



Alternative Project Delivery Methods

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Committee**

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We all have a stake in **A  B**



Presentation Overview

- ▶ Introduction to Design Build & CMGC
- ▶ Delivery Method Selection
- ▶ Other Procurement Methods
- ▶ Contractor Selection Results on Major Projects
- ▶ Update on four major projects:
 - TH 53 Realignment
 - TH 43 Mississippi River Winona Bridge
 - TH 36 St. Croix River Crossing
 - TH 169 over Nine Mile Creek



MnDOT's Design-Build Program



'ROC 52' in Rochester

- First DB project in 1997
 - First modern DB project in 2002: 'ROC52'
- Typically 15-25% of MnDOT's program by cost.
 - 2-3% of program by number (limited to 10% by Statute)
 - Typically 3-5 projects per year over last five years.



I-35W Bridge

DB Strengths and Weaknesses

DB Benefits:

- Accelerated Delivery
- Risk Transfer (Quantities, etc.)
- Competing/Innovative Designs
- Contractor 'Value Engineering'/ATCs
- "Best Value" Awards
- Flexibility



TH 61 Hastings bridge

DB Drawbacks:

- Non-Complex Project Cost Efficiency
- Less Control over Design
- Third party permits or agreements
- Design Oversight Resources



Maryland Ave/I-35E bridge

Design Build Scoring

▶ Low Bid

- Pass/Fail Technical Proposal
 - Best for: non-complex projects, minimal risk transfer, lower dollar value (under 10 to 20 million)

▶ Best Value

- Formal Technical Proposal Scoring
 - Best for: major bridges, complex highways, unique designs, major risk transfer
 - Weight of price vs technical score is determined before RFP is issued
 - Criteria typically includes items such as approach to design elements, environmental management, substantial completion, schedule for achieving proposed completion date.



Construction Manager/General Contractor (CMGC)

- An innovative delivery method that is an alternative to Design-Bid-Build or Design-Build
- Take advantage of the “pros” in both methods
- Relatively new to the transportation industry
- Looking to add another delivery method to our toolbox



Adding CMGC to the Toolbox



- In 2012, MAP 21 enacted – moved CMGC from experimental to approved for State DOTs, provided their state statutes allow for it

- In May, 2012 MnDOT received authority from the state legislature to deliver 10 projects with CMGC



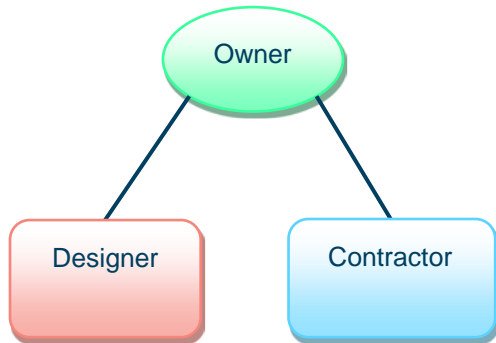
What is CMGC?

- Allows MnDOT to procure a contractor early in the design process to provide constructability input into the design
- Allows the chosen contractor to construct the project if they are able to reach agreement on price with MnDOT
- Allows for a collaborative project team that includes the designer, contractor and MnDOT.
- Allows MnDOT to make informed decisions in meeting the project goals and reduces the risks of the unknown.

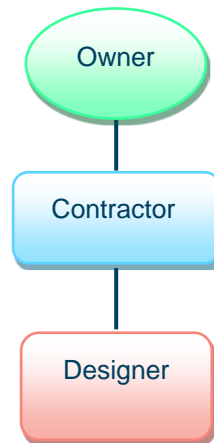


Contractual Relationships: DBB, DB, CMGC

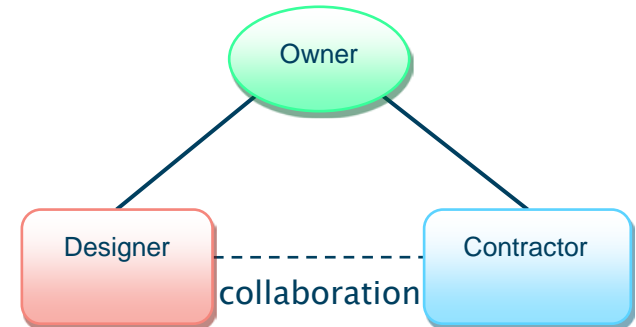
Design-Bid-Build Model



Design-Build Model



CMGC Model



CMGC Process

Procurement

CMGC Contractor may be procured based on qualifications or best-value

Enter into a professional/technical services contract for the preconstruction phase

Preconstruction Phase

CMGC Contractor provides input into the design regarding constructability, risk, cost, schedule and staging

Formal workshops to evaluate the design, risk, and cost for the project that align with typical design review milestones – Interim Pricing Milestone Process



CMGC Process (cont'd)

Construction Phase

If agreement is reached on the price, the CMGC Contractor is awarded a construction contract – Bid Validation Process

If unable to reach agreement on the price, the construction may be procured by advertising for competitive bids (DBB)



CMGC Strengths and Weaknesses

CMGC Benefits:

- Owner Retains control of Design
- Innovation
- Risk Mitigation
- Improved Constructability
- Cost Certainty
- Flexibility

CMGC Drawbacks:

- 'Negotiating' Price
- Resources necessary in Preconstruction Phase



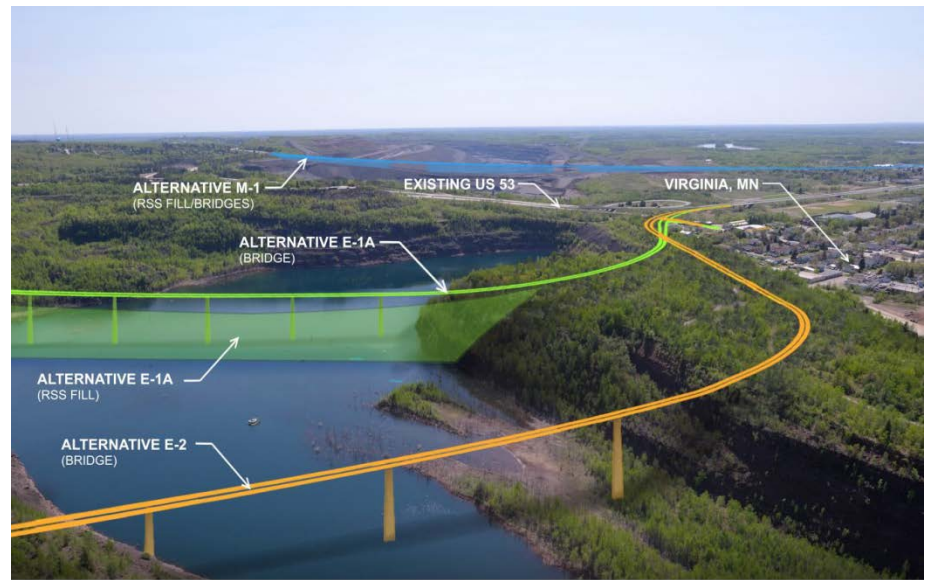
When to consider CMGC

Projects that can benefit from contractor involvement during the preconstruction phase of the project. Examples include projects with:

- ▶ Inherent 3rd Party Risk
- ▶ New Technology/Technical Complexities
- ▶ Complex Staging
- ▶ Schedule/Budget Constraints



Why CMGC for Winona and TH 53?



Delivery Method Selection

- Primary Factors Considered
 - Cost
 - Schedule
 - Project Complexity & Innovation
 - Current Status of Design
 - Staffing/Workforce Availability & Experience
 - Risk Allocation



Delivery Method Selection

- Candidate Projects are Nominated
- Delivery Method Workshop
 - Workshop Model was Developed by Colorado and adapted to MN
 - Evaluation of Factors
 - Panel Discussion and Evaluation
 - Recommendation to Management
 - Recommendation to Stakeholders/Partners



Other Delivery Methods & Bidding

Indefinite Delivery, Indefinite Quantity (IDIQ)

- ▶ Provide for an indefinite quantity of work over a specified time (minimum quantity is established)
- ▶ Provide flexibility in the program, add work as funding becomes available
- ▶ Streamline delivery

A+B Contracting – Design–Bid–Build

- ▶ Cost plus time (value of calendar days bid)

Holding to contract commitments

- ▶ Liquidated damages, lane rental, locked incentive



Winona Bridge CMGC Contractor – Qualifications–based Selection

Request For Qualifications (RFQ) – Shortlist Process

- Project Team/Key Personnel 20 points
 - Concrete Segmental Box Girder Experience 20 points
 - Bridge Rehabilitation Experience 20 points
 - Major River Crossing Experience 20 points
 - Experience with Historic Bridge Standards 20 points
- (note: all 4 teams who submitted were shortlisted)

Request For Proposals

- Project Approach 35 points
- Project Innovations 15 points
- CMGC Design Process 25 points
- Approach to Cost Estimating 25 points



Winona Bridge CMGC Contractor – Qualifications–based Selection, cont

The selected CMGC Contractor was the proposer with the highest total points (100 maximum) from the RFP phase.

Four contractors who submitted SOQs and proposals; RFP Scores:

- Ames – 78.86
- Kraemer – 76.03
- PCL – 72.16
- Lunda - 68.25



TH 53 Realignment CMGC Contractor – Best Value Selection

RFP Qualitative Criteria

- Key Personnel 27 points
- Firm's Technical Capabilities and Experience 20 points
- CMGC Process Management 10 points
- Project Approach 25 points
- Project Innovations 5 points
- Approach to Cost Estimating 10 points

Price Criteria

- Preconstruction Price Proposal 3 points

The selected CMGC Contractor is the proposer with the highest total points between the qualitative and price criteria. 97 points + 3 points = 100 points maximum



TH 53 Realignment CMGC Contractor – Best Value Selection

Six Contractors Proposed; Overall Scores:

- Kiewit 90.32
- Kraemer-Ames 90.05
- Lunda-Parsons 81.34
- Myers-Wadsworth 80.65
- PCL 74.63
- Granite 73.60



Winona Bridge – Cost Estimate Comparisons (in Millions)

| Description | CMGC Contractor's Bid | Owner's Estimate | Engineer's Estimate | Independent Cost Estimate |
|---|-----------------------|------------------|---------------------|---------------------------|
| <i>Work Package 1</i> (Material procurement – bridge piling) | \$2.074 | \$2.164 | \$2.092 | \$2.050 |
| <i>Work Package 2</i> (Project Access) | \$3.452 | \$3.281 | \$2.278 | \$3.228 |
| <i>Work Package 3</i> (New Bridge River Foundations) | \$17.939 | \$18.486 | \$16.699 | \$17.778 |
| <i>Work Package 4</i> (Completion of New Bridge) | \$56.134 | \$57.464 | \$52.683 | \$53.737 |
| <i>Total Work Packages 1–4</i> | \$79.600 | \$81.396 | \$73.752 | \$76.792 |



TH 53 Realignment – Cost Estimate Comparisons (in Millions)

| Description | CMGC Contractor's Bid | Engineer's Estimate | Independent Cost Estimate |
|--|-----------------------|---------------------|---------------------------|
| <i>Work Package 1</i> (Material procurement –bridge girders) | \$17.148 | \$19.361 | \$16.901 |
| <i>Work Package 2</i> (Construction to Relocate TH 53) | \$138.892 | \$127.944 | \$121.102 |
| <i>Total Work Packages 1 and 2</i> | \$156.039 | \$147.305 | \$138.003 |



St. Croix River Bridge Bids (in Millions) – A+B Contracting

| | Engineer's Estimate | Lunda-Ames | St. Croix Constructors | PCL |
|---------------------------------|---------------------|------------|------------------------|-----------|
| Construction Cost | \$324.143 | \$332.456 | \$345.076 | \$409.716 |
| Cost + Time | \$376.943 | \$380.256 | \$392.876 | \$461.716 |
| Value of Time (\$50,000/day) | \$52.800 | \$47.800 | \$47.800 | \$52.000 |
| Calendar Days | 1056 | 956 | 956 | 1040 |





Highway 53 Relocation Project



We all have a stake in **A  B**



TH53 – Project Overview

- ▶ 1960 – TH 53 constructed on private easement
- ▶ 2010
 - MnDOT given notice to vacate the easement in 3 years
 - Start project development process
- ▶ 2012 – Easement extended to May 2017



TH 53 Relocation Project Goals

- ▶ Relocate TH53 from easement area by May 2017
- ▶ New alignment will be on MnDOT Right of Way
- ▶ Expedite environmental and design processes
- ▶ Control costs



Why CMGC for TH 53?

- ▶ Inherent 3rd party risk
 - Concurrent design and EIS process
 - Three alignments in the EIS
 - Designing one of the three before EIS was complete
 - What if EIS selected another alignment?
 - Concurrent Right-of-Way negotiation
 - Negotiations with Cliffs/RGGS went to the end of design
 - What if agreement on right-of-way could not be reached in time?
 - CMGC contracting gave an “off-ramp” in the event a road block. MnDOT would not be forced to proceed with a construction contract.

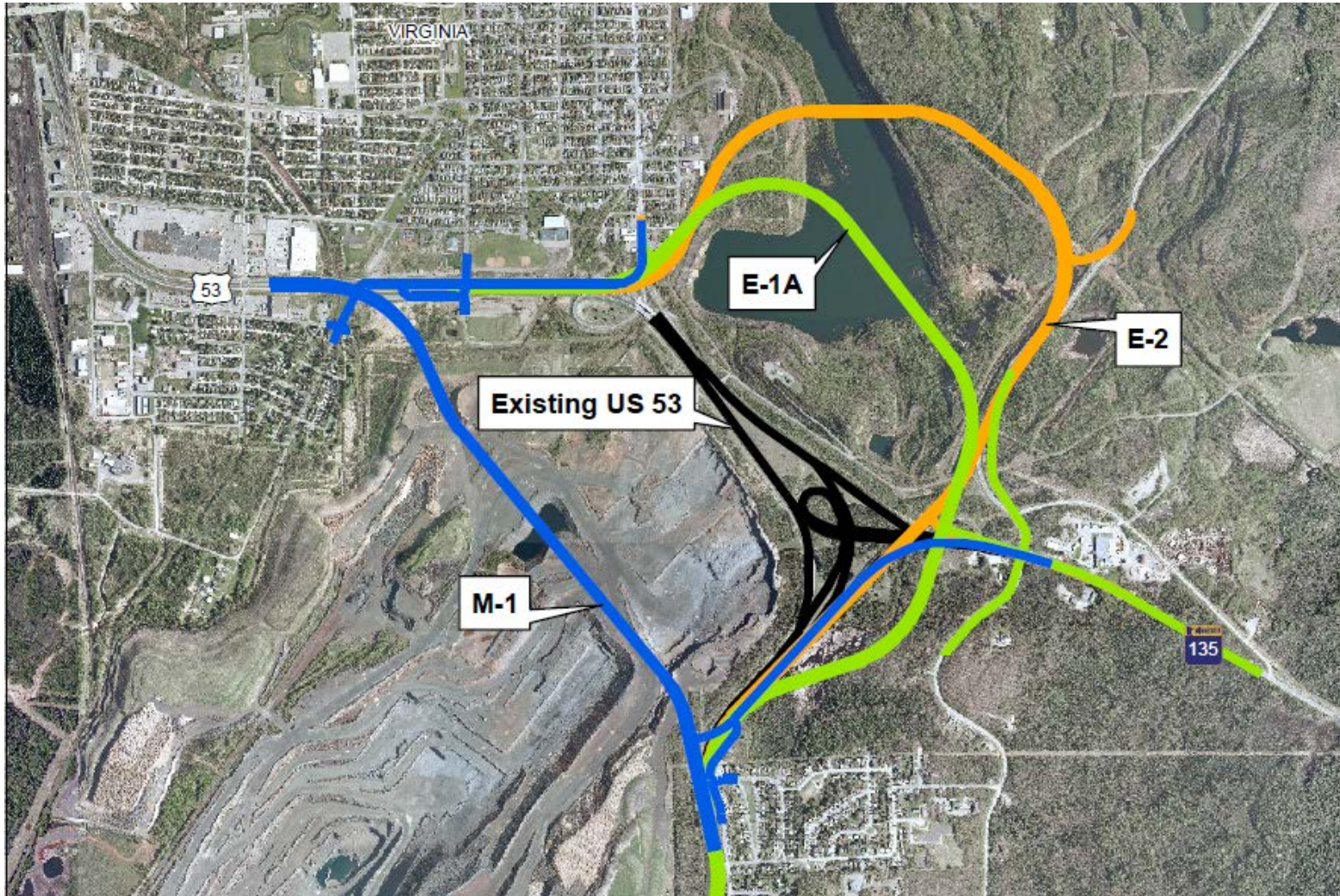


Why CMGC for TH 53?

- ▶ Schedule optimization
 - The TH 53 project has a very condensed schedule; CMGC procurement enhanced schedule certainty
- ▶ Design ownership
 - MnDOT needed to own the design to ensure EIS and right-of-way commitments were honored
 - Design, EIS and right-of-way procurement were all concurrent activities



Final Alignments in DEIS



TH53 Relocation

▶ CMGC

- Best value selection of contractor

▶ Bridge type study

- Preferred type was identified
- Three other types that met the project goals were vetted with design and contractor
- Preferred (Steel Plate Girder) was selected
- Plate girder size not unusual
- Site access and time constraint biggest challenges



TH53 Relocation

- ▶ CMGC process – Kiewit selected
 - Two work packages
 - 1st – Early steel (Bridge girders)
 - 2nd – Remainder of work (Roadway and Bridge)
 - Bids accepted based on comparison to independent estimates
- ▶ No project issues to date
- ▶ Original project completion goal – Nov 2017
 - Traffic on new bridge summer 2017
 - Remove in-place roadway alignment – fall 2017
 - On schedule



TH 53 Schedule Milestones

| Date | Milestone |
|------------|--|
| 2/6/2015 | Parsons design contract executed |
| 2/26/2015 | Design begins |
| 3/9/2015 | Kiewit CM contract executed |
| 4/30/2015 | Early steel plan complete/turned in |
| 6/19/2015 | Early steel contract executed |
| 9/10/2015 | ROD/FEIS complete |
| 10/7/2015 | Plan complete and turned in |
| 10/9/2015 | Plan advertised |
| 10/21/2015 | Bid received |
| 10/26/2015 | DBE cleared |
| 10/26/2015 | Bid accepted |
| 10/29/2015 | Kiewit GC construction contract executed |
| 11/2/2015 | Construction starts |

9 months!



Project Cost and Schedule Overview

- ▶ Total construction cost = \$156 million
- ▶ Using over 10 million pounds of US-made steel
- ▶ Construction timeline = 2015–2017 (24 months)
 - Open to traffic: Late summer 2017
 - Finishing work: Summer of 2018
 - Landscaping contract: 2018





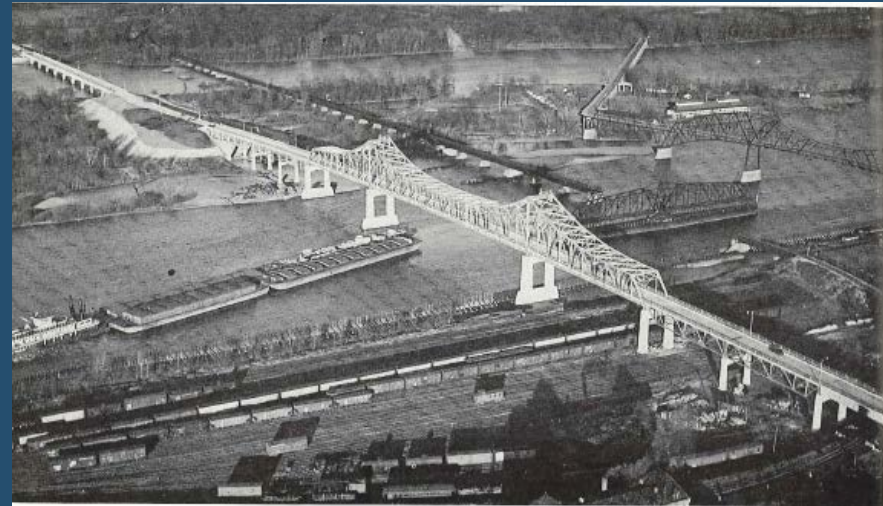
Winona Bridge Project MnDOT's First CMGC Project

We all have a stake in **A  B**



Bridge 5900 Background

- Built in 1942.
- 50-Year Structure - \$1.5 million.
- Fracture Critical.
- Scour Critical.
- Closed in 2008 for 2 weeks for 15 gusset plate repairs.
- Eligible for the National Historic Register.
- Frac Sand shipping concerns.



Bridge 5900 Background





Winona Involvement

June 2012: Winona City and Community Leaders Officially Call for New Two-Lane Span. Gov. Mark Dayton and U.S. Rep. Tim Walz also Voice Support for New Two-Lane Span, Express Frustration at Project's Pace.

Source: Winona Daily News, August 4, 2013





New PM Team Start - Project Goals Developed with City of Winona Leaders

- Start Construction on the New Mississippi River Bridge as Expeditiously as Possible.
- Move Traffic to the New Bridge as Expeditiously as Possible to Minimize the Likelihood of Detours Related to Bridge Maintenance Work on the Existing Structure.
- Keep the River Crossing Open During Construction.
- Understand overall project costs as early as possible.





Project Goals - Responses

- Selected Project for First use of Construction Manager General Contractor (CMGC).
- Moved up Start of Construction:
 - Previously: Construction Starting in 2015.
 - Commitment: July 2014 to March 2015.
 - Open new bridge by end of 2016.
- Our Construction Staging Approach will not Close the River Crossing During Construction.





Winona Bridge CMGC Project

o WHY CMGC?

1. To meet the goal of opening the new bridge by the end of 2016, it was the only procurement method.
 - a. Break Project into Work Packages.
 - b. Overall Master Construction Schedule (fluid).
 - c. Streamline Plan Reviews and Advertisements.
 - d. Coordinate Early with Construction Team.

2. For the Rehabilitation of the Through Truss.
 - a. Recent Significant Bid Overruns on Similar Work.
 - b. Contractor Means and Methods.





CM/GC Benefits

- Allows for collaboration with the contractor but owner retains control of design
- Innovation
- Minimize/Manage Risk
- Improved Constructability
- Schedule Optimization
- Cost Certainty





Winona

- ▶ Bridge type pre-determined
 - Post-tensioned Concrete Box Girder with Prestressed Beams on approaches
 - Included retrofit of inplace truss bridge
 - Level of rehabilitation work based on last inspections and analysis
- ▶ CMGC process – Ames selected
 - Five work packages (maybe 6)
 - First four packages for new bridge construction
 - Work package 5 and 6 are bridge rehab
 - All bids too date were in acceptable range of our estimator values
- ▶ Work package 5 and 6 estimate is higher than planned
 - Team and stakeholders looking for cost saving options



St Croix Crossing



The Lift Bridge



- Built in 1931
- Historic and Unique
- Lift span along with 7 truss spans

Why replace?

- Traffic Congestion
- Bridge Condition
- Pedestrian Safety
- Traffic/Bridge Safety
- Will be future ped/bike facility



St. Croix Crossing Bridge

- ▶ Design Bid Build
 - Low bid selection with A+B (days to build)
 - MN roadway utilized Design Build
 - Wisconsin is cost partner in river bridge
- ▶ Bridge type was pre-determined
 - Stakeholder process
 - Extradosed type
 - 2nd in the USA - Very unique
 - Post-tensioned Concrete Box Girders on MN approach
- ▶ Bridge Project – Three Bidders



St. Croix Crossing Bridge Construction Contracts

- Early Foundation: 2013
 - Edward Kraemer and Sons: \$37 Million
- Superstructure: 2014-2017
 - Lunda/Ames Joint Venture: \$332 Million
- \$640 Million Total Project Cost



St. Croix Crossing Bridge

- ▶ Project delay issues
 - Delay in procuring precast forms
 - Skilled labor shortage
 - Bridge Complexity
 - Tight construction and erection tolerances
 - Longer than anticipated durations
 - River and weather challenges
 - Focus on safety and quality
 - Some operations not suited for night work
- ▶ Project completion timeline
 - Originally – Fall 2016
 - Currently – Fall 2017



Project Schedule (going forward)

2016

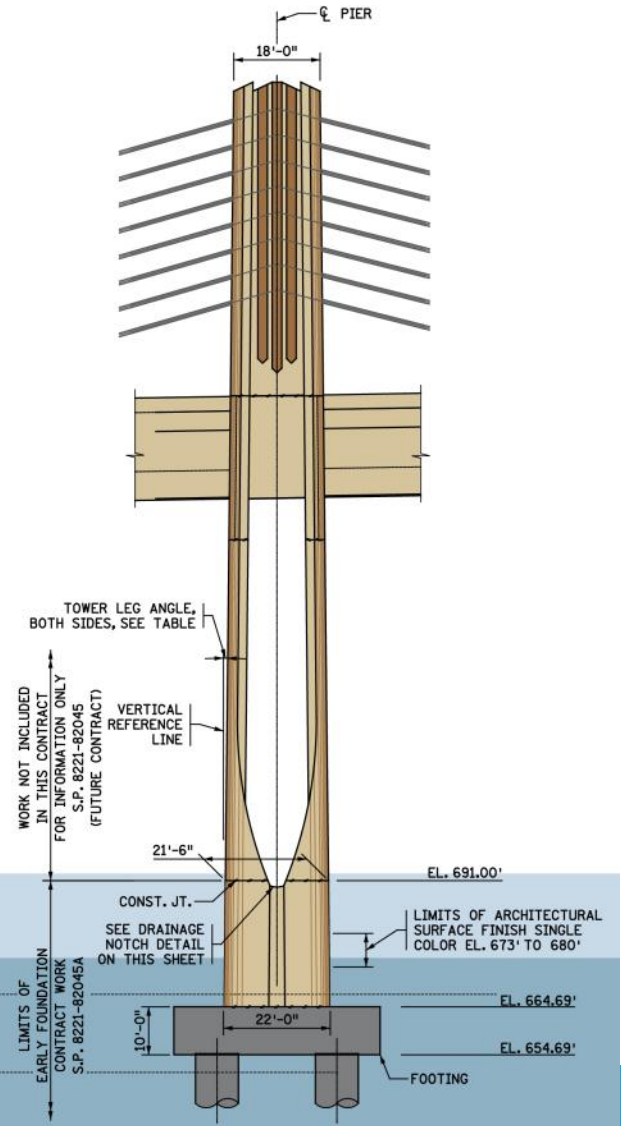
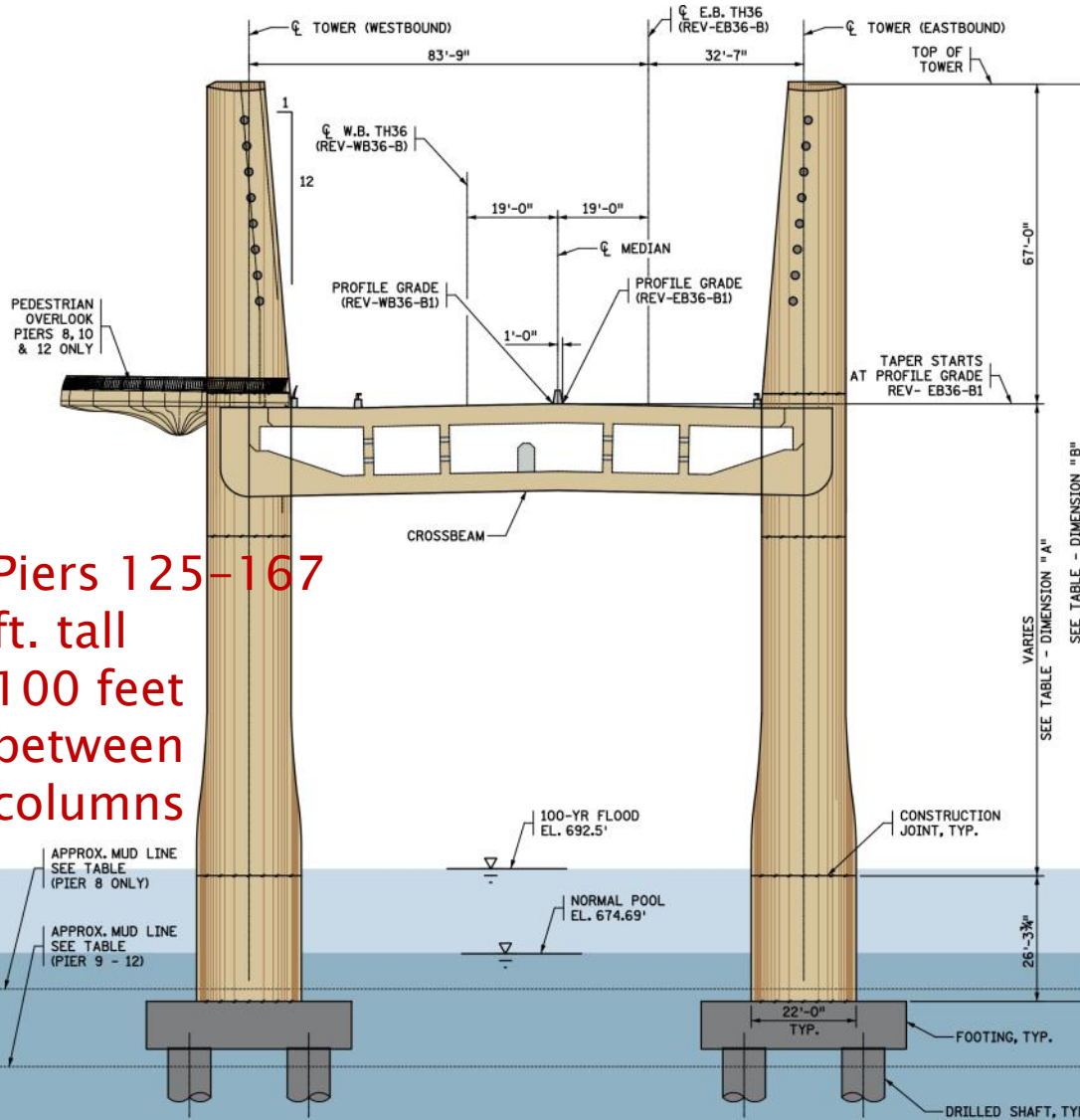
- Continue segment erection
 - Bring in two large cranes
 - Erect segments at all five river piers
- Complete cast-in-place box girder sections (fall)
- Finish precasting segments (late summer)
- Complete approach bridges and ramps

2017

- Complete segment erection and closure pours
- Complete finishing work

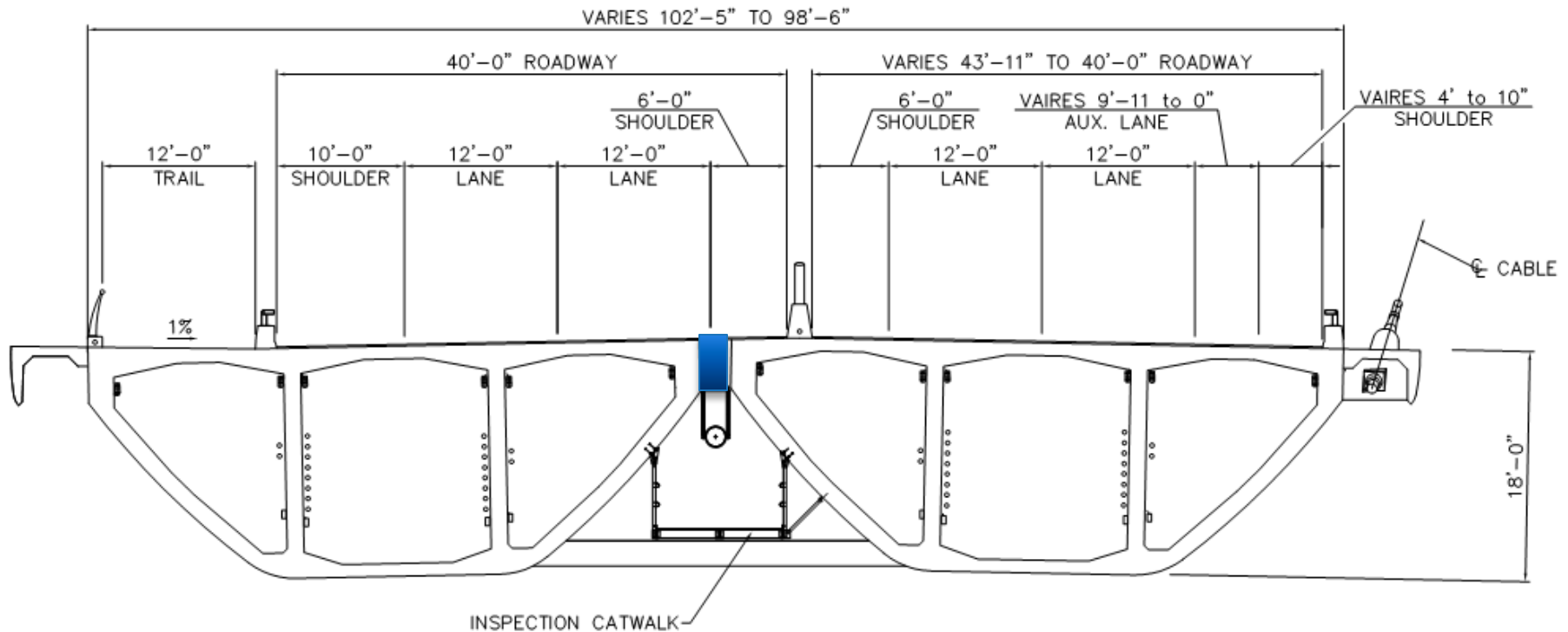


Pier Towers



- Piers 125-167 ft. tall
- 100 feet between columns

Typical Deck Section

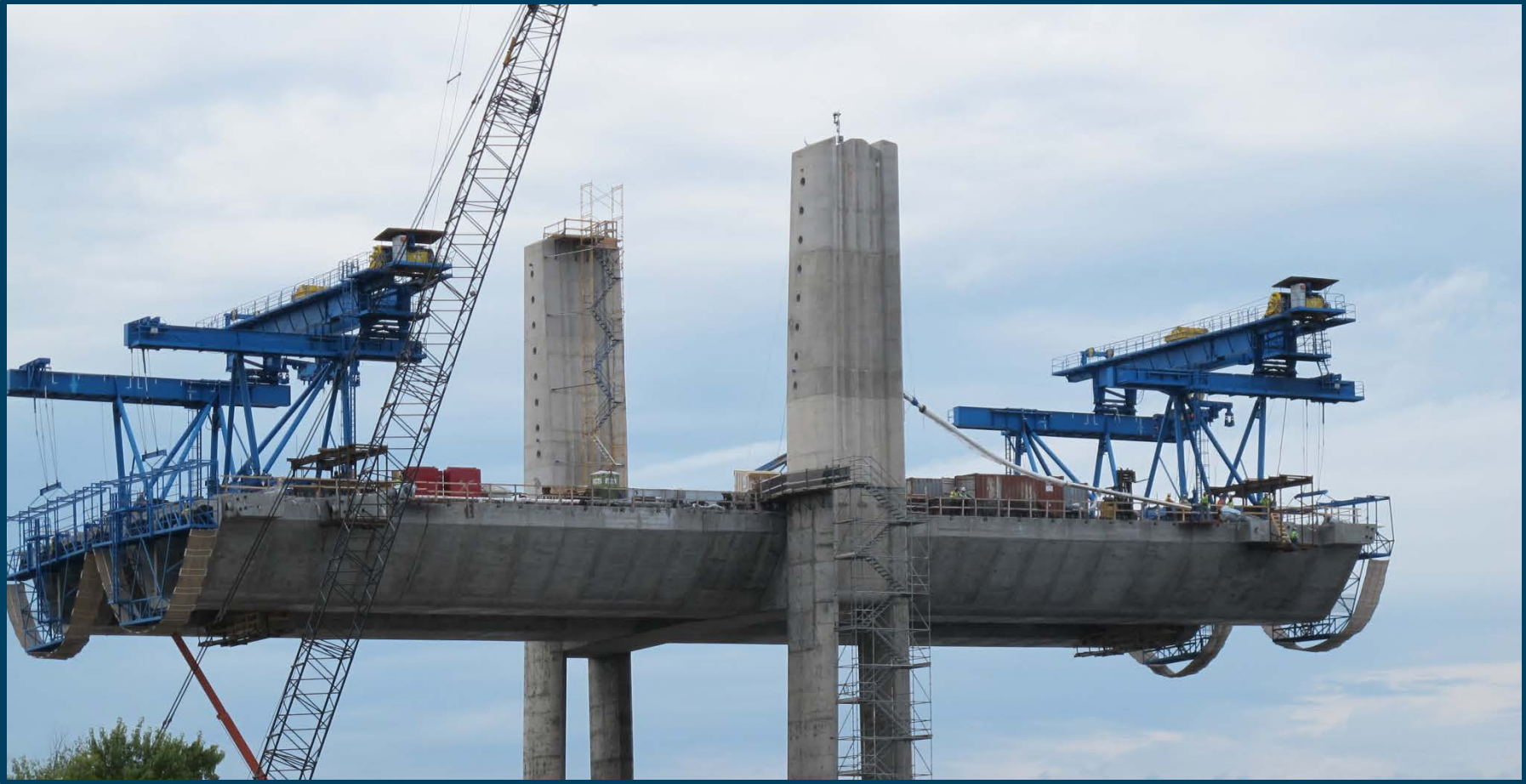


- 18-ft. deep twin three cell box
- Span-to-depth ratio reduced to 33
- CIP closure link



Pier Complete

Segment Erection Partially Complete



Longitudinal Closure Link & Transverse Struts

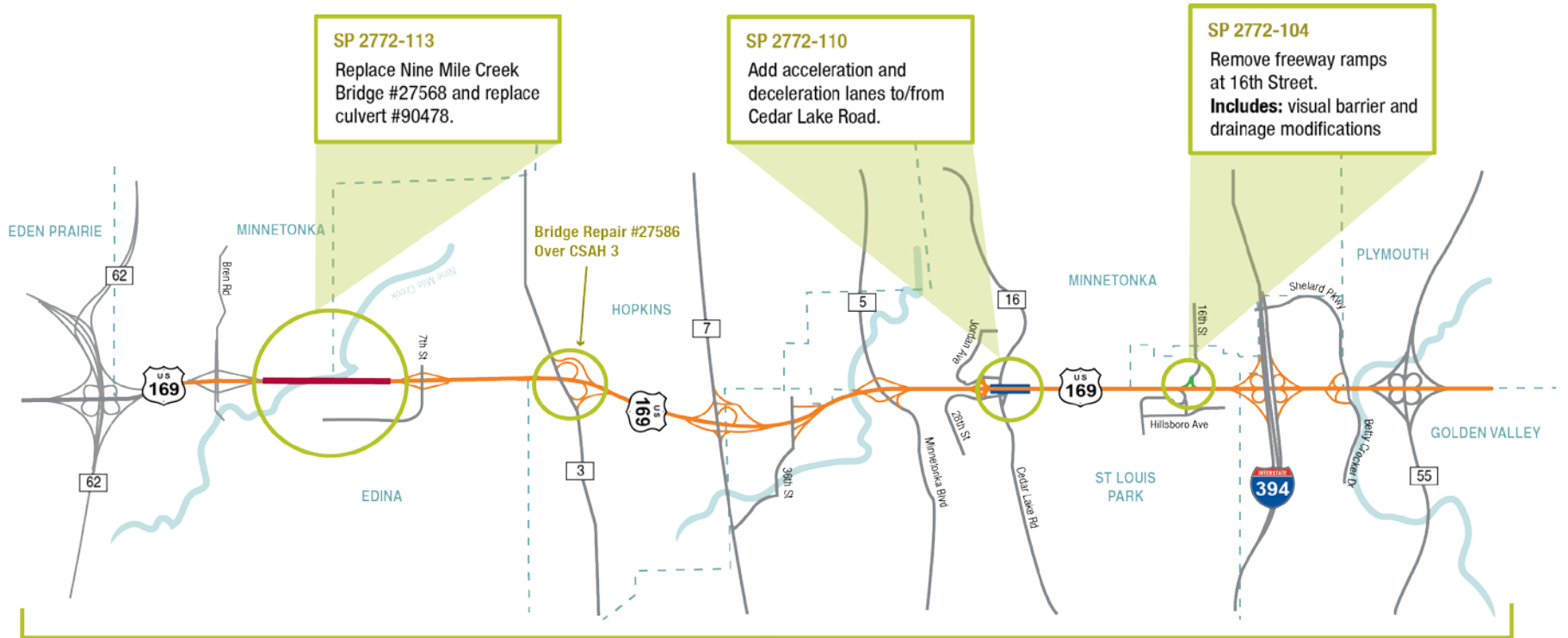


Closure Link between
Eastbound and Westbound
segments

Transverse Strut at each Stay Cable



TH 169 Nine Mile Creek –Location Map



SP 2772-105
Pavement preservation
Includes: CPR; medium mill and overlay; signal, drainage, guardrail, concrete median barrier, RTMC, repair retaining wall, noise wall repair, ADA upgrades; and **bridge repair #27586, over CSAH 3.**



- Road Pavement Rehabilitation
- Nine Mile Creek Bridge Replacement
- Acceleration/Deceleration Lanes
- 16th Street Access Modification



TH 169 over Nine Mile Creek

- ▶ **Project Work** (4 projects tied together)
 - Replace Nine Mile Creek Bridge (Cost Est. = \$60M)
 - Remove Ramps on southbound TH 169 at 16th St. in St. Louis Park & Install Visual Barrier (Cost Est. = \$0.85M)
 - Major Concrete Pavement Repair & Bituminous Mill & Overlay between TH 62 and TH 55 (Cost Est. = \$15M)
 - Add Acceleration & Deceleration Lanes along TH 169 at Cedar Lake Rd. Interchange Ramps (Cost Est. = \$0.77M).

- ▶ **Key Project Goals**
 - Replace TH 169 bridge over Nine Mile Creek by closing TH 169 completely between Bren Rd and 7th St. for one year (Nov. 2016 – Nov. 2017)
 - Perform concrete pavement rehab through remainder of project while keeping open one lane in each direction.



TH 169 over Nine Mile Creek

- ▶ Design Build Delivery Chosen
 - Schedule constraints – most achievable with DB
 - Construction efficiency, unique aspect to design
 - Certain risks (soils, quantities) useful to share with contractors
- ▶ Request for Qualifications – Shortlist Process
 - Four teams were shortlisted:
 - Ames
 - Kiewit
 - Kraemer
 - Lunda



Questions?

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