Silver Creek
The Team

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Outline

- Project overview
- Computer modeling
- Southfield basin design
- Calvin basin design
- Conclusions
- Acknowledgements
Evaluating 3 of 4 detention basins along the Silver Creek Drain.

Silver Creek drains to Plaster Creek, and eventually the Grand River.

Goal: to maintain/improve detention time, improve water quality, and daylight Silver Creek where possible.
Computer Model: EPA-SWMM

- EPA-SWMM incorporates the hydrology of the land, and the hydraulics of the peak flows in Silver Creek.

- Design storage for 25-year and water treatment for 2-year design storms.

- Full, detailed model for existing conditions and final design choice.
Construct new inlet on easternmost end:

- Needed to verify invert elevations for feasibility
- Leave existing inlet as is
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Southfield Design: Surveying Southfield
- Feasible to construct inlet
- Total fall: 3.4 ft
- Channel slope: 0.28%
Southfield Design: Channel Geometry

- Use Manning's equation to design geometry of low-flow channel and overbank geometries
- Two stage trapezoidal channel
- Meander through basin to optimize stormwater treatment
- Channel bed holds baseflow, grassy overbanks hold larger storms
- Designed weir and inlet structure in order to divert as much of a two year storm as possible, without compromising upstream hydraulics.
- 6’x8’ box culvert inlet
- 2 foot weir constructed in Silver Creek
Southfield Design: Proposed Inlet Planview
Southfield Design: 1 Year Storm

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Southfield Design: 2 Year Storm

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Calvin Design

- Construct pre-sedimentation basin
- Install 18 inches of sand filtering media
- Leave inlet and outlet structures intact
- Direct first flush to overtop a dead end channel into filter beds
Calvin Design: Sample Cross Section

- 18' of Sand Filtering Media
- Effective Grain Size: 2mm
- RLP-RAP & Berm
  EL 690'
- Sand Filter Bed
  EL 688'
- Slope 4:1
  (TYP)
- 5.5'
- Observed Water Table
  EL 682.5'
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## Conclusions: Final Cost Estimate

### Labor:

1. Field Inspection
   - Field Survey, 40 hrs @ $110/hr  
     - Sub-Total: $4,400
   - Office Coordination, 2 hrs @ $70/hr.  
     - Sub-Total: $140

2. Engineering
   - Engineer, 160 hrs @ $70/hr.  
     - Sub-Total: $11,200
   - Drafting, 80 hrs @ $50/hr.  
     - Sub-Total: $4,000

### Modify Detention Basin Bottom:

- Construction for Calvin improvements: $20,000-$35,000
- Construction of Southfield channel: $25,000-$35,000
- Site Clearing: $4,000-$8,000
- Southfield and Calvin Excavation (~5500 cu. yds): $55,000-$66,000  
  - Sub-Total: $104,000-$144,000

### Structures:

- New Inlet Construction (Southfield): $50,000-$80,000  
  - Sub-Total: $50,000-$80,000

### Filtering Media:

- Filtering Sand Effective Grain Size 2mm (51,300 cu. ft): $77,000-$128,000  
  - Sub-Total: $77,000-$128,000

### Miscellaneous:

- Soil Erosion and Sedimentation Control: $2,000-$5,000
- MDOT Heavy Rip-Rap 100 Sq. Yd.: $4,000-$6,000  
  - Sub-Total: $6,000-$11,000

### Project Total

- $258,000-$384,000

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Conclusions: Looking Back

What we learned:

- Don’t always take model results at face value
- Importance of communication and organization

What we would do different:

- Front load the project
- Better distribution of individual and team tasks
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- Brad Boomstra (client at KCDC)
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Questions?