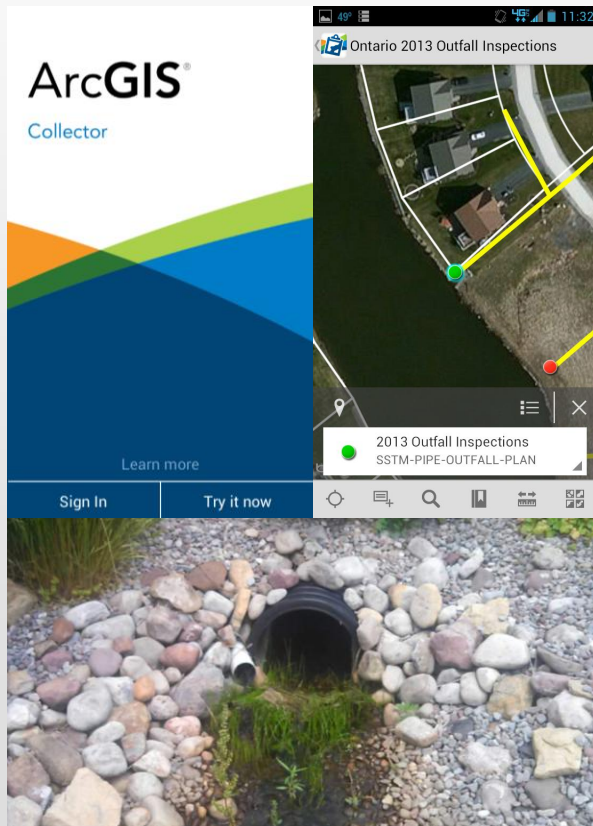


ArcGIS Collector App for Stormwater Phase II Inspections



November 13, 2013

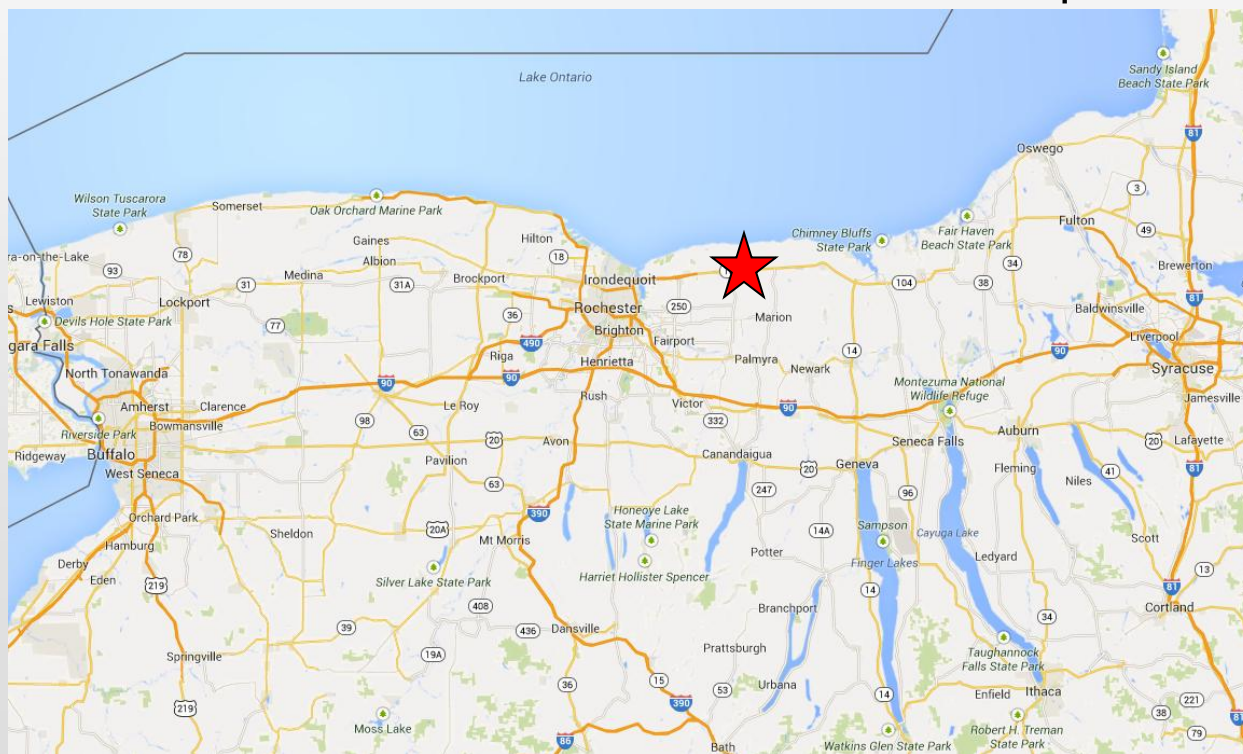
Presented by:

Daniel Allen, GISP

MRB | *group*

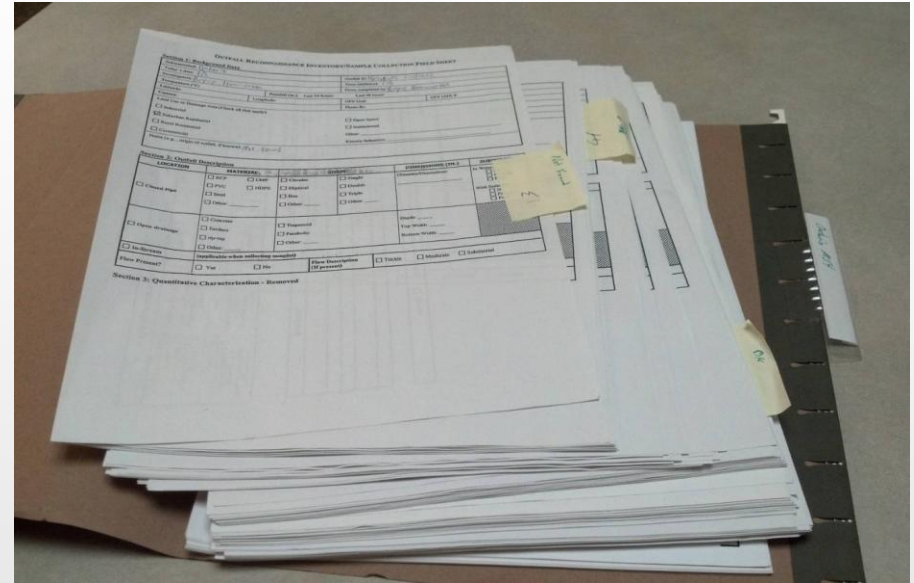
Introduction

- Town of Ontario (Wayne County, NY)
 - Required to perform stormwater phase II inspections of all storm outfalls and detention ponds



Problem

- Large stack of paper inspections from 2012
 - No easy way to map results or query the information collected
 - No easy way to associate pictures taken with existing GIS points
- Lack of an easy mobile map for the inspector to find all features to be inspected in 2013



Opportunity

- Ontario-Wayne Stormwater Coalition gave notice that the Town would have an intern for a week to complete the 2013 stormwater inspections
- The decision was made to pilot test the ArcGIS app for live inspection collection with pictures taken on a mobile phone
- We only had about 2 days to test the procedure and work out any bugs

Ingredients / Known Variables

- ArcGIS Online organizational subscription
- Android and/or Apple Smartphones to be used
- ArcGIS app and the ArcGIS Collector app to pick from
- Existing geodatabase feature classes for pipe and pond outfalls
- Existing EPA paper inspection form
- ArcGIS apps do not support offline editing yet
 - Must have cellular data connection to save inspections
- Known dead spots in cell coverage along Lake Ontario

Ingredients / Known Variables



Ingredients / Known Variables

- Intern had no experience with GIS
- Everything stock ESRI – no budget or time for customization
- Oh... and did I mention that we only had 2 days to work out any bugs?

Design Process

- ArcGIS Online does not yet support related tables
 - Inspection data must be collected as a “duplicate” GIS point
- Made copy of existing feature class points for storm sewer and pond outfalls
- Renamed “2013 Inspections-”
- Added appropriate fields as attributes to mimic EPA paper inspection form
- Added subtypes for consistent data entry

Design Process

OUTFALL RECONNAISSANCE INVENTORY/ SAMPLE COLLECTION FIELD SHEET

Section 1: Background Data

Subwatershed: _____		Outfall ID: _____	
Today's date: _____		Time (Military): _____	
Investigators: _____		Form completed by: _____	
Temperature (°F): _____	Rainfall (in.): Last 24 hours: _____ Last 48 hours: _____		
Latitude: _____	Longitude: _____	GPS Unit: _____	GPS LMK #: _____
Camera: _____		Photo #s: _____	
Land Use in Drainage Area (Check all that apply):			
<input type="checkbox"/> Industrial		<input type="checkbox"/> Open Space	
<input type="checkbox"/> Ultra-Urban Residential		<input type="checkbox"/> Institutional	
<input type="checkbox"/> Suburban Residential		Other: _____	
<input type="checkbox"/> Commercial		Known Industries: _____	
Notes (e.g., origin of outfall, if known): _____			

- Noticeable from a distance
- Clearly visible in outfall flow
- Opaque
- Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE	DIMENSIONS (IN.)	SUBMERGED
<input type="checkbox"/> Closed Pipe	<input type="checkbox"/> RCP <input type="checkbox"/> CMP <input type="checkbox"/> PVC <input type="checkbox"/> HDPE <input type="checkbox"/> Steel <input type="checkbox"/> Other: _____	<input type="checkbox"/> Circular <input type="checkbox"/> Single <input type="checkbox"/> Elliptical <input type="checkbox"/> Double <input type="checkbox"/> Box <input type="checkbox"/> Triple <input type="checkbox"/> Other: _____ <input type="checkbox"/> Other: _____	Diameter/Dimensions: _____	In Water: <input type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/> Fully With Sediment: <input type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/> Fully
<input type="checkbox"/> Open drainage	<input type="checkbox"/> Concrete <input type="checkbox"/> Earthen <input type="checkbox"/> rip-rap <input type="checkbox"/> Other: _____	<input type="checkbox"/> Trapezoid <input type="checkbox"/> Parabolic <input type="checkbox"/> Other: _____	Depth: _____ Top Width: _____ Bottom Width: _____	
<input type="checkbox"/> In-Stream	(applicable when collecting samples)			
Flow Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <i>If No, Skip to Section 5</i>			
Flow Description (If present)	<input type="checkbox"/> Trickle <input type="checkbox"/> Moderate <input type="checkbox"/> Substantial			

To The Cloud....

- Published feature classes to ArcGIS online map feature services
- Enabled attachments for inspection photographs
- Created ArcGIS.com web map with the published feature services
 - Added zoom scales and customized pop-up's
 - Configured point features to change color once inspection was complete

To The Cloud....

The screenshot displays the ArcGIS Online interface for a web map titled "StormOutfallInspection2013". At the top, there is a navigation bar with options: "Add Item", "Create Map", "Share", "Delete", "Move", "Create Service", and "Change Owner". Below this is a breadcrumb trail: "HOME", "GALLERY", "MAP", "GROUPS", "MY CONTENT", "MY ORGANIZATION", and a user profile "Dan".

The main content area shows the map title "StormOutfallInspection2013" and a thumbnail of the map. To the right of the thumbnail, the following information is displayed:

- Outfall Inspections
- Features (Hosted) by allenallen
- Source: Feature Service
- Last Modified: June 27, 2013
- 0 ratings, 1,151 views
- Facebook and Twitter social media links

Below the map information, there are action buttons: "OPEN", "SHARE", "EDIT", "DELETE", "MOVE", "CHANGE OWNER", and "USAGE".

The "Description" section contains the text "Outfall Inspections".

The "Access and Use Constraints" section lists "Town of Ontario".

The "Layers" section shows a layer named "STORM_PIPE_OUTFALLS". A context menu is open over this layer, listing the following options:

- Export to Shapefile
- Export to CSV file
- Service URL
- Disable Attachments
- Time Settings

The "Properties" section is partially visible, showing fields for "Shared with", "Tags", "Credits", and "Size".

On the left side, a legend is open, showing two main categories:

- 2013 SWMF Inspections**
 - Pending Inspection (Red star icon)
 - Complete (Green star icon)
- 2013 Outfall Inspections**
 - Pending Inspection (Red circle icon)
 - Complete (Green circle icon)
- Storm Pipe**
 - Yellow line icon

Testing

- The beauty of ArcGIS Online maps
 - One map, many viewing platforms
 - No configuration changes needed
- Opened ArcGIS Online map in Android and Apple versions of ArcGIS mobile app
- Created and edited “test” inspections with photo attachments
- Everything appeared to work as planned (in the office that is)

Testing

Ontario 2013 Outfall Inspe x

mrbgroup.maps.arcgis.com/home/webmap/viewer.html?webmap=1cb84cdc766e4073a04726f2138ab957

HOME ▾ Ontario 2013 Outfall Inspections NEW MAP Dan ▾

Details Add Edit Basemap Save Share Print Directions Measure Bookmarks Find address or place

Legend

2013 SWMF Inspections

- ★ Pending Inspection
- ★ Complete

2013 Outfall Inspections

- Pending Inspection
- Complete

bing

101 Lake Rd

101 Lake Rd

POWERED BY esri

Learning Curve

- Training session with Stormwater Coalition intern
 - Installed ArcGIS app on his phone (Motorola Razr – Android)
- Lack of substantial GIS experience was not an issue
- ArcGIS apps have a quick learning curve

Initial Technical Problems

- Photo attachments and sometimes certain inspection fields were not saving
 - We were following in real-time back at the office using an ArcGIS Online map
 - We were able to spot this problem right away

Initial Technical Problems

The screenshot shows a web browser window displaying an ArcGIS web map viewer. The browser's address bar shows the URL: `mrbgroup.maps.arcgis.com/home/webmap/viewer.html?webmap=1cb84cdc766e4073a04726f2138ab957`. The page title is "Ontario 2013 Outfall Inspections". The interface includes a top navigation bar with "HOME" and "NEW MAP" options, and a user profile "Dan". A toolbar below the navigation bar contains icons for "Details", "Add", "Edit", "Basemap", "Save", "Share", "Print", "Directions", "Measure", and "Bookmarks", along with a search box labeled "Find address or place".

On the left side, there is a "Legend" panel with two sections:

- 2013 SWMF Inspections**
 - Pending Inspection (red star icon)
 - Complete (green star icon)
- 2013 Outfall Inspections**
 - Pending Inspection (red circle icon)
 - Complete (green circle icon)

The main content area displays a detailed information popup for a selected feature. The popup contains the following data:

Location	7228 Byron Cir
OutfallType	Pipe Outfall
Accuracy	Approximate/Unknown
InspectionDate	7/8/2013, 10:43 AM
Inspector	
LandUseNearby	Residential Suburban
PipeMaterial	
NumberOfPipes	
EndComposition	
DiameterOrDims	18
SubmergedWater	
SubmergedSediment	
Flow	
FlowAmount	
FlowOdor	
FlowOdorSeverity	
FlowColor	
FlowColorSeverity	
FlowTurbidity	
FlowFloatables	
FlowFloatablesSeverity	
DepositsStains	
Vegetation	
PoorPoolQuality	
PipeBenthicGrowth	
OutfallStructureCondition	
OverallOutfallRating	
ActionRequired	No
Notes	
PhotoNumber	
MappedLocationWrong	No
InspectionComplete	Yes

Below the table, there is an "Attachments:" section with one attachment: `ArcGISApp_1373294688515.jpg`. At the bottom of the popup, it says "Edited by mrbguest on Monday at 10:45 AM" and provides "Zoom to" and "Get Directions" options.

The background of the map shows a satellite view of a residential area with a street labeled "Stonehedge Dr". The Esri logo is visible in the bottom right corner of the map area.

Quick Fix

- Had intern download ArcGIS Collector app
- Seemed to resolve the problems we were having with the original ArcGIS app not saving certain fields
- Source of problems unknown
 - Possibly related to conflict with specific Android mobile device hardware being used or network connectivity issues
- Easy transition to new app because of similar design

Inspection Progress

- Inspections went fairly smoothly after that
- There were a few points where there was no cell service by Lake Ontario shoreline
 - These were recorded on the paper form and entered to the ArcGIS Online map back at the office

Mobi



Details

DepositsStains

None



Notes



Ontario 2013 Outfall Inspections

NEW MAP Dan

Details
 Add
 Edit
 Basemap
 Save
 Share
 Print
 Directions
 Measure
 Bookmarks

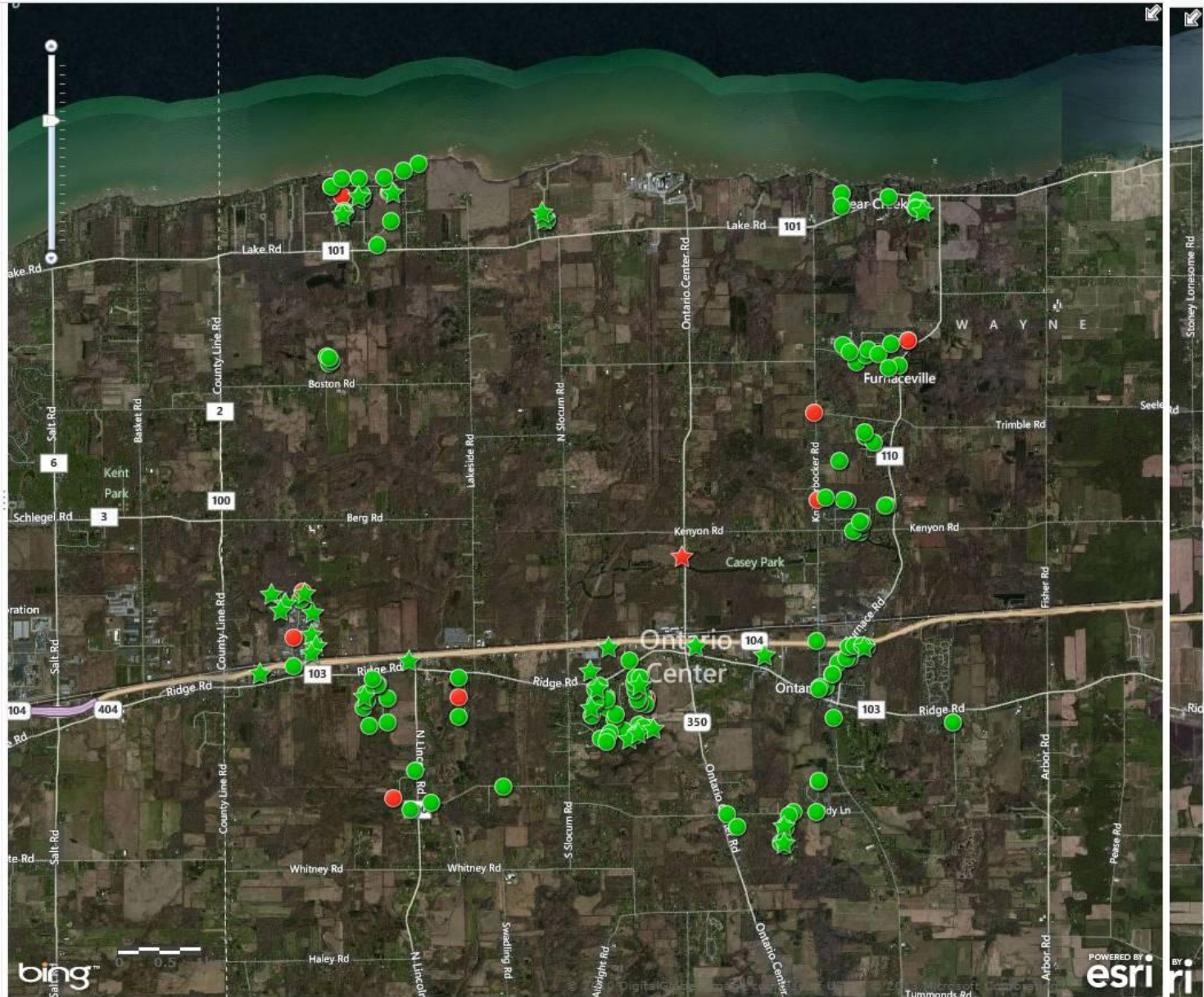
Add Features

Storm Mgmt Facilities

- Pending Inspection
- Complete Inspection

STORM_PIPE_OUTFALLS

- Pending Inspection
- Complete Inspection



Inspections Complete

- Now what?
- Bring data back from the “Cloud” to original local network file geodatabase
- Generate custom paper reports using ArcGIS Desktop
- So this should be easy right?

Disappearing Photo Attachments

- When I synchronized the inspection data back to the local network, the photo attachments disappeared from the inspection points

Disappearing Photo Attachments

Identify from: <Top-most layer>

STORM_PIPE_OUTFALLS
SSTM-PIPE-OUTFALL-PLAN

Location: 625,895.026 1,174,724.943 Feet

Attachments (1)

Field	Value
PipeShape	<null>
NumberOfPipes	1
EndComposition	None
DiameterOrDims	18
SubmergedWater	Partially
SubmergedSediment	No
Flow	Yes
FlowAmount	Trickle
FlowOdor	None
FlowOdorSeverity	0
FlowColor	Clear
FlowColorSeverity	0
FlowTurbidity	0
FlowFloatables	None
FlowFloatablesSeverity	0
DepositsStains	None
Vegetation	Sparse
PoorPoolQuality	Suds
PipeBenthicGrowth	Green
OutfallStructureCondition	Excellent
OverallOutfallRating	Good
ActionRequired	No
Notes	
PhotoNumber	
MappedLocationWrong	No
InspectionComplete	Yes
GlobalID	3e0937dd-5630-4ee6-8043
CreationDate	12:00:00 AM
Creator	
EditDate	12:00:00 AM
Editor	
Shape	Point

Identify from: <Top-most layer>

STORM_PIPE_OUTFALLS
SSTM-PIPE-OUTFALL-PLAN

Location: 625,892.737 1,174,729.520 Feet

Field	Value
Outfall_Id	3097
Location	615? Lillypond Way
InspectionDate	7/10/2013 6:01:43 PM
Inspector	Evan Baxter
LandUseNearby	Residential Suburban
PipeMaterial	HDPE
PipeShape	<null>
NumberOfPipes	1
EndComposition	None
DiameterOrDims	18

Identified 1 feature

Tip: Double-click an item to open.

OK Cancel

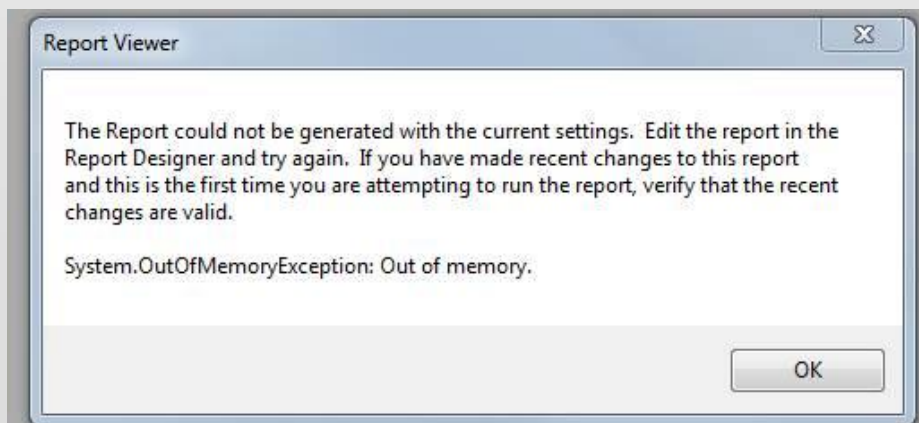
Disappearing Photo Attachments

Long story short –

- According to ESRI Tech Support, it appeared this was a bug with ArcGIS 10.1 related to the inspection feature classes having subtypes
- This was the **only** part of the process I did not have time to fully test before implementation
- So we had to manually re-attach every photo to its inspection point using ArcGIS desktop
 - By “we” I mean we had the intern do it

Final Report

- Used ArcGIS Desktop report wizard to create a report template that could be reused every year to make a paper record of all inspections
- Worked great – except the large number of photos created an “out of memory” exception from ArcGIS Desktop during printing
- Exported smaller groups to get around error



To

Out

Loc

Land

Pipe

No.

End

Flow

Flow

Flow

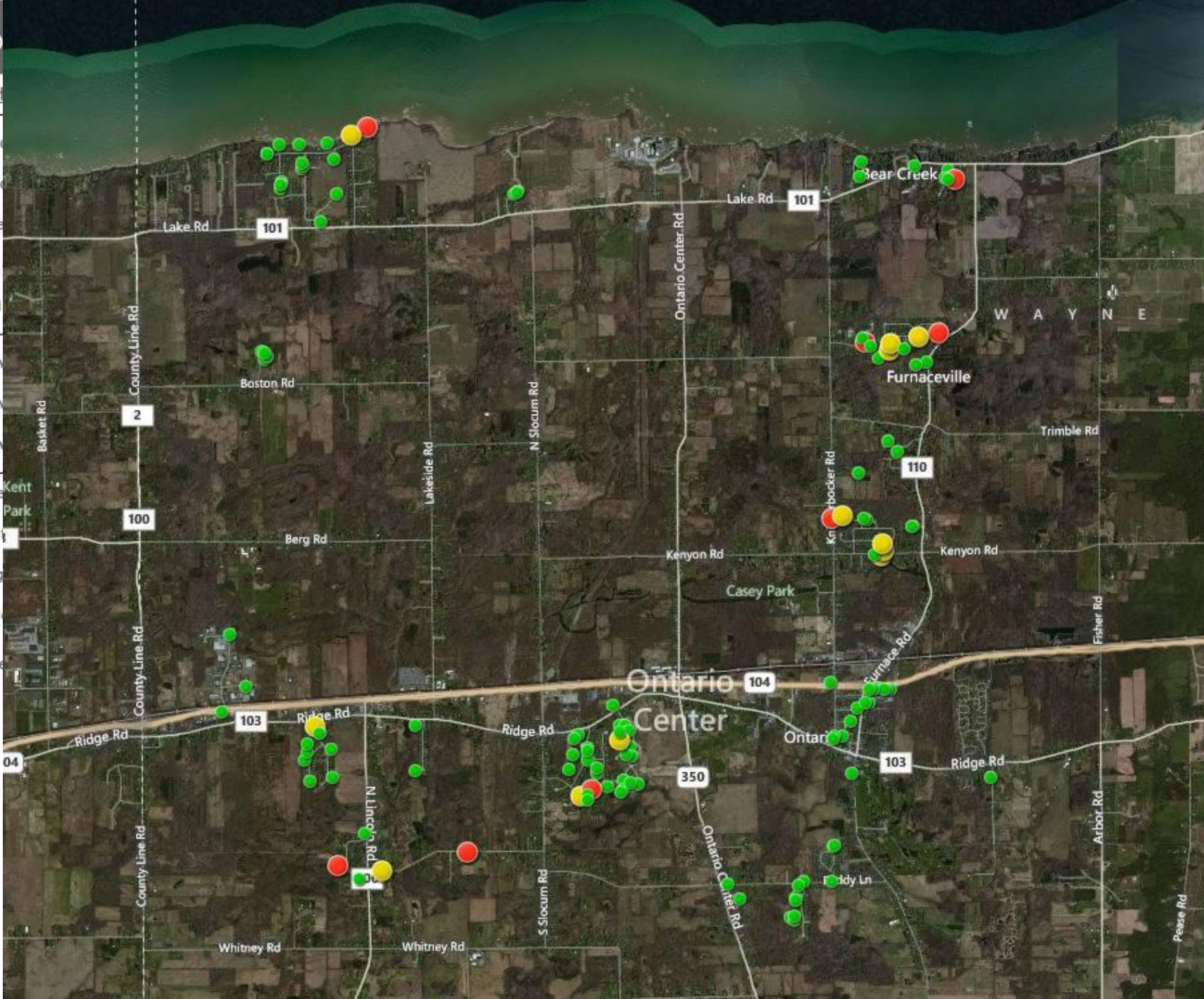
Pipe

Ben

Veg

Issu

Note



Conclusions

- We were able to accomplish our goals with no custom programming
- The end result was a happy client, a quality report, and an interactive map with picture attachments
- The bugs in the process were not a deal breaker
 - Do not let them discourage you from adopting this technology
- This workflow shows great promise and will be extremely valuable to the mobile municipal workforce as it becomes more refined
- Offline data editing available with the next release of the ArcGIS Collector app early next year (per ESRI)
- ArcGIS Online account and 100 credits now come with each desktop license on ESRI maintenance agreement at 10.2, so give it a try!

Questions?

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