FRA Monitoring Procedures (MP)			
MP		**Description**	**Date**
Program Support			
1		MTAP Administrative Conditions and Requirements	Oct-20
2		MTAS Implementation & Transition Planning	Oct-20
Technical Assistance			
3		Technical Assistance	Oct-20
Project Management Reviews			
20 & 21		Project Management Plan (PMP) and Management & Technical Capacity/Capability (MTCC) Review	Oct-20
22		Safety and Security Management Review	Oct-20
23		Real Estate Acquisition & Management Plan Review	Oct-20
24		Quality Assurance/Quality Control Review	Oct-20
Monitoring and Reporting			
25		Recurring Oversight & Related Reports	Oct-20
26		Lessons Learned / Best Practices	Oct-20
27		Before-and-After Study	Oct-20
31		Annual Review & Closeout of Grant	Oct-20
Technical Reviews			
30		Value Engineering Review	Oct-20
32A		Planning & Concept Design	Oct-20
32B		Environmental Review	Oct-20
32C		Project Scope Review	Oct-20
32D		Project Delivery Method Review	Oct-20
33		Capital Cost Estimate Review	Oct-20
34		Project Schedule Review	Oct-20
35		Americans With Disabilities Act (ADA) Review	Oct-20
36		Buy America Review	Oct-20
38		Rolling Stock Acquisition	Oct-20
39		Preliminary Engineering, Final Design, Readiness to Procure Construction	Oct-20
40		Risk and Contingency Review	Oct-20
54		Readiness for Revenue Operations	Oct-20

U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs

Monitoring Procedure 01 – Adminitrative Conditions and Requirements

1.0 PURPOSE

The purpose of this Monitoring Procedure (MP) is to provide an overview of the Monitoring and Technical Assistance Program (MTAP) and the performance of monitoring by the Monitoring and Technical Assistance Support (MTAS) Contractor for the Federal Railroad Administration (FRA).

This MP is a guide. The FRA will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 BACKGROUND

The FRA provides and administers Federal grants, cooperative agreements and loans to assist in financing intercity passenger rail and freight rail projects. The FRA, therefore, is responsible for monitoring the grants, cooperative agreements and loans, and ensuring projects are delivered successfully, provide public benefits, and meet Federal requirements. While both grants and cooperative agreements are awarded by FRA, the type of agreement may vary by program. Herein, the term grant is used to reference both grants and cooperative agreements.

In 2020, FRA undertook a significant effort to enhance its monitoring and oversight program. It assessed its program holistically, from start to finish, to establish a risk-based oversight approach. This effort included the revision of several key oversight procedures. This will aid FRA in allocating its resources, based on a project's risk level and FRA's project portfolio, to ensure each project receives an appropriate level of oversight commensurate to its assessed level of risk.

This approach includes the following procedures:

- **Project Risk Assessment Model (PRAM)**: This risk assessment is conducted during the initial stage of the grant lifecycle, the pre-obligation phase, to identify potential project delivery risks. The comprehensive risk model assesses seven major risk categories: scope, schedule, cost, funding, environmental, experience and expertise, and risk. The output of the risk model is a risk rating based on a three-tiered risk scale (low/medium/high). As it pertains to its risk-based oversight approach, FRA considers this risk rating output[1] to:
    - Determine the appropriate level of FRA project oversight resources (e.g. staff assignments based on capacity) and more granularly the level of effort allocated to oversight reviews by staff
    - Scale the selection of deliverables required for a Grantee's project (based on the Deliverable Guidebook) and the content of a deliverable

[1] See Project Risk Assessment Model Instruction Manual, Introduction Section, for a full list of considerations.

- In addition, FRA may determine specific technical assistance and the scheduling of a non-safety project visit depending on resources

- **Deliverable Guidebook**: Deliverables are tools to assist in FRA in the oversight of a Grantee's project delivery. This guidebook establishes standard deliverables and evaluation criteria. This Guidebook provides the framework to assist in making the following determinations using the PRAM's risk rating as input:
  - Scaling FRA's staff resources supporting deliverable oversight to a Grantee's project risk rating
  - Scaling a Grantee's required deliverables and the content of the deliverables to its assessed risk rating (which includes various factors such as complexity, size and magnitude). For example, it may be appropriate to require a Grantee deemed as high risk to provide more deliverables and/or more detailed deliverables (e.g. more appendices)

- **Monitoring Procedures:** These procedures outline how the Monitoring Technical Assistance Support (MTAS) Contractors supplement FRA staff in its monitoring and oversight program. Similar to FRA oversight as detailed in the Deliverable Guidebook, MTAS oversight support may be scaled to the reflect the risk rating of a project to include, but not limited to:
  - Scaling of the MTAS support to supplement FRA's oversight of a project (e.g. depth of review to conduct of a Grantee's project or deliverables)
  - Scaling of MTAS deliverables to FRA, from its assessment of Grantee performance observed through its execution of the Monitoring Procedures. Since the input to the MTAS's monitoring reviews, the Grantee deliverables, are scaled to the project's risk rating in the PRAM, the MTAS's deliverables to FRA should be commensurately scaled to the size, complexity and magnitude of a Grantee's project.

- **Grants Management Manual:** The manual establishes the policies and procedures for grant processing and management throughout a grant lifecycle. In specific, as it pertains to grantee's non-compliance the manual establishes criteria for escalation and enforcement measures to be taken by FRA based of the severity and frequency of a grantee's non-compliance.

The FRA performs monitoring using a mix of staff and contractors. Some FRA-administered programs are appropriated funding (administrative takedown) to help fund contractor services, while others do not receive an appropriation. Although the Monitoring Procedures (MP) are meant to guide both Federal staff and contractors, the MTAS contractor may have a significant role in conducting monitoring of the FRA's programs. Therefore, the MPs refer to the reviewer as the MTAS.

2.1 MTAS Objectives

The FRA currently provides stewardship of taxpayers' dollars and conducts due diligence as a Federal grants-making agency. The FRA administers grant and loan programs to assist States and other eligible entities in the planning, acquisition, design, construction, and readiness for operations of intercity passenger rail and freight rail improvement projects.

For the FRA's monitoring of capital rail projects, the MTAS brings additional contractor resources, technical expertise, and greater consistency of approach to projects across the FRA portfolio.

The FRA's goals for the MTAS are at three levels:

- Projects – To proactively provide technical assistance to grantees to identify and mitigate risks, foster good solutions to challenges/issues, and ensure projects move successfully into revenue operations
- Program – To develop and improve FRA's ongoing grant and project monitoring program with knowledge sharing and partnering
- Industry – To elevate the knowledge and level of practice of the U.S. rail industry

The predominant activity of the MTAS is assisting the FRA with project monitoring. The MTAS performing monitoring should fully understand the projects, consider project content and approach, advise and recommend approaches, and identify and evaluate risks. They support FRA involvement in the Grantees' projects, and make positive contributions to the overall endeavor.

Another activity of the MTAS is Technical Assistance. Technical Assistance goes further than monitoring – into the realm of teaching, training, tutoring, special studies, and presentations on identified topics. Technical assistance needs are identified through monitoring and may be customized to one Grantee or to a national audience depending on the issue. Either way, the work should further the FRA goals for the MTAP: elevate the knowledge base in the industry; improve the FRA's monitoring capabilities; and achieve higher-quality projects.

Note that neither the MTAS monitoring nor technical assistance in any way relieves the Grantee of its responsibility for delivery of the project.

3.0 MTAS SCOPE OF WORK

3.1 Projects Covered

Historically, the Monitoring and Technical Assistance Contract, superseded by the MTAS, covered High-Speed Intercity Passenger Rail (HSIPR), Transportation Investment Generating Economic Recovery (TIGER), and Amtrak projects. However, the MTAS is designed to support FRA capital projects from any grant or loan program as authorized and funded by Congress from time to time.

The MTAS covers projects funded through grants and cooperative agreements. The FRA's grant and cooperative agreement authority is contained in 49 U.S.C. 103(i). Amtrak projects are typically funded through grants and loans.

3.2 Roles and Responsibilities

The FRA engaged the U.S. DOT Volpe Center to support MTAP. Contract management and issuance of the MTAS Blanket Purchase Agreements (BPA) and Call Orders is assisted by the Volpe Center. The FRA's regionally-based, multi-disciplinary teams are led by Project Managers (PM) who monitor and oversee the Grantees' projects to completion. The PM/Project teams are comprised of FRA staff engineers, planners, environmental protection specialists, grant managers, financial analysts, attorneys, rail safety specialists, as well as a Volpe Call Order Contracting Officer's Representative (COCOR).

The MTAS supplements FRA staff where agency resources are constrained. This may be on a project by project basis or at a more granular level for specific monitoring procedure to be executed. As such, FRA staff, who have overall project oversight responsibility, provides direction to the MTAS on specific monitoring procedures to perform and the MTAS deliverable to FRA. This may vary on a case by case basis as determined by a Grantee's project risk rating which is considered when determining FRA oversight of a project and the deliverable a Grantee is required to provide. How the MTAS performs a monitoring procedure, based off Grantee's risk rating (which considers its size, complexity, and magnitude), and the subsequent deliverable the MTAS provides to FRA detailing it review, may vary. FRA will provide guidance to the MTAS, as appropriate. The MTAS's execution of these procedures are generally intended to inform FRA staff of a Grantee's performance and to supplement FRA's interactions and feedback to a Grantee where FRA serves as the lead for interface with the Grantee. In this sense, FRA reinforces the MTAS role in its oversight program.

The MTAS is to exercise their professional expertise, professional judgment, and communicate with all parties. Based on direction from the Federal PM/Project team, the MTAS is to develop and regularly maintain contact with the Federal team; develop and regularly maintain contact with key personnel in multiple departments of the Grantee's organization, as directed; avoid relying on only one source for information; and coordinate with other MTAS's covering the same Grantee (if applicable).

3.3 Monitoring Procedures (MP)

The MPs provide guidance to the MTAS, but they may also be of interest to Grantees, FRA staff, third party stakeholders, the railroads, Congressional monitoring entities, and auditors. Guidance in the MPs pertain to content review, document structure/formatting, reports the MTAP produces for FRA, and best practices. The reports produced by the MTAS are stored in FRA's repository by the Contracting Office Representative as it serves as a record of the MTAS's assessment of a Grantee's project. The MPs will be modified and improved over time. The current version will be posted to the FRA's internal website.

3.4 Implementation Plans, MTAS Status Reports and Invoices

Implementation Plan: The MTAS Contractor submits an Implementation Plan, outlining the proposed approach, identifying monitoring and technical assistance activities to be performed, with a related schedule, and cost breakdown. The Implementation Plan is described in MP02.

MTAS Contractor Status Reports, Cost Reports, and Invoices: Status Reports, Cost Reports, and Invoices are submitted monthly, in accordance with the MTAS Contract's. These Status Reports should include:

1. The activities performed and tasks completed during the month
2. The activities planned for the next month, including any significant events or milestones
3. Any issues that need to be addressed

In addition to monthly status reports, a weekly task tracker will be submitted to the COCOR in order to summarize completed and assigned/upcoming activities for each Grant or project on a weekly basis.

APPENDIX A References

The following are the principal, but by no means only, references to Federal regulations and guidance relating to the work performed under the MPs.

ADA

Final Rule for the Transportation for Individuals with Disabilities at Intercity, Commuter, and High Speed Passenger Railroad Station Platforms. The U.S. Department of Transportation issued the Final Rule on September 19, 2011 (available at http://www.gpo.gov/fdsys/pkg/FR-2011-09-19/html/2011-23576.htm).

Final Rule for the Transportation for Individuals with Disabilities; Adoption of New Accessibility Standards. The Department of Transportation issued this rule on October 30, 2006 (available at http://www.fra.dot.gov/eLib/Details/L03333). This Final Rule establishes that the Department of Transportation amended the ADA regulations to adopt, as its regulatory ADA standards, the new Americans with Disabilities Act Accessibility Guidelines (ADAAG) issued by the United States Access Board.

U.S. DOT Guidance: What Accessibility Standards Apply to Passenger Rail Cars When Specific Design Standards Are Not Provided In 49 CFR Part 38? December 2012 (available at https://railroads.dot.gov/elibrary/ada-level-boarding-accessibility-standards-applying-passenger-rail-cars).

Questions and Answers on the 49 CFR Part 37 Revision - Transportation Services for Individuals with Disabilities (ADA) (available at https://www.transit.dot.gov/faq?combine=&shs_term_node_tid_depth=2086).

The ADA Standards for Transportation Facilities (available at http://www.access-board.gov/guidelines-and-standards/transportation/facilities/ada-standards-for-transportation-facilities).

36 CFR Part 1191. Americans with Disabilities Act (ADA) Guidelines for Buildings and Facilities – 36 CFR Part 1191 (available at http://www.gpo.gov/fdsys/granule/CFR-2011-title36-vol3/CFR-2011-title36-vol3-part1191/content-detail.html).

36 CFR Parts 1192 Subpart H – High-Speed Rail Cars, Monorails and Systems. The Access Board provides technical guidance on ADAAG for high-speed rail cars, monorails, and systems. (available at http://www.access-board.gov/guidelines-and-standards/transportation/vehicles/technical-assistance-manuals-on-adaag-for-transportation-vehicles/subpart-h-high-speed-rail-cars,-monorails-and-systems).

49 CFR Part 27. Nondiscrimination on the Basis of Disability in Programs or Activities Receiving Federal Financial Assistance (available at http://www.gpo.gov/fdsys/pkg/CFR-2011-title49-vol1/pdf/CFR-2011-title49-vol1-part27.pdf).

49 CFR Part 37. Transportation Services for Individuals with Disabilities (ADA) (available at https://www.transit.dot.gov/regulations-and-guidance/civil-rights-ada/part-37-transportation-services-individuals-disabilities).

49 CFR Part 38. Americans With Disabilities Act (ADA) Accessibility Specifications for Transportation Vehicles – Subpart H – Other Vehicles and Systems – 49 CFR Part 38 §175 – High-Speed Rail Cars, Monorails, and Systems (available at http://www.gpo.gov/fdsys/pkg/CFR-2011-title49-vol1/pdf/CFR-2011-title49-vol1-part38.pdf).

ANNUAL REVIEW

FRA's Office of Passenger and Freight Programs Monitoring Manual, available at request from FRA; this is the primary guide for the annual review.

BUY AMERICA/N

49 U.S.C § 24405 (a) (available at http://www.gpo.gov/fdsys/pkg/USCODE-2011-title49/html/USCODE-2011-title49-subtitleV-partC-chap244-sec24405.htm).

4949 U.S.C § 8302 (available at https://uscode.house.gov/view.xhtml?path=/prelim@title38/part6&edition=prelim).

FRA Buy America Guidance - including Frequently Asked Questions (available at http://www.fra.dot.gov/Page/P0185).

ENVIRONMENTAL REVIEW

2010 NOFA: Appendix 2.2 Environmental Documentation. Federal Register Vol. 75, No. 126, Thursday, July 1, 2010. Notices USDOT, FRA, HSIPR Program; ACTION: Notice of funding availability for Individual Projects; issuance of interim program guidance, (available at http://www.fra.dot.gov/eLib/details/L03701).

Notice of Updated Environmental Assessment Procedures. Federal Register Vol. 64, No. 101, Wednesday, May 26, 1999. Notices page 28545, USDOT, FRA, ACTION; Notice of Updated Environmental Assessment Procedures (available at http://www.fra.dot.gov/eLib/details/L02561).

National Environmental Policy Act (NEPA), Compliance and Enforcement, Basic Information (available at https://www.epa.gov/nepa/national-environmental-policy-act-policies-and-guidance).

GRANTS AND COOPERATIVE AGREEMENTS

OMB Circular A-102, Grants and Cooperative Agreements with State and Local Governments (available at https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A102/a102.pdf).

49 CFR Part 18, Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments (available at http://www.gpo.gov/fdsys/pkg/CFR-2009-title49-vol1/xml/CFR-2009-title49-vol1-part18.xml).

OMB Circular A-133, Audits of State and Local Governments (available at https://www.federalregister.gov/documents/2015/07/14/2015-17236/audits-of-states-local-governments-and-non-profit-organizations-omb-circular-a-133-compliance).

APPENDIX A References

PLANNING AND DESIGN

Railroad Corridor Transportation Plans: A Guidance Manual, July 8, 2005 (available at https://railroads.dot.gov/elibrary/railroad-corridor-transportation-plans-guidance-manual).

USDOT, FRA HSIPR Program. Notice of funding availability for Service Development Programs; issuance of interim program guidance; pg. 38344, Federal Register/Vol. 75, No. 126/Thursday, July 1, 2010/Notices, available on the FRA website (available at https://www.govinfo.gov/content/pkg/FR-2010-07-01/pdf/2010-15992.pdf).

FRA's State Rail Plans Guidance, September 2013 (available at http://www.fra.dot.gov/eLib/Details/L04760).

FRA's "Station Area Planning for High-Speed and Intercity Passenger Rail," June 2011 (available at http://www.fra.dot.gov/eLib/Details/L03759).

Transportation Research Board. (2003). *Transit Capacity and Quality of Service Manual, 2nd edition.* TCRP Report 100. Transportation Research Board, Washington DC, 2003. (available at http://www.trb.org/Main/Blurbs/153590.aspx).

The American Railway Engineering and Maintenance-of-Way Association (AREMA) publications (available at https://www.arema.org/AREMA_MBRR/Publications/AREMA_MBRR/AREMAStore/Store_Main.aspx?hkey=91bf1d49-63d0-4049-9ca0-fd3b0abb2cba).

- Manual for Railway Engineering
- Practical Guide to Railway Engineering

PROJECT MANAGEMENT PLAN

Project Management Oversight – 49 USC 24403 (available at http://www.gpo.gov/fdsys/granule/USCODE-2011-title49/USCODE-2011-title49-subtitleV-partC-chap244-sec24403/content-detail.html).

REAL ESTATE

Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act) (available at https://www.fhwa.dot.gov/legsregs/directives/fapg/cfr4924a.htm.)

Uniform Act Regulations (49 CFR Part 24) (available at https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/49cfr24fr.pdf.)

SAFETY AND SECURITY

49 CFR Parts 213 and 238 Final Rule on Vehicle/Track Interaction Safety Standards; High-Speed and High Cant Deficiency Operations. USDOT, FRA 49 CFR Parts 213 and 238, Federal Register/Vol. 78, No. 49/Wednesday, March 13, 2013/Rules and Regulations (available at https://www.gpo.gov/fdsys/pkg/CFR-2011-title49-vol4/pdf/CFR-2011-title49-vol4-part213.pdf, https://www.gpo.gov/fdsys/pkg/CFR-2011-title49-vol4/pdf/CFR-2011-title49-vol4-part238.pdf).

FRA Office of Safety Website (https://railroads.dot.gov/railroad-safety), including references to:

- 49 CFR 213 – Track Safety Standards
- 49 CFR 214 – Railroad Workplace Safety (Roadway worker protection)
- 49 CFR 228 – Hours of service railroad employees
- 49 CFR 233 – Signal systems reporting requirements
- 49 CFR 234 – Grade crossing signal system safety and State action plans
- 49 CFT 235 – Instructions governing applications for approval of a discontinuance or material modification of a signal system or relief from the requirements of part 236
- 49 CFR 236 – Rules, standards, and instructions governing the installation, inspection, maintenance, and repair of signal and train control systems, devices, and appliances
- 49 CFR 237 – Bridge Safety Standards
- 49 CFR 238 – Passenger Equipment Safety Standards
- 49 CFR 239 – Passenger Train Emergency Preparedness

Amtrak Station Program and Planning Guidelines, safety in site planning, station and platform design (available at https://www.greatamericanstations.com/planning-development/station-planning-guidelines/).

Amtrak Emergency Management and Corporate Security

- Design Guidance, Practices and Recommendations for: Video Surveillance Systems, Physical Security, Intrusion Detection Systems, and Physical Access Control Systems. 2013, Rev. 4. Obtain from Amtrak.

NFPA 130: Standard for Fixed Guideway Transit and Passenger Rail Systems

- Topics covered include stations, trainways, emergency ventilation systems, vehicles, emergency procedures, communications, control systems, and vehicle storage areas. Provisions pertain to stations accommodating only passengers and employees of the fixed guideway transit and passenger rail systems and incidental occupancies in the stations (available at http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=130).

Schachenmayr, M.P. *Application Guidelines for the Egress Element of the Fire Protection Standard for Fixed Guideway Transit Systems.* Parsons, Brinckerhoff, Quade & Douglas, 1998.

STATIONS

FRA's "Station Area Planning for High-Speed and Intercity Passenger Rail," June 2011 (available at http://www.fra.dot.gov/eLib/Details/L03759).

Amtrak Station Program and Planning Guidelines (available at http://www.greatamericanstations.com/planning-development/station-planning-guidelines).

Fruin, J. J. *Pedestrian Planning and Design, Revised Edition.* Elevator World, Inc., Mobile, Alabama, 1987.

VALUE ENGINEERING

Value Methodology Standard and Body of Knowledge, June 2007 (or the latest edition) published by SAVE International (available at http://www.value-eng.org/pdf_docs/monographs/vmstd.pdf).

VEHICLES

305 Committee Railcar Specifications, Passenger Rail Investment and Improvement Act of 2008 (PRIIA) 305 Next-Generation Equipment Committee (NGEC) (available at http://www.highspeed-rail.org/Documents/Standardization/305_Standardization_NGEC_Rpt_3-12.pdf)

APTA Standards and Recommended Practices relevant to railcar design (available at https://www.apta.com/research-technical-resources/standards/

Federal Safety Regulatory requirements (49 CFR Part 229, 238, 239) as applicable.

APPENDIX B Report Format

MTAS Reports on Grantees' Projects

To support the MTAS oversight and technical assistance work, reports are typically required (for most MPs). Some MPs contain a specific reporting format and content that best suit the topic being monitored (e.g. MP 25, 26, 27). In those instances, the MTAS should follow that guidance. The information below provides a general report outline for all other instances.

MTAS Call Order / Contract #
Date:
To: FRA POC
From: MTAS Reviewer / Firm

Grant / Grant No:
Title:

Purpose:

Documents Reviewed:
1. Document reviewed / status

Summary:
Observations:
Conclusions
Recommendations:

General guidelines for reports:

- Content: Provide current information; cite sources; present information without taking it out of context. Provide focused, clear, concise, coherent, accurate, complete, objective and unbiased reports. Use "MTAS" vs "contractor" to distinguish from construction contractors. Use photos, tables, and other graphics to aid understanding. These should be included in an appendix.

- Style: Refer back to original text instead of repeating text. Avoid long narratives. Use bold or underline for emphasis. Use Calibri 11 point font.

- Distribution: Send draft documents to the Federal team for review; if applicable, address any concerns from FRA, then finalize the report and resubmit to FRA. FRA may share information, such as concerns and recommendations, from the report with the Grantee as determined appropriate.

- Level of Detail: The length and level of detail for each report will vary depending on the topic, and will follow guidance from the FRA.

- Format: Unless otherwise specified within the MP, reports will be submitted in memorandum format. An outline of topics to include are listed below. Certain MPs may also note additional topics of interest to report and should be incorporated as appropriate within the reporting outline.

- General Report Outline
  1. Report / routing information
     a. Date
     b. FRA POC to receive the report
     c. MTAS reviewer / firm name, MTAS call order / contract number
     d. Grant / grant number
     e. Title of report
  2. Body of report – by topic
     a. Purpose of the report – Include what MP the review was done in accordance with

b. Documents reviewed / document status – State the status of each Grantee document reviewed. [2] For example, the document reviewed is sufficient/insufficient[3] or complete/incomplete[4]. If the document is insufficient or incomplete state the reason (e.g. incomplete, in the wrong format, etc.)
c. Summary – Include a summary of the review and the status of the review. The status of the review may be complete or incomplete. If the review is incomplete, state the reason (e.g., the review could not be completed as the Grantee deliverable/document is missing required components).
d. Observations
e. Conclusions
f. Recommendations for action

3. Appendices
    a. Acronyms used
    b. Supporting checklists, tables, spreadsheets, photos, etc.

[2] The MPs note recommended documents that a MTAS may review. FRA requires a Grantee to provide specific deliverables as part its Grant Agreement. Other documents may be recommended as part of the MP review, but not required in a Grantee's Grant Agreement with FRA, and their review is pending availability. As needed, FRA provides direction on specific documents the MTAS will review and may also provide the documents, if not previously provided to the MTAS by the Grantee. The MTAS should consider this when conducting a MP and making recommendations.
[3] The term sufficient references the level of detail of a document. For example, a document may be missing a component (such as the introduction), but the level of detail for what is included in the document is sufficient.
[4] The term complete signifies that a document has all required components (e.g. topics, chapters, appendices).

U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs

Monitoring Procedure 02 – MTAS Implementation and Transition Planning

1.0 PURPOSE

This Monitoring Procedure (MP) describes the Federal Railroad Administration (FRA) requirements for the Monitoring and Technical Assistance Support (MTAS) when developing Implementation and Transition Plans.

This MP is a guide. The FRA will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

The FRA requires the MTAS to demonstrate management accountability; responsibility for quality, timely performance, and productivity; compliance with laws and ethics guidelines; cost control; and recommendation of useful mitigations to minimize adverse impacts to the project from internal and external forces. The plans produced under this MP should help the MTAS to achieve these ends. In addition, implementation plans should show adequate and comprehensive oversight. Transition plans help to maintain continuity in the performance of oversight during a change in MTAS assignment.

3.0 SCOPE OF WORK

3.1 Implementation Plan

The Implementation Plan summarizes the oversight work for the task order. It serves as the MTAS's work plan, including hours and planned staffing for each of the projects in the portfolio. The MTAS, the FRA, and the Volpe Center will conduct an Implementation Plan meeting prior to developing the Plan to review the projects in the portfolio; discuss the monitoring and technical assistance needs for the upcoming calendar year (or period of request); and document the requirements in the Implementation Plan. The Implementation Plan should include the oversight efforts by MP, by project, by approximate date, level of effort estimates, with reports and other deliverables noted.

The Implementation Plan should demonstrate the MTAS's understanding of the FRA's purposes with respect to oversight, as well as the scope and nature of the work to be performed. It should also define the MTAS's intended services, products, and deliverables.

After the FRA accepts this Implementation Plan, unless otherwise directed, the MTAS work should be performed in conformance with this Implementation Plan. If changes are necessary, they should be documented in the MTAS weekly tracker and in the monthly progress report. Typically, it is not necessary to update the Implementation Plan, unless significant changes are made.

The incoming MTAS is responsible for the following:

- Becoming familiar with the project
    - Establishing key contacts among the personnel of the outgoing oversight contractor, the Grantee and its team, the FRA, and Volpe; as well as scheduling, coordinating, and integrating services and work products with the current oversight contractor
    - Gathering current documents to understand the project and any associated project delivery risks, such as:
        - Baseline cost estimates and schedules
        - Project drawings and analyses
        - Grantee management plans, e.g. Project Management Plan, QA/QC plan
        - Oversight reports by outgoing contractor
        - Annual Monitoring Reports

- Participating in the initial meetings, interviews, site tours, conference calls, and follow-up meetings:
    - Conducting sufficient pre-meetings between the FRA and the outgoing contractor; conducting an adequate number of site visits, meetings, tours, or Grantee personnel interviews to cost effectively bring the new team up to speed
    - Making every effort to understand and document project conditions, including taking photos during site visits; quickly gaining knowledge of project content and sensitive issues; and understanding key issues that could impact project progress
    - Achieving a sufficient level of knowledge about the outgoing contractor's oversight activities and maintaining traceability on key information and assessments
    - Promoting a "partnership" relationship with all parties to minimize the impact of the transition

- Developing the Implementation Plan including the following elements:
    - Description of the MTAS scope of work and period of performance (one page)
    - By project, a table listing the MPs (review efforts), yearly schedule in months, staff assigned, labor hours, hourly rates, expenses, and total cost
    - Organizational chart showing MTAS, subcontractors, the FRA, and Volpe; include resumes for key personnel or project/area leads
    - Description of communications and document control:
        - MTAS approach to communications with the Grantee, the FRA, and Volpe, including frequency, and how it will be reported, both formally and informally
        - MTAS approach to controlling correspondence to and from FRA
        - MTAS approach to file control and sharing

3.2 Transition Plan

During the contract period, changes in MTAS task order assignment may occur to avoid conflicts of interest or for other reasons.

The FRA Project Manager will notify the Grantee of a pending change in a timely fashion. The FRA will set up a transition schedule that fits with previously arranged meetings wherever possible; arrange for the incoming MTAS to be introduced to the Grantee's staff and consultant team; give

the incoming MTAS a project tour (as appropriate); and familiarize the MTAS with project documents, administrative matters such as invoicing and performance evaluations.

Incoming and outgoing MTAS are responsible for preparing Transition Plans, covering the following:

The outgoing MTAS:

- Coordinating with and integrating the work of the incoming MTAS.
    - Providing the incoming MTAS with a general orientation to the project to minimize the loss of knowledge during the transition
    - Facilitating introductions to the Grantee as well as supporting the incoming MTAS's readiness to assume oversight responsibilities; providing a sufficient number of and qualified personnel to participate in conference calls and meetings during the transition
    - Identifying transition elements and developing a schedule and milestones; assisting the new MTAS in locating the information
    - Helping to maintain traceability of oversight information and assessments

- Preparing contract "close-out" including:
    - A Final Report for use by the FRA and the incoming MTAS covering project facts, status, characteristics, major issues, and other information
    - Close-out/transition schedule
    - Lessons learned/best practices
    - Transfer of all files (documents, data, and photos) to the FRA and key documents to the incoming MTAS

The incoming MTAS:

- Demonstrating management organization, authorities, and lines of reporting during the transition from the outgoing MTAS to the incoming MTAS.
    - Contacting and information exchange plan with outgoing MTAS
    - Documenting request list including:
        - Project baseline documents
        - Grantee management plans
        - Monitoring and quarterly reports
        - FRA recommended documents
    - Preparing and participating in initial meetings, interviews, and site tours
- Demonstrating an approach to risk mitigation during the transition including:
    - Minimizing disruption to ongoing tasks
    - Planning for mitigating any potential project disruptions
    - Producing a staffing plan with adequate resources

3.3 Timeframe for Implementation and Transition Plans

Unless otherwise indicated, the MTAS will deliver plans in accordance with the following timeline:

Implementation Plan

	Calendar Days after Implementation Plan Meeting
Draft plan or revision of previous plan	14
Final plan	21
Readiness to assume oversight responsibilities	21

Transition Plan (Outgoing and Incoming MTAS)

	Calendar Days after Request
Draft plan	7
Final plan	14
Readiness for meetings	14
Readiness to assume oversight responsibilities (incoming MTAS)	21

U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs

Monitoring Procedure 03 – Technical Assistance

1.0 PURPOSE

This Monitoring Procedure (MP) describes the performance and deliverables the Federal Railroad Administration (FRA) expects from the Monitoring and Technical Assistance Support (MTAS) for Technical Assistance activities. By definition, Technical Assistance tasks are those above and beyond the standard monitoring activities performed under other MPs.

This MP is a guide. The FRA will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

As unique and specific assignments to the MTAS, when warranted by program or project circumstances, the MTAS may be asked to perform Technical Assistance work. This work requires the MTAS to demonstrate initiative, creativity, and subject matter expertise. Regardless of the scope or scale of the assignment, the work should be performed with the following broad goals in mind:

- Advancing the knowledge base among Grantees
- Advancing the state-of-the-practice in the industry
- Improving the FRA's monitoring capabilities for major capital rail projects
- Achieving higher-quality projects that meet goals, budgets, and schedules

Technical assistance can help Grantees overcome obstacles and problems that arise during project execution. Typically, when an MTAS perceives (through monitoring reviews of the Grantee) a key benefit that could be obtained or a deficiency in knowledge or approach that could be remedied, the MTAS recommends Technical Assistance to the FRA. The FRA wants to encourage a culture of learning and sharing of knowledge among its rail program participants. Providing Technical Assistance can accelerate learning, but does not relieve Grantees of their project responsibilities.

3.0 RECOMMENDED DOCUMENTS

Before performing Technical Assistance, the MTAS should obtain and review relevant documents, pending availability, some of which may be identified by the FRA, obtained from the Grantee, or other MTAS resources.

4.0 SCOPE OF WORK

Technical Assistance activities may include preparation, attendance, and participation in discussions, and presentation of materials. Presentations or teaching, training, and tutoring may be in the following formats:

- Structured sessions, similar to a teacher-student dynamic, such as:
    - With a single Grantee and its team
    - With groups in day-long or multi-day courses, teleconferences, or webinars
- Group or peer review workshops focused on a specific project
- Presentation in conferences or meetings, sponsored by the FRA or others such as legislative staff, other executive branch offices, industry associations, community groups, or professional organizations

The MTAS may develop materials such as briefings, agendas, papers, presentations, analyses, and other documents, and submit materials to the FRA for its use and possible publication. Example topics include:

- Capital program monitoring, including improvements to the Monitoring and Technical Assistance Program (MTAP)
- Edits and additions to the Monitoring Procedures (MP)
- Monitoring methods, including the following examples:
    - Cost estimating
    - Scheduling
    - Assessing and managing risk
    - Railroad operations modeling
- Case studies of capital projects on strategies and best practices for project development and delivery, including the following examples:
    - Infrastructure and service planning
    - Organization of leadership and project teams
    - Environmental reviews
    - Real estate acquisition and management
    - Risk assessments
    - Vehicle design and acquisition
    - Positive train control, signaling, and communications
    - Railroad safety
    - Railroad and station design
    - Construction phasing and staging
    - Testing before operations
- Analyses of trends in the following example areas:
    - Industry (agency or industry histories and practices)
    - Projects (costs, cost increases, schedule, risks, etc.)
    - Technology (vehicles, signaling, communications, etc.)

U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs

Monitoring Procedure 20 and 21– Project Management Plan (PMP) and Management & Technical Capacity/Capability (MTCC) Review

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1.0 PURPOSE

The Federal Railroad Administration (FRA) expects the Grantee to develop and complete its rail project(s) using sound project management strategies. The Monitoring and Technical Assistance Support's (MTAS) review of the Project Management Plan (PMP) and sub-plans, including the Management & Technical Capacity/Capability Plan (MTCC) will help the FRA determine whether the Grantee's legal, administrative, management, technical capacities, and capabilities are adequate to effectively and efficiently plan, develop, manage, and complete a Federally-assisted capital rail project. The MTAS should also recommend where improvements may be made.

This Monitoring Procedure (MP) is a guide. The FRA will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

The PMP is the Grantee's overarching project implementation plan that spans the entire project period. It should be a guide for action. The PMP should describe the Grantee's authority, capacity, policies, practices, and procedures related to all phases of the project, and should set forth the specific action plan for implementing the project and managing the scope, cost, schedule, quality, and associated risks to successfully deliver the project as agreed to with FRA.

MTAS areas of focus on the Grantee should include:

- The Grantee's "extended team"– executive leadership, project team, host railroads, consultants and contractors on the Grantee's team, other partners, and third-party contributors
- Extended Team structure and capabilities, including:
    - Organization
    - Personnel qualifications and experience
    - Team members' understanding of their project roles and the project's critical issues
- Grantee's overall approach to the work, including:
    - Policies and procedures
    - Use of project control methods to:
        - Develop and update cost estimates and schedules
        - Collect costs and measure against the Work Breakdown Structure (WBS); forecast cost-to-complete
        - Identify, manage, and mitigate risks; identify variances
        - Develop recovery plans

3.0 RECOMMENDED DOCUMENTS

The MTAS should review the following Grantee-generated documents as required by the grant agreement:

- Project Management Plan (PMP) and other sub-plans, if applicable – provide context and are necessary for the MTAS's evaluation of the Grantee's management and technical capacity and capability
- Management & Technical Capacity and Capability Plan (MTCCP) – may be a PMP sub-plan prepared by the Grantee before each project phase begins, or at least, very early in each project phase

The MTAS should also review the Grantee's agreement(s)/draft agreements with the FRA; contracts with consultants and contractors, railroads, and other parties, as available.

4.0 SCOPE OF WORK

The MTAS should review the Grantee's PMP and should review sub-plans, as applicable. PMP submittals are typically provided once per project phase, although interim submittals may be required for particularly long phases or gaps between phases; changes in policies, procedures, or procurement methods; changes in organization leadership or responsibilities; and changes in program, logistics, or scope.

For each phase below, at the direction of the FRA, the MTAS will detail its observations, conclusions, and recommendations in a manner consistent with the general report outline in MP01 Appendix B. The MTAS should consider the adequacy and soundness of the Grantee's deliverables for this phase and readiness for the next phase. If the MTAS determines that the Grantee is inadequate or weak because of its organization, personnel qualifications and experience, or approach or ability to perform the work, the MTAS will make recommendations for corrective action and a time frame for the action for FRA consideration.

Appendix A and Appendix B include PMP and MTCC Tables of Contents (TOC), respectively. Using these TOCs as a guide, the Grantee may provide the FRA with documents developed to the level of completeness shown for each phase depending on the FRA's requirement. Also, the Grantee will appropriately scale the documents to the complexity and size of the project based off FRA direction.

4.0.1 Project Management Plan

The PMP should demonstrate the Grantee's technical capacity and ability to:

- Effectively and efficiently manage the proposed project (Note: While not applicable to most grants/projects, some grants only fund certain scope elements). In these cases, the MTAS requires direction from the FRA as to whether they should review the PMP with an eye toward the grantee's ability to 1) deliver the entire project (not just the elements funded by the grant) or 2) deliver the elements funded by the grant.
- Recognize and cooperate with project oversight activities by the FRA/MTAS
- Provide directly or by contract:

    - Adequate professional and technical expertise for environmental clearance, service planning, project design and construction, Buy America and equipment/rolling stock procurement, as appropriate
    - Qualified services for testing and start-up work
    - Qualified services for construction inspection and supervision, including inspection/supervision of environmental mitigation and other federal requirements such as the Davis-Bacon Act
- Validate the project conforms with:
    - Grant agreements
    - Applicable statutes
    - Regulations, codes, and ordinances
    - Safety standards
- Provide an operations and maintenance plan for ensuring continuous use and upkeep following project completion Establish and maintain adequate internal controls for:
    - Scope, cost, schedule, and risk, as related to design and construction
    - System operations and service schedules
    - Financial planning and reporting for capital and operations
    - Adequate staffing for each project stage (e.g. oversight personnel, designers, and contractors)
    - Overseeing/monitoring sub-Grantees as well as professional consultants

For Grantee PMP submissions during each phase, the MTAS should consider the following:

- Usefulness as an overarching project implementation plan
- Adequacy and soundness of PMP elements and sub-plans, including the MTCC
- Level of completeness for current phase and readiness for the next phase

4.0.2 Management & Technical Capacity/Capability

The MTAS should evaluate the Grantee's approach to the following:

- Management of professional staff and construction contractors to progress the work
- Management of third-party contracts in compliance with Federal requirements
- Compliance with federal and FRA grant provisions and reporting requirements, for example:
    - Title VI of Civil Rights Act of 1964, Disadvantaged Business Enterprise (DBE)
    - Americans With Disabilities Act
    - Uniform Property Acquisition and Relocation Act of 1970
    - Construction program assurances as described in SF424-d
    - Requirement for matching funds and related intergovernmental/local agreement
- Management and technical capacity and capability to perform specific aspects of the work, such as:
    - Conducting planning analyses for corridor and train capacity, operations, ridership, and infrastructure
    - Designing and engineering the project
    - Developing/delivering the project so that it meets goals, objectives, and outcomes
    - Responding in a timely manner to RFIs from, FRA, MTAS, etc.
    - Developing/implementing a sound community relations program

    - Accounting for real estate acquisitions and relocations; maintenance of a project property inventory
    - Developing/implementing safety and security measures
    - Cost estimating and scheduling

Regarding the Grantee's organization, personnel qualifications, and experience, the MTAS should evaluate and assess the following:

- The completeness of the organizational information provided and whether the organizational structures are conducive to effective and efficient project implementation
- The roles, responsibilities, and interfaces among the Grantee's team:
    - Assess the effectiveness of the lines of authority and responsibility between the executive leadership and the project team, and between the project team and partners and third-parties. Include the:
        - Executive leadership
        - Project team of staff, consultants, and contractors
        - Partners including host railroads and other transportation entities, as well as state, regional, and local jurisdictions
        - Third-party contributors to the project program
    - Assess whether the Grantee possesses the appropriately qualified staff and/or third-party consultants to (see Appendix C of this MP for a sample):
        - Obtain support and incorporate requirements from jurisdictions through which the project passes; from third parties including railroads, utility companies, and adjacent parcel owners
        - Secure and administer the required local funding
        - Conduct planning, feasibility studies, alternatives analyses, as well as environmental reviews
        - Design, and manage the project construction using appropriate delivery method(s), e.g. design/bid/build, design/build, construction management/general contractor (CM/GC), etc.
        - Maintain operations on the existing rail system at the same time as adding infrastructure and service
        - Acquire and commission vehicles
- The agency's history of performance, financial stability, adequacy of management systems, and conformance with the terms of previous FRA awards, etc.
- The Grantee's agreements/draft agreements with the FRA, as well as its contracts, and agreements with railroads, and other parties
- The Labor Hour Distribution and Staffing Plan over the project life (see Appendix D and Appendix E for examples), and assess the adequacy of staffing and project budget for staffing
- The adequacy of the Grantee's physical resources to effectively advance the project, such as office space, equipment, and furnishings

Regarding the description of management processes and procedures, the MTAS should evaluate the Grantee's processes and procedures related to:

- Agency board decision-making authority
- Agency and project leadership and executive staff decision-making authority

- Legal services
- Procurement services
- Financial planning and management such as developing budgets for capital projects and operations; securing matching funds; managing cash flow
- Community outreach

Regarding the resumes of project team members, the MTAS should:

- Evaluate the resumes of project team members
- Conduct personal interviews of Grantee leadership and key staff (See Appendix F for sample questionnaire)

4.1 Preliminary Review

After receiving the Grantee's submission, the MTAS, upon FRA direction, will scrutinize for adequacy and completeness. If the submission is unsatisfactory, the MTAS will notify FRA (email summary is sufficient). If directed, the MTAS will provide technical assistance to the Grantee. The Grantee would then complete the necessary revisions and resubmit.

4.2 Planning and Conceptual Design

The FRA, with input from the MTAS, may recommend that the Grantee conduct a PMP workshop to establish an atmosphere of partnership and collaboration and help define baseline standards of performance for project management. Collaboration among the Grantee's leadership and project teams, the FRA, host railroads, other transportation agencies, and other relevant third parties early in the project life increase understanding of requirements, responsibilities, and authorities. Vital project implementation topics can also be fully explored. The FRA may explain the oversight process. Discussion topics may include:

- Elements and sub-plans of the PMP
- Agreements required
- Real estate requirements; eminent domain authority and protocols
- Service planning methods
- Environmental process, and permitting requirements and protocols
- Delivery methods, authorities, and protocols

The MTAS should review the PMP for the Grantee's description of its intended management approach to:

- Planning and Concept Design (refer to **MP32A**), including:
  - Establishment of project rationale, goals, objectives, and desired outcomes
  - Establishment of the range of alternatives; screening and selection; Alternatives Analysis Report
  - Service planning criteria and analysis; Service Development Plan
  - Agreements among project stakeholders
  - Ridership analysis
  - Criteria for station location and infrastructure design
  - Environmental analysis; Tier I NEPA, Service NEPA
  - Public participation

    - Financial planning
- Roles and responsibilities and the interaction of various project participants

4.3 Agreements among Project Stakeholders

The MTAS should discuss with the FRA the expectations for agreements within individual projects and then proceed with monitoring accordingly. Unless otherwise determined by FRA, agreements are required to be complete and accepted by the FRA prior to start of Final Design and/or construction or the related expenditure of funds for Final Design and/or construction.

- Construction and Maintenance Agreements are agreements that set the terms for the construction of the project including all appropriate Federal flow down requirements, commitment to construct the project, and terms for long-term maintenance. The agreements are between the Grantee/rail project sponsor and host railroad or any railroad owning property on which the project is to be undertaken.

- Any agreements necessary to operate service over the infrastructure improved with FRA grant funding (e.g. Operating Agreement between the passenger train operator and the host railroad).

- Service Outcome Agreements (SOA), as applicable, are for quantified performance benefits such as additional daily round trips, improved on-time performance or fewer minutes of delay, reduced scheduled trip times, and increased capacity. The agreements include provisions on enforcement and dispute resolution, the term of the agreement, modification procedures, and, at a high-level, maintenance and operations commitments related to the project. Each SOA is uniquely tailored to the parties and project conditions, however all SOAs contain enforceable written commitments made by project stakeholders to ensure the successful improvement of passenger rail service through an FRA-funded project. Usual signatories include the Grantee, the service operator, and the host railroad or owner of the rail line.

4.4 Preliminary Engineering (PE)/NEPA (refer also to MP39)

The MTAS should assess the Grantee's project management approach to Preliminary Engineering (PE) (see Section 4.0.2). The PMP should demonstrate a well-conceived plan for the design process and project controls. The MTAS should review the adequacy and soundness of the Grantee's PMP for:

- Demonstration of Technical Capability and Capacity to perform the work of this phase and adequately prepare for the next, including leadership and sufficient professional expertise to complete the work
- National Environmental Policy Act (NEPA) Coordination: Verify that the Grantee's environmental review is consistent with FRA policy, and that plans for managing and implementing environmental mitigations are incorporated into design documents, cost estimates, and schedules
- Design Control:
    - Confirm the Grantee's plans and procedures are appropriate for design control, including establishment of design criteria; reviews for consistency with the service plan goals; value engineering; life-cycle cost; and safety/security considerations

    - Confirm procedures for incorporating comments/changes to drawings and specs
    - For Design Bid Build or Design Build, confirm the PMP stipulates an appropriate level of completion of drawings and specifications
- Project Control:
    - Review the Grantee's control procedures for documents, cost, and schedule with the project team and third parties and assess how well they are followed
    - Review the Grantee's baselines for the capital cost estimate and schedule
    - Verify that a risk assessment has been conducted before PE completion, including risk identification, assessment, mitigation, and development of adequate contingency amounts for cost and schedule at project hold points
- Project Delivery and Procurement:
    - Review the Grantee's plan for selecting the project delivery and procurement methods; verify the selected methods are reflected in project schedules and cost estimates; for Design Build, confirm that Grantee is implementing appropriate plans and procedures for project delivery and procurement.
    - Evaluate the Grantee's proposed approach to construction management, bidding/awarding contracts, and procuring materials, equipment, and vehicles
- Review PMP sub-plans for adequacy and soundness as applicable. Sub-plans may include:
    - Grantee Technical Capacity and Capability (Section 4.0.2)
    - Quality Assurance/Quality Control (**MP24**)
    - Safety and Security Management (**MP22**)
    - Real Estate Acquisition and Management (**MP23**), especially as related to Right-of-Way (ROW) and utilities; consistency with The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act)
    - Rolling Stock Acquisition and Management (**MP38**)

4.5 Final Design Review

The MTAS should assess whether the Grantee's project management approach is suitable to carry the project through bid, award, construction, and into revenue operations. For Design-Bid-Build, the Grantee's design team will conduct Final Design (refer to **MP39**). The MTAS should assess the adequacy and soundness of the Grantee's PMP for:

- Demonstration of Technical Capability and Capacity to perform the work of this phase and adequately prepare for the next, including adequate leadership and sufficient professional expertise to complete schematic design/design development for track, structures, signals, and stations.
- National Environmental Policy Act (NEPA) Coordination—Verify Grantee incorporates mitigation work into the design documents, cost estimates, and schedules
- Design Control—Confirm that the Grantee has implemented appropriate plans and procedures for design control. In particular, confirm that:
    - Plans and procedures are consistent with design criteria
    - Coordination and change control procedures are in place across design disciplines
    - Soil testing and site surveys are complete and adequate
    - Coordination with third parties is adequate
    - For Design Bid Build, project documents for bidding are complete

- Project Controls—Confirm that Grantee is implementing project controls in all aspects, including procedures for:
    - Cost and schedule control
    - Risk management (see that a risk assessment "refresh" is conducted during Final Design, including risk identification, assessment and mitigation, and development of adequate contingency amounts for cost and schedule at project hold points)
    - Dispute resolution during construction
- Project Delivery Method (refer to **MP32D**):
    - Confirm Grantee's plans and procedures for project delivery and procurement
    - Review Grantee's schedule for bidding construction/procuring vehicles
    - Review division of labor between railroad forces (Force Account) and contractors
- Labor Agreements, Labor Policies
- Review PMP sub-plans as noted for PE above
- Assess plans and procedures for readiness to start construction of fixed infrastructure:
    - Construction administration
    - Construction management
    - Construction inspection
    - Coordinating construction work by third parties
    - Construction phasing plans—sequencing the work
    - Staging plans—site logistics
    - Construction change order and shop drawing document flow
- Assess the Grantee's plan for readiness for Startup and Operations, including:
    - Testing of systems and equipment
    - Coordination with other transportation entities
    - Training of train engineers and crews, station attendants, personnel for maintenance facilities, track, signaling, and roads
    - Commissioning of stations, maintenance facilities
    - Closeout of construction contracts

4.6 Construction

The MTAS should review the construction portions of the PMP in Final Design, as noted above, at 40 percent bid (mid-stream to allow course correction if needed), and at 50 percent constructed (again mid-stream to allow course correction if needed). The MTAS should update its evaluation of the Grantee's application of the following:

- Technical capability and capacity to perform the work of the construction phase and adequately prepare for operations; including evaluation of adequacy of railroad force account work—scheduling of crews, types and numbers of crews
- Implementation of environmental mitigation measures as part of construction
- Implementation of its procedures for configuration and control during construction of contract documents/shop drawings/change documents
- Use of project controls—for documents, cost, schedule, risk, and dispute resolution
- Adequacy of construction inspection and administration
- Compliance with labor agreements and related policies
- Use of construction management and administration procedures

- Follow through on plans and procedures in PMP sub-plans, as applicable

4.7 Post-Construction

The MTAS should review the operations and maintenance portions of the PMP during construction, at 80 percent constructed (before substantial completion to allow course correction if needed). The MTAS should review the adequacy and soundness of the Grantee's PMP to:

- Demonstrate the Technical Capability and Capacity as well as a funding source for the continuous use and maintenance of the project property in accordance with applicable agreements
- Assess the Grantee's plan for readiness for operations and maintenance. The MTAS should:
    - Determine if an operating agreement is in place to ensure continuous intercity passenger rail service using the project property for the required 20 year period in accordance with applicable agreements
    - Determine if an agreement or plan is in place to ensure project property maintenance requirements are met for the next 20 years in accordance with applicable agreements

APPENDIX A Sample PMP Table of Contents

KEY
P – Preliminary or draft
C – Complete
M – Modification is needed

Sample PMP Table of Contents					
	Elements	Planning	PE	Final Design	Construction
1.0	**Introduction**				
	Purpose of the Project Management Plan	C	M		
	Project History	C			
	Project Scope	P	C		
	Schedule	P	C	M	M
	Budget	P	C	M	M
	Finance Plan	P	C	M	M
	Delivery Strategies	P	C		
2.0	**Project Leadership and Team Organization**	P	C		
	Grantee Leadership Organization Chart, roles/responsibilities	C			
	Project Team Organization Chart, roles/responsibilities	C	M	M	M
	Contact information for all project personnel	C	M	M	M
	Plan to provide Technical Capacity and Capability, if applicable (see Sub-Plan below)	P	C	M	
3.0	**Government/Community/Labor Relations and Railroad Agreements and other Third Party Agreements**	C			
	Plan for management of: • Legislative and government relations • Intergovernmental and utility agreements • Stakeholder communications, public participation • Agreements with host railroads and other transportation entities • Labor relations including project labor agreements, establishment of wage rates and classifications, wage and hour requirements, and adherence to state and local requirements, etc.	P	C	M	M
4.0	**Planning/Concept Design**				
	Plan for management of Alternative Analysis including: • Establishment of project rationale • Identification and selection of alternatives • Management of development of infrastructure and service plans • Management of process to achieve performance measures	C			

APPENDIX A Sample PMP Table of Contents

KEY
P – Preliminary or draft
C – Complete
M – Modification is needed

Sample PMP Table of Contents					
	Elements	Planning	PE	Final Design	Construction
5.0	Environmental Analysis	P	C		
	Description of approach to environmental analysis including: • Development and management of alternatives • Management of resource agency permit acquisition • Management and implementation of mitigation actions	P	C	M	
6.0	Design Control				
a	Description of relationship between service plans and infrastructure - capacity, operations, stations, support facilities; • Plan for management of service outcome agreement, if applicable • Plan for management of other agreements related to service and operations	P	C	M	
b	Plan for Design Standards and Criteria	P	C	M	
c	Plan for investigation and testing including site surveys, geotechnical and materials investigation before and during design, and during construction	P	C	M	M
d	Plan for Preliminary Engineering	P	C		
e	Plan for development and management of Final Design		P	C	
f	Plan for safety and security, if applicable (see Sub-Plan below)	P			
g	Plan for QA QC, if applicable (see Sub-Plan below)	P	C		
h	Plan for real estate RAMP, if applicable (see Sub-Plan below)	P	C		
i	Plan for rolling stock, if applicable (see Sub-Plan below)	P	C		
j	Plan to manage changes, configuration control for design/construction	P	C	M	M
k	Plan for management of design reviews including: • Value engineering • Coordination reviews • Constructability reviews • Reviews for operations and maintenance • Other peer or industry reviews	P	C	M	

APPENDIX A Sample PMP Table of Contents

KEY
P – Preliminary or draft
C – Complete
M – Modification is needed

Sample PMP Table of Contents					
	Elements	Planning	PE	Final Design	Construction
7.0	**Management and Project Controls**				
a	Scope Control and Configuration – approach to management	P	P	C	
b	Budget and Cost Control – approach to management including descriptions of cost estimating methodologies and assumptions	P	P	C	
c	Schedule Control – approach to management including descriptions of scheduling methodologies and assumptions	P	P	C	
d	Risk Control – approach including risk identification, evaluation, management; including contingency control	P	P	C	M
e	Overall Project Tracking and Reporting	P	C	M	
f	Document Control and Records Management – including approach to review, track changes, distribution, storage	P	C	M	
g	Dispute/conflict resolution plan	P	P	C	
8.0	**Project Delivery, Procurement, Contract Administration**				
	Contracting Authority	C			
	Procurement Strategy – selection of delivery methods	P	C		
	Procurement Procedures (for design, legal, const. contracts)	P	C		
9.0	**Construction Management**				
	Construction Management Plan including: • Independent verification and validation • Construction inspection including materials testing procedures • Site logistics plan including maintenance of traffic/ops • Coordination with third parties affected by construction		P	C	M
	Construction Contract Administration including plan for: • Processing ship drawings, bulletins, RFIs • Negotiating and approving change orders and claims • Establishing substantial completion and final completion • Coordination with third parties interested in construction			C	M
10.0	**Start-Up, Revenue Operation, Construction Close Out**		P	M	C
	Plan for readiness testing for start-up and operations			C	M
	Plan for training of staff, train operators, others			C	M
	Construction contract close out, including obtaining warranties, testing results, O&M manuals, spare parts, etc.			C	M
	Administrative close out			C	M

APPENDIX A Sample PMP Table of Contents

KEY
P – Preliminary or draft
C – Complete
M – Modification is needed

Sample PMP Table of Contents					
	PMP SUB-PLANS, if applicable	Planning	PE	Final Design	Construction
11.0	Management and Technical Capacity/Capability Plan	P	C	M	
12.0	Quality Assurance, Quality Control Plan	P	C	M	
13.0	Safety and Security Management Plan	P	C	M	
14.0	Real Estate Acquisition and Management Plan	P	C	M	
15.0	Rolling Stock Acquisition and Management Plan	P	C	M	
16.0	Risk and Contingency Management Plan (RCMP)	P	C	M	M

APPENDIX B Sample Management & Technical Capacity/Capability (MTCC) Table of Contents

KEY

C – COMPLETE for each phase. Unlike other PMP Sub-plans in which a preliminary or draft document is further developed in subsequent phases, the items below must be fully provided for the current phase and, to the extent possible, be provided for the subsequent phase as well.

Sample Management & Technical Capability - Table of Contents					
	Elements	Planning	PE	Final Design	Construction
1.0	Approach to the Project				
	Description of Grantee's Approach to Project covering: • Planning/concept design • Preliminary Engineering • Final Design • Bidding through construction, testing, startup, rev operations	C	C	C	C
2.0	Organizational Charts				
	Organizational Charts for: • Grantee's executive leadership • Its project team of staff, consultants, and contractors • Its partners in the effort including host railroads, other transportation entities, as well as state, regional, and local jurisdictions • Third party contributors to the project program	C	C	C	C
	Staff Qualifications and Experience Chart	C	C	C	C
	Descriptions of roles, responsibilities, interfaces among key project team members through responsibility matrix	C	C	C	C
	Staffing Plan – Labor Hour Distribution over Life of Project	C	C	C	C
	Copies of relevant RFPs/Contracts/Agreements	C	C	C	C
3.0	Description of Management Processes and Procedures				
	Agency Board decision-making authority	C	C	C	C
	Agency Leadership and Executive Staff decision-making authority	C	C	C	C
	Project Leadership and Executive Staff decision-making authority	C	C	C	C
	Legal services for contracts, ADR	C	C	C	C
	Financial Management, funding approval processes/authorities	C	C	C	C
	Procurement services	C	C	C	C
	Community outreach and relations, interface with state and local agencies and media; public hearings	C	C	C	C
4.0	Resumes of Project Team Members	C	C	C	C

Staff Qualifications and Experience

								Qualifications		Experience (Mark with "X")												Proposed Time on Project (%)				
Discipline	Specialty	Person's Name	Title	Organization	Years of Experience	Years w/ Organization	Years w/ Current Project	Education	Prof. Reg.	Service Planning	Infrastructure Planning and Design	Safety and Security	Real Estate	Environmental Analysis	Financial Planning	Project Controls	Systems & Vehicles	Testing for Rev Ops	Procurement & Contracting for Construction	Construction Management	Current Time (%)	PE	FD	CON	Start Up	Ops

APPENDIX D Sample Labor Hour Distribution over the Life of Project

Agency Staff – Project Labor Distribution (FTE)														
			2014 (one year only shown for example)											
Position	Person's Name	2014	Jan	Feb	Mar	Apr	May	June	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
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
Administrative Assistant/Reception		-	-	-	-	-	-	-	-	-	-	-	-	-
Civil Systems Integration Manager		0.2	0	0	0	0	0	0	0.4	0.4	0.4	0.4	0.4	0.4
Chief of Staff		1	1	1	1	1	1	1	1	1	1	1	1	1
Electrical Engineer		0.5	0	0	0	0	0	0.5	0.5	1	1	1	1	1
Senior Civil/Structural Engineer		-	-	-	-	-	-	-	-	-	-	-	-	-
Administrative Assistant		-	-	-	-	-	-	-	-	-	-	-	-	-
Director's Office FTE Total		24	1.3	1.3	1.3	1.3	1.3	1.8	2.2	2.7	2.7	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
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
Project Manager		0.2	0	0	0	0	0	0	0.4	0.4	0.4	0.4	0.4	0.4
Project Development Manager		1	1	1	1	1	1	1	1	1	1	1	1	1
Project Development Coordinator		0.5	0	0	0	0	0	0.5	0.5	1	1	1	1	1
Administrative Assistant		-	-	-	-	-	-	-	-	-	-	-	-	-
Project Development FTE Total		24	1.3	1.3	1.3	1.3	1.3	1.8	2.2	2.7	2.7	2.7	2.7	2.7
Civil Engineering Manager														
Senior Civil Engineer														
Senior Architect														
Architect														
Civil Engineer														
Permits Administrator														
Permit Assistant														
Senior Civil Engineer														
Civil Engineer														
Right of Way Assistant														
Administrative Assistant														
CADD Operator														
Civil Engineering FTE Total														
Systems Engineering Manager														
Engineering Systems Inspector														
Senior Systems Engineer														
Systems Engineer														
Systems Engineer														
Senior Systems Engineer														
Senior Systems Engineer														
Administrative Assistant														
Systems Engineering FTE Total														
etc.														
Project Controls FTE Total														
etc.														
Construction Management FTE Total														
etc.														
Environmental FTE Total														
etc.														
Real Estate FTE Total														
etc.														
TOTAL AGENCY FTE	48	2.6	2.6	2.6	2.6	2.6	2.6	3.6	4.4	5.4	5.4	5.4	5.4	5.4

Consultant – Project Labor Distribution (Hours/FTE)

			2014 (one year only shown for example)											
Position	Person's Name	2014	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Project Management and Control		669		54	77	61	80	61	64		54	77	61	80
Project Manager		779	40	50	96	61	80	61	64	40	50	96	61	80
Project Controls Mgr.		168	40	8	10	8	10	8	8	40	8	10	8	10
Project Controls		876	8	80	96	76	100	76	80	8	80	96	76	100
Administrative Support		393	40	48	58	15	20	15	16	40	48	58	15	20
QA Manager		171		16	19	15	20	15	16		16	19	15	20
Service Planning Manager		172		16	19	15	20	16	16		16	19	15	20
Environmental Analysis Manager		0												
Systems Integration Mgr.		520		48	58	46	60	48	48		48	58	46	60
Design Integration Engineer		689		64	77	61	80	61	64		64	77	61	80
Vehicle Manager		0												
Electrification System Mgr.		940	40	80	96	76	100	76	80	40	80	96	76	100
Utilities Coordination		171	0	16	19	15	20	15	16	0	16	19	15	20
QC Manager		0	0	0	0	0	0	0	0	0	0	0	0	0
Quality Control		0	0	0	0	0	0	0	0	0	0	0	0	0
System-wide Electrical		0												
System-wide Electrical Mgr.		940	40	80	96	76	100	76	80	40	80	96	76	100
System-wide Electrical		174	0	16	19	16	20	16	16	0	16	19	16	20
Quality Control		72	0	0	0	0	20	16	16	0	0	0	0	20
Signal System Mgr.		623	48	58	48	60	46	48	55	48	58	48	60	46
Civil Coordination		623	48	58	48	60	46	48	55	48	58	48	60	46
Quality Control		0	0	0	0	0	0	0	0	0	0	0	0	0
Communications System		0												
Communications System Mgr.														
etc.														
etc.														
etc.														
etc.														
etc.														
etc.														
Total Hours		7980	304	692	836	661	822	656	694	304	692	836	661	822
Total FTE's based on 160 hours/month		49.875	1.9	4.33	5.23	4.13	5.14	4.1	4.34	1.9	4.33	5.23	4.13	5.14

Total Project Labor Distribution (FTE)

			2014 (one year only shown for example)											
Position	Person's Name	2014	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Total Agency FTE		48	2.6	2.6	2.6	2.6	2.6	3.6	4.4	5.4	5.4	5.4	5.4	5.4
Total Consultant FTE		49.9	1.9	4.3	5.2	4.1	5.1	4.1	4.3	1.9	4.3	5.2	4.1	5.1
Total		97.9	4.5	6.9	7.8	6.7	7.7	7.7	8.7	7.3	9.7	10.6	9.5	10.5

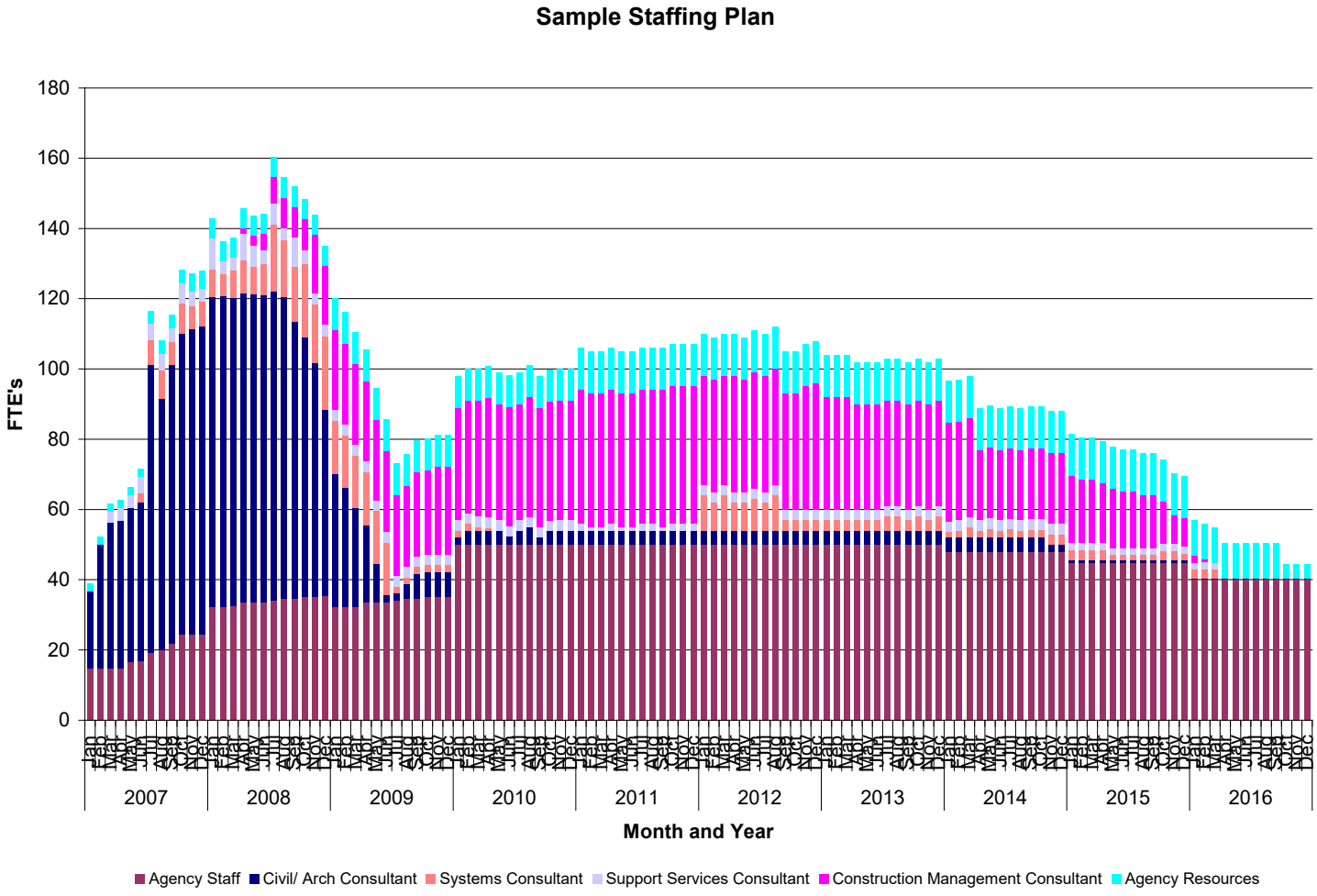

Figure 1. Sample Staffing Plan over Project Life

U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs

Monitoring Procedure 22 – Safety and Security Management Review

1.0 PURPOSE

This Monitoring Procedure (MP) describes the Monitoring and Technical Assistance Support's (MTAS) review and analysis of the Grantee's implementation of Federal requirements for safety and security management.

This MP is a guide. The Federal Railroad Administration (FRA) will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

Safety and security should be considered as a top priority and incorporated into the work of planning, design, construction, and testing of rail projects, so that during operation, safety and security risks are reduced and safe transport of passengers and freight is ensured.

3.0 RECOMMENDED DOCUMENTS

The MTAS should obtain and review the documents listed in Section 3.0 of the following MPs (if applicable) to the Grantee's project under review. If the particular MP reviews have not been completed, the MTAS should review the documents that are detailed in the MPs below to assist in their review of the Safety and Security Management Plan (SSMP):

- MP20 – Project Management Plan (referencing Safety and Security Management Plan) and Management & Technical Capacity/Capability Plan (MTCC)
- MP32A – Planning and Concept Design
- MP32C – Project Scope Review
- MP38 – Vehicle Acquisition and Management
- MP39 – Preliminary Engineering and Final Design

4.0 SCOPE OF WORK

After consultation with the FRA Project Manager, referring to the documents in 3.0 above, and the conditions at the project sites, the MTAS may perform the review as follows. The MTAS should review each section of the SSMP and provide their assessment and recommendations for improvement, if necessary. In addition, the MTAS will coordinate with the FRA Office of Railroad Safety personnel to confirm that they conduct their reviews. The review under this MP is ideally performed once per project phase. At the direction of the FRA, the MTAS will detail its observations, conclusions, and recommendations in a manner consistent with the general report outline in MP01 Appendix B.

1. Plan the review – based on activities, documentation, committees, and responsibilities identified in the Grantee's Safety and Security Management Plan (SSMP), prepare a list of documents and materials to review, individuals to interview, and sites to visit; and a schedule for the interviews and site visits

2. Safety, Security — Threat, Vulnerability, Hazard Analyses – Coordination of reviews by the FRA and DHS
    - Obtain the established coordination plan between the FRA Railroad Policy and Development and the FRA Office of Safety; in accordance with the SSMP, verify that reviews and approvals by the Office of Safety are performed in a timely manner
    - Confirm that the FRA Office of Safety staff reviews and approves the Grantee's policy, process, and procedures prior to Grantee's start of the analyses; and
    - For security related analyses and designs, verify that the Security Officer within the FRA Office of Safety provides a review and also obtains reviews as required from the Department of Homeland Security, Transportation Security Administration, etc.

3. Assess the Grantee's project documents, SSMP, and Threat/Vulnerability/Hazard Analysis. This could include Preliminary Hazard Analysis (PHA), Collision Dazard Analysis (CHA), Systems Hazard Analysis (SHA), and a variety of reliability analyses, including Failure Modes Effects and Criticality Analysis (FMECA). Consider whether the analysis is adequate and whether the proposed infrastructure and operations planning and design facilitates the following objectives:
    - Protect life, prevent accidents and injuries for
        - Pedestrians and bicyclists at stations
        - Pedestrians, bicyclists, and autos at grade crossings
        - Train passengers
        - Train crewmembers
    - Protect property
    - Control and minimize the effects of all incidents and accidents
    - Minimize effects of derailments with primary and secondary collisions.[i]
    - Eliminate/mitigate hazards and reduce vulnerability to security threats
    - Prevent release of hazardous materials
    - Create a safe connected rail network infrastructure
    - Create safe operating conditions given the proposed railroad infrastructure conditions and train traffic

4. Interview the Grantee 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.

5. Assess the consistency between the Grantee's SSMP, hazard analysis, risk analysis, and the Grantee's activities and processes; and assess both for consistency with the FRA's safety regulations.

6. The FRA Office of Safety is responsible for field inspections and final regulatory inspections. The MTAS will coordinate with the FRA and confirm that the reviews and approvals are obtained from the FRA Office of Safety staff for the following:
    - During concept design, preliminary engineering and final design
        - Highway-Rail Crossing and Trespasser Prevention including quiet zones
        - Motive Power and Equipment
        - Signal and Train Control
        - Track
        - System Safety Program
    - During construction
        - Field inspections (periodic and final) and certifications where applicable, e.g., PTC
    - During pre-revenue testing
        - Testing plans, verification of integrated testing, and certifications where applicable, e.g., PTC

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

4.1 SSMP Report

Typical contents of SSMP:

1. Management Commitment and Philosophy
    - Safety and Security Policy Statement
    - Overarching Goal
    - Applicability and Scope

2. Safety and Security Integration into Project Development
    - Safety and Security Activities
    - Safety and Security Procedures and Resources
    - Agency/Grantee Management Interfaces
        - Organization Chart
        - Identification of Safety and Security Decision Makers
        - Defined Interfaces for Grantee staff and construction contractors

3. Safety and Security Responsibility Assignments
    - Responsibility and Authority
    - At project transition points, e.g. from Preliminary Engineering (PE) to Design-Build contract; from PE to Final Design; from Final Design to Construction, etc., demonstration of proper turnover of materials, information, and plans to new project team members
    - 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 Certification Committee
    - Safety and Security Responsibilities Matrix
        - Designated Function for Safety
        - Designated Function for Security
        - Construction Safety
        - Project Manager (Executive)
        - Operations Manager

4. Safety and Security Design Criteria
    - Approach to Development of Design Criteria
    - Design Reviews
    - Deviations, changes, configuration control

5. Safety and Security Analysis
    - Preliminary Safety and Security Analysis
        - Hazard Analysis and
        - Threat and Vulnerability Analysis
        - Health Hazard Analysis
            - Systems, subsystems
            - Failure modes, effects, criticality analysis

6. Process for Ensuring Qualifying Operations and Maintenance Personnel
    - O&M Personnel Requirements
    - Plans and procedures
    - Training Program
    - Emergency Preparedness
    - Public Awareness

7. Safety and Security Verification Process
    - Design Criteria Verification Process
    - Construction Specification Conformance Process
    - Testing and Inspection Verification
    - Hazard and Vulnerability Resolution Verification
    - Operational Readiness Verification
    - Safety and Security Certification Requirements

8. Construction Safety and Security
    - Construction Safety and Security Program Elements
    - Construction Phase Hazard and Vulnerability Analysis

9. The Office of Safety reviews and coordination for compliance with regulations

10. U.S. Dept. of Homeland Security coordination

[i] U.S. Department of Transportation, Federal Railroad Administration, "Collision Hazard Analysis Guide: Commuter and Intercity Passenger Rail Service," October 2007

Monitoring Procedure 23 – Real Estate Acquisition and Management Plan Review

1.0 PURPOSE

This Monitoring Procedure (MP) describes the Monitoring and Technical Assistance Support (MTAS) review and analysis of the Grantee's plan for and implementation of real estate (RE) acquisition and management.

This MP is a guide. The Federal Railroad Administration (FRA) will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

On major capital projects, real property acquisition and relocation components represent substantial project risk; therefore, the Grantee should focus on the real estate work early in the Planning and Preliminary Engineering (PE) phases. In addition, the Grantee's project team should include individuals with real estate expertise and an understanding of the risks that real estate can pose to project schedule and cost.

3.0 RECOMMENDED DOCUMENTS

In order to perform the review, the MTAS will obtain the Real Estate Acquisition and Management Plan (RAMP) and supporting documents (depending on the phase, obtain project cost estimate and schedule documents listed in Section 3.0 of MP32A Planning and Concept Design or 39 Preliminary Engineering and Final Design), pending availability.

In addition, the MTAS should access the Uniform Act Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended (Uniform Act) and the most current implementation regulations contained in 49 CFR 24 Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally-assisted Programs.

4.0 SCOPE OF WORK

The MTAS should confirm that the Grantee's RAMP includes the contents in Appendix A below, and aligns with the following principles:

1. Completeness of real estate information, consistency, and appropriate level of detail (for project phase)
2. Real estate cost estimates and schedules are complete, realistic, and fit within the accepted overall project cost estimate and schedule

3. Real estate risks are identified and potential impacts on project scope and cost are evaluated and mitigated

At the direction of the FRA, the MTAS will detail its observations, conclusions, and recommendations in a manner consistent with the general report outline in MP01 Appendix B.

Real estate work on the project should meet the requirements of all State, local and Federal laws, regulations, and guidance associated with acquiring real estate, including the Uniform Act and the most current implementation regulations contained in 49 CFR 24 Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally-assisted Programs.

The MTAS should evaluate:

1. Grantee's approach
    a. Adequacy and soundness of the Grantee's organizational structure relating to real estate acquisition management
        i. Identification of the individual(s) responsible for performing property management, including contracts for demolition
        ii. Identification of persons or parties to establish offers of just compensation and authorize condemnation
        iii. Identification of consultant versus Grantee's in-house responsibilities, when consultant services are used
    b. Understanding of, and compliance with, all State, local and Federal laws, regulations, and guidance associated with acquiring real estate
    c. Early involvement with real estate work on the project
    d. Clear definition/flowchart of process for acquisitions and relocations

2. Tools and Document Control
    a. Use of document control/tracking tools, including management software, geographic information system (GIS), and database tools, to monitor RE status and avoid impacts
    b. Plan to deal with changes and corrections as a result of negotiations, etc.
    c. Plan for filing and maintaining documents, and organizing parcel and condemnation files
    d. Accounting approach and tools, including how Federal participation versus Grantee cost will be distinguished

3. Acquisition and Relocations Plan
    a. Map highlighting the parcels and spreadsheet to track parcels by:
        i. Description of properties and title info
        ii. Lengths of right-of-way and dimensions of parcels
        iii. Full and partial takes
        iv. Residential and non-residential displacements/relocations
        v. Information on major stakeholders and property owners
        vi. Foreseeable impacts due to the acquisitions and relocations

vii. Identification of properties that require environmental mitigation, extensive utility work, or third party coordination
- NOTE: Hazardous Material Potential - Has a search of historical uses of the parcel(s) been conducted? Has the cost and time to provide environmental mitigation been factored in?

b. Status of appraisals
c. Type of transaction (per parcel):
   i. Purchase, such as fee simple, etc.
   ii. Acquisition of other property rights, easements, etc.
   iii. Functionally replaced properties (wetlands, parklands, etc.)
   iv. Administrative settlements
   v. Eminent domain
   vi. Relocation/dislocation

4. Acquisition and Relocations Schedule
   a. Consistency between the RE schedule and project schedule
   b. Negotiations, offers of just compensation, and closing/escrows
   c. Potential condemnation proceedings
   d. Draft agreements and agreements
   e. Relocations- schedule for displacements/relocations showing their relationship with the critical path of the project schedule; schedule for negotiations, offers of just compensation, and closing/escrows
      i. NOTE: Re-sequencing of construction due to delayed real estate can result in major cost and schedule impacts to the project. For this reason, coordination between real estate acquisition and construction activities should be evaluated in the following areas:
         - 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/entity (such as a City) in real estate acquisition under Federal acquisition laws.
         - Acquisition of parcels from Railroads: Has the time and cost associated with obtaining agreements from railroads for acquiring parcels, obtaining easements, and performing legal reviews by Grantee and Railroad been considered?
         - 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.
      ii. NOTE: Additional Schedule Considerations
         - Appraisal: has the time to order and receive appraisals been considered?
         - Offer: is the time allowed for the property owner to accept the offer considered?
         - Negotiations: if the initial offer is not accepted by the property owner, what is the amount of time allocated to the Grantee to take additional measures

before proceeding to condemnation (if the Grantee has the authority for condemnation)?
- Quick take, condemnation, or eminent domain process: check the amount of time estimated for adequacy
- Grantee's board approval: check the Grantee has allowed adequate amount of time between offer acceptance or the settlement is reached and the Grantee's Board has approved
- Review time by funding agencies: has time been allowed for potential multiple agency concurrence (Federal, State, and local)?
- Title: following all approvals and concurrences, what is the time required to transfer ownership?
- Relocations: has the time for relocating business or residence been accounted for?

5. Acquisition and Relocation Costs
   a. Grantee's basis for the estimate; anticipated updates of the estimate
   b. How the estimate will be compared to actual costs as the project progresses
   c. Delineation between Federal participation and Grantee cost
   d. If available, the MTAS should review historical data for real estate acquisition in the immediate project area to assess cost uncertainties
      i. NOTE: Estimates for real estate are frequently low. FRA provides a model estimating spreadsheet to assist the MTAS in reviewing the Grantee's approach to estimating real estate costs (refer to Appendix B of this MP). The spreadsheet may help the MTAS to verify that all components are included in the estimate.
         - Additional costs due to partial acquisitions (damage to remainder)
         - Potential increase between negotiated costs and the appraised cost
         - Cost of demolition is in estimate
   e. Relocations: have all the costs of relocating the business or residence (for example replacement and moving costs) been included in the estimate?
   f. Court and Legal Costs: if a settlement cannot be reached, have court and legal costs been considered? Discuss whether "Cost to Cure" costs have been considered.
   g. Appraisals: cost of appraisals, review appraisals, survey, title, and closing: has escalation of appraisals versus the timing of actual acquisition been taken into account?
   h. Negotiations/Just Compensation: review the adequacy and soundness of the Grantee's plan for conducting negotiations:
      i. Who will negotiate?
      ii. What is their authority?
      iii. When will negotiations initiate?
      iv. Who should approve administrative settlements and other concessions to property owners?
      v. What is the documentation required during the negotiations process?
      vi. Who signs the offer letter?
      vii. Will the negotiator also handle relocation payments?
      viii. How is the interface between negotiations and condemnation handled?

ix. Which documents will the negotiator be expected to provide to legal for settlement and condemnation?
x. Will the negotiator be present at closing?
xi. Review the adequacy and soundness of the Grantee's plan for establishing an offer of just compensation including identifying responsible staff and the basis of the offer

i. Closing/Escrows:
  i. Who will provide this service?
  ii. How will it function?
  iii. What is the estimated length of time to deposit funds to escrow for closing?
  iv. Which documents will be necessary?
  v. What form of deeds will be used?
  vi. How will property taxes be paid and exempted?

j. Condemnation:
  i. Who will authorize suits?
  ii. Who will file?
  iii. What is the relationship between the Grantee and its legal personnel?
  iv. What authority does the attorney have for settlement?
  v. What are progress reporting requirements?

k. Appeals:
  i. What are the legal requirements for administrative appeals?
  ii. How will the agency establish and staff an appeal function?
  iii. Who is the recipient of appeal requests?
  iv. What is the appeal process?

APPENDIX A

Sample Table of Contents for Real Estate Acquisition Management Plan

	Real Estate Acquisition and Management Plan Elements
1	**Introduction** • Short history of project • Geographical description of project • Physical description of proposed acquisitions: number of parcels, total acquisitions, anticipated number of relocations, etc. • Control agreements, intergovernmental contracts, pending solicitations, etc.
2	**Agency's Real Estate Policies and Procedures** • Legal requirements: refer to applicable statutes, regulations, policies such as Uniform Act, various state laws, local requirements, etc. • General outline of process and authority to condemn • Summary of Agency Real Estate Manual
3	**Real Estate Team Organizational Structure** • Staff and contractor functions, resumes, description of roles and responsibilities • Org chart showing lines of authority, who can establish offer of just compensation, and who can authorize initiation of condemnation action • Grantee real estate staff and consultant experience is critical for reducing project risks and uncertainties. The MTAC should evaluate: (i) whether the Grantee has adequate experience in acquiring real estate per the requirements of the Uniform Act; and (ii) whether the Grantee has adequate capacity to meet the requirements of the project
4	**Acquisition Schedule** • Timeframe for acquisition and relocation; total length of time needed • Initiation dates and durations for key acquisition activities • Relationship of design to acquisition • Anticipated difficulties and potential delays • Progress reporting methods • Right of way critical path
5	**Real Estate Cost Estimate** • Background of estimate: when it was done; what was the basis • Need for any update of cost estimate • How estimate will be compared to actual costs as project progresses • Details for appraisals, negotiations/offers of just compensation, final costs
6	**Document Control** • How documents are filed, what length of time original paper documents will be maintained, organization of parcel files, condemnation files, etc.

APPENDIX A

Sample Table of Contents for Real Estate Acquisition Management Plan

	• Expected contents and organization of a typical file

7	**Acquisition Process**
	• Acquisition Plans: who prepares, who can modify, process for considering property owner's request to modify, etc.
	• Ownership and Title Information: how is this gathered, what is the contractual requirements, are those contracts in place, what is the process to update and correct errors and omissions
	• Appraisal: who will do appraisals, what is the contracting requirements if necessary, what is the estimate duration of this task, how may copies of appraisals will be obtained, will appraisals be shared with property owners
	• Appraisal Review process: who will do this task, what is the scope of the task in general, what is the turnaround time for this work, will the review handle updates of appraisals, will review handle modification of appraisal based on owner claims, will review be used to support administrative settlements
	• Establishment of Offer of Just Compensation: who does this, what is the basis of this offer
	• Negotiations: who will negotiate, what is their authority, who should 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 for settlement and condemnation, will negotiator be present at closing
	• Administrative Settlements: who will handle these, how do they originate, who prepares document, who can approve settlement, concurrent requirements
	• Closing / Escrows: 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 property taxes be paid and exempted
	• Condemnation: who will authorize suits, who will file, what is relationship between grantee and its legal personnel, what authority does attorney have for settlement, what are progress reporting requirements
	• NEPA impacts
	  ○ Pre NEPA ROD: draft agreements w/real estate third parties
	  ○ Post NEPA ROD: executed agreements w/real estate third parties

8	**Relocation Process** • Relocation Plan: owner, tenant information • Staffing and Administration: how will the relocation function be staffed, 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, who will provide advisory services, what is the claims payment process, what is the time to pay a relocation claims, what authority and controls will be needed for the advanced claims, what documentations will be retained in the files, what forms will be used

APPENDIX A

Sample Table of Contents for Real Estate Acquisition Management Plan

	• Scope: what is the anticipated extent of displacement, types of displacement, availability of replacement housing and business sites, contemplated problems associated with the displacements • Appeals: what are the legal requirements for administrative appeals, how will the agency establish and staff an appeal function, who is the recipient of appeal requests, what is the appeal process • Relocation Schedule, including critical path from project schedule • Cost estimate, negotiations, final costs, appeals
9	**Property Management & Disposition Plan** • For property acquired for project purpose: who will perform property management; what is the scope of work required; who contracts for demolition; what are reporting requirements; statement of policy regarding rental property for extended possession; policy regarding rental of property not immediately needed for project • For excess property: who will prepare and track inventory of excess parcels, what is the process to evaluate and determine when to sell excess; what is the disposition of proceeds; what are agency/state/local restrictions on the sale of public property
10	**Appendices** • Copies of internal procedures for various functions such as relocation and negotiations • Copies of standard forms used for key acquisition functions • Copies of acquisition and relocation brochures with a statement as to the need to update any of these documents

APPENDIX B

Real Estate Cost Estimate Template

Cost Estimate Template		Description/ 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					**$**

Monitoring Procedure 24 – Quality Assurance/Quality Control Review

1.0 PURPOSE

The success of a Grantee's capital project depends to a large degree on the Grantee and its design and construction contractors developing and executing a sound quality assurance and quality control (QA/QC) program. The purpose of this Monitoring Procedure (MP) is to describe how the Monitoring and Technical Assistance Support (MTAS) should review the Grantee's QA/QC program.

This MP is a guide. The Federal Railroad Administration (FRA) will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

The QA/QC program may be a component of a Grantee's Project Management Plan (PMP). At a minimum, it should define the functions, procedures, and responsibilities for designing and constructing a capital project.

- Quality Assurance includes planning quality management activities and verifying that those activities are carried out
- Quality Control includes implementing the quality management plan activities that will result in quality deliverables

Specifically, a typical QA/QC program should address, but not be limited to:

- Management responsibility
- Documented quality system
- Design and construction quality
- Document control
- Purchasing
- Product identification and traceability
- Material testing
- Inspection, measuring, and test equipment
- Corrective action
- Quality records
- Quality audits
- Training

3.0 RECOMMENDED DOCUMENTS

The MTAS should obtain current versions of documents appropriate to the current project development phase, including but not limited to:

- Project Management Plan
    a. QA/QC Program Plan (may be a PMP Sub-plan)
    b. Grantee Technical Capacity and Capability Plan (may be a PMP Sub-plan)
    c. Quality Management Plan

4.0 SCOPE OF WORK

This review will cover the assessment of the Grantee's QA/QC program. At the direction of the FRA, the MTAS will detail its observations, conclusions, and recommendations in a manner consistent with the general report outline in MP01 Appendix B

4.1 Quality Management Program

The MTAS should verify that the Grantee has documented, implemented, and maintained a Quality Management Program supporting the entire Grantee organization and the project. Procedures and activities may include document configuration and version control, design review, soil and material inspection, and material testing. The Grantee will set up an internal audit to ensure that the Quality Management Program functions as intended.

The MTAS should:

- Verify that the Quality Management Program satisfies project quality objectives related to:
    - Version control
    - Design
    - Procurement
    - Construction
    - Start-up
    - Operations
- Verify and assess how the Grantee has defined its quality policy and the quality responsibilities for the project team
- Confirm that the Grantee has assigned qualified personnel—independent of those with direct responsibility for the work being performed—to carry out QA/QC
- Verify that such personnel are in fact implementing and maintaining the Grantee's quality policy
- Review the Grantee's quality control and assurance procedures and determine their adequacy (see Sections 4.1.1 and 4.1.2)

4.1.1 Quality Assurance

The MTAS should evaluate the Grantee's:

- Plan for quality management activities
- Ability to establish quality systems
- Identification and evaluation of quality problems and solutions

4.1.2 Quality Control

The MTAS should evaluate how the Grantee:

- Implemented quality management activities
- Documented quality management activities

4.2 Document Control

The MTAS should confirm that the Grantee has a Document Control Program as part of its QA/QC Program Plan. The MTAS should confirm that the Grantee's document control procedures include:

- Document review
- Distribution, storage, and policies of retention
- Adequate quality assurance procedures to ensure document controls are in place and implemented

4.3 Design Control

The MTAS should confirm that the Grantee has a Design Control Plan as part of its QA/QC Program Plan that includes procedures for design verification and design review. The MTAS's design verification procedures should include activities such as:

- Independent checks on design drawings and specifications to document:
    - Completeness
    - Coordination
    - Constructability
    - Operability
    - Maintainability
- Design calculations for:
    - Structural
    - Mechanical
    - Electrical
    - Other systems
- Confirmation that the consultant(s) responsible for design have established procedures for controlling their design processes
- Confirmation that the Grantee has procedures for design consultants to evaluate the design review
- Confirmation that the Grantee has procedures for design and specification changes, including signoff and documenting these changes
- Confirmation that the Grantee has documented procedures and requirements for as-built documents
- Confirmation that the Grantee QA is adequate to ensure design control procedures are in place and being implemented

4.4 Procurement, Construction, and Inspection

The MTAS should confirm that the Grantee has competitive bid procedures to ensure that bids for desired services are obtained from a number of qualified contractors.

4.4.1 Procurement Plan

The Grantee should include in its Procurement Plan a statement of general requirements[1], including:

- Quality requirements
- Any past demonstrated capability and performance requirements

4.4.2 Procurement

- The MTAS should confirm that quality control requirements are included within Grantee proposals and bids and are formally communicated to:
    - Potential consultants
    - Contractors
    - Subcontractors
- The MTAS should confirm that Grantee procurement documents, in particular construction contract documents, are reviewed and approved by a designated authority before they are released, including general conditions, specific conditions, and QC requirements
- The MTAS should review and assess the Grantee's procedures and requirements for product identification and traceability of equipment manufacturers or other manufacturers supplying products for the project
- The MTAS should review and assess the Grantee's procedures and requirements for product identification, traceability, and disposition when products and materials are turned over to the owner at project conclusion
- The above requirements will be placed in contract documents where appropriate

4.4.3 Construction and Inspection

The MTAS should review and assess the Grantee's requirements for a QC inspection and testing program covering all phases of the work:

- Inspection and testing procedures for special processes
- Requirements for calibrating and inspecting maintenance, measuring, or test equipment

The MTAS should confirm that:

- The QA/QC Program Plan adequately describes required inspection, testing, and expected standards
- Testing and inspection requirements are referenced in the project specifications
- Grantee QA procedures are adequate to ensure that the QC program is successfully implemented during construction

The MTAS should review and assess the Grantee's procedures for handling nonconforming work and verifying that such procedures define:

- Responsibilities
- Conditions that would cause work to stop

[1] Procurement Plan should align with 2 CFR 200.318

- How to record nonconforming work

The MTAS should review and assess the Grantee's procedures for taking corrective action.

4.5 Operations, Startup, and Training

4.5.1 Control Procedures

The MTAS should review and assess the Grantee's control procedures for testing:

- Systems
- Vehicles
- Service equipment

4.5.2 Training Procedures

The MTAS should review and assess the Grantee's training procedures for operations and maintenance to confirm that a smooth transition to operations The MTAC will confirm that Grantee QA procedures are adequate to ensure the training program is implemented successfully

5.0 PROPOSED APPROACH

5.1 QA/QC Review

The MTAS's review of the adequacy and soundness of the Grantee's QA/QC Program should occur at the completion of the Planning and Preliminary Engineering phases. The FRA may require subsequent reviews if there are updates or changes to the Grantee's QA/QC Program Plan.

Appendix A in this MP contains a example Table of Contents for a QA/QC Program Plan and the milestones for completing the elements within the plan.

APPENDIX A Example Table of Contents – Quality Assurance/Quality Control Plan

Quality Control/Quality Assurance Table of Contents	Planning/ Concept Design	Preliminary Engineering	Final Design	Construction
Quality Management Program				
Introduction	C	U		
Quality Policy	C	U		
Quality Objectives	C	U		
Quality Management Responsibility	C	U		
Quality Management Training Procedures	C	U		
Document Control Procedures and Activities				
Project Document Review, Distribution, and Storage Procedures	C	U		
Quality Records Distribution, Maintenance, and Storage Procedures	C	U		
Document Control Quality Assurance Procedures	C	U		
Design Control Procedures and Activities				
Design Verification Procedures	C	U		
Design Review Procedures for Drawings and Specifications	C	U		
Design Change Procedures	P	C	U	
Design Control Quality Assurance Procedures	C	U		
Procurement Procedures and Construction Procedures				
Construction Procurement Procedures, Identification of Contract Requirements		C	U	
Construction Contract Document Review Procedures including General and Supplementary Conditions		C	U	
Equipment and Vehicle Procurement Procedures		C	U	
Product Identification		C	U	
Product Identification Procedures		C	U	
Inventory Control Procedures		C	U	
Routing Documentation Procedures		C	U	
Special Process Procedures		C	U	U
Construction Inspection Procedures (project site and fabrication site)		C	U	U
Measuring and Test Equipment Quality Control Procedures		C	U	U
Testing Procedures (soils, materials)		C	U	U
Nonconformance Procedures		C	U	U
Corrective Action Procedures		C	U	U
Procurement/Construction Quality Assurance Procedures		C	U	U
Operations, Startup, and Training				
Testing Procedures for Systems, Vehicles, and Service Equipment		C	U	U
Training Procedures		C	U	U
Operations, Startup, and Training Quality Assurance Procedures		C	U	U

P Preliminary information required C Element to be completed U Element to be modified or augmented with additional information as necessary

Monitoring Procedure 25 – Recurring Oversight and Related Reports

1.0 PURPOSE

This Monitoring Procedure (MP) describes the Federal Railroad Administration (FRA) requirements for the Monitoring and Technical Assistance Support (MTAS) when performing recurring oversight of a Grantee's project. It also provides direction on the format and content of reports developed by the MTAS in support of the oversight work.

This MP is a guide. The FRA will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

Recurring oversight by the MTAS assists the FRA in their stewardship role and provides a venue to foster best practices. Recurring oversight helps Grantees to identify and mitigate risks, capture opportunities, and meet the requirements of their agreements with the FRA.

2.0 KEY PRINCIPLES

During oversight of the project the MTAS obtains important information related to project administration, planning, design, and construction, as well as the Grantee's ability to implement the project. As part of recurring oversight, the MTAS is expected to proactively engage with the Grantee and offer alternative approaches and suggestions to help solve problems.

The MTAS will update the Federal team about observations, project status, issues of concern, and suggest recommendations for action. Through oversight and reporting, the MTAS will help to confirm that the project is delivered on time, within budget, and meets all Federal requirements.

3.0 RECOMMENDED DOCUMENTS

Pending availability, the MTAS will review project materials, grant deliverables and documents as part of recurring oversight, including, but not limited to:

- Grantee correspondence with the FRA, other agencies, third parties, etc.
- Project Management Plans (PMPs)
- Analyses and planning studies for operations, capacity, and service
- Design drawings, construction documents, and specifications
- Site investigation and analysis documents
- Third-party agreements
- Performance measures
- Project schedule
- Cost estimate and budget
- Risk management plans and analyses
- Project delivery and procurement documents

- Construction administration/management files
- Safety plans

4.0 SCOPE OF WORK

4.1 Discussions with the FRA and/or Grantee

The MTAS will be proactive in its oversight role. Through investigation and dialogue with the Grantee, the MTAS should assess the project, provide suggestions and recommendations, and offer professional opinions based on its observations, knowledge, experience, etc. The information collected should be included in the MTAS's report(s) to support oversight goals.

The MTAS should hold meetings with the FRA and/or Grantee (weekly, monthly, and/or quarterly, based on the project's activity level and Grantee performance). The MTAS should recommend adjustments to the meeting frequency as the activity level changes or to address anticipated/on-going project issues. For projects in construction, the MTAS should plan sufficient time to be on site to participate in site tours, meetings with individuals representing all aspects of the project, and discussions with the agency's leadership and management. The necessity and duration of the MTAS's visit will depend on the stage of project development as well as the project's activity level.

4.2 Types of Meetings

4.2.1 Quarterly Meetings

The FRA or the MTAS may lead a quarterly meeting attended by the Grantee's executive management and project team as well as FRA leadership, as needed. The quarterly meeting allows the FRA and Grantee a venue to accelerate the resolution of project issues and move the project forward.

- Prior to the meeting, the MTAS prepares the agenda and briefs the Federal team on agenda items and major issues of concern
- During the meeting the MTAS takes notes that capture the discussion and serves as the official record of the meeting. The notes should also include prior and current action items identifying the responsible party and a sign-in sheet of meeting attendees

4.2.2 Monthly Meetings

The FRA or the MTAS usually leads the monthly meetings attended by the Grantee's project team. The responsibilities of the MTAS are the same as the quarterly meetings.

4.2.3 Special Meetings and Site Visits

Special meetings and site visits may be held when required. The responsibilities of the MTAS are the same as the quarterly meetings.

4.3 Meeting Notes and Reports

At direction from the FRA, The MTAS will produce meeting notes and site visit reports (e.g., visits to vehicle manufacturing facilities, construction locations, etc.) as described below for the Federal team.

The cover email should include the MTAS's professional opinions/recommendations on direction needed and next steps. The report should be submitted in memorandum format and an outline of topics to include are listed below.

Meeting notes / site visit report outline:

1. Report / routing information
    a. Date
    b. FRA POC to receive the report
    c. MTAS reviewer / firm name, MTAS call order / contract number
    d. Grant /grant number
    e. Title of report / meeting
2. Body of Report – By topic
    a. Purpose of the meeting / site visit
    b. Meeting / visit participants organized by organization, starting with the FRA and ending with the MTAS
    c. Agenda / locations visited (with photographs)
    d. Summaries of the discussion
    e. Recommendations for action and resulting action items including responsible party
    f. Next steps

Reports should be written simply and clearly, using plain language, and include graphic aids such as photos and tables to help convey meaning. The MTAS should not repeat text within a report but should cross reference earlier text.

4.3.1 Meeting Notes

For all meetings (in person or teleconferences), the MTAS will submit draft notes to the Federal team for review and concurrence no later than 5 business days after the meeting. If there are differences of opinion between the MTAS and the Grantee about the MTAS's conclusions, the Federal team may direct the MTAS to reconcile with the Grantee. If this occurs the MTAS should submit an amended report to the Federal team that highlights report modifications within 5 days of the reconciliation.

4.3.2 Comprehensive Report (Monthly or Quarterly)

The MTAS must prepare a Comprehensive Report quarterly, following the third month of every quarter—March, June, September, and December, to report on the Grantee's status. The MTAS will submit the report to the FRA Project Manager (PM) for review and concurrence no later than 15 days after the end of the quarter. The Comprehensive Report is then stored in FRA's repository by the Contracting Office Representative as it serves as a record of the MTAS's assessment of a Grantee's overall project, highlights a Grantee's performance, and escalates issues to FRA attention for action.[1]

In an effort to streamline the process of reporting and to provide the Federal team with project information in a timelier manner, the PM may request the MTAS prepare a shorter, more focused

[1]In addition, MP01 requires that all reports are stored in FRA's central repository.

report, the Mini-Monthly (described in Section 4.3.2 of this MP). This report can be developed for one month or for the first two months of every calendar quarter. Following the third month, however, the MTAS will prepare a Comprehensive Report.

If the PM deems coverage of all topics is necessary every month, the Comprehensive Report format can be used monthly instead of the Mini-Monthly.

In the Comprehensive Report, the MTAS provides the Federal team with an update of the entire project, including critical issues, MTAS concerns, recommendations, and professional opinions on the project's status. It is based on the MTAS's independent observations and opinions from meetings with the Grantee and thorough review of Grantee materials. At a minimum, the Comprehensive Report should contain the following information in the order outlined below.

4.3.2.1 Report Content

1. Cover Page

a. Title of Report
b. Contract Number
c. Task Order Number
d. Prepared By: MTAS Firm Name
e. Table of Contents listing projects by Grantee, then Grant Number

FEDERAL RAILROAD ADMINISTRATION

MTAS Quarterly Task Order Status Report Period Ending March 30, 2020

Contract Number:
Task Order Number:
Period Covered:
Prepared By:

Table of Contents

2. Executive Summary

The executive summary will be succinct and contain information that is of interest to FRA executive staff/upper management. It should brief the reader in a clear, concise manner on the status of the project and include major issues impacting project scope, schedule, budget, safety, and quality.

The executive summary should include one paragraph each describing the project scope, a brief summary of the project status, changes since the last report, critical issues that should be brought to the FRA's attention, an indication of whether the Grantee is taking action to resolve the issues, the MTAS's assessment and recommendations, and a table containing cost, schedule, and project completion information using the following format:

Grant Number

Grant Number:					
Project Title:					
Grantee:					
Scope:					
Key Dates:	Grant Performance Start Date:		Grant Performance End Date:		
Grant Amount:	Total Amount of Grant: Fed Award Value:		Amount Spent: Local Match:		
Project Status:	(Obligated or Not Obligated)				
Changes Since Last Quarter:					
Critical Issues:	Degree of Risk[2]		Is Grantee Taking Action?	Assessment	Recommendations [3]
	Prior Quarter	This Quarter			
Capacity/Capability			Yes, No, N/A		
Scope			Yes, No, N/A		
Schedule			Yes, No, N/A		
Cost/Budget			Yes, No, N/A		
Risk			Yes ,No, N/A		

[2] See Risk Rating definitions following the chart
[3] Describe the recommendation briefly and include further detail in the body of the report

90-day Look Ahead:	•

Risk Rating Definitions	
Risk Rating	**Definition**
LOW	Scope/schedule/budget are consistent with the SOW targets; identified risks are being adequately managed
MEDIUM	Issues or risks have been identified that create a meaningful probability that scope/schedule/budget targets might not be fully met and/or the Grantee is proposing scope/schedule/budget changes that are likely to be within the grant's terms
HIGH	Moderate to high likelihood that the project as currently being executed will fail to meet scope/schedule/budget targets

3. Body of Report

The MTAS will include any issues observed and recommendations made during recurring oversight or that are outstanding from other reviews. In this manner, the report serves as a tool for the MTAS to escalate unresolved items from the MTAS's oversight reviews to FRA's attention for support and/or enforcement. The MTAS should use tables, schedules, and photos to help explain issues, as necessary. Recommendations should be aligned against the topics of discussion to understand the impacts to the project. The MTAS should also include details on the impact of the recommendation (e.g safety, cost, project delivery). Details should be provided on the action necessary to address the recommendation to facilitate FRA's determination if the recommendation is required or optional for a Grantee's action. FRA will address the recommendations made by the MTAS with the Grantee upon determining the necessity of the recommendation. The MTAS should include each recommendation in the report until resolution or guidance from FRA to remove the recommendation if it is not deemed as required for a Grantee's action.

Topics include:

1. Grantee's capacity, capability, and approach to the project:
    a. Based on observations and discussions with the Grantee and review of the PMP and detailed work plan, the MTAS will assess the Grantee's management capacity and capability to successfully complete the project and achieve compliance with applicable statutes, regulations, and standards
    b. The MTAS will assess the Grantee's use of project controls for scope, quality, schedule, cost, risk, and safety
2. Project scope, including:
    a. Sufficiency of analyses and plans for operations and service

b. Condition and quality of design/construction documents, bidding, and construction status
c. List and status of third-party agreements including utilities, railroads, other agencies, etc.
d. Selection of delivery method, description of contract packages, construction sequencing, contract terms, and conditions
e. Vehicle status of design, procurement, safety approvals, testing, etc.
f. Safety and security activities including hazard analyses, threat and vulnerability assessments, development of safety and security design criteria, certifiable elements, plan for oversight, etc.
g. Compliance with applicable statutes, regulations, guidance, and agreements

3. Project Management Plan and Sub-Plans
4. Project Schedule status:
    a. Table of key milestones – planned and actual
    b. Explanation of changes between baseline schedule and current schedule
    c. Explanation of changes in critical path and recommended actions to recover
    d. 90-day look ahead for important activities by the Grantee, the Federal team, and the MTAS
5. Project cost status, including:
    a. Table showing original budget, current budget, expenditures to date, earned value, and estimate to complete by element for the current month
    b. Explanation of variances between planned and actual cost to date
    c. Information on funding sources, if required
6. Project risk, including:
    a. Discuss the Grantee's status of risk assessment, including treatment of risks and related mitigation actions, as well as contingencies. Provide date of initial risk assessment and updates.
    b. Lessons Learned/Best Practices (MP26)
    c. Before and After information (MP27)
    d. Table of action items, including pending items and the responsible party
    e. Failure to fulfill requirements that pose a risk to the Grantee's compliance with its agreement with FRA and could result in non-compliance. Provide details on escalation measures, if necessary. Provide details to escalate the unresolved deficiency to FRA to address with the Grantee to reinforce MTAS oversight support

4. Appendices

1. Project Map
2. Acronyms
3. Longer supporting information, e.g. during construction track construction changes and claims, source of change (owner, contractor, site conditions, etc.)

4.3.3 Mini-Monthly Report

Use of the Mini-Monthly report does not change the duration or format of the meetings with the Grantee. Only the report is changed to be more focused in its coverage of key milestones and critical issues. The Mini-Monthly should follow the outline for the comprehensive report, however, with the

exception of the executive summary and the project overview, the MTAS should only include sections that are needed to inform the Federal team of the most critical project occurrences, issues, and next steps, as well as professional opinions and recommendations.

4.3.4 Final Report

The MTAS will submit a Final Report to the Federal team after the project is complete, the phase is complete, or construction is complete and revenue operations has commenced, if applicable.

The MTAS should organize this report according to the outline for the Comprehensive Report. The report should highlight, in a broad way, the most important events, issues, hurdles, resolutions, and actions taken during project life so that the report is instructive for future projects. Excerpts of the report can become Lessons Learned or Best Practices.

In addition, as preparation for a Before and After Report (MP27), the MTAS should confirm the Grantee provides information on the project's benefits and impacts on passenger service, railroad operations, and overall system performance, and organizes such information to mirror the Grantee's Service Outcome Agreement, when applicable.

U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs

Monitoring Procedure 26 – Lessons Learned/Best Practices

1.0 PURPOSE

The Federal Railroad Administration (FRA), U.S. DOT Volpe Center, Grantees, stakeholders in rail projects, and even host railroads can learn from the project experiences of others. This Monitoring Procedure (MP) describes the FRA's expectations of the Monitoring and Technical Assistance Support (MTAS) to record those experiences.

This MP is a guide. The FRA will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

The FRA has the following goals related to lessons learned/best practices:

- Increase awareness of project risks and identify best practices
- Make lessons learned and best practices available via the FRA public website
- Update FRA policies, procedures and practices when lessons suggest such changes should be made

3.0 RECOMMENDED DOCUMENTS

The MTAS will obtain documents and other materials from the Grantee and/or other sources, as required or identified by the FRA. The MTAS is encouraged to use their experience, gather additional relevant documents, materials and observations that can be used to inform development of best practice reports.

4.0 SCOPE OF WORK

The MTAS should identify lessons and best practices in the course of the project, and describe each in a Lessoned Learned/Best Practices Report that includes narrative, drawings and/or photos, if applicable. Webinars or online videos may be developed from the report material for dissemination to Grantees, stakeholders in rail projects, host railroads, and others as appropriate.

The length and level of detail for each report will vary depending on the topic, and will follow guidance from the FRA. In most cases, a short report of two to three pages will be preferred. Background information should be included to provide sufficient context to the reader. The report scope may focus on events or insights from any project phase – planning, project development, construction, or operations. The report should include significant findings, recommendations, and new insights.

The MTAS will be the primary author of the report material, with additional input provided by the FRA and Grantees, as appropriate. Final editorial comments and considerations will be the responsibility of the FRA.

5.0 TOPICS FOR BEST PRACTICES

Topics for the Lessoned Learned/Best Practices Reports will be determined by the FRA. Focus should be given to topics where there is a known need for best practice guidance. The MTAS will be expected to identify potential topics for Lessoned Learned/Best Practices Reports during the course of their recurring project monitoring. Topics for best practices may include project management, planning methodologies, environmental reviews, design guidelines or criteria, techniques in design or construction, cost estimating, scheduling, developing project scopes, identifying and mitigating project risks, testing preparation to operations, or stakeholder coordination.

U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs

Monitoring Procedure 27 – Before-and-After Study

1.0 PURPOSE

This Monitoring Procedure (MP) describes the Federal Railroad Administration (FRA) requirements for the Monitoring and Technical Assistance Support (MTAS) activities related to Before-and-After Studies.

This MP is a guide. The FRA will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

Before-and-After studies compare scope, capital cost, operational performance, and ridership before and after an FRA-funded rail project progresses through a phase or phases. This demonstrates the benefits of FRA's investments and participation in improving the nation's rail network

Points of reference include:

- Document actual conditions before
- Performance measures
- Describe planned project outcomes
- Monitor progress made during
- Examine forecasts made during
- Document actual conditions after

The information should be gathered and preserved for select projects during a single phase or at various phases (planning, design, construction, and operation), if applicable, so that when a project progresses, a comparison can be made with the earlier point of reference. The comparisons should show what has been accomplished through the FRA capital program by the Grantee and its team. The studies may be considered in future funding opportunities or to mitigate pre-award risk in other grantees.

3.0 RECOMMENDED DOCUMENTS

The MTAS should discuss the Before-and-After study with the Grantee and confirm that the Grantee preserves relevant project information on project scope, capital cost, operational performance, ridership, and agreements for construction and maintenance, operations, and performance measures.

If applicable, for the project, the Grantee should:

- Set up and maintain an electronic archive for drawings, cost estimates (in original and in Standard Cost Categories (SCC) format), information on operational performance and ridership, information on development and population densities in station areas
- At each phase, document the required information including narratives to explain changes

4.0 SUGGESTED REPORT OUTLINE

The length and level of detail for each report will vary depending on the topic, and will follow guidance from the FRA. Suggested topics are below:

1. Executive Summary
2. Introduction
    a. Report Objectives
    b. Project Description & Planned Outcomes
        i. Performance Measures (if applicable)
    c. Before & After Data
    d. Schedule Milestones
    e. Responsibilities (FRA, Grantee, Contractor)
        i. Grantee Organizational Charts
        ii. Project Management Responsibilities
3. Observations and Comments
    a. Project Management
    b. Relationship with Project Stakeholders
    c. Project Budget
    d. Change Orders
    e. Burn Rate
    f. Project Schedule
    g. Project Outcomes
4. Conclusions
5. Recommendations

U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs

Monitoring Procedure 30 – Value Engineering Review

1.0 PURPOSE

This Monitoring Procedure describes the Monitoring and Technical Assistance Support's (MTAS) review of the Grantee's Value Engineering (VE) practices, particularly the Grantee's success in identifying scope that could be done more efficiently and in identifying design and construction solutions that meet project function and public benefit at the lowest life cycle cost, consistent with required performance, quality, reliability, and safety criteria.

This MP is a guide. The Federal Railroad Administration (FRA) will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

The optimal time for Grantees to conduct VE is half-way to three-quarters of the way through Preliminary Engineering, when design criteria are developed, capacity/operational analyses are complete, and the implications of the infrastructure schematic design are becoming clear.

Value engineering requires a systematic process executed by a multidisciplinary team led by a designated facilitator. Core objectives of VE include open communication among involved parties, and objective consideration of all proposals, without prejudgment. VE is particularly valuable when a project involves numerous stakeholders. Conducting a VE process can have the benefit of solidify agreement about selected solutions even if a limited number of design changes are ultimately implemented.

3.0 RECOMMENDED DOCUMENTS

The MTAS should obtain the following project documents if available from the Grantee before performing the VE review:

- Value Engineering Work Plan
- Design documents and project information to gain general familiarity with the design being considered
- Previous VE reports indicating the disposition of previous VE recommendations (accepted, discarded, held)
- Non- Safety Field Inspection, if applicable
- FRA's Project Risk Assessment, if applicable

4.0 SCOPE OF WORK

4.1 MTAS Oversight

- The MTAS should evaluate the Grantee's Value Engineering (VE) process to assess the efficacy and quality of decisions weighing long- and short-term value (quality/capacity) against long- and short-term cost
- The MTAS should attend a site visit and/or VE workshops, as directed by FRA
- The MTAs will assess that the Grantee's VE process for the following:
    - The design information supplied is sufficient to conduct the VE study and includes:
        - A complete cost estimate, with sufficient breakdown of facility line items, quantities and unit costs which corresponds to the design drawings being considered
        - Draft specifications, if available
        - Design memoranda for key disciplines
        - Design criteria or basis of design
        - Plan set and specifications at Concept Design (10 percent) or Preliminary Engineering (30 percent)
        - Environmental documents
        - Milestone schedule
    - The team is multidisciplinary, independent from the project team, experienced, and qualified to conduct the study
    - The Final VE Report includes the disposition of each recommendation – rejected proposals are based on reasonable criteria; accepted proposals are incorporated into the revised project documents and tracked in configuration control
- At the direction of the FRA, the MTAS will detail its observations, conclusions, and recommendations in a manner consistent with the general report outline in MP01 Appendix B.

4.2 Grantee's VE Program

The Grantee should build the VE effort into the project schedule so that adequate time is allowed for preparation, the Workshop, and recording of decisions/disposition of VE recommendations. The following describes a typical VE process, based on conducting workshops that might be used by the Grantee. Regardless of whether the Grantee uses the process below, the elements described below (e.g., involve many disciplines, include several VE alternatives, perform functional analysis, etc.) should be included in whatever VE process is selected.

4.2.1 Pre-Workshop

- The Grantee prepares for the VE study. Typical activities include:
    - Obtain management support for the VE
    - Select appropriate VE workshop participants
        - The participants should represent the many disciplines required to develop, deliver, and operate the project/service; they should understand the functions with the greatest impact on cost, operability and risk

        - Invaluable to the effort are outside “peer experts” -- technical, managerial, and operational – who will take time to study the project and its trade-offs
        - Also, key to the VE workshop success is participation by project leadership and staff. Agency leadership should attend the final presentation of VE recommendations
    - Develop the scope of work and objectives for the study; develop a work plan; define logistics for the workshop, and distribute all to the team
    - Collect and transmit the project support memoranda, plan set, draft specifications, project schedule and capital cost estimate

4.2.2 Workshop

The Grantee’s facilitator takes workshop participants through the following steps:

- **Presentation** – A representative from the design team presents the existing design to the VE team to expedite the participants understanding of the project

- **Information Gathering** – The team reviews and defines the current conditions of the project and solidifies the goals of the study

- **Function Analysis** – The team defines the project functions, and evaluates them for improvement or elimination, or identifies if new functions are needed to meet the project’s goals. The team considers the cost-to-worth ratio of the project’s basic and secondary functions:
    - Cost-driving design criteria and functions
    - Marginally justified support functions
    - Project elements that have poor cost to worth relationships
    - Schedules that maximize the time-value of capital investment

- **Creativity** – The team brainstorms other ways to perform project function(s)

- **Evaluation** – The team follows a structured evaluation process to select ideas with the potential for value improvement that comply with the project’s function(s) and take into account performance requirements and resource limits. The team consider important tradeoffs:
    - Cost vs. flexibility, redundancy, convenience
    - Cost savings and innovation vs. agency risk
    - Initial capital savings vs. operational cost
    - Potential inefficiencies of phased construction vs. cash flow

- **Development** – The team develops the selected ideas as alternatives (or proposals) and provides sufficient documentation to allow decision makers to decide if the alternative (or proposal) should be implemented. The team makes recommendations

- **Presentation** – The VE team leader presents observations and recommendations and/or summarizes this information in a report that documents process, proposals considered, the VE team's recommendations, and associated value improvement opportunity

4.2.3 Post-Workshop

- The Grantee's leadership confirms the disposition of the accepted VE recommendations
- The Grantee implements changes to the project documents (drawings, cost estimate, and other design documents). Changes are tracked in the Grantee's Project Configuration Management process

5.0 REFERENCES

A good resource for information and assessment methods of Value Engineering is provided by SAVE International. SAVE is a professional society devoted to advancing and promoting the Value Methodology. Refer to http://www.value-eng.org/.

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Monitoring Procedure 31 – Annual Monitoring Review and Closeout of Grant

1.0 PURPOSE

This Monitoring Procedure (MP) describes the Federal Railroad Administration's (FRA's) requirements for the Monitoring and Technical Assistance Support (MTAS) when performing an Annual Monitoring Review of Grantee's projects and grant closeout of the grant agreement between the FRA and the Grantee.

This MP is a guide. The FRA will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

The FRA utilizes a risk model to determine the priority grants for Annual Monitoring each year. Details for the annual monitoring selection process can be found in the FRA's Grants Management Manual (GMM). The Annual Monitoring Review verifies that Grantees comply with the requirements in the FRA grant agreement; identify and address instances of fraud, waste, and abuse; verify that the grantees are administering programs in a manner consistent with the stated plan, identify any problems or successes in program execution, and address issues through advice, training, or technical assistance as appropriate.

"Closeout" refers to the process by which the FRA determines completion of:

- All applicable administrative actions, scope of work, and all required deliverables under the award
- The grant period of performance (PoP)
- Progress or when circumstances warrant administrative closeout
- All closeout activities, as described in 2 CFR 200.343 and the FRA's GMM. The GMM specifies the actions the grantee and the FRA must take to complete the programmatic aspects version of the GMM from the FRA of the closeout process for RPD grants.

3.0 RECOMMENDED DOCUMENTS

The MTAS will obtain the most current version of the GMM from the FRA Project Manager/Grant Manager (the manual is stored on the FRA's Office of Rail Program Delivery internal webpage).

3.1 Annual Monitoring Review

The FRA has developed a respository with document templates and tools to assist with Annual Monitoring, including:

- Kick-off documents to be used during the initial team kick-off meetings:
    - Detailed Monitoring Plan Templates
    - Monitoring Activities Checklists
    - Monitoring Checklist Tool
- Call scripts that can be used during phone calls to the Grantees:
    - Notice of Monitoring review
    - Conducting a desk review
- E-Mail templates that can be used for a variety of e-mail correspondence with the Grantees
- Checklists for all desk and site reviews
- Report templates to be used for the Annual Monitoring Report

The MTAS will obtain the necessary Grantee materials to review the elements in the checklists and other materials outlined in the GMM. Data sources for checklist input may include, but are not limited to:

- Grant Solutions (https://home.grantsolutions.gov): electronic system containing the Grants and their required deliverables, Statement of Work, budget, and schedule
- FRA Program Management Tracker (PMT): internal FRA database containing grant agreements (and amendments, deliverables (status reports, PMPs, budgets, schedules, etc.), invoices, correspondences between the FRA and Grantee(s), etc.
- Previous Monitoring and Corrective Action Reports: in cases where projects may have been monitored previously, the Monitoring Report should be reviewed. Previous reports provide a status of the grant at the time of the report. Previous issues and concerns will be documented in the report, as well as any corrective actions needed (Corrective Action Plan)
- FRA Project and Grant Managers: can provide background on the project, past and on-going issues, location of deliverables, and identification of focus areas for the site review
- FRA Subject Matter Experts: can provide information pertinent to a specific area, e.g., financial, engineering, environmental, planning

3.2 Grant Closeout Review

Prior to Grant closeout, the FRA's GMM requires the following pre-closeout activities are complete:

1. Resolve monitoring corrective actions (if applicable)
2. Resolve single, state, or OIG audit findings (if applicable)
3. Address any outstanding deliverables and obtain RPD approval

The FRA's GMM requires the Grantee to submit the following closeout documentation no later than 90 days after the end of the period of performance:

- Final Property Accounting
- Final Progress Report
- Final Reimbursement Request (SF-270)
- Final Federal Financial Report (SF-425)
- Final Performance Report

The FRA has also developed Grantee Guidance on FRA closeout procedures, and associated training for Grant closeout.

4.0 SCOPE OF WORK

4.1 Annual Monitoring Review

The FRA's GMM outlines the FRA-mandated roles, responsibilities, and actions for Annual Monitoring. The PM may ask the MTAS for assistance in completing the actions and facilitating Review activities. All tasks will be coordinated with the FRA Manager, but may include:

- Prepare for monitoring
- Conduct monitoring review
- Document review results
- Assist the Grantee in developing a Correction Action Plan, if needed

4.2 Grant Closeout Review

The PM may ask the MTAS for assistance in completing the actions and facilitating the Grant Closeout Review. All tasks will be coordinated with the PM, but may include:

- Confirm pre-closeout activities are complete
- Obtain the required closeout documentation (listed above) from the Grantee
- Coordinate the documents for delivery to the Federal team, if necessary
- Review the closeout documents for accuracy and completeness
- Produce a final oversight report that summarizes the project and closeout documents
- Produce a Lessons Learned/Best Practice report for one or more lessons that may be useful to others

4.3 Post Closeout

Certain grant programs have statutory requirements for performance measures to be developed that identify the project benefits and assess whether the benefits are in fact achieved. The PM may ask the MTAS for assistance in reviewing performance measure reports submitted by the Grantee, which may occur in designated intervals posts grant closeout depending on the grant agreement.

5.0 REFERENCES

- FRA's Grants Management Manual
- FRA's Monitoring Manual and Annual Monitoring Checklists
- FRA's Grantee Guidance on Grant Closeout
    - Grantee Closeout Training: https://www.fra.dot.gov/Page/P0809
    - Grantee Guidance on FRA Closeout Procedures: https://www.fra.dot.gov/eLib/Details/L18581
- Additional information for Grantees on FRA Grant Management can be found at: https://www.fra.dot.gov/eLib/Details/L17124

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Monitoring Procedure 32A – Planning and Concept Design

1.0 PURPOSE

This Monitoring Procedure (MP) describes Federal Railroad Administration (FRA) requirements for the Monitoring and Technical Assistance Support (MTAS) when evaluating the Grantee's planning processes and its planning work products. This MP covers State rail planning, regional and corridor planning, and station area planning.

This MP is a guide. The Federal Railroad Administration (FRA) will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

The planning process brings many "actors" or stakeholders together to identify a vision, establish goals, discuss existing conditions and possible alternatives, arrive at an agreed approach, and move into implementation. Planning for intercity passenger rail and high-speed rail aims to improve connectivity between cities and towns as well as intermodal access within station cities. Passenger rail planning reflects input from many stakeholders: State elected representatives and governors, the passenger rail project sponsor, host railroads, rail operators, advisory boards, local jurisdictions, transit operators, community and industry groups, and other interested parties.

The FRA funds passenger rail planning at the State, regional, corridor, and station area levels. Planning at the regional level becomes the platform for State and corridor plans, which in turn provides a foundation for project design, construction, and operations.

The MTAS's evaluation of the Grantee's planning processes and work products provides critical input to the FRA's determination of the likelihood that the plan can achieve its stated purposes and goals through subsequent project implementation.

One aspect of the planning process is to insure planning analyses and decisions will be consistent with processes associated with potential environmental review phases. The planning and engineering of a proposed project should be substantially completed before a project begins the environmental review process. The planning phase is critical to project development as it requires "a clear and complete understanding of all project elements, reached through sound engineering and railroad planning…"[1]. When projects are appropriately defined and federally-funded (full or partial), they are required to develop environmental documentation, consistent with the National Environmental Policy Act (NEPA.)

[1] Railroad Corridor Transportation Plans: A Guidance Manual, July 2005 (available at http://www.fra.dot.gov/eLib/Details/L04161).

The planning and engineering completed for this "pre-NEPA" phase should be consistent with environmental procedures and practices to prevent duplication of work or reassessment.

To complete appropriate planning and engineering prior to the environmental phase, project sponsors need to identify project alternatives via an Alternatives Analysis. Defining project alternatives requires several logical steps, such as the assessment of whether alternatives are consistent with Purpose and Need based on completing the following sequential analyses: route assessment, service planning, investment identification, and design. The following table is a guide for the work that is necessary to complete each sequential analysis. The table also shows the transition from the planning related tasks of route identification and service planning to the engineering related tasks of identifying specific infrastructure investments and completing conceptual and preliminary engineering as part of the design phase.

Pre-NEPA Alternatives Analysis

Preliminary Draft Purpose and Need

- Identify a vision
- Establish rationale for Federal investment for project or service.
- Establish goals, objectives, and desired outcomes.
- Develop preliminary draft Purpose and Need Statement.

Route Option Analysis

- Route Option Analysis Methodology
    - Alternatives Analysis, Project Development, Environmental Analysis
- Preliminary Route Option Development
    - High level market analysis
    - Identify existing/greenfield corridors and existing infrastructure conditions
    - High level operations analysis (i.e. existing traffic conditions, local freight movements)
    - Initiate data collection for information on environmental resources
    - Obtain GIS data and other desktop level readily available data from resource agencies and tribal groups
    - High-level identification of potentially sensitive resource areas
    - Public/Agency Involvement
- Route Option Screening Process
    - High-level market analysis methodology
    - High-level conceptual engineering
    - High-level operations analysis methodology
    - High-level desktop, GIS-based analysis
    - Screen for conflicts or constraints with sensitive environmental resources at a high-level of the natural and built environment
    - Application of screening criteria
    - Public Involvement
- Route Options to be Advanced

Service Option Analysis

- Service Option Analysis Methodology
    - Alternatives Analysis, Project Development, Environmental Analysis

Pre-NEPA Alternatives Analysis

- Preliminary Service Option Development
    - Detailed Market Analysis- Markets to Serve
    - High-Level Operations Analysis (Train Performance Calculator)- Trip Times
    - High-Level Station and Access Analysis- Station location vs access time
    - Continue data collection to gather additional information on environmental resources
    - Identify service driven resource areas of concern (e.g. air quality, economic development, population and job growth, sensitive noise receptors)
    - Public/Agency Involvement
- Service Option Screening Process
    - Detailed Demand Forecasting- Ridership and revenue forecasting
    - High-Level Operations Analysis- Viability of service speeds and frequency levels
    - High-Level Operations and Maintenance Cost Analysis
    - Qualitative analysis with input from stakeholders and readily available sources
    - Screen for conflicts or constraints in resources that could be affect by service changes
    - Application of screening criteria
    - Public Involvement
- Service Options to be Advanced

Investment Option Analysis

- Investment Option Analysis Methodology
    - Alternatives Analysis, Project Development, Environmental Analysis
- Preliminary Investment Option Development
    - Mid-level operations analysis
    - Parametric capacity analysis
    - Train path planning
    - Timetable development
    - Candidate “line-haul” project lists
    - MOW facility requirements and siting
    - Mid-level station and access analysis
    - Specific station locations
    - Station design requirements
    - Mid-level fleet analysis
    - Consist requirements
    - Equipment technology
    - Equipment performance
    - MOE facility requirements and siting
    - For areas outside of existing ROW, research and collect data regarding surrounding land uses and compatibility
    - Provide greater definition and detail associated with any resource areas previously identified as sensitive/concern
    - Description of the environmental setting should be developed that will be used to develop the affected environment
    - Develop methodologies for detailed assessment of environmental impacts for each resource area to be used during NEPA
    - Public/Agency Involvement
- Investment Option Screening Process
    - Detailed operations analysis

Pre-NEPA Alternatives Analysis
○ Operations simulation ○ Detailed functional requirements of each component project ○ Detailed station and access analysis ○ Detailed functional requirements of each component project ○ Detailed fleet analysis ○ Detailed functional requirements for rolling stock ○ Fleet size established ○ Detailed conceptual engineering ○ High-level cost estimate ○ High-level implementation schedule ○ Identify physical location of newly established rights-of-way ○ Implementation phasing analysis ○ Consolidated project list with functional requirements ○ High-level desktop, GIS-based analysis ○ Screen for conflicts or constraints with sensitive environmental resources at a high-level of the natural and built environment ○ Application of screening criteria ○ Public Involvement • Investment Options to be Advanced
Design Option Analysis
• Design Option Analysis Methodology ○ Alternatives Analysis, Project Development, Environmental Analysis • Preliminary Design Option Development ○ High-level preliminary engineering ○ Conceptual plans for component project ○ Developed with intent to meet functional requirements ○ Continue data collection for information on environmental resources ○ Determine which sensitive resource areas may be impacted by design options ○ Public/Agency Involvement • Design Option Screening Process ○ High/Mid-level preliminary engineering ○ Determine ability of design to meet detailed functional requirements ○ Determine physical feasibility of design ○ High-level desktop, GIS-based analysis ○ Determine variation in impacts to resources for each design option ○ Screen for new conflicts or constraints with sensitive resource of the natural and build environmental ○ Application of screening criteria ○ Public Involvement • Preliminary Range of Reasonable Alternatives to be Advanced into NEPA

The planning activities listed are applicable to the project development phase, but early phases could apply at the State and regional level. For planning under project development, the Purpose and Need and the scope of a project may limit the necessity to complete each subsequent step. FRA, supplemented by the MTAS, should assess specific project details to determine what analyses and what

steps may or may not be applicable. At any time during an alternatives process, an option can be dismissed from further analysis based on the outputs of the previous task (i.e. options do not need to be carried through completely under each phase before being eliminated). FRA reserves the right to review and approve the analysis completed at each step prior to the work on the subsequent step commences. Additionally, it is expected that the grantee provides a methodology for FRA to review and approve for each evaluation step before they complete the analysis.

3.0 RECOMMENDED DOCUMENTS

FRA, supported by the MTAS, should obtain applicable documents from the Grantee, such as those identified in the table above. Documentation for each element should include a methodology, an assessment, and screening process. Related documentation for an Alternatives Analysis approach includes:

- Background studies
- Planning narratives including rationale, assumptions, and planning criteria
- Agreements:
    - Grant Agreement
    - Construction and Maintenance
    - Operations
    - Service Outcome Agreement (SOA), if applicable
    - Real estate agreements
    - Third party agreements
- Planning analyses of:
    - Passenger rail needs and opportunities
    - Passenger rail market potential
    - Railroad infrastructure network and train capacities
    - Railroad and train operations (passenger and freight)
    - Station and facility capacity and throughput
- Operations capacity modeling (RTC or equivalent)
- Analysis of alternatives:
    - Concept design studies:
        - Horizontal and vertical alignments in the context of existing development
        - Civil works, track, bridges, tunnels, stations, maintenance facilities, signals, electric traction, systems
        - Real estate acquisition
        - Rolling stock
    - Plans and forecasts:
        - Railroad infrastructure network and train capacity plans
        - Passenger rail ridership and revenue forecasts
        - Operations plans for all entities providing service
        - Station plans, station area plans
    - Associated environmental documents
    - Cost estimates:
        - Capital cost
        - Operations and maintenance costs

- Schedules:
  - For planning work
  - High-level schedule for full build-out (including design, construction)
- Preliminary assessment of risks
- Financial projections

4.0 SCOPE OF WORK

The MTAS should apply its planning expertise, knowledge, and experience in the railroad industry to the study and evaluation of the Grantee's railroad planning activities and documents, will provide its professional opinion on their adequacy and merits, and make recommendations for their improvement. At the direction of the FRA, the MTAS will detail its observations, conclusions, and recommendations in a manner consistent with the general report outline in MP01 Appendix B.

4.1 Regional Rail Planning

The MTAS may be asked to participate in FRA-led multi-State regional network planning activities. Regional rail plans are based on evaluation of potential markets for passenger rail service, and optimal network integration and sequencing of rail corridors. The work includes identification of governance and funding strategies and consideration of project development and delivery issues associated with multi-State service. Regional rail plans influence the direction and content of passenger rail corridor investment plans. The FRA has developed a regional network sketch-planning tool called "CONNECT" (CONceptual NEtwork Connections Tool); contact FRA Planning for more information.

4.2 State Rail Planning

The State Rail Plan describes the State's long-term vision for rail service and its role in the statewide multimodal transportation system. Based on an inventory of the existing rail system, and an assessment of needs and opportunities, the Plan prioritizes future projects, programs, policies, laws, and funding necessary to achieve the long-term vision. In addition, since it is State policy, the Plan demonstrates political, legal, and financial support for rail development. For the FRA's State Rail Plans Guidance, September 2013, see http://www.fra.dot.gov/eLib/Details/L04760.

- The MTAS should review the adequacy of the State Rail Plan in:
  - Providing a long-term vision for rail in the State
  - Evaluating:
    - Existing transportation conditions including rail, highway, and air
    - Trends for fuel costs, congestion, industry, etc.
    - Trends and factors related to demographics and the overall economy
  - Analyzing:
    - Railroad capacity
    - Needs and opportunities for passenger and freight rail service
    - Impacts of rail on transportation, economy, environment
  - Demonstrating input from Plan stakeholders

- Providing a prioritized list of near- and long-term projects based on goals to achieve the vision, using evaluations, analyses, and inputs from capital cost estimates and funding plans for near-term projects

4.3 Project Development Planning

For potential high-speed and intercity passenger projects that are proposing the implementation of a service or infrastructure, Grantees will need to develop an Alternatives Analysis.

An Alternatives Analysis comprehensively addresses the planning, design, construction and acquisition of infrastructure, equipment, stations, and facilities required from a reasonable range of preliminary alternatives to operate high-speed and intercity passenger rail service. It establishes the overall scope and approach for the proposed route and service, and identifies infrastructure investments and design options.

Primary objectives of the Alternatives Analysis include:

- Clear demonstration of the project's rationale
- Address a draft preliminary Purpose and Need
- Analysis of alternatives for the proposed program or project
- Demonstration of the operational and financial feasibility

Project development planning can primarily be split into different types of projects:

- **Corridor Plans** for new or improvements to existing passenger rail services. The alternatives criteria for these types of projects are Section 2.0 and 3.0 of this document.
- **Station Area Plans** describe the vision for the one-quarter to one-half mile radius around a passenger rail station. The Plan includes the station itself – its horizontal and vertical location, form and mass, public-space implications, and architecture. It includes enhancements to transportation connections between rail, transit, automobiles, biking, walking, and passenger loading. It also includes development plans– form, mass, types of development, and urban design parameters and motifs. The Station Area Plan can guide the insertion of a new station into a context and illustrate how the station is networked to the city and region through enhancements to transportation and development.

  For the FRA's recommendations titled "Station Area Planning for High-Speed and Intercity Passenger Rail," June 2011, see http://www.fra.dot.gov/eLib/Details/L03759.

  FRA and the MTAS will review the Station Area Plan for its adequacy in addressing station location, transportation connections, and urban design and infill development.

Additional References:

- The FRA's Planning Framework from 2014 FRA Rail Program Delivery Meeting (available at http://cms.fra.dot.gov/eLib/Details/L05473)
- National Rail Planning (available at http://cms.fra.dot.gov/Page/P0522)

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Monitoring Procedure 32B – Environmental Review

1.0 PURPOSE

This Monitoring Procedure (MP) describes the Federal Railroad Administration (FRA) requirements for the Monitoring and Technical Assistance Support (MTAS) when evaluating the Grantee's processes and work products related to the environmental review of projects.

This MP is a guide. The FRA will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

The Council on Environmental Quality (CEQ) encourages integrating environmental reviews required by the National Environmental Policy Act (NEPA) with other planning and environmental reviews, to avoid duplicative or inconsistent processes and facilitate quicker, more informed decision-making.[1]

Consistent with CEQ, the FRA's review process ensures that environmental values are integrated into project decision-making processes by considering the environmental impacts of proposed actions and all reasonable alternatives to those actions. The FRA also ensures that information on environmental impacts and alternatives is publicly available before decisions are made and actions occur.

FRA staff work with Grantees and other parties in the preparation of environmental studies and documents. Through collaboration with the FRA, State and local agencies provide environmental review services and prepare documents on behalf of FRA. The environmental documents are used and issued as FRA agency documents.

The MTAS should obtain direction from FRA staff regarding the MTAS's role in the environmental process. The MTAS may be asked to assist FRA staff in the review and preparation of NEPA and related documents, agency coordination and/or consultation, and other aspects of the environmental review process.

3.0 RECOMMENDED DOCUMENTS

The MTAS should obtain direction from FRA staff regarding applicable documents from the Grantee, such as:

- Grant Agreement
- Service Development Plan materials
- Class of Action Checklist
- Alternative Analysis materials
- Agency Coordination Plan
- Notice of Intent

[1] In March 2012, CEQ issued Final Guidance to Promote Efficient Environmental Reviews, available at http://www.whitehouse.gov/administration/eop/ceq/initiatives/nepa/efficiencies-guidance.

- Scoping documents
- Project Methodologies
- Public participation materials
- Design documents
- Materials related to analysis and compliance with
    - National Environmental Policy Act (42 USC 4321 et seq., hereinafter NEPA), especially NEPA section 102 (2)(C) (42 USC 4332(2)(C)); including mitigation information; including decision documents such as a Categorical Exclusion (CE), Finding of No Significant Impact (FONSI), and Record of Decision (ROD)
    - Section 4(f) of the Department of Transportation Act (49 USC 303(c))
    - Section 106 of the National Historic Preservation Act (16 USC 470(f))
    - Section 309(a) of the Clean Air Act (42 USC 7609(a))
    - Section 307(c)(2) of the Coastal Zone Management Act (16 USC 1456(c)(2))
    - Section 10 of the Rivers and Harbors Act (33 USC 403)
    - Section 401 of the Clean Water Act (33 USC 1341)
    - Section 404 of the Clean Water Act (33 USC 1344)
    - Section 2(a) of the Fish and Wildlife Coordination Act (16 USC 662(a))
    - Section 7 of the Endangered Species Act (16 USC 1536)
    - Noise Control Act of 1972 (42 USC 4901 et seq.) and
    - Executive Orders (including Executive Order 12898, Environmental Justice for Low Income & Minority Populations), regulations, and guidelines cited in Appendices A and B of this MP
- Mitigation Monitoring and Enforcement Plans
- Federal-Level project approvals, if previously determined by another Federal agency
- State-level project approvals, as applicable

4.0 SCOPE OF WORK

Since the FRA is responsible for compliance with environmental regulations, the MTAS must understand its role as evaluator/recommender to the FRA. The MTAS must check in with the FRA before proceeding with a course of action related to a Grantee's environmental process and products, or its own work; for example, application of methodologies, agency coordination, handling letters and public responses. The MTAS must obtain agreement on the approach for the course of action by the following individuals:

- FRA Project Manager
- FRA Environmental Protection Specialist (Subject Matter Expert and Manager of the environmental review process)
- FRA Chief of Planning and Environment Division or Environmental Team Lead

In addition, the MTAS should establish a process to identify which Grantee deliverables and/or MTAS work products would go through FRA legal review and help to facilitate such reviews.

Once the approach for the course of action is set, at direction from the FRA, the MTAS may be responsible to do the following and additionally detail its observations, conclusions, and recommendations in a manner consistent with the general report outline in MP01 Appendix B:

- Set up meetings with the individuals above—as frequently as required, weekly, monthly, or periodically—and obtain their concurrence, approval, and input
- Review and evaluate the Grantee's environmental processes and documents. For example:

    - Review Grantee's environmental schedule to identify all appropriate steps in the NEPA process are included and review periods are adequate
    - Encourage early identification of Federal, State, and local agencies and stakeholders and facilitate coordination throughout the project
    - Identify that all appropriate technical reports are prepared and review for adequacy
- Review design plans to ensure consistency with the project defined in the environmental documents
- Review for adequacy and timing the Grantee's approach to incorporating environmental requirements, including restrictions contained in the project's NEPA documents, into the project design documents and the Grantee's plan
- Review the Grantee's schedules for permits and approvals, and coordinate with FRA on regular updates for these schedules on the Federal Permitting Dashboard
- During design and construction, check and review the design documents when changes occur in environmental requirements. Check for consistency. Assess the level to which environmental impacts and avoidance or mitigation measures are reflected in project design documents. Check constructability, cost, and time effects of implementing the mitigation measures
- Verify that necessary agreements and permits are identified
- Verify that impacts to third parties, especially to those in the railroad environment, stakeholders, and parties to agreements, are identified in the environmental document and listed at their current addresses for distribution of the document. Confirm that the Grantee has received comments, if any, from such third parties
- As a possible further step, prior to the NEPA decision (e.g., at the Alternatives Analysis or Service Development Plan stage), encourage the Grantee to document resolution of railroad operation impacts and mitigations, and to obtain sign-off of this plan by affected parties
- During construction, verify that the contract documents and/or interagency or public-private partnership agreements are being followed and that the project itself and the related mitigation measures are being implemented consistent with the environmental decision document. As directed by FRA, this may include regular field visits, site inspections, agency consultations and possible identification of remedial actions as required in the case of non-compliance with permit conditions

4.1 NEPA Basics

The National Environmental Policy Act (NEPA) is the national charter for protecting the environment. Refer to 42 USC 4321-4347 (available at http://www.dot.gov/regulations/42-usc-sec4321-4347).

The purposes of NEPA are:

- "To declare a national policy which will encourage productive and enjoyable harmony between man and his environment
- To promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man
- To enrich the understanding of the ecological systems and natural resources important to the nation

- To establish a Council on Environmental Quality"[2]

The implementing regulations for NEPA written by CEQ are applicable to and binding on all Federal agencies. These regulations are listed in 40 CFR 1500-1518 (available at http://www.gpo.gov/fdsys/pkg/CFR-2004-title40-vol30/pdf/CFR-2004-title40-vol30-chapV.pdf).

For projects initiated before November 28, 2018 FRA implementation of CEQ regulations is through the *FRA Procedures for Considering Environmental Impacts* as amended for NEPA review that has already started and/or is underway. (available in Appendix B and at http://www.fra.dot.gov/eLib/details/L02561 and http://www.fra.dot.gov/Page/PO215).

For projects initiated after November 28, 2018 FRA implementation of CEQ regulations is through 23 CFR 771 and 774 for all new environmental reviews. (available at https://www.govinfo.gov/content/pkg/FR-2018-10-29/pdf/2018-23286.pdf).

The NEPA process consists of an evaluation of the environmental effects of a Federal action, using three levels of analysis:

- Categorical Exclusion
    - "Means a category of actions which do not individually or cumulatively have a significant effect on the human environment and which have been found to have no such effect in procedures adopted by a Federal agency in implementation of these regulations (§ 1507.3 Agency Procedures) and for which, therefore, neither an environmental assessment nor an environmental impact statement is required."[3] (ref. 1508.4)
    - "Human environment shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment." (ref. 1508.4)
- Environmental Assessment (EA)
    - "(a) Means a concise public document for which a Federal agency is responsible that serves to:
        (1) Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact
        (2) Aid an agency's compliance with the Act when no environmental impact statement is necessary
        (3) Facilitate preparation of a statement when one is necessary
    - (b) Shall include brief discussions of the need for the proposal, of alternatives as required by section 102(2)(E), of the environmental impacts of the proposed action and alternatives, and a listing of agencies and persons consulted." (ref. 1508.9)

  If through the EA process, the Federal agency determines the project would have no significant impact, the agency issues a finding of no significant impact (FONSI). "Finding of no significant impact means a document by a Federal agency briefly presenting the reasons why an action, not otherwise excluded (§ 1508.4), will not have a significant effect on the human environment and for which an environmental impact statement therefore will not be prepared. It shall include the environmental assessment or a summary of it and shall note any other environmental documents related to it (§ 1501.7(a)(5)). If the assessment is included, the finding need not

[2] http://www.dot.gov/sites/dot.dev/files/docs/NEPA%20of%201969.txt
[3] NEPA Implementing Regulations by CEQ, 40CFR1500-1518, http://www.gpo.gov/fdsys/pkg/CFR-2004-title40-vol30/pdf/CFR-2004-title40-vol30-chapV.pdf

repeat any of the discussion in the assessment but may incorporate it by reference." (ref. 1508.13)

- Environmental Impact Statement (EIS)

  "Means a detailed written statement as required by section 102(2)(C) of the Act."[4] (ref. 1508.11) If the EA determines that the action will have a significant effect on the human environment, an EIS is prepared. An EIS is a more detailed evaluation of the proposed action and alternatives. After a final EIS is prepared and at the time of its decision, a Federal agency will prepare a public record stating what the decision was; identifying all alternatives considered; stating whether all practicable means to avoid or minimize environmental harm from the alternative selected were adopted, and if not, why they were not. It also includes a monitoring and enforcement program for mitigation. This is the Record of Decision (ROD).

A NEPA analysis can be conducted during the planning or preliminary engineering phase as described in Section 4.2, but it must be completed before a project starts final design or is released for a design-build contract. The implementing regulations state "Agencies shall not commit resources prejudicing the selection of alternatives before making a final decision." (ref. 1506.1 Limitation on Actions during NEPA process)[5]

NEPA also serves as a process to include compliance with associated laws. Often referred to as the "NEPA Umbrella," analysis, decisions, and mitigation from over a dozen different laws are included in a NEPA analysis. These laws include: The National Historic Preservation Act, the Clean Air Act, the Clean Water Act, the Endangered Species Act, Section 4(f) of the DOT Act, and others.

4.2 FRA and NEPA

To Grantees and the industry at large, the FRA provides information and resources on environmental issues relating to the planning and development of the nation's railroad system. These issues range from hazardous materials, safety, noise, and invasive species to climate change and community livability. For railroad projects, the FRA implements Federal environmental laws and policies and conducts environmental impact assessments of pending actions and projects. For rail planning, actions typically involve infrastructure and service changes over very long and linear geographic areas across multiple jurisdictions. Implementation of specific rail project elements along a corridor tend to be more localized.

Since NEPA regulations require consideration of all reasonable alternatives to inform decision making, the integration of planning and NEPA allows for an effective and efficient process to make decisions. Environmental documents are intended to "serve as the means of assessing the environmental impact of proposed agency actions, rather than justifying decisions already made" (ref. 1502.2(g)).

During Pre-NEPA Planning, for complex corridor conditions, in tandem with development of the Service Development Plan described in MP32A, a Tier 1 or Programmatic environmental review may be performed (ref. 1508.28 Tiering) to address broad questions and environmental effects in an entire corridor. For rail projects, a "Service NEPA" is sometimes completed with the Tier 1 NEPA Document to address questions and effects relating to alternatives for route, stations, and other facilities; and

[4] Ibid.

[5] NEPA Implementing Regulations by CEQ, 40CFR1500-1518, http://www.gpo.gov/fdsys/pkg/CFR-2004-title40-vol30/pdf/CFR-2004-title40-vol30-chapV.pdf

alternatives for service including type, level of service, and operating technology.[6] The NEPA process concludes with the FRA's issuance of a decision document (FONSI or ROD) that may include mitigation measures to minimize impacts. State environmental reviews are ideally conducted in concert with NEPA.

At its best, planning is a rational, open, and transparent process that encourages informed decision making with public input. Agencies are required to include the public in preparing and implementing NEPA procedures. For FRA projects, this typically means participation by the Grantee's executive leadership, boards of directors of partner agencies, advisory groups, community and business groups, resource agencies, affected entities and property owners, the general public, and other stakeholders.

During Preliminary Engineering, project-specific environmental reviews (Tier 2) build on the Tier 1 NEPA work, with additional public input.

For more information on the FRA's approach to NEPA reviews, see appendices on the following pages:

- Appendix B: FRA Procedures for Considering Environmental Impacts

For a list of CEs, see FRA's Categorical Exclusion Guidance at http://www.fra.dot.gov/Page/P0550. Categorical Exclusion worksheets are found at https://railroads.dot.gov/elibrary/categorical-exclusion-worksheet-0.

[6] "Service NEPA" is a term coined by FRA.

For projects initiated before November 28, 2018 FRA implementation of CEQ regulations is through the *FRA Procedures for Considering Environmental Impacts* as amended for NEPA review that has already started and/or is underway (available in Appendix B and at http://www.fra.dot.gov/eLib/details/L02561 and http://www.fra.dot.gov/Page/PO215).

TOC and Sections 1, 2, 3, 10, 13, 14 from:

Federal Register/Vol. 64, No. 101/Wednesday, May 26, 1999/Notices pg. 28545

USDOT, FRA Procedures for Considering Environmental Impacts

AGENCY: Federal Railroad Administration (FRA), Department of Transportation (DOT).

ACTION: Notice of Updated Environmental Assessment Procedures.

Note: available in full at http://www.fra.dot.gov/eLib/details/L02561

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Sec.

1. Purpose

This document establishes procedures for the assessment of environmental impacts of actions and legislation proposed by the FRA, and for the preparation and processing of documents based on such assessments. These Procedures supplement the Council on Environmental Quality (CEQ) Regulations (40 CFR parts 1500 et seq., hereinafter ''CEQ 1500'', DOT Order 5610.1C. Although only certain portions of the CEQ regulations or DOT Order are specifically referenced in these Procedures, the unreferenced portions also apply.

2. Authority

These Procedures implement the requirements of section 20 of DOT Order 5610.1C. This document establishes procedures for compliance by the FRA with the National Environmental Policy Act (42 USC 4321 et seq., hereinafter NEPA), especially NEPA section 102 (2)(C) (42 USC 4332(2)(C)); section 4(f) of the Department of Transportation Act (49 USC 303(c)); section 106 of the National Historic Preservation Act (16 USC 470(f)); section 309(a) of the Clean Air Act (42 USC 7609(a)); section 307(c)(2) of the Coastal Zone Management Act (16 USC 1456(c)(2)); section 2(a) of the Fish and Wildlife Coordination Act (16 USC 662(a)); section 7 of the Endangered Species Act (16 USC 1536); the Noise Control Act of 1972 (42 USC 4901 et seq.); and certain Executive Orders, regulations, and guidelines cited in this document which relate to environmental assessment and environmental documentation.

3. Definitions

The definitions contained within CEQ 1508 apply to these Procedures. Additional or expanded definitions are as follows:

(a) ''Administrator'' means the Federal Railroad Administrator.
(b) ''CEQ'' means the Council on Environmental Quality.
(c) ''EIS'' means an Environmental Impact Statement.
(d) ''EPA'' means the U.S. Environmental Protection Agency.
(e) ''FONSI'' means a Finding of No Significant Impact.
(f) ''4(f)-Protected Properties'' are any publicly-owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State or local significance or any land of an historic site of national, State, or local significance (as determined by the Federal, State, or local officials having jurisdiction over the park, area, refuge, or site) within the meaning of section 4(f) of the DOT Act (49 U.S.C. 303(c)).
(g) ''4(f) Determination'' is a report which must be prepared prior to the Administrator's approval of any FRA action which requires the use of any 4(f)-protected properties. This report documents both the supporting analysis and the finding required by section 4(f) of the DOT Act (49 U.S.C. 303(c)), that (1) there is no prudent and feasible alternative to the use of such land, and (2) the proposed FRA action includes all possible planning to minimize harm to the park, recreational area, wildlife and waterfowl refuge, or historic site resulting from the use.
(h) ''FRA Action'' is an action taken by the Administrator or his or her delegate. FRA actions include grants, loans, financing through redeemable preference shares and loan guarantees, contracts, purchases, leases, construction, research activities, rulemaking, regulatory actions, approvals, certifications, and licensing. FRA actions also include actions only partially funded by FRA. FRA actions include FRA-sponsored proposals for legislation and favorable reports on proposed rail-related legislation, but do not include responses to Congressional requests for reports on pending legislation or appropriation requests.
(i) ''Program Office'' is an office within FRA which has been delegated the authority to administer a particular FRA action or program and which therefore bears primary responsibility for performing environmental assessments and preparing environmental documents in compliance with these Procedures.
(j) ''P–10'' refers to the Office of Environment, Energy, and Safety within the Department of Transportation.

10. Environmental Assessment Process

(a) Policy. The process of considering the environmental impacts of a proposed major FRA action should be begun by or under the supervision of the Program Office at the earliest practical time in the planning process for the proposed action and shall be considered along with technical and economic studies. To the fullest extent possible, steps to comply with all environmental review laws and regulations shall be undertaken concurrently.

(b) Scope. The process of considering environmental impacts should begin by identifying all reasonable alternatives to the proposed action, including ''no action'' and including mitigation measures not incorporated into the design of the proposed action. It is entirely proper that the number of alternatives being considered should decrease as the environmental consideration process proceeds and as analysis reveals that certain alternatives would in fact be unreasonable. The relevant environmental impacts of all alternatives should be identified and discussed, including both beneficial and adverse impacts; impacts which are direct, indirect, and cumulative; and impacts of both long and short-term duration; and mitigation measures that would be included for each alternative. Consultation with appropriate Federal, State, and local authorities, and to the extent necessary, with the public, should be begun at the earliest practicable time. The following aspects of potential environmental impact should be considered:
    (1) Air quality;
    (2) Water quality;
    (3) Noise and vibration;
    (4) Solid waste disposal;
    (5) Ecological systems;
    (6) Impacts on wetlands areas;
    (7) Impacts on endangered species or wildlife:
    (8) Flood hazards and floodplain management;
    (9) Coastal zone management;
    (10) Use of energy resources;
    (11) Use of other natural resources, such as water, minerals, or timber;
    (12) Aesthetic and design quality impacts;
    (13) Impacts on transportation: of both passengers and freight; by all modes, including the bicycle and pedestrian modes; in local, regional, national, and international perspectives; and including impacts on traffic congestion;
    (14) Possible barriers to the elderly and handicapped;
    (15) Land use, existing and planned;
    (16) Impacts on the socioeconomic environment, including the number and kinds of available jobs, the potential for community disruption and demographic shifts, the need for and availability of relocation housing, impacts on commerce, including existing business districts, metropolitan areas, and the immediate area of the alternative, and impacts on local government services and revenues;
    (17) Environmental Justice;
    (18) Public health;
    (19) Public safety, including any impacts due to hazardous materials;
    (20) Recreational opportunities;

(21) Locations of historic, archeological, architectural, or cultural significance, including, if applicable, consultation with the appropriate State Historic Preservation Officer(s);
(22) Use of 4(f)-protected properties; and
(23) Construction period impacts.

(c) Depth. The environmental consideration process should seek to quantify each impact identified as relevant to each alternative evaluated for the proposed action. Such quantification should properly develop, over the course of the environmental impact process, from a rough order-of-magnitude estimate of impact to finer and more precise measurements. The depth of analysis of each impact should be guided by the following factors:
(1) The likely significance of the impact, taking into consideration context and intensity;
(2) The magnitude of the proposed action or an alternative action;
(3) Whether the impact is beneficial or adverse; and
(4) Whether and to what extent the impact has been assessed in a prior environmental document.

(d) Environmental Assessment. An environmental assessment shall be prepared, in accordance with CEQ 1508.9, prior to all major FRA actions. The environmental assessment shall be used to determine the need to prepare either a FONSI or an EIS for the proposed action, in accordance with subsection (e) of this section. An environmental assessment need not be prepared as a separate document where the Program Office or an applicant has already decided to prepare an EIS for the proposed action. Evidence of consultation with appropriate Federal, State, and local authorities is especially desirable as a part of the environmental assessment. The Program Office is encouraged to seek the advice of the FRA Office of Policy and Program Development and the FRA Office of Chief Counsel as to the sufficiency of the environmental assessment.

(e) Determination Based on the Environmental Assessment. On the basis of the environmental assessment, the Program Office shall determine: whether the proposed action will or will not have a foreseeable significant impact on the quality of the human environment; whether or not the proposed action will use 4(f)-protected properties; whether or not the proposed action will occur in a wetlands area; and whether or not the proposed action will occur in a base flood plain. In making these four determinations, the Program Office shall seek the advice of the FRA Office of Chief Counsel and shall inform this advisory office of the ultimate determinations. Based on these four determinations, the Program Office shall take action in accordance with paragraphs (1) through (4) below, as applicable:
(1) If the Program Office determines that the proposed action will not have a foreseeable significant impact, the Program Office shall compile that determination and its supporting documentation into a FONSI and proceed in accordance with section 11 of these Procedures.
(2) If the Program Office determines that there is a foreseeable significant impact, it shall begin the scoping process (CEQ 1501.7) and proceed to prepare a draft EIS in accordance with sections 9 and 13 of these Procedures.
(3) If the Program Office determines that the proposed action contemplates using 4(f)-protected properties, it shall proceed in accordance with section 12 of these Procedures.
(4) If the Program Office determines that the proposed action will occur in a wetlands area or in a base floodplain, the Program Office shall comply with subsection 14(n)(6) or (8)

of these Procedures, as applicable. If a FONSI is prepared, the reference in 14(n) (6) and (8) to final EIS should be read as reference to the FONSI.

13. Environmental Impact Statement

(a) General. The FRA shall prepare and include a final EIS in every recommendation on proposals for major FRA actions significantly affecting the quality of the human environment, as determined in accordance with section 10 of these Procedures. There are no actions which FRA has determined always require an EIS; however, an EIS shall be prepared for all major FRA actions significantly affecting the quality of the environment. This normally includes any construction of new major railroad lines or new major facilities or any change which will result in a significant increase in traffic.

(b) Decision making on the Proposed Action. No decision shall be made at any level of FRA to commit the FRA or its resources to a major FRA action for which an EIS must be prepared until the later of the following dates:

(1) Thirty (30) days after a final EIS covering the action has been submitted to the EPA, as measured from the date the EPA publishes a notice of the final EIS's availability in the Federal Register; or

(2) Ninety (90) days after a draft EIS has been made available to the public, as measured from the date the EPA publishes a notice of the draft EIS's availability in the Federal Register. The Program Office may seek a waiver from the EPA to shorten these time limits for compelling reasons of national policy.

In emergency circumstances, alternative arrangements can be made through CEQ. Any proposed waiver of time limits should be requested only after consultation with the FRA Office of Chief Counsel which will submit the request through P–10 to EPA or CEQ as appropriate.

The Fixing America's Surface Transportations (FAST) Act was signed into law in December 2015. The FAST Act reforms certain elements of the FRA's environmental and historic preservation review processes to help accelerate the delivery of rail projects. One of the NEPA process elements the FAST Act reformed is for projects where a Notice of Intent to prepare an EIS was published after December 4, 2015 and the Secretary approved the funding arrangement after December 4, 2015 then the Final EIS and ROD are combined.

(c) Staff Responsibilities and Timing.

(1) The Program Office shall begin the preparation of a draft EIS as soon as it determines, or the environmental assessment performed in accordance with section 10 of these Procedures discloses, that the proposed action will significantly affect the quality of the human environment.

(2) As soon as a decision to prepare a draft EIS has been made, if FRA is the lead or only agency, the Program Office, in consultation with the FRA Office of Chief Counsel, shall undertake the scoping process identified in CEQ 1501.7.

(3) In preparing a draft EIS, the Program Office shall perform such research and consultation as may be required in accordance with section 14 of these Procedures or as may be considered desirable as a result of the scoping process. The completed draft

EIS shall be signed by the head of the Program Office. The Program Office shall forward a copy to the FRA Office of Policy and Program Development and a copy to the FRA Office of Chief Counsel.

(4) When requested by the Program Office, the FRA Office of Policy and Program Development shall review the draft EIS and shall advise the Program Office in writing as to the consistency of the draft EIS with FRA policies and programs.

(5) The FRA Office of Chief Counsel shall review every draft EIS and shall advise the program office in writing as to the legal sufficiency of the draft EIS.

(6) The Program Office shall submit the draft EIS to the Administrator concurrently with the advice obtained from the FRA Office of Policy and Program Development, when applicable, and from the FRA Office of Chief Counsel.

(7) A draft EIS may be formally released outside the FRA only after approval by the Administrator.

(8) The Program Office shall direct distribution of the draft EIS as follows: EPA (five copies); the Office of the Assistant Secretary of Transportation for Policy and International Affairs (two copies); all interested FRA regional offices; appropriate DOT Regional Representatives; the FRA Office of Policy and Program Development; the FRA Office of Chief Counsel; all Federal agencies which have jurisdiction by law or special expertise with respect to the environmental impacts of the proposed action; State and local government authorities and public libraries in the area to be affected by the proposed action; and all other interested parties identified during the preparation of the draft EIS pursuant to section 9(b)(1) of these Procedures.

(9) The draft EIS shall be made available for public and agency comment for at least45 days from the Friday following the week the draft EIS was received by EPA. The time period for comments on the draft EIS shall be specified in a prominent place in the document, but comments received after the stated time period expires should be considered to the extent possible.

(10) Where a public hearing is to be held on the draft EIS, as determined in accordance with section 9(b) (5) of these Procedures, the draft EIS shall be made available to the public at least 30 days prior to the hearing.

(11) The Program Office shall consider all comments received on the draft EIS, issues raised through the citizen involvement process, and new information, and shall revise the text into a final EIS accordingly. (See CEQ 1503.4). If the proposed final EIS is not submitted to the Administrator within three years from the date of the draft EIS circulation, a written reevaluation of the draft shall be prepared to determine if the draft EIS remains applicable, accurate, and valid. If not, a supplement to the draft EIS or a new draft EIS shall be prepared and circulated as required by paragraphs (1) through (9) of this subsection. If the draft EIS remains applicable, accurate, and valid, the final EIS shall be signed by the head of the Program Office and copies forwarded to the FRA Office of Policy and Program Development and the FRA Office of Chief Counsel.

(12) When requested by the Program Office, the FRA Office of Policy and Program Development shall review the final EIS and shall advise the Program Office in writing as to the consistency of the final EIS with FRA policies and programs.

(13) The FRA Office of Chief Counsel shall review every final EIS and shall advise the Program Office in writing as to its legal sufficiency.
(14) The Program Office shall submit the final EIS to the Administrator concurrently with the advice obtained from the FRA Office of Policy and Program Development, when applicable, and the FRA Office of Chief Counsel.
(15) The final EIS may become final only upon approval by the Administrator.
(16) After approval by the Administrator, the Program Office shall direct distribution of the final EIS as follows: EPA (five copies); appropriate DOT Regional Representatives; all interested FRA regional offices; the FRA Office of Policy and Program Development; the FRA Office of Chief Counsel; State and local authorities and public libraries in the area affected by the proposed action; Federal agencies and other parties who commented substantively on the draft EIS in writing or at a public hearing; and all agencies, organizations, or individuals requesting copies.
(17) If major steps toward implementation of the proposed action have not commenced, or a major decision point for actions implemented in stages has not occurred within three years from the date of approval of the final EIS, a written reevaluation of the adequacy, accuracy, and validity of the final EIS shall be prepared, and a new or supplemental EIS prepared, if necessary. If major steps toward implementation of the proposed action have not occurred within the time frame, if any, set forth in the final EIS, or within five years from the date of approval of the final EIS, a written reevaluation of the adequacy, accuracy, and validity of the final EIS shall be prepared, and a new or supplemental EIS prepared, if necessary. A decision that a new or supplemental EIS is not necessary must be processed in accordance with paragraph (14) of this subsection (c).

(d) Legislative EIS. An approved draft legislative EIS may be forwarded to the appropriate Congressional committee(s) up to 30 days later than the proposed legislation. If a final EIS is prepared as required by CEQ 1506.8(b) (2), it shall be forwarded to the appropriate Congressional committee as soon as it becomes available. Comments on the draft EIS and FRA's responses thereto shall be forwarded to the appropriate Congressional committee(s).
(e) Changes and Supplements. Where, in the development of an FRA action for which a draft or final EIS has been prepared, a significant change is made which would alter environmental impacts, or where significant new information becomes available regarding the environmental impacts of such an FRA action, the Program Office shall prepare an appropriate supplement to the original draft or final EIS for that portion of the FRA action affected. Such a supplement shall be processed in accordance with paragraphs (3) through (17) of subsection (c) of this section. If a formal administrative record is required for any FRA action for which a supplemental EIS is prepared, the supplemental EIS shall be introduced into the formal administrative record. The Program Office, in consultation with the FRA Office of Chief Counsel, shall determine whether and to what extent any portion of the proposed action is unaffected by the planning change or new information. FRA decision making on portions of the proposed action having utility independent of the affected portion may go forward regardless of the concurrent processing of the supplement.
(f) Representations of Mitigation. Where a final EIS has represented that certain measures would be taken to mitigate the adverse environmental impacts of an action, the FRA program office shall monitor the action and, as necessary, take steps to enforce the implementation of such

measures. Where applicable, the Program Office shall include appropriate mitigation measures as a condition to financial assistance and as a provision of contracts. The program office shall, upon request, inform cooperating and commenting agencies on progress in carrying out mitigation measures they proposed and which were adopted by FRA and shall also, upon request, make available to the public the results of relevant monitoring.

(g) 4(f) Determinations. Where a 4(f) determination as well as an EIS is required for a proposed FRA action, it shall be prepared in accordance with section 12 of these Procedures and shall be integrated with the draft and final EIS.

(h) Contents of an EIS. The specific contents of both a draft and final EIS are prescribed by section 14 of these Procedures. Prescribed format for or page limitations on EIS's shall be those set out in CEQ 1502.7 and 1502.10. An EIS shall be prepared so as to focus on the significant issues, as identified by the environmental assessment and the process of public comment, and so as to avoid extraneous data and discussion. The text of an EIS should be written in plain language comprehensible to a lay person, with technical material gathered into appendices. Graphics and drawings, maps and photographs shall be used as necessary to clarify the proposal and its alternatives. The sources of all data used in an EIS shall be noted or referenced in the EIS.

14. Contents of an Environmental Impact Statement

To the fullest extent possible, the Program Office shall prepare draft environmental impact statements concurrently with and integrated with environmental impact analyses and related studies required by the various environmental review laws and Executive Orders listed in subsection (n) below.

In addition to the requirements of CEQ 1502.11 through 1502.18, and subject to the general provisions of section 13(h) of these Procedures, a draft or final EIS shall contain the following:

(a) If appropriate, identification of the document as containing a 4(f) determination made pursuant to section 4(f) of the Department of Transportation Act, 49 U.S.C. 303(c).

(b) If appropriate, a citation to section 106 of the National Historic Preservation Act, 16 U.S.C. 470(f). If the project has developed a Programmatic Agreement among the consulting parties then the Programmatic Agreement should also be referenced.

(c) Identification of the FRA.

(d) The Program Office that prepared the document.

(e) The month and year of preparation of the document.

(f) In a draft EIS, the name and address of the person in the FRA to whom comments on the document should be addressed, and the date by which comments must be received to be considered.

(g) A list of those persons, organizations, or agencies assisting the FRA in the preparation of the document.

(h) In a draft EIS, a list of agencies, organizations, and persons to whom copies of the document are being sent.

(i) In a final EIS, a list of all agencies, organizations, or persons from whom comments were received on the draft EIS.

(j) A table of contents.

(k) A brief statement of the purpose and need to which the alternatives described in subsection (l) respond, including, where applicable, the legislative authority on which it is based; and the

extent to which other Federal, State, or local agencies are funding or otherwise participating in or regulating the alternatives.

(l) A description of all reasonable alternative courses of action which could satisfy the purpose and need identified in subsection (k). The description should include the ''no action'' alternative and alternatives not currently within the authority of the FRA, as well as a description of feasible mitigation measures which have not been incorporated into the proposed action. The draft EIS may and the final EIS shall identify which alternative is the proposed action.

(m) A short description of the environment likely to be affected by the proposed action, by way of introduction to the environmental impact analysis, including a list of all States, counties, and metropolitan areas likely to be so affected.

(n) An analysis of the environmental impacts of the alternatives, including the proposed action, if identified. The discussion under each area of impact should cover the proposed action and all alternatives, even if only to point out that one or more alternatives would have no impact of that kind. Under each area of impact, the discussion should focus on alternatives which might enhance environmental quality or avoid some or all adverse impacts of the proposed action. Attachment 2 to DOT Order 5610.1C provides guidance on the contents of this section. Analysis should be focused on areas of significant impact: beneficial and adverse; direct, indirect, and cumulative; and both long- and short-term. There should be evidence of consultation with appropriate Federal, State and local officials. At a minimum, the following areas should be considered in the environmental analysis, although their discussion in the EIS is dependent on their relevance.

(1) Air quality
(2) Water quality
(3) Noise and vibration
(4) Solid waste disposal
(5) Natural ecological systems
(6) Wetlands
(7) Endangered species
(8) Flood hazard evaluation and floodplain management
(9) Coastal zone management
(10) Production and consumption of energy
(11) Use of natural resources other than energy, such as water, minerals, or timber
(12) Aesthetic environment and scenic resources
(13) Transportation
(14) Elderly and handicapped
(15) Land use
(16) Socioeconomic environment
(17) Public health
(18) Public safety
(19) Recreation areas and opportunities
(20) Environmental Justice
(21) Sites of historical, archeological, architectural, or cultural significance
(22) Construction impacts

(o) A summary of unavoidable adverse impacts of the alternatives and a description of mitigation measures planned to minimize each adverse impact.
(p) A brief discussion of the relationship between local short-term uses of the environment affected by the alternatives, and the maintenance and enhancement of long-term productivity in that environment.
(q) Any 4(f) determination covering the same proposed action as the EIS.
(r) A compilation of all applicable Federal, State and local permits, licenses, and approvals which are required before the proposed action may commence. The final EIS should reflect that there has been compliance with the requirements of all applicable environmental laws and orders.
(s) A discussion of the public and agency involvement program including public involvement and outreach, agency involvement, and notification and circulation of the draft EIS.
(t) In a final EIS, a compilation of all responsible comments received on the draft EIS, whether made in writing or at a public hearing, and responses to each comment.
(u) An index, if possible and useful.
(v) Signature and date indicating the approval of the Administrator as required by section 13(c) of these Procedures.

U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs

Monitoring Procedure 32C – Project Scope Review

1.0 PURPOSE

This Monitoring Procedure (MP) describes the Monitoring and Technical Assistance Support's (MTAS) review and analysis of the Grantee's project scope.

This MP is a guide. The Federal Railroad Administration (FRA) will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

The scope of the project represented by the totality of all documentation should be 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 consistent with the scope approved by the FRA.

The MTAS may be directed to review the scope of the project during any phase.

3.0 RECOMMENDED DOCUMENTS

The MTAS should obtain from the Grantee current versions of the following documents, where applicable, to help determine if the project work aligns with the scope previously approved by the FRA:

- Grant agreement(s) with the FRA and the Grantee's application for funding. Note: the project scope review is intended to determine that the project aligns with proper planning and design processes, as well as with the scope proposed in the original application
- Written project description (narrative)
- Approved project scope with changes since the last milestone
- Environmental documents (i.e. CE; FEIS/ROD; EA/FONSI)
- Basis of design reports; design criteria reports
- Design documents (drawings, specifications)
- Project schedule
- Project cost estimate (and estimate from completed project phase to track changes)
- Project Management Plan and sub-plans, such as Risk and Contingency Management Plan
- Planning and Concept Design documents
    - Service Development Plan
    - Performance measures
    - Corridor studies (capacity, operations, etc.)
    - Rail alignment and station location plans
- Review documents:

- Value Engineering Reports
- Constructability Reviews
- Risk Assessment Reports

4.0 SCOPE OF WORK

4.1 On-Site Review Meeting

If it is determined by the FRA that an on-site review is necessary, the MTAS should review any relevant documentation (the list above provides examples of relevant documentation). The on-site review may occur prior to obligation.

The MTAS should arrange for an on-site briefing with the Grantee's project management team. This briefing should include:

- A narrative description of the project scope
- Project graphics, drawings, maps, and projections
- Scope changes that have occurred since the last major review milestone, e.g. completion of Planning/Concept Design; completion of Preliminary Engineering (PE), etc.
- Plan for project delivery
- Plans to change the manner of project management in subsequent phases
- Changes in external factors such as right-of-way, permits, or third-party agreements that would affect project scope

4.2 Review and Assessment

The MTAS should review the Grantee's plan to review the project scope for completeness; coordination and timing of the reviews; and, personnel including independent peer reviewers and the Grantee's project team. At the direction of the FRA, the MTAS will detail its observations, conclusions, and recommendations in a manner consistent with the general report outline in MP01 Appendix B.

The Scope Review Checklist, attached as Appendix A, provides a guide to evaluating the scope. The MTAS should use the Checklist 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 Checklist is organized using the FRA's Standard Cost Categories (SCC) for consistency.

The MTAS should address and report on the following when reviewing the project scope:

- Does the Grantee have change control procedures and appropriately timed checks to track scope, verify approvals of changes, and ensure consistency of scope, cost estimate, and schedule?
- Characterize the project scope in a manner that integrates and summarizes available information, provides professional opinions, analyses, and recommendations
- In Planning/Concept Design:
    - Does the scope appear to fulfill the established project rationale, goals and objectives?

- Have key stakeholders (host railroads, infrastructure owners, operators, the FRA, community representatives, Grantee agency leadership, etc.) provided the appropriate input to the project scope?
- Have planning analyses been done to provide parameters related to existing and forecasted infrastructure and service conditions?

- In PE:
  - Is the scope consistent with the approved Planning/Concept Design (and Tier 1 NEPA if applicable)?
  - Is the scope compliant with applicable laws and regulations?
  - Identify additional known or anticipated changes to scope. Are these changes incorporated into project documents and the Grant agreement?
  - Identify unknown or uncertain conditions, (e.g., real estate to be acquired, permits to be issued, third-party agreements to be finalized). Assess the Grantee's plan and schedule for resolving these issues
  - Considering known and uncertain conditions, do the cost estimate and schedule take these changes into account?
  - Do the project documents and the risk/contingency management plan appropriately allocate the risk?
  - Altogether, is the scope internally consistent, defined to a level appropriate for PE and the applicable project delivery method, consistent with the scope approved by the FRA?

- In final design (FD):
  - Is the scope consistent with the approved PE/NEPA documents?
  - Are the major work details, structural element dimensions, design interfaces, and physical interfaces consistent with the approved scope? Are the plans and drawings adequate in terms of content, presentation, clarity, cross-referencing?
  - Is the scope internally consistent, defined to a level appropriate for FD and the applicable project delivery method, consistent with the estimated cost and schedule, and consistent with the scope approved by the FRA?

- The MTAS should present findings in order of importance (most likely, largest consequences, etc.) and accompanied by recommendations for modifications or additional work by the Grantee, along with a time frame for the performance of the work

CONTENTS

- Design Document Coordination
- SCC 10 Guideway and Track Elements
- SCC 20 Stations, Stops, Terminals, Intermodals and SCC 30 Support Facilities: Yards, Shops, Admin. Buildings
- SCC 40 Sitework and Special Conditions
- SCC 50 Systems
- SCC 60 ROW, Land, Existing improvements
- SCC 70 Vehicles
- SCC 80 Professional Services
- Project Delivery Method, Contract Packaging

The MTAS should review design or contract packages, or major scope element against applicable criteria.

Design Document Coordination

The Civil, Structural, Architectural, Electrical, Mechanical, Power, Signal and Communications, Trackwork, Track Structures, 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.

SCC 10 Guideway and Track Elements

Major design decisions are documented through definition of track and guideway type (elevated, at-grade, underground), rehabilitation of existing infrastructure, and structures such as bridges/tunnels.

- Major or critical work details, structural element dimensions, design interfaces, and physical interfaces are complete and defined appropriately in drawings, standards, criteria, specifications and contract package scopes
- Design Relative to Site and Geotechnical Conditions
    - Site investigation
        - Pre-construction site reconnaissance visits have been made
        - Site boundary and existing conditions surveys are complete
        - Flood hazard analyses have 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
        - Geotechnical investigations are complete
            - Subsurface exploration or laboratory testing program
            - Identification of buried structures and utilities

        - Identification of contaminated soils and other hazardous material
    - Design in response to geotechnical and other below-grade conditions is appropriate
        - Local seismic conditions and codes have been considered
        - Structural approach to ground conditions, subsidence, etc. is identified and resolved
        - Design of the rock support in station caverns, crossover caverns, the TBM tunnels, drill/blast tunnels, etc. is appropriate to rock characteristics (fracture planes, hardness and cleavage)
        - Relative to subsurface conditions, selection of building type, foundation, and methods of construction are reasonable
        - Mass balance diagrams have been completed for alignments on fill or cut
        - The design appropriately responds to identified buried structures and utilities, contaminated soils and hazardous material on site, and provision for removal or remediation has been made
- Structural systems and elements are established and dimensioned to show number of spans, span length, substructure design, etc.
- Trackwork
    - Includes track layout, turnouts, crossovers, and special track work; (Note: On a site specific basis, taking into account operating conditions, it may be appropriate to locate platforms off the mainline)
    - Track design is required to comply with 49 CFR 213
    - Level of detail in Concept Design: Schematic
    - Level of detail in PE and FD: Scaled and dimensioned drawings, plans, profiles, with tabulations of track geometry (horizontal and vertical curve data)
- For tunnels and elevated structures, the center line of track and base of rail are referenced to tunnel or elevated structure; guideway sections show the distance from centerline of track to critical clearance points such as walls, walkways, and edges of platforms
- Tunnels are 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 design decisions are documented through definition of station and maintenance facility structures and buildings, and as a subset, definition of access, functionality, operations, maintenance, fire/life safety, and security.

- Major or critical work details, structural element dimensions, design interfaces, and physical interfaces are complete and defined appropriately in drawings, standards, criteria, specifications, and contract package scopes
- Site context

  - Site environment and development conditions are considered — sun orientation, wind, topography, drainage patterns, flora, fauna; historical development context
  - Site layout takes into account safety through principles of Crime Prevention Through Environmental Design (CPTED); and security based on a threat and vulnerability assessment
  - Within the site plan are shown:
    - Building footprint, trackwork/guideway; relationship of the building to grade; site utilities
    - ADA-compliant walkways from the public way to the buildings, within public areas of the buildings, and to the train platform
    - Prominently located transit bus and light rail transfer points with connecting walkways to the station and the public way
    - Bikeways extending from the public way and prominently located bicycle parking lots
    - Conveniently located taxi and kiss-n-ride passenger drop-off with more distant auto parking
- Station and maintenance facility architecture is established.
  - The drawing package of site plans, floor plans, longitudinal and cross sections, elevations, and details illustrate typical and special conditions; finish schedules. Design interfaces among disciplines are defined in drawings, standards, design criteria, and specifications
  - Building floor plans show ADA compliant access to public spaces; vertical circulation systems including stairs, elevators, escalators, dimensioned platforms, work bays in maintenance facilities, support spaces for mechanical and maintenance access; agent area, passenger waiting and facilities; fare gate area, and ADA compliant level boarding transition between the platform and train car. Building sections and elevations illustrate form, mass, relationship to grade, and surrounding development; interior spaces.
  - The building structural system is designed and dimensioned, with supporting calculations; it may reflect security criteria stemming from a threat and vulnerability assessment
  - Electrical power, lighting, fire/life safety including NFPA, security systems, passenger info, security systems; communications systems; mechanical including support facility and track area drainage, piped utilities, heating ventilation and air conditioning, and smoke evacuation; equipment; all shown on floor plans and described in schedules on drawings or specifications; all compliant with FRA safety regulations

SCC 40 Sitework and Special Conditions

Major drainage facilities, flood control, hazardous materials, retaining walls, site structures, roadways, grade crossings, traffic control, and utilities are defined and physical limits and interfaces identified, based upon site specific surveying with digitized data integrated into alignment base mapping. Definition is through plans, plan profiles, standards, and criteria, specifications.

- Adequate construction access and staging areas are provided. Complex railroad reconfigurations (typically in and around major passenger stations or freight yards) should include a proposed construction staging sequence to avoid shutting down operating railroads during construction.

Environmental documents and cost estimates should reflect the temporary tracks and other measures that may be taken to avoid impacts of construction sequencing
- Refer to Design Relative to Site and Geotechnical Conditions above
- Structural elements for retaining walls and other site structures are advanced in design

SCC 50 Systems

- 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 center, substations, crossings, tunnel ventilation (both normal and emergency) and traction power) is well defined and identified in drawings and specifications, general arrangements and standard details, and single line drawings
- Signaling and Train Control
    - 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
    - Track plans 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.
    - Site specific requirements are defined (for signal structural work) and location drawings for signal enclosures (as input to ROW requirements)
    - Central instrument rooms (CIR), central instrument huts (CIH), central instrument locations (CIL), and relay rooms locations and sizes, as well as room layouts (relay, termination, central instrument, power), are identified and defined
    - Signal cable routing methodology, as well as power supply and distribution, are identified and defined
    - Positive Train Control (PTC) technology, where applicable, capable of preventing train-to-train collisions, overspeed derailments, and casualties or injuries to roadway workers, (e.g., maintenance-of-way workers, bridge workers, and signal maintainers). PTC may be implemented as overlay (existing method of operations remains) or standalone (replaces existing methods of operation)
    - PTC combines:
        - Precise real-time locating (usually with GPS) of all trains and other vehicles occupying track
        - Cataloging of infrastructure, including: turnouts, crossing junctions, grades, and associated permissible speeds
        - Algorithms that calculate the effective safe braking characteristics for each train en route in PTC territory
        - Wireless communications between all operating units, including: engineers, dispatchers, and work crews
    - Software and interface requirements (to facilities, existing system, and other system elements) are identified and defined

  - Maintenance, testing, and training requirements are identified and defined (factory acceptance, site acceptance, field integration, start up, etc.)
- System Description
  - 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.
  - 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
  - Third-rail or overhead contact system (OCS) is defined
  - AC Switchgear type, ratings, relay protections provided
  - Traction Power Transformer type is defined
  - Low Voltage Direct Current electric traction system — 12.5/25 kV alternating current system with redundant utility supply points
  - DC Switchgear basis of design and choice of switches, busses and feeder breakers is identified and equipment list is complete
  - Programmable Logic Controller (PLC) system, if provided, integrates and control intercubicle functions and provides control, monitoring, and data logging at each substation
  - 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
  - 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
  - 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

SCC 60 ROW, Land, Existing improvements

- The Real Estate Acquisition and Management Plan (RAMP) is complete consistent with the phase of the project. A fully complete RAMP is expected at the completion of PE. Land acquisition and relocation activities are being implemented in accordance with the RAMP and project schedule. 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
- Site surveys include property lines and identification of structures for buildings, site features, utilities; surface improvements such as streets and railroad rights-of-way

- 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
- Land owned or proposed for acquisition that is outside of the proposed project footprint should be identified as such
- 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 Grantee should share this information with the property appraiser

SCC 70 Vehicles

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 within passenger cars and locomotives:

- System Functional Description has been developed and advanced to include the following:
    - Definition of the subsystems that constitute the overall system
    - Description, graphic depiction of each interface between subsystems
    - Description of how each subsystem will meet the requirements of the specification
    - Vehicle dynamic envelop has been defined to meets the facility and alignment limitations
    - Vehicle-systems integration has been addressed to assure compatibility of electrification, signal and communications systems
- Materials specifications have been developed and advanced to include lists of qualified materials considering the requirement for compliance with Buy America/n.
- Testing requirements have been developed and advanced to include the following:
    - 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)
    - Maintenance and Training Requirements should be defined and identified including development of maintenance and training requirements for new system elements.
- All compliant with ADA and FRA Safety regulations

SCC 80 Professional Services

The roles and responsibilities of the Grantee's professional consultants (design, engineering, and construction management) or others such as attorneys or insurance professionals may be distinguished from the Grantee's own professional staff and manual labor. When the Grantee'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, and 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.

Project Delivery Method, Contract Packaging

Check that the Grantee has planned for construction, at either a project or contract package level, and has sufficiently analyzed and adequately addressed the following elements:

- Delivery Methods
    - Grantee has demonstrated that the selected delivery method is allowed under State law
    - When selecting a project delivery method, the Grantee has considered its contracting objectives, risk tolerance, level of uncertainties remaining during PE, and its own organizational capability and capacity; it has analyzed the costs and benefits of the various methods, and considered such aspects as loss of design control, input from construction contractors during Final Design, and reallocation of risk
- Contract packaging and structuring
    - The Grantee has considered tradeoffs between large size contracts which are often more efficient to manage and small contracts that can attract 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)
    - Construction industry information sessions have been held after advertisement in industry publications in order to attract regional, national, and international contractors
    - Timing of major bid activity, within schedule constraints, will be managed to maximize contractor competition, with consideration to bid schedule for project(s) in the region such as highway or major redevelopment projects;
    - 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.
    - “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
    - Third parties:
        - Third party procurement contracts have been utilized only where long lead-time items will impact project schedule if purchased by construction contractor
        - Contract packaging for Third-party construction contracts has been structured to maximize competition; and has been coordinated with the project schedule to minimize schedule impact by critical third parties, e.g. utilities, fire/life safety test witnessing or installation
        - Agreements have been reached with third party contractors on Buy America/n, schedule, and cost
- Site investigation and geotechnical studies will be available to construction contractors

- The General Conditions, Supplementary Conditions, and Division 1 of the Specifications adequately describe for bidding construction contractors the following:
    - Project site access, schedule, unit prices
    - Provisions for change in 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
    - Socioeconomic requirements related to bidding
- Market conditions are considered
    - Market conditions for the state/regional/local construction economy for the general contractors (GC) and subcontractors on public and private work
    - Market conditions for the national construction economy for rail GCs and subcontractors
    - Availability of labor for various trades such as electricians, etc.
    - 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.)
    - Availability of construction equipment, e.g. cranes, launching girders, pre-mix plants, barges
- Access and staging on project construction sites are considered
    - Transportation of materials to the various jobsites, access points and laydown areas, need for temporary construction for mobilization; potential weather impacts and related need to protect the work; identification of waste sites/borrow sites
    - Construction impacts on ongoing transport and neighborhoods
        - Very complex railroad reconfigurations (typically in and around major passenger stations or freight yards) and corridor improvement projects with multiple work elements, (e.g., track improvements, signal upgrades, and station work) must include a construction phasing plan that identifies the sequence in which work will be completed. The plan needs to:
            - Package work into phases that maximize track outages
            - Ensure construction crews do not conflict with each other
            - Identify temporary structures that are needed, ensure impacts to railroad operations are minimized to the extent possible
            - Identify access points and access periods for construction work, given the competing need for ongoing train operations; consider adjusting train schedules, reducing service, and busing of passengers
        - Ongoing operations for other transport such as transit, auto traffic, pedestrain walkways and bikeways

- Impacts due to socioeconomic conditions; constraints due to public spaces, historic, natural, and archaeological resources, air quality, noise, vibration, contaminated materials

- Access restrictions
  - Permits, environmental requirements, e.g. in-water work windows
  - Site availability in terms of hours per day, days per week, months or seasons during a year

U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs

Monitoring Procedure 32D – Project Delivery Method Review

1.0 PURPOSE

This Monitoring Procedure (MP) describes the Monitoring and Technical Assistance Support (MTAS) review and analysis of the Grantee's consideration, selection, and implementation of a project delivery method for its project, specifically as it pertains to Final Design / Construction projects.

This MP is a guide. The Federal Railroad Administration (FRA) will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

A variety of project delivery methods are available to the Grantee. One method is Design-Bid-Build, in which the Grantee's design consultant prepares 100% complete contract documents for bidding by construction contractors. Alternative contracting methods include design-build, design-build-operate and maintain, 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.

The MTAS will use its understanding of a variety of project delivery methods to evaluate the efficacy of the project delivery method chosen by the grantee, and determine appropriate milestones for FRA oversight and monitoring.

3.0 RECOMMENDED DOCUMENTS

The MTAS should obtain direction from FRA staff regarding applicable documents from the Grantee, such as:

- Written project description
- Design documents (Plans, Specifications), if applicable
- Project schedule
- Cost estimate
- Project Management Plan
- Project Delivery Plan

4.0 SCOPE OF WORK

The MTAS should review the documents listed above, discuss with the Grantee, at direction of the FRA, and evaluate the Grantee's approach and documents related to the Grantee's design and construction procurement, and contract packaging strategies. At the direction of the FRA, the MTAS will detail its observations, conclusions, and recommendations in a manner consistent with the general report outline in MP01 Appendix B.

4.1 Review of Selection and Implementation of Project Delivery Method

The MTAS review should:

- Review and analyze the project information to understand the size and complexity of the project, including:
    - The laws, regulations, policies, guidance documents, and practices that apply
    - The ability to divide the project into contract packages attractive to medium-size and smaller contractors
    - The project's potential effect on construction labor in the region given other projects in or near construction
    - Its level of design customization and the related capacity and capability of domestic labor to provide custom materials, fabrications, and manufactured items
    - The strengths and weaknesses of the design itself and the design documents in terms of completeness and coordination
    - The magnitude of remaining uncertainties or unresolved issues
    - The implementation schedule showing each major element or package and associated preparatory and subsequent events
    - Potential alignments between various delivery methods and the Grantee's Project Schedule and funding/cash flow
    - The opportunities and constraints the Grantee perceives for this project for bidding and construction

- Discuss with the Grantee its management and technical capacity and capability
    - Grantee's priorities
    - Grantee team's strengths (e.g., long history of building rail projects) and weaknesses (e.g., all new team)
    - The opportunities and constraints the Grantee perceives for bidding and construction due to its management and technical capacity and capability

- Evaluate the Grantee's selection of a delivery method
    - Is it a comprehensive project delivery strategy?
    - Is it likely to satisfy the overall project objectives?
    - Is it authorized by State law?
    - Does it consider relevant risks associated with the project element(s)?
    - Does the project schedule reflect the project delivery method, including sufficient preparation time?
    - Does the Grantee have staff resources to execute the project delivery strategy?
    - Identify discrepancies, shortcomings, fatal flaws in the Grantee's decision-making

- Evaluate the Grantee's implementation of the delivery method
    - Identify, describe, and analyze the Grantee's individual contract packages and anticipated or actual bids, pricing, and compensation components
    - Consider overheads, contingency and "contingency-like" components, and any negotiated profit or fee values
    - The MTAS will evaluate the degree to which such pricing or compensation components are aligned with the Grantee's project strategy and risk management plan and their effectiveness in minimizing cost (and cost overruns) and schedule slippage

U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs

Monitoring Procedure 33 – Capital Cost Estimate Review

1.0 PURPOSE

This Monitoring Procedure (MP) describes the analysis, recommendation, and reporting that the Federal Railroad Administration (FRA) requires of the Monitoring and Technical Assistance Support (MTAS) when evaluating the Grantee's cost estimates. The MTAS's review should help the Grantee make decisions regarding cost control measures, contingencies, and other mitigations; in addition, it should inform the FRA of the validity and reliability of the Grantee's cost estimate and to identify existing or potential issues regarding costs.

This MP is a guide. The FRA will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES FOR COST ESTIMATING

- PROVEN METHODOLOGIES: Proven professional quantity surveying and cost estimating practices should be used to develop the estimates;

- THE WHOLE PICTURE: The cost estimate should reflect all the costs for the entire project scope and schedule

- RELIABILITY: The cost estimate will incorporate a level of detail that is appropriate for the project phase; however, at any phase, adequate consideration of risks, uncertainties, and unknowns should be reflected in cost contingencies and reserves, so that a reliable estimate results

3.0 RECOMMENDED DOCUMENTS

Typical documents that the MTAS should obtain and review as part of the capital cost review include:

- Project statement of work
- Project drawings and specifications
- Design criteria reports
- Project schedule
- Project capital cost estimate
- Capital cost estimate backup data (take-offs, cut sheets, work breakdown structure, calculations) for the purpose of traceability
- Capital cost estimating methodology
- Project Management Plan

4.0 SCOPE OF WORK

The FRA monitors a wide range of rail projects with varying degrees of complexity, from small scale freight rail improvements to large scale high speed passenger rail networks. As such, the FRA and the MTAS will work together to identify the appropriate type and extent of capital cost review for each project. The following provides an overview of the types of cost reviews and monitoring that may be required of the MTAS. At the direction of the FRA, the MTAS will detail its observations, conclusions, and recommendations in a manner consistent with the general report outline in MP01 Appendix B.

4.1 Evaluation of the Grantee's Management and Control of Project Cost

The MTAS should evaluate the Grantee's management and control of project costs through consideration of the following:

- The Grantee's project control staff and organizational structure; experience and size of staff; ability to independently and effectively communicate with agency executive leadership regarding project costs and related practices; willingness of executive leadership to communicate with project controls staff and take action accordingly;
- The Grantee's project control systems, tools and software, and suitability for the size and complexity of the project;
- The Grantee's project control plans, procedures, and cost management contractual requirements; methods by which the Grantee checks its own estimate, such as peer reviews, independent cost estimates, etc.;
- The Grantee's baseline cost analysis, frequency of revisions during the design and construction process, and documentation and control of changes

4.2 Evaluation of the Grantee's Cost Estimate

4.2.1 Selecting the Review Approach

After a cursory examination of the required documents, the MTAS should recommend to the FRA an appropriate level of review for the project estimate. The level may range from a sampling approach, using only parametric cost estimating methods, to a full independent cost estimate, using detailed engineering estimating methods.

The MTAS may perform the following upon the direction of the FRA:

- Characterizing the Grantee's level of estimating and general approach
- Parametric and Analogous estimating reviews of the Grantee's estimate. Metrics such as cost per mile are compared to similar projects or industry standards
- Detailed reviews, where cost estimates are analyzed in detail in all areas (unit costs, cost estimate reviews, contingency, escalation, inflation, etc.), to verify that all scope elements are covered, the estimate adequately reflects the project scope, quantity takeoffs are correct, the methodology is correct, and all elements of the estimate are appropriate
- Development of a completely independent cost estimate. This goes beyond the detailed review of the Grantee's estimate
- Analysis of cost contingencies

- Bid-tab analysis, where contract bids are compared to the detailed project estimate and analysis to determine adequacy of the bids
- Specific element reviews, where one or more specific elements are analyzed in detail, such as professional services, real estate, finance charges
- Establishment of specialized quantitative cost modeling or assessments and surveillance reporting or trend analysis
- Presentation to the Grantee of observations, analysis, recommendations, and opinions
- Participation in workshops with the Grantee to discuss the project

4.2.2 Characterizing the Grantee's Level of Estimating and General Approach

The MTAS should verify that the Grantee's approach to developing cost estimates is adequate and appropriate for both the project type and complexity and the current level of project development. The MTAS should characterize the methodologies used and the level of support provided for the costs.

- Methodologies – Characterize the methodologies used by the Grantee:
    - Parametric (Statistical) -- Estimating using statistical relationships
    - Analogous (Comparison) – Estimating based on historical data of a similar item
    - Bottom-Up (Detailed Engineering) -- Uses a detailed Work Breakdown Structure (WBS) and prices out each work package making up the project
    - Extrapolation (Earned Value) -- Estimating based on actual project costs

- Support for costs – Characterize the support for costs, i.e. how they were derived; how the scope was captured, how it was priced, what assumptions were considered, referring to the levels below

4.2.3 Performing order-of-magnitude checks on the main project components/cost drivers

The MTAS should conduct checks on the estimate using parametric estimation and/or analogous estimating. These two checks are high-level reviews based on historic costs.

- Parametric Estimating – This method uses historical costs as a basis for developing current cost estimates for the project. The method involves identifying the project's key input drivers (i.e. independent variables), ranking their relative impact on the estimate and developing relationships for the key variables, and checking the results with the Grantee's costs

- Analogous Estimating – Analogous estimating uses historical cost information from existing completed projects as a basis for comparison. The completed projects are similar in design and operation to the proposed project. The cost of the proposed is estimated by adjusting the historical cost to account for differences between the two projects in size, performance, technology, and/or complexity.

4.2.4 Overall Review of Cost Estimate

The MTAS should review the estimates and methods when requested by the FRA as early as the pre-obligation stage to verify they are:

- Mechanically correct and complete
- Appropriate for the current project phase
- Consistent with relevant industry or engineering practices
- Based on consistent methods of calculation
- Consistent with project scope and schedule; consistent with project construction packages and that all scope elements are accounted for
- Material and labor escalation rates are reasonable

Appendix A provides a listing and description of typical cost elements included in cost estimates.

4.2.5 Review of Grantee's Contractor Costs Estimate

During project implementation, the Grantee will receive bids or offers that may have a significant impact on the project budget. The MTAS may be requested by the FRA to analyze the following:

- Characterize and evaluate the Grantee's proposed plan and processes for solicitations
- Correlate and analyze bids or proposal amounts against the estimated values for each bid or proposal by element
- Characterize estimate reconciliation exercises performed between the Grantee 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 Grantee has established a plan to utilize bid results to adjust future packages for similar unsolicited work (if necessary)

4.2.6 Review During Construction – Assessment of Grantee's Cost Estimate

Characterize the Grantee's estimate of the project cost-to-complete. Describe the level to which it:

- Is integrated with and makes adequate use of the Grantee's previously developed supporting documentation for the estimate
- Reflects current project schedule, including the Contractor's Critical Path (CPM) scheduling Plan
- Reflects the Grantee's change order experience on the project
- Evaluates and incorporates project progress and trends to date
- Reflects reasonable provisions for testing, commissioning, start-up, and revenue service

4.2.7 Assessment of Grantee's Cost Estimate – Contingency and Risk

The MTAS may perform a review of the project cost contingency to verify that appropriate amounts are included commensurate with the stage of project development. Prepare a cost draw-down curve including both forward pass and backward analysis analyses. Also, refer to the requirements Risk and Contingency Management Plan Structure, Cost Contingency Management Plan to verify that the estimate itself is fully coordinate with the Grantee's plan.

APPENDIX A Typical Cost Estimate Elements

Below are typical cost estimate elements that the MTAS should evaluate during review:

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

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

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 (TBMs, etc.), an appropriate evaluation of market conditions has been incorporated, and currency adjustments as applicable have been made

Escalation for 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.
- Confirm that costs for permitting, agency review fees, legal fees, etc. have been included 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)

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.

Vehicles

- Review 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

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

- Confirm that cost estimates are based on realistic levels of staffing for the duration of the project through closeout of construction contracts

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. Verify that the Grantee and the FRA's Financial Management Oversight Consultant review the reasonableness of the amount of finance charges

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). Reference indices that may be useful are the Engineering News-Record Building Cost Index and Construction Cost Index, some with regional cost databases

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Monitoring Procedure 34 – Project Schedule Review

1.0 PURPOSE

This Monitoring Procedure (MP) describes how the Monitoring and Technical Assistance Support (MTAS) conducts a project schedule review to determine whether the Grantee's project schedule is reasonable given the project conditions. Competent scheduling is required for sound project planning and control of costs and risks.

This MP is a guide. The Federal Railroad Administration (FRA) will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

The MTAS will evaluate the Grantee's Project Schedule for completeness and reliability; logic flow; usefulness as a management tool; the degree to which it reflects the project scope, cost, grant schedule, management practices; and the method of project delivery.

3.0 RECOMMENDED DOCUMENTS

Before performing the review, the MTAS should meet with the Grantee to discuss the purpose of the review and obtain required information, including but not limited to:

- Schedule Assumptions (see a sample schedule in Appendix A)
- Description of the schedule development, control process, and procedures
- Latest schedules in electronic format (i.e., XER format for Primavera Schedules, MPP for Microsoft Project, otherwise PDF format)

4.0 SCOPE OF WORK

4.1 Review of Schedule

The MTAS should review the Grantee's project schedule, related staff, and processes. At the direction of the FRA, the MTAS will detail its observations, conclusions, and recommendations in a manner consistent with the general report outline in MP01 Appendix B.

In planning, the Grantee develops a schematic schedule showing all project phases. In Preliminary Engineering (PE), the Grantee sets forth a more detailed schedule including activities within PE and related to the selected delivery method, schedule control procedures, and schedule control personnel.

In Final Design (FD), the Grantee develops an Integrated Baseline Schedule showing critical project activities and logic flow and durations, including identification of agreements for third parties,

utilities, and real estate/right of way (ROW). The schedule is recommended to be cost- and resource-loaded.
Below are Schedule Essentials for any project phase:

	Schedule Essentials
Basis of Schedule	A logical document that defines the basis for the development of the project schedule, including: • Key elements, issues and special considerations, and exclusions • Resource planning methodology • Activity identification and duration estimating • Source and methodology for determining logic and sequencing • Labor productivity adjustments, including congestion assessment, extended work hours, winter work, curfews, etc. • Production rates, identifies basis for startup and sequencing requirements, and defines any owner requirements such as regulatory, environmental, and quality/inspection • Consistency in use of the time sensitive variables in the capital cost estimate, including year of expenditure assumptions and durations incorporated into the master schedule
Schedule Format	Consistent with relevant, identifiable industry engineering practices. Software is appropriate for size and complexity of project. For example, the schedule may be formatted as a Gantt chart.
Schedule Structure	Work Breakdown Structure (WBS) has been applied in the development of the schedule. WBS is consistent with the analyzed plan and program for all project participants' agreed upon roles, responsibilities, capabilities, and capacities.
Schedule Level	Schedule is 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, environmental, public involvement, PE design, value engineering, final design, right-of-way, permits, third party agreements, 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.
Schedule Elements	Schedule reflects the approved scope Schedule includes adequate time and appropriate sequencing for: • Design phases • Agreements - Right-of-way acquisition, household/business relocations, utilities relocation, railroad purchase and/or usage, Interagency Agreements, funding milestones for Federal and non-Federal sources • Reviews - environmental (by Federal Railroad Administration), risk assessment, PMP reviews, completion reviews for each phase (by State, other Federal agencies, and third parties) • Procurement of design contracts and materials, equipment, vehicles, especially long-lead items • Bid and award periods reflect the required sequencing and durations for the selected project delivery method and are logically tied to the proper work activities • Construction processes and durations are adequate, complete, and allow schedule contingency for potential delays, including inter-agency work, utility relocation, civil, architectural, and systems work, Grantee operations and maintenance, mobilization, and integrated pre-revenue testing

	Schedule Essentials
Resource Scheduling	Quantities and costs defined in cost estimate match resources/costs assigned to the activities in the schedule. The distribution of resources and costs per specification or industry standards are reasonably associated to the activity it is assigned.
Schedule Control	Define the approach to and use of scheduling tools, such as scheduling software, Grantee procedures for schedule change and update, use of a work breakdown structure, assignment of staff responsibility for schedule, cost loading, resource loading, etc.

In addition, the MTAS should review the project schedule and the Grantee's schedule staffing, capabilities, and processes as follows:

- Evaluation of the Grantee's schedule
    - *Format*. Is the schedule format consistent with relevant, identifiable industry or engineering practices? Does it use software appropriate for the size and complexity of the project?
    - *Quality.* What is the structure, quality, and detail of the schedule?
    - *Completeness.* Is the schedule mechanically correct and complete and free of material inaccuracies or incomplete information?
    - *WBS.* How has the project work breakdown structure (WBS) been applied to develop the schedule?
    - *Phasing and Sequencing:*
        - Does the schedule contain activities that adequately define the entire scope of the work being performed?
        - Is the schedule sufficiently developed to determine the validity, stability, and reasonableness of the project critical path?
        - Are near-critical paths easily identifiable and reasonable in terms of their logic and proximity to the project critical path?
        - Are the schedule assumptions for project phase durations reasonable?
        - Check for consistency with Grantee's Schedule Assumptions (see Appendix A)
        - Review project calendars used in the schedule (see Appendix B)
        - Assess the validity and reasonableness of activity durations for major elements on the critical path and the critical path schedule contingency (float)
        - Have labor and material availability (long lead items, Buy America/n requirements) been factored into construction durations?
        - Are the project schedule structure and sequencing logical and reasonable?
        - Is sequencing, through the use of predecessors and successors, identified for all material tasks?
        - Have assumed production rates been backed up with supporting data?
        - Is the work sequenced efficiently (i.e., can/should work be conducted in parallel that is shown in sequence)?
        - Is the use of constraints identifiable, justified, and reasonable?
        - Are work areas identified in construction and properly sequenced from the appropriate predecessor activities (i.e., right-of-way acquisition, permitting, etc.)?

        - Are the durations and logic reasonable for temporary construction and physical construction constraints, such as transportation, soil/underground conditions, or site access restrictions?
        - Have potential conflicts with nearby projects or railroad operations been identified?
        - Are project calendars appropriately defined and utilized and inclusive of allowances for seasonal weather variations and pre-defined holiday outages?
    - *Hierarchy.* Is the hierarchy of schedule elements evident?
        - Is a top-level summary included to clarify phases or groups of activities?
        - Is the schedule detail beneath the 'hammock' or summary level task-based?
    - *Cost/Resource-loaded Schedules*
        - A cost/resource-loaded schedule enables the Grantee to be a more "informed consumer" of a construction contractor's schedule. If the schedule is cost-loaded for construction activities, examine the flow of cost through time and assess the following:
        - Do the quantities and costs assigned to activities in the schedule match those in the cost estimate?
        - If the schedule critical path and logic ties among activities are reasonable, does the cost curve presented seem reasonable? Is the money flowing too fast? Are the costs front-end loaded?
        - When the initial cost distribution is accepted, that curve becomes a baseline from which project progress is compared. If actual expenditures are "above the curve," investigate why project funds are being spent faster than anticipated. Verify the cost distribution was accepted by all parties including the construction contractor
        - Consider the cost impacts if the project experiences delays or finishes early
        - A resource-loaded schedule is the hardest to develop, but yields valuable information:
        - Consider the job loading for the project for a daily work force and a monthly work force
        - How many people should be on the project?
        - How many people and related equipment can fit into the available work space?
    - *Contingencies.* Discuss with the Grantee the exposed and hidden (patent and latent) contingency in the schedule, including amounts and how it is expressed in the schedule. Does the schedule include contingencies for unplanned risk events (i.e. market risks, key personnel changes, contractor issues, seasonal impacts, and environmental effects)?
        - The Grantee should develop a bar chart to illustrate the placement of this contingency across the project design phase and the major contract packages during construction
        - Describe the adequacy of proposed contingency at milestones
        - Describe the Grantee's approach to identifying schedule hidden contingency, e.g. talking with the Grantee's scheduler, etc.

        - Evaluate schedule elements that are functionally equivalent to schedule contingency but not identified as such, including extended durations, forced float, dummy activities, or positive lag values
        - Determine if the use of constraints is identifiable and reasonable
        - Float available in the schedule, at any time should not be considered for the exclusive use of either the Grantee or the contractor. During the course of contract execution, any float generated due to the efficiencies of either party is not for the sole use of the party generating the float, rather it is a shared commodity to be reasonably used by either party. Efficiencies gained as a result of favorable weather within a calendar month will also contribute to the reserve of float. An accepted schedule showing work completed in less time than the contract completion date will be considered to have Project Float
- Evaluation of the Grantee's schedule control methods and staff
    - The approach to and use of scheduling tools, such as scheduling software
    - Grantee internal procedures for schedule maintenance, plan and timing of schedule reviews, and procedures for schedule change and update
    - Use of a WBS
    - Assignment of staff responsibility for schedule, cost loading, resource loading, etc., and the adequacy of the scheduling staff and software for the size and complexity of the project
- Evaluation conclusions, recommendations
    - Validate the usefulness of the schedule as a project management tool. Does it provide pertinent and timely information on the overall pulse of the project? Does the schedule indicate to the reader what project work should be happening? If the schedule and project reality don't match, is the project ahead or has it slipped?
    - Evaluate the level of definition of the schedule and elements within for relevance to the project phase
    - Describe areas of concern and uncertainties and constraints to sequencing or duration. Identify risks and provide a list of risks associated with the schedule. If requested, the MTAS will provide a written comparison of the proposed schedule with similar project(s) and analyze the differences. The MTAS will draw conclusions and provide recommendations based on this comparison
    - Make suggestions to improve the schedule and proactively help the Grantee solve schedule problems

APPENDIX A Sample Format – Schedule Assumptions

Items (basis for duration assumptions) should be tailored to the project. Items shown are for example.

SCHEDULE ASSUMPTIONS	DURATION (Months)
Planning & Concept Design	
PMP and Sub-plans	X
Alternatives Analysis	X
Service Planning/Infrastructure Design	X
NEPA, Tier I	X
Service Development Plan	X
Cost Estimate, Schedule, and Finance Plan	X
Periodic Reviews by the FRA during development and at completion	X
Total	XX
Preliminary Engineering	
PMP and Sub-plans	Etc.
Design	
Refinement of Service Planning	
NEPA, Tier II	
Cost Estimate, Schedule, and Finance Plan	
Value Engineering	
Risk Assessment	
Reviews	
Total	
Final Design	
PMP and Sub-plans	
Design	
Cost Estimate, Schedule, and Finance Plan	
Constructability Review	
Risk Assessment Refresh	
Reviews	
Total	
Bid and Award of Construction Packages	
Bid package A, B, C, etc.	
Prepare and bid documents	
Award	
Construction	
10 Guideway and Track Elements	
20 Stations	
30 Support Facilities: Yards, Shops, Admin., Buildings	
40 Site Work and Special Conditions	
50 Systems	
60 ROW, Land, Existing Improvements	
70 Vehicles	
80 Professional Services	
Inspections, Safety Certifications, Reviews, and Testing	
Training of Operator and Staff / Simulated Revenue Operations	

APPENDIX A Sample Format – Schedule Assumptions

SCHEDULE ASSUMPTIONS	DURATION (Months)
Revenue Operations	

APPENDIX B Sample Calendar Description and List

For capital projects, two calendars predominate. The majority of the physical construction activities are based on a five-day work week with non-work days for holidays and weather delays. Design and other activities are based on a five-day work week with non-work days for holidays. Additional calendars can be used for other activities.

The MTAS should confirm Grantees provide calendar information for their Project Schedules and the number of schedule activities associated with each calendar — useful for calculating acceleration and delays. Below are examples.

Calendar Name	Number of Activities Assigned	Number of Activities on Critical Path/Total Duration	Number of Non-Critical Activities With Less Than 30 Days Contingency/ Avg. Contingency
Construction 5 Day w/Union Holiday & 30 Weather Days	2649 activities	700/36 months	2000/10 days
Engineering/Procurement/Permit Calendar	1555 activities		
Grantee/Contractor 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 activities		
7-day Workweek Test/Commission Yard Modification Pre-Revenue Operation Start Revenue Operations	9 activities	9/6 months	
54-Hour Outage calendar	5 activities		
Weekend Outage Calendar w/30 Weather Days	4 activities		
Tunneling w/Union Holiday & 2 Weather Days	2 activities		
TOTAL	**4,801 activities**		

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Monitoring Procedure 35 – Americans With Disabilities Act (ADA) Review

1.0 PURPOSE

This Monitoring Procedure (MP) describes the Monitoring and Technical Assistance Supports's (MTASS) review and analysis of the Grantee's compliance with the regulations and guidance issued by the U.S. Department of Transportation implementing the transportation provisions of the Americans with Disabilities Act (ADA) of 1990 (49 CFR Parts 27, 37, and 38) and subsequent amendments.

This MP is a guide. The Federal Rail Administration (FRA) will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

The review should focus on the provision of access to:

- Stations and the public access areas of the maintenance facilities, including the approach from the public right of way
- The passenger train rail car, including how access is achieved from the station platform
- Services within stations and passenger cars (e.g., ticket counters, restrooms, drinking fountains, circulation within public access areas, and seating)

3.0 RECOMMENDED DOCUMENTS

The MTAS should obtain and study relevant and applicable project materials from the Grantee, such as:

- Stations and maintenance facilities
    - Facility site plans
    - Building plans, sections, elevations, including plans and sections through the station platform and doorway of passenger cars to show platform height, length, width, path of travel, and any obstructions on the platform
    - Track plans at and in the vicinity of the facilities
    - Information on freight operations and track usage at and in the vicinity of the facilities
- Vehicles and vehicle boarding devices (i.eie., bridgeplates, ramps, or lifts)
    - Plans, sections, and elevations

4.0 SCOPE OF WORK

During each phase – planning, preliminary engineering, final design, and construction – the MTAS should assess the Grantee's project and its compliance with ADA. The MTAS should verify the project's compliance against the following standards:

- 49 CFR Part 27:a
    - Section 504 of the Rehabilitation Act, applicable to all Federal Grantees

    - Requires services be provided in the most integrated setting reasonably achievable
- 49 CFR Part 37:
    - Subpart C contains guidance for transportation facility accessiblity
    - Subpart D contains guidance for the acquisition of accessible vehicles by publc entities
    - Appendix A contains modifications to standards for accessible transportation facilities found in Appendices B and D to 36 CFR part 1191 (ADA Accessibility Guidelines for Buildings and Facilities)
- 49 CFR Part 38:
    - Subpart F contains minimum design standards for intercity railcars and systems
    - Subpart H contains minimum design standards for high speed rail systems
- U.S. DOT Guidance: "What Accessibility Standards Apply to Passenger Rail Cars When Specific Design Standards Are Not Provided In 49 CFR Part 38?" December 2012
- Specifications developed by the Next Generation Corridor Equipment Pool Committee (NGEC). Public Law 110-432 PRIIA Section 305 required Amtrak to establish such a committee of representatives of Amtrak, the FRA, host freight railroad companies, passenger railroad equipment manufacturers, interested States, and, as appropriate, other passenger railroad operators, to design, develop specifications for, and procure standardized next-generation corridor equipment.

At the direction of the FRA, the MTAS will detail its observations, conclusions, and recommendations in a manner consistent with the general reporting guidance outline in MP01 Appendix B. If at any point in the project's development there are aspects or components that are not in compliance, or will impede, the compliance, the MTAS will notify the FRA immediately. The FRA may ask the MTAS to recommend other infrastructure or service approaches to the Grantee or to convene a workshop to discuss alternative possibilities with the Grantee.

4.1 Transportation Facilities

The MTAS should review the design and construction of transportation facilities, including stations, public areas of maintenance facilities, paths of travel, transit connections, and the integragtion of accessible features to ensure the project is in compliance with ADA, specifically 49 CFR Part 37.42.

The review should include at least the following aspects of the facilities:

- Accessible Routes: accessible routes provide a continuous unobstructed path connecting the architectural or mechanical components of a site and facility, including public interior spaces within facilities
- Exterior Elements:
    - Walkways/bikeways from public sidewalks to the building and platform
    - Transition from the platform into the passenger train car
    - Signage (static and dynamic)
    - Platforms
    - Ramps, stairs, and elevators
    - Passenger loading zones, including transit transfer and auto drop-off
    - Parking
- Interior Elements:
    - Doorways, circulation routes, ramps, stairs, and elevators

- Service counters, restrooms, drinking fountains, and seating
- Communication systems (public address, fire alarm, assistive listening, clock, phone)
- Signage (static and dynamic)

For the transition from the platform into the train car, if a means other than level-entry boarding is proposed, the Grantee must prepare an analysis for each station and submit a plan ("narrative") to the FRA as described in 49 CFR 37.42(d) prior to constructing or altering a platform. If the Grantee is not the passenger rail service provider, the passenger rail service provider must submit the narrative to FRA on behalf of the Grantee.

4.2 Passenger Train Rail Cars

- Below is a suggested list of car elements for which the MTAS should do a compliance check for vehicle design and manufacturing elements, including:
  - Signage
  - Doorways, thresholds, floors, steps
  - Circulation, handrails, and stanchions
  - Seating accommodation
  - Lighting and foot-candles of illumination for open doorways
  - Public information system
  - Restrooms
  - Level change mechanisms and/or boarding devices such as car lifts, car ramps, and bridge plates

U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs

Monitoring Procedure 36 – Buy America Review

1.0 PURPOSE

This Monitoring Procedure (MP) describes the Federal Railroad Administration's (FRA) requirements for the Monitoring and Technical Assistance Support (MTAS) when evaluating the Grantee's compliance with Buy America requirements.

This MP is a guide. The Federal Rail Administration (FRA) will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

One goal of FRA's rail program is to increase the use of domestic resources in FRA-funded rail projects. The Buy America requirement reinforces this goal and helps to grow domestic manufacturing of materials and products used in railroad projects.

FRA encourages domestic sourcing of all materials used in a Project, in accordance with the following:

- Projects authorized under FRA's discretionary grant programs, DOT grants administered by FRA, and the Build America Bureau loans administered by FRA, are subject to the Buy America provisions of 49 USC. § 22905(a) ("FRA Buy America"). These programs include:
  a. Consolidated Rail Infrastructure and Safety Improvements (CRISI);
  b. Federal-State Partnership;
  c. Restoration and Enhancement;
  d. BUILD (formerly TIGER);
  e. FASTLANE (formerly INFRA);
  f. RRIF and TIFIA loans administered by FRA.
- Projects authorized under the Passenger Rail Investment and Improvement Act of 2008 (PRIIA) and funded by the American Recovery and Reinvestment Act of 2009 (ARRA)FY 2010 appropriations are also subject to the Buy America provision of 49 USC § 22905(a) ("FRA Buy America") - (Intercity Passenger Rail Service Corridor Capital Assistance, Grant conditions).
- Amtrak projects are required to adhere to a Domestic Buying Preference through 49 USC § 24305(f) ("Amtrak Buy American") when funded by either Amtrak's own funds or the FRA Amtrak annual grant;
  - Note: when Amtrak is funded by one of the discretionary grants listed above (as Grantee or contractor), 49 USC § 22905(a) applies as well.[1]

[1] As a general matter, compliance with 49 USC 22905(a) ("FRA Buy America) will also satisfy Amtrak's requirement.

- The Buy American Act of 1933 in 41 USC § 8302 also requires domestic sourcing of materials and manufactured goods, and is applied to Rail Line Relocation Grants, FY 2008 Capital Assistance to States Grants, and FY 2009 High-Speed Intercity Passenger Rail Grants
- In addition, FRA encourages all grantees to maximize the use of domestic materials consistent with Executive Order 13788, *Buy American and Hire American* (April 18, 2017).

The Buy America requirement that should be applied to a particular project can be found in the Grantee's grant agreement and should be carried forward into any sub-grants or contracts and subcontracts funded by the Grant.

3.0 RECOMMENDED DOCUMENTS

The MTAS, should review the following project documents from the Grantee, as available:

- Grantee's grant agreement with the FRA
- Design standards and criteria
- Design and construction drawings, outline, and final specifications
- Solicitations for construction bids and other Requests for Proposals (RFPs), contracts, and purchase agreements
- Certificates of Compliance and Non-Compliance with Buy America Requirements (see Section 7.0 for examples)
- Buy America requirement waiver granted by the FRA, if applicable
- Rolling stock audit material and/or reports

4.0 BACKGROUND

The following are descriptions of domestic sourcing statutes that, depending on the funding source used, apply to procurements for FRA projects. Note that FRA's Buy America requirements generally apply to the project as defined in the grant agreement's Statement of Work. This requirement applies to the whole of the project, even if the funds used to purchase material for certain aspects of the project are non-Federal funds. If the component/material is being used as part of the FRA-funded project, it should meet the respective Buy America requirement, regardless of the funding source for the component/material.

4.1 49 USC § 22905 – FRA Buy America

For FRA's discretionary grant programs, DOT grants administered by FRA, and the Build America Bureau loans administered by FRA, FRA's Buy America requirement (49 USC 22905) applies. For projects which the costs exceed $100,000, "the steel, iron, and manufactured goods used in the project [must be] produced in the United States." FRA's Buy America statute requires all end products and components used in a project to be domestically manufactured. Subcomponents may be from foreign sources.

For products to be considered "manufactured" in the United States, all of the manufacturing processes of the end products must take place in the United States and the components of the products must be of U.S. origin (a component is considered to be of U.S. origin if it is manufactured in the United States, regardless of the origin of its subcomponents).

For locomotives, railcars, and other rolling stock, all components must be manufactured in the United States and final assembly of the end product (e.g., railcar) must take place in the United States. FRA has developed sample lists of items it has determined to be components of various railcar types. The Grantee may reference this list to determine whether its materials are components or subcomponents for purposes of FRA's Buy America requirement.

FRA has additional Buy America requirements for the steel and iron used to manufacture the following types of primarily steel and iron manufactured goods:

- Railcar systems and components, including items such as steel car shells, wheels, couplers, trucks, axles, piping, battery boxes, enclosures, mounting racks, and grab irons.
- Structural construction materials, including items such as steel or iron beams and columns, and bridge trusses.
- Steel track work used in track projects, including items such as running rail, contact rail, switch rails, and turnouts.

The additional requirements for steel and iron are that all steel and iron manufacturing processes must have taken place in the United States, except any metallurgical processes involving refinement of steel additives. In other words, FRA requires the ingot be manufactured (i.e. processed and rolled) in the United States. FRA does not consider the source of the raw materials whether recycled or otherwise that are used to manufacture steel or iron as long as it is manufactured in the United States. Additionally, steel manufacturing outside the United States would not be FRA Buy America compliant even if the raw material was U.S. mined.

FRA has determined that steel or iron subcomponents of a component, such as steel rebar (subcomponent) in a concrete pile (component), do not need to be composed of U.S.-manufactured steel. In addition, whether classified by FRA as a component or subcomponent in a particular project, steel or iron connectors and fasteners, which because of their small size contain only a minimal quantity of steel or iron, do not need to be composed of U.S.-manufactured steel.

There are also no added FRA Buy America requirements for the steel or iron used in the manufacture of non-structural construction material. For example, the steel or iron components found in a heating, ventilating, and air conditioning system, elevator or bathroom fixture need not consist of U.S.-manufactured steel or iron even though the components themselves must be manufactured in the United States.

4.1.1 Definitions

- *End products* incorporate components at the final assembly location and are acquired ready to provide the intended end function without further manufacturing or assembly
- *Components* are directly incorporated into end products at the final assembly location
- *Subcomponents* are one step removed from a component in the manufacturing process – they are incorporated into components during manufacturing
- *Manufacturing* is the application of processes to substantially transform and add value to components or subcomponents and to create a functionally different product. Manufacturing means more than "mere assembly."

- *Final assembly* is the creation of an end product from individual elements brought together for that purpose through the application of manufacturing processes

4.1.2 Waivers

FRA may waive FRA Buy America requirements if one of the conditions listed below is applicable:

- Application of the requirements would be inconsistent with the public interest;
- The materials for which a waiver is requested are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality;
- That domestically manufactured rolling stock or power train equipment cannot be bought and delivered within a reasonable timeframe; or
- That the inclusion of a domestic item or domestic material will increase the cost of the overall project by more than 25 percent.

If the Grantee is unable to comply with the FRA Buy America requirements, the Grantee may submit a letter to FRA requesting a waiver. Generally, waiver requests include the following:

- Description of the specific materials requiring a waiver;
- Description of the efforts taken to identify a domestic source for the materials;
- Explanation of the need for the project, and the harm that would result in the absence of a waiver; and
- Explanation of how the Grantee has sought to maximize the use of domestic content in the project.

All waivers are processed in accordance with 49 USC 22905(a)(4), and generally require a public comment period for the incoming waiver request and publication of the decision granting a waiver in the Federal Register.

All waivers will be approved by the FRA Administrator. In practice, waiver applications are usually reviewed by the Department of Transportation (DOT) Deputy Secretary. Any waivers granted will be time-limited.

4.2 49 USC § 24305(f) Amtrak Buy American

Amtrak's "Domestic Preference" statute ("Amtrak Buy American"), 49 U.S.C. § 24305(f), requires Amtrak to "buy only…manufactured articles…manufactured in the United States substantially from articles…manufactured in the United States." This requirement "applies only when the cost of those articles…bought is at least $1,000,000." § 24305(f)(3). Amtrak, and not FRA, interprets Amtrak's Buy America statute and develops polices to ensure its procurement process is compliant. As a result, FRA's role when investigating Amtrak's compliance with its own requirement is to verify whether Amtrak is following Amtrak's interpretation or policies.

FRA's sole statutory role regarding the requirement is when Amtrak needs a waiver from the requirement ("On application of Amtrak, [FRA] may exempt Amtrak from [its Buy America

requirements]…." § 24305(f)(3)). The process for reviewing Amtrak waiver requests is similar to the process described above for FRA Buy America.[2]

4.3 41 USC § 8302 - Buy American Act

The FRA has determined that Rail Line Relocation projects and projects funded from FY 2008 and FY 2009 Appropriations are subject to the requirements of the Buy American Act of 1933.

The Buy American Act requires that "only manufactured articles, materials, and supplies that have been manufactured in the United States substantially all [determined to mean greater than 50%] from articles, materials, or supplies mined, produced, or manufactured in the United States, shall be acquired for public use unless the head of the department or independent establishment concerned determines their acquisition to be inconsistent with the public interest or their cost to be unreasonable."

The FRA generally may waive the Buy American Act requirements using the same justification as the PRIIA Buy America statute, with one exception: if the cost of a domestic item or domestic material will increase the cost of the contract between the Grantee and the supplier of that item or material by more than 6 percent.

Other exceptions to the Buy American Act exist where items are not 1) produced, or manufactured in the United States in sufficient and reasonably available commercial quantities and are not of a satisfactory quality, and 2) procured under any contract with an award value that is not more than the micro-purchase threshold, which is currently set at $3,000.

5.0 SCOPE OF WORK

The MTAS should confirm that the Grantee understands that compliance with the applicable Buy America(n) requirement is required under the grant agreement. The MTAS should evaluate the Grantee's compliance with Buy America(n) requirements and provide recommendations if the Grantee is found to be non-compliant or encounters any difficulties complying with the Buy America requirements. The MTAS will perform this work as directed by the FRA, usually at completion of Preliminary Engineering (PE) and Final Design (FD) for infrastructure, and when specifications are written and before bidding for vehicle procurements. At the direction of the FRA, the MTAS will detail its

[2] When Amtrak is purchasing items with annual grant funds, then an additional requirement applies under the grant agreement to sub-$1 million items:

Consistent with the Appropriations Act, the Recipient will not spend funds provided through this Agreement in contravention of sections 2 through 4 of the Act of March 3, 1933 (41 U.S.C. § 8302, popularly known as the "Buy American Act"), except for acquisitions of $1,000,000 or more where the Recipient will comply with the domestic buying preference requirements in 49 U.S.C. § 24305(f).

FRA's interpretation as applied to Amtrak is that Amtrak will almost never be "in contravention" of the Buy American Act because the Buy American Act applies only to items purchased for "public use." Amtrak's purchases of the truck parts are for "commercial use." In the normal course, the Buy American Act does not apply to Amtrak's purchases under $1 million.

observations, conclusions, and recommendations in a manner consistent with the general report outline in MP01 Appendix B.

5.1 Compliance Requirements for Grantees

The Grantee is responsible for showing compliance by taking the following actions:

- Ensure that the design, detailing, and specification of materials, manufactured end products, and components are done with domestic sourcing in mind
- Perform Buy America reviews before releasing construction documents for bid or specifications for manufacture and verify references to the applicable statutes and regulations are in solicitations and RFPs
    - Verify that all iron, steel, end products, and components are called to be manufactured domestically, unless a waiver is obtained from the FRA
    - Bid documents should include pertinent Buy America definitions and explanations that help contractors and suppliers understand and meet the requirements.
    - Include provisions in procurement contracts to ensure that the applicable statutory requirements flow down to suppliers, contractors, and sub-contractors
- After the award, confirm that contractors/manufacturers understand they are responsible for complying with Buy America requirements, and evaluate whether they are capable of complying
- Inspect or research manufacturer's facilities to verify domestic sourcing
- Obtain signed certifications from suppliers and contractors when construction materials are installed or during the manufacturing process
- Perform formal pre- and post-award audits for rolling stock procurements

5.2 MTAS Evaluation of Compliance

The MTAS may be tasked with the following actions in order to evaluate Grantee compliance with Buy America requirements:

- To confirm that Grantees take the actions noted above:
    - During design:
        - Check that Grantee's procedures will ensure early detection of any deficiencies in procurement regulations
        - Guide Grantees when manufacturers are found to be deficient in Buy America or other related requirements
    - Before solicitation:
        - Review the Grantee's bid documents for requirements that could impact the ability of contractors or manufacturers to comply
        - Oversee pre-award reviews conducted by the Grantee before entering into a contract for construction or purchase for manufactured goods
        - Encourage the Grantee to conduct intermediate reviews for rolling stock procurements
    - After the award:
        - Oversee the Grantee's post-award audit and its confirmation that contractors and manufacturers are responsible for and capable of complying

        - Confirm the Grantee has verified the manufacturer's bid specifications comply
    - During construction and manufacturing:
        - Evaluate data provided to the Grantees by contractors and manufacturers
        - Verify final assembly sites along with tangible information and references to FRA regulations to enable Grantees to accurately evaluate Buy America review results
        - Monitor compliance before manufactured end products are delivered and placed into service
        - Confirm the Grantee has obtained signed certifications for all iron, steel, and manufactured end products (including rolling stock)
        - Confirm that the Grantee has obtained signed Buy America certifications for manufactured end products and their components (See Section 7.0 of this MP for examples of certifications)
        - Check that the Grantee's certification includes the current language requiring compliance with Buy America. The MTAS should consult the FRA Buy America website (https://railroads.dot.gov/legislation-regulations/buy-america/buy-america) for recent changes
        - Review the Grantee's certifications and supporting documents in detail. confirm that the Grantee's Buy America team has reviewed compliance at the lowest level required to demonstrate that claims of U.S. origin content are valid
        - Confirm that component manufacturing requirements are met. If there is doubt (for instance when major sub-assemblies of a component are made out-of-country but incorporated during the domestic vehicle final assembly) bring these to the Grantee's attention for clarification. If the Grantee cannot justify the discrepancy, the MTAC should report this finding to the FRA for further action
    - Throughout the entire process:
        - Bring to FRA's attention, at the appropriate time, if it appears that Buy America might not be met or the Grantee's audit is inadequate; request FRA intervention when deficiencies are uncovered; develop reporting protocols for the Grantee to adopt
- The MTAS should discuss recommendations and possible corrective actions with the FRA and as directed with the Grantee. Some examples include:
    - Advise revision of Grantee's procurement documents to include Buy America
    - Advise performance of a procurement review by the Grantee to verify compliance; where faults exist, modify language and procedures for future procurements
    - Advise explanation of circumstances that have led to a manufacturer's non-compliant process that includes partial assembly outside of the U.S.

6.0 REFERENCES

49 USC § 22905 (a) (available at https://uscode.house.gov/view.xhtml?req=(title:49%20section:22905%20edition:prelim)%20OR%20(granuleid:USC-prelim-title49-section22905)&f=treesort&edition=prelim&num=0&jumpTo=true

41 USC § 8302 (available at http://uscode.house.gov/view.xhtml?req=(title:41%20section:8302%20edition:prelim)

FRA Buy America Guidance - including Frequently Asked Questions (available at https://railroads.dot.gov/legislation-regulations/buy-america/buy-america

7.0 CERTIFICATES (SAMPLES)

These certificates are required for Buy America compliance, **HTTPS://RAILROADS.DOT.GOV/LEGISLATION-REGULATIONS/BUY-AMERICA/BUY-AMERICA**

Certificate of Compliance with Buy America Requirements

The bidder or offeror hereby certifies that it will comply with the FRA Buy America requirements of 49 U.S.C. Section 22905(a)(1).

Date _____
Signature _____
Company _____
Name, Title _____

Certificate of Non-Compliance with Buy America Requirements

The bidder or offeror hereby certifies that it cannot comply with the requirements of 49 U.S.C. Section 22905(a)(1), but it may qualify for an exception to the requirement pursuant to 49 U.S.C. Section 22905(a)(2).

Date _____
Signature _____
Company _____
Name, Title _____

U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs

Monitoring Procedure 38 – Rolling Stock Acquisition

1.0 PURPOSE

This Monitoring Procedure (MP) describes the Monitoring and Technical Assistance Support's (MTAS) oversight for Grantees' rolling stock acquisition and management for the Federal Railroad Administration (FRA).

This MP is a guide. The FRA will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

For successful rolling stock procurement, testing, and commissioning/pre-revenue activities, Grantees must have sufficient management and technical capacity and capability in development of rolling stock design specifications and drawings, project controls, procurement, coordination with stakeholders, rolling stock testing, and training of personnel prior to operations.

3.0 RECOMMENDED DOCUMENTS

The MTAS, following direction from the FRA, may obtain from the Grantees and review the following documents:

- Management and project controls documents
    - Project description
    - Grant application and amendments
    - Project Management Plan
    - Project organizational chart
    - Rolling Stock Acquisition Plans
    - Service Development Plan (if applicable)
    - Project schedules
    - Cost estimate/budget/financial plan with funding sources (including allocation of funding for joint procurements)
    - Vendor Contract(s) including change orders and options orders
    - Joint Procurement Agreements
    - Non-disclosure/confidentiality agreement with vendor/manufacturer (if required)
    - Procurement solicitations, technical responses and evaluations
- Technical documents
    - Vehicle specifications including citation of appropriate regulations, environmental and performance standards, and the required approval or certification by the governing authority (Federal, State, etc.)
    - Design, Analysis, Manufacture, and Testing

        - Preliminary, Intermediate, and Final Design Reviews
        - Modeling of rolling stock crashworthiness
        - Modeling of rolling stock dynamic performance
        - List of assemblies and subassemblies for First Article Inspections
        - List of drawings and supporting information for analysis and testing (including proof of design), availability, maintainability, operability, safety, serviceability, reliability, configuration control, and management
    - Contract Deliverables Master List-Complete contract
    - Buy America Audits
    - First Article Inspections (including major components)
    - All tests, test plans, and test reports, if applicable
        - Safety and Security Certification Plans and the Certifiable Items List
        - FRA Safety regulatory assessments with concurrence or approvals
    - Conditional and Final Acceptance Checklists
    - Training programs (operator, engineering, maintenance, etc.)

4.0 SCOPE OF WORK

On a program-wide basis, the MTAS may be asked by the FRA to establish, maintain, and implement a rolling stock information matrix to track projects and activities against the approved schedule. The matrix will help to track FRA-funded equipment procurement projects, by equipment type and quantity, with the documents listed in Section 3.0 above, and with the elements and activities listed in Appendix A below, for these purposes:

- Notify FRA staff of upcoming events, issues, and requirements for FRA action; ensure concerns of Grantees and other parties are brought in a timely way to the appropriate FRA staff; provide technical expertise to support FRA staff
- Monitor procurement schedules, discuss with FRA Regional/Project Managers for the project, and identify potential areas of delay
- Attend design meetings and in technical meetings (as necessary)

The MTAS's review and technical support validates if the Grantee is sufficiently managing the rolling stock specification review, procurement process, manufacturing approach, quality and testing process, commissioning and safety assessment process, ownership, management and maintenance. It should also verify if the resulting rolling stock meet program requirements, and conform to applicable statutory requirements, regulations, guidance, and cost and schedule limitations.

The MTAS should confirm that Grantees develop a Rolling Stock Acquisition and Management Plan that references items in Section 3.0 above and Appendix A below, and the following:

- Equipment ownership, management, and maintenance
    - Ownership structure; management responsibilities; assignment rights; equipment maintenance; financial terms to ensure adequate operating funding for vehicle operations and maintenance, and overhaul over the service life according to industry best practices
- Terms of deployment/redeployment

The MTAS should confirm that Grantees have sufficient:

- Management and technical capacity and capability in rolling stock
- Expertise in project controls and in critical path method scheduling
- Technical competence with respect to:
    - Compliance with specifications approved by Passenger Rail Investment and Improvement Act of 2008, 305 Next-Generation Equipment Committee (if applicable)
    - Compatibility with Amtrak rolling stock, stations and maintenance facilities (if applicable)
    - Modeling of vehicle crashworthiness
    - Vehicle Track Interaction (VTI) criteria
    - Design of traction power and signaling
    - All applicable testing
    - Americans with Disabilities Act (ADA) and Buy America requirements (Pre-Award and Post-Award Audits)
    - Agreements for joint procurements
    - Ownership, management, and maintenance
- Ability to conduct the following planning and reviews and productively incorporate the results of these reviews into the project
    - QA/QC Plan so that materials are as specified, and testing procedures and manufacturing processes are correct
    - System Safety Program Plan (per CFR 238)
    - Risk and Contingency Management Plan (evaluate cost and schedule)
    - Hazard Analysis, Threat, and Vulnerability Assessment

At the direction of the FRA, the MTAS will detail its observations, conclusions, and recommendations in a manner consistent with the general report outline in MP01 Appendix B.

Rolling Stock Aquistion Technical Review Checklist

The MTAS should perform the reviews below as necessary or requested by the FRA.

The MTAS should consider the following issues at 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 and actually impacting schedule
- Issues impacting rolling stock operability
- Ownership
- Maintenance
- Other, such as commonality/compatibility with the existing rolling stock, interface issues with other elements of the transit system, or others as specified or directed by the FRA

1. Planning, Solicitation, Vendor Selection

- The MTAS should review the materials listed in Section 3.0 of this MP to confirm the acquisition/procurement documents meet FRA guidance.

2. Design and Manufacturing

- The Grantee should conduct a Preliminary Design Review (PDR), an Intermediate Design Review (IDR), and a Final Design Review (FDR). If requested by FRA, the MTAS will participate and document these reviews in each instance.
    - These reviews are essential to verify the equipment is designed according to the approved specifications and that proper interface coordination occurs in a timely manner (according to the agreed schedule) between rolling stock design and train control, traction power, communication, track, wayside and related systems design.
    - During the IDR and FDR, Equipment Testing may be required to verify the equipment design qualification requirements are met.
- The MTAS should confirm the Grantee's schedule includes all FRA Safety reviews, testing, qualification, or expected waiver requests (if required). This includes a minimum of 30 days advanced notice prior to the commencement of any testing that is required to demonstrate compliance with regulatory requirements. The Grantee is required to build FRA Safety requirements into its schedule.

U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs

Monitoring Procedure MP39 – Preliminary Engineering, Final Design, Readiness to Procure Construction

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1.0 PURPOSE

This Monitoring Procedure (MP) describes the Monitoring and Technical Assistance Support (MTAS) Contractor's review and analysis of the Grantee's activities in Preliminary Engineering (PE), Final Design (FD), and the Grantee's readiness to procure construction.

This MP is a guide. The FRA will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

Completion of the Preliminary Engineering phase encompasses a level of design that demonstrates the project is feasible and program requirements are fulfilled, all environmental reviews are completed and decision documents are issued, and a cost estimate that is developed that is deemed sufficiently reliable to remain unchanged through construction.

Final Design is refinement of PE work and preparation of contract documents for bids.

Regardless of the Grantee's selected delivery method, readiness to procure construction requires:

- Procurement packages consistent with the project scope, schedule, and budget
- Procurement packages that are complete -- including plans, specifications, and contract Provisions, with Federal procurement requirements addressed
- A Grantee organization prepared to successfully manage procurement and construction; having in place the necessary qualified project staff
- Consistent project management plans, procurement and construction management procedures, including project controls procedures
- Resolved agreements with railroads, and other governmental agencies or third parties (including real estate agreements)
- The required financial resources

3.0 RECOMMENDED DOCUMENTS

Materials referenced below and in Appendix A. The level of review of the additional information and requirements included in Appendix A will be based on the FRA's assessment of the project.

4.0 SCOPE OF WORK

4.1 Overview of Review and Assessment

The MTAS will apply its planning expertise, engineering knowledge, and experience in the railroad industry to review and evaluate the Grantee's PE and FD activities and documents, as well as the Grantee's preparations to procure construction.

Following direction from the FRA, the MTAS will review selected topics and materials in Appendix A using the objectives and methods in Section 4.5 as a guide. The MTAS should work with the FRA to develop an approach to the review, which may include on-site meetings with the Grantee and its project team to become fully informed on the project history, rationale, current status, and changes since the previous project phase. The MTAS should obtain and study the materials for topics and notify the FRA of missing information that will hinder a thorough review.

At the direction of the FRA, the MTAS will detail its observations, conclusions, and recommendations in a manner consistent with the general report outline in MP01 Appendix B. The MTAS should provide its professional opinion on the adequacy and merits of the topics and materials reviewed and make recommendations for improvement.

4.2 Preliminary Engineering

For major corridors, planning and concept design are summarized in the Alternatives Analysis Report, NEPA document and decision, and Service Development Plan. Specific design alternatives are developed to effect new or improved intercity passenger rail service in the corridor. NEPA documentation is prepared for these alternatives and a preferred alternate is typically identified. In PE, the selected alternative is developed further. Design and engineering outputs of PE are inputs to the evaluation of environmental impacts just as identified impacts are inputs for design and engineering. Refer to Environmental Review (MP32B) for more information on Environmental reviews.

To obtain the most benefit from reviews such as Value Engineering (MP30) and Risk and Contingency Review (MP40), they should be conducted concurrently with the PE review.

The level of effort required for PE and the NEPA decision will depend on FRA direction and the scope and complexity of the engineering, environmental, social, and regulatory issues to be addressed.

PE completion is usually marked by:

- A level of design demonstrating project feasibility and fulfillment of program requirements
- Completion of the NEPA review and issuance of a decision document
- Sign-off on a scaled set of drawings by all affected parties (typically includes Grantee, host railroad, Amtrak, cities, and the FRA) indicating support for the project, knowledge of project contents, and an understanding of the financially responsible party for any project changes
- Applicable Federal and FRA program requirements for PE having been satisfied
- A cost estimate and schedule that fully reflect the scope of work in the design documents. This cost estimate should be considered sufficiently reliable to remain unchanged through construction completion, barring subsequent major scope or schedule changes

- The FRA's acceptance of PE completion, based in part on the results of the MTAS's evaluation

4.3 Final Design (FD)

In FD, the work of PE is refined, and contract documents are prepared for construction bids. FD can be performed by the Grantee's design consultants in Design-Bid-Build or by the Contractor's design consultants in Design-Build

Refer to Appendix A for further expectations of the Grantee.

To obtain benefit from a constructability review, the MTAS should perform this review concurrently with the FD review. For construction in existing operating railroad environments, the MTAS should comprehensively consider the adequacy of the Grantee's plans to successfully handle the complexity of construction within an existing operating railroad environment, including:

- Plans to reroute, shutdown, reschedule, stage, phase, worker-protect, and work-around existing rail traffic
- The presence of agreements with existing freight or passenger train owners and other affected third parties to plans to reroute, shutdown, etc.
- The adequacy of the Grantee's project cost and schedule to cover such rerouting, shutdowns, including if necessary, monetary compensation to the railroads

4.4 Readiness to Procure Construction

The Grantee's issuance of contract documents for bid or proposal is the final step before the Grantee enters into binding construction contracts. The MTAS's review of the Grantee's readiness to procure construction work helps to confirm that:

- The Grantee's organization is prepared to successfully manage the contract packages through procurement, construction and start-up, or in the case of a Design/Build or Construction Manager/General Contractor contract, through design, construction, and revenue operations
- The Grantee's plan for qualification, bid and award follows accepted best industry practices; the procedures provide for project risks and unexpected procurement issues (e.g., no bids, single bid, unacceptably high bids and protests)
- The Grantee's design documents are developed 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; the procurement package is consistent with appropriate Federal requirements, including Buy America requirements
- The Grantee's cost estimates accurately reflect contractual requirements; project risks have been subject to mitigation measures to the greatest extent possible

The MTAS's review should be conducted when the Grantee's contract document work is internally consistent and sufficiently complete. This is typically around the ninety percent (90%) design level for traditional design-bid-build contracts. If the Grantee plans to use an alternate delivery method such as design-build or construction manager/general contractor (also known as construction manager-at-risk), the timing of the review should be advanced accordingly.

The MTAS should review the following for each segment or contract package:

- The adequacy of the entity identified to construct – a freight railroad, a general contractor, an operator such as Amtrak, a utility company, or governmental agency – and its organization, staff capabilities, and history of performing similar work
- The risk allocation associated with the proposed contract terms
- The unit costs, allowances (contingencies), specifications, drawings, provision for staging and phasing, and contract package interface. Use of FRA SCC (FRA'S Standard Cost Category) and FRA'S Capital Cost Estimating Guidance is recommended

The MTAS's review team should consist of staff qualified to perform the work being reviewed. Because rail 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.

4.5 MTAS Engineering Review Objectives

The following types of reviews may be performed by the MTAS at the direction of the FRA. The level of review and type of deliverable will be based on the FRA's assessment of the project.

READINESS REVIEW:

Review Item	Review Objective	Review Method
Construction Plans/Specifications	To confirm that the plans and specifications completely and clearly define the required work and that there are no major/significant omissions. To confirm that construction documents reflect results of Value Engineering choices and constructability reviews.	Review by qualified engineer(s) with expertise in the area(s) of design.
Construction Plans/ Specifications for Design-Build Delivery or other alternate delivery method	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 Grantee's D/B procurement documents may be required to confirm that the process is sound and conforms to good industry practice.	Review by qualified engineer(s) and construction manager(s).
Construction Contract Terms and Conditions	To confirm that the construction contract completely and clearly defines the terms and conditions under which the work will be performed. To confirm that Federal procurement requirements are addressed, including Buy America requirements.	Review by a person or contract administrator with experience in managing construction contracts of similar scope and complexity.

Review Item	Review Objective	Review Method
Construction Contract Document Terms and Conditions for DB and other alternate methods	To confirm consistency between the bid package and the contract packaging plan. For D/B Contracts, to confirm the contract defines both design and construction requirements. For CM/GC contracts, to confirm that both design and construction phase services are adequately defined; to confirm the amount of the contractor's fee; to confirm the CM/GC contract requirements correspond to requirements in the Grantee's design contract.	Review by a person or contract administrator with experience in managing a design-build contract of similar scope and complexity.
Quality assurance records	To confirm that quality assurance checks and reviews have been performed in accordance with approved QA/QC Plan.	Review by a person with experience in performing quality assurance reviews.
Construction Cost Estimate	To confirm that the estimate is consistent with the Plans, Specifications, and Contract General and Special Conditions, and that it is based upon contemporary cost information. To confirm that the estimate of General Conditions' costs reflects actual contract requirements and not an industry average factor.	Review by a cost estimator experienced in the estimation of cost impacts of contract special provisions, terms, conditions, allowances, etc., related to risk transfer and construction limitations.

CONSISTENCY REVIEW:

Review Item	Review Objective	Review Method
Plans, specifications, and special contract conditions with respect to Environmental documents	To confirm the design and construction requirements of the Environmental Document are reflected in the design and requirements of the bid package.	Review by qualified engineer(s) and construction manager(s).
Plans, specifications, and special contract conditions with respect to the project Scope of Work.	To confirm that the documents reflect the scope of work developed during previous phases and reflected in the grant agreement with the FRA.	Review by qualified engineer(s) and construction manager(s).

Plans, specifications, and special contract conditions with respect to Project Master Schedule	To confirm consistency between the bid package and the Project Master Schedule. Review the schedule in context with the Cost Estimate(s); confirming that cost associated with all work activities have been properly accounted for in the cost estimate. Pay particular attention to schedule contingency for delay and re-bid, and ensure that predecessor activities will not interfere with construction per the bid package schedule (examples: preceding contractors, utilities relocations, real estate acquisition).	Review by a person with experience in performing schedule reviews.
Construction Cost Estimate with respect to Project Budget	To confirm that the Construction Cost Estimate plus appropriate contingencies is feasible within the overall Project Budget. To confirm consistency of Cost (and Schedule) Package Level products and documentation with package management baselines. To confirm that the Project Schedule & Cost Estimate are in sync, i.e. time allocated for work activities in the cost estimate agrees with time allocation is schedule.	Review by a cost estimator with experience in managing a contract of similar scope and complexity.

GRANTEE ORGANIZATION AND PMP REVIEW:

Review Item	**Review Objective**	**Review Method**
Third Party Agreements	To confirm that necessary third party agreements are in place to support the construction, with focus on 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.	Review by qualified engineer(s) and construction manager(s) with experience in managing a contract of similar scope and complexity.)
Real Estate requirements in contract documents	To confirm that all necessary real estate and rights-of-way (ROW) will be available for use by the contractor at Notice to Proceed (NTP). If not, 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).	Review by a person or real estate expert with experience in managing a contract of similar scope and complexity.

Procurement Policies and Procedures	To confirm that 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.	Review by a person or contract administrator with experience in managing construction contracts of similar scope and complexity.
Project Staffing Plan	To confirm that the Grantee 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.	Review by a person with experience in performing staffing reviews
Risk Register, Risk and Contingency Management Plan (RCMP)	To confirm the Grantee has incorporated appropriate risk mitigation measures into the contract plans and specifications. To confirm the Grantee 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	Review by a person or risk management expert with experience in managing construction contracts of similar scope and complexity.
Financing Plan	To ensure that money will be available to pay the contractor for the work on a timely basis.	Review by a person with experience in performing financial reviews

APPENDIX A Preliminary Engineering and Final Design – Sample Topics and Materials

Topics / Materials	Preliminary Engineering	Final Design
Legal Authority		
	Grantee's Review of State statutes to demonstrate its authority to implement the project, and its knowledge of requirements and constraints flowing from State law that may impact project cost and schedule if not addressed proactively. If the Grantee is planning to use a project delivery method other than Design-Bid-Build, the Grantee should establish its legal authority to do so under State law.	
PMP and Sub-plans, if applicable		
	Project Management Plan	Project Management Plan
	Management & Technical Capacity/Capability	Management & Technical Capacity/Capability
	Safety and Security Management Plan	Safety and Security Management Plan
	Real Estate Acquisition and Management Plan	Real Estate Acquisition and Management Plan
	QA/QC Plan	QA/QC Plan
	Rolling Stock Acquisition and Management Plan	Rolling Stock Acquisition and Management Plan
Service Planning		
Service Planning Refinements	Service Planning Refinements • Ridership/revenue forecasts, railroad and train capacity analysis • Detailed operations modeling with timetables • Operations and maintenance cost estimate • Confirmation of entities responsible for services such as equipment maintenance, maintenance of way, and train operations • Development/finalization of agreements with host railroads/other rail/transport providers	

Topics / Materials	Preliminary Engineering	Final Design
Service Outcome Agreements (SOA), if applicable	When construction funding is identified, the SOA should be negotiated/finalized with the involved parties for train frequencies, run times, and host railroad delay minutes. Finalize plans for performance improvement through strategies such as: • Revision to contract language to improve performance of vendors to train • Additional marketing to attract riders • Capital Investments to improve infrastructure capacity • Operational changes to improve schedule efficiency	Implement terms of SOA regarding performance objectives; taking corrective action where necessary. Implement strategies for performance improvement through the FD/contract documents, operational agreements.
Environmental Review		
	Project level NEPA – completion of project environmental evaluation and public participation and finalization of CE, FONSI, or Record of Decision	
Design Level	Level of Design Expected for PE (30%)	Level of Design Expected for FD (evolution from 30% to 100%)
General Criteria	The project design satisfies the capacity and operational objectives established in the Service Plan and approved environmental document. Documents should be brought to a level of completion sufficient for the related capital cost estimate to be reliable enough to remain unchanged through construction. • Design is informed by non-safety field inspection to determine the necessity of the proposed rail infrastructure improvements • Design, construction, system and vehicle interfaces are known, defined, including vehicle dynamic clearance and structure clearances • Design Reports, Concept of Operations Report, and configuration studies are adequate and complete • The documents possess and appropriate level of definition, clarity, presentation and cross-referencing • The project is constructible. Adequate construction access and staging are as identified	Design/Contract Documents are developed to an appropriate level of completion. • The work to be constructed is consistent with that shown in the environmental documents and scope established in PE • Plans and specifications completely and clearly define the required work • Civil, structural, architectural, electrical, mechanical, communications, track work, and site work documents have a comparable level of definition, clarity, presentation, and cross-referencing • Consistency exists between the project schedule, bid packages, and applicable Federal requirement, including Buy America/n and ADA • QA/QC checks and reviews have been performed in accordance with the approved Quality Assurance Plan

Topics / Materials	Preliminary Engineering	Final Design
Design Criteria	Grantee accepted design standards and performance requirements • Civil engineering criteria • Safety and security criteria; results of hazard and threat and vulnerability analyses are incorporated into design criteria and the scope of work • ADA criteria	Fully prepared Basis of Design Reports Fully prepared analyses for track and structures, utilities, safety, security, FRA Safety regulation compliance, ADA compliance General Design Criteria Survey and Mapping Criteria Track Way Clearances, Geometry and Work Criteria Civil, Drainage, and Utility Criteria Geotechnical Criteria Seismic and Structural Criteria Criteria for Mechanical, Plumbing and Electrical incl. Motive Power, signal, communications, safety, security Rolling Stock Criteria Other safety and security criteria
Outline Specifications	Draft General and Special Conditions Outlines specifications	Fully developed specifications, instructions to bidders, general and special conditions of the contract
Documentation of Existing Conditions	Digitized aerial photogrammetry, aerial photo background, planimetric and topographic mapping Photos, photo-simulations, schematic renderings As-is survey and mapping of existing area, including topography, infrastructure, track, ROW, structures ROW/environmental footprint is clearly identified	Full survey of project area
Guideway – Plans and Sections	Guideway (track and roadbed), general notes, standard abbreviations, symbols, key; • Appropriately scaled track geometry (spirals, curves, tangents), points of switch, existing track, new track, track to be removed, future track work, etc.; horizontal and vertical controls, alignment geometry in plan and profile; curve data in table and drawing	Guideway – Fully developed drawings with all horizontal and vertical controls, full geometry including plan and profile, complete curve information on table and drawings, all typical and special sections

Topics / Materials	Preliminary Engineering	Final Design
	Other • Guideway drainage plans; grade crossings, general layout • Pedestrian connections to the public way • Transit access ways, auto parking, railroad crossings	
Guideway Structures	Bridge and wall nomenclature, symbols and abbreviations, and general notes; • Bridge and wall general plans and sections • Bridge foundation, abutment, bent plans, and deck plans • Load diagrams for structures (e.g., aerial guideway) • Retaining walls, including typical wall sections	Fully developed seismic and gravity load calculations and completed structural design for all structures
Tunnels	Tunnel layout plans, structural plans, typical sections, excavation plans, approach wall plans and sections • Other tunnel detail optional: emergency walkway, groundwater control and tunnel drainage, safety and security, fire protection, communications, lighting, ventilation	
Stations and Finishes	Station design characteristics including station locations and station sizing. Should identify platform lengths and support spaces for mechanical/electrical equipment	Complete station documents
	General information, including notes and legend	
	Architectural design of building/facilities plans, including footprint, floor plans, sections, elevations, platform detail demonstrating compliance with ADA	
	Grading, drainage plans, site cross sections, urban design, utilities, landscaping, paving for pedestrian transit, auto parking, bikes	
	For stations elevated or underground, show structure	

APPENDIX A Preliminary Engineering and Final Design – Sample Topics and Materials

Topics / Materials	Preliminary Engineering	Final Design
Real Estate and Right of Way Plans	Right of way limits Parcel/property acquisitions and easements, if known	Fully detailed parcel maps; for acquisition or sale
Roadways	Roadway/pedestrian access plans and profiles, typical sections; drainage plans; signing plans, intersection traffic signal plans	Key map showing roadways plan with signalized and other intersections
Utility Plans	Utilities key map, list of owners, symbols, and notes, utility plans	Fully detailed utilities plans, utilities report
Environmental Mitigation Plans	Mitigations committed to in the ROD, when involving a physical or operational feature, are incorporated into project documents. Examples: changes in design, use of different material, modification to traffic, restriction on construction activities, etc.	Mitigations fully incorporated into contract documents
Third party requirements	Third party agreements in draft form/at least an outline or term sheet. If not, issues and obstacles are identified. Types of agreements and information: • Utility relocation agreements, public water, sewer, etc. • Intergovernmental agreements with local entities • Agreements with host railroads and Amtrak for design, construction, operations • Third party franchise agreements – gas, telephone, cable TV, other communications, power; • Public/private funding arrangements • Master permitting plan and schedule Agreements should be negotiated and completed to the extent possible prior to start of FD; where incomplete, a defined process for achieving completion should be in place.	Necessary third party agreements are in place to support the construction and revenue operations. Permitting report and permits.
Geotechnical Baseline	Geotechnical baseline report based on geotechnical investigations, subsurface exploration and laboratory testing. Requirements for additional geotechnical investigations are defined. Buried structures, utilities, contaminated soils, hazmat are identified.	Additional geotechnical studies as needed. Full geotechnical design complete.

Topics / Materials	Preliminary Engineering	Final Design
Systems	Traction power plan, including location of substations and feeds, OCS layouts, as relevant	Complete Systems plans
	Train/vehicle control plans, including schematic guideway layout (e.g., circuits/block diagrams)	
	Signal design considering signal locations, particularly at stations, to maximize platform length and pockets, and speed, considering different classes of track, and braking distances	
	Operations control center plan, including basic layout and space allocations	
	Communications plans, including equipment locations, and provisions for station message signs, phones, cameras, other	
Maintenance Facility	Overall site plan (existing and proposed conditions)	Complete Maintenance Facility plans
	Grading and drainage plans, site cross sections	
	Urban design/general landscaping features	
	Utilities	
	Paving for pedestrian access, transit access, and parking plans	
	Yard/lot layout, with typical sections	
	Access (roadway, parking) plans compliant with ADA	
	Demolition plans	
	Architectural design of building/facilities plans, including footprint, floor plans, sections	
	Foundation and foundation section plans	
	Safety and security, fire protection plans	
	Basic equipment lists	
	Traction power (OCS, substation location) plans for rail systems	
Rolling Stock Acquisition & Management	Criteria, specification	Detailed drawings for rolling stock manufacturing

Topics / Materials	Preliminary Engineering	Final Design
Value Engineering	Conduct VE review about half-way through PE	
Constructability Review	Grantee's PE work has conducted a constructability review, has considered Buy America/n compliance for materials, products, and availability of domestic labor to produce custom work, and related costs.	Full constructability review performed including consideration for adequate construction access and staging areas, temporary construction to maintain operations.
Project Delivery Methods		
	Cogent rationale provided for selection of project delivery method (design-bid-build, design-build, etc.) Design packages and contract packages are defined and delineated. • Procedures for Procurement (advertising, bidding, awarding of contracts for consultants and construction contractors, procurement for equipment, etc.) are established	The Grantee's organization is fully prepared to manage contract packages 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. • The Grantee has a project staffing plan that ensures the necessary qualified staff will be available to manage and support the work • The Grantee has established a plan for contractor qualification, bid and award that follows accepted best industry practices • The Grantee has procedures in place to deal with unexpected procurement issues (e.g., no bids, single bid, high bids, protests)
Capital Cost Estimate		
	Cost estimating methods memo and cost estimate	The construction cost estimate is consistent with plans, specification, contract general and special conditions, and is based on contemporary cost information. It includes appropriate contingencies and fits within overall project budget.

APPENDIX A Preliminary Engineering and Final Design – Sample Topics and Materials

Topics / Materials	Preliminary Engineering	Final Design
Project Schedule	Level of detail to be included in Schedule during PE	Level of Detail to be included in Schedule during FD
Representation of PE Activities	All major PE activities including main tasks for each design discipline (civil, structural, systems, other)	
Reviews	Identification and duration of all reviews by the FRA and others	
Agreements	Identification of agreements that are on critical path (e.g. real estate transactions, utility relocation, railroad and interagency agreements, procurement agreements (such as for manufacturer of vehicles, long lead items, Grantee purchased items)	
Environmental Clearance	Detailed activities/milestones for completion of environmental document, including the FRA, public and agency review periods	
	FRA Record of Decision/Finding of No Significant Impact or other actions at close of environmental review phase	
	Approvals at completion of environmental review and PE, e.g., permits, interagency and third party agreements, funding	
Representation of FD Activities	Major design packages identified	All contract packages identified and sequenced properly
	Milestones for 60%, 90% and 100% complete (or similar %) Key dates for funding and approvals	Milestones for 60%, 90% and 100% (or similar) percent complete indicated
Advertise and Bid	Includes adequate time for bid and award, with contingency time for rebidding. Construction milestones indicated, including advertise/bid dates, start construction, substantial completion targets.	
Construction	Outline level of detail, indicating construction segments and contract units	Schedule clearly showing sequencing of segments, critical path and major construction packages for each segment
Utilities	Outline level of detail, which utilities, with durations	Detailed level of information
Real Estate	Key activities such as appraisals, acquisitions, relocations, sales, tie to specific segments or construction packages	Detailed level of information with tie to construction access and funding if applicable
Final Testing and Startup	Placeholder information, indicating duration and predecessor logic, for phased openings include milestones and start of revenue service	

Topics/ Materials	Preliminary Engineering	Final Design
Risk and Contingency		
	Risk is addressed through identification ,quantification , and mitigation, with three types of mitigation: • Proactive project management (primary mitigation); • Pre-planned, potential scope or process changes that may be triggered when risk events occur (secondary mitigation); • Cost and time set-asides to overcome events for which no other mitigation is available (contingencies.)	Updated risk assessment, risk register, and mitigation strategies; Control of risk through active management with all three types of mitigation.
Finance Plan		
	Financial Plan is developed to identify costs, funding requirements (initial capital funding and cash flow, and ongoing operational expenses) and sources (non-Federal and Federal).	Finance Plan is complete. Funding is fully committed to be available through cash flow consistent with the timing in the project schedule.
Before and After Study	Gather and preserve required information	Gather and preserve required information

U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs

Monitoring Procedure 40 – Risk and Contingency Review

This Monitoring Procedure (MP) describes Federal Railroad Administration (FRA) guidance for the Monitoring and Technical Assistance Support (MTAS) conducting risk and contingency reviews. Two sets of guidance are provided to evaluate the Grantee's plan for mitigating and managing project risks:

- MP40a: This MP describes the procedure to evaluate the Grantee's process for development of its Risk and Contingency Management Plan (RCMP), including its identification of uncertainties and risks; assessment of project risk; and consideration of risk response options and alternatives including the use of cost and schedule contingencies. This MP does not require an independent MTAS risk assessment; its intent is to rely primarily on the risk assessment and contingency plans developed by the Grantee.

- MP40c: This MP describes the procedure to perform a full MTAS risk assessment. This review requires the MTAS to evaluate the reliability of the Grantee's project scope, cost estimate, and schedule, with special focus on the elements of uncertainty associated with the effectiveness and efficiency of the Grantee's project implementation and within the context of the surrounding project conditions.

The following table generally depicts differences between MP40a and 40c. Note: MP40b has been omitted. The FRA will determine the level of risk and contingency review to apply to any project, and may direct the MTAS to modify the level of review at any time during a project.

	Activity	MP 40a Grantee-led	MP 40c MTAS/FRA-led
A	Review of management capacity and capability, scope, cost, schedule	Grantee presents organization, scope, schedule, and estimate; MTAS reviews and comments	Perform full Management & Technical Capacity/Capability (MTCC), scope, cost, schedule reviews. This could be up to a 2-3 month long process.
B	Review Grantee's risk identification	Grantee presents risk register; MTAS reviews and comments	Review, comment on, and provide amendments to Grantee's risk register.
C	Review Grantee's assessment	Grantee presents assessment; MTAS reviews and comments	Review and comment on Grantee's assessment process; contrast against MTAS risk assessment
D	Develop or refresh MTAS's Beta Range assessment and develop or refresh schedule risk model	No MTAS risk assessment required	Usually requires a separately scheduled risk workshop
E	Review Grantee's risk response plans (primary mitigation)	Grantee presents mitigation management; MTAS reviews and comments	Review, comment on, and provide amendments to Grantee's primary mitigation plans
F	Review Grantee's contingency and contingency management	Grantee presents contingency planning; MTAS reviews and comments	Provide modeled contingency recommendations; compare to Grantee's contingency. Review and comment on Grantee's contingency management planning.
G	Review Grantee's Risk and Contingency Management Plan (RCMP)	Grantee presents RCMP; MTAS reviews and comments	Review and comment on Grantee's Project Management Plan (PMP) and RCMP Sub-plan. Focus on risk organization and levels of contingency authority.

The scope of work elements and appendices that are covered within each set of guidance are shown below:

Section	Section Title	MP40a (Grantee-led)	MP40c (Full)
4.1	Overview • Grantee Interface • Organizing the Risk Assessments by FRA Milestones	√	√
4.2	Project Status Evaluation: MTAS's Efforts	√	√
4.3	Identification and Categorization of Risks: Grantee's Efforts	√	√
4.4	Identification and Categorization of Risks: MTAS's Efforts • Risk Events • Risk Categories	N/A	√
4.5	Risk Assessment: Grantee's Efforts	√	N/A
4.6	Risk Assessment: MTAS's Efforts • Project Cost Risk Review • Pre-assessment Adjustments of the Grantee Estimate • Risk Profiles • Cost Risk Assessment – Beta Range Model • Project Schedule Risk Review • Schedule Risk Assessment	N/A	√
4.7	Risk Mitigation: Grantee's Efforts • Risk Mitigation Recommendations • Primary Risk Mitigation Recommendations • Project Cost Contingency • Cost Contingency Draw-down Curve • Secondary Cost Risk Mitigation Recommendations • Project Schedule Contingency Review	√	√
4.8	Grantee's Risk and Contingency Management Plan (RCMP)	√	√
4.9	MTAS's Monitoring of Grantee's Risk and Contingency Management Plan	√	√
Appendix B	Grantee's Submittals	N/A	√
Appendix C	Grantee Risk Interface	√	N/A
Appendix E	Example Risk Register	√	√
Appendix F	Beta Range Factor Guidelines	N/A	√
Appendix G	Risk and Contingency Management Plan (RCMP) Sample Table of Contents	√	√

1.0 PURPOSE

This Monitoring Procedure (MP) describes Federal Rail Administration (FRA) guidance for the Monitoring and Technical Assistance Support (MTAS) to evaluate the Grantee's plan for mitigating and managing project risks. This MP does not require an independent MTAS risk assessment; its intent is to rely primarily on the risk assessment and contingency plans developed by the Grantee.

Risk management helps to improve the reliability of project delivery. The MTAS's evaluation of the Grantee's risk plans provides the FRA with critical information related to the potential risks and overall success of the Grantee's project.

This MP is a guide. The FRA will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

This review requires an evaluation of the Grantee's process for development of its Risk and Contingency Management Plan (RCMP), as part of the PMP, including identification of uncertainties and risks, assessment of project risk, and consideration of risk response options and alternatives, including the use of cost and schedule contingencies.

Under this review, the MTAS relies on the Grantee's work. To best achieve confidence in Grantee-led plans and enhance the collaboration between the teams, the MTAS is recommended, but not required, to participate in the Grantee's risk workshops and other meetings in which the Grantee's planning and methods for dealing with risk are demonstrated.

3.0 RECOMMENDED DOCUMENTS

In advance of reviewing the completed RCMP, the MTAS should obtain the Grantee's PMP, which includes the RCMP. The RCMP should at a minimum include the following.

- A risk register that sufficiently describes the individual risks with likelihood of occurrence and magnitude of cost and schedule as applicable outcomes and describes how the risk impacts proposed have been calculated
- Appropriate identification and evaluation of total project risk, including appropriately assessing the cost and schedule impact to project's overall objective for each risk;
- A description of the cost and schedule risk mitigation measures
- The progress reporting intervals for tracking the performance of mitigation actions;

- Clear identification of cost and schedule contingencies; the process for tracking and managing current and minimum levels of contingency; and the policies for use and custody of contingencies
- Other items as the MTAS may, in consideration of the project specifics, deem appropriate for a thorough review
- The elements or details listed in Appendix G that are applicable to the phases of the project

The Grantee's schedule risk mitigation recommendations should specifically treat both critical path and non-critical path activities.

Supporting documents should include appropriate design, cost, and schedule information sufficient to establish the basis of the project upon which the risk management process was developed.

During a project's pre-obligation phase, FRA may conduct a Project Risk Assessment that evaluates a project's risk in its early in its grant lifecycle. FRA may direct the MTAS to address concerns or information discovered during the assessment, if applicable

The MTAS should perform an initial review of these submittals and notify the FRA of important discrepancies in the project information that would hinder the review; e.g., insufficient detail or a discrepancy between drawings and cost estimate in which the drawings are current and the cost estimate is significantly older.

4.0 SCOPE OF WORK

4.1 Overview

The risk management review builds upon regular reviews of scope, schedule, cost, and Grantee management capacity and capability that may have been previously performed. The risk management review includes evaluation and recommendations regarding the Grantee's project risk identification and assessment, mitigation, and contingency plans, as reflected in its RCMP.

At the direction of the FRA, the MTAS will detail its observations, conclusions, and recommendations in a manner consistent with the general report outline in MP01 Appendix B. If necessary and upon findings of concern, the FRA may request the MTAS to independently develop other review products to provide a thorough analysis of the Grantee's project.

4.1.1 Grantee Interface

MTAS interfaces with the Grantee during its risk review facilitates and expedites the process and provides the MTAS with the background necessary to recommend revisions, if any, to the Grantee's PMP and RCMP. Where possible and subject to FRA approval, the MTAS should encourage the Grantee to involve the MTAS in the processes for development of its risk identification, risk assessment, and risk mitigation.

The MTAS should independently compile their own list of risks and rate each for probability and cost and schedule impact and compare these to the Grantees risk register and the results of the FRA Project

Risk Assessment, if applicable. The MTAS should discuss their list of risks with the Grantee at regular intervals, if directed by FRA, and report to the FRA on any significant variances in either risks or quantification. A typical structure for Grantee interface meetings is presented in Appendix C.

If requested by the FRA, before the Grantee undertakes the risk management process, the MTAS will conduct a Preliminary Review of the Grantee's risk-related organization and proposed processes for development of its RCMP. The purpose of this preliminary review is to develop an understanding of the Grantee's readiness to perform risk identification and assessment and prepare and implement mitigation plans.

Preliminary Reviews evaluate the following readiness criteria:

- Appropriate technical experts are identified and available for inclusion in the risk identification process
- Appropriate technical experts are identified and available for developing the risk scoring matrix and impact criteria modeling
- Grantee demonstrates sufficient understanding and clarity about project objectives, scope, estimate, and schedule
- Sufficient management plans and understanding of responsibility have been developed for successfully completing all important elements of the RCMP

Upon completion of the Preliminary Review, the MTAS will notify the FRA of its preliminary opinion (email summary is sufficient) regarding the Grantee's readiness for the risk planning tasks.

4.2 Project Status Evaluation: Grantee's Efforts to Validate Basic Project Elements

While the basic goal of the risk review is to identify and quantify uncertainties and their potential impacts on a project's estimate and schedule, the necessary first step of the risk review is to understand the status and soundness of the project's basic and known elements. These elements (such as scope, design quality, cost estimates, and schedule) serve as the starting points for identifying risks and opportunities. It is, therefore, crucial that these known project elements be validated or, if necessary, adjusted before attempting to address a project's uncertain elements. The MTAS should review and comment upon the Grantee's efforts at validation of the basic project elements.

4.3 Identification and Categorization of Risks: Grantee's Efforts

Risk identification plays a significant role in the overall risk management process. Sufficient efforts should be made by the Grantee 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" should include at a minimum a description of the potential risk event, causes and effects; its qualitatively-evaluated potential consequences and likelihood of occurrence together with notes on how that qualitative assessment has been arrived at; its Standard Cost Category, SCC (refer to MP33) 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.

4.3.1 Example of Risk Register

A simplified example partial risk register is included in Appendix E.

4.4 (This section not used in Grantee-led Assessments)

4.5 Risk Assessment: Grantee's Efforts

4.5.1 Grantee-developed Cost Risk Assessments

Where a Grantee has independently developed a cost-risk assessment, the MTAS should review the risk assessment submittal and comment as to whether the Grantee has:

- Sufficiently described the individual risks for adequate assessment of likelihood of occurrence and magnitude of
- Established appropriate risk-range cost estimate and distribution functions for any given individual risk event
- Adequately modeled project risk using stochastic (Monte Carlo), risk range, or expected value methods
- Considered the risk of optimism basis in the risk evaluation process and has explained how this has been addressed
- Applied appropriate methods to characterize total project risk if not sufficiently modeled through individual risk events
- Provided a reasonable analysis of model results, sufficient for evaluating adequacy of budget, contingencies, and secondary mitigations

4.5.2 Grantee-developed Schedule Risk Assessments

Where a Grantee has independently developed a schedule risk assessment, the MTAS should review the assessment submittal and comment whether the Grantee has:

- Sufficiently described the individual risks for adequate assessment of likelihood of occurrence and magnitude of outcome
- Established appropriate risk distribution functions and duration ranges for the modeled schedule activities
- Applied identified risks to the schedule activities for impact analysis
- Adequately modeled schedule risk using stochastic (Monte Carlo), risk range, or expected value methods
- Applied appropriate correlation methods to quantify total impact of project risk to the schedule
- Provided a reasonable analysis of model results for evaluating sufficiency of schedule and schedule contingencies

4.6 (This section not used in Grantee-led Assessments)

4.7 Risk Mitigation: Grantee's Efforts

The MTAS should review and make recommendations regarding Grantee risk mitigation plans, as documented in its RCMP. Areas of review and comment should include the development and

management of:

- Primary and secondary mitigation measures
- Quantitative results from Cost and Schedule risk analysis
- Sufficiency of contingencies and to-date contingency draw-down curves
- Ownership of the mitigation plans and due dates
- Risk exposure after the completion of mitigation plans and potential cost savings

4.7.1 Risk Mitigation Recommendations

The review and recommendations should be organized appropriately by Mitigation Structure (defined below), SCC, and Risk Type. Each mitigation recommendation should include an indication of the Mitigation Type(s) (defined below) that best describe the mitigation recommendation.

4.7.2 Mitigation Structure

Mitigation structure refers to varying levels by which the Grantee 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 Grantee and its consultants and contractors as described in the RCMP, as supplemented with the MTAS'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. Once risks have been assessed, Risk mitigation plans should be prepared to prevent the risk from occurring. The selection of a mitigation plan is based upon the balance of cost and effort of their implementation, against the benefits gained within project context. Risk mitigation categories include:

- Avoidance: A change is made (e.g., to project scope) to remove the threat or neutralize its effect on project objectives. By taking these steps, the uncertain event can never occur
    - – 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
- Reduction: Action to reduce either the probability or the impact of the risk. This, like "Avoid," is a proactive response category, (i.e., action is taken before the risk occurs). Mitigation may also include a contingency plan, a response performed only if the risk occurs, and is therefore reactive rather than proactive. Thus, it does not affect risk probability, but mitigates its impact
    - – 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 Grantee organization or project team will carry out the mitigation should be included
- Transfer: The financial impact of a risk can partly be transferred to a third party (e.g., by taking out insurance, or by building penalty payments into suppliers' contracts for late

delivery)
    - Risk Transfer occurs when the mitigation and the consequences resulting from a risk event become the responsibility of a party other than the Grantee; 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, 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
- Accept: This is a conscious decision to do nothing. If a risk is accepted, then the situation should be monitored carefully, to make sure that the risk does not move beyond an acceptable level of probability or impact

If the "Mitigation" category is decided for a risk, then three types of treatment actions exist:

- ACTION: A physical task with a defined deliverable
- CONTROL: On-going consultations, meetings, discussions or procedure changes
- FALLBACK ACTIONS: A set of actions which will be taken only if the risk happens

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 Grantee to make cost reductions in a planned and orderly process and preserves contingencies for use later in the project. Secondary Mitigation is fundamentally different from 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 should the contingency be totally consumed until all project risk is removed, usually only at project completion or beyond.

4.8 Grantee's Risk and Contingency Management Plan (RCMP)

The MTAS should verify that the Grantee's RCMP considers all aspects of potential risk, including management capacity and capability, project performance, cost and schedule risk. A recommended structure for the RCMP is included in Appendix G.

On a case by case basis, after FRA approval of the MTAS's report detailing its review the FRA may make available to the Grantee some or all the MTAS's assessments and recommendations for inclusion in the Grantee's RCMP. With direction from the FRA, the MTAS may work collaboratively with the Grantee, ensuring to keep the FRA informed, as the Grantee prepares and/or revises the RCMP to reflect the

recommendations and considerations provided by the FRA.

4.9 MTAS's Monitoring of Grantee's Risk and Contingency Management Plan (RCMP)

Post-assessment monitoring by the MTAS is intended to assess the Grantee's performance in active risk management and confirm that the Grantee's project implementation achieves its risk management objectives and targets. The MTAS should use the Grantee's RCMP, for its post-risk review monitoring.

Monitoring should consist of evaluation and reporting of:

- The Grantee's implementation 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
- The effectiveness of the Grantee's organization to fully manage its RCMP
- Recommend opportunities and encourage the Grantee to identify and track project's opportunities

1.0 PURPOSE

This Monitoring Procedure (MP) describes Federal Railroad Administration (FRA) guidance for the Monitoring and Technical Assistance Support (MTAS) when evaluating the Grantee's plan for mitigating and managing project risks. This MP describes the procedure for a full MTAS risk assessment.

Risk management helps to improve the reliability of project delivery. The MTAS's evaluation of the Grantee's plan for mitigating and managing project risks provides the FRA with critical information related to the potential risks and overall success of the Grantee's project.

This MP is a guide. The FRA will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

This review requires an evaluation of the reliability of the Grantee's project scope, cost estimate, and schedule, with special focus on the elements of uncertainty associated with the effectiveness and efficiency of the Grantee's project implementation and within the context of the surrounding project conditions.

This MP requires the MTAS to synthesize available project information including the completed FRA pre-obligation risk assessment, if applicable; the Grantee's Risk and Contingency Management Plan (RCMP), ; identify, evaluate, explore, and analyze uncertainties and risks; establish appropriate methods for qualitative and quantitative models that will be used for assessment of ranges or adequacy of forecasted cost and schedule; describe and evaluate the analytical methods used; develop risk mitigation options and suggest 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.

The FRA may direct the MTAS to conduct this review at various points in a project's life.

3.0 RECOMMENDED DOCUMENTS AND PREPARATION FOR THE REVIEW

In advance of performing the review, the MTAS should be familiar with the necessary documents listed in Appendix B, as appropriate for the project phase and level of review. The supporting documents should include sufficient information on design, cost, and schedule to establish the basis of the project. Many of these documents will have been obtained through the review of scope, schedule, cost, and Grantee management and technical capacity and capability from previous efforts.

During a project's pre-obligation phase, FRA may conduct a Project Risk Assessment that evaluates a project's risk in its early in its grant lifecycle. FRA may direct the MTAS to address concerns or information discovered during the assessment, if applicable

The MTAS should perform an initial review and notify the FRA of important discrepancies in the project information that would hinder the review; e.g., insufficient detail or a discrepancy between drawings and cost estimate in which the drawings are current and the cost estimate is significantly older.

4.0 SCOPE OF WORK

4.1 Overview

The scope of this review includes evaluation and recommendations for amendment of the Grantee's project risk identification and assessment, mitigation recommendations, and contingency assessment, as reflected in its RCMP, where available. The MTAS should independently develop a risk analysis to provide a thorough analysis of the Grantee's project.

This risk management review builds upon regular reviews of scope, schedule, cost, and Grantee management and technical capacity and capability that may have been previously performed.

At the direction of the FRA, the MTAS will detail its observations, conclusions, and recommendations in a manner consistent with the general report outline in MP01 Appendix B.

4.1.1 Grantee Interface

The MTAS interface with the Grantee during its risk review facilitates and expedites the process and provides the MTAS with the background necessary to efficiently evaluate risk and provide recommendations for revisions, if any, to the Grantee's PMP and RCMP.

MTAS should independently compile their own list of risks and rate each for probability, cost, and schedule impact and compare these to the Grantees risk register and the results of the FRA Project Risk Assessment, if applicable. The MTAS should discuss their list of risks with the Grantee at regular intervals and report to the FRA on any significant variances in either risks or quantification. A typical structure for Grantee interface meetings is presented in Appendix C.

4.1.2 Organizing the Risk Assessments by FRA Milestones

Project risk should be reviewed and assessed consistently around points in time when level of project development typically indicates changes in project risk. The following FRA Milestones reflect common FRA approval points and important percentages of construction completion:

- Completion of Planning and Concept Design
- Completion of Preliminary Engineering
- Completion of Final Design
- Ready to Bid Construction
- Start of construction

- 50% physically complete for construction
- 75% physically complete for construction
- 90% physically complete for construction
- Substantial Completion

The FRA Milestones may be modified to reflect important milestones in the Grantee's schedule, especially those points where significant changes in risk occur. If FRA Milestones and MTAS-added milestones are more than one year apart, the MTAS should consider developing supplemental milestones.

4.2 Project Status Evaluation: MTAS's Efforts

The MTAS 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 Grantee management and technical capacity and capability, scope, cost and schedule (from previous reviews) and the latest risk register; as well as evaluation of the Grantee's contract packaging strategies. Other review elements may be included at the discretion of the FRA.

4.3 Identification and Categorization of Risks: Grantee's Efforts

See Section 4.3 of MP 40a for content in this section.

4.3.1 Example of Risk Register

A simplified example partial risk register is included in Appendix E.

4.4 Identification and Categorization of Risks: MTAS's Efforts

The MTAS should obtain current documents, progress reports, and observations developed through prior analysis of the Grantee's organization, the project's latest scope, cost estimate, schedule, and contract packaging to develop a synthesized, enumerated list of MTAS-identified risk events. This list should be compared with risk events as independently developed by and identified in the Grantee's Risk Register.

The MTAS should compare the two Risk Registers (Grantee and MTAS) and identify the discrepancies to the FRA.

4.4.1 Risk Events

Risk Events are individually identified events that if they are to occur, may create a plan variance and may lead to 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.

4.4.2 Risk Categories

Risk should 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 eliminated 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.

1. **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 Grantee to actively identify these goals and conditions. Generally, requirements risk is associated with all project development activities from earliest concept through Alternatives Analysis. 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.
2. **Design Risk** is associated with the performance and variability of design-related activities occurring after Alternatives Analysis. 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.
3. **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 Grantee's contract packaging strategies.
4. **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 Grantee 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).

Commercial Risk (including Legal): risks related to reasons such as lack of clarity of contract or unclear responsibility of the parties involved, undefined portion of scope of work and changes in design, or construction directed by client. The risks may also relate to events caused by funding, delay in receipt of payments or disagreements on pricing or progress to date.

4.5 (This section used only in Grantee-led Assessments)

4.6 Risk Assessment: MTAS's Efforts

4.6.1 Project Cost Risk Overview

- Two approaches to cost risk assessment are recommended which when used together provides the best estimate of project's risk cost exposure. Input data is derived from historic parametric sources and project specific risk registers, estimating basis, schedule basis, and the knowledge of the subject matter experts involved during the risk identification meetings. The FRA recommends the MTAS use both approaches which should provide similar results at around the 50th percentile confidence level (P50). If results from the two approaches are significantly different then the MTAS should establish the cause which may highlight input inaccuracies or specific or unusual project uncertainty or risk which requires further research to verify and then quantify and manage accordingly. The two approaches are as described as follows:
    - **Bottom-up Cost Risk Assessment** – The Bottom-up methodology is the term used to describe the traditional Monte Carlo-based approach to risk quantification, requiring consideration of uncertainty around individual estimating components and specific project risk. This approach requires the establishment of source and range of variability around that source, such as historical data, supplier quotations or bottom-up quantitative and pricing detail. The Monte Carlo approach uses both the project basis of estimate and the project Risk Register as a basis for ascertaining current uncertainty supporting a clear traceability through to the risk model results. For each risk included in the assessment, a possible range of cost impact (Min, Most Likely, Max) with the best guess of probability of occurrence is required so the Monte-Carlo analysis can run numerous iterations and then produce a possible outcome of overall cost impact to the project. The MTAS should compare the results to available contingency and report to the FRA.
    - **Top-down Cost Risk Assessment – Beta Range Model –** The Top Down methodology for evaluating cost-risk uses broad parameters derived from historic project information. These parameters are applied to reflect the reducing risk profile as a project moves through the delivery cycle from conception to start-up. Risk is applied sequentially across the project delivery stages 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. Also called the Beta Range Model, the top-down cost risk assessment method has been developed through implementation on many transportation projects. Its features have become accepted as common starting points for project-specific cost risk assessments.

4.6.2 Pre-assessment Adjustments of the Grantee Estimate

- **Stripped Cost Estimate** – Based upon analyses performed in the MTAS's review of the cost estimate in previous efforts, the MTAS should verify that Grantee 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 (i.e., exposed) contingency funds and latent (i.e., hidden) contingency funds should be identified; the identification of latent contingency funds will likely involve interviews with the Grantee. Further, particular attention should be paid to contingent funds that may be embedded within estimates for inflation or escalation risk.
    - Once these contingency funds have been quantified, they should be removed from the estimate to form a Stripped Cost Estimate. The total removed contingency amount from different line items can be presented as a single line item at the bottom of the budget estimate.
- **Adjusted Cost Estimate** - Utilizing scope, cost, schedule, contract packaging, and other information gathered through prior-performed analyses and/or workshops with the Grantee, the MTAS should evaluate the Stripped Cost Estimate, suggesting changes to the various estimate line items to produce an Adjusted Cost Estimate. Care should be taken to identify whether items so adjusted should also become elements of the Risk Register. Any such adjustments and the MTAS's rationale should be fully documented. Note that the adjusted estimate, at a minimum, should include one level of breakdown below the SCC Cost Elements [e.g., 10.01, 10.02]. The estimate should 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 should be a rate that is a reasonably-expected value without significant hidden contingency, in a similar manner that occurs with other estimate line items.
    - For the estimate line items, the MTAS should re-evaluate the amount and re-forecast the realistic to-go value and if possible note the contingency allocation for the adjusted budget.
    - Subsequent analyses of risk depend upon accurate estimate adjustments. Where possible, and especially in the case of significant adjustments, the MTAS should strive for consensus of the FRA and Grantee 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.

4.6.3 Risk Profiles

Many large transportation 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 railway alignment 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.

4.6.4 Cost Risk Assessment – Beta Range Model

The MTAS should 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 should 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.

Standard Cost Category (SCC) Risk Assessment

SCC Cost Element Ranges – Utilizing the procedures outlined below, the MTAS should 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 transportation project outcomes, and may be adjusted from time-to-time. These ranges should 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 MTAS should 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 MTAS should establish the 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 Grantee and the FRA.

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, Commercial 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 Grantee 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, commercial, and construction risk prior to

the completion of design activities. The extent and effectiveness of risk transfers and risk retained by the Grantee inherent in such alternative project delivery methods should be considered when developing recommendations for BRF assignment.

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. The Beta Range Model Workbook illustrates the formats and bases of calculations to properly execute the cost risk assessment described herein. The MTAS should become fully familiar with the Beta Range Model Workbook prior to undertaking the work of this section. The MTAS should adjust the FRA Beta Range Model Workbook as appropriate to meet specific project conditions.

The MTAS should produce, using the Beta Range Model Workbook, a summary table that lists the Grantee's estimated values, and the MTAS'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 MTAS will then identify, in a narrative format, the key risk drivers through an analysis of those project elements with large cost risk impact.

The FRA may have the MTAS perform additional analyses as appropriate to provide further insight into the project-level risk assessment.

Conditioned Estimate – The MTAS should evaluate contingency amounts identified for the project and comment on the sufficiency of the contingency, establishing a recommended contingency amount for the project in accordance with this MP. A Conditioned Estimate may be developed by adding the recommended contingency to the Adjusted Estimate, which forms the MTAS'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 Grantee may allocate the contingency among the various project elements.

4.6.5 Project Schedule Risk Overview

The MTAS should use its professional judgment and objective schedule data to evaluate the Grantee'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.

Pre-assessment Adjustments of the Grantee Schedule

Stripped Schedule – Based upon analyses performed in review of the Schedule and/or workshops with the Grantee, the MTAS should provide opinion on whether the Grantee has

exposed all contingency durations embedded therein. 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 (i.e., exposed) contingency durations and latent (i.e., hidden) contingency durations should be identified; the identification of latent contingency durations will likely involve interviews with the Grantee. Further, particular attention should be paid to contingent durations that may be embedded as lag time hidden within the activity logic ties or artificially applied constraints.

- Once identified, the MTAS should quantify and remove these contingency durations from the schedule to form a Stripped Schedule. The total removed contingency duration from different activities can be presented as a single line item at the bottom of the budget estimate.

Adjusted Schedule – Utilizing scope, cost, schedule, etc. information obtained in prior-performed reviews or joint MTAS and Grantee workshops, the MTAS should appropriately provide suggested revisions to the Stripped Schedule, increasing or decreasing the various activity durations based on reviews and meetings with subject matter experts. When applied to the Stripped Schedule, the MTAS will develop an Adjusted Schedule based on the suggested changes, as well as fully document any such adjustments and their rationale.

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 MTAS should strive for consensus of the FRA, MTAS, and Grantee in such adjustments before moving forward with the schedule risk evaluation.

4.6.6 Schedule Risk Assessment

Summary Schedule Development

To aid in efficient and effective attribution of risk, the MTAS should review, or independently develop, a summary schedule based upon the Adjusted Schedule that will be used for modeling project schedule risk. The summary schedule should 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 should 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 MTAS should 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.

Schedule Activity Risk Assessment

Duration ranges for the activities of the Summary Schedule should 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 should be determined considering discussion with the Grantee and the FRA. The Adjusted Schedule durations should be used to establish the optimistic estimate for the summarized activity durations. The MTAS should 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 should be clearly documented and included in the assessment notes. Methods used in the analysis should 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 should 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.

Project Level Schedule Risk Assessment

The likelihood of project completion within the timeframes estimated on Grantee's master schedule should be assessed using a commercially available scheduling software program capable of stochastic schedule risk modeling ("Monte Carlo" modeling). The schedule modeling should successively and randomly develop alternate forecasted project completion dates, based upon the activity duration range input described above. Such modeling should be undertaken by individuals fully capable of establishing modeling parameters and capable of interpreting the modeling results. This assessment should include an evaluation of the predicted range of completion dates compared to the Grantee'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 FRA may request other similar analyses.

The Project Schedule Risk Assessment should 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 MTAS should assess the sufficiency of the Grantee's base sequencing and schedule to adequately reflect the modeled interim and final milestone completion dates. The MTAS should provide recommendations for adjustment to the Grantee's schedule and PMP to reduce the risk of not meeting the project's schedule goals.

To check the accuracy of the results produced, the FRA suggests that the MTAS review the Grantee's schedule risk assessment and find the differences and report to the FRA any disagreement regarding the risks or duration of the activities.

Conditioned Schedule - The MTAS should evaluate the contingency amounts identified for the

project and should comment on the sufficiency of the contingency, establishing a recommended amount for the project in accordance with this MP. A Conditioned Schedule is developed when the recommended contingency is integrated with the Adjusted Schedule.

4.7 Risk Mitigation: Grantee's Efforts

The MTAS should review and make recommendations regarding Grantee risk mitigation plans, as documented in its RCMP. Areas of review and comment should include the development and management of:

- Primary and secondary mitigation measures
- Quantitative results from Cost and Schedule risk analysis
- Sufficiency of contingencies and to-date contingency draw-down curves
- Ownership of the mitigation plans and due dates
- Risk exposure after the completion of mitigation plans and potential cost savings

4.7.1 Risk Mitigation Recommendations

See Section 4.6.1 (formerly 4.7.1) of MP 40a for content in this section.

4.7.2 Mitigation Structure

See Section 4.6.2 (formerly 4.7.2) of MP 40a for content in this section.

4.7.3 Primary Risk Mitigation Recommendations

The MTAS should review the Grantee'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 Grantee's RCMP, including scope, deliverables, outcomes, and recommended completion dates. These measures should include those management activities directly related to performance by the Grantee 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 should indicate progress-reporting intervals for tracking the performance of mitigation actions. All material assumptions should be identified along with their rationales. The mitigation plans should 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 should include actions related to partial risk transference, especially those risks transferred through construction contracting, ensuring that risk remaining with the Grantee is fully recognized and an effective risk response plan has been developed. The Grantee's project delivery methods and contracting plans, including its proposed terms and conditions, should offer a comprehensive approach to ensuring that all costs due to risk transference are reflected in the project estimate. MTAS should inform the Grantee of any additional mitigations necessary to help better mitigate a specific risk and provide industry best practice lessons to assure that the mitigation measures are sufficient.

Schedule risk mitigation recommendations should 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 should start and complete as soon as feasible.

4.7.4 Project Cost Contingency

The MTAS should fully identify, describe, and analyze the adequacy of the Grantee's cost contingencies. This analysis should 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 Grantee-provided risk assessment model (if undertaken)
4. A MTAS-developed risk assessment model

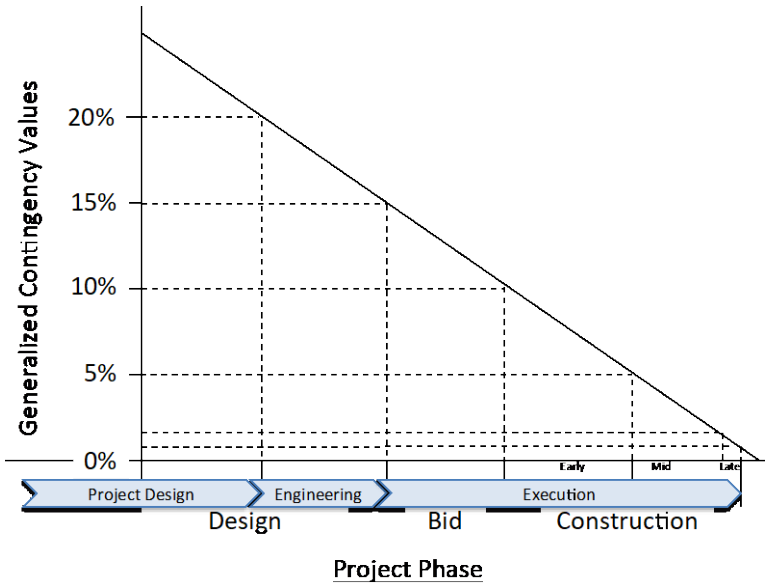
The MTAS should use its professional judgment to evaluate the contingency requirements estimated by these four approaches, and should establish an overall recommended minimum contingency level, as described below.

Generalized Contingency Levels

The FRA has determined, from historic project information, that the following minimum levels of contingency (the aggregate of allocated and unallocated cost contingency) are generally prudent:

Milestone	**Contingency**	The amount of contingency depends on many things. One of them is the comprehensiveness of the project cost estimate. Does the estimate include just what is on the drawings, or does it "fill in the blanks," and consider what is really needed for the complete job?
Completion of Planning and Concept Design	30-40%	
Completion of Preliminary Engineering [Assumes minimum 30% design completion (not 15%)]	20-30%	
Ready to Procure Construction	15-20%	
Start of Construction	10-15%	
At 50% Physically Complete for Construction	5-7%	

- The contingency amount recommendation using above table should be checked with the contingency level based on the risk assessment result. This comparison will assist both Grantee and MTAS/FRA to better manage the available contingency
- The above contingency recommendations 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 Grantee 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.

4.7.5 Cost Contingency Draw-down Curve

The MTAS should review and make recommendations regarding adjustments to the Grantee's Cost Contingency Draw-down Curve, and should 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 should indicate by phase, the recommended minimum contingency levels that most reasonably reflect the specific project conditions. These minimum levels should be indicated for each of the FRA milestones, including additional milestones as identified by the Grantee and MTAS for points of time at which significant changes in risk may occur. These milestones and minimum contingency amounts define a Cost Contingency Draw-down 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.

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 Grantee or MTAS has identified additional milestone points, the MTAS should 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. The MTAS should combine the contingency curves, from different project phases and present to the FRA. The overall curve will assist the FRA to understand the usage of contingency given to a project at different levels and the timescale of any potential funding required to finish the project.

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 MTAS 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," should 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, often established through the judgment of project experts, becomes the minimum amount of contingency that should 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 should 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 should be made in development of the backward pass contingency values:

- At the Revenue Operations Date, 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 Grantee's experience and experience on other similar FRA projects to identify an amount sufficient to closeout 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.

- For any potential delay duration greater than 9 months, the contingency amounts should 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, Grantee contingency needs for Design and Market risks may be significantly reduced, and Grantee 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.

MTAS and Grantee should also present and track the contingency amounts assigned to the activities related to scope changes directed by the client.

4.7.6 Secondary Cost Risk Mitigation Recommendations

The MTAS should review the Grantee's schedule of Secondary Risk Mitigation items, and comment whether such Secondary Mitigation results in sufficient protection for the project; evaluation of which should include consideration of levels of risk reflected within the risk register, as well as any risk analyses available for the project. The schedule of Secondary Mitigation should include the targeted magnitude of the cost or time savings expected, as well as a description of the scope, deliverables, and outcomes of the activity. The MTAS will also review and comment on scheduled progress-reporting intervals for Grantee's tracking of the utilization and management of such mitigation capacities; as well as any integration with the Grantee's overall program schedule and resource loading. Important assumptions should be identified with their rationales.

The Secondary Mitigation recommended amount in the Beta Range Model is calculated as the Secondary Mitigation Target, less the Conditioned Estimate. This target is developed using the Beta Range Model Workbook. The MTAS may, with the FRA's approval, modify this amount based upon overlapping Grantee milestones, actual progress beyond a given phase, or other project-specific factors. It is noted that as a project progresses toward completion, it may become increasingly difficult to develop substantial amounts of Secondary Mitigation capacity, especially as the project construction is contracted. Early identification of Secondary Mitigation items helps to preserve their availability in later stages of the project. The MTAS should carefully take into consideration the current status of design efficiency, the stage of project progression, and the effect that development of Secondary Mitigation may have on the project scope or the agreed level of service when making its opinion regarding Secondary Mitigation.

In the case of design-build contracting, Secondary Mitigation elements may be preserved by contractually causing the design-builder to provide for Secondary Mitigation design options in its work, subject to Grantee's option.

4.7.7 Project Schedule Contingency Review

The MTAS should fully identify, describe, and analyze the adequacy of the Grantee's schedule contingencies based on the latest analysis of project status. The MTAS should make recommendations as to what minimum amounts of schedule contingency are recommended for inclusion in the Grantee's PMP and supporting schedules.

Schedule Contingency Analysis and Recommendation

The MTAS should evaluate the schedule contingency available within the Grantee's schedule, and provide recommendations as appropriate. Such recommendation should be made in consideration of the following:

- The project should follow the general guideline that sufficient schedule contingency is available at the completion of preliminary engineering to absorb a project schedule delay equivalent to 25% of the duration from start of final design through the Revenue Service Date, 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)
- The general assessment of risk is not in conflict with the risk contingency requirements established in development of the Schedule Contingency Draw-down Curve (see below).

Schedule Contingency Draw-down Curve

The Grantee should develop a forecasted amount of minimum total schedule contingency to be available for the project at the current and each future major milestone; the MTAS should review this analysis 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 should be indicated for each of the project milestones, including additional milestones as identified by the Grantee and MTAS for points of time at which significant changes in risk may occur. These milestones and minimum schedule contingency amounts define a Schedule Contingency Draw-down Curve indicating a minimum level of contingency that should 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 same practice and draw-down curve should be produced for realistic schedule contingency amounts for each of the FRA or Grantee milestones. The comparison of the realistic and minimum Schedule Contingency Draw-Down Curve will show the opportunity for cost and schedule savings.

The Schedule Contingency Draw-down Curve should 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 MP. The MTAS should evaluate this draw-down curve and comment on its appropriate allocation of risk over time, including recommendations for adjustment as appropriate.

4.8 Grantee's Risk and Contingency Management Plan (RCMP)

4.9 See Section 4.7 (formerly 4.8) of MP 40a for content in this section. MTAS's Monitoring of Grantee's RCMP

See Section 4.8 (formerly 4.9) of MP 40a for content in this section.

APPENDIX B (A is not used)
Grantee's Submittals

In advance of performing the review, the MTAS should be familiar with 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 Grantee management and technical capacity and capability from previous efforts. At direction from the FRA, the MTAS will perform an initial review and notify the FRA of important discrepancies in the project information that would hinder the review; an example would be insufficient detail or a discrepancy between drawings and cost estimate in which the drawings are current and the cost estimate is significantly older.

Programmatic

- Alternatives Analysis final report
- State Rail Plan include the project for PE, Final Design, and Construction phases
- Environmental documents and NEPA determination

Agreements

- FRA Grant Agreement/Cooperative Agreement
- Service Outcome Agreement, if applicable
- Agreements with third parties, including railroads and utilities, as appropriate

Project Management Plan and sub-plans

Scope/Project Definition

- Basis of Design reports, Design Criteria reports
- Project plans, drawings, and specifications
- Master Permitting Plan and Schedule
- Geotechnical baseline report
- Vehicle specifications /design documentation
- Capacity and Operations Modeling and Operating Plan
- Documentation of changes to scope that have occurred since last FRA review

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 estimate backup documentation
- Capital cost estimating methodology memo
- Summary of O&M Cost assumptions/productivities
- Before and After Study documentation

Due to the reliance on the Grantee's process, reflected through its PMP, RCMP, scope, schedule, and cost documents, the MTAS will interface with the Grantee during the risk review, at direction of the FRA, wherever possible, in order to understand and build confidence in the Grantee's risk process. Formal establishment of this interface ensures a robust Grantee review.

A suggested structure for the joint FRA, MTAS, and Grantee interface is as follows: the MTAS should assess the level of project completion and familiarity of the Grantee with the risk review process to determine whether adjustment to the following structure is appropriate. It is emphasized that the meetings described as follows are not intended to be the only risk management-related interface with the Grantee. Wherever possible, the MTAS should seek to attend Grantee-led internal risk meetings and workshops at the direction of the FRA. Suggested meetings and topics of discussion are described below.

Kickoff meeting:

- Introduce the FRA, MTAS, and Grantee teams
- Grantee presents the project to MTAS team:
    - Agency organization, including project team and plan for staffing
    - Description of work and reviews over the previous year
    - Discussion of schedule, cost estimate, Grantee's RCMP and risk register
- Risk review of the project by discipline, organized by SCC
    - Review the status of Grantee'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 observations, conclusions, recommendations, questions, and enter into discussions with the Grantee's project team to resolve open questions
- Discuss the quantitative risk model draft to be used for the project
- Discuss actions required to facilitate the MTAS risk review
- Inform the Grantee of next steps in the risk review process

Follow-up meetings may be required to review specific issues discovered. As soon as possible after the kickoff, at direction from the FRA, the MTAS should develop a risk analysis and risk review recommendations, and schedule the Risk Workshop.

This Risk Workshop should occur after MTAS team has reviewed the risk listing, has developed its cost and schedule risk assessments, and has developed recommendations regarding Grantee's target budget, contingency and risk mitigation. Suggested workshop structure:

- Introduce the FRA, MTAS, and Grantee team
- Describe the process used to review and establish quantitative risk recommendations
- Summarize the key observations 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
- Discuss action items and next steps in the risk management and FRA review process
- Provide any opportunities in the cost or schedule analysis

APPENDIX E (D is not used)
Example Risk Register

The following is provided only as an example of a risk register used for risk identification; the intention is to convey the basic content for a comprehensive 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 establishing his or her own 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:		1-Requirements		Cost	<$250K	$250K><$1M	$1M><$3M	$3M><$10M	>$10M
		2-Design		Schedule	<1 Mths	1><3 Mths	3><6 Mths	6><12 Mths	>12 Mths
		3-Market		Rankinig	<=3	3.1-9.49		>=9.5	
		4-Construction							

					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 possibilty 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	Evauate 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 utiliy 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

This workbook is based on the summary organizational structure of the FRA 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 FRA reviews

The following guidelines apply for cumulative Beta Range Factors (BRFs). Note that:

- The following BRF amounts are the sum of the individual risk category factors
- 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
- The cumulative factors here represent a range of observed risk across many transportation 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 MTAS should 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. The fundamental premise is that risk reduction, and hence BRF reduction, proceeds rapidly through the design phase. As design proceeds into final design, risk is reduced, yielding a net BRF of 2.00. At completion of final design, design risk should virtually be eliminated, yielding a BRF at completion of final design 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 MTAS should 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**

Risk Category	Risk Category Factor	
Requirements Risk	Evaluated on a case-by-case basis	
Design Risk in Preliminary Engineering	0.35	
Design Risk in Final Design	0.25	
Market Risk	0.25	Construction Risk Sub-Factor
Construction Risk	0.45	
Early Construction		0.25
Mid Construction		0.15
Late Construction		0.05
Post Construction	0.05	

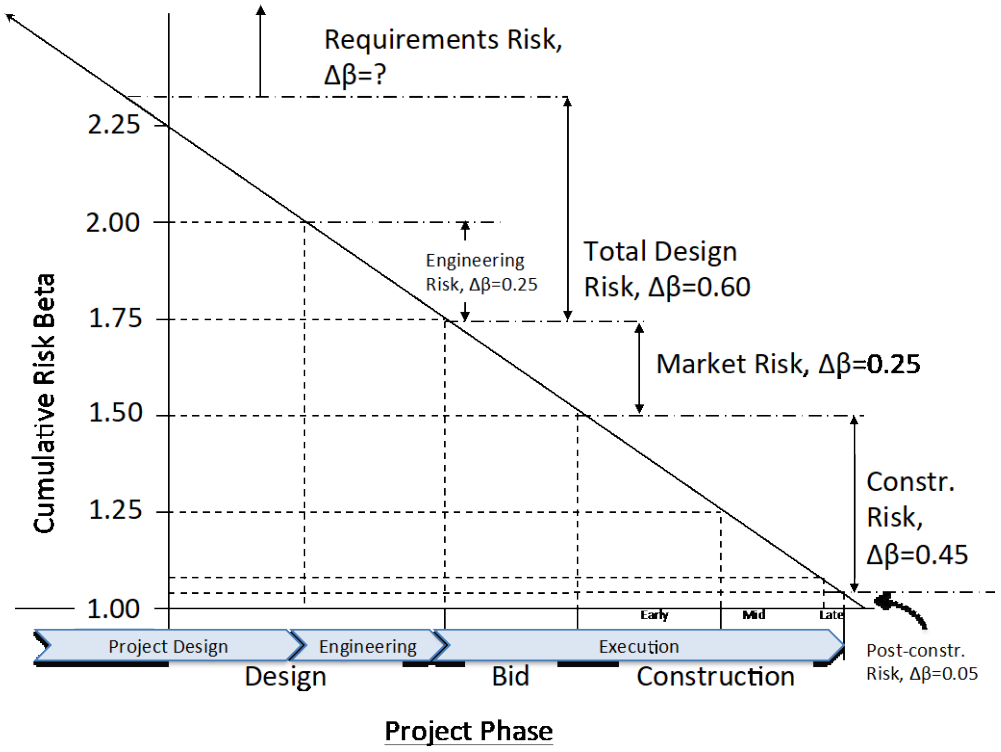


Figure 1 – SCC 10-50 Beta Risk Factors by Level of Development

SCC60 through 80:

SCCs 60 through 80 represent project elements that are not traditional construction elements. As such, the risk categories should 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
- 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.

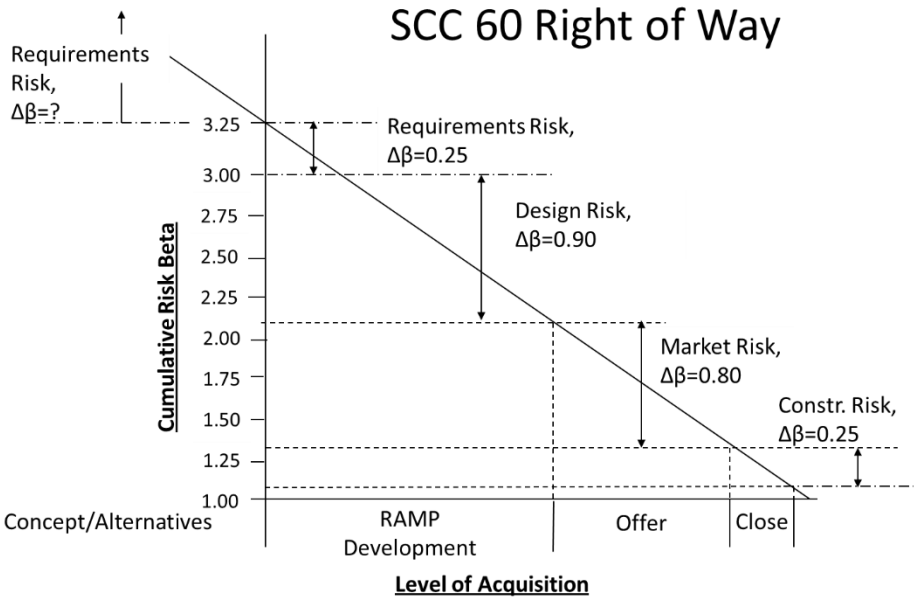


Figure 2 - SCC 60 Beta Range Factors by Level of Development

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.

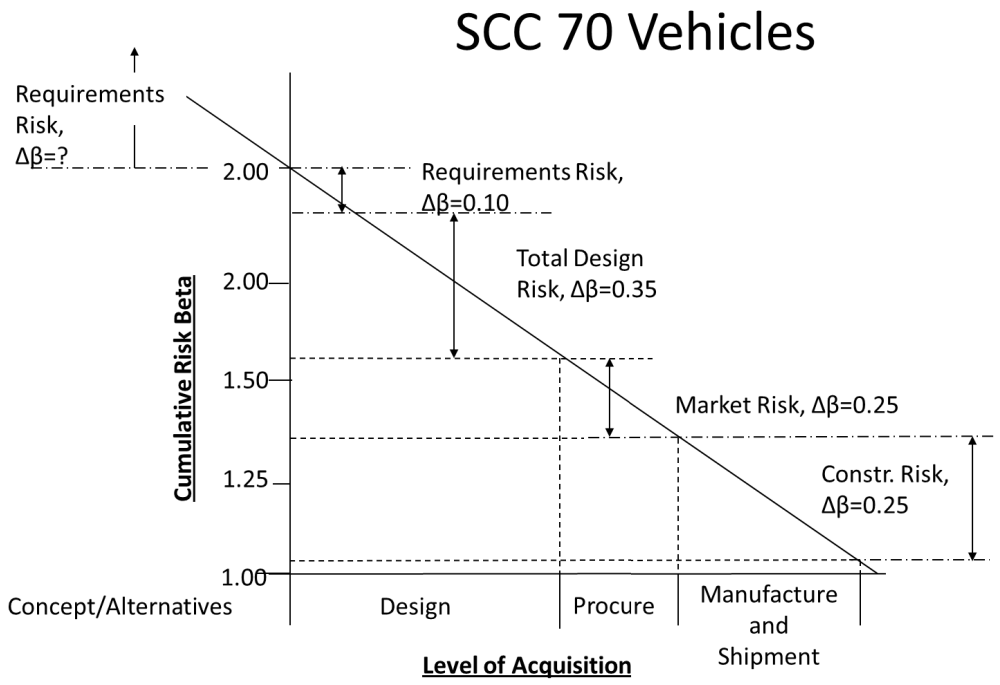


Figure 3 - SCC 70 Beta Range Factors by Level of Development

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 should be estimated in consideration of the commensurate risk factors. See Figure 4 for standard BRF values for professional services.

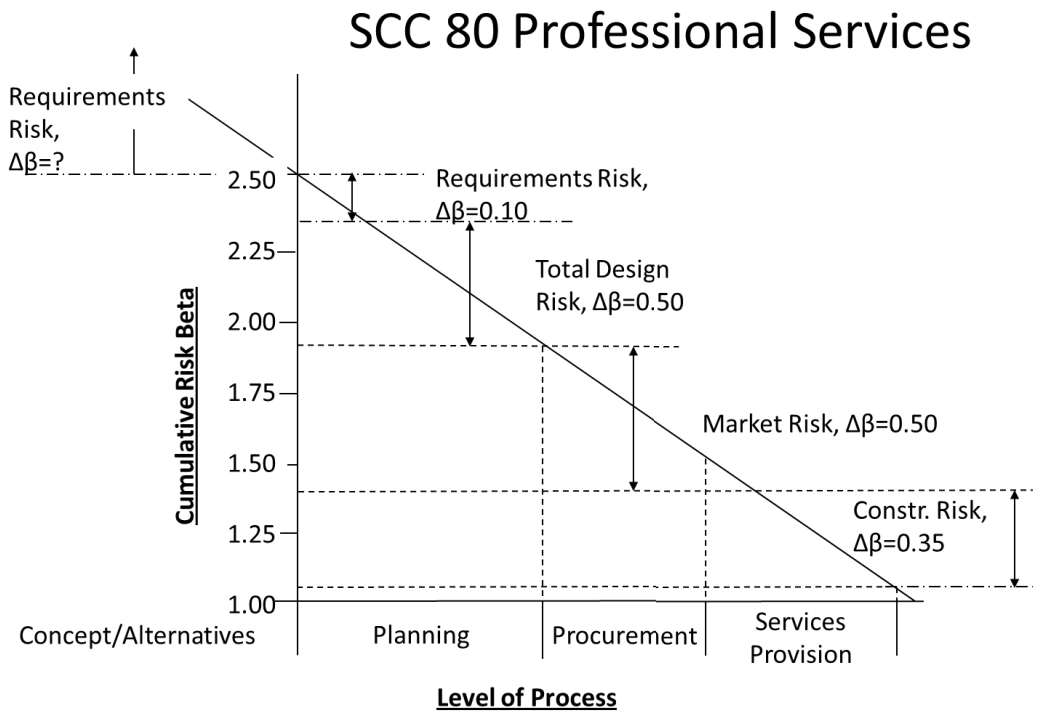


Figure 4 - SCC 80 Beta Range Factors by Level of Development

KEY
P – Preliminary or draft
C – Required to be complete
M – Modification is required

RCMP Sample Table of Contents					
	Elements	Planning	PE	Final Design	Construction
1	**Preliminary Note**				
2	**Overview**				
a	A brief summarization of topics covered within the RCMP should be included, including such topics as: • Primary Mitigation • Insurance • Contingency Management • Secondary Mitigation • Risk Management				
3	**Goals and Objectives**				
4	**Risk Review Process**				
5	**Insurance**				
6	**Primary Mitigation**				
a	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. • Management Capacity • Project Scoping and Design • Requirements • Design				
7	**Delivery Methods and Contracting**				
8	**Construction Process**				
9	**Project Tracking**				
10	**Contingency Management**				
a	Cost Contingency Management Plan				
b	Schedule Contingency Management Plan				
11	**Secondary Mitigation**				
12	**Risk Management and Risk Mitigation**				

U.S. DOT Federal Railroad Administration
Office of Passenger and Freight Programs

Monitoring Procedure 54 – Readiness for Revenue Operations

1.0 PURPOSE

This Monitoring Procedure (MP) describes the Federal Railroad Administration (FRA) requirements for the Monitoring and Technical Assistance Support (MTAS) when evaluating the Grantee's readiness for revenue operations. This MP applies primarily to new services; however, it can also be applied to services having undergone major improvements..

This procedure assumes the Grantee is the host, or owner of the railroad, and can provide the information and documents detailed in this procedure. In cases where the Grantee is not the host this process and documents may vary.

This MP is a guide. The FRA will determine the appropriate level of review required and the format for the deliverable based on the FRA's assessment of the project and may be executed differently from how it is described in this MP.

2.0 KEY PRINCIPLES

The readiness objectives are as follows:

- All facilities, systems, and equipment furnished and installed conform to safety requirements, design criteria, and specifications;
- The entire rail system, with all interfaces, operates as an integrated whole and is capable of functioning effectively to provide dependable service;
- The system is ready for public use in conformance to regulations and industry standards, standard of care, and conformance with contractual requirements;
- The system will operate safely through the host communities; and
- The Grantee or Train Operator has the management capacity and capability to operate and maintain the system through hiring and training of sufficient numbers of experienced staff

Considering the objectives above, the MTAS should evaluate and assess the readiness for initiating revenue operations:

- Completion of system integration testing (SIT) of project components, equipment, subassemblies, assemblies, subsystems, and systems;
- Fulfillment of safety and security certification requirements;
- Completion of pre-revenue operations (PRO);
- Confirmation that the Grantee or Service Operator has the management capacity and capability to operate and maintain the new or improved service and facilities

Through early performance of this MP, the MTAS can help the Grantee 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 planned substantial completion of project construction.

3.0 RECOMMENDED DOCUMENTS

Before performing the review, the MTAS should be familiar with the following project documents. The MTAS should notify the FRA of important discrepancies in the project information that would hinder the review. The documents detailed below assume that the Grantee is also the host railroad.

- Planning / Design / Construction
    - Contract documents (plans, specifications)
    - Documentation of changes to scope
    - Operating Plan, operating rules
    - Reference codes and regulations
    - Design criteria, including appropriate safety and security guidelines and standards
    - Agency policies related to testing, operations
    - Safety Certifiable Items List (CIL)

- Safety and Security – Management and Certification (coordinate with the FRA Office of Safety as applicable and directed by FRA)
    - Systems Integration Testing (SIT) Plan
    - Systems/Facilities Integration and Coordination Plan
    - 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 Certification Plan (SSCP)Preliminary Hazard Analysis (PHA), including updates
    - Threat and Vulnerability Analysis (TVA), including updates
    - Operation Hazard Analysis (OHA)
- Pre-Revenue Operations
    - Rail Activation Plan (RAP)/ PRO Plan
    - Fleet Management Plan if applicable
    - Schedule for PRO Activities Training Program
    - Rule Book
    - Standard Operating Procedures (SOPs) and Maintenance Procedures
    - Public Awareness/Outreach Plan
- Project Management Plan (PMP) and sub-plans, 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; safety certifications
    - Quality Assurance/Quality Control Plan

4.0 SCOPE OF WORK

The MTAS should verify the following:

- That early planning for SIT and PRO training and testing is performed to avoid public safety concerns associated with conforming to regulations and industry standards and practice, standard of care, and conformance with contractual requirements, impacts to construction and delays to the revenue service date.
- That all involved stakeholders have clearly defined roles and responsibilities in regards to the safety certification and verification activities, and are made aware of the testing and PRO processes when they do not have a direct role and/or responsibility.
- That the Grantee, in the course of SIT and PRO, refers to the project hazard analyses and provides 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 Grantee should review the hazards and provide detailed workarounds to mitigate these hazards until final resolution.
- That testing verifies that all systems, subsystems, components, equipment, and materials conform to the requirements of the contract documents, that the service will operate and can be maintained as an integrated whole at acceptable levels of safety and security

At the direction of the FRA, the MTAS will detail its observations, conclusions, and recommendations in a manner consistent with the general report outline in MP01 Appendix B.

The Systems Integration Testing (SIT) should be integrated into the project master schedule with time-phased activities showing the inter-dependencies between various activities and project milestones.

The tests should conform to the following sequence:

- Design Completions. All design affecting the respective equipment or work should 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 should 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 should 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 should be satisfactorily completed prior to proceeding to production tests
- Production/Factory Acceptance Tests. All production tests affecting the respective equipment and devices should 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

4.1 Testing Overview

The MTAS should assess and evaluate the adequacy, soundness, and timeliness of the Grantee's performance in certifying the following:

- Tracks and Structures
- Signage
- Stations
- Yards and shops
- Vehicles
- Traction power system (substations, contact rails, catenary)
- Train control system
- Signaling system
- Traffic signaling
- Communications system
- Fare collection system

The MTAS should evaluate the Systems Integration Testing (SIT) and Systems/Facilities Integration and Coordination Plan. This Plan should coordinate stakeholder roles and responsibilities; take into account time constraints and access for testing; and incorporate supporting information as necessary.

The MTAS should check areas where early coordination and testing may be critical to avoid delays to the remaining tests. As an example, railroads often require early coordination and testing in the following situations:

- Clearance testing for shared railroad/railroad track along the railroad corridor
- Pedestrian crossing warning system testing at stations and other locations
- Grade crossing warning system control testing at intersections with both roadway and railroad tracks

4.2 Plan for Systems Integration Testing (SIT)

The MTAS will evaluate the Grantee's SIT 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 test plan should include:

- 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 – start and completion date for each test

4.3 Schedule for Testing

- The MTAS should evaluate the schedule for integrated testing
- The MTAs should verify that track access is coordinated with the contractors' and agency's operations to minimize interference and delay to construction;
- The MTAS should verify that "cutovers" to the existing system are coordinated and scheduled
- Since testing and startup activities at interface points between existing lines and future extensions can easily impact existing operations, the MTAS should verify the schedule minimizes impacts at cutover or interface points and the Grantee has coordinated appropriately with the existing system schedule and construction contractors' schedules

4.4 Test Procedure

The MTAS should evaluate the detailed test procedures for each test. Each test procedure will contain detailed step-by-step procedures for performing the test and include the following information:

- Title of test
- Test objectives
- Test prerequisites
- 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

4.5 Test Reports

The MTAS should evaluate the Grantee's test reports and verify 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

4.6 Completion and Recording

The MTAS should confirm the Grantee has successfully completed and recorded the following tests:

- Design tests
- Production tests
- Field tests
- Individual systems
- Integrated tests – static and dynamic

4.7 Other Pre-Revenue Operations Items

The MTAS should verify the following items are implemented successfully:

- Procedures and rules for operations and maintenance
    - Completed Rule Book and Standard Operating Procedures
    - Operator and Maintenance Staff Training
- Emergency response program
- Spares and spare parts requirements & inventory
- System Safety and Security Program Plan
- Public Education and Safety Awareness

The MTAS should confirm the Grantee has received the following items:

- Safety certification tests
- Training certifications/qualification for railroad employees and station staff
- Warranties and Operation and Maintenance (O&M) manuals
- Permits for/from:
    - Operating
    - Safety and security (including coordination with local police department(s))
    - State/county/city codes
    - Fire department(s)

5.0 TIMELINE

5.1 Test Plans, Procedures, and Reports

The Grantee should complete all requirements in the contract documents relating to test plans, test procedures, and test reports before starting the next test phase covering individual equipment, devices, subsystems, or systems.

5.2 Design Tests

The Grantee should complete all design tests affecting the individual equipment, devices, and materials satisfactorily before starting production testing.

5.3 Production Tests

The Grantee should satisfactorily complete all production tests affecting individual equipment and devices before shipping equipment from the factories.

5.4 Field Tests

The Grantee should perform field tests after installing equipment, devices, and materials at the project site and will verify all equipment is properly installed, connected, and in operable condition. No equipment will be energized or placed in the operating mode without FRA approval.

5.5 Startup Tests

The Grantee should perform startup tests after satisfactorily completing all field tests and verifying that all equipment, devices, and materials installed will function as an integrated system, in accordance with the contractual requirements.