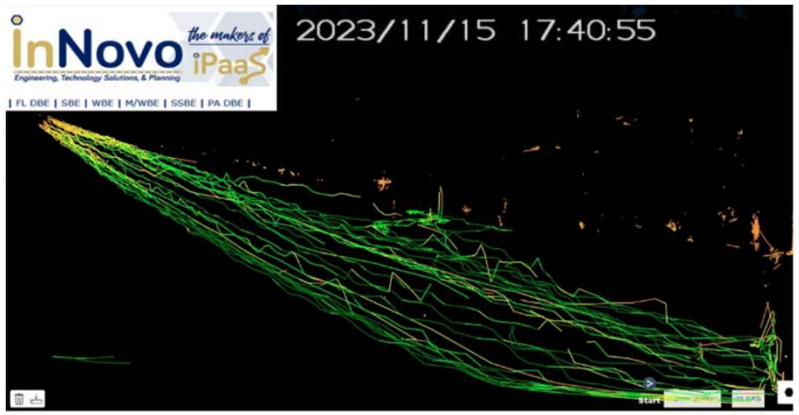


Manual Bicycle Count Validation: 297

Conclusions & Findings - Challenges

- Introduction to Computer Vision
- Computer Vision as a Tool
- Project Purpose & Overview
- Conclusions & Findings





Conclusions & Findings - Recommendations

- Introduction to Computer Vision
- Computer Vision as a Tool
- Project Purpose & Overview
- Conclusions & Findings

- **Average Accuracy of 98% was achieved**
- **Placement:** Locate camera closer to analysis area for better object identification.
- **Field of view:** The placement of the camera and establishing its field as close as possible to the desired analysis area is recommended for good recognition and counting objects.
- **Camera Specification:** 1920x1080 pixel or higher is recommended to improve detection and a higher FPS for better tracking.
- **Camera deployment characteristics:**
  - It is recommended that cameras are mounted with the capability to minimize excessive vibration.
  - To mitigate weather and wear and tear conditions, cameras equipped with self-cleaning mechanisms will allow for uninterrupted computer vision analysis.

Thank you for your time!

Please contact the InNovo team for any questions or follow up:

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Non-motorized traffic monitoring

Redefining
solutions

Content

- TNL / Technolution
- The sensor: FlowCube
  - Test in Tallahassee
- Non-motorized (and motorized) Data insights
  - Traffic data
  - Near misses
- Acting on data:
  - Tactical: Traffic Flow Engine
  - Strategic: MobiMaestro

Technolution / TNL in short

Technolution

1987
Founded in the Netherlands

300
Motivated employees

8.2
Customer satisfaction

75M€
Revenue

Offices and projects in EU and US

Certifications

ISO 9001
Quality

ISO 27001
Information security

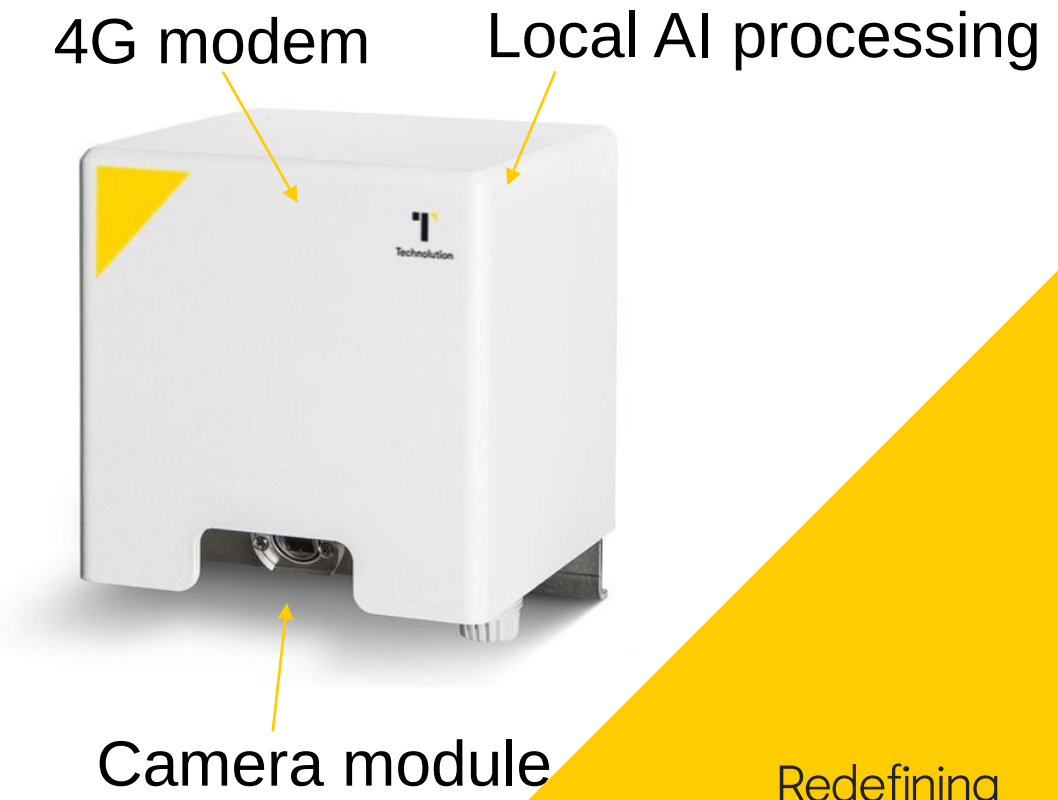
ISO 14001
Environment

CO_2
Performance ladder 5

The sensor: FlowCube

- **Measures**
  - Traffic volume
  - Pedestrians, Cyclists, Cars, Trucks, Buses etc.
  - Route statistics and travel time

- **Applications**
  - Advanced multi-modality traffic and route data
  - Live optimization (strategic and tactical)
  - Safety (Near miss) data



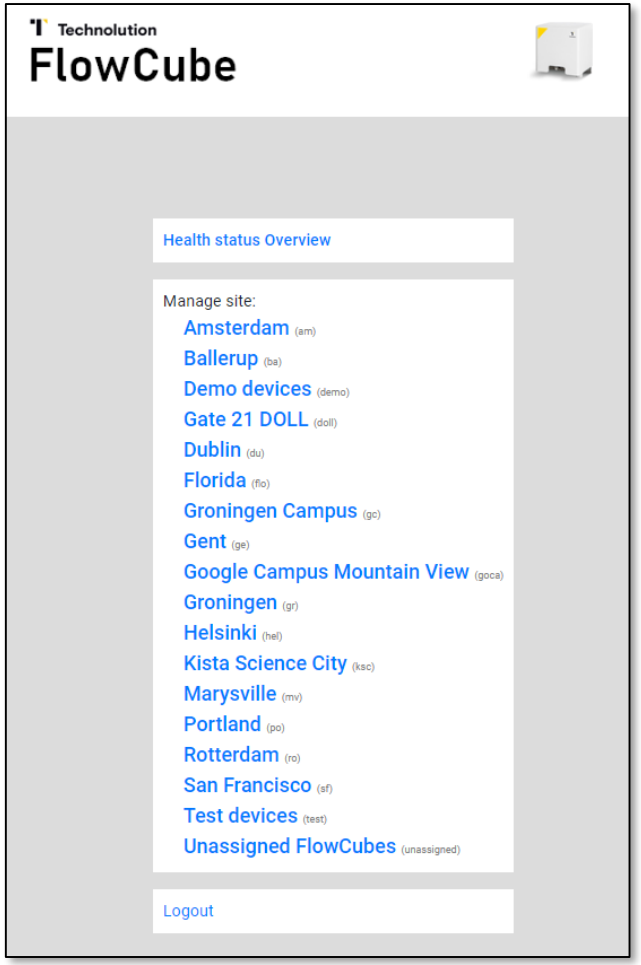
Technolution

Redefining **solutions**

FlowCube locations

In operation or finished:

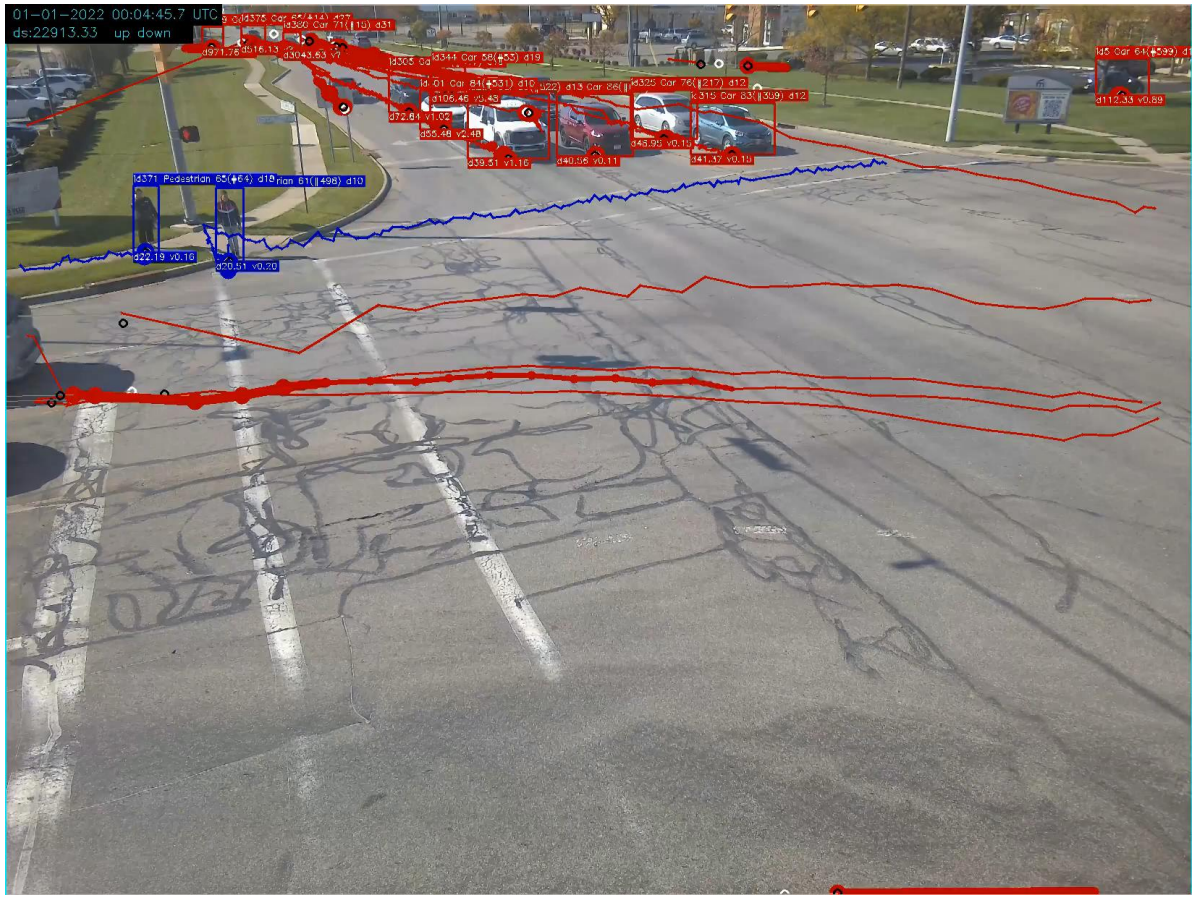
- Groningen (NL)
- Rotterdam (NL)
- Amsterdam (NL)
- Campus University Groningen (NL)
- San Francisco (USA)
- Ballerup (DK)
- Brugge / Gent (B)
- Portland (OR)
- Glostrup DOLL Living Lab (DK)
- Kista (SE)
- Marysville (OH)
- Dublin (OH)
- Helsinki (FI)
- Tallahassee (FL)



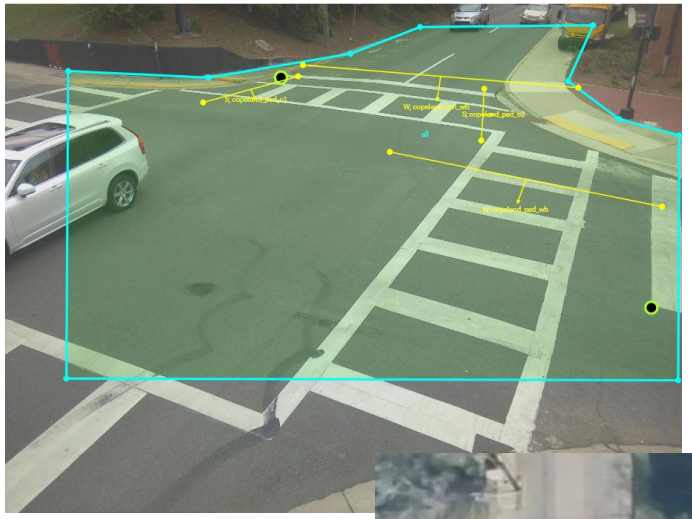
Vision AI at Technolution

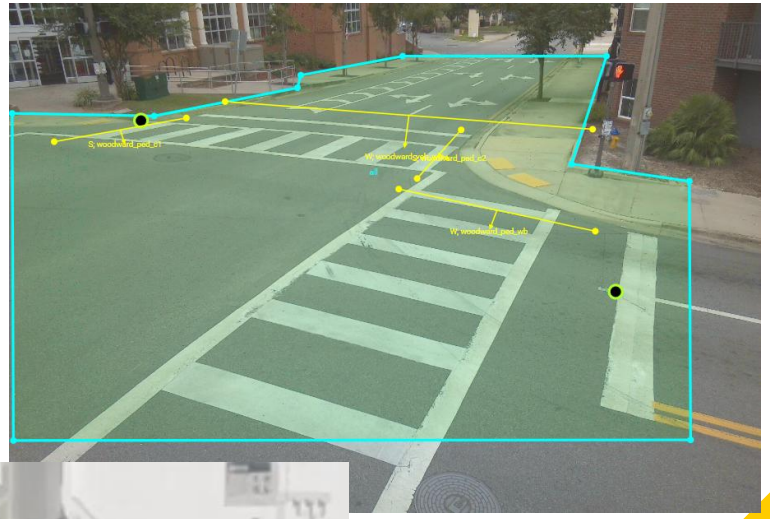
Technolution

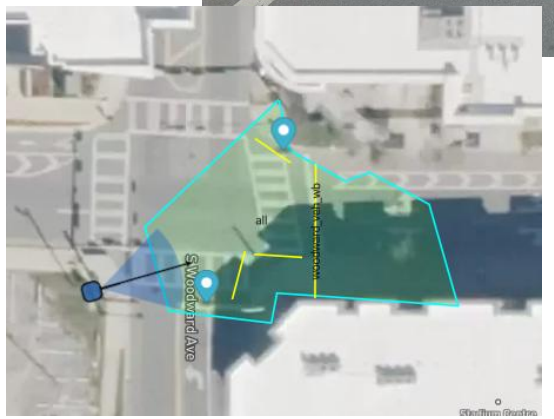
FlowCube



Test in Tallahassee







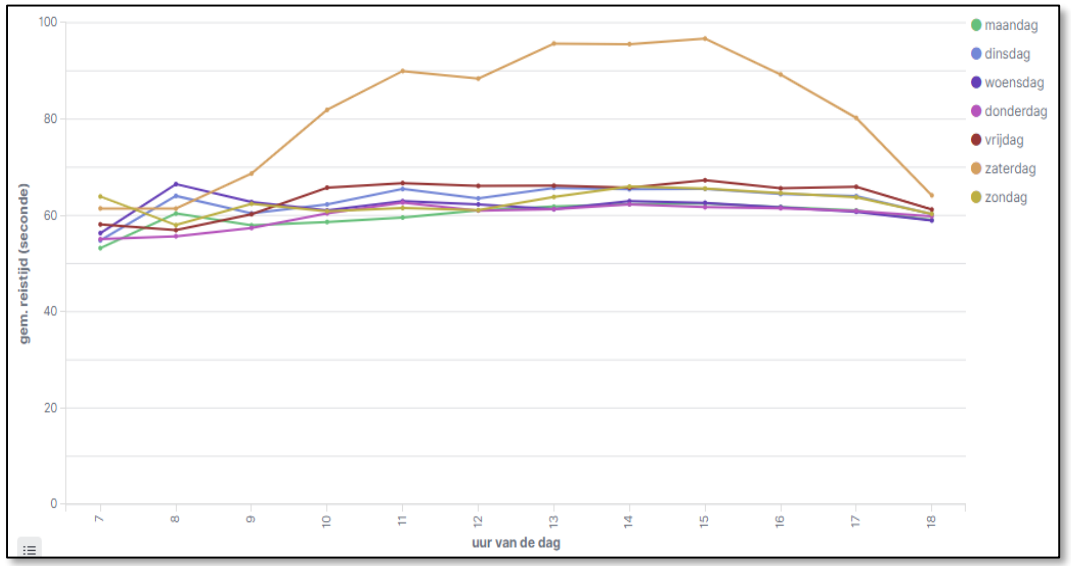
Technolution

Redefining
solutions

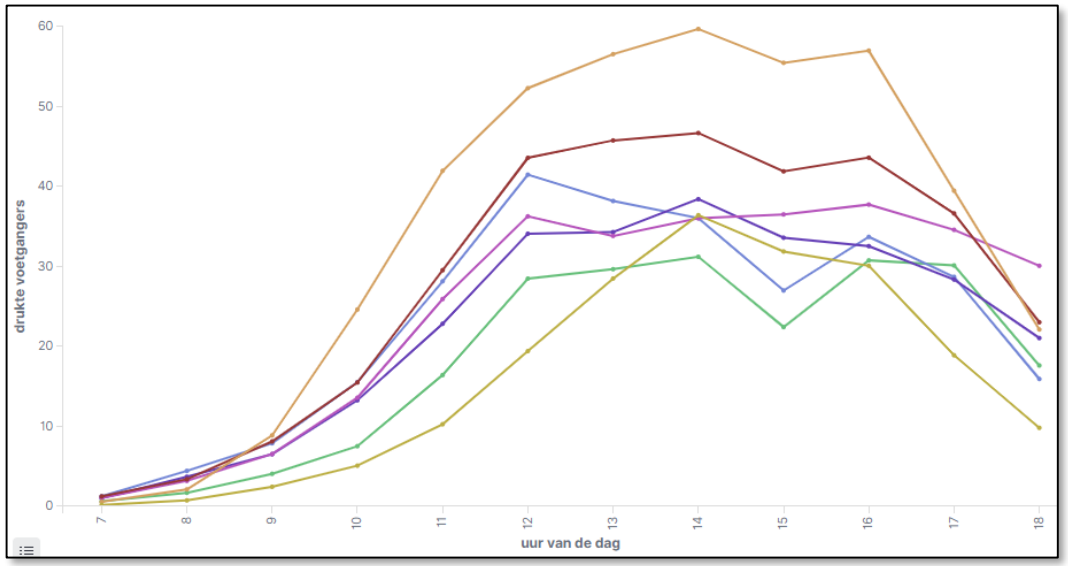
Traffic data: Analysis from Groningen

Technolution

Journey tJourney times cyclists

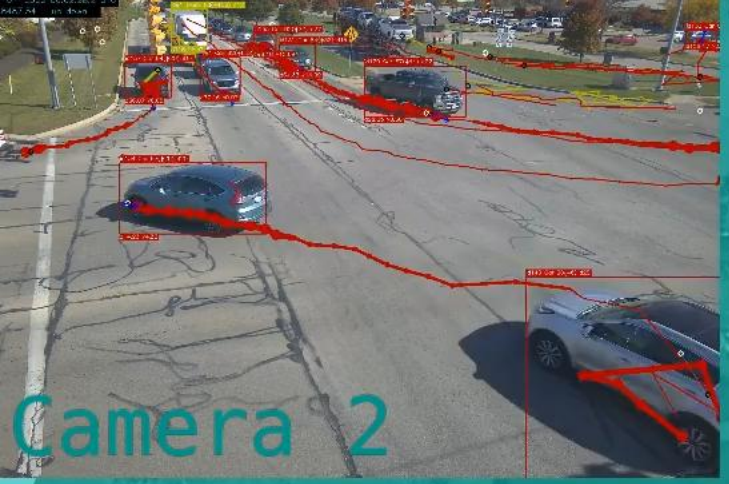


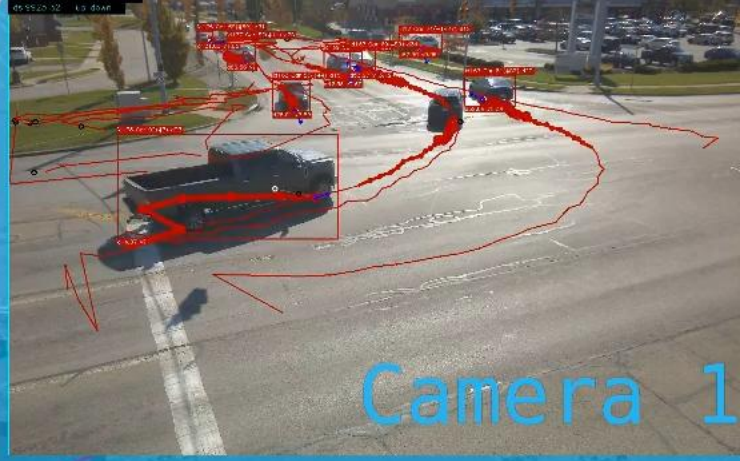
Correlated to pedestrians

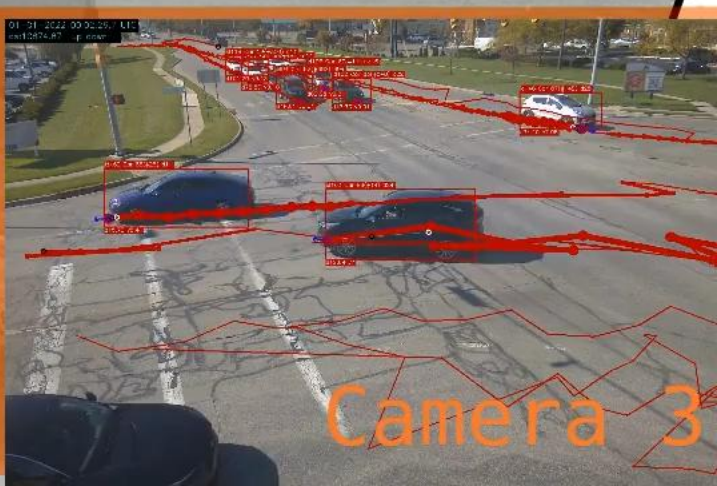


➔ The number of pedestrians on Saturday leads to 50% longer journey times for bikes.

Near Miss detection







Near-Miss

Tactical: MobiMaestro FLOW + FlowCube

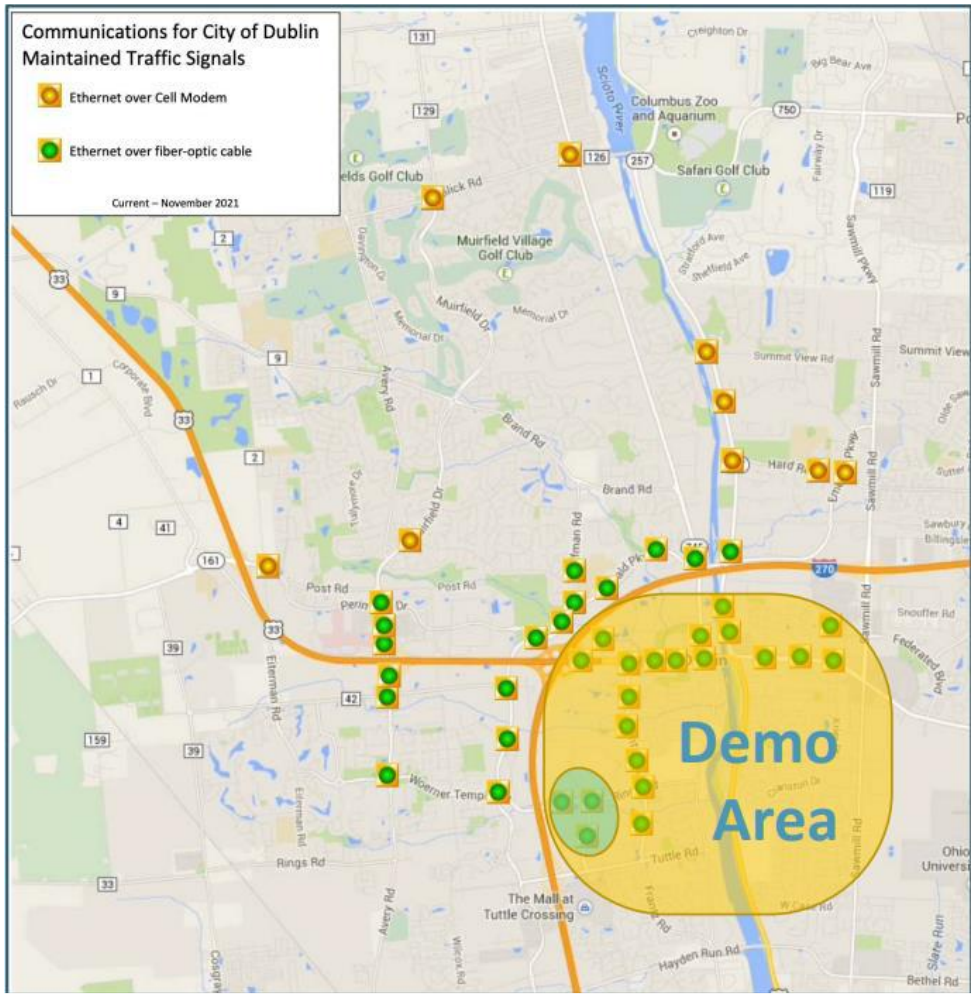
Technolution

Better traffic flow through:

1. FlowCube AI sensing
   Rich realtime sensing
2. Multimodality
   All modalities are included
3. Traffic light optimization
   Model based delay minimization
4. Corridor/city level optimization
   Cooperation between intersection

+

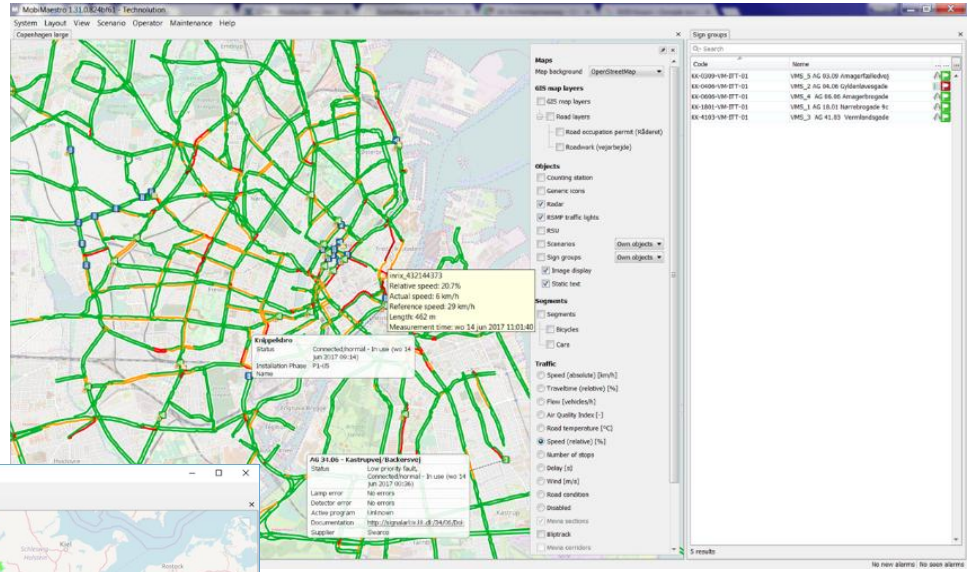
MobiMaestro

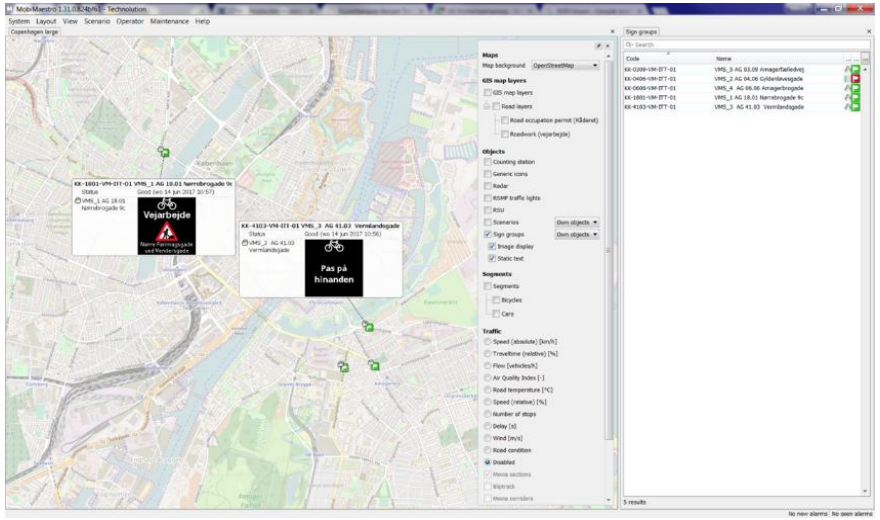


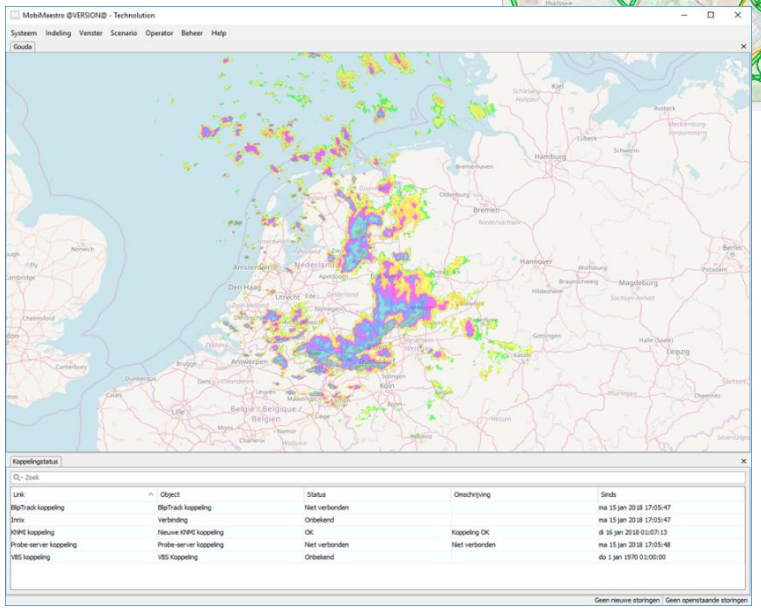
Strategic: MobiMaestro Traffic Management

Improvements through:

1. Asset Management
2. Common view from all data sources
3. Automatic scenario’s
4. Holistic strategy for improving KPIs







MobiMaestro

Redefining **solutions**

TNL