

Collector/Mobile Data Collection User Group

Esri Survey123:

Customization & Submission URL


Jeff Fennimore, GeoSpatial IT Manager
PennDOT – Office of Planning and Research

Kelly Fisher, GIS Manager
GeoDecisions



Maps Layers Tools Enter search criteria

Video Log



County CUMBERLAND (21)
Route 0581 (PA - 581)
Direction EAST
Segment 0140
Offset 929 ft.
Latitude 40:14:11.25600

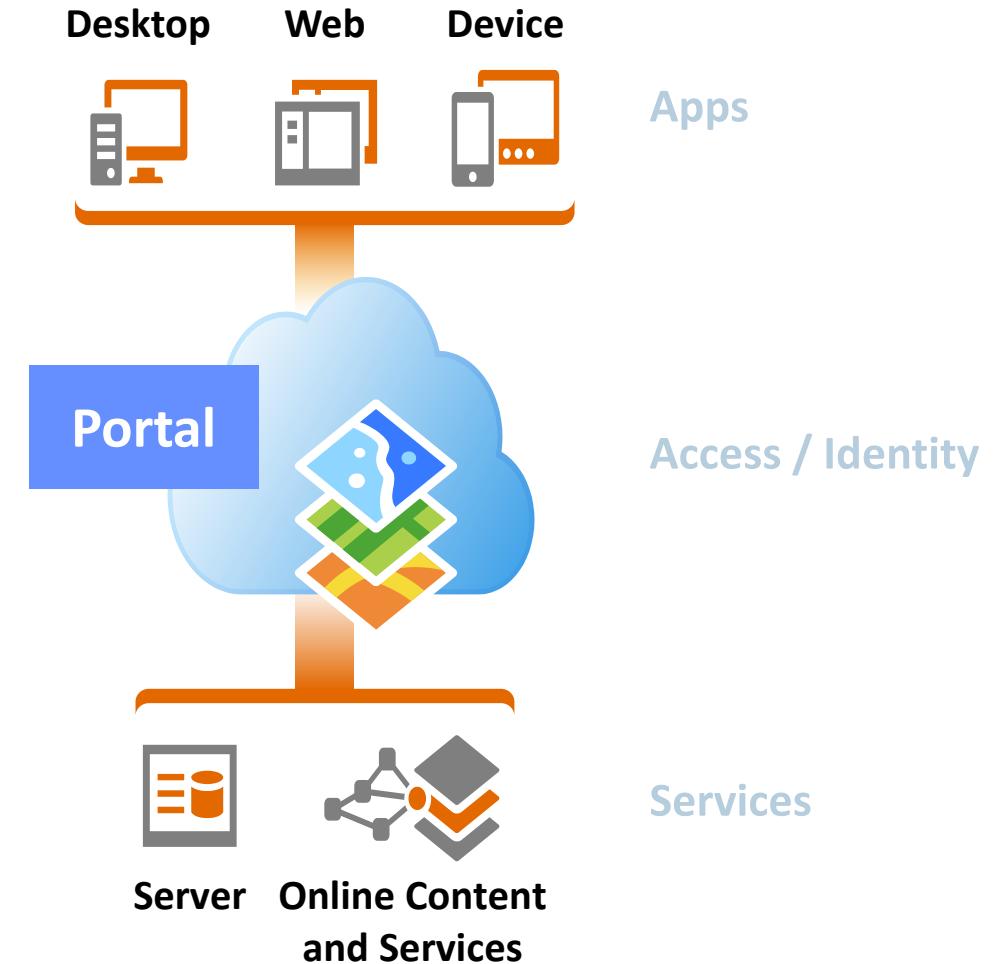
Records to fetch: 1,000 Records fetched: 91 of 91 (0 selected)

DEC LAT	DEC LONG	BRIDGE ID	FEATINT	DISTRICT	FACILITY	LOCATION	OWNER	YEARBUILT	YEARRECON
40.22810000	-77.1345	21008105100...	PA TURNPIKE	08	I-81 NB; SR...	I-81N.B. OV...	01	1963	1995
40.1824	-77.4139	21017401203...	YELLOW B...	08	PA 174; SR...	WALNUT B...	01	1938	1978
40.2865	-77.3737	21017401502...	YELLOW/R	08	PA 174; SR...	1 MIN F OF	01	1917	n
40.1201	-77.183	21007401900...	LETOR						
40.1621	-77.4062	21300701200...	BIG SF						
40.1265	-77.3737	21301100101...	YELLO						
40.11720000	-77.3692	21008103540...	TRIB Y						
40.1145	-77.3692	21008103540...	VEH I						



Topics/Discussions

- **PennDOT STAMPP**
 - Review Current STAMPP Application
 - Why Change Current System?
 - Potential Solutions
 - Proposed Survey123 Solution
 - Survey123 Demonstration
 - Customization
 - Submission URL
 - Where Do We Go From Here?
- **Questions**





PennDOT STAMPP

Current System and Process



pennsylvania
DEPARTMENT OF TRANSPORTATION



Current Pavement and Asset Survey System

- Systematic Technique to Analyze and Manage Pennsylvania's Pavements (STAMPP)
- Survey System was developed in Microsoft Access
 - 1-3 person team per engineering district completes manual distress surveys of the following assets:
 - Drainage Conditions
 - Unpaved Roads
 - Guide Rails
 - Shoulder

The screenshot displays the STAMPP Survey System interface. It features a green header area with a 'Select STAMPP Survey' dropdown menu containing radio buttons for CRC, Drainage, Guide Rail, Shoulder (selected), and Unpaved. Below this are filter buttons for 'All Records', 'Surveyed', 'Not Surveyed', and 'Deleted'. On the right, a 'STAMPP Menu' contains buttons for 'Import Menu', 'Export Menu', 'County Setup', and 'Observer Setup'. The main area is a data table with columns for County, Route, Segment, County Name, Length(Ft), Left Total, Left Pave, Left Type, Right Total, Right Pave, Right Type, Survey Date, and three Observer columns (1, 2, 3) plus an ID column.

County	Route	Segment	County Name	Length(Ft)	Left Total	Left Pave	Left Type	Right Total	Right Pave	Right Type	Survey Date	1	2	3	ID
1	15	10	ADAMS	3564	4	4	CONCRETE	10	10	CONCRETE					1
1	15	11	ADAMS	2877	10	10	CONCRETE	4	4	PAVED					2
1	15	20	ADAMS	2731	4	4	CONCRETE	10	10	CONCRETE					3
1	15	21	ADAMS	3473	10	10	CONCRETE	4	4	PAVED					4
1	15	30	ADAMS	2718	4	4	CONCRETE	10	10	CONCRETE					5
1	15	31	ADAMS	2837	10	10	CONCRETE	4	4	PAVED					6
1	15	40	ADAMS	2859	4	4	CONCRETE	10	10	CONCRETE					7



Current Pavement and Asset Survey System

- Teams are temporary Engineering, Scientific, and Technical Interns (ESTI)
- Surveys are performed during the summer months
- Asset and survey data is retrieved and uploaded via flat files to/from PennDOT's Roadway Management System (RMS)

pennsylvania
DEPARTMENT OF TRANSPORTATION

Unpaved Condition Survey Form

County: 8 County Name: BRADFORD State Route: 1059 Segment: 32 Length: 9 Dir: B Common Street Name: ARNOLD RD

Surface: 40 Width: 18 Lanes: 2 Begin Description: ARNOLD RD End Description: DRAIN RIGHT Survey Date: | Observers: 1, 2, 3

Condition	Extent				Severity	Sign Adequacy		
	None	<10%	10-30%	>30%		Length	Missing	Both Ok
Corrugation		<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	> 3" Depth	<input type="radio"/> 0	<input type="radio"/> Both Ok	<input type="radio"/> 0
		<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	1" - 3" Depth	<input type="radio"/> 1	<input type="radio"/> Begin	<input type="radio"/> 1
		<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	< 1" Depth	<input type="radio"/> 2	<input type="radio"/> End	<input type="radio"/> 2
Loss of Aggregate Surface	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	Length	<input type="radio"/> 3	<input type="radio"/> Both	<input type="radio"/> 3
Poor Drainage	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	Length	Remarks		
Soft Areas	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	Counts			
Intentionally Not Tested	<input type="radio"/> 0	Not Surveyed						

SR Search: County [v] SR [v] Seg [v] Search

1 of 1

pennsylvania
DEPARTMENT OF TRANSPORTATION

Shoulder Condition Survey Form

County: 01 County Name: ADAMS State Route: 0015 Segment: 0010 Length: 3564 Dir: N Common Street Name: BLUE-GRAY HW Begin Description: MARYLAND STAT End Description: DRAIN RIGHT Survey Date: 04/05/2016 Observers: 1, 2, 3

Condition	Left Extent				Severity	Right Extent				Sign Adequacy		
	None	<10%	10-30%	>30%		Length	None	<10%	10-30%	>30%	Missing	Both Ok
Lane/Shoulder Separation		<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	> 1"	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 0	<input type="radio"/> Both Ok	<input type="radio"/> 0
		<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	1/4" - 1"	<input type="radio"/> 1	<input type="radio"/> Ahead	<input type="radio"/> 1				
		<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	< 1/4"	<input type="radio"/> 2	<input type="radio"/> Back	<input type="radio"/> 2			
Deterioration		<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	Holes/Sev Crkng	<input type="radio"/> 3	<input type="radio"/> Both	<input type="radio"/> 3				
		<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	Ent Paved Width	Shoulders Paved and Unpaved						
		<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	Minor Cracking	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3		

Condition	Left Extent				Severity	Right Extent				Shoulders Paved and Unpaved			
	None	<10%	10-30%	>30%		Length	None	<10%	10-30%	>30%	Left	Right	
Slope	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	Does Not Drain	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	Total	Paved	Total	Paved
Buildup	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	Does Not Drain	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	04	04	10	10
Dropoff		<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	> 4"	Type		Type					
		<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	> 2 - 4"	CONCRETE	CONCRETE						
		<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	Remarks							

Intentionally Not Tested: 0 **Not Surveyed** SR Search: County [v] SR [v] Seg [v] Search

1 of 100



How Much Data is Surveyed?

- **Pavement and Shoulder Conditions:**
 - **Every Year: National Highway System (NHS) and Interstate System**
 - **Other state routes ½ per year**
 - **Interstate Routes 2,740 segment miles**
 - **Non-Inter NHS 7,187 segment miles**
 - **½ other SRs 16,690 segment miles**
 - **TOTAL 26,617 segment miles every year**
- **Guide rail systems and drainage are surveyed on a 4 year cycle for all routes**
 - **Approximately 10,000 segment miles every year surveyed**



Why Replace Existing Pavement Survey Solution?

- **Microsoft Access form code is outdated and difficult to update**
- **Does not support mobile devices**
- **Does not support mapping of assets**
- **Upload mechanism is difficult and has no validation**
- **Database corruption in the field**
- **Would like the forms to be more user friendly**
- **Bulky equipment in the vehicle**
- **And so on....**





Potential Solutions

- **2012 – ESRI built the Local Roads Collector for PennDOT**
 - ArcGIS Mobile on Rugged tablets running Windows
 - Works, but hard to maintain.
 - Utilizes ArcGIS Server 10.0. Will run out of support.
- **October/November 2015 – Review of Collector and Its Capabilities**
 - Looked promising, easy to use, light-weight
 - Industry Standard for collecting field data
 - No Conditional Logic in forms
- **December 2015 – ESRI Announces Survey123**
 - Not released, nor in Beta
 - Receive Beta from ESRI



Why Survey 123?

- **Pros**

- **Conditional Logic Support - out of the box functionality**
- **Offline Editing and Syncing**
- **Easy to create and modify survey forms**
- **Form GUI is similar to Mobile Collector – Easy to use**
- **Customizable**
- **Full support and integration of the ESRI Platform**
- **Easily published for Windows, Android, and iOS devices**

- **Cons**

- **Does not support mapping out of the box – Ability to select feature from the map**
- **Does not support the editing of existing data out of the box**
- **Supports point data only.**



Survey123 Custom Development

- **Attended Esri's Survey123 Holistic Event**
- **Programming Languages Required for Custom Development**

Component	Programming Language
Survey123	AppStudio for ArcGIS 1.4 Qt Creator – Part of AppStudio Install
Web Service for Retrieval of Existing Survey Data	ASP.NET WebAPI 2.2, .Net 4.5.1



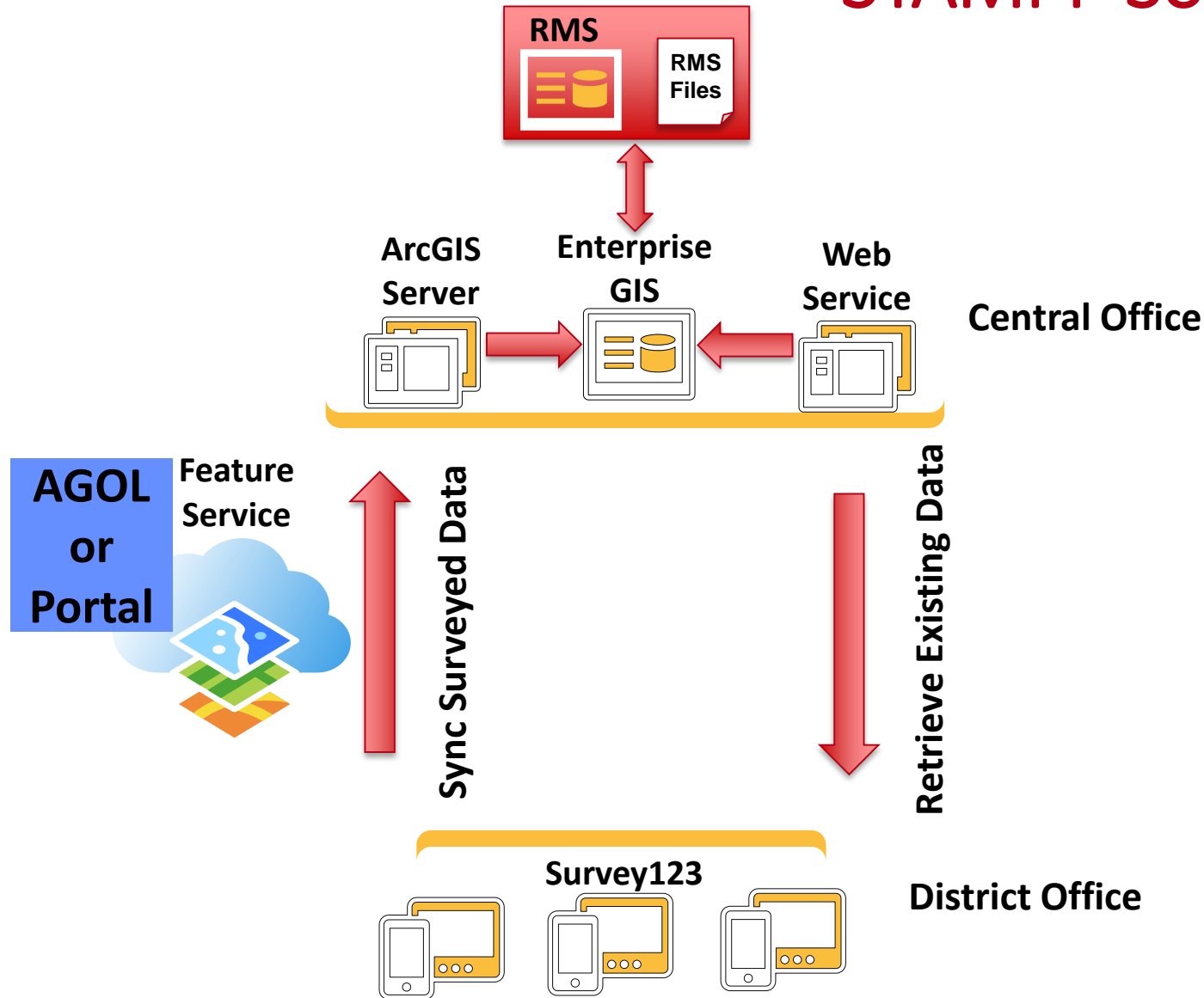
Survey123 Custom Development

- **Things to Consider:**
 - **AppStudio for ArcGIS Standard license**
 - **Builds**
 - Can easily perform Android and Windows builds
 - iOS builds are more complex
 - **Application Developer had to learn Qt Creator language**
 - **Have to manually sync custom code with new Survey123 releases**



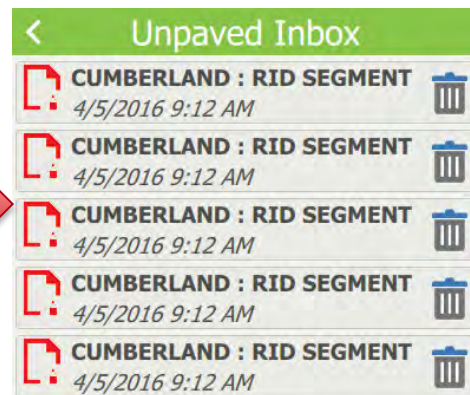
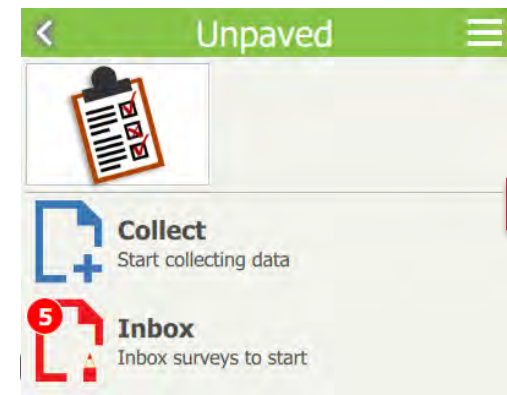
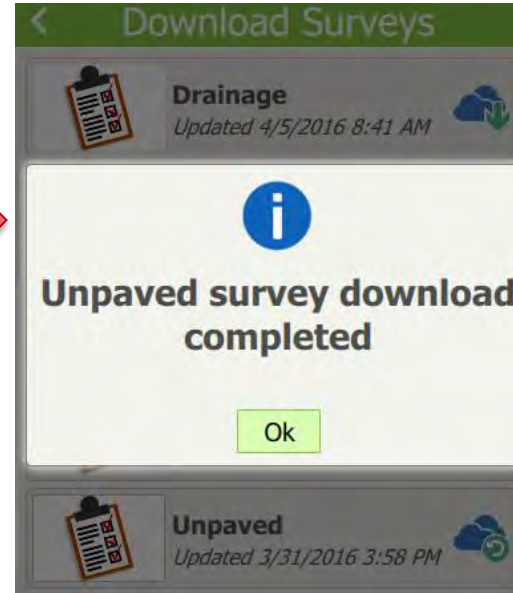
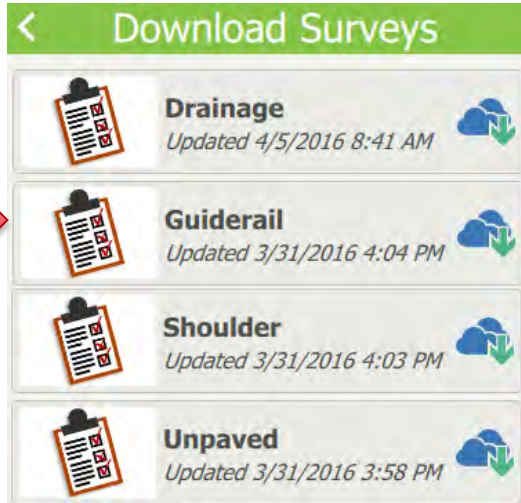
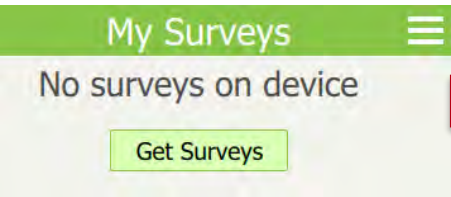


STAMPP Solution Architecture





DEMO SURVEY123





Submission URL

- What is it?
- Why use it?
 - Leverage data in existing PennDOT applications and data processing workflows

Drainage.xlsx - Excel

FILE HOME INSERT Design PAGE LAYOUT FORMULAS DATA REVIEW VIEW DEVELOPER ACROBAT

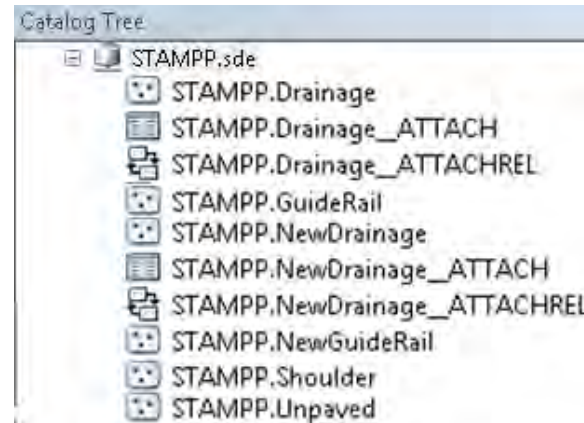
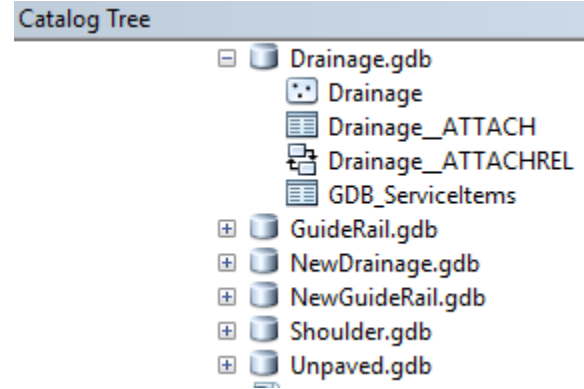
D2 : http://utility.arcgis.com/usrvcs/servers/ee595ca698934befa900d5f938ac25c7/rest/service

	A	B	C	D	E
1	form_title	form_id	instance_name	submission_url	default_language
	Drainage	Drainage	concat (\${county}	http://utility.arcgis.com/usrvcs/servers/ee595ca698934befa900d5f938ac25c7/rest/services/PENNDOT/Drainage/FeatureServer	
2					
3					



Submission URL Configuration Workflow

1. Export Hosted Feature Layer Data from AGOL as File GeoDatabase
2. Load survey layers into PennDOT's Enterprise GeoDatabase
3. Publish as feature services in ArcGIS Server
4. Secure the feature services in ArcGIS Server:
<http://support.esri.com/technical-article/000014793>
5. In ArcGIS Online, add services as item from the web



Item from the web ?

Reference an item on the Web.

Type: ArcGIS Server web service KML
 WMS (OGC) WFS (OGC)
 WMTS (OGC) Document

URL:

A secure service was detected.

Username:

Password:

Do not store credentials with service item.
Prompt for authentication everytime.

Store credentials with service item.
Do not prompt for authentication.

[Learn more](#)

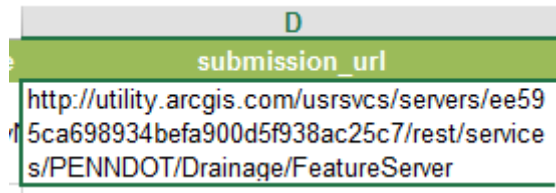
Title:

Tags:

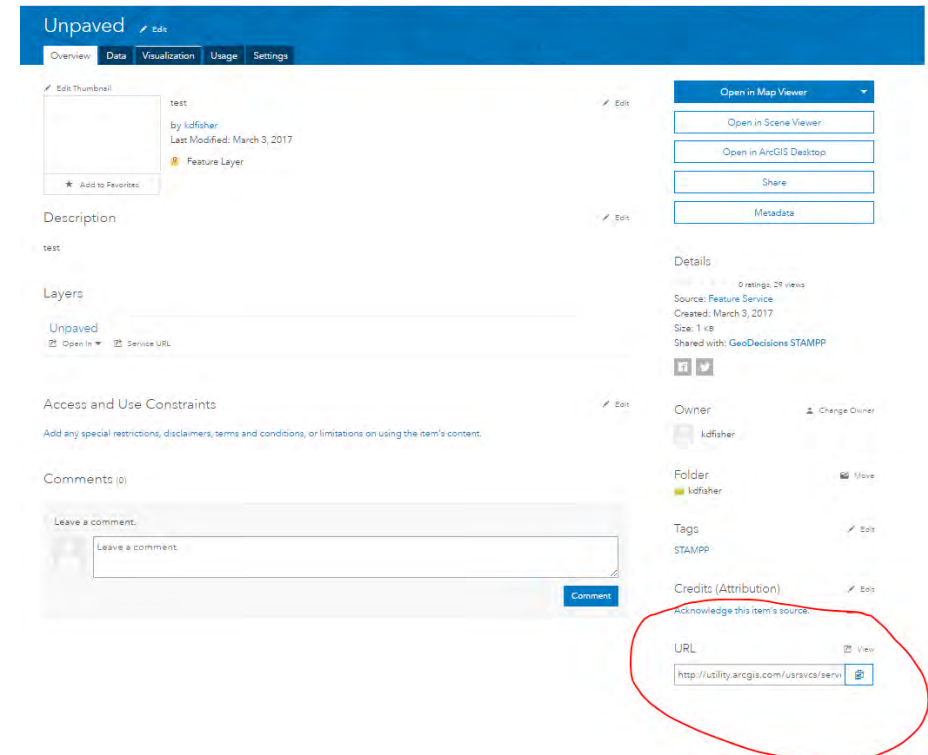


Submission URL Configuration Workflow

6. In AGOL, copy the feature service url from the feature layer page.
7. Paste the url in the submission url value within the Settings tab in the survey xlsx file



8. Republish the survey in Survey123 Connect for ArcGIS





Where Does PennDOT Go From Here?

- **District Implementation Began Last Week!!!!**
- **Possible enhancements:**
 - **Map integration and routing of surveys**
 - **Line Data Type, not just Point**
 - **Reporting through Maintenance-IQ application**
 - **QA/QC Editing via AGOL**
 - **Possible look at navigation, workforce management and tracking, and alerting via Esri ArcGIS Platform offerings**
 - **More, more, and more...!!**



Questions? Thank You!

Jeff Fennimore, GeoSpatial IT Manager
PennDOT – Office of Planning and Research
jfennimore@pa.gov

Kelly Fisher, GIS Manager
GeoDecisions
kfisher@geodecisions.com



pennsylvania
DEPARTMENT OF TRANSPORTATION