



GRS ABUTMENT PROJECT PLANNING – KEEFER HIGHWAY BRIDGE  
*PAUL SPITZLEY - IONIA COUNTY ROAD COMMISSION*



## Planning a GRS Abutment Project

Selecting a Bridge

Estimating the Project

Gathering a Design Team

Consideration of Alternative Designs

Interactions with Stakeholders

What We Learned

# Selecting A GRS Abutment Project

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- Span length less than 140 feet
- Less than 30 foot abutment height
- 9 or less feet per second stream velocity

*Great for replacing low cover large culverts*

# Project Estimating

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## *The Keefer Highway Example:*

- Total Project Cost was +/- \$550,000  
*Deck Size: 50 foot span, 33 foot width*
- Abutment Cost was +/- \$220,000  
*11 foot height, 42 foot face, with 20 foot return walls*

# Design



## Lead Designers

- Deck Design
- Channel Design

## Construction Engineering



## Geotechnical Design

- GRS Abutment Design

## Abutment Materials Testing



## Geotechnical Designers

- Existing Soil Exploration
- GRS Abutment Design
- MDOT Incentive

## Performed Field Visits During Abutment Construction

# One Summer ... Three Bridges



Long Lake Road  
over Flat River



Riverside Drive  
over Libhart Creek



Kefer Highway over Sebewa Creek



# Three Varying Designs

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## Spread Box beam

- Spread Footing Abutments

## 3 Sided Pre-Fabricated Arch

- Pile Supported Abutments

## Side-by-Side Box Beam

- GRS Abutments

# Cost Comparisons

## Long Lake Road Bridge – Spread Box Beam on Spread Footing Abutments

- \$1.1 Million
  - By Span Length: \$10,476 per ft

## Riverside Drive Bridge – Three Sided Arch on Pile Supported Abutments

- \$960,000
  - By Span Length: \$21,670 per ft

## Keefer Highway Bridge – Side by Side Box Beam on GRS Abutments

- \$550,000
  - By Span Length: \$11,000 per ft



# Schedule Comparisons

## Long Lake Road Bridge – Spread Box Beam on Spread Footing Abutments

- 4 months

## Riverside Drive Bridge – Three Sided Arch on Pile Supported Abutments

- 2.5 months

## Keefer Highway Bridge – Side by Side Box Beam on GRS Abutments

- 2 months
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# Stakeholder Involvement

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Board of Road Commissioners

Township Officials

Road Users

Adjacent Property Owners

MDEQ

# Lessons Learned

- Know the existing sub-structure
  - Mandatory pre-bidders meeting
  - Explore alternative structural backfills





*QUESTIONS*