Project Delivery Selection Workshop Summary

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| Workshop Summary | |
| Project Name: |  |
| Workshop Date: |  |
| Workshop Location: |  |
| Facilitator: |  |
| Delivery Method Selected: |  |

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| Workshop Participants | |
| Name | Email |
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Project Delivery Selection Matrix

Overview

This document provides a formal approach for selecting project delivery methods for highway projects. The information below lists the project delivery methods followed by an outline of the process, instructions, and evaluation worksheets for use by state transportation agency (STA) staff and project team members. By using these forms, a brief Project Delivery Selection Report can be generated for each individual project. The primary objectives of this tool are:

* Present a structured approach to assist Agencies in making project delivery decisions;
* Assist Agencies in determining if there is a dominant or optimal choice of a delivery method; and
* Provide documentation of the selection decision.

Background

The project delivery method is the process by which a construction project is comprehensively designed and constructed including project scope definition, organization of designers, constructors and various consultants, sequencing of design and construction operations, execution of design and construction, and closeout and start-up. Thus, the different project delivery methods are distinguished by the manner in which contracts between the agency, designers and builders are formed and the technical relationships that evolve between each party inside those contracts. Currently, there are several types of project delivery systems available for publicly funded transportation projects. The most common systems are Design-Bid-Build (DBB), Design-Build (DB), and Construction Manager/General Contractor (CMGC). No single project delivery method is appropriate for every project. Each project must be examined individually to determine how it aligns with the attributes of each available delivery method.

Primary delivery methods

**Design-Bid-Build** is the traditional project delivery method in which an agency designs, or retains a designer to furnish complete design services, and then advertises and awards a separate construction contract based on the designer’s completed construction documents. In DBB, the agency “owns” the details of design during construction and as a result, is responsible for the cost of any errors or omissions encountered in construction.

**Design-Build** is a project delivery method in which the agency procures both design and construction services in the same contract from a single, legal entity referred to as the design-builder. The method typically uses Request for Qualifications (RFQ)/Request for Proposals (RFP) procedures rather than the DBB Invitation for Bids procedures. The design-builder controls the details of design and is responsible for the cost of any errors or omissions encountered in construction.

**Construction Manager / General Contractor** is a project delivery method in which the agency contracts separately with a designer and a construction manager. The agency can perform design or contract with an engineering firm to provide a facility design. The agency selects a construction manager to perform construction management services and construction works. The significant characteristic of this delivery method is a contract between an agency and a construction manager who will be at risk for the final cost and time of construction. Construction industry/Contractor input into the design development and constructability of complex and innovative projects are the major reasons an agency would select the CMGC method. Unlike DBB, CMGC brings the builder into the design process at a stage where definitive input can have a positive impact on the project. CMGC is particularly valuable for new non-standard types of designs where it is difficult for the agency to develop the technical requirements that would be necessary for DB procurement without industry input.

Facilitation of the tool

When embarking on using the project delivery selection tool for the first time, it is recommended that a facilitator is brought in for the workshop. The facilitator will assist with working through the tool and provide guidance for discussing the project and selection of a delivery method. This individual should be knowledgeable about the process and should be consistently used. The facilitator also helps to answer questions and make sure the process stays on track and the team moves towards a formal selection.

Participation

Using the project delivery selection matrix is only as good as the people who are involved in the selection workshop. Therefore, it is necessary to have a collection of individuals to participate in the selection of the delivery method. The selection team needs to include the project manager, the project engineer, a representative of the procurement/contracting office, and any other STA staff that is crucial to the project. In addition, the selection team might want to consider including representatives from specialty units and from the local jurisdictions where the project is located. However, it is important to keep the selection team to a minimum amount of participants. Otherwise, the selection process can take a long time to complete. Normally, 3-7 people represent a selection team, but this number should be based on the specific project being analyzed.

Potential bias

The best approach for the participants of the workshop is to keep an open mind about the delivery method to choose. However, there might be participants that have a preconceived notion about the delivery method to use on a project. When this occurs, it is best to discuss that person’s ideas with the entire selection team at the beginning of the workshop. Putting that person’s ideas on the table helps others to understand the choice that person has in mind. Then, it is important to acknowledge this person’s ideas, but to remind that person to keep an open mind as the team works through the selection process.

Pre-workshop Tasks

Before conducting the selection workshop, a few tasks can be completed by the workshop participants. Preparing for the workshop prior to conducting it will result in a much more concise and informative session. It is advised that participants review all known project information, goals, risks, and constraints prior to the workshop. The best approach is to complete the *Project Delivery Description*, the *Project Delivery Goals*, and the *Project Delivery Constraints* worksheets before conducting the workshop. Completing the three worksheets will shorten the time needed to review the project and allows the workshop team to move right into the selection process.

Project Delivery Selection Process

The process is shown in the outline below and a flowchart on the next page. It consists of individual steps to complete the entire process. The steps should be followed in sequential order.

STAGE I - Project Attributes, Goals, and Constraints

1. Delivery methods to consider
2. Design-Bid-Build
3. Design-Build
4. Construction Manager / General Contractor
5. Project Description/Goals/Constraints
6. Project attributes
7. Set project goals
8. Determine and review project dependent constraints

STAGE II – Primary Factor Evaluation

1. Assess the primary factors (these factors most often determine the selection).
2. Delivery Schedule
3. Complexity & Innovation
4. Level of Design
5. Cost
6. If the primary factors indicate there is a clear choice of the delivery method, then:
7. Perform an initial risk assessment for the desired delivery method to ensure that risks can be properly allocated and managed, and

STAGE III – Secondary Factor Evaluation

1. Perform a pass/fail analysis of the secondary factors to ensure that they are not relevant to the decision.
2. Staff Experience/Availability (Agency)
3. Level of Oversight and Control
4. Competition and Contractor Experience
5. If steps B, C & D do not result in clear determination of the method of delivery then perform a more rigorous evaluation of all eight factors against the three potential methods of delivery (DBB, DB and CMGC).

NOTE: Typically, the entire selection process can be completed by the project team in a 3 hour workshop session, as long as each team member has individually reviewed and performed the assessment prior to the workshop.



Flowchart of the Project Delivery Selection Process

Project Delivery Selection Matrix Worksheets and Forms

The following forms and appendices are included to facilitate this process.

Project delivery description worksheet

Provide information on the project. This includes size, type, funding, risks, complexities, etc. All information should be developed for the specific project.

Project delivery goals worksheet – including example project goals

A careful determination of the project goals is an instrumental first step of the process that will guide both the selection of the appropriate method of delivery for the project.

Project delivery constraints worksheet - including example project constraints

Carefully review all possible constraints to the project. These constraints can potentially eliminate a project delivery method before the evaluation process begins.

Project delivery selection summary form

The Project Delivery Selection Summary summarizes the assessment of the eight selection factors for the three delivery methods. The form is qualitatively scored using the rating provided in the table below. The form also includes a section for comments and conclusions.Thecompleted Project Delivery Selection Summary should provide an executive summary of the key reasons for the selection of the method of delivery**.**

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

Workshop blank form

This form can be used by the project team for additional documentation of the process. In particular, it can be used to elaborate the evaluation of the *Assessment of Risk* factor.

Project delivery methods selection factor opportunities / obstacles form

These forms are used to summarize the assessments by the project team of the opportunities and obstacles associated with each delivery method relative to each of the eight Selection Factors. The bottom of each form allows for a qualitative conclusion using the same notation as described above. Those conclusions then are transferred to the **Project Delivery Selection Summary.**

Project delivery methods opportunities / obstacles checklists

These forms provide the project team with direction concerning typical delivery method opportunities and obstacles associated with each of the eight Selection Factors. However, these checklists include general information and are not an all-inclusive checklist. Use the checklists as a supplement to developing project specific opportunities and obstacles.

Risk assessment guidance form

Because of the unique nature of Selection Factor 5, *Assessment of Risk*, this guidance section provides the project team with additional assistance for evaluation of the risk factor including: Typical Transportation Project Risks; a General Project Risks Checklist; and a Risk Opportunities/Obstacles Checklist.

Project Delivery Description

The following items should be considered in describing the specific project. Other items can be added to the bottom of the form if they influence the project delivery decision. Relevant documents can be added as appendices to the final summary report.

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| Project Attributes |
| Project Name: |
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| Location: |
|  |
| Estimated Budget: |
|  |
| Estimated Project Delivery Period: |
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| Required Delivery Date (if applicable): |
|  |
| Source(s) of Project Funding: |
|  |
| Project Corridor: |
|  |
| Major Features of Work – pavement, bridge, sound barriers, etc.: |
|  |
| Major Schedule Milestones: |
|  |
| Major Project Stakeholders: |
|  |
| Major Obstacles (as applicable) |
|  |
| With Right of Way, Utilities, and/or Environmental Approvals: |
|  |
| During Construction Phase: |
|  |
| Main Identified Sources of Risk: |
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| Safety Issues: |
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| Sustainable Design and Construction Requirements: |
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Project Delivery Goals

An understanding of project goals is essential to selecting an appropriate project delivery method. Therefore, project goals should be set prior to using the project delivery selection matrix. Typically, the project goals can be defined in three to five items and need to be reviewed here. Example goals are provided below, but the report should include project-specific goals. These goals should remain consistent over the life of the project.

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| Project-Specific Goals |
| Goal #1: |
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| Goal #2: |
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| Goal #3: |
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| Goal #4: |
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| Goal #5: |
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General Project Goals (For reference)

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 and improvements within the project budget

Quality

* Meet or exceed project requirements
* Select the best team
* Provide a high quality design and construction constraints
* 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

Project Delivery Constraints

There are potential aspects of a project that can eliminate the need to evaluate one or more of the possible delivery methods. A list of general constraints can be found below the table and should be referred to after completing this worksheet. The first section below is for general constraints and the second section is for constraints specifically tied to project delivery selection.

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| General Constraints |
| Source of Funding: |
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| Schedule constraints: |
|  |
| Federal, state, and local laws: |
|  |
| Third party agreements with railroads, ROW, etc: |
|  |
| Project Delivery Specific Constraints |
| Project delivery constraint #1: |
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| Project delivery constraint #2: |
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| Project delivery constraint #3: |
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| Project delivery constraint #4: |
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| Project delivery constraint #5: |
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General Project Constraints

Schedule

* Utilize federal funding by a certain date
* Complete the project on schedule
* Weather and/or environmental impact

Cost

* Project must not exceed a specific amount
* Minimal changes will be accepted
* Some funding may be utilized for specific type of work (bridges, drainage, etc)

Quality

* Must adhere to standards proposed by the Agency
* High quality design and construction constraints
* Adhere to local and federal codes

Functional

* Traveling public must not be disrupted during construction
* Hazardous site where safety is a concern
* Return area surrounding project to existing conditions

Project Delivery Selection Summary

Determine the factors that should be considered in the project delivery selection, discuss the opportunities and obstacles related to each factor, and document the discussion on the following pages. Then complete the summary below.

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

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

Project Delivery Selection Summary Conclusions and Comments

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Project Delivery Selection Matrix Primary Factors

1) 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.

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| **DESIGN-BID-BUILD** - 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 |
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| **DESIGN-BUILD -** 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. | | |
| Opportunities | Obstacles | Rating |
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| **CMGC -** 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 Guaranteed Maximum Price (GMP). | | |
| Opportunities | Obstacles | Rating |
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2) Project Complexity and Innovation

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

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| **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. | | |
| Opportunities | Obstacles | Rating |
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| **DESIGN-BUILD -** 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 |
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| **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 GMP. | | |
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### 3) Level of Design

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

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| **DESIGN-BID-BUILD -** 100% design by Agency or contracted design team, with Agency having complete control over the design. | | |
| Opportunities | Obstacles | Rating |
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| **DESIGN-BUILD -** Design advanced by Agency to the level necessary to precisely define contract requirements and properly allocate risk (typically 30% or less). | | |
| Opportunities | Obstacles | Rating |
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| **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. | | |
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### 4) Cost

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

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| **DESIGN-BID-BUILD -** 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. | | |
| Opportunities | Obstacles | Rating |
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| **DESIGN-BUILD -** 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. | | |
| **Opportunities** | **Obstacles** | **Rating** |
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| **CMGC -** Agency/designer/contractor collaboration to reduce risk pricing can provide a low cost project however non-competitive negotiated GMP introduces price risk. Good flexibility to design to a budget. | | |
| Opportunities | Obstacles | Rating |
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### 5) Initial Risk Assessment

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.

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| **DESIGN-BID-BUILD -** 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. | | |
| Opportunities | Obstacles | Rating |
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| **DESIGN-BUILD -** 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. | | |
| Opportunities | Obstacles | Rating |
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| **CMGC -** 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. | | |
| Opportunities | Obstacles | Rating |
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## Project Delivery Selection Matrix Secondary Factors

### 6) Staff Experience and Availability

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

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| **DESIGN-BID-BUILD -** Technical and management resources necessary to perform the design and plan development. Resource needs can be more spread out. | | |
| Opportunities | Obstacles | Rating |
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| **DESIGN-BUILD -** 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. | | |
| Opportunities | Obstacles | Rating |
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| **CMGC -** 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 GMP negotiations. | | |
| Opportunities | Obstacles | Rating |
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### 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

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| **DESIGN-BID-BUILD -** Full control over a linear design and construction process. | | |
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| **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). | | |
| Opportunities | Obstacles | Rating |
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| **CMGC -** Most control by Agency over both the design, and construction, and control over a collaborative agency/designer/contractor project team | | |
| Opportunities | Obstacles | Rating |
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### 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.

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| **DESIGN-BID-BUILD -** High level of competition, but GC selection is based solely on low price. High level of marketplace experience. | | |
| Opportunities | Obstacles | Rating |
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| **DESIGN-BUILD -** Allows for a balance of price and non-price factors in the selection process. Medium level of marketplace experience. | | |
| Opportunities | Obstacles | Rating |
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| **CMGC -** Allows for the selection of the single most qualified contractor, but GMP can limit price competition. Low level of marketplace experience. | | |
| Opportunities | Obstacles | Rating |
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## Project Delivery Selection Factors Opportunities and Obstacles Checklists

**(With project risk assessment and checklists)**

### 1) Delivery Schedule Project Delivery Selection Checklist

|  |  |
| --- | --- |
| 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. |
| 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)  Allows innovation in resource loading and scheduling by DB team | Request for proposal development and procurement can be intensive  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 intensive  Time required to gain acceptance of quality program  Requires agency and stakeholder commitments to an expeditious review of design |
| CMGC | |
| 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  Contractor input for phasing, constructability and traffic control may reduce overall schedule | Potential for not reaching GMP and substantially delaying schedule  GMP negotiation can delay the schedule  Designer-contractor-agency disagreements can add delays  Strong agency management is required to control schedule |

### 2) Project Complexity and Innovation Project Delivery Selection Checklist

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| --- | --- |
| DESIGN-BID-BUILD | |
| Opportunities | Obstacles |
| Agencies can have more control of design of complex projects  Agency and 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 | 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 |
| DESIGN-BUILD | |
| Opportunities | Obstacles |
| Designer and contractor collaborate to optimize means and methods and enhance innovation  Opportunity for innovation through draft RFP, best value and ATC processes  Can use best-value procurement to select design-builder with best qualifications  Constructability and VE inherent in process  Early team integration  Sole point of responsibility | Requires desired solutions to complex designs to be well defined through technical requirements (difficult to do)  Qualitative designs are difficult to define (example. aesthetics)  Risk of time or cost constraints on designer inhibiting innovation  Some design solutions might be too innovative or unacceptable  Quality assurance for innovative processes are difficult to define in RFP |
| CMGC | |
| Opportunities | Obstacles |
| Highly innovative process through 3 party collaboration  Allows for agency 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  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 |

### 3) Level of Design Project Delivery Selection Checklist

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| DESIGN-BID-BUILD | |
| Opportunities | Obstacles |
| 100% design by agency  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 | Agency 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 |
| DESIGN-BUILD | |
| Opportunities | Obstacles |
| Design advanced by the agency to level necessary to precisely define the contract requirements and properly allocate risk  Does not require much design to be completed before awarding project to the design-builder (between ~ 10% - 30% complete)  Contractor involvement in early design, which improves constructability and innovation  Plans do not have to be as detailed because the design-builder is bought into the project early in the process and will accept design responsibility | Must have very clear definitions and requirements in the RFP because it is the basis for the contract  If design is too far advanced it will limit the advantages of design-build  Potential for lacking or missing scope definition if RFP not carefully developed  Over utilizing performance specifications to enhance innovation can risk quality through reduced technical requirements  Less agency control over the design  Can create project less standardized designs across agency as a whole |
| CMGC | |
| Opportunities | Obstacles |
| Can utilize a lower level of design prior to selecting a contractor then collaboratively advance design with agency, designer and contractor  Contractor involvement in early design improves constructability  Agency controls design  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 |

### 4) Cost Project Delivery Selection Checklist

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| DESIGN-BID-BUILD | |
| Opportunities | Obstacles |
| Competitive bidding provides a low cost construction to a fully defined scope of work  Increase certainty about cost estimates  Construction costs are contractually set before construction begins | Cost accuracy is limited until design is completed  Construction costs are not locked in until design is 100% complete  Cost reductions due to contractor innovation and constructability is difficult to obtain  More potential of cost change orders due to Agency design responsibility |
| DESIGN-BUILD | |
| Opportunities | Obstacles |
| Contractor input into design should moderate cost  Design-builder collaboration and ATCs can provide a cost-efficient response to project goals  Costs are contractually set early in design process with design-build proposal  Allows a variable scope bid to match a fixed budget  Potential lower average cost growth  Funding can be obligated in a very short timeframe | Risks related to design-build, lump sum cost without 100% design complete, can compromise financial success of the project |
| CMGC | |
| Opportunities | Obstacles |
| Agency/designer/contractor collaboration to reduce project risk can result in lowest project costs  Early contractor involvement can result in cost savings through VE and constructability  Cost will be known earlier when compared to DBB  Integrated design/construction process can provide a cost efficient strategies to project goals  Can provide a cost efficient response to the project goals | Non-competitive negotiated GMP introduces price risk  Difficulty in GMP negotiation introduces some risk that GMP will not be successfully executed requiring aborting the CMGC process  Paying for contractors involvement in the design phase may increase total cost |

### 5a) Initial Risk Assessment Guidance

Three sets of risk assessment checklists are provided to assist in an initial risk assessment relative to the selection of the delivery method:

* Typical Transportation Project Risks
* General Project Risks Checklist
* Opportunities/Obstacles Checklist (relative to each delivery method)

It is important to recognize that the initial risk assessment is to only ensure the selected delivery method can properly address the project risks. A more detailed level of risk assessment should be performed concurrently with the development of the procurement documents to ensure that project risks are properly allocated, managed, and minimized through the procurement and implementation of the project.

#### Typical Transportation Project Risks

Following is a list of project risks that are frequently encountered on transportation projects and a discussion on how the risks are resolved through the different delivery methods.

##### 1) Site Conditions and Investigations

How unknown site conditions are resolved. For additional information on site conditions, refer to 23 CFR 635.109(a) at the following link:

<http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=91468e48c87a547c3497a5c19d640172&rgn=div5&view=text&node=23:1.0.1.7.23&idno=23#23:1.0.1.7.23.1.1.9>

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| DESIGN-BID-BUILD  Site condition risks are generally best identified and mitigated during the design process prior to procurement to minimize the potential for change orders and claims when the schedule allows. |

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| DESIGN-BUILD  Certain site condition responsibilities can be allocated to the design-builder provided they are well defined and associated third party approval processes are well defined. Caution should be used as unreasonable allocation of site condition risk will result in high contingencies during bidding. The Agency should perform site investigations in advance of procurement to define conditions and avoid duplication of effort by proposers. At a minimum, the Agency should perform the following investigations:   1. Basic design surveys 2. Hazardous materials investigations to characterize the nature of soil and groundwater contamination 3. Geotechnical baseline report to allow design-builders to perform proposal design without extensive additional geotechnical investigations |

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| CMGC  The STA, the designer, and the contractor can collectively assess site condition risks, identify the need to perform site investigations in order to reduce risks, and properly allocate risk prior to GMP. |

##### 2) Utilities

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| DESIGN-BID-BUILD  Utility risks are best allocated to the Agency, and mostly addressed prior to procurement to minimize potential for claims when the schedule allows. |

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| DESIGN-BUILD  Utilities responsibilities need to be clearly defined in contract requirements, and appropriately allocated to both design-builder and the Agency:  *Private utilities (major electrical, gas, communication transmission facilities*): Need to define coordination and schedule risks, as they are difficult for design-builder to price. Best to have utilities agreements before procurement. Note – by state regulation, private utilities have schedule liability in design-build projects, but they need to be made aware of their responsibilities.  *Public Utilities*: Design and construction risks can be allocated to the design-builder, if properly incorporated into the contract requirements. |

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| CMGC  Can utilize a lower level of design prior to contracting and joint collaboration of Agency, designer, and contractor in the further development of the design. |

##### 3) Railroads (if applicable)

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| DESIGN-BID-BUILD  Railroad risks are best resolved prior to procurement and relocation designs included in the project requirements when the schedule allows. |

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| DESIGN-BUILD  Railroad coordination and schedule risks should be well understood to be properly allocated and are often best assumed by the Agency. Railroad design risks can be allocated to the designer if well defined. Best to obtain an agreement with railroad defining responsibilities prior to procurement |

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| CMGC  Railroad impacts and processes can be resolved collaboratively by Agency, designer, and contractor. A lengthy resolution process can delay the GMP negotiations. |

##### 4) Drainage/Water Quality Best Management Practices (construction and permanent)

Both drainage and water quality often involve third party coordination that needs to be carefully assessed with regard to risk allocation. Water quality in particular is not currently well defined, complicating the development of technical requirements for projects.

Important questions to assess:

1. Do criteria exist for compatibility with third party offsite system (such as an OSP (Outfall System Plan))?
2. Is there an existing cross-drainage undersized by design Criteria?
3. Can water quality requirements be precisely defined? Is right-of-way adequate?

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| DESIGN-BID-BUILD  Drainage and water quality risks are best designed prior to procurement to minimize potential for claims when the schedule allows. |

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| DESIGN-BUILD  Generally, the Agency is in the best position to manage the risks associated with third party approvals regarding compatibility with offsite systems, and should pursue agreements to define requirements for the design-builder. |

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| CMGC  The Agency, the designer, and the contractor can collectively assess drainage risks and coordination and approval requirements, and minimize and define requirements and allocate risks prior to GMP. |

##### 5) Environmental

Meeting environmental document commitments and requirements, noise, 4(f) and historic, wetlands, endangered species, etc.

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| DESIGN-BID-BUILD  Risk is best mitigated through design prior to procurement when the schedule allows. |

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| DESIGN-BUILD  Certain environmental approvals and processes that can be fully defined can be allocated to the design-builder. Agreements or MOUs with approval agencies prior to procurement is best to minimize risks. |

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| CMGC  Environmental risks and responsibilities can be collectively identified, minimized, and allocated by the Agency, the designer, and the contractor prior to GMP |

##### 6) Third Party Involvement

Timeliness and impact of third party involvement (funding partners, adjacent municipalities, adjacent property owners, project stakeholders, FHWA, PUC).

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| DESIGN-BID-BUILD  Third party risk is best mitigated through design process prior to procurement to minimize potential for change orders and claims when the schedule allows. |

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| DESIGN-BUILD  Third party approvals and processes that can be fully defined can be allocated to the design-builder. Agreements or MOUs with approval agencies prior to procurement is best to minimize risks. |

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| CMGC  Third party approvals can be resolved collaboratively by the Agency, designer, and contractor. |

### 5b) General Project Risk Checklist (Items to consider when assessing risk)

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| Environmental Risks | External Risks |
| Delay in review of environmental documentation  Challenge in appropriate environmental documentation  Defined and non-defined hazardous waste  Environmental regulation changes  Environmental impact statement (EIS) required  NEPA/ 404 Merger Process required  Environmental analysis on new alignments required | Stakeholders request late changes  Influential stakeholders request additional needs to serve their own commercial purposes  Local communities pose objections  Community relations  Conformance with regulations/guidelines/ design criteria  Intergovernmental agreements and jurisdiction |
| Third-Party Risks | Geotechnical and Hazmat Risks |
| Unforeseen delays due to utility owner and third-party  Encounter unexpected utilities during construction  Cost sharing with utilities not as planned  Utility integration with project not as planned  Third-party delays during construction  Coordination with other projects  Coordination with other government agencies | Unexpected geotechnical issues  Surveys late and/or in error  Hazardous waste site analysis incomplete or in error  Inadequate geotechnical investigations  Adverse groundwater conditions  Other general geotechnical risks |
| Right-of-Way/ Real Estate Risks | Design Risks |
| Railroad involvement  Objections to ROW appraisal take more time and/or money  Excessive relocation or demolition  Acquisition ROW problems  Difficult or additional condemnation  Accelerating pace of development in project corridor  Additional ROW purchase due to alignment change | Design is incomplete/ Design exceptions  Scope definition is poor or incomplete  Project purpose and need are poorly defined  Communication breakdown with project team  Pressure to deliver project on an accelerated schedule  Constructability of design issues  Project complexity - scope, schedule, objectives, cost, and deliverables - are not clearly understood |
| Organizational Risks | Construction Risks |
| Inexperienced staff assigned  Losing critical staff at crucial point of the project  Functional units not available or overloaded  No control over staff priorities  Lack of coordination/ communication  Local agency issues  Internal red tape causes delay getting approvals, decisions  Too many projects/ new priority project inserted into program | Pressure to delivery project on an accelerated schedule.  Inaccurate contract time estimates  Construction QC/QA issues  Unclear contract documents  Problem with construction sequencing/ staging/ phasing  Maintenance of Traffic/ Work Zone Traffic Control |

### 5c) Assessment of Risk Project Delivery Selection Opportunities/Obstacles Checklist

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| DESIGN-BID-BUILD | |
| Opportunities | Obstacles |
| Risks managed separately through design, bid, build is expected to be easier  Risk allocation is most widely understood/used  Opportunity to avoid or mitigate risk through complete design  Risks related to environmental, railroads, & third party involvement are best resolved before procurement  Utilities and ROW best allocated to the agency and mostly addressed prior to procurement to minimize potential for claim  Project can be shelved while resolving risks | Agency accepts risks associated with project complexity (the inability of designer to be all-knowing about construction) and project unknowns  Low-bid related risks  Potential for misplaced risk through prescriptive specifications  Innovative risk allocation is difficult to obtain  Limited industry input in contract risk allocation  Change order risks can be greater  Contractor may avoid risks |
| DESIGN-BUILD | |
| Opportunities | Obstacles |
| Performance specifications can allow for alternative risk allocations to the design builder  Risk-reward structure can be better defined  Innovative opportunities to allocate risks to different parties (e.g., schedule, means and methods, phasing)  Opportunity for industry review of risk allocation (draft RFP, ATC processes)  Avoid low-bid risk in procurement  Contractor will help identify risks related to environmental, railroads, ROW, and utilities  Designers and contractors can work toward innovative solutions to, or avoidance of, unknowns | Need a detailed project scope, description etc., for the RFP to get accurate/comprehensive responses to the RFP (Increased RFP costs may limit bidders)  Limited time to resolve risks  Additional risks allocated to designers for errors and omissions, claims for change orders  Unknowns and associated risks need to be carefully allocated through a well-defined scope and contract  Risks associated with agreements when design is not completed  Poorly defined risks are expensive  Contractor may avoid risks or drive consultant to decrease cost at risk to quality |
| CMGC | |
| Opportunities | Obstacles |
| Contractor can have a better understanding of the unknown conditions as design progresses  Innovative opportunities to allocate risks to different parties (e.g., schedule, means and methods, phasing)  Opportunities to manage costs risks through CMGC involvement  Contractor will help identify and manage risk  Agency still has considerable involvement with third parties to deal with risks  Avoids low-bid risk in procurement  More flexibility and innovation available to deal with unknowns early in design process | Lack of motivation to manage small quantity costs  Increase costs for non-proposal items  Disagreement among Designer-Contractor-Agency can put the process at risk  If GMP cannot be reached, additional low-bid risks appear  Limited to risk capabilities of CMGC  Designer-contractor-agency disagreements can add delays  Strong agency management is required to negotiate/optimize risks  Discovery of unknown conditions can drive up GMP, which can be compounded in phased construction |

### 6) Staff Experience and Availability Project Delivery Selection Checklist

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| --- | --- |
| DESIGN-BID-BUILD | |
| Opportunities | Obstacles |
| Agency, contractors and consultants have high level of experience with the traditional system  Designers can be more interchangeable between projects | Can require a high level of agency staffing of technical resources  Staff’s responsibilities are spread out over a longer design period  Can require staff to have full breadth of technical expertise |
| DESIGN-BUILD | |
| Opportunities | Obstacles |
| Less agency staff required due to the sole source nature of DB  Opportunity to grow agency staff by learning a new process | Limitation of availability of staff with skills, knowledge and personality to manage DB projects  Existing staff may need additional training to address their changing roles  Need to “mass” agency management and technical resources at critical points in process (i.e., RFP development, design reviews, etc.) |
| CMGC | |
| Opportunities | Obstacles |
| Agency can improve efficiencies by having more project managers on staff rather than specialized experts  Smaller number of technical staff required through use of consultant designer | Strong committed agency project management is important to success  Limitation of availability of staff with skills, knowledge and personality to manage CMGC projects  Existing staff may need additional training to address their changing roles  Agency must learn how to negotiate GMP projects |

### 7) Level of Oversight and Control Project Delivery Selection Checklist

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| --- | --- |
| DESIGN-BID-BUILD | |
| Opportunities | Obstacles |
| Full agency control over a linear design and construction process  Oversight roles are well understood  Contract documents are typically completed in a single package before construction begins  Multiple checking points through three linear phases: design-bid-build  Maximum control over design | Requires a high-level of oversight  Increased likelihood of claims due to agency design responsibility  Limited control over an integrated design/construction process |
| DESIGN-BUILD | |
| Opportunities | Obstacles |
| A single entity responsibility during project design and construction  Continuous execution of design and build  Getting input from construction to enhance constructability and innovation  Overall project planning and scheduling is established by one entity | Can require high level of design oversight  Can require high level of quality assurance oversight  Limitation on staff with DB oversight experience  Less agency control over design  Control over design relies on proper development of technical requirements |
| CMGC | |
| Opportunities | Obstacles |
| Preconstruction services are provided by the construction manager  Getting input from construction to enhance constructability and innovation  Provides agency control over an integrated design/construction process | Agency must have experienced staff to oversee the CMGC  Higher level of cost oversight required |

### 8) Competition and Contractor Experience Project Delivery Selection Checklist

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| --- | --- |
| DESIGN-BID-BUILD | |
| Opportunities | Obstacles |
| Promotes high level of competition in the marketplace  Opens construction to all reasonably qualified bidders  Transparency and fairness  Reduced chance of corruption and collusion  Contractors are familiar with DBB process | Risks associated with selecting the low bid (the best contractor is not necessary selected)  No contractor input into the process  Limited ability to select contractor based on qualifications |
| DESIGN-BUILD | |
| Opportunities | Obstacles |
| Allows for a balance of qualifications and cost in design-builder procurement  Two-phase process can promote strong teaming to obtain “Best Value”  Increased opportunity for innovation possibilities due to the diverse project team | Need for DB qualifications can limit competition  Lack of competition with past experience with the project delivery method  Reliant on DB team selected for the project  The gap between agency experience and contractor experience with delivery method can create conflict |
| CMGC | |
| Opportunities | Obstacles |
| Allows for qualifications based contractor procurement  Agency has control over an independent selection of best qualified designer and contractor  Contractor is part of the project team early on, creating a project “team”  Increased opportunity for innovation due to the diversity of the project team | Currently there is not a large pool of contractors with experience in CMGC, which will reduce the competition and availability  Working with only one contractor to develop GMP can limit price competition  Requires a strong project manager from the agency  Teamwork and communication among the project team |