

GEORGIA DOT RESEARCH PROJECT NO. 16-17

FINAL REPORT

**SYNTHESIS OF THE PROJECT LEADERSHIP
STAFFING NEEDS FOR SUCCESSFUL
DEVELOPMENT OF ALTERNATIVE DELIVERY
PROGRAMS**



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1. FHWA-GA-17-1617		2. Government Accession No.:		3. Recipient's Catalog No.:	
4. Title and Subtitle: Synthesis of the Project Leadership Staffing Needs for Successful Development of Alternative Delivery Programs			5. Report Date: August 2017		
			6. Performing Organization Code:		
7. Author(s): Baabak Ashuri, Ph. D., DBIA, CCP, DRMP Shiva Bahrami			8. Performing Organ. Report No.:		
9. Performing Organization Name and Address: Economics of the Sustainable Built Environment (ESBE) Lab Georgia Institute of Technology 280 Ferst Drive, Atlanta, GA 30332-0680			10. Work Unit No.:		
			11. Contract or Grant No.:		
12. Sponsoring Agency Name and Address: Georgia Department of Transportation, Office of Research 15 Kennedy Drive, Forest Park, Georgia 30297-2599			13. Type of Report and Period Covered: Final; May 2016 – August 2017		
			14. Sponsoring Agency Code:		
15. Supplementary Notes:					
16. Abstract: This research provides a synthesis of practices in organizational structuring and professional staffing of the innovative delivery units in several state DOTs across the nation that are actively utilizing alternative project delivery. Several major challenges and barriers faced by innovative project delivery units to fulfill project leadership staffing needs are identified. Various approaches that state DOTs have utilized to respond to their staffing and organizational needs are identified. Differences in organizational structuring and professional staffing for innovative project delivery programs are described in: (1) Models of office of innovative delivery; (2) Main roles and responsibilities of the headquarters (HQ) office of innovative delivery; (3) Involvement of district offices in delivery of design-build projects; (4) Training and staffing strategies and preferred skillsets; and (5) Utilizing consulting firms to assist the owner.					
17. Key Words: Innovative project delivery, Design-build, Public-private partnership (P3), Staffing, Leadership, Organizational structure, Staffing, Owner's consultants, Program management consulting firm, and General engineering consultants			18. Distribution Statement:		
19. Security Classification (of this report): Unclassified	20. Security Classification (of this page): Unclassified	21. Number of Pages: 221	22. Price:		

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Contract with

Georgia Department of Transportation

In cooperation with

U.S. Department of Transportation

Federal Highway Administration

August 2017

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EXECUTIVE SUMMARY

Attracting and retaining talented staff has always been a challenge for state DOTs. When it comes to innovative project delivery, the problem becomes more apparent as a unique set of project management skills (e.g., leadership, technical, managerial, financial, and procurement) are required to perform design–build services. These skills often require project-related experience in alternative project delivery (e.g., conceptual estimating, design management, financial analysis, team building, and quality assurance for design–build).

Considering the evolving nature of innovative delivery methods, state DOTs are challenged with keeping up with changes in the required workforces and skillsets for design–build programs. State DOTs need to understand the new roles and positions that the office of innovative delivery introduces, such as conceptual estimator or quality assurance for the design–build project. It is also necessary to identify best practices in procurement of consulting resources (e.g., types of programmatic agreements used by state DOTs as a means to deal with increased workload). Evaluating the best practices with respect to staff education and training for design–build roles and responsibilities can be helpful to strengthen the design–build workforce inside the state DOT.

The overarching objective of this research project is to provide a synthesis of practices in organizational structuring and professional staffing of the innovative delivery units in

several state DOTs across the nation that are actively utilizing alternative project delivery.

The specific research objectives are the following:

1. Identify and analyze the latest developments and trends in project leadership staffing needs for innovative delivery programs among state DOTs across the nation
2. Identify and analyze major challenges and barriers faced by innovative project delivery units to fulfill project leadership staffing needs
3. Identify and analyze the organizational structure of innovative project delivery units in state DOTs with an active design–build program
4. Identify and analyze the skillsets, experience, and professional backgrounds of the PMs (Project Managers) in the innovative delivery units
5. Identify the list of expertise and key professional leadership staffing requirements for various project delivery responsibilities throughout the project lifecycle
6. Identify and analyze the organizational structure and role of district offices in accomplishing various project delivery tasks and responsibilities
7. Identify and analyze state DOTs' preferred model for innovative project delivery (e.g., outsourcing to consultants, relying on in-house resources, sharing resources with the other involved offices, or a combination of those approaches)
8. Identify best practices in workplace training, knowledge retention and sharing, and knowledge management utilized by the innovative delivery units

To achieve the objective, the researchers took several steps:

1. Create the survey questions and identify the main research areas
2. Refine the survey questions through conducting a dry-run interview with selected subject-matter experts to ensure that the questions are clearly crafted and the anticipated responses reflected the intent of the research
3. Determine the areas to prepare questions for follow-up interviews and conduct structured interviews with agencies that best responded to the survey questions
4. Collect documents from state DOTs following the interviews (e.g., design-build manual, organizational charts of innovative delivery offices, master contracts and related task orders with the owner's consulting firm, task orders, etc.)
5. Analyze the content of the documents in several areas of particular interest, such as different practices in using consultant firms, contract type, task orders, etc.
6. Summarize and present in the research report the findings of all the information collected through survey, structured interviews, and content analysis

Several challenges for organizational structuring and professional staffing of design-build programs are identified by State DOTs' subject matter experts who were surveyed by email and interviewed by phone as the following:

1. Growing needs to deliver more projects, especially more complex projects and megaprojects, using innovative project delivery

2. Sudden need for staffing growth in the innovative delivery program
3. Limited internal expertise in innovative project delivery, especially in the early stage of adoption
4. Limited resources to learn best practices from other State DOTs and the design-build industry
5. Succession planning for the State DOT's subject matter experts in innovative delivery
6. Justification for hiring fulltime staff for alternative delivery program
7. High turnover rate among State DOT innovative delivery subject matter experts
8. Substantially greater staffing needs for megaprojects that often require a dedicated program in the State DOT
9. Required non-traditional skillset for the Innovative Delivery staff
10. Difficulty in attracting internal State DOT staff to join the innovative delivery project management team
11. Establishing a collaborative environment with district offices
12. Identification of the appropriate model to utilize consultants
13. Limited financial capacity to afford expensive rates of some consulting firms

14. Consistency in the management, procurement, and oversight of design-build projects
15. Issues related to the procurement of owner's consultants to help the State DOT in the innovative delivery program
16. Familiarity of consulting firms with the State DOT's approach for project development
17. Establishing a collaborative environment with other offices
18. Conflict of Interest (COI) for owner's consultants
19. Concerns of the State Engineering Consultant Industry
20. Concerns of the Professional Engineers in the State Government
21. Issues germane to disadvantaged business enterprises (DBEs)
22. Development of a proper performance measurement system to keep track of the performance of owner's consultant

There are differences among state DOTs on how to respond to the challenges of professional staffing for innovative delivery programs. Identified strategies to enhance professional staffing of innovative delivery programs are presented in the following areas:

1. Models of office of innovative delivery

2. Main roles and responsibilities of the headquarters (HQ) office of innovative delivery
3. Involvement of district offices in delivery of design-build projects
4. Training and staffing strategies and preferred skillsets
5. Utilizing consulting firms to assist the owner

ACKNOWLEDGMENTS

The research reported herein was sponsored by the Georgia Department of Transportation through Research Project Number 16-17. The authors acknowledge and appreciate the help of Mr. Darryl VanMeter, GDOT Assistant P3 Division Director/State Innovative Delivery Administrator, and Ms. Supriya Kamatkar from the GDOT Office of Research.

CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

Since the introduction of the special experimental project 14 (SEP-14) in 1990, the Federal Highway Administration (FHWA) has encouraged state departments of transportation (DOTs) to utilize alternative approaches, such as design–build (DB), for delivery of highway projects (FHWA 2015). State transportation agencies (STAs) across the country continue to face several challenges to repair and enhance roadway infrastructure. One of these challenges is the selection of agency staff and other workforce needs (NCHRP, Synthesis 450).

Several state DOTs have dedicated units or offices for delivery of design–build projects. State DOTs throughout the United States are increasingly utilizing design–build to deliver a significant portion of their annual construction budgets. For instance, Georgia DOT (GDOT) has awarded 22 design–build projects worth over \$1.1 billion since 2008 (GDOT 2015). In 2012, the Georgia legislature approved an increase in the level of using design–build for transportation projects by raising the cap to 50% (in dollars) of the total amount of construction projects awarded in the previous fiscal year and provided the flexibility for GDOT to utilize the best-value selection for procurement of design–build projects. As the use of design–build is growing throughout the United States, competent project managers

(PMs) are required to continue the success and expand the design–build and alternative delivery program.

Attracting and retaining talented staff has always been a challenge for state DOTs. When it comes to innovative project delivery, the problem becomes more apparent as a unique set of project management skills (e.g., leadership, technical, managerial, financial, and procurement) are required to perform design–build services. These skills often require project-related experience in alternative project delivery (e.g., conceptual estimating, design management, financial analysis, team building, and quality assurance for design–build) that may be difficult to find in graduates of most engineering and project management schools around the nation (Gransberg and Molenaar 2008). Additionally, between 2000 and 2010 the total lane-miles in the systems managed by state transportation agencies increased by an average of 4.1%, whereas the in-house STA personnel available to manage these systems decreased by an average of 9.78% over the same time period (NCHRP Synthesis 450, Forecasting Highway Construction Staffing Requirements-Summary Section). Approximately 86.1% of respondents to the survey in the NCHRP study noted that by any measure STAs are doing more work with fewer agency employees than they were 10 years ago. Some of these agency employees have been replaced with consultant personnel (NCHRP Synthesis 450, Forecasting Highway Construction Staffing Requirements- Summary Section).

These statistics indicate that the allocation of human resources is critical in maintaining and improving the nation's roadway infrastructure system. This is especially true for agency employees in the area of construction because those projects represent a significant portion of a transportation agency's total budget. Adequate construction staffing is critical to the cost, schedule, quality, and safety performance of highway construction projects. However, the variable nature of construction project volume, type, and location can make estimating staffing requirements for both the short and long term difficult (NCHRP, Synthesis 450).

Considering the evolving nature of innovative delivery methods, state DOTs are challenged with keeping up with changes in the required workforces and skillsets for design-build programs. State DOTs need to understand the new roles and positions that the office of innovative delivery introduces, such as conceptual estimator or quality assurance for the design-build project. The dynamics of change should be studied to clarify how design-build roles differ from conventional roles and responsibilities (Warne 2003). The role of consultants and outsourcing in design-build project delivery should be clearly identified. It is also necessary to identify best practices in procurement of consulting resources (e.g., types of programmatic agreements used by state DOTs as a means to deal with increased workload). Some state DOTs distinguish between the roles of design-build consultants who perform program management services and those who provide general engineering

services. Understanding this difference and characterizing the main functions that owner's consultants perform for the state DOT are among the main objectives of this study.

One area of great interest is how DOTs make the decision to outsource. There are occasions "when either the legislative or executive branches of state government mandate outsourcing directly, although more commonly they act to limit or reduce the number of state employees, resulting in a de facto mandate to outsource" (Warne 2013). In most cases, the decision to outsource is unique to the state DOT and the specific activity. Substantial variations occur among the states and the activities outsourced when it comes to procuring different services. The type of contractor, method of procurement, and payment basis are all functions of the unique characteristics of the outsourced activity (NCHRP 313).

The NCHRP Synthesis 246 study (1997) found that reasons for outsourcing were most frequently related to either increased workloads or decreased staffing levels. Much variation was also found among states in areas such as outsourcing procedures, pre-award and prequalification processes, use of alternative bids, and value engineering. The most common benefits cited by respondents about the utilization of consulting firms were the ability to supplement in-house staffing levels in meeting workloads and schedules, the ability to use specialized skills or equipment available in the private sector, and cost savings (Witthford 1997). However, the use of consulting firms has not been without challenges. Therefore, in this study, the researchers investigate the main issues related to the effective use of owner's consultants in providing services to the design-build program.

Evaluating the best practices with respect to staff education and training for design–build roles and responsibilities can be helpful to strengthen the design–build workforce inside the state DOT. It is necessary to implement an appropriate training program for the DOT to prepare the office of innovative delivery workforce for design–build dynamics and a new set of roles and responsibilities. Training should include not only contracting agency personnel but also consulting engineers and construction contractors who will perform various tasks for the state DOT in design–build and public–private partnership (P3) projects.

The overarching objective of this research project is to provide a synthesis of practices in organizational structuring and professional staffing of the innovative delivery units in several state DOTs across the nation that are actively utilizing alternative project delivery.

The specific research objectives are the following:

1. Identify and analyze the latest developments and trends in project leadership staffing needs for innovative delivery programs among state DOTs across the nation
2. Identify and analyze major challenges and barriers faced by innovative project delivery units to fulfill project leadership staffing needs
3. Identify and analyze the organizational structure of innovative project delivery units in state DOTs with an active design–build program

4. Identify and analyze the skillsets, experience, and professional backgrounds of the PMs in the innovative delivery units
5. Identify the list of expertise and key professional leadership staffing requirements for various project delivery responsibilities throughout the project lifecycle
6. Identify and analyze the organizational structure and role of district offices in accomplishing various project delivery tasks and responsibilities
7. Identify and analyze state DOTs' preferred model for innovative project delivery (e.g., outsourcing to consultants, relying on in-house resources, sharing resources with the other involved offices, or a combination of those approaches)
8. Identify best practices in workplace training, knowledge retention and sharing, and knowledge management utilized by the innovative delivery units

CHAPTER 2

RESEARCH METHODOLOGY

2.1. Overview

Because of the nature of this topic, the researchers used a combination of methods. An overview of the research methodology is presented in Figure 2-1. The principal objective of this research is to synthesize variations among state DOTs in professional staffing of alternative delivery programs. To achieve the objective, the researchers took several steps:

1. Create the survey questions and identify the main research areas
2. Refine the survey questions through conducting a dry-run interview with selected subject-matter experts to ensure that the questions are clearly crafted and the anticipated responses reflected the intent of the research
3. Determine the areas to prepare questions for follow-up interviews and conduct structured interviews with agencies that best responded to the survey questions
4. Collect documents from state DOTs following the interviews (e.g., design-build manual, organizational charts of innovative delivery offices, master contracts and related task orders with the owner's consulting firm, task orders, etc.)
5. Analyze the content of the documents in several areas of particular interest, such as different practices in using consultant firms, contract type, task orders, etc.
6. Summarize and present in the research report the findings of all the information collected through survey, structured interviews, and content analysis

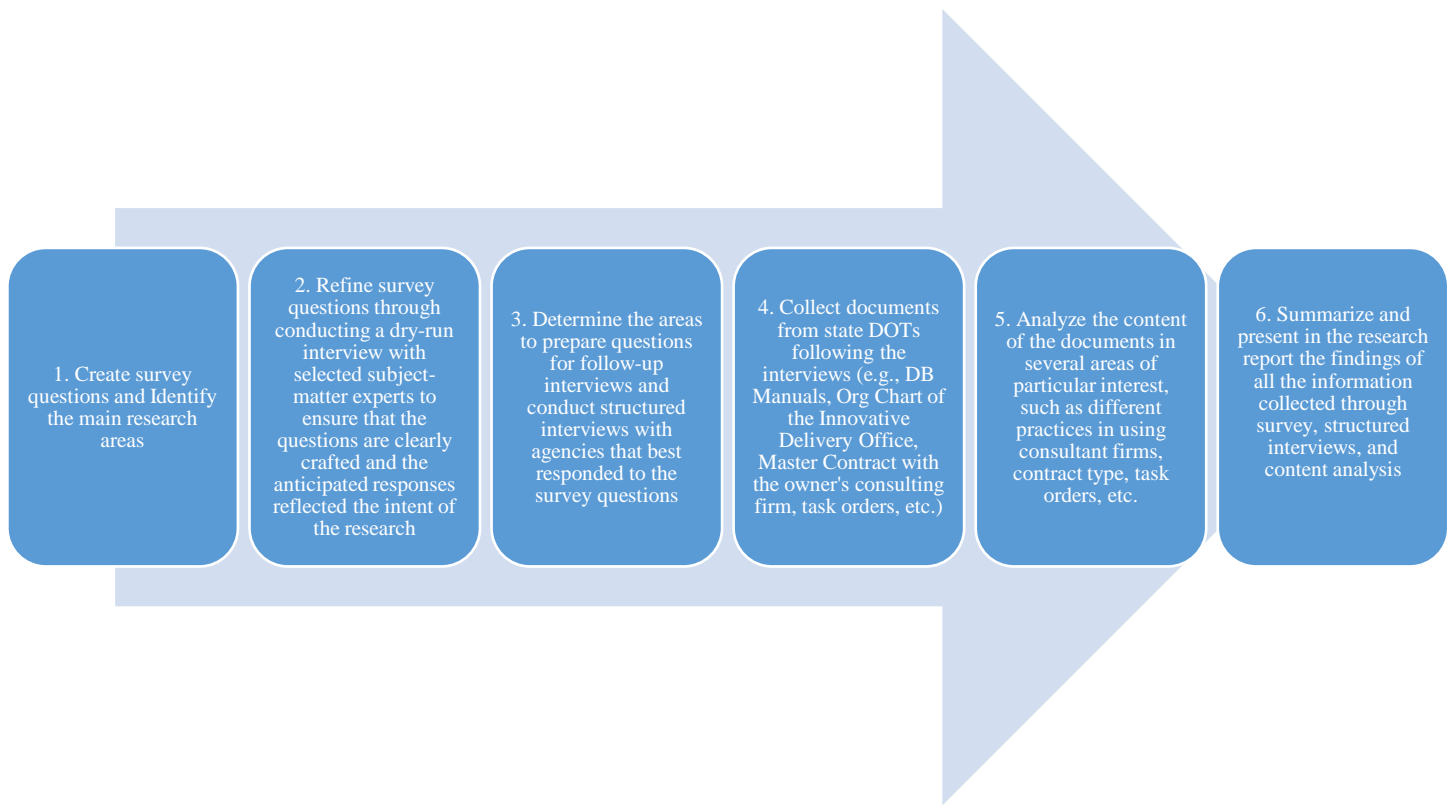


Figure 2-1 An Overview of the Research Methodology

2.2. Research Methodology

2.2.1. Prepare Survey Questions and Areas of Research

The research team initially prepared a set of questions in major areas related to professional staffing that represent challenges and needs of the state DOT in delivering design–build projects. An email survey was prepared and distributed among state DOTs’ innovative delivery office administrators. The major areas of study used in the survey were the following:

- Position of the office of innovative delivery in the state DOT’s organizational chart
- Formation and internal structure of the office of innovative delivery
- Changes that the office of innovative delivery has brought to the state DOT

- The role of consultants and outsourcing in design–build project delivery
- Training and skills development programs

2.2.2. Refine the Survey Questions

Researchers sent the survey to several innovative delivery subject-matter experts, such as heads of the office of innovative delivery program and senior project managers in several state DOTs across the nation, in order to validate and refine the questions and make a final decision on the best questions to use in the survey to get the best results. They then used the refined set of questions to gain and collect information about the current practices in professional staffing of state DOTs in their offices of innovative delivery. The email survey was sent to 33 state DOTs in the United States with active design–build programs, of which 15 state DOTs provided answers.

2.2.3. Prepare Interview Questions and Conduct Interviews

Selecting State DOTs

Following the analysis of the survey results, the researchers identified the following state DOTs for follow-up interviews.

- Colorado DOT (CDOT)
- Florida DOT (FDOT)
- Maryland State Highway Administration (MDSHA)
- Massachusetts DOT (MassDOT)
- Minnesota DOT (MnDOT)
- Virginia DOT (VDOT)
- Utah DOT (UDOT)

- California DOT (Caltrans)
- North Carolina DOT (NCDOT)
- Texas DOT (TxDOT)
- Georgia DOT (GDOT)
- Washington State DOT (WSDOT)
- New York State DOT (NYSDOT)
- Missouri DOT (MoDOT)
- Louisiana Department of Transportation & Development DOT (La DOTD)

The selection was made based on the quality and depth of answers to the survey questions, as well as expressed interest by the respondents to participate in the following research steps.

Preparing Interview Questions

The research team used more detailed questions for the interview phase to better understand the practice of staffing among state DOTs. The areas of focus for the interview phase were related to the following:

- Skillset of the staff in the innovative delivery office
- Training and education programs
- Tasks that are assigned to consultant firms
- Roles and responsibilities of every involved entity (headquarters [HQ] office, district offices, and consulting firms)
- Models of HQ offices and district offices
- Tasks that are conducted inside the office of innovative delivery
- Involving smaller firms in consulting tasks

- Whether state DOTs implement consultant firms on program level or on project level
- Type of contracts (including basis of reimbursement, indefinite delivery/indefinite quantity[ID-IQ], disadvantaged business enterprise [DBE] utilization, etc.)
- Skillset/qualifications of the proposed staff by consultant companies
- Selection process and selection criteria of selecting the firms for different tasks

The researchers refined the interview questions through conducting dry-run interviews with a few subject-matter experts in design–build organizations (Including the above-mentioned state DOTs) to ensure that the questions would help collect the information they intended to retrieve from the state DOT officials.

Conducting Interviews

After refining and finalizing interview questions, the research team conducted interviews with the selected heads of the offices of innovative delivery, other professionals who have major roles in the offices of innovative delivery, or owner’s consultants that represent the offices.

2.2.4. Collect Documents from State DOTs

Participants in the interview provided several internal documents that contain valuable information regarding the organizational structure of their design–build programs. Also, they shared copies of their contracts with the owner’s consulting firms. These documents explain how the state DOT handles the inflow of design–build projects and describe the augmentation model that the state DOT uses to supplement its internal staff through outsourcing preliminary engineering tasks to the consulting firms. These documents included, but were not limited to, design–build manuals; organizational chart of the office of innovative delivery, as well as the description of the related roles and responsibilities; organizational charts of mega projects; innovative delivery methods

presentations or related materials of current practice; request for qualifications/request for proposals (RFQs/RFPs) for hiring owner's representative or consultant company; master agreement; and sample of task order contracts.

2.2.5. Analyze Document Content

Content analysis was performed on the resources provided to identify and characterize different state DOTs' practices in utilizing consultant firms, managing conflicts of interest, addressing DBE involvement, assigning tasks to the consultant firms, and describing staff qualifications and needs. The content analysis helped the researchers gain knowledge of the language of contracts in different DOTs and how DOTs exclude or include consultant firms in different areas and tasks.

CHAPTER 3

IDENTIFIED CHALLENGES RELATED TO PROFESSIONAL STAFFING OF INNOVATIVE DELIVERY PROGRAMS IN STATE DOTs

Subject matter experts, who were surveyed by email or interviewed by telephone, identified several challenges for professional staffing of design–build programs, as detailed in the following subsections.

3.1. Growing Needs to Deliver More Projects, Especially More Complex Projects and Megaprojects, Using Innovative Project Delivery

State DOTs across the nation face the rising challenge of delivering more complex projects with substantially larger scopes and budgets. Typically, and if allowed in the state procurement law, state DOTs turn to innovative project delivery to develop complex and large projects. For instance, Georgia DOT is in the midst of a substantial growth in number of megaprojects in the state with the launch of the Major Mobility Investment Program (MMIP) that needs to be delivered using design–build and P3 methods. Innovative delivery is a prime candidate for megaprojects and complex projects, as this state DOT anticipates using the innovation in the private sector to expedite the delivery of projects with limited budgets. However, innovative project delivery demands a new set of expertise in design, construction, procurement, contracting, and advisory and project oversight. Therefore, new challenges are introduced to the state DOT in terms of organizational structure and professional staffing as changes should be made in the regular way to

do the business in the Department. The state DOT needs to rethink how it should utilize its own expertise, train its resources, and use external support to deliver complex projects.

3.2. Sudden Need for Staffing Growth in the Innovative Delivery Program

Staffing a couple of (or a few) projects per year may not be too problematic for the state DOT but staffing several projects in such short notice is a much greater challenge. This issue, especially, becomes challenging when the state DOT is under pressure from the legislature to deliver a minimum number of design–build projects or minimum dollar amount in design–build programs per annum. Too much growth in a short period of time is typically becoming problematic in terms of finding reliable and knowledgeable workforces from inside the department to staff the projects. Planned growth for design–build helps the state DOT manage workforce issues more efficiently. State DOTs that frequently start and stop their design–build programs often struggle the most to efficiently staff their design–build projects, as they sometimes lose talent and expertise to the private sector and do not capitalize on the gain that can be made through learning-by-doing and economies of scale. A well-planned and stable design–build program can handle growth much better through providing the needed skilled workforce for the growing number of projects.

3.3. Limited Internal Expertise in Innovative Project Delivery, Especially in the Early Stage of Adoption

Design–build and P3 models of project delivery are completely unlike the traditional design–bid–build project delivery model that has been utilized for many years in state DOTs across the nation. Especially in the early stage of adopting the alternative delivery methods, state DOTs have struggled with the change as they lack the required expertise and experience in innovative project delivery. The main challenge was how to establish an innovative delivery unit and professionally

staff the office with the existing DOT project management staff and technical professionals to achieve the desired outcomes promised by design–build and P3 methods. Typically, state DOTs began their efforts by establishing a separate dedicated unit to handle innovative delivery projects (initially with delivering a pilot program) in parallel to other regular projects in the state. Some state DOTs, such as Maryland State Highway Authority (MDSHA) tried to enhance a successful organizational model for a substantially large design–bid–build project and modified the model to deliver its first design–build megaproject. The transition, however, was not without challenges.

3.4. Limited Resources to Learn Best Practices from Other State DOTs and the Design–Build Industry

State DOTs are often challenged in providing satisfactory training for their staff to learn best practices in design–build project delivery. In addition to limited funding, time, and resources to acquire training, each state DOT has its own unique issues for implementing innovative delivery in the Department. General resources may be available through the Federal Highway Administration, but each state DOT faces a challenge on how to best customize these training modules based on its unique needs and conditions. Engaging in different forums and committees at the regional and national levels has been an appropriate strategy to exchange lessons learned and identify best practices from peer colleagues in the other state DOTs and the design–build industry. However, an effective engagement requires substantial investment of time and resources from a group of dedicated state DOT practitioners, which may be difficult to justify to the upper management. Overall, defining a successful roadmap for implementation is a major barrier that state DOTs need to overcome to create a sustaining innovative delivery program.

3.5. Succession Planning for the State DOT's Subject Matter Experts in Innovative Delivery

One of the major challenges that almost every state DOT is facing is succession planning for the head of their office of innovative delivery and its senior project managers. The head of the design–build office has a critical position as the most knowledgeable subject matter expert in charge of leadership, advising, and support for the rest of the group. Also, as the amount of design–build work ramps up there is a pressing need for at least an assistant to the head of the office to manage different projects in various phases throughout the state. This issue was particularly highlighted by the MnDOT design–build program manager, as their program needs to justify the funding request for the succession planning considering the volatility in the number of design–build projects from one year to another.

3.6. Justification for Hiring Fulltime Staff for Alternative Delivery Program

Since the flow of design–build and P3 projects in some state DOTs may not be constant year by year, it is not easy to justify the expansion of alternative delivery programs as there is a considerable uncertainty in some state DOTs about the longevity of design–build or P3 programs. This is especially challenging for state DOTs that have considerable uncertainty in the legislative environment with a sunset put on the design–build legislation. Also, the office of innovative delivery competes with several other offices in the state DOT for hiring additional staff, which makes the justification particularly difficult. A stable legislative environment with an appropriate plan for growth provides an opportunity for the Department to justify strategic hires for the design–build program as a long-term investment in human resources.

3.7. High Turnover Rate among State DOT Innovative Delivery Subject Matter Experts

Maintaining the talent in the design–build office for a long period of time is difficult. Considering the required expertise in managing alternative delivery projects, design–build and P3 experts in state DOTs tend to be closer to the retirement age. Also, consulting firms are very interested in offering top dollars to hire design–build and P3 experts from state DOTs.

3.8. Substantially Greater Staffing Needs for Megaprojects that often Require a Dedicated Program in the State DOT

Design–build project management is not the only discipline needed to effectively run the innovative delivery program. A wide range of disciplines should be utilized to deliver megaprojects. Megaprojects have substantially complex issues germane to environmental studies, right-of-way (ROW) acquisition, utilities relocation, roadway and bridge design, etc. during the preliminary engineering phase of the project. It is often difficult for the office of innovative delivery to rely on the other offices to complete these tasks in an expedited schedule, as is always desirable in design–build and P3 projects. In this sense, the office of innovative delivery acts as a miniature DOT to handle most of the required tasks outside the help of other offices in the Department. Engineering consulting firms are currently utilized as owner’s consultants to assist the office of innovative delivery to perform various tasks related to the preliminary engineering phase of the project. Some state DOTs have an opportunity to hire key technical professionals as part of the innovative delivery staff to reduce the reliance of the office of innovative delivery on outside consultants (e.g., bridge design and environmental specialists). Regardless of the choice that the office has to make to address the technical aspect of megaproject development, finding the right professionals in different areas who are also familiar with the dynamics of design–build

project delivery is not easy at all and represents a significant hurdle for staffing the office of innovative delivery.

3.9. Required Non-traditional Skillset for the Innovative Delivery Staff

Design–build project managers need different skillsets than PMs of the traditional design–bid–build projects, which makes finding the right candidates challenging. A design–build PM needs to interact with a wide range of stakeholders from different backgrounds. Design–bid–build PMs are in charge of contract administration for a construction contract and, therefore, primarily deal with highway contractors. Design–build PMs need to be comfortable interacting with design consultants, as well, that demand them to be multidisciplinary-proficient. Design–build PMs need to be strong in a particular discipline but should appreciate the contributions of the other disciplines to the project (i.e., T-shaped skillset). Project managers need to know the design–build legislations and policies; understand the difference in the dynamics of the innovative project delivery; have the ability to interact with the FHWA representatives, engineering design consultant firms, design–builders, and several other stakeholders; and try to reduce the conflicts as much as possible. Soft skills, especially communication skills, are absolutely critical for the success of a design–build PM, as great PMs are diplomatic in nature and can protect the owner’s interest without damaging the good relationships between the state DOT and the design–build industry. Finding a candidate with the right personality is more important for some state DOTs than just the technical skillset, and this makes it difficult for government agencies to find candidates with these qualifications.

3.10. Difficulty in Attracting Internal State DOT Staff to Join the Innovative Delivery Project Management Team

It is usually perceived that the workload of the innovative delivery office is more than that of the traditional delivery method due to the nuance of managing complex design–build projects and interacting with a large number of stakeholders engaged in the design–build contract. As an evolving project delivery system, design–build PMs learn new things every day. They also need to frequently reach out to their peers in other state DOTs and subject matter experts in the design–build industry to get updates. Such a demanding position might be attractive for some DOT professionals, but many of the DOT engineers or construction managers may not be interested in accepting the challenging position, especially when they recognize that the pay rate is not necessarily higher than other traditional positions in the Department. This issue represents a challenge for the head of the design–build program to find the right candidates for the project management position. Often, nonmonetary incentives, such as training opportunities and a flexible job description, should be used to motivate the state DOT engineers and managers to join the design–build team to make an impact on the way the Department conducts its business.

3.11. Establishing a Collaborative Environment with District Offices

The HQ office of innovative delivery office should strive to maintain good working relationships with district offices across the state. District personnel are usually the most knowledgeable DOT staff about project-specific issues. They also have daily working relationships with local engineering and construction firms. The HQ office personnel capitalize on this knowledge and expertise to develop design-build and P3 projects more smoothly. DOT experts in district offices should not feel that they are not truly consulted throughout the project development process. Establishing a productive climate for collaboration may become challenging for some state DOTs,

especially when district personnel are not familiar with the new dynamics of alternative project delivery or the HQ staff do not attempt to engage district experts in the process. Some state DOTs interviewed in this research recommend hiring the design-build or P3 project manager from the district office that the project is located in. The project manager can act as a liaison between the district office and the HQ office of innovative delivery.

3.12. Identification of the Appropriate Model to Utilize Consultants

The major challenge for acquiring consulting professional expertise in the office of innovative delivery is how an owner's representative should look like to truly act in the best interest of the owner. The office of innovative delivery may need a wide range of skills to perform various tasks throughout different phases of the project development. The office of innovative delivery needs to conduct a tradeoff analysis to decide whether many of these tasks should be combined under a program management umbrella contract or the office should bring in multiple consulting firms to perform these tasks. Utilization of a large consulting firm as a one-stop shop is helpful as it minimizes the need for issuing multiple contracts for different services, provides consistency in the approach used across a portfolio of projects, and offers efficiency in the delivery of various services. However, the selection of a single firm may reduce opportunities for other consulting firms in the market to participate in the state design-build program, and the required workload might be beyond what a consulting firm is normally able to provide. Using a single firm may also limit the state DOT's choice to utilize the best firm in each discipline. The office of innovative delivery needs assistance in making a decision about the right organizational model for the design-build program or an individual project, as the decision depends on several internal and external factors, such as available internal resources, the local design-build consulting industry conditions, scheduling constraints, funding limits, etc.

3.13. Limited Financial Capacity to Afford Expensive Rates of Some Consulting Firms

Considering the complexity of some design–build and P3 projects, the state DOT may require a unique set of skillsets that may be expensive to acquire. For instance, legal and financial advisors typically charge high rates for their services in P3 projects. Also, resolving unique design and construction challenges may require hiring a specialized consulting firm with a substantially higher rate compared to regular consulting firms. Justification of the high pay rates that are outside the Department’s regular pay range to consultants is challenging for the innovative delivery office.

3.14. Consistency in the Management, Procurement, and Oversight of Design–Build Projects

Considering limited staff in the office of innovative delivery, it is a great challenge for the Department to ensure consistency across all design–build projects in the state. For instance, district offices may need significant support for design–build projects during letting, but the HQ office cannot be actively involved with those projects due to the staffing limitation. The HQ office or the district offices turn to consulting firms to represent the owner in tasks such as design oversight and construction administration. This practice has been helpful, but even though these consulting firms are experienced, they often review too many details or are otherwise inconsistent. The design–build industry is interested in working with the state DOT on a common set of procedures and policies across the entire program all over the state. Establishing a unified model is also useful for all the disciplines required in delivering design–build programs, e.g., structural design review and quality assurance/quality control (QA/QC). Dedicated subject matter experts assigned to the design–build program can be considered as a strategy to not only enhance consistency but also

reduce external consulting cost for the Department. It is also desirable to streamline developing procurement documents (RFQs and RFPs) for simple design–build projects.

3.15. Issues Related to the Procurement of Owner’s Consultants to Help the State DOT in the Innovative Delivery Program

Acquiring consulting services can be challenging, especially for an inexperienced state DOT that may not know what it does not know about the design–build program. An owner needs to clearly specify the areas that it needs help with. Defining the end goals and performance expectations can be problematic for unique and complex projects when the state DOT has no experience in delivering similar projects. Some state DOTs use a separate advisory consulting firm to assist the office of innovative delivery with conducting capability assessment, identifying gaps in expertise, defining the areas where the design–build office needs assistance, and drafting the request for qualifications to hire owner’s program management consulting firms to perform the required tasks.

3.16. Familiarity of Consulting Firms with the State DOT’s Approach for Project Development

Staff in some state DOTs knows how the Department works and how other state agencies work but may not have experience with design–build, and the state, typically, does not have time for training. On the other hand, consultants know the design–build process but do not know how the Department or the state agencies work. Finding a delicate balance is a great challenge for these state DOTs.

3.17. Establishing a Collaborative Environment with Other Offices

The HQ office of innovative delivery office should strive to maintain good working relationships with other DOT offices throughout the development process of design-build and P3 projects. Often

the HQ office utilizes resources outside the department from the consulting community to help develop design-build and P3 projects. It is important to manage the interface between different offices and consulting resources utilized on the project. It is critical to avoid any inconsistency with the existing processes for project development that other offices follow to perform different tasks, such as utilities coordination and right of way acquisition. Establishing a productive climate for collaboration may become challenging for some state DOTs, especially when subject matter experts in various offices are not familiar with the new dynamics of alternative project delivery or the HQ staff do not attempt to engage experts in the process. Experts in other DOT offices should not feel that they are not truly consulted throughout the project development process. The HQ office personnel should capitalize on knowledge and expertise of personnel in other offices to develop design-build and P3 projects more smoothly. In summary, the main challenge for the head of alternative delivery contracting program is that his/her office of innovative delivery is not perceived as an entity that works independently without effective engagement with the rest of offices in the state DOT.

3.18. Conflict of Interest (COI) for Owner's Consultants

Generally speaking, owner's consulting firms and their key sub-consultants that assist the innovative delivery office in important tasks during the preliminary engineering phase of the project are not allowed to participate in any design-build teams competing on the project, as these consulting firms have an advantageous position over the other firms. Some state DOTs even go a step farther and limit the participation of owner's consulting firms at the program level and do not let the owner's program management consultant be on any design-build or P3 projects in the state. The office of innovative delivery needs to carefully protect the integrity of the delivery process through effective management of owner's consulting firms' conflicts of interest (COIs). However,

the state position should not limit the competition in the market. Also, applying limitations to consulting firms at the entire program level should be considered carefully because owner's consulting firms and their subs are often the most qualified firms to provide exemplary services in other design-build and P3 projects. These firms know what the state DOT considers as an exceptional service in each discipline. Thus, flexibility in managing COIs should be considered as an option for the state DOT.

3.19. Concerns of the State Engineering Consultant Industry

Sometimes, the local engineering consulting community has the perception that design-build and P3 programs limit opportunities for its participation in the state DOT's works. The state DOT engages with a large national or international consulting firm through an extensive contract to provide the agency with program management and general engineering services. Due to the size of these contracts and required massive skillsets, local small- to mid-size engineering consulting firms cannot take a lead to participate. Although local small firms find opportunities to be a part of the owner's prime consulting firm they often prefer working directly under the state DOT. Sometimes, these local firms may not receive a good portion of the contract as the prime consulting firm is in charge of distributing the work. The state DOT needs to develop appropriate strategies and provide the right incentives to better engage local firms in the owner's consulting services. For instance, in certain areas of works, the state DOT can ask the prime consulting firm to bring local experts on board through offering additional points in the evaluation of consultant proposals. Also, the state DOT can execute specific task orders, knowing that a good portion of the budget is allocated to local consulting firms. The state DOT needs to do its best to distribute works across different disciplines and among active local consulting firms.

3.20. Concerns of the Professional Engineers in the State Government

Over the past two decades, some state DOTs have faced reluctance and sometimes opposition from their government engineers unions or related organizations in implementing design–build programs. These organizations have argued that the growth of design–build sends a substantial amount of engineering works to the outside agency, and this outsourcing eventually leads to less demand for the state engineers. Although these claims were not justified (Gransberg and Molenaar 2008) they present challenges for the office of innovative delivery to justify the use of consulting firms as owner’s representatives in design–build programs. Finding the right balance between the utilization of internal staff and the use of consultants is a problem for some state DOTs that struggle to justify alternative contracting methods for the public and the state legislatures.

3.21. Issues Germane to Disadvantaged Business Enterprises (DBEs)

DBEs in the state are used to work directly under the state DOT that is best familiar with appropriate strategies to engage the DBE firms in a wide range of services. Under the master agreement with the owner’s prime consulting firm, the state DOT needs to rely on the consulting team to act similarly on behalf of the state DOT to effectively engage DBEs in providing services for design–build and P3 programs. This transition may be problematic as the owner’s consulting firm may not know various DBE participants in the market. Also, the owner’s consulting firm is a private firm that needs to run its business as efficiently as possible, in order to provide adequate profits for its shareholders. Hence, the prime consultant may be selective in choosing DBEs to partner with in providing services to the state DOT in design–build and P3 programs. Naturally, some DBEs may be left out and this may create some tensions in the market. The state DOT needs to manage the interface between DBEs and prime consulting firms, in order to provide several

opportunities for these firms to participate in the design–build and P3 programs. Several state DOTs set goals for DBE participation, and some go farther and request broader DBE participation across several disciplines to avoid concentration.

3.22. Development of a Proper Performance Measurement System to Keep Track of the Performance of the Owner’s Consultant

As the size and complexity of the owner’s required services from consulting firms keep increasing, it is reasonable that the state DOT thinks of appropriate metrics to measure the performance of consulting firms. Currently, state DOTs mainly rely on the consultant’s self-incentive to deliver a high-quality project in hopes of return business with the office of innovative delivery. Thus, there is a lack of a unified framework to measure the performance of owner’s consulting firms throughout different phases of the project development. Such performance measures can facilitate the evaluation of consulting firms and can help the state DOT select the most qualified consulting firm for specific program requirements. Developing a systematic and unbiased set of performance measures presents a great challenge to the office of innovative delivery to track the progress of the owner’s consulting team in various areas of concern.

CHAPTER 4

IDENTIFIED STRATEGIES TO ENHANCE PROFESSIONAL STAFFING OF INNOVATIVE DELIVERY PROGRAMS

4.1. Introduction

There are differences among state DOTs on how to respond to the challenges of professional staffing for innovative delivery programs. The major objective of this study is to identify the various approaches that state DOTs have utilized to respond to their staffing and organizational needs. Organizational structure of a state DOT, regulating legislations and policies, history and culture of the organization, and the design–build industry in the state are among the most important factors that affect the approach the state DOT utilizes to professionally staff its innovative delivery program.

The results of email surveys, structured interviews, and content analysis of several documents help better understand various models utilized by different state DOTs in managing the workload for design–build (DB) and public–private partnership (P3) programs. Depending on the overall approach that a state DOT has in delivering design–build and P3 projects (i.e., centralized vs. decentralized), the roles and responsibilities of the HQ and district offices are changed. At the HQ level, state DOTs have utilized different organizational models to professionally staff the office of innovative delivery. Most state DOTs that have an active design–build program have established a dedicated office to manage design–build-related activities centrally at the HQ office. Temporary organizations are normally used when a project is substantially large and complex in terms of budget and the extent of design and construction. Thus, a separate office is dedicated to the megaproject (or program) to manage the contract and oversee the project(s) with more control.

Some state DOTs without a substantially large design–build program do not have an established office for innovative delivery and, depending on the project, they might use a temporary office organization to manage the project. Some other DOTs that have a dedicated office for innovative contracting may also prefer to establish a specific temporary office dedicated to the related project management activities of the megaproject. For instance, the Maryland State Highway Authority (MDSHA) established a dedicated office to manage the Intercounty Connector (ICC) megaproject.

Since design–build projects typically require new skillsets and present additional workload demands to the department, state DOTs utilize consulting firms to assist them in developing and delivering design–build projects. State DOTs’ practices differ in managing the additional workloads and acquiring the required skills through hiring the owner’s consulting firms.

In this chapter, differences in organizational structuring and professional staffing for innovative project delivery programs are described in the following areas:

- Models of Office of Innovative Delivery
- Main Roles and Responsibilities of the HQ Office of Innovative Delivery
- Involvement of District Offices in Delivery of Design–build Projects
- Training and Staffing Strategies and Preferred Skillsets
- Utilizing Consulting Firms to Assist the Owner
 - Prequalification, Licensing Requirements, and Selection Criteria for Evaluating Consulting Firms (Licenses, Requirements)
 - Selection Process
 - Contracting and Payment Methods
 - Assigned Tasks to the Owner’s Consulting Firm

- Key Personnel and Respective Required Skillsets and Qualifications for Owner's Consultants
- Conflicts of Interest (COIs)
- Disadvantaged Business Enterprise (DBE)
- Performance Metrics

4.2. Models of Office of Innovative Delivery: Organizational Structuring and Professional Staffing

State DOTs use different numbers of employees at their HQ offices of innovative delivery based on their available resources and program size. The combination of the staff also depends on the size of the program, number of design–build and P3 projects that the state DOT is delivering, and any limitations on hiring in-house staff. Figure 4-1 shows different models that are currently used in state DOTs to manage design–build workload. On one end of the spectrum, some design–build programs, such as Colorado DOT, only have one person in charge of administrating the office of innovative delivery with no dedicated person to the office. Some others, like the Minnesota, Maryland SHA, and New York State DOT, provide an assistant director to assist in the administration of design–build programs. Some state DOTs have dedicated PMs to the design–build and P3 programs, but other DOTs assign PMs from the regular construction program to the design–build and P3 programs, as needed. On the other end of the spectrum, some state DOTs, such as North Carolina DOT and Virginia DOT, enjoy more dedicated resources, e.g., multiple dedicated PMs, design engineers, construction PMs, and environmental specialists.

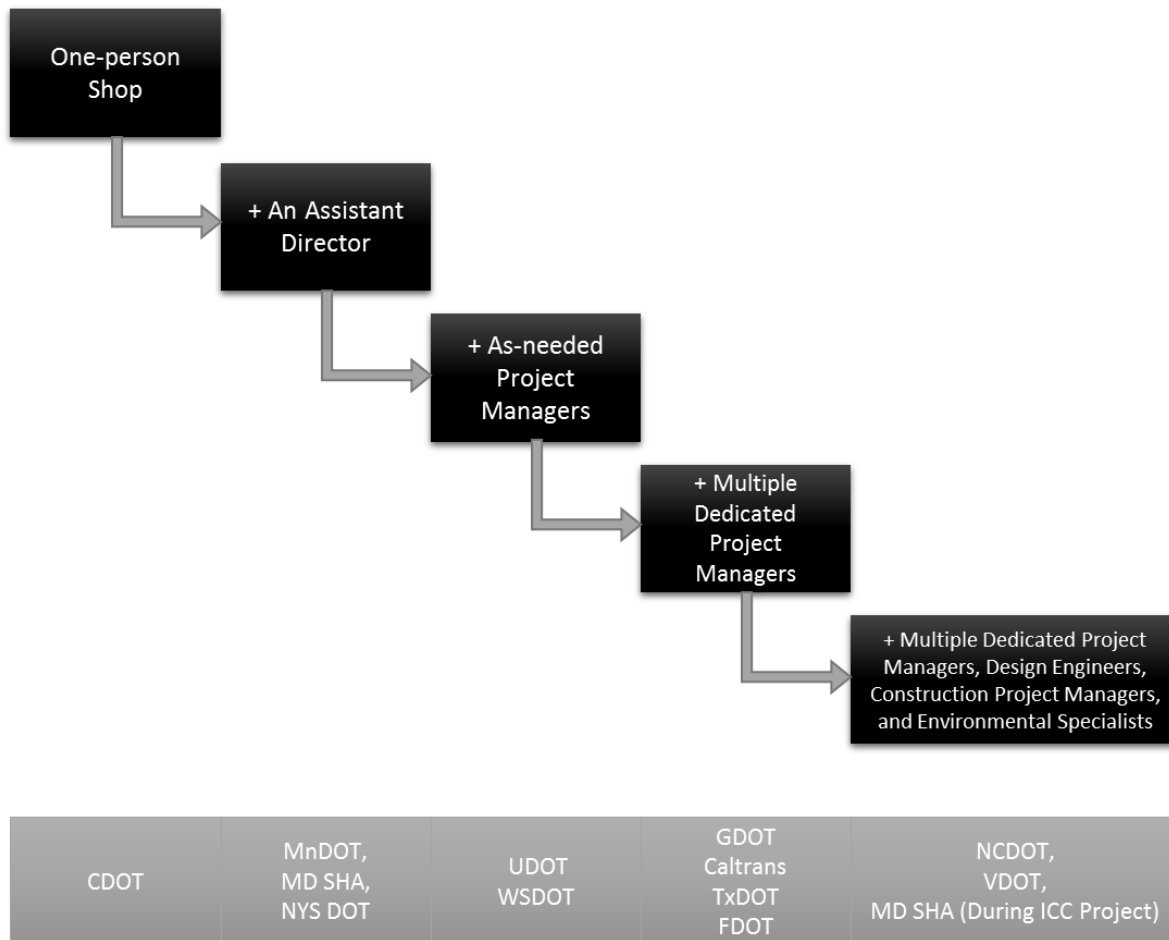


Figure 4-1 An Overview of Design-Build Programs in Different State DOTs

State DOTs that are decentralized in delivery of design-build projects have more resources at the district offices to handle project management, engineering design, and construction management issues. The size of the office of innovative delivery in these state DOTs is typically small. Delivery of design-build programs is centralized in some state DOTs where procurement and project management activities are primarily conducted at the HQ office of innovative delivery. These state DOTs dedicated more full-time staff to their office of innovative delivery to keep up with the design-build and P3 demand. Some state DOTs where the number of design-build and P3 projects often fluctuates from one year to the next need to staff their innovative delivery programs with

PMs from the regular design–bid–build program, as needed. This is an efficient approach to cope with changes in the inflow of the projects. Figure 4-2 shows the number of full-time employees in the office of innovative delivery or in the design–build program at HQ, which is extracted from a survey performed by the Design-Build Institute of America (DBIA) in 2016.

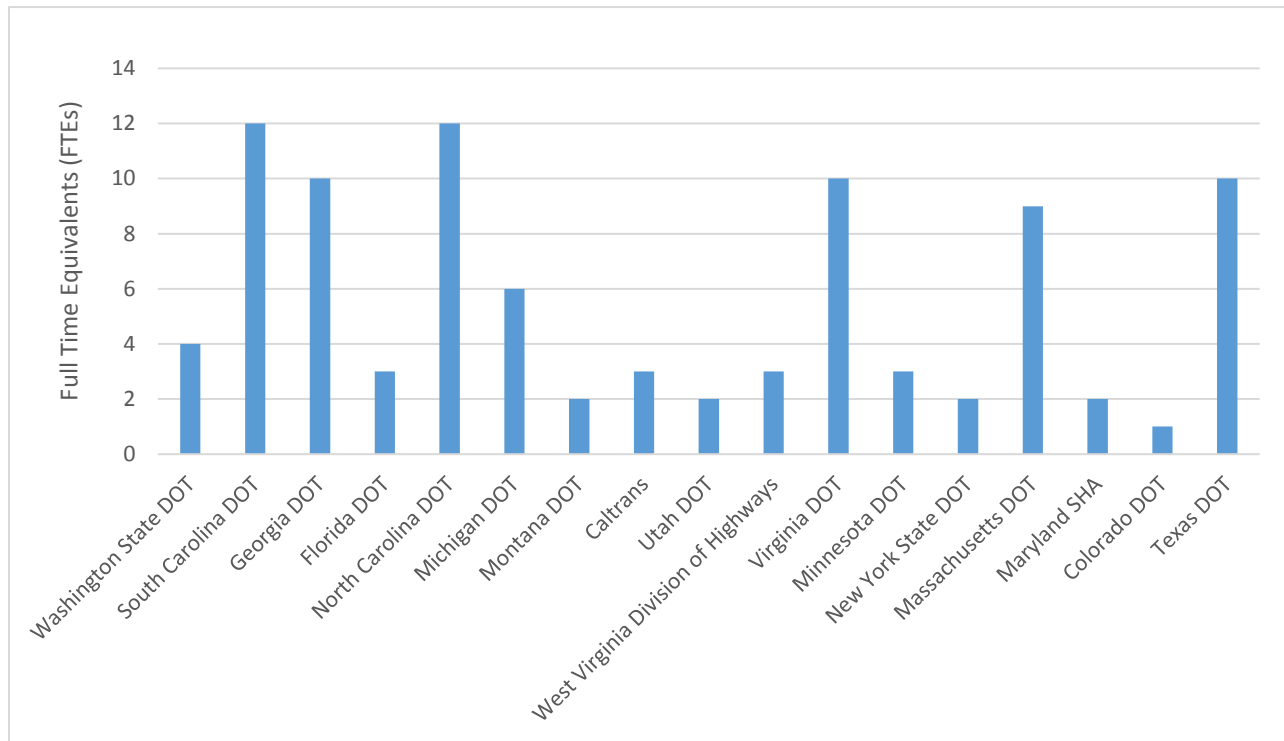


Figure 4-2 Number of Full Time Equivalents (FTEs) Dedicated to Office of Innovative Delivery in Different State DOTs

The model of HQ office and also assigned roles and responsibilities on each party affect the number of full-time employees in state DOTs’ office of innovative delivery and any related offices. There are several state DOTs with design–build programs that have no dedicated office for

delivering design–build projects. As needed, the following state DOTs assign their design–bid–build project managers (PMs) to be in charge of their design–build projects:

- Oregon DOT (ODOT)
- District of Columbia DOT (DDOT)
- Maine DOT (MaineDOT)
- Nevada DOT (NevadaDOT)
- Vermont Agency of Transportation (VTrans)
- Kansas DOT (KDOT)
- Ohio DOT (ODOT)
- Missouri DOT (MoDOT)
- Louisiana Department of Transportation and Development (La DOTD)
- New Mexico DOT (NMDOT)

Regardless of the model used to staff the design–build office at the HQ, state DOTs must satisfy the Federal Highway Administration’s (FHWA’s) requirement related to responsible charge.

4.2.1. Responsible Charge

All the texts and information in this section are extracted from the Federal Highway Administration (FHWA) Defining “Responsible Charge” in the Federal-aid Highway Program:

Regulation

“The key regulatory provision, 23 CFR 635.105—Supervising Agency, provides that the state transportation agency (STA) is responsible for construction of federal-aid projects, whether it or a

local public agency (LPA) performs the work. The regulation provides that the STA and LPA must provide a full-time employee to be in “responsible charge” of the project.

Requirements of Position

For projects administered by the STA, the regulation requires that the person in “responsible charge” be a full-time employed state engineer. This requirement applies even when consultants are providing construction engineering services.

For locally administered projects, the regulation requires that the person in “responsible charge” be a full-time employee of the LPA. The regulation is silent about engineering credentials. Thus, the person in “responsible charge” of LPA administered projects need not be an engineer. This requirement applies even when consultants are providing construction engineering services.

Duties

Regardless of whether the project is administered by the STA or another agency, the person designated as being in “responsible charge” is expected to be a public employee who is accountable for a project. This person should be expected to be able to perform the following duties and functions:

- Administers inherent governmental project activities, including those dealing with cost, time, adherence to contract requirements, construction quality, and scope of federal-aid projects
- Maintains familiarity of day-to-day project operations, including project safety issues
- Makes or participates in decisions about changed conditions or scope changes that require change orders or supplemental agreements

- Visits and reviews the project on a frequency that is commensurate with the magnitude and complexity of the project
- Reviews financial processes, transactions, and documentation to ensure that safeguards are in place to minimize fraud, waste, and abuse
- Directs project staff, agency or consultant, to carry out project administration and contract oversight, including proper documentation
- Maintains awareness of the qualifications, assignments, and on-the-job performance of the agency and consultant staff at all stages of the project

The regulations do not restrict an agency's organizational authority over the person designated in "responsible charge," and the regulations do not preclude sharing of these duties and functions among a number of public agency employees. The regulations also do not preclude one employee from having responsible charge of several projects and directing PMs assigned to specific projects."

4.3. Main Roles and Responsibilities of the HQ Office of Innovative Delivery

State DOTs are different in terms of the role of their office of innovative delivery at the HQ. The HQ office of innovative delivery can accept one or several roles from the following:

- Support, advisory, training, and policymaking role
- Administration role for project development, design development, procurement, and contracting

- Contract administration and construction project management role during the post-award phase of the project

Table 4-1 shows different roles that the HQ office of innovative delivery plays in delivering design–build projects in different state DOTs. HQ offices of innovative delivery in some state DOTs, such as Florida and Colorado DOTs, have a primary advisory/support role. These HQ offices rely on available expertise and resources in the DOT district offices to develop and deliver their own design–build projects. This decentralized approach can only be successful in state DOTs that are immensely familiar with design–build project delivery system. In these offices, the district offices are capable of taking a lead on the development of design–build projects in their own districts. Particularly, those district offices are comfortable with the nuance of procurement and contracting for design–build projects.

Some other HQ offices of innovative delivery, such as that in Virginia DOT, are also solely in charge of procurement. These state DOTs believe there is great value in centralized procurement as this phase of project delivery is a critical phase in the project development. This approach facilitates the consistent implementation of procurement practices for design–build projects across the state. District offices come on board in these states after the design–build project is awarded.

Other HQ offices of innovative delivery, such as those in Georgia and North Carolina DOTs, accept the entire responsibility for developing, delivering, and managing design–build projects from inception to completion. These HQ offices provide project management and contract administration resources during the post-award phase of the design–build project. This centralized approach requires substantial resources dedicated at the HQ to manage various aspects of the design–build project development process.

Table 4-1 Different Roles that the HQ Office of Innovative Delivery Plays in Delivering Design–Build Projects in Different State DOTs

State DOT	Support, Advisory, Training, and Policymaking Role	Administration Role for Project Development, Design Development, Procurement, and Contracting	Contract Administration and Construction Project Management Role during the Post-award Phase of the Project
Georgia DOT	✓	✓	✓
North Carolina DOT	✓	✓	✓
Virginia DOT	✓	✓	✓
Maryland SHA	✓	✓	District Offices take over the project during the post-award-except for design oversight
Minnesota DOT	✓	✓	District Offices take over the project during the post-award
Caltrans	✓	✓	District Offices take over the project during the post-award
Utah DOT	✓	✓	District Offices take over the project during the post-award
Texas DOT	✓	District Offices develop design-build projects and select the design-builder	District Offices take over the project during the post-award
Colorado DOT	✓	District Offices develop design-build projects and select the design-builder	District Offices take over the project during the post-award
Florida DOT	✓	District Offices develop design-build projects and select the design-builder	District Offices take over the project during the post-award
Washington State DOT	✓ Districts are involved as well	District Offices develop design-build projects and select the design-builder	District Offices take over the project during the post-award
Missouri DOT	✓ Districts are involved as well	District Offices develop design-build projects and select the design-builder	District Offices take over the project during the post-award

Offices of innovative delivery in different state DOTs accept different sets of responsibilities in the development of design–build and P3 programs. Below, the main responsibilities of eight different design–build offices are summarized.

4.3.1. Responsibilities of the Washington State DOT (WSDOT) Design–Build Program Manager and Other Staff

WSDOT’s design–build program manager position is organized under the lead construction engineer, administration. Figure 4-3 shows the structure of WSDOT’s design–build program.

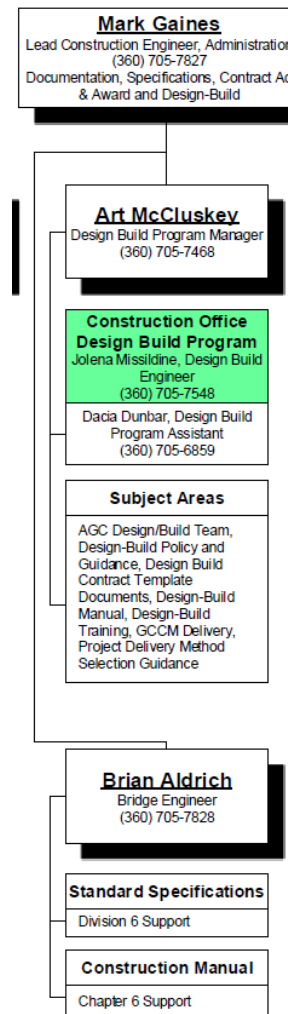


Figure 4-3 Structure of the Design–Build Program in WSDOT

All the texts and information in this section are extracted from documents provided by WSDOT with titles *DB Personnel Qualifications* and *DB Personnel*:

HQ Office's Role in Design-Build

“The WSDOT HQ’s main responsibilities in the design-build program are summarized in the following areas:

1. Identify WSDOT’s program of design-build projects
2. Develop and integrate design-build processes and procedures
3. Pilot alternative best-value applications
4. Develop a competitive design-build climate
5. Establish working relations with industry, resource agencies, and within WSDOT

Tasks Assigned to Key Personnel

As part of an organizational development effort at WSDOT, several tasks are identified and assigned to the following key personnel in the program.

- Roles and Responsibilities of the Design-Build Program Manager:
 - Lead technical expert and headquarters resource for design-build delivery
 - Make high-level policy decisions on the direction of WSDOT’s design-build program and the role of headquarters in supporting delivery of design-build projects
 - Lead the team that develops and maintains the design-build program’s policy, guidance and resources, including contractual template documents, the design-build manual, and associated training
 - Lead outreach efforts with headquarters, regions, technical support groups, and other stakeholders to ensure contract documents are consistently updated based on the application of best practices

- On behalf of the state construction office and the design–build program, provide leadership and guidance on several teams, focus groups, and forums associated with design–build delivery
 - Participate in state and national groups that support design–build and alternative delivery, such as the Capital Projects Advisory Review Board, the DBIA¹, and the NCHRP²
 - Industry liaison; co-chair of WSDOT/AGC³/ACEC⁴ Committee
 - Co-chair of internal Design–Build Workgroup
 - Responsible for all design–build deliverables (manuals, procedures, training, databases) and roll-out strategies for same
 - Development of strategy for small design–build projects
 - Review current procurement process and recommend changes to evaluation criteria and scoring, instructions to proposers (ITP) language, and practical design process.
- Roles and Responsibilities of Design–Build Program Assistant:
 - Develop and maintain databases for design–build lessons learned and alternative technical concepts (ATCs)
 - Develop and maintain historical database of design–build specifications
 - Develop portions of design–build manual
 - Assist in development of design–build training materials
 - Review and edit various design–build documents (templates, manuals)

¹ Design-Build Institute of America

² National Cooperative Highway Research Program

³ Associated General Contractors

⁴ American Council of Engineering Companies

- Maintain meeting minutes of WSDOT Design–Build Workgroup
- Roles and Responsibilities of Design–Build Program Specialist:
 - Develop portions of the design–build manual
 - Develop portions of design–build training material
 - Execute design–build training
 - Maintain design–build training material”

Currently, WSDOT assigns one design-build project per project engineer (equivalent to the project manager term). The project engineer can have assistant project engineers reporting to him/her on the project, depending on the project size and complexity. There can be some overlap between the end of a project and the start of a new one where the project engineer would be involved in more than one project. It is believed in WSDOT that with the potential of design-build delivery being used for smaller projects in the future, the situation where a project engineer is initially assigned to more than one design-build project becomes more likely. Almost all of WSDOT’s design-build projects to date have been large enough to only assign one project to a project engineer. It is worthy of notice that there is no limit on the total dollar value of all projects that a project engineer can be assigned to. The projects range in value from less than \$10 million to over \$1 billion dollars.”

4.3.2. Responsibilities of the Minnesota DOT (MnDOT) Design–Build Program Manager and Other Staff

All the texts and information in this section are extracted from personal communication and interview with the MnDOT design-build program manager:

“MnDOT has officially one person as a program manager in the HQ (“one-man band” as described by the program manager) in design–build without a unit supporting the design–build program manager. There are two full-time design–build bridge reviewers/overseers in the MnDOT

structures office and there are two to three PMs in the districts who specialize in alternative delivery.

MnDOT also has a general engineering consultant (GEC) on a 3- to 5-year contract who prepares RFPs and large programmatic documents for MnDOT. MnDOT hired an on-call GEC to provide horsepower for the contract writing and other needed jobs on projects, and expertise/independent reviews when needed.

The design–build program manager’s role is effectively to serve as an assistant PM on all design–build projects to advise the project team on the following tasks (programmatically with the assistance of the GEC as necessary):

- Define the design–build strategy
- Write the ‘legal’ portions of the RFPs and review the rest in detail
- Streamline FHWA authorization
- Communicate with contractors
- Run the one-on-one scoring meetings
- Train overseers
- Develop programmatic policies and manuals
- Run delivery selection meetings
- Resolve disputes
- Educate/listen to MnDOT’s external partners

When it comes to assigning project managers on design-build projects, HQ does not have any role in assigning project managers. Project managers come from districts and the design-build program manager only gives district management some suggestions if he/she believes there is any particular

suitable fit for the role. Therefore, the challenge is that the project managers are not central and it is difficult to develop them programmatically in MnDOT. Two of the districts (Metro/Minneapolis/St Paul and the Rochester region) have regular alternative delivery project managers who have led four or more projects during at least one phase of the project. On most other districts, the same project manager is rarely being seen twice, in part because those districts go quite a while without having a design-build Project.

The smallest project that has been done in MnDOT was \$500,000 and the largest design-build project was about \$240 M. Once the design-build projects become larger than \$25M or so the construction –phase project manager is devoted to that project alone until it starts to be completed. The design-phase project managers tend to have other projects to manage unless the design-build project is larger than \$75 M. In MnDOT, there are no cradle-to-grave project managers who actively manage all phases of the project due in large part to a lack of personnel who have experience in both design and construction. The project managers with experience in both in design and construction are preferred by MnDOT’s design-build program management.

The current MnDOT design–build program manager believes that the lack of succession planning is one of the major challenges for the design–build program in Minnesota. Also, the design–build PM is unable to provide significant support to design–build projects during letting. MnDOT’s oversight practices are not as consistent as they should be, except the oversight on the structures discipline for which an in-house expert is onboard to review and provide feedback on the structural engineering design review. MnDOT usually hires consultants to provide oversight, and—even though many are quite experienced—they often review in too much detail or are otherwise inconsistent. They are also expensive.

MnDOT's design-build program manager recommends hiring an assistant to his position, who will be sent out to serve as a design oversight manager on as many design-build projects as possible. This adds "bench strength" for the MnDOT design-build program manager position, adds consistency to oversight, and reduces the cost of oversight. It may reduce the need for the utilization of prime GEC contracts if MnDOT starts doing more simple RFPs internally. The MnDOT design-build program manager prefers that MnDOT hire another person or two to take more work back from the GEC and other overseers, presuming MnDOT's funding/program stabilizes."

4.3.3. Responsibilities of the Colorado DOT (CDOT) Innovative Contracting Program

All the texts and information in this section are extracted from *CDOT Innovative Contracting Program Accomplishments 2000-Present* document:

"The innovative contracting program manager (ICPM) represents CDOT in the expertise area of alternative contracting (design-build, modified design-build, streamlined design-build, construction manager/general contractor (CM/GC), and design-bid-build) on a national and state level with professional engineering firms, professional engineering organizations, the construction industry, local governments, federal agencies, and educational institutions. The primary responsibility of the ICPM is to manage resources, develop policies and procedures, and provide assistance and guidance to CDOT and the industry.

Through the innovative contracting branch, the ICPM provides CDOT headquarters and the five regions the support and clarity needed for the use of innovative contracting methods, through the project planning, procurement, design, and construction phases. Regions select and implement projects by themselves. The HQ does not use any consultant to provide its services. Regions use

program management consultants on a project-by-project basis with a specific scope of work. Also, CDOT's Office of Major Project Development (OMPD) acts as an in-house program manager at HQ that helps the regions. The main tasks of the OMPD are:

- Assist the five CDOT regions in delivering their design-build, CM/GC, and all other innovative contracting projects
- Develop and institutionalize streamlined CM/GC, and obtain FHWA programmatic approval to pilot it
- Issue Innovative Contracting Bulletins as needed in coordination with the Standards and Specifications Unit
- Act as a liaison between CDOT and many other public, private, educational, and federal agencies

In February 2010, the ICPM was established and has since chaired the CDOT Innovative Contracting Advisory Committee (ICAC). The ICAC meets on a regular basis, and is made up of approximately 20 members and guests representing the five CDOT regions, CDOT HQ, the Colorado Office of the Attorney General, FHWA, the Colorado Contractor's Association (CCA), the consulting industry (ACEC), and the University of Colorado at Boulder. The ICAC has been able to successfully diffuse all pre-existing adversarial relationships between CDOT and the industry, and instead, create a professional partnership where several achievements have been realized."

4.3.4. Responsibilities of the Maryland State Highway Authority (MDSHA) Innovative Contracting Division

All the texts and materials in this section are extracted from MDSHA design-build manual and personal communication and interview with Chief of the innovative contracting division:

“Historically, design-build projects have ebbed and flowed from year to year in Maryland. Therefore, MDSHA never established a fully staffed design-build office, given that a full unit worth of personnel may not have much to do in any given year if the projects are not there. In the past, MDSHA hired an on-call general engineering consultant to provide horsepower for the contract writing and other needed jobs on projects (and expertise/independent reviews when needed).

Currently, MDSHA has a small centralized office with a few in-house staff for managing design-build projects. Currently, MDSHA does not utilize any owner’s consulting contract due to the issues related to conflicts of interest. Program management is led by the office of highway development while contract administration is led by district construction.

Project managers are assigned a project based on office workloads. A particular project manager will usually have multiple projects (design-bid-build, design-build, or construction manager/general contractor (CM/GC)) in MDSHA and there are times where a project manager may be assigned more than one design-build project. Typically, if a project manager has more than one design-build project then he/she is more experienced.

Project values may range from a few million dollars for a small project to over \$100 M for a larger project. There is no upper limit or total dollar value used to assign projects. Number of projects, complexity, timeframe, and level of commitment to deliver are factors considered for assigning project managers more than the cost of a project.

Upon award of the design–build contract, the district office typically takes over management of the project. MDSHA Office of Construction and District Construction staff, including regional construction engineers, area engineers, project engineers, and project inspectors, work together to manage the design–build project during the post-award phase. Their level of responsibility generally remains unchanged as these people monitor and report on project progress, attend meetings, and perform other duties as with a traditional design–bid–build project.

The MDSHA district engineer (DE) is in responsible charge of the project on behalf of the MDSHA. The main difference for each of the construction positions involves the level of authority to act on behalf of the MDSHA. The design–build team provides the design. MDSHA design staff remain involved in the design–build project to review plans and specifications provided by the design–build contractor. Any changes in design made by the design–builder require MDSHA design staff review and approval. The change may require input from the field personnel as the changes are identified and documented. The MDSHA construction staff should maintain close contact with the MDSHA design throughout the project.

It is mentioned in Maryland SHA Design-Build Manual that in design–build, the administration is responsible for:

- Overall program administration
- Identification of project goals
- Determination of the best procurement method
- Identification and allocation of project risks

- Preparation of RFQ and RFP, evaluation of statements of qualifications (SOQs) and proposals, determination of the Reduced Candidate List, and selection of a design–builder
- Furnishing site information
- Providing inspection and quality assurance
- Land acquisition for rights-of-way and easements
- Utility and railroad agreements
- Preliminary surveys
- Timely review, comment, and final acceptance of the work
- Payment for work performed
- Media relations supported by the design–builder
- Independent Environmental Monitoring
- Wetland and waterway construction permits and reforestation permits
- Coordination and facilitation with regulatory and resource agencies
- QA/QC of the design–builder’s design and construction
- Developing an efficient change order process”

Organization of a Unique Megaproject: MDSHA Intercounty Connector (ICC)

All the texts and information in this section are extracted from *MDSHA Intercounty Connector Project’s Project Management Plan*:

“The ICC was financed and owned by the Maryland Transportation Authority (MDTA), which owns and operates all eight of Maryland’s existing toll facilities. The SHA, working in cooperation with and acting on behalf of the MDTA, was responsible for the environmental approvals for the ICC, and led the efforts in acquiring property, preparing and executing contracts, and administering

design and construction of the ICC. The MDTA members participated in major decisions concerning finances, procurement, and project implementation including approvals for award of all construction and design contracts in addition to right-of-way acquisitions. MDTA staff supported SHA for project development, major design decisions, general project administration, and construction management. An ICC Management Team (ICC Team) had been organized to ensure the successful completion of the ICC project. This ICC Team is under the leadership of the MDTA and SHA personnel. The ICC Team is staffed with SHA personnel supplemented with personnel from ICC Corridor Partners, a group from the private sector selected by the SHA to act as an extension of the SHA and MDTA staff.

ICC Team Overview

The ICC Team is under the project leadership of the SHA administrator, who is advised by the Executive Policy Committee consisting of the Maryland Secretary of Transportation and senior members of the Maryland Department of Transportation (MDOT) and the MDTA. The project director performs day-to-day project management with advice as needed from a Senior Management Team made up of key MDTA and SHA personnel. Group leaders report to the project director and are responsible for specific managerial, administrative, financial, engineering, design, construction, and technical areas of the project. The ICC Team works in close partnership with the local entities that are affected by the project.

The project director has the responsibility to provide project direction and policy decisions as necessary to the remaining portion of the ICC Management Team as shown in Figure 4-4. The project director is responsible for the day-to-day management of the project. The project director chairs the ICC Team meetings, defines project priorities, determines project assignments, and assures that the project goals are achieved. The project director and/or the designee recommends

approval of all change orders and contract modifications over an established amount to either the MDTA members or the MDTA executive secretary. Other members of the Project Direction are the FHWA project delivery team leader and FHWA PM.

The FHWA project delivery team leader provides policy direction and decisions from the federal perspective, with the goal of providing direction to the FHWA PM. The FHWA project delivery team leader serves as the primary spokesperson for the FHWA on all federal matters relating to the project, and recommends approval of the Initial Financial Plan and annual updates, the Project Management Plan, as well as other status reports.

The FHWA PM provides stewardship, oversight, and project-related federal approvals, and is the FHWA representative on contract administration issues. The FHWA PM is a first line of contact for the ICC Management Team, and attends project, design-build, environmental, quality assurance, as well as other meetings as needed. Assigning these two roles was among the best strategies to establish desirable working relationships with the FHWA.

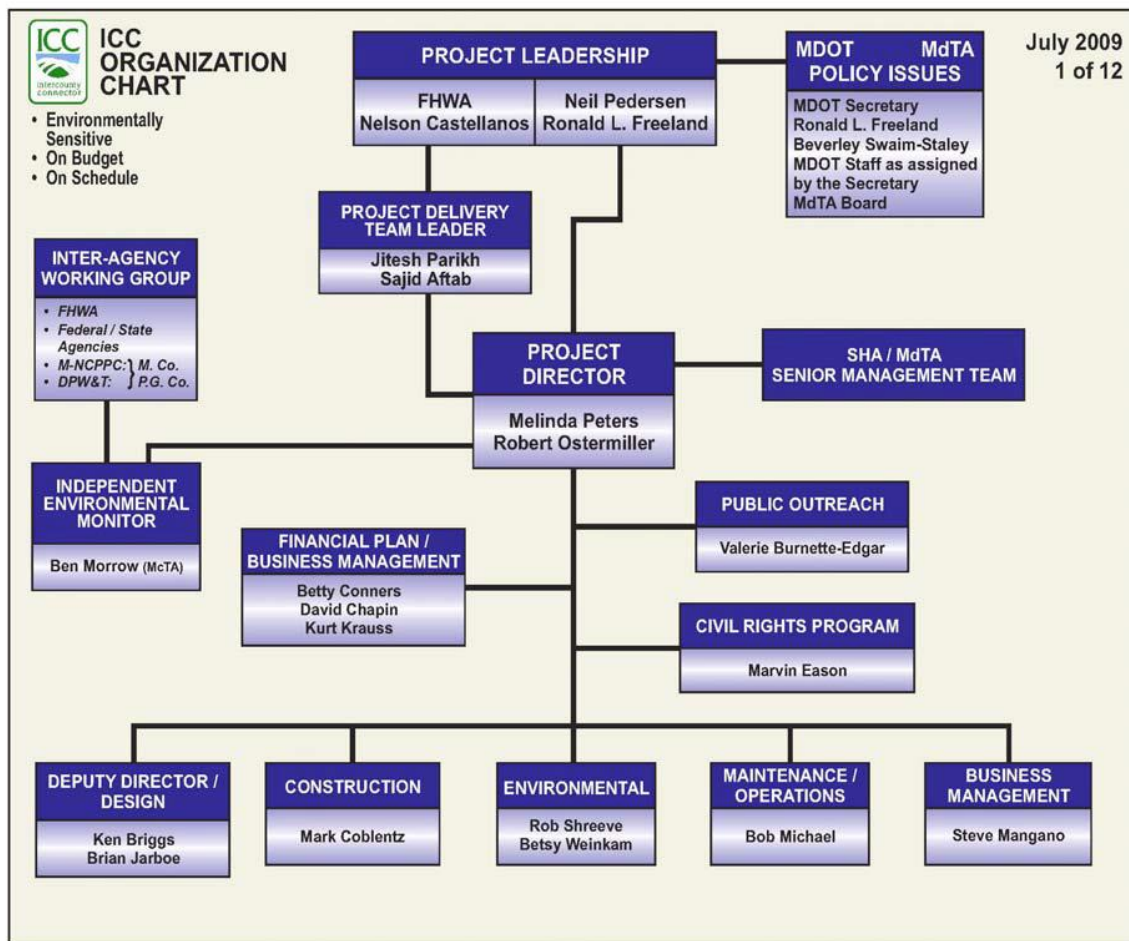


Figure 4-4 ICC Management Team Organization Chart (copyright of MDSHA)

Key managers who work under the project director's roles and responsibilities (ICC key managers) are described in the following subsections.

ICC Design Manager

The ICC design manager is responsible to:

- Develop concept plan design
 - Manage technical staff in overseeing and assessing design compliance by the design-builder
- (Technical areas within the Design Group include: Aesthetics, Air Quality, Noise, Computer

Systems, Geotechnical, Highway, Hydraulics and Hydrology, Pavements, Structures, Survey, ITS⁵, and ETC⁶ systems, Traffic, and Utilities.)

- Provide engineering personnel to the hub office to facilitate design oversight and resolution of design issues during construction.

ICC Construction Manager

The ICC construction manager is responsible to:

- Oversee and audit the design–builder’s construction activities
- Manage the individual contract resident engineers who are assigned with their own staff to each construction contract (Each Contract Resident Engineer provides day-to-day interface with the Design–Builder for that contract.)
- Maintain a staff of office engineers and administrative aides who assist in the performance of other construction management activities

ICC Environmental Manager

The ICC environmental manager is responsible to:

- Coordinate the Environmental Management Team and the Independent Environmental Monitors
- Manage the processes, as well as the construction products, of the environmental portions of the project.

⁵ Intelligent Transportation Systems

⁶ Electronic Toll Collection

The Environment Group is responsible for oversight of the design–builder’s construction efforts on the various contracts. In addition to the five main design–build construction contracts, there are a number of environmental stewardship projects, compensatory mitigation projects and community stewardship projects that are included within the overall ICC project. The conceptual development, design permitting, procurement and oversight during construction are all the responsibility of the Environmental Group.

ICC Business Manager

The ICC business manager is responsible to:

- Track project control areas for the project as a whole, as well as each individual contract.

Specific functions include:

- Cost control and management of cost tracking system
- Funds management
- Schedule maintenance, analysis, and updates
- Document control
- Progress reports
- Cost and schedule analysis for change orders
- Review of contracts
- Processing progress payments

The Business Management group interfaces with all groups on the ICC project to assure that accurate and up-to-date information is available for project reports and cost and schedule analysis.

Public Outreach Manager

The public outreach manager is responsible to:

- Manage the public outreach efforts of the entire ICC Team, including the design–builder. The effort includes:
 - elected official updates, public information, community and public outreach, media relations and governmental relations

In addition, the public outreach manager is responsible for coordinating with, and providing oversight for, the different design–builders on the project.

Specific responsibilities of the group include:

- Preparing and keeping the Public Information Plan up to date
- Planning and making arrangements for public meetings
- Preparing information such as newsletters for distribution
- Maintaining information on the project website
- Assisting with the development of the design–builder’s Public Information Program and monitoring the program
- Receiving and responding to public input
- Maintaining a database of all public correspondence

ICC Civil Rights Manager

The ICC Civil Rights Manager is responsible to:

- Oversee and audit all project activities to assure that all equal opportunity and non-discrimination requirements are met

- Oversee and monitor the DBE goals and requirements for the entire project. Specific responsibilities include:
 - Monitor all Contractors including the design–builder’s internal processes for employment and external processes for subcontracting
 - Review all subcontracting
 - Ensure labor compliance for all craft workers
 - Investigate complaints related to discrimination, prompt pay, labor violations, etc.
 - Advise, conduct outreach, train and increase awareness regarding equal employment opportunities (EEO)

Leadership Support

The leadership role of the Executive Policy Committee was noteworthy for the successful delivery of the ICC, as the committee provided overall policy direction for the megaproject. The primary function of this group was to:

- Make policy decisions for the project
- Assure that adequate resources are provided from each respective organization to support the project
- Provide support to the Project Team in relations with regional and national stakeholders
- Monitor the progress of the project

The Maryland DOT secretary/chairman of the MDTA has ultimate decision-making authority for the project. This assures that the project receives a high level of support and attention from each agency. The MDOT secretary provides the primary project interface with the Transportation

Commission, and with the members of the MDTA. The members of the Executive Policy Committee include the:

- MDOT secretary
- Authority executive secretary
- MDOT deputy secretary
- SHA administrator
- MDOT chief of staff; as needed
- MDOT assistant secretary for policy, government affairs, and communications
- Authority deputy executive for facilities development

The Executive Policy Committee meets as necessary with the project director and team to review project status and major project issues.

Several structured meetings regularly took place to facilitate decision-making based on progress and needs of the project.

- Executive Policy Committee Meetings: This Committee provided overall program direction to the project team. Meetings were held to review project status, evaluate outstanding project policy issues, and to provide overall and specific policy direction.
- Project Leadership Team Meetings: The team is to meet whenever issues arise that require the Project Leadership Team's consideration and direction to the project. It was anticipated that at a minimum, a meeting would be held every two months. The project director was to provide a weekly update to SHA senior managers and the FHWA. The weekly update included information on the progress of the project.

- **Project Management Meetings:** Project management meetings were held weekly to review major ongoing project issues. Key managers were to bring agenda items to the project director, who chairs the meeting. Attendees were drawn from diverse areas of the ICC Team to assure that any critical issues were brought forward and discussed. Other ICC Team members might be requested to attend, as required. Pending and possible change orders were reviewed at this meeting. Change orders requiring approval of the project director were discussed and approved (or rejected) as necessary.
- **Design–Build Meetings:** It was expected that the design–builder would conduct a number of regular Task Force meetings in each discipline area to facilitate project coordination between SHA and design–builder technical personnel. SHA and the design–builder met weekly to review major project issues. A Look Ahead meeting was held weekly to review major upcoming project activities, particularly those that may have an impact on the public. This included identification of upcoming detours, closures, or other activities requiring either SHA approval or notification to the public.
- **MDTA Board Meetings:** Meetings were held with the Authority Board as necessary.”

4.3.5. Responsibilities of the Florida DOT (FDOT) Design–Build Project Manager

All texts and information in this section are extracted from Design-Build Procurement and Administration document- Topic No. 625-020-010-I:

“FDOT’s project manager will be responsible for coordinating the procurement of design–build services, as well as overseeing the engineering/inspection/construction of the project. A team approach, with a PM from production and a PM from operations, is a viable solution to fulfilling

the responsibilities associated with this role. The responsibilities may include, but are not limited to:

- Working with Contracting Unit and other appropriate offices in establishing the pre-qualification categories and advertisement
- Coordinating with the Federal Highway Administration representative on oversight and exempt projects
- Participating in the *Proposal Evaluators'* review of *Letters of Interest* submitted by responsive design-build firms
- Participating in the development of the RFP
- Working with the Contracting Unit in responding to the design-build firm's inquiries
- Participating in the procurement meetings
- Coordinating the *Proposal Evaluators'* review of the technical proposals
- Coordinating the submittal of technical evaluations to the Selection Committee
- Acting as the Department's liaison with the design-build firm during the construction of the project in general and as the person in responsible charge of the project
- Coordinating the review of the design-build firm's submittals by FDOT during design and construction
- Working with the assigned right-of-way project manager to ensure right-of-way services are provided as specified in the contract and in compliance with applicable state and federal requirements
- Making periodic site reviews
- Reviewing and approving periodic progress payments
- Monitoring minority business enterprise (MBE)/DBE participation

- Ensuring the Department receives final documents as specified in the contract
- Ensuring that proper construction engineering and inspection (CEI) is performed during construction
- Ensuring Materials Acceptance Program requirements are met
- Working with appropriate offices to develop supplemental agreements if applicable
- Ensuring that the design–build firm’s quality control (QC) plan is being followed
- Ensuring that all environmental commitments are followed
- Ensuring that appropriate documentation takes place at each step in the process
- Conducting performance evaluations

The PM must rely heavily on a multi-disciplined team in order to: (a) determine the pre-qualification requirements; (b) develop the design and construction criteria; (c) evaluate the Letters of Interest and technical proposals; and (d) oversee the design, construction, and CEI of the project and, if applicable, right-of-way services provided on the project. The district secretary or the district directors should assign the appropriate people to serve on this team. Due to the complexity of coordinating a design–build project, the PM and members of the multi-disciplined FDOT team must work in concert to successfully complete all elements of the contracting and administrative process required by design–build projects.”

4.3.6. Responsibilities of the Georgia DOT (GDOT) Office of Innovative Delivery

All the texts and information in this section are extracted form GDOT Design-Build Manual:

“The GDOT Office of Innovative Delivery is in charge of the administration of the design–build program in the state. The primary responsibility of the office of innovative delivery includes a

primary focus on design–build project selection, schedule management, RFP development, as well as management of the design phase of the design–build contract. Other responsibilities include:

- Evaluate projects for design–build suitability
- Collaborate with the chief engineer regarding project selection
- Manage the design–build procurement process
- Facilitate reviews of all design–build submittals
- Proactively communicate with other GDOT offices, local governments, and FHWA
- Develop and maintain design–build procedures, guidelines, boilerplate contracts, and related documents
- Serve as a resource to the industry and local governments regarding design–build delivery”

4.3.7. Responsibilities of the Texas DOT (TxDOT) Strategic Contracts Management Division

In TxDOT, project managers are only assigned to one project. TxDOT’s design-build and P3 contracts are usually between \$500 million to \$1.2 billion. During the post-award and throughout the operations and maintenance phases of the project, the district office handles project management issues. The main responsibilities of the TxDOT Strategic Contracts Management Division throughout different phases of design–build and P3 projects are summarized in Figure 4-5.

Program Administration	Pre-Procurement	Procurement	Post Procurement	Tolling, CMA, COMA, Warranties
<ul style="list-style-type: none"> Records Management Implement SharePoint across: <ul style="list-style-type: none"> All project phases SCM Administration District Project performance and records review Dashboards/Tabloids DBE Coordinator Policy, Process, Procedure Strategic Planning Legislative Review Commission Business Operations, Contracts and HR Systems and Automation Risk Management Consultant Procurement Management 	<ul style="list-style-type: none"> Financing Liaison to PFD Funding Cost estimates Feasibility Scenarios Maintenance Alternatives T & R Initial Risk /CERA workshop lead or support Project Development Agreements Project Funding Sheets UTP project selection process and support to districts CTR DB vs. DBB tool FHWA/Third Party/RMA Coordination 	<ul style="list-style-type: none"> Procurement Documents, Developer Agreement and Technical Provisions Selection Process One On Ones ATC Review ROW/Utility Liaison Risk Management FHWA/Third Party/RMA Coordination Industry Workshops Contract Negotiation and Execution AGC Liaison 	<ul style="list-style-type: none"> Compliance and Oversight Scheduling and Payment support Change Order support Claims support Risk Management Troubleshoot design and const. issues Quality Assurance Program(QAP) for Design Build(DB) projects Project Manger's Implementation Guide Review and manage materials quarterly reports Develop and document new and existing procedures Manage training- DB 101, exec. DB 101, QAP for DB, Scheduling and Payment, Design Oversight Technical Provision support for design and construction Transition projects from Procurement to Construction, then to O&M Contractor perf evals 	<ul style="list-style-type: none"> Manage EOC: charged with overall program administration Cross-Divisional support for projects (FIN, TOD, DMO, OGC, MNT) Program reporting to Administration & Bond holders Oversight requirements/compliance review Develop QAP for O&M activities Renew/not Renew CMA Risk and Financial Analysis Process Guidance & Training Feedback to Procurement Risk Management Project metrics, dashboards Policy, process and procedures Evaluate non-compliance points Project Manager's O and M Guide Transition Checklist from DB to O and M Coordinate and approve submittal/authority matrix

Figure 4-5 The Main Responsibilities of the Texas DOT Strategic Contracts Management Division Throughout Different Phases of Design–Build and P3 Projects
(Copyright of Texas DOT)

4.3.8. Responsibilities of the Virginia DOT (VDOT) Alternate Project Delivery Office

All the texts and information of this section are extracted from personal communication with the head of the Alternative Delivery Office and Virginia DOT Design-Build Manual:

“VDOT conducts procurement in a centralized approach to minimize the risks of legal challenges. VDOT has one key personnel from the Alternate Project Delivery Office (PM-APD) whose responsibility is to supervise procurement of a design–build contract. This individual is responsible for contract development, solicitation, and award. Also, the project manager from the district (PM-D) is VDOT’s designee for managing all phases of project development and administering

the design–build contract. The PM-D is responsible for the scope, schedule, and budget of the project.

Figure 4-6 describes the organizational structure of VDOT’s Alternative Project Delivery Division.”

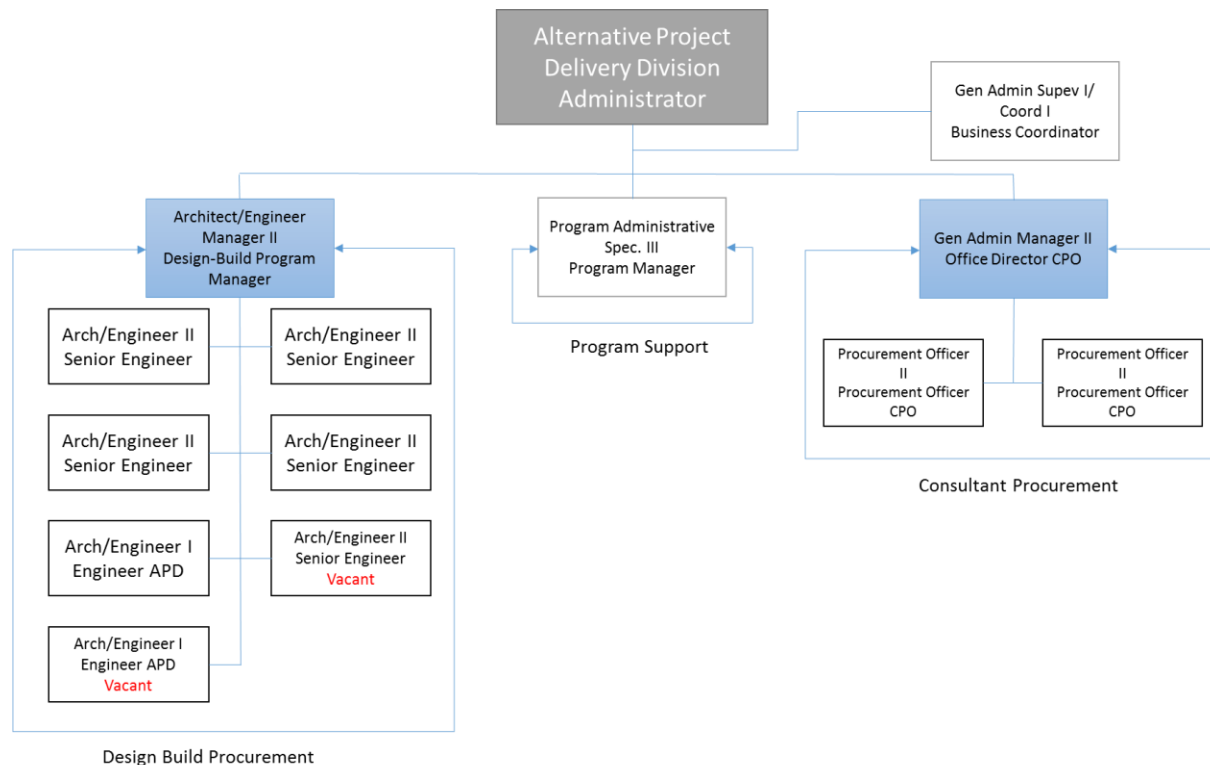


Figure 4-6 Organizational Structure of VDOT’s Alternative Project Delivery Division

4.3.9. Responsibilities of the Missouri DOT’s (MoDOT’s) Design–Build Project Manager

All the texts and information of this section are extracted from personal communication with the MoDOT’s project manager – design build coordinator:

“In MoDOT, a project director (equivalent to project manager) is not assigned more than one design-build project. The design-build coordinator is also a project director on a smaller \$22 Million project at the same time. It is possible that a project director could handle more than one project if those projects are smaller and less complex (\$20 M range).

All projects currently have a project director assigned to them regardless of price. It is believed in MoDOT that it is important to have one person empowered to make decisions for the project. On larger projects (\$65 + Million), MoDOT will assign a deputy project director to assist the project director on the project. The deputy will generally have complimentary skillset to the project director (such as construction/design/traffic/bridge).”

4.3.10. Responsibilities of the New York State DOT’s (NYSDOT’s) Design–Build Project Manager

All the texts and information of this section are extracted from personal communication with the NYSDOT’s director, project management office/design-build program director:

“The number of projects a project manager may have during the development of the RFP would vary depending on complexity. Typically, these projects are sizeable with a lot of complexity, so it is best to have a project manager focused on one procurement at a time. After award, the project manager is not the same as the procurement project manager, rather a construction project manager. Typically, based on project complexity, a project manager is limited to one project. If the project is not too difficult and complex, it may be possible for the project manager to manage more than one project. However, this is possible if the project managers have very strong project management skills and a very competent support staffs on site.

NYSDOT's design-build projects vary in size from \$20 million to \$550 million to date. The project manager assigned is a function of the skills necessary for having a successful project. When it comes to assigning a project manager, the logistics of a project and the availability of the contractor/designer pool of design-build firms are more important than the project's dollar size. If the project is too big, it leads to complex joint ventures and or national firms to become on-board and it can preclude local teams due to the size, which is not a desirable consequence by NYSDOT."

4.4. Involvement of District Offices in Delivery of Design–Build Projects

There are variations among state DOTs in terms of how they involve district offices in developing design–build projects. The model they choose has a significant effect on the roles and tasks that are assigned to the HQ and also the relationship with the districts and other offices in DOT. Figure 4-7 shows variations of district offices in delivery of design–build projects. The more tasks and responsibilities district offices can handle, the more decentralized the state DOT is in handling procurement, administration, and management of design–build projects.

On the other end of the spectrum, some state DOTs, such as Georgia, North Carolina, and Virginia DOTs, perform all the related tasks in a dedicated design–build office at the HQ. District offices play a minor role in the delivery of design–build projects in these states. For instance, Virginia DOT has some minor design–build projects that are being done locally at the district offices. This practice is mainly utilized to dedicate the authority of small design–build projects to the local offices and make them more familiar with the dynamics of the innovative project delivery systems. Maryland State Highway Administration follows a similar practice for executing small design–build projects. The design–build PM is assigned to the project at the HQ office of innovative delivery in Georgia and North Carolina DOTs without much involvement from the district offices. This practice is slightly different from that in Virginia DOT in that the district office assigns a dedicated PM to the design–build project to become engaged with the project from inception to completion.

DOTs’ district offices have a wide range of responsibilities and roles. Some of the large design–build programs have tried to get district offices involved in a variety of tasks for planning, preliminary engineering, procurement, and post-award activities for design–build projects. This is considered as an appropriate strategy to enhance the utilization of alternative delivery in the state. **Table 4-2** shows how district offices in different state DOTs perform different types of tasks related to the delivery of design–build projects throughout different phases of project development. The more decentralized a design–build program becomes, the more involved the district offices are in the delivery of the design–build projects. The tasks that are assigned to the district offices mainly depend on the size of the program, available resources in the HQ, and available expertise in the district offices. As an example, in the Colorado DOT, there is only one full-time employee available in the HQ, whose main role is support and advisory. Therefore, it is only practical to

assign the administration of design–build projects to the district offices. It is worth noting that district offices often bring consulting firms on board to assist them in performing the identified tasks as they may not have the time, resources, or skills to perform them.

Table 4-2 Tasks Performed by District Offices to Assist the HQ Office of Innovative Delivery in Different State DOTs

Phase of the Project	Tasks	State DOT						
		Utah DOT	Texas DOT	Caltrans	Colorado DOT	Florida DOT	Washington State DOT	Missouri DOT
Prior to the Procurement	Assist the HQ in establishing design-build rules and policies, and developing tools to support implementing the design-build program	-	✓ TxDOT has an executive oversight committee made up of district engineers that help advise the HQ office.	General policies are developed by HQ. District may have an opportunity to review them.	-	-	✓ WSDOT has an internal design-build work group which develops policy. It meets regularly and is composed of staff from region offices, HQ, and mega projects.	✓ One dedicated design-build coordinator manages this with input from design-build teams in districts.
	Be responsible to assess the appropriateness of design-build for a project and identify candidate projects for design-build	✓	✓ TxDOT has a tool that helps determine if a project would be better as design-bid-build or	✓ Districts nominate projects for design-build. The nominations are reviewed by the	✓	✓	✓ Collaboration between HQ and Region exists. The probable project delivery	✓ A variation of the University of Colorado project delivery selection matrix with an initial risk assessment

			design-build. The districts supply the data for the tool.	HQ office that prepares a recommendation to the management as to whether the project is a good candidate.			method is determined at HQ. The final project delivery method is determined by the region.	is used to vet projects.
	Hire consulting firms to assist the district office in procurement and related tasks	✓	✓ The districts hire a general engineering consultant (GEC) to help them with schematics, environmental and technical components.	If help was needed to procure, HQ would hire the consultant. This is not the standard practice.	✓	✓	✓ This task is solely the responsibility of the a region (district) office.	✓ Consulting firms provide more support related activities (e.g., utilities, survey, traffic, and preliminary design)
	Hire and sign the contract with the owner's consulting firm(s)	✓	✓ The division owns the procurement process and hires procurement engineers and attorneys to help them.	This would be a HQ function if used.	✓	✓	✓ This task is primarily the responsibility of a region office.	✓

During the Procurement	Take a lead in performing preliminary engineering to prepare the materials for the RFP	✓	-	✓ All preliminary engineering is done by the districts.	✓	✓	✓ Region office and HQ collaborate on this task.	✓
	Assist the HQ in the procurement process of design-builder (or developer)	✓	✓	✓ Districts are active participants in the procurement process (developing RFP, participating in one-on-one meetings, reviewing ATCs, and evaluating proposals).	✓	✓	✓ This task is primarily the responsibility of a Region office.	✓ The District is the lead, not HQ.
	Take a lead in procurement of design-builder (or developer)	-	✓	HQ is the lead.	✓	✓	✓ This task is mainly the function of a region (district).	✓
Post-Award	Designate a district engineer to oversee	✓	✓	✓	✓	✓	✓	✓

	and administer the design-build contract, and manage scope, schedule and budget of the design-build project			Districts assign a contract manager to administer the contract.			The region office designates a project engineer to administer the contract with assistance from an assistant state construction engineer from HQ.	
	Take over the management of the project upon the award of the contract.	✓	✓	✓ Districts administer the contracts.	✓	✓	✓	✓
	Be responsible for design oversight	✓	✓	✓	✓	✓	✓ This task is mainly the responsibility of a region office.	✓ Central office supports this function.
	Be responsible for construction oversight (e.g., visiting construction job sites on a regular basis, responding to any	✓	✓	✓ HQ provides support and is involved in change orders	✓	✓	✓ This task is mainly the responsibility	✓

	issues from the contractor during the construction, etc.)			and dispute resolution.			of a region office.	
Operations and Maintenance	Manage the operations and maintenance of design-build and P3 projects	✓	✓	✓	✓	✓	Region office and HQ collaborate on this task.	✓

Tasks Performed by District Offices to Assist the HQ Office of Innovative Delivery in Different State DOTs (Cont'd)

Phase of the Project	Tasks	State DOT					
		New York State DOT (NYSDOT)	Maryland SHA (MDSHA)	Georgia DOT	North Carolina DOT	Virginia DOT	Minnesota DOT
Prior to the Procurement	Assist the HQ in establishing design-build rules and policies, and developing tools to support implementing the design-build program	<p>A continuous improvement and feedback process is in place to shape policy.</p> <p>Ultimate decision for change in process and procedure resides with the project and design build management office (P&DBO).</p>	-	-	-	-	- Districts being asked for advice/review when necessary.
	Be responsible to assess the appropriateness of design-build for a project and identify candidate projects for design-build	<p>Regional offices make design-build project recommendations to the P&DBO for review and approval.</p> <p>A straightforward informational process is used to decide what</p>	District office may be part of team to assess but recommendation of appropriateness is from the innovative contracting.	-	-	✓	✓

		should be delivered via design-build.					
	Hire consulting firms to assist the district office in procurement and related tasks	NYS DOT has a procurement support consultant and a design quality assurance support consultant on each project.	Procurement is managed by HQ.	--	-	-	-
	Hire and sign the contract with the owner's consulting firm(s)	The P&DBO is responsible for contracts with consultants that support the design-build delivery.	Consultant firms, design or construction, are procured through the office of procurement and contract management. Generally, the construction management/construction inspection (CM/CI) contracts are developed by the central office of construction for all districts.	-	-	-	-

			Design contracts are developed by the lead design office.				
During the Procurement	Take a lead in performing preliminary engineering to prepare the materials for the RFP	<p>✓</p> <p>Preliminary engineering remains the duty of the regional design offices.</p> <p>The P&DBO provides guidance related to content of the design approval document (DAD) to ensure the right level of engineering is performed to support a quality RFP.</p>	Design is lead from HQ.	-	-	-	<p>✓</p> <p>HQ Office helps as much as needed, but not much.</p>
	Assist the HQ in the procurement process of design-builder (or developer)	<p>✓</p> <p>District offices provide project content as necessary.</p>	<p>✓</p> <p>District personnel may be involved in the review of statements of qualifications or</p>	-	✓	✓	✓

			technical proposals.				
	Take a lead in procurement of design-builder (or developer)	P&DBO is the lead for consistency of the program.	Procurement is led by HQ.	-	-		- MnDOT believes that it's wise to run the program centrally but be friendly such that the district appreciates the help and participates appropriately.
Post-Award	Designate a district engineer to oversee and administer the design-build contract, and manage scope, schedule and budget of the design-build project	A regional PM is assigned, but reports to the director of the P&DBO for policy, procedures, and administrative guidance	✓ The district office administers and manages the contract.	✓	✓	✓	✓ Districts needs central guidance as well.
	Take over the management of the project upon the award of the contract.	Regional PM is responsible for day to day job. Overall project and program	✓ Contractually, it is the district's	-	-	✓	✓

		responsibility resides with the P&DBO Director.	responsibility to manage.				
	Be responsible for design oversight	<p>A DQAE works for the PM to provide design oversight.</p> <p>The design quality assurance engineer (DQAE) consultants are procured by the P&DBO.</p>	All design acceptances are from the lead design office.	-	✓	✓	<p>✓</p> <p>Assisted heavily by a separately-hired design oversight consultant and/or central functional staff (MnDOT has dedicated DB bridge and semi-dedicated DB geotech personnel) Soon to be assisted by a central assistant PM.</p>
	Be responsible for construction oversight (e.g., visiting construction job sites on a regular basis, responding to any issues from the contractor during the construction, etc.)	Regional PM performs daily tasks. All risks and issues are routinely reported to the P&DBO.	<p>✓</p> <p>The district is responsible for construction management and inspection.</p>	-	✓	✓	✓

		<p>Contract disputes and claims are resolved at the P&DBO.</p> <p>Quality issues are resolved at the P&DBO too.</p>					
Operations and Maintenance	Manage the operations and maintenance of design-build and P3 projects	✓	<p>✓</p> <p>Operations and maintenance is provided by the district office.</p>	✓	✓	✓	✓

4.5. Training and Staffing Strategies and Preferred Skillsets

Developing skilled workforces for the office of innovative delivery is a daunting challenge for all the state DOTs. Attracting and maintaining the subject matter experts in design–build and alternative delivery is even more difficult currently, considering the DOT’s limitations in recruiting new hires and compensating the staff at a comparable level with the private-sector consulting firms. At the same time, innovative project delivery needs to get acceptance from other disciplines in the Department. As a new model for project development, DOT professionals in different offices need to be further educated and bought into the new paradigm, as their support is key to sustaining efforts to enhance the breadth and quality of design–build programs.

The research team addressed these challenges and surveyed heads of offices of innovative delivery in different state DOTs about their strategies in two main areas of staffing:

1. What strategies have they used to inform and educate internal DOT staff about design–build and P3 programs?
2. How has their agency tried to develop a pool of qualified candidates inside different offices that can take leadership positions in design–build or P3 projects?

Table 4-3 summarizes different strategies utilized by state DOTs in enhancing the awareness of the internal staff about design–build and developing skilled workforces to staff design–build programs.

Table 4-3 A Summary of Different Strategies Utilized by State DOTs in Enhancing the Awareness of the Internal Staff about Design-Build and Developing Skilled Workforces to Staff Design-Build Program

State DOT	What strategies have been used to inform and educate internal DOT staff about DB and P3 program?	How has the agency tried to develop a pool of qualified candidates inside different offices that can take leadership positions in DB or P3 projects?
Minnesota DOT (MnDOT)	<p>MnDOT does not have a sustained effort yet, but</p> <ul style="list-style-type: none"> • DB program manager is developing half-day classes for program and project managers this year. • DB program manager provides short training sessions as needed for project delivery method selection meeting and as needed for staff working on projects. • He also occasionally trains districts as needed/requested. 	<ul style="list-style-type: none"> • Small districts do not have enough DB projects to maintain knowledgeable staff in most cases. • Two of the three larger districts have developed an ‘alternative delivery’ expert who is the first-choice PM for any alternative delivery project in those areas. • Main problem: <ul style="list-style-type: none"> ○ If one of the people who are working as PM is promoted or leaves, his/her experience is irreplaceable in short-term. • Good news: MnDOT is currently hiring an assistant to DB program manager position. • Right now, DB program manager works closely with PMs during procurement as an assistant PM. He trains them in DB methods by helping them through all DB-specific activities. Following procurement, however, he does not have a specific role. • New assistant to DB program manager will essentially do the same thing he is doing now (assist/train) following letting. • Benefits of hiring assistant DB program manager:

State DOT	What strategies have been used to inform and educate internal DOT staff about DB and P3 program?	How has the agency tried to develop a pool of qualified candidates inside different offices that can take leadership positions in DB or P3 projects?
		<ul style="list-style-type: none"> ○ It is believed that this will increase DOT's oversight consistency, better train construction PMs, and save money that otherwise would have been spent on consultants. ○ It is believed that the assistant will also be 'bench strength' for the DB program in case the current DB program manager leaves someday.
Further Information (MnDOT)	MnDOT management instructed DB program manager not to use P3 in the DB program.	
Texas DOT (TxDOT)	<ul style="list-style-type: none"> • TxDOT is currently finalizing final design–build phase and operations and maintenance (OM) phase Project Manager Guides. • TxDOT has engaged the design–build industry and department subject matter experts to develop standardized documents including a Design–Build Procurement Manual, Design–Build Agreement, and Design–Build Specification Book. Final first drafts of each are nearly complete. • TxDOT conducted district tours to discuss roles and responsibilities and program goals. • TxDOT added processes and procedures. • TxDOT is currently drafting a plan that will review current trainings and identify the goal of 	TxDOT did not have any specific plan to do so, but it is implementing a succession planning program this year, and believes that might help it address the issue.

State DOT	What strategies have been used to inform and educate internal DOT staff about DB and P3 program?	How has the agency tried to develop a pool of qualified candidates inside different offices that can take leadership positions in DB or P3 projects?
	<p>new/revised trainings, attendees, and frequency of training. Plan also includes a process for soliciting training feedback for improvements to existing courses, guidelines, and identifying gaps.</p> <ul style="list-style-type: none"> • TxDOT is currently developing a Contract Administration Manual and financial manuals for P3 projects. • Current training classes include: DB 101 (2 days) Executive DB101 (4 hours), Design Oversight, Quality Assurance program, one-day project-specific start-up training. 	
New York State DOT (NYSDOT)	<ul style="list-style-type: none"> • For the NYSDOT DB program, when DOT created its Design–Build Procedures Manual (DBPM) these components were included and made available online: <ul style="list-style-type: none"> ○ Educational piece ○ Basic training ○ Presentations • NYSDOT conducted formal classes as well. • This material has been updated and as each design–build project is identified, the staff involved get trained on relevant design–build processes. 	<ul style="list-style-type: none"> • There have not been formal efforts up until now. • Originally, a person was designated as the DB program lead reporting directly to the commissioner. • The delivery of the projects was highly dependent upon consultant services working with district staff. • Currently, primarily because the DB lead person left NYSDOT, the DB program has been assigned to a newly created Project Management Office (PMO)—still very dependent on consultant support. • Outside the PMO, NYSDOT does not have designated design–build staff. • Project manager at the region level is assigned on a project-by-project basis, typically, a one-time assignment for that region.

State DOT	What strategies have been used to inform and educate internal DOT staff about DB and P3 program?	How has the agency tried to develop a pool of qualified candidates inside different offices that can take leadership positions in DB or P3 projects?
	<ul style="list-style-type: none"> In addition, NYSDOT is currently updating its DBPM—this effort includes updating the training (with a particular focus on post-award activities). 	
Further Information (NYSDOT)	<ul style="list-style-type: none"> NYSDOT does not have any P3 experience or process, nor does it have legislative approval to use the P3 project delivery method. 	
Maryland State Highway Authority (MDSHA)	<ul style="list-style-type: none"> As part of D-B training for new employees, MDSHA has 3 training modules: <ul style="list-style-type: none"> D-B Design D-B Procurement D-B Project Management and all employees are invited to attend the training. 	<ul style="list-style-type: none"> MDSHA district offices take many things into consideration when assigning construction staff to a D-B contract. MDSHA believes that scope of work, not necessarily the project delivery method, will determine who is best qualified to take leadership positions.

State DOT	What strategies have been used to inform and educate internal DOT staff about DB and P3 program?	How has the agency tried to develop a pool of qualified candidates inside different offices that can take leadership positions in DB or P3 projects?
Further Information (MDSHA)	<p>Lessons learned from the Intercounty Connector (ICC):</p> <ul style="list-style-type: none"> • Office of Highway Development was the lead that <ul style="list-style-type: none"> ○ Provided program oversight from design initiation through construction ○ Was directly responsible for overseeing procurement/selection process • Program Management was led by the Office of Highway Development, and Contract Administration was led by District Construction. Related challenges were: <ul style="list-style-type: none"> ○ Required strong project management skills ○ Needed ability and willingness to partner between design & construction ○ Was dependent on all MDSHA staff to meet critical dates • <i>Innovative Strategy</i>: Senior members of the following MDSHA offices were teamed up with the respective developer's team to facilitate smooth decision-making about the project: <ul style="list-style-type: none"> ○ Office of Highway Design, Office of Environmental Analysis, and Office of Construction/Procurement • This decision was not perceived problematic for these offices although they were losing great subject matter experts. In fact, MDSHA tried to make the best of this situation. These experts were getting close to the end of their careers and were looking for exciting and challenging opportunities toward the end of their careers in the agency. Working on such high-profile projects actually helped them to find further consulting opportunities after their retirements from the agency. Also, inside the offices after these senior people left, room was created for the next generation of experts to move up the organizational ladder. It provided career advancement opportunities for other people in these offices. 	

State DOT	What strategies have been used to inform and educate internal DOT staff about DB and P3 program?	How has the agency tried to develop a pool of qualified candidates inside different offices that can take leadership positions in DB or P3 projects?
Colorado DOT (CDOT)	<ul style="list-style-type: none"> • CDOT has an internal formal DB training program. • CDOT has been using DB for more than 20 years so there are numerous very knowledgeable project managers within each region that informally educate other staff about DB and P3 either by word or when assigned to a particular project. • CDOT has the D-B Manual and the P3 Manual available on the CDOT website that have a wealth of information about various phases of the D-B project delivery method. 	<ul style="list-style-type: none"> • CDOT does not have a formalized process for this. • CDOT is very decentralized. The regions procure and deliver their projects and HQ acts only as a support. <ul style="list-style-type: none"> ○ DB program manager is the only staff member in the Innovative Contracting Office. ○ The regions try to assign staff that have adequate experience in D-B in order to deliver successful D-B projects.
California Department of Transportation (Caltrans)	<ul style="list-style-type: none"> • One of the main strategies Caltrans has used to educate and inform about DB and P3 are presentations to staff in a variety of forums: <ul style="list-style-type: none"> ○ Caltrans provides a short 30–60-minute presentation at staff meetings throughout the state to let staff know about the programs, why DOT uses these tools (benefits of DB and P3), what the status of programs and projects are, and what we have learned to date (best practices). 	<ul style="list-style-type: none"> • For the first round of projects, Caltrans did not have this type of pool of candidates because these processes were new to Caltrans. • Now that Caltrans have done some projects, they have identified those staff who seemed to understand the methodologies and are now assigning that staff to future projects. • In addition, Caltrans is focusing on identifying key personnel for future projects to make sure that they have the skills and attitudes necessary for these methods. • Caltrans is considering requesting resumes and possibly interviewing for staff for future projects.

State DOT	What strategies have been used to inform and educate internal DOT staff about DB and P3 program?	How has the agency tried to develop a pool of qualified candidates inside different offices that can take leadership positions in DB or P3 projects?
	<ul style="list-style-type: none"> ○ Caltrans also provides written articles about the programs in various Caltrans publications. • When a DB or P3 project is initiated, Caltrans provides more intensive training: <ul style="list-style-type: none"> ○ Each team member on a DB project attends at least one of two training classes that Caltrans has purchased through the American Society of Civil Engineers (ASCE) ○ The first class is focused on the procurement process and how to develop an RFP. ○ The other is a class on how to administer a DB project. <ul style="list-style-type: none"> ➤ Each class is two days. • Caltrans has also provided a couple of DBIA classes to its staff. • For its one P3 project, Caltrans' P3 program developed training modules and delivered those using Caltrans' own staff and consultants. 	

State DOT	What strategies have been used to inform and educate internal DOT staff about DB and P3 program?	How has the agency tried to develop a pool of qualified candidates inside different offices that can take leadership positions in DB or P3 projects?
Washington State DOT (WSDOT)	<ul style="list-style-type: none"> WSDOT is in the process of developing an extensive internal training program on all aspects of DB. <ul style="list-style-type: none"> It should be complete by 06.30.17. The program material will be utilized to train WSDOT staff through instructor-led programs, as well as web-based instruction. 	<ul style="list-style-type: none"> WSDOT currently utilizes knowledge transfer between project staff, as well as between staff in different regional offices with DB experience to develop candidates for leadership on DB projects.
Missouri State DOT (MoDOT)	<ul style="list-style-type: none"> Currently the only strategy that MoDOT uses in place has been to create a “Project Manager – Design Build Coordinator” position to guide Project Leadership through the process. MoDOT is currently exploring more robust training. 	<ul style="list-style-type: none"> The current strategy has been to keep previous project staff involved in new projects. <ul style="list-style-type: none"> MoDOT has seen previous leaders take over new projects, and previous field engineers move into project leadership positions. MoDOT is relatively new to design–build (Procuring 11 and 12 DB Projects now). <ul style="list-style-type: none"> MoDOT is working through these issues as it uses design–build more and more. MoDOT believed that these are definitely challenges MoDOT is currently faced with and are working on solutions.

In the following subsections, preferred skillsets expected from a PM in the office of innovative delivery are summarized based on several examples collected from the state DOTs.

4.5.1. MnDOT's Preferred Skillsets for the Design-Build Project Manager

According to the MnDOT design-build program manager, “knowledge of writing design-build contracts, defining design-build strategies, risk management, and contract administration are important and certainly needed for a PM of a design-build project. However, soft skills are probably more important for the design-build PM who needs to be a customer/solution-focused professional (to support the PMs/districts and even the contractors to an extent) as opposed to a regulator. A project manager needs to know how to prevent problems from developing with the industry/FHWA as opposed to cause them. The design-build industry must feel like it can trust the state design-build program and its manager. It is believed that personality matters more than design-build knowledge. Somebody with the right soft skills but limited design-build knowledge can be a good candidate for the design-build PM position, as this professional can always get sufficient design-build training for performing the required technical tasks.”

4.5.2. MDSHA's Preferred Skillsets for the Design-Build Project Manager

Extracted from MDSHA DB Manual:

- “Strong project management skills

- Ability and willingness to partner between design and construction
- Dependent on all MDSHA staff to meet critical dates”

4.5.3. VDOT’s Preferred Skillsets for the Design–Build Project Manager

The following knowledge, skills, and abilities are retrieved from a *job advertisement for an Architect Engineer I* (the position is shown in Figure 4-6) that is assigned to work in the VDOT Alternative Project Delivery Office:

- Working knowledge of civil engineering principles and practices as relates to transportation project design; construction and operations; and standards, specifications, and materials
- Working knowledge of project and program development process, project and program management, contract negotiations, and contract administration
- Working knowledge of the procurement process in accordance with VDOT’s and FHWA’s policies and the Virginia Public Procurement Act, procedures, and process as relates to alternate project delivery
- Demonstrated project management skills; time management, presentation skills; negotiations skills, team building and leadership skills; effective peer relationships; and coaching and training skills
- Demonstrated contract management skills, planning and budgeting skills, and computer skills

- Ability to critically evaluate alternate project delivery proposals using civil engineering principles, practices, policies, and standards
- Ability to interpret and effectively apply department policies and procedures, federal and state procurement laws
- Ability to plan, coordinate, and manage multiple, concurrent assignments in a timely manner

Core Responsibilities of this position are:

- Assist in delivery of Alternate Project Delivery Programs
- Provide input and assist in developing policies, procedures, practices, and guidance for the Alternative Project Delivery Program and procurement of professional services contracts
- Assist in monitoring compliance to ensure conformance to the policy, procedures, and state and federal procurement laws

Minimum Qualifications for this position are:

- Work experience in transportation engineering, highway construction, report writing, developing of policies and procedures, contract development, and contract administration

- Working knowledge of VDOT's procurement process, FHWA's policies, and the Virginia Public Procurement Act
- Working knowledge of civil engineering principles and practices as relates to transportation project design, construction and operations, standards, specifications, and materials

Preferred Qualification for this position is:

- B.S. degree in civil engineering, construction management, business, or related field preferred; equivalent experience or training may substitute for degree.

4.5.4. WSDOT's Preferred Skillsets for the Design–Build Project Manager and Other Staff

All the texts and information in this section are extracted from documents provided by WSDOT with titles *DB Personnel Qualifications* and *DB Personnel*:

Design–Build Program Manager

“The following are the qualifications of the DB program manager.

- Bachelor of Science in Civil Engineering or a closely related field, or EIT Certificate and 4 years Professional Engineer experience

- Experience:
 - Minimum of 4 years of combined experience as an assistant project engineer/project engineer, with a minimum of 2 years as a project engineer, or
 - A senior-level engineer with a minimum of 10 years engineering experience and significant experience assisting with design–build contract delivery
- Licenses:
 - Professional Engineer License, Civil (Washington State)
- Knowledge of:
 - Principles of contract administration · WSDOT specifications and standards · Construction practices and methods · Construction industry associations and contacts · Construction law · L&I⁷ and OSHA⁸ requirements · State and federal public contracting laws and regulations · Alternate dispute resolution process · Construction materials · Principles of negotiation · Computer applications · Legislative process
 - The WSDOT design–build process, including first-hand knowledge attained by working on design–build projects · The WSDOT design process,

⁷ Labor and Industries

⁸ Occupational Safety and Health Administration

construction support resources, environmental permits, cultural resources process, and maintenance and traffic operations, OEO ⁹ and DBE compliance

- Skills to:
 - Work collaboratively with a diverse groups to reach consensus on major policy and process issues · Successfully lead, manage, and motivate both direct and indirect reports · Highly developed communications skills, including strong technical writing and speaking abilities · Determine acceptable risk levels and make decisions on difficult and complex construction engineering and contract administration issues · Facilitate disputes resolution between state personnel and contractors · Effective management, leadership, and supervisory skills · Determine compliance with state and federal public contracting laws and regulations · Facilitation skills
 - Issue guidance and make determinations on the interpretation of contract documents · Coach, mentor, and develop department employees and contractor managers and employees · Advise region construction personnel

⁹ Office of Equal Opportunity

and other WSDOT personnel on construction engineering and claims issues

- Perform cost evaluation/validation of changes to contracts

- Abilities to:

- Make decisions on difficult and complex construction engineering and contract administration issues · Develop policies and procedures for statewide use on construction contracts · Facilitate disputes resolution between parties · Provide coaching and mentoring · Research statutes, administrative codes, and regulations · Give presentations and conduct training

Design–Build Program Assistant

The following are the qualifications of the DB program assistant.

- Knowledge of construction specifications, manuals, and general construction activities
- Skills related to computer applications involving databases, word processing, spreadsheets, and presentations
- Familiarity with Microsoft Word, Excel PowerPoint, Access, and SharePoint
- Technical writing, editing, and proofreading skills related to construction contracts
- Two years' experience working with WSDOT in a design or construction office with familiarity with contract documents such as specifications, drawings, and design and construction work activities and processes or equivalent experience

- Experience with Visio and Electronic data management desired
- Technical writing experience is desired

Design–Build Program Specialist

The following is the qualification of the DB Program Specialist.

- A combination of design–build engineer and design–build assistant capabilities is anticipated”

4.6. Utilizing Consulting Firms to Assist the Owner

Utilizing consultant companies is a common practice in most state DOTs in managing design–build programs. State DOTs try to leverage their in-house staff by outsourcing some of the roles and responsibilities to outside consultants. Some state DOTs utilize consulting firms in an early stage of a program or a project during policy-making and developing guidelines. Some other DOTs might do these tasks internally and use consultants during the procurement process. Any of these practices largely depend on the DOT’s budget, and program size and complexity. If the state DOT has the capability of performing any of the major roles that were mentioned in the previous section in-house, it will not use consultants as much as other DOTs that do not have any in-house skilled workforce capable of doing those tasks. There are several areas that are worth studying

regarding outsourcing and design–build programs. The researchers interviewed several subject matter experts in state DOTs and consulting firms, and identified the following areas that make outsourcing practice unique for each transportation agency.

4.6.1. Prequalification, Licensing Requirements, and Selection Criteria for Evaluating Consulting Firms (Licenses, Requirements)

Consulting firms can work with a state DOT in a variety of roles and responsibilities to assist the DOT in executing tasks in different disciplines. In general, the consulting firm needs to be prequalified in the anticipated discipline that it is going to provide services; for example, the consultant needs to be registered and certified for professional engineering services in the state if engineering design tasks are required in the DOT services. State DOTs select the consultant firm purely based on their qualification. Several external factors are also considered as important selection criteria for evaluating the consulting firm, such as whether the consulting firm was onboard for other projects with the DOT, whether the consultant company is a local company that can help grow the design–build capability among the state consulting industry, and whether the consulting firm brings national and international expertise to the state’s design–build industry. One of the most important factors for a state DOT to select a consultant firm is the team composition of the firm and the firm’s available expertise. Consulting firms always strive to satisfy the required tasks with experienced, qualified, and competent staff that are knowledgeable in different aspects of innovative project delivery. Also, state DOTs are always interested in innovative

solutions developed by the consulting firm to provide significant savings in project cost and schedule. Thus, understanding the project goals and offering innovative solutions to address the project challenges are among the most critical criteria for the evaluation of consulting firms. Overall, the selected consulting firm should assure the state DOT that it can act as a true extension of the state DOT organization and fulfill the DOT's mission to protect the best interests of the state in the design-build program. Several examples of selection criteria from different state DOTs are provided below.

North Carolina DOT (NCDOT)

All the texts and information in this section are extracted from NCDOT's *Request for Letters of Interest (RFLOI)*, Title: *On-call General Engineering Services* document:

"NCDOT does not have any specific prequalification for soliciting the GESC (General Engineering Services Contract) firm, but, the extent to which a firm (and its sub-consultants) is prequalified in the anticipated disciplines involved in the contract is an important evaluation criterion. NCDOT maintains on file the qualifications and key personnel for each approved discipline, as well as any required samples of work, and each year on the anniversary date of the company, each firm must renew its prequalified disciplines. The selected consulting firm(s) must have the financial ability to undertake the work and assume the professional liability.

The following areas are considered as selection criteria for the evaluation of consulting firms in NCDOT:

- Experience, qualifications, and technical competence of the staff proposed
- Breadth of expertise of the firm(s), including national involvement in alternative delivery projects
- Past performance of the firm(s)
 - Track record of the firm’s ability to provide satisfactory client support under a multi- year contract
- Responsiveness to NCDOT, and the availability/readiness of the proposed staff
- Familiarity of the firms with NCDOT practices and procedures, including design–build projects
- Team composition and extent of prequalification across various disciplines”

Virginia DOT (VDOT)

All the texts and information in this section are extracted from Request for Proposal- Limited Services Term Consultant Contract for Statewide Design Build and P3 Support Services- RFP #LD-20150106 document:

“Organizational capabilities of consulting firms are evaluated in the following areas to select the most qualified firm to assist VDOT in design–build project delivery:

- Proposed organization, resources, and capabilities that will enhance the successful delivery of assignments
- Ability to provide local resources (office/personnel in the state) in support of task orders for design–build projects
- Proposed processes and tools to address staffing, cost control, and schedule issues
- Proposed process for ensuring utilization of sub-consultants
- The organization’s capacity with its existing workload, as well as the proposed workload from this contract
- Proposed plan to meet the expected contract deliverables and resources needed while managing other competing workloads and priorities
- Proposed management approach to complete the task assignments requiring deliverables on short notice
- Experience of individual firms working together in the past and/or plan to work together on the project”

Utah DOT (UDOT)

All the texts and information in this section are extracted from Modified Standard Request for Qualifications for Project No. 8284XCH1021:

“The consulting firm’s submitted statement of qualifications (SOQ) is evaluated in the following areas to select the most qualified firm to assist UDOT in design–build project delivery:

- Qualifications and experience of the proposed team members related to the specific project goals
- Capability of the consultant to perform the work:
 - Unique qualifications of the firm to perform of the work
 - Firm’s internal quality and cost control procedures
 - The overall performance record of the proposed project team firms
 - An analysis of the project team firms’ current workload
- Approach to the project: The selection team evaluates how well the consultant has planned a basic course of action, what alternatives and/or preliminary approaches are proposed, and what provisions are identified for dealing with potential impacts, impediments, or conflicts.
 - Description of the course of action proposed to meet the goals and objectives of the project (the proposed plan should be realistic, clear, and concise)
 - Proposed approach to manage variable workload
 - Description of proposed course of action to meet the conflict of interest requirements

- Identification of key project milestones
- Identification of potential impacts, impediments, conflicts, or potential mitigation
- Proposed key personnel to be used on the project”

Texas DOT (TxDOT)

All the texts and information in this section are extracted from *Procurement Engineer Consultant RFQ/RFP Example- Notice of Intent to Contract for Indefinite Deliverable Contract with State Funding and HUB (Historically Underutilized Business) Goal* document:

“Certification requirement and annual renewal requirement count as deal-breaker issues and absolute requirements that, without them, the firm would be ineligible to compete to assist Texas DOT in design–build project delivery. Note that for non-listed work categories precertification is not required. Also, the proposed team must demonstrate that a professional engineer, registered or licensed in Texas, will sign and seal the work to be performed on the contract. For purposes of executing an engineering contract and doing work with TxDOT, the prime provider must be registered with the Texas Board of Professional Engineers.

TxDOT evaluates letters of interest using the following criteria to select a consulting firm for program management services:

- Project understanding and approach
- The PM's experience with similar projects
- Similar project-related experience of the task leaders responsible for the major work categories identified in this Notice
- The prime provider's Quality Assurance/Quality Control (QA/QC) program
- Innovative concepts for efficiency and cost controls
- Organizational structure and its elements that bring benefits and strengths to the program management services
- Coordination with all the consulting firms through the implementation of the project to ensure clear communication and quality deliverables to the state DOT
- Audit and compliance verification program
- Quality cost estimating process and procedure

TxDOT allows joint ventures, but a single PM must be identified to represent the joint venture. All joint venture parties will be required to sign the contract and take equal 100 percent responsibility for the contract. Also, the prime provider must certify that they meet the following requirements:

- The prime firm is registered or licensed with the Texas Board of Professional Engineers
(If proposing as a joint venture, the requirement applies to each joint venture member.)
- Individuals on the project team must be currently employed by either the prime provider or a sub-provider firm that has been identified on the team
- A professional engineer, registered or licensed in Texas, will sign and seal the work to be performed on the contract
- The prime provider shall perform at least 30 percent of the contracted work with its own work force”

All the texts and information in this section are extracted from Selection Criteria for Procurement Engineers- Request for Qualifications (RFQ) for Professional Engineering Services (PEPS) – Solicitation number 86-5RFP5075:

“Key personnel in the owner’s consultant team are often required to be collocated with the state DOT staff. Also, there is an additional level of conflict of interest (COI) restrictions applied to these key professionals, beyond what is applied on the selected consulting firm.

The following people are considered key personnel in the GEC team:

- Project manager
- Deputy project manager
- Task leaders of major categories:
 - General Engineering Consultant Project Services

- Plan Review
- Cost Estimating
- Claims Management

In particular, PM replacement on an active contract, while not strictly prohibited, will require TxDOT's prior consent. Any such replacements will be subject to the terms of the agreement.”

4.6.2. Selection Process

According to the Brooks Act (U.S.C. 40 Chapter 11), consulting firms should only be selected based on their qualifications. State DOTs use qualifications-based selection (QBS) as the procurement method. Consulting firms are not allowed to put any factors regarding price in their proposals. Often, oral interviews are conducted to further evaluate the proposed consulting firm. State DOTs typically use their own staff in the selection committee to evaluate consulting proposals. Utah DOT uses an advisory consultant to assist the DOT in the selection process for owner's consultants that help district offices in the development of design-build projects. Two examples are provided from the UDOT and TxDOT selection processes.

Utah DOT (UDOT)

All the texts and information in this section are extracted from Modified Standard Request for Qualifications for Project No. 8284XCH1021:

“UDOT selects the owner’s consultant using the QBS approach. Cost must not be a factor in the selection. No discussion of cost is allowed in the submitted statement of qualification. Any discussion of cost other than cost control measures makes the proposer disqualified.

Based on Modified Standard Request for Qualification, Project No. 8284XCH1021; Statewide Consultant Services Assistance document, the Consultant Services Division in UDOT is in charge of procuring the owner’s consultants. An overview of the selection process for the owner’s consultant for design–build projects is summarized below:

1. Consulting firms submit SOQs.
2. Submitted SOQs are evaluated by a Department selection team in accordance with the SOQ evaluation procedures and criteria described in UDOT’s guidelines.
3. Proposals are scored by individual selection team members. Then, the administrator tallies and compiles comments and determines the average of voting team members’ scores.
4. Oral interviews are conducted if needed: Interview only occurs when there is a small enough point deviation to continue the competitive selection process.

Selection is based on a consensus decision made by all the selection team members.

If the Department selection team determines interviews are necessary, the following project-specific topics may be some of the issues discussed:

- a. Understanding of the Work
 - b. Approach to the Project
 - c. Schedule Control Management of the Project
5. The final selection process is performed using the “selecting by consent” (SBC) process. The SBC process is a scoring process that aids the selection team in developing the final ranking of consultants through a collaborative process. In this process, each segment and question of the interview is weighted in advance during the selection team meeting. After the interviews are conducted, the selection team scores each segment and answer by consent. Consent is defined as the willingness of all selection team members to accept a decision reached by a collaborative process. The final selection ranking of consultants is based on the final scores developed by the selection team using the Interview Scores Spreadsheet.
6. Financial screening is performed on the selected consultants. The Department requires consultants be financially screened prior to performing work for UDOT.
7. Up to two consultants may be selected.

The SOQ of the successful consultant will be open to the public inspection during a period of 1 year after the contract award. The consultant may request a portion of its SOQ remains nondisclosed as trade secrets and other proprietary data. The consultant services manager shall inform the consultant about the Department's decision about the request. It is also worth noting that all tracings, plans, manuscripts, specifications, data, maps, etc. prepared or obtained by the consultant shall be delivered and become the property of the Department.

The selected consultant must perform work valued at not less than 100 percent of the total work, excluding specialized services, with its own staff. Specialized services are those services or items not usually furnished by a consultant performing the particular type of services contained in the RFQ.”

Texas DOT (TxDOT)

All the texts and information in this section are extracted from Selection Criteria for Procurement Engineers- Request for Qualifications (RFQ) for Professional Engineering Services (PEPS) – Solicitation number 86-5RFP5067:

“The Professional Engineering Procurement Services (PEPS) Division in TxDOT is in charge of procuring general engineering consultants to assist the owner in DB and P3 programs.

The following process is followed by TxDOT in selecting owner's consulting firms:

- LOI submission, shortlisting, interview
- Scoring method
- Debriefs after the contract execution are offered for non-winning consultants
- Shortlist
- Meeting with short listed firms
- Interview
- Debriefs”

4.6.3. Contracting and Payment Methods

Consulting firms are typically brought on board through an indefinite delivery/indefinite quantity (IDIQ) master contract. Owner’s consultants’ contracts are on-call contracts, as state DOTs want to maintain flexibility in assigning different tasks to consulting firms. A tentative list of tasks is defined in the master agreement, but the amount and timing of these tasks vary over the course of the contract. The maximum amount of total contract is defined in the master agreement. The duration of the master contract is typically 3 to 5 years. At any point of the contract, the state DOT executes the needed task(s) as a special task order. The scope of the services, the required milestones, and the payment mechanism must be clearly defined in the task order.

In the master agreement, some state DOTs try to provide an estimate of percentage for each task that the consultant’s services may be utilized on. This approach helps the consulting

firm prepare better for the anticipated tasks and allocate resources (especially skilled workforces) more efficiently to the owner's services.

Basis of reimbursement varies from contract to contract. State DOTs typically use lump-sum and cost plus fixed-fee as the payment method for the task order agreement. The decision of the payment method depends on the type of the task assigned to the consultant. The decision also depends on the phase of the project, which determines the source of funding for the project. Lump-sum contracts are often utilized by state DOTs during the construction phase of the design-build project as the funding during the construction phase is usually spent on a lump-sum basis. Several examples of contracting and payment methods from different state DOTs are provided below.

North Carolina DOT (NCDOT)

All the texts and information in this section are extracted from NCDOT's *Request for Letters of Interest (RFLOI)*, Title: *On-call General Engineering Services* document:

“The contract between a program management firm and NCDOT is called the General Engineering Services Contract (GES). NCDOT retains one or more firms to provide professional and engineering services as required under an on-call GES. This on-call contract is for a limited time (for example, 3 years with an extension of 1 year at most). The GES firm is supposed to be available on one or more projects depending on the scope of the project and is supposed to be assigned to specific program functions.

Lump sum or cost- plus is used as the contract payment type by NCDOT. The choice varies per task order based on the scope of work and other factors, as appropriate, and as agreed between the GESC firm and NCDOT. The consulting firm(s) must have an adequate accounting system to identify costs chargeable to the project.

The solicitation for GESC firm is not intended for legal or financial services. For major public-private partnership (P3) projects, it is intended that a separate solicitation be made for legal, commercial, and financial services to support each specific P3 project.”

Virginia DOT (VDOT)

All the texts and information in this section are extracted from Request for Proposal-Limited Services Term Consultant Contract for Statewide Design Build and P3 Support Services- RFP #LD-20150106 document:

“Currently, VDOT anticipates the possibility to award the engineering consulting contracts to two companies if both of those prime consultants are qualified. The contract is an as-needed basis for 2 years with two optional 1-year renewable terms.”

Minnesota DOT (MnDOT)

All the texts and information in this section are extracted from personal communication and interview with head of the Innovative Delivery Program:

“MnDOT hired an on-call general engineering consultant on a 3- to 5-year contract to prepare large programmatic documents and RFPs for design–build projects. From the Design–Build Manual of the Minnesota DOT, MnDOT employs a GEC firm to assist the design–build PM with various aspects of procuring design–build projects. The GEC master contract is managed by the design–build PM. However, the work orders issued under the contract necessary for performing work related to a specific design–build project are funded and managed by the district offices.”

Utah DOT (UDOT)

Utah’s contract for consultant firm is one master contract that is executed in different task orders.

Texas DOT (TxDOT)

All the texts and information in this section are extracted from *Procurement Engineer Consultant RFQ/RFP Example* and *Selection Criteria for Procurement Engineers- Request for Qualifications (RFQ) for Professional Engineering Services (PEPS)*:

“TxDOT uses an IDIQ master agreement for hiring both procurement engineering consultant (PcE) and general engineering for program management (GECP). TxDOT uses different payment methods as the basis of reimbursement for the consultant firm: lump sum, cost plus fixed fee, and/or specified rate. Due to the size of TxDOT’s design–build

and P3 programs, TxDOT brought four general engineering consultants onboard to assist the state in design–build and P3 projects. The highest ranked consultant gets the largest contract. Each consultant is assigned to one or more design–build or P3 projects.

The contract shall include multiple project corridor assignments divided into several program development stages as follows:

- Program Management Oversight (PMO)
- Planning and Environmental Development
- Alternative Delivery Program (ADP) Firm Procurement Support
- Design Development and Oversight
- ADP Firm Implementation Oversight
- Construction Management Oversight (CMO)
- Operations and Maintenance Oversight”

Colorado DOT (CDOT)

All the texts and information in this section are extracted from Consultant Agreement “As Needed” Design Engineering Service- CDOT Project 19039- Procurement Engineering Design for RFP document:

“Several payment formats are approved to execute any relevant task orders issued pursuant to the master agreement with the owner’s consultant:

- Lump sum contracts
- Cost plus fixed-fee contracts
- Specific rate of compensation contracts
- Price per unit of work contracts”

California DOT (Caltrans)

All the texts and information in this section are from State of California, Department of Transportation Task Order Documents for Consultant Firm:

“Caltrans uses a master IDIQ contract for establishing an agreement with the consulting firm. Caltrans develops each task order under this master agreement with emphasis on deliverables and milestones, with no cost estimate. The consulting firm provides estimated hours to Caltrans to complete the task order. The estimated hours will be first provided by the consultant. Caltrans reviews the hours and begins negotiation with the consulting firm to arrive at a budget for the contract. Hence, the contract payment type is a “firm fixed price” or for specific rates of compensation, both of which must be based on the labor and other rates set forth in the consultant’s cost proposal.”

4.6.4. Assigned Tasks to the Owner’s Consulting Firm

State DOTs assign a wide range of tasks to the selected owner’s consulting firms. These tasks represent all the required activities that must be performed to deliver design–build

projects. The researchers divided these tasks into several categories based on the timing of the tasks throughout the project timeline. A comprehensive list of activities is provided below that the state DOT can use as a template or a checklist to determine the required needs of the project.

Tasks Performed during the Planning Phase of the Project to Develop the Project Scope and the Initial Baseline for the Project Cost and Schedule

1. Conduct initial meetings with the state DOT design–build (or P3) staff to review and discuss the design–build (or P3) process, and roles and responsibilities
2. Conduct research to identify best practices in various areas of design–build (or P3) contracting and assist the state DOT in refining its design–build (or P3) manual
3. If the state DOT is new to design–build, identify any necessary changes in existing standard contract specifications and practices to accommodate design–build and assist the state DOT in providing engineering expertise in developing new contract provisions to implement design–build
4. Assist the state DOT in the critical assessment of the appropriateness of a design–build (or P3) delivery system for a project, and recommend a list of candidate projects for design–build (or P3) program
5. Organize a goals workshop to identify project goals

6. Develop documents in support of project funding, especially through utilization of alternative funding sources and innovative financing mechanisms (e.g., collection of data and the preparation of a GEC report to support the issuance of toll revenue bonds)
7. Establish and maintain a project office to support staff for the project (e.g., management of vendor services, development of procedures, communications and document control, and logistical support for multiple project offices)
8. Perform environmental studies, document preparation, and review
9. Perform field surveying and photogrammetry
10. Develop plans for public involvement, public relations, and stakeholder engagement services
11. Develop 3D visualizations and animation of transportation facilities for use in public presentations
12. Develop an initial baseline estimate for the project cost and schedule
13. Facilitate workshops for risk identification, analysis, and mitigation (e.g., identify potential scope, budget, and schedule risks and assess their impacts on the project goals, and prepare mitigation and/or minimization strategies)
14. Prepare the request for letters of interest (RLOI) for the design–build (or P3) project
15. Organize an industry forum to promote the design–build (or P3) project to interested parties

Tasks Performed Prior to Release of the RFQ

1. Update the project cost and schedule
2. Update the project risk register
3. Develop qualifications criteria to be included in the request for qualifications (RFQ)
4. Develop the key personnel requirements for design–build (or P3) proposers to be included in the RFQ
5. Prepare the draft and final design–build (or P3) RFQ
6. Assist in the identification of the selection committee, technical evaluation committees, and technical advisors
7. Prepare the evaluation criteria and train the selection committee for the evaluation of the statements of qualifications (SOQs)

Tasks Performed During the RFQ Phase

1. Accept, process, and distribute contractor SOQs to the evaluation team members
2. Assist the state DOT in reviewing the submitted SOQs (e.g., process and consolidate evaluation team members' scores)
3. Assist the state DOT in determining the short list of the most- qualified respondents
4. Assist the state DOT with debriefing proposers
5. Update the project risk register and coordinate with the shortlisted teams to prepare mitigation strategies for each identified risk

Tasks Performed Prior to Release of the RFP

1. Update project cost and schedule
2. Develop, prepare, and review plans, specifications, and estimates (PS&E)
3. Update the risk register and incorporate the risk mitigation strategies into the RFP as appropriate (i.e., determine assignments for the allocation of risks between the state DOT and the design–build contractor)
4. Assist the state DOT PM in completing the project advertisement checklist
5. Assist the state DOT in developing proposal evaluation criteria, assigning appropriate weights to the criteria, and providing guides on how to rate the proposals
6. Facilitate a training session for the selection committee on the proposal evaluation process
7. Perform advanced planning services including route studies, schematic design and development, and traffic modeling
8. Perform hydraulic and drainage studies and review
9. Perform geotechnical services
10. Perform subsurface utility engineering (SUE)
11. Prepare the preliminary design plans to be included in the RFP

12. Prepare the concept structure situation & layout (S&L) plan to be included in the RFP
13. Conduct toll system and intelligent transportation system (ITS) planning and design
14. Coordinate with utility companies and other affected third- parties, prepare master utility agreements (MUAs) for all affected utilities, and assist the state DOT in obtaining signatures
15. Perform right-of-way (ROW) surveying and mapping, and identify the proposed ROW limits and construction limits for the design–build (or P3) project
16. Assist the state DOT in developing ROW design plans and construction limits plans
17. Assist the state DOT in performing ROW acquisition services
18. Perform design and constructability review of contract plans and specifications for highway construction
19. Prepare the draft and final request for proposals (RFP) specific to the design–build (or P3) project

Tasks Performed During the RFP Phase:

1. Assist the state DOT in issuing the procurement documents
2. Organize pre- proposal meetings with all proposers
3. Review request for clarifications (RFCs) from proposers, develop responses, and prepare addenda as necessary

4. Schedule proposers' one-on-one Alternative Technical Concepts (ATCs) confidential meetings
5. Assist the state DOT in the evaluation of ATCs and coordinate with respective state DOT staff to respond to ATCs
6. Prepare the proposal evaluation criteria and tools (i.e., design-build [or P3] evaluation manual, evaluation forms, and score sheets) and provide training to the members of technical review committees for roadway, management of traffic (MOT), geotechnical, structures, drainage, and public involvement
7. Accept, review, process, and distribute contractor proposals to evaluation committee members
8. Schedule and facilitate the meetings for technical review committees and assist the committees in preparing briefs to the selection committee
9. Perform a follow-up risk workshop with the evaluation committees to evaluate how each proposal addresses risks and compare the risk analysis results from each proposal to the baseline risk to help determine the proposal that provides the most value to the Department
10. Review proposers' construction cost and schedule
11. Make recommendations to the state DOT on potential unsafe conditions created by the provisions in the design-build (or P3) document
12. Assist the state DOT in the selection of the winning proposal

13. Collect all proposal components, reviews, and scoring information; maintain and archive one set of each proposal; and destroy the remaining proposals, review notes, and scoring information.
14. Assist the state DOT in the preparation of contract documents for the successful proposer and with debriefings with the unsuccessful proposers
15. Assist the state DOT protest official with any contractor protest
16. Schedule a lessons-learned meeting at the conclusion of the procurement phase, identify the areas for improvement, and assist the state DOT with process revisions, procedure manuals, and updating standards as appropriate

Tasks Performed During the Post-Award Phase

1. Design oversight: Provide services necessary to support the state DOT in receiving, documenting, tracking, reviewing, approving, and responding to all submittals by the contractor (e.g., provide discipline-specific reviews of design submittals to provide assurance that they are in compliance with contract requirements; review the contractor-provided traffic control plan for adherence to the state DOT policies to protect the safety of workers and the travelling public; review structure shop drawing submittals for conformance to contract requirements; coordinate the design submittals with the review of utility and third-party submittals; and evaluate,

- consult, and provide recommendations to field staff to mitigate varying field conditions as they arise)
2. Provide independent verification and validation of highway design in order to monitor and audit the design development process to ensure compliance with the project design performance requirements
 3. Review geotechnical exploration plans and geotechnical recommendations, and provide the oversight necessary to demonstrate compliance with contract requirements
 4. Construction oversight: Develop and implement project document and controls procedures and conduct all project management and control tasks to ensure the timely and efficient execution and completion of the design–build (or P3) project (e.g., organize regular technical meetings with the project team; organize regular coordination meetings with the state DOT management; prepare weekly project status reports with action items and follow-up assignments; conduct monthly invoicing and project accounting activities; and develop, maintain, and update the project dashboard to present critical project information to the state DOT PM and other state DOT officials as deemed appropriate)
 5. Provide independent verification and validation of highway construction in order to monitor and audit the construction development process to ensure compliance

- with specific construction requirements of urban freeways, interchanges, and complex bridges
6. Provide QA/QC process verification to ensure that approved project management plans are working as called for
 7. Document and track the identified risks throughout the project execution, and organize risk mitigation meetings as necessary
 8. Provide construction engineering and inspection (CEI) services, including construction administration, inspections, material testing, and documentation of contractor work activities, and traffic signal and lighting inspections
 9. Perform inspection and testing including owner verification, testing, and inspection (OVTI) services
 10. Develop and implement process auditing services
 11. Provide toll and intelligent transportation systems (ITS) equipment planning, design, and implementation on transportation facilities
 12. Coordinate all environmental activities, conduct environmental inspections at the roadway construction project site, and provide field documentation related to auditing of the contractor's environmental compliance performance
 13. Develop and implement an ongoing audit program for oversight of the contractor's safety compliance with the project management plan and the contract, provide

- recommendations for the issuance of safety compliance orders, and monitor monthly safety reports prepared by construction oversight personnel
14. Avoid, analyze, mitigate, and resolve claims from the design–build contractor (or the P3 developer)
 15. Perform public involvement management tasks as the Department’s third-party public involvement representative

Several examples of tasks assigned to consultants from different state DOTs are provided below.

North Carolina DOT (NCDOT)

All the texts and information in this section are extracted from NCDOT’s *Request for Letters of Interest (RFLOI), Title: On-call General Engineering Services* document:

“The GESC firm will provide professional consulting services to support NCDOT’s design–build and priority projects programs on an as- needed basis for projects across all modes, including but not limited to design–build, design–build–finance, public–private partnerships, sponsorships, and North Carolina turnpike projects. The GESC firm may also assist in the tracking and reporting on other NCDOT initiatives on a macro level, such as Division-managed projects (DMPs).

The GESC firm does not have the authority to determine scope, manage the selection, or work, of other consultants (except the sub- consultants on their own GESC team), or other tasks that are the responsibility of NCDOT or other NCDOT- hired contractors. The GESC firm will serve in a support and advisory role to the design-build office, the priority projects office and the North Carolina Turnpike Authority. Based on their contract, the GESC firm is responsible for supporting the delivery of multiple projects developed and procured using alternative delivery methods, as well as general program support and refinement. The GESC firm is supposed to review planning and engineering documents in support of the procurement and design review phases of alternative delivery program (ADP).

Firms that are selected to be a GESC firm may be assigned to work on one or more ADPs, as well as specific program functions. Project- specific duties may differ from project to project. At a minimum, and as agreed upon by NCDOT and the GESC firm, one project manager from the GESC firm will be embedded within the Technical Services Division at the NCDOT Century Center.

The services that were supposed to be provided by the firm(s) included (1) engineering services support whereby the firm(s) serves as a technical extension of the NCDOT's staff for the purposes of ADPs, and (2) general consulting and professional services for alternative delivery program management and support. The responsibilities of the firm(s) included, but were not limited to:

- Serve as a resource and advisor to NCDOT project managers for ADPs
 - Review the State Transportation Improvement Program (STIP) and advise on the project delivery approach (recommend design–build candidate projects) in consideration of specific project characteristics and applicable innovative procurement and contracting methods
 - Assist in the development of requests for qualifications (RFQs) and requests for proposals (RFPs)
 - Review and provide recommendations on statements of qualifications, technical proposals, and, in some cases, alternative technical concepts, if such practice is supported by the Joint AGC/ACEC/NCDOT Subcommittee on Design–Build
 - Review technical aspects in support of RFP development
 - Perform and review any technical design (or associated environmental analysis) to support development of RFQs and RFPs
 - Review and provide recommendations for post- let design submittals
 - Provide quality assurance and quality control
 - Support public involvement and communication efforts

- Research and make recommendations on alternative delivery methods, including but not limited to:
 - Policies and processes
 - Compliance with federal transportation regulations (existing, new, or emerging)
 - Changes in North Carolina law for transportation projects (recent, emerging, or needed)
 - Best practices associated with public–private partnerships, sponsorships, and other alternative delivery methods
 - Performance measurement and management

- Support project and program support functions, including but not limited to:
 - Report preparation (such as the annual report on the design–build program)
 - Drafting correspondence
 - Presentation preparation
 - National/regional award application preparation
 - Meeting management (scheduling, preparation, facilitation, meeting minutes, etc.)
 - Process and policy documentation
 - Preparation of project briefs

- Project delivery tracking and reporting on other delivery approaches
 - Tracking and reporting on progress of Division-managed projects
 - Identifying training needs for DMPs
 - Making recommendations for improvements for the delivery of DMPs, including process integration of Division and Central planning and design staff efforts, and drafting related protocols as necessary”

Virginia DOT (VDOT)

All the texts and information in this section are extracted from Request for Proposal-Limited Services Term Consultant Contract for Statewide Design Build and P3 Support Services- RFP #LD-20150106 document:

“The consultant firm is responsible for providing professional engineering services on interstate, primary, urban, and secondary road, bridge, structures, and related infrastructure projects during the pre-award and the post-award phase for projects to be procured and administered in accordance with alternative delivery methods, such as design–build or P3.

There is a list of the services that the consultant is responsible for; these services may include but are not limited to, providing comprehensive products and services associated with the following functions:

- Location surveys and supplemental survey data

- Right-of-way and construction plans
- Roadway, hydraulic, and drainage designs
- Design of interchange improvements, parking lots, and multi-purpose trails
- Landscape and aesthetics plans
- Traffic engineering and related analysis
- Utility design
- Structure and bridge design
- Geotechnical and geophysical services
- Environmental documents to satisfy the national environmental policy act (NEPA) and related studies/requirements
- Permit drawings
- Preparation and performance of public hearings/citizen information meetings
- Constructability reviews
- Project cost estimating
- Risk assessments and analysis
- Cost/benefit and user cost analysis
- Development and analysis of (resource loaded) project schedules
- Development and review of special provisions
- Review of shop drawings and right-of-way and construction plan submittals
- Contract time determination analysis

- Review of design submittals
- Review of scope validation issues
- Review of contractor notices of intent to file claims (review formal time impact analysis submissions by contractors, assess schedule and cost impacts encountered, participate in schedule negotiations, review monthly schedule updates and recovery plans, monitor progress and report the findings, and conduct project audits and claims support services)
- Preparation of solicitation documents and assistance in evaluation of alternative delivery projects (Such work may include, but not be limited to the development/preparation of RFQ, RFP, RFP technical requirements, plans, and technical support in the evaluation of proposals/expressions of interest)”

Minnesota DOT (MnDOT)

All the texts and information in this section are from MnDOT Design-Build Manual:

“MnDOT uses consulting firms to develop design–build procurement/contract documents.

The consultant is supposed to provide preliminary engineering, environmental documentation, and permit services to support the design–build documents. The main role of the general engineering consultant is to review the contracts and help the DOT develop the guidelines and the needed documents for design–build contracts. The consultant provides preliminary engineering, environmental documentation, and permit services to

support the design–build documents. MnDOT prepares the request for letters of interest and RFQ documents.

The consultant finalizes instructions to proposers (ITP) for solicitation of the second phase of the selection process. The consultant performs a peer review of the ITP, including evaluation criteria, to describe the RFP process for phase 2 of the solicitation.

The consultant prepares an estimated cost of the design–build contract using existing design work prepared by MnDOT and the consultant. The consultant prepares the estimate using MnDOT’s design–build project estimate template. The consultant does not submit this estimate to central office (CO) Estimating directly, and instead the estimate will be an independent check. The consultant also creates a report that estimates the cost of utility relocation. The report explains the utility relocations costs incurred by the state versus the utility relocation costs incurred by the utility owner.

The GEC firm work orders may include:

- Performing tasks for pre-award project development of design–build projects (preparation of environmental documents, geometric layout preparation, preliminary bridge design, etc.)
- Developing RFPs and supporting MnDOT’s DB program management (updating contract documents, manuals, standards, etc.)”

Utah DOT (UDOT)

All the texts and information in this section are extracted from Modified Standard Request for Qualifications for Project No. 8284XCH1021:

“The main role of the consultant is to assist the Innovative Contracting Division in administering the procurement of design–build teams for a design–build contract. The consulting firm not only has advisory and support roles, but also provides helps and augments the DOT staff during procurement process. UDOT takes advantage of an advisory consultant at the HQ office to develop consistent design–build policies that are implemented uniformly in different district offices across the state. The main responsibilities of the advisory consultant that help the UDOT Innovative Contracting Division at the HQ are:

- Oversee the execution of DB projects, research best practices, resolve issues, and define consistent alternative delivery rules and procedures
- Administrate and facilitate the program for selection of engineering services consultants for UDOT and write the contracts for UDOT
- Assist the Innovative Contracting Division in administering the selection of contractors for the design–build procurement process
- Assist the Innovative Contracting Division in developing design–build (and P3) policies and procedures

- Develop template RFQ and RFP that can be easily modified by the regions in developing project-specific advertisement materials

Each region hires its own program management consultant firm to help the region in the procurement of design–build and P3 projects. The advisory consultant helps district offices select the most qualified program management consulting firms capable of assisting district offices in administering the procurement of design–build teams. The detailed list of the tasks are as follows:

- Conduct an initial meeting with the UDOT project manager, innovative contracting manager and design/build program management consultant to review and discuss the design–build process and the roles and responsibilities
- Assist in identifying the Selection Committee, Technical Evaluation Committee (TEC), and technical advisors (TA)
- Assist with the development of the construction request for letters of interest (RLOI).
Post on the construction project web page a list of interested firms and companies
- Assist in the development of the RFQ document
- Accept, process, and distribute contractor SOQs to the TEC and other evaluation team members
- Process and consolidate the TECs and other evaluation team members' scores
- Assist the project manager in completing the Project Advertisement Checklist

- Assist in the development of the RFPs
- Schedule the proposers' one-on-one ATC meetings
- Schedule TEC/TA review dates, location, and meals (as directed)
- Develop and assist in TEC/TA evaluation training
- Create evaluation forms and score sheets
- Accept, review, process, and distribute contractor proposals to the TEC and TAs
- Oversee TA subgroups and TEC review
- Process all RFCs¹⁰ to contractors and their response back to the TEC/TA
- Process and consolidate TEC and TA proposal evaluation comments
- Assist the TEC in the development of the Selection Committee technical recommendations briefing
- Schedule and facilitate the Selection Committee Team meeting
- Schedule the Selection Committee and Selection Official meeting
- Notify the contractor design–build teams of the Selection Committee's decision/selection
- Schedule and facilitate the contractor design–build team debriefings
- Collect all proposal components; review, and score information
- Assist the protest official with any contractor protest

¹⁰ Request for Clarification

- Maintain and archive one set of each proposal; destroy remaining proposals, review notes, and scoring information
- Assist in post-selection activities: review of contractor escrow documents and inclusion of the contractor's revised proposal for addition to the construction contract
- Assist construction division personnel as needed in preparing the contract
- Schedule a lessons-learned meeting at the conclusion of the procurement phase of each design-build project with the project manager, Technical Evaluation Committee, technical advisors, and UDOT design/build engineer; document the items as discussed
- Incorporate lessons learned into the "Standardization" process by assisting the Department with process revisions, procedure manuals, and updating standards as appropriate
- Assist in tracking and reporting performance"

California DOT (Caltrans)

All the texts and information in this section are from State of California, Department of Transportation Task Order Documents for Consultant Firm:

"Development of RFP for DB projects is conducted as a collaborative process between the HQ and district offices. Owner's consultants work with district offices remotely and on-site, and also, coordinate with the HQ engineer and procurement officer. The agreement between Caltrans and the consultant is on-call professional and technical support services.

A master agreement is made with the consultant firm, and the type of contract is IDIQ. Moreover, the overarching scope of the consultant contracts is to assist the Caltrans' Design-Build Demonstration Program in the development and implementation of processes, policies, and procedures as related to design-build projects overseen by Caltrans. It is mentioned in the contract that the specific projects will be assigned to the consultant through issuance of task orders. The main tasks assigned to the consulting firms are summarized as follows:

- Support of Design-Build Demonstration Program
 - Hold meetings and consultations with the Department on an on-call basis
 - Provide progress reports and meetings with the contract manager
- Support of Design-Build Project
 - Provide technical support to the district office and develop the request for proposal on an on-call basis
 - Provide technical support to district offices in developing independent cost estimates
- Thorough independent review of the Design-Build Demonstration Program
 - Review the design-build contract documents, design-build procurement processes, identification of best practices, and recommendations for improvement”

Texas DOT (TxDOT)

All the texts and information in this section are extracted from *Procurement Engineer Consultant RFQ/RFP Example and Selection Criteria for Procurement Engineers- Request for Qualifications (RFQ) for Professional Engineering Services (PEPS)*:

“The general engineering consultant program manager is being procured as a part of a team of general engineering consultants made up of the GECP, the general engineering consultant for design (GECD), the general engineering consultant for construction (GECC), and the general engineering consultant for operations and maintenance (GECM) to support and act as an extension of the state. The GECP will be responsible for making this team work as a cohesive unit.

The GECP shall assist TxDOT in procurement, scheduling, budgeting, administration, design, construction, operations, and maintenance of alternative delivery projects. The developer of the ADP is referred to as the ADP firm that is responsible to design, build, and/or maintain the project. The GECP shall be responsible for supporting the state and the procurement engineers during procurement; and overseeing and auditing functions of design, construction, operations, and maintenance. The GECP will also be responsible for administrative functions, including setting up the project office to be co-located with the ADP firm team.

The GECP and the state's project manager shall be the single point of contact between the state and the ADP firm. The GECP shall function as an extension of the state's resources by providing qualified technical and professional personnel to perform the duties and responsibilities assigned under the terms of this agreement. The GECP shall work to minimize, to the maximum extent possible, the need for the state to apply its own resources.

The GECP shall provide the following services for multiple projects located within the state:

- Environmental studies, document preparation, and review
- Advanced planning, including route studies, schematic design and development, and traffic modeling
- Planning studies, including master and strategic development plans
- Public involvement and public relations services
- Toll system and ITS planning, design, and implementation
- Field surveying and photogrammetry
- Right-of-way surveying and mapping
- Hydraulic and drainage studies and review
- Geotechnical services
- Utility management and coordination
- Subsurface Utility Engineering (SUE)

- Plans, specifications, and estimates (PS&E) development, preparation, and review
- Bridge design and review
- Provide engineering and planning support for the procurement effort, project and contract management, oversight, scheduling, administration, review, and coordination of all design and construction activities performed by the Comprehensive Development Agreement (CDA) ADP firm and Comprehensive Maintenance Agreement (CMA) ADP firm for various projects
- Financial plan and program management plan development and reviews for compliance with FHWA guidelines and legislative requirements
- Program implementation plan preparation and reviews
- Construction management, inspection, and testing, including OVTI¹¹ services
- QA/QC and process auditing services
- Cost estimating services for total project costs

The GECP project manager shall function as program director for all GECP personnel, including individual PMs and task leaders involved in multiple and concurrent work authorizations. For project management of alternative delivery projects or megaprojects, the GECP could be staffed in offices located at the project site furnished by the ADP firm once work begins. Most of the engineering work is expected to be performed on-site at the

¹¹ Owner Verification Testing and Inspection

GECP offices co-located with the state. Some work may be performed off-site and the appropriate negotiated overhead rate would apply. The GECP shall prepare and maintain an electronic document management system to collect, assemble, manage, and maintain all documents pertinent to the project. This shall include paper copies of all written and electronic correspondence.

The GECP shall perform project management oversight, oversee and audit deliverables prepared by the ADP firm, participate in ADP firm meetings, and facilitate meetings between the state and the ADP firm; prepare and submit project reports and documents as described herein and as otherwise requested by the state. The GECP shall support the state by coordinating with state ROW division forces for the oversight of the ADP firm's ROW mapping, surveying controls, utility coordination, utility engineering, and development of utility agreements. The GECP shall support the state and oversee the public involvement, third-party stakeholder interaction, and operation and maintenance transition program. The GECP's oversight responsibilities shall include monitoring, auditing, commenting, and reporting on the ADP firm's compliance with project requirements as defined by the state. The GECP shall provide recommendations where applicable to aid the state in its decision-making and approval process. The GECP shall facilitate the state's plan to complete the ADP in compliance with its requirements, schedule, and budget.

The GECP shall perform PMO¹², which shall include:

- Mobilization and demobilization
- Leadership and management team
- Program scheduling
- Financial plan
- Project controls and project implementation plan (PIP)
- Program reporting and audits
- Agency coordination
- Contract management
- Project assurance
- Contracts management and claims

The GECP shall perform route and design studies, which shall include:

- Data collection
- Field reconnaissance
- Master development plan
- Program design criteria
- Traffic modeling and planning studies
- ITS and toll system planning, design, and implementation

¹² Project Management Office

- Rail coordination services
- Geotechnical field investigations and reports
- Special studies, white papers, and research documentation

The GECP shall perform environmental services, which shall include:

- Environmental studies and document preparation, review, and management
- Public involvement and communications

The GECP shall perform field surveying and photogrammetry, which shall include:

- Survey control

When requested by the state, the GECP shall perform the following roadway design controls services to support project advancement:

- Geometric design
- Grading design
- Prepare roadway typical sections
- Finalize design elements
- Plan development

The GECP shall provide drainage planning, modeling, and design management services to guide and oversee implementation of a corridor-wide approach to drainage analysis, modeling, mitigation, permitting, and coordination in conformance with the TxDOT

Hydraulic Design Manual, and to establish program-specific design criteria and standards for assigned projects or corridors. The GECP, when requested by the state, shall provide the following:

- Modeling and corridor drainage impact reports
- Pump stations

The GECP shall manage contracted PS&E services, which shall include:

- Plan review
- Design services and PS&E preparation

The GECP shall provide engineering and planning support for the state's procurement effort for assigned projects or corridors, which shall include:

- Engineering support for procurement
- Bond issuance

The GECP shall oversee and audit the GECC services and shall monitor and report on key elements of the ADP firm's construction activities. When requested by the state, the GECP shall perform the following services:

- Construction management oversight
- CMO Review of the ADP firm's project management plan

The GECP shall be responsible for monitoring and reporting on key elements of the developer or design–builder’s activities associated with its transition from capital improvement design and construction to maintenance work. The GECP shall provide maintenance transition oversight (MTO), which shall include:

- Operations and maintenance oversight
- MTO review of transition plan

TxDOT’s Professional Engineering Procurement Services (PEPS) Division executes task orders with the selected GECs in the following standard work categories:

- Systems planning
- Subarea/corridor planning
- Land planning/engineering
- Feasibility studies
- Nationwide permits
- §404 (Title 33, United States Code §1344) Individual Permits
- Water pollution abatement plan
- Hazardous materials initial site assessment
- Environmental document preparation
- Route studies and schematic design (major roadways)
- Route studies and schematic design (complex highways)

- Major bridge layouts
- Multi-level interchange and exotic bridge layout
- Complex highway design
- Major freeway interchanges and direct connectors
- Major bridge design
- Multi-level interchange design
- Traffic engineering studies
- Highway–rail grade crossing studies
- Intelligent transportation system
- Signing, pavement marking, and channelization
- Illumination
- Signalization
- ITS control systems analysis, design, and implementation
- Highway–rail grade crossings
- Bicycle and pedestrian facility development
- Hydrologic studies
- Complex hydraulic design
- Roadway construction management and inspection
- Major bridge construction, management, and inspection
- Asphaltic concrete

- Portland cement concrete
- Plant inspection and testing
- Soil exploration
- Geotechnical testing
- Design and construction survey

The selected GECs provide services for one or more design–build projects in the following non-listed work categories:

- Design–build project services
- Plan review
- Project office support
- Critical path method scheduling
- Cost estimating
- Public involvement support
- QA/QC process verification
- 3D design
- 3D visualizations
- Utility management & coordination oversight
- Environmental inspections
- ROW acquisition services

- Bond issuance support
- Safety
- Independent verification and validation; highway construction
- Independent verification and validation; highway design
- Claims management
- Toll & ITS planning & design

More specifically, the selected GECs provide services for one or more P3 projects in the following non-listed work categories:

- P3 project procurement services
- Operations and maintenance
- Toll collection system and back-office analysis
- Traffic forecasting, traffic & revenue (T&R) and financial feasibility analysis
- P3 cost estimator
- P3 project feasibility
- Project office operations
- Project/program scheduling
- P3 training and presentation materials
- P3 preliminary design
- Pavement engineering

- Legislative review
- Cost estimating
- Claims management”

New York State DOT (NYSDOT)

All the tasks and information in this section is from Comptroller’s Contract No. D031100-Consultant Agreement document:

“The main role of the consultant is to be DOT’s assistant in design-build projects. The consultant is supposed to assist NYSDOT in preparing project-specific design-build procurement and contract documents. It also should facilitate design-build orientation and document review by the DOT and the industry, and assist DOT in managing the evaluation and selection process.

The consultant provides technical assistance and support during the procurement and contract document development and contract implementation phases of the project in conformance with the design-build procedures manual. It also provides design oversight, quality assurance, and other necessary assistance to DOT during the design and construction phases of individual design-build projects.

The following tasks are identified as the tasks that the consultant firm should deliver during the design-build projects.

1. Design-build technical training program: The consultant develops a technical training program and necessary additional training materials, including syllabus, visual aids, and handouts, to instruct DOT employees in the changes to the DOT'S policies and procedures necessitated by the design-build program. These topics include design-build orientation, selection, design, construction, and administrative procedures. These materials supplement those the DOT currently has in place. The consultant firm also assists the DOT in providing the training as needed.
2. Industry and agency meetings: The consultant facilitates information meetings between the department and interested construction and engineering firms at various times during the procurement process.
3. Request for letters of interest (RLOI): The consultant drafts either a "request for letters of interest", or a "notice of intent" (NOI), or an advertisement for the department publication and distribution that will announce the design-build project. The RLOI, NOI, or advertisement will briefly describe the project scope, and solicit expressions of interest from design-build teams (consisting of contractor and consultant firms).
4. Request for qualifications (RFQ): The consultant provides technical assistance to DOT in preparing request for qualifications (RFQ) to solicit statements of qualifications (SOQs) from interested design-build teams (proposers). The RFQ

will focus on determining the proposer's experience, qualifications, and past performance, and other criteria consistent with the enabling legislation.

The RFQs may include but are not limited to:

- Federal-and NYSDOT- mandated procurement provisions, including M/W/DBE¹³ and EEO program requirements;
- Protocol for communicating with NYSDOT;
- A description of the RFQ evaluation process;
- The RFQ evaluation and selection criteria and their relative weights, including legal and financial requirements;
- Brief scope of work and status of the project;
- Preliminary list of RFP evaluation criteria;
- Specific information to be included in SOQs and the required SOQ format;
- Forms to be used in preparing SOQs (hardcopy and electronic format); and
- Protest procedures.

Upon issuance of the RFQ, the consultant assists DOT in responding to requests for clarification from prospective Proposers and in preparing addenda to the RFQ, as required.

¹³ Minorities/Women/ Disadvantage Business Enterprises

5. Draft request for proposals (DRFP): The consultant assists the DOT in preparing instructions to proposers (ITP), contract documents, reference documents, performance specifications, preliminary utility agreements, and other information that will comprise the draft request for proposal (DRFP). This task requires significant interaction with the department.
6. Final request for proposals (RFP): The consultant assists with the preparation of the final RFP, as agreed with the DOT, for distribution to the short-listed proposers, designated NYSDOT staff and NYSDOT-designated stakeholders in conformance with FHWA policies and procedures. Following issuance of the RFP, the consultant assists DOT in responding to requests for clarification from short-listed proposers; and prepare any necessary addenda to the RFP.
7. Evaluation and selection criteria: The consultant assists DOT in the preparation of preliminary written evaluation and selection (E&S) criteria for the request for qualifications (RFQ) and request for proposal (RFP) phases of the procurement. The E&S Criteria will describe each step of the evaluation and selection process, and will identify the roles and responsibilities of the personnel assigned to evaluate statements of qualifications (SOQs) during the RFQ phase and proposals during the RFP phase.
8. Design and environmental activities during design-build procurement: The preliminary engineering effort to complete the environmental process is anticipated

to be completed by others. However, when requested, the consultant may be asked to complete minor design services such as:

- Develop and prepare the preliminary design and environmental documents for specific design-build projects;
- Provide technical support to the department as needed during the procurement process; and
- Provide construction cost estimates and/or reviews of cost estimates prepared by others.

In addition, the following services if required should be performed by the consultant in coordination with DOT on an as needed basis:

- Assist with the responding to any protests or other disputes related to the procurement process; and
 - Undertake and complete other assignments to assist the department in the use of design-build contracting.
9. Support activities during design-build implementation: DOT may request the consultant to provide additional services after selection of the Design-Builder for assistance with the management and oversight of the Design-Build contract.
10. Design oversight and quality assurance during design-build implementation: The consultant provides design oversight and quality assurance services of project designs prepared by the Design-Builder.

11. Document control and administrative record: The consultant establishes and maintains a document control system and prepares and maintains the administrative record for the procurement process, including evaluation and selection.”

Colorado DOT (CDOT)

All the texts and information in this section are extracted from Consultant Agreement “As Needed” Design Engineering Service- CDOT Project 19039- Procurement Engineering Design for RFP document:

“Colorado DOT utilizes a consultant firm through a single program-management master agreement that combines procurement and general engineering services in one contract at district level for the design–build project. This contract explains how it works in tandem with task orders assigned to the consultant as the project moves forward. The master contract contains an exhaustive list of tasks that may be eventually needed on developing a DB project. It is explicitly mentioned in the contract that it consists of “as needed” projects, specifically design/engineering services for CDOT. The goal of the contract is to provide flexibility to develop specific task orders to respond to the needs of the project. Also, a sample of task order is included in the master contract, which shows how CDOT defines the exact scope of services that is required from the consultant. It is worthy to mention that a task order should be included in the master contract. CDOT allows the

consulting firm to be involved in the evaluation of the proposals with a significant role in the selection process.

The following section is the list of tasks that are normally assigned to the consultant firms in CDOT. Tasks might change from project to project, but it basically stays the same in different projects. The consultant's scope of services is described in terms of roles and responsibilities of the consulting firm in different major categories of works as the following:

Program Management Services (Project Management, Coordination, and Administration)

- Project coordination
 - Coordinate all contract activities with the CDOT project manager
 - Provide invoices and work status reports
 - Provide minutes of all meetings
 - Provide draft reports and submittals to CDOT prior to their content being utilized in follow-up work efforts
 - Keep a current “to do” task list to track the status of major and minor tasks
- Progress meeting/meeting minutes
 - CDOT management meetings
 - Coordination/progress meetings

- Contract development meetings
- Policy elements, schedules, estimates, and quality control
- Status reporting
- Document control
- Project planning, scheduling and budgeting

The consultant assists the CDOT/PM(s) in developing a well-convinced, thorough implementation plan for the project (a plan that fully addresses all of the work elements necessary to accomplish the project goals, and reflects reasonable design and construction durations) that includes:

- Master schedule
- Project budgeting and forecasting

Design Development (General Engineering Services)

These are services that are typically required from a general engineering consultant. The goal is to develop a basis of design and establish design criteria to advance preliminary engineering to a phase that prepares it for inclusion in an RFP. The consultant is tasked with the development of a refined conceptual design for the project. It also is responsible for completing conceptual designs related to the roadway project and developing additional information related to the refined conceptual design. Design development is supposed to

be focused on defining the scope of work for a design–build procurement and minimizing project risk to both the design–builder and to CDOT while providing the maximum flexibility for the design–builder to provide innovative design solutions.

The actual scope of work for the design development depends on the following factors:

- Available funding for the project
- Development of the basic configuration for the project
- Design risk assessment
- Potential development of additional request elements for the project

The following areas are covered in design development:

1. Survey and mapping
 - a. Data collection
 - b. Survey control
 - c. Design surveys
 - d. Utilities survey
2. Geology and geotechnical investigation
 - a. Preliminary soil investigation to support pavement designs
 - b. Preliminary soil investigations to support bridges and structures foundations designs

3. Hazardous waste investigations
4. Utilities coordination
5. Right-of-way mapping updates
6. Traffic analysis
7. Hydrology, hydraulics, and water quality
8. Roadway design
9. Pavement design
 - a. Pavement rehabilitation design
 - b. New pavement structures
 - i. Pavement justification
 - ii. Pavement design report
10. Structures design
11. Constructability, construction phasing, and traffic control
12. Conceptual design
 - a. Conceptual plans
 - b. Conceptual cost estimating
13. Environmental analysis updates
14. Agency coordination for design development

15. Additional consultant responsibilities in support of design development

- a. Overall project administration, including preparation of an administrative record
- b. Agency and public meetings
- c. Preparation for the design–build
- d. Coordination of CDOT, FHWA, and cooperating agencies (if applicable) reviews
- e. Final document revisions
- f. Field reviews
- g. Coordination of plan review, concurrence, distribution

Design–Build Procurement (Program Management Services)

- 1. Document control system for design–build project
- 2. Design–build procurement management services
 - a. Policy decisions
 - b. Design–build project goals and best value
 - c. Risk assessments
- 3. Request for qualifications services
 - a. Letter of interest

- b. Development of the RFQ
 - c. Qualification evaluation criteria and methodology
 - d. Responses to the RFQ
 - e. Presentations/briefings/discussions—Executive Oversight Committee (EOC)
 - f. Participation with EOC—discussions and reviews
 - g. Participating for and presenting the recommendations
 - h. Document classification and identification system
 - i. Preparation of correspondence
4. Draft request for proposals (draft RFP)
- a. Development of a management plan and schedule for procurement
 - b. Development of the draft RFP
 - i. Instructions to proposers (ITP)
 - ii. Design–build contract (the actual contract to be executed between CDOT and the successful proposer)—provided by CDOT
 - iii. Technical requirements
 - iv. Applicable requirements, data, and reports
 - v. Contract drawings/ROW plans
 - vi. Reference document (organize reference documents, for information only)

- c. Development and implementation of an industry review process
 - d. Coordination with FHWA and assist CDOT in obtaining FHWA approval of the final RFP
- 5. Final request for proposals (final RFP)
 - a. Compiling the final RFP
 - b. Final RFP handling, distributing, tracking, storing
 - c. Final RFP 1-on-1 meeting
 - d. Assess status of the reference documents prepared by the consultant, CDOT
 - e. Addenda to the final RFP
- 6. Proposal evaluations
 - a. Develop proposal evaluation procedures
 - i. Alternate technical concepts (ATCs)
 - ii. Technical proposals
 - b. Review of ATCs and technical approaches
 - c. Detailed review of the technical and price proposals
 - d. Final deliberations pertaining to the proposals

Design–Build Implementation and Construction Management Services

This section has responsibilities and tasks assigned to the consultant during the post-award phase of the project. It outlines how the owner’s consultant should be involved to work with the design–build team.

The consultant provides program management services to support the design–build implementation phase of the project, as necessary for the project.

1. Contract management

The consultant supports CDOT in managing and administrating the construction contract between CDOT and the contractor. That work effort may include:

- a. Change order management
- b. Payment management
- c. Schedule management

2. Design oversight

- a. Participation in contractor lead design task force meeting, including “over the shoulder” design and plan reviews
- b. Providing formal design reviews and participating in design review meetings

- c. Providing design reviews associated with contractor design support during construction activities, including: requests for information, field design changes, non-conformance resolution, and designer site observation
- 3. Quality control program oversight—The consultant provides support as necessary to CDOT in its execution of the owner’s oversight quality control program and oversight of the contractor’s quality program
- 4. Owner’s construction management

The program may include the following activities:

- a. Quality assurance inspection and testing
- b. Owner’s verification testing and inspection (if the contractor provides quality assurance for the project)
- c. Coordinating a schedule at the start of construction and maintaining the schedule throughout the project life
- d. Provide field observation and daily diaries
- e. Provide technical assistance to CDOT personnel on an as-needed basis
- f. Progress reports
- g. Daily time sheets
- h. Calculations, drawings, and specifications as needed
- i. Document changes and revisions”

4.6.5. Key Personnel and Respective Required Skillsets and Qualifications for Owner's Consultants

Managing innovative delivery contracting is different from that of the traditional delivery methods. Therefore, when the state DOT uses a staff augmentation model to manage the workload of an alternative delivery program, it anticipates a different set of unique skills for managing design–build and P3 projects. Technical skills are still important for the PM of the owner's consulting firm but, more importantly, soft skills such as communication matter in the selection of the most qualified consultants. The PM needs to be diplomatic in negotiating on behalf of the owner with various parties involved in the project. The PM needs to have a broad view of all the disciplines involved in the project. Knowledge of engineering design practices is important but should be complemented with the ability to address unique challenges of construction project management and integration with operations and maintenance requirements of the project.

Most of the DOTs are looking for soft skills such as the ability to manage conflicts and negotiate with different parties for candidates in these positions. The PM should be comfortable communicating effectively with a wide range of agencies, firms, and people to achieve the best from the project for the owner. Diplomatic skills are tremendously helpful to reduce the chance of any conflicts and disputes that can delay the smooth progress of the project. Below, several examples of key personnel and their required

skillsets are provided from several state DOTs for the consulting teams that help the state DOT in delivering design–build and P3 projects.

Virginia DOT (VDOT)

All the texts and information in this section are extracted from Request for Proposal-Limited Services Term Consultant Contract for Statewide Design Build and P3 Support Services- RFP #LD-20150106 document:

“Project manager, design manager, and contract specialist are key personnel for consulting engineering firms providing engineering support services for design–build and P3 programs. VDOT requires that the consulting team shows that key personnel have qualification, experience, expertise, and other skills in leadership and technical ability as follows:

- Consultant Project Manager (experience and expertise shall include):
 - Leadership roles in administration of consultant services contracts for design of various transportation engineering disciplines, construction, operation, and maintenance of complex transportation projects of similar type and size using traditional and/or alternative project delivery methods
 - Ability to coordinate the activities and efforts of a large organization/team that includes numerous design firms, contractors, and other disciplines that

will be involved in the development and construction of transportation projects

- Experience in resource management and timely delivery of quality work products in accordance with contract requirements
- A registered, licensed professional engineer in the Commonwealth of Virginia and/or project management professional certification (PMP) (preferred not mandatory)
- Design Manager (experience and expertise shall include, but not be limited to):
 - Leadership roles in the development of relevant project designs, review of design, working plans, specifications, and constructability, QA/QC for all pertinent disciplines involved in the design of the project for the alternative delivery methods
 - Experience in design and construction; heavy civil, structures, and relevant experience working on major transportation corridor projects
 - A registered, licensed, professional engineer in the Commonwealth of Virginia
- Contract Specialist:
 - Experience and expertise in development and/or administration of solicitation documents, technical requirements, specifications and special

provision writing/interpretation, contracts, estimates, construction schedules, project control, quality control and assurance, and claim analyses for complex construction projects using traditional and/or alternative delivery methods

- Ability to identify, address, and otherwise resolve project challenges, disputes, and all administrative issues affecting the successful completion of the projects, and identify and mitigate risk items
- Experience in transportation construction means and methods

The consultant's key personnel shall be permanently assigned to the contract. The availability of key personnel should be flexible to meet the needs of the Department. All individuals identified as key personnel shall remain on the consultant's team for the duration of the procurement process and, if the consultant is awarded a contract, the duration of the contract. Unauthorized changes to the consultant's team at any time during the procurement process may result in elimination of the consultant's team from further consideration. If the consultant is awarded a contract, unauthorized changes to any individuals identified as key personnel may be considered a breach of contract and result in termination.

Overall, VDOT expects that its design-build consultants have expertise and experience in the following areas:

- Preparation of solicitation documents such as RFQ, RFP, RFP plans, and engineering documents
- Technical support in the evaluation of design–build proposals/expressions of interest
- Managing, administering, and providing similar services per scope for complex design and construction contracts
- Specialized competence related to all aspects of review, design, quality assurance, maintenance, and operation of transportation projects
- State and federal processes/requirements associated with design–build and P3 projects; environmental permitting and compliance: managing environmental permitting processes and agency coordination; clear understanding of the pertinent state and federal laws and regulations
- Geotechnical knowledge of, expertise in, and experience with the issues that will affect the design and construction of the design–build projects
- Public and private utility management
- Expertise in the design, inspection, operation, and implementation of complex ITS computer and communications systems/networks
- Schedule review and analysis, and claim avoidance analysis and resolution procedures
- Managing and analyzing construction and field issues and the responses to these situations

- Value engineering procedures and experience in evaluating and analyzing value engineering proposals during construction”

Texas DOT (TxDOT)

All the texts and information in this section are from Professional Engineering Procurement Services (PEPS) Division Solicitation Number: 86-5RFP5067 RFQ:

“The general engineering consultant program manager (GECP) project manager shall function as program director (PD) for all GECP personnel, including individual project managers and task leaders (TLs) involved in multiple and concurrent work authorizations (WAs). The following professionals will be considered key personnel for GECP: project manager, deputy project manager, and TLs of major categories, including GECP project services, plan review, and cost estimating. Co-location of the key staff is considered as a strategy to enhance collaboration. The following skillsets are required for the PM of the GECP:

- Experience in development and management of a program management or a general engineering consulting contract for a design–build or a P3 project from project concept through project award/negotiation/execution, and project outcome
- Experience in development of program management or general engineering consulting documents, technical concepts, legal and financial terms and any innovation/value to the project as a result

- Ability to lead financial and legal teams
- Ability to manage concurrent tasks and projects on an accelerated schedule
- Ability to manage unforeseen assignments
- Ability to coordinate with several consulting firms throughout the implementation phase of the project
- Exceptional communication skills
- Capability to ensure quality cost estimating throughout various phases of the project

The following professionals will be considered key personnel for the general engineering consultant program manager (GEC) that works on P3 projects: project manager, deputy project manager, P3 procurement managers, and TLs of major work categories, including P3 project procurement services, and operations and maintenance. These key professionals need to be collocated with the state DOT staff to enhance collaboration. Leaders of toll collection system and back-office analysis, traffic forecasting, traffic & revenue (T&R) and financial feasibility analysis, and claims management are also considered key personnel in the GEC team but are not required to be collocated with the TxDOT team.

The P3 project manager oversees project management activities for transportation projects and is responsible for P3 contract administration, compliance and coordination of planning, design, construction, maintenance, and operations with developers, districts, divisions, and FHWA. The following competencies are expected from the P3 project manager:

- Government programs and operations affecting highway and P3 development
- Transportation design engineering principles, practices, and methods and the application of engineering theory
- State, county, and local government operations and metropolitan planning organizations or regional mobility authorities affecting highway and transportation development and operations
- Applicable plans, specifications, and estimates preparation, review, processing and, compliance requirements
- Contract interpretation and oversight
- Thorough knowledge of roadway construction, inspection, and evaluation methods and procedures
- Applicable contract/grant/funding/project/program processes, policies, and procedures
- Contract management policies and procedures”

North Carolina DOT (NCDOT)

All the texts and information in this section are extracted from NCDOT’s *Request for Letters of Interest (RFLOI)*, Title: *On-call General Engineering Services* document:

“The GESC firm is intended to augment the capacity and capabilities of NCDOT staff to deliver projects using alternative delivery methods. The consultant’s PM is the key personnel in the consulting team and is required to have the following qualifications:

- Ability to provide or secure technical design and environmental services expertise across all modes in support of alternative delivery project procurement documents and design approvals
- Experience with alternative delivery methods and processes
- Project management, scheduling, tracking, and performance measurement capability
- Ability to effectively communicate (written and verbal) with internal and external stakeholders/partners
- Working knowledge of federal, state, and NCDOT alternative delivery laws, regulations, policies, processes, and practices
- Demonstrated ability to apply continuous improvement methodology to recommend changes to policies, processes, and programs
- A minimum of 10 years of relevant transportation experience (preferred, but not required)”

California DOT (Caltrans)

All the texts and information in this section are from State of California Standard Agreement between the agency and the Consultant Firm, Agreement Number 53A0156:

“Consultant’s personnel shall be capable of performing the types of work described in the description of required services with minimal instructions. Consultant’s personnel may be required to work on extended assignments in Caltrans facilities. Consultant’s project

manager shall be a licensed engineer in the State of California, shall have at least 3 years of experience in developing design–build transportation-related projects, and shall coordinate all contract management matters with the Caltrans contract manager. The project manager shall be accessible to the Caltrans contract manager at all times during normal Caltrans working hours. In addition to other specified responsibilities, the project manager shall be responsible for all matters related to the consultant’s personnel, including:

- Reviewing, monitoring, training, and directing Consultant’s personnel
- Assigning personnel to complete the required task order work as specified
- Administering personnel actions

All work performed under the contract shall be under the direction of a civil engineer registered in the State of California. Each consultant employee assigned as a lead worker in a specific field on a deliverable shall be a licensed engineer in that field, shall be registered in the State of California, and shall have at least 3 years of experience in developing design–build transportation-related projects.

Caltrans insists that the owner’s consulting firms truly act in the best interest of the state DOT as an extension of the owner in providing project management services. Caltrans requests that the owner’s consultants’ practice of project management be consistent with the Caltrans’ own project management services. A similar principle of project management should be followed by the owner’s consultants. It is required that the consultant follow the

Caltrans PM manual. If needed, Caltrans refers consultants to the Project Management Body of Knowledge (PMBOK). Quality of work performed by consultants is expected to be at least equal to the quality of work performed by Caltrans itself.

1. All works are supposed to be performed in accordance with current Caltrans manuals, Project Management Handbook, and project management directives. Work not covered by the Caltrans-published standards shall be performed in accordance with the generally accepted principles of project management, as described in “A Guide to the Project Management Body of Knowledge” published by the Project Management Institute (www.pmi.org).
2. The Caltrans contract manager shall resolve all questions that may arise as to the quality or acceptability of deliverables furnished and work performed for the contract.
3. The minimum standard of work quality shall be that of similar work performed by Caltrans.
4. Additional standards for specific tasks may be included in the task order. Such standards supplement the standards specified herein. If such additional standards conflict with the standards specified herein, the contract standards shall govern.”

4.6.6. Conflicts of Interest (COIs)

It is a common practice among all the state DOTs that the prime owner's consultant firms are precluded from being involved in the design-builder's or the developer's team. Some state DOTs even preclude the consulting firms to propose on the other consulting contracts with the state related to innovative delivery projects. There are some exceptions, as in TxDOT a firm which proposed for either PMC or GEC tasks can propose for both of the contracts if the core team in each contract is different. Some state DOTs are more flexible in allowing the consulting firm to compete in design-build or P3 teams. For instance, CDOT allows the consultant that has been involved in less than 20 percent of the tasks to bid for the same project as a part of the design-build team. However, some state DOTs, like GDOT, UDOT and Caltrans, are more restricted and do not let the consultant compete on any DB projects in the state. Restrictions are typically much harder for consulting firms that have program management roles at the high level to oversee the entire state design-build or P3 program. General engineering consulting firms that just perform specific engineering design tasks can compete on other design-build and P3 projects.

Also, consulting firms and state DOTs' staff need to adhere with the state laws and regulations related to the use of former state DOT employees in the consulting team. The prime consultant is responsible to reveal any possible sources of COI and understands that the best approach is not to hide any possible issues in the submission. The state DOT also

needs to make sure that enough firewalls are placed to implement a fair and consistent selection process. Several examples of COIs are provided from different state DOTs as follows.

North Carolina DOT (NCDOT)

Based on the contract of the GESC firm and consistent with the NCDOT ethics policy and the design-build policy and procedures, the following restrictions have been placed for the GESC firm (and its sub-consultants, as applicable) as a means of avoiding potential conflicts of interest and perceived or real unfair competitive advantage:

1. The GESC firm (prime firm only) will be precluded, in perpetuity, from working for, or advising, any contractor or firm pursuing a design-build contract or a public-private partnership contract for which the GESC firm:
 - a. participated or contributed to the development of the project; or
 - b. participated or contributed to the procurement of the project, including but not limited to, the development of the request for proposals, unless otherwise approved by the department.

This prohibition would also apply to sub-consultants that participated or contributed in the procurement of the project. Sub-consultants that did not participate or contribute to the procurement of the project, but participated or

- contributed to the project development would require a policy exception to be a part of a pursuit of such a project in accordance with the design-build policy and procedures.
2. In the event that the GESC firm (prime firm only) does not participate and does not contribute to the procurement of the project, then the GESC firm (prime firm only) may pursue that design-build contract or that public-private partnership contract provided that:
 - a. the contract is publicly advertised after the termination or expiration of the GESC; and
 - b. the firm obtains all required exceptions to participate in accordance with the design-build policy and procedures, if necessary (i.e., if the firm has prior project involvement outside of this GESC contract) unless otherwise approved by the Department in writing.
 3. In the event that a sub-consultant does not participate and does contribute to the procurement of the project, then the sub-consultant may pursue that design-build contract or that public-private partnership contract provided that:
 - a. the sub-consultant does not have any embedded employees under this contract;

- b. the sub-consultant informs the Department in writing of its intent to pursue that ADP¹⁴ before participating or contributing to the development of the project or participating or contributing to the procurement of the project;
 - c. the sub-consultant obtains all required exceptions to participate in accordance with the design-build policy and procedures, if necessary (i.e., if the sub-consultant has prior project involvement outside of this GESC contract); and
 - d. adequate firewalls or other such controls are established, as determined by the Department, to restrict access (to the sub-consultant pursuing the ADP) to certain project information that if otherwise provided could be perceived as providing an unfair competitive advantage.
4. GESC firm personnel will not be a part of any technical review committee (TRC) but may serve as advisors to the TRCs, as designated by NCDOT.
5. The GESC firm and its sub-consultants may pursue express design-build contracts provided that:
- a. adequate firewalls or other such controls, as determined by the department, are established to restrict access (to those employees involved in the pursuit of an express design-build contract) to certain project information that if

¹⁴ Alternative Delivery Projects

otherwise provided could be perceived as providing an unfair competitive advantage; and

b. that the NCDOT provides advance written approval for such pursuit in advance of the submittal of the express design–build statement of qualifications.

6. Confidentiality agreements will likely be required to be executed among the GESC firm, NCDOT, and all GESC sub-consultants.
7. Nothing in the above restrictions is intended to preclude the GESC firm or its sub-consultants from pursuing or engaging in other work directly contracted by and between the GESC firm or its sub-consultants and the NCDOT (e.g., performance of CEI¹⁵ for projects, including ADPs).

Virginia DOT (VDOT)

All the texts and information in this section are extracted from Request for Proposal-Limited Services Term Consultant Contract for Statewide Design Build and P3 Support Services- RFP #LD-20150106 document:

“Like other state DOTs, VDOT does not allow the consulting firm participating in design–build teams to compete on the project that the firm provides services. VDOT utilizes an

¹⁵ Construction Engineering and Inspection

important feature in its agreement with the consulting firm to facilitate the implementation of COI in its design–build program. The selected delivery method for the project might be changed throughout the project development. The consultant will be notified about this change to alter the scope of work. This approach reduces the chance for encountering the conflict of interest in cases where the best project delivery option for the project has not been yet finalized. The following section describes the approach in the owner’s consulting contract:

- A change in a project delivery method may result in a potential conflict of interest for the consultant or any of its team members. As such, the scope of services and their role may be revised and redefined to meet the project need as identified by the Department. The consultant and its team members may not be allowed to participate in any subsequent contracts (design and/or construction) that are authorized or developed under this contract. The conflict of interest determination will be made in accordance with the Department’s policy.”

Minnesota DOT (MnDOT)

From Minnesota DOT’s Design-Build Manual: “The GEC cannot join a design–build team as the GEC firm is exclusive to MnDOT. Sub-consultants to the GEC that do not perform work on a design–build project may participate as an offeror or join a design–build team.”

Utah DOT (UDOT)

The consultant cannot list the current Utah DOT employees as key personnel in the SOQ.

The retired Utah DOT employee can be listed as key personnel only if the former employee was not involved in the development of the RFQ for the project. COI is considered project-by-project but it is restrictive and no exception is allowed to be made for any firms. The consultant cannot participate as part of a design-build (or P3) team on those specific projects for which the consultant provides management services.

UDOT's Project Development Division has created a process where disclosed concerns may be reviewed and addressed on a consistent case-by-case basis by a conflict of interest review team.

- The disclosed concerns are forwarded to the consultant services manager for screening, who either makes a determination or, if there is any question at all, forwards disclosed conflict of interest issues to the review team to address.
- Consultant Services has created a project-specific Conflict of Interest and Confidentiality Form for consultant/contractor selection teams to utilize.
- A team member must affirm or certify that the team has no conflict of interest either real or potential as to any matter which is entrusted to the team in its job or assignment.
- All team members must disclose a potential conflict of interest prior to receiving consultant or contractor proposals.

- All individuals must certify they will maintain confidentiality.

Consultant Acting as UDOT Project Manager Conflict of Interest

- UDOT retains consultants to perform UDOT project management services, and consultants in this role must represent UDOT in an equitable, ethical, and unbiased manner.
- Consultants acting as a UDOT project manager work under the direction of the UDOT program manager and must inquire and disclose potential conflicts of interest between their firm, the other consultants they manage, and the project(s).
- All potential conflicts of interest must be disclosed to the UDOT program manager and, in cases of potential conflicts of interest, the Consultant Contract Administrator and UDOT will work out a course of action to alleviate the conflict.

Construction Engineering and Design by Same Consultant Conflict of Interest

- UDOT may retain consultants to perform both design and construction engineering management on the same project.
- UDOT recognizes there are times when having the same consultant perform both design and construction engineering management is advantageous.
 - However, UDOT is aware there may be a perception of negative influence when a consultant performing construction engineering management for a project also performs the design services for the same project.

- FHWA outlines this potential conflict in the Consultant Services Procurement, Management, and Administration of Engineering and Design Related Services—Questions and Answers Section VIII.
- UDOT project management teams must consider and evaluate possible conflicts of interest when selecting a consultant resident engineer employed by the same design consultant team.
- If the UDOT Project Management Team considers selecting a resident engineer employed by the same design consultant team, the design consultant team will be required to submit documentation with an explanation of benefits to the director of project development or the engineer for preconstruction for approval prior to the consultant selection.
- This does not apply to local government projects. Local governments will be advised of UDOT's concerns and allowed to determine their own practices.

Design–Build Conflict of Interest

The UDOT Conflict of Interest Review Team will review any potential conflict of interest in design–build projects. UDOT developed the following definition of a conflict of interest to preclude a consultant from participating on the design–build team. However, if a situation occurs outside the definition, it may still be considered a conflict.

- Any individual, organization, or association that is directly involved in the development of selection criteria for the design–build RFQ/RFP or is involved in the RFQ/RFP selection process is precluded from proposing on the project (as part of a design–build team).
 - Example: If a key person leaves an organization that is directly involved in the development of selection criteria for the design–build RFQ/RFP or is involved in the RFQ/RFP selection process, and joins another organization, both organizations may be precluded from proposing on the project (as part of a design–build team) based on a determination by the UDOT Conflict of Interest Review Team.
 - “Organization” includes all entities existing within the same corporate umbrella.
- For program management services, if eligible sub-consultants to the prime consultant choose to pursue participation on a design–build team they, and the program management consultant, will be required to submit a mitigation plan to UDOT, and receive UDOT approval of that plan.

Texas DOT (TxDOT)

From Texas DOT Procurement Engineer Consultant RFQ/RFP Example document:

“TxDOT has a broad restriction related to COI that precludes the prime consultant and all

sub-consultants, including their subsidiaries and affiliates, to team up with design-builders or developers in any part of the TxDOT DB and P3 program.

The consultant firm can bid on both procurement engineering consultant and general engineering consultant for program management contracts, but the core team should be different. The core team members on one contract can only be in minor support roles in the other contract.

- The core team members (PM, deputy PM, and task leaders of major work categories) proposed by a firm (prime or sub-providers), are precluded from being proposed as core team for the PcE¹⁶ services contract solicitation. However, core team members could be used on the PcE in minor support roles.

The selected consultant on any of these contracts cannot bid on any of the subsequent consulting opportunities in the series:

- General engineering consultant for design review/oversight (GECD) services
- General engineering consultant for construction/owner verification testing and independent assurance oversight (GECC) services
- General engineering consultant for operation and maintenance oversight (GECM)

¹⁶ Procurement Engineering Consultant

A prime provider or sub-provider currently employing former TxDOT employees must be aware of the revolving door employment laws and rules in the State of Texas. Both the firm and former TxDOT employees are responsible for understanding and adhering to these rules and laws.”

California DOT (Caltrans)

All the texts and information in this section are from State of California Standard Agreement between the agency and the Consultant Firm, Agreement Number 53A0156:

“Caltrans has a strict policy about implementing COI on the prime consultant and its sub-consultants. The consultant is not allowed to be in any design–build team bidding on the same project, except for sub-consultants in surveying or materials testing. It is also worthy of notice that COI is at the project level and not at the wide program level. Interestingly, the consultant cannot compete to provide construction inspection services on the same project.

- The consultant hereby certifies that neither the consultant nor any firm affiliated with the consultant will bid on any construction contract or on any agreement to provide construction inspection for any construction project resulting from this agreement. An affiliated firm is one that is subject to the control of the same persons, through joint ownership or otherwise.

- Except for those sub-consultants whose services are limited to providing surveying or materials testing information, no sub-consultant who has provided design services in connection with this agreement shall be eligible to bid on any construction contract or on any agreement to provide construction inspection for any construction project resulting from this agreement.”

4.6.7. Disadvantaged Business Enterprise (DBE)

The U.S. Department of Transportation (U.S. DOT) is dedicated to serving the community, including those businesses contracting with state agencies and recipients of DOT funds. The Department’s Disadvantaged Business Enterprise (DBE) program is designed to remedy ongoing discrimination and the continuing effects of past discrimination in federally assisted highway, transit, airport, and highway safety financial assistance transportation contracting markets nationwide. The primary remedial goal and objective of the DBE program is to level the playing field by providing small businesses that are owned and controlled by socially and economically disadvantaged individuals a fair opportunity to compete for federally funded transportation contracts. State DOTs highly encourage the consulting firms to utilize DBEs in various capacities throughout the development of design–build and P3 programs. Most DOTs set DBE goals for owner’s consulting firms in design–build and P3 services. Also, most state DOTs provide training opportunities for DBEs and assist them in connecting with national and large consulting firms on design–

build and P3 initiatives. Some state DOTs provide mandates in their consulting contracts to allocate several types of work items to small firms, especially DBEs. This approach tries to avoid concentration of DBE services and helps widen the breadth of specialty firms involved in the consulting works. Some state DOTs request the prime consulting firm to provide specific rates for the all sub-consultants in the team, especially the DBE members. In some cases, the state DOT audits DBEs' invoices and evaluates the authenticity of paychecks to DBE members of the team. Several examples are provided here from different state DOTs' approaches to handling DBE issues.

Caltrans

All the texts and information in this section are from State of California Standard Agreement between the agency and the Consultant Firm, Agreement Number 53A0156:

“Caltrans sets an 8 percent goal in its agreement with Underutilized DBE (UDBE) Participation. No further instruction is provided to set goals for different types of works that DBEs should conduct.

- If a DBE sub-consultant is terminated or fails to complete its work for any reason, the consultant will be required to replace that original DBE sub-consultant with another DBE sub-consultant. The DBE cannot be replaced without receiving a formal notice from Caltrans.”

Florida DOT (FDOT)

All the texts and information in this section are extracted from the current DBE Supportive Services Provider for the State of Florida in the Equal Opportunity website at: <http://www.fdot.gov/equalopportunity/serviceproviders.shtm>.

“The Department has contracted with a consultant, referred to as the DBE supportive services provider, to provide managerial and technical assistance to DBEs. This consultant is also required to work with prime design–build firms, who have been awarded contracts, to assist in identifying DBEs that are available to participate on the project. The successful design–build firm should meet with the DBE supportive services provider to discuss the DBEs that are available to work on this project.”

Texas DOT (TxDOT)

All the texts and information in this section are extracted from *Procurement Engineer Consultant RFQ/RFP Example- Notice of Intent to Contract for Indefinite Deliverable Contract with State Funding and HUB (Historically Underutilized Business) Goal* document:

“TxDOT emphasizes the use of DBE firms in its owner’s consulting contracts. This emphasis can be observed in the title of the RFQ that contains the term “with DBE goal.” TxDOT set goals for DBE firms under its “State of Texas Historically Underutilized

Business (HUB) Subcontracting Plan (HSP) Requirement.” The following are excerpts from one of the consulting agreements:

- This is a state-funded contract and it has been determined by TxDOT that there are probable subcontracting opportunities in the scope of work for this contract. The assigned HUB subcontracting goal for participation in the work to be performed under this contract is 23.6 percent of the contract amount.
- Each sub-provider listed to meet the assigned HUB subcontracting goal must be HUB-certified in the Business Category applicable to the type of service being offered by that firm. A firm offering architecture, engineering, or surveying services must be HUB-certified in Business Category 05: Architectural/Engineering and Surveying Services. A firm offering another type of service, such as environmental services, must be HUB certified in either Business Category 05 or Business Category 06: Other Services Including Legal Services. A firm not HUB-certified in the Business Category applicable to the type of service being offered will not be counted toward the assigned HUB subcontracting goal.

TxDOT provides a list of subcontracting opportunities in Procurement Engineer Consultant RFQ/RFP Example document that is applicable to different categories of works as a resource for the prime consultant to select eligible HUB subcontractors from a table titled

“Possible Subcontracting Opportunities by TxDOT Precertification Group or Category, or Non-Listed Group or Category.” These categories are:

- Transportation system planning
- Environmental studies
- Schematic development
- Roadway design
- Bridge design
- Traffic engineering and operations studies
- Traffic operations design
- Hydraulic design and analysis
- Surveying and mapping
- Miscellaneous
- Public–private partnership project procurement services
- Traffic and revenues studies
- Project office operations
- Multi- modal cost estimates
- Commercial highway transportation business regulatory and safety
- Public involvement

Also, resources for searching the eligible list of subs that are HUB-certified or minority- and women-owned businesses in TxDOT are provided in the contract. The DBE subs need to be certified in the specific area that they are utilized to work on (from Professional Engineering Procurement Services (PEPS) Division Solicitation Number: 86-5RFP5075, Request for Qualification):

- A firm not DBE-certified in the Subsector 541 NAICS¹⁷ Code applicable to the type of service being offered will not be counted toward the assigned DBE subcontracting goal.

North Carolina DOT (NCDOT)

All the texts and information in this section are extracted from NCDOT's *Request for Letters of Interest (RFLOI)*, Title: *On-call General Engineering Services* document:

“The NCDOT also encourages the use of small professional services firms (SPSF). Small businesses determined to be eligible for participation in the SPSF program are those meeting size standards defined by Small Business Administration (SBA) regulations, 13 CFR Part 121 in Sector 54 under the North American Industrial Classification System (NAICS). The SPSF program is a race, ethnicity, and gender-neutral program designed to

¹⁷ North American Industry Classification System

increase the availability of contracting opportunities for small businesses on federal, state or locally funded contracts. SPSF participation is not contingent upon the funding source.”

New York State DOT (NYSDOT)

All the texts and information in this section are from Comptroller’s Contract No. D031100-Consultant Agreement document:

“NYSDOT heavily emphasizes on non-discrimination practices and involvement of minorities and women in its consulting contracts. Under the nondiscrimination/EEO (equal employment opportunity)/DBE requirements, the consultants are asked that no one should be excluded from participation in, or denied the benefits of, or be subject to discrimination under the project funded through their contracts based on race, color, creed, national origin, sex, age or handicap. Also, municipality/sponsor shall cause its contractors to cooperate with the State in meeting its commitments and goals with regard to the utilization of DBEs and will use its best efforts to ensure that DBEs will have opportunity to compete for subcontract work under the master agreement.”

4.6.8. Performance Metrics

To the best of the researchers’ knowledge, none of the state DOTs interviewed in this research has any systematic approach to evaluate the performance of owner’s consulting firms in design–build and P3 programs. There is not a defined set of metrics that any state

DOTs have developed to measure the performance of the consultant firm. This is an area where further research is deemed appropriate. In fact, some state DOTs have issued a specific task order for the consulting firm to develop a list of performance metrics for their works that the state DOT could use to evaluate their performance. This task order is considered under the high-level advisor and policy development role of the consulting firm. As biased as this approach might be, this may be the only approach that some state DOTs currently use amid their limited in-house expertise in performance evaluation.

State DOTs can begin looking into their RFQs to reassess how the most qualified consultants are selected and what role past performance plays in the selection criteria. Timeliness, quality of services, price stability, and business relations are among the important areas that can be initially used to quantify the past performance of consulting firms. Specific metrics can be developed under these areas for design-build and P3 programs. Measuring the performance and keeping track of it can help state DOTs in future selection processes and benefit the consulting industry as an appropriate lesson-learned tool.

The bottom line is that the consulting industry correctly understands that superior performance is absolutely critical in securing future businesses with the client. Anything short of superseding the state DOT's expectations is not an option for the consulting firm, as prior experience is the most critical evaluation factor used by state DOTs to shortlist and

select the owner's consulting firm in design-build and P3 programs. Internal incentives, such as reputation and higher likelihood of becoming successful in future consulting contracts are appropriate mechanisms to motivate consulting firms to perform the best they can in their services to assist the owner in managing design-build and P3 programs.

Colorado DOT (CDOT)

All the texts and information in this section are from Consultant Agreement, "As Needed" Design Engineering Service, CDOT Project 19039, Procurement Engineering for Design RFQ:

"CDOT does not have any specific measurement system to assess the performance of owner's consulting firms in design-build and P3 programs. However, good information is available from the vendor performance evaluation metrics that can be considered as an initial point to begin thinking about finding appropriate measures to assess the performance of owner's consulting firms helping the DOT in design-build and P3 projects. CDOT acknowledges that performance measurement is really difficult as no two services by a vendor are equal due to the task, condition, timing, etc.

CDOT uses a general section for evaluation of the consultant firm that summarizes several performance measures divided into the following categories:

- Vendor requirements met as to quality of goods/services

- Vendor requirements met as to timeliness of delivery or performance (deadlines, milestones, schedule)
- Vendor requirements met as to price/budget (cost control)
- Business relations (professionalism, responsiveness, change management)
- Project-specific requirements

Vendor performance is usually evaluated in the areas of pricing, quality, timeliness, delivery, and service. Each area varies in the number of factors deemed critical by CDOT toward “successful” vendor performance. Ratings should reflect how well (how close) the consulting firm complied with the specific contract performance requirements for each area as follows.

- Pricing of work: The forecasted costs were close or identical to billed costs. Costs were managed effectively. Costs needed to be renegotiated to meet contract requirements. The value received supported costs.
- Quality of work: Vendor consistently achieved desired outcomes with a minimum of avoidable errors and problems. Work met the requirements, expectations, or desired outcomes. The work was accurate and complete. The work was done in an efficient and effective manner.

- Timeliness of work: Work is happening or done at the right time or an appropriate time as agreed to under contract. Agreed-to dates of delivery were met. The vendor kept the project on schedule. Service hours and effort were as agreed.
- Business relations: Vendor was professional, responsive, and proactive. Proposed limited changes without cost impacts. Vendor was reliable and managed the project effectively.

Specific factors are considered in the following evaluation areas:

- Pricing factors:
 - Price stability: Price should be reasonably stable over the term of the contract.
 - Price accuracy: There should be a low number of variances from initial agreed process and the costs on received invoices.
 - Advance notice of price changes: The vendor should provide adequate advance notice of price changes.
 - Sensitive to costs: The vendor should demonstrate respect for the bottom line and show an understanding of the agency's needs. Possible cost savings could be suggested.

- Billing: Vendor's invoices should be accurate. Estimates should not vary significantly from the final invoice. Effective vendor bills are timely and easy to read and understand.
- Quality factors:
 - Compliance with the contract: The vendor should comply with terms and conditions as stated in the agreement. The vendor should show an understanding of the agency's expectations.
 - Conformity to specifications: The product or service must conform to the specifications identified in the original solicitation and contractual agreement. The product should perform as expected. The services should be provided as expected.
 - Reliability: The rate of product failure is within reasonable limits.
 - Durability: The time until replacement is reasonable.
 - Support: Quality support should be available from the vendor. Immediate response to and resolution of the problem is always desirable.
 - Warranty: The length and provisions of warranty protection offered should be reasonable. Warranty problems should be resolved in a timely manner.

- State-of-the-art product/service: The vendor offers products and services consistent with the industry state-of-the-art. The vendor should consistently refresh product life by adding enhancements.
- Timeliness and delivery factors:
 - Time: The vendor delivers products and/or services on time. The actual receipt date is on or close to the promised date. The promised date should correspond to the vendor's published lead times.
 - Quantity: The vendor should deliver the correct items or services as the contracted for quantity.
 - Lead time: The average time for delivery is comparable to that of the other vendors for similar products and services.
 - Documentation: The vendor should furnish proper documents (packing slips, invoices, technical manual, etc.)
- Service factors:
 - Vendor approach: Good vendor representatives have sincere desire to serve. Vendor reps display courteous and professional approach, and handle complaints effectively. The vendor should also provide up-to-date catalogs, price information, and technical information, etc.

- Technical support: The vendor should provide technical support for maintenance, repair, and installation situations. The vendor should provide technical instructions, documentation, and general information. Support personnel should be courteous, professional, and knowledgeable. The vendor should provide training on the effective use of its products or services.
- Emergency support: The vendor should provide emergency support for repair or replacement of a failed product.
- Problem resolution: The vendor should respond in a timely manner to resolve a problem. An excellent vendor provides follow-up on the status of problem correction.”

Caltrans

Caltrans has a formal written process to evaluate consultants. However, no metrics were offered to specifically measure the performance of owner’s consultants in design–build and P3 projects. The consultant’s performance will be evaluated by Caltrans. A copy of the evaluation will be sent to the consultant for comments. The evaluation, together with the comments, shall be retained by Caltrans.

CHAPTER 5

CONCLUSIONS

This research provides a synthesis of practices in organizational structuring and professional staffing of the innovative delivery units in several state DOTs across the nation that are actively utilizing alternative project delivery. Subject matter experts, who were surveyed by email or interviewed by telephone, identified several major challenges and barriers faced by innovative project delivery units to fulfill project leadership staffing needs.

Also, various approaches that state DOTs have utilized to respond to their staffing and organizational needs were identified. Organizational structure of a state DOT, regulating legislations and policies, history and culture of the organization, and the design–build industry in the state are among the most important factors that affect the approach the state DOT utilizes to professionally staff its innovative delivery program.

The results of email surveys, structured interviews, and content analysis of several documents help better understand various models utilized by different state DOTs in managing the workload for design–build (DB) and public–private partnership (P3) programs. Differences in organizational structuring and professional staffing for innovative project delivery programs are described in the following areas:

- Models of Office of Innovative Delivery

- Main Roles and Responsibilities of the Headquarter (HQ) Office of Innovative Delivery
- Involvement of District Offices in Delivery of Design–build Projects
- Training and Staffing Strategies and Preferred Skillsets
- Utilizing Consulting Firms to Assist the Owner
 - Prequalification, Licensing Requirements, and Selection Criteria for Evaluating Consulting Firms (Licenses, Requirements)
 - Selection Process
 - Contracting and Payment Methods
 - Assigned Tasks to the Owner’s Consulting Firm
 - Key Personnel and Respective Required Skillsets and Qualifications for Owner’s Consultants
 - Conflicts of Interest (COIs)
 - Disadvantaged Business Enterprise (DBE)
 - Performance Metrics

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