

The Big Dig Disaster: Was Design-Build the Answer?

In 1991, Boston Commuter was excited because his new daily commute was only twenty miles to an office park north of Boston. Moreover, he understood that construction had begun on an historic roadway project that would drastically improve his commute.¹ Thirteen years later, he sat in his car cursing the “Big Dig.” The tunnel was leaking again, project costs were increasing, and Commuter’s car idled in the tunnel for the third consecutive day.² With nothing else to do, he listened to a radio report about recent Massachusetts legislation reforming public construction laws.³ Commuter thought to himself, “What a disaster; where were they thirteen years ago?”

I. INTRODUCTION

Boston’s Central Artery Project, the Big Dig, replaced the city’s elevated highways with a series of underground tunnels.⁴ Since its inception in 1983, the Big Dig has plagued the Commonwealth of Massachusetts with problems.⁵ The initial \$2.6 billion project budget has soared to over \$14 billion.⁶ Further, environmental regulations, community opposition, and design changes have

1. See *Boston’s CAT Project Warrants a Better Review*, ENGINEERING NEWS-REC., Aug. 11, 1997, at 94 [hereinafter *Boston’s CAT Project*] (reporting new Central Artery to comfortably carry 250,000 vehicles per day); see also Mac Daniel, *Big Dig Benefit: A Quicker Downtown Trip*, BOSTON GLOBE, Feb. 15, 2006, at A1 (reporting drastic time reduction in Boston commute after Big Dig). The old artery’s capacity was only 75,000 vehicles, but high traffic demands forced it to carry over 190,000 vehicles daily. *Boston’s CAT Project*, *supra*, at 94. The average commute through Boston has improved from 19.5 minutes to 2.8 minutes. Daniel, *supra*, at A1. Additionally, 800,000 more people can get to Logan Airport in less than forty minutes. *Id.* But see Mac Daniel, *Beyond Big Dig, Jams Continue*, BOSTON GLOBE, Feb. 16, 2006, at B3 (reporting commute improvements limited to immediate Boston area).

2. See *infra* notes 6-8 and accompanying text (discussing Big Dig failures such as budgeting, scheduling, and quality control).

3. See An Act Further Regulating Public Construction in Commonwealth, 2004 Mass. Acts 193 § 27 (effective Jan. 1, 2005) (codified as MASS. GEN. LAWS ch. 149A, §§ 1-21 (Supp. 2007)) (passing construction alternative delivery methods); see also Ronald G. Busconi & Brian C. O’Donnell, *Chapter 193 a Year Later: Living Up to Expectations?*, BOSTON BUS. J., July 22, 2005, available at <http://www.bizjournals.com/boston/stories/2005/07/25/focus3.html> (explaining passage of Act in July 2004 reforming public construction laws).

4. See Otis White, *Otis White’s Urban Notebook*, GOVERNING MAG., Feb. 2003, at 12 (summarizing components of Big Dig project).

5. *Id.* (reporting cost overruns and delays).

6. See Fred Bayles, *Boston Has a Lot More than Cars Riding on the Big Dig*, USA TODAY, Jan. 20, 2003, at 1A (doubting likelihood of initial \$2.6 billion project estimate); Raphael Lewis, *Big Dig Costs May Rise by Millions; US Memo Says Total Could Reach \$14.7B*, BOSTON GLOBE, Dec. 24, 2005, at A1 (indicating likelihood of \$14.7 billion cost as of December 2005).

delayed the completion date from the mid 1990s to December 2005.⁷ Finally, not only is the project well over budget and behind schedule, but the recent death of Milena Del Valle in one Big Dig tunnel and persistent tunnel leaks also have led many to question the tunnels' design quality and construction integrity.⁸

In 1982, when the Big Dig was in its infancy, state construction laws mandated that the Massachusetts Highway Department (MHD) use design-bid-build as the project delivery method.⁹ In response to years of criticism regarding state construction laws, however, Massachusetts legislators passed construction reform legislation in 2004.¹⁰ The reform included a new project delivery method whereby authorized agencies could use design-build instead of the traditional design-bid-build method for roads, bridges, and tunnels.¹¹ Under design-build, instead of contracting with designers and contractors separately,

7. See Mac Daniel, *Paved With Good Intentions, Big Dig Work Angers Some*, BOSTON GLOBE, Nov. 2, 2005, at B1 (reporting final surface road paving not completed until mid-December 2005); Jake Halpern, *What to Do After the Big Dig is Finished*, BOSTON MAG., Sept. 2005, at 25 (reporting Big Dig not substantially complete in September 2005); Phil Primack, *Surprising Details About Where Big Dig Money Went*, BOSTON MAG., July 2005, at 57 (portraying ten-year lead time on entire Big Dig project at project outset).

8. See, e.g., Kimberly Atkins, *AG Eyes Big Dig Flaws; Still Deciding Whether to File Suit*, BOSTON HERALD, Nov. 15, 2005, at 7 (reporting Massachusetts Attorney General considering suit against Big Dig contractors because of tunnel leaks); Howie Carr, *Flacks Take Whack at Dig Hacks' Fiasco*, BOSTON HERALD, Mar. 2, 2005, at 18 (estimating fifty-three percent of drivers feared dying in tunnel during tunnel leaks); Jessica Fargen, *Tunnel Horror; Calamity Rocks Commonwealth (Time Line)*, BOSTON GLOBE, July 16, 2006, at 6 (outlining events of tunnel collapse and death of commuter); Scott S. Greenberger, *Leaks May Cost Taxpayers: U.S. Panel Told of Difficulty Assigning Blame for Big Dig Tunnels*, BOSTON GLOBE, Apr. 23, 2005, at A1 (reporting United States Department of Transportation Inspector General's opinion that leaks indicate widespread construction issues); Sean P. Murphy, *The Whistle-Blower*, BOSTON GLOBE MAG., Dec. 18, 2005, at 18 (praising former Judge Edward Ginsburg for ensuring safety of tunnels after leaks). The Boston Globe named Judge Ginsburg "Bostonian of the Year" for his work on the Big Dig. See Murphy, *supra*, at 18. But see Press Release, Massachusetts Turnpike Authority, Big Dig Turnpike News (Apr. 5, 2005) [hereinafter MTA Press Release], available at <http://www.masspike.com/user-cgi/news.cgi?dbkey=155&type=Press%20Release&src=news>

(declaring Federal Highway Administration (FHWA) found tunnels safe for traffic in April 2005 after leaks).

9. See Gerald Yakowenko, *Megaproject Procurement: Breaking From Tradition; Looking Beyond Design-Bid-Build to Find Another Project Delivery Method That's Right for the Megaproject*, SUPERINTENDENT OF DOCUMENTS, PUB. ROADS, July 1, 2004, at 48 (observing design-bid-build only delivery method under Massachusetts law in 1980s); see also The Comm. on Constr. Law, *Alternate Methods of Public Works Procurement*, 58 THE REC. 274, 274 (2003) (defining design-bid-build as traditional approach to public procurement of public works). Under design-bid-build, a public owner obtains completed designs before accepting bids for construction of the project. See The Comm. on Constr. Law, *supra*, at 274. The owner integrates the completed design into a competitive bid and awards a separate construction contract. See *id.*

10. See Joe Bartolotta, *Celluci Bill Would Gut Govt. Corruption Regs*, BOSTON HERALD, Apr. 27, 1999, at 5 (reporting Governor Celluci's proposal to amend construction laws in 1999); see also Thomas C. Palmer Jr., *Old Laws Blamed for Waste of \$220m*, BOSTON GLOBE, Sept. 15, 1999, at C16 (criticizing \$220 million waste due to ineffective construction laws); *supra* note 3 and accompanying text (explaining passage of construction reform allowing design-build as alternative delivery method).

11. See MASS. GEN. LAWS ch. 149A, §§ 1-21 (Supp. 2007) (codifying design-build via passage of Chapter 193 of the Massachusetts Acts of 2004). Authorized agencies may use design-build for public works projects in excess of \$5 million with approval from the Massachusetts Office of the Inspector General (Mass IG). *Id.* at § 14.

owners contract with a single entity that is responsible for both the project design and construction.¹² Saving time and reducing costs are among the proposed advantages to the design-build delivery method.¹³

This Note examines whether the use of the design-build method would have mitigated the problems on the Big Dig had the alternate delivery method been available earlier.¹⁴ Whether design-build could have saved the Big Dig helps predict the success of other states' design-build legislation.¹⁵ This inquiry is also germane now that several states are considering expansive roadway projects similar to the Big Dig.¹⁶

To begin, Part II.A of this Note reviews the relative merits of the traditional delivery method versus the design-build method.¹⁷ Part II.B then explains Massachusetts construction reform and the ideals that shaped its passage.¹⁸ Part II.C reviews the complexities of the Big Dig and summarizes its myriad of problems and controversies.¹⁹ This Note then analyzes, in Part III.A, whether the problems would have been resolved using the design-build method.²⁰ In sum, this Note proposes that the complex nature of the Big Dig would have precluded design-build's effectiveness.²¹ As discussed in Part III.B, however, there were several ways the Commonwealth could have shifted the project's inherent risks away from the Commonwealth.²² Finally, in Part III.C, this Note recommends several steps that the Commonwealth could take to promote design-build so that it might become an effective alternative project delivery method.²³

12. See JAMES J. MYERS & RONALD G. BUSCONI, MASSACHUSETTS CONSTRUCTION LAW § 16-1(a) (2004) (describing use of limited specifications under design-build in place of completed designs under design-bid-build). The design/builder assumes responsibility for the entire project instead of separate liability for the designer and contractor. *Id.*

13. See *infra* notes 59-63 and accompanying text (detailing design-build advantages).

14. See *infra* Part III (arguing design-build methods would not have mitigated Big Dig problems).

15. See The Comm. on Constr. Law, *supra* note 9, at 275-76 (disclosing twenty-three states approved of or used design-build method since 1990); Sara B. Miller, *Will Big Dig Woes Deter Other Megaprojects?*, CHRISTIAN SCI. MONITOR, Dec. 9, 2004, at 2 (suggesting Seattle authorities monitored Big Dig before beginning \$4.1 billion elevated highway repair project).

16. See Bayles, *supra* note 6, at 1A (citing nine state funded highway projects with budgets exceeding \$1 billion each).

17. See *infra* Part II.A (comparing strengths and weaknesses of design-bid-build with design-build).

18. See *infra* Part II.B (reviewing Massachusetts public construction laws and policies behind enactment).

19. See *infra* Part II.C (highlighting shortcomings and challenges of Big Dig).

20. See *infra* Part III.A (applying Big Dig contractual issues to design-build requirements and public policy behind construction reform).

21. See *infra* Part III.A (concluding complex environmental approval process and public policy concerns mitigate design-build advantages).

22. See *infra* Part III.B (proffering ways of shifting assumption of risk to Big Dig management consultant).

23. See *infra* Section III.C (theorizing lower threshold and better Mass IG guidance might improve usage of design-build in Massachusetts).

II. HISTORY

A. Comparing Old and New Public Sector Project Delivery Methods

1. Established Design-Bid-Build

Traditionally, the government required public owners to use design-bid-build for construction projects.²⁴ For example, in 1963, Massachusetts legislators introduced design-bid-build as a primary project delivery method.²⁵ The federal government required design-bid-build as its project delivery method from 1947 to 1996.²⁶ In fact, as recently as 2003, only thirty-five states allowed public owners to deviate from the design-bid-build method.²⁷

Under design-bid-build, public owners perform two distinct contracting steps.²⁸ First, they contract with a designer to provide a set of design plans or they produce the plans in house.²⁹ Procurement statutes generally do not permit public owners to contract for design services based on price, but instead require owners to select designers based on other qualitative factors.³⁰ Second, owners incorporate the completed design into a competitive bid that they

24. See Stephen Wichern, Note, *Protecting Design-Build Owners Through Design Liability Coverage, Independent Construction Managers, and Quality Control Procedures*, 32 *TRANSP. L.J.* 35, 35 (2004) (describing design-build as traditional method). *But see* Fluor Enters., Inc. v. United States, 64 Fed. Cl. 461, 482 (2005) (suggesting design-build predates design-bid-build). The concept of separating design and construction services did not emerge until late in the nineteenth century. *Id.*

25. See Act to Require That All Contracts for Construction and Materials Be Awarded to the Lowest Responsible and Eligible Bidder, and to Assure Full Competition in the Taking of Bids for Such Contracts, 1963 Mass. Acts 842 (codified and amended as MASS. GEN. LAWS ch. 30, § 39M (2004)) (requiring written specifications for full competition for each item prior to bidding). This Act required all public contracts for construction to create specifications prior to awarding a contract. *See id.* (applying Act to contracts under MASS. GEN. LAWS ch. 149, § 44A-L).

26. See *Fluor Enters. Inc.*, 64 Fed. Cl. at 483 (describing federal government's movement towards design-build). The Procurement Act of 1947 and the Property Act of 1949 required competitive bidding for all federal construction contracts, mandating design-bid-build. *See id.* Congress passed the Clinger-Cohen Act in 1996 that allowed federal agencies to use design-build in certain circumstances. *Id.*

27. See JOHN R. HEISSE, II & JAMES S. SCHENCK, IV, *THE DESIGN/BUILD DESKBOOK* 1-27 (2004) (reporting survey results regarding public sector's use of design-build instead of design-bid-build).

28. See Gordon Hunt & John Darling, *Practice Tips: The Allocation of Risks in a Design/Build Construction Project*, 21 *L.A. LAW.* 21, 21 (1999) (summarizing briefly design-bid-build process).

29. *Id.* (observing first step of providing design plans in design-bid-build process).

30. See MASS. GEN. LAWS ch. 7, § 38F(a) (2004) (listing designer selection board criteria for awarding public design contracts in public building construction); *see also* Fluor Enters. Inc. v. United States, 64 Fed. Cl. 461, 477 (2005) (acknowledging impact of Brooks Act on federal contracting); Brian G. Papernik & Nancy C. Smith, *By Design*, 22 *L.A. LAW.* 32, 32 n.3 (1999) (describing award of California design contracts based on competence rather than lowest bid). The Massachusetts designer selection criteria include many qualitative factors, but not price. *See* MASS. GEN. LAWS ch. 7, § 38F(a). The Brooks Act, passed by Congress in 1972, required the federal government to procure all design services based on the "demonstrated competence and qualifications" of the design firm. *Fluor Enters. Inc.*, 64 Fed. Cl. at 477. Further, the federal government must negotiate a fair and reasonable price, effectively eliminating sealed bidding procedures. *See id.*

distribute to a separate set of construction contractors.³¹ The public owner then impliedly warrants the design to the bidding contractors.³² Most state and federal legislation requires public owners to award this portion of the contract to the lowest responsive bidder.³³

Proponents of design-bid-build attribute its popularity to satisfaction of at least two out of three public procurement principles.³⁴ First, the objective award criteria based on accepting lowest bid reduces the likelihood of collusion or favoritism.³⁵ Second, because awarding authorities do not require contractors to include design services, competition is not limited to large firms, thus creating an open and fair competition to all those wishing to participate.³⁶ Finally, opponents and proponents of design-bid-build disagree over whether it promotes the final principle: obtaining the best value.³⁷ Proponents of design-bid-build argue that requiring the lowest bid ensures the best value; opponents counter that cost savings can be achieved more effectively through the benefits of design-build such as reduction of pre-construction costs.³⁸

In addition to design-bid-build promoting public sector construction principles, there are several other advantages.³⁹ First, the method provides for a definitive design and defined relationships in the beginning stages of the project.⁴⁰ Second, the designer contracts with the owner and, therefore,

31. See Hunt & Darling, *supra* note 28, at 21 (observing bidding stage in second step of design-bid-build).

32. See United States v. Spearin, 248 U.S. 132, 137 (1918) (holding government warrants adequacy of contractor's design specifications included in government's bid packages). In *Spearin*, even though the government included a provision requiring bidders to examine the construction site, the government nonetheless impliedly warranted the design specifications regarding the site conditions provided by the designer. *Id.*

33. See 41 U.S.C. § 253(a)(2) (2000) (requiring governmental agency to use sealed bidding and competitive proposals in certain circumstances). In sealed bidding, the Agency must award the contract to the lowest responsive bidder. See 41 U.S.C. 253b(c) (2000) (setting forth procedures for sealed bidding and competitive proposals); see also MASS. GEN. LAWS ch. 30 § 39M(a) (2004) (codifying Massachusetts sealed bidding requirements based on lowest responsive bid for high construction exceeding \$10,000); Papernik & Smith, *supra* note 30, at 32 (reporting state agencies award construction contracts to lowest responsible bidder).

34. See *infra* notes 35-37 and accompanying text (outlining three public procurement principles and design-bid-build application); see also The Comm. on Constr. Law, *supra* note 9, at 278 (rationalizing design-bid-build encourages competition and prevents favoritism).

35. See Darrel J. Bostwick, *Should Design Build Used for Public Works Projects?*, INTERMOUNTAIN CONTRACTOR, Sept. 1, 2005, at 26 (declaring prevention of collusion and favoritism as one of three inviolable, basic, public procurement principles).

36. See *id.* (naming opportunity for many to participate as one of three public purchasing principles).

37. *Id.* (listing best value for taxpayers as one of three public principles).

38. See Kelly Lucas, *Design/Build Alliances Allow Choices for Industry*, IND. LAW., June 21, 2000, at 9 (debating whether design-build or design-bid-build guarantees best value); Wichern, *supra* note 24, at 36 (describing various ways design-build reduces overall project costs).

39. See Carter Burgess, *Design-Build v. Design-Bid-Build*, Q., Issue 2, 2002, available at <http://www.c-b.com/information%20center/design-build/ic.asp?tID=3&pID=102> (providing bulleted list of design-build advantages).

40. See Carter Burgess, *supra* note 39 (listing advantages of more precise designs and clear contractual roles between designer and owner); see also John B. Tieder, Jr. & Shelly Ewald, *Globalization of Construction-Evolving International Standards of Construction Law*, in CONSTRUCTION LAW § 21.03 (Steven G.M. Stein ed.,

represents the owner's interests over the interests of the builder.⁴¹ Finally, the design-bid-build method makes the owner more likely to accept the final design of the project.⁴²

2. *Emerging Design-Build*

Design-build is one of several emerging alternative project delivery systems.⁴³ While design-build is relatively new in the public sector, the method has deep roots in construction contracting dating back thousands of years.⁴⁴ More recently, between 1993 and 2003 at least sixteen states passed legislation authorizing alternative public construction procurement methods, including design-build.⁴⁵ The states in the mid-Atlantic region may be the heaviest users of design-build.⁴⁶ There, all states actively use design-build except Delaware, which requires legislative approval for use on each individual project.⁴⁷ Several other large states are less enthusiastic about design-build.⁴⁸ For

2006) (describing owner addressing design issues with designer and owner addressing construction issues with contractor).

41. See Carter Burgess, *supra* note 39 (noting advantage of designer representing owner interests); see also Tieder & Ewald, *supra* note 40, at § 21.03 (describing benefit of outside designer's oversight of contractor's performance).

42. See Burgess, *supra* note 39 (highlighting third advantage of more certain final project acceptance by owner).

43. See Yakowenko, *supra* note 9, at 48 (identifying design-bid-build as traditional method and discussing emergence of design-build); see also Fed. Highway Admin., U.S. Dep't of Transp., Design-Build—Public Private Partnerships, <http://www.fhwa.dot.gov/ppp/db.htm> (last visited Feb. 1, 2006) [hereinafter FHWA Design-Build] (listing seven project delivery methods and corresponding private versus public responsibility). A second emerging project delivery method popular for building construction is construction manager-at-risk. See Yakowenko, *supra* note 9, at 48. Under this method, a construction manager runs the construction project for the owner and assumes the financial risks of cost increases. *Id.* Other project delivery methods in addition to design-build and design-bid-build include private contract fee services, build-operate-transfer, design-build-finance operate, and build-own-operate. See FHWA Design-Build, *supra*.

44. See The Comm. on Constr. Law, *supra* note 9, at 282 (commenting on historic roots of design-build); see also Lucas, *supra* note 38, at 9 (explaining emerging popularity of design-build in international commercial construction). Design-build dates back to 1800 B.C. and was popular in America until the creation of the Commissary General in 1775, emphasizing competition in government contracting. See The Comm. on Constr. Law, *supra* note 9, at 282. Design-build accounts for fifty percent of European commercial construction and seventy-five percent of Japanese commercial construction. See *id.*

45. See The Comm. on Constr. Law, *supra* note 9, at 283, 284 n.16 (citing sixteen state authorizing alternative methods including design-build).

46. See Jim Parsons, *Public Scrutiny: Public Agencies Cautiously Accept Design-Build Option*, MID-ATLANTIC CONSTRUCTION, Sept. 1, 2005, at 21 (prefacing design-build discussion in mid-Atlantic by contemplating method not novel in region). *But see Industry News*, NEW ENG. CONSTRUCTION, Nov. 27, 2006, at 26 (noting design-build most favorable to public owners in Northeast and Midwest).

47. See Parsons, *supra* note 46, at 21 (describing Delaware considering privatizing funding and construction of popular Route 1).

48. See Katherine S. Robertson, *Project Delivery: Design-Build Slowly Makes Inroads Amid Skepticism*, N.Y. CONSTRUCTION, Sept. 1, 2005, at 82 (reporting New York and New Jersey laws make design-build difficult); Ted Wendling, *ODOT Parks Fast-Track Bidding: Officials Cite Flaws with Design-Build*, PLAIN DEALER (Cleveland), July 15, 2002, at B1 (reporting Ohio Department of Transportation limited use of design-build).

example, New York has not approved design-build, and although Ohio has approved the method, it has curtailed its usage.⁴⁹

The federal government has taken the lead in authorizing design-build for federally funded federal and state projects.⁵⁰ For example, the Federal Highway Administration (FHWA) introduced a program in 1990 whereby states applying for federal money could use nontraditional contracting methods including design-build.⁵¹ In 1998, Congress passed legislation requiring the FHWA to develop regulations for the use of design-build in federally funded highway projects.⁵²

Under design-build, public owners identify the scope of their construction needs and pre-qualify three to five bidders through an open bidding process.⁵³ Owners then select the most advantageous proposal from the pool of pre-qualified bidders based on a number of factors beyond quoted price.⁵⁴ The unique contracting relationship allows construction to begin before completion of the entire design.⁵⁵ There are several subtle variations of the procedures between jurisdictions.⁵⁶ For example, some jurisdictions retain design consultants to complete a percentage of the design before the pre-qualification stage.⁵⁷ Other jurisdictions restrict the use of design-build based on a minimum

49. See HEISSE & SCHENCK, *supra* note 27, at NY-9 (summarizing New York law for public construction lacking design-build method); Wendling, *supra* note 48, at B1 (reporting Ohio lawmakers' skepticism of design-build cost saving ability and effectiveness on large projects). According to one author, there is no single correct delivery method, but New York should allow public owners to select the best method under the circumstances. See The Comm. on Constr. Law, *supra* note 9, at 274. New York laws require competitive bidding that is inconsistent with implementing design-build. See HEISSE & SCHENCK, *supra* note 27, at NY-9.

50. See Federal Acquisition Reform Act of 1996, Pub. L. No. 104-106, § 4105, 110 Stat. 186, 645-49 (codified as 110 U.S.C. § 2305a and 41 U.S.C. § 253m (2000)) (authorizing design-build for public buildings or works in public contracts and military contracts).

51. See Yakowenko, *supra* note 9, at 48 (describing 1990 Special Experimental Project No. 14 Innovative Contracting Practices program). The program allows states to use design-build so long as there is an open and competitive procurement process. *Id.*; see also Fed. Highway Admin., U.S. Dep't of Transp., Briefing on FHWA Innovative Contracting Practices, http://fhwa.dot.gov/programadmin/contracts/sep_a.cfm (last visited Apr. 7, 2007) (stating Special Experimental Project No. 14 remains available for using design-build).

52. See 23 U.S.C. § 112(b)(3) (2000) (codifying design-build provisions of Transportation Equity Act for 21st Century); see also HEISSE & SCHENCK, *supra* note 27, at 1-4 (describing federal government providing incentive to states to use design-build). Pursuant to this legislation, the FHWA promulgated regulations in 2002 for states wishing to use design-build procedures. See HEISSE & SCHENCK, *supra* note 27, at 1-4.

53. See Mark L. McAlphine, *Construction Law: Will Design-Build Contracting Really Solve All of the Problems?*, 76 MICH. B.J. 552, 552-53 (1997) (discussing two-step design-build process recommended by American Institute of Architecture).

54. *Id.* at 553 (disclosing second step of contractor selection and award process). Owners evaluate the bids by considering both the design quality and the overall construction cost. *Id.*

55. Wichern, *supra* note 24, at 37 (describing design-build fast-tracking process whereby planning, design, and construction occur simultaneously).

56. See *infra* notes 57-58 and accompanying text (explaining varying percent completion standards and minimum legislative dollar thresholds for using design-build).

57. See McAlphine, *supra* note 53, at 552-53 (debating thirty-five percent completion versus five percent completion); Yakowenko, *supra* note 9, at 48 (describing Utah's use of thirty percent design completion); see also FHWA Design-Build, *supra* note 43 (describing FHWA's ten to fifteen percent completion recommendation). Proponents of a five percent completion requirement argue that the thirty-five percent

or maximum project cost.⁵⁸

Common advantages of design-build include: creating a single point of contact, thus reducing litigation; encouraging design creativity; involving the contractor early in the process; and shortening project delivery through fast-track contracting.⁵⁹ Perhaps the most noteworthy design-build success was the \$1.5 billion reconstruction of Interstate 15 in Utah.⁶⁰ Because of the ingenuity of the design-build relationship, contractors finished the project early, in time for the 2002 Winter Olympic Games.⁶¹ Other successes include a \$490 million freeway project in California⁶² and a \$240 million Louisiana bridge project.⁶³

These advantages are counterbalanced by costly procurement processes, increased need for upfront owner input, decreased owner control, and increased construction risk.⁶⁴ The lack of control, and increased construction risk,

completion undermines the design-build model's flexibility. See McAlphine, *supra* note 53, at 553. By using the thirty percent completion requirement, the Utah Department of Transportation was able to avoid conflicts with utility and railroad right-of-ways prior to bidding and construction. See Yakowenko, *supra* note 9, at 48.

58. See Angelle Bergeron, *On Hold: South Central DOTs Take Wait-and-See Approach to Design-Build*, S. CENT. CONSTRUCTION, Sept. 1, 2005, at 22 (reporting jurisdictions restrict design-build to more expensive projects); see also HEISSE & SCHENCK, *supra* note 27, at OH-9 (citing Ohio \$1.5 million limit for design-build projects by county engineer); Yakowenko, *supra* note 9, at 48 (revealing \$5 million minimum for federally funded intelligent transportation projects and \$50 million minimum for others). In 2005, Congress enacted legislation that eliminated the minimum dollar amount for federal design-build projects. See Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy For Users or SAFETEA-LU, Pub. L. No. 109-59, 119 Stat. 1144 (codified as amended at 23 U.S.C. § 112 (2000)) (eliminating dollar threshold for design-build construction projects); Bergeron, *supra*, at 22 (discussing introduction of bill in 2005).

59. See Jeffrey B. Mullan, *Design-Build Delivery for Massachusetts Public Construction Projects*, 45 BOSTON B.J. 10, 23 (2001) (enumerating design-build advantages and promoting its use in Massachusetts); see also *Playskool, Inc. v. Elsa Benson, Inc.*, 497 N.E.2d 1199, 1205 (Ill. App. Ct. 1986) (holding design-build contractor unable to indemnify itself to subcontractor for construction defects); TIEDER & EWALD, *supra* note 40, at § 21.03 (explaining design-build facilitating fast-tracking allowing construction commencement before design completion); *Industry News*, *supra* note 46, at 26 (revealing survey indicating seventy-nine percent of public owners find lower costs through design-build). Design-build also benefits public owners in that it takes away *Spearin* liability. See Hunt & Darling, *supra* note 28, at 21. When the public owner contracts with a single entity for the design and construction, it must no longer warrant the design to the builder. See *id.* On the other hand, *Spearin* liability may still apply to a public owner using design-build if the owner makes significant changes to the design not contemplated in the original design. See *id.* at 21-22.

60. See Yakowenko, *supra* note 9, at 48 (explaining innovative design-build success on Utah roadway project).

61. See Yakowenko, *supra* note 9, at 48 (describing Utah's use of improved design criteria and settlement techniques unavailable under design-bid-build).

62. See *Design/Build Delivery for 22 Project*, CAL. CONSTRUCTION LINK, Sept. 1, 2005, at 16 (reporting success of twelve-mile freeway project in California). The design-build method will shave approximately three years off of the project timeline. See *id.* Design-build facilitated mid-stream adjustments when contractors found gas, sewer, and phone lines. *Id.* Additionally, contractors recovered thirty days lost during torrential rains. *Id.*

63. See Angelle Bergeron, *Proving Grounds: St. Francisville Bridge Provides Big-Dollar Test for Design-Build*, LA. CONTRACTOR, Sept. 1, 2005, at 33 (identifying potential benefits of design-build for Mississippi bridge project). Officials believe that contractors will finish the project by 2010, which is more than a year earlier than it would have taken under design-bid-build. *Id.* The procurement process took less time than the time ordinarily required to develop complete plans. *Id.*

64. See TIEDER & EWALD, *supra* note 40, at § 21.03(2) (theorizing increased construction risk because of

suggest that large and evolving construction projects are not appropriate for design-build.⁶⁵ For example, problems on a \$675 million railway project in Minnesota indicated that design-build may not have been appropriate.⁶⁶ Lack of sufficient project review may have contributed to costly change orders and increased lead-time.⁶⁷ Additionally, design-build has proven ineffective on the Hanford Nuclear Reservation project in Washington, where costs have risen from \$4.6 billion to \$12 billion and managers have pushed the completion date back from 2009 to 2019.⁶⁸ Likewise, design-build's insufficient oversight of large-scale projects may have caused the problems in Washington.⁶⁹ Finally, the method may reduce the number of potential bidders, which leads to less competitive proposals for the owner.⁷⁰

B. Massachusetts Construction Reform

*"Corruption is a way of life in the Commonwealth of Massachusetts."*⁷¹

Such was the sentiment of the Ward Commission following the investigation of improprieties in Massachusetts public construction during the 1960s and 1970s.⁷² The Commission estimated that out of \$17.1 billion spent on construction, state officials spent \$7.73 billion on projects that contained severe defects.⁷³ Overall, corruption cost Commonwealth taxpayers more than one

owner's greater need of confidence in design/build team); Mullan, *supra* note 59, at 24 (enumerating design-build's disadvantages).

65. See Robertson, *supra* note 48, at 82 (discussing New York's limitation of design-build to smaller scale projects). Increased construction risk may arise in complex projects under design-build because owners are more likely to provide definitive preliminary designs and plan and specification approvals. See Hunt & Darling, *supra* note 28, at 21. This owner involvement may trigger *Spearin* liability; therefore, owners should insert disclaimers as part of their contracts to avoid liability. *Id.* at 21-22.

66. See Mike Kaszuba & Laurie Blake, *Public-Works Projects Face Tortoise vs. Hare Debate; Design-build Gets Projects Done More Quickly, but Critics Say Haste Can Make Waste*, STAR TRIB. (Minneapolis), May 7, 2001, at 1A (describing conflicting opinions on design-build and its application to 2001 railway project).

67. See Kaszuba & Blake, *supra* note 66, at 1A (revealing \$2.9 million change order for structural changes without public review under design-build).

68. See Doug Most, *Megaproblems Think the Big Dig is a Mess? As Tom Carpenter of the Government Accountability Project Explains, the Nations Second Biggest Public Works Project is No Better*, BOSTON GLOBE (Magazine), Dec. 3, 2006, at 15 (outlining concern regarding midstream changes to design).

69. See Most, *supra* note 68, at 15 (recounting Government Accountability office representative's comments on project's flaws).

70. See David C. Walters, *Choosing Architect No Easy Task*, CHRISTIAN SCI. MONITOR, May 11, 1992, at 10 (reporting lack of responses for Chicago public library bid due to design-build's constraints). The city reduced the number of expected responses from 250 to 50 due to the complex bidding process. *Id.* While the city reported decreased competition, the selected firm completed the project on budget and on time. *Id.*

71. Scot Lehigh, *Ethics: Turning the Corner on a Crooked Road Ward Commission Pointed the Way*, BOSTON GLOBE, Jan. 21, 2001, at E1 (quoting Ward Commission).

72. *Id.* (reporting Ward commission findings of bribery and quid pro quo kickbacks for design contracts).

73. *Id.* (expanding upon Ward Commission findings). Other noteworthy findings included \$48.7 million squandered on projects never undertaken and routine awarding of design contracts in exchange for political

billion dollars during that period.⁷⁴ To address this problem, in the 1980s the Commonwealth created several new agencies and developed complex construction laws.⁷⁵ Further demonstrating Massachusetts's commitment to combating bidding improprieties, the Supreme Judicial Court has repeatedly reinforced open and honest procedures for public construction contracts.⁷⁶

Fallout from the Ward Commission's findings resulted in Massachusetts having "the most regulated public construction contracting process in the country."⁷⁷ For example, two separate sets of construction laws apply to public building construction and public works projects.⁷⁸ There are significant differences between the two.⁷⁹ Public building construction requires statewide certification from general contractors and owners must collect filed sub-bids on behalf of general contractors.⁸⁰ For public works projects, general contractors may contract independently with subcontractors and there is no required certification program.⁸¹ In addition, owners must follow a separate designer

contributions. *Id.*

74. See Jeff McLaughlin, *Public Works Bidding System Under Review: Critics Rap Procedures as Too Complex and Slow*, BOSTON GLOBE, Oct. 11, 1998, at 1 (discussing monetary effects of corruption according to Ward Commission).

75. See Lehigh, *supra* note 71, at E1 (describing legislative effects of Ward Commission). The Ward Commission authored a complex set of laws and created the Massachusetts Office of the Inspector General (Mass IG) to oversee public contracting issues. See *id.* The reforms helped clean up the Massachusetts public construction industry. See *id.* Others, however, suggest that Governor Dukakis had already ended the corruption during his first term. See *id.*

76. See *Annese Elec. Servs., Inc. v. City of Newton*, 730 N.E.2d 290, 294 (Mass. 2000) (noting purpose of competitive bidding to ensure lowest price through open and honest procedure); *Interstate Eng'g Corp. v. City of Fitchburg*, 329 N.E.2d 128, 132 (Mass. 1975) (promoting importance of subcontractors adhering to bidding laws regarding open and fair competition); *Bowditch v. Superintendent of Sts. of Boston*, 46 N.E. 1026, 1027 (Mass. 1897) (requiring advertised invitations for proposals for public works construction to protect taxpayers).

77. See McLaughlin, *supra* note 74, at 1 (citing Massachusetts textbook on construction law).

78. Compare MASS. GEN. LAWS ch. 149, § 44A (2004) (regulating procurement of contracts for public building projects), with MASS. GEN. LAWS ch. 30, § 39M (2004) (regulating procurement of contract for public works and low value building projects). See also MYERS & BUSCONI, *supra* note 12, at § 5-5(c) (describing when alternative bidding regulations apply).

79. See *infra* notes 80-83 and accompanying text (explaining difference between contracting for public works and public buildings).

80. See MASS. GEN. LAWS ch. 149, § 44F (2004) (mandating filed sub-bid procedures); MASS. GEN. LAWS ch. 149, § 44D (2004) (mandating general contractor prequalification). Within seventeen listed trades, the owner collects bids from subcontractors with estimates more than \$20,000. See § 44F. Owners then evaluate sub-bid proposals and send results to all potential general contractors who choose which sub-bid to include in their proposal. See § 44F(3); MYERS & BUSCONI, *supra* note 12, at § 5-5(e). General contractors wishing to bid on public building contracts must apply for certification through the Division of Capital Asset Management and Maintenance (DCAMM). See MASS. GEN. LAWS ch. 149, § 44D. DCAMM maintains a certificate of eligibility for all general contractors by surveying awarding authorities that have contracted with the general contractor. See MYERS & BUSCONI, *supra* note 12, at § 5-5(c).

81. See *Sciaba Constr. Corp. v. Mass. Turnpike Auth.*, 591 N.E.2d 190, 192-93 (Mass. 1992) (observing MHD pre-qualification proper for public works project); MYERS & BUSCONI, *supra* note 12, at § 5-6(a) (stating filed sub-bid laws not applicable to public works projects). While DCAMM does not pre-qualify public works bidders, contracting authority may implement a pre-qualification step before collecting bids. *Sciaba Constr. Corp.*, 591 N.E.2d at 192-93. Additionally, there is no pre-qualification maintained by DCAMM for public

selection statute for building projects.⁸² Neither set of regulations authorizes design-build as a project delivery method and both require contract awards to the lowest responsive bidder.⁸³

Cries for construction reform began in the late 1990s.⁸⁴ In 1999, a Pioneer Institute study concluded that Massachusetts wastes \$220 million because of antiquated public construction laws.⁸⁵ The institute proposed that Massachusetts should have more flexibility to use design-build on large projects.⁸⁶ The same year, Governor Paul Cellucci introduced an unsuccessful bill to ease the restrictions imposed under the Ward Commission.⁸⁷ Among other reforms, Cellucci's bill proposed authorizing design-build for the MHD and the Massachusetts Port Authority (Massport).⁸⁸ Then, in 2003, after the legislature rejected Governor Romney's proposal to eliminate filed sub-bids, legislators authorized a special commission to modernize construction laws that eventually led to construction reform.⁸⁹

In 2004, the Legislature passed Chapter 193, "An Act Furthering Regulating Public Construction" (the Act), creating Chapter 149A that authorized the use of design-build for public works projects with a total cost greater than \$5 million.⁹⁰ According to the Act, awarding authorities must apply to the

works projects. See MYERS & BUSCONI, *supra* note 12, at § 5-6(c). The Massachusetts Highway Department (MHD) and Metropolitan District Commission (MDC), however, require pre-qualification for projects greater than \$50,000. See *id.*

82. See MASS. GEN. LAWS ch. 7, § 38A1/2 (2004) (mandating scope of designer selection laws to public buildings without mentioning public works).

83. See MASS. GEN. LAWS ch. 30, § 39M (2004) (requiring award to lowest bidder); MASS. GEN. LAWS ch. 149, § 44A(2) (2004) (requiring award to lowest responsible eligible bidder); MYERS & BUSCONI, *supra* note 12, at 16-2(b)(1) (explaining why Massachusetts public construction contracting laws did not permit design-build).

84. See *infra* notes 85-88 and accompanying text (describing studies and state government initiatives criticizing Massachusetts public construction).

85. See Thomas C. Palmer, Jr., *Old Laws Blamed for Waste of \$220M*, BOSTON GLOBE, Sept. 15, 1999, at C16 (reporting institute's findings on survey). The study compared similar projects in four states and found that projects in Massachusetts waste seven percent of their costs and take fifty-five percent longer than the seventeen percent average in the other three states. *Id.*

86. *Id.* (criticizing design-bid-build and suggesting reform). The Institute also blamed waste on filed sub-bids laws and construction regulations that do not have designers and contractors working together from the start. *Id.*

87. See Bartolotta, *supra* note 10, at 5 (discussing Advisory Board's displeasure with bureaucratic obstacles in Massachusetts public construction).

88. See Bartolotta, *supra* note 10, at 5 (reporting components of Cellucci's bill). Other highlights included allowing the same designer to prepare the feasibility design and the final design for public building projects, and consolidating some of the public building and public works regulations. See *id.*

89. See Corwin & Corwin LLP, *Public Construction Reform*, CONST. L. COMMENTS, Fall 2004, at 1, available at <http://www.corwinlaw.com/newsletters/04/fall/newf04.html> (reporting the legislative process leading to construction reform). Governor Romney was reacting to a fiscal crisis but there was no evidence that eliminating filed sub-bids would reduce construction costs. *Id.* The Commission consisted of representatives from the legislature, awarding authorities, general contractors, subcontractors, and architects. *Id.*

90. See MASS. GEN. LAWS ch. 149a, § 14 (2004) (mandating \$5 million threshold for design-build project delivery method); MASS. GEN. LAWS ch. 149a, § 1 (2004) (allowing Construction Management at Risk delivery

Massachusetts Office of the Inspector General (Mass IG) each time they wish to use design-build.⁹¹ Upon approval, the Mass IG issues the awarding authority a notice to proceed.⁹² MHD, however, is exempt from the application process so long as its procedures are consistent with Chapter 149A.⁹³

While the legislature only recently passed design-build authorization, state officials have used the method several times with special legislative approval.⁹⁴ In 2000, MHD entered into a \$385 million design-build contract with Modern Continental to widen Route 3 between Burlington and the New Hampshire border.⁹⁵ The project would have normally taken ten years, but under design-build, the contract called for completion within four years.⁹⁶ Modern Continental, however, has only recently completed the project and the Commonwealth fined them over \$10,000 per day because of the delays.⁹⁷

method for public buildings but not public works); *see also* Busconi & O'Donnell, *supra* note 3 (describing passage of reform and effects of new laws within first year). *See generally* MASSACHUSETTS OFFICE OF THE INSPECTOR GENERAL, FREQUENTLY ASKED QUESTIONS REGARDING THE NEW PUBLIC CONSTRUCTION REFORM LAW (2005), available at <http://www.mass.gov/cam/Creform/CRLFAQS.pdf> [hereinafter MASS IG FAQ] (listing highlights of Chapter 193). Provisions other than alternative project delivery methods include: increased bidding thresholds; certification for filed sub-bidders; pre-qualification requirements for high threshold projects; and new affirmative market program requirements. *See* MASS IG FAQ at 1.

91. *See* MASS. GEN. LAWS ch. 149A, § 16 (2004) (proscribing application procedure for using design-build on public works project).

92. *See id.* (codifying application process for design-build notice to proceed); 945 MASS. CODE REGS. § 3.04 (2005) (formalizing application procedure to proceed using design-build). Considerations include: authorization from governing body; effective plan and procedures; plans ensuring fairness; value in excess of \$5 million; and stated reasons for using design-build. *See* 945 MASS. CODE REGS. CODE § 3.04 (2005); *see also* GREGORY W. SULLIVAN, OFFICE OF THE INSPECTOR GENERAL, PROCEDURES RELATIVE TO RECEIVING A NOTICE TO PROCEED TO USE DESIGN-BUILD SERVICES 9 (2005) [hereinafter MASS IG PROCEDURES], available at <http://www.mass.gov.ig/creform/dbappli.pdf> (setting forth evaluation process for design-build).

93. *See* MASS. GEN. LAWS ch. 149A, § 16(d) (2004) (classifying MHD as exempt agency). MHD must submit its procedures to Mass IG each year for approval; then it receives blanket approval to use design-build on any project. *See id.* Other exempt agencies include Massachusetts Port Authority (MassPort) and Massachusetts Water Resource Authority (MWRA). *See id.*

94. *See* Mullan, *supra* note 59, at 25 (reporting Commonwealth's use of design-build on courthouses, garages, and correctional facilities); *see also* Judith Forman, *Coalition Sees Need to Speed 128 Widening Officials Plan Forum to Boost 'Design-Build'*, BOSTON GLOBE, June 15, 2003, at 1 (reporting Massachusetts officials considering design-build on Route 128 lane expansion project).

95. *See* Paul Fournier, *Route 3 Nears Completion; Modern Continental Expects Entire Burlington-Nashua Link to be Open in November*, NEW ENGLAND CONSTR., Nov. 8, 2004, at 22 (reporting scope of Route 3 expansion project). Modern Continental was the same contractor responsible for the 2004 Big Dig slurry wall tunnel leaks. *See* Primack, *supra* note 7, at 57 (blaming Modern Continental for tunnel leaks); Scott Van Voorhis, *Tunnel Horror; Embattled Contractor; Collapse Yet Another Fiasco for Contractor*, BOSTON HERALD, July 12, 2006, at 5 (noting Modern Continental under scrutiny for 2006 tunnel collapse). The Route 3 project covers a 21-mile stretch and includes forty-seven bridges, a visitor center, and environmental improvements. *See* Fournier, *supra*, at 22. Modern Continental's other large-scale projects include an expansive high-rise office building, an upscale Cambridge restaurant, and a noteworthy farm in Natick. *See* Van Voorhis, *supra*, at 5.

96. *See* Fournier, *supra* note 95, at 22 (reporting agreed upon contract dates). Modern Continental received the notice to proceed from MHD in August 2000 and officials expected them to complete the project by Spring 2004. *See id.*

97. *See* Douglas Belkin, *Route 3 Bump Becoming a Grind*, BOSTON GLOBE, Oct. 16, 2005, at 3 (reporting

Several agencies have used design-build for non-highway construction projects including a commuter rail project by the Massachusetts Bay Transportation Authority (MBTA).⁹⁸

C. The Big Dig Experience

“[The Big Dig is] the largest and most complex urban infrastructure project ever undertaken in the modern world.”⁹⁹

The enormous scope of the Big Dig includes two sections of interstate highway with much of the construction underground or underwater.¹⁰⁰ The first part encompasses five miles of Interstate 93 flowing north and south under the city and includes a state-of-the-art bridge at the northernmost point.¹⁰¹ The second part includes a three-mile extension of Interstate 90 to Logan International Airport.¹⁰² Despite the enormity of the Big Dig, authorities managed to keep the Central Artery open while contractors demolished the existing elevated highway.¹⁰³

Local approval and federal funding of the Big Dig has a history typical of Boston politics.¹⁰⁴ Governor Dukakis and his administration first considered depressing the Central Artery in 1974.¹⁰⁵ When Dukakis lost the reelection in 1978, however, there was little support for the Big Dig until his reelection in 1982.¹⁰⁶ During Dukakis's second term, his staff convinced him to include both the Central Artery portion and the Logan Airport tunnel as a single project; the governor then forwarded the project to Washington for federal funding.¹⁰⁷ House Speaker O'Neil and Massachusetts Senator Kennedy were

project not complete after five years). Modern Continental was still repairing ramps to correct draining and curbing. *Id.* Modern Continental began paying \$10,450 in fines after missing the May 2004 completion date. See Christine McConville, *Widening Route 3 North*, BOSTON GLOBE, Jan. 2, 2005, at 10 (describing long awaited Route 3 expansion). As of January 2005, Modern Continental had accrued \$3.2 million in fines. *Id.*

98. See Mullan, *supra* note 59, at 10 n.1 (reporting legislative approval for MBTA's use of design-build on commuter rail extension in 2000).

99. See DAN MCNICHOL, THE BIG DIG 10 (Marjorie Palmer ed., 2001) (describing enormous scope of Big Dig). The Big Dig is a larger project than the Panama Canal or the Hoover Dam. *Id.*

100. *Id.* (explaining need to avoid subway lines, building foundations, and other challenging impediments).

101. *Id.* (describing new bridge as world's widest cable-stayed bridge). The bridge is a spotlight within the city skyline. *Id.*

102. *Id.* (explaining original design of Interstate 90 running to coastline in 1950s).

103. See *infra* note 125 and accompanying text (describing unique construction method allowing traffic to remain open during project).

104. See MCNICHOL, *supra* note 99, at 27-39 (describing “backdoor” local and federal politics leading to Big Dig's approval); Frank Micciche, *Black Hole*, NAT'L J. GOV'T EXECUTIVE, Apr. 2001, at 36 (analogizing Big Dig and old-school Boston politics).

105. See MCNICHOL, *supra* note 99, at 34 (explaining Dukakis's support of Central Artery project). When Massachusetts voters elected Dukakis as governor in 1974, he supported the vision of Frederick Salvucci, his Secretary of Transportation, to depress the Central Artery. *Id.*

106. See MCNICHOL, *supra* note 99, at 34-35 (explaining shift of project scope after Dukakis left office). From 1978 through 1982, Governor Edward J. King ignored the Central Artery plans and instead focused on adding a third harbor tunnel to the airport. *Id.*

107. See MCNICHOL, *supra* note 99, at 35-36 (describing inclusion of both project components). Salvucci

crucial in securing the federal funding in 1987.¹⁰⁸ Initially, federal funding supported up to ninety percent of the project costs.¹⁰⁹

In implementing the Big Dig, the MHD did not contract with a single entity, but instead entered into several different contracts.¹¹⁰ In 1985, nine highway officials unanimously selected Bechtel/Parsons Brinckerhoff (B/PB) to act as management consultant.¹¹¹ B/PB's duties included overseeing the construction, managing the designs, providing cost estimates, and developing budget forecasts.¹¹² The Commonwealth paid B/PB over two billion dollars over the twenty years B/PB acted as the project manager.¹¹³ Based on designs secured by B/PB, MHD used the traditional design-bid-build model and awarded a series of contracts for the different sections of the Big Dig.¹¹⁴

convinced Dukakis to include the harbor tunnel after a newspaper story revealed Salvucci's plan to include both parts of the project. *Id.*

108. See MCNICHOL, *supra* note 99, at 37-39 (indicating Reagan's opposition to Big Dig). President Reagan opposed the project and vetoed a transportation bill that included the Big Dig. *Id.* The House voted down the veto and Senator Kennedy helped secure the Senate's support thereby securing the federal funding. *Id.*

109. See Micciche, *supra* note 104, at 36 (reporting initial expansive federal funding). The federal government capped funding at \$8.5 billion, thereby funding approximately sixty percent of the project. *See id.* Federal funding is not always favorable for public works projects. *See* Alan Greenblatt, *A Smarter Dig*, GOVERNING MAG., Sept. 2006, at 19 (noting potential disadvantage of federal funding compared to local funding). The local, as opposed to federal, funding on a large Massachusetts Water Resources Authority project may have created more local oversight compared to the Big Dig, thus contributing to its successful and timely completion of the water project. *See* Greenblatt, *supra*, at 19.

110. See GREGORY W. SULLIVAN, MASS. OFFICE OF THE INSPECTOR GEN., A BIG DIG COST RECOVERY REFERRAL: POOR CONTRACT OVERSIGHT BY BECHTEL/PARSONS BRINCKERHOFF MAY HAVE LED TO COST INCREASES B-1 (2004) (providing example of thirteen separate Big Dig contracts); *see also infra* note 112 and accompanying text (describing contractual relationships between MHD and Bechtel/Parsons Brinckerhoff (B/PB)).

111. See MCNICHOL, *supra* note 99, at 42 (describing contract award to design firm). In 1985, B/PB was a large company, and by 2005, it employed 40,000 people and had revenues in excess of eighteen billion dollars. *See* Christopher Rowland, *Probes May Test Bechtel's Clout; Responsibility on Bolts at Issue*, BOSTON GLOBE, July 24, 2006, at A1. Slurry wall construction was a major project component and B/PB had extensive experience in this area. *See id.*; *see also infra* note 125 and accompanying text (describing slurry walls and ensuing problems).

112. William J. Angelo, *State Sues Consultant for Central Artery Role*, ENGINEERING NEWS-REC., Mar. 29, 2004, at 12 (describing broad role of design firm). MHD passed over their oversight of B/PB to the Massachusetts Turnpike Authority (MTA) in 1997. *Id.* B/PB was the initial designer, and also supervised and managed the final design firms. Thomas C. Palmer, *DeNucci Says Design Flaws Cost Big Dig \$19M Audit Says Soil Concerns Were Ignored*, BOSTON GLOBE, Feb. 6, 2000, at B2. By 2000, the MTA paid B/PB \$1.92 billion out of the \$2.15 billion spent on project management, which amounted to fifteen percent of the project's costs. *See* Primack, *supra* note 7, at 57. The industry standard for a billion-dollar project is eight to twelve percent of the project's costs. *See id.* Additionally, the MTA lacked the expertise to provide oversight of B/PB. *See id.* *But see Boston's CAT Project*, *supra* note 1, at 94 (reporting unique design-to-cost cost saving measure). Big Dig designers agreed to a construction cost before completing the final design. *See id.* This, and value engineering techniques, has saved \$878 million. *See id.*

113. Sean P. Murphy & Scott Allen, *Under Fire, Big Dig Firm Never Left Consortium Got \$8M After Ceiling Collapse*, BOSTON GLOBE, Oct. 26, 2006, at A1 (reporting B/PB's continuing role as consultant). Even after the tunnel collapse, the Commonwealth extended consulting contracts to B/PB. *See id.*

114. *See* SULLIVAN, *supra* note 110, at B-1 (describing examples thirteen Big Dig projects).

Big Dig supporters attributed project delays to several sources outside the control of the Massachusetts Turnpike Authority (MTA) and its contractors.¹¹⁵ Initially, project organizers expected the environmental approvals to take one year.¹¹⁶ Officials ultimately took more than seven years to obtain the necessary state and federal approvals.¹¹⁷ Additionally, officials had to appease community groups to get their backing.¹¹⁸ State and federal authorities had to reapprove the environmental plan each time the design changed, which furthered delayed the project timeline.¹¹⁹

The initial \$2.6 billion project has ballooned to over \$14.7 billion, making the Big Dig the subject of constant scrutiny and controversy.¹²⁰ Perhaps the most divisive cost increase occurred in 2000, when Big Dig officials unexpectedly announced a \$1.4 billion increase in the project.¹²¹ The surprise increase outraged the FHWA because hours before the announcement, Big Dig officials failed to disclose any budgetary issues in a financing report.¹²² As a

115. See Bayles, *supra* note 6, at 1A (justifying Big Dig delays outside fault of contractors).

116. See McNichol, *supra* note 99, at 43 (explaining expectation of initial environmental approval timeline). After officials received federal approval in 1987, they expected resolution of environmental and permit issues by 1988. See *id.*

117. See McNichol, *supra* note 99, at 43-45 (outlining two tiers of environmental approvals). First, state officials had to approve an Environmental Impact Report; next, federal officials had to approve an Environmental Impact Statement. *Id.* Officials began the environmental reports in 1983 and received final supplemental approval in 1991. See Mass. Turnpike Auth., Project Schedule and Timeline, <http://www.masspike.com/bigdig/updates/timeline.html> (last visited Apr. 9, 2007) [hereinafter Big Dig Timeline].

118. See Bayles, *supra* note 6, at 1A (providing example of compromise to Cambridge officials). Big Dig administrators had to redesign a bridge because of the city of Cambridge's opposition. See *id.* The redesign added three years to the project. See *id.*

119. See McNichol, *supra* note 99, at 45 (counting over 100 changes in project).

120. See Lewis, *supra* note 6, at A1 (reporting potential increase from \$14.625 billion to \$14.7 billion in 2005); Raphael Lewis, *Big Dig Overrun is Just Plain Big Perspective on Project Given by World Study*, BOSTON GLOBE, July 14, 2002, at B1 [hereinafter Lewis, *Big Dig Overrun*] (reporting historic overruns of Big Dig); see also Primack, *supra* note 7, at 57 (reporting Salvucci's 1982 estimate of \$2.6 billion); see also Sullivan, *supra* note 110, at 4 (providing sample of six Big Dig contracts over original contract value). The recent increase is due to tunnel leaks, non-collection from contractors for delays, and employing personnel beyond completion date. See Lewis, *Big Dig Overrun*, *supra*, at B1 (highlighting problems with project leading to increased cost). The 300 percent overruns exceed the thirty-four percent average for tunnel and bridge projects. *Id.* The former Massachusetts Secretary of Transportation reported that there was no reason to underestimate the initial project budget. See *id.* At the time, federal authorities tied funding to cost estimates, rather than actual costs, thus reducing the likelihood that project officials underestimated the project. See *id.* But see Angelo, *supra* note 112, at 12 (reporting B/PB's budget manager opining inflation accounts for \$6.6 billion of project increase); Primack, *supra* note 7, at 57 (reporting \$6 billion increase due to inflation and \$3 billion increase due to environmental requirements).

121. See Micciche, *supra* note 104, at 36 (reporting \$1.4 billion overrun). Included in the \$1.4 billion increase was \$915 million in unforeseen construction costs. *Id.* Representative Frank Wolf, chairman of a committee that oversees highway funding, commented that "[m]ost projects in the country don't cost \$1.4 billion, and this was just the increase." *Id.*

122. See Micciche, *supra* note 104, at 36 (reporting non-disclosure). Hours before disclosing the increase, the MTA filed a FHWA finance report without mentioning the increase. *Id.* Five months before MTA announced the increase, MTA Chairman criticized the federal Transportation Inspector General's report that forecasted higher project costs. *Id.* Ultimately, the MTA upped the \$1.4 million increase to \$3.2 million within

result, federal officials capped federal funding at \$8.5 billion, and the MTA replaced its commissioner.¹²³

In 2004, a major tunnel leak wreaked havoc on the Central Artery and its commuters.¹²⁴ Investigators found 102 breaches in the slurry wall panels and hundreds of roof-wall joint leaks.¹²⁵ Whether taxpayers will pay the \$17 million to repair the leaks is uncertain.¹²⁶ Mounting criticism questioned the close relationship between B/PB and the MTA and B/PB's lack of assumption of risk.¹²⁷ Additionally, the Mass IG has repeatedly questioned B/PB's contract management.¹²⁸ In fact, the Massachusetts Attorney General (Mass AG) took over the cost recovery process and is deciding whether to pursue legal claims against B/PB and other contractors.¹²⁹

one year. *See id.*

123. *See* Micciche, *supra* note 104, at 36 (outlining eleven-point agreement limiting federal contribution to \$8.54 billion and replacing MTA Chairman).

124. *See* Greenberger, *supra* note 8, at A1 (investigating outcome of September 2004 breach in tunnel wall causing massive water leak).

125. *See* Greenberger, *supra* note 8, at A1 (revealing uncertainty in extent of problem as more leaks discovered). Slurry wall construction involves creating an underground support before digging out the tunnel beneath the surface. *See* McNICHOL, *supra* note 99, at 106. The narrow construction of slurry walls was necessary to avoid disturbing buildings or traffic. *See id.* The Big Dig has the largest use of slurry wall construction in the world. *See id.* at 105. As of December 2005, contractors repaired 157 of the 188 slurry wall leaks. *See* Casey Ross, *Contractors Under Gun as Leaks Dog Dig Tunnel*, BOSTON HERALD, Dec. 8, 2005, at 018.

126. *Compare* Mass. Turnpike Auth., Big Progress and Challenges: June 2005 – A Brief History and Review of Pending Issues, http://www.masspike.com/bigdig/updates/progress_challenges.html (last visited January 4, 2006) [hereinafter MTA Big Dig Progress] (attributing responsibility of inspections and repairs to B/PB and contractors), *with* Greenberger, *supra* note 8, at A1 (considering taxpayers may partially pay for tunnel repair from September 2004 leaks). Finding the responsible party may be difficult because of the widespread nature of the defects. *See id.* (highlighting conflict over determining responsible party). To investigate responsibility, engineers working for former Massachusetts Attorney General Thomas F. Reilly installed sensors into the concrete tunnel to monitor the temperature and movement of the concrete. *See* Sean P. Murphy, *Big Dig Testing a Theory on Leaks*, BOSTON GLOBE, Feb. 28, 2006, at B4. Some engineers think the steel girders shrink in the cold allowing water into the tunnel. *See id.* The test results, however, are confidential between the Attorney General's office, B/PB, and the MTA. *See id.*

127. *See* Greenberger, *supra* note 8, at A1 (commenting on reasons for lack of oversight). According to officials, there should have been more checks and balances to prevent extensive change orders. *See id.* A judge commented on the relationship between B/PB and state officials saying, "they were all married to each other." Murphy, *supra* note 8, at 19. The state lacked leverage over B/PB because of the lack of management oversight. *See* Primack, *supra* note 7, at 57. B/PB was acting as owner without assuming ownership risks. *See id.*

128. *See* SULLIVAN, *supra* note 110, at 1 (referencing two Mass IG reports detailing B/PB mismanagement practices). The reports provided information to the MTA recommending it recover costs against B/PB. *See id.* The Mass IG concluded that if the Commonwealth had to pay cost overruns due to B/PB's inability to defend arising from its failure to document the claims, B/PB should be responsible. *See id.*

129. *See* Kimberly Atkins, *AG Eyes Big Dig Flaws; Still Deciding Whether to File Suit*, BOSTON HERALD, Nov. 15, 2005, at 7 (reporting Attorney General's office still considering whether to sue contractors over leaks and other mismanagement). Reilly suspended a \$150 million lawsuit filed in March 2004. *Id.* So far, the state has spent more than \$7 million on cost recovery and has only recovered \$4 million. *Id.* The 2004 lawsuit was for breach of contractual and fiduciary obligations for purposefully underestimating project costs. *See* Angelo, *supra* note 112, at 12 (discussing allegations regarding B/PB underestimating costs to increase incentive compensation for staying within budget). The Mass IG, however, reports that B/PB disclosed a \$14 billion

Just two years later, several three-ton slabs of concrete fell from the tunnel ceiling and crushed Milena Del Valle while she and her husband drove to the airport.¹³⁰ Subsequent inspections revealed substantial failures of the epoxy-secured bolts.¹³¹ In response, the Mass AG filed several civil lawsuits, including a negligence action, against B/PB, Modern Continental, and a project design team.¹³² Additionally, the Mass AG convened a grand jury to consider potential criminal charges, and the Del Valle family filed a wrongful death action.¹³³ Once again, critics cited a lack of project oversight by the Commonwealth.¹³⁴

III. ANALYSIS

A. Why Design-Build Would Not Have Worked

The intricacies of the Big Dig would have precluded design-build's effectiveness.¹³⁵ The dynamic environmental approvals and community input required midstream, flexible design changes.¹³⁶ A design-build firm could not properly hedge its bid with the uncertainty of these impending design changes.¹³⁷ The reduced competition would have resulted in a few large firms

estimate to MHD in 1994. *Id.* But see Brian McGrory, *Our Money is Their Money*, BOSTON GLOBE, Feb. 17, 2006, at B1 (claiming Mass AG's office given up on \$150 million lawsuits). The office is compromising by suing ten small Big Dig design consultants. *Id.*

130. See Jessica Fargen, *Tunnel Horror; Calamity Rocks Commonwealth (Time Line)*, BOSTON HERALD, July 16, 2006, at 6 (describing July 10, 2006 tragedy).

131. See Raja Mishra, *Watchdogs for State Projects Sought; Lawmakers Seek Increased Safety*, BOSTON GLOBE, Sept. 15, 2006, at B1 (describing results of initial investigation); see also Letter from Gregory W. Sullivan, Inspector Gen., Mass. Office of the Inspector Gen., to Representative Joseph F. Wagner, House Chairman, Joint Comm. on Transp. & Senator Steven A. Baddour, Senate Chairman, Joint Comm. on Transp. (Oct. 12, 2006) (on file with Mass IG) (noting lack of inspection procedure in connection with bolt-fastened ceilings). Investigations also revealed that the bolts had failed on occasion in early tests yet construction proceeded. See Mishra, *supra*, at B1.

132. *Industry News*, NEW ENG. CONSTRUCTION, Dec. 25, 2006, at 36 (identifying lawsuits filed by Massachusetts Attorney General Tom Reilly). The suit seeks \$150 million on behalf of the Commonwealth, the MTA, and the MHD. See *id.*

133. Jessica Fargen, *State Claims Negligence in \$ Suit v. Dig Bigwigs*, BOSTON HERALD, Nov. 27, 2006, at 2 (revealing scope of potential lawsuits stemming from tunnel collapse).

134. See Mishra, *supra* note 131, at B1 (discussing Massachusetts Senate's and Mass IG's proposal for independent inspector); see also S. 1847, 2007 Leg., 185th Sess. (Mass. 2007) (indicating current pending status of bill). The proposal would assign an independent inspector for construction projects greater than \$50 million. See Mishra, *supra* note 131, at B1. The inspector would have five years of experience and could not have any relation to the project's contractor. *Id.*

135. See *supra* notes 116-118 and accompanying text (describing broad environmental and community concerns leading to numerous changes); see also Robertson, *supra* note 48, at 82 (reporting design-build not appropriate for evolving projects).

136. See Yakowenko, *supra* note 9, at 48 (reporting extensive changes to Big Dig inevitable because of environmental, political, and community issues).

137. See Yakowenko, *supra* note 9, at 48 (noting difficulty of design-build bidders to bid on changing projects due to cost uncertainty); see also Mullan, *supra* note 59, at 25 (noting design-build inappropriate for

inflating their quotes to cover the risk of a substantial design change.¹³⁸

Even the thirty percent design completion method that was so successful in Utah would have been ineffective.¹³⁹ On occasion, Big Dig engineers completely reworked plans after they finished large portions of the designs.¹⁴⁰ For example, engineers dramatically changed the Fort Point Channel crossing design in the final design stage.¹⁴¹ If officials fast-tracked the Fort Point Channel crossing, either the contractor, or worse, the Commonwealth would have paid to correct the wasted construction.¹⁴² Alternatively, if officials waited for a completed design and utilized design-build, the Commonwealth would have paid a premium for shifting risks without realizing the cost savings associated with fast-tracking.¹⁴³

Had design-build been available, the Commonwealth could have paid the premium to obtain other design-build benefits aside from fast-tracking.¹⁴⁴ Authorities, however, lacked the expertise to monitor the quality of a large design-build project.¹⁴⁵ Under design-build, because the owner relies more on the contractor's quality control procedures, it is critical that the owner properly monitor the contractor.¹⁴⁶ Government officials did not have the appropriate staff or relationships to monitor their construction manager B/PB, nevermind monitoring the quality control procedures of dozens of design-build contractors.¹⁴⁷ Without appropriate oversight, there is no assurance that design-build would have prevented the 2004 tunnel leaks, the tragedy in 2006, or other

projects presenting unique permitting and regulatory issues).

138. See *supra* note 70 and accompanying text (explaining lack of design-build bid responses due to complex bidding process); see also Burgess, *supra* note 39, (identifying bid process as expensive for design-build teams); Parsons, *supra* note 46, at 21 (reporting many builders fear design-build's high-risk undertaking).

139. See *supra* notes 57 & 61 and accompanying text (explaining success of design-build on Utah highway project).

140. See *infra* note 141 and accompanying text (describing expensive late stage Fort Point Channel crossing design changes).

141. See MCNICHOL, *supra* note 99, at 174 (describing intricate design changes to Fort Point Channel crossing). Earlier tests failed to show the weakness of the soil. See *id.* As a result, the revised plan increased construction in the wet soil and decreased the work done in the dry soil. See *id.* at 175. The change in construction required new project designs and significantly increased costs. See *id.*

142. See TIEDER & EWALD, *supra* note 40, at § 21.03 (explaining how fast-tracking permits construction before completion of plans).

143. See FHWA Design Build, *supra* note 43 (explaining unattractiveness of fully designed plans because of inability to reduce cost and schedule).

144. See Mullan, *supra* note 59, at 23 (describing other design-build benefits aside from improving project schedule); TIEDER, *supra* note 40, at § 21.03 (explaining design-build advantages).

145. See *infra* notes 146-147 and accompanying text (explaining awarding authority's inability to oversee B/PB and its importance on design-build project quality).

146. See Wichern, *supra* note 24, at 43-44 (describing design-build as limiting quality control practices of owners). Public owners are unable to implement the same quality control procedures compared to those under design-bid-build. See *id.*

147. See Primack, *supra* note 7, at 57 (reporting Commonwealth did not hire in-house staff with expertise to oversee project); *supra* note 127 and accompanying text (discussing lack of oversight by Commonwealth of B/PB).

construction issues.¹⁴⁸

Even if the Commonwealth hired appropriate staff to monitor the design-build contractors, the State's corruptive past suggests that design-build on the Big Dig would have been against Massachusetts public policy.¹⁴⁹ Design-build allows awarding authorities to award final contracts based on factors well beyond price.¹⁵⁰ The Ward Commission corrected the backhanded awarding of design contracts and the use of substandard construction practices.¹⁵¹ The public assurance in stymieing corruption afforded by design-bid-build's low bid award outweighs the possible design-build benefits on the Big Dig.¹⁵² For example, the use of design-build has enabled the MHD to award a contract on the Route 3 expansion to a questionable contractor—one that is in financial difficulty and that was largely responsible for the 2004 Big Dig tunnel leaks.¹⁵³ Such liberal procurement practices, if used on the Big Dig, may have been even more disastrous for the Commonwealth.¹⁵⁴

B. What Would Have Helped

The best solution for the Big Dig involved shifting risk from government officials to B/PB, thereby providing better oversight of B/PB.¹⁵⁵ B/PB's contract should have been more like the "construction manager at risk" arrangement whereby construction managers assume financial risk beyond a

148. See *supra* note 8 and accompanying text (discussing 2004 Big Dig tunnel leaks and controversy surrounding tunnel safety); see also Most, *supra* note 68, at 15 (noting consequences of lack of oversight of B/PB at Hanford Nuclear Reservation under design-build model). The Department of Energy did not properly oversee B/PB; allowing them to reschedule inspections, not report problems, and hide major failures. See Most, *supra* note 68, at 15.

149. See *supra* notes 71-72 (discussing history of corruption in Massachusetts public construction procurement). The decreased competition in using design-build, coupled with design-build's method of awarding contracts on factors unrelated to price, are diametric to Massachusetts's commitment to open and honest procurement. See *supra* note 70 and accompanying text (reporting decreased competition with design-build); *supra* note 76 and accompanying text (citing Massachusetts's procurement policy).

150. See FHWA Design-Build, *supra* note 43 (describing design-build procurement based on best value). There is no set formula defining best value, but awarding authorities merely combine technical factors and qualifications with price. See *id.*

151. See *supra* notes 71-75 and accompanying text (describing Ward Commission findings including exchange of design contracts for campaign contributions).

152. See *supra* note 35 and accompanying text (explaining design-bid-build's reduction of collusion or favoritism); see also *supra* notes 65-70 and accompanying text (reporting poor results from design-build).

153. See *supra* note 95 and accompanying text (identifying Modern Continental as Route 3 design-build contractor and Big Tunnel contractor); see also Van Voorhis, *supra* note 95, at 5 (noting Modern Continental's financial demise).

154. See *supra* notes 127-128 and accompanying text (detailing mismanagement of Big Dig construction by B/PB); *supra* note 64 and accompanying text (noting decreased owner control and greater reliance on design-build contractor in design-build construction); *supra* note 70 and accompanying text (highlighting problems of reduced competition in bidding for design-build contracts).

155. See *supra* note 127 and accompanying text (blaming Big Dig problems on Commonwealth's lack of oversight and B/PB's lack of risk assumption).

quoted price.¹⁵⁶ Instead, officials contracted with B/PB based upon a percentage of the total project costs.¹⁵⁷ For example, B/PB hastily blamed Modern Continental for the 2004 tunnel leaks without readily assuming any responsibility.¹⁵⁸ Further, B/PB defended its work in the aftermath of the tunnel collapse, claiming that the Commonwealth was responsible for the final approval of the design that may have led to Del Valle's death.¹⁵⁹ A contract that shifted more risk to B/PB may have averted the so far unsuccessful cost recovery efforts associated with the tunnel collapse, the 2004 leaks, and the subsequent pending litigation.¹⁶⁰

Project oversight was particularly important because of B/PB's potentially conflicting roles.¹⁶¹ B/PB performed the initial design and oversaw the final designers.¹⁶² For example, on the Fort Point Channel Crossing, B/PB developed the initial plan and then oversaw Maguire/Harris's final design.¹⁶³ After Maguire/Harris pointed out B/PB's design flaws, B/PB defended its own design for one full year.¹⁶⁴ While B/PB cited inflation as the primary source of cost issues beyond its control, the Commonwealth realized one year of inflation on this large and expensive part of the project.¹⁶⁵ Big Dig officials needed a staff capable of recognizing the project delays and monitoring B/PB.¹⁶⁶ The legislature should consider the Massachusetts Senate and Mass IG bill requiring an independent inspector for projects over \$50 million.¹⁶⁷ This way, the inspector can inform the Commonwealth regarding critical engineering

156. See *supra* note 43 and accompanying text (explaining construction managers' risk). Construction-manager-at-risk is, however, unavailable to public works projects similar to the Big Dig because it is only available in building construction. See MASS. GEN. LAWS ch. 149A, § 1 (2004) (allowing construction management-at-risk method for public building but not public works).

157. See *supra* note 112 and accompanying text (outlining high percentage of project costs as basis of B/PB's contract).

158. See Primack, *supra* note 7, at 57 (noting B/PB did not accept blame for approving Modern Continental's defective construction). The Mass IG wrote a letter to the MTA stating that "[t]he leak problem would not have occurred if [B/PB] had simply made the construction contractors perform according to the specification in their contracts." *Id.*

159. See Rowland, *supra* note 111, at A1 (reporting B/PB's denial of responsibility in aftermath of tunnel collapse).

160. See *supra* note 129 and accompanying text (reporting unsuccessful cost recovery efforts and AG's litigation options to recover costs).

161. See Palmer, *supra* note 112, at B2 (criticizing B/PB's dual roles).

162. See Palmer, *supra* note 112, at B2 (reporting managing and designer among B/PB's multiple roles).

163. See Palmer, *supra* note 112, at B2 (disclosing B/PB's role in Fort Point Channel Crossing design).

164. See Palmer, *supra* note 112, at B2 (reporting state auditor's conclusion regarding B/PB's defense of Fort Point initial design).

165. See *supra* note 120 (exposing B/PB's management opinion attributing bulk of Big Dig project increases to inflation).

166. See Primack, *supra* note 7, at 57 (describing need for group of highly skilled workers to oversee B/PB).

167. See *supra* note 134 (describing status and components of bill proposing independent project inspector).

decisions and facilitate cost recovery.¹⁶⁸

C. How to Make Design-Build Work in Massachusetts for Other Projects

Aside from the Big Dig, if the Commonwealth is truly interested in making design-build successful on other projects, awarding authorities need to be comfortable with the method.¹⁶⁹ Generally, design-build cannot be effective unless owners use it more than occasionally.¹⁷⁰ Authorities, however, had not elected to use design-build a single time in the year following construction reform.¹⁷¹ Therefore, Massachusetts legislators should promote its use by lowering the design-build dollar threshold from the \$5 million minimum.¹⁷²

The federal government eliminated its \$5 million threshold for design-build projects and the Commonwealth should do the same.¹⁷³ The Commonwealth has smaller and less expensive projects compared to the federal government.¹⁷⁴ Current legislation precludes the Commonwealth agencies and departments from experimenting with design-build on small projects.¹⁷⁵ Further, the argument that smaller companies would be unable to participate is not persuasive.¹⁷⁶ They could contract in ways other than serving as prime contractors.¹⁷⁷ For example, smaller contractors could act as subcontractors or partner with other small or large contractors.¹⁷⁸

Additionally, the Mass IG could promote design-build by providing

168. See Mishra, *supra* note 131, at B1 (noting duties of independent inspector). Transportation officials would be responsible for selecting the inspectors. *Id.*

169. See Robertson, *supra* note 48, at 82 (quoting director of government affairs at Design-Build Institute of America regarding design-build's effectiveness). The director of government affairs said, "once you get over the status quo and people start doing it, they find design-build works for all types of projects." *Id.*

170. See Parsons, *supra* note 46, at 21 (describing design-build's ineffectiveness if used part-time).

171. See Busconi & O'Donnell, *supra* note 3 (reporting Mass IG issued zero notices to proceed one year after legislation). Additionally, the Mass IG only issued one "construction manager at risk" notice to proceed. *See id.*

172. See Busconi & O'Donnell, *supra* note 3 (suggesting minimum threshold may discourage use of design-build); *see also supra* note 90 (summarizing \$5 million minimum for design-build projects).

173. See *supra* note 58 and accompanying text (reviewing various jurisdictional thresholds and congressional Act eliminating federal minimum threshold).

174. See Busconi & O'Donnell, *supra* note 3 (noting some local officials' project smaller in scope than \$5 million).

175. See Busconi & O'Donnell, *supra* note 3 (reasoning local official not using design-build because of \$5 million requirement).

176. See Parsons, *supra* note 46, at 21 (noting opposition to design-build's high cost of bidding serving as barrier to small contractors). Additionally, some argue past performance as selection criteria used in design-build does not allow young, small companies to participate. *See id.* at 21. *But see* Bergeron, *supra* note 58, at 33 (noting smaller contractors favor design-build because of increased early involvement).

177. See Parsons, *supra* note 46, at 21 (noting alternative contract opportunities for small contractors under design-build).

178. See Bergeron, *supra* note 58, at 22 (countering big versus small contractor argument on design-build). Smaller contractors may join with larger contractors or serve as subcontractors on design-build contracts. *Id.* The only change may be the mechanism by which awarding authorities distribute the work. *See* Parsons, *supra* note 46, at 21.

examples of sound design-build business practices.¹⁷⁹ As it stands, the Mass IG Design-Build application for a notice to proceed merely requests components of the awarding authority's plan and provides a general evaluation process overview.¹⁸⁰ For example, the application states that awarding authorities should address their plan to control risk.¹⁸¹ The Mass IG does not, however, indicate any proper way of controlling risks.¹⁸² In addition to providing initial suggestions, as more agencies use design-build, the Mass IG should post their approved guidelines.¹⁸³ These steps will improve the likelihood of design-build's popularity thereby increasing its successful implementation.¹⁸⁴

IV. CONCLUSION

While design-build is well past an experimental project delivery method, it is not appropriate for all construction projects. Boston's massive Big Dig project included vast design and plan changes. These last minute changes would have abrogated the fast-tracking benefit gained under design-build. While the Commonwealth could have paid more for other design-build benefits, those benefits balanced against potential cost increases and public policy concerns suggest that design-build was not the answer on the Big Dig.

Instead, the Commonwealth should have shifted more risk to B/PB. B/PB was able to operate independently, but lacked motivation and supervision to monitor the Big Dig properly. The Commonwealth should have had better agency oversight of B/PB and would have benefited from an independent project inspector.

The Commonwealth could, however, increase the success of future design-build projects by increasing its current usage. The Commonwealth should lower the minimum design-build threshold and the Mass IG should provide more substantive guidance for design-build procedures. Perhaps one day, once the Commonwealth successfully implements design-build on smaller projects, it could be expanded to large projects similar to the Big Dig. For now, Boston Commuter will have to wait in the tunnel like everyone else.

Jason H. Peterson

179. See Mullan, *supra* note 59, at 25-26 (suggesting agencies adapt specific standards and provide examples of design-build application).

180. See *supra* note 92 and accompanying text (providing several Mass IG approval criteria).

181. See MASS IG PROCEDURES, *supra* note 92, at 6 (listing six components of application demonstrating awarding authority's plan regarding expertise and ability). The applicant must demonstrate the awarding authority's ability to control risks such as design risks, warranties, and guarantees. See *id.*

182. See MASS IG PROCEDURES, *supra* note 92, at 7 (outlining Mass IG evaluation criteria). The application criteria lack any mention of how awarding authorities may control risk under design-build. See *id.*

183. See Mullan, *supra* note 59, at 25-26 (recommending agencies provide examples where particular project elements have been used).

184. See Mullan, *supra* note 59, at 25-26 (proposing Massachusetts improve design-build procurement by setting specific standards, educating public, and encouraging enrollment).