



## Competition Requirements of the Design/Build, Construction Manager at Risk, and Public-Private Partnership Contracts—Seven Case Studies

### DETAILS

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## TRANSIT COOPERATIVE RESEARCH PROGRAM

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# Legal Research Digest 39

## COMPETITION REQUIREMENTS OF THE DESIGN/BUILD, CONSTRUCTION MANAGER AT RISK, AND PUBLIC-PRIVATE PARTNERSHIP CONTRACTS—SEVEN CASE STUDIES

This report was prepared under TCRP Project J-5, “Legal Aspects of Transit and Intermodal Transportation Programs,” for which the Transportation Research Board is the agency coordinating the research. The report was prepared by Anthony D. Songer, Ph.D., Boise State University; Michael J. Garvin, Ph.D., P.E., Virginia Polytechnic Institute and State University; and Michael C. Loulakis, Esq., Capital Project Strategies, LLC. James B. McDaniel, TRB Counsel for Legal Research Projects, was the principal investigator and content editor.

### The Problem and Its Solution

The nation’s 6,000 plus transit agencies need to have access to a program that can provide authoritatively researched, specific, limited-scope studies of legal issues and problems having national significance and application to their business. Some transit programs involve legal problems and issues that are not shared with other modes; as, for example, compliance with transit-equipment and operations guidelines, FTA financing initiatives, private-sector programs, and labor or environmental standards relating to transit operations. Also, much of the information that is needed by transit attorneys to address legal concerns is scattered and fragmented. Consequently, it would be helpful to the transit lawyer to have well-resourced and well-documented reports on specific legal topics available to the transit legal community.

The *Legal Research Digests* (LRDs) are developed to assist transit attorneys in dealing with the myriad of initiatives and problems associated with transit start-up and operations, as well as with day-to-day legal work. The LRDs address such issues as eminent domain, civil rights, constitutional rights, contracting, environmental concerns, labor, procurement, risk management, security, tort liability, and zoning. The transit legal research, when conducted through the TRB’s legal studies process, either collects primary data that generally are not available elsewhere or performs analysis of existing literature.

### Application

In the recent past, the primary practice of procurement of officials for major transportation construction projects has been to follow the design-bid-build methodology. However, increasingly this method is being criticized as restrictive of public owner flexibility in aligning the procurement process to achieve the best value for locally funded projects. In response to this problem, states and local governments are engaging in procurement methods that place more financial risks and liability on the contractor in the preconstruction planning process, construction management, and operational aspects of construction projects.

Government procurement officers are, however, more and more resorting to alternative delivery methods as a means to greater efficiency while ensuring good outcomes and value in products. This report explores the use of varying systems, including design-build, construction management at risk, and a variety of options considered public-private partnerships, through the examination of seven separate construction projects in various parts of the United States. This examination of the seven selected projects shows how particular, and often unique, problems were met in each project by utilizing a wide variety of procurement and delivery methods. The results were successful to varying degrees; however, the intent of this report is not to suggest the use of one type of delivery method over another, but to demonstrate the wide variety of systems and procurement methods that may be available, especially as states and localities broaden their legislative authority to enter into contracts and private-public agreements.

TRANSPORTATION RESEARCH BOARD  
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## COMPETITION REQUIREMENTS OF THE DESIGN/BUILD, CONSTRUCTION MANAGER AT RISK, AND PUBLIC-PRIVATE PARTNERSHIP CONTRACTS—SEVEN CASE STUDIES

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### I. THE REGULATORY AND STATUTORY FRAMEWORK FOR ALTERNATIVE PROJECT DELIVERY

#### Introduction

In the post–World War II era, the delivery mechanisms that drove the nation's early infrastructure development lay dormant as the country's method of procuring infrastructure evolved to rely upon a single system, design-bid-build (DBB).<sup>1</sup> Over roughly the last 20 years, however, many public owners have rediscovered the potential value of other delivery systems such as design-build (DB), construction-manager-at-risk (CMAR), and a variety of options that are considered public-private partnerships (PPP), such as design-build-operate-maintain (DBOM) and build-operate-transfer (BOT). Arguments for these choices include opportunities to leverage private-sector expertise and capital, to predict operational funding requirements, and to realize life-cycle cost reductions through the integration of delivery activities and private-sector efficiencies that are honed in competitive markets.

Many within the engineering, procurement, and construction community in the United States have recognized the limitations of a strategy designed to support a single delivery method, and shifts are underway across all infrastructure sectors. Those searching for real solutions to their infrastructure problems have employed a variety of means to fulfill the demand for vital infrastructure services. Still, public-sector experience in the use of such delivery systems remains immature, and public agencies are generally unprepared to execute workable arrangements with the private sector. Despite the recent resurgence of alternative project delivery methods, many within the construction industry continue to misunderstand the characteristics and implications of each system. The intent of this digest is *not* to provide guidance with respect to the choice of one delivery method over another for transit projects. Instead, the digest primarily investigates the statutory basis for the use of alternative delivery methods and how transit agencies have legally procured and priced the services associated with alternative delivery methods. Readers interested in guidance on delivery method selection are referred to *TCRP Report 131: A Guidebook for the Eval-*

*uation of Project Delivery Methods.*<sup>2</sup> The examination of the seven projects that are included in this digest demonstrates how the private contractors and the government agencies involved in each project were successful, to varying degrees, in utilizing a wide variety of procurement and delivery methods, to meet the problems encountered in each situation.

This section provides a broad discussion of the procurement issues associated with alternative project delivery on DB, CMAR, and PPP projects. It will consider historical issues associated with these delivery systems and examine some of the approaches states have taken to implement these programs.

#### Design-Build

##### *Historical Review*

While the origins of the DB method of project delivery are traced back to ancient Mesopotamia, the process was thought to be virtually abandoned by modern designers and constructors.<sup>3</sup> For years, the design and construction industry in North America functioned under the traditional method, DBB. However, with the advent of the post–World War II building boom in North America, construction owners sought alternatives to the fragmented responsibilities, cost issues, and limited flexibility of DBB. This was particularly the case during the inflationary periods of the 1970s, where both public- and private-sector owners found the DBB process to provide less than satisfactory results because of extended project delays and a growing “cottage” industry of construction claims litigation. By the late 1980s and early 1990s, another trend emerged—both private-sector firms and public agencies began restructuring their organizations to reduce or eliminate staff not directly associated with their core goals. All of this led to procurement policies that not only helped introduce different forms of construction management, but also reintroduced DB as a viable delivery system.<sup>4</sup>

As the use of DB began accelerating in the 1990s, many believed that it could be effectively used only in

<sup>2</sup> A. TOURAN ET AL., A GUIDEBOOK FOR THE EVALUATION OF PROJECT DELIVERY METHODS (Transit Cooperative Research Program Report 131, 2009).

<sup>3</sup> DBIA, [www.dbia.org/about/designbuild/default.htm](http://www.dbia.org/about/designbuild/default.htm) PF= 1.

<sup>4</sup> JEFFREY L. BEARD, MICHAEL C. LOULAKIS & EDWARD C. WUNDRAM, DESIGN BUILD: PLANNING THROUGH DEVELOPMENT 2 (2003).

<sup>1</sup> J. B. MILLER ET AL., *Towards a New Paradigm: Simultaneous Use of Multiple Project Delivery Methods*, JOURNAL OF MANAGEMENT IN ENGINEERING 16 (3), at 58 (2000).

the private sector, where owners enjoyed freedom in selecting delivery and acquisition strategies. At that time, the procurement laws for many federal, state, and municipal agencies made it difficult, if not impossible, to use DB, because of the differing requirements for selection of designers and contractors. A key problem was the Federal Brooks Architect-Engineer's Act, passed in 1972, which mandated that design professionals be selected based on qualifications, with the best-qualified firm negotiating with the government to reach a fair and reasonable contract price. Contracts for construction, however, had long been based on a competitive, open-bidding, low-bid selection process, with qualifications not being factored into the selection process. Each state had its own version of the Brooks Architect-Engineer's Act that imposed similar restrictions. Therefore, absent special legislation, this dichotomy between architect/engineer selection and contractor selection complicated the ability of an agency to procure a firm to do both design and construction.

By 1994, a group of major trade and professional associations formed the Design and Construction Procurement Coalition to promote the adoption of legislation allowing federal agencies to have broader discretion to consider DB. Among the specific goals of the coalition was to codify a shortlist procedure through the use of a two-phase procurement process. In February 1996, Congress passed what is now known as the "Clinger-Cohen Act,"<sup>5</sup> sometimes informally called the federal "two-phase design-build act." As its informal name suggests, the Act permitted the federal government to procure DB services using a two-phase selection process.

The impact of the Clinger-Cohen Act on public-sector DB has been substantial. In addition to creating a great deal of interest in DB, it provided, for the first time, a way for the federal government to eliminate marginal proposals and teams. The Clinger-Cohen Act also gave comfort to government contractors that they could, at very low expense, submit proposals to become part of the shortlist and, if they made the shortlist, that there would be a limited number of competitors, justifying the more substantial investment in time and money to respond to the request for proposals (RFP). The Act not only created a surge of interest by federal agencies in DB, but it also became the catalyst for many state and local governments to adopt similar two-phase legislation, thereby increasing DB use in these sectors as well.<sup>6</sup>

#### *Use of DB in State Procurement*

Before the Clinger-Cohen Act was passed, there were no state laws that allowed the use of DB for public-sector procurement. However, with the impetus from the federal sector, state legislative initiatives acceler-

ated in the decade following its passage. By the early 2000s, several states had enacted legislation that expressly allowed DB to be used on any project undertaken by the state or its associated agencies. The more common experience, however, was to have a state authorization of DB only for specifically designated projects or agencies—in effect, allowing the state to "test the waters," implementing it on selected projects to see what kind of results were obtained before broadening its use. It should be noted, however, that by the early 2000s, many states still expressly forbade the use of DB for public-sector construction projects.<sup>7</sup>

The following chart demonstrates how state procurement of DB has changed since 1993. It indicates by year the number of states (including the District of Columbia) which fall into each category, with the information current as of the end of calendar year 2009.

<sup>5</sup> Pub. L. No. 103-355, 108 Stat. 3243; Pub. L. No. 104-106, 110 Stat. 642, codified at 40 U.S.C. 1401 et seq.

<sup>6</sup> DESIGN-BUILD FOR THE PUBLIC SECTOR 4-7 (Michael C. Loulakis ed., 2003).

<sup>7</sup> *Id.*

Design-Build State Public Procurement (Design-Build Institute of America 2009)								
	1993	2003	2004	2005	2006	2007	2008	2009
DB permitted by all agencies for all types of design and construction	1	-	-	17	18	17	20	22
Widely permitted	-	22	22	13	12	15	12	13
Limited option	-	19	22	15	15	15	16	15
Not specifically authorized for public agencies	50	-	-	6	6	4	3	1
State procurement laws do not permit the use of DB in the public sector	-	10	7	-	-	-	-	-

These changes are obviously the result of a significant amount of legislation being introduced and passed. In 2001, 49 bills regarding DB were introduced in state legislatures; 30 of them, or 61 percent, passed. In 2002, the number of bills introduced increased significantly, to 143, 36 percent of which passed. By 2003, the passing percentage had increased to 52 percent. In 2005, a record 250 bills were introduced, with a record high of 82 passing.

An arguably historic year for DB was 2009, in that a record high of 62 percent of the 160 DB bills introduced were passed. This translates into 100 bills granting or expanding DB authorization. Some of the more notable 2009 legislation is discussed in greater detail below.<sup>8</sup>

There are several potential explanations for this rise. In the early 2000s, legislative successes could be chalked up to the fact that many new owners were being introduced to DB and were excited about its potential, particularly at the state level. By 2009, DB had seemingly matured, with nearly all states having DB authority of some kind. This reality is reflected in the

<sup>8</sup> Readers interested in learning about the legislation from 2010 and beyond should consult with the Design-Build Institute of America, which regularly publishes tables chronicling legislative initiatives in the areas of design-build. Likewise, the National Conference on State Legislatures regularly publishes annual updates of legislation affecting the transportation sector. An update from 2010 can be found at <http://www.ncsl.org/documents/transportation/PPPTOOLKIT-AppendE.pdf>.

types of legislation that were proposed in 2009—only 52 percent of the bills attempt to expand state authority. The legislation dealing with state DB authority was primarily focused on transportation. In January 2009, 12 states still did not have authority for Department of Transportation (DOT) projects. That number fell by half by October 2009, as six states passed new legislation allowing DB authority. In contrast, 48 percent of DB legislation in 2009 was focused on granting local DB authority.

While some bills gave local government agencies project-specific DB authority (or authority for a limited number of projects), other bills were broad in the authority they granted, allowing localities to use DB on virtually any type of project they chose. Most of the local legislation focused on buildings—from schools to health clinics to stadiums and courthouses. The bills also showed a growing trend toward DB use on local waste/wastewater and transportation projects. A third of the successful local DB bills were focused on those areas, as noted below:<sup>9</sup>

- Alabama: House Bill (HB) 217 gives the new Alabama Toll Road Bridge and Tunnel Authority full authority to enter into DB, DBO, and DBOM contracts. (Alabama Code Sections 23-2-140 to 163.)

<sup>9</sup> Design-Build Institute of America, [www.dbia.org/about/designbuild/default.htm?PF=1](http://www.dbia.org/about/designbuild/default.htm?PF=1).

- Arizona: HB 2396 allows PPPs on transportation projects; they can be DB, design-build-maintain (DBM), DBOM, or design-build-finance-operate-maintain (DBFOM) agreements. (Arizona Revised Statutes Sections 28-7701, 28-7363 to 28-7365.)
- California: Senate Bill (SB) 4 allows PPPs on transportation projects; Assembly Bill (AB) 729 extends the DB repeal date on transit projects from 2011 to 2015. (California Public Contract Code Sections 6800 *et seq.*)
- Colorado: SB 108 authorized PPPs for transportation projects on state and local projects; DB is permitted as the project delivery method. (Colorado Revised Statutes Sections 43-1-1404.)
- Delaware: HB 52B expands the Delaware DOT's DB authority from 7 to 12 projects. (2 Delaware Code Annotated, Section 2003; Delaware Laws, Chapter 329.)
- Florida: HB 1021 authorized the Florida DOT to meet a goal of 25 percent of its projects delivered using DB by 2014 to add capacity. (Florida Statutes Section 337.11.)
- Illinois: HB 372 repeals DB sunset provisions; SB 1609 repeals DB sunset provisions. (30 Illinois Compiled Statutes Section 535/75.)
- Louisiana: SB 351 authorizes DB on DOT projects. (Louisiana Revised Statutes Annotated, Sections 48:250.2 *et seq.*)
- Massachusetts: SB 2087 authorizes PPPs for transportation projects using DBOM and DBFOM project delivery methods. (Massachusetts General Laws Annotated Chapter 6C, Sections 1 *et seq.*)
- Minnesota: HB 1308 provides state DB authority to local governments for 10-project transportation pilot program; HB 2086 directs the Minnesota DOT to use DB on high-speed rail projects. (Minnesota Statutes Annotated Section 383B.158(3) and Section 473.3993.)
- Missouri: HB 359 permits the Missouri DOT to use DB on up to 2 percent of its projects, up from a total of three projects. (Missouri Revised Statutes Section 227.107.)
- Nevada: SB 245 creates regional transportation authorities and permits the use of private partnerships for transportation and related projects. (Nevada Revised Statutes Sections 277A.170, 277A.280.)
- New Mexico: SB 345 grants DB authority for all American Recovery and Reinvestment Act (ARRA) projects. (New Mexico Statutes Annotated Section 13-1-119.2.)
- North Carolina: HB 772 grants the City of Huntersville DB authority for buildings, parking, roads, streets, bridges, or any other type of construction project. (General Assembly of North Carolina 2009 Session Law 298.)
- North Dakota: SB 2147 authorized the North Dakota DOT to complete two DB pilot projects. (2009 North Dakota Session Laws, Chapter 236, or North Dakota Century Code Section 24-02-47 *et seq.*)
- Texas: SB 882 authorizes regional toll authorities to give stipends on DB projects over \$50 million. (2009 Texas General Laws, Chapter 770.)

• Vermont: HB 438 authorizes the DOT to use DB on four projects in FY 2010. (Vermont Statutes Annotated Title 19, Section 2602.)

• Washington: SB 5768 authorizes DB authority for State Route (SR) 99 (Alaskan Way Viaduct). (Washington Revised Code 47.20.780–85.)

• West Virginia: HB 2753 authorized the DOT to expand its DB pilot program from 3 to 13 projects by June 30, 2011, and to spend up to \$50 million per year for an aggregate of \$150 million over 3 years. (West Virginia Code Section 17-2D.)

### *DB Procurement and Selection Criteria*

It is beyond the scope of this digest to fully address all of the legislation that impacts each state's DB program, or the DB legislation that impacts transportation projects. This information is available from several sources, including the *50-State Summary Survey of Transportation Agency Design-Build Authority* that is published annually by Nossaman LLP.<sup>10</sup> Appendix A provides a compilation of some applicable DB legislation in each state, along with Web site links. Suffice it to say that, based on the legislation that existed as of December 2009, virtually every state gives the agency broad discretion to decide how to select the DB entity.

For example, Arkansas allows the transportation agency to make an award “on a qualifications basis that offers the greatest value for the state.” (Ark. Code Ann. Section 27-65-107.) Arizona has one of the most progressive procurement processes in the country for alternative project delivery. It allows an agency to use a one-step DB selection process, where the design-builder is selected only on qualifications—price is not a factor. Nevada, Missouri, and Colorado are among the states that use a two-phase selection process and require that price be a factor in selecting among the shortlisted DB proposers. Virginia and Minnesota authorize either a two-phase selection process, where best value is the basis for selection, or a one-phase selection process, where the agency can use best value or low bid.

### *The 2009 California DB Transportation Statute*

Representative of the current influx of legislation affecting the DB transportation sector is California SB 4.<sup>11</sup> This bill, signed into law on February 20, 2009, allows DB to be used for up to 15 transportation projects. The statute (California Public Contract Code Sections 6800 *et seq.*) gives the California Transportation Commission (CTC) authority to decide which projects to include in the program. Local transportation entities (defined to include transportation authorities created by county boards of supervisors, transportation planning agencies, county transportation commissions, and certain other agencies) have authority for up to five pro-

<sup>10</sup> <http://www.nossaman.com/50state-survey-transportation-agency-designbuild-authority>.

<sup>11</sup> Nancy Smith & Evan Caplicki, *California Passes New Design-Build Law for Highway Projects*, Apr. 1, 2009, Nossaman E-Alerts.

jects, which may include local street or road, bridge, tunnel, and public transit projects. The California DOT (Caltrans) has authority for up to 10 projects, which may include state highway, bridge, or tunnel projects. The law also permits DB for certain other types of public projects and allows the use of PPPs for transportation projects.

The procuring agency for a DB project authorized under the law may use either a best-value or a low-bid selection process, as approved by the CTC. The CTC must ensure that use of low bid and best value is balanced among the approved projects, so that the costs and benefits of each method can be assessed. Procurements under the statute involve two steps: prequalification based on a standard questionnaire prepared by the procuring agency, followed by a request for proposals issued to the prequalified firms. In determining whether a firm is prequalified, the agency must consider technical design and construction expertise and skilled labor force availability.

The process for selecting a design-builder will depend on whether the CTC authorizes the procuring agency to use competitive bidding or a best-value process. For procurements involving competitive bidding, bidders would be required to provide sealed bids including lump sum prices, and award would be made to the lowest responsible bidder amongst the prequalified bidders. Procurements using a best-value process would call for an RFP that must specify the criteria to be used to evaluate proposals. Criteria must include price, technical design, construction expertise, and life-cycle costs. The best-value procurement process under the California law may include negotiations with responsive bidders. Upon conclusion of a best-value procurement process, the contract would be awarded (if at all) to the responsible bidder offering the best-value proposal. The award must be publicly announced, along with a list identifying the rankings of the top three proposers and a written decision supporting the award.

## Construction Management

### *Historical Review*

Construction management emerged in the 1960s as a direct way to address some of the major challenges of the DBB system. While the term “construction management” as applied to project delivery systems can be a very broad term, its public-sector use has generally come to mean one of two forms: Agency Construction Management (Agency CM) or At-Risk Construction Management (known by many labels, including CMAR and CM/GC). For clarity, this report refers to any At-Risk Construction Management as CMAR.

Under Agency CM, the construction manager is providing a professional service and is an agent of the owner relative to specifically identified matters—be it procurement, constructability reviews, or supervision of trade contractors. Agency CM is not a delivery system per se. Rather, it is a management approach that is used with other delivery systems, including DBB, DB,

and multiple prime contracting. Agency CM is widely used in the public sector and has a long history of successful use in the transportation and transit industry.

Unlike Agency CM, CMAR is a unique delivery system. Under this system, the owner hires a designer and contractor using separate contracts, just as in the DBB method. However, these two services are generally hired nearly simultaneously, well before the design is advanced, and usually as soon as the project is approved. Unlike the contractor in a DBB process, the CMAR firm provides preconstruction services—such as design input, constructability reviews, value engineering, and estimating and scheduling support—on a professional basis. At some point, the CMAR firm will stipulate to a guaranteed maximum price (GMP) above which the owner is not liable for payment. Often these contracts include incentive clauses in which the CMAR and owner can share any cost savings realized below the GMP. The CMAR firm contracts directly with trade firms and takes on performance risk (cost and schedule commitments) for the project, although, unlike DB, it does not take design risk.

A key difference between DBB and CMAR is how the contractor is selected. Using the DBB method, all construction firms are assumed to be equally capable and are judged only by price. In contrast, the CMAR method recognizes that each construction firm has unique skills and experience, and the contractor is selected through the same qualifications-based selection process used to select the designer. Because the design phase is not yet complete when the contract is executed, establishment of a firm final price is accomplished later in the design phase.

CMAR has long been associated with private sector construction—virtually every commercial office building across the country has been delivered through this system. In recent years, as public owners have considered alternatives to DBB, they have considered using CMAR. In many respects, this has been prompted by owners who like the idea of collaboration between the design and construction teams, but prefer to hold the contract with the designer instead of using a DB process, where the collaboration takes place within the context of a contract between the contractor and designer.

### *Use of CMAR in State Procurement*

While the use of public sector DB has been substantial, CMAR’s use in the public sector is much more limited. Appendix B provides a compilation of some applicable CMAR legislation in each state, along with Web site links. This information is valid as of December 2009.

The Associated General Contractors of America (AGC) and the National Association of State Facilities Administrators recently collaborated on a survey of state-by-state information on CMAR. They concluded that many states are still determining how to approach CMAR, and this can result in a lack of clear and precise information. In fact, unlike DB, where there is legislation throughout the states, many states are silent on



CMAR, and not all states use the same definitions for the categories of construction.<sup>12</sup>

Specifically, the survey revealed that 11 states permit CMAR in five areas (state building construction, K-12 education, higher education, local government, and horizontal nonbuilding DOT projects). It showed that in seven states, CMAR is not allowed in any of those five areas; in 32 states, it is allowed in some of those areas. The American Institute of Architects also produced a summary of state-by-state CMAR laws.<sup>13</sup>

Broadly speaking, the most prevalent use of CMAR in the public sector is in the western states, which have created legislation that allows the liberal use of the process. For example:

- *Arizona.* As noted above, Arizona has one of the most progressive alternative project delivery statutes in the United States. As is the case with DB, Arizona law allows an agency to use CMAR to procure construction services on a qualifications basis, with price not a factor.

- *Oregon.* The Oregon CMAR process has a long history of successful use on a variety of public projects.<sup>14</sup> Similar to Arizona, it does not require price as a factor, and relies on qualifications and interviews for selecting the successful firm.

- *Utah.* In October 2006, the Utah DOT and the Federal Highway Administration entered into an agreement to implement and evaluate a program of projects utilizing the Construction Manager/General Contract contracting method. Twenty-four projects have been authorized under this process, and the annual report for 2008 provides helpful guidance on the success of the program.<sup>15</sup>

## Public-Private Partnerships

PPPs are

contractual agreements between a public agency (federal, state, or local) and a private sector entity. Through this agreement, the skills and assets of each sector (public and private) are shared in delivering a service or facility for the use of the general public. In addition to the sharing of resources, each party shares in the risks and rewards potential in the delivery of the service and/or facility.<sup>16</sup>

PPPs are being used in a variety of industry sectors, including transportation, water/wastewater, urban de-

velopment, energy, financial management, and schools.<sup>17</sup>

As of the writing of this digest, approximately 20 states have some form of PPP-authorizing legislation. Appendix C provides a compilation of some applicable PPP legislation in each state, along with Web site links. As can be noted in the compilation, as well as through several of the case studies included in this report, several states have allowed BOT and DBOM concessions through their PPP legislation.

Florida DOT is using its PPP legislation to obtain financing for some of its projects that would otherwise not be able to be developed. For example, its I-75 project is a nearly \$430 million project on a heavily-traveled section of Interstate highway that carries up to 85,000 vehicles per day. The project involves widening I-75 from four to six lanes from Golden Gate Parkway in Naples to Colonial Boulevard in Fort Myers. It also includes interchange upgrades. This PPP is using DB as its delivery model, with the joint venture acting as the design-build-financer. The joint venture will provide "gap" financing, which allows Florida DOT to implement the project in advance of its planned program, and pay out the contract monies to the design-build-financer over time.<sup>18</sup> The design work began in May 2007, with completion anticipated in summer of 2010.

While it is beyond the scope of this digest to review the attributes of PPP legislation across the country, it is worth observing several major points about this process. The first issue is legislative: does the agency have the statutory right to execute a contract that does not have a fixed price for construction services? Some states, like Virginia, have addressed this directly. Virginia's Public Private Transportation Act of 1995 (PPTA) gives the Commonwealth of Virginia, acting through the Virginia DOT (VDOT), broad abilities to contract on terms that it deems to be in the best interests of the public. This legislative authority, for example, recently resulted in VDOT executing a Comprehensive Agreement with Capital Beltway Express, LLC, a venture between Transurban and Fluor, for the financing, design, construction, and operation of 14 mi of new high occupancy toll facilities on the Capital Beltway in Northern Virginia. This project reached financial closure in December 2007 and is currently under construction. It involves an 80-year toll concession and is approximately a \$1.5 billion project. The PPTA was also the vehicle by which the Dulles Metrorail Project (discussed in detail subsequently) was procured on a DB basis and funded entirely by public monies.

Another timely PPP issue involves the requirement for performance and payment bonds. Projects performed under many PPP statutes are not required to follow the state's procurement statutes, giving the agency flexibility in how it will secure performance of the private

<sup>12</sup> Associated General Contractors of America Web site, [www.agc.org](http://www.agc.org).

<sup>13</sup> American Institute of Architects Web site, [www.aia.org/advocacy/state/aiaas078882](http://www.aia.org/advocacy/state/aiaas078882).

<sup>14</sup> Oregon Public Contracting Coalition Guide to CM/GC Contracting, [http://www.agc-oregon.org/public/resource\\_center/publications/CM\\_GC\\_Guide\\_05.pdf](http://www.agc-oregon.org/public/resource_center/publications/CM_GC_Guide_05.pdf).

<sup>15</sup> Utah DOT Annual Report on the Use of CMGC, <http://www.udot.utah.gov/main/uconowner.gf?n=1135040022049311030>.

<sup>16</sup> National Council for Public-Private Partnerships, [www.ncppp.org](http://www.ncppp.org).

<sup>17</sup> *Id.*

<sup>18</sup> Florida Department of Transportation (2009), <http://www.dot.state.fl.us/financialplanning/Finance-Work%20Program.pdf>.

party (Virginia's PPTA is a good example of this). Other states have been challenged by statutes that require 100 percent bonding for any contract involving construction of a public project. This proved to be a major challenge for Missouri DOT in implementing its Safe and Sound bridge rehabilitation program. This was originally conceived as a design-build-finance arrangement, with an expected cost of \$800 million. When it was determined that Missouri statutes required a 100 percent bond on the entire contract value (including the financing component), Missouri DOT was required to obtain legislative amendments to the statute, as the industry was not able, or was unwilling, to meet this requirement.

Another important legislative issue is whether the PPP statute should allow unsolicited proposals to the agency, or whether all projects must be formulated by the agency and solicited. Delaware, Texas, Virginia, and Oregon are among the states that allow unsolicited proposals to be made by the private sector for whatever ideas the private sector feels are justified. However, most states that have PPP legislation do not allow unsolicited proposals. This area is currently being looked at carefully by some state legislatures, as they evaluate whether the benefits of getting novel ideas are worth more than formulating their own specific needs and developing a competitive proposal process. Many of these legislatures are also evaluating the entire premise of PPPs—particularly whether there is a loss of state control because of their long duration and whether they are creating what is an essentially unregulated monopoly to outsource the responsibility for raising tolls to the private sector.

Regardless of how the project is delivered, there is one other major issue to consider on PPP projects—the marketplace's view of risk. Contractual terms and conditions in many of the PPP projects demonstrate a reluctance, or unwillingness, to assume unlimited liability for performance. As a result, the contracts have a look and feel very similar to those one might expect from the private sector—particularly relative to limitations of liability, limitations on latent defect and warranty coverage, and caps on liquidated damages.

## Summary

The evolving regulatory and statutory environment of alternative delivery systems in the public sector mandates that practitioners maintain an understanding of what is happening in the states where they practice. While DB and CMAR delivery approaches are recognized at the federal level and in most states, the span of use and experience of the approaches varies widely among states. PPP approaches are a work in progress, and best procurement practices continue to develop.

## II. BART EXTENSION TO SAN FRANCISCO INTERNATIONAL AIRPORT

### Project Overview

The San Francisco Airport Extension project involved an 8.7-mi, four-station extension of the existing Bay Area Rapid Transit (BART) system from the Colma Station to Millbrae, with an aerial station at the planned International Terminal at the San Francisco International Airport (SFIA). BART developed this project in conjunction with the San Mateo County Transit District (SamTrans). Before the system's opening in June 2003, airport users had to drive to the airport. SamTrans projected that the extension would carry an estimated 68,500 passengers per weekday overall in the year 2010, including 20,000 to and from the airport. The extension was expected to reduce the number of work-related auto trips by about 35,000 vehicles per day by the year 2010, while BART ridership in San Mateo County would jump 41 percent, to 123,000 passengers per day from 87,000. Additionally, the light rail access to the airport was expected to greatly reduce the 70,000 vehicles per day on the Highway 101 access road to the airport.

BART developed the contract documents and awarded a general engineering consultant (GEC) contract to Bay Area Transit Consultants, a Bechtel-led joint venture that included Parsons Brinckerhoff; Quade & Douglas; John Warren & Associates; and Don Todd Associates, Inc. The overall project used a multicontract DB delivery process. The biggest DB contract was for the line, track, and systems portion of the SFIA extension. This contract is the subject of this section. The other DB contracts included 1) above-grade stations and below-grade platforms and finishes; 2) parking and station site work; and 3) elevators, escalators, alarm, and detection systems.

BART secured funding for the total project through several resources. The original budget for all of the work associated with the project was \$1.167 billion, of which \$750 million came from a Federal Transit Administration (FTA) grant as part of its New Starts Program (49 U.S.C. 5309), which provided funding for new fixed guideway systems and extensions of existing guideway systems. This project was also part of the FTA Turnkey Demonstration Program, which was a pilot program to assess if the DB approach would reduce implementation time and cost. The remainder of the project funding came from the following resources: SFIA (\$200 million); the State of California (\$108 million); SamTrans (\$99 million); and West Bay bridge funds (\$10 million).

### Procurement

#### *Scope of Work*

The scope of the subject contract was only for the design and construction of the line, trackwork, and systems for the BART extension into SFIA. The specific

construction work included cut-and-cover subway, aerial structures, U-wall and at-grade trackway, trackwork, contact rail, site work, drainage, utilities, street work, ancillary structures, conduits and cable tranches, and subway mechanical and electrical systems and structures. The line facilities included below-grade structures for each station, including retaining walls, trackway, platform structure, and station structure. The contract also required systems design, procurement, and installation.

In addition, because of the anticipated funding from the FTA, the proposers were to comply with federal requirements as stipulated in Supplementary Conditions, Article SC 10, of the contract. The requirements included certification by bidders, suppliers, and subcontractors that they have not been debarred, suspended, or ineligible to participate in U.S. government contracting activity and the requirement that bidders conform with U.S. prevailing wage laws as set by the Department of Labor.

#### *Process Overview*

BART released an RFP in December 1996. Prequalified proposers submitted bids in accordance with the contract book, contract drawings, bid book, standard and directive drawings, and specifications standards. BART evaluated the bid documents and maintained the sole discretion to reject any bids and waive any informalities and minor irregularities in the bids received. Furthermore, the Invitation to Bid did not commit BART to award any contract or pay any costs incurred in the preparation or submission of a bid. The project depended on the availability of funding, and in the event that the funding did not materialize, BART did not have to accept any bids.

#### *Selection and Award Criteria*

The basis for award on this DB project was low bid. As part of the bid process, proposers submitted unit, lump sum, and other prices for various elements of the work. BART reviewed the Total Contract Bids to ensure the correct sum of bid item totals. In the event of a discrepancy, the sum of bid item totals prevailed. The “instructions to bidders” indicated that “the award of contract will go to the lowest responsible bidder who complies with the prescribed project requirements and whose qualifications are satisfactory to [BART].”

The successful design-builder for this project was the joint venture of Tutor-Saliba/Slattery, which was awarded an approximately \$530 million contract.<sup>19</sup> The engineering firm HNTB was the lead engineer for the joint venture.

<sup>19</sup> Tutor-Saliba/Slattery was also awarded two separate DB contracts totaling \$95 million for stations (San Bruno and S. San Francisco) along the extension route.

## **Key Contract Provisions**

### *Ownership of Documents*

The contract provided for ownership of the work product whereby the owner maintained ownership of all pertinent documentation for the design and construction of the project. Those documents included drawings, specifications, and data regardless of whether they were used in the project. Upon the project’s conclusion, the design-builder was to provide the owner with a list of the information not previously received by the owner, and the owner had 30 days to requisition that documentation.

The contract also provided for the use of escrowed bid documents (EBD). The use of EBD was conventional, in that the EBD were to be used in the course of the project to assist in price adjustments, change orders, and dispute settlements. The EBD are the property of the design-builder, but remain in the owner’s possession for the life of the project. The owner entrusts the EBD to an escrow agent and returns the documents to the design-builder after final payment and final claims resolution.

### *Suspension and Termination*

The owner reserved the right to terminate all or part of the contract if it deemed the design-builder to be in default. Default included 1) violation of contract terms; 2) abandonment, assignment, or subletting of the contract without BART approval; 3) filing for bankruptcy; 4) failure to maintain work schedule; 5) refusal to properly execute the work; 6) use of improper materials or supplies; 7) inadequate skilled labor supply; 8) inadequate design services; 9) failure to provide proper workmanship; 10) failure to take steps in a prolonged labor dispute; or 11) performance of the contract in bad faith. If the owner chose to suspend the design-builder’s responsibilities for all or part of the contract, the design-builder would incur the cost of the BART-chosen replacement contractors.

### *Design-Builder Proposed Changes in Standards or Requirements*

The contract stipulated a value engineering incentive for the contract. The incentive included several criteria for value engineering change proposals (VECP):

- Design-builder must identify changes at the time of submittal to BART’s representative.
- Items must require a change in the contract.
- Items must decrease the contract price.
- Items must not alter the light rail system’s characteristics: service life, reliability, economy of operation, ease of maintenance, and necessary features and appearance.
- Items cannot require unacceptable extensions of contract time (contract does not define what is “unacceptable”).

In the event that the owner accepted the VECP, resulting in a contract price adjustment, the net savings resulting from the change would be evenly shared (50/50) between the design-builder and the owner. The contract defined net savings as the gross savings less the following: design-builder's costs for developing and implementing the VECP and estimated amounts of increases to the owner (review, inspection, implementation, and BART-furnished property).

#### *Inclusion of Disadvantaged Business Enterprises*

The supplementary conditions of the contract documents included goals for disadvantaged business enterprise (DBE) participation and a structure for measuring DBE involvement in the project. The final contract documents included percent total bid for category of work for DBE involvement in the following portions of the project: Engineering and Architectural Design, Material Procurement, Facilities Construction, Systems, and Trucking. The contract documents stated that DBE joint venture partners be responsible for a clearly defined portion of the project and that any DBE participants perform a commercially useful function. The contract provided the following measurements to quantify DBE participation:

1. Total dollar amount of contracts with DBE bidders. If a joint venture, then only the proportionate interest of the DBE is counted unless the DBE ownership is 51 percent or greater, whereby the measurement is 100 percent of the contract value.
2. The dollar value of all first- and second-tier DBE subcontracts, except those executed under a DBE subcontractor.
3. Dollar value of supplies or materials purchased from a DBE manufacturer.
4. Sixty percent of dollar value of material or supplies purchased from a DBE regular dealer.
5. Fees or commissions charged for providing legitimate service and assistance in any procurement (personnel, supplies, materials, etc.); bonding; or insurance required for the project.

The RFP required a list of eligible DBE participants as identified by the design-builder and proof that the design-builder had solicited proposals from DBE entities to perform portions of the project. Should the bidders fail to provide proof of good faith efforts to solicit DBE participation, BART notified the bidder of its recommendation to reject the proposal. Should the design-builder, after award of contract, fail to provide adequate proof that it is meeting the DBE goals as agreed upon in the final contract, the design-builder is subject to liquidated damages of an amount equal to \$50,000 for every 0.1 percentage point that the design-builder falls below the DBE goals set forth in the contract. The contract specifies that BART will appoint an ombudsperson to ensure that any and all DBE suppliers and subcontractors receive adequate and timely compensation for their services. The contract requires the design-builder

to compile a DBE-loaded schedule so that BART can monitor DBE participation and payment.

#### *Dispute Resolution*

The Supplementary Conditions of the contract include recommendations that the design-builder enter a "partnering" agreement with the owner. Within such an agreement, the design-builder and the owner are to work together to develop goals and establish a cooperative and collaborative atmosphere for the project. The goals for the partnering arrangement are as follows:

1. For the design-builder, GEC, general contracting consultant (GCC), State, municipal governments, Burlingame, Airport, and District to work as partners.
2. To avoid confrontation and litigation among the parties.
3. To reach a mutual understanding for the proper execution of the project.
4. To establish an atmosphere of trust and communication.

The contract stipulates an allowance provided by BART to pay for meetings and professional facilitators. The contract invites subcontractor participation in the partnering meetings.

In the event of a dispute or claim arising from the work of the project, the contract offers a dispute review board (DRB) provision, unless the design-builder elects not to participate in a DRB within 45 days of the contract's execution. The DRB, if established, consists of one owner representative, one design-builder representative, and a chairperson identified by the two representatives, each with no prior direct involvement or financial interest within 6 months of the contract. BART, the design-builder, and three DRB members execute a DRB agreement within 14 days of the selection of the chairperson. If the design-builder objects to a decision by BART in the course of the project, the matter can be brought to the DRB. The parties offer evidence, and the DRB issues a report of its findings per the procedures outlined in the DRB agreement. The DRB's recommendations are not binding on the two parties. Should one of the parties reject the DRB recommendations, that rejection can be considered grounds for awarding costs and attorney's fees to the prevailing party in arbitration.

#### *Other Provisions*

The contract required the design-builder to guarantee its work. In the event of discrepancies or defects with respect to facilities (it does not stipulate a clear definition of facilities) within 12 months after the date of acceptance, the design-builder must perform corrective work. Additionally, the design-builder is to guarantee the corrective work for the shorter of 12 months after the system is operational or 18 months after total completion of the corrective work.

The contract documents required the design-builder to be responsible for all work and approvals necessary

for utility rearrangements. The design-builder bears the cost of rearranging utilities and is responsible for obtaining necessary approvals and giving required advance notice to any stakeholder agencies or utilities. Additionally, regarding utility relocations, the design-builder must coordinate with the owner, contractors, subcontractors, utility companies, and property owners with regard to site access, as well as local governments.

The owner maintained the right to take possession of portions of the work prior to total project acceptance. In the event the owner decides to take early possession of portions of the work, the design-builder is relieved from performing additional work and maintaining those portions of the project. If injury or damages occur to those portions of the work as a result of public traffic or the elements, the owner bears responsibility.

The contract included an incentive/disincentive program for safety on the project. BART used the design-builder's cumulative incident rate (IR) as computed below:

$$IR = \frac{LTI}{200,000} \times MH$$

LTI = Number of lost time incidents

MH = Total hours worked by all jobsite employees

*\*\*For the purposes of computing IR, each fatality equals 5 LTI.*

The contract did not provide specific IR values for incentives and disincentives, nor did it specifically address the magnitude of the compensation or penalty.

### Project Performance

The original cost for the entire extension as estimated for the Full Funding Agreement with the FTA was \$1.167 billion. The final cost for all of the work associated with the extension was \$1.55 billion, about 33 percent over budget. The project, which broke ground ceremonially in November 1997 and was originally scheduled to open in late 2001, did not open until June 2003, approximately 20 months behind schedule.

As the cost of the project exceeded the budget, the FTA required the project to develop a financing plan in 2000 to help control costs. As part of that plan, the project scope changed from the purchase of 28 new rail cars at a cost of \$100 million to the updating and improvement of existing maintenance facilities at a cost of \$70 million. The improved maintenance and storage facilities would allow BART owners to properly maintain and improve their existing rail car stock at a \$30 million savings to the extension project.

For the track and systems work contract, the original project scheduled an estimated 50 ft of track completed each day, while the actual average was around 35–40 ft per day. Delays were caused by several factors. An endangered species—the San Francisco garter snake—was discovered in the transit corridor in April

2000; this halted work for nearly 3 weeks as measures were taken to handle this circumstance. No one was found at fault, so BART bore the \$1 million delay cost.<sup>20</sup> Further, the excavation operations were slowed by tough site conditions; soils encountered were so rigid and hard that sheet pilings were bent during installation.<sup>21</sup> The design-builder had to implement overtime and weekend work to speed up the project. Substantial change orders were issued, but no formal claims were filed by the contractor or BART officials.

In 2002, however, San Francisco City Attorney Dennis Herrera filed a federal lawsuit against Tutor-Saliba and its partner contractors for their roles in the several contracts of the total project. Herrera accused the contractors of “intentionally bidding less than they knew the new international terminal would cost so they could bill the city later for the difference”; the suit also alleged that Tutor-Saliba used minority-owned subcontractors inappropriately.<sup>22</sup> Tutor-Saliba filed a defamation lawsuit against Herrera himself after he referred to the suit against the company in a speech. This suit was dismissed by a state appeals court in early 2006.<sup>23</sup> Ultimately, a settlement was reached where the company agreed to pay \$19 million in a series of annual installments; company owner Ronald Tutor is personally liable should the company miss a payment.

In its first year, the extension did not meet its projected ridership of 50,000 riders per week. The ridership averaged around 35,000 actual riders per week. At the onset of the project, BART and SamTrans made an agreement whereby BART would extend service to San Mateo County if the county agreed to pay the costs for operating the system within the county; the county agreed to these conditions as long as projected revenues, based on estimated ridership for trains accessing the airport, materialized. Given the lower than expected ridership, BART officials wanted to increase service in the area to improve ridership while the county wanted to reduce service to save on operations costs. Ultimately, San Mateo County paid BART \$32 million and agreed to pay an annual amount for BART to take over the operating costs for the rail system in the county.

### III. DALLAS AREA RAPID TRANSIT GREEN LINE PROJECT

#### Project Overview

Dallas Area Rapid Transit's (DART) Green Line Project is the largest portion of a systemwide expansion

<sup>20</sup> M. Cabanatuan & M. Wilson, Delays Plague BART Extension to SFO, SFGate.com, Jan. 6, 2003, <http://www.sfgate.com/cgi/bin/article>.

<sup>21</sup> *Id.*

<sup>22</sup> C. Goodyear, Tutor-Saliba to Pay SF \$19 Million, San Bruno B.A.R.T., Feb. 24, 2006, <http://www.sanbrunobart.com/news/2006/02/24/tutor-saliba-to-pay-sf-19-million>.

<sup>23</sup> *Id.*

that will double DART's rail network to more than 90 mi by 2013. The overall 28-mi, \$1.8 billion Green Line project consists of two segments, the Southeast Corridor and the Northwest Corridor. The first phase includes all of the Southeast Corridor work and will extend service southeast of downtown Dallas to Fair Park; it will also include the first portion of the Northwest Corridor segment, which provides service to Victory Station. This portion opened for service on September 14, 2009. The remainder of the Northwest Corridor segment opened in December 2010. When complete, the Green Line will serve several regional destinations, including Deep Ellum, Baylor University Medical Center, Victory Park, the Dallas Market Center, the University of Texas Southwestern Medical District, Love Field Airport, and the cities of Farmers Branch and Carrollton.

This section focuses on the second phase Northwest Corridor segment from Inwood Station to the North Carrollton/Frankford Station, which consists of approximately 13.5 mi of light rail service and eight stations—five at grade and three aerial. The portions of the Northwest Corridor included in this procurement are referred to as NW-2, NW-3, and NW-4 line sections. The solicitation was issued with the intention of making a single award for preconstruction services and assumed that upon successful negotiation of a GMP and the execution of a Full Funding Grant Agreement (FFGA) with the FTA, a contract modification for construction services would be executed. The delivery approach adopted is characterized as a CMAR method. A joint venture of Archer Western Contractors and Herzog Contracting, Inc., was awarded the CMAR contract in 2005. Archer Western Contractors was also the lead contractor in the joint venture that was awarded the first phase contract.

## Procurement

### *Scope of Work*

This contract included the NW-2, NW-3, and NW-4 line sections. At the time of solicitation, the three line sections were in design development under a separate contract, and preliminary design drawings for each section were included in the solicitation.

Anticipated preconstruction services were defined according to a task-order schedule and included the following:

- Construction planning.
- Construction contract document support.
- Specification support.
- Geotechnical investigations.
- Utility identification and conflicts.
- Project safety and quality control.
- Plan reviews for NW-2, NW-3, and NW-4.
  - DART and Agency Review Submittal.
  - Prefinal Design Submittal.
  - Final Design Submittal.
  - Contract Documents.

The selected contractor would be paid on a negotiated basis for the task orders. Proposers, however, were required to develop estimated prices for the anticipated task orders provided in the solicitation and task orders submitted in their proposals. These prices would become the basis for the task order negotiations. Proposers were also required to submit a not-to-exceed price for preconstruction services.

Anticipated construction services would include the following:

- Demolition.
- Civil improvements.
- Underground utilities.
- Drainage.
- Retaining walls.
- Street improvements.
- Bridges (steel and concrete).
- Light Rail Transit (LRT) Stations.
- Hardscaping/Landscaping.
- Parking lots with lighting.
- An underpass structure at Mockingbird Lane.
- New freight track bed construction (freight trackwork installed by Dallas, Garland, and Northeastern Railroad).
  - LRT Trackwork Installation (Trackwork is authority-furnished material).
  - Highway grade crossings (both freight and LRT).
  - LRT systems elements including:
    - Traction power (traction power substations are authority-furnished material).
    - Overhead contact system.
    - Track switches.
    - Signals.
    - Communications (fiber optic backbone cable for NW-2 and NW-3 is authority-furnished material).
    - Supervisory control system components.
    - Wayside cab signaling components.
    - Fare collections components (ticket vending machines furnished and installed by others).
    - Radio equipment components (radio equipment furnished and installed by others).
    - Systems testing.
  - Support of authority integrated testing.
  - Project turnover to the authority.
  - Support of authority pre-revenue operator certification (pre-revenue service).
  - Support of project startup.
  - Contract close-out.

Preliminary unit price schedules were developed for each of the line sections and included in the solicitation. The proposers were required to submit unit prices for the identified items and estimated quantities of work in their proposals. In addition, they were required to submit a construction services not-to-exceed fixed price, exclusive of preconstruction services. The proposer's unit prices and not-to-exceed fixed price would serve as "a basis to negotiate the GMP once the specifications,

drawings, and proposer’s cost estimates are validated in the Pre-Construction phase.”

*Process Overview*

In general, the evaluation methodology assessed four factors: 1) conformance of a proposal with stated requirements, 2) assessment of the evaluation criteria and the proposal risk assessment, 3) past performance, and 4) price. Factors 2 and 3 were of equal importance and Factors 2 and 3 combined were approximately equal to price. The CMAR was selected early in the project to provide the Authority and the design team with expertise and experience that would assist in decision-making, constructability reviews, cost estimates, cost control, and schedule control. The Authority was seeking assistance in ensuring that the project design allowed for economical and efficient methods of construction with minimal disruption to the community, the Authority's ongoing operations, and operations of the affected freight railroads. The Authority intended to select a CMAR who would best provide the services needed to achieve these goals.

The selected CMAR would be a member of a team composed of representatives from the Authority, the design consultants, and DART's member municipalities. The Authority intended that the CMAR provide preconstruction services and serve as general contractor for

the construction. DART issued the RFP in October 2005 and required responses by December 2005.

*Selection and Award Criteria*

Evaluation criteria listed in Table 1 were part of the overall evaluation methodology employed to select the CMAR.

**Table 1. DART Green Line Evaluation Criteria**

<i>Item</i>	<i>Points</i>
Project Approach	300
Project Personnel	200
Team Composition/Subcontracting Opportunities	200
Firm/Team Experience	200
Oral Presentations (If Required)	100
Proposal Risk Assessment	100
<b>Total</b>	<b>1,100</b>

Table 2 briefly describes the subcriteria and the points considered for the criteria project approach through firm/team experience.

**Table 2. DART Green Line Evaluation Subcriteria**

<i>Criteria</i>	<i>Subcriteria</i>	<i>Description</i>
Project Approach	Budget (0–75 points)	Explanation of approach to keep project within budget
	Completion (0–75 points)	Explanation of management to construction on time
	Quality (0–75 points)	Explanation of quality control program
	Community Relations (0–75 points)	Description of steps to minimize impact of project upon public and property
Project Personnel	Proposed Team (0–150 points)	Project organization chart depicted proposed key staff
	Resumes (0–50 points)	Provide resumes for all personnel shown in the organization chart
Team Composition/ Subcontracting	Subcontractors (0–85 points)	Explanation of proposed subcontractor tiers to include the utilization of small business concerns that are independently owned and operated
	Dispute Resolution (0–45 points)	Explanation of procedures for handling issues and resolving disputes with subcontractors
	Experience (0–35 points)	Description of success and/or failure on similar projects regarding disadvantaged/minority/women-owned business enterprises participation goals
	Small Business Outreach (0–35 points)	Description of existing mentoring and internship programs for small businesses
Firm/Team Experience	Similar Project Experience (0–75 points)	List firm/team’s experience over last 10 years with projects of similar scope and value
	Record of Safety (0–75 points)	Description of firm safety record; proposed incident-free management of public safety risks; firm’s safety record and experience with in-street construction; and proposed worker safety plan for working on or adjacent to active railroads
	Local Experience (0–50 points)	Description of work experience in the DART service area

The Proposal Risk Assessment involved rating each proposal in either a high, moderate, or low risk category, as illustrated in Table 3.

**Table 3. DART Green Line Proposal Risk Assessment**

<i>Risk Rating</i>	<i>Definition</i>
High (0–49 points)	Likely to cause significant disruption of schedule, increased cost, or degradation of performance. Risk may be unacceptable even with special contractor emphasis and close Authority monitoring.
Moderate (50–74 points)	Can potentially cause some disruption of schedule, increased cost, or degradation of performance. Special contractor emphasis and close Authority monitoring will probably be able to overcome difficulties.
Low (75–100 points)	Has little potential to cause disruption of schedule, increased cost, or degradation of performance. Normal contractor effort and normal Authority monitoring will probably be able to overcome difficulties.



Specifically, each proposal was evaluated against the criteria and subcriteria in Table 2 and Table 3 and scored according to the points listed. Subsequently, the risk of each proposal was assessed and scored against the criteria in Table 1. Next, the past performance of each proposer was assessed against a set of criteria and rated from “Exceptional/High Confidence” to “Unsatisfactory/No Confidence.” Finally, the price of each proposal was considered. Proposed prices were evaluated for completeness, reasonableness, and realism. A proposer’s proposed prices were determined by multiplying the quantities identified in the schedule by the proposed unit price for each line item to confirm the extended amount.

## Key Contract Provisions

### *Suspension and Termination*

The Authority retained the right to suspend all or any part of the work for a period deemed appropriate by the Authority. Any unreasonable suspensions or delays impacting performance of the work entitled the contractor to a cost adjustment (excluding profit). Adjustments would not be made if 1) performance would have been suspended or delayed by any other cause, including the fault or negligence of the contractor, or 2) circumstances for which an equitable adjustment was provided for or excluded under any other provision of the contract.

The Authority could terminate the contract, in whole or in part, at its convenience. The contractor would incur no further obligations related to the terminated work and should stop work on the date specified. The contractor would also cancel outstanding orders or subcontracts connected to the terminated work while settling liabilities and claims arising out of the termination of subcontracts. The Authority could direct the contractor to assign the contractor’s right, title, and interest under terminated orders or subcontracts to the Authority. The contractor would still be required to complete the work not terminated by the notice of termination and may incur obligations as are necessary to do so.

The contractor could be required to transfer title and deliver to the Authority in the manner and to the extent directed: the fabricated or unfabricated parts; work in process; completed work, supplies, and other material produced or acquired for the work terminated; and the completed or partially completed plans, drawings, information, and other property that, if the contract had been completed, would be required to be furnished to the Authority. The contractor would need to, as directed, protect and preserve property in the possession of the contractor in which the Authority has an interest.

The Authority would pay the contractor the following amounts:

- For contract work performed before the effective date of termination, the total (without duplication of any items) of the cost of this work; the cost of settling

and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the terminated portion of the contract; and a sum, as profit on the cost of this work, determined by the contracting officer to be fair and reasonable. However, if it appears that the contractor would have sustained a loss on the entire contract had it been completed, the contracting officer shall allow no profit and shall reduce the settlement to reflect the indicated rate of loss.

- The reasonable costs of settlement of the work terminated, including accounting, legal, clerical, and other expenses reasonably necessary for the preparation of termination settlement proposals and supporting data; the termination and settlement of subcontracts (excluding the amounts of such settlements); and storage, transportation, and other costs incurred, and reasonably necessary for the preservation, protection, or disposition of the termination inventory.

- The total sum to be paid the contractor would not exceed the total contract price plus the reasonable settlement costs of the contractor reduced by the amount of payments otherwise made; the proceeds of any sales of construction, supplies, and construction materials; and the contract price of work not terminated.

### *Contractor Proposed Changes to Standards or Requirements*

Proposers were allowed to either use the solicitation’s example task order and work breakdown sheets provided or provide their own version as long as all line items were included in the proposer’s version in the same order. Proposers were required to clearly explain how their not-to-exceed prices were developed.

### *Inclusion of DBEs*

In accordance with its DBE policy, the Authority established a goal for DBE participation in this solicitation. The proposer was expected to meet or exceed and/or demonstrate its good faith efforts to meet the goal. This goal, expressed as a percentage of the total contract price, including any increases that may occur, was 7 percent DBE participation. DBE participation only counted the value of commercially-useful work actually performed. To count, DBE work had to be performed by its own forces.

### *Dispute Resolution*

A DRB was established to assist in the resolution of disputes, including claims and other controversies, arising out of the work of this contract. This provision describes the purpose, procedure, function, and key features of the DRB. A three-party agreement would be executed by the Authority, the contractor, and members of the DRB for the purpose of formalizing the creation of the DRB.

The DRB would assist in and facilitate the timely and equitable resolution of disputes between the Authority and the contractor in an effort to avoid construction delay and litigation. The intent was not for the

Authority or the contractor to default on their normal responsibility to amicably and fairly settle their differences by indiscriminately referring them to the DRB. The Authority and contractor would be encouraged to resolve potential disputes without resorting to the DRB procedures.

A dispute would be referred to the DRB only when it appeared that the normal Authority/contractor dispute resolution effort was not succeeding, and before instituting action under the "Disputes" clause of the General Provisions. However, a dispute would be referred to the DRB only when the contracting officer and the contractor jointly agreed to do so and agreed to the scope of the DRB review.

### Project Performance

Work proceeded as planned, and the segments NW-2, NW-3, and NW-4 opened slightly ahead of schedule on December 6, 2010. Project personnel were interviewed, and it is reported that no preconstruction claims or significant changes occurred.

## IV. DULLES CORRIDOR METRORAIL PROJECT

### Project Overview

The Metropolitan Washington Airports Authority (MWAA) is in the process of constructing a 23-mi extension to the existing Metrorail system, with the project being commonly known as the "Dulles Corridor Metrorail Project." When completed, the project will be turned over to another agency, the Washington Metropolitan Area Transit Authority (WMATA), for operation and maintenance and will be known as the "Silver Line." The project will provide transit from East Falls Church, Virginia, to Washington Dulles International Airport (DIA) and west to Ashburn, Virginia. Importantly, the new line will provide service to Tyson's Corner (a major commerce center in Northern Virginia), the Reston-Herndon area, and will be a one-seat ride from DIA to downtown Washington, D.C.

The project is broken into two phases and is expected to have a total cost in excess of \$5 billion. The first phase will be approximately 13 mi, and have four stations in the Tyson's Corner area. Utility and right-of-way acquisition work along the Phase 1 corridor started in August 2007, and Full Notice to Proceed with final design and construction under a DB contract was authorized in March 2009. Phase 1 is expected to be completed by 2013. Phase 2 will extend the transit system to DIA and eastern Loudon County, Virginia.

This case is an example of how the Virginia PPP procurement statute provided the authorization for Phase 1 of this complex project to reach fruition. The case study will provide an overall background to the corridor transit project while focusing upon Phase 1 of the project and procurement.

## Procurement

### History

The concept for rail to DIA developed in 1990 when the Virginia Commonwealth Transportation Board (CTB) adopted a Dulles Corridor Transportation Program with rail service as its goal. In 1995, the Commonwealth of Virginia enacted the PPTA. This act allows private entities to enter into agreements with the Commonwealth to construct, improve, maintain, and operate transportation facilities.

In 1998, an unsolicited conceptual proposal for a rail project came from Raytheon Infrastructure, Inc. (now URS) to the Virginia Department of Rail and Public Transportation (DRPT). The proposal included design, construction, operation, and maintenance services for a new rail line and a Bus Rapid Transit (BRT) system. In accordance with PPTA implementation guidelines, the conceptual proposal was posted and published. A competing proposal was received in January 1999 from the Tyson-Dulles Corridor Group, a consortium consisting of Bechtel and West\*Group.

The Initial Review Committee considered both proposals and determined that the Raytheon proposal merited further review. In February 2000, CTB adopted a resolution approving Raytheon's conceptual proposal and invited a detailed proposal. An Advisory Panel was formed to handle subsequent matters in accordance with PPTA implementation guidelines. By October 2000, Raytheon announced the formation of Dulles Transit Partners (DTP), a consortium of Raytheon, Bechtel, and West\*Group (West\*Group eventually withdrew from the consortium), an occurrence that the Advisory Panel acknowledged.

In late May 2002, DTP submitted its detailed proposal, and by June 2002, DTP had submitted a draft environmental impact statement (EIS) to DRPT. The Draft EIS proposed several transportation alternatives, including bus, combined bus/rail, and exclusively rail options. The full Metrorail system emerged as the Locally Preferred Alternative to increase nonvehicular access to Tyson's Corner, Dulles, and Loudon County. WMATA, the CTB, Fairfax County, Loudon County, and MWAA all approved or endorsed the project in December 2002. DRPT and DTP began to negotiate a comprehensive agreement (CA) in January 2003. The CA was executed in June 2004.

The CA called for, among other things, DTP to perform preliminary engineering on Phase 1 and then provide a fixed-price proposal to DRPT to complete the final design and construct Phase 1. DTP performed the preliminary engineering and ultimately submitted a Final EIS in December 2004, which received FTA approval in March 2005.

MWAA became involved in the project when, in December 2005, it submitted a proposal to the Commonwealth of Virginia proposing that the Dulles Toll Road be transferred to MWAA in consideration of MWAA operating the Dulles Toll Road and using toll revenues as a nonfederal source of funding to construct the pro-

ject and for other transportation improvements in the Dulles Corridor. In March 2006, the Commonwealth of Virginia entered into a Memorandum of Understanding with MWAA agreeing to the transfer, and on December 29, 2006, the Commonwealth of Virginia and MWAA entered into a transfer agreement which, among other things, effected an assignment of the CA to MWAA.

### *Scope of Work*

The scope associated with Phase 1 of the Dulles Metrorail Project is broad-based and includes administration, design, engineering, procurement, transportation, quality assurance, inspection, installation, construction supervision, management, documentation, maintenance demonstration, and testing services. The design-builder also has responsibility to provide labor, equipment and materials, machinery, tools, consumables, utilities, and other services dictated or enumerated by the contract.

### *Process Overview*

DTP finished the preliminary engineering and in January 2007 submitted a fixed-price DB proposal to MWAA for Phase 1. The parties negotiated the proposal, and on June 17, 2007, MWAA and DTP executed the DB contract in the amount of approximately \$1.6 billion.

To advance the project and eliminate risks that were considered inherent in the right-of-way acquisition and utility relocation scope of work, MWAA and DTP agreed that this work would be performed under the CA on a cost-reimbursable basis, as opposed to being part of the DB contract. This eliminated the need for DTP to put contingencies in its lump-sum contract for what were expected to be challenging and unknown conditions. Having this work proceed under the CA also enabled the project to mitigate the potential impact of this scope of work, as DTP was able to start work on these activities in August 2007—several months in advance of the expected notice-to-proceed date (February 2008) for the DB work. This approach was viewed as mitigating the impact to the project schedule that could come from having this work performed concurrently with the release of the DB package. Since MWAA would have ultimate financial responsibility for right-of-way and utility relocations, the cost-reimbursable contracting approach offered under the CA also enabled MWAA to have DTP serve as MWAA's representative in performing this work, with MWAA ultimately controlling the pace and disposition of the negotiations for land and relocations.

Because of delays to the FFGA, which called for the FTA to provide \$900 million for Phase 1, the start of the DB project was delayed beyond February 2008. The parties proceeded to have certain work performed under the CA on a series of interim agreements, and an amended and restated DB contract was executed on July 25, 2008, to address a number of issues that arose from the delayed notice to proceed. On March 10, 2009, the FFGA was signed, and full release under the DB contract was issued shortly thereafter.

One of the important procurement features of the project involved the handling of certain subcontractors and suppliers. During the course of the negotiations on the DB contract, the parties concluded that portions of the work that were to be performed by certain subcontractors were difficult to price realistically. These subcontracts involved work that was scheduled to be performed several years after the start of construction, and it appeared that the pricing prospective subcontractors were providing had substantial contingencies, due to the combination of the level of design existing as of the proposal pricing date, implementation schedule, and market conditions. To deal with this situation, the parties carved out this work from the fixed-priced component of the proposal and converted it to an allowance. Therefore the \$1.6 billion DB contract price with DTP includes approximately \$600 million of allowances for the following:

- Track work.
- Wiehle Parking Garage.
- Station finishes and mechanical, electrical, and plumbing work.
  - West Falls Church Yard sound and box platforms.
  - Pedestrian bridges.
  - Site development.
  - Installation of public art.
  - Communications and security.
  - Fire suppression.
  - Elevators and escalators.
  - Spare parts.
  - West Falls Church Yard service and inspection building.
    - Traction power supply.
    - Automatic train control supply.
    - Corrosive and stray currents.
    - Contact rail.
    - Replacement parking.

The contract requires DTP to include MWAA in oversight of the bidding and awarding of allowance item contracts. DTP was to develop prequalification criteria and submit them to MWAA 30 days before requesting bids for subcontracted work. DTP also has responsibility for drafting RFPs for allowance items. In the event that it was necessary to engage different subcontractors for allowance item tasks, DTP was to develop separate RFPs for those items. DTP was also to open the bids in the presence of MWAA and evaluate the bids according to established selection criteria.

A key part of the allowance arrangement is that each party has taken some risk in the arrangement. MWAA has taken procurement risk for the allowance subcontractors, since the ultimate price for the DB contract is adjusted to reflect actual prices received from the bidding process and how those prices vary from the allowance price within the contract for such scope of work. Once the bidding is completed and the subcontract signed, DTP is to take full risk of the subcontractors for

performance, just as it is required to do under the lump-sum component of the contract.

### *Selection and Award Criteria*

Since the CA was developed in accordance with the requirements of the PPTA, its complementary implementation guidelines governed the selection of contractors for public-private projects. The PPTA guidelines include suggestions for evaluation criteria, including: experience with similar infrastructure projects, past performance, demonstration of ability to perform work, leadership structure, project manager experience, management approach, project ownership, participation of small businesses, participation of locally-owned or women- or minority-operated businesses, safety record and plan, and liability.

The allowance portion of the DB contract for the Dulles Metrorail Project called for evaluation of subcontractor bids for the allowance items according to the following selection criteria:

- Schedule.
- Evaluated price.
- Scope.
- Commercial compliance.
- Technical expertise.
- Safety.
- DBE participation.
- Quality assurance/quality control.
- Key personnel.
- Prior relevant experience.
- Performance history.
- Claims history.
- Execution plan.

The contract does not stipulate the order of importance of the selection criteria, as it will be the prerogative of the parties to decide which subcontractor bid is most appropriate.

### **Key Contract Provisions**

The terms of the design-build contract reflect both a public and private sector large project dynamic. Among the unique clauses are limitations of liability and a combination parental guarantee/performance bond security backstop provided by DTP to secure its obligations. Additionally, the Amended and Restated Design-Build Contract identified another element of the deal, whereby the FTA required MWAA to identify funding sources for a \$200 million Capital Reserve Account (CAPRA), with the CAPRA being created to ensure that sufficient funds will be available to cover risks on the project in the event that project cost exceeds allocated and unallocated contingency levels. DTP agreed to contribute up to \$25 million of this CAPRA amount, which will be drawn on a *pari passu* basis (proportionally or at an equal pace) with all other amounts drawn from the CAPRA.

In addition to the above, some of the more significant clauses are discussed below.

### *Ownership of Documents*

The title of all work product developed by DTP passes to MWAA on the earliest of the date: 1) DTP has prepared or received such work product, 2) payment has been made by MWAA for such work product, or 3) MWAA terminates the contract for DTP default. DTP retains intellectual property rights to all DTP background data, including designs, plans, models, drawings, prints, samples, transparencies, specifications, reports, manuscripts, working notes, documentation, manuals, photographs, negatives, tapes, discs, databases, and software that DTP or subcontractor owns or prepared before the contract effective date. However, DTP must grant a nonexclusive, irrevocable, royalty-free license for the background data to MWAA. DTP must also make an effort to provide MWAA with the necessary permissions, waivers, or licenses for any software used by or for the project.

### *Design Review*

DTP has the full responsibility to execute the design in accordance with the contract documents regardless of any documentation or information provided by MWAA or other persons. Consistent with one of the purposes of the CA, DTP also has the responsibility for the accuracy and completeness of the preliminary engineering (as it developed this design) and any subsequent engineering. MWAA has the right to review all draft plans and specifications for compliance with the contract documents, and maintains the right to disapprove any designs that are inconsistent with preliminary engineering plans and specifications. MWAA can conduct over-the-shoulder reviews of the designs during normal business hours in the presence of the design professionals in addition to reviewing any design or engineering submissions.

### *Suspension and Termination*

MWAA has the right to suspend the work for its convenience at any time with written notice to DTP. The suspension entitles DTP to a change order if DTP claims the suspension has affected the project's cost or schedule performance. DTP might be subject to compensation in the event of a change order but not for markup for profit. MWAA can suspend work for up to 24 hours twice in a 12-month period with no penalty. MWAA also has the right to suspend the work if DTP fails to provide a safe environment for workers, does not execute the work according to the contract documents, or fails to carry out orders properly given. Such suspensions do not entitle DTP to compensation.

The contract entitles DTP to suspend work if MWAA fails to pay undisputed amounts owed to DTP within 21 days. If the suspension affects the cost or schedule of the project, the contract entitles DTP to a change order. DTP can terminate the project if failure to pay extends past 180 consecutive days. DTP receives payment for any work completed according to the contract up to the termination date and compensation for demobilization

costs, termination costs, and other shut-down costs. A termination by DTP does not entitle DTP to any unearned profits, unabsorbed overhead, opportunity costs, or other damages as a result of owner default.

MWAA has the right to terminate the contract prior to full notice to proceed, but must compensate DTP for any costs due for work performed pursuant to any limited notices to proceed and any costs due according to the CA or CA Supplement. In the event of an owner-induced termination with no DTP default, MWAA and DTP work together to establish a close-out plan within 60 days of the notice for termination. Should MWAA terminate the work owing to DTP default, DTP bears the cost for the remainder of the work, including any additional contractors hired by MWAA.

*Contractor Proposed Changes in Standards or Requirements*

If DTP perceives the need for a change order it must 1) detail the facts and circumstances underlying the need for the change order, 2) provide information supporting any proposed changes in the contract price, and 3) provide information detailing the proposed change’s impact on the project schedule. Should MWAA deem the change reasonable, the owner adjusts the contract price accordingly. If MWAA determines the scope and extent of the change prior to performing the changed work, it can negotiate a new fixed-price lump-sum agreement with DTP. If MWAA cannot perceive the extent of the change before its execution, MWAA can compensate DTP on a time and material basis.

The contract also includes provisions for DTP-initiated VECPs. MWAA encourages DTP to voluntarily propose value engineering changes, accompanied by proof of cost savings and an outline of changes to the contract and project schedule. In the event that MWAA accepts a VECP, the net cost savings is distributed as 30 percent to DTP and 70 percent to MWAA.

*Inclusion of Disadvantaged Business Enterprises*

In the contract’s supplemental exhibits, MWAA details the plan to include DBEs in the project, establishing 10 percent DBE participation. The contract requires DTP to make good faith efforts towards including DBE participation in the project. Once DTP identifies DBE subcontractors or suppliers participating in the project, the contributions of those DBE participants are converted to monetary measurements to determine the adherence to the 10 percent performance goal.

*Dispute Resolution*

DTP and MWAA established a Conflict Resolution Plan as part of the Project Management Plan for the Dulles Metrorail Project. The plan consists of the following steps:

1. Negotiations (field level with DTP and MWAA representatives).
2. Elevated negotiations (DTP and MWAA senior representatives).

3. Independent expert.
4. Submission of certified claim (recommendation by MWAA representative; DTP has 30 days to agree or seek further action).
5. Mediation.
6. Legal proceedings.

Any false claims entitle MWAA to full recovery of any costs incurred in the dispute resolution process. During the dispute resolution process, both DTP and MWAA are contractually obligated to maintain their legal commitments and roles and responsibilities for the project.

*Schedule-Related Issues*

The DB contract has a robust scheduling specification (Division 01322) that identifies how baselines will be developed and updated. The commercial terms also include daily liquidated damages (staged at \$25,000 to \$100,000 per day at various points and capped at \$60 million) and an early completion incentive per month for each month that substantial completion is achieved earlier than the agreed-upon substantial completion date. The incentive amounts are displayed in Table 4.

**Table 4. Dulles Metrorail Early Completion Incentives**

<i>Month</i>	<i>Incentive Value</i>
First	\$1,000,000
Second	\$2,000,000
Third	\$3,000,000
Fourth	\$2,000,000
Fifth	\$2,000,000

The incentive schedule is additive—therefore a substantial completion 3 months in advance would translate to a \$6,000,000 incentive. The incentive is not to exceed \$10,000,000, so there is no additional monetary incentive for reaching substantial completion more than 5 months in advance.

**Project Performance**

At the time of this digest, Phase 1 of the project was well into construction and, by reports from the project personnel interviewed, there had been no significant claims. Phase 1 of the project appeared to be on schedule as well. It appeared that the delivery system for Phase 2 of the project would be design/build, but that had not been finalized.

**V. AIRTRAIN JFK SYSTEM**

**Project Overview**

AirTrain JFK is a light-rail transport system designed to provide easier access from New York City to John F. Kennedy International Airport (JFK Airport). The AirTrain system consists of three service loops

comprising 8.1 mi of railway: a 1.8-mi Central Terminal Area loop, a 3.3-mi Howard Beach extension, and a 3-mi Jamaica Station extension. The AirTrain comes under the jurisdiction of the Port Authority of New York and New Jersey. The Port Authority composed the contract documents and conducted the request for proposals. The Port Authority awarded the contract in May 1998 to the Air Rail Transit Consortium (ARTC), a consortium comprised of Slattery Skanska, Inc.; Koch Skanska, Inc.; Perini Corporation; and Bombardier Transit Corporation.

The Port Authority secured project funding and chose to pursue a DBOM agreement. The project funding came primarily from a \$3 passenger facility charge (PFC), a local tax for all outbound users from JFK airport. The PFC funds secured financing of \$1.2 billion, and the Port Authority secured the remaining \$0.7 billion by issuing revenue bonds. ARTC assumed responsibility for the project's preliminary engineering, design completion, construction, installation, testing, demonstration, and operations and maintenance (O&M). The contract stipulated a 5-year O&M period with optional 1-year contract extensions for up to 10 additional years.

## Procurement

### *Scope of Work*

The request for proposals encompassed three phases: 1) preliminary engineering; 2) design completion, construction, procurement, installation, testing, and demonstration; and 3) contractor O&M (COM). The Port Authority provided written technical provisions and limited contract drawings to proposers to provide a foundation for the AirTrain's design. Further, the Port Authority provided proposers with existing site and subsurface information from prior site investigations or projects; few new site investigations were performed by the Authority. The technical provisions stipulated that the contractor design, build/erect, install, and test:

- Trackway.
- Passenger stations.
- Vehicles.
- Trackwork.
- ATC system.
- Communications system.
- Supervisory control and data acquisition system.
- Traction power system.
- Operations, maintenance, and storage facilities.

The technical provisions also stipulated that the contractor operate and maintain the system, including the use of a Port Authority–furnished fare collection system.

The contract documents required the proposer to certify the design of the AirTrain system according to the RFP's basic design criteria and contract drawings and agree to construct, operate, and maintain the system according to the detailed specifications, contract drawings, and approved contractor deliverables. Addition-

ally, the proposer had to certify, in accordance with the contract drawings and specifications, all structures, facilities, equipment, and labor associated with the project.

### *Process Overview*

The Port Authority of New York and New Jersey sent an RFP to several prequalified firms inviting them to submit DBOM proposals for the AirTrain JFK. The Port Authority required bidders to submit five separate, written proposal packages: 1) Proposal Forms, 2) Management Proposal, 3) Price Proposal, 4) Technical Proposal, and 5) Operations and Maintenance Proposal.

An Evaluation Team comprised of Port Authority employees and hired consultants evaluated each proposal according to the selection/award criteria (see the next section) before submitting them to the Selection Committee. The evaluation process consisted of the following steps: initial screening of proposals, nonprice evaluation, price evaluation, establishment competitive range, negotiations followed by best and final offers (BAFO), BAFO evaluation, and contract award. The Selection Committee assigned numerical scores to each proposal by calculating the Net Present Value (NPV) for each proposal. The Selection Committee combined the two NPV calculations (NPV1 and NPV2) to compute the Final Net Present Value (NPVT). NPV1 represented the Port Authority's required payments to the proposer over the life of the project, including payments for the base LRT system, O&M costs, and any additional costs incurred by special requests by the Port Authority. NPV2 represented the payments to be paid by the Port Authority to parties other than the proposer for scope items that the proposer excluded from the proposal. The Port Authority maintained the discretion for valuing the payments in the NPVT calculation.

The Port Authority included several disclaimers in the RFP, including:

- Liability or commitment for providing passenger facilities charges or other revenues to assist in the AirTrain's development and operation.
  - Obligations to select a proposer for competitive negotiations or even to carry out competitive negotiations if the Port Authority deems it better to terminate negotiations.
  - Obligation to award or execute a contract pursuant to the procurement process.
  - Obligation to reimburse a proposer for any costs associated with the proposal process.
  - Obligation to issue a notice to proceed upon award or execution of a contract.

The contract also states that the Port Authority has the discretion to disregard provisions in its own request for proposal if it deem it appropriate in the procurement process.

*Selection and Award Criteria*

After identifying the responsive proposals, the Selection Committee reviewed the required forms included in Package One (Proposal Forms). The Port Authority required that no cost or price information appear in Package One or any of its required forms. After review of Package One, the Selection Committee reviewed the four subsequent proposal packages, consisting of the four major “Group Criteria”: Management, Price, Technical, and Operations and Maintenance. Within the “Group Criteria” the selection committee considered several subcriteria. The contract documents do not stipulate weights for each of the criteria or subcriteria, merely stating that the Selection Committee has the authority to assign a group percentage value based on the selection criteria totaling 100 percent and that the weights would be assigned in terms of relative importance, with the management proposal having the most importance and the O&M proposal having the least importance.

Table 5 shows the group criteria (listed in order of importance) with the subcriteria for each group criterion.

**Table 5. AirTrain JFK Selection Criteria**

<i>Group Criteria</i>	<i>Subcriteria</i>
Management	1) Financial and Legal Information 2) Proposer’s Organizational Structure and Resources 3) Proposer’s Approach 4) Proposer’s Experience
Price	1) Phase I Preliminary Engineering Lump Sum Price 2) Phase II Final Design and Construction Lump Sum Price 3) Phase III Contractor Operations and Maintenance (COM) Lump Sum Price 4) Fixed Prices for Options
Technical	1) System and Vehicle Performance Characteristics 2) System and Subsystem Design and Other Features
Operations and Maintenance	1) Technical Adequacy

*Group Criterion 1: Management.*—The Port Authority required the proposing team to show the efficacy of their composition and legal structure, their ability to guarantee work, the viability of their financial resources, and their compliance with bonding and insurance requirements. The proposer also had to prove the availability of skilled, experienced, and well-equipped design, construction, and O&M organizations; sufficient capability for technical work, production, and imple-

mentation of the project; and sufficient contractual relationships with subcontractors.

Each proposer included Project Management Plans for Phases I and II of the project that show the proposer’s ability to organize subcontractors, interface with the Port Authority, manage the construction within the established criteria, maintain the project schedule within budget, and provide the necessary experience and personnel to successfully complete the project. The proposer had to provide project descriptions for any similar projects executed within 10 years of the proposal submission and descriptions of projects completed by any major subcontractor identified as a potential major contributor to the AirTrain JFK project.

*Group Criterion 2: Price.*—The Pricing Package included the Contract Guaranty Agreements provided in the attachments to the RFP. The Selection Committee required all prices to be quoted in United States dollars, but would consider some payments in foreign currency if such arrangements showed significant cost savings for the overall project. The Price Proposal had to begin with an overall price summary of the fixed lump-sum prices (as identified in subsequent parts of the price proposal) reported in Year of Expenditure dollars, including escalation. The first subcriterion, *Phase I Preliminary Engineering Lump-Sum Price*, included a detailed summary of lump-sum costs associated with each summary work category for the project: facilities design, systems design, project management, and program control. Additionally, the RFP required proposers to include cash flow curves for each of the work categories in the engineering phase, a summary cash flow curve for the entire project, and a schedule to correlate the pricing with the project schedule for Phase I.<sup>24</sup>

The second subcriterion, *Phase II Final Design and Construction Lump-Sum Price*, required all costs associated with the design, construction, installation, and successful demonstration of AirTrain JFK. Proposers had to provide a lump-sum breakdown for each section of the project to correlate with the Work Breakdown Structure provided in the Management Proposal Approach. The Port Authority divided the AirTrain project into five major Line Sections: Howard Beach Station to Federal Circle Station, Federal Circle Station to Central Terminal Area (CTA), CTA, Federal Circle Station to Jamaica Station, and Project-wide. The Port Authority required pricing information for each of 15 work categories for each section of the total project: guideway facilities, station facilities, other facilities, infrastructure and site work, utilities, track work and other guideway equipment, power and supply distribution, automatic train control, communication supervisory control and data acquisition (SCADA) and security systems, fare collection, vehicles, project management administration and engineering, design, construction management, and right-of-way and other environmental cleanup. In addition to cash-flow curves for each

<sup>24</sup> A cash flow curve typically illustrates a contractor’s expected or actual cumulative expenses for a project.

of the five major sections of the AirTrain project, the proposers had to provide a summary cash-flow curve for the entire project with a correlating project schedule.

The third subcriterion, *Phase III Contractor Operations and Maintenance (COM) Lump-Sum Price*, required separate lump-sum prices for the first year and for each year between 2 and 5 years, because the transit system would not be fully operational until the second year. The proposers had to provide the following specifics: fixed price for the 1st year of COM services; fixed price for the first year COM fee; unit price adjustments for changes made in the first year of COM services; fixed price for COM services for the second year; fixed price for the COM fee for the second year; unit price adjustments for changes in COM services in the second year; Phase III COM Prices, Fixed COM fees, Unit Price Adjustments for changes in COM Services, Payment/Performance Bonds, and Insurance Prices for Years 3 through 5; and a Capital Asset Replacement Program.

Additionally, the Port Authority asked for fixed prices for bonds and insurance to include: Phase I and II payment and performance bonds; Phase III first year payment and performance bond; Phase III second year payment and performance bonds; Phase III payment and performance bonds for the annual costs of years 3 through 5; Phase III insurance for the first year; Phase III insurance for the second year; and Phase III insurance for the annual costs of years 3 through 5.

The fourth subcriterion, *Fixed Prices for Options*, included pricing for optional vehicles to provide 25 percent additional capacity and COM prices for any year in the period of Years 6 through 15.

*Group Criterion 3: Technical.*—The first technical subcriterion, *System and Vehicle Performance Characteristics*, required proposals for vehicle performance, system performance, and system capacity. The second technical subcriterion, *System and Subsystem Design and Other Features*, required a system description detailing the technologies for vehicles, ATC, communications, power, and SCADA.

The technical provisions stipulated that the proposed light rail system apply developed technologies as much as possible, and provided the following criteria:

- The equipment or technology must have been previously used in a similar public transit project for at least 2 years and have well-documented reliability and maintainability characteristics.
- The previous project referenced in the first criterion must have environmental and operating conditions comparable to AirTrain JFK.
- The reliability and maintainability characteristics must be presented in relation to the overall system availability requirements; if the proposer offers an alternate design, that design must be shown to better accommodate the service availability requirement.
- The proposer must provide documentation of the system's satisfactory interface and interaction with other equipment.

*Group Criterion 4: Operations and Maintenance.*—The Selection Committee considered the O&M packages using the subcriterion *Technical Adequacy*. The RFP required a general operations plan including operation plans and plan statistics for years 2001 through 2015, a rule book, and a plan for fare receipts, collection, counting, and security. Additionally, proposers had to provide a maintenance plan and an organization and staffing plan to include an operations procedures manual. The proposal requirements did not stipulate criteria for the O&M contract to extend beyond the first 5-year period into the optional additional 1-year periods. Additionally, the request for proposal did not stipulate any subcriteria by which the O&M proposals would be evaluated.

## Key Contract Provisions

### *Design Review*

During the contract period, the proposal documents stipulated deliverables required of the contractor. The Port Authority required design submittals and approvals at 30 percent, 65 percent, 85 percent, and 100 percent of design completion. If the contractor chose to proceed with any portion of the project without prior Port Authority approval, the contractor would be working on an “at-risk” basis.

### *Operating Provisions*

In the event that the system did not reach a minimum service availability of 99 percent for any calendar month after the system demonstration, the contractor had to assemble a report based on design and O&M procedure review. If the system performed at service availability of 99.7 percent or above, the contractor received a bonus, whereas in months of service availability less than 99.3 percent, the contractor's payment would be reduced. The contract also stipulated downtime limits with percentage deduction per percentage of downtime event. The contract required the contractor to be assessed \$25,000 in liquidated damages for each day the AirTrain service was delayed from Jamaica Station and \$50,000 a day for delays for the Howard Beach Station, with total liquidated damages not to exceed \$40 million. In the event of a delay in service, the Port Authority reserved the right to cancel the remainder of the project. Additionally, before the receipt of final payment at the conclusion of the COM period, the contractor had to certify settlement of all claims or disputes dealing with subcontractors, material suppliers, or other personnel at the expense of the contractor.

For the O&M period, in the event that the AirTrain service availability fell below 98 percent for 6 consecutive months, the Port Authority could terminate the contract. If the Port Authority decided to terminate the contract for service availability or any other contract violation, the contractor had to provide a training program for all personnel tasked with taking over the operations of the facility.



As a part of the COM agreement, the contractor had to assemble and provide an Operating Rule Book, Standard Operating Procedures Manual, Training Programs, System Maintenance Plan, Preventative Maintenance Schedule, Plan for Unscheduled Corrective Maintenance, Integrated Materials Procurement, and Inventory Control Program. Additionally, for each element of the system, the contractor had to provide an operations instruction manual, repair and maintenance manual, workshop manual, illustrated parts catalog, diagnostic test equipment manual, and special tools manual.

The contractor also ensured that all necessary tools and equipment needed for operations O&M of the system were available in addition to a capital asset replacement program, computer-based facilities management system, and safety and security program. At the conclusion of the COM period, the contractor had to train all personnel tasked with assuming the O&M of the AirTrain. Absent from the contract documents, however, are general condition provisions for the facility upon the termination of the O&M period. The contract does not specifically stipulate terms for the transfer of the AirTrain from ARTC to the Port Authority regarding the physical state of the tracks, facilities, and rail cars.

*Operations Performance Requirements*

The system had to accommodate the estimated baseline ridership plus 10 percent more than the estimates provided in the RFP. The goal for the system was to ultimately accommodate 110 percent of the estimated ridership for the year 2023. The Technical Provisions stipulated that the Central Control Facility be able to accommodate up to two additional on-airport stations and a 20 percent increase in track capacity without destroying the basic system structure nor interrupting regular daytime service (6:00 a.m. to 11:00 p.m.).

The train must operate 24 hours a day, 365 days a year. In times of degraded service, the provisions state, the system must have the ability to operate at 70 percent capacity with no longer than twice the allowable headway at no more than 40 minutes delay for any passenger using the AirTrain service.

The system availability requirements were measured using three performance factors: on-time performance, fleet availability, and station availability. The Port Authority took the three service availability measurements and calculated their weighted average, or Route Daily Availability measurement, for the day. The contractor is responsible for providing the data to the Port Authority to monitor system performance.

**Project Performance**

*Procurement Issues*

The Port Authority received proposals from five different consortiums. Table 6 shows the proposer consortiums and member companies.

**Table 6. AirTrain JFK Proposer Consortiums**

<i>Consortium Name</i>	<i>Consortium Members</i>
AirRail Transit Consortium	Bombardier, Koch, Perini, Slatery-Skanska, STV
JFK Link	Fluor Daniel, GEC Alsthom, Morse Diesel
JFK Express Transit (JET)	Parsons, Siemens, Matra, Schiavone, Defoe, Halmar
Raytheon-Ansaldo	Raytheon (Civil Infrastructure) and Ansaldo (Trains)
Sky Rail Systems	Yonkers, Granite, Turner, ICF-Kaiser, ABB Daimler-Benz

The Port Authority reviewed the initial proposals and directed the consortiums to submit revised proposals at lower prices. After reviewing the second proposals, the Port Authority’s Selection Committee short-listed two consortiums, JFK Link and ARTC, and ultimately selected ARTC. In an effort to further reduce the design and construction prices submitted, the Port Authority discussed risk-allocation issues with ARTC. Upon conclusion of these discussions, the Port Authority agreed to establish a \$129 million contingency fund to alleviate contingency pricing associated with 1) traffic management during construction of the elevated track along a 2-mi stretch of the Van Wyck Expressway; 2) hazardous materials encountered during construction; 3) work days lost due to any labor disruptions during the construction period (union wage/conditions contracts would expire during the scheduled contract period); and 4) unanticipated subsurface or geotechnical conditions. Any justified costs associated with, in particular, items 1, 2, and 4, would be paid on a reimbursable basis up to the \$129 million ceiling. If costs were kept below this ceiling, then the Authority would retain 60 percent of the savings while ARTC would receive 40 percent. Table 7 shows the final contract amount (excluding the contingency fund).

**Table 7. AirTrain JFK Contract Award Amounts**

<i>Contract Phase</i>	<i>Award Amount (millions)</i>
Early Action (Cut and Cover Tunnels)	99
DB	930
O & M (5 years)	105
<b>Total</b>	<b>1,134</b>

Prior to the JFK AirTrain project, PFC had only been used for terminal improvement projects or runway expansions. No precedent existed for using the PFC to improve access to JFK airport. In addition to requiring approval through the Uniform Land Use Review Procedure, the Port Authority needed funding approval from the Federal Aviation Administration (FAA) because the

PFC was a nominal charge for every flight passenger departing JFK Airport. In addition to the funding debate, the Air Transportation Association filed suit to block the AirTrain project over the definition of enhanced capacity. The lawsuit halted the review procedure until the Port Authority resolved the funding issue with the FAA. In response, the Port Authority purchased the Van Wyck right-of-way to Jamaica Station and submitted required detailed design and construction documents to the FAA. The FAA reviewed the documents and determined that the Port Authority could use \$1.2 billion of the \$1.6 billion in PFC funds collected before 1992 for the AirTrain Project.

After the Port Authority resolved the funding issues, various conflicts arose with the contractor due in large part to the minimal functional design information provided in the RFP. Generally, line and grade drawings as well as station locations were provided to define the corridor. Limited information was provided with respect to station design. In the Technical Provisions section of the RFP, the Port Authority stipulated that

the contractor shall address...aesthetic issues with the same degree of care that will be given to the more easily evaluated technical aspects of the System. This means inducting good architects, signage and graphic designers, site planners and others on the design-construct team that will contribute to the aesthetic quality of the end result.

Apart from this description, the Port Authority did not provide specific details for the design aesthetic of the train stations. Consequently, the designers planned the stations according to their interpretation of the requirements. In some cases, the station design choices did not conform to the Port Authority's expectations for level of quality or standard of care. Generally, the Port Authority and ARTC worked to resolve these conflicts within the bounds of the contract, but these issues caused delays in the project schedule. At the conclusion of design and construction, roughly \$40 million worth of changes or claims remained unsettled. Through extensive negotiations, the majority of the disputed amounts were resolved, generally in ARTC's favor, so consequently no further legal actions were required.

Another delay in the project occurred in the testing phase of the AirTrain system. On September 27, 2002, a car operator died when a test train, travelling at an unknown speed, derailed and crashed in the parapet. The crash caused the front car of the train to tear open and the guideway wall to shear away 150 ft. The National Transportation Safety Board is still investigating the cause of the incident. According to the investigation, the test operation may have been faulty as it involved the placement of 16 unsecured concrete blocks in three cars of the trains to simulate passengers. The 2,000 pd blocks shifted as the train rounded the curve. In the end, the final cost of the AirTrain project came to \$1.9 billion, approximately \$770 million more than the contract award amount. Currently, the railway operates at approximately one-half of the projected ridership.

## VI. LARGO EXTENSION OF BLUE LINE PROJECT

### Project Overview

The Largo Extension project consists of a 3.1 mi extension to the WMATA Blue Line train. The extension links the existing Blue Line to Largo Town Center in an effort to relieve the area's severe traffic congestion and provide more public transit service. Original estimates showed that after the extension the number of daily transit passengers would increase by an estimated 20,000 customers.

WMATA awarded a DB contract for line, trackwork, and systems (Contract 2) to the Lane, Granite, Slattery-Skanska Joint Venture (LGS) in the amount of \$218 million. WMATA awarded separate contracts for site clearing/preparation (Contract 1, \$14 million, DBB) and the construction of two new stations (Contract 3, \$92.9 million, DB). The work under Contract 1 preceded the Contract 2 work, and was performed by Lane Construction. The total projected budget for the entire extension project was \$460 million. The project secured funds from two sources: a local funding agreement with the Maryland DOT for \$173.6 million, and an FFGA with the FTA for \$260.3 million as part of its New Starts Program (49 U.S.C. 5309), which provides funding for extensions to fixed guideway systems. This section covers the procurement, contracting strategies, and performance of Contract 2.

### Procurement

#### *Scope of Work*

The DB RFP stipulated that the design-builder provide the following services: engineering and architectural services for the final design, drawings, and specifications; schedules and cost estimates; and all labor, equipment, materials, project management, QC, and architecture and engineering required for construction. The primary scope of the work included double-box structure cut-and-cover work with some aerial and retained cut construction. The work as defined by the RFP included the tasks shown in Table 8.

**Table 8. Largo Extension Project Tasks**

<i>Project Task</i>	<i>Subtasks</i>
Structures	<ul style="list-style-type: none"> <li>• Retained cut with walls</li> <li>• Retained fill with walls</li> <li>• Cut-and- cover double box and single box</li> <li>• Aerial guideway</li> <li>• Aerial through girder</li> <li>• Vent shaft</li> <li>• Multicell culverts under box structure in wet areas</li> </ul>
Trackwork	<ul style="list-style-type: none"> <li>• Mainline track</li> <li>• Storage track</li> <li>• Two No. 10 tangential geometry double crossovers</li> <li>• Three No. 10 tangential geometry turnouts</li> <li>• Primarily direct fixation construction with some ballasted track</li> </ul>
Automatic Train Control System	<ul style="list-style-type: none"> <li>• Automatic train protection</li> <li>• Operation</li> <li>• Supervision</li> <li>• Connections and compatibility with existing Blue Line system</li> </ul>
Traction Power	<ul style="list-style-type: none"> <li>• Two 9-MW substations</li> <li>• Tie breaker</li> <li>• Distribution system</li> </ul>
Voice and Data Communications Systems	<ul style="list-style-type: none"> <li>• Telephone</li> <li>• Remote indication and control of operating facilities</li> <li>• Security</li> <li>• Radio</li> <li>• Public address</li> <li>• Passenger information display system</li> </ul>
Systems	<ul style="list-style-type: none"> <li>• CCTV</li> <li>• Fire</li> <li>• Intrusion</li> </ul>
Corrosion Control	n/a
Jet Fan	<ul style="list-style-type: none"> <li>• Tunnel air circulation</li> <li>• Control room</li> </ul>
Operations Building	n/a
Facility Systems	<ul style="list-style-type: none"> <li>• Mechanical</li> <li>• Electrical</li> <li>• Plumbing</li> </ul>

Additionally, the scope of the project included several points for interfacing and integrating with the existing Blue Line system. The extension connects with aerial and at-grade structures and elements of the existing Addison Road station. It also connects with a Beltway-crossing bridge built under Contract 1. The proposer was obligated to coordinate with track, traction power, train control, communications, and systems

providers to accommodate station construction under Contract 3. Additionally, the proposer was to facilitate integration with WMATA system elements at large. WMATA’s goal was to have the trains running before the 2005 Presidential Inauguration, an unchanging goal, which ultimately governed the pace of the project.

*Process Overview*

WMATA used a two-phase, best value selection process for procuring a DB team. The first phase of procurement was based on a request for qualifications (RFQ), which resulted in the selection committee narrowing the proposers down to a shortlist of four entities. In the second phase, each of the shortlisted proposers submitted a detailed proposal in response to an RFP.

*Selection and Award Criteria*

WMATA’s evaluation committee used a combination of technical capability and price to determine the ultimate design-builder. The technical proposal considered the management plan, key staff, preliminary safety plan, quality plan, and a preliminary schedule. Price was set forth in a separate, sealed, cost proposal. The price proposal structure is illustrated in Table 9, whereby WMATA included estimated incentives and allowances and the proposer provided lump-sum and options costs.

**Table 9. Largo Extension Price Proposal Structure**

<i>Base Proposal Item Description</i>	<i>Amount</i>
All Work	Lump sum (to be determined by proposer)
Authority Share of Partnering Cost*	\$20,000
Authority Share of Disputes Review Cost*	\$50,000
Safety Awareness Program Costs	\$500,000
Schedule Incentives	\$900,000
Allowance for Fiber Optics	\$600,000
Allowance for Spare Parts	\$2,000,000
<b>BASE PROPOSAL PRICE</b>	To be determined (TBD)
<i>*Design-builder portion of partnering and dispute review costs are part of lump sum bid.</i>	
<b>OPTIONS*</b>	<b>AMOUNT</b>
A—Reduced Excavation/Aerial	TBD
B—Retained Fill	TBD
C—Reduced Excavation/Retained Fill**	TBD
D—6-Month Extension	TBD
E—9-Month Extension	TBD
<i>*Proposers choose option A or C and option D or E.</i>	
<i>**Option C may only be selected if option B is as well.</i>	

WMATA evaluated the proposals based on the Base Proposal Price plus the price of options multiplied by a factor (not given in the RFP). The factor allowed for Alternatives A or C and Alternatives D or E, with affordability as a key consideration.

At first, each of the proposers submitted proposals that exceeded the cost budget estimated by WMATA. WMATA then requested that the proposers submit their BAFO. The BAFO adjusted the project milestones so that final completion and acceptance had to be achieved in 1,005 days from Notice to Proceed, a reduction of 130 days (approximately 4½ months) from the duration indicated in the RFP, which in essence maintained the original December 2004 completion date. After price negotiations, WMATA awarded the Contract 2 work through a DB contract to LGS.

**Key Contract Provisions**

*Ownership of Documents*

The request for proposal and contract documents does not address ownership of documents beyond

WMATA’s provided precaution in protecting proprietary, pricing, and technical information in the proposal process. In the event that participants detect inconsistencies in the project requirements, the contract assigns the following order of precedence for the documents:

1. Change Orders and Contract Amendments.
2. Section 00500: Agreement and Section 00600: Bonds and Certificates.
3. Section 04450: Representations and Certifications.
4. Section 00800: Special Provisions.
5. Section 00700: General Conditions.
6. Division 01, General Requirements.
7. Contract-Specific Mandatory Drawings and Specifications.
8. WMATA’s Design Criteria.
9. Standard Drawings and Specifications.
10. Design-Builder’s Accepted Technical Proposal.

*Design Review*

The contract stipulates a two-phased design review: Intermediate Review and Final Review. The design review includes specifications, drawings, and submittals. WMATA was to review design submittals solely to ascertain their conformance to the Mandatory Documents. The Mandatory Documents as defined by the RFP are:

- Division 00, Proposing and Contracting Requirements.
- Division 01, General Requirements.
- Division 02 to 16, Specifications.
- WMATA Design Criteria.
- WMATA Construction Safety Manual.
- WMATA Insurance Requirements.
- Volumes 1 to 5, Mandatory Drawings.
- All other documents incorporated by reference in the above.

WMATA was to approve or disapprove submittals when, in its sole judgment, those submittals deviated from the Mandatory Documents. The contract’s General Conditions further indicate that WMATA’s review, approval, or acceptance of submittals would not waive the design-builder’s responsibility for the quality, technical accuracy, and coordination of the design documents.

*Suspension and Termination*

The contract required liquidated damages if the design-builder does not achieve the project work within the specified period of performance or if the design-builder does not meet project milestones. Table 10 shows the sum per day for each calendar day that constitutes a delay in the project schedule.

**Table 10. Largo Extension Milestones and Liquidated Damages**

<i>Milestone</i>	<i>Description</i>	<i>Required Date</i>	<i>Sum per calendar day</i>
1	<ul style="list-style-type: none"> <li>• Complete service rooms</li> <li>• Duct connections to service rooms</li> <li>• Full access to station contractor to allow commencement of Contract 3</li> </ul>	Notice to Proceed (NTP) + 564	\$1,500
2	Complete energization of line	NTP + 765	\$1,500
3	Achievement of Operations Readiness Date (ORD)	NTP + 975 (ORD)	\$4,500
4	<ul style="list-style-type: none"> <li>• Final Completion and Acceptance                             <ul style="list-style-type: none"> <li>• As-built drawings</li> <li>• Manuals</li> <li>• Punch list items</li> </ul> </li> </ul>	December 30, 2004 (Note: After the RFP, the date was changed to November 30, 2004)	\$1,500

The contract stipulated that WMATA has the authority to extend the period of performance as often as and in time periods deemed necessary by the performance of the work. It also had a preestablished table that identified expected dates of adverse weather for each month of the year. These days were to be the responsibility of the design-builder and factored into its schedule. Adverse weather conditions exceeding the designated number of days were to be a risk borne by WMATA.

The contract stipulated that should a suspension of work order be issued in the life of the project and subsequently canceled, the design-builder must resume work. The contract has provisions for an equitable adjustment to the project schedule, price, or combination thereof and any other contract provisions affected by the suspension in the event that

1. The suspension results in an increase in schedule or cost to the design-builder in performance of the contract, *and*
2. The design-builder submits a claim within 30 days of resuming work.

*Contractor Proposed Changes in Standards or Requirements*

The contract included provisions for design-builder submissions of VECPs in the design phase of the project. The provisions stipulated that WMATA will accept VECPs according to the following conditions: requires significant change to contract and mandatory documents, decreases contract price, maintains contract requirements, does not require an unacceptable extension to schedule, and passes a 2-phase review and evaluation process. Phase 1 involved conditional approval and Phase 2 involved final approval. WMATA was to share the savings with the design-builder 50/50 based on net savings.

*Dispute Resolution*

The contract required the use of a DRB as the first stage in resolving contractual or process disputes related to the project work. Each party was obligated to pay 50 percent of the costs of the DRB. Disputes that could not be resolved at the DRB level were ultimately to be brought by the complaining party to the Armed Services Board of Contract Appeals.

The contract also required the development of a partnership charter to encourage cooperation among the owner, design-builder, lead design professional, and principal subcontractors and suppliers. While the establishment of such a charter does not negate the legal relationship of the parties, it is meant to achieve the following goals:

1. For the owner and design-builder to establish a cohesive partnership with the objective to build a quality product on time, at a satisfactory cost to the owner and a satisfactory profit to the design-builder.
2. To establish trust and open communication for the life of the project.
3. To develop an understanding for the management of the project.
4. To resolve disputes.
5. To avoid disputes and confrontation.

*Other Provisions*

The contract included a safety awareness program provision that provides incentives to the design-builder for positive safety performance. The design-builder was to share in an incentive value worth 1 percent of the Base Proposal Price or contract value upon the date of completion (whichever is higher). To determine the incentive, the contract employed a formula for determining IR on the job site. The contract assumed a base IR of 4.0. The actual IR at the date of substantial completion is computed using the following formula:

$$IR = \frac{N \times 200,000}{MH}$$

Where:

- N = Number of lost work day injuries and/or illness
- MH = Total hours worked by all construction site employees
- 200,000 = Base for 100 full-time equivalent workers working 40 hours per week, 50 weeks per year

In addition to a section for safety performance, the contract documents included incentives for early project completion. Early completion is based on the ORD of 975 days. The incentive equals \$10,000 for every day to a maximum of 90 days for each day earlier than the ORD. Accordingly, the maximum incentive allowed by the contract is \$900,000.

### Project Performance

In March 2002, WMATA issued a Notice to Proceed to LGS. LGS self-performed the majority of the civil and structural work on the project, using several major subcontractors. It encountered a number of delays, which allegedly included access delays, late relocation of utilities or work of other WMATA contractors, and delays associated with deficiencies in and/or changes to WMATA’s Mandatory Design. During the project, the Washington, DC, area experienced severe inclement weather, including excessive rain, a hurricane, and record cold temperatures and snowfall. LGS claimed that this unusually severe weather—which started in October 2002 and continued through the winter of 2003/2004—exacerbated the effect of the delays. LGS claimed that WMATA instructed LGS that it would not grant time extensions and that LGS must complete the project by the contractual completion date in December 2004. LGS allegedly undertook a number of measures to accelerate the work and was able to overcome the various alleged WMATA delays as well as the unusually severe weather, completing the project by the original contract completion date as directed by WMATA.

In April 2004, LGS sought a time extension and submitted to WMATA an Analysis of Schedule Impacts and Cost Increases, indicating the reasons for the requested extension. It subsequently submitted a \$30 million Request for Equitable Adjustment in November 2004. Attempts to negotiate a settlement were unsuccessful. In January 2006, WMATA ultimately denied virtually the entire claim, and its contracting officer issued a Final Decision that was unacceptable to LGS. Subsequently, in February 2006, LGS appealed to the Armed Services Board of Contract Appeals and filed a \$32 million loss of productivity claim for delay and constructive acceleration, arguing that the project experienced delay events that would have delayed the project by 197 days but for the acceleration of LGS. The primary basis for its claims rested on adverse weather, although LGS also argued that it was delayed by delays

in utility relocation and WMATA’s failure to obtain right-of-way access.

WMATA initially disputed LGS’s argument that the delays it experienced were excusable delays that impacted activities on the critical path. It contended that LGS did not appropriately request and substantiate time extensions as required, thus depriving WMATA of the opportunity to make informed decisions about schedule relief before any purported acceleration occurred. WMATA also disagreed that the delaying events claimed by LGS were the cause of the additional costs incurred by LGS and its subcontractors. WMATA attributed some of the delays to the weakness of LGS’s ability to plan and execute its work, particularly its seeming inability to generate a workable project schedule in a timely fashion. WMATA also felt that LGS had particular difficulty in reaching a productive level on the “learning curve” due to the unique double-box tunnel construction and the associated steel-box traveler forms called for in the contract.

After limited discovery, LGS altered its claim theories and argued that the majority of its delays were caused by a change to the jet fan design, which had arguably been resolved by a change order at the beginning of the project. WMATA defended this theory on a variety of grounds, but its primary argument was that LGS had failed to provide requisite notice that its loss of productivity claim was based on the jet fan change order—since the weather, utilities, and right-of-way were the items that had been claimed for years.

The parties decided to conduct a mediation with a retired Contract Appeals judge, with the participation of representatives from the State of Maryland, the contract’s funding source. The parties exchanged mediation position statements and key documents, including expert analyses of the sources of contract delay and the associated performance costs. The parties then met for 2 days—in joint sessions and in caucuses with the mediator. The mediator provided his assessment of the strengths and weaknesses of their respective positions to both sides in separate, oral discussions. After advisement from the mediation judge, LGS and WMATA reached a settlement of \$9.5 million to resolve all claims pertaining to the contract; it was subject only to approval by WMATA’s Board of Directors and funding by the State of Maryland. The State of Maryland ultimately agreed to pay the settlement amount. After the claim settlement in December 2007, the total project budget (for all three contracts) grew from \$459,458,604 to \$468,958,604.

## VII. PORTLAND SOUTHERN CORRIDOR—PORTLAND MALL SEGMENT

### Project Overview

The Portland Transit Mall is the public transportation network operating in the Portland, Oregon, metropolitan area. The light-rail network in this region, known as the Metropolitan Area Express (MAX), runs

three lines (Blue Line, Red Line, and Yellow Line) and has been operated by the Tri-County Metropolitan Transportation District of Oregon (TriMet) since 1986. The growing transportation needs of the increasing population in the region (an estimated one million new residents by 2030) required further expansion of the MAX light-rail network. To meet this need, it was proposed to add a new line (the Green Line) to the existing network. This expansion project was officially titled the I-205/Portland Mall Light Rail Extension Project.

The Portland Mall Light Rail Extension Project and the I-205 Light Rail Extension Project together form the I-205/Portland Mall Light Rail Extension Project, which is the first phase of the South Corridor Project. Phase 1 was proposed to bring the MAX Green Line service to I-205 between Clackamas Town Center and Gateway, where it would then use the existing MAX Blue and Red line tracks to downtown Portland, and then run on new tracks along the Portland Mall to Portland State University. The second phase of the South Corridor Project is the Portland-Milwaukie Light Rail Project.

This section discusses the Portland Mall Light Rail Extension Project segment. Launched in 2005 by TriMet and its partners—the City of Portland, MAX, Oregon Department of Transportation (ODOT), and Clackamas County—the 3.4-mi Portland Mall light-rail project was completed in fall 2009. This segment of the Green Line runs the length of the Mall, connecting 15 stations from Union Station to Portland State University. TriMet managed the construction of the Portland Mall under one CMAR contract. The contract, a fixed unit-price type, was awarded as a single contract to a joint venture formed by Stacy & Witbeck and Kiewit Pacific. The contractor was responsible for assisting the team during the preconstruction period in the advancement of the drawings into 100 percent final design and construction documents. As a part of this process, the contractor was required to perform a detailed review of the design drawings for constructability, value engineering, and cost savings opportunities, and to provide a detailed construction cost estimate and take-off that reflected the then current market conditions and pricing. The CMAR was required to provide preconstruction services and serve as general contractor for the civil, utilities, and systems construction. The CMAR contract included a preconstruction services agreement and, upon successful negotiation of a GMP, a contract for construction services.

## Procurement

### *Scope of Work*

The scope of the construction project included all of the construction work for the Mall with the exception of shelters for the light-rail platforms. The contractor appointed was brought on during the final design phase to provide design review, value engineering, a detailed schedule, and cost estimates to meet the contract schedule and budget. The scope was predefined by TriMet in the RFP document.

The anticipated scope of preconstruction services under the contract was identified by task order number. The scope included tasks such as:

- Consult with owner and design team to advise and assist and provide recommendations on civil, utility, and systems elements.
- Provide full-time services of the proposed project manager for 15 months beginning with "Notice to Proceed."
- Provide and submit written documentation and plans related to value engineering, constructability recommendations, QA/QC plans, and a preliminary and final "Conduct of Construction," which address construction aspects such as phasing and sequencing of events and special considerations like storm water drainage management, emergency vehicle provisions, and public and worker safety provisions.
- Submit detailed schedules, work plans for different phases of construction, contracting plans with goals such as maximizing DBE opportunities and construction of systems work, cost estimates, Critical Path Method schedules, and safety plans.
- Following completion of 100 percent of the final design and construction documents, submit a GMP.

The scope of the construction services involved the finalized submission of cost and schedule plans, contracting documents, QA/QC plans, and other project documents, in accordance with the plans presented during preconstruction services.

Apart from this, the scope involved implementation of an effective safety program and the DBE and Workforce Training programs, all in accordance with plans developed during the preconstruction phase. The scope also included conducting weekly job meetings with TriMet, resolving disputes between subcontractors and suppliers as a result of construction, obtaining necessary permits for construction, and completing all construction work for a price not exceeding the established GMP.

### *Process Overview*

The bid evaluation procedure was divided into three phases—the determination of a competitive range based upon written proposals, an interview process of short-listed firms, and a final score to select the firm that would be awarded the contract. TriMet and the Office of Transportation of Portland had appointed an Evaluation Committee (EC) to determine a competitive range and evaluate the proposals of various firms based on the range. Only the firms that fell in the competitive range were considered for award of the contract. This was the first stage.

The EC then interviewed those firms that scored within the competitive range. The interviews had a two-fold purpose. First, it allowed the proposers to clarify written proposals in response to questions from the EC. Second, it provided the proposers an opportunity to ask questions on any provisions of the RFP. Following the

interview, the proposers were given the opportunity to revise their proposals and submit a BAFO.

In the final stage, the EC assigned evaluation points to each proposer upon receiving the BAFO. The evaluation points were assigned utilizing certain pre-established criteria (see next section). The EC based its decision of selecting the most favorable proposal on these evaluation points and forwarded its recommendation to the Executive Director of Capital Projects and Facilities of TriMet for authorization.

*Selection and Award Criteria*

The EC evaluated the submitted written proposals on the basis of certain predetermined criteria and set a score for each criterion, totaling to a maximum of 150 points. Each criterion was further divided into subcriteria with scores associated with them. The score of each individual criterion was computed using these subcriteria. The evaluation criteria and corresponding subcriteria are listed in Table 11.

**Table 11. Portland Transit Mall Segment Selection Criteria**

<i>Group Criterion</i>	<i>Maximum Score</i>	<i>SubCriteria</i>
Firm experience and project team	25	<ol style="list-style-type: none"> <li>1. Capacity</li> <li>2. Similar project experience</li> <li>3. Proposed team</li> <li>4. Specific roles</li> <li>5. Resumes</li> </ol>
Project approach, safety and management plan	50	<ol style="list-style-type: none"> <li>1. Within budget</li> <li>2. On-time completion</li> <li>3. Community impacts</li> <li>4. Safety</li> </ol>
Price	50	<ol style="list-style-type: none"> <li>1. Preconstruction services price</li> <li>2. Lump-sum fixed fee price</li> </ol>
DBE and Workforce Training Program	25	<ol style="list-style-type: none"> <li>1. Workforce diversity</li> <li>2. Subcontractor utilization</li> <li>3. Project subcontracting plan</li> </ol>

*Group Criterion 1: Firm Experience and Project Team.*—The capability of each proposing firm in executing projects of this nature was evaluated through relevant subcriteria. Based on the findings, the firms were allotted scores (maximum of 25 points). The capacity of the proposer was assessed based on the firm’s annual volume figures for the previous 5 years, current firm commitments, and current bonding capacity. The experience of the proposing firm was gauged through the performance of its projects over the previous 10 years that were similar in scope and value to the current pro-

ject as identified in the RFP. The performance of previous projects was evaluated through information such as location of the project, the completion date, a brief description of the project highlighting similarities in scope and value, the amount of initial contract award and final contract close-out, and the number and dollar amount of the claims and legal expenses incurred in the project. An organizational chart showing the proposed key staff for this project at the field and corporate level was required to be submitted. The proposing firm was required to identify key personnel involved in activities



such as preconstruction services, DBE and workforce utilization, safety, QC, budget control, schedule control, and utility coordination. The firm was further required to provide the resumes of all the individuals listed in the organizational chart.

*Group Criterion 2: Project Approach, Safety, and Management Plan.*—The proposing firms were required to identify how the project was planned for completion within the established GMP and on time. A preliminary baseline schedule with the proposed phasing, sequencing of work, durations, and number of concurrent work zones had to be submitted by the proposing firms. They were further required to report and justify what percentage contingency the Owner had to retain, and which tasks of the project would be subcontracted. The proposers had to highlight the steps taken to minimize adverse impact to the surrounding environment of the site, and to establish good relations and productive communication with all interested parties. The proposing firms were required to identify their plan and approach to incident-free management of public safety risks and highlight their safety experience and performance on projects involving in-street construction under vehicular and pedestrian traffic in central city areas. Based on these subcriteria, the firms were allotted a maximum score of 50 for this evaluation criterion.

*Group Criterion 3: Price.*—The proposing firms had to provide a not-to-exceed price based on the units and scope of the project as identified in the RFP. In addition, the firms were required to provide their “fixed fee” for construction services as a firm, lump-sum price, inclusive of all the services mentioned in the RFP. The proposed “Preconstruction Services Price,” which was inclusive of all associated costs and profit, was not included in the GMP and would be paid under a professional service contract. The fixed-fee lump-sum price for the construction services was included in the GMP, which was calculated as the sum of the reimbursable costs, contractor’s risk/contingency, and fixed fee. Based on these subcriteria, the firms were allotted a maximum score of 50 for this evaluation criterion.

*Group Criterion 4: DBE and Workforce Training Program.*—The proposing firms were required to take all necessary and reasonable steps in accordance with federal laws to ensure that DBEs were given the maximum opportunity to compete for and participate in the performance of the project. The proposer was required to agree that the firm will not discriminate on any grounds in the award of subcontracts or in performance of this project. The proposer had to provide a descriptive analysis of the current utilization of minorities and women in its workforce, the previous training and employment opportunities provided to them, and remedial action planned to counter current underrepresentation of minorities and women, if existent.

Each proposing firm was required to provide a narrative description of its previous experience in promoting participation of DBEs as contractors, consultants, or suppliers, along with supporting data identifying the level of activity by task in man-hours to be performed

by DBE firms, and the percentage of the total work effort that it represented. Further documents required to be submitted were a detailed outreach program or plan for obtaining maximum utilization of DBE firms on the project, including a detailed schedule of events and steps to maximize DBE participation. It was highlighted that in no event should there be an increase in the contract price due to changes in DBE participation.

## Key Contract Provisions

### *Design Review*

The project drawings were provided by TriMet, and the contractor was required to assist the team during the preconstruction period in the advancement of these drawings into 100 percent final design and construction documents. As a first priority, the contractor was required to perform a detailed review of the design drawings for constructability, value engineering, and cost savings opportunities, and to provide a detailed construction cost estimate and a take-off based on current market conditions and pricing. The design consultant was responsible for the development of specifications that would govern the construction of the project.

### *Suspension and Termination*

TriMet had the right to terminate all or part of the contract if it was determined that termination was in the public interest. The termination would be effective upon delivery of written notice of termination to the contractor. The contractor would be entitled to payment for the contract work completed before termination, and to payment for all reasonable contract close-out costs.

TriMet reserved the right to terminate the project contract if the contractor failed to perform the services within the time specified in the contract or make progress or otherwise performed in a way to endanger the performance of the project. In such a case, TriMet’s right to terminate the contract could only be exercised if the contractor did not rectify the failure within 10 calendar days (or more if authorized in writing by the contract administrator) after receipt of notice from the contract administrator specifying the failure. In the event of TriMet terminating the contract, the contractor would be liable to TriMet for any excess costs incurred for seeking alternate supplies and services similar to those terminated. The contractor would be paid the contract price only for completed services delivered and accepted. If later determined by TriMet that the contractor had an excusable reason for not performing, TriMet could allow the contractor to continue work, or treat the termination as a termination for convenience.

### *Inclusion of DBEs*

The DBE program required that the contractor obtain a list of certified DBE firms from TriMet’s online DBE directory or the state certification list and appoint a DBE coordinator to manage all DBE matters on the project. The contractor was required to solicit the inter-

est of certified DBEs by providing adequate project information about the plans, specifications, and requirements of the contract and list all project drawing and documents. The contractor had to solicit the interest of certified DBEs and allow for 2 consecutive weeks for DBEs to respond to the solicitation.

The City of Portland and TriMet had identified specific areas of construction activities that would be potential subcontracting opportunities for DBEs. The contractor was required to describe how it would allocate the subcontracting opportunities to a broad range of qualified DBE firms to maximize the number of contracts in ranges of \$10,000 to \$50,000 and \$250,000 to \$1 million.

The contractor was stipulated to document in writing all DBE solicitations, list them in the DBE documentation form, break out contract work items into economically feasible units, and identify opportunities to maximize DBE participation from Portland metropolitan areas. The contractor was encouraged to utilize small contract packages to maximize DBE participation. The contractor was required to negotiate in good faith with interested DBEs and record these negotiations as evidence, which had to be made available for TriMet's review.

The contractor was required to further conduct a thorough investigation of a DBE's capability before rejecting it as unqualified. The contractor was required to make efforts in assisting interested DBEs in obtaining financial support such as bonding, lines of credit, or insurance, and material support such as necessary equipment, supplies, material, or other services as required by the contractor. Contractor had to maintain records of all subcontracts entered into with DBEs and records of materials purchased from DBE suppliers.

#### *Dispute Resolution*

The contract stipulated that unresolved disputes between the contractor and TriMet's project manager be referred to TriMet's Director for Project Implementation, Capital Projects and Facilities Division (Project Director). If the dispute still remained unresolved, it had to be referred to TriMet's Executive Director of the Division for resolution. The Executive Director had to then issue a written decision to resolve the dispute.

Pending resolution, the contractor had to proceed as directed by the Project Director. If the dispute remained unresolved at this stage, then the contractor and TriMet were required to submit the dispute to mediation to resolve it. In such an event, the parties were required to act in good faith in a nonbinding mediation process. Mediation was a condition precedent to litigation. The mediator would be selected by mutual agreement of the parties, but in the absence of such agreement, each party would select a temporary mediator, and those mediators would jointly select the permanent mediator. All costs of mediation would be borne equally by the parties.

#### **Project Performance**

The contractor was compensated for the preconstruction services and construction services separately in the form of a predetermined lump-sum fee. The total compensation to the contractor for preconstruction services was set at a ceiling of \$446,100. The total fee for compensation for construction services was set at a ceiling of \$5,390,000 in the form of a fixed fee. As per the terms of the contract, the contractor had to provide and pay for the task orders, labor, facilities, and services necessary for the execution and completion of the contract work. The contractor was reimbursed at predecided unit prices for the task orders. The contractor was responsible for supervision of project performance and for the selection of means of contract performance. The total cost for the Portland Mall Segment was approximately \$220 million, and the segment opened for service in September 2009. When combined with the 1-205 segment, the total cost for this phase was \$575.7 million.

At the time of this digest, no preaward claims were filed, and no postaward claims have occurred. However, this project encountered changes primarily due to unanticipated utility relocations and differing subsurface conditions.

#### **VIII. THE RIVER LINE (SOUTHERN NEW JERSEY LIGHT RAIL TRANSIT SYSTEM)**

##### **Project Overview**

Upon its opening in 2004, the New Jersey Transit Corporation (NJ Transit) renamed the Southern New Jersey Light Rail Transit System (SNJLRTS) the River Line. This system provides 34 mi of new LRT service from Trenton to Camden along the Delaware River, running roughly parallel to Route 130. It connects riders to the larger transportation networks of NJ Transit, Amtrak, Port Authority Transit Corporation, and Southeastern Pennsylvania Transit Authority (SEPTA). The River Line consists of 20 stations, 3 park-and-ride facilities, 17 bridges, and 50 grade crossings along the Delaware River corridor; the system also uses advanced, articulated, clean-burning-diesel, light-rail vehicles.

With the goal of accelerating the availability of service and integrating the design, build, and operations process, NJ Transit pursued a DBOM approach for this project. NJ Transit awarded the contract to Southern New Jersey Rail Group, LLC (Rail Group), a limited liability corporation consisting of Bechtel Corporation and Bombardier, from a field of five prequalified bidders. Rail Group provided the low bid of \$605 million to design and build the rail system as well as operate and maintain it 10 years after the project reached revenue-ready status. The original fixed price for the design and construction services totaled \$441 million, while the 10-year O&M component totaled \$153.5 million.

## Procurement

### *Scope of Work*

The contract documents for SNJLRTS stipulated the project's scope as the design, construction, operation, and maintenance of the Initial Operating Corridor from Camden, New Jersey, to Trenton, New Jersey. The design portion of the scope includes producing design drawings, specifications, and calculations. All portions of the design scope must comply with the Mandatory Requirements of the contract and referenced standards, codes, and legislative requirements. Reference Documents were also provided to the proposers for informational purposes only. The construction portion of the scope includes the manufacture, fabrication, and installation of all elements needed to operate an LRT system in the initial operating corridor. The elements of the design and construction scope included the following:

- Earthwork.
- New and rehabilitated track.
- Drainage structures and facilities.
- New and modified roadways and grade crossings.
- New and rehabilitated structures.
- Station stops and parking areas.
- Landscaping.
- Utility relocations and protections.
- Light rail train car storage and maintenance facilities.
- Control center.
- Traffic signals.
- Signage and striping.
- LRT cars.
- Signal and communications system.

The scope of the operations portion of the project includes the management and administration of the system, vehicle operation, full-time dispatching, safety, and security. The track configuration, fleet size, and system design and capabilities had to support a revenue service headway of 15 minutes during peak periods and 30 minutes during off-peak periods in each direction of the Initial Operating Corridor.

The maintenance portion of the project scope included responsibility for maintaining:

- LRT cars.
- Track.
- Signaling equipment.
- Grade crossing equipment.
- Communications equipment.
- Telephones.
- Buildings and structures.

The scope also addressed street-running sections of the SNJLRTS, which require maintenance for affected highway systems and road traffic signals, associated signal and crossing equipment, and permanent road markings. The contractor operations agreement is for 10 years after the completion of the construction.

Additionally, the contract stated that the contractor must obtain and pay the cost of all necessary government approvals to execute the work. The contractor has the responsibility to maintain all stipulations for government approvals as well as to perform any required environmental mitigation in the owner's permits.

### *Process Overview*

NJ Transit first solicited statements of qualifications from interested consortia and firms. A key aspect of the prequalification process was the prohibition of proposers requiring exclusive agreements of diesel light-rail car manufacturers; this condition was included to permit car suppliers to participate in multiple teams, thereby increasing the number of potential proposers.

Prequalified teams were then invited to submit an initial, unpriced proposal consisting of an executive summary, management proposal, technical proposal, O&M proposal, identification of cost drivers, and unpriced project schedule. NJ Transit distributed the initial proposals to technical subcommittees to assess conformance with instructions, general satisfaction of project requirements, evidence the bidder can deliver the project, compliance with goals for minority- and women-owned business enterprise participation, and any proposed alternatives. NJ Transit maintained the sole discretion to invite bidders to confidential meetings regarding initial proposals, regardless of technical subcommittee assessments.

Subsequently, proposers submitted final proposals and price proposals. The final proposals included an executive summary as well as management, technical, and O&M proposals. The price proposal included a price proposal, DB escrow documents, and O&M escrow documents. Any unauthorized exceptions to the requirements were cause for bid rejection. The technical subcommittees then sent compliant proposals to the evaluation committee for consideration for selection.

### *Selection and Award Criteria*

NJ Transit's evaluation committee reviewed the final proposals according to pass/fail criteria and assessed criteria. The pass/fail criteria included acceptable company structure, bid guarantees, performance commitment guarantees, financial requirements, and technical requirements. The assessed criteria are depicted in Table 12.

**Table 12. Southern NJ Light Rail Assessed Criteria**

<i>Criterion</i>	<i>Subcriteria</i>
Technical Approach	<ul style="list-style-type: none"> <li>• Safety in design and operation</li> <li>• Quality revenue service</li> <li>• Integration of components, systems, civil and building works, and operations</li> <li>• Quality of product and features</li> <li>• Proposal for achieving public acceptance</li> <li>• Life-cycle reduction techniques</li> </ul>
Quality of Team and Approach	<ul style="list-style-type: none"> <li>• Ability and commitment to project safety, quality, schedule, management, and exceeding system assurance requirements</li> <li>• Experience</li> </ul>
Benefit to the State	<ul style="list-style-type: none"> <li>• Financial and/or quality of life benefit</li> <li>• Ability and commitment to expansion and development provisions</li> </ul>

The evaluation committee assigned scores to each technical proposal with a maximum achievable score of 300. The RFP did not stipulate any weight for the final proposal criteria nor any method or procedure for assigning scores.

If the proposer’s proposal was considered to be “entire and complete and in full and total compliance,” the evaluation committee opened the price proposal. The prices were evaluated using the following formula:

$$\left[ \frac{1 - (\text{Bid Price} - \text{Low Price})}{\text{Low Price}} \right] \times 700 = \text{price score}$$

Bid Price = Proposer’s price

Low Price = Lowest price for any submitted price proposal

The committee combined the price scores with the technical scores to generate a composite score. The highest possible composite score was 1000. The bidder with the highest composite score was declared the apparent low bidder, and its price proposal underwent a detailed examination. Each proposer assumed proposal preparation costs, regardless of whether or not their proposal was accepted.

NJ Transit, at its sole discretion, held the right to reject any and all proposals or bids, to waive any minor informalities or irregularities in any of the proposals, and to award the contract to the proposer that it deemed most advantageous. It did not have to award the contract to the lowest bidder nor did it have to make an award at all.

## Key Contract Provisions

### Scope, Price, and Schedule

A basic, but very significant, aspect of this contract was the language used relative to scope of services, price, and schedule. The contract stated:

The parties intend this Contract to be a fixed price contract with respect to the design/build services to be provide by [Rail Group], obligating [Rail Group] to perform all Work necessary to obtain completion by the deadlines specified herein, subject only to certain specified limited exceptions.

[New Jersey Transit] and [Rail Group] intend for this Contract to significantly limit the opportunity for price increases or extensions of the Guaranteed Completion Date, and to provide for [Rail Group] to bear some risks which are typically the responsibility of the owner of a project (including certain events typically considered force majeure events and design responsibilities). [Rail Group] has agreed in this Contract to assume such responsibilities and risks and has reflected the assumption of such responsibilities and risks in its bid price.

[New Jersey Transit] has provided [Rail Group] certain Mandatory Documents relating to the Work. [Rail Group] is required in all events to comply with the requirements set forth in the Mandatory Documents. [New Jersey Transit] and [Rail Group] both intend for [Rail Group] to assume full responsibility and liability with respect to final design, construction and operations and maintenance of the Project.

These excerpts from the contract became quite significant as the project progressed and design and construction issues were encountered.

### Suspension and Termination

The owner may decide to suspend, at any time and for any reason, the DB work for the project. The owner also assigns the length of the suspension according to its convenience, but must compensate the contractor for any expenses resulting from such a suspension.

### Liquidated Damages

The contractor guarantees a completion date. In the event that the contractor does not achieve revenue-ready status by the guaranteed completion date, it must compensate the owner \$25,000 a day up to a maximum of \$10 million. Such payment by the contractor does not excuse the contractor from liability or any other breach of contract requirements.

### Operations and Maintenance

During the operating period, the contractor must perform according to owner-established policies for station stops, hours of service, levels of service, public and media information, and interfacing with the public. Furthermore, the owner has the responsibility for hiring and training all fare enforcement officers, as well as responsibility for maintaining and replacing all fare collection equipment.

The contractor provides all personnel and materials for maintaining the facility. If the owner decides to terminate the contractor during the O&M period, because the owner deems it in its best interest, the owner has the right to terminate for convenience. The contractor has the right to any costs incurred up to the termination date and costs incurred solely as a result of the termination, any unusual costs incurred to operate/maintain the facility, and previously unreimbursed capital expenditures within a 12-month period.

At the end of the contractor-obligated O&M period, the contract stipulates that the contractor train any owner personnel to take over the O&M. In addition, the contract requires that the contractor perform an inventory of all O&M equipment and replace any missing equipment, to be deducted from the contractor's compensation. If the price of replacement equipment exceeds the contractor's compensation, the owner must replace any and all equipment within 15 days after the termination of the contractor's obligation.

The contract also stipulates the condition of the assets upon the completion of contractor-obligated O&M. All assets, including LRT cars, must be in good condition, normal wear and tear excepted. All assets must have a physical and economic life expectancy consistent with the timeline provided in the mandatory documents. The contract does not provide any more specific information regarding the state of the facility at the termination of contractor-obligated O&M.

## Project Performance

### *General*

In June of 1999, NJ Transit issued a letter of intent to award the contract to Rail Group, and subsequently it entered into an agreement with Rail Group for the design, construction, and O&M of the SNJLRTS. A notice to proceed was issued in December of 1999 with an original opening date in 2003. The procurement and contract documents included both mandatory compliance requirements and reference design documents. Rail Group was granted substantial flexibility with respect to design, construction, and operating details; however, it agreed to deliver the system for a fixed price and by a specified date. Further, Rail Group assumed the obligation to coordinate various design and construction issues with local municipalities and entities along the corridor. Following extensive delays and disputes, the River Line opened for service in March 2004.

### *Issues, Claims, and Settlement*

Progress and changes became challenges relatively early in the project. Delays, cost overruns, and disputes were the result of several factors: 1) difficulties in establishing final design parameters, which were compounded by Rail Group's need to coordinate final design with multiple government agencies and municipalities along the corridor; 2) identification, protection, or relocation of utilities throughout the corridor; 3) issues related to the condition of existing freight railways and

bridges that were to be rehabilitated as part of the agreement; and 4) discrepancies with respect to the quality of work or equipment specified for installation. For over a year, the two parties sought to resolve developing issues within the bounds of the contract.

In 2002, Rail Group filed suit. The case was heard in the Superior Court in Essex County, New Jersey, for over 4 years. The primary basis of Rail Group's claim was that it had encountered substantial increases in project cost and schedule due to owner-caused disruptions, delays, and changes in the scope of the work. Another key issue relative to Rail Group's argument was the function of the Reference Documents provided by NJ Transit as the basis for Rail Group's bid for DB services. Rail Group's claim amounted to \$125 million in "extras" and an extension in the project's schedule. This claim was in addition to \$28 million for changes already authorized by NJ Transit. NJ Transit's counterclaims, in excess of \$56 million, were based upon their argument that required work was either deficient or not yet completed, credits were due to NJ Transit for items of work that were removed from the original scope of work, and payment of liquidated damages. In addition, NJ Transit argued that Rail Group had failed to provide it with the necessary evidence to substantiate its requests for changes in the contract price.

Ultimately, the two parties settled, but throughout the case several findings impacted the terms of the settlement agreement. During discovery, NJ Transit was found to have not adequately addressed some basic project issues such as right-of-way management. The court, however, dismissed Rail Group's assertion that mistakes in the Reference Documents had cost it roughly \$20 million. The contract stated that the Reference Documents were for informational purposes only, so Rail Group had an obligation to assess, in particular, the accuracy of these documents relative to existing conditions during the bidding process. As NJ Transit's counsel, Philip White, commented, "[the contract] was very onerous on the contractor and it was enforced."<sup>25</sup> Ultimately, NJ Transit agreed to pay \$53 million to Rail Group. Of this amount, however, \$15 million was payment of the Rail Group joint venture's undisputed retainer, and \$8 million was payment for agreed-upon changes. NJ Transit also agreed to extend the contract by 438 calendar days, which allowed Rail Group to avoid liquidated damages.

## IX. COMPARATIVE ANALYSIS AND DISCUSSION

### General Overview

The seven cases investigated illustrate an array of delivery approaches, procurement processes, contract provisions, and outcomes. A general summary of each case (in the order presented in the digest) is depicted in the following table.

<sup>25</sup> Public Works Financing, NJ Transit Rail DBOM Claims Settled, Vol. 215, at 4 (2007).

**Table 13. Overview of Case Studies**

<i>Project</i>	<i>Delivery Method</i>	<i>Contract Value (mil-lions)<sup>26</sup></i>	<i>Start</i>	<i>Finish</i>	<i>Comments</i>
BART Ex-tension to SFIA	DB	\$530	1997	2003	Track work and systems portion of project was delayed and experienced cost escalation; this portion encountered undiscovered endangered species, had construction accidents, and difficult site conditions. Project inclusive of other contracts was 20 months late and 33 percent over budget.
DART Green Line	Construction Man-agement/General Contractor	\$497.5	2005	2010	Opened ahead of schedule and on budget.
Dulles Metrorail	DB	\$1,600	2007	2013	Construction of Phase 1 in progress and ap-pears to be on time and generally within budget.
AirTrain JFK	Design-Build-Operate-Maintain	\$1,134	1998	2003	Roughly 1 year late and 67 percent over budget.
Largo Ex-tension	Design-Build	\$218	2002	2004	On time and ultimately 4 percent over bud-get; delay claims initially of \$30 million, but set-tled through mediation for \$9.5 million.
Portland Mall Seg-ment	Construction Man-agement/General Contractor	\$220	2005	2009	On time and slightly over budget; no known claims or major issues.
Southern New Jersey Light Rail System	DBOM	\$605	1999	2004	438 days late and ultimately 9 percent over budget; \$125 million in claims by contractor and \$56 million counterclaim by owner. After exten-sive litigation, \$53 million settlement and time extension of 438 days.

<sup>26</sup> For CMAR delivery, value is for construction; for DB, value is for design and construction; for DBOM, value is for design, construc-tion, and operations.

While the intention of this study was not to compare the performance of one delivery method with another, the evidence gathered, while anecdotal, does permit some basic inferences about the circumstances associated with each project and its delivery method.

### DBOM Projects

The two DBOM projects—AirTrain JFK and Southern New Jersey Light Rail—were complex endeavors, and each experienced its share of issues and challenges. Both employed best-value type of procurement processes, but both strongly emphasized the fixed-price for design, construction, and operations services. The fixed prices delivered by the proposers were based on functional designs prepared by each agency. For the AirTrain JFK, the technical provisions and contract drawings were developed only to a 5 to 10 percent level of design at the time of procurement.<sup>27</sup> This eventually caused issues, particularly in finalizing the station designs. However, the project team was driven to work through issues: “Everyone was motivated to make things work. No one wanted to be the bad guy in terms of stopping the project.”<sup>28</sup> Still, the project had \$40 million in unresolved claims and changes as it neared conclusion. Ultimately, these issues were solved through negotiations, thanks to the prevailing attitude to “make things work.”

The SNJ Light-Rail Project (i.e., the River Line) had a different philosophy and outcome. At the time of procurement, NJ Transit provided proposers with Mandatory and Reference Documents as a basis for developing their fixed prices. NJ Transit made it clear and contended throughout the process that the Reference Documents were for informational purposes only, so the accuracy of the information was not confirmed or validated. This position effectively required that proposers complete their own design development activities, conduct their own site investigations, or assume the risks inherent in not doing so—risks such as unknown conditions or latent defects of existing facilities requiring enhancement or rehabilitation as part of the contract. Once the contract was awarded and work progressed, existing site and facility conditions (as well as finalizing detailed design) became issues for the contractor. Litigation ensued, but as counsel for NJ Transit noted, the contract “was very onerous on the contractor and it was enforced.”<sup>29</sup>

General lessons that may be drawn from these two cases relate principally to the level of design detail and

project information provided by the owner. In both cases, uncertainty existed in site conditions and design requirements at the time of procurement. In one instance, however, the owner adopted more of a risk-sharing philosophy in the project whereas in the other the owner maintained a risk-transfer stance.

Although these two issues are not unique to DBOM contracts, the real question is whether it was appropriate for the agencies to shift the risks of site conditions and defects in the design documents developed by the agency to the contractor. For example, the purpose behind the standard differing site conditions clause used by the federal government (which has been a central tenet of construction contracts for decades) is that no contractor can control preexisting site conditions, and there is a benefit in having the contractor strip its bid of contingencies for these risks and have the owner pay actual costs if a differing site condition is actually found. It is axiomatic that, notwithstanding contract language to the contrary, if a contractor encounters a site condition risk that it did not price, it will file a claim and the parties will become adverse to each other. The agencies in both of these case studies experienced this firsthand.

### DB Projects

The three DB projects—BART Extension to SFIA, Largo Extension of the Blue Line, and Dulles Metrorail (Phase I)—varied in terms of scale and complexity. The Largo Extension was one of three contracts associated with expanding service in the Washington, DC, metropolitan area and had a value of \$210 million. This contract required trackwork and necessary appurtenances but no station design. While the project was delivered on time, the design-builder claimed that it had suffered \$30 million in loss of productivity. The project’s procurement process, to some extent, may have contributed to this. The BAFO process resulted in the design-builder shaving 4½ months off of its schedule. While not directly stated by the project personnel interviewed, it is conceivable that this eliminated time needed by the design-builder to deal with, among other things, bad weather.

The line and track DB contract for the BART Extension was one of several contracts for extending service to the San Francisco Airport and had a value of \$530 million. Like the Largo Extension, it required trackwork and necessary appurtenances but no station design. This project, however, experienced substantial delays and cost overruns. Of note was the discovery of an endangered species on the project site, which caused over 2 weeks of delay. More significant were the site conditions where soils were so rigid and hard that they bent steel pilings.<sup>30</sup> As noted by a BART project representative at the time, “construction has gone pretty much as planned. But every day you have something that slows you down, you lose ground.” Additional issues were encountered on other contracts associated

<sup>27</sup> A. Cracchiolo & V. Simuoli, JFK AirTrain: Project Management Issues on a Large DBOM Project, ASCE 8TH ANNUAL CONFERENCE ON AUTOMATED PEOPLE MOVERS PROC., San Francisco, CA (2001).

<sup>28</sup> A.L. C. deCerreño, AirTrain JFK, *Integrated Transportation and Land Use Planning: Facilitating Coordination Across and Among Jurisdictions* 42, Rudin Center for Transportation Policy and Management, NYU Wagner School of Public Service, New York (2008).

<sup>29</sup> Public Works Financing, *supra* note 25, at 4.

<sup>30</sup> Cabanatuan & Wilson, *supra* note 20.

with the overall project involving the lead contractor in this case, but these were discussed previously.

The Dulles Metrorail is unique among these three projects since it developed out of an unsolicited proposal allowed by Virginia's PPTA. The unsolicited proposal was delivered in 1998, and it was not until 2004 that a CA for the total project was executed. Essentially, the CA gives DTP the right to develop the project for the MWAA (recall that Virginia transferred the CA to MWAA in 2006). The DB project investigated in this report was a negotiated contract between DTP and MWAA under the CA. This first phase of the project is well under construction, and the contract includes an aggressive scheduling specification. Daily liquidated damages are staged at \$25,000 to \$100,000 per day and capped at \$60 million, but incentives for early completion are also provided; the contractor may earn up to \$10 million in incentive payments for completing the project up to 5 months early.

The two "conventional" DB projects reinforce the simple fact that large-scale infrastructure projects often face unexpected issues. The Largo and BART Extension projects were not atypical, and each confronted characteristic construction challenges. Such issues caused significant problems in the BART project. Alternatively, the Dulles Metrorail project demonstrates the potential of public-private arrangements; the unsolicited proposal catalyzed action on a concept that had been notional for years. Somewhat paradoxically though, it also highlights the commercial and legal complexity of such contractual arrangements. It took nearly 10 years from the original unsolicited proposal for a design and construction contract to finally get executed.

### CMAR Projects

The two CMAR projects—DART Green Line (Northwest segments) and TriMet Portland Mall Segment—were two of the more recent cases studied. As project delivery options continue to open up for owners, new methods are being employed. In each of these cases, the projects involved substantial design development activities and community engagement. For instance, the Portland Mall project was part of the expansion of light-rail service in Portland's southern corridor. The Mall Segment involved the development of light rail in a dense urban setting where disruption of urban businesses was a concern. By involving a construction organization during the preconstruction phase, TriMet was able to work closely with the designer and the construction management team to package the work to minimize construction impacts. The work proceeded through different zones sequentially to contain activities to specific locations.<sup>31</sup> This type of interaction and planning was not necessary on the I-205 portion of the expansion since the railway largely followed an existing

transitway; consequently, TriMet used a DB approach for this section.<sup>32</sup>

A possible lesson from these two projects is the potential that the CMAR method has to bring construction expertise into the preconstruction phase of a project. Such involvement generally promotes better work sequencing and enables other activities such as constructability reviews and value engineering. While the CMAR approach has been used frequently in commercial vertical construction for similar reasons, it has been used infrequently on public sector projects. The transit community should consider this delivery method alongside other options for its projects, as CMAR is an attractive alternative where an owner 1) desires to retain significant influence over design development but still wants to fast-track a project; or 2) expects involving a construction manager early in a project outweighs the need for substantial construction pricing competition.

### Procurement Processes

Generally, the procurement processes employed in the case studies were multiphased arrangements where prequalified teams submitted proposals in response to an RFP. Evaluation methodologies and criteria were fairly diverse, but broadly speaking, procurement practices that had characteristics of "best value procurements" were observed in five of the seven cases.

There were two "outlier" cases. The BART Extension used a prequalification process, followed by a procurement strategy that ensured that proposals met minimum technical requirements. Award was based on lowest responsible price. The second outlier case, the Dulles Metrorail, was ultimately the result of an unsolicited proposal that generated a CA, and the DB contract for a phase of the overall project outlined in the CA was a negotiated arrangement.

In the remaining cases, categories of selection criteria including price were evaluated. Some processes used scoring systems for the categories, which provides proposers an indication of the relative importance of the criteria. Scoring approaches, however, do not necessarily provide a clear indication of how the points in any particular category will be assigned. In other cases, categories were assigned relative weights, while in others, categories were only prioritized or the relative importance of the categories was not disclosed. Table 14 provides a detailed summary of the procurement processes for each case sorted by delivery method. The cases demonstrate commonality in general procurement approach but some diversity in definition of selection criteria and assessment of those criteria.

<sup>31</sup> TriMet, *I-205/Portland Mall: Max Light Rail Fact Sheet 1* (2009).

<sup>32</sup> *Id.*



**Table 14. Summary of Procurement Processes**

<i>Project</i>	<i>Delivery Method</i>	<i>Procurement Process</i>
DART Green Line	Construction Manager/ General Contractor	RFP with selection based upon multiple scored qualitative criteria: a) project approach, b) project personnel, c) team composition/subcontracting, d) firm/team experience, e) oral presentations, and f) proposal risk assessment <i>and</i> lowest responsive price; price weighted most heavily in the overall assessment
Portland Mall Segment	Construction Manager/ General Contractor	Multiphase selection: Phase 1—150 points in 4 categories to establish a competitive range: a) firm experience and project team [25 pts], b) project approach, safety and management plan [50 pts], c) price [50 pts], and d) DBE and workforce training programs [25 pts]; Phase 2—interviews with proposers in the competitive range; and Phase 3 – BAFO
BART Extension to SFIA	DB	Prequalification; RFP with proposals selected based upon minimum price and meeting minimum specified technical requirements
Dulles Metrorail	DB	Unsolicited proposal that led to CA; DB contract for a phase of overall project negotiated within the bounds of the CA
Largo Extension	DB	RFQ followed by short-listing; RFP with selection based on technical proposal and separate sealed price proposal; technical proposal considered: a) management plan, b) key staff, c) preliminary safety plan, d) quality plan, and a preliminary critical path method schedule
AirTrain JFK	DBOM	RFQ followed by short-listing; RFP with multiphase selection: Phase 1—evaluation of non-price proposal based on multiple qualitative criteria; Phase 2—evaluation of NPV of design, construction, and operations services; Phase 3—establishment of a competitive range; Phase 4—BAFO
Southern New Jersey Light Rail System	DBOM	RFQ followed by short-listing; RFP with selection based on 300 points for technical proposal and 700 points for price (points awarded based upon percent of bid to low bid)

Not surprisingly, price was a dominant or heavily-weighted selection factor in every case except the Dulles Metrorail. Note, however, that while selection of the design-builder in the Dulles Metrorail project was not dependent directly on price competition, steps were taken by MWAA to ensure that the price was reasonable. This finding increases the substance of the indeterminate pricing question, which was fundamental to this study. Interestingly, two cases—Largo Extension and AirTrain JFK—had procurement processes that deviated somewhat from the planned approach. In both cases, the initial prices provided by the proposers exceeded those expected. In the Largo project, WMATA instructed the proposers to submit their BAFOs. Subsequently, the Authority finalized a deal with its selected contractor. In the AirTrain JFK project, the Port Authority directed the proposing consortia to submit revised proposals at lower prices. After receiving the second proposals, the Authority short-listed two proposers and selected one of the remaining two. The procurement documents provided both owners with the latitude to adjust the process as necessary to identify and select a preferred bidder.

**Indeterminate Pricing**

Each case study is, to some extent, an example of the procurement of design and construction services based on indeterminate pricing, inasmuch as the final design of the project was not fully defined before contracts were awarded to the contracting teams. In all of the DB and DBOM arrangements, agencies required the proposers to advance the RFP design to a point where they could provide a fixed price for final design and construction (and, for DBOM, operations). Where operations services were requested, it was common to include means to adjust the prices of some commodity items over extended periods of time via indexing techniques.

The Dulles Metrorail project was a bit different. Of the DB and DBOM contracts surveyed, it was the only one where the contracting entity was able to both advance the design and then negotiate the contract prior to contract award. As a result, there was no direct competition at the prime design-builder level, and there was no other DB price for MWAA to consider in evaluating the reasonableness of DTP’s price. Rather, MWAA and its consultants were able to evaluate, on an open-book basis, DTP’s assumptions and conduct their own assessment of what the project should cost. The other DB and DBOM projects selected the contractor through a competitive process.

The other unique feature of Dulles Metrorail vis-à-vis indeterminate pricing was the use of an innovative allowance process for \$600 million of what would ordinarily have been lump-sum work. These allowances were developed because some subcontractors had a challenge in pricing their work so many years in advance of their actual work. By taking these items out of the fixed price, the owner assumed the risk of subcontractor pricing, but eliminated what would have been substantial contingencies for the affected subcontractors. Based on reports from the project personnel, the allowance program has been highly successful, and the actual pricing has been, for most items, at values less than the allowance prices—and far less than the values that would have been contained in the fixed price.

In the AirTrain JFK case, the Port Authority of New York and New Jersey chose to negotiate a contingency fund with its selected contractor to segregate elements of the project where potential risks forced escalation of the overall fixed price. In doing so, the Authority established a reimbursable payment scheme with a ceiling price for these items and provided the contractor incentive to minimize costs by sharing 40 percent of any savings below the ceiling with the contractor.

In the River Line case, NJ Transit provided proposers with Mandatory and Reference Documents in the solicitation, with the Reference Documents being for informational purposes only. As a result, proposers were expected, in developing their prices, to anticipate and verify existing conditions before submitting proposals. This shifted the risk of pricing incomplete documents to the design-builder, and based upon the result of the litigation, this risk shifting was successful.

In the two CMAR cases, the approaches employed were similar. In each, the owner defined preconstruction task orders and the proposers submitted unit prices for the items of work. In each, the owner and the contractor negotiated a GMP for construction services once the scope of the project was more fully defined. In the DART Green Line project, the owner developed a detailed schedule of anticipated items of construction work, so proposers had to submit unit prices against these items as well as an expected not-to-exceed price. These prices served as the basis for subsequent GMP negotiations. In the Portland Mall Segment project, however, the owner requested that the proposers only submit a fixed fee for construction period services, which would be included in the GMP. In the DART case, the owner needed to do far more front-end planning and the proposers had to have a reasonable level of confidence in the developed schedule of construction items if it was to have any true value to the project.

To increase competitive pressure when soliciting bids from subcontractors, both CMAR arrangements had procurement provisions for this purpose. In the DART case, the RFP required proposers to submit a completed schedule of anticipated subcontractors/subconsultants. Further, before the award of any subcontract or subcontract modification expected to exceed \$100,000, the contractor was required to submit the subcontractor's cost

or pricing data unless the price was based on adequate price competition, based on established catalog or market prices of bulk commercial items sold to the general public, or set by law.

In the Portland Mall Segment project, TriMet required each proposer to identify in its contracting plan any construction trade work that it proposed to complete by other than low-bid subcontracting. Proposers were allowed, however, to accomplish work either by selecting subcontractors on a best-value basis or through self-performance. TriMet retained the right, however, to require competitive bidding for all work, to negotiate firm prices, or to allow all work on a cost-reimbursable basis. Any self-performed work was required to be based on competitive pricing.

### Contract Provisions

Overall, the contract provisions in the case studies did not provide any substantial surprises with regard to ownership of documents, design review, contractor proposed changes, suspension and termination, or inclusion of DBEs and dispute resolution. Instead, the case studies confirmed that owners still expect to maintain the right to review design documents when DB or DBOM approaches are employed. Likewise, alternative dispute resolution mechanisms remain a staple of contractual arrangements for these types of projects. Two of the case studies coupled partnering/team-building initiatives with alternative dispute resolution mechanisms to encourage participant cooperation. Of note, however, were some of the other provisions discovered such as the monetary incentives or damages employed to motivate contractor safety or schedule performance.

### Legal Issues and Disputes

Disputes arose in three of the cases studied. Of the remaining four, two cases had yet to reach a point where disclosure of disputes, if any, was possible. Interestingly, both DBOM cases had issues related to scope definition and existing conditions. Each of these projects provided a limited functional description of the project in the solicitation documents as well as limited or “nonbinding” information regarding existing conditions. In one case, the owner held fast to the conditions of the contract, so the disputes went into litigation. During litigation, the court tended to hold the contractor to the contract conditions and requirements, so a large claim was ultimately settled, generally in favor of the owner. In the other case, the owner chose to mitigate apparent contingency pricing in the winning proposal by negotiating a contingency fund that would pay for certain items of work or encountered conditions on a reimbursable basis up to a maximum price. In addition, the owner worked through various issues with the contractor to the point where disputed items of work were resolved by the completion of construction. In the end, both owners obtained the projects they solicited, even though the means for handling issues with the contractor were different.

## Dispute Resolution

While the norm in all of the cases, alternative dispute resolution methods varied. The following summarizes the methods employed in the cases:

- BART Extension: Partnering arrangement coupled with an optional DRB.
- DART Green Line: DRB.
- Dulles Metrorail: Escalating dispute resolution process—negotiations (field level with DTP and MWAA representatives); elevated negotiations (DTP and MWAA Senior Representatives); independent expert; submission of certified claim (recommendation by MWAA representative, DTP has 30 days to agree or seek further action); mediation; legal proceedings.
- Largo Extension: Initially DRB; subsequently, parties could propose and agree to any form of alternative dispute resolution.
- Portland Mall Segment: Tiered dispute resolution followed by mediation.
- River Line: Partnering arrangement; consent to jurisdiction of Courts of New Jersey and waiver of trial by jury.

## X. CONCLUSION AND KEY FINDINGS

This digest explores the nature of alternative delivery methods for U.S. transit projects. The use of alternative delivery methods such as DB, CMAR, and PPP techniques (like DBOM) has been steadily increasing over the past 20 years. Although use of alternative methods has grown, the specific characteristics and implications of the various methods remain largely project-specific. There has yet to emerge a universally-accepted or institutionalized framework for implementing alternative procurement methods.

Based on the statutes and projects studied, several key findings are noted:

*Substantial flexibility exists with respect to project delivery methods nationally.* The review of the statutory authority for using delivery methods other than DBB for transportation projects indicates clearly that many public agencies across the nation may use methods ranging from DB to CMAR to unsolicited proposals that include private investment. The cases reviewed are a reflection of this flexibility, which has grown substantially over roughly the last decade.

*Procurement methods are evolving from fixed price awards to best-value approaches.* Chronologically, the BART extension to SFIA was the earliest case studied. Its award was based significantly on the price proposed. The DART Green Line and the Portland Mall Segment cases were the most recent awards. These procurements had multiple phases where qualifications and qualitative, technical, and price criteria were assessed for the award of the contract. In both of these cases, rather complex point-scoring systems were used to select the preferred contractor. While best-value procurements are growing in popularity, a word of caution is warranted. Scoring systems can prove difficult to imple-

ment, as indicated by recent research into best-value procurement.<sup>33</sup>

*Best-value procurement methods employed in the cases still showed a preference for “fixed” pricing.* Pricing strategies for design, preconstruction services, and construction work remained oriented toward fixed pricing. This is not necessarily unusual in DB or DBOM solicitations, but the two CMAR cases studied went to substantial lengths to establish unit prices for preconstruction or construction items of work. The unit prices proposed served as both a means to award the contract and as the basis of pricing or negotiating the price for task orders or work items. This strategy, while potentially advantageous to the owner, creates a significant burden to properly identify and characterize these items. While this initiative did not uncover evidence of issues related to this strategy, the proper interpretation of these items by proposers/contractors is clearly correlated with the merit of the corresponding prices.

*Indeterminate pricing prior to award poses a substantial risk to the contracting community if the owner seeks to obtain a fixed/lump-sum price through competition.* Owners in the case studies that provided preliminary design and geotechnical information in the RFP documents, and then attempted to distance themselves from the accuracy of such information, had mixed success. This approach clearly created conflict between the contractor and the owner when problems surfaced, and the contractor was able to recover some monies in the cases reported.

*The use of allowances appears to be an effective way of addressing the challenges of pricing long-duration projects.* There are times when the extended duration, or other characteristics, of a project will lead to inefficiencies in using a pure fixed-price contracting approach with the contractor. The Dulles Metrorail project (and the AirTrain JFK project to some extent) provides an excellent example of how to creatively use allowances to avoid excessive contingencies and have a direct role in the procurement of major subcontractors.

*Plans for the inclusion of DBEs in proposals were either a condition of responsiveness or an evaluated criterion.* Proposers in the cases studied had to demonstrate compliance with the project’s DBE requirements during procurement. Typically, proposals were not considered responsive unless an appropriate DBE plan was presented. In one case, the DBE plan was an evaluation criterion. During project execution, one case used a liquidated damages provision in the event that the selected contractor fell out of compliance with the project’s DBE participation goals. Little to no evidence was uncovered to suggest that the projects were unable to achieve their DBE participation goals.

*Alternative dispute resolution mechanisms were varied among the cases, but they were the norm.* The cases demonstrated a variety of alternative dispute resolution

<sup>33</sup> S. SCOTT ET AL., BEST-VALUE PROCUREMENT METHODS FOR HIGHWAY CONSTRUCTION PROJECTS 24 (National Cooperative Highway Research Program Report 561, 2006).

approaches from hierarchical interpretation/negotiation with owner representatives followed by mediation to *ex*

*ante* establishment of DRBs. All cases, however, included an alternative dispute resolution mechanism.

## REFERENCES

- AGC. [www.agc.org](http://www.agc.org).
- AGC OR. Oregon Public Contracting Coalition Guide to CM/GC Contracting ([http://www.agc-oregon.org/public/resource\\_center/publications/CM\\_GC\\_Guide\\_05.pdf](http://www.agc-oregon.org/public/resource_center/publications/CM_GC_Guide_05.pdf)).
- AIA. [www.aia.org/advocacy/state/aia078882](http://www.aia.org/advocacy/state/aia078882).
- Beard, Jeffrey L., Loulakis, Michael C., and Edward C. Wundram. *Design-Build: Planning through Development*. McGraw-Hill, New York, 2003.
- Cabanatuan, M. and Wilson, M. Delays Plague BART Extension to SFO, SFGate.com, 2003. [http://articles.sfgate.com/2003-01-06/bay-area/17473541\\_1\\_bart-officials](http://articles.sfgate.com/2003-01-06/bay-area/17473541_1_bart-officials).
- Cracchiolo, A. and Simuoli, V. JFK AirTrain: Project Management Issues on a Large DBOM Project. *Proc., ASCE 8th Annual Conference on Automated People Movers*, San Francisco, CA, 2001.
- DBIA. [www.dbia.org/about/designbuild/default.htm?PF=1](http://www.dbia.org/about/designbuild/default.htm?PF=1).
- DBIA 2009. Data Extrapolated from *Advocacy Map History 1993-2009*, Design-Build Institute of America, 2009.
- de Cerreño, A. L. C. AirTrain JFK. *Integrated Transportation and Land Use Planning: Facilitating Coordination Across and Among Jurisdictions*. Rudin Center for Transportation Policy and Management, NYU Wagner School of Public Service, New York, 2008.
- Florida DOT (2009). <http://www.dot.state.fl.us/financialplanning/Finance-Work%20Program.pdf>.
- Goodyear, C. Tutor-Saliba to Pay SF \$19 Million. Bruno B.A.R.T., Feb. 24, 2006.
- Loulakis, Michael C. *Design-Build for the Public Sector*. Aspen Publishers, Inc., New York, 2003.
- Metropolitan Washington Airports Authority and Dulles Transit Partners LLC. *Amended and Restated Design-Build Contract: Dulles Corridor Metrorail Project*. Washington, DC, July 25, 2008.
- Miller, J.B., Garvin, M.J., Ibbs, C.W., and Mahoney, S.E. Towards a New Paradigm: Simultaneous Use of Multiple Project Delivery Methods. *Journal of Management in Engineering*, 16 (3), 2000, 58–67.
- National Council for Public-Private Partnerships ([www.ncppp.org](http://www.ncppp.org)).
- New Jersey Transit Corporation. *Board Item Fact Sheet, Invitation for Bid No. 96CT001, Hudson-Bergen Light Rail Transit System*, Newark, NJ, 1996.
- New Jersey Transit Corporation. *Hudson-Bergen Light Rail Transit System: Proposal Solicitation Package, Book III, Volumes 1 and 2*. Newark, NJ, May 21, 1996.
- New Jersey Transit Corporation. *Southern New Jersey Light Rail Transit System: Contract 97CJ052, Books One and Two*. Newark, NJ, Dec. 1, 1998.
- Nossaman LLP. *50-State Summary Survey of Transportation Agency Design-Build Authority*. (<http://www.nossaman.com/showarticle.aspx?show=925>).
- Nossaman State. *State Legislation Authorizing Public Private Partnerships for Transit Projects*. (<http://www.nossaman.com/showarticle.aspx?show=4892>).
- Port Authority of New York and New Jersey. *Request for Proposals for Jamaica-JFK with Howard Beach Light Rail System: Contract No. LRS 100.001*. New York, NY, Sept. 12, 1996.
- Public Works Financing. *NJ Transit Rail DBOM Claims Settled*. Vol. 215, 2007.
- San Francisco Bay Area Rapid Transit District. *Contract Book for Line, Trackwork, and Systems Design-Build Contract: Contract No. 12YC-120*. San Francisco, CA, Dec. 2, 1996 (1).

- Scott, S., Molenaar, K.R., Gransberg, D.D., and Smith, N.C. *Best-Value Procurement Methods for Highway Construction Projects*. NCHRP Report 561, Transportation Research Board, Washington, DC, 2006.
- Smith, Nancy, and Caplicki, Evan. *California Passes New Design-Build Law for Highway Projects*. Nossaman E-Alerts, Apr. 1, 2009.
- Touran, A., Gransberg, D.D., Molenaar, K.R., Ghavamifar, K., Mason, D.J., and Fithian, L.A. *A Guidebook for the Evaluation of Project Delivery Methods*. TCRP Report 131, Transportation Research Board, Washington, DC, 2009.
- TriMet. *I-205/Portland Mall I-205 LRT Extension Project: I-205 Segment, Contract No. RH040161LE, Request for Proposal*. Portland, OR, July 31, 2003.
- TriMet. *South Corridor Project: Portland Mall Segment, Contract No. RH050506LE, Request for Proposal*. Portland, OR, Mar. 24, 2005.
- TriMet. *South Corridor Project: Portland Mall Segment, Contract No. RH050506LE, Project Contract*. Portland, OR, July 25, 2005.
- TriMet. *I-205/Portland Mall: Max Light Rail Fact Sheet*. Portland, OR, May 2009.
- Utah DOT Annual Report on the Use of CMGC  
(<http://www.udot.utah.gov/main/uconowner.gf?n=1135040022049311030>).
- Virginia Department of Rail and Public Transportation. *Comprehensive Agreement to Develop the Dulles Corridor Rapid Transit Project*. Richmond, VA, June 11, 2004.
- Washington Metropolitan Area Transit Authority. *Design-Build Contract RFP: Contract No. 1G0042*. Washington, DC, June 11, 2001.

**APPENDIX A: DESIGN-BUILD LEGISLATION**

<b>Design-Build Legislation as of December 31, 2009</b>		
<b>State</b>	<b>Statute</b>	<b>Web Site Link</b>
Alaska	Alaska Stat. § 36.30.200	<a href="http://touchngo.com/lglcntr/akstats/STATUTES/Title36/Chapter30/Section200.htm">http://touchngo.com/lglcntr/akstats/STATUTES/Title36/Chapter30/Section200.htm</a>
Arizona	Ariz. Rev. Stat. § 28-7363	<a href="http://www.azleg.gov/FormatDocument.asp?inDoc=/ars/28/07363.htm&amp;Title=28&amp;DocType=ARS">http://www.azleg.gov/FormatDocument.asp?inDoc=/ars/28/07363.htm&amp;Title=28&amp;DocType=ARS</a>
Arkansas	Ark. Code Ann. § 27-65-107(c)	<a href="http://www.arkansashighways.com/Info/Act300/2007/27/27-65-107.htm">http://www.arkansashighways.com/Info/Act300/2007/27/27-65-107.htm</a>
California	Cal. Pub. Cont. Code § 20133	<a href="http://law.onecle.com/california/public-contract/20133.html">http://law.onecle.com/california/public-contract/20133.html</a>
Colorado	Colo. Rev. Stat. § 43-1-1401	<a href="http://www.michie.com/colorado_print/lpExt.dll/cocode/2/6e5f7/6e607/6e609#JD_43-1-1401">http://www.michie.com/colorado_print/lpExt.dll/cocode/2/6e5f7/6e607/6e609#JD_43-1-1401</a>
Delaware	29 Del. Code Ann. § 6962	<a href="http://delcode.delaware.gov/title29/c069/sc04/index.shtml#6962">http://delcode.delaware.gov/title29/c069/sc04/index.shtml#6962</a>
Florida	Fla. Stat. § 337.11	<a href="http://www.leg.state.fl.us/statutes/index.cfm?App_mode=Display_Statute&amp;Search_String=&amp;URL=Ch0337/Sec11.HTM">http://www.leg.state.fl.us/statutes/index.cfm?App_mode=Display_Statute&amp;Search_String=&amp;URL=Ch0337/Sec11.HTM</a>
Georgia	Ga. Code Ann. § 32-2-81	<a href="http://www.lexis-nexis.com/hottopics/gacode/default.asp">http://www.lexis-nexis.com/hottopics/gacode/default.asp</a>
Hawaii	Haw. Rev. Stat. § 103D-303	<a href="http://www.capitol.hawaii.gov/hrscurrent/Vol02_Ch0046-0115/HRS0103D/HRS_0103D-0303.htm">http://www.capitol.hawaii.gov/hrscurrent/Vol02_Ch0046-0115/HRS0103D/HRS_0103D-0303.htm</a>
Idaho	Idaho Code Ann. § 67-2309	<a href="http://www3.state.id.us/cgi-bin/newidst?sctid=670230009.K">http://www3.state.id.us/cgi-bin/newidst?sctid=670230009.K</a>
Illinois	30 Ill. Comp. Stat. 535/75	<a href="http://www.ilga.gov/legislation/ilcs/ilcs3.asp?ActID=538&amp;ChapAct=30%26nbsp%3BILCS%26nbsp%3B535%2F&amp;ChapterID=7&amp;ChapterName=FINANCE&amp;ActName=Architectural%2C+Engineering%2C+and+Land+Surveying+Qualifications+Based+Selection+Act">http://www.ilga.gov/legislation/ilcs/ilcs3.asp?ActID=538&amp;ChapAct=30%26nbsp%3BILCS%26nbsp%3B535%2F&amp;ChapterID=7&amp;ChapterName=FINANCE&amp;ActName=Architectural%2C+Engineering%2C+and+Land+Surveying+Qualifications+Based+Selection+Act</a>
	70 Ill. Comp. Stat. 3615/4.06	<a href="http://www.ilga.gov/legislation/ilcs/fulltext.asp?DocName=007036150K4.06">http://www.ilga.gov/legislation/ilcs/fulltext.asp?DocName=007036150K4.06</a>
Indiana	Ind. Code § 5-30-2-2	<a href="http://www.in.gov/legislative/ic/code/title5/ar30/ch2.html">http://www.in.gov/legislative/ic/code/title5/ar30/ch2.html</a>
Kentucky	Kan. Stat. Ann. § 45A.180	<a href="http://www.lrc.state.ky.us/KRS/045A00/180.PDF">http://www.lrc.state.ky.us/KRS/045A00/180.PDF</a> (from <a href="http://www.lrc.state.ky.us/KRS/045A00/Chapter.htm">http://www.lrc.state.ky.us/KRS/045A00/Chapter.htm</a> )
	Kan. Stat. Ann. § 65.025	<a href="http://www.lrc.state.ky.us/KRS/065-00/025.PDF">http://www.lrc.state.ky.us/KRS/065-00/025.PDF</a>
Louisiana	La. Rev. Stat. 48:250.2-4	<a href="http://www.legis.state.la.us/lss/lss.asp?doc=103068">http://www.legis.state.la.us/lss/lss.asp?doc=103068</a> <a href="http://www.legis.state.la.us/lss/lss.asp?doc=285593">http://www.legis.state.la.us/lss/lss.asp?doc=285593</a> <a href="http://www.legis.state.la.us/lss/lss.asp?doc=330364">http://www.legis.state.la.us/lss/lss.asp?doc=330364</a>
Maine	Me. Rev. Stat. tit. 5 § 1743	<a href="http://www.mainelegislature.org/legis/statutes/5/title5sec1743.pdf">http://www.mainelegislature.org/legis/statutes/5/title5sec1743.pdf</a>

<b>Design-Build Legislation as of December 31, 2009</b>		
<b>State</b>	<b>Statute</b>	<b>Web Site Link</b>
Maryland	Md. Code Ann. § 3-602	<a href="http://mlis.state.md.us/google_docs\$/Google_Statutes/Statutes_Sept_09/gsf/3-602.pdf">http://mlis.state.md.us/google_docs\$/Google_Statutes/Statutes_Sept_09/gsf/3-602.pdf</a>
Massachusetts	Mass. Gen. Laws ch. 149A, § 14	<a href="http://www.mass.gov/legis/laws/mgl/149a-14.htm">http://www.mass.gov/legis/laws/mgl/149a-14.htm</a>
Minnesota	Minn. Stat. §§ 161.3410, 161.3412	<a href="https://www.revisor.mn.gov/statutes/?id=161.3410">https://www.revisor.mn.gov/statutes/?id=161.3410</a> <a href="https://www.revisor.mn.gov/statutes/?id=161.3412">https://www.revisor.mn.gov/statutes/?id=161.3412</a>
Missouri	Mo. Rev. Stat. § 227.107	<a href="http://www.moga.mo.gov/statutes/C200-299/2270000107.HTM">http://www.moga.mo.gov/statutes/C200-299/2270000107.HTM</a>
Montana	Mont. Code Ann. § 60-2-137	<a href="http://data.opi.state.mt.us/bills/mca/60/2/60-2-137.htm">http://data.opi.state.mt.us/bills/mca/60/2/60-2-137.htm</a>
Nevada	Nev. Rev. Stat. Ann. § 338.1711	<a href="http://www.leg.state.nv.us/NRS/NRS-338.html#NRS338Sec1711">http://www.leg.state.nv.us/NRS/NRS-338.html#NRS338Sec1711</a>
	Nev. Rev. Stat. Ann. § 408.388	<a href="http://www.leg.state.nv.us/nrs/NRS-408.html#NRS408Sec388">http://www.leg.state.nv.us/nrs/NRS-408.html#NRS408Sec388</a>
New Hampshire	N.H. Rev. Stat. Ann. 228:4	<a href="http://gencourt.state.nh.us/rsa/html/XX/228/228-4.htm">http://gencourt.state.nh.us/rsa/html/XX/228/228-4.htm</a>
New Mexico	N.M. Stat. Ann. § 13-1-119.1	<a href="http://www.conwaygreene.com/nmsu/lpext.dll?f=templates&amp;fn=main-hit-h.htm&amp;2.0">http://www.conwaygreene.com/nmsu/lpext.dll?f=templates&amp;fn=main-hit-h.htm&amp;2.0</a>
North Carolina	N.C. Gen. Stat. § 136-28.11	<a href="http://www.ncga.state.nc.us/EnactedLegislation/Statutes/HTML/BySection/Chapter_136/GS_136-28.11.html">http://www.ncga.state.nc.us/EnactedLegislation/Statutes/HTML/BySection/Chapter_136/GS_136-28.11.html</a>
New Jersey	N.J. Stat. Ann. § 27:25-11(c)	<a href="http://lis.njleg.state.nj.us/cgi-bin/om_isapi.dll?clientID=28030919&amp;Depth=4&amp;TD=WRAP&amp;advquery=title%2027%3a25-11&amp;headingswithhit=on&amp;info base=statutes.nfo&amp;rank=&amp;softpage=Doc_Frame_Pg42&amp;wordsaroundhits=2&amp;x=22&amp;y=12&amp;zz=">http://lis.njleg.state.nj.us/cgi-bin/om_isapi.dll?clientID=28030919&amp;Depth=4&amp;TD=WRAP&amp;advquery=title%2027%3a25-11&amp;headingswithhit=on&amp;info base=statutes.nfo&amp;rank=&amp;softpage=Doc_Frame_Pg42&amp;wordsaroundhits=2&amp;x=22&amp;y=12&amp;zz=</a>
Ohio	Ohio Rev. Code Ann. 5543.22	<a href="http://codes.ohio.gov/orc/5543">http://codes.ohio.gov/orc/5543</a>
	Ohio Rev. Code Ann. 5517.011	<a href="http://codes.ohio.gov/orc/5517.011">http://codes.ohio.gov/orc/5517.011</a>
Oklahoma	Okla. Stat. tit. 61, § 202.1	<a href="http://www.lsb.state.ok.us/">http://www.lsb.state.ok.us/</a>
Oregon	Or. Rev. Stat. § 383.005	<a href="http://www.leg.state.or.us/ors/383.html">http://www.leg.state.or.us/ors/383.html</a>
	Or. Rev. Stat. 279B.085	<a href="http://www.leg.state.or.us/ors/279b.html">http://www.leg.state.or.us/ors/279b.html</a>
South Carolina	S.C. Code Ann. § 57-5-1625	<a href="http://www.scstatehouse.gov/CODE/t57c005.htm">http://www.scstatehouse.gov/CODE/t57c005.htm</a>
South Dakota	S.D. Codified Laws § 5-18B-20	<a href="http://legis.state.sd.us/statutes/DisplayStatute.aspx?Type=Statute&amp;Statute=5-18B-20">http://legis.state.sd.us/statutes/DisplayStatute.aspx?Type=Statute&amp;Statute=5-18B-20</a>



<b>Design-Build Legislation as of December 31, 2009</b>		
<b>State</b>	<b>Statute</b>	<b>Web Site Link</b>
Tennessee	Tenn. Code Ann. 12.10.124	<a href="http://michie.lexisnexis.com/tennessee/lpext.dll?f=templates&amp;fn=main-h.htm&amp;cp">http://michie.lexisnexis.com/tennessee/lpext.dll?f=templates&amp;fn=main-h.htm&amp;cp</a>
Texas	Tex. Transp. Code § 223.203	<a href="http://codes.lp.findlaw.com/txstatutes/TN/6/B/223/E/223.203">http://codes.lp.findlaw.com/txstatutes/TN/6/B/223/E/223.203</a>
	Tex. Local Gov't Code § 271.119	<a href="http://law.justia.com/texas/codes/lg/008.00.000271.00.html">http://law.justia.com/texas/codes/lg/008.00.000271.00.html</a>
Utah	Utah Code Ann. § 63-56-502	<a href="http://law.justia.com/utah/codes/title63/63_29046.html">http://law.justia.com/utah/codes/title63/63_29046.html</a>
Virginia	Va. Code Ann. §§ 2.2-4303 and 2.2-4306	<a href="http://198.246.135.1/cgi-bin/legp504.exe?000+cod+2.2-4303">http://198.246.135.1/cgi-bin/legp504.exe?000+cod+2.2-4303</a>
	Va. Code Ann. § 33.1-12	<a href="http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+33.1-12">http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+33.1-12</a>
Washington	Wash. Rev. Code § 47.20.785	<a href="http://apps.leg.wa.gov/rcw/default.aspx?cite=47.20.785">http://apps.leg.wa.gov/rcw/default.aspx?cite=47.20.785</a>
West Virginia	W. Va. Code § 17-2D-2	<a href="http://www.legis.state.wv.us/wvcode/Code.cfm?chap=17&amp;art=2D">http://www.legis.state.wv.us/wvcode/Code.cfm?chap=17&amp;art=2D</a>
Wisconsin	Wis. Stat. § 84.11	<a href="http://nxt.legis.state.wi.us/nxt/gateway.dll?f=templates&amp;fn=default.htm&amp;d=stats&amp;jd=84.11">http://nxt.legis.state.wi.us/nxt/gateway.dll?f=templates&amp;fn=default.htm&amp;d=stats&amp;jd=84.11</a>

**APPENDIX B: CONSTRUCTION MANAGEMENT LEGISLATION**

<b>Construction Management at Risk Legislation as of December 31, 2009</b>		
<b>State</b>	<b>Statute</b>	<b>Web Site Link</b>
Arizona	Ariz. Rev. Stat. § 41-2579	<a href="http://www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/41/02579.htm&amp;Title=41&amp;DocType=ARS">http://www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/41/02579.htm&amp;Title=41&amp;DocType=ARS</a>
Arkansas	Ark. Code Ann. § 9-11-801	<a href="http://staging.arkleg.state.ar.us/ARCodeInop.asp">http://staging.arkleg.state.ar.us/ARCodeInop.asp</a>
Connecticut	Public Act No. 06-134 § 21	<a href="http://www.cga.ct.gov/2006/ACT/PA/2006PA-00134-R00HB-05695-PA.htm">http://www.cga.ct.gov/2006/ACT/PA/2006PA-00134-R00HB-05695-PA.htm</a>
Georgia	Ga. Code Ann. § 36-91-20	<a href="http://law.justia.com/georgia/codes/36/36-91-20.html">http://law.justia.com/georgia/codes/36/36-91-20.html</a>
Kentucky	Ky. Rev. Stat. Ann. § 45A.045	<a href="http://www.lrc.state.ky.us/KRS/045A00/045.PDF">http://www.lrc.state.ky.us/KRS/045A00/045.PDF</a>
Maine	Me. Rev. Stat. § 1743	<a href="http://www.mainelegislature.org/legis/statutes/5/title5sec1743.html">http://www.mainelegislature.org/legis/statutes/5/title5sec1743.html</a>
Massachusetts	Mass. Gen. Laws ch. 149A, § 1	<a href="http://www.mass.gov/legis/laws/mgl/149a-1.htm">http://www.mass.gov/legis/laws/mgl/149a-1.htm</a>
Minnesota	Minn. Stat. § 16C.34	<a href="https://www.revisor.mn.gov/statutes/?id=16C.34">https://www.revisor.mn.gov/statutes/?id=16C.34</a>
New Hampshire	N.H. Rev. Stat. Ann. 21-I:78	<a href="http://www.gencourt.state.nh.us/RSA/html/I/21-I/21-I-78.htm">http://www.gencourt.state.nh.us/RSA/html/I/21-I/21-I-78.htm</a>
	N.H. Rev. Stat. Ann. 21-I:80	<a href="http://www.gencourt.state.nh.us/RSA/html/I/21-I/21-I-80.htm">http://www.gencourt.state.nh.us/RSA/html/I/21-I/21-I-80.htm</a>
North Carolina	N.C. Gen. Stat. § 143-128.1	<a href="http://www.ncga.state.nc.us/EnactedLegislation/Statutes/HTML/BySection/Chapter_143/GS_143-128.1.html">http://www.ncga.state.nc.us/EnactedLegislation/Statutes/HTML/BySection/Chapter_143/GS_143-128.1.html</a>
Oklahoma	Okla. Stat. tit. 61, § 202.1	<a href="http://www.lsb.state.ok.us/">http://www.lsb.state.ok.us/</a>
Oregon	Or. Rev. Stat. § 279B.085	<a href="http://www.leg.state.or.us/ors/279b.html">http://www.leg.state.or.us/ors/279b.html</a>
South Dakota	S.D. Codified Laws § 5-18B-44	<a href="http://legis.state.sd.us/statutes/DisplayStatute.aspx?Type=Statute&amp;Statute=5-18B-44">http://legis.state.sd.us/statutes/DisplayStatute.aspx?Type=Statute&amp;Statute=5-18B-44</a>
	S.D. Codified Laws § 5-18B-43	<a href="http://legis.state.sd.us/statutes/DisplayStatute.aspx?Type=Statute&amp;Statute=5-18B-43">http://legis.state.sd.us/statutes/DisplayStatute.aspx?Type=Statute&amp;Statute=5-18B-43</a>
Tennessee	Tenn. Code Ann. 12.10.124	<a href="http://michie.lexisnexis.com/tennessee/lpext.dll?f=templates&amp;fn=main-h.htm&amp;cp">http://michie.lexisnexis.com/tennessee/lpext.dll?f=templates&amp;fn=main-h.htm&amp;cp</a>

<b>Construction Management at Risk Legislation as of December 31, 2009</b>		
<b>State</b>	<b>Statute</b>	<b>Web Site Link</b>
Texas	Tex. Local Gov't Code § 271.118	<a href="http://law.justia.com/texas/codes/lg/008.00.000271.00.html">http://law.justia.com/texas/codes/lg/008.00.000271.00.html</a>
Virginia	Va. Code Ann. § 2.2-4301	<a href="http://198.246.135.1/cgi-bin/legp504.exe?000+cod+2.2-4301">http://198.246.135.1/cgi-bin/legp504.exe?000+cod+2.2-4301</a>
	Va. Code Ann. § 2.2-4306	<a href="http://198.246.135.1/cgi-bin/legp504.exe?000+cod+2.2-4306">http://198.246.135.1/cgi-bin/legp504.exe?000+cod+2.2-4306</a>
Washington	Wash. Rev. Code § 39.04.220	<a href="http://apps.leg.wa.gov/rcw/default.aspx?cite=39.04.220">http://apps.leg.wa.gov/rcw/default.aspx?cite=39.04.220</a>
	Wash Rev. Code § 39.10.061	<a href="http://law.justia.com/washington/codes/title39/39.10.061.html">http://law.justia.com/washington/codes/title39/39.10.061.html</a>
Wyoming	Wyo. Stat. § 16-6-701	<a href="http://legisweb.state.wy.us/statutes/statutes.aspx?file=titles/Title16/Title16.htm">http://legisweb.state.wy.us/statutes/statutes.aspx?file=titles/Title16/Title16.htm</a>
	Wyo. Stat. § 16-6-702	<a href="http://legisweb.state.wy.us/statutes/statutes.aspx?file=titles/Title16/Title16.htm">http://legisweb.state.wy.us/statutes/statutes.aspx?file=titles/Title16/Title16.htm</a>

**APPENDIX C: PPP LEGISLATION**

<b>Public-Private Partnership Legislation as of December 31, 2009</b>		
<b>State</b>	<b>Statute</b>	<b>Web Site Link</b>
Alabama	Ala. Code §§ 23-1-80 to 23-1-95	<a href="http://www.legislature.state.al.us/CodeOfAlabama/1975/132328.htm">http://www.legislature.state.al.us/CodeOfAlabama/1975/132328.htm</a>
California	Cal Sts. & Hy. Code § 143	<a href="http://www.leginfo.ca.gov/cgi-bin/waisgate?WAISdocID=07667820093+1+0+0&amp;WAIAction=retrieve">http://www.leginfo.ca.gov/cgi-bin/waisgate?WAISdocID=07667820093+1+0+0&amp;WAIAction=retrieve</a>
	Cal. Gov. Code §§ 5956 to 5956.10	<a href="http://law.justia.com/california/codes/gov/5956-5956.10.html">http://law.justia.com/california/codes/gov/5956-5956.10.html</a>
	Cal. Pub. Util. Code § 130242	<a href="http://law.onecle.com/california/utilities/130242.html">http://law.onecle.com/california/utilities/130242.html</a>
	Cal. Pub. Cont. Code §§ 20360 to 20369	<a href="http://law.onecle.com/california/public-contract/20360.html">http://law.onecle.com/california/public-contract/20360.html</a>
	Cal. Pub. Util. Code § 40075	<a href="http://law.onecle.com/california/utilities/40075.html">http://law.onecle.com/california/utilities/40075.html</a>
	Cal. Pub. Util. Code § 40183	<a href="http://law.onecle.com/california/utilities/40183.html">http://law.onecle.com/california/utilities/40183.html</a>
Colorado	Colo. Rev. Stat. §§ 32-9-107, 32-9-114, 32-9-119, 32-9-119.5, 32-9-128.5	<a href="http://www.michie.com/colorado/lpext.dll?f=templates&amp;fn=main-h.htm&amp;cp">http://www.michie.com/colorado/lpext.dll?f=templates&amp;fn=main-h.htm&amp;cp</a>
Delaware	Del. Code Ann. Tit. 2, §§ 2001 to 2012	<a href="http://delcode.delaware.gov/title2/c020/index.shtml">http://delcode.delaware.gov/title2/c020/index.shtml</a>
Florida	Fla. Stat. Ann. § 334.30, § 334.03 (31)	<a href="http://www.leg.state.fl.us/STATUTES/index.cfm?App_mode=Display_Statute&amp;URL=Ch0334/tit10334.htm&amp;StatuteYear=2009&amp;Title=%2D%3E2009%2D%3EChapter%20334">http://www.leg.state.fl.us/STATUTES/index.cfm?App_mode=Display_Statute&amp;URL=Ch0334/tit10334.htm&amp;StatuteYear=2009&amp;Title=%2D%3E2009%2D%3EChapter%20334</a>
Georgia	Ga. Code Ann. §§ 32-2-78 to 32-2-80	<a href="http://www.lexis-nexis.com/hottopics/gacode/default.asp">http://www.lexis-nexis.com/hottopics/gacode/default.asp</a>
Hawaii	Haw. Rev. Stat. § 103D-303	<a href="http://www.capitol.hawaii.gov/hrscurrent/Vol02_Ch0046-0115/HRS0103D/HRS_0103D-0303.htm">http://www.capitol.hawaii.gov/hrscurrent/Vol02_Ch0046-0115/HRS0103D/HRS_0103D-0303.htm</a>
Indiana	Ind. Code § 8-15.7	<a href="http://www.in.gov/legislative/ic/code/title8/ar15.7/">http://www.in.gov/legislative/ic/code/title8/ar15.7/</a>
Louisiana	La. Rev. Stat. §§ 48:2072 (C) (D); 48:2084 to 48:2084:15	<a href="http://www.legis.state.la.us/lss/lss.asp?doc=103018;">http://www.legis.state.la.us/lss/lss.asp?doc=103018;</a> <a href="http://www.legis.state.la.us/lss/lss.asp?doc=410943">http://www.legis.state.la.us/lss/lss.asp?doc=410943</a>
Maryland	Md. Code Regs. §§ 11.07.06; 11.07.06.03	<a href="http://www.dsd.state.md.us/comar/SearchAll.aspx">http://www.dsd.state.md.us/comar/SearchAll.aspx</a>

Public-Private Partnership Legislation as of December 31, 2009		
State	Statute	Web Site Link
Michigan	2009 Legisla- tion	<a href="http://www.legislature.mi.gov/documents/2007-2008/billanalysis/House/htm/2007-HLA-6542-6.htm">http://www.legislature.mi.gov/documents/2007-2008/billanalysis/House/htm/2007-HLA-6542-6.htm</a>
	Michigan Comp. Laws §§ 124.401 to 124.426	<a href="http://www.legislature.mi.gov/(S(3sfaapz4vbhoxirgfbjirzp))/mileg.aspx?page=getObject&amp;objectName=mcl-Act-204-of-1967">http://www.legislature.mi.gov/(S(3sfaapz4vbhoxirgfbjirzp))/mileg.aspx?page=getObject&amp;objectName=mcl-Act-204-of-1967</a>
Missouri	Mo. Rev. Stat. §§ 238.300 to 238.367	<a href="http://www.moga.mo.gov/STATUTES/C238.HTM">http://www.moga.mo.gov/STATUTES/C238.HTM</a>
	Mo. Rev. Stat. §§ 238.400 to 238.412	
North Carolina	N.C. Gen. Stat. § 136-18 (39)	<a href="http://www.ncga.state.nc.us/EnactedLegislation/Statutes/HTML/BySection/Chapter_136/GS_136-18.html">http://www.ncga.state.nc.us/EnactedLegislation/Statutes/HTML/BySection/Chapter_136/GS_136-18.html</a>
Nevada	Nev. Rev. Stat. §§ 338.161 to 338.168	<a href="http://www.leg.state.nv.us/NRS/NRS-338.html#NRS338Sec161">http://www.leg.state.nv.us/NRS/NRS-338.html#NRS338Sec161</a>
New Jersey	New Jersey Public Trans- portation Act of 1979 (N.J. Stat. Ann. § 27:25-1 et seq.)	<a href="http://lis.njleg.state.nj.us/cgi-bin/om_isapi.dll?clientID=28030667&amp;Depth=2&amp;depth=2&amp;expandheadings=on&amp;headingswithhits=on&amp;hitsperheading=on&amp;infobase=statutes.nfo&amp;record={B4EC}&amp;softpage=Doc_Frame_PG42">http://lis.njleg.state.nj.us/cgi-bin/om_isapi.dll?clientID=28030667&amp;Depth=2&amp;depth=2&amp;expandheadings=on&amp;headingswithhits=on&amp;hitsperheading=on&amp;infobase=statutes.nfo&amp;record={B4EC}&amp;softpage=Doc_Frame_PG42</a>
Ohio	Am. Sub. H.B. No. 2	<a href="http://www.legislature.state.oh.us/BillText128/128_HB_2_PH_N.html">http://www.legislature.state.oh.us/BillText128/128_HB_2_PH_N.html</a>
Oregon	Or. Rev. Stat. §§ 367.800 to 367.826	<a href="http://www.leg.state.or.us/ors/367.html">http://www.leg.state.or.us/ors/367.html</a>
Texas	Tex. Transp. Code Ann. §§ 451.801 to 451.812	<a href="http://www.statutes.legis.state.tx.us/Docs/TN/htm/TN.451.htm">http://www.statutes.legis.state.tx.us/Docs/TN/htm/TN.451.htm</a>
	Texas Loc. Gov. Code Ann. §§ 271.181 to 271.199	<a href="http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.271.htm">http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.271.htm</a>
Virginia	Va. Code Ann. §§ 56-556 to 56-575	<a href="http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+TOC5600000002200000000000">http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+TOC5600000002200000000000</a>
Washing- ton	Wash. Rev. Code §§ 47.29.010 to 47.29.900	<a href="http://apps.leg.wa.gov/RCW/default.aspx?cite=47.29">http://apps.leg.wa.gov/RCW/default.aspx?cite=47.29</a>
Wisconsin	Wis. Stat. 84.01(30)	<a href="http://nxt.legis.state.wi.us/nxt/gateway.dll?f=templates&amp;fn=default.htm&amp;d=stats&amp;jd=84.01(30)">http://nxt.legis.state.wi.us/nxt/gateway.dll?f=templates&amp;fn=default.htm&amp;d=stats&amp;jd=84.01(30)</a>

## ACRONYMS

ACG	Associated General Contractors of America	LRT	Light rail transit
Agency CM	Agency construction management	MAX	Metropolitan Area Express
ASBCA	Armed Services Board of Contract Appeals	MWAA	Metropolitan Washington Airports Author- ity
ARTC (ATC)	Air Rail Transit Consortium	NASFA	National Association of State Facilities Ad- ministration
BAFO	Best and final offer	NPV	Net present value
BART	Bay Area Rapid Transit	NPVT	Final net present value
BATC	Bay Area Transit Consultants	O&M	Operation and maintenance
BOT	Build-operate-transfer	ODOT	Oregon Department of Transportation
BRT	Bus rapid transit	ORD	Operations readiness date
CA	Comprehensive agreement	OTP	On-time performance
CAPRA	Capital reserve account	PATCO	Port Authority Transit Corporation
CMAR	Construction-Manager-at Risk	PFC	Passenger facility charges
COM	Contractor operations and maintenance	PPP	Public-private partnership
CTB	Commonwealth Transportation Board (of Vir- ginia)	PPTA	Virginia's Public Private Transportation Act
CTC	California Transportation Commission	QA/QC plans	Quality control measures
DART	Dallas Area Rapid Transit	RDA	Route daily availability
DB	Design-build	REA	Request for equitable adjustment
DBB	Design-bid-build	RFP	Request for proposals
DBE	Disadvantaged business enterprises	RFQ	Request for qualifications
DBOM	Design-build-operate-maintain	SA	Station availability
DIA	Dulles International Airport	SCADA	Supervisory control and data acquisition
DRB	Dispute resolution board	SEPTA	Southeastern Pennsylvania Transit Author- ity
DRPT	Virginia Department of Rail and Public Transportation	SFIA	San Francisco International Airport
DTP	Dulles Transit Partners	SNJTRLS	Southern New Jersey Light Rail Transit System
EBD	Escrowed bid documents	TBD	To be determined
EC	Evaluation committee	Trimet	Tri-County Metropolitan Transportation District of Oregon
FA	Fleet availability	ULURP	Uniform land use review procedure
FAA	Federal Aviation Administration	VECP	Value engineering change proposals
FFGA	Full funding grant agreement	WMATA	Washington Metropolitan Area Transit Authority
FTA	Federal Transit Administration		
GEC	General engineering consultant		
GMP	Guaranteed maximum price		
LFA	Local funding agreement		
LGS	Lane, Granite, Slattery, Skanska joint enter- prise		



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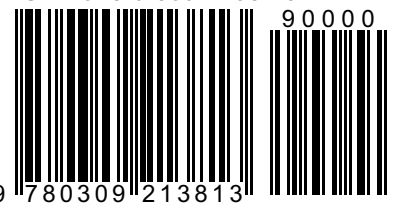
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