APPENDIX D

Forms for the Analytical Delivery Decision Approach (Tier 1)

The first tier in the systematic approach developed in this guidebook is the Analytical Delivery Decision Approach discussed in Chapter 4. This appendix provides the reader with the forms and templates required to implement the analytical approach. Templates can be printed and used for the analysis.

Project Level Issues

1) Project Size

Project size reflects the dollar value and physical dimensions of the transit corridor.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ DBB has been shown to work on projects of all sizes.	❒ As projects grow in size, the amount of owner staffing required to oversee DBB can become very large.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ CMR has been shown to work on projects of all sizes.	❒ If not managed well, the use of multiple bid packages to facilitate CMR can be difficult.

DESIGN-BUILD	
Advantages	Disadvantages
❒ DB has been shown to work on projects of all sizes. ❒ Some owners have noted that DB can facilitate better management of large projects due to the single source of responsibility.	❒ As projects grow in size, there can be large peaks in owner staffing requirements with DB (e.g., during RFP development, during design review, etc.).

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ DBOM is appropriate for large projects. ❒ Similar to DB, DBOM can facilitate better management of large projects due to the single source of responsibility.	❒ DBOM is not appropriate for smaller projects due to the overhead costs (e.g., for maintenance, etc.) ❒ Similar to DB, DBOM can necessitate large peaks in owner staffing requirements.

Table D-1 - Project Size Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
1. Project Size				

Key: ● Most appropriate delivery method
O Appropriate delivery method
○ Least appropriate delivery method
X Not Applicable (discontinue evaluation of this method)

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2) Cost

This issue represents several aspects of project cost like ability to handle budget restrictions, early and precise cost estimation, and consistent control of project costs.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ Costs are known at bid time, before construction begins. ❒ Project can benefit from low-bid procurement. ❒ Project can benefit from unit price bidding because quantities are defined prior to procurement.	❒ Construction costs are not fixed (or locked in) until design is 100% complete. ❒ Constructability advice and contractor innovations are not available to save cost until post bid. ❒ The DBB process is prone to change orders and cost growth after award.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ CMR can be used in conjunction with a GMP pricing structure, which can be useful in negotiating and controlling costs. ❒ If open book pricing can be used, all costs will be known by the owner. ❒ Costs will be known earlier when compared to DBB. ❒ Early constructor involvement or construction advice can lead to cost savings through value engineering and constructability reviews.	❒ If multiple bid packages are used, the overall project cost could grow if later bid packages cost more than estimated. ❒ If a GMP pricing structure is used, owners may have some difficulty in negotiation.

DESIGN-BUILD	
Advantages	Disadvantages
❒ If a lump sum pricing structure is used, costs will be fixed early in the project development process. ❒ DB has been shown to have lower average cost growth than DBB or CMR.	❒ If a lump sum pricing structure is used, constructors must develop prices before plans are 100% complete and therefore must assume some risk in pricing.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ Owner is provided with fixed cost for design, construction, and maintenance very early in the process.	❒ Due to the large amount of risk being taken by the DBOM provider, costs may be higher if the providers are not given opportunities to find efficiencies. ❒ DBOM pricing may be hard to negotiate due to the complexity and time frame of maintenance contracts.

Table D-2 - Cost Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
2. Cost				

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3) Schedule

This factor shows two aspects of project schedule and includes both the ability to shorten the schedule and the opportunity to control and prevent time growth.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ None.	❒ Likely to yield longest delivery schedule. ❒ Likely to yield the highest schedule growth. ❒ There is a lack of opportunity to compress schedule due to the linear nature of DBB.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ Facilitates fast-tracking or the ability to bid multiple design packages. ❒ Studies have shown that CMR is faster on average than DBB, but slower than DB.	❒ Risk that overlapping design and construction packages may create delays if not properly coordinated. ❒ Fast-tracking schedule will require owner effort in design and construction reviews.

DESIGN-BUILD	
Advantages	Disadvantages
❒ Provides a single point of responsibility (DB contractor) for schedule control. ❒ Provides early schedule certainty. ❒ Historically, provides the least schedule growth. ❒ Provides opportunities for flexibility in schedule compression. ❒ Studies have shown that DB is faster on average than DBB or CMR.	❒ Owner will sacrifice the checks and balances of having a 100%-complete design prior to start of construction. ❒ Rapid schedule will require owner effort in design and construction reviews.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ Provides a single point of responsibility (DB contractor) for schedule control. ❒ Provides early scheduled certainty. ❒ Historically, provides the least schedule growth. ❒ Provides opportunities for flexibility in schedule compression. ❒ Will facilitate start-up process due to a single point of responsibility for design, construction, and operation. ❒ Historically faster than DBB or CMR.	❒ Owner will sacrifice the advantage of having complete design prior to start of construction. ❒ Rapid schedule will require owner effort in design and construction reviews.

Table D-3 - Schedule Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
3. Schedule				

Comments_____
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4) Risk Management

The issue details methods to cope with project uncertainties that are inherent to each delivery method. For more detailed guidance, please see Tier 3 for a risk-based approach to selecting project delivery methods.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ Provides historically well-defined and well-understood risk management processes. ❒ Prescriptive designs and specifications allow for greater detail in risk allocation.	❒ Constructor cannot participate in risk management during design. ❒ Constructor's ability to manage risk is constrained by low-bid procurement.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ Construction manager understands and participates in risk management process during design.	❒ Risk management process can be more complex due to separate design, construction, and construction management contracts.

DESIGN-BUILD	
Advantages	Disadvantages
❒ Single point of responsibility for risk management in design and construction.	❒ Owner may lose some ability to participate in the risk management process.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ Single point of responsibility for risk allocation in design, construction, operation, and maintenance.	❒ Owner may lose some ability to participate in the risk management process for design, construction, operation, and maintenance.

Table D-4 - Risk Management Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
4. Risk Management				

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5) Risk Allocation

Each project delivery method has inherent risk-allocation characteristics. The overarching goal should be to select the project delivery method with the best ability to assign project risks to the parties in the best position to manage them.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ A clear risk allocation has been established due to history of use and statutory case law.	❒ Constructor cannot participate in risk-allocation discussions during design. ❒ Conflicts can exist in risk allocation between separate design and construction contracts.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ Construction Manager understands and participates in risk allocation during design. ❒ Prescriptive designs and specifications allow for greater detail in risk allocation.	❒ Conflicts can exist in risk allocation between separate design, construction, and construction management contracts.

DESIGN-BUILD	
Advantages	Disadvantages
❒ Provides a single party for risk allocation in both design and construction. ❒ Design-builder owns risk for design errors and omissions.	❒ Risks must be allocated through conceptual design and performance specifications.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ Provides a single-party risk allocation in design, construction, and maintenance. ❒ Constructor owns risk for design errors and omissions in construction, operations, and maintenance.	❒ Risks must be allocated through conceptual design and performance specifications for design, construction, operation, and maintenance.

Table D-5 – Risk-Allocation Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
5. Risk Allocation				

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6) LEED Certification

Each project delivery method has some inherent abilities to include these features in accordance with the owner's needs.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ LEED certification can be established in more detail during design period.	❒ Provides the least opportunity for constructor to participate in LEED process during design. ❒ Separate design packages can create difficulty in coordinating LEED elements in construction.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ Construction manager can offer its construction expertise during design decisions that involve LEED issues.	❒ Separate design packages can create difficulty in coordinating LEED elements in construction.

DESIGN-BUILD	
Advantages	Disadvantages
❒ Owner can use some LEED certification elements to select constructor. ❒ Single point of responsibility is provided for LEED certification in design and construction.	❒ Owner may not be involved in all LEED decisions.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ Owner can use some LEED certification elements to select constructor. ❒ In addition to having a single point of responsibility provided for LEED certification in design and construction, many LEED principles are in alignment with the constructor's motivation to minimize operating costs.	❒ Owner may not be involved in all LEED decisions.

Table D-6 - LEED Certification Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
6. LEED Certification				

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Agency Level Issues

7) Agency Experience

The level of experience of an owner's staff can affect the success of an alternative delivery method application.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ Since this is the traditional method of project delivery, owners will likely have the most experience with this method.	❒ None.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ CMR is similar to DBB in many key aspects where agencies have experience (e.g., separation of design and construction).	❒ Agencies may not have experience with GMP pricing or the negotiation that can be involved. ❒ Agencies may not have experience in the use of multiple bid packages to facilitate fast-track construction.

DESIGN-BUILD	
Advantages	Disadvantages
❒ Agencies can take advantage of the sole point of responsibility for design and construction to leverage their experience.	❒ Agencies may not have experience authoring DB RFPs and conducting procurements. ❒ Agencies may not have experience administering DB contracts, particularly in the area of design review and administration. ❒ DB necessitates experienced staff to manage design and construction under one contract.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ Similar to DB, agencies can take advantage of the sole point of contact for design, construction, and maintenance to leverage their experience.	❒ Agencies may not have experience authoring DBOM RFPs and conducting procurements. ❒ Agencies may not have experience administering DBOM contracts, particularly in the area of design review and administration. ❒ DBOM necessitates the most experienced staff to manage design, construction, and maintenance under one contract.

Table D-7 - Agency Experience Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
7. Agency Experience				

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8) Staffing Required

The total number of required owner's employees for each delivery method is one measure of the extent of owner involvement. Another important measure for the owners is the variation in the number of staff required throughout the project development process.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ The separation of design and construction phases provides less variation in owner staffing levels.	❒ DBB typically requires a larger owner staff than the other delivery methods. ❒ DBB typically requires a higher level of owner involvement.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ The CMR alternative can use the least number of owner staff if the CMR is allowed to take on the traditional owner tasks.	❒ The owner will need to have a number of staff with the ability to oversee and negotiate with the CMR during the process.

DESIGN-BUILD	
Advantages	Disadvantages
❒ DB can greatly reduce the number of required owner staff. ❒ Design and construction reviews can be done in shorter periods of time.	❒ DB creates peaks in owner staffing needs, particularly during procurement and design review periods. ❒ While fewer owner staff is needed, more experienced staff is required.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ Similar to DB, DBOM can greatly reduce the number of required owner staff. ❒ Design and construction reviews can be done in shorter periods of time.	❒ DBOM can create larger peaks in owner staffing needs during procurement and design review due to the inclusion of maintenance and finance issues involved in the process. ❒ While fewer owner staff is needed, more experienced staff is required.

Table D-8 - Staffing Required Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
8. Staff Required				

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9) Staff Capability

This issue regards the owner's requirement to furnish a highly capable staff to complete the duties it must undertake in each delivery method.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ DBB is traditionally aligned with owner staff capabilities.	❒ As projects grow in size, more experienced staff is required. ❒ Owners typically have different staff to oversee design and construction processes.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ The CMR can augment an owner's capabilities with his own staff.	❒ Owners must have experienced staff to oversee the CMR. ❒ Owners may lack some capabilities in negotiating prices, developing designs, and managing the constructor's inputs during the design phase.

DESIGN-BUILD	
Advantages	Disadvantages
❒ The owners will be able to rely on one source of responsibility for both design and construction.	❒ Similar to CMR, DB is an alternative delivery method and it is advisable to have a staff with DB oversight experience. ❒ Owners will need capabilities to develop procurement documents and performance criteria. ❒ Owners will need to have capabilities of reviewing design under a DB contract.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ The owners will be able to rely on one source of responsibility for design, construction, operations, and maintenance.	❒ Similar to DB, DBOM is an alternative delivery method and it is advisable to have staff members with DBOM oversight experience. ❒ Owners will need capabilities to develop procurement documents and performance criteria. ❒ Owners will need capabilities to analyze complex financial proposals. ❒ Owners will need to have capabilities of reviewing design under a DB contract.

Table D-9 - Staff Capability Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
9. Staff Capability				

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10) Agency Goals and Objectives

Agency goals define project success. The extent to which these goals align with the inherent attributes of each project delivery method has a significant bearing on delivery method selection.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ The DBB process allows for goals to be defined through the design process.	❒ Separate design and construction contracts can make goals more difficult to align and manage. ❒ If not developed correctly, detailed designs and prescriptive specifications can conflict with agency goals.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ Agency can involve the CMR in refinement of goals while working together to refine the scope and the GMP. ❒ Qualifications-based construction manager selection can align the team with the project goals.	❒ The agency must have the goals substantially developed when the construction manager contract is awarded. ❒ The negotiation of a GMP may inhibit the alignment of project goals between the agency and the construction manager.

DESIGN-BUILD	
Advantages	Disadvantages
❒ Best-value design-builder selection can align the team with the project goals. ❒ Properly written procurement performance criteria can help design-builders innovate to achieve project goals.	❒ To ensure success, agencies must completely understand goals prior to awarding the DB contract.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ In addition to the DB advantages, DBOM allows owners to include lifecycle and maintenance goals in the contract.	❒ Similar to DB, agencies must completely understand goals prior to awarding the DBOM contract.

Table D-10 - Agency Goals and Objectives Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
10. Agency Goals and Objectives				

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11) Agency Control of Project

The owner's ability to control the details of design and construction varies with each project delivery method. (Note that cost control and time control are described in other issues).

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ The use of prescriptive specifications and complete designs at the time of award provides agencies with the most control over the project. ❒ Separate design and construction contracts provide clear checks and balances.	❒ With additional control come added activities and responsibility for agency staff. ❒ The DBB method can be prone to change orders if any design conflicts or constructability issues are found.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ The CMR method benefits from early constructor involvement, but still has the benefit of separate design and construction contracts.	❒ Agency control of CMR delivery requires more effort due to the use of multiple design packages and the need for a GMP pricing structure.

DESIGN-BUILD	
Advantages	Disadvantages
❒ The transfer of design liability lessens the need for agency control over design.	❒ Award at a conceptual design level means that the agency will lose control over the details of the final design.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ The transfer of design liability lessens the need for agency control over design and maintenance decisions.	❒ Award at a conceptual design level means that the agency will lose control over the details of the final design. ❒ Since the DBOM will be responsible for maintaining the project, the agency could lose control over the detail of some maintenance decisions.

Table D-11 - Agency Control of Project Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
11. Agency Control of Project				

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12) Third-Party Agreement

Each delivery method can facilitate agreements with third parties, such as political entities, utilities, railroads, etc. in a different manner. The extent to which designers or constructors can facilitate third-party agreements is the basis for the advantages and disadvantages of each delivery method.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ The use of complete plans and prescriptive specifications facilitates third-party agreements.	❒ Expediting third-party agreements in the DBB process can be cumbersome if it is required.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ Construction managers can help facilitate third-party agreements.	❒ Construction managers typically do not guarantee costs that stem from problems with third-party agreements.

DESIGN-BUILD	
Advantages	Disadvantages
❒ Design-builders can use innovative methods to assist in obtaining third-party agreements.	❒ Some third-party agencies can have codes that negate the use of DB thereby excluding the DB method from consideration (see Step 3 Review Go/No-Go Decision Points). ❒ Design-builders typically do not guarantee costs that stem from problems with third-party agreements.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ Design-builders can use innovative methods to assist in obtaining third-party agreements.	❒ Some third-party agencies can have codes that negate the use of DBOM thereby excluding the DBOM method from consideration (see Step 3 Review Go/No-Go Decision Points). ❒ Design-builders typically do not guarantee costs that stem from problems with third-party agreements.

Table D-12 – Third-Party Agreement Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
12. Third-Party Agreement				

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Public Policy/Regulatory Issues

13) Competition

Each delivery method may affect the level of competition. This concerns the evaluation of facilitating effects of each method on competition. Alternative project delivery methods allow agencies to package projects in sizes that effectively enhance or reduce competition.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ Owner benefits from large pool of potential bidders and high level of competition.	❒ There are issues that follow low-bid procurement such as a higher probability of request for change orders, disputes, and claims.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ Qualifications-based selection factors can be applied to select only the most highly qualified construction managers.	❒ Presence of a constructor early in the project may give the owner less competitive leverage when pricing construction.

DESIGN-BUILD	
Advantages	Disadvantages
❒ Qualifications-based selection factors can be applied to select only the most highly qualified design-builders.	❒ Proposal package size and bid preparation costs can decrease the number of qualified bidders. ❒ Opposition from public-sector employees, unions, or other interested parties can exclude the DB method from consideration (see Step 3 Review Go/No-Go Decision Points).

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ Qualifications-based selection factors can be applied to select only the most highly qualified design-builders.	❒ Proposal package size and bid preparation costs can decrease the number of qualified bidders. ❒ Lengthy contract duration and extra competencies required for O&M part of the contract decrease the number of bidders. ❒ Opposition from public-sector employees, unions, or other interested parties can exclude the DBOM method from consideration (see Step 3 Review Go/No-Go Decision Points).

Table D-13 - Competition Advantages/ Disadvantages Summary

	DBB	CMR	DB	DBOM
13. Competition				

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14) Disadvantaged Business Enterprise (DBE) Impacts

The extent to which the delivery methods can be used to promote participation of disadvantaged businesses forms the advantages and disadvantages of this issue.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ Agencies can include DBE requirements in both design and construction requirements. ❒ DBE involvement is known at time of award for design and construction.	❒ Low-bidding environment may harm future viability of DBE companies.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ Agencies can include DBE requirements in both design and construction requirements. ❒ DBE involvement is known at time of award for design and construction.	❒ Due to the phased nature of CMR contracts, the final DBE involvement may not be known until the project is ultimately completed.

DESIGN-BUILD	
Advantages	Disadvantages
❒ Agencies can include DBE requirements in the RFP for design and construction requirements.	❒ Owners can set DBE requirements, but because all subcontractors are not known at the time of award, there is a risk that design-builders may not achieve the DBE goals they specify in their proposals.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ Agencies can include DBE requirements in the RFP for design, construction, and maintenance requirements.	❒ Owners can set DBE requirements, but because all subcontractors are not known at the time of award, there is a risk that design-builders may not achieve the DBE goals they specify in their proposals.

Table D-14 - DBE Impacts Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
14. DBE Impacts				

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15) Labor Unions

The choice of delivery method may have an impact on labor usage and hence labor union issues. These issues can be both internal to the transit agency as well as external with its contractors.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ The DBB process is well established, so there is generally no fundamental opposition from unions.	❒ None.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ Similar to DBB, there is generally no fundamental opposition from unions.	❒ Construction managers do not generally guarantee prices if there are issues with labor unions.

DESIGN-BUILD	
Advantages	Disadvantages
❒ None.	❒ Opposition from public design unions can exclude the DB method from consideration (see Step 3 Review Go/No-Go Decision Points). ❒ Design-builders do not generally guarantee prices if there are issues with labor unions.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ None	❒ Opposition from public design unions can exclude the DBOM method from consideration (see Step 3 Review Go/No-Go Decision Points). ❒ Opposition from public maintenance unions can exclude the DB method from consideration (see Step 3 Review Go/No-Go Decision Points). ❒ Design-builders do not generally guarantee prices if there are issues with labor unions.

Table D-15 - Labor Unions Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
15. Labor Unions				

Comments_____
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16) Federal/State/Local Laws

Use of some delivery methods may not be allowed for transit agencies due to state or local laws. Some of the states mandate that the transit agencies go through several steps before being allowed to use an alternative delivery method. The level of difficulty of using a delivery method from a legal standpoint constitutes the advantages and disadvantages of this issue.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ All states are authorized to use DBB.	❒ None.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ Some states allow more flexible procurement regulations with CMR, which can be advantageous in appropriate situations to expedite project development.	❒ Some state agencies are not authorized to use CMR or need to get extra approvals (see Step 3 Review Go/No-Go Decision Points).

DESIGN-BUILD	
Advantages	Disadvantages
❒ Some states allow more flexible procurement regulations with DB, which can be advantageous in appropriate situations to expedite project development.	❒ Some state agencies are not authorized to use DB or need to get extra approvals (see Step 3 Review Go/No-Go Decision Points).

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ Some states allow more flexible procurement regulations with DBOM, which can be advantageous in appropriate situations to expedite project development.	❒ State laws and regulations for DBOM are similar to DB (see Step 3 Review Go/No-Go Decision Points).

Table D-16 - Federal/State/Local Laws Advantages/ Disadvantages Summary

	DBB	CMR	DB	DBOM
16. Federal/State/Local Laws				

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17) FTA/EPA Regulations

The extent to which the various delivery methods can facilitate FTA requirements and EPA regulations, given the unique project characteristics, constitutes the advantages and disadvantages of this issue.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ Familiarity of agencies with this method facilitates permit and funding processes.	❒ The final cost and schedule are established long after the Full Funding Grant Authorization (FFGA), which can be problematic if FFGA cost and schedule estimates are not met.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ Construction managers can help facilitate the environmental process.	❒ The use of a GMP with separate design and construction packages can result in a final cost and schedule confirmation long after the FFGA.

DESIGN-BUILD	
Advantages	Disadvantages
❒ FTA has gained some experience and has modified its procedures to use DB. ❒ Cost and schedule are fixed near the FFGA.	❒ The design required to acquire environmental permits before hiring a design-builder may cause delays and negate some of the advantages of the DB method.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ FTA has gained some experience and has modified its procedures. ❒ Cost and schedule are fixed near the FFGA.	❒ The design required to acquire environmental permits before hiring a design-builder may cause delays and negate some of the advantages of the DB method.

Table D-17 - FTA/EPA Regulations Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
17. FTA/EPA Regulations				

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18) Stakeholder/Community Input

This issue addresses the opportunity for stakeholder involvement afforded by the delivery methods.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ Separate design and construction phases give an opportunity to get stakeholders' inputs before the commencement of construction.	❒ The opportunity for stakeholder changes in design can cause delays in the project and add to the costs in the form of change orders.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ The construction experience of the construction manager can help facilitate stakeholder input.	❒ Stakeholder input can make GMP negotiation troublesome if not managed correctly.

DESIGN-BUILD	
Advantages	Disadvantages
❒ The owner can require the DB contractor to include a public information and outreach program to facilitate communities' inputs. ❒ Design-builders can be innovative in helping gain community involvement.	❒ Any change because of community inputs after the issuance of RFP can be costly.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ The owner can require the DB contractor to include a public information and outreach program to facilitate communities' inputs. ❒ Design-builders can be innovative in helping gain community involvement.	❒ Any change because of community inputs after the issuance of RFP can be costly.

Table D-18 - Stakeholder/Community Input Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
18. Stakeholder/Community Input				

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Lifecycle Issues

19) Lifecycle Costs

Delivery methods can influence costs in the operation and maintenance phase. This issue focuses on the opportunities or barriers that each delivery method provides with regard to lifecycle costs.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ The agency can control lifecycle costs through completed design and performance specifications.	❒ The DBB system allows for little constructor input into lifecycle costs.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ CMR has all the benefits of DBB, plus the agency can leverage construction manager's input into lifecycle costs.	❒ If lifecycle performance criteria are not well understood during the development of the GMP, lifecycle issues may be difficult to incorporate into the final product.

DESIGN-BUILD	
Advantages	Disadvantages
❒ The agency can use performance criteria to set lifecycle performance standards and rely on design-builder innovation to achieve these standards.	❒ If lifecycle performance criteria are not well understood at the procurement stage, they will not be incorporated into the DB contract.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ The design-builder is responsible for maintenance in the DBOM contract and will be highly motivated to provide optimal lifecycle designs. ❒ The agency can use performance criteria to set lifecycle performance standards and rely on design-builder innovation to achieve these standards.	❒ The agency will not have complete control over all lifecycle issues that are not included as performance criteria in the contract.

Table D-19 - Lifecycle Costs Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
19. Lifecycle Costs				

Comments_____
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20) Maintainability

There can be advantages and disadvantages to each delivery method with regard to how maintainability is achieved. This issue describes these advantages and disadvantages as they relate to the owner's ability to specify quality and ease of maintenance.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ The opportunity to view completed plans before award allows agencies to review maintenance issues in designs.	❒ There is little opportunity for constructors to have input into maintenance issues.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ CMR has all benefits of DBB, plus the agency can leverage construction manager's input into maintenance issues.	❒ If maintainability issues are not well understood during the development of the GMP, they may be difficult to incorporate into the final product.

DESIGN-BUILD	
Advantages	Disadvantages
❒ The agency can emphasize maintainability issues through performance criteria and best-value award factors.	❒ If maintainability issues are not well understood at the procurement stage, they will not be incorporated into the DB contract.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ The design-builder is responsible for maintenance in the DBOM contract and will be highly motivated to provide optimal lifecycle designs. ❒ The agency can emphasize maintainability issues through performance criteria and best-value award factors.	❒ The agency will not have complete control over all maintainability issues that are not included as performance criteria in the contract.

Table D-20 - Maintainability Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
20. Maintainability				

Comments_____
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21) Sustainable Design Goals

Sustainable design is becoming ever more important in achieving overall sustainability goals for projects. The effect of delivery method in facilitating the process of implementing sustainability issues in the design is the focus of this issue.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ Agencies can work with designers to incorporate sustainable designs into complete designs.	❒ The process provides little opportunity for constructability reviews to ensure that sustainable designs can be constructed efficiently and are not cost prohibitive.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ CMR has all the benefits of DBB, plus the agency can leverage construction manager's input into sustainable design issues.	❒ The use of separate bid packages can create barriers in the integration of sustainable solutions if not approached correctly.

DESIGN-BUILD	
Advantages	Disadvantages
❒ The agency can emphasize sustainable design issues through performance criteria and best-value award factors. ❒ Integration of the design and construction team can enhance constructability of designs.	❒ If sustainable design issues are not well understood at the procurement stage, they will not be incorporated into the DB contract.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ The agency can emphasize sustainable design issues through performance criteria and best-value award factors. ❒ Integration of the design and construction team can enhance constructability of designs. ❒ DBOM contractors can realize economic returns for sustainable designs since they have an inherent bias toward minimizing operations and maintenance lifecycle costs.	❒ If sustainable design issues are not well understood at the procurement stage, they will not be incorporated into the DB contract.

Table D-21 - Sustainable Design Goals Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
21. Sustainable Design Goals				

Comments_____
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22) Sustainable Construction Goals

Sustainable construction is an important vehicle for achieving overall sustainability goals as well. The effect of delivery method in facilitating the process of sustainable construction is the focus of this issue.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ Prescriptive specifications can be used to define sustainable construction practices prior to design.	❒ There is little opportunity or incentive for the constructor to do more than what is specified in terms of sustainable construction practices. ❒ Agencies can assume liability when prescribing construction methods.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ The agency can leverage construction manager's input into sustainable construction issues.	❒ The use of separate bid packages can create barriers in the integration of sustainable solutions if not approached correctly.

DESIGN-BUILD	
Advantages	Disadvantages
❒ The agency can emphasize sustainable construction issues through performance criteria and best-value award factors. ❒ Integration of the design and construction team can enhance the use of sustainable construction practices.	❒ If sustainable construction issues are not well understood at the procurement stage, they will not be incorporated into the DB contract.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ DBOM contractors can realize economic returns for sustainable designs since they have an inherent bias toward minimizing operations and maintenance lifecycle costs.	❒ If sustainable construction issues are not well understood at the procurement stage, they will not be incorporated into the DBOM contract.

Table D-22 - Sustainable Construction Goals Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
22. Sustainable Construction Goals				

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Other Issues

23) Construction Claims

The effect of each delivery method in exposing the agency to potential conflicts and claims is addressed under this issue.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ DBB has well-understood legal precedent for construction claims.	❒ DBB historically has the highest occurrence of claims and disputes, which often occur in the areas of authority, responsibility, and quality. ❒ The low-bid environment can provide incentives for a constructor to file claims—particularly if any ambiguity in plans exists.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ Having the constructor on the team early during design can lessen the likelihood for disputes and claims regarding designs.	❒ Since design and construction contracts are separate, the potential for disputes and claims regarding design still exists. ❒ If multiple bid packages are not managed correctly, the coordination of these bid packages can result in claims.

DESIGN-BUILD	
Advantages	Disadvantages
❒ The single source for design and construction eliminates claims for design errors or omissions from the agency's perspective.	❒ There is potential for claims with regard to scope definition if the form of the DB contract is not well understood.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ DBOM has similar advantages to DB and additionally eliminates claims regarding operating performance due to the integration of the operator.	❒ There is potential for claims with regard to scope definition if the form of the DBOM contract is not well understood.

Table D-23 - Construction Claims Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
23. Construction Claims				

Comments_____
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24) Adversarial Relationship

The extent to which a delivery method can prevent adversarial relationships on the project team varies depending upon the nature of the project and the owner's experience with the delivery methods.

DESIGN-BID-BUILD	
Advantages	Disadvantages
❒ Roles and responsibilities in a DBB contract are very well understood in the industry.	❒ DBB can create an adversarial relationship between the parties, primarily between the owner and the construction contractor.

CONSTRUCTION MANAGEMENT AT RISK	
Advantages	Disadvantages
❒ Inclusion of the construction manager in the design process can align team members and lessen adversarial relationships.	❒ Negotiation of GMP can create an adversarial situation if the process is not well understood.

DESIGN-BUILD	
Advantages	Disadvantages
❒ Inclusion of the designer and constructor on the same team can lessen adversarial relationships.	❒ Due to the loss of control over the details of design, DB requires a high level of trust between the owner and design-builder. Without this trust, design-build can become adversarial.

DESIGN-BUILD-OPERATE-MAINTAIN	
Advantages	Disadvantages
❒ Inclusion of the designer, constructor, and maintenance contractor on the same team can lessen adversarial relationships.	❒ Similar to DB, DBOM delivery requires a high level of trust to succeed.

Table D-24 - Adversarial Relationship Advantages/Disadvantages Summary

	DBB	CMR	DB	DBOM
24. Adversarial Relationship				

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Table D-25 - Project Delivery Method Advantage/Disadvantage Summary

PROJECT DELIVERY METHOD ADVANTAGE/DISADVANTAGE SUMMARY				
	DBB	CMR	DB	DBOM
Project Level Issues Rating				
1. Project Size				
2. Cost				
3. Schedule				
4. Risk Management				
5. Risk Allocation				
6. LEED Certification				
Agency Level Issues Rating				
7. Agency Experience				
8. Staffing Required				
9. Staff Capability				
10. Agency Goals and Objectives				
11. Agency Control of Project				
12. Third-Party Agreement				
Public Policy/Regulatory Issues Rating				
13. Competition				
14. DBE Impacts				
15. Labor Unions				
16. Federal/State/Local Laws				
17. FTA/EPA Regulations				
18. Stakeholder/Community Input				
Lifecycle Issues Rating				
19. Lifecycle Costs				
20. Maintainability				
21. Sustainable Design Goals				
22. Sustainable Construction Goals				
Other Issues Rating				
23. Construction Claims				
24. Adversarial Relationships				
Other				
Other				
Other				

Key: ● Most appropriate delivery method
◘ Appropriate delivery method
○ Least appropriate delivery method
X Not Applicable (discontinue evaluation of this method)

Project Goals and Pertinent Issue Comments

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