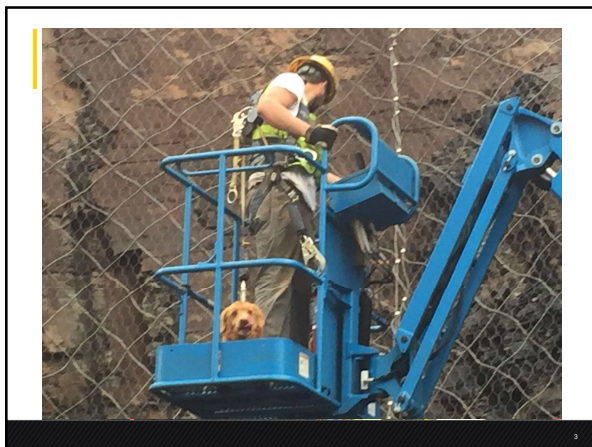


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Outline

- Project Background and Overview
- The Project
- The Fly Ash Issue
- Closing and Questions

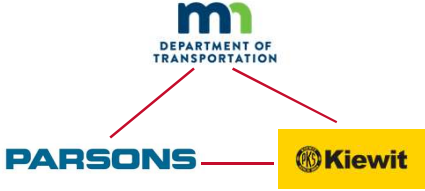
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Project Background and Overview

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CMGC Delivery Method



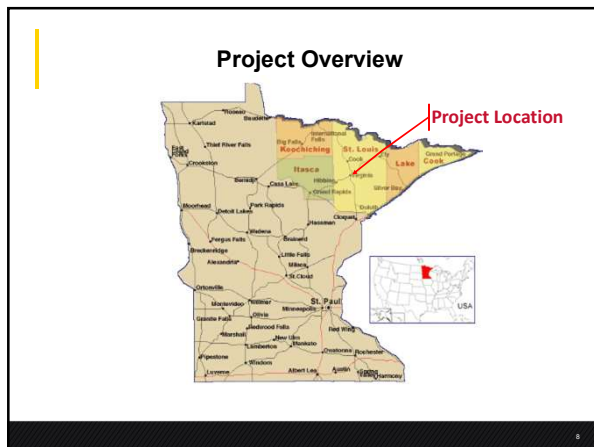
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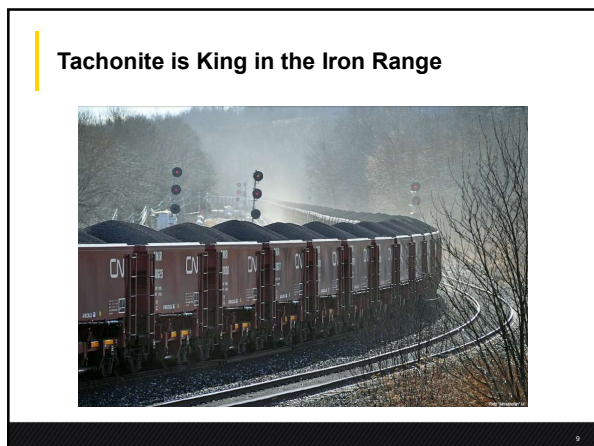
Project Goals

Priority	Goal
1	Allow existing TH 53 area to be established, completed and opened before November 2017 Get out of the way on time
2	Construct the project to provide best value while minimize future maintenance costs Do it right
3	Don't mess up the public water supply...or anything else
4	Minimize disruption This is an interesting project, but one move is enough
5	Accommodate Virginia utility and Mesabi Trail relocation

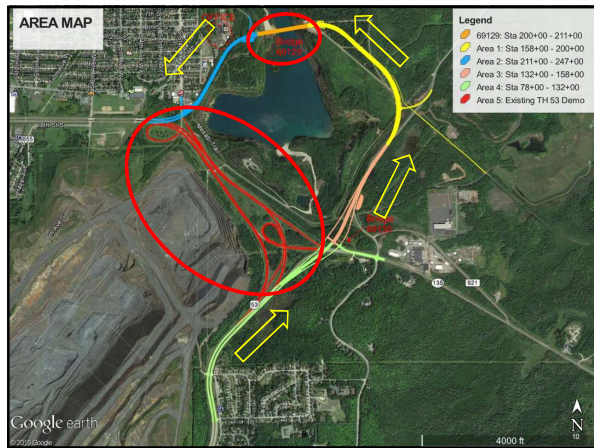
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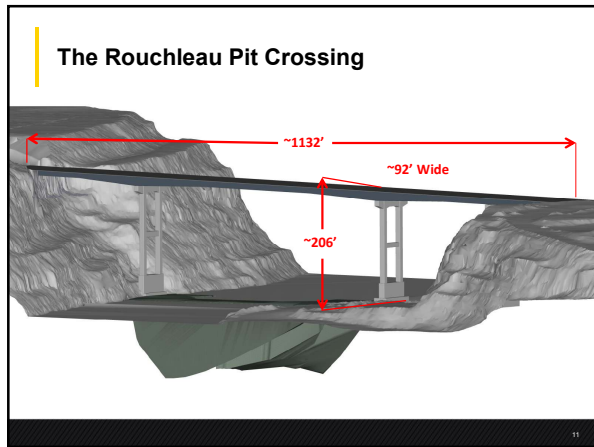
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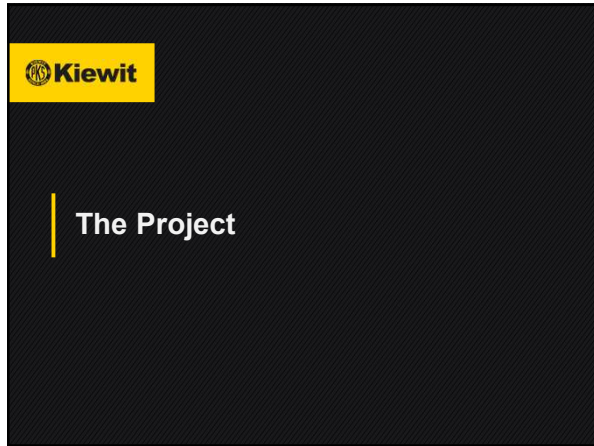


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Program Schedule Highlights

Milestone	Date	Notes
Design Begins	Mar, 2015	
Steel Girder Plans Stamped and Accepted	May, 2015	90 Days Girders Ordered Before 60% Design Complete Design 90% Complete Before ROD/FEIS Complete
Girder Fabricator Selected	Jun, 2015	
ROD/FEIS Complete	Sep, 2015	
Final Plans Stamped and Accepted	Oct 9, 2015	Prepared and Final Price Agreed to in < 3 weeks
NTP for Construction	Oct 29, 2015	
Construction Starts	Nov 2, 2015	
Substantial Completion	Sep, 2017	Project Complete 5 Weeks Early

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Utilities



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Bridge Access

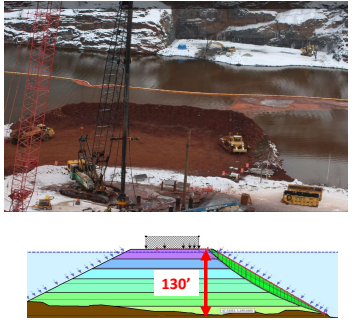
- **Problem:** How do we gain access to the bridge work? How to execute 750,000# girder lift safely?
- **Solution:** 170' W x 450' L x 130' D rock causeway across the Rouchleau Pit
- **340,000CY of Mine Tailings**



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Causeway Construction

- 2 months to complete double shift
- 14EA 740 Cat dump trucks & 1EA 1250 Komatsu excavator
- Used sonar topography to measure slopes
- Settlement monitoring & safe working zones



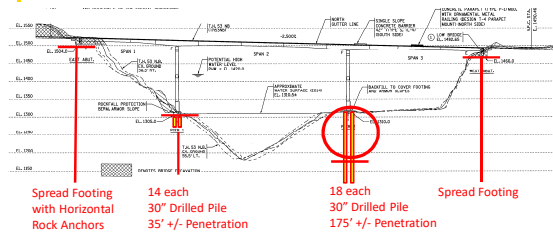
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Completed Causeway

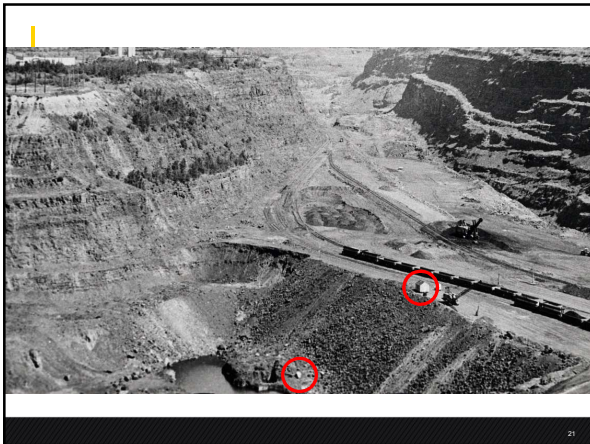


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Bridge Foundations



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Substructure Overview

- 10' Deep Footings
- 30' Tall Plinth Walls
- **9'x9' Columns**
- 9' Deep Struts
- 14' Deep Caps

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Columns

- 1,590 CY of Concrete
- ~140' Tall Twin Columns
- 30' - 40' Column Lifts
- Tie-less Steel Forms
- Self supporting rebar frame

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Columns

- Mass Concrete
 - 7 Day Cycle
- Setting/Stripping Deck
- Integrated Scaffolding
- **Critical Path of Substructure**





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Pier Caps



- 720CY Total
- 1.5 Million #'s
- Steel Falsework 100' L x 24' W
 - Prefabricated on the ground



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Pier Caps





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Steel Early Procurement

- Independent Work Package
- Early Fabricator Involvement
 - Constructability Reviews
- Accelerated Detailing
- Dedicated Management
- Schedule Integration




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Steel Fabrication

- 5,227 Tons
- 80EA Girders
- Heaviest Girder = 224,000#s
- Tallest Girder = 15'-2"
- Longest Girder = 140'




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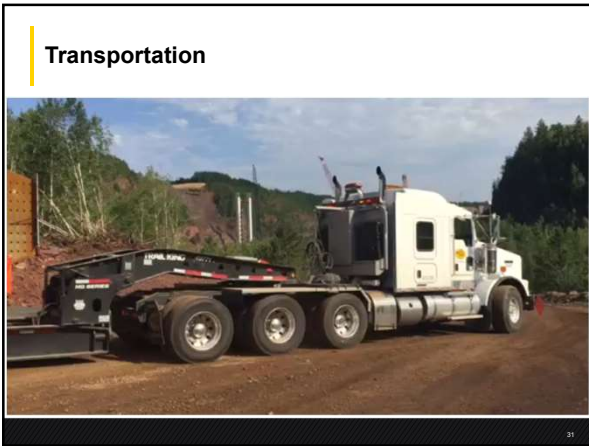
Steel Transportation

- Argee Transport
 - Des Moines, IA
- Hauled Horizontal
- Challenges
- Jobsite Access
- Weather Conditions



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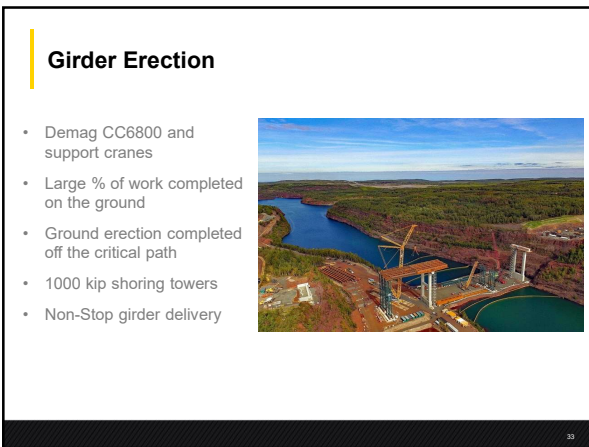
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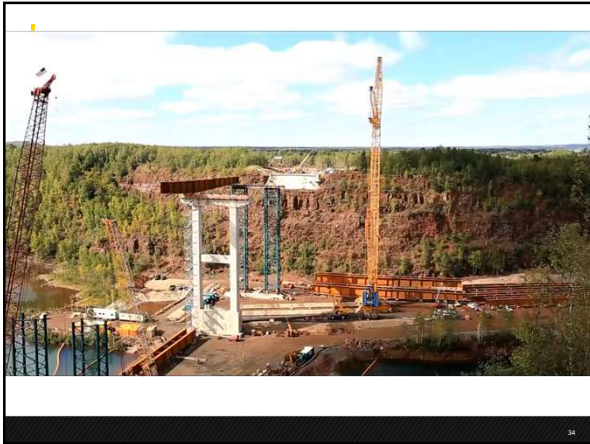
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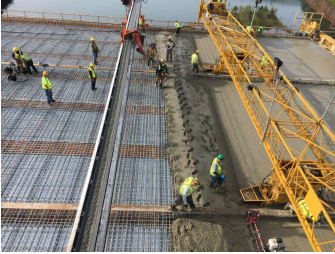
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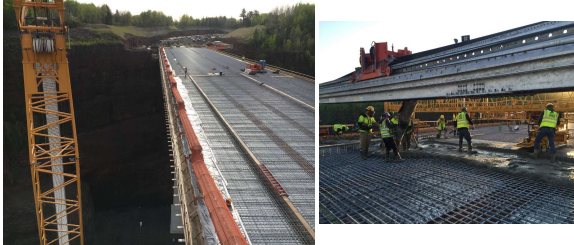
Bridge Deck Placement

- 3,600 CY Total
- 6 Individual Pours
- Largest Pour = 900 CY
- Poured Using Bidwell 4800
 - Twin Carriages
 - Razorback Scream for Trail



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Bridge Deck Placement



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Bridge Deck Placement



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The Fly Ash Issue

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THE FLY ASH ISSUE



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THE FLY ASH ISSUE

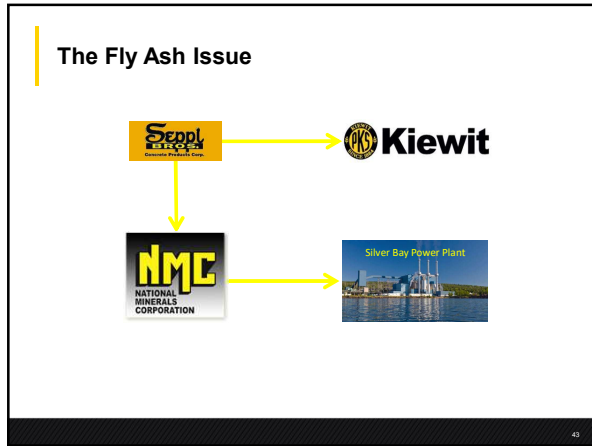


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THE FLY ASH ISSUE



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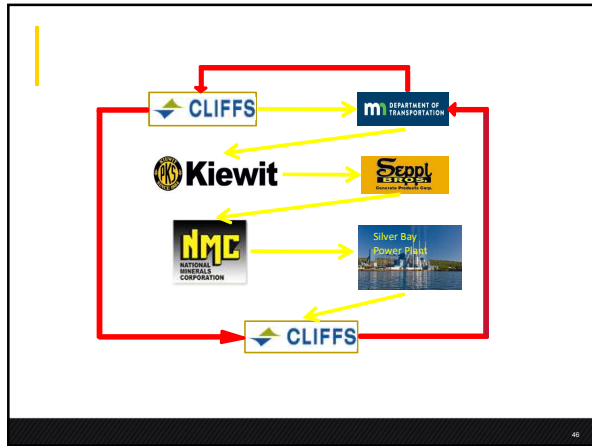
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- ### Potential Huge Delay
- 4-8 Week delay to the Critical Path
 - Delay to girder erection
 - Would force inefficient sequence of work
 - Risk of pushing concrete into winter

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Conclusion

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Project Status


- New alignment opened 10/17
- 5 weeks early
- Mining operations have started
- Final Acceptance of the project
- Project accolades

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Safety Success

- Safety
 - 650,000 hours worked without a lost time injury
 - OSHA Recordable - 0
 - MnDOT Safety Initiative from lessons learned on TH-53
 - Recently named ENR's Best of the Best project for Safety

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Questions

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