Managing Gas Facility Inspections with Workforce for ArcGIS
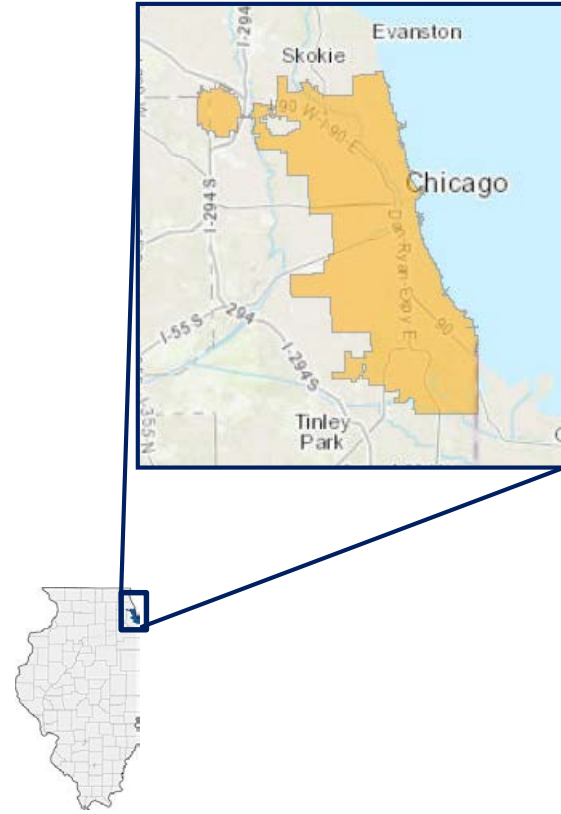
Esri GeoConX 2017

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NORTH SHORE GAS®
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Peoples Gas

- Founded in **1850**

- Deliver natural gas to about **843,000 customers** in the city of Chicago.

- **~20 GIS staff** supporting Peoples Gas and North Shore Gas

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Background

- System Operations performs inspections on:
  - Gate station components
  - District regulator stations
  - Valves
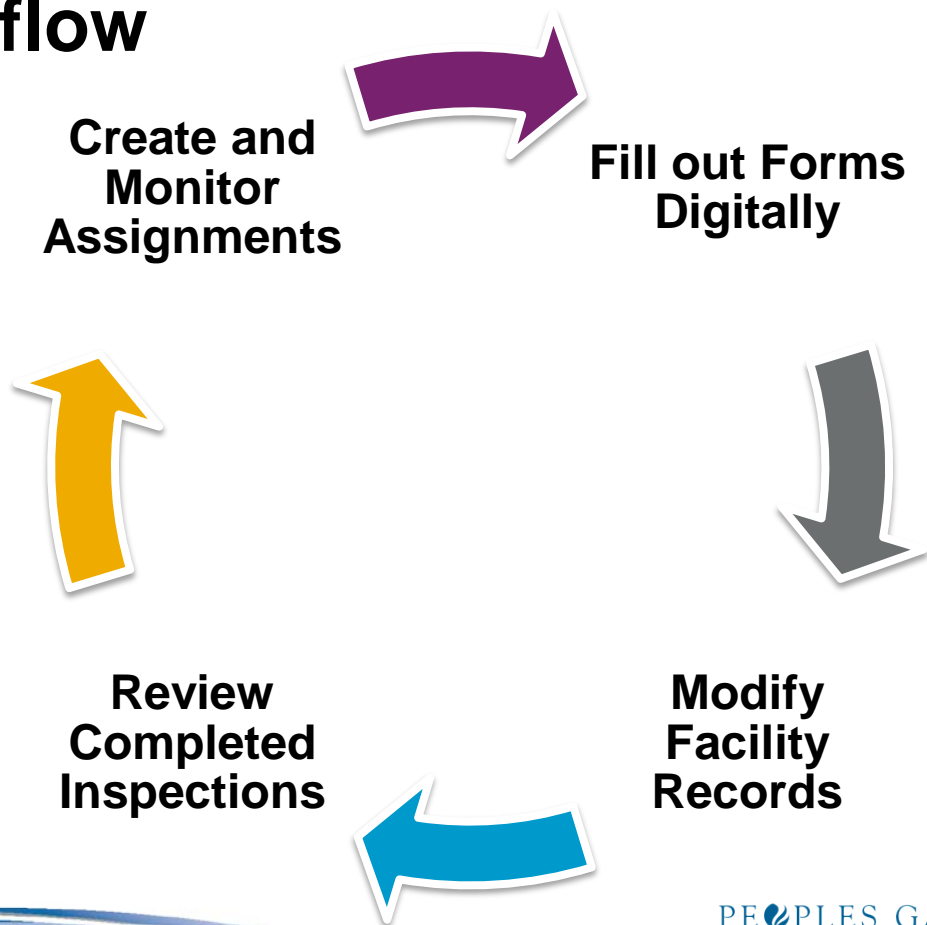 - and other facilities…

Background

- System Operations Group asked GIS group for help shifting away from paper record-keeping:
    - Filing cabinets full of paper
    - Difficult to retrieve and audit
    - Lost paperwork
- Initial focus on non-regulatory work
    - Vault Inspection Runs
    - Maintenance Work

Records

- Paper used for district regulator (**vault**) inspections and **maintenance work**.

Target Workflow

Create and Monitor Assignments

Fill out Forms Digitally

Modify Facility Records

Review Completed Inspections

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Target Workflow

Workforce — **Create and Monitor Assignments**

Survey123 — **Fill out Forms Digitally**

Collector — **Modify Facility Records**

Survey123 Web — **Review Completed Inspections**

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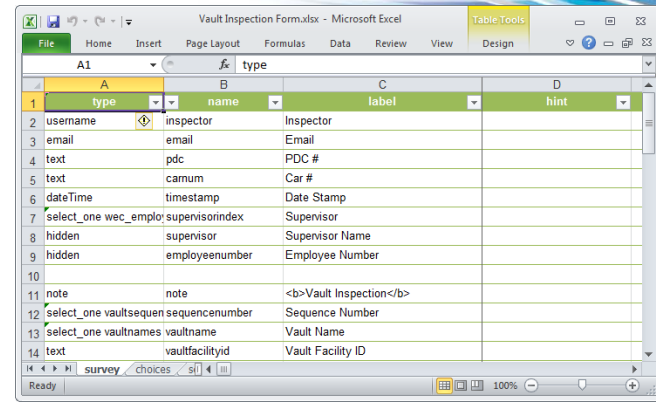
Configuration

Configuration Steps

- Build and Configure:
  1. Forms (Survey123)
     - Vault Run
     - Maintenance
  2. Maps (Collector)
  3. Project (Workforce)
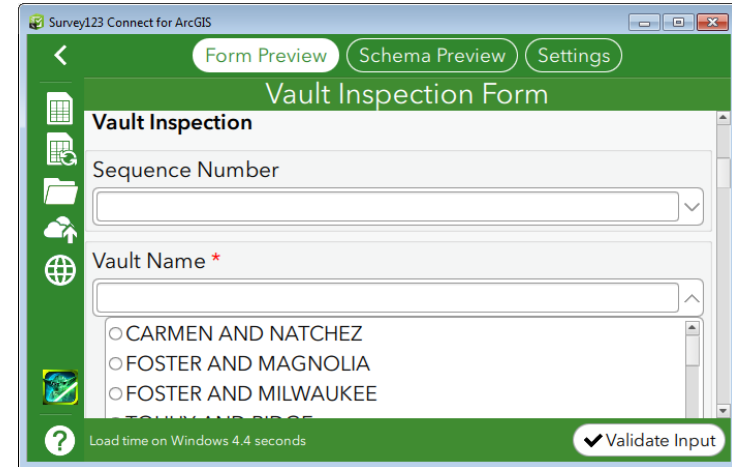
Form Configuration

- Survey123 Connect

  - Allows for XLSForm-based authoring of surveys

  - Preview appearance and functionality of survey

  - Surveys published to ArcGIS Online or Portal

Map Configuration

- ArcGIS Online/Portal
  - Include feature service(s) to be edited
  - Configure
    - Scale dependencies
    - Edit permissions
    - Popup customization
    - Custom URL linking to Survey123
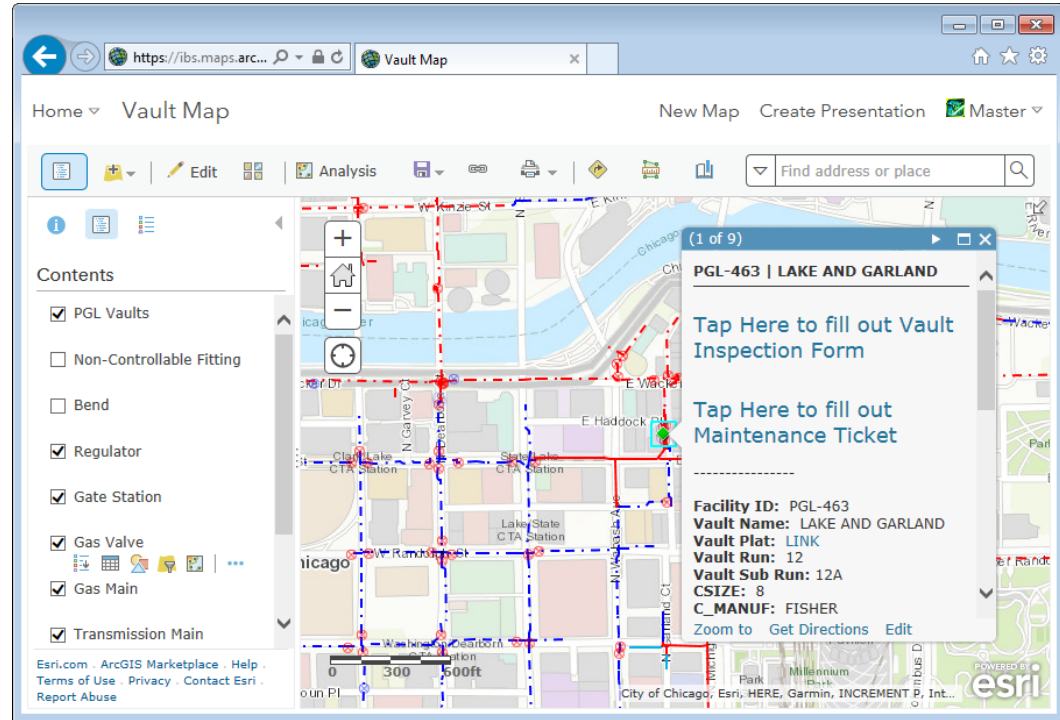
Workforce: Project Configuration

- Workforce Web App
  - Project Creation (**6** steps) and Configuration
  - Assignment Dispatch

1. Create Project

2. Add Assignment Types

3. Add Mobile Workers

4. Add More Dispatchers

5. App Integration

6. Configure Dispatch and Mobile Worker Maps

Workforce: Project Configuration

1. **Create Project**
2. Add Assignment Types

Project Setup

1 of 4 Steps Completed

Add the types of work that your mobile workers will be performing.

1. Create Project ✓
2. Add Assignment Types
3. Add Mobile Workers
4. Add More Dispatchers

Create a Project ✕

Name *

Demonstration

Summary (Optional)

This is a demonstration.

Give your project a summary that describes what it will be used for.

Cancel   Create project

Assignment types specify the different kinds of work that your mobile workers need to perform. When creating a new work assignment, dispatchers choose from a list of assignment types.

Add an Assignment Type

Enter a new type…   + Type

Assignment Type

Inspect Vault   ⊗

Perform Maintenance   ⊗

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Workforce: Project Configuration

1. Create Project
2. **Add Assignment Types**

Project Setup

1 of 4 Steps Completed

Add the types of work that your mobile workers will be performing.

1. Create Project ✓
2. Add Assignment Types
3. Add Mobile Workers
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Create a Project   ×

Name *
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Add an Assignment Type

Enter a new type...   + Type

Assignment Type

Inspect Vault   ⊗

Perform Maintenance   ⊗

Workforce: Project Configuration

3. **Add Mobile Workers**
4. Add More Dispatchers

Workforce: Project Configuration

3. Add Mobile Workers
4. **Add More Dispatchers**

Workforce: Project Configuration

Initial Setup Complete

Workforce: Project Configuration

5. **App Integration**

Workforce: Project Configuration

5. App Integration

Step 1 of 2: Integrate Survey123 for ArcGIS ✕

Integrate the Survey123 form with the Project or specific Assignment Types.

Vault

Vault Inspection Form
Updated Aug 22, 2017

Cancel | Next

App Integration ✓   Collapse ⌃

App integrations maximize the efficiency of your mobile workers by providing directions and the maps and forms needed to complete their work. More info

⬦ Navigator for ArcGIS ✓   Remove

📋 Collector for ArcGIS ✓   Add   Remove All
   Assignment type Inspect Vault is integrated to the Vault Map Collector map   Edit   Remove

📋 Survey123 for ArcGIS   Add

Step 2 of 2: Integrate Survey123 for ArcGIS ✕

Integrate the Survey123 form with the Project or specific Assignment Types.

☐ Project (applies to all assignment types)

☑ Inspect Vault   ☐ Perform Maintenance

Cancel | Done

Workforce: Project Configuration

5. App Integration

Workforce: Project Configuration

6. **Configure Dispatch and Mobile Worker Maps**

Workforce: Project Configuration

6. **Configure Dispatch and Mobile Worker Maps**

- Add operational layers (e.g., gas system)
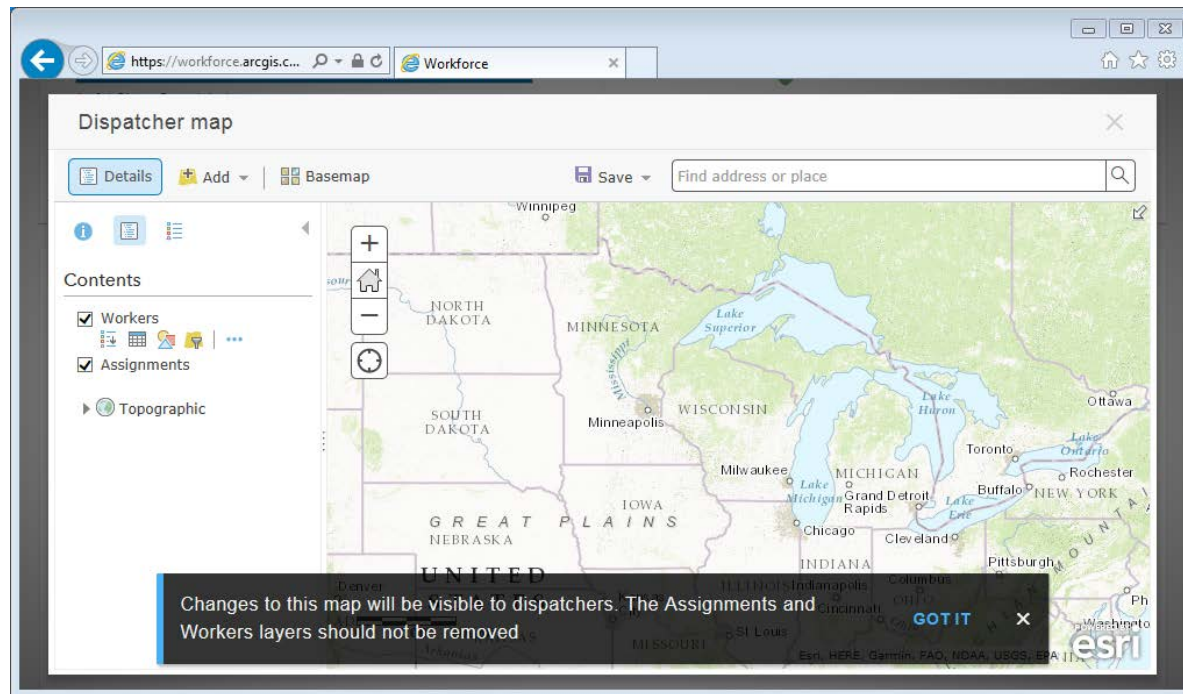
Workforce: Project Configuration

6. **Configure Dispatch and Mobile Worker Maps**

- Enable Querying in Dispatch Map
  - Access each map's Web Map Settings through ArcGIS Online/Portal to enable query functionality within Workforce
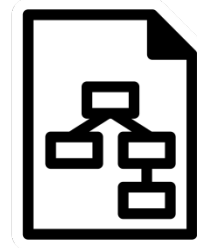
Workflows

Workforce: Dispatch Workflows

- Creating Facility Maintenance Assignments
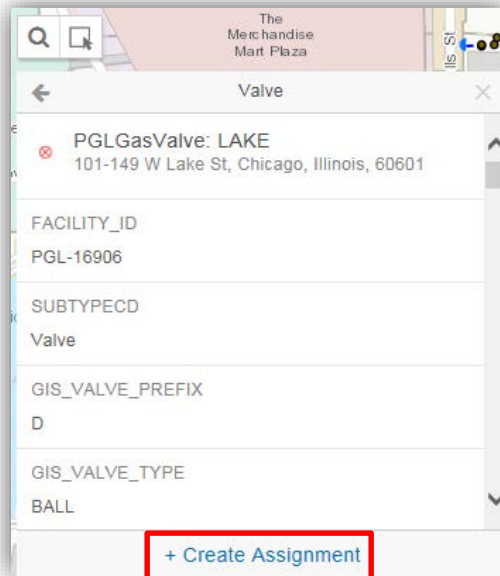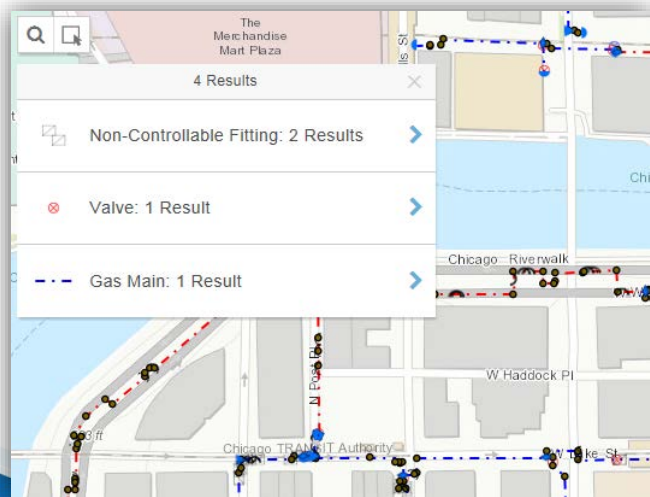
Workforce: Dispatch Workflows

- Creating Vault Inspection Assignments
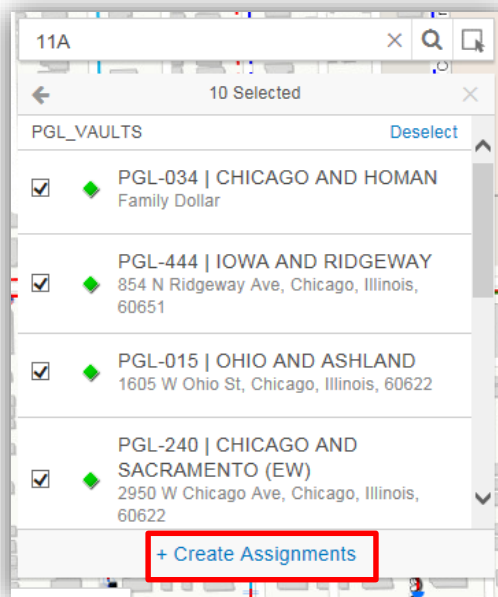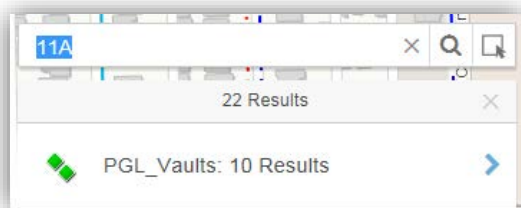
Workforce: Dispatch Workflows

- View Worker Status
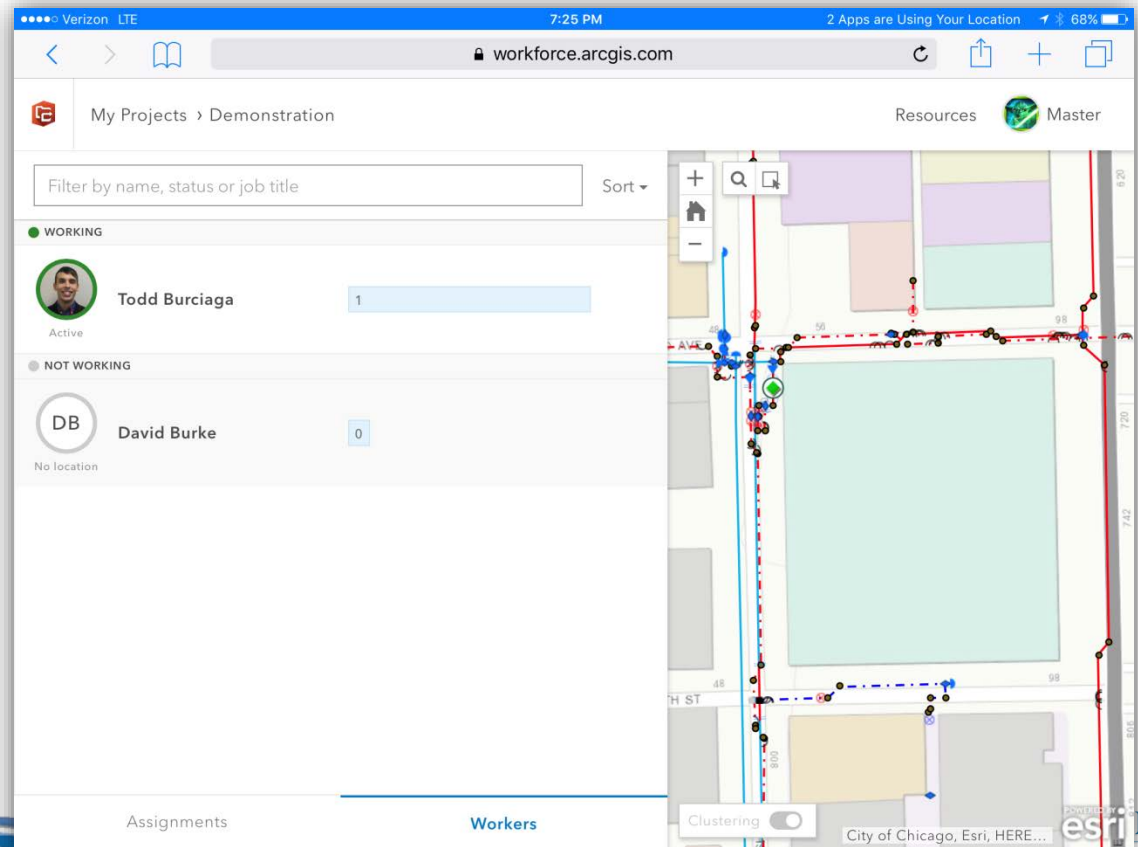
Workforce: Dispatch Workflows

- ▪ REST API
  - ▪ Can create assignments by pushing work orders from external systems

Create an assignment through the REST API

Workforce works with the content of the Assignments feature layer, regardless of how the records were created. There is no requirement to create assignments through the Workforce web app. If the record is created in the Assignments feature layer properly through the REST API, Workforce recognizes it as a valid assignment in both the web and mobile apps.

When creating assignments, use the REST API Add features command. There are some fields you are required to provide values for, some fields you can provide values for if your assignment requires them, and others that you shouldn't provide values for.

You need to supply values for the following fields:

| Field	Definition	Value to provide
SHAPE	The point location of the assignment	An x,y coordinate pair
status	The assignment's status, from the values in the Assign_Status domain	▪ 0 (Unassigned) to create unassigned work ▪ 1 (Assigned) if you are going to assign the work as part of its creation ⚠ Caution: If you are going to assign the work, you also need to include values for the workerId and assignedDate fields, described in a later table.
assignmentType	The type of the assignment, from the values in the Assign_Type domain	Any valid value from the Assign_Type domain
location	Text description of the point location of the assignment	An address; an x,y coordinate pair; or any descriptive text
assignmentRead	Specifies if the worker has viewed the assignment	0 since the assignment is unread
dispatcherId	The ID of the dispatcher creating the assignment (dispatchers.OBJECTID from the Dispatchers layer)	May be the dispatcher ID for the ArcGIS organizational user you are connected as, or could be the ID of a particular dispatcher associated with the project

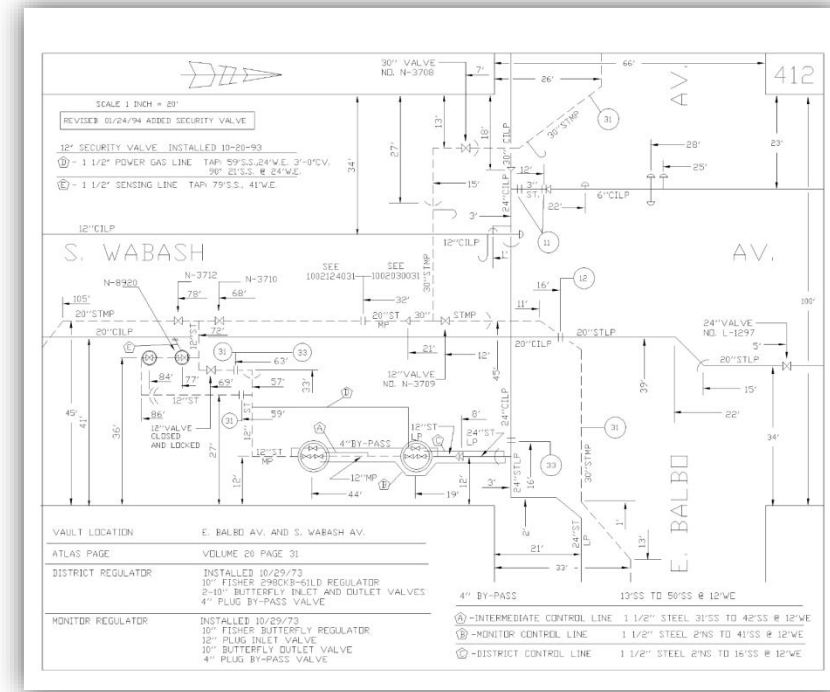# Workforce: Mobile Worker Workflow

1. Assignment Received
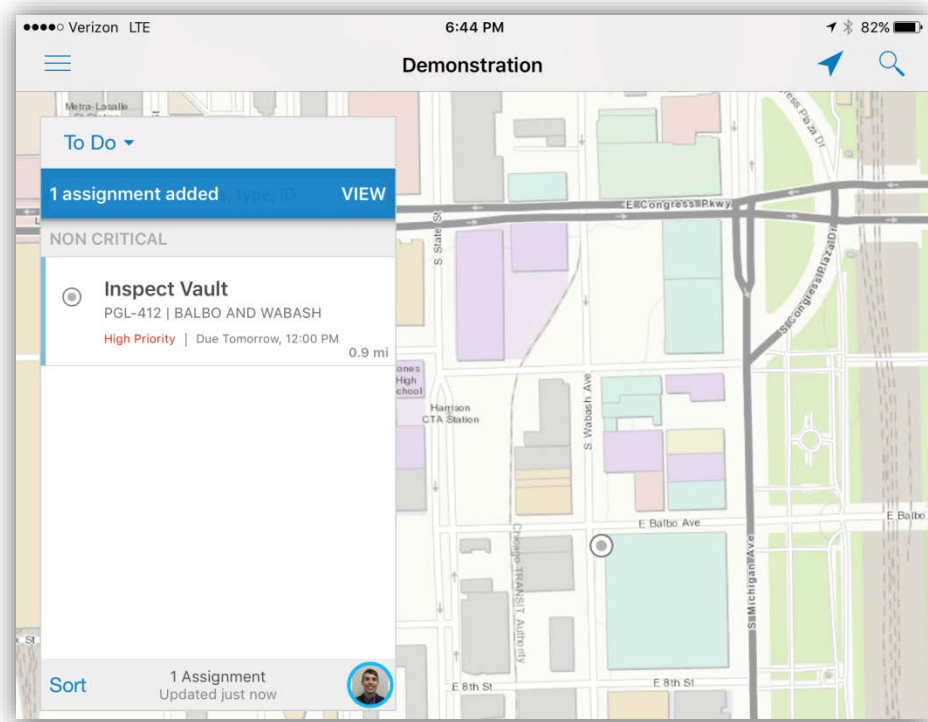
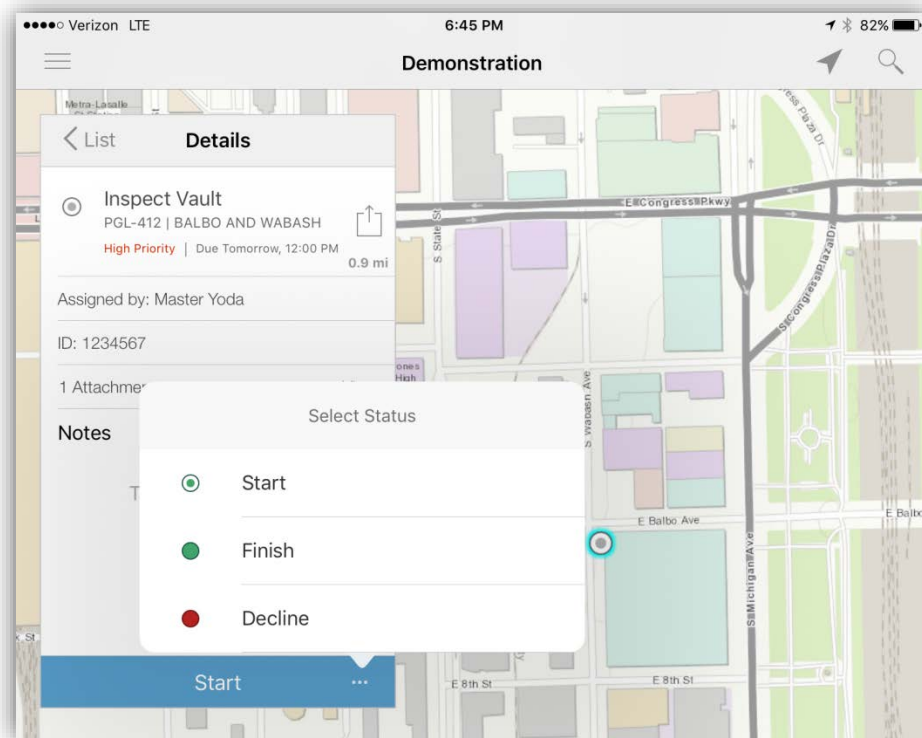# Workforce: Mobile Worker Workflow

2. Accept and Start Work

Workforce: Mobile Worker Workflow
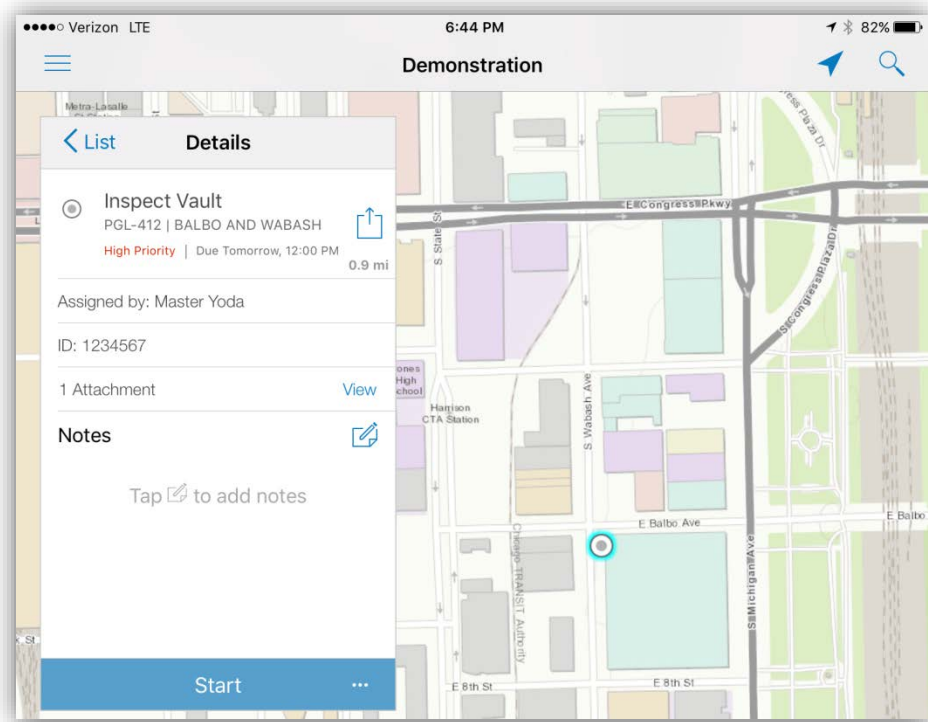
3. View Attachments if needed

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Workforce: Mobile Worker Workflow

4. Change States to "Start"

Workforce: Mobile Worker Workflow

5. Tap "Survey at Assignment" to Complete Inspection Form

Modify Feature Location or Attributes

Complete Inspection Form

Workforce: Mobile Worker Workflow

6. Populate form

Workforce: Mobile Worker Workflow

6. Populate form

Workforce: Mobile Worker Workflow

6. Populate form

Workforce: Mobile Worker Workflow

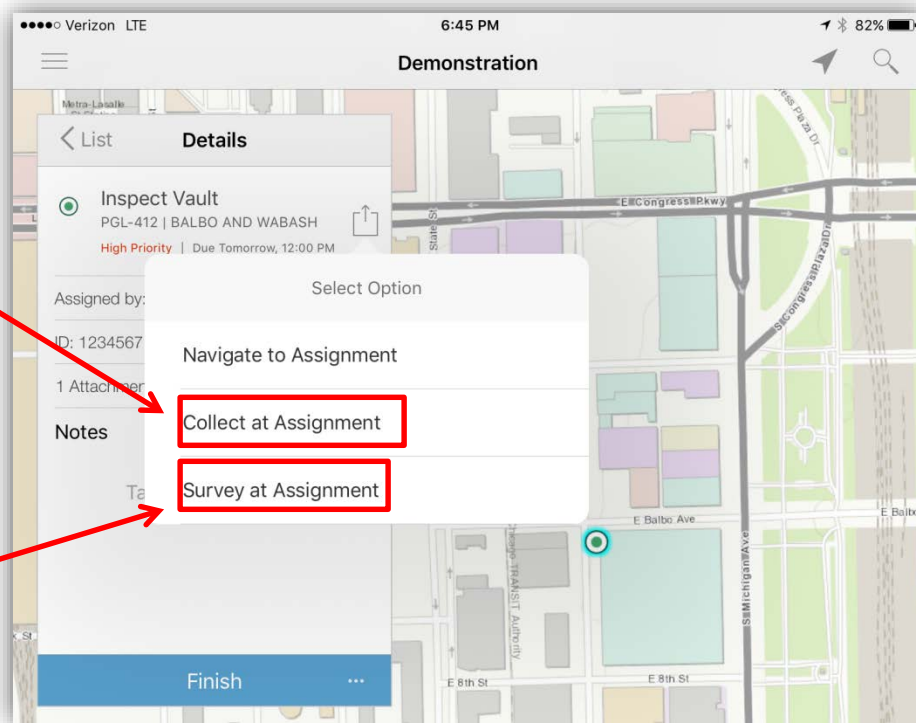6. Submit form

Workforce: Mobile Worker Workflow

7. Tap "Collect at Assignment" to update feature location or attributes
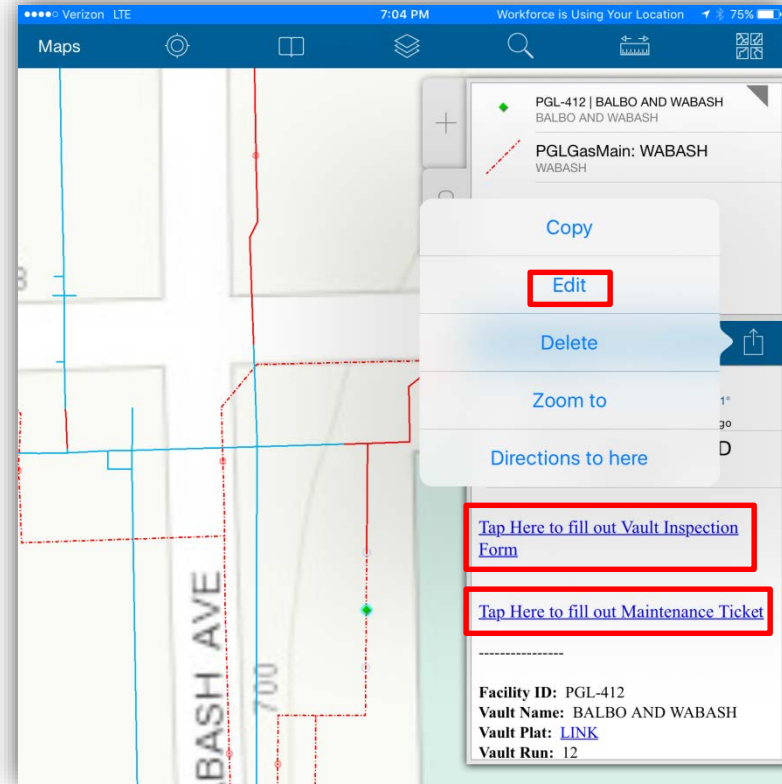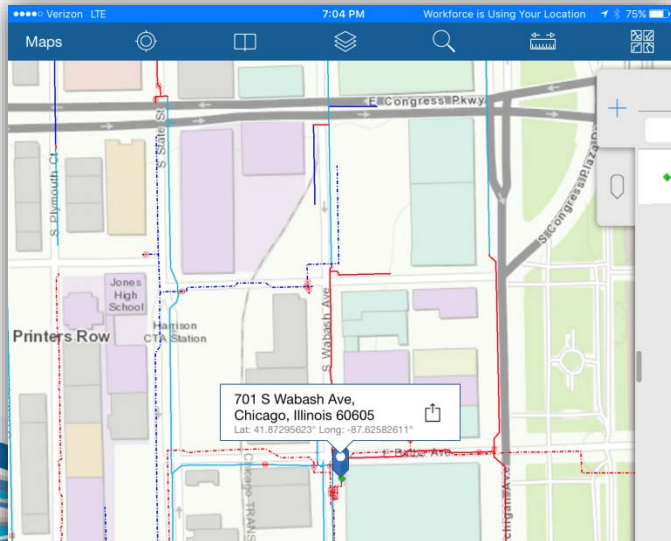
Modify Feature
Location
or Attributes

Complete
Inspection Form

Workforce: Mobile Worker Workflow

8. Update location, attributes, or attachments

- Alternatively, launch the vault or maintenance forms
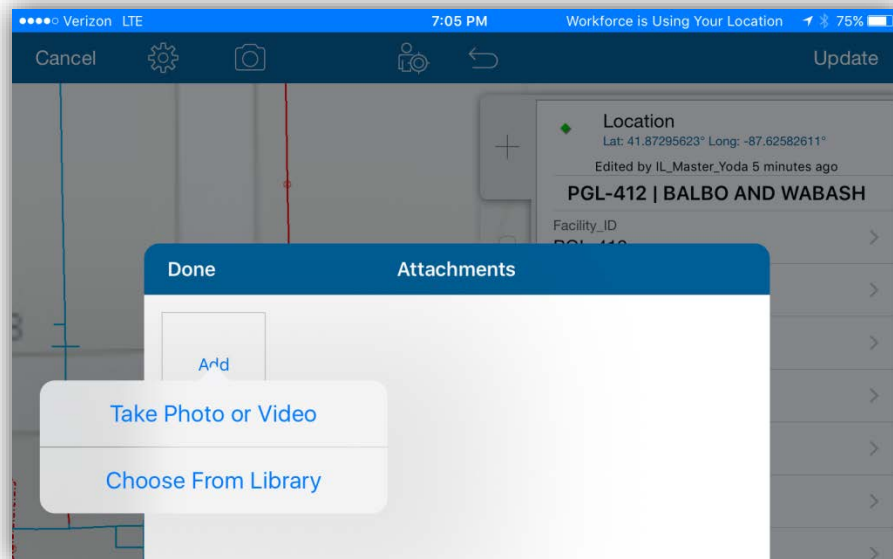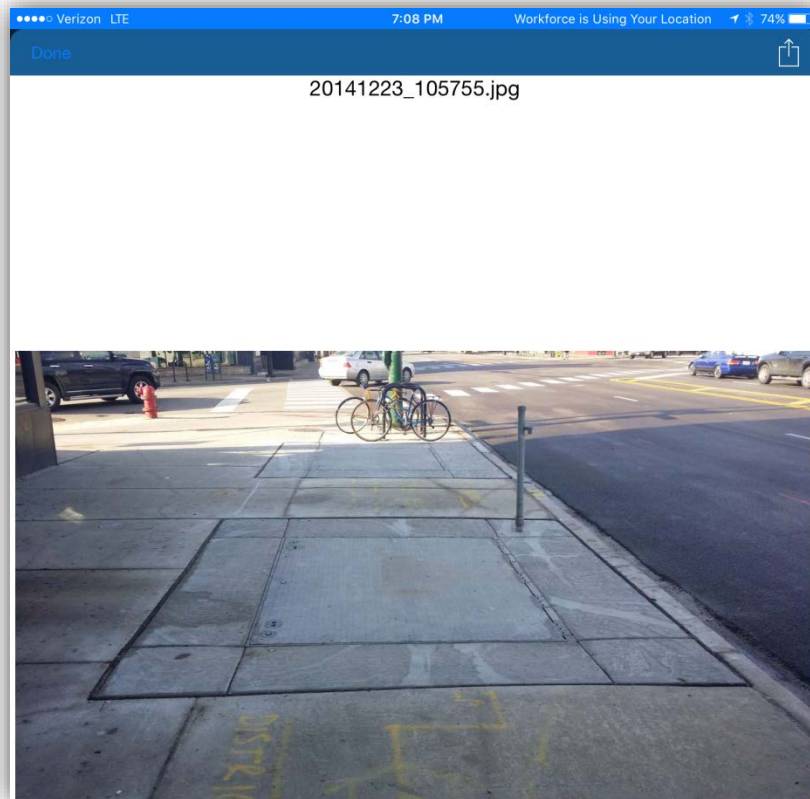
Workforce: Mobile Worker Workflow

8. Update location, attributes, or attachments

Workforce: Mobile Worker Workflow

8. Update location, attributes, or attachments
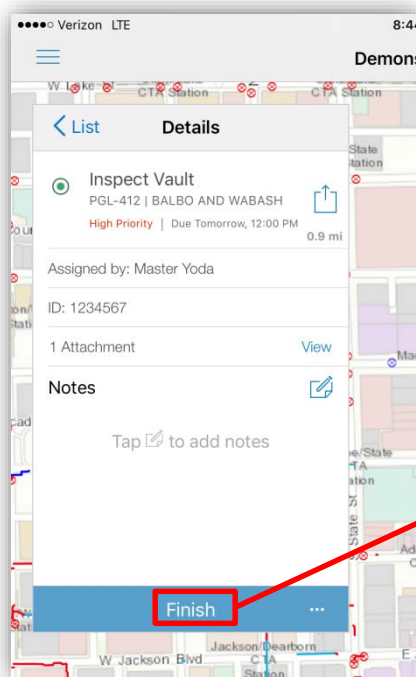
Workforce: Mobile Worker Workflow

8. Update location, attributes, or attachments
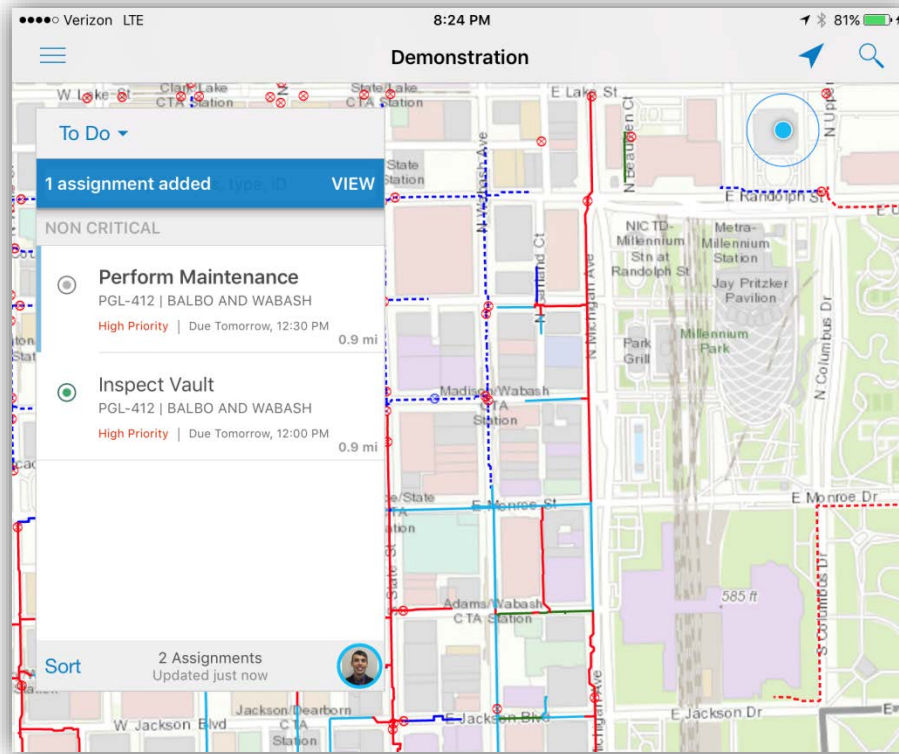
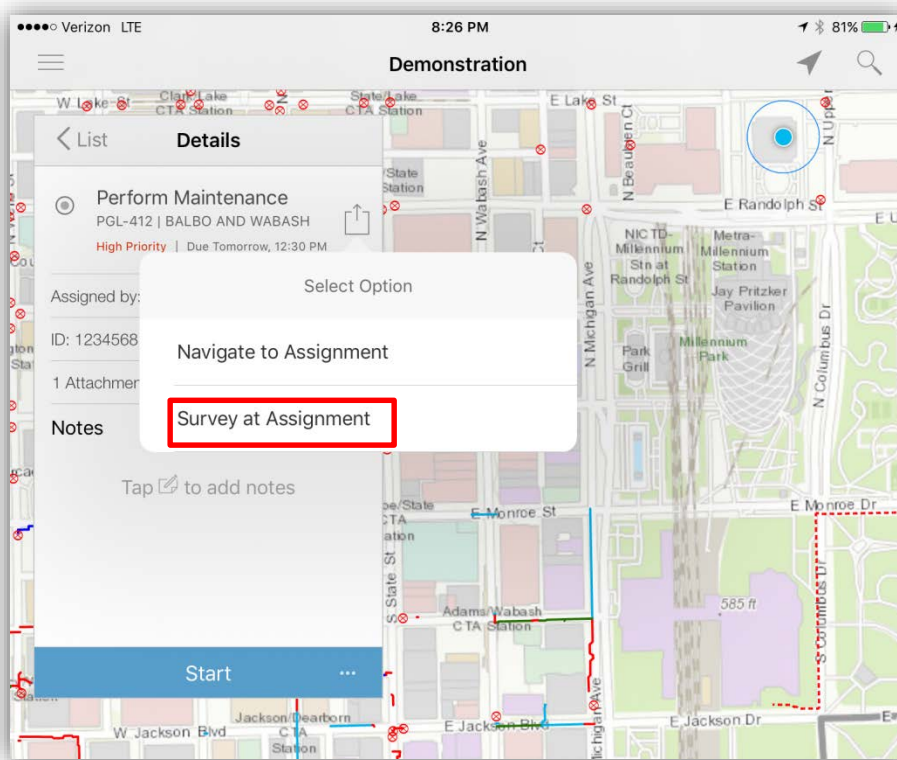# Workforce: Mobile Worker Workflow

9. Finish Assignment

Workforce: Mobile Worker Workflow

- Maintenance Form

Workforce: Mobile Worker Workflow

- Different assignment type, different form.

Workforce: Mobile Worker Workflow

- Different assignment type, different form.

Data Review

Workforce: Data Review

- Survey123 Web: Analyze and Data Views

Data Tab

Analyze Tab

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Hardware & Training

- 25 iPads for field use.
- Pilot with small user group (~3 crew members)
- Several revisions of the forms
- System Operations conducted training

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Planned Improvements

- Convert additional paper forms

- Develop more robust reporting

Web AppBuilder

- Pursue automatic assignment creation via REST API.

Lessons Learned

1. Pilot with small tech-friendly group and implement feedback quickly.

2. Integrating additional forms into each Workforce Project is seamless.

3. Ability to vary associated Survey123 form and Collector map by assignment type is crucial.

4. Use of Survey123 forms requires very little training for most.

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Future Improvements

Workforce Functionality Wish List

- Pass attributes from facility to assignment to Survey123 via action button according to the assignment type

- Allow more than 12 results by webmap query

- Enable mobile workers to add attachments to assignments as they complete them

- Consolidation of functions into one application.

- Ability to turn layers on/off within the Workforce mobile app.

All Are Already Ideas on ArcGIS Ideas website

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Q&A