An ***IPRF*** Research Report

Innovative Pavement Research Foundation

Airport Concrete Pavement Technology Program

Report IPRF 01-G-002-06-1

Using Design/Build Acquisition for Airfield Pavements

BEST PRACTICES GUIDE

Program Management Office
Cooperative Programs Office
5420 Old Orchard Road
Skokie, Illinois 60077

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BEST PRACTICES GUIDE

Principal Investigator
Dr. Jim Hall, Jr., P.E., Applied Research Associates, Inc.

Research Team
David K. Hein, P.Eng., Applied Research Associates, Inc.
Chris Olidis, P.Eng., Applied Research Associates, Inc.
Ahmad Ardani, P.E., Applied Research Associates, Inc.
Dr. Jack McChesney, Applied Research Associates, Inc.
Justin, P. Jones, P.E., Post, Buckley, Schuh & Jernigan, Inc.

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The Innovative Pavement Research Foundation and the FAA thank the Technical Panel that willingly gave of their expertise and time for the development of this report. They were responsible for the oversight and the technical direction. The names of those individuals on the Technical Panel follow.

Dr. Craig Rutland, P.E.	**Air Force Civil Engineering Support Agency**
Mr. Gary Mitchell, P.E.	**American Concrete Paving Association (ACPA)**
Mr. Carlton Lambiasi, P.E	**FAA**
Mr. Bob Benko, P.E.	**FAA (Retired)**
Ms. Susan Winslow, P.E.	**Delta Airport Consultants**
Mr. Dean Rue, P.E.	**CH_2M Hill**
Mr. Mike Devoy, P.E.	**RW Armstrong**

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LIST OF ABBREVIATIONS AND ACRONYMS

AC	Advisory Circular
AIP	Airport improvement program
AOA	Air operations area
D/B	Design/build
D/B/B	Design/bid/build
DBE	Disadvantaged business enterprise
DBIA	Design Build Institute of America
DoD	Department of Defense
FAA	Federal Aviation Administration
FAR	Federal Acquisition Regulation
IPRF	Innovative Pavement Research Foundation
ISO	International Standards Organization
QA/QC	Quality assurance/quality control
RFP	Request for proposals
RFQ	Request for qualifications
UFC	United Facilities Criteria
USACE	United States Army Corps of Engineers
VE	Value engineering

PREFACE

This best practices guide is the product of Innovative Pavements Research Program (IPRF) Project 01-G-0002-06-1, Using Design/Build Acquisition for Concrete Airfield Pavements. The primary objective of the study was to develop a template that owners can use to define the attributes of projects that could be accomplished using design/build (D/B) acquisition and a guide for the use of D/B concepts for the acquisition of airfield concrete pavements projects.

The technical report (under separate cover) documents the results of a literature survey, review of contract statutes, case study interviews, lessons learned, and performance evaluation for airfield pavement projects constructed using D/B acquisition, and it includes a critique of current published guidance for D/B procurement. This best practices guide provides specific guidance to owners, airfield owners, engineers, specification writers, contractors, and contract inspectors as an education/training guide and as a criteria document that will assist the airport industry in the application of D/B acquisition for airfield pavement rehabilitation and construction.

The IPRF Technical Manager for this project was Mr. Jim Lafrenz. The project review panel consisted of Dr. Craig Rutland - Air Force Civil Engineering Support Agency (HQ AFCESA/CEOA), Mr. Gary Mitchell - American Concrete Paving Association (ACPA), Mr. Carlton Lambiasi - Federal Aviation Administration (FAA), Mr. Bob Benko - FAA (Retired), Ms. Susan Winslow - Delta Airport Consultants, Mr. Dean Rue - CH_2M Hill, and Mr. Mike Devoy - RW Armstrong.

Applied Research Associates, Inc. (ARA) conducted the research and developed this best practices guide and a draft FAA Advisory Circular for airfield pavement construction for D/B procurement contracts. The ARA research team included Dr. Jim Hall, Mr. David Hein, Dr. Jack McChesney, and Mr. Chris Olidis, as well as Mr. Justin Jones from Post Buckley, Schuh & Jernigan, Inc. (PBS&J).

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EXECUTIVE SUMMARY

Design/build (D/B) is a method of project delivery in which the design and construction phases of a project are combined into one contract and awarded on either a low bid or best-value basis. D/B projects allow for better collaboration between the designer and contractor in the delivery of transportation projects. Agencies can focus on policy and planning, while the private sector deals with cost efficiency and construction risk.

There are a number of federal and state regulations and policies pertaining to the implementation of alternate procurement methods. Federal Statute 49 USC 47104 authorized a D/B pilot program for the Federal Aviation Administration (FAA) that expired on September 30, 2003. Statute 49 USC 47142 authorized the FAA to use D/B selection procedures under specific guidelines effective September 30, 2003. The FAA administrator may approve an application of an airport sponsor under this statute to authorize the airport sponsor to award a D/B contract using a selection process permitted under applicable state or local law; the statute describes the specific conditions and criteria.

There are many perceptions regarding the pros and cons of using the D/B procurement methodology. Advantages of the D/B methodology include:

- Single point accountability for owner
- Opportunities for efficiency in construction
- Reduction in project delivery time
- Greater access to private sector experience
- Opportunities for innovation and cost savings
- Transfer of delivery risk to the private sector
- Fewer construction claims

The disadvantages of the D/B methodology include:

- Contractors usually do not have the in-house resources with the experience to prepare qualification submittals
- Best value and qualification based selection is not a common practice and experience necessary to provide quality assurance lacks
- Little experience with contractor led design
- Owner does not have a direct relationship with the designer
- The perception that economics, not functional need, drives the design
- Not suitable for all projects
- Lack of understanding of risk transfer could lead to higher project costs
- Compressed schedules may require quick owner turnaround of submittals

D/B projects typically move from conception to commission faster than the traditional design/bid/build (D/B/B) process. Procurement is achieved through a single process by integration of design and construction into one overall project team. Designers and contractors

can form a joint venture for the project or act as independent firms with one being the prime contractor.

This project included the review of airports/airfields where D/B has been used. Opinions on the use of the D/B process were varied, but there were common elements and experiences shared in many of the case studies. Many of the successes and shortcomings were used to assist in developing the best practices guide.

This guide is a consolidation of information obtained from the literature survey, case study analysis, and the experience of the project team. D/B is a unique project delivery process that combines the best features of both professional qualitative selection and competitive price selection. Accordingly, documents should be tailored to a D/B process and the project requirements.

The first step in determining the suitability of a project for D/B procurement is to determine if legislation exists to allow it. The next step is to evaluate whether the project provides the opportunity for any of the remaining primary considerations:

- Savings in project delivery time
- Potential for value engineering (VE) for project enhancement
- Project complexity, including environmental assessments, design, and construction

If there are no fatal flaws identified, then an analysis should be completed to evaluate the anticipated benefits and risks associated with the D/B procurement methodology. The best practices guide contains a suitability matrix that assists users in deciding when D/B is the best approach. The remaining steps include the development of the request for qualifications and request for proposals, advertise, evaluate and award a contract and then monitor the project work for compliance with the specifications.

BACKGROUND

In the design/build (D/B) project delivery method, the design and construction phases of a project are combined into one contract and awarded on either a low bid or best-value basis. D/B allows for greater collaboration between the designer and contractor. Agencies can focus on policy and planning, while the private sector deals with cost efficiency and construction risk.

Under the traditional design/bid/build (D/B/B) procurement method, the owner designs the project in-house or through a contract with a consultant firm. When the design is completed and approved, the project is then advertised and the owner enters into another contract for the construction of the project. The contract usually is awarded to the lowest responsive bidder. This process may be repeated a number of times for different elements of a project until the project is fully commissioned.

Under the D/B procurement method, the owner identifies the project's desired outcome, leaving most of the decision making to the D/B entity. Prospective bidders are provided with a preliminary design (anywhere from 30 to 50 percent complete) and mandatory performance-related requirements. In turn, the bidders are asked to prepare a technical proposal and a price proposal showing how they intend to complete the remaining design and construction of the project. The contract is awarded to a firm that provides the best value offer.

The use of D/B is attractive because it provides the opportunity to obligate funds quickly. The methodology requires a single procurement phase, the guaranteed maximum price of the project is known, and fast tracking is accomplished by paralleling design and construction activities. In contrast, traditional D/B/B projects use separate contracts for design and for construction, the budget for the project is based on the designer's estimate, and the construction schedule is not detailed or finalized until the construction phase commences.

Many transportation agencies have developed guidelines or acquisition criteria for D/B contracts. Guidelines for D/B airport projects are provided in Federal Aviation Administration (FAA) Administration Order 5100.38C, Paragraph 931, and the criteria developed by the Department of Defense (DoD) titled "Unified Facilities Criteria, UFC 3-26-11FA." The latter contains information pertinent to preparing requests for proposal for airfield D/B projects. The primary objectives of the document are:

- Establish the roles and responsibilities of the government and contractor
- Provide an adequate definition of project design and construction criteria

The ultimate goal of the FAA Order 5100.38C and UFC 3-26-11FA manual is to reduce the risks of D/B contracting for both the government and the contractor. However, there are some unanswered questions that need to be addressed in using the criteria:

- How are the acquisition criteria different from the D/B/B process?
- Do these criteria promote or stifle innovation?
- How applicable are these criteria to the FAA and other agencies?

BEST PRACTICES GUIDE

This best practices guide was developed using the results of a literature survey, review of contract statutes, case study interviews, lessons learned, and performance evaluation for airfield pavement projects constructed using D/B acquisition. The guide was written as an education/training guide and as a criteria document that will assist airfield owners, engineers, specification writers, contractors, and contract inspectors in the application of D/B acquisition for airfield pavement rehabilitation and construction.

D/B is a unique, distinctive project delivery process. Best-value selection combines the best features of both professional qualitative selection and competitive price selection. Accordingly, documents should be tailored to a D/B process and the project requirements.

Table 1 is a project flow chart that outlines the various steps in developing a D/B procurement, and each step is defined with action items and supporting reference documents. The steps are described in the following pages.

Step 1 – Determine Suitability of the Project for D/B Procurement

The first step in determining the suitability of a project for D/B procurement is to determine if legislation exists to allow it. Fatal flaws include items such as environmental approvals, record of decision and project funding. The next step is to evaluate whether the project provides the opportunity for any of the following considerations:

- Savings in project delivery time
- Potential for VE for project enhancement
- Project complexity, including environmental assessments, design, and construction

If there are no fatal flaws identified, then additional considerations should be analyzed to evaluate the anticipated benefits and risks associated with the D/B procurement methodology.

Table 1. Project flowchart.

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
Determine Suitability of Project for D/B Procurement	**Prepare Procurement Development Plan**	**Develop RFQ: Qualification Submittal**	**Develop RFP: Technical and Financial Submittal**	**Advertise, Evaluate, and Award**	**Project Performance**
ACTION ITEMS					
1. Define/establish project requirements and scope 2. Evaluate deal breakers 3. Complete suitability matrix	1. Complete strategic planning 2. Develop project description 3. Assess risk 4. Choose selection method 5. Establish owner's team 6. Create knowledgeable selection panel 7. Develop schedule and planning budget	1. Establish pre-qualification requirements 2. Disclose selection criteria and weighting scheme 3. Determine requirements for financial capacity 4. Shortlist qualified firms	1. Balance responsibility/ risk in contract language 2. Disclose project budget 3. Consider stipend and guidelines for use of intellectual property 4. Establish design guidelines 5. Confirm subcontracting and disadvantaged business requirements 6. Define operational requirements 7. Prepare performance criteria/specifications 8. Provide background information 9. Limit design direction 10. Confirm financial guarantees 11. Consider management plans including quality management 12. Define bonding and insurance 13. Establish and disclose warranty and performance measures	1. Arrange bidder meetings and answer questions 2. Evaluate proposal submissions 3. Separate evaluation of price and qualitative issues 4. Hold bidder presentations 5. Use of documents or design concepts from unsuccessful proposers 6. Award contract	1. Hold chartering sessions 2. Review documents and approval procedures 3. Undertake auditing/monitoring 4. Final acceptance 5. Dispute resolution
GUIDANCE					
IPRF Report 01-G-002-06-1 Sections 2.7 and 3.12	IPRF Report 01-G-002-06-1 Sections 2.1, 2.8.7, 3.12 FAA Order 5100.38.C UFC 3-26-11FA FAR Part 36 49 USC 47142	IPRF Report 01-G-002-06-1 Sections 2.4, 2.5 and 3.12 FAA Order 5100.38.C FAA AC 150/5370-10 UFC 3-26-11FA FAR Part 36	IPRF Report 01-G-002-06-1 Sections 2.4, 2.6, 2.8 and 3.12 FAA Order 5100.38.C FAA AC 150/5370-10 UFC 3-26-11FA UFC 3-260-02 FAA AC 150/5320-6D FAR Part 36 UFC 1-300-07A	IPRF Report 01-G-002-06-1 Sections 2.2, 2.3, 2.5, 2.8 and 3.12 FAA Order 5100.38.C UFC 3-26-11FA FAR Part 36	IPRF Report 01-G-002-06-1 Section 2.8 and 3.12 FAA AC 150/5370-12 FAA AC 150/5370-10 UFC 3-250 Series UFGS Master Series

To determine the suitability of a project for D/B, the key factors specific to the project should be considered. Typically, these factors are divided into primary, secondary, and other considerations which may impact the decision to use D/B for a particular project.

A. Primary Considerations (Deal Breakers)

- Time constraints for project delivery
- Status of environmental approval
- Availability of funding
- Well defined scope

B. Secondary Considerations (Advantages of Design/Build)

- Overall project complexity
- Complexity of performance requirements
- Project size
- Availability of qualified teams
- Owner experience and resources
- Cost of the project
- Degree of team collaboration
- Number of contracts
- Allocation of risks
- Interest in innovation

C. Other Considerations (Risk Transfer)

- Airside security
- Operational constraints
- Utility relocations
- Quality assurance/quality control (QA/QC) responsibilities
- Weather conditions
- Performance guarantees/warranties
- Design reviews/approvals
- Impact of unknown site conditions
- Ability to pay stipend
- Ownership of intellectual property

The primary considerations are those that would have an overriding influence on the decision to move forward with the project. The secondary considerations have a lesser influence and usually are taken into account when there are no overriding considerations or one type of contacting mechanism is not clearly superior for the particular project. Other considerations may have some influence on the procurement type decision but would not preclude the use of D/B. The primary considerations are weighted the highest to reflect their importance in moving forward with the project and the D/B procurement method. This is not an exhaustive list, but rather

reflects a particular owner's needs and expectations. Other constraints and project-specific considerations should be added or deleted as necessary. The individual weighting of the considerations should be modified to reflect local agency needs and expectations.

To assist in evaluating the suitability of projects for the D/B procurement method, a project suitability matrix (template) was developed (Table 2). The matrix includes the considerations outlined above with appropriate weighting factors for each group. Within each group, the individual consideration items also are given weighting factors. Each factor is assessed using specific criteria of the owner's needs and expectations for the project. Once the factor is rated, the total scores are summed on a scale of 0 to 100. If the score totals less than 50, the project is not considered a good candidate for D/B procurement. Between 50 and 65, the project can be considered for D/B. Scores over 65 indicate that the project is well suited for D/B.

In the example shown in Table 2, the primary considerations have been given a category weighting of 50 points, the secondary considerations are weighted at 35, and other considerations are weighted at 15. When considering the primary factors, there was a preference to accelerate the project delivery. To accelerate project delivery, this example considered that the record of decision and environmental approvals were in place, the funding was committed, and the scope of the project was generally defined. These items were selected as primary considerations because this project could not proceed in a timely manner without them. The secondary considerations are items that can define the benefits of D/B procurement, such as a single contract, owner experience with D/B, overall project complexity, and the like. The other considerations are largely risk-related items that the owner would consider as risk transfer elements.

Step 2 – Prepare Procurement Development Plan

This phase of the project involves the preparation of the procurement development plan, including project description, strategic planning, etc. This phase ensures the owner has prepared a blueprint for the project and establishes core guidelines for project delivery.

Strategic Planning

Current and future airside requirements are assessed to determine the general facility development for the owner/user. Inputs for strategic planning may include the airport master plan, airport pavement management system, maintenance reports, pilot and tenant feedback, operations reports, and traffic forecast. For specific projects, the relevant environmental documents should be completed and approved.

Table 2. Example airport pavement design/build project screening matrix.

A. Primary Considerations

Part A Weighting: 50

(Deal Breakers)

Consideration	Rating	Weighting	Weighted Value	Weighting Guidelines Low	Medium	High
Time constraints for project delivery	Medium	25.0	15.0	Sufficient time for standard procurement	Need to accelerate project delivery	Insufficient time for standard delivery
Status of environmental approvals	High	25.0	25.0	Not started	Underway	Complete
Availability of funding	High	25.0	25.0	Unknown	Multiple funding periods/sources	Funding in place and available
Well defined scope	Medium	25.0	15.0	Concept only	Scope needs refinement	Clearly defined scope
Total		**100.0**	**80.0**			
		Weighted Total:	**40.0**			

B. Secondary Considerations

Part B Weighting: 35

(Advantages of Design/Build)

Consideration	Rating	Weighting	Weighted Value	Weighting Guidelines Low	Medium	High
Overall project complexity	High	10.0	10.0	Simple project	Moderate complexity	Significant complexity
Complexity of performance requirements	High	10.0	10.0	Performance requirements unknown	Performance requirements established	Performance requirements known
Project size	High	10.0	10.0	< $ 1 million	$1 to $ 5 million	> $5 million
Availability of qualified teams	Medium	10.0	6.0	< 3 possible bidders	3 to 5 possible bidders	> 5 bidders
Owner experience and resources	Medium	10.0	6.0	First design/build project	Some experience	Significant experience
Cost of project	Medium	10.0	6.0	No fixed budget	Some budget flexibility	Fixed budget
Degree of team collaboration	High	10.0	10.0	Unknown teaming arrangements	May know some team members	Owner familiar with the teams
Number of contracts	High	10.0	10.0	Many separate small contracts	Several contracts but manageable	One overall contract
Allocation of risks	Medium	10.0	6.0	Owner retains majority of risk	Risks shared between owner and D/B tea	Transfer majority of risk to D/B team
Interest in innovation	High	10.0	10.0	Low	Medium	High
Total		**100.0**	**84.0**			
		Weighted Total:	**29.4**			

C. Other Considerations

Part C Weighting: 15

(Risk Transfer)

Consideration	Rating	Weighting	Weighted Value	Weighting Guidelines Low	Medium	High
Airside security	Medium	10.0	6.0	Airfield operations area work	Some airfield operations area work	Non airfield operations area work
Operational constraints	Low	10.0	2.0	Significant operational constraints	Some operational constraints	No operational constraints
Utility relocations	Low	10.0	2.0	Significant utility relocations	Some utility relocations	Minimal utility relocations
QC/QA responsibilities	Medium	10.0	6.0	Owner's responsibility	Shared responsibility	Design/build entity responsibility
Weather conditions	Low	10.0	2.0	Owner takes all weather related risk	Some weather risk transfer	Weather risk transferred to D/B team
Performance guarantees/warranties	Medium	10.0	6.0	Short term coverage	Medium term coverage	Long term warranties
Design reviews/approvals	Low	10.0	2.0	Significant design review required	Moderate owner review required	Short turn around/minimal review
Impact of unknown site conditions	Low	10.0	2.0	Owner's risk (geotech by owner)	Risk shared	D/B team risk (geotech by D/B)
Ability to pay stipend	Medium	10.0	6.0	Cannot pay stipend	Unknown	Can pay stipend
Ownership of intellectual property	Low	10.0	2.0	Significant intellectual property	Some intellectual property	No intellectual property
Total		**100.0**	**36.0**			
		Weighted Total:	**5.4**			

Sub Totals

A. Primary Considerations	50	40.0
B. Secondary Considerations	35	29.4
C. Other Considerations	15	5.4
Grand Total	**100**	**74.8**
Decision		**Yes**

Decision Range		
From	**To**	**D/B Applicability**
0	50	**No**
50	65	**Can Consider**
65	100	**Yes**

Project Description

The owner (or the owner's program manager) establishes the project requirements in terms of project limits, design and performance criteria, quality standards, applicable codes, regulatory standards, and so on. The project description:

- Outlines the owner's expectations of the key physical aspects
- Identifies the available funding, expected design work, construction work, prospective schedule, technical criteria, reviews project constraints (environmental, third party involvement, etc.), and warranty considerations
- Summarizes the selection process and scoring
- Identifies important project issues that are not readily apparent through the technical requirements

Risk Management

The D/B concept shares risk between the owner and the D/B team. The areas of risk should be well defined in the RFP so that the D/B team understands their responsibility for risk. The airport owner normally maintains responsibility for high-risk areas throughout the duration of the contract. If differing site conditions pose increased risk due to such issues as unforeseen ground conditions, hazardous materials, underground utilities, archeological sites, endangered species, or other environmental concerns, the airport owner should accept responsibility unless specified otherwise in the contract. The D/B team may or may not be asked to perform the associated work under a change order.

An effective way to identify and allocate the risks associated with a project is through the use of a risk allocation matrix. The matrix shown in Table 3 is based on a matrix developed for highway projects by the Washington State DOT (*2004*), modified for use for airport projects. This table is for illustration purposes only.

Table 3. Example airport project risk allocation matrix[1].

RISK[2]	Design/Build	
	Owner	**D/B Team**
Design Issues		
Definition of Scope	X	
Project Definition	X	
Establishing Performance Requirement	X	
Preliminary Survey/Base Map	X	
Geotechnical Investigation - Initial Borings based on Initial Design	X	

Table 3. Example airport project risk allocation matrix[1].

RISK[2]	Design/Build	
	Owner	**D/B Team**
Geotechnical Investigation - Initial Borings based on Proposal		X
Establish/Define Initial Subsurface Conditions	X	
Initial Geotechnical Analysis Report based on Preliminary Design	X	
Proposal-specific Geotechnical Analysis/Report		X
Plan Conformance with Regulations/Guidelines/Request for Proposal (RFP)		X
Plan Accuracy		X
Design Criteria	X	
Conformance to Design Criteria		X
Design Review Process		X
Design QC		X
Design QA		X
Owner Review Time	X	
Changes in Scope	X	
Constructability of Design		X
Contaminated Materials	X	
Local Agency and Utility Issues		
Identification of Initial Local Agency Impacts	X	
Obtaining Initial Local Agency Permits	X	
Establishing Local Agency Requirements	X	
Establishing Final/Actual Local Agency Impacts		X
Modifications to Existing Local Agency Permits		X
Identification of Initial Utility Impacts	X	
Establish Initial Utility Locations/Conditions	X	
Defining Required Utility Relocations	X	
Relocation of Utilities Prior to Contract	X	
Relocation of Utilities Under Agreement During Contract		X
Modified Agreement With Private Utility		X
Damage to Utilities Under Construction		X
Verification of Utility Locations/Conditions		X
Coordination with Utility Relocation Efforts during Contract		X
Unforeseen Delays - Utility/Third Party	X	
Utility/Third Party Delays resulting from Proposal Modification		X

Table 3. Example airport project risk allocation matrix[1].

RISK[2]	Design/Build	
	Owner	D/B Team
Other Work/Coordination		X
Third Party Agreements (Fed, Local, Private, etc.)	X	
Coordinating with Third Parties under Agreement		X
Coordination/Collection for Third Party Betterments		X
Coordination with Other Projects		X
Coordination with Adjacent Property Owners		X
Construction		
DBE Compliance		X
Safety/Safety QA		X
Construction Quality/Workmanship		X
Schedule		X
Materials Quality		X
Materials Documentation		X
Material Availability		X
Initial Performance Requirements of QA Plan	X	
Final Construction/Materials QA/QC Plan		X
Construction/Materials QA		X
Construction QC		X
Construction QA Procedural Compliance Auditing	X	
Construction Testing/Inspection	X	
Construction Layout		X
Erosion Control		X
Spill Prevention		X
Accidents within Work Zone/Liability		X
Third Party Damage		X
Operations and Maintenance During Construction		X
Maintenance under Construction		X
Airside Operations		X
Damage to Utilities under Construction		X
Falsework		X
Construction		
Shop Drawings		X
Equipment Failure/Breakdown		X
Work Methods		X
Early Construction/At Risk Construction		X
Community Relations	X	

Table 3. Example airport project risk allocation matrix[1].

RISK[2]	Design/Build	
	Owner	D/B Team
Performance of Defined Mitigation Measures		X
Warranty		X
Force Majeure/Acts of God		
Strikes/Labor Disputes – On-site Labor		X
Tornado/Earthquake/Hurricanes	X	
Epidemic, Terrorism, Rebellion, War, Riot, Sabotage	X	
Archaeological Discovery	X	
Suspension of any Environmental Approval	X	
Changes in Law	X	
Lawsuit against Project	X	
Storm/Flooding	X	
Fire or Other Physical Damage	X	
Differing Site Conditions/Changed Conditions		
Changed Conditions	X	
Differing Site Conditions	X	
Completion and Warranty		
Establishment/Definition of any Risk Pool	X	
Long term Ownership/Final Responsibility	X	
Insurance		X

1. For illustration purposes only; each project should have its own detailed risk assessment.
2. Shaded items are typically high risk/high cost and should be defined as well as possible.

Selection Method

The three common approaches to selecting a D/B entity are:

- Low bid – selection based on the lowest construction bid
- Best value bid – combination of a weighted technical approach and low bid
- Qualifications-based selection – the construction bid is not a factor in the final selection

Based on literature review and case studies, the two-step bid appears to be the preferred approach—specifically, an approach where the first phase consists of an evaluation of bidder qualifications and the second phase evaluates the technical and financial submission of a shortlisted group of bidders. Some agencies may not be able to use best value or qualifications-based selection because of legislatively mandated low bids only.

There are also a number of different methods that can be used to evaluate best value and qualifications-based bids:

- Pass/fail
- Modified pass/fail
- Qualitative rating
- Direct points scoring

The pass/fail method uses a list of evaluation criteria that proposers either meet or do not. If they do not meet the criteria, the bid may be disqualified. The modified pass/fail method allows some "gray area" where a reviewer may pass a bid if the majority of the criteria are met and the others are close to being met. The qualitative rating uses a system such as good, fair, poor to rank the submissions. The direct points scoring method assigns points to each rating criterion, with a minimum number of points considered acceptable to move forward in the bidding process.

D/B presents a unique opportunity to optimize price and other issues. The most effective selection results from a competitive process that balances first cost with life cycle costs, design aesthetics, maintenance/operational costs, and other project-specific qualitative and efficiency factors. The Design-Build Institute of America (DBIA) indicates that D/B selection typically is weighted about 60 percent towards the technical submission and 40 percent towards price. Current trend indicates the maintenance of this heavy weighting in favor of technical submissions.

Owner's Team

Depending on the selection method, the owner will need to identify both internal resources and any external supplemental resources used for its project management team.

Roles of the Owner and D/B Contractor

In the development stage, the agency oversees the development of the design criteria, the contract documents, and the procurement process. During the design and construction phase, the agency is responsible for controlling the process through design review, notices to proceed, monitoring contract compliance and schedules, processing progress payments, performing QA overview, negotiating contract amendments, and resolving disputes. Technical submittals will require review by the agency for conformance to the technical criteria and contract terms. The agency needs to verify progress payment submissions by the D/B team. With respect to QA, the agency needs to monitor compliance with the contract documents and verify the contractor's compliance with the project QC plan.

The agency's team must be developed to ensure rapid review and processing to avoid schedule impacts to the D/B team.

There are no inherent "design/build" roles and responsibilities simply because a contract is called design/build. To increase the probability of a successful D/B contract, it is necessary that both the agency and D/B contractor have a clear understanding of their respective roles,

responsibilities, and risks. The general descriptions of the D/B roles may change to meet the requirements of individual projects.

Agency Role

The role of the agency is to:

- Clearly establish the roles of the agency and D/B contractor in the RFP.
- Express the intent of the design and provide an adequate and complete facility design/construction scope and criteria in the RFP.
- Establish execution requirements (e.g., customer schedule, customer operations, and any constraints on contractor work, contractor submittals, permits, special work acceptance requirements) and identify appropriate requirements in the RFP.
- Monitor design and construction during the project implementation for contract compliance.
- Respond quickly to the design and construction needs of the contractor to avoid slowing down or otherwise impeding the contractor's schedule.
- The agency must not assume responsibility for the design adequacy by "approving" design or construction submittals, except to approve requested deviations from the contract when acceptable and appropriate. The agency's role changes from reviewing designs and submittals for technical adequacy for D/B/B projects to reviewing for conformance with the contract on D/B contracts.

D/B Contractor Role

Whether the prime is the designer or contractor, or both (joint venture), its role in a D/B contract is expanded from the conventional D/B/B to include the following:

- Project management
- Integrated schedule for design and construction
- Extensions of designs
- Permit preparation (sometimes application)
- Cost control
- Material and equipment acquisition
- Construction
- Inspection and quality control
- As-built survey for acceptance and record purposes
- Training for operation and maintenance
- Turnover, warranty and record drawings.

The D/B contractor employs the designer of record, who must personally ensure the integrity of all extensions of the designs and ensure that all equipment and materials meet the design criteria. This is a D/B contractor function, not an agency function, which is a significant role reversal from D/B/B contracting.

Owner's D/B Consultant

An outside firm with adequate pavements and airside electrical D/B experience and expertise may be engaged to assist owners who do not have in-house experience with defining, procuring, or administrating D/B projects. This role typically is called a design/build consultant or a program manager. The owner's D/B consultant should be excluded from availability for any work with the D/B teams.

Supplemental Technical Experts

Some owners have sufficient expertise within their organizations to prepare the necessary documents and administer a D/B contract, such as the U.S. Army Corps of Engineers (USACE) or large airport authorities. Others without sufficient internal resources may need to use external consultants to provide specific subject matter expertise. These external consultants may be responsible for developing the RFP technical documents, performance specifications, monitoring contract compliance, processing progress payments, performing QA activities, and assisting with the negotiation of contract amendments and disputes. Typically, technical submittals would be reviewed by the external consultants for conformance to the technical criteria and contract terms.

Schedule and Planning Budget

The short project delivery schedule as compared to D/B/B is the reason many owners choose the D/B procurement methodology. The owner will need to establish major procurement and construction milestone dates. In addition, the owner will need to have an understanding of the overall cost of the project for budget allocation.

Step 3 – Development of the Request for Qualifications

The professional, financial, and experience requirements for D/B teams and the general project parameters are articulated in a request for qualifications (RFQ) prepared by the owner, in-house, or by the owner's representative or program manager. The RFQ should include an information session where the owner presents the general requirements of the project and their expectations. Guidance is provided in FAA Advisory Circular (AC) 150/5300-9A for pre-design, pre-bid, and pre-construction conferences for airport grant projects.

Prequalification Requirements

The project is advertised and qualification statements are received in response to the RFQ. The selection criteria for determining the D/B team are critical and need to be well defined, and an

evaluation method or rating system needs to be established for items such as experience, management, and so on. Large projects require bonding; this may limit the number of firms that can qualify.

The RFQ is used in the two-stage process for D/B procurement to shortlist qualified D/B entities for receipt of RFPs and the opportunity to prepare a detailed proposal for the project. The key considerations of the RFQ are to establish the team's ability to complete the design and construction, the experience and past performance of the team and of key individuals, and the financial capacity of the team to undertake the project.

Below are some of the considerations that could be included when reviewing RFQ submissions:

- Team's understanding of the project
- Individual and corporate team members and experience with design/build
- Previous experience of team members working together
- Relevant design capabilities
- Specialized construction capabilities
- Experience with complex construction staging, airport operations, site conditions
- Safety record
- Key project team member availability and time commitment (project director, design manager, construction manager, quality manager, etc.)
- Quality control organization and performance
- Bonding record or proof of bonding ability
- Past contract performance (completion, liquidated damages, quality, claims, fines, schedule)
- Financial capability
- Understanding the local and political environment of the work location
- Project management and schedule control
- Risk management

Overly extensive proposal requirements are financially burdensome to the proposers, serve to discourage the participation of quality firms, and add unnecessarily to the owner's proposal review process. The quantity of proposal deliverables should be limited to the information necessary to adequately judge competing proposals and to protect the owner's interest in the subsequent contract.

Care must be taken establishing acceptable qualifications and experience. Raising the bar too high may preclude qualified individuals and firms that normally would be well qualified to undertake the assignment.

The RFQ submissions should be evaluated by a qualified evaluation committee. To ensure consistency in the evaluation process, some agencies have held training sessions for the committee members in advance of the review process.

The Federal Acquisition Regulation (FAR) suggests that the maximum shortlist number should be limited to five. However, in consideration of the effort required to respond to the RFP, consideration should be given to shortlisting no more than three.

Disclose Selection Criteria and Weighting

The basis for evaluating the proposal should be identified clearly in the RFQ/RFP documents. Specific evaluation criteria, or a fully defined point award system, will allow proposers to provide submissions that maximize benefits and optimize solutions to the owner's needs.

Requirements for Financial Capability

The RFQ should require submitters to provide some form of financial capability by the D/B entity. This may include a list of similar size projects completed, bonding capacity backlog, equipment and staffing, and the like. This will help to ensure that the firms are capable of undertaking the project.

Shortlist Qualified Firms

The first stage of a two-step procurement process should limit the final competitors to a field of three to five best qualified D/B firms. Shortlisting more than five teams undermines the credibility of the process and discourages high-quality proposals. For FAA projects awarded under the AIP Handbook, the method must meet with requirements of both Paragraph 904(b)(2) from Order 5100.38c for professional services and the price competition requirements for construction.

The number of prospective bidders can impact the suitability of a project for D/B. If the owner anticipates fewer bids than the desired shortlist number, then alternative procurement should be considered if this would increase the number of bidders. If only the desired shortlist number or fewer submit bids, do not shortlist.

Step 4 – Development of the Request for Proposals

The development of the RFP establishes the requirements, standards, and expectations for the project. The RFP also should outline the owner's organization structure and how it integrates with the D/B team.

Balance Responsibility/Risk in Contract Language

D/B inherently imposes additional risk and responsibility upon the D/B entity. Contract language should not needlessly exacerbate this situation by attempting to pass the owner's legal risks and responsibilities on to the proposers. Examples of such unbalanced risk transfer include making the D/B entity responsible for certain types of zoning or environmental permits, concealed conditions, differing site conditions, third party delays over which it has no control, obtaining property/rights-of-way, and other similar clauses. The D/B contract may properly assign responsibility to the contractor for compliance with performance criteria, compliance with

codes, design approvals and certain permits (except those under control of the owner), and adequacy of designs to meet expressed purposes.

The information that the owner provides in the RFP also will impact the allocation of risk. The owner should be aware that risk allocation may impact the cost of the project, as well as affecting the D/B firms' cost of developing technical submissions. For example, if the owner provides only limited or no geotechnical information, it may be necessary for the proposers to undertake their own geotechnical investigations in order to complete technical submissions. This not only impacts the costs to the proposers but also likely will impact operations at the facility.

Disclose the Project Budget

The D/B process can be useful for achieving budgetary goals. If there is a budget amount above which an award absolutely will not be made, this should be stated. Proposers have the right to know that funding is available for the project before investing the considerable resources that a D/B proposal requires.

Create Knowledgeable Selection Panel

The panel responsible for evaluating proposals should include individuals knowledgeable in the D/B process and the technical issues related to the project. The panel should consist of sufficient members with representative expertise reflecting the requirements of the RFP to ensure that a full and detailed technical evaluation of the selection criteria can be completed.

Consider Applicability of a Stipend

On large or complex projects, or where the quantity of documents required for submission of a proposal is relatively great, the owner should consider paying a stipend to the unsuccessful proposers. While many firms may compete in the absence of such payments, excessive submittal requirements and preliminary design effort is considered abusive to contractors and designers and may discourage quality teams from participating. A stipend also is an indication that the owner is serious about awarding and receiving a quality project. A stipend in the order of 0.01 to 0.2 percent is considered typical. The value of the stipend should be commensurate with the work required to prepare the bid. Typically, smaller projects use a higher stipend percentage.

D/B Team Organization

One of the chief benefits of D/B is that the owner will deal with a single entity for both the design and the construction of the project. This does not mean that the owner has relinquished control of the project. The owner still is responsible for developing the project, contract administration, and quality assurance.

The D/B entity should be required to submit a management plan as part of the technical submission. The management plan should include details on the organization of the team, internal and external lines of communication, and levels of responsibility.

The internal structure of a D/B team can take one of two forms: designer-led or contractor-led. The distinction is in which entity assumes the greatest risk and liability. Many would argue that the risks typically associated in construction of a facility are higher than the design of a project, and therefore are best dealt with by a contractor-led team. A typical D/B organizational chart is provided in Figure 1.

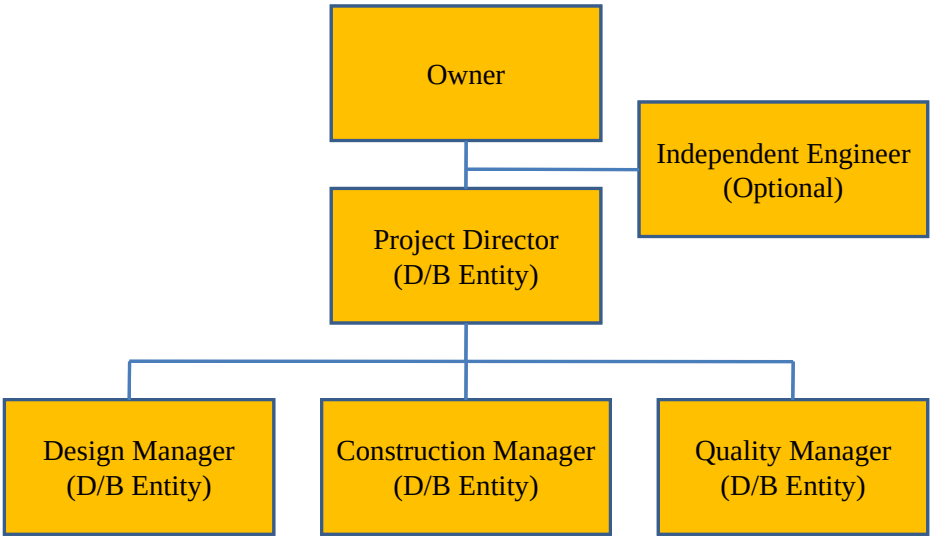

Figure 1. Typical organization and project roles for D/B projects.

The D/B entity assumes the combined risk of both the design and the construction of the project. Within the D/B team, roles and responsibilities must be clearly defined. Typically, professional liability insurances do not offer coverage for construction-related claims. This also would include indemnification and dispute resolution.

Many owners have found that independent engineers, retained by mutual agreement between the owner and the contractor, can fill the gap as the owner's agent. The independent engineer can act as reviewer, provide overview, certify works and payment, mediate dispute resolution, and so on. The independent engineer's mandate should be defined clearly in the D/B contract. It is also very important to choose an independent engineer who understands the D/B process and is willing to work with the D/B team to ensure that the technical requirements are met, and not to dictate design. Often, the cost of the independent engineer is shared between the D/B entity and the owner, and it can be included in the D/B contract.

Design-Construction Team Experience

The RFP typically includes a section on construction team experience. D/B contracts should require information to be submitted in the proposal that addresses the experience of the D/B team. References and information relative to experience should be provided by the RFP offerors for those specific types of design and construction pertinent to the project, such as:

- Airport pavement
- Airport lighting and visual navigational aids
- Electronic navigational aids
- Aircraft fueling system

The specific different types of airport design/construction for which information is needed should be stated in the RFP. The forms to be completed by the D/B contractor outlining the D/B team's experience, as well as the experience records of key personnel, also should be included.

General Design Guidelines and Mandatory Design Requirements

The project documents should outline general design guidelines and mandatory design requirements. General design guidelines, for example, would include the FAA and UFC design manuals, as well as local and state design criteria. Mandatory design requirements would include aircraft design group requirements, aircraft traffic mix and frequency, design life, FAA and DoD lighting and navigational aids requirements, and so on.

Subcontracting Requirements

The perception in the contracting community is that a small business cannot compete with larger companies on D/B projects. However, experience has shown that many large firms tend to subcontract to local companies. Further, in the acquisition process, many RFPs award points to technical proposals that have a balanced approach to subcontracting. Agencies that encourage, or have mandated, disadvantaged business enterprise (DBE) participation should include these requirements in the RFQ/RFP process. Depending on agency preference, points may be awarded to proposers that commit to the minimum requirements.

Operational Requirements

The RFP documents must outline operational requirements for the project. This includes access to the site, available working times, security requirements, restrictions on proximity to live surfaces, height restrictions, noise, and the like.

Use of Performance-Based Criteria/Specifications

The technical requirements listed in the RFP should, as far as possible, be defined in performance terms. They should be comprehensive enough to ensure that the intended result is achieved, but not restrictive in a way that would inhibit creative solutions and best value.

The owner should identify the specifications (e.g., FAA or DoD) that should be followed for the project and the limitations for changes to the specifications that would be accepted. The standard project specifications should be edited and of sufficient detail to ensure that the owner's requirements for construction quality are met. The specifications should be not be modified without the express approval of the owner.

Owner Provided Information

The owner needs to provide adequate information to the bidders to permit the completion of a preliminary design and costing. This information may include:

- Topographical survey
- Geotechnical
- As-built plans (existing electrical, underground utilities)
- Performance documentation
- Design criteria
- Airside layout
- Design requirements (life, aircraft mix, drainage, electrical, lighting, navigational aids)
- Operational requirements
- Master plan
- Staging areas
- Access and security

There are two philosophies regarding the level of information that should be provided to the D/B team. One is to provide preliminary design-level information to define minimum requirements such as geometry, pavement type, etc. The advantage of this approach is that the owner can dictate part or all of the design. The disadvantage is that the owner takes on more risk and limits innovation.

Alternatively, the owner can provide only base data from which bidders must develop their own design to meet the project requirements. Typical base data would include a topographical survey, raw geotechnical information, as-built plans, and historical performance information. The advantage of this approach is that the owner minimizes risk through transferring the design liability to the D/B, but the disadvantage is that the owner has less control over the design.

There is a minimum amount of information that must be provided irrespective of the option chosen. This would include performance specifications, environmental approvals, geotechnical information, and topographical survey. To minimize the amount of disruption to airside operations, it often is impractical to allow each D/B team to undertake its own geotechnical investigation and topographical survey. Therefore, the owner may elect, schedule permitting, to solicit scope from the teams and consolidate this information into one overall information gathering plan. The resultant data from this investigation are then shared with all bidders. This is one option to transfer the risk from the owner to the prospective D/B teams.

Typically, information is provided to the preliminary (30 percent) design level. This information should state the purpose, function, and characteristics of the project. This typically would include a project site plan, facility layout, geotechnical information, topographical information, performance specifications, pavement sections and critical details, airport master plans, and utility plans. An example for RFP content for drawings is provided in Unified Facilities Criterial Model Design-Build (D-B) Request for Proposals (RFP) for Airfield Construction (UFC 3-260-11FA), Chapter 2. Table 2-1 from this document is reproduced on the following page (Table 4).

Guidelines for geotechnical investigations, including test types and frequencies for airside pavements, are provided in FAA AC 150/5320.

As the majority of airside projects have security and operational constraints, it is not realistic to require D/B teams to complete their own geotechnical investigations. The owner should complete sufficient geotechnical investigations characterize the site to adequately. If insufficient information is provided in the bid phase, the inherent risk of the D/B team increases significantly, and this risk is reflected in the bid price.

Limit Design Direction in RFP

Certain specific areas of design that are critically important to the owner—and that should not be compromised under any circumstances—should be stipulated in detail without reducing opportunities for full creativity elsewhere throughout the project. In general, limiting direction in design/construction will increase the potential for D/B teams to achieve innovative solutions.

Use Lump Sum Contracts When Selection is Competitive

The contract for D/B services obtained competitively generally should be made on the basis of a lump sum fixed price. The use of cost plus contracts when price was a factor in the initial award is inappropriate and fails to recognize the special risk position imposed on the competitors.

Table 4. Suggested RFP content for drawings.

Drawing Description	Information Provided		
	Minimal	**Partial**	**Full**
Cover Sheet		X	X
Location Plan/Project Site Plan	X	X	X
Contractor Access, Storage, and Haul Routes	X	X	X
Horizontal and Vertical Control		X	X
Existing Topography (if available)		X	X
Existing Utilities		X	X
Demolition Plans		X	X
Runway Geometry w/Key Elevations		X	X
Taxiway Geometry w/Key Elevations		X	X
Apron Geometry w/Key Elevations		X	X
Typical Pavement Sections	X	X	X
Phasing Plans		X	X
Conceptual Drainage Plans			X
Conceptual Grading Plans			X
Conceptual Jointing Plan			X
Joint/Sealant Detail			X
Grounding Point Locations			X
Mooring Point Locations			X
Pavement Marking Plans			X
Visual Navigation Aids Location			X
Electronic Navigation Aids Location			X
Apron Lighting Plan			X
Electric Vault Location			X

Requirements for Financial Guarantee

A requirement for proposers to submit bid bonds or other forms of financial guarantee assures the owner that the selected D/B team is financially capable of performing the work and reduces the possibility that unrealistic designs are submitted without financial risk for later withdrawing.

Project Management Plans

As part of the RFP submission, the D/B team typically is required to submit an outline of its project management plans. Once selected as the preferred bidder, detailed project management plans that govern all aspects of the delivery of the project must be delivered. The plans typically include:

- Mandatory Project Management Plans
  - Overall Management Plan
  - Design Management Plan
  - Construction Management Plan
  - Quality Management Plan
- Optional Project Management Plans
  - Environmental Management Plan
  - Safety Management Plan
  - Airfield Traffic Management Plan

Typically, these plans would follow the basic framework of the International Standards Organization (ISO) guidelines. In essence, the plans establish the procedures to be followed, how they will be followed, and documentation that they have been followed. These are living documents that may be updated regularly during the course of the project.

An example table of contents of a typical quality management plan is presented in Table 5.

Bonding and Insurance

Basic comprehensive liability coverage is typical in the construction industry and would include vehicles and equipment, employers, workers compensation, builder's risk, and excess liability. These policies usually exclude liability arising from design errors and omissions.

As D/B entities often are contractor-led, many take the form of limited liability companies or joint ventures, which customarily carry general liability coverage that would be considered typical for contractors. As a result of policy endorsements and exclusions, there can be gaps in coverage, or insufficient coverage, for professional liability.

D/B agreements should consider project-specific liability insurance with limits commensurate with the size of the project. These policies have terms that continue through construction to upwards of 10 years after construction. These types of policies would insure both the design professionals (and subconsultants) and the constructor (and subcontractors).

Contract surety bonds provide financial security and construction assurance on construction projects by assuring the project owner that the contractor will perform the work and pay certain subcontractors, laborers, and material suppliers. Traditionally, surety bonds excluded coverage for errors and omissions.

The bonding and insurance coverage should be commensurate with the project size and in accordance with specific agency requirements.

Table 5. Example table of contents for quality management plans for a D/B project.

PART 1 QUALITY MANAGEMENT SYSTEM
- 1.1 Quality Management System
- 1.2 D/B Team Responsibilities
- 1.3 Quality Management System Requirements
- 1.4 Certification
- 1.5 Documentation Deliverables
- 1.6 Timing of Implementation
- 1.7 Compliance with Quality Management System
- 1.8 Continuous Improvement in Quality Management System

PART 2 QUALITY DIRECTOR
- 2.1 Appointment and General Responsibilities
- 2.2 Specific Responsibilities

PART 3 TESTING
- 3.1 Testing Requirements
- 3.2 Accreditation Standards
- 3.3 Remedial Work

PART 4 QUALITY AUDITS AND MONITORING
- 4.1 Quality Audit Plans
- 4.2 Owner's Quality Audits
- 4.3 Owner's Monitoring
- 4.4 Deficient Quality Audits
- 4.5 Third Party Audits

PART 5 QUALITY DOCUMENTATION
- 5.1 Principles
- 5.2 Quality Plan Reference Documents
- 5.3 Quality Documentation Requirements
- 5.4 Submission of Quality Documentation
- 5.5 D/B Team Obligation to Update
- 5.6 Changes to Quality Documentation
- 5.7 Amendment of Quality Documentation
- 5.8 Quality Records
- 5.9 Quality Management System Reports
- 5.10 Additional Information

PART 6 NONCONFORMITIES
- 6.1 Nonconformity Reporting Process
- 6.2 Nonconformity Report Tracking System
- 6.3 Unresolved Nonconformity
- 6.4 Nonconformity Records

Warranty and Performance Measures

The D/B team is responsible for QC and process control. The owner relies on the team's quality management plan to identify and correct non-conformities in the project. As the owner is not directly involved in the quality management of the project, many defects may not be readily identifiable.

Warranties should require repair or replacement of defective work, or work that does not conform to the contract requirements during the warranty period. The warranty should reference the specific performance measures for the item in question over the term of the warranty. Often, warranties will have extensions for remedial works completed during the warranty period.

Warranty terms typically range from 1 to 5 years. One year is thought to be too short in consideration that the owner is limited to an oversight role during the construction process, and beyond 5 years can raise surety issues and is thought to be excessive. Two to 3 years is reasonable for the initial progression of pavement distress. The length of the warranty should be tied to the amount of QA inspection and testing conducted by the owner; extensive testing by the owner should provide a high degree of confidence in the quality of the construction work and therefore require a shorter warranty period. It also should be recognized that unlike highways, access to the areas to be repaired may be more difficult for airports/airfields.

Construction Phasing

Construction operations in, adjacent to, or requiring construction traffic through an airport's air operations area (AOA) will require a phasing plan. The purpose of the plan is to establish guidelines and constraints the contractor must follow during construction in these areas. This basic information for the phasing plan must be included in the RFP:

- AOA facilities that will be closed or partially closed for construction
- Phasing required to maintain minimum aircraft operation with those airfield facilities that will be opened and closed during each phase identified
- Maximum duration of each phase (or closure)
- Time allowance between phases for preparation to redirect air traffic
- Requirements for temporary marking and lighting
- Liquidated damages for each phase if closure and construction extend beyond the time limit for each phase

The contractor shall submit the phasing plan with the first design submittal and include contractor-furnished drawings showing phasing details and notes.

Safety and Security Plan

Safety and site security during construction are primary considerations. The RFP should require contractors to submit a safety program as part of their management plan which includes guidelines for accident prevention. On airfield projects, a safety plan is also necessary to

acquaint construction personnel with airfield operations and provide a safe environment for aircraft operations and personnel during construction. A security plan is required to assure security at the construction site and the airport.

Step 5 – Evaluate and Award

Evaluation and award will include answering bidder questions and possibly individual bidder meetings. Once the proposals are submitted, the owner would evaluate the bidder submissions based on the established selection criteria and weighting factors and award the contract.

Answers to Questions and Individual Bidder Meetings

Some agencies allow meetings with individual bidders during the bid phase to assist in clarifying specific points of the design and procurement process.

Proposal Submission and Evaluation

Once received, proposals are evaluated on the basis of quality of design, price, and other predetermined factors (best value).

Conduct Separate Evaluation of Price and Qualitative Issues

Qualitative issues are best evaluated before prices are revealed. This prevents the tendency of allowing knowledge of price to short-circuit a thorough review of qualitative issues. Owners should request that qualitative and cost sections of a proposal be submitted in separate sealed envelopes, with the price envelope opened only after the qualitative evaluation has been concluded.

Shortlisted Bidder Presentations

Typically, shortlisted bidders are asked to present their technical bids at a meeting in front of the evaluation panel. This gives the panel an opportunity to gain a better understanding of the bidder's proposal and evaluate their team qualifications and the technical concepts of the bid.

Promptly Award the Contract

Once a selection has been made, the project should be awarded in a prompt and straightforward manner without on-going adjustments to the proposer's submission. Review meetings with the owner for the purpose of design modification should be conducted following selection and prior to award, not while proposers are in a competitive posture. This principle also applies to price, which should not be subject to negotiation or modification between formal submission and selection.

Use of Documents/Design Concepts from Unsuccessful Proposers

The winning design proposal submitted in a D/B competition is the design that ultimately should be constructed. Providing a stipend reduces the proposers' cost for participating in D/B projects,

and in return the owner may require that all innovations and concepts used in their proposals become the property of the owner. Use of design concepts from unsuccessful proposers without compensation is inappropriate and unethical.

Contract Award

Prior to the award of the contract, the contents of both the technical and financial proposal must be reviewed to ensure that the proposer is meeting the expectations of the owner. The selected proposer enters into a contract with the owner that incorporates both the owner's requirements and the D/B entity's proposal.

Execute Contract

The contract should incorporate both the owner's requirements and the D/B team's proposal.

Step 6 – Project Performance

The last step in the D/B procurement process is the administration of the contract. This would include monitoring of compliance with management plans, including documents and submittals. This may also include the owner's right to complete independent QA inspection and testing.

Documents/Approvals/Construction

Upon completion of the design documents for all elements (or for specific phases) of the project, construction commences. The contract may call for fast track methods, allowing for construction to commence after logical phases of design and permitting are completed, but prior to completion of the entire body of construction documents.

Auditing/Monitoring

Although the contractor is fully responsible for the quality of all work, D/B agreements should provide for the owner's right of access at any time to all records produced in the performance of the work, including inspection records and test results, and to conduct sampling, to ensure the contractor is adhering to all requirements of the agreement. Weekly progress meetings should be held with the D/B team to monitor performance. Meetings should be well documented, including follow-up of action items.

D/B agreements also should include provisions confirming the owner's right to audit the contractor's work to ensure that the owner's requirements are being achieved. Such review may consist of random or milestone inspections or audits, continuous inspection, sampling and testing for audit purposes, or any combination thereof.

Final Acceptance

Prior to final acceptance of the work, all systems being inspected shall be completed and approved for acceptance by the quality management plan. A final inspection should be

completed by the quality manager and owner. The inspection will verify that the facility is complete and ready to be accepted. A "punch list" should be developed as a result of this inspection, and the quality manager will ensure that all items on this list are addressed prior to final acceptance.

Dispute Resolution

The D/B contract should outline a method for dispute resolution. The D/B process requires a change in attitude towards the procurement process. One way to minimize dispute is through partnering, which fosters cooperation between the owner and the contractor to resolve their disputes. Many owners and contractors have established dispute resolution boards to diffuse issues before they become formal disputes. Typically, the board consists of three respected, experienced individuals: one appointed by the owner, one appointed by the contractor, and a third appointed jointly. Arbitration is another frequently used method for dispute resolution.

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APPENDIX A

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Example Airport Pavement Design/Build Project Screening Matrix