Using LiDAR Data for Engineering Projects

West Central Regional Advanced LiDAR Workshop
MGISAC
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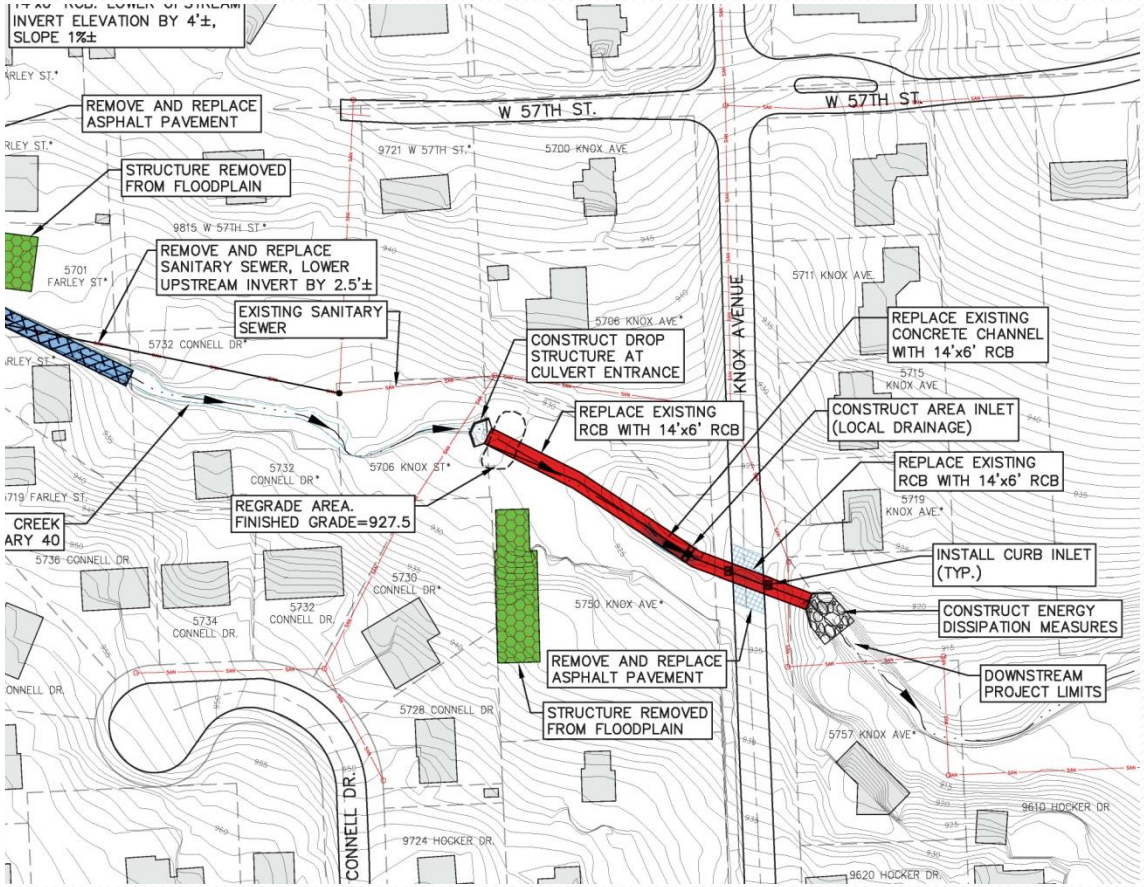
Engineering Applications

- Preliminary Studies
- Design Projects
  - Linear Projects (Creek/Roadway)
  - Development Projects
- FEMA Floodplain Updates
  - Hydraulic Models
  - Floodplain Mapping

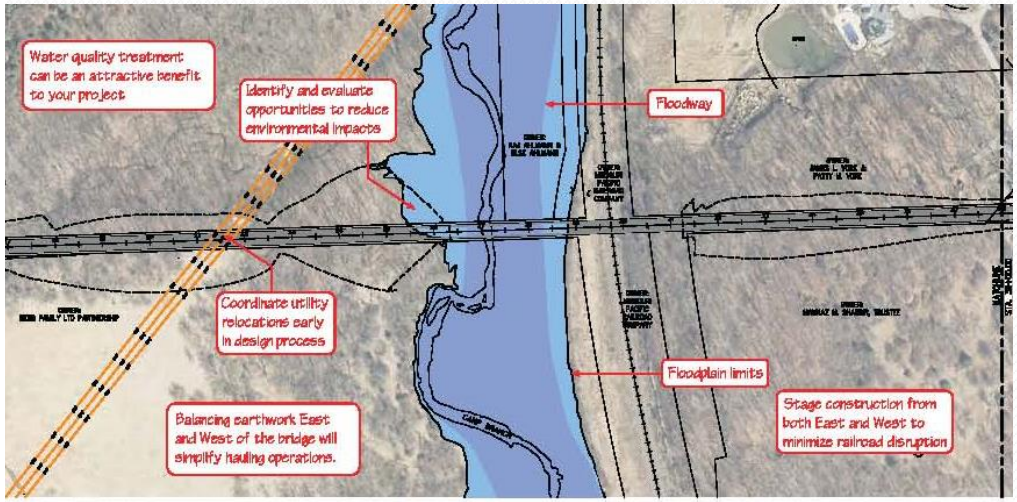
Preliminary Studies – Storm Drainage

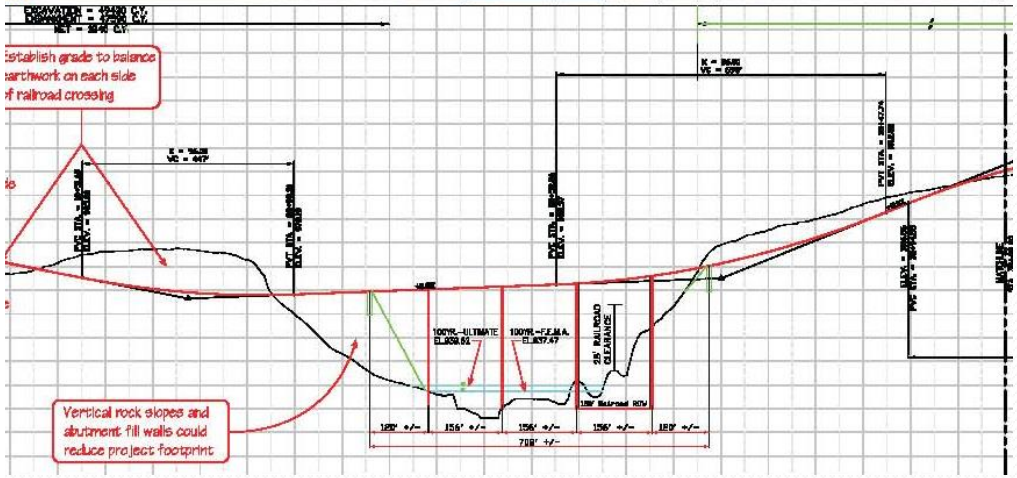
- Detailed Survey Data Not Required
- Same level of accuracy as the Johnson County Watershed Studies
- Significant Cost Savings



Preliminary Studies – Roadway

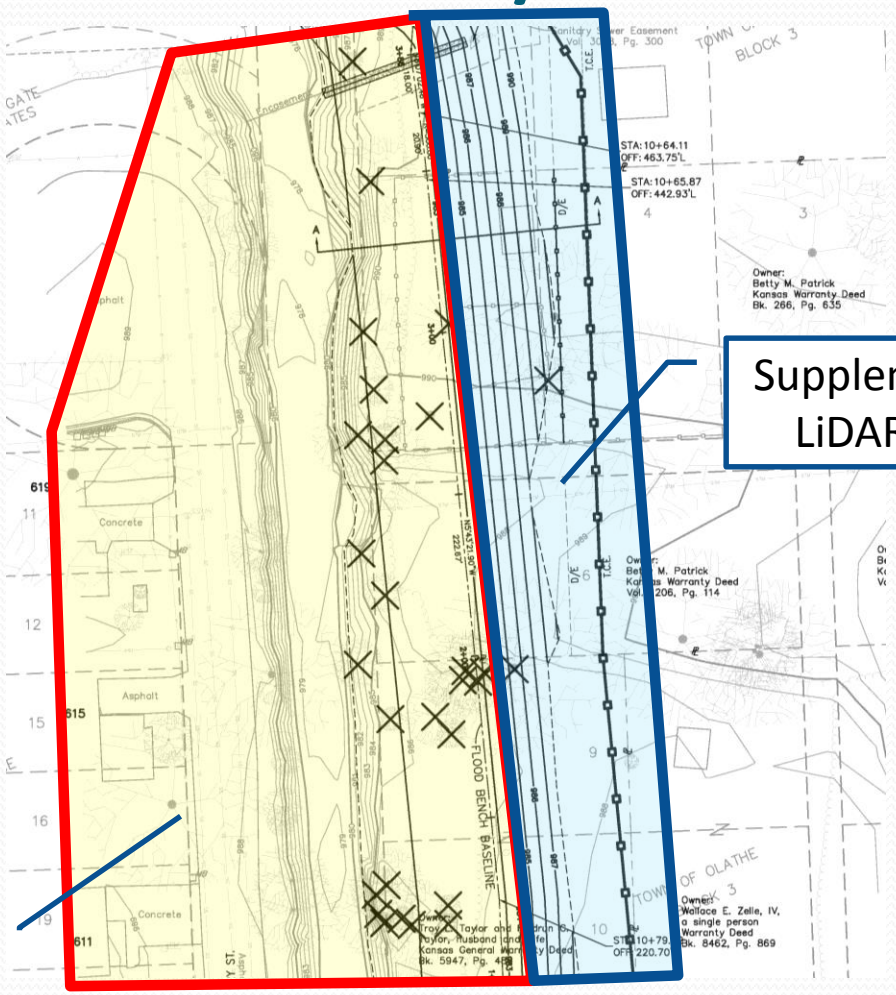
- Detailed Survey Data Not Required
- Determine the limits of impact for design alternatives
- Significant Cost Savings





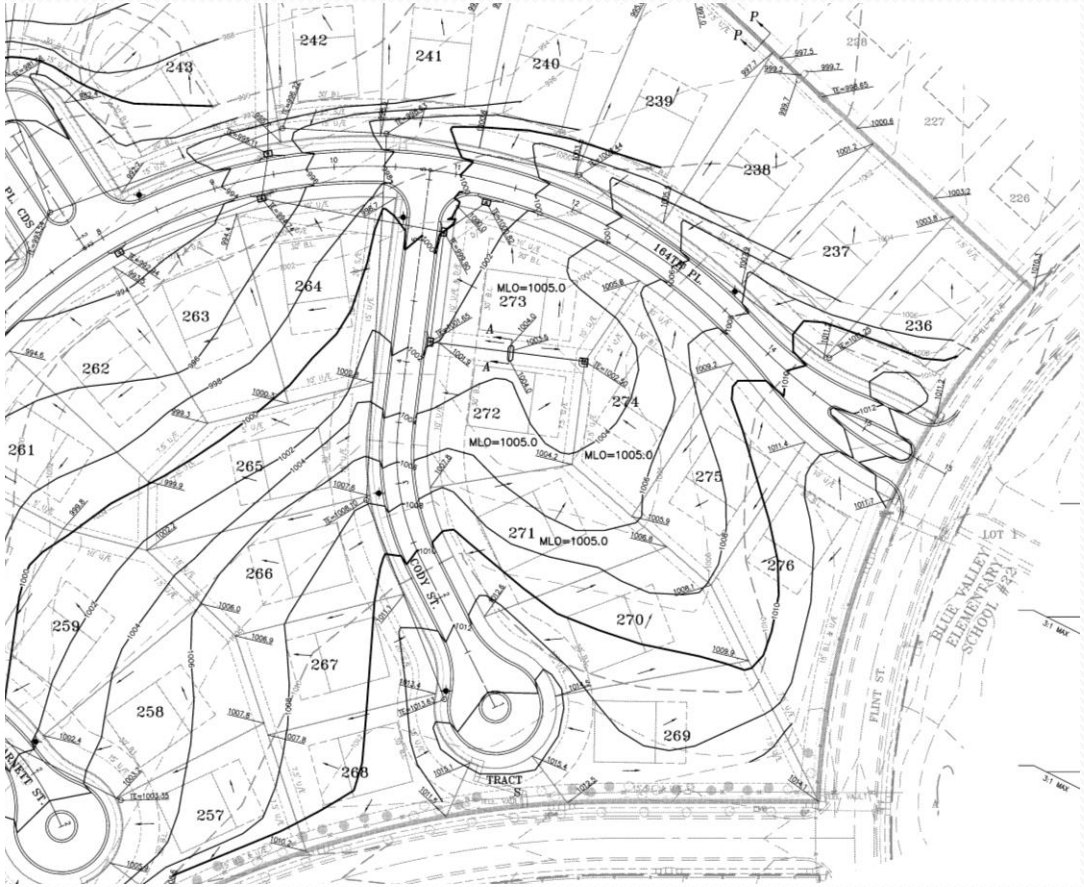
Design Project – Creek/Road

- LiDAR supplements detailed survey data
- Create a “blended” surface for work outside the detailed survey limits
- Significant Cost Savings



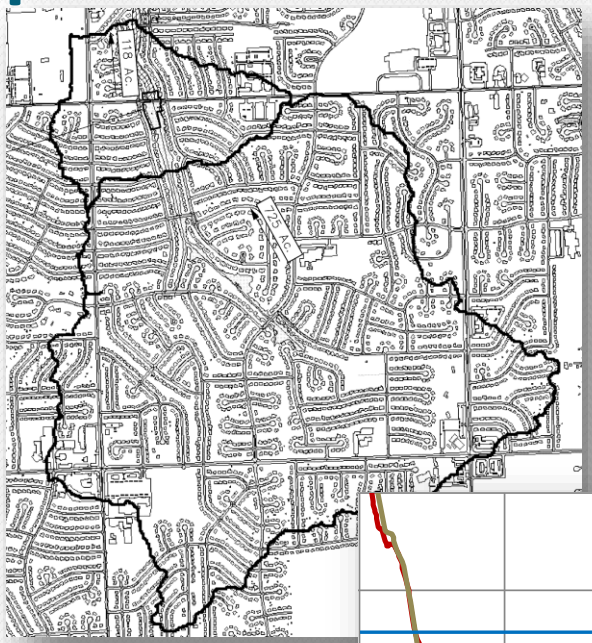
Design Project – Development

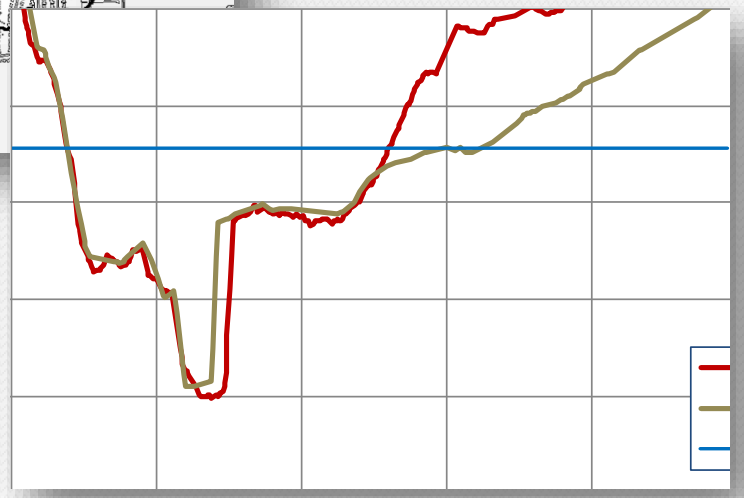
- Survey key locations to verify accuracy of AIMS Data and supplement LiDAR with survey data
- Adjust data if needed to design street, storm and sanitary sewer
- Significant Cost Savings



FEMA Floodplain - Modeling

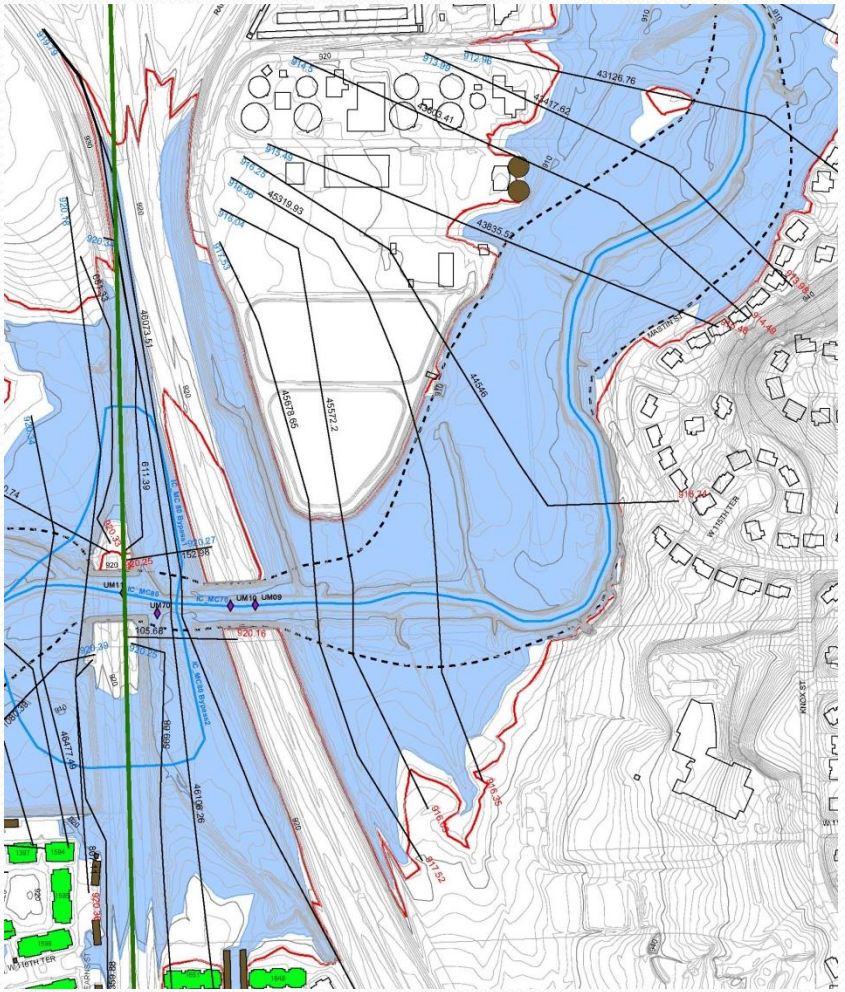
- Use LiDAR DEM to estimate the watershed and runoff in the creek
- Use LiDAR TIN to determine the shape of the channel
- Significant Cost Savings and greater degree of accuracy





FEMA Floodplain - Mapping

- Estimate depth of flow in Creek
- Project on LiDAR DEM
- Delineate Floodplain



Future Uses

- Identify Areas of Topographic Change
  - Stream Migration
  - Development
  - FEMA mapping updates
- Determine areas at risk of slope failure
  - Steep Stream Banks
  - Overlay with soil shapefile to identify erosive soils
  - Develop Stream Bank Stability programs/priorities
- Countywide Master Planning
  - BMP's
  - Sanitary Sewer
  - Roadway Alignments

LiDAR Delivery Formats

- For Use in GIS Analysis
  - “Clean” DEM with no conversion by AIMS
  - Typically for Watershed or County Wide Studies

- For Use in AutoCAD Projects
  - Convert “Clean” DEM to a Point Shapefile
  - Text File with Only Northing, Easting and Elevation
  - Does not require highly trained GIS personnel
  - Typically for Design Projects

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Discussion