

Evaluation of Highway Agency Approaches to Consultant Oversight for Construction Engineering and Inspection Services

Proposal to the Transportation Construction Management Pooled Fund

July 8th, 2013

Objective

The objective of this research is to develop a guide to effectively evaluate the various approaches to state department of transportation (DOT) oversight of consultants for construction engineering and inspection (CEI) services. The guide will include examples of construction management procedures, policies, templates, flowcharts, checklists, and other resources discovered throughout the course of the research. So that the guide can be concise and user-friendly, the research will document the study in a separate research report.

The **guide** will include:

- (1) A review and synthesis of recent experiences of DOTs on the use of consultant CEI oversight; and
- (2) Identification of the current state-of-practice, best practices, and specific challenges facing DOTs in utilizing consultants for CEI services.

The **research report** will include:

- (1) Documentation of the research process and data collection; and
- (2) Documentation of the research results in a concise and comprehensive report.

Background

State DOTs face the challenge of managing dynamic programs with large fluctuations in workload. The DOTs' expectations of delivering high quality projects on time and within budget is threatened by peak work demands, staffing limitations, hiring freezes, and other constraints. As a result, DOTs use consultants for CEI services to some degree. The engineering consultants providing CEI services to the DOTs should perform all work under the direct control of the field engineering and project management. It is assumed that the quality of a project is the same whether it is accomplished by in-house staff or outside consultants. A major consideration for any DOT in using CEI programs is program oversight. While most DOTs have developed processes, procedures, and policies to address the selection, contracting issues and management of consultants, there is a need to share best practices in oversight approaches.

Research Plan

The research plan entails the following tasks, which are explained in the sections that follow:

- Task 1 – Research Team-TCM Panel Work Plan Meeting
- Task 2 – Literature Review
- Task 3 – Survey and Analysis of State DOTs and Consultants
- Task 4 – Structured Interviews
- Task 5 – Final Guide and Research Report

Task 1 – Research Team-TCM Panel Work Plan Meeting

Upon successful award of the project, the research team will develop a detailed work plan. The research team will organize a kick-off teleconference with the Transportation Construction Management (TCM) Pooled Fund panel. The research team will present the plan and solicit feedback from the panel members to refine the project approach. The work plan will focus on the design of the survey, structure of interviews, expectations for the analysis, and approach to the guide and final research report.

The deliverables of Task 1 will be:

- a. A written work plan for discussion on the panel teleconference; and
- b. Meeting minutes from the teleconference documenting any change to the work plan.

Task 2 – Literature Review

This task includes collecting, reviewing, and synthesizing relevant literature, research findings, and other appropriate material, inside and outside of the transit and highway industry. The primary focus of this task is to identify current practices on the use of technologies and innovations to enhance consultant oversight of CEI services for transportation projects. Sources of literature to be examined include, but not limited to: state DOT websites; transit boards; Transportation Research Information Database (TRID); and the academic journals. The product of this task will be a written summary of the literature review for inclusion in the final report and an annotated bibliography.

The deliverables of Task 2 will be:

- a. A written summary of the literature review for inclusion in the final report;
- b. A technical memorandum and presentation to the TCM advisory panel in a teleconference.

Task 3 – Survey and Analysis of State DOTs and Consultants

Task 3 involves a survey of DOT representatives and consultants. The survey questions will be specifically structured to be consistent with current literature and previous studies. The survey will include a combination of closed-ended structured and open-ended semi-structured questions. The purpose of this survey is to: (1) identify the challenges that DOTs face when using consultants for CEI services; (2) identify the commonly-used resources and references on the oversight process of using consultants; and (3) describe the weaknesses in the current state-of-practice.

The analyses of the survey data will rely on a combination of frequency and chi-square analyses for the purpose of quantifying: (1) the challenges DOTs commonly face when using consultants for CEI services; (2) the resources are most commonly used in the oversight of CEI consultant services; and (3) the weaknesses are most commonly encountered in the utilization of CEI consultant services. Chi-square analyses will be used to describe if the above frequencies vary by a DOT's approach in utilizing CEI consultant services.

The deliverables of Task 3 will be:

- a. A written summary of survey results; and
- b. A technical memorandum and presentation to the TCM advisory panel in a teleconference.

Task 4 – Structured Interviews

Following the completion of exploratory surveys, case studies will be conducted on exemplary projects or exemplary state programs identified during the survey. The objectives of the structured interviews are to: (1) supplement and validate the findings from the survey; (2) identify and document common barriers and success factors of DOT oversight approaches of consultants; and (3) obtain examples of processes, procedures, and policies to the use of consultants for CEI services.

The deliverables of Task 4 include:

- a. Common barriers to success for consultant oversight of CEI services;
- b. Examples of successful practices and programmatic approaches;
- c. Process examples of best practices including templates, flow charts, and checklists; and
- d. A technical memorandum and presentation to the TCM advisory panel in a teleconference.

Task 5 – Final Guide and Research Report

The final product should include a written guide with a searchable matrix relating state DOTs with their key practices, contact information, and hyperlinks to more detailed information (if available).

The deliverables of Task 5 include:

- a. The guide to be titled “Evaluation of Highway Agency Approaches to Consultant Oversight for CEI Services”; and
- b. The research report to be titled “Research Report on the Evaluation of Highway Agency Approaches to Consultant Oversight for CEI Services.”

Potential Information Sources

- Relevant publications by TRB, FHWA, AASHTO
- State DOTs
- NCHRP Synthesis 20-5/ Topic 18-01 (1989) Use of Consultants for Construction Engineering Inspection
- NCHRP Synthesis 20-5/ Topic 29-06 (1999) Consultants for DOT Preconstruction Engineering Work

Schedule of Tasks

Task	2013					2014							
	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
Work Plan Development	■												
Task 1 – Panel Kickoff Meeting	◆												
Task 2 – Literature Review	■	■	■										
Tech Memo 1 and Advisory Board Meeting			◆										
Task 3 – Draft Survey				■									
Task 3 – Pilot Survey and Revisions				■	■								
Task 3 – National Survey Data Collection					■	■							
Task 3 – Analysis of Survey Data Collection						■							
Task 3 – Structured Interview Identification						■							
Tech Memo 2 and Advisory Board Meeting							◆						
Task 4 – Conduct Structured Interviews							■	■	■	■			
Task 4 – Analyze Structured Interviews										■			
Tech Memo 3 and Advisory Board Meeting										◆			
Task 5 – Prepare guide and research report											■	■	
Guide and Report Advisory Board Meeting													◆
Final Guide and Report Revisions													■

PROPOSED BUDGET DETAILS

Institution: The Regents of the
University of Colorado
572 UCB
Boulder, CO 80309-0572

Title: Evaluation of DOT Approaches to
Consultant Oversight for CEI Services

Principal Investigator: Paul Goodrum

Duration: 8/15/13 to 8/14/14

A. Salaries and Wages	Year 1
PI: Goodrum	
100% time, 0.75 months summer	9,194
Co-PI: Molenaar	
100% time, 0.25 months AY	3,537
Graduate Research Assistant	
50% time, 9 months	<u>17,381</u>
Total Salaries and Wages	30,112
B. Fringe Benefits	
PI: 27.5%	2,528
Co-PI: 27.5%	973
GRA: 7.9%	<u>1,373</u>
Total Fringe Benefits	4,874
C. Permanent Equipment	
None requested	<u>0</u>
Total Permanent Equipment	0
D. Travel	
Domestic Travel	<u>0</u>
Total Travel	0
E. Other Direct Costs	
Supplies	0
Tuition Remission	<u>12,960</u>
Total Other Direct Costs	12,960
F. Total Direct Costs	47,947
G. Indirect Costs	
20% of TDC per agreement	<u>9,589</u>
H. Total Costs	57,536