



COLORADO

Department of Transportation

CDOT Region 1 North Engineering
4670 Holly St., Denver, CO 80216

DATE: May 26, 2022

TO: Stephen Harelson, P.E. Chief Engineer
Matthew Pacheco, P.E. Alternative Delivery Program Manager

FROM: Adam Parks, P.E. Resident Engineer, Region 1 North Program

SUBJECT: Design Decision, Alternate Project Delivery Method Recommendation Project
No. FBR 2706-044 (24947/24527), I-270 Critical Bridge Replacements

BACKGROUND:

The I-270 corridor provides a vital connection from I-70 to I-25. Approximately 100,000 vehicles per day utilize this corridor to bypass the friction of downtown Denver to move goods, services, information, and people from the eastern edge of the city to north of the city. On the I-270 corridor, there are eight (8) structures within a one mile stretch between York St. and Vasquez Blvd. that have been the source of many challenges to the mission of this corridor. These structures have been in service for over 50 years and have been requiring frequent emergency repairs. Over 300 emergency repairs have been performed to the bridges along this corridor since 2006. These deck repairs always require significant lane closures affecting trip reliability within this corridor. This corridor lacks redundancy, and any detours during these emergency repairs require use of local roads or significant out-of-direction movements.

Bridge inspections rated 6 of the 8 bridges in this one-mile segment as 'poor', which made them eligible for Bridge & Tunnel Enterprise (BTE) funding for full replacement. CDOT and BTE recognize that any further investment into keeping these 8 bridges in service will have diminishing return, therefore the next step should be full replacement. CDOT Region 1 North Engineering has begun to advance the design phase to pursue replacement of these bridges as soon as possible. Full funding for the Critical Bridge Replacements project is available from sources including BTE and Senate Bill 17-267. A subsequent future project will complete the I-270 EA proposed action (to be determined) throughout the I-270 corridor.

CDOT Region 1 North Engineering convened a team of agency subject matter experts, and project team members for an interactive workshop to discuss and evaluate various delivery methods for the "I-270 Critical Bridges Replacement Project" using CDOT's Project Delivery Selection Matrix (PDSM). The workshop was held over the course of three days (February 9, 11, and 15, 2022), and approximately 9 hours total was spent discussing the opportunities and obstacles each delivery method brought to the table, and how those characteristics can be leveraged to pursue the goals of the I-270 Critical Bridges Scope.

ANALYSIS:

The Project Team first discussed the project attributes, goals, constraints, and risks. Design-Bid-Build (DBB), Design-Build (DB), and Construction Manager/General Contractor (CM/GC) methods were then discussed in

detail. Each participant provided input as the opportunities and obstacles of each delivery method and those were documented in the PDSM.

It should be noted that the Progressive Design Build (PDB) delivery method was not evaluated in the workshop but was discussed separately by members of the project team. This delivery method would be a new type of contracting at CDOT requiring coordination and approval from the office of the Attorney General and the State Controller. The resulting schedule uncertainty and risk would not meet project delivery goals. After all comments were recorded, the project team collectively assigned a rating to each method for the primary factors listed in the PDSM. The summary table was then populated with the ratings for comparison and selection of the most appropriate delivery method for this project. Please refer to the attached I-270 PDSM for the summary table and detailed matrix evaluations.

The project faces scope and schedule risks due to the features underneath bridges requiring “third-party” agreements. Four of the eight bridges to be replaced span over Class 1 Railroads (BNSF Railway and Union Pacific Railroad) which will require complicated, lengthy design approval processes and negotiated clearances. Two bridges spanning over the historic Farmers Reservoir and Irrigation Company (FRICO) Burlington Ditch will also require similar design approvals and clearance. Two bridges span over the S. Platte River and adjacent Greenway Trail which must remain open to users throughout construction using its existing alignment, a temporary detour, or the future trail alignment. Maintenance of traffic must be optimized during all phases of bridge replacement with a goal of reducing the number of full freeway closures required.

The project team recognized several advantages offered by alternative delivery methods when compared to traditional Design-Bid-Build (DBB). An alternative delivery method with an accelerated design schedule can accommodate an earlier construction start date reducing the number of emergency repairs required over the remaining service life of the existing bridges. Alternative contracting also results in contractor input and consultation during the design phase reducing the risk of post-design scope changes and schedule delays stemming from contractor site access, phasing considerations and general constructability issues.

Key advantages typically offered by the Design-Build (D-B) delivery method were diminished by the prevalence of third-party agreement requirements controlling most of the project scope (Railroads and the FRICO Ditch Company). The project schedule critical path includes railroad and ditch review and approval at 30% design, final design, and construction. If final bridge designs for approvals are advanced in parallel to a lengthy Design-Build procurement process, the innovation advantages typically offered by D-B competition would be diminished for all but a small remaining portion of the project scope. If overpass design changes are then proposed by the selected Design-Build team after procurement, the lengthy overpass design and approval processes may need to restart with significant delays to the schedule.

The CM/GC delivery method provides CDOT the earliest opportunity to secure a qualified designer and construction manager with the needed expertise for the Project and provides early and continuous collaboration between the owner, designer, construction manager, and stakeholders throughout all Project phases. In addition, the construction manager’s early and continuous input into design may identify additional or previously unknown risks while providing further consideration of opportunities for innovation, feasible mitigation strategies and collaborative scope development.

RECOMMENDATION:

The project team recommends the CM/GC Project Delivery Method. The expected opportunities offered by CM/GC can be leveraged to meet the unique challenges of this project. CM/GC allows CDOT to manage and mitigate risk using shared risk pools and the influence of an integrated project team that includes participation from CDOT, the designer and the construction manager. CDOT can negotiate and coordinate risk elements by assigning risk to the party best suited to manage the risk during design and construction.

Justification includes:

- Advantage of early construction manager input on complex project challenges:
 - Railroads and Ditch Company approvals for overpass designs and construction
 - Constructability and site access planning
 - Maintenance of Traffic planning for each bridge construction phase
 - Accelerated Bridge Construction (ABC) opportunities
- Acceleration of pre-construction schedule
- Project team collaboration can result in early cost certainty
- Collaborative design process, guided by CDOT, can pursue a quality and efficient project
- Through strong CDOT management and project team collaboration, risks can be identified, quantified, and mitigated

In accordance with the accountability and transparency requirements within Senate Bill 21-260, a Public/Industry Meeting was held on May 25, 2022, to discuss the recommendation of CM/GC for this project. A summary of the I-270 Critical Bridge Replacements Project Alternative Delivery Public/Industry Meeting is attached to this memorandum.

I concur:.

Matthew Pacheco

Matthew Pacheco, P.E. Alternative Delivery Program Manager

Stephen Harelson

Stephen Harelson (May 31, 2022 17:11 MDT)

Stephen Harelson, P.E. Chief Engineer

Attachments:

- 1) I-270 Critical Bridge Replacements Project Delivery Selection Matrix (PDSM Workshop)
- 2) Summary of the I-270 Critical Bridge Replacements Alternative Delivery Public/Industry Meeting

Cc: Jessica Myklebust, Region 1 Transportation Director
Patrick Holinda, P.E. Bridge and Tunnel Enterprise Program Manager
Andrew Stratton, P.E. Region 1 Deputy Director of Program Delivery
Jan Chang, P.E. Region 1 Acting North Program Engineer