



## **Oversight Procedure 01 – Administrative Conditions and Requirements**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure (OP) is to describe the administrative conditions and requirements associated with the performance of oversight by the Project Management Oversight Contractors (PMOC) for the Federal Transit Administration (FTA).

### **2.0 BACKGROUND**

As part of its responsibility to prudently use public funds, FTA performs project oversight to ensure that major capital transit projects are executed professionally, efficiently, and in conformance with applicable statutes, regulations, and guidance, and sound engineering and project management practices.

FTA performs oversight through its own staff and through its contractors, the PMOCs. While these OPs are meant to instruct both FTA staff and its PMOCs, the PMOCs in fact perform most of the oversight. Therefore, the OPs refer to the reviewer as the PMOC.

### **3.0 OBJECTIVES**

FTA requires project oversight that is proactive, includes investigation of issues and conditions, dialogue and problem solving with the project sponsor, and provision of professional opinions and recommendations for action. Reports that support the oversight activities should be concise and provide FTA with critical input to its decision making on project advancement and funding.

### **4.0 REFERENCES**

See Appendix A for the principal, but by no means the only, references to Federal legislation, regulation and guidance with which the PMOC should have a good understanding as related to the project sponsor's project work and the oversight function.

### **5.0 PROJECT SPONSOR SUBMITTALS - NA**

### **6.0 SCOPE OF WORK**

#### **6.1 General Administrative Requirements and Documents**

##### **6.1.1 Contracts**

Every five years, FTA issues a request for proposals for project management oversight services for its major capital projects. A group of firms is selected for award of indefinite-delivery indefinite-quantity

contracts for oversight services, over a period of five years, for a not-to-exceed contract amount. Specific assignments for oversight work are negotiated with individual firms and are authorized through task orders, and within task orders, through work orders. A PMOC may be issued one or more task orders under its contract.

Contract Line Item Numbers (CLINs) are primarily used for administration and accounting. The contract includes the CLINs and SubCLINs listed below:

CLIN 0001	CONTRACT AND PROGRAM SUPPORT
CLIN 0002	PROJECT MANAGEMENT REVIEW SERVICES
CLIN 0003	TECHNICAL REVIEW SERVICES
CLIN 0004	OTHER REPORTS, REVIEWS, AND PLANS
CLIN 0005	OTHER DIRECT COSTS

**CLIN 0001** CONTRACT AND PROGRAM SUPPORT covers services that are required by FTA in support of the PMOC's contract, the PMO program, and special tasks including technical assistance to project sponsors.

0001A Special Tasks

**CLIN 0002** PROJECT MANAGEMENT REVIEW SERVICES covers services that typically are required at intervals. These review services are normally specified and managed by FTA regional staff.

0002A Project Management Reviews (Project Management Plan Reviews, Project Sponsor Management Capacity and Capability Reviews, Safety Security Management Plan Reviews, Real Estate Reviews, Quality Assurance/Quality Control Program Reviews, etc.)

0002B On-site Monitoring and Reporting (Recurring Oversight and Related Reports),

**CLIN 0003** TECHNICAL REVIEW SERVICES covers oversight reviews and analyses of project scope, schedule, cost, risk and contingency, as well as other scope reviews, vehicle reviews and readiness reviews. These services are normally specified and managed by FTA headquarters staff.

0003A Scope, Cost, Schedule Characterization Reviews (Value Engineering-Constructability Review; Project Transit Capacity Review; NEPA and Design Document Comparative Review; Project Scope Review; Project Delivery Method Review; Capital Cost Estimate Review; Project Schedule Review; Americans with Disabilities Act Review; Buy America Review)

0003B Vehicles Reviews (Fleet Management Plan Review; Bus and Rail Vehicle Technical Review)

0003C Risk and Contingency Reviews

0003D Readiness Reviews (Readiness to Enter Engineering; Readiness to Execute/Amend FFGA; Readiness to Procure Construction Work; Readiness for Revenue Operations; Letter of No Prejudice Review)

0003E Small Starts Reviews

0003F Special Project Reviews

#### **CLIN 0004 OTHER REPORTS, REVIEWS, AND PLANS**

0004A Implementation Plans and Transition Plans, PMOC Status Reporting, Lessons Learned Reports, Before and After Study Reviews, and Annual New Starts Reviews

#### **CLIN 0005 OTHER DIRECT COSTS (primarily travel expenses)**

### **6.1.2 Roles and Responsibilities**

The project sponsor is fully responsible for development and implementation of the capital transit project. The project sponsor is responsible for planning, design, and bidding the contract documents, supervising, administering, inspecting and accepting construction, and performing testing and start up.

FTA administers grants and loans to State and local public bodies, and in public-private partnerships to private entities, to acquire, construct, and reconstruct transit facilities. As a steward of public funds, FTA provides oversight to ensure that FTA-funded transit projects are implemented responsibly – that scope, schedule and cost are in balance and the project design and construction conform to statutes, regulations, guidance, etc.

FTA performs oversight through its own staff and through its PMOCs to ensure the adequacy of the project sponsor's management capability and capacity, assess the reasonableness of the scope, schedule and cost, and assess the likelihood the cost and schedule will hold through revenue service. As part of oversight, FTA and the PMOCs identify problems, suggest solutions to the project sponsor, and report to FTA their findings, professional opinions, and recommendations.

Apart from oversight, FTA and the PMOCs occasionally provide technical assistance to project sponsors. Such assistance may include providing information and instruction in project management and project analysis practices, and sharing technical expertise in transit project design and construction. In the course of performing oversight, the PMOCs must bring to FTA's attention the occasions when the project sponsor could benefit from technical assistance. FTA will issue direction to the PMOC through the work order scope to cover these occasions.

The FTA Office of Capital Project Management (TPM-20) within the Office of Program Management (TPM) in Washington, D.C. and the FTA Regional Offices (TROs) are responsible for providing project oversight starting prior to Engineering, and the Full Funding Grant Agreement (FFGA) or prior to the Small Starts Grant Agreement (SSGA), into construction, substantial completion, testing, start-up, and revenue service. As a general rule, recurring oversight (periodic and quarterly) is conducted by TROs; whereas, reviews for scope, schedule, cost, contingency and risk, etc. are usually initiated by TPM. TPM and TRO, along with the FTA Office of Procurement, administer the PMOC contracts, task orders and work orders.

The PMOCs' primary FTA points of contact are FTA's Alternate Contracting Officer Representatives (ACOR) and Work Order Managers from TRO or TPM. The primary staff person in the FTA Office

of Procurement is the Contracting Officer (CO). The Contracting Officer's Representative (COR) for the PMO program is part of TPM. The Alternate COR assumes the duties of the COR in his or her absence. ACORs were previously referred to as FTA "Task Order Managers."

The PMOCs are responsible for rigorously but non-intrusively analyzing progress on projects; positively and constructively interacting with the project sponsor to solve problems; and maintaining objectivity in discussions of findings, conclusions and recommendations with FTA and the project sponsor.

One of the most important reviews is the assessment of project sponsors' management capacity and capability to successfully implement projects. Through a review of project sponsors' organizations, personnel qualifications and experience, and the project sponsors' stated approaches to the work and understanding of the work, PMOCs can assess the project sponsors ability to perform the work responsibly and keep projects on time, on budget, and in accordance with approved plans and specifications.

The PMOCs also review the planning, design, construction and operations of the project in the context of the existing transit system. The review covers all project components – guideway structures, stations, maintenance and storage facilities, sitework, power, signal and communications systems; fare collection; real estate; vehicle design and manufacturing – as well as overall project quality and capacity, safety, cost estimates, schedules, and assessments of risk.

After PMOCs are awarded contracts, they may be awarded task orders and work orders within task orders to perform oversight. Task orders will typically cover all projects by a particular project sponsor. "Programmatic" task orders issued from TPM can cover special studies and research, as well as technical reviews of project scope, schedule, cost, risk, and other tasks, as necessary.

The PMOCs' main responsibilities include:

- Investigating project conditions and core documents; visiting project sites; reviewing pertinent documents; performing interviews; all in sufficient detail as to become familiar with the proposed project goals, site conditions, design criteria, operations plans, drawings and specifications, value engineering studies, peer and constructability reviews, schedules, cost estimates, risks, bid packages and contracts, construction progress, methodology for resolving changes and claims, and conducting project closeout;
- Assessing project sponsors' management capacity and capability to manage the projects, to meet goals related to design capacity, scope, schedule, budget, quality, and safety both during construction and in revenue service;
- Identifying problems and uncertainties in a timely manner;
- Making recommendations and proactively solving problems with the project sponsor and FTA staff;
- Providing professional opinions on the project sponsors' work to the FTA;
- Discussing findings, conclusions and recommendations with the project sponsor and FTA;
- Providing supporting reports and presentations to the FTA;



- Engaging in other duties and responsibilities as requested by FTA.

In the performance of the above, the PMOCs are to accomplish, among other duties, the following:

1) Communications

- a) Develop and regularly maintain contact throughout a project sponsor's organization with key personnel in planning, design and construction departments as well as operations, operations planning, procurement, legal, budgeting and real estate; and avoid relying on only one source for information;
- b) Develop and regularly maintain contact with FTA ACORs and Work Order Managers at both headquarters and the region;
- c) Maintain a log of project contacts;
- d) Coordinate with other PMOCs covering the same project sponsor;
- e) Remind the project sponsor of its responsibility for the project; and that PMOC oversight or technical assistance in no way relieves the project sponsor of responsibility;
- f) Provide informal communication to the project sponsor on the results of PMOCs' reviews and analysis after approval from FTA. Provide draft reports to FTA and receive comments from FTA before providing copies to the project sponsor. Discuss draft findings with the project sponsor prior to finalizing reports.

2) Oversight assessments, recommendations, reporting

- a) Identify sources of information to allow the FTA to directly question the project sponsor on the accuracy or completeness of their information. Present information without taking it out of context. Efficiently verify the information with trusted sources, before presenting it as fact. Describe PMOC assumptions used to form conclusions and the methods used to come to those conclusions. Support PMOC statements, observations, findings, conclusions and professional opinions with project information, appropriate analysis and interpretation of the project information by qualified PMOC personnel with relevant and appropriate project development, design and construction experience.
- b) Based on a cost-effective mix of random and planned sampling and, in certain cases, sampling all of the information provided from the project sponsor, perform quantitative and qualitative checks on project sponsors' project information.
- c) Provide reports that are focused, clear, coherent, accurate, complete, objective and unbiased. Perform work in a cost-efficient manner.
- d) Specifically cost-related
  - i) Regarding the project sponsors' cost estimating methodologies, verify that current market conditions for bidding of construction contracts are taken into account; provide professional estimators' opinions as to whether project sponsors' cost estimate information is complete, coordinated, and unbiased;
  - ii) Describe the context of key cost assumptions and decisions by involved parties such as the project sponsors, and their consultants and contractors; state reservations about costs in estimates or bids.

As PMOC products are delivered to the FTA, it is the responsibility of the FTA Work Order Manager to evaluate the deliverables against the criteria set forth in the Acceptable Quality Level (AQL) tables associated with each OP. The FTA Work Order Manager should maintain a copy of the completed assessment of the PMOC's deliverables for ongoing discussions with the PMOC and for future reference during the formal contractor's performance evaluation period. Copies of the completed assessments shall be made available to the headquarters' COR upon request. PMOC performance is formally evaluated on an annual basis; however, expect that the FTA Work Order Manager will provide the PMOC with informal feedback on the firm's performance no less than once every three months. The evaluation system used is the federal government's Contractor Performance Assessment Reporting System (CPARS) – a web-based system administered by the Department of the Navy located at <http://www.cpars.gov>. CPARS transmits the final evaluations to the Past Performance Information Retrieval System (PPIRS), a multi-federal agency repository of past performance assessments.

The PMOC shall specifically and promptly advise the CO that its Task Order budget with respect to obligated funds to date, not just the task order award amount, has been seventy-five percent (75%) exhausted in the performance of such Task Order; and shall state whether, in the opinion of the PMOC, the assigned responsibilities under the Task Order can be completed without exceeding the applicable budget.

### **6.1.3 Task Orders**

To begin the Task Order process, FTA Headquarters or Regional staff considers a project sponsor and its current and foreseeable projects. As a general rule, Task Orders will be written for oversight of all projects by a particular project sponsor. However, when the projects are too many or too large for the capacity of one PMOC, the project sponsor's work will be divided among two or more PMOCs.

The FTA ACOR will develop a draft Task Order and a related Independent Government Estimate (IGE). After internal approval of these documents, FTA will issue the schedule and scope of work to PMOCs as a request for cost proposal. Within seven days of receipt (or as noted in the task order proposal request), the PMOCs should submit cost proposals for the scope of work for each year of the Task Order. The cost proposal should be supplemented as required with work and staffing plans.

The not-to-exceed value of most Task Orders will be under \$5 million. For these Task Orders, TPM-20 (Office of Capital Project Management) will develop a short list of three PMOCs based on responses in the request for proposal, conflict of interest matrix, interviews, and experience and capacity to undertake the work. After the PMOCs submit cost proposals and supplementary plans, FTA Regional and Headquarters staff reviews the materials and make a selection. The COR then issues the Task Order to the PMOC.

For Task Orders with a value of over \$5 million, the FTA Procurement Office issues to all PMOCs having no conflict of interest, the schedule and scope of work as a request for cost proposal. After the PMOCs submit cost proposals and supplementary plans, the FTA Procurement Office, with the assistance of the Regional and Headquarters staff, reviews the materials and makes a selection. The CO then issues the Task Order to the PMOC.

In the interest of economy and efficiency, follow-up Task Orders will typically be issued to the PMOC holding the initial Task Order for oversight of a particular project sponsor's projects. However, if the performance of the PMOC is unsatisfactory, or if introducing competition is deemed in the best interest of the government, FTA will follow the processes above for issuing a new Task Order under or over \$5 million, as necessary.

Upon selection and award of the Task Order, the PMOC is required to submit a Task Order Implementation Plan, outlining the proposed approach to the overall task, identifying activities to be performed, and providing a schedule and cost breakdown for the activities. Monthly PMOC Status Reports are required to track estimated versus actual costs for each Task Order.

Activities performed under Task Orders will be authorized through Work Orders. Some Work Orders will be written broadly, for example, covering all recurring oversight activities on a project (such as monthly and quarterly meetings and supporting reports). Other Work Orders will be written more detailed, for example, covering specific reviews (such as project sponsor management capacity and capability, scope, schedule, cost, and risk). When services are performed, the PMOC should bill by Work Order for labor hours and expenses.

In a single year, the funding for all Task Orders will not exceed the total amount available to FTA for major capital project oversight, as documented in the one-year program plan for the TPM-20 (Office of Major Capital Project Management). Therefore, while Task Order dollar amounts will cover two to five years of work, funding will be incrementally provided on a one-year basis.

#### **6.1.4 Work Orders**

A Work Order is issued under an existing Task Order. The cost of the Work Order is included in the total authorized Task Order amount. The FTA Work Order Manager, supported by the FTA ACOR, other FTA staff and the PMOC (if requested to participate by FTA) formulates and documents the scope of work in the format shown in Appendix B and develops an IGE in the format shown in Appendix D. The Work Order will describe the work to be performed and it may refer to certain OPs or parts of OPs to guide the performance of the work. It will include a not-to-exceed cost and a defined schedule. The Work Order will also refer to applicable CLINs.

After internal approval of the draft Work Order and IGE by the FTA, the COR requests a cost proposal from the PMOC. Within five (5) business days of receipt, the PMOC should submit its cost proposal using the formats in Appendices D and E, adjusting them as required to fit the scope of work.

The Task and Work Order Managers then review the proposal and submit comments to the COR. If the proposal is accepted, the COR will authorize the PMOC to proceed. If the proposal is not accepted, the COR, ACOR, and Work Order Managers collectively negotiate with the PMOC to achieve a resolution to accept, modify, or reject the proposal.

Invoices should be in the format described in Section G.10 and G.11 of the contract, and shall include the worksheets provided in Appendix E. Invoices should be submitted to the Task and Work Order Managers. The COR should be emailed a PDF copy of each invoice submitted. The cost of each Work Order must be tracked separately in invoices with a breakdown by SubCLIN. See Appendix F for an OP-CLIN list. Work Order Implementation Plans may be called for by FTA for Work Orders

that cover large or complex scopes of work, or for oversight activities for which there is no associated SubCLIN.

If a PMOC fails to meet the desired outcomes of a given Work Order, the PMOC may be required to rework the deliverable. If a rework is required by FTA, the PMOC will perform such additional work at cost without fee.

## **7.0 REPORTING, PRESENTATIONS, RECONCILIATION**

For most oversight activities, the PMOC is required to provide FTA with a supporting written report of findings, analysis, recommendations, professional opinions, and a description of the review activities undertaken.

The sequence and distribution for all reports is as noted in Section 7.0 of OP 25.

Reports should be submitted via email. Unless specifically requested, no paper copies of reports should be submitted. In addition, the PMOC may be required to post reports to an FTA website (to be identified in future.)

After FTA approval, the PMOC may be instructed to share the report with the project sponsor. In the event that differences of opinion exist between the PMOC and the project sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile with the project sponsor and provide FTA with a report addendum covering the agreed modifications by the project sponsor and PMOC. On occasion, the PMOC may be required to make presentations of project reports or other studies to FTA, the project sponsor, or third parties.

### **7.1 Format for Reports**

The PMOC should be concise and avoid repeating text. Instead, the PMOC should refer back to the original text. Provide current information and avoid long historical narratives or lists of events. Use bold or underline text for emphasis. Creatively portray information to aid understanding, e.g., photographs, tables, graphs, etc. Use Microsoft Word, Excel, and Microsoft Project. Typically, use Times Roman 12 point font. Refer to "PMOC" instead of "contractor" to distinguish from construction contractors. All reports should include the following.

- 1) Cover page (See Appendix G for sample cover page and required information.)
- 2) Executive Summary (three pages max) – simply written summary of the most important findings, professional opinions, conclusions, and recommendations. This section should include a one paragraph description of the project scope.
- 3) Table of Contents
- 4) Body of Report – By topic
  - a) Findings (include photos of site conditions to aid in understanding )
  - b) Analysis, professional opinions regarding status, recommendations for action with time frame for performing recommended actions
- 5) Appendix
  - a) Acronyms used
  - b) Supporting checklists, tables, spreadsheets, photos, etc.
  - c) PMOC team – list personnel, qualifications for performing the review



## **Oversight Procedure 01 – Administrative Conditions and Requirements**

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## APPENDIX A

### References

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The following are the principal, but by no means the only, references to Federal legislation, codification, regulation and guidance with which the PMOC should have a good understanding as related to the project sponsor's project work being reviewed under the Oversight Procedures (OPs):

#### Legislative

- Moving Ahead for Progress in the 21<sup>st</sup> Century Act, or MAP-21, Public Law 112-141, July 6, 2012

#### United States Code

- 49 U.S.C Section 5327, Project Management Oversight
- 49 U.S.C Section 5309, Fixed Guideway Capital Investment Grants

#### Regulations

- Project Management Oversight, 49 C.F.R. Part 633
- Major Capital Investment Projects, 49 C.F.R. Part 611
- Joint FTA/FHWA regulations, Metropolitan Planning, 23 C.F.R. Part 450
- Joint FTA/FHWA regulations, Environmental Impact and Related Procedures, 23 C.F.R. Part 771
- U.S. DOT regulation, Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs, 49 C.F.R. Part 24

#### FTA Circulars

- C 4220.1F (Previously C4220.1D) Third Party Contracting Requirements
- C 5010.1D (Previously C5010.1C) Grant Management Guidelines
- C 5200.1A (Previously C5200) Full Funding Grant Agreements Guidance
- C 5800.1 (Previously C6800.1) Safety and Security Management Plan

#### Guidance

- FTA Master Agreement, FTA MA
  - <http://www.fta.dot.gov/documents/17-Master.pdf>
- Project and Construction Management Guidelines, 2011 Update
  - [http://www.fta.dot.gov/images/content\\_images/FTA\\_Project\\_and\\_CM\\_Guidelines\\_-\\_July\\_2011\\_Update\\_12-01-26.pdf](http://www.fta.dot.gov/images/content_images/FTA_Project_and_CM_Guidelines_-_July_2011_Update_12-01-26.pdf)
- Guidance for Transit Financial Plans, June 2000
  - <http://www.fta.dot.gov/images/gftfp.pdf>
- New Starts
  - [http://www.fta.dot.gov/planning/newstarts/planning\\_environment\\_218.html](http://www.fta.dot.gov/planning/newstarts/planning_environment_218.html)
  - [http://www.fta.dot.gov/planning/newstarts/planning\\_environment\\_213.html](http://www.fta.dot.gov/planning/newstarts/planning_environment_213.html)
- Construction Project Management Handbook, March 2012
  - [http://www.fta.dot.gov/documents/FTA\\_Report\\_No.\\_0015.pdf](http://www.fta.dot.gov/documents/FTA_Report_No._0015.pdf)
- Best Practices Procurement Manual, FTA, 2001
  - [http://www.fta.dot.gov/documents/BPPM\\_fulltext.pdf](http://www.fta.dot.gov/documents/BPPM_fulltext.pdf)

## APPENDIX B

### Work Order Sample

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#### Federal Transit Administration

**WORK ORDER No. \_\_\_\_**

Date:

Summary title:       **Review of X on Project Y, Project Sponsor Transit Agency ABC**  
Located in City, Region, State/s

PMOC:               Firm name  
Lead person's name, title, phone, email  
Firm address

Contract No.:       DTFT \_\_\_\_\_  
Task Order No.:   \_\_\_\_\_, Project No. \_\_\_\_\_  
Work Order:       Managed by (FTA Region) or (FTA Headquarters) – *select one*  
FTA ACOR: name, phone, email  
FTA Work Order Manager: name, phone, email

BACKGROUND:      Provide history and references, etc. to set context for the work.

SCOPE:             Insert a description of the scope of work;  
Refer to specific FTA Oversight Procedures, CLIN Nos.

SCHEDULE:         Indicate work order duration, period of performance, milestones, due dates

COST:              \$ \_\_\_\_\_ Labor  
                      \$ \_\_\_\_\_ Expenses  
                      \$ \_\_\_\_\_ Total Not-to-Exceed

This is being issued under COR authority.

Services performed or products delivered under this work order are billable by work order and CLIN. Under no circumstances is the PMOC authorized to incur costs in excess of the amount above without prior authorization from the COR.



## APPENDIX C

### Work Order Cost Proposal Summary Page Sample

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#### COST PROPOSAL TO FTA

Date:

Summary title:       **Review of X on Project Y, Project Sponsor Transit Agency ABC**  
Located in City, Region, State/s

PMOC:               Firm name  
Lead person's name, title, phone, email  
Firm address

Contract No.:       DTFT \_\_\_\_\_  
Task Order No.:     \_\_\_\_\_, Project No. \_\_\_\_\_, Work Order No. \_\_\_\_\_  
Task Order:       Managed by (FTA Region) or (FTA Headquarters)  
FTA ACOR: name, phone, email  
FTA Work Order Manager: name, phone, email

BACKGROUND:      Important history, references, etc. to set context for the work.

SCOPE:             Description of scope of work; ref. to FTA Oversight Procedures, CLIN Nos.

SCHEDULE:         Period of Performance, Schedule of Milestones, Due Dates

COST:               \$\_\_\_\_\_ Labor  
                      \$\_\_\_\_\_ Expenses  
                      \$\_\_\_\_\_ Total Not-to-Exceed  
(The PMOC agrees to notify the FTA Work Order Manager as soon as the  
PMOC becomes aware of the possibility of an overrun of the not-to-exceed  
amount.)

Provide cost proposal breakdown using format in Appendix D.

# APPENDIX D

## Work Order Cost Breakdown Sample

COST BREAKDOWN										Revised 09/29/09		
NOTE: This format can be used for Work Order cost proposals, invoices, and independent government estimates.												
Contractor:		XYZ Co.										
Date:		10/7/2009										
Task Order:		1										
Work Order:		1										
WO Description:		Sample Project										
G&A		Applies to PMOC labor only; does not apply to PMOC overhead or fee, subcontractor costs, or expenses.					5.00%					
Overhead		PRIME OVERHEAD RATE						130.00%				
Fee		Applies to PMOC labor, PMOC overhead, and G & A only.							8.00%			
SUB CLIN Number and Name		PERSONNEL	HOURS	HOURLY RATE	LABOR	G&A	PRIME OVERHEAD	LABOR + OVERHEAD + G&A	Fee on LABOR + OH + G&A	TOTAL with Fee	Small Business Sub-contracting Participation G-15	
1A Special Tasks		Name, Firm, Title per contract	20.0	\$85.00	\$1,700	\$85	\$2,210	\$3,995	\$320			
		Name, Firm, Title per contract	40.0	\$75.00	\$3,000	\$150	\$3,900	\$7,050	\$564			
		Name, Firm, Title per contract	10.0	\$30.00	\$300	\$15	\$390	\$705	\$56			
		Prime Totals	70.0		\$5,000		\$11,750	\$940	\$12,690			
		Sub 1 - Name, Title	30.0									
		Sub 1 - Name, Title	20.0									
		Sub 2 - Name, Title	40.0									
		Subcontractor Totals	90.0						\$11,433			
Total for this Product										\$24,123		
2B On-Site Monitoring and Reporting		Name, Firm, Title per contract	20.0	\$85.00	\$1,700	\$85	\$2,210	\$3,995	\$320			
		Name, Firm, Title per contract	40.0	\$75.00	\$3,000	\$150	\$3,900	\$7,050	\$564			
		Name, Firm, Title per contract	10.0	\$30.00	\$300	\$15	\$390	\$705	\$56			
		Prime Totals	70.0		\$5,000		\$11,750	\$940	\$12,690			
		Sub 1 - Name, Title	40.0									
		Sub 2 - Name, Title	30.0									
		Sub 2 - Name, Title	20.0									
		Subcontractor Totals	90.0						\$13,504			
Total for this Product										\$26,194		
5A Travel Expense		city 1 - Staff	2	Trips at	\$1,000			\$2,000				
		city 2 - Subcontractor	2	Trips at	\$1,000			\$2,000				
		city 3 - Staff	2	Trips at	\$2,000			\$4,000				
		city 2 - Subcontractor	2	Trips at	\$2,000			\$4,000				
		Total Travel Expenses										\$12,000
5A Other Direct Exp		Staff	printing, phone charges					\$500				
		Subcontractor	printing, phone charges					\$200				
		Total Other Direct Expenses										\$700
% SB Participation												
Total Proposed										\$95,818		

Note: Additional SubCLINs included in the Total Proposed Amount are not shown here as this sheet is for demonstration purposes.

## APPENDIX E

### Invoice Format Sample

INVOICE OVERVIEW						
Contractor:	XYZ Co.					
Address:	2304 Maple St. San Francisco, CA 900.					
Taxpayer I.D. Number:	2339408					
Bank info for deposit:	Citibank account.....324999999					
Invoice Contact:	J. Smith, 415-999-9999, jsmith@xyz.net					
PMO CONTRACT No.:	DTFT60-04-D-0000X					
FTA CO:	J.W. Brown					
FTA COR:	A. B. Kim					
Invoice period of performance:	March 1 – March 31, 2008					
Invoice No.	12					
Invoice Date:	04/05/14					
Task Order Number	Task Order Description	Project Number	Task Order Expiration Date	FTA Task Order Manager		Initial / Date Invoice Approved
1	Perris Valley (Regional)	DC-03-XXXX	2/13/2013	M. Jones		
Work Order Number	Work Order Description	FTA Work Order Manager	Hours Billed this Invoice	Billed this Invoice	Initial / Date Invoice Approved	
1	Perris Valley - On-site Monitoring / Reporting	M. Davis	625	\$94,264		
2	Perris Valley - Readiness Reviews	M. Davis	100	\$5,000		
3	Perris Valley - Special Tasks	C. Lewis	175	\$50,000		
Total Billed This Period			900	\$149,264		
NOTE: Invoice Overview Format Applies to both Headquarter's and Regional Task Orders						

# INVOICE BREAKDOWN

Contractor **XYZ Co.**

Invoice No.: **12**

Invoice Date: **04/05/14**

Task Order Number	Task Order Description	Task Order Dollars Not-to-Exceed Authorized		Task Order Hours Not-to-Exceed Authorized	Task Order Funded to Date	Task Order Hours to Date	Work Order Authorized to Date	Work Order Hours Authorized to Date	Work Order Dollars Billed to Date	Work Order Hours Billed to Date	Funded Balance Available			Hours Balance Available	Small Business Sub-Contracting Participation		
1	Perris Valley (Regional)	\$1,000,000		56400	\$650,000	43000	\$420,000	2100	\$359,264	1475	\$230,000			40900	Billed to Date		
															23%		
Work Order Number	Work Order Description	Not-to-Exceed Dollars Authorized		Not-to-Exceed Hours Authorized	Dollars Billed Previously	Hours Billed Previously	Dollars Billed This Period	Hours Billed This Period	Total Dollars Billed to Date	Total Hours Billed to Date	Fund Balance Remaining	Fund Balance Remaining	Funds Billed To Date (%)	Hours Billed To Date (%)	SB	SB	SB
															Billed Previously	Billed this Period	Billed to Date
1	Perris Valley - On-site Monitoring / Reporting	\$200,000		1000	\$80,000	275	\$94,264	625	\$174,264	900	\$25,736	100	87%	90%	\$16,000	\$4,900	\$20,900
2	Perris Valley - Readiness Reviews	\$160,000		800	\$120,000	200	\$5,000	100	\$125,000	300	\$35,000	500	78%	38%	\$30,000	\$500	\$30,500
3	Perris Valley - Special Tasks	\$60,000		300	\$10,000	100	\$50,000	175	\$60,000	275	\$0	25	100%	92%	\$2,000	\$10,000	\$12,000
Total		\$420,000		2100	\$210,000	575	\$149,264	900	\$359,264	1475	\$60,736	625	86%	70%	\$48,000	\$15,400	\$63,400

### COST BREAKDOWN

NOTE: This format can be used for Work Order cost proposals, invoices, and independent government estimates.

Contractor: **XYZ Co.**  
 Date: **04/05/14**  
 Task Order: **1**  
 Work Order: **1**  
 WO Descr: **Sample Project**

G&A	Applies to PMOC labor only; does not apply to PMOC overhead or fee, subcontractor costs, or expenses.					5.00%							
Overhead	PRIME OVERHEAD RATE					130.00%							
Fee	Applies to PMOC labor, PMOC overhead, and G & A only.						8.00%						
SUB CLIN Number and Name	PERSONNEL		HOURS	HOURLY RATE (Fully Loaded Rate for CLIN 4)	LABOR	G&A	PRIME OVERHEAD	LABOR + OVERHEAD +G&A	Fee on LABOR + OH + G&A	TOTAL with fee	Small Business Sub-contracting Participation		
1A Special Tasks	Name, Firm, Title per contract		40.0	\$85.00	\$3,400	\$170	\$4,420	\$7,990	\$639				
	Name, Firm, Title per contract		80.0	\$75.00	\$6,000	\$300	\$7,800	\$14,100	\$1,128				
	Name, Firm, Title per contract		20.0	\$30.00	\$600	\$30	\$780	\$1,410	\$113				
	Prime Totals		140.0		\$10,000			\$23,500	\$1,880			\$25,380	
	Sub 1 - Name, Title		70.0										
	Sub 1 - Name, Title		50.0										
	Sub 2 - Name, Title		60.0										
	Subcontractor Totals		180.0									\$11,433	
Total for this Product										\$36,813			
2B On-site Monitoring and Reporting	Name, Firm, Title per contract		10.0	\$85.00	\$850	\$43	\$1,105	\$1,998	\$160				
	Name, Firm, Title per contract		20.0	\$75.00	\$1,500	\$75	\$1,950	\$3,525	\$282				
	Name, Firm, Title per contract		20.0	\$65.00	\$1,300	\$65	\$1,690	\$3,055	\$244				
	Name, Firm, Title per contract		10.0	\$55.00	\$550	\$28	\$715	\$1,293	\$103				
	Name, Firm, Title per contract		40.0	\$50.00	\$2,000	\$100	\$2,600	\$4,700	\$376				
	Name, Firm, Title per contract		10.0	\$30.00	\$300	\$15	\$390	\$705	\$56				
	Prime Totals		110.0		\$6,500			\$15,275	\$1,222			\$16,497	
	Sub 1 - Name, Title		40.0										
	Sub 1 - Name, Title		40.0										
Sub 2 - Name, Title		50.0											
Subcontractor Totals		130.0							\$16,304				
Total for this Product										\$32,801			
4A Other Reports, Reviews, and Plans	Name, Firm, Title per contract		10.0	\$185.00	\$1,850								
	Name, Firm, Title per contract		20.0	\$175.00	\$3,500								
	Name, Firm, Title per contract		20.0	\$165.00	\$3,300								
	Name, Firm, Title per contract		20.0	\$165.00	\$3,300								
	Total for this Product		70.0		\$11,950				\$11,950				
5A Travel Expenses/ Other Direct Expenses	city 1 - city 2	Staff	2	Trips at	\$1,000			\$2,000					
		Subcontractor	2	Trips at	\$1,000			\$2,000					
	city 3 - city 2	Staff	2	Trips at	\$2,000			\$4,000					
		Subcontractor	2	Trips at	\$2,000			\$4,000					
	Total Travel Expenses											\$12,000	
		Staff	printing, phone charges					\$500					
		Subcontractor	printing, phone charges					\$200					
	Total Other Direct Expenses											\$700	
% SB Participation													
Total Proposed										\$94,264			

Note: Additional SubCLINs included in the Total Billed Amount are not shown here as this sheet is for demonstration purposes.

## SUBCONTRACTOR COST BREAKDOWN

NOTE: This format can be used for Work Order cost proposals, invoices, and independent government estimates.

Subcontractor: **Sub 1**  
 Date: **04/05/14**  
 Task Order: **1**  
 Work Order: **1**  
 WO Descr: **Sample Project**

G&A	Applies to PMOC labor only; does not apply to PMOC overhead or fee, subcontractor costs, or expenses.					0.00%					
Overhead	PRIME OVERHEAD RATE					125.00%					
Fee	Applies to PMOC labor, PMOC overhead, and G & A only.							8.00%			
SUB CLIN Number and Name		PERSONNEL	HOURS	HOURLY RATE	LABOR	G&A	Sub 2 OVERHEAD	LABOR + OVERHEAD +G&A	Fee on LABOR + OH + G&A	TOTAL with fee	
1A Special Tasks		Name, Firm, Title per contract	30.0	\$70.00	\$2,100	\$0	\$2,625	\$4,725	\$378		
		Name, Firm, Title per contract	20.0	\$50.00	\$1,000	\$0	\$1,250	\$2,250	\$180		
		Sub Labor	50.0		\$3,100			\$6,975	\$558		\$7,533
2B On-site Monitoring and Reporting		Name, Firm, Title per contract	40.0	\$70.00	\$2,800	\$0	\$3,500	\$6,300	\$504		
		Name, Firm, Title per contract	0.0	\$50.00	\$0	\$0	\$0	\$0	\$0		
		Sub Labor	40.0		\$2,800			\$6,300	\$504		\$6,804
4A Other Reports, Reviews, and Plans		Name, Firm, Title per contract	20.0	\$70.00	\$1,400						
		Name, Firm, Title per contract	0.0	\$50.00	\$0						
		Sub Labor	20.0		\$1,400						\$1,400
5A Travel Expenses/ Other Direct Expenses	city 1 - city 2	Subcontractor 1	2	Trips at	\$1,000			\$2,000			
	city 3 - city 2	Subcontractor 1	2	Trips at	\$2,000			\$4,000			
		Total Travel Expenses									\$6,000
	city 1 - city 2	Subcontractor 1	2	Trips at	\$1,000			\$2,000			
	city 3 - city 2	Subcontractor 1	2	Trips at	\$2,000			\$4,000			
		Total Travel Expenses									\$6,000
		Subcontractor	printing, phone charges					\$100			
		Total Other Direct Expenses									\$100
Total Billed This Period										\$27,837	

COST BREAKDOWN BY CLIN AND SUBCLIN							
Contractor: XYZ Co.							
Invoice No. 12							
Invoice Date: 04/05/14							
CLIN	CLIN Description	T.O. Dollars Billed Previously	T.O. Hours Billed Previously	T.O. Dollars Billed This Period	T.O. Hours Billed This Period	T.O. Dollars Billed To Date	T.O. Hours Billed To Date
	<b>TOTAL</b>	<b>\$320,000</b>	<b>575</b>	<b>\$150,000</b>	<b>900</b>	<b>\$470,000</b>	<b>1475</b>
<b>1</b>	<b>Contract and Program Support</b>	<b>\$120,000</b>	<b>275</b>	<b>\$5,000</b>	<b>625</b>	<b>\$125,000</b>	<b>900</b>
0001A	Special Tasks	\$120,000	275	\$5,000	625	\$125,000	900
<b>2</b>	<b>Project Management Review Services</b>	<b>\$80,000</b>	<b>200</b>	<b>\$90,000</b>	<b>100</b>	<b>\$170,000</b>	<b>300</b>
0002A	Project Management Reviews						
0002B	On-Site Monitoring and Reporting	\$80,000	200	\$90,000	100	\$170,000	300
<b>3</b>	<b>Technical Review Services</b>	<b>\$120,000</b>	<b>100</b>	<b>\$5,000</b>	<b>175</b>	<b>\$125,000</b>	<b>275</b>
0003A	Scope, Cost, Schedule Characterization Reviews						
0003B	Vehicle Reviews						
0003C	Risk and Contingency Reviews						
0003D	Readiness Reviews	\$120,000	100	\$5,000	175	\$125,000	275
0003E	Small Starts Reviews						
0003F	Special Project Reviews						
<b>4</b>	<b>Other Reports, Reviews, and Plans</b>	<b>\$0</b>	<b>0</b>	<b>\$0</b>	<b>0</b>	<b>\$0</b>	<b>0</b>
0004A	Other Reports, Reviews, and Plans						
<b>5</b>	<b>Other Direct Costs</b>	<b>\$0</b>	<b>0</b>	<b>\$50,000</b>	<b>0</b>	<b>\$50,000</b>	<b>0</b>
0005A	Travel Expenses / Other Direct Expenses			\$50,000		\$50,000	
G & A can apply to PMOC labor and overhead; does not apply to PMOC fee, subcontractor costs or expenses.						\$0	0

## APPENDIX F

### OP-CLIN List

SubCLIN		OP	Description	Typically Issued By
Contract and Program Support				
0001A	Special Tasks	3	Special Tasks	TPM
Project Management Review Services				
0002A	Project Management Reviews	20	Project Management Plan Review	TRO
		21	Grantee Technical Capacity and Capability Review	TRO
		22	Safety and Security Management Plan Review	TRO
		23	Real Estate Review	TRO
		24	Quality Assurance/Quality Control Review	TRO
0002B	On-site Monitoring and Reporting	25	Recurring Oversight and Related Reports	TRO
Technical Review Services				
0003A	Scope, Cost, Schedule Characterization Reviews	30	Value Engineering-Constructability Review	TPM
		32A	Project Transit Capacity Review	TPM
		32B	NEPA and Design Document Comparative Review	TPM
		32C	Project Scope Review	TPM
		32D	Project Delivery Method Review	TPM
		33	Capital Cost Estimate Review	TPM
		34	Project Schedule Review	TPM
		35	ADA Review	TRO
		36	Buy America Review	TRO
0003B	Vehicle Reviews	37	Fleet Management Plan Review	TRO
		38	Bus and Rail Vehicle Technical Review	TRO
0003C	Risk and Contingency Review	40	Risk and Contingency Review	TPM
0003D	Readiness Reviews	51	Readiness to Enter Engineering	TRO
		52	Readiness to Execute FFGA	TRO
		53	Readiness to Bid Construction Work	TRO
		54	Readiness for Revenue Operations	TRO
		56	Letter of No Prejudice Review	TRO
0003E	Small Starts Reviews	60	Small Starts Readiness Review	TRO
0003F	Special Project Reviews	61	Special Project Review	TRO
		62	Asset Management System Review	TRO
Other Reports, Reviews, and Plans				
0004A	Other Reports, Reviews, and Plans	2	PMOC Implementation, Transition Plans, and PMOC Status Reporting	TRO
		26	Lessons Learned	TRO
		27	Before and After Study Review	TRO
		31	Annual NS Review	TPM



## APPENDIX G

### Report Cover Page Sample

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#### CAPITAL COST ESTIMATE REVIEW

##### **Great City Light Rail Subway Project**

Great City Transportation Authority

Region or City, State

May 1, 2008

May 22, 2008, Rev. 1

PMOC Contract Number: DTFT\_\_-\_\_-\_\_-\_\_

Task Order Number: \_\_\_\_\_, Project Number: \_\_\_\_\_, Work Order No. \_\_\_\_\_

OPs Referenced: \_\_\_\_\_

##### **PMOC firm name, address**

PMOC lead person's name, affiliation if different from PMOC firm, phone, email

Length of time PMOC firm and person have been assigned to this project

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## **Oversight Procedure 02 – PMOC Implementation / Transition Plans and Monthly Task Order Cost Status Report**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure (OP) is to describe the review, analysis and recommended procedures and reporting that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) with regard to two types of administrative tasks: Implementation / Transition Plans and Monthly Task Order Cost Status Reports.

### **2.0 BACKGROUND**

#### **2.1 PMOC Implementation and Transition Plans**

FTA requires PMOCs to develop implementation plans to ensure adequate and comprehensive oversight work by PMOCs. FTA requires PMOCs to develop transition plans to ensure continuity in the performance of oversight.

#### **2.2 Monthly Task Order Cost Status Reports**

FTA requires PMOCs to manage the activities and related costs and hours spent in the course of oversight, and to report on projected and actual time and cost expenditures. Such reporting allows FTA to monitor oversight efforts by Task Order for a specific PMOC. When PMOC reports are aggregated, FTA is able to monitor its entire oversight program.

**The Contractor shall not be compensated directly by the Government for the preparation and delivery of the requisite Task Order Cost Status Report and shall not include the Level of Effort to generate this report in their Cost Proposal for any Task Order or Work Order.**

### **3.0 OBJECTIVES**

#### **3.1 Implementation and Transition Plans**

An Implementation Plan should demonstrate the PMOC's comprehensive, organized and well considered proposal to accomplish the assigned scope of work in a manner, quality and quantity that meets FTA's requirements. A Transition Plan should relay to an incoming PMOC from an outgoing PMOC the essential project facts needed to effectively assume oversight activities with minimum disruption to the project sponsor.

#### **3.2 Monthly Task Order Cost Status Reports**

PMOC Monthly Reports serve to update FTA on the PMOC's oversight activities associated with one Task Order.

## **4.0 REFERENCES**

- OP 01 – Administrative Conditions and Requirements
- OP 25 – Recurring Oversight and Related Reports

## **5.0 PROJECT SPONSOR’S SUBMITTALS – N/A**

## **6.0 SCOPE OF WORK**

### **6.1 PMOC Implementation Plan / Transition Plan**

#### **6.1.1 Implementation Plan**

After FTA awards a Task Order, the PMOC responds to the assigned scope of work and schedule and develops an Implementation Plan. This plan, the PMOC’s recommended course of oversight action, is submitted for FTA review, comment and approval. An Implementation Plan may be required for a Work Order as well if the work is to be performed over several months, the work is particularly complex, or if FTA is concerned about the PMOC’s technical approach, staffing, schedule, etc.

An Implementation Plan should demonstrate the PMOC understands FTA’s mission with respect to oversight, as well as the scope and nature of the oversight work to be performed. It should define the manner, quantity and quality of the PMOC’s intended services, products, deliverables, etc. It should also demonstrate the PMOC’s readiness to perform such oversight activities in a manner that meets FTA’s requirements. The Implementation Plan shall be provided upon request of the Contracting Officer’s Representative (COR) or Alternate Contracting Officer’s Representative (ACOR), previously referred to as the “FTA Task Order Manager”. It should include an integrated schedule for the work (services and deliverables) and a plan to report progress against the schedule. After approval by FTA, unless otherwise directed by the ACOR, PMOC services, products and outcomes should be performed in conformance with the Implementation Plan.

In the case of a transition, FTA, in its sole discretion, may require the outgoing PMOC to update and revise its existing Implementation Plan to better coordinate with and orient the incoming PMOC and minimize the loss of knowledge when the incoming PMOC assumes oversight duties.

The elements of the plans are described in Section 7 and Appendix B. Examples of charts and graphs are shown in Appendix B as well.

#### **6.1.2 Transition Plan**

When changes occur in PMOC assignments at the Task Order level, FTA shall require the outgoing PMOC to develop a transition “report” and the incoming PMOC to develop a transition “plan.” Changes in assignments may be due to the development of a conflict of interest or FTA’s determination that it is in its best interest to replace or supplement a PMOC. Transition reports and plans may be required for Work Order assignments if the work is particularly complex or for other reasons indicated by FTA.

Upon notice from the ACOR of an incoming PMOC to replace or supplement an existing PMOC, the ACOR or Work Order Manager will notify the project sponsor in a timely fashion, address the project sponsor’s concerns, and set up a transition schedule that fits well with previously arranged meetings to

the extent possible.

The ACOR shall also establish a transition dialogue between the incoming and outgoing PMOC and set forth the priorities for both PMOCs. The ACOR's overall objectives are to minimize disruption to the project sponsor, facilitate teamwork between the PMOCs, and ensure transition steps are accomplished; for example, arranging for the incoming PMOC to be introduced to FTA, the outgoing PMOC, and the project sponsor's staff and consultant team; giving the incoming PMOC a project tour and familiarizing the PMOC with project documents and FTA administrative matters such as invoicing and performance evaluations; arranging for the outgoing PMOC to orient the incoming PMOC to the project, its characteristics, major project issues, baseline project information, and FTA's expectations.

FTA's Office of Program Management will seek to achieve transition periods of at least two months in length. During the transition, the outgoing and incoming PMOCs will be expected to collaborate and effectuate a smooth transition.

The incoming PMOC shall perform services as follows:

- 1) Develop a transition "plan." Coordinate and integrate incoming PMOC services and work products with the current PMOC to identify transition elements, develop schedule and milestones.
- 2) Establish key contacts among the personnel of the incoming and outgoing PMOCs, FTA Region and Headquarters, and the project sponsor.
- 3) Develop a list of documents needed for the transition period as applicable, including but not limited to the following:
  - a) The latest baseline documents (Project Development, Engineering, or FFGA) and all amendments, application materials, Letters of No Prejudice, etc.
  - b) Relevant project sponsor management plans such as Project Management Plan, QA/QC Plan, Fleet Management Plan(s), etc.
  - c) Lessons Learned Reports, Monitoring Reports, Quarterly Progress Review Meeting Reports, Final Closeout Monitoring Report
  - d) Project related design and construction documents, construction contract agreement, general and special provisions, technical specifications, baseline and updates of project cost and schedule
  - e) Other documents recommended by FTA and outgoing PMOC
  - f) List of project contact information for contractor, consultants, and project sponsor's representatives associated with the project
- 4) Be adequately prepared for the initial monthly or quarterly meeting, interviews, site tours, conference calls, follow-up meetings, etc. by:
  - a) Conducting sufficient pre-meetings between FTA and outgoing PMOC.
  - b) Providing sufficient and appropriate personnel at meetings, interviews or tours.

- c) Being prepared and knowledgeable of the content in materials prepared by the project sponsor, PMOC, and FTA on major issues. Be aware of sensitive issues.
  - d) Listening carefully, particularly to key issues/potential impacts to project progress.
  - e) Promoting a “partnership” relationship and minimizing project sponsor impacts.
  - f) Making every effort to understand the project conditions including taking project photos during tour.
- 5) Act in a manner consistent with FTA’s direction on priorities and expectations.
- a) Conduct an adequate number of site visits, meetings, or project sponsor personnel interviews to be cost effective.
  - b) Do not discuss the outgoing PMOC’s products or services with the project sponsor.
  - c) Provide an adequate amount of useful inputs to the outgoing PMOC on the incoming PMOC transition activities during that period of performance when the outgoing PMOC has responsibility for project monitoring.
  - d) Achieve a sufficient level of knowledge about the outgoing PMOC’s oversight activities. Maintain traceability of information or assessments developed by the outgoing PMOC until and unless otherwise directed by the ACOR.
- 6) Complete familiarization with the project sponsor’s project, reports and information and achieve readiness to assume oversight responsibilities.

The outgoing PMOC’s responsibilities include but are not limited to:

- 1) Develop a transition “report” to relay to the incoming PMOC the essential project facts needed to effectively assume oversight activities with minimum disruption to the project sponsor.
- 2) Subject to FTA’s Contracting Officer’s request, prepare a “close-out” Task Order proposal according to FTA’s instructions that includes “close-out” schedules and deliverables including a final report and lessons learned, as well as transfer documents and information to the incoming PMOC and other transition elements identified above. If necessary or requested by FTA, update the Task Order Level Implementation Plan to reflect “close-out” activities.
- 3) Orient the incoming PMOC; facilitate introductions to the project sponsor. Provide requested documents and, if necessary, assist the incoming PMOC in locating and securing the information. Additionally, provide the incoming PMOC with any other documents that might be pertinent to understanding the condition and status of the project sponsor and the project. Conduct project site tours with the project sponsor and incoming PMOC.
- 4) Coordinate and integrate the services and work products of the incoming PMOC with your own.
  - a) Identify transition elements, develop a schedule and milestones.
  - b) Incorporate the incoming PMOC’s input into the monitoring reports.
  - c) Maintain traceability until otherwise directed by the ACOR of information or assessments developed by the incoming PMOC.

- d) Evaluate input and work products of the incoming PMOC giving consideration to its lack of familiarity with the project.
  - e) Provide sufficient and appropriate personnel to participate in conference calls and meetings during the transition.
- 5) Assess the incoming PMOC's readiness to assume oversight responsibilities

### 6.1.3 Schedule for Implementation and Transition Plans

Unless otherwise indicated by Work Order instructions, Implementation and Transition plans and reports shall be delivered in accordance with the following timeline.

	<u>Calendar Days after Request by FTA</u>
1) Implementation Plans and Transition Plans (incoming PMOC)	
a) Draft plan or revision of previous plan	15-21
b) Finalize plan	30
c) Readiness for meetings	30
d) Readiness to assume oversight responsibilities (transitions)	60
e) Annual resubmittal of Implementation Plan*	Jan. 30 of each year
2) Transition Reports by Outgoing PMOC	
a) Production of requested project information/documentation	15
b) Draft of "Close-out" task order implementation plan	21
c) Finalize "Close-out" task order implementation plan	30
d) Evaluation of Incoming PMOC work	15 after 1st product
e) Final participation in meetings, conference calls	60

\*When requested by the ACOR, annual resubmittals will be required for any plan that has been in effect for more than 90 days.

## 6.2 Monthly Task Order Cost Status Reports

The PMOC shall submit Monthly Task Order Cost Status Reports which set forth monthly and cumulative: (1) direct labor hours by categories as set forth in the task order, including subcontract hours; and (2) elements of cost by direct loaded dollars, subcontracts, and other direct costs, etc. that have been incurred and/or committed. The Monthly Task Order Cost Status Reports shall be provided by the 15<sup>th</sup> of each month. Proprietary rate information should not be discussed in the status reports. The costs that have been committed, but are unpaid to date, will be noted in the status reports. Where the burn rate and cumulative amounts on the monthly reports differ from those anticipated at task order award the Contractor shall provide a reconciliation of the difference, and a plan for future expenditure rates, as part of the monthly report.

The Monthly Task Order Cost Status Reports will assist in FTA's efforts to improve the accountability and effectiveness of its oversight program on major capital transit projects. PMOCs are required to use management procedures in the performance of contracts, task orders, and work orders

that provide for the following:

- Planning and control of costs and schedules
- Measurement of performance (value for completed tasks and major subtasks)
- Generation of timely and reliable information to be reported

Upon receipt of the Monthly Task Order Cost Status Reports, FTA can monitor the status of the oversight, verify the reasonableness of the PMOCs' invoices considering performance, verify reported costs and expenses accrued during reporting periods, and estimate costs to be accrued during subsequent reporting periods.

Management accountability is the expectation that managers are responsible for the quality and timeliness of program performance, increasing productivity, controlling costs and mitigating adverse aspects of agency operations, and assuring that programs are managed with integrity and in compliance with applicable law.

Management controls are the organization, policies, and procedures used to reasonably ensure that (1) programs achieve their intended results; (2) resources are used consistent with agency mission; (3) programs and resources are protected from waste, fraud, and mismanagement; (4) laws and regulations are followed; and (5) reliable and timely information is obtained, maintained, reported and used for decision making.

The Monthly Task Order Cost Status Reports typically incorporate task order level information; however, on occasion FTA may require a Monthly Task Order Cost Status Report containing contract or work order level information.

Monthly Task Order Cost Status Reports are for FTA staff use only. This only includes the Contracting Officer, Contract Specialist, COR, ACOR, Work Order Manager, and Headquarters Project Engineer.

## **7.0 REPORTS, PRESENTATION, RECONCILIATION**

The PMOC shall provide reports to FTA as required by Work Order, following this OP for content and OP 01, Administrative Conditions and Requirements, for the report format and OP 25, Recurring Oversight and Related Reports, for the submittal timeframes. When necessary, the PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel, Project, and Word and use FTA-templates when provided. The PMOC may add other software as required but documentation and report data shall be made available to FTA upon request.

### **7.1 Implementation Plan - Body of Report**

- 1) Description of the PMOC scope of work and period of performance (one page)
- 2) Table of proposed work program elements including tasks, schedule, staffing, labor hours for staff and subcontractors, hourly rates, expenses, and total cost. The total cost should be consistent with the Task Order (or Work Order) and reflect the requirements of the OPs.

Using Microsoft Project, show this information in a schedule of project phases, years, months, milestones, etc.

### 3) Description of Approaches and Procedures

- a) PMOC organization and approach to communications with FTA on project progress, events, etc.
  - i) Include organizational charts for FTA, project sponsor, and PMOC personnel to illustrate lines of communication
  - ii) Identify staff and subcontractors. Include resumes, describe capabilities
  - iii) Describe the approach to provide proactive oversight, technical assistance and professional opinions
  - iv) Indicate the frequency of communications with FTA and project sponsor and how this work will be coordinated and reported, both formally and informally. An example of a statement follows: “The PMOC’s written communication documents will be submitted to FTA’s assigned COR/ACOR who will distribute the documents within FTA as appropriate, collect FTA comments, request the PMOC to make modifications to the documents, and authorize distribution of the documents to the project sponsor. Informal verbal communication will occur directly between the PMOC and the project sponsor staff, at various levels; however, the FTA COR/ACOR will be made aware of the general nature of and any material specifics developed during these communications.”
- b) Cost Tracking, Invoicing, Financial Administration and Cost Control
  - i) Identify the contract type and terms for all the tasks in the task order and identify relevant compensation sub-limits or fixed price work;
  - ii) Describe employees’ record daily project time charges and how the charges are accumulated into the corporate accounting system, and the periodicity (e.g., weekly);
  - iii) State how the PMOC intends to comply with FTA’s billing instructions;
  - iv) Provide a description how invoices are generated and the periodicity (e.g., monthly);
  - v) Identify when the PMOC accounting period closes (e.g., on the last Friday of the month);
  - vi) Describe the recordation process of Subcontractor invoices (e.g., monthly in the corporate accounting system).
- c) Correspondence and Document Control
  - i) The PMOC shall describe its approach to controlling correspondence to and from FTA; meeting FTA’s task order requirements for information delivery when deliverables have been accepted by FTA; the location of PMOC project files; file maintenance and control.

## **7.2 Monthly Task Order Cost Status Report at Task Order Level - Body of Report**

Unless otherwise directed by the COR/ACOR, Monthly Task Order Cost Status Reports should cover only one Task Order and include the following:

- 1) Introduction
  - a) Period covered (one month)
  - b) Percent expended of authorized/obligated amount (dollars and hours) on Task Order



- c) 75% expenditure level occurred on X date or is anticipated on X date
- d) Time remaining until end date of Task Order
- 2) List
  - a) Major completed PMOC tasks
  - b) Significant issues encountered in project or by PMOC
  - c) Significant events in the next 90 days
- 3) Brief narrative
  - a) Describing reasons for variances between planned and actuals for PMOC hours and costs
  - b) Describing the benefits the assigned PMOC team has brought to the major capital project. Approach this description of benefits from a “lessons learned” or lessons to be shared point of view.
- 4) Costs and Labor Hours – See Appendix B for sample tables and graphs. Cost and hours utilization information is to be consistent with the monthly invoices.
  - a) In a table, record task order planned per month, planned to date, actual per month, and actual to date for cost and hours.
  - b) In one graph show task order cost utilization for planned and actuals to date for the PMOC/sub-consultants, as well as for Small Business Enterprise (SBE) and Disadvantage Business Enterprise (DBE)/ Women Business Enterprise (WBE). In another graph similarly show task order hours utilization.

### **7.3 Monthly Task Order Cost Status Reporting at Contract Level – Body of Report**

This report is to be provided at the direction of the COR. Provide a contract level progress, status, and management report that consolidates information for all task orders issued under the contract. This report shall include the following information:

- 1) Listing of all active task orders
- 2) Listing of all inactive task orders and date of closure and final total cost
- 3) Percentage of contract expenditures for SBE, DBE and WBE
- 4) Cost summaries for each task orders including:
  - a) Planned costs for full period of performance
  - b) Actual costs to date
  - c) Ratio of expenditures for prime contractor to subcontractors
  - d) Estimate of cost to complete
  - e) Notation of task orders with overruns over 10% with explanation
  - f) Notation of task orders with significant issues and/or problems.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1	The PMOC shall inform the FTA, as directed, via Monthly Task Order Cost Status Reports, PMOC Implementation Plans and PMOC Transition Plans of PMOC's professional and managerial expertise.	<b>R1a.</b> The PMOC shall develop and document a process for review, analysis and reporting to FTA regarding, Monthly Task Order Cost Status Reports, PMOC's Implementation Plans and PMOC's Transition Plans.		<b>Q1a.</b> PMOC provides documentation of the process.	<b>M1a.</b> Review of the process documentation.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process and project management judgment to review, analyze and report to FTA regarding Monthly Task Order Cost Status Reports, PMOC's Implementation Plans and PMOC's Transition Plans.		<b>Q1b.</b> Review must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>M1b.</b> Documented review, analysis, and report to FTA regarding, Monthly Task Order Cost Status Reports PMOC's Implementation Plans and PMOC's Transition Plans.	<b>MM1b.</b> Periodic review by FTA or its agent and the PMOC's internal verification.
2	The PMOC shall provide FTA with an Implementation Plan that shows PMOC's well-considered proposal to accomplish assigned work in accordance with FTA requirements.	<b>R2.</b> The PMOC shall provide FTA, as directed, with a plan to accomplish work assigned to it that demonstrates PMOC's ability to manage, man, schedule and prosecute the work in accordance with well accepted standards of professionalism and so as to satisfy FTA guidance and requirements.		<b>Q2.</b> PMOC provides plan to accomplish tasks that demonstrate sound management and its ability to schedule and prosecute the work effectively and efficiently.	<b>M2.</b> PMOC's management procedures and implementation planning for assigned Tasks demonstrate sound management and engineering practices and professional experience.	<b>MM2.</b> Periodic review by FTA or its agent.
3	The outgoing PMOC shall provide FTA, as directed, a Transition Report that substantively reports to FTA essential Project facts and knowledge to assist in facilitating the transition from the current PMOC to an incoming PMOC.	<b>R3.</b> The outgoing PMOC shall apply suitable management procedures in developing schedule and milestones, contact lists, document lists and other pertinent Project facts to assist the follow-on PMOC in becoming familiar with and taking oversight responsibility for the Project.		<b>Q3.</b> Documented application of suitable management procedures to assist in facilitating a transition from the current PMOC to an incoming PMOC.	<b>M3.</b> PMOC's management procedures and planning in preparation for transition to a new PMOC demonstrate sound management and engineering practices and professional experience.	<b>MM3.</b> Periodic review by FTA or its agent.
4	The incoming PMOC shall provide FTA, as directed, a Transition Plan that coordinates and integrates incoming PMOC services and work products with the current PMOC to ensure complete familiarization with the project sponsor's project and the outgoing PMOC's work product to achieve readiness to assume oversight activities.	<b>R4.</b> The incoming PMOC shall apply suitable management procedures in coordinating and integrating its work with the current PMOC by identifying transition elements, developing schedule and milestones, establishing key FTA and project sponsor contacts, and developing a list of documents needed for the transition to ensure complete familiarization with the project sponsor's project, reports and information so as to assume oversight responsibilities.		<b>Q4.</b> Documented application of suitable management procedures in coordination and integration of work products with outgoing PMOC to ensure complete familiarization with the project sponsor's project and the PMOC's work product.	<b>M4.</b> PMOC's management procedures and planning in preparation for transitioning from the outgoing PMOC demonstrate sound management and engineering practices and professional experience.	<b>MM4.</b> Periodic review by FTA or its agent.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
5	The PMOC shall provide monthly to FTA on a report with relevant progress updates on PMOC's assigned work completed tasks, issues encountered and 90-day projection of its anticipated work efforts.	<b>R5.</b> The PMOC shall apply suitable management procedures to its assigned Tasks to demonstrate planning, cost control, scheduling, performance measurement and timely reporting of data to FTA.		<b>Q5.</b> Documented and applied management procedures that demonstrate planning, cost control, scheduling, performance measurement and timely reporting to the FTA.	<b>M5.</b> PMOC's management procedures for assigned Tasks demonstrate sound management and engineering practices and professional experience.	<b>MM5.</b> Periodic review by FTA or its agent.
6	The PMOC shall provide FTA with written reports as required by the Task Order or Work Order.	<b>R6.</b> The PMOC shall present its findings, analysis (including data analysis and data models where necessary), recommendations and professional opinions to FTA in the form of written reports.		<b>Q6.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports.	<b>M6.</b> Review of the PMOC's presentation of findings, analysis, recommendations and professional opinions by the FTA.	<b>MM6.</b> Periodic review by FTA or its agent.

## APPENDIX B

### Implementation Plan Elements / Monthly Task Order Cost Status Reporting Tables

**Task Order Key Parameters Table**

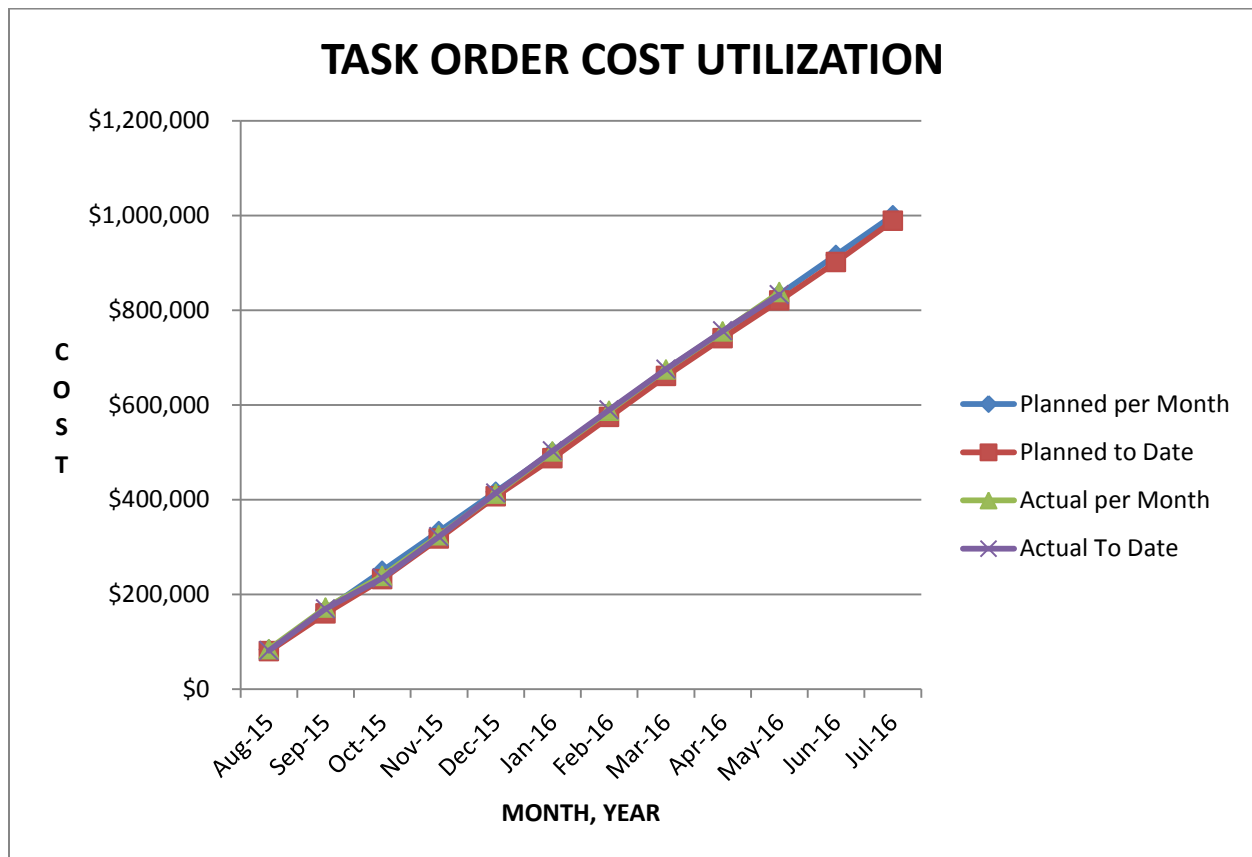
Period covered:	May 2015
Task Order NTE Amount:	\$5,000,000
Task Order Incremental Funding Amount:	\$1,000,000
Percent expended (cost):	6%
Percent expended (hours):	5%
Anticipated date of 75% expenditure level of funded dollars:	November 2016
Anticipated date of 75% expenditure level of funded hours:	December 2016
Time remaining until end date of Task Order:	30 months

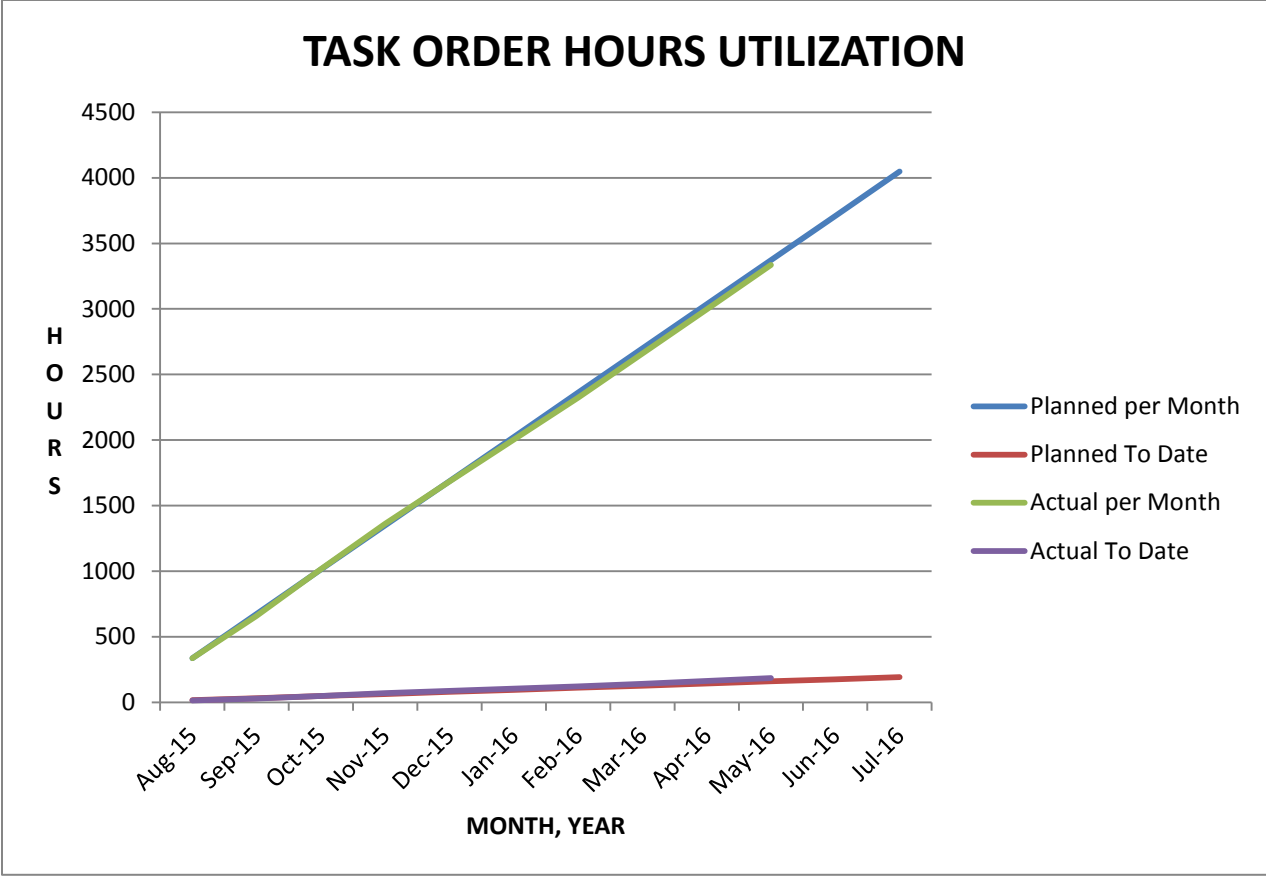
PMOC Name, Task Order No. ____, Grantee Name and Location, Project Name										
TASK ORDER COST AND HOURS UTILIZATION**										
COST						HOURS				
Year One	MONTH -YEAR	Planned per Month	Planned to Date	Actual per Month	Actual To Date	MONTH -YEAR	Planned per Month	Planned to Date	Actual per Month	Actual To Date
	Aug-15	\$83,333	\$80,000	\$84,221	\$81,437	Aug-15	337.25	16	337	14
	Sep-15	\$83,333	\$79,800	\$87,488	\$88,021	Sep-15	337.25	16	321	16
	Oct-15	\$83,333	\$72,345	\$67,239	\$65,328	Oct-15	337.25	16	358	20
	Nov-15	\$83,333	\$85,899	\$85,458	\$87,330	Nov-15	337.25	16	345	21
	Dec-15	\$83,333	\$88,933	\$87,964	\$92,002	Dec-15	337.25	16	323	16
	Jan-15	\$83,333	\$80,238	\$88,953	\$88,554	Jan-15	337.25	16	319	18
	Feb-15	\$83,333	\$87,333	\$86,232	\$86,998	Feb-15	337.25	16	321	17
	Mar-15	\$83,333	\$86,234	\$87,117	\$85,889	Mar-15	337.25	16	336	19
	Apr-15	\$83,333	\$80,216	\$80,111	\$80,553	Apr-15	337.25	16	336	23
	May-15	\$83,333	\$79,440	\$82,980	\$76,557	May-15	337.25	16	340	21
	Jun-15	\$83,333	\$81,225			Jun-15	337.25	16		
	Jul-15	\$83,333	\$86,811			Jul-15	337.25	16		
		\$1,000,000	\$988,474	\$837,763	\$832,669		4047	192	3336	185

\*\* Above table represents current incremental funding amount. Subsequent incremental funding amounts will require additional tables joined together.

DBE Notification				
Sub-Consultant	DBE	SBE	MBE	WBE
TEAM A	X			
TEAM B			X	

Sub Consultant	Planned per Month	Actual per Month		Planned per Month	Actual per Month
	COST			HOURS	
TEAM A					
TEAM B					





## Monthly Task Order Hours and Cost Tables

HOURS							
CLIN/Sub CLIN	CLIN Description	TO Total	Incr. Funded	Planned To Date	Billed This Period	Billed To Date	Balance Remaining *
0001	Contract and Program Support						
0001A	Special Tasks						
0002	Project Management Review Services						
0002A	Project Management Reviews						
0002B	On-Site Monitoring and Reporting						
0003	Technical Review Services						
0003A	Scope, Cost, Schedule Characterization Reviews						
0003B	Vehicle Reviews						
0003C	Risk and Contingency Reviews						
0003D	Readiness Reviews						
0003E	Small Starts Reviews						
0003F	Special Project Reviews						
0004	Other Reports, Reviews, and Plans						
0004A	Other Reports, Reviews, and Plans						
0005	Other Direct Costs						
0005A	Travel Expenses / Other Direct Expenses						
	TOTAL						

\*Balance Remaining from Total Authorized amount.

## Monthly Task Order Hours and Cost Tables

DOLLARS							
CLIN	CLIN Description	TO Total	Incr. Funded	Planned To Date	Billed This Period	Billed To Date	Balance Remaining *
0001	Contract and Program Support						
0001 A	Special Tasks						
0002	Project Management Review Services						
0002 A	Project Management Reviews						
0002 B	On-Site Monitoring and Reporting						
0003	Technical Review Services						
0003 A	Scope, Cost, Schedule Characterization Reviews						
0003 B	Vehicle Reviews						
0003 C	Risk and Contingency Reviews						
0003 D	Readiness Reviews						
0003E	Small Starts Reviews						
0003F	Special Project Reviews						
0004	Other Reports, Reviews, and Plans						
0004 A	Other Reports, Reviews, and Plans						
0005	Other Direct Costs						
0005 A	Travel Expenses / Other Direct Expenses						
	TOTAL						

\*Balance Remaining from Total Authorized amount.





## **Oversight Procedure 03 – Special Tasks**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure is to describe the performance and deliverables that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) for special tasks required in addition to the project management and technical review services performed under other Oversight Procedures (OPs).

### **2.0 BACKGROUND**

FTA may occasionally issue work orders to one or more PMOCs to perform special tasks for program-wide and project-related activities. In the past, special tasks assigned to PMOCs have included:

- development of technical papers in support of FTA's risk management program;
- study of factors leading to project cost increases on major capital projects;
- updates to the project management oversight procedures;
- providing technical assistance to Project Sponsors (Sponsors) in a structured way, similar to a teacher-student relationship.

### **3.0 OBJECTIVES**

Utilizing the PMOCs' professional experience and expertise in both program-wide and project-specific ways should:

- advance the knowledge base among Sponsors and the state-of-the-practice in the industry;
- improve FTA's oversight capabilities for the various phases of major capital transit projects; and
- result in higher quality transit projects that meet project goals, budget and schedule requirements.

### **4.0 REFERENCES**

References shall be provided in the assigned work orders or by FTA Work Order Manager.

### **5.0 PROJECT SPONSOR SUBMITTALS**

If applicable, submittals will be indicated by FTA in work orders or as directed by the FTA Task Order Manager.

## 6.0 SCOPE OF WORK

FTA may require the PMOC to conduct and/or provide:

- special oversight and special studies;
- support the Office of Inspector General (OIG ) / Government Accountability Office (GAO) audits by providing reports and requested research material;
- participate in webinars or similar meetings to brainstorm with others in and out of the industry with the intent to bring new and innovative technologies/techniques to the FTA for use or for support of proposing an FTA beneficial pilot program;
- provide special technical assistance such as emergency support and other work as directed by the Administrator. This work may entail site visits and interviews; providing technical assistance to newer Sponsors and Sponsors with smaller and/or atypical capital projects on the development of their project plans, schedules and procedures; project investigations; preparation of professional papers based on research and development of concepts, trends, information, etc.; examinations of agency histories; etc.
- technical assistance to Sponsors on their Project Management Plan, schedules, budget and cost estimates, project organization and staffing requirements, project control and reporting systems, supporting plans (addressing quality, safety and the like), policies and procedures, project investigations, project delivery requirements and methods, contracting strategies, and/or overall process of setting-up a project management office. The scope of this PMOC work may be tailored to focus on specific project issues and areas as requested by the Sponsor or specified by FTA.

Special studies required by FTA may focus on processes and/or projects that include “state of the art” advances in technology, systems, materials, vehicles and equipment; new and unique project delivery approaches and methods; updated management systems and metrics; impacts of new procurement practices, alternative funding sources, and new FTA requirements.

Findings, conclusions, and recommendations may be required by the PMOC in written documents to inform FTA and designated third parties. The PMOC may be required to present papers and studies in meetings, represent FTA, lead or participate in meetings with parties such as Sponsors and their representatives, legislators, legislative staff, U.S. DOT Secretary and staff, Office of Management and Budget, U.S. DOT Government Accountability Office, U.S. DOT Office of Inspector General, non-governmental entities and industry associations such as Transportation Research Board, American Public Transportation Association, National Transit Institute, American Society of Civil Engineers, American Institute of Architects, American Planning Association, community representatives and professional peer groups, etc.

Representation of FTA or participation in meetings may include preparation of advance meetings and briefings with FTA staff to discuss concepts, project issues, industry conditions or trends, etc.; participation in and presentations at meetings, workshops, conferences; development of meeting agendas; documentation of results of meetings in reports; debriefings, follow up papers or other documents.

## **7.0 REPORTS, PAPERS, PRESENTATIONS**

The PMOC shall provide FTA with written materials fulfilling the requirements above and as stated in the assigning work order. When applicable, follow the report formatting requirements of OP 01 or other OPs as indicated in the work order. When necessary, perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may add other software as required but documentation and report data shall be made available to FTA.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1	The PMOC shall perform Special Tasks in program-wide and project-specific matters to advance industry state-of-the-practice and improve FTA oversight of capital transit projects.	<b>R1a.</b> The PMOC shall develop and document a process for utilizing its professional expertise and judgment to perform Special Tasks.		<b>Q1a.</b> Process exists and the instructions/directions provided by FTA have been followed.	<b>M1a.</b> Evidence of a documented process.	<b>MM1a.</b> Review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process and professional expertise, experience and judgment in analysis and preparation of deliverables for FTA required Special Tasks.		<b>Q1b.</b> Review must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>M1b.</b> Documented professional judgment, observation and opinion in analysis and preparation of deliverables for FTA required Special Tasks.	<b>MM1b.</b> Review by FTA or its agent.
2	PMOC shall utilize its professional expertise, experience, and judgment in performing Special Tasks relating to capital transit projects as assigned by FTA.	<b>R2a.</b> The PMOC shall, as directed by FTA, develop, prepare and present professional papers and special studies relating to FTA assigned Special Tasks.		<b>Q2a. Include</b> professional opinion, review, research and analysis of Special Task related materials and information.	<b>M2a.</b> Documented evidence of review, research and analysis of all pertinent information related to the assigned Special Task, supported by professional opinion.	<b>MM2a.</b> Review by FTA or its agent.
		<b>R2b.</b> The PMOC shall, when so directed by FTA, provide technical assistance and guidance to Sponsors in the development of their project management/execution plans, schedules and procedures.		<b>Q2b.</b> Professional expertise and experience demonstrated in technical assistance provided to the Sponsor.	<b>M2b.</b> Documented evidence of assistance provided to the Sponsor in the development of their plans, schedules and procedures supported by professional expertise and experience.	<b>MM2b.</b> Review by FTA or its agent.
		<b>R2c.</b> The PMOC shall, when so directed by FTA, represent FTA and participate in meetings with all applicable parties and representatives.		<b>Q2c.</b> Professionalism displayed in assigned representation and participation.	<b>M2c.</b> Documented evidence of representation and participation, supported by professionalism at all levels.	<b>MM2c.</b> Review by FTA or its agent.
		<b>R2d.</b> When representing FTA, PMOC may be required to perform in a leadership role, conduct pre-meetings and briefings with FTA staff, participate in meetings, prepare meeting agendas, document the result(s) of meetings and conduct debriefings.		<b>Q2d.</b> Professionalism displayed in all aspects of leadership, meeting conduct and document preparation.	<b>M2d.</b> Documented evidence of all Special Task related leadership, preparation, participation development, documentation and debriefing, supported by professionalism at all levels.	<b>MM2d.</b> Review by FTA or its agent.
3	The PMOC shall prepare required reports and papers and make necessary presentations.	<b>R3.</b> The PMOC shall provide FTA with written materials that fulfill the requirements of the assigned Special Task.		<b>Q3.</b> Reports and presentations are professional, complete, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports.	<b>M3.</b> PMOC's findings, conclusions, recommendations and written materials.	<b>MM3.</b> Review by FTA or its agent.



## Oversight Procedure 20 - Project Management Plan Review

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### 1.0 PURPOSE

The purpose of this Oversight Procedure is to describe the review, analysis, and recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) as regards the Project Sponsor's (Sponsor's) Project Management Plan (PMP) submission at milestones noted below.

The PMP is the overarching project implementation plan that spans the entire project period. It should be a guide for action. It should describe approved policies, practices, and procedures related to the management, design, and construction of the major capital transit project. The PMP elements should be tailored to set forth the specific action plan for implementing the project, and managing the cost, schedule, quality, and associated risks.

FTA expects that that Sponsor's PMP is based on a thorough understanding of risk-informed and sound project management strategies and plans. The PMOC's review of the PMP enables the FTA to determine the adequacy of the legal and administrative capabilities as well as its management capacity and capability to effectively and efficiently execute the project in all of its aspects, including planning, design, construction, testing, and revenue operations.

### 2.0 BACKGROUND

Because projects were frequently experiencing cost and schedule increases, and actual ridership was often less than forecasted, Congress called for the establishment of a Project Management Oversight program for FTA through the Surface Transportation and Uniform Relocation Assistance Act of 1987. This Act and subsequent amendments set forth the requirement for FTA Sponsors to produce a PMP.

In 1989, FTA finalized a regulation responding to this legislation. This regulation is called the PMO Rule and is found in 49 CFR 633. The regulation lists the contents of a PMP at 49 CFR 633.25:

“At a minimum, a recipient's project management plan shall include—

- (a) A description of adequate recipient staff organization completes with well-defined reporting relationships, statements of functional responsibilities, job descriptions, and job qualifications;
- (b) A budget covering the project management organization, appropriate consultants, property acquisition, utility relocation, systems demonstration staff, audits, and such miscellaneous costs as the recipient may be prepared to justify;
- (c) A construction schedule;
- (d) A document control procedure and recordkeeping system;

- (e) A change order procedure, which includes a documented, systematic approach to the handling of construction change orders;
- (f) A description of organizational structures, management skills, and staffing levels required throughout the construction phase;
- (g) Quality control and quality assurance programs, which define functions, procedures, and responsibilities for construction and for system installation and integration of system components;
- (h) Material testing policies and procedures;
- (i) Plan for internal reporting requirements including cost and schedule control procedures; and
- (j) Criteria and procedures to be used for testing the operational system or its major components;”

Title 49 U.S. Code Section 5327 Project Management Oversight reiterated these PMP components and added the following requirements:

- “(11) Periodic updates of the plan, especially related to project budget and project schedule, financing, ridership estimates, and the status of local efforts to enhance ridership where ridership estimates partly depend on the success of those efforts;
- (12) The recipient's commitment to submit a project budget and project schedule to the Secretary each month; and

On August 10, 2005, Section 3026 of SAFETEA-LU<sup>1</sup> amended 49 U.S. Code Section 5327 as follows: “Project Management Plan Requirements – Section 5327(a) is amended. . .” to include

- “(13) safety and security management.”

MAP-21<sup>2</sup> was enacted in part to improve the development and delivery of capital projects. To that end, it redefined the initial phases for new fixed guideway capital projects or core capacity improvement projects to be “Project Development” and “Engineering.”

## 1. Project Development Phase

- (a) A project enters into the Project Development Phase when—
  - the Sponsor
    - submits a letter to the FTA describing the project and requests entry into the project development phase; and

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<sup>1</sup> Public Law 109-59: Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A legacy for Users (SAFETEA-LU).

<sup>2</sup> The Moving Ahead for Progress in the 21<sup>st</sup> Century Act (MAP-21), which is a funding and authorization bill that governs U.S. federal surface transportation spending, became law on July 6, 2012. (Ref: Public Law 112-141, July 6, 2012)

- initiates activities required to be carried out under the National Environmental Policy Act of 1969 (42 U.S.C. et seq.) with respect to the project; and
  - the FTA
    - responds in writing to the Sponsor within 45 days whether the information provided is sufficient to enter into the Project Development Phase, including, when necessary, a detailed description of any information deemed insufficient; and
    - provides concurrent notice to Congress that the project is entering the project development phase.
- (b) During the Project Development Phase, Sponsors shall develop sufficient information for the FTA to make findings of project justification, policies and land use patterns that promote public transportation, and local financial commitment.
- (c) Not later than 2 years after the date on which a project enters into the Project Development Phase, the Sponsor shall complete the activities required to obtain a project rating and submit completed documentation to the FTA.

## 2. **Engineering Phase**

- (a) A project may advance into the Engineering Phase upon completion of activities required under NEPA<sup>3</sup> as demonstrated by a record of decision with respect to the project, a finding that the project has no significant impact, or a determination that the project is categorically excluded; and only if FTA determines that the project is selected as the locally preferred alternative, is adopted into metropolitan transportation plan, is justified, and is supported by an acceptable degree of local financial commitment.
- (b) For consideration for an **FFGA** and readiness to proceed into the **Construction Phase**, the Sponsor must have fully developed its PMP and have demonstrated full compliance or revisions to the PMP that reflect current, appropriate, and effective management practices.

FTA Circular 5200.1 “Full-Funding Grant Agreements Guidance” provides Sponsors with guidance and direction on the development of Full Funding Grant Agreements (FFGAs). This circular defines the PMP as a written plan developed and implemented to cover the “Sponsor's detailed project management strategy to control the project budget, schedule, and quality.” It states the following: “By the time of submittal of the application for an FFGA, the Project Management Plan must explicitly address, at a minimum, each of the following: the applicant’s staffing and organization, budget, schedule, document control, change orders, construction staffing, quality control and quality assurance, materials testing, internal reporting, property acquisition, operational systems testing, and safety and security. Also, the Project Management Plan must require that the plan itself will be updated periodically.

The requirements for the PMP are also defined in FTA’s *Project and Construction Management Guidelines, 2011 Update*, (PCMG). The PCMG provides guidance to Project Sponsors on project management principles and practices, and summarizes FTA requirements, best practices, and research results in the management of transit capital project development. The PCMG recommends a phased

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<sup>3</sup> National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.)

project management approach that starts with inputs, establishes a baseline, refines project definition, and generates outputs that become the inputs and baseline for the subsequent phase. The PCMG suggests that Sponsors should define project requirements, allocate resources, perform project activities, monitor progress, and make adjustments, to ensure timely gathering of information and decision making. The PCMG calls for Sponsors to apply the management principles and guidance embodied in the PCMG to their unique project environment. PCMG Section 2.2.3 lists the 13 required PMP elements, mirroring the language in the law.

### **3.0 OBJECTIVES**

It is essential that the PMOC understand that the preparation of a project management plan is the responsibility of the Sponsor, as is the resultant execution of the total project. FTA and its PMOC are responsible for overseeing the work, providing suggestions for improvement, and confirming compliance with federal laws, regulations, and policies.

The PMOC's review of the PMP provides a major input to FTA to facilitate determination of the adequacy of the Sponsor's legal and administrative capabilities as well as the management capacity and capability to effectively and efficiently execute the planning, design, and implementation of the project. The objectives of this procedure are to guide the PMOC to (1) validate the usefulness of the PMP as an overarching project implementation plan, (2) assess the adequacy and soundness of the elements and sub plans contained within the PMP at required points during the Project, and to ensure such elements are complete to the level necessary for effective and efficient execution of the Project given the project phase, and (3) document its findings, professional opinions, and recommendations in reports to the FTA.

### **4.0 REFERENCES**

The following are the principal, but by no means the only, references to Federal legislation, regulation, and guidance, which the PMOC should review and understand to evaluate project work being reviewed under this OP:

#### **4.1 Legislative**

- The Moving Ahead for Progress in the 21<sup>st</sup> Century Act, or MAP-21, Public Law 112-141, July 6, 2012.

#### **4.2 United States Code**

- FTA statutes, 49 U.S.C. Chapter 53

#### **4.3 Regulations ([www.ecfr.gov](http://www.ecfr.gov))**

- Project Management Oversight, 49 CFR Part 633
- Major Capital Investment Projects; Final Rule, 49 CFR Part 611, April 9, 2013
- Joint FTA/FHWA regulations, Metropolitan Transportation Planning and Programming, 23 CFR Part 450, Subpart C
- Joint FTA/FHWA regulations, Environmental Impact and Related Procedures, 23 CFR Part 771
- U.S. DOT regulation, Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs, 49 CFR Part 24



#### **4.4 FTA Circulars**

- C4220.1F, Third Party Contracting Guidance
- C5010.1D, Grant Management Requirements
- C5200.1A, Full Funding Grant Agreements Guidance
- C5800.1, Safety and Security Management Guidance for Major Capital Projects
- FTA Master Agreement (updated and published October 1 of each calendar year)

#### **4.5 Guidance**

- Guidance for Transit Financial Plans, June 2000
- Reporting Instructions for the Section 5309 New Starts Criteria, July 2009
- Interim Guidance on Design-Build Project Delivery and the FFGA Process
- Quality Management System Guidelines, December 2012
- Project and Construction Management Guidelines, 2011 Update
- Construction Project Management Handbook, September 2009
- TCRP G-08 - A Guidebook for the Evaluation of Project Delivery Methods, 2009

#### **5.0 SPONSOR SUBMITTALS**

The Sponsor is required to formally submit its PMP to FTA at the following milestones during the project life:

- For the Readiness Review to enter the Engineering Phase
- For the Readiness Review for Full Funding Grant Agreement (FFGA)
- When 40% of construction value has been bid and contracted
- At revenue operations [as a retrospective or as-built]

Depending on the duration between milestones, the Sponsor may elect to make interim submittals or FTA may require interim submittals when any major section of the PMP has been significantly affected (i.e. major policies or procedures have changed based on changes to the procurement methods, manner in which cost or schedule are tracked, major organizational or responsibility changes, program changes, logistics changes, scope changes, and other similar changes).

Appendix B below provides a typical Table of Contents for a PMP. The PMP elements and sub plans are explained in greater detail in Section 6.0 below. The Sponsor should appropriately scale the PMP to the size of the project. The treatment of elements and sub plans may vary with the size and complexity of the project, however, a Safety and Security Management Plan is always required.

## **6.0 SCOPE OF WORK**

### **6.1 PMP Element and Subplan Requirements by Phase**

Based on the Table of Contents in Appendix B, the following sections provide supplemental information regarding the PMOC's review of the PMP at each of the three review milestones and at interim points as directed by FTA. At these milestones, the Sponsor is expected to provide FTA with a PMP developed to the level of completeness indicated. If the PMOC determines an element of the PMP is not complete to a satisfactory level, the PMOC should recommend to FTA that the element be returned for revision and resubmittal. The PMOC will be required to re-review such elements. Also, if an unanticipated project event, for example a change in organizational structure warrants the revision of an element or elements of a PMP, another review by the PMOC will be required.

The PMOC shall become familiar with FTA's guidance on PMP development, which can be found in the *Project & Construction - Management Guidelines* and *Circular 5010.1 Grant Management Requirements*. The PMOC should understand that the Sponsor is required to develop and implement a PMP that demonstrates its management capacity and capability to:

- Effectively and efficiently manage the implementation of the proposed project;
- Provide, directly or by contract, adequate professional, managerial, and technical expertise for the project's design, construction, and start-up, as well as qualified services for inspection and supervision of construction, testing, and start up work;
- Assure conformance with grant agreements, applicable statutes, regulations, codes, ordinances, and safety standards;
- Recognize FTA's role and the PMOC's role in performing oversight of the project;
- Establish and maintain adequate internal controls regarding system operations, service schedules, and financial reporting for capital assets and operations.

#### **Cursory Review**

Upon receipt of the PMP, the PMOC shall quickly scrutinize it for its adequacy and completeness. If the PMP outline appears unsatisfactory, the PMOC shall recommend to FTA that it be returned to the Sponsor for revision and resubmittal.

#### **Full Review**

In its full review, the PMOC shall assess, evaluate, and characterize the PMP; shall consider the extent, nature, level of detail, and quality of the Sponsor's approach as portrayed by the entire PMP and in each PMP element. The PMOC's review report should provide FTA with findings, analyses, professional opinions, and recommendations in a clear and understandable format. Each element of the PMP appropriate and required for this phase in the project's development shall be addressed. If an element is recommended for acceptance, revision, or rejection, this recommendation shall be clearly noted in the PMP report.

### **6.2 Technical Assistance/Oversight Reviews During Project Development**

During Project Development, FTA may perform technical assistance workshops and reviews and assign FTA staff or a PMOC. The reviews provide the Grantee guidance to meet the requirements to enter Engineering, and provide FTA with information about the project's strengths and weaknesses to timely complete the Readiness Review for entry into the Engineering Phase of the project.

FTA may recommend that the PMOC hold a workshop to help establish roles and responsibilities and define baseline standards of performance related to the management of the project. Few, if any, Grantees have all the capabilities or authorities to plan, design, and implement a major capital project by themselves. Bringing the Grantee's staff, consultants, the PMOC team (including appropriate sub-contractors), and relevant third parties together in a workshop early in Project Development can help to shape the project management approach. Through workshop discussions, all parties can gain a better understanding of each other's requirements, responsibilities, and authorities as related to the project.

Examples of workshop participants are other federal transportation representatives (FRA, FAA), other passenger transport agencies (transit, intercity rail and bus, airport authorities), state DOTs, city departments of streets, utilities, zoning/permitting, emergency responders, and other stakeholders. Workshop discussions can lay the foundation for the project management approach that is documented in the PMP. FTA can participate as well to set forth the federal requirements for a major capital transit investment and explain FTA's oversight process.

In a workshop setting, vital project implementation topics can be put on the table and fully explored. Examples of topics include real estate requirements, policies, and procedures (i.e., appraisal requirements; eminent domain authority and protocols); alternative delivery contracting authorities and protocols; negotiated contract sum vs. low bid; permitting submittal requirements and protocols; community concerns and outreach plans; and other appropriate implementation topics. In the workshop, a partnering-type process can be established that can help to weather future political shifts and agency leadership changes.

### **6.3 Review for Entry into Engineering**

It is important to recognize the expected status of the project when preparing for the Readiness Review for Entry into Engineering:

- NEPA process is complete
- The project has an acceptable rating (reference 49 CFR 611.207)
- The elements listed in Appendix B of OP 51 "Readiness to Enter Engineering" are complete

Within the PMP, the Sponsor should delineate specifics for administrative and technical activities, environmental assessment work, property acquisition and relocation, and community relations, and delineate the process and activities it will employ to ensure completeness and accuracy of the Project Development phase work so as to meet FTA requirements for technical and financial readiness for Engineering and future project development phases.

PMP review at this milestone shall assess the capability of the Sponsor and its project management approach to take the project successfully from Project Development through Engineering and through award of the FFGA. In addition, the PMP at this phase should demonstrate a well-conceived plan for project bidding and construction.

The PMOC shall assess and evaluate the degree to which the PMP elements 1) mirror and complement the Sponsor's overall management strategy and 2) are effective in minimizing scope changes, cost increases, and schedule extensions. The PMP covers all material project activities over the entire project life and the PMP constitutes evidence of the Sponsor's capacity and capability to manage the project. Given these, the PMOC's review of the PMP is a critical input to FTA's finding of whether the Sponsor is eligible for an engineering grant in accordance with 49 CFR 611.201, New Starts Eligibility.

The PMOC shall review and summarize its findings and opinions and present recommendations with respect to the adequacy and soundness of the plans and procedures for:

- NEPA Coordination. As the NEPA determination will have been made, the PMOC should verify that the Sponsor's plan for managing and implementing mitigation actions is in place. A component of this review is to ensure that the environmental mitigation work is incorporated into the design documents, cost estimates, and schedules. This should include the identification of the environmental site assessments that will need to be completed before the real estate process is started. If the project documents are not advanced enough to incorporate the environmental mitigation work, the PMOC shall ensure this is checked at the next milestone review.
- Design Control. The review should confirm the Sponsor's establishment and implementation of appropriate plans and procedures for design control including reviews for design, value engineering, life-cycle cost considerations, constructability, and safety. The review should confirm the ridership forecast is supported by the project operations plan and transit capacity. Procedures for the resolution of drawing and specification review comments should be in place; these procedures should be in use by all design team members. The PMOC should check that Change Control procedures are established to ensure that changes are adequately carried through all drawings.
- Property Acquisitions and Relocation. The PMOC should review and assess the Sponsor's property acquisition and relocations policies and procedures including but not limited to the Real Estate Acquisition Management Plan.
- Project Controls. The PMOC should review the Sponsor's document control, cost, schedule and control procedures with the project team and third parties, and assess whether these procedures are in place and well followed. The PMOC should review the baselines for capital cost estimate and schedule, and assess the approach and plans for risk identification, assessment and mitigation, and the development of adequate contingencies. The risk management plan shall incorporate mitigation measures including maintenance of contingency amounts for cost and schedule at project hold points. It is important to note that this PMP review is not a risk review. Procedures for performing risk and contingency reviews are contained in the Risk Management Review, OP40. In addition, the PMOC should review procedures for cost sharing agreements with outside funding partners, and check that the schedule for receipt of funds is consistent with the requirements of the project schedule.
- Project Delivery and Procurement. The PMOC shall review the Sponsor's plan for project delivery and procurement. The PMOC shall evaluate the soundness and adequacy of the Grantee's approach to bidding and awarding of contracts, procurement of materials, equipment and vehicles and the construction administration and construction management of

the Project. The PMOC should verify that the selected project delivery methods and contract packaging strategies are reflected in project schedules and cost estimates.

- PMP Subplans. The PMOC shall review for adequacy and soundness the Sponsor's PMP subplans, including:
  - Management Capacity and Capability documents (OP21);
  - Safety and Security Management Plan (OP22);
  - Real Estate Acquisition Management Plan (OP23);
  - Quality Assurance/Quality Control Plan (OP24);
  - Bus and Rail Fleet Management Plans (OP37)
  - Risk and Contingency Management Plan (OP40)

The PMOC shall analyze these subplans and make suggestions for improvement to the Sponsor along with recommendations for resolving issues surrounding the development and implementation of these plans.

## **6.4 Review During Engineering**

This PMP review should assess the Sponsor's basis for the project, how well the Sponsor has addressed the environmental review requirement, and how robust the Sponsor's management plan is to take the project successfully from Project Development through Engineering. Further, it is critical that the PMP at this phase demonstrate the Sponsor's consideration and careful planning of risk and contingency management plans and controls.

The PMOC's review should fully assess the degree to which the PMP describes the processes and methods needed to implement the project and the interfaces that will be created between various participants. The PMOC shall review and summarize its findings and opinions and provide recommendations with respect to the adequacy and soundness of the Sponsor's plans and procedures for:

- Environmental assessment, including environmental site assessments
- Design control
- Project controls
- Project delivery and procurement
- PMP sub plans including: (refer to other OPs on each of these sub plans)
  - Sponsor's Management Capacity and Capability Plan: The adequacy and soundness of the Sponsor's approach to managing and staffing the project with agency staff and outside consultants are critical to project success.
  - Quality Assurance / Quality Control (QA/QC) Plan: This plan establishes management responsibility and a QA/QC framework for the project, with emphasis at this milestone on the plan for design review during Project Development.
  - Safety and Security Management Plan
  - Real Estate Acquisition Management Plan
  - Bus and Rail Fleet Management Plans
  - Risk and Contingency Management Plan

## 6.5 Readiness Review for FFGA

The requirements for an FFGA are:

- Updated PMP and subplans, which includes a risk and contingency management plan;
- Processes and procedures in place to manage the project during FFGA/Construction;
- Staffing Plan that includes real estate acquisition and management, schedule and cost controls, risk management, construction management, quality assurance and quality control, safety and security management, and start-up and testing;
- Refined and updated level of project definition to support FFGA costs and schedule;
- All critical third-party agreements and permits are in place; and,
- Resolution of all remaining issues from the Engineering Review,

As a part of the FFGA Readiness Review, which should take no more than two months, the PMOC shall review the PMP to reassess the management capability of the Sponsor to successfully take the project upon award of an FFGA through bid, award, and construction, and into revenue operations.

The PMOC shall review and summarize its findings and opinions and present recommendations with respect to the adequacy and soundness of the Sponsor's PMP and subplans and procedures, and the successful implementation of such plans and procedures for:

- NEPA Coordination. The PMOC should confirm that the Sponsor's plan for managing and implementing mitigation actions is in place, and confirm that the environmental mitigation (including environmental site assessments) work is incorporated into the design documents, cost estimates, and schedules.
- Design Control. The review should confirm implementation of appropriate plans and procedures for design control in all aspects. Areas of focus include level of:
  - consistency with design criteria;
  - coordination and change control among design disciplines for drawings and specifications;
  - completeness of soils testing and site surveys;
  - coordination with third parties;
  - completeness of project documents for bidding.
- Project Controls. The review at this stage should confirm implementation of project controls in all aspects including procedures for cost and schedule control, risk management, and dispute or conflict resolution during construction. The PMOC should again check for procedures on cost sharing (see entry to Engineering). Risk and contingency management policies and procedures should be in place and routinely used.
- Property Acquisitions. The review should assess whether the land acquisitions and relocation activities have been implemented in compliance with established policies and procedures and are in compliance with applicable laws and regulations. In addition, a review of the Sponsor's procedures for tracking and monitoring the status of real estate activities should be done to confirm the Grantee's ability to meet project schedule.

- Project Delivery and Procurement. The review should confirm implementation of plans and procedures for project delivery and procurement. Specifically, the review should focus on the Sponsor's schedule for bidding construction packages and procuring equipment and vehicles.
- Labor Relations and Policies. The review should assess the establishment of these policies.
- Construction of Fixed Infrastructure. The review should assess the establishment of plans and procedures regarding construction administration, construction management, construction inspection, coordinating construction work by third parties, site logistics, and construction change order and shop drawing document flow and authorities.
- Start-up and Revenue Operations. The review should assess the establishment of plans and procedures regarding testing/commissioning, closeout of construction contracts, and training of staff.
- PMP Subplans. The PMOC shall review for adequacy and soundness the Sponsor's PMP subplans including the Sponsor's Management Capacity and Capability Documents, QA/QC Plan, Safety and Security Management Plan, Risk and Contingency Management Plan, Real Estate Acquisition Management Plan, and Bus and Rail Fleet Management Plans. The PMOC shall analyze these subplans and provide technical assistance to the Sponsor along with recommendations for resolving issues surrounding the development and implementation of these plans.

## 6.6 Reviews During Construction

PMP reviews should take place when approximately 40 percent of the construction has been bid awarded, and again at revenue operations to serve as an as-built document. The PMOC should update its previous assessment of the capability of the Sponsor and the Sponsor's management approach to successfully take the project through completion of bidding, award, construction, and revenue operations. The PMOC should update its evaluation of the soundness and adequacy of the Sponsor's approach to:

- Performance of environmental mitigation measures during construction;
- Design control. The review should check for maintenance of the Sponsor's schedule for completion of contract documents relative to the schedule for bidding and awarding of contract; and implementation of procedures established for configuration and change control of documents.
- All of the following: Project Controls, Project Delivery and Procurement, Labor Relations and Policies, and Construction procedures. In addition, the PMOC should give particular focus to the Sponsor's implementation of plans and procedures for document control, cost, schedule and risk control, and dispute resolution. Also, the PMOC shall focus on an update to its assessment of the adequacy and soundness of the Sponsor's plan for startup and testing operations including coordination, collection of materials, and staffing and training staff for operations.
- PMP Sub plans. The PMOC should assess the implementation of established plans and procedures for the Sponsor's PMP sub plans including the Sponsor Management Capacity and Capability, QA/QC, Safety and Security Management Plan, Real Estate Acquisition Management Plan, and Bus and Rail Fleet Management Plans.

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

Bearing in mind the requirements of the Project Management Oversight Rule, FTA Circular 5200.1 and other relevant guidance, the PMOC should provide a comprehensive report on the Sponsor's PMP. The report should identify insufficiencies and areas of non-conformance, document other findings and conclusions, support findings with evidence, support conclusions with sound analysis, and include suggestions for improving the Sponsor's Plan.

The PMOC shall provide FTA with a written report of its findings, analysis, recommendations, professional opinions, and a description of the review activities undertaken. After FTA approval, the PMOC should share the report with the Sponsor. In the event that differences of opinion exist between the PMOC and the Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile with the Sponsor and provide FTA with a report addendum covering the agreed modifications by the Sponsor and PMOC. Further, in the event that the PMOC determines that any element of the Sponsor's PMP is inadequate or weak, the PMOC shall make recommendations for corrective action along with a time frame for these actions, and reconcile such findings with the Sponsor.

The report formatting requirements of OP 01 apply. When necessary, PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may add other software as required, but documentation and report data shall be made available to FTA.



## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1	The PMOC shall validate the thoroughness of Sponsor's PMP as an overarching project management tool.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of a Sponsor's PMP.		<b>Q1a.</b> PMOC provides documentation of the process	<b>M1a.</b> Review of the process documentation.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process and project management judgment at specific Project phases to validate the thoroughness of the PMP and its ability to carry the Project to successful conclusion.		<b>Q1b.</b> Assessment must be made and the PMOC provides internal verification that the process has been followed.	<b>M1b.</b> Documented assessment of the PMP as an overarching project management tool.	<b>MM1b.</b> Periodic review by FTA or its agent.
2	The PMOC shall assess, evaluate and characterize the Sponsor's PMP, including required sub plans, for various phases of the Project from Project Development to closeout such that FTA is assured that Sponsor will implement the Project on schedule and within budget.	<b>R2b. In Project Development or Requesting Entry into Engineering:</b> The PMOC shall provide FTA with its opinion and recommendations as to Sponsor's PMP at this phase of the Project and the ability of the Sponsor and its PMP to carry the project from Engineering through award of FFGA.		<b>Q2b.</b> Professional opinion of Sponsor's PMP for the Project phase and necessary recommendations.	<b>M2b.</b> Documented evidence of a thorough review of Sponsor's PMP at this phase of the Project, supported by professional opinion.	<b>MM2b.</b> Periodic review by FTA or its agent.
		<b>R2c. In Engineering and/or Requesting FFGA:</b> The PMOC shall provide FTA with its opinion and recommendations as to Sponsor's PMP at this phase of the Project and the ability of the Sponsor and its PMP to carry the Project from award of FFGA through bid, award, and construction and into revenue operations.		<b>Q2c.</b> Professional opinion of Sponsor's PMP for the Project phase and necessary recommendations.	<b>M2c.</b> Documented evidence of a thorough review of Sponsor's PMP at this phase of the Project, supported by professional opinion.	<b>MM2c.</b> Periodic review by FTA or its agent.
		<b>R2d. Bid/Award/Construction:</b> The PMOC shall provide FTA with its opinion and recommendations at a) when 40 percent of construction is awarded and b) at revenue operations (to serve as an as-built document) as to Sponsor's PMP at this phase of the Project and the ability of the PMP to carry the Project through completion of construction and into revenue operations.		<b>Q2d.</b> Professional opinion of Sponsor's PMP for the Project phase and necessary recommendations.	<b>M2d.</b> Documented evidence of a thorough review of Sponsor's PMP at these milestones and this phase of the Project, supported by professional opinion.	<b>MM2d.</b> Periodic review by FTA or its agent.
		<b>R3.</b> The PMOC shall present its findings, conclusions, and recommendations to FTA and the Sponsor and reconcile other reports and those recommendations with the Sponsor to the extent possible.		<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with Sponsor to the extent possible.	<b>M3.</b> PMOC's findings, conclusions, recommendations, and presentation.	<b>MM3.</b> Periodic review by FTA or its agent.
3	The PMOC shall document its findings, professional opinions, and recommendations in a report to the FTA and Sponsor.					

## Appendix B

### PMP Table of Contents

PMP Table of Contents	In PD, and/or Req. Entry to Eng.	In Eng. and/or Req. FFGA	In Bid / Award and / or Constr.
<b>1. Basis for the Project</b>			
Objectives of the Project	•		
Project Description	•		
Name of project sponsor and all partners involved in project development work	•		
Description of project organization with key personnel and support contractors including safety and security, for Project Development	•		
An anticipated timeline for completing the project development work within the two-year timeframe specified in MAP-21	•		
Delete this row			
Evidence of LPA adoption into MPO Long Range Plan	•		
Evidence of project in TIP, STIP	•		
Legal Authority to Implement the Project and other Legal Approvals	•	○	
PMP Workshop Documentation (if applicable)	•		
<b>2. Environmental Assessment / Mitigation Plan</b>			
Delineation of NEPA analysis requirements / Project Impact Analysis	•		
Description of Mitigation Principles	•		
Plan for Management and Implementation of Mitigation Actions	•	○	○
<b>3. Design Control Plan</b>			
Description of relationship between forecasted ridership, operating plan and proposed project transit capacity in guideways, stations, support facilities	•		
Design Criteria for Each Discipline	•		
Schedule for the development of contract documents (level of development expected at each milestone for design/construction drawings, specifications, general and supplementary conditions of contracts for construction, and the Division 1)	•	○	
Design Reviews for Drawings and Specifications			
Value Engineering Review / Life Cycle Review	•	○	
Coordination Review – Internal to agency and design team; External to third parties, intergovernmental, etc.; Transit-oriented and Joint Dev.	•	○	
Constructability Review	•	○	
Operability and Maintainability Review	•	○	
Other peer or industry reviews	•	○	
Design Change and Configuration Control of documents during Design and Construction			
Change Identification	•	○	
Documentation Procedures	•	○	
Review and approval	•	○	
Plan (List and schedule) for third party agreements permits including utilities, real estate, railroads, transit-oriented development/joint development, etc.	•	○	
Investigation and Testing Plan			
Plan/schedule for site surveys, geotechnical and materials investigation before/during design	•		
Plan/schedule for geotechnical and materials testing during construction	•	○	
<b>4. Project Controls</b>			
Document and Records Controls			
Description of document organization approach including review, distribution, storage	•	○	○
Identification of physical document location	•	○	○
Identification of electronic document control system; description of interoperability among management systems	•	○	○
Evidence of Document Control Procedures being implemented	•	○	○
Cost Control Procedures			
Description of Estimating Methods/Assumptions	•		

## Appendix B

### PMP Table of Contents

PMP Table of Contents		In PD, and/or Req. Entry to Eng.	In Eng. and/or Req. FFGA	In Bid / Award and / or Constr.
	Final Cost Estimating Methodology Report	●		
	Procedures for maintaining Baseline Project Cost through:			
	Minimizing schedule delays	▲	●	○
<b>4. Project Controls (con't)</b>				
	Contingency Management	▲	●	○
	Contracting techniques	▲	●	○
	Cost allocation	▲	●	○
	Procedures for working with construction contractors to maintain SCC Cost Breakdown of contract sum through construction, at contract closeout.	▲	●	○
Schedule Control Procedures				
	Description of Scheduling Methods and Assumptions	●		
	Procedures for updating Baseline Project Schedule	▲	●	○
	Procedures for keeping the project on schedule	▲	●	○
Risk Control Procedures				
	Description of risk identification procedures pertaining to project team organization, scope, cost, schedule, quality;	●	○	
	Risk identification in project team; drawings; General and Supplementary Conditions; Div. 1, Div. 2 – 48 Technical Specifications			
	Risk evaluation / assessment plan and procedures	●	○	
	Risk control and management plan and procedures	●	○	○
	Contingency control and management plan and procedures including establishment of minimum contingency levels at each milestone (contingency drawdown)	●	○	○
	Role of Insurance	●	○	
Dispute / Conflict Resolution Plan (claims avoidance and claims resolution)				
	Plan for Design Phases	●		
	Plan for Procurement	●	○	
	Plan for Construction Phase	▲	●	○
	Plan for Start Up and Revenue Operations		●	○
<b>5. Project Delivery and Procurement Plan</b>				
Procedures for Procurement (advertising, bidding, awarding of contracts for consultants and construction contractors, procurement for equipment, etc.)		▲	●	○
Procurement Plan and Schedule (indicate project phase, durations for RFP, screening, interviews, selection, board approvals, etc.)		▲	▲●	○
	Community Outreach Services	●		
	Information System Services	●	○	
	Real Estate Services	●		
	Project Management Services	●	○	
	Design Services	●	○	
	Legal Services and other services	●	○	
	Construction Management Services	●	○	
	Construction Testing and Inspection Services	●	○	
	Construction	●	○	
	Prelim. Selection of Project Delivery Method (DBB, DB, CMGC etc.) (include rationale for and identification of risks inherent in selected method)	●	○	
	Final Selection of Project Delivery Method	●	○	
	Major Contract Packages – Description of Packages and Construction Sequencing	●	○	
	Procurement of Long Lead Items and Pre-FFGA items or work	●	○	

## Appendix B

### PMP Table of Contents

PMP Table of Contents		In PD, and/or Req. Entry to Eng.	In Eng. and/or Req. FFGA	In Bid / Award and / or Constr.
	Procurement of Materials, Equipment, Vehicles including procurement in advance of construction contract	●	○	
	Work by Sponsor's Own Forces	●	○	
<b>5. Project Delivery and Procurement Plan (con't)</b>				
	Work by Third Parties such as Utilities, Railroads, Private Sector, etc.	●	○	
Contracting Strategy for Transit- Oriented Development and Joint Development		●	○	○
Identification of Disadvantaged Business Enterprises (DBE) Opportunities, Federal DBE, State/Local WBE & MBE, Plans and Goals		●	○	○
<b>6. Labor Relations and Policies</b>				
Wage Rates and Classifications			●	
Wage and Hour Requirements			●	
State and Local Regulations			●	
No-Strike Agreements			●	
<b>7. Construction of Fixed Infrastructure – Procedures</b>				
Construction Contract Administration			●	
Construction Management			●	
Construction Inspection			●	
Coordination with Third Parties			●	
Site Logistics Plan (materials transport and storage; temporary site facilities; maintenance of existing pedestrian ways, transit and traffic operations during construction; protection of existing utilities)		▲	●	
Processing Shop Drawing, Bulletin, RFIs			●	
Negotiating and Approving Change Orders and Claims			●	
Substantial Completion; Final Completion			●	
<b>8. Start up and Revenue Operations</b>				
Testing Plan			●	
	Systems		●	
	Equipment		●	
	Vehicles		●	
Closeout Materials (warranties, testing results, O&M manuals, spare parts, etc.)			●	
Plan for Training of Staff			●	
<b>9. Sponsor Management Capacity and Capability Documents (MCC)</b>				
Management Capacity and Capability		●	○	○
<b>10. Quality Assurance / Quality Control Program Plan</b>				
QA/QC Plan		●	○	○
<b>11. Safety and Security Management Plan</b>				
Safety and Security Management Plan		●	○	○
<b>12. Real Estate Acquisition and Management Plan</b>				
Real Estate Acquisition Management Plan		●	○	○
<b>13. Fleet Management Plan</b>				
Fleet Management Plan		●	○	

▲ Preliminary information required    ● Element to be completed    ○ Element to be modified or augmented with additional information as necessary



## **Oversight Procedure 21 - Management Capacity and Capability Review**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure (OP) is to describe the review, analysis, and recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) with regard to the Sponsor's management, organization, and capability to effectively and efficiently plan, develop, manage and complete a Federally-assisted capital project.

### **2.0 BACKGROUND**

The PMOC shall review and evaluate a Project Sponsor's management capability and capacity to efficiently and effectively develop a Federally-assisted project for implementation by evaluating the organizational structure of the Sponsor, qualifications of personnel, as well as the policies, procedures, and implementation methods. Pay particular attention to the Sponsor's abilities, resources, staff organization and third-party consultants since these are essential to develop and manage project cost and schedule risks, real estate acquisition, safety and security, quality assurance and quality control, and other activities of Federal concern. The results of this evaluation shall serve as an input for the FTA in making programmatic decisions regarding the Sponsor's readiness to advance the project.

### **3.0 OBJECTIVES**

Perform evaluations and render professional opinions regarding the Sponsor's capacity and capability to successfully implement, manage, and complete a major Federally-assisted capital project, and to recognize and manage project risk factors and implement mitigation measures. The evaluations shall cover the following:

- 1) Organization, Personnel Qualifications, and Experience;
- 2) Sponsor's approach to the work, ability to perform the work including its methods, policies, and procedures for developing and updating reasonable and realistic project cost estimates and schedules and the abilities to identify, analyze, manage and mitigate project risks.
- 3) Sponsor's ability to collect costs and measure performance against line items in a robust Work Breakdown Structure (WBS), forecast cost to complete through an industry-accepted cost analysis technique, and identify variances and report on project status and recovery action plans on a monthly basis.

### **4.0 REFERENCES**

The following are the principal, but by no means the only, references to Federal legislation, regulation, and guidance which the PMOC should review and for which it should develop a strong understanding as related to the Sponsor's project work being reviewed under this OP:

#### **4.1 Regulations**

- 49 CFR Part 633, Project Management Oversight
- 49 CFR Part 659, Rail Fixed Guideway Systems; State Safety Oversight

#### **4.2 FTA Circulars**

- C5010.1D, Grants Management Guidelines
- C5200.1A, Full-Funding Grant Agreements Guidance
- C4220.1F, Third-Party Contracting Requirements
- C5800.1, Safety and Security Management Guidance for Major Capital Projects

#### **4.3 Guidance**

- Terms of the Full Funding Grant Agreement and referenced documents
- System safety Certification Guidelines
- FTA's Project and Construction Management Guidelines, 2011 update
- FTA's Quality Management System Guidelines, December 2012

#### **4.4 Oversight Procedures**

- OP20 Project Management Plan Review
- OP23 Real Estate Acquisition and Management Plan Review
- OP24 Quality Assurance / Quality Control Review
- OP25 Recurring Oversight and Related Reports
- OP32C Project Scope Review

The PMOC shall refer to other applicable regulations, policies, guidelines and circulars in determining the capacity and capability of a Sponsor to advance a major capital project as relevant and necessary.

### **5.0 SPONSOR SUBMITTALS**

The submittals to be secured by the PMOC from the Sponsor shall be appropriate with the phase of project development. Such submittals include, but are not limited to, the following:

- Management Capacity and Capability (MCC) documents (See Table of Contents in Appendix B);
- Project Management Plan (PMP) and other associated sub-plans, e.g., QAP, SSMP, RAMP;
- Work Breakdown Structure (WBS), detailed project schedule, and the Agency's latest monthly project report; and,
- Description of management tools (if not in the PMP) for controls and reporting of scope, cost, schedule, quality, safety and security.

### **6.0 SCOPE OF WORK**

The PMOC should review the Sponsor's MCC documents to ascertain the ability to fulfill the demands of implementing a major capital project. An important aspect is the Sponsor's staff qualifications and experience and their ability to implement methods, policies, and procedures for developing and updating reasonable and realistic project cost estimates and schedules along with the ability to identify, analyze, manage and mitigate project risk from scope, schedule and cost. Another important aspect is each staff understanding of their role on the project and the project's critical issues.

While the MCC documents make up part of the PMP, the review of the entire PMP is central to the PMOC's determination regarding the Sponsor's MCC and its preparedness to advance a project into the next phase.

The FTA normally engages a PMOC to review the Sponsor's MCC as necessary throughout the life of the project. This includes the Readiness Reviews for entry into Engineering, and for FFGA.

The FTA may request the PMOC perform an MCC review at other times such as:

- post-FFGA but before construction to verify continued capability and capacity;
- at 15% to 20% construction completion to confirm that the Grantee has the MCC to deliver the project;
- when Sponsor performance in areas such as vehicle maintenance, procurement, safety, and quality is a cause for concern;
- as required for high risk Sponsors;
- when Sponsors exhibit less than satisfactory performance in past oversight reviews; and, when a Sponsor engages in non-FFGA projects such as multi-modal centers, bus and maintenance facilities, new Bus Rapid Transit (BRT), or a streetcar.

## **6.1 General Review of Sponsor's Management Capacity and Capability Documents**

Appendix B identifies the MCC documents required at specific project milestones. This table also indicates when to submit preliminary information as well as when the Sponsor shall augment or modify existing information. The PMOC, during its review of the MCC documents, shall verify that the Sponsor has completed and submitted the required documents given the project phase. Further, as the project progresses, the PMOC shall ensure that the Sponsor is updating or modifying its existing information as necessary.

At a minimum, the following items are reviewed by the PMOC to reach a determination of a Sponsor's capability and capacity to successfully manage and complete a major Federally-assisted capital project:

- 1) Organization, Personnel Qualifications and Experience:
  - a) Review the complete organization of the Sponsor to determine the likelihood of the project management team successfully implementing the project. Determine whether the Sponsor has an effective and efficient organizational structure.
  - b) Review the assigned and supporting staff qualifications, including but not limited to the review of resumes and conduct of personal interviews of key agency and project leadership, based on PMOC generated questionnaires. The purpose of the questionnaire is to gain insight into the interviewees' background and experience, to understand their

concept of their project role, and to obtain their input as to the critical issues that must be managed and/or resolved to successfully complete the project. Sample questionnaires are in Appendix C. The PMOC can use the sample questionnaires as a guide, but should also use judgment about the right approach to achieve the objective of the review.

- c) A sample Summary Staff Qualifications/Experience Chart to document information gathered during interviews and resume reviews is included in Appendix D. These interviews and reviews should determine whether the Sponsor has the appropriately qualified staff and/or third-party consultants to:
    - i) design and manage the construction of the project;
    - ii) obtain support and incorporate requirements from the multiple jurisdictions through which the project may pass;
    - iii) obtain cooperation and incorporate requirements from third parties including railroads, utility companies, and adjacent parcel owners;
    - iv) deliver the project, given the form of project delivery method(s) it plans to use, e.g. design/bid/build, design/build, Construction Management/General Contractor (CM/GC), etc.;
    - v) develop and implement a sound Project Management Plan and its required sub-plans;
    - vi) secure and administer the required local funding;
    - vii) maintain the Sponsor's existing transit system with the addition of the project.
  - d) Review the Sponsor's staffing plan. A sample staffing plan is shown in Appendix E to this document. The staffing plan should be adjusted to the project. Assess the reasonableness of the hours for each project team component over the life of the project and whether the costs for professional services in the cost estimate accurately reflect the labor required. (Note: staffing plans can be shown in hours per month or full time equivalents (FTE) per month. The tables in Appendix E show examples of both. If FTEs are used, the industry standard is one FTE equals 160 hours per month.
  - e) Analyze whether the Sponsor has the physical resources, such as sufficient office space, equipment, and furnishings to effectively and efficiently advance the project.
  - f) Assess the agency's history of performance, financial stability, adequacy of management systems, and conformance with the terms of previous awards, etc.
- 2) Sponsor's approach to the work, understanding of the work, ability to perform the work:
- a) Review the adequacy of the Sponsor's methods, policies, and procedures for developing, and its ability to develop and update reasonable and realistic project budgets, cost estimates, and schedules and the control mechanisms in place to monitor and ensure adherence with said budgets, estimates, and schedules. Evaluate the Sponsor's methods, policies, and procedures for identifying, analyzing, managing, and mitigating project risks and disputes.
  - b) Evaluate the Sponsor's approach to:



- i) satisfying FTA grant reporting requirements and responding in a timely manner to specific requests from Congress, the FTA, and the PMOC for project-related information;
  - ii) packaging, procuring, and managing third-party contracts in compliance with FTA and other Federal requirements;
  - iii) developing and implementing a sound community relations program;
  - iv) developing and implementing land acquisition and relocation program;
  - v) accounting for project property and maintenance of project property inventory;
  - vi) developing and implementing a force account plan;
  - vii) developing and implementing safety and security measures and a Safety and Security Management Plan;
  - viii) complying with contract terms of the Full Funding Grant Agreement;
  - ix) entering into clearly defined intergovernmental and other local agreements (e.g. agreements with utilities or railroads) in a timely manner to secure sources of local funding and cooperation.
- c) Evaluate the Sponsor's understanding of
- i) its obligations under Title VI of the Civil Rights Act of 1964, the Disadvantaged Business Enterprise (DBE) Program, and the Americans with Disabilities Act;
  - ii) the requirements associated with real estate acquisition and relocation in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and FTA Circular 5010.D either with its own staff or with qualified consultants.

If the PMOC determines that the Sponsor's MCC is inadequate or weak in terms of (1) organization, personnel qualifications and experience, and/or (2) approach to the work, understanding of the work, or ability to perform the work, then the PMOC should make recommendations for corrective action along with a time frame for these actions.

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall provide FTA with a written report of its findings, analysis, recommendations, professional opinions, and a description of the review activities undertaken. After FTA approval, the PMOC may share the report with the Sponsor. In the event that differences of opinion exist between the PMOC and the Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile with the Sponsor and provide FTA with a report addendum covering the modifications agreed to by the Sponsor and PMOC.

The report formatting requirements of OP 01 apply. When necessary, PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may add other software as required, but documentation and report data shall be made available to FTA.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1	The PMOC shall review and analyze the Sponsor's management capability and capacity to develop a Federally-assisted Project.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of the management capability and capacity of Sponsor to develop a Federally-assisted capital project.		<b>Q1a.</b> PMOC provides documentation of the process.	<b>M1a.</b> Review of the process documentation.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process and project management judgment to review and analyze Sponsor's management capability and capacity to develop a Federally-assisted Project.		<b>Q1b.</b> Review must be made and PMOC provides internal verification that the process, as documented, has been followed.	<b>M1b.</b> Documented review and analysis of Sponsor's management capability and capacity to develop a Federally-assisted Project.	<b>MM1b.</b> Periodic review by FTA or its agent and the PMOC's internal verification.
2	The PMOC shall, through review of Sponsor's organization, personnel qualifications, and experience, form a professional opinion of the Sponsor's ability to successfully manage and complete the project.	<b>R2a.</b> The PMOC shall review the Sponsor's complete organization to determine if the Sponsor has a suitable management team and organizational structure to successfully accomplish the project in an effective and efficient manner.		<b>Q2a.</b> Professional opinion of the ability of the Sponsor's organization and management team to successfully accomplish a major Federally-assisted capital project.	<b>M2a.</b> PMOC's review and opinion as to the Sponsor's organization and management team and its ability to successfully accomplish a major Federally-assisted capital project demonstrates sound management and engineering practices and professional experience.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall review the Sponsor's staffing plan and staff qualifications, including third-party consultants, to determine if the Sponsor has adequately qualified staff to effectively and efficiently plan, manage, and deliver the project.		<b>Q2b.</b> Professional opinion of the adequacy of the Sponsor's staffing plan and staff qualifications.	<b>M2b.</b> PMOC's review and opinion as to the Sponsor's staffing plan and staff qualifications demonstrates sound management and engineering practices and professional experience.	<b>MM2b.</b> Periodic review by FTA or its agent.
3	The PMOC shall, through a review of the Sponsor's approach to the work, understanding of the work, and ability to perform the work, form a professional opinion as to the adequacy of the (1) the Sponsor's abilities to identify, analyze, manage and mitigate project risks, and (2) the Sponsor's methods, policies, and procedures for developing and updating reasonable and realistic cost estimates and schedules.	<b>R3a.</b> The PMOC shall form a professional opinion of Sponsor's ability to manage project risk and clearly identify potential risks while rendering its professional opinion as to their possible impacts on the scope, cost, and schedule of the Project.		<b>Q3a.</b> Professional opinion of the potential project risks and possible impacts on Project scope, cost and schedule and the Sponsor's ability to manage such risks.	<b>M3a.</b> PMOC's review and opinions as to the potential risks, project impacts and the Sponsor's risk management abilities demonstrates sound management and engineering practices and professional experience.	<b>MM3a.</b> Periodic review by FTA or its agent.
		<b>R3b.</b> The PMOC shall review the Sponsor's approach to the work to determine if the Sponsor has suitable methods, policies, and procedures for developing and updating reasonable and realistic cost estimates and schedules.		<b>Q3a.</b> Professional opinion of the adequacy of the Sponsor's methods, policies and procedures for developing and updating reasonable and realistic cost estimates and schedules.	<b>M3a.</b> PMOC's review and opinions as to the adequacy of the Sponsor's methods, policies and procedures for developing and updating reasonable and realistic cost estimates and schedules demonstrate sound management and engineering practices and professional experience.	<b>MM3a.</b> Periodic review by FTA or its agent.
4	The PMOC shall provide FTA with a written report of the review activities it undertook, and its findings, analysis, recommendations and professional opinions.	<b>R4.</b> The PMOC shall present its findings, analysis, recommendations, and professional opinions to FTA in a written report and, when so directed by FTA, seek to reconcile its findings with Sponsor to the extent possible. A supplemental report shall be filed describing the results of reconciliation attempts.		<b>Q4.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with the Sponsor to the extent possible.	<b>M4.</b> Review of the PMOC's presentation of findings, analysis, recommendations and professional opinions by the FTA.	<b>MM4.</b> Periodic review by FTA or its agent.

## Appendix B

### Management Capacity and Capability Document Requirements for Milestone Reviews

Management Capacity and Capability Documents	Readiness Review for Engineering	Readiness Review for FFQA	In Bid / Award and / or Constr.
Description (two page max) of Sponsor's Approach to Project covering:			
Entry to Project Development			
Entry to Engineering	●		
Bidding of Major Contracts through Construction, Testing, Start-up, Revenue Operations		●	○
Organizational Charts			
Agency	○	○	○
Project Team (agency staff and consultants)	●	○	○
Staff Qualifications/Experience Chart	●	○	○
Description of roles, responsibilities, interfaces among key project team members through responsibility matrix	●	○	○
Staffing Plan - Labor Hour Distribution over Life of Project	●	○	○
Copies of Relevant RFPs / Contracts / Agreements	▲	●	○
Description of Management Processes and Procedures			
Agency Board decision-making authority	○	○	○
Agency Leadership and Executive Staff decision-making authority	○	○	○
Project Leadership and Executive Staff decision-making authority	▲	○	○
Legal services for contracts, Alternative Dispute Resolution (ADR)	○	○	○
Financial Management, Funding Approval processes and authorities	○	○	○
Procurement services	○	○	○
Community outreach and relations, interface with State and Local Agencies and Media; Public Hearings	○	○	○
Resumes of project team members			
Project Management			
Agency Leadership	○	○	○
Project Management Lead	○	○	○
Legal Services Lead	○	○	○
Financial Management and Funding Leads	○	○	○
Grants Management Lead	○	○	○
Procurement Lead	○	○	○
Agency Force Account Work Lead	●	○	○
Community Outreach Lead	○	○	○
Environmental Assessment and Mitigation Leads			
Environmental study and NEPA document	●		
Environmental Coordination with Design / Monitoring	●	○	
Environmental Mitigation Monitoring During Construction		●	○
Travel Forecasting Lead	○	○	
Operations Planning, Fleet Management Planning Leads	○	○	
Design Team Lead			
Civil	●	○	
Structural	●	○	
Guideway and Track Design	●	○	
Architectural	●	○	
Mechanical	●	○	
Electrical	●	○	

## Appendix B

### Management Capacity and Capability Document Requirements for Milestone Reviews

Management Capacity and Capability Documents	Readiness Review for Engineering	Readiness Review for FF&A	In Bid / Award and / or Constr.
Plumbing	●	○	
Communications	●	○	
Vehicle Design and Manufacture	●	○	
Special Equipment Design and Manufacture	●	○	
Investigation and Testing lead	●	○	
Coordination with Third Parties Lead	●	○	
Quality Assurance and Quality Control lead	○	○	
Project Controls			
Project controls lead	○	○	○
Cost Estimating and Cost Estimating Review Leads	○	○	○
Scheduling and Schedule Review Leads	○	○	○
Risk Assessment and Mitigation Lead		●	○
Construction, Permits, Testing, Start-up Leads			
Construction Administration		●	○
Construction Management		●	○
Acquisition of Permits		●	○
Testing of systems and vehicles		●	○
Start-up and transition into Revenue Operations		●	○
Real Estate Lead	○	○	○
Safety and Security Review Lead	○	○	

NOTE: ▲ – Preliminary information required; ● – Element to be completed; ○ – Element to be modified or augmented with additional information as necessary.

NOTE: ▲ – Preliminary information required; ● – Element to be completed; ○ – Element to be modified or augmented with additional information as necessary.

## Appendix C

### Sample Questionnaire

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#### **1. Organizational Experience- AGENCY Project History**

Agency to describe all projects in the last 5 years with a construction cost of \$100M or more - provide description, cost, schedule, project delivery methods, issues, personnel, etc.

#### **2. Questions for Key Individuals within AGENCY or on Project Team – note that the questions are tailored to the position within the organization.**

#### **VP / DIRECTOR OF CAPITAL PROJECTS**

1. What is your educational background? Do you have a copy of your resume?
2. Briefly describe your work experience prior to coming to AGENCY, especially on rail projects. On projects of comparable dollar volume. On projects in similar municipalities.
3. Describe AGENCY experience on large dollar projects in the last 5 years. Budget performance. Schedule performance.
4. How long have you worked with AGENCY and what positions have you held?
5. Briefly describe your role and responsibilities as VP/Director of Capital Projects as they relate to the AGENCY's Project.
6. Describe actions taken by you to complete other similar sized projects on budget and schedule. What actions would you take if you saw the project overrunning the project budget and schedule?
7. Describe your working relationship with other AGENCY Departments. What resources, if any are available for this project from the AGENCY's Capital Projects Group?
8. What level of personal involvement do you anticipate in the following project activities?
  - a) Project management
  - b) Financial management
  - c) Design and engineering
  - d) Environmental monitoring and reporting
  - e) ROW acquisition
  - f) Grants administration
  - g) Project Controls
  - h) QA/QC
  - i) Safety and security
  - j) Change order negotiation
  - k) Dispute resolution
  - l) Final acceptance
9. Who do you report to and how do you interface with your boss? Did you work with your boss prior to this project?
10. Who reports to you, what are their responsibilities and how do you interface with each? Did you work with them prior to this project?
11. Who has the authority to make personnel changes on this project?
12. What additional AGENCY staff will be required beyond that described in PMP dated \_\_\_\_\_ (or the current staffing plan)? When do you plan to bring on the additional staff?
13. Please describe your interface with:
  - a) Project Director (AGENCY)

## Appendix C

### Sample Questionnaire

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- b) Chief Operating Officer (AGENCY)
  - c) Manager of Project QA QC and Safety (AGENCY)
  - d) Dep. Director Project Development (AGENCY)
  - e) Dep. Director Design (AGENCY)
  - f) Dep. Director Construction (AGENCY)
  - g) Manager of Rail Communications (AGENCY)
  - h) Dep. Director Project Finance (AGENCY)
  - i) Contracting Officer (AGENCY)
  - j) Project Manager
  - k) Other parties as required
14. What do you see as the main challenges to completing the project on schedule and within budget?
15. What do you see as the greatest engineering challenge and how would you address it?
16. What do you see as the greatest construction challenge and how would you address it?
17. What is your role in addressing those challenges?
18. Describe AGENCY management approach to limit scope increase changes to the project. How will scope issues (scope creep) generated by Third Parties or Operating Entity review/technical support involvement be managed?
19. If you had to start over again, what would you do differently?

### **PROJECT DIRECTOR**

1. What is your educational background? Do you have a copy of your resume?
2. Briefly describe your work experience prior to coming to AGENCY, especially on rail projects. On projects of comparable dollar volume.
3. How long have you worked with AGENCY and what positions have you held?
4. Briefly describe your role and responsibilities as Project Director.
5. Describe your prior project experience that gave you the skills to perform the duties of project director on a project of this size.
6. Do you have a copy of PMP? Do you have any concerns about assigned responsibilities?
7. What are your personal responsibilities and what AGENCY resources are available to assist you to fulfill your assigned responsibilities in following areas?
8. What key support staff are assigned to assist in specific disciplines.
  - a) Environmental monitoring and reporting
  - b) IGA interpretation/compliance
  - c) Third Party coordination (treat these individually)
  - d) ROW acquisition
  - e) Grants administration
  - f) PMP updating
  - g) Project Controls (AGENCY staff)
  - h) Contract administration
  - i) Estimating
  - j) CO/Claims
  - k) Consultant oversight

## Appendix C

### Sample Questionnaire

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- l) DBE monitoring
  - m) Document control
  - n) Reporting
9. Who do you report to and how do you interface with your boss? Did you work with your boss prior to this project?
  10. Who reports to you, what are their responsibilities and how do you interface with each? Did you work with them prior to this project?
  11. Describe your working relationship with the AGENCY Operations? Engineering? Procurement?
  12. Do you envision AGENCY staff beyond that described in PMP (or current staffing plan)? Will this be adequate?
  13. Please describe your interface with: (go up a level and down two levels on org chart)
  14. What do you see as the main challenges to completing the project on schedule and within budget?
  15. What is your role in addressing those challenges?
  16. Describe role of Operating Agency or Other Third Party Agency in submittal review/approval process. How will scope issues (scope creep) generated by them, review/technical support involvement be managed?
  17. What do you see as the greatest engineering challenge and how would you address it?
  18. What is your role in addressing those challenges?
  19. What do you see as the greatest construction challenge and how would you address it?
  20. What is your role in addressing those challenges?
  21. Were you involved in the development of the Quality Assurance Program Plan? If so what was your responsibility?
  22. If you had to start over again, what would you do differently?

### **PROJECT QA/QC MANAGER**

1. What is your educational background? Do you have a copy of your resume?
2. Briefly describe your work experience prior to coming to AGENCY, especially on rail projects. What is your experience on projects of comparable dollar volume?
3. How long have you worked with AGENCY, and what positions have you held?
4. Briefly describe your role and responsibilities as Project QA/QC & Safety Manager.
5. What AGENCY resources are available to assist you to fulfill your assigned responsibilities in following areas?
  - a) Preparation of AGENCY Quality Program Plan (QPP)
  - b) Implementing and maintaining QPP
  - c) Preparation of AGENCY Safety and Security Management Plan (SSMP)
  - d) Implementing and maintaining SSMP
  - e) Review of DESIGNER OR CONSTRUCTION CONTRACTOR OR DESIGN BUILD CONTRACTOR System Safety/Security Certification Management Plan
  - f) DESIGNER OR CONSTRUCTION CONTRACTOR OR DESIGN BUILD CONTRACTOR Environmental, Safety and Health Plan
  - g) DESIGNER OR CONSTRUCTION CONTRACTOR OR DESIGN BUILD CONTRACTOR procedures related to system and construction safety



## Appendix C

### Sample Questionnaire

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- h) Audits/ reviews of AGENCY and consultants
- 6. Whom do you report to, and how do you interface with them? Did you work with this individual prior to this project?
- 7. Who reports to you, what are their responsibilities and how do you interface with each other? Did you work with them prior to this project?
- 8. When will Project QA/QC Supervisor and Project Safety Supervisor be hired?
- 9. Do you envision the need for additional AGENCY staff beyond that described in PMP? Or do you believe staffing is adequately addressed?
- 10. Please describe your interface with: VP/Director of Capital Projects, Project Director, all Deputy Directors
- 11. What do you see as the main challenges to completing the project on schedule and within budget?
- 12. What do you see as the greatest engineering challenge and how would you address it?
- 13. What do you see as the greatest construction challenge and how would you address it?
- 14. What was your responsibility in the development of the Quality Program Plan (QPP)?
- 15. Were you involved in the development of the PMP? Does it reflect the appropriate QPP commitments?
- 16. Are you satisfied with the consultants and AGENCY Quality Plans? What improvements would you like to see?
- 17. Have you prepared a safety certification checklist and schedule? How is it updated?
- 18. Audits
  - a) Who is audited?
  - b) Construction safety?
  - c) Frequency?
  - d) Who assists?
  - e) Follow up on findings?
  - f) Does AGENCY management support this process?
  - g) Are you satisfied with the audit process?
  - h) How can the process be improved?
- 19. What do you see as the main challenges to obtaining safety certification?
- 20. How do you interface with the Operating Agency on this issue?
- 21. What is your recruitment plan for the “QA Specialist” and “Project Safety Supervisor”?
- 22. Describe the process you envision to interface with the Contractor’s Safety and Security Manager.
- 23. Has AGENCY provided training to AGENCY and consultant staff on the Project’s QPP and AGENCY’s Project Management Procedures in accordance with the QPP? If so, is there documentation of training sessions (attendee sign-in sheets, training agenda and materials, etc.)?
- 24. Has the QPP been distributed to all personnel assigned to the Project (AGENCY, THE OPERATING AGENCY, CONSULTANTS, etc.)? Is there documentation of which Project staff members have received the QPP?
- 25. Have the Project Management Procedures established for this Project been distributed to all assigned project personnel (AGENCY, THE OPERATING AGENCY, CONSULTANTS, etc.)? Is there documentation of which Project staff members have received the procedures?

### **PROJECT SAFETY AND SECURITY MANAGER**

## Appendix C

### Sample Questionnaire

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1. What is your educational background? Do you have a copy of your resume?
2. Briefly describe your work experience prior to coming to AGENCY, especially on rail projects. What is your experience on projects of comparable dollar volume?
3. How long have you worked with AGENCY, and what positions have you held?
4. Briefly describe your role and responsibilities as Project Safety & Security Manager.
5. What AGENCY resources are available to assist you to fulfill your assigned responsibilities in following areas?
  - i) Preparation of AGENCY Safety and Security Program Plan (SSPP)
  - j) Implementing and maintaining SSPPP
  - k) Preparation of AGENCY Safety and Security Management Plan (SSMP)
  - l) Implementing and maintaining SSMP
  - m) Review of DESIGNER OR CONSTRUCTION CONTRACTOR OR DESIGN BUILD CONTRACTOR System Safety/Security Certification Management Plan
  - n) DESIGNER OR CONSTRUCTION CONTRACTOR OR DESIGN BUILD CONTRACTOR Environmental, Safety and Health Plan
  - o) DESIGNER OR CONSTRUCTION CONTRACTOR OR DESIGN BUILD CONTRACTOR procedures related to system and construction safety
  - p) Audits/ reviews of AGENCY and consultants
6. Whom do you report to, and how do you interface with them? Did you work with this individual prior to this project?
7. Who reports to you, what are their responsibilities and how do you interface with each other? Did you work with them prior to this project?
8. When will Project Safety & Security Supervisor be hired?
9. Do you envision the need for additional AGENCY staff beyond that described in PMP? Or do you believe staffing is adequately addressed?
10. Please describe your interface with: VP/Director of Capital Projects, Project Director, all Deputy Directors
11. What do you see as the main challenges to completing the project safely and securely?
12. What do you see as the greatest engineering challenge and how would you address it?
13. What do you see as the greatest construction challenge and how would you address it?
14. What was your responsibility in the development of the SSPP and SSMP?
15. Were you involved in the development of the PMP? Does it reflect the appropriate SSPP and SSMP commitments?
16. Are you satisfied with the consultants and AGENCY SSPP and SSMP? What improvements would you like to see?
17. Have you prepared a safety certification checklist and schedule? How is it updated?
18. Audits
  - i) Who is audited?
  - j) Construction safety?
  - k) Frequency?
  - l) Who assists?
  - m) Follow up on findings?
  - n) Does AGENCY management support this process?

## Appendix C

### Sample Questionnaire

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- o) Are you satisfied with the audit process?
  - p) How can the process be improved?
19. What do you see as the main challenges to obtaining safety certification?
  20. How do you interface with the Operating Agency on this issue?
  21. What is your recruitment plan for the “Project Safety Supervisor”?
  22. Describe the process you envision to interface with the Contractor’s Safety and Security Manager.
  23. Has AGENCY provided training to AGENCY and consultant staff on the Project’s SSPP and SSMP and AGENCY’s Project Management Procedures in accordance with the SSPP and SSMP? If so, is there documentation of training sessions (attendee sign-in sheets, training agenda and materials, etc.)?
  26. Have the SSPP and SSMP been distributed to all personnel assigned to the Project (AGENCY, THE OPERATING AGENCY, CONSULTANTS, etc.)? Is there documentation of which Project staff members have received the SSPP and SSMP?

### **DEPUTY DIRECTOR OF PROJECT FINANCE**

1. What is your educational background? Do you have a copy of your resume?
2. Briefly describe your work experience prior to coming to AGENCY, especially on rail projects. In addition, what is your experience on projects of comparable dollar volume?
3. How long have you worked with AGENCY, and what positions have you held?
4. Briefly describe your role and responsibilities as Deputy Director Project Finance. Are you assigned to the Project full time?
5. Do you have a copy of PMP? Do you have any concerns about assigned responsibilities?
6. What are your personal job responsibilities and what AGENCY resources are available to assist you to fulfill your assigned responsibilities in following areas?
  - a) Development of detailed financial plan
  - b) Development of financial documentation in support of New Starts submittal
  - c) Development of financial documentation in support of FFGA
  - d) Development of project funding agreements
  - e) Maintaining cash flow requirements based on contract need
  - f) Management of capital funding sources to ensure funding matches construction draw down schedule
  - g) Coordination with AGENCY Financial Management Division on finance and accounting support
  - h) Coordination with funding partners to identify funding and support debt issuances
7. Whom do you report to, and how do you interface with them (AGENCY VP of Finance)? Did you work with this individual prior to this project?
8. Explain indirect reporting relationship with the Project Director. Do you foresee any problems arising due to this relationship structure? If so, please explain.
9. Who reports to you, what are their responsibilities and how do you interface with each other? Did you work with them prior to this project?
10. Do you envision the need for additional AGENCY staff beyond that described in PMP, or is it adequate?

## Appendix C

### Sample Questionnaire

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11. Please describe your interface with: VP/Director of Capital Projects, Project Director, all Deputy Directors etc.
12. What do you see as the main challenges to completing the project on schedule and within budget?
13. Describe the process of obtaining funding for THE OPERATING AGENCY or local municipality imposed preferential (out of scope) changes.
14. Describe the process of obtaining funding required beyond the budget.
15. Describe how the financial reporting/aspects of the project can be improved.

### **MANAGER OF PUBLIC AFFAIRS & COMMUNICATIONS**

1. What is your educational background? Do you have a copy of your resume?
2. Briefly describe your work experience prior to coming to AGENCY, especially on rail projects, as well as, on projects of comparable dollar volume.
3. How long have you worked with AGENCY and what positions have you held?
4. Briefly describe your role and responsibilities as Manager of Rail Communications.
5. Do you have a copy of PMP dated \_\_\_\_? Do you have any concerns about assigned responsibilities?
6. What are your personal responsibilities and what AGENCY resources are available to assist you to fulfill your assigned responsibilities in following areas?
  - a) Press Releases
  - b) News Conferences
  - c) Ground breaking events
  - d) Town meetings
  - e) Management of Arts In Transit Program
  - f) Communications with public officials
  - g) Communication of traffic impacts (planned and unplanned)
  - h) Media relationships
  - i) Online communications
7. Whom do you report to, and how do you interface with them? Did you work with your boss prior to this project?
8. Who provides you with the approval and/or direction to share information with the public?
9. How do you ensure that a consistent message is sent to community/media from the Project team?
10. Who reports to you, what are their responsibilities and how do you interface with each other? Did you work with them prior to this project?
11. Do you envision the need for additional AGENCY staff beyond that described in PMP? Or is this adequate?
12. Please describe your interface with: VP/Director of Capital Projects, Project Director , all Dep. Directors
13. What do you see as the greatest community impact and how will you address it?
14. Do you have a copy of the Communications and Outreach Plan? Have you reviewed it?
  - a. Has this Plan been shared with the Project team (AGENCY, CONSULTANTS, etc.)? How often will this Plan be updated?
  - b. Who is the individual responsible for the oversight and execution of this Plan?

## Appendix C

### Sample Questionnaire

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15. How often is the Project's website updated? Who is responsible for ensuring the content on the website is accurate and up-to-date?
16. What is the protocol for responding to a media inquiry concerning the Project?
17. Are there strategies/protocols for emergency situations (i.e., construction accident requiring closure of a major roadway)? If so, where can they be found, and is the Project Team (AGENCY, CONSULTANTS, etc.) aware of these protocols?

### **DEPUTY DIRECTOR OF PROJECT DEVELOPMENT**

1. What is your educational background? Do you have a copy of your resume?
2. Briefly describe your work experience prior to coming to AGENCY, especially on rail projects. On projects of comparable dollar volume. On projects in same municipalities.
3. How long have you worked with AGENCY and what positions have you held?
4. Briefly describe your role and responsibilities as Deputy Director of Project Development. How much time do you expect to devote to this project?
5. Do you have a copy of PMP? Do you have any concerns about assigned responsibilities?
6. Describe your prior project experience that gave you the skills to perform the duties of Deputy Director Project Development on a project of this size.
7. At the current stage of the project, please describe the different responsibilities of Project Development and Project Design?
8. What are your personal responsibilities and what AGENCY resources are available to assist you to fulfill your assigned responsibilities in following areas?
  - a) Management of environmental mitigation compliance during design and construction. Explain reporting process.
  - b) Management of coordination with local, state and federal agencies. ROW acquisition. Identify key entities and contact personnel.
  - c) Management of "Before and After Study".
  - d) Development and execution of project agreements. Identify major agreements that you would be responsible for developing and executing.
  - e) Coordination with regional transportation plan. What are your responsibilities in this area?
  - f) Coordination with other active Federal, State and county projects.
  - g) Coordination of ROW acquisition.
  - h) Coordination of permit applications including environmental.
9. Who do you report to and how do you interface with your boss? Did you work with your boss prior to this project?
10. Who reports to you, what are their responsibilities and how do you interface with each? Did you work with them prior to this project?
11. Describe your working relationship with the AGENCY Engineering Dept/.
12. Do you envision AGENCY staff beyond that described in PMP? Is this adequate?
13. Please describe your interface with Project Director, all Dep. Directors, the Operating Agency, other third parties.
14. What do you see as the main challenges to completing the project on schedule and within budget?

## Appendix C

### Sample Questionnaire

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15. What is your role in addressing those challenges?
16. Describe role of THE OPERATING AGENCY in submittal review/approval process. How will scope issues (scope creep) generated by THE OPERATING AGENCY review/technical support involvement be managed?
17. What do you see as the greatest engineering challenge and how would you address it?
18. What do you see as the greatest construction challenge and how would you address it?
19. Were you involved in the development of the Quality Assurance Program Plan? If so what was your responsibility?
20. If you had to start over again, what would you do differently?

**For all of the following positions, ask similarly tailored questions:**

- **Deputy Director Design/Engineering**
- **Deputy Director of Construction**
- **Contracting Officer**
- **Manager of Real Estate**

## APPENDIX D

### Sample Summary of Staff Qualifications Experience

[illegible]

## APPENDIX E

### Sample Agency Staff Project Labor Distribution

**Table 1: Sample Agency Staff Project Labor Distribution {using full time equivalents (FTE) where 1 FTE = 160 hours/month}**

Position	Individual	2008	2008												2009	2009											
			Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec		Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Executive Director		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
Deputy Executive Director		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Administrative Specialist		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
Administrative Assistant/Reception		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Civil Systems Integration Manager		0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4	0.4	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4		
Chief of Staff		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		
Electrical Engineer		0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	1.0	1.0	1.0	1.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	1.0	1.0	1.0		
Senior Civil/Structural Engineer		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Administrative Assistant - Civil Engineering		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Director's Office FTE Total		2.0	1.3	1.3	1.3	1.3	1.3	1.8	2.2	2.7	2.7	2.7	2.7	2.7	2.0	1.3	1.3	1.3	1.3	1.3	1.8	2.2	2.7	2.7	2.7		
Program Manager		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		
Project Manager		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Project Development Coordinator		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		
Project Manager		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Project Manager		0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4	0.4	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.4	0.4		
Project Development Manager		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		
Project Development Coordinator		0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	1.0	1.0	1.0	1.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.5	1.0	1.0	1.0		
Administrative Assistant		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Project Manager		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Project Development FTE Total			3.2	2.1	1.2	0.2	6.6		3.2	2.1	1.2	0.2	6.6	3.2		3.2	2.1	1.2	0.2	6.6		3.2	2.1	1.2	0.2		
Civil Engineering Manager																											
Senior Civil Engineer																											
Senior Architect																											
Architect																											
Architect																											
Senior Civil Engineer																											
Senior Civil Engineer																											
Civil Engineer																											
Permits Administrator																											
Permit Assistant																											
Senior Civil Engineer																											
Civil Engineer																											
Right of Way Assistant																											
Administrative Assistant																											
CADD Operator																											
CADD Operator																											
Civil Engineering FTE Total																											
Systems Engineering Manager																											
Engineering Systems Inspector																											
Senior Systems Inspector																											
Senior Systems Engineer																											
Senior Systems Engineer																											
Senior Systems Engineer																											
Systems Engineer																											
Senior Systems Engineer																											
Systems Engineer																											
Senior Systems Engineer																											
Administrative Assistant																											
Systems Engineering FTE Total																											
Project Control Manager																											



### Sample Agency Staff Project Labor Distribution

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## APPENDIX E

### Sample Agency Staff Project Labor Distribution

**Table 2: Sample Systems Consultant Labor Distribution Plan (Using hours/month instead of FTEs) }**

Description	2007												2008											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Project Management and Control							54	77	61	80	61	64	74	58	76	100	80	80	173	144	137	180	137	180
Project Manager						40	50	96	61	80	61	64	74	58	61	80	64	64	192	160	152	200	152	200
Project Controls Mgr						40	8	10	8	10	8	8	9	7	8	10	8	8	19	16	15	20	15	20
Project Controls						8	80	96	76	100	76	80	92	72	76	100	80	80	192	160	152	200	152	200
Administrative Support						40	48	58	15	20	15	16	18	14	15	20	16	16	58	48	46	60	46	60
QA Manager							16	19	15	20	15	16	18	14	15	20	16	16	38	32	30	40	30	40
Diversity Management							16	19	15	20	16	16	18	14	15	20	16	16	19	16	15	20	15	20
Central Link Liaison							8	10	8	10	8	8	9	7	8	10	8	8	19	16	15	20	15	20
HMM Project Manager																								
Systems and Project Integration																								
Systems Integration Mgr							48	58	46	60	48	48	55	43	46	60	48	48	58	48	46	60	46	60
Design Integration Engineer							64	77	61	80	61	64	74	58	61	80	64	64	77	64	61	90	61	80
Light Rail Vehicle (LRV)																								
Light Rail Vehicle (LRV) Mgr						0	0	0	0	0	0	0	0	0	23	30	24	24	29	24	23	30	23	30
Various						0	0	0	0	0	0	0	0	0	15	20	16	16	19	16	15	20	15	20
Inspection						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	200	152	200
Inspection						0	0	0	0	0	0	0	0	0	0	0	0	0	77	64	61	80	61	80
Traction Electrification System																								
Traction Electrification System Mgr						40	80	96	76	100	76	80	92	72	76	100	80	80	134	112	106	140	106	140
Simulations						0	0	0	0	20	15	16	18	14	15	20	16	16	19	16	15	20	15	20
TPSS Engineer						0	16	19	15	20	15	16	18	14	30	40	32	32	96	80	76	100	76	100
TPSS Ground Mat Design						0	8	10	8	10	8	8	9	7	8	10	8	8	38	32	30	40	30	40
Ceng						0	16	19	15	20	15	16	18	14	15	20	16	16	19	16	15	20	15	20
OCS Design Engineer						0	16	19	15	20	15	16	18	14	15	20	16	16	154	128	122	160	122	160
OCS Design Engineer						0	0	0	0	0	0	0	0	0	0	0	0	0	58	48	46	60	46	60
OCS Support						0	8	10	8	10	8	8	9	7	8	10	8	8	19	16	15	20	15	20
Corrosion Mitigation						0	8	10	8	10	8	8	9	7	15	20	16	16	38	32	30	40	30	40
EMI Coordinator						0	32	38	30	40	30	32	37	29	30	40	32	32	58	48	46	60	46	60
Utilities Coordination						0	16	19	15	20	15	16	18	14	15	20	16	16	19	16	15	20	15	20
QC Manager						0	0	0	0	0	0	0	0	0	8	10	8	8	38	32	30	40	30	40
Quality Control						0	0	0	0	0	0	0	0	0	8	10	8	8	38	32	30	40	30	40
Systemwide Electrical																								
Systemwide Electrical Mgr						40	80	96	76	100	76	80	92	72	76	100	80	80	96	80	76	100	76	100
Systemwide Electrical						0	16	19	16	20	16	16	18	14	15	20	16	16	96	80	76	100	76	100
Quality Control						0	0	0	0	20	16	16	16	14	15	20	16	16	19	16	15	20	15	20
Signal System																								
Signal System Mgr						48	58	48	60	46	48	55	43	46	60	48	48	115	96	91	120	91	120	86
Design Support						16	19	15	20	15	16	18	14	15	20	16	16	77	64	61	80	61	80	58
Block Design						16	19	15	20	15	16	18	14	15	20	16	16	38	32	30	40	30	40	29
Civil Coordination						48	58	48	60	46	48	55	43	46	60	48	48	98	80	76	100	76	100	72
Quality Control						0	0	0	0	0	0	0	0	8	10	8	8	10	8	8	10	8	10	7
Communications System																								
Communications System Mgr						40	800	96	76	100	76	80	92	72	76	100	80	80	192	160	152	200	152	200
Design Support						0	0	0	0	0	0	0	0	0	0	0	0	0	77	64	61	80	61	80
Central Control Design							16	19	15	20	15	16	18	14	30	40	32	32	96	80	76	100	76	100
Radio							16	19	15	20	15	16	18	14	15	20	16	16	58	48	46	80	46	80
QC and Special Studies							16	19	15	20	15	16	18	14	15	20	16	16	96	80	76	100	76	100
CADD																								
CADD Mgr						40	80	96	76	100	76	80	92	72	76	100	80	80	192	160	152	200	152	200
Design Integration Engineer						0	16	19	15	20	15	16	18	14	15	20	16	16	58	48	46	50	46	60
CADD Support						0	0	0	0	20	15	16	18	14	15	20	16	16	58	48	46	50	46	60
Operations Planning																								
Planner						0	32	38	30	40	30	32	37	29	30	40	32	32	38	32	30	40	30	40

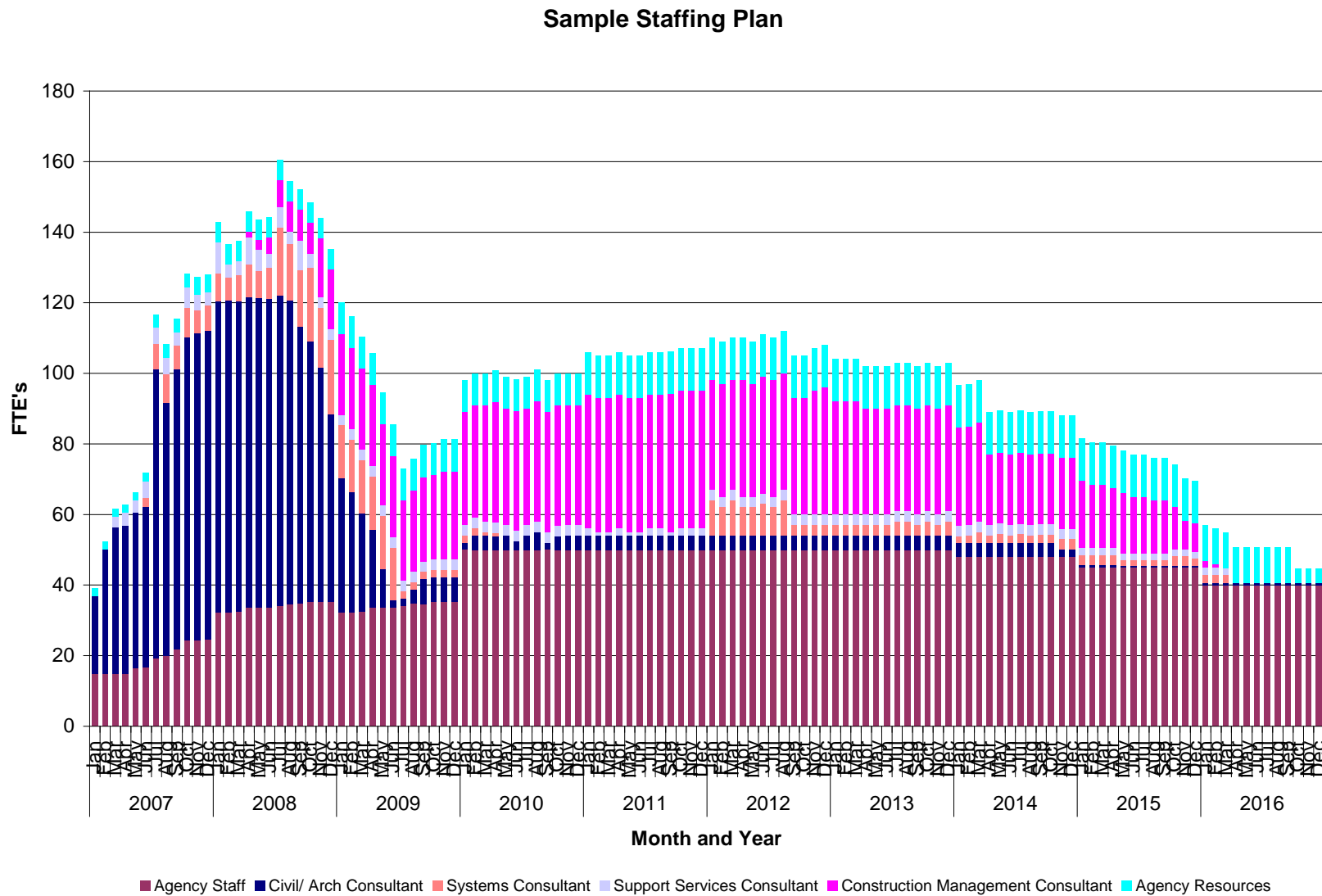
### Sample Agency Staff Project Labor Distribution

### Table 3: Sample Labor Distribution Summary Plan

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## APPENDIX E

### Sample Agency Staff Project Labor Distribution



**Figure 1: Sample Staffing Plan over project life**



## **Oversight Procedure 22 – Safety and Security Management Review**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure (OP) is to describe the review, analysis, and recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) with regards to the implementation of Federal requirements for safety and security management.

### **2.0 BACKGROUND**

Chapter II, Paragraph 2 of FTA's Circular 5800.1 identifies the minimum, specific activities required as part of the safety and security management program developed for capital projects. Depending on the size and nature of the project, the safety and security management activities may be:

- Included as a section or chapter of the Project Management Plan (typically for Small Starts, bus vehicle and facility replacement projects, smaller bus rapid transit projects, and smaller rail modernization and rehabilitation projects), or
- Documented in a separate Safety and Security Management Plan (SSMP) that is submitted as part of the Project Management Plan (PMP) and conforms to Chapter IV of FTA's Circular 5800.1 (typically for larger projects). The PMP shall contain a section that references and summarizes the separate SSMP.

The FTA Alternate Contracting Officer Representative, or ACOR, (previously referred to as "Task Order Managers") will determine whether a separate SSMP or a separate chapter in the PMP will suffice.

### **3.0 OBJECTIVE**

The objective of this procedure is to guide the PMOC's efforts in evaluating the development and implementation of the sponsor's safety and security management program over the course of a capital project.

### **4.0 REFERENCES**

The following are the principal, but by no means, the only references to Federal legislation, regulation, and guidance that will help the PMOC perform the work requested under this OP:

#### **4.1 United States Code**

- FTA statutes, 49 U.S.C. Chapter 53 (as amended October 1, 2012)
- 49 U.S.C. 114(d), Transportation Security Administration

## 4.2 Regulations

- Project Management Oversight, 49 C.F.R. Part 633 – Projects requiring and assigned an oversight consultant by FTA – [Link to 49 C.F.R. Part 633](#)
- Major Capital Investment Projects, 49 C.F.R. Part 611 – [Link to 49 CFR Part 611](#)
- Rail Fixed Guideway Systems; State Safety Oversight, 49 CFR Part 659 - Rail transit projects only – [Link to 659](#)
- Federal Railroad Administration, Legislation & Regulations – [Link to FRA Regs](#)
- Bus Testing; 49 C.F.R. Part 665 – [Link to 49 C.F.R. Part 665](#)
- Sensitive Security Information; 49 C.F.R. Parts 15 and 1520 – [Link to 49 C.F.R. Parts 15 and 1520](#)
- Moving Ahead for Progress in the 21st Century Act (MAP-21)

## 4.3 Circulars

- FTA Circular 5800.1, Safety and Security Management Guidance for Major Capital Projects, August 1, 2007 – [Link to Circular 5800.1](#)

## 4.4 Applicable FTA Oversight Procedures

- OP-20 Project Management Plan Review
- OP-21 Management Capacity and Capability Review
- OP-24 Quality Assurance / Quality Control (QA/QC) Review
- OP-25 Recurring Oversight and Related Reports
- OP-51 Readiness to Enter Engineering
- OP-52 Readiness to Execute FFGA
- OP-53 Readiness to Procure Construction Work
- OP-54 Readiness for Revenue Operations
- OP-60 Small Starts Readiness Reviews

## 4.5 Guidance

- FTA's Safety and Security Management in Rail Transit Projects Guidebook, March 2009 (Available upon request from the FTA ACOR)
- Frequently asked Safety and Security Management Plan Questions – [Link for Questions](#)
- FTA's Handbook for Transit Safety and Security Certification, November 2002 – [Link for Handbook](#)
- FTA's Implementation Guidelines for 49 CFR Part 659, March 2006 – [Link for 659 Guidelines](#)
- FTA's Resource Toolkit for States Implementing 49 CFR Part 659, March 2006 – [Link for Toolkit](#)

- Manual for the Development of Bus Transit System Safety Program Plans – [Link for Bus Manual](#)
- Hazard Analysis Guidelines for Transit Projects, 2000 – [Link for Hazard Analysis Guidelines 2000](#)
- FRA, Collision Hazard Analysis Guide: Commuter and Intercity Passenger Rail Service, October 2007 – [Link for FRA, Collision Hazard Analysis Guide](#)
- Federal Emergency Management Agency, Lessons Learned Information Sharing Network, [Link to FEMA](#)
- FTA Project and Construction Management Guidelines, [Link to PCMG](#)
- FTA Quality Assurance / Quality Control Guidelines, 2012 update, [Link to QA/QC Guidelines](#)

A sample list of safety and security standards can be found in **Appendix J**.

## **5.0 PROJECT SPONSOR SUBMITTALS**

**Appendix B** of this OP, Critical Safety and Security Management Program Interfaces and Documentation, identifies typical interfaces between the safety and security management program and other project activities that FTA would expect to see referenced in documentation. **Appendix B** of this OP also includes a table of suggested documents for review by the PMOC during any Adherence Reviews that may be performed as directed by the FTA ACOR.

Rail Fixed Guideway Projects, not subject to regulation by the Federal Railroad Administration (FRA), shall be subject to State Safety Oversight Agency (SSOA) jurisdiction as specified in the Rail Transit Agency Safety Plan.

The reviews conducted by the PMOC or FTA personnel require submittals from project sponsors (sponsors) appropriate to the stage of project development and shall conform to requirements and recommendations applicable to the project and the sponsor's safety and security management program.

Depending on the project or the regulations required, sponsors may have different names for similar documents. The sponsor must identify the safety and security management program documents containing titles different of those generally accepted. The PMOC must be cognizant of these variations and work with the sponsor to clarify needed submittals.

## **6.0 SCOPE OF WORK**

The PMOC will review the adequacy and soundness of the sponsor's safety and security management program. As directed by the FTA ACOR, the PMOC or FTA personnel will perform the following activities:

- Initial Review: Conduct an initial review of the safety and security management program prior to entry to Engineering Phase.
- Follow-Up Reviews: Review the SSMP each time it changes substantially and provide formal comments. At a minimum, the SSMP is reviewed with every PMP update.
- Adherence Reviews: Conduct a safety and security management program Adherence Review during each major project phase and follow-up review to determine how well the sponsor is implementing its program. This on-site activity requires document reviews, interviews and field verifications regarding the implementation of the sponsor's safety and security management program.
- Coordination: Coordinate and support, as directed, the implementation of other oversight procedures, such as OP 24 "Quality Assurance / Quality Control Review", OP 25 "Recurring Oversight and Related Reports", and OP 54 "Readiness for Pre-Revenue and Revenue Operations" for safety and security management program issues. Whether the safety and security management program review is assigned to a PMOC familiar with the project or to a specialist PMOC, FTA expects that review activities will be coordinated between the PMOC or FTA personnel providing the on-going monitoring, the FTA Regional Office, including regional engineers, FTA ACOR, and the SSOA. Specifically, the PMOC or FTA personnel must coordinate the safety and security management program reviews with PMP reviews conducted following the relevant OPs. Since the safety and security management program is part of the PMP, FTA's evaluation of the PMP cannot be completed until the safety and security management program is reviewed.
- Updates: Provide updates on the development and implementation of the safety and security management program in monthly reports or as directed.

Appendices referred to or helpful in complying with this section include:

- Appendix B: Project Phase and Documentation Requirements
- Appendix C: Sample Document Flow Chart
- Appendix D: Safety and Security Management Initial Review Checklist
- Appendix E: Safety and Security Management Areas for Consideration in the PMP Section
- Appendix F: Safety and Security Management Organization Structure
- Appendix G: Matrix of Responsibilities
- Appendix H: Safety and Security Management Adherence Review Report
- Appendix I: Safety and Security Management Adherence Review Worksheets
- Appendix J: Sample Safety and Security Design Criteria and Standards
- Appendix K: Acronyms



The PMOC's review provides major input to FTA in determining the sponsor's ability to perform safety and security management on the project. This input is used to help the FTA make decisions for future for project advancement.

## **6.1 Initial Review**

As set forth in 49 U.S.C. § 5327(a) and in 49 CFR Part 633, within 60 days of receiving the PMP, FTA will approve or disapprove the plan, or will notify the applicant that FTA is not yet able to complete its review. As a critical component of the PMP approval process, the PMOC must conduct an initial review of the safety and security management program submittal.

The PMOC must use the checklist in **Appendix D** of this OP to complete its review. For each section in the checklist, the PMOC should assess if the SSMP meets the requirements. The checklist also requires the PMOC to identify and review any documents referenced in the SSMP describing the approach to performing specific safety and security management activities.

A SSMP must follow the sections and sub-sections in Chapter IV of Circular 5800.1 and shall not include material that is not specified (such as project description, agency history, etc.). The PMOC must follow the process outlined in Chapter III of Circular 5800.1 for identifying and documenting activities that are "not applicable" to the SSMP. All "not applicable" items must be marked as such in the SSMP and in the checklist in **Appendix D**.

If the safety and security management program is addressed directly in the PMP, the PMOC should modify the checklist in **Appendix D** so that it only covers applicable items. Depending on the size and type of capital project, the PMOC may choose to develop its own checklist rather than alter **Appendix D**. **Appendix E** of this OP contains the minimum Safety and Security Management Areas for consideration in the PMP Section.

If the PMOC determines that additional information is needed while completing the initial review checklist, the PMOC must notify the sponsor that additional information is required and then specify a time-frame for its submission.

During the initial review, the PMOC shall consult the SSOA in its assessment of the sponsor's safety and security management program implementation.

### **6.1.1 Review of Safety and Security Organization**

Beginning with its initial PMP, the sponsor must establish a specific organization to manage safety and security for the project. The sponsor must identify, by name, title, and department or affiliation, all staff and contractors assigned to this organization. In addition, the sponsor must identify supporting committees.

The sponsor must also identify who among the project team leadership has ultimate decision-making responsibilities for safety and security issues and their interface with the organization and committees.

**Appendix F** of this OP presents typical safety and security functions and committee structures.

### 6.1.2 Review of Activities to be Completed by Project Phase

**Appendix B** identifies the activities that may be performed by project phase for safety and security management. The PMOC should review this listing against the sponsor's initial safety and security management submission. The PMOC should ensure that the sponsor's initial submission adequately plans future safety and security management activities.

## 6.2 Follow-up Reviews

Periodically, the sponsor will update its SSMP and re-submit it to FTA for review and approval. The PMOC must review the sponsor's updated SSMPs, and then update the assessments made in the checklist provided in **Appendix D** of this OP.

As specified in Paragraph 3 in Chapter II of FTA's Circular 5800.1, the PMOC should focus on the following throughout the lifecycle of the project:

- The sponsor's assignment of responsibility for safety and security, including the process for maintaining responsibility over safety and security tasks it delegates to outside consultants and/or contractors.
- The effectiveness of the sponsor's process to identify and communicate safety hazards and security vulnerabilities during each project phase.
- The sponsor's capacity to support and maintain the levels of duties and responsibilities it identified for safety and security activities in the SSMP.
- The sponsor's safety and security budget and schedule, including the determination regarding the resources it requires for the safety and security activities in the SSMP
- The extent to which the sponsor incorporates safety and security requirements into the project's technical specifications and contract documents.
- The extent to which the sponsor incorporates the safety and security management program activities and requirements into the technical direction provided to contractors and sponsor personnel.
- The effectiveness of the sponsor's approach in managing the safety and security activities of contractors.
- The extent to which the sponsor takes documented action to address safety and security concerns in a timely and appropriate manner.
- The effectiveness of the sponsor's approach for verifying that contractors, staff, and committees built, installed, inspected, and tested all facilities, systems, and equipment in accordance with the adopted safety and security requirements, as reflected in the project's technical specifications, drawings, and contracts.
- The effectiveness of the sponsor's QA/QC program and personnel in oversight and audit of safety and security requirements across the project phases, as described in the FTA approved quality management plan(s).

- The readiness of operations and maintenance personnel for revenue service.
- The effectiveness of the sponsor's process for providing safety and security certification, issuing the Final Verification Report, and managing any identified restrictions or work-arounds to full safety and security certification.
- The effectiveness of the sponsor's process for ensuring compliance with requirements specified by State oversight agencies, FRA, and DHS agencies, including TSA and OGT.

The PMOCs should use **Appendix B** of this OP as a general guide to evaluate the sponsor's progress and to identify when additional verification activities may be needed. Issues, needs and concerns identified by the PMOC should be communicated to the FTA ACOR in a timely and clear manner.

### 6.3 Adherence Review

The PMOC must conduct an Adherence Reviews to assess the implementation of the safety and security management program. The goal of the adherence reviews is to determine if the sponsor is following its safety and security management program and FTA's required activities identified in Chapter II of Circular 5800.1. The degree of adherence is determined by evaluating the level of compliance with the safety and security management program requirements.

The Adherence Reviews should be performed a minimum of once for each phase and potentially several times per phase depending on the project and the agency, as determined by the FTA ACOR.

This review can be divided into five activities:

1. Planning the review – based on activities, documentation, committees, and responsibilities identified in the SSMP or PMP, prepare a list of documents and materials to review, individuals to interview, and sites to visit; materials not in possession of the PMOC should be requested and a delivery schedule and a schedule for the interviews and site visits should be developed.
2. Reviewing plans, policies, and procedures – to determine whether they are consistent with the SSMP or PMP section and with the FTA's intent for management of safety and security programs.
3. Reviewing documentation, including memoranda, reports, records, and minutes of safety and security-related committees – to verify that the program has been implemented and plans and procedures are being followed.
4. Interviewing sponsor and consultant staff (senior and middle managers and consultant personnel identified in the SSMP, PMP or others with safety and security responsibilities in the agency and throughout the project) – to verify that personnel charged with carrying out the safety and security programs are aware of their responsibilities and are capable of meeting them. SSOA participation and interviews are also encouraged.

5. Inspecting selected sites – to view evidence that safety and security programs are being implemented throughout the project area.

**Appendix H** of this OP contains a sample report outline for the Adherence Review and **Appendix I** contains worksheets for the PMOC to document the on-site review activities.

### **6.3.1 Planning the Review**

The sponsor will be asked to supply a considerable amount of material and to schedule interviews and site visits over a relatively short time span. Based on the volume of documents and the number of people to be interviewed, the PMOC may perform the review using a small team of safety and security experts.

To orient themselves to the sponsor's safety and security management program for the capital project, the PMOC team may choose to attend the sponsor's recurring meeting where safety and security management issues are discussed, such as a safety and security certification working group or a fire/life safety committee meeting. The PMOC also may consider an alignment tour led by the senior project staff members, including safety and security personnel.

Such a tour may assist the PMOC in finalizing the list of documents to be submitted by the sponsor to support the review and also in identifying the staff members to be interviewed. The PMOC should coordinate with the sponsor on the documents the PMOC would like to review and the interviews they would like to conduct. It is a good practice to document this step with an informal progress report to the FTA ACOR.

A number of documents to be reviewed may be labeled Sensitive Security Information (SSI) in conformance with 49 CFR Part 15 and 1520. Since the PMOC's Task Order will not authorize access to SSI materials, the PMOC must obtain clearance from the FTA ACOR.

For more information on handling SSI, refer to the document, "Sensitive Security Information (SSI): Designation, Markings and Control, Resource Document for Transit Agencies" at: [Link to 49 C.F.R. Parts 15 and 1520](#)

### **6.3.2 Review of Plans, Policies, Procedures and Project Documents**

Upon receipt, the PMOC should review all plans, policies, and procedures of the safety and security programs referenced in the SSMP or PMP. The PMOC must determine whether the SSMP or PMP and its supporting documents describe consistent, comprehensive, and effective safety and security programs. Supporting documents should be identified and should be consistent with sound safety and security practice and principles. The checklist in **Appendix D** of this OP also can be used to support this activity.

The PMOC should assess whether the safety and security programs described in the plans, policies, and procedures are being implemented. The review may include reports of committees with safety or security oversight responsibilities, especially to determine membership, meeting schedules, document

control policies, and mechanisms for tracking open issues and bringing unresolved issues to the sponsor's senior managers (See **Appendix B** of this OP for typical documents).

The PMOC should pay particular attention to changes in scope that may reduce the safety and security controls designed into the project. Change documents such as Value Engineering lists, risk assessment mitigation action lists, and construction contract modifications should be carefully reviewed for their safety and security implications.

PMOC should review to assess the QA personnel role in oversight and audit of safety and security requirements across the project phases.

### **6.3.3 Interviews**

Interviews are crucial for determining that those assigned responsibilities in the SSMP or PMP are aware of and understand their roles. The interviews aid both the sponsor and the PMOC. The sponsor's senior staff gains a better understanding of the importance of safety and security planning and management and the PMOC comes away assured that the SSMP or PMP reflects the roles of those overseeing the project.

The PMOC must identify individuals and work with the sponsor to prepare an interview schedule. The SSMP will identify those with safety or security responsibilities (by title and responsibilities). The sponsor's project organization charts may also identify additional interview candidates. **Appendix G** of this OP provides a matrix of responsibilities for a large New Starts project that would require an SSMP. Smaller projects will have fewer participants and safety and security management activities. The PMOC should include consultant or contractor personnel who are assigned full-time (seconded) to the project.

The interview process may take several days, depending on the number and availability of interviewees. It should begin with a meeting (an hour or less) with those who will be interviewed, the sponsor's executive staff, SSOA staff and a representative of the FTA Regional office. This establishes the authority for the interviews, provides for introductions, and allows the PMOC to explain the purpose and importance of the review.

Interviews should be conducted in a 30 to 60 minute time frame. They should be scheduled at 75-minute intervals to allow time for the PMOC to gather information and allow interviewees to ask questions. Questions should be prepared that are specific to each individual's role.

The questionnaires should be used for recording answers and making notes. Interviews should not be tape-recorded because interviewees may be uncomfortable speaking openly on tape. If the PMOC does intend to record the interviews, each interviewee should be asked if they are comfortable with being recorded. If the interviewee is not comfortable, they should not be recorded.

### **6.3.4 Field Inspections**

Site inspections should include the proposed right-of-way, locations of proposed terminals, existing terminals, and major stations that will be part of the new system, parking lots, and rail or bus vehicle storage, repair, and maintenance facilities.

A senior project staff member or project safety officer should lead the visits. Unless scheduling is difficult, all PMOC team members should participate in the field tour. In addition to initial inspections, periodic inspections should be performed, especially during construction, to verify that safety and security procedures are being followed. Construction phase observations should include verification that contractors are wearing required personal protection equipment (PPE), that site security is in place, that precautions have been taken to protect the surrounding public and properties, and that similar construction-specific safety and security concerns are being addressed.

During the construction, testing and pre-revenue phases, many contractual and integrated tests are being conducted for the purpose of validating proper operation of equipment being furnished and constructed for the project, such as: sprinkler systems, alarms, emergency management panels, fire management panels, ticket vending machines, and CCTV systems. As possible, the PMOC should participate in system integration and pre-revenue testing activities.

The SSMP should identify the sponsor's process and plans for verifying that integrated tests, acceptance tests, and other inspections will be conducted to ensure that safety and security requirements have been effectively addressed. Integrated test plans and procedures should be reviewed by the PMOC as part of the inspection.

During inspections, the PMOC should examine project elements that were identified in Preliminary Hazard Analyses (PHAs) or Threat and Vulnerability Analyses (TVAs) and should determine whether appropriate mitigations are in place or planned. The PMOC should also be prepared to identify other potential hazards and vulnerabilities.

Observations should be recorded, and, if appropriate, photographs taken. **Appendix I, SSMP Adherence Review Worksheet**, provides space to identify the elements to be reviewed in the field and a place to record the PMOC's determinations.

The PMOC should also plan to attend and observe safety and security related committee meetings as described in the procedures to assess sponsor's implementation and compliance of the project's safety and security management requirements.

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

At the end of the Adherence Review an exit conference should be scheduled with the agency's representatives. The draft findings from the Adherence Review will be presented by the PMOC at the exit conference for discussion and clarification by the agency. After the exit conference, the PMOC shall provide FTA with a draft written report of its findings, analysis, recommendations, professional opinions, and a description of the review activities undertaken. After FTA acceptance of the draft report, the PMOC and FTA may share the draft report with the sponsor and the SSOA.

The report formatting requirements of OP 01 apply. When necessary, the PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as

Excel and Word and use FTA-templates when provided. The PMOC may add other software, as required, but documentation and report data shall be made available to FTA.

## **7.1 Final Report**

The PMOC should prepare a Final Report reflecting the resolution of all open issues and correction of all deficiencies. FTA at its discretion will transmit the Final Report to the sponsor and the SSOA.

In the event the sponsor does not resolve the concerns identified in the Final Report within the time-frame specified, FTA's ACOR may request PMOC support in drafting and managing correspondence and communication with the sponsor related to outstanding findings documented in the Final Report.

The PMOC should always keep the FTA ACOR and the SSOA informed regarding any non-compliance items or concerns that may require FTA grant withholding action.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	PERFORMANCE MEASURE	ACCEPTABLE QUALITY LEVEL	MONITORING METHOD
1	The PMOC shall validate the thoroughness of the sponsor's Safety and Security Management Plan (SSMP) as a major component of the PMP.	<b>R1a.</b> The PMOC shall develop and document a process for review, analysis and recommendations for submission, revision and resolution of deficiencies in the SSMP.		<b>M1a.</b> Review of the process documentation.	<b>Q1a.</b> PMOC provides documentation of the process.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process and project management judgment to validate the thoroughness of the sponsor's SSMP as a major component of the PMP.		<b>M1b.</b> Documented review and analysis of the sponsor's SSMP as a major component of the PMP.	<b>Q1b.</b> Review must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>MM1b.</b> Periodic review by FTA or its agent and the PMOC's internal verification.
2	The PMOC shall assure FTA's access to a well-prepared SSMP that demonstrates the sponsor's ability to manage Project safety and security and to continue to receive Federal funds for further Project development.	<b>R2a.</b> The PMOC shall review the sponsor's SSMP submittal(s) and supporting documentation and provide FTA with its opinion as to the soundness of the sponsor's SSMP and the sponsor's management of safety and security issues compared with proven professional management practices for projects of similar scale.		<b>M2a.</b> PMOC's review and opinion as to the soundness of the SSMP and sponsor's safety and security management processes demonstrates the application of sound management and engineering practices and professional experience.	<b>Q2a.</b> Professional opinion of the soundness of the sponsor's SSMP and safety and security management processes.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall analyze the sponsor's SSMP submittals and supporting documentation and provide FTA with its opinion of the adequacy of the sponsor's implementation of the SSMP for the specific phase of the Project addressed in the PMP.		<b>M2b.</b> PMOC's analysis and opinion as to the sponsor's implementation of the SSMP is based on sound management and engineering practices and professional experience.	<b>Q2b.</b> Professional opinion of the adequacy of the sponsor's implementation of the SSMP.	<b>MM2b.</b> Periodic review by FTA or its agent.
		<b>R2c.</b> The PMOC shall provide FTA, and sponsor when so directed by FTA, with its recommendations, based on review and analysis of the SSMP, to bring the SSMP to a level necessary for effective and efficient management of safety and security issues on the Project.		<b>M2c.</b> PMOC's review, analysis, recommendations and opinion as to the sponsor's SSMP and its ability to successfully manage safety and security issues on the Project demonstrates sound management and engineering practices and professional experience.	<b>Q2c.</b> Professional opinion of the sponsor's ability to successfully manage safety and security issues and recommendations to bring the SSMP to a level necessary for effective and efficient management of safety and security issues on the Project	<b>MM2c.</b> Periodic review by FTA or its agent.
3	The PMOC shall provide FTA with a written report of its findings, analysis, recommendations and professional opinions.	<b>R3.</b> The PMOC shall present its findings, analysis, recommendations and professional opinions to FTA in a written report and, when so directed by FTA, seek to reconcile its findings with the sponsor to the extent possible. A supplemental report shall be filed describing the results of reconciliation attempts.		<b>M3.</b> Review of the PMOC's presentation of findings, analysis, recommendations and professional opinions by the FTA.	<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with the sponsor to the extent possible.	<b>MM3.</b> Periodic review by FTA or its agent.



## APPENDIX A

### Acceptable Quality Level

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	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	PERFORMANCE MEASURE	ACCEPTABLE QUALITY LEVEL	MONITORING METHOD
4	The PMOC shall provide FTA with written reports and assessments regarding the quality of the sponsor's implementation of its safety and security management program.	<b>R4.</b> The PMOC shall present its findings, analysis, recommendations and professional opinions regarding the sponsor's implementation of its safety and security program to FTA in a written report and, when so directed by FTA, seek to reconcile its findings with the sponsor to the extent possible. A supplemental report shall be filed describing the results of reconciliation attempts.		<b>M4.</b> Review of the PMOC's presentation of findings, analysis, recommendations and professional opinions by the FTA.	<b>Q4.</b> . Reports and presentations are accurate and assess the sponsor's level of implementation of its safety and security management program. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with the sponsor to the extent possible.	<b>MM4.</b> Periodic review by FTA or its agent.

## APPENDIX B

### Project Phase and Documentation Requirements

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#### Project Phase and Documentation Requirements

In most instances, a well-prepared SSMP or PMP section will utilize, by reference, other documents, including some that apply across the sponsor's organization, and some that are intended just for the project. For instance, some sponsors with FTA-funded capital projects are established agencies with existing safety and security programs and plans. In Circular 5800.1, FTA encourages sponsors to reference their existing programs and plans in the SSMPs they develop for their projects. Further, FTA understands that, as sponsors with new fixed guideway systems and extensions move through the project phases, they will develop additional programs, plans, and documentation. FTA also encourages these sponsors to reference to-be-developed and newly developed documents and procedures in their SSMPs.

For each project phase, critical interfaces for the safety and security management program that are referenced in documentation typically include the following project elements:

- **Organization Charts and Budgets** – to assess the authority, personnel, contractor resources and other resources devoted to the safety and security management program.
- **Project Solicitations** (Request for Proposal [RFP], Invitation for Bid [IFB], other procurement vehicle) – to identify activities to be performed by the project contractors to ensure that safety and security are designed into the system and delivered in the project received by the sponsor.
- **Project Evaluation and Award Process** – to assess the quality of contractors' responses to the safety and security activities identified in the Solicitation and to request additional activities (if necessary) during negotiation of final contract.
- **Project Contracts** – to provide legal and administrative documentation of the safety and security activities to be performed by the contractor.
- **Quality Assurance/Quality Control (QA/QC) Program** – to ensure that activities performed for the project's quality management system incorporate safety and security requirements and that the results, in each project phase, are accessible to the designated safety and security functions. The PMOC shall review and assess the adequacy of the sponsor's QA/QC procedures for handling safety critical nonconforming work. The PMOC shall verify that such QA/QC procedures define responsibilities and safety critical conditions that would cause work to stop and documentation procedures to record nonconforming work. Further, the PMOC shall review and assess the adequacy of the sponsor's procedures for taking corrective action.
- **Engineering and Inspection Services** – to perform safety and security analysis, to perform or witness specific tests, and to provide technical expertise in specific project areas (software safety, electrification, etc.).

## APPENDIX B

### Project Phase and Documentation Requirements

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- **Design Criteria Manuals** – to ensure that safety and security requirements are clearly identified in the manuals and other references used to develop the preliminary and final designs and to prepare specifications.
- **Project Milestone Schedule** – including Design Reviews – to ensure that requirements to address safety and security are tied to project advancement and contractor payment.
- **Project Testing Program Plan** – to ensure performance of all tests necessary to verify that the delivered project complies with approved project specifications and that appropriate supporting verification documentation is filed with the safety and security certification program.
- **Operational Readiness Reviews** – to ensure that safety and security are addressed in operating and maintenance manuals and rules, standard and emergency operating procedures, training, and work-arounds and other activities developed to address change orders and deviations from the approved design during construction.
- **Auditing Services** – to ensure that contractors and others are following criteria, safety and security testing and acceptance standards, and safety and security management practices.

The Table below contains a list of documents for consideration in the Adherence Review. The Table shows the project phases when each document is likely to apply, and whether or not the document is likely to be SSI.

This list can help the PMOC prepare the document request to the sponsor. This list may be tailored for a particular project, as recommendation by the PMOC to FTA. Once the PMOC has customized the list to suit the specific uses of the sponsor and project, it should be included in a Progress Report submitted to the FTA ACOR.

## APPENDIX B

### Project Phase and Documentation Requirements

Safety and Security Management Program List of Activities		Requesting Entry to Engineering	In Engineering and/or Requesting FFGA	In Bid / Award and / or Construction	In Testing and / or Pre-Revenue Operations
Management Commitment and Philosophy					
	Safety and Security Policy Statement	●	○	○	○
	Purpose of SSMP The SSMP is an element of the PMP, but is a stand-alone document that must comply with the requirements of the FTA Circular.	●	○	○	○
	Applicability and Scope	▲	●	○	○
	SSMP Goal	●	○	○	○
Safety and Security Integration into Project Development					
	Safety and Security Activities	●	○		
	Safety and Security Procedures and Resources	▲	●	○	○
	System Safety Program Plan (SSPP) This will likely not exist until late construction or testing and pre-revenue operation phase if it is the sponsor's initial project.	▲	●	○	○
	Project Safety and Security Plan (PSSP) Document is project-specific; it is distinct from the sponsor's SSPP, and will pertain to safety/security plans and policies for all project phases. It usually contains requirements of what must be included in contractor-submitted safety and security plans. It may be called by other names, such as Capital Improvement Program Management Plan or Project Safety Program.	▲	●	○	○
	Agency / sponsor Management Interfaces	▲	●	○	○
	Organization Chart	▲	●		
	Identification of Safety and Security Decision Makers	▲	●		
	Defined Interfaces for sponsor staff and construction contractors	▲	●		
Safety and Security Responsibility Assignments					
	Responsibility and Authority	▲	●		
	Committee Structures	●	○		
	Safety and Security Review Committee	●	○		○
	Fire/Life Safety and Security Committee	●	○		○
	Safety and Security Change Review Board	●	○		
	Safety and Security Operations Review Committee	●	○		
	Safety and Security Responsibilities Matrix	●	○		
	Designated Function for Safety	●	○		
	Designated Function for Security	●	○		
	Construction Safety	●	○		

## APPENDIX B

### Project Phase and Documentation Requirements

	Project Manager (Executive)	●	○		
	Operations Manager	●	○		
Safety and Security Analysis					
	Approach to Safety and Security Analysis	▲	●	○	○
	Hazard and Vulnerability Identification Program	▲	●	○	○
	Requirements for Safety and Security Analysis	▲	●	○	○
	Preliminary Hazard Analysis (PHA) Determine comprehensiveness and roles in analyses and procedures for implementing recommendations; should be compared with GAEC requirements. Document is normally finalized prior to entering engineering.	▲	●	○	○
	Threat and Vulnerability Analysis (TVA) Determine comprehensiveness and roles in analyses and procedures for implementing recommendations; should be compared with GAEC requirements. Document is normally finalized prior to entering engineering.	▲	●	○	○
	Subsystem Hazard Analysis	▲	●	○	○
	System Hazard Analysis	▲	●	○	○
	Failure Modes and Effects Analysis	▲	●	○	○
	Failure Modes, Effects and Criticality Analysis	▲	●	○	○
	Fault Tree Analysis	▲	●	○	○
	Operations Support Hazard Analysis	▲	●	○	○
	General Architect/Engineering Contractor (GAEC) contractual requirements for identifying/resolving hazards/threats and vulnerabilities Materials determine responsibilities of GAEC, including general reporting requirements to sponsor's safety/security personnel, and division of performance authority between sponsor and GAEC for PHAs, TVAs, operating and maintenance procedures, training plans, System Integration Test Plans, and the like.	▲	●	○	○
	Health Hazard Assessment	▲	●	○	
Safety and Security Design Criteria					

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### Project Phase and Documentation Requirements

	Design Criteria Manual (DCM) and Approach sponsor document applied to all projects. If sponsor has no DCM, documents that include safety and security design recommendations and requirements, particularly egress, train/bus and traffic control, lighting, cameras, emergency phones, and other elements of Crime Prevention Through Environmental Design (CPTED) and Situational Crime Prevention must be reviewed. The process for updating the DCM based on PHA, TVA, and other analyses must also be reviewed. Document is normally finalized prior to entering engineering.	●	○		
	Safety and Security Design Reviews	●	○		
	Safety and Security Design Change and Configuration Control Procedures Document should be examined to determine how design or configuration changes that may impact safety/security will be reviewed and approved by sponsor and to ensure that safety and security management personnel are involved and have appropriate sign-off authority.	●	○	○	
	Qualifying Operations and Maintenance Personnel				
	Operations and Maintenance Plan (OMP) and Requirements New plan for a sponsor's initial project or revisions to an existing plan for a subsequent project; review for consistency with SSMP, timeliness of safety and security training requirements, and adequacy of personnel to provide required levels of safety and security after the start of revenue operations	▲	●	○	
	Standard Operating Procedures (SOPs) and Emergency Operating Procedures (EOPs) Some sponsors have separate EOPs and some include them in the SOPs. PMOC should review to assure conformance with SSMP to determine responsibilities for emergencies, particularly in agencies where there is no fully commissioned police force. Usually, completeness of SOPs and EOPs will increase as project moves through its phases.	▲	●	○	
	Training Program, Plans and Manuals	▲	●	○	
	Security and Emergency Preparedness Plan (SEPP) / Emergency Management Plan (EMP) / System Security Plan (SSP) Many sponsors are combining the SSP and EMP into an SEPP. PMOC must be aware of the nomenclature within the sponsor's agency to assure that proper documents are reviewed.	▲	●	○	

## APPENDIX B

### Project Phase and Documentation Requirements

	Public Awareness / Public Education Program Program is relevant if safety or security issues are required in outreach efforts. (Examples: grade crossing, noise abatement, trespass issues)	▲	●	○	
Safety and Security Verification Process					
	Design Criteria Verification Process	▲	●	○	
	Construction Specification Conformance Process Normally includes the general safety and security responsibilities of the contractor, obligations to maintain a safe/secure site, requirement to submit a CSSP, and any specific safety and security requirements that the contractor must comply with during portions of the work.	▲	●	○	
	Testing/Inspection Verification	▲	●	○	
	Hazard and Vulnerability Resolution Verification	▲	●	○	
	Operational Readiness Verification [Pre-Revenue]	▲	●	○	
	Rail [or Bus] Fleet Management Plan New plan for a sponsor's initial rail/bus project or revisions to an existing plan for a subsequent project; review for consistency with SSMP and adequacy of facilities to safely maintain fleet.	▲	●	○	
	Quality Assurance Plan (QAP) PMOC should review to assess QA personnel role in oversight and audit of safety and security requirements across the project phases.	▲	●	○	
	Safety and Security Certification Requirements / Safety and Security Certification Plan (SSCP) Document is normally created prior to entering Project Development for design certification and updated for construction certification and after the start of construction for testing and start-up, training, PRO, and other safety and security certification requirements. As applicable, the SSOA has primary oversight responsibility of the SSCP and corresponding activities. Should be reviewed for consistency with SSMP, adequacy of certification procedures and documentation requirements, and comprehensiveness of Certifiable Items List (CIL).	▲	●	○	
	Safety and Security Certification Verification Report (SSCVR) The sponsor's document for final safety and security certification prior to the placement of the project in revenue service.			▲	●
Construction Safety and Security					
	Construction Safety and Security Program Elements / Contractor Safety and Security Plan (CSSP) Document produced by each contractor that details how the contractor will comply with the PSSP and/or other specific safety and security requirements identified in the bid documents	▲	●	○	
	Construction Phase Hazard and Vulnerability Analysis	▲	●	○	

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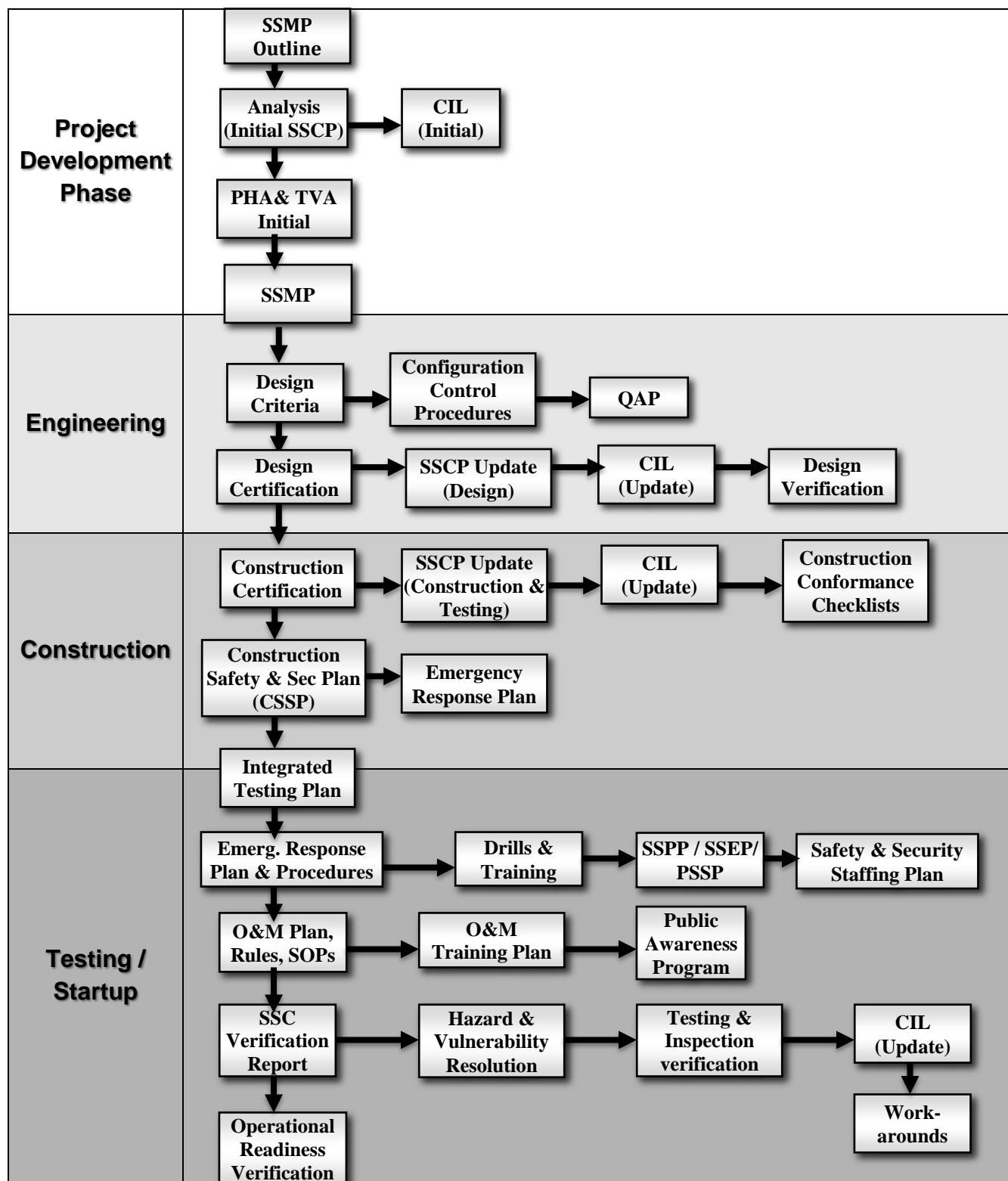
### Project Phase and Documentation Requirements

	Safety and Security Incentives	▲	●	○
State Safety Oversight Agency (SSOA) Coordination Process				
	SSOA Coordination Activities	▲	●	○
	Implementation Schedule	▲	●	○
	Coordination Process	▲	●	○
FRA Coordination Process (if necessary)				
	FRA Waives and Coordination Activities Required for some projects that involve sharing of FRA-regulated rights of way.	▲	●	○
	Implementation Schedule	▲	●	○
	Coordination Process	▲	●	○
DHS Coordination Process				
	DHS Coordination Activities	▲	●	○
	Implementation Schedule	▲	●	○
	Coordination Process	▲	●	○

NOTE: ▲ – Preliminary information required; ● – Element to be completed; ○ – Element to be modified or augmented with additional information as necessary.



**APPENDIX C**  
**Sample Document Flow Chart**



## APPENDIX D

### Safety and Security Management Initial Review Checklist

No.	Checklist Item	Plan Requirements	Document Reference	Comments
1.1	Safety and Security Policy Statement	<ul style="list-style-type: none"><li>• A <i>Safety and Security Policy Statement</i> is developed for the Safety and Security Management Plan (SSMP).</li><li>• The policy statement endorses the SSMP and confirms the project's commitment to safety and security throughout all project phases.</li><li>• The policy statement is signed by the sponsor's executive leadership.</li></ul>		
1.2	Purpose of SSMP	<ul style="list-style-type: none"><li>• The SSMP implements the <i>Safety and Security Policy Statement</i>.</li><li>• The SSMP identifies the sponsor's management structure and activities to be performed to integrate safety and security into all project phases.</li></ul>		
1.3	Applicability and Scope	<ul style="list-style-type: none"><li>• The SSMP applies to all project development activities from project development, engineering, construction, integrated testing, demonstration, and the initiation of operations.</li><li>• Depending on the nature of the project, this scope may encompass the following:<ul style="list-style-type: none"><li>○ System-wide Elements,</li><li>○ Fixed Facilities,</li><li>○ Safety, Security, System Assurance, Operational, and Maintenance Plans and Procedures, and</li><li>○ Personnel Qualifications, Training and Drills/Exercises.</li></ul></li><li>• As applicable, the SSMP also includes activities to ensure compliance with requirements specified by the State Safety Oversight Agency (49 CFR Part 659) and/or the Federal Railroad Administration (FRA), and/or the Department of Homeland Security, including the Transportation</li></ul>		

## APPENDIX D

### Safety and Security Management Initial Review Checklist

No.	Checklist Item	Plan Requirements	Document Reference	Comments
		Security Administration (TSA) and the Office of Program Management.		
1.4	SSMP Goal	<ul style="list-style-type: none"><li>Ensures that the final project initiated into revenue service is safe and secure for passengers, employees, public safety personnel, and the general public through a formal program of safety and security certification.</li><li>Describes how the sponsor's executive leadership has designated personnel and committees with the responsibility:<ul style="list-style-type: none"><li>to establish safety and security requirements for the project;</li><li>to ensure that the design, acquisition, construction, fabrication, installation, and testing of all critical elements of the project will be evaluated for conformance with the established safety and security requirements;</li><li>to verify operational readiness; and</li><li>to ensure that a mechanism is provided to follow to completion the resolution of any restrictions to full safety and security certification.</li></ul></li></ul>		
2.1	Safety and Security Activities	<ul style="list-style-type: none"><li>Identifies the specific safety and security tasks that must be performed for the project through all phases.</li><li>Includes both a text description of the activities and a matrix listing these activities and the project phases during which they will be performed.<ul style="list-style-type: none"><li>One matrix may be prepared that combines safety and security activities by project phase, or separate matrices may be developed.</li></ul></li></ul>		

## APPENDIX D

### Safety and Security Management Initial Review Checklist

No.	Checklist Item	Plan Requirements	Document Reference	Comments
2.2	Procedures and Resources	<ul style="list-style-type: none"><li>Identifies the procedures and resources that will support performance of safety and security activities throughout the project phases.</li><li>Includes procedures for the management of sensitive security information (SSI).</li></ul>		
2.3	Interface with Management	<ul style="list-style-type: none"><li>Identifies the process and lines of communication by which safety and security issues will be communicated to senior management and used by senior management in decision-making.</li><li>An organization chart showing the sponsor's project management team and key points of interface regarding safety and security issues must also be provided.</li><li>The organization chart shall identify the relationships from the safety and security staff and organizations to construction management, project management, and executive management.</li></ul>		
3.1	<i>Responsibility and Authority</i>	<ul style="list-style-type: none"><li>Identifies, by title and department, all staff, contractors, and committees assigned to manage the safety and security activities specified in Section 2 of the SSMP.<ul style="list-style-type: none"><li>Each individual staff member must be identified by title and affiliation.</li><li>Each committee must be identified by name and acronym, with membership provided by title and affiliation.</li><li>For each authority delegated to a contractor, the sponsor individual or committee responsible for oversight must be shown.</li></ul></li></ul>		

## APPENDIX D

### Safety and Security Management Initial Review Checklist

No.	Checklist Item	Plan Requirements	Document Reference	Comments
		<ul style="list-style-type: none"><li>○ An organization chart must be provided.</li></ul>		
3.2	<i>Committee Structure</i>	<ul style="list-style-type: none"><li>• Describes the organization and responsibilities of the different safety and security committees , including<ul style="list-style-type: none"><li>○ Safety and Security Review Committee;</li><li>○ Fire/Life Safety Committee;</li><li>○ Safety and Security Change Review Board;</li><li>○ Safety and Security Operations Review Committee;</li><li>○ Other comparable committees.</li></ul></li></ul>		
3.3	Safety and Security Responsibilities Matrix	<ul style="list-style-type: none"><li>• Presents the responsibility and reporting relationships for safety and security in the form of a matrix.<ul style="list-style-type: none"><li>○ Separate matrices may be used for safety and security authorities and responsibilities, or a single matrix may be used.</li><li>○ Individuals having authority for safety or security functions who are not part of the sponsor staff must report to a member of that staff who is responsible for that safety or security function.</li></ul></li></ul>		
4.1	Approach to Safety and Security Analysis	<ul style="list-style-type: none"><li>• Describes the sponsor's approach to the analysis of safety hazards and security vulnerabilities.</li><li>• Known hazards and vulnerabilities must be:<ul style="list-style-type: none"><li>○ Identified and categorized for their potential severity and probability of</li></ul></li></ul>		

## APPENDIX D

### Safety and Security Management Initial Review Checklist

No.	Checklist Item	Plan Requirements	Document Reference	Comments
		occurrence, <ul style="list-style-type: none"> <li>○ analyzed for potential impact, and</li> <li>○ resolved by design, engineered features, warning devices, procedures and training, or other methods.</li> </ul>		
4.2	Requirements for Safety and Security Analysis	<ul style="list-style-type: none"> <li>• Specifies the distinct types of safety and security analysis to be performed during the specific phases of the project.</li> <li>• Describes the mechanism for communicating analysis results throughout the project team.</li> <li>• Describes the process for assuring the resolution of identified hazards and vulnerabilities.</li> </ul>		
5.1	<i>Approach to Development of Safety and Security Design Criteria</i>	<ul style="list-style-type: none"> <li>• Describes the project's approach to creating suitable safety and security design criteria.</li> <li>• Identifies the resources, including standards prepared by such organizations as the American Public Transportation Association (APTA), the National Fire Protection Association (NFPA), Underwriters Laboratories (UL) and others that the sponsor will use to develop safety and security requirements.</li> <li>• Explains how the sponsor will identify safety and security certifiable elements and how identification of these elements will guide the development of safety and security design criteria.</li> <li>• Ensures that the final specifications and contract documents for the project will result</li> </ul>		

## APPENDIX D

### Safety and Security Management Initial Review Checklist

No.	Checklist Item	Plan Requirements	Document Reference	Comments
		in design that meets the sponsor's requirements for safety and security and addresses the certifiable elements.		
5.2	<i>Design Reviews</i>	<ul style="list-style-type: none"><li>Identifies how safety and security activities will be addressed during design reviews to ensure incorporation of safety and security requirements into the final project design.</li></ul>		
5.3	Deviations and Changes	<ul style="list-style-type: none"><li>Identifies procedures for ensuring that changes to safety and security design criteria are appropriately reviewed and approved prior to adoption.</li></ul>		
6.1	<i>Operations and Maintenance Personnel Requirements</i>	<ul style="list-style-type: none"><li>Identifies the number of personnel and their specific job classifications required to operate and maintain the project in revenue service.</li><li>Specifies the qualifications and core competencies, required by job classification, for these personnel to ensure their abilities to provide safe and secure service and to respond to emergencies.</li><li>Emphasizes special needs of front-line personnel (i.e., operators, supervisors, station attendants, and mechanics).</li></ul>		
6.2	Plans, Rules and Procedures	<ul style="list-style-type: none"><li>Identifies by name the specific safety, security and emergency plans, rules, procedures, and manuals to be developed for operations and maintenance personnel, and also provides a schedule for their development.</li></ul>		
6.3	<i>Training Program</i>	<ul style="list-style-type: none"><li>Lists the elements of training to be provided to employees, by job classification, to ensure their capabilities to provide safe and secure service and to respond effectively to</li></ul>		

## APPENDIX D

### Safety and Security Management Initial Review Checklist

No.	Checklist Item	Plan Requirements	Document Reference	Comments
		<p>emergencies.</p> <ul style="list-style-type: none"> <li>Provides a schedule for the development and offering of this training, and for completion of any qualifications or certifications required by employees.</li> <li>Ensures the availability of documented evidence of personnel training and qualifications/certifications.</li> </ul>		
6.4	<i>Emergency Preparedness</i>	<ul style="list-style-type: none"> <li>Identifies any exercises, drills, tabletops or other activities that will be performed to ensure the readiness of the project placed in revenue service to respond to emergencies, and how the results of these activities will be assessed (i.e., after action report or equivalent document).</li> </ul>		
6.5	Public Awareness	<ul style="list-style-type: none"> <li>Identifies programs that support a commitment to on-going comprehensive public awareness, for both security awareness (such as the Transit Watch “eyes and ears” program) and emergency preparedness (such as emergency evacuation instructions to riders).</li> </ul>		
7.1	Design Criteria Verification Process	<ul style="list-style-type: none"> <li>Describes the process used by the sponsor to verify that safety and security design criteria have been addressed in project specifications and contract requirements and that all required inspections and tests have been incorporated into project test plans.</li> </ul>		
7.2	Construction Specification Conformance Process	<ul style="list-style-type: none"> <li>Describes the process used to ensure that elements of the system provided under construction, procurement and installation contracts conform to the specifications.</li> </ul>		



## APPENDIX D

### Safety and Security Management Initial Review Checklist

No.	Checklist Item	Plan Requirements	Document Reference	Comments
7.3	Testing / Inspection Verification	<ul style="list-style-type: none"><li>Describes the process used to ensure that the as-built (or delivered) configuration contains the safety- and security-related requirements identified in the specifications and other contract documents.</li></ul>		
7.4	Hazard and Vulnerability Resolution Verification	<ul style="list-style-type: none"><li>Describes the process used to ensure that safety and security design criteria and safety and security analysis have effectively identified, categorized and resolved hazard and vulnerabilities to a level acceptable by management.</li></ul>		
7.5	Operational Readiness Verification	<ul style="list-style-type: none"><li>Describes the process used to ensure that rules and procedures are developed to effectively incorporate all safety and security requirements specified during design and identified through safety and security analysis. This includes the process to ensure that the project has provided training to personnel and is using qualified and capable operations and maintenance personnel to initiate revenue service.</li></ul>		
7.6	Safety and Security Certification Requirements	<ul style="list-style-type: none"><li>Describes the requirements that must be met to deliver final certification that the project is safe and secure for passengers, employees, public safety personnel, and the general public, including individual certificates issued for specific elements to be verified.</li></ul>		
8.1	Construction safety and Security Program Elements	<ul style="list-style-type: none"><li>Describes the requirements to be implemented by contractors and reports to be received by the sponsor's management for implementing and tracking construction safety and security programs and plans.</li></ul>		

## APPENDIX D

### Safety and Security Management Initial Review Checklist

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No.	Checklist Item	Plan Requirements	Document Reference	Comments
8.2	Construction Phase Hazard and Vulnerability Analysis	<ul style="list-style-type: none"><li>Describes the analyses that must be done to identify and resolve or mitigate hazards or threats and vulnerabilities that may be unique to the construction phase.</li></ul>		
8.3	Safety and Security Incentives	<ul style="list-style-type: none"><li>Describes any incentives that may be in place to support implementation of the construction safety and security program.</li></ul>		
9.1	Activities	<ul style="list-style-type: none"><li>Identifies the activities that must be performed by the sponsor to comply with State Safety Oversight Agency (SSOA) requirements implementing 49 CFR Part 659.</li><li>If the SSOA has authorities that exceed 49 CFR Part 659 minimum requirements, this section must also explain the sponsor's approach for addressing these additional authorities.</li></ul>		
9.2	Implementation Schedule	<ul style="list-style-type: none"><li>Provides an implementation schedule regarding the performance of activities required to meet SSOA requirements.</li></ul>		
9.3	Coordination Process	<ul style="list-style-type: none"><li>Describes the processes to be used to communicate and coordinate with the SSOA.</li><li>Identifies by title and name the sponsor's primary point of contact working with the SSOA.</li></ul>		
10.1	Activities	<ul style="list-style-type: none"><li>Identifies the activities to be performed by sponsors with projects that propose to share track with one or more FRA-regulated railroads or that will operate on, connected</li></ul>		

## APPENDIX D

### Safety and Security Management Initial Review Checklist

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No.	Checklist Item	Plan Requirements	Document Reference	Comments
		<p>with, or share a corridor with, the general railroad system.</p> <ul style="list-style-type: none"><li>Identifies whether the sponsor will be requesting waivers from FRA regulations or if they will be complying with them.<ul style="list-style-type: none"><li>Each FRA regulation must be identified and the sponsor's activity regarding that regulation must be specified.</li></ul></li></ul>		
10.2	Implementation Schedule	<ul style="list-style-type: none"><li>Provides a schedule regarding the sponsor's activities to comply with FRA regulations or to meet requirements for FRA waivers.</li></ul>		
10.3	Coordination Process	<ul style="list-style-type: none"><li>Describes the processes to be used to communicate and coordinate with FRA.</li><li>Identifies by title and name the sponsor's primary point of contact working with FRA.</li></ul>		
11.1	Activities	<ul style="list-style-type: none"><li>Identifies the activities to be performed by sponsors to meet requirements and programs managed by DHS agencies, including the applicable Security Directives issued by TSA.</li></ul>		
11.2	Implementation Schedule	<ul style="list-style-type: none"><li>Provides a schedule regarding the sponsor's activities to comply with DHS requirements and programs.</li></ul>		
11.3	Coordination Process	<ul style="list-style-type: none"><li>Describes the processes to be used to communicate and coordinate with DHS.</li><li>Identifies the sponsor's primary point of contact working with DHS.</li></ul>		

## **APPENDIX E**

### **Safety and Security Management Areas for Consideration in PMP Section**

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When the sponsor's safety and security management activities are included as a section or chapter of the PMP (typically for Small Starts, bus vehicle and facility replacement projects, smaller bus rapid transit projects, and smaller rail modernization and rehabilitation projects), the sponsor should, at a minimum, address the following areas:

#### **Management Commitment and Philosophy**

- a. Safety and Security Policy Statement
- b. Purpose of SSMP
- c. Applicability and Scope
- d. Safety and Security Project Goal(s)

#### **Integration of Safety and Security into Project Development Process**

- a. Safety and Security Activities
- b. Procedures and Resources
- c. Interface with Management

#### **Assignment of Safety and Security Responsibilities**

- a. Responsibility and Authority
- b. Committee Structure
- c. Safety and Security Responsibilities Matrix

#### **Development of Safety and Security Design Criteria**

- a. Approach to Development of Safety and Security Requirements and Design Criteria
- b. Design Reviews
- c. Deviations and Changes

#### **Safety and Security Verification Process**

- a. Design Criteria Verification Process
- b. Construction Specification Conformance Process
- c. Testing/Inspection Verification
- d. Hazard and Vulnerability Resolution Verification
- e. Operational Readiness Verification
- f. Safety and Security Certification Requirements

Requirements for 49 CFR Part 659, Rail Fixed Guideway Systems; State Safety Oversight (if applicable)

FRA Coordination (if applicable)

DHS/TSA Coordination (if applicable)

Other Agencies associated with the project, such as local law enforcement, fire and emergency management, etc. (if applicable)

## APPENDIX F

### Safety and Security Organization Structure

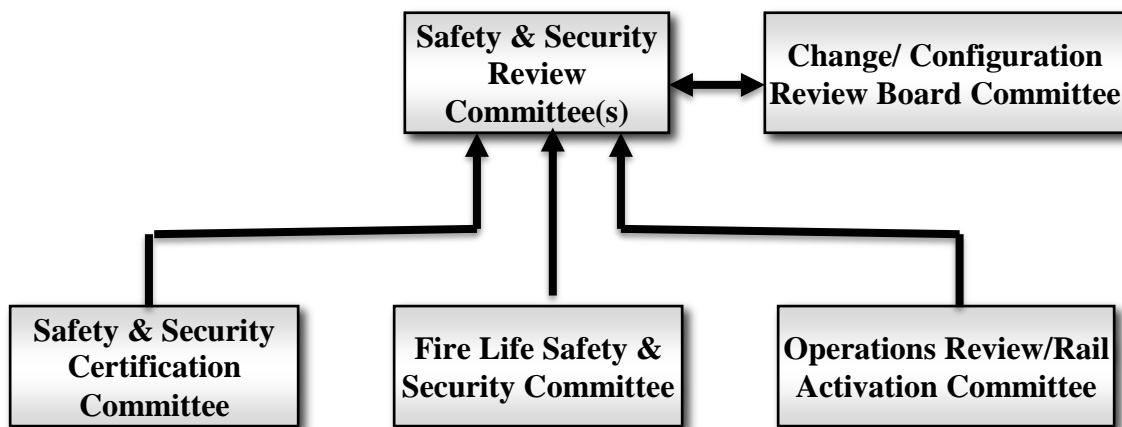
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#### Safety and Security Management Program Organization

The following organizational elements are typically established to address safety and security in a major capital project:

- Designated Function for Safety
- Designated Function for Security
- Safety Review Committee
- Security Review Committee
- Fire/Life Safety Committee
- Safety and Security Change Review Board
- Safety and Security Operations Review Committee

Depending on the project complexity, there may be multiple personnel assigned to designated function for safety and security, and multiple committees. Below is a sample committee structure diagram, which may vary depending on the project's requirements.



The organizational elements are briefly summarized below.

**Designated Function (DF) for Safety:** The DF for Safety typically reports to the Project Manager for project direction. The DF for Safety is the key contact and coordination point for the performance of the all safety activities identified for the project. The DF role may be performed by one person throughout the entire project, or may reside with different project personnel. For example, throughout the different project phases, the DF for Safety role may be assumed by: System Safety Manager, Project Systems Engineer, Contractor/Sub-contractor, System Safety Engineer, Security Engineer or Specialist, System Integration Engineer/Specialist, Project Engineer, Construction Safety Manager, Start-up/Activation Manager, and other personnel.

## APPENDIX F

### Safety and Security Organization Structure

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**DF for Security:** The DF for Security is responsible for all security planning activities specified in the SSMP.

**Safety Review Committee:** The goal of the Safety Review Committee, whether for a New Starts project or existing system, should be the effective and efficient accomplishment of the project safety objectives for that phase, including all activities specified in the SSMP. This goal may necessitate the involvement of different personnel and contractors from phase to phase and may even require different lead public agencies and project managers.

The Safety Review Committee is generally comprised of senior management personnel, or their designees, who represent the major project areas and activities, including: engineering and systems integration, architectural design, quality assurance/quality control, industrial and construction safety, security, technical services, construction management, operations and maintenance, contracts administration, labor relations, public relations, cost and scheduling, and training. The Safety Review Committee is generally chaired by the agency's highest ranking safety official and generally managed, convened, and coordinated by the agency's System Safety Department. For New Start projects that have not yet developed an in-house staff or an in-house System Safety Department, the Safety Review Committee should fill this role until a fixed organizational element is designated to manage safety. The Safety Review Committee, through its system safety engineering function, is accountable to the sponsor's executive leadership for the overall function, direction, coordination, control and conduct of the conduct of Safety Certification Program, and functional approval of certification documentation.

**Security Review Committee:** This Committee mirrors the role of the Safety Review Committee, but for security. It conducts or oversees system-wide security assessments and identifies and addresses requirements from the Department of Homeland Security, the Transportation Security Administration, and the Office of Program Management as they relate to the project. The Committee also ensures that new procedures and facilities incorporate security in their design. The Committee reviews security training curriculum and programs affecting security. The Committee also focuses on the current design measures, and policies and procedures in place in order to analyze and evaluate their effectiveness in meeting security challenges in all aspects of the operations. The results of these analyses could result in design modifications and proposed new procedures for security.

The Security Review Committee should be comprised of senior management personnel, or their designees, who represent the major project areas and activities, including: engineering and systems integration, architectural design, quality assurance/quality control, industrial and construction safety, safety, technical services, construction management, operations and maintenance, contracts administration, labor relations, public relations, cost and scheduling, and training. The SRC is generally chaired by the agency's highest ranking security official and generally managed, convened, and coordinated by the agency's System Security or Police Department. For those New Start projects that have not yet developed an in-house staff or an in-house System Security Department, the Security Review Committee should fill this role until a fixed organizational element is designated to manage security. The Security Review Committee, through its system security engineering function, is

## **APPENDIX F**

### **Safety and Security Organization Structure**

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accountable to the sponsor's executive leadership for the overall function, direction, coordination, control and conduct of the conduct of Security Certification Program, and functional approval of certification documentation.

**Fire/Life Safety and Security Committee (FLSSC):** The purpose of the FLSSC for the project is to serve as a liaison between the sponsor and the fire jurisdictions and emergency response agencies during the project development process. This Committee is typically comprised of local and state fire jurisdictions, local emergency response agencies, the project operations and maintenance liaison, the DF for Safety and Security, construction and design managers along with project management staff and the general design consultant. The Committee reviews standards and safety-related designs and tests to verify FLSS code and regulation compliance. In addition, the Committee reviews fire/life safety compliance documents and recommends resolution to the Safety Review Committee for exceptions to the requirements. The Committee also assists the DF for Safety and the Safety Review Committee.

The Committee meets periodically to review proposed design changes that may affect FLSS, to debrief major incidents, which involve emergency response agencies, and to plan emergency response drills and exercises. The Committee reviews and recommends revisions to emergency preparedness response plans, policies, and procedures; operating procedures which affect emergency response; changes to training plans and training programs pertaining to emergency response and personnel; and FLSS design changes.

**Safety and Security Change Review Board:** The Safety and Security Change Review Board reviews, evaluates and manages proposed changes to the project's baseline configuration and related baseline operation for safety and security impacts. The Review Board makes recommendations for the disposition of proposed changes. The Review Board also ensures that the Safety and Security Design Verification and that Construction Specification Conformance reflect the correct versions of specifications, drawings and bid package materials. The Review Board coordinated closely with the configuration control/document control function established for the project.

**Safety and Security Operations Review Committee:** The Safety and Security Operations Review Committee is responsible for overseeing the project's commissioning activities including systems integration testing, start-up, activation, final safety and security certification, and operation and maintenance demonstration.

**Safety and Security Certification Committee (SSCC):** It is beneficial to create a SSCC, or equivalent multi-disciplinary group, to oversee the conduct of safety and security certification efforts for the projects. The SSCC is responsible for adequately monitoring the status, results and issues of the certification process through periodic reviews, and provides related approvals, concurrences, guidelines or direction for the resolution of identified hazards, safety critical concerns, or non-compliances, as appropriate. The SSCC is typically chaired by a full-time System Safety and/or Security Manager or the Certification Manager. The SSCC is typically comprised of safety and

## **APPENDIX F**

### **Safety and Security Organization Structure**

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security personnel, or their designees, who represent the major project areas and activities as well as the contractor.



## APPENDIX G

### Matrix of Responsibilities

Project Safety and Security Tasks and Responsibilities	Safety Officer (SO)	Chief of Security (COS)	Safety and Security Contractor (SSC)	Construction Safety (CS)	Project Manager (PM)	Design Manager (DM)	Construction Manager (CM)	Quality Manager (QM)	Test Manager (TM)	Operations Manager (OM)
<b>Legend:</b> P – Primarily or lead S – Secondary function or assistance A – Approval authority C – Comment only										
<b>Program Management and Control</b>										
Establish Safety and Security Policy Statement	P	S	S	C	A	C	C	C	C	C
Set safety and security policies, goals and objectives	P	P	S	C	A	C	C	C	C	C
Develop safety and security task list	P	P	S	C	A	C	C	C	C	C
Establish safety organization (DF, committees, contractor support, etc.)	P	S	S	C	A	C	C	C	C	C
Establish security organization (DF, committees, contractor support, etc.)	S	P	S	C	A	C	C	C	C	C
Assign roles and responsibilities for safety activities	P	S	S	C	A	C	C	C	C	C
Assign roles and responsibilities for security activities	S	P	S	C	A	C	C	C	C	C
Develop Safety and Security Management Plan	P	P	S	C	A	C	C	C	C	C
Develop Safety and Security Milestone Schedule	P	P	S	C	A	C	C	C	C	C
Develop and disseminate Safety and Security Certification Program Plan	P	P	S	C	A	C	C	C	C	C
Develop and disseminate procedures to direct safety activities	P	S	S	C	A	C	C	C	C	C
Develop and disseminate procedures to direct security activities	P	S	S	C	A	C	C	C	C	C
Provide assistance on safety and security issues	P	P	S	C	A	C	C	C	C	C
Provide centralized procurement of safety and security contractors and consultants	P	P	C	C	A	C	C	C	C	C
Perform program reviews and audits for safety and security activities	P	P	C	C	C	S	S	P	S	C
Establish system for hazard and vulnerability tracking and resolution	P	P	S	C	A	S	S	S	S	C
Require hazard/vulnerability analysis to assess impacts of deviations from design criteria/design standards and project technical baseline specifications	P	P	S	C	A	S	S	S	S	C
<b>Design Evaluation</b>										
Establish project concept and component list applicable to safety and security	A	A	P	C	A	P	S	S	C	C
Identify codes, standards, regulations, or existing design criteria or manuals containing safety and security requirements for project	A	A	P	C	A	P	S	S	C	C
Develop Preliminary Hazards and Vulnerabilities List	A	A	P	C	A	S	C	S	C	C
Perform preliminary hazard analyses	A	S	P	C	A	S	C	S	C	C
Perform threat and vulnerability analysis	S	A	P	C	A	S	C	S	C	C
Develop safety and security requirements/design criteria for project	A	A	P	C	A	S	C	S	C	C
Perform additional safety and security analysis (as appropriate)	A	S	P	C	A	S	C	S	C	C
Develop a listing of elements which identifies contracts to be safety- and security-certified	A	A	P	C	A	S	C	S	C	C
Develop Safety and Security Certifiable Items List (CIL) to support preparation of design criteria and construction specification conformance checklists	A	A	P	C	A	S	C	S	C	C
Review 50%, 95%, and Final Designs and Update CIL	S	S	P	C	A	S	C	S	C	C
Review 60%, 95%, and Issued for Construction Designs and update CIL	S	S	P	C	A	S	C	S	C	C
Develop Design Criteria Verification Checklist requirements for each certifiable contract and verify inclusion in the system design through the CIL	S	S	P	C	A	S	C	S	C	C
<b>Compliance and Verification</b>										
Audit safety and security certification processes	S	S	P	C	A	S	C	S	C	C
Perform safety and security compliance assessments and complete Design Criteria Verification Checklists	S	S	P	C	A	S	C	S	C	C
Based on completed Design Criteria Verification Checklists, develop Construction Specification Conformance Checklists	S	S	P	C	A	S	C	S	C	C
Complete Construction Specification Conformance Checklists (verify inclusion of safety and security conformance criteria in as-built facilities and installed systems/equipment)	S	S	P	C	A	S	S	S	S	C
Issue/obtain permits and notices to support testing and pre-revenue operations	P	S	S	C	A	S	S	S	S	C
Document the findings of integrated testing for safety- and security-related elements	S	S	S	S	A	S	S	S	P	C
Verify that contractual vendor training classes have been provided	S	S	S	S	A	S	S	S	C	P

## APPENDIX G

### Matrix of Responsibilities

Project Safety and Security Tasks and Responsibilities	Safety Officer (SO)	Chief of Security (COS)	Safety and Security Contractor (SSC)	Construction Safety (CS)	Project Manager (PM)	Design Manager (DM)	Construction Manager (CM)	Quality Manager (QM)	Test Manager (TM)	Operations Manager (OM)
<b>Legend:</b> P – Primarily or lead S – Secondary function or assistance A – Approval authority C – Comment only										
Monitor the identification and resolution of the system hazards and vulnerabilities assessment process to verify that no significant hazard is unresolved at system opening	P	P	S	S	A	S	S	S	C	P
Establish a construction safety and security plan	S	S	S	P	A	C	S	S	C	C
Establish an emergency response plan for construction	S	S	S	P	A	C	S	S	C	C
Conduct inspections of construction operations, equipment, storage areas, and facilities	S	S	S	P	A	C	S	S	C	C
Note unsafe acts, unhealthy conditions, or non-secure conditions on the construction site	S	S	S	P	A	C	S	S	C	C
Document serious or repeated construction safety and/or security violations	S	S	S	P	A	C	S	S	C	C
Conduct or monitor construction incident/mishap response and investigations	S	S	S	P	A	C	S	S	C	C
Conduct or monitor construction mishap trend analysis and response planning	S	S	S	P	A	C	S	S	C	C
Provide construction safety, security and emergency response training	S	S	S	P	A	C	S	S	C	C
Conduct project demonstration evaluation and safety and security acceptance	S	S	S	S	A	C	S	S	P	S
Identify and resolve restrictions, deviations and work-arounds	S	S	S	S	A	C	S	P	P	S
Issue final safety and security certification certificates for design verification and construction specification conformance	P	P	S	S	A	C	S	S	S	S
<b>Operations Support</b>										
Coordinate with State Safety Oversight Agency regarding requirements for safety and security plans and procedures during operations	P	P	S	C	A	C	C	C	C	P
Coordinate with FRA Office of Safety Oversight and Regional Office regarding requirements for safety plans and procedures and shared track waiver submission	P	P	S	C	A	C	C	C	C	P
Develop System Safety Program Plan	P	P	S	C	A	C	C	C	C	P
Develop System Security Program Plan	P	P	S	C	A	C	C	C	C	P
Develop Emergency Response Plan	P	P	S	C	A	C	C	C	C	P
Perform safety and security review of preliminary operations & maintenance procedures	P	P	S	C	A	C	C	C	C	P
Develop safety rules and procedures	P	P	S	C	A	C	C	C	C	P
Develop security rules and procedures	P	P	S	C	A	C	C	C	C	P
Establish safety staffing and operational safety program	P	P	S	C	A	C	C	C	C	P
Establish security staffing and operational security program	P	P	S	C	A	C	C	C	C	P
Conduct safety incident response and investigations	P	P	S	C	A	C	C	C	C	P
Conduct security incident/mishap response and investigations	P	P	S	C	A	C	C	C	C	P
Perform crime pattern trending and response planning	P	P	S	C	A	C	C	C	C	P
Perform safety trend analysis and response planning	P	P	S	C	A	C	C	C	C	P
Develop and disseminate emergency safety and security procedures	P	P	S	C	A	C	C	C	C	P
Provide safety- and security-related training	P	P	S	C	A	C	C	C	C	P
Conduct operational readiness reviews	P	P	S	C	A	C	C	S	P	P
Conduct emergency response drill or exercise	P	P	S	C	A	C	C	S	P	P
Identify and resolve restrictions, deviations and work-arounds	P	P	S	C	A	C	C	S	P	P
Issue final safety and security certification certificates for operational readiness	P	P	S	C	A	C	C	S	S	S
Issue Final Safety and Security Verification Report	P	P	S	C	A	C	C	S	S	S

## **APPENDIX H**

### **SSMP Adherence Review Report Outline**

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#### **Outline for SSMP Adherence Review Report**

Refer to OP 01 for additional requirements on report format. The SSMP report should specifically include the following:

- 1) Executive Summary (approximately two pages)
  - a) Provide a simply written summary of the PMOC's most important findings regarding the compliance of the project's SSMP to FTA requirements and the adequacy of safety and security programs, as documented in the SSMP and supporting materials, and as implemented based on reviews of operating documents, interviews, and site inspections.
  - b) Provide professional opinions, conclusions, and recommendations for improvement.
- 2) Table of Contents
- 3) Project Background / Description (approximately three pages)
  - a) Describe the objectives of the SSMP review
  - b) Introduction to the project
  - c) Discussion of the project's objectives and benefits
  - d) Current project status
  - e) Describe the documents reviewed, the individuals interviewed, and the sites visited in the course of performing this review (include supporting tables in an appendix to the report)
- 4) Body of Report – For each section or topic area provide findings, analysis, summary statement:
  - a) Findings (include photos of site conditions to aid in understanding )
  - b) Analysis, opinions, recommendations (specify time for performing recommended actions)
    - i) SSMP Compliance Assessment
      - (1) Provide a general assessment of the quality and compliance level of the SSMP to the applicable FTA requirements
      - (2) Provide an in-order specific assessment of how each specific FTA requirement is implemented, including a clear description of areas of deficiency and suggestions for resolving deficiencies. The letter C, M, or N should be shown to indicate that the Item is compliant, marginally compliant, or noncompliant with FTA requirements at the beginning or end of each assessment item.
    - ii) SSMP Adherence Assessment
      - (1) This section should present the results and conclusions from the review of support documentation, interviews, and site visits and indicate whether or not the SSMP requirements and safety and security programs are adequate for the current stage of the project, as planned, documented, and implemented. Findings that support the conclusion and any recommendations for improving or resolving program

## APPENDIX H

### SSMP Adherence Review Report Outline

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deficiencies should be presented in descending order of importance. Detailed support for the findings, if required, should be placed in an appendix to the Report.

(a) Examples of the discussion of some findings and resultant recommendations are:

- (i) The sponsor does not have a functioning Safety and Security Working Group. The SSMP identifies a Safety and Security Working Group (SSWG) that will be established prior to start of PE to assure that safety and security requirements, including police and fire regulations are incorporated into all phases of the design. The project is requesting entrance into PE and the PMOC has found no evidence that a SSWG exists. The Director of Safety, who would normally be either chair or co-chair of a SSWG, was unable to state when a SSWG would become functional. The PMOC recommends that the sponsor create a SSWG, as identified in the SSMP, and set a regular schedule for meetings. The SSWG should include participation from city, transit agency, and county agencies that the right of way traverses.
- (ii) The sponsor has not addressed egress and overcrowding on platforms during periods of heavy system use. Overcrowding and lack of adequate egress is hazardous and introduces security vulnerabilities; neither the PHA nor TVA has addressed this issue at the stations serving the college and the high school and the design criteria are silent on maximum platform loads. These issues must be resolved with the local academic institutions, which generate increased ridership during those months that classes are in session. The PMOC recommends assessments of maximum passenger loads on these platforms, and the rate of flow through egress points, through formal hazard analyses and TVAs.

iii) Issues and Analysis

- (1) In the course of the review, the PMOC may encounter safety and security issues that can affect or be affected by the project but do not constitute findings. These should be presented. Example: The PMOC identified three schedule changes that relate to project safety and security:
  - (a) The tunnel TVA originally planned for September 2006 is now forecast to be completed in January 2007. This will delay review of the TVA by the city, delay issuance of tunnel bid package, and reduce schedule float by at least two months
  - (b) Changes in personnel in local police/fire departments have delayed formation of the Fire Life Safety and Security Committee (FLSSC) originally planned for April 2010. It is currently planned that the new police and fire commissioners, named in December 2010, will select their candidates for the committee so that it can be formed and made operational in the following quarter.
  - (c) Late changes in establishing the alignment have resulted in design delays. The TVA and Emergency Evacuation Plan (EEP) cannot be formally completed until the right of way is finalized. In the opinion of the PMOC, this delay should not affect commencement of revenue operations because the safety and security departments are participating in the design revisions on a real-time basis.

## **APPENDIX H**

### **SSMP Adherence Review Report Outline**

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- 5) Summary statements by section or topic area (Note that the Executive Summary requires further summarization of these section summary statements.)
  - a) Present the major conclusions reached from the assessment as to the compliance of the SSMP with FTA Circular requirements and the adequacy of sponsor adherence to the SSMP, as well as the overall project safety and security program.
  - b) Present a numbered compilation of recommendations contained in other sections of the report. (Each recommendation should include a parenthetical reference to the section or subsection where the recommendation was made.)
- 6) Appendix
  - a) Acronyms used
  - b) Supporting checklists, tables, spreadsheets, photos, etc.
  - c) PMOC team – list personnel and their qualifications for performing the review (short blurb on each; altogether one or two pages max)

# APPENDIX I

## Adherence Review Worksheet

Safety and Security Management Program Adherence Review Worksheet										
Date of Review:		Project Name:			<b>Adherence Rating Legend</b> 1= Poor, Action Required 2= Adequate, Comments Provided 3= Acceptable, No Comments N/A – Not Applicable or Not Reviewed					
No.	Checklist Item	Plan Requirements	Document Reference	Evaluation				Audit Elements	Comments	
				1	2	3	N/A			
1.1	Safety and Security Policy Statement	<ul style="list-style-type: none"> <li>A <i>Safety and Security Policy Statement</i> is developed for the Safety and Security Management Plan (SSMP).</li> <li>The policy statement endorses the SSMP and confirms the project's commitment to safety and security throughout all project phases.</li> <li>The policy statement is signed by the sponsor's executive leadership.</li> </ul>								
1.2	Purpose of SSMP	<ul style="list-style-type: none"> <li>The SSMP implements the <i>Safety and Security Policy Statement</i>.</li> <li>The SSMP identifies the sponsor's management structure and activities to be performed to integrate safety and security into all phases of the project development process.</li> </ul>								
1.3	Applicability and Scope	<ul style="list-style-type: none"> <li>The SSMP applies to all project development activities through project development, engineering, construction, integrated testing, demonstration, and the initiation of operations.</li> <li>Depending on the nature of the project, this scope may encompass the following:               <ul style="list-style-type: none"> <li>System-wide Elements,</li> <li>Fixed Facilities,</li> <li>Safety, Security, System Assurance, Operational, and Maintenance Plans and Procedures, and</li> <li>Personnel Qualifications, Training and Drills/Exercises.</li> </ul> </li> <li>As applicable, the SSMP also includes activities to ensure compliance with requirements specified by the State Safety Oversight Agency (49 CFR Part 659) and/or the Federal Railroad Administration (FRA), and/or the Department of Homeland Security, including the Transportation Security Administration (TSA) and the Office Program</li> </ul>								

# APPENDIX I

## Adherence Review Worksheet

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No.	Checklist Item	Plan Requirements	Document Reference	Evaluation				Audit Elements	Comments
				1	2	3	N/A		
		Management.							
1.4	SSMP Goal	<ul style="list-style-type: none"> <li>Ensures that the final project initiated into revenue service is safe and secure for passengers, employees, public safety personnel, and the general public through a formal program of safety and security certification.</li> <li>Describes how the sponsor's executive leadership has designated personnel and committees with the responsibility:               <ul style="list-style-type: none"> <li>to establish safety and security requirements for the project;</li> <li>to ensure that the design, acquisition, construction, fabrication, installation, and testing of all critical elements of the project will be evaluated for conformance with the established safety and security requirements;</li> <li>to verify operational readiness; and</li> <li>to ensure that a mechanism is provided to follow to completion the resolution of any restrictions to full safety and security certification.</li> </ul> </li> </ul>							
2.1	Safety and Security Activities	<ul style="list-style-type: none"> <li>Identifies the specific safety and security tasks that must be performed for the project through all phases.</li> <li>Includes both a text description of the activities and a matrix listing these activities and the project phases during which they will be performed.               <ul style="list-style-type: none"> <li>One matrix may be prepared that combines safety and security activities by project phase, or separate matrices may be developed.</li> </ul> </li> </ul>							
2.2	Procedures and Resources	<ul style="list-style-type: none"> <li>Identifies the procedures and resources that will support performance of safety and security</li> </ul>							

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No.	Checklist Item	Plan Requirements	Document Reference	Evaluation				Audit Elements	Comments
				1	2	3	N/A		
		activities throughout the project phases. • Includes procedures for the management of sensitive security information (SSI).							
2.3	Interface with Management	• Identifies the process and lines of communication by which safety and security issues will be communicated to senior management and used by senior management in decision-making. • An organization chart showing the sponsor's project management team and key points of interface regarding safety and security issues must also be provided. • The organization chart shall identify the relationships from the safety and security staff and organizations to construction management, project management, and executive management.							
3.1	<i>Responsibility and Authority</i>	• Identifies, by title and department, all staff, contractors, and committees assigned to manage the safety and security activities specified in Section 2 of the SSMP. <ul style="list-style-type: none"> <li>○ Each individual staff member must be identified by title and affiliation.</li> <li>○ Each committee must be identified by name and acronym, with membership provided by title and affiliation.</li> <li>○ For each authority delegated to a contractor, the sponsor individual or committee responsible for oversight must be shown.</li> <li>○ An organization chart must be provided.</li> </ul>							
3.2	<i>Committee Structure</i>	• Describes the organization and responsibilities of the different safety and security committees ,							



## APPENDIX I

### Adherence Review Worksheet

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No.	Checklist Item	Plan Requirements	Document Reference	Evaluation				Audit Elements	Comments
				1	2	3	N/A		
		including <ul style="list-style-type: none"> <li>○ Safety and Security Review Committee;</li> <li>○ Fire/Life Safety Committee;</li> <li>○ Safety and Security Change Review Board;</li> <li>○ Safety and Security Operations Review Committee;</li> <li>○ Other comparable committees.</li> </ul>							
3.3	Safety and Security Responsibilities Matrix	<ul style="list-style-type: none"> <li>• Presents the responsibility and reporting relationships for safety and security in the form of a matrix.               <ul style="list-style-type: none"> <li>○ Separate matrices may be used for safety and security authorities and responsibilities, or a single matrix may be used.</li> <li>○ Individuals having authority for safety or security functions who are not part of the sponsor staff must report to a member of that staff who is responsible for that safety or security function.</li> </ul> </li> </ul>							
4.1	Approach to Safety and Security Analysis	<ul style="list-style-type: none"> <li>• Describes the sponsor's approach to the analysis of safety hazards and security vulnerabilities.</li> <li>• Known hazards and vulnerabilities must be:               <ul style="list-style-type: none"> <li>○ Identified and categorized for their potential severity and probability of occurrence,</li> <li>○ analyzed for potential impact, and</li> <li>○ resolved by design, engineered features, warning devices, procedures and</li> </ul> </li> </ul>							

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No.	Checklist Item	Plan Requirements	Document Reference	Evaluation				Audit Elements	Comments	
				1	2	3	N/A			
		training, or other methods.								
4.2	Requirements for Safety and Security Analysis	<ul style="list-style-type: none"> <li>Specifies the distinct types of safety and security analysis to be performed during the specific phases of the project.</li> <li>Describes the mechanism for communicating analysis results throughout the project team.</li> <li>Describes the process for assuring the resolution of identified hazards and vulnerabilities.</li> </ul>								
5.1	<i>Approach to Development of Safety and Security Design Criteria</i>	<ul style="list-style-type: none"> <li>Describes the project's approach to creating suitable safety and security design criteria.</li> <li>Identifies the resources, including standards prepared by such organizations as APTA, NFPA, UL and others that the sponsor will use to develop safety and security requirements.</li> <li>Explains how the sponsor will identify safety and security certifiable elements and how identification of these elements will guide the development of safety and security design criteria.</li> <li>Ensures that the final specifications and contract documents for the project will result in design that meets the sponsor's requirements for safety and security and addresses the certifiable elements.</li> </ul>								
5.2	<i>Design Reviews</i>	<ul style="list-style-type: none"> <li>Identifies how safety and security activities will be addressed during design reviews to ensure incorporation of safety and security requirements into the final project design.</li> </ul>								
5.3	Deviations and Changes	<ul style="list-style-type: none"> <li>Identifies procedures for ensuring that changes to safety and security design criteria are appropriately reviewed and approved prior to adoption.</li> </ul>								

# APPENDIX I

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Date of Review:		Project Name:		<b>Adherence Rating Legend</b> 1= Poor, Action Required 2= Adequate, Comments Provided 3= Acceptable, No Comments N/A – Not Applicable or Not Reviewed					
No.	Checklist Item	Plan Requirements	Document Reference	Evaluation				Audit Elements	Comments
				1	2	3	N/A		
6.1	<i>Operations and Maintenance Personnel Requirements</i>	<ul style="list-style-type: none"> <li>Identifies the number of personnel and their specific job classifications required to operate and maintain the project in revenue service.</li> <li>Specifies the qualifications and core competencies, required by job classification, for these personnel to ensure their abilities to provide safe and secure service and to respond to emergencies.</li> <li>Emphasizes special needs of front-line personnel (i.e., operators, supervisors, station attendants, and mechanics).</li> </ul>							
6.2	Plans, Rules and Procedures	<ul style="list-style-type: none"> <li>Identifies by name the specific safety, security and emergency plans, rules, procedures, and manuals to be developed for operations and maintenance personnel, and also provides a schedule for their development.</li> </ul>							
6.3	<i>Training Program</i>	<ul style="list-style-type: none"> <li>Lists the elements of training to be provided to employees, by job classification, to ensure their capabilities to provide safe and secure service and to respond effectively to emergencies.</li> <li>Provides a schedule for the development and offering of this training, and for completion of any qualifications or certifications required by employees.</li> <li>Ensures the availability of documented evidence of personnel training and qualifications/certifications.</li> </ul>							
6.4	<i>Emergency Preparedness</i>	<ul style="list-style-type: none"> <li>Identifies any exercises, drills, tabletops or other activities that will be performed to ensure the</li> </ul>							

# APPENDIX I

## Adherence Review Worksheet

Safety and Security Management Program Adherence Review Worksheet									
Date of Review:		Project Name:		<b>Adherence Rating Legend</b> 1= Poor, Action Required 2= Adequate, Comments Provided 3= Acceptable, No Comments N/A – Not Applicable or Not Reviewed					
No.	Checklist Item	Plan Requirements	Document Reference	Evaluation				Audit Elements	Comments
				1	2	3	N/A		
		readiness of the project placed in revenue service to respond to emergencies, and how the results of these activities will be assessed (i.e., after action report or equivalent document).							
6.5	Public Awareness	<ul style="list-style-type: none"> <li>Identifies programs that support a commitment to on-going comprehensive public awareness, for both security awareness (such as the Transit Watch “eyes and ears” program) and emergency preparedness (such as emergency evacuation instructions to riders).</li> </ul>							
7.1	Design Criteria Verification Process	<ul style="list-style-type: none"> <li>Describes the process used by the sponsor to verify that safety and security design criteria have been addressed in project specifications and contract requirements and that all required inspections and tests have been incorporated into project test plans.</li> </ul>							
7.2	Construction Specification Conformance Process	<ul style="list-style-type: none"> <li>Describes the process used to ensure that elements of the system provided under construction, procurement and installation contracts conform to the specifications.</li> </ul>							
7.3	Testing / Inspection Verification	<ul style="list-style-type: none"> <li>Describes the process used to ensure that the as-built (or delivered) configuration contains the safety- and security-related requirements identified in the specifications and other contract documents.</li> </ul>							
7.4	Hazard and Vulnerability Resolution Verification	<ul style="list-style-type: none"> <li>Describes the process used to ensure that safety and security design criteria and safety and security analysis have effectively identified, categorized and resolved hazard and vulnerabilities to a level acceptable by management.</li> </ul>							

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Safety and Security Management Program Adherence Review Worksheet										
Date of Review:		Project Name:			Adherence Rating Legend 1= Poor, Action Required 2= Adequate, Comments Provided 3= Acceptable, No Comments N/A – Not Applicable or Not Reviewed					
No.	Checklist Item	Plan Requirements	Document Reference	Evaluation				Audit Elements	Comments	
				1	2	3	N/A			
7.5	Operational Readiness Verification	<ul style="list-style-type: none"> <li>Describes the process used to ensure that rules and procedures are developed to effectively incorporate all safety and security requirements specified during design and identified through safety and security analysis. This includes the process to ensure that the project has provided training to personnel and is using qualified and capable operations and maintenance personnel to initiate revenue service.</li> </ul>								
7.6	Safety and Security Certification Requirements	<ul style="list-style-type: none"> <li>Describes the requirements to deliver final certification that the project is safe and secure for passengers, employees, public safety personnel, and the general public, including individual certificates issued for specific elements to be verified.</li> </ul>								
8.1	Construction safety and Security Program Elements	<ul style="list-style-type: none"> <li>Describes the requirements to be implemented by contractors and reports to be received by the sponsor's management for implementing and tracking construction safety and security programs and plans.</li> </ul>								
8.2	Construction Phase Hazard and Vulnerability Analysis	<ul style="list-style-type: none"> <li>Describes the analyses that must be done to identify and resolve or mitigate hazards or threats and vulnerabilities that may be unique to the construction phase.</li> </ul>								
8.3	Safety and Security Incentives	<ul style="list-style-type: none"> <li>Describes any incentives that may be in place to support implementation of the construction safety and security program.</li> </ul>								
9.1	Activities	<ul style="list-style-type: none"> <li>Identifies the activities that must be performed by the sponsor to comply with State Safety Oversight</li> </ul>								

# **APPENDIX I** **Adherence Review Worksheet**

Safety and Security Management Program Adherence Review Worksheet										
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No.	Checklist Item	Plan Requirements	Document Reference	Evaluation				Audit Elements	Comments	
				1	2	3	N/A			
		Agency (SSOA) requirements implementing 49 CFR Part 659. <ul style="list-style-type: none"> <li>If the SSOA has authorities that exceed 49 CFR Part 659 minimum requirements, this section must also explain the sponsor's approach for addressing these additional authorities.</li> </ul>								
9.2	Implementation Schedule	<ul style="list-style-type: none"> <li>Provides an implementation schedule for the performance of activities required to meet SSOA requirements.</li> </ul>								
9.3	Coordination Process	<ul style="list-style-type: none"> <li>Describes the processes for communication and coordination with the SSOA.</li> <li>Identifies by title and name the sponsor's primary point of contact working with the SSOA.</li> </ul>								
10.1	Activities	<ul style="list-style-type: none"> <li>Identifies the activities to be performed by sponsors with projects that propose to share track with one or more FRA-regulated railroads or that will operate on, connected with, or share a corridor with, the general railroad system.</li> <li>Identifies whether the sponsor will be requesting waivers from FRA regulations or if they will be complying with them.               <ul style="list-style-type: none"> <li>Each FRA regulation must be identified and the sponsor's activity regarding that regulation must be specified.</li> </ul> </li> </ul>								
10.2	Implementation Schedule	<ul style="list-style-type: none"> <li>Provides a schedule regarding the sponsor's activities to comply with FRA regulations or to meet requirements for FRA waivers.</li> </ul>								
10.3	Coordination Process	<ul style="list-style-type: none"> <li>Describes the processes to be used to communicate and coordinate with FRA.</li> </ul>								

**APPENDIX I**  
**Adherence Review Worksheet**

Safety and Security Management Program Adherence Review Worksheet									
Date of Review:		Project Name:		<b>Adherence Rating Legend</b> 1= Poor, Action Required 2= Adequate, Comments Provided 3= Acceptable, No Comments N/A – Not Applicable or Not Reviewed					
No.	Checklist Item	Plan Requirements	Document Reference	Evaluation				Audit Elements	Comments
				1	2	3	N/A		
		<ul style="list-style-type: none"> <li>Identifies by title and name the sponsor's primary point of contact working with FRA.</li> </ul>							
11.1	Activities	<ul style="list-style-type: none"> <li>Identifies the activities to be performed by sponsors to meet requirements and programs managed by DHS agencies, including the applicable Security Directives issued by TSA.</li> </ul>							
11.2	Implementation Schedule	<ul style="list-style-type: none"> <li>Provides a schedule regarding the sponsor's activities to comply with DHS requirements and programs.</li> </ul>							
11.3	Coordination Process	<ul style="list-style-type: none"> <li>Describes the processes to be used to communicate and coordinate with DHS.</li> <li>Identifies the sponsor's primary point of contact working with DHS.</li> </ul>							

## APPENDIX J

### Examples of Safety and Security Standards and Criteria

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- American Association of State Highway Transportation Officials (AASHTO) - <http://www.aashto.org>
- Americans with Disabilities Act (ADA) – [www.ada.gov](http://www.ada.gov)
- American National Standards Institute (ANSI) - <http://www.ansi.org>
- American Public Transportation Association (APTA) - <http://www.apta.com>
- American Railway Engineering and Maintenance-of-Way Association (AREMA)- <http://www.arema.org>
- American Society for Testing and Materials (ASTM) - <http://www.astm.org>
- Construction Specification Institute (CSI) - <http://www.csinet.org>
- Department of Homeland Security, Transportation Security Administration, Mass Transit Program, <http://www.tsa.gov/stakeholders/mass-transit-and-passenger-rail>
- Federal Emergency Management Administration (FEMA) - <http://www.fema.gov>
- Federal Highway Administration (FHWA)- <http://www.fhwa.dot.gov/>
- Federal Railroad Administration (FRA) - <http://www.fra.dot.gov>
- Federal Transit Administration (FTA) - <http://www.fta.dot.gov>
- Institute of Electrical and Electronics Engineers (IEEE) - <http://www.ieee.org/>
- International Building Code (IBC), published by the International Code Council (ICC), with local amendments <http://www.iccsafe.org/>
- International Fire Code (IFC), published by the International Code Council (ICC), with local amendments <http://www.iccsafe.org/>
- Manual on Uniform Traffic Control Devices (MUTCD) - <http://mutcd.fhwa.dot.gov/>
- National Fire Protection Association (NFPA) - <http://www.nfpa.org>
- National Environmental Policy Act (NEPA) - <http://www.epa.gov/>
- Occupational Safety and Health Administration (OSHA) - <http://www.osha.gov>
- Transit Cooperative Research Program (TCRP) – <http://www.tcrponline.org/>
- Underwriters Laboratories, Inc. (U.L.) - <http://www.ul.com>



## **APPENDIX K**

### **Acronyms**

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ACOR	Alternate Contracting Officer Representative
CPTED	Crime Prevention Through Environmental Design
DF	Designated Function
EMP	Emergency Management Plan
FFGA	Full Funding Grant Agreement
FLSSC	Fire/Life Safety and Security Committee
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
OMP	Operations and Management Plan
OP	Operating Procedure
PHA	Preliminary Hazard Analysis
PMOC	Project Management Oversight Contractor
PMP	Project Management Plan
QA/QC	Quality Assurance / Quality Control
SEPP	Security and Emergency Preparedness Plan
SSCC	Safety and Security Certification Committee
SSCP	Safety and Security Certification Plan
SSCVR	Safety and Security Certification Verification Report
SSI	Sensitive Security Information
SSMP	Safety and Security Management Plan
SSOA	State Safety Oversight Agency
SSPP	System Safety Program Plan
SSP	System Security Plan
SSWG	Safety and Security Working Group
TVA	Threat and Vulnerability Analysis



## **Oversight Procedure 23 – Real Estate Acquisition and Management Plan Review**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure (OP) is to describe the review, analysis and recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) as regards to the Project Sponsor's Real Estate Acquisition and Management Plan (RAMP).

This review will provide a critical input to FTA's determination regarding the Project Sponsor's project readiness for advancement and funding. The review will cover the RAMP and related scope, schedule and cost estimate information.

### **2.0 BACKGROUND**

On major capital projects, the real property acquisition and relocation components represent substantial risk from both a schedule and budget standpoint. In some situations, scope can also be a significant risk. FTA therefore requires the PMOC team to include and continuously utilize a specialized real estate expert consultant, hereafter referred to as the Real Estate PMOC (RE PMOC). This RE PMOC should have significant experience in early right-of-way (R/W) planning and acquisition; have a working knowledge in the four major areas of Uniform Act compliance (Appraisal, Acquisition, Relocation and Property Management); and have a thorough working knowledge of 49 CFR Part 24 and FTA Circular 5010.1D and the FTA Project Management Oversight Program Guidance.

FTA requires the PMOC to send all reports produced under this OP, including all comments and recommendations for approval, to the FTA Headquarters' Real Estate Specialists for final review and acceptance.

For proper oversight of a project with significant real estate requirements, it is necessary for the real estate expert to be active on the PMOC team beginning early in the project. This is especially relevant when reviewing cost estimates and schedules.

### **3.0 OBJECTIVES**

The reviews under this OP have the following objectives:

- Early and continuous involvement in the real estate program that commences with the NEPA process. Now available as technical assistance.

- Evaluate the Project Sponsor's RAMP and oversee implementation of defined policies and procedures, real estate acquisitions, and relocations.
- Evaluate the Project Sponsor's understanding of, and assure compliance with, all state, local and Federal laws, regulations, and guidance associated with acquiring real estate.
- Evaluate the real estate components of the project scope for completeness, adequacy, consistency, appropriateness of level of detail given the phase
- Evaluate the real estate cost estimate for completeness, adequacy, consistency, appropriateness of level of detail given the phase
- Evaluate the real estate schedule for completeness, adequacy, consistency, appropriateness of level of detail given the phase; compatibility of the real estate schedule with the overall project schedule is required as part of the evaluation.
- Identify risks inherent in the project scope, schedule and cost estimate
- Evaluate the Project Sponsor's effective use of tracking tools to monitor status and avoid negative budget and schedule impacts.
- Evaluate compliance with all governing requirements related to the real estate acquisition program ensure eligibility of reimbursed cost.
- Provide timely reporting by the PMOC of recommended improvements, lessons learned, and best practices based on observations of the project.

#### **4.0 REFERENCES**

The following are the principal, but by no means the only, references to Federal legislation, regulation and guidance with which the PMOC should review and develop a solid understanding as related to the Project Sponsor's project work under this OP:

- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Pub. Law 91-646; 42 U.S.C. 4601, et seq.).  
[http://www.fta.dot.gov/planning/planning\\_environment\\_5937.html](http://www.fta.dot.gov/planning/planning_environment_5937.html)
- Implementing Regulations 49 CFR Part 24.  
[http://www.fta.dot.gov/planning/planning\\_environment\\_5937.html](http://www.fta.dot.gov/planning/planning_environment_5937.html)
- FTA Circular 5010.1D, Grant Management Guidelines, Chapter IV, (Management of Real Property). [http://www.fta.dot.gov/planning/planning\\_environment\\_5937.html](http://www.fta.dot.gov/planning/planning_environment_5937.html)

#### **5.0 GRANTEE SUBMITTALS**

In order to perform the review, the RE PMOC shall obtain the RAMP and supporting documents such as the real estate cost estimate, and schedule as well as any applicable agency policies and procedures. In cases of difficulty in obtaining these documents, the PMOC shall notify FTA immediately.

See Appendix B for sample RAMP Table of Contents with milestone dates for completion of plan elements. The PMOC shall use the Table of Contents as a guide for its review.

- Real Estate Team Organization information should include:
  - Organization chart for Agency  
Organization chart for Project including Agency's project executive, real estate staff and consultants
  - Real estate staff and consultant/contractor functions/resumes/description of roles and responsibilities for both real estate acquisition and relocation
  - Lines of authority including as applicable, the Project Sponsor's Board, chief executive officer, project executive, project staff, real estate staff and consultants
- Acquisition Plan and Relocation Plan should include:
  - Description of real estate to be acquired for the project
  - Real estate planning, budgeting, scheduling, tracking and reporting documents
  - Discussion of any existing contaminated property based on content of Environmental Site Assessment documents or the NEPA documents and strategy to avoid, value, and/or remediate such property
  - Summary of Potential Third Party Agreements
- An explanation of the process to be used for:
  - Utility Relocations
  - Appraisals and appraisal reviews
  - Acquisition files including offers, negotiations and contact logs
  - Relocation files including notices, inventories, determinations, claims, payments and contact logs
- Real Estate Schedule should be portrayed in relation to overall project schedule/critical path and should include detail on specific tasks and time required to complete
- Real Estate Cost Estimate may be submitted as an independent document.

## **6.0 SCOPE OF WORK**

The specialized RE PMOC is expected to initiate communication with the FTA Headquarters' Real Estate Specialists for guidance and policy interpretation prior to starting the review. It is expected that for the duration of the review, the RE PMOC will maintain this communication.

The Prime PMOC is expected to have the RE PMOC in attendance (by phone or in person) at any time matters involving real estate are discussed and this includes early involvement in the NEPA process. The RE PMOC shall continue to provide ongoing oversight and monitoring in all areas involving real estate so that early warning signs can be recognized and potential issues can be identified and mitigated prior to serious impacts to schedule and/or budget.

The RE PMOC should focus on four main areas: budget, schedule, scope and compliance. The RE PMOC should oversee the Project Sponsor's process to ensure compliance with statutory and regulatory requirements including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended (Uniform Act) and applicable FTA Circulars. The RE PMOC should determine if Project Sponsor's acquisition and relocation scope, schedule and budget are realistic, reflect the Project Sponsor's plans and specifications, and agree with the overall project scope, cost estimate and schedule. Real estate oversight in regard to these four

areas should be an active process throughout the life of the project, and should be scoped to the complexity of the proposed real estate program.

For projects with a significant real estate component, early discussion between the RE PMOC and the grantee are necessary to establish a proper foundation for future activities. The RE PMOC should make special efforts to verify that any proposed mitigation measures can be implemented in compliance with all applicable laws, regulations, and guidance, including 49 CFR Part 24 and FTA Circular 5010.

The scope of real estate acquisition should also be examined by the RE PMOC to determine that real estate acquired for the project is necessary and not in excess of those property interests necessary to construct, operate and maintain the project funded by FTA. This may entail an engineering review by the PMOC or FTA.

The RE PMOC should review the RAMP, scope of real estate to be acquired, cost estimate and schedule at the milestone points shown in the table in Appendix B; and more frequently if directed by FTA. Tailor the review to the information and materials available at the time. Prior to entering Engineering, the PMOC shall check that the Project Sponsor has identified the necessary parcels; its proposed schedule; potential real estate problems and possible solutions related to these problems. Any environmental documentation and environmental site assessments should also be evaluated for accurate depiction of any real estate acquisition impacts, contamination, and any proposed mitigation measures. During engineering, verify that the planned real estate acquisitions and relocations are comprehensive; the schedule is coordinated with the critical path of project schedule; the real estate cost estimates are reasonable; the Project Sponsor is adhering to the policies and procedures set forth in the RAMP.

If any supplemental real estate services are needed, they may be authorized by the Region or Headquarters and conducted under OP 3.

For projects other than New Starts, the PMOC shall check for compliance with the requirements of 49 CFR Part 24. At a minimum, the PMOC shall review the RAMP at the milestone points described in Section 6.1 through 6.3, as appropriate for the project.

## **6.1 Prior to Engineering**

The RE PMOC may provide technical assistance as needed for the development of the NEPA document(s) – review and assess the adequacy and soundness of the Project Sponsor’s identification of real estate impacts and proposed methods of mitigation (if any), ensuring compliance to Federal law, regulation and guidance.

The RAMP is required to contain information demonstrating an adequate real estate organization with well-defined reporting relationships and responsibilities:

- Organizational Structure – Review and assess the adequacy and soundness of the Project Sponsor’s organizational structure as it relates to real estate acquisition

management including identification and definition of staff functions with an organizational chart with positions and/or names and contractual functions; identification of persons to develop the RAMP; deal with plan changes, corrections, or modifications as a result of negotiations, etc.; ensure the Project Sponsor has identified who will be accountable for specific responsibilities such as the person who will be responsible for identifying appraisal problem and developing scope of work; the person responsible for monitoring status of activities required for acquisition and relocation; the persons or parties to establish offers of just compensation; the person who can authorize administrative settlements and authorize condemnation.

- Document Control – Review and assess the adequacy of the Project Sponsor’s document control plan as it relates to real estate acquisition management including ensuring the Grantee has a sound plan for filing documents, maintenance of documents, and organization of parcel files, acquisition files, relocation files, and condemnation files.
- Property Management Plan – Review and assess the adequacy and soundness of the Project Sponsor’s preliminary property management plan including who will perform property management; what is included in the scope of work for property management; who contracts for demolition; what are the contracting requirements; what are the reporting requirements; policies regarding rental property for extended possession by tenants and owners; who will prepare and track excess parcels; what is the process to evaluate these parcels.

In addition, the RAMP should contain, and the RE PMOC should review, the following items:

*(Note: It is recognized that these items may be in a preliminary state; however, they must be present)*

- Acquisition Plan/Relocation Plan – Review and assess the adequacy and soundness of these preliminary plans including the following information:
  - Proposed acquisitions and relocations
    - Map highlighting the parcels proposed to be acquired
    - Spreadsheet to track parcels by
      - Description of properties
      - Lengths of right-of-way (related to construction segments)
      - Dimensions of parcels
      - Full and partial takes, easements and temporary easements
      - Residential and non-residential displacements/relocations
      - Information on major stakeholders, property owners
      - Title information
      - Foreseeable impacts due to the acquisitions and relocations;
      - Identification of properties that may require environmental mitigation, (commitment in FONSI or ROD to mitigate); properties requiring

- contamination remediation (based on environmental site assessments);
- extensive utility work; or third party coordination
- Status of appraisals
- Type of transaction
  - purchase such as fee simple, etc.
  - acquisition of other property rights, easements, etc.
  - functionally replaced properties (wet lands, park lands, etc.)
  - land exchanges, just compensation or combinations, thereof
  - administrative settlements
  - eminent domain (process and lead-time required to obtain physical possession)
  - relocation/dislocation
  - identification of utility relocations: how they will be handled and associated real estate impacts such as replacement easements
  - identification of potential third party agreements, how they will be obtained and who, specifically, will be responsible for obtaining them
- Schedule for the acquisitions and displacements/relocations, showing the relationship with the critical path of the project schedule; schedule for negotiations, offers of Just Compensation, closing / escrows; schedule for condemnation proceedings should that become necessary; should include detailed timeframes for each required activity.
- Cost estimate for the acquisitions and displacements/relocations
  - Refer to Appendix C: Estimates for real estate are frequently found to be low and inaccurate. Real estate costs are often the weakest link in the overall project cost estimate. FTA provides a model estimating spreadsheet shown in Appendix C as an assist to RE PMOC in their review of the Project Sponsor's approach to estimating real estate costs. The spreadsheet may help to ensure that all components are included in the estimate. Supportable realistic allowance should be established to pay for overages related to administrative settlements and adverse condemnation awards. State departments of transportation may have statistical data on administrative settlements and condemnation outcomes that will aid in more accurately estimating real estate costs.
  - The RE PMOC shall review and assess the adequacy and soundness of the Project Sponsor's preliminary real estate cost estimate including the Project Sponsor's basis for the estimate; anticipated updates of estimate; and how the estimate will be compared to actual costs as the project progresses. See Appendix C for further discussion. Identify real estate acquisition program risks and recommend mitigation actions by the Grantee. The overall estimate for real estate must include sufficient cost to meet the contractual service needs of the project. These include title work, appraisals, appraisal reviews, legal and relocation assistance services, with other related costs. In addition, a supportable, realistic allowance should be established to pay for overages related to administrative settlements and adverse condemnation awards.

In reviewing the Project Sponsor's RAMP, the RE PMOC shall verify the Grantee

has included a short history of the project. Considering the Project Sponsor's level of compliance with the Uniform Act and other regulations, the RE PMOC shall review and summarize its findings and opinions and provide recommendations.

## **6.2 In Engineering**

When the Project Sponsor obtains the NEPA determination, usually the Record of Decision (ROD) or Finding of No Significant Impact (FONSI), the Project Sponsor is granted pre-award authority for real estate acquisition and agreements with third parties for operations rights, easements, etc. It is critical, therefore, that the RAMP be substantially complete prior to the signing of the ROD or FONSI.

Prior to FTA approval of the Full-Funding Grant Agreement, the RAMP should be fully complete. The real estate schedule should be consistent with the critical path in the project schedule. The RAMP should demonstrate that adequate relocation planning has been accomplished per 49 CFR Section 24.205, including recognition of problems associated with displacement and an evaluation of program resources available to carry out timely and orderly relocations.

The RE PMOC should review and summarize its findings and opinions and provide recommendations with respect to the Project Sponsor's plans and procedures:

- Introduction – Review any updates to the Project Sponsor's Introduction section of its RAMP and ensure Grantee compliance with applicable statutory, regulatory and circular requirements. With consideration of the laws, regulations, etc. that apply to the work, the PMOC should review and analyze the Project Sponsor's information for reasonableness within the scope and cost parameters; for completeness and consistency.
- Organizational Structure – Review and assess the adequacy and soundness of the Project Sponsor's organizational structure including any updates or modifications to the organizational structure and or staff functions, and responsibilities and lines of authority.
- Document Control – Review and assess the Project Sponsor's real estate document control plan and any updates to such plan.
- Property Management Plan – Review and assess the adequacy and soundness of the Project Sponsor's property management plan including who will perform property management, what is included in the scope of work for property management, who contracts for demolition, what are contracting requirements, what are reporting requirements, statement of policy regarding rental property for extended possession by tenants and owners, who will prepare and track excess parcels, what is the process to evaluate these tracts.
- Acquisition Plan
  - Tracking - Review and assess the adequacy of the Project Sponsor's plan for tracking all required activities associated with acquisition and relocation including who will be responsible for developing, monitoring, and updating the tracking reports on a consistent and ongoing basis. This tracking plan should also include a



process through which the RE PMOC can monitor the progress of the real estate program through regular access to the tracking reports.

- Plans - Review and assess the adequacy of the Project Sponsor's acquisition plan including who prepares the plans, who can authorize plan revisions, who will track plan revisions, modifies the plans; and what is the process for considering property owner's request to modify, etc.
- Ownership and title information – Review the Project Sponsor's plans for gathering ownership and title information as well as its plan for identifying contractual requirements and whether contracts are in place. Review the Project Sponsor's process to update and correct errors and omissions.
- Review Project Sponsor's plan for identification of parcel specific environmental assessments (i.e., Phase 1, Phase 2, etc.) and how this information will be provided to the appraisers.
- Appraisal – Review the Project Sponsor's plan for performing appraisals including appraisal scope of work development, identifying who will perform the appraisals and identifying contracting requirements if necessary and estimated duration of this task. Review what process is in place to insure the identification and resolution of personalty/realty issues at the time of the appraisal. Review the Project Sponsor's plan for obtaining copies of appraisals and sharing of such appraisals with property owners. Review the adequacy and soundness of the Project Sponsor's appraisal review process including the following: who will do this task, what is the appraisal scope of work (SOW) for the task in general, what is the turn turnaround time for this work, will the reviewer handle updates of appraisals, will reviewer handle modification of appraisals based on owner claims, will review appraiser review owners' appraisals, will review appraisal be used to support administrative settlements. If contaminated property is involved, will the appraisal SOW delineate the appraiser's responsibility and information to be provided in that regard?
- Establishment of offer of Just Compensation – Review the adequacy and soundness of the Project Sponsor's plan for establishing an offer of just compensation including identifying responsible staff and the basis of the offer.
- Negotiations – Review the adequacy and soundness of the Project Sponsor's plan for conducting negotiations including the following information: who will negotiate, what is their authority, when will negotiations initiate, who must approve administrative settlements and other concessions to property owners, what is the documentation required of the negotiations process, who signs letter of offer, will negotiator also handle relocation payments, how is interface between negotiations and condemnation handled, what documents will negotiator be expected to provide to legal for settlement and condemnation, will negotiator be present at closing. If consultants will be utilized, what are the contracting requirements and the duration of the associated lead time?
- Closing / Escrows – Review the adequacy and soundness of the Project Sponsor's plan for handling closings / escrows including the following information: who will provide this service, how will it function, what is the estimated length of time to deposit funds to escrow for closing, what documents will be necessary, how will

closings be conducted, what form of deeds will be used, how will partial releases be handled and how will the expected duration of that process fit into the schedule, how will property taxes be paid and exempted.

- Condemnation – Review the Project Sponsor’s plan for condemnations including the following information: who will authorize suits, does agency have quick take authority, what is the lead time to obtain court ordered legal/physical possession, who will file, what is relationship between grantee and its legal personnel, what authority does attorney have for settlement, what are progress reporting requirements, expected timeframe to obtain possession, and how contamination remediation will be addressed with the responsible parties, in the event it is encountered within the project limits.
- Disposition Plan – Review and assess the adequacy and soundness of the Project Sponsor’s re-sale plan including who will determine when to sell excess land and /or buildings, what is the disposition of proceeds, and what are the agency, state or local restrictions on the sale of public property. In the disposal of any excess land, FTA appraisal procedures found in Circular 5010.1D, Chapter IV apply.
- Relocation Assistance Plan (for projects with displacements)
  - Review the adequacy and soundness of the Project Sponsor’s plan to staff and administer its relocation assistance plan including the method to employee staff or contractors; lead time to employ the staff; and supervision of staff or contractors.
  - Review who is authorized to compute payments, who will approve payments, what is the relocation process to be utilized in the project, what level of advisory services will be needed, and who will provide advisory services. If last resort housing be required what is the justification and how will it be conducted.
  - Determine the estimated time to pay a relocation claim, what authority and controls will be needed for advance payment of claims, what documentation will be retained in the files, what forms will be used
  - Review the adequacy and soundness of the Project Sponsor’s Relocation Assistance Plan per the regulatory requirements at 49 CFR 24.205 including the degree to which it contains the following elements:
    - Description of project
    - Discussion of displacees’ characteristics and needs
    - Inventory of available housing
    - Discussion of non-residential displacees’ needs
    - Inventory of Non-Residential Property
    - Discussion regarding concurrent displacements
    - Needs vs. availability analysis and correlation
    - Advisory Services
    - Conclusion
  - Appeals – Review and assess the adequacy and soundness of the Project Sponsor’s plan for conducting administrative appeals such as the legal requirements for administrative appeals, how will the agency establish and staff an appeal function, who is the recipient of appeal requests, and what is the appeal process.
- Third Party Real Estate Agreements – Ensure the Grantee has identified all third party agreements anticipated and included any draft or executed agreements with third parties

that may involve the transfer of real estate interests. This review should also include who will be responsible for negotiating third party agreements, anticipated time required and any potential issues that may involve the transfer of real estate interests.

- Real Estate Cost Estimate – Review and assess the adequacy and soundness of the Project Sponsor’s Real Estate Cost Estimate for acquisitions and relocations including a review of the background of estimate; what methodology was used; when the estimate was completed, what was the basis of the estimate, and how and when will the any need for an update of the cost estimate be updated, and how the estimate will be compared to actual costs as project progresses. Identify real estate acquisition and relocation program risks and recommend mitigation actions by the Grantee. Review the cost basis of the estimated allocations for various contractual services necessary for the project. Refer to Appendix C.
- Acquisition and Relocation Schedule - Review the adequacy and soundness of the Project Sponsor’s schedule including its critical path for real estate, established timeframes for acquisition and relocation, schedule for property negotiations for the project and identification of potential difficulties and delays. The PMOC shall also review the Project Sponsor’s plans for tracking and reporting progress and the dissemination of such progress updates. The real estate program should not be expected to cure the shortfall of time resulting from prior delays in other functional areas of the project development process.

### **6.3 Requesting FFGA**

Prior to FTA award of the Full Funding Grant Agreement (FFGA), the information in the RAMP should be updated if necessary and third-party agreements finalized. Cost estimates and schedules should all be current.

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

The RE PMOC shall provide FTA with a written report of its findings, analysis, recommendations, and professional opinions, including a description of the review activities undertaken. In the report, state findings in descending order of importance (most likely, largest consequences, least likely, moderate consequences). Make recommendations for modifications. The report should be sent to the FTA Headquarters’ Real Estate Specialists for final review and approval. After approval, the RE PMOC should share the report with the Grantee and work with the Grantee on issues of non-compliance. Should the issues persist and a broader review is necessary, the review will be directed by the Headquarters’ Real Estate Specialists with support from the Region.

The report formatting requirements of OP 01 apply as summarized below. When necessary, RE PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The RE PMOC may add other software as required, but documentation and report data shall be made available to FTA.

As the PMOC products are delivered to the FTA, it is the responsibility of the FTA Contracting Officer Representative (COR)/Alternate Contracting Officer Representative (ACOR) to evaluate the deliverables against the criteria set forth in the Acceptable Quality Level (AQL) in Appendix A of this OP. Upon request the headquarters' real estate specialists will provide assistance in completing the form. The COR/ACOR should maintain a copy of the completed assessment of the PMOC's deliverables for ongoing discussions with the PMOC and for future reference during the formal contractor's performance evaluation period. Copies of the completed assessments shall be made available to the headquarters' COR upon request.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1	The PMOC shall assess the reliability of the elements of Project Sponsor's real estate acquisition program.	R1a. The PMOC shall develop and document a process for review and analysis of a Project Sponsor's RAMP and supporting documents.		<b>Q1a.</b> Process exists and has been followed.	<b>M1a.</b> Evidence of a documented process.	<b>MM1a.</b> Periodic review by FTA or its agent.
		R1b. The PMOC shall use its process and project management judgment to validate the thoroughness of the RAMP and supporting documents at all phases of the Project.		<b>Q1b.</b> Assessment must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>M1b.</b> Documented assessment of the reliability of the RAMP and supporting documents.	<b>MM1b.</b> Periodic review by FTA or its agent.
2	The PMOC shall provide oversight, continuous review and evaluation of Project Sponsor's real estate acquisition program to ensure compliance with federal requirements and Project Sponsor's ability to maintain its proposed real estate scope, schedule and budget.	R2a. The PMOC shall review the project real estate schedule and cost estimates at specific milestones in b), c) and d) below, as well as when directed by FTA, identify possible problems and determine solutions.		<b>Q2a.</b> Professional opinion of the real estate acquisition process as implemented.	<b>M2a.</b> Documented evidence of a thorough review by PMOC for completeness and level of detail of the real estate acquisition program, supported by professional opinion.	<b>MM2a.</b> Periodic review by FTA or its agent.
		R2b. In Prior to entering Engineering: The PMOC shall provide FTA with its opinion and recommendations of Project Sponsor's RAMP and its demonstration of an adequate real estate organization with proper Federal compliance, Organizational Structure, Document Control, Property Management Plan and Real Estate Acquisition and Relocation Plan.		<b>Q2b.</b> Professional opinion of the RAMP and supporting documents at this Project phase.	<b>M2b.</b> Documented evidence of review of the RAMP and supporting documents at this Project phase, supported by professional opinion.	<b>MM2b.</b> Periodic review by FTA or its agent.
		R2c. In Engineering: The PMOC shall provide FTA with its opinion and recommendations of Project Sponsor's RAMP, and specifically as to completeness and integration with the Project schedule critical path prior to entry into FD.		<b>Q2c.</b> Professional opinion of Project Sponsor's RAMP and supporting documents at this Project phase.	<b>M2c.</b> Documented evidence of a thorough review of Project Sponsor's RAMP and supporting documents at this Project Phase, supported by professional opinion	<b>MM2c.</b> Periodic review by FTA or its agent.
		R2d. Requesting FFGA: The PMOC shall, prior to award of FFGA, verify that all necessary updates to the RAMP are made and third-party agreements finalized and provide FTA with an opinion and recommendations of Project Sponsor's RAMP.		<b>Q2d.</b> Professional opinion of Project Sponsor's RAMP and supporting documents at this phase of the Project.	<b>M2d.</b> Documented evidence of a thorough review of Project Sponsor's RAMP and supporting documents, verification of updates and finalization of third-party agreements, supported by professional opinion.	<b>MM2d.</b> Periodic review by FTA or its agent.
3	The PMOC shall document its findings, professional opinions, and recommendations in a report to the FTA.	R3. The PMOC shall present its findings, conclusions, and recommendations to FTA and reconcile those recommendations with the Grantee to the extent possible.		<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with Grantee to the extent possible.	<b>M3.</b> PMOC's findings, conclusions, recommendations, and presentation.	<b>MM3.</b> Periodic review by FTA or its agent.

## APPENDIX B

### Sample Table of Contents for Real Estate Acquisition Management Plan

Real Estate Acquisition Management Plan Elements	Prior to Entering Engineering	In Engineering	Requesting Full Funding Grant Agreement	In Bid / Award and / or Construction
Introduction	●	○		
Agency's Real Estate Policies and Procedures referring to applicable statutes, regulations, policies	▲	●	○	
Real Estate Team Organizational Structure	▲	●		
Staff and Contractor functions/resumes/description of roles and responsibilities for Acquisition and Relocation	▲	●		
Lines of Authority	▲	●		
Document Control	●	○	○	
Property Management Plan	▲	●	○	
Disposition Plan	▲	●	○	
Acquisition Process	▲	●	○	
Acquisition Plan	▲	●	○	
Ownership and Title Information	▲	●	○	
Acquisition Schedule, include critical path from Project Schedule	▲	●	○	
Pre NEPA ROD: Draft Agreements w/RE Third Parties	▲	●	○	
Post NEPA ROD: Executed Agreements w/RE Third Parties		▲	●	○
Cost				
Estimate	▲	●	○	
Appraisals	▲	●	○	
Property Contamination	▲	●	○	
Negotiations/ Offers of Just Compensation	▲	●	○	
Final Costs			●	○
Closing / Escrows	▲	●	○	
Condemnation	▲	●	○	
Relocation Process	▲	●	○	
Relocation Plan – Owner, Tenant information	▲	●	○	
Relocation Schedule, include critical path from Project Schedule	▲	●	○	
Cost				
Estimate	▲	●	○	
Negotiations/Final Costs			●	○
Appeals			●	○

NOTE: ▲ – Preliminary information required; ● – Element to be completed; ○ – Element to be modified or augmented with additional information as necessary.

## APPENDIX C

### Real Estate Cost Estimate Template and Supporting Questions

Cost Estimate Template		Desc/number of parcel	Cost	Subtotal	Total
LAND					
	Fee Acquisitions		\$		
	Full Takes		\$		
	Partial Takes		\$		
	Easement Acquisitions		\$		
	Other Rights		\$		
	TOTAL LAND COST			\$	
	Administrative Settlement Rate of ____ x Administrative Increase ____ = ____%			\$	
	Condemnation Rate of ____ x Excess Award ____ = ____%			\$	
	TOTAL LAND/SETTLEMENT				\$
RELOCATION					
	Residential (Owners)		\$		
	Residential (Tenants)		\$		
	Business (Owners and Tenants)		\$		
	Others (Personal Property Moves)		\$		
	Last Resort Housing		\$		
	TOTAL RELOCATION				\$
SERVICES					
	Title Work (Reports, Insurance, Closings)		\$		
	Appraisals		\$		
	Appraisal Reviews		\$		
	Other Services related to acquisition, relocation, property management, etc.		\$		
	Legal (Pre-condemnation)		\$		
	Legal (Condemnation)		\$		
	TOTAL SERVICES				\$
GRAND TOTAL					\$

#### Supporting Questions

Real estate acquisition can significantly affect a project's cost and schedule because of the number and types of uncertainties and risks. In the RAMP, real estate cost and schedule elements should be fully described along with notations regarding perceived uncertainties and risks on a per parcel basis. The PMOC should discuss the uncertainties with the Grantee,

the likelihood of a negative occurrence, the potential magnitude, and the Project Sponsor's plan for mitigating the risk. An example of mitigation is requiring that property acquisition be complete prior to advertising construction contracts. The PMOC should verify the Grantee understands the potential cost and schedule impacts to the project if real estate acquisition is delayed. As an assist to the PMOC in reviewing, the following questions are provided:

### **Cost Impacts**

If available, review historical data for real estate acquisition in the immediate project area to assess cost uncertainties.

- 1) Cost of appraisals, review appraisals, survey, title, and closing: Has escalation of appraisals versus the timing of actual acquisition been taken into account?
- 2) Damage to remainder: Have additional costs that may be incurred due to partial acquisitions been taken into account? (Partial acquisitions also tend to be impacted more frequently by design changes that occur when acquisition is initiated prior to final design.)
- 3) Cost of Settlement: Has the potential increase between negotiated costs versus appraised cost been considered? Was an acquisition incentive program approved by FTA and implemented appropriately?
- 4) Court and Legal Costs: If settlement cannot be reached have court and legal costs been considered?
- 5) Cost to Cure: Was the cost to cure considered and addressed in the appraisal scopes of work, where the cure may be economically justified?
- 6) Relocations: Have all the costs of relocating the business or residence (for example replacement and moving costs) been included in the estimate? Were the replacement housing payment negative equity (underwater mortgages), protective rental cost to preclude subsequent occupants included in the cost estimate and addressed in the relocation plan approved by FTA?
- 7) Demolition: Is the cost of demolition included in the real estate or overall project estimate?

### **Schedule Impacts**

The PMOC should study the Project Sponsor's detailed real estate acquisition schedule with an eye to schedule uncertainties. The schedule should display the need date of each parcel and each step required to achieve that date.

- 1) Appraisal: Has the time to order and receive appraisals been considered?
- 2) Environmental Assessments: Has time to order Phase 1 and 2 been factored into the schedule in order to provide the reports to the appraiser for consideration?



- 3) Offer: Is a minimum time period allowed for the property owner to accept the offer considered in the development of the schedule? Federal guidelines suggest a minimum of 30 days.
- 4) Negotiations: If the initial offer is not accepted by the property owner what is the amount of time the Grantee has allocated to take additional measures prior to proceeding to condemnation (if Grantee has the authority for condemnation).
- 5) Quick Take, Condemnation or Eminent Domain Process: Check the amount of time estimated for adequacy, of lead time for acquisitions that are dependent on court ordered legal and physical possession.
- 6) Project Sponsor's Board approval: Check for adequacy the amount of time between offer acceptance or the settlement is reached and the Project Sponsor's Board approval. County commission or higher level approval may be required by some agencies.
- 7) Review time by funding agencies: Has time been allowed for potential multiple agency concurrence (federal, state, and local)?
- 8) Title: Following all approvals and concurrences, what is the time to needed to transfer ownership?
- 9) Relocations: Has the time for relocating business or residence been accounted for?
- 10) Are the real estate clearance schedule milestones compatible with the project schedule for segments being advanced to construction?

### **Other**

The Agency must account for the need for coordination between real estate acquisition and construction activities. As noted above, re-sequencing of construction due to delayed real estate can result in major cost and schedule impacts to the project.

- 1) Experience of Grantee: Experience of the Project Sponsor's real estate staff and consultants is critical to reduce uncertainties and risks to the project. Are they experienced in acquiring real estate in accordance with the requirements of the URA?
- 2) Other Parties
  - a) Third party acquisition, such as real estate to be acquired by a local agency or entity such as a City: Consider the experience of the local agency in real estate acquisition under Federal acquisition laws.
  - b) Acquisition of parcels from Railroads: Has the time and cost associated with obtaining agreements for acquiring parcels, obtaining easements, and performing legal reviews by Grantee and Railroad been considered?

- c) Negotiations with a Private or Public Utility Agency: Does the agency have the time and ability to perform in a timely manner? Does it have cost estimating and scheduling ability? Consider “Prior Rights” documentation and the potential resultant replacement easement or Right of Way for utility companies. Consider the reasonableness of utility relocation and “betterments” in the project cost.
- 3) RAMP: Does the RAMP adequately describe the steps required for acquisition?
- 4) Design Development: Consider the level of design development when considering the real estate requirements for the project. Are the requirements for real estate adequately developed with respect to the number, type, and size of parcels needed?
- 5) Parcels: Have the types of acquisitions been defined by full or partial take, permanent or construction easement, or air rights?
  - a) Special types of Parcels: Certain types of parcels traditionally take longer to acquire and to provide relocation services – e.g. low income housing; and religious facilities. Consider these as well as “functional replacement properties” – certain publicly owned facilities (e.g. firehouse) that may need to be functionally replaced prior to displacement of the subject.
  - b) Joint Development/Transit-Oriented Development (JD/TOD): Does the property have the potential to achieve JD/TOD? Does the Grantee have experience with JD/TOD and with FTA related guidance?
- 6) Potential of hazardous materials: Has a search of historical uses of the parcel(s) been conducted? Have the cost and time to provide environmental mitigation been factored?



## Oversight Procedure 24 – Quality Assurance/Quality Control Review

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### 1.0 PURPOSE

The purpose of this Oversight Procedure is to describe the review, analysis, and recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) with regard to the Project Sponsor's quality assurance and quality control program and procedures and the implementation of such procedures.

### 2.0 BACKGROUND

The review and monitoring of a Project Sponsor's Quality Assurance/Quality Control (QA/QC) program has been a primary function of the Project Management Oversight (PMO) Program since its inception. Ensuring QA/QC is a cornerstone of the PMO Program. To a large degree, the successful implementation of a major capital project depends on the development and execution of a sound QA/QC program by the responsible Project Sponsor and its design and construction contractors.

Specifically, 49 U.S.C. 5327, Project Management Oversight, of the Federal Transit Act, states that a recipient's Project Management Plan (PMP) shall include, at a minimum, a quality assurance and quality control program which defines functions, procedures, and responsibilities for the design and construction of a major capital project. PMO Program contractors are charged with reviewing and monitoring a Project Sponsor's *development and implementation* of a PMP. A vital part of a Project Sponsor's PMP is the QA/QC program which defines a process for assuring that a quality project is designed and constructed.

The FTA Quality Management System Guidelines (QMS), issued in December 2012, define and delineate QA and QC activities:

- **Quality Assurance** includes planning for quality management activities and confirming that those activities were carried out
- **Quality Control** includes the actual implementation of quality management activities, inspecting to confirm that processes are performed correctly and completely, and the documentation thereof.

The FTA Quality Management System Guidelines also recommend that a QA/QC program should specify the organization, procedures, documentation, testing, and methods to be used to provide quality in accordance with contract documents. More specifically, a typical QA/QC program should address, but not be limited to, the following elements.

- Management Responsibility
- Documented Quality Management System

- Design Control
- Document Control
- Purchasing
- Product Identification and Traceability
- Process Control
- Inspection and Testing
- Inspection, Measuring, and Test Equipment
- Inspection and Test Status
- Nonconformance
- Corrective Action
- Quality Records
- Quality Audits
- Training

### **3.0 OBJECTIVES**

The objective of this review is to assess and evaluate the adequacy and soundness of the Project Sponsor's QA/QC program and the Project Sponsor's implementation of such program over the course of the Project.

### **4.0 REFERENCES**

The following are the principal, but by no means the only, references to Federal legislation, regulation, and guidance with which the PMOC should review and develop a strong understanding as related to the Project Sponsor's work being reviewed under this OP:

#### **4.1 Legislative**

- Moving Ahead for Progress in the 21<sup>st</sup> Century, or MAP-21, P.L. 112-141

#### **4.2 United States Code**

- FTA statutes, 49 U.S.C. Chapter 53

#### **4.3 Regulations**

- Project Management Oversight, 49 C.F.R. Part 633

#### **4.4 FTA Circulars**

- C5200.1A, Full-Funding Grant Agreements Guidance, 12-05-02;

#### **4.5 Guidance**

- FTA's Quality Management System Guidelines, December 2012.

#### **4.6 Relevant OP References**

- OP 1 Administrative Conditions and Requirements
- OP20 Project Management Plan Review

## **5.0 PROJECT SPONSOR SUBMITTALS**

The submittals to be secured by the PMOC from the Project Sponsor shall be appropriate with the stage of project development. Such submittals include, but are not limited to, the following:

- Quality Assurance/Quality Control (QA/QC) Program Plan (subplan of PMP)
- Project Management Plan (PMP)
- Other sub plans

## **6.0 SCOPE OF WORK**

The PMOC shall review the adequacy and soundness of the Project Sponsor's QA/QC Program Plan. This review will occur upon request for entry into Engineering, and upon request for receipt of a Full Funding Grant Agreement (FFGA) or Small Starts Grant Agreement (SSGA) or at FTA requests. Subsequent reviews may be required if updates and/or changes are made to the Project Sponsor's QA/QC plan.

Appendix B contains a typical Table of Contents for a QA/QC Program plan and the milestones for completion of the elements within this plan. Instructions for PMOC review of Project Sponsor's internal cost, schedule, and risk control procedures are contained in other OPs.

### **6.1 Quality Management Program**

The PMOC shall confirm that the Project Sponsor has established a documented Quality Management Program (QMP) of procedures and activities to support the entire organization, as well as the project.

The PMOC shall confirm that the program can ensure satisfaction of project quality objectives related to the control of documents, design, procurement, construction, start-up, and operations. Procedures and activities should include document configuration, change control, and design review. Additionally, procedures may include, as relative to the project, soils and materials inspection and materials testing, among other activities.

Regarding Quality Assurance, the PMOC shall evaluate the Project Sponsor's plan for quality management activities; capabilities regarding the establishment of quality systems, identification and evaluation of quality problems, and provision of solutions. The PMOC shall confirm that quality activities were carried out.

Regarding Quality Control, the PMOC shall evaluate the Project Sponsor's actual implementation of quality management activities and the documentation thereof.

The PMOC shall confirm and assess that the Project Sponsor has adequately defined its quality policy and the quality responsibilities of the project team. The Project Sponsor is responsible for ensuring that the quality policy and program are being implemented and maintained at all levels of the Project Sponsor organization and project staff. The PMOC shall confirm that the Project Sponsor has assigned qualified personnel, independent of those having direct responsibility for the work being performed, to be responsible for QA/QC functions within the project. The PMOC shall also confirm that such personnel are implementing and maintaining the Project Sponsor's quality policy.

The Project Sponsor shall also establish an internal audit process to ensure that the elements of the quality management program are functioning as intended. The PMOC shall review the Project Sponsor's quality control and assurance procedures and determine the adequacy of such procedures.

## **6.2 Document Control**

The PMOC shall confirm that the Project Sponsor has an established document control program within its QA/QC Program Plan, and shall assess the adequacy of such control and assurance procedures and requirements. During review of the Project Sponsor's document control procedures, the PMOC shall confirm that the Project Sponsor has specified a written document control procedure, which includes document review and document distribution and storage, and that incorporates the requirements and responsibilities of design consultants and various construction contractors. Further, the PMOC shall confirm that the Project Sponsor has in place adequate quality assurance procedures to ensure document controls are in place and being implemented.

## **6.3 Design Control**

The PMOC shall confirm that the Project Sponsor has an established Design Control Plan within its QA/QC Program Plan and shall assess the adequacy of such quality control and assurance procedures and requirements. The PMOC shall confirm that the Project Sponsor has specified procedures for design verification and design review, and shall assess the adequacy and efficacy of these control and assurance procedures. Design verification procedures shall include activities such as independent checks on design drawings and specifications and/or checklists documenting completeness, coordination, constructability, operability, and maintainability; and design calculations for structural, mechanical, electrical, etc. Further, the PMOC shall confirm that the consultant(s) responsible for design have established procedures for controlling their design processes. The PMOC shall also confirm that the Project Sponsor has specified design review procedures for all design consultants and procedures for design and/or specification changes including signoff and documentation of such changes. Finally, the PMOC shall confirm that the Project Sponsor has documented procedures and requirements regarding "as-built" documents. Further, the PMOC shall confirm that the Project Sponsor has in place adequate quality assurance procedures to ensure design control procedures are in place and being implemented.

## **6.4 Procurement/Construction/Inspection**

### **6.4.1 Procurement**

The PMOC shall confirm that the Project Sponsor has in place written procedures that will; ensure competition in the bidding by obtaining bids from a number of qualified contractors for desired services. The PMOC shall confirm that the Project Sponsor complies with the requirement to include in its procurement plan a statement of general requirements, which includes quality requirements and a requirement for any past, demonstrated capability, and performance of quality implementation. The PMOC shall review and assess the Project Sponsor's procedures for ensuring that quality control requirements are included within proposals/bids, and formally communicated to potential consultants/contractors/subcontractors.

The PMOC shall review the Project Sponsor's procedures for ensuring that procurement documents are reviewed and approved by a designated authority prior to release, with special attention to the review of the Project Sponsor's construction contract documents including general and special conditions and quality control requirements.

The PMOC shall confirm that the Project Sponsor includes in contract documents, where appropriate, a requirement for equipment manufacturers or others supplying products for the project, that clearly provides for product identification and traceability. The PMOC shall also review and assess the adequacy of the Project Sponsor's requirements for product identification and traceability for products and materials turned over to the owner at project conclusion.

#### **6.4.2 Construction/Inspection**

The PMOC shall review and assess the adequacy of the Project Sponsor's requirements for a quality control inspection and testing program through all phases of the work including inspection and testing procedures for special processes and requirements for calibration and maintenance of inspection, measuring, and/or test equipment. The PMOC shall confirm that the Project Sponsor's QA/QC Program Plan adequately indicates and describes the types of inspection and testing required and the standards to be met and provides reference to such testing and standards requirements within the project specifications. Further, the PMOC shall also confirm that the Project Sponsor has in place adequate quality assurance procedures to ensure successful implementation of the quality control program during construction of the works.

The PMOC shall review and assess the adequacy of the Project Sponsor's procedures for handling nonconforming work. The PMOC shall confirm that such procedures define responsibilities, conditions that would cause work to stop, and documentation procedures to record nonconforming work. Further, the PMOC shall review and assess the adequacy of the Project Sponsor's procedures for determining the root cause of the nonconforming work and taking corrective action to preclude recurrence.

#### **6.5 Operations, Startup, and Training**

The PMOC shall review and assess the adequacy of the Project Sponsor's control procedures for the testing of systems, vehicles, and service equipment, as well as the Project Sponsor's safety certification process, training procedures for operating and maintenance to ensure a smooth transition to operations. The PMOC shall also confirm that the Project Sponsor has in place adequate quality assurance procedures to ensure successful implementation of the training program.

### **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall provide the FTA with a written report of its findings, analysis, recommendations, and professional opinions, including a description of the review activities undertaken. After FTA approval, the PMOC should share the report with the Project Sponsor. In the event that differences of opinion exist between the PMOC and the Project Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile with the Project Sponsor and provide the FTA with a report addendum covering the agreed modifications by the Project Sponsor and PMOC.

The report formatting requirements of OP 01 apply. When necessary, the PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may add other software as required, but documentation and report data shall be made available to the FTA.



## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1	The PMOC shall assess and evaluate the adequacy and soundness of Project Sponsor's QA/QC program and implementation of it throughout the course of the Project.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of a Project Sponsor's QA/QC program.		<b>Q1a.</b> PMOC provides documentation of the process	<b>M1a.</b> Review of the process documentation.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process and project management judgment to evaluate the adequacy, soundness and implementation of the QA/QC program over the course of the Project.		<b>Q1b.</b> Assessment must be made and the PMOC provides internal confirmation that the process has been followed.	<b>M1b.</b> Documented assessment of the QA/QC program and its implementation as an integral component of Project Sponsor's Project Management.	<b>MM1b.</b> Periodic review by FTA or its agent.
2	PMOC shall confirm that Project Sponsor has established a documented Quality Management Program (QMP) of procedures and activities that fully support the Project and the entire Project Sponsor organization.	<b>R2a.</b> The PMOC shall provide FTA with its opinion as to the ability of Project Sponsor's QMP to satisfy Project objectives related to documentation, design, procurement, construction, start-up, and operations.		<b>Q2a.</b> Professional opinion of the soundness of Project Sponsor's QMP for the Project phase.	<b>M2a.</b> Documented evidence of a thorough review by PMOC of soundness of Project Sponsor's QMP, supported by professional opinion.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall provide FTA with an opinion as to Project Sponsor's implementation of its Quality Assurance Plan, including quality management activities, quality systems, problem solving, and confirmation that quality activities were carried out.		<b>Q2b.</b> Professional opinion of implementation of Project Sponsor's QA Plan and confirmation that it was utilized throughout the Project.	<b>M2b.</b> Documented evidence of a thorough review of Project Sponsor's implementation of its QA Plan with confirmation that quality activities were carried out, supported by professional opinion.	<b>MM2b.</b> Periodic review by FTA or its agent.
		<b>R2c.</b> The PMOC shall provide FTA with an opinion as to Project Sponsor's implementation of its Quality Control Plan, including evaluation of the actual implementation of quality management activities and documentation of them by the Project Sponsor.		<b>Q2c.</b> Professional opinion of implementation of Project Sponsor's QC Plan throughout the Project.	<b>M2c.</b> Documented evidence of a thorough review of the implementation of Project Sponsor's QC Plan, supported by professional opinion	<b>MM2c.</b> Periodic review by FTA or its agent.
		<b>R2d.</b> The PMOC shall provide FTA with its opinion of the adequacy of Project Sponsor's QA/QC Plan with respect to document control procedures for review, distribution, and storage and content and that Project documentation is being maintained according to the Plan.		<b>Q2d.</b> Professional opinion of QA/QC document control and its implementation on the Project.	<b>M2d.</b> Documented evidence of a thorough review of the QA/QC Plan for document control and confirmation of its proper implementation, supported by professional opinion.	<b>MM2d.</b> Periodic review by FTA or its agent.
		<b>R2e.</b> The PMOC shall provide FTA with its opinion of the adequacy of Project Sponsor's QA/QC Plan with respect to Design Control and Design Control procedures and confirm that those procedures are in place and being adhered to.		<b>Q2e.</b> Professional opinion of QA/QC design control and its implementation on the Project.	<b>M2e.</b> Documented evidence of a thorough review of the QA/QC Plan for design control and confirmation of its proper implementation, supported by professional opinion	<b>MM2e.</b> Periodic review by FTA or its agent.
		<b>R2f.</b> The PMOC shall provide FTA with its opinion of the adequacy of Project Sponsor's QA/QC Plan with respect to procurement, construction/inspection, testing, startup, and training and confirm that Project Sponsor has in place the necessary procedures to insure competition in bidding, appropriate construction inspection and testing, vehicle and system testing and Project startup.		<b>Q2f.</b> Professional opinion of QA/QC procedures of procurement, construction/inspection, testing, startup, and training for the Project.	<b>M2f.</b> Documented evidence of a thorough review of the QA/QC Plan for proper procedures in procurement, construction/inspection, testing, startup, and training, supported by professional opinion	<b>MM2f.</b> Periodic review by FTA or its agent.

## APPENDIX A

### Acceptable Quality Level

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	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
3	The PMOC shall document its findings, professional opinions, and recommendations in a report to the FTA.	<b>R3.</b> The PMOC shall present its findings, conclusions, and recommendations to FTA and reconcile other reports and those recommendations with the Project Sponsor to the extent possible.		<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with Project Sponsor to the extent possible.	<b>M3.</b> PMOC's findings, conclusions, recommendations, and presentation.	<b>MM3.</b> Periodic review by FTA or its agent.

## APPENDIX B

### Sample Table of Contents – Quality Assurance/Quality Control Plan

Quality Control/Quality Assurance Table of Contents	In PD and/or Requesting Entry to Engineering	In Engineering and/or Requesting FFGA/SSGA	In Bid/ Award and/or Construction	Startup and Safety Certification
Quality Management Program				
Introduction	○			
Quality Policy	○			
Quality Objectives	○			
Quality Management Responsibility	○			
Quality Management Training Procedures	○			
Document Control Procedures and Activities				
Project Document Review, Distribution, Storage Procedures	○			
Quality Records Distribution, Maintenance, Storage Procedures	○			
Document Control Quality Assurance Procedures	○			
Design Control Procedures and Activities				
Design Verification Procedures	○			
Design Review Procedures for Drawings and Specifications	○			
Design Change Procedures	●	○		
Design Control Quality Assurance Procedures	○			
Procurement Procedures and Construction Procedures				
Construction Procurement Procedures, Identification of Contract Requirements	●	○		
Construction Contract Document Review Procedures including General and Supplementary Conditions	●	○		
Equipment and Vehicle Procurement Procedures	●	○		
Product Identification	●	○		
Product Identification Procedures	●	○		
Inventory Control Procedures	●	○		
Routing Documentation Procedures	●	○		
Special Process Procedures	●	○	○	
Construction Inspection Procedures (project site and fabrication site)	●	○	○	
Measuring and Test Equipment Quality Control Procedures	●	○	○	
Testing Procedures (soils, materials)	●	○	○	
Nonconformance Procedures	●	○	○	
Corrective Action Procedures	●	○	○	
Procurement/Construction Quality Assurance Procedures	●	○	○	
Operations, Startup, and Training				
Testing Procedures for Systems, Vehicles, Service Equipment	●	○	○	○
Training Procedures	●	○	○	○
Operations, Startup, Training Quality Assurance Procedures	●	○	○	○

NOTE: ▲ – Preliminary information required; ● – Element to be completed; ○ – Element to be modified or augmented with additional information as necessary.



## ***U.S. DOT Federal Transit Administration***

TPM-20 Office of Capital Project Management  
Project Management Oversight

### **Oversight Procedure 25 – Recurring Oversight and Related Reports**

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#### **1.0 PURPOSE**

The purpose of this Oversight Procedure (OP) is to describe the review, analysis, and recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) regarding ongoing or recurring oversight of major capital transit projects. In addition, it describes the expected type and quality of reports of the PMOC's findings, conclusions, and recommendations based on oversight activities.

#### **2.0 BACKGROUND**

In its project management oversight program, FTA oversees projects designated as major capital projects. These projects can extend for miles and cross jurisdictional boundaries while fitting into existing urban, rural, and railroad environments. They are designed to accommodate and transport persons while providing comfort, convenience, safety, and enjoyment.

Ongoing and recurring oversight by the PMOC helps FTA to accomplish its fundamental stewardship role, and provides Project Sponsors with technical oversight to identify and avoid problems, capture opportunities, mitigate risks, and meet the requirements of 49 CFR Part 633, the Project Management Oversight Rule. This rule states that "Project management oversight means the monitoring of a major capital project's progress to determine whether a project is on time, within budget, in conformance with design criteria, constructed to approved plans and specifications, and is efficiently and effectively implemented." The PMO rule also describes the roles and responsibilities of FTA and recipients of federal funds (Project Sponsors) with respect to the PMO program and Project Management Plans (PMPs).

OP 01 includes a discussion of the PMOC's role in oversight for FTA, while this OP focuses on ongoing and recurring oversight and the related support function of reporting. Note that OP 02 outlines the requirements for the PMOC Status Report, which highlights the PMOC's activities and related expenditure information and is intended for internal FTA use only.

#### **3.0 OBJECTIVES**

The primary objective of this OP and its related reports is to provide the FTA with timely information, supported by the PMOC's professional opinions, regarding the project's progress with respect to its intended scope, cost and schedule, its compliance with safety and other federal requirements, with the goal of providing its promised benefits.

The PMOC obtains important information in the course of overseeing the project related to the planning, design, and construction of the project, as well as the Project Sponsor's ability to implement the project. As part of ongoing monitoring, the PMOC is expected to proactively work with the FTA to identify potential problems and offer alternative approaches and suggestions to avoid or mitigate the problems. The PMOC is expected to promptly transmit information to FTA and keep the FTA informed of findings, project status, issues of concern, and recommendations for action. The reporting function of the PMOC allows the FTA to make proper and timely decisions regarding project advancement and funding, as well as appropriate corrective actions.

## **4.0 REFERENCES**

The PMOC should be familiar with and have an understanding of the references listed in Appendix A of OP 01, "Administrative Conditions and Requirements." This Appendix provides a listing of the principal, but by no means the only, references to Federal legislation, regulations, and guidance applicable to the Project Sponsor's project development activities and the PMOC's oversight function.

## **5.0 PROJECT SPONSOR SUBMITTALS**

Appendix D of this OP lists some of the project materials that the PMOC may review to perform its recurring oversight and monitoring functions.

## **6.0 SCOPE OF WORK**

### **6.1 Meetings with the Project Sponsor**

Recurring PMOC oversight of FTA funded projects will generally be on monthly basis until after the signage of a construction grant agreement upon which PMOC recurring oversight will be limited to quarterly reviews. However, the FTA may require more frequent oversight should the recipient fail to meet the requirements of the Project Management Plan (PMP) and/or the project may be at risk of going over budget or falling behind schedule or exhibit other significant problems. Oversight of projects monitored more frequently than quarterly will revert to quarterly oversight once the recipient has satisfactorily demonstrated compliance with the PMP and the FTA determines that the project is no longer at risk of going over budget or falling behind schedule or has resolved the problem that led to increased oversight. It must be noted that the limitation to quarterly reviews after signage of construction grant agreement does not apply to projects funded under TIGER and Hurricane Sandy programs.

FTA's Work Order Manager directs the PMOC to hold meetings with the Project Sponsor based on the project's activity level, which are typically quarterly unless more frequent oversight is required. The PMOC is encouraged to recommend adjustments to the meeting's frequency as the activity level changes.

The duration of the PMOC's visit will depend on the stage of the project's development, as well as the project's activity level. For projects in construction, the PMOC should anticipate sufficient time for being on-site to participate in site tours, meetings with individuals representing all aspects of the project (including quality control/quality assurance and safety personnel), and discussion with the

agency's management. The PMOC assesses the status of the project, including challenges, upcoming events, milestones passed etc.

The PMOC should be proactive in its oversight role. Through investigation and dialogue with the Project Sponsor, the PMOC should provide suggestions and recommendations to assist the FTA in solving any issues, as well as offer professional opinions based on its observations, knowledge, experience etc.

The information collected, findings, PMOC's analysis, recommendations, and professional opinions should be reflected in the PMOC's report so the report supports and assists in the oversight activity. The PMOC's report allows FTA to take actions and make decisions in a timely manner. The report is a critical input to FTA in its determinations regarding project advancement and funding as well as potential corrective actions.

All reports should be written simply and clearly. They should use all available tools to convey meaning, such as narrative, photos, tables etc. The PMOC should refer back to paragraphs if necessary and should minimize repetition within a report. The reports should include the PMOC's professional opinions regarding project status, as well as suggested alternative solutions and recommended courses of action. The reports should "tell it like it is."

Within 24 hours after the PMOC's meeting with the Project Sponsor, the PMOC shall provide a brief email to FTA with its assessment of the project, as well as project update and any issues in bullet format.

## **6.2 PMOC's Recurring Report**

The PMOC's Recurring or Monitoring Report provides FTA with an update of the entire project including critical issues, PMOC concerns, recommendations, and professional opinions regarding the project's status. In addition, the PMOC's report should be based on the PMOC's independent observations and opinions derived from the information gathered at its meetings with the Project Sponsor. At a minimum, all recurring reports should contain the following content in the order outlined below. For projects with a SSGA or FFGA, the report shall also include the items outlined in the PMOC's Monitoring Plan approved by the FTA Work Order Manager.

## **6.3 Comprehensive Report**

The length of the Comprehensive report shall be a maximum of 20 pages, excluding the appendices.

### **6.3.1 Report Content**

#### **1) Cover Page**

See OP 01 for formatting.

#### **2) Executive Summary**

The Executive Summary shall be succinct and contain information that is of interest to FTA executive staff / upper management. It should brief the reader in a clear, concise manner on the current status of the project, including any major issues impacting the project's scope, schedule, budget, safety, and quality. This section shall not be more than three pages long and should include the following information:

**A. Project description (one paragraph)**

This section should enable the reader to identify the project and differentiate it from others. The description should include information about the name and location of the project, the mode of the project, the name of the project sponsor, the cost, the type of work done, and the service provided by the project once it is completed.

**B. Project status**

In bullet format, provide a status update on cost, scope and schedule. Also provide a status update on significant project activities and/or key milestones. These activities shall be updated or removed upon completion or resolution. Only highlight the critical project aspects and most important current information from the body of the report.

**C. Core accountability information**

- Cost
  - Original (baseline) total project cost (if FFGA or SSGA, cost indicated in agreement)
  - Forecast (current) total project cost
- Schedule
  - Original project revenue service date (if FFGA or SSGA, date indicated in agreement)
  - Forecast (current) project revenue service date
- Contingency
  - Original unallocated contingency
  - Current (remaining) unallocated contingency
  - Original total contingency
  - Current (remaining) total contingency
- Earned Value Parameters
  - Budgeted cost of work completed to date (Earned value/percent complete)
  - Budgeted cost of work scheduled to date (Planned value)
  - Actual cost of work completed to date (Actual expenditures)
- Contracts Awarded
- Major Issues
- Date of Next Meeting

**D. Major problems and/or issues**

Discuss any major issues impacting the project's scope, schedule, budget, funding, safety, and/or quality. If there are no major issues, then state this in the report. Issues raised here should be significant issues of concern having an impact on the project's implementation that should be brought to the FTA's attention, with the PMOC providing its opinion and recommendations. In addition, address whether or not the Project Sponsor is taking action to resolve the issues in an appropriate manner and if the Project Sponsor's actions are in conformance with the approved PMP and/or RCMP.



Use the following table to report the core accountability information:

FFGA Core Accountability Items			
Project Status:		Original at FFGA:	Current Estimate (EAC):
Cost	Cost Estimate	\$	\$
Contingency	Unallocated Contingency	\$	\$
	Total Contingency (allocated plus Unallocated)	\$	\$
Schedule	Revenue Service Date		
		Amount (\$)	Percent (as percent of total)
Planned Value to Date	Total budgeted cost of work scheduled to date <i>(if available)</i>	\$	%
Earned Value to Date	Budgeted cost of work completed to date, i.e actual total value of work earned or done <i>(if available)</i>	\$	%
Actual Cost	Total cost of work completed to date <i>(actual total expenditures)</i>	\$	%
Contracts		Amount (\$)	Percent
	Total contract awarded to date		(as percent of all total contract)
	Total construction contract awarded to date (construction contracts only)		(as percent of all construction contract only)
	Physical construction work completed (amount of construction contract work actually completed)		(as percent of all construction contract only)
Major Issues	Status	Comments / Action / Planned Action	
Date of Next Quarterly Meeting (if known):			

### 3) Table of Contents

### 4) Body of Report

At a minimum, all projects shall include the information below. For projects with a SSGA or FFGA, the body of the report shall also include the items outlined in the PMOC's Monitoring Plan as approved by the FTA. The report should not contain, or at least minimize the amount of historical project information included. If there is no change on a particular item from the previous month's report, then indicate this in the report.

- A. Project Status – For each item below, provide a status update, observations, issues/concerns, and recommendations. One or two photos may also be included to better convey an issue or key milestone activity.
- Design (by contract, if multiple contracts)
  - Construction (by contract, if multiple contracts)
  - Real estate acquisition (if applicable)
  - Third party agreements and coordination (i.e., railroad, utilities, other agencies, etc.)
  - Environmental mitigation measures
- B. Project Management Plan (PMP) and Sub-Plans – Include discussion on the status of the Project Sponsor's PMP and sub-plans (i.e., under development, under review, or approved/accepted).

In addition, verify that the Project Sponsor is following the procedures and practices established in the PMP and sub-plans.

- C. Project Management Capacity and Capability – Through the PMOC's observations and discussions with the Project Sponsor, as well as its review of the PMP and sub-plans, the PMOC shall determine if the Project Sponsor has the management capacity and capability to sufficiently complete the project and compliance with all applicable statutes, regulations, circulars, and technical standards.
- D. Project Cost
- Table showing original budget, current budget, expenditures to date, earned value, and estimate to complete by SCC for the subject month
  - Explanation of variances between planned and actual costs to date
  - Discussion of funding sources
- E. Project Schedule
- Table showing key milestone dates – planned and actual
  - Explanation of variances between baseline schedule and current schedule
  - 90-day look ahead of important activities by the Project Sponsor, FTA, and the PMOC
  - Critical and near critical paths, as well as provide explanation for changes in critical path from previous month and recommended Project Sponsor actions to recover time
- F. Quality Assurance / Quality Control (QA/QC) – This section shall discuss the PMOC's observations, issues/concerns, and recommendations with regard to QA/QC, as well as any scheduled audits, audit results, non-compliances, etc.
- G. Safety and Security – This section shall discuss the PMOC's observations, issues/concerns and recommendations with regard to safety and security activities.
- Hazard Analysis and Threat and Vulnerability Analysis results
  - Development of Safety and Security Design Criteria
  - Certifiable Elements and Items List (CEs and CILs)

- Design Criteria Conformance
- Construction Specification Conformance
- Construction Safety and Security Plan
- Safety and Security Review Committees
- Safety and Security Involvement in Change Order Process
- Testing and Start Up
- Operational Readiness
- State Safety Oversight Agency coordination
- FRA coordination, if applicable.

- H. Americans with Disabilities Act (ADA) – This section shall discuss the PMOC’s observations, issues/concerns and recommendations with regard to compliance with the Americans with Disabilities Act.
- I. Buy America – This section shall discuss the PMOC’s observations, issues/concerns and recommendations with regard to compliance with Buy America as applicable to the project. The PMOC should confirm that the Project Sponsor understands that Buy America compliance applies not only to bus and rail vehicles but is also required for procurement of all manufactured products, including all iron and steel, as defined in 49 CFR 661. Further that, domestic manufacture of all federally-funded procurements is required and should be certifiable.
- J. Vehicle Technology – This section shall discuss the PMOC’s observations, issues/concerns and recommendations with regard to Vehicle Technology as applicable to the project.
- Each Comprehensive Report should contain a vehicle status report which contains:
    - Vendor(s), Models, Year(s), and Number of Vehicles and Identification used for this project
    - New Technologies utilized for this project and/or the industry
    - Upcoming significant events
    - Vehicle Testing, if applicable
      - PMOC review of Bus Testing report
      - Status of Bus Testing for Model used in Project.

## 5) **Project Risk**

Discuss Project Sponsor’s status of risk management, including treatment of risks and related mitigation actions, as well as contingencies.

## 6) **Discussion of Monitoring Plan Items**

For projects with a SSGA or FFGA, discuss items identified in the Monitoring Plan that are not captured in the list of items listed above.

## 7) **Action Item Table**

See Appendix B of this OP for table format.

## 8) **Appendices**

The following are items that should be included as appendices. Other appendices are included if deemed necessary or as requested by the FTA Work Order Manager.

- a. Safety and Security Checklist – Include on a quarterly basis, more frequent if updated prior to scheduled quarterly submission or at the request of FTA. For required content and format, see Appendix C of this OP.
- b. Top 10 Project Risks – Include on a quarterly basis, more frequent if updated prior to scheduled quarterly submission, or at the request of FTA. For format, see Appendix E of this OP.
- c. Roadmap to Revenue Operations – Once a project has a SSGA or FFGA, include this submission, as a separate attachment, on quarterly basis unless otherwise required by the FTA. (Note, the PMOC should obtain the information in the report from the sponsor’s integrated project schedule.)
- d. Project Map – Include in recurring reports
- e. List of Acronyms – This list should reference basic acronyms found in the report. Each acronym should be fully spelled out the first time it is used in the report.

## **6.4 Mini Report**

In an effort to streamline the process of reporting and to provide FTA with project information in a more timely way, a shorter, more focused report, the “Mini-Report,” may be ordered by the WOM at his/her discretion. A Comprehensive Report is needed on a quarterly basis. However, if the project requires additional reports in between (e.g. monthly reports), the WOM has the option of ordering a “Mini” report in lieu of the “Comprehensive.

With regard to the “Mini,” it is important to not similarly shorten the update meetings with the Project Sponsors. Only the report has been changed to be more targeted and focused in its coverage of critical issues, so as to bring to FTA the most pressing information. The “Mini” report should follow the outline for the Comprehensive report described above; however, with the exception of the Executive Summary and the Project Overview, the PMOC should include only those sections in the body of the report, necessary to inform FTA of the most critical project occurrences, issues, and next steps, as well as professional opinions and recommendations. These reports should be no more than twelve pages long.

The following options are available upon direction of the FTA Regional Office:

- 1) The “Mini” report can be supported with additional information in report appendices. This approach retains the quick-read aspect of the “Mini” without losing the detail that may be needed to cover a topic.
- 2) The “Comprehensive recurring” report can be used in lieu of the “Mini” if coverage of every topic is deemed necessary.

## **6.5 Quarterly Meetings and Supporting Meeting Notes**

The FTA Regional office, the PMOC, and Project Sponsor typically meet on a quarterly basis, standand operating procedure (SOP) TPM CPM-001 dated April 2014 or most current update applies.

The meeting is usually led by the FTA Regional Administrator, with the Project Sponsor's executive management also participating. The Quarterly Meeting allows the FTA and Project Sponsor executive management the means to accelerate the resolution of project issues and support the project moving forward.

Prior to the meeting, the PMOC coordinates with the FTA ACOR or Work Order Manager, as well as the FTA Region to set the meeting date. In addition, the PMOC will assist in preparing the meeting's agenda. The agenda should be tailored to the specific needs of the project, and include issues that require executive management direction. The PMOC may be asked to prepare an Annotated agenda to aid the FTA in conducting the meeting. Prior to the Quarterly Meeting, the PMOC will meet with FTA staff to brief them on the agenda items and major issues of concern.

The PMOC shall take meeting notes that will serve as the official record of the meeting. The notes should completely capture the discussion. They should also include the status of prior and current action items with the responsible party identified, as well as the sign-in sheet of meeting attendees. The format of the meeting notes shall be left to the discretion of the FTA Work Order Manager.

## **6.6 Special Meetings and supporting Trip Reports**

When conducting or attending special meetings or site visits (i.e., visits to vehicle manufacturing facilities, etc.), the PMOC shall prepare a Trip Report. Trip Reports summarize the items discussed and should be no more than seven pages long.

## **6.7 Final Report**

After construction is complete, construction contracts are closed, and the project is in revenue operations, or when a PMOC task order is complete, a Final Report shall be submitted to FTA. While this report should be organized according to the outline for the recurring reports, it should highlight in a broad way the most important events, issues, hurdles, resolutions, actions taken and actions pending during the project life, so that the report is instructive to others. In addition, the Final Report should describe the impacts of the project on the Grantee's staff (administration, operations and maintenance), include lessons learned, and transit operations/overall system performance.

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall provide the FTA with written reports of its findings, analysis, recommendations, professional opinions, and a description of the review activities undertaken.

Reports shall follow the formatting requirements listed in OP 01, as well as the formatting requirements outlined in this OP.

## **7.1 Distribution of Reports**

The following is the sequence for distribution of the PMOC's reports and meeting notes:

1. Draft report or meeting notes – One copy to the following individuals:
  - FTA Alternate Contacting Officer's Representative (ACOR)

- FTA Work Order Manager (if different from ACOR)
  - FTA Headquarters/TPM Office of Capital Projects staff assigned to project
  - Project Sponsor (at discretion of the FTA Work Order Manager)
2. Final report or meeting notes – Comments from both FTA region and headquarters are transmitted to the PMOC through the FTA’s Work Order Manager. Upon the incorporation of the FTA’s comments (and if applicable, the Project Sponsor’s), the PMOC shall submit one copy to the following individuals:
- FTA ACOR
  - FTA Work Order Manager (if different from ACOR)
  - FTA Headquarters/TPM Office of Capital Projects staff assigned to project
  - FTA Contracting Officer’s Representative (COR)

Note that at the discretion of the FTA Work Order Manager, the PMOC may provide the draft report or meeting notes to the Project Sponsor for review at the same time it is submitted to the FTA. This review by the Project Sponsor is only to review the facts presented in the PMOC’s report for accuracy, not the PMOC’s assessment of the project.

Upon FTA’s submission of the PMOC’s final version of the report or meeting notes to the Project Sponsor, if differences of opinion exist between the PMOC and Project Sponsor regarding the PMOC’s findings, the FTA may direct the PMOC to reconcile with the Project Sponsor. The PMOC should then submit to FTA an amended report that highlights the modifications within 15 calendar days of such reconciliation.

## **7.2 Report Submission Due Dates**

Below are the typical due dates for the various PMOC’s reports discussed in this OP. Note that these due dates may be modified by the FTA Work Order Manager and/or the individual PMOC work orders.

### **7.2.1 Recurring Reports**

Draft reports are due 10 calendar days from the meeting. Final report are due 15 calendar days from meeting.

Within 24 hours after the PMOC’s meeting with the Project Sponsor, via a brief email, the PMOC shall provide to FTA its assessment of the project, as well as project update and any issues in bullet format.

### **7.2.2 Quarterly Meeting Notes**

Draft Quarterly Meeting notes are due 10 calendar days from the date of the meeting and the final notes 15 calendar days from meeting.

### **7.2.3 Trip Reports**

Draft trip reports are due 7 calendar days from the meeting and the final trip report 10 calendar days from meeting.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1	The PMOC shall perform oversight and provide FTA with supporting periodic reports as well as quarterly meeting notes. The PMOC's recurring oversight primarily covers the Project Sponsor's management of project scope, cost, schedule, risk, safety and quality.	<b>R1a.</b> The PMOC shall develop and document a process for project reviews periodically, trip or final of Project Sponsor's management of scope, cost, schedule, risk, safety and quality.		<b>Q1a.</b> PMOC provides documentation of the process	<b>M1a.</b> Review of the process documentation.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process and project management judgment to review and evaluate the Project Sponsor's management of project scope, cost, schedule, risk, safety and quality.		<b>Q1b.</b> Review must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>M1b.</b> Documented review and evaluation of the Project Sponsor's management of project scope, cost, schedule, risk, safety and quality.	<b>MM1b.</b> Periodic review by FTA or its agent and the PMOC's internal verification.
2	The PMOC shall, on a quarterly basis in a "Comprehensive Report" and at the end of the project in a Final Report, provide FTA with professional assessments of the reliability of Project Sponsor's management of project scope, cost, schedule, risk, safety and quality including status updates, observations, recommendations and graphics.	<b>R2a.</b> The PMOC shall provide FTA with its opinion and overall findings on Project Sponsor technical capacity and capability including a review of the Project Sponsor's organization, use of project controls and compliance with applicable statutes, regulations and agreements.		<b>Q2a.</b> Professional opinion of the Project Sponsor's technical capacity and capability.	<b>M2a.</b> Documented evidence of a thorough review of Project Sponsor technical capacity and capability supported by professional opinion.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall provide FTA with its opinion and an accompanying update on project scope and status of project phase, whether design, bidding or construction.		<b>Q2b.</b> Professional opinion of the project scope and status of project phase, whether design, bidding or construction.	<b>M2b.</b> Documented evidence of a thorough review of project scope and status supported by professional opinion.	<b>MM2b.</b> Periodic review by FTA or its agent.
		<b>R2c.</b> The PMOC shall provide FTA its opinion and an accompanying update on the Project Management Plan and its Sub-plans.		<b>Q2c.</b> Professional opinion and status of the Project Management Plan and its Sub-plans.	<b>M2c.</b> Documented evidence of a thorough review of the Project Management Plan and its subplans.	<b>MM2c.</b> Periodic review by FTA or its agent.
		<b>R2d.</b> The PMOC shall provide FTA with a 90-day look ahead schedule for important activities and a table of critical activities including with an accompanying opinion and explanation of variances to the project schedule.		<b>Q2d.</b> Professional opinion of the project schedule status.	<b>M2d.</b> Documented evidence of a thorough review of project schedule and status supported by professional opinion.	<b>MM2d.</b> Periodic review by FTA or its agent.
		<b>R2e.</b> PMOC shall provide FTA with data on cost expended to date and cost to complete, including its opinion and explanation regarding cost variances during reporting periods.		<b>Q2e.</b> Professional opinion of project cost data.	<b>M2e.</b> Documented evidence of a thorough review of project cost data supported by professional opinion.	<b>MM2e.</b> Periodic review by FTA or its agent.
		<b>R2f.</b> The PMOC shall provide FTA with the status of the top risks to the project and mitigation actions as well as an opinion regarding current contingency amounts relative to the contingency management plan.		<b>Q2f.</b> Professional opinion of the top project risks.	<b>M2f.</b> Documented evidence of a thorough review of project risks supported by professional opinion.	<b>MM2f.</b> Periodic review by FTA or its agent.



	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
2	The PMOC shall, on a quarterly basis in a "Comprehensive Report" and at the end of the project in a Final Report, provide FTA with professional assessments of the reliability of Project Sponsor's management of project scope, cost, schedule, risk, safety and quality including status updates, observations, recommendations and graphics.	<b>R2g.</b> PMOC shall provide FTA with its opinion and status updates of critical real estate, vehicle design and procurement, 3rd party agreements and other critical project items.		<b>Q2g.</b> Professional opinion and status updates of critical real estate, vehicle design and procurement, 3rd party agreements and other critical project items.	<b>M2g.</b> Documented evidence of a thorough review and status updates of real estate, vehicle, 3rd party agreements and other critical items supported by professional opinion.	<b>MM2g.</b> Periodic review by FTA or its agent.
3	The PMOC shall, on a quarterly basis in Quarterly Meetings, conduct discussions with the Project Sponsor regarding capabilities and approach to the project, use of project controls, and compliance with applicable statutes and regulations, and deliver to FTA Quarterly Meeting Notes capturing such discussions.	<b>R3.</b> The PMOC shall, on a quarterly basis in Quarterly Meetings, provide FTA with Quarterly Meeting Notes capturing discussions with the Project Sponsor regarding its capabilities and approach to the project, use of project controls, and compliance with applicable statutes and regulations,		<b>Q3.</b> Meeting Notes are professional, clear, concise, well written and completely capture the Quarterly Meeting discussions.	<b>M3.</b> Review of the PMOC's Meeting Notes by the FTA.	<b>MM3.</b> Periodic review by FTA or its agent.
4	The PMOC shall, as required by the FTA, provide FTA with focused and targeted professional assessments and status updates of the most critical project occurrences.	<b>R4.</b> The PMOC shall, as required by the FTA, provide FTA with its focused and targeted assessments of and professional opinions regarding the most critical project occurrences and issues and the PMOC's suggested alternative solutions and recommended courses of action.		<b>Q4.</b> Professional opinion regarding critical project occurrences and issues occurring during the reporting period.	<b>M4.</b> Documented evidence of a thorough review of critical project occurrences and issues supported by professional opinion.	<b>MM4.</b> Periodic review by FTA or its agent.
5	The PMOC shall, as required by the FTA, provide FTA with professional assessments and status updates of the project resulting from special project site visits or special meetings.	<b>R5.</b> The PMOC shall, as required by the FTA, provide FTA with an assessment of and professional opinion regarding subject items discussed at project meetings or site visits.		<b>Q5.</b> Professional opinion of project status and project issues as discussed in project site visits or other special meetings.	<b>M5.</b> Documented evidence of a thorough review of project status and project issues through site visits and special meetings supported by professional opinion.	<b>MM5.</b> Periodic review by FTA or its agent.
6	The PMOC shall provide FTA with a written report of its findings, analysis, recommendations, professional opinions and a description of the review activities undertaken.	<b>R6.</b> The PMOC shall present its findings, analysis, recommendations and professional opinions to FTA in a written report and, when so directed by FTA, seek to reconcile its findings with Project Sponsor to the extent possible. A report addendum shall be filed describing the results of reconciliation attempts.		<b>Q6.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with Project Sponsor to the extent possible.	<b>M6.</b> Review of the PMOC's presentation of findings, analysis, recommendations and professional opinions by the FTA.	<b>MM6.</b> Periodic review by FTA or its agent.

## APPENDIX B

### Action Item Table

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Item No.	Item	Responsible Party	Date Identified	Date Due	Date Completed	Status / Action Required

## APPENDIX C

### Safety and Security Checklist

Project Overview			
Project Mode (Rail, Bus, BRT, Multimode)			
Project Phase (PE, Final Design, Construction, Start-Up)			
Project Delivery Method (Design/Build, DBOM, CMGC, etc.)			
Project Plans	Version	Review by FTA	Status
Safety and Security Management Plan (SSMP)			
Safety and Security Certification Plan (SSCP)			
System Safety Program Plan (SSPP)			
System Security Plan or Security and Emergency Preparedness Plan (SEPP)			
Construction Safety and Security Plan (CSSP)			

Area of Focus	Y/N	Notes/Status
<b>Safety and Security Authority</b>		
Is the Project Sponsor subject to 49 CFR Part 659 state safety oversight requirements?		
Has the state designated an oversight agency as per 49 CFR Part 659.9?		
Has the oversight agency reviewed and approved the Project Sponsor's Security Plan or SSPP as per 49 CFR Part 659.17?		
Did the oversight agency participate in the last Quarterly Program Review Meeting?		
Has the Project Sponsor submitted its safety certification plan to the oversight agency?		
Has the Project Sponsor implemented security directives issued by the Department of Homeland Security and/or Transportation Security Administration?		
<b>SSMP Monitoring</b>		
Is the SSMP project-specific, clearly demonstrating the scope of safety and security activities for this project?		
Does the Project Sponsor review the SSMP and related project plans to determine if updates are necessary?		
Does the Project Sponsor implement a process through which the Designated Function (DF) for Safety and DF for Security are integrated into the overall project management team? Please specify.		
Does the Project Sponsor maintain a regularly scheduled report on the status of safety and security activities?		
Has the Project Sponsor established staffing requirements, procedures and authority for safety and security activities throughout all project phases?		
Does the Project Sponsor update the safety and security responsibility matrix/organizational chart as necessary?		
Has the Project Sponsor allocated sufficient resources to oversee or carry out safety and security activities?		
Has the Project Sponsor developed hazard and vulnerability analysis techniques, including specific types of analysis to be performed during different project phases?		

Area of Focus	Y/N	Notes/Status
Does the Project Sponsor implement regularly scheduled meetings to track to resolution any identified hazards and/or vulnerabilities?		
Does the Project Sponsor monitor the progress of safety and security activities throughout all project phases? Please describe briefly.		
Does the Project Sponsor ensure the conduct of preliminary hazard and vulnerability analyses? Please specify the analyses conducted.		
Has the Project Sponsor ensured the development of safety design criteria?		
Has the Project Sponsor ensured the development of security design criteria?		
Has the Project Sponsor ensured conformance with safety and security requirements in design?		
Has the Project Sponsor verified construction specifications conformance?		
Has the Project Sponsor identified safety and security critical tests to be performed prior to passenger operations?		
Has the Project Sponsor verified conformance with safety and security requirements during testing, inspection and start-up phases?		
Has the Project Sponsor evaluated change orders, design waivers, or test variances for potential hazards and/or vulnerabilities?		
Has the Project Sponsor ensured the performance of safety and security analyses for proposed work-arounds?		
Has the Project Sponsor demonstrated through meetings or other methods the integration of safety and security in the following: <ul style="list-style-type: none"> <li>• Activation Plan and Procedures</li> <li>• Integrated Test Plan and Procedures</li> <li>• Operations and Maintenance Plan</li> <li>• Emergency Operations Plan</li> </ul>		
Has the Project Sponsor issued final safety and security certification?		
Has the Project Sponsor issued the final safety and security verification report?		
<b>Construction Safety</b>		
Does the Project Sponsor have a documented/implemented Contractor Safety Program with which it expects to comply?		
Does the Project Sponsor's contractor(s) have a documented company-wide safety and security program plan?		
Does the Project Sponsor's contractor(s) have a site-specific safety and security program plan?		
How do the Project Sponsor's OSHA statistics compare to the national average for the same type of work?		
If the comparison is not favorable, what actions are being taken by the Project Sponsor to improve its safety record?		
<b>Federal Railroad Administration</b>		
If shared track: has the Project Sponsor submitted its waiver request application to FRA? (Please identify specific regulations for which waivers are being requested.)		

Area of Focus	Y/N	Notes/Status
If shared corridor: has the Project Sponsor specified specific measures to address safety concerns?		
Is the Collision Hazard Analysis underway?		
Other FRA required Hazard Analysis – Fencing, etc.?		
Does the project have Quiet Zones?		
Does FRA attend the Quarterly Review Meetings?		

## APPENDIX D

### Project Sponsor Submittals

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The following are some of the potential project materials that the PMOC may request from the Project Sponsor to review as part of the PMOC's recurring oversight and monitoring:

- Project Sponsor correspondence with FTA, other agencies, third parties, etc.
- Project Progress Reports
- PMP and sub-plans and other documents including, but not limited to:
  - Project Sponsor technical capacity and capability documents – organization charts, project staff resumes, contracts, and RFPs for consultants and other procurement contracts
  - Risk management documents including Risk and Contingency Management Plan
  - Document control plans and procedures
  - QA/AC plans and procedures
  - Safety and Security Management Plan
  - Fleet Management Plans
  - Real Estate Acquisition and Management Plan
- Third Party Agreements
- Environmental documents (i.e., Environmental Assessment, etc.)
- Environmental monitoring and mitigation reports
- Design Documents
  - Plans and Specifications
  - Basis of Design document
  - Design Criteria
  - Preliminary Hazard Analysis
  - Threat and Vulnerability Assessment
  - Geotechnical studies and reports
  - Value Engineering and Constructability Review reports
  - Specialty reports
- Project Schedule including Integrated Master Project Schedule and updates and schedule basis document
- Cost estimates in original and SCC format
- Cost estimating methodology report
- Expenditure reports, Estimates at Completion, and Contingency drawdown reports
- Real estate activity reports
- Before and After Study Report and Documentation
- Permits
- Project Delivery and Procurement Documents
  - Evaluation and selection of project delivery methods
  - Organization and coordination of contract packages
  - Terms and conditions of construction contracts
  - Solicitation materials such as Invitations for Bid and/or Requests for Proposal
  - Addenda to bid packages

- Bid results / tallies
  - Independent cost estimates
  - Negotiation summaries
- Construction Administration/Management files
  - Construction contracts
  - Contractor progress reports
  - Contractor pay requests
  - Contractor schedule updates and short range look-ahead schedules
  - Change order files (including potential change orders)
  - Claims files (including potential claims)
  - Request for Information (RFI) logs
  - Inspection and testing reports
  - Quality and safety reports
  - Meeting minutes
  - Contractor correspondence
  - Contract management reports
  - QA/QC audit reports

## APPENDIX E

### Example: Top 10 Project Risks Table

Risk No.	Risk Category		Risk Description	Status
	Cost	Sched.		
C-2	x	x	Insufficient extended curfews to complete all signal and grade crossing work.	Open. Construction has not started.
M-8	x		Bids for the station finishes construction contract may come in higher than the engineers estimate.	Open. This work has not yet been advertised for bid.
C-11 D-7	x	x	Utilities are not relocated on time.	Open. Utility relocation has not yet started.
C-12 C-13		x	Late delivery of locomotives and/or coaches and cab cars could delay project start-up.	Open. Vehicles are not yet in production.
R-10		x	Changes in FRA requirements could impact track, vehicles and signals.	Open.
C-3	x	x	The need to support and maintain freight operations may impair the productivity of signal and grade crossing work, resulting in those areas of work being delayed beyond the current schedule.	Open. Construction has not yet started.
C-8	x	x	Weather impacts or concerns and protection of the work.	Open. Construction has not yet started.
C-10		x	Coordination between multiple contractors.	Open. Construction has not yet started.
D-27		x	Additional noise mitigation measures may be required to meet National Environmental Policy Act (NEPA) requirements.	Open. Although the “NEPA requirements have been addressed in the revised FONSI, there may still be some local demand for additional noise mitigation measures.
C-14	x	x	Grade crossing upgrades require substantial coordination with locals resulting in potential delays.	New risk.







## **Oversight Procedure 26 – Lessons Learned**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure is to describe the analysis and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) with regard to sharing the experiences gained in all phases of major capital transit projects with a wider audience. The application of Lessons Learned by sponsors of future transit projects can potentially produce better project outcomes while saving time and cost, thereby increasing the effectiveness of FTA's capital investment.

### **2.0 BACKGROUND**

The Lessons Learned program has existed for more than a decade and was developed with the assistance of the Project Sponsors, FTA, and its PMOCs. However, the central repository of lessons was not been kept up to date and some lessons were shared with project team members only. When lessons were shared with a wider audience, the timing of the publication was often delayed and the impact of the lesson was reduced. FTA is renewing the emphasis on the Lessons Learned program so that it can be valuable to FTA and the transit industry.

Lessons can be derived from any phase of project implementation: design, real estate, construction, management, etc. The PMOC, in concert with the Project Sponsor, during each project phase, should create, add to, and maintain a list of Lessons Learned. The Lessons Learned list should include significant findings, recommendations, and new insights realized. Maintenance of the list ensures that lessons will not be forgotten and it provides ready material for inclusion in Lessons Learned reports to FTA in a timely manner. Project Sponsor participation ensures that the lessons are accurately portrayed with the proper perspective.

FTA will publish Lessons Learned on its public website. A hyperlinked table of contents will provide access to full documents (see sample in Appendix B below). The table of contents will be continuously updated as new Lessons Learned are reviewed and approved by the FTA. The FTA public website front page has the option for users to sign-up for email notification of changes or updates to the website including Lessons Learned.

### **3.0 OBJECTIVES**

The objectives are:

- To define a simple process for capturing POTENTIAL lessons as they are encountered during the project execution without a major expenditure of time and resources (“mini-lessons”);
- To provide a cumulative list of mini-lessons at the end of each project phase as a tool for the selection, full development, and formal issuance of those mini-lessons that are sufficiently robust to be developed into Project Lessons to be shared;
- To share Lessons Learned on major capital transit projects with the transit industry and other interested parties;
- To have the lessons readily available via the FTA public website;
- To increase awareness within the transit industry of pitfalls and impediments to the achievement of project goals;
- To recommend changes in FTA policies and practices when Lessons Learned on projects suggest that such changes may be advisable.

### **4.0 REFERENCES**

The following are the principal, but by no means the only, references to Federal legislation, regulation and guidance with which the PMOC should have a good understanding as related to the Project Sponsor’s project work being reviewed under this OP: The references in OP 01 (Administrative Conditions and Requirements) apply.

### **5.0 PROJECT SPONSOR SUBMITTALS**

The PMOC should obtain documents and other materials from the Project Sponsor that are needed to support the development and preparation of the lesson. As mini-lessons are documented, the PMOC and Project Sponsor should consider the likelihood of future availability of the applicable Project Sponsor documents, and if it is expected that the records will become inaccessible before the completion of the project or other such time that mini-lessons may be developed into full Project Lessons, take action with the Project Sponsor to collect the documentation while it is still accessible.

### **6.0 SCOPE OF WORK**

The PMOC shall document Lessons Learned in the following manner:

- 1) Mini-Lessons: With each Comprehensive Monthly Report (refer to OP25), the PMOC should issue a separate document containing a cumulative list of briefly described POTENTIAL Lessons Learned to date (“Mini-Lessons”) on the project(s) for which oversight is provided. With each subsequent issue of the Mini-Lessons document, the PMOC should note, in as little as a sentence or two each, the potential Lessons Learned during the preceding quarter. Mini-Lessons should track insights and remind the PMOC and Project Sponsor of hurdles crossed during the course of the project. Mini-Lessons should be characterized by project phase and by category. Refer to Appendix B of this OP for format. The cumulative list of Mini-Lessons will be reviewed later in the project to confirm the continued validity of the

POTENTIAL lessons captured in the “Mini” write-ups. This process recognizes that not all “good” ideas result in positive outcomes after final invoices, change orders, and claims are reconciled at the end of the project.

- 2) Project-Lessons: These are the two or three most important lessons that have been learned over the course of each phase of the project. Near the end of each project phase the PMOC and the Project Sponsor should review the cumulative list of Mini-Lessons to identify those two or three Mini-Lessons that continue to stand out as significant when all aspects of the project have been taken into consideration. The PMOC and the Project Sponsor then should collaboratively develop these into a full Lessons Learned, writing them for the benefit the entire transit industry, as well as FTA. They will be posted to FTA’s public website, and should therefore not be repetitive with Lessons Learned already posted, unless valuable different perspectives are presented.

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

Each Lessons Learned Report should be no more than two or three pages in length. The Lessons Learned Report should be descriptively titled to allow the reader to understand the lesson content through the title alone. They should include just enough project background information to facilitate understanding of the lesson. The Lessons Learned Report should follow the following outline:

- 1) Date
- 2) Project Name
- 3) Abstract (a summary or concentration of the essentials of a larger issue)
- 4) Project Phase (Project Development, Engineering, Procurement, Construction, Startup)
- 5) Category (Management, Scope, Schedule, Cost, Risk)
- 6) Background (type of project, geographic location, other pertinent information)
- 7) The Lesson (including condition, cause, effect, and remedy/resolution)
- 8) Applicability (types of projects, how lesson scan be applied, responsible party(ies) for action)
- 9) Contact Person/Info

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1	The PMOC shall identify, analyze, document and recommend to FTA Lessons Learned in conjunction with project experiences.	<b>R1a.</b> The PMOC shall develop and document a process for identification, analysis and documentation of Lessons Learned on each Project to which it is assigned.		<b>Q1a.</b> Process exists and has been followed.	<b>M1a.</b> Evidence of a documented process.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process to make recommendations regarding Lessons Learned for the benefit of future federally assisted projects.		<b>Q1b.</b> Assessment must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>M1b.</b> Documented assessment and analysis of Lessons Learned.	<b>MM1b.</b> Periodic review by FTA or its agent.
2	The PMOC shall develop Lessons Learned in planning, design, construction, revenue operations and associated matters on capital transit projects for the benefit of future transit project sponsors to potentially produce higher quality projects and to improve the effectiveness of future FTA capital investments.	<b>R2a.</b> The PMOC shall, as an appendix to each quarterly report, develop and note mini-Lessons Learned organized by project phase and category which occurred during the preceding quarter.		<b>Q2a.</b> Professional opinion of mini-lessons with appropriate discussions.	<b>M2a.</b> Documented evidence of mini-lessons developed by the PMOC supported by professional opinion.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall, near the end of each project phase, develop Project-Lessons collaboratively with the Project Sponsor drawing upon mini-lessons and reflective discussions with the Project Sponsor.		<b>Q2b.</b> Written report of Project-Lessons learned and coordination with Project Sponsor.	<b>M2b.</b> Documented evidence of Project-Lessons and collaboration with Project Sponsor.	<b>MM2b.</b> Periodic review by FTA or its agent.
3	The PMOC shall provide written Project-Lessons Learned Reports in accordance with the prescribed format to FTA for publication on FTA's public website.	<b>R3.</b> The PMOC shall present its findings, conclusions, recommendations, and Lessons Learned in Project-Lessons Learned Reports to the FTA in the prescribed format.		<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with Project Sponsor to the extent possible.	<b>M3.</b> PMOC's findings, conclusions, recommendations with respect to Project-Lessons Learned.	<b>MM3.</b> Periodic review by FTA or its agent.

## APPENDIX B

### Sample – “Mini-Lessons” Learned Table

LL #	Date	Phase	Category	Subject	Lesson Learned
1	Jan-09	Final Design	Schedule	Problems with getting D/B contractor to submit CPM schedules.	Future contracts need to include stronger language dealing with a contractor's failure to submit accurate CPM schedules and failure to follow their schedule. <a href="http://www.hillintl.com/fta/lessonslearned/SouthFloridaPBDT">http://www.hillintl.com/fta/lessonslearned/SouthFloridaPBDT</a>
2	Apr-09	Final Design	Cost	D/B contracts can have extra costs the same as sealed bid.	For future design/build projects, the budget needs to include a larger contingency amount to allow for issues that arise during the final design stage. <a href="http://www.hillintl.com/fta/lessonslearned/SouthFloridaPBDT">http://www.hillintl.com/fta/lessonslearned/SouthFloridaPBDT</a>
3	Jul-09	Final Design	Cost	Bids are coming in high on many projects nationwide.	Grantees should consider use of early completion incentives to stimulate greater bidder interest (more bids) and lower bids. <a href="http://www.fta.dot.gov/TPM-20Recommendations">http://www.fta.dot.gov/TPM-20Recommendations</a>



## **Oversight Procedure 27 – Before-and-After Study Review**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure (OP) is to describe the review, verification, analysis, and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) with regard to the adequacy of specific aspects of the Project Sponsor's Before-and-After (B&A) Study.

The specific aspects covered by this OP are the project scope and capital cost elements in the Project Sponsor's before-and-after materials. The other elements of the B&A Study are addressed by FTA's Office of Planning and Environment (TPE).

### **2.0 BACKGROUND**

In the December 2000 Final Rule on Major Capital Investment Projects, FTA required that Project Sponsors receiving Section 5309 New Starts funding complete a B&A Study to document the actual outcomes of New Starts projects and to examine the accuracy of the predictions of those outcomes prepared during project planning and development. In 2005, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) amended Section 5309(g)(2)(c) to codify this regulatory requirement and to require that Project Sponsors, as a condition of receiving a Full Funding Grant Agreement (FFGA), assemble information on five project characteristics: (1) project scope; (2) capital costs; (3) transit service levels; (4) operating and maintenance (O&M) costs; and (5) ridership patterns. SAFETEA-LU also required FTA to use this information in preparing an annual report to Congress on B&A Studies completed each year.

In 2012, a new two-year transportation authorization, "Moving Ahead for Progress in the 21<sup>st</sup> Century (MAP-21), required that project sponsors complete B&A Studies for core capacity improvement projects.

### **3.0 OBJECTIVES**

The overall goal of this OP is to confirm that the scope and capital cost elements of B&A Studies prepared by Project Sponsors are accurate and complete. To meet this goal, the OP has four specific objectives for the PMOC assignment:

- Objective 1: to confirm that project sponsors comply with the B&A Study requirements as they develop and implement the project;
- Objective 2: to confirm that the predictions archived by project sponsors at specified milestones are complete and accurate representations of the then-current expectations for the project's scope and capital cost;

- Objective 3: to confirm that the data and documentation of the as-built project's scope and capital cost are complete and accurate; and
- Objective 4: to confirm that the final report from the B&A Study provides useful documentation of the actual scope and capital cost of the project and highlights the key findings on the accuracy of predictions on project scope and capital cost.

## **4.0 REFERENCES**

The following are the principal references to Federal legislation, codification, regulation, and guidance that the PMOC should understand regarding the Project Sponsor's work that the PMOC will review under this OP:

### **4.1 Legislative**

- The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Pub.L. 109-59
- Moving Ahead for Progress in the 21<sup>st</sup> Century, or MAP-21, Pub.L. 112-141

### **4.2 Guidance**

- FTA's "Before-and-After Study Qs and As" webpage ([http://www.fta.dot.gov/12304\\_2613.html](http://www.fta.dot.gov/12304_2613.html))
- "Summary of FTA Technical Guidance on Before-and-After Studies," FTA, June 2012
- "The Work-plan", FTA, May 2012
- "Standard Outline of the Final Report from Before-and-After Studies," FTA, October 2012.

## **5.0 PROJECT SPONSOR SUBMITTALS**

The Project Sponsor is responsible for developing and providing to FTA all materials supporting the B&A Study. While this section identifies all of those materials, PMOC assignments under this OP relate only to a subset of topics (project scope and capital cost) and a subset of items (comprising items 5.2, 5.4, and 5.5, but not items 5.1 or 5.3).

### **5.1 Plan for the Before-and-After Study**

FTA now requires that the Project Sponsor prepare a draft of the study plan as an initial task after entry into project development (PD) for all projects. In coordination with FTA, the Project Sponsor can make subsequent adjustments as the project advances. FTA and the Project Sponsor must come to agreement on a final plan before the grant agreement or grant for the project so that the FTA-approved plan can be incorporated by reference in the funding document. TPE handles review and approval of the draft and final plans; consequently, the PMOC has no review responsibilities for the contents of the plan. However, once the PMOC is assigned to the project, the PMOC will use the draft and final versions of the plan to monitor the Project Sponsor's progress on the various requirements over the course of project development, implementation, and opening to service.



## **5.2 Documented and Archived Predictions at Prediction Milestones**

Under MAP-21, the prediction milestones for New Starts projects are Entry into Engineering and the FFGA. For Small Starts, the single milestone is the Small Starts Grant Agreement (SSGA), or the grant (for projects entirely funded in one year). For New Starts projects developed previously under SAFETEA-LU procedures, the prediction milestones were Entry into Preliminary Engineering (PE), Entry to Final Design (FD), and the FFGA. PMOCs reviewing B&A documents from these earlier projects will encounter the former sequence of milestones.

FTA requires that, at each prediction milestone, the Project Sponsor document and archive the predictions of project scope, capital costs, and other outcomes so that the predictions are available for later use in the study. The documentation includes an analysis and explanation of any significant changes in the predictions since the previous milestone (except at the initial milestone where no previous milestone exists). The PMOC assignment under this OP includes review of the project scope and capital cost elements of the predictions documented by the Project Sponsor at each of these milestones.

## **5.3 Documented and Archived Data on Actual Conditions “before” the Project**

FTA requires that the Project Sponsor collect, document, and archive data on actual transit service levels, O&M costs, and transit ridership before implementation of the project disrupts these conditions. These data establish the basis for before-versus-after analysis of project impacts and outcomes. Since there are no actual project scope or capital costs before project implementation (only predictions of those outcomes), the data requirement at this milestone does not involve these two elements. Consequently, the PMOC assignment under this OP includes no activity at the “Before” milestone.

## **5.4 Documented and Archived Data on Actual Impacts “after” the Project**

FTA requires that the Project Sponsor collect, document, and archive data on the actual outcomes of the project after it has opened to service. These data support the presentation in the final report of actual project impacts and the comparison of those impacts to predictions made development of the project. The as-built project scope and capital costs are largely known within several months of project opening; consequently, data collection on those elements can proceed straightaway. Adjustments to transit services and consequent impacts on O&M costs and ridership may continue for some time; consequently the nominal target for data collection on those elements is two years after project opening. The PMOC assignment under this OP includes review of the project-scope and capital-cost elements of the as-built data collection and documentation by the Project Sponsor at this milestone.

## **5.5 The Final Report from the Before-and-After Study**

FTA requires that the Project Sponsor prepare documentation of the actual outcomes of the project and examine the accuracy of predictions of those outcomes. FTA strongly recommends that the Project Sponsor first prepare a technical memorandum on each of these two topics and

then summarize the key finding in a concise (15-20 pages) final report with the memoranda attached as appendices.

FTA has also engaged the services of a separate on-call contractor to assist with the preparation of B&A Study final reports. At the discretion of and as directed by TPE, this contractor may either assist the Project Sponsor with preparation of the final report or prepare the draft of the document in collaboration with the Project Sponsor.

In either case, the PMOC assignment under this OP includes review of the project-scope and capital-cost elements of both analyses and the presentation of the project-scope and capital-cost findings in the B&A Study final report.

## 6.0 PMOC SCOPE OF WORK

The scope of work for this OP includes technical reviews at all but one of the milestones in a B&A study. The “before” milestone is the single exception because the data collection at the “before” milestone does not involve any aspects of the project scope or capital costs. The milestones are:

Type of Milestone	PMOC Review under OP 27?	Milestones under MAP-21		Milestones under SAFETEA-LU	
		New Starts	Small Starts	New Starts	Small Starts
Prediction	Yes	Entry into Engr.	-	Entry into PE Entry into FD	Entry into PD
Prediction	Yes	FFGA	SSGA/grant	FFGA	SSGA/grant
Data	No	“Before” Opening	“Before” Opening	“Before” Opening	“Before” Opening
Data	Yes	“After” Opening	“After” Opening	“After” Opening	“After” Opening
Conclusion	Yes	Final Report	Final Report	Final Report	Final Report

For most projects, these milestones will span many years. During that span, turnover may occur in the PMOC assigned by FTA to the project. Consequently, documentation prepared by the PMOC under this OP must be sufficient to convey PMOC insights and conclusions about the project to a possible successor PMOC who will be responsible for later assignments under this OP.

In this OP, project scope means the physical elements of the project -- along with associated acquisition, procurement, construction, and professional services -- organized by FTA Standard Cost Categories (SCCs). Capital cost includes: (1) the constant-dollar costs of the project organized by the FTA SCCs; (2) the schedule for project development, construction, and opening to service; and (3) the year-of-expenditure (YOE) dollar costs.

### 6.1 Review the Predictions Archived by the Project Sponsor at the Entry-to-Engineering Milestone

Under OP 33 and OP 51, the PMOC will have recently dealt with the proposed project for the first time in PMOC reviews of the predicted capital cost of the project and of its readiness to enter Engineering. These reviews will have given the PMOC an understanding of the project and its predicted capital cost that are crucial to the initial assignment under this OP on B&A Studies.

Under this OP, the PMOC will receive from the Project Sponsor draft copies of the archived predictions and the technical memorandum documenting the predictions. The PMOC will review the materials related to the predicted scope of the project and its predicted capital costs, and prepare a memorandum conveying to FTA the findings from the review. The findings will address three topics:

- The completeness of draft archive materials related to predicted scope and capital cost;
- The usefulness of the technical memorandum in documenting the contents of the archived materials on predicted scope and capital cost; and
- The accuracy of the technical memorandum in characterizing the current predictions of project scope and capital cost – areas of significant uncertainty, work done thus far to address and reduce those uncertainties, allowances for other outcomes, and other observations likely to be useful in later work to examine the accuracy of predictions at this milestone compared to the as-built scope and capital cost of the project.

## **6.2 Prepare for and Undertake the Review of Predictions at the FFGA/SSGA/Grant Milestone**

Under OP 25, the PMOC will already have assignments to monitor and report on progress by the Project Sponsor to develop the project. This on-going oversight of Project Sponsor progress will enable the PMOC to address effectively the two objectives related to the B&A Study during Project Development and Engineering: to confirm that the Project Sponsor prepares for the upcoming milestone during the course of Project Development and Engineering and to confirm that the project-scope and capital-cost materials archived by the Project Sponsor at the milestone are complete and accurately documented.

Under this OP, the PMOC will (1) make Project Sponsor preparation for the FFGA/SSGA/grant milestone a routine element of the PMOC's ongoing monitoring of Project Sponsor progress and (2) review the draft materials on predicted scope and capital cost of the project that are assembled by the Project Sponsor for archiving at the FFGA/SSGA/grant milestone.

For item (1), the PMOC will include in the agenda for quarterly review meetings:

- (a) Project Sponsor progress with respect to activities identified in the plan for the B&A Study,
- (b) Recent Project Sponsor documents on project scope and capital cost that will be flagged for inclusion in the milestone archive, and
- (c) Steps necessary to maintain records on key decisions and outstanding issues that will need to be documented in the archive.

For item (2), the PMOC will review the materials related to the predicted scope of the project and its predicted capital costs, and prepare a memorandum conveying to FTA the findings from the review. The findings will address the same three topics as the memorandum prepared under 6.1 above, plus a fourth topic. These four topics are:

- The completeness of draft archive materials related to predicted scope and capital cost;

- The usefulness of the technical memorandum in documenting the contents of the archived materials on predicted scope and capital cost;
- The accuracy of the technical memorandum in characterizing the current predictions of project scope and capital cost – areas of significant uncertainty, work done thus far to address and reduce those uncertainties, allowances for other outcomes, and other observations likely to be useful in later work to examine the accuracy of predictions at this milestone compared to the as-built scope and capital cost of the project; and
- The accuracy of the technical memorandum in documenting and explaining the causes of any significant changes in the predicted project scope and capital cost since the Entry-to-Engineering milestone.

### **6.3 Review the Data Archived by the Project Sponsor at the “After” Milestone**

Under OP 25 the PMOC will already have assignments to monitor and report on progress by the Project Sponsor to construct the project and open it to revenue service. This on-going oversight of Project Sponsor progress will enable the PMOC to address effectively the two objectives related to the B&A Study leading to and at the “After” milestone: to ensure that the Project Sponsor prepares for the upcoming milestone during project construction and the two years of operation immediately following project opening, and to confirm that the project scope and capital cost materials archived by the Project Sponsor at the “After” milestone are complete and accurately documented.

Under this OP, the PMOC will (1) make Project Sponsor preparation for the “After” milestone a routine element of the PMOC’s ongoing monitoring of Project Sponsor progress and (2) review the draft materials on predicted scope and capital cost of the project that are assembled by the Project Sponsor for archiving at the “After” milestone. For item (1), the PMOC will include in the agenda for quarterly review meetings (a) an update by the Project Sponsor on progress with respect activities specified in the plan for the B&A Study and (b) recent documents on project scope and capital cost that will be flagged for inclusion in the milestone archive. For item (2), the PMOC will review the materials prepared by the Project Sponsor to document the as-built scope of the project and its actual capital costs, and prepare a memorandum conveying to FTA the PMOC’s findings from the “After” review. The PMOC’s findings will address three topics:

- The completeness of Project Sponsor’s draft of the archive materials related to as-built scope and capital cost;
- The usefulness of the Project Sponsor’s documentation of the contents of the archived materials on as-built scope and capital cost; and
- The accuracy of the Project Sponsor’s documentation in characterizing the actual outcomes regarding project scope and capital cost.

### **6.4 Review the Project Sponsor’s Analyses and Final Report**

Under this OP, the PMOC will review and comment on the Project Sponsor’s analyses and final documentation for the B&A Study. The Project Sponsor is required to prepare documentation that summarizes the project, documents its actual outcomes, and presents the key findings on the accuracy of predictions prepared during project development.

FTA strongly recommends that the Project Sponsor prepare two technical memoranda to document the Project Sponsor's in-depth analyses of:

- (a) The as-built scope of the project, its capital and O&M costs, and its impacts on transit service and ridership; and
- (b) The accuracy of predictions of those outcomes at the project-development milestones and the causes of any significant differences from the actual outcomes.

The technical memoranda are intended to provide the necessary detail to present the analyses and support the findings. The memoranda will be included in the final report appendices.

If the Project Sponsor chooses to prepare the memoranda, the PMOC will review drafts of the sections dealing with project scope and capital costs and prepare a memorandum to convey comments to FTA on the completeness and accuracy of the analyses.

The PMOC will review a draft of the final report – written by either the Project Sponsor or by FTA's on-call contractor for B&A Study Reports -- and prepare a memorandum to convey comments to FTA on the accuracy and usefulness of the findings. If the Project Sponsor did not prepare the recommended technical memoranda, the PMOC's review will include a review of the sufficiency of the documentation provided in the final report to support the findings.

## **7.0 PMOC REPORT, PRESENTATION, RECONCILIATION**

For each milestone review, the PMOC will prepare a memorandum to FTA that will be a concise presentation of the PMOC's findings and conclusions. The purpose of the memorandum is to convey the value-added analysis by the PMOC rather than merely to summarize the materials prepared by the Project Sponsor. The memorandum will identify any shortcomings in the draft archive and technical memorandum and recommend remedies to be undertaken by the Project Sponsor. If necessary, the PMOC will participate with FTA staff in discussions with the Project Sponsor regarding the findings and recommendations. Once the Project Sponsor has updated the materials, the PMOC will review the changes to confirm that they respond adequately to the comments.

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1	The PMOC shall assess the reliability of the elements of the Project Sponsor's B&A Study program.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of the Project Sponsor's preservation of project scope, schedule, and capital cost forecasts and its B&A Study Plans and Reports.		<b>Q1a.</b> PMOC provides documentation of the process.	<b>M1a.</b> Review of the process documentation.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process and project management judgment to validate the thoroughness of the Project Sponsor's B&A Study Plan and the Project Sponsor's preservation of project scope, schedule, and capital cost data at all phases of the project.		<b>Q1b.</b> Review must be made and PMOC provides internal verification that the process as documented has been followed.	<b>M1b.</b> Documented review and analysis of Project Sponsor's B&A Study Plan, preservation of project data and capacity to develop a Federally-assisted Project.	<b>MM1b.</b> Periodic review by FTA or its agent and the PMOC's internal verification.
2	The PMOC shall provide continuous review and evaluation of Project Sponsor's B&A Study program to confirm project scope, schedule, and capital cost forecasts and data are being preserved such that complete and accurate B&A Study comparisons and analyses can be performed.	<b>R2a.</b> The PMOC shall assess if the Project Sponsor has preserved the necessary project scope, schedule, and capital cost information and the reliability of such information for use in the predicted versus actual analysis for the Before and After Study.		<b>Q2a.</b> Professional findings and opinions of the reliability of the Project Sponsor's preservation of project scope, schedule, and capital cost data.	<b>M2a.</b> Documented evidence of a review of the Project Sponsor's preserved project scope, schedule, and capital cost information demonstrates sound management and engineering practices and professional experience.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall assess if the Project Sponsor has adequately analyzed and explained the causes of changes in project scope, schedule, and capital cost forecasts from last project milestone.		<b>Q2b.</b> Professional opinion of the adequacy of the Project Sponsor's explanations of deviations in project scope, schedule, and capital cost forecasts from last project milestone.	<b>M2b.</b> PMOC's review and opinion as to the Project Sponsor's explanations for deviations in project scope, schedule, and capital cost forecasts demonstrates sound management and engineering practices and professional experience.	<b>MM2b.</b> Periodic review by FTA or its agent.
		<b>R2c.</b> During Construction, the PMOC shall confirm the Project Sponsor preserves the actual (as-built) project scope, schedule, and capital cost data as it becomes available in order to sufficiently document changes between projected scope/costs and as-built scope/costs.		<b>Q2c.</b> Professional findings and opinions of the reliability of the Project Sponsor's preservation of actual (as-built) project scope, schedule, and capital cost data during construction of the project.	<b>M2c.</b> Documented evidence of a review of the Project Sponsor's preservation of actual project scope and capital cost information demonstrates sound management and engineering practices and professional experience.	<b>MM2c.</b> Periodic review by FTA or its agent.
		<b>R2d.</b> The PMOC shall review and assess the Project Sponsor's B&A Study Plan and provide FTA with its determinations on whether (1) the Project Sponsor properly identified work to be performed in its B&A Study, (2) the Plan provides for capturing what has occurred to date, (3) the Plan reflects project characteristics and (4) the Plan captures all known issues which have influenced project scope and costs.		<b>Q2d.</b> Professional findings and opinions of the adequacy and completeness of the Project Sponsor's B&A Study Plan.	<b>M2d.</b> Documented evidence of a thorough review of Project Sponsor's B&A Study Plan, supported by professional opinion	<b>MM2d.</b> Periodic review by FTA or its agent.

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
		<b>R2e.</b> The PMOC shall review and assess the completeness and reasonableness of the analyses contained in the Project Sponsor's Interim B&A Study Reports.		<b>Q2e.</b> Professional findings and opinions of the completeness and reasonableness of the Project Sponsor's Interim B&A Study Reports.	<b>M2e.</b> Documented evidence of a thorough review of the Project Sponsor's Interim B&A Study Report, supported by professional opinion	<b>MM2e.</b> Periodic review by FTA or its agent.
		<b>R2f.</b> The PMOC shall review and assess the completeness and reasonableness of the analyses contained in the Project Sponsor's Final B&A Study Report.		<b>Q2f.</b> Professional findings and opinions of the completeness and reasonableness of the analyses contained in the Project Sponsor's Final B&A Study Report.	<b>M2f.</b> Documented evidence of a thorough review of the Project Sponsor's Final B&A Study Report, supported by professional opinion	<b>MM2f.</b> Periodic review by FTA or its agent.
<b>3</b>	The PMOC shall provide FTA with a written report of its findings, analysis, recommendations and professional opinions.	<b>R3.</b> The PMOC shall present its findings, analysis, recommendations and professional opinions to FTA in a written report and, when so directed by FTA, seek to reconcile its findings with Project Sponsor to the extent possible. A supplemental report shall be filed describing the results of reconciliation attempts.		<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with the Project Sponsor to the extent possible.	<b>M3.</b> Review of the PMOC's presentation of findings, analysis, recommendations and professional opinions by the FTA.	<b>MM3.</b> Periodic review by FTA or its agent.



## Oversight Procedure 30 – Value Engineering and/or Constructability Review

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### 1.0 PURPOSE

The purpose of this Oversight Procedure is to describe the review, analysis and recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects the Project Management Oversight Contractor (PMOC) with regards to the completeness and reliability of the results of the Project Sponsor's Value Engineering (VE) and/or Constructability Review (CR) programs; and to assess the respective program's usefulness as a management tool for controlling project costs and improving the overall value of the FTA's investment in the project.

### 2.0 BACKGROUND

#### 2.1 VALUE ENGINEERING

The value methodology is a systematic process that follows the Job Plan<sup>1</sup>. A value methodology is applied by a multidisciplinary team to improve the value of a project through the analysis of functions.

A Value Study is the formal application of a value methodology to a project in order to improve its value. This application is also referred to as value engineering, value analysis, value planning, or value management.

##### (1) Applicability:

- a) Major Capital Projects. VE must be used on major capital projects. A major capital project is usually identified early in the grant application process. FTA guidance requires VE on all projects unless an approved waiver is obtained by FTA.
- b) Non-Major Capital Projects. Project Sponsors are encouraged to conduct VE on all construction projects including but not limited to bus maintenance and storage facilities, intermodal facilities, transfer facilities, revenue railcar acquisition and rehabilitation, and offices, with the level of VE study to be commensurate with the size of the project.

##### (2) Timing:

VE on a project should be performed early in the design process before major decisions have been completely incorporated into the design. This could be as early as FTA's evaluation of the project's entry to project development (PD) or near the end of project development (PD) and prior to a project's Entry to Engineering. For Design-Build projects, the VE should be conducted prior to completion and release of the Request for Proposal (RFP).

Some large or complex projects, generally with costs surpassing \$500 million, may need to conduct two VE studies, one prior to entry into engineering and a second at approximately 60

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<sup>1</sup>For a discussion of the Job Plan see Appendix B.



percent design. Project Sponsors should make this determination early in the project's life-cycle and clearly document the VE plan and timing in the PMP.

(3) Reporting:

Project Sponsors with major capital projects are required to submit a VE report to the appropriate FTA Regional Office at the end of each Federal fiscal year (FY) (October 1) indicating the results of their VE efforts. Copies of the VE report form are available in each Regional Office. **Note: This requirement is independent of the recommendations and guidance contained in the Oversight Procedure.**

(4) Expected Results:

Well conducted VE studies should generally return \$20 dollars in savings for every \$1 invested in the study. Many studies will realize higher ratios and some will be less. Greater savings are possible during Planning, Conceptual Design and Project Development because the potential to implement planning-level design changes is possible without affecting the schedule. Ideally, these changes would occur prior to Entry into Engineering.

(5) Other Applications

VE may also be required in cases where the project is found to exceed budget prior to award of a Full Funding Grant Agreement (FFGA); a Small Starts Grant Agreement (SSGA); at 100 percent design; or after the receipt of bids. In these cases, the intent of the VE is to reduce cost to the point of affordability. The PMOC may also be required to review Value Engineering Change Proposals (VECP)<sup>2</sup> initiated by the construction contractor or vehicle supplier. Value Engineering proposals may also take the form of Alternative Technical Concepts (ATCs) submitted (if allowed) by design-build teams during the proposal process. If ATCs are permitted by the procurement process, they are normally evaluated by the Project Sponsor's staff and consultants and the Project Sponsor normally has no obligation to accept any ATC.

## 2.2 CONSTRUCTABILITY REVIEWS

A Constructability Review (CR) is a structured review of the project and design documents to ensure that construction of the project is feasible and that the design as represented in the plans and specifications or bridging documents<sup>3</sup> is biddable and constructible in a safe manner.

(1) Applicability:

- a) Major Capital Projects. Constructability Reviews are encouraged on major capital projects. A major capital project is usually identified early in the grant application process.

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<sup>2</sup>VECPs involve recommendations made by the construction contractor for saving cost after the award of their contract. Generally, the cost savings are split on a 50:50 basis between the owner and the construction contractor. Specific language must be included in construction or procurement contracts to incorporate the VECP process and define the sharing of any resultant savings.

<sup>3</sup>Bridging documents are those materials (plans, performance requirements, specifications, etc.) prepared by the Project Sponsor (or one or more consultants retained by the Sponsor) to guide the design-build contractors in the preparation of their design-build proposals. The objective of the bridging documents is to accurately communicate the Sponsor's (including relevant third-parties) responsibilities and expectations to the prospective design-build contractors so that parties' objectives are well aligned.

- b) Non-Major Capital Projects. Project Sponsors are encouraged to conduct CR on all substantial construction projects including but not limited to bus or rail maintenance and storage facilities, intermodal facilities, transfer facilities, and offices, with the extent of the CR to be commensurate with the size and complexity of the project.
- c) Projects Using Alternative Delivery Methods. Project Sponsors are strongly encouraged to conduct a CR for any project that is being considered for use of an alternate delivery method or for any contract that is being considered for an alternate delivery method. Alternate delivery methods are those other than competitive low-bid and may include design-build, construction manager/general contractor (CM/GC) or construction manager at risk (CMAR); design-build-operate and maintain (DBOM); or Public Private Partnership (P3).

#### (2) Timing:

A CR conducted early in the project development cycle should focus on (a) site constraints; (b) schedule constraints; and (c) resource constraints. Site constraints include the presence of existing underground and overhead utilities, access, availability of lay down and storage areas, availability of utility services and height or clearance restrictions. Schedule constraints include time of year, weather restrictions, seasonal environmental restrictions, local construction moratoria, and permissible work hours. CRs conducted prior to the advertisement of a project or contract for bids or proposals focus on whether the project or contract is biddable and whether the contract documents are complete, clear and unambiguous.

CR on a project should be performed relatively early in the design process before design concepts are fixed and while there is still an opportunity to influence factors such as location, access, etc. This may be near the end of project development (PD) and prior to a project's Entry to Engineering. For Alternate Delivery projects or contracts such as Design-Build, the CR should be conducted before the Request for Proposal (RFP) is finalized and released. In design-build procurement that uses a Request for Qualifications (RFQ) process to pre-qualify design-build teams, it may be advantageous to perform the CR after qualifications have been received and evaluated but before the RFP is completed.

#### (3) Expected Results:

An effective CR early in the project development process may identify situations where conditions restrict access, limit the use of certain construction techniques or equipment, or result in unsafe working conditions. Late stage CRs will point out gaps or inconsistencies in the contract and design documents or missing information that, if not corrected, might cause contractors to prepare inaccurate bids with excessive contingency. In all cases, a CR should identify risks specifically associated with the constructability of the project or contract. Among the risks that should be considered are unusually complex or "signature" structures incorporating expensive materials, glazing or coating systems that may be costly to construct and/or maintain. As in the case of VE reviews, greater benefits accrue early in the project development process by avoiding changes during later stages of design or potential construction change orders.

#### (4) Other Applications:

A CR may also be indicated in situations where a project or contract package is met with resistance in the marketplace as evidenced by no bids or proposals, or extremely high bids or proposals. In these cases, the Project Sponsor is well advised to conduct de-briefings of the contractors to determine the probable cause before proceeding with additional actions such as re-

scoping or re-design. Re-bidding a job will result in delays in all cases; an alternative approach is to advertise the pre-final design documents for industry review in an effort to avoid an unsatisfactory procurement outcome.

### **3.0 OBJECTIVE**

The objective of this review is to provide the FTA with the PMOC's professional opinions regarding the overall effectiveness of the Project Sponsor's Value Engineering or Constructability Review programs. Value Engineering is a required activity for Major Capital Projects. VE workshops are expected to identify alternative approaches to meeting project requirements that result in capital and/or operating cost savings to the project sponsor. Constructability Reviews are designed to avoid problems and resulting cost increases resulting from inadequate consideration of factors likely to affect a contractor's ability to efficiently construct a project, or problems inherent to the Project Sponsor's plans, specifications and contract documents.

### **4.0 REFERENCES**

The PMOC should be familiar with the statutes, regulations, policies, guidance documents and circulars listed in OP 01. These are the principal, but by no means the only, references to Federal legislation, regulation and guidance that apply to the project work being reviewed under this OP.

Value Engineering Reviews Only - The PMOC should refer to SAVE International Value Standard, 2007 or current Edition and the material describing the VE process contained in Appendix B.

### **5.0 PROJECT SPONSOR SUBMITTALS**

The PMOC shall obtain the following from the Project Sponsor in advance of performing the review.

#### **5.1 VALUE ENGINEERING**

Prior to conduct of the VE Workshop, the PMOC shall obtain the following from the Project Sponsor:

- Value Engineering work plan including proposed list of participants/disciplines and estimated labor hours for the analysis; and
- Orientation Memoranda including logistics, assumptions, any scope limitations applicable to the study, cost models if used and materials, e.g., plans, specifications, materials list, and cost estimates to be reviewed by participants prior to the study.

Following completion of the VE workshop, the PMOC shall obtain the following from the Project Sponsor:

- Draft VE Report, including all VE recommendations;
- Final VE Report, including the disposition of the VE recommendations; and
- Documentation that adopted VE recommendations have been incorporated/implemented.

#### **5.2 CONSTRUCTABILITY REVIEW**

Prior to conduct of the CR Workshop, the PMOC shall obtain the following from the Project Sponsor:

- Constructability Review work plan including scope of the review, preliminary schedule, list of participants/disciplines and estimated labor hours for the analysis; and
- Orientation Memoranda including logistics and schedule; scope of the review; limitations, if any; project delivery or project execution plan; and descriptions, plans, specifications, material lists and cost estimates or other materials provided to participants for advance study.

Following completion of the Constructability Review, the PMOC shall obtain the following from the Project Sponsor:

- Draft Constructability Review Report with recommendations;
- Final Constructability Review Report, including the disposition of the Constructability recommendations; and
- Documentation that adopted recommendations have been incorporated and/or implemented in the project plans or contract documents.

## **6.0 SCOPE OF WORK**

### **6.1 GENERAL REQUIREMENTS**

The scope of work for the PMOC will be similar for either a Value Engineering Review or a Constructability Review and will generally require the PMOC to do the following:

- Obtain copies of the Project Sponsor's documents for review in advance of the planned activities.
- Review the VE or CR work plan to determine if the plan is complete, meets the relevant standards and if implemented as planned, is likely to produce the intended results and be beneficial to the Sponsor's team and project.
- Prepare and submit a report to FTA summarizing the work plan review including observations, comments and recommendations for improvement. Provide a copy of the report to the Project Sponsor if directed by FTA.
- If authorized by FTA, attend the Sponsor's VE or CR workshop. Active participation by the PMOC (as distinguished from attendance and observation) is encouraged only in those areas where the PMOC's knowledge and experience with relevant federal processes would be beneficial to the participants. The PMOC should use discretion and good judgment when offering professional opinions on other topics being discussed.
- Prepare and submit a Trip Report to FTA summarizing the PMOC's workshop attendance including observations and comments. Provide summaries of significant findings or conclusions and identify planned follow-on activities.
- Obtain copies of interim and final VE or CR reports and associated documentation. Review the reports and provide comments to FTA regarding the adequacy and completeness of the reports, including the PMOC's professional opinions regarding the

appropriateness of the workshop recommendations and the disposition of the recommendations.

- Follow-up with the Project Sponsor on the implementation of workshop recommendations as part of the PMOC's routine monitoring of project activities and include the relevant information as part of regular project monitoring reports.

## **6.2 VALUE ENGINEERING**

### **6.2.1 Evaluation Criteria**

The PMOC shall consider the following in assessing the effectiveness of the Project Sponsor's VE activities:

- That the VE study was conducted in accordance with the VE Job Plan and met the standards for Value Engineering workshops established by SAVE International (See Appendix B).
- That the design information supplied was sufficient to conduct the VE study, including:
  - a. A complete cost estimate following the SCC elements corresponding to the plan set reviewed
  - b. Design memoranda for key disciplines are available
  - c. Design Criteria
  - d. Conceptual (10%), 30, or 60 percent completed plan set
  - e. Draft specifications
  - f. Final Environmental Document (EIS/EA/CE) and applicable decision documents (ROD/FONSI)
  - g. Milestone schedule
- The team is multidiscipline, independent from the project team and qualified to conduct the study.
- That the VE team leader is a Certified Value Specialist certified by SAVE International.
- The VE Job Plan endorsed by SAVE International has been followed.
- The Final VE Report includes the "disposition" of each VE recommendation.
- Decisions to reject VE proposals were based on reasonable criteria.
- That accepted VE proposals have been incorporated into the revised plan set and processed through the Project Sponsor's Configuration Control Board (or equivalent organization).

Under some circumstances, VE may be less formal and not strictly follow SAVE protocols, such as: 1) cost reduction efforts for specific elements of a project (e.g. high ROW costs); 2) for very small projects; or 3) for the preparation of VECs by the construction contractor.

### **6.2.2 Implications of Alternate Delivery Methods on Value Engineering**

Project Sponsors are increasingly using alternative project delivery methods such as Design-Build, Construction Manager/General Contractor (CM/GC), Construction Manager at Risk (CMAR), and Public Private Partnership (P3) instead of the traditional Design-Bid-Build (DBB)

approach. If an alternate delivery method is chosen, the approach to VE would be the same as for a traditional D-B-B project up until Entry into Engineering or early in the Engineering phase. The specific timing of the VE activity will vary somewhat depending on the delivery method selected and the associated schedule for implementation, i.e., VE could be done near the completion of Project Development or early in Engineering by the Project Sponsor. After a design-build contract is advertised, VE will also be performed by the prospective bidders when competing for the project and during actual construction, assuming that a VECP provision is included in the contract documents. The PMOC would not have oversight responsibility during the bidding phase, but may be required to evaluate the contractor's VECP documentation. Evaluation of contractor-initiated VE or VECP efforts would typically be performed by the Project Sponsor's internal staff and not by persons accredited by SAVE International, which is appropriate.

## **6.3 CONSTRUCTABILITY REVIEW**

### **6.3.1 Evaluation Criteria**

The PMOC shall consider the following in assessing the effectiveness of the Project Sponsor's Constructability Review activities.

- That the information supplied to the CR team was sufficiently complete and up-to-date to conduct the study, including:
  - a. Documentation related to the Project Sponsor's selection of project delivery methods and contract packaging and any owner furnished materials
  - b. One or more plan sets representing the current level of project development (conceptual, 30%, 60%, 95%, etc.)
  - c. A complete cost estimate for the project or contract(s) being reviewed in native format; the estimate should also be keyed to FTA's SCC
  - d. Master project schedule in sufficient detail to show the relationship between the various construction contracts or packages, contract durations including procurement activities, and major project milestones such as completion of NEPA, FFGA, right-of-way acquisition, etc.
  - e. Draft contract provisions and technical specifications
  - f. Draft or Final Environmental Document (EIS/EA/CE) and FTA Decision Document
- The CR team is multidiscipline, independent from the project team and qualified to conduct the study.
- That the team leader has the experience and qualifications to conduct the review.
- The Constructability Review Plan has been followed.
- The Final Constructability Review Report includes the "disposition" of each of the Constructability Review recommendations.
- That the "disposition" of the Constructability Review recommendations is reasonable and based on sound criteria.
- That the accepted recommendations have been incorporated into the Sponsor's Project Delivery Plan and the appropriate plans and other contract documents, and that these

materials have been processed through the Project Sponsor's Configuration Control Board (or equivalent organization).

### **6.3.2 CR Staffing**

Staffing for a Constructability Review will depend on whether the scope is an entire project, a single contract or multiple contract packages. The team should be multidisciplinary including staff experienced in the construction or procurement of those SCC elements (10 through 80) that have the greatest effect on cost, operability and risk. For a fixed guideway project, these will generally include:

- CR Team Leader
- Construction Manager
- General Civil Engineer
- Structural Engineer
- Systems Engineer
- Specialty construction experts (bridges, tunnels, underground stations, and trackwork, if applicable)
- Station Architect
- Construction Cost Estimator
- Construction Scheduler
- Project Sponsor representatives, including Project Manager, Environmental Manager and Construction Manager
- The team size will vary from five persons for a small project or single contract package, to twelve or more for a complex project of \$1 billion or more with multiple contract packages or delivery methods. For these large projects, the team may be divided into two or three sub-teams assigned to individual contract packages.

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall provide FTA with a written report of its findings, analysis, recommendations and professional opinions, including a description of the review activities undertaken, as well as other supporting information.

After FTA approval, the PMOC may share the report with the Project Sponsor. In the event that differences of opinion exist between the PMOC and the Project Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile its findings with the Project Sponsor and provide FTA with a report addendum covering the agreed modifications by the Project Sponsor and PMOC.

The report formatting requirements of OP 01 apply. When necessary, the PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may use additional software as required but documentation and report data shall be made available to FTA.

## Appendix A

### Acceptable Quality Level of PMOC's Performance

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1.	The PMOC shall validate the effectiveness of the Project Sponsor's project VE or CR process.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of a Project Sponsor's VE or CR program.	NA	<b>Q1a.</b> VE process exists and has been followed according to the SAVE International Standard. CR process exists and has been followed.	<b>M1a.</b> Evidence of a documented process.	<b>MM1a.</b> Periodic review by FTA
		<b>R1b.</b> The PMOC shall use its professional judgment to validate the usefulness of the Project Sponsor's VE or CR program	NA	<b>Q1b.</b> Assessment must be made	<b>M1b.</b> Documented assessment of the VE or CR program	<b>MM1b.</b> Periodic review by FTA
2.	FTA and the PMOC shall have full understanding of the Project Sponsor's VE or CR program including: <ul style="list-style-type: none"> <li>• Pre-Workshop Activities</li> <li>• Workshop</li> <li>• Post-Workshop Activities</li> <li>• Documented implementation of accepted VE or CR proposals</li> </ul>	<b>R2a.</b> The PMOC shall provide FTA with its opinion as to the completeness and level of detail of the <b>Pre-Workshop</b> activities.	NA	<b>Q2a.</b> Professional opinion that the Pre-workshop activities were completed per the SAVE International Standard for VE or per the plan for CR.	<b>M2a.</b> Documented evidence of a review by PMOC for completeness of the Pre-Workshop activities.	<b>MM2a.</b> Periodic review by FTA
		<b>R2b.</b> The PMOC shall provide FTA with its opinion as to the completeness and level of detail of the <b>Workshop</b> activities.	NA	<b>Q2b.</b> Same as above for Workshop activities.	<b>M2b.</b> Documented evidence of a review by PMOC for completeness of the Workshop activities.	<b>MM2b.</b> Periodic review by FTA
		<b>R2c.</b> The PMOC shall provide FTA with its opinion as to the completeness and level of detail of the <b>Post-Workshop</b> activities.	NA	<b>Q2c.</b> Same as above for Post-Workshop activities.	<b>M2c.</b> Documented evidence of a review by PMOC for completeness of the Post-Workshop activities.	<b>MM2c.</b> Periodic review by FTA
		<b>R2d.</b> The PMOC shall provide FTA with its opinion as to the completeness and level of detail of the <b>implementation</b> of accepted VE or CR proposals. .	NA	<b>Q2d.</b> Same as above for VE or CR implementation activities.	<b>M2d.</b> Documented evidence of a review by PMOC for appropriateness of the VE or CR implementation activities.	<b>MM2d.</b> Periodic review



	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
<b>3</b>	The PMOC shall document that VE or CR changes have beneficial impact to the Project Sponsor's overall scope, schedule, and budget in its reports to the FTA.	<b>R3a.</b> The PMOC shall clearly identify potential benefits of VE or CR recommendations to the Project Sponsor's program/project based on its professional opinion	NA	<b>Q3a.</b> Potential benefits identified by the implementation of accepted VE or CR recommendations are documented.	<b>M3a.</b> Identified risks and potential project impacts on safety and security, project scope, cost, and schedule.	<b>MM3a.</b> Periodic review by FTA
<b>4</b>	The PMOC shall document its findings, professional opinions, and recommendations in a report to the FTA.	<b>R4a.</b> The PMOC shall present its findings, conclusions, and recommendations to FTA and reconcile other reports and those recommendations with the Project Sponsor to the extent possible.	NA	<b>Q4a.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with Project Sponsor to the extent possible.	<b>M4a.</b> PMOC's findings, conclusions, recommendations, and presentation.	<b>MM4a.</b> Periodic review by FTA

## **Appendix B**

### **SAVE Standards for Value Engineering Workshops**

The Standard for conducting VE workshops is provided through guidance published by SAVE International. Federal agencies, including FTA, FHWA, EPA, DOD, DOE etc., base their value programs on the SAVE Standard. The PMOC shall evaluate the Project Sponsor's VE program against the SAVE Standard (the "standard") formally referenced as the *Value Standard and Body of Knowledge*, June 2007 (or the latest edition) SAVE International.

#### **1. Minimum Standards**

According to the SAVE Standard, the following conditions must be met in order to represent an acceptable VE Study:

- The Value Study Team follows an organized Job Plan that includes the six phases identified in this standard. Function Analysis, is performed on the project.
- The Value Study Team is a multidisciplinary group of experienced professionals and project stakeholders. Team members are chosen based on their expertise and relevant experience.
- The Value Study Team Leader is trained in value methodology techniques and is qualified to lead a study team using the Job Plan. The SAVE International Certification Board certifies, with the designation Certified Value Specialists (CVS), those individuals who have met specified training requirements and have demonstrated competency in the application of the Job Plan. The Team Facilitator shall be a CVS, or an Associate Value Specialist (AVS) serving under the guidance of a CVS as defined by SAVE Certification criteria, or shall be the holder of another active certification recognized by SAVE International.

#### **2. SAVE Job Plan**

##### **2.1 Pre-Workshop Phase**

In this phase the Project Sponsor prepares for the VE study. This typically involves obtaining management support for the VE, selecting the appropriate team members, developing the scope of work and objectives for the study, and collecting the required background information for the work. This latter task includes transmittal of the project discipline support memoranda, plan set, draft specifications, project schedule and capital cost estimate. The logistics for the study are defined and distributed to the team. The main deliverable for the Pre-Workshop activities includes an Orientation Memorandum, which will suffice as a work plan for the study.

##### **2.2 Workshop Phase**

The workshop includes the six-step process, typically held over five consecutive days, as shown on Figure 1 and described below.

**Step 1: Information Phase** - The team reviews and defines the current conditions of the project and identifies the goals of the study.

**Step 2: Function Analysis Phase** - The team defines the project functions using a two-word active verb/measurable noun context. The team reviews and analyzes these functions to determine which need improvement, elimination, or creation to meet the project's goals.

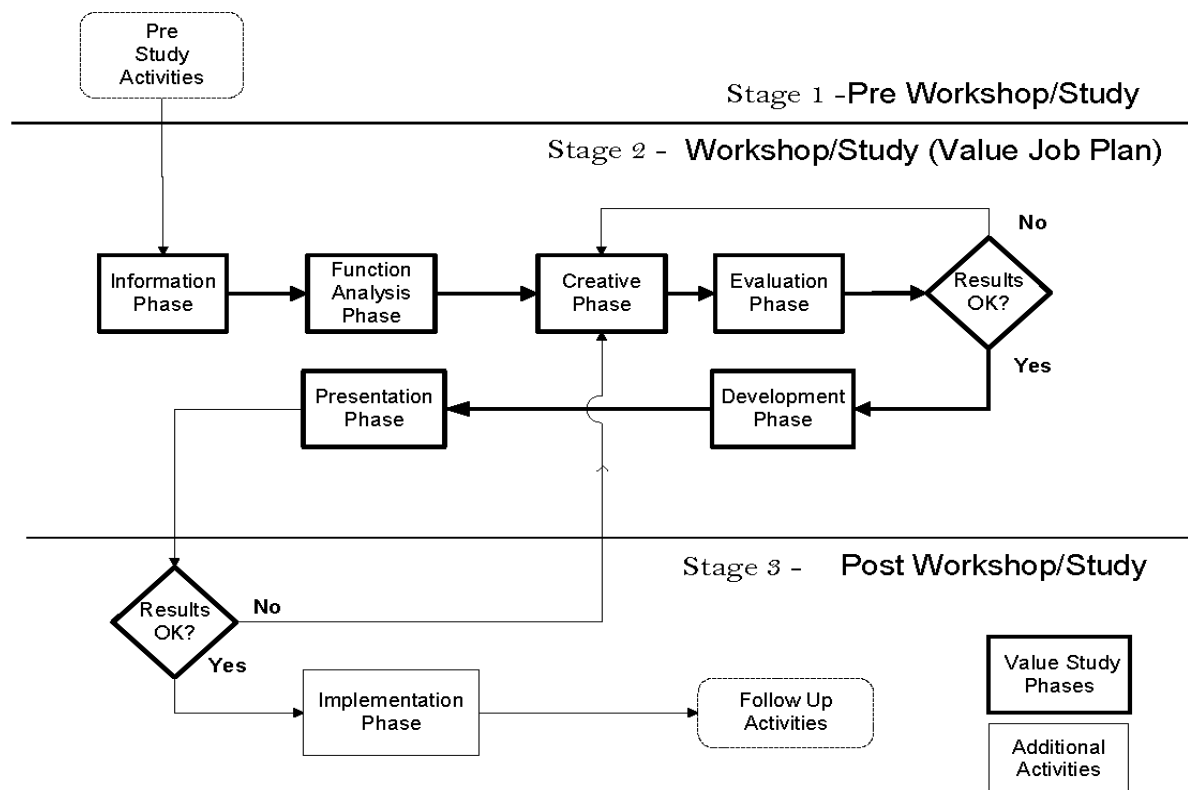
**Step 3: Creative Phase** - The team employs creative techniques to identify other ways to perform the project's function(s).

**Step 4: Evaluation Phase** - The team follows a structured evaluation process to select those ideas that offer the potential for value improvement while delivering the project's function(s) and considering performance requirements and resource limits.

**Step 5: Development Phase** - The team develops the selected ideas into alternatives (or proposals) with a sufficient level of documentation to allow decision makers to determine if the alternative should be implemented.

**Step 6: Presentation Phase** - The team leader develops a report and/or presentation that documents and conveys the adequacy of the alternative(s) developed by the team and the associated value improvement opportunity.

**Figure 1 – Value Study Process Flow Diagram**



### 2.3 Post-Workshop Phase

The purpose of the Post-Workshop activities is to confirm the disposition and benefits of the accepted VE recommendations. The benefits should be documented in a revised cost estimate. This shall be performed through review of the modified plan set and through tracking the changes in the Project Sponsor's Configuration Management process.

## 2.4 VE Participants

VE workshops should be multidisciplinary including staff representing those SCC elements (10 through 80) that have the greatest effect on cost, operability and risk. For a fixed guideway project, these will generally include:

- Value Engineering Team Leader (CVS)
- General civil engineer
- Track engineer
- Structural engineer
- Traction Power engineer
- Vehicle specialist
- Construction expert
- Station Architect
- Cost estimator
- Owner representatives

The team size will vary from five persons for a small project to fifteen or more for a project of \$1 billion and above. For these large projects, the team may be divided into two or three sub-teams; for example: one team covering the civil, architectural and guideway elements; a second team covering the systems elements; and a third team evaluating project risks and mitigation measures. In most instances, the hours estimate for a VE evaluation will range between 300 (small project) to 800 (large project), with some projects exceeding 1,000 hours.



## **Oversight Procedure 31 – Annual New Starts Review**

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### **1.0 PURPOSE**

This Oversight Procedure describes the review, analysis, recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) with regard to the reliability of the Project Sponsor's (Sponsor) characterization of its project's scope, capital cost and schedule as submitted to FTA for an annual evaluation and/or a recommendation to Congress.

### **2.0 BACKGROUND**

Congress requires that FTA report every year on the status of projects approved into its project development pipeline. The annual review is meant to ensure that projects continue to meet their goals and stay on-time and on-budget. The Annual New Starts (NS) Review is performed for projects as they advance to an FFGA and achieve revenue service or as deemed necessary by FTA. More in-depth reviews are conducted prior to advancement to the next milestone.

### **3.0 OBJECTIVES**

The PMOC's review should provide findings, conclusions, and recommendations regarding the reliability of the Project Sponsor's characterization of its project scope definition, schedule and cost estimate as a critical input to FTA's annual project evaluation.

### **4.0 REFERENCES**

The following are the principal, but by no means the only, references to applicable federal legislation, statutes, regulations and guidance. The PMOC should have a good understanding of these reference materials as they apply to the Sponsor's project being reviewed under this OP:

- Title 49 United States Code, Chapter 53 (49 USC 53) Federal Transit Laws as amended by Moving Ahead for Progress in the 21st Century Act (MAP-21).
- Federal Transit Administration Regulations (49 Code of Federal Regulations Chapter VI) as amended.
- New Starts and Project Development Policy Guidance issued by the Federal Transit Administration (latest version)
- OP 32C Project Scope Review; OP 33 Capital Cost Estimate Review; OP34 Schedule Review; and OP 40 Risk and Contingency Review.

## **5.0 PROJECT SPONSOR SUBMITTALS**

The PMOC should obtain and study appropriate project documents prior to performing the review. The required documents will depend on the current status of the project and the specific project activities that the Sponsor seeks to advance. Electronic files should be obtained in native format to allow the PMOC to confirm the accuracy and consistency of calculations. The PMOC should notify FTA of important deficiencies or discrepancies in the project information that would hinder the review.

- Written Project Description
- Environmental Documents (FEIS/ROD; EA/FONSI; CATEX/FONSI)
- Basis of Design Reports, Design Criteria
- Design Documents (Plans, Specifications)
- Project Management Plan
  - Risk and Contingency Management Plan (RCMP)
  - Project Delivery or Contracting Plan
- Project Schedule (Master Baseline Schedule)
  - Basis of the Schedule
  - Schedule Management Plan
  - Identification of Critical Path
  - List of Deliverables and Key Milestones
- Current Capital Cost Estimate
  - Basis of the Estimate or estimating methodology memo (refer to Appendix B)
  - Complete cost estimate in project sponsor's original format, including
    - Calculations for construction escalation by commodity type
    - Calculations for inflation by year
  - Complete cost estimates in FTA's Standard Cost Category (SCC) format  
Note: The SCC worksheets serve as a reporting format; they summarize the actual cost estimate. (Obtain from the Sponsor the same version of the SCC worksheets that was or will be submitted to FTA for the annual review).
- Other Relevant Documents, such as:
  - Independent Cost Estimates
  - Value Engineering Reports
  - Constructability Reviews
  - Risk Assessment Reports
- Documentation of changes to scope, cost and schedule that have occurred since the last milestone or annual review.
- A copy of the PMOC's annual review from the previous year

## **6.0 SCOPE OF WORK**

### **6.1 Preliminary Document Review**

Upon receipt of the assignment, the PMOC should obtain the specified project documents and other materials from the Project Sponsor. The PMOC may already be generally familiar with the project as a

result of on-going monitoring activities. The assigned personnel should review the materials in preparation for their on-site visit and identify any identify and missing documents.

## **6.2 On-Site Review Meeting**

The PMOC should arrange for an on-site meeting with the Sponsor's project management team. The meeting should include a discussion of project conditions, current developments, changes to the project's scope, schedule or cost estimate reflected in the current New Starts submission and any questions related to the initial document review

## **6.3 Review and Assessment**

Assess the reliability of the Sponsor's New Starts submittal in light of existing project documentation. Refer to the report contents in Section 7.1 below to identify the specific tasks and analyses required.

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall provide FTA with a written report of its findings, analysis, recommendations, professional opinions, and a description of the review activities undertaken. The report formatting requirements of OP 01 apply. When necessary, PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may add other software as required but documentation and report data shall be made available to FTA

### **7.1 Report Content**

#### **7.1.1 Introductory Information**

Provide the following information on an introductory page of the report:

- a) Date of your report
- b) Project name and location
- c) Project Sponsor
- d) PMOC firm
- e) Person (and affiliation if different from PMOC firm) providing this report
- f) Length of time PMOC firm and person have been assigned to this project

#### **7.1.2 History and Basis of the Project Cost Estimate**

- a) Verify that the cost estimate in its original and SCC formats are consistent. Identify discrepancies between the content in the two formats.
- b) Attach the Excel file of the SCC Workbook to your email with your report
- c) Explain reasons for increases in the cost estimate. Example:

“The estimate was originally done in (year of estimate) when the project sponsor requested entry to engineering. It could be characterized as a “bottom up” estimate because it was done from scratch and based on a very complete set of initial design documents. It made wide use of quantities and unit costs and broke down indirect costs. The estimate was \$250 million in 20XX Base Year dollars and \$300 million in Year of Expenditure (YOE) dollars. The current estimate was

updated in (date) to \$310 million YOE. The increase of \$10 million is attributable solely to an inflation rate correction. Based on the June 20XX estimate, the Project Sponsor's SCC worksheets dated (include date), submitted as part of their 20XX (FYXX) New Starts submittal, indicate \$310 million YOE."

For all of the following questions, refer to the cost estimate and schedule both in their original format and in the SCC format. Also refer to the other project documents listed above.

### **7.1.3 Cost Estimate in (year) Base Year Dollars**

- a) Characterize the scope and level of scope definition that formed the basis for the Project Sponsor's current capital cost estimate. Has the project scope been changed since the original cost estimate was developed or since the previous New Starts submission? If the scope has changed, does the current cost estimate reflect the changes?
- b) Evaluate the capital cost estimate. Make recommendations where appropriate for change of approach or additional work. Choose line items that represent the highest risk for spot checks.
  - i. Spot check the estimate's internal consistency (does it add up?);
  - ii. Spot check the estimated quantities through comparison with drawings;
  - iii. Spot check the unit costs through comparison with recent similar bid prices;
  - iv. Review the reasonableness of pricing escalation for specific construction elements and commodities based on current conditions;
  - v. Review the reasonableness of the cost estimate for and assumptions behind the General Conditions and Supplementary Conditions of the Contract and Division 1 Specifications in terms of allocation of risk between the Project Sponsor the construction contractors and any third-parties, e.g., a freight railroad.
  - vi. Have important changes occurred since the Project Sponsor's original cost estimate was prepared that would render the estimate less valid? How does the project compare with the project reviewed by the PMOC during the last calendar year (if review is more than six months old)?
  - vii. Identify sources of uncertainty and related potential for cost increases. Uncertainties may include unresolved issues or inadequate project definition associated with the design and construction scope; the political, institutional and project management context of the project; procurement conditions, contracting methodology, bid climate; methodology of developing the capital cost estimate itself; perceived biases in the estimate; funding sources / financing mechanisms; cost of inflation or change in the value of the dollar over time.
  - viii. Check the amount of allocated contingency for specific line items. Has allocated contingency been well used to target perceived uncertainties in scope, schedule or cost in a specific line item? In your opinion, is the total allocated contingency as a percentage of total base year dollars and project scope adequate?

### **7.1.4 Cost Estimate in Year-of-Expenditure (YOE) Dollars**

- a) On the Inflation Worksheet, verify that "base year" costs have been spread across the top part of the worksheet in accordance with the project schedule.
- b) Comment on the fit between the YOE schedule for expenditures compared with the



- project schedule for design and construction.
- c) Is the assumed rate of inflation used for each year of the project reasonable? Compare the rates with those used last year.
  - d) For past years, verify that the actual dollar amounts expended have been inserted in the YOE (bottom) section of the worksheet and are inflated in the top section.
  - e) Comment on the reasonableness of construction escalation for specific commodities that may be included in the YOE cost.
  - f) Identify uncertainties introduced through the development of the YOE cost estimate.
  - g) Is the unallocated contingency adequate to cover unforeseen conditions in all areas of the project and still remain in place until construction is well underway?
  - h) Do you recommend this project carry a project reserve?

#### **7.1.5 Project Schedule**

Comment on the overall reasonableness of the project schedule. Assess the proposed durations for each phase, giving consideration to the national, local, and agency-specific track records for implementation of similar projects. Identify sources of uncertainty. Identify potential obstacles or uncertainties that could affect the schedule such as utilities and real estate acquisition.

#### **7.1.6 Concluding Statement**

Develop a concluding statement in 500 words or less:

- a) Briefly describe your findings on project scope, schedule, and cost.
- b) Provide a professional opinion regarding the reliability of the project scope, schedule and cost.
- c) Make a statement of potential range of cost (lower, upper bound and most likely.)
- c) Characterize the top three uncertainties in terms of their likelihood (probable, improbable) and consequence (catastrophic, significant, and marginal.)
- d) For areas of significant uncertainty, recommend additional investigation, planning or design work by the Project Sponsor or other parties, with a schedule for the accomplishment of the work.

#### **7.2 Reconciliation**

After FTA approval, the PMOC should share the report with the Project Sponsor. In the event that differences of opinion exist between the PMOC and the Project Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile with the Project Sponsor and provide FTA with a report addendum covering the agreed modifications by the Project Sponsor and PMOC.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1	The PMOC shall perform an annual review regarding the reliability of the Project Sponsor's project scope, schedule and cost estimate as a critical input to FTA's annual project	<b>R1a.</b> The PMOC shall develop and document a process for annual review and analysis of Project Sponsor's project scope, project schedule and project cost estimate documentation.		<b>Q1a.</b> PMOC provides documentation of the process.	<b>M1a.</b> Review of the process documentation.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process and project management judgment to perform an annual review regarding the reliability of the Project Sponsor's project scope, schedule and cost estimate as a critical input to FTA's annual project evaluation.		<b>Q1b.</b> Review must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>M1b.</b> Documented annual review regarding the reliability of the Project Sponsor's project scope, schedule and cost estimate as a critical input to FTA's annual project evaluation.	<b>MM1b.</b> Periodic review by FTA or its agent and the PMOC's internal verification.
2	The PMOC shall provide FTA with professional assessments of the reliability of Project Sponsor's project scope, schedule and cost documentation.	<b>R2a.</b> The PMOC shall provide FTA with its overall findings on project scope, schedule and cost and provide its professional opinion as to the reliability of Project Sponsor's project scope, schedule and cost documentation.		<b>Q2a.</b> Professional findings and opinions of the reliability of the Project Sponsor's project scope, schedule and cost documentation.	<b>M2a.</b> PMOC's review of project documents, its findings regarding them and its opinion as to the reliability of project scope, schedule and cost documents demonstrates the application of sound management and engineering practices and professional experience.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall provide FTA with its opinion as to the potential range of project cost, showing lower limit, upper limit and most likely.		<b>Q2b.</b> Professional opinion as to the range of potential project cost.	<b>M2b.</b> PMOC's review and opinion as to the potential range of project cost is based on sound management and engineering practices and professional experience.	<b>MM2b.</b> Periodic review by FTA or its agent.
		<b>R2c.</b> The PMOC shall provide FTA with its opinion as to the top three uncertainties to the project in terms of their likelihood, i.e. probable to improbable, and their potential consequence to the project, i.e. catastrophic, significant, or marginal.		<b>Q2c.</b> Professional opinion as to the top three uncertainties to the Project Sponsor's project, their likelihood and potential consequences to the Project.	<b>M2c.</b> PMOC's review and opinion as to the top three uncertainties to the project in terms of likelihood and consequence demonstrates sound management and engineering practices and professional experience.	<b>MM2c.</b> Periodic review by FTA or its agent.
		<b>R2d.</b> With respect to areas of significant uncertainty, the PMOC shall provide FTA with its opinion and recommendation as to additional investigation, planning or design effort by the Project Sponsor or other parties and a schedule for the accomplishment of the needed additional work.		<b>Q2d.</b> Professional opinion and recommendation as to the necessity of additional investigation, planning or design work for Project Sponsor's project.	<b>M2d.</b> PMOC's review and opinion as to the necessity of additional investigation, planning or design work demonstrates sound management and engineering practices and professional experience.	<b>MM2d.</b> Periodic review by FTA or its agent.
3	The PMOC shall provide FTA with a written report of its findings, analysis, recommendations, professional opinions and a description of the review activities undertaken.	<b>R3.</b> The PMOC shall present its findings, analysis, recommendations, professional opinions and a description of the review activities undertaken to FTA in a written report and, when so directed by FTA, seek to reconcile its findings with Project Sponsor to the extent possible. A supplemental report shall be filed describing the results of reconciliation attempts.		<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with the Project Sponsor to the extent possible.	<b>M3.</b> Review of the PMOC's presentation of findings, analysis, recommendations, professional opinions and review activities by the FTA.	<b>MM3.</b> Periodic review by FTA or its agent.

## **APPENDIX B Memo Regarding Cost Estimating Methods**

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The Project Sponsor should develop a memo regarding its cost estimating approach as part of its Project Development alternatives analysis work and should update it with each subsequent estimating effort. The memo should note the method by which the Project Sponsor will ensure that costs will be tracked throughout the project life in both their original format and in the FTA SCC format. It is important that costs be tracked through construction, revenue operations and through two years post-revenue operations to document contract closeout.

The cost estimating methods memo should explain the structure of the cost estimate and market and other assumptions. It should cite other projects as precedents. The memo should note important considerations such as characteristics of the physical context, site constraints, design parameters, institutional constraints, contracting and procurement plans, project schedule, etc.

The memo should describe the approach to cost information development, i.e. parametric (use of aggregated unit costs per lineal foot of cross-section; use of segments to estimate similar construction conditions within a complex alignment) or definitive (based on the application of unit costs to quantities derived from drawings). If multiple parties are estimating parts of the project, this memo should help to ensure consistency of approach.



## Oversight Procedure 32A – Project Transit Capacity Review

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### 1.0 PURPOSE

This Oversight Procedure describes the review, analysis, recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) regarding the transit design capacity, functionality, and project definition for critical project scope elements relative to that required to achieve forecasted conditions and be consistent with sound engineering practices.

### 2.0 BACKGROUND

In the past, FTA projects have sometimes reduced capacity to meet cost ceilings. This approach emphasized near term capital cost at the expense of the long term use of the infrastructure investment. Project expansions and renovations are expected on some of these projects within ten years of revenue operations. Undertaking a transit capacity review is one tool FTA can use to ensure more efficient use of public funds.

### 3.0 OBJECTIVES

This review may occur prior to a project's entry into the Engineering Phase and may be conducted prior to awarding a Full Funding Grant Agreement if the project's scope or the project sponsor's operations have changed since the Engineering phase review. However, it can be also ordered earlier if the scope of investment is known and the FTA is concerned about core capacity impacts of the proposed investment.

The evaluation of transit design capacity is critical to FTA's determination as to whether the project:

- can meet its stated project purposes and goals, and at least its 20-year forecasted ridership and level of service;
- is "right-sized" or not too big or small;
- employs economies of scale; and,
- keeps operating, maintenance, and rebuild costs reasonably low over the long term.

In addition, if the project will become part of an existing transit system, the assessment will include the project's impact upon the capacity of the existing transit system. The review should be tailored to the specific Project Sponsor, its track record and the risks associated with implementation of the proposed project.

If the project is proposed as a Core Capacity Improvement Project, the sponsor must demonstrate that the corridor is at or over capacity; or is projected to be at or over capacity within the next 5 years.

## 4.0 REFERENCES

TCRP Report 100 Transit Capacity and Quality of Service Manual, 2nd edition (2003) - In addition, the statutes, regulations, policies, circulars, and guidance documents noted in OP 01 apply.

Title 49 United States Code Chapter 53 (49 USC 53) Federal Transit Laws as amended by Moving Ahead for Progress in the 21st Century Act (MAP-21).

## 5.0 PROJECT SPONSOR SUBMITTALS

Information required to accomplish this review include all engineering studies, preliminary reports, drawings and other documents produced on the project to date, which describe the project details. Specifically, the PMOC should review the following documents and information submitted by the Project Sponsor:

- Drawings of proposed transit project;
- Drawings of the existing transit system (civil, architectural, electrical, mechanical, communications);
- Operations Plans;
- Fleet Management Plan;
- Capacity Studies for the proposed project in the context of the existing system (as applicable); the studies should cover applicable items in TCRP Report 100 including but not limited to guideway and station sizing, including platform and support spaces for mechanical and electrical equipment, and pedestrian circulation capacity and access for persons with disabilities (ADA);
- The Project Sponsor's previous experience with past capital projects that are related to the proposed project scope as reported in their Grant Application
- Project Sponsor staffing capacity and Force Account workload during the proposed project implementation period as reported in their Grant Application
- Project Sponsor's cost and schedule performance on past capital projects;
- Project Sponsor's system, facilities and equipment utilization before and after the introduction of the proposed project. as reported in their Grant Application;
- Project Sponsor's plan for financing, staffing and governing the proposed system improvement based on Project Sponsor Finance Plan as updated at each phase of the project;
- Project Sponsor's plans for interfaces with other systems and utilities based on Project Sponsor's Finance Plan as updated at each phase of the project;
- Results of any prior Before and After studies; and
- Project Sponsor's baseline performance on ridership and operating efficiency metrics as reported in annual reports or to the National Transit Database (NTD) program including:
  - System and corridor ridership trends;
  - Peak of Peak hour Ridership at maximum load point in project corridor;
  - Peak hour vs. average daily use in project corridor;
  - System-wide Fare Box Recovery Ratio (Fare Revenue/Operating Cost);
  - Vehicles spare ratio to peak hour needs as reported to NTD; and

- Vehicles Mean Distance Between Failures (MDBF) as reported to NTD or annual reports.
- For Core Capacity Improvement Projects documentation of the current and projected ridership in the corridor, current limitations to expansion of capacity in the corridor; and how the proposed improvement will increase transit capacity in the corridor by 10% or more.

## 6.0 SCOPE OF WORK

The PMOC should review the Project Sponsor's drawings, operations plans, and capacity analyses. Assess and evaluate the physical capacity of the project and its component parts to accommodate the forecasted ridership and level of service. Assess long-term vs. short-term capital and operating cost and service trade-offs inherent in capacity choices.

If the project will become part of an existing transit system, assess the project's impact upon the capacity of the existing transit system, for example, will the project boost the carrying capacity of the entire system, overload the system or create bottlenecks. Consider whether the Project Sponsor can build, operate, and maintain its entire system without reducing existing public transportation services or level of service to operate the proposed project. Consider the Project Sponsor's financial and staffing capabilities to operate, and maintain the project in addition to its existing system.

Referring to TCRP Report 100, identify the topics applicable to the project. The capacity sections of the manual provide both planning and detailed operations analysis procedures for assessing capacity for transit modes and the individual components within transit projects. Employ the building-block approach suggested in the manual. Initially address the capacity characteristics of individual transit stops and station components, and then expand the concepts to address the capacity of broader transit services, facilities, and systems.

The PMOC shall review the relevant items according to the current project phase as follows:

1. Reviews for entry into Engineering
2. Reviews during Engineering
3. Reviews for Full Funding Grant Agreement (FFGA)

The PMOC shall gain an understanding of the following with respect to the project and the Project Sponsor's updates relevant to the current project phase at the time of the PMOC review. For Core Capacity Improvement Projects, the PMOC shall also gain an understanding of the current or projected limitations to expansion of transit capacity within the selected corridor and how the proposed improvements will increase transit capacity by 10% or more in the corridor.

- Route information
  - Selection
  - Route and station coordination for ease of transferring among passenger transport agencies
  - Requests and requirements by customers, public officials, other departments or the general public
  - Paratransit operations

- Schedule and staffing<sup>1</sup>
  - Headways
  - Schedule adherence
  - Operational constraints
    - During construction (access to construction, shut down of transit and utilities, etc.)
    - During full revenue service
    - Due to weather-related emergencies and other unexpected occurrences
    - Verify sufficiency of staffing
    - Verify sufficiency of funding for operations considering agency finances
- Station design<sup>2</sup>
  - Pedestrian access from public way; intermodalism or connectivity with other passenger transport;
  - Consider fire exiting design criteria for public areas, platforms, stairways;
  - Capacity of escalators, elevators, stairs;
  - Dimensional and clearance requirements of the Americans with Disabilities Act.

The PMOC's evaluation shall include:

- 1) "Line capacity" or theoretical capacity of the project, as defined by TCRP Report 100 as "the maximum number of trains that can be operated over a section of track in a given period of time, typically one hour... The factor providing the lowest capacity—the weakest link—will constrain the capacity of a given section of a line." As the report notes, "ideally, the combination of the train signaling system being used and the station with the longest dwell time will control the line capacity. However, under less-than-ideal conditions, any number of other factors may control line capacity." The PMOC shall analyze other factors that may control line capacity including:
  - a) Line capacity and vehicle capacity, both relating to the number of trains that can be operated per hour, are equivalent terms for rail.
  - b) Station dwell time and the minimum train separation produced by the signaling system.
  - c) Signaling systems designed for the minimum planned train headway, rather than maximum capacity.
  - d) Speed restrictions due to sharp curves or steep downgrades on the approach to the station with the longest dwell time.
  - e) Line crossings and merges, particularly at-grade track junctions.
  - f) Time required to turn back a train at a terminal station.
  - g) Mode-specific issues, such as light rail trains operating in mixed traffic or commuter rail trains sharing tracks with freight trains.
  - h) Traction power substation type and characteristics, DC distribution systems including the OCS, DC feeders, and return rails, and the power characteristics of the vehicles to be used on the system.

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<sup>1</sup> Starting with Entry into Engineering unless the scope of investment is known earlier. Re-reviewed for FFGA as indicated by changes in details of the system design or the Project Sponsor's operations.

<sup>2</sup> Typically only reviewed for Engineering Phase and for FFGA when design or conditions are substantially changed from Engineering Phase.

- i) Person capacity after adjustments to line capacity.
  - j) Capacity modeling shall develop static and dynamically elements for traffic operations and other guideway elements such as vertical and horizontal curvature and line of sight restrictions.
  - k) Capacity of the project's maintenance infrastructure (as-built) such as shops, yards, secondary maintenance, component rebuilds or capital inventory requirements using a structured and methodical approach that makes maximum use of previous TRB work and other existing engineering data.
- 2) Capacity of the transit project as required to meet the passenger load requirements forecasted for the revenue operations date (peak hour passenger boardings) and the recommended "mature capacity" identified in TCRP 100. When the transit project is forecast to operate with crowding consider how long the typical passenger will be expected to ride on a crowded vehicle and what fraction of the overall forecast ridership will be riding under crowded conditions.
- 3) This assessment shall also address the relationship between cost and transit design capacity for the project and the system. Consider capital costs, operating, maintenance, and replacement costs.
- a) Consider forecasted ridership for the project for milestones including opening day of service, the 20-year forecast year, and system-specific milestones that may be noted in the fleet management plan.
  - b) Estimate the useful economic life for major project elements. Refer to the "Build Annualized Worksheet" within FTA's Standard Cost Category (SCC) Workbook on FTA's public website for useful life lengths.
  - c) Assess for cost effectiveness the proposed "build out" approach for the transit project given the revenue operations date, and the 20-year, 50-year, and 100-year horizons (if specified in project plans). Recommendations should consider the time value of money at the prevailing public bond rate as well as the costs associated with various construction approaches where specified for possible future expansions.
  - d) Potential enhancements and benefits to the existing transit systems (Transfer Stations, Intermodal Connections, Passengers Comfort and Travel Time Savings)
  - e) Urban Development Enhancements and Potential Benefits to the Communities.
- 4) Technological and organizational risks posed by the proposed project including:
- a) Is the proposed technology new or proven in the industry?
  - b) Is the proposed technology new or proven on the Project Sponsor's system and how does it fit with the existing system and support facilities including those for maintenance and storage?
  - c) Do relationships among stakeholders and funding partners seem durable and realistic?
  - d) Are interfaces with systems and utilities likely to succeed?
  - e) Does the track record of the Project Sponsor or design of the proposed project indicate possible risks relative to:
    - i) Failure to meet forecast growth in ridership after opening year
    - ii) Overcrowding or underutilization during peak periods
    - iii) Meeting fare revenue and operating cost forecasts
    - iv) Maintaining appropriate spare ratios (too low or too high)



- v) Maintaining an acceptable level of in-service vehicle failures

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall provide FTA with a written report of its findings, analysis, recommendations, and professional opinions, including a description of the review activities undertaken, as well as supporting diagrams, calculations, etc.

After FTA approval, the PMOC should share the report with the Project Sponsor. In the event that differences of opinion exist between the PMOC and the Project Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile its findings with the Project Sponsor and provide FTA with a report addendum covering the agreed modifications by the Project Sponsor and PMOC.

The report formatting requirements of OP 01 apply. When necessary, PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may add other software as required but documentation and report data shall be made available to FTA.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1	The PMOC shall review and analyze Project Capacity.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of Project Capacity at all phases of the Project.		<b>Q1a.</b> Process exists and has been followed.	<b>M1a.</b> Evidence of a documented process.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process to analyze and make recommendations concerning Project Capacity at all phases of the project.		<b>Q1b.</b> Review must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>M1b.</b> Documented review and analysis of reporting requirements and project capacity review.	<b>MM1b.</b> Periodic review by FTA or its agent.
2	The PMOC shall review and evaluate Project Sponsor's capacity analyses and other documentation, evaluate physical capacity, assess long-term and short-term capital choices and, where necessary, evaluate impact on existing transit facilities during the various phases of the Project.	<b>R2a.</b> The PMOC shall evaluate Project Sponsor's documentation for Route Information, Schedule and staffing for proposed operations and Station design.		<b>Q2b.</b> Professional opinion of Project Sponsor's route, staffing and station design.	<b>M2b.</b> Documented evidence of a thorough review of Project Sponsor's route, staffing and station design documents, supported by a professional opinion.	<b>MM2b.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall make a full assessment and evaluation of the Project's Transit Capacity and Quality of Service using the TCRP Report 100 Manual, beginning with analysis of individual stops and stations then expanding the analysis to address broader system issues.		<b>Q2b.</b> Professional opinion of Project Sponsor's transit capacity using TCRP Report 100 Manual.	<b>M2b.</b> Documented evidence of a thorough review of Project Sponsor's Project transit capacity characteristics, supported by a professional opinion.	<b>MM2b.</b> Periodic review by FTA or its agent.
		<b>R2c.</b> The PMOC shall evaluate and address Line capacity of Project Sponsor's Project, capacity to meet forecasted loads, relationship between cost and design capacity, forecasted ridership, estimate useful economic life, cost effectiveness for time value of money and construction approaches and make suitable recommendations.		<b>Q2c.</b> Professional opinion of critical elements of scope, cost and capacity.	<b>M2c.</b> Documented evidence of evaluation of line capacity, transit capacity, cost effectiveness and other matters together with recommendations, supported by a professional opinion.	<b>MM2c.</b> Periodic review by FTA or its agent.
3	The PMOC shall document its findings, professional opinions, and recommendations in a report to the FTA.	<b>R3.</b> The PMOC shall present its findings, conclusions, and recommendations to FTA and, upon FTA approval, reconcile those recommendations with the Project Sponsor to the extent possible.		<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with Project Sponsor to the extent possible.	<b>M3.</b> PMOC's findings, conclusions, recommendations, and presentation.	<b>MM3b.</b> Periodic review by FTA or its agent.



## **Oversight Procedure 32B – NEPA and Design Document Comparison**

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### **1.0 PURPOSE**

This Oversight Procedure describes the review, analysis, recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractors (PMOC) regarding the extent to which the scope and requirements found in the NEPA document have been addressed in project design documents.

### **2.0 BACKGROUND**

#### **2.1 The National Environmental Policy Act**

The National Environmental Policy Act (NEPA) is our basic national charter for protection of the environment. NEPA's purpose is to foster excellent action; it is to help public officials make decisions that are based on understanding the environmental consequences, and take actions that protect, restore, and enhance the environment. The NEPA statute is found in 42 U.S.C. §§ 4321-4347.

NEPA's policy calls for federal agencies to:

- implement procedures to make the NEPA process useful to decision makers through clear documents that emphasize real environmental impacts and alternatives;
- integrate the requirements of NEPA with other planning and environmental review procedures;
- facilitate public involvement;
- use NEPA to identify alternatives that will avoid or minimize adverse effects upon the quality of the human environment;
- restore and enhance the quality of the human environment and avoid or minimize adverse effects of their actions upon the quality of the human environment.

The general process for complying with NEPA is set forth in the FHWA/FTA regulation, "Environmental Impact and Related Procedures," 23 CFR Part 771 and 49 CFR Part 622 and 23 U.S.C. § 139.

The Project Sponsor's coordination with FTA planning and environmental specialists to develop and carry out the scoping process, outlined in 40 CFR § 1501.7 of the Council on Environmental Quality (CEQ) Regulations, before the NEPA process formally begins, ensures that all necessary environmental issues are addressed early in the planning process. Related to the proposed action, NEPA requires an early and open process to identify the scope of issues to be addressed and develop appropriate mitigation measures.

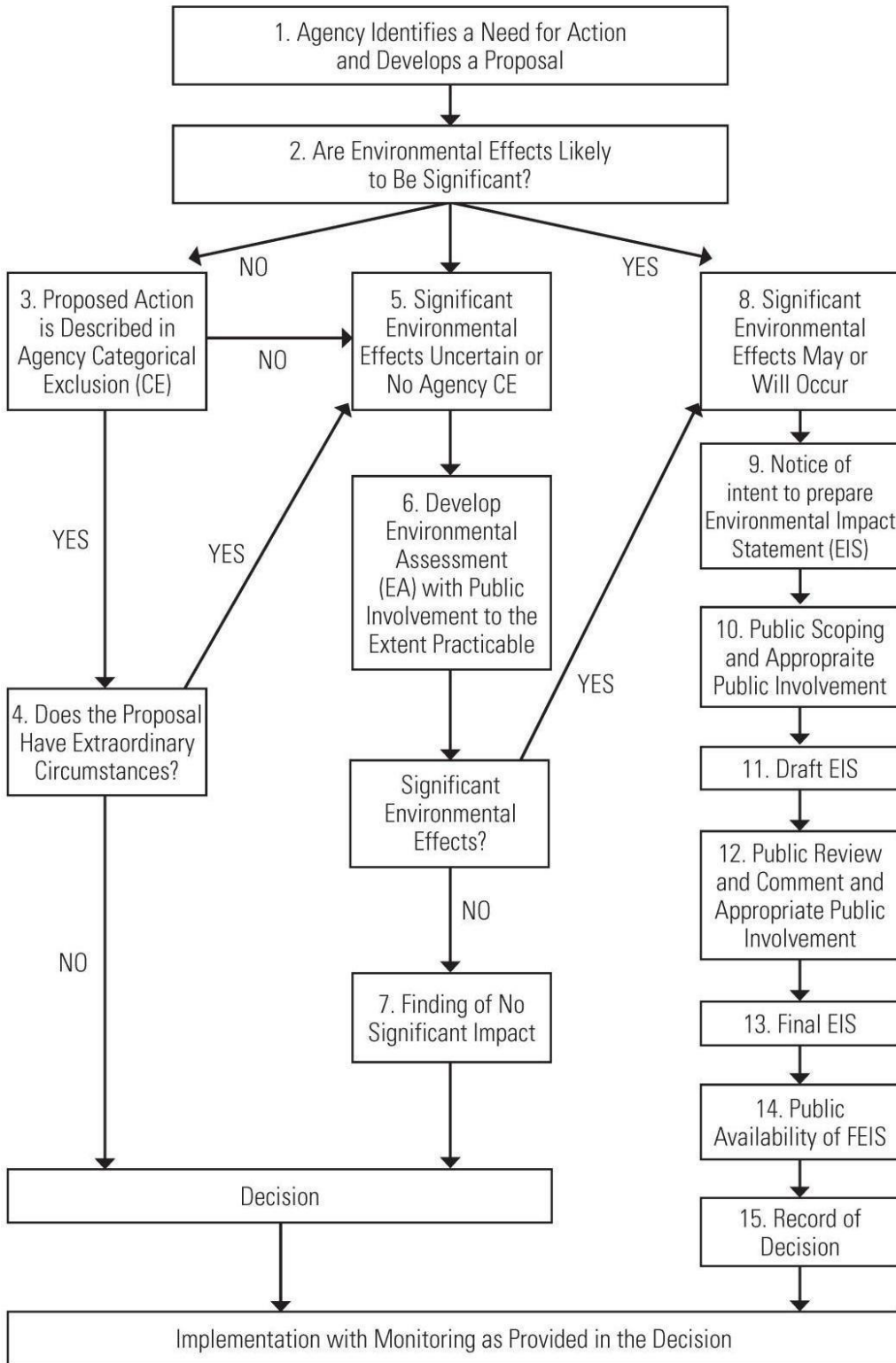
Agencies are encouraged to integrate the NEPA process with other planning requirements (such as those related to historic preservation and protection of public lands) at the earliest possible time to ensure that planning and decisions reflect environmental values, to avoid delays later in the process, and to head off potential conflicts. In air quality non-attainment or maintenance areas, transportation plans must contain enough information to allow conformity findings as defined by U.S. Environmental Protection Agency, 40 CFR Part 51.

Within the NEPA document, the agency discusses the factors that are considered in its decision to proceed with the proposed action. If a project is not categorically excluded (CE) under NEPA, the NEPA process is concluded with a Record of Decision (ROD) for an EIS level action; or a Finding of No Significant Impact (FONSI) for an EA level action. Note that an EA could result in preparation of an EIS, in which case the process would be concluded with a ROD.

The ROD or FONSI states what the decision is; identifies the alternatives considered, including the preferred alternative; and discusses mitigation measures. The final environmental determination details all practical means of avoiding or minimizing environmental harm, including enforcement and monitoring commitments, and explains why other means were not adopted.

A project sponsor must initiate the NEPA process before FTA can approve its project for entry into the project development (PD) phase. The NEPA process must be concluded before a project can be approved for entry into the engineering phase. The graphic below is from the Council on Environmental Quality, Executive Office of The President, A Citizen's Guide to The NEPA, Dec. 2007, pg. 8.

# The NEPA Process



*\*Significant new circumstances or information relevant to environmental concerns or substantial changes in the proposed action that are relevant to environmental concerns may necessitate preparation of a supplemental EIS following either the draft or final EIS or the Record of Decision (CEQ NEPA Regulations, 40 C.F.R. § 1502.9(c)).*

### **3.0 OBJECTIVE**

The objective of this review is for the PMOC to characterize the level to which the project design documents reflect the NEPA findings and recommendations. The PMOC should compare for consistency, the project design documents, cost estimate and schedule with the impacts and mitigation requirements identified through NEPA and found in the NEPA decision document.

### **4.0 REFERENCES**

The following are the principal, but by no means the only, references to Federal legislation, regulation and guidance, with which the PMOC should develop a solid understanding as related to the Project Sponsor's project work being reviewed under this OP:

#### **4.1 Statutes and Legislation**

- Title 49 United States Code Chapter 53 (49 USC 53) Federal Transit Laws, as amended by Moving Ahead for Progress in the 21st Century Act (MAP-21), Pub. L. 112-141, effective October 1, 2012
- 49 U.S.C. § 5309, Fixed Guideway Capital Investment Grants;
- 49 U.S.C. § 303, Policy on lands, wildlife and waterfowl refuges, and historic sites
- 42 U.S.C. §§ 4321-4347, National Environmental Policy Act of 1969 (NEPA), as amended
- 23 U.S.C. § 139, Efficient Environmental Reviews for Project Decision making

#### **4.2 Executive Orders**

- Executive Order 11988 - Floodplain Management, , 42 Federal Register 26951, page 117, May 24, 1977; 3 CFR 1977 Compilation, page 117, as amended

#### **4.3 Regulations**

- 49 CFR Part 602, Emergency Relief Program, Interim Final Rule, 78 Federal Register 61, pages 19136 – 19147, March 29, 2013
- 49 CFR Part 611, Major Capital Investment Projects, 78 Federal Register 6, pages 2032-2037, January 9, 2013
- 49 CFR Part 622, Environmental Impact and Related Procedures
- 23 CFR Part 450, Planning Assistance and Standards
- 23 CFR Part 771, Environmental Impact and Related Procedures;
- 23 CFR Part 774, Parks, Recreation Areas, Wildlife and Waterfowl Refuges, and Historic Sites (Section 4(F))
- 40 CFR Parts 1500-1508, Council on Environmental Quality

#### **4.4 Agency Guidance**

- FTA Policy and Procedures for FY 2013 Grants, 77 Federal Register 200, Section V(B), pages 63701-63703, October 16, 2012
- New Starts and Small Starts Policy Guidance, 78 Federal Register 157, page 49372, August 14, 2013

## **5.0 PROJECT SPONSOR SUBMITTALS**

The PMOC shall obtain from the project sponsor the most current versions of the following:

- Alternatives Analysis Report (prior to entry to Engineering)
- MPO-adopted LRTP (prior to entry to Engineering)
- NEPA documents (CE, EA, DEIS, FEIS, NEPA Re-evaluations, Supplemental EIS, etc.)
- Applicable Memoranda of Understanding (MOU), Memoranda of Agreement (MOA), Biological Opinions (BO) or other specific documents executed for the proposed action
- Locally Preferred Alternative (LPA) and decision-making documentation (when available)
- Operating cost estimate for project
- Capital cost estimate for project (or as defined in the LPA, if available)
- Project master schedule (inclusive of additional planning, design phases, procurement and construction, through to Revenue Service Date)
- New Starts submittals
- Project drawings, project narratives, design criteria, specifications
- Information on third-party interfaces (including especially freight railroads), description of interface and status of negotiations/agreements
- Project Management Plan and associated sub-plans
- Real Estate Acquisition and Management Plan (RAMP)
- Public Involvement Plan/Agency Coordination Plan
- Permit/Approval Tracking Table (when available)

## **6.0 SCOPE OF WORK**

The PMOC should review for adequacy and timing the Project Sponsor's approach to incorporating the environmental requirements, including restrictions, contained in the project's NEPA documents, into its project design documents and the Project Sponsor's plan to check, review and update the design documents for changes in environmental requirements. Checks may be peer reviews or independent reviews to ensure that the two document sets are consistent and the project scope definition is adequate to avoid or mitigate impacts identified under NEPA.

Verify the preferred alternative's fit with local conditions. See that required cooperating agreements and permits have been identified and impacted stakeholders listed. Assess the level to which environmental impacts and avoidance or mitigation measures are reflected in project design documents. Focus on the constructability, cost and time effects of implementing the mitigation measures.

Coordinate this review with an OP 32A (Project Transit Capacity Review) to ensure the project scope documentation matches the project LPA (or currently identified preferred alternative if the LPA has not yet been decided) analyzed in the environmental documents.

Verify that impacts to third parties, especially to those in the railroad environment (freight carriers, Amtrak, high speed corridors, etc.), are identified in the environmental document. Where there are impacts, verify that impacted third parties at their current addresses have received the environmental

document for review. Confirm that comments, if any, have been received by the Project Sponsor from such third parties. As a possible further step, prior to the Record of Decision, encourage the Project Sponsor to produce a plan or drawing showing impacts and mitigations within the railroad environment, and to obtain sign-off by affected parties on this drawing.

During construction, the PMOC should verify that the contract documents and/or interagency or public-private partnership agreements are being followed – that the project itself and the related mitigation measures are being implemented as called for in the NEPA document and in the Full Funding Grant Agreement (FFGA) or Small Starts Grant Agreement (SSGA).

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall review and analyze the pertinent information available for completeness, adequacy, consistency, and appropriateness of the level of detail; identify discrepancies; state findings in order of importance (most likely, largest consequences, etc.); provide professional opinions and make recommendations for modifications or additional work by the Project Sponsor along with a time frame for the performance of the work.

The PMOC shall provide FTA with a written report of its findings, analysis, recommendations, professional opinions, and a description of the review activities undertaken. After FTA approval, the PMOC should share the report with the project sponsor. In the event that differences of opinion exist between the PMOC and the project sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile its findings with the project sponsor and provide FTA with a report addendum covering the modifications agreed to by the project sponsor and the PMOC.

The report formatting requirements of OP 01 apply. When necessary, the PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may use other software as required but documentation and report data shall be made available to FTA.



## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1	PMOC shall review and analyze the extent to which the scope in the NEPA document has been addressed in project design documents; including real estate acquisition and relocation plans and contracts, construction contract plans and specifications, and project operating plans.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of the extent to which the scope in the NEPA document has been addressed in project design documents.		<b>Q1a.</b> Process exists and has been followed.	<b>M1a.</b> Evidence of a documented process.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process to validate the extent to which NEPA issues are reflected in design documents, cost estimates and schedules.		<b>Q1b.</b> Review must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>M1b.</b> Documented review and analysis of NEPA and other Project documentation.	<b>MM1b.</b> Periodic review by FTA or its agent.
2	The PMOC shall assess and evaluate the Project Sponsor's environmental and other PE documentation for compliance with NEPA and other environmental laws and regulations	<b>R2a.</b> The PMOC shall assess the level to which impacts and mitigations are reflected in Project design documents, evaluate constructability, cost and time affects of mitigation implementation and confirm that NEPA scope is adequately reflected in Project capital cost estimates and schedule.		<b>Q2a.</b> Professional opinion of mitigation impacts, cost and time effects and reflection of NEPA scope in Project Sponsor's NEPA process.	<b>M2a.</b> Documented evidence of assessment of design documents for mitigation impacts, cost and time affects and reflection of NEPA scope, supported by a professional opinion.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall, during construction, verify that the Project and related mitigation measures are implemented in accordance with the NEPA document.		<b>Q2b.</b> Professional opinion pertaining to implementation by Project Sponsor of NEPA plan mitigation measures.	<b>M2b.</b> Documented evidence of review and verification of implementation of mitigation according to the NEPA plan, supported by a professional opinion.	<b>MM2b.</b> Periodic review by FTA or its agent.
3	The PMOC shall document its findings, professional opinions, and recommendations in a report to the FTA.	<b>R3.</b> The PMOC shall present its findings, conclusions, and recommendations to FTA and, upon FTA approval, reconcile those recommendations with the Project Sponsor to the extent possible.		<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with Project Sponsor to the extent possible.	<b>M3.</b> PMOC's findings in descending order of importance, conclusions, recommendations, and presentation.	<b>MM3.</b> Periodic review by FTA or its agent.



## **Oversight Procedure 32C - Project Scope Review**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure is to describe the review, analysis and recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) regarding the sponsor's project scope. The purpose of the review is to verify that the scope of the project represented by the totality of all documentation, including environmental documents, basis of design and design criteria, third-party agreements, Real Estate Acquisition and Management Plan, and contract plans and specifications is internally consistent, defined to a level appropriate for the project development phase and applicable project delivery method, consistent with the estimated cost and schedule, and when applicable, consistent with the scope approved by FTA in the Sponsor's approval letters and Letters of No Prejudice (LONP), Letters of Intent (LOI), Early Systems Work Agreements (ESWA) and Full Funding or Small Starts Grant Agreements (SSGA).

### **2.0 BACKGROUND**

Monitoring scope as the project moves through the various phases of development benefits cost control and management of risks inherent in the design and construction process. The scope of a transit project funded by Section 5309 or other federal funds is first established through the development of alternatives, and the selection of a preferred alternative. The scope at that point is often defined in general terms by the type of transit technology to be employed, the length of the project, the number of stations, and other general characteristics. The project scope is continuously refined as it moves through the successive phases of Project Development and Engineering. The scope of the project is first defined at the completion of the environmental review process required under the National Environmental Policy Act (NEPA) and ultimately the scope of the project is established in the Full Funding Grant Agreement (FFGA) or Small Starts Grant Agreement (SSGA) entered into between the Sponsor and the FTA. Any changes in the scope as defined in the FFGA or SSGA are expected to be minor in nature, and any significant changes are subject to the approval of the FTA.

The scope of the project is subject to FTA review as part of the process of approving the Sponsor's entry into Engineering, and later, prior to award of an FFGA or SSGA. Ideally, scope definition and refinement occurs during the Project Development Phase. The scope of the project should be very well defined at the completion Project Development or early in the Engineering phase; the later stages of the Engineering phase should be limited to preparing the drawings, specifications and related documents necessary for construction. In practice, however, some projects are not completely defined at the completion of the Project Development phase and additional definition is provided during the Engineering phase. Note that the effort to define (or redefine) any particular element of project scope becomes increasingly costly and disruptive as the project moves from the evaluation of alternatives through Project Development, Engineering, and into construction. The cost of a construction change order is greater and its impact on completion of the project is more significant than if the change had

occurred prior to bid. This is especially true if an alternate project delivery method such as design-build has been selected. For these reasons, the scope must be tightly defined prior to advertising the work for construction, or design and construction in the case of an alternate delivery method.

If the sponsor has selected a design-build project delivery method, the most important design document will be a performance specification. This document will determine what the construction contractor has to deliver, and once under contract, the Sponsor gives up the right (subject to contractual provisions) to make detailed design decisions. Because of the nature of a design-build contract, a change in scope that occurs after contract award is likely to be much more costly than a similar change to a project being built using a design-bid-build process. This result occurs because any scope change will affect both the design schedule and the construction schedule, which are closely tied by the design-build contract.

In the TCRP Report G-07, *Managing Capital Costs Of Major Federally Funded Public Transportation Projects* (2006), the Transportation Research Board notes that project definition entails the “conceptualization of the alternatives and the refinement of this project definition through the course of the project-development process. The inception and evolution of a project can have a large impact on the capital costs. In particular, the level of design is an important factor affecting the uncertainty of the capital costs and the subsequent variation in the estimates.

Clear cost priorities, established early in project development, are important to cost and schedule performance. These priorities should be reflected in the initial evaluation of alternatives. Establishing clear budget and schedule constraints early in the project-development process helped contain scope creep and identify reasonable project-development schedules. However, some flexibility with respect to scope and schedule should be maintained in the project-development process in order to adapt to the more unique project conditions identified throughout the development process. This flexibility combined with appropriate budgetary targets and reasonable developmental schedules formed the successful factors in project definition.”

Further: “[t]he project definition strategies that contributed the most success to the project-definition process were a transparent development process with extensive stakeholder input, a reasonable project-development schedule that reflects sufficient time for stakeholder outreach, *a value engineering exercise at each stage that reconsiders the definition results to that point, and a design-to-budget approach that maintains budgetary considerations within each stage of project development.*” (Emphasis added.)

### **3.0 OBJECTIVES**

The objective of this review is to assess the Sponsor’s definition of the project scope as represented by environmental documents and permits, basis of design and design criteria, third party agreements, Real Estate Acquisition and Management Plan, drawings, specifications, narratives, plans for project delivery, etc., for adequacy and completeness given the phase; for internal consistency; for compliance with applicable laws, regulations, policies, etc.; bid-ability and constructability. If the review is performed after issuance of approval letters, Letters of No Prejudice (LONP) or Early Systems Work Agreements (ESWA) or award of an FFGA or SSGA, the review may include verification that the

scope definition still meets the functional requirements documented in the approval letter, LONP, ESWA, FFGA or SSGA.

## **4.0 REFERENCES**

The following are the principal, but by no means the only, references to Federal legislation, codification, regulation and guidance with which the PMOC should have a good understanding as related to the Sponsor's project work being reviewed under this OP:

### **4.1 STATUTES AND LEGISLATION**

- Moving Ahead for Progress in the 21st Century Act (MAP-21), Pub. L. 112-141, effective October 1, 2012.
- National Environmental Policy Act of 1969, as amended, 42 U.S.C. §§ 4321 *et seq.*
- Americans with Disabilities Act of 1990 (ADA), as amended by the ADA Amendments Act of 2008 (Pub. L. 110-325).

### **4.2 EXECUTIVE ORDERS**

- Executive Order 11988 - Floodplain Management, May 24, 1977, 42 Federal Register 26951, page 117, 3 CFR, 1977 Compilation, page 117, as amended.

### **4.3 REGULATIONS**

- Project Management Oversight, 49 C.F.R. Part 633
- Chapter 53 of Title 49 as amended by MAP-21 provisions
- 49 CFR Part 602, Emergency Relief Program, Interim Final Rule, 78 Federal Register 61, March 29, 2013, pages 19136 – 19147.
- 49 CFR Parts 27, 37 & 38: U.S. Department of Transportation regulations implementing the transportation provisions of the ADA.  
[http://www.fta.dot.gov/civilrights/ada/civil\\_rights\\_5936.html](http://www.fta.dot.gov/civilrights/ada/civil_rights_5936.html). Important to the design of transit stations are paragraphs 206.3 regarding the location of accessible routes relative to general circulation paths, and 810.5.3 regarding the coordination of platform and rail car door height. Paragraph 810.5.3 also contains language correcting a misunderstanding of 49 CFR 38.71(b) (2) concerning light rail.

### **4.4 GUIDANCE**

- Project and Construction Management Guidelines, 2011 Update
- Project Construction Management Handbook, 2013
- FTA Standard Cost Category Workbook (SCC)  
[http://www.fta.dot.gov/planning/newstarts/planning\\_environment\\_2580.html](http://www.fta.dot.gov/planning/newstarts/planning_environment_2580.html)

## **5.0 PROJECT SPONSOR SUBMITTALS**

The PMOC should obtain the most current versions of the following documents from the Sponsor. Depending on the project phase in which this review is completed, not all of the documents below will be available.

- Written Project Description
- Environmental Documents (FEIS/ROD; EA/FONSI; CATEX)
- Basis of Design Reports, Design Criteria Reports

- Design Documents (Plans, Performance Specifications and Specifications)
- Project Management Plan, Project Delivery Plan
- Real Estate Management Plan (RAMP) with current status
- Risk and Contingency Management Plan or Risk Register (if available)
- Permits
- Project Schedule
- Current Capital Cost Estimate
- Review documents
  - Independent Cost Estimates
  - Threat and Vulnerability Assessments
  - Hazard Analyses
  - Value Engineering Reports
  - Constructability Reviews
  - Risk Assessment Reports
- Documentation of changes to scope that have occurred since last milestone
- Approval letters, Letters of No Prejudice (LONP) or Early Systems Work Agreements (ESWA) issued by the FTA
- Full Funding Grant Agreement or Small Starts Grant Agreement and Attachments; approved and pending amendments

## **6.0 SCOPE OF WORK**

### **6.1 PMOC QUALIFICATIONS**

The individual or team of individuals selected to perform this evaluation should have extensive experience in the planning and delivery of large, complex, federally funded transit projects. The experience should include familiarity with the issues usually presented during the construction phase of such projects.

### **6.2 PRELIMINARY DOCUMENT REVIEW**

Upon receipt of the assignment, the PMOC should obtain the specified materials from the Sponsor. The PMOC may already be generally familiar with the project as a result of on-going monitoring activities. If the assigned personnel are not familiar with the project, they should review the materials in preparation for their on-site visit.

### **6.3 PROPOSED APPROACH TO REVIEWING THE SCOPE – A SAMPLING PLAN**

The PMOC shall propose to FTA an approach to reviewing the Sponsor's scope documentation that, regardless of the level of development of the project, will provide FTA with reliable analysis and recommendations. The proposal should include a description of the level of sampling of the documentation.

## **6.4 ON-SITE REVIEW MEETING**

The PMOC should arrange for an on-site briefing by the Sponsor's project management team. The briefing should include a narrative description of the project scope supplemented by suitable graphics with particular emphasis on any changes in the scope of the project that have occurred since the last major review milestone, e.g. commencement of project development, commencement of engineering, execution of the FFGA or SSGA. The discussion of project scope should include a review of the Sponsor's plan for project delivery, any changes in the Sponsor's plans for managing the project through the construction, start-up, testing and acceptance phases, and any changes in external factors such as right-of-way, permits or third-party agreements that would affect project scope.

## **6.5 REVIEW AND ASSESSMENT**

The PMOC should review the Sponsor's internal plan to check and review its design for scope completeness and coordination. The PMOC should review the adequacy and timing of the checks planned and implemented by the Sponsor. Checks may be in the form of peer reviews and/or independent or internal design reviews that ensure the design provided to the PMOC for FTA's review is, at a minimum, adequately complete given the project phase, internally consistent and coordinated.

The Scope Review Checklist, attached as Appendix B, provides a guide to evaluating the scope for completeness. The checklist should be used in conjunction with the project cost estimate and schedule to develop a comprehensive understanding of the scope and as a cross-check for scope omissions and conflicts.

The PMOC should address the following questions. The answers should be comprehensive, with sufficient information to allow the reader to develop a complete understanding of any significant changes in the scope of the project since the last major milestone.

- 1) What changes in project scope have occurred since the last major milestone e.g. commencement of project development or engineering, execution of the FFGA, or SSGA?.
- 2) Have the known changes been incorporated into the documents, design criteria, plans, specifications, related Management Plans, and the Grant Agreement?
- 3) Are there any additional known or anticipated changes to scope at the time of this assessment?
- 4) Do the project delivery plans and construction documents reflect the full scope of the project? If not, identify any missing elements.
- 5) Does the current capital cost estimate and schedule correlate with the known and anticipated scope of the project?
- 6) Identify any unknown or uncertain conditions (e.g., real estate to be acquired, permits to be issued, and third-party agreements to be finalized) that may affect the cost and/or schedule for construction and assess the Sponsor's plan and schedule for resolving these issues.
- 7) Do the contract documents address these unknown or uncertain issues in a way that appropriately allocates risk and avoids incurring unnecessary costs?

- 8) Based on this review of the project and its current documentation, are there likely to be changes in project scope (including related cost and schedule impacts) beyond those ordinarily expected of a project at this phase of development. If so, identify these items and discuss the Sponsor's plan for resolving them.
- 9) If the scope of the functional elements of the project has changed, e.g., longer/shorter alignment, fewer/more stations, fewer traction power substations, etc., can the revised project still meet the capacity requirements of the program and as approved in the FFGA or SSGA?

The PMOC shall assess and evaluate Sponsor and material third party project information and data. Then the PMOC shall produce characterizations of the project scope that integrate and summarize available information and data for the project, providing professional opinions, analysis, information, data and descriptive text in an accessible and understandable format.

- 1) Such project information can include but is not limited to scope, capacity, level of service, functionality, reliability, etc.
- 2) Characterizations for individual scope elements such as guideway, vehicles, systems, etc. shall be sufficient to provide FTA with a project-level and element-level of understanding.
- 3) For projects in Project Development or Engineering, the PMOC shall review and characterize the Sponsor's project scope in terms of its descriptions, designs, products, etc. using the checklist from Appendix B to determine that:
  - a) The scope is substantially consistent with the scope adopted in the environmental decision document, e.g., Record of Decision, Finding of No Significant Impact or Categorical Exclusion;
  - b) The scope will support the level and quality of revenue service typically offered by the Sponsor;
  - c) Proprietary systems or methods specified will permit a reasonable number of construction contractors with the appropriate expertise to compete for construction packages;
  - d) Major work details, structural element dimensions, design interfaces and physical interfaces are complete and well defined;
  - e) Plans and drawings or performance specifications are adequate in terms of content, presentation, clarity, cross-referencing and detail;
  - f) Roles and responsibilities of construction contractors versus those of the Sponsor's team of staff and consultants or other third-parties are well defined;
  - g) Project is constructible.
- 4) Review and characterize the Sponsor's project systems and vehicle design. Determine whether the Sponsor has matched appropriate technologies with the planned transit applications for the best performance at a reasonable cost.
- 5) In the absence of adequate scope detail for a given level of design, the PMOC shall validate project data by comparing the current Sponsor assumptions to relevant, identifiable industry standards or experience.
- 6) The PMOC's findings should be presented in order of importance (most likely, largest

consequences, etc.) and accompanied by recommendations for modifications or additional work by the Sponsor along with a time frame for the performance of the work.

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall provide FTA with a written report of its findings, analysis, recommendations, professional opinions, and a description of the review activities undertaken. After FTA approval, the PMOC should share the report with the Sponsor. In the event that differences of opinion exist between the PMOC and the Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile its findings with the Sponsor and provide FTA with a report addendum covering the agreed modifications by the Sponsor and PMOC.

The report formatting requirements of OP 01 apply. When necessary, the PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may add other software as required but documentation and report data shall be made available to FTA.



## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL (AQL)	PERFORMANCE MEASURE	MONITORING METHOD
1	PMOC shall review and analyze the scope of Sponsor's project and its completeness and consistency with Project documentation.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of Sponsor's overall project scope.		<b>Q1a.</b> Process exists and has been followed.	<b>M1a.</b> Evidence of a documented process.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process to analyze the completeness and consistency of Sponsor's overall Project scope.		<b>Q1b.</b> PMOC must verify internal processes as documented have been followed.	<b>M1b.</b> Documented review and analysis of the overall project scope and supporting documents for completeness, definition and consistency.	<b>MM1b.</b> Periodic review by FTA or its agent.
2	The PMOC shall review the scope of Sponsor's project prior to advertising for construction; verify project scope is internally consistent with contract plans and specifications, cost and schedule.	<b>R2a.</b> The PMOC shall review all Project scope documentation and arrange an on-site briefing from the Sponsor.		<b>Q2a.</b> Professional opinion of scope review through Sponsor's submittals and on-site briefing.	<b>M2a.</b> Documented evidence of a thorough review by PMOC and attendance at an on-site briefing by Sponsor, supported by professional opinion.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall review for adequacy and timing Sponsor's plan for checks and reviews for scope completeness and coordination.		<b>Q2b.</b> Professional opinion and review of Sponsor's plan for scope checks and reviews.	<b>M2b.</b> Documented evidence of review of Sponsor's check and review plan for scope completeness and coordination, supported by professional opinion.	<b>MM2b.</b> Periodic review by FTA or its agent.
		<b>R2c.</b> The PMOC shall, in conjunction with Project cost estimate and schedule, develop an analysis of significant changes in scope since the last major milestone.		<b>Q2c.</b> Professional opinion and review of Project scope and significant changes in scope.	<b>M2c.</b> Documented evidence of review of the overall project scope and supporting documents with analysis of scope changes, supported by professional opinion.	<b>MM2c.</b> Periodic review by FTA or its agent.
		<b>R2d.</b> The PMOC shall analyze potential changes to Project scope based on current documentation and evaluate the risks to Project associated with those potential changes.		<b>Q2d.</b> Professional opinion and evaluation of potential changes in Sponsor's scope and evaluation of associated risks.	<b>M2d.</b> Documented evidence of analysis of potential changes and evaluation of associated risks, supported by a professional opinion.	<b>MM2d.</b> Periodic review by FTA or its agent.
		<b>R2e.</b> The PMOC shall assess and evaluate Sponsor and 3rd party documentation and develop characterizations of Project scope that integrate and summarize all available information for the Project.		<b>Q2e.</b> Professional opinion and characterization of Project scope that integrates available data.	<b>M2e.</b> Documented evidence of review and characterization of Project scope integrating available data, supported by a professional opinion.	<b>MM2e.</b> Periodic review by FTA or its agent.
		<b>R2f.</b> The PMOC shall present its findings in descending order of importance, make recommendations for needed Sponsor action and present a time frame for Sponsor's actions.		<b>Q2f.</b> Professional opinion evidenced by findings, recommendations for corrective action and recommended time frame.	<b>M2f.</b> Documented evidence of findings, recommended Sponsor actions and a recommended time frame, supported by a professional opinion.	<b>MM2f.</b> Periodic review by FTA or its agent.
	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL (AQL)	PERFORMANCE MEASURE	MONITORING METHOD

## APPENDIX A

### Acceptable Quality Level

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<b>3</b>	The PMOC shall document its findings, professional opinions, and recommendations in a report to the FTA.	<b>R3.</b> The PMOC shall present its findings, conclusions, and recommendations to FTA and, upon FTA approval, reconcile those recommendations with the Sponsor to the extent possible.	<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with Sponsor to the extent possible.	<b>M3.</b> PMOC's findings in descending order of importance, conclusions, recommendations, and presentation.	<b>MM3.</b> Periodic review by FTA or its agent.
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## **APPENDIX B**

### **Scope Review Checklist**

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Each design package, contract or budget unit, or scope element is to be reviewed against these criteria as applicable<sup>1</sup>. The review shall reflect as much of these criteria and concepts as is practical and consistent with the Sponsor's project design or construction plan.

#### **Design Document Coordination**

The Civil, Structural, Architectural, Electrical, Mechanical, Power, Signal and Communications, Trackwork, Sitework and other plan documents possess a comparable level of definition, clarity, presentation and cross-referencing. Design, construction, system and vehicle interfaces are well known and defined. Design Reports, Concept of Operations Report, and configuration studies are adequate and complete. Work descriptions and definitions used in designs and specifications are consistent and uniformly applied. The project phasing is adequate and the project is constructible. Adequate construction access and staging areas are defined.

#### **Project Delivery Method, Contract Packaging**

Check that the Sponsor has planned for construction, at either a project or contract package level, and has sufficiently analyzed and adequately addressed the following elements:

- 1) Delivery Methods
  - a) Has the Sponsor demonstrated that the selected delivery method is permissible under local public contracting laws and authorized by Agency policy?
  - b) Has the Sponsor performed an analysis of its contracting objectives and organizational capability and capacity in arriving at the selection of project delivery method(s)?
  - c) If alternate delivery methods are permitted, has there been an analysis of the costs and benefits of Design-Bid-Build versus Design-Build?
  - d) In case of Design-Build, are the risks being transferred to the contractor reasonable and can the risks be adequately addressed by the contractor?
  - e) Has the level of design reached a point where major uncertainties and risks have been identified and addressed for the Design-Builder?
- 2) Contract packaging and structuring:
  - a) Tradeoffs have been considered between large size contracts, which are often more efficient due to coordination and scheduling constraints, and small contracts that can attract industry interest and increase the number of bidders. Where small contract packages are used, they have been kept small enough to allow mid-sized contractors to bid without teaming as joint ventures (which tends to yield higher costs);
  - b) Construction industry information sessions have been held after advertisement in industry publications in order to attract regional, national, and international contractors.

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<sup>1</sup> Not every project will include every item in the list above.

- c) Timing of major bid activity, within schedule constraints, will be managed to maximize contractor competition, with consideration to other major project(s) status in the region such as highway or redevelopment projects;
- d) Prequalification of general contractors or subcontractors has been considered to ensure quality, e.g. prequalification for experience with a type of construction, safety record, claims history, etc.
- e) “Procurement only” contracts have been minimized (consistent with industry practice and agency experience), recognizing there is a higher claims risk when the installation contractor does not have full control of the materials;
- f) Third parties:
  - i) Contract packaging for Third-party construction contracts has been structured to maximize competition;
  - ii) Third party procurement contracts have been utilized only where long lead-time items will impact project schedule if purchased by construction contractor;
  - iii) Contract packaging and project schedule have been coordinated to minimize overextension of critical third parties inclusive of utilities and fire/life safety test witnessing or installation work;
  - iv) Buy America provisions have been incorporated in third party contracts.
  - v) Have agreements been reached with utilities on responsibility for timing and cost of relocating affected utilities.
- 3) Site investigation and geotechnical studies will be available to construction contractors;
- 4) The General Conditions, Supplementary Conditions, and Division 1 of the Specifications adequately describe, for bidding construction contractors, project site access; schedule; unit prices; provisions for increased and decreased compensation through incentives and liquidated damages; risk allocation as related to unforeseen conditions including geotechnical conditions; the construction contractor’s design/engineering scope of work; mobilization costs; cash flow in general including pay schedule; requirements for bonds, insurance, taxes; maintenance and warranty provisions; contractor field management and supervision; socio-economic requirements related to bidding; among other things.
- 5) Market conditions are considered.
  - a) Market conditions for the state/regional/local construction economy for the general contractors/subcontractors on public works and private;
  - b) Market conditions for the national construction economy for transit general contractors/subcontractors.
  - c) Availability of labor for various trades such as electricians, etc.
  - d) Availability of major materials at the bulk commodity level (fuel, cement, steel, copper, plywood/lumber, etc.) and the finished component level (traction power supply and distribution, train control elements, vehicles, microprocessor equipment, etc.)
  - e) Availability of construction equipment/sequencing/timeframe requirements for specially designed, or project specific equipment such as cranes, launching girders, pre-mix plants, barges, etc.
- 6) Accessing and occupancy of project construction sites
  - a) Transportation of project materials to the various jobsites/access points/laydown areas;
  - b) Local community restrictions and accommodations;
  - c) Temporary Construction/Facility requirements and mobilizations;
  - d) Weather impacts or concerns and protection of the work;

- e) Special projects requirements such as permits; environmental requirements and restrictions, e.g., in-water work windows; site availability in terms of hours per day, days per week, months or seasons during a year, considering ongoing operations for transit, railroads, pedestrians, bicycles, and roadway traffic; impacts such as transportation, social and economic conditions; constraints due to public spaces, historic and archaeological resources, air quality, noise and vibration, contaminated materials and natural resources, among others.
- f) Force account:
  - i) Contract packaging and project schedule have been coordinated to minimize overextension of agency force account personnel;
  - ii) Force account procurement contracts have been utilized only in cases where agency has substantial market leverage or “purchasing power”;
- g) Providing for construction contractors:
  - i) Advanced utility / utility relocation contracts have been provided with significant schedule contingency since these are delay-prone activities;
  - ii) Waste sites / borrow sites have been identified for use at contractor’s option;
  - iii) Advance agreements with utilities and agencies have been negotiated (for TBM power supply, for example), for use at contractor’s option.

### **Design Relative to Site and Geotechnical Conditions**

- 1) Site investigation
  - a) Pre-construction site reconnaissance visits have been made;
  - b) Site boundary and existing conditions surveys are complete;
  - c) Flood hazard analyses has been conducted as required by Executive Order 11988 (including the potential for re-definition of flood plains and floodways as a result of climate change) and the results have been incorporated into the design.
  - d) Geotechnical investigations are complete;
    - i) Subsurface exploration or laboratory testing program;
    - ii) Identification of buried structures and utilities;
    - iii) Identification of contaminated soils and other hazardous material;
- 2) Design in response to geotechnical and other below-grade conditions are appropriate.
  - a) Local seismic conditions and codes have been considered;
  - b) Structural approach to ground conditions, subsidence, etc. is identified and resolved;
  - c) Design of the rock support in the station caverns, the crossover caverns, the TBM tunnels, drill/blast tunnels, etc. is appropriate to rock characteristics (fracture planes, hardness and cleavage);
  - d) Relative to subsurface conditions, selection of building type, foundation, and methods of construction is reasonable;
  - e) Mass balance diagrams have been completed for vertical alignments on fill or cut;
  - f) The design appropriately responds to identified buried structures and utilities, contaminated soils and other hazardous material on site, and provision for removal or remediation has been made.

## **SCC 10 Guideway and Track elements**

Major or critical design decisions are defined including trackway type (elevated, at-grade, or underground), rehabilitation or reuse of existing infrastructure, structures, facilities or systems including but not limited to the following:

- 1) Major or critical work details, structural element dimensions, design interfaces and physical interfaces are complete and well defined in terms of drawings, standards, criteria, specifications and contract package scopes;
- 2) Structural systems are established and dimensioned to show number of spans, span length, substructure design, etc.; structural elements are advanced beyond simple span design.
- 3) Work descriptions and definitions used in designs or specifications are consistent and uniformly applied;
- 4) Trackwork is advanced to a level where single line schematics of the track layout, plan and profile drawings, dimensioned layouts of turnouts and crossovers, and tabulations of track geometry (horizontal and vertical curve data) have been defined; alignment of tunnel structure referenced to the center line of track and base of rail; guideway sections inclusive of tunnel and station cross sections consistently show the distance from centerline of track to critical clearance points such as walls, walkways and edges of platforms;
- 5) Special trackwork is adequately defined;
- 6) Tunnels are well defined in terms of access and egress, construction access and laydown, temporary and permanent drainage, openings for stations, cross-passages or refuge chambers, ventilation or emergency access shafts or adits, sections and profiles depicting cross sections of major tunnel features; cross checked to adjacent building foundations and coordinated with the vehicle's dynamic envelope, walkways, lighting, systems elements such as ventilation, communications and traction power and egress.

## **SCC 20 Stations, Stops, Terminals, Intermodals and SCC 30 Support Facilities: Yards, Shops and Admin Buildings**

Major or critical design decisions are defined including rehabilitation or reuse of existing structures, facilities or systems. Major or critical operational, maintenance (heavy and light, wayside, facilities and vehicle), accessibility, fire/life safety, security and logistics (spares, rebuild, training, documentation) requirements whether in the existing system or the project have been defined.

- 1) Station and support facility architecture is established. The drawing package consists of site plans, floor plans, longitudinal and cross sections, elevations and details illustrating typical and special conditions; finish schedules;
- 2) Within the site context, the building footprints are shown. The relationship of the building to grade and to adjacent facilities is clearly defined, as is provision for pedestrians and bicycles to access the public way from the building. Site layout takes into account Safety and Security considerations, e.g. Crime Prevention Through Environmental Design (CPTED). Site environmental conditions such as wind load, drainage and foundations have been considered. Provisions for motorized vehicles are also shown. Platform access, building access, and building interiors comply with ADA.

- 3) Station building floor plans show vertical circulation systems including stairs, elevators, escalators, dimensioned platforms, work bays in maintenance facilities, support spaces for mechanical and maintenance access; agent area, fare gate area, etc.; the building structural system is established and dimensioned. Structural elements are advanced beyond simple span design.
- 4) Building sections and elevations illustrate the relationship of the station to grade (below, on-grade, elevated structure);
- 5) Level boarding between the transit vehicle and the boarding platform complies with ADA.
- 6) Mechanical, electrical and communications systems are described including station, support facility and track area drainage, piped utilities, heating ventilation and air conditioning, smoke evacuation, power and lighting for the station, fire/life safety including NFPA, security systems, passenger information systems (PIS), fare vending machines, etc.
- 7) Equipment is shown on floor plans and described in schedules on drawings or specifications;
- 8) Design interfaces among disciplines are defined on drawings, in standards, design criteria, specifications and contract package scopes.

#### **SCC 40 Sitework and Special Conditions**

Major drainage facilities, flood control, hazardous materials, housing types, street crossings, traffic control, utilities, are defined and physical limits and interfaces identified, based upon site specific surveying with digitized data integrated into alignment base mapping, plan profiles.

The project scope reflects the safety and security requirements resulting from the Sponsor's Hazard Analyses and Threat and Vulnerability Assessments.

Major or critical design decisions are defined including rehabilitation or reuse of existing structures, facilities or systems including but not limited to the following:

- 1) Refer to Design Relative to Site and Geotechnical Conditions above;
- 2) Structural elements for retaining walls and other site structures are advanced in design.
- 3) Major or critical work details, structural element dimensions, design interfaces and physical interfaces are complete and well defined in terms of drawings, standards, criteria, specifications and contract package scopes.
- 4) Mass balance diagrams complete for vertical alignments on fill or cut are supported by complete site specific surveys and soil investigations;
- 5) The presence of buried structures, utilities, and contaminated soils which may have to be backfilled or which would otherwise be unavailable for backfilling, has been taken into account;
- 6) Adequate construction access;
- 7) Access and staging areas are defined.

#### **SCC 50 Systems**

- 1) System (Wayside and Facilities), Trackwork (Running and Special) and Vehicle (revenue and non-revenue) descriptions, functionalities, reliabilities, technologies (level identified and cost effectiveness known) and performances are defined. Major equipment (for the control room, substations, crossings, tunnel ventilation (both normal and emergency) and traction power) is

well defined and identified in terms of specifications, bills of materials, standard drawings and specifications, general arrangements and standard details, and single line drawings (similar to industry process and instrumentation diagrams, high level logic design).

2) Signaling and Train Control

- a) Operations analysis has determined the most efficient location of interlockings based on track layout, headways, train lengths, braking tables as well as requirements of each interlocking and its control limits.
- b) Track plans have been sufficiently developed to define and identify vertical grades, horizontal and vertical curves, elevation, station platforms, switch point stationing, rail bonding and connection requirements as well as typical track circuit drawings.
- c) Site specific requirements are defined (for signal structural work) and location drawings for signal enclosures (as input to ROW requirements)
- d) Central instrument rooms (CIR), central instrument huts (CIH), central instrument locations (CIL), relay rooms; locations and sizes as well as room layouts (relay, termination, central instrument, power) are identified and defined.
- e) Signal cable routing methodology as well as power supply and distribution are identified and defined
- f) Software and interface requirements (to facilities, existing system, and other system elements) are identified and defined
- g) Maintenance, testing and training requirements are identified and defined (factory acceptance, site acceptance, field integration, start up, etc.)

3) System Description

- a) Built-in-place substations are identified, numbered and located with approximate spacings along the system route, ratings (MW) as well as the details (e.g. three phase nominal 12.47–13.2 kV distribution circuit [name utility] and any exceptions.
- b) Nominal (full-load Vdc) project voltage is identified and basis of design and choice of project nominal voltage relative to system voltage is identified, voltage drop minimization, maximization of vehicle propulsion system performance, and train regeneration issues have been addressed.
- c) Third-rail or overhead contact system (OCS) is defined including conductor sizes relative to existing parts of system, as well as any supplementary parallel feeders to meet design requirements for substation out-of-service scenario.
- d) AC Switchgear type (i.e. indoor, metal clad vacuum circuit type breaker, etc.), ratings (i.e., 15 kV, 500 MVA, etc.), relay protections provided (Phase overcurrent protection, Ground overcurrent protection, Negative sequence voltage relay, Rectifier overload relay, AC lock-out relay, etc.)
- e) Traction Power Transformer type (i.e. vacuum pressure impregnated dry type, etc.), ratings (i.e., 1110 kVA 65°C rise at 100% load, three phase, 60 Hz., ANSI and NEMA standards for extra heavy-duty service).
- f) Power rectifiers are matched and assemblies capable of providing a stated output such as “twelve pulse, 825 VDC output at rated 100% load with the overload capabilities as specified in NEMA RI-9 for extra heavy-duty traction service.” Harmonics in the utility power lines and the interference voltages due to residual ripple issues have been addressed in the design.
- g) DC Switchgear basis of design and choice of switches, busses and feeder breakers is identified and equipment list is complete.



- h) Programmable Logic Controller (PLC) system, if provided, integrates and control intercubicle functions and provides control, monitoring, and data logging at each substation.
- i) Substation grounding system basis of design and choice of separate AC and DC ground mats as well as stray current monitoring or testing, lightning arresters and protective relays and fault current contribution from the AC equipment to the DC equipment issues and utility system faults have been addressed.
- j) Minimum voltage at the pantograph is identified and the basis is established for locations during the sustained project headways with substations operating, or with “...” substations out of service. If substations are required, under-voltage conditions are identified with one substation out of service and the operation plan identifies mitigation measures.
- k) Overhead Contact Systems (OCS) are identified in terms of Single Contact Wire Auto Tensioned, Simple Catenary Auto Tensioned and Balanced Weight Anchor Assemblies, and issues associated with temperature variations are addressed as structures identified. Tensions for the contact wire and messenger wire are defined; maximum distances between tensioning points is identified depending on the amount of curves and the individual track configuration, reduced to ensure the auto tensioning effect of the wheel assembly; mid-point anchor installation details and locations identified to reduce the along-track movement of the OCS equipment and minimize the work in case of a conductor breakage; OCS is sectionalized to provide isolation of the OCS section at each substation and basis for design is established and design issues associated with Insulated overlaps, section insulators, electrical continuity, overlaps and at crossover locations are addressed. Substation buildings, including low voltage substation AC auxiliary electrical system and facility electrical equipment such as AC panel boards, heating and ventilation systems, transformer partitions, embedded conduit work, utility instrument enclosure, door intrusion switches, lighting, and substation ground mats are built into or coordinated with the Civil contracts in advance of the associated system contract.
- 4) Major or critical design decisions are defined including rehabilitation or reuse of existing structures, facilities or systems including but not limited to the following:
  - a) Pre-construction, site reconnaissance, geotechnical and soil resistivity surveys are complete;
  - b) Ground subsidence and structural protections issues have been resolved;
  - c) Structural elements are advanced beyond simple span design, or simply supported.
- 5) Major or critical work details; structural element dimensions, design interfaces and physical interfaces are complete and well defined in terms of drawings, standards, criteria, specifications and contract package scopes.

### **SCC 60 ROW, Land and existing improvements**

- 1) The Real Estate Acquisition and Management Plan (RAMP) is complete consistent with the phase of the project. A complete RAMP is expected prior to entry into engineering or shortly thereafter. Land acquisition and relocation activities have been implemented per RAMP consistent with master schedule. Refer to the Real Estate OP 23 for more information. Real estate documents and drawings identify the full takes, partial takes, residential, commercial or industrial relocations, easements and other rights to be acquired, possible eminent domain actions.

- 2) Site surveys include property lines and identification of structures for buildings, site features, utilities, and surface improvements such as streets and railroad rights-of-way.
- 3) The real estate information and survey information is fully coordinated with drawings of structures for guideways and buildings; site features; utilities; streets, railroads, transitways; construction easements; site access and staging areas and environmental mitigation requirements, e.g., wetland mitigation requirements.
- 4) Any lands owned or proposed for acquisition in excess of the proposed project footprint must be identified as such.
- 5) The existence of contaminated or potentially contaminated property can influence the scope of the project footprint as well as the project schedule. The real estate to be acquired should be thoroughly analyzed during the NEPA review and through appropriate environmental site assessments prior to initiation of the acquisition process. The Sponsor must share this information with the property appraiser.

### **SCC 70 Vehicles**

Refer to Bus and Rail Vehicle Technical Review OP for more information. Vehicle (Revenue and non-revenue) descriptions, fleet size, functionalities, reliabilities, technology and performances are defined and drawn to the upper level of assembly, major equipment, general arrangements of cabin and cab:

- 1) System Functional Description has been developed and advanced to include the following:
  - a) Definition of the subsystems that constitute the overall system
  - b) Description, graphic depiction of each interface between subsystems
  - c) Description of how each subsystem will meet the requirements of the specification.
  - d) Vehicle dynamic envelop has been defined to meets the facility and alignment limitations.
  - e) Vehicle-systems integration has been addressed to assure compatibility of electrification, signal and communications systems.
- 2) Materials specifications have been developed and advanced to include lists of qualified materials, such as brake shoe composition, electric components, refrigerants, lubricants, cleaners, paints/coatings, wiring, etc.
- 3) Testing requirements have been developed and advanced to include the following:
  - a) High-level Test Program Plan for both production and on-site acceptance should be underway (including requirements for factory inspection and testing, First Article and Pre-shipment inspections, static and dynamic testing and conditional acceptance).
  - b) Maintenance and Training Requirements should be defined and identified including development of maintenance and training requirements for new system elements.

### **SCC 80 Professional services**

Refer to the Sponsor Management Capacity and Capability OP for more information. The roles and responsibilities of the Sponsor's professional consultants (design, engineering, and construction management) or others such as attorneys or insurance professionals may be distinguished from the Sponsor's own professional staff and manual labor. When the Sponsor's manual labor, equipment and facilities are used to facilitate construction or to assist in construction of the project, a Force Account Plan and associated cost estimate should be provided.

Costs associated with construction – building contractors’ management, labor, indirect costs, overhead, profit, construction insurance should not be included in SCC 80 but in SCC 10 through 50 as appropriate. Cost estimates should conform to this allocation of cost.



## **Oversight Procedure 32D - Project Delivery Method Review**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure is to describe the review, analysis, recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) with regard to the Project Sponsor's (Sponsor) plan for project delivery and the selection of the project delivery method(s).

### **2.0 BACKGROUND**

For these purposes, Project Delivery Method is defined as the overall approach selected by the Sponsor to contract for those services necessary to place the project in revenue service. Major capital transit projects include fixed infrastructure, real estate, vehicles, work by third-parties and utilities, materials and equipment and the professional services required to manage and design the project and see it through construction and into revenue operations. Normally, the largest proportion of the project's budget is associated with the construction of fixed infrastructure. The focus of this review is on the Sponsor's plan for the selection of the delivery method (or methods) for construction, and as a subset of this, the Sponsor's strategy for segmenting the project into contract packages.

A variety of project delivery methods and/or contracting techniques are available. However, individual state laws control which methods may be used by public entities for various types of construction within the state. The most common method involves the use of a design consultant to prepare drawings and specifications which are attached to contract documents and then used to solicit competitive bids for construction. This is often referred to as design-bid-build (D-B-B). Other alternative contracting methods include design-build (D-B), design-build-operate and maintain (DBOM), Public-Private Partnerships (P3) and the construction manager at-risk or construction manager/general contractor (CM/GC) approach. All of these delivery methods are viable and have been used successfully, however, some work better than others in particular situations. For example, a parking garage might be a good candidate for design-build because the garage designs can be formulaic. A linear transportation project in an urban area might be a good candidate for design-bid-build or construction manager/general contractor because of the importance of a unique design with specific attention to sequencing construction to avoid unnecessary traffic impacts.

The project delivery method should be selected on the basis of how well it satisfies the Sponsor's goals. Goals could include rapid construction, lowest constructed cost, or a unique innovative design among other things. The Sponsor's goals should be clearly understood and articulated before the process of developing a project delivery plan is initiated. The Sponsor must also understand the limitations imposed by state law and the attributes and inherent strengths and weaknesses of each project delivery method before an appropriate selection can be made. The Sponsor should document its choice of and rationale for a project delivery method or methods and contracting strategy in its Project Management Plan (PMP) or in a specific sub-plan such as a Project Implementation Plan or Project Delivery Plan.

In the PMP or a specific sub-plan, the Sponsor should demonstrate knowledge and consideration of:

- The overall scope of the project;
- Its goals and objectives for the project or discrete project elements;
- Limitations imposed by state law;
- Its current and anticipated design approach to the project;
- Its own project management capacity and capability to manage the project using the selected delivery method(s). Different staffing levels and skill sets are required to successfully manage a design-bid-build approach versus a design-build approach. An agency embarking on its first rail project will face many decisions that will require careful consideration. A traditional design-bid-build approach can provide more opportunities and time to consider those decisions without necessarily impacting the project schedule. Using a design-build approach, however, requires the Sponsor to make decisions at the outset as part of the preparation of the performance specifications. A delay in making those decisions may negate the perceived schedule advantage offered by the design-build approach.
- Its preferred allocation of risk between itself, the construction contractors, and third parties. Note that the allocation of risk between the parties may vary on different contracts on the same project. FTA's Project and Construction Management Guidelines note that risk should be considered in selection of project delivery method so that the likelihood of success is optimized.
- Its selection of project delivery method(s) with a narrative explaining the factors taken into consideration.
  - The overall strategy for delivering the project should be developed prior to the Engineering phase. These decisions should start with the identification of key objectives of the Sponsor. There may be multiple objectives that apply to the overall project or selected elements. The comparison of objectives and project delivery methods should take into account the physical characteristics of the project and the degree of difficulty inherent in constructing the project. Factors may include the amount of real estate and right-of-way to be acquired and the number of individual parcels affected; whether development involves negotiation of rights with a freight railroad; the number of political jurisdictions involved; the need for a tunnel or significant aerial structure, etc. Once the selection of delivery method(s) has been made, the Sponsor must tailor the contract documents and procurement process and schedule to match the selected delivery method(s).
  - The development of the project delivery strategy early in the project is important because design of the project is directly linked to the strategy. Prior to embarking on the design of the project, the design consultant should know whether the design will be used for competitive bidding; whether collaboration with a contractor will be necessary in a construction manager/general contractor arrangement; or if less detailed design documents along with a performance specification are needed for a design-build approach.

FTA's initial review of the Sponsor's project delivery plan for a New Starts project should occur no

later than the readiness reviews prior to entry into the Engineering Phase. The review should be refreshed prior to execution of a Full Funding Grant agreement. For Small Start projects, the initial review should be conducted after the Sponsor has developed its project delivery plan and before the Small Start Grant Agreement (SSGA) award. Timing of this review is especially important if the Sponsor proposes use of an alternative project delivery method. The review should be refreshed prior to execution of a Full Funding Grant Agreement. For all projects, additional reviews may be required if the Sponsor proposes a change to its project delivery plan.

### **3.0 OBJECTIVES**

The objectives of this review are to verify that the Sponsor has a rational plan for project delivery; that the selected delivery method(s) are permissible under the public contracting laws governing the Sponsor's actions; that the plan is based on satisfying the Sponsor's objectives for the project or its individual parts; that the plan is based on the unique characteristics of the project; that the plan was developed with consideration of the current and expected conditions of the local and national construction market place; that the project delivery method(s) chosen are appropriate for the associated project element; that the implications of the plan are reflected in the project's schedule and capital cost estimate; and that the plan takes into account the Sponsor's project management capacity and capability.

### **4.0 REFERENCES**

The following are the principal, but by no means the only, references to Federal legislation, regulation and guidance with which the PMOC should have a good understanding as related to the Sponsor's project work being reviewed under this OP:

#### **4.1 United States Code**

- 49 U.S.C. Section 5327

#### **4.2 Regulations**

- Project Management Oversight, 49 C.F.R. Part 633

#### **4.3 FTA Circulars**

- C4220.1 Third Party Contracting Guidance

#### **4.4 Guidance**

- Project and Construction Management Guidelines, 2011 Update
  - 3.6 Procurement, Contracts, and Related Topics
  - 4.3 Construction Procurement Considerations
  - 4.3.1 Construction Contract Bid Documents and Requirements

## **5.0 PROJECT SPONSOR SUBMITTALS**

- Written Project Description
- Design Documents (Plans, Specifications)
- Project Management Plan
- PMP sub-plans such as Project Implementation Plan, and the Risk/Contingency Assessment and Management Plan
- Project Schedule
- Cost Estimate in original and SCC format
- Decision documents related to selection of contracting methods and packages
- Documentation of statutory basis and Agency or Board Actions required prior to use of the selected contracting method(s).

## **6.0 SCOPE OF WORK**

### **6.1 PMOC Qualifications**

The individual or team of individuals selected to perform this evaluation should have extensive experience in the planning and delivery of large complex capital projects. The experience should include the use of a variety of delivery methods. The individual(s) should be familiar with the advantages and disadvantages inherent in the various techniques, and the factors that would influence the choice of a particular delivery method. Ideally, the individual(s) should have managed the actual construction of multiple projects using a variety of contracting methods.

### **6.2 Preliminary Document Review**

Upon receipt of the assignment, the PMOC should obtain the specified project documents and other materials from the Grantee. The PMOC may already be generally familiar with the project as a result of on-going monitoring activities. If the assigned personnel are not familiar with the project, they should review the materials in preparation for their on-site visit.

### **6.3 On-Site Review Meeting**

The PMOC should arrange for an on-site briefing by the Sponsor's project management team. The briefing should include a point-by-point discussion of the project delivery strategy. The presentation should include:

- discussion of the project objectives
- the delivery and packaging methods considered
- any state law constraints on contracting methods
- the process that was used to develop the strategy
- opportunity for the Sponsor to demonstrate its understanding of the selected delivery method(s)
- the selected strategy and packaging plan, including individual procurement packages for long lead time or specialty items or services and materials to be furnished to contractors by the owner

- the implementation schedule showing each major element or package and associated preparatory and subsequent events
- significant risks affecting the selection
- the proposed procurement process for each type of delivery method and the steps being taken to develop appropriate contract documents, including the use of specialized legal counsel
- the Sponsor's approach and proposed staffing to manage implementation of the strategy

#### **6.4 Review and Assessment**

The PMOC should review the Sponsor's plan to identify the process used to select the strategies for delivering the project. The PMOC should review for adequacy and timing the checks planned and/or implemented by the Sponsor as part of its plan. Checks may be in the form of peer reviews and/or independent or internal process reviews that ensure the strategies employed and processes used to select and ultimately deliver the project are both sound and comprehensive.

The PMOC shall fully identify, describe, and analyze the Sponsor's individual contract packages and anticipated or actual pricing/compensation components inclusive of overheads, stipends, incentives, contingency and "contingency like" components, and any negotiated profit/fee values. The PMOC shall also identify and assess the impact of project elements which are likely to contribute to increased contractual risk and specific contractual risk transfer provisions. The PMOC shall assess and evaluate the degree to which such contractual provisions including pricing/compensation components are aligned with the Project Sponsor's project strategy/risk management plan and their effectiveness in terms of minimizing costs (and cost overruns) and schedule (and schedule slippages).

The PMOC shall review Sponsor's Project Delivery and Procurement section of the PMP or comparable sub-plan and supporting documents to characterize and provide a report regarding the sufficiency of Sponsor's design and construction procurement and contract packaging strategies. An example of the content of this section of the PMP is provided in Appendix B for the PMOC's reference. The PMOC's should consider the following questions in conducting its review:

- Does the Sponsor have a comprehensive project delivery strategy?
- Was a sound process used to develop the strategy?
- Is the Sponsor's strategy likely to satisfy the overall project objectives as well as the unique objectives of individual elements?
- Did the selected delivery method(s) consider relevant risks associated with the project element(s)?
- Is the selected delivery method or methods appropriate for use with the particular project element?
- Has the Sponsor considered local (and national/international where appropriate) market conditions for construction services and materials, including specialty contractors, e.g., tunneling, in the development of its strategy?
- Is the strategy, including the contract packaging plan, appropriately documented in the PMP or sub-plan?



- Does the project schedule reflect the project delivery strategy, including sufficient preparation time and negotiation periods (if appropriate)?
- Does the project's capital cost estimate reflect the contract packaging assumptions, including related overhead charges, incentives, or other contract related costs?
- Does the project's capital cost estimate reflect the cost of staff and other outside services necessary to implement the project delivery strategy?
- Does the Sponsor possess the requisite experience, organizational sophistication and technical competence to successfully implement the proposed strategy?
- Does the Sponsor currently possess, or have a plan to acquire, the staff resources to successfully execute the project delivery strategy?

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC should provide its review with due consideration of the laws, including state public contracting laws, regulations, policies, circulars, guidance documents, and industry practices that apply to the Sponsor's work. Review and analyze the pertinent information available for completeness, adequacy, consistency, and the appropriate level of detail given the phase of the work. Identify any and all discrepancies, shortcomings or fatal flaws. State findings in descending order of importance and make recommendations for modifications or additional work by the Sponsor, including a time frame for the performance of the work.

The PMOC shall provide FTA with a written report of its findings, analysis, recommendations, professional opinions, and a description of the review activities undertaken. After FTA approval, the PMOC should share the report with the Sponsor. In the event that differences of opinion exist between the PMOC and the Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile with the Sponsor and provide FTA with a report addendum covering the agreed modifications by the Sponsor and PMOC.

The report formatting requirements of OP 01 apply. When necessary, PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may use or add other software as required but documentation and report data shall be made available to FTA.

Include in the Body of the Report:

- Review procedures and PMOC personnel (including capsule of reviewer qualifications attached as an appendix)
- Summary of the Sponsor's Project Delivery Plan
- Findings with regard to the consistency of Sponsor's Project Deliver Plan with:
  - Project Management Plan and sub-plans
  - Drawings and specifications
  - Contracting Plan
  - Master Schedule
  - Capital Cost Estimate

- Findings with respect to the Sponsor's project management capacity and capability to successfully implement the project delivery plan including staffing, and procurement policies and processes;
- Recommended changes, alterations or amendments to the Sponsor's project delivery strategy and packaging plans
- Any other suggestions related to the Sponsor's project delivery strategy and packaging plans

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1	PMOC shall review, analyze and present findings to FTA regarding Sponsor's plan for project delivery.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of Sponsor's project delivery plan.		<b>Q1a.</b> Process exists and has been followed.	<b>M1a.</b> Evidence of a documented process.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process to analyze the completeness, consistency and appropriateness of Sponsor's project delivery plan.		<b>Q1b.</b> Assessment must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>M1b.</b> Documented assessment of the overall project delivery plan and supporting documents for completeness, consistency and appropriateness.	<b>MM1b.</b> Periodic review by FTA or its agent.
2	The PMOC shall review Sponsor's plans for project delivery to determine whether appropriate delivery methods have been selected and whether the Sponsor has the project management capacity and capability to successfully implement the selected methods.	<b>R2a.</b> The PMOC shall review and assess the necessary Project documents in preparation for an on-site review meeting with Sponsor.		<b>Q2a.</b> Professional opinion of project delivery plan and other supporting documentation.	<b>M2a.</b> Documented evidence of a thorough review by PMOC of Sponsor's project delivery plan technical components, and other related documentation, supported by professional opinion.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall arrange an on-site briefing by Sponsor's project management team to include a complete and comprehensive discussion of all phases of Sponsor's project delivery strategy. PMOC shall require sufficient information and discussion from Sponsor's staff to be able to form a well-reasoned professional opinion of Sponsor's project delivery plan, the likelihood of success of Sponsor's plan and the risks attendant thereto.		<b>Q2b.</b> Professional opinion and review of Project delivery strategy via an on-site briefing from Sponsor.	<b>M2b.</b> Documented evidence of on-site briefing of PMOC by Sponsor's project management team with full discussion of all aspects of Sponsor's project delivery strategy, supported by professional opinion.	<b>MM2b.</b> Periodic review by FTA or its agent.
		<b>R2c.</b> The PMOC shall review and provide an opinion on the adequacy of Sponsor's plan and process for checking and review of selected strategies for delivering the Project.		<b>Q2c.</b> Professional opinion and evaluation of review process instituted by Sponsor for its Project delivery strategies.	<b>M2c.</b> Documented evidence of review and analysis of adequacy of review process for Sponsor's selected Project delivery strategies, supported by a professional opinion.	<b>MM2c.</b> Periodic review by FTA or its agent.
		<b>R2d.</b> The PMOC shall review the Project Delivery and Procurement sections of the PMP with supporting documentation and provide in its report an opinion characterizing the sufficiency of Sponsor's design and construction procurement and contract packaging strategies.		<b>Q2d.</b> Professional opinion and evaluation of Grantee's contract packaging selections.	<b>M2d.</b> Documented evidence of review of Project Delivery and Procurement sections of the PMP and analysis of sufficiency of Sponsor's contract packaging, supported by a professional opinion.	<b>MM2c.</b> Periodic review by FTA or its agent.
	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD

## APPENDIX A

### Acceptable Quality Level

2	The PMOC shall review Sponsor's plans for project delivery to determine whether appropriate delivery methods have been selected and whether the Sponsor has the project management capacity and capability to successfully implement the selected methods.	<b>R2e.</b> The PMOC shall address in its report, the completeness, adequacy, consistency and any discrepancies of Sponsor's project delivery plan, stating its findings in descending order of importance, with recommendations for modifications or additional work by Sponsor and a time table for completion of such.		<b>Q2e.</b> Professional opinion and evaluation of Sponsor's project delivery plan and analysis of discrepancies.	<b>M2e.</b> Documented evidence of findings, analysis of discrepancies, evaluation of adequacy and consistency and recommendations supported by a professional opinion.	<b>MM2e.</b> Periodic review by FTA or its agent.
		<b>R2f.</b> The PMOC shall make an overall assessment of the comprehensiveness of Sponsor's project delivery method, including all documentation, the presence or absence of necessary personnel and shall identify any risks associated with Sponsor's plan.		<b>Q2f.</b> Professional opinion and review of delivery methods and associated risks.	<b>M2f.</b> Documented evidence, review and evaluation of project delivery method, all documentation and associated risks, supported by a professional opinion.	<b>MM2f.</b> Periodic review by FTA or its agent.
3	The PMOC shall document its findings, professional opinions, and recommendations in a report to the FTA.	<b>R3.</b> The PMOC shall present its findings, conclusions, analysis and recommendations to FTA and, upon FTA approval, reconcile those recommendations with the Sponsor to the extent possible when so directed by FTA.		<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with Sponsor to the extent possible.	<b>M3.</b> PMOC's findings in descending order of importance, conclusions, recommendations, and presentation.	<b>MM3.</b> Periodic review by FTA or its agent.

## APPENDIX B

### Project Delivery and Procurement Table of Contents from Project Management Plan

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<b>Project Delivery and Procurement Table of Contents</b>
Procedures for Procurement (Advertising, bidding, and awarding of contracts for consultants and construction contractors, and procurement of equipment, etc.)
Procurement Plan and Schedule (Indicate project phase, durations for RFP, screening, interviews, selection, board approvals, etc.)
Community Outreach Services
Information Systems Services
Real Estate Services
Project Management Services
Design Services
Legal Services and other services
Construction Management Services
Construction Testing and Inspection Services
Construction
Preliminary Selection of Project Delivery Method (DBB, DB, CMGC, DBOM, PPP) (include rationale for selecting the method and identification of risks inherent in the selected method)
Final Selection of Project Delivery Method
Major Construction Packages – Description of Packages, Package Interfaces and Construction Sequencing
Procurement of Long Lead Items and Pre-FFGA/SSGA items or work
Procurement of Materials, Equipment, Vehicles including procurement in advance of construction contracts.
Work by Project Sponsor's own Forces (Force Account Work)
Work by Third Parties such as Utilities, Railroads, Private Sector, etc.
Contracting Strategy for Transit-oriented and Joint Development
Identification of Small/Disadvantaged Business Enterprises (S/DBE) Opportunities and Federal Small/DBE/Veterans, State/Local WBE & MBE, Plans and Goals



## **Oversight Procedure 33 – Capital Cost Estimate Review**

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### **1.0 PURPOSE**

This Oversight Procedure (OP) describes the review, analysis and recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) with regard to the:

- Soundness of the Sponsor's cost estimating methods and processes compared with proven professional quantity surveying and cost estimating practices;
- Congruence of the project cost estimate with the project scope and schedule, i.e. do these three elements fully reflect each other;
- Reliability of the estimate for procurements, contract bids, and contract closeout, i.e. will the project budget prove to be adequate at these milestone events.

### **2.0 BACKGROUND**

Congress and FTA's good stewardship require that a Sponsor's cost estimates be reliable before entry into Engineering and Full Funding Grant Agreement (FFGA) or Small Starts Grant Agreement (SSGA), as well as other points in project development, when requested by FTA, a thorough evaluation of the scope, schedule and cost is performed to confirm the estimate's reliability.

### **3.0 OBJECTIVES**

FTA's objective is to assess the consistency of cost estimating information, understand its characteristics, evaluate the methodologies, and confirm that the estimate adequately reflects the overall project scope, the estimated quantities shown on the design documents, the anticipated market conditions, the risk elements associated with the project, and the project schedule. This procedure is applicable to Design-Bid-Build, Design-Build and other delivery methods. A cost or cost range is established as a base from which future estimates are measured. Later, when contract packages are conceived, the PMOC will evaluate the estimates in the packages. This review may be performed prior to FFGA or SSGA and issuance of documents for bid, or during construction. The review results should help the Sponsor with decisions regarding the level of cost control measures, appropriateness and reasonableness of contingency provisions, and mitigations required; in addition, the results will assist FTA with decisions regarding project advancement and funding.

### **4.0 REFERENCES**

The statutes, regulations, policies, guidance documents and circulars in OP 01 apply. The Sponsor's estimate should conform to industry standards as published by leading project management and control organizations. In addition, the schedule management and project controls will be subject to reviews as described in the following OPs:

- OP32C – Project Scope Review
- OP34 – Project Schedule Review
- OP40a/b/c – Risk and Contingency Review

## 5.0 SPONSOR SUBMITTALS

The PMOC shall obtain and study the Sponsor's current cost information:

- Summary of O&M Cost Assumptions/Productivities;
- Capital cost estimate in original and SCC format;
- Capital cost estimate backup data (take-offs, cut sheets, work breakdown structure, calculations, and recapitulation) for the purpose of traceability or mapping.
- Capital cost estimating methodology memo (refer to Appendix B);
- Assumptions used for all escalation and contingency (allocated, unallocated, and hidden or latent) provisions.
- Before and After Study Documentation.

In addition, the PMOC shall obtain and study the project environmental documents, project drawings, specifications, narratives, design criteria reports, project schedule, information on land acquisitions and relocations, and procurement of vehicles, material, and equipment.

## 6.0 SCOPE OF WORK

This Review may be performed during project planning, design or construction. The work order may specify the extent of the review, add re-assessments or specialized analyses. Under the MAP-21 process, PMOC cost reviews will occur as directed by the FTA work order manager but, most likely at the following stages:

### **Review during Project Development (PD)**

Preparation of a comprehensive capital cost estimate in native and SCC format should occur during PD. The PMOC should review the cost estimate and also review the Sponsor's cost estimate staffing, capabilities and processes. OP51, Appendix B, Section 6 provides criteria for evaluating the completeness, level of detail and reasonableness of the project cost estimate at Entry into Engineering.

**Entry into Engineering:** Preparation of an appropriate cost estimate developed using acceptable methodology, with all elements identified in SCC second level format, including costs for third party, utility and critical ROW agreements. Depending on the initial risk level of the project and/or Sponsor, the PMOC would conduct either a review workshop or a more intensive full cost estimate review (in conjunction with full scope and schedule reviews). The FTA reserves the discretion to conduct risk assessments prior to Entry into Engineering. As a result, additional cost estimating analysis may need to be performed to support processes required under OP40a/b/c.

**Reviews during Engineering:** Upon Entry into Engineering, the PMOC updates the cost estimate review and conducts a risk assessment which could range from a Sponsor-led expedited review, FTA-led expedited review or FTA-led full review. This review could be used to award Letter of No Prejudice (LONP), Letter of Intent (LOI) or Early Systems Work Agreement (ESWA) or commitment of Federal share.

### **Review for FFGA/SSGA**

: Prior to the final request for FFGA/SSGA, the FTA will perform a readiness review, potentially request the PMOC to refresh its Cost review (along with schedule and risk). FFGA/SSGA, required for construction, can occur at any time after the Project Engineering phase. As such, the PMOC review for FFGA/SSGA will need to be commensurate with the Sponsor's documents available at the time and require the PMOC team performing the update to evaluate the suitability of the project documents to the Sponsor's project execution and contracting strategy, whether design-bid-build, design-build or other FTA acceptable process.

**Reviews during Construction:** During construction, the FTA may require the PMOC to monitor the Sponsor's compliance with the cost and estimating elements of the PMP and its subplans, monitor for risks to budget, including contingency levels, and monitor the appropriate cost and estimating capacity and capability of the Sponsor's organization.

The PMOC shall assess and evaluate the Sponsor's estimate and its plan for cost control. Consider the adequacy of the Sponsor's project control staff, systems and software for the size and complexity of the project. Validate the usefulness of the estimate as a project management tool, consider the level of definition of the estimate and elements within the schedule for appropriateness to the project phase; identify cost uncertainties, and issues with the project estimate mechanical soundness, and fundamental and reasonable soundness.

The PMOC shall review the Sponsor's cost control including internal procedures and estimate reviews. Consider the timing and adequacy of such reviews to determine if the schedule is sufficiently developed, properly maintained, and consistent with the progress of the project. Review the Sponsor's processes and procedures for developing, monitoring and changing the estimate, including approvals if a significant change in the Revenue Service Date is required. The PMOC should additionally determine if the Sponsor has a formalized Configuration Management process that controls baseline budget and any re-baselining controls for cost revisions.

The PMOC shall provide recommendations to improve the development and implementation of cost management and proactively help the Sponsor solve cost problems. In a report, the PMOC shall document its findings, professional opinions and recommendations.

The PMOC shall:

1. Evaluate the Sponsor's development and implementation of the following cost management components:
  - a. Project Control Organizational Structure – Includes the Sponsor's staff combined with the potential blending of other consultant project controls staff for all project phases
  - b. Project control systems, tools and software used
  - c. Review of project control plans, procedures, and cost management contractual requirements
2. Conduct a Technical Estimate Review
  - a. Mechanical Soundness check
  - b. Fundamental and Reasonable Soundness check
3. Readiness to conduct OP 40 Schedule Risk Analysis check – (If applicable)



The PMOC shall provide a written comparison of the proposed estimate with similar project(s) and analyze the differences. To the extent possible, early in the project early stages, the PMOC shall use the cost data base for comparisons purposes. The PMOC should then draw conclusions and provide recommendations based on this comparison, if applicable.

## **6.1 Review of Sponsor's Estimate Review Process**

The Sponsor should have a review process for its own cost estimate and be continually monitoring and updating its estimate using said process. The PMOC should review the Sponsor's approach to this task for adequacy and timing. Checks may be in the form of peer reviews and/or independent cost estimates or internal reviews that ensure the estimate provided to the PMOC for FTA's review is, at a minimum, internally consistent, coordinated, and reflects current assumptions and project status.

## **6.2 Review of Sponsor's Cost Estimate**

The PMOC should perform any or all of the following after discussing the selection with FTA staff:

- A full project level cost characterization;
- A limited cost element review;
- Development of a cost estimate baseline;
- Specialized quantitative cost modeling or assessments, surveillance reporting or trends analysis;
- Reevaluation of project cost information on a periodic or event driven basis;
- Coordination of the cost estimate with the project scope and schedule;
- Coordination of the cost estimate with any known risk elements worthy of forecast adjustments;
- Presentation to the Sponsor of findings, analysis, recommendations, and opinions;
- Participation in a workshop with the Sponsor to discuss the project.

### **6.2.1 Proposed Approach to Reviewing the Estimate – A Sampling Plan**

After briefly evaluating the Sponsor's submittals associated with their current Cost Estimate (and discussing with them), the PMOC shall propose to FTA an approach to reviewing the Sponsor's cost estimate that, regardless of the level of development of the estimate, will provide FTA will reliable findings and recommendations. The PMOC's proposed approach should be commensurate with the level of development of the Sponsor's Cost Estimate, which typically becomes more detailed as design progresses. In addition, depending on the Sponsor's chosen Project Delivery method(s), the PMOC may need to structure the proposed approach for the reviewing the Sponsor's Cost Estimate to be appropriate for the planned Delivery method(s) (i.e. Design-Build, Construction Manager-General Contractor (GM-GC), or other hybrid approaches might necessitate different and refined techniques for evaluating the Sponsor's Cost Estimate). Further, the Sponsor's cost estimating techniques and methodologies are often different based on the size of the project (from an overall projected cost standpoint), complexities, number of anticipated contract packages, and other factors. As such, in proposing an appropriate and reasonable approach to reviewing the Sponsor's Cost Estimate, the PMOC should consciously consider the stage of project development, the methodology and degree of development of the Sponsor's Cost Estimate, and the size, complexities, and circumstances surrounding the project being evaluated. The proposal should include a description of the level of sampling of the estimate line items, and, if possible, examples of a sampling approach taken from a

previous project(s). The plan shall also identify the sources of comparable data to be reviewed including third parties, market indices, other projects or databases, schedule options, etc.

### **6.2.2 Review of Sponsor's Cost Estimating Capabilities**

When applicable, as part of Checklist, Section 3, Project Sponsor Organization, found in OP-51, the PMOC should request from the Sponsor the names, resumes, and job descriptions of its Cost Estimating representatives, along with any organizational or project-specific policies or procedures that the Cost Estimating representatives are tasked with following. Although this test is also covered in the OP-21, Sponsor Project Management Capacity and Capability Review, the importance of having a sufficient number of qualified Cost Estimators in support of a major capital project cannot be emphasized enough. As such, the PMOC should review the Sponsor's capabilities in this regard as part of its overall evaluation of the Sponsor's Cost Estimate.

In addition, when applicable, the PMOC shall reference the Checklist Section 2.0 Project Management Plan, found in OP-51 to confirm that the Sponsor's Project Management Plan incorporates the practices and procedures needed to manage the cost estimates and cost control processes.

## **6.3 Basic Review**

### **6.3.1 Review for Traceability, Integration, Coordination, Consistency**

The PMOC should check that the Cost Estimate is:

- Mechanically correct and complete; free of any material inaccuracies or incomplete data
- Consistent with relevant, identifiable industry or engineering practices
- Consistent and reasonable approach taken and format used by the Sponsor's cost estimators
- Consistent and reasonable methods of calculation/application of multipliers for escalation, inflation, general conditions, contingencies, cost of money, and taxes.
- Consistent with the project scope described in NEPA document, Record of Decision, and design documents
- Organized into SCC cost accounts categories
- Consistent with the current project schedule

### **6.3.2 Characterize the Level of Estimating**

The PMOC should:

- Characterize the estimating methodologies used:
  - Parametric (Statistical) -- A cost estimating methodology using statistical relationships (see Appendix C). Commonly referred to as "Top Down" estimating.
  - Analogous (Comparison) -- An estimate of costs based on historical data of a similar (analog) item.
  - Bottom-Up (Detailed Engineering) -- This involves using a detailed Work Breakdown Structure (WBS) and pricing out each work package making up the project.
  - Extrapolation (Earned Value) -- Estimates which are based on actual project costs
- For the estimated elements, characterize the nature of the support for the costs estimated, i.e. how these were derived so that the basis of estimate is documented in terms how the scope was captured, how it was priced and what assumptions were considered in the cost
  - Level 1: Characterize the line quantities and nature of the estimate as being:

- the product of unit cost and quantity (Unit costs are defined when the estimate separately identifies direct and indirect cost components)
- a cost estimating relationship (CER); (Unit pricing is classified as CER)
- a lump sum (sometimes referred to as an “allowance” or “plug number”)
- Level 2: Subdivide Level 1 as follows:
  - quantities indicated in both the design documents and the cost estimate
  - quantities indicated only in the cost estimate
  - quantities indicated only in the design documents
- Level 3: Subdivide Level 2 into the following subcategories:
  - Cost to Cost CERs
  - Non-Cost to Cost CERs
  - Cost or Non-Cost to Non-CERs
- Level 4: Subdivide Level 3 as follows:
  - Project direct costs
  - Escalation of materials and labor
  - Total project allowances
  - Project indirect costs
  - Construction contractor profit
  - Total inflation costs (nationwide/regional change in costs over time)
  - Total project contingency (allocated, unallocated, hidden or latent) (coordinate work under this section with work performed separately under OP-40 for risk and contingency)

The PMOC shall provide its professional opinion regarding the over/understatement in the Sponsor’s cost estimate and shall support its opinion with its own spreadsheets and calculations. The PMOC shall assess the integration and traceability of the estimate with the defined scope and schedule of the project for purposes of identifying a “baseline” or initial project estimate. The PMOC shall assess the escalation factors used for material, labor and other costs, as well as the inflation of costs from the Base Year to the Year of Expenditure (YOE) cost, the soundness of the economic forecasts and factors used, and the appropriateness and reasonableness of contingency levels, noting the use of inconsistent and questionable rates or costing techniques within the estimate.

## **6.4 Specific Reviews**

### **6.4.1 Review of Parametric Project Cost Estimate (Refer to Appendix C for Description)**

The PMOC shall characterize the Sponsor’s parametric estimate of project cost to determine that it:

- Identifies the key input drivers (i.e. independent variables) and explains their relative impact on the estimate;
- Adequately provides and supports the data and inputs used in calibration;
- Demonstrates that the model utilizes historical costs that are calibrated to current conditions within a reasonable degree of accuracy;
- Explains any adjustments to the model or to the key inputs, and provides adequate rationale for such adjustments;

- Demonstrates that the calibrated model produces reliable estimates in comparison to some other benchmark (e.g., actuals, comparative estimates).

#### **6.4.2 Review of Definitive Project Cost Estimate (Refer to Appendix D for Checklist)**

Review and characterize the Sponsor's cost estimate using the checklist from Appendix D. Determine that the estimate reflects a thorough and reasonable incorporation of all cost elements consistent with the project scope, schedule, known and unknown risk elements, and correlates with current construction contractor pricing and work quantities. Assess and evaluate construction contract package elements and the impact of the terms in the General and Supplementary Conditions of the Contract, and Division 1 provisions, on the anticipated bid price. Describe and characterize the Sponsor's construction contract package information as follows:

- Identification of restrictive schedule or mobilization requirements that would materially affect bid prices;
- Identification of construction contract elements or contract language that would reasonably serve as a basis for reduced competition, increased pricing (due to passed-on risks), and ambiguous or incomplete terms leading to additional compensation, which is not part of a scheduled payment item;
- Geotechnical data;
- Provision for third party, real estate, utility relocations and support issues.
- Evaluative and pricing approach to changed conditions;
- Unit pricing and allowed variability in unit pricing (including maximum limits of variance);
- Provision for an adequate amount for the construction contractor's general conditions;
- Requirements for specific services such as QA/QC or scheduling, appropriately allocated to each contract and evident in bidding documents.

The PMOC shall develop an independent detailed cost estimate of the construction contractor's general conditions for the systems work and for the three largest construction contracts, and shall compare and contrast and make recommendations of change to the Sponsor's estimate.

#### **6.4.3 Comparison between Sponsor's Project Cost Estimate and FTA Database**

The FTA maintains a Capital Cost Database on the FTA's website that can be found at the following link: [http://www.fta.dot.gov/12305\\_11951.html](http://www.fta.dot.gov/12305_11951.html).

The Database presents a summary of "as-built" costs for federally-funded, Light and Heavy Rail projects. The projects' costs are tracked in FTA's Standard Cost Categories, (SCCs) which have been validated by the project sponsors. While the Database should not be used exclusively or predominantly as the PMOC's Cost Estimating review tool, it should be consulted with as it allows for a comparison to historical projects, having generally similar characteristics. It provides a tool for assessing and evaluating the Sponsor's project estimate, specifically identifying variances in unit costs and quantities from database averages, while promoting analysis of variances. The PMOC should continually consult the Database with each Cost Estimate review as the Database will be further

developed, with new projects being added periodically, along with an annual update of the inflationary factors.

#### **6.4.4 During Engineering, Pre-Bid, Post-Bid: Market Conditions Review**

During project implementation, the Sponsor will receive bids or offers that may have a significant impact on the project budget. The PMOC shall analyze project information Pre-Bid:

- Identify, organize, characterize, and analyze substantial construction contracts, signaling, and equipment procurements;
- Describe and evaluate the Sponsor's contract packaging strategy, its relationship to the project cost estimate, and the rationale (political, economic, engineering, etc.) for the contract packaging strategy;
- Characterize and evaluate the Sponsor's proposed plan and processes for solicitations;
- Characterize and evaluate the material elements of the project risk assessments as available, emphasizing scope, cost and schedule reviews as highlighted in internal risk registers, and the Sponsor's Risk and Contingency Management Plan (RCMP). Correlate these elements with the contract packaging strategy analysis, bid/bidder information, market conditions information, specialty equipment requirements, etc.

Address the following Post-Bid:

- Correlate and analyze bids or proposal amounts against the estimated values for each bid or proposal by element. Assess the impact of each deviation on the overall estimate, risk assessments, cost risk-cost ranges and risk mitigations;
- Characterize and evaluate the Sponsor's bid process (plan sets distributed, pre-bid conference attendance, bid question activity, exit conferences, telephone interviews, analytical products, bid tabulations);
- Characterize estimate reconciliation exercises performed between the Sponsor and the contractor (i.e. post bid negotiations, inclusions and exclusions);
- Where significant variances between bid received and estimates are discovered:
  - Trace variances on bid tabulation elements back to the cost estimate and risk register;
  - Sample unit cost and quantity information to evaluate the reliability of estimate compared with bid pricing; obtain independent market data and adjust as necessary to compare to pricing and estimate. Sample scope elements from the contract documents to support conclusions;
  - Survey the market to ascertain reasons for no bids, price drivers, retained risks, etc.;
  - Develop an estimated allocation between unit cost and quantity variance;
  - Organize causal factors into groups such as market factors, general conditions, risk transfers, etc.;
  - Evaluate contract award against design scope to assess whether the contract includes all of the planned scope as originally estimated (sometimes designs are adjusted after the

estimate is prepared and large portions of work are not included in the solicitation package leading up to contract award).

- That the Sponsor has established a plan to utilize bid results to adjust future packages for similar unsolicited work (if necessary).

#### **6.4.5 During Construction -- Assessment of Sponsor's Cost Estimate**

Characterize the Sponsor's estimate of the project cost-to-complete the project. Describe the level to which it:

- Is integrated with and makes adequate use of the Sponsor's previously developed supporting documentation for the estimate;
- Reflects current project schedule, including the Contractor's Critical Path (CPM) scheduling plan;
- Reflects the Sponsor's change order experience on the project;
- Evaluates and incorporates project progress and trends to date; and
- Reflects reasonable provisions for testing, commissioning, start-up, and revenue service.

#### **6.4.6 During Construction -- Assessment of Sponsor's Cost Estimate – Contingency and Risk**

##### **1. Cost Contingency**

Per the requirements of the *Project Cost Contingency* section of OP40b, perform a review of the project cost contingency to ensure that appropriate amounts are included commensurate with the stage of project development. Prepare a cost draw-down curve per the *Cost Contingency Draw-Down Curve* section of OP 40b including both forward pass and backward analysis analyses. Also, refer to the requirements of OP40b, Appendix G Risk and Contingency Management Plan Structure, Cost Contingency Management Plan to ensure that the estimate itself is fully coordinated with the Sponsor's plan.

##### **2. Readiness to perform OP 40 a, b or c Risk Analysis**

During the project the FTA may direct the PMOC to conduct/refresh an OP 40 Risk Assessment. The risk assessment includes a cost and schedule risk analysis as described in OP40a, OP40b and OP40c. In order to perform a cost risk analysis the project estimate must first be reviewed or characterized (OP 33) and adjustments must be made if so determined by the PMOC. Most importantly, similar to the project schedule, the project estimate must be completely stripped of all contingencies (patent and latent).

1. Once all contingencies have been identified and documented during the Technical Review, all contingencies must be removed from the project estimate.
2. Once all constraints are identified and documented during the Technical Review, all constraint must be removed from the project estimate.

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

Refer to Appendices E and F below for information on the Body of the Report.

The PMOC shall provide FTA with a written report of its findings, analysis, recommendations, professional opinions, and a description of the review activities undertaken. After FTA review and approval, the PMOC should share the report with the Sponsor. In the event that differences of opinion exist between the PMOC and the Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile with the Sponsor and provide FTA with a report addendum covering the agreed modifications by the Sponsor and PMOC.

The report formatting requirements of OP 01 apply. When necessary, the PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may add other software as necessary, but all supporting documentation and report data must be made available to FTA.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1	The PMOC shall validate the usefulness of Sponsor's cost estimates as project management tools.	<b>R1a.</b> The PMOC shall develop and document a process for review, analysis and validation of Sponsor's project cost estimates.		<b>Q1a.</b> PMOC provides documentation of the process.	<b>M1a.</b> Review of the process documentation.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process and project management judgment to validate the usefulness of Sponsor's cost estimates as project management tools		<b>Q1b.</b> Assessment must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>M1b.</b> Documented assessment of the Sponsor's cost estimates as project management tools.	<b>MM1b.</b> Periodic review by FTA or its agent and the PMOC's internal verification.
2	The PMOC shall assure FTA's access to increasingly reliable cost estimates throughout the life of the project and as directed by FTA.	<b>R2a.</b> The PMOC shall provide FTA with its opinion as to the soundness of Sponsor's estimating methods and processes compared with proven professional quantity surveying and cost estimating practices for projects of this scale.		<b>Q2a.</b> Professional opinion of the soundness of Sponsor's cost estimating processes.	<b>M2a.</b> PMOC's review and opinion as to the soundness of cost estimating methods and processes demonstrates the application of sound management and engineering practices and professional experience.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall provide FTA with its opinion as to the congruence of the project cost estimate with the project scope and schedule. In addition, the PMOC will evaluate whether the cost estimate includes sufficient and reasonable provisions for known and unknown risk elements.		<b>Q2b.</b> Professional opinion of the congruence of Sponsor's cost estimates with the project scope, schedule, and risk elements.	<b>M2b.</b> PMOC's review and opinion as to the congruence of project cost estimates with the project scope, schedule, and risks is based on sound management and engineering practices and professional experience.	<b>MM2b.</b> Periodic review by FTA or its agent.
		<b>R2c.</b> The PMOC shall provide FTA with its opinion as to the reasonableness and appropriateness of core assumptions embedded in the Cost Estimate by the Sponsor, included provisions for escalation and contingencies.		<b>Q2c.</b> Professional opinion of the reasonableness and appropriateness of all core assumptions in the Cost Estimate, which particular emphasis on escalation and contingency provisions.	<b>M2c.</b> PMOC's review and opinion on soundness and reasonableness of Sponsor core assumptions for its Cost Estimates.	<b>MM2c.</b> Periodic review by FTA or its agent.
		<b>R2d.</b> The PMOC shall provide FTA with its opinion as to the reliability of the cost estimates for procurements, contract bids and contract closeout as seen in light of the project budget.		<b>Q2d.</b> Professional opinion of the reliability of Sponsor's cost estimates for procurements, contract bids and contract closeout.	<b>M2d.</b> PMOC's review and opinion as to the reliability of cost estimates for procurements, contract bids and closeout demonstrates sound management and engineering practices and professional experience.	<b>MM2d.</b> Periodic review by FTA or its agent.
		<b>R2e.</b> The PMOC shall provide FTA with its opinion as to the adequacy and timing of Sponsor's plan for evaluating, monitoring, and updating its Project cost estimate to ensure that the estimate provided to PMOC is internally coordinated and consistent.		<b>Q2e.</b> Professional opinion of the adequacy of Sponsor's internal cost estimate evaluation, monitoring, and updating plan.	<b>M2e.</b> PMOC's review and opinion as to Sponsor's plan for internal evaluation, monitoring, and updating of its cost estimate demonstrates the application of sound management and engineering practices and professional experience.	<b>MM2e.</b> Periodic review by FTA or its agent.



## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
3	The PMOC shall provide FTA with assessments of the consistency of Sponsor's cost estimating process.	<b>R3.</b> The PMOC shall provide FTA with its analysis and opinion as to the consistency of and correlation between estimated quantities and quantities contained in design or contract documents as reflected in Sponsor's cost estimates and the degree to which the cost estimates reflect the scope and schedule contained in design or contract documents.		<b>Q3.</b> Professional opinion of the consistency, thoroughness, and correlation to the current design scope and schedule is included in the Sponsor's cost estimates.	<b>M3.</b> PMOC's review and opinions as to the consistency and correlation of cost estimate quantities with design and contract quantities and the degree to which cost estimates reflect the design and contract scope and schedule reflect the application of sound management and engineering practices and professional experience.	<b>MM3.</b> Periodic review by FTA or its agent.
4	The PMOC shall provide FTA with a written report of its findings, analysis, recommendations and professional opinions.	<b>R4.</b> The PMOC shall present its findings, analysis, recommendations and professional opinions to FTA in a written report and, when so directed by FTA, seek to reconcile its findings with Sponsor to the extent possible. A supplemental report shall be filed describing the results of reconciliation attempts.		<b>Q4.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with the Sponsor to the extent possible.	<b>M4.</b> Review of the PMOC's presentation of findings, analysis, recommendations and professional opinions by the FTA.	<b>MM4.</b> Periodic review by FTA or its agent.

## APPENDIX B

### Sponsor's Memo Regarding Cost Estimating Methods

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The PMOC shall review the Sponsor's memo or report regarding its cost estimating methodologies and approach. The memo should be developed by the Sponsor as part of its alternatives analysis work and updated with each subsequent estimating effort. The memo or report outline should be as follows:

- 1) Introduction to the project;
- 2) Estimating Methodology – Describe the general approach to defining and quantifying the project capital cost estimate;
- 3) Sources of Cost Data – Define the nature and sources for cost data used in the preparation of the estimate;
- 4) Cost Estimating Assumptions:
  - a) Allocated Contingency
  - b) Unallocated Contingency
  - c) Latent (or hidden) Contingency
  - d) Estimating Procedures – If multiple parties are estimating parts of the project, this memo should help to ensure reasonableness and consistency of approach
    - i) Parametric Approach (see Appendix C)
    - ii) Top Down Approach (using peer data, historical database information, etc.; typically used by Sponsors prior to Engineering or for Design-Build contracts)
    - iii) Bottom Up Approach (using built-up quantities and units for labor, material, equipment, and all supporting services or acquisition costs and based upon more defined and educated provisions as developed during the design process; typically used by Sponsors during and at the conclusion of final design for Design-Bid-Build contracts)
    - iv) Facilities (Guideway, Stations, Support Facilities) Costing Procedures for typical vs. non-typical components
    - v) Organization and Management of Cost Data (by segment elements; project-wide elements)
- 5) Estimate Limitations – Describe perceived or known risks, as well as unknowns that could lead to changes in the estimate due to changes in project scope and design standards, schedule, incorrect unit cost or quantity assumptions, and unforeseen problems in implementation;
- 6) Tracking Costs – Describe how capital expenditures in the SCC format will be tracked through design, construction, revenue service, etc. (e.g. provision in Division 1 contract terms and conditions requiring contractor/consultant to submit SCC update with monthly pay application). FTA requires that costs be tracked in the SCC format through construction, into revenue service and through two years post-revenue service to document contract closeout and to establish the “after” point for the Before and After Study.

## APPENDIX C

### Parametric Estimating

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The term “Parametric”, as applied to estimating, denotes determination of the position of the estimate for a new project within the limitations of cost parameters developed by cost experience on similar previous projects. The Department Of Defense (DOD) and [International Society of Parametric Analysts \(ISPA\)](#) defines “parametric estimating” as a technique that “...develops estimates based upon the examination and validation of the relationships which exist between a project's technical, programmatic, and cost characteristics, and the resources consumed during its development, manufacture, maintenance, and/or modification.”

ISPA goes on to note that practitioners use a number of parametric techniques to estimate costs, including cost estimating relationships (CERs) and parametric models. ISPA defines a CER as a mathematical expression, which describes how the values of, or changes in, a “dependent” cost variable are partially determined, or “driven,” by the values of, or changes in, one or more “independent” variables. In practice, CERS are usually derived using a single, independent cost variable. Since a parametric estimating method relies on the value of one or more input variables, or parameters, to estimate the value of another variable, a CER is actually a type of parametric estimating technique.

ISPA defines a cost CER as one in which cost is the dependent variable. In a “cost-to-cost” CER the independent variables are also costs. The cost of one element is used to estimate, or predict, that of another.

In a non-cost-to-cost relationship, the CER uses a characteristic of an item to predict its cost. Examples are CERs that estimate the quantity of revenue vehicles as a function of guideway mileage (independent variable), or the design engineering costs from the number of engineering drawings (independent variable) involved.

## APPENDIX D

### Definitive Project Cost Estimate Review Checklist

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The components of the cost estimate are to be reviewed against these criteria. Structure the review to incorporate as much of this terminology and these concepts as is practical and consistent with Sponsor's project design or construction plan.

Review of Sponsor's cost estimate shall indicate whether:

- Estimate was developed by those with substantial experience in the type of construction under consideration;
- Sufficient judgment was applied to forecast design development, especially during early design stages;
- Evidence exists indicating sufficient collaboration with design team, especially in the application of value engineering;
- Work Breakdown Structure has been formatted to conform to the FTA Standard Cost Categories (SCC).

The PMOC shall further consider the following category-specific items:

- SCC category 10-50: Fixed Construction (guideways, stations, support facilities, site work, systems)
  - Construction Materials
    - Quantities have been calculated with appropriate conservatism to accommodate development to a more advanced stage of design if appropriate
    - Allowances for material quantities have been included for commodities which cannot be fully quantified at the present level of design
    - Unit Prices have been developed using the best available local market information
    - Project sales tax exemption status has been established if appropriate and incorporated in material cost projections
    - Quotes have been obtained for specialty and price-sensitive materials
    - Material cost projections reflect reasonable allowances/provisions for market volatility
  - Construction labor
    - Local wage rates, fringe benefits, and work rules are incorporated and are consistent with federal labor laws (e.g. Davis-Bacon Act)
    - Local payroll taxes and insurance rates are incorporated
    - Holiday / show-up / vacation pay is incorporated
    - Crew productivity is appropriate and conservative for the task under evaluation
    - Availability and variability of utility and railroad outages and "track time" have been incorporated in a conservative manner in determining the crew productivities for impacted work
  - Construction equipment
    - Local equipment rental rates and current fuel costs are incorporated

- Consideration has been given to procuring certain pieces of equipment via a cost/benefit analysis that supports purchasing, rather than leasing
  - Quotes have been obtained for specialty equipment (TBM's, etc.), an appropriate evaluation of market conditions has been incorporated, and currency adjustments as applicable have been made.
- Escalation for Construction Materials, Labor and Equipment
  - Confirm that reasonable escalation rates have been applied to estimates of material, labor and equipment costs to anticipate prices at the time of project bid. Cost escalation can result from increased global or local demand (example is China's construction boom results in high demand for copper, steel, cement), or reduced supply (example is the reduced labor pool in neighboring states when construction workers flocked to New Orleans after Hurricane Katrina).
- Special considerations
  - Utility and Railroad labor, equipment, and overhead rates have been verified and incorporated in third party or "force account" work pricing, as well as local utility/RR work and safety rules
  - Special consideration has been given to support operations and facilities for tunneling operations, facilities to support operations in contaminated/hazardous materials, etc.
- Construction Indirect Costs, Multipliers for Risk etc.
  - Contractor indirect and overhead costs are advanced beyond a percent of the associated construction direct costs and should be analyzed based on field and home office indirect costs such as contract duration, appropriate levels of staffing (including project managers, engineers, safety engineers, schedulers, superintendents, QA/QC engineers, craft general foreman, labor stewards / nonproductive labor, warehousing, project trucking, survey layout, purchasing, timekeeping, etc.), mobilization / demobilization costs, equipment standby / idle time costs, reviewer office / lab / tool facilities, safety equipment, QA/QC testing equipment, temporary utilities (sanitary / power / light / heat), jobsite and public security measures, etc.
  - Appropriate provisions have been included for payment and performance bonds and special insurance requirements (RR protective, pollution liability, etc.).
  - Other construction insurance provisions and/or project-wide coverage (Owner Controlled Insurance Policy) has been included based on quotes from appropriate carriers.
  - Contractor profit / risk costs have been incorporated that reflect the expected level of competition by contract package (higher profit margin where few competitors will bid) and the sharing or assumption of risks by the contracting community as a result of the contract terms and conditions, project scope, and schedule.
- Cat. 60 - Real Estate
  - Provisions for professional services (contracted and in-house legal, appraisal, real estate and relocation consultants) and conservative provisions for property acquisitions, easements, and associated costs for the real estate and relocations have been included. Check that easements, acquisitions, inspections, takings, etc. have been appraised or estimated by qualified professionals familiar with local real estate markets and practices. For projects that involve acquisition of railroad property or property rights, verify that the estimate has been performed by a specialist familiar with these unique transactions. Include reasonable provisions for any market volatility and taxes. The real estate estimate

should also contain an additional allowance above each estimated Fair Market Value (FMV) to reflect settlements and court awards which should be considered inevitable. This allowance should be based on historical data regarding complete acquisition costs on similar projects in the recent past. The cost estimate for real estate should include all of the relevant cost elements identified in OP 23, Appendix C.

- Cat. 70 - Vehicles
  - Costs for professional services (both contracted and in-house) for vehicle design and procurement as well as construction of prototypes and vehicles themselves. Review estimates for current purchase prices for similar vehicles or quoted prices from manufacturers; costs for spare parts and project requirements for non-revenue support vehicles are included. Also, consideration should be given to current market conditions and production schedules due to the relative shortage of vehicle suppliers.
- Cat. 80 - Professional Services
  - Costs both contracted and in-house for all professional, technical and management services related to the design and construction of fixed infrastructure (Cats. 10 - 50) during the engineering, construction, testing, and start-up phases of the project. This includes environmental work; surveying; geotechnical investigations; design; engineering and architectural services; materials and soils testing during construction; specialty services such as safety or security analyses; value engineering, risk assessment, cost estimating, scheduling, Before and After studies, ridership modeling and analyses, auditing, legal services, administration and management, etc. by agency staff or outside consultants. Provisions for professional liability insurance and other non-construction insurance should be included on 80.05.
  - Refer to Sponsor's contracts for services.
  - Confirm that cost estimates are based on realistic levels of staffing for the duration of the project through close-out of construction contracts.
  - Confirm that the Sponsor has developed a staffing plan that properly contemplates the cost of attrition, staffing interruptions, and replacement of key personnel.
  - Confirm that costs for permitting, agency review fees, legal fees, etc. have been included.
- Cat. 90 - Unallocated Contingency
  - Confirm that adequate contingency has been added to the total project cost based on the perceived project risk and the stage of design/construction development.
- Cat. 100 – Finance Charges
  - Confirm that finance charges are included if necessary. Ensure that the Sponsor and FTA's Financial Management Oversight Consultant review the reasonableness of the amount of finance charges.
- Allocated Contingency
  - Confirm that adequate contingency has been allocated to each of the SCC categories based on the perceived risk inherent to each and the stage of project development.
- Inflation
  - Confirm that adequate and reasonable inflation rates have been applied to Base Year project costs to anticipate costs at procurement or bid (through the use of cash flow analysis). The Year of Expenditure costs should be developed thoughtfully. Reference indices that may be useful are the ENR Building Cost Index and Construction Cost Index, some with regional cost databases.

## APPENDIX E

### Body of Report (refer to OP 01 for more information on report requirements)

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#### 1) Executive Summary

- a) The PMOC shall provide an executive summary in three pages or less that includes the following:
  - i) Synthesis of findings as related to the cost estimate;
  - ii) Characterization of significant uncertainties in terms of likelihood (probable, remote, improbable) and their consequence (catastrophic, critical, serious, moderate, marginal);
  - iii) Professional opinion regarding the reliability of the cost estimate;
  - iv) Statement of potential range of cost (lower, upper, and most likely);
  - v) To reduce important uncertainties, recommendations for additional work of any kind including but not limited to investigation, planning or design work by the Sponsor or other party with a schedule for the performance of the work (recommend performance either before or after FTA's decision regarding project advancement or funding.)

#### 2) Introduction

- a) Indicate date of estimate received in original and SCC format
- b) Indicate the level of design completion represented by the cost estimate

#### 3) Methodology – Describe the PMOC's approach to:

- a) Sampling; provide rationale for approach (e.g. higher sample rate for higher cost items, etc.); overall sampling rate of \_\_\_ percent;
- b) Checking costs against scope and schedule;
- c) Identifying allowances;
- d) Identifying patent (exposed) and latent (hidden) contingencies;
- e) Evaluating provisions for escalation and inflation;
- f) Evaluating provisions for risk elements;
- g) Accepting Sponsor cost and other information with/without adjustment;

#### 4) PMOC team review of the various cost and other documents provided by the sponsor following this outline:

- a) Description of the structure, quality, level of detail of the project information (including Sponsor and third party information);
  - i) describe the contract packages and the estimating approach/consistency for each;
  - ii) describe the manner of tying the estimate line items to the FTA Standard Cost Categories (SCC) line items;
- b) Characterization or Stratification of Cost Items

- i) Characterize estimate data into one of three cost item categories or classifications -- Lump Sum, Unit Cost or Cost Estimate Relationship. Organize Sponsor costs in the format shown in Appendix F;
  - ii) Select sample totals based on individual sampling rates for each category;
  - iii) Identify cost items for detailed review based on random selection of individual cost items;
  - iv) Allowances - Evaluate use of allowances for reliability with respect to the scale of the work covered and known project risks.
- c) Mechanical Check of Estimate
  - i) Mathematically sum all lump-sum prices, unit price and quantity calculations, and cost estimating relationships to confirm the sponsor's total cost estimate;
  - ii) Perform a mathematical check of all sampled unit price or quantity calculations;
  - iii) Mathematically check the cross-walk and cost sums from the contract packages to the FTA Standard Cost Categories;
  - iv) Mathematically check all escalation and inflation provisions through a cash flow analysis.
- d) Comparison to Industry Standards
  - i) Review sampled unit prices and quantities for conformance to industry standards, regional variations or other unique characteristics;
  - ii) Check sampled unit costs of similar items used in differing conditions to ensure local conditions and difficulty factors were considered in the individual estimated units;
  - iii) Check sampled quantities to confirm basis of calculations are consistent with design documents and core assumptions.
- e) Correspondence with Scope Review
  - i) Cross check sampled quantity estimates with the project scope contained in the design documents to determine degree of correlation between the design deliverables and the project cost estimate down to the 2nd level WBS;
  - ii) Perform general "Overview" of total estimate to give it a "sanity check" and ensure that all major components appear, conscious of any risk assessments that have occurred;
  - iii) Review sample quantities for reasonableness and to be representative of industry standards and the design scope of work with respect to major components.
- f) Evaluation of Contract Package Elements
  - i) Assess certain contract package elements as to requirements and associated reviewer payments, characterizing elements as:
    - (1) Contract requirements for specific services such as QA/QC and scheduling that would be material elements in the development of bids;
    - (2) Elements of contract language that would reasonably serve as a basis for additional compensation not part of a scheduled payment item;
    - (3) Restrictive schedule or mobilization requirements that would be material pricing elements in developing a bid;



- (4) Geotechnical data and pricing approach to changed conditions;
  - (5) Unit pricing and allowed variability in unit pricing;
  - (6) Risk elements that will be absorbed by the contractor.
- g) Costs associated with General and Supplementary Conditions of the Construction Contract; Division 1 Provisions:
- i) By contract package, evaluate the Sponsor's proposed language and the allocation of scope, schedule and cost risk described therein;
  - ii) For comparison with the Sponsor's estimates, the PMOC is to develop independent cost estimates for General /Supplementary Conditions/ Division 1 for the three largest construction contracts and the systems work;
- h) Contingencies – Present and evaluate cost contingency elements in the Sponsor's cost estimate – patent (exposed) and latent (hidden costs that are functionally equivalent to contingency but not identified). Are the contingency amounts appropriate for the level of risk and stage of design/construction development?
- i) Escalation and Inflation Review
- i) Building up from the second SCC level, evaluate uniformity of application of escalation and inflation factors. Review and evaluate the application of the escalation factors to costs for materials, labor and equipment. Review and evaluate the application of inflation rates to the Base Year dollar costs to arrive at Year of Expenditure dollars. Consider the adequacy and reasonableness of the rates, the soundness of the economic forecasts, and whether the Sponsor has performed any sensitivity analysis to supports its projections;
  - ii) Compare escalation and inflation factors used by sponsor to Producer Price Index data from the Bureau of Labor and Statistics (<http://www.bls.gov>) and other sources such as ENR, AGC, Means, Richardson, etc. to ensure adequate escalation and inflation cost is included to carry the project to the mid-point of construction (the assumed time when contract unit awards will be complete).
- 5) Appendices
- a) PMOC Evaluation Team Member and qualifications
  - b) Other appendices as required

# APPENDIX F

## Exhibit F-1: Project Cost Estimate Classification

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Estimate Classification	Quantity	UM	n	Unit Pricing	n	CER	n	Lump Sum / Allowance	Σ <sub>n</sub>	Total	Percent n	Percent \$
Percent Of Total			88.7%	43.0%	1.4%	22.4%	10.0%	34.6%				
10 GUIDEWAY & TRACK ELEMENTS (route miles)	9.40	RM	258	\$ 73,570,533	4	\$ 38,348,813	29	\$ 59,196,427	291	\$ 171,115,773		
Drawings / Specifications			257	\$ 63,214,438	3	\$ 32,950,675			260	\$ 96,165,113	89.3%	56.2%
Schedule (Includes Escalation)			1	\$ 10,356,094	1	\$ 5,398,138	1	\$ 8,332,735	3	\$ 24,086,968	1.0%	14.1%
Design Report				\$ -		\$ -	28	\$ 50,863,692	28	\$ 50,863,692	9.6%	29.7%
GCs				\$ -				\$ -	-	\$ -	0.0%	0.0%
Percent Of Total			54.3%	28.1%	11.4%	18.0%	34.3%	53.8%				
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)	11.00	EA	19	\$ 7,299,565	4	\$ 4,683,534	12	\$ 13,967,320	35	\$ 25,950,418		
Drawings / Specifications			18	\$ 6,272,000	3	\$ 4,024,229			21	\$ 10,296,229	60.0%	39.7%
Schedule (Includes Escalation)			1	\$ 1,027,565	1	\$ 659,304.4	1	\$ 1,966,190	3	\$ 3,653,059	8.6%	14.1%
Design Report				\$ -		\$ -	11	\$ 12,001,130	11	\$ 12,001,130	31.4%	46.2%
GCs				\$ -				\$ -	-	\$ -	0.0%	0.0%
Percent Of Total			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%				
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	9.40	RM	-	\$ -	-	\$ -	-	\$ -	-	\$ -		
Drawings / Specifications						\$ -			-	\$ -	\$ -	\$ -
Schedule (Includes Escalation)				\$ -		\$ -		\$ -	-	\$ -	\$ -	\$ -
Design Report				\$ -		\$ -		\$ -	-	\$ -	\$ -	\$ -
GCs				\$ -				\$ -	-	\$ -	\$ -	\$ -
Percent Of Total			48.3%	42.1%	32.8%	47.9%	18.9%	10.0%				
40 SITEWORK & SPECIAL CONDITIONS	9.40	RM	115	\$ 34,909,305	78	\$ 39,674,285	45	\$ 8,243,518	238	\$ 82,827,108		
Drawings / Specifications			114	\$ 29,995,357	77	\$ 34,089,602	44	\$ 7,083,134	235	\$ 71,168,093	98.7%	85.9%
Schedule (Includes Escalation)			1	\$ 4,913,948	1	\$ 5,584,682	1	\$ 1,160,385	3	\$ 11,659,015	1.3%	14.1%
Design Report				\$ -					-	\$ -	0.0%	0.0%
GCs				\$ -					-	\$ -	0.0%	0.0%
Percent Of Total			9.8%	9.8%	7.8%	23.2%	82.4%	67.0%				
50 SYSTEMS	9.40	RM	5	\$ 2,459,937	4	\$ 5,847,541	42	\$ 16,888,973	51	\$ 25,196,451		
Drawings / Specifications			4	\$ 2,113,650	-	\$ -	-	\$ -	4	\$ 2,113,650	7.8%	8.4%
Schedule (Includes Escalation)			1	\$ 346,287	1	\$ 823,163	1	\$ 2,377,473	3	\$ 3,546,923	5.9%	14.1%
Design Report				\$ -	3	\$ 5,024,379	41	\$ 14,511,500	44	\$ 19,535,879	86.3%	77.5%

# APPENDIX F

## Exhibit F-1: Project Cost Estimate Classification

DRAFT

GCs				\$ -		\$ -		\$ -	-	\$ -	0.0%	0.0%
Percent Of Total			0.0%	0.0%	50.0%	9.1%	50.0%	90.9%				
60 ROW, LAND, EXISTING IMPROVEMENTS	9.40	RM	-	\$ -	2	\$ 2,107,818	2	\$ 21,078,182	4	\$ 23,186,000		
Drawings / Specifications				\$ -		\$ -		\$ -	-	\$ -	0.0%	0.0%
Schedule (Includes Escalation)				\$ -	1	\$ 107,818	1	\$ 1,078,182	2	\$ 1,186,000	50.0%	5.1%
Design Report				\$ -	1	\$ 2,000,000	1	\$ 20,000,000	2	\$ 22,000,000	50.0%	94.9%
GCs				\$ -		\$ -		\$ -	-	\$ -	0.0%	0.0%
Percent Of Total			0.0%	0.0%	50.0%	9.1%	50.0%	90.9%				
70 VEHICLES (number)	30.00	A	-	\$ -	2	\$ 1,475,182	2	\$ 14,751,818	4	\$ 16,227,000		
Drawings / Specifications				\$ -		\$ -		\$ -	-	\$ -	0.0%	0.0%
Schedule (Includes Escalation)				\$ -	1	\$ 224,182	1	\$ 2,241,818	2	\$ 2,466,000	50.0%	15.2%
Design Report			-	\$ -	1	\$ 1,251,000	1	\$ 12,510,000	2	\$ 13,761,000	50.0%	84.8%
GCs				\$ -		\$ -		\$ -	-	\$ -	0.0%	0.0%
Percent Of Total			0.0%	0.0%	80.0%	89.3%	20.0%	10.7%				
80 PROFESSIONAL SERVICES	9.40	RM	-	\$ -	8	\$ 72,996,814	2	\$ 8,779,666	10	\$ 81,776,479		
Drawings / Specifications				\$ -		\$ -			-	\$ -	0.0%	0.0%
Schedule (Includes Escalation)				\$ -	1	\$ 6,482,377	1	\$ 779,666	2	\$ 7,262,043	20.0%	8.9%
Design Report			-	\$ -	7	\$ 66,514,437	1	\$ 8,000,000	8	\$ 74,514,437	80.0%	91.1%
GCs				\$ -		\$ -			-	\$ -	0.0%	0.0%
90 UNALLOCATED CONTINGENCY			-	\$ -	2	\$ 21,342,960	-	\$ -	2	\$ 21,342,960		
Drawings / Specifications									-	\$ -	0.0%	0.0%
Schedule (Includes Escalation)					1	\$ 2,721,995			1	\$ 2,721,995	50.0%	12.8%
Design Report					1	\$ 18,620,965			1	\$ 18,620,965	50.0%	87.2%
GCs									-	\$ -	0.0%	0.0%
100 FINANCE CHARGES			-	\$ -	-	\$ -	-	\$ -	-	\$ -		
Drawings / Specifications									-	\$ -		
Schedule (Includes Escalation)									-	\$ -		
Design Report									-	\$ -		
GCs									-	\$ -		
Percent Of Total			62.5%	26.4%	16.4%	41.7%	21.1%	31.9%				
Grand Totals	9.40	RM	397	\$118,239,340	104	\$186,476,946	134	\$142,905,904	635	\$447,622,189		



## **Oversight Procedure 34 -Project Schedule Review**

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### **1.0 PURPOSE**

This Oversight Procedure describes the review, analysis, recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) with regard to the completeness and reliability of the Sponsor's project schedule; to assess its usefulness as a management tool; to assess the extent to which the project schedule reflects the project scope, cost, management practices and method of project delivery.

### **2.0 BACKGROUND**

Competent schedule management is necessary for sound project planning and control of time, costs and risks. Congress and FTA's good stewardship require that a Sponsor's schedule be reliable. During Project Development (PD) and prior to entry to Engineering and Full Funding Grant Agreement (FFGA) or Small Starts Grant Agreement (SSGA), as well as at other points in project development, when requested by FTA, a thorough evaluation of the scope, schedule and cost is performed to confirm the schedule reliability.

### **3.0 OBJECTIVES**

FTA's objective is to determine whether the Sponsor's schedule management and project schedule are sufficient to plan and control the project time at the programmatic and contract level and complement the management of scope, cost and risk. This project is applicable to Design-Bid-Build, Design-Build and other delivery methods.

### **4.0 REFERENCES**

The statutes, regulations, policies, guidance documents and circulars in OP01 are the principal, but by no means the only, references to Federal legislation, regulation and guidance with which the PMOC should review and develop a solid understanding as related to the Sponsor's project work being reviewed under this OP. The Sponsor's schedule should conform to industry standards as published by leading project management and control organizations. In addition, the schedule management and project control reviews must be coordinated with:

- OP32C – Project Scope Review
- OP33 – Capital Cost Estimate Review
- OP40a/b/c – Risk and Contingency Review

## 5.0 SPONSOR SUBMITTALS

In advance of performing the review, the PMOC shall meet with the Sponsor and its staff and consultants, discuss the purpose of the review, and obtain information as required, including but not limited to:

- Basis of Schedule (see sample in Appendix B below);
- Description of the project control organization, schedule development, and control process and procedures;
- CPM specifications or contractual requirements (if available)
- Latest schedules in electronic format – both PDF and native scheduling software;
- Supporting scope and cost information.

## 6.0 SCOPE OF WORK

This Review may be performed during project planning, design or construction. The work order may specify the extent of the review, add re-assessments or specialized analyses. The PMOC schedule reviews will occur at the following stages:

**Reviews during Project Development (PD):** A comprehensive project schedule should be developed during PD, including activities associated with the project's proposed delivery program. An overall project schedule, including the anticipated timeline for completing the required project development work within the two year timeframe specified in MAP-21, should be in place when a project enters PD. The PMOC should review the project schedule and the Sponsor's schedule staffing, capabilities and processes. OP51, Appendix B, Section 5 provides criteria for evaluating the completeness, level of detail and reasonableness of the project schedule at Entry into Engineering.

**Entry into Engineering:** Preparation of an appropriate Integrated Baseline Schedule showing critical project activities, logic flow and durations, including identification of third party, utility and critical ROW agreements. The Checklist contained in OP-51, Section 5.0, provides the criteria for evaluation of completeness, level of detail and reasonableness of the project schedule and schedule related items. Section 2.4 of the checklist addresses the need for Schedule Control Procedures as part of the Sponsor's Project Management Plan.

**Reviews during Engineering:** Upon Entry into Engineering, the PMOC updates the schedule review. If requested by the FTA, the PMOC conducts a risk assessment. This review could be used to award a Letter of No Prejudice (LONP), a Letter of Intent (LOI) or an Early Systems Work Agreement (ESWA) or commitment of the Federal share.

**Review for Award of FFGA/SSGA:** The FTA may request that the PMOC update or refresh its Schedule review (in addition to project scope, cost and risk) as part of the evaluation of the Sponsor's readiness to receive an FFGA/SSGA. The PMOC's review for an FFGA/SSGA must be commensurate with the Sponsor's documents available at the time. The review includes an evaluation of the suitability of the project documents to the Sponsor's project execution and contracting strategy, whether design-bid-build, design-build or other FTA acceptable process.

**Reviews during Construction:** The FTA may request that the PMOC monitor the Sponsor's compliance with schedule elements of the PMP and its subplans during construction, monitor for risks to the schedule, including float levels, and monitor the Sponsor's organization for appropriate scheduling capacity and capability.

The PMOC shall assess and evaluate the Sponsor's schedule and its plan for schedule control. Consider the adequacy of the Sponsor's project control staff, systems and software for the size and complexity of the project. Validate the usefulness of the schedule as a project management tool, consider the level of definition of the schedule and elements within the schedule for appropriateness to the project phase; identify schedule uncertainties, and issues with the project schedule mechanical soundness, and fundamental and reasonable soundness.

The PMOC shall review the Sponsor's schedule control including internal procedures and schedule reviews. Consider the timing and adequacy of such reviews to determine if the schedule is sufficiently developed, properly maintained, and consistent with the progress of the project. Review the Sponsor's processes and procedures for developing, monitoring and changing the schedule, including approvals if a significant change in the Revenue Service Date is required. The PMOC should additionally determine if the Sponsor has a formalized Configuration Management process that controls baseline schedule and any re-baselining controls for schedule revisions.

The PMOC shall provide recommendations to improve the development and implementation of schedule management and proactively help the Sponsor solve schedule problems. In a report, the PMOC shall document its findings, professional opinions and recommendations.

The PMOC shall:

1. Evaluate the Sponsor's development and implementation of the following schedule management components:
  - a. Project Control Organizational Structure (Capacity and Capability) – Includes the Sponsor's staff combined with the potential blending of other consultant project controls staff for all project phases
  - b. Project control systems, tools and software used
  - c. Review of project control plans, procedures, and schedule management contractual requirements
  - d. Review of the work breakdown structure (WBS) to assure all critical project scope components are included in the WBS.
2. Conduct a Technical Schedule Review
  - a. Assure consistency with scope and WBS
  - b. Soundness Check: Mechanically Correct and Fundamentally and Reasonably Sound
    - i. WBS properly structured and consistent with scope and cost
    - ii. Proper calendars are incorporated into the schedule
    - iii. Complete list of activities which captures the scope
    - iv. Proper durations applied to activities, along with their proper calendars
    - v. Complete logic network developed, including proper logic ties, minimal use of lags

- vi. Float values and late start and finish dates are reasonable and make intuitive sense
- vii. Critical path is identifiable, logical and reasonable
- viii. Secondary critical paths are identifiable, logical and reasonable
- ix. Costs are applied to the schedule, incorporating the SCC cost accounts

3. Readiness to conduct OP 40 Schedule Risk Analysis check – (if applicable)

The PMOC shall provide a written comparison of the proposed schedule with similar project(s) and analyze the differences. The PMOC shall draw conclusions and provide recommendations based on this comparison.

## 6.1 Schedule Management Review

**Organization** – The PMOC shall review the Sponsor’s organization chart and personnel with reference to Section 3 of the Checklist found in OP-51. Within this organization should be a project controls department which includes coordinated management of primary project control functions such as budget/funds management, cost estimating, cost control, document management, risk management, and change control (configuration management). The review should concentrate on the current schedule management organization and how it functions with project control positions within the engineering, real estate acquisition and relocation, program and construction and management consultant teams.

- a. **Project Management Capacity and Capability** – Has the project controls staff demonstrated the Capacity and Capability during the project schedule development and implementation? How will the project scheduling staff blend in with the engineering and construction management organization and staffing? Does the Sponsor’s scheduling team have the experience and qualifications to manage the proposed program?

**Systems, Tools and Software** –The PMOC shall review the Project Sponsor’s project-control systems (PCS) with reference to Sections 2.4 and 5.7 of the OP-51 Checklist, including the use of tools, risk analysis and scheduling software suitable for the Project scope, magnitude and complexity. The Sponsor must be able to demonstrate successful development and implementation of their systems, tools and software and also describe how their system will be shared with other primary team members and consultants on the Project.

- a. **Schedule Format:** Is the schedule format consistent with relevant, identifiable industry or engineering practices?
- b. Does the Sponsor’s project scheduling software and IT infrastructure have the capabilities and scalability to manage the project and the consultants, suppliers and contractors?
- c. Describe the control methods used by the Sponsor
- d. Are the Sponsor schedule update procedures during Project Development, Engineering, and Construction phases commensurate with the challenges of the project?
- e. Describe how the Sponsor incorporates change control (scope, schedule and budget) into the schedule management process.
- f. Has the Sponsor incorporated claims avoidance techniques into their schedule management process? How have they developed a dispute resolution, peer review or change control board, time impact analysis or claims mitigation processes?

Project Control Plans, Procedures, and Contractual Requirements – The Sponsor should develop and implement the necessary plans and procedures which describe how their PCS, tools and software are to be used during the Project including performance measurement, reporting and control measures. The Sponsor must develop CPM Schedule specifications, General Requirements and Special Provisions in coordination with its own PCS, which address the schedule management standards and requirements necessary to develop “contract” schedules required of major suppliers and vendors (rolling stock and fare collection), engineering consultants, and construction contractors.

## **6.2 Technical Review**

The schedule shall be sufficiently developed in detail to determine the validity of the project critical path to revenue service. The project schedule level of detail should be commensurate with the level of detail depicted in the current project phase scoping documents and drawings. Likewise the Schedule Review effort should also be commensurate with the current project phase and schedule level of detail. Project schedules developed during the Project Development and Engineering may contain summary level representation for long lead procurement items, bid and award, construction and systems integration, startup and testing, and contract closeout tasks and therefore some of the Schedule Review topics below may not be applicable as noted.

The following section describes the expected project schedule level of detail as it evolves through each of the following project phases under the standard Design-Bid-Build project execution process.

- **Project Development Phase**  
The schedule must have detail entitlement, planning and environmental tasks associated with the NEPA process, public involvement, FTA requirements and roadmap to support Sponsor request to enter the Engineering phase. The schedule should include appropriate detail for Engineering phase tasks and milestones but use summary tasks that include phasing and contract packaging for subsequent construction phase work. This criteria applies to Design-Bid-Build, Design-Build or other project delivery method. The Basis of Schedule should clearly document all schedule assumptions.
- **Engineering Phase**  
Continuation of planning phase tasks plus Engineering phase tasks, value engineering, third party agreements, utility provider coordination, initial development of real estate acquisition planning, permits, agreements and approvals, FTA requirements and roadmap to support Sponsor request to enter the Full Funding Grant Agreement Phase. Engineering, procurement, bid and award, construction, system integration and startup and testing, and contract closeout tasks are summary in nature but with enough detail to identify interface points among tasks and phases, with justification for estimated durations and sequences. The Basis of Schedule should clearly document all schedule assumptions and increase in detail and succinctly match the assumptions indicated in the Basis of Estimate for the project budget.
- **Full Funding Grant Agreement or Small Starts Grant Agreement**



Continuation of Engineering phase tasks plus construction phase, long-lead procurement items, contract packaging strategies, contract delivery method strategies (DB, DBOM, DBB), safety and security, risk assessment tasks, PMP and sub-plan development and review, and other FTA requirements to support FFGA/SSGA application and entry into construction, Design-Build, and or LONP requests. The Sponsor's schedule should also include expanded detail on third party agreements, real estate acquisition activities, utility relocations, permits, and other agreements and approvals.

For the balance of the work, the schedule should include the following major characteristics, no matter the Sponsor's procurement strategy:

Pre-Award Authority and Procurement of Long lead Material and Equipment-

Expanded activity logic and detail for procurement items, bid and award, proposed construction contract tasks should include the optimization of crew efficiencies and economies of scale in accordance to the assumptions documented in the Basis of Estimate and Basis of Schedule. Proposed construction tasks should also include major summary for systems integration including traction power, train control, communications, fare collection, vehicle acceptance and testing, commissioning of facilities, startup and testing, and pre-revenue service operations and training.

Bid and Award

Includes representative tasks representing applicable contract delivery methods (DB, DBB, DBOM, etc.) chosen for professional services, material and equipment procurements, and construction contracting, startup and testing, and operation and maintenance (DBOM) if applicable.

Construction, Startup & Testing

At a minimum these tasks should represent the project contract packaging plan, contract delivery methods, and contract interface points for construction and startup and testing activities. Schedule detail can be summary in nature during the Engineering phase but must be more detailed during the final design phase for DBB, and very detailed for DB contract delivery methods.

Contract Closeout

The project schedule should include summary tasks that adequately represent contract closeout activity for tasks such as administrative closeout activities for all contracts, closeout and storage of all records, and transfer of warranties, manuals, and training.

The Technical Review should be conducted in sequence with the Mechanical Soundness check and the Fundamental and Reasonable Soundness check. Note the technical review level of effort should be commensurate with the current project phase in which the project schedule is developed as some review topics (construction related) may not yet be applicable.

1. Mechanical Soundness Check

- a. Review Basis of Schedule documentation and verify adequate documentation of all assumptions used to develop the project schedule including justification of work periods and shifts, contract packaging and contract delivery methods, economies of scale, production factors and contingencies used to justify all activity durations.
  - b. Schedule Breakdown Structure (SBS) – A taxonomic description of the Master Program Schedule and all of the sub-tier schedules that comprise or roll-up to the Master Program Schedule. Such schedules may include real estate acquisition, procurement, General Engineering Consultant (GEC) schedules, PM/CM schedules, CE&I schedules, rolling stock manufacturing and fare collection vendor schedules, and construction contractor schedules.
  - c. Hierarchical Structure – Describe how the Project Work Breakdown Structure (WBS), activity coding, and sequence of project phasing. Describe how the project phasing and components can be organized, sorted by level of detail using the file layout structure, hammocks or level of effort tasks.
  - d. Standard Cost Codes (SCC) – Review the schedule to ensure that it can be grouped and summarized according to SCC codes.
  - e. Calendars – Explain the schedule calendars and how they are applied to work tasks. Are calendars appropriately defined and utilized; including allowances for seasonal weather variations? Refer to Exhibit C “Example Calendar Description”.
  - f. Resource Loading – Characterize the extent to which the schedule has been resource loaded?
    - i. Do quantities and costs as defined in the cost estimate match the resource/costs assigned to the activities in the schedule?
    - ii. Explain the application of material, equipment and labor resource allocation applied to schedule tasks.
    - iii. Have labor and material availability been factored into construction durations?
  - g. Cost Loading – Characterize the extent to which the schedule has been cost loaded?
    - i. Do contract and project component subtotal amount match project budget estimate subcomponents and total?
    - ii. Can the schedule cost code structure be organized and sorted into SCC and proposed contractor progress payment line items?
    - iii. Describe how the Sponsor will use cost loading the project execution phase.
  - h. Software Settings – The Sponsor procedures and contractual requirements must address which scheduling software settings shall be used for all scheduling parties as a claims avoidance technique and schedule management standardization best practice.
  - i. Schedule File Log – Is the schedule mechanically correct and complete, free of material inaccuracies or incomplete information? Generate and review a Schedule File Log within the scheduling software as a quality control check to verify use of milestones and constraints, errors and warnings within schedule logic and activity relationship connections, existence of open-ended activities, poor schedule maintenance, and out-of-sequence progressing for progress update schedules.
  - j. Critical Path – A review check to verify the existence of a discernible critical path extending completely from the start to completion activities. The critical path analysis is performed during the fundamental soundness step below.
2. Fundamental and Reasonable Soundness Check
- a. Characterize the schedule quality and detail.

- b. Does the schedule adequately represent the project scope of work including the approved environmental documents?
- c. Is the schedule sufficiently developed to determine the validity, stability and reasonableness of the critical path? Are near critical paths easily identifiable and reasonable in terms of their logic and proximity to the critical path?
- d. Durations –
  - i. Review and evaluate the justification of schedule activity durations contained in the Basis of Schedule; are the activity original durations reasonable, given quantities of work, local conditions, available resources and realistic and achievable expectations?
  - ii. Does the schedule include adequate time and appropriate sequencing for:
    - 1. FTA review and approval cycles for:
      - a. Environmental documents?
      - b. Request to Enter Engineering?
      - c. FFGA/SSGA Application and execution?
      - d. Potential LONP requests?
      - e. Risk Assessments?
      - f. PMP and sub-plan reviews?
      - g. Reviews by applicable local, state and federal jurisdictions and third parties?
    - 2. Agreements associated with real estate acquisition, utility providers, railroad operators, and other interagency agreements?
    - 3. Funding time frames and/or milestones for FTA and non-FTA sources?
  - iii. How were the durations determined? Does the Basis of Schedule indicate what percent of each activity's duration contains built-in patent contingency?
  - iv. Are the activity durations overly optimistic, aggressive or conservative?
  - v. Are durations sufficient during Project Development and the Engineering phases and continuing into subsequent design phases?
  - vi. Are durations sufficient for professional services, material and equipment procurement, and construction contractor procurements (DB, DBB, DBOM, etc.)?
  - vii. For summary schedules typically developed prior to the Engineering phase, are phase durations reasonable and adequately justified with supportable backup documentation?
  - viii. For Engineering phase schedules containing detailed construction tasks: did the Sponsor develop contract time determination (CTD) schedules in order to derive contract durations for incorporation into contractual documents?
- e. Schedule Sequencing:
  - i. Does the schedule follow an expected work sequence and tasks are logically sequenced?
  - ii. Does the sequence include consideration for opportunities to optimize economies of scale, maximize crew production, optimize equipment utilization, and perform concurrent work activity?
  - iii. Can similar work activity be accomplished with available labor and materials?
  - iv. Does sequencing account for temporary construction, site access and logistics, and physical construction constraints?

- v. Is real estate acquisition properly incorporated into Engineering activities and connected to phase construction segments, contracts or relevant contract package phasing in order to efficiently use resources?
- vi. Are long-lead material and equipment procurement adequately represented?
- vii. Is the use of constraints justified and reasonable? (The use of constraints should be kept to a minimum and should be completely removed when the schedule is used to conduct a schedule risk analysis).
- viii. Does the critical path run through a logical and reasonable sequence of activities?
- ix. Are the major milestones achievable and logically sequenced?
- f. Schedule Contingency: Explain the exposed and hidden (patent and latent) contingency in the schedule and how well it is documented in the Basis of Schedule.
  - i. Describe the PMOC's approach to identifying latent contingency if the Sponsor did not properly document their assumptions in the Basis of Schedule.
  - ii. Do built-in contingencies allow for potential delays; including interagency work; utility relocation, civil, architectural, and systems work's Sponsor operations and maintenance mobilization; and integrated pre-revenue testing?

### 3. Schedule Contingency

Per the requirements of *Schedule Contingency Analysis and Recommendation* section of OP40b, perform a review of the schedule contingency to ensure that appropriate hold points are included, sufficient contingency time is in the schedule commensurate with the stage of project development, a draw-down curve has been prepared using both forward pass and step-back analysis as defined in the *Schedule Contingency Draw-down Curve* section of OP 40b. Also, refer to the requirements of OP40a, Appendix G Risk and Contingency Management Plan Structure, Schedule Contingency Management Plan to ensure that the schedule itself is fully coordinate with the Sponsor's plan.

### 4. Readiness to perform OP 40 Schedule Risk Analysis

During the project, the FTA may direct the PMOC to conduct/refresh an OP 40 Risk Assessment. The risk assessment includes a cost and schedule risk analysis as described in OP40a, OP40b and OP40c. In order to perform a schedule risk analysis the project schedule must first be reviewed or characterized (OP 34) and adjustments must be made if so determined by the PMOC. Most importantly, similar to the project budget estimate, the project schedule must be completely stripped of all contingencies (patent and latent). Secondly, the project schedule must be stripped of all constraint dates and types.

1. Once all contingencies have been identified and documented during the Technical Review, all contingencies must be removed from the project schedule.
2. Once all constraints are identified and documented during the Technical Review, all constraint must be removed from the project schedule.

The removal of contingency and constraints can be performed on the project schedule or by using a separate copy of the project schedule in order to maintain the original project schedule.

## 7.0 REPORT, PRESENTATION, RECONCILIATION

The PMOC shall provide FTA with a written report of its findings, analysis, recommendations, and professional opinions, including a description of the review activities undertaken, as well as supporting diagrams, calculations, etc.

After FTA approval, the PMOC may share the report with the Sponsor. In the event that differences of opinion exist between the PMOC and the Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile with the Sponsor and provide FTA with a report addendum covering the agreed modifications by the Sponsor and PMOC.

The report formatting requirements of OP 01 apply. When necessary, PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may add other software as required but documentation and report data shall be made available to FTA.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1	The PMOC shall validate the usefulness of the project schedule as a project management tool.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of a Sponsor's project schedule.		<b>Q1a.</b> Process exists and has been followed.	<b>M1a.</b> Evidence of a documented process.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process and project management judgment to validate the usefulness of project schedule		<b>Q1b.</b> Assessment must be made.	<b>M1b.</b> Documented assessment of the project schedule as a useful project management tool.	<b>MM1b.</b> Periodic review by FTA or its agent.
2	FTA and the PMOC shall have full understanding of the Sponsor's project schedule, including its critical path, durations, and logic, fit with proposed project scope and cost, fit with review periods and funding milestones.	<b>R2a.</b> The PMOC shall provide FTA with its opinion as to the completeness and level of detail of the schedule relative to the project phase.		<b>Q2a.</b> Professional opinion that the schedule is complete and the level of detail is appropriate for the stage of the project.	<b>M2a.</b> Documented evidence of a thorough review by PMOC for completeness and level of detail of the schedule, supported by professional opinion.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall provide FTA with an opinion as to the reasonableness of assigned activity durations.		<b>Q2b.</b> Professional opinion of the reasonableness of assigned activity durations.	<b>M2b.</b> Documented evidence of a thorough review of assigned activity durations for reasonableness by PMOC, supported by professional opinion.	<b>MM2b.</b> Periodic review by FTA or its agent.
		<b>R2c.</b> The PMOC shall provide FTA with an opinion as to the reasonableness of the critical path, logic and construction sequencing applied.		<b>Q2c.</b> Professional opinion of the reasonableness of logic, sequencing and critical path.	<b>M2c.</b> Documented evidence of a thorough review of the reasonableness of the critical path, logic and construction sequencing applied by PMOC, supported by professional opinion.	<b>MM2c.</b> Periodic review by FTA or its agent.
		<b>R2d.</b> The PMOC shall review and provide FTA with an opinion as to Sponsor's schedule control process, procedures and reviews and Sponsor's process for monitoring and making necessary schedule changes, including approvals, where a change in ROD is evident.		<b>Q2c.</b> Professional opinion of Sponsor's schedule control and schedule revision process.	<b>M2c.</b> Documented evidence of a thorough review of Sponsor's schedule control and schedule revision process, supported by professional opinion.	<b>MM2c.</b> Periodic review by FTA or its agent.
3	The PMOC shall identify risks and potential impacts in its reports to the FTA.	<b>R3.</b> The PMOC shall clearly identify potential risks and render its professional opinion on their potential impacts on the scope, cost, and schedule of the Project.		<b>Q3b.</b> Minimum of 90% of identifiable risks are documented.	<b>M3.</b> Identified risks and potential project impacts on project scope, cost, and schedule.	<b>MM3b.</b> Periodic review by FTA or its agent.
4	The PMOC shall document its findings, professional opinions, and recommendations in a report to the FTA.	<b>R4.</b> The PMOC shall present its findings, conclusions, and recommendations to FTA and reconcile other reports and those recommendations with the Sponsor to the extent possible.		<b>Q4.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with Sponsor to the extent possible.	<b>M4.</b> PMOC's findings, conclusions, recommendations, and presentation.	<b>MM4.</b> Periodic review by FTA or its agent.

## APPENDIX B

**Sample Format – Basis of Schedule** (These should be tailored to the project; items shown below are for example)

SCHEDULE ASSUMPTIONS	DURATIONS
1. Request for entry to Project Development	
NEPA	
Design Package, Cost Estimate, Schedule	
PMP and all sub-plans	
Readiness Review	
Financial Review	
DEIS Approval	
FEIS Record of Decision	
Agency request ___ months from completion of ___% design to 1st submittal to FTA	
FTA review and approval of final EIS for publication estimated at ___ months	
Publish date to issuance of ROD set at ___ calendar days	
Engineering phase Value Engineering when applicable (within ___ months of start of Engineering)	
2. Engineering <sup>1</sup>	
If Design-Bid-Build:	
Engineering consultant packaging and procurement	
Engineering to 30% and required reviews and approvals	
Engineering to 60% and required reviews and approvals	
Engineering to 90% and required reviews and approvals	
Engineering to 100% and required reviews and approvals	
If Design-Build (or other alternate delivery method)	
Engineering to Basis of Design / Build requirement and required reviews and approvals	
Engineering and procurement of Owner Furnished Equipment and Systems	
Permits and regulatory reviews and approvals	
Design Package, Cost Estimate, Schedule	
Value Engineering when applicable	
PMP and all sub-plans	
Risk Assessment (___ month duration)	
To meet schedule Risk Assess shown as overlapping completion of Engineering by ___ weeks	
Inter-governmental and Third-Party Agreements	
Real Estate Acquisition	
Utility work	
Construction packages	
Delivery methods	
Readiness Review	
Financial Capacity Assessment (by FMO)	
FTA approval to enter Full Funding Grant Agreement (___ month duration)	
Submittal of FGFA application concurrent with latest of completion of VE, Risk and ROD	
FFGA/SSGA Approval by FTA shown at ___ months after submittal of application	
3. Construction Phase Procurement to Notice to Proceed <sup>2</sup>	
Permitting and regulatory approvals (including seasonal windows)	
Bid and award processes	
Construction Package with Cost Estimate and Schedule	
FFGA/SSGA Award	

<sup>1</sup> Upon FTA's approval to enter Engineering, pre-award authority is extended to project Sponsors to incur costs for engineering work.

<sup>2</sup> FTA's FFGA /SSGA approval can occur either during final design or afterward, depending on the Sponsor's contract execution strategy, but is necessary to incur costs for construction and utility relocations.

## APPENDIX B

**Sample Format – Basis of Schedule** (These should be tailored to the project; items shown below are for example)

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Utility Relocation and Real Estate Acquisition Plans Finalized	
LONP <sup>3</sup>	
Completion of 100 percent bid documents	
4. Bid and Award of Construction Packages	
Bid package A, B, C, etc.	
Prepare bid documents, issue bid documents	
RFP and negotiations concurrent with FTA review of FFGA/SSGA application	
5. Construction	
Construction Section A ( __ month duration)	
Construction Section B ( __ month duration)	
Systems ( __ month duration)	
Systems for Section A finishes __ months after _____	
Station Structure Architecture, Mechanical, Electrical, Plumbing, Signage ( __ month duration)	
Completes __ after Section A	
Safety Certification and Integrated Testing ( __ month duration)	
Completes ____ after Section A	
6. Start-up/Operator Training/Simulated Revenue	
7. Opening / Revenue Service Date	

Refer to OP50 Appendix C and OP51 Appendix C for Expected Attributes

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<sup>3</sup> A Letter of No Prejudice (LONP) is an authorization by FTA that allows Sponsors to incur costs for certain specified project activities without losing eligibility for future FTA grant assistance. The Sponsor must meet all Federal requirements prior to incurring costs covered by the specific LONP in order to be reimbursed if and when FTA awards the project a construction grant agreement. LONP is a discretionary form of pre-award authority, in other words, it can apply to project activities that are not covered by automatic pre-award authority.



## APPENDIX C

### Sample Calendar Description and List

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There are two predominant calendars in use. The majority of the physical construction activities are based on a five day work week with non-work days for holidays and weather delays. The design and other activities are on a calendar that is based on a five day work week with non-work days for holidays. Additional calendars are used in the schedule for other specific types of activities. Following is a listing of all the calendars and the activity usage of each:

<b>Calendar Name</b>	<b>Number of Activities Assigned</b>	<b>Number of Activities on Critical Path/ Total Duration</b>	<b>Number of non-critical activities with less than 30 days contingency /avg. contingency</b>
Const. 5 Day w/Union Holiday & 30 weather days	2649 activities		
Engineering/Procurement/Permit Calendar	1555 activities		
DTP/DTE Business Days	446 activities		
Standard 5 Day Work week	100 activities		
Winter Outage Calendar w/30 weather days	21 activities		
5-Day Week, 2-shift	10 tunneling activities		
7-day workweek Test/Commission ...Yard Modification Pre-Revenue Service Start Revenue Service	9 activities		
54 hour Outage calendar	5 activities		
Weekend Outage Calendar w/30 weather days	4 activities		
NATM Tunneling w/Union Holiday & 30 weather days	2 activities		
TOTAL	4801 activities		



## Oversight Procedure 36 - Buy America Compliance Review

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### 1.0 Purpose

The purpose of this Oversight Procedure (OP) is to describe the review, analysis, and recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) with regards to the Project Sponsor's compliance with Buy America requirements for procurements in excess of \$150,000 (2 CFR §200.88). These procurements are for **“all iron, steel, and manufactured products used in the project”**.<sup>1</sup> The instructions in this OP subordinate to the regulations in 49 CFR 661 - Buy America Requirements and 49 CFR 663 - Pre-Award and Post-Delivery Audits of Rolling Stock Purchases.

### 2.0 BACKGROUND

#### 2.1 Overview

A number of public transit agencies have experienced difficulties in understanding the nuances and complexity of FTA's Buy America Requirements (which are unrelated to the Buy American Act of 1933, which governs direct Federal procurements). FTA's Buy America requirements specifically apply to third-party procurements by state and local governments using FTA funds.

The first Buy America provision was included in the Surface Transportation Assistance Act of 1978. Currently codified at 49 U.S.C. 5323(j), this provision prohibits FTA from obligating funds for a project unless the steel, iron, and manufactured products used in the project are produced in the United States.<sup>2</sup> For steel and iron end products to be considered produced in the United States, all manufacturing processes must take place in the United States, except metallurgical processes involving refinement of steel additives.<sup>3</sup>

For manufactured products to be considered “manufactured” in the United States, all of the manufacturing processes must take place in the United States, and the components of the product must be of U.S. origin (a component is considered of U.S. origin if it is manufactured in the United States, regardless of the origin of its subcomponents).<sup>4</sup>

For buses, railcars, and other rolling stock (including train control, communication, and traction power equipment), at least 60% of the components, calculated by cost, must be produced in the United States and final assembly must take place in the United States.

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<sup>1</sup> 49 CFR § 661.5.(a)

<sup>2</sup> 49 U.S.C. Section 5323(j)(2)(C)

<sup>3</sup> 49 CFR 661.5(b)

<sup>4</sup> 49 CFR 661.5(c)

## 2.2 Buy America Requirements for Revenue Service Rolling Stock

In addition to the requirements outlined above, a recipient purchasing rolling stock to carry passengers in revenue service must ensure that a pre-award audit as described in 49 CFR 663.21 is complete before the recipient enters into a formal contract for the purchase of rolling stock. Similarly, recipients purchasing revenue service rolling stock must also ensure that a post-delivery audit as prescribed in 49 CFR 663.31 is complete before the title to the rolling stock is transferred to the recipient.

## 3.0 OBJECTIVES

The primary objective of this procedure is to provide clear, consistent instructions to PMOCs engaged in overseeing Project Sponsor's compliance with Buy America requirements by verifying that:

- The grantee has and continues to “**adhere to the Buy America clause set forth in its grant contract with FTA**” in accordance with 49 CFR § 661.13.(a),
- The grantee has included “**in its bid or request for proposal specification for procurement within the scope of this part an appropriate notice of the Buy America provision, and that such specifications shall require, as a condition of responsiveness, that the bidder or offeror submit with the bid or offer a completed**” **Certificate of Compliance with Buy America Requirements** (49 CFR § 661.6) in accordance with 49 CFR § 661.13.(b),
- The grantee has confirmed and verified that all bidders and offerors meet the requirements of their original **Certificate of Compliance with Buy America Requirements** or their **Certificate of Compliance with Buy America Requirements** submitted with its final offer and are not permitted to change their certification after bid opening or submission of a final offer in accordance with 49 CFR § 661.13.(c),
- The grantee has procedures and processes in place to verify Buy America Compliance for manufactured products **prior to delivery, installation, and payment to the Contractor**,
- Each bidder or offeror has submitted with bids or offers a completed Buy America certificate, and,
- During the manufacturing process, each bidder or offeror has complied with the applicable Buy America requirements.

When reviewing the Project Sponsor's Buy America Audit, the objective is to confirm the Project Sponsor's investigation and approval of the Manufacturer's report of their plan for production of the rolling stock and the compliance with the regulations of that plan.

This procedure provides PMOCs with direction regarding how to perform the following:

- 1) Review to ensure that Project Sponsor has all necessary Buy America and related certifications, as they relate to the procurement of all iron, steel, and manufactured products used in the project ;
- 2) Review and make an assessment of manufacturer's data including Project Sponsor's efforts to identify component and sub-component values;
- 3) Determine manufacturer's compliance of the requirements for final assembly in the United States;

- 4) Identify if the Project Sponsor agreed or disagreed with the manufacturer's reporting of components including where they are manufactured and the origin of all of the sub-components;
- 5) Identify if the Project Sponsor investigated any component that is inconsistent with the components listed in Appendix B to Sec. 661.11 for buses and 49 CFR section 661.11, Appendix C for rail rolling stock;
- 6) As requested, monitor Buy America and related provisions beginning with the Final Design or at a Letter of No Prejudice (LONP) and before vehicles are delivered and placed into revenue service;
- 7) Check Project Sponsor's and manufacturer's files and records, when needed, to assure early detection of any deficiencies in Buy America regulations compliance;
- 8) Ensure timely intervention when there are indications that Buy America might not be met or the Project Sponsor's audit is inadequate;
- 9) Guide Project Sponsors to the regulations when manufacturers are found to be deficient in Buy America or other related requirements;
- 10) Visit the final assembly sites when requested and be prepared with tangible information and references to FTA regulations that will allow the PMOC to:
  - a) Validate the accuracy, and authenticity of all Certificates of Compliance with Buy America Requirements, and verifying compliance during manufacturing process (for all procurements).
  - b) Accurately evaluate Buy America audit results for compliance (for rolling stock procurements);
- 11) Request FTA intervention when Buy America Audit reviews uncover deficiencies; and provide reporting protocols to be adopted;
- 12) Participate in First Article Inspections of rolling stock or components that are near the requirement to be 60% domestic. This is to confirm components or sub-component source manufacturing and manufacturing site.

In addition to reviewing specific bus and/or rail related audits, PMOC will be directed to evaluate general compliance for systems equipment, other manufactured products, and iron and steel.

## **4.0 REFERENCES**

The following are the principal but by no means the only references to Federal legislation, regulation and guidance with which the PMOC should review and develop a solid understanding as related to the Project Sponsor's project work being reviewed under this OP.

### **4.1 Legislative**

- The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, or SAFETEA-LU, Pub.L. 109-59
- Moving Ahead for Progress in the 21st Century, or MAP-21, P.L. 112-141

## 4.2 United States Code

- 49 U.S.C. Chapter 53, specifically, section 5323(j)

## 4.3 Regulations ([http://www.fta.dot.gov/legislation\\_law/12921.html](http://www.fta.dot.gov/legislation_law/12921.html)).

- Buy America Requirements, 49 C.F.R. Part 661
- Pre-Award and Post-Delivery Audits, 49 C.F.R. Part 663

## 4.4 Guidance

- FTA's Buy America Audit Handbooks ([http://www.fta.dot.gov/legislation\\_law/12921.html](http://www.fta.dot.gov/legislation_law/12921.html)).

## 5.0 PROJECT SPONSOR SUBMITTALS

The following are to be obtained by the PMOC from the Project Sponsor for performance of this review:

### For all procurements:

- Documentation verifying compliance of systems equipment and manufactured products.
  - Buy America Compliance certification (see 49 CFR § 661.6);
    - Oversight activities report(s) prepared by the Project Sponsor, including internal verification of observance.
- For each awarded and active contract for all iron, steel, and manufactured products used in the project:
  - The Project Sponsor will allow the PMOC to verify all required Buy America certificate have been submitted.
  - The Project Sponsor will allow the PMOC to determine the proposed or expected start and end of manufacturing for each iron, steel, and manufactured products used in the project.

### For rolling stock procurement:

- Pre-Award Audit (See Appendix B for examples of required certifications);
  - Pre-award Buy America Compliance certification;
  - Pre-award Purchaser's Requirements certification;
  - Manufacturer's Federal Motor Vehicle Safety certification, where appropriate;
  - Pre-award Buy America audit report prepared by the Project Sponsor. This is based on manufacturer supplied reporting.
- Intermediate Audit, when applicable;
  - Interim Buy America audit report prepared by the Project Sponsor. This is based on manufacturer supplied reporting.
- Post-Delivery Audit (See Appendix B for examples of required certifications);
  - Post-Delivery Buy America Compliance certification;
  - Post-Delivery Purchaser's Requirements certification;
  - Manufacturer's Federal Motor Vehicle Safety certification, where appropriate.

- Post-delivery audit report prepared by the Project Sponsor. This is based on manufacturer supplied reporting.
- Post-Delivery Domestic Content Monitoring
  - Resident Inspector Reports in accordance with 49 CFR §663.37.(a).

## **6.0 SCOPE OF WORK**

For all assigned OP 36 reviews, the PMOC is responsible for reviewing and reporting on the presence, accuracy, and authenticity of all Certificates of Compliance with Buy America Requirements, and verifying compliance during manufacturing process.

For all assigned OP 36 reviews, the PMOC is responsible for reviewing and reporting on the Project Sponsor's audit report (for rolling stock procurements) and should examine the Project Sponsor's certifications and supporting documents (for all procurements), with all due diligence. Attention shall be focused on ensuring the Project Sponsor's Buy America team has "drilled down" to the lowest level required, in order to demonstrate that the 60% rule has been followed and the content claimed is valid.

The PMOC must verify/confirm that the Project Sponsor and contractor(s) are meeting the requirements of any conditions/agreement stipulated by the FTA.

The FTA should assure that the Project Sponsor understands that failure to comply with Buy America requirements can put the Project Sponsor's FTA grant in jeopardy.

The PMOC shall ensure that the vehicle component manufacturing requirements are/were met, and where there is doubt (for instance where major sub-assemblies of a component are foreign-made but incorporated during the domestic vehicle final assembly), that these concerns are identified and brought to the Project Sponsor's attention for clarification. If the Project Sponsor cannot justify the discrepancy, the PMOC should report this finding to the FTA for a determination.

The PMOC shall ensure that the Project Sponsor has required the manufacturers of all iron, steel, and manufactured products used in the project to maintain and periodically update Buy America compliance in a report that tracks the projected and actual Buy America attainment. The PMOC shall ensure that the Project Sponsor has required that the rolling stock manufacturer provides a monthly or at a minimum quarterly update report with a detailed register of components in the rolling stock being procured. The PMOC should report any progress or failure to track components to FTA.

### **6.1 Pre-Award Requirements (Bus & Rail) Buy America and Related Provisions**

For bus and van procurements, the PMOC must confirm that the Project Sponsor has completed three certifications in this Pre-Award process. All three certifications must be in the Project Sponsor's files for future FTA reviews. These certifications are:

- Pre-Award Buy America Compliance certification;
- Federal Motor Vehicle Safety Standards (FMVSS) certification;
- Pre-Award Purchaser's Requirements certification.

For rail rolling stock procurements, the PMOC must confirm that the Project Sponsor has completed two certifications in this Pre-Award process. Both certifications must be kept together in the Project Sponsor's files for future FTA reviews. These certifications are:

- Pre-Award Buy America Compliance certification;
- Pre-Award Purchaser's Requirements certification.

### **6.1.1 Pre-Award Buy America Audits**

The PMOC must confirm that the Project Sponsor has certified through Pre-Award audits that the procurement with FTA appropriated funds, of new revenue service buses, rail vehicles, and vans, is Buy America compliant.

The PMOC, as part of their normal oversight activities, should assure the Project Sponsor understands that failure to comply with Buy America requirements can put the Project Sponsor's FTA grant in jeopardy. Project Sponsor's contract documents to acquire the rolling stock must contain language requiring compliance with approved waivers. The supplier's bids/proposals must show compliance that includes any waiver(s) issued to the supplier by FTA or non-compliance.

Pre-award audits are required before a Project Sponsor can enter into a formal contract for the purchase of such rolling stock with a manufacturer. The Pre-Award review period begins when the Project Sponsor issues the solicitation and ends when the Project Sponsor signs a formal contract with the selected manufacturer.

#### **6.1.1.1 Bus and Van**

For the bus portion of the Buy America Pre-Award review, the PMOC must confirm the Project Sponsor has verified that all vehicles will meet the following conditions:

- 1) The cost of all components produced in the United States is more than 60 percent of the total of all bus/van rolling stock components including those in 49 CFR Section 661.11, Appendix B. The following is a list of items that typically would be considered components of a bus. This list is not all-inclusive.
  - Car body shells, engines, transmissions, front axle assemblies, rear axle assemblies, drive shaft assemblies, front suspension assemblies, rear suspension assemblies, air compressor and pneumatic systems, generator/alternator and electrical systems, steering system assemblies, front and rear air brake assemblies, air conditioning compressor assemblies, air conditioning evaporator/condenser assemblies, heating systems, passenger seats, driver's seat assemblies, window assemblies, entrance and exit door assemblies, door control systems, destination sign assemblies, interior lighting assemblies, front and rear end cap assemblies, front and rear bumper assemblies, specialty steel (structural steel tubing, etc.) aluminum extrusions, aluminum, steel or fiberglass exterior panels, and interior trim, flooring, and floor coverings.<sup>5</sup>

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<sup>5</sup> 49 CFR 661.11, Appendix B

- 2) Final assembly of the vehicles will take place in the United States; or, the Project Sponsor has obtained from the FTA a waiver letter exempting the buses or a component from FTA's Buy America requirement.
- 3) Project Sponsor's determination that the manufacturer is responsible and capable of building the bus to the Project Sponsor's design and solicitation specification.
- 4) Purchaser's Requirements certification. See description of this requirement in 6.1.2, below.
- 5) First Article Inspections (FAI) of the bus/van rolling stock and components that are near the 60% requirement to be domestic. This is to confirm component or sub-component source manufacturing and manufacturing site.

A two-stage process for bus manufacturing allows the empty bus shell to be transported to the final assembly site. When the transportation is from a domestic bus shell manufacturing facility to final assembly, the cost is domestic. The regulations require that final assembly in the U.S. include, at a minimum, the following requirements described in 49 CFR 661.11 Appendix D (b):

- installation and interconnection of the engine, transmission, axles, cooling and braking systems;
- installation and interconnection of the heating and air conditioning equipment;
- installation of pneumatic and electrical systems, door systems, passenger seats, passenger grab rails, destination signs, and wheelchair lifts; and road testing, final inspection, repairs and preparation of the vehicles for delivery.<sup>6</sup>

The PMOC shall confirm the Project Sponsor's compliance with the above requirements as well as those requirements stipulated on the FTA's website at [http://www.fta.dot.gov/legislation\\_law/12921.html](http://www.fta.dot.gov/legislation_law/12921.html).

#### **6.1.1.2 Rail, All Types**

For the rail portion of the Buy America Pre-Award review, the PMOC must confirm the Project Sponsor has verified that all vehicles will meet the following conditions:

- 1) The cost of all components produced in the United States is more than 60 percent by cost of the total of all rail rolling stock components including those in 49 CFR Section 661.11, Appendix C. The following is a list of items that typically would be considered components of rail rolling stock. This list is not all inclusive.
  - Car shells, engines, main transformer, pantographs, traction motors, propulsion gear boxes, interior linings, acceleration and braking resistors, propulsion controls, low voltage auxiliary power supplies, air conditioning equipment, air brake compressors, brake controls, foundation brake equipment, articulation assemblies, train control systems, window assemblies, communication equipment, lighting, seating, doors, door actuators and controls, wheelchair lifts and ramps to make the vehicle accessible to persons with disabilities, couplers

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<sup>6</sup> 49 CFR 661.11, Appendix D (b)



and draft gear, trucks, journal bearings, axles, diagnostic equipment, and third rail pick-up equipment.<sup>7</sup>

- 2) Final assembly of the vehicles will take place in the United States; or, the Project Sponsor has obtained from the FTA a waiver letter exempting the rail rolling stock or a component from FTA's Buy America requirement.
- 3) Project Sponsor's determination that the manufacturer is responsible and capable of building the rail rolling stock to the Project Sponsor's design and solicitation specification.
- 4) Purchaser's Requirements certification. See description of this requirement in 6.1.2, below.
- 5) First Article Inspections of the rolling stock and components that are near the requirement to be 60% domestic. This is to confirm component or sub-component source manufacturing and manufacturing site.

A two-stage process for rail rolling stock manufacturing allows the transport of the empty car shell to the final assembly site. When the transportation is from a domestic car shell manufacturing facility to final assembly, the cost is domestic. The regulations require that final assembly in the U.S. include, as a minimum the following requirements described in 49 CFR 661.11 Appendix D (a):

- installation and interconnection of propulsion control equipment, propulsion cooling equipment, brake equipment, energy sources for auxiliaries and controls, heating and air conditioning, communications equipment, motors, wheels and axles, suspensions and frames;
- inspection and verification of all installation and interconnection work; and
- the in-plant testing of the stationary product to verify all functions.<sup>8</sup>

The PMOC shall confirm the Project Sponsor's compliance with the above requirements as well as those requirements stipulated on the FTA's website at [http://www.fta.dot.gov/legislation\\_law/12921.html](http://www.fta.dot.gov/legislation_law/12921.html).

### **6.1.2 Pre-Award Purchaser's Requirement Audit**

The PMOC must confirm the Project Sponsor has verified that the manufacturer's bid is in compliance with Project Sponsor's solicitation specifications. Further, the PMOC must review the specifications to assure there are no requirements that will impact the ability of the supplier to achieve Buy America compliance.

The PMOC's review shall include assurance that the Project Sponsor's certification includes the most up-to-date language requiring compliance with Buy America. PMOCs are advised to consult the FTA Website ([http://www.fta.dot.gov/legislation\\_law/12921.html](http://www.fta.dot.gov/legislation_law/12921.html)) for recent changes.

The PMOC must also confirm that the Project Sponsor has verified that the vehicle manufacturer is responsible and capable of building the rolling stock to the Project Sponsor's solicitation specifications; and identification by the Project Sponsor of their agreement or disagreement with the

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<sup>7</sup> 49 CFR 661.11, Appendix C

<sup>8</sup> 49 CFR 661.11, Appendix D (a)

manufacturer's reporting of components, where they are manufactured and the origin of all of the sub-components.

The PMOC must identify components in the Project Sponsor's Pre-Award Buy America review that are at risk of being under the 60% line, moving from domestic to foreign; which could risk lowering the total domestic content below 60% minimum required. For each component near the 60% threshold, the PMOC must assure the Project Sponsor will conduct a line by line review of the sub-components noting the cost and country of origin. FTA may request additional reports on these components. Project Sponsor and PMOC concerns about the accuracy of the claims for final assembly must be identified.

### **6.1.3 Pre-Award FMVSS Requirements Review for Bus and Van**

The PMOC must confirm that the Project Sponsor has obtained a letter from the vehicle manufacturer stating the information that is required for the FMVSS vehicle plaque will be provided.

## **6.2 Intermediate Audit (Bus & Rail)**

The FTA and PMOC should encourage the Project Sponsor to include a requirement for an intermediate Buy America audit in the contract solicitation specification. The intermediate audit should occur early in the production but after the components and their sub-components are procured and under contract. While an intermediate audit is not required by the regulation, it shall be encouraged since it represents the last chance for the Project Sponsor to minimize the risk of potential adverse impact on the total domestic content of the vehicle, by taking corrective action before the end of the production process and prior to delivery; particularly for rolling stock contracts of extended delivery schedules and large order quantities or for any at-risk component(s) with near 60% domestic content that could change from domestic to foreign.

For an intermediate audit, the FTA should require the Project Sponsor to provide the plan for the PMOCs participation in the Project Sponsor's First Article Inspections of components (and subcomponents). The at-risk components (and subcomponents) identified in the Pre-Award Purchaser's Requirement Review are those that are near the 60% domestic content requirement. The FTA should encourage the Project Sponsor and supplier to conduct any FAI at the components (and subcomponents) manufacturing site. This is to get an on site opportunity to confirm sub-component manufacturing source and country of origin. If the FAI is not at the components (or subcomponent) manufacturing site, a follow-up site visit to the component manufacturing site should be discussed with the Project Sponsor and FTA.

An intermediate audit or review should be best conducted after the vehicle manufacturer has signed contracts with component suppliers and as components are getting ready to be sourced. This review is conducted in the same manner as a Post-Delivery Review. When FTA requires a PMOC review of a Project Sponsor's Intermediate Audit, the PMOC shall consult the Post-Delivery review requirements below for performance of this review.

### 6.3 Post Delivery Requirements Audit (Bus & Rail)

The PMOC must confirm the Project Sponsor has completed a Post-Delivery audit, before a vehicle title is transferred from the manufacturer to the Project Sponsor. This section provides specific input that PMOCs can use to evaluate the Project Sponsor's Post-Delivery audit report.

The Post-Delivery audit review period begins when the Project Sponsor signs a formal contract with the selected manufacturer and ends before the title transfer or when the vehicle enters into revenue service.

The PMOC must pay close attention to the pre-award audit report and follow or pursue any changes that the manufacturer may have made that could adversely affect compliance. Examples of such changes are a vendor of at-risk components (and subcomponents) identified in the Pre-Award Purchaser's Requirement Review that was near the 60% domestic content requirement no longer complies with Buy America; or a U.S. vendor going out of business that is replaced with a foreign vendor; or the changing to a new vendor in order to avoid schedule delays and/or contract default and related liquidated damages due to unavailability of needed components or equipment; or the manufacturer's final assembly plan identified in the Pre-Award Audit plan has changed with less than required final assembly. The PMOC must ensure that Project Sponsor's approval of a replacement vendor does not change the requirement to comply with Buy America.

As with the Pre-Award audit, PMOCs must confirm for the bus and van Post-Delivery audit that the Project Sponsor has completed separate certifications. Certifications must be kept in the Project Sponsor's files for future FTA reviews.

The certifications required for bus and van projects are:

- Post-Delivery Buy America Compliance certification;
- Post-Delivery Purchaser's Requirements certification;
- Post-Delivery FMVSS certification.

The PMOC should also review and confirm, for bus and van post-delivery audits that the Project Sponsor has complied with other requirements stipulated on the FTA website at:

[http://www.fta.dot.gov/legislation\\_law/12921.html](http://www.fta.dot.gov/legislation_law/12921.html).

For Rail projects, the required certifications are:

- Post-Delivery Buy America Compliance certification;
- Post-Delivery Purchaser's Requirements certification.

The PMOC should also review and confirm, for rail post-delivery audits that the Project Sponsor has complied with other requirements stipulated on the FTA website at:

[http://www.fta.dot.gov/legislation\\_law/12921.html](http://www.fta.dot.gov/legislation_law/12921.html).

PMOCs should note that for bus and rail projects, the Buy America Post-Delivery Purchaser's Requirements and the FMVSS certifications are similar to the reviews completed for Pre-Award

certifications, except that the Post-Delivery audit must contain *actual data* instead of the estimated data used in Pre-Award audits. Estimates are not acceptable.

PMOCs should confirm in writing in the report that, for the bus and van Post-Delivery Purchaser's certification, the Project Sponsor has completed visual inspections and road tests to demonstrate that buses meet contract specifications.

- 1) Project Sponsors in urbanized areas with populations of more than 200,000 that purchase more than 10 buses or vans must have an inspector in the production facility during the final assembly process;
- 2) Project Sponsors in urbanized areas with populations of 200,000 or less that purchase more than 20 buses, must have an inspector in the production facility during the final assembly process;
- 3) Bus purchases not meeting the criteria in 1 & 2 above, or purchases of any number of standard production or unmodified vans, require only visual inspection and road test upon delivery.

PMOCs should confirm in writing in the report that, for the Rail Vehicle Post-Delivery Purchaser's certification, the Project Sponsor that is purchasing any number of rail vehicles must certify the following:

- 1) An on-site inspector has performed complete visual inspections and performance tests to demonstrate that the vehicles meet the contract specifications, and;
- 2) A resident inspector was on-site in the manufacturing facility, during the final assembly period and has (a) monitored the final assembly process and (b) completed a final report describing the construction activities and explaining how the construction and operation of the rail vehicles meet the contract specifications.

#### **6.4 Post-Delivery Domestic Content Monitoring**

Post-Delivery Domestic Content Monitoring is a recommended best practice that should occur during the time in the procurement process from when the vehicle manufacturer delivers the first vehicle to the recipient until the vehicle manufacturer transfers title to the last vehicle to the recipient or the recipient puts the last vehicle into revenue service, whichever is first. The recipient should complete the Post-Delivery Audit as described in 49 CFR §663.5(f) and 49 CFR §663.33 on the first vehicle. FTA recommends that the Post-Delivery Domestic Content Monitoring start when the Post-Delivery Audit for the first vehicle is completed. The Post-Delivery Domestic Content Monitoring should end when the recipient puts the last vehicle into revenue service.

FTA recommends that the resident inspector, or an agent or employee of the recipient should perform the Post-Delivery Domestic Content Monitoring. FTA does not recommend that an agent or employee of the manufacturer perform the Post-Delivery Domestic Content Monitoring. See 49 CFR §663.37(a) for more information.

The purpose of the Post-Delivery Domestic Content Monitoring is to ensure that all vehicles after the first one are compliant with the regulations.

The personnel performing the Post-Delivery Domestic Content Monitoring should monitor all of the following for changes to determine that any changes detected do not affect the compliance of any vehicle:

- Change Orders
- Changes to the Bill of Materials
- Changes to the assembly or manufacturing processes
- Changes to the final assembly location
- Any changes to the cost or origin of any components and subcomponents
- Any change that would affect the domestic content of the vehicle

If the recipient (or its agent) detects any changes, the recipient (or its agent) should perform an evaluation to determine if the domestic content of the vehicles has changed. The recipient (or its agent) should report any changes in domestic content to FTA. If necessary to ensure continued compliance, the recipient (or its agent) should perform an additional Post-Delivery Audit.

## **6.5 Buy America Requirements Review for Systems Equipment**

The PMOC should confirm that the Project Sponsor/ understands that Buy America compliance applies not only to bus and rail vehicles but is also required for procurement of equipment specific to stand-alone systems as defined in 49 CFR 661. This includes Train Control Equipment (49 CFR 661.11.t), Communication Equipment (49 CFR 661.11.u), and Traction Power Equipment (49 CFR 661.11.v).

The procurement of each category of such systems equipment must comply with domestic content and final assembly requirements delineated for the rolling stock procurements in 49 CFR 661 (i.e. if a component of Train Control Equipment is classified as domestic, it must have minimum 60% U.S. content and final assembly must have occurred in the U.S). Further that, domestic manufacture of all federally funded procurements is expected and should be certifiable.

The bill of materials provides a good initial material list. The final assembly of systems projects has been attributed to the field construction.

The Project Sponsor should be able to demonstrate how Buy America compliance is verified, documented, and tracked.

## **6.6 Buy America Requirements Review for Manufactured Products**

The PMOC should confirm that the Project Sponsor understands that Buy America compliance applies not only to bus and rail vehicles but is also required for procurement of all manufactured products, including all iron and steel, as defined in 49 CFR 661. Further that, domestic manufacture of all federally-funded procurements is expected and should be certifiable. The Project Sponsor should be able to demonstrate to FTA and the PMOC how Buy America compliance is verified, documented, and tracked.

The bill of materials provides a good initial material list. The final assembly of infrastructure projects has been attributed to the field construction.

#### **6.6.1 Comprehensive Contract Review (Annually after first Contract Award)**

Analyze and evaluate the project and all contracts awarded to create a database of product, and vendor information to support verification and validation of all required “**Certificates of Compliance with Buy America Requirement**” (49 CFR § 661.6).

The contractor shall verify and validate all required “**Certificates of Compliance with Buy America Requirement**” (49 CFR § 661.6) by performing a desk review of the grantees’ Buy America documentation. No Travel is anticipated for this part of the review. The desk review shall provide a summary of the documentation, noting any errors or concerns with the Buy America certifications, audits, or reports, as applicable. The desk review shall also summarize the project and identify areas of concern for Buy America compliance (e.g. sole source items, elements with a small domestic market, items with lacking documentation that should be reviewed in greater detail). The contractor may utilize FTA regional staff to projects/grantees to gain historical background on the project/procurement being reviewed.

Provide report to FTA.

#### **6.7 Common Discrepancy Types and Corrective Actions**

The PMOC shall conduct the review of submittals indicated above including any discrepancies noted and make recommendations in a report to FTA for corrective action by the Project Sponsor. After being directed to do so by FTA, the PMOC may discuss these recommendations and possible corrective actions of the discrepancies with the Project Sponsor. Examples of discrepancy types are listed below:

- Discrepancy Type 1: Project Sponsor is deficient and did not have Buy America requirements in its procurement contracts for iron, steel, or manufactured products and/or does not have an FTA approved waiver.
  - Action: Notify FTA of the problem. The PMOC shall advise FTA that the Project Sponsor needs to submit revised purchasing procedures to the FTA.
- Discrepancy Type 2: Project Sponsor is deficient and did not receive all of the required certifications and reviews for its rolling stock procurement. Project Sponsor does not have all of the required certifications in its files confirming the Project Sponsor has done the reviews.
  - Action: Notify FTA of the problem. The PMOC should advise the Project Sponsor to locate all missing and required certifications.
- Discrepancy Type 3: The Project Sponsor is deficient and has not adequately or sufficiently reviewed the manufacturer’s Buy America documentation to determine compliance or intent to comply with requirements.
  - Action: Notify FTA of the problem. The PMOC should advise the Project Sponsor that it should take whatever action is necessary to obtain appropriate certifications, including

performing an “after-the-fact” Pre-Award audit to prove that vehicles will comply with domestic content requirements.

- Discrepancy Type 4: Project Sponsor is deficient and has placed vehicles into revenue service, before completing Post-Delivery audits to verify that the procurement complies with domestic content and final assembly requirements.
  - Action: Notify FTA of the problem. The PMOC should advise the Project Sponsor to provide the FTA with an explanation for how/why vehicles were placed in service before completing the Post-Delivery Audit.
  - Action: The Project Sponsor must complete outstanding audits, without delay and furnish copies of the audit documentation to the FTA.
  - Action: The Project Sponsor must provide assurance to FTA that changes in its procurement procedures have been made so that future procurements will comply with Buy America requirement.
- Discrepancy Type 5: The Project Sponsor is deficient and did not use “in-plant” inspectors or did not perform visual inspections and road tests on bus procurements, for FTA funded procurement, as required.
  - Action: Notify FTA of the problem. The PMOC must advise the Project Sponsor to provide FTA with a complete explanation for why the inspection requirement was not met. FTA will determine the appropriate action.
  - Action: The Project Sponsor must change its procurement procedures and assure the FTA that future procurements will comply with regulations.
- Discrepancy Type 6: The Project Sponsor is deficient because the manufacturer’s assembly process included partial final assembly outside of the U.S. and final assembly activities in the U.S. did not meet minimum requirements for compliance.
  - Action: Notify FTA of the problem. The PMOC must advise the Project Sponsor to provide the FTA with a complete explanation for not complying with the regulations. FTA will determine the appropriate action.
  - Action: The Project Sponsor must provide assurance that future vehicle procurements will be conducted in compliance with FTA Buy America requirements.
- Discrepancy Type 7: The Project Sponsor is deficient because the manufactured products included in systems installed were manufactured outside of the U.S. and no formal written exception is available.
  - Action: Notify FTA of the problem. The PMOC must advise the Project Sponsor to provide the FTA with a complete explanation for not complying with the regulations. FTA will determine the appropriate action.

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall provide FTA with a separate written report for the PMOC’s review of the Buy America audit conducted by the Project Sponsor. The report shall contain PMOC’s findings including identified discrepancies and suggested corrective actions, analyses, professional opinions, and recommendations, as well as a description of the review activities undertaken. The PMOC shall refer to the checklist in Appendix C as a guide for performing its review.

After FTA's approval, the PMOC may share the report with the Project Sponsor.

The report formatting requirements of OP 01 apply. When necessary, PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may add other software as required but documentation and report data shall be made available to FTA.

### **7.1 Reporting for Bus & Rail**

When the review applies to bus and rail vehicles, the PMOC shall provide FTA with a written report for each or any of the three reviews described above – pre-award, intermediate, post-delivery. The report is specifically meant to discuss and help resolve issues associated with traditional bus, rail, and other rolling stock audits.

### **7.2 Reporting for Systems Equipment, Other Manufactured Products, Iron and Steel**

For manufactured products or equipment specific to stand alone systems; the PMOC is also tasked with evaluating whether Buy America regulations are being adhered to by the Project Sponsor. Procurements that are not categorized solely as bus or rail typically do not undergo a pre-award, intermediate, and post-delivery review; however the overall responsibility to monitor and perform oversight activities should be no different.



## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD	CHECK LIST
1	The PMOC shall review the status of Project Sponsor's Buy America compliance.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of a Project Sponsor's Buy America requirements.	<b>Q1a.</b> Process exists and has been followed.	<b>M1a.</b> Evidence of a documented process.	<b>MM1a.</b> Periodic review by FTA or its agent.	
		<b>R1b.</b> The PMOC shall use its process and to validate the thoroughness of Buy America requirements at all phases of the Project.	<b>Q1b.</b> Assessment must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>M1b.</b> Documented assessment of Buy America process and requirements.	<b>MM1b.</b> Periodic review by FTA or its agent.	
2	The PMOC shall, at appropriate phases of the Project, review Project Sponsor's compliance with Buy America, determine the existence of any discrepancies, report such discrepancies to FTA and concurrently work with Project Sponsor to secure correction of them.	<b>R2a.</b> The PMOC shall confirm through review of Project Sponsor submittals, contract provisions, audits and certifications that Buy America requirements have been met at pre-award, intermediate and post-delivery times.	<b>Q2a.</b> Professional opinion of Buy America compliance by Project Sponsor.	<b>M2a.</b> Documented evidence of a thorough review by PMOC for Buy America compliance at pre-award, intermediate and post-delivery, supported by a professional opinion.	<b>MM2a.</b> Periodic review by FTA or its agent.	
		<b>R2b.</b> The PMOC shall continually monitor the status of Project Sponsor's Buy America program, note discrepancies, discuss corrective action with Project Sponsor and report discrepancies together with intended corrective action to FTA.	<b>Q2b.</b> Professional opinion as it pertains to discrepancies in Project Sponsor's program together with intended corrective action.	<b>M2b.</b> Documented evidence of continued monitoring and review, discussion of discrepancies and reporting of intended corrective action, supported by a professional opinion.	<b>MM2b.</b> Periodic review by FTA or its agent.	
3	The PMOC shall document its findings, professional opinions, and recommendations in a report to the FTA.	<b>R3.</b> The PMOC shall present its findings, conclusions, and recommendations to FTA and, upon FTA approval, reconcile those recommendations with the Project Sponsor to the extent possible.	<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with Project Sponsor to the extent possible.	<b>M3.</b> PMOC's findings, conclusions, recommendations, and presentation.	<b>MM3b.</b> Periodic review by FTA or its agent.	

## APPENDIX B

### Sample Review Certifications (Bus and Rail)

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The following review certifications required for Buy America compliance can be found at [http://www.fta.dot.gov/legislation\\_law/12921.html](http://www.fta.dot.gov/legislation_law/12921.html).

#### PRE-AWARD BUY AMERICA COMPLIANCE CERTIFICATION

As required by Title 49 of the CFR, Part 663 – Subpart B, \_\_\_\_\_ (the recipient) is satisfied that the rail vehicles to be purchased, \_\_\_\_\_ (number and description of rail vehicles) from \_\_\_\_\_ (the manufacturer), meet the requirements of 49 USC 5323(j). The recipient, or its appointed analyst \_\_\_\_\_ (the analyst – not the manufacturer or its agent), has reviewed documentation provided by the manufacturer, which lists (1) the proposed component and subcomponent parts of the rail vehicles identified by manufacturer, country of origin, and cost; and (2) the proposed location of the final assembly point for the rail vehicles, including a description of the activities that will take place at the final assembly point and the cost of final assembly.

Date: \_\_\_\_\_

Signature: \_\_\_\_\_ Title: \_\_\_\_\_

#### Exhibit B-1. Sample Pre-Award Buy America Compliance Certification

#### PRE-AWARD BUY AMERICA EXEMPTION CERTIFICATION

As required by Title 49 of the CFR, Part 663 – Subpart B, \_\_\_\_\_ (the recipient) certifies that there is a letter from FTA that grants a waiver to the rail vehicles to be purchased, \_\_\_\_\_

\_\_\_\_\_  
(number and description of rail vehicles), from 49 USC 5323 (j). .

Date: \_\_\_\_\_

Signature: \_\_\_\_\_ Title: \_\_\_\_\_

#### Exhibit B-2. Sample Pre-Award Buy America Exemption Certification

PRE-AWARD PURCHASER'S REQUIREMENTS CERTIFICATION

As required by Title 49 of the CFR, Part 663 – Subpart B, \_\_\_\_\_  
\_\_\_\_\_(the recipient) certifies that the rail vehicles to be purchased,  
\_\_\_\_\_(number and description of rail vehicles) from \_\_\_\_\_(the  
manufacturer), are the same product described in the recipient's solicitation specification and that the  
proposed manufacturer is a responsible manufacturer with the capability to produce a rail vehicle that  
meets the specifications.

Date: \_\_\_\_\_

Signature: \_\_\_\_\_ Title: \_\_\_\_\_

Exhibit B-3. Sample Pre-Award Purchaser's Requirements Certification

POST-DELIVERY BUY AMERICA COMPLIANCE CERTIFICATION

As required by Title 49 of the CFR, Part 663 – Subpart C, \_\_\_\_\_  
\_\_\_\_\_(the recipient) certifies that it is satisfied that the rail vehicles received, (number  
and description of rail vehicles) from \_\_\_\_\_  
\_\_\_\_\_(the manufacturer), meet the requirements of 49 USC 5323 (j). The recipient, or its appointed  
analyst \_\_\_\_\_(the analyst – not the manufacturer or its agent), has  
reviewed documentation provided by the manufacturer, which lists (1) the actual component and  
subcomponent parts of the rail vehicles identified by the manufacturer, country of origin, and cost; and  
(2) the actual location of the final assembly point for the rail vehicles, including a description of the  
activities that took place at the final assembly point and the cost of final assembly.

Date: \_\_\_\_\_

Signature: \_\_\_\_\_ Title: \_\_\_\_\_

Exhibit B-4. Sample Post-Delivery Buy America Compliance Certification

POST-DELIVERY BUY AMERICA EXEMPTION CERTIFICATION

As required by Title 49 of the CFR, Part 663 – Subpart C, \_\_\_\_\_  
\_\_\_\_\_(the recipient) certifies that there is a letter from FTA, which grants a waiver  
to the rail vehicles received, \_\_\_\_\_  
\_\_\_\_\_(manufacturer, number  
and description of rail vehicles), from the Buy America requirements under 49 USC 5323 (j).

Date: \_\_\_\_\_

Signature: \_\_\_\_\_ Title: \_\_\_\_\_

Exhibit B-5. Sample Post-Delivery Buy America Exemption Certification

POST-DELIVERY PURCHASER'S REQUIREMENTS CERTIFICATION

As required by Title 49 of the CFR, Part 663 – Subpart C,  
\_\_\_\_\_  
\_\_\_\_\_(the recipient) certifies that a resident inspector,  
\_\_\_\_\_  
(the resident inspector – not an agent or employee of the manufacturer), was at  
\_\_\_\_\_  
(the manufacturer) manufacturing site during the period of manufacture of the rail vehicles,  
\_\_\_\_\_  
(number and description of rail vehicles). The inspector monitored manufacturing and completed a  
report on the manufacture of the rail vehicles providing accurate records of all vehicle construction  
activities. The report addresses how the construction and operation of the rail vehicles fulfill the contract  
specifications. After reviewing the report, visually inspecting the rail vehicles, the recipient certifies that  
the rail vehicles meet the contract specifications.

Date: \_\_\_\_\_

Signature: \_\_\_\_\_ Title: \_\_\_\_\_

Exhibit B-6. Sample Post-Delivery Purchaser's Requirements Certification

## APPENDIX C

### Pre-Award, Intermediate, and Post-Delivery Review Checklists (Bus and Rail)

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Item	Issue
<b>1.0</b>	<b>Specification</b>
1.1	Does the specification contain requirements that make it hard for the supplier to achieve Buy America requirements
1.2	Does the specification require the supplier to meet the Buy America Act and refer specifically to the relevant sections of Title 49, CFR, Sections 661 and 663
1.3	Does the specification call for Pre-Award and Post Delivery Audits for Buy America
1.4	Does the Project Sponsor's procurement documentation mandate or require an Intermediate Buy America Audit, and is the Audit planned at such a point that it will identify whether or not the procurement is on target but still allow time to take corrective action(s) if there is a risk of failing to comply?
<b>2.0</b>	<b>Pre Award Audit</b>
2.1	Is the Project Sponsor's auditor experienced in Buy America Audits?
2.2	Are there any major assemblies or sub-assemblies identified in the Pre-Award review with Domestic content close to or below 60%?
2.3	Are there significant sub-assemblies with content close to 60% that are claimed as 100% in the Major Assembly
2.4	Has the auditor drilled down into the list of vehicle components sufficiently to demonstrate that changes at lower levels will not cause any major sub-assemblies, claimed at 100%, to not comply?
2.5	Will the vehicle bodies be manufactured in the US, or will they arrive as "knock down" components from abroad, requiring minor assembly work?
2.6	What inspection services does the Project Sponsor propose?
<b>3.0</b>	<b>Intermediate Audit</b>
3.1	Has the Project Sponsor performed an Intermediate Audit?
3.2	Is the Project Sponsor's auditor experienced in Buy America Audits?
3.3	Are there major assemblies with Domestic content close to or below 60%?
3.4	Are there significant sub-assemblies with content close to 60% that are claimed as 100% in the Major Assembly?
3.5	Has the auditor drilled down sufficiently to demonstrate that changes at lower levels will not cause any major sub-assemblies, claimed at 100%, to not comply?
3.6	Are the vehicle bodies manufactured in the US, or do they arrive as "knock down" components from abroad, requiring minor assembly work?
3.7	Does the Project Sponsor have on-site inspection?
3.8	Does the Project Sponsor's inspection coverage include major sub-suppliers?
3.9	If the Project Sponsor did not perform an Intermediate Audit:
3.10	Have there been any substantive changes in sourcing since the Pre-Award audit
3.11	Do any of the changes impact Major Assemblies with close to or below 60% domestic content?

<b>4.0</b>	<b>Post Delivery Audit</b>
4.1	Is the Project Sponsor's auditor experienced in Buy America Audits?
4.2	Did the Project Sponsor obtain and retain Pre-Award Buy America certifications from successful suppliers for purchases of more than \$100,000?
4.3	Did the Project Sponsor conduct Pre-Award and Post-Delivery audits for its purchase of rolling stock over \$100,000? Does the Project Sponsor have properly completed certifications for each review in its contract files?
4.4	If the Project Sponsor is purchasing rolling stock with multiple delivery dates, using options, or multi-year procurements, and, if so, has the Project Sponsor/Sponsor performed and certified Pre-Award and Post-Award audit for each group of vehicles, before placing them into revenue service?
4.5	Has the Project Sponsor requested and/or received a waiver for any part of its purchase of vehicles? Does the Project Sponsor have the FTA approved waiver in its procurement files for PMOC review?
4.6	Are there major assemblies with Domestic content close to or below 60%?
4.7	Are there significant sub-assemblies with content close to 60% that are claimed as 100% in the Major Assembly?
4.8	Has the auditor drilled down sufficiently to demonstrate that changes at lower levels will not cause any major sub-assemblies, claimed at 100%, to not comply?
4.9	Were the vehicle bodies manufactured in US, or did they arrive as "knock down" components from abroad, requiring minor assembly work?
4.10	Does Project Sponsor have on-site inspection planned and implemented throughout manufacturing, assembly and testing; and provided such reports?



## **Oversight Procedure 37 – Fleet Management Plan Review**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure is to describe the review, analysis, recommendation procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) regarding the project sponsor's Rail Fleet Management Plan (RFMP) and Bus Fleet Management Plan (BFMP).

To support a request for advancement or funding for a major capital project, FTA requires the project sponsor submit a fleet management plan covering all existing transit modes in service. This plan should demonstrate that the project sponsor properly plans for and carries out competent overall management of its entire vehicle fleet. As an alternate, the project sponsor may submit separate RFMPs for each mode that does not share track with any other mode.

While the fleet management plans are not approved or disapproved per se, the PMOC's review informs FTA as to whether the proposed major capital project will degrade existing transit service as a consequence of its design and construction; whether the project sponsor will have adequate resources to provide service to meet the transit demand during and after the construction of the major capital project. This review provides a major input to FTA in its determination of the adequacy of the project sponsor's operational resources and financial capacity.

### **2.0 BACKGROUND**

The FTA, in two 1999 Internal Memos to the Regional Administrators (see Section 4.0 below), explained that the purpose of bus and rail fleet management plans is to encourage a transit operator or project sponsor to properly plan for and carry out the overall management of its fleets. The Memos also provided an outline format to assist in FTA's review of fleet management plans and sets forth the minimum content requirements of each plan. The letters stress that the items in the outline section of each are minimum requirements and to include other material, as appropriate.

### **3.0 OBJECTIVES**

The objectives of the PMOC review of the project sponsor fleet management plans is to ensure that each plan meets the minimum criteria provided in the FTA's 1999 RFMP and BFMP Guidance and ensure that the content will enable the transit operator to properly plan for and carry out the overall management of its vehicle fleet(s).

To enable proper evaluation, the RFMP submitted in support of a major capital project should, at a minimum, reflect a ten to fifteen year time frame and must include the project's design year. The BFMP time frame should begin with at least one full year of historical and empirical data compiled through past and current operations of the rail fleet. The minimum time frame requirements for a bus

fleet management plan are three to five years prior to the start of project construction until one to three years after the start of operations on the completed project, including at least one full year of historical and empirical data compiled through past and current operations of the bus fleet.

An effective plan will address vehicle and service types (bus, rail, etc.) in operation and anticipated to be in operation, including paratransit, as well as factors that are relevant to the project sponsor's determinations of current and future equipment needs. Future demand should be estimated based on (a) vehicle life expectancy, (b) the requirements for peak and spare vehicles, (c) strategies for acquisition of new vehicles, and (d) strategies for maintenance and operations. The plan should also address in detail the composition of the fleet, operating conditions, facilities, etc.

The role of the PMOC in this process is to evaluate, based on the experience and knowledge of the qualified evaluator(s), the extent to which the project sponsor has met the intent of the requirement for a Fleet Management Plan, as well as the project sponsor's ability to properly plan for and carry out the overall management of its vehicle fleet. The PMOC should first examine whether all of the required factors have been included in the Plan, and then provide opinions on whether the Plan is: a) feasible, based on the resources immediately available to the project sponsor, b) sustainable, based on the long term infrastructure and resources anticipated to be available to the project sponsor, and c) comprehensive, based on its consideration of the required factors to properly maintain and operate the new or refurbished vehicles contemplated.

#### **4.0 REFERENCES**

The following is the principal, but by no means the only, references to Federal legislation, regulation and guidance with which the PMOC should review and develop a solid understanding as related to the project sponsor's project work being reviewed under this OP:

- Circular C9030.1D, Urbanized Area Formula Program: Program Guidance and Application Instructions
- Circular 5200.1A, Full-Funding Grants Agreements Guidance
- Project and Construction Management Guidelines, 2011 Update
- Guidance: Rail Fleet Management Plans, FTA Memorandum to Regional Administrators, September 2, 1999 (attached as Appendix D)
- Guidance: Bus Fleet Management Plans for New Starts, FTA Memorandum to Regional Administrators, April 8, 1999 (attached as Appendix E)

#### **5.0 PROJECTS SPONSOR'S SUBMITTALS**

Appendix C contains a sample table of contents and timeline for completion of a Fleet Management Plan. Separate fleet management plans may be developed for bus and rail including separate plans for rail systems that do not share a common rail line. The PMOC shall utilize this table of contents as a guide in its review of a project sponsor's Fleet Management Plan.

The project sponsor is required to formally submit its Fleet Management Plan to FTA at the following milestones during the project life:



- Before entry into Engineering;
- For a Risk Assessment if conducted during the Engineering Phase
- Before FFGA (if required, as an update).

It is anticipated that an existing fleet management plan may need updates from time to time between milestones. It should be noted that during transitional periods of new replacement car deliveries, retirement, or the rebuild/rehab, the spare ratio of the total cars available will be higher than typical. Any increase over previous spare ratios should be clearly described and should be temporary in nature for the transit agency. Items that will necessitate an immediate update to the plan might include the following:

- New vehicle purchase;
- Retiring of existing vehicles;
- Rebuild/rehab program to extend life expectancy of existing vehicles;
- Extensions or expansions in service;
- Strategic changes that affect the operations, peak vehicle requirements, or load factors of the system.

A revised fleet management plan should include a brief description and clear reconciliation to the previously submitted plan.

## **6.0 SCOPE OF WORK**

At the milestone points or as conditions warrant the FTA may require the PMOC to review the project sponsor's Fleet Management Plan. The PMOC shall report findings and make recommendations as to the accuracy, adequacy and reasonableness of the project sponsor's Fleet Management Plan and supporting data, plans, and documentation.

The fleet management plans must address operating policies (level of service requirements, vehicle failure definitions and actions); peak vehicle requirements (peak service period and scheduled standby trains); maintenance program (scheduled, unscheduled, and overhaul); system and service expansions; vehicle procurements and related schedules; and spare ratio justification.

The PMOC may be asked to:

- Share its knowledge of fleet management plans and practices with the project sponsor; serve as a resource, lend its experience and knowledge of other plans;
- Provide plans that have been found complete and reasonable as models of "best practices" among project sponsors;
- Provide further outlines of the elements in a fleet management plan to adjust the plan to the project sponsor's operation;
- Review the fleet management plan to ensure it is comprehensive and complete in its analysis of the vehicle operations.

In support of this review, the PMOC shall, when directed, conduct on-site inspections of equipment, facilities, data, documentation, or records to evaluate the project sponsor's effectiveness in implementing the fleet management plan in conformance with the grant agreement, sound operating or

engineering practices, or other statutory and administrative requirements. Inspection visits should be made, for example, to follow up on information received from the project sponsor about an event with significant impact on the project, or to determine whether the project sponsor has adequately implemented the fleet management plan.

The PMOC shall review project sponsor documentation, characterize the project sponsor's fleet management plan, and validate the plan and operating assumptions in conformance with these procedures; when directed the PMOC shall perform a technical review and/or conduct physical inspections. The PMOC shall evaluate and assess the accuracy, adequacy and reasonableness of the project sponsor's Fleet Management Plan and its supporting plans and documentation using the following criteria:

- 1) The project sponsor's existing transit service, in terms of level of service, operating costs, reliability, quality, and support functions, will not be degraded as a consequence of either the design and manufacture of the equipment or the design and construction of the project; and that the project sponsor will be able to provide adequate service to meet the transit demand for the years leading up to and following either the delivery of the equipment/facility or construction of the project;
- 2) Fleet operations (present and future) as described in the plan are substantially consistent with that adopted in the Record of Decision (if applicable), sufficiently complete in detail and analysis (fleet plan or supporting documentation) to readily demonstrate project sponsor's ability to maintain or improve the current level, and quality of operating costs, and reliability and quality of service for the years leading up to and following construction of the project. The plan also provides details of existing and planned vehicle procurements as well as any overhaul/rebuild programs that extend the life expectancy of the equipment;
- 3) The project sponsor has selected a sufficient time frame for fleet planning<sup>1</sup>, and compiled sufficient historical and empirical data from past and current fleet operations;
- 4) The project sponsor can properly plan for and execute the overall management of its entire fleet of vehicles and related support functions and equipment, addressing reasonably foreseeable and relevant factors regarding future equipment needs:
  - a) Additional maintenance facility requirements;
  - b) Accommodations for future growth;
  - c) Contingency for short term changes in ridership;
  - d) Vehicle life cycle maintenance;
- 5) The project sponsor's management is competent and capable of providing leadership and direction on fleet planning and operating matters including all aspects of Fleet Management Plan requirements;
- 6) The Plan includes: (a) definition of terms, (b) the requirements for peak and spare vehicles including schedule spares, maintenance spares, parts spares, (c) the requirements for support functions such as heavy and running maintenance, capital and operating parts inventory and information technology, (d) strategies for acquisition of new vehicles or overhauling existing equipment and tradeoffs between them, (e) strategies for maintenance and operations

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<sup>1</sup> The planning horizon for bus fleet plans should be at least 10 years but not less than described in Appendix E for BFMP in support of rail projects. The planning horizon for rail fleet plans should be through either the design year for new systems or through the first vehicle overhaul cycle, whichever comes later. For existing rail operators; however, the fleet plan should not be less than 15 years but typically 20 years to 30 years (See end note in Appendix D).

- including reducing spare vehicles, (f) strategies for reducing operating costs and increasing service reliability, (g) description of existing system and expansion plans, both project and non-project related, (h) a schedule for the existing and procured/overhauled vehicle fleet; (i) the project sponsor's reliability program, past performance and plans to improve reliability;
- 7) The FTA provides a recommended spare ratio of 20% for bus fleets. For rail fleets, the FTA has not established a specific spare ratio number as rail transit operations tend to be highly individualized and, as such, the spare ratio is expected to vary from operator to operator. The following, which mirrors the guidance provided to project sponsors, should be used by the PMOC in its review of the project sponsor's justification for and the reasonableness of the proposed spare vehicle ratio:
- a) Spare ratio justification should consider: average number of cars out of service for scheduled maintenance, unscheduled maintenance<sup>2</sup>, and overhaul programs; allowance for ridership variation (historical data); ridership changes that affect car needs caused by expansion of system or services; contingency for destroyed cars; and car procurements for replacements and system expansions; vehicle procurement lead times;
  - b) Cars delivered for future expansion and cars that have been replaced, but are in the process of being disposed of should be identified and separated from other spares because they unfairly distort the spare ratio;
  - c) The Peak Vehicle Requirement should include "spare", "gap", or "standby" trains but only where those trains are scheduled, ready for service, and have a designated crew;
  - d) Factors that may influence spare ratio are: equipment make-up (locomotive-hauled trains; married pair units or single cars; equipment design, reliability and age); environmental conditions (weather, above-ground or underground operation, loading and track layout); operational policies (standby trains, load factors, headways); maintenance policies (conditions for removing cars from service), maintenance scheduled during nights and weekends, and labor agreement conditions; and maintenance facilities and staff capabilities;
  - e) A template for the calculation can be found in the Circular 9030.1D, Appendix D;
- 8) The project sponsor's information system reliably provides needed operating and financial data such as current estimates of maintenance facility and vehicle operating costs, reliability, and life expectancy for decision-making and performance review;
- 9) That in its selection and specification of vehicle equipment and systems, the project sponsor has matched the appropriate technology with the planned transit applications for the best performance at the lowest cost;
- 10) Project sponsor estimates of costs, service levels, quality, or reliability are mechanically correct and complete, consistent with the project sponsor-defined methodologies, and free of any material inaccuracies or omissions;
- 11) Project sponsor forecasts and schedules are mechanically correct and complete and are consistent with the plan scope and project scope adopted in the Record of Decision.

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<sup>2</sup> Since the average number of cars undergoing unscheduled maintenance (including collision damage or waiting for parts) varies on a daily basis, it is expected that there will be a number of vehicles available but not used; this number represents the difference between the average number of cars held for unscheduled maintenance and the maximum permissible number of cars that can be held for unscheduled maintenance and still support the Peak Vehicle Requirement.

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall review the items as per the checklist in Appendix. The PMOC shall provide FTA with a written report of its findings, analysis, recommendations, and professional opinions, including a description of the review activities undertaken. After FTA approval, the PMOC should share the report with the project sponsor. The report formatting requirements of OP 01 apply. When necessary, PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may add other software as required but documentation and report data shall be made available to FTA.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1	The PMOC shall review and analyze project sponsor's Fleet Management Plan and the projects sponsor's ability to properly plan and carry out the overall management of its entire vehicle fleet.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of the Fleet Management Plan.		<b>Q1a.</b> PMOC provides documentation of the process.	<b>M1a.</b> Review of the process documentation.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process and project management judgment to review and analyze project sponsor's Fleet Management Plan and the projects sponsor's ability to properly plan and carry out the overall management of its entire vehicle fleet.		<b>Q1b.</b> Review must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>M1b.</b> Documented review and analysis of project sponsor's Fleet Management Plan and the projects sponsor's ability to properly plan and carry out the overall management of its entire vehicle fleet.	<b>MM1b.</b> Periodic review by FTA or its agent and the PMOC's internal verification.
2	The PMOC shall, as directed by FTA, review project sponsor's Fleet Management Plan and form a professional opinion as to the feasibility, sustainability and comprehensiveness of project sponsor's ability to successfully manage and complete the project.	<b>R2a.</b> The PMOC shall review the project sponsor's Fleet Management Plan to determine the feasibility, sustainability and comprehensiveness of the project sponsor's fleet management plan.		<b>Q2a.</b> Professional opinion of the feasibility, sustainability and comprehensiveness of project sponsor's fleet management plan.	<b>M2a.</b> PMOC's review and opinion as to the feasibility, sustainability and comprehensiveness of project sponsor's fleet management plan demonstrates sound management and engineering practices and professional experience.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall review the Operations and Maintenance strategy contained in project sponsor's Fleet Management Plan to determine the feasibility, sustainability and comprehensiveness of the O&M strategy.		<b>Q2b.</b> Professional opinion of the feasibility, sustainability and comprehensiveness of the project sponsor's Operations and Maintenance strategy.	<b>M2b.</b> PMOC's review and opinion as to the feasibility, sustainability and comprehensiveness of project sponsor's Operations and Maintenance strategy demonstrates sound management and engineering practices and professional experience.	<b>MM2b.</b> Periodic review by FTA or its agent.
		<b>R2c.</b> The PMOC shall review the Fleet Management Plan to determine the feasibility, sustainability and comprehensiveness of the project sponsor's management capabilities.		<b>Q2c.</b> Professional opinion as to the feasibility, sustainability and comprehensiveness of the project sponsor's management capabilities.	<b>M2c.</b> PMOC's review and opinion as to the feasibility, sustainability and comprehensiveness of project sponsor's management capabilities demonstrates sound management and engineering practices and professional experience.	<b>MM2c.</b> Periodic review by FTA or its agent.
		<b>R2d.</b> The PMOC shall review the Fleet Management Plan to assess the impact of this Project on feasibility, sustainability and comprehensiveness of present and future transit operations of the project sponsor.		<b>Q2d.</b> Professional opinion of the impact of this Project on the feasibility, sustainability and comprehensiveness of project sponsor's present and future transit operations.	<b>M2d.</b> PMOC's review and opinion as to the impact of this Project on the feasibility, sustainability and comprehensiveness of project sponsor's present and future transit operations demonstrates sound management and engineering practices and professional experience.	<b>MM2d.</b> Periodic review by FTA or its agent.
3	The PMOC shall provide FTA with a written report of its findings, analysis, recommendations and professional opinions.	<b>R3.</b> The PMOC shall present its findings, analysis, recommendations and professional opinions to FTA in a written report and, when so directed by FTA, seek to reconcile its findings with project sponsor to the extent possible. A supplemental report shall be filed describing the results of reconciliation attempts.		<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with the project sponsor to the extent possible.	<b>M3.</b> Review of the PMOC's presentation of findings, analysis, recommendations and professional opinions by the FTA.	<b>MM3.</b> Periodic review by FTA or its agent.

## APPENDIX B

### Fleet Management Plan Checklist

	Requirement	PMOC Review Comments
<i>Review comments will indicate the following:  Acceptable, Unacceptable, Acceptable with comment.  Identify portions of the document that meet the criteria</i>		
<b>1</b>	<b>Project Sponsor Document</b> <i>Verify that:</i>	
1A	The FMP is conformed in accordance with the project sponsor's Document Control System.	
1B	Each page identifies the Revision No. and the date of the document.	
1C	The date of the project sponsor's submittal is clearly identified.	
1D	The contents of the FMP properly reflect the Table of Contents.	
<b>2</b>	<b>PMOC review of Project Sponsor's fleet description</b>	
	Verify description of the makeup of the present fleet, including:	
2A	The number and type of rail vehicles and busses in service	
2B	Peak vehicle requirements (service period and make-up, e.g., standby trains)	
2C	Address the spare ratio of rail cars, and the rationale underlying that spare ratio	
2D	Achieve optimal life expectancies	
2E	Details of existing and planned rail vehicle procurements	
2F	Current and future equipment needs	
2G	Project sponsor in its selection and specification of vehicle equipment and systems has matched appropriate technology with the planned transit applications for best performance at the lowest cost.	

	Requirement	PMOC Review Comments
<b>3</b>	<b>PMOC review of Project Sponsor's Operations and Maintenance strategy</b>	
	Verify that the Operations and Maintenance Strategy addresses:	
3A	Operating policies and conditions (level of service requirements, train failure definitions and actions)	
3B	In detail the composition of facilities	
3C	Any rebuilds that extend the life expectancy of the equipment, any overhaul/rebuild programs; schedule to complete, effects on vehicle availability and useful life, etc., to the fleet	
3D	The project sponsor has adequately defined the preventive maintenance and schedule established for the existing and procured/overhauled rail car fleet	
3E	Enable a transit operator to properly plan for and carry out the overall management of its entire fleet of locomotives and rail cars	
3F	Fleet operations (present and future) as described in the plan are substantially consistent with that adopted in the Record of Decision (if applicable)	
<b>4</b>	<b>PMOC review of Project Sponsor's Management Capabilities</b>	
	Verify that the project sponsor's management is competent and capable of providing leadership and direction on matters of:	
4A	The requirements for peak and spare vehicles including schedule spares, maintenance spares, parts spares	
4B	The requirements for support functions such as heavy maintenance, capital and operating parts inventory and information technology	
4C	Strategies for acquisition of new vehicles or overhauling existing equipment and tradeoffs between them	
4D	Strategies for maintenance and operations including reducing spare vehicles	

	<b>Requirement</b>	<b>PMOC Review Comments</b>
4E	Strategies for reducing operating costs and increasing service reliability.	
4F	The plan discusses the project sponsor's reliability program, past performance and plans to improve reliability including profile monitoring and support of maintenance as well as failure rates and rail cars out-of-service as well as providing train failure definitions and actions	
4G	Project sponsor keeps a copy on file for review upon request updated from time to time as changes occur within the transit agency, acquisitions, replacement, rebuild/rehab, changes in headway or level of service, etc.	
4H	Sufficiently complete in detail and analysis (Fleet plan or supporting documentation) to readily demonstrate (1) project sponsor's ability to maintain and consistently improve the current level, operating costs, reliability and quality of revenue service for the years leading up to and following construction of the project; (the plan also provides.)	
4I	The project sponsor's information system reliably provides needed operating and financial data such as current estimates of vehicle operating costs, reliability and life expectancy, for decision-making and performance review.	
4J	The plan defines system and service expansions.	
<b>5</b>	<b>Project Impact Assessment</b>	
	Verify that critical system elements receive comprehensive assessment:	
5A	The project sponsor's existing transit service, in terms of level of service, operating costs, reliability, quality, and support functions, will not be degraded as a consequence of either the design and manufacture of the equipment or the design and construction of the project.	
5B	The project sponsor will be able to provide adequate service to meet the transit demand for the years leading up to and following either the delivery of the equipment/facility or construction of the project	



	Requirement	PMOC Review Comments
5C	The project sponsor can properly plan for and execute the overall management of its entire fleet of vehicles and related support functions and equipment, addressing all the reasonably foreseeable factors that are relevant to the determination of current and future equipment needs in light of demand for service	
5D	Project sponsor estimates of costs, service levels, quality, or reliability are mechanically correct and complete, consistent with the project sponsor-defined methodologies and free of any material inaccuracies or incomplete data.	
5E	Project sponsor forecasts and schedule are also mechanically correct and complete, consistent with the plan scope and project scope adopted in the Record of Decision (if applicable) and the proposed Revenue Operations Date as well as free of any material inaccuracies or incomplete data.	
<b>6</b>	<b>PMOC's review of Project Sponsor's Operations and Maintenance Plan Format</b>	
	Verify that the plan is consistent with FTA's guidance specifically with respect to:	
6A	Definition of terms	
6B	Description of existing system and expansion plans, both project and non-project related	
6C	The Demand for Revenue Vehicles and Operating Spare Ratio have been calculated in conformance with FTA guidance	
6D	The project sponsor has selected a sufficient time frame, (see Section 6.0 for guidance) and has compiled sufficient historical and empirical data from past and current fleet operations	

## APPENDIX C

### Sample Fleet Management Plan Table of Contents

Sample Fleet Management Plan Table of Contents		Prior to Entry into Engineering	During Engineering	Requesting FFGA or in Bid / Award and / or Construction
Introduction		●	○	○
	Overview of Plan	●	○	○
	Plan Timeframe	●	○	○
Definition of Terms		●	○	○
Existing System		●	○	○
	Description of current system	●	○	○
	Inventory List	●	○	○
Expansion Plan		●	○	○
Demand for Revenue Vehicles		●	○	○
	Peak Passenger Demand	●	○	○
	Passenger Load Standards	●	○	○
	Vehicle Run Times	●	○	○
	Peak Vehicle Calculations	●	○	○
	Gap or Ready reserve vehicles	●	○	○
	Spare Vehicle Calculation	●	○	○
	Total Sum of Vehicles required out of service	●	○	○
Supply of Revenue Vehicles		●	○	○
	Reconciliation of Demand versus Supply	●	○	○
	Existing and planned fleet procurements	●	○	○
	Define overhaul / rebuild programs	●	○	○
	Rebuild Schedules	●	○	○
	Vehicle Availability	●	○	○
	Useful Life	●	○	○
Maintenance and Reliability		●	○	○
	Preventative Maintenance Program	●	○	○
	Fleet Failure Rates	●	○	○
Revenue Vehicle Demand/Supply Balance		●	○	○
	Comparison of Vehicle Demand and Supply for duration of plan	●	○	○

#### LEGEND:

- Element to be completed.
- Element to be modified or augmented with additional information as necessary.

## APPENDIX D

### Rail Fleet Guidance Memo

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U.S. Department  
of Transportation  
Federal Transit  
Administration

## Memorandum

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Subject:	GUIDANCE: Rail Fleet Management Plans	Date:	Sep 2, 1999
From:	Hiram J. Walker Associate Administrator For Program Management	Reply to Attn. of:	
To:	Regional Administrators Regions I through X		
Through:	Nuria I. Fernandez Deputy Administrator		

This memorandum provides guidance on the requirement for fleet management plans by all transit agencies that have a rail system—light, heavy, commuter or other, either in existence or in the new starts approval process. It addresses the objectives of the fleet management plan, outlines the content of the plan, and defines FTA's role in the review of and acceptance of the plan. Establishing an outline format will assist in the review of the fleet management plans. A general outline is attached that will assist transit agencies in preparing their plan. The items in the outline section should be viewed as minimums, and not as the only items incorporated in the fleet management plan.

The appropriate FTA Regional Office will review all fleet management plans for its completeness in addressing the key factors outlined. No formal approval or acceptance process for the respective fleet management plans is needed, but the Regional Office will provide comments to the submitting agency. After the plan has been reviewed and all comments incorporated into the plan by the submitting agency, a copy shall be kept on file by the transit property for review upon request.

It is anticipated that the fleet management plan will need to be updated from time to time as changes occur within the transit agency—acquisitions, replacement, rebuild/rehab, changes in headway or level of service, etc. When updates are made, the plan will be reviewed and comments provided back by the Regional Office to the transit agency. This memorandum also outlines what constitutes the need for updating the plans by the respective transit agencies.

#### RESPONSIBILITIES

The responsibilities of the FTA Regional offices with regards to the fleet management plan are to:

- Make the grantee aware of FTA guidance in the area of fleet management plans
- Be aware of those transit systems in the process of procuring or rebuilding rail cars

**GUIDANCE: Rail Fleet Management Plan**  
**Page Two**

- Monitor transit properties through the new starts process and evaluate completeness of fleet management plan
- Assist the transit properties in preparing a fleet management plan in advance of their request for grants for the purchase of rail cars
- Review and comment back to the transit property on completeness and reasonableness of the plan in addressing the key factors outlined
- Ensure that an acceptable fleet management plan is kept on file at the transit agency

Certain capital projects have a Project Management Oversight (PMO) contractor assigned to them by the FTA. On those projects, the PMO contractor may be asked to:

- Share its knowledge of fleet management practices with the transit agency
- Assist in identifying materials that are crucial to the successful development of a fleet management plan
- Provide plans that have been found complete and reasonable as models of "best practices" among transit agencies
- Provide further outlines of the elements in a fleet management plan that makes it comprehensive and acceptable to their operation
- Participate in the review of the fleet management plan to ensure the plan is comprehensive and complete in its analysis of the rail operations
- Serve as a resource by lending its experience and knowledge of other plans that are completed or viewed as exhibiting "best practices" in the industry

It should be noted that the Rail Fleet Management Plan and Bus Fleet Management Plan for New Starts (dated April 8, 1999) are required by FTA's Office of Planning. The Office of Planning is aware that the FTA does not formally approve these plans, nonetheless the plans are important submissions by a program sponsor for review.

If you require further guidance or clarification, please contact Spiro Colivas at (202) 366-6009.

Attachment: Rail Fleet Management Plan

# **RAIL FLEET MANAGEMENT PLAN**

## **INTRODUCTION**

This memorandum provides guidance on fleet management plans for all transit agencies that have a rail system—light, heavy, commuter or other, either in existence or in the new starts approval process. The procurement of rail cars is not an easy task for transit operators. Each rail fleet is complex and unique to the environment in which it will operate. From the development of a technical specification, bid process, technical reviews, contractor award, engineering, prototype testing and analysis can take years before actual production and subsequent revenue service of the rail cars begin. Because of these factors, the fleet management plan should be viewed as dynamic rather than a static document.

The appropriate FTA Regional Office will review all fleet management plans for completeness in addressing the key factors outlined. No formal approval or acceptance process for the respective fleet management plans is needed, but the Regional Office will provide comments to the submitting agency. After the plan has been reviewed and all comments incorporated into the plan by the submitting agency, a copy shall be kept on file by the transit property for review upon request.

## **BACKGROUND**

The U.S. DOT Office of Inspector General (OIG) audited eight major rail transit operators from 1993 to 1995. A final national report (R4-FT-6-027) was issued on March 16, 1996. Since that time, the FTA has worked with the OIG and the Office of the Secretary to resolve issues in the final OIG audit report—"Summary Report on Audit of Useful Life of Rail Cars". The OIG recommendations involved the FTA's guidance regarding 12-year overhaul and 25-year replacement criteria, as well as establishment of a universal spare ratio for rail cars.

Throughout the discussions with the OIG, FTA has maintained that service and other operational factors were local decisions and should be left to the local decision-makers. FTA also maintained that existing policy provided a balance between effective oversight and grantee flexibility in making project specific decisions. In order to resolve some of the OIG's issues, FTA has:

- Issued guidelines in FTA Circular 9030.1C – Urbanized Area Formula Grant dated October 1, 1998, requiring a fleet management plan (excerpt in Attachment 1) and,
- Agreed to issue complete technical assistance guidelines for rail operators for preparation of their respective fleet management plan to include the following minimum areas;
  - New railcar purchases
  - Maintenance and operations strategies
  - Railcar life expectancy
  - Peak railcar requirements and spares

The guidance provided herein will serve as technical assistance and help identify "best practices" for the rail operators to prepare a rail fleet management plan for their system. It should be understood that this guidance needs to be reviewed periodically and updated as necessary.

### OBJECTIVE

The purpose of a fleet management plan is to encourage a transit operator to properly plan for and carry out the overall management of its vehicle fleet. Because of scarce resources, the importance of having a plan cannot be overstated. The transit operator needs to address the key factors necessary to make effective decisions on equipment needs and future vehicle demand. One of those factors will be spare ratio of rail cars. A specific spare ratio based on standards established according to industry "best practices" is an effective means of avoiding inefficient railcar investments.

It is understood that the spare ratio will vary from operator to operator. FTA's Circular 9030.1C states that "because rail transit operations tend to be highly individualized, FTA has not established a specific number to serve as an acceptable spare ratio for rail transit operations". This fact does not exclude any property from the requirement of a fleet management plan, but allows grantees flexibility to determine service requirements in their area. Circular 9030.1C further states that "the grant applicant's rail vehicle spare ratio and the rationale underlying that spare ratio will be examined as part of the grant application review whenever FTA assistance is requested to purchase rail vehicles and during the triennial review".

FTA desires to ensure that adequate guidance is available to assist grantees in making educated judgments on how scarce resources are used in capital investment decision-making and to protect the federal investments in transit systems. Implementation of a fleet management plan through these "best practices" will enable transit systems to achieve optimal life expectancies and appropriate spare rail car ratios.

FTA does not specify a rail car spare ratio, but operators are required to justify spare ratio calculations in a fleet management plan. The plan will be examined during triennial reviews and reviewed in grant requests for vehicle acquisition. FTA Circular 9030.1C – Urbanized Area Formula Program: Grant Application Instructions dated October 1, 1998, Chapter V, Section 15. Fixed Guideway Rolling Stock, paragraph b(5) Spare Ratio Policy, contains a requirement that grantees prepare and maintain a fleet management plan. The Circular states:

"An operator of a rail system must have in its file available upon request by FTA a fleet management plan that addresses operating policies (level of service requirements, train failure definitions and actions); peak vehicle requirements (service period and make-up, e.g., standby trains); maintenance and overhaul program (scheduled, unscheduled, and overhaul); system and service expansions; rail car procurements and related schedules; and spare ratio justifications."



### OUTLINE CONTENT

FTA has reviewed draft fleet management plans that were submitted to the respective FTA Regional Offices. For uniformity and establishment of "best practices" among the rail operators, an outline is shown below describing the minimum requirements in the fleet plans. These are viewed as the minimum required items with regards to composition of fleet, operating conditions, maintenance, facilities, peak vehicle demand and spare ratio. Any collected data from past and current operations used in making projections should be included in the appropriate sections as well. All historical and empirical data compiled through years of operating the existing fleet is important information on which to base portions of the fleet management plan. Each plan should consider a minimum time frame of 10 years from the date of the initial analysis.<sup>1</sup>

- Introduction: Broad overviews of the plan being submitted and exact time frame that it covers.
- Definition of Terms: Use of terms such as demand refers to ridership and the need for service, supply refers to amount of vehicles available, etc.
- Existing System: Description of the current system and rail fleet. A table detailing vehicle inventory for the transit agency (owned, leased, etc.) should be provided in this area or reference to an appendix at the end of the fleet management plan. This inventory list should list vehicle number or ID, age, status (active, inactive, disabled, salvage, etc.), and other clarifying comments.
- Expansion Plans: Future system development.
- Demand for Revenue Vehicles: Establishment of passenger demand and resulting peak vehicle requirement.
  - Step One – Determine peak passenger demand at the maximum load points by actual counts of present ridership and estimates of future demand. Include additions or rail extensions that will open in the 10-year time frame.
  - Step Two – Define and adopt passenger load standards and calculate load factor. Explain current passenger load standards and future load standards along with objectives or goals to achieve.
  - Step Three – Determine vehicle run times. This should be based on actual train performance for the existing system and for future expansions.
  - Step Four – Apply the adopted passenger load standards to the peak period ridership to calculate the number of cars required at the maximum loading points during peak period.
  - Step Five – Establish the peak vehicles required based on the selected headway (time interval between trains) and car consists (number of cars in a train) that meet the passenger load criteria.
  - Step Six – Explain if any gap or ready reserve trains will be utilized in the operating strategy. These rail cars will be added to the peak vehicles required for revenue service.

**Rail Fleet Management Plan**  
**Page Four**

- Step Seven – Calculation of spare rail cars required. Determine the number of scheduled preventive maintenance, unscheduled maintenance, vehicles used for continued testing/engineering review, etc., as basis for total sum of vehicles required out-of-service at any given time.
- Step Eight – Determination of total fleet demand and spare ratio. Total fleet is the sum total of peak vehicles required, scheduled service, gap trains, and spares. The operating spare ratio is defined as:

$$\frac{(\text{Total Fleet} - \text{Peak Vehicles Required})}{\text{Peak Vehicles Required}} = \text{Operating Spare Ratio}$$

- Supply of Revenue Vehicles: Reconciliation of demand versus supply should determine if additional rail cars will be needed and procured or other changes will be implemented instead. Details of existing and planned rail vehicle procurements as well as any rebuilds that extend the life expectancy of the equipment. Define any overhaul/rebuild programs; schedule to complete, effects to vehicle availability and useful life, etc., to the rail fleet.
- Maintenance and Reliability: Define the preventive maintenance and schedule established for the existing rail car fleet. Profile monitoring and support of maintenance as well as failure rates and rail cars out-of-service. Provide train failure definitions and actions.
- Revenue Vehicle Demand/Supply Balance: Explain and provide a comparison of the vehicle demand and the supply for the time duration of the plan, including any new rail car procurements.

This outline is not meant to be an all-encompassing list of items for the fleet management plan. Rail operators should review the suggested outline and determine what additional items or priority provide a better overview of its system.

#### **UPDATES TO FLEET MANAGEMENT PLANS**

The existing fleet management plans will need to be updated by the respective transit operator from time to time. It should be noted that during transitional periods of new replacement car deliveries, retirement, or the rebuild/rehab of existing rail cars, the spare ratio of the total cars available might be higher of necessity. Any increase over previous spare ratios should be clearly defined and temporary in nature for the transit agency. Items that will necessitate an immediate update to the plan might include the following:

- New rail car purchase
- Retiring of existing rail cars



**Rail Fleet Management Plan**  
**Page Five**

- Rebuild/rehab program to extend life expectancy of existing vehicles
- Extensions or expansions in service
- Strategic changes that affect the operations, peak vehicle requirements, or load factors of the system

It is anticipated that the fleet management plan will need to be updated from time to time as changes occur within the transit agency. When updates have been made, the plan will be reviewed and comments provided back by the Regional Office to the transit agency. Currently, FTA requires that every rail operator have an acceptable rail fleet management plan prior to award of any Federal Grant. The revised fleet management plan should include a brief description and clear reconciliation to the previously submitted plan.

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<sup>i</sup> Although this 1999 Dear Colleague Letter recommended a minimum time frame of 10 years, experience since that time, noting the procurement and service life of rail vehicles, calls for a longer planning horizon. The planning horizon for rail fleet plans should be through either the design year for new systems or through the first vehicle overhaul cycle, whichever comes later. For existing rail operators; however, the fleet plan should not be less than 15 years but typically 20 years to 30 years.

## APPENDIX E

### Bus Fleet Guidance Memo

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U.S. Department  
of Transportation  
Federal Transit  
Administration

## Memorandum

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Subject: GUIDANCE: Bus Fleet Management Plan for New Starts Date: APR 8, 1999

From: Hiram J. Walker Associate Administrator For Program Management Reply to Attn. of:

To: Regional Administrators Regions I through X

Through: Nuria I. Fernandez Deputy Administrator

The purpose of this memorandum is to provide guidance on bus fleet management plans for New Starts. As the sponsors of a New Start move into final design, a bus plan must be prepared in support of their project. This memorandum lists the objectives, process and provides an outline for the sponsors of the New Start to address in their bus plan. The items in the outline section should be viewed as minimums and not as the only items that should be incorporated in the bus plans.

#### OBJECTIVE

The objective of the bus fleet management plan is for the New Starts sponsor to ensure that bus service is not degraded during design and construction of their rail project. Each bus plan should address how the sponsor will:

- Maintain a bus fleet and facilities for the level of service and area currently served
- Establish quality of service measures and adequate monitoring of the bus service
- Provide capital and operating funds that will be required for bus service in the area

#### SCOPE

Each bus fleet management plan should give a clear explanation of their current situation with regards to composition of bus fleet, maintenance facilities and operating conditions. A New Start sponsor should prepare simple tables of time series data for their bus fleet for the periods of 3-5 years prior to rail construction, duration of the rail construction, and at least 1-3 years after rail service begins. Past years' data should be as reported to the National Transit Database, where possible and future data will be projected.

**GUIDANCE: Bus Fleet Management Plan for New Starts**  
**Page Two**

The New Start sponsor should be clear and concise in their bus plan. At minimum, the plan should include the following areas:

- Peak level of service for each year – number of vehicles required
- Fleet average age, composition, rehab/rebuild projects, vehicle retirements and purchase plans
- Ridership – current and projected average daily trips and load factor policy
- Maintenance facilities – age of facilities, capacity for existing fleet, expansion capacity for future vehicle purchases
- Maintenance expenditures, service quality and reliability measures – existing programs or measures used to gather information on service quality and reliability, on-time performance, load factors, vehicle reliability, etc.
- Annual budgets to provide for all of the above (tie into financial capacity review)

If you require further guidance or clarification, please contact Mr. Spiro Colivas in TPM-20 at (202) 366-6009.



## **Oversight Procedure 38 – Bus and Rail Vehicle Technical Review**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure (OP) is to describe the review, analysis, , and recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) as regards the Project Sponsors' procurements of bus and rail vehicles. The review should ensure that the vehicles being procured:

- Are a good fit for the intended use
- Represent good value for the product selected
- Meet the specified requirements
- Include the most appropriate technologies
- Conform to Federal Requirements

For all but the smallest procurements, reviews should be performed at definitive stages of the procurement: 1) Planning and Solicitation, 2) Vendor Selection, 3) Design, Manufacturing and Testing, 4) Acceptance, Commissioning, and Readiness for Revenue Service processes. It is important to evaluate the Project Sponsor's Management Capacity and Capability to be able to successfully manage these processes within stated cost and schedule constraints while meeting the intent of the project scope.

### **2.0 BACKGROUND**

The PMOC's review should occur in conjunction with other related Guidance. Refer to the following OPs when performing this review:

- OP 20 - Project Management Plan Review – including various supporting plans such as Vehicle Maintenance Plans, Operations Plans, and other Plans as applicable
- OP 25 - Recurring Oversight and Related Reports
- OP 35 (If applicable) - ADA (Level Boarding for Commuter Rail)
- OP 36 – Buy America Review
- OP 37 – Fleet Management Plan Review

### **3.0 OBJECTIVES**

The objectives of this review are to ensure that the vehicle procurement is performed in conformance with applicable regulations and guidance, and that process corrections are made in a timely manner involving vehicle specifications, manufacturing approaches, quality and testing processes, commissioning and safety certification in order to meet vehicle program requirements at key stages of the project.

## **4.0 REFERENCES**

The following are the principal, but not the only, references to Federal legislation, regulation and guidance with which the PMOC should review and develop a solid understanding as related to the Project Sponsor's project work being reviewed under this OP:

### **4.1 Legislative**

- The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, or SAFETEA-LU, Pub.L. 109-59
- Moving Ahead for Progress in the 21st Century, or MAP-21, P.L. 112-141
- 49 CFR Parts 27, 37 & 38: U.S. Department of Transportation regulations implementing the transportation provisions of the ADA.  
[http://www.fta.dot.gov/civilrights/ada/civil\\_rights\\_5936.html](http://www.fta.dot.gov/civilrights/ada/civil_rights_5936.html)
- 49 CFR Parts 661 & 663 Buy America regulations: This regulation is likely to have a significant impact on the procurement process continuing through the manufacture of the vehicles.
- The Department of Transportation issued Disability Law Guidance, Full-Length, Level-Boarding Platforms in New Commuter and Intercity Rail Stations on September 1, 2005  
[http://www.fta.dot.gov/civilrights/ada/civil\\_rights\\_3890.html](http://www.fta.dot.gov/civilrights/ada/civil_rights_3890.html)

### **4.2 United States Code**

- 49 U.S.C. Chapter 53, specifically, section 5323(j)

### **4.3 Regulations**

- Buy America Requirements, 49 C.F.R. Part 661
- Pre-Award and Post-Delivery Audits, 49 C.F.R. Part 663

### **4.4 Guidance**

- FTA's Buy America Audit Handbooks

### **4.5 FTA Circulars**

- C4220.1F, Third Party Contracting Requirements
- C9030.1D, Urbanized Area Formula Program
- FTA's Best Practices Procurement Manual

## **5.0 PROJECT SPONSOR SUBMITTALS**

In support of this review, the PMOC shall obtain and study the documents listed below. Under 49 U.S.C. 5325, 18 CFR 18.36(i), and 49 CFR 633.17 all supplier submittals are required to be available to the PMOC.

- Environmental Document
- Project Description - Grant Application
- Project (Vehicle) Specifications

- Procurement Solicitations, Technical Responses and Evaluations
- List of Drawings and supporting information on analysis and testing, including proof of design, maintainability, operability, safety, serviceability, and reliability; configuration control and management
- Testing Program Plan
- Quality Assurance and Quality Control Plan for Vehicles (and supporting documents)
- Vehicle History Books
- Safety and Security Certification Plans and Certifiable Items List
- Appropriate standards should be included in the specification by the Project Sponsor to ensure that vehicles comply with all Federal and state regulations. Environmental and performance standards should be explicit and appropriate for the locale.

## **6.0 SCOPE OF WORK**

In performance of the reviews below and following the checklist in Appendix B, the PMOC should report discrepancies and make suggestions for correction as appropriate. The PMOC should then follow up and report on the corrective actions taken by Project Sponsor. The PMOC should pay particular attention to those issues which may be identified in each stage of the procurement process.

- Cost - issues impacting cost as related to the use of technology, deviation from industry accepted designs, contract packaging, and specification enforcement;
- Schedule, issues potentially impacting schedule, and issues actually impacting schedule;
- Vehicle quality and safety issues;
- Vehicle reliability, availability and maintainability;
- Issues impacting vehicle operability;
- Faulty or unreliable vehicle designs or systems;
- Known component or material deficiencies and availability of replacement parts;
- Other, such as payments to vendors (slow or no payments), commonality / compatibility with the existing vehicles, interface issues with other elements of the transit system

### **6.1 Planning and Solicitation**

At this stage of the process the PMOC should review concerns resulting from the NEPA process and the Engineering phase. The PMOC must also review the portions of the procurement process leading up to Vendor Selection using Invitation for Bid (IFB) or two-step procurement or Best Value procurement using competitive negotiations. The review would include Environmental Documents, Project Description –Grant Application, Technical Specifications, any proposed Contract Document Requirement Lists(CDRL), Test Program Plans, Design Drawings and Design Criteria, Quality Assurance Requirements, Technology Assessments, Requests for Expressions of Interest (RFEI), related Environmental Impact Statements (EIS), Contract Terms and Conditions (General Conditions, Special Provisions, Compensation Provisions, Sample Contracts, Bid Forms, Contractor Questionnaires), Requests for Proposals(RFP), Source Selection Procedure, Invitation for Bid (IFB), Instructions to Proposers, Minutes of Pre-Proposal Conferences, or any other documentation that ensures appropriate technological and financially responsible procurement of rolling stock.

The PMOC should evaluate the above documentation and process for impacts as identified above.

- The PMOC shall confirm that the intended vehicle does not potentially conflict with statements in the environmental documents.
- The PMOC shall review the design documents.
- The PMOC shall consider how well the proposed vehicle fulfills the Project Sponsor's stated purpose of the project and complies with applicable statutes and regulations. Consider operational requirements, cost to procure vehicles, maintenance intentions, and prospects for follow-on procurements.
- The PMOC shall review the RFP or Bid package and solicitation and evaluation process including vehicle specification and terms and conditions.

## **6.2 Vendor Selection**

At this stage of the process the PMOC should review the vendor selection process; that would include – review of Contractor Proposals, completed Contractor Questionnaires, any Best and Final Offers, Proposal Evaluations Process, Completed Price Proposal (or Bid) Forms, Proposal Questions and Responses, Pre-award site survey(s), Pre-award Buy America Audit or any other documentation that ensures appropriate technological and financially responsible procurement of rolling stock.

The PMOC should evaluate the above documentation and process for impacts as identified above and to:

- a) determine that the selected vendor meets the qualification requirements
- b) ensure the integrity of the proposal evaluation criteria and process
- c) monitor the contract negotiation process and agreed terms
- d) assure that the contract vehicle options meet the Project Sponsor's needs
- e) verify that a Pre-Award Buy America audit is compliant
- f) monitor any Post-award, Pre-initial Notice to Proceed (NTP) Conference

## **6.3 Design, Manufacturing and Testing**

As part of the review of the Design, Manufacturing and Testing process, the PMOC should review the Project Sponsor's management of and processes for review and approval of the vehicle manufacturer's design, production schedule, materials, subsystems, vendors, QA/QC plans and inspection forms, hold points for Project Sponsor inspections/approvals, First Article Inspection (FAI) procedures and schedule, Vehicle History Book Development, CDRL submission and approval, and the verification of adherence to safety, security, Buy America Audit, and ADA requirements. In addition, for rail vehicles, the PMOC should conduct periodic reviews and oversight of the interface coordination between vehicle design and train control, traction power, communication, track, wayside and related systems design. The PMOC should also review and provide oversight of the Project Sponsor's management of and processes for review and approval of the vehicle manufacturer's qualification and production conformance test plans (including static and dynamic testing), execution of those plans, handling of non-compliant test results, retesting, and acceptance of the vehicle structure, interior, propulsion and braking systems, doors, and all other vehicle systems.

- The PMOC shall review the CDRLs to determine whether they address all of the characteristics to be demonstrated through analysis and testing including proof of design, maintainability, operability, safety, serviceability, and reliability. The PMOC must closely monitor the configuration controls and management to enable ongoing and timely procurement updates and schedule performance.
- The PMOC shall review the Test Program Plan and supporting analysis and testing information to ensure the vehicle and its systems are integrated per specifications, including with the vehicle operating environment elements. The PMOC must assure that, between test and analysis, the supplier will demonstrate full compliance with the Project Sponsor's design specification.
- The PMOC shall review and monitor the Project Sponsor's final Buy America Audit.
- The PMOC shall review the Project Sponsor's QA plan to ensure the vehicle manufacturer and suppliers' QA/QC will be performed under adequate surveillance.

#### **6.4 Acceptance, Commissioning and Readiness for Revenue Service**

At this final stage of the vehicle procurement process, the PMOC should review acceptance and commissioning activities and provide oversight related to Project Sponsor's planned management of and processes for receipt of vehicles, static and dynamic (on site) qualification/acceptance testing plans and procedures, identification process for needed modifications and modification management process, systems integration and interface compatibility testing (integrated testing) with civil infrastructure and wayside systems, commissioning and start-up operations testing (including pre-revenue), acceptance and stocking of spare parts, vehicle manufacturer and vendor manuals and training delivery, conditional and final acceptance requirements, warranty management, delivery of Vehicle History Books, and safety and security certification of each vehicle.

- The PMOC shall review the qualification and production conformance test plans to determine whether they address all of the characteristics to be demonstrated through analysis and testing including proof of design, maintainability, operability, safety, serviceability, and reliability. The PMOC must closely monitor the integrated testing process to ensure delivery of a fully functioning transit system within the scope of the project definition.
- The PMOC shall review the vehicle manuals and training programs to ensure the Project Sponsor's preparedness to place vehicles into revenue service and mesh them with other plans to be delivered including the Bus and Rail Fleet Management Plan and the Operations and Maintenance Plan.
- The PMOC shall review the Safety and Security Certification process for all vehicles to ensure compliance to the Safety and Security Implementation Plan and the addressing of all identified items on the Certifiable Items List (CIL).



## **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall provide FTA with written reports of findings, analysis, recommendations, professional opinions, and a description of the review activities undertaken. After FTA approval, the PMOC should share reports with the Project Sponsor. In the event that differences of opinion exist between the PMOC and the Project Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile with the Project Sponsor and provide FTA with a report addendum covering the agreed modifications by the Project Sponsor and PMOC.

The report formatting requirements of OP 01 apply. When necessary, PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may add other software as required but documentation and report data shall be made available to FTA.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	ACCEPTABLE QUALITY LEVEL	PERFORMANCE MEASURE	MONITORING METHOD
1	PMOC shall review the status of Project Sponsor's procurements of road and rail vehicles.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of Project Sponsor's procurements of road and rail vehicles.		<b>Q1a.</b> Process exists and has been followed.	<b>M1a.</b> Evidence of a documented process that does not duplicate work performed by the sponsor or its consultants.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process to validate the thoroughness of road and rail procurements at all phases of the project.		<b>Q1b.</b> Assessment must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>M1b.</b> Documented assessment of road and rail vehicle procurements.	<b>MM1b.</b> Periodic review by FTA or its agent.
2	The PMOC shall oversee Project Sponsor's procurements of road and rail vehicles to ensure that FTA grants are used to obtain best value.	<b>R2a.</b> The PMOC shall continually assure that FTA's interests are protected economically through review and analysis of Project Sponsor's procurement of intended vehicle for 1) consistency with EIS/EIR, 2) needs identified in Grant Application, 3) compliance with CDRs, 4) assurance that the Test Program Plan demonstrates full compliance with the Sponsors design specification, 5) adequacy of Design Documents and 6) adequacy of the QA Plan.		<b>Q2b.</b> Professional opinion of compliance through Project Sponsor's submittals protecting FTA's economic interests.	<b>M2b.</b> Documented evidence of a thorough review of Project Sponsor's submittals and design documentation, supported by a professional opinion.	<b>MM2b.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall continually monitor the status of Project Sponsor's procurements of road and rail vehicles to assure that: 1) The vehicles are a good fit for the intended use, 2) The vehicles represent good value, 3) The vehicles are assured to meet specification requirements and 4) The Project Sponsor has considered the most appropriate technologies.		<b>Q2c.</b> Professional opinion pertaining to vehicles meeting Project Sponsor needs and specification requirements at appropriate levels of technology.	<b>M2b.</b> Documented evidence of continued monitoring and review, discussion of discrepancies and reporting of intended corrective action, supported by a professional opinion.	<b>MM2b.</b> Periodic review by FTA or its agent.
		<b>R2c.</b> The PMOC shall identify and report areas of Project Sponsor's procurements of road and rail vehicles requiring corrective action and make suggestions for correction as appropriate.		<b>Q2c.</b> Professional opinion pertaining to corrective actions needed to assure protection of FTA's interests.	<b>M2c.</b> Documented evidence of continued monitoring and review, discussion of needed corrective action with Project Sponsor upon FTA approval and reporting of needed corrective action to FTA, supported by a professional opinion.	<b>MM2c.</b> Periodic review by FTA or its agent.
3	The PMOC shall document its findings, professional opinions, and recommendations in a report to the FTA.	<b>R3.</b> The PMOC shall present its findings, conclusions, and recommendations to FTA and, upon FTA approval, reconcile those recommendations with the Project Sponsor to the extent possible.		<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with Project Sponsor to the extent possible.	<b>M3.</b> PMOC's findings, conclusions, recommendations, and presentation.	<b>MM3b.</b> Periodic review by FTA or its agent.

## APPENDIX B

### Bus and Rail Vehicle Technical Review Checklist

Section	Issue	Description
<b>6.1</b>		<b>Planning and Solicitation</b>
	1	The PMOC shall confirm that the intended vehicle does not potentially conflict with statements in the environmental documents. Describe any conflicts between environmental documents and intended vehicle and Project Sponsor's intended response.
	2	The PMOC shall consider how well the proposed vehicle fulfills the Project Sponsor's stated purpose of the project and complies with applicable statutes and regulations as well as fill operational needs.
	3	Will the specified vehicle fit the Project Sponsor budget and resources available?
	4	Will additional vehicles be required and if so has the process taken follow-on procurements into account?
	5	Review draft specification and the final specifications: <ul style="list-style-type: none"> <li>a. Do the payment schedule and the work schedule match?</li> <li>b. Will key technical documents be approved before hardware delivery?</li> <li>c. Can the vehicles be maintained with the resources at the Project Sponsor's disposal?</li> <li>d. Will the specified training program enable the Project Sponsor to perform vehicle operations and maintenance?</li> <li>e. Are adequate measures taken to protect the Project Sponsor in terms of liquidated damages, weight penalties, design conformance, warranty provisions, delivery of "as-built" drawings?</li> </ul>
	6	Review Contract Terms and Conditions: <ul style="list-style-type: none"> <li>a. Are appropriate FTA contract clauses included?</li> <li>b. Have appropriate contract methods been followed to allow for competition and yield the best price for the technology and vehicle chosen?</li> <li>c. Appropriate General Conditions, Special provisions, Technical Provisions identified</li> <li>d. Does the payment schedule (in particular front-loaded payment schedule) adequately leverage compliance with specifications; does it ensure the Project Sponsor holds sufficient retainage at Preliminary Design Review (PDR), Final Design Review (FDR), FAI, Performance Testing, Vehicle Acceptance, and the warrantee period for supplier and sub-suppliers;</li> </ul>
	7.	RFP Solicitation: <ul style="list-style-type: none"> <li>a. Was an RFEI distributed? Adequate competition for selected technology/vehicle?</li> <li>b. Pre-proposal conference held/questions answered fully?</li> <li>c. Contractor questionnaire utilized?</li> </ul>
<b>6.2</b>		<b>Vendor Selection</b>
	1	PMOC should review contractor technical and price proposals, any bid forms, questionnaires, BAFO, and other related documents to validate open and fair competition as well as technological and financially responsible vendor selection.
	2	Determine that selected vendor meets specified requirements
	3	PMOC should monitor negotiation process and agreed terms
	4	Assure any contract options meet Project Sponsor's needs
	5	Verify Pre-Award Buy America Audit
	6	Monitor NTP, post-award conferences
<b>6.3</b>		<b>Design, Manufacturing and Testing</b>
	1	Contract Deliverables Requirements List: Does the CDRL assure that all critical performance issues are adequately analyzed,

		<p>including:</p> <ul style="list-style-type: none"> <li>a. Structural strength and fatigue resistance of rail vehicle body and truck or bus vehicle frame and chassis</li> <li>b. Brake Performance</li> <li>c. Propulsion performance</li> <li>d. Dynamic performance</li> <li>e. HVAC performance</li> <li>f. Dynamic Envelope, loading gauge, and clearance requirements</li> <li>g. Controls and Interlocks</li> <li>h. Weight Management</li> <li>i. Safety Management</li> <li>j. Reliability Management</li> <li>k. Availability Management</li> <li>l. Maintainability and Mean Time To Repair</li> </ul> <p>Does the CDRL schedule assure that performance is proved by analysis before start of sub-assembly production?</p>
	2	<p>Test Program Plan and Procedures:</p> <ul style="list-style-type: none"> <li>a. Are critical specified performance criteria demonstrated by test, by acceptable analysis, or prior agency certified test?</li> <li>b. Are acceptance tests sufficient to demonstrate that each vehicle is compliant through testing of representative criteria?</li> <li>c. Is the test program valid for the vehicle and the intended infrastructure; for instance, are new vehicle designs on new infrastructure treated to a different approach (a full system test for example), than existing vehicle designs; existing vehicle designs previously tested on the existing infrastructure might only require vehicle testing to assure satisfactory interfacing with the existing infrastructure?</li> <li>d. Do the qualification and acceptance test criteria ensure the vehicles “as delivered” will meet the Project Sponsor’s needs within acceptable boundaries without having to repeat qualification tests?</li> <li>e. Do test procedures refer to applicable sections of the specification?</li> <li>f. Are test procedures up-to-date and do they reflect the latest design configurations? Will the test plan validate all analyses?</li> <li>g. Will the test plan validate performance that has not been analyzed?</li> <li>h. Will the acceptance testing proposed validate production results and fleet performance?</li> </ul>
	3	Does the test plan and CDRL ensure the vehicle will perform on the actual infrastructure?
	4	<p>Review Design Documents to ensure:</p> <ul style="list-style-type: none"> <li>a. Do the documents address the intended issues?</li> <li>b. Is there a properly sequenced and efficient plan of design to ensure compliance and mitigate against rework?</li> <li>c. Assumptions made are valid and proven</li> <li>d. Analytical methods meet current professional standards</li> <li>e. The Project Sponsor’s review is by persons competent in the field and capable of detecting and commenting on design and analytical errors</li> <li>f. Drawing and configuration control are designed to ensure consistency throughout the fleet, including option orders</li> <li>g. Is PDR consistent with the specification?</li> <li>h. Is FDR consistent with specification, with all issues of design and analysis closed?</li> <li>i. Does the FAI validate all items of production; Does analysis and test precede production to minimize changes after production has started</li> <li>j. Are waivers for existing designs evaluated fully to ensure that the waivers are based on proven in-service technology used in demonstrably similar systems?</li> <li>k. Are project technical issues being resolved/mitigated; open items resolved prior to next payment</li> </ul>

	5	Review the Project Sponsor Quality Assurance Plan and vehicle manufacturer's Quality Program Plan to assure: <ul style="list-style-type: none"> <li>a. Do the vehicle manufacturer and its supplier's QA program and the Project Sponsor's oversight ensure delivery of the vehicle "as designed"?</li> <li>b. Does the Project Sponsor have qualified inspector(s) on site during manufacturing, including during pre-production of jigs and fixtures?</li> <li>c. Do the Project Sponsor and vehicle manufacturer reporting relationships provide sufficient independence to allow issues to be raised?</li> <li>d. Are protocols in place for dealing with discrepant or non-conformant products or materials, to quarantine them before proper disposal; does the Project Sponsor's inspector have a voice in disposal of discrepant or non-conformant products or materials?</li> <li>e. Is the schedule such that choices between corrective action and meeting the schedule do not drive compromise vehicle quality?</li> <li>f. Have the vehicle manufacturer and the Project Sponsor conducted quality audits on a pre-determined schedule?</li> </ul>
	6	Are FAIs complete and do they validate intended design function and performance?
	7	Is the rail vehicle adequately integrated with other systems such as train control, traction power, communications, wayside facilities, shops and shop equipment?
	8	Have Buy America Audits been completed and validated?
<b>6.4</b>		<b>Acceptance, Commissioning and Readiness for Revenue Service</b>
	1	Are the qualification and acceptance tests a full validation of the vehicle performance?
	2	Does vehicle acceptance validate the fleet performance within acceptable tolerances?
	3	Have Vehicle History Books been completed and do they represent the configuration of the as-built vehicles supplied?
	4	Have systems integration tests been completed satisfactorily with a validated vehicle configuration?
	5	Have spare parts, manuals and training been supplied in support of revenue service?
	6	Are all open items and warranty or fleet defect issues being addressed?
	7	Are Safety and security certification items (CIL) completed or satisfactorily disposed to allow for safe and secure operation?
	8	Have reliability, maintainability and other proof of design been addressed or completed?

Note: These check lists are to be supplemented as needed by the PMOC.



## **Oversight Procedure 40b – Risk and Contingency Review (Abbreviated Review)**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure (OP) is to describe the review procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) as regards review of the Sponsor's plan for mitigating and managing project risks.

Further, this OP describes the procedure for a PMOC risk assessment, under an abbreviated review process. See Appendix D.

### **2.0 BACKGROUND**

The reliability of the Sponsor's project scope, cost estimate, and schedule over the course of the project life is extremely important, not only for the success of the individual project, but also for the professional credibility of the transit industry including FTA. Professional risk management provides the basis for improving the reliability of project delivery.

### **3.0 OBJECTIVES**

This review requires an evaluation of the reliability of the Sponsor's project scope, cost estimate, and schedule at a summary level, with special focus on the elements of uncertainty associated with the effectiveness and efficiency of the Sponsor's project implementation and within the context of the surrounding project conditions.

This OP requires the PMOC to synthesize available project information including the Sponsor's separate Risk and Contingency Management Plan; evaluate, explore, and analyze uncertainties and risks; establish that an appropriate qualitative and quantitative assessment of ranges of forecasted cost and schedule has been developed; describe and evaluate the analytical methods used; consider risk mitigation options and alternatives including use of cost and schedule contingencies; draw conclusions; and provide recommendations for adjustment to scope, cost, schedule, project delivery method, construction methodology, and project management and risk planning in order to respond to project risk.

Review of the Sponsor's capacity and capability and of the Sponsor's Project Management Plan and subplans will occur in an expedited manner by focusing on key elements that present the strongest risk to the project's goals. The scope, estimate, and schedule reviews are reviewed in an expedited fashion; a duration of approximately 1-2 months; the review will culminate in a workshop as follows and as discussed further in this OP:

A workshop will be conducted in which the Sponsor will present the major elements of the project's scope, cost, and schedule at a summary level. The workshop's goals are to provide the Sponsor and PMOC the opportunity to jointly confirm these project documents based on the PMOC's earlier

expedited review, and to also discover and document weaknesses and assumptions in the documents; such weaknesses and assumptions will either be corrected or noted on a Risk Register to be used as a basis for the PMOC's risk analysis. The PMOC will work jointly with the Sponsor to establish an appropriate agenda and schedule of attendees for the meeting. It is intended that the meeting duration be no more than 3 days, depending on the complexity of the project and the level of definition of the documents. Workshop duration beyond these limits shall be confirmed with the FTA.

FTA may direct the PMOC to conduct this review at various points in a project's life. This review is applicable to projects using any project delivery method: Design-Build-Build (DBB), Design-Build (DB), Construction Manager/General Contractor (CM/GC), etc.

The PMOC's review under this OP is a critical input to FTA's decision regarding project advancement and funding.

## **4.0 REFERENCES**

The statutes, regulations, policies, guidance documents and circulars in OP 01 Administrative Conditions and Requirements apply.

## **5.0 REVIEW OF SPONSOR'S SUBMITTALS**

In advance of performing the review, the PMOC shall obtain and study documents similar to those listed in Appendix B, as appropriate for the particular project phase and level of review, including the Sponsor's Project Management Plan (including especially the Risk and Contingency Management Plan) and supporting documents. Supporting documents shall include appropriate design, cost, and schedule information sufficient to establish the basis of the project. Many of these documents will have been obtained through the review of scope, schedule, cost, and Sponsor management capacity and capability in other OPs. The PMOC shall perform an initial review and notify the FTA of important discrepancies in the project information that would hinder the review; an example would be insufficient detail or a mismatch between drawings and cost estimate in which the drawings are current and the cost estimate is significantly older.

## **6.0 SCOPE OF WORK**

### **6.1 Overview**

The scope of this review includes evaluation and recommendations for amendment of the Sponsor's project risk identification and assessment, mitigation recommendations, and contingency assessment, as reflected in its Risk and Contingency Management Plan. The PMOC shall independently develop a risk analysis to provide a thorough analysis of the Sponsor's project.

This risk management review builds upon any review of scope, schedule, cost, and Sponsor management capacity and capability in other OPs that may have been previously performed.

#### **6.1.1 Sponsor interface**

PMOC interface with the Sponsor during its risk review facilitates and expedites the process and provides the PMOC with the background necessary to efficiently evaluate risk and provide recommendations for revisions, if any, to the Sponsor's Project Management Plan. A typical structure for Sponsor interface meetings is presented in Appendix C.

### **6.1.2 Organizing the Risk Assessments by FTA Milestones**

Depending on the project trends, detailed forecasted levels of project risk would be developed around points in time when level of project development typically indicates changes in project risk. The following reflect common and important FTA Milestones for such detailed reviews:

- Readiness to Enter into Engineering;
- Readiness for SSGA/FFGA;
- Ready to Bid Construction;
- Start of Construction;
- 20% construction;
- 50% construction;
- 75% construction; and
- 90% construction.

The FTA Milestones may be modified to reflect important milestones in the Sponsor's schedule, especially those points where significant changes in risk occur. If FTA Milestones and PMOC-added milestones are more than one year apart, the PMOC shall consider developing supplemental milestones.

### **6.2 Project Status Evaluation: PMOC's Efforts**

A joint PMOC and Sponsor project status evaluation is a precursor to the detailed risk review. The completeness and accuracy of the risk review is highly dependent on the completeness and accuracy of the project status evaluation. The project status evaluation is performed in an abbreviated process, focusing on the most important drivers of the Sponsor's management capacity and capability, scope, cost, and schedule, especially as related to risk. The target is a review process of no more than 1-2 months. This evaluation shall culminate with include a workshop of typically a 2-5 day duration, during which the sponsor will present its scope, cost, and schedule documents, including whatever supporting documents are necessary to provide a full project understanding. It is the intent that this presentation will expedite the review through focus on those elements of the project that present large amounts of risk to the project's goals.

Prior to the workshop, the PMOC will additionally review key elements of the Sponsor's PMP (including especially the Risk and Contingency Management Plan and Staffing Plan) to also, in an expedited fashion, consider risks related to management capacity and capability, scope, cost and schedule. Other review elements may be included at the discretion of the FTA.

### **6.3 Identification and Categorization of Risks: Sponsor's Efforts**

Risk identification plays a significant role in the overall risk management process. Sufficient efforts shall be made by the Sponsor to ensure that adequate resources and processes have been used to develop a thorough listing of risk events, appropriate to the current project phase. This "Risk Register" shall include at a minimum a description of the potential risk event; its qualitatively-evaluated potential consequences and likelihood of occurrence; its SCC category and risk category; the contract package in which it falls (where appropriate); a method for prioritizing among risks; and potential actions to mitigate the risk.



### 6.3.1 Example of risk register

An example of a simplified, partial, risk register is included in Appendix E.

## 6.4 Identification and Categorization of Risks: PMOC's Efforts

The PMOC shall participate in a joint PMOC and Sponsor workshop, the intent of which is to receive a presentation on the key elements of the Sponsor's scope, cost, schedule and other key documents required to provide a full description of the project. The Sponsor and PMOC will consider each project element and the cost estimate and schedule, noting assumptions and potential risks in each area, and will identify new risk events that may threaten the projects goals as well as evaluate risk events that exist on the Sponsor's current Risk Register.

### 6.4.1 Risk Events

**Risk Events** are individually identified contingent, or unplanned, events that may occur and which may create a plan variance and may be cause for special management scrutiny or action. Such events, or a combination of such events, do not represent all risk present on a project, and the identification or disposal of risk events may only become possible as the project proceeds through its various phases. Therefore, risk event identification will require frequent updates as a project progresses.

### 6.4.2 Risk Categories

Risk shall be characterized as belonging to any of the following categories, which are listed in chronological order; generally, risk is categorized as associated with the category during which the risk may be earliest and best mitigated. The categories are listed below, and are related to traditional sequential phases of project development. If a risk event is not disposed of during a particular phase, it may survive into the following phase. See Appendix F for application of the risk category to risk assessment principles for capital and non-capital construction project elements.

**Requirements Risk** relates to the establishment and variability of fundamental goals and conditions of a project to which the design or construction process must respond, as well as the activities of the Sponsor to actively identify these goals and conditions. Generally, requirements risk is associated with all project development activities from earliest concept through Project Development. A significant portion of Requirements Risk can be attributed to the potential influence of project stakeholders and third parties (such as regulatory agencies) if project goals and requirements are not fully defined.

**Design Risk** is associated with the performance and variability of design-related activities occurring after Project Development. Substantially complete design risk is indicated when no material design-related assumptions or likely variations are detected through the scope review; the estimate review indicates that 95% of all construction direct cost activities are shown on both design deliverables and cost estimate; and the schedule review indicates that no project level critical path element or procurement activity exceeds 45 calendar days (or other reasonable minimum) in duration.

**Market Risk** is related to the procurement of project management, administrative, right-of-way, design, or construction services; materials; and equipment and the variability associated therewith. This risk refers to both the effects of the open-market pricing of goods and services, as well as the effects of the Sponsor's contract packaging strategies.

**Construction Risk** includes both risks that are due to the inevitable variability of the project's environment—including such items as unusual weather, unexpected subsurface conditions, and

unexpected construction contractor failure—as well as performance risk that is manageable by the Sponsor and its consultants and contractors—for example uncertainty surrounding mobilization of a tunnel boring machine and its planned production rates. Capital construction risk may be subdivided into: Early-Range Construction Risk (composed generally of site activities such as Geotechnical or Utility activities, usually associated with up to 20% complete), Mid-Range Construction Risk (associated with coordination of contractors, etc., from 20% to 50%), and Late-Range Construction Risk (associated with 50% to substantial completion).

## **6.5 Risk Assessment: PMOC's Efforts**

### **6.5.1 Project Cost Risk Overview**

The PMOC shall use its professional judgment and objective cost data to sequentially summarize, adjust, and condition the Sponsor's estimate at the minor SCC level to empirically develop the basis for evaluation of cost risk. These parameters will then be used to assess the magnitude of project risk and guide the potential responses to manage the risk.

**Top-down Cost Risk Assessment** - The FTA has developed methodologies for evaluating cost-risk assessment using broad parameters derived from historic project information. These parameters are applied as risk-based ranges of potential cost at a summarized category level, and this process is referred to as a top-down cost risk assessment model. The FTA top-down cost risk assessment methods are project-level risk assessment tools that have been developed through implementation on many FTA transit projects. The features have become accepted as common starting points for creation of a project-specific cost risk assessments.

### **6.5.2 Pre-assessment Adjustments of the Sponsor Estimate**

**Stripped Cost Estimate** - Based upon analyses performed in accordance with the OP associated with the review of the cost estimate, the PMOC shall ensure that Sponsor has identified all contingency funds embedded within its cost estimate. Such contingency funds may include both unallocated funds (usually applied as a percentage of summary costs) and allocated funds (usually applied as increases to individual estimate line items). Both patent (or exposed) contingency funds and latent (or hidden) contingency funds shall be identified; the identification of latent contingency funds will likely involve interviews with the Sponsor. Furthermore, particular attention shall be paid to contingent funds that may be embedded within estimates for inflation or escalation risk.

Once these contingency funds have been quantified, they shall be removed from the estimate to form a Stripped Cost Estimate.

**Adjusted Cost Estimate** - Utilizing scope, cost, schedule, contract packaging, etc. information developed through prior-performed analyses prescribed by Oversight Procedures and/or workshops with the Sponsor, the PMOC shall evaluate the Stripped Cost Estimate, suggesting changes to the various estimate line items to produce an Adjusted Cost Estimate. The amount of analysis shall be appropriate with the level of review required by the FTA. Care shall be taken to identify whether items so adjusted shall also become elements of the Risk Register. Any such adjustments and their rationale shall be fully documented. Note that the adjusted estimate, at a minimum, shall include one level of breakdown below the standard SCC Cost Elements [e.g.10.01, 10.02, etc.] The estimate shall be inflated to the year of expenditure (YOE), which becomes the basis for the ensuing risk assessment. Note that the inflation rate used for developing the Adjusted Cost Estimate shall be a rate that is a

reasonably-expected value without significant hidden contingency, in a similar manner that occurs with other estimate line items.

Subsequent analyses of risk depend upon accurate estimate adjustments. Where possible, and especially in the case of significant adjustments, the PMOC shall strive for consensus of the FTA, PMOC, and Sponsor in such adjustments before moving forward with the risk assessment.

This Adjusted Cost Estimate, appropriately stripped of contingencies, establishes a highly optimistic level of cost forecast for the various estimate line items, useful for assessing the range of risk for the line item.

### **6.5.3 Risk Profiles**

Many large transit projects, especially those in latter stages of development, consist of multiple phases or contract packages that are delivered using differing project methods or that are staged with differing timing. For example, Phase I of a project may begin a year or more earlier than Phase II; alternatively, the corridor for a particular project may be delivered using design-build methods, while the stations may use design-bid-build delivery. These circumstances may create project portions that exhibit different risk profiles, characterized by widely varying risk ranges factors.

Where practical and reasonable for accurate assessment of project risk or application of contingencies, the project may be apportioned based on these different risk profiles; risk and mitigations, including contingencies assessed independently by project portion; and the portions subsequently combined using appropriate techniques into an overall project risk recommendation.

### **6.5.4 Cost Risk Assessment – Beta Range Model**

The PMOC shall develop an independent top-down project cost risk assessment using the Beta Range Model method. The following generally describes its procedures; actual implementation of the Beta Range Model method shall be undertaken by those thoroughly familiar with the process and able to use judgment as necessary to fine-tune the process for specific project conditions.

#### **6.5.4.1 Standard Cost Category (SCC) Risk Assessment**

**SCC Cost Element Ranges** - Utilizing the procedures outlined below, the PMOC shall establish likely ranges of cost for estimated line items, or elements, at the minor SCC level, spanning the range of lower bound to upper bound, to which a Beta probability distribution function will be applied, allowing the application of risk across the entire project. The Beta probability distribution function has been derived from historical FTA transit project outcomes, and may be adjusted from time-to-time. These ranges shall be established as follows:

- **Lower Bound SCC Cost Element Range Establishment** - The Adjusted Cost Estimate for each minor SCC is established as the lower bound value of the SCC element.
- **Upper SCC Cost Element Range Establishment** - The PMOC shall establish the upper bound minor SCC value through multiplying the Lower Bound value by a range factor (hereinafter referred to as the Beta Range Factor or BRF); i.e., Upper Bound = BRF\*Lower Bound.

**Beta Range Factor Establishment** - The PMOC shall establish the Beta Range Factor (BRF) values through a process of initially utilizing the guidelines indicated below and in Appendix F, and then varying the developed Beta Factors based upon specific project situations (especially including those noted in the Risk Register), considering discussion with the Sponsor and FTA work order manager.

Beta Range Factors are sums of Risk Category factors; i.e., total risk for an SCC element is the sum of the individual Risk Category Factors for Requirements Risk, Design Risk, Market Risk, and Construction Risk, added to a base factor of 1.05. The base factor of 1.05 provides for a 5% end-of-project risk range allowance, which recognizes that risk generally remains, even at the end of construction.

Methods for establishing the BRFs are presented in Appendix F.

**SCC Cost Item Risk Curve Establishment** - The median, mean, and variance of the suggested range distribution for the SCC cost item are fully determined using the Lower Bound, the BRF, and the historically-derived Beta distribution. These calculations are modeled in the Beta Range Model Workbook.

**Project Delivery Method Influence** - Differing project delivery methods may generally affect the timing and scope of risk retained by the Sponsor but not necessarily the magnitude of risk nor the sequence of risk mitigation until contracting has occurred. Traditional project delivery methods (Design-Bid-Build) transfer or share much of the construction risk at the completion of design and market risk mitigation. Alternative project delivery methods such as Design-Build may transfer or share some components of requirements, design, market, and construction risk prior to the completion of design activities. The extent and effectiveness of risk transfers and risk retained by the Sponsor inherent in such alternative project delivery methods shall be considered when developing recommendations for BRF assignment.

#### 6.5.4.2 Project Level Cost Risk Assessment

Project-level risk is an aggregated amount of the risk associated with all of the SCC Category Cost Ranges. The Beta Range Model Workbook develops these calculations.

The Beta Range Model Workbook has been developed to illustrate the method's common features and to serve as a starting point for a particular project. This workbook is based on the summary organizational structure of the FTA Standard Cost Categories (SCC) 10 through 80 for the capital cost elements of a project; SCC category 90 (contingency) is specifically excluded as a duplicate measure of risk. Risk for SCC category 100 (finance charges) is not covered in the standard BRFs for categories 10 through 80; opinion of finance cost risk is provided separately through other FTA reviews. The Beta Range Model Workbook illustrates the formats and bases of calculations to properly execute the cost risk assessment described herein. The PMOC shall become fully familiar with the Beta Range Model Workbook prior to undertaking the work of this section. The PMOC shall adjust the FTA Beta Range Model Workbook as appropriate to meet specific project conditions.

The PMOC shall produce, using the Beta Range Model Workbook, a summary table that lists the Sponsor's estimated values, and the PMOC's recommended project cost elements with its assessment data—including the reportable range of variability determined in the risk assessment and its effect on the overall budget. The PMOC will then identify, in a narrative format, the key risk drivers through an analysis of those project elements with large cost risk impact.

The FTA may direct the PMOC to perform additional analyses as appropriate to provide further insight into the project-level risk assessment.

**Conditioned Estimate** - The PMOC shall evaluate contingency amounts identified for the project and shall comment on the sufficiency of the contingency, establishing a recommended contingency amount

for the project in accordance with this OP. A Conditioned Estimate may be developed by adding the recommended contingency to the Adjusted Estimate, which forms the PMOC's recommendation for the project budget. Note that contingency recommendations, regardless of method of analysis, are applied at the project level only, regardless of whether and how the Sponsor may allocate the contingency among the various project elements.

#### **6.5.5 Project Schedule Risk Overview**

The PMOC shall use its professional judgment and objective schedule data to evaluate the Sponsor's assessment of schedule risk, and to provide an independent assessment of schedule risk.

**Schedule Risk** is risk to the project schedule critical path directly delaying the project, or to any other significant activity, the delay of which may reduce schedule float, schedule contingency or threaten the project estimate. Note that schedule risk may also indicate cost risk.

##### **6.5.5.1 Pre-assessment Adjustments of the Sponsor Schedule**

**Stripped Schedule** - Based upon analyses performed in accordance with the OP associated with the review of the Schedule and/or workshops with the Sponsor, the PMOC shall to render an opinion whether the Sponsor has exposed all contingency durations embedded therein; the level of analysis so undertaken shall conform to the level required by the FTA. Such contingency durations to be removed may include both unallocated (usually applied as a dummy activity at the end of the project or sub-network) and allocated (usually applied as increases to individual activity durations). Both patent (or exposed) contingency durations and latent (or hidden) contingency durations shall be identified; the identification of latent contingency durations will likely involve interviews with the Sponsor. Further, particular attention shall be paid to contingent durations that may be embedded as lag time hidden within the activity logic ties or artificially applied constraints.

Once identified, these contingency durations shall be quantified and removed from the schedule to form a Stripped Schedule.

**Adjusted Schedule** - Utilizing scope, cost, schedule, etc. information developed in prior-performed Operational Procedures or joint PMOC and Sponsor workshops, the PMOC shall appropriately provide suggested revisions to the Stripped Schedule, increasing or decreasing the various activity durations. When applied to the Stripped Schedule, the suggested changes will develop an Adjusted Schedule. Any such adjustments and their rationale shall be fully documented.

The Adjusted Schedule forms a highly optimistic schedule for the project.

Subsequent analyses of risk depend upon accurate schedule adjustments. Where possible, and especially in the case of significant adjustments, the PMOC shall strive for consensus of the FTA, PMOC, and Sponsor in such adjustments before moving forward with the schedule risk evaluation.

#### **6.5.6 Schedule Risk Assessment**

##### **6.5.6.1 Summary Schedule Development**

To aid in efficient and effective attribution of risk, the PMOC shall review, or independently develop, a summary schedule based upon the Adjusted Schedule that will be used for modeling project schedule risk. The summary schedule shall be a mechanically-correct critical-path method schedule that adequately reflects the interrelationships among its activities so as to model the effect of a variation in any activity upon the other activities. The number of activities modeled shall be commensurate with

the Adjusted Schedule and level of detail available at the time of analysis; very large models are, however, generally difficult to assess and the principles underlying risk attribution may be difficult for all audiences to understand. Therefore, the PMOC shall review, or independently establish, a summary schedule for risk assessment purposes which, in its professional judgment, strikes a reasonable balance between transparency and level of detail required for sufficient risk assessment.

#### **6.5.6.2 Schedule Activity Risk Assessment**

Duration ranges for the activities of the Summary Schedule shall be established through a process of evaluating the specific project attributes (especially including those noted in the Risk Register); the reasonableness of these duration ranges shall be determined considering discussion with the Sponsor and the FTA. The Adjusted Schedule durations shall be used to establish the optimistic estimate for the summarized activity durations. The PMOC shall determine that appropriate technical experts have been consulted to establish the most likely and pessimistic estimates for the activity duration, or other parameters required for the stochastic analysis. The choice of probability functions or other technical parameters used in the analysis shall be clearly documented. Methods used in the analysis shall be made clear to all parties, in order that each may review, comment upon, and ultimately embrace the results of the schedule risk assessment.

The schedule activity risk assessment shall utilize a commercially-available project scheduling system that is capable of critical path scheduling and stochastic modeling for probabilistically-described activity durations. This system will be used for capturing and reporting activity risk duration ranges, as well as reporting the resulting project-level schedule risk assessment.

#### **6.5.6.3 Project Level Schedule Risk Assessment**

The likelihood of project completion within the timeframes estimated on Sponsor's master schedule shall be assessed using a commercially available scheduling software program capable of stochastic schedule risk modeling ("Monte Carlo" modeling). The schedule modeling shall successively and randomly develop alternate forecasted project completion dates, based upon the activity duration range input described above. Such modeling shall be undertaken by individuals fully capable of establishing modeling parameters and capable of interpreting the modeling results. This assessment shall include an evaluation of the predicted range of completion dates compared to the Sponsor's scheduled milestones; evaluation of assigned activity duration ranges, including statistical information such as range, median, mean, minimum and maximums; and identification of critical and near-critical paths and the relationship between those paths and identified risk events. The FTA may direct other similar analyses.

The Project Schedule Risk Assessment shall consider whether non-construction activities, such as vehicle procurement, may introduce a relationship that creates a critical path that in turn masks critical paths for construction activities; in such case, it may be prudent to temporarily remove the non-construction activities and perform a separate analysis on the thus-altered schedule.

Based upon its findings, the PMOC shall assess the sufficiency of the Sponsor's base sequencing and schedule to adequately reflect the modeled interim and final milestone completion dates. The PMOC shall provide recommendations for adjustment to the Sponsor's schedule and Project Management Plan to reduce the risk of not meeting the project's schedule goals.

**Conditioned Schedule** - The PMOC shall evaluate the contingency amounts identified for the project

and shall comment on the sufficiency of the contingency, establishing a recommended amount for the project in accordance with this OP. A Conditioned Schedule is developed when the recommended contingency is integrated with the Adjusted Schedule.

## **6.6 Risk Mitigation: Sponsor's Efforts**

The PMOC shall review and make recommendations regarding Sponsor risk mitigation plans, as documented in its Risk and Contingency Management Plan—a part of the Project Management Plan. Areas of review and comment shall include the development and management of:

- Primary mitigation;
- Secondary mitigation; and
- Contingencies and contingency draw-down curves.

### **6.6.1 Risk Mitigation Recommendations**

The review and recommendations shall be organized appropriately by Mitigation Structure (defined below), SCC, and Risk Type. Each mitigation recommendation shall include an indication of the Mitigation Type(s) (defined below) that best describe the mitigation recommendation.

#### **6.6.1.1 Mitigation Structure**

Mitigation structure refers to varying levels by which the Sponsor and its consultants and contractors may respond to the risk events identified through the review processes described above. This structure consists of three parts: Primary Mitigation, Secondary Mitigation, and Contingencies.

**Primary Mitigation** occurs throughout the various project phases and is the result of the planned actions of the Sponsor and its consultants and contractors as described in the Risk Management Plan portion of the Project Management Plan, as supplemented with the PMOC's recommendations resulting from this review. Such activities are scheduled at the earliest phase during which the mitigation activity may occur, and are expected to be completed on a timely basis to achieve the cost- and schedule-risk parameter targets at the end of that phase. Examples of mitigation might be completing design, or a geotechnical survey, etc.

**Secondary Mitigation** consists of pre-planned, potential scope or process changes that may be triggered when risk events occur that cause overuse of project contingencies. Example events that may incur secondary mitigation include construction bids that are significantly over the estimate, or unexpected geotechnical hazards that are encountered, etc., such that the change is likely to cause a significant over-budget condition. Such "triggered" mitigation enables the Sponsor to make cost reductions in a planned and orderly process and preserves contingencies for use later in the project. Secondary Mitigation is fundamentally different than value engineering, which is a formal, systematic, multi-disciplined process designed to optimize the value of each dollar spent.

**Contingencies** are set-aside estimated amounts (monetary set-asides for cost and time set-asides for schedule) that are included within the overall cost or schedule targets for the project. The amounts are to be used to overcome increases in cost or schedule that are due to potential risks, and for which no other mitigation measure is available. These contingency amounts may be associated with a particular activity or category of cost, or may be set aside in a general fund. In most cases, the amount of risk a project experiences reduces as the project progresses toward completion; similarly, it is expected that

the amount of contingencies required for a project also decreases over time; however, at no time shall the contingency be totally consumed until all project risk is removed—usually only at project completion or beyond.

#### 6.6.1.2 Mitigation Types

The PMOC shall indicate whether the four Mitigation Types— Risk Avoidance, Risk Transfer, Risk Reduction, or Risk Acceptance—have been sufficiently considered in the Sponsor’s list of proposed mitigation measures.

**Risk Avoidance** is available when a project element that is associated with certain potential risk events may be alternatively delivered through a less-risky process or design, or may be eliminated altogether.

**Risk Transfer** occurs when the mitigation and the consequences resulting from a risk event become the responsibility of a party other than the Sponsor; this may include a partial transfer (or risk sharing). Risk transfer measures involve sharing or transference to a third party such as a contractor, consultant, or other governmental organization in the form of contract requirements, warranties, or insurance policies etc. The recommendation may also be to reallocate scope in such a manner as to transfer risks to parties that are better suited to mitigate risk.

**Risk Reduction** is a planned action that will either reduce the consequence or the likelihood of a risk event. The root cause of the risk event, how the root cause or its consequences will be reduced by implementing the mitigation action, and who within the Sponsor organization or project team will carry out the mitigation shall be included.

**Risk Acceptance** results from the recognition that further reduction of a particular risk would only come at the expense of the project’s fundamental goals, such as unacceptable service loss or cost increase, etc. Risk acceptance may also be a preferred method to deal with those risks that are of a high level of impact yet low level of probability and that mitigating them would put undue financial burden on the project. Risk Acceptance often involves the potential consumption of project cost or schedule contingencies, project schedule float, or an increase in either project estimate or schedule.

In its review, the PMOC shall recognize that there is a point in the implementation of the Sponsor’s project (“break point”) where non-contingency mitigation becomes increasingly difficult to effect and beyond which Risk Acceptance through the use of project contingency funds is the only effective means to treat project risk. This “break point” between risk reduction and risk acceptance typically occurs at the point where all construction has been procured, whether through Design-Bid-Build or Design-Build delivery methods. Prior to this “break point,” secondary mitigation may be additionally available to preserve a minimum contingency balance that provides sufficient funds for the completion of the project.

#### 6.6.2 Primary Risk Mitigation Recommendations

The PMOC shall review the Sponsor’s Primary Risk Mitigation process and mitigation activities, and comment on the sufficiency of the list of prioritized cost and schedule risk mitigation measures within the Sponsor’s Risk and Contingency Management Plan (RCMP), including scope, deliverables, outcomes, and recommended completion dates. These measures shall include those management activities directly related to performance by the Sponsor as well as its consultants. This list will serve as a means to provide recommendations and to monitor the reduction of project cost risk. The RCMP shall indicate progress-reporting intervals for tracking the performance of mitigation actions. All



material assumptions shall be identified along with their rationales. The mitigation plans shall develop priorities such that mitigation activities associated with high-risk project work elements are to be executed as early as possible to reduce the potential for loss.

Mitigation measures shall include actions related to partial risk transference, especially those risks transferred through construction contracting, ensuring that risk remaining with the Sponsor is fully recognized and an effective risk response plan has been developed. The Sponsor's project delivery methods and contracting plans, including its proposed terms and conditions, shall offer a comprehensive approach to ensuring that all costs due to risk transference are reflected in the project estimate.

Schedule risk mitigation recommendations shall specifically treat both critical path and non-critical path activities. One role of schedule mitigation is to protect the critical path from non-critical path activities becoming critical themselves through two main objectives. The primary objective of schedule risk mitigation is keeping a necessary amount of path float between the project critical paths and all of the intersecting (or potentially intersecting) paths, i.e. to "buffer" the critical paths and thus preserve their stability. The secondary objective of schedule risk management is to keep significant risk (such as technical construction process risk) off of the project critical path, or minimize their schedule variance if critical path activities are involved. The general principle is that activities with high schedule risk shall start and complete as soon as feasible.

### **6.6.3 Project Cost Contingency**

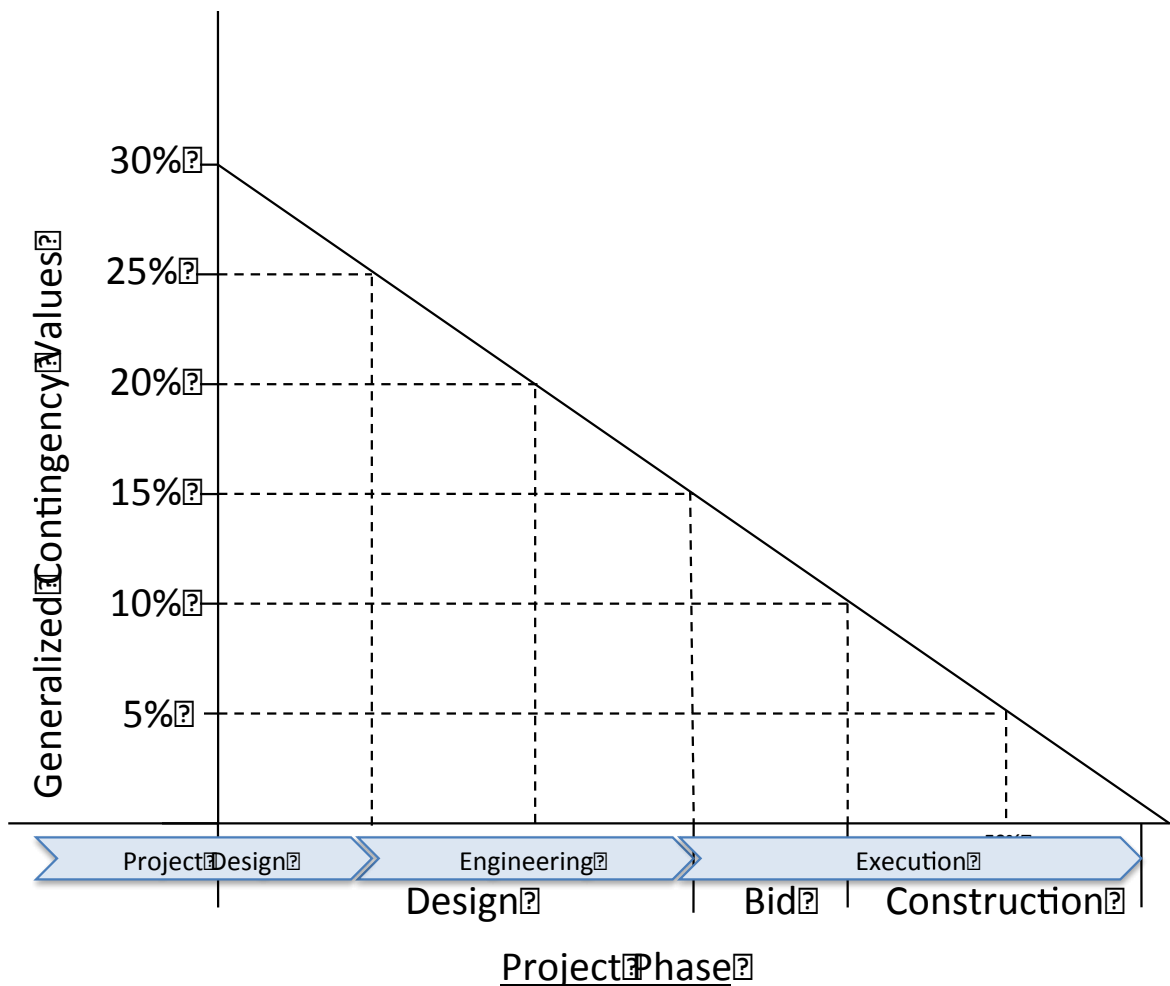
The PMOC shall fully identify, describe, and analyze the adequacy of the Sponsor's cost contingencies. This analysis shall be developed in consideration of four models: 1) the generalized contingency level recommendations (described below); 2) a Cost Contingency Draw-down curve (described below); 3) a Sponsor-provided risk assessment model (if undertaken); and 4) a PMOC-developed risk assessment model. The PMOC shall use its professional judgment to evaluate the contingency requirements estimated by these four approaches, and shall establish an overall recommended minimum contingency level, as described below.

#### **6.6.3.1 Generalized Contingency Levels**

The FTA has determined, from historic project information, that the following minimum levels of contingency (the aggregate of allocated and unallocated cost contingency) are generally prudent:

- At Entry into Engineering, 25%
- At Readiness to Bid Construction, 15%.
- At Start of Construction, 10%.
- At 50% physically complete for construction, 5%.

The above contingency estimates may be interpolated at points of completion between the above milestones (see figure below).



The generalized contingency levels reflect historic risk undertaken through a design-bid-build delivery method. Where alternate delivery methods, especially design-build (DB), are used and where the DB contract has been bid and the bid price incorporated into the Adjusted Estimate, then Sponsor risk associated with design and procurement (Design and Market Risk Categories) will likely have been significantly transferred to the design-builder. An analysis of the actual contracting document is necessary to determine the extent of the risk transference and the resulting extent of reduced contingency requirements in this circumstance.

#### 6.6.4 Cost Contingency Draw-down Curve

The PMOC shall review and make recommendations regarding adjustments to the Sponsor's Cost Contingency Draw-down Curve, and shall use its professional judgment to consider the currently-recommended contingency as well as a Forward Pass analysis (and Backward Pass analysis as appropriate) in development of its recommendations. The Cost Contingency Draw-down Curve shall indicate recommended minimum contingency levels by phase that most reasonably reflects the specific project conditions. These minimum levels shall be indicated for each of the FTA milestones, including additional milestones as identified by the Sponsor and PMOC for points of time at which significant changes in risk may occur. These milestones and minimum contingency amounts define a cost contingency drawdown curve, indicating a minimum level of contingency that must remain in the

project budget at any given point in time. This draw-down curve is used to protect from inappropriately early draw down of contingency funds.

#### **6.6.4.1 Forward Pass Cost Contingency Analysis**

The Cost Contingency Draw-down Curve is evaluated in consideration of a “forward pass” set of minimum recommended cost contingency values for each of the Project Milestones beyond that under current review and for additional points of significant changes of project risk, utilizing the Generalized Contingency Levels above.

Where the Sponsor or PMOC has identified additional milestone points, the PMOC shall use its judgment to establish forward-pass contingency recommendations, based on interpolated Generalized Contingency recommendations above.

In the case of multiple project phases that are staged at differing levels of development, or significant portions that exhibit differing risk profiles. A project contingency curve may be constructed as the addition of several contingency curves reflecting each significant project portion.

#### **6.6.4.2 Backward Pass Cost Contingency Analysis**

Projects, or portions of projects, may face extraordinary levels of risk during specific project points in time. In such case, the PMOC may establish a Cost Contingency Draw-down Curve in consideration of a “backward pass” set of recommended cost contingency values that represent the minimum amount of total cost contingency expected to be necessary at Project Milestones, which may be used to adjust forward pass contingency/milestone recommendations. The Backward Pass method considers estimates of minimum total cost contingencies based upon an assessment of the project status and project risk at the milestone under consideration. Items of high risk, especially those identified with the Mitigation Type of “Risk Acceptance”, shall be specifically reviewed when performing the backward pass analysis.

This process begins by considering the final stages of the project (say 95% complete) and determining how large of a contingency fund shall remain in the project budget to solve potential risk-laden events. This amount—often established through the judgment of project experts—becomes the minimum amount of contingency that shall be maintained at that point. The next step is to consider another point in time when the project is less complete (say at 75% completion) and to similarly determine the size of contingency fund that shall remain available until the next milestone. This process is completed—moving stage by stage toward the beginning of the project—until the current phase is reached.

The following considerations shall be made in development of the backward pass contingency values:

- At the Revenue Operations Date (ROD), the demand for total cost contingency has been reduced to a minimum requirement for scope changes or clarifications and schedule delays or changes. The establishment of required contingency at this point shall carefully consider conditions such as the Sponsor’s experience and experience on other similar transit projects to identify an amount sufficient to close out punch list work, additional work orders, etc. The working target for this point is generally 1-3% total contingency, including 0-1% for schedule delay costs and the remainder for other costs;
- At the point that the project construction procurement is “substantially complete” (90-100% bid for either Design-Bid-Build or 90-100% subcontracted for alternative project delivery methods), the

project is exposed to cost changes in the range of 10% of project costs, which includes 4-6% to reflect schedule delays that at this point can average 20% of the construction phase duration; and

- For any potential delay duration greater than 9 months, the contingency amounts shall assume 3 months each of demobilization and remobilization with a variable standby period in between.
- Consideration shall be made to appropriately reflect contingency needs under design-build contracts, where the cost of the contracted design-build portion is accurately reflected in the Adjusted Estimate. In this circumstance, Sponsor contingency needs for Design and Market risks may be significantly reduced, and Sponsor contingency needs for Construction risks may also be significantly reduced, though to a lesser extent. A thorough analysis of the design-build contract is necessary to establish these amounts.

#### **6.6.5 Secondary Cost Risk Mitigation Recommendations**

The PMOC shall review the credibility and applicability of the Sponsor's schedule of Secondary Risk Mitigation items, and comment on whether such Secondary Mitigation results in sufficient protection for the project. Such evaluation shall consider levels of risk reflected within the risk register, as well as any risk analyses available for the project. The schedule of Secondary Mitigation shall include the targeted magnitude of the cost and/or time savings expected and the latest time at which a Secondary Mitigation item may be triggered effectively, as well as a description of the scope, deliverables, and outcomes of the item. The PMOC will also review and comment on scheduled progress-reporting intervals for Sponsor's tracking of the utilization and management of such mitigation capacities, as well as any integration with the Sponsor's overall program schedule. All important assumptions shall be identified along with their rationales.

Estimation of all Secondary Mitigation items shall be at a level commensurate with the current level of estimating used for the project as a whole. Further, the cost and/or schedule adjustments proposed shall include an analysis of the adjustment for any scope reductions as well as any adjustment for redesign of the project area affected due to such scope reduction, with any associated soft costs.

The Secondary Mitigation Recommended Amount in the Beta Range Model is calculated as the Secondary Mitigation Target minus the Conditioned Estimate. This target is developed using the Beta Range Model Workbook; if the project budget includes contingency above the modeled Conditioned Estimate, such contingency amount above the Conditioned Estimate may be considered as fulfilling a portion of the Secondary Mitigation recommended amount. With approval from the FTA, the PMOC may modify this amount based upon overlapping Sponsor milestones, actual progress beyond a given phase, or other project-specific factors.

Where Secondary Mitigation is insufficient to protect the project at the level prescribed in the Beta Range Model Workbook, or as otherwise adjusted by the FTA, the PMOC shall recommend sufficient additional contingency to reach the level of protection that would otherwise be available through Secondary Mitigation. In general, Secondary Mitigation should be sufficient to bring the project to the 65% confidence level as indicated in the Beta Range Model Workbook, or such other level as may be directed by the FTA...

As a project progresses toward completion, it may be increasingly difficult to develop Secondary Mitigation measures, especially if project construction is already contracted. Early identification of Secondary Mitigation measures helps to preserve its availability in later stages of the project. The PMOC shall consider the current design efficiency, the stage of the project, and the impact that

developing Secondary Mitigation measures will have on the FFGA/SSGA's scope, transit capacity, or level of service.

In the case of design-build contracting, Secondary Mitigation elements may be preserved by contractually causing the design-builder to provide Secondary Mitigation design options in its work, subject to Sponsor's option.

#### **6.6.6 Project Schedule Contingency Review**

The PMOC shall fully identify, describe, and analyze the adequacy of the Sponsor's schedule contingencies. The PMOC shall make recommendations as to what minimum amounts of schedule contingency are recommended for inclusion in the Sponsor's Project Management Plan and supporting schedules.

##### **6.6.6.1 Schedule Contingency Analysis and Recommendation**

The PMOC shall evaluate the schedule contingency available within the Sponsor's schedule, and provide recommendations as appropriate. Such recommendation shall be made in consideration of the following:

- The project shall follow the general guideline that sufficient schedule contingency is available at any major review milestone to absorb a project schedule delay equivalent to 25% of the remaining duration through the Revenue Service Date proposed for the project, calculated by adding the schedule contingency to the Adjusted Schedule;
- Any available schedule risk assessment histogram indicates a confidence level of at least 65% of reaching the proposed Revenue Service Date (RSD); and
- The general assessment of risk is not in conflict with the risk contingency requirements established in development of the Schedule Contingency Draw-down Curve, below;
- Based on inflation factors, professional opinion and other factors, the PMOC should ensure that the cost estimate is appropriately increased to account for any additional schedule contingencies.

##### **6.6.6.2 Schedule Contingency Draw-down Curve**

The Sponsor shall develop a forecasted amount of minimum total schedule contingency to be available for the project at the current and each future major milestone; the PMOC shall review this analysis and comment and make recommendations about its sufficiency. Premature use of significant amounts of schedule contingency reduces the ability of the project to withstand schedule change. These minimum levels shall be indicated for each of the FTA milestones, including additional milestones as identified by the Sponsor and PMOC for points of time at which significant changes in risk may occur. These milestones and minimum schedule contingency amounts define a schedule contingency drawdown curve indicating a minimum level of contingency that must remain in the project schedule at any given point in time. This draw-down curve is used to protect from inappropriately early draw down of schedule contingency durations.

The Schedule Contingency Draw-down curve shall be evaluated by sequentially "stepping back" through various completion milestones for the project and estimating the minimum amount of schedule

contingency required to complete the project on schedule from that point forward, in consideration of risks identified in this OP. The PMOC shall evaluate this draw-down curve and comment on its appropriate allocation of risk over time, including recommendations for adjustment as appropriate.

#### **6.7 Sponsor's Risk and Contingency Management Plan (RCMP)**

The PMOC shall ensure that the Sponsor's RCMP considers all aspects of potential risk, including management capacity and capability, project performance, cost and schedule risk. A recommended structure for the Risk and Contingency Management Plan is included in Appendix G.

Upon FTA approval, the PMOC shall make available to the Sponsor the assessments and recommendations developed in this OP for inclusion in the Sponsor's Risk and Contingency Management Plan (RCMP), a section of the Project Management Plan. The PMOC shall work collaboratively with the Sponsor, as the Sponsor prepares and/or revises the Risk and Contingency Management Plan (RCMP) section of its Project Management Plan to reflect the recommendations and considerations provided by the PMOC.

#### **6.8 PMOC's Monitoring of Sponsor's Risk and Contingency Management Plan**

Post-assessment monitoring by the PMOC is intended to assess the Sponsor's performance in risk management and ensure that the Sponsor's project implementation achieves its risk management objectives and targets. The PMOC shall use the Sponsor's Risk and Contingency Management Plan (RCMP), which has been collaboratively amended with the PMOC's recommendations, as its guide for post-risk review monitoring.

Monitoring shall consist of evaluation and reporting of:

- The Sponsor's prosecution of the Primary Mitigation action items, including the effectiveness of the action to mitigate the potential risk event and the timeliness of the completion of the action item;
- The occurrence of risk events on the project, whether or not previously identified, and their estimated effect on the project's cost and schedule goals;
- The use of cost and/or schedule contingencies and whether such use threatens minimum levels of contingency required for future phases;
- Successful implementation of other major initiatives noted in the RCMP; and
- The effectiveness of the Sponsor's organization to fully manage its Risk and Contingency Management Plan.

### **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall provide the FTA with a written report of its findings, analysis, recommendations, professional opinions, and a description of the review activities undertaken. After FTA approval, the PMOC shall share the report with the Sponsor. In the event that differences of opinion exist between the PMOC and the Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile with the Sponsor and provide FTA with a report addendum covering the agreed modifications by the Sponsor and PMOC.

The report formatting requirements of OP-1 apply. When necessary, the PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use of FTA-templates when provided. The PMOC may add other software as required but documentation and report data shall be made available to FTA.

The PMOC shall prepare a written report in the format discussed in Appendix H and attach the sponsor's most current SCC estimate, schedule, and other related documents. Embed references to, or exhibits from, Sponsor's estimate, schedule or other documents to explain the analysis, findings, and recommendations.

Integrate and summarize available information and data for the project, providing professional opinion, analysis, information, data and descriptive text in an accessible and understandable format. Opinions shall be supported by data tables prepared in a professional manner

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	PERFORMANCE MEASURE	ACCEPTABLE QUALITY LEVEL	MONITORING METHOD
1	PMOC shall support FTA's programmatic decisions through review and analysis of Sponsor's risk management process PMOC shall review, analyze and recommend to FTA regarding Project Contingency and Contract Packaging.	<b>R1a.</b> The PMOC shall develop and document a process for review, analysis and reporting to FTA of Sponsor's risk assessment and risk management practices.		<b>M1a.</b> Evidence of a documented process.	<b>Q1a.</b> Process exists and has been followed.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process to analyze and advise FTA on Cost, Schedule and Contract Packaging and other project risk issues.		<b>M1b.</b> Documented assessment of overall Project Contingencies and Contractual Risk Allocations.	<b>Q1b.</b> Review must be made and the PMOC provides internal verification that the process as documented was followed.	<b>MM1b.</b> Periodic review by FTA or its agent.
		<b>R1c.</b> The PMOC shall develop and document a process for review and analysis of Sponsor's Project Contingencies, Contractual Risk Allocations and Contract Packaging.		<b>M1c.</b> Evidence of a documented process.	<b>Q1c.</b> Process exists and has been followed.	<b>MM1c.</b> Periodic review by FTA or its agent.
		<b>R1d.</b> The PMOC shall use its process to analyze the adequacy, effectiveness and efficiency of Sponsor's Project Contingencies and Sponsor's management and risk management practices prior to each milestone, as directed by FTA.		<b>M1d.</b> Documented assessment of overall Project Contingencies, Contractual Risk Allocations and management practices.	<b>Q1d.</b> Review must be made and the PMOC provides internal verification that the process as documented was followed.	<b>MM1d.</b> Periodic review by FTA or its agent.
2	The PMOC shall utilize its experience and professionalism in monitoring Sponsor risk management systems to produce required deliverables based on comprehensive systems analysis strategically repeated as the project advances. The PMOC shall review, identify, characterize and analyze project contingency	<b>R2a. PMOC Oversight Plan.</b> The PMOC shall develop and submit a plan for providing surveillance of the Sponsor's performance in risk management defining how services and products will be accomplished in a manner meeting FTA requirements.		<b>M2a.</b> Documented evidence of a risk management surveillance plan, supported by professional opinion.	<b>Q2a.</b> Professional opinion of risk management objectives and targets, other supporting documentation or submittals and recommendations for course of action.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b. Cost Risk.</b> The PMOC shall identify, assess and evaluate the uncertainties in Sponsor's cost estimates in terms of project's social, political, legal, financial and physical environment and make recommendations regarding identified risks.		<b>M2b.</b> Documented evidence of review of Sponsor's cost estimates, supported by professional opinion.	<b>Q2b.</b> Professional opinion and recommendations regarding identified items of likely risk.	<b>MM2b.</b> Periodic review by FTA or its agent.



	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	PERFORMANCE MEASURE	ACCEPTABLE QUALITY LEVEL	MONITORING METHOD
	availability, status and forecasts for critical project milestones and assure Sponsor's use of sound project management strategies.	<b>R2c. Schedule Risk.</b> The PMOC shall identify, assess and evaluate Sponsor's project schedule uncertainties in terms of social, political, legal, financial and physical environment and make recommendations regarding identified risks.		<b>M2c.</b> Documented evidence of review of Sponsor's project schedule, supported by professional opinion.	<b>Q2c.</b> Professional opinion and recommendations regarding identified items of likely risk.	<b>MM2c.</b> Periodic review by FTA or its agent.
		<b>R2d. Non-Cost and Non-Schedule Risk.</b> The PMOC shall, as directed by FTA, identify, assess and evaluate all non-cost and non-schedule related uncertainties and risks found in Sponsor's project, including risks associated with Sponsor's project delivery methods and strategies for packaging the contracts for construction, and make appropriate recommendations.		<b>M2d.</b> Documented evidence of review and evaluation of Sponsor's non-cost and non-schedule related uncertainties, supported by professional opinion.	<b>Q2d.</b> Professional opinion and recommendations regarding identified items of likely risk.	<b>MM2d.</b> Periodic review by FTA or its agent.
		<b>R2e. Risk Mitigation.</b> The PMOC shall review Sponsor's risk register and risk mitigation plan. If required by the FTA, the PMOC shall independently identify and characterize project risks, develop a and prepare a report showing its recommendations, including those for needed changes to Sponsor's PMP.		<b>M2e.</b> Documented evidence of review and assessment of risk together with recommend changes to PMP and preparation of risk mitigation plan, supported by professional opinion.	<b>Q2e.</b> Professional opinion and recommended changes to PMP together with risk mitigation plan.	<b>MM2e.</b> Periodic review by FTA or its agent.
		<b>R2f. The PMOC shall identify, describe and analyze the adequacy of Sponsor's cost contingencies, make necessary recommendations and, through parameters developed using the "forward pass" and "backward pass" approaches, create the overall minimum contingency curve.</b>		<b>M2f.</b> Documented evidence of a thorough review, analysis and description of Sponsor's Cost Contingencies, supported by professional opinion.	<b>Q2f.</b> Professional opinion of Cost Contingencies.	<b>MM2f.</b> Periodic review by FTA or its agent.
		<b>R2g.</b> The PMOC shall develop a "Forward Pass" cost contingency analysis using historically-developed parameters and a "Backward Pass" cost contingency analysis using project specific data. This data shall be reconciled and a Cost Contingency Curve and graphics developed.		<b>M2g.</b> Documented evidence of forward and backward pass cost contingency analysis, and creation of cost contingency curve, supported by professional opinion.	<b>Q2g.</b> Professional opinion and review of all cost contingency analyses and creation of Cost Contingency Curve with graphics.	<b>MM2g.</b> Periodic review by FTA or its agent.
		<b>R2h.</b> The PMOC shall identify, describe and analyze the adequacy of Sponsor's schedule contingencies making recommendations for minimum amounts of schedule contingency and supporting schedules.		<b>M2h.</b> Documented evidence and review of Sponsor's Project Schedule Contingencies, supported by a professional opinion.	<b>Q2h.</b> Professional opinion and evaluation of Sponsor's Schedule Contingencies.	<b>MM2h.</b> Periodic review by FTA or its agent.

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	PERFORMANCE MEASURE	ACCEPTABLE QUALITY LEVEL	MONITORING METHOD
		R2i. The PMOC shall "step back" at various milestones and estimate the minimum amount of schedule contingency required to complete the project on schedule. This data shall be used to develop a Schedule Contingency Curve.		M2i. Documented evidence of schedule contingency analysis and creation of schedule contingency curve, supported by a professional opinion.	Q2i. Professional opinion and review of all schedule contingency analyses and creation of Schedule Contingency Curve with graphics.	MM2i. Periodic review by FTA or its agent.
		R2j. The PMOC shall identify, describe and analyze Sponsor's individual contract packages and a) Contract Packaging Strategy: characterize and report on the sufficiency of design and construction contract packaging strategies; b) Contractual risk Allocation: discover and report proposed or actual allocation of risk between Sponsor and third parties; and c) Contractual Risk Allocation Assessment: evaluate proposed contractual allocations of risk and comment on potential cost-to-benefit balance and effectiveness of assignments.		M2j. Documented evidence, review and assessment of Sponsor's Contract Packaging Strategy and Contractual Risk Allocations and supporting documents, supported by professional opinion.	Q2j. Professional opinion and Contract Packaging Review.	MM2j. Periodic review by FTA or its agent.
3	The PMOC shall document its findings, professional opinions, and recommendations in a report to the FTA for its Risk, Cost and Schedule Contingency, and Contractual Risk Allocation Reviews. PMOC shall further attach SCC estimate, schedule and other related documents with Primary Deliverables and Sub deliverables.	R3. The PMOC shall present its findings, conclusions, analysis and recommendations to FTA and reconcile those recommendations with the Sponsor to the extent possible when so directed by FTA.		M3. PMOC's findings conclusions, recommendations, and presentation.	Q3. Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with Sponsor to the extent possible.	MM3. Periodic review by FTA or its agent.

## APPENDIX B

### Sponsor's Submittals

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In advance of performing the review, the PMOC shall obtain and study the following, as appropriate for the particular project phase and level of review required. Many of these documents will have been obtained through the review of scope, schedule, cost, and Sponsor management capacity and capability in other OPs. The PMOC shall perform an initial review and notify the FTA of important discrepancies in the project information that would hinder the review; an example would be insufficient detail or a mismatch between drawings and cost estimate in which the drawings are current and the cost estimate is significantly older.

Coordinate these submittals with those required for the OPs related to *Readiness to Enter Engineering* and *Readiness for SSGA/FFGA*.

#### **Programmatic**

Project Development Final Report  
Final environmental documents and NEPA determination

#### **Scope / Project Definition**

Basis of Design and Design Criteria  
Project Plans, Drawings, and Specifications  
Master Permitting Plan and Schedule  
Geotechnical Baseline Report  
Vehicle design documentation  
Transit Capacity and Operating Plan

#### **Project Management Plan and sub-plans**

Program Management Plan (if applicable)  
Basis for the Project  
Environmental Assessment/Mitigation Plan  
Project Controls (Document, Scope, Cost, Schedule, Dispute)  
Risk Assessment, Risk and Contingency Management Plan  
Project Delivery and Procurement  
Sponsor Management Capacity and Capability  
Real Estate Management Plan  
\*\* Other subplans if necessary to evaluate and expose significant areas of risk

#### **Schedule**

Project schedule in original and SCC format; schedule narrative describing critical path, expected durations, and logic

#### **Cost Estimate**

Capital cost estimate in original and SCC format  
Capital cost estimating methodology memo

#### **FTA Agreements**

Entry to Engineering Checklist (if applicable)  
SSGA/FFGA Checklist (if applicable)  
Record of Decision  
Full Funding Grant Agreement and Attachments if available

## APPENDIX C

### Sponsor Risk Interface

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Interface with the Sponsor during the risk review facilitates the process and provides the PMOC with project background information necessary to identify new risk events or amendments to the existing Sponsor Risk Register. Subsequently, the PMOC develops a risk analysis and risk review recommendations for incorporation into the Sponsor's Project Management Plan. It is the purpose of this level of review to develop this information in an abbreviated manner by focusing on significant TCC, schedule, scope, and cost risk drivers, through a primary workshop with the sponsor of no more than 3 days in duration with a subsequent risk assessment immediately following the workshop or as soon as a reasonable; auxiliary meetings for follow-up of specific issues discovered in the workshop may be necessary.

Prior to the workshop, the PMOC team shall be provided a tour of the alignment, including station and support facility locations

A suggested structure for the joint PMOC and Sponsor meeting is as follows; the PMOC shall assess the level of project completion and familiarity of the Sponsor with the risk review process to determine whether adjustment to the following structure is appropriate:

Kickoff meeting:

- Introduce PMOC team and Sponsor team;
- Sponsor presents the project to PMOC team:
  - Agency organization, including project team and plan for staffing;
  - Description of work and reviews over the previous year;
  - Discussion of schedule, cost estimate, Sponsor's RCMP and risk register;
- Review of the project by discipline, organized by SCC;
  - Review the status of Sponsor's risks listed on its Risk Register, and discuss and record any additional risks discovered during the workshop, including qualitative characterization of likelihood and magnitude of cost and/or schedule impact for the identified risks;
- Summarize findings, conclusions, recommendations, questions, and enter into discussions with the Sponsor's project team to resolve open questions;
- Discuss actions required to facilitate the PMOC risk analysis; and
- Inform the Sponsor of next steps in the risk review process.

Risk Workshop: This workshop shall occur after PMOC team has reviewed the risk listing, has developed its cost and schedule risk assessments, and has developed recommendations regarding Sponsor's target budget, contingency and risk mitigation.

- Introduce PMOC team and Sponsor team;
- Describe the process used to review and establish quantitative risk recommendations;
- Summarize the key findings of the review and recommendations;
- Provide recommendations regarding risk mitigation options and alternatives including possible changes to scope, budget, schedule, project delivery method, construction methodology, and/or use of cost and schedule contingencies;
- Review detail of individual risks, as appropriate, regarding the method of quantification of risk and which risks strongly influence overall project risk;

- Review specific recommended mitigation measures and solicit completion dates; and
- Discuss action items and next steps in the risk management and FTA review process.

## APPENDIX D

### Risk and Contingency Review Levels

The following generally depicts large differences among the three OP40 products (OP40 a, b, or c). Refer to details within each OP40 product to establish technical requirements for each element to be performed. The FTA will initially recommend the level of risk and contingency review to apply to any project, and the FTA may change the level of review at any time during a project as project conditions warrant.

Activity		FTA will determine initial level of review required based on assumed project conditions; level of review may be changed should actual project conditions warrant, at FTA discretion.		
		OP40a Sponsor-led	OP40b Abbreviated	OP40c Full
A	Review of management capacity & capability, scope, cost, schedule (and others as directed)	Sponsor presents organization, scope, schedule and estimate; PMOC reviews and comments	Perform 1-2 month abbreviated CC, scope, cost, schedule review, etc. Includes 2-3 day workshop	Perform full CC, scope, cost, schedule review, etc. Generally 2-3 month process.
B	Review Sponsor risk identification	PMOC participates with Sponsor Risk Register Workshop and comments	Review, comment on, and provide amendments to Sponsor's Risk Register	
C	Review Sponsor assessment (if required or provided)	Participate and comment on Sponsor's assessment	Review and comment on Sponsor's assessment process; contrast against PMOC risk assessment	
D	Develop or refresh PMOC Beta range assessment and develop or refresh schedule risk model	PMOC participates in Sponsor's assessment process. No PMOC risk modeling required	Provide concurrently with CC, scope, cost, schedule workshop where possible	Usually requires separately scheduled risk workshop
E	Review Sponsor risk response plans (primary and secondary mitigation)	Sponsor presents mitigation management; PMOC reviews and provides comment	Review, comment on, and provide amendments to Sponsor's primary and secondary mitigation plans	
F	Review Sponsor contingency and contingency management	Sponsor presents contingency planning; PMOC reviews and provides comment	Provide modeled contingency recommendations; compare to Sponsor's contingency. Review and comment on Sponsor's contingency management planning	
G	Review Sponsor RCMP	Sponsor presents its RCMP; PMOC reviews and provides comment	Review and comment on Sponsor's PMP; focus on risk organization and levels of contingency authority	

## APPENDIX E

### Example Risk Register

The following is provided as an example only of a risk register used for risk identification; the intention is to convey the basic content for a robust risk register. Other more detailed formats have been found useful in practice, depending on professional experience and project-specific requirements.

The Risk Register developer is encouraged to obtain the most recent examples before determining Risk Register format.

RISK REGISTER									
Grantee:				Rating	Low (1)	Med (2)	High (3)	Very High (4)	Significant (5)
Project:				Probability	<10%	10><50%	>50%	75%><90%	>90%
Date:				Cost	<\$250K	\$250K><\$1M	\$1M><\$3M	\$3M><\$10M	>\$10M
				Schedule	<1 Mths	1><3 Mths	3><6 Mths	6><12 Mths	>12 Mths
				Ranking	<=3	3.1-9.49		>=9.5	
					Risk Ranking				
					Probability	Cost	Schedule	Risk Rating	
SCC	ID	Risk Cat.	Risk Description	Outcome	[P]	[C]	[S]	(P) X (C+S)/2	Mitigation Action
10.01	3	1-Requirements	Third parties may influence the alignment in an untimely manner.	Delay and cost.	2	1	0	1	Obtain municipal consent buy-in at 30% design.
10.01	5	1-Requirements	Delays may occur in reconfiguring Railroad connection project.	If Railroad connection is not completed in time, entire Agency project could be subject to indefinite delay.	3	2	5	10.5	Agency undertake design
10.01	6	1-Requirements	The drawings indicate that there are freight tracks close to the LRT guideway. Is clearance an issue at any of these locations? Is there the possibility of crash walls or something similar required?	Could cause additional costs and studies involved with providing greater physical separation between light rail and freight rail lines.	3	4	0	6	Evaluate whether the current estimate reflects this scope for crash walls. May be an estimate reduction
20.01	43	1-Requirements	As all stations have center island platforms at grade, if a decision, for safety or operations reasons, is made to avoid pedestrian grade crossings, all stations will need tunnels or bridges along with multiple vertical circulation elements to replace them.	Much greater cost per station.	1	5	0	2.5	History indicates a very low probability
20.01	153	2-Design	Potential elevated pedestrian connection between park-and-ride and LRT station (814)		3	3	0	4.5	
30.02	55	1-Requirements	Failure to identify economical, environmental-suitable, and practical location for maintenance facility could cause excessive project costs.	Much higher costs, both for real estate acquisition and construction cost and for O&M costs when the project goes into operation.	1	3	0	1.5	Is currently under choice selection, among final 4 sites. Re-evaluate costs when a site is chosen.
40.01	61	1-Requirements	Balance of earthwork is unknown at this time, although it would appear that there may be more fill than cut. Lack of economical embankment material could be a problem.	Higher cost if material is hard to find.	4	4	3	14	Evaluate as an estimate adjustment. Figure out more during design.
40.02	62	1-Requirements	Since a number of the "tunnels" are only shallow cut & cover grade separations under existing streets (where the utilities are usually buried), there are likely to be utility issues to be dealt with.	Costly relocations of utilities. Short construction season may require expedited advance utility relocation packages to avoid delaying project.	2	3	0	3	Perform utility location studies during early PE
60.01	139	1-Requirements	Potential impact to loading dock access of existing commercial building (124)		5	4	0	10	Evaluate for estimate adjustment

## APPENDIX F

### Beta Range Factor Guidelines

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The following guidelines apply for cumulative Beta Range Factors (BRFs). Note that 1) the following BRF amounts are the sum of the individual risk category factors; 2) failure to remove a category of risk at a given phase indicates that some amount of that risk survives to the next phase—for example, Design Risk may exist during the construction phase if a design decision has been delayed; and 3) the cumulative factors here represent a range of observed risk across many transit projects and therefore increases to the suggested BRFs shall only occur where exceptional risks are involved, beyond what would be expected by a “normal” project. The PMOC shall appropriately suggest BRFs, depending upon the complexity of and risk inherent in the element under analysis.

#### **SCC10 through 50:**

- A BRF above 2.50 implies uncertainty associated with the completion of the project development process; after completion of project development, some level of Requirements Risk remains;
- A BRF between 2.50 and 2.25 implies reduction of remaining Requirements Risk, and increasing mitigation of Design Risk as design proceeds to Entry to Engineering. During Engineering, remaining design risk is virtually removed, yielding a BRF at completion of Engineering of 1.75;
- A BRF between 1.75 and 1.50 recognizes the existence and reduction of Market Risk (bid risks; uncertainties associated with reliable information on market conditions, short of a project specific firm price, etc.);
- A BRF between 1.50 and 1.35 generally recognizes uncertainties related to construction associated with geotechnical/utility, other underground, or other construction activities occurring during the first 20% of construction “Early Construction”).
- A BRF of 1.25 indicates reduction of risk to the level of 50% of construction;
- A BRF between 1.25 and 1.05 indicates uncertainty associated with late construction activities, including activities through start-up and substantial completion.
- A BRF of 1.05 implies that no unresolved risk events are identified for this item and only unknown risk events remains.

#### **SCC10 through 40:**

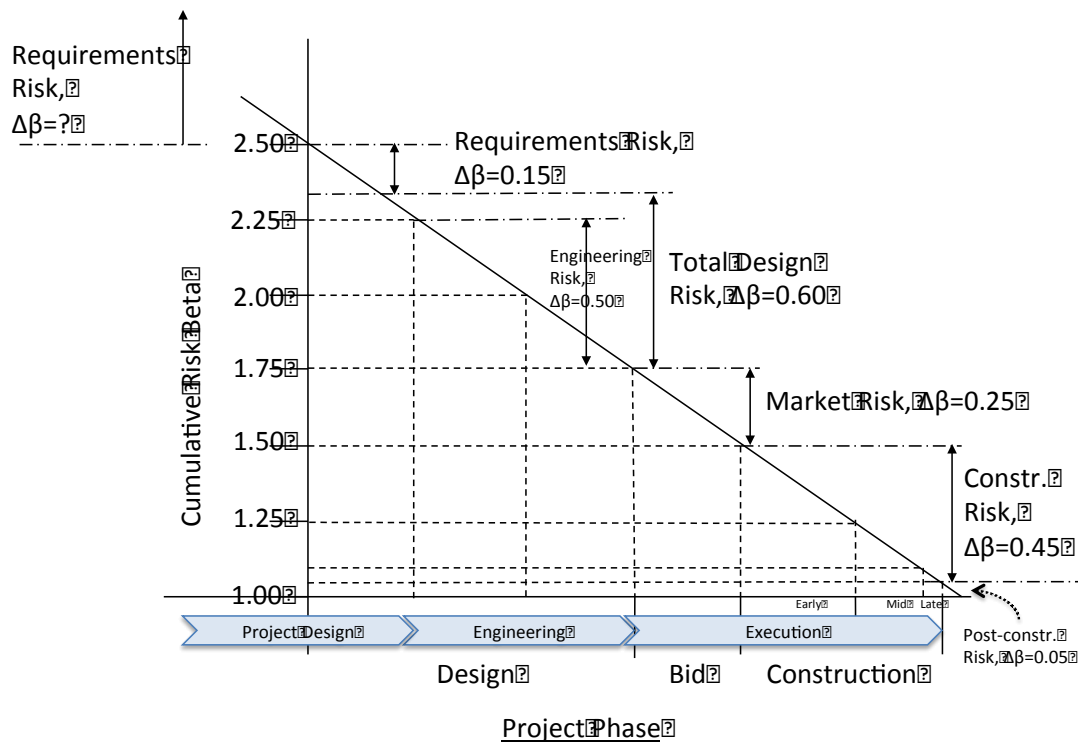
- Where exceptional geotechnical conditions exist, especially deep excavations and/or tunneling, the PMOC shall provide a separate analysis and explanation of the BRFs that apply to the corresponding estimate elements. Such BRFs may significantly exceed standard BRFs.

The standard BRFs are presented in Table 1 and Figure 1 in this appendix. Note that at any given point in a project, BRFs for the SCC elements may be comprised of cumulative factors of risk from any or all of the categories shown.



**Table 1 – SCC 10-50 Beta Range Factors by Risk Category**

<u>Risk Category</u>	<u>Risk Category</u> <u>Factor</u>	
Requirements Risk	Min. 0.15	
Design Risk in Project Development	0.10	
Design Risk in Engineering	0.50	
Market Risk	0.25	<b><u>Construction Risk</u></b> <b><u>Sub-Factor</u></b>
Construction Risk	0.45	
Early Construction		
Mid Construction		
Late Construction		
Post Construction	0.05	



**Figure 1 – SCC 10-50 Beta Risk Factors by Level of Development**

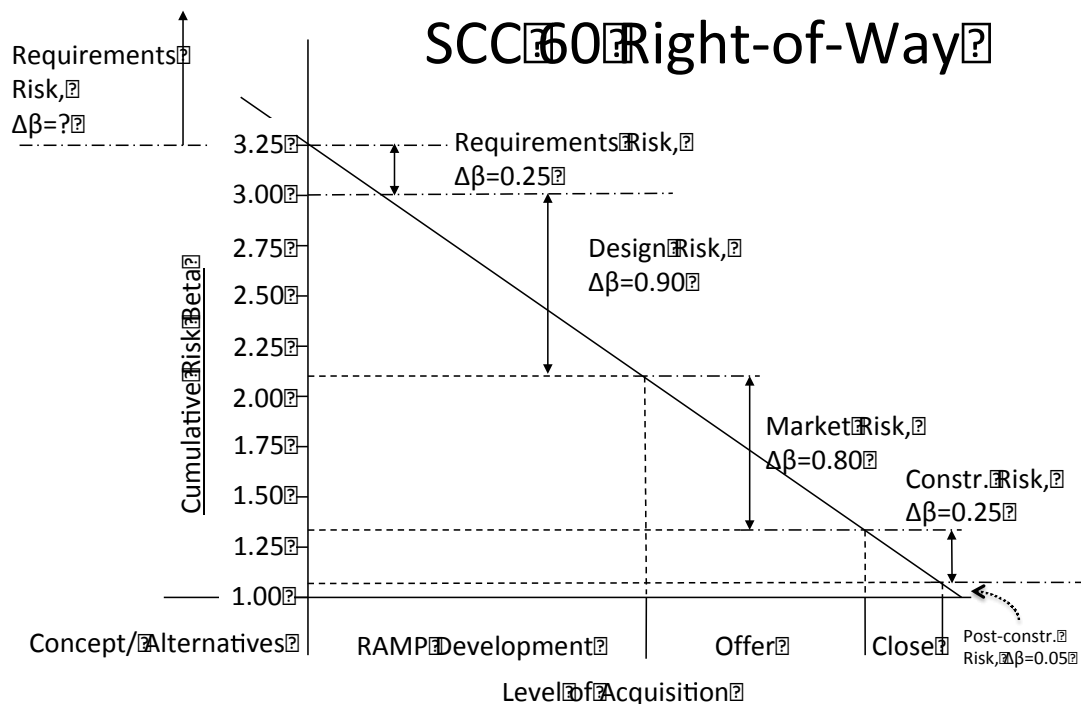
## SCC60 through 80:

SCCs 60 through 80 represent project elements that are not traditional construction elements. As such, the risk categories shall be interpreted as follows:

- Requirements risk is similar to that defined above, wherein it is related to uncertainty of environmental conditions, uncertainty of third party requirements or regulations, or uncertainty of project goals;
- Design risk is related to the sufficiency and potential error of development of plans for execution of the element. For example, for SCC80, this may relate to the development of staffing plans for project management staffing;
- Market risk is similar to that defined above. It is related to the potential variance in price for acquisition of the property, equipment, or staffing necessary to complete the element; and
- Construction risk relates to the actual act of completing the element itself, including any variances that result from conditions only evident at the time of acquisition of property or equipment, or at the time of execution of management or technical activities, such as design or construction management.

### SCC60:

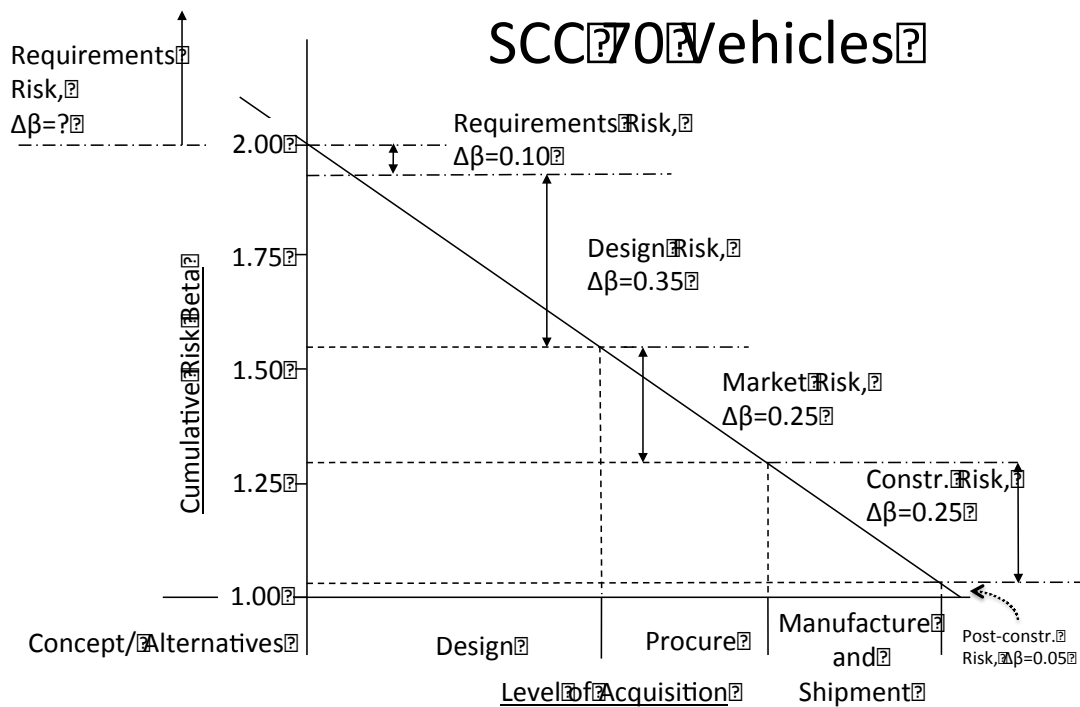
- Risk for Right-of-Way tends to survive later in time and suffer higher risk than for those items in SCC 10 through 50 due to large uncertainties and delayed resolution of ROW acquisition; therefore cumulative BRFs are generally estimated larger than that of SCCs 10 through 50 until ROW acquisition is substantially complete. See Figure 2.



**Figure 2 - SCC 60 Beta Range Factors by Level of Development**

### SCC70:

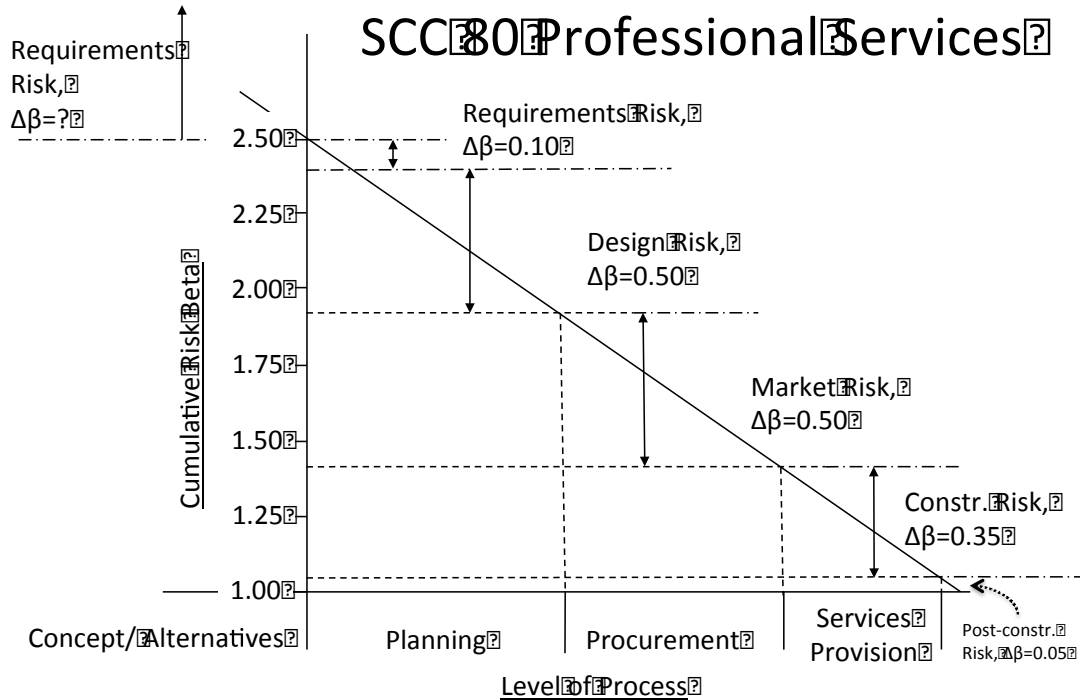
- Risk for vehicles tends to be removed more quickly in time than for those items in SCC 10 through 50 due to reduced design uncertainties and early vehicle purchasing; therefore cumulative BRFs are generally less than that of SCCs 10 through 50 during early phases of the project. See Figure 3.



**Figure 3 - SCC 70 Beta Range Factors by Level of Development**

## SCC80:

- Risk for each minor SCC for professional services is highly dependent upon the phase in which it is performed. For professional services, the cumulative BRFs shall be mostly drawn down at the point at which the category of services has been largely completed. BRFs for other services (i.e., insurance, etc.) in this category shall be estimated in consideration of the commensurate risk factors. See Figure 4 for standard BRF values for professional services.



**Figure 4 - SCC 80 Beta Range Factors by Level of Development**

## APPENDIX G

### **Risk and Contingency Management Plan (RCMP) Structure**

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**Note:** the following narrative for potential structure of the RCMP contains elements or details that may not be appropriate for all phases of the project. For example, early in the Engineering phase, some details may be undeveloped and only broad characterization of project elements or risk management plans may be available. The PMOC's review of the Sponsor's RCMP shall appropriately consider the phase of the project development, and the PMOC shall adjust its review accordingly.

The Risk and Contingency Management Plan (RCMP) is a subplan of the Sponsor's Project Management Plan (PMP); its successful implementation depends upon a fully updated and effective PMP. It is the purpose of the RCMP to highlight specific areas of management focus as identified through the risk evaluation process, which shall be implemented along with Sponsor's normal project operations as described elsewhere within the PMP. Further, the RCMP provides a means for monitoring Sponsor's progress as it moves the project forward to its next phase. These areas of management focus may include actions to strengthen management capacity and capability, project performance, cost and schedule analyses, mitigations of identified project risks, and others.

Information contained within the RCMP shall complement and not be in conflict with information contained elsewhere within the PMP or in other FTA guidance documents. Such areas of concordance shall include, for example, the project estimate and schedule, FTA's completion criteria for the various phases such as Entry to Engineering and SSGA/FFGA, master checklists for being considered ready to proceed into the next phase, as well as associated FTA PMOC work products used to review the various technical elements of the project, etc.

Successful implementation of the RCMP is important to the goals of both the Sponsor and the FTA, and monitoring of the RCMP implementation will be undertaken by both the Sponsor and the FTA (through the PMOC). It is important, therefore, that the FTA, PMOC, and Sponsor work collaboratively and develop agreement on the substance of the RCMP.

A potential structure for the RCMP follows:

#### **Overview**

This section shall indicate that the RCMP is a subplan of the over-arching PMP, including an indication of the latest version of the PMP upon which the RCMP is based. If the RCMP depends specifically on other sections of the PMP, those sections shall be noted, including an indication of their latest versions.

A brief description of the important, actionable findings of the RCMP shall be included in the overview. If further actions are required to finalize the current draft of the RCMP, those shall also be indicated along with expected completion dates.

A brief summarization of topics covered within the RCMP shall be included, including such topics as:

Primary Mitigation, organized by significant project activities, such as:

- Management Capacity and Capability
- Project Scoping and Design;
- Delivery Methods and Contracting;
- Construction Process;

- Project Tracking, including:
  - Cost Estimating, Financing and Financial Management; and
  - Project Schedule Management.

Insurance:

- Professional services, construction phase, wrap-up, or other specialized insurances purchased for reduction of risk exposure.

Contingency Management:

- Cost Contingency Management Plan; and
- Schedule Contingency Management Plan.

Secondary Mitigation:

- Establishment of Secondary Mitigation actions and cost targets which may trigger the implementation of Secondary Mitigation.

Risk Management:

- Risk management and mitigation monitoring, change identification, and management controls.

**Goals and Objectives**

The major goals of the RCMP shall be stated, including establishment of measures to complete the project within budget and on schedule, implementation of project cost and time contingency procedures, risk mitigation, and development of available risk mitigation capacity. The role that the RCMP plays in advancing the Sponsor into the next stage of FTA approval shall be noted.

Broad goals expected to be accomplished prior to the next stage of RCMP revision (including revisions required at FTA milestones) shall be noted. For example, for a project in the Engineering (ENG) phase, such goals may include (similar, phase-appropriate goals would apply to other project phases):

- Adherence to environmental requirements, such as the National Environmental Policy Act (“NEPA”) requirements;
- Mitigation of design risks where possible during the ENG phase, or appropriate transfer of such risks to a design-build entity if applicable;
- Mitigation of other identified risk events;
- Reasoned analysis and assessment of likely market risks to be encountered;
- Cost and schedule risk mitigation capacity developed and implemented as needed, including targets to be achieved during the ENG Phase and forecasted cost and schedule risk management mitigation capacity for subsequent phases;
- Uncertainty in cost estimates and forecasts and project schedules, including tracking mechanisms to identify trends in known costs and risk reduction; and
- Maintenance of minimum cost contingency and schedule contingency targets.

Generally, detailed description of these or other broad goals is required to achieve measurable project evaluations; those descriptions and their metrics shall be outlined in separate plans or in an appendix to the RCMP.

The RCMP shall note that the Sponsor and its local and state partners understand that the plan was developed in concurrence with the FTA, that implementation of the RCMP is an important consideration

in further FTA approvals, and that the RCMP describes processes and requirements that must be adhered to, in addition to current FTA grant contracts and related FTA Circulars, regulations and guidance.

#### **Risk Review Process:**

The section shall include a description of procedures used for development of the Risk and Contingency Management Plan, including procedures for development of risk identification, risk assessment, risk response recommendations, risk protection measures (including Secondary Mitigation and minimum contingencies) and risk management and control.

[Note: In the following sections, the Sponsor shall provide an outline of its strategic, performance-based project management activities to identify, assess and respond to the project risks. It is the intent of the following to view risk management as a process of continual risk reduction; i.e., while the mitigation of any specific identified risk is an important activity, the identification, addition and mitigation of newly-discovered risks forms a process that provides both the Sponsor and the FTA (through its PMOC) with the means and methods to best ensure satisfactory outcomes for the project. The goal of the RCMP is to provide a plan to take the Sponsor through the upcoming phase, and prepare it for possible entry into the next phase, with:

- Cost estimates and forecasts and project schedules continuing to be developed as planned;
- Reasoned analysis and assessment of likely upcoming risks, including risks associated with Sponsor's management capacity;
- Mitigation of risks at the earliest possible time;
- Completion of all mitigation actions scheduled for the upcoming phase;
- Cost and schedule risk mitigation capacity developed, implemented as needed, and targets achieved; and
- Minimum cost and schedule contingency targets continuing to be achieved.]

#### **Insurance**

This section shall include a summarized discussion of current or future major insurances provided to the project to respond to identified risk, including especially unusual, highly likely, or high exposure risk identified through the risk review process. Such insurances may include professional services, builder's risk, wrap-up, or other specialized insurances purchased for reduction of risk exposure. Detailed insurance information shall be included as an appendix to the RCMP or reflected elsewhere in the PMP.

#### **Primary Mitigation**

The primary mitigation section shall include the process used to develop the Risk Register, which outlines risks and mitigations that require Sponsor managerial, administrative, and technical action. The section shall be organized as follows; each area below shall include a brief summary of key risks and action items as of the date of the latest RCMP update.

A detailed listing of all identified risks and proposed mitigations shall be included as a separate report, or attached as an appendix, as further indicated below; this separate report shall be updated at the frequency noted in the RCMP.

#### **Management Capacity:**

The RCMP shall summarize key management capacity risks identified in the Risk register. A plan shall be indicated for additional resource commitments, additional requirements for methods and resources, and

improved management strategies to address the findings of risk. Management strategies shall include specific plans or products, project control, responsibilities, authorities, and measures of performance.

Detailed risk issues related to Management Capacity shall be specifically cited in an appendix, and shall be noted as *Management Capacity Risks and Mitigations*. This list shall include proposed mitigation activities, responsibility for action and targeted date for completion.

#### Project Scoping and Design:

**Requirements:** A summary of key requirements risks and proposed mitigations shall be discussed in the body of the report to provide a succinct overview of the outstanding risk mitigation work to be accomplished. In addition, all outstanding project requirements risks, including undefined project goals, third party requirements, and environmental considerations shall be listed in an appendix, indicated as *Requirements Risks and Mitigations*. Such activities shall also include risk associated with all compliance of NEPA activities consistent with the NEPA Final Determination; and public and governmental reviews and critiques;.

**Design:** A summary of important design risks and proposed mitigations shall be discussed in the body of the report to provide a succinct overview of the outstanding design risk mitigation work to be accomplished. In addition, all design activities indicated in the risk review as potential risk events, including activities associated with unproven project technologies, unresolved alternate design approaches, late design, and others shall be listed in an appendix, indicated as *Design Risks and Mitigations*. As appropriate, statements of sub consultant responsibilities for risk mitigation shall be included.

Where value engineering efforts have been or will be undertaken, a summarized discussion of the effect on project risk shall be discussed, including plans for closure of the value engineering process. Detailed value engineering items shall be referenced elsewhere in the PMP, or included in an appendix if otherwise unavailable.

#### Delivery Methods and Contracting:

The purpose of this section is to illustrate the Sponsor's plans for efficient risk allocation through choice of delivery method and through contractual risk allocation; such risks so considered shall include common design, market, and construction risks as well as those risks identified in the risk review. All contracts shall be considered, including design, vendor, and construction contracts. The Sponsor shall discuss the following:

- Strategies for contractual risk allocation or risk sharing through explicit contract language, ordinary custom/commercial/trade practices, or statutory authority such as the Uniform Commercial Code. The risk allocation plan shall include allocations of future and prior contracted work, shall complement other PMP sub-plans, such as the Contract Package Plan and future individual contracts, the Real Estate Acquisition Management Plan ("RAMP"), and all NEPA-related documentation;
- The effect of the chosen strategy on market pricing for the various contracts;
- Assessment of the contracted party's capacity to efficiently mitigate its allocated project risk exposure, including market risk, such that the risk allocation represents the best value for the project; and
- Actions to implement the strategy.

Detail for the proposed allocation strategy shall be referenced elsewhere in the PMP or shall be included



in an appendix. Individual risks identified in the risk review shall be indicated as *Delivery Methods and Contracting Risks and Mitigations*.

#### Construction Process:

The purpose of this section is to demonstrate the Sponsor's plans for effective management of risk during the construction process. This section shall include a summarized discussion of the key construction phase risks identified in the risk review and plans to mitigate and respond to those risks. Especial attention shall be placed on those risks that have not been wholly transferred to a contracted party. In addition, all outstanding project construction risks identified in the risk review shall be listed in an appendix, indicated as *Construction Risks and Mitigations*.

#### Project Tracking:

The purpose of this section is to discuss those activities that will be put in place to ensure that adequate tracking and forecasting of cost and schedule outcomes are available to measure potential increased cost or time due to project risk. Such increases may require actions, such as use of contingencies or may trigger the implementation of Secondary Mitigation. This section shall complement and may reference other related sections of the PMP. Where the risk review has identified risks associated with project cost and time tracking, a detailed listing of all identified risks and proposed mitigations shall be included in an appendix, indicated as *Project Tracking Risks and Mitigations*. The section shall be organized as follows; each area below shall include a brief summary of key risks and action items:

Cost Estimating and Forecasting: discussion shall include the process used for development and management of project cost and project cost uncertainty, including the effect of schedule risk uncertainty on the cost risk results. Included within the discussion shall be establishment of reliable estimates for the maximum dollar amount of the FTA financial contribution needed to implement or complete the project.

The following efforts for reduction of cost uncertainty shall be indicated or referenced elsewhere in the PMP:

- Continuous administrative and management efforts for increased detailed development of the cost estimate;
- Internal quality control to ensure adequate technical provision of all estimating and forecasting work;
- Methods for adjustment of cost schedules in reaction to realized schedule risks.

Detailed cost and cost risk information shall be referenced as available elsewhere in the PMP or made available in an appendix to the RCMP.

Project Schedule Management: discussion shall include the process used for development and management of project schedule forecasts and project schedule uncertainty, including any effect of cost risk uncertainty on the schedule risk results. Such external requirements as NEPA compliant related work and community involvement shall be considered in the discussion of risk-related schedule management.

Plans to maintain schedule tracking shall be discussed, including both design and construction schedules, to detect schedule deviation through techniques such as earned value. Such plans shall indicate responsibility and frequency of reporting (usually monthly). Where appropriate, the RCMP shall indicate efforts made to ensure that consultants and contractors comply with similar measures. Such tracking is important for the establishment of risk response actions, such as potential use of schedule contingency; this discussion shall rely upon and complement schedule control discussions contained within the scheduling section of the PMP.

## **Contingency Management**

The purpose of this section is to discuss the Sponsor's plans for establishment and management of cost and schedule contingency protections. The section shall be organized as follows:

### **Cost Contingency Management Plan:**

- Results of cost contingency recommendations developed, including minimum contingency hold points by milestone and reflected in a minimum cost contingency draw-down curve;
- Sponsor plans to reach substantial conformance with the contingency recommendations on a timely basis;
- Procedures in place to implement and maintain throughout the project, a Cost Contingency Management Plan as an identifiable element in the RCMP, including authorities and procedures for distribution, transfer and use of all cost contingency in conformance with the requirements of this plan and sufficient documentation as each transfer occurs. This Cost Contingency Management Plan shall also describe the manner in which the Sponsor will forecast and trend the project contingency; and
- Sponsor plans to recover in those cases where cost estimate forecasts indicate contingency levels have fallen below the minimum planned contingency hold points, including as necessary implementation of a formal Recovery Plan or adjustment of the expected project final cost with FTA approval.

### **Schedule Contingency Management Plan:**

- Results of schedule contingency recommendations developed, including minimum contingency hold points by milestone and reflected in a minimum schedule contingency draw-down curve;
- Sponsor plans to reach substantial conformance with the contingency recommendations on a timely basis;
- Procedures in place to implement and maintain a Schedule Contingency Management Plan as an identifiable element in the RCMP, including authorities and procedures for distribution, transfer and use of all schedule contingency in conformance with the requirements of this plan and sufficient documentation as each transfer occurs. This Schedule Contingency Management Plan shall also describe the manner in which the Sponsor will forecast and trend the project contingency; and
- Sponsor plans to recover in those cases where schedule estimate forecasts indicate contingency levels below the minimum planned contingency hold points, including as necessary a formal Recovery Plan or adjustment of the expected completion date for the project or appropriate milestones.

## **Secondary Mitigation**

The purpose of this section is to discuss the Sponsor's plans for establishment and management of Secondary Mitigation protections. The section shall discuss the following:

- Results of Secondary Mitigation recommendations developed and the process for reviewing and developing future items;
- A summary discussion of such Secondary Mitigation, including a brief description of a prioritized list of identified Secondary Mitigation items and the timing necessary for their implementation, especially including dates beyond which the items may no longer be effective;
- A discussion of those points of project completion at which Secondary Mitigation at which the items are no longer available to be triggered for implementation; and
- Procedures in place to track such trigger points and to implement available Secondary Mitigation, including authority responsibility for such actions.

If the project has progressed to a stage at which no available Secondary Mitigation has been identified, this condition shall be discussed in the report.

### **Risk Management and Risk Mitigation**

The Sponsor shall describe its plans to implement, administer and maintain throughout the project, a Risk and Contingency Management plan for:

- Assessing (identifying and analyzing) project cost and schedule risk;
- Developing risk-handling options inclusive of primary risk mitigation;
- Developing a secondary mitigation plan to handle risk events or “triggered” mitigation activities;
- Monitoring risks to determine how risks have been handled or changed; and
- Documenting and reporting to the FTA the risk management program.

The risk management description shall include such considerations as:

- Design control processes to detect potential consultant failure, such as scope, schedule, and budget “earned value” metrics;
- Clearly established Sponsor, consultant, and contractor responsibilities for risk management;
- Plans for amendment of the risk register during the course of the work, to both succinctly catalogue additional significant issues that arise, as well as to identify closure of issues as they become resolved to the satisfaction of the Sponsor and the FTA; and
- Plans and timing for systematically updating the RCMP.

## APPENDIX H

### Risk Report Format

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Reporting shall occur immediately after conclusion of the risk workshops; timely reporting will facilitate Sponsor's early adoption of the recommended risk mitigation measures into its Project Management Plan.

In the conduct of this report, the PMOC shall use its professional judgment to identify and categorize, assess and evaluate the uncertainties in the Sponsor's project information, considering the project's administrative, management, political, legal, financial and physical conditions. The PMOC will document and report its professional opinions and its recommendations for responding to identified risk, including recommendations for mitigations including contingencies. Unless otherwise directed, the report will be sectioned as follows:

#### Title Page

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Include disclaimer, below.

**Disclaimer Insert:** This Project Management Oversight Contractor (PMOC) report and all supporting reports and back up materials contain the findings, conclusions, professional opinions and recommendations stemming from a risk-informed evaluation and assessment, prepared solely for the Federal Transit Administration (FTA). This report shall not be relied upon by any party, except FTA or the project Sponsor, in accordance with the purposes of the evaluation and assessment as described below. For projects funded through FTA's Major Capital Investment (New Starts) program, FTA and its PMOCs use a risk-informed process to review and reflect upon a Sponsor's scope, schedule, and cost, and to analyze the Sponsor's project development and management. This process is iterative in nature. The results represent a "snapshot in time" for a particular project under the conditions known at that point. The evaluation or assessment and related results may subsequently change due to new information, changes in circumstances, additional project development, specific measures a Sponsor may take to mitigate risks, Sponsor's selection of strategies for project execution, etc.

#### Table of Contents

#### List of Figures and Tables

#### Executive Summary

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The PMOC shall provide an executive summary in three pages or less that includes the following:

- 1) Purpose
- 2) Project Description
- 3) Results and Recommendations - PMOC's professional opinion regarding:
  - Contract packaging review and assessment
  - A table that provides the following elements, if a separate PMOC risk assessment has been performed:
    - i) 10th, 40th, 50th, 65th, 80th, and 90th percentile projections
    - ii) Total Contingency (per model)
    - iii) Secondary Mitigation Required
    - iv) Secondary Mitigation Available
  - Project schedule and schedule contingency, including statement of separate PMOC findings where a PMOC assessment has been performed; and

- Top Risks, mitigations, and recommended actions.

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## **Project Background**

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Project descriptions and data shall be consistent with the Monitoring report guidance, current monitoring report and the most recent FTA New Start profile. Notwithstanding the foregoing, FTA may direct the contractor to use an identifiable draft version of these materials. Ridership shall include peak hour ridership data. Sub-sectioning shall also include Guideway Components, Project Delivery Method, proposed Contract Packaging Strategy and, as applicable, Master Planning for the Corridor.

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## **Summary of Project Status from other OPs**

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Summary-level information from: Sponsor Management Capacity and Capability, Project Scope, Project Estimate, and Project Schedule reviews if performed. Include specifically elements from prior reviews that are particularly important to developing understanding of the issues presented later in this report.

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## **Risk Identification**

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Provide a summary of the process used for identification of risks, and provide a narrative discussion of key risk events (categorized by SCC), including their potential impact on the project. Characterize the remaining elements of the Risk Register, which is to be attached as an appendix.

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## **Risk Assessment**

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For projects with prior risk reviews, include comparisons of the currently-assessed project risk to the prior-assessed project risks and comment on the changes indicated.

### **PMOC Cost Risk Assessment**

Where the cost risk review is based on an independent PMOC risk assessment, describe the methodology used to deliver the risk assessment products. Further, present any cost estimate adjustments and selection of cost range factors; especially discuss any factors that vary from standard recommendations. Provide a summary of key risks that influence PMOC's characterization of level of project risk by SCC. The PMOC shall present detailed data and analysis in a separate appendix as necessary in order to maintain readability of the report.

### **PMOC Schedule Risk Modeling**

Where the schedule risk review is based on an independent PMOC risk assessment, describe the methodology used to deliver the risk assessment products. This section shall present the findings resulting from the schedule risk modeling, including development of the summary schedule activities, ranges for activity durations in the summary schedule, and characterization of specific risks that influence important schedule activities; characterization of the results of the schedule risk modeling, including confidence levels for achieving the Sponsor's Revenue Service Date target; the PMOC's professional opinion regarding the most likely schedule for Revenue Service Date; and PMOC's recommended actions.

### **Risk Mitigation**

The purpose of this section is to present the PMOC's review and recommendation for any adjustment of risk mitigation efforts by the Sponsor. The PMOC's narrative shall allow FTA management and the Sponsor to maintain focus upon these risk mitigation efforts as the means to maintain the baseline cost estimate and avoid potential cost escalation from these potential project risks.

The report shall include separate subsections for Primary Mitigation, Secondary Mitigation and Contingency Recommendations.

**Primary Mitigation:** Specific mitigation recommendations shall be presented, including appropriate timeframes for completion of the mitigation activity, especially focused on those mitigations considered necessary for successful approval at the next FTA milestone. Where a PMOC assessment has been performed, link the mitigation activity to the risk register and/or the assignment of exceptional risk factors. Such mitigation recommendations shall be segregated by SCC and Risk Category.

For projects with prior risk reviews, include discussions (as appropriate for project phase) of Sponsor's historic mitigation efforts by Risk Category.

**Secondary Mitigation:** Provide recommendations for adjustments to amounts of Secondary Mitigation capacity developed by the Sponsor. Where the risk review has provided such, include suggested additional areas for potential Secondary Mitigation.

**Contingency:** Provide a narrative indicating minimum recommended levels of both cost and schedule contingency, including a summary of the basis for development of the recommended minimums. Further, provide graphical or tabular representations of the Sponsor's contingency draw-down curves, including review comments and PMOC's recommendations for adjustment, if any.

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## Monitoring Plan Basis

Indicate a plan for testing the implementation and effectiveness of Sponsor mitigation measures on the project.

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## Conclusion

### Appendices

As required, include the following or other additional information:

#### Risk Register

#### Sponsor Data Characterization

Provide a descriptive listing of documents used in this analysis, including a narrative characterization of their completeness and sufficiency as appropriate for the project phase during which this review was conducted.



## **Oversight Procedure 40c – Risk and Contingency Review - Full**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure (OP) is to describe the review procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) during the review of a Sponsor's plan for mitigating and managing project risks.

This OP also describes the procedure for full PMOC risk assessment, using the Beta Range Factor Analysis, see Appendix D.

### **2.0 BACKGROUND**

The reliability of the Sponsor's project scope, cost estimate, and schedule over the course of the project life is extremely important, not only for the success of the individual project, but also for the professional credibility of the transit industry including FTA. Professional risk management provides the basis for improving the reliability of project delivery.

### **3.0 OBJECTIVES**

The PMOC's review of project risk and risk mitigation requires evaluation of the Sponsor's project scope, cost estimate, and schedule. The PMOC should place special focus on elements of uncertainty associated with the Sponsor's project implementation and project conditions.

During a Risk and Contingency Review, the PMOC must review the Sponsor's Risk and Contingency Management Plans so that the PMOC can:

- 1) Evaluate, explore, and analyze uncertainties and risks
- 2) Establish an appropriate qualitative and quantitative assessment of ranges of forecasted cost and schedules
- 3) Describe and evaluate the analytical methods used
- 4) Consider risk mitigation options and alternatives including use of cost and schedule contingencies; and
- 5) Provide recommendations for adjustment to scope, cost, schedule, project delivery method, construction methodology, and project management and risk planning in order to respond to project risk.

FTA may request the PMOC complete a Risk and Contingency Review at various points in a project's life. This review is applicable to projects using any project delivery method: Design-Build-Build (DBB), Design-Build (DB), Construction Manager/General Contractor (CM/GC) or other alternate delivery methods.

The PMOC's review under this OP is a critical input to FTA's decision regarding project advancement and funding.

## **4.0 REFERENCES**

The statutes, regulations, policies, guidance documents and circulars in OP 01 Administrative Conditions and Requirements apply.

## **5.0 REVIEW OF SPONSOR'S SUBMITTALS**

The Risk and Contingency review requires the PMOC to obtain and study project documents similar to those listed in Appendix B. These documents at a minimum include the Sponsor's Project Management Plan (including the Risk and Contingency Management Plan) and supporting documents. Supporting documents shall include appropriate design, cost, and schedule information. Many of these documents will already be available because of previous scope, schedule, cost, and Sponsor management capacity and capability reviews. The PMOC should perform an initial review and notify the FTA of important discrepancies in the project information that would hinder the Risk and Contingency Review. An example of an important discrepancy would be insufficient detail or a mismatch between drawings and the cost estimate because the drawings are current and the cost estimate is not.

## **6.0 SCOPE OF WORK**

### **6.1 Overview**

The goal of the Risk and Contingency Review is to evaluate a Sponsor's risk identification and assessment process and to evaluate the Sponsor's Contingency Management Plan. After evaluation, the PMOC should recommend changes to the Sponsor for risk identification, assessment, and mitigation. The PMOC should also recommend changes to the Sponsor's Risk and Contingency Management Plan. The PMOC shall independently develop a risk analysis to provide a thorough analysis of the Sponsor's project.

This risk management review builds upon any review of scope, schedule, cost, and Sponsor management capacity and capability in other OPs that may have been previously performed.

#### **6.1.1 Sponsor interface**

PMOC interface with the Sponsor during its risk review facilitates and expedites the process and provides the PMOC with the background necessary to efficiently evaluate risk and provide recommendations for revisions, if any, to the Sponsor's Project Management Plan. A typical structure for Sponsor interface meetings is presented in Appendix C.

#### **6.1.2 Organizing the Risk Assessments by Milestones**

Depending on the project conditions, detailed forecasted levels of project risk should be developed around points in time when level of project development typically indicates changes in project risk. The following reflect common and important FTA and other milestones for such detailed reviews:

- Readiness to Enter into Engineering;
- Readiness for FFGA/SSGA award;
- Ready to Bid Construction;
- Start of Construction;
- 20% construction;
- 50% construction;
- 75% construction; and



- 90% construction.

The FTA Milestones may be modified to reflect important milestones in the Sponsor's schedule, especially those points where significant changes in risk occur. If milestones are more than one year apart, the PMOC should consider developing supplemental milestones.

## **6.2 Project Status Evaluation: PMOC's Efforts**

The PMOC project status evaluation is a precursor to the detailed risk review. The completeness and accuracy of the risk review is highly dependent on the completeness and accuracy of the project status evaluation. The project status evaluation typically includes evaluation of:

- 1) The Sponsor's management capacity and capability
- 2) The Sponsor's contract packaging strategies
- 3) The project's scope, cost and schedule. Other review elements may be included at the discretion of the FTA.

## **6.3 Identification and Categorization of Risks: Sponsor's Efforts**

Risk identification plays a significant role in the risk management process. Efforts should be made by the Sponsor to ensure that there is a thorough listing of risks. This "Risk Register" shall include a description of the potential risks, their qualitatively-evaluated potential consequences, and the likelihood of each risk's occurrence. The "Risk Register" shall also list each risk's SCC category and risk category, its contract package, a method for prioritizing risks, and potential actions to mitigate the risk.

### **6.3.1 Example of risk register**

A simplified example of a partial risk register is included in Appendix E.

## **6.4 Identification and Categorization of Risks: PMOC's Efforts**

The PMOC shall obtain current project documents, reports, and observations developed through prior analysis of the Sponsor's organization, the project's scope, cost estimate, schedule, and contract packaging to develop a list of PMOC-identified risk events. This list shall be compared with the "Risk Register" independently developed by the Sponsor.

### **6.4.1 Risk Events**

**Risk Events** are individually identified events that may occur and can cause changes to the project significant enough to incite management scrutiny or action. Such events do not represent all risk on a project. Additionally, new risks develop as a project progresses. Therefore, risk identification will require frequent updates as a project progresses.

### **6.4.2 Risk Categories**

Risk shall be characterized into categories: Requirements Risk, Design Risk, Market Risk, and Construction Risk. See Appendix F for application of the risk category to risk assessment principles for capital and non-capital construction project elements.

**Requirements Risk** relates to the difficulty of succinctly and fully developing project requirements. Generally, requirements risk is associated with project development activities from earliest concept through Alternatives Analysis. A significant portion of Requirements Risk can be attributed to differences in project stakeholder goals, third parties (such as regulatory agencies), and undefined

requirements.

**Design Risk** is associated with the performance and variability of design activities occurring after Alternatives Analysis. Design risk occurs when design-related assumptions are incorrect or in situations where unknown factors cause designs to change.

**Market Risk** refers to the risk of procuring project management, administrative, right-of-way, design, or construction services, materials, and equipment. This risk refers to both the effects of the open-market pricing of goods and services, as well as the effects of the Sponsor's contract packaging strategies.

**Construction Risk** includes both risks that are due to variability of the project's environment—including unusual weather, unexpected subsurface conditions, and unexpected construction contractor failure. Construction risk also includes performance risk of consultants and contractors. Capital construction risk may be subdivided into: Early-Range Construction Risk (composed generally of site activities such as Geotechnical or Utility activities, usually associated with up to 20% complete), Mid-Range Construction Risk (associated with coordination of contractors, etc., from 20% to 50%), and Late-Range Construction Risk (associated with 50% to substantial completion).

## **6.5 Not used**

## **6.6 Risk Assessment: PMOC's Efforts**

### **6.6.1 Project Cost Risk Overview**

The PMOC shall use its professional judgment and cost data to evaluate the cost risk. The PMOC will also assess the magnitude of project risk and guide potential responses to manage the risk.

**Top-down Cost Risk Assessment** - The FTA has developed methodologies for evaluating cost risk using cost data derived from historic project information. These parameters are applied as risk-based ranges of potential cost at a summarized category level, and this process is referred to as a top-down cost risk assessment model. The FTA top-down cost risk assessment methods are project-level risk assessment tools that have been developed through implementation on many FTA transit projects. The features have become accepted as common starting points for the creation of a project-specific cost risk assessments.

### **6.6.2 Pre-assessment Adjustments of the Sponsor Estimate**

**Stripped Cost Estimate** - Based on review of the cost estimate, the PMOC shall ensure that the Sponsor has identified all contingency funds embedded within its cost estimate. Contingency funds may include both unallocated funds (usually applied as a percentage of summary costs) and allocated funds (usually applied as increases to individual estimate line items). Both patent (exposed) contingency funds and latent (hidden) contingency funds shall be identified. The identification of latent contingency funds will likely involve interviews with the Sponsor. Further, PMOCs should look for contingent funds embedded within estimates for inflation or escalation risk.

Once these contingency funds have been quantified, they shall be removed from the estimate to form a Stripped Cost Estimate.

**Adjusted Cost Estimate** – The Adjusted Cost Estimate is created by the PMOC and is the term used to describe the Stripped Cost Estimate amended to include the PMOC's line item revisions. Information to create the Adjusted Cost Estimate can be found from scope, cost, schedule, and contract packaging documents and from Operational Procedures and workshops with the Sponsor. The amount

of analysis shall be appropriate with the level of project development.

The PMOC should determine if line item revisions should become elements of the Risk Register. The adjusted estimate, at a minimum, shall include one level of breakdown below the standard SCC Cost Elements [e.g. 10.01, 10.02, etc.]. The estimate shall be inflated to the year of expenditure (YOE). The inflation rate used for developing the Adjusted Cost Estimate should be a reasonably-expected value without hidden contingency

Subsequent analyses of risk depend on accurate estimate adjustments. The PMOC should obtain consensus from the FTA, PMOC, and Sponsor in adjustments before moving forward with the risk assessment.

This Adjusted Cost Estimate, appropriately stripped of contingencies, establishes an accurate level of cost forecast. The adjusted cost estimate line items will be used later for assessing the range of risk.

### **6.6.3 Risk Profiles**

Many large transit projects, especially those in latter stages of development, are planned, built and funded in multiple phases and phases frequently overlap. Additionally, each phase can be delivered with various contracting methods. The overlap of phases and the different contracting methods create situations where project risks are difficult to quantify.

Where practical for accurate assessment of project risk or contingencies, the project's risks may be apportioned based on different risk profiles: risk and mitigations, including contingencies assessed independently by project portion; and the portions subsequently combined using appropriate techniques into an overall project risk recommendation.

### **6.6.4 Cost Risk Assessment – Beta Range Model**

The PMOC shall develop an independent top-down project cost risk assessment using the Beta Range Model method. The following describes its procedures. Actual implementation of the Beta Range Model method should be undertaken by those thoroughly familiar with the process and able to use engineering judgment to fine-tune the process for specific project conditions.

#### **6.6.4.1 Standard Cost Category (SCC) Risk Assessment**

**SCC Cost Element Ranges** - Utilizing the procedures outlined below, the PMOC shall establish a range for each estimated line items, or elements, at the minor SCC level, to which a Beta probability distribution function will be applied. This will allow the application of risk across the entire project. The Beta probability distribution function has been derived from historical FTA transit project outcomes, and may be adjusted from time-to-time. These ranges shall be established as follows:

- **Lower Bound SCC Cost Element Range Establishment** - The Adjusted Cost Estimate for each minor SCC is established as the lower bound value of the SCC element.
- **Upper SCC Cost Element Range Establishment** - The PMOC shall establish the upper bound minor SCC value through multiplying the Lower Bound value by a range factor (hereinafter referred to as the Beta Range Factor or BRF); i.e., Upper Bound = BRF\*Lower Bound.

**Beta Range Factor Establishment** - The PMOC shall establish the Beta Range Factor (BRF) values by using the guidelines indicated below and in Appendix F. The PMOC should use project specific Beta Factors based upon previously developed generic Beta factors.

Beta Range Factors are sums of Risk Category factors; i.e., total risk for an SCC element is the sum of

the individual Risk Category Factors for Requirements Risk, Design Risk, Market Risk, and Construction Risk, added to a base factor of 1.05. The base factor of 1.05 provides for a 5% end-of-project risk range allowance, which recognizes that risk generally remains, even at the end of construction.

Methods for establishing the BRFs are presented in Appendix F.

**SCC Cost Item Risk Curve Establishment** - The median, mean, and variance of the suggested range of distribution for the SCC cost item are fully determined using the Lower Bound, the BRF, and the historically-derived Beta distribution. These calculations are modeled in the Beta Range Model Workbook.

**Project Delivery Method Influence** - Differing project delivery methods may impact the timing and scope of Sponsor risk, but not necessarily the magnitude of risk nor the sequence of risk mitigation. Traditional project delivery methods (Design-Bid-Build) transfer risk to the contractor at the completion of design. Alternative project delivery methods such as Design-Build may transfer or share some requirements, design, market, or construction risk between the Sponsor and contractor. The effectiveness of risk transfers and risk retention methods should be considered when developing recommendations for BRF assignment.

#### 6.6.4.2 Project Level Cost Risk Assessment

Project-level risk is the sum of all risks associated with all of the SCC Cost Ranges. The Beta Range Model Workbook develops these calculations.

The Beta Range Model Workbook has been developed to illustrate the method's common features and to serve as a starting point for a particular project. This workbook is based on the organizational structure of the FTA Standard Cost Categories (SCC):

- 1) SCC Category 10 through 80: Capital cost elements of a project
- 2) SCC Category 90: Contingency, specifically excluded as a duplicate measure of risk
- 3) SCC Category 100: Finance charges not covered in the standard BRFs for categories 10 through 80. The finance cost risk is provided separately through other FTA reviews.

The Beta Range Model Workbook illustrates the formats and bases of calculations to execute the cost risk assessment described. The PMOC shall become familiar with the Beta Range Model Workbook prior to developing its model and shall adjust the FTA Beta Range Model Workbook to meet specific project conditions.

The PMOC shall use the Beta Range Model Workbook to create a summary table that lists the Sponsor's estimated values, and the PMOC's recommended project cost elements with its assessment data. The summary table will include the reportable range of variability determined in the risk assessment and its effect on the overall budget. The PMOC will then identify the key risk drivers through an analysis of those project elements with large cost risk impact.

The FTA may direct the PMOC to perform additional analyses to provide further insight into the project-level risk assessment.

**Conditioned Estimate** - The PMOC shall evaluate the project's contingency amounts and then shall comment on the sufficiency of the contingency. The PMOC will also recommend a contingency amount for the project in accordance with this OP. A Conditioned Estimate will be developed by adding the recommended contingency to the Adjusted Estimate, which forms the PMOC's

recommendation for the project budget. Contingency recommendations, regardless of method of analysis, are applied at the project level only.

### **6.6.5 Project Schedule Risk Overview**

The PMOC shall use its professional judgment and schedule data to evaluate the Sponsor's assessment of its project's schedule risk, and the PMOC will provide an independent assessment of the schedule risk.

**Schedule Risk** is any risk that can cause delay on the project's critical path. Note that schedule risk may also indicate cost risk.

#### **6.6.5.1 Pre-assessment Adjustments of the Sponsor Schedule**

**Stripped Schedule** - Based upon analyses of the schedule, the PMOC shall advise FTA on the Sponsor's identification of contingency durations and if the Sponsor's level of analysis conforms to the level required by the FTA. Contingency durations the PMOC should assess may include unallocated (dummy activity at the end of the project or sub-network) and allocated (increases to individual activity durations) schedule contingency. The PMOC will identify both patent (exposed) contingency durations and latent (hidden) contingency durations. Latent contingency is usually discovered during interviews with Sponsors. The PMOC should carefully review contingent durations that may be embedded as lag time hidden within the activity logic ties or artificially applied constraints.

Once identified, these contingency durations shall be quantified and removed from the schedule to form a Stripped Schedule.

**Adjusted Schedule** - Utilizing scope, cost, schedule, and other information developed in prior-performed Operational Procedures or joint PMOC and Sponsor workshops, the PMOC shall provide suggested revisions to the Stripped Schedule, increasing or decreasing the various activity durations. When applied to the Stripped Schedule, the suggested changes will develop an Adjusted Schedule. Any such adjustments and their rationale shall be fully documented.

The Adjusted Schedule forms a highly optimistic schedule for the project.

Subsequent analyses of risk depend on accurate schedule adjustments. The PMOC should get consensus of the FTA, PMOC, and Sponsor schedule adjustments before moving forward with the schedule risk evaluation.

### **6.6.6 Schedule Risk Assessment**

#### **6.6.6.1 Summary Schedule Development**

The PMOC shall review a summary schedule based upon the Adjusted Schedule. The summary schedule shall be a mechanically-correct critical-path method schedule that reflects the relationships between activities so that it models the impacts of schedule changes on other activities. The number of activities modeled should be commensurate with the Adjusted Schedule and level of detail available at the time of analysis. However, large models that are difficult to understand shall be avoided. The PMOC will use a summary schedule for risk assessment that creates balance between transparency and the detail required for sufficient risk assessment.

#### **6.6.6.2 Schedule Activity Risk Assessment**

The length of each activity on the Summary Schedule shall be determined by evaluating the specific project attributes (especially those on the Risk Register). Each activity's duration will be analyzed by both the Sponsor and the FTA to verify its reasonability. The Adjusted Schedule activity lengths shall

be used to establish the optimistic estimate for the summarized activity durations. The PMOC shall determine that appropriate technical experts have been consulted to establish the most likely and the most pessimistic estimates for each activity duration. The choice of probability functions or other technical parameters used in the analysis should be clearly documented. Methods used in the analysis should be presented clearly so that all parties can understand the analysis of the schedule risk assessment.

The schedule activity risk assessment shall utilize a commercially-available project scheduling system that is capable of critical path scheduling and stochastic modeling for probabilistically-described activity durations. This system will be used for capturing and reporting activity risk duration ranges, as well as reporting the resulting project-level schedule risk assessment.

#### **6.6.6.3 Project Level Schedule Risk Assessment**

The likelihood of project completion within the timeframes estimated on Sponsor's master schedule shall be assessed using a commercially available scheduling software program capable of stochastic schedule risk modeling ("Monte Carlo" modeling). The schedule modeling software shall develop alternate forecasted project completion dates, based upon the activity range input described above. This PMOC's modeling shall be completed by an expert versed in "Monte Carlo" modeling and transit project risk. This assessment shall include an evaluation of the predicted range of completion dates compared to the Sponsor's scheduled milestones. The assessment will also evaluate assigned activity duration ranges, including statistical information such as range, median, mean, minimum and maximums. The assessment will also identify critical and near-critical paths and the relationship between those paths and identified risk events. The FTA may direct other analyses.

The Project Schedule Risk Assessment shall consider whether non-construction activities, such as vehicle procurement, may introduce a relationship that creates a critical path that in turn masks critical paths for construction activities. In this case, it may be prudent to temporarily remove the non-construction activities and perform a separate analysis on the altered schedule.

Based upon its findings, the PMOC shall assess the sufficiency of the Sponsor's base sequencing and schedule to adequately reflect the modeled interim and final milestone completion dates. The PMOC shall provide recommendations for adjustment to the Sponsor's schedule and Project Management Plan to reduce the risk of not meeting the project's schedule goals.

**Conditioned Schedule** - The PMOC shall evaluate the contingency amounts identified for the project and shall comment on the sufficiency of the contingency. The PMOC shall also establish and recommended a schedule contingency amount for the project in accordance with this OP. A Conditioned Schedule is developed when the recommended contingency is integrated with the Adjusted Schedule.

### **6.7 Risk Mitigation: Sponsor's Efforts**

The PMOC shall review and recommend changes to the Sponsor risk mitigation plans. Areas of review and comment shall include the development and management of:

- Primary mitigation
- Secondary mitigation
- Contingencies and
- Contingency draw-down curves.

### 6.7.1 Risk Mitigation Recommendations

Each of the PMOC's recommendations to the Sponsor's Risk Mitigation Plans should be organized by the Mitigation Structure defined below, its SCC, and Risk Type. Each mitigation recommendation shall be denoted by the Mitigation Type that best describes the mitigation recommendation.

#### 6.7.1.1 Mitigation Structure

Mitigation structure refers to defined roles of whom and how the Sponsor and its consultants and contractors respond to risks identified in the review process. This structure consists of three parts: Primary Mitigation, Secondary Mitigation, and Contingencies.

**Primary Mitigation** occurs during all project phases and is the result of the planned actions of the Risk Management Plan and recommendations of the PMOC. Mitigation activities should be scheduled at the earliest phase during which the mitigation activity may occur, and should be completed quickly so that cost and schedule risks can be reduced early. Examples of mitigation might be completing design or performing a geotechnical survey.

**Secondary Mitigation** consists of pre-planned, potential scope or process changes that do not change the basic requirements and functionalities of the project. Secondary Mitigation may be triggered when risk events cause overuse of project contingencies; where such potential changes are unavailable on a project, additional contingency allowances may be required to protect the project. Example events that may trigger secondary mitigation include construction bids that are significantly over the estimate, or unexpected geotechnical hazards that are encountered and cause the project to be significantly over budget. Such "triggered" mitigation enables the Sponsor to make cost reductions in a planned and orderly process and preserves contingencies for use later in the project. Secondary Mitigation is fundamentally different than value engineering, which is a formal, systematic, multi-disciplined process designed to optimize the value of each dollar spent.

**Contingencies** are set-aside estimated amounts (monetary set-asides for cost and time set-asides for schedule) that are included within the overall cost or schedule targets for the project. The amounts are to be used to overcome increases in cost or schedule that are caused by potential risks. Contingency amounts may be associated with a particular activity or category of cost, or may be set aside in a general fund. In most cases, the project's risk decreases as the project progresses toward completion. As a result of risk decreasing over a project's life, the amount of required contingency also decreases. However, some contingency should always be available even beyond project completion.

#### 6.7.1.2 Mitigation Types

The PMOC shall indicate whether the four Mitigation Types— Risk Avoidance, Risk Transfer, Risk Reduction, or Risk Acceptance—have been sufficiently considered in the Sponsor's list of proposed mitigation measures.

**Risk Avoidance** is available when project elements may be alternatively delivered through a less-risky process or design, or may be eliminated altogether.

**Risk Transfer** occurs when responsibility and consequences for risk are transferred to a party other than the Sponsor. Risk transfers may be partial or complete. Risk is transferred to a third party through contract requirements, warranties, or insurance policies. The PMOC may recommend risk transfers or may recommend scope changes to transfer risk to parties better suited to mitigate risk.

**Risk Reduction** is a planned action that will either reduce the consequence or the likelihood of a risk event. When listing risk reduction, the PMOC should annotate: 1) The cause of the risk, 2) the

possible outcomes of the risk, 3) how the mitigation measures will be reduce the risk, and 4) whom within the Sponsor organization or project team will carry out the mitigation.

**Risk Acceptance** results from the recognition that further reduction of a particular risk would only come at the expense of the project's fundamental goals, such as unacceptable service loss or cost increase, etc. Risk acceptance may also be a preferred method to deal with those risks that are of a high level of impact yet low level of probability and that mitigating them would put undue financial burden on the project. Risk Acceptance often involves the potential consumption of project cost or schedule contingencies, project schedule float, or an increase in either project estimate or schedule.

In its review, the PMOC shall recognize the tipping point where non-contingency mitigation becomes so difficult to implement that risk acceptance is more beneficial to the overall project. This "break point" between risk reduction and risk acceptance typically occurs at the point where significant contingency funds are the only effective means to treat this project risk.

### **6.7.2 Primary Risk Mitigation Recommendations**

The PMOC shall review the Sponsor's Risk Mitigation process and its mitigation activities. After review, the PMOC will comment on the sufficiency of the project's cost risk and the project's schedule risk mitigation measures.

The PMOC's comments will include proposed management activities for the Sponsor and its consultants that will reduce risk. This list will serve to provide recommendations and to monitor the reduction of project cost risk. The RCMP should include progress-reporting timeframes for tracking the performance of mitigation actions. All assumptions should be identified with their rationales. The mitigation plans should develop priorities so that mitigation activities of high-risk project elements are executed as early as possible.

Mitigation measures should include actions that transfer risk. PMOCs should focus on recommending risk transfers through construction contracting. The PMOC should also ensure the Sponsor understands the risk it still has and that the Sponsor has an effective risk response plan. The Sponsor's project delivery methods and contracting methods should ensure that all costs due to risk transference are reflected in the project estimate.

Schedule risk mitigation recommendations should specifically address both critical path and non-critical path activities. Schedule risk mitigation aims to protect non-critical path activities from becoming critical path activities. This is done by: 1) Keeping a necessary amount of path float between the project critical paths and all of the intersecting (or potentially intersecting) paths and 2) keep significant risk off of the project critical path, or minimize their schedule variance if critical path activities are involved. The general principle is that activities with high schedule risk should start and complete as soon as feasible.

### **6.7.3 Project Cost Contingency**

The PMOC shall identify, describe, and analyze the adequacy of the Sponsor's cost contingencies. This analysis shall be developed in consideration of four models: 1) the generalized contingency level recommendations (described below); 2) a Cost Contingency Draw-down curve (described below); 3) a Sponsor-provided risk assessment model (if undertaken); and 4) a PMOC-developed risk assessment model. The PMOC shall use its professional judgment to evaluate the contingency requirements estimated by these four approaches, and shall establish an overall recommended minimum contingency level, as described below.

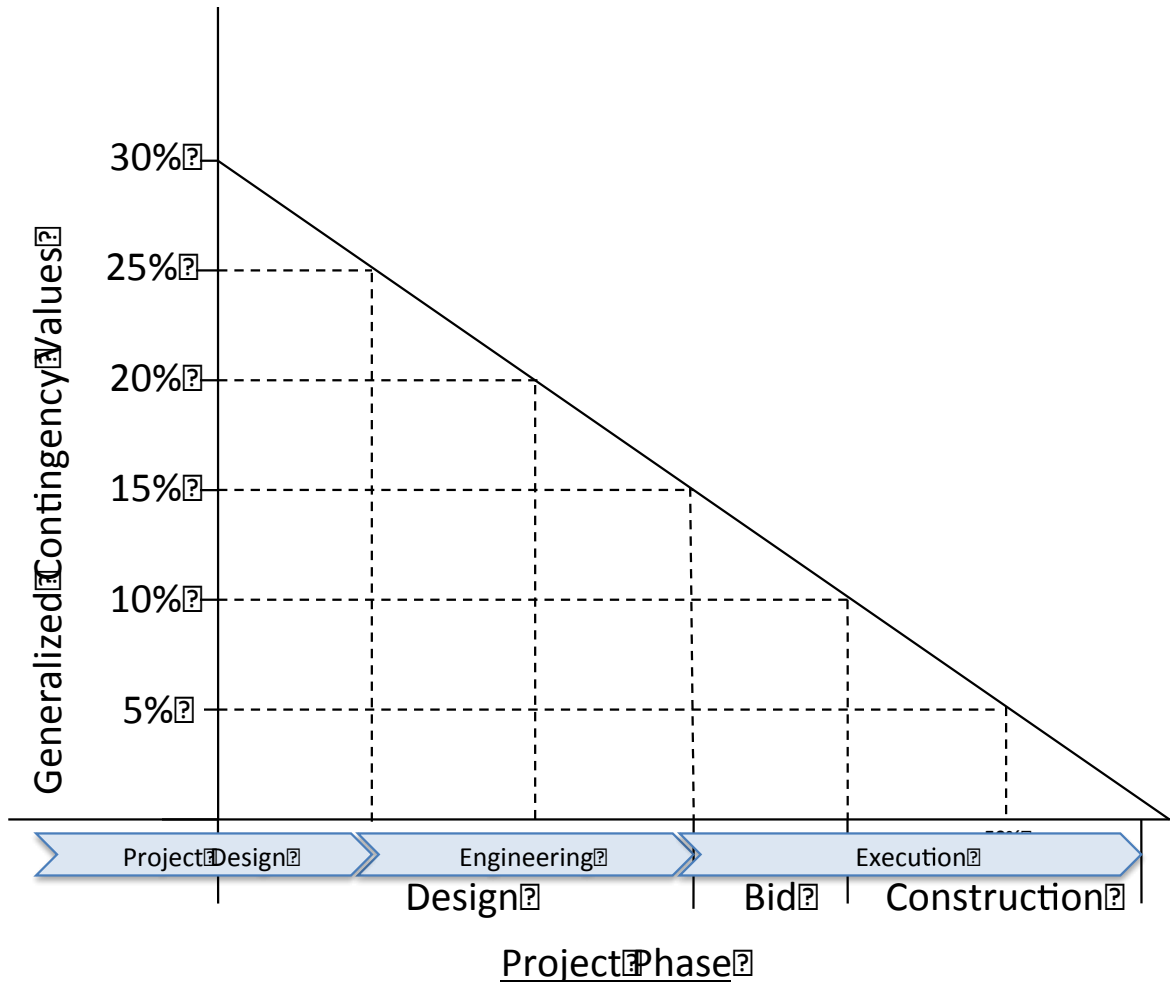


### 6.7.3.1 Generalized Contingency Levels

The FTA has determined, from historic project information, that the following minimum levels of contingency (the aggregate of allocated and unallocated cost contingency) are prudent:

- At Entry into Engineering, 25%
- At Readiness to Bid Construction, 15%.
- At Start of Construction, 10%.
- At 50% physically complete for construction, 5%.

The above contingency estimates may be interpolated at points of completion between the above milestones (see figure below).



The generalized contingency levels reflect historic risk undertaken through a design-bid-build delivery method. When alternate delivery methods are used, some portion of Sponsor risk associated with design and procurement (Design and Market Risk Categories) will be transferred to the design-builder. An analysis of the actual contracting documents is necessary to determine how much risk is transferred and the resulting contingency requirements.

#### **6.7.4 Cost Contingency Draw-down Curve**

The PMOC shall review the Sponsor's Cost Contingency Draw-down Curve and then make recommendations to improve it. The PMOC will also evaluate the Sponsor's current contingency and Forward Pass analysis (and Backward Pass analysis as appropriate) in development of its recommendations. The PMOC shall recommend minimum contingency amounts for the Cost Contingency Draw-down Curve by phase that reflects the specific project conditions. These minimum levels should be noted for each of the FTA milestones, including additional milestones identified by the Sponsor and PMOC. These milestones and minimum contingency amounts define a cost contingency drawdown curve, indicating a minimum level of contingency that must remain in the project budget at any given point in time. This draw-down curve is used to protect from inappropriately early draw down of contingency funds.

##### **6.7.4.1 Forward Pass Cost Contingency Analysis**

The Cost Contingency Draw-down Curve is evaluated as a "forward pass" set of minimum recommended cost contingency values for each of the Project Milestones beyond the current review and for points of significant changes of project risk.

Where the Sponsor or PMOC have identified additional milestone points, the PMOC shall use its judgment to establish forward-pass contingency recommendations based on interpolated Generalized Contingency recommendations discussed above.

In the case of multiple project phases that in different levels of development, or significant portions that exhibit differing risk profiles, a project contingency curve may be constructed as the addition of several contingency curves reflecting each significant project portion.

##### **6.7.4.2 Backward Pass Cost Contingency Analysis**

Projects, or portions of projects, may face extraordinary levels of risk during specific project points in time. In such case, the PMOC may establish a Cost Contingency Draw-down Curve using a "backward pass" set of recommended cost contingency values. These values would represent the minimum amount of total cost contingency expected to be necessary at Project Milestones and may be used to adjust forward pass contingency/milestone recommendations. The Backward Pass method considers estimates of minimum total cost contingencies based on an assessment of the project status and project risk at the milestone under consideration. Items of high risk, especially those identified with the Mitigation Type of "Risk Acceptance", shall be specifically reviewed when performing the backward pass analysis.

This process begins by considering the final stages of the project (say 95% complete) and determining how large of a contingency fund should remain in the project budget to solve potential risk-laden events. This amount becomes the minimum amount of contingency that should be maintained at that final stage. The next step is to consider another point in time when the project is less complete (say at 75% completion) and to similarly determine the size of contingency fund that should remain available at the 75% completion time. This process is completed—moving stage by stage toward the beginning of the project—until the current phase is reached.

The following considerations shall be made in development of the backward pass contingency values:

- At the Revenue Service Date (RSD), the demand for total cost contingency has been reduced to a minimum requirement for scope changes or clarifications and schedule delays or changes. The establishment of required contingency at this point should carefully consider conditions such as the

Sponsor's experience and experience on other similar transit projects to identify an amount sufficient to close out punch list work, additional work orders, etc. The working target for this point is generally 1-3% total contingency, including 0-1% for schedule delay costs and the remainder for other costs;

- At the point that the project construction procurement is “substantially complete” (90-100% bid for either Design-Bid-Build or 90-100% subcontracted for alternative project delivery methods), the project is exposed to cost changes in the range of 10% of project costs, which includes 4-6% to reflect schedule delays that at this point can average 20% of the construction phase duration; and
- For any potential delay duration greater than 9 months, the contingency amounts shall assume 3 months each of demobilization and remobilization with a variable standby period in between.
- Consideration should be made to appropriately reflect contingency needs under design-build contracts, where the cost of the contracted design-build portion is accurately reflected in the Adjusted Estimate. In this circumstance, Sponsor contingency needs for Design and Market risks may be significantly reduced, and Sponsor contingency needs for Construction risks may also be significantly reduced, though to a lesser extent. A thorough analysis of the design-build contract is necessary to establish these amounts.

### **6.7.5 Secondary Cost Risk Mitigation Recommendations**

The PMOC shall review the credibility and applicability of the Sponsor's schedule of Secondary Risk Mitigation items, and comment on whether such Secondary Mitigation results in sufficient protection for the project. Such evaluation shall consider levels of risk reflected within the risk register, as well as any risk analyses available for the project. The schedule of Secondary Mitigation shall include the targeted magnitude of the cost and/or time savings expected and the latest time at which a Secondary Mitigation item may be triggered effectively, as well as a description of the scope, deliverables, and outcomes of the item. The PMOC will also review and comment on scheduled progress-reporting intervals for Sponsor's tracking of the utilization and management of such mitigation capacities, as well as any integration with the Sponsor's overall program schedule. All important assumptions shall be identified along with their rationales.

Estimation of all Secondary Mitigation items shall be at a level commensurate with the current level of estimating used for the project as a whole. Further, the cost and/or schedule adjustments proposed shall include an analysis of the adjustment for any scope reductions as well as any adjustment for redesign of the project area affected due to such scope reduction, with any associated soft costs.

The Secondary Mitigation Recommended Amount in the Beta Range Model is calculated as the Secondary Mitigation Target minus the Conditioned Estimate. This target is developed using the Beta Range Model Workbook; if the project budget includes contingency above the modeled Conditioned Estimate, such contingency amount above the Conditioned Estimate may be considered as fulfilling a portion of the Secondary Mitigation recommended amount. With approval from the FTA, the PMOC may modify this amount based upon overlapping Sponsor milestones, actual progress beyond a given phase, or other project-specific factors.

Where Secondary Mitigation is insufficient to protect the project at the level prescribed in the Beta Range Model Workbook, or as otherwise adjusted by the FTA, the PMOC shall recommend sufficient additional contingency to reach the level of protection that would otherwise be available through Secondary Mitigation. In general, Secondary Mitigation should be sufficient to bring the project to the 65% confidence level as indicated in the Beta Range Model Workbook, or such other level as may be directed by the FTA.

As a project progresses toward completion, it may be increasingly difficult to develop Secondary Mitigation measures, especially if project construction is already contracted. Early identification of Secondary Mitigation measures helps to preserve its availability in later stages of the project. The PMOC shall consider the current design efficiency, the stage of the project, and the impact that developing Secondary Mitigation measures will have on the FFGA/SSGA's scope, transit capacity, or level of service.

In the case of design-build contracting, Secondary Mitigation elements may be preserved by contractually causing the design-builder to provide Secondary Mitigation design options in its work, subject to Sponsor's option.

### **6.7.6 Project Schedule Contingency Review**

The PMOC shall fully identify, describe, and analyze the adequacy of the Sponsor's schedule contingencies. The PMOC shall make recommendations as to what minimum amounts of schedule contingency are recommended for inclusion in the Sponsor's Project Management Plan and supporting schedules.

#### **6.7.6.1 Schedule Contingency Analysis and Recommendation**

The PMOC shall evaluate the schedule contingency available within the Sponsor's schedule, and provide recommendations as appropriate. Such recommendation shall be made in consideration of the following:

- The project shall follow the general guideline that sufficient schedule contingency is available at any major review milestone to absorb a project schedule delay equivalent to 25% of the remaining duration through the Revenue Service Date proposed for the project, calculated by adding the schedule contingency to the Adjusted Schedule;
- Any available schedule risk assessment histogram indicates a confidence level of at least 65% of reaching the proposed Revenue Service Date (RSD); and
- The general assessment of risk is not in conflict with the risk contingency requirements established in development of the Schedule Contingency Draw-down Curve, below.
- Based on inflation factors, professional opinion and other factors, the PMOC should ensure that the cost estimate is appropriately increased to account for any additional schedule contingencies.

#### **6.7.6.2 Schedule Contingency Draw-down Curve**

The Sponsor shall develop a plan that forecasts the minimum amount of schedule contingency required for the project at the current, and all future major milestones. The PMOC shall review the Sponsor's analysis and make recommendations about its sufficiency. Premature use of schedule contingency reduces the ability of a project to withstand schedule change. Minimum levels of schedule contingency should be noted by the PMOC for each of the FTA milestones, including additional milestones identified by the Sponsor and the PMOC designated as points in the project when significant changes in risk may occur. These milestones and minimum schedule contingency amounts define a schedule contingency drawdown curve. The schedule contingency drawdown curve defines

minimum levels of contingency that must remain in the project schedule at any given time. The draw-down curve is used to protect from inappropriately early draw down of schedule contingency durations.

The Schedule Contingency Draw-down curve shall be evaluated by sequentially “stepping back” through various completion milestones for the project. The Schedule Contingency Draw-down curve will also be evaluated by estimating the minimum amount of schedule contingency required to complete the project on schedule from that point forward. The PMOC shall evaluate this draw-down curve and comment on the appropriate allocation of risk over time.

## **6.8 Sponsor’s Risk and Contingency Management Plan (RCMP)**

The PMOC shall ensure that the Sponsor’s RCMP identifies all aspects of potential risk, including management capacity and capability, project performance, cost and schedule risk. A recommended structure for the Risk and Contingency Management Plan is included in Appendix G.

Upon FTA approval, the PMOC shall give the Sponsor the assessment and recommendations developed in this OP for inclusion in the Sponsor’s RCMP. The PMOC shall work collaboratively with the Sponsor as the Sponsor prepares and/or revises the RCMP section of its Project Management Plan to reflect the recommendations provided by the PMOC.

## **6.9 PMOC’s Monitoring of Sponsor’s Risk and Contingency Management Plan**

Post-assessment monitoring by the PMOC is intended to assess the Sponsor’s performance in risk management and ensure that the Sponsor’s project implementation achieves its risk management objectives and targets. The PMOC shall use the Sponsor’s RCMP, which has been collaboratively amended with the PMOC’s recommendations, as its guide for post-risk review monitoring.

The PMOC shall report on the following items:

- The effectiveness of the Sponsor’s implementation of the Primary Mitigation measures and the effectiveness and timeliness of the mitigation action on the potential risk.
- The occurrence of risk events on the project, and whether or not the risk was previously identified. The PMOC will also comment on the estimated effect of the risk on the project’s cost and schedule goals;
- The use of cost and/or schedule contingencies and whether such use threatened **minimum levels of contingency required for future phases**;
- Successful implementation of other major initiatives noted in the RCMP; and
- The effectiveness of the Sponsor’s organization to fully manage its Risk and Contingency Management Plan.

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall provide the FTA with a written report of its findings, analysis, recommendations, professional opinions, and a description of the PMOC’s review activities. After FTA approval, the PMOC will share the report with the Sponsor. If the PMOC and the Sponsor have different opinions of the PMOC’s findings, the FTA may direct the PMOC to reconcile with the Sponsor and provide FTA with a report addendum covering the modifications agreed upon by the Sponsor and PMOC.

The report formatting requirements of OP-1 apply. The PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use of FTA-templates when provided. The PMOC may add other software as required, but documentation and report data shall be available to FTA.

The PMOC shall prepare a written report in the format discussed in Appendix H and attach the sponsor's most current SCC estimate, schedule, and other related documents. The PMOC may also include embedded references to, or exhibits from, the Sponsor's estimate and schedule, or other documents that clarify the analysis, findings, and recommendations.

The PMOC's report will integrate and summarize available information and data for the project, providing professional opinion, analysis, information, data and descriptive text in an accessible and understandable format. Opinions shall be supported by data tables.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	PERFORMANCE MEASURE	ACCEPTABLE QUALITY LEVEL	MONITORING METHOD
1	PMOC shall support FTA's programmatic decisions through review and analysis of Sponsor's risk management process PMOC shall review, analyze and recommend to FTA regarding Project Contingency and Contract Packaging.	<b>R1a.</b> The PMOC shall develop and document a process for review, analysis and reporting to FTA of Sponsor's risk assessment and risk management practices.		<b>M1a.</b> Evidence of a documented process.	<b>Q1a.</b> Process exists and has been followed.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process to analyze and advise FTA on Cost, Schedule and Contract Packaging and other project risk issues.		<b>M1b.</b> Documented assessment of overall Project Contingencies and Contractual Risk Allocations.	<b>Q1b.</b> Review must be made and the PMOC provides internal verification that the process as documented was followed.	<b>MM1b.</b> Periodic review by FTA or its agent.
		<b>R1c.</b> The PMOC shall develop and document a process for review and analysis of Sponsor's Project Contingencies, Contractual Risk Allocations and Contract Packaging.		<b>M1c.</b> Evidence of a documented process.	<b>Q1c.</b> Process exists and has been followed.	<b>MM1c.</b> Periodic review by FTA or its agent.
		<b>R1d.</b> The PMOC shall use its process to analyze the adequacy, effectiveness and efficiency of Sponsor's Project Contingencies and Sponsor's management and risk management practices prior to each milestone, as directed by FTA.		<b>M1d.</b> Documented assessment of overall Project Contingencies, Contractual Risk Allocations and management practices.	<b>Q1d.</b> Review must be made and the PMOC provides internal verification that the process as documented was followed.	<b>MM1d.</b> Periodic review by FTA or its agent.
2	The PMOC shall utilize its experience and professionalism in monitoring Sponsor risk management systems to produce required deliverables based on comprehensive systems analysis strategically repeated as the project advances. The PMOC shall review, identify, characterize and analyze project contingency	<b>R2a. PMOC Oversight Plan.</b> The PMOC shall develop and submit a plan for providing surveillance of the Sponsor's performance in risk management defining how services and products will be accomplished in a manner meeting FTA requirements.		<b>M2a.</b> Documented evidence of a risk management surveillance plan, supported by professional opinion.	<b>Q2a.</b> Professional opinion of risk management objectives and targets, other supporting documentation or submittals and recommendations for course of action.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b. Cost Risk.</b> The PMOC shall identify, assess and evaluate the uncertainties in Sponsor's cost estimates in terms of project's social, political, legal, financial and physical environment and make recommendations regarding identified risks.		<b>M2b.</b> Documented evidence of review of Sponsor's cost estimates, supported by professional opinion.	<b>Q2b.</b> Professional opinion and recommendations regarding identified items of likely risk.	<b>MM2b.</b> Periodic review by FTA or its agent.

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	PERFORMANCE MEASURE	ACCEPTABLE QUALITY LEVEL	MONITORING METHOD
	availability, status and forecasts for critical project milestones and assure Sponsor's use of sound project management strategies.	<b>R2c. Schedule Risk.</b> The PMOC shall identify, assess and evaluate Sponsor's project schedule uncertainties in terms of social, political, legal, financial and physical environment and make recommendations regarding identified risks.		<b>M2c.</b> Documented evidence of review of Sponsor's project schedule, supported by professional opinion.	<b>Q2c.</b> Professional opinion and recommendations regarding identified items of likely risk.	<b>MM2c.</b> Periodic review by FTA or its agent.
		<b>R2d. Non-Cost and Non-Schedule Risk.</b> The PMOC shall, as directed by FTA, identify, assess and evaluate all non-cost and non-schedule related uncertainties and risks found in Sponsor's project, including risks associated with Sponsor's project delivery methods and strategies for packaging the contracts for construction, and make appropriate recommendations.		<b>M2d.</b> Documented evidence of review and evaluation of Sponsor's non-cost and non-schedule related uncertainties, supported by professional opinion.	<b>Q2d.</b> Professional opinion and recommendations regarding identified items of likely risk.	<b>MM2d.</b> Periodic review by FTA or its agent.
		<b>R2e. Risk Mitigation.</b> The PMOC shall review Sponsor's risk register and risk mitigation plan. If required by the FTA, the PMOC shall independently identify and characterize project risks, develop a and prepare a report showing it's recommendations, including those for needed changes to Sponsor's PMP.		<b>M2e.</b> Documented evidence of review and assessment of risk together with recommend changes to PMP and preparation of risk mitigation plan, supported by professional opinion.	<b>Q2e.</b> Professional opinion and recommended changes to PMP together with risk mitigation plan.	<b>MM2e.</b> Periodic review by FTA or its agent.
		<b>R2f.</b> The PMOC shall identify, describe and analyze the adequacy of Sponsor's cost contingencies, make necessary recommendations and, through parameters developed using the "forward pass" and "backward pass" approaches, create the overall minimum contingency curve.		<b>M2f.</b> Documented evidence of a thorough review, analysis and description of Sponsor's Cost Contingencies, supported by professional opinion.	<b>Q2f.</b> Professional opinion of Cost Contingencies.	<b>MM2f.</b> Periodic review by FTA or its agent.
		<b>R2g.</b> The PMOC shall develop a "Forward Pass" cost contingency analysis using historically-developed parameters and a "Backward Pass" cost contingency analysis using project specific data. This data shall be reconciled and a Cost Contingency Curve and graphics developed.		<b>M2g.</b> Documented evidence of forward and backward pass cost contingency analysis, and creation of cost contingency curve, supported by professional opinion.	<b>Q2g.</b> Professional opinion and review of all cost contingency analyses and creation of Cost Contingency Curve with graphics.	<b>MM2g.</b> Periodic review by FTA or its agent.
		<b>R2h.</b> The PMOC shall identify, describe and analyze the adequacy of Sponsor's schedule contingencies making recommendations for minimum amounts of schedule contingency and supporting schedules.		<b>M2h.</b> Documented evidence and review of Sponsor's Project Schedule Contingencies, supported by a professional opinion.	<b>Q2h.</b> Professional opinion and evaluation of Sponsor's Schedule Contingencies.	<b>MM2h.</b> Periodic review by FTA or its agent.



	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	PERFORMANCE MEASURE	ACCEPTABLE QUALITY LEVEL	MONITORING METHOD
		<b>R2i.</b> The PMOC shall "step back" at various milestones and estimate the minimum amount of schedule contingency required to complete the project on schedule. This data shall be used to develop a Schedule Contingency Curve.		<b>M2i.</b> Documented evidence of schedule contingency analysis and creation of schedule contingency curve, supported by a professional opinion.	<b>Q2i.</b> Professional opinion and review of all schedule contingency analyses and creation of Schedule Contingency Curve with graphics.	<b>MM2i.</b> Periodic review by FTA or its agent.
		<b>R2j.</b> The PMOC shall identify, describe and analyze Sponsor's individual contract packages and a) Contract Packaging Strategy: characterize and report on the sufficiency of design and construction contract packaging strategies; b) Contractual risk Allocation: discover and report proposed or actual allocation of risk between Sponsor and third parties; and c) Contractual Risk Allocation Assessment: evaluate proposed contractual allocations of risk and comment on potential cost-to-benefit balance and effectiveness of assignments.		<b>M2j.</b> Documented evidence, review and assessment of Sponsor's Contract Packaging Strategy and Contractual Risk Allocations and supporting documents, supported by professional opinion.	<b>Q2j.</b> Professional opinion and Contract Packaging Review.	<b>MM2j.</b> Periodic review by FTA or its agent.
3	The PMOC shall document its findings, professional opinions, and recommendations in a report to the FTA for its Risk, Cost and Schedule Contingency, and Contractual Risk Allocation Reviews to the FTA. PMOC shall further attach SCC estimate, schedule and other related documents with Primary Deliverables and Subdeliverables.	<b>R3.</b> The PMOC shall present its findings, conclusions, analysis and recommendations to FTA and reconcile those recommendations with the Sponsor to the extent possible when so directed by FTA.		<b>M3.</b> PMOC's findings conclusions, recommendations, and presentation.	<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with Sponsor to the extent possible.	<b>MM3.</b> Periodic review by FTA or its agent.

## **APPENDIX B**

### **Sponsor's Submittals**

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In advance of performing the review, the PMOC should obtain and study the following, as appropriate for the particular project phase and level of review required. Many of these documents will have been obtained through the review of scope, schedule, cost, and Sponsor management capacity and capability in other OPs. The PMOC should perform an initial review and notify the FTA of important discrepancies in the project information that would hinder the review; an example would be insufficient detail or a mismatch between drawings and cost estimate in which the drawings are current and the cost estimate is significantly older.

Coordinate these submittals with those required for the OPs related to *Readiness to Enter Engineering* and *Readiness for FFGA/SSGA*.

#### **Programmatic**

Alternatives Analysis Final Report  
MPO adoption of the LPA into Fiscally Constrained Long Range Plan  
TIP and STIP include the project for PE, Final Design, and Construction phases  
Final environmental documents and NEPA determination

#### **Scope / Project Definition**

Basis of Design Reports, Design Criteria Reports  
Project Plans, Drawings, and Specifications  
Master Permitting Plan and Schedule  
Geotechnical Baseline Report  
Passenger Level Boarding Design documents  
Vehicle design documentation  
Transit Capacity and Operating Plan  
Documentation of changes to scope that have occurred since last FTA review

#### **Project Management Plan and sub-plans**

Program Management Plan (if applicable)  
Basis for the Project  
Environmental Assessment/Mitigation Plan  
Design Control including but not limited to Value Engineering, Agreements with Railroads, Utilities, other Third Parties  
Project Controls (Document, Scope, Cost, Schedule, Dispute)  
Risk Assessment, Risk and Contingency Management Plan  
Project Delivery and Procurement  
Sponsor Technical Capacity and Capability  
Quality Assurance / Quality Control Plan  
Safety and Security Management Plan  
Real Estate Management Plan  
Fleet Management Plan

#### **Schedule**

Project schedule in original and SCC format; schedule narrative describing critical path, expected durations, and logic

#### **Cost Estimate**

Summary of O&M Cost Assumptions/Productivities  
Capital cost estimate in original and SCC format

Capital cost estimate backup documentation  
Capital cost estimating methodology memo  
Before and After Study Documentation

**FTA Agreements**

Entry to Engineering Checklist (if applicable)  
FFGA/SSGA Checklist (if applicable)  
Record of Decision  
Full Funding Grant Agreement/Small Starts Grant Agreement and Attachments if available

## APPENDIX C

### Sponsor Risk Interface

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Interface with the Sponsor during the risk review facilitates the process and provides the Sponsor with the background necessary to incorporate the risk review recommendations into its Project Management Plan. A typical structure for Sponsor interface meetings is as follows; the PMOC shall assess the level of project completion and familiarity of the Sponsor with the risk review process to determine whether adjustment to the following structure is appropriate:

Kickoff meeting:

- Introduce PMOC team and Sponsor team;
- Sponsor presents the project to PMOC team:
  - Agency organization, including project team and plan for staffing;
  - Description of work and reviews over the previous year;
  - Review of the project by discipline;
  - Review of schedule, cost estimate, Sponsor's RCMP and risk register;
- PMOC presents the risk review process to Sponsor; and
- Tour of alignment, station and support facility locations.

Workshop 1 (may be broken into two sessions): This workshop should occur after PMOC team has reviewed Sponsor's documents, written and exchanged issue papers for each discipline, and has developed its RCMP, including its cost and schedule risk assessment products.

- Introduce PMOC team and Sponsor team;
- Characterize PMOC's understanding of Sponsor Technical Capacity and Capability, Scope, Cost and Schedule (all reviewed under separate Ops);
- Discuss summary schedule (if schedule risk assessment is undertaken);
- Discuss risks, categorized by SCC structure and/or summary schedule activity, identified by the PMOC, review the status of Sponsor's risks listed on its Risk Register, and discuss and record any additional risks discovered during the workshop, including qualitative characterization of likelihood and magnitude of cost and/or schedule impact for the identified risks;
- Where possible, confirm or establish draft mitigation actions for the identified risk events;
- Summarize findings, conclusions, recommendations, questions, and enter into joint discussions to resolve open questions;
- Discuss actions required to facilitate the next stage of risk review; and
- Inform the Sponsor of next steps in the risk review process.

Workshop 2 (may be combined with Workshop 1 in the case of a risk refresh): This workshop should occur after PMOC team has reviewed the risk listing, has developed its cost and schedule risk assessments (as appropriate), and has developed recommendations regarding Sponsor's target budget, contingency and risk mitigation.

- Introduce PMOC team and Sponsor team;
- Describe the process used to review and establish quantitative risk recommendations;
- Summarize the key findings of the review and recommendations;

- Provide recommendations regarding risk mitigation options and alternatives including possible changes to scope, budget, schedule, project delivery method, construction methodology, and/or use of cost and schedule contingencies;
- Review detail of individual risks, as appropriate, regarding the method of quantification of risk and which risks strongly influence overall project risk;
- Review specific recommended mitigation measures and solicit completion dates; and
- Discuss action items and next steps in the risk management and FTA review process.

## APPENDIX D

### Risk and Contingency Review Levels

The following generally depicts large differences among the three OP40 products (OP40 a, b, or c). Refer to details within each OP40 product to establish technical requirements for each element to be performed. The FTA will initially determine the level of risk and contingency review to apply to any project, and the FTA may change the level of review at any time during a project as project conditions warrant.

Activity		FTA will determine initial level of review required based on assumed project conditions; level of review may be changed should actual project conditions warrant, at FTA discretion.		
		OP40a Sponsor-led	OP40b Abbreviated	OP40c Full
A	Review of management capacity & capability, scope, cost, schedule (and others as directed)	Sponsor presents organization, scope, schedule and estimate; PMOC reviews and comments	Perform 1-2 month abbreviated TC, scope, cost, schedule review, etc. Includes 2-3 day workshop	Perform full TC, scope, cost, schedule review, etc. Generally 2-3 month process.
B	Review sponsor risk identification	PMOC participates with Sponsor Risk Register Workshop and comments	Review, comment on, and provide amendments to sponsor's risk register	
C	Review sponsor assessment (if required or provided)	Participate and comment on sponsor's assessment	Review and comment on sponsor's assessment process; contrast against PMOC risk assessment	
D	Develop or refresh PMOC Beta range assessment and develop or refresh schedule risk model	PMOC participates in Sponsor's assessment process. No PMOC risk modeling required	Provide concurrently with TC, scope, cost, schedule workshop where possible	Usually requires separately scheduled risk workshop
E	Review sponsor risk response plans (primary and secondary mitigation)	Sponsor presents mitigation management; PMOC reviews and provides comment	Review, comment on, and provide amendments to sponsor's primary and secondary mitigation plans	
F	Review sponsor contingency and contingency management	Sponsor presents contingency planning; PMOC reviews and provides comment	Provide modeled contingency recommendations; compare to sponsor's contingency. Review and comment on Sponsor's contingency management planning	
G	Review sponsor RCMP	Sponsor presents its RCMP; PMOC reviews and provides comment	Review and comment on sponsor's PMP; focus on risk organization and levels of contingency authority	

## APPENDIX E

### Example Risk Register

The following is provided as an example only of a risk register used for risk identification; the intention is to convey the basic content for a robust risk register. Other more detailed formats have been found useful in practice, depending on professional experience and project-specific requirements.

The Risk Register developer is encouraged to obtain the most recent examples before determining Risk Register format.

RISK REGISTER									
Grantee:				Rating	Low (1)	Med (2)	High (3)	Very High (4)	Significant (5)
Project:				Probability	<10%	10><50%	>50%	75%><90%	>90%
Date:				Cost	<\$250K	\$250K><\$1M	\$1M><\$3M	\$3M><\$10M	>\$10M
				Schedule	<1 Mths	1><3 Mths	3><6 Mths	6><12 Mths	>12 Mths
				Ranking	<=3	3.1-9.49		>=9.5	
					Risk Ranking				
					Probability	Cost	Schedule	Risk Rating	
SCC	ID	Risk Cat.	Risk Description	Outcome	[P]	[C]	[S]	(P) X (C+S)/2	Mitigation Action
10.01	3	1-Requirements	Third parties may influence the alignment in an untimely manner.	Delay and cost.	2	1	0	1	Obtain municipal consent buy-in at 30% design.
10.01	5	1-Requirements	Delays may occur in reconfiguring Railroad connection project.	If Railroad connection is not completed in time, entire Agency project could be subject to indefinite delay.	3	2	5	10.5	Agency undertake design
10.01	6	1-Requirements	The drawings indicate that there are freight tracks close to the LRT guideway. Is clearance an issue at any of these locations? Is there the possibility of crash walls or something similar required?	Could cause additional costs and studies involved with providing greater physical separation between light rail and freight rail lines.	3	4	0	6	Evaluate whether the current estimate reflects this scope for crash walls. May be an estimate reduction
20.01	43	1-Requirements	As all stations have center island platforms at grade, if a decision, for safety or operations reasons, is made to avoid pedestrian grade crossings, all stations will need tunnels or bridges along with multiple vertical circulation elements to replace them.	Much greater cost per station.	1	5	0	2.5	History indicates a very low probability
20.01	153	2-Design	Potential elevated pedestrian connection between park-and-ride and LRT station (814)		3	3	0	4.5	
30.02	55	1-Requirements	Failure to identify economical, environmental-suitable, and practical location for maintenance facility could cause excessive project costs.	Much higher costs, both for real estate acquisition and construction cost and for O&M costs when the project goes into operation.	1	3	0	1.5	Is currently under choice selection, among final 4 sites. Re-evaluate costs when a site is chosen.
40.01	61	1-Requirements	Balance of earthwork is unknown at this time, although it would appear that there may be more fill than cut. Lack of economical embankment material could be a problem.	Higher cost if material is hard to find.	4	4	3	14	Evaluate as an estimate adjustment. Figure out more during design.
40.02	62	1-Requirements	Since a number of the "tunnels" are only shallow cut & cover grade separations under existing streets (where the utilities are usually buried), there are likely to be utility issues to be dealt with.	Costly relocations of utilities. Short construction season may require expedited advance utility relocation packages to avoid delaying project.	2	3	0	3	Perform utility location studies during early PE
60.01	139	1-Requirements	Potential impact to loading dock access of existing commercial building (124)		5	4	0	10	Evaluate for estimate adjustment

## APPENDIX F

### Beta Range Factor Guidelines

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The following guidelines apply for cumulative Beta Range Factors (BRFs). Note that 1) the following BRF amounts are the sum of the individual risk category factors; 2) failure to remove a category of risk at a given phase indicates that some amount of that risk survives to the next phase—for example, Design Risk may exist during the construction phase if a design decision has been delayed; and 3) the cumulative factors here represent a range of observed risk across many transit projects and therefore increases to the suggested BRFs should only occur where exceptional risks are involved, beyond what would be expected by a “normal” project. The PMOC shall appropriately suggest BRFs, depending upon the complexity of and risk inherent in the element under analysis.

#### **SCC10 through 50:**

- A BRF above 2.50 implies uncertainty associated with the completion of the alternatives analysis process; after completion of alternatives analysis, some level of Requirements Risk remains;
- A BRF between 2.50 and 2.25 implies reduction of remaining Requirements Risk, and increasing mitigation of Design Risk as design proceeds to Entry to Engineering. During Engineering, remaining design risk is virtually removed, yielding a BRF at completion of Engineering of 1.75;
- A BRF between 1.75 and 1.50 recognizes the existence and reduction of Market Risk (bid risks; uncertainties associated with reliable information on market conditions, short of a project specific firm price, etc.);
- A BRF between 1.50 and 1.35 generally recognizes uncertainties related to construction associated with geotechnical/utility, other underground/construction activities occurring during the first 20% of construction “Early Construction”).
- A BRF of 1.25 indicates reduction of risk to the level of 50% of construction;
- A BRF between 1.25 and 1.05 indicates uncertainty associated with late construction activities, including activities through start-up and substantial completion.
- A BRF of 1.05 implies that no unresolved risk events are identified for this item and only unknown risk events remains.

#### **SCC10 through 40:**

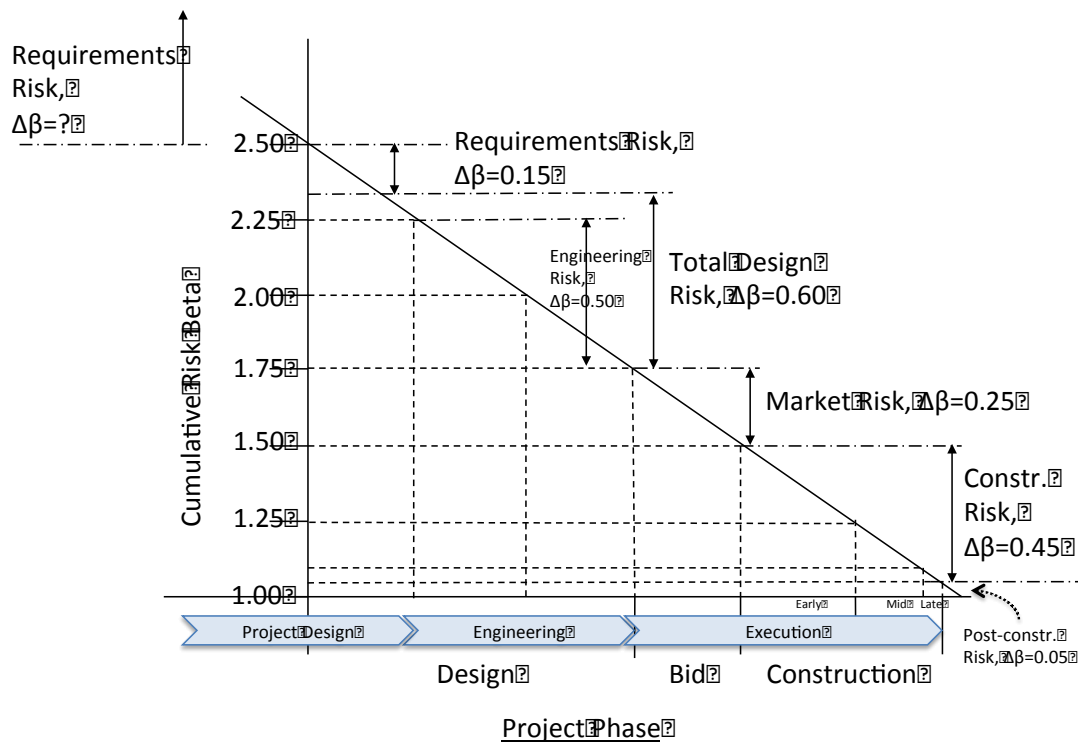
- Where exceptional geotechnical conditions exist, especially deep excavations and/or tunneling, the PMOC shall provide a separate analysis and explanation of the BRFs that apply to the corresponding estimate elements. Such BRFs may significantly exceed standard BRFs.

The standard BRFs are presented in Table 1 and Figure 1 in this appendix. Note that at any given point in a project, BRFs for the SCC elements may be comprised of cumulative factors of risk from any or all of the categories shown.



**Table 1 – SCC 10-50 Beta Range Factors by Risk Category**

<u>Risk Category</u>	<u>Risk Category</u> <u>Factor</u>	
Requirements Risk	Min. 0.15	
Design Risk in Project Development	0.10	
Design Risk in Engineering	0.50	
Market Risk	0.25	<b><u>Construction Risk</u></b> <b><u>Sub-Factor</u></b>
Construction Risk	0.45	
Early Construction		
Mid Construction		
Late Construction		
Post Construction	0.05	



**Figure 1 – SCC 10-50 Beta Risk Factors by Level of Development**

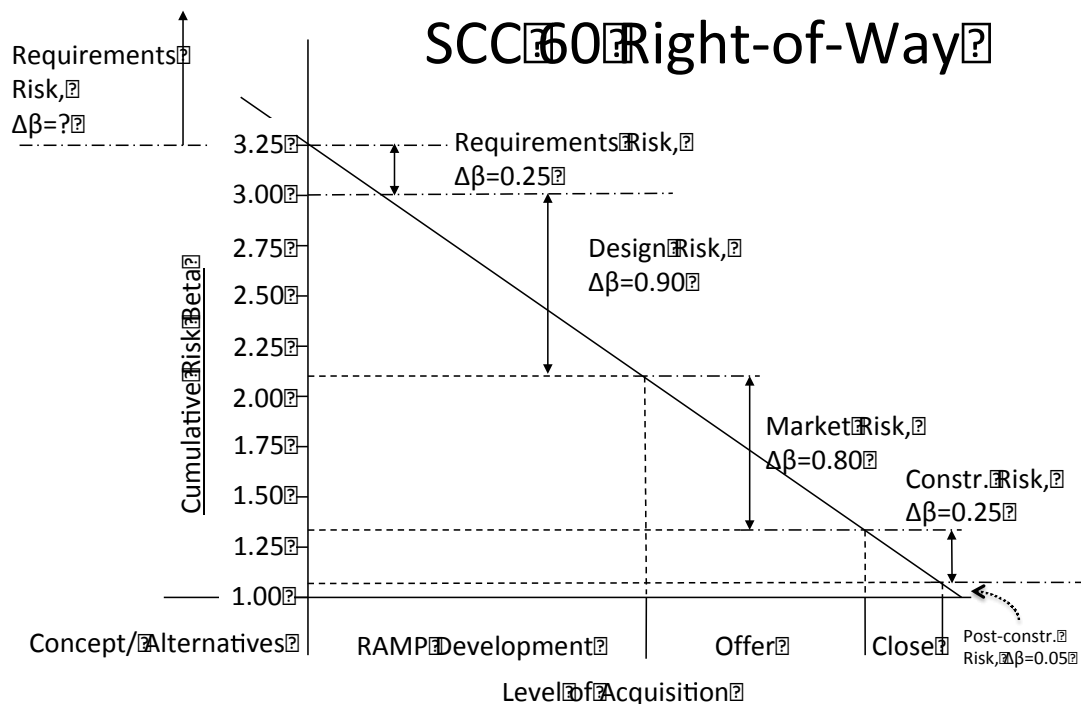
## SCC60 through 80:

SCCs 60 through 80 represent project elements that are not traditional construction elements. As such, the risk categories shall be interpreted as follows:

- Requirements risk is similar to that defined above, wherein it is related to uncertainty of environmental conditions, uncertainty of third party requirements or regulations, or uncertainty of project goals;
- Design risk is related to the sufficiency and potential error of development of plans for execution of the element. For example, for SCC80, this may relate to the development of staffing plans for project management staffing;
- Market risk is similar to that defined above. It is related to the potential variance in price for acquisition of the property, equipment, or staffing necessary to complete the element; and
- Construction risk relates to the actual act of completing the element itself, including any variances that result from conditions only evident at the time of acquisition of property or equipment, or at the time of execution of management or technical activities, such as design or construction management.

### SCC60:

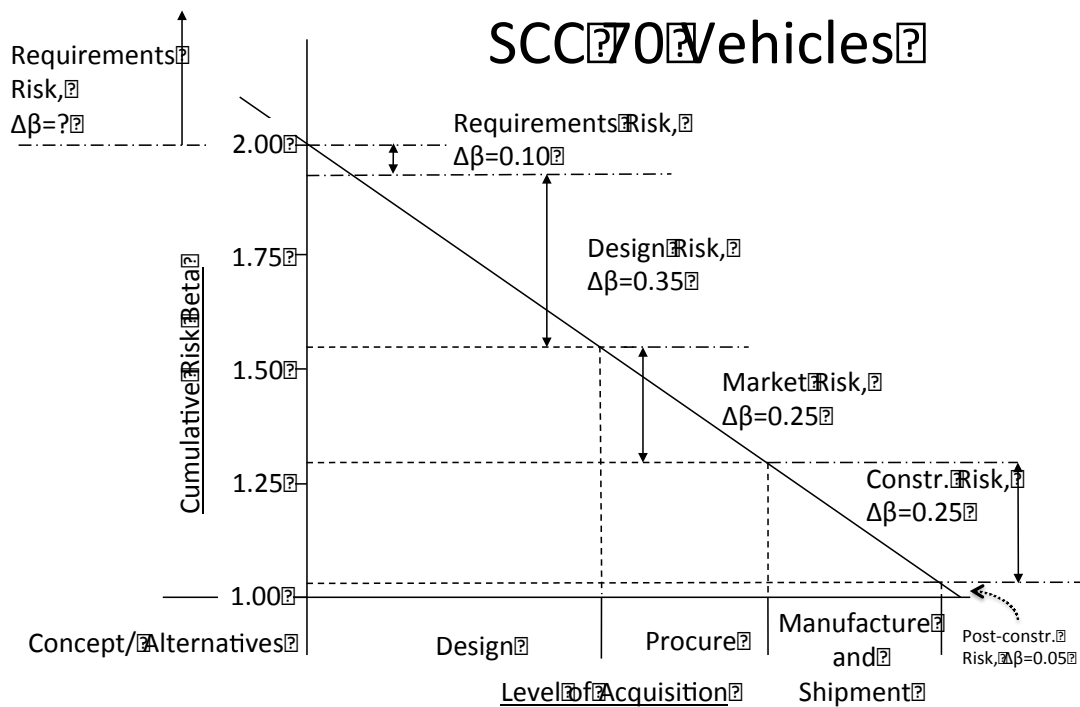
- Risk for Right-of-Way tends to survive later in time and suffer higher risk than for those items in SCC 10 through 50 due to large uncertainties and delayed resolution of ROW acquisition; therefore cumulative BRFs are generally estimated larger than that of SCCs 10 through 50 until ROW acquisition is substantially complete. See Figure 2.



**Figure 2 - SCC 60 Beta Range Factors by Level of Development**

### SCC70:

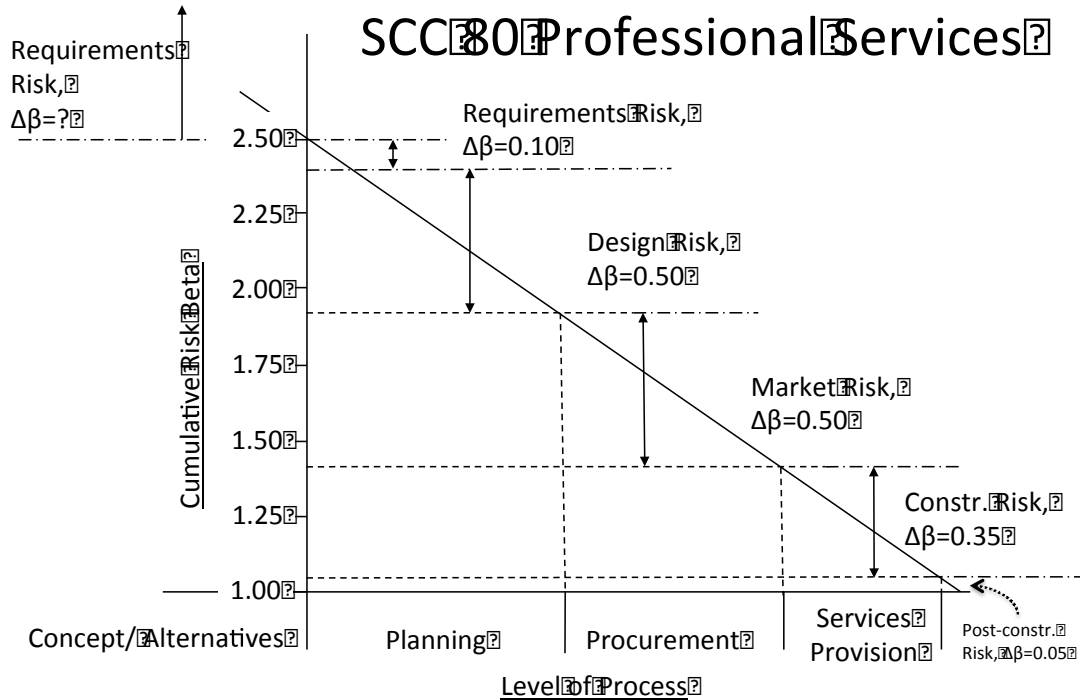
- Risk for vehicles tends to be removed more quickly in time than for those items in SCC 10 through 50 due to reduced design uncertainties and early vehicle purchasing; therefore cumulative BRFs are generally less than that of SCCs 10 through 50 during early phases of the project. See Figure 3.



**Figure 3 - SCC 70 Beta Range Factors by Level of Development**

## SCC80:

- Risk for each minor SCC for professional services is highly dependent upon the phase in which it is performed. For professional services, the cumulative BRFs should be mostly drawn down at the point at which the category of services has been largely completed. BRFs for other services (i.e., insurance, etc.) in this category shall be estimated in consideration of the commensurate risk factors. See Figure 4 for standard BRF values for professional services.



**Figure 4 - SCC 80 Beta Range Factors by Level of Development**

## APPENDIX G

### **Risk and Contingency Management Plan (RCMP) Structure**

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**Note:** the following narrative for potential structure of the RCMP contains elements or details that may not be appropriate for all phases of the project. For example, early in the design phase, some details may be undeveloped and only broad characterization of project elements or risk management plans may be available. The PMOC's review of the Sponsor's RCMP should appropriately consider the phase of the project development, and the PMOC should adjust its review accordingly.

The Risk and Contingency Management Plan (RCMP) is a subplan of the Sponsor's Project Management Plan (PMP); its successful implementation depends upon a fully updated and active PMP. It is the purpose of the RCMP to highlight specific areas of management focus as identified through the risk evaluation process, which should be implemented along with Sponsor's normal project operations as described elsewhere within the PMP. Further, the RCMP provides a means for monitoring Sponsor's progress as it moves the project forward to its next phase. These areas of management focus may include actions to strengthen management capacity and capability, project performance, cost and schedule analyses, mitigations of identified project risks, and others.

Information contained within the RCMP should complement and not be in conflict with information contained elsewhere within the PMP or in other FTA guidance documents. Such areas of concordance should include, for example, the project estimate and schedule, FTA's completion criteria for the various phases such as Entry to Engineering and FFGA/SSGA, master checklists for being considered ready to proceed into the next phase, as well as associated FTA PMOC work products used to review the various technical elements of the project, etc.

Successful implementation of the RCMP is important to the goals of both the Sponsor and the FTA, and monitoring of the RCMP implementation will be undertaken by both the Sponsor and the FTA (through the PMOC). It is important, therefore, that the FTA, PMOC, and Sponsor work collaboratively and develop agreement on the substance of the RCMP.

A potential structure for the RCMP follows:

#### **Overview**

This section should indicate that the RCMP is a subplan of the over-arching PMP, including an indication of the latest version of the PMP upon which the RCMP is based. If the RCMP depends specifically on other sections of the PMP, those sections should be noted, including an indication of their latest versions.

A brief description of the important, actionable findings of the RCMP should be included in the overview. If further actions are required to finalize the current draft of the RCMP, those should also be indicated along with expected completion dates.

A brief summarization of topics covered within the RCMP should be included, including such topics as:

Primary Mitigation, organized by significant project activities, such as:

- Management Capacity and Capability
- Project Scoping and Design;
- Delivery Methods and Contracting;
- Construction Process;

- Project Tracking, including:
  - Cost Estimating, Financing and Financial Management; and
  - Project Schedule Management.

#### Insurance:

- Professional services, construction phase, wrap-up, or other specialized insurances purchased for reduction of risk exposure.

#### Contingency Management:

- Cost Contingency Management Plan; and
- Schedule Contingency Management Plan.

#### Secondary Mitigation:

- Establishment of Secondary Mitigation actions and cost targets which may trigger the implementation of Secondary Mitigation.

#### Risk Management:

- Risk management and mitigation monitoring, change identification, and management controls.

### **Goals and Objectives**

The major goals of the RCMP should be stated, including establishment of measures to complete the project within budget and on schedule, implementation of project cost and time contingency procedures, risk mitigation, and development of available risk mitigation capacity. The role that the RCMP plays in advancing the Sponsor into the next stage of FTA approval should be noted.

Broad goals expected to be accomplished prior to the next stage of RCMP revision (including revisions required at FTA milestones) should be noted. For example, for a project in the Engineering (ENG) phase, such goals may include (similar, phase-appropriate goals would apply to other project phases):

- Adherence to environmental requirements, such as the National Environmental Policy Act (“NEPA”) requirements;
- Mitigation of design risks where possible during the ENG phase, or appropriate transfer of such risks to a design-build entity if applicable;
- Mitigation of other identified risk events;
- Reasoned analysis and assessment of likely market risks to be encountered;
- Cost and schedule risk mitigation capacity developed and implemented as needed, including targets to be achieved during the ENG Phase and forecasted cost and schedule risk management mitigation capacity for subsequent phases;
- Uncertainty in cost estimates and forecasts and project schedules, including tracking mechanisms to identify trends in known costs and risk reduction; and
- Maintenance of minimum cost contingency and schedule contingency targets.

Generally, detailed description of these or other broad goals is required to achieve measurable project evaluations; those descriptions and their metrics should be outlined in separate plans or in an appendix to the RCMP.

The RCMP should note that the Sponsor and its local and state partners understand that the plan was

developed in concurrence with the FTA, that implementation of the RCMP is an important consideration in further FTA approvals, and that the RCMP describes processes and requirements that must be adhered to, in addition to current FTA grant contracts and related FTA Circulars, regulations and guidance.

#### **Risk Review Process:**

The section should include a description of procedures used for development of the Risk and Contingency Management Plan, including procedures for development of risk identification, risk assessment, risk response recommendations, risk protection measures (including Secondary Mitigation and minimum contingencies) and risk management and control.

[Note: In the following sections, the Sponsor should provide an outline of its strategic, performance-based project management activities to identify, assess and respond to the project risks. It is the intent of the following to view risk management as a process of continual risk reduction; i.e., while the mitigation of any specific identified risk is an important activity, the identification, addition and mitigation of newly-discovered risks forms a process that provides both the Sponsor and the FTA (through its PMOC) with the means and methods to best ensure satisfactory outcomes for the project. The goal of the RCMP is to provide a plan to take the Sponsor through the upcoming phase, and prepare it for possible entry into the next phase, with:

- Cost estimates and forecasts and project schedules continuing to be developed as planned;
- Reasoned analysis and assessment of likely upcoming risks, including risks associated with Sponsor's management capacity;
- Mitigation of risks at the earliest possible time;
- Completion of all mitigation actions scheduled for the upcoming phase;
- Cost and schedule risk mitigation capacity developed, implemented as needed, and targets achieved; and
- Minimum cost and schedule contingency targets continuing to be achieved.]

#### **Insurance**

This section should include a summarized discussion of current or future major insurances provided to the project to respond to identified risk, including especially unusual, highly likely, or high exposure risk identified through the risk review process. Such insurances may include professional services, builder's risk, wrap-up, or other specialized insurances purchased for reduction of risk exposure. Detailed insurance information should be included as an appendix to the RCMP or reflected elsewhere in the PMP.

#### **Primary Mitigation**

The primary mitigation section should include the process used to develop the Risk Register, which outlines risks and mitigations that require Sponsor managerial, administrative, and technical action. The section should be organized as follows; each area below should include a brief summary of key risks and action items as of the date of the latest RCMP update.

A detailed listing of all identified risks and proposed mitigations should be included as a separate report, or attached as an appendix, as further indicated below; this separate report should be updated at the frequency noted in the RCMP.

#### **Management Capacity:**

The RCMP should summarize key management capacity risks identified in the Risk register. A plan should be indicated for additional resource commitments, additional requirements for methods and resources, and improved management strategies to address the findings of risk. Management strategies should include specific plans or products, project control, responsibilities, authorities, and measures of performance.

Detailed risk issues related to Management Capacity should be specifically cited in an appendix, and should be noted as *Management Capacity Risks and Mitigations*. This list should include proposed mitigation activities, responsibility for action and targeted date for completion.

#### Project Scoping and Design:

**Requirements:** A summary of key requirements risks and proposed mitigations should be discussed in the body of the report to provide a succinct overview of the outstanding risk mitigation work to be accomplished. In addition, all outstanding project requirements risks, including undefined project goals, third party requirements, and environmental considerations should be listed in an appendix, indicated as *Requirements Risks and Mitigations*. Such activities should also include risk associated with all compliance of NEPA activities consistent with the NEPA Final Determination; and public and governmental reviews and critiques;.

**Design:** A summary of important design risks and proposed mitigations should be discussed in the body of the report to provide a succinct overview of the outstanding design risk mitigation work to be accomplished. In addition, all design activities indicated in the risk review as potential risk events, including activities associated with unproven project technologies, unresolved alternate design approaches, late design, and others should be listed in an appendix, indicated as *Design Risks and Mitigations*. As appropriate, statements of subconsultant responsibilities for risk mitigation should be included.

Where value engineering efforts have been or will be undertaken, a summarized discussion of the effect on project risk should be discussed, including plans for closure of the value engineering process. Detailed value engineering items should be referenced elsewhere in the PMP, or included in an appendix if otherwise unavailable.

#### Delivery Methods and Contracting:

The purpose of this section is to illustrate the Sponsor's plans for efficient risk allocation through choice of delivery method and through contractual risk allocation; such risks so considered should include common design, market, and construction risks as well as those risks identified in the risk review. All contracts should be considered, including design, vendor, and construction contracts. The Sponsor should discuss the following:

- Strategies for contractual risk allocation or risk sharing through explicit contract language, ordinary custom/commercial/trade practices, or statutory authority such as the Uniform Commercial Code. The risk allocation plan should include allocations of future and prior contracted work, should complement other PMP sub-plans, such as the Contract Package Plan and future individual contracts, the Real Estate Acquisition Management Plan ("RAMP"), and all NEPA-related documentation;
- The effect of the chosen strategy on market pricing for the various contracts;
- Assessment of the contracted party's capacity to efficiently mitigate its allocated project risk exposure, including market risk, such that the risk allocation represents the best value for the project; and



- Actions to implement the strategy.

Detail for the proposed allocation strategy should be referenced elsewhere in the PMP or should be included in an appendix. Individual risks identified in the risk review should be indicated as *Delivery Methods and Contracting Risks and Mitigations*.

#### Construction Process:

The purpose of this section is to demonstrate the Sponsor's plans for effective management of risk during the construction process. This section should include a summarized discussion of the key construction phase risks identified in the risk review and plans to mitigate and respond to those risks. Especial attention should be placed on those risks that have not been wholly transferred to a contracted party. In addition, all outstanding project construction risks identified in the risk review should be listed in an appendix, indicated as *Construction Risks and Mitigations*.

#### Project Tracking:

The purpose of this section is to discuss those activities that will be put in place to ensure that adequate tracking and forecasting of cost and schedule outcomes are available to measure potential increased cost or time due to project risk. Such increases may require actions, such as use of contingencies or may trigger the implementation of Secondary Mitigation. This section should complement and may reference other related sections of the PMP. Where the risk review has identified risks associated with project cost and time tracking, a detailed listing of all identified risks and proposed mitigations should be included in an appendix, indicated as *Project Tracking Risks and Mitigations*. The section should be organized as follows; each area below should include a brief summary of key risks and action items:

Cost Estimating and Forecasting: discussion should include the process used for development and management of project cost and project cost uncertainty, including the effect of schedule risk uncertainty on the cost risk results. Included within the discussion should be establishment of reliable estimates for the maximum dollar amount of the FTA financial contribution needed to implement or complete the project.

The following efforts for reduction of cost uncertainty should be indicated or referenced elsewhere in the PMP:

- Continuous administrative and management efforts for increased detailed development of the cost estimate;
- Internal quality control to ensure adequate technical provision of all estimating and forecasting work;
- Methods for adjustment of cost schedules in reaction to realized schedule risks.

Detailed cost and cost risk information should be referenced as available elsewhere in the PMP or made available in an appendix to the RCMP.

Project Schedule Management: discussion should include the process used for development and management of project schedule forecasts and project schedule uncertainty, including any effect of cost risk uncertainty on the schedule risk results. Such external requirements as NEPA compliant related work and community involvement should be considered in the discussion of risk-related schedule management.

Plans to maintain schedule tracking should be discussed, including both design and construction schedules, to detect schedule deviation through techniques such as earned value. Such plans should indicate responsibility and frequency of reporting (usually monthly). Where appropriate, the RCMP should indicate efforts made to ensure that consultants and contractors comply with similar measures.

Such tracking is important for the establishment of risk response actions, such as potential use of schedule contingency; this discussion shall rely upon and complement schedule control discussions contained within the scheduling section of the PMP.

### **Contingency Management**

The purpose of this section is to discuss the Sponsor's plans for establishment and management of cost and schedule contingency protections. The section should be organized as follows:

#### **Cost Contingency Management Plan:**

- Results of cost contingency recommendations developed, including minimum contingency hold points by milestone and reflected in a minimum cost contingency draw-down curve;
- Sponsor plans to reach substantial conformance with the contingency recommendations on a timely basis;
- Procedures in place to implement and maintain throughout the project, a Cost Contingency Management Plan as an identifiable element in the RCMP, including authorities and procedures for distribution, transfer and use of all cost contingency in conformance with the requirements of this plan and sufficient documentation as each transfer occurs. This Cost Contingency Management Plan should also describe the manner in which the Sponsor will forecast and trend the project contingency; and
- Sponsor plans to recover in those cases where cost estimate forecasts indicate contingency levels have fallen below the minimum planned contingency hold points, including as necessary implementation of a formal Recovery Plan or adjustment of the expected project final cost with FTA approval.

#### **Schedule Contingency Management Plan:**

- Results of schedule contingency recommendations developed, including minimum contingency hold points by milestone and reflected in a minimum schedule contingency draw-down curve;
- Sponsor plans to reach substantial conformance with the contingency recommendations on a timely basis;
- Procedures in place to implement and maintain a Schedule Contingency Management Plan as an identifiable element in the RCMP, including authorities and procedures for distribution, transfer and use of all schedule contingency in conformance with the requirements of this plan and sufficient documentation as each transfer occurs. This Schedule Contingency Management Plan should also describe the manner in which the Sponsor will forecast and trend the project contingency; and
- Sponsor plans to recover in those cases where schedule estimate forecasts indicate contingency levels below the minimum planned contingency hold points, including as necessary a formal Recovery Plan or adjustment of the expected completion date for the project or appropriate milestones.

### **Secondary Mitigation**

The purpose of this section is to discuss the Sponsor's plans for establishment and management of Secondary Mitigation protections. The section should discuss the following:

- Results of Secondary Mitigation recommendations developed and the process for reviewing and developing future items;

- A summary discussion of such Secondary Mitigation, including a brief description of a prioritized list of identified Secondary Mitigation items and the timing necessary for their implementation, especially including dates beyond which the items may no longer be effective;
- A discussion of those points of project completion at which Secondary Mitigation at which the items are no longer available to be triggered for implementation; and
- Procedures in place to track such trigger points and to implement available Secondary Mitigation, including authority responsibility for such actions.

If the project has progressed to a stage at which no available Secondary Mitigation has been identified, this condition should be discussed in the report.

### **Risk Management and Risk Mitigation**

The Sponsor should describe its plans to implement, administer and maintain throughout the project, a Risk and Contingency Management plan for:

- Assessing (identifying and analyzing) project cost and schedule risk;
- Developing risk-handling options inclusive of primary risk mitigation;
- Developing a secondary mitigation plan to handle risk events or “triggered” mitigation activities;
- Monitoring risks to determine how risks have been handled or changed; and
- Documenting and reporting to the FTA the risk management program.

The risk management description should include such considerations as:

- Design control processes to detect potential consultant failure, such as scope, schedule, and budget “earned value” metrics;
- Clearly established Sponsor, consultant, and contractor responsibilities for risk management;
- Plans for amendment of the risk register during the course of the work, to both succinctly catalogue additional significant issues that arise, as well as to identify closure of issues as they become resolved to the satisfaction of the Sponsor and the FTA; and
- Plans and timing for systematically updating the RCMP.

## APPENDIX H

### Risk Report Format

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Reporting should occur soon after conclusion of the risk workshops; timely reporting will facilitate Sponsor's early adoption of the recommended risk mitigation measures into its Project Management Plan.

In the conduct of this report, the PMOC shall use its professional judgment to identify and categorize, assess and evaluate the uncertainties in the Sponsor's project information, considering the project's administrative, management, political, legal, financial and physical conditions. The PMOC will document and report its professional opinions and its recommendations for responding to identified risk, including recommendations for mitigations including contingencies. Unless otherwise directed, the report will be sectioned as follows:

#### Title Page

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Include disclaimer, below.

**Disclaimer Insert:** This Project Management Oversight Contractor (PMOC) report and all supporting reports and back up materials contain the findings, conclusions, professional opinions and recommendations stemming from a risk-informed evaluation and assessment, prepared solely for the Federal Transit Administration (FTA). This report should not be relied upon by any party, except FTA or the project Sponsor, in accordance with the purposes of the evaluation and assessment as described below. For projects funded through FTA's Major Capital Investment (New Starts) program, FTA and its PMOCs use a risk-informed process to review and reflect upon a Sponsor's scope, schedule, and cost, and to analyze the Sponsor's project development and management. This process is iterative in nature. The results represent a "snapshot in time" for a particular project under the conditions known at that point. The evaluation or assessment and related results may subsequently change due to new information, changes in circumstances, additional project development; specific measures a Sponsor may take to mitigate risks, Sponsor's selection of strategies for project execution, etc.

#### Table of Contents

#### List of Figures and Tables

#### Executive Summary

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The PMOC should provide an executive summary in three pages or less that includes the following:

- 1) Purpose
- 2) Project Description
- 3) Results and Recommendations - PMOC's professional opinion regarding:
  - a) Contract packaging review and assessment
  - b) Total project cost, including statement of potential range of cost (lower reporting range, conditioned estimate and upper reporting range) and recommended cost contingency where a separate PMOC risk assessment has been performed;
  - c) Project schedule and schedule contingency, including statement of separate PMOC findings where a PMOC assessment has been performed; and
  - d) Top Risks, mitigations, and recommended actions.

## **Project Background**

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Project descriptions and data shall be consistent with the Monitoring report guidance, current monitoring report and the most recent FTA New Start profile. Notwithstanding the foregoing, FTA may direct the contractor to use an identifiable draft version of these materials. Ridership shall include peak hour ridership data. Sub-sectioning shall also include Guideway Components, Project Delivery Method, proposed Contract Packaging Strategy and, as applicable, Master Planning for the Corridor.

## **Summary of Project Status from other OPs**

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Summary-level information from: Sponsor Management Capacity and Capability, Project Scope, Project Estimate, and Project Schedule reviews if performed. Include specifically elements from prior reviews that are particularly important to developing understanding of the issues presented later in this report.

## **Risk Identification**

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Provide a summary of the process used for identification of risks, and provide a narrative discussion of key risk events (categorized by SCC), including their potential impact on the project. Characterize the remaining elements of the Risk Register, which is to be attached as an appendix.

## **Risk Assessment**

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For projects with prior risk reviews, include comparisons of the currently-assessed project risk to the prior-assessed project risks and comment on the changes indicated.

### **PMOC Cost Risk Assessment**

Where the cost risk review is based on an independent PMOC risk assessment, describe the methodology used to deliver the risk assessment products. Further, present any cost estimate adjustments and selection of cost range factors; especially discuss any factors that vary from standard recommendations. Provide a summary of key risks that influence PMOC's characterization of level of project risk by SCC. The PMOC shall present detailed data and analysis in a separate appendix as necessary in order to maintain readability of the report.

### **PMOC Schedule Risk Modeling**

Where the schedule risk review is based on an independent PMOC risk assessment, describe the methodology used to deliver the risk assessment products. This section shall present the findings resulting from the schedule risk modeling, including development of the summary schedule activities, ranges for activity durations in the summary schedule, and characterization of specific risks that influence important schedule activities; characterization of the results of the schedule risk modeling, including confidence levels for achieving the Sponsor's Revenue Service Date target; the PMOC's professional opinion regarding the most likely schedule for Revenue Service Date; and PMOC's recommended actions.

### **Risk Mitigation**

The purpose of this section is to present the PMOC's review and recommendation for any adjustment of risk mitigation efforts by the Sponsor. The PMOC's narrative should allow FTA management and the Sponsor to maintain focus upon these risk mitigation efforts as the means to maintain the baseline cost estimate and avoid potential cost escalation from these potential project risks.

The report should include separate subsections for Primary Mitigation, Secondary Mitigation and Contingency Recommendations.

**Primary Mitigation** - Specific mitigation recommendations shall be presented, including appropriate timeframes for completion of the mitigation activity, especially focused on those mitigations considered necessary for successful approval at the next FTA milestone. Where a PMOC assessment has been performed, link the mitigation activity to the risk register and/or the assignment of exceptional risk factors. Such mitigation recommendations shall be segregated by SCC and Risk Category.

For projects with prior risk reviews, include discussions (as appropriate for project phase) of Sponsor's historic mitigation efforts by Risk Category.

**Secondary Mitigation** - Provide recommendations for adjustments to amounts of Secondary Mitigation capacity developed by the Sponsor. Where the risk review has provided such, include suggested additional areas for potential Secondary Mitigation.

**Contingency** - Provide a narrative indicating minimum recommended levels of both cost and schedule contingency, including a summary of the basis for development of the recommended minimums. Further, provide graphical or tabular representations of the Sponsor's contingency draw-down curves, including review comments and PMOC's recommendations for adjustment, if any.

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### **Monitoring Plan Basis**

Indicate a plan for testing the implementation and effectiveness of Sponsor mitigation measures on the project.

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### **Conclusion**

#### **Appendices**

As required, include the following or other additional information:

#### **Risk Register**

#### **Sponsor Data Characterization**

Provide a descriptive listing of documents used in this analysis, including a narrative characterization of their completeness and sufficiency as appropriate for the project phase during which this review was conducted.



## **Oversight Procedure 51–Readiness to Enter Engineering**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure is to describe the review, analysis and recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) as regards the project's readiness to enter Engineering.

### **2.0 BACKGROUND**

A proposed project can be considered for advancement into Engineering only if the NEPA (National Environmental Policy Act) process has been completed; a New Starts submittal has been accepted by FTA and the project is rated favorably; approval to enter Project Development was received from FTA and the design has been developed to a level described within Appendix B of this OP; a project cost estimate and detailed schedule have been developed to a level commensurate with the design; and the Project Sponsor can demonstrate adequate management capacity and capability to carry out Engineering ("design development") for the proposed project, among other requirements. All applicable federal and FTA program requirements for Project Development and readiness to enter Engineering must have been satisfied.

FTA's approval will be based on the results of its evaluation as described in 49 CFR Sections 611.9-611.13 (Code of Federal Regulations, Title 49 – Transportation). The FTA Office of Program Management (TPM) works closely with the Office of Planning and Environment (TPE) in determining whether a Project Sponsor is ready to enter Engineering. TPM, Office of Capital Project Management (TPM-20), has a critical role in determining technical readiness to enter Engineering as opposed to TPE's role in evaluating whether environmental and planning requirements have been satisfied.

Between Project Development and Engineering, the project is likely to be subject to an in-depth review for management capacity and capability. Whether the Project Sponsor has the necessary management approach and organizational structure, internal and external controls, and other resources available to administer a project is another important aspect of readiness to enter Engineering. The procedures for making these assessments are established in the OP for Project Sponsor Management Capacity and Capability.

Similarly, between Project Development and Engineering, project scope, schedule, and cost are subject to intensive reviews as described in separate OPs. These reviews may culminate in a risk assessment and the development of a risk and contingency management plan. The risk assessment identifies risk, assesses it, considers mitigations approaches, and develops a risk management plan to inform the Project Sponsor's project management practices.

### **3.0 OBJECTIVES**

The objective of this review is, based on the PMOC's review of the Project Sponsor's preliminary design documents, schedule, cost estimate, and other documents, to synthesize findings, and provide input to FTA in the form of evaluations, conclusions, recommendations, and well-grounded professional opinions regarding the:

- Completeness, quality, and accuracy of the design, project schedule, and capital cost estimate at the conclusion of Project Development
- Project Sponsor's program for advancing the design, schedule, and cost estimate to the point of construction-ready bid documents for design-bid-build project delivery, or of preparing bridging documents for alternative delivery method contracts
- Project Sponsor's ability to execute design and construction (i.e., management capacity and capability) and whether the Project Sponsor has adopted a risk-based management approach to project implementation that incorporates findings of a project risk assessment
- Adequacy of the Project Sponsor's project controls and management policies and procedures to execute the project, including those for maintaining quality control/quality assurance of products and services; safety and security, construction and operation; and, acquisition of required rights-of-way, among other policies and procedures
- Overall readiness to advance to Engineering

This information, combined with findings from environmental, New Starts, financial, and other FTA-directed reviews will support FTA's determination regarding advancement of the Project Sponsor's project into the Engineering phase.

### **4.0 REFERENCES**

The following are the principal, but by no means the only, references to Federal legislation, codification, regulation and guidance with which the PMOC should review and develop a solid understanding as related to the Project Sponsor's project work being reviewed under this OP:

#### **4.1 Legislative**

- Surface Transportation and Uniform Relocation Assistance Act of 1987, P.L. 100-17
- The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, or SAFETEA-LU, Pub.L. 109-59
- Moving Ahead for Progress in the 21<sup>st</sup> Century, or MAP-21, P.L. 112-141

#### **4.2 United States Code**

- FTA enabling statutes, 49 U.S.C. Chapter 53, ( See Section (e), and 49 USC 5309(e)(6) and 5328(a)(3), Parts Sections 611.9-611.11)

#### **4.3 Regulations**

- Project Management Oversight, 49 C.F.R. Part 633
- Major Capital Investment Projects, 49 C.F.R. Part 611
- Joint FTA/FHWA regulations, Metropolitan Planning, 23 C.F.R. Part 450



- Joint FTA/FHWA regulations, Environmental Impact and Related Procedures, 23 C.F.R. Part 771
- U.S. DOT regulation, Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs, 49 C.F.R. Part 24

#### **4.4 FTA Circulars**

- C4220.1F, Third Party Contracting Requirements
- C5010.1D, Grant Management Guidelines
- FTA Master Agreement
- C5800.1, Safety and Security Management Plan
- FTA Guidance on the Application of 49 U.S.C. 5324(c) – Railroad Right-of-Way Acquisition (April 30, 2009)

### **5.0 PROJECT SPONSOR'S SUBMITTALS**

In advance of performing the review, the PMOC should obtain and study the project documents identified in Appendix B of this OP. The purpose of this checklist is to provide a categorized list of elements that are expected to be complete prior to FTA's approval for Entry to Engineering. Each list item is followed by a brief description of the level of completion expected of that item. The PMOC should notify FTA of important discrepancies in the project information that would hinder the review. An example would be a mismatch between drawings and cost estimate in which the drawings are current and the cost estimate is two years old.

### **6.0 SCOPE OF WORK**

Appendix B provides detail of each relevant element to be assessed by the PMOC. For entry to Engineering, the Project Sponsor must have a suitable organizational structure in place to effectively manage the project. In addition, they must have made satisfactory progress in advancing the project design and the corresponding cost estimate and schedule. At a minimum, the level of design detail described in Appendix B of this OP must be provided in drawings. The supporting capital cost estimate must be based on quantities of work established in the drawings and a substantial level of cost line item detail and backup for all other costs (vehicles, equipment, real estate, professional services, unallocated and allocated contingencies, and financing costs). The master schedule should include sufficient detail to identify all significant activities, their durations, and logical ties to other activities, as described in Appendix B. In addition, it informs the PMOC as to the other information required of the Project Sponsor to demonstrate technical readiness to enter Engineering.

In general, for each work item listed in Appendix B, the PMOC will follow a similar analytical approach:

- 1) Review and analyze the pertinent information available for completeness, adequacy, consistency, and appropriate level of detail given the phase of the work.
- 2) Identify all apparent discrepancies and deficiencies.
- 3) State findings in descending order of importance (most likely, largest consequences, least likely, moderate/minor consequences) and make recommendations for modifications or

additional work by the Project Sponsor along with a time frame for the performance of the work.

- 4) For major findings, provide recommendations for the Project Sponsor and/or FTA to implement that will address the issue or correct or mitigate the deficiency.
- 5) Identify action items, if any, and next steps.
- 6) Document the assessment, including objectives, approach/methodology, findings, and recommendations and provide back-up information in appendices or attachments to the main body of any report.

It is important to note that the individual OPs describe the procedures for evaluating the reasonableness and accuracy of each review element for the project. The PMOC shall incorporate the results of these reviews into this assessment of Readiness to Enter Engineering.

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall provide FTA with a written report limited to 20 pages that summarizes its findings, analysis, recommendations, professional opinions, and a description of the review activities undertaken. Appendix C provides a sample Table of Contents. After FTA approval, the PMOC should share the report with the Project Sponsor. In the event that differences of opinion exist between the PMOC and the Project Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile with the Project Sponsor and provide FTA with a report addendum covering the agreed modifications by the Project Sponsor and PMOC.

The PMOC's readiness report shall:

- 1) Integrate the findings and recommendations of the reviews discussed in this OP.
- 2) Include an executive summary in three pages or less that includes the following:
  - a) Synthesis of findings on scope, schedule, and cost
  - b) Characterization of significant uncertainties in terms of likelihood (probable, remote, improbable) and their consequence (catastrophic, critical, serious, moderate, marginal)
  - c) Professional opinion regarding the reliability of the project scope, schedule and cost and the ability of the project sponsor to manage the project
  - d) Statement of potential range of cost (lower, upper bound and most likely)
  - e) To reduce important uncertainties, recommendations for additional work of any kind including but not limited to investigation, planning or design work by the Project Sponsor or other party with a schedule for the performance of the work (recommend performance either before or after FTA's decision regarding project advancement or funding).
- 3) Document the assessment methodology.
- 4) Provide back-up information in appendices.

The report formatting requirements of OP 01 apply. When necessary, PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may add other software as required but documentation and report data shall be made available to FTA.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	PERFORMANCE MEASURE	ACCEPTABLE QUALITY LEVEL	MONITORING METHOD
1	The PMOC shall review and analyze project documents to determine the completeness, quality and accuracy of cost, schedule, budget and design, and the readiness of the project to enter Engineering.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of the Project cost, schedule and design documents, Project Sponsor's ability to bring the Project to successful conclusion and the readiness of the Project to enter Engineering.		<b>M1a.</b> Review of the process documentation.	<b>Q1a.</b> PMOC provides documentation of the process.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process and project management judgment to review and analyze Project documents to determine the completeness, quality and accuracy of cost, schedule, budget and design, and the readiness of the project to enter Engineering.		<b>M1b.</b> Documented review and analysis of Project documents to determine the completeness, quality and accuracy of cost, schedule, budget and design, and the readiness of the project to enter Engineering.	<b>Q1b.</b> Review must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>MM1b.</b> Periodic review by FTA or its agent and the PMOC's internal verification.
2	The PMOC shall form a professional opinion and make findings and recommendations regarding the Project's readiness to enter the Engineering phase.	<b>R2a.</b> The PMOC shall perform a review and analysis of the completeness, quality and accuracy of the engineering design, schedule and capital cost estimate for the Project at the conclusion of Project Development and make suitable findings and recommendations.		<b>M2a.</b> PMOC's review and opinion as to the completeness, quality and accuracy of the Project cost, schedule and engineering documents at conclusion of Project Development demonstrates sound management and engineering practices and professional experience.	<b>Q2a.</b> Professional opinion as to the completeness, quality and accuracy of engineering design, cost and schedule documents at conclusion of Project Development.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall, after review and analysis of the Project Sponsor's program for advancing the Project to the point of construction-ready bid documents, provide its findings and recommendations.		<b>M2b.</b> PMOC's review and opinion as to the suitability of Project Sponsor's program demonstrates sound management and engineering practices and professional experience.	<b>Q2b.</b> Professional opinion as to the suitability of the Project Sponsor's program for advancing the Project to the point of construction-ready bid documents.	<b>MM2b.</b> Periodic review by FTA or its agent.
		<b>R2c.</b> The PMOC shall review and analyze Project Sponsor's management system approach and Project Sponsor's management capability and capacity to execute Engineering and construction of the Project, and make suitable findings and recommendations.		<b>M2c.</b> PMOC's review, opinions and, if necessary, recommendations regarding management approach and management capability and capacity demonstrates sound management and engineering practices and professional experience.	<b>Q2c.</b> Professional opinion and recommendations where necessary regarding the Project Sponsor's management approach and technical capability and capacity to execute Engineering and construction of the Project.	<b>MM2c.</b> Periodic review by FTA or its agent.
		<b>R2d.</b> The PMOC shall determine whether the Project Sponsor has in place necessary Project controls, management policies and procedures, including quality control/quality assurance, safety and security and right-of-way acquisition, and other necessary components to assure successful Project execution. The PMOC shall make suitable findings and recommendations.		<b>M2d.</b> PMOC's review, opinions and, if necessary, recommendations regarding Project Sponsor's management system and Project procedures demonstrates sound management and engineering practices and professional experience	<b>Q2d.</b> Professional opinion and recommendations where necessary regarding Project Sponsor's project controls, management system and Project procedures.	<b>MM2d.</b> Periodic review by FTA or its agent.

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	PERFORMANCE MEASURE	ACCEPTABLE QUALITY LEVEL	MONITORING METHOD
3	The PMOC shall provide FTA with a written report of its findings, analysis, recommendations and professional opinions.	<b>R3.</b> The PMOC shall present its findings, analysis, recommendations and professional opinions to FTA in a written report and, when so directed by FTA, seek to reconcile its findings with Project Sponsor to the extent possible. A supplemental report shall be filed describing the results of reconciliation attempts.		<b>M3.</b> Review of the PMOC's presentation of findings, analysis, recommendations and professional opinions by the FTA.	<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with the Project Sponsor to the extent possible.	<b>MM3.</b> Periodic review by FTA or its agent.

## APPENDIX B

### Checklist for Approval to Enter Engineering

The purpose of this checklist is to provide a categorized list of elements to be completed, ideally, prior to FTA's approval for Entry to Engineering. Each listed item is followed by a brief description of the level of completion expected of that item. The PMOC should note elements that need attention by the Project Sponsor and adjudge their significance to the overall project readiness to enter the engineering phase.

Item	Description	OP	PMOC Review	✓
<b>1.0</b>	<b>PROJECT DEFINITION</b>			
<b>1.1</b>	<b>System Definition</b>			
1.1.1	Alignment Definition	32C	General alignment is defined to include the approximate horizontal and vertical alignment, approximate station locations, and length. The alignment should be developed beyond the definition contained in the LPA to describe all structures necessary for the project. Minor alternative alignments may be evaluated within the corridor, as required, to the degree they are within the LPA definition.	
1.1.2	Configuration Management Plan	20	Configuration Management should document the process of managing the physical configurations and their supporting processes through documents, records and data. Configuration Management should demonstrate a process that accommodates changes and continually documents how a physical system is configured, ensuring that documents, records, and data remain concise and valid.	
1.1.3	Station requirements	32C	Station design characteristics including station locations and station sizing. Should identify platform lengths and support spaces for mechanical/electrical equipment.	
<b>1.2</b>	<b>Environmental Constraints</b>			
1.2.1	NEPA	32B	NEPA requirements for entry into Engineering include preparation of an EIS where effects from a proposed project are significant or a Finding of No Significant Impact (FONSI) and accompanying environmental assessment (EA) where effects are less than significant. For an EIS, FTA approves the preferred project through issuance of a Record of Decision (ROD). The ROD describes the scope of the projected and committed mitigations to reduce the effects of identified impacts.	
1.2.2	Third party requirements	20	(1) Evaluate third-party agreement processes and current status of agreements. Where agreements are not available, Project Sponsor should provide an outline or term sheet(s). When even this information is not available, the needed agreement shall be identified and the issues and any obstacles to executing the agreements noted.	
			(2) Types of agreements and information to be reviewed include, but are not limited to: <ul style="list-style-type: none"> <li>▪ utility relocation agreements (public-water, sewer, etc.)</li> <li>▪ intergovernmental agreements (IGA) with local entities</li> <li>▪ agreements with railroad companies (design, construction, operating)</li> <li>▪ third-party franchise agreements (gas, telephone, cable TV, other communications, power);</li> </ul>	

Item	Description	OP	PMOC Review	✓
			<ul style="list-style-type: none"> <li>universities, colleges, other educational institutions agreements</li> <li>public/private funding arrangements (including transit-oriented development - TOD)</li> <li>Master permitting plan and schedule</li> </ul>	
			(3) The framework and content of these agreements must conform to the needs of the project. Agreements should be negotiated and completed to the extent possible prior to start of Engineering Phase; where incomplete, a defined process for achieving completion is in place.	
1.2.3	Geotechnical Baseline	32C	Geotechnical baseline report prepared for projects involving tunnels or other underground structures, or where specific structures (e.g., major bridges, retaining walls, levees, or other facilities) will be located on material with questionable or unknown load bearing capacity.	
<b>2.0 PROJECT MANAGEMENT PLAN</b>				
2.1	Basis of project documented	20	<p><i>Note: Some of the items listed are repeated below where additional review guidance is provided.</i></p> <p>(1) FTA's regulations are found in 49 CFR 633.25, which requires a Project Management Plan to contain at a minimum the following:</p> <p>(a) A description of adequate recipient staff organization, complete with well-defined reporting relationships, statements of functional responsibilities, job descriptions, and job qualifications;</p> <p>(b) A budget covering the project management organization, appropriate consultants, property acquisition, utility relocation, systems demonstration staff, audits, and such miscellaneous costs as the recipient may be prepared to justify (Note: budget should also address design, construction, and start-up/commissioning);</p> <p>(c) A construction schedule (Note: schedule should address entire project from design through revenue operations);</p> <p>(d) A document control procedure and recordkeeping system;</p> <p>(e) A change order procedure which includes a documented, systematic approach to the handling of construction change orders (Note: should also address change orders for all procurements);</p> <p>(f) A description of organizational structures, management skills, and staffing levels required throughout the construction phase (Note: budget should also address design, construction, and start-up/commissioning);</p> <p>(g) Quality control and quality assurance programs which define functions, procedures, and responsibilities for construction and for system installation and integration of system components (Note: QA/QC program should also address design, procurement, and start-up/commissioning);</p> <p>(h) Material testing policies and procedures;</p> <p>(i) Plan for internal reporting requirements including cost and schedule control procedures; and</p> <p>(j) Criteria and procedures to be used for testing the operational system or its major components;"</p>	
			(2) Legal authority for project	
			(3) The FTA or its PMOC may recommend a workshop be held to help establish roles and	

Item	Description	OP	PMOC Review	✓
			<p>responsibilities and define baseline standards of performance related to the management of the project. Few, if any, Project Sponsors have all the capabilities or authorities to plan, design, and implement a major capital project by themselves. Bringing Project Sponsor staff, consultants, and relevant third parties together in a workshop early in the project life can help to shape the project management approach. Through workshop discussions, all parties can gain a better understanding of each other's requirements, responsibilities, and authorities as related to the project. The PMOC will review and summarize its findings and opinions and present recommendations with respect to the adequacy and soundness of the Project Sponsor's plans and procedures, and the successful implementation of such plans and procedures for:</p> <ul style="list-style-type: none"> <li>• NEPA coordination – The Project Sponsor's plan for managing and implementing mitigation actions should be in place and environmental mitigation work should be incorporated into the design documents, cost estimates, and schedules.</li> <li>• Design control. The Project Sponsor should implement appropriate plans and procedures for design control in all aspects. These plans and procedures should illustrate: <ul style="list-style-type: none"> <li>▪ consistency with design criteria;</li> <li>▪ coordination and change control among design disciplines for drawings and specifications;</li> <li>▪ completeness of soils testing and site surveys;</li> <li>▪ coordination with third parties; and</li> <li>▪ completeness of project documents for bidding.</li> </ul> </li> </ul>	
			(4) The Project Management Plan should provide for implementation of project controls in all aspects including procedures for cost and schedule control, risk management, and dispute or conflict resolution during construction. The PMP should include procedures on cost sharing. Risk and contingency management policies and procedures should be in place and routinely used.	
			(5) The PMP should confirm implementation of plans and procedures for project delivery and procurement. Specifically, it should focus on the schedule for bidding construction packages and procuring equipment and vehicles.	
			(6) Labor Relations and Policies should be in development.	
			(7) Development should be underway for plans and procedures regarding construction administration, construction management, construction inspection, coordinating construction work by third parties, site logistics, and construction change order and shop drawing document flow and authorities.	
			(8) Development of Start-up and Revenue Operations should be underway to establish plans and procedures regarding testing/commissioning, closeout of construction contracts, and training of staff.	
			(9) PMP Subplans should include the Quality Assurance / Quality Control Plan, Safety and Security Management Plan, Real Estate Acquisition Management Plan, and Bus and Rail Fleet Management Plans.	

Item	Description	OP	PMOC Review	✓
2.2	Environmental mitigation/ assessment documented	20	(1) Description of Mitigation Principles	
			(2) Plan for Management and Implementation of Mitigation Actions	
2.3	Design Procurement and Control Plan	20	(1) Design contracting plan for the Engineering Phase	
			(2) Description of relationship between forecast ridership, operating plan and proposed project transit capacity in guideways, stations, support facilities	
			(3) Design Criteria for each discipline	
			(4) Schedule for the development of contract documents (level of development expected at each milestone for design/construction drawings, specifications, general and supplementary conditions of contracts for construction, and the Division 1)	
			(5) Plan / procedures for Design Drawings and Specifications	
			(6) Procedures for Design Change and Configuration Control of documents during Design and Construction	
			(7) Plan (List and schedule) for third party agreements and permits including utilities, real estate, railroads, transit-oriented development/joint development, etc.	
			(8) Investigation and Testing Plan (List and schedule) for site surveys, geotechnical and materials investigation before/during design.	
2.4	Project Controls	20	(1) Document and Records Controls	
			(2) Internal reporting procedures	
			(3) Cost Control Procedures	
			(4) Schedule Control Procedures	
			(5) Risk Control Procedures	
			(6) Dispute / Conflict Resolution Plan (claims avoidance and claims resolution)	
2.5	Project construction delivery and procurement plan	20	(1) Procedures for Procurement	
			(2) Procurement Plan and Schedule	
			(3) Contracting Strategy for Transit- Oriented Development and Joint Development, if applicable	
			(4) Identification of Disadvantaged Business Enterprises (DBE) Opportunities, Federal DBE, State/Local WBE & MBE, Plans and Goals	
			(5) Negotiating and Approving Change Orders and Claims	
			(6) Procedures for claims avoidance	
2.6	Labor relations and Policies	20	(1) Wage Rates and Classifications	
			(2) Wage and Hour Requirements	
			(3) State and Local Regulations	
2.7	Construction Procedures for Fixed Infrastructure	20	(1) Construction Contract Administration	
			(2) Construction Management	



Item	Description	OP	PMOC Review	✓
			(3) Construction Inspection	
			(4) Coordination with Third Parties	
			(5) Site Logistics Plan (materials transport and storage; temporary site facilities; maintenance of existing pedestrian ways, transit and traffic operations during construction; protection of existing utilities)	
			(6) Processing Shop Drawings, Bulletins, and RFIs	
			(7) Substantial Completion; Final Completion	
2.8	Start up and Revenue Operations	20	(1) Testing plan elements are identified and would be expanded at a later date	
			(2) Closeout materials (warranties, testing results, O&M manuals, spare parts, etc.) to be identified to provide direction to the Engineer	
			(3) Plan for Training of Staff to be developed later	
2.9	QA/QC Plan	24	At entry to Engineering, the QAP shall fully address all elements governing project activities through the design phase. It should also contain, at least in outline form and to the level of detail possible, information relative to the upcoming construction phase. The PMOC shall also confirm that the Project Sponsor has exhibited both a Quality Assurance and Quality Control review of its PD package.	
2.10	Safety and Security Management Plan	22	In place and is in compliance with FTA guidance as provided in Circular C5800.1. Preliminary Hazard Analysis (PHA) and Threat and Vulnerability Assessment (TVA) are complete. Safety and Security Design Criteria development is underway.	
2.11	Real estate Acquisition and Relocation Plan	23	(1) Conforms with and is expressly incorporated within the Design Drawings, Master Schedule and budget for all phases and types of work planned or anticipated. Further, the RAMP must meet all federal requirements. The Project Sponsor is to provide a complete list of all parcels with title searches on all properties to be acquired and RAMP procedures.	
			(2) Preparation of a relocation plan to include interviews with potential displacees which stresses that displacees are not to move until project plans have been finalized.	
			(3) Project Sponsor shall exhibit management capacity and capabilities to implement the real estate acquisition and relocation process, including organization structure and staffing plan and any consultant agreements undertaken in support of these activities.	
2.12	Rail and Bus Fleet Management	37	Plan demonstrates consistency with the project scope, NEPA documents, and the project's Operations Plan.	
2.13	Before and After Study Documentation	27	Plan submitted in accordance with FTA guidance; verify that the plan has preserved the project scope and capital cost information.	
<b>3.0 MANAGEMENT CAPACITY AND CAPABILITY</b>				
3.1	Organizational charts	21	Project organization charts show the complete organization, covering all project functions and all project personnel, regardless of affiliation. Staffing levels should be indicated. Charts should be time-oriented to show different organizational arrangements for different phases of the project.	

Item	Description	OP	PMOC Review	✓
3.2	Staff qualifications / Experience chart	21	Key personnel in all organizations should be identified and their principal duties, reporting relationships, job descriptions, job qualifications, and assigned responsibility and delegated authority should be defined. The size, qualifications, and availability of new and existing staff resources must be considered in relation to the human resource requirements and duration of the project. A responsibility matrix should be developed that identifies critical management activities and demonstrates the staff's ability to satisfy these requirements.	
3.3	Staffing plan	21	Staffing levels should be indicated. Charts should be time-oriented to show different organizational arrangements for different phases of the project. The organization chart should be supplemented with a tabular staffing plan that shows percent utilization, mobilization start date, and release date (where applicable) information.	
3.4	Engineering/Design Consultants	21	During construction planning, careful examination of the existing labor situation has determined the impacts of DBE participation.	
3.5	Agency-level processes and procedures	21	Should include project management policies and procedures and an adequate staff of professionals skilled in but not limited to, project controls, QA/QC, cost estimation, scheduling, procurement, change control, risk management, transit operations, and public participation.	
3.6	Resumes of project team members	21	Resumes should be provided for both agency and consultant <b>key staff</b> . Resumes must demonstrate experience and ability to manage each of the following key project areas: <ul style="list-style-type: none"> <li>▪ Project management</li> <li>▪ Environmental assessment and mitigation leads</li> <li>▪ Operations planning, Fleet management lead</li> <li>▪ Design team leads</li> <li>▪ Quality assurance and Quality control lead</li> <li>▪ Project controls leads</li> <li>▪ Construction, permits, testing, start-up leads</li> <li>▪ Real estate lead</li> <li>▪ Safety review lead</li> </ul>	
<b>4.0 SCOPE</b>				
4.1	Scope Development	32C	(1) Definition of the project (i.e., scope) contained in the project ROD/FONSI and most recent New Starts submittal agree with the scope as developed in Project Development materials, including the approved PMP and the engineering design plans and specifications. Discrepancies or unclear scope items in the plans should be noted (2) Basic quantities, such as number and locations of facilities, peak and total vehicles, etc., identified in the environmental document and ROD/FONSI are the same as assumed in the current project definition (3) The current project design satisfies the capacity and operational objectives established in the approved environmental document. (4) Mitigations committed to in the ROD (or project mitigation plans), when involving a physical or operational feature of the project, are incorporated - or in the process of being incorporated - into the engineering design, proposed construction program, and/or other implementation	

Item	Description	OP	PMOC Review	✓
			plans. Mitigations could include changes in design, use of different types of material, modified traffic control, restricted construction activities, etc.	
			(5) Results of the hazard and threat and vulnerability analyses are incorporated in the design criteria and the scope of work.	
4.2	Design Package	32C	A Basis of Design Report is required which presents the following content:	
			(1) Project Sponsor accepted design standards and performance objectives including consistency with the required transit capacity.	
			(2) Design, construction, system and vehicle interfaces are well known and defined. Vehicle dynamic clearance and structure clearance diagrams are prepared.	
			(3) Design Reports, Concept of Operations Report, and configuration studies are adequate and complete.	
			(4) Design packages and contract packages are defined and delineated.	
			(5) The documents possess a level of definition, clarity, presentation and cross-referencing consistent with the scope definitions in following sections.	
			(6) The project is constructible. Adequate construction access and staging areas are identified.	
4.3	Project Delivery Method Plan	32D	Procedures for Procurement (advertising, bidding, awarding of contracts for consultants and construction contractors, procurement for equipment, etc.) are established including: Procurement Plan and Schedule (indicate project phase, durations for RFP, screening, interviews, selection, board approvals, etc.); Contracting Strategy for Transit-oriented and Joint Development; and identification of Disadvantaged Business Enterprises (DBE) Opportunities and Federal DBE and State/Local WBE & MBE Plans and Goals.	
4.4	Constructability	32C	Project Sponsor's construction planning of the project has sufficiently and adequately addressed the constructability of the project. An in-depth constructability review is required of the Project Sponsor. It is a critical tool for synthesizing the preliminary design work.	
4.5	Site and Geotechnical Conditions	32C	(1) Digitized aerial photogrammetry (aerial photo background; planimetric and topographic mapping) is complete.	
			(2) Photo simulations and/or schematic renderings are available for stations, samples of the alignment, and unique features of the line.	
			(3) Preliminary geotechnical investigations are complete including a subsurface exploration or laboratory testing program. Requirements for additional geotechnical investigations have been defined and identification of buried structures and utilities and identification of contaminated soils and other hazardous materials are complete.	
4.6	SCC 10 Guideway	32C	(1) Major or critical design decisions have been researched and decided including location and extent of elevated or underground structures, rehabilitation or reuse of any existing infrastructure, structures, facilities, or systems.	
			(2) The choice of track or roadway design has been made for the line. Grade crossing construction is defined and clearances established for operations, maintenance, and	

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			emergency evacuation. Guideway drainage has been defined.	
			(3) Major or critical work details, structural element dimensions, design interfaces, and physical interfaces have been identified and are defined in terms of drawings, standards, criteria, specifications.	
			(4) Structural systems are established. Aerial guideway is dimensioned to show number of spans, span length, substructure design, etc.	
			(5) Preliminary mass balance diagrams have been developed for vertical alignments on fill or cut supported by topographic surveys and soil investigations.	
			(6) Retaining walls and fills are located and dimensioned and defined in terms of drawings, standards, criteria, specifications.	
			(7) Tunnels, both cut-and-cover and mined, are defined in terms of access and egress, construction access and laydown, openings for stations, passage chambers, ventilation or emergency access shafts or adits, sections, and profiles to depict and dimension major tunnel features. Tunnel design and dimensions have been cross checked to adjacent building foundations and coordinated with the vehicle's dynamic envelope, walkways and egress, tunnel lighting, and systems elements such as ventilation, communications, and traction power.	
			(8) Trackwork is advanced to a level where single line schematics of the track layout, plan and profile drawings, dimensioned layouts of turnouts and crossovers, and tabulations of track geometry (horizontal and vertical curve data) have been defined. The alignment of any tunnel structure is referenced to the center line of track and base of rail. Guideway sections, inclusive of aerial, tunnel and station cross sections, consistently show the distance from centerline of track to critical clearance points such as walls, walkways, and edges of platforms.	
			(9) Special trackwork is located and adequately defined.	
			(10) Where used, the contact rail system is specified with typical details and required clearances provided. End ramps and anchors are located. Gaps are coordinated with the traction power supply system. Feeder and return conductor attachment are specified and typical details provided.	
			(11) The need for special track construction for noise or vibration control is identified with locations and preliminary dimensions and a preliminary choice is made for the noise and vibration control design.	
4.7	SCC 20 Stations, Stops, and Terminals	32C	(1) Major or critical design decisions have been researched and decided including rehabilitation or reuse of any existing structures, facilities or systems. Major or critical operational fire/life safety, and security requirements have been defined. Interfaces with other transit facilities or structures are identified and passenger and public circulation concepts defined.	
			(2) Station architecture is established. The drawing package consists of site plans and, for station buildings, floor plans, elevations, longitudinal and cross sections, and details illustrating typical and special architectural conditions. The finish concept should be clearly described.	

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			The location and outline of fare gates and barriers should be shown. The location of ticket vending machines, electronic passenger information displays, security systems and other platform amenities should be shown.	
		35	(3) Within the site context, the building footprints are shown. The relationship of the building to grade and to adjacent facilities is clearly defined, as is provision for pedestrians and bicycles to access the public way from the building. Provision for motorized vehicles is also shown. Access to the platforms and buildings and within the buildings complies with ADA. Any parking lots or structures are shown.	
			(4) Building sections and elevations illustrate the relationship of the station to grade (below, on-grade, elevated structure); the building structural system has been chosen and preliminary dimensions established for clearances.	
			(5) Station building floor plans show vertical circulation systems including stairs, elevators, escalators, and support spaces for mechanical, plumbing, electrical, and communications systems. The floor plans should show the agent area, fare gate area, retail areas, and any crew or public facilities.	
		35	(6) Level boarding between the transit vehicle and the boarding platform complies with ADA. Documentation shows passenger level boarding design for all stations and/or satisfactory determination of infeasibility for one or more stations along with a satisfactory alternative plan for accessibility.	
			(7) Preliminary identification of arts-in-transit integrated into station design.	
			(8) Electrical systems should include a single line drawing including the source and distribution of power. Mechanical and electrical systems, including area drainage, piped utilities, heating ventilation and air conditioning, smoke evacuation, power, and lighting, are described and single line drawings are provided.	
			(9) Design interfaces among disciplines are defined on drawings, in standards, design criteria, specifications and contract package scopes.	
			(10) Parking structure design is progressed to a level consistent with station buildings as described above including vertical transportation and interface with the station buildings. Parking design is consistent with Record of Decision.	
4.8	SCC 30 Support Facilities: Yards, Shops, Administration Buildings	32C	(1) Major or critical design decisions have been researched and decided including rehabilitation, reuse or expansion of any existing structures, facilities or systems. Major or critical operational fire/life safety, and security requirements have been defined.	
			(2) An architectural space program has been prepared for all occupied buildings including for modifications to existing buildings such as Control Centers. The support facility drawings are consistent with the architectural program. Adequate employee parking is provided.	
			(3) Based on the vehicles chosen and utilization as set out in the fleet management plans, a review has been done to determine the number of vehicle spots and facilities (jacks, wheel truing, etc.) required.	
			(4) A preliminary industrial engineering evaluation has been prepared for all workspaces in shops	

Item	Description	OP	PMOC Review	✓
			showing clearances, location of utilities (water, electric outlets, hose reels, etc.), and the flow of vehicles from revenue service through servicing and into storage or maintenance and then returning to service. Adequate space should be provided for material storage both in the building and outside.	
			(5) A site plan has been prepared showing vehicle (revenue, non-revenue, commercial and private) access to shop buildings, storage yard layout, track layout, and location of auxiliary buildings including pump houses, signal houses, and traction power substations. Provisions for fueling and fuel storage are located. The overall site plan (existing and proposed conditions) should include grading and drainage plans, site cross sections, utilities, and roadway and parking plans.	
			(6) Within the site context, the building footprints are shown. The relationship of the building to grade and to adjacent facilities is clearly defined, as is provision for vehicular and pedestrian access to new buildings. Access to the buildings and within the buildings complies with ADA.	
			(7) Basic facility architecture is established including vertical circulation requirements. The drawing package consists of site plans and for buildings floor plans, elevations, longitudinal and cross sections, and details illustrating typical and special architectural conditions.	
			(8) Building sections and elevations illustrate the relationship of the buildings to grade (below, on-grade, elevated structure); the building structural system has been chosen and is dimensioned for clearances.	
			(9) Electrical systems should include a single line drawing including the source and distribution of power. Mechanical and electrical systems, including area drainage, piped utilities, heating ventilation and air conditioning, smoke evacuation, power, lighting, and fuel storage and dispensing are described and single line drawings are provided.	
			(10) Design interfaces among disciplines are defined on drawings, in standards, design criteria, specifications and contract package scopes.	
4.9	SCC 40 Sitework and Special Condition	32C	(1) Major drainage facilities, flood control, housing types, street crossings, traffic control, utilities, are defined and physical limits and interfaces identified, based upon alignment base mapping, plans, and profiles.	
			(2) Major or critical design decisions are defined including rehabilitation or reuse of existing structures or facilities.	
			(3) Areas requiring clearing or demolition are identified.	
			(4) Utility key maps, lists of owners, symbols and notes are provided. Preliminary utility relocation plans have been developed.	
			(5) Mitigation plans are progressed for environmental issues and have accepted by the authority having jurisdiction. Mitigation facilities such as wetlands, buffers, noise barriers and historic preservation requirements are identified and located.	
			(6) A survey for hazardous materials has been completed.	
			(7) On-site and off-site mitigation plan requirements are identified and outline plans prepared.	

Item	Description	OP	PMOC Review	✓
			(8) Structural elements for retaining walls and other site structures are advanced in design.	
			(9) Preliminary mass balance diagrams for vertical alignments on fill or cut are supported by topographic surveys and soil investigations.	
			(10) Roadway modifications necessary to accommodate stations, guideway, or support facilities are defined and design is complete to a level comparable to that specified for guideway and stations. Traffic control devices or modifications have been defined.	
			(11) The landscaping requirements, including irrigation systems, are defined on the station, support facility, and guideway plans.	
			(12) The presence of buried structures, utilities, and contaminated soils which may have to be removed, backfilled or which would otherwise be unavailable for backfilling, has been taken into account.	
			(13) Within the site context, the building footprints are shown. The relationship of the buildings to grade and to adjacent facilities is clearly defined, as are provisions for pedestrians and bicycles and special maintenance access. Provision for motorized vehicle access is shown. Adequate surface parking including spaces for disabled parking and facilities for bicycles is provided, where needed. Access to stations and buildings complies with ADA.	
			(14) Adequate construction access has been considered; access and staging areas are identified.	
			(15) Maintenance of traffic and railroad protective flagging are identified and costs estimated.	
4.10	SCC 50 Systems	32C	(1) Major or critical design decisions have been researched and decided including connections to, and rehabilitation or reuse of, existing systems. Pre-construction site reconnaissance and soil resistivity surveys are complete.	
			(2) Major or critical work details, structural element dimensions, design interfaces and physical interfaces have been identified and are defined in terms of drawings, standards, criteria, specifications and contract package scopes. Single line or functional block drawings are prepared for each system. Technologies have been chosen, evaluated for cost effectiveness, and expected performance defined. Major equipment (for the control room, substations, grade crossings, tunnel ventilation, and traction power) has been defined and identified in terms of basic specifications, outline drawings, general arrangements, and standard drawings and details.	
			(3) Signaling and Train Control – Decisions have been made regarding those sections of alignment to be operated under visual or traffic signal control as opposed to train signal systems. Operations analysis has determined the most efficient location of interlockings based on track layout, headways, train lengths, and braking tables as well as requirements of each interlocking and its control limits. Site specific requirements are defined (for signal structural work) and locations for signal enclosures and relay rooms including sizes as well as room layouts (relay, termination, power) are identified and defined. Signal cable routing methodology as well as power supply and distribution are identified and defined. Software and interface requirements (to facilities, existing system, and other system elements) are identified and defined. The scope of construction between contractors and other operators	

Item	Description	OP	PMOC Review	✓
			(railroads or existing agency systems) is defined. Maintenance, testing and training requirements are identified and initially defined (factory acceptance, site acceptance, field integration, start up, etc.).	
			<p>(4) Traffic signals - Basic coordination between train control and traffic signals or other traffic controls has been evaluated. The interaction among traffic signals in the immediate area has been coordinated with local jurisdictions. Simulations have been completed on the impact of the transit system on local traffic and the impact of signalization on transit running times. Decisions have been made regarding transit vehicle pre-emption or priority and interaction with emergency vehicle priority systems such as Opticon. Site specific requirements are defined (for structural work) and locations defined for crossing gates and signal enclosures. Related requirements for grade crossing protection, including use of four-quadrant gates or other methods to prevent vehicles from circumventing crossing gates have been identified and defined. The location of vehicle sensing elements is shown on intersection drawings. Software and interface requirements (to the train control system and other system elements) are identified and initially defined. The scope of construction between contractors and others is defined. Maintenance, testing and training requirements are identified and initially defined (factory acceptance, site acceptance, field integration, start up, etc.).</p> <p>(5) Traction Power – Traction power requirements and the location of substations is established. The basis of design including nominal project voltage and voltage limits are identified. The OCS system or contact rail layout is defined including conductor sizes relative to existing parts of system, as well as any supplementary parallel feeders to meet design requirements for substation out of service scenarios. Minimizations of voltage drop, maximization of vehicle propulsion system performance, and train regeneration issues have been initially addressed. Substation equipment requirements are identified. Single line drawings are provided. Preliminary equipment performance specifications have been developed. The source of commercial power is identified and preliminary negotiations have begun and technical interface conditions established. Substation grounding, stray current monitoring or testing, lightning arresters, and protective systems for equipment and utility system faults have been identified. Supervisory control has been defined as well as requirements for integration with central control.</p> <p>(6) Overhead Contact Systems (OCS) – OCS system type is identified and issues associated with temperature variations are addressed. Decisions have been made regarding the types of support structures or poles to be used, particularly in urban area. Tensions for the contact wire and messenger wire are defined; maximum distances between tensioning points are identified. OCS is sectionalized in coordination with the traction power supply. The basis for OCS design is established and design issues associated with overlaps, section insulators, and crossing and crossover locations are preliminarily addressed.</p> <p>(7) Communication System – Communications plans, including building or equipment locations, and provisions for station message signs, public address, emergency phones, security cameras,</p>	



Item	Description	OP	PMOC Review	✓
			intrusion detection, and other system elements are defined and coordinated with station, guideway, support facility, and central control building plans. Cabling schemes are coordinated with the guideway and utilities. Preliminary specifications for the radio system have been developed and the system is coordinated with the vehicles and central control. Communication between field locations and central control is defined and coordinated with other systems.	
			(8) Fare Collection System – The fare collection concept is defined and is accepted by all stakeholders. The number and location of fare collection equipment has been determined and is shown on the drawings. Basic equipment is specified.	
			(9) Central Control – Operations control center plan is provided, including basic layout and space allocation requirements. System interface requirements and modifications for existing central control facilities are coordinated with the systems being controlled. Provisions for security and emergency response are considered. Preliminary equipment and control system requirements are established.	
4.11	SCC 60 ROW, Land and existing improvements	32C	(1) The Real Estate Acquisition and Management Plan (RAMP) is complete. Refer to the OP-23 RAMP for more information. Real estate documents and drawings identify the full takes, partial takes, temporary and permanent easements, and other rights. Any special access requirements for existing structures have been identified. Possible eminent domain actions need to be identified.	
			(2) Site surveys include property lines and identify structures for buildings, site features, utilities; and surface improvements such as streets and railroad rights-of-way, including private crossings of railroad rights-of-way.	
			(3) The real estate information and survey information is fully coordinated with drawings of structures for guideways and buildings; site features; utilities; streets, railroads, transitways; construction easements; and site access and staging areas.	
			(4) Parties to be relocated are identified and an action plan is developed.	
			(5) Hazardous material sites are identified and characterized and the responsibility and scope of remedial actions specified.	
4.12	SCC 70 Vehicles	32C	(1) Refer to OP-38 for additional information.	
			(2) Vehicle performance requirements are specified and incorporated into the Design Criteria, the Operations and Maintenance Plan, and the Bus or Rail Fleet Management Plans. Preliminary specifications must include allowable vehicle static and dynamic clearance diagrams, allowable axle weight, allowable total weight, door location, floor height, passenger capacity (seated and under heavy load conditions), and ADA accommodation. For buses, the specification must also include fuel type and turning radius. For rail, the specification must include acceleration and deceleration characteristics and expected train consist.	
			(3) System Interface Functional Descriptions have been developed and advanced to include the following: definition of the subsystems that constitute the overall vehicle system; description and graphic depiction of each interface between on-board subsystems and wayside systems;	

Item	Description	OP	PMOC Review	✓
			and, description of how each subsystem will meet the project requirements.	
			(4) Expected vehicle servicing, periodic maintenance, and component repair and replacement requirements (estimated time to repair and frequency of repair) should be compiled to support shop design (SCC 30)	
			(5) Initial testing requirements have been developed to include the following: high level Test Program Plan for both production and on-site acceptance including requirements for factory inspection and testing, First Article and Pre-shipment inspections, static and dynamic testing, and conditional acceptance.	
			(6) Maintenance and Training Requirements should be defined and identified including development of maintenance and training requirements for new system elements.	
			(7) Preliminary requirements for special tools and equipment have been established as well as preliminary requirements for initial spare parts orders.	
4.13	SCC 80 Professional services	32C	(1) The roles and responsibilities of Project Sponsor's professional consultants (design, engineering, and construction management) may be distinguished from Project Sponsor's own professional staff. If alternative delivery systems (design-build, CM/GC) are proposed, the costs of design professionals employed by the contractor should be identified.	
			(2) Costs associated with construction – building contractors' management, labor, indirect costs, overhead, profit, construction insurance should not be included in SCC 80 but in SCC 10 through 50 as appropriate. Cost estimates should conform to this allocation of cost.	
			(3) When Project Sponsor's manual labor, equipment and facilities are used to facilitate construction or to assist in construction of the project, a Force Account Plan and cost estimate should be provided. The cost of these services should be applied to the appropriate SCC code with the exception of start-up training.	
			(4) Costs associated with permits, insurance, and taxes are researched, identified, and estimated.	
			(5) Costs associated with start-up training and simulated operation for operators and supervision is estimated.	
<b>5.0 SCHEDULE</b>				
5.1	Basis of Schedule	34	(1) Includes a logical document that discreetly defines the basis for the development of the project schedule that identifies key elements, issues and special considerations (assumptions, exclusions, etc.)	
			(2) Describes the planning basis, including resource planning methodology, activity identification, duration estimating, and source and methodology for determining logic and sequencing.	
			(3) Identifies labor productivity adjustments, including congestion assessment, extended work hours, winter work, curfews, etc.	
			(4) Documents all production rates, identifies basis for startup and sequencing requirements, and defines any owner requirements (regulatory, environmental. Quality/ inspection)	
			(5) Is consistent in use of the time sensitive variables in the capital cost estimate, including year of expenditure assumptions, and durations incorporated into the master schedule.	

Item	Description	OP	PMOC Review	✓
5.1	Schedule Format	34	Is consistent with relevant, identifiable industry or engineering practices. Software is appropriate for the size and complexity of the project.	
5.3	Schedule structure	34	(1) Work Breakdown Structure has been applied in the development of the schedule.	
			(2) WBS consistent with the analyzed plan and program for all project participants' agreed upon roles, responsibilities, capabilities and capacities.	
			(3) The project schedule is in original and SCC format.	
5.4	Schedule level	34	The schedule shall be sufficiently developed in detail to determine the validity of the project critical path to revenue operations. It should break out, at a minimum, project milestones, FFGA related work, planning and environmental, public involvement, Project Development, value engineering, final design, right-of-way, permits, third party agreements, public and private utility relocations, safety and security, construction, trackwork, train control systems, vehicles, system integration, communications, fare collection, and startup and testing in sufficient detail to confirm the reasonableness of durations and sequencing and to estimate the probability of schedule risk	
5.5	Schedule elements	34	(1) Schedule reflects the project scope that is described in the approved environmental document.	
			(2) Schedule includes adequate time and appropriate sequencing for: <ul style="list-style-type: none"> <li>• Reviews <ul style="list-style-type: none"> <li>▪ Required FTA-related environmental, risk assessment, PMP reviews, readiness reviews at designated milestones, and grant approvals</li> <li>▪ Project reviews by applicable local, state and federal jurisdictions and affected third parties</li> </ul> </li> <li>• Agreements <ul style="list-style-type: none"> <li>▪ Right-of-way acquisition; household/business relocations</li> <li>▪ Utilities relocation</li> <li>▪ Railroad purchase and/or usage</li> <li>▪ Interagency Agreements</li> <li>▪ Funding time frames and/or milestones for FTA and non-FTA sources</li> <li>▪ Procurement and manufacturing durations for equipment and vehicles, especially for Long Lead Items, are adequate and complete</li> <li>▪ Procurement of design contracts for civil/facilities, systems, and vehicles</li> <li>▪ Performance of design contracts to produce 100 percent complete documents prior to bidding</li> <li>▪ Bid and award periods reflect the required sequencing and durations for the selected project delivery method and logically tied to the proper work activities</li> <li>▪ Construction processes and durations are adequate and complete, and allow schedule contingency for potential delays, including inter-agency work, utility relocation, civil, architectural, and systems work, Project Sponsor operations and maintenance, mobilization, and integrated pre-revenue testing.</li> </ul> </li> </ul>	
5.6	Resource scheduling	34	(1) Quantities and costs as defined in the cost estimate match the resources/costs assigned to the activities in the schedule.	

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			(2) The distribution of resources and costs per specification or industry standards are reasonably associated to the activity it is assigned.	
5.7	Schedule control	34	Define the approach to and use of scheduling tools, such as scheduling software, Project Sponsor procedures for schedule change and update, use of a work breakdown structure, assignment of staff responsibility for schedule, cost loading, resource loading, etc.	
<b>6.0 CAPITAL COST ESTIMATE</b>				
6.1	Basis of Estimate	33	<p>(1) The Project Sponsor needs to provide a Basis of Estimate report describing its cost estimating approach. The report should be developed by the Project Sponsor as part of its initial Project Development work and updated with each subsequent estimating effort.</p> <p>(2) The Basis of Estimate outline should be as follows:</p> <ul style="list-style-type: none"> <li>• Estimating Methodology – Describe the general approach to defining and quantifying the project capital cost estimate.</li> <li>• Sources of Cost Data – Define the nature and sources for cost data used in the preparation of the estimate; <ul style="list-style-type: none"> <li>▪ Cost Estimating Assumptions</li> <li>▪ Allocated Contingency</li> <li>▪ Unallocated Contingency</li> <li>▪ Escalation</li> <li>▪ Contract packages</li> </ul> </li> <li>• Estimating Procedures – If multiple parties are estimating parts of the project, this memo should help to ensure consistency of approach.</li> <li>• Organization and Management of Cost Data (by segment elements; project-wide elements)</li> <li>• Bottom Up and Top Down Approaches (e.g. at Entry to Project Development, it could be reasonable to use Bottom Up estimating approach for Guideway, Stations, Support Facilities; and Top Down estimating approach for Sitework, Systems, ROW Land Existing Improvements, and Vehicles)</li> <li>• Facilities (Guideway, Stations, Support Facilities) Costing Procedures for typical construction methods and for construction and components unique to transit projects.</li> <li>• Estimate Limitations – Describe perceived or known uncertainties, as well as unknowns that could lead to changes in the estimate due to changes in project scope and design standards, incorrect unit cost or quantity assumptions, and unforeseen problems in implementation.</li> <li>• Tracking Costs – Describe how capital costs in the SCC format will be tracked through construction, revenue operations, etc. (e.g. provision in Division 1 requiring contractor to submit SCC update with monthly pay application). FTA requires that costs be tracked in the SCC format through construction, revenue operations and through two years post-revenue operations to document contract closeout and the “after” point for the Before and After Study.</li> </ul>	
6.2	Value Engineering (VE) report	33	(1) VE effort has been performed on the design completed in Project Development and a report	

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			has been prepared. Focus should be on VE recommendations approved by the Project Sponsor and incorporated into the project. The Project Sponsor should identify why recommendations were or were not approved.	
			(2) The cost estimate should incorporate the accepted changes.	
6.3	Standard Cost Categories (SCC) Workbook	33	(1) Work Breakdown Structure formatted to conform to the FTA SCC.	
			(2) Workbook includes SCC annualized worksheets.	
			(3) Estimate is in general agreement with the latest SCC information contained in the Project Sponsor's most recent New Starts submission.	
6.4	Capital cost estimate	33	<p>(1) SCC category 10-50: Fixed Construction (guideways, stations, support facilities, sitework, systems)</p> <ul style="list-style-type: none"> <li>• Construction Materials <ul style="list-style-type: none"> <li>▪ Quantities have been calculated with appropriate conservatism to accommodate development to a more advanced stage of design if appropriate</li> <li>▪ Allowances for material quantities have been included for commodities which cannot be fully quantified at the present level of design</li> <li>▪ Unit Prices have been developed using the best available local market information;</li> <li>▪ Project sales tax exemption status has been established if appropriate and incorporated in materials costs</li> <li>▪ Quotes have been obtained for specialty and price-sensitive materials</li> <li>▪ Materials costs reflect market volatility</li> </ul> </li> <li>• Construction labor <ul style="list-style-type: none"> <li>▪ Local wage rates, fringe benefits, and work rules are incorporated</li> <li>▪ Local payroll taxes and insurance rates are incorporated</li> <li>▪ Holiday / show-up / vacation pay is incorporated</li> <li>▪ Crew productivity is appropriate and conservative for the task under evaluation</li> <li>▪ Availability and variability of utility and railroad outages and "track time" have been incorporated in a conservative manner in determining the crew productivities for impacted work</li> </ul> </li> <li>• Construction equipment <ul style="list-style-type: none"> <li>▪ Local equipment rental rates and current fuel costs are incorporated</li> <li>▪ Quotes have been obtained for specialty equipment.</li> </ul> </li> <li>• Escalation for Construction Materials, Labor and Equipment <ul style="list-style-type: none"> <li>▪ Confirm that adequate escalation rates have been applied to estimates of material, labor and equipment costs. Costs to anticipate prices at the time of project bid.</li> </ul> </li> <li>• Special considerations <ul style="list-style-type: none"> <li>▪ Utility and Railroad labor, equipment, and overhead rates have been verified and incorporated in third party or "force account" work pricing, as well as local utility/RR work and safety rules</li> </ul> </li> </ul>	

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			<ul style="list-style-type: none"> <li>▪ Special consideration has been given to support operations and facilities for tunneling operations, facilities to support operations in contaminated/hazardous materials, etc.</li> <li>• Construction Indirect Costs, Multipliers for Risk etc. <ul style="list-style-type: none"> <li>▪ Contractor indirect and overhead costs are advanced beyond a percent of the associated construction direct costs and should be analyzed based on field and home office indirect costs such as contract duration, appropriate levels of staffing (including project managers, engineers, safety engineers, schedulers, superintendents, QA/QC engineers, craft general foreman, labor stewards / nonproductive labor, warehousing, project trucking, survey layout, purchasing, timekeeping, etc.), mobilization / demobilization costs, equipment standby / idle time costs, reviewer office / lab / tool facilities, safety equipment, QA/QC testing equipment, temporary utilities (sanitary / power / light / heat), jobsite and public security measures, etc.</li> <li>▪ Appropriate costs have been included for payment and performance bonds and special insurance requirements (RR protective, pollution liability, etc.).</li> <li>▪ Other construction insurance costs and/or project-wide coverage (Owner Controlled Insurance Policy) has been included based on quotes from appropriate carriers.</li> <li>▪ Contractor profit / risk costs have been incorporated that reflect the proposed delivery method and expected level of competition by contract package (higher profit margin where few competitors will bid).</li> </ul> </li> </ul>	
			<p>(2) Cat. 60 - Real Estate</p> <ul style="list-style-type: none"> <li>• Includes estimated costs (acquisition costs) for the real estate and associated relocation costs. Costs for professional services, both contracted and in-house legal, appraisal, review appraisal, settlement costs, environmental site assessments, demolition, real estate and relocation consultants have been included (and not included in SCC 80). Easements, acquisitions, inspections, takings, etc. have been appraised or estimated by qualified professionals familiar with local real estate markets and practices, especially any acquisitions involving freight railroads. Includes allowance for the expected increase in costs over appraised value. Includes costs for taxes attributable to real estate acquisition.</li> </ul>	
			<p>(3) Cat. 70 - Vehicles</p> <p>Estimates account for current purchase prices for similar vehicles or quoted prices from manufacturers. Includes costs for professional services (both contracted and in-house) for vehicle design and procurement, and not included in SCC 80. Estimates allow costs for special tools and equipment and spare parts. Requirements for non-revenue support vehicles identified and include in estimate.</p>	
			<p>(4) Cat. 80 - Professional Services</p> <ul style="list-style-type: none"> <li>• Costs included for both contracted and in-house, for all professional, technical and management services related to the design and construction of fixed infrastructure (Cats. 10 - 50) during the Project Development, engineering, and construction phases of the project. This includes environmental work, surveying, geotechnical investigations, design,</li> </ul>	

Item	Description	OP	PMOC Review	✓
			<p>engineering and architectural services; materials and soils testing during construction; specialty services such as safety or security analyses; value engineering, risk assessment, cost estimating, scheduling, Before and After studies, ridership modeling and analyses, auditing, legal services, administration and management, etc. by agency staff or outside consultants.</p> <ul style="list-style-type: none"> <li>Professional liability insurance and other non-construction insurance should be included on 80.05.</li> <li>Confirmation that cost estimates are based on realistic levels of staffing for the duration of the project through close-out of construction contracts. (The estimate should be consistent with the Project Management Plan.)</li> <li>Confirmation that costs for permitting, agency review fees, legal fees, etc. have been included.</li> <li>General Conditions included for design, construction, and procurement contracts.</li> <li>If alternative delivery systems (design-build, CM/GC) are proposed, the costs of design professionals employed by the contractor should be identified.</li> </ul>	
6.5	Contingency	33	Allocated Contingency – Confirmation that adequate contingency has been allocated to each of the SCC categories based on the perceived risk inherent to each category’s estimate.	
			Cat. 90 - Unallocated Contingency - Confirmation that adequate contingency has been added to the total project cost based on the perceived project risk.	
			Total Contingency should be consistent with that derived in the Risk and Contingency Management Plan.	
6.6	Cat. 100 – Finance Charges	33	Finance charges included, consistent with FTA’s Financial Management Oversight Consultant’s review.	
6.7	Inflation	33	Confirmation that adequate inflation rates have been applied to Base Year project costs to anticipate costs at procurement or bid; the Year of Expenditure costs should be developed thoughtfully. Reference indices should include ENR Building Cost Index and Construction Cost Index or other demonstrated authoritative source.	
<b>7.0 RISK AND CONTINGENCY MANAGEMENT</b>				
7.1	Risk process established	40	(1) Risk organization is in place, with independent reporting to executive management and roles and responsibilities defined.	
			(2) Contingency management, contingency use authority, and reporting structure is established.	
7.2	Risk identification	40	<p>(1) Risk register is developed, with risk categories and priorities.</p> <p>(2) Process is established to update risk register.</p>	
7.3	Risk assessment	40	(1) Valuation of project cost risk by method appropriate for project	
			(2) Valuation of project schedule risk by appropriate methods	
			(3) Documented report demonstrating valuation method and result	
7.4	Risk Mitigation	40	(1) Mitigation process in-place with documented responsibilities.	

Item	Description	OP	PMOC Review	✓
			(2) Established insurance plan	
			(3) Contingency amounts identified and tied to risk assessment	
			(4) Requirements risks clearly identified and mostly resolved; plans in place for unresolved requirements risks	
			(5) Secondary mitigation plan defined and documented	
7.5	Risk management	40	(1) Plans for amendment of the risk register during the course of the work, to both succinctly catalogue additional significant issues that arise, as well as to identify closure of issues as they become resolved to the satisfaction of the Project Sponsor and the FTA.	
			(2) Plans and timing for systematically updating the RCMP.	
<b>8.0</b>	<b>CERTIFICATIONS, REPORTS, AND ADMINISTRATIVE REQUIREMENTS</b>			
<b>8.1</b>	<b>Administrative requirements</b>			
8.1.1	Legal Authority to implement transit mode project		The Project Sponsor must perform a review of existing statutes to gain a full understanding of the Project Sponsor's authority and any legal constraints that may affect the project. The purpose should be to identify requirements and constraints in an orderly and timely manner and to deal with them as the project advances. Failure to recognize and accommodate legal requirements may jeopardize the entire project and, at the very least, severely impact the subsequent grant approval process and project schedule, as well as project costs. The project sponsor must be diligent in maintaining cognizance of changes in the legislative/regulatory environment which may impose future constraints on a project. This legal authority must be reviewed to confirm that it addresses all forms of project delivery that may be considered.	
8.1.2	Legal Authority to use alternative project delivery method		Provide evidence of authority under non-Design-Bid-Build format.	



## APPENDIX C

### Sample Table of Contents for PMOC OP 51 Report

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    - 1.3.2 Management Capacity and Capability Review
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    - 1.3.6 Project Risk and Contingency Review, if required
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  - 8.1 Conclusion
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## **Oversight Procedure 52 – Readiness to Execute FFGA/SSGA**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure is to describe the review, analysis and recommendation procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) as regards the project's readiness for recommendation of a Full Funding Grant Agreement (FFGA) or Small Starts Grant Agreement (SSGA).

### **2.0 BACKGROUND**

An FFGA/SSGA is a contract between the Project Sponsor and FTA. It details the rights and obligations of both parties relative to the project scope, budget, schedule, funding, and other terms. Because of the importance and the binding nature of the FFGA/SSGA, FTA requires a final review of the Project Sponsor's readiness to enter into a FFGA/SSGA (or to amend an FFGA/SSGA). Execution of a FFGA/SSGA is the final step in FTA's approval of a project for implementation. Review of the Project Sponsor's readiness is part of FTA's due diligence review prior to execution or modification of the FFGA/SSGA, and protects FTA's interests by providing a final check that all of the required predecessor activities have been satisfactorily completed and required project resources are available. Essentially the FFGA readiness review, for all new starts projects is an "update" of prior reviews and risk assessments performed at entry to Engineering, and possibly again during Engineering.

- The PMOC should notify FTA of elements that need attention by the Project Sponsor in order for the PMOC to attest to the readiness of the project for an FFGA/SSGA.
- At this state of the project all issues must have been addressed to the satisfaction of FTA, if not a plan of action satisfactory to FTA must be in place to address the issues.

The Project Management Oversight Contractor (PMOC) report that is a product of the readiness review becomes part of the package provided to Congress in conjunction with Congressional review of the proposed FFGA/SSGA.

### **3.0 OBJECTIVES**

The objective of the readiness review to execute or amend a FFGA/SSGA is to confirm that:

- All technical aspects of the FFGA/SSGA are complete and accurate,
- All required plans and analysis have been satisfactorily prepared and implemented to the extent necessary, plus
- The FFGA/SSGA attachments accurately represent the project's Scope, Schedule and Costs.

## **4.0 REFERENCES**

The following are the principal, but by no means the only, references to Federal legislation, codification, regulation and guidance with which the PMOC should review and develop a solid understanding as related to the Project Sponsor's project work under review for this OP:

### **4.1 Legislative**

- Surface Transportation and Uniform Relocation Assistance Act of 1987, P.L. 100-17
- The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, or SAFETEA-LU, Pub. L. 109-59
- Moving Ahead for Progress in the 21<sup>st</sup> Century, or MAP-21, P.L. 112-141

### **4.2 United States Code**

- FTA enabling statutes, 49 U.S.C. Chapter 53, Section 5327

### **4.3 Regulations**

- Project Management Oversight, 49 C.F.R. Part 633
- Major Capital Investment Projects, 49 C.F.R. Part 611
- Joint FTA/FHWA regulations, Metropolitan Planning, 23 C.F.R. Part 450
- Joint FTA/FHWA regulations, Environmental Impact and Related Procedures, 23 C.F.R. Part 771
- U.S. DOT regulation, Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs, 49 C.F.R. Part 24

### **4.4 FTA Circulars**

- C4220.1F, Third Party Contracting Requirements
- C5010.1D, Grant Management Guidelines
- FTA Master Agreement
- C5800.1, Safety and Security Management Plan
- FTA Guidance on the Application of 49 U.S.C. 5324(c) – Railroad Right-of-Way Acquisition (April 30, 2009)

### **4.5 Guidance**

- Reporting Instructions for the Section 5309 New Starts Criteria
- Interim Guidance on Design-Build
- Quality Assurance and Quality Control Guidelines
- Project and Construction Management Guidelines
- Value Engineering Process Overview, January 1998

## **5.0 PROJECT SPONSOR'S SUBMITTALS**

In advance of performing the review, the PMOC should obtain and study the following project documents. A more exhaustive list is identified in Appendix B of this OP. The PMOC should notify FTA of important discrepancies in the project information that would hinder the review. An example would be a mismatch between drawings and cost estimate in which the drawings are current and the cost estimate is two years old.

- Scope / Project Definition
  - Final environmental documents and NEPA determination
  - Basis of Design Reports, Design Criteria Reports
  - Engineering Project Plans, Drawings, Design Criteria, Standards and Specifications
  - Master Permitting Plan and Schedule
  - Geotechnical Baseline Report
  - Passenger Level Boarding Design documents
  - Vehicle design documentation
  - Transit Capacity and Operating Plan
- Project Management Plan and sub-plans completed including but not limited to:
  - Signed Agreements with Railroads, Utilities, other Third Parties
  - Risk Assessment, Risk and Contingency Management Plan
  - Project Delivery Plan, Contract Packaging Plan, Procurement Policies and Procedures
  - Project Sponsor Management Capacity and Capability
  - Update of RAMP as needed
- Schedule
  - Project schedule in original and SCC format; schedule narrative describing critical path, expected durations, and logic
- Cost
  - Summary of O&M Cost Assumptions/Productivities
  - Capital cost estimate in original and SCC format
  - Before and After Study Documentation (if study is required)
- FFGA/SSGA Attachments on Scope of Project, Project Description, Baseline Cost Estimate, Project Budget, Baseline Project Schedule

## 6.0 SCOPE OF WORK

With the exception of the FFGA/SSGA attachments, all of the Project Sponsor submittals noted in Section 5.0 and Appendix B of this OP should have been previously reviewed by the PMOC prior to final preparation for the FFGA/SSGA, and any deficiencies found as a result of those reviews should have been reconciled and corrected with the Project Sponsor. The scope of this procedure is to confirm that all of the documentation and analysis remains satisfactory and that there is consistency between the project documents and the proposed FFGA/SSGA. It is the responsibility of the PMOC to notify FTA of any deficiencies prior to the preparation of the OP 52 report.

Qualifications of Reviewers – To the extent possible, the reviewers should be same individuals that performed the prior review of the project documents, and should be regular participants in project reviews.

The review effort should consist of the following:

- 1) Referring to the most current versions of the Project Sponsor submittals, the PMOC shall update previous reviews of Project Scope, Schedule, Cost, Risk, Project Sponsor Management Capacity and Capability and the PMP.
  - a) The deficiencies found as a result of those reviews should be reconciled and corrected with the Project Sponsor prior to preparation of the OP 52 report;

- 2) Prior to the Project Sponsor's formal request to FTA for an FFGA/SSGA, the PMOC should complete its review and submit to FTA a recommendation of the project for funding. This recommendation should be included in the executive summary as described below;
- 3) The PMOC's readiness report shall (Appendix C provides a sample Table of Contents):
  - a) Integrate the findings and recommendations of the reviews above;
  - b) Include an executive summary in three pages or less that includes the following:
    - i) Synthesis of findings on scope, schedule, and cost;
    - ii) Professional opinion regarding the reliability of the project scope, schedule and cost and the ability of the project sponsor to manage the project;
    - iii) Statement of potential range of cost (lower, upper bound and most likely);
    - iv) Recommendation (if PMOC considers a recommendation appropriate) of the project to FTA for funding based on the PMOC's finding that the project is accurately represented by the total project cost, scope description, and schedule, shown in draft attachments; and that the project has a high likelihood of staying within budget and schedule through construction and into revenue operations;
  - c) Document the assessment methodology;
  - d) Provide back-up information in appendices.
- 4) Another task is the PMOC's review of the FFGA/SSGA attachments to assure that they accurately represent the project scope, cost and schedule.

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall provide FTA with a written report limited to 20 pages that summarizes its findings, analysis, recommendations, professional opinions, and a description of the review activities undertaken. After FTA approval, the PMOC should share the report with the Project Sponsor. In the event that differences of opinion exist between the PMOC and the Project Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile with the Project Sponsor and provide FTA with an updated report or addendum covering the agreed modifications by the Project Sponsor and PMOC.

The report formatting requirements of OP 01 apply. When necessary, PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may add other software as required, but the PMOC shall make all documentation and report data available to FTA.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	PERFORMANCE MEASURE	ACCEPTABLE QUALITY LEVEL	MONITORING METHOD
1	The PMOC shall review and analyze project documents to determine the readiness of Project Sponsor to enter into or amend a FFGA/SSGA with FTA.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of the required Project documents to determine Project Sponsor's readiness to execute or amend a FFGA/SSGA.		<b>M1a.</b> Review of the process documentation.	<b>Q1a.</b> PMOC provides documentation of the process.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process and project management judgment to review and analyze Project documents to determine the readiness of Project Sponsor to enter into or amend a FFGA/SSGA with FTA.		<b>M1b.</b> Documented review and analysis of Project documents to determine the readiness of Project Sponsor to enter into or amend a FFGA/SSGA with FTA.	<b>Q1b.</b> Review must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>MM1b.</b> Periodic review by FTA or its agent and the PMOC's internal verification.
2	The PMOC shall form a professional opinion of the Project Sponsor's readiness to enter into or amend a FFGA/SSGA.	<b>R2a.</b> The PMOC shall perform a review and analysis of the Project Sponsor's submitted plans and other documents to assure that all required analysis and documentation has been properly prepared and implemented to the extent necessary to reach readiness for execution or amendment of a FFGA/SSGA.		<b>M2a.</b> PMOC's review and opinion as to the preparation and implementation of required analysis and documentation for FFGA/SSGA demonstrates sound management and engineering practices and professional experience.	<b>Q2a.</b> Professional opinion of the preparation and implementation of required analysis and documentation submitted by Project Sponsor for FFGA/SSGA.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall, after review and analysis of the Project Sponsor's submitted Plans and other documentation and the proposed FFGA/SSGA or amendment, determine whether all technical aspects of the FFGA/SSGA or amendment are complete and accurate and that there is consistency between the Project documentation and the proposed FFGA/SSGA or amendment.		<b>M2b.</b> PMOC's review and opinion as to accuracy, completeness and consistency between documentation and proposed FFGA/SSGA or amendment demonstrates sound management and engineering practices and professional experience.	<b>Q2b.</b> Professional opinion of the accuracy, completeness and consistency between documentation and proposed FFGA/SSGA or amendment.	<b>MM2b.</b> Periodic review by FTA or its agent.
3	The PMOC shall provide FTA with a written report of its findings, analysis, recommendations and professional opinions.	<b>R3.</b> The PMOC shall present its findings, analysis, recommendations and professional opinions to FTA in a written report.		<b>M3.</b> Review of the PMOC's presentation of findings, analysis, recommendations and professional opinions by the FTA.	<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with the Project Sponsor to the extent possible.	<b>MM3.</b> Periodic review by FTA or its agent.

## APPENDIX B

### Checklist for Approval of the FFGA/SSGA

This list categorizes elements to be completed prior to FTA's approval of the FFGA/SSGA. Each listed item is followed by a brief description of the level of completion expected of that item. The PMOC should notify FTA of elements that need attention by the Project Sponsor in order for the PMOC to complete the FFGA/SSGA Readiness Report.

Item	Description	OP	PMOC Review	✓
<b>1.0</b>	<b>PROJECT DEFINITION</b>			
<b>1.1</b>	<b>System Definition</b>			
1.1.1	Alignment Definition	32C	Alignment is defined to include the horizontal and vertical alignment, station locations, and length. The alignment should be developed beyond the definition contained in the NEPA documents to describe all structures necessary for the project. .	
1.1.2	Configuration Management Plan	20	Configuration Management should document the process of managing the physical configurations and their supporting processes through documents, records and data. Configuration Management should demonstrate a process that accommodates changes and continually documents how a physical system is configured, ensuring that documents, records, and data remain concise and valid.	
1.1.3	Station requirements	32C	Station design characteristics including station locations and station sizing. Should identify platform lengths and support spaces for mechanical/electrical equipment.	
<b>1.2</b>	<b>Environmental Constraints</b>			
1.2.1	NEPA	32B	NEPA requirements include preparation of an EIS where effects from a proposed project are significant or a Finding of No Significant Impact (FONSI) and accompanying environmental assessment (EA) where effects are less than significant. For an EIS, FTA approves the preferred project through issuance of a Record of Decision (ROD). The ROD describes the scope of the projected and committed mitigations to reduce the effects of identified impacts.	
1.2.2	Third party requirements	20	<p>(1) Evaluate third-party agreement processes and current status of agreements.</p> <p>(2) Types of agreements and information to be reviewed include, but are not limited to:</p> <ul style="list-style-type: none"> <li>▪ utility relocation agreements (public-water, sewer, etc.)</li> <li>▪ intergovernmental agreements (IGA) with local entities</li> <li>▪ agreements with railroad companies (design, construction, operating)</li> <li>▪ third-party franchise agreements (gas, telephone, cable TV, other communications, power);</li> <li>▪ universities, colleges, other educational institutions agreements</li> <li>▪ public/private funding arrangements (including transit-oriented development - TOD)</li> <li>▪ Master permitting plan and schedule</li> </ul> <p>(3) Identify all agreements needed by the project. Critical third party agreements are required to be signed prior to an FFGA/SSGA.</p>	



Item	Description	OP	PMOC Review	✓
1.2.3	Geotechnical Baseline	32C	Geotechnical baseline report prepared for projects involving tunnels or other underground structures, or where specific structures (e.g., major bridges, retaining walls, levees, or other facilities) will be located on material with questionable or unknown load bearing capacity.	
<b>2.0 PROJECT MANAGEMENT PLAN</b>				
2.1	Basis of project documented	20	<p><i>Note: Some of the items listed are repeated below where additional review guidance is provided.</i></p> <p>(1) FTA's regulations are found in 49 CFR 633.25, which requires a Project Management Plan to contain at a minimum the following:</p> <ul style="list-style-type: none"> <li>(a) A description of adequate recipient staff organization, complete with well-defined reporting relationships, statements of functional responsibilities, job descriptions, and job qualifications;</li> <li>(b) A budget covering the project management organization, appropriate consultants, property acquisition, utility relocation, systems demonstration staff, audits, and such miscellaneous costs as the recipient may be prepared to justify (Note: budget should also address design, construction, and start-up/commissioning);</li> <li>(c) A construction schedule (Note: schedule should address entire project from design through revenue operations);</li> <li>(d) A document control procedure and recordkeeping system;</li> <li>(e) A change order procedure which includes a documented, systematic approach to the handling of construction change orders (Note: should also address change orders for all procurements);</li> <li>(f) A description of organizational structures, management skills, and staffing levels required throughout the construction phase (Note: budget should also address design, construction, and start-up/commissioning);</li> <li>(g) Quality control and quality assurance programs which define functions, procedures, and responsibilities for construction and for system installation and integration of system components (Note: QA/QC program should also address design, procurement, and start-up/commissioning);</li> <li>(h) Material testing policies and procedures;</li> <li>(i) Plan for internal reporting requirements including cost and schedule control procedures; and</li> <li>(j) Criteria and procedures to be used for testing the operational system or its major components;"</li> </ul> <p>(2) Legal authority for project</p> <p>(3) The PMOC will review and summarize its findings and opinions and present recommendations with respect to the adequacy and soundness of the Project Sponsor's plans and procedures, and the successful implementation of such plans and procedures for:</p> <ul style="list-style-type: none"> <li>• NEPA coordination – The Project Sponsor's plan for managing and implementing mitigation actions should be in place and environmental mitigation work should be incorporated into the design/contract documents, cost estimates, and schedules.</li> <li>• Design control. The Project Sponsor should implement appropriate plans and procedures</li> </ul>	

Item	Description	OP	PMOC Review	✓
			for design control in all aspects. These plans and procedures should illustrate: <ul style="list-style-type: none"> <li>consistency with design criteria;</li> <li>coordination and change control among design disciplines for drawings and specifications;</li> <li>completeness of soils testing and site surveys;</li> <li>coordination with third parties; and completeness of project documents for bidding.</li> </ul>	
			(4) The Project Management Plan should provide for implementation of project controls in all aspects including procedures for cost and schedule control, risk management, and dispute or conflict resolution during construction. The PMP should include procedures on cost sharing. Risk and contingency management policies and procedures should be in place and routinely used.	
			(5) The PMP should confirm implementation of plans and procedures for project delivery and procurement. Specifically, it should focus on the schedule for bidding construction packages and procuring equipment and vehicles.	
			(6) Labor Relations and Policies.	
			(7) Plans and procedures regarding construction administration, construction management, construction inspection, coordinating construction work by third parties, site logistics, and construction change order and shop drawing document flow and authorities.	
			(8) Development of Start-up and Revenue Operations should be underway to establish plans and procedures regarding testing/commissioning, closeout of construction contracts, and training of staff.	
			(9) PMP Subplans should include the Quality Assurance / Quality Control Plan, Safety and Security Management Plan, Real Estate Acquisition Management Plan, Bus and Rail Fleet Management Plans and Risk and Contingency Management Plan.	
2.2	Environmental mitigation/assessment documented	20	(1) Description of Mitigation Principles	
			(2) Plan for Management and Implementation of Mitigation Actions	
2.3	Design Procurement and Control Plan	20	(1) Design contracting plan for the FFGA/SSGA Phase	
			(2) Description of relationship between forecast ridership, operating plan and proposed project transit capacity in guideways, stations, support facilities	
			(3) Design Criteria for each discipline	
			(4) Schedule for the development of contract documents (level of development expected at each milestone for design/construction drawings, specifications, general and supplementary conditions of contracts for construction, and the Division 1)	
			(5) Plan / procedures for Design Drawings and Specifications	
			(6) Procedures for Design Change and Configuration Control of documents during Design and Construction	
			(7) Plan (List and schedule) for third party agreements and permits including utilities, real estate,	

Item	Description	OP	PMOC Review	✓
			railroads, transit-oriented development/joint development, etc.	
			(8) Investigation and Testing Plan (List and schedule) for site surveys, geotechnical and materials investigation before/during design.	
2.4	Project Controls	20	(1) Document and Records Controls	
			(2) Internal reporting procedures	
			(3) Cost Control Procedures	
			(4) Schedule Control Procedures	
			(5) Risk Control Procedures	
			(6) Dispute / Conflict Resolution Plan (claims avoidance and claims resolution)	
2.5	Project construction delivery and procurement plan	20	(1) Procedures for Procurement	
			(2) Procurement Plan and Schedule	
			(3) Contracting Strategy for Transit- Oriented Development and Joint Development, if applicable	
			(4) Identification of Disadvantaged Business Enterprises (DBE) Opportunities, Federal DBE, State/Local WBE & MBE, Plans and Goals	
			(5) Negotiating and Approving Change Orders and Claims	
			(6) Procedures for claims avoidance	
2.6	Labor relations and Policies	20	(1) Wage Rates and Classifications	
			(2) Wage and Hour Requirements	
			(3) State and Local Regulations	
2.7	Construction Procedures for Fixed Infrastructure	20	(1) Construction Contract Administration	
			(2) Construction Management	
			(3) Construction Inspection	
			(4) Coordination with Third Parties	
			(5) Site Logistics Plan (materials transport and storage; temporary site facilities; maintenance of existing pedestrian ways, transit and traffic operations during construction; protection of existing utilities)	
			(6) Processing Shop Drawings, Bulletins, and RFIs	
			(7) Substantial Completion; Final Completion	
2.8	Start up and Revenue Operations	20	(1) Testing plan elements are identified and would be expanded at a later date	
			(2) Closeout materials (warranties, testing results, O&M manuals, spare parts, etc.) to be identified to provide direction to the Engineer	
			(3) Plan for Training of Staff	
2.9	QA/QC Plan	24	The QAP shall fully address all elements governing project activities through the design phase. The PMOC shall also confirm that the Project Sponsor has exhibited both a Quality Assurance and Quality Control review of its Engineering package.	
2.10	Safety and Security Management	22	In place and is in compliance with FTA guidance as provided in Circular C5800.1. Preliminary	

Item	Description	OP	PMOC Review	✓
	Plan		Hazard Analysis (PHA) and Threat and Vulnerability Assessment (TVA) are complete. Safety and Security Design Criteria development is complete.	
2.11	Real estate Acquisition and Relocation Plan	23	(1) Conforms with and is expressly incorporated within the Design Drawings, Master Schedule and budget for all phases and types of work planned or anticipated. Further, the RAMP must meet all federal requirements. The Project Sponsor is to provide a complete list of all parcels with title searches on all properties to be acquired and RAMP procedures. (2) Preparation of a relocation plan to include interviews with potential displacees which stresses that displacees are not to move until project plans have been finalized. (3) Project Sponsor shall exhibit management capacity and capabilities to implement the real estate acquisition and relocation process, including organization structure and staffing plan and any consultant agreements undertaken in support of these activities.	
2.12	Rail and Bus Fleet Management	37	Plan demonstrates consistency with the project scope, NEPA documents, and the project's Operations Plan.	
2.13	Before and After Study Documentation	27	Plan submitted in accordance with FTA guidance; verify that the plan has preserved the project scope and capital cost information (may not be required for Small Starts projects).	
<b>3.0 MANAGEMENT CAPACITY AND CAPABILITY</b>				
3.1	Organizational charts	21	Project organization charts show the complete organization, covering all project functions and all project personnel, regardless of affiliation. Staffing levels should be indicated. Charts should be time-oriented to show different organizational arrangements for different phases of the project.	
3.2	Staff qualifications / Experience chart	21	Key personnel in all organizations should be identified and their principal duties, reporting relationships, job descriptions, job qualifications, and assigned responsibility and delegated authority should be defined. The size, qualifications, and availability of new and existing staff resources must be considered in relation to the human resource requirements and duration of the project. A responsibility matrix should be developed that identifies critical management activities and demonstrates the staff's ability to satisfy these requirements.	
3.3	Staffing plan	21	Staffing levels should be indicated. Charts should be time-oriented to show different organizational arrangements for different phases of the project. The organization chart should be supplemented with a tabular staffing plan that shows percent utilization, mobilization start date, and release date (where applicable) information.	
3.4	Engineering/Design Consultants	21	During construction planning, careful examination of the existing labor situation has determined the impacts of DBE participation.	
3.5	Agency-level processes and procedures	21	Should include project management policies and procedures and an adequate staff of professionals skilled in but not limited to, project controls, QA/QC, cost estimation, scheduling, procurement, change control, risk management, transit operations, and public participation.	
3.6	Resumes of project team members	21	Resumes should be provided for both agency and consultant <b>key staff</b> . Resumes must demonstrate experience and ability to manage each of the following key project areas: <ul style="list-style-type: none"> <li>▪ Project management</li> <li>▪ Environmental assessment and mitigation leads</li> </ul>	

Item	Description	OP	PMOC Review	✓
			<ul style="list-style-type: none"> <li>Operations planning, Fleet management lead</li> <li>Design team leads</li> <li>Quality assurance and Quality control lead</li> <li>Project controls leads</li> <li>Construction, permits, testing, start-up leads</li> <li>Real estate lead</li> <li>Safety review lead</li> </ul>	
<b>4.0</b>	<b>SCOPE</b>			
4.1	Scope Development	32C	<p>(1) Definition of the project (i.e., scope) contained in the project ROD/FONSI and most recent New Starts submittal agree with the scope as developed in Engineering Phase materials, including the approved PMP and the engineering design plans and specifications. Discrepancies or unclear scope items in the plans should be noted</p> <p>(2) Basic quantities, such as number and locations of facilities, peak and total vehicles, etc., identified in the environmental document and ROD/FONSI are the same as assumed in the current project definition</p> <p>(3) The current project design satisfies the capacity and operational objectives established in the approved environmental document.</p> <p>(4) Mitigations committed to in the ROD (or project mitigation plans), when involving a physical or operational feature of the project, are incorporated - or in the process of being incorporated - into the engineering design, proposed construction program, and/or other implementation plans. Mitigations could include changes in design, use of different types of material, modified traffic control, restricted construction activities, etc.</p> <p>(5) Results of the hazard and threat and vulnerability analyses are incorporated in the design criteria and the scope of work.</p>	
4.2	Design Package	32C	<p>A Basis of Design Report is required which presents the following content:</p> <p>(1) Project Sponsor accepted design standards and performance objectives including consistency with the required transit capacity.</p> <p>(2) Design, construction, system and vehicle interfaces are well known and defined. Vehicle dynamic clearance and structure clearance diagrams are prepared.</p> <p>(3) Design Reports, Concept of Operations Report, and configuration studies are adequate and complete.</p> <p>(4) Design packages and contract packages are defined and delineated.</p> <p>(5) The documents possess a level of definition, clarity, presentation and cross-referencing consistent with the scope definitions in following sections.</p> <p>(6) The project is constructible. Adequate construction access and staging areas are identified.</p>	
4.3	Project Delivery Method Plan	32D	Procedures for Procurement (advertising, bidding, awarding of contracts for consultants and construction contractors, procurement for equipment, etc.) are established including: Procurement Plan and Schedule (indicate project phase, durations for RFP, screening, interviews, selection,	

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			board approvals, etc.); Contracting Strategy for Transit-oriented and Joint Development; and identification of Disadvantaged Business Enterprises (DBE) Opportunities and Federal DBE and State/Local WBE & MBE Plans and Goals.	
4.4	Constructability	32C	Project Sponsor's construction planning of the project has sufficiently and adequately addressed the constructability of the project. An in-depth constructability review is required of the Project Sponsor. It is a critical tool for synthesizing the design work.	
4.5	Site and Geotechnical Conditions	32C	(1) Digitized aerial photogrammetry (aerial photo background; planimetric and topographic mapping) is complete.	
			(2) Photo simulations and/or schematic renderings are available for stations, samples of the alignment, and unique features of the line.	
			(3) Geotechnical investigations are complete including a subsurface exploration or laboratory testing program. Requirements for additional geotechnical investigations have been defined and identification of buried structures and utilities and identification of contaminated soils and other hazardous materials are complete.	
4.6	SCC 10 Guideway	32C	(1) Major or critical design decisions have been researched and decided including location and extent of elevated or underground structures, rehabilitation or reuse of any existing infrastructure, structures, facilities, or systems.	
			(2) The choice of track or roadway design has been made for the line. Grade crossing construction is defined and clearances established for operations, maintenance, and emergency evacuation. Guideway drainage has been defined.	
			(3) Major or critical work details, structural element dimensions, design interfaces, and physical interfaces have been identified and are defined in terms of drawings, standards, criteria, specifications.	
			(4) Structural systems are established. Aerial guideway is dimensioned to show number of spans, span length, substructure design, etc.	
			(5) Preliminary mass balance diagrams have been developed for vertical alignments on fill or cut supported by topographic surveys and soil investigations.	
			(6) Retaining walls and fills are located and dimensioned and defined in terms of drawings, standards, criteria, specifications.	
			(7) Tunnels, both cut-and-cover and mined, are defined in terms of access and egress, construction access and laydown, openings for stations, passage chambers, ventilation or emergency access shafts or adits, sections, and profiles to depict and dimension major tunnel features. Tunnel design and dimensions have been cross checked to adjacent building foundations and coordinated with the vehicle's dynamic envelope, walkways and egress, tunnel lighting, and systems elements such as ventilation, communications, and traction power.	
			(8) Trackwork is advanced to a level where single line schematics of the track layout, plan and profile drawings, dimensioned layouts of turnouts and crossovers, and tabulations of track geometry (horizontal and vertical curve data) have been defined. The alignment of any tunnel	

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			structure is referenced to the center line of track and base of rail. Guideway sections, inclusive of aerial, tunnel and station cross sections, consistently show the distance from centerline of track to critical clearance points such as walls, walkways, and edges of platforms.	
			(9) Special trackwork is located and adequately defined.	
			(10) Where used, the contact rail system is specified with typical details and required clearances provided. End ramps and anchors are located. Gaps are coordinated with the traction power supply system. Feeder and return conductor attachment are specified and typical details provided.	
			(11) The need for special track construction for noise or vibration control is identified with locations and dimensions and a preliminary choice is made for the noise and vibration control design.	
4.7	SCC 20 Stations, Stops, and Terminals	32C	(1) Major or critical design decisions have been researched and decided including rehabilitation or reuse of any existing structures, facilities or systems. Major or critical operational fire/life safety, and security requirements have been defined. Interfaces with other transit facilities or structures are identified and passenger and public circulation concepts defined.	
			(2) Station architecture is established. The drawing package consists of site plans and, for station buildings, floor plans, elevations, longitudinal and cross sections, and details illustrating typical and special architectural conditions. The finish concept should be clearly described. The location and outline of fare gates and barriers should be shown. The location of ticket vending machines, electronic passenger information displays, security systems and other platform amenities should be shown.	
		35	(3) Within the site context, the building footprints are shown. The relationship of the building to grade and to adjacent facilities is clearly defined, as is provision for pedestrians and bicycles to access the public way from the building. Provision for motorized vehicles is also shown. Access to the platforms and buildings and within the buildings complies with ADA. Any parking lots or structures are shown.	
			(4) Building sections and elevations illustrate the relationship of the station to grade (below, on-grade, elevated structure); the building structural system has been chosen and preliminary dimensions established for clearances.	
			(5) Station building floor plans show vertical circulation systems including stairs, elevators, escalators, and support spaces for mechanical, plumbing, electrical, and communications systems. The floor plans should show the agent area, fare gate area, retail areas, and any crew or public facilities.	
		35	(6) Level boarding between the transit vehicle and the boarding platform complies with ADA. Documentation shows passenger level boarding design for all stations and/or satisfactory determination of infeasibility for one or more stations along with a satisfactory alternative plan for accessibility.	
			(7) Preliminary identification of arts-in-transit integrated into station design.	

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			(8) Electrical systems should include a single line drawing including the source and distribution of power. Mechanical and electrical systems, including area drainage, piped utilities, heating ventilation and air conditioning, smoke evacuation, power, and lighting, are described and single line drawings are provided.	
			(9) Design interfaces among disciplines are defined on drawings, in standards, design criteria, specifications and contract package scopes.	
			(10) Parking structure design is progressed to a level consistent with station buildings as described above including vertical transportation and interface with the station buildings. Parking design is consistent with Record of Decision.	
4.8	SCC 30 Support Facilities: Yards, Shops, Administration Buildings	32C	(1) Major or critical design decisions have been researched and decided including rehabilitation, reuse or expansion of any existing structures, facilities or systems. Major or critical operational fire/life safety, and security requirements have been defined.	
			(2) An architectural space program has been prepared for all occupied buildings including for modifications to existing buildings such as Control Centers. The support facility drawings are consistent with the architectural program. Adequate employee parking is provided.	
			(3) Based on the vehicles chosen and utilization as set out in the fleet management plans, a review has been done to determine the number of vehicle spots and facilities (jacks, wheel truing, etc.) required.	
			(4) A preliminary industrial engineering evaluation has been prepared for all workspaces in shops showing clearances, location of utilities (water, electric outlets, hose reels, etc.), and the flow of vehicles from revenue service through servicing and into storage or maintenance and then returning to service. Adequate space should be provided for material storage both in the building and outside.	
			(5) A site plan has been prepared showing vehicle (revenue, non-revenue, commercial and private) access to shop buildings, storage yard layout, track layout, and location of auxiliary buildings including pump houses, signal houses, and traction power substations. Provisions for fueling and fuel storage are located. The overall site plan (existing and proposed conditions) should include grading and drainage plans, site cross sections, utilities, and roadway and parking plans.	
			(6) Within the site context, the building footprints are shown. The relationship of the building to grade and to adjacent facilities is clearly defined, as is provision for vehicular and pedestrian access to new buildings. Access to the buildings and within the buildings complies with ADA.	
			(7) Basic facility architecture is established including vertical circulation requirements. The drawing package consists of site plans and for buildings floor plans, elevations, longitudinal and cross sections, and details illustrating typical and special architectural conditions.	
			(8) Building sections and elevations illustrate the relationship of the buildings to grade (below, on-grade, elevated structure); the building structural system has been chosen and is dimensioned for clearances.	



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			(9) Electrical systems should include a single line drawing including the source and distribution of power. Mechanical and electrical systems, including area drainage, piped utilities, heating ventilation and air conditioning, smoke evacuation, power, lighting, and fuel storage and dispensing are described and single line drawings are provided.	
			(10) Design interfaces among disciplines are defined on drawings, in standards, design criteria, specifications and contract package scopes.	
4.9	SCC 40 Sitework and Special Condition	32C	(1) Major drainage facilities, flood control, housing types, street crossings, traffic control, utilities, are defined and physical limits and interfaces identified, based upon alignment base mapping, plans, and profiles.	
			(2) Major or critical design decisions are defined including rehabilitation or reuse of existing structures or facilities.	
			(3) Areas requiring clearing or demolition are identified.	
			(4) Utility key maps, lists of owners, symbols and notes are provided. Preliminary utility relocation plans have been developed.	
			(5) Mitigation plans are progressed for environmental issues and have accepted by the authority having jurisdiction. Mitigation facilities such as wetlands, buffers, noise barriers and historic preservation requirements are identified and located.	
			(6) A survey for hazardous materials has been completed.	
			(7) On-site and off-site mitigation plan requirements are identified and outline plans prepared.	
			(8) Structural elements for retaining walls and other site structures are advanced in design.	
			(9) Preliminary mass balance diagrams for vertical alignments on fill or cut are supported by topographic surveys and soil investigations.	
			(10) Roadway modifications necessary to accommodate stations, guideway, or support facilities are defined and design is complete to a level comparable to that specified for guideway and stations. Traffic control devices or modifications have been defined.	
			(11) The landscaping requirements, including irrigation systems, are defined on the station, support facility, and guideway plans.	
			(12) The presence of buried structures, utilities, and contaminated soils which may have to be removed, backfilled or which would otherwise be unavailable for backfilling, has been taken into account.	
			(13) Within the site context, the building footprints are shown. The relationship of the buildings to grade and to adjacent facilities is clearly defined, as are provisions for pedestrians and bicycles and special maintenance access. Provision for motorized vehicle access is shown. Adequate surface parking including spaces for disabled parking and facilities for bicycles is provided, where needed. Access to stations and buildings complies with ADA.	
			(14) Adequate construction access has been considered; access and staging areas are identified.	
			(15) Maintenance of traffic and railroad protective flagging are identified and costs estimated.	
4.10	SCC 50 Systems	32C	(1) Major or critical design decisions have been researched and decided including connections to, and rehabilitation or reuse of, existing systems. Pre-construction site reconnaissance and soil	

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			resistivity surveys are complete.	
			(2) Major or critical work details, structural element dimensions, design interfaces and physical interfaces have been identified and are defined in terms of drawings, standards, criteria, specifications and contract package scopes. Single line or functional block drawings are prepared for each system. Technologies have been chosen, evaluated for cost effectiveness, and expected performance defined. Major equipment (for the control room, substations, grade crossings, tunnel ventilation, and traction power) has been defined and identified in terms of basic specifications, outline drawings, general arrangements, and standard drawings and details.	
			(3) Signaling and Train Control – Decisions have been made regarding those sections of alignment to be operated under visual or traffic signal control as opposed to train signal systems. Operations analysis has determined the most efficient location of interlockings based on track layout, headways, train lengths, and braking tables as well as requirements of each interlocking and its control limits. Site specific requirements are defined (for signal structural work) and locations for signal enclosures and relay rooms including sizes as well as room layouts (relay, termination, power) are identified and defined. Signal cable routing methodology as well as power supply and distribution are identified and defined. Software and interface requirements (to facilities, existing system, and other system elements) are identified and defined. The scope of construction between contractors and other operators (railroads or existing agency systems) is defined. Maintenance, testing and training requirements are identified and initially defined (factory acceptance, site acceptance, field integration, start up, etc.).	
			(4) Traffic signals - Basic coordination between train control and traffic signals or other traffic controls has been evaluated. The interaction among traffic signals in the immediate area has been coordinated with local jurisdictions. Simulations have been completed on the impact of the transit system on local traffic and the impact of signalization on transit running times. Decisions have been made regarding transit vehicle pre-emption or priority and interaction with emergency vehicle priority systems such as Opticon. Site specific requirements are defined (for structural work) and locations defined for crossing gates and signal enclosures. Related requirements for grade crossing protection, including use of four-quadrant gates or other methods to prevent vehicles from circumventing crossing gates have been identified and defined. The location of vehicle sensing elements is shown on intersection drawings. Software and interface requirements (to the train control system and other system elements) are identified and initially defined. The scope of construction between contractors and others is defined. Maintenance, testing and training requirements are identified and initially defined (factory acceptance, site acceptance, field integration, start up, etc.).	
			(5) Traction Power – Traction power requirements and the location of substations is established. The basis of design including nominal project voltage and voltage limits are identified. The OCS system or contact rail layout is defined including conductor sizes relative to existing	

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			parts of system, as well as any supplementary parallel feeders to meet design requirements for substation out of service scenarios. Minimizations of voltage drop, maximization of vehicle propulsion system performance, and train regeneration issues have been initially addressed. Substation equipment requirements are identified. Single line drawings are provided. Preliminary equipment performance specifications have been developed. The source of commercial power is identified and preliminary negotiations have begun and technical interface conditions established. Substation grounding, stray current monitoring or testing, lightning arresters, and protective systems for equipment and utility system faults have been identified. Supervisory control has been defined as well as requirements for integration with central control.	
			(6) Overhead Contact Systems (OCS) – OCS system type is identified and issues associated with temperature variations are addressed. Decisions have been made regarding the types of support structures or poles to be used, particularly in urban area. Tensions for the contact wire and messenger wire are defined; maximum distances between tensioning points are identified. OCS is sectionalized in coordination with the traction power supply. The basis for OCS design is established and design issues associated with overlaps, section insulators, and crossing and crossover locations are preliminarily addressed.	
			(7) Communication System – Communications plans, including building or equipment locations, and provisions for station message signs, public address, emergency phones, security cameras, intrusion detection, and other system elements are defined and coordinated with station, guideway, support facility, and central control building plans. Cabling schemes are coordinated with the guideway and utilities. Preliminary specifications for the radio system have been developed and the system is coordinated with the vehicles and central control. Communication between field locations and central control is defined and coordinated with other systems.	
			(8) Fare Collection System – The fare collection concept is defined and is accepted by all stakeholders. The number and location of fare collection equipment has been determined and is shown on the drawings. Basic equipment is specified.	
			(9) Central Control – Operations control center plan is provided, including basic layout and space allocation requirements. System interface requirements and modifications for existing central control facilities are coordinated with the systems being controlled. Provisions for security and emergency response are considered. Preliminary equipment and control system requirements are established.	
4.11	SCC 60 ROW, Land and existing improvements	32C	(1) The Real Estate Acquisition and Management Plan (RAMP) is complete. Refer to the OP-23 RAMP for more information. Real estate documents and drawings identify the full takes, partial takes, temporary and permanent easements, and other rights. Any special access requirements for existing structures have been identified. Possible eminent domain actions need to be identified.	
			(2) Site surveys include property lines and identify structures for buildings, site features, utilities;	

Item	Description	OP	PMOC Review	✓
			and surface improvements such as streets and railroad rights-of-way, including private crossings of railroad rights-of-way.	
			(3) The real estate information and survey information is fully coordinated with drawings of structures for guideways and buildings; site features; utilities; streets, railroads, transitways; construction easements; and site access and staging areas.	
			(4) Parties to be relocated are identified and an action plan is developed.	
			(5) Hazardous material sites are identified and characterized and the responsibility and scope of remedial actions specified.	
4.12	SCC 70 Vehicles	32C	(1) Refer to OP-38 for additional information.	
			(2) Vehicle performance requirements are specified and incorporated into the Design Criteria, the Operations and Maintenance Plan, and the Bus or Rail Fleet Management Plans. Preliminary specifications must include allowable vehicle static and dynamic clearance diagrams, allowable axle weight, allowable total weight, door location, floor height, passenger capacity (seated and under heavy load conditions), and ADA accommodation. For buses, the specification must also include fuel type and turning radius. For rail, the specification must include acceleration and deceleration characteristics and expected train consist.	
			(3) System Interface Functional Descriptions have been developed and advanced to include the following: definition of the subsystems that constitute the overall vehicle system; description and graphic depiction of each interface between on-board subsystems and wayside systems; and, description of how each subsystem will meet the project requirements.	
			(4) Expected vehicle servicing, periodic maintenance, and component repair and replacement requirements (estimated time to repair and frequency of repair) should be compiled to support shop design (SCC 30)	
			(5) Testing requirements have been developed to include the following: high level Test Program Plan for both production and on-site acceptance including requirements for factory inspection and testing, First Article and Pre-shipment inspections, static and dynamic testing, and conditional acceptance.	
			(6) Maintenance and Training Requirements should be defined and identified including development of maintenance and training requirements for new system elements.	
			(7) Requirements for special tools and equipment have been established as well as requirements for initial spare parts orders.	
4.13	SCC 80 Professional services	32C	(1) The roles and responsibilities of Project Sponsor's professional consultants (design, engineering, and construction management) may be distinguished from Project Sponsor's own professional staff. If alternative delivery systems (design-build, CM/GC) are proposed, the costs of design professionals employed by the contractor should be identified.	
			(2) Costs associated with construction – building contractors' management, labor, indirect costs, overhead, profit, construction insurance should not be included in SCC 80 but in SCC 10 through 50 as appropriate. Cost estimates should conform to this allocation of cost.	
			(3) When Project Sponsor's manual labor, equipment and facilities are used to facilitate	

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			construction or to assist in construction of the project, a Force Account Plan and cost estimate should be provided. The cost of these services should be applied to the appropriate SCC code with the exception of start-up training.	
			(4) Costs associated with permits, insurance, and taxes are researched, identified, and estimated.	
			(5) Costs associated with start-up training and simulated operation for operators and supervision is estimated.	
<b>5.0</b>	<b>SCHEDULE</b>			
5.1	Basis of Schedule	34	(1) Includes a logical document that discreetly defines the basis for the development of the project schedule that identifies key elements, issues and special considerations (assumptions, exclusions, etc.)	
			(2) Describes the planning basis, including resource planning methodology, activity identification, duration estimating, and source and methodology for determining logic and sequencing.	
			(3) Identifies labor productivity adjustments, including congestion assessment, extended work hours, winter work, curfews, etc.	
			(4) Documents all production rates, identifies basis for startup and sequencing requirements, and defines any owner requirements (regulatory, environmental, Quality/ inspection)	
			(5) Is consistent in use of the time sensitive variables in the capital cost estimate, including year of expenditure assumptions, and durations incorporated into the master schedule.	
5.1	Schedule Format	34	Is consistent with relevant, identifiable industry or engineering practices. Software is appropriate for the size and complexity of the project.	
5.3	Schedule structure	34	(1) Work Breakdown Structure has been applied in the development of the schedule.	
			(2) WBS consistent with the analyzed plan and program for all project participants' agreed upon roles, responsibilities, capabilities and capacities.	
			(3) The project schedule is in original and SCC format.	
5.4	Schedule level	34	The schedule shall be sufficiently developed in detail to determine the validity of the project critical path to revenue operations. It should break out, at a minimum, project milestones, FFQA/SSGA related work, planning and environmental, public involvement, Project Development, value engineering, final design, right-of-way, permits, third party agreements, public and private utility relocations, safety and security, construction, trackwork, train control systems, vehicles, system integration, communications, fare collection, and startup and testing in sufficient detail to confirm the reasonableness of durations and sequencing and to estimate the probability of schedule risk	
5.5	Schedule elements	34	(1) Schedule reflects the project scope that is described in the approved environmental document.	
			(2) Schedule includes adequate time and appropriate sequencing for: <ul style="list-style-type: none"> <li>Reviews <ul style="list-style-type: none"> <li>Required FTA-related environmental, risk assessment, PMP reviews, readiness reviews at designated milestones, and grant approvals</li> <li>Project reviews by applicable local, state and federal jurisdictions and affected third parties</li> </ul> </li> </ul>	

Item	Description	OP	PMOC Review	✓
			<ul style="list-style-type: none"> <li>Agreements <ul style="list-style-type: none"> <li>Right-of-way acquisition; household/business relocations</li> <li>Utilities relocation</li> <li>Railroad purchase and/or usage</li> <li>Interagency Agreements</li> <li>Funding time frames and/or milestones for FTA and non-FTA sources</li> <li>Procurement and manufacturing durations for equipment and vehicles, especially for Long Lead Items, are adequate and complete</li> <li>Procurement of design contracts for civil/facilities, systems, and vehicles</li> <li>Performance of design contracts to produce 100 percent complete documents prior to bidding</li> <li>Bid and award periods reflect the required sequencing and durations for the selected project delivery method and logically tied to the proper work activities</li> <li>Construction processes and durations are adequate and complete, and allow schedule contingency for potential delays, including inter-agency work, utility relocation, civil, architectural, and systems work, Project Sponsor operations and maintenance, mobilization, and integrated pre-revenue testing.</li> </ul> </li> </ul>	
5.6	Resource scheduling	34	(1) Quantities and costs as defined in the cost estimate match the resources/costs assigned to the activities in the schedule.	
			(2) The distribution of resources and costs per specification or industry standards are reasonably associated to the activity it is assigned.	
5.7	Schedule control	34	Define the approach to and use of scheduling tools, such as scheduling software, Project Sponsor procedures for schedule change and update, use of a work breakdown structure, assignment of staff responsibility for schedule, cost loading, resource loading, etc.	
<b>6.0 CAPITAL COST ESTIMATE</b>				
6.1	Basis of Estimate	33	(1) The Project Sponsor needs to provide a Basis of Estimate report describing its cost estimating approach. The report should be developed by the Project Sponsor as part of its initial Project Development work and updated with each subsequent estimating effort.	
			(2) The Basis of Estimate outline should be as follows: <ul style="list-style-type: none"> <li>Estimating Methodology – Describe the general approach to defining and quantifying the project capital cost estimate.</li> <li>Sources of Cost Data – Define the nature and sources for cost data used in the preparation of the estimate; <ul style="list-style-type: none"> <li>Cost Estimating Assumptions</li> <li>Allocated Contingency</li> <li>Unallocated Contingency</li> <li>Escalation</li> <li>Contract packages</li> </ul> </li> <li>Estimating Procedures – If multiple parties are estimating parts of the project, this memo</li> </ul>	

Item	Description	OP	PMOC Review	✓
			<p>should help to ensure consistency of approach.</p> <ul style="list-style-type: none"> <li>• Organization and Management of Cost Data (by segment elements; project-wide elements)</li> <li>• Bottom Up and Top Down Approaches (e.g. at Entry to Project Development, it could be reasonable to use Bottom Up estimating approach for Guideway, Stations, Support Facilities; and Top Down estimating approach for Sitework, Systems, ROW Land Existing Improvements, and Vehicles)</li> <li>• Facilities (Guideway, Stations, Support Facilities) Costing Procedures for typical construction methods and for construction and components unique to transit projects.</li> <li>• Estimate Limitations – Describe perceived or known uncertainties, as well as unknowns that could lead to changes in the estimate due to changes in project scope and design standards, incorrect unit cost or quantity assumptions, and unforeseen problems in implementation.</li> <li>• Tracking Costs – Describe how capital costs in the SCC format will be tracked through construction, revenue operations, etc. (e.g. provision in Division 1 requiring contractor to submit SCC update with monthly pay application). FTA requires that costs be tracked in the SCC format through construction, revenue operations and through two years post-revenue operations to document contract closeout and the “after” point for the Before and After Study. (Note that the Before and After Study may not be required for Small Starts projects.)</li> </ul>	
6.2	Value Engineering (VE) report	33	<p>(1) VE effort has been performed on the design completed in Project Development and a report has been prepared. Focus should be on VE recommendations approved by the Project Sponsor and incorporated into the project. The Project Sponsor should identify why recommendations were or were not approved.</p> <p>(2) The cost estimate should incorporate the accepted changes.</p>	
6.3	Standard Cost Categories (SCC) Workbook	33	<p>(1) Work Breakdown Structure formatted to conform to the FTA SCC.</p> <p>(2) Workbook includes SCC annualized worksheets.</p> <p>(3) Estimate is in general agreement with the latest SCC information contained in the Project Sponsor’s most recent New Starts submission.</p>	
6.4	Capital cost estimate	33	<p>(1) SCC category 10-50: Fixed Construction (guideways, stations, support facilities, sitework, systems)</p> <ul style="list-style-type: none"> <li>• Construction Materials <ul style="list-style-type: none"> <li>▪ Quantities have been calculated with appropriate conservatism to accommodate development to a more advanced stage of design if appropriate</li> <li>▪ Allowances for material quantities have been included for commodities which cannot be fully quantified at the present level of design</li> <li>▪ Unit Prices have been developed using the best available local market information;</li> <li>▪ Project sales tax exemption status has been established if appropriate and incorporated in materials costs</li> </ul> </li> </ul>	

Item	Description	OP	PMOC Review	✓
			<ul style="list-style-type: none"> <li>▪ Quotes have been obtained for specialty and price-sensitive materials</li> <li>▪ Materials costs reflect market volatility</li> <li>• Construction labor <ul style="list-style-type: none"> <li>▪ Local wage rates, fringe benefits, and work rules are incorporated</li> <li>▪ Local payroll taxes and insurance rates are incorporated</li> <li>▪ Holiday / show-up / vacation pay is incorporated</li> <li>▪ Crew productivity is appropriate and conservative for the task under evaluation</li> <li>▪ Availability and variability of utility and railroad outages and “track time” have been incorporated in a conservative manner in determining the crew productivities for impacted work</li> </ul> </li> <li>• Construction equipment <ul style="list-style-type: none"> <li>▪ Local equipment rental rates and current fuel costs are incorporated</li> <li>▪ Quotes have been obtained for specialty equipment.</li> </ul> </li> <li>• Escalation for Construction Materials, Labor and Equipment <ul style="list-style-type: none"> <li>▪ Confirm that adequate escalation rates have been applied to estimates of material, labor and equipment costs. Costs to anticipate prices at the time of project bid.</li> </ul> </li> <li>• Special considerations <ul style="list-style-type: none"> <li>▪ Utility and Railroad labor, equipment, and overhead rates have been verified and incorporated in third party or “force account” work pricing, as well as local utility/RR work and safety rules</li> <li>▪ Special consideration has been given to support operations and facilities for tunneling operations, facilities to support operations in contaminated/hazardous materials, etc.</li> </ul> </li> <li>• Construction Indirect Costs, Multipliers for Risk etc. <ul style="list-style-type: none"> <li>▪ Contractor indirect and overhead costs are advanced beyond a percent of the associated construction direct costs and should be analyzed based on field and home office indirect costs such as contract duration, appropriate levels of staffing (including project managers, engineers, safety engineers, schedulers, superintendents, QA/QC engineers, craft general foreman, labor stewards / nonproductive labor, warehousing, project trucking, survey layout, purchasing, timekeeping, etc.), mobilization / demobilization costs, equipment standby / idle time costs, reviewer office / lab / tool facilities, safety equipment, QA/QC testing equipment, temporary utilities (sanitary / power / light / heat), jobsite and public security measures, etc.</li> <li>▪ Appropriate costs have been included for payment and performance bonds and special insurance requirements (RR protective, pollution liability, etc.).</li> <li>▪ Other construction insurance costs and/or project-wide coverage (Owner Controlled Insurance Policy) has been included based on quotes from appropriate carriers.</li> <li>▪ Contractor profit / risk costs have been incorporated that reflect the proposed delivery method and expected level of competition by contract package (higher profit margin where few competitors will bid).</li> </ul> </li> </ul>	



Item	Description	OP	PMOC Review	✓
			<p>(2) Cat. 60 - Real Estate</p> <ul style="list-style-type: none"> <li>Includes estimated costs (acquisition costs) for the real estate and associated relocation costs. Costs for professional services, both contracted and in-house legal, appraisal, review appraisal, settlement costs, environmental site assessments, demolition, real estate and relocation consultants have been included (and not included in SCC 80). Easements, acquisitions, inspections, takings, etc. have been appraised or estimated by qualified professionals familiar with local real estate markets and practices, especially any acquisitions involving freight railroads. Includes allowance for the expected increase in costs over appraised value. Includes costs for taxes attributable to real estate acquisition.</li> </ul>	
			<p>(3) Cat. 70 - Vehicles</p> <p>Estimates account for current purchase prices for similar vehicles or quoted prices from manufacturers. Includes costs for professional services (both contracted and in-house) for vehicle design and procurement, and not included in SCC 80. Estimates allow costs for special tools and equipment and spare parts. Requirements for non-revenue support vehicles identified and include in estimate.</p>	
			<p>(4) Cat. 80 - Professional Services</p> <ul style="list-style-type: none"> <li>Costs included for both contracted and in-house, for all professional, technical and management services related to the design and construction of fixed infrastructure (Cats. 10 - 50) during the Project Development, engineering, and construction phases of the project. This includes environmental work, surveying, geotechnical investigations, design, engineering and architectural services; materials and soils testing during construction; specialty services such as safety or security analyses; value engineering, risk assessment, cost estimating, scheduling, Before and After studies, ridership modeling and analyses, auditing, legal services, administration and management, etc. by agency staff or outside consultants.</li> <li>Professional liability insurance and other non-construction insurance should be included on 80.05.</li> <li>Confirmation that cost estimates are based on realistic levels of staffing for the duration of the project through close-out of construction contracts. (The estimate should be consistent with the Project Management Plan.)</li> <li>Confirmation that costs for permitting, agency review fees, legal fees, etc. have been included.</li> <li>General Conditions included for design, construction, and procurement contracts.</li> <li>If alternative delivery systems (design-build, CM/GC) are proposed, the costs of design professionals employed by the contractor should be identified.</li> </ul>	
6.5	Contingency	33	Allocated Contingency – Confirmation that adequate contingency has been allocated to each of the SCC categories based on the perceived risk inherent to each category's estimate.	
			Cat. 90 - Unallocated Contingency - Confirmation that adequate contingency has been added to the total project cost based on the perceived project risk.	

Item	Description	OP	PMOC Review	✓
			Total Contingency should be consistent with that derived in the Risk and Contingency Management Plan.	
6.6	Cat. 100 – Finance Charges	33	Finance charges included, consistent with FTA’s Financial Management Oversight Consultant’s review.	
6.7	Inflation	33	Confirmation that adequate inflation rates have been applied to Base Year project costs to anticipate costs at procurement or bid; the Year of Expenditure costs should be developed thoughtfully. Reference indices should include ENR Building Cost Index and Construction Cost Index or other demonstrated authoritative source.	
7.0 RISK AND CONTINGENCY MANAGEMENT				
7.1	Risk process established	40	(1) Risk organization is in place, with independent reporting to executive management and roles and responsibilities defined.	
			(2) Contingency management, contingency use authority, and reporting structure is established.	
7.2	Risk identification	40	(1) Risk register is developed, with risk categories and priorities. (2) Process is established to update risk register.	
7.3	Risk assessment	40	(1) Valuation of project cost risk by method appropriate for project	
			(2) Valuation of project schedule risk by appropriate methods	
			(3) Documented report demonstrating valuation method and result	
7.4	Risk Mitigation	40	(1) Mitigation process in-place with documented responsibilities.	
			(2) Established insurance plan	
			(3) Contingency amounts identified and tied to risk assessment	
			(4) Requirements risks clearly identified and resolved; plans in place for unresolved requirements risks	
			(5) Secondary mitigation plan defined and documented	
7.5	Risk management	40	(1) Plans for amendment of the risk register during the course of the work, to both succinctly catalogue additional significant issues that arise, as well as to identify closure of issues as they become resolved to the satisfaction of the Project Sponsor and the FTA.	
			(2) Plans and timing for systematically updating the RCMP.	
8.0 CERTIFICATIONS, REPORTS, AND ADMINISTRATIVE REQUIREMENTS				
8.1	Administrative requirements			
8.1.1	Legal Authority to implement transit mode project		The Project Sponsor must perform a review of existing statutes to gain a full understanding of the Project Sponsor’s authority and any legal constraints that may affect the project. The purpose should be to identify requirements and constraints in an orderly and timely manner and to deal with them as the project advances. Failure to recognize and accommodate legal requirements may jeopardize the entire project and, at the very least, severely impact the subsequent grant approval process and project schedule, as well as project costs. The project sponsor must be diligent in	

Item	Description	OP	PMOC Review	✓
			maintaining cognizance of changes in the legislative/regulatory environment which may impose future constraints on a project. This legal authority must be reviewed to confirm that it addresses all forms of project delivery that may be considered.	
8.1.2	Legal Authority to use alternative project delivery method		Provide evidence of authority under non-Design-Bid-Build format.	

## APPENDIX C

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## **Oversight Procedure 53 - Readiness to Procure Construction Work**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure (OP) is to describe the review, analysis, recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) with respect to the project sponsor's readiness to procure the major construction and equipment contracts on a project.

### **2.0 BACKGROUND**

Issuance of design documents for bid or request for proposals marks an important milestone in project implementation, and is a final step before the project sponsor enters into construction contracts that are binding on the project sponsor as well as the construction contractor. The PMOC's review should be conducted after the project sponsor's contract package is sufficiently developed to permit an accurate assessment; typically around the ninety percent (90%) design level for traditional design-bid-build contracts. If the project sponsor plans to use an alternate delivery method such as design-build (D/B) or construction manager/general contractor (CM/GC) (also known as construction manager-at-risk (CMR)), the timing of the review should be advanced accordingly.

### **3.0 OBJECTIVES**

FTA review of the project sponsor's readiness to procure construction work helps to ensure:

- the project sponsor has developed the design documents to an appropriate level of completion given the selected delivery method;
- the procurement packages and supporting documents are complete, accurate, and consistent with the project scope, as established in the Project Development phase;
- the procurement package is consistent with appropriate Federal requirements, including Buy America requirements;
- the project sponsor's cost estimates accurately reflect contractual requirements;
- the project sponsor has addressed the project risks identified by implementing mitigation measures to the greatest extent possible;
- the project sponsor has established a plan for qualification, bid and award that follows accepted best industry practices;
- the project sponsor has established procedures in place to deal with unexpected procurement issues (e.g., no bids, single bid, unacceptably high bids and protests); and
- the project sponsor's organization is prepared to successfully manage the contract package through procurement, construction and start-up, or in the case of a D/B or CM/GC contract, through the design construction and start-up phase.

## 4.0 REFERENCES

The following are the principal, but by no means the only, references to Federal legislation, codification, regulation and guidance with which the PMOC should review and develop a solid understanding as related to the project sponsor's project work being reviewed under this OP:

### 4.1 Regulations and FTA Circulars

- Federal Acquisition Regulations
- C4220.1F, Third Party Contracting Guidance

### 4.2 Guidance

- Best Practices Procurement Manual,  
[http://www.fta.dot.gov/funding/thirdpartyprocurement/grants\\_financing\\_6037.html](http://www.fta.dot.gov/funding/thirdpartyprocurement/grants_financing_6037.html)
- Pricing Guide for FTA project sponsors,  
[http://www.fta.dot.gov/documents/Helpline\\_Price\\_Guide.doc](http://www.fta.dot.gov/documents/Helpline_Price_Guide.doc)
- Procurement System Self Assessment Guide,  
[http://www.fta.dot.gov/funding/thirdpartyprocurement/grants\\_financing\\_6326.html](http://www.fta.dot.gov/funding/thirdpartyprocurement/grants_financing_6326.html)
- Project and Construction Management Guidelines, 2011 Update

## 5.0 PROJECT SPONSOR'S SUBMITTALS

In advance of performing the review, typically three (3) to six (6) months prior to advertising major construction and equipment bid packages, the PMOC should obtain and study the following project documents. The PMOC should notify FTA of important discrepancies in the project information, including incomplete or unavailable information that would hinder the review. An example would be a mismatch between drawings and cost estimate in which the drawings are current and the cost estimate is two years old.

- Scope / Project Definition / Procurement
  - Final environmental documents and NEPA determination
  - Construction Documents (Plans and Specifications including Division 1 Provisions)
  - Geotechnical Baseline Report
  - Value Engineering Reports
  - Constructability Reviews
  - General and Supplementary Conditions of the Construction Contract
  - Request for Bid or Instructions to Proposers
  - Vehicle design documentation
- Project Management Plan (PMP) and sub-plans completed, including but not limited to:
  - Signed Agreements with Railroads, Utilities, other Third Parties
  - Risk Assessment, Risk and Contingency Management Plan
  - Safety and Security Management Plan (for application to construction)
  - Project Delivery Plan, Contract Packaging Plan, Procurement Policies and Procedures
  - Project sponsor Management Capacity and Capability
  - Quality Assurance / Quality Control Plan and Records
  - If an OP 32D and/or OP 52 review has been completed, applicable findings and conclusions should be examined for consistency with elements of this review.

- Schedule
  - Project schedule in original and SCC format; schedule narrative describing critical path, expected durations, and logic
- Cost
  - Capital cost estimate in original and SCC format, including Basis of the Estimate
  - Full Funding Grant Agreement and Attachments (if applicable)

## 6.0 SCOPE OF WORK

### PMO Reviewers:

The quality and usefulness of the review relies in large part on the perception and judgment of the reviewers. Ideally, they should be senior technical managers qualified to actually perform the work being reviewed. Because transit projects are complex and interdisciplinary in nature, the reviewers should have a broad range of knowledge, experience and capabilities. Structural plans should be reviewed by structural engineers; signaling plans should be reviewed by signaling engineers, etc.

### Tasks:

This review is divided into three sub-reviews described in tables below. Review items may be modified somewhat to accommodate the particular circumstances associated with a project.

- 1) Confirmation of the readiness for procurement of a complete bid package, including plans, specifications, and contract provisions, and that federal procurement requirements are addressed;
- 2) Confirmation that the procurement package is consistent with the scope, schedule, and budget established during the Project Development Phase; Confirmation of the readiness of the project sponsor's organization with respect to having in place the necessary qualified project staff; consistent project management plans, procurement and construction management procedures, including project controls procedures; needed interagency, third party, and real estate agreements; and required financial resources. Additionally, that the project sponsor has sufficiently addressed the project risks identified during the Risk Assessment and mitigated them to the extent possible;

Confirmation of the readiness for bidding of the construction procurement package is accomplished by the following specific reviews:

Review Item	Review Objective	Review Method
Construction Plans and Specifications	<p>To confirm that the plans and specifications completely and clearly define the required work and that there are no major/significant omissions.</p> <p>To confirm that construction documents reflect results of constructability reviews.</p>	Review by qualified engineer(s) with expertise in the area(s) of design.



Review Item	Review Objective	Review Method
	<p>To confirm that any project sponsor accepted Value Engineering alternatives have been incorporated into the construction documents.</p> <p>To confirm consistency with any project sponsor plans for owner furnished equipment.</p>	
Construction Plans and Specifications for Design-Build Delivery or other alternate delivery method	<p>To confirm that the construction plans, specifications, bridging documents and/or performance requirements for design and construction are at the appropriate level of completion to adequately define the scope of work. A separate review of the project sponsor's D/B procurement documents may be required to confirm that the process is sound and conforms to FTA C-4220.1F.</p>	Review by qualified engineer(s) and construction manager(s)
Construction Contract Terms and Conditions	<p>To confirm that the construction contract completely and clearly defines the terms and conditions under which the Work will be performed.</p> <p>To confirm that federal procurement requirements are addressed, including Buy America requirements.</p>	Review by a person or contract administrator with experience in managing construction contracts of similar scope and complexity
Construction Contract Document Terms and Conditions for Design-Build Delivery and other alternate delivery methods	<p>To ensure consistency between the bid package and the contract packaging plan.</p> <p>For D/B Contracts, to confirm that the contract clearly defines both design and construction requirements.</p> <p>For CM/GC contracts, to confirm that both design phase and construction phase services are adequately defined and calculation of the contractor's fee has been precisely defined.</p> <p>For CM/GC delivery, a review of the project sponsor's design</p>	Review by a person or contract administrator with experience in managing a design-build contract of similar scope and complexity.

<b>Review Item</b>	<b>Review Objective</b>	<b>Review Method</b>
	contract should be conducted to confirm that the requirements correspond with those in the CM/GC contract.	
Quality assurance records	To confirm that quality assurance checks and reviews have been performed in accordance with the approved Quality Assurance Program Plan (QAPP)	Review QA audits and observations by a person with experience in performing quality assurance reviews or audits.
Construction Cost Estimate	<p>To confirm that the estimate as prepared is consistent with the Plans, Specifications, and Contract General and Special Conditions, and that it is based upon contemporary cost information.</p> <p>To confirm that the estimate of General Conditions' costs reflects actual contract requirements and not an industry average factor.</p>	<p>Review by a cost estimator with experience in cost estimating, including the estimation of the construction cost impacts of contract special provisions related to risk transfer and construction limitations.</p> <p>Consider interview of agency / consultant estimator to confirm that they have reviewed contract terms and conditions and made appropriate allowances.</p>

Confirmation that the bid package is consistent with project management plans with respect to delivery method, scope, schedule and budget. The following reviews and comparisons provide confirmation that the bid package is consistent with the Environmental Documents and previously accepted project management plans.

<b>Review Item</b>	<b>Review Objective</b>	<b>Review Method</b>
Plans, specifications, and special contract conditions with respect to Environmental Documents	To confirm compliance of the Work to be constructed with the Environmental Documents	Comparison, using qualified personnel, of the design and construction requirements of the Environmental Document with the designs and requirements of the bid package.
Plans, specifications, and special contract conditions with respect to the project Scope of Work.	To ensure that the documents reflect the scope of work developed during the Project Development and Engineering phases.	Compare bid package scope of work with that developed during Project Development and Engineering phases using qualified personnel.
Plans, specifications, and special contract conditions with respect to Project Master Schedule	To ensure consistency between the bid package and the Project Master Schedule. Review the schedule in context with the	Compare bid package schedule information with Project Master Schedule using qualified personnel. Identify management

Review Item	Review Objective	Review Method
	Cost Estimate(s); ensuring that cost associated with all work activities have been properly accounted for in the cost estimate and vice versa	baseline data used and modifications made through the procurement phase. Particular attention should be paid to schedule contingency for delay and re-bid, and ensuring that predecessor activities will not interfere with construction per the bid package schedule (examples: preceding contractors, utilities relocations, real estate acquisition).
Construction Cost Estimate with respect to Project Budget	<p>To confirm that the Construction Cost Estimate plus appropriate contingencies is affordable within the overall Project Budget.</p> <p>To confirm consistency of Cost (and Schedule) Package Level products and documentation with package management baselines.</p> <p>To confirm that the Project Schedule &amp; Cost Estimate are in sync, i.e. time allocated for work activities in the cost estimate agrees with time allocation is schedule</p>	Compare Construction Cost Estimate with Project Budget using qualified personnel. Identify management baseline data used and modifications made through the procurement phase. .

Confirmation that the project sponsor's organization has in place the necessary precursors to begin construction, and that the organization is ready to enter the construction phase of the project. The PMOC should verify the review items are consistent and updated in applicable project management plans.

<b>Review Item</b>	<b>Review Objective</b>	<b>Review Method</b>
Third Party Agreements	To confirm that necessary third party agreements are in place to support the construction.	Review third party agreements in the overall context of the project with qualified personnel. Particular attention should be provided to design standards; utility agreements; agreement with other railroads; inclusion of enhancements; concurrent non-project activities, and timing of reviews, permits, land transfers, and funds transfers.
Real Estate requirements in contract documents	To confirm that all necessary rights-of-way (ROW) will be available for use by the contractor at Notice to Proceed (NTP). If all ROW will not be available at NTP, confirm that the contract documents, including plans, clearly identify those parcels that are not immediately available, when each parcel will be available for use by the contractor and any associated contract conditions for further delays.	Compare the Real Estate requirements in the contract documents with the approved Real Estate Acquisition and Management Plan (RAMP).
Procurement Policies and Procedures	To ensure Procurement Policies and Procedures are in place that are in compliance with federal policies, ensure a fair bidding environment, and are able to efficiently resolve issues and disputes that may arise during the course of the Construction Contract.	Review project sponsor's policies and procedures by qualified personnel.
Project Staffing Plan	To ensure that the Project Sponsor has adequately implemented a project staffing plan that ensures the necessary qualified staff will be available at an appropriate time to manage and support the work that is being bid.	Review staffing plan to ensure it is consistent with the PMP approved for construction.

<b>Review Item</b>	<b>Review Objective</b>	<b>Review Method</b>
Risk Register, Risk and Contingency Management Plan (RCMP)	To confirm that the project sponsor has incorporated appropriate risk mitigation measures into the contract plans and specifications. To confirm that the project sponsor has a plan to mitigate project budget and schedule risks if they come to fruition.	Review Risk Register and RCMP and compare to contract documents by qualified staff.
Financing Plan	To ensure that money will be available to pay the contractor for the work on a timely basis	To be performed by the Financial Management Oversight Contractor (FMOC). Review the funds availability in the context of all project requirements to confirm that adequate funds will be available on the schedule called out in the bid package. Confirm the current validity of any underlying assumptions associated with the Financing Plan (for example that borrowing will occur at a given time).

The PMOC readiness report shall include:

- 1) Executive summary in three pages or less that includes the following:
  - a) Summary of findings of the procurement documents related to the project's scope, schedule, and cost
  - b) Listing of any significant omissions or uncertainties and characterization of them in terms of likelihood (probable, remote, improbable) and their consequence (catastrophic, critical, serious, moderate, marginal)
  - c) Professional opinion regarding the consistency of the project scope, schedule and cost and the ability of the project sponsor to manage the project
  - d) Statement of potential range of procurement cost (bids) (lower and upper bound)
  - e) Recommendation to FTA (if PMOC considers a recommendation appropriate) of the readiness of the project (or procurement package) to proceed with bidding (or advertisement)
- 2) Review procedures and personnel (including capsule of reviewers qualifications; to the extent possible, the reviewers should be same individuals that performed the prior review of the project documents, and should be regular participants in project reviews).
- 3) Readiness of plans and specifications for the type of procurement contemplated
  - a) Design completeness
  - b) Contract terms and conditions are consistent with federal requirements, including Buy America requirements
  - c) Procurement bid and award process consistent with best industry practices
  - d) Cost Estimate accurately reflects contractual requirements

- 4) Consistency with Environmental Document and Project Plans
  - a) Consistent with Environmental Documents and Project Development Plans
  - b) Consistent with PMP, RAMP and QAPP
  - c) Consistent with Risk Assessment and RCMP
  - d) Consistent with Project Master Schedule
  - e) Consistency with Project Budget
- 5) Agency Readiness
  - a) Organization and Staffing
  - b) Third party agreements and project sponsor furnished permits
  - c) Funding availability (FMOC)
- 6) Conclusions and Recommendations (detailed)
- 7) Provide appropriate back-up information in appendices

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall provide FTA with a written report of its findings, analysis, recommendations, professional opinions, and a description of the review activities undertaken. The report shall identify any and all omissions, discrepancies, shortcomings or fatal flaws. After FTA approval, the PMOC should share the report with the project sponsor. In the event that differences of opinion exist between the PMOC and the project sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile its findings with the project sponsor and provide FTA with a report addendum covering the agreed modifications by the project sponsor and PMOC.

The report formatting requirements of OP 01 apply. When necessary, PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may add other software as required but documentation and report data shall be made available to FTA.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	PERFORMANCE MEASURE	ACCEPTABLE QUALITY LEVEL	MONITORING METHOD
1	The PMOC shall review and analyze Project documents to determine that project sponsor has advanced the Project to the position of being ready to procure construction work.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of Project documents to confirm that the Project has been advanced by project sponsor to the position of readiness to procure construction work.		<b>M1a.</b> Review of the process documentation.	<b>Q1a.</b> PMOC provides documentation of the process.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process and project management judgment to review and analyze Project documents to determine that project sponsor has advanced the Project to the position of being ready to procure construction work.		<b>M1b.</b> Documented review and analysis of Project documents to determine that project sponsor has advanced the Project to the position of being ready to bid construction work.	<b>Q1b.</b> Review must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>MM1b.</b> Periodic review by FTA or its agent and the PMOC's internal verification.
2	The PMOC shall form a professional opinion as to whether or not the construction procurement packages and supporting documentation are complete, accurate and consistent with the PMP and confirm that 's organization is prepared to successfully manage the procurement and construction processes.	<b>R2a.</b> The PMOC shall perform a review and analysis of the project documentation and confirm that the construction procurement package, including plans, specifications and contract provisions is ready for bidding.		<b>M2a.</b> PMOC's review and opinion as to the readiness of the construction procurement package for bidding demonstrates sound management and engineering practices and professional experience.	<b>Q2a.</b> Professional opinion of the readiness of the construction procurement package for bidding.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall perform a review and analysis of the Project documentation and confirm that the construction procurement package is consistent with the PMP with respect to scope, schedule and budget.		<b>M2b.</b> PMOC's review and opinion as to the consistency of project sponsor's construction procurement package with Project documents demonstrates sound management and engineering practices and professional experience.	<b>Q2b.</b> Professional opinion of the consistency of the project sponsor's construction procurement package with the PMP with respect to scope, schedule and budget.	<b>MM2b.</b> Periodic review by FTA or its agent.
3	The PMOC shall provide FTA with a written report of its findings, analysis, recommendations and professional opinions.	<b>R3.</b> The PMOC shall present its findings, analysis, recommendations and professional opinions to FTA in a written report and, when so directed by FTA, augment the written report with oral presentations.		<b>M3.</b> Review of the PMOC's presentation of findings, analysis, recommendations and professional opinions by the FTA.	<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with the project sponsor to the extent possible.	<b>MM3.</b> Periodic review by FTA or its agent.



## **Oversight Procedure 54 – Readiness for Service**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure (OP) is to describe the review, analysis, and recommended procedures that the Federal Transit Administration (FTA) expects the Project Management Oversight Contractor (PMOC) when evaluating the Project Sponsor's readiness for service. For the purposes of this OP, readiness to enter service is the completion of system integration testing (SIT) of project components, equipment, subassemblies, assemblies, subsystems, and systems; fulfillment safety and security certification requirements; completion of pre-revenue operations (PRO); and confirmation that the Project Sponsor (or Operator, if different) has the management capacity and capability (MCC) to operate the new transit facility (collectively, this evaluation is referred to as a "Readiness Review").

Through early performance of this OP, the PMOC can help the Project Sponsor to avoid "11th hour" testing, untimely surfacing of operational, maintenance and safety problems, and related delays of the revenue service date. Planning for SIT and PRO should start at least 12 months prior to substantial completion of project construction. These planning activities should include the development of an Operation Hazard Analysis, System Integration Test Plan, and PRO Plan and work-arounds. Further, the Project Management Plan (PMP) and referenced sub-plans should be reviewed prior to revenue operations to ensure the processes are sufficient for operations.

### **2.0 BACKGROUND**

Early planning for SIT and PRO training and testing is essential. This avoids public safety concerns associated with conforming to industry standards, standard of care, and conformance with contractual requirements, impacts to construction and delays to the revenue service date. All involved stakeholders including safety personnel, operations, maintenance, engineering, construction manager, and the construction contractors should be aware of the testing and PRO processes. Further, the Project Sponsor is responsible for informing the affected community and public of the safety and security concerns associated with the operation of the new transit system. This is essential prior to and during the testing and PRO phase when the facilities represent new and unknown risks to the community, as well as to the workers.

It is important for Project Sponsors to continually refer to hazard analyses and provide evidence that the hazard resolution process has been implemented, tracked and monitored throughout the project life cycle. Safety devices, warning devices, updated procedures and rules should all be in place before any train movement is allowed. If such items are outstanding prior to testing, the Project Sponsor must review the hazards and provide detailed workarounds to mitigate these hazards until final resolution. Safety certification should not be left for final approval until just days before a project opens for revenue service.



Testing verifies that all systems, subsystems, components, equipment, and materials conform to the requirements of the contract documents. Successful completion of the PRO testing, certifying, and permitting helps to assure that the transit project will operate and can be maintained as an integrated whole at acceptable levels of safety and security, to the extent possible in conformance to industry standards, standard of care, and conformance with contractual requirements, for the public at large as well as the work force.

### **3.0 OBJECTIVES**

The objectives are to generally assess the following:

- All systems, subsystems, components, equipment, and materials furnished and installed conform to the requirements of the contract documents;
- The entire transit system, with all interfaces, operates as an integrated whole and is capable of functioning effectively to provide dependable service;
- The system is safe for use by patrons to the extent possible in conformance to industry standards, standard of care, and conformance with contractual requirements;
- The system will operate safely through the host communities; and
- The Operator has demonstrated the MCC to safely operate and maintain the system to the extent possible through hiring sufficient numbers of experienced staff to operate and maintain the new system, and that all employees have been adequately trained and protected.

### **4.0 REFERENCES**

The following are the principal, but by no means the only, references to Federal legislation, regulation and guidance with which the PMOC should review and develop a solid understanding as related to the Project Sponsor's project work being reviewed under this OP:

#### **4.1 Legislative**

- The Moving Ahead for Progress in the 21<sup>st</sup> Century Act, or MAP-21, Public Law 112-141, July 6, 2012.

#### **4.2 Regulations**

- Project Management Oversight, 49 CFR Part 633
- State Safety Oversight, 49 CFR Part 659

#### **4.3 Guidance**

- Project and Construction Management Guidelines, 2011 Update
- Handbook for Transit Safety and Security Certification; Final Report November 2002

## 5.0 PROJECT SPONSOR'S SUBMITTALS

In advance of performing the Readiness Review, the PMOC should obtain and study the following project documents. The PMOC should notify FTA of important discrepancies in the project information that would hinder the review. An example would be a mismatch between drawings and actual construction in which the drawings do not reflect field conditions.

### 5.1 Project Documents:

- **Scope / Project Definition**
  - Contract Documents (Plans and Specifications)
  - Documentation of changes to scope that have occurred since last milestone
  - Operating Plan; Operating Rules
  - Applicable Standards, Codes and Regulations
  - Project Design Criteria
  - Quality Control Procedures
- **System Integration Testing (SIT)**
  - Agency Policies related to testing, operations
  - Systems/Facilities Integration and Coordination Plan
  - SIT Plan
  - Schedule for SIT Activities
  - Test Procedures Signed Test Reports
- **Safety and Security**
  - System Safety Program Plan (SSPP)
  - System Emergency Management Plan (SEMP) if not included in SSPP
  - Security and Emergency Preparedness Plan(s) and/or System Security Plan (SPP)
  - Safety and Security Management Plan (SSMP)
  - Safety and Security Certification Plan (SSCP)
  - Safety Certifiable Items List (CIL)
  - Preliminary Hazard Analysis (PHA), including updates
  - Threat and Vulnerability Analysis (TVA), including updates
  - Operation Hazard Analysis (OHA)
  - Safety and Security related design criteria
- **Pre-Revenue Operations**
  - Rail Activation Plan (RAP)/ PRO Plan
  - Fleet Management Plan
  - Schedule for PRO Activities Training Program
  - Rule Book
  - Standard Operating Procedures (SOPs)
  - Public Awareness / Outreach Plan
  - Work-arounds
- **Management Capacity and Capability**
  - PMP and sub-plans
  - Signed Agreements with Railroads, Utilities, other Third Parties
  - Quality Assurance / Quality Control (QA/QC) Plan

## 5.2 Timing of the Process

Figure 1 presents the ideal timeline for implementing the SIT, Safety and Security, and PRO processes. Ideally, the processes are complementary with the intent of completing the work comfortably in time for revenue operations. Prior to any trains operating on the alignment for PRO, all system safety and security elements or an effective work-arounds should be in place.

Depending on the project's scope and schedule, FTA and the PMOC may consider conducting the Readiness Review as (i) a single complete review, (ii) multiple complete reviews, or (iii) multiple partial reviews, as described below:

- i. When conducting a single review that completely addresses the Readiness Review scope, FTA and the PMOC should schedule the review prior to the start of SIT, typically three (3) to six (6) months prior to the start of revenue operations.
- ii. When conducting multiple readiness reviews, with each review completely addressing the Readiness Review scope, these reviews would be conducted as the SIT and PRO phases progress, and the project documents and activities are advanced. The PMOC Readiness Review Report would be revised or updated to reflect the subsequent review findings.
- iii. When conducting multiple readiness reviews, with each review partially addressing the Readiness Review scope, the PMOC would review a limited scope of the project documents and activities. An example may include conducting the partial Readiness Review to address the SIT activities, then scheduling another review to address the PRO activities, etc. as the project schedule advances.

**Figure 1: Systems Integration and Pre-Revenue Operations Integrated Process**

Activity/ Phase	Project Development	Engineering	Start Construction	50% Construction	90% Construction		Pre-Revenue Operations	Revenue Service
Project Management Plan (PMP)								
Update PMP & Sub-plans	Develop Outline	Finalize Plans			Update			
Quality Control Procedures		Develop	Finalize		Update			
Safety & Security								
SSMP	Develop Outline	Finalize Plan			Update			
Design Criteria	Develop	Finalize						Update
Preliminary Hazard Analysis		Finalize	Update					
Threat & Vulnerability Assessment		Finalize	Update					
Safety & Security Certification Plan	Develop Outline	Finalize Plan						
Safety Certifiable Items List (SCIL)	Develop	Finalize						
Operations Hazard Analysis					Develop		Finalize	
System Safety Program Plan (49 CFR 659)		Develop					Finalize	
SCIL Documentation	Safety & Security Certification Activities and Documentation							
System Integration Test (SIT) Planning								
SIT Plan			Develop	Finalize			Update	
Schedule for SIT Activities				Develop	Finalize		Update	
Test Procedures				Develop	Finalize		Update	
Testing								
Pre-Revenue Operations (PRO) Planning								
PRO Plan & Schedule				Develop - 12-months prior to substantial completion				
Emergency Preparedness Plan				Develop				
Update Rule Book					Finalize / Update			
Standard Operating Procedures					Finalize / Update			
Training Program						Conduct Training		
Public Awareness Plan					Develop			
PRO						PRO is typically 3-4 months after substantial completion		
Final Safety & Security Certification								
Safety & Security Certification Verification Report							Finalize	
SSO approvals (as applicable)							Complete	
Revenue Service								

## 6.0 SCOPE OF WORK

The PMOC shall assess and evaluate the adequacy, soundness, and timeliness of the Project Sponsor's:

- SIT
- Project System Safety and Security Validation
- PRO Plan and Work-arounds
- Management Capacity and Capability

In addition, the PMOC will coordinate and support, as directed, the implementation of other oversight procedures, such as OP 24 "Quality Assurance / Quality Control Review" and OP 22 "Safety and Security Management Review" to adequately assess the project's readiness for operations. FTA expects that review activities will be coordinated with other ongoing reviews by the FTA Office of Safety and Oversight (TSO) or the State Safety Oversight Agency (SSOA).

The PMOC will continue to provide updates on the Project Sponsor's activities to address the Readiness Review findings and recommendations in monthly reports or as directed.

The PMOC will reference the following appendices in completing the Readiness Review:

- Appendix A: Acceptable Quality Level
- Appendix B: Sample Pre-Revenue Activity Flow Chart
- Appendix C: Sample Rail Activation Plan Table of Contents
- Appendix D: OP 54 Readiness Review Worksheet

### 6.1 System Integration Testing

SIT validates that all fixed facilities, systems, and equipment perform as intended, both individually and as an overall system when integrated. The process also confirms that all personnel have the management capacity and capability to provide safe and dependable service, and that emergency drills have been completed prior to revenue operations.

For a well-managed project, SIT is integrated into the project master schedule with time-phased activities showing the inter-dependencies between various activities and project milestones. The tests should confirm to the following sequence:

- **Design Completions.** All design affecting the respective equipment or work must have been approved prior to start of any test. Exceptions determined by design conformance reviews should be documented and mitigated as applicable.
- **Inspection.** All equipment, devices, and materials must be inspected for compliance to contractual requirements before commencement of any test. Exceptions determined by construction conformance reviews should be documented and mitigated as applicable.

- **Test Plans, Procedures and Reports.** All requirements in the contract documents regarding test plans, test procedures, and test reports must be completed prior to the commencement of the next phase of test for each respective equipment, device, subsystem, or system;
- **Design / Component Tests.** All design tests affecting the respective equipment, devices, and materials must be satisfactorily completed prior to proceeding to production tests;
- **Production / Factory Acceptance Tests (FAT).** All production tests affecting the respective equipment and devices must be satisfactorily completed prior to shipment of equipment from the factories;
- **Field Tests.** Field tests will be performed after installation of equipment, devices, and materials at the project site. All equipment will be verified that it is properly installed, connected, and in operable condition. No equipment will be energized or placed in the operating mode until approved;
- **Startup Tests.** Startup tests will be performed after satisfactory completion of all field tests to verify that all equipment, devices, and materials installed will function as an integrated system in accordance with the contractual requirements.

In its review the PMOC will complete the following subtasks:

#### **6.1.1 Systems to be tested:**

The PMOC shall assure all of the systems below (as applicable) are tested:

- Tracks
- Stations
- Yards and Shops
- Vehicles
- Traction Power System (Substations, Contact Rails and Overhead Catenary)
- Train Control System
- Signaling System
- Traffic Signaling
- Communications System
- SCADA (supervisory control and data acquisition)
- Operations Control Center
- Fare Collection System Equipment
- Grade Crossings
- Other items, as deemed necessary

The PMOC shall evaluate the Grantee's Systems/Facilities Integration and Coordination Plan. This plan must coordinate stakeholders; take into account time constraints and access for testing; and incorporate supporting information as necessary. Check for areas in which early coordination and testing may be critical to avoiding delays to the balance of the testing. As an example, railroads often require early coordination and testing, including:

- Clearance testing for shared transit/railroad track along the transit corridor;

- Pedestrian crossing warning system testing at stations;
- Grade crossing warning system control testing at intersections with both transit and railroad tracks.

### **6.1.2 Plan for Systems/Facilities Integration and Coordination for Testing**

The PMOC shall evaluate the Sponsor's Systems/Facilities Integration and Coordination Plan. This plan must coordinate stakeholders; take into account time constraints and access for testing; and incorporate supporting information as necessary. Check for areas in which early coordination and testing may be critical to avoiding delays to the balance of the testing. As an example, railroads often require early coordination and testing, including:

- Clearance testing for shared transit/railroad track along the transit corridor;
- Pedestrian crossing warning system testing at stations;
- Grade crossing warning system control testing at intersections with both transit and railroad tracks.

### **6.1.3 Systems Integration Test Plan (SITP)**

The PMOC shall evaluate the Project Sponsor's SITP as an effective work plan for - coordination of stakeholders; integration with the master schedule; procedures for public safety; protocols for document control; and other elements as necessary. The PMOC shall evaluate activities where coordination and testing may be critical to avoiding delays.

The PMOC shall evaluate the test plan, to confirm the following have been included:

- Title of each test with reference to the respective article or section number in the contract documents
- Organization performing each test
- Coordination with other stakeholders
- Test location
- Submittal date of each test procedure, test report, and certified test document;
- Schedule – Starting and completion date for each test
- Document control procedures

### **6.1.4 Schedule for Testing**

The PMOC shall evaluate the project's schedule for integrated testing.

### **6.1.5 Test Procedures**

Each test procedure shall contain detailed step-by-step procedures for performing the test and shall include the following information:

- Title of test
- Test objectives

- Test location and date of test
- Equipment and instrumentation with accuracy and calibration data
- Test criteria including test setup with circuit diagrams and test sequence
- Test criteria including data evaluation procedures
- Test data requirements including forms and format for recording data
- Primary and supporting test agency

#### **6.1.6 Test Reports**

The PMOC shall evaluate the project's test reports and ensure they include the following information:

- Title of test
- Test objectives
- Summary and conclusions
- Location and date of test
- Results including tables, curves, photographs, and any additional test data required to support the test results
- Descriptions of all failures and modifications including reasons for such failures and modifications and names of individuals approving such modifications
- Abbreviations and references
- Signatures of test witnesses

#### **6.1.7 Completion and Recording**

The PMOC shall confirm the successful completion and recording of the tests:

- Design Tests
- Production Tests
- Field Tests
- Individual Systems
- Integrated Tests – Static and Dynamic

### **6.2 Project System Safety and Security Validation**

The PMOC shall review the Project Sponsor's safety and security planning process for general conformance that the recommendations developed through the hazard management program and other planning processes have been carried through design, and implemented during construction. The PMOC will also confirm that the host communities affected by the project have been well informed on safety and security issues associated with the project. Safety and Security validation should begin prior to any train movements being allowed on the new system, and hazards that have not been fully mitigated should be reviewed and appropriate work-arounds developed. The following subtasks will be completed, as described below.



### **6.2.1 Safety and Security Organization**

As part of its review the PMOC will assess the general effectiveness of the safety and security organization within the Project Sponsor's organization at large. For example:

- Does the safety and security organization have the appropriate Management Capacity and Capability to assure a safe project and is the organization effectively configured?
- Has the safety and security organization participated in design reviews, configuration control, the change control board and/or other review capacities?
- Has the safety and security organization participated in the proceedings of the Fire/Life Safety Committee established for the new system?
- Has the safety and security organization been party to the completion of the PHA and TVA workshops and resulting mitigations?
- Has the safety and security organization participated in development of work-arounds for outstanding construction punch-list items affecting safe operation and interface with the general public prior to testing trains on the system?
- Has an OHA been prepared, or as an alternative, has the PHA been refreshed to address readiness to first test trains safely; and to safely open for revenue operations?

### **6.2.2 Review of Safety and Security Planning**

The PMOC shall review the following plans and documents to assure that safety and security concerns have been addressed prior to testing trains and all intermediate steps leading up to revenue operations:

- a. Safety and Security Program Plan
- b. Safety and Security Management Plan
- c. Preliminary Hazard Analysis
- d. Threat and Vulnerability Analysis
- e. Operation Hazard Analysis
- f. Grade Crossing Analysis / Reports
- g. Safety and Security Certification Plan
- h. Certifiable Items Lists
- i. Workarounds / Construction Punch-lists\*

\* Construction punch-lists should be reviewed to ensure all safety critical items, public warning devices, and safety-related signage are installed and tested prior to testing trains.

### **6.2.3 Review of Risks and Mitigation**

The PMOC will confirm that the findings and mitigations from the TVA and PHA are reviewed and addressed by the Project Sponsor. The PMOC will confirm that an OHA, containing, at a minimum, an assessment of the PHA and typically involving additional hazard analysis was conducted with operation and maintenance experts. The PMOC shall review the disposition of all unacceptable and undesirable risks (sometimes color coded "Red" and "Yellow" in hazard tables) and the associated mitigation measures recommended in the PHA or the OHA, as applicable. The intent is to confirm which high risks have been mitigated, whether the mitigation has been included in the completed

project or appropriate workarounds have been developed, or if the high risk has been considered acceptable and documented with the justification for this conclusion.

### **6.3 Pre-Revenue Operation**

PRO planning involves the Project Sponsor's work plan for preparing the system for revenue service. This work plan referred to as the PRO Plan/RAP, defines the staffing requirements, personnel, and the training, testing and documentation necessary to prepare the project for revenue operations.

The PMOC shall evaluate satisfactory completion of the following:

- PRO Planning
- Completed Rule Book and Standard Operating Procedures
- Operator and Maintenance Staff Training
- Emergency Preparedness
- Security System
- Public Education and Safety Awareness

### **6.3.1 Pre-Revenue Operations Planning**

The PMOC shall confirm that the Project Sponsor has prepared a PRO Plan/RAP to guide its activities. The PRO Plan/RAP is a narrative document that introduces the PRO requirements of operation and maintenance personnel prior to the opening of the project.

The following will be done before operating the new project or alignment in revenue service:

- Assurance that the system is safe for PRO including mitigating the unacceptable risk identified in the OHA or acceptable workarounds
- Rail Activation Committee or other applicable committee approvals
- Schedules for PRO and operations are completed
- Operations, maintenance, supervisor and first responder personnel training are complete
- Standard and emergency operating procedures (SOPs and EOPs) should be updated
- The operating book of rules should be updated
- Emergency drills with local emergency response agencies should be completed
- PRO activities are complete
- Assurance that all rail operations certifiable items are complete / certificate of occupancy

### **6.3.2 Completed Rule Book and Standard Operating Procedures**

The PMOC shall review and confirm that the Rule Book and the SOPs have been updated, accepted and distributed to all operations personnel prior to the start of revenue service. The Project Sponsor shall demonstrate that all Operations and Maintenance (O&M) staff has been trained in the new procedures.

### **6.3.3 Operator, Maintenance and Supervisor Staff Training**

The PMOC shall determine that the Project Sponsor has trained its staff to operate and maintain the new transit system. The PMOC should assess the training program to determine if new and updated procedures and rules are provided within the training curriculum and to confirm that all training schedules or activities address training for all necessary staff, including supervisors, as applicable. If this has been confirmed by a recent MCC study, the PMOC shall reference the findings of that evaluation.

### **6.3.4 Emergency Preparedness**

The PMOC shall review the Emergency Preparedness Plan and PRO schedule to confirm that emergency preparedness drills and familiarization training activities have been completed and coordinated with the affected community fire departments, police departments and first responding agencies, prior to revenue operations. The documentation of completeness should include a description of the drill, date, procedures, attendees and results of the drill. The proceedings should be incorporated into the Project Sponsor document control system.

### **6.3.5 Security System**

Implementation of a new transit system will often require additional security staff. The PMOC shall determine whether the Project Sponsor has increased and trained its security forces proportionate to the added system capacity. If a recent MCC study has confirmed this, the PMOC shall reference the findings of that evaluation.

### **6.3.6 Public Education and Safety Awareness**

Introduction of a new transit system into the community adds an element of risk, especially accidents related to pedestrian/transit vehicle and automobile/transit vehicle collisions. The PMOC shall document that the Project Sponsor has prepared the community for the implementation of transit, prior to train movements on the new system within a safety outreach plan and a grand opening plan. The outreach activities would typically include outreach to schools, neighborhood associations, and other well-attended community events.

### **6.3.7 Spare Parts Requirements and Inventory**

The PMOC shall review and assess the Project Sponsor's process to track and maintain spares, spare parts, spare parts inventory, warranties, and O&M manuals.

## **6.4 Evidence of Management Capacity and Capability**

As a confirmation of the readiness to enter service, the PMOC shall assess the MCC but with emphasized focus on operational capacity. This assessment will simply refresh the previous MCC evaluations if these have been completed within one calendar year. This will include a review of the following:

- a. PMP
- b. O&M Plan
- c. Rail/Bus Fleet Management Plans
- d. Safety and Security Plans, Signed Third Party Agreements with Railroads, Utilities, other Third Parties
- e. Quality Management Plan (QMP)

### **6.4.1 Project Management Plan**

The PMOC shall determine that the PMP and Sub-Plans are current and demonstrate the readiness to enter service. For example, the PMP should incorporate the updated SSMP and related plans including the RAP, SSCP, and OHA, and all should be tracked back to the findings and mitigation measures recommended in the refreshed PHA and TVA. Further, the O&M Plan, Rail Fleet Management Plan, and Bus Fleet Management Plan should demonstrate the ability to own and operate the new transit system.

### **6.4.2 Third Party Agreements**

The PMOC shall determine if the Project Sponsor has all third party agreements signed and accepted. This will most likely include all environmental agreements, agreements with railroads and other utilities, and all signed memoranda of understanding with the affected local governments.

### **6.4.3 Quality Management**

The PMOC will assess the effectiveness of the QA/QC program as described in the FTA approved QMP(s). The PMOC shall determine that the quality processes have assured that the project has been constructed as intended by the finalized plans and specifications, including documented design reviews and reconciled changes, evidence of QC, inspections and QA audits conducted during the construction phase, and that all SIT and CIL forms have been validated, signed and included within the project's secured document control system. The PMOC will also review and assess the workarounds and procedures for taking corrective actions of open quality non-conformances that can affect the operations, maintenance or safety of the project.

## **7.0 COORDINATION WITH OTHER REVIEWS**

Rail Fixed Guideway Projects not subject to regulation by the Federal Railroad Administration (FRA) shall be subject to SSOA jurisdiction as specified in the Rail Transit Agency Safety Plan. During the review, the PMOC shall consult the SSOA in its assessment of the project's safety and security management program implementation. SSOA participation in Readiness Review interviews and inspection should also be supported and encouraged.

Where the SSOA conducts a Readiness to Enter Revenue Operations review, the PMOC's review shall, to the extent possible, be coordinated with this work. Other reviews subject to PMOC coordination may include FTA's Safety and Security Readiness Reviews (SSRRs) and FRA inspections. Coordination with other reviews will reduce the amount of time required on the part of the Project Sponsor addressing auditing requirements, and through information sharing between the PMOC and SSOA, reduce redundant professional hours.

## **8.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall provide the FTA with a written report of its findings, analysis, recommendations, professional opinions, and a description of the review activities undertaken. Upon approval by the FTA, the PMOC should share the report with the Project Sponsor. In the event that differences of opinion exist between the PMOC and the Project Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile with the Project Sponsor and provide the FTA with a report addendum covering the agreed modifications.

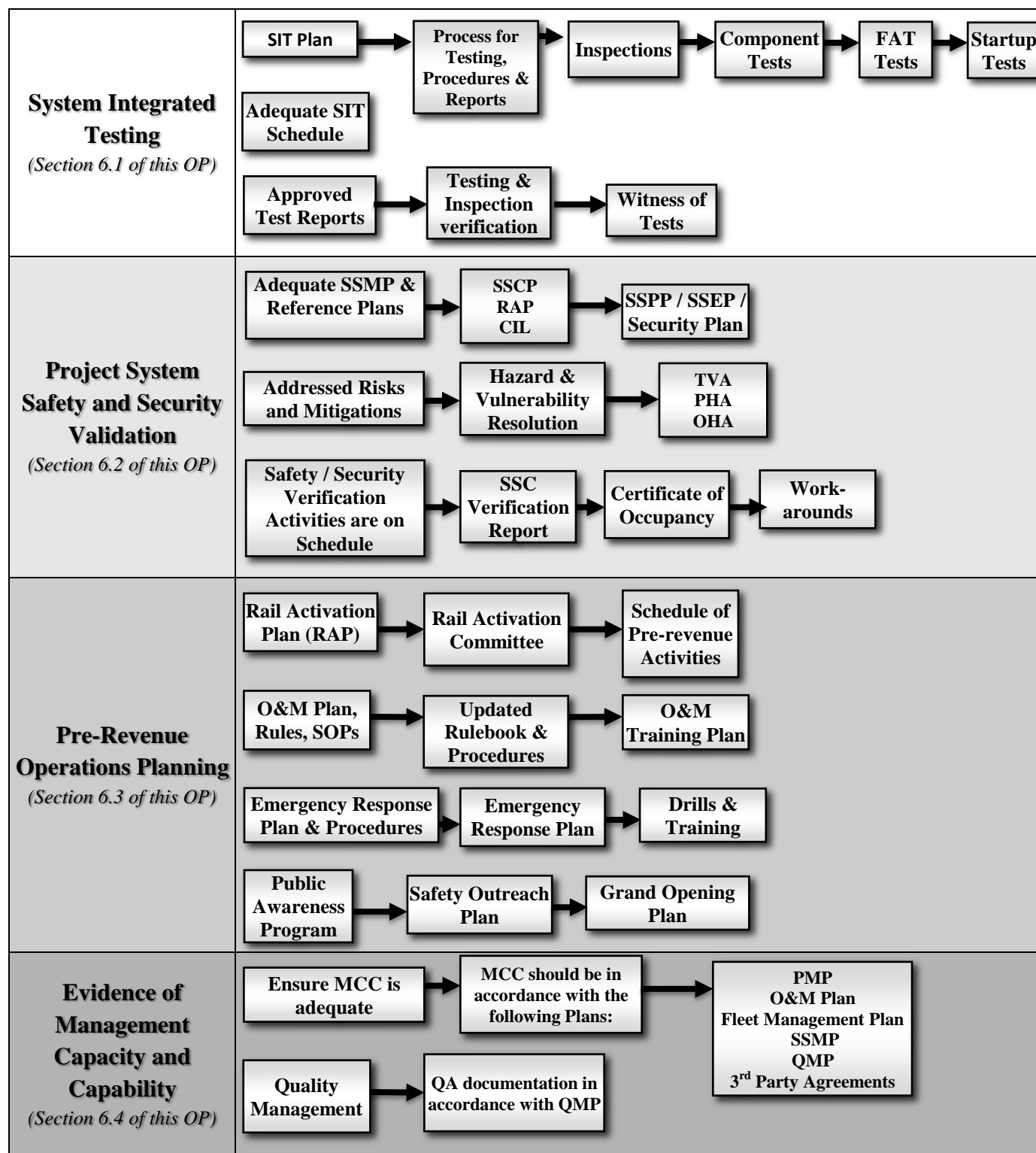
The report formatting requirements of OP 01 apply. When necessary, the PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may add other software as required but documentation and report data shall be made available to the FTA.

## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	PERFORMANCE MEASURE	ACCEPTABLE QUALITY LEVEL	MONITORING METHOD
1	The PMOC shall review and analyze Project documents, procedures and policies to validate the project's readiness to enter service.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of Project documentation that verifies contract compliance and successful testing of all Project components and systems leading to the conclusion that the Project is safe, to the extent possible in conformance to industry standards, standard of care, and conformance with contractual requirements, to the riding public and affected community, and ready for service.		<b>M1a.</b> Review of the process documentation.	<b>Q1a.</b> PMOC provides documentation of the process.	<b>MM1a.</b> Periodic review by FTA or its agent.
2	The PMOC shall, through review of Project documents and testing, form a professional opinion as to whether the Project will operate can be maintained as intended, will operate as an integrated whole and that the project is safe, to the extent possible in conformance to industry standards, standard of care, and conformance with contractual requirements, for service.	<b>R2a.</b> The PMOC shall perform a review and analysis of the Project and verify that all systems, subsystems, components, equipment and materials furnished and installed conform to the construction and fabrication contract requirements, and that all risks identified in the PHA, TVA and/or OHA have been mitigated to the extent possible in the current design, or that an acceptable work-around has been implemented prior to public use of the system.		<b>M2a.</b> PMOC's review and opinion as to whether the conformance to contract and safety requirements demonstrates sound management and engineering practices and professional experience.	<b>Q2a.</b> Professional opinion as to the conformance of the Project to contract and safety requirements.	<b>MM2a.</b> Periodic review by FTA or its agent.
3	The PMOC shall provide FTA with a written report of its findings, analysis, recommendations and professional opinions.	<b>R3.</b> The PMOC shall present its findings, analysis, recommendations and professional opinions to the FTA and, when so directed, seek to reconcile its findings with the Project Sponsor to the extent possible. A supplemental report shall be filed describing the results of reconciliation attempts.		<b>M3.</b> Review of the PMOC's presentation of findings, analysis, recommendations and professional opinions by the FTA.	<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled to the extent possible.	<b>MM3.</b> Periodic review by the FTA or its agent.

**APPENDIX B**  
**Sample Activity Flow Chart**



**Sample Rail Activation Plan (RAP)  
Table of Contents**

1. Introduction
2. Project Background
  - a. Project Description
  - b. Rail Activation Schedule
3. Rail Activation Committee
  - a. Rail Activation Committee Participants and Org Chart
  - b. Coordination with Safety Certification Committee
  - c. Coordination with Operations Safety Review Committee
  - d. Coordination with Operations Change Control Committee
4. Project Resources
  - a. Staffing / Budget
    - i. Skills Matrix
  - b. Hiring Schedule
    - i. Job Descriptions
5. System Testing and Acceptance
  - a. Applicable SIT Plan Activities
  - b. Roles and Responsibilities
  - c. Start-up Tests
6. Rulebook, SOPS and Manuals
  - a. Process for updating Rulebook
  - b. Process for issuing SOPs and Bulletins
  - c. Schedule of Rule revisions
7. Training
  - a. Vendor supplied training manuals
  - b. Operations Training
  - c. Maintenance Training
  - d. Rail Control Center Training
  - e. Supervisor Training
  - f. Schedule of Training Activities
8. Safety and Security
  - a. Safety and Security Certification / CIL
  - b. Safety and Security Verification Report (SSCVR)
    - i. State approval of SSCVR
  - c. Workarounds
  - d. Quality Management
    - i. Review of non-conformances
    - ii. Assure that CIL forms are validated, signed and tracked in document control system
  - e. Inspections and audits
  - f. Review and Update of SSPP and Security Plan
  - g. Documentation



## **APPENDIX C**

### **Sample Rail Activation Plan Table of Contents**

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- 9. Emergency Preparedness
  - a. NFPA 130 activities
  - b. Familiarization Training and Schedule
  - c. Table top and full-scale emergency drills
    - i. Drill Scenario, Location, Participating Agencies and Schedule
    - ii. After Action Reports and Tracking Corrective Actions
- 10. External Coordination
  - a. Permits
  - b. Coordination with Federal, State and Local Agencies
- 11. Rail Operations
  - a. Simulated Rail Service
  - b. Startup Procedures
  - c. Operating Procedures / Schedules
  - d. Emergency Operations Procedures (single tracking, bus bridge, etc.)
- 12. Appendices
  - a. Acronyms
  - b. Certifiable Items List

**APPENDIX D**  
**Pre-revenue Assessment Worksheet**

OP 54 Readiness Review Worksheet							
Date of Review:	Project Name:		<b>Readiness Review Rating Legend</b> <ul style="list-style-type: none"> <li>1= Poor, Action Required</li> <li>2= Adequate, Comments Provided</li> <li>3= Acceptable, No Comments</li> <li>N/A = Not Applicable or Not Reviewed</li> </ul>				
Reference OP 54 Section	Checklist Item	Document Reference	Evaluation				Comments
			1	2	3	N/A	
<b>6.1</b>	<b>System Integration Testing</b>	-	-	-	-	-	-
6.1.1	Systems to be tested						
6.1.2	Plan for Systems/Facilities Integration and Coordination for Testing						
6.1.3	Systems Integration Test Plan (SITP)						
6.1.4	Schedule for Testing						
6.1.5	Test Procedures						
6.1.6	Test Reports						
6.1.7	Completion and Recording						
<b>6.2</b>	<b>Project System Safety and Security Validation</b>	-	-	-	-	-	-
6.2.1	Safety and Security Organization						
6.2.2	Review of Safety and Security Planning						
6.2.2a	System Safety Program Plan						
6.2.2b	Safety and Security Management Plan						
6.2.2c	Preliminary Hazard Analysis						
6.2.2d	Threat and Vulnerability Analysis						
6.2.2e	Operation Hazard Analysis						
6.2.2f	Grade Crossing Analysis / Report						
6.2.2g	Safety and Security						

**APPENDIX D**  
**Pre-revenue Assessment Worksheet**

OP 54 Readiness Review Worksheet							
Date of Review:	Project Name:		Evaluation				Readiness Review Rating Legend
							1 = Poor, Action Required
Reference OP 54 Section	Checklist Item	Document Reference	1	2	3	N/A	Comments
	Certification Plan						
6.2.2h	Certifiable Items Lists						
6.2.2i	Construction Punch-lists						
6.2.3	Review of Risks and Mitigation						
<b>6.3</b>	<b>Pre-Revenue Operation</b>	-	-	-	-	-	-
6.3.1	Pre-Revenue Operation Planning						
6.3.2	Completed Rule Book and Standard Operating Procedures						
6.3.3	Operator and Maintenance Staff Training						
6.3.4	Emergency Preparedness						
6.3.5	Security System						
6.3.6	Public Education and Safety Awareness						
6.3.7	Spare Parts Requirements and Inventory						
<b>6.4</b>	<b>Management Capacity and Capability</b>						
6.4a	Project Management Plan						
6.4b	O&M Plan						
6.4c	Rail/Bus Fleet Management Plans						
6.4d	Safety and Security Plans, Signed Third Party Agreements with Railroads, Utilities, other Third Parties						
6.4e	Quality Management Plan						

**APPENDIX D**  
**Pre-revenue Assessment Worksheet**

OP 54 Readiness Review Worksheet							
Date of Review:	Project Name:		Evaluation				<u>Readiness Review Rating Legend</u> <ul style="list-style-type: none"> <li>• 1= Poor, Action Required</li> <li>• 2= Adequate, Comments Provided</li> <li>• 3= Acceptable, No Comments</li> <li>• N/A = Not Applicable or Not Reviewed</li> </ul>
Reference OP 54 Section	Checklist Item	Document Reference					1
	(QMP)						
6.4.1	Project Management Plan						
6.4.2	Third Party Agreements						
6.4.3	Quality Management						
<b>7.0</b>	<b>Coordination with other reviews</b>						
7.0a	Interviews with SSOA or FRA (if applicable)						
7.0b	Review of external agency readiness reports (if applicable)						
7.0c	Review of OP 22 or OP 24 reports (if applicable)						
Appendix C	Rail Activation Plan						



## **Oversight Procedure 56 - Letter of No Prejudice Review**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure is to describe the review, analysis and recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) regarding the advancement of project activities that are not otherwise subject to automatic pre-award authority prior to execution of a Full Funding Grant Agreement (FFGA) or Small Start Grant Agreement (SSGA).

### **2.0 BACKGROUND**

Letter of No Prejudice (LONP) or Early Systems Work Agreement (ESWA) may be issued following the completion of all required reviews under the National Environmental Policy Act of 1969 (NEPA). It is frequently in the best interests of projects to advance certain activities prior to the full execution of the FFGA or SSGA. Advancing activities that are on the project schedule critical path and that may require an extended period of time to complete may lead to significant cost savings and may reduce the potential for schedule delays later in the project.

The LONP permits a Project Sponsor to incur costs on a project using non-federal resources with the understanding that the costs incurred after the LONP may be reimbursable as eligible expenses or may be eligible for credit toward local matching share if the project is approved for federal funding at a later date.

Unlike an LONP, an ESWA obligates an amount of available budget authority specified in law. An ESWA covers a period of time the FTA considers appropriate; the period may extend beyond the period of current authorization. If a Project Sponsor does not carry out the project for reasons within its control, the Project Sponsor must repay all government payments made under the ESWA plus reasonable interest and penalty charges the FTA establishes in the agreement.

FTA Policy and Procedures for FY 2013 Grants, 77 Federal Register 200 (October 16, 2012), Section V (B), pages 63701-63703 describes the requirements that Project Sponsors seeking an LONP from FTA must meet.

In addition, FTA Policy and Procedures for FY 2013 Grants specifies that a written request accompanied by sufficient information and justification be delivered to the appropriate FTA regional office. FTA Policy and Procedures for FY 2011 Grants lists the following information to be included with the request:

- Description of the activities to be covered by the LONP or ESWA.

- Justification for advancing the identified activities. The justification should include an accurate assessment of the consequences to the project scope, schedule, and budget should the LONP not be approved.
- Allocated level of risk and contingency for the activity requested.
- Status of procurement progress, including, if appropriate, submittal of bids for the activities covered by the LONP or ESWA.
- Strength of the capital and operating financial plan for the New or Small Starts project and the future transit system.
- Adequacy of the Project Management Plan.
- Resolution of any readiness issues that would affect the project, such as land acquisition and technical capacity to carry out the project.

Review of the Project Sponsor's compliance with these requirements and readiness to advance the proposed activities is part of FTA's due diligence review prior to issuing a LONP or ESWA. These reviews protect FTA's interests by providing a final check that required activities have been completed and required project resources are available. The LONP review for all projects is an update of any prior readiness reviews and risk assessments that ensures proposed spending before grant agreement is a prudent and cost-effective investment of local funds and future federal funds. An ESWA review is more rigorous and is similar to what is required in advance of an FFGA.

### **3.0 OBJECTIVES**

The objective of the review of readiness for an LONP is to verify that the project will maintain its eligibility for the reimbursement of incurred costs. This reimbursement may be with federal funds or crediting of expended funds toward the required local match. The objective of the review of readiness for an ESWA is to verify that the project sponsor is advancing the project in accordance with all approved project management plans and other applicable requirements and that the project is likely to complete the requirements necessary for an FFGA. The review is intended to confirm that:

- All required conditions for issuance of the LONP or ESWA have been completed and the associated documents are complete, accurate and meet all federal requirements;
- The project definition is sufficiently advanced to support proceeding with the proposed activities with minimal risk that changes to either the early work or the remaining construction will be necessary;
- Advancing the proposed activities is justified in terms of controlling project costs, maintaining the project schedule and/or reducing the potential for schedule delays; and/or mitigating potential project risks; and
- The Project Sponsor has sufficient project management capacity and capability to effectively carry out the proposed activities while completing the other work needed to prepare the project for execution of the FFGA.
- The Project Sponsor has identified adequate financial resources to fund the requested activities prior to issuance of an FFGA or SSGA.

### **4.0 REFERENCES**

The following are the principal, but by no means the only, references to federal statutes, legislation, Executive Orders, regulation and guidance with which the PMOC should review and be familiar with

in order to develop a solid understanding of the requirements related to the Project Sponsor's project work being reviewed under this OP:

#### **4.1 Statutes and Legislation**

- Intermodal Surface Transportation Efficiency Act of 1991, Pub. L. No. 102-240, 105 Stat. 1914, Dec. 18, 1991 (codified as amended by Pub. L. 103-272, 108 Stat. 745, July 5, 1994, in scattered sections of 49 and 23 United States Code).
- Transportation Equity Act for the 21st Century (TEA-21), Pub. L. No. 105-178, June 9, 1998, as amended by the TEA-21 Restoration Act, Pub.L. No. 105-206, June 22, 1998.
- The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Pub. L. 109-59.
- Moving Ahead for Progress in the 21st Century Act (MAP-21), Pub. L. 112-141, effective October 1, 2012.
- National Environmental Policy Act of 1969, as amended, 42 U.S.C. §§ 4321 et seq.
- Section 106 of the National Historic Preservation Act, 16 U.S.C. § 470f.
- Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, 42 U.S.C. §§ 4601 et seq.
- Federal highway and surface transportation laws, Title 23, United States Code.
- FTA enabling statutes, 49 U.S.C. Chapter VI

#### **4.2 Regulations**

- Project Management Oversight, 49 C.F.R. Part 633
- Major Capital Investment Projects, 49 C.F.R. Part 611
- Joint FTA/FHWA regulations, Metropolitan Planning, 23 C.F.R. Part 450
- Joint FTA/FHWA regulations, Environmental Impact and Related Procedures, 23 C.F.R. Part 771
- EPA regulations, "Determining Conformity of federal Actions to State or Federal Implementation Plans," 40 C.F.R. Part 93.
- U.S. DOT regulation, Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs, 49 C.F.R. Part 24
- FTA regulations, "Pre-Award and Post-Delivery Audits of Rolling Stock Purchases," 49 C.F.R. Part 663; and FTA Disposition of Inquiries, "Pre-Award and Post-Delivery Audits of Rolling Stock Questions and Answers," 57 Fed. Reg. 10834 (1992).
- Buy America Requirements, 49 C.F.R. Part 661
- "FTA Policy and Procedures for FY 2011 Grants," 76 Federal Register 26, Part IV, page 6970, (February 8, 2011)
- "FTA Policy and Procedures for FY 2013 Grants," 77 Federal Register 200, Section V (B), pages 63701-63703 (October 16, 2012).

#### **4.3 FTA Circulars**

- FTA Circular 9300.1A Capital Program, Grant Application Instructions, November 1, 2008.
- C4220.1F, Third Party Contracting Requirements
- C5010.1C, Grant Management Guidelines, November 1, 2008
- FTA Master Agreement
- C5800.1, Safety and Security Management Plan, August 1, 2007

- FTA Circular 5200.1, "Full Funding Grant Agreements Guidance," December 5, 2002.

#### **4.4 Guidance**

- Guidance for Transit Financial Plans, June 2000
- Quality Assurance and Quality Control Guidelines
- Project and Construction Management Guidelines,
- Value Engineering Process Overview, January 1998
- New Starts Letter of No Prejudice Checklist (latest version). Note: Pre-MAP-21 version (2008) attached as Appendix B

### **5.0 PROJECT SPONSOR SUBMITTALS**

In advance of performing the review, the PMOC should study the project documents listed below. Electronic files should be obtained in native format to allow the PMOC to confirm the accuracy and consistency of calculations. The PMOC should notify FTA of important discrepancies in the project information that would hinder the review. An example would be a mismatch between drawings and cost estimate in which the drawings are current and the cost estimate is not.

- Scope / Project Definition
  - Final environmental documents and NEPA determination (CE, FONSI or ROD)
  - Basis of Design Report, Design Criteria Reports
  - Latest versions of Project Design Drawings, Design Criteria, Standards and Specifications
  - Master Permitting Plan and Schedule
  - Geotechnical Baseline Report
  - Passenger level boarding design documents
  - Transit capacity and operating plan
- Project Management Plan and sub-plans completed including but not limited to:
  - Project Management Capacity and Capability Plan including Project Staffing Plans (focused on staffing for the proposed activities to be advanced)
  - Real Estate Acquisition and Management Plan (RAMP) if real estate will be acquired
  - Rail and/or Bus Fleet Management Plan (RFMP, BFMP) if rolling stock will be acquired
  - List of inter-governmental and third-party agreements accompanied by signed agreements with jurisdictions, railroads, utilities, other third parties for the work to be advanced or performed
  - Risk Assessment, Risk and Contingency Management Plan, current Risk Register
  - Project Delivery Plan, Contract Packaging Plan, Procurement Policies and Procedures
  - Quality Management Plan
- Schedule
  - Schedule Basis and Assumptions or Basis of Schedule Report
  - Cost and resource loaded project schedule in original and SCC format; schedule narrative describing critical path and near-critical activities, expected durations, and logic
- Cost
  - Capital Cost Basis and Assumptions or Basis of Cost Report



- Latest version of the capital cost estimate in original and SCC format, including all cost categories

The PMOC should also obtain and review the results of the most recent oversight reviews conducted prior to the project's advancement to the current phase of project development, including:

- Project Management Plan Review (OP 20)
- Project Sponsor Project Management Capacity and Capability Review (OP 21)
- Real Estate Acquisition and Management Plan Review (OP 23)
- Project Scope Review (OP 32C)
- Project Delivery Method Review (OP 32D)
- Capital Cost Review (OP 33)
- Project Schedule Review (OP 34)
- Risk and Contingency Management Review (OP 40)
- Readiness Reviews (OP 50 – 54)
- Small Starts Readiness Review (OP 60, if applicable)
- Copies of Monthly Oversight Reports (OP 25)

## **6.0 SCOPE OF WORK**

The scope of this procedure is to confirm that the project definition and all of the documentation and analysis required to advance the project is developed to assure that the proposed activities can be cost-effectively advanced prior to the execution of an FFGA or SSGA with minimal risk. In addition, the review should confirm whether the Project Sponsor has the project management capacity and capability to effectively manage the proposed activities while continuing to advance the remainder of the project in preparation for the FFGA or SSGA. The review should focus on those components of the project that the Project Sponsor seeks to advance.

The usefulness of the review is based on the perception and judgment of the reviewers. Ideally, they should be senior technical managers qualified to actually perform the work being reviewed. Because transit projects are complex and interdisciplinary in nature, the reviewers should have a broad range of knowledge, experience and capabilities. Right-of-way documentation should be reviewed by professionals with right-of-way experience, utility plans and agreements should be reviewed by professionals with experience in utility engineering and coordination, early construction of structures or other specific elements should be reviewed by individuals with experience in those disciplines, and vehicle documentation should be reviewed by individuals with vehicle design and procurement experience. This review is divided into three areas described in tables below. Review items may be modified to accommodate the particular circumstances associated with a project and the activities that the Project Sponsor seeks to advance.

- 1) Confirmation of the justification for advancing the proposed activities and the Project Sponsor's readiness for early Engineering work or bidding/procurement of the design activities or contract packages for the components of the project to be advanced, including plans, specifications, and contract provisions;
- 2) Confirmation that the proposed activities are consistent with the Project Management Plan and relevant sub-plans and NEPA requirements with respect to scope, schedule, and budget;

3) Confirmation of the readiness of the Project Sponsor's organization with respect to having in place the necessary qualified project staff; consistent project management plans, procurement and construction management procedures; needed interagency, third party, and real estate agreements; and required financial resources to undertake the proposed activities.

The following specific reviews are designed to confirm the readiness for advancement of early engineering activities for the bidding/procurement of the proposed activities or contract packages:

<b>Review Item</b>	<b>Review Objective</b>	<b>Review Method</b>
Justification for advancement of the proposed activities prior to FTA's approval to enter the next phase or award of a Grant Agreement	Confirm that advancing the proposed elements of the project are justified by the potential time and cost savings.	Review by qualified professionals of the proposed activities and the Project Sponsor's justification for advancing the activities.
Construction Plans and Specifications (Utility Plans and Specifications)	Confirm that the Plans and Specifications completely and clearly define the required work.	Review by qualified engineer(s) with expertise in the area(s) of design.
Design, Construction or Procurement Contracts	Confirm that the Contract(s) completely and clearly defines the terms and conditions under which the Work will be performed and that all permits, real estate and other requirements will be in-place to void future claims.	Review by a person or contract administrator with experience in managing construction or procurement contracts of similar scope and complexity.
Quality assurance records and Quality Management Plans	Confirm that quality assurance checks and reviews of the design have been performed in accordance with the approved Quality Assurance Plan and that sufficient Quality Management Procedures are established for the proposed activities to be advanced.	Review by a person with experience in performing quality assurance reviews or audits.
Cost Estimate	Confirm that the estimate for the proposed activities is consistent with (1) the overall project cost estimate, and (2) the Plans, Specifications, and Contract General and Special Conditions, and that it is based upon contemporary cost information.	Review by a cost estimator with experience in estimating work of the proposed type, including the estimation of the construction cost impacts of contract special provisions related to risk transfer and construction limitations.

The following reviews and comparisons provide confirmation that the project and proposed activities to be advanced are consistent with the Environmental Documents and previously accepted project management plans:

<b>Review Item</b>	<b>Review Objective</b>	<b>Review Method</b>
Contract Plans and Specifications; Utility Plans and Specifications; special contract conditions; and Right-of-Way	Confirm that the work to be performed or constructed and the right-of-way to be acquired comply with the Environmental	Comparison, using qualified personnel, of the permitting, design and construction and right-of-way requirements of the

Plans in comparison to Environmental Documents	Documents.	Environmental Document with the designs and requirements of the proposed contracts.
Plans, specifications, and special contract conditions in comparison to Contract Packaging Plan	Verify consistency between the proposed activities and the adopted Contract Packaging Plan.	Compare scope of the proposed activities with contracting plan using qualified personnel. Particular attention should be paid to risk allocation / transfers and interfaces between contacts.
Plans, specifications, and special contract conditions with respect to Project Master Schedule	Verify consistency between the proposed activities and the Project Master Schedule.	Compare schedule information for the proposed activities, including availability of right-of-way and any owner furnished equipment or permits, with the Project Master Schedule using qualified personnel. Particular attention should be paid to schedule contingency for delays and the potential impacts to follow-on activities.
Capital Cost Estimate in comparison to Project Budget	Confirm that the estimated costs of the proposed activities, including appropriate contingencies, is affordable within the overall Project Budget.	Compare Capital Cost Estimate for the proposed activities with Project Budget using qualified personnel. Determine if any risks associated with advancing the proposed activities is appropriately accounted for by contingencies and risk mitigation measures.

The final set of reviews provides confirmation that the Project Sponsor has completed all the necessary prerequisites to advancing the proposed activities, and is capable and ready to manage the project and the proposed activities effectively.

<b>Review Item</b>	<b>Review Objective</b>	<b>Review Method</b>
Third Party Agreements and related contractual obligations	Confirm that necessary inter-governmental, interagency, utility and other third party agreements are in place to support the proposed activities.	Review third party agreements in the overall context of the project with qualified personnel. Particular attention should be provided to design standards; inclusion of betterments; and timing of reviews, permits, land transfers, and funds transfers. Review of contract documents by qualified personnel to identify any agreement

		related Owner obligations.
Real Estate Acquisition and Management Plan and related contractual obligations	Confirm that the RAMP is complete and that the Project Sponsor has the capacity and capability to carry out the real estate program in conformance with the Uniform Act and that required real estate will be available as required to avoid contract claims.	Review of the Real Estate Acquisition and Management Plan (RAMP) by qualified personnel to ensure that the Project Sponsor can effectively implement the real estate program. Review of contract documents by qualified personnel to identify any real estate related Owner obligations.
Procurement Policies and Procedures	Confirm that the Project sponsor has the technical capacity and capability as well as the Procurement Policies and Procedures in place to execute the proposed activities in compliance with federal policies, ensure a fair bidding environment, and are able to efficiently resolve issues and disputes that may arise.	Review by qualified personnel of Project Sponsor's Procurement organization and Procurement Policies and Procedures (including procedures related to advertisement, bidding, award, protests, disputes, changes, payment, etc.) for the planned activities.
Project Staffing Plan	Confirm that the Project Sponsor has adequately implemented a project staffing plan that ensures the necessary qualified staff will be available to manage and support the activities that are proposed to be advanced while managing the project and completing the required activities to support execution of the Grant Agreement.	Review by qualified personnel of Project Sponsor's plans for hiring or transferring staff or consultants to support the project. If transfers of existing staff are planned, investigate who will replace transferred staff. If hiring of new staff is planned, review reasonableness of the hiring schedule relative to salary schedule and availability of staff locally.
Financing Plan	Verify that money will be available to pay the costs associated with the proposed activities in addition to on-going project activities.	Review the availability of funds in the context of all project requirements to confirm that adequate funds will be available on the schedule proposed by the Project Sponsor. Confirm the current validity of any underlying assumptions associated with the Financing Plan, e.g., that borrowing will occur at a given time.

## 7.0 REPORT, PRESENTATION, RECONCILIATION

The PMOC's report shall integrate the findings and recommendations of the reviews above. The report should follow the outline below.

### 1.0 EXECUTIVE SUMMARY

#### 1.1 Introduction

1.2 Summary of Findings

1.3 Conclusion/Recommendations

## 2.0 BACKGROUND

2.1 Project Description

2.2 Contract Description Specific to LONP or ESWA Request

2.3 Description of LONP or ESWA Activities

2.4 Methodology

2.5 Documents Reviewed

## 3.0 REVIEW, ANALYSIS AND ASSESSMENT

3.1 LONP or ESWA Justification

3.2 Consistency with Environmental Documents

3.3 Project Management Capacity and Capability

3.4 Schedule

3.5 Cost

3.6 Third Party Agreements

3.7 Real Estate Acquisition and Relocation Activities

## 4.0 CONCLUSION/RECOMMENDATIONS

The summary of findings should detail in three pages or less the following information:

- a) Justification for advancing the proposed project activities in terms of schedule, cost and risk;
- b) Project Sponsor's readiness to advance the proposed activities;
- c) Consistency of the proposed activities with the Environmental Compliance documents for the project;
- d) Completeness, accuracy and consistency of the required documentation supplied by the Project Sponsor;
- e) Professional opinion regarding the reliability of the scope, schedule and cost for the proposed activities and the ability of the project sponsor to manage the activities; and
- f) Recommendation (if PMOC considers a recommendation appropriate) of the project to FTA for approval of the LONP or ESWA based on the findings of the assessment.

After FTA approval, the PMOC should share the report with the Project Sponsor. In the event that differences of opinion exist between the PMOC and the Project Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile its findings with the Project Sponsor and provide FTA with a report addendum covering the agreed modifications by the Project Sponsor and PMOC.

The report formatting requirements of OP 01 apply. When necessary, PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may use other software as required but documentation and report data shall be made available to FTA.

**APPENDIX A**  
**Acceptable Quality Level**

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	<b>DESIRED OUTCOME</b>	<b>PERFORMANCE REQUIREMENT</b>	<b>CHECK LIST</b>	<b>PERFORMANCE MEASURE</b>	<b>ACCEPTABLE QUALITY LEVEL</b>	<b>MONITORING METHOD</b>
<b>1</b>	The PMOC shall review and analyze project documents to determine the readiness of the Project Sponsor to advance project activities under an LONP or ESWA granted by FTA.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of the required Project documents to determine Project Sponsor's justification for and readiness to advance the proposed project activities.		<b>M1a.</b> Review of the process documentation.	<b>Q1a.</b> PMOC provides documentation of the process.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process and project management judgment to review and analyze Project documents to determine the readiness of Project Sponsor to advance the proposed project elements and the justification for advancing the proposed elements in terms of cost, schedule and risk.		<b>M1b.</b> Documented review and analysis of Project documents to determine the readiness of Project Sponsor for LONP or ESWA.	<b>Q1b.</b> Review must be made and the PMOC provides internal verification that the process as documented has been followed.	<b>MM1b.</b> Periodic review by FTA or its agent and the PMOC's internal verification.

2	<p>The PMOC shall form a professional opinion of the Project Sponsor's readiness to advance the proposed activities following completion of all NEPA reviews and prior to completion of the approved phase or execution of an FFGA or SSGA.</p>	<p><b>R2a.</b> The PMOC shall perform a review and analysis of the Project Sponsor's submitted plans and other documents to assure that all required analysis and documentation has been properly prepared and implemented to the extent necessary to reach readiness for advancing the project under an LONP or ESWA.</p>		<p><b>M2a.</b> PMOC's review and opinion as to the preparation and implementation of required analysis and documentation for LONP or ESWA using sound management and engineering practices and professional experience.</p>	<p><b>Q2a.</b> Professional opinion of the preparation and implementation of required analysis and documentation submitted by Project Sponsor for LONP or ESWA.</p>	<p><b>MM2a.</b> Periodic review by FTA or its agent.</p>
		<p><b>R2b.</b> The PMOC shall, after review and analysis of the Project Sponsor's submitted Plans and other documentation and the proposed LONP or ESWA determine whether all technical aspects of the documentation supporting the LONP or ESWA are complete and accurate and that there is consistency between the Project documentation and the proposed LONP or ESWA</p>		<p><b>M2b.</b> PMOC's review and opinion as to accuracy, completeness and consistency between documentation and proposed LONP or ESWA demonstrates sound management and engineering practices and professional experience.</p>	<p><b>Q2b.</b> Professional opinion of the accuracy, completeness and consistency between documentation and proposed LONP or ESWA.</p>	<p><b>MM2b.</b> Periodic review by FTA or its agent.</p>

3	The PMOC shall provide FTA with a written report of its findings, analysis, recommendations and professional opinions.	<b>R3.</b> The PMOC shall present its findings, analysis, recommendations and professional opinions to FTA in a written report.		<b>M3.</b> Review of the PMOC's presentation of findings, analysis, recommendations and professional opinions by the FTA.	<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with the Project Sponsor to the extent possible.	<b>MM3.</b> Periodic review by FTA or its agent.
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## APPENDIX B

### New Starts Letter of No Prejudice Checklist (2008 Version Pre-MAP-21)

NEW STARTS PROJECT PLANNING AND DEVELOPMENT  
CHECKLIST OF PROJECT SPONSOR SUBMITTALS TO FTA FOR A LETTER OF NO PREJUDICE (LONP) REQUEST AND  
SPECIAL CATEGORIES OF PRE-AWARD AUTHORITY THAT REQUIRE FTA SUBMITTALS

<i>PRODUCTS</i>	<i>FTA CONCURRENCE DATE</i>	<i>REFERENCE (Regulations, Guidance and Other Resources)</i>
<b><i>REQUIREMENTS FOR ALL LONPs</i></b>	-	
<p>Written request accompanied by sufficient information and justification to the appropriate FTA regional office, including the following information:</p> <ul style="list-style-type: none"> <li>• Description of the activities to be covered by the LONP</li> <li>• Justification for advancing the identified activities, including an accurate assessment of the consequences to the project scope, schedule, and budget should the LONP not be approved</li> <li>• Information that indicates that the project will maintain its ability to receive a rating of “medium,” or better and that its cost effectiveness rating will be “medium,” or better, unless such project has been specifically exempt from such a requirement</li> <li>• Allocated level of risk and contingency for the activity requested</li> <li>• Status of procurement progress, including, if appropriate, submittal of bids for the activities covered by the LONP</li> <li>• Adequacy of the Project Management Plan</li> <li>• Resolution of any readiness issues that would affect the project, such as land acquisition and technical capacity to carry out the project</li> <li>• Brief summary of project characteristics and project map</li> </ul>		<ul style="list-style-type: none"> <li>• <a href="#">FTA Fiscal Year 2008 Apportionments and Allocations and Program Information; Notice (Section V.B.)</a></li> </ul>
Final NEPA Documentation (i.e., Categorical Exclusion, Finding of no Significant Impact, or Record of Decision) including description of required environmental permits and New Starts Rating Information in ROD if the New Starts Rating is less than “medium”		<ul style="list-style-type: none"> <li>• <a href="#">23 CFR 771</a></li> <li>• <a href="#">49 CFR 622</a></li> <li>• <a href="#">2006 Guidance on New Starts Policies and Procedures - May 16, 2006 (Section 1) - Reference for New Starts Rating Information in ROD</a></li> </ul>
TIP Programming of PE, Final Design and Construction (Programming of PE is not necessary if project is already in final design)		<ul style="list-style-type: none"> <li>• <a href="#">Capital Program Circular 9300.1A</a></li> <li>• <a href="#">Transportation Planning Final Rule</a></li> </ul>

<b>REQUIREMENTS FOR SPECIAL CATEGORIES OF PRE-AWARD AUTHORITY THAT DO NOT REQUIRE LONPs, BUT REQUIRE FTA WRITTEN APPROVAL</b>	-	
<b>Demolition of Buildings after Final NEPA Documentation, but before Final Design Approval</b>	-	<ul style="list-style-type: none"> <li>• <a href="#">FTA Fiscal Year 2008 Apportionments and Allocations and Program Information; Notice (Section V.B.)</a></li> </ul>
Written request to the appropriate FTA regional office, including information to demonstrate that the building poses a potential fire-safety hazard or other hazard to the community in which it is located		
Real Estate Acquisition Management Plan (RAMP)		<ul style="list-style-type: none"> <li>• <a href="#">49 CFR 24</a></li> <li>• <a href="#">Uniform Act</a></li> <li>• <a href="#">Real Estate Page of FTA Website</a> and <a href="#">FTA Real Estate Course</a></li> </ul>
<b>Rolling Stock Acquired for a Future Extension of a Grantee's Fixed Guideway System</b>	-	
Written request to the appropriate FTA regional office, including information to demonstrate that the rolling stock is being purchased for use on the New Starts project extension.		<ul style="list-style-type: none"> <li>• <a href="#">49 U.S.C. § 5309(h)(6)</a></li> </ul>
Rail Fleet Management Plan (RFMP) and/or Bus Fleet Management Plan (BFMP), as applicable		<ul style="list-style-type: none"> <li>• <a href="#">Grant Management Circular 5010.1C (Chapter 1)</a></li> <li>• <a href="#">FFGA Guidance 5200.1A (Chapter 2)</a></li> </ul>



## **Oversight Procedure 62 – Asset Management System Review**

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### **1.0 PURPOSE**

The purpose of this Oversight Procedure (OP) is to describe the review analyses, recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from Project Management Oversight Contractor (PMOC) to help ensure successful implementation of asset management projects.

### **2.0 BACKGROUND**

The Federal Transit Administration (FTA) is one of eleven agencies in the Department of Transportation and has the primary responsibility of carrying out the federal mandate of promoting and improving the nation's public transportation system. As part of its role, FTA provides over \$10 billion annually in financial assistance to transit agencies and the states for building and maintaining the public transportation system. There is, however, a growing concern that a significant proportion of the nation's public transportation assets are in need of capital reinvestment due to inadequate financial resources. A June 2010 study by the FTA shows that there is almost \$80 billion in State of Good Repair (SGR) backlog for the transit industry. FTA has therefore set as one of its major priorities, the State of Good Repair initiative with the primary objective of working with and assisting transit agencies to improve the condition of their assets.

The improvement of the state of asset management in public transportation is one of the major focus areas in FTA's SGR initiative. As a result, the FTA has provided grants to transit agencies to improve their asset management practices so as to enhance the efficient allocation and utilization of resources.

### **3.0 OBJECTIVES**

The objective is to conduct a number of reviews, as required, to help ensure that asset management projects are being successfully delivered within scope, schedule and budget. More specifically, the reviews should verify the following:

- The adequacy of the project sponsor's staffing plan to successfully carry out the project;
- Project progress vis-à-vis the elements of the project scope
- Project implementation schedule vis-à-vis actual progress
- Project budget vis-à-vis actual expenditures
- Any risks of not achieving the scope within budget and schedule
- FTA's investment is being utilized as intended and there is no evidence of waste, fraud, and abuse.

Any areas of concern by the PMOC should be brought to FTA's attention for immediate resolution.

## **4.0 REFERENCES**

The following are the principal, but by no means the only, references to Federal legislation, regulation and guidance with which the PMOC should review and develop a solid understanding as related to the Sponsor's project work being reviewed under this OP:

### **4.1 Regulations**

- Project Management Oversight, 49 C.F.R. Part 633

### **4.2 Guidance**

- Project and Construction Management Guidelines, 2010 Update (or later)
- FTA Circular 5010.1D, Grant Management Guidelines

### **4.3 State of Good Repair**

- FTA's SGR report to congress and other asset management reports and documents as may be necessary located at: <http://www.fta.dot.gov/about/13248.html>

## **5.0 PROJECT SPONSOR'S SUBMITTALS**

In performing the review the PMOC should obtain and study the following project documents from the Sponsor, as applicable:

- Sponsor correspondence with FTA, other agencies, third parties, etc.
- Grant proposal
- Grant agreement
- Project schedule and schedule, durations
- Capital Cost Estimates
- Reporting
  - Sponsor Federal Financial Report (FFR)
  - Sponsor Milestone Progress Report (MPR)
  - Sponsor DBE Goal Compliance Reporting
- Project Delivery and Procurement Documents
  - RFP, RFQ, IFB etc.
  - Contractor's/Supplier's Cost Proposal
  - Contract Package (list of deliverables)
  - Addenda to bid packages
- Design Documentation
  - Contractor/Supplier Deliverables
  - Systems Design Documentation
  - Systems Integration Design Documentation
  - Specifications
- Management Plans for the Project (grant management procedures, procurement procedures, most recent triennial review)
- Administration/Management files
  - Change order files (including potential change orders)

- Claims files (including potential claims)
- Request for Information (RFI) logs
- Submittal Log
- Inspection and testing reports
- Meeting minutes
- Contract management reports

## **6.0 SCOPE OF WORK**

The PMOC should assign a competent Task Order Manager with relevant experience with similar projects to fulfill the scope of work contained within this procedure, as directed under an approved work order. Prior to a request for information or meeting request, the PMOC should discuss with the Sponsor the purpose of the review, and confirm the necessary documentation is available prior to proceeding with the review.

Travel to the Sponsor's offices, the project site, or the FTA regional office may or may not be required for this review. This will be determined and directed by FTA's Work Order Manager.

This OP is intended to be used on a variety of asset management projects and, as such, all of the specific reviews listed below may not be required. Some aspects of the reviews listed below will not be applicable based on the size and scope of the project. The work order developed by FTA's Work Order Manager will indicate which reviews are required.

### **6.1 Sponsor's Management Capacity and Capability (MCC)**

The PMOC shall evaluate the Sponsor's MCC to undertake and successfully complete the project based on the Sponsor's project delivery and management plans including the following:

- Management team, employees and consultants, professional skills and project experience to manage the project; assess organizational charts, and history of performance;
- Project controls to deliver the project within budget, on schedule, and in conformance with the agreed to scope.

### **6.2 Sponsor Policies and Procedures**

The PMOC shall review the Sponsor's policies and procedures for adequacy, including but not limited to: document control; cost, schedule and risk control; quality; change order management, procedures for procurement, (advertising, bidding, awarding of contracts for consultants, procurement for equipment, etc.) if applicable. Include review of most recent triennial review and procurement system review findings and corrective actions that may apply to this project.

### **6.3 Sponsor Project Implementation Plans**

The PMOC shall assess, evaluate and characterize the project's implementation plans; and shall consider the extent, nature, level of detail, and quality of the Sponsor's approach as described by the implementation plan. The term "project implementation plans" refers to the sum of the documented plans that Sponsors have prepared that describe how they will execute and deliver the project. The

term “project implementation plans” does not imply a full-scale Project Management Plan, a requirement for Major Capital Projects, as defined in 49 CFR Part 633.

The PMOC shall assess and evaluate the degree to which the project implementation plans 1) mirror and complement the Sponsor’s overall management strategy and 2) is effective in minimizing cost increases and schedule extensions. The PMOC should understand that the Sponsor’s project implementation plans demonstrate its MCC to:

- Effectively and efficiently manage the implementation of the proposed project;
- Provide, directly or by contract, adequate professional and technical expertise for the project.
- Assure conformance with grant agreements, applicable statutes, regulations, codes, ordinances, and safety standards, as applicable;
- Establish and maintain adequate internal controls

#### **6.4 Project Scope**

The PMOC shall obtain an understanding of the project scope by performing the following activities:

- 1) Review the original grant proposal submitted by the Sponsor so as to have a comprehensive knowledge of the purpose of the grants.
- 2) Monitor the progress of the project to ensuring that the scope of the project being undertaken is consistent with the intended purpose of the grant.
- 3) Through a site visit as may be necessary, perform an on-the-ground check of physical conditions.
- 4) Study and evaluate the applicable submittals listed in Section 5, above;

#### **6.5 Project Cost**

The PMOC shall evaluate the project cost by performing the following activities, as required:

- Review the latest cost estimate
- Evaluate the cost estimate in relation to the scope and make recommendations where additional detail or other information is needed
- Check the estimate’s internal consistency

#### **6.6 Project Schedule**

The PMOC shall evaluate the project schedule by performing the following activities:

- Evaluate the reasonableness of the Sponsor’s schedule assumptions;
- Evaluate the durations for each phase of work in relation to the completion of similar work by other agencies, if known, and the Sponsor’s track record for implementing similar projects;

## **6.7 Recurring Oversight**

Depending on the complexity or size of an asset management project and also on the management capacity and capability of the Sponsor managing the project, the FTA's Work Order Manager may request specific aspects of this review be revisited on a recurring basis (semi-annually, quarterly, monthly). The details of this request will be specified in the work order. At a minimum, recurring oversight should be performed semi-annually.

For example, the FTA's Work Order Manager may require the PMOC to review the cost and schedule (see section 6.5 and 6.6 above) every quarter. This is at the FTA's Work Order Managers discretion. Travel may or may not be required for this requirement.

Unless otherwise specified in the Work Order, reviews described in Sections 6.1 through 6.6 shall be non-recurring.

## **6.8 Reporting**

The PMOC shall generate one report with combined results of the different aspects of the review as follows, unless otherwise directed by the FTA's Work Order Manager.

- 1) Include an executive summary in two pages or less that includes the following:
  - a) Progress of the project with focus on how the scope elements are progressing and being achieved
  - b) Adequacy of the MCC to accomplish project goals
  - c) Project Implementation schedule vis-à-vis actual progress
  - d) Project budget vis-à-vis actual expenses
  - e) Identify risks and potential risks that may impact cost, schedule and scope and make recommendations for mitigation
- 2) Provide back-up information in appendices;

The report should, typically, not exceed 10 pages in length and delivered in accordance with the delivery requirements in the work order. Additionally, report for site visits may be required as specified by the FTA's Work Order Manager.

## **6.9 Other**

In regards to asset management system projects, FTA may require the PMOC to conduct special oversight and special studies; provide special technical assistance such as emergency support and other work as directed by the Administrator. This work may entail site visits and interviews; providing technical assistance to newer Sponsors on the development of their project plans, schedules and procedures; project investigations; preparation of professional papers based on research and development of concepts, trends, information, etc.; examinations of agency histories, etc.

As requested, the PMOC may provide their written findings, conclusions, and recommendations to inform FTA and designated third parties. This may include presenting issue papers and studies in meetings, and when requested, representing FTA with parties such as Sponsors and their representatives, legislators, legislative staff, the U.S. DOT Secretary and staff, Office of Management

and Budget, U.S. Government Accountability Office, U.S. DOT Office of Inspector General, non-governmental entities and industry associations such as Transportation Research Board, American Public Transportation Association, National Transit Institute, American Society of Civil Engineers, American Institute of Architects, American Planning Association, community representatives and professional peer groups, etc.

Representing FTA or participation in meetings may include preparation of advance meetings and briefings with FTA staff to discuss concepts, project issues, industry conditions or trends, etc.; participation in and presentations at meetings, workshops, conferences; development of meeting agendas; documentation of results of meetings in reports; debriefings, follow up papers or other documents.

## **7.0 REPORT, PRESENTATION, RECONCILIATION**

The PMOC shall provide FTA with a written report of its findings, analysis, recommendations, professional opinions, and a description of the review activities undertaken. After FTA approval, the PMOC should share the report with the Sponsor. In the event that differences of opinion exist between the PMOC and the Sponsor regarding the PMOC's findings, the FTA may direct the PMOC to reconcile with the Sponsor and provide FTA with a report addendum covering the agreed modifications by the Sponsor and PMOC.

The report formatting requirements of OP 01 apply. When necessary, PMOC shall perform data analysis and develop data models that meet FTA requirements using Microsoft Office products such as Excel and Word and use FTA-templates when provided. The PMOC may add other software as required but documentation and report data shall be made available to FTA.



## APPENDIX A

### Acceptable Quality Level

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	PERFORMANCE MEASURE	ACCEPTABLE QUALITY LEVEL	MONITORING METHOD
1	PMOC shall review, analyze and recommend to FTA on the status and implementation of the project, and the Sponsor's management of the project.	<b>R1a.</b> The PMOC shall develop and document a process for review and analysis of assigned projects.		<b>M1a.</b> Evidence of a documented process.	<b>Q1a.</b> Process exists and has been followed.	<b>MM1a.</b> Periodic review by FTA or its agent.
		<b>R1b.</b> The PMOC shall use its process to evaluate the status of projects.		<b>M1b.</b> Documented assessment of the status of assigned project.	<b>Q1b.</b> Review must be made and the PMOC provides internal verification that the process as documented was followed.	<b>MM1b.</b> Periodic review by FTA or its agent.
2	The PMOC shall review Sponsor's project for reasonableness, quality, cost and schedule including management capacity and capability of Sponsor. Reviews shall be conducted as directed by FTA.	<b>R2a.</b> The PMOC shall, in advance of work, meet with Sponsor, staff and consultants to obtain pertinent and necessary documents and discuss the purpose of the FTA directed review.		<b>M2a.</b> Documented evidence of a meeting with Sponsor and staff and a thorough review by PMOC of Sponsor's project technical components, and submittals, supported by professional opinion.	<b>Q2a.</b> Professional opinion of project and supporting documentation.	<b>MM2a.</b> Periodic review by FTA or its agent.
		<b>R2b.</b> The PMOC shall evaluate and describe Sponsor's management capacity and capability through analysis of management structure and consultants, approach and understanding of the work and project controls in place to deliver the project within budget and on schedule.		<b>M2b.</b> Documented evidence of review and evaluation of Sponsor's management, approach and project controls establishing management capacity /capability supported by professional opinion.	<b>Q2b.</b> Professional opinion regarding management, approach and project controls and management capacity/capability.	<b>MM2b.</b> Periodic review by FTA or its agent.
		<b>R2c.</b> The PMOC shall perform the following, when directed, and form an opinion of project implementation : 1) Site visit, as directed by FTA; 2) Evaluate Sponsor submittals; 3) Review of Sponsor design documents; 4) Review and characterize systems and vehicles for project needs; 5) Policies and procedures review of project implementation plans; and 6) Review Sponsor's third party agreements.		<b>M2c.</b> Documented evidence of the required project scope reviews, supported by professional opinion.	<b>Q2c.</b> Professional opinion and evaluation of the reliability of project's scope.	<b>MM2c.</b> Periodic review by FTA or its agent.
		<b>R2d.</b> The PMOC shall evaluate the project schedule for completeness and level of detail by performing the following reviews: 1) Evaluate schedule assumptions; 2) Evaluate durations and compare to other similar work; 3) Evaluate number and duration of activities and critical path; and 4) Evaluate uncertainties and risks.		<b>M2d.</b> Documented evidence of review and evaluation of project schedule, supported by a professional opinion.	<b>Q2d.</b> Professional opinion and review of project schedule.	<b>MM2d.</b> Periodic review by FTA or its agent.

	DESIRED OUTCOME	PERFORMANCE REQUIREMENT	CHECK LIST	PERFORMANCE MEASURE	ACCEPTABLE QUALITY LEVEL	MONITORING METHOD
2	The PMOC shall review Sponsor's Project for reasonableness, quality, cost and schedule including management capacity and capability of Sponsor. Reviews shall be conducted as directed by FTA.	<b>R2e.</b> The PMOC shall perform the following and form an opinion of the reliability of the project cost estimate: 1) Review estimate and evaluate estimating methodology; 2) Evaluate estimate compared to scope and recommend additional detail as needed; 3) Verify reasonableness of cost distribution over project; 4) Discuss with Sponsor and evaluate reasonableness of escalation rates and inflation over project; and 5) Examine overarching political, institutional and project management influences on potential to change cost estimate.		<b>M2e.</b> Documented evidence of review and evaluation of various technical aspects of cost estimate, supported by a professional opinion.	<b>Q2e.</b> Professional opinion and review of technical aspects of cost estimate.	<b>MM2e.</b> Periodic review by FTA or its agent.
3	The PMOC shall document its findings, professional opinions, and recommendations in a report to the FTA.	<b>R3.</b> The PMOC shall present its findings, conclusions, analysis and recommendations to FTA and reconcile those recommendations with the Sponsor to the extent possible when so directed by FTA.		<b>M3.</b> PMOC's findings conclusions, recommendations, and presentation.	<b>Q3.</b> Reports and presentations are professional, clear, concise, and well written. The findings and conclusions have been reconciled with other PMOC reports and have been reconciled with Sponsor to the extent possible.	<b>MM3.</b> Periodic review by FTA or its agent.