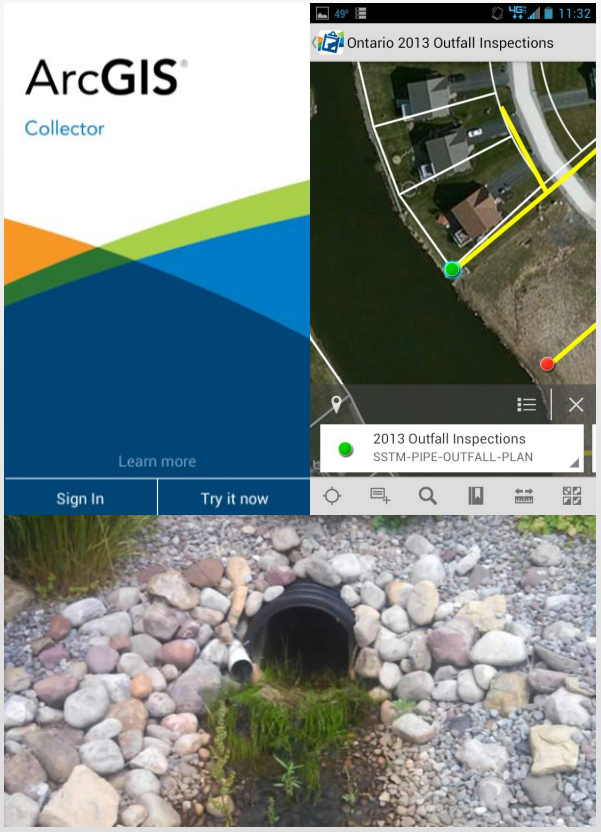
ArcGIS Collector App for Stormwater Phase II Inspections



November 13, 2013

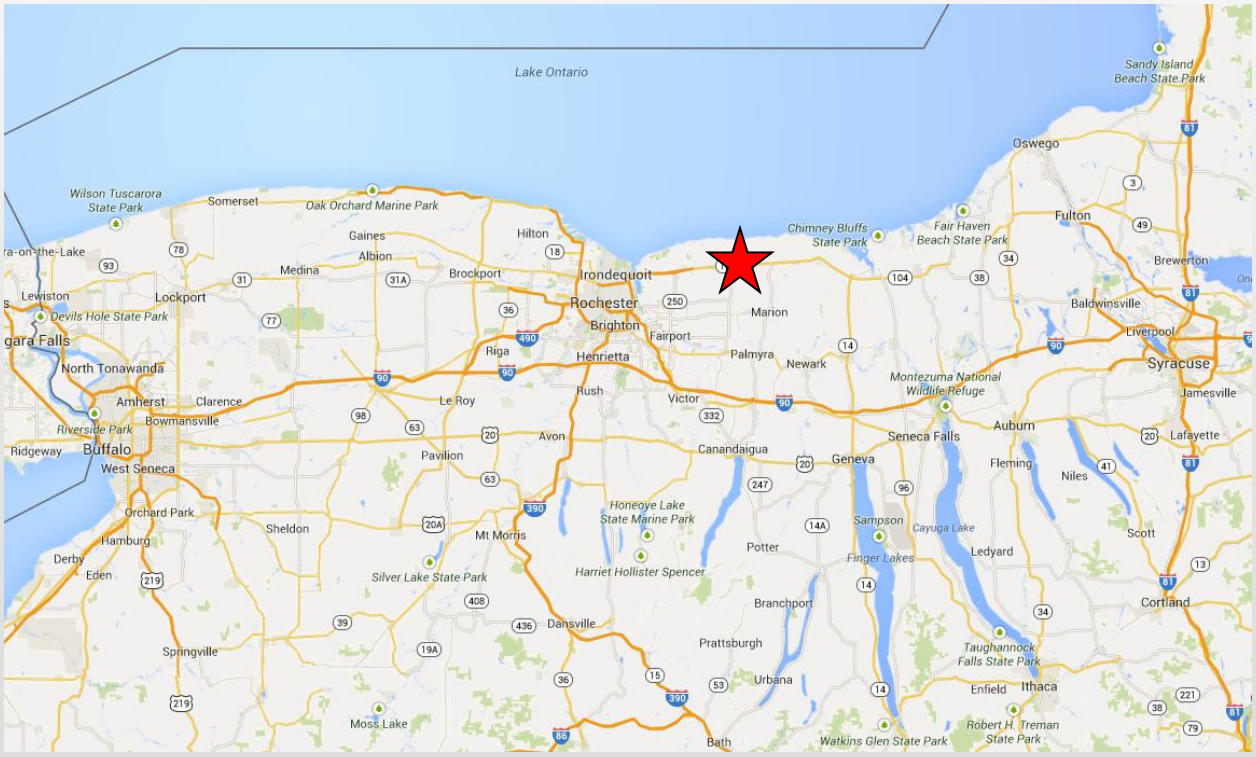
Presented by:

Daniel Allen, GISP

MRB | group

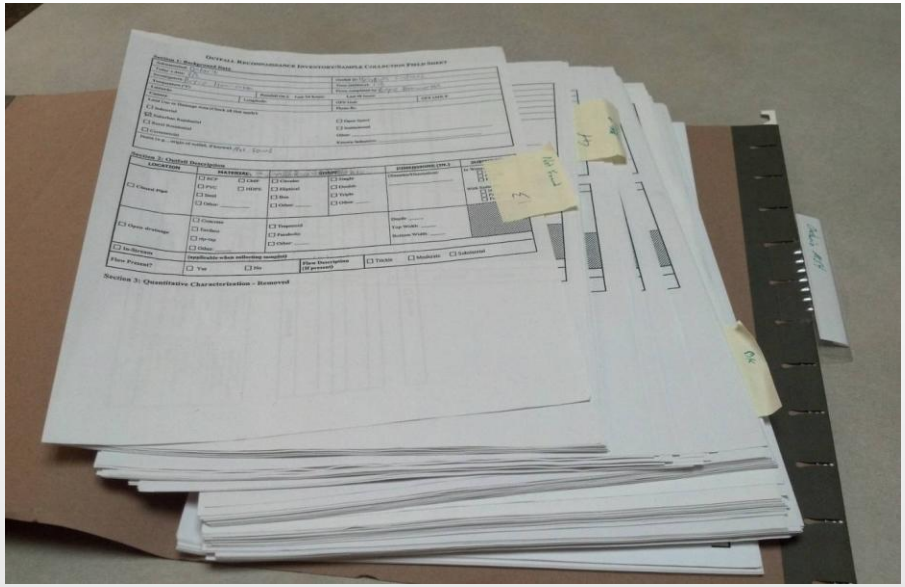
Introduction

- 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:	
Latitutde:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

- ☐ Industrial
- ☐ Ultra-Urban Residential
- ☐ Suburban Residential
- ☐ Commercial
- ☐ Open Space
- ☐ Institutional
- Other:
- Known Industries:

Notes (e.g., origin of outfall, if known):

Section 2: Outfall Description

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

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

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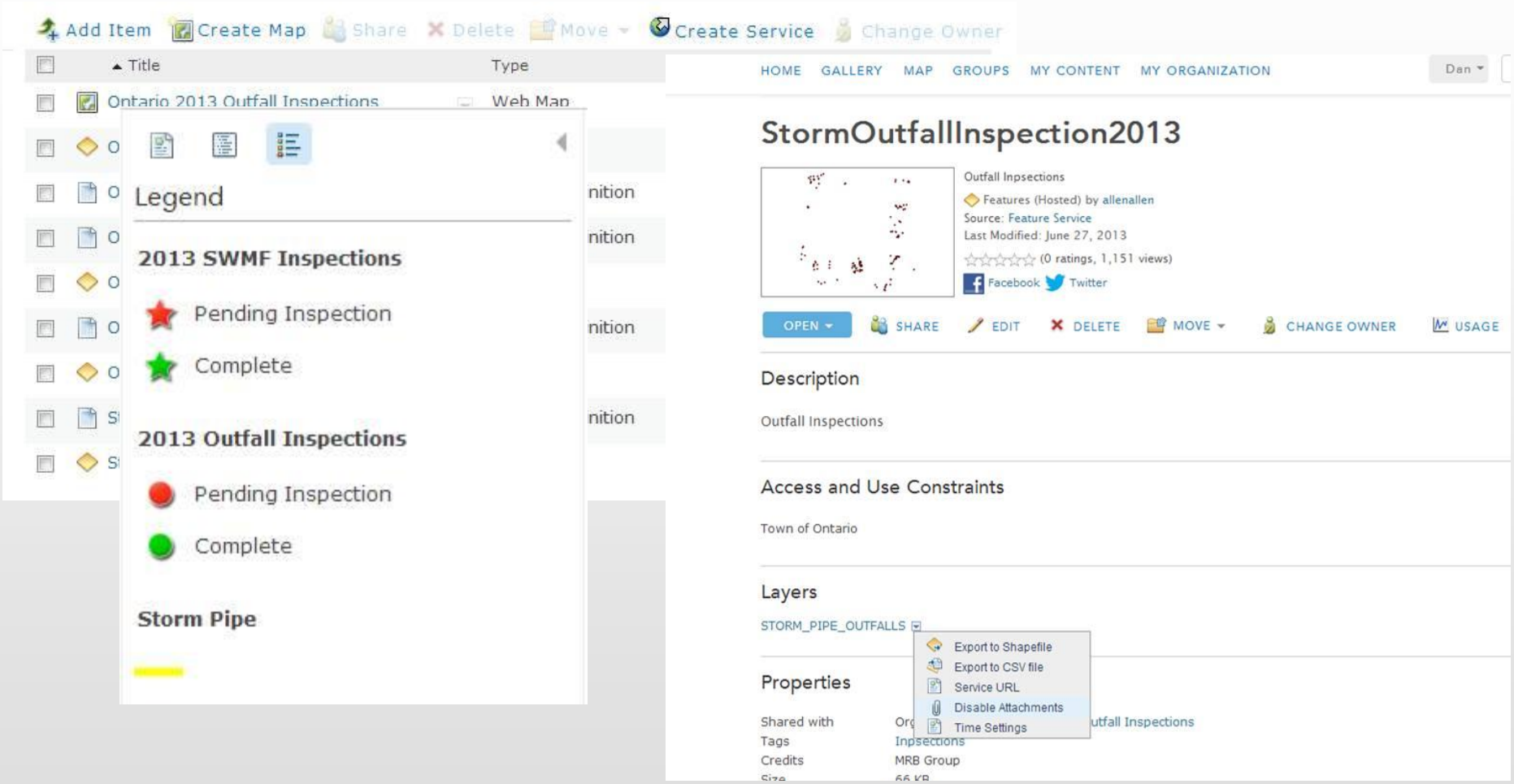
To The Cloud….

- 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….


Add Item
Create Map
Share
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Create Service
Change Owner
Title
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Ontario 2013 Outfall Inspections
Web Map
Legend
2013 SWMF Inspections
Pending Inspection
Complete
2013 Outfall Inspections
Pending Inspection
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Storm Pipe
HOME
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Features (Hosted) by allenallen
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Last Modified: June 27, 2013
(0 ratings, 1,151 views)
Facebook
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Description
Outfall Inspections
Access and Use Constraints
Town of Ontario
Layers
STORM_PIPE_OUTFALLS
Export to Shapefile
Export to CSV file
Service URL
Disable Attachments
Time Settings
Properties
Shared with
Tags
Credits
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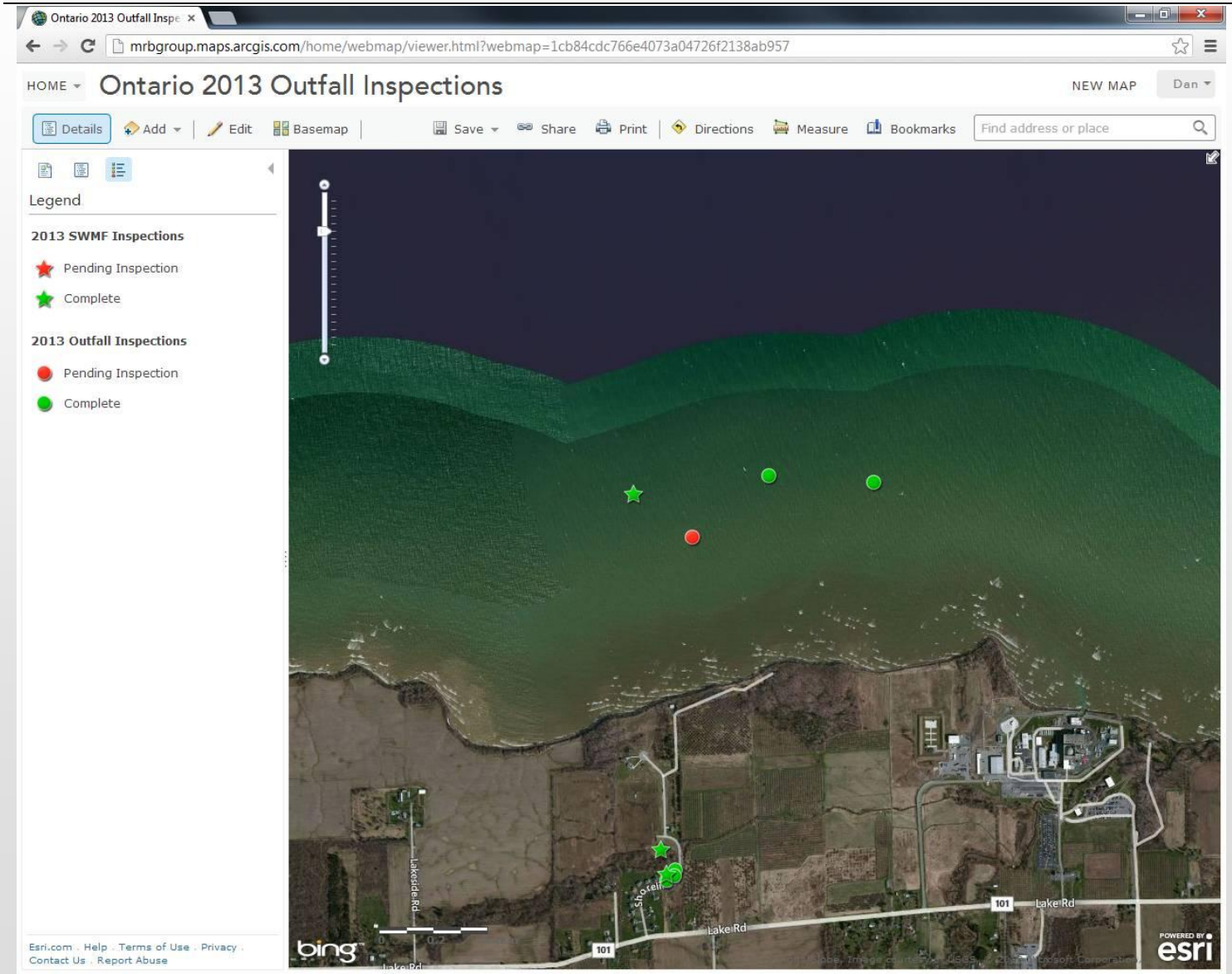
Testing

- 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



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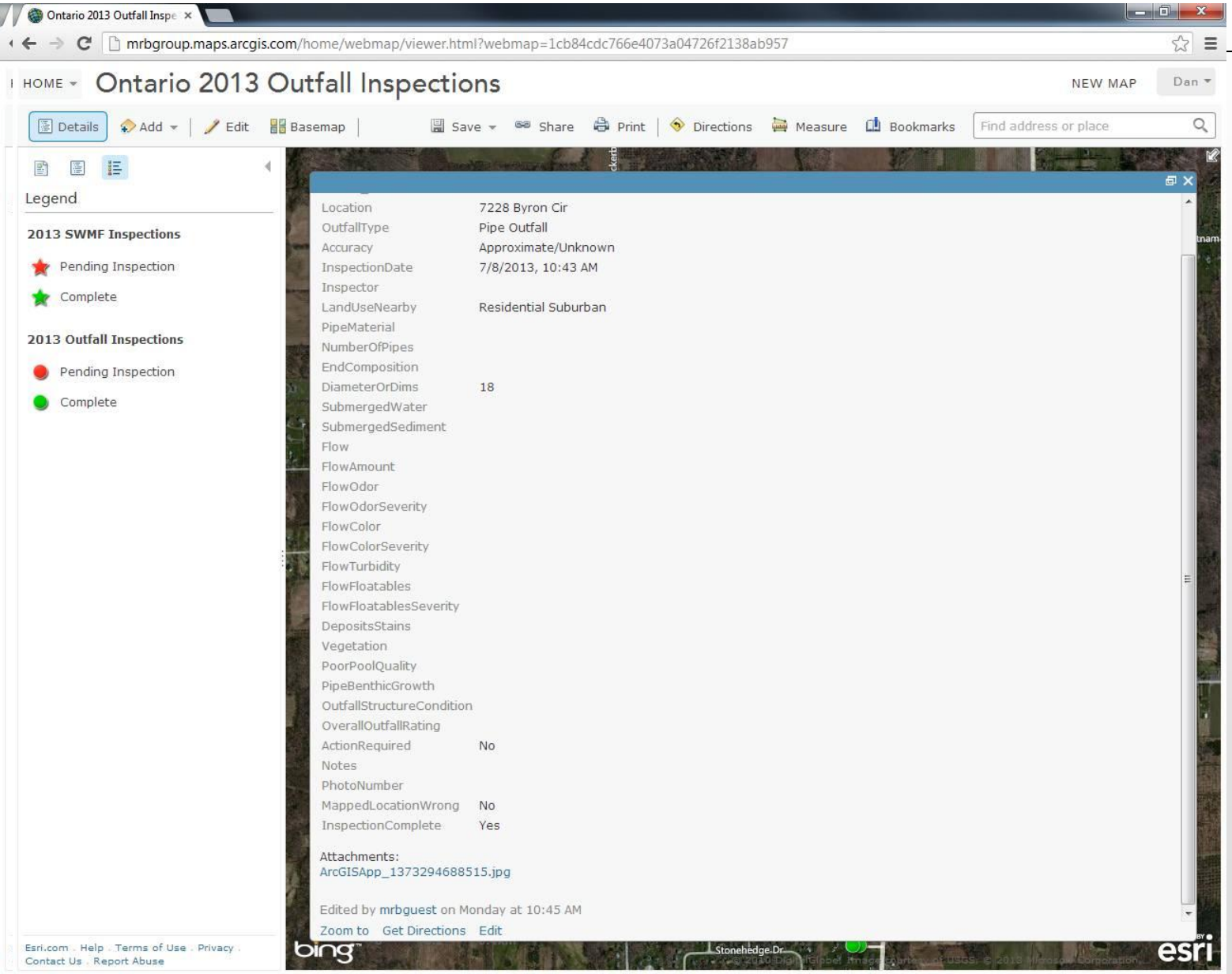
Learning Curve

- 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



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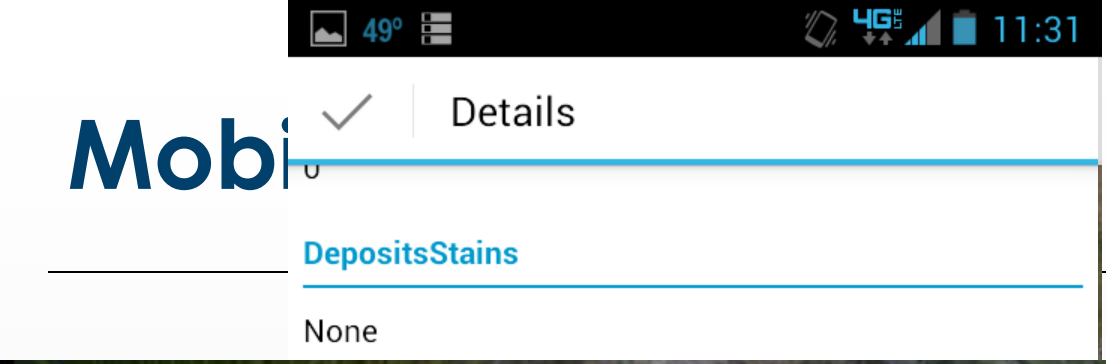
Quick Fix

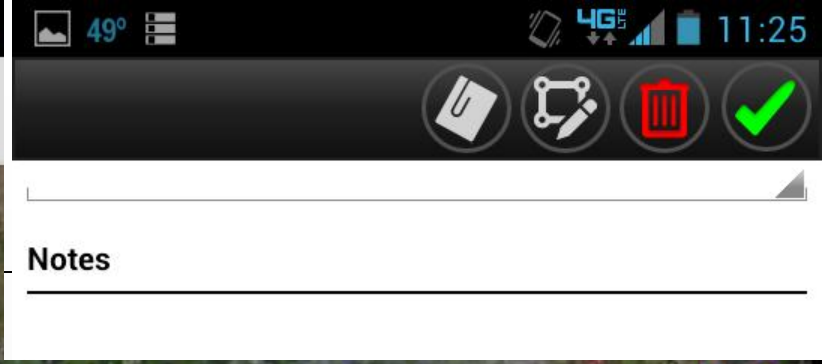
- Had intern download ArcGIS Collector app
- Seemed to resolve the problems we were having with the original ArcGIS app not saving certain fields
- Source of problems unknown
  - Possibly related to conflict with specific Android mobile device hardware being used or network connectivity issues
- Easy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

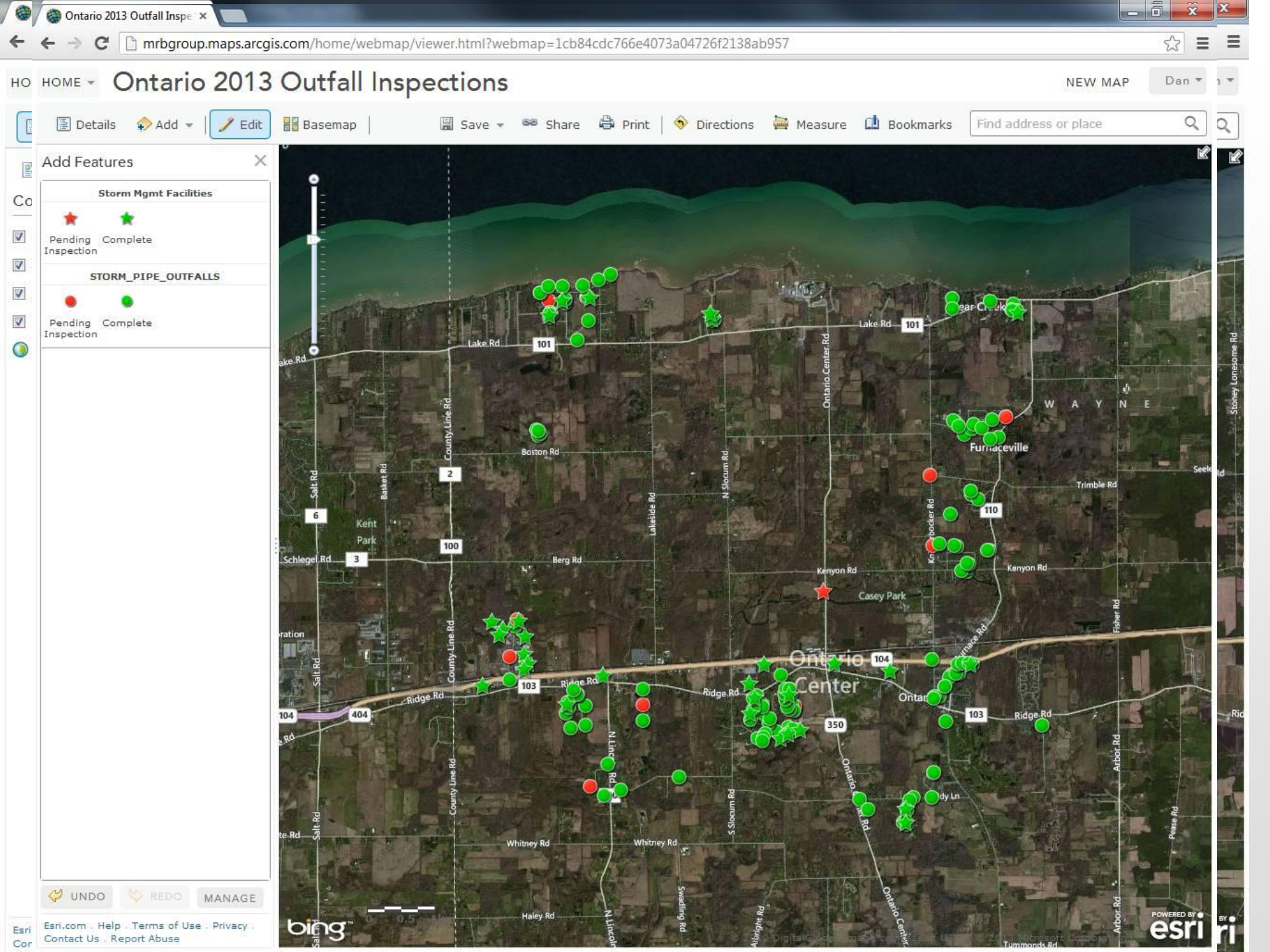
Inspection Progress

- 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



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HOME
Ontario 2013 Outfall Inspections
NEW MAP
Dan
Details
Add
Edit
Basemap
Save
Share
Print
Directions
Measure
Bookmarks
Find address or place
Add Features
Storm Mgmt Facilities
Pending Inspection
Complete
STORM_PIPE_OUTFALLS
Pending Inspection
Complete
UNDO
REDO
MANAGE
Esri.com . Help . Terms of Use . Privacy .
Contact Us . Report Abuse
Lake Rd
101
Boston Rd
Furnaceville
W A Y N E
Trimble Rd
110
Kenyon Rd
Casey Park
Ontario Center
Ridge Rd
103
104
404
350
Whitney Rd
Haley Rd
Berg Rd
Schlegel Rd
Kent Park
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County Line Rd
Salt Rd
Basket Rd
Lakeside Rd
N Slocum Rd
S Slocum Rd
Ontario Center Rd
Fisher Rd
Arbor Rd
Peace Rd
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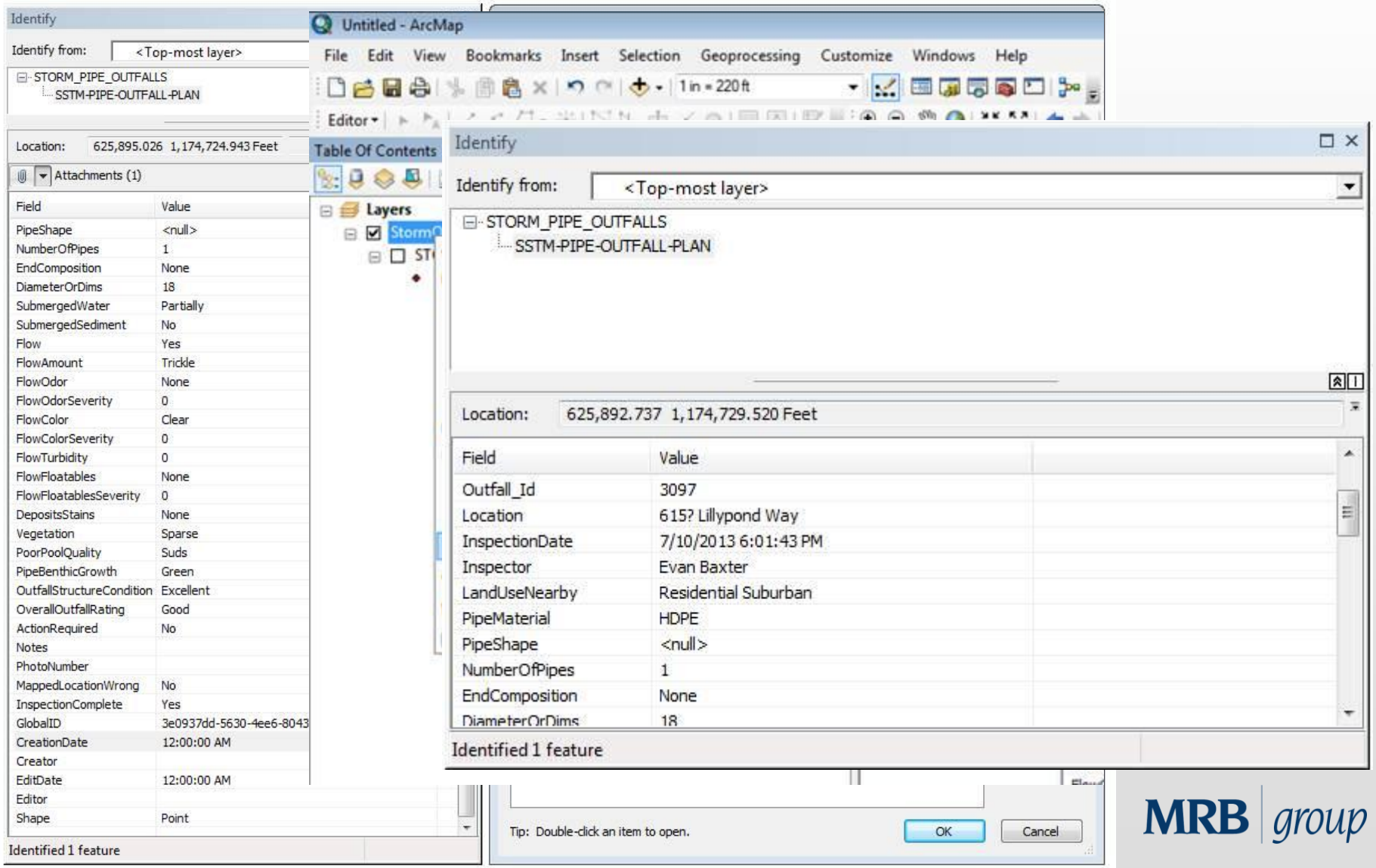
Inspections Complete

- 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



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Disappearing Photo Attachments

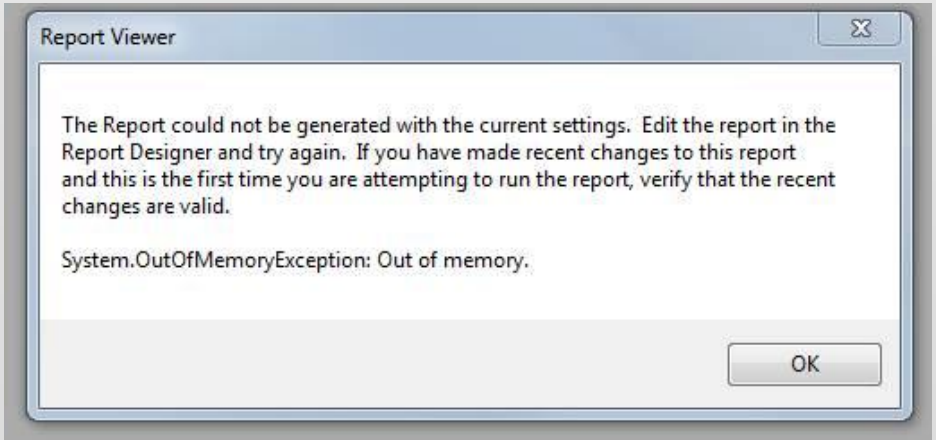
Long story short –

- 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



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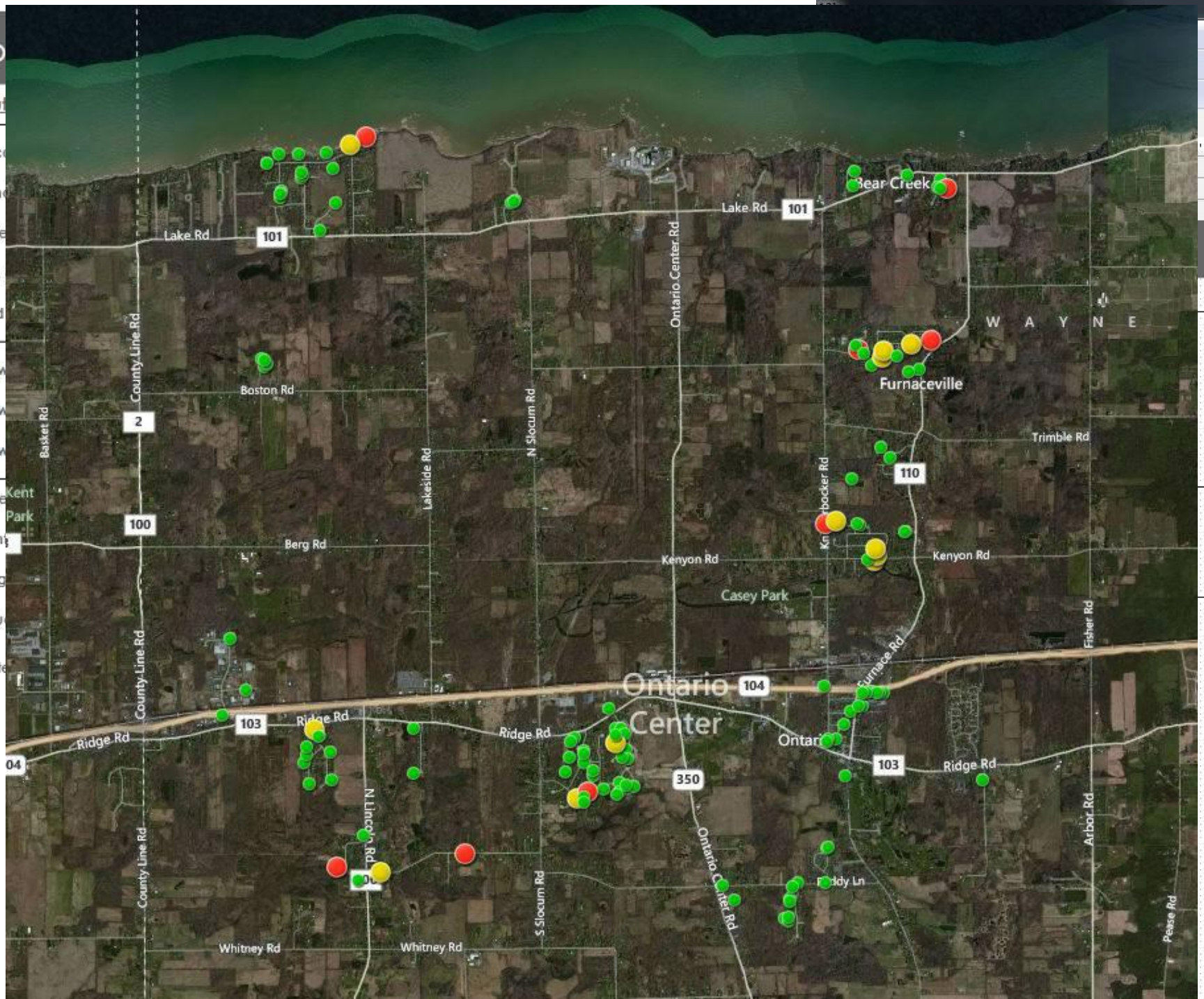
Lake Rd
101
Bear Creek
Ontario Center Rd
W A Y N E
Furnaceville
County Line Rd
Boston Rd
2
Basket Rd
N Slocum Rd
Lakeside Rd
Trimble Rd
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Kent Park
100
Berg Rd
Kenyon Rd
Casey Park
Furnace Rd
Fisher Rd
Ontario Center
104
103
Ridge Rd
350
N Lincoln Rd
S Slocum Rd
Whitney Rd
Arbor Rd
Pease Rd

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?

Contact Information:

Daniel Allen, GISP
MRB Group
dan.allen@mrbgroup.com
(585)381-9250