MDE Field Data Collection Tool utilized for Limited Detailed Modeling

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AECOM Water – Watershed Concepts

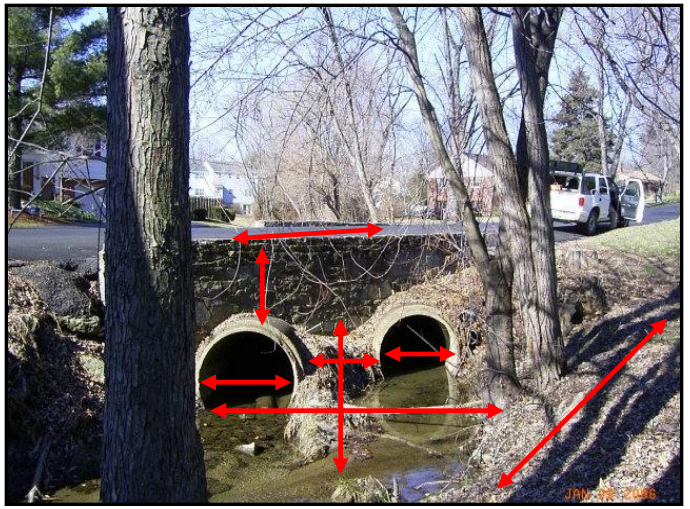
Overview

- Maryland floodplain mapping update
- MDE Field Data Collection Tool
  - Reason for development
  - Implementation and development
  - Data Collection Process
  - Future possibilities

- Limited Detailed Study (Enhanced Approximate)
  - Review of FEMA study types
  - Link between MDE data collection tool and LDS
  - LDS approach
  - DFIRM Integration

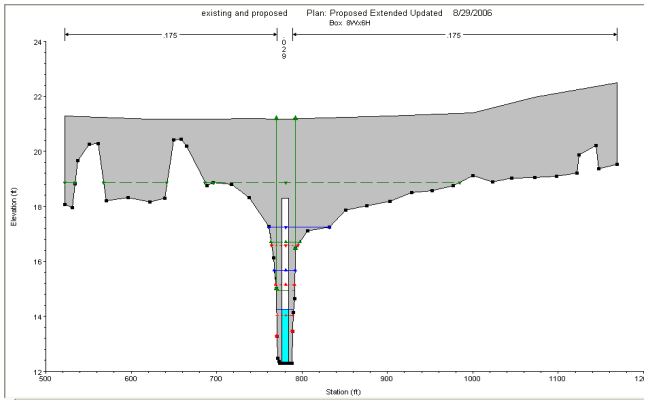
Maryland Floodplain Mapping Update

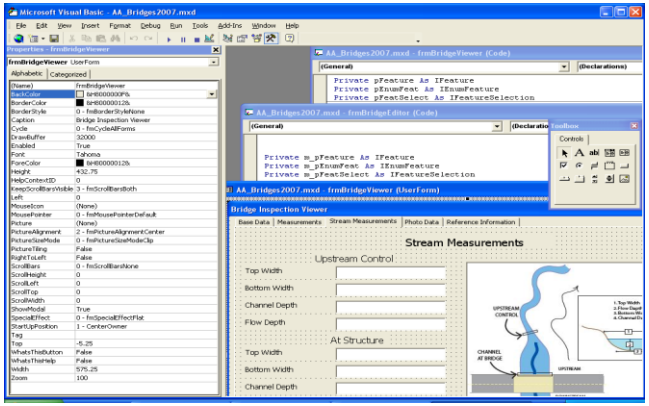
- FEMA funded 13 MD counties to be updated with digital flood insurance rate maps
- MDE as the CTP recognized several opportunities:
  - Leverage new LIDAR dataset for the state
  - New hydrology by University of Maryland
  - Select the USACE for engineering support
  - Utilize Maryland Environmental Services for field data collection
- Key dataset was missing
  - Culvert crossings!



MDE Field Data Collection Tool

- Reasons for development
  - In need of structure survey data for modeling
  - Field data collection is expensive
  - Limited budget
- Implementation and development
  - Data to be georeferenced (ArcPad)
  - Data in standard format
  - Data intelligent enough for multiple applications
  - Direct link to photos, sketches, and notes
  - Visual Basics Programming by MES





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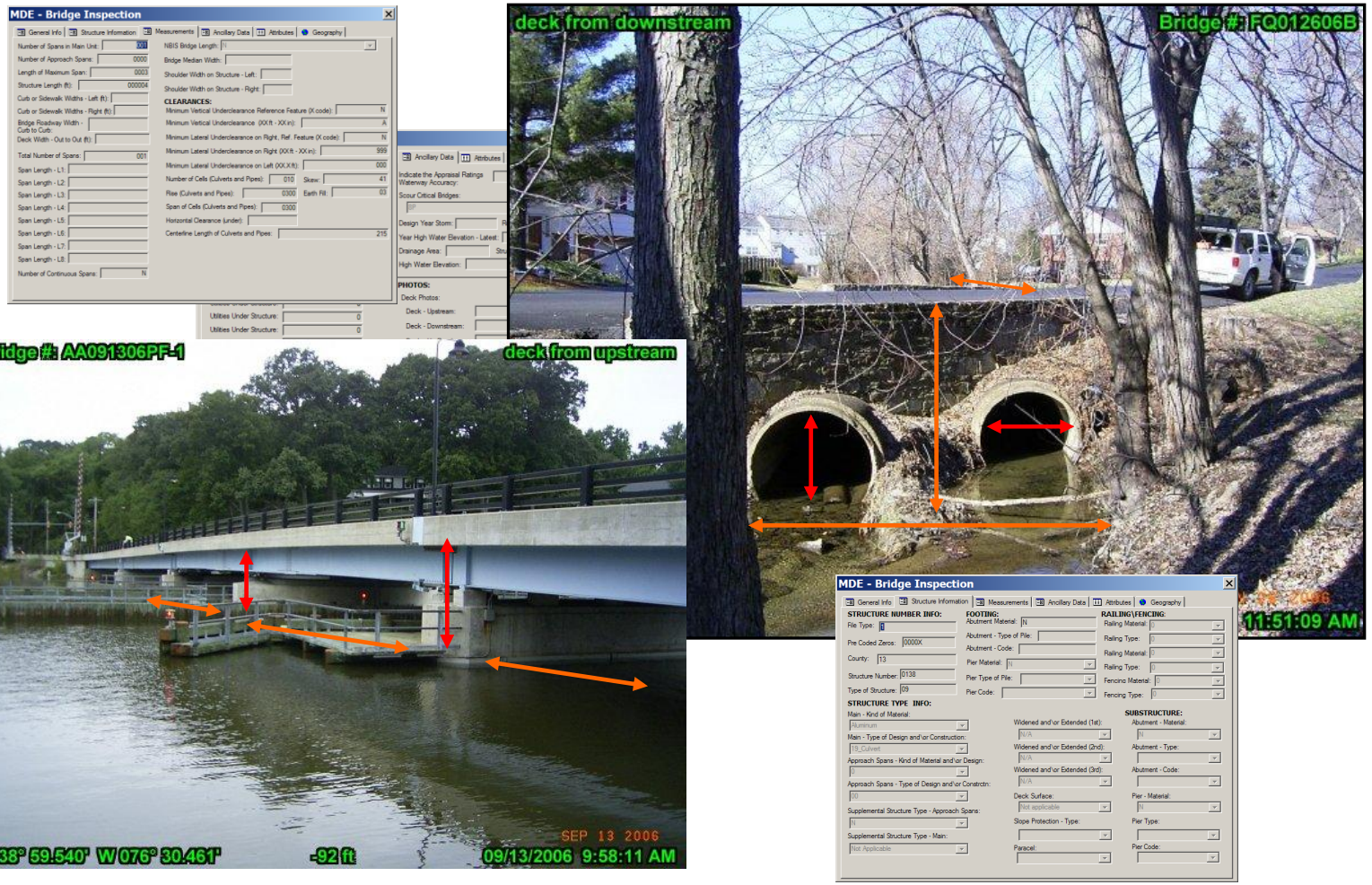
Field Data Collection Process

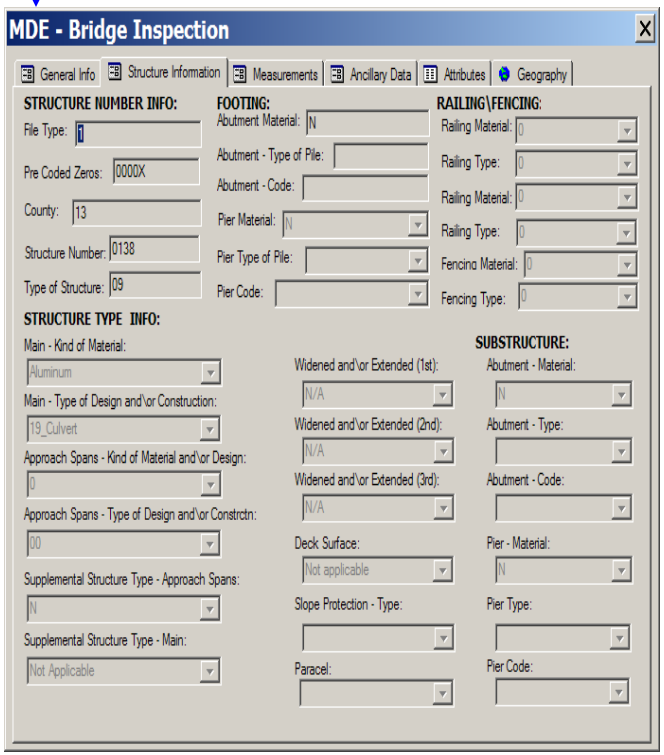
MDE

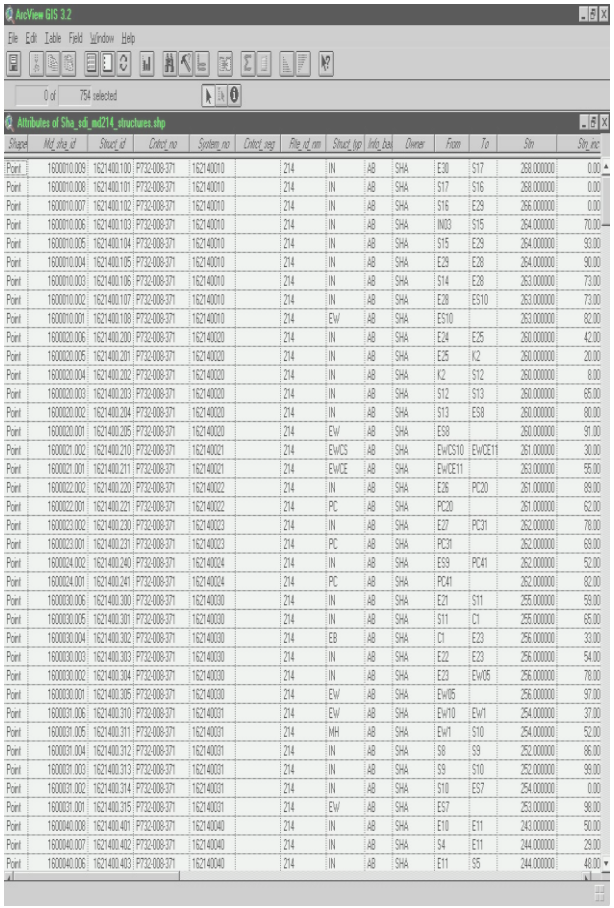


Import of Field Data into ArcMap

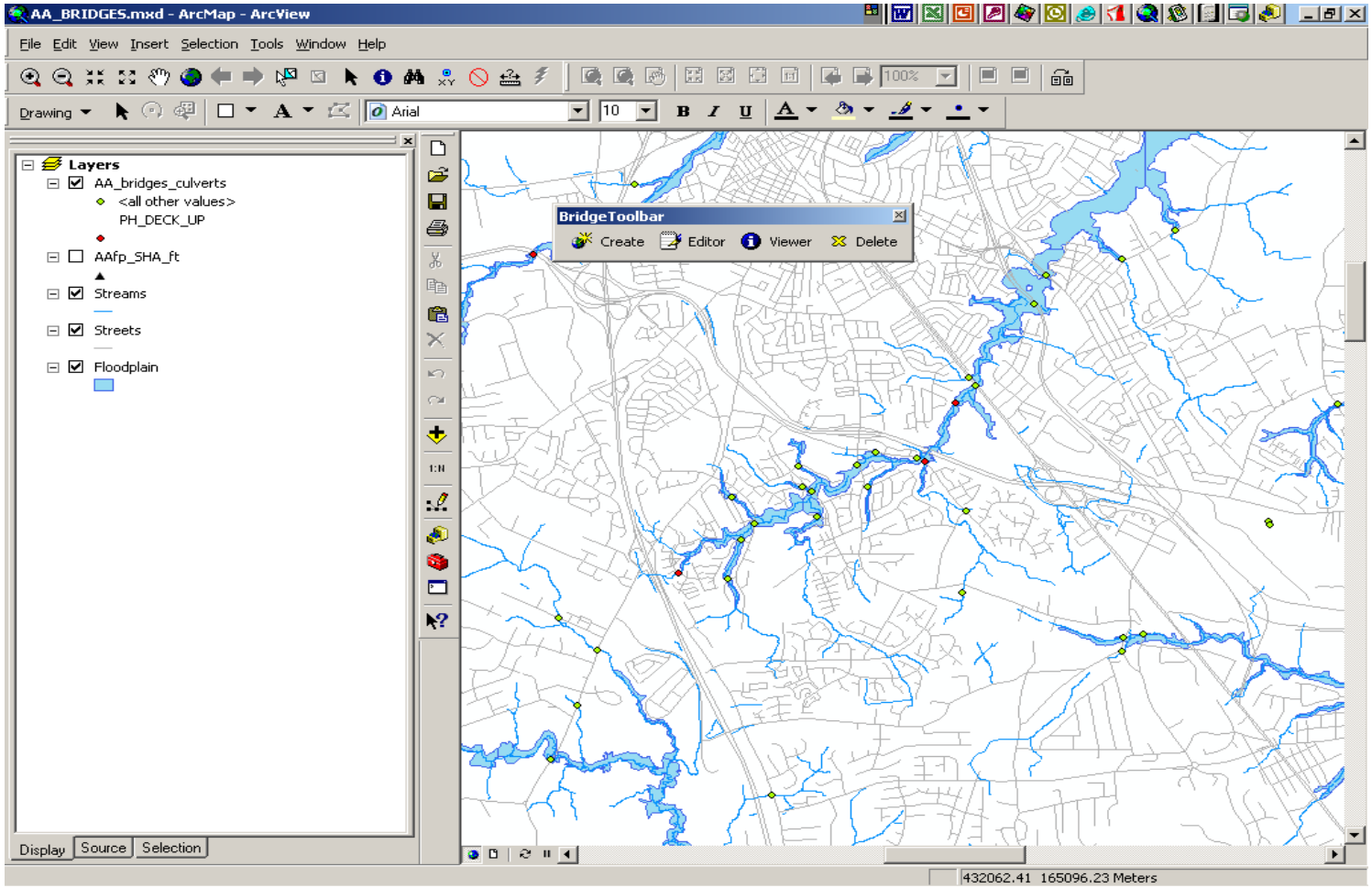
Export Form from Arc/Pad

Result: Shapefile Database in Arc/Map

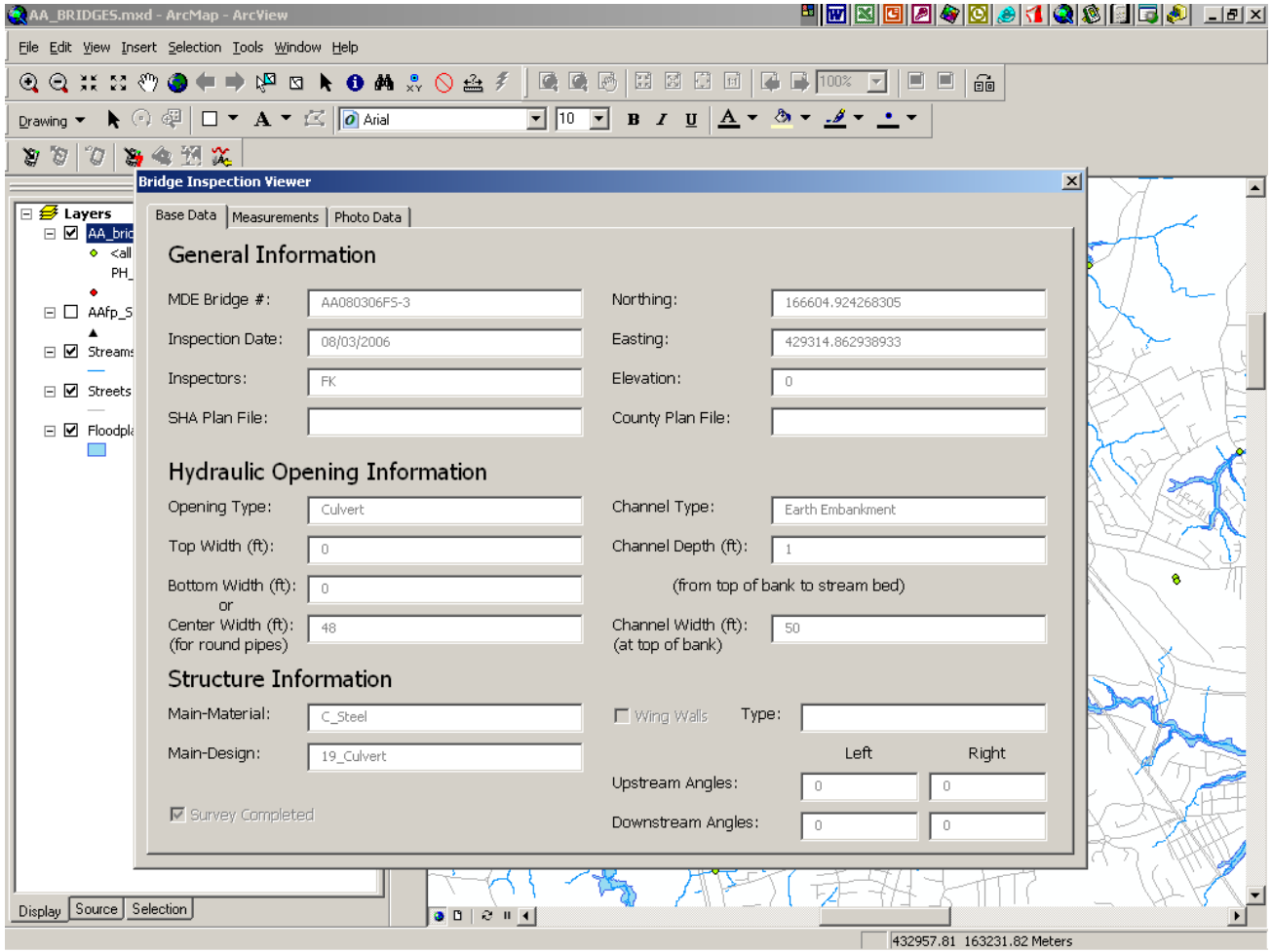




Field Data in ArcMap



Field Data in ArcMap Cont.



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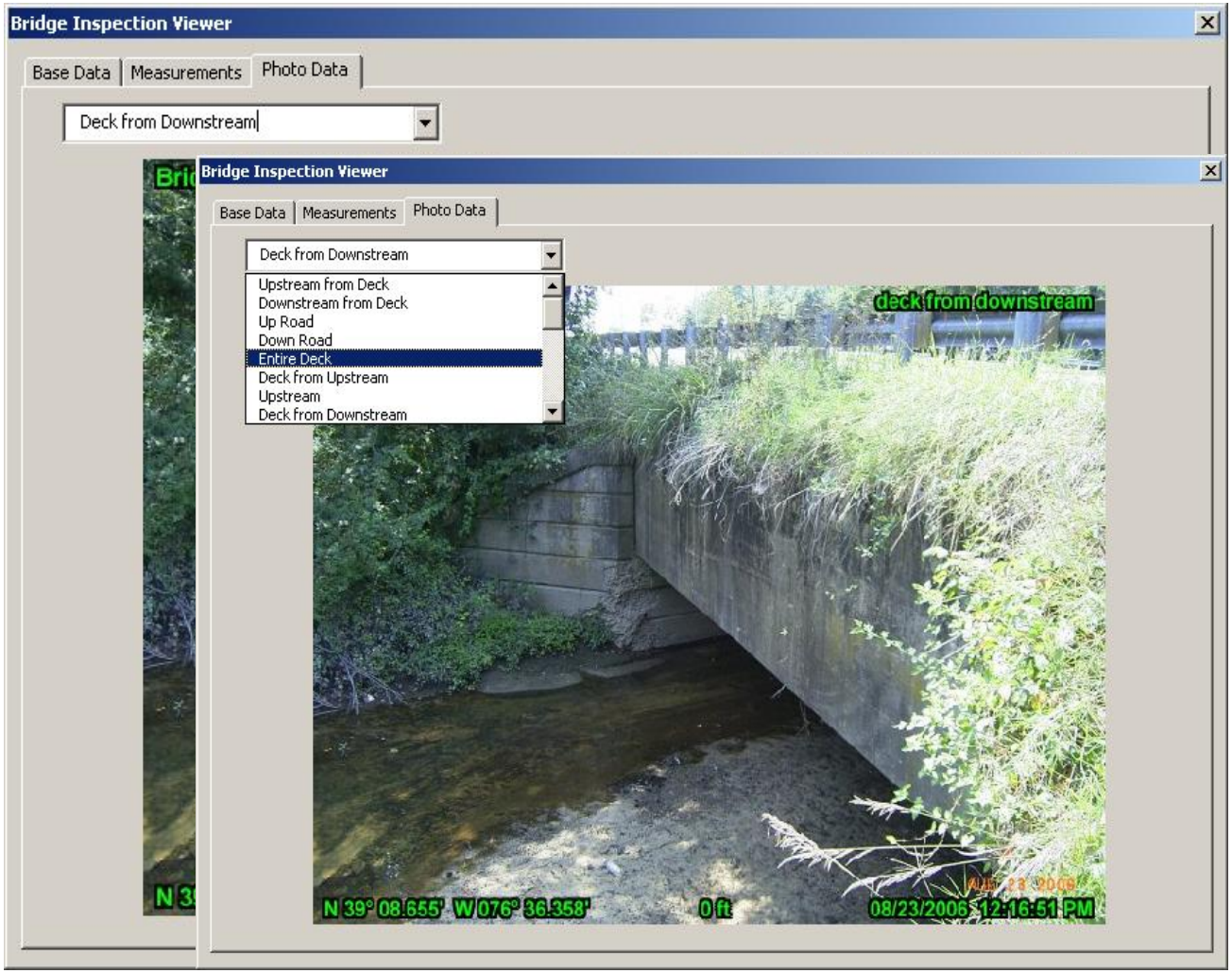
Field pictures (Auto upload)

MDE



State\County road & bridge plans

Microsoft Excel - 3190005A.xls

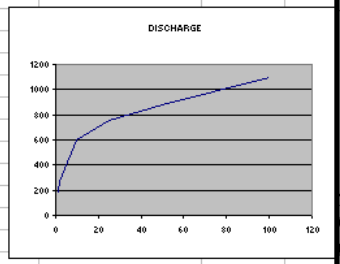
File Edit View Insert Format Tools Data Window Help

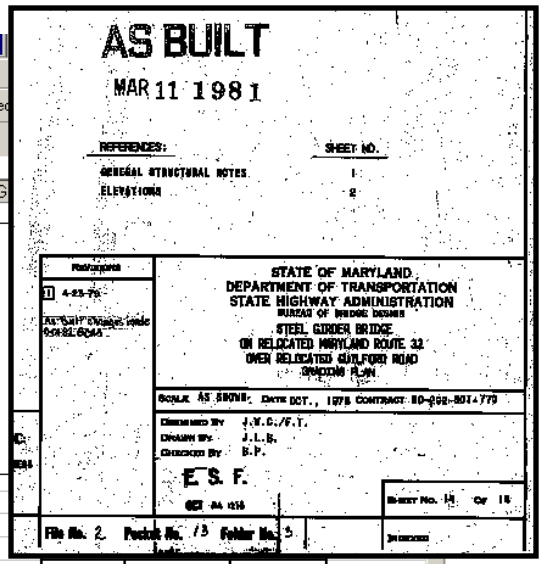
Arial 10 B I U

H10 =

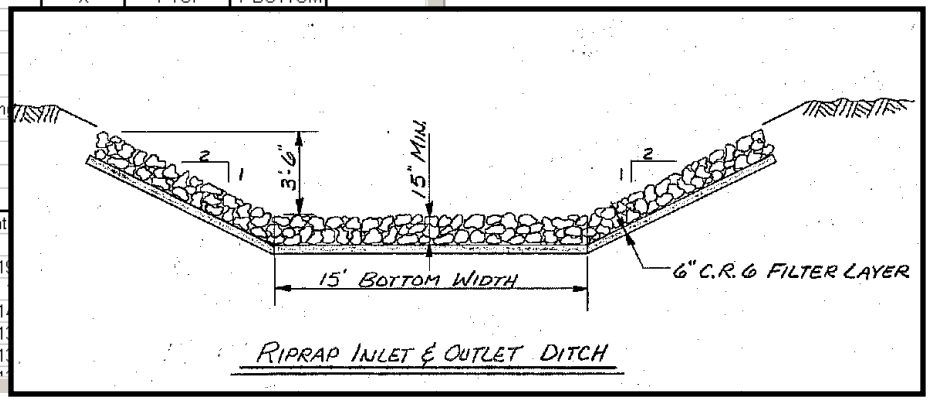
	A	B	C	D	E	F	G
1	**Culvert_ID**						
2	**3190005A**						
3	Q YR	DISCHARGE					
4	1	183					
5	2	267					
6	10	601					
7	25	751					
8	**50**	**884**					
9	100	1099					
10	Tc (min)			hours			
11	CN						
12	Area (Ac)			sq/ miles			
13	Elevation adjustment	30					
14					INPUT TO HY8		
15		FIELD DATA			Road to top of culvert	10.92	
16	inlet elevation	13.76	13.78		inlet elevation	16.24	
17	outlet elevation	14.88	15.08	0.2	outlet elevation	15.12	
18	Number of barrels	1			culvert length	70	
19	Shape	CIRCULAR	span	rise	number of barrels	1	
20	Material	Concrete	5.5	5.5	shape	CIRCULAR	
21	Inlet	headwall and wingwalls 45 degrees			material	Concrete	
22	Inlet depression	no			Inlet	headwall and win	
23	culvert length	70			Depresion	no	
24	DWNS channel elev	16.78	13.22		Slope	-0.02324	
25	DWNS channel elev 2	15.82	14.18				
26	length	41.3					
27	Downstream XS	Stat	Elevation	Elevation correctic	Downstream XS	Stat	Elevat
28					24		
29		0	10.13		49	0	1
30		22.5	12.9		71.5	22.5	
31		27	15.08		76	27	1
32		30.4	16.17		79.4	30.4	1
33		30.8	16.81		79.8	30.8	1

Schematic 3190005A shape Summary

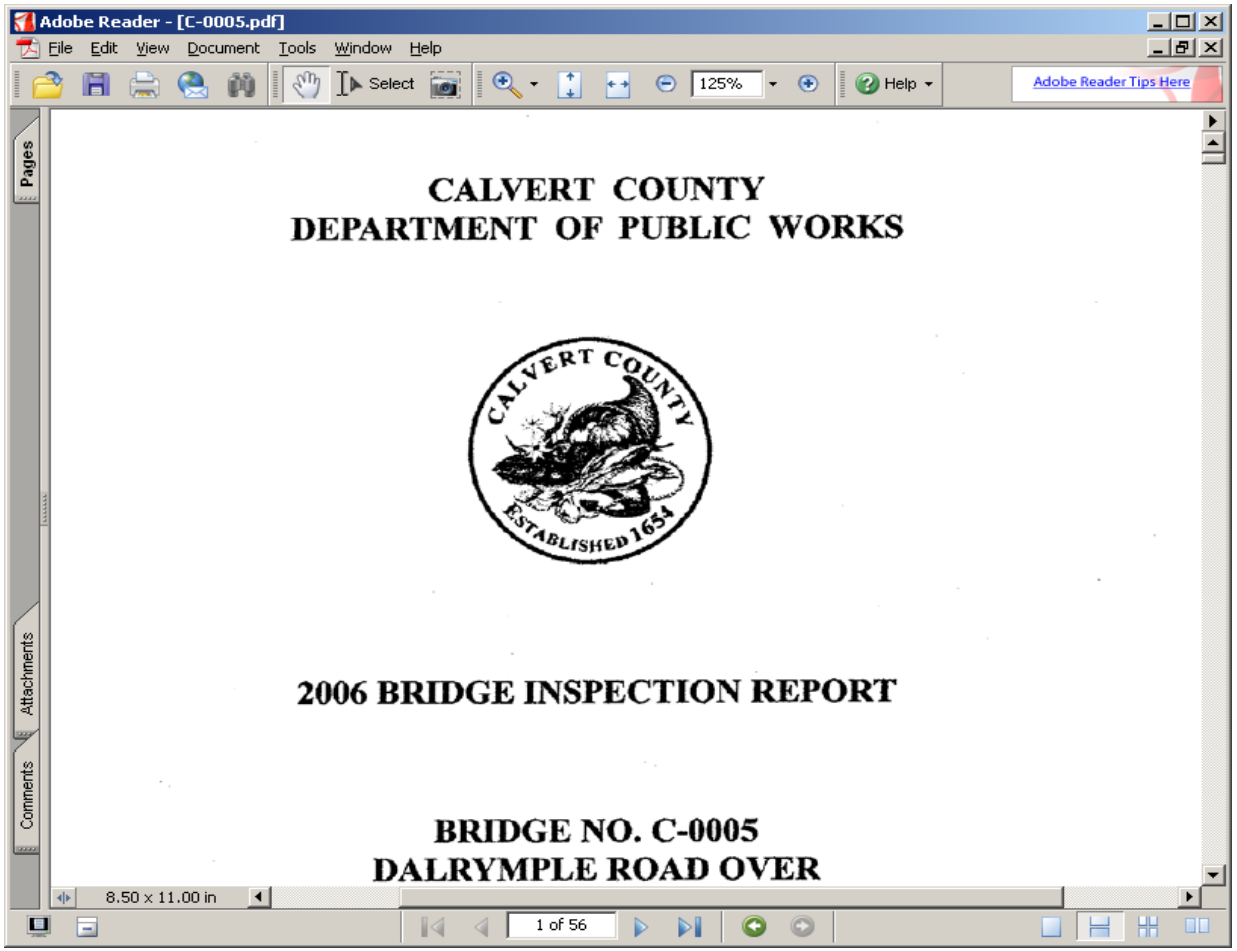




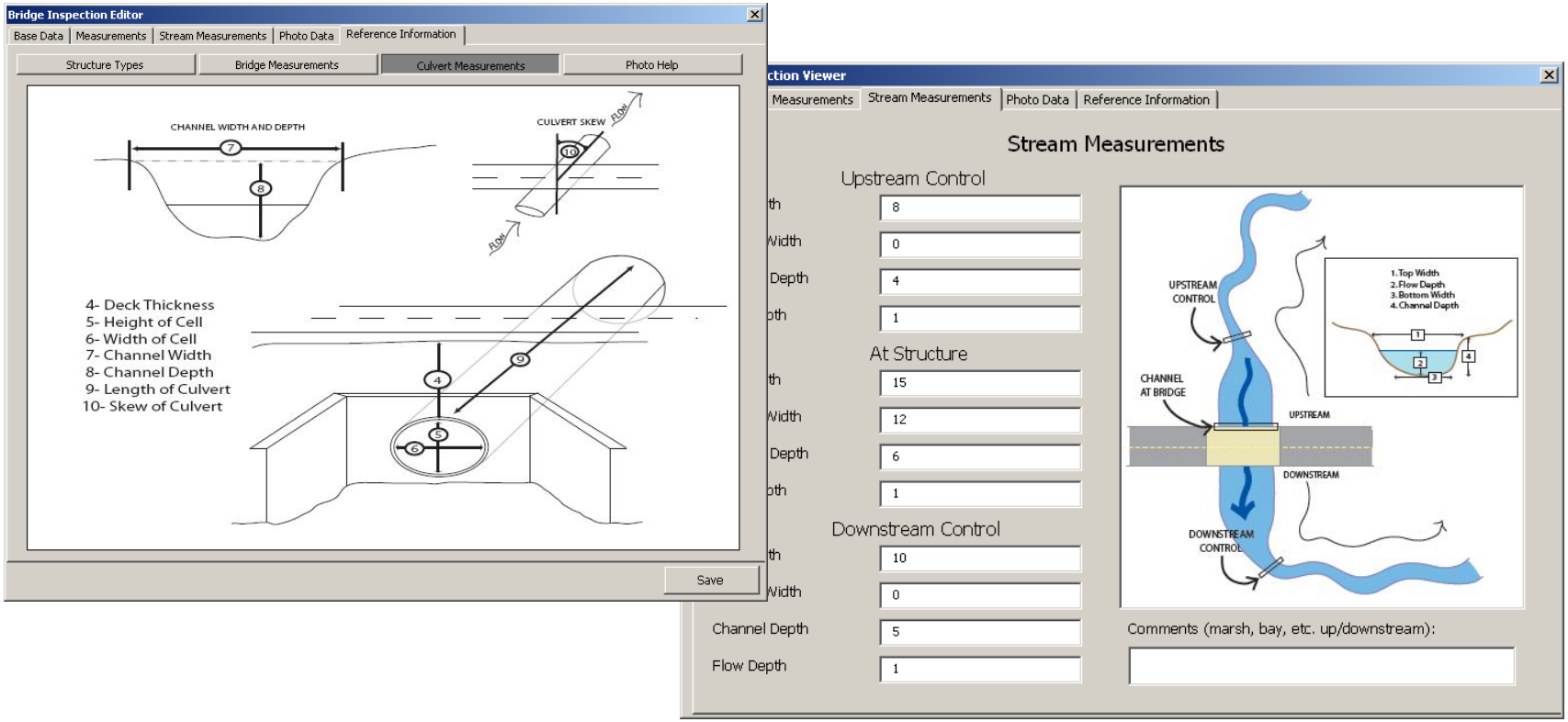
X	Y TOP	Y BOTTOM



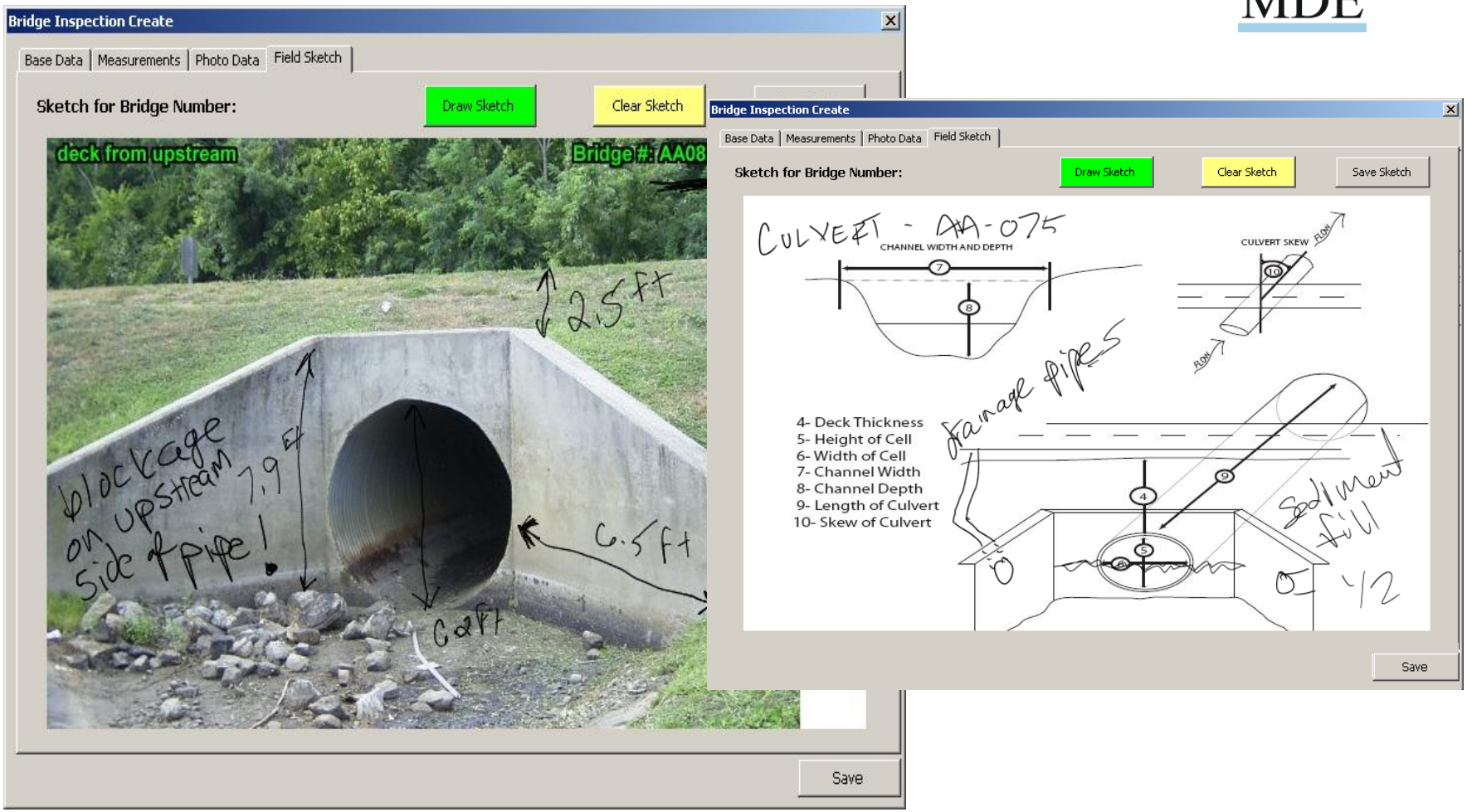
Scour Reports (reduced data entry)



Reference information



Digital sketch tool



Future Opportunity for Collection Tool

- .NET development
- LiDAR Integration (3D)
- Integrate Permit and Field Data w/ Models
- Multiple Users – GIS Tool (MDE)
- GIS Hydro (Inventory tool for Models)
- Web access (Likely) / GeoDatabase
- Wetland Assessment Tools (at MDE)

FEMA Study Types - LDS

- FEMA Study Types
  - Detailed Study
    - 1%, 0.2%, FW
  - Approximate Zone A
  - Redelineation
- FEMA Limited Detailed Modeling (Enhanced approximate)
  - Limited structure survey
  - No cross section survey (taken from terrain)
  - 1% annual chance flood hazard delineated
    - placement of BFEs and XS on DFIRM possible

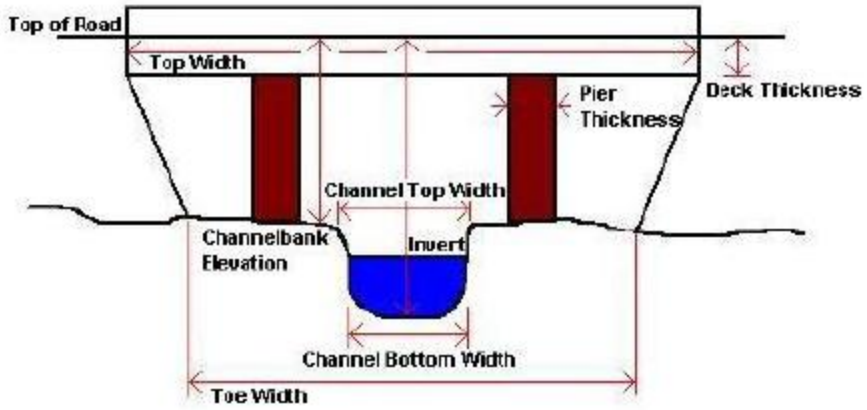
General Survey Requirements for LDS

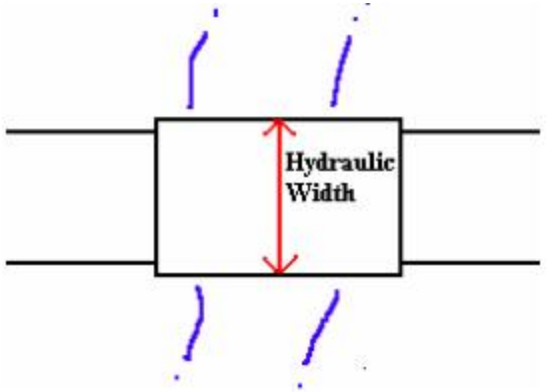
LDS Requirement	MDE Survey tool
Survey Notes	✓
Survey Sketch	✓
Survey Coordinates	✓
4 Photos (US face & Channel; DS face & Channel)	✓
Measurements	✓

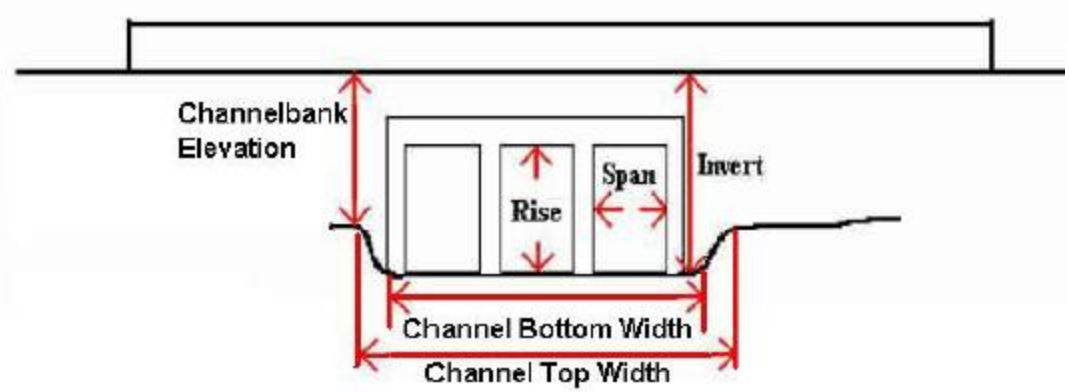
Collected Information

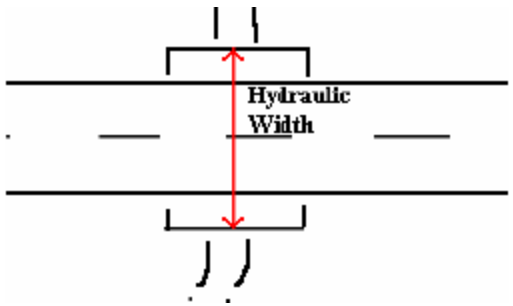
- TOR – Top of Road elevation
- Hydraulic width, Pier and Deck dimensions
- Culvert size, length and material
- Channel Measurements
  - Taken at upstream face of the structure
    - Top width
    - Bottom width
    - Channel bank elevations
    - invert

Graphics


Top of Road
Top Width
Deck Thickness
Pier Thickness
Channel Top Width
Channelbank Elevation
Invert
Channel Bottom Width
Toe Width


Hydraulic Width


Channelbank Elevation
Rise
Span
Invert
Channel Bottom Width
Channel Top Width


Hydraulic Width

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Utilization of survey data for LDS

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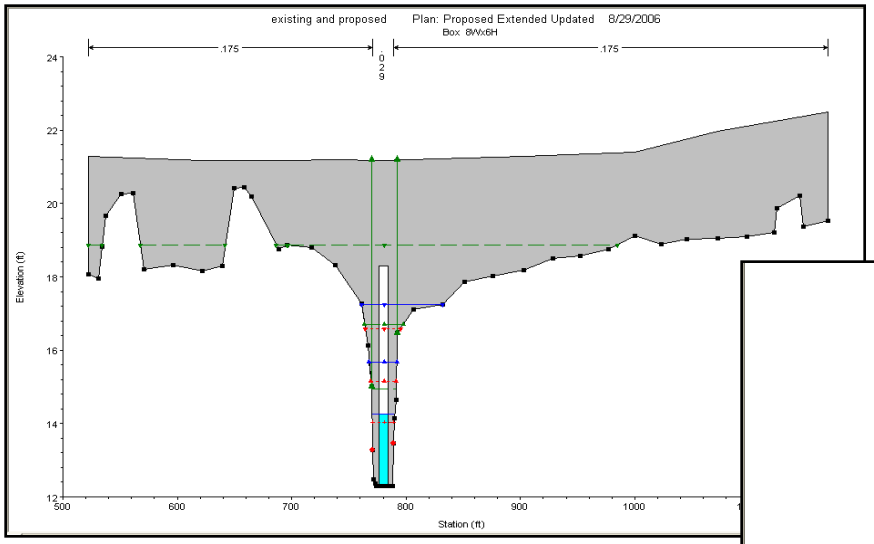
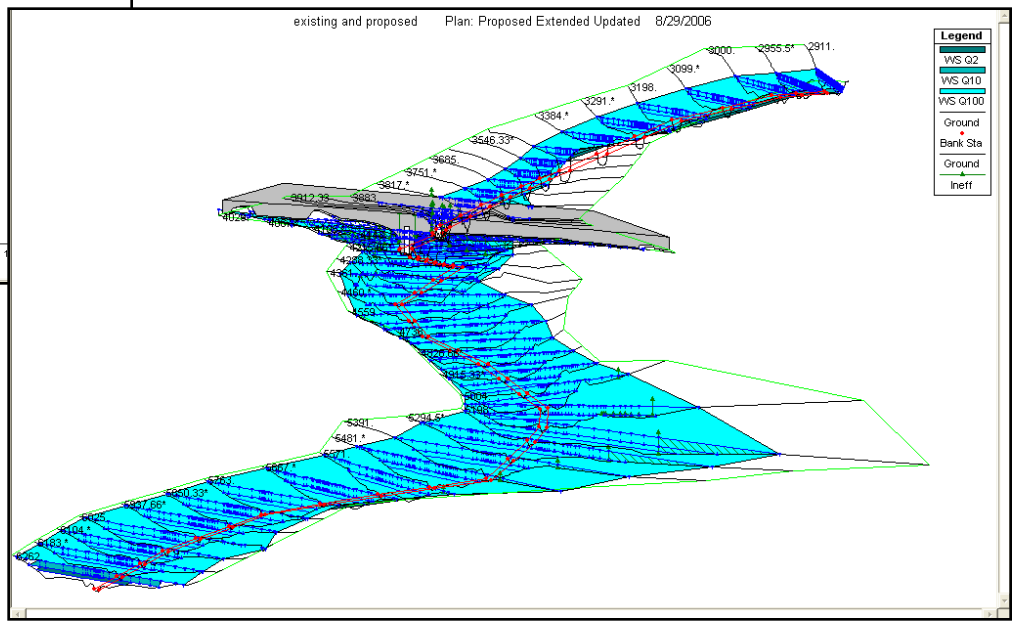
- Survey data gets imported into Open Inventory Module of WISE
- Stored in database format and can be edited and blended with terrain data
- Export to txt format for HEC RAS import
- Modeling performed in HEC RAS
- Boundary delineation performed within WISE
  - GeoRAS

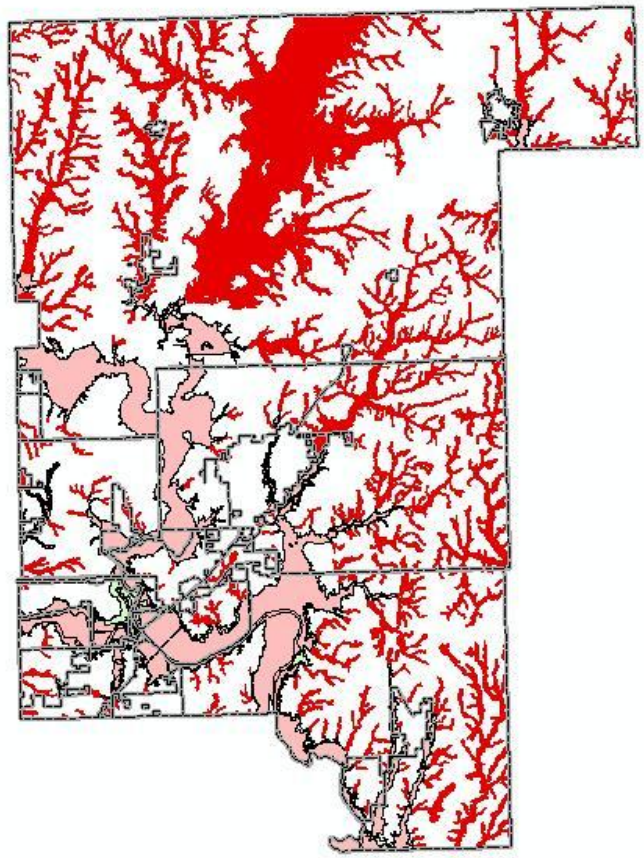
Survey data for in HEC RAS

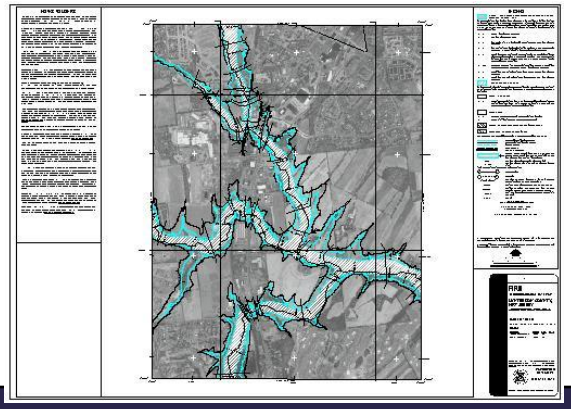




DFIRM Production

- Merging of boundary data
- Base data prep
- DFIRM DB creation (GIS)
- Panel border creation
- Annotation





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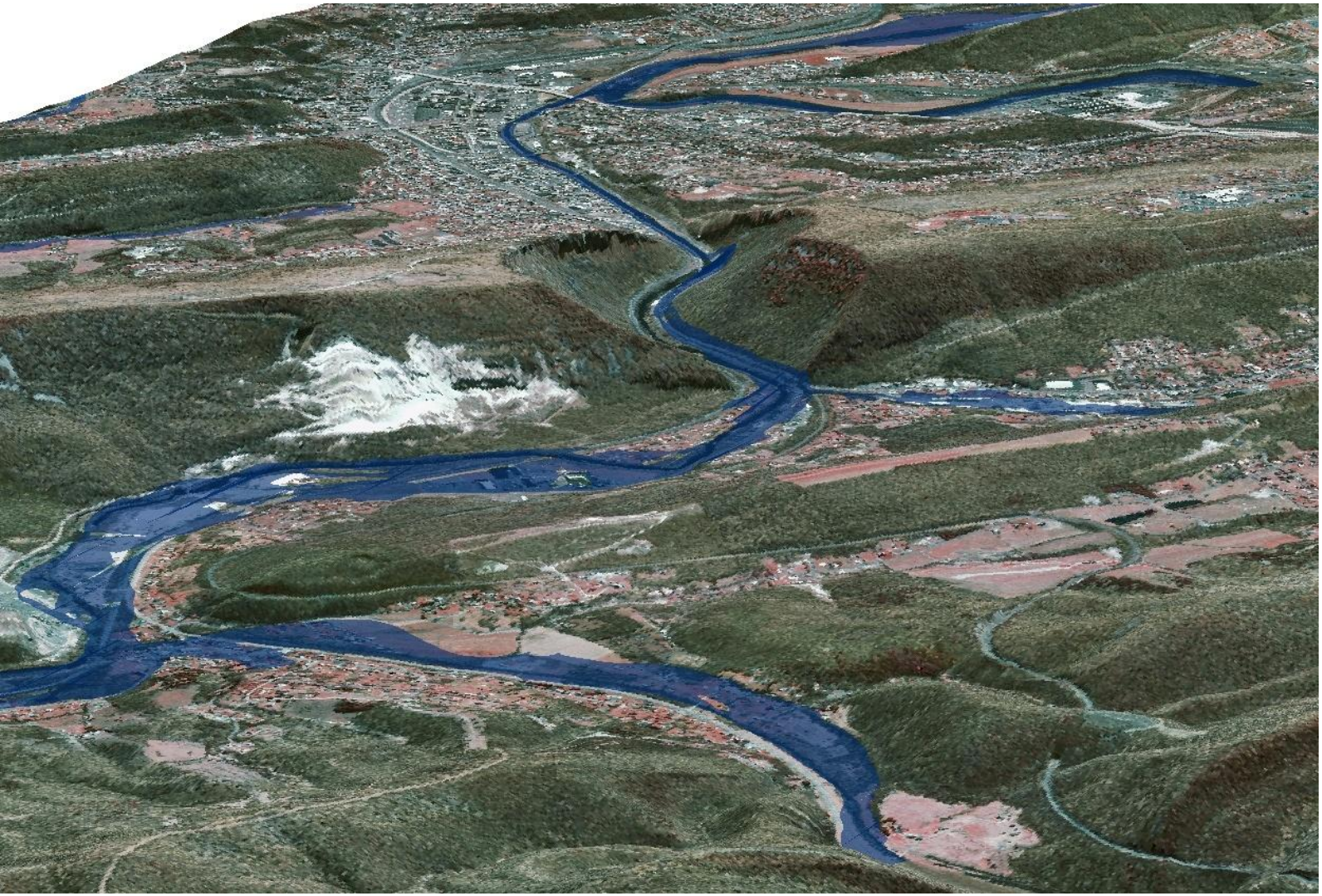

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Questions?