PROJECT DELIVERY SELECTION MATRIX

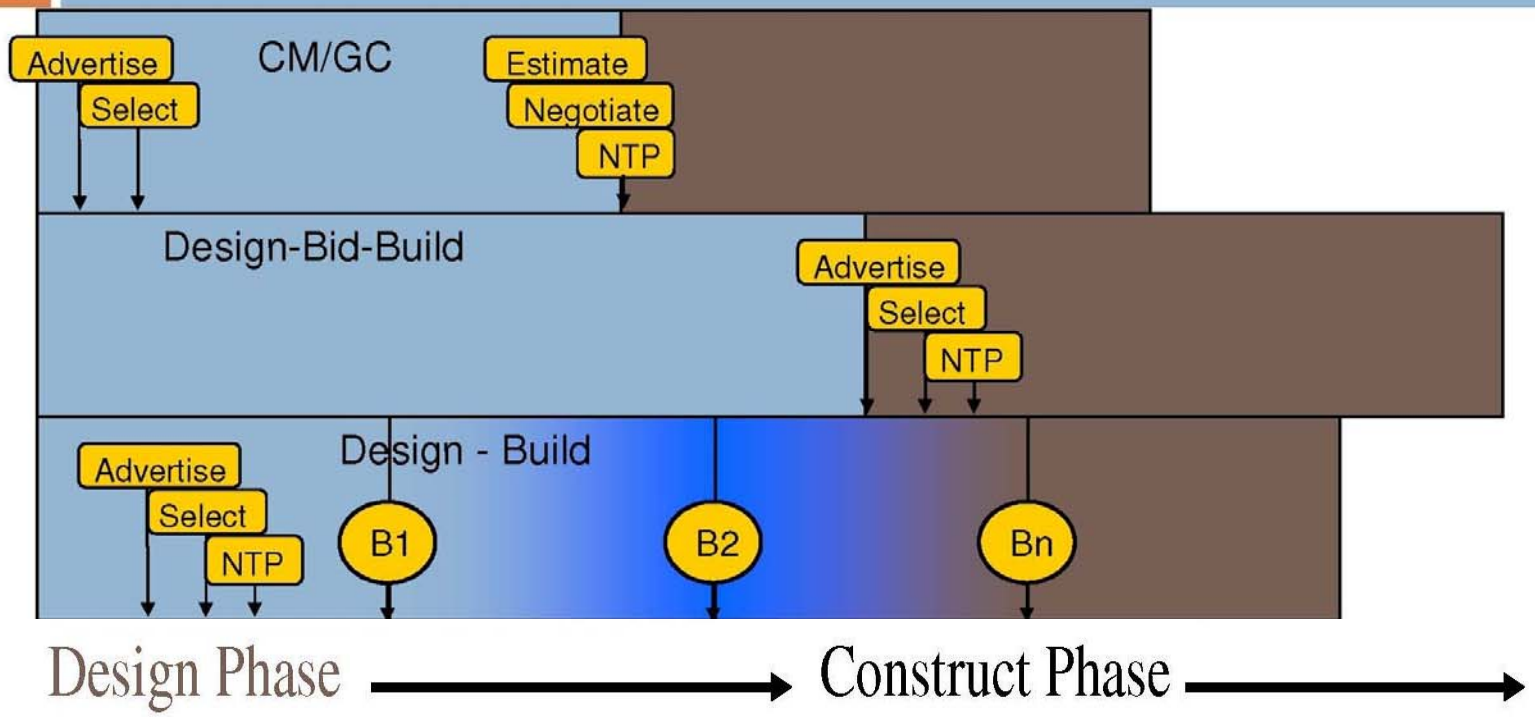
HOW DOES CDOT DECIDE?

May 18th, 2012

What are the choices?

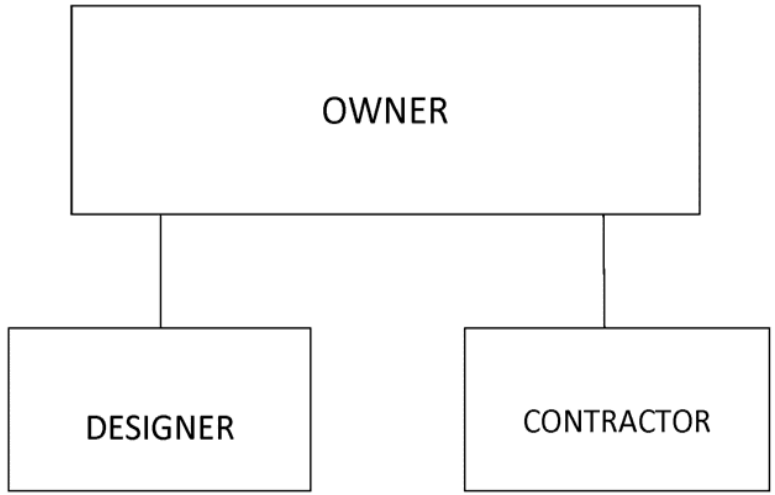
- Design/Bid/Build (D/B/B) – standard approach
- Design/Build (D/B) – Contractor and Designer team
- Construction Manager/General Contractor (CM/GC)

Timeline Comparison

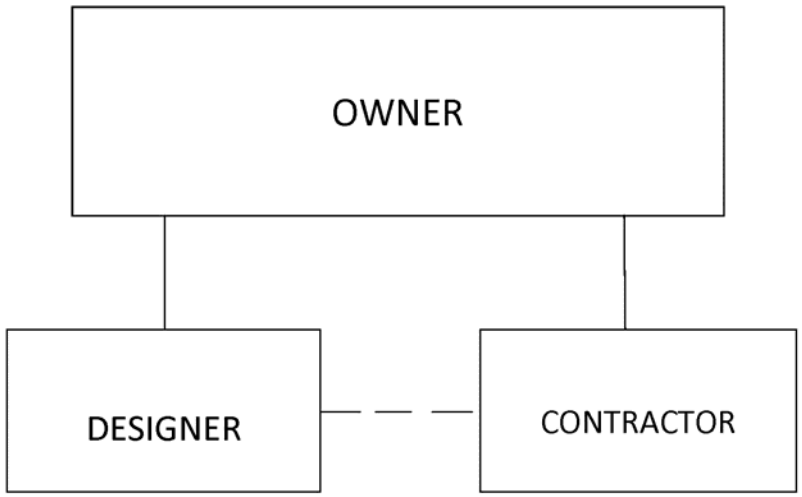


*From Utah Department of Transportation

Design/Bid/Build (D/B/B):



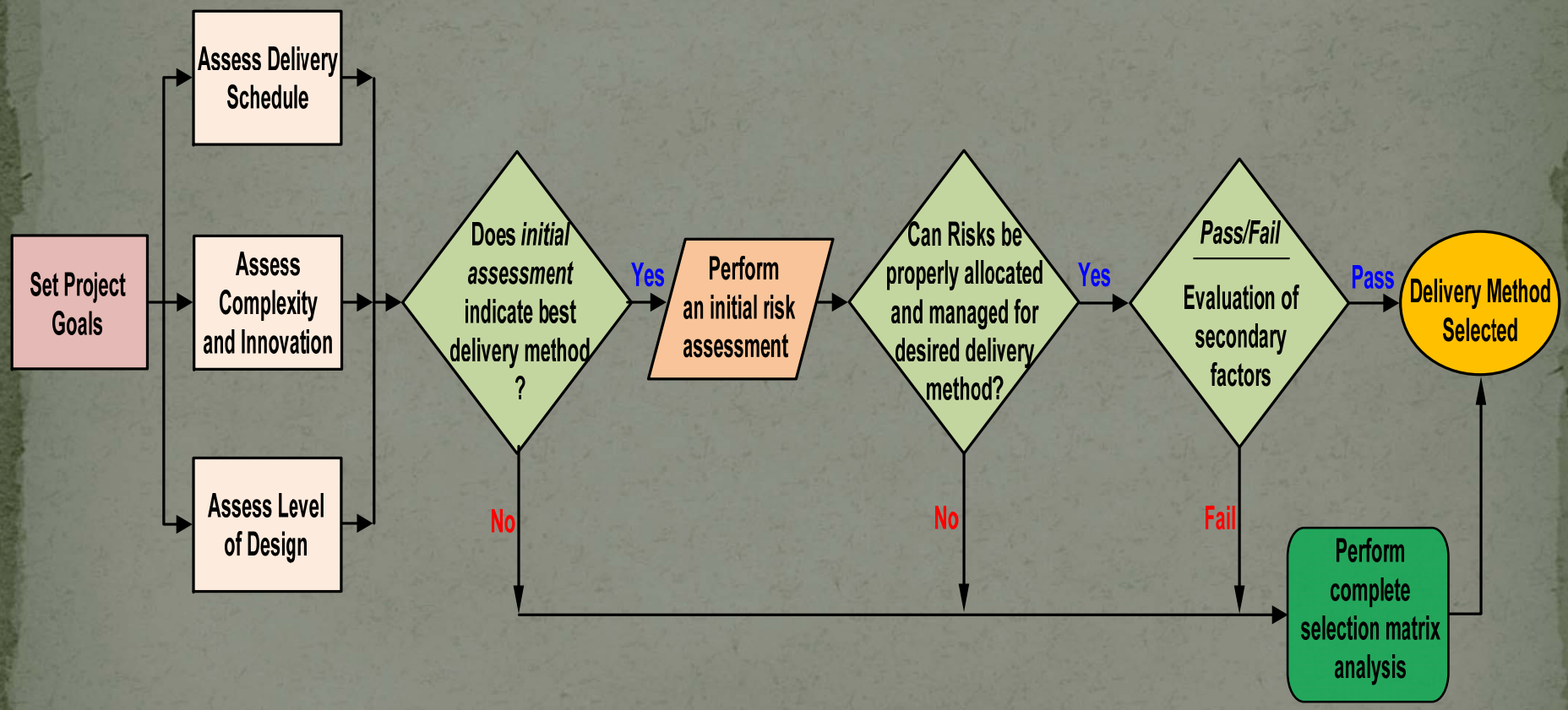
CM/GC:



HOW do we DECIDE on method?

- We develop Project Goals with Stakeholders
  - Is Traffic Interference a huge concern?
  - Do we need "out of the box" phasing?
  - Do we need contractor ingenuity?
  - Do we need it done very quickly and need it designed?
- We take a look at the Risks of the Project
  - Subsurface/Geotechnical/Tight Access?
- We consult with FHWA on whether it meets the Special Experimental Projects (SEP-14) Criteria
- We evaluate the Project using a Selection Matrix that addresses the Risks and Opportunities

Flowchart


Set Project Goals
Assess Delivery Schedule
Assess Complexity and Innovation
Assess Level of Design
Does *initial assessment* indicate best delivery method ?
Yes
No
Perform an initial risk assessment
Can Risks be properly allocated and managed for desired delivery method?
Yes
No
Pass/Fail
Evaluation of secondary factors
Pass
Fail
Delivery Method Selected
Perform complete selection matrix analysis

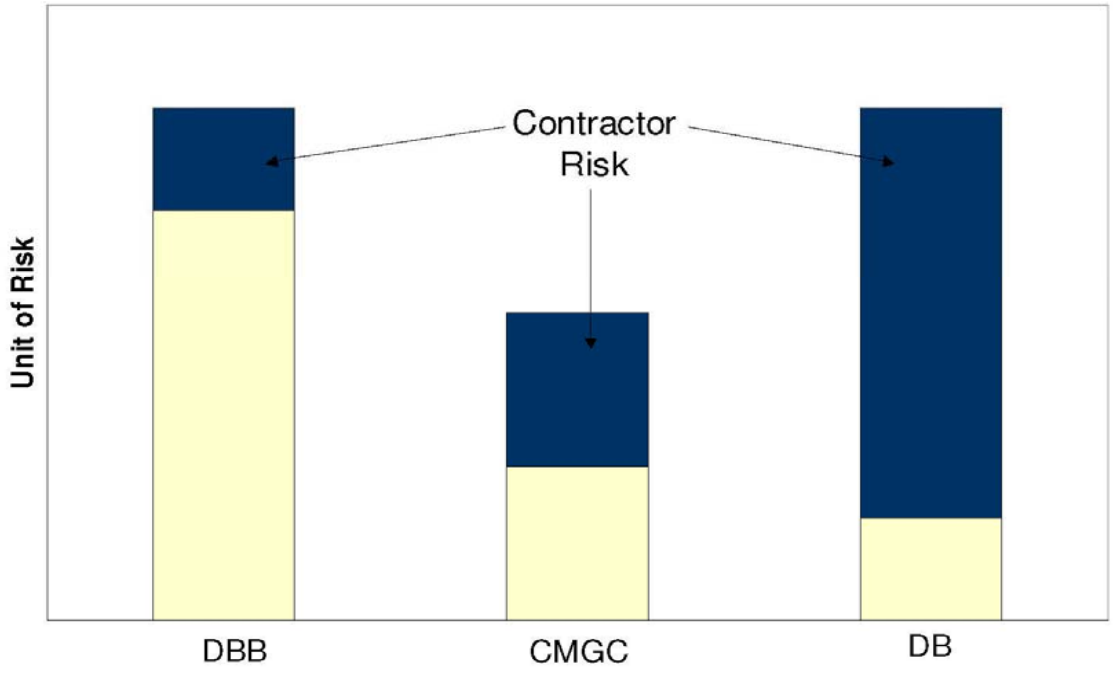
Project Goals – Generic List

- Schedule
- • Minimize project delivery time
- • Complete the project on schedule
- • Accelerate start of project revenue
- Cost
- • Minimize project cost
- • Maximize project budget
- • Complete the project on budget
- • Maximize the project scope & improvements within project budget
- Quality
- • Meet or exceed project requirements
- • Select the best team
- • Provide a high quality design and construction
- • Provide an aesthetically pleasing project
- Functional
- • Maximize the life cycle performance of the project
- • Maximize capacity and mobility improvements
- • Minimize inconvenience to the traveling public during construction
- • Maximize safety of workers and traveling public during construction

Eagle Interchange Goals

- 1. Minimize impact to homeowners, businesses, public and multi-modal users.
- 2. Project completion on budget and on schedule.
- 3. Maintain safety during construction.
- 4. Provide useful communication to homeowners, businesses, and users.
- 5. Strive for best value and high quality construction.
- 6. Improve long term operations and safety.
- 7. Seamless coordination between the three phases (utility, roadway and landscape) of project.

Risk



Eagle Interchange Risks

1. Delivery Schedule 2. Project Complexity & Innovation 3. Level of Design 4.Initial Project Risk Assessment

	1	2	3	4
HIGH RISK				
Inadequate Staging areas identified for construction		x		
Problems with or uncertainty in construction sequencing/staging/phasing/construction duration		x		
Work-window restrictions (e.g. fish windows, weather shut-down, lane closure, phasing restrictions, periods of no interference	x	x	x	
Right-of-Way phasing & takes adequate	x			
Business or economic disruption mitigation		x	x	
Encounter unexpected utilities during construction		x		
TOTALS	**2**	**5**	**2**	**0**
MEDIUM RISK				
Condition of existing structures (repair required?)			x	
Tie-ins with existing facilities/roadways/structures/local access		x		
Uncertainty in retaining walls (including type, length, height - foundations and superstructure)		x	x	

Selection Matrix Factors:

- **Primary Factors**
  - Delivery Schedule
  - Complexity & Innovation
  - Level of Design
- **Secondary Factors (Pass/Fail Analysis)**
  - Cost
  - Staff Experience/Availability (Owner)
  - Level of Oversight and Control
  - Competition and Contractor Experience

Eagle Interchange Matrix Examples

- 1) Delivery Schedule

DESIGN-BID-BUILD	
Opportunities	**Obstacles**
❒ Schedule is more predictable and more manageable ❒ Milestones can be easier to define ❒ Projects can more easily be "shelved" ❒ Shortest procurement period ❒ Elements of design can be advanced prior to permitting, construction, etc. ❒ Time to communicate/discuss design with stakeholders	❒ Requires time to perform a linear design-bid-construction process ❒ Design and construction schedules can be unrealistic due to lack industry input ❒ Errors in design lead to change orders and schedule delays ❒ Low bid selection may lead to potential delays and other adverse outcomes.

Eagle Interchange Matrix Examples

- 1) Delivery Schedule

DESIGN-BUILD	
Opportunities	**Obstacles**
❒ Potential to accelerate schedule through parallel design-build process ❒ Shifting schedule risk to DB team ❒ Encumbers construction funds more quickly ❒ Industry input into design and schedule ❒ Fewer chances for disputes between agency and design-builders ❒ More efficient procurement of long-lead items ❒ Ability to start construction before entire design, ROW, etc. is complete (i.e., phased design)	❒ Request for proposal development and procurement can be lengthy ❒ Undefined events or conditions found after procurement, but during design can impact schedule and cost ❒ Time required to define technical requirements and expectations through RFP development can be lengthy ❒ Time required to gain acceptance of quality program ❒ Requires agency and stakeholder commitments to an expeditious review of design

Eagle Interchange Matrix Examples

- 1) Delivery Schedule

CM/GC	
Opportunities	**Obstacles**
❒ Ability to start construction before entire design, ROW, etc. is complete (i.e., phased design) ❒ More efficient procurement of long-lead items ❒ Early identification and resolution of design and construction issues (e.g., utility, ROW, and earthwork) ❒ Can provide a shorter procurement schedule than DB ❒ Team involvement for schedule optimization ❒ Continuous constructability review and VE ❒ Maintenance of Traffic improves with contractor inputs	❒ Potential for not reaching GMP and substantially delaying schedule ❒ GMP negotiation can delay the schedule ❒ Schedule-driven goals may drive up cost ❒ Designer-contractor-agency disagreements can add delays ❒ Strong agency management is required to control schedule

Eagle Interchange Matrix Examples

- 2) Project Complexity & Innovation

DESIGN-BID-BUILD	
Opportunities	**Obstacles**
❒ CDOT can have more control of design of complex projects ❒ CDOT& consultant expertise can select innovation independently of contractor abilities ❒ Opportunities for value engineering studies during design, more time for design solutions ❒ Aids in consistency and maintainability ❒ Full control in selection of design expertise ❒ Complex design ~~can be resolved~~ and competitively bid	❒ Increased costs due to pricing of risk ❒ Innovations can add cost or time and restrain contractor's benefits ❒ No contractor input to optimize costs ❒ Limited flexibility for integrated design and construction solutions (limited to constructability) ❒ Difficult to assess construction time and cost due to innovation (or lack of efficiency)

Eagle Interchange Matrix Examples

- 2) Project Complexity & Innovation

CM/GC	
Opportunities	**Obstacles**
❒ Highly innovative process through 3 party collaboration ❒ Allows for owner control of a designer/contractor process for developing innovative solutions ❒ Allows for-an independent selection ~~of the best qualified designer~~ and best qualified contractor ❒ VE inherent in process and enhanced constructability (innovative phasing, VE walls) ❒ Risk of innovation can be better defined and minimized and allocated ❒ Can take to market for bidding as contingency	❒ Process depends on designer/CM relationship ❒ No contractual relationship between designer/CM ❒ Innovations can add cost or time ❒ Scope additions can be difficult to manage ❒ Preconstruction services fees for contractor involvement ❒ Cost competitiveness – single source negotiated GMP ❒ Limited competition in design after designer is selected

Eagle Interchange Matrix Examples

- 3) Level of Design

DESIGN-BID-BUILD	
Opportunities	**Obstacles**
❒ 100% design by owner ❒ Agency has complete control over the design (can be beneficial when there is one specific solution for a project) ❒ Project/scope can be developed through design ❒ The scope of the project is well defined through complete plans and contract documents ❒ Well-known process to the industry	❒ Owner design errors can result in a higher number of change orders, claims, etc. ❒ Minimizes competitive innovation opportunities ❒ Can reduce the level of constructability since the contractor is not bought into the project until after the design is complete

Eagle Interchange Matrix Examples

- 3) Level of Design

CM/GC	
Opportunities	**Obstacles**
❒ Can utilize a lower level of design prior to selecting a contractor then collaboratively advance design with owner, designer and contractor ❒ Contractor involvement in early design improves constructability ❒ CDOT controls design (phasing) ❒ Design can be used for DBB if the price is not successfully negotiated. ❒ Design can be responsive to risk minimization	❒ Teaming and communicating concerning design can cause disputes ❒ Three party process can slow progression of design ❒ If design is too far advanced it will limit the advantages of CMGC or could require design backtracking

Eagle Interchange Matrix Summary

PROJECT DELIVERY METHOD OPPORTUNITY/OBSTACLE SUMMARY			
	DBB	DB	CM/GC
Primary Evaluation Factors		NA	
1. Delivery Schedule	+	NA	+ +
2. Project Complexity & Innovation	-	NA	+ +
3. Level of Design	+	NA	+ +
4. Initial Project Risk Assessment	-	NA	+ +
Secondary Evaluation Factors		NA	
5. Cost		NA	Pass
6. Staff Experience/Availability (Owner)		NA	Pass
7.Level of Oversight and Control		NA	Pass
8. Competition and Contractor Experience		NA	Pass

QUESTIONS?

- Thanks for your time and attention!

- Joe Elsen, P.E.
  - Region 3 – East Program Engineer
  - 202 Centennial Street
  - Glenwood Springs, CO 81601
  - 970.384.3332 office
  - 970.379.9532 cell
  - Joseph.Elsen@dot.state.co.us