Ready to Respond: Improving Critical Water Line Locating with SUE and GIS

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Discussion

• Background
• Kildaire Farm Rd SUE Operations
• GIS SOP
• Outcomes and Next Steps
Background
Background

- 1,063 miles of water mains
- 10% of that is non-metallic, installed prior to 1975
- New 811 laws
  - Tickets more than doubled from 2014 to 2016
  - Increased telecommunications infrastructure installation
Quick Survey
What is Unique

- Comprehensive approach by locating and marking everything by using a sensitive corridor approach
  - Locate all water facilities
  - Locate all tees/branches of the water main
- Marker balls installed
- GIS update incorporated into SUE work
  - Ensure GIS is 100% accurate
Project Scope

- 5 years
- Positively identify all water facilities in one corridor per year
- Install marker balls, pull GPS coordinates
- Update the Town of Cary GIS

First Year:
- Provide a standard operating procedure allowing the GIS Update portion of the process to be repeated in the future.
Kildaire Farm Rd Operations

Field work and GIS Update
SUE/GIS Update Process

1. GIS Update Required
2. KCI SUE Locates Features
3. KCI Survey Acquires Locations
4. KCI Geospatial compiles GIS Data into Town of Cary GIS format
5. Town of Cary Reconciles GIS Data
Kildaire Farm Rd Operations

GIS Update Required

KCI SUE Locates Features

KCI Survey Acquires Locations

KCI Geospatial compiles GIS Data into Town of Cary GIS format

Town of Cary Reconciles GIS Data
Kildaire Farm Operations

- 2.2 mile stretch of Kildaire Farm Rd
- All non-metallic pipe
- Complete SUE every 150 ft
- Coordination between KCI and Cary so Town staff could exercise valves in KCI work zone
- +/- 4 SUE locations per day
  - Approximately 1 month, start to finish
KCI SUE Locates Features

• Using Subsurface locating equipment...
  • Mark Features with paint according to type of utility (Blue for Water)
  • Every 150 feet...
    • Perform a vacuum excavation in the form of a test hole
    • Positively locate the water pipe
    • Capture the depth of the pipe
    • Place a RFID “marker ball” in the hole and refill
  • RFID markers can also be used when a tracer wire system fails.
    • Markers are typically located at major fittings, changes if pipe direction, or at regular intervals such as at intersections or every 150' or so.
Kildaire Farm Rd GIS Update

GIS Update Required

KCI SUE Locates Features

KCI Survey Acquires Locations

KCI Geospatial compiles GIS Data into Town of Cary GIS format

Town of Cary Reconciles GIS Data
KCI Survey Acquires Locations

• Survey the location of each feature along the stretch of road
  • Valves
  • Manholes
  • Hydrants
  • Marker ball locations
  • SUE Paint markings

• Considerations
  • Traffic
  • Trees
  • Coordination with SUE
    • Time between marking and field capture
    • Field Revisits for clarification
  • Efficient/Accurate data transfer to GIS
GIS Layer Updates
What can initiate a GIS Update at Town of Cary?

- The Town of Cary (ToC) regularly encounters a need to have one or more Public Works related GIS layers updated.
- Various Town processes spur requests to improve GIS data:
  - Capital Improvement Project Process
  - Development Review Process
  - Asset Rehab Process
  - External projects involving consultants
  - Town employees engaged in daily work encounter GIS data that is in error and report it.
GIS Layers included in project scope

- GIS Feature Datasets
- Stored in ArcSDE/SQL Server
  - Water
  - Sewer
  - Storm
  - Reclaimed Water
- Point, Line and Polygon layers contained in the ESRI Feature Dataset
- Network Topology
- Water alone has 24 layers
- Maintained by the Transportation and Facilities group and housed in the Town’s Technology Services GIS database
SUE/GIS Update Process (Critical Water Project)

1. KCI Survey Acquires Locations
2. KCI Geospatial compiles GIS Data into Town of Cary GIS format
3. Town of Cary Reconciles GIS Data
4. GIS Update Required
5. KCI SUE Locates Features

Flowchart:
- KCI Survey Acquires Locations → KCI Geospatial compiles GIS Data into Town of Cary GIS format → Town of Cary Reconciles GIS Data → GIS Update Required → KCI SUE Locates Features → KCI Survey Acquires Locations
KCI Geospatial compiles GIS Data

- Town of Cary supplies current replica of GIS data to KCI
- KCI preforms updates to the water layers within that replica
  - Adding new features
  - Geometry changes
  - Attribute Changes
- Interim delivery via ArcGIS Online is made
  - Platform for review and discussion
  - Additional field data capture and adjustments are documented
- Return to the field for updated data capture if needed
- Final updates are made
- The replica database is delivered to Town
SUE/GIS Update Process (Critical Water Project)

1. GIS Update Required
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Town of Cary Reconciles GIS Data

- Replica database delivered to the town and it is reconciled
GIS SOP Development
GIS SOP Development

• Why was this needed?
  • GIS is housed in multiple areas
  • Field staff finding discrepancies with GIS and actual utility layout
  • Needed to create a defined workflow to ensure proper and efficient updates are made.
  • Wanted to meet the needs of all stakeholders
  • Increase GIS accuracy
Outcomes and Next Steps
Outcomes

• 136 GPS points
• 97 marker balls
• Completely updated corridor in the Town water GIS table
• Exercised all the valves in corridor, pulled valve info
• Develop a Town-wide GIS update SOP and workflow
  • Tied in to Town’s new work order system
• Accurate mapping to support the Kildaire Farm Rd water main replacement
Next Steps/Lessons

• Town Public Works and Utilities staff identified the remaining corridors
  • Corridor-wide approach works well – get one long stretch of the system verified

• Important points to remember
  • Staff know their processes best and what is broken
  • The consultants role is to assist and facilitate
  • Revisions to documents are important don’t be afraid to revise repeatedly
  • Ask questions when you do not understand
  • Teamwork between Town staff can make all the difference
    • Get all stakeholders involved; co-creation leads to buy-in
  • Alert the public to the field work
    • High traffic areas at night
Questions?

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