Creating a NEW Foundation for the NEXT Generation of Transportation Initiatives

The morphing of the role of a utility project manager.
New AASHTO Break-out Meetings
Morph: Dictionary.com

“To be transformed: morphing from a tough negotiator to Mr. Friendly”
To be transformed: morphing from several co-dependent consultants providing utility planning, utility coordination, subsurface utility engineering and utility coordination inspection during relocation to one independent consultant managing and completing all of these services.
Current Standard Practice:

- The Normal Lifecycle of a Project
  - Concept / planning / study
  - Pre-construction
  - Utility relocation
  - Road construction
Current Standard Practice:

- The Normal Lifecycle of a Project:
  - Concept/Planning/Study
    - This phase of a project may include:
      1. Subsurface utility engineering – Preparation of a detailed utility report for each alternative (CI/ASCE 38-02 – Utility Quality Level D)
      2. Utility planning – Initial corridor analysis to determine potential environmental impacts due to relocation of utilities, potential impacts to major facilities, potential planning for facility upgrades within the corridor as indicated by contact with utility owners, etc.
Current Standard Practice:

- The Normal Lifecycle of a Project:
  - Concept/Planning/Study
  - Pre-construction
    - This phase of a project may include:
      - Subsurface utility engineering – Preparation of detailed utility plans for the selected alignment
        - May or may not include all of the following services per CI/ASCE 38-02 or per scope of service defined by the project owner:
          - Utility Quality Level D
          - Utility Quality Level C
          - Utility Quality Level B
          - Utility Quality Level A
Current Standard Practice:

- Pre-construction *continued*
  - This phase of a project may include:
    - Utility coordination – Working as the liaison between the DOT design project manager, the consultant design project manager and each individual utility owner.
    - May or may not include the following general activities:
      - Initial meeting with all stakeholders
      - Distribution of project data to utility owners
      - Conduct meetings with utility owners and field reviews
      - Review plans prepared by subsurface utility engineer
      - Utility impact analysis
        - Collect and review data received from UAO’s
        - Review relocation plans
        - Prepare detailed utility conflict matrix
Current Standard Practice:

- Resolve or mitigate utility conflicts by:
  - Identify the type of conflict
  - Coordinate additional subsurface utility engineering
  - Develop cost effective recommendations for resolution

- Draft report preparation:
  - Initial conflict matrix
  - Constructability review matrix
  - Review meeting notes from individual utility owners

- Negotiate and secure utility relocation agreements and commitments

- Prepare contract documents for utility activities and utility/contractor coordination requirements

- Utility composite drawings

- Prepare utility clearance documents certifying the completion of utility work or ensure all arrangements are made for the work to be properly coordinated with the road contractor.
Current Standard Practice

The Normal Lifecycle of a Project:

- Concept / planning / study
- Pre-construction
- Utility Relocation
  - This phase of a project may include:
    - Subsurface utility engineering
      - Additional supplemental utility designating
      - Additional supplemental utility locating
    - Utility coordination inspection
      - Coordinate and inspect location of relocated/adjusted utilities
      - Report and provide guidance for unknown utility situations
      - Transfer utility as-built information to utility composite plans
      - Administer proper hand-off to road contractor
Current Standard Practice:

- The Normal Lifecycle of a Project:
  - Concept/Planning/Study
  - Pre-construction
  - Utility Relocation
  - Construction
    - This phase of a project may include:
      - Subsurface utility engineering
        - Additional supplemental utility designating
        - Additional supplemental utility locating
      - Utility coordination/utility coordination inspection
        - Attend pre-bid meeting for road construction
        - Administer proper hand-off to road contractor
Why not consolidate these activities?

- What if all of the above activities were encapsulated under the discipline of “utilities?”
  - Knowledge base under the management of the utility project manager
  - One point of contact
  - Efficiencies of practice by instantaneous information sharing
  - More refined approach to subsurface utility engineering
  - Faster resolution to conflicts
  - Greater potential for reducing overall construction cost
Case and Point:

Successful Project Examples
O’Neal Lane – LA DOTD

- Utility coordination from design through construction
  - During design – four utility companies within 10’ corridor
    - Limited right of way availability
    - Assisted with development of utility relocation construction plans at different depths while maintaining close horizontal clearances on very long directional bores
      - Developed based on information provided by utility as-builts
      - Gas and water mains located to 10’ deep adjacent to proposed box culvert to avoid damage during culvert installation,
Utility coordination from design through construction

During construction – on site inspection

- Minimized misplacement of relocated utilities by being onsite to discuss plans with contractors.

- 18” force main inaccurately depicted
  - Hit during utility relocation; $100,000 repair cost
  - We recommended subsurface utility engineering to accurately map line not being relocated
  - During mapping, two more conflicts identified
  - If not identified, would have caused more delays and extra costs

- Pictures of relocated utilities furnished to LADOTD for visual confirmation
New water line and gas main installed between stake and drainage ditch. This was the location new drainage would have caused the normal 3 foot of bury utilities to be lost in excavation. Utilities installed deeper and no problem occurred.
Broken sewer force main flow in ditch. This was not marked by one call or by utility owner. No subsurface utility engineering done at this time so no way to avoid large spill. After this, we were authorized to find remainder of force main to make sure there were no conflicts with road construction.
An 18-inch sewer force main is installed just inside fence. A new drainage pipe needed to be installed crossing it and emptying in ditch to left/bottom of picture. Our subsurface utility engineering investigation found this valve and force main and another force main tying to valve during utility relocation. This was able to be relocated by sewer company without delaying road contractor.
Relocated water, gas and telephone in narrow corridor, but out of way of road construction.
Picture of relocated water main and tie in to existing water main in foreground.
US 280 - AL DOT

Project Limits: 9.77 miles, along US 280 from Red Mountain Expressway to Eagle Point Drive
US 280 – AL DOT

- Initial scope: elevated toll road
- Major impact to AT&T duct bank running in the median for most of the project with limited space in the right of way for relocation.
- Could cost upwards to $5 million and 3 years to construct.
- Scope revised to access management improvements involving ± 20 intersections to enhance traffic flow
Where is the Steel Gas Main?
Where is the Steel Gas Main?

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<td>NHF-0038 (526)</td>
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<td>US 280</td>
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<td>NHF-0038 (526)</td>
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<td>TEST HOLE DATA FORM</td>
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<td>CITY:</td>
<td>Birmingham, AL</td>
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<tr>
<td>COUNTY:</td>
<td>Jefferson</td>
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<td>GENERAL LOCATION:</td>
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**UTILITY TYPE**

- Electrical
- Gas
- BT - Buried Telephone
- FO - Fiber Optic Cable
- W - Water
- SAN - Sanitary Sewer
- ST - Storm Sewer
- CATV - Cable Television
- FM - Force Main
- RW - Reclaimed Water
- SL - Street Light
- TS - Traffic Signal
- FL - Fuel Line
- UNK - Unknown

**UTILITY MATERIAL**

- Steel
- PVC (Polyvinyl Chloride)
- DP (Ductile Iron Pipe)
- VCP (Vitrified Clay Pipe)
- PE (Polyethylene Pipe)
- AC (Asphalt)
- CI (Cast Iron)
- DRC (Direct Buried Cable)
- Concrete Pipe
- Corrugated Metal Pipe
- Duct
- Concrete Duct Bank
- Fiberglass
- Other:

**IDENTIFIED BY**

- 20 - Steve
- 21 - HulkaThal
- 22 - NA/EI
- 23 - "X" In Concrete
- 24 - SICL ½"***

**OFFSET DISTANCE PULLED FROM**

- 30 - Edge of Pavement
- 31 - Baseline
- 32 - Right-of-Way
- 33 - Curbline
- 34 - Back of Curb
- 35 - Survey Hub
- 36 - "X" In Concrete
- 37 - Swing Ties
- 38 - Ref. Pt. In Driveway
- 39 -

**SURFACE TYPE**

- A - Asphalt
- C - Concrete
- NG - Natural Ground

**NOT TO SCALE**

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<th>SHEET 1 OF 6</th>
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<td>DATE:</td>
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<td>QA/QC BY:</td>
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**STORM SEWER MANHOLE**

- 1A
- 73.9
- B1: Core Bore 17.9
- B2: Core Bore 70.1
- C: Core of Sidewalk 41.4

**TEST HOLE DATA**

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<th>Test</th>
<th>Hole</th>
<th>Utility</th>
<th>Material</th>
<th>Utility Size (In.)</th>
<th>Approx. Offset</th>
<th>Manual Depth</th>
<th>Cross Section</th>
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<td>G</td>
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**QUESTIONS**

- Where is the Steel Gas Main located?
- What is the utility material identified as Steel?
- What is the offset distance pulled from the Steel Gas Main?
- Identify the surface type near the location of the Steel Gas Main.
Where is the Steel Gas Main?
US 280 – AL DOT

- Using a cross-sectional view with the accurately located gas line shown in relation to the retaining wall was very helpful.
- The geotechnical designer was able to design the wall foundation to avoid impacting the gas line, taking the compaction of the backfill during construction into consideration.
Subsurface Utility Engineering Results
Before and After Comparison
US 280 – AL DOT

- Unknown/unmarked 4” steel gas main crossing US 280 found
- 20” water transmission line found 500’ from locations indicated on as-built drawings
- 12” high pressure gas main
- Accurate designating and one test hole showed gas main to be 10’ down, engineer could design accordingly for pilings to not strike gas main
- Would have cost $50,000 for point re-route
- Traffic signal fiber duct banks; once accurate horizontal and vertical location was determined, engineer could design around
US280 – AL DOT: $$$ Savings!

- A flyover ramp is being considered to eliminate a left turn from US-280 to I-459. Knowing the exact locations of the underground utilities will help avoid utility conflicts by addressing them early with the designers and the utility owners.

- Planning and designing around the utilities early rather than addressing them during construction saves time, money and enables more projects to be built in the future!

- AL DOT currently manages a statewide subsurface utility engineering program.
We have just recently kicked off Utility Coordination services in support of the US280 project to help organize the utility relocation activities based on good subsurface utility engineering information.

Having the same provider doing both subsurface utility engineering and utility coordination on the project is streamlining communication, eliminating delays due to the request for more information and provides a more intimate familiarity with the facility owners in the corridor.
Lee Roy Selmon Expressway Design-Build – FDOT

- Bridge widening and deck replacement
  - Subsurface utility engineering and utility coordination
  - 14 utility owners
  - 23,525 linear feet of buried facilities
  - 102 test holes (48 during phase one, 20 used for mast arm locations during phase two, and 34 completed to address potential utility conflicts with the proposed bridge pier locations)
  - Non-reimbursable and reimbursable utility work
Lee Roy Selmon Expressway Design-Build – FDOT

Issues Encountered and Resolution

- Major 30” water transmission line below elevated roadway – QL B required to avoid conflict with bridge piles (reimbursable – savings > $1 million)

- Overhead Electric Transmission – Adjacent to limited access ROW and crossings created constructability issues for contractor. DB team able to modify installation methods to avoid some impacts (non-reimbursable – cost savings to utility and savings for DB construction schedule)

- Utility adjustment sheets developed to document utility relocation and coordination commitments
I-95 Express Lanes Design-Build Project - FDOT

- 13 miles of Managed Lanes (Electronic Tolling), plus 5 interchange bridge replacements
  - Providing utility coordination, subsurface utility engineering and survey
  - 29 utility owners
  - Over 60,000’ of designation (QL B)
  - Estimated 212 test holes (QL A)
  - All utilities reimbursable (estimated at $2,639,010)
Issues encountered and mitigation efforts:

Bridge piles and sheet pile locations
- Performed QL B designations
- Data enabled designer to modify pile placements, as well as, sheet pile lengths
- Avoided majority of utility facilities

Pile installation vibration
- One City feared vibration may fail water lines
- Performed QL A on water mains
- Contractor able to pre-drill past lines to minimize vibration
I-95 Express Lane Design-Build Project - FDOT

- Overhead Electric Transmission and Distribution
  - Maintain OSHA and NESC clearances
  - Moratoriums for de-energizing built into schedule of work
  - Mandatory crew safety training by power company

- Cost savings to date:
  - Three of five bridges under construction
  - Less than $50,000 spent on utilities to date
  - Anticipate saving over $2.1 million on relocations
How do we Morph and is it Viable?

- Pre-qualification for utilities:
  - Subsurface utility engineering
  - Utility coordination
  - Utility coordination inspection
  - Utility design

- Minimum requirements for services
- Scopes for specialized master contracts
- Scopes for individual design projects
Consider it this way...