Licking County
Tax Map Realignment Pilot Project

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Agenda

1. Background
2. Objective
3. Pilot Project
4. Lessons Learned

Background

1. Improvement and Innovation
2. County Timeline
3. EMH&T Perspective
4. The Problem

Background: Improvement and Innovation

Continuous Improvement Process (CIP)

Management process whereby delivery (customer valued) processes are constantly evaluated and improved in the light of their efficiency, effectiveness and flexibility (www.wikipedia.org)

Innovation

The process of making changes to something established by introducing something new (www.wikipedia.org)

Background: County Timeline

1960's: All tax maps were re-drafted based on USGS 1" = 800' work sheets.

- Resultant maps were drafted in NAD 27 Ohio State plane South zone projection.

1998: Initiated conversion of paper maps to digital format.

- Converted to NAD 83 Ohio State plane south zone projection. CAD format (Bentley MicroStation95 format).

2001: Initial conversion from a CAD environment to GIS.

Background: County Timeline

2005: Tax map access via WEB occurred.

- As Web use increased, need to accommodate the public's desire to concurrently view orthophoto images with tax map features overlaid greatly increased.

2007: Pilot project initiated to identify and address registration issues.

2008: Work initiated to complete entire County based on pilot project criteria.

EPIN's: Solved that issue as well

Background: EMH&T Perspective

1997: Initial Request for Proposal (twice!)

2001: Reynoldsburg GIS

- Centerline and topo released, but no parcels
- Reynoldsburg had parcels created

2004: Parcels released w/ caution

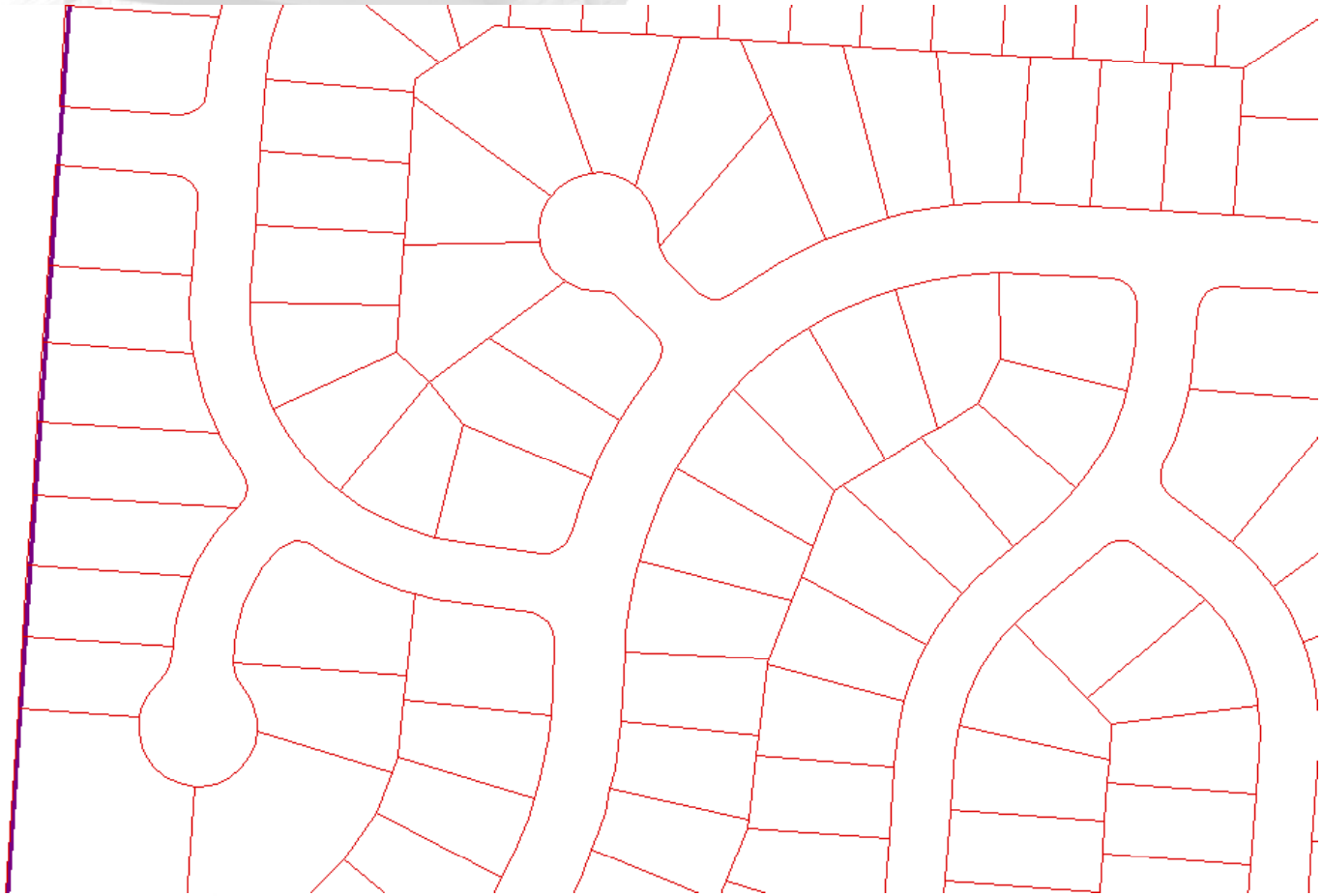
2006: Internet Accessible and Downloadable

2007: Pilot Project Request for Proposal

2008: Full County Project

Background: The Problem

Parcels only



Background: The Problem

Orthophoto only

Background: The Problem

Parcels overlaid on orthophoto

Background: The Problem

Licking County Tax Maps

1. They are a very accurate representation of the ownership information
2. In almost every case the deed information and displayed dimensions of the property are correct.
3. In many cases, do not match the ground features displayed on the orthophotography.

Caused by drafting errors, poor parcel descriptions, and in many instances inaccurate initial property location assumptions

Background: The Problem

Strengths

- Good for an inventory map
- Adequate to replace tax maps

Weaknesses

- Not suitable for general purpose GIS
- Internet mapping – no parcels with orthos

Bottom line: Not comfortable releasing it

Objective

1. The Vision
2. Methodology
3. Pilot Project Defined

Objective: The Vision

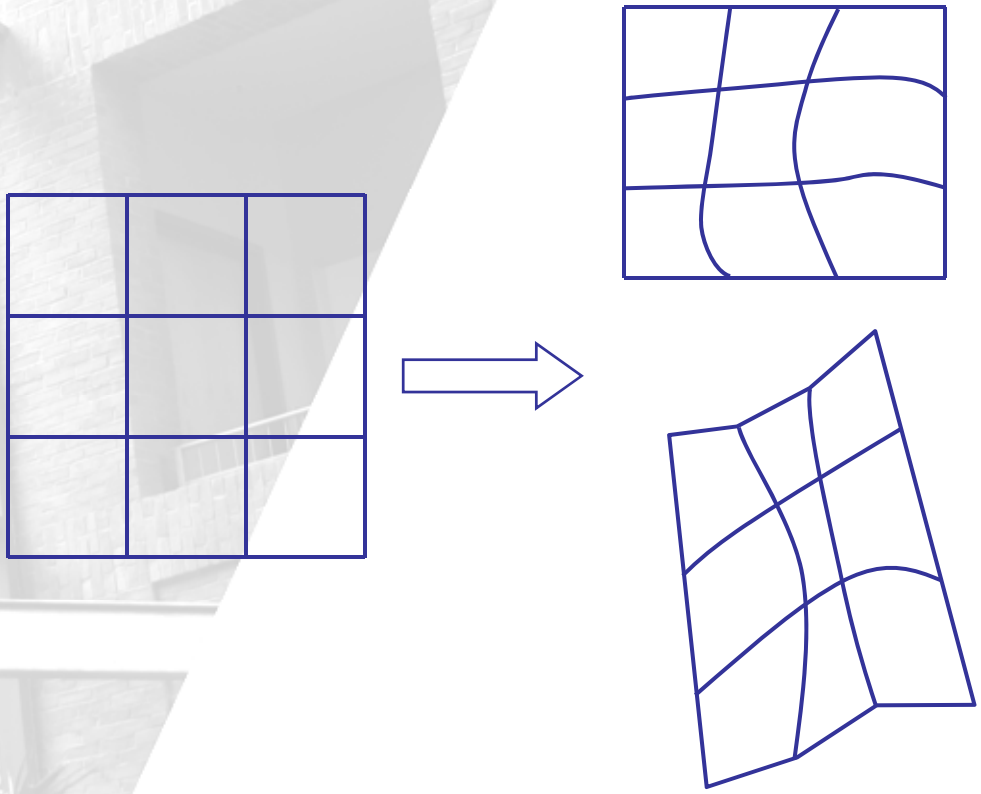
Adjusted parcels with poor alignment and orthophoto

Objective: The Vision

Adjusted parcels with orthophoto

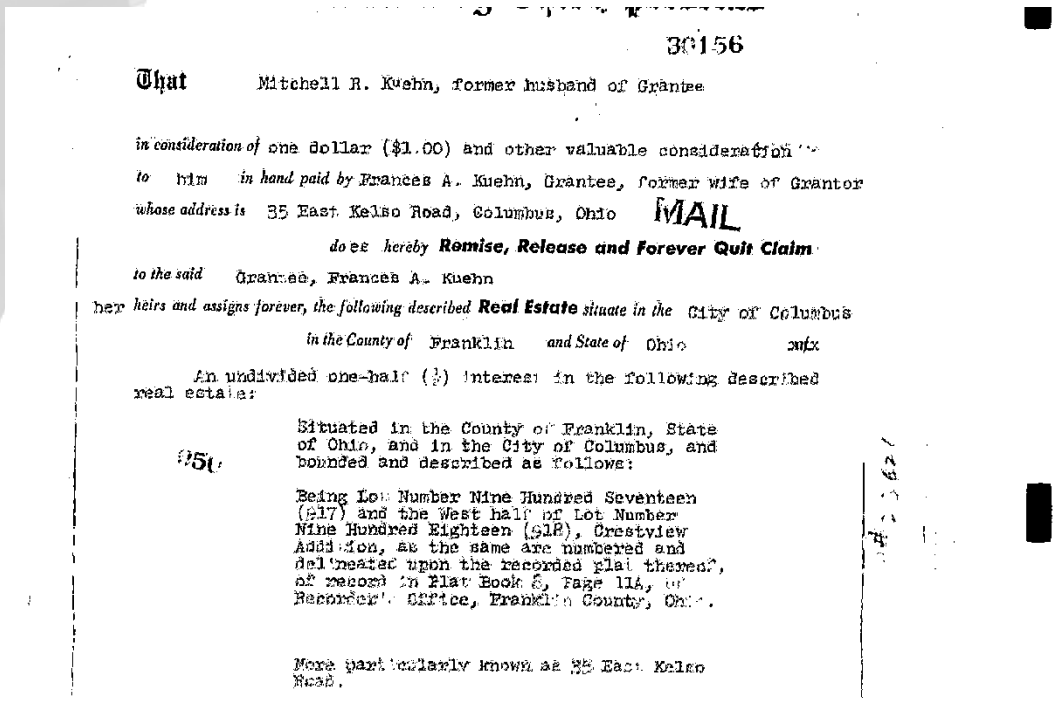
Objective: Methodology

County staff attempted to "rubber sheet" the tax maps to the orthophotography, but the results achieved were marginal at best.



Objective: Methodology

The use of traverse calculations base on deed information was tested with very accurate results. However, this method was extremely time consuming.



30156

That Mitchell R. Kuehn, former husband of Grantee

in consideration of one dollar ($1.00) and other valuable consideration

to him in hand paid by Frances A. Kuehn, Grantee, former wife of Grantor

whose address is 35 East Kelso Road, Columbus, Ohio MAIL

does hereby **Remise, Release and Forever Quit Claim**

to the said Grantee, Frances A. Kuehn

her heirs and assigns forever, the following described **Real Estate** situate in the City of Columbus

in the County of Franklin and State of Ohio

An undivided one-half (½) interest in the following described real estate:

Situated in the County of Franklin, State of Ohio, and in the City of Columbus, and bounded and described as follows:

Being Lot Number Nine Hundred Seventeen (917) and the West half of Lot Number Nine Hundred Eighteen (918), Crestview Addition, as the same are numbered and delineated upon the recorded plat thereof, of record in Plat Book 8, Page 11A, of Recorder's Office, Franklin County, Ohio.

More particularly known as 35 East Kelso Road.

Objective: Methodology

Muskingum Watershed Conservancy District developed parcels for billing residents. Created from large scale mapping. Attempted to use that, but found it unsuitable.

Other options?

In 2007 the County initiated a pilot project to develop a cost effective methodology.

Pilot Project

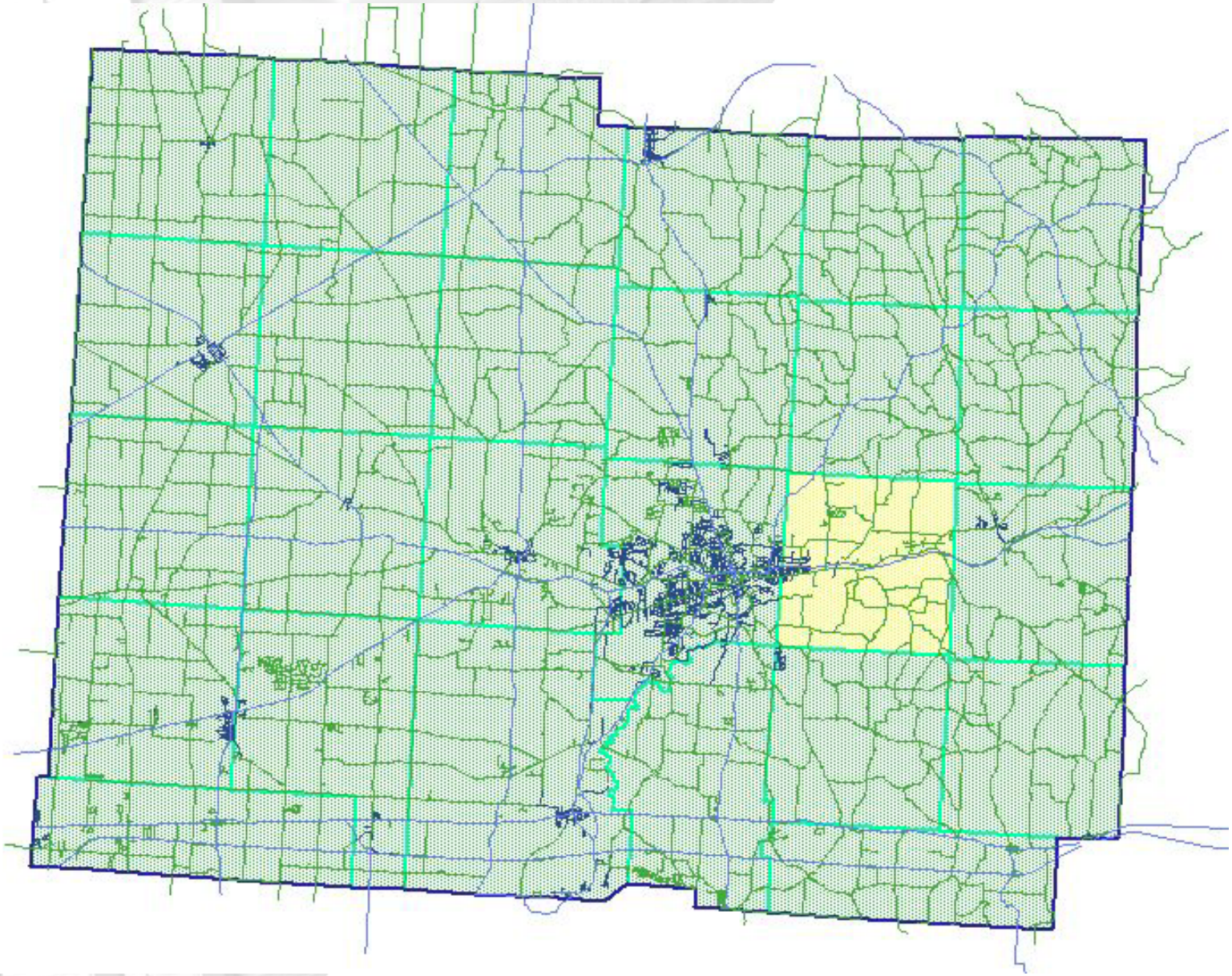
- Objective
  - Adjust its existing tax parcel data layer such that line work properly aligns with digital orthophotography

- Approach
  - Begin the project with a pilot study in Madison Township. The pilot study area contains approximately 4% of Licking County's parcels featuring a mix of urban properties along the State Route corridor and rural parcels.
  - Remainder of the study area is "if-approved"

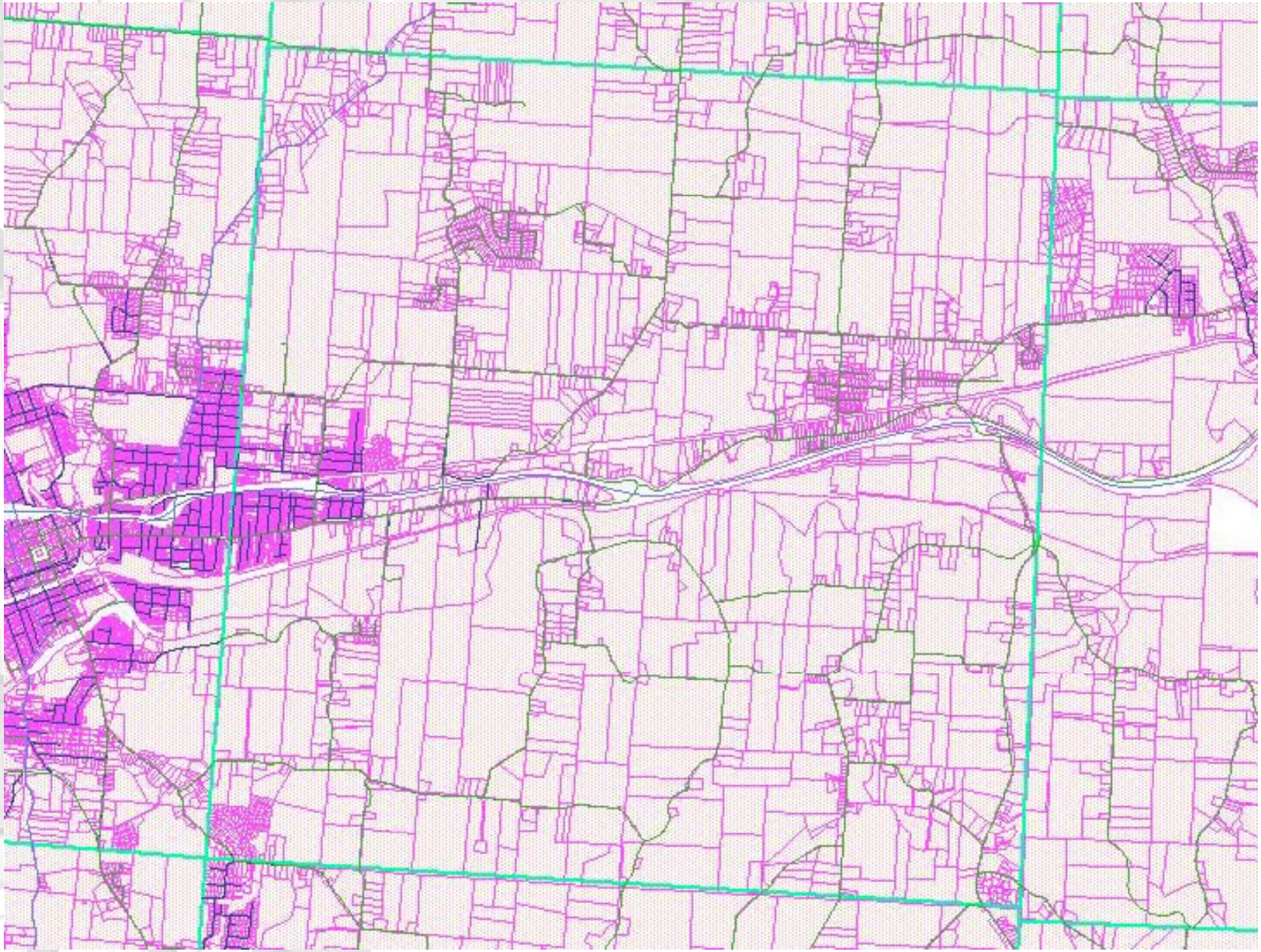
Pilot Project

1. Area
2. Accuracy
3. Format
4. Assumptions
5. Approach
6. Methodology options

Pilot Project: Area



Pilot Project: Area



Pilot Project: Accuracy

1. Corrected tax map line work will be free of overshoots, undershoots, and gaps between adjacent features.

2. All linear features will conform to CAD drawing standards to accurately reflect the property angular and dimensional characteristics of the property description. In general linear features, when measured, will be within ± 2.0' of the annotation (deed) distance.

Pilot Project: Accuracy

3. When the linear features are registered to the digital orthophotography, the linear features will coincide with observable physical boundary features. Where a fit is not possible, the contractor will document the problem and resolution used.

Pilot Project: Format

"All information developed by the contractor will be delivered to the County in an agreed upon database format. This data format, at a minimum, will he fully compatible with the County's existing GeoMedia® GIS format and will allow the existing database records to be corrected/updated with a minimum amount of effort."

- Used ESRI's Data Interoperability Extension
- Set up a Virtual Private Network (VPN)

Pilot Project: Assumptions

- Geometry is correct
- Dimensions are correct

Pilot Project: Approach

+ APPROACH
  - Task Series 1 | Draft Pilot Area Work Plan
  - Task Series 2 | Complete Pilot Area Work
  - Task Series 3 | Finalize Pilot Area Work Plan
  - Task Series 4 | Create Work Plan for Full Implementation

Pilot Project: Approach

+ Task Series 1 | Draft Pilot Area Work Plan

- The first step is to document present conditions and then prepare a draft Work Plan with the essential procedures, rules and specifications necessary to complete the project.

- Task 1.1: Assess Quality across Pilot Area (Consultant)
- Task 1.2: Characterize Problem Types (Consultant)
- Task 1.3: Describe Methods of Registration (Team)
- Task 1.4: Document QA/QC Process (Team)
- Task 1.5: Develop County Acceptance Testing and Criteria (Team)
- Task 1.6: Define Deliverable Format (Team)
- Task 1.7: Detail System Data Update Procedure (Team)
- Task 1.8: Prioritize and Sequence Areas for Completion (Team)
- Task 1.9: Prepare DRAFT Work Plan (Consultant)
- Task 1.10: Accept DRAFT Work Plan (County)

- Task Series 2 | Complete Pilot Area Work
  - Completing the data work within the pilot area is secondary to the objective of validating the procedures and specifications of the Work Plan. The pilot area work processes will be closely monitored to allow the project team to understand the progression and to be educated by its results.
  - Task 2.1: Apply Work Plan to Completion of Pilot Area Work (Consultant)

Pilot Project: Approach

- Task Series 3 | Finalize Pilot Area Work Plan
  - This task series focuses on the acceptance testing by the County. Corrections and edits at this point are not a failure, simply an exercise in experience and understanding. Based on the results of acceptance testing, detailed situational examples will be reviewed by the team for fine tuning and finalizing the Work Plan.

  - Task 3.1: Review Pilot Area Work (County)
  - Task 3.2: Review Edits and Corrections (Team)
  - Task 3.3: Perform Edits and Corrections (Consultant)
  - Task 3.4: Accept Pilot Area Work (County)
  - Task 3.5: Prepare FINAL Pilot Area Work Plan (Consultant)
  - Task 3.6: Accept FINAL Work Plan (County)

Pilot Project: Approach

- Task Series 4 | Create Work Plan for Full Implementation
  - The Work Plan developed for the Pilot Area needs to be enhanced to be applicable for the full Project Area. If the Project does not include this Task Series, the level of effort for the full implementation cannot be accurately estimated. Within this Task Series, key elements of the Project Area Work Plan will be established by the Project Team.

  - Task 4.1: Assess Quality across Project Area (Consultant)
  - Task 4.2: Prioritize and Sequence Areas for Completion (Team)
  - Task 4.3: Prepare Work Plan (Consultant)
  - Task 4.4: Accept Work Plan (County)

Pilot Project: Methodology Options

Method 1. Legal descriptions

- Redrawing each parcel based on legal descriptions. Then fit each together over the orthophoto

Method 2. Dimensions and orthophoto

- Realign by redrawing with dimensions to orthophoto

Method 3. Orthophoto-based

- Realign by matching parcels to the orthophoto

Method 4. Rubber sheeting

- Non-uniform transformation given estimated matching points

Pilot Project: Methodology Options

Method 1. Legal descriptions

- Redrawing each parcel based on legal descriptions. Then fit each together over the orthophoto

Pro:

Highly accurate

Can adjust things in groups

Con:

Labor intensive because each parcel needs to be redrawn

Need to fit redrawn parcels together

Still needs an anchor point established

Pilot Project: Methodology Options

Method 2. Dimensions and orthophotos

- Realign by redrawing with dimensions to orthophoto

Pro:

Accurate

Checking every dimension

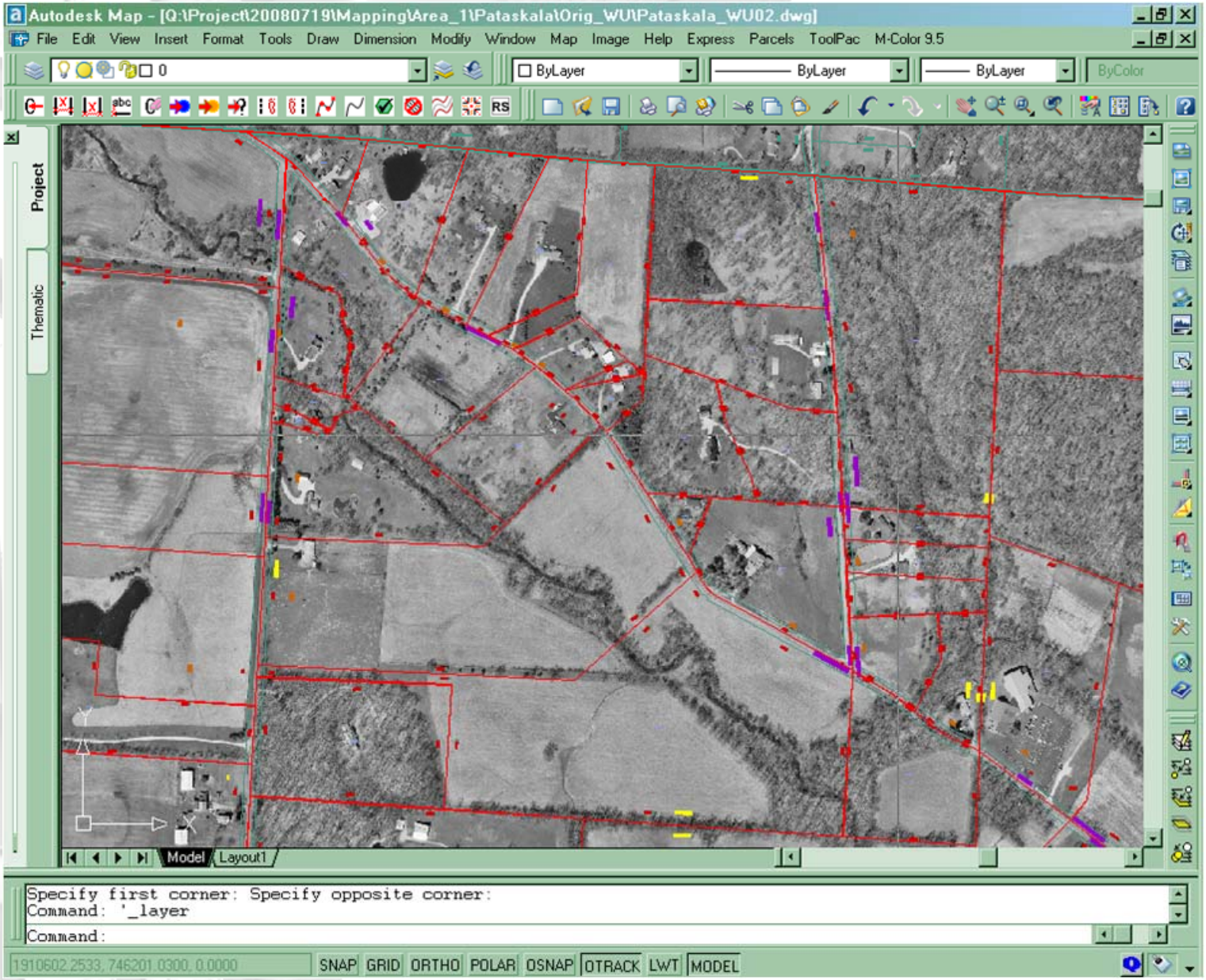
Con:

Labor intensive – checking every dimension

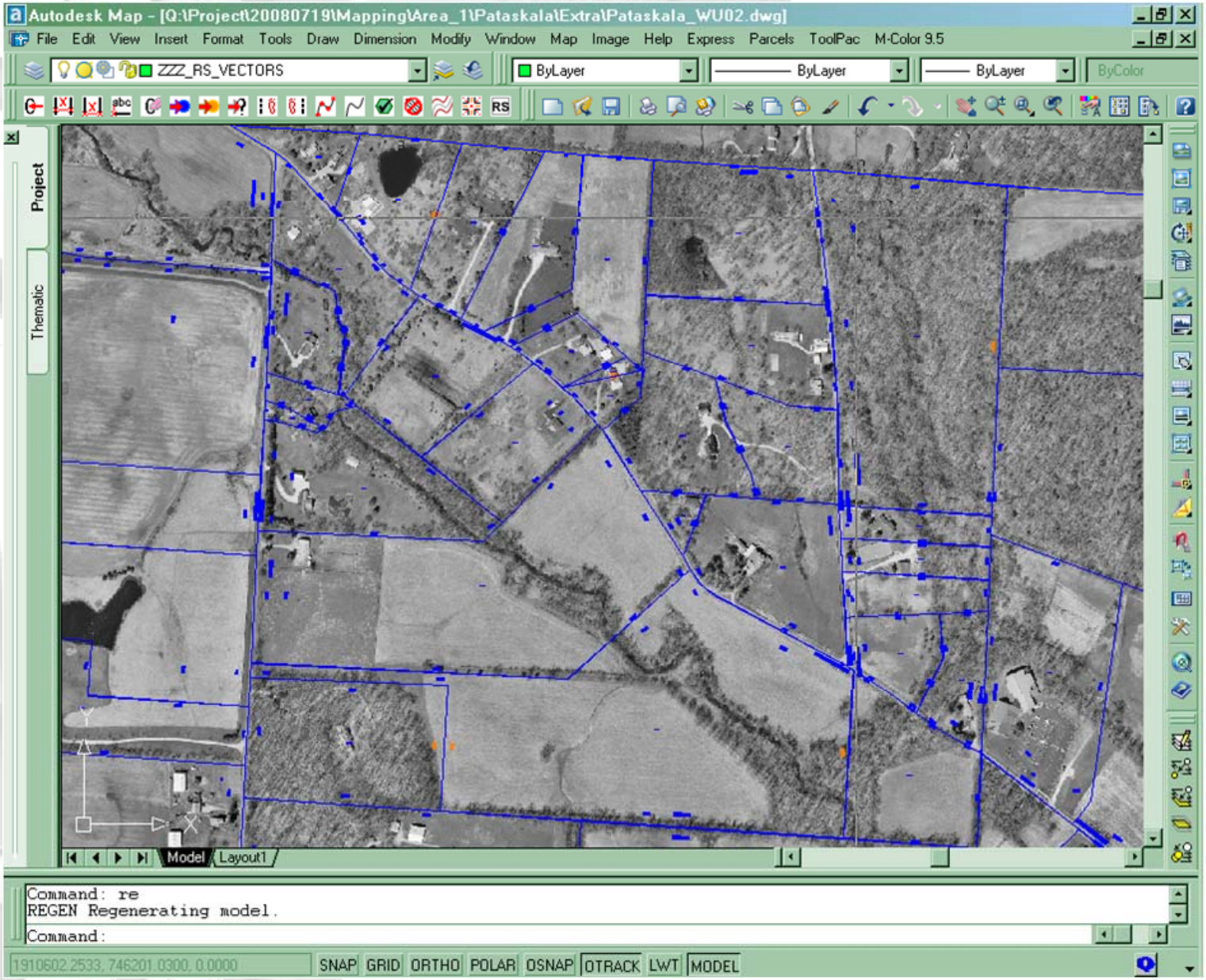
(5 to 10 parcels per hour)

Must fit dimension allowance

Pilot Project: Methodology Options



Pilot Project: Methodology Options



Pilot Project: Methodology Options

Method 3. Orthophoto-based

- Realign by matching parcels to the orthophoto

Pro:

Quicker than Methods 1 and 2

Parcels are visually appealing

Con:

Not checking every dimension

Pilot Project: Methodology Options

Method 4. Rubber sheeting

- Non-uniform transformation given estimated matching points

Pro:

Very quick

Con:

Not accurate
Ignored dimensions
skewed things
created arcs
other strangeness

Pilot Project: Methodology Options

- Tested all during the Pilot Project.
- Most of the pilot was completed using Method 2
- Recommended a hybrid approach

<u>Hybrid Approach</u>

Level 1: Orthophoto-based (Method 3)

Used during initial construction – flag inconsistencies

Level 2: Dimensions and orthophoto (Method 2)

Used during quality control steps – guided by flagging

Level 3: Legal descriptions (Method 1)

Used to resolve discrepancies and issues - identified by problem resolution form (PRF)

Pilot Project: Methodology Options

More about Method 3 – rules and constraints

+ First do no harm
+ Topologically sound
+ Visually appealing
+ Geometrically similar
+ Buildings not split by parcels
+ Sidewalks at parcel edge (in the ROW)
+ Roads at parcel edge
+ Dimensionally similar
+ Begin working at an anchor point (c/l or ROW)
+ Rely on plats within subdivisions
+ Validated approximately 30% of the dimension

(EXAMPLES)

Lessons Learned: EMH&T Perspective

1. Assumptions are not perfect
   - Geometry is a mixed bag
   - Dimensions are not always correct
2. Priorities migrated to:
   - Topologically sound
   - Visually appealing
   - Geometrically similar
3. Need to be flexible
   - Schedule, quality and budget constraints interwoven
4. Escalate problems to add value to product

Lessons Learned: EMH&T Perspective

PRF Discussion Page - Microsoft Internet Explorer provided by EMHT INC

File Edit View Favorites Tools Help

Address http://dowprf.emht.com/Content/PRF_Discussion.asp?txtPRFID=450

Evans, Mechwart, Hambleton & Tilton, Inc.
Engineers, Surveyors, Planners, Scientists

Log out

PRF ID	Submittal	Atlas Map	Topic	Priority	Status	Type
450	12	0300	WL1971-57_003	Normal	Resolved	Situational

We received WL1971-57_003 with the following note in the source log and need to know if there's something else we should follow? "Scan copy does not match original record."

Karen Tillman
1/17/2007
2:56:00 PM

« RE: WL1971-57_003 — D Fann — 1/22/2007 11:07:00 AM

Karen, I assume the installation of either meter pit which is not indicated or the connection of existing hydrant to 42" main, which are both shown incorrectly on WL1971-57_003 which would be per existing records, the FRA-Morse-Rd-CR and P2525 . Dave

« RE: RE: WL1971-57_003 — Karen Tillman — 1/22/2007 11:08:00 AM

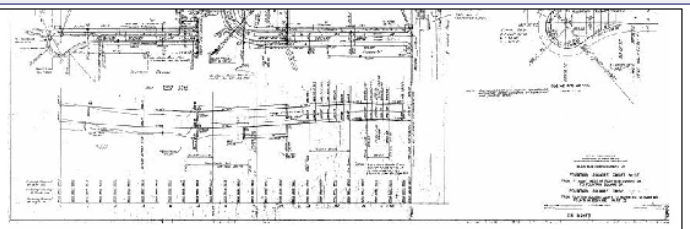
I am not sure but think you are saying we should not use this source but rather what we can find on the FRA and P plan?

« RE: RE: RE: WL1971-57_003 — D Fann — 1/22/2007 1:38:00 PM

Karen, WL1971-57_003 is the plan of installation for the waterline in Fountain Square Dr, but not the north and south ends. Dave

RE: RE: RE: RE: WL1971-57_003 — Karen Tillman — 1/22/2007 1:42:00 PM

Thank you Dave!



Lessons Learned: County Perspective

1. Prior knowledge of Licking County and work experience in the County is invaluable
2. Proximity to the Contractors office has proven to be an asset. The ability to resolve a problem before they impact large portions of the project save both time and cost
3. There is no single solution that will resolve all registration problems in the county

County: Expectations of Full Alignment

1. Enhanced ability to maintain the database in a timely manner
2. Able to provide more accurate and better information to other agencies
3. Better able meet the public's expectations to see their property in a photographic context
4. Hope to regain the status of being the second largest county in land area in Ohio

(Ross is currently 2 square miles larger than Licking)

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