

## Project Delivery Selection Workshop Summary

Workshop Summary	
<b>Project Name:</b>	I-70 Floyd Hill to Veterans Memorial Tunnels
<b>Workshop Dates:</b>	8/8/18 and 8/14/18 with Revision Dates 4/2/2020 and 7/23/20
<b>Workshop Location:</b>	425A Corporate Circle, Golden CO
<b>Facilitator:</b>	David Wells, Colorado Department of Transportation
<b>Delivery Method Selected:</b>	CMGC

Workshop Participants	
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## Project Delivery Description

Project Attributes
<b>Project Name:</b> I-70 Floyd Hill to Veterans Memorial Tunnels
<b>Location:</b> Interstate 70 between Exits 241 and 248. The Project is located in the I-70 Corridor east of Idaho Springs.
<b>Estimated Budget:</b> \$600M - \$700M
<b>Estimated Project Delivery Period:</b> NEPA/20% Design (Winter 2017 – Summer/Fall 2021); Final Design (Winter 2021 – Winter 2022); Construction (Spring 2023 – Fall 2026)
<b>Required Delivery Date (if applicable):</b> TBD – dependent on funding
<b>Source(s) of Project Funding:</b> 100M SB 267/ Approx. 250M HPTE and BE / 250-350M Funding Gap TBD
<b>Project Corridor:</b> Interstate 70 West
<b>Major Features of Work – pavement, bridge, sound barriers, etc.:</b> <ul style="list-style-type: none"> <li>• Provides a westbound third lane from the top of Floyd Hill through the Veterans Memorial Tunnel (VMT)</li> <li>• Safety and geometric improvements to eastbound and westbound I-70 to improve design speed to 55 mph</li> <li>• Different alignments for both westbound and eastbound I-70 between approximately the Veterans Memorial Tunnels and Exit 244 (U.S. Highway 6 [US 6]).</li> <li>• Potential changes to interchanges to provide optimal access to and from I-70.</li> <li>• Potential changes to intersection design/control type at key locations (ramp junctions, intersections along U.S. Highway 40 [US 40], and some intersection locations).</li> <li>• Addition of a frontage road and greenway between Exit 243 (Hidden Valley) and Exit 244 (US 6).</li> <li>• Potential wildlife crossings throughout project.</li> </ul>
<b>Major Schedule Milestones:</b> <ul style="list-style-type: none"> <li>• 20% Design Completion – Summer/Fall 2021</li> <li>• Additional Funding Identification – Summer 2021</li> <li>• NEPA Completion – Summer 2021</li> <li>• Final Design – 2022</li> <li>• Construction Commencement – Spring 2023</li> </ul>
<b>Major Project Stakeholders:</b> <ul style="list-style-type: none"> <li>• City of Black Hawk</li> <li>• City of Central City</li> <li>• City of Idaho Springs</li> <li>• Clear Creek Bikeway User Group</li> <li>• Clear Creek County</li> <li>• Clear Creek Greenway Authority</li> <li>• Clear Creek Watershed Foundation</li> <li>• Colorado Department of Public Health and Environment – Water Quality Control Division</li> <li>• Colorado Department of Transportation</li> <li>• Colorado Motor Carriers Association</li> <li>• Colorado Parks and Wildlife</li> <li>• Colorado Trout Unlimited</li> <li>• Denver Regional Council of Governments</li> <li>• Federal Highway Administration</li> </ul>

- Floyd Hill Community
- Gilpin County
- I-70 Coalition
- Jefferson County
- Law Enforcement/Emergency Services
- State Historic Preservation Office
- Summit County
- Town of Empire
- US Army Corps of Engineers
- US Environmental Protection Agency
- US Fish and Wildlife Service
- US Forest Service

**Major General Obstacles:**

- Securing full project funding

**Major Obstacles with Right of Way, Utilities, and/or Environmental Approvals:**

- None anticipated

**Major Obstacles during Construction Phase:**

- Maintenance of Traffic during construction
- Specialized work (tunnels, viaduct bridges, rock cuts)

**Safety Issues:**

- Design Considerations: Substandard interchanges, Substandard curves (<55 mph)
- Construction: Known landslides in area

**Sustainable Design and Construction Requirements:**

- TBD

## Project Delivery Goals

### Project-Specific Goals

**Goal #1: IMPROVED I-70 SAFETY, MOBILITY AND OPERATIONS**

Improve the safety, mobility, and operational characteristics of the I-70 corridor by replacing aging infrastructure, minimizing substandard design and atypical interchanges, achieving a 55 mile per hour (mph) design speed where feasible, and maximizing travel time reliability throughout the corridor. Improve emergency response times and provide redundant access for local residents. Maximize safety of workers, traveling public, residents, and business owners during construction.

**Goal #2: STAKEHOLDER COMMITMENT, PARTNERSHIP, AND ENVIRONMENTAL STEWARDSHIP**

Facilitate and foster collaboration, communication, and partnerships among all stakeholders throughout the five life cycle phases of the CDOT project process according to the I-70 Mountain Corridor Context Sensitive Solutions (CSS) process as outlined in Appendix A of the Final Programmatic Environmental Impact Statement (PEIS). Maintain the design guidance developed through CSS in all phases. Maximize opportunities for shared-uses within and adjacent to the I-70 Corridor by implementing innovative methods for environmental stewardship and community supported enhancements including wildlife mitigation, frontage road access to amenities, and the Clear Creek Greenway from Veterans Memorial Tunnels to US 6. Adhere to all environmental compliance requirements, including those documented in the I-70 Mountain Corridor PEIS/Record of Decision commitments and stakeholder agreements while minimizing environmental impacts including aesthetics.

**Goal #3: MINIMIZE CONSTRUCTION IMPACTS**

Minimize inconvenience to the traveling public, residents, and business owners during construction. Accommodate and maintain freight and interstate travel providing motorists access to recreation and jobs along the corridor. Provide accurate, meaningful, and timely communication to minimize construction impacts and create a reliable communication system for disseminating information.

**Goal #4: FISCAL RESPONSIBILITY, RESOURCES, and PROJECT SCOPE**

Optimize the project scope with the available financial resources. Clearly define project risks to achieve cost certainty as soon as possible to fully understand project costs and define the project scope. Provide packaging and phasing flexibility with currently available financial resources while still committing to build the entire project.

**Goal #5: SCHEDULE**

Implement the final design and commence construction so that the project can be open to traffic as soon as possible to address the deteriorating bridge and economic impacts to the State from congestion on I-70. Achieve a 2022 construction commencement to capitalize on project momentum and work to date as well as to minimize substantial inflation costs of a project of this magnitude.

## Project Delivery Constraints

General Constraints
<p><b>Source of Funding:</b></p> <ul style="list-style-type: none"> <li>• 100M SB 267 with potential future year funding</li> <li>• Bridge Enterprise</li> <li>• HPTE</li> <li>• TBD</li> <li>• Grants</li> </ul>
<p><b>Schedule constraints:</b></p> <ul style="list-style-type: none"> <li>• NEPA Completion April 2021</li> <li>• Construction commencement 2022</li> </ul>
<p><b>Federal, state, and local laws:</b></p> <ul style="list-style-type: none"> <li>• 1041</li> <li>• 404 Permit</li> </ul>
<p><b>Third party agreements with railroads, ROW, etc.:</b></p> <ul style="list-style-type: none"> <li>• ROW Acquisition</li> </ul>
Project Delivery Specific Constraints
<p><b>Project delivery constraint #1:</b> Design parameters and major concept changes must be endorsed through CSS Process</p>
<p><b>Project delivery constraint #2:</b> Design changes late in project development need to go through a NEPA Reevaluation process</p>
<p><b>Project delivery constraint #3:</b> Replacement of structurally deficient bridge located on westbound I-70 at the bottom of Floyd Hill</p>
<p><b>Project delivery constraint #4:</b> Schedule / Construction Seasons</p>
<p><b>Additional Project delivery constraints:</b> Unknown source of construction funding leading to unknown project phasing and schedule requirements.</p>

# Project Risks

## Identified Project Risks

### PROJECT MANAGEMENT

- Construction funding has not been fully identified.
- Additional scope requests throughout life of project
- Scope responsibilities between CDOT and Stakeholders need to be fully defined
- Coordination with other active projects on I-70 Corridor
- Access impacts to residents, recreation and businesses along corridor
- Accuracy of current cost estimate due to market price variations and scope changes
- CDOT cannot comply with all stakeholder requests within project limits due to wide variety of shared-use requests within small area
- Experience of staff with specific delivery methods
- Schedule commitments tied to funding
- Project delivery uncertainty – political influence on project delivery methodology
- CSS considerations during development
- CSS considerations during administration

### FINAL DESIGN

- Traffic Modeling cannot appropriately account for latent demand/upcoming technology
- Fluidity of design impacts ROW needs as design progresses
- Approval of NEPA delayed
- 1041 Permitting with Clear Creek County and Idaho Springs
- Design Optimization related cost savings from contractor modifications/efficiencies
- Changes in regulations codes and standards during project development
- Aesthetic requirements create additional costs
- Expertise in tunnel or viaduct design
- Geotechnical conditions unknown during design
- Re-Evaluation process due to major design changes
- Updates to Interchange Approval Request (IAR) delays schedule

### CONSTRUCTION

- Unexpected Rock Conditions not identified in geotechnical baseline
- Utility relocations have seasonal restrictions.
- Maintaining large construction vehicles access during construction (e.g. tunnel excavation or viaduct construction)
- Maintenance of Traffic during construction
- Limited Contractor, Subcontractor and DBE firms available
- Discover unknown site conditions during construction (ex: contaminated water, mine shafts, hazardous materials, etc.)
- CSS and stakeholder implementation during construction
- Muck and rock disposal

## Project Delivery Selection Summary

<b>PROJECT DELIVERY METHOD OPPORTUNITY/OBSTACLE SUMMARY</b>			
	<b>DBB</b>	<b>CMGC</b>	<b>DB</b>
<b>Primary Selection Factors</b>			
1. Project Complexity & Innovation	-	++	+
2. Project Delivery Schedule	-	++	+
3. Project Cost Considerations	+	+	++
4. Level of Design	+	+	+
5. Risk Assessment	-	++	-
<b>Secondary Selection Factors</b>			
6. Staff Experience/Availability (Agency)	<b>NA</b>	<b>Pass</b>	<b>NA</b>
7. Level of Oversight and Control	<b>NA</b>	<b>Pass</b>	<b>NA</b>
8. Competition and Contractor Experience	<b>NA</b>	<b>Pass</b>	<b>NA</b>

<b>Rating Key</b>	
<b>++</b>	Most appropriate delivery method
<b>+</b>	Appropriate delivery method
<b>-</b>	Least appropriate delivery method
<b>X</b>	Fatal Flaw (discontinue evaluation of this method)
<b>NA</b>	Factor not applicable or not relevant to the selection

# Project Delivery Selection Summary Conclusions and Comments

## **PDSM Update: 4/2/2020**

The Floyd Hill Project team and subject matter experts conducted a Preliminary Project Delivery Selection Matrix (PDSM) in August of 2018. It was revisited and updated in April of 2020 based on current project status and context. The recommendation of Construction Manager/General Contractor (CMGC) did not change but the following is an updated summary of the PDSM Recommendation.

### **Project Summary and Conclusions:**

The CMGC delivery method is recommended as the most appropriate delivery method for the I-70 Floyd Hill to Veterans Memorial Tunnels Project (Project). CMGC mitigates risk throughout the development and implementation phases of the project better than the Design Build (DB) or Design Bid Build (DBB) methods. It also provides the advantages for schedule and scope flexibility essential for a complex project like this with funding challenges.

In terms of risk, CDOT can negotiate, assign and coordinate risk elements with the contractor, designer and owner by assigning risk to the party best suited at managing the risk during design and construction. CMGC provides CDOT the most opportunity to secure a qualified Contractor and Designer with the needed expertise for the Project and provides early and continuous collaboration between the Owner, Designer, General Contractor, and stakeholders throughout all Project phases. This is especially important on the I-70 Mountain Corridor with its robust Context Sensitive Solutions (CSS) process that ensures considerations to residents, recreation and businesses in a compact and environmentally sensitive location. In addition, the General Contractor'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 to inform the National Environmental Policy Act (NEPA) process. It also provides the quantification of these risks that can be allocated into risk pools during construction to appropriately share risk on a complex project of this magnitude.

CMGC also provides advantages in schedule and scope flexibility that can match the funding uncertainties within the Fixed Limit of Construction Costs. It provides for construction of an initial phase with currently identified resources as well as opportunities to accelerate or slow construction commencement for future phases based on funding availability and/or financing scenarios currently being considered.

Reflecting on the other delivery methods, when examining the five primary factors, DB and CMGC were both seen to be appropriate delivery methods as both would be able to deliver a project of this magnitude given the current budget and schedule unknowns. DBB was least appropriate due to the complexity and grand scale of the Project and scope and the linear schedule would be difficult to meet the demands of current milestones. The evaluation demonstrated that CMGC stood out clearly as the most appropriate method due to the ability to manage risk, accommodate stakeholder involvement and maintain the required schedule through phasing flexibility for the Project. Below is a discussion of the primary factors.

### **Project Complexity & Innovation:**

CMGC was deemed the most appropriate method since it provides the advantage of CDOT being able to allow a higher level of input in more phases of the Project. More complicated aspects of the Project definition can be investigated at a pace that will accommodate meaningful stakeholder involvement and concurrence. With complex Project features such as the viaduct structures, impacts to the travelling public, rock excavation, and environmental commitments, CMGC provides early contractor input to more accurately price alternatives and refine and optimize the design. CMGC also allows contractor input into the NEPA process should re-evaluation be necessary. While DB was considered to be able to provide maximum opportunity to benefit from innovative approaches of multiple proposer teams, there are significant challenges with implementation of these potential innovations with the restrictive and prescriptive nature of the CSS process that is required on the I-70 Mountain Corridor. These challenges may actually limit the innovation on DB or have significant schedule delays during the DB procurement and design process. CMGC also provides the opportunity for innovation through collaboration between the owner, designer, and contractor earliest in the project development process. DBB was the least appropriate method since this method does not provide opportunity for contractor input into design or for innovative approaches.

### **Project Delivery Schedule:**

DB and CMGC were rated equally related to schedule for the Project overall but CMGC provides the opportunity to get a contractor on board the quickest, start construction the soonest, and provides the flexibility for a reduced scope phase if full construction funding does not materialize. It also provides schedule flexibility if funding becomes



available immediately or further along in project development within the fixed limit of construction cost. CMGC allows for multiple separate and severable construction packages to accelerate schedule and to allow for incremental funding through construction. If CMGC procurement is initiated in summer 2021, the Project could commence in 2023 with potential early packages in late 2022. The DB procurement process is much longer and labor intensive and would eliminate opportunity to begin construction in early 2023. The CSS process would be on the critical path, and the coordination and design effort necessary to obtain approvals from the stakeholders, would lessen the project intensity, which would offset the schedule benefit of concurrent design and construction paths. DBB was again the least appropriate method of delivery due to the long duration required to get to 100% final design with associated plans and specs for CDOT Low-Bid selection.

#### **Project Cost Considerations:**

DB rated higher related to the cost component but recent research and CDOT experiences have indicated that all methods overall are similar in costs. The competitive nature of DB would provide cost competitiveness and may lead to a reduced initial cost. With submittal of Alternative Technical Concepts (ATCs), Alternative Configuration Concepts (ACCs) and Additional Requested Elements (AREs), the Project could realize more scope elements for the same overall cost but again, there may be limited benefit or cost saving realized due to the prescriptive nature of the CSS process.

CMGC provides opportunity to get actual market pricing from contractors on Project elements with different funding sources, allowing these aspects to be defined earlier in the process. The actual market pricing allows CDOT to weigh options more accurately. CDOT experience on CMGC projects may result in negotiated Construction Agreed Prices (CAPs) being slightly higher than anticipated which is why DB is rated higher in this category.

#### **Level of Design:**

CMGC also provided a clear advantage in level of design. The project could proceed with CMGC at 20% level of design and still allow for the CSS process and the NEPA process to be completed. For the CSS Process, DB would require advancement of portions of the design beyond 20% to address commitments. This would lengthen the overall project schedule as more design would have to be finalized before early construction packages could be released. DBB was again the least appropriate method of delivery due to the long duration required to get to 100% final design as 20% design could not be used for CDOT Low-Bid selection.

#### **Risk Assessment of Delivery Methods:**

Examining risk, DB places the risk of errors and omissions entirely on the Design Build Team which would be the contractor and designer. While this is desirable as an owner, the risk to the project schedule is much higher with CSS approvals and coordination with third parties that are a requirement for the project. CMGC uses a modified Spearin Doctrine model which ensures all parties; the owner, the designer, and the contractor, share the risk. In this model, the owner does not bear the full burden of Spearin. CMGC displays opportunity over the other delivery methods to mitigate, share, and partner in early identification, quantification, and assignment of risks. In CMGC, the parties can quantify, assign and coordinate these risk elements as a partnered team. CMGC would provide the opportunity for contractor input in the NEPA phase to help minimize rework, provide real-time cost estimates, determine optimum location for early geotechnical investigation, and collaborate to uphold commitments of the CSS process. Comparing CMGC to DBB, the overall risk profile is lowered, exposure due to changes of errors and omissions is much less, and total project cost certainty is achieved much sooner.

#### **Secondary Selection Factors:**

Based on the secondary factors, CMGC received a PASS for all factors, including: Staff Availability, and Competition and Contractor Experience. CMGC provides ample competition for both Final Design Consultant and General Contractor, as recent CMGC solicitations were well received within the GC industry. For the CSS process, additional Oversight and Control is necessary and CMGC provides that opportunity as discussed.

## Project Delivery Selection Matrix Primary Factors

### 1) Project Complexity and Innovation

Project complexity and innovation is the potential applicability of new designs or processes to resolve complex technical issues.

<b>DESIGN-BID-BUILD - Allows Agency to fully resolve complex design issues and qualitatively evaluate designs before procurement of the general contractor. Innovation is provided by Agency/Consultant expertise and through traditional agency directed processes such as VE studies and contractor bid alternatives.</b>		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
Agency maintains full control to ensure follow through for CSS commitments.	Level of geotechnical complexity risk would be difficult to accurately bid.	<b>-</b>
Limits NEPA changes during final design and construction.	Specialty Design/Resources scarce.	
	All error, omission and change conditions are CDOT's responsibility. Big risk with the complexity of the project	
	Variability of conditions and unknown risk could lead to higher bids than anticipated which leads to no Contract award.	
	Limited contractor input on design to optimize or innovate.	
	No concurrent constructability review and partnership with CM	
	Does not require integration of the design and construction team. (design is compartmentalized)	
	No contractor quality review of construction plans	
	To incorporate contractor input would require a value engineering change proposal, which could jeopardize schedule and loss in value.	
	Ability for contractors to fully understand the project's complexity is limited due to the short procurement time.	
<b>CMGC - Allows independent selection of designer and contractor based on qualifications and other factors to jointly address complex innovative designs through three party collaboration of Agency, designer and Contractor. Allows for a qualitative (non-price oriented) design but requires agreement on CAP.</b>		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
Technical expertise to help define the scope provide innovation, and realize efficiency in the design phase.	Selection of CM commits to a particular specialty and not an overall contractual schedule/budget/scope.	<b>++</b>
Designer has direct contract relationship with owner.	Schedule milestones are fluid.	
Shared ownership of errors/omissions for the project. (risk pools, agreed upon overrun items )	Project may not be best-fit for construction innovation or limits opportunity due to the Proposed Action being bought into through CSS process.	
Opportunity for potential early mobilizations with the CM.	Innovation from only one contractor	
Early feedback from the contractor helpful to optimize preliminary investigations.	Administering contracts for multiple packages can be burdensome.	
Leads to more integrated partnering with Stakeholders. Important in I-70 Corridor due to the CSS process.	Contractor and Designer potentially not unified team for how to handle innovation or complexity.	
Designer and Contractor separate entity to help manage scope, through checks and balances to handle complex issues on the project.	Potential for project packaging to lose efficiency.	

Allows greater management of complex funding, design, construction relationship between the roadway, accesses, structures, and tunneling	Obtaining clearances for multiple packages requires dedicated resources.	
Contractor selected based on qualifications		
Develop innovation with CSS partners for a higher potential for buy-in on ideas.		
Input during NEPA process reflects means and methods to accomplish mitigation during construction		
Continual constructability review to guide innovation for maintenance of traffic.		
<b>DESIGN-BUILD</b> - Incorporates design-builder input into design process through best value selection and contractor proposed Alternate Technical Concepts (ATCs) – which are a cost oriented approach to providing complex and innovative designs. Requires that desired solutions to complex projects be well defined through contract requirements.		
Opportunities	Obstacles	Rating
Competitive proposal process to add value and innovation from 3-4 Contractors.	Requires dedicated staff required for design reviews and task force meetings due to the nature of the complexity of the project. CDOT is experiencing a shortage of specialty resources.	<b>+</b>
Proposal commitments are included in contract and contractually binding.	Difficult to ensure proposer has clear direction from owner that does encourages innovation due to the complexity and constraints. .	
ATC process allows owner to approve more efficient investment of the taxpayer dollar.	Heavily reliant on writing tight requirements for the complexity of project. Project scope as defined in CSS process may limit innovations considered due to how requirements are written.	
Owner defined AREs add additional scope, maximizing the budget.	Maintaining environmental clearance and being flexible for innovation.	
Propriety solutions. Success through competition.	Constrained RFP through writing requirements for CSS process losing innovation.	
Contractor and Designer are unified team to work through complexity and innovative solutions, to minimize impacts to the project.	Innovation opportunities are high risk to the CSS process.	
	Project intensity would put a lot of pressure on the CSS to make decisions.	
	Limited contractor competition available to participate due to size and complexity of the scope.	

## 2) Delivery Schedule

Delivery schedule is the overall project schedule from scoping through design, construction and opening to the public.

Assess time considerations for starting the project or receiving dedicated funding and assess project completion importance.

<b>DESIGN-BID-BUILD</b> - Requires time to perform sequential design and procurement, but if design time is available has the shortest procurement time after the design is complete.		
Opportunities	Obstacles	Rating
Less Chance for NEPA Reevaluations	Accelerating the schedule is costly, and requires additional resources.	<b>-</b>
Predictable. Potentially causing less design rework.	Change conditions would be significant time delay. CDOT would own that delay.	
	Low bid selection would be difficult to develop a construction schedule that CDOT could own risk.	

	Construction phase would not be concurrent with design.	
	Couldn't advance design of critical path items early to start early action of long construction items. All design would be complete and then bid on at the same time.	
	No potential to parallel design and construction schedules for efficiency	
<b>CMGC</b> - Quickly gets contractor under contract and under construction to meet funding obligations before completing design. Parallel process of development of contract requirements, design, procurements, and construction can accelerate project schedule. However, schedule can be slowed down by coordinating design-related issues between the CM and designer and by the process of reaching a reasonable CAP.		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
CM input early in design could reduce NEPA and ROW acquisition rework that could extend the project schedule.	CAP would not be agreed. Additional procurement process and schedule delays.	<b>++</b>
Phased construction packages start construction earlier.	Linear process – limits opportunities to accelerate construction completion.	
Procurement is a 3 to 6-month process for both Contractor and Designer, which accelerates the overall project schedule.	Multiple packages can be challenging to identify and monitor the critical path of the entire project.	
Qualifications based selection to ensure that the most highly qualified contractor is selected	Schedule certainty is not certain until the last package has been negotiated.	
Contractor involvement in the design provides more predictable, reliable Maintenance of Traffic schedule. That can be monitored and improved upon during construction due to contractor being involved in design.	Coordinating and obtaining clearances of multiple packages can be a challenge	
Developing schedule is collaborative between Owner, Designer and Contractor. Resulting in a more reliable schedule, based on actual contractor production rates, rather than a forecast of historical data.	Cost and schedule impacts can influence the negotiation of the CAP	
<b>DESIGN-BUILD</b> - Ability to get project under construction before completing design. Parallel process of design and construction can accelerate project delivery schedule; however, procurement time can be lengthy due to the time necessary to develop an adequate RFP, evaluate proposals and provide for a fair, transparent selection process.		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
Parallel design and construction.	Longer procurement process	<b>+</b>
Milestones contractually binding	Schedule not collaborative between Owner and DB team.	
Multiple NTPs to be able to move forward with construction.	Owners role for critical path. Ensuring clearances, acquisitions, and review process can add to the owner's role and overall risk.	
Impacts due to construction could be potentially shorter. More efficient design and construction coordination can lead to a shorter schedule.	Pressure on the CSS process and PLT to make decisions to comply with the Contractor's proposed schedule.	
Major deviations from the basic configuration may contribute to a shortened more efficient construction duration.	Ideas presented during Draft RFP could cause NEPA rework extending the schedule.	
	Potential for reevaluations from proposal commitments, ACC's being different then base configuration triggering NEPA and the CSS process.	
	Major design changes proposed during procurement may delay construction commencement.	

### 3) Level of Design

Level of design is the percentage of design completion at the time of the project delivery procurement.

<b>DESIGN-BID-BUILD - 100% design by Agency or contracted design team, with Agency having complete control over the design.</b>		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
Solutions are low risk and “tried and true”	Own the errors and omissions. CDOT assumes all risk.	<b>+</b>
CDOT has 100% control of the design	No opportunities to improve the design from Contractor input.	
The current level of design would cater to success for all three delivery methods	Owner error and omission warranty would make the owner liable to schedule and budget impacts due to proposed changes in the contract.	
Full development of the design allows the project team to ensure the integrity of the CSS process.	Contractor less likely to deviate from the plans due to the higher risk.	
	Contractor input will require value engineering, resulting in a loss of value and potential schedule impact.	
<b>CMGC - Can utilize a lower level of design prior to procurement of the CMGC and then joint collaboration of Agency, designer, and CMGC in the further development of the design. Iterative nature of design process risks extending the project schedule.</b>		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
Planning level of design is adequate to start the CM process.	Contractor could have a preferred specialty which influences scope development.	<b>+</b>
Inform the NEPA process through CM. Help with mitigations during NEPA process causing limited NEPA rework.	Current level of design could be susceptible to scope creep.	
Optimize design through contractor review due to current level of design.		
Current level of design provides opportunity for innovation		
Owner has relationship with designer.		
Designer is involved longer with the project.		
Collaborative relationship.		
<b>DESIGN-BUILD - Design advanced by Agency to the level necessary to precisely define contract requirements and properly allocate risk (typically 30% or less).</b>		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
Scope to the RFP is set, providing less opportunity for scope creep.	NEPA re-evaluation likely due to Contractor proposed design.	<b>+</b>
	Teams come together quickly. Less familiar with the scope of the project.	
	“Decision making mode” for design limits collaborative nature to work through CSS type solutions due to nature of design build. (Project intensity).	
	Project risks can be difficult to define at 30%, certain areas could need to be developed earlier.	
	Requires a well-developed, negotiated CSS approval process that has been approved by the CSS Stakeholders.	

#### 4) Project Cost Considerations

Project cost is the financial process related to meeting budget restrictions, early and precise cost estimation, and control of project costs.

<b>DESIGN-BID-BUILD</b> - Competitive bidding provides a low cost construction for a fully defined scope of work. Costs accuracy limited until design is completed. More likelihood of cost change orders due to contractor having no design responsibility.		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
Lowest bidder is awarded project.	Total Project Cost historically much more than the low bid amount.	<b>+</b>
Market determines initial construction cost.	Only single step value engineering requires profit sharing which lessens value.	
Design Cost does not include CM Management fee.	Cost certainty not achieved prior to construction completion.	
<b>CMGC</b> - Agency/designer/contractor collaboration to reduce risk pricing can provide a low cost project however non-competitive negotiated CAP introduces price risk. Good flexibility to design to a budget.		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
Shared risk quantified early on to clarify how Contractor is carrying complex risk elements into their cost proposal. (Risk Pools)	Owner managing scope can be challenging to determine most economical project.	<b>+</b>
Early contractor constructability review to lower cost	Not necessarily the most economic design.	
Collaborative effort reduces argumentative design/GC conflicts.	Risk pools can be abused.	
Earlier cost certainty due to tracking throughout design. Less change orders.	Non-innovative elements are priced non competitively. Unit Prices can be higher than market cost.	
Contractor input and investigation into pricing of alternatives, more accurate than historical cost estimating.	Owner negotiating skill set not as well-established/robust as contracting community.	
	Cost and schedule impacts can weaken the owners leverage in the negation of the CAP	
<b>DESIGN-BUILD</b> - Designer-builder collaboration and ATCs can provide a cost-efficient response to project goals. Costs are determined with design-build proposal, early in design process. Allows a variable scope bid to match a fixed budget. Poor risk allocation can result in high contingencies.		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
AREs and ATCs – Add value within the project budget.	Lump sum contracting can be difficult to account for various funding sources.	<b>++</b>
Market risk handled by Contractor.	No bid items. Contract administration can be intensive.	
Earliest cost certainty compared to other methods as the cost is known upfront.	Pricing the geotechnical risks (landslide, mine shaft) in a lump sum cost causes less availability for additional scope.	
Economical design due to competitive procurement process	Technical expertise of tunnel design and construction scope can be difficult to price for design build.	
ACC's provide opportunity for Owner to add value for the project budget.		

### 5) Risk Assessment of Delivery Methods

Risk is an uncertain event or condition that, if it occurs, has an effect on a project's objectives. Risk allocation is the assignment of unknown events or conditions to the party that can best manage them. An initial assessment of project risks is important to ensure the selection of the delivery method that can properly address them. An approach that focuses on a fair allocation of risk will be most successful.

<b>DESIGN-BID-BUILD</b> - Risk allocation for design-bid-build best is understood by the industry, but requires that most design-related risks and third party risks be resolved prior to procurement to avoid costly contractor contingency pricing, change orders, and potential claims.		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
Clearances and permits all obtained prior to construction substantially limits NEPA reevaluation work.	Any unknowns realized during Construction would be CDOT cost. Agency assumes all risk.	-
Most experience from CDOT and Contracting community delivering and administering this delivery method.	Due to the short procurement, selected Contractor may not have the time to become familiar with the plans and specs to accurately low bid the project.	
Collaboration allows for the integrity of the CSS process to be upheld through the design process. The owner, designer, and stakeholders assist in developing scope minimizing the risk of losing local community support.	The most qualified contractor for the job may not be selected due to low bid.	
	Limited Contractor input in Design limits innovation for Maintenance of Traffic and other construction best practices from the design being completed.	
	Additional scope requests later in project would be difficult to negotiate for competitive price.	
	Lack of Contractor input for geotechnical investigation needs could result in additional investigations later and substantial design changes. Unknown risks may be reflected in the bid item costs resulting in higher project cost.	
	Ensuring CSS and Environmental mitigation requirements are defined well enough in the plans that they will adequately fulfilled can be challenging during construction.	
<b>CMGC</b> - Provides opportunity for Agency, designer, and contractor to collectively identify and minimize project risks, and allocate risk to appropriate party. Has potential to minimize contractor contingency pricing of risk, but can lose the element of competition in pricing.		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
Throughout the project development and implementation, CDOT can negotiate, assign and coordinate risk elements with contractor, designer and owner and assign it to the party that can best handle it. This stabilizes Contractor pricing risk better than low bid or lump sum.	CAP failure, requiring DBB style procurement, could result in awarding to a lesser qualified contractor and not receiving the best value. The low bid contractor may not have intimate knowledge of the risks therefore the cost may not accurately priced leading to potential change order and claims.	++
Early CM input to identify and optimize geotechnical exploration needs. This will minimize owner risk of unknowns in construction as the location is specific to the collaborated design the contractor will bid.	Risk of early procurement of a Contractor and final designer may result in design and construction solutions associated with their specialty limiting overall innovation.	
Price negotiated to encourage collaboration with owner and stakeholders to best realize the optimum solution. This is especially important on the I-70 corridor with the impacts to residents, recreation and businesses in a compact location.	CAP failure could result in multiple contractors working contiguously within the corridor.	

Phased implementation of project minimizes the risk of a set budget. Project packaging provides opportunity to fund the primary objectives of the scope without precluding additional requested scope items, which can be negotiated or deferred if funding limitations or opportunities are realized.		
Early and continuous collaboration allows for the integrity of the CSS process to be upheld. The owner, designer, contractor and stakeholders assist in developing scope minimizing the risk of losing local community support.		
Selection of the most qualified Contractor and most qualified designer encourages owner confidence in the final design and construction of a complex scope.	Qualification based selection is dependent on aspirational responses from designer and contractor and could be difficult to enforce during the progression of the project.	
Early and continuous contractor and design team input through collaborative development better inform the NEPA process. Minimizes risk of infeasible mitigations, and schedule risk due to different alternatives proposed requiring NEPA reevaluations.		
<b>DESIGN-BUILD</b> - Provides opportunity to properly allocate risks to the party best able to manage them, but requires risks allocated to design-builder to be well defined to minimize contractor contingency pricing of risks.		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
CDOT assigns the risks which are priced in the awarded contract creating confidence in the initial cost.	Early geotechnical exploration chosen by Procurement team might not be in line with selected contractor's ideas for alignments. Result in additional exploration and unknowns being discovered later in process creating schedule risk.	-
Increased opportunity of innovations maximizes opportunity to discover equal or better solutions to the Proposed Action.	Contractor assumes certain risks that may not be likely due to lack of intimate knowledge of project.	
	Capturing intent in requirements without being prescriptive to allow for innovation while upholding the commitments to the stakeholders may be difficult.	
	Greater schedule risk due to additional stakeholder coordination required through CSS.	
	A DB team could propose an alignment that differs from the Base Configuration and associated ROW acquisition could impact the project schedule.	
	Innovative ideas require engagement in CSS process creating a potential schedule and cost risk.	



Project Delivery Selection Matrix Secondary Factors6) Staff Experience and Availability

Agency staff experience and availability as it relates to the project delivery methods in question.

<b>DESIGN-BID-BUILD</b> - Technical and management resources necessary to perform the design and plan development. Resource needs can be more spread out.		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
		n/a
<b>CMGC</b> - Strong, committed Agency project management resources are important for success of the CMGC process. Resource needs are similar to DBB except Agency must coordinate CM's input with the project designer and be prepared for CAP negotiations.		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
West Program has administered a successful CMGC Contract in the corridor	CAP Packages require additional blue back from Contracts.	Pass
Project staff have experience with CMGC on multiple projects.		
CDOT is one of States in US with most experience with CMGC and most fully developed programs.		
<b>DESIGN-BUILD</b> - Technical and management resources and expertise necessary to develop the RFQ and RFP and administrate the procurement. Concurrent need for both design and construction resources to oversee the implementation.		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
		n/a

**7) Level of Oversight and Control**

Level of oversight involves the amount of agency staff required to monitor the design or construction, and amount of agency control over the delivery process

<b>DESIGN-BID-BUILD - Full control over a linear design and construction process.</b>		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
		n/a
<b>CMGC - Most control by Agency over both the design, and construction, and control over a collaborative agency/designer/contractor project team</b>		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
Owner control in delivering project within tight timeline with input from CMGC	Securing Contracts for CMGC and ICE.	Pass
Tailor design to goals of corridor and stakeholders (phasing, constructability, means & methods, materials.)		
Opportunity to have multiple construction packages to mitigate delays in high risk areas.		
Minimize risk of environmental reevaluation.		
<b>DESIGN-BUILD - Less control over the design (design desires must be written into the RFP contract requirements). Generally less control over the construction process (design-builder often has QA responsibilities).</b>		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
		n/a

**8) Competition and Contractor Experience**

Competition and availability refers to the level of competition, experience and availability in the market place and its capacity for the project.

<b>DESIGN-BID-BUILD - High level of competition, but GC selection is based solely on low price. High level of marketplace experience.</b>		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
		n/a
<b>CMGC - Allows for the selection of the single most qualified contractor, but CAP can limit price competition. Low level of marketplace experience.</b>		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
Qualifications based selection allows for selection of high quality contractor and designer. Project of this magnitude is anticipated to attract regional and national interest.	Not a competitive bid. Loss of benefit of competitive sealed bid.	Pass
<b>DESIGN-BUILD - Allows for a balance of price and non-price factors in the selection process. Medium level of marketplace experience.</b>		
<b>Opportunities</b>	<b>Obstacles</b>	<b>Rating</b>
		n/a