COLORADO
Department of Transportation

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DATE: August 19th, 2022

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

FROM: Andrew Knapp, P.E. Region 3 Glenwood Springs Resident Engineer

SUBJECT: Alternate Project Delivery Method Recommendation
Project 24493, FBR 0063-066, US6D F-06-A Elk Creek New Castle Project

BACKGROUND:

On June 15, 2022, CDOT held a Project Delivery Selection Matrix (PDSM) workshop, to discuss the replacement of the US 6 Bridge over Elk Creek, within the town limits of New Castle, Colorado.

This project is replacing and existing steel arch structure over Elk Creek, with a proposed bridge that will include updates to the current design standards. There is a detached pedestrian bridge that parallels the existing structure that will also be replaced as part of the scope of this project. The location of the pedestrian bridge will remain on the north side of the proposed structure to synchronize with existing pedestrian facilites and planned future regional trail connectivity. The configuration of the pedestrian structure whether it remains detached or becomes attached to the proposed bridge will need to be explored as part of the project development. The proposed solution for the pedestrian bridge will need to incoporate current Americans with Disabilities Act standards.

The location of this structure connects several essential and critical facilities and services such as Elk Creek Elementary school, Coal Ridge High School and the Town of New Castle Maintenance and Police Facility, to the general population of New Castle. The US 6 corridor serves as the main thoroughfare through the town of New Castle, provides immediate redundancy for Interstate-70 any detour necessary for a full closure would require traffic to be redirected on to Interstate 70, which significantly will increase travel time. Utility coordination will be challenging for this project as there exists several utilities mounted to the structure itself, as well as overhead powerlines that will make crane operations difficult. The Right of Way (ROW) for US 6 at the existing structure is very constrained.

The project spans Elk Creek which is a managed flood plain that will require coordination with the United States Army Corp of Engineers, and Federal Emergency Management Agency, during both design and construction.

ANALYSIS:

Project Complexity and Innovation

When discussing the opportunities and obstacles specific to the topic of “Project Complexity and Innovation”, several key characteristics of this project were distinguishing factors in choosing a delivery method. The needs to develop a de-construction plan of the existing structure, tight existing ROW envelope, minimizing the impact to the traveling public, and maintaining access to the facilities on the east bank of Elk Creek, are driving forces that would benefit from having early input from a contractor.

The ability to have immediate contractor feed back when developing the scope of this project will assist in determining the necessary ROW footprint and any necessary accommodations for cranes, and other equipment necessary to complete the

de-construction and construction successfully. The exploration of Accelerated Bridge Construction (ABC) techniques, that may assist the project team to meet the desired goal of *"Minimize impacts to the traveling public" and "Maintaining access to the east bank of Elk Creek"* are also enhanced by having a contractor on board to ensure a more complete scope. A contractor may also assist the team to understand the cost of rehabilitation of the old structure and prepare it for potential re-use applications.

Several opportunities that this project presents assisted the project team when trying to determine how to receive the input from a contractor. The project intensity of design-build, would make the coordination with third party stakeholders such as United States Army Corp of Engineers (USACE), Utilities, and ROW very challenging and could adversley effect the success of this project. Acquiring easements and necessary ROW acquisition would be very difficult to achieve in such a way that critical-path would remain clear. Another key deciding factor is the desire for CDOT Staff Bridge to remain the designer for this project. There are several benefits to CDOT Staff Bridge maintaining the design role on this project. The first being the experience gained, not just designing the bridge, but potentially designing the de-construction, and any ABC techniques that may be used for this project. The opportunity for CDOT's own staff to gain this experience does not come on a regular basis, so it is very important for CDOT to take advantage when it does occur.

In the discussion of "Project Complexity and Innovation" this project is a complex project, and in that complexity there is a greater than average opportunity for innovation. This project also presents opportunity for CDOT to use the unique characteristics of this project for staff development, and the complex coordination with third party stakeholders to acquire ROW and re-locate utilities. These characteristic of the project can be leveraged best by the Contrstruction Manager/General Contractor (CM/GC) project delivery model, and therefore was seen to be the most appropriate.

Delivery Schedule

There is opportunity for this project to benefit from a delivery model that allows the paths of schedule elements to be put in parallel. Not knowing the ultimate solution of what the pedestrian bridge may look like, the opportunity to procure long lead time items such as: steel structures, precast elements that may be used in ABC, or potentially to secure equipment necessary for ABC would be a benefit.

The opportunity to draw upon the experience of a contractor when developing the schedule for innovative items such as de-construction of a steel structure and ABC, proves to be a great opportunity for this project. Schedule certainty during construction would be a great tool to assist in the coordination with the impacted stakeholders.

There is a benefit to having a contractor's input on items that may be affected by supply chain delays, these items can be re-designed to minimize the need for them, or the work can be re-sequenced to incorporate the delay, which contributes to schedule certainty.

The opportunity to mobilize earlier prior to completion of design and begin construction on elements that will encourage an optimized schedule would benefit the US 6 over Elk Creek project. Schedule certainty and efficiency during construction, especially during time of full closure are necessary to ensure that the impact to the public and emergency services are minimized.

This project is not extraordinarily constrained when it comes to schedule and would not benefit from a competitive procurement that incorporates schedule into the evaluation. If CDOT were to accept an overly aggressive schedule, there is the potential that CDOT's commitments would become critical path elements.

In consideration of the discussion of Delivery Schedule; the opportunities that CM/GC can leverage, would significantly benefit this projects pursuit of the key goals. Therefore CM/GC is seen to be the most appropriate.

Project Cost

For the "*Project Cost Considerations"* there are several major contributors that guided the project management team to a conclusion.

The current volatility of the market would require a contractor to include a large contingency to account for the potential fluctuations that may occur in the costs of materials, and the cost of commodities. The portion of a guaranteed maximum price that is contingency does not translate to value for CDOT, contingency is managed by the Design-Build team and is

used to keep the project on track if certain risks, such as market volatility, manifest. If the risks never manifest, the contingency is kept by the Design-Build team. This is an obstacle that significantly limits the possibility of success for Design-Build.

Design-Bid-Build offered some opportunity due to the competitive bidding process, encouraging the lowest initial project cost. However, estimating the cost for the project for a Design-Bid-Build uses historical data to put cost to the bid schedule established by the designer. This makes it difficult for CDOT, in a more volatile market, to predict the initial project cost of the project. Additionally, the risk for error or omission in the plan set for a design that our design resources are unfamiliar with are much higher for this project, which would lead to a higher risk that cost growth will affect the project negatively, which significantly hinders the possibility of success for Design-Bid-Build.

The opportunity to negotiate a price based on actual sub-contractor/supplier quotes, is significant strength in consideration of the current market environment. Additionally, the bottoms up cost estimating allows CDOT to explore alternatives using more accurate data. This is a significant strength when exploring the unique characteristics of this project specifically in the areas of the deconstruction of the existing steel structure, and the exploration of the ABC techniques.

Therefore, regarding *"Project Cost Considerations"* the most appropriate delivery method based on the discussion captured above is CM/GC.

Level of Design

As established in the discussion about complexity and innovation, there is a significant benefit to having a contractor's input on the design. For CDOT to complete the design to 100% prior to advertisement, for a scope of which they have limited experience, specifically in the areas of :de-construction of a steel structure, temporary bridges, and ABC construction techniques would expose CDOT liability for error and omission due to the sufficiency warranty implied at advertisement.

Once the benefits of a contractor's input have been established, other inputs can be viewed through the delivery methods that offer the opportunity to engage in early contractor input.

If Design-Build were to be seen as the most appropriate for this project, the procurement would select a contractor and designer as a team, which would eliminate the opportunity for CDOT to design the project, thus eliminating the opportunity for CDOT to gain valuable experience that could benefit the program in the future. The level of design necessary for a Design-Build is typically, approximated at 30%. To develop the project to this level would require the CDOT Bridge Unit to make several key assumptions that would need to be revisited and potentially re-designed which would decrease the efficiency of the overall delivery of the project. Because CDOT would not be able to address the concerns of the impacted stakeholders, based off a preliminary design effort, the negotiation and coordination of with the impacted stakeholders would need to occur during the Design-Build teams' development of the project, and on their schedule. The intensity of the project for a Design-Build would also add undue pressure to the negotiation of multiple ROW acquisitions, multiple utility relocations, and several critical environmental clearances. The intensity of the project would put the risk of CDOT's coordination with impacted stakeholders such as Federal Emergency Management Agency (FEMA) and USACE, on the critical path as well.

CM/GC incorporates the contractor as a consultant to the design and would allow CDOT to maintain the design responsibility of the project. CM/GC would also progress at a more manageable pace, which would not result in a reduction of negotiation leverage with the impacted stakeholders.

The results of this discussion led the workshop participants to conclude that when discussing the level of design necessary for procurement that the most appropriate delivery method for this specific project would be CM/GC.

Risk Assessment

As discussed, there are many risks that need to be identified, assessed/analyzed; and mitigated and planned for, to make this project a success. This project would benefit more significantly from a delivery method that can share the risks, and that can more accurately represent the risks using quantified risk pools rather than qualitative tracking techniques and force accounts. Having a contractor's input provides the opportunity to develop a more accurate representation of the scope of the project, as well as a more refined way to mitigate risk than carrying large contingencies that do not add value to the project. It is the conclusion of the workshop that the delivery method that best can be leveraged to manage the risk profile of this project is CM/GC.

RECOMMENDATION:

Based upon the findings of the Region 3 Project Management Team, and in consultation with the Bridge and Tunnel Enterprise, and the CDOT's Alternative Delivery Program, it is the recommended that the most appropriate delivery method for this project is CM/GC. As discussed in this memo CM/GC allows opportunity to gain a contractor's input, while also allowing CDOT to continue as the design partner in the development of the project. Other opportunities that prove to be significant strengths include the ability to react to uncertain market conditions, and to provide a more nuanced risk management techniques, that can be leveraged to position the project for success.

The Region 3 Project Management Team is requesting concurrence with our recommendation to use CM/GC to deliver the US6D F-06-A Elk Creek New Castle Project.

Respectfully submitted for consideration of concurrence, If you would like to meet and discuss any of this memo in detail please do not hesitate to reach out to

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I concur:

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