2014 Global Level Crossing Safety & Trespass Prevention Symposium

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Data Management Technology as a Means to Optimizing Grade Crossing Improvements on Transportation Infrastructure

Presenters:

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moffatt & nichol

tavla solutions

Introduction

Why is technology important as a means of communicating?

- Conservation of Institutional Knowledge
- Secure and Maintain Funding
- Maximizing Information Technology Infrastructure
- Maximizing Information *Transportation* Infrastructure

The NPRM states: ***"in order for the Crossing Inventory to serve as an effective database, States and railroads need to exchange information with each other and promptly update the crossing data records as changes occur."***

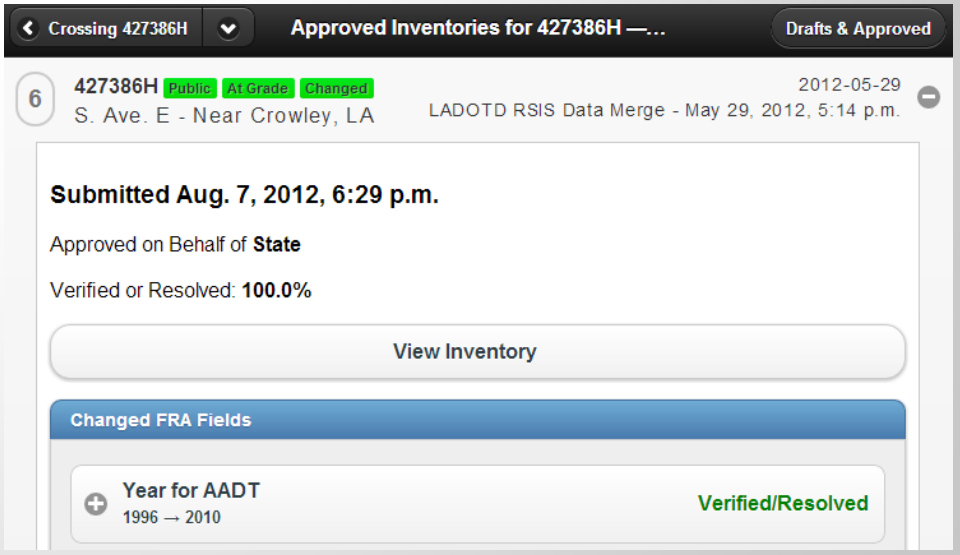
Docket No. FRA–2011–0007, National Highway-Rail Crossing Inventory Reporting Requirements

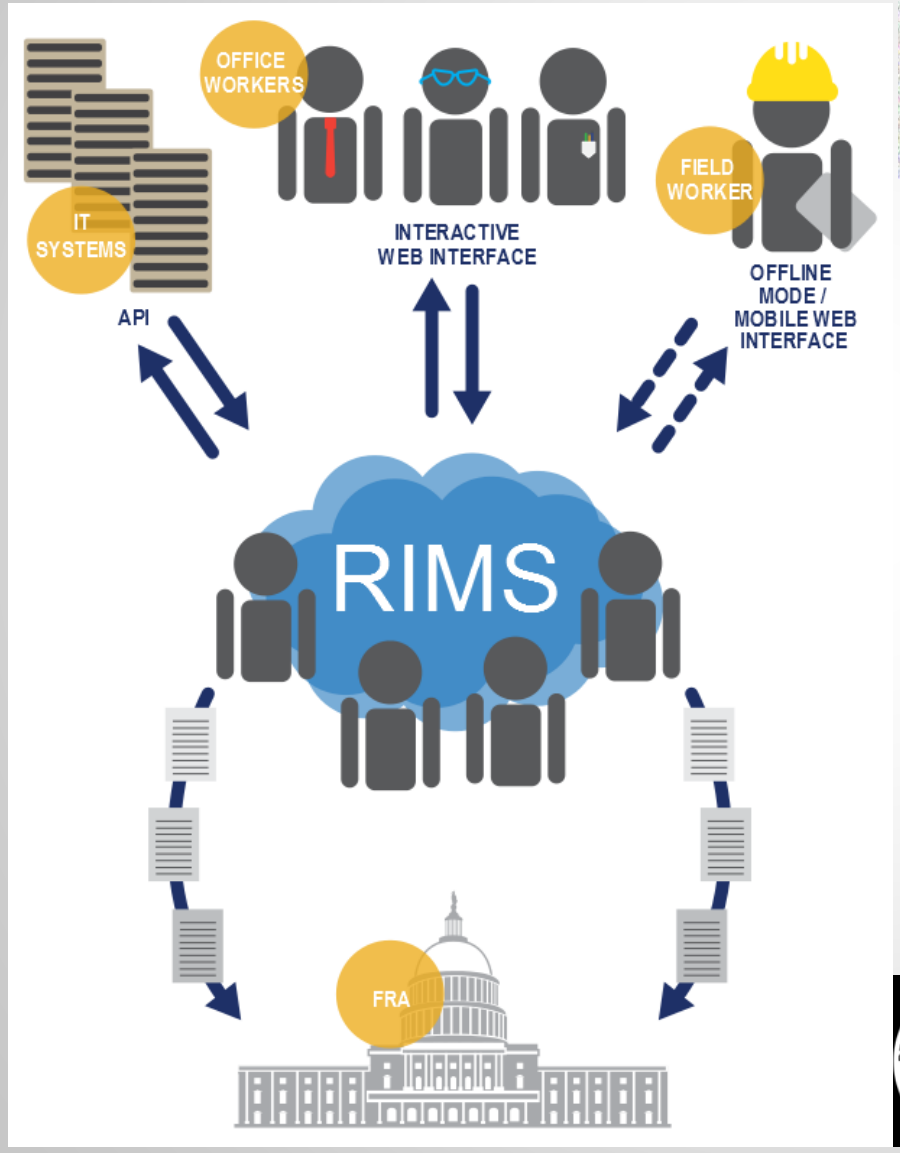
Three Sides of Hosted Web-based Solutions

I. ***Data Service***

II. ***Data Collection***

III. ***Analytical Tools***





Three Sides of Hosted Web-based Solutions

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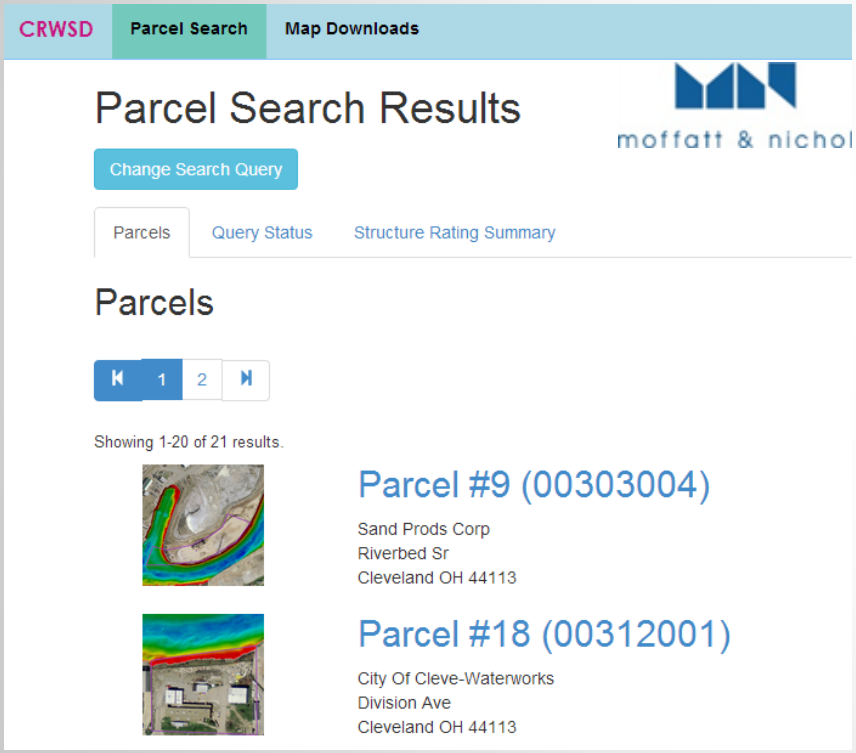
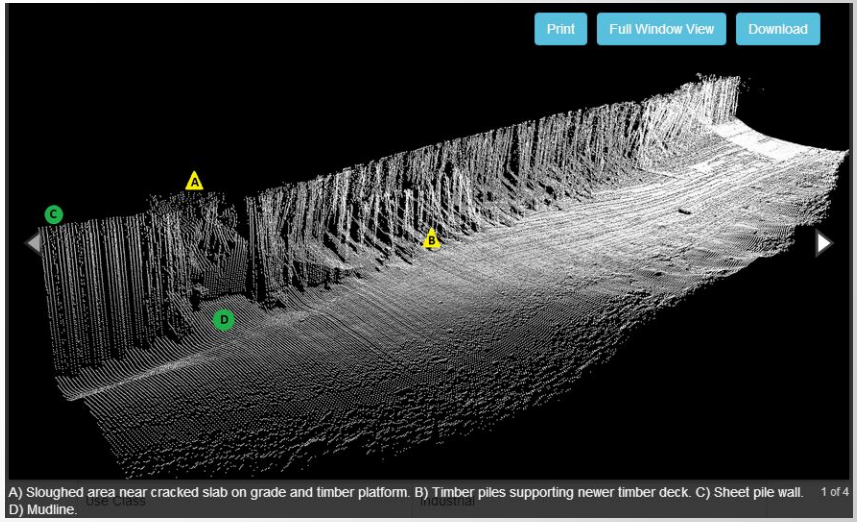
DATA SERVICE



- Cuyahoga River Waterfront Structure Database
- Searchable report of bulkhead data including:
  - *Attribute data*
  - *GIS parcel data*
  - *Inspection photos*
  - *Underwater point cloud imagery*

- Underwater point cloud images display the condition of the structures below the waterline
- Condition and structure notes are highlighted
- Future versions could include an interactive 3D model



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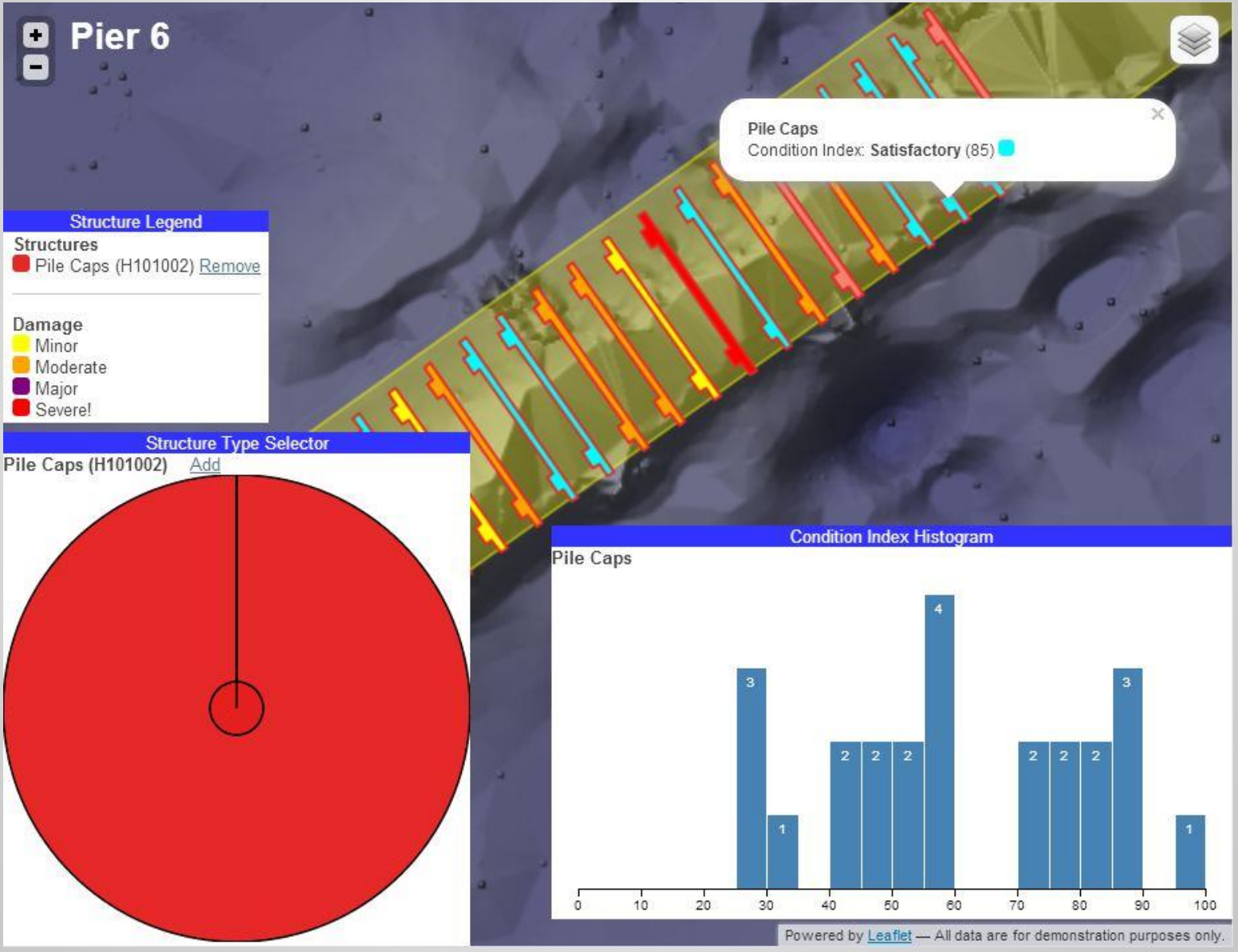
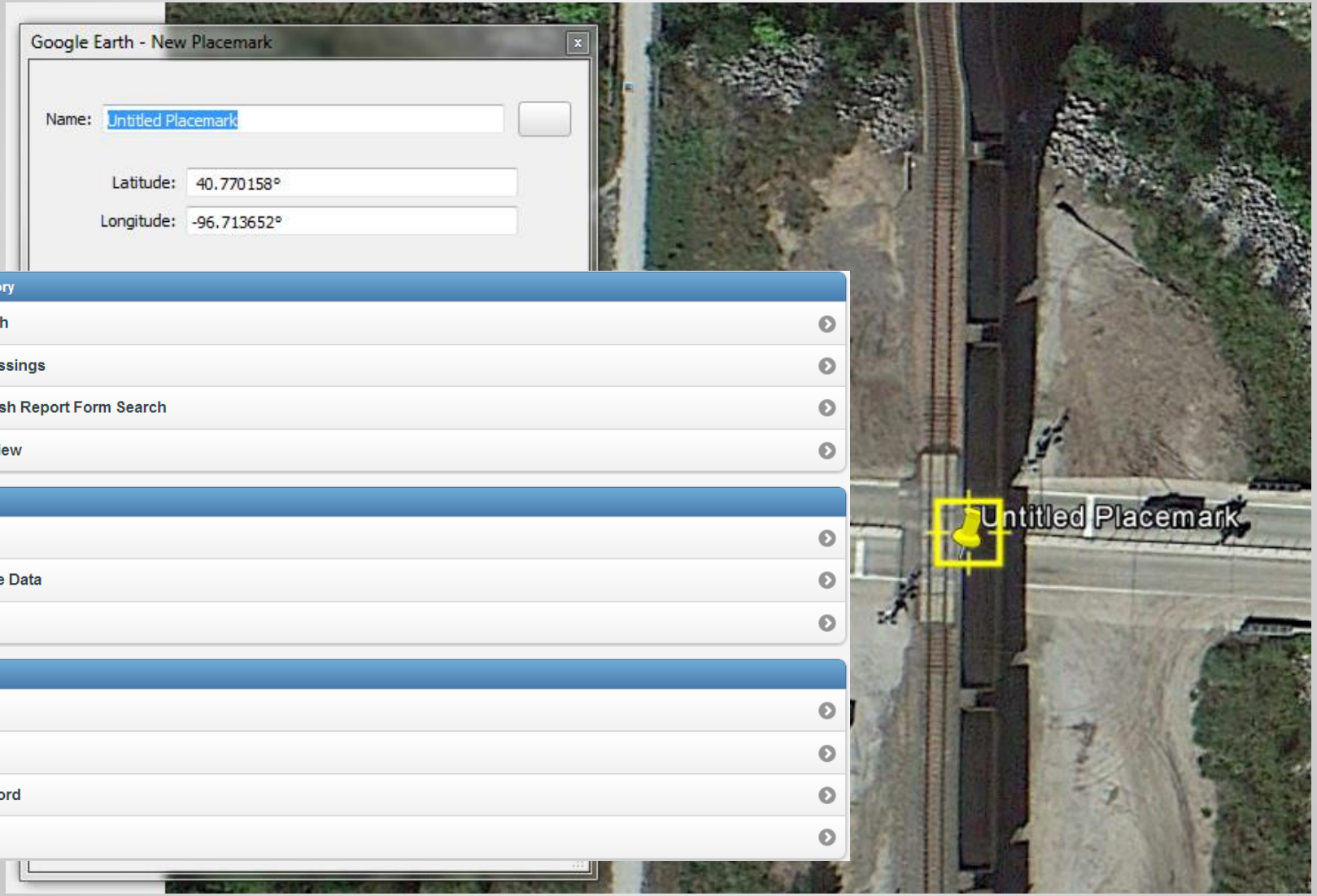


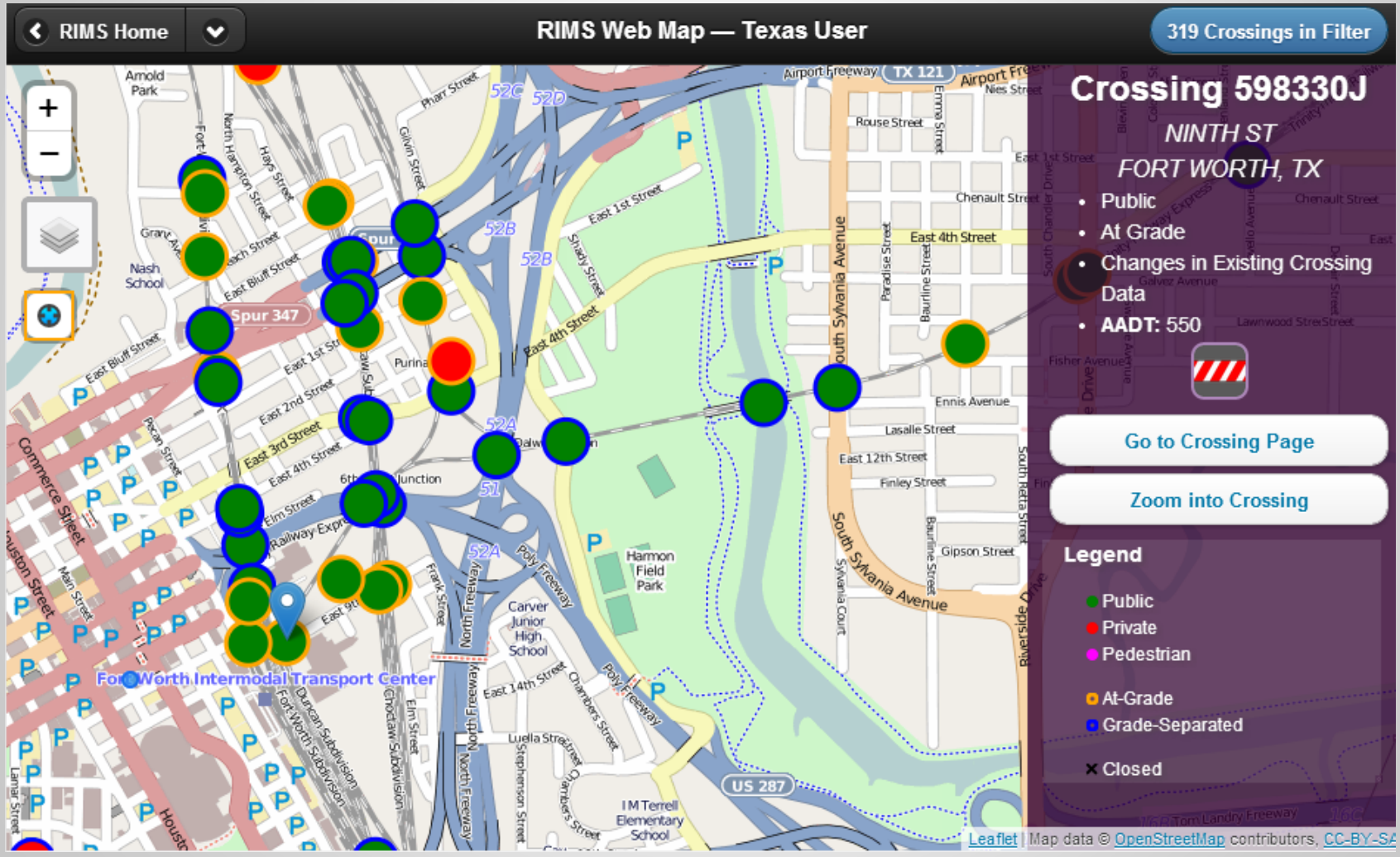
DATA COLLECTION

Understanding
our
Capabilities

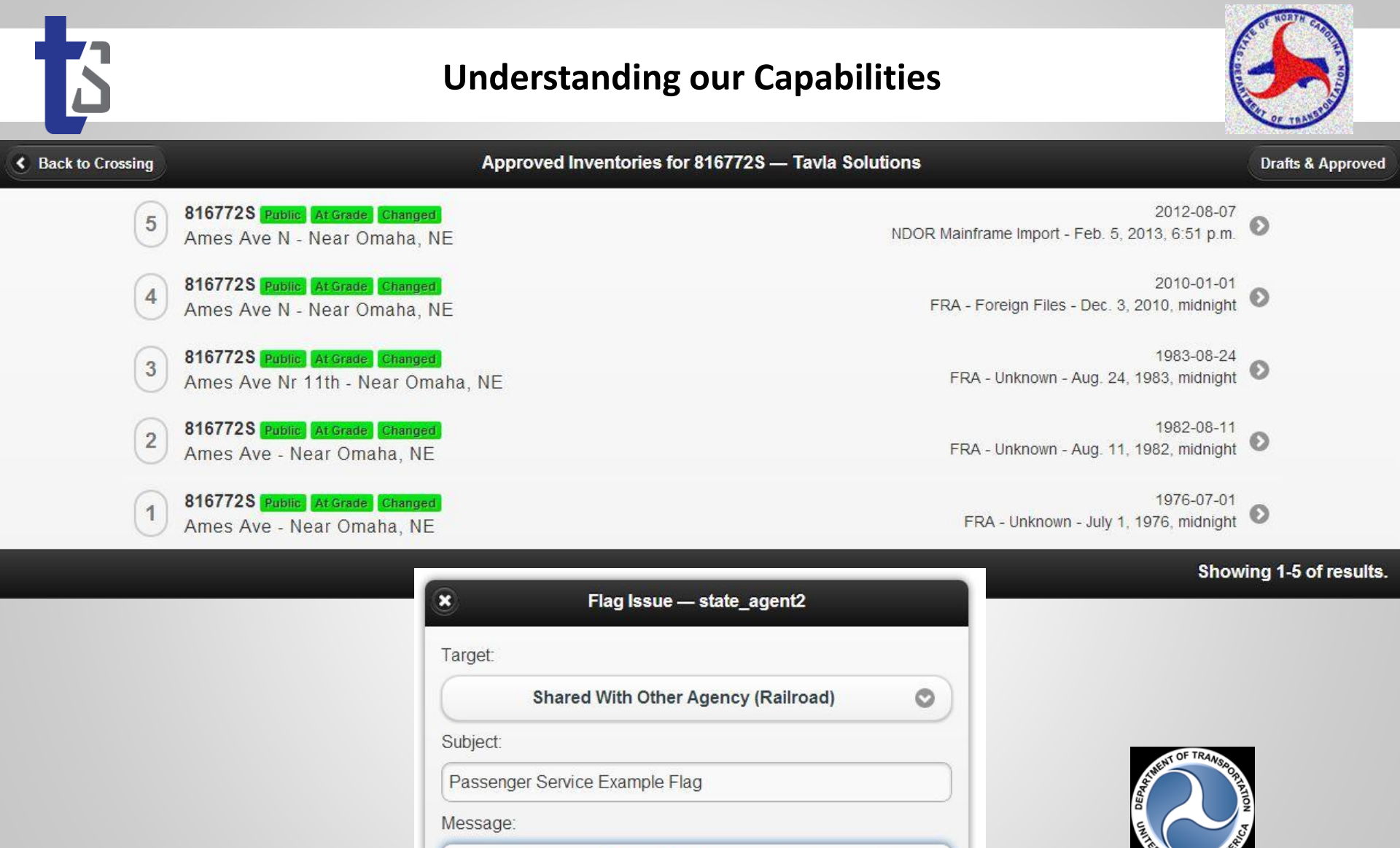
Understanding our Capabilities



Understanding our Capabilities



Understanding our Capabilities



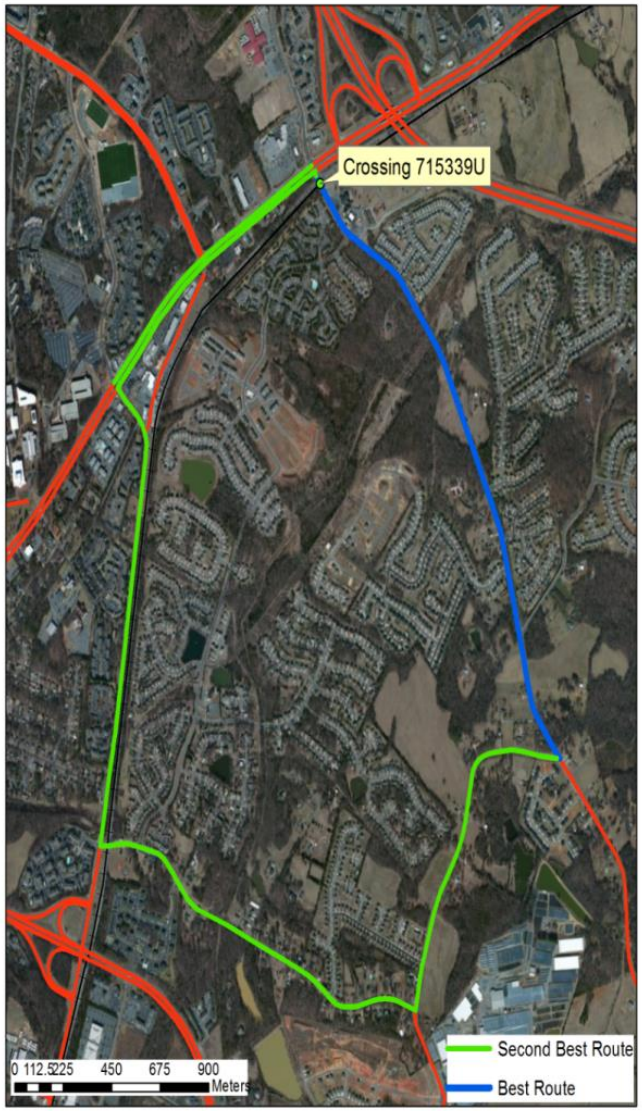
ANALYTICAL TOOLS

ANALYSIS - Expected At-grade Rail Crash Cost-Based Screening

- **Cost Based Screening uses the expected cost of a crash an at-grade-crossing that has three components:**

Expected crash cost = crash probability * (primary effect costs + secondary effect costs)

- **Cost Based Screening is a data intensive process**
  - *Rail infrastructure inventory;*
  - *Crash history;*
  - *Traffic volumes;*
- **While not necessary in the screening process, GIS platforms can significantly improve the initial steps of the safety improvement process;**



ANALYSIS - Application to Cost Benefit Analysis

- Identify potentially high risk crossing based on the expected crash costs;
- This approach can help in identifying potentially high-reward (crossings with most improvements) crossings for future investigations;
- Additional elements need to be included in order to estimate a full-blown cost benefit ratio.

Transportation Infrastructure – Project Prioritization

Funding Validation

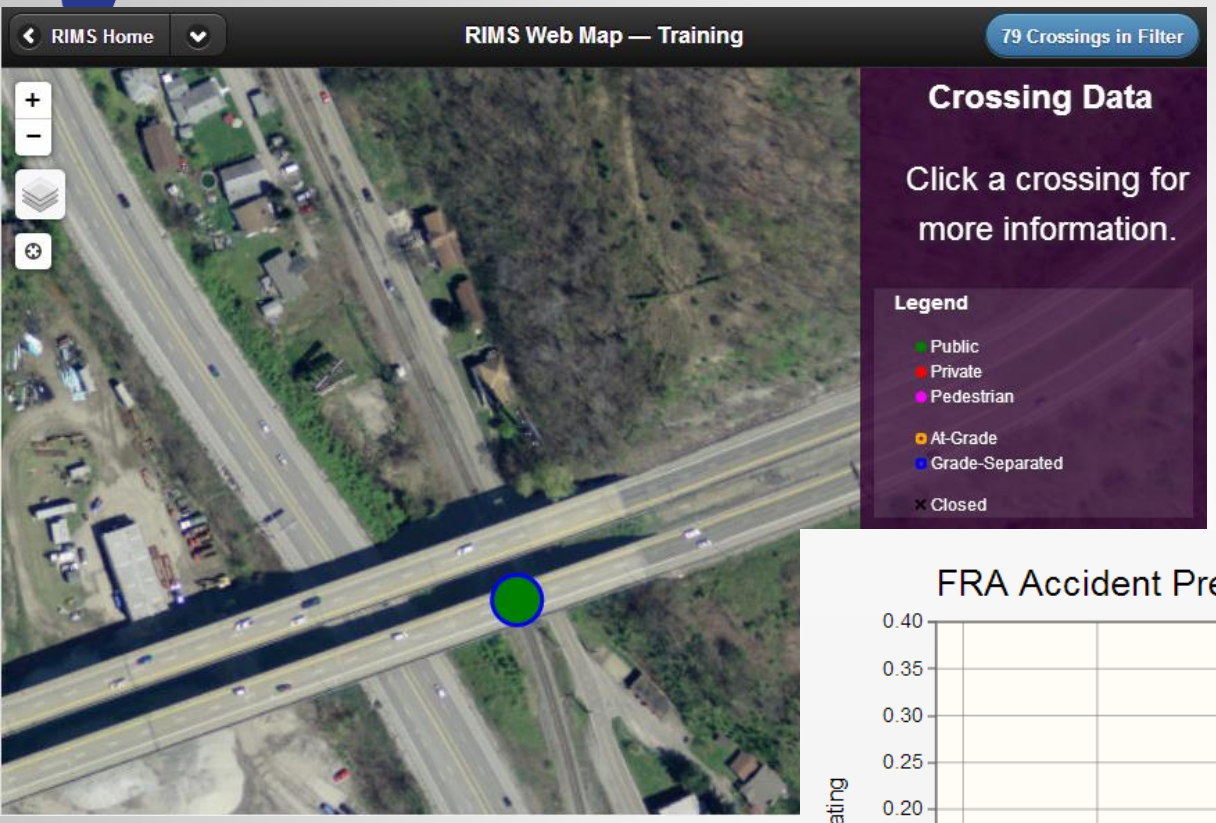
Additional funding sources and Strategies

Grade crossing projects included within highway projects

Benefit / Cost Justification

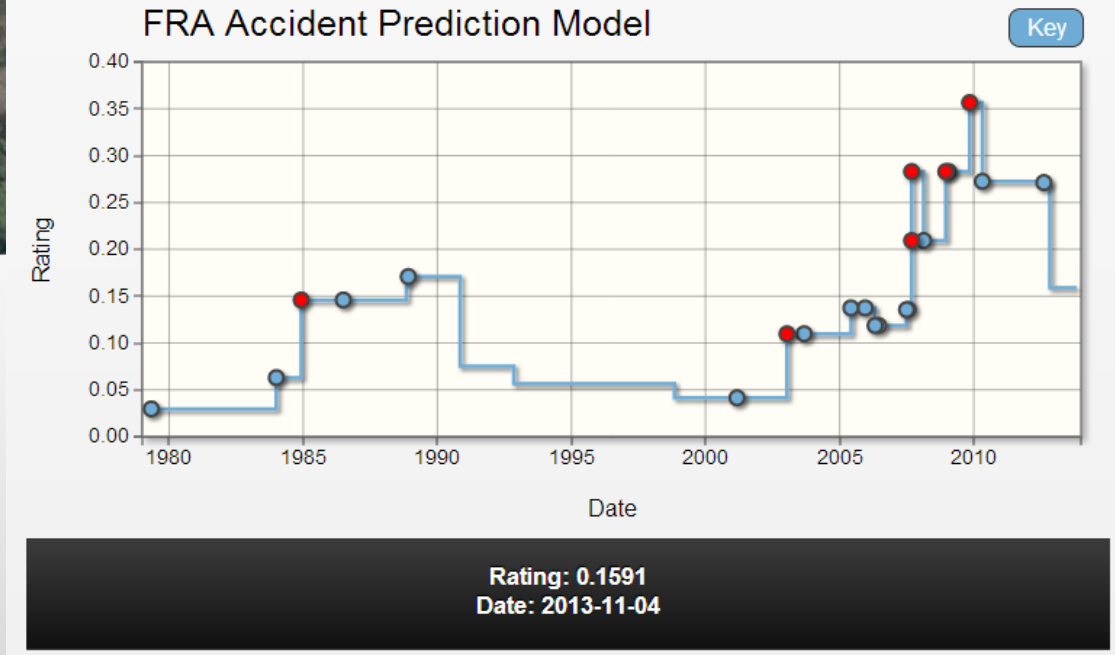
Infrastructure Report Card

ANALYSIS - Transportation Project Prioritization



Project Approach:

- Analysis of current data systems
- Analyze current prioritization processes
- Recommend improvement to processes



ANALYSIS - Transportation Infrastructure – Project Prioritization

Method of Implementation:

- **Develop B/C models**
- **Design Web based application**

Project Criteria Summary

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Total Scores

Project	Base Score	Division	Regional
RUS test 1	220.167847767	30.2122912954	42.7052008843
Lexington Test 1	118.467664978	17.4356497467	27.660449561

Specific Criteria Scores

Passenger Station Connectivity

Rank	Project	Base Score	Division	Regional
1	RUS test 1	52.4377173913	5.24377173913	5.24377173913
2	Lexington Test 1	6.6	0.66	0.66

Passenger Station Mobility

Rank	Project	Base Score	Division	Regional
1	RUS test 1	81.782068974	12.2673103461	16.3564137948
2	Lexington Test 1	19.1493336717	2.87240005076	3.82986673435

Passenger Station Capacity & Congestion

Rank	Project	Base Score	Division	Regional
1	Lexington Test 1	92.6283313065	13.894249696	23.1570828266
2	RUS test 1	82.1280614013	12.3192092102	20.5320153503

Benefit-Cost

Rank	Project	Base Score	Division	Regional
1	RUS test 1	3.82	0.382	0.573
2	Lexington Test 1	0.09	0.009	0.0135

CONCLUSIONS:

- **Emphasis on electronic communication requirements/capabilities**
  - *Federal Railroad Administration*
  - *Railroads*
  - *State Agencies*
- **Update economic factors for Cost/Benefit approaches**
  - *Prioritization Models*
  - *Corridor Approach*
  - *Infrastructure management*
- **Spatial Analysis and Data Integration**
  - *GIS Rail and Highway LRS*
  - *Scenario based modeling*

QUESTIONS/DISCUSSION…?

Presenters:

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