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AASHTO Subcommittee on Right of Way, Utilities and Outdoor Advertising Controls Conference

April 17, 2013
Product Overviews

• Utility Conflict Matrix (R15B)
  – Product Description
  – Implementation Plan
  – Recommendations

• Locating Underground Utilities Bundle
  – Storage, retrieval & utilization of 3D utility data (R1A)
  – Multi-sensor platforms to locate
  – deep utilities (R1B & C)
  – Next Steps for Implementation
Utility Conflict Package

- Utilities Conflict Matrix (UCM)
  - Tool for managing utility conflicts on roadway projects
  - Excel spreadsheet

- Utilities Conflict Matrix Manager (UCM Manager)
  - Prototype tool

- Training Course
Addresses Key Problems

• Lack of accurate, complete information about utilities – both within a utility and within a transportation agency
• Disruptions from unexpected utility installations during construction
• Damage to utility installations
• Safety hazards for construction workers
• Delays that can lead to project extensions
• Increased project costs, driver delays, and public frustration
Recommendations from State DOTs

- Track utility conflicts at facility level
- Maintain and update UCM regularly
- Develop UCM reports for utility companies
- Keep UCMs simple
- Use 11x17-inch page size for UCM
- Start UCM during preliminary design phase
- Include data from UCM in PS&E assembly
What is the UCM?

- Standalone, Microsoft Excel-based Utility Conflict Matrix
- Drop down lists that allow users to select a variety of pre-populated data sets
- Wide range of styles and content analyzed
  - 26 sample tables received
  - 144 different data items in total
  - Range of data items per table: 4 – 39 (average: 14)
  - Different ideas about “consensus” tables
- One size does not fit all
- Usable for small projects with few conflicts (roadway resurfacing, signal projects, etc).
- Already available on TRB’s website
Sample: Utility Conflict Matrix

- MS Excel format, includes drop-down lists
- UCM spreadsheet is the product

<table>
<thead>
<tr>
<th>Utility Owner and/or Contact Name</th>
<th>Conflict ID</th>
<th>Drawing or Sheet No.</th>
<th>Utility Type</th>
<th>Size and/or Material</th>
<th>Utility Conflict Description</th>
<th>Start Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT&amp;T</td>
<td>1</td>
<td>U-1</td>
<td>Telephone</td>
<td>Fiber Optic</td>
<td>Conflict with construction of frontage road widening.</td>
<td>21+00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>End Station</th>
<th>Start Offset</th>
<th>End Offset</th>
<th>Utility Investigation Level Needed</th>
<th>Test Hole</th>
<th>Recommended Action or Resolution</th>
<th>Estimated Resolution Date</th>
<th>Resolution Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>22+00</td>
<td>45' Lt</td>
<td>45' LT</td>
<td>QLC</td>
<td>Relocation before construction.</td>
<td>3/8/2010</td>
<td>Utility conflict identified.</td>
<td></td>
</tr>
</tbody>
</table>
UCM Manager

• Prototype available only at this time – not fully developed
• Scalable product in a database environment
• Would enable large amounts of utility data to be managed in a comprehensive, integrated manner
• Measures process performance, event, and cost estimate tracking
• Flexible, interoperable tool, with query and report functions
• Good for larger projects (grading, ROW acquisitions, multiple districts or databases)
UMC Manager Prototype: Potential Reports

- All utility conflicts associated with company X (project, corridor, or timeframe)
- Average conflict resolution time for electric utilities
- All utility conflicts with resolution time >100 days
- Customized UCMs for individual utility companies
- Utility certification for inclusion in PS&E package
# Utility Conflict Event Tracking

<table>
<thead>
<tr>
<th>Event ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Utility conflict identified</td>
</tr>
<tr>
<td>1</td>
<td>Comment created</td>
</tr>
<tr>
<td>2</td>
<td>Utility owner informed of utility conflict</td>
</tr>
<tr>
<td>3</td>
<td>Utility conflict resolved</td>
</tr>
<tr>
<td>4</td>
<td>Utility owner acknowledges receipt of document</td>
</tr>
<tr>
<td>5</td>
<td>Document requested</td>
</tr>
<tr>
<td>6</td>
<td>Document sent</td>
</tr>
<tr>
<td>7</td>
<td>Document received</td>
</tr>
<tr>
<td>8</td>
<td>Document reviewed</td>
</tr>
<tr>
<td>9</td>
<td>Document certified</td>
</tr>
<tr>
<td>10</td>
<td>Document approved</td>
</tr>
<tr>
<td>11</td>
<td>Document uploaded</td>
</tr>
<tr>
<td>12</td>
<td>Document review, comment, and approval</td>
</tr>
<tr>
<td>13</td>
<td>Utility coordination meeting</td>
</tr>
<tr>
<td>14</td>
<td>ROW cleared for adjustment</td>
</tr>
<tr>
<td>15</td>
<td>Required adjustment completion</td>
</tr>
<tr>
<td>16</td>
<td>Estimated adjustment completion</td>
</tr>
<tr>
<td>17</td>
<td>Scheduled adjustment completion</td>
</tr>
<tr>
<td>18</td>
<td>Notice to proceed to utility owner</td>
</tr>
<tr>
<td>19</td>
<td>Adjustment construction start</td>
</tr>
<tr>
<td>20</td>
<td>Adjustment construction end</td>
</tr>
<tr>
<td>21</td>
<td>Permit application</td>
</tr>
<tr>
<td>22</td>
<td>Permit approved</td>
</tr>
<tr>
<td>23</td>
<td>Exception requested</td>
</tr>
<tr>
<td>24</td>
<td>Exception approved</td>
</tr>
<tr>
<td>25</td>
<td>Plans sufficient sent to utility owner</td>
</tr>
<tr>
<td>26</td>
<td>30-day notice submitted</td>
</tr>
<tr>
<td>27</td>
<td>90-day notice submitted</td>
</tr>
<tr>
<td>28</td>
<td>Utility conflict resolution strategy selected</td>
</tr>
<tr>
<td>29</td>
<td>Utility relocation under construction</td>
</tr>
<tr>
<td>30</td>
<td>Utility conflict archived</td>
</tr>
</tbody>
</table>
UCM Training Course

• One-day, in person class
• Lesson plan (6 lessons)
• Presentation materials (PowerPoint)
• Presenter notes
• Participant handouts
  – Handouts, sample project plans, UCM templates
• Companion CD
  – All training materials, including UCM
  – Prototype utility conflict database
• Hands-on utility conflict analysis exercise
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>C3</td>
<td>1</td>
<td>WM</td>
<td>30&quot;</td>
<td>Proposed 18&quot; drainage pipe would cross WM.</td>
<td>37+20</td>
<td>60' Rt</td>
<td>QLA</td>
<td>3</td>
<td>Review possibility of adjusting drainage pipes up to avoid conflict, lowest structure (B13) is at 5.6'</td>
<td>D</td>
<td>n/a</td>
<td>Utility conflict identified.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Benefits to Users

• Allows systematic treatment of utility conflicts
• Generates more effective project development process integration
• Improves tracking and accountability
• Provides training for all stakeholders to realize benefits of UCM implementation
• Generates slightly higher front-end costs but potentially much lower costs once in continuous use
Implementation Tactics

• Build awareness of UCM
• Develop business case, outreach and guidance to utility industry as well as state DOTs
• Provide workshops, hands-on training, technical assistance
• Conduct webinars and seminars
• Provide financial incentives
• Refine prototypes of UCM Manager interface to build compatibility and ease of use
• Develop outreach materials and survey users on prospective product title: Utility ReSolution
• Encouraging Innovation in Locating and Characterizing Underground Utilities (R01)

• Technologies to Support Storage, Retrieval, and Utilization of 3-D Utility Location Data (R01 - A)

• Multi-sensor platforms for locating underground utilities (R01 - B)

• Innovation in Location of Deep Utilities (R01 - C)
Locating and Characterizing Underground Utilities (R01)

Selection Assistant for Utility Locating Technologies (SAULT)

- Web-based selection support tool to identify most appropriate technologies at specific sites
- Comprehensive list of documented technologies for locating underground utilities

• Benefits:
  - Reduces project delays, re-design costs, and safety risks
  - Allows transportation agencies to know the location and characteristics of underground utilities within the project right-of-way early in the project design phase

• Status:
  - Web-tool and the reference report documenting successful practices are available at TRB’s website
3-D Utility Location Data

Technologies to Support Storage, Retrieval, and Utilization of 3-D Utility Location Data (R01A)

- State-of-the-art 3D data model
- Recognizes horizontal and vertical location of the facility + type of utility

• Benefits:
  - Accommodates large volumes of data
  - Interfaces with existing design software

• Status: The data model and associated process flow detailing the management of the 3D utility data is scheduled for piloting with Virginia DOT in June 2013.
Prototype one-pass platform (R01B)

- Multi-sensored platform combines several types of technologies, including:
  - Multi-channel ground-penetrating radar
  - Electromagnetic imaging
  - Seismic systems

- Benefits:
  - Streamlines location process
  - Improves accuracy

- Status: Report and guidance, late 2013
Locating Deep Utilities

Prototype long-range radio frequency ID and low frequency acoustic location technologies (R01C)

- New devise under development
  - Will expand locatable zoom capability to find deep utilities

- Benefits:
  - Projects can be designed to avoid deep utilities
  - Accidental damage and be circumvented
  - Costly repairs to contractors avoided
  - Reduces delays and costs for potential repairs

- Status:
  - Report is expected in late 2013
Questions?

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For more SHRP2 information:
http://SHRP2.transportation.org

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