Federal GIS Conference
February 9–10, 2015 | Washington, DC

Solving Your Top 10 Production Issues with ArcGIS Extensions

Amber Bethell

Sherry Fagin

How can we do production work
faster, better and cheaper?

Production issues relate to…

Data

Cartography

Management

Producing Data

Data validation is time-consuming

Data being created is of poor quality

Understanding data quality is difficult

Producing Data

Data validation is time-consuming

Data being created is of poor quality

Understanding data quality is difficult

Data Reviewer

Production Mapping

Managing Production

Knowing if we will meet our deadlines is difficult

There is no consistency in how work is done

Takes too long for new staff to become effective

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There is no consistency in how work is done

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Workflow Manager

Task Assistant

Producing and Sharing Maps

- Getting the same results from multiple cartographers
- Difficult to make complex, specification driven maps
- Difficult to find the map you need when you need it
- Maintaining data and maps at multiple scales is costly

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Production Mapping

Production Mapping Server

How can we create data better, faster and cheaper?

Issue 1: Data validation is time-consuming

Solution 1: Automate data validation with batch jobs

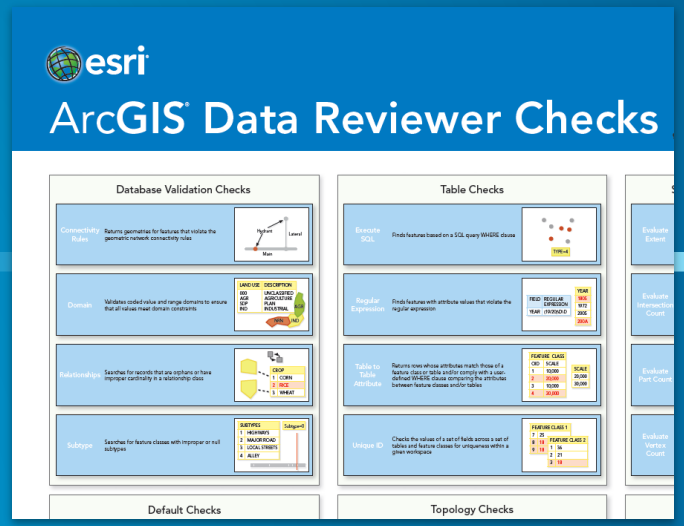
- Encapsulate quality rules
- Configured from 40+ automated checks
- Designed once and executed many times

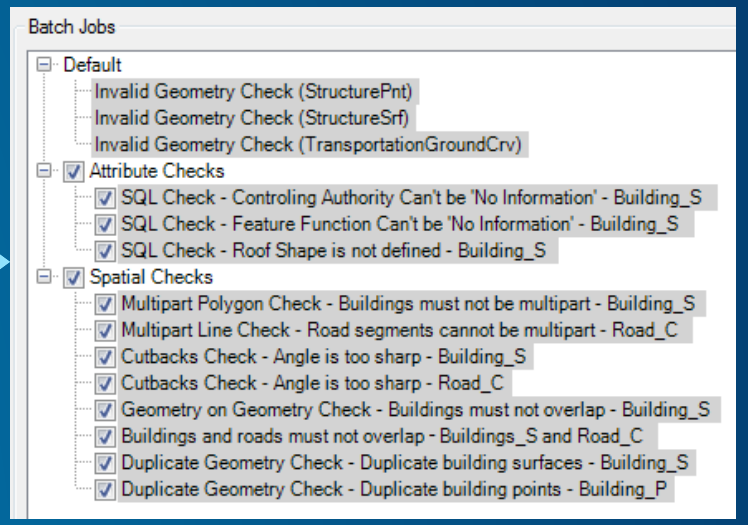
No duplicates

No Multiparts

Critical attributes must be populated

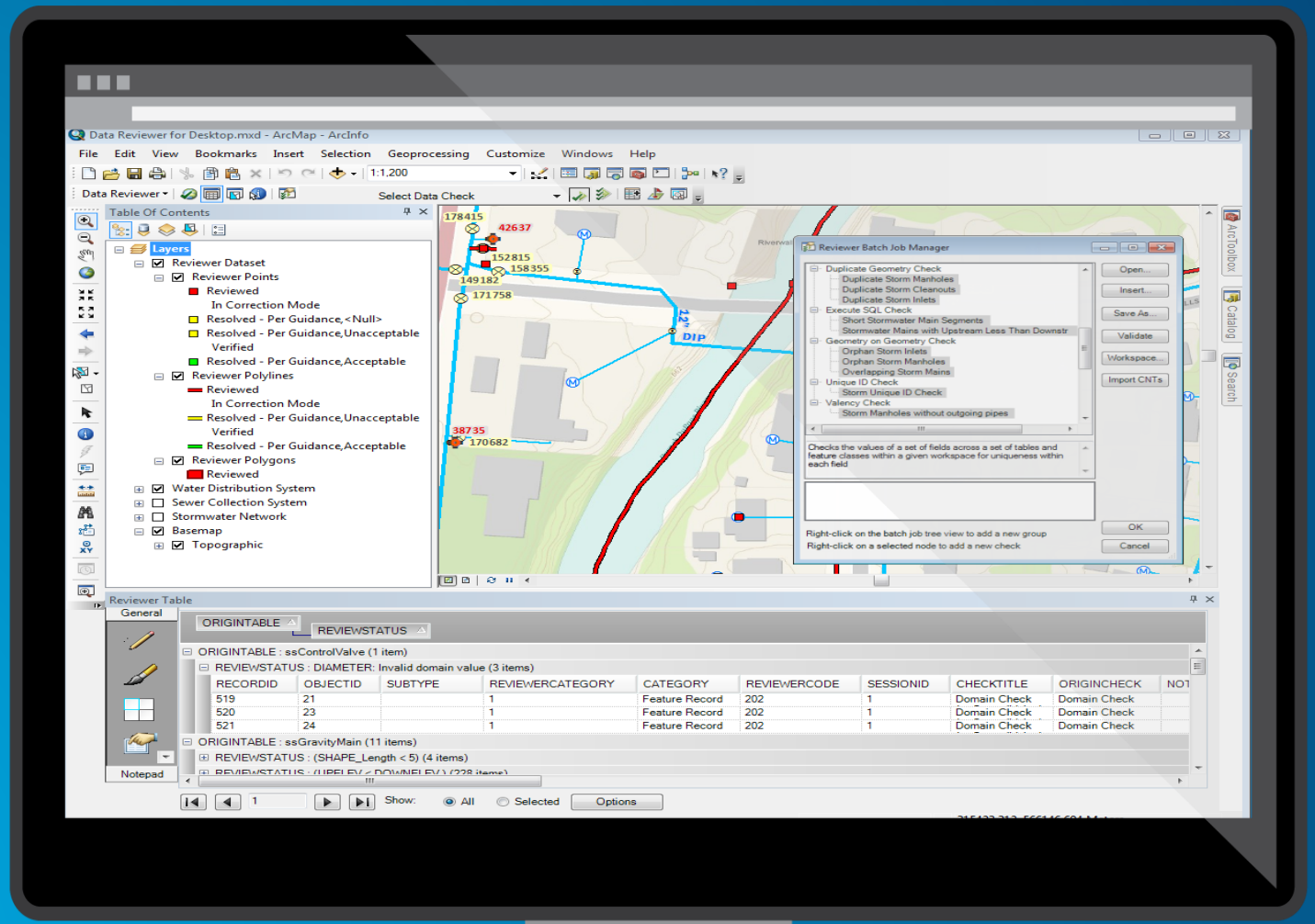
No overlaps





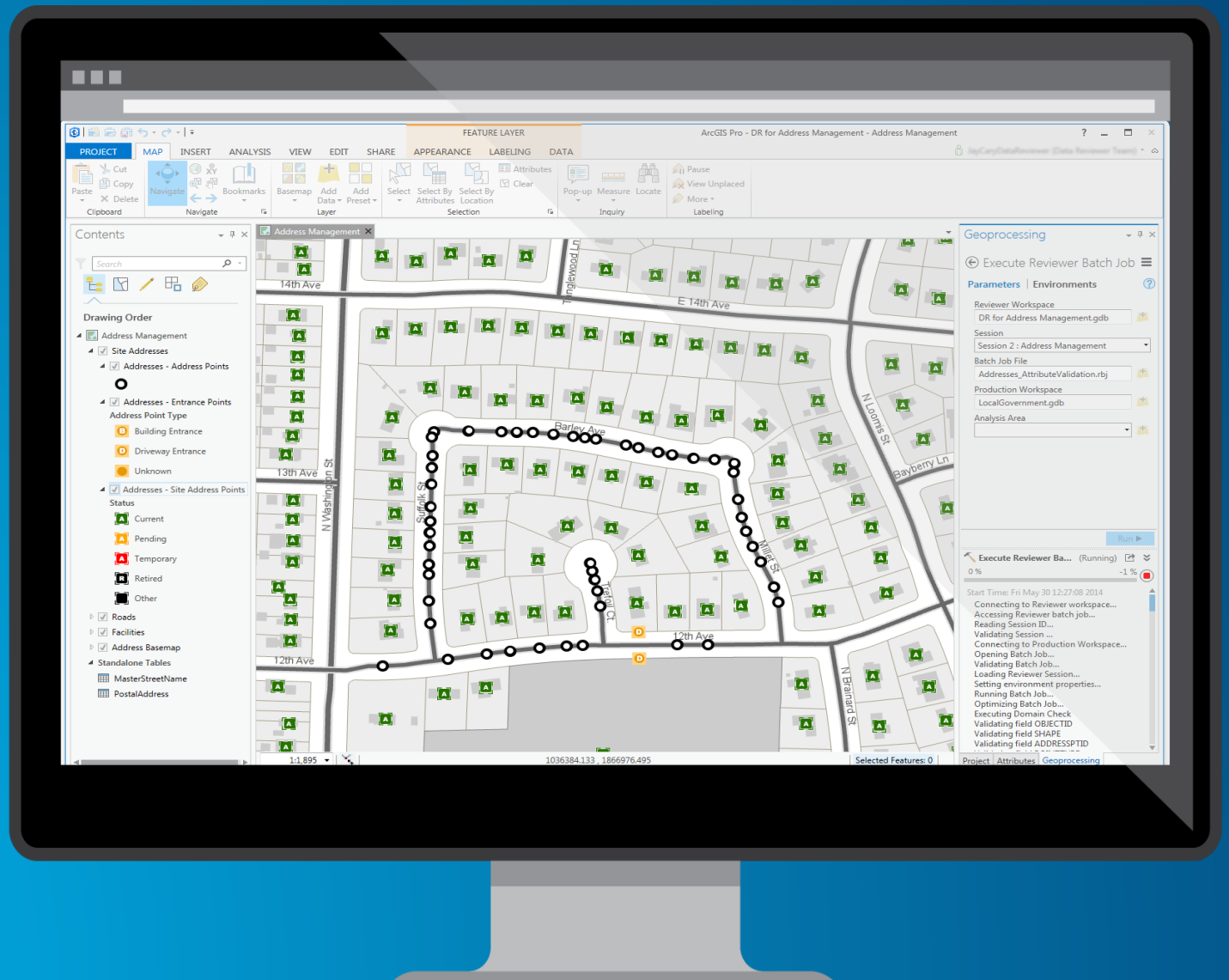
Solution 1: Automate data validation with batch jobs

ArcMap



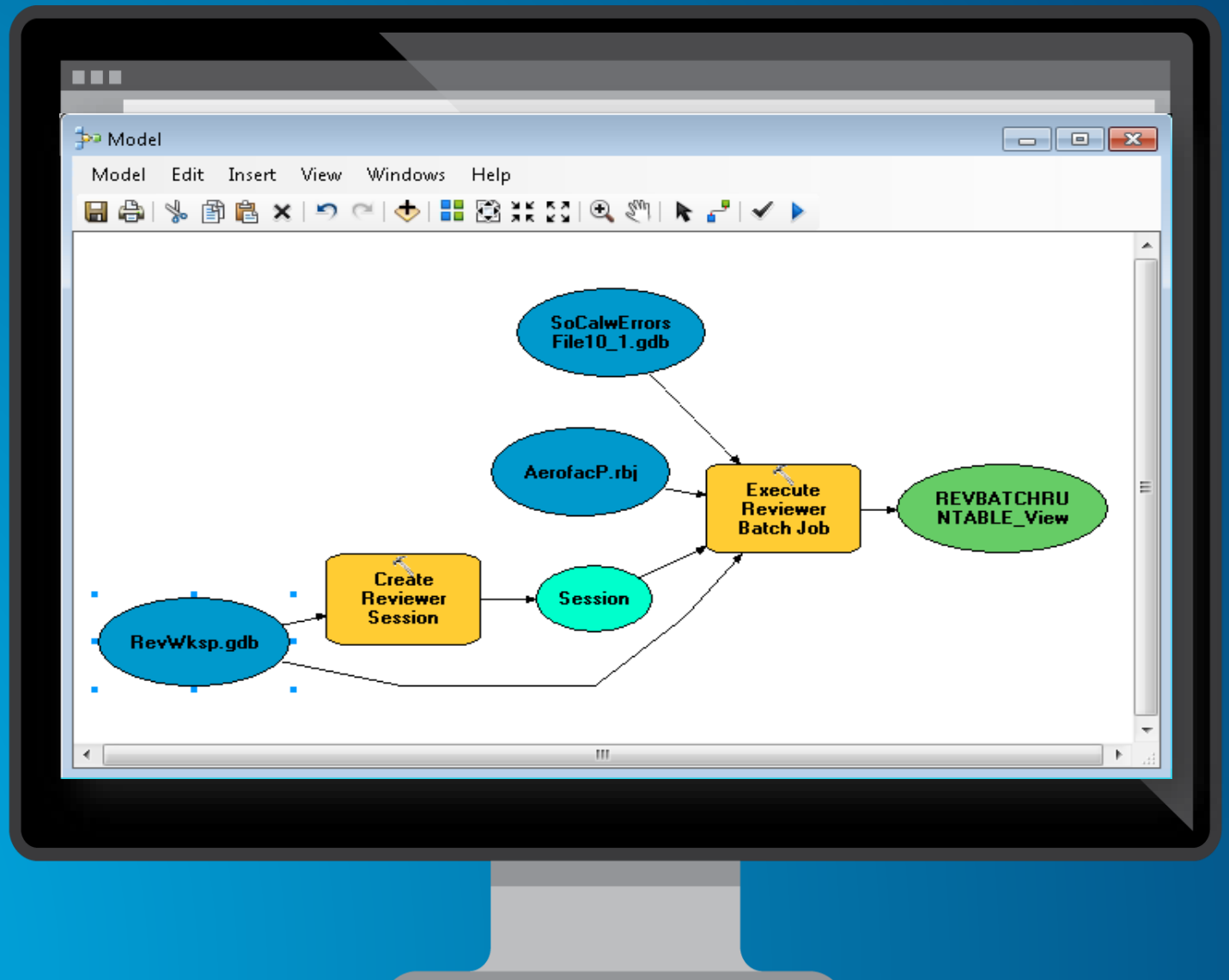
Solution 1: Automate data validation with batch jobs

ArcGIS Pro



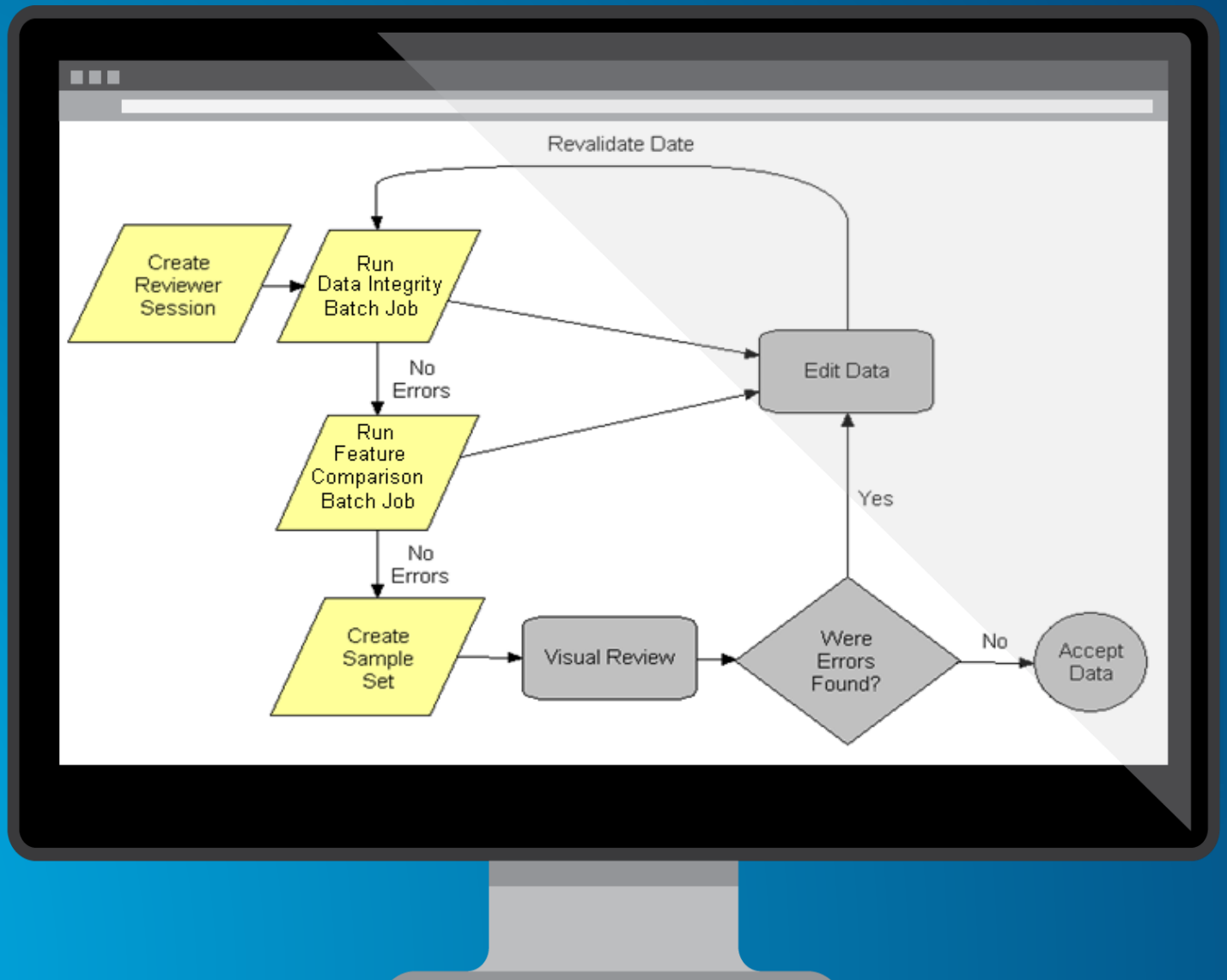
Solution 1: Automate data validation with batch jobs

Models/Python scripts



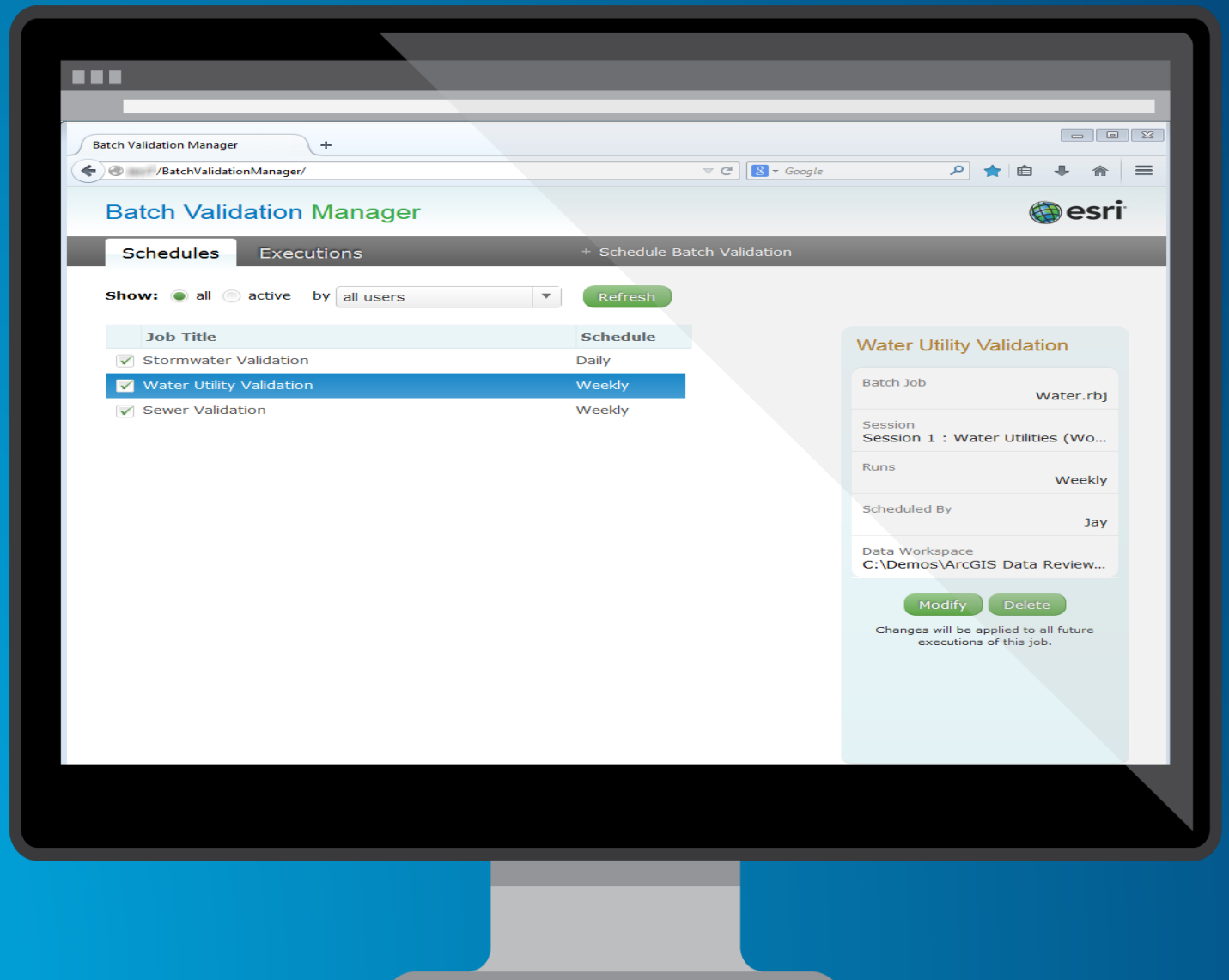
Solution 1: Automate data validation with batch jobs

ArcGIS Workflow Manager

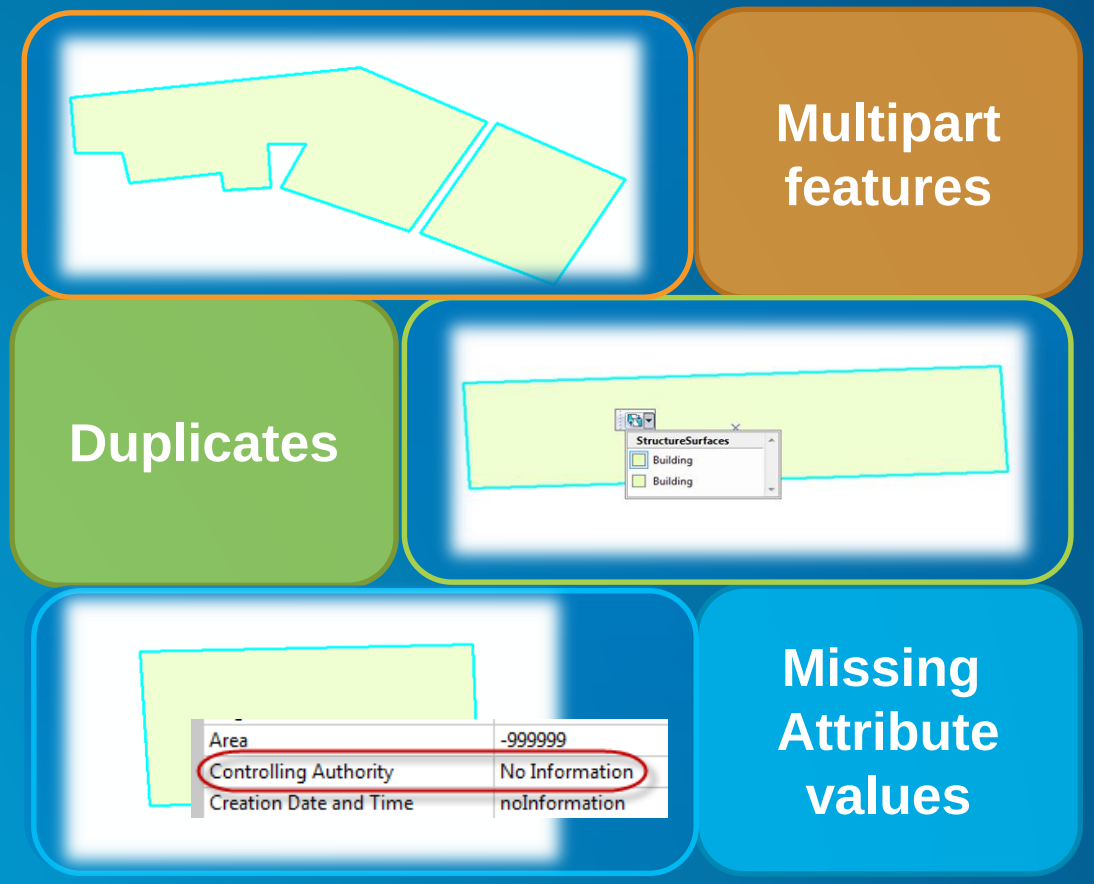


Solution 1: Automate data validation with batch jobs

ArcGIS Data Reviewer for Server

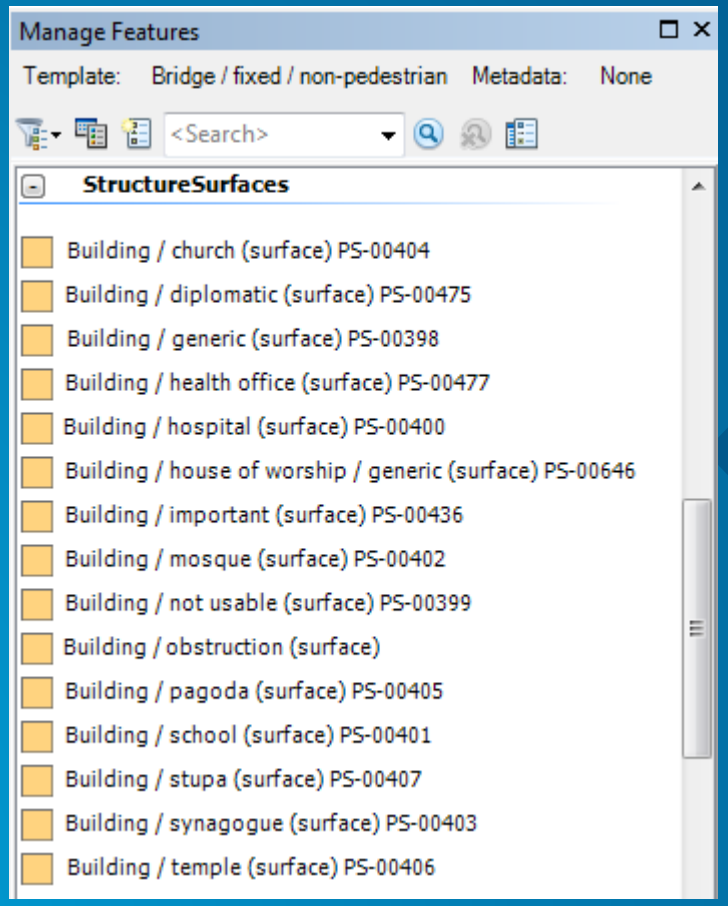


Issue 2: Data being created is of poor quality



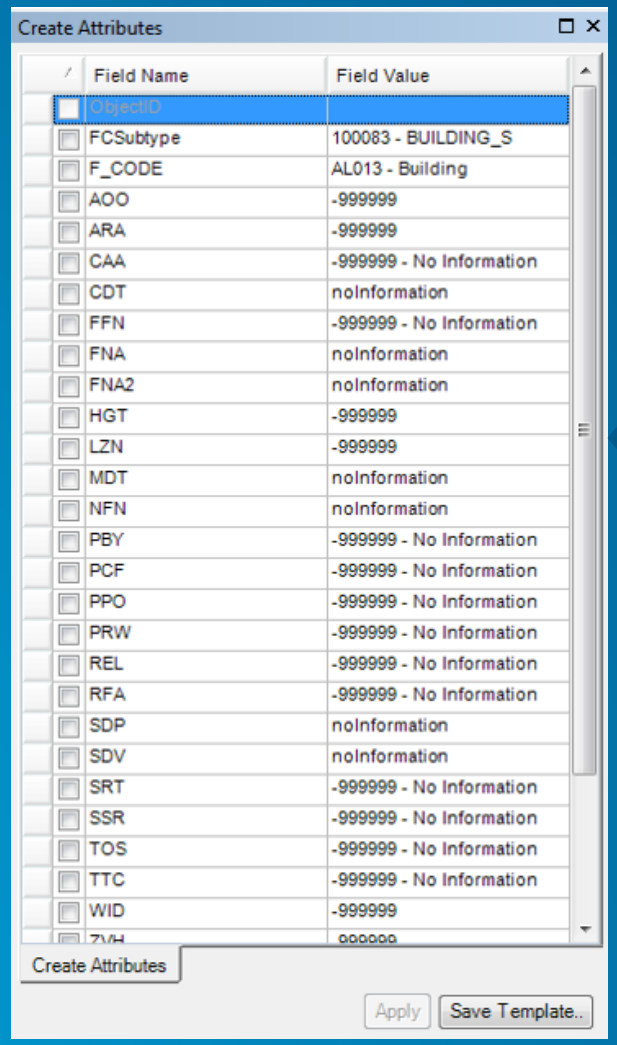
Solution 2: Validate features while editing

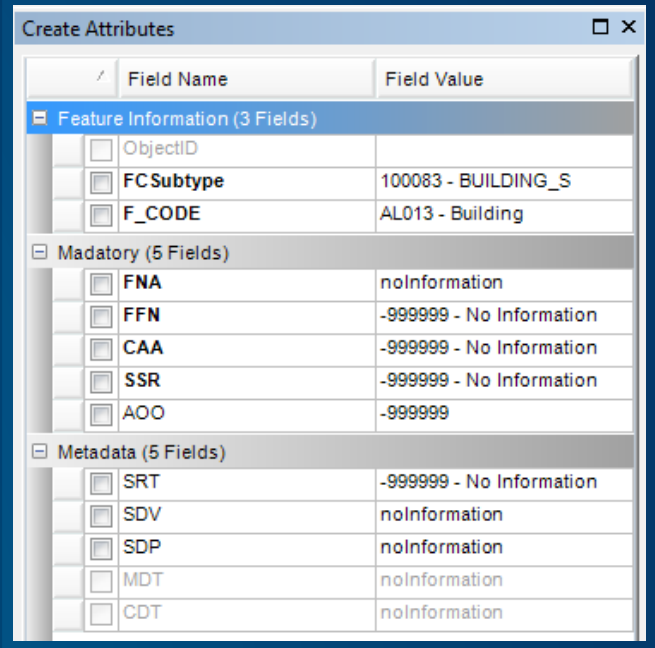
- **Enforce standards**
  - **Templates**



Solution 2: Validate features while editing

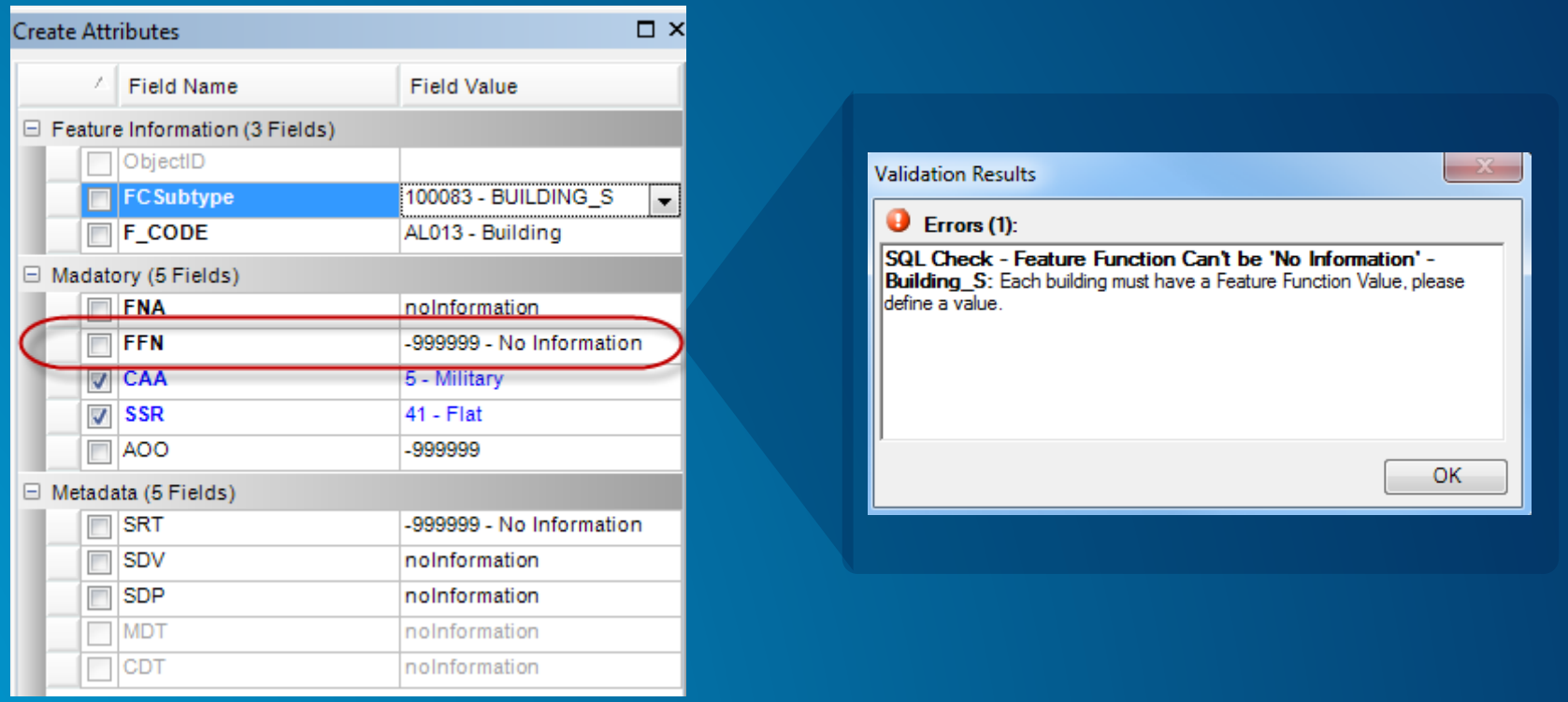
- **Enforce standards**
  - **Templates**
  - **Attribute display**



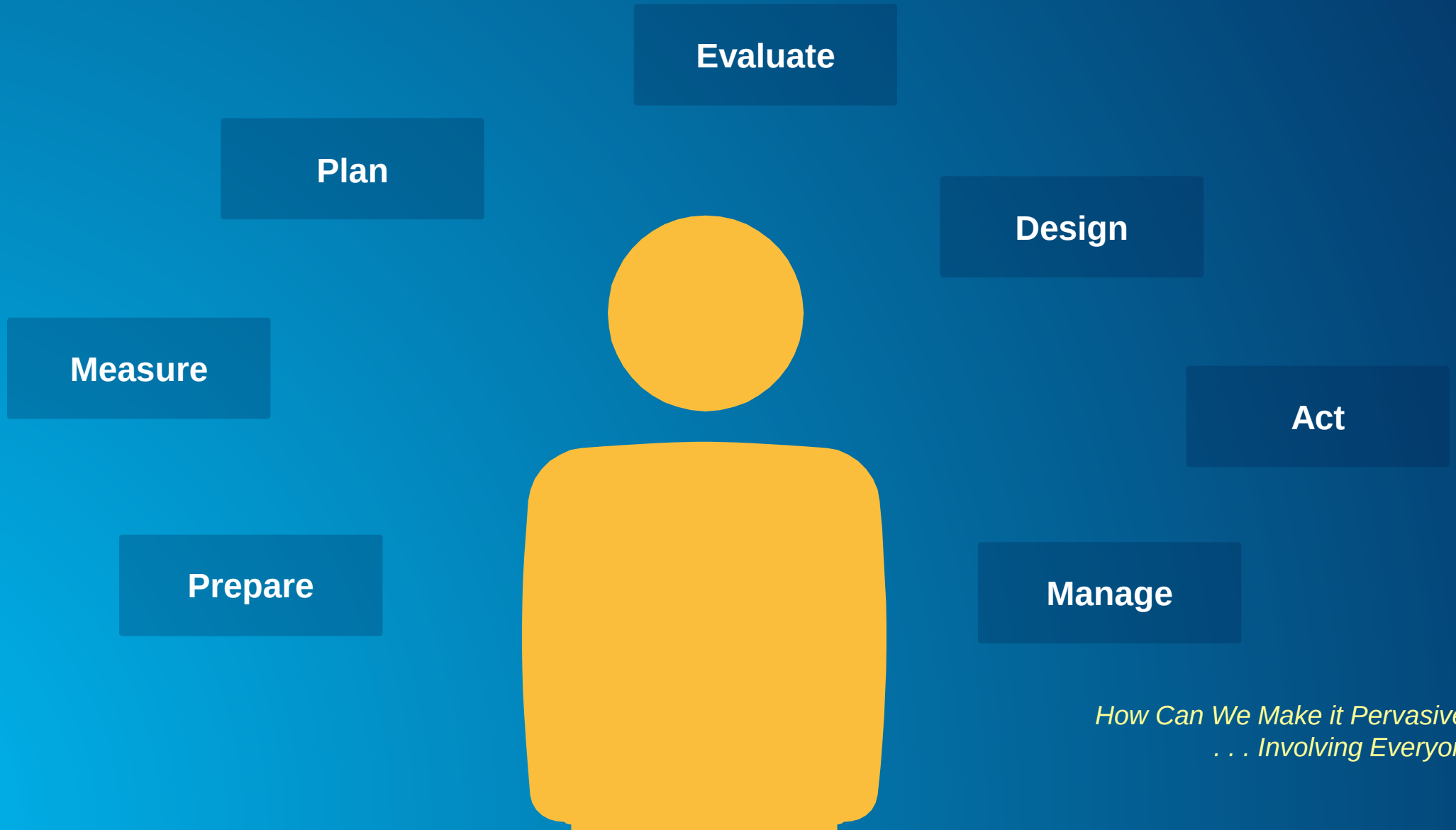


Solution 2: Validate features while editing

- **Enforce standards**
  - **Templates**
  - **Attribute display**
- **On-the-fly**

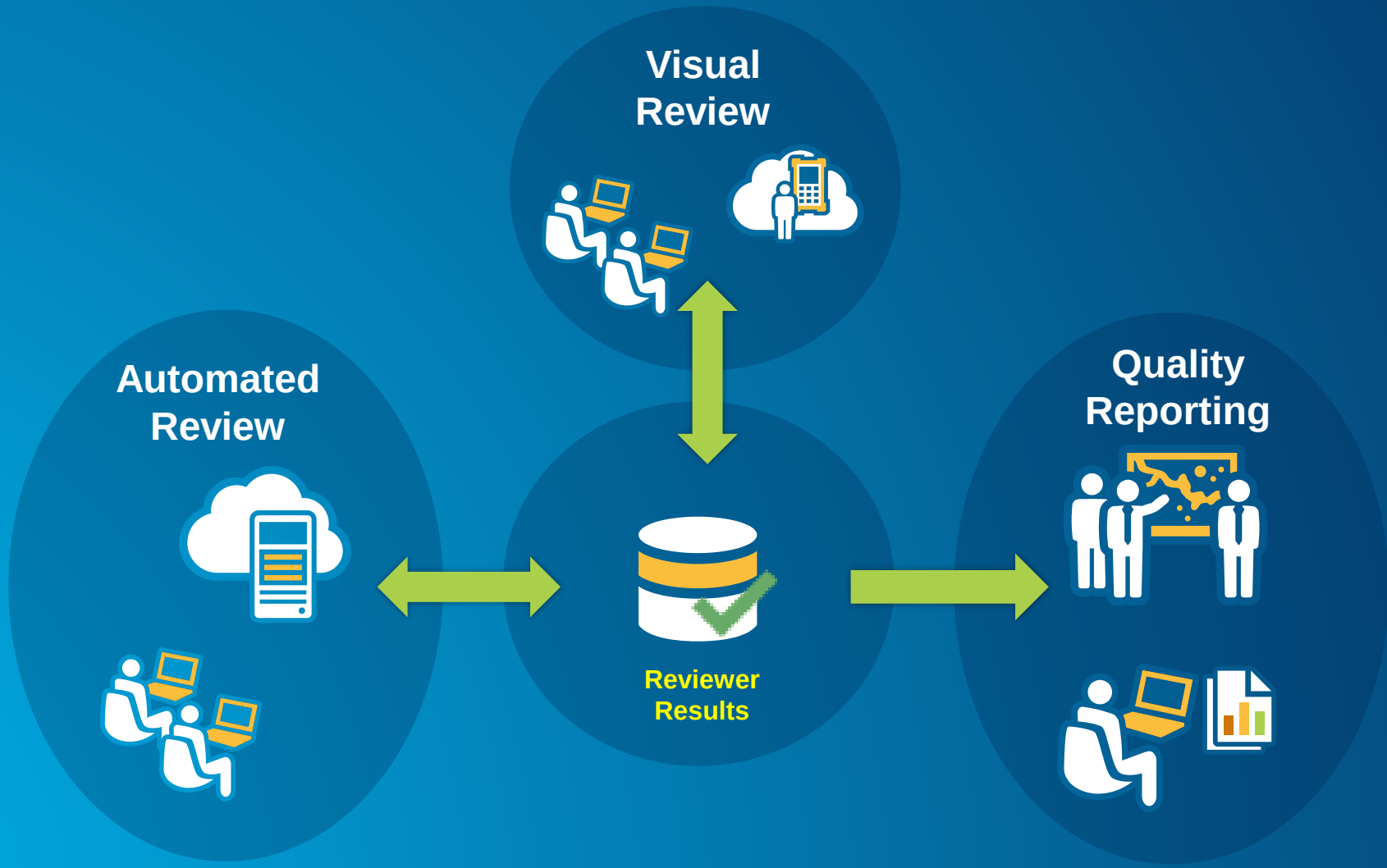


Issue 3: Understanding data quality is difficult



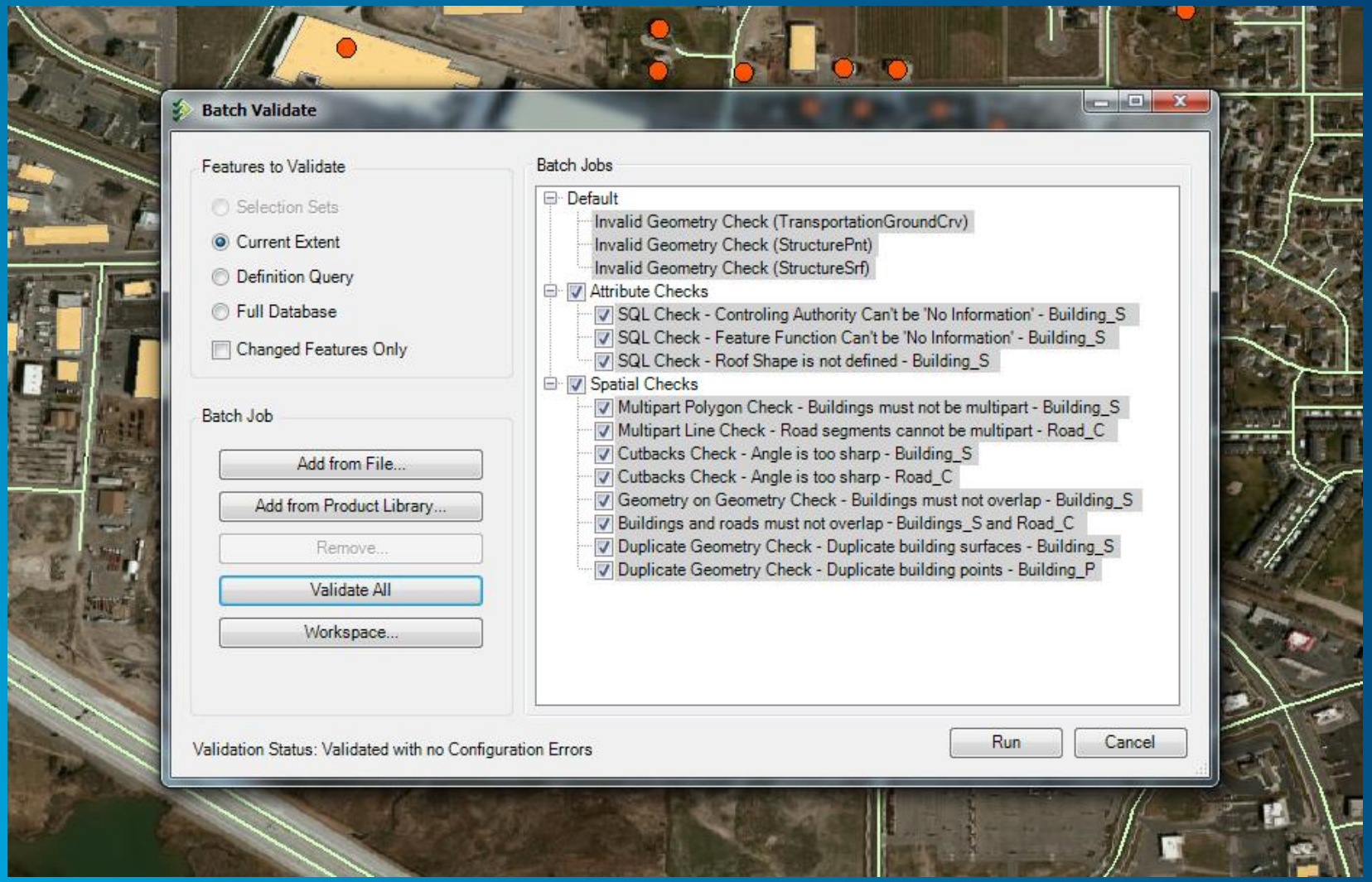
How Can We Make it Pervasive?
. . . Involving Everyone

Solution 3: Centralize quality results in a geodatabase

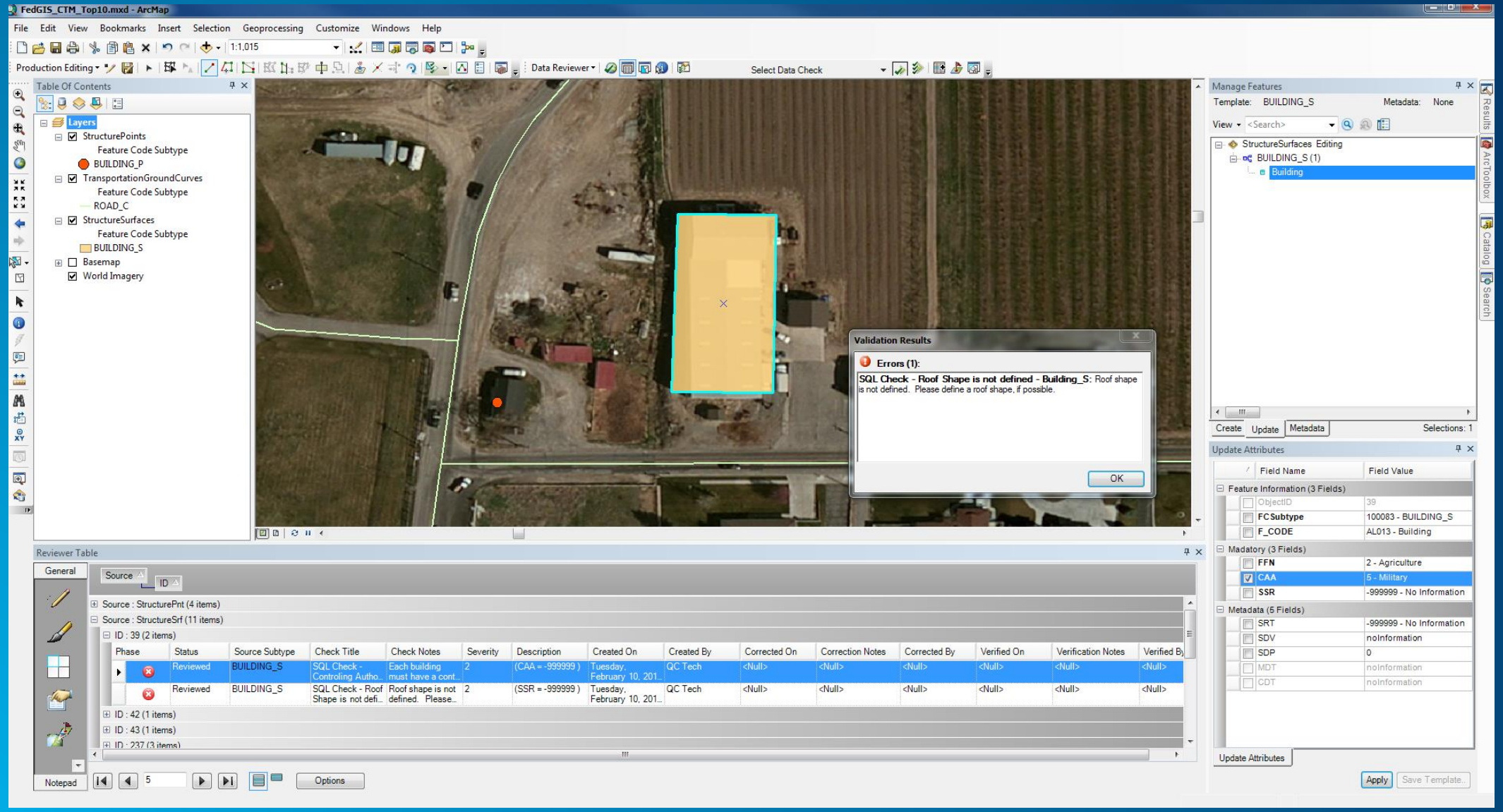


Data validation

Sherry Fagin



For analysts, we're encapsulated data validation rules in a batch job.



For editors, we're using templates, field configurations and on-the-fly validation to ensure new errors are not introduced.

Automated Check Report By Origin Table

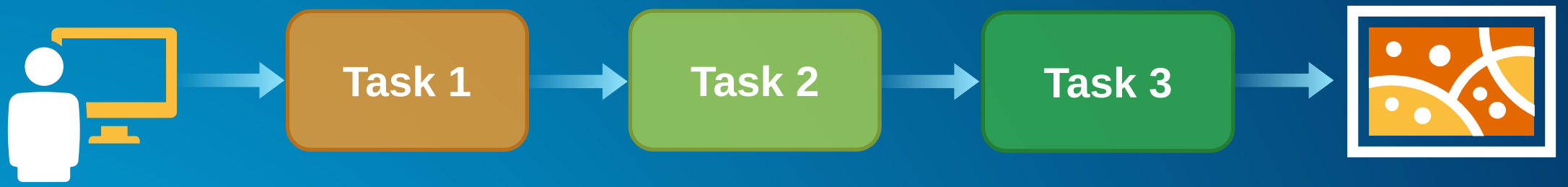
Report generated on 2/10/2015 7:42 AM
Reviewer Workspace Location: C:\Demo\FedGIS\Top10\FedGIS_Top10_Final\ReviewerWorkspaceTop10.gdb
Session(s): Session 8 : QC Tech

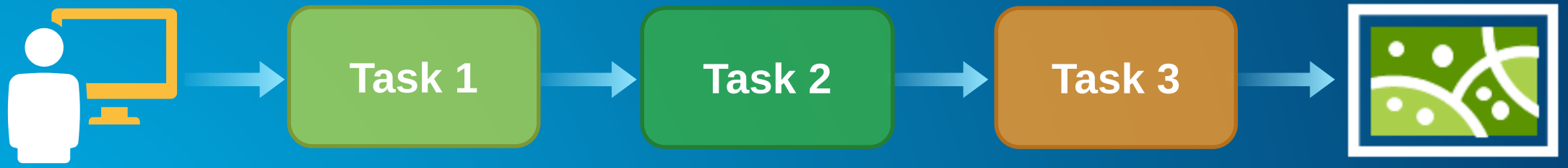
Batch Job Name	Date/Time	Origin Table	Check Type	Check Title	Severity	Records Validated	Total Results	Total Percent Accuracy	Distinct Results	Distinct Percent Accuracy
C:\Users\Documents\CTM_FedGIS_Checks_v1.1.rbj						1455	40	97.25%	24	98.35%
	2/10/2015 12:38:17 PM									
		StructurePnt				60	4	93.33%	4	93.33%
			Duplicate Geometry Check							
				Duplicate Geometry Check - Duplicate building points - Building_P	3	30	4	86.67%		
			Invalid Geometry Check							
				Invalid Geometry Check (StructurePnt)	5	30	0	100.00%		
		StructureSrf				495	36	92.73%	20	95.96%
			Cutbacks Check							
				Cutbacks Check - Angle is too sharp - Building_S	2	55	0	100.00%		
			Duplicate Geometry Check							
				Duplicate Geometry Check - Duplicate building surfaces - Building_S	2	55	8	85.45%		
			Execute SQL Check							
				SQL Check - Controling Authority Can't be 'No Information' - Building_S	2	55	4	92.73%		
				SQL Check - Feature Function Can't be 'No Information' - Building_S	1	55	1	98.18%		
				SQL Check - Roof Shape is not defined - Building_S	2	55	4	92.73%		

For managers, we've equipped them with automated reporting capabilities from desktop and server.

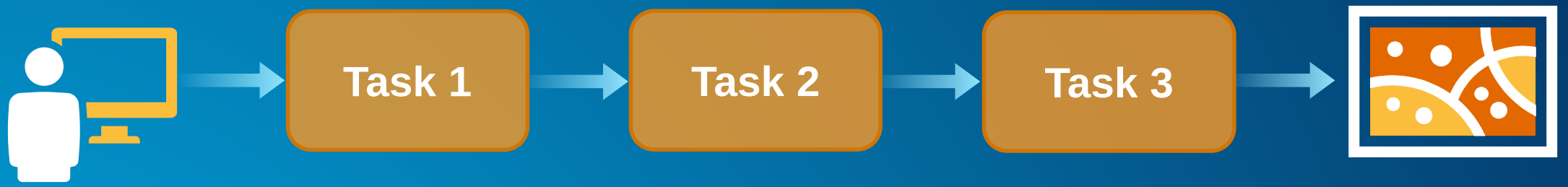
How can we manage our work to make better, faster and cheaper products?

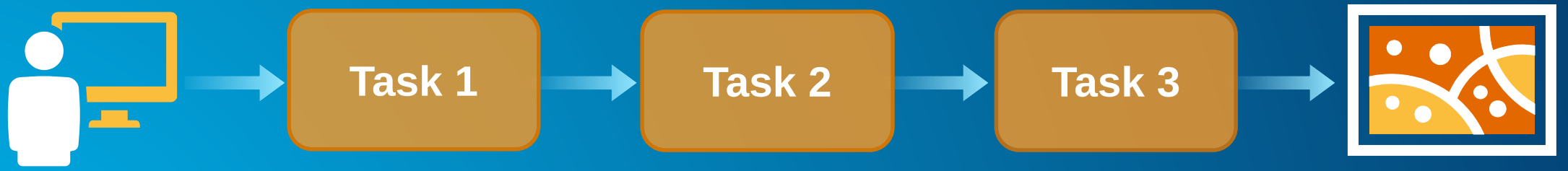
Issue 4: Keeping staff on task





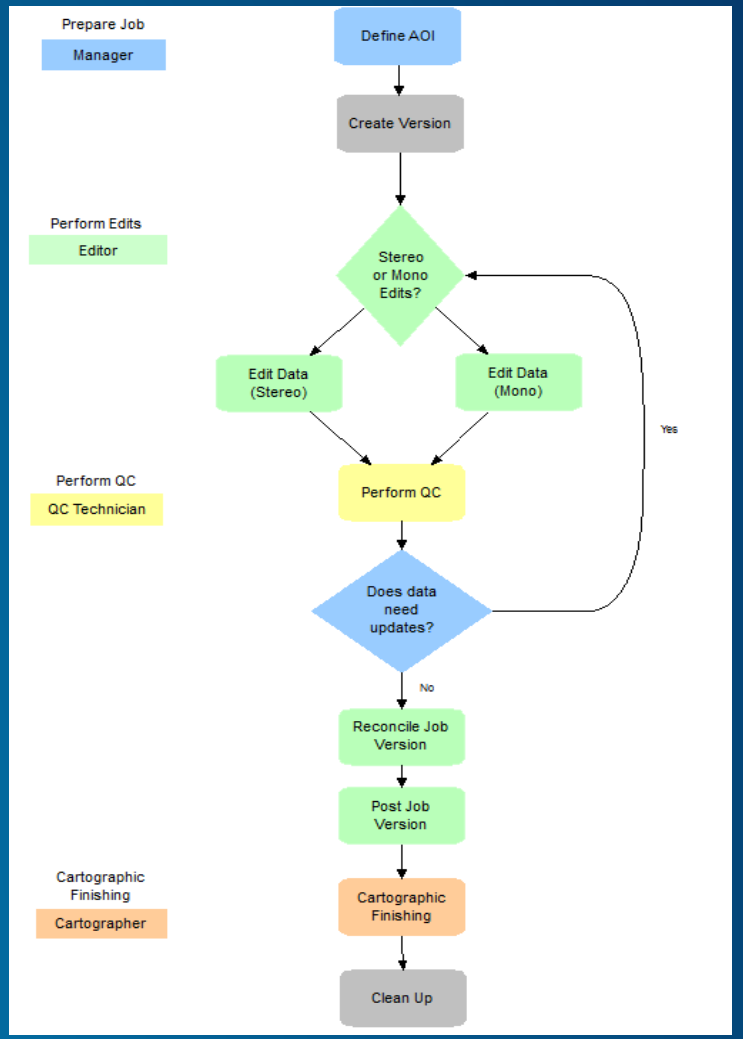
Solution 4: Keeping staff on task





Solution 4: Defining workflows with Workflow Manager

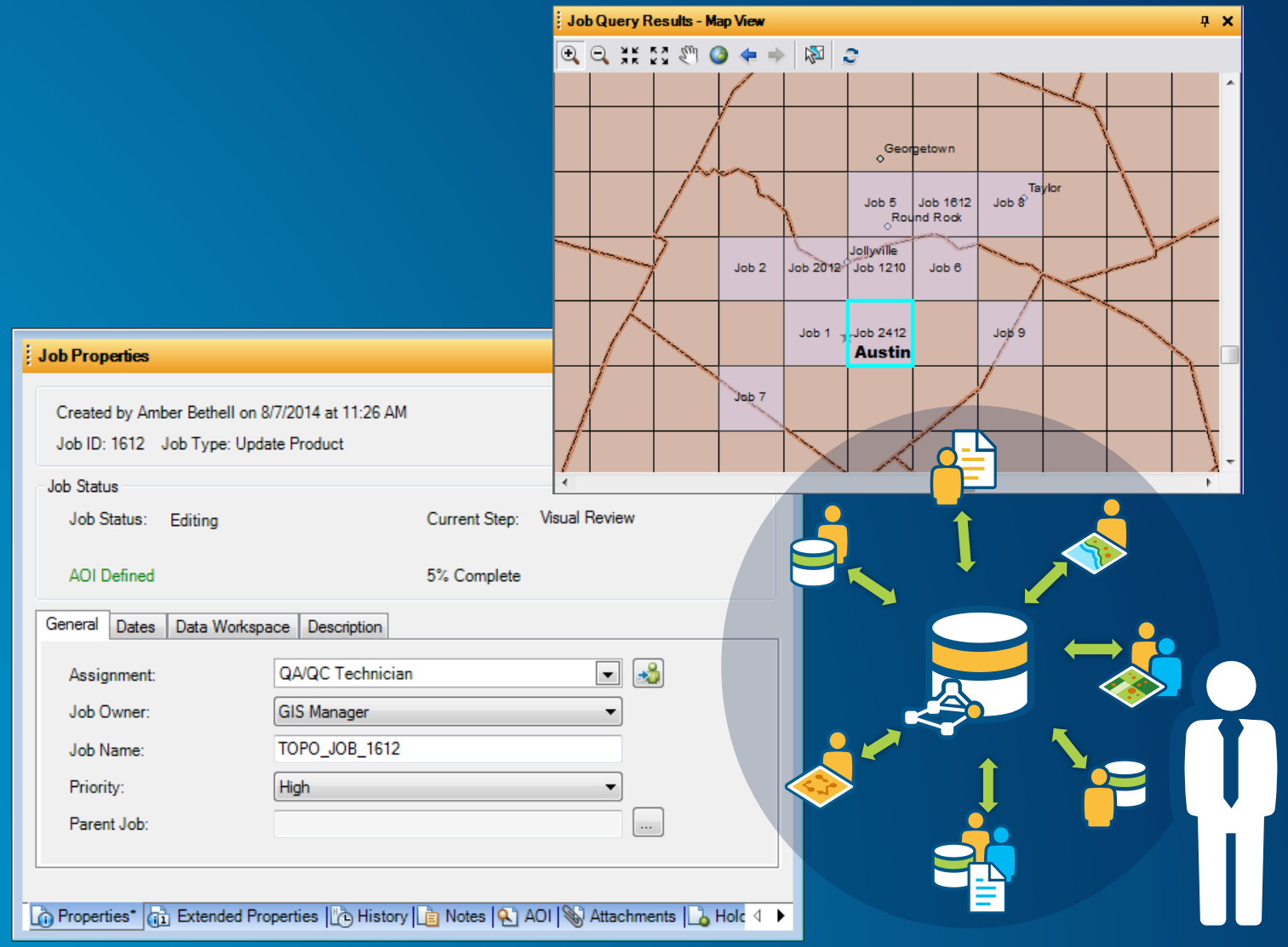
- Configurable to your business processes
- Repeatable across projects and areas
- Cross team interaction



Issue 5: Keeping staff on time

Solution 5: Managing jobs with Workflow Manager

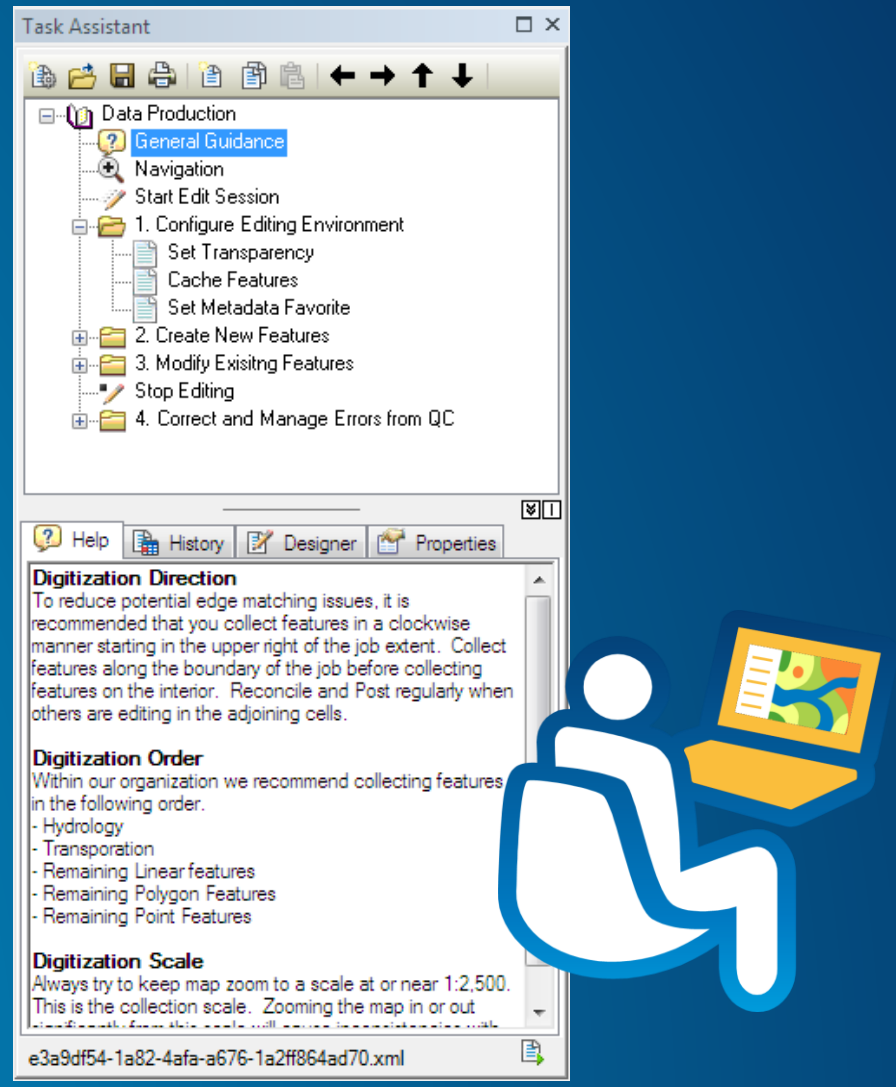
- Jobs - unit of work
- Descriptive properties
  - Assignment
  - Dates
  - Data
  - Area of interest
  - History



Issue 6: Training new staff

Solution 6: Executing task based workflows with Task Assistant

- **Share knowledge**
  - **Experienced users create**
  - **New users execute**
- **Communicate best practices**
- **Integrated into ArcMap**



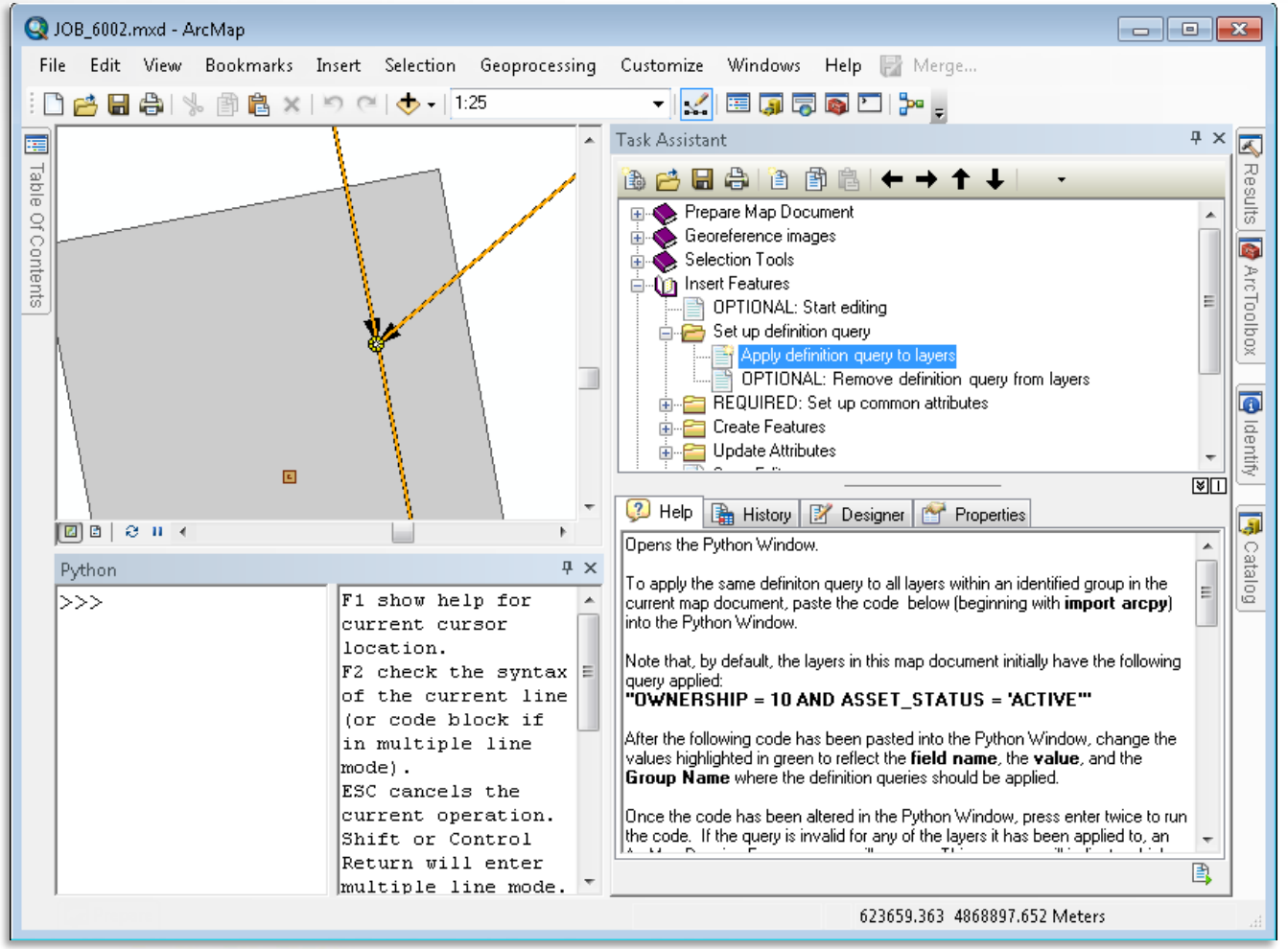
Case Study

Timmons Group
Courtney Moore

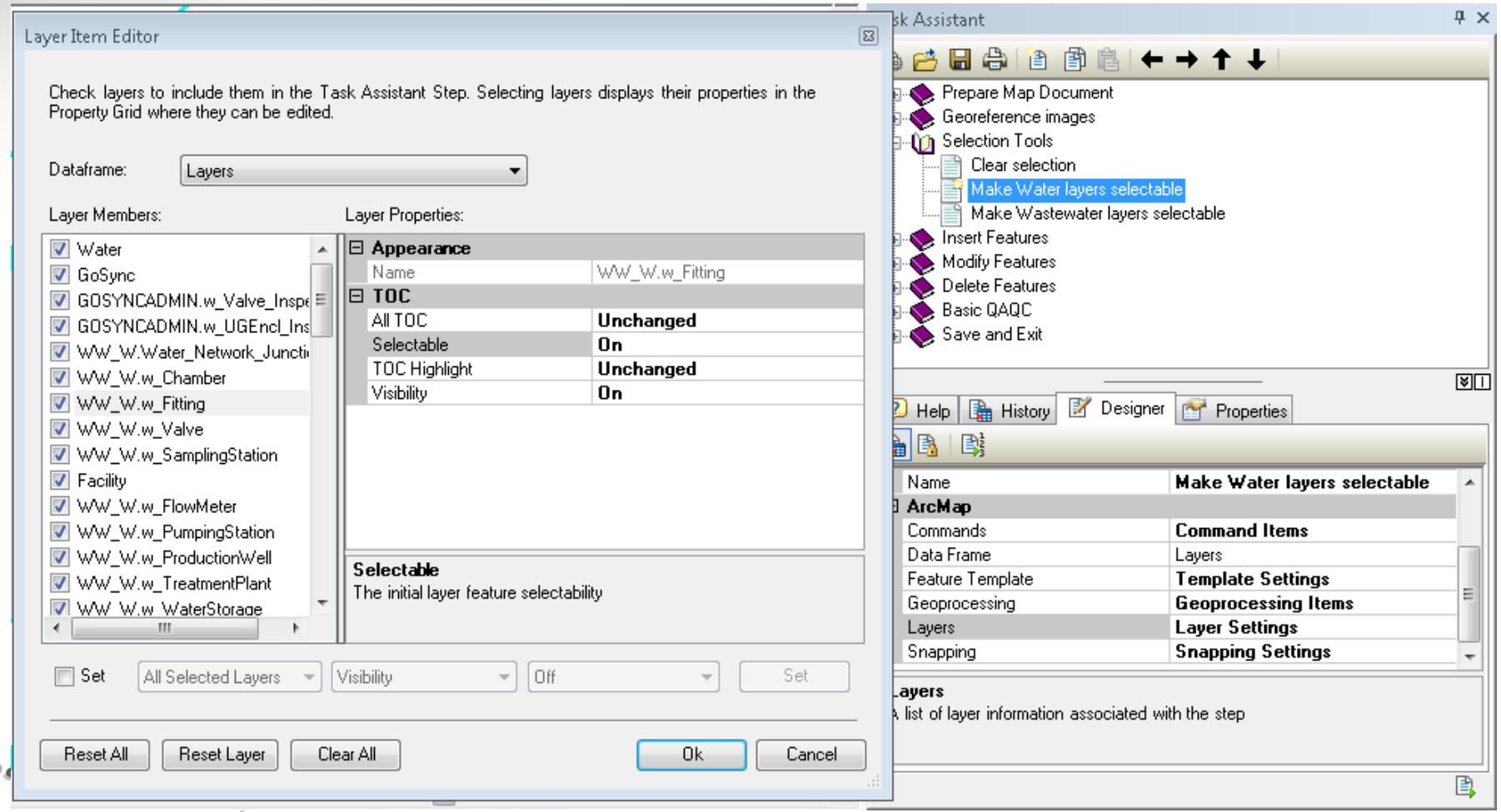
York Region Canada

- ✓ Geographic Information Systems Branch (GISB)
- ✓ Previous tools: Feature Object Class Extensions
- ✓ Migrated to: Esri's Production Mapping

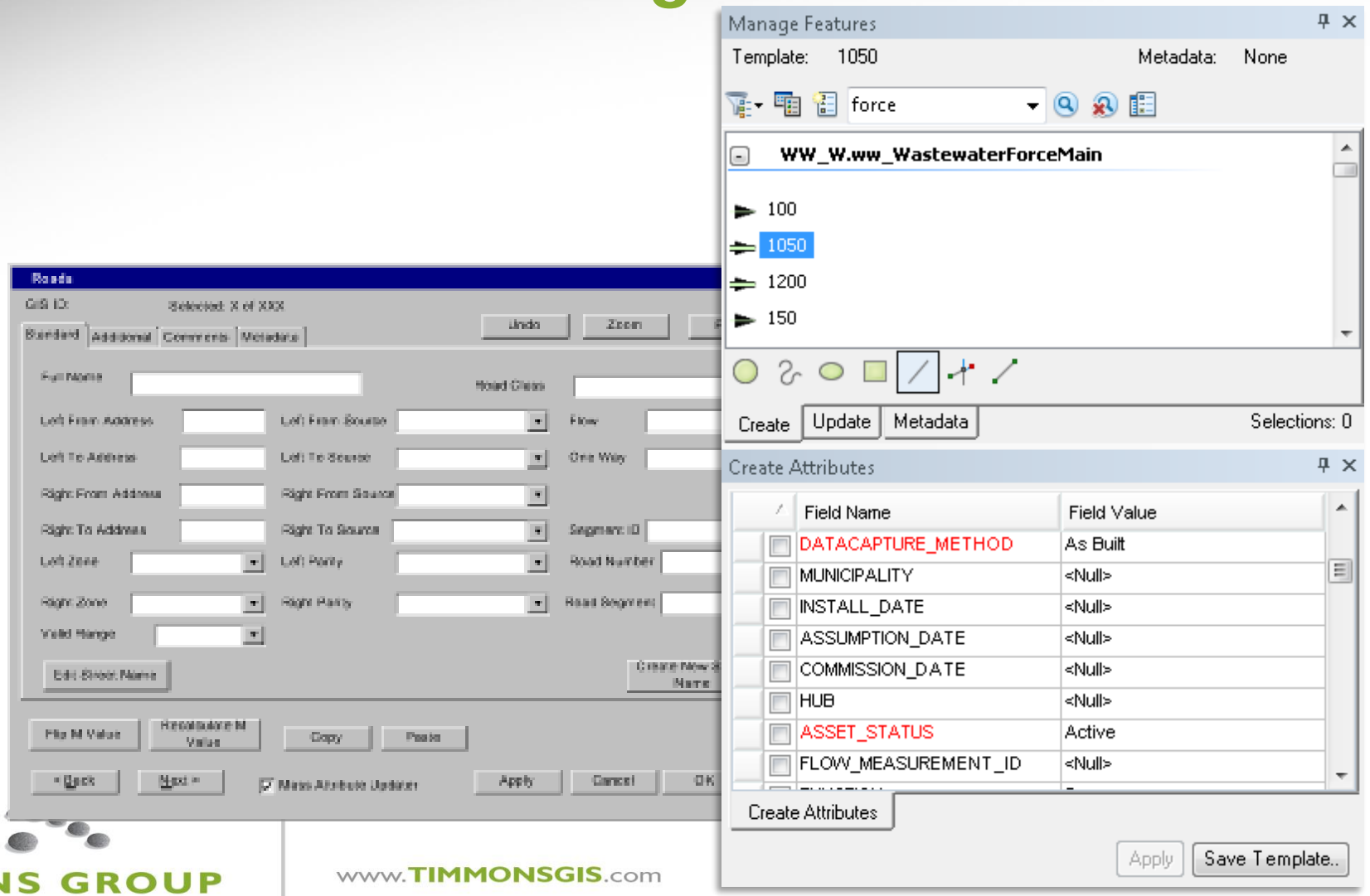
Guided Editing with Task Assistant Manager



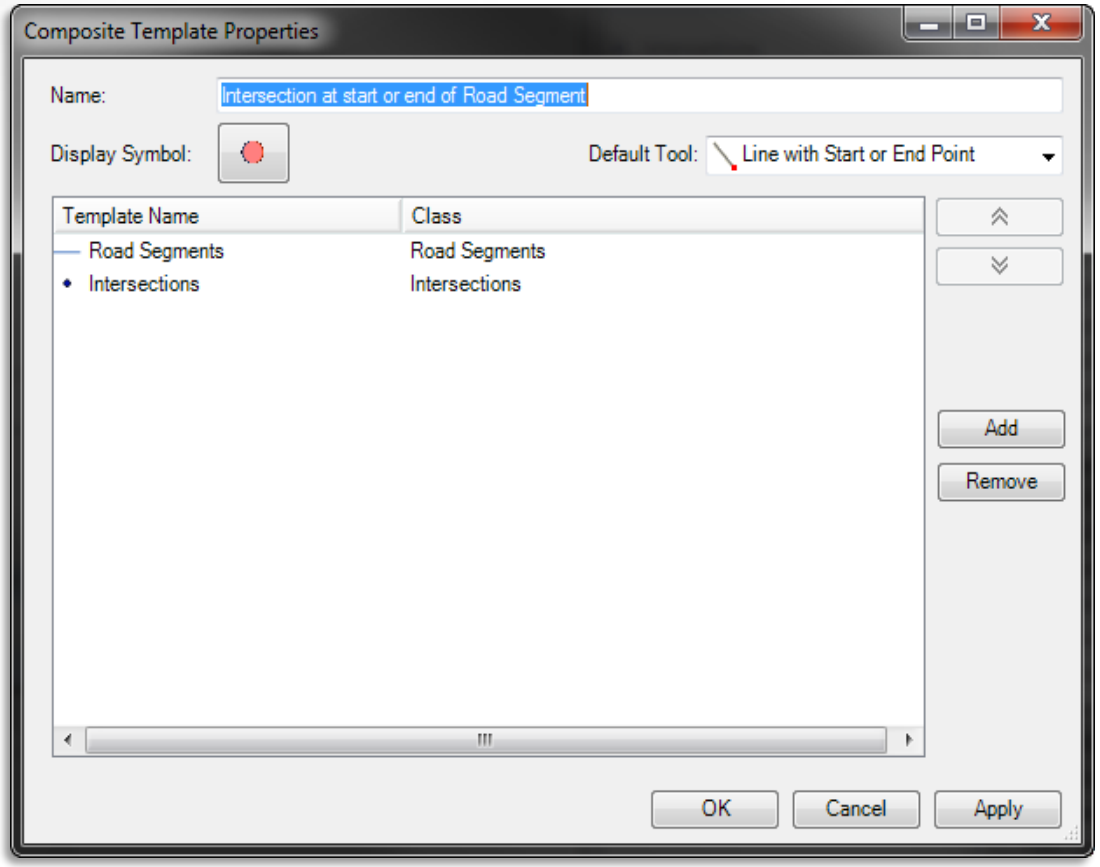
Automating Editing with TAM



Manage Features & Attribute Window



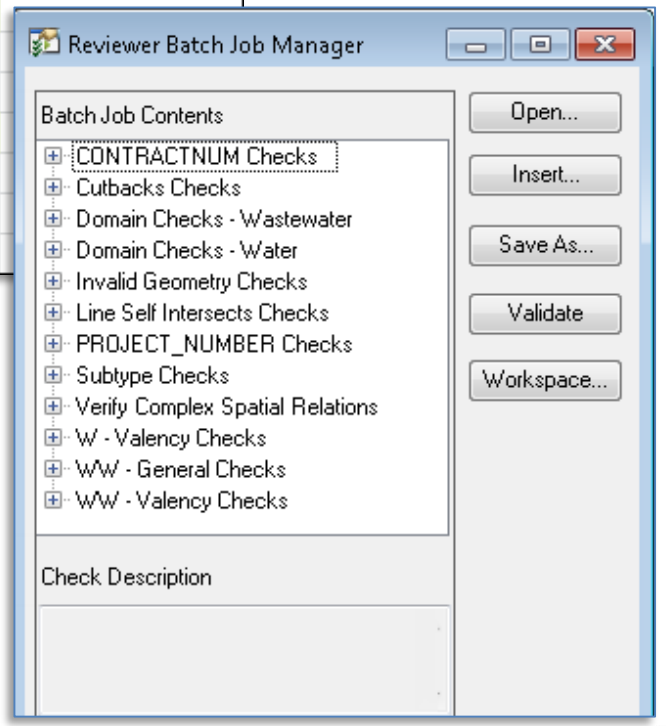
Composite Template Construction Tools



Data Quality with Data Reviewer

Wastewater Network Valency Checks

Check #	Error Description	Check Description and Data Reviewer Parameters		Hard Fail (Yes/No)
Check 1a	Reducer not connected to exactly 2 Gravity Main pipes	Searches for points or nodes of linear features that intersect with a specified number of linear features		
	Valency Check	Feature Class / Subtype 1:	ww_Fitting: Reducer	
		Where Clause:	ASSET_STATUS = 'Active'	
		Fields to Include for Feature Class 1:	None	
		Feature Class 2:	ww_WastewaterGravityMain	
		Where Clause:	ASSET_STATUS = 'Active'	
		Fields to Include for Feature Class 2:	None	
		Validation Method:	Valency at point location	
		Valency Operation:	<> (not equal to) 2	



Reporting with Data Reviewer

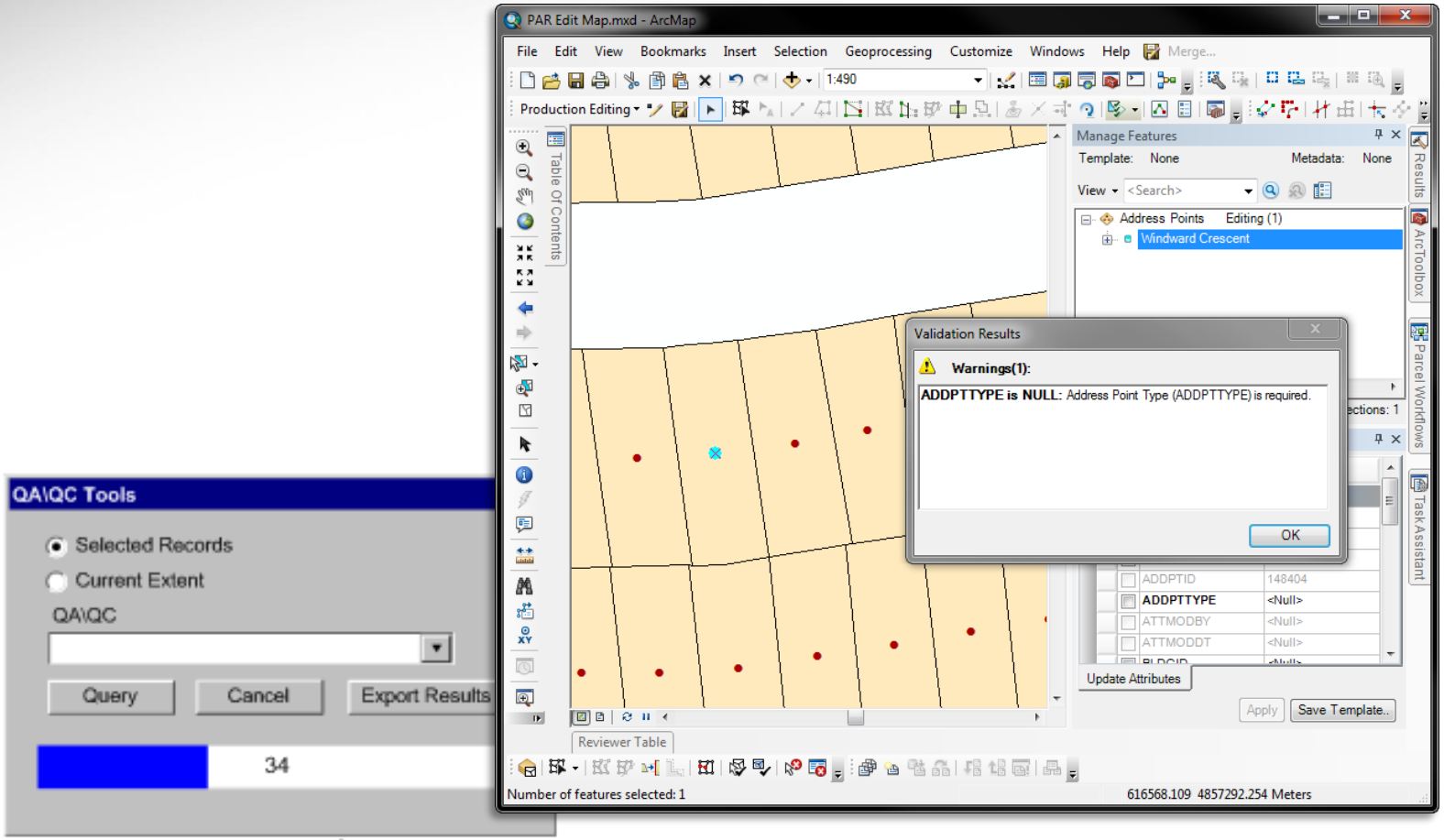
Report By Total Record Count

Report generated on 10/22/2012 10:49 AM by jenniferk
Reviewer Workspace Location: K:\projects\QAQC\DataRev.gdb
Session(s): Session 1 : QA/QC

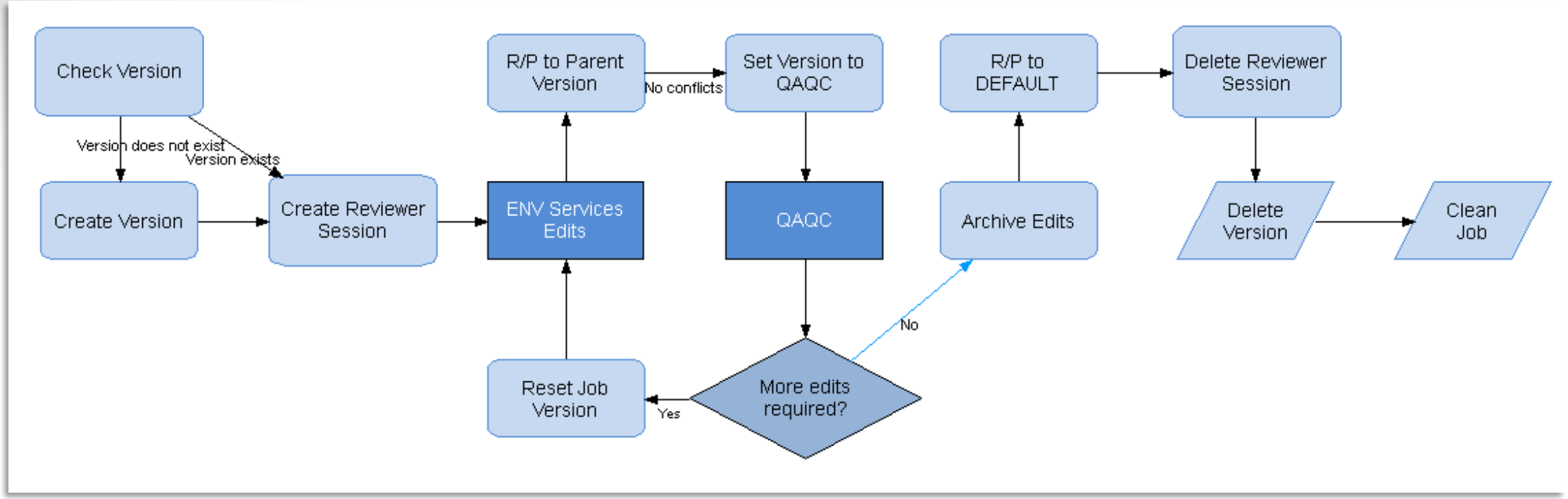
Origin Table	Check Type	Check Title	Total Records*	Total Results	Total Percent Accuracy	Distinct Results	Distinct Percent Accuracy
PAR.DBO.Addresses			95	1	98.95%	1	98.95%
	Commit to Reviewer Table Tool						
		Commit to Reviewer Table Tool	95	1	98.95%		
PAR.DBO.Parcels			5929	31	99.48%	31	99.48%
	Batch Check						
		Domain Value Check	5929	6	99.90%		
	Batch Check						
		Geometry Check	5929	25	99.58%		
Total			6024	32	99.47%	32	99.47%

*This report is based on the total number of records in the Origin Table at the time this report is generated.

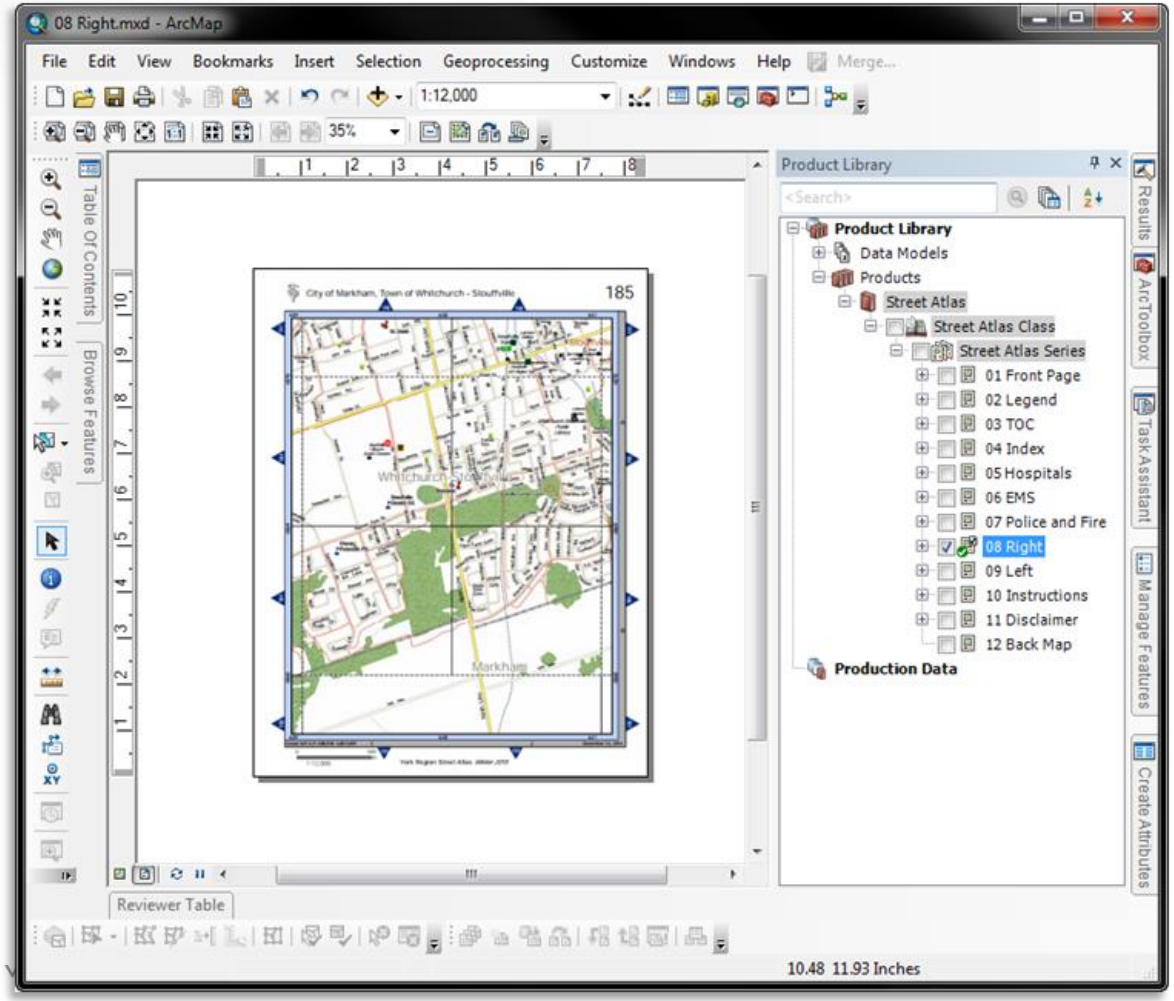
On-the-Fly Validation



Process Management with Workflow Manager

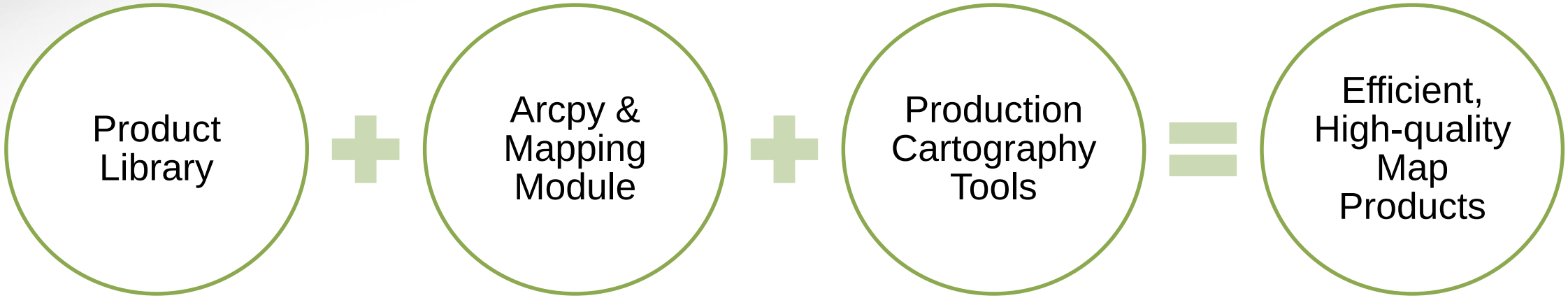


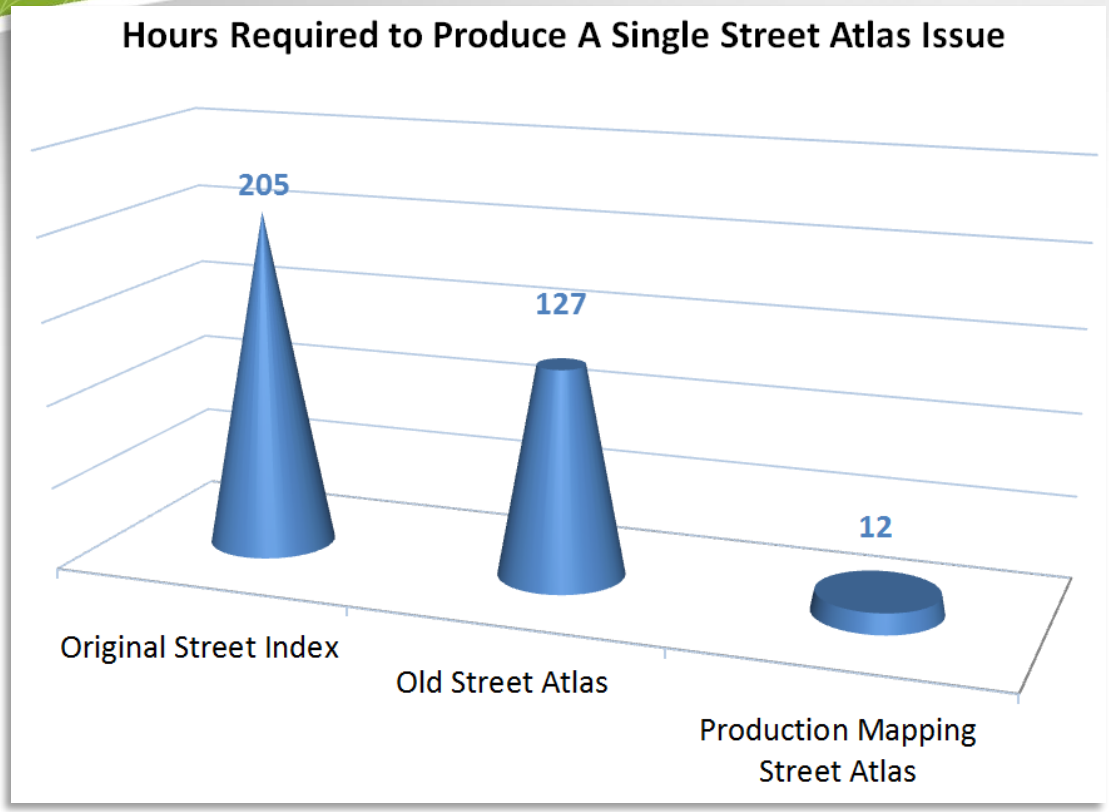
Atlas Production with Product Library



TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Atlas Production with Product Library

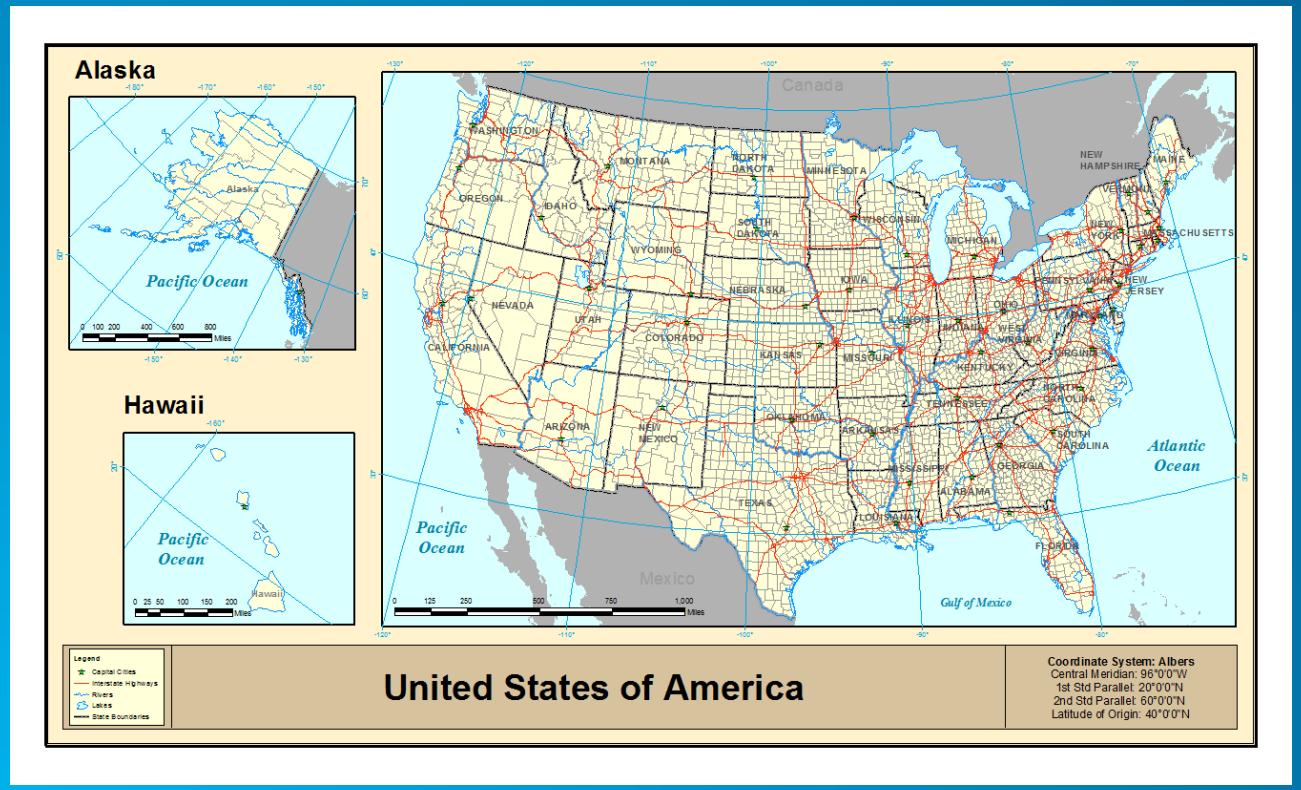


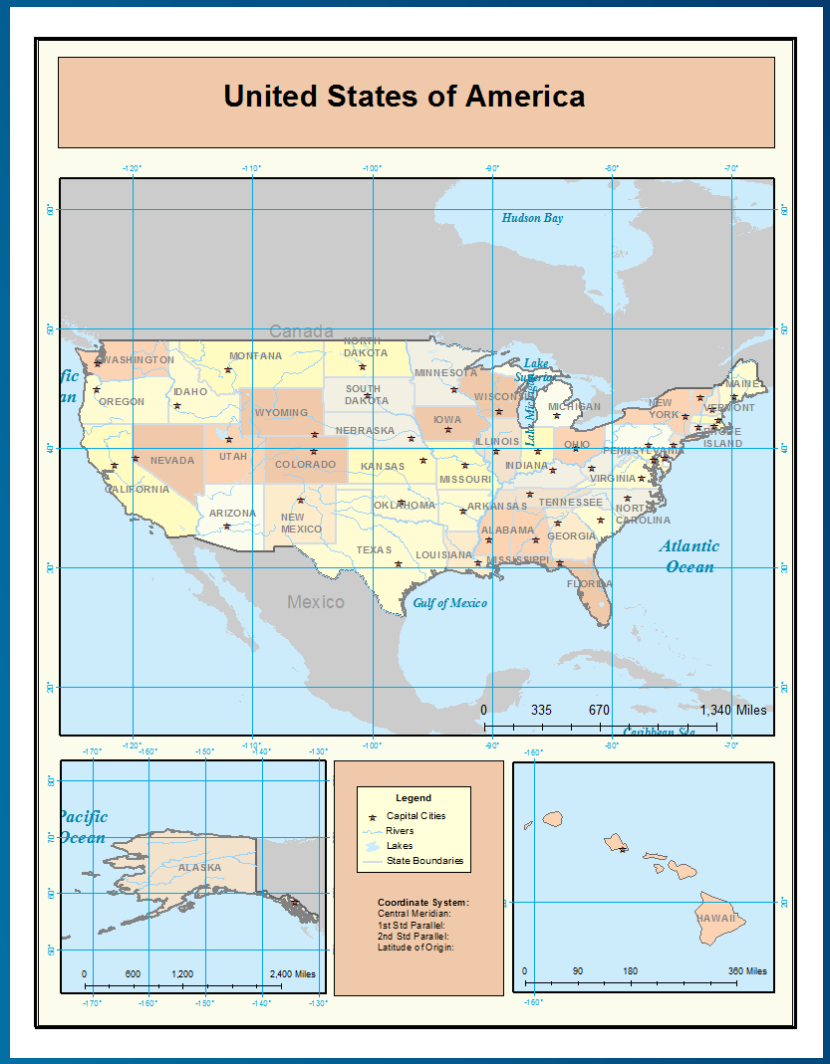


This result represents a gain of over 40 person hours each time the Street Atlas is produced, and a simpler, more repeatable and accessible process.

How can we create cartographic output better, faster and cheaper?

Issue 7: Getting the same results from multiple cartographers





Solution 7: Centralized cartographic rules and behavior

Product Library

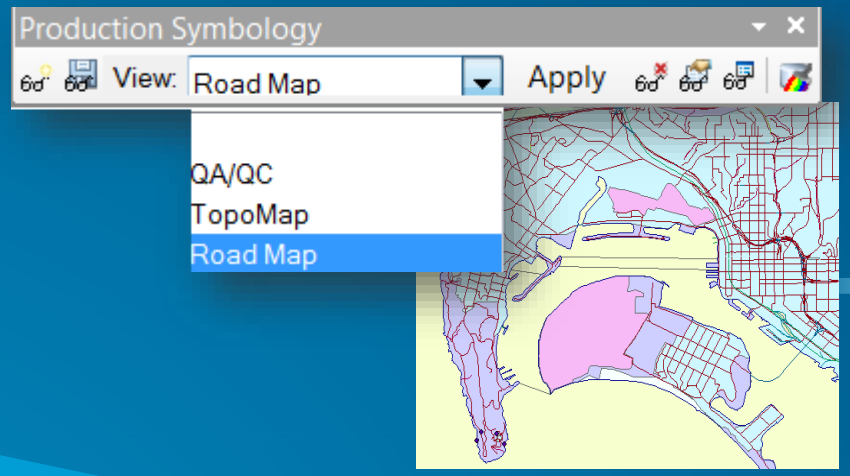
Configure once, apply to many maps

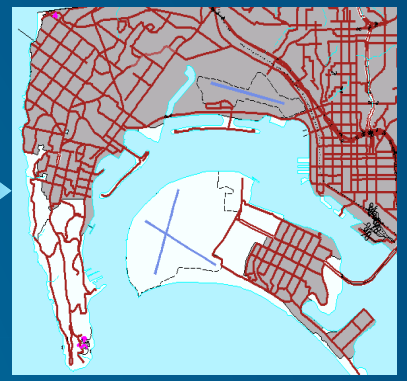
Solution 7: Centralized cartographic rules and behavior

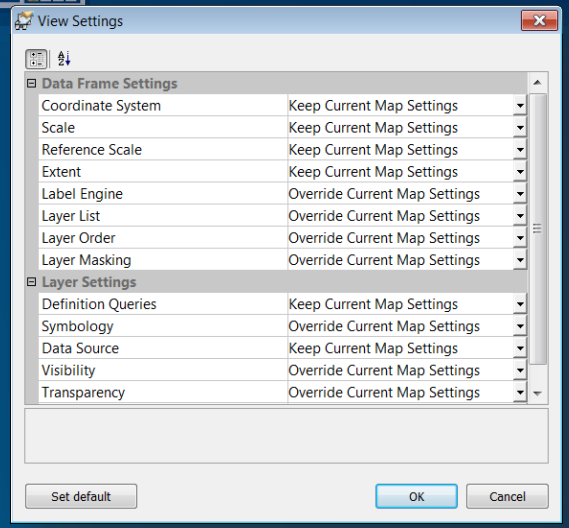
Views

Surround Elements

Layout Rules







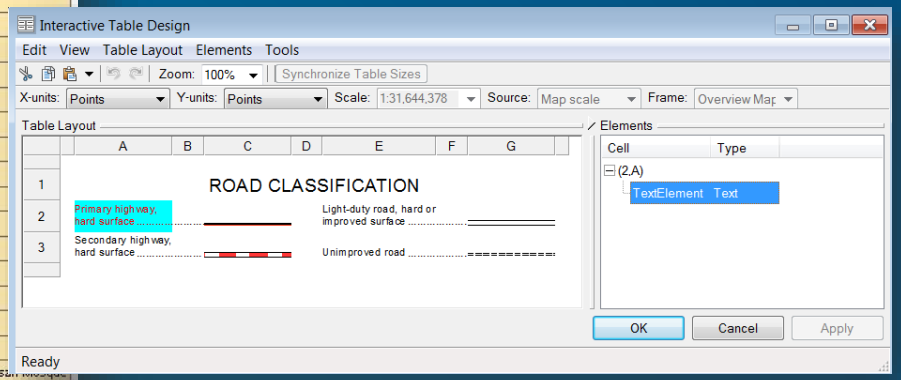
Product Library

Configure once, apply to many maps

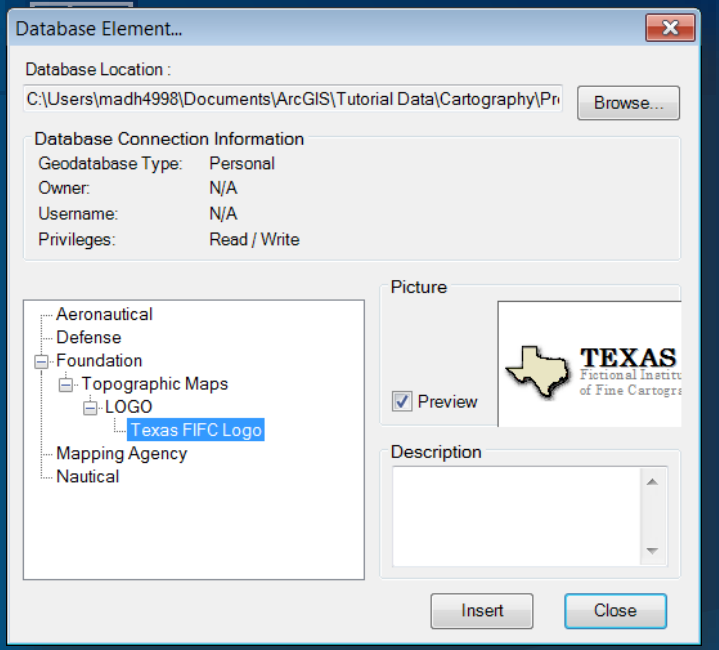
Solution 7: Centralized cartographic rules and behavior

Category	Reference Number	Feature Name
1	4	Industrial plant with warehouses
1	12	Warehouse and storage facility
1	10	Underground POL storage
1	5	Market
1	9	Truck depot
4	25	Al Kut Military Hospital
5	43	Military facility
5	34	Helipad
5	35	Helipad
8	61	Transformer station
8	66	Water treatment plant
8	51	Bus depot
8	62	Transformer station
8	57	Diesel power plant
8	53	Dam
8	54	Dam
8	68	Water treatment plant
8	58	Helipad
8	60	Bus depot
9	74	Imam Muhammad Abu Al Hasa

Compiled from 2006 Sample Data



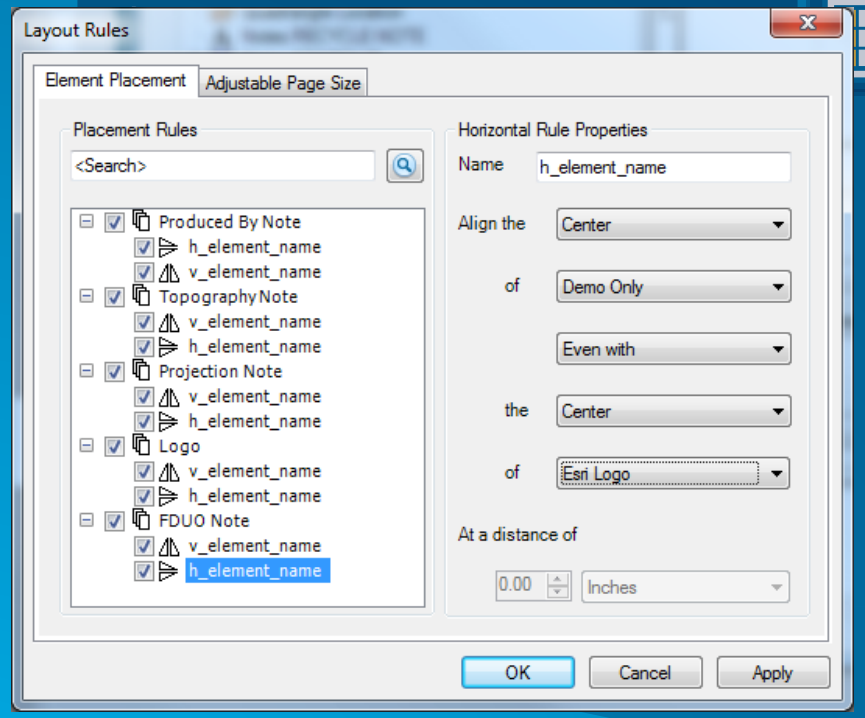
Surround Elements



Product Library

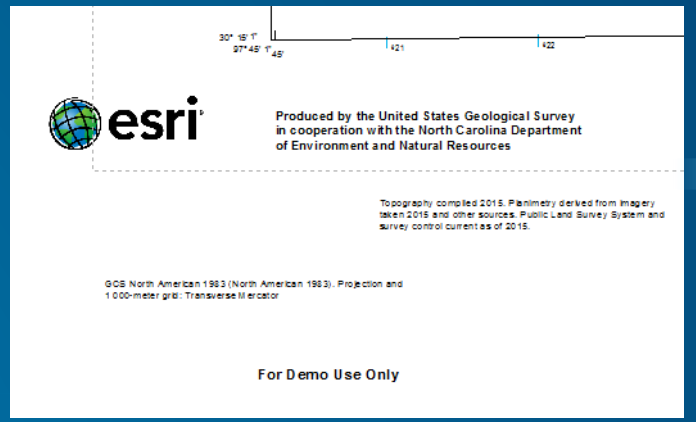
Configure once, apply to many maps

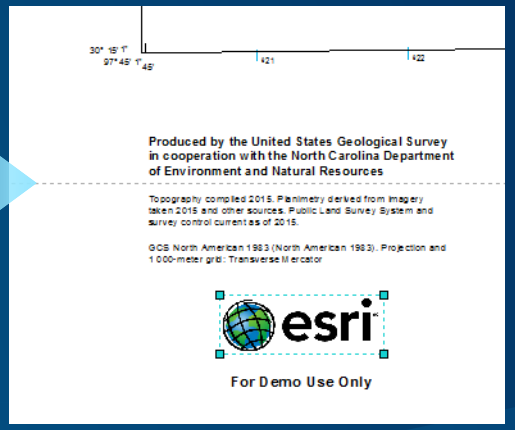
Solution 7: Centralized cartographic rules and behavior



Surround Elements

Layout Rules

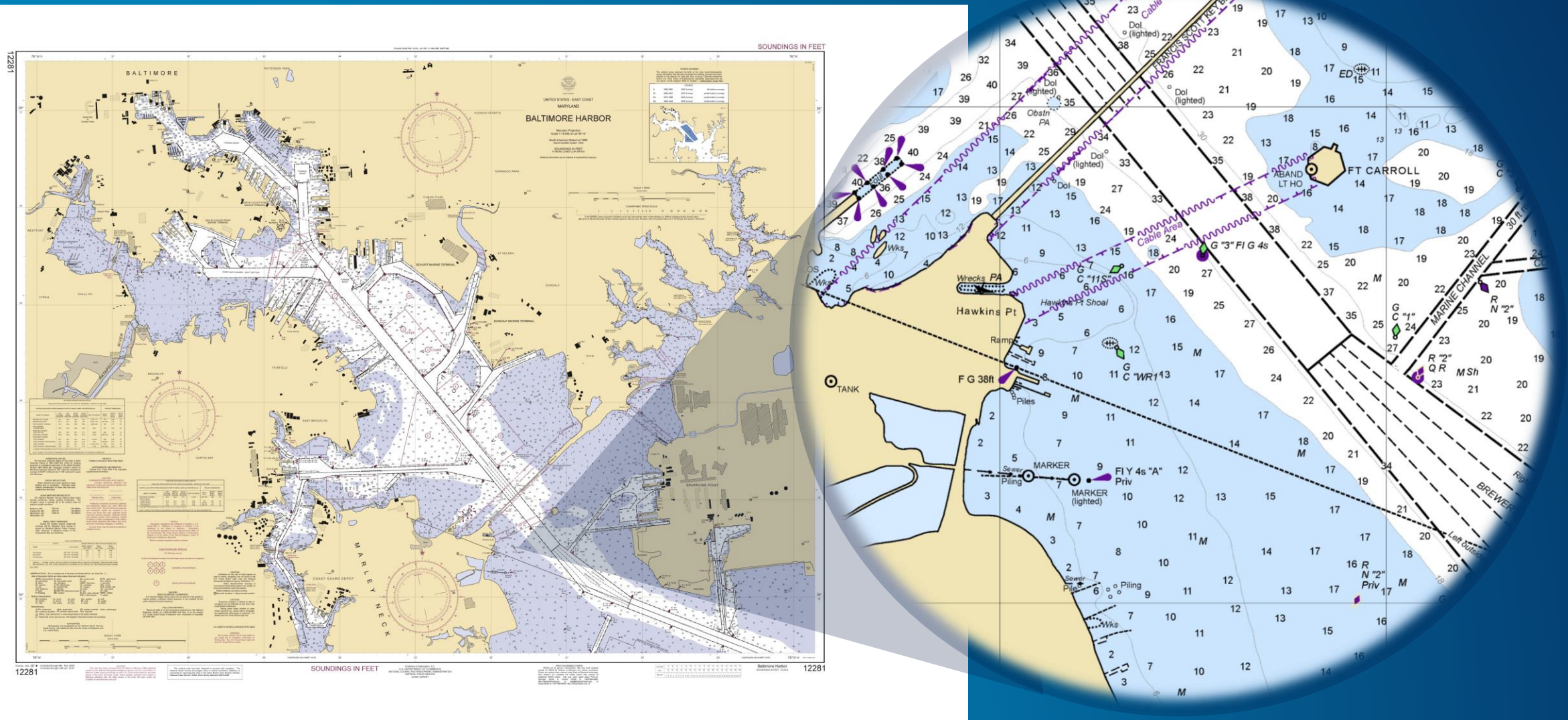




Product Library

Configure once, apply to many maps

Issue 8: Difficult to make complex, specification driven maps



Solution 8: Make specification driven maps with Production Mapping

Visual Specifications

Grids & Graticules

Visual Specifications Advanced View

Rule Type	Specification	Rule Description	Dataset	SQL Statement	Previe
Representation	CTM_25K	Tower	StructurePnt	SELECT <TargetTable.OID> FROM <TargetTable> WHERE F_CODE = 'AL241'	Str
Representation	CTM_25K	Church	StructurePnt	SELECT <TargetTable.OID> FROM <TargetTable> WHERE HWT in (000, 002, 003, 004)	Str
Representation	CTM_25K	Building/Shed	StructureSrf	SELECT <TargetTable.OID> FROM <TargetTable> WHERE F_CODE = 'AL013' OR F_CODE	Struct

Show: All Selected Options >> Apply

1L015 – BUILDING
POINT FEATURE... SYMBOL#1L015P011

ATTRIBUTES:

HWT – HOUSE OF WORSHIP TYPE
000 – UNKNOWN
002 – CATHEDRAL
003 – CHAPEL
004 – CHURCH
NAM – NAME CATEGORY
ANY

PARAMETERS:

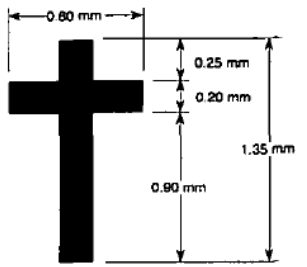
Origin: Center of square

FILL: SQUARE
Lineweight: 0.630mm
Length: 0.630mm
Color: BLACK (#58600)

LABEL: NAM
Type Size: 6 point
Type Style: Upper/Lower Case, Condensed
Color: RED (#60862)

POSICUT
Posicut: #21
Color: BLACK (#58600)

POSICUT # 21

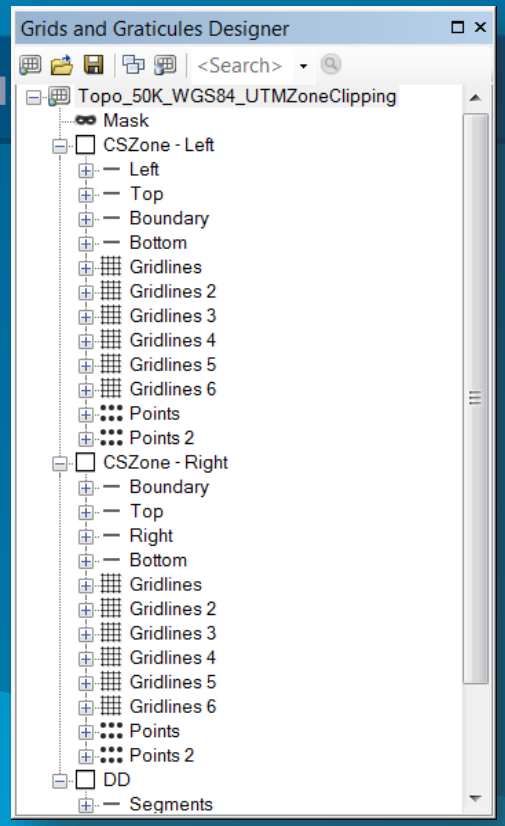


Cross lineweights : 0.20 mm
Origin : Base of cross

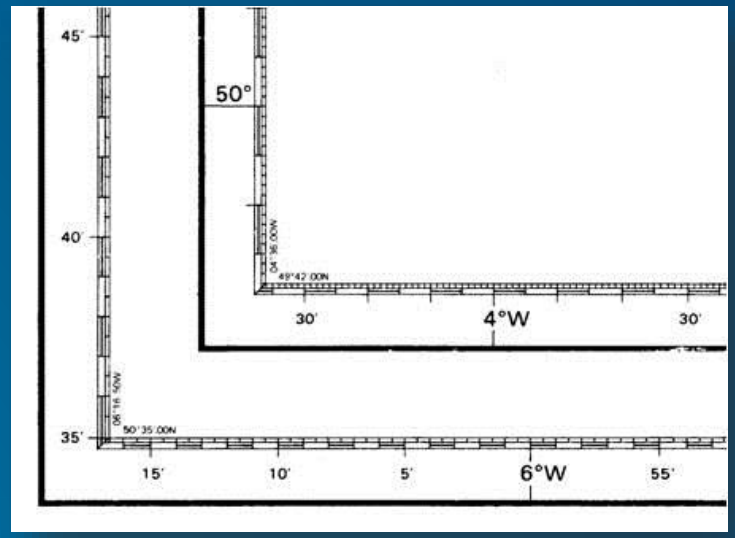
Product Library

Solution 8: Make specification driven maps with Production Mapping

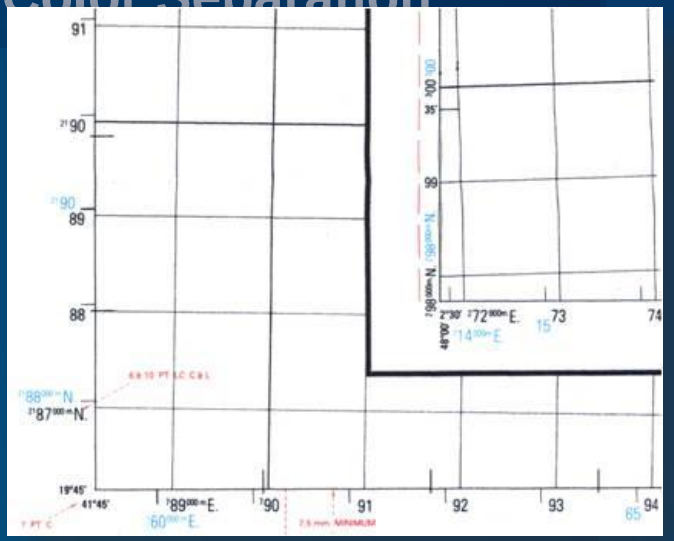
Visu



Grids & Graticules



Color Separation



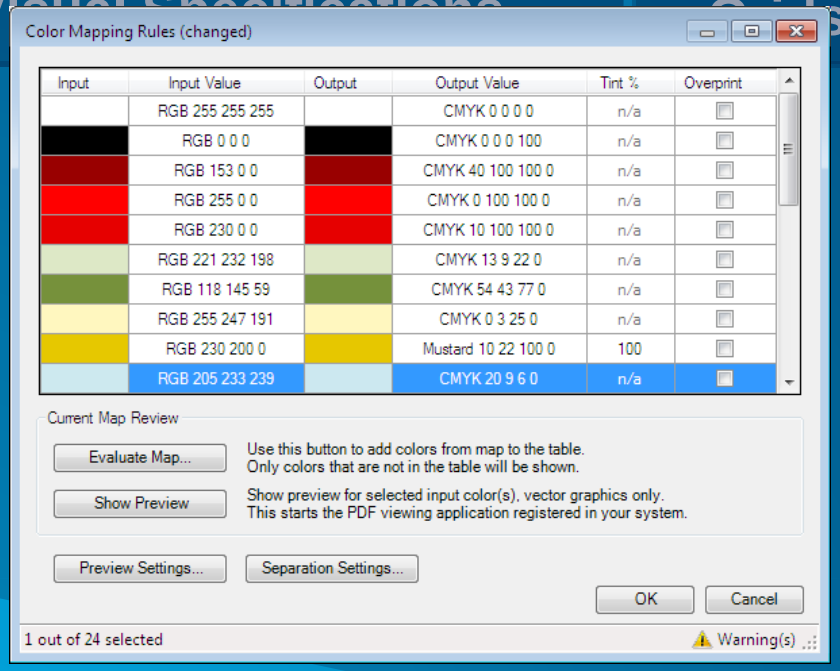
Product Library

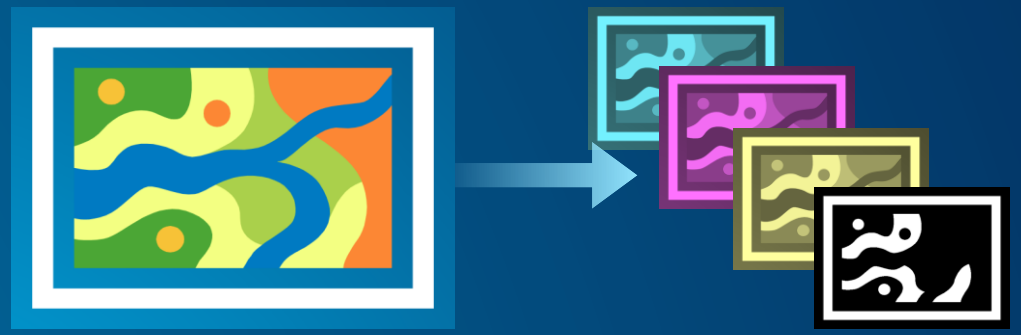
Solution 8: Make specification driven maps with Production Mapping

Visual Specifications

Grids & Graticules

Color Separation



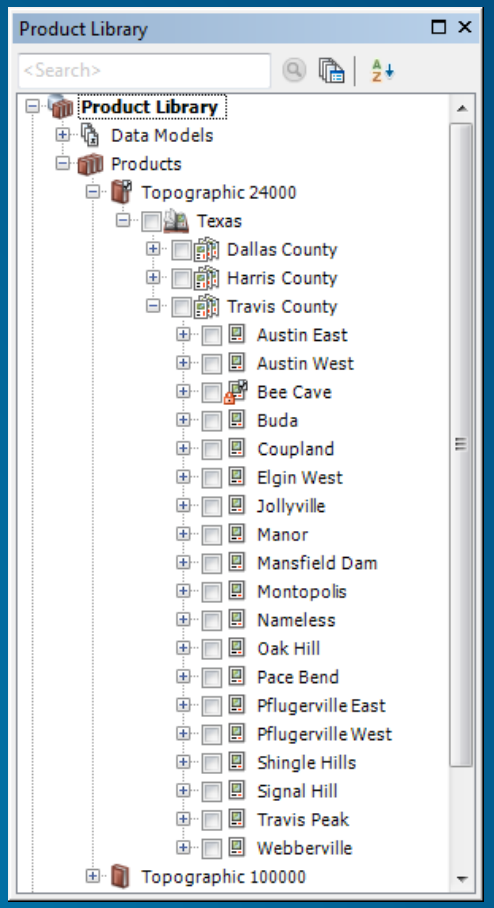


Product Library

Issue 9: Difficult to find the map you need when you need it

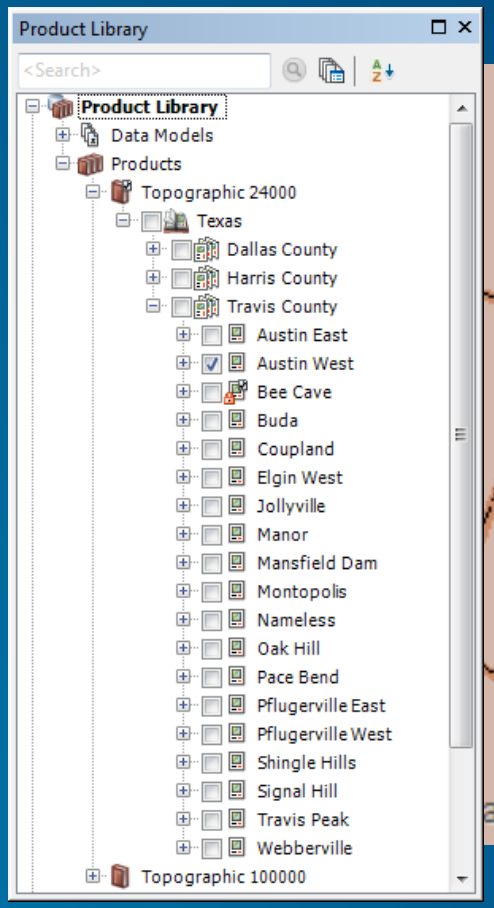
Solution 9: Product catalogs and self-service mapping

Product Library



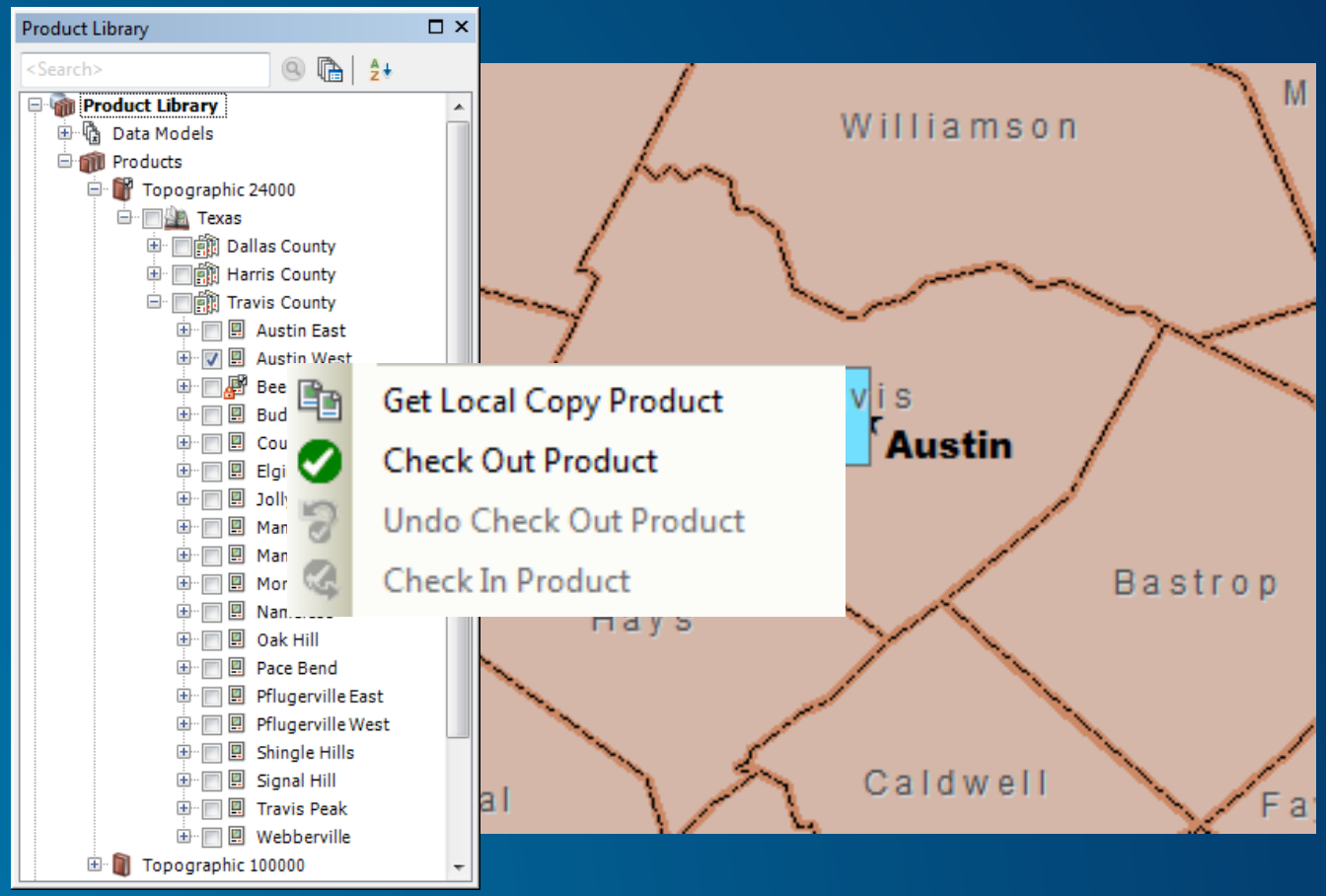
Solution 9: Product catalogs and self-service mapping

Product Library



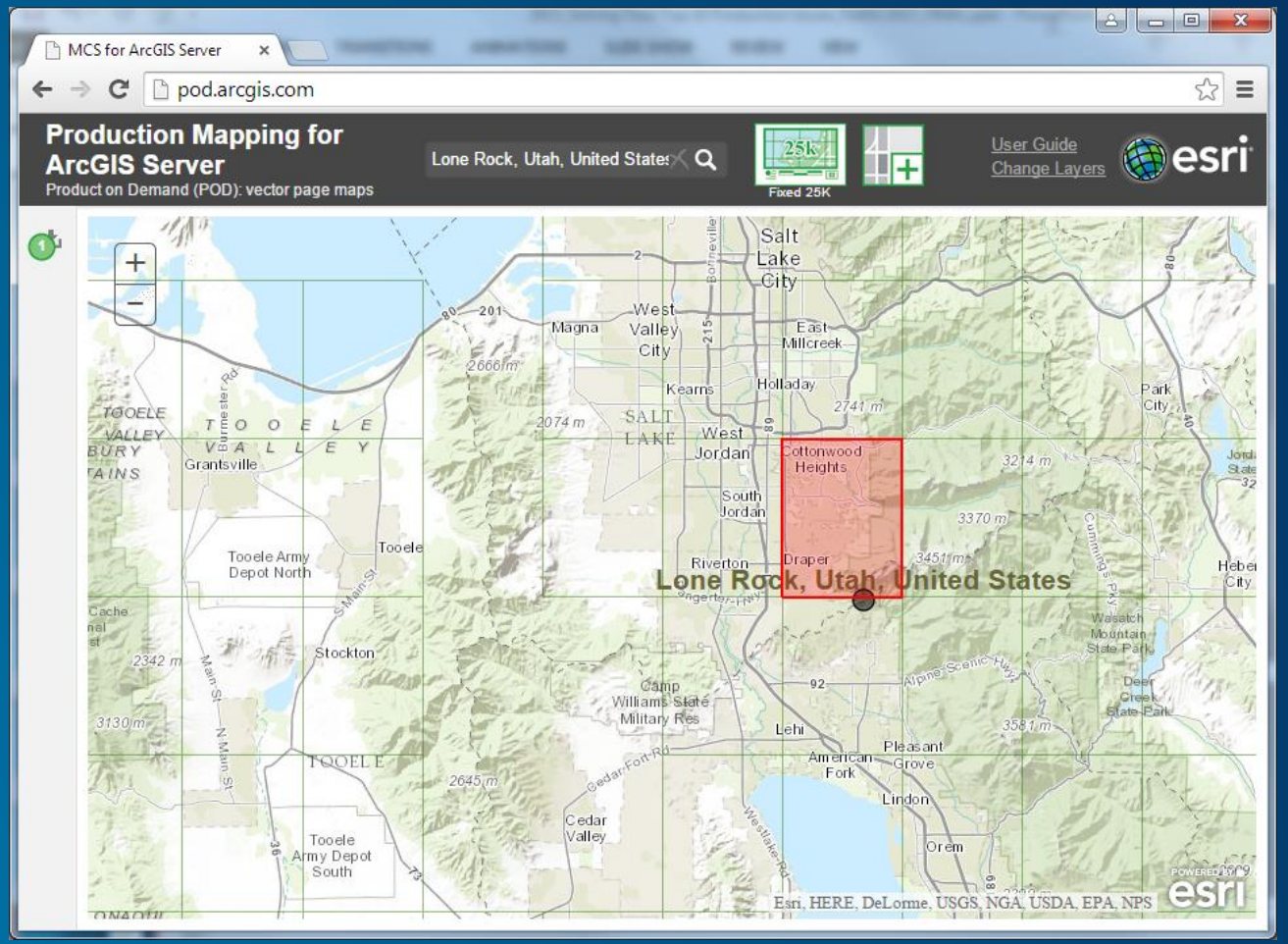
Solution 9: Product catalogs and self-service mapping

Product Library



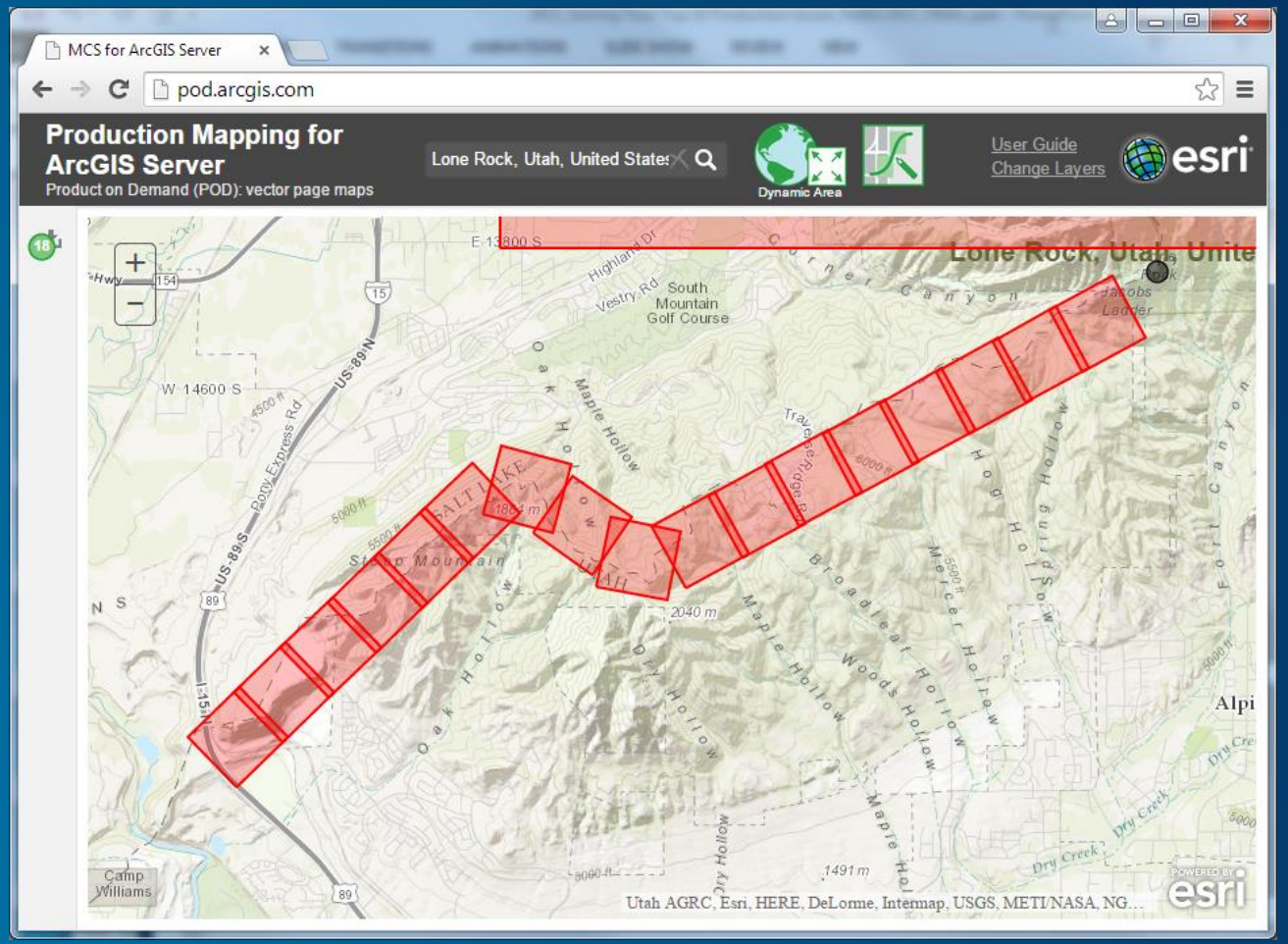
Solution 9: Product catalogs and self-service mapping

Production
Mapping Server



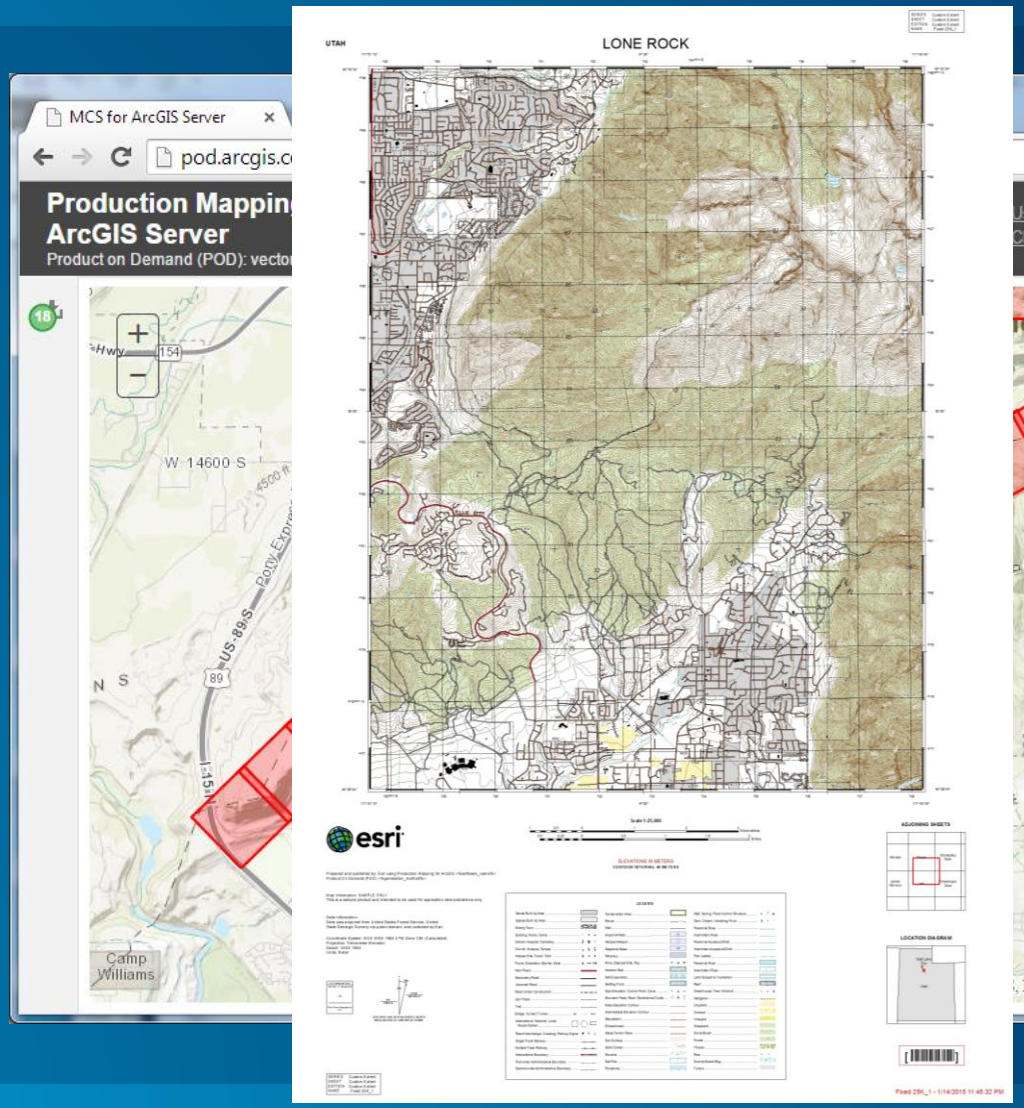
Solution 9: Product catalogs and self-service mapping

Production
Mapping Server



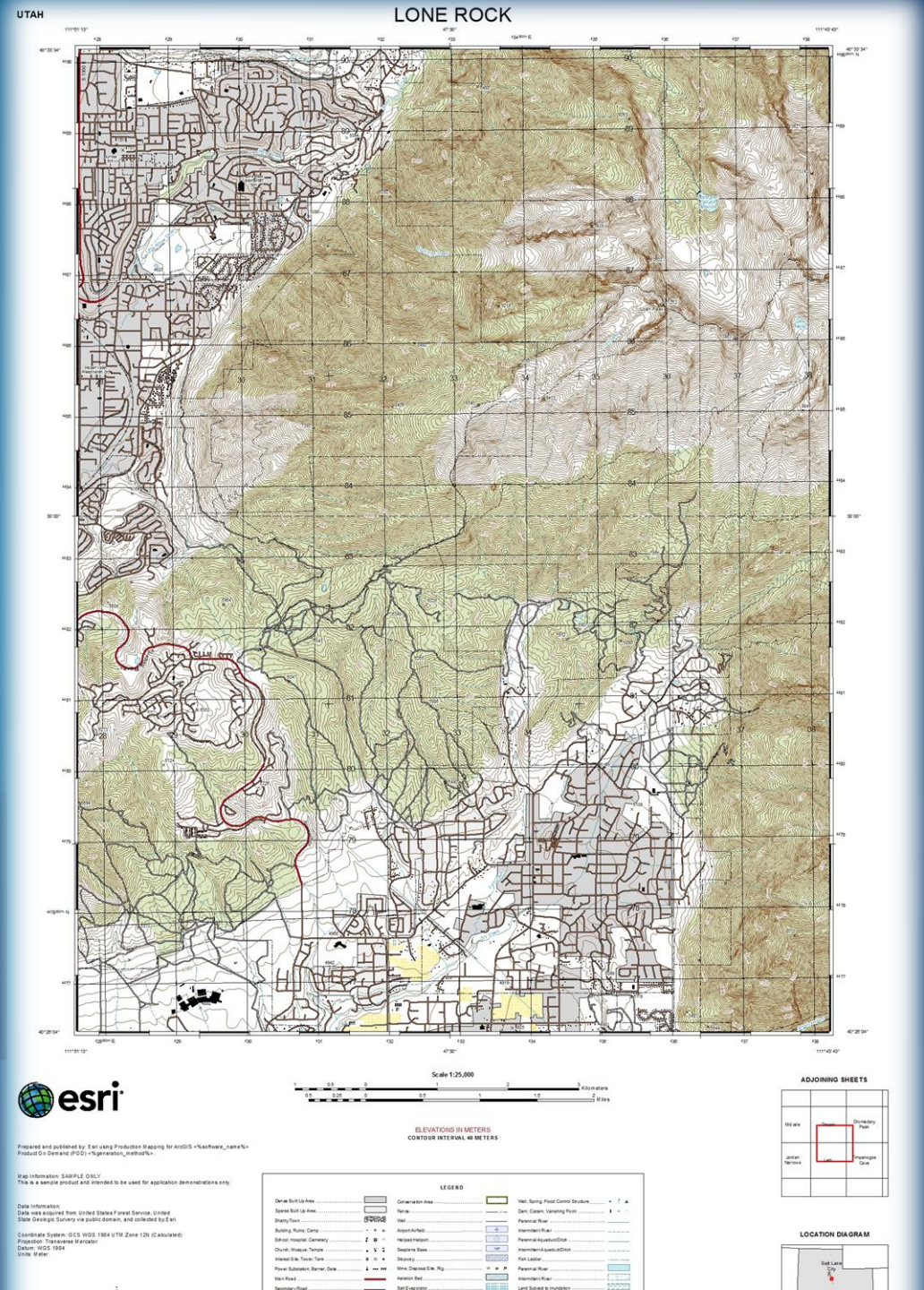
Solution 9: Product catalogs and self-service mapping

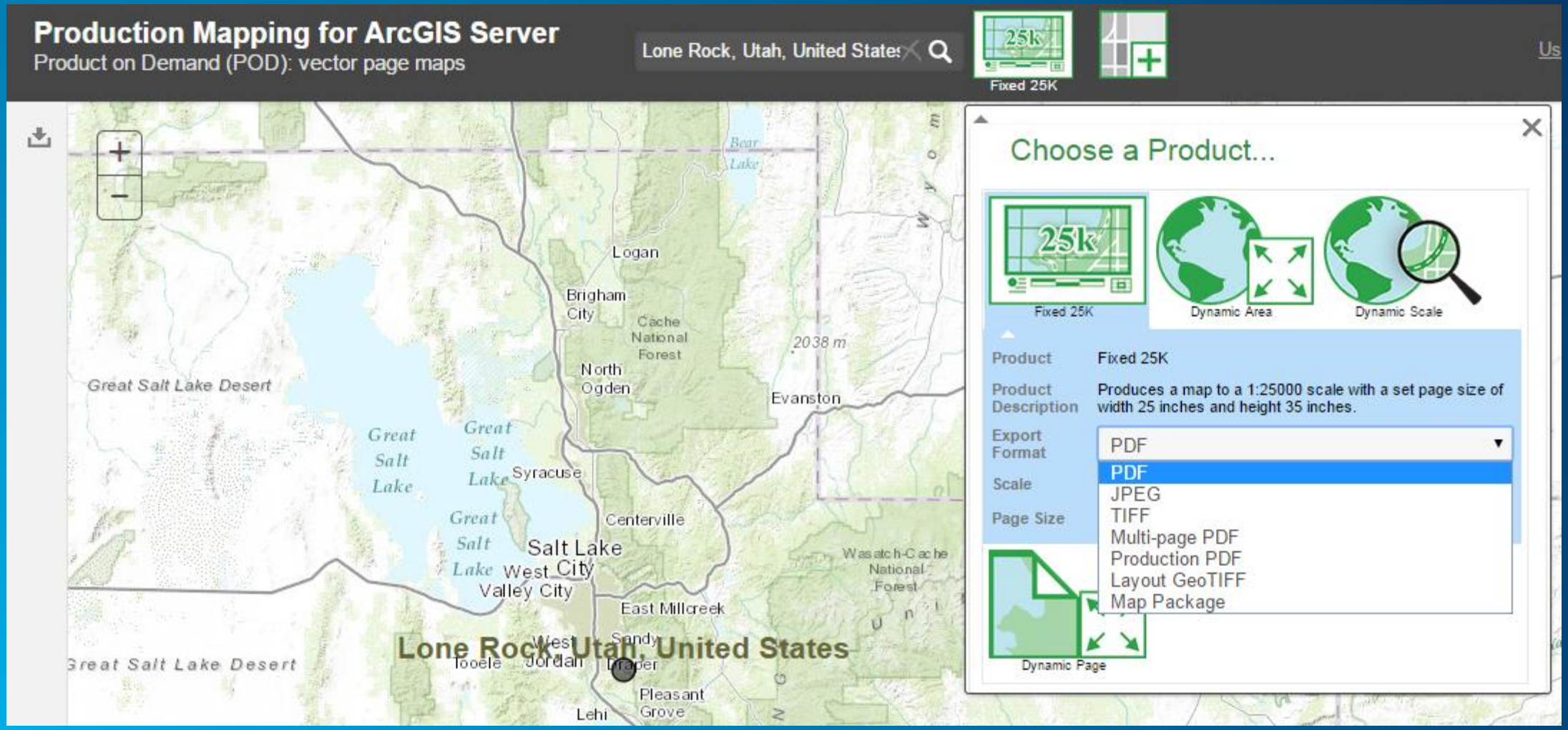
Production
Mapping Server



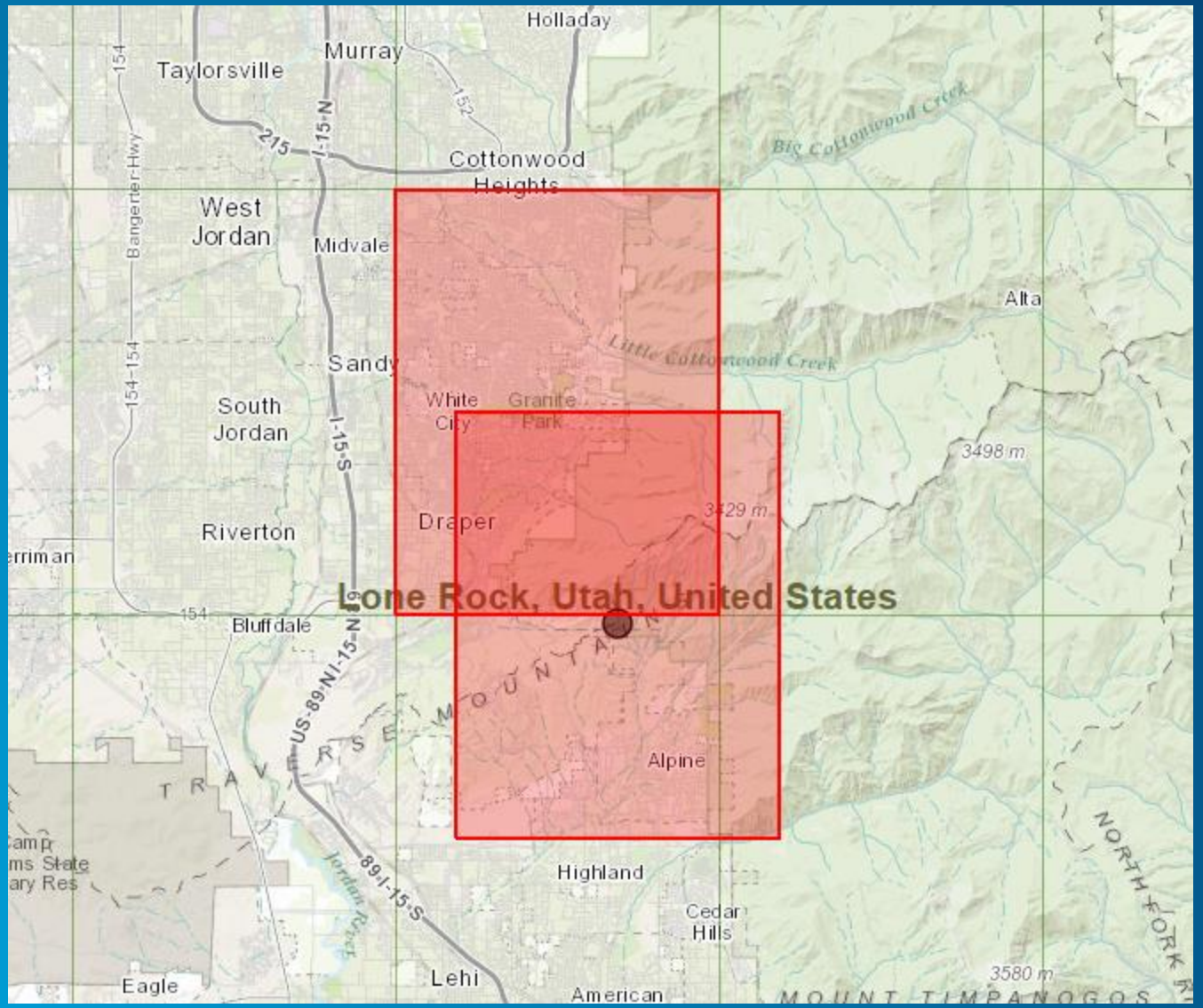
Creating Products on Demand

Amber Bethell

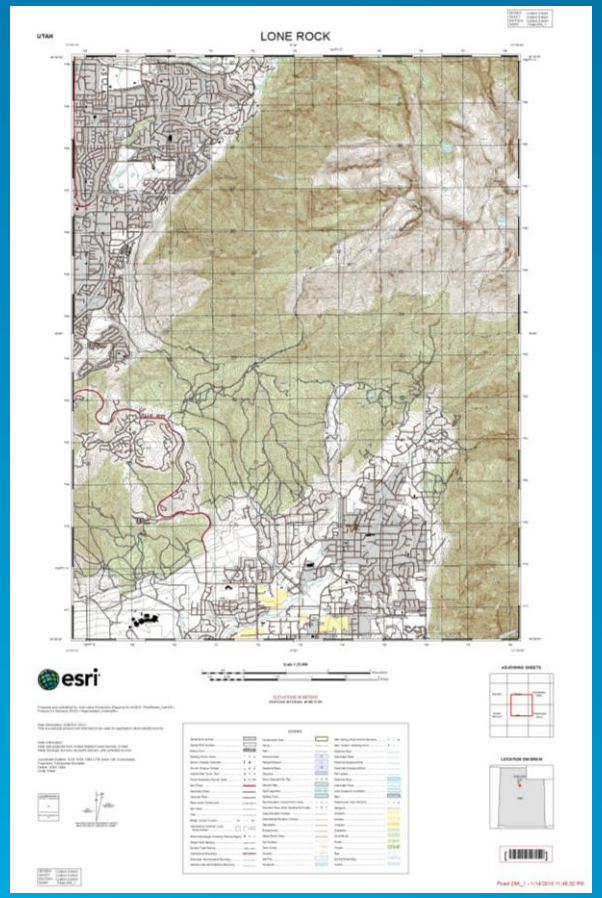


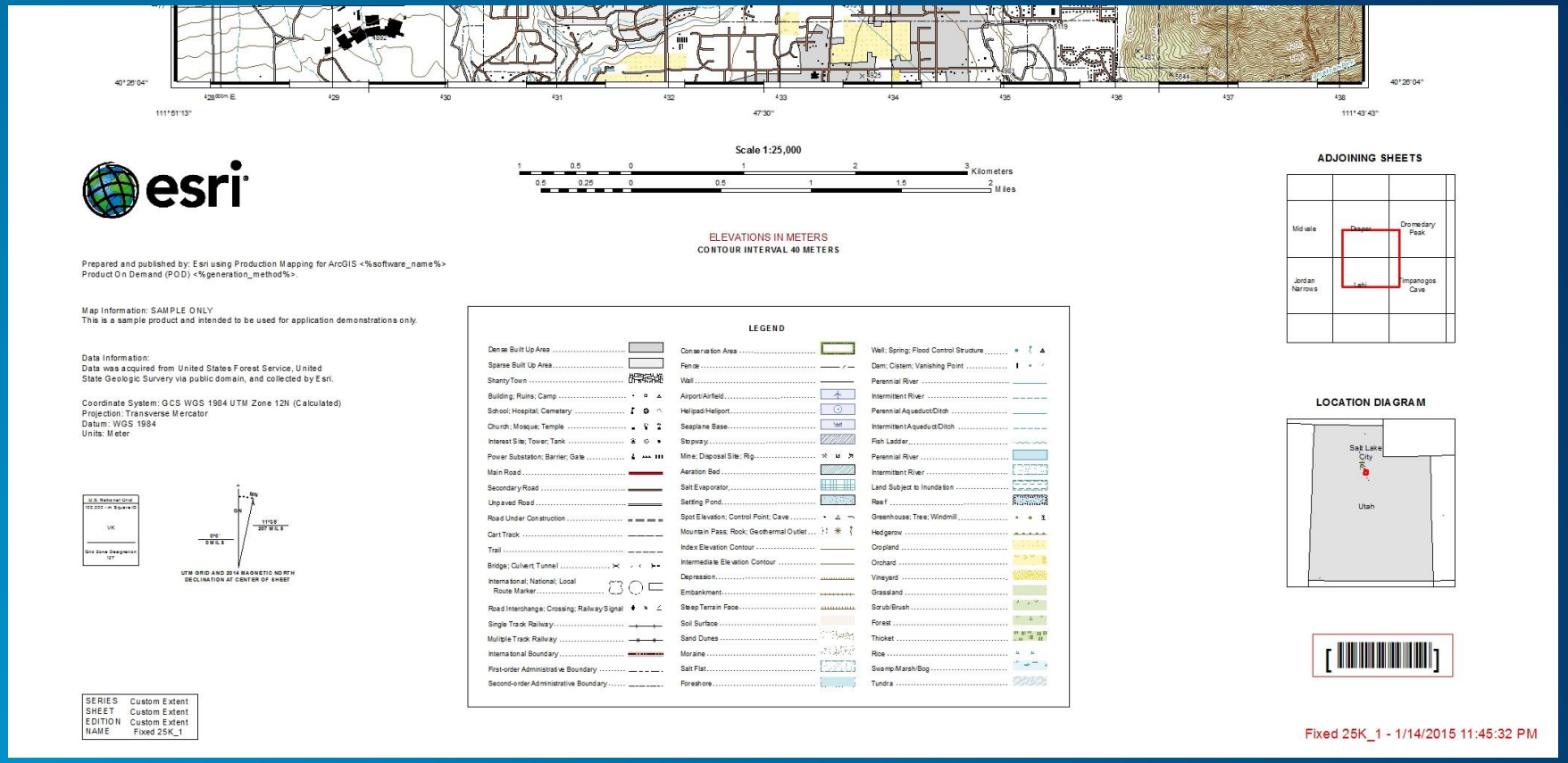


You can choose the type of map to be produced and the format you want it in

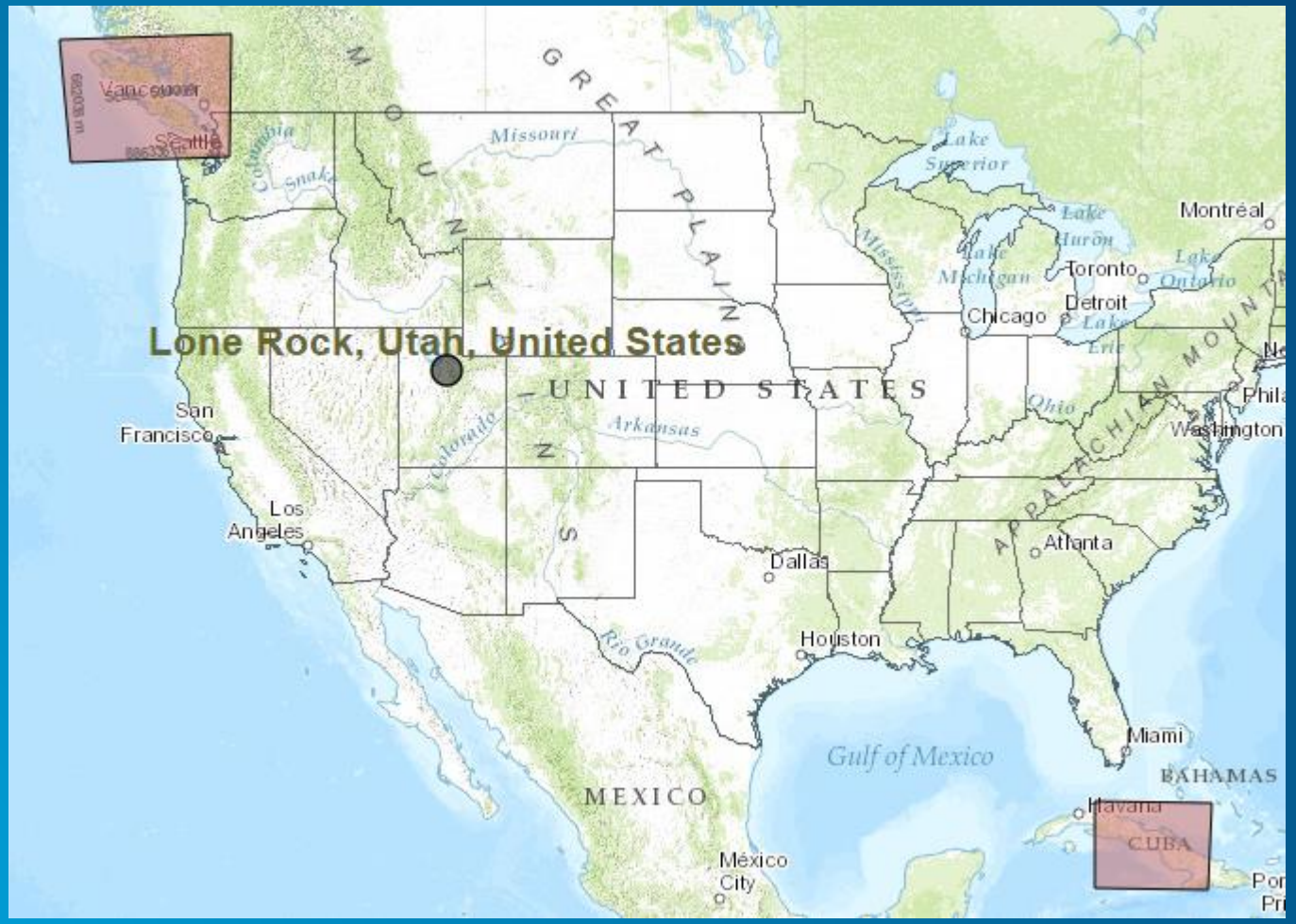


You can create a map that follows the traditional map sheet extents or an extent that better covers the desired ground area.

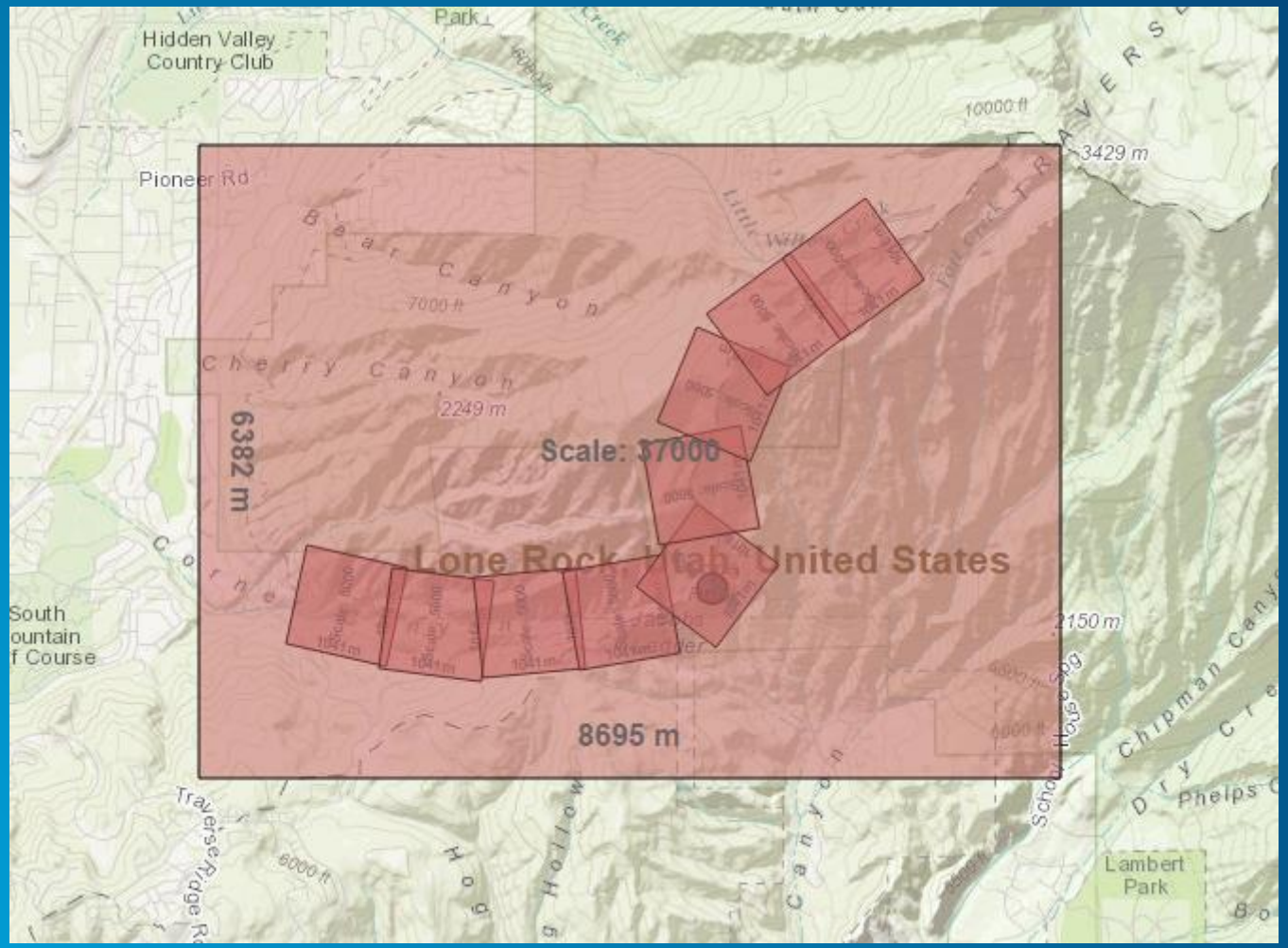




Maps produced, regardless of extent, meet your cartographic specifications.

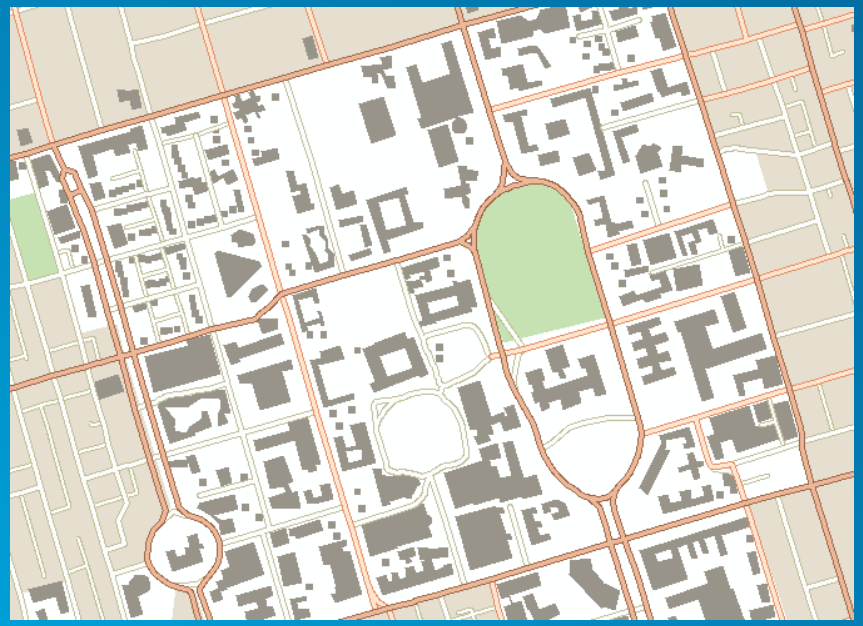


The application understands scale, projection, rotation, etc so you don’t have to. You only need to know what area needs to be covered.



Maps can be created to follow a path or a specific area.

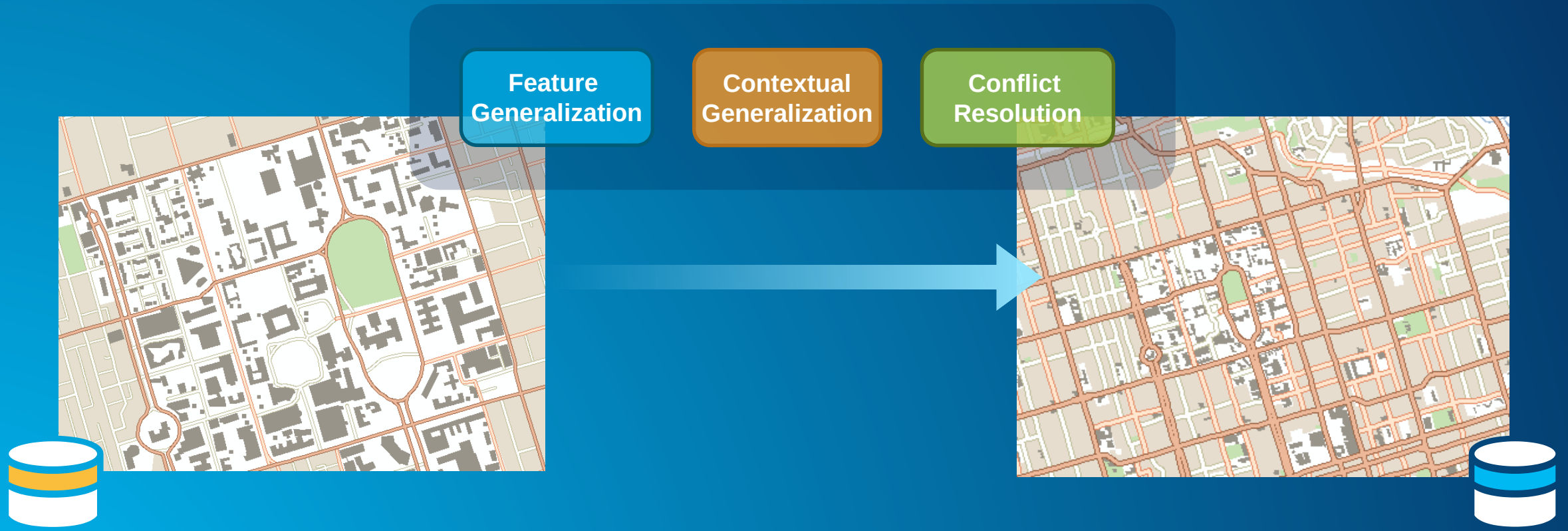
Issue 10: Maintaining data and maps at multiple scales is costly



1:12,500

1:50,000

Solution 10: Cartographic Generalization



Case Study

Dutch Kadaster

Dutch Kadaster – case study

Manual Generalization

Automated Generalization

Dutch Kadaster – case study

Manual Generalization

25 cartographers

5 year update cycle

Automated Generalization

6 computers, 6 CPUs each

3 week production time

Dutch Kadaster

Using ArcGIS, including tools for map automation and generalization, Dutch Kadaster realized a 5,000 percent savings in the time required by traditional cartographic methods for map production.

ArcNews Winter 2013/2014

http://www.esri.com/esri-news/arcnews/winter1314articles/transforming-national-map-production

How can we do production work
faster, better and cheaper?

Producing Data

Data validation is time-consuming

Data being created is of poor quality

Understanding data quality is difficult

Data Reviewer

Production Mapping

Managing Production

Knowing if we will meet our deadlines is difficult

There is no consistency in how work is done

Takes too long for new staff to become effective

Workflow Manager

Task Assistant

Producing and Sharing Maps

- Getting the same results from multiple cartographers
- Difficult to make complex, specification driven maps
- Difficult to find the map you need when you need it
- Maintaining data and maps at multiple scales is costly

Production Mapping

Production Mapping Server

ArcGIS Extensions Covered

- **Workflow Manager for ArcGIS and Task Assistant**
  - www.esri.com\workflowmanager
- **Data Reviewer for ArcGIS**
  - www.esri.com\datareviewer
- **Production Mapping**
  - www.esri.com/productionmapping
  - **Includes Workflow Manager, Task Assistant and Data Reviewer**

- **Email questions and comments** productionmapping@esri.com

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Monday, 12:30pm – 6:30pm

Tuesday, 10:45 AM–4:00 PM

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- Technical & Extended Support
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