FHWA Utility Update

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FHWA – Office of Infrastructure
Agenda

• What’s new with FHWA’s Utility Program
• Utilities in the Right of Way
• National Utility Program Review
• Techniques and Resources for better managing utility conflicts in transportation projects
What’s new with FHWA’s Utility Program?

• 2018 Mobile Now Act
  • Signed on March 23, 2018
  • Section 607 Broadband Infrastructure Deployment
  • Requires FHWA to develop regulations
Sec 607 Broadband Infrastructure Deployment

Title 23 States shall

• Identify a broadband utility coordinator that is responsible for facilitating the broadband infrastructure right-of-way (ROW) efforts within the State.

• Establish a process to register broadband infrastructure entities that seek to be included.

• Establish a process to electronically notify those broadband entities of the State transportation improvement program (STIP) on an annual basis.
Sec 607 (cont.)

• Coordinate telecommunication and broadband initiatives with State and local transportation and land use plans.
• Minimize repeated excavations of broadband infrastructure in a right-of-way.
• Ensure that any existing broadband infrastructure entities are not disadvantaged, as compared to other broadband infrastructure entities, with respect to the program.
Sec 607 (cont.)

• Nothing in Sec 607 requires that a State install or allow the installation of broadband infrastructure in a highway ROW.

• Nothing in this section authorizes the Secretary of Transportation to withhold or reserve funds or approval of a title 23 project.

• FHWA will develop regulations in accordance with the requirements of this section.
Utilities in the Right of Way

• June 2017 Memo
• Utility Accommodation and Other Uses of Highway Rights of Way (ROW)
  • Brief refresher on regulations that govern utility accommodation and other uses of highway ROW

• FHWA Developed a standard presentation that Divisions and state DOT’s may use.
Can a Utility Reside in a Federal-aid ROW?

The answer is, “It depends.”

• The use of highway ROW to accommodate utilities is in the public interest.

• Governed by Federal law/regulation, State law, and the State’s Utility Accommodation Policy.

• The CFR defines a utility very broadly (23 CFR 645.105).
  • Must serve the public.
  • State law definition of a utility can be more restrictive.
What if the State Law Is More Restrictive?

• If proposed installation is not a utility under state law, it is considered a “Non-Highway Use.”

• A ROW use agreement may be issued if certain terms and conditions are met (23 CFR 710.405).
  • Requires FHWA approval in most instances.

• Current fair market value must be charged with few exceptions (23 CFR 710.403(e)).
  • Railroads.
  • Bikeways and pedestrian walkways.
  • Overall public interest based on social, environmental, or economic benefits.
  • See 23 CFR 710.403(e) for entire list of exceptions.
Safety, Operations, & Aesthetics

• Location of utilities must conform to the clear roadside policies for the highway involved.

• Above ground installations should be located as far from the traveled way as possible.

• With limited exceptions, no new above ground installations may be located within the established clear zone of the highway (see exceptions in 23 CFR 645.209(b)).
  • Safety countermeasures are required when exceptions are made.

*Note: The above is not an all inclusive list.*
Why Is This Important?

- Collisions with roadside trees and utility poles are the most harmful event in 14 percent of all fatal crashes.
Note Pole Location

Source: FHWA
Other Considerations

- FHWA has found that utility conflicts during highway construction projects have large impacts on cost and schedules.
3rd Leading Cause of Project Delays

- Weather: 20.90%
- Utilities/3rd parties: 14.93%
- Materials, QA, Fabrication: 13.43%
- Site Conditions, Extra Work, Env. Mitigation, Quantity Adjustments: 61.19%
- Other - Contractor Means and Methods, Records: 10.45%
- Design: 8.96%
- Incentives: 2.99%
Other Considerations (cont.)

• A 2015 report to the Texas House Transportation Committee
  • TxDOT had spent $25 million on 70 projects because one major telecommunications company failed to timely move utility lines.

• A 2002 Transportation Research Board (TRB) report, *The Root Causes of Delays in Highway Construction*
  • utility relocation delays were the number one reason for delays in highway construction.
Other Considerations (cont.)

• A 2009 (SHRP 2) report, *Encouraging Innovation in Locating and Characterizing Underground Utilities*,
  • unknown underground utility is one of the major causes of delay during highway projects and one of the major contributors to traffic disruptions and budget overruns.

• An October 2001 NCHRP report, *Avoiding Delays During the Construction Phase of Highway Projects*
  • unforeseen underground utilities and untimely utility relocations were among the more common root causes of delays.
Impacts on Transportation Projects

• Contractors increase bids due to the increased risks, costing taxpayers more money.
• Construction projects are delayed due to unknown utility issues, leaving the public’s transportation needs unmet.
• Costs and time are increased because of change orders due to utility conflicts.
Impacts on Transportation Projects

• Contractor and public safety is jeopardized because of unknown underground utilities during construction.
• Public safety is compromised when delays extend construction, sometimes into the next season.
• Relationships among State DOTs, contractors, and utility companies are strained.
What else is new?

• National Utility Program Review
  • Conducted in 2016
  • Final Report will be published on FHWA’s Utility Website
    • https://www.fhwa.dot.gov/utilities/

• Purpose of the Review
  • To determine if utility coordination posed a risk to the Federal-aid highway program.
Review Conclusion

• Gaps exist at a program and project level.
• Not all the 23 CFR 645 regulations met.
• There is a financial and safety risk to the delivery of the Federal-aid highway program.
What was reviewed?

• Review team performed on-site visits and remote data analysis:
  • Utility agreements
  • Relocation plans
  • Schedules and estimates
  • Information in contract bid documents
  • Impacts during construction
    • Time delays and cost increases
Findings

Utility coordination gaps fall into several broad categories:

- Inaccurate utility location information
- Incomplete utility relocation plans
- Lack of justification for utility relocation estimates
- Lack of utility relocation schedules
Findings (continued)

Utility coordination gaps fall into several broad categories (continued):

• Lack of utility information in bid packages
• Inability to quantify utility cost-and-time increases on highway construction projects
• Lack of utility relocation oversight/inspection
• Lack of source documents to support utility payments (utility final vouchers)
Utility Investigations

• Most states rely on as built or One Call data
• 23% of states use some type of SUE investigation.
• Primary reasons for not conducting adequate utility investigation: Cost & Time
• Result:
  • inaccurate utility location data
  • unknown utility conflicts
  • poor utility plans
Utility Agreements

• Many states do not have adequate utility agreements that spell out who is going to do what and by when
• Many states do not prepare utility agreements for non-reimbursable utilities
• Include:
  • Utility Relocation Plans
  • Utility Relocation Estimate
  • Utility Relocation Schedule
Utility Relocation Estimates

• Lack of accurate or detailed utility relocation plans results in inaccurate estimates
• Most states provide some type of LS estimate
• Criteria for Utility Estimates: 23 CFR 645.113(a)&(c)
• Utilities are unique and materials unknown
• Complex to estimate
• Result in obligating funds based inaccurate and incomplete estimates
Utility Relocation Schedule

• Most states provide advance notice and duration only
• 60% of states did not provide a detailed schedule
• No location specific schedule information
• Criteria for utility schedules: 23 CFR 645.113(g)
• Most states believe it’s the contractors responsibility to coordinate schedules
What is FHWA Doing about this?

• Utility Coordination Initiatives in FHWA’s Strategic Implementation Plan (SIP) 2018/2019
• Improve educational opportunities
  • NHI Training
  • National Webinars
• Improve utility program networking
• Encourage divisions to be more engaged in utilities
  • Assess risk of state program
  • Conduct program review for high risk programs
Managing utility conflicts in transportation projects

SHRP2 Utility Bundle

• 3D Utility Location Data Repository (R01A)
• Utility Investigation Technologies (R01B):
  • Identifying and Managing Utility Conflicts (R15B)
Utility Education and Initiatives

• Web based training is currently in development
  • Utility Agreements
  • Utility Investigations
  • Utility Conflict Management
  • Utility Data Management

• Instructor-led training
  • Utility Program Management
Thank you

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Supporting Documents in Utility Agreements: Effective Practices

Cesar Quiroga, Ph.D., P.E., F.ASCE
Presentation Topics

• Required elements and additional practices that enhance effectiveness of supporting documents in utility agreements:
  • Utility relocation plans
  • Utility relocation schedule
  • Utility relocation cost estimate

• Required elements and additional practices that enhance effectiveness of utility information in construction bid packages
Utility Relocation Plan Requirements

• Location
• Attributes
• Depiction and visualization
• Other elements
Utility Relocation Plan Requirements

- **Location**
- **Attributes**
- **Depiction and visualization**
- **Other elements**

- Location of existing (in-use and out-of-service) utility installations
- Location of proposed (i.e., to-be-relocated) utility installations
- Stations and offsets/coordinates based on project datum
- Utility conflicts, including project features and construction phases
- Protect-in-place measures
- Elevations of utility facilities at critical points
Utility Relocation Plan Requirements

- Location
- **Attributes**
  - Depiction and visualization
  - Other elements

(depending on utility relocation work)
- Type
- Size
- Class
- Material
- Capacity
- Pressure requirements
- Wall thickness
- Number and size of cables and conduits
- ...

2018 CRUO Conference, Baltimore
Utility Relocation Plan Requirements

- Location
- Attributes
- Depiction and visualization
- Other elements

- Dimensions of utility structures, particularly when elements are not to scale
- Symbology and legend to depict:
  - Existing and proposed utility facilities
  - Conflicts with highway features or elements
Utility Relocation Plan Requirements

- Location
- Attributes
- Depiction and visualization
- Other elements

- Quantities
- Notes
- Additional instructions that:
  - Facilitate understanding of the relocation work
  - Help with development of cost estimate and schedule
Elements that Enhance Effective Utility Relocation Plans

• **Location**

• **Additional elements**

- Distinction of utility relocation work on private and public ROW
- Existing and proposed highway ROW
- Existing and proposed utility ROW
- Control of access lines
- 3D models of existing and proposed utility installations
- Test hole locations with corresponding test hole sheets
Elements that Enhance Effective Utility Relocation Plans

- Location
- **Additional elements**
  - Excavation and fill zones
  - Overhead spacing requirements
  - Work phase details, including coordination and conflict management with highway work phases
  - Traffic control and safety plan
  - Environmental mitigation plans, including storm water pollution prevention plan (SWPPP)
Presentation Topics

• Required elements and additional practices that enhance effectiveness of supporting documents in utility agreements:
  • Utility relocation plans
  • **Utility relocation schedule**
  • Utility relocation cost estimate

• Required elements and additional practices that enhance effectiveness of utility information in construction bid packages
Utility Relocation Schedule Requirements

- Manageable, logical phases
- Activities and durations
- Advance notice(s) to utility owner
- Required work by others
- Access restrictions for highway contractor
- Coordination with other utility owners and stakeholders
Elements that Enhance Effective Utility Relocation Schedules

• Draft special provisions
• Assumed durations for work by other stakeholders
• Bar chart schedules
Presentation Topics

• Required elements and additional practices that enhance effectiveness of supporting documents in utility agreements:
  • Utility relocation plans
  • Utility relocation schedule
  • Utility relocation cost estimate

• Required elements and additional practices that enhance effectiveness of utility information in construction bid packages
Utility Relocation Cost Estimate Requirements

• Cost factor method
• Unit cost method
Utility Relocation Cost Estimate Requirements

- **Cost factor method**
- **Unit cost method**

  - Direct labor
  - Labor surcharges
  - Overhead and indirect construction charges
  - Materials and supplies
  - Transportation
  - Equipment
  - Credits
Utility Relocation Cost Estimate Requirements

• Cost factor method
• Unit cost method

• Quantities
• Unit costs:
  • Based on accepted industry practices
  • Supported by recent, actual expenditures
  • Updated periodically
  • Supported annually by a maintained database of utility relocation expenses
  • Agreed upon in the form of a master agreement between the State and utility
Presentation Topics

• Required elements and additional practices that enhance effectiveness of supporting documents in utility agreements:
  • Utility relocation plans
  • Utility relocation schedule
  • Utility relocation cost estimate

• Required elements and additional practices that enhance effectiveness of utility information in construction bid packages
Effective Utility Information in a ConstructionBid Package

- Utility relocation plans
- Special provisions
Effective Utility Information in a Construction Bid Package

- Utility relocation plans
- Special provisions

- Required elements for all the utilities
- As-built information, if utility work occurs prior to highway construction
- Information about existing utility locations that remain in place, including protect-in-place measures
Effective Utility Information in a Construction Bid Package

• Utility relocation plans

• Special provisions

• Required information:
  • Activity-based schedules
  • Utility contact information
  • Protect-in-place measures

• Additional information:
  • Assumed durations of work by other stakeholders
  • Bar chart schedules
  • Tabulated list of utility conflicts by station with corresponding resolution
<table>
<thead>
<tr>
<th>Document/Deliverable</th>
<th>Information Requirement</th>
<th>Information Category</th>
<th>Information Element</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility relocation plans</td>
<td>Required</td>
<td>Location</td>
<td>Location of existing (in use and out of service) utility installations. Location of proposed utility installations (where the relocated facilities will be placed). Stations and offsets to highway control baseline or coordinates based on the highway project datum. Utility conflicts, including those with project features and construction phases. Measures to protect in place. Elevations of utility facilities at critical points.</td>
<td></td>
</tr>
<tr>
<td>Utility relocation plans</td>
<td>Required</td>
<td>Attributes</td>
<td>(To the extent that they apply to the specific utility agreement) Type. Size. Class. Material. Capacity. Pressure requirements. Wall thickness. Anode beds. Number and size of cables and conduits. Protective devices.</td>
<td></td>
</tr>
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<td>Utility relocation plans</td>
<td>Required</td>
<td>Depiction and visualization</td>
<td>Dimensions of utility structures, particularly when elements are not to scale. Symbology and legend used to depict: • Existing and proposed utility facilities • Conflicts with highway features or elements</td>
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<td>Information Element</td>
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</table>
| Utility relocation plans | Required                | Other elements      | Quantities. Notes. Additional instructions that:  
  - Facilitate understanding of the relocation work  
  - Help with development of schedule and cost estimate                                                                                                      |               |
<p>| Utility relocation plans | Enhancement             | Location            | Distinction of utility relocation work on private and public right of way. Existing and proposed highway right of way. Control of access lines and corresponding highway station locations. 3D models of existing and proposed utility installations. Test hole location identification with corresponding table. |               |
| Utility relocation plans | Enhancement             | Additional elements | Excavation and fill zones. Overhead spacing requirements. Work phase details, including coordination and conflict management with highway work phases. Traffic control and safety drawing. Environmental mitigation plans, including storm water pollution prevention plan (SWPPP). |               |
| Utility relocation schedule | Required               | All                 | Organized into manageable, logical phases. Activities and durations. Advance notice(s) to the utility owner. Required work by others (prep interim and finish). Access restrictions for highway contractor. Coordination with other utility owners and stakeholders. |               |
| Utility relocation schedule | Enhancement             | All                 | Special provisions. Assumed duration for work by other stakeholders. Bar chart schedules.                                                                                                                                 |               |</p>
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<td>M</td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>
|                                                          |                         |                           | Supported by recent, actual expenditures. Updated periodically. Supported annually by a maintained database of utility relocation expenses. Agreed upon in the form of a master agreement between the State and utility that includes the following components:  
  - Agree to use unit cost method
  - Identify common pay items
  - Develop specifications and unit costs that account for:  
    - Scope and description of the activity
    - List of payable items associated with the activity
    - Unit of measurement for each item
    - Method to measure item
    - List of subsidiary items not payable separately | H             |
<p>| | | | | |
|                                                          |                         |                           |                                                                                                         |               |
|                                                          | Required                | Unit cost method          |                                                                                                         |               |
|                                                          |                         |                           |                                                                                                         |               |
|                                                          |                         |                           |                                                                                                         |               |
|                                                          | Required                | Lump sum payment option   | Detailed relocation plans. Detailed work schedule. Detailed cost estimate.                              |               |
|                                                          |                         |                           |                                                                                                         | M             |
|                                                          |                         |                           |                                                                                                         |               |
|                                                          |                         |                           |                                                                                                         |               |</p>
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<th>Information Requirement</th>
<th>Information Category</th>
<th>Information Element</th>
<th>Effectiveness</th>
</tr>
</thead>
</table>
| Construction bid package | Required                | Utility relocation plans | Show utilities that:  
  - Remain or need to be protected in place  
  - Were relocated prior to letting  
  - Will be relocated during construction  
  - Will be put out of service  
Include symbology for all utilities.  
Identify excavation/fill zones and overhead spacing requirements.  
Include access availability requirements for highway contractor. |               |
| Construction bid package | Required                | Utility relocation schedule | Detailed activities (highway contractor and utility owners) by phase and location of work to ensure integration with the highway construction.  
Durations, start and end dates, and sequence for all activities.  
Requirements for and coordination with all relevant stakeholders.  
Preparation work that must be completed prior to the utility relocations.  
Access availability requirements for highway contractor. |               |
| Construction bid package | Required                | Utility conflict list     | Known utility conflicts and their resolution.  
Outstanding utility relocations, if applicable.  
Utility owner contact information. |               |
| Construction bid package | Required                | Special provisions        | Scope of utility relocations and effect on the highway project.  
Requirements for notification to appropriate agencies, including One Call.  
Requirements for utility coordination and corresponding documentation that include:  
  - Notices and notifications  
  - Meeting minutes  
  - Test hole results |               |

**Level of Effectiveness:**
- **H:** Effective  
- **M:** Minor improvements recommended  
- **L:** Ineffective
Utility Relocation Plan Requirements

• Location
  • Attributes
  • Depiction and visualization
  • Other elements

  • Location of existing (in-use and out-of-service) utility installations
  • Location of proposed (i.e., to be relocated) utility installations
  • Stations and offsets/coordinates based on project datum
  • Utility conflicts, including project features and construction phases
  • Protect-in-place measures
  • Elevations of utility facilities at critical points

Existing poles identified through callouts and icons

Existing Pole to remain in place

Existing Pole SCI-107 to remain in place
Utility Relocation Plan Requirements

- **Location**
  - Location of existing (in-use and out-of-service) utility installations
  - Location of proposed (i.e., to be relocated) utility installations
  - Stations and offsets/coordinates based on project datum
  - Utility conflicts, including project features and construction phases
  - Protect-in-place measures
  - Elevations of utility facilities at critical points

*Proposed poles*

**Duke to Install New Pole at Approx. Station 381+66; 22' Lt.**

**Duke to Install New Pole at Approx. Station 383+06; 22' Lt.**

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Utility Relocation Plan Requirements

- Location
  - Location of existing (in-use and out-of-service) utility installations
  - Location of proposed (i.e., to-be-relocated) utility installations
  - Stations and offsets/coordinates based on project datum

- Attributes
  - Utility conflicts, including project features and construction phases
  - Protect-in-place measures

- Depiction and visualization
  - Elevations of utility facilities at critical points

- Other elements
  - Frontier will place 2 temporary poles and aerial cables to avoid conflict with box culvert installation
  - Temporary poles and cables placed outside of construction zone
  - Frontier's temporary aerial telephone cables
  - Existing Pole 283.466 to remain in place
  - Existing Pole to remain in place
Utility Relocation Plan Requirements

- Location
- Attributes
- Depiction and visualization
- Other elements
  - Location of existing (in-use and out-of-service) utility installations
  - Location of proposed (i.e., to-be-relocated) utility installations
  - Stations and offsets/coordinates based on project datum
  - Utility conflicts, including project features and construction phases
  - Protect-in-place measures
  - Elevations of utility facilities at critical points

Information on how to protect the utility in place
Elements that Enhance Effective Utility Relocation Plans

- Distinction of utility relocation work on private and public ROW
- Existing and proposed highway ROW
- Existing and proposed utility ROW
- Control of access lines
- 3D models of existing and proposed utility installations
- Test hole locations with corresponding test hole sheet

Proposed 12" water main to be installed in private easement

Identifies work to be completed on private easement
Elements that Enhance Effective Utility Relocation Plans

- Location
- Additional elements
  - Distinction of utility relocation work on private and public ROW
  - Existing and proposed highway ROW
  - Existing and proposed utility ROW
  - Control of access lines
  - 3D models of existing and proposed utility installations
  - Test hole locations with corresponding test hole sheet
Utility Relocation Schedule

Requirements

- Manageable, logical phases
- Activities and durations
- Advance notice(s) to utility owner
- Required work by others
- Access restrictions for highway contractor
- Coordination with other utility owners and stakeholders

Relocation activities grouped by phase

<table>
<thead>
<tr>
<th>ID</th>
<th>Task Name</th>
<th>Responsible</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pre-Phase 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Review submittal to MBTA/Keolis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td><strong>Phase 1 - Temporary Foundation and Utility Bridge</strong></td>
<td>Verizon</td>
<td>60 days</td>
</tr>
<tr>
<td>9</td>
<td>Deliver temp utility bridge in sections for offload, assembly, and installation by Contractor</td>
<td>Verizon</td>
<td>10 days</td>
</tr>
<tr>
<td>11</td>
<td>Move in and set up, expose conduit on North Side of bridge</td>
<td>Verizon</td>
<td>2 days</td>
</tr>
<tr>
<td>19</td>
<td>Extend truss support arms and block up conduit</td>
<td>Verizon</td>
<td>3 days</td>
</tr>
<tr>
<td>20</td>
<td>Excavate duct to TMH on each side of bridge to get slack and remove Transite (asbestos) conduit surrounding the existing cables</td>
<td>Verizon</td>
<td>6 days</td>
</tr>
<tr>
<td>21</td>
<td>Shift load of cables onto extension arms to clear the way for the demo of existing bridge</td>
<td>Verizon and American UTel</td>
<td>7 days</td>
</tr>
<tr>
<td>23</td>
<td>Relocate cable onto new bridge, install new duct and split duct, and new hanger system, and complete work on approaches</td>
<td>Verizon</td>
<td>8 days</td>
</tr>
<tr>
<td>26</td>
<td>Supply additional temp utility bridge sections/parts</td>
<td>Verizon</td>
<td>8 days</td>
</tr>
<tr>
<td>28</td>
<td><strong>Phase 2 - Sidewalk, Signal, and Pavement Patching</strong></td>
<td></td>
<td>187 days</td>
</tr>
<tr>
<td>30</td>
<td>Remove empty conduit and block up live duct, extend truss support arms, and shift load of cables/duct onto extension arms to clear the way for the demo of existing bridge</td>
<td>Verizon</td>
<td>21 days</td>
</tr>
<tr>
<td>32</td>
<td>Install new hanger system and replace old pvc duct with new fiberglass duct and move all cables into new split duct onto new bridge and approaches</td>
<td>Verizon</td>
<td>6 days</td>
</tr>
<tr>
<td>34</td>
<td>Inventory components of the temporary utility bridge furnished by Verizon/American U-Tel</td>
<td>Verizon</td>
<td>2 days</td>
</tr>
<tr>
<td>38</td>
<td><strong>Stage 1B - Relocate Fire Alarm Stanchion/pull box Sta. 9+77 Lt</strong></td>
<td></td>
<td>64 days</td>
</tr>
<tr>
<td>47</td>
<td>Remove utility pole # 205 Sta. 9+67 Lt</td>
<td>Verizon</td>
<td>1 day</td>
</tr>
</tbody>
</table>
Elements that Enhance Effective Utility Relocation Schedules

- Draft special provisions
- Assumed durations for work by other stakeholders
- Bar chart schedules
  - Bars represent the individual activities, duration, and sequence in which they must be completed.

Estimated duration for highway contractor activities
For Additional Information

- Cesar Quiroga
  - Senior Research Engineer
  - Texas A&M Transportation Institute
  - Email: c-quiroga@tti.tamu.edu
  - Phone: (210) 321-1229