



## **Oversight Procedure 34 -Project Schedule Review**

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### **1.0 PURPOSE**

This Oversight Procedure describes the review, analysis, recommended procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the Project Management Oversight Contractor (PMOC) with regard to the completeness and reliability of the Sponsor's project schedule; to assess its usefulness as a management tool; to assess the extent to which the project schedule reflects the project scope, cost, management practices and method of project delivery.

### **2.0 BACKGROUND**

Competent schedule management is necessary for sound project planning and control of time, costs and risks. Congress and FTA's good stewardship require that a Sponsor's schedule be reliable. During Project Development (PD) and prior to entry to Engineering and Full Funding Grant Agreement (FFGA) or Small Starts Grant Agreement (SSGA), as well as at other points in project development, when requested by FTA, a thorough evaluation of the scope, schedule and cost is performed to confirm the schedule reliability.

### **3.0 OBJECTIVES**

FTA's objective is to determine whether the Sponsor's schedule management and project schedule are sufficient to plan and control the project time at the programmatic and contract level and complement the management of scope, cost and risk. This project is applicable to Design-Bid-Build, Design-Build and other delivery methods.

### **4.0 REFERENCES**

The statutes, regulations, policies, guidance documents and circulars in OP01 are the principal, but by no means the only, references to Federal legislation, regulation and guidance with which the PMOC should review and develop a solid understanding as related to the Sponsor's project work being reviewed under this OP. The Sponsor's schedule should conform to industry standards as published by leading project management and control organizations. In addition, the schedule management and project control reviews must be coordinated with:

- OP32C – Project Scope Review
- OP33 – Capital Cost Estimate Review
- OP40a/b/c – Risk and Contingency Review

## 5.0 SPONSOR SUBMITTALS

In advance of performing the review, the PMOC shall meet with the Sponsor and its staff and consultants, discuss the purpose of the review, and obtain information as required, including but not limited to:

- Basis of Schedule (see sample in Appendix B below);
- Description of the project control organization, schedule development, and control process and procedures;
- CPM specifications or contractual requirements (if available)
- Latest schedules in electronic format – both PDF and native scheduling software;
- Supporting scope and cost information.

## 6.0 SCOPE OF WORK

This Review may be performed during project planning, design or construction. The work order may specify the extent of the review, add re-assessments or specialized analyses. The PMOC schedule reviews will occur at the following stages:

**Reviews during Project Development (PD):** A comprehensive project schedule should be developed during PD, including activities associated with the project's proposed delivery program. An overall project schedule, including the anticipated timeline for completing the required project development work within the two year timeframe specified in MAP-21, should be in place when a project enters PD. The PMOC should review the project schedule and the Sponsor's schedule staffing, capabilities and processes. OP51, Appendix B, Section 5 provides criteria for evaluating the completeness, level of detail and reasonableness of the project schedule at Entry into Engineering.

**Entry into Engineering:** Preparation of an appropriate Integrated Baseline Schedule showing critical project activities, logic flow and durations, including identification of third party, utility and critical ROW agreements. The Checklist contained in OP-51, Section 5.0, provides the criteria for evaluation of completeness, level of detail and reasonableness of the project schedule and schedule related items. Section 2.4 of the checklist addresses the need for Schedule Control Procedures as part of the Sponsor's Project Management Plan.

**Reviews during Engineering:** Upon Entry into Engineering, the PMOC updates the schedule review. If requested by the FTA, the PMOC conducts a risk assessment. This review could be used to award a Letter of No Prejudice (LONP), a Letter of Intent (LOI) or an Early Systems Work Agreement (ESWA) or commitment of the Federal share.

**Review for Award of FFGA/SSGA:** The FTA may request that the PMOC update or refresh its Schedule review (in addition to project scope, cost and risk) as part of the evaluation of the Sponsor's readiness to receive an FFGA/SSGA. The PMOC's review for an FFGA/SSGA must be commensurate with the Sponsor's documents available at the time. The review includes an evaluation of the suitability of the project documents to the Sponsor's project execution and contracting strategy, whether design-bid-build, design-build or other FTA acceptable process.

**Reviews during Construction:** The FTA may request that the PMOC monitor the Sponsor's compliance with schedule elements of the PMP and its subplans during construction, monitor for risks to the schedule, including float levels, and monitor the Sponsor's organization for appropriate scheduling capacity and capability.

The PMOC shall assess and evaluate the Sponsor's schedule and its plan for schedule control. Consider the adequacy of the Sponsor's project control staff, systems and software for the size and complexity of the project. Validate the usefulness of the schedule as a project management tool, consider the level of definition of the schedule and elements within the schedule for appropriateness to the project phase; identify schedule uncertainties, and issues with the project schedule mechanical soundness, and fundamental and reasonable soundness.

The PMOC shall review the Sponsor's schedule control including internal procedures and schedule reviews. Consider the timing and adequacy of such reviews to determine if the schedule is sufficiently developed, properly maintained, and consistent with the progress of the project. Review the Sponsor's processes and procedures for developing, monitoring and changing the schedule, including approvals if a significant change in the Revenue Service Date is required. The PMOC should additionally determine if the Sponsor has a formalized Configuration Management process that controls baseline schedule and any re-baselining controls for schedule revisions.

The PMOC shall provide recommendations to improve the development and implementation of schedule management and proactively help the Sponsor solve schedule problems. In a report, the PMOC shall document its findings, professional opinions and recommendations.

The PMOC shall:

1. Evaluate the Sponsor's development and implementation of the following schedule management components:
  - a. Project Control Organizational Structure (Capacity and Capability) – Includes the Sponsor's staff combined with the potential blending of other consultant project controls staff for all project phases
  - b. Project control systems, tools and software used
  - c. Review of project control plans, procedures, and schedule management contractual requirements
  - d. Review of the work breakdown structure (WBS) to assure all critical project scope components are included in the WBS.
2. Conduct a Technical Schedule Review
  - a. Assure consistency with scope and WBS
  - b. Soundness Check: Mechanically Correct and Fundamentally and Reasonably Sound
    - i. WBS properly structured and consistent with scope and cost
    - ii. Proper calendars are incorporated into the schedule
    - iii. Complete list of activities which captures the scope
    - iv. Proper durations applied to activities, along with their proper calendars
    - v. Complete logic network developed, including proper logic ties, minimal use of lags

- vi. Float values and late start and finish dates are reasonable and make intuitive sense
  - vii. Critical path is identifiable, logical and reasonable
  - viii. Secondary critical paths are identifiable, logical and reasonable
  - ix. Costs are applied to the schedule, incorporating the SCC cost accounts
3. Readiness to conduct OP 40 Schedule Risk Analysis check – (if applicable)

The PMOC shall provide a written comparison of the proposed schedule with similar project(s) and analyze the differences. The PMOC shall draw conclusions and provide recommendations based on this comparison.

## 6.1 Schedule Management Review

Organization – The PMOC shall review the Sponsor’s organization chart and personnel with reference to Section 3 of the Checklist found in OP-51. Within this organization should be a project controls department which includes coordinated management of primary project control functions such as budget/funds management, cost estimating, cost control, document management, risk management, and change control (configuration management). The review should concentrate on the current schedule management organization and how it functions with project control positions within the engineering, real estate acquisition and relocation, program and construction and management consultant teams.

- a. Project Management Capacity and Capability – Has the project controls staff demonstrated the Capacity and Capability during the project schedule development and implementation? How will the project scheduling staff blend in with the engineering and construction management organization and staffing? Does the Sponsor’s scheduling team have the experience and qualifications to manage the proposed program?

Systems, Tools and Software –The PMOC shall review the Project Sponsor’s project-control systems (PCS) with reference to Sections 2.4 and 5.7 of the OP-51 Checklist, including the use of tools, risk analysis and scheduling software suitable for the Project scope, magnitude and complexity. The Sponsor must be able to demonstrate successful development and implementation of their systems, tools and software and also describe how their system will be shared with other primary team members and consultants on the Project.

- a. Schedule Format: Is the schedule format consistent with relevant, identifiable industry or engineering practices?
- b. Does the Sponsor’s project scheduling software and IT infrastructure have the capabilities and scalability to manage the project and the consultants, suppliers and contractors?
- c. Describe the control methods used by the Sponsor
- d. Are the Sponsor schedule update procedures during Project Development, Engineering, and Construction phases commensurate with the challenges of the project?
- e. Describe how the Sponsor incorporates change control (scope, schedule and budget) into the schedule management process.
- f. Has the Sponsor incorporated claims avoidance techniques into their schedule management process? How have they developed a dispute resolution, peer review or change control board, time impact analysis or claims mitigation processes?

Project Control Plans, Procedures, and Contractual Requirements – The Sponsor should develop and implement the necessary plans and procedures which describe how their PCS, tools and software are to be used during the Project including performance measurement, reporting and control measures. The Sponsor must develop CPM Schedule specifications, General Requirements and Special Provisions in coordination with its own PCS, which address the schedule management standards and requirements necessary to develop “contract” schedules required of major suppliers and vendors (rolling stock and fare collection), engineering consultants, and construction contractors.

## **6.2 Technical Review**

The schedule shall be sufficiently developed in detail to determine the validity of the project critical path to revenue service. The project schedule level of detail should be commensurate with the level of detail depicted in the current project phase scoping documents and drawings. Likewise the Schedule Review effort should also be commensurate with the current project phase and schedule level of detail. Project schedules developed during the Project Development and Engineering may contain summary level representation for long lead procurement items, bid and award, construction and systems integration, startup and testing, and contract closeout tasks and therefore some of the Schedule Review topics below may not be applicable as noted.

The following section describes the expected project schedule level of detail as it evolves through each of the following project phases under the standard Design-Bid-Build project execution process.

- **Project Development Phase**  
The schedule must have detail entitlement, planning and environmental tasks associated with the NEPA process, public involvement, FTA requirements and roadmap to support Sponsor request to enter the Engineering phase. The schedule should include appropriate detail for Engineering phase tasks and milestones but use summary tasks that include phasing and contract packaging for subsequent construction phase work. This criteria applies to Design-Bid-Build, Design-Build or other project delivery method. The Basis of Schedule should clearly document all schedule assumptions.
- **Engineering Phase**  
Continuation of planning phase tasks plus Engineering phase tasks, value engineering, third party agreements, utility provider coordination, initial development of real estate acquisition planning, permits, agreements and approvals, FTA requirements and roadmap to support Sponsor request to enter the Full Funding Grant Agreement Phase. Engineering, procurement, bid and award, construction, system integration and startup and testing, and contract closeout tasks are summary in nature but with enough detail to identify interface points among tasks and phases, with justification for estimated durations and sequences. The Basis of Schedule should clearly document all schedule assumptions and increase in detail and succinctly match the assumptions indicated in the Basis of Estimate for the project budget.
- **Full Funding Grant Agreement or Small Starts Grant Agreement**

Continuation of Engineering phase tasks plus construction phase, long-lead procurement items, contract packaging strategies, contract delivery method strategies (DB, DBOM, DBB), safety and security, risk assessment tasks, PMP and sub-plan development and review, and other FTA requirements to support FFGA/SSGA application and entry into construction, Design-Build, and or LONP requests. The Sponsor's schedule should also include expanded detail on third party agreements, real estate acquisition activities, utility relocations, permits, and other agreements and approvals.

For the balance of the work, the schedule should include the following major characteristics, no matter the Sponsor's procurement strategy:

Pre-Award Authority and Procurement of Long lead Material and Equipment-

Expanded activity logic and detail for procurement items, bid and award, proposed construction contract tasks should include the optimization of crew efficiencies and economies of scale in accordance to the assumptions documented in the Basis of Estimate and Basis of Schedule. Proposed construction tasks should also include major summary for systems integration including traction power, train control, communications, fare collection, vehicle acceptance and testing, commissioning of facilities, startup and testing, and pre-revenue service operations and training.

Bid and Award

Includes representative tasks representing applicable contract delivery methods (DB, DBB, DBOM, etc.) chosen for professional services, material and equipment procurements, and construction contracting, startup and testing, and operation and maintenance (DBOM) if applicable.

Construction, Startup & Testing

At a minimum these tasks should represent the project contract packaging plan, contract delivery methods, and contract interface points for construction and startup and testing activities. Schedule detail can be summary in nature during the Engineering phase but must be more detailed during the final design phase for DBB, and very detailed for DB contract delivery methods.

Contract Closeout

The project schedule should include summary tasks that adequately represent contract closeout activity for tasks such as administrative closeout activities for all contracts, closeout and storage of all records, and transfer of warranties, manuals, and training.

The Technical Review should be conducted in sequence with the Mechanical Soundness check and the Fundamental and Reasonable Soundness check. Note the technical review level of effort should be commensurate with the current project phase in which the project schedule is developed as some review topics (construction related) may not yet be applicable.

1. Mechanical Soundness Check

- a. Review Basis of Schedule documentation and verify adequate documentation of all assumptions used to develop the project schedule including justification of work periods and shifts, contract packaging and contract delivery methods, economies of scale, production factors and contingencies used to justify all activity durations.
  - b. Schedule Breakdown Structure (SBS) – A taxonomic description of the Master Program Schedule and all of the sub-tier schedules that comprise or roll-up to the Master Program Schedule. Such schedules may include real estate acquisition, procurement, General Engineering Consultant (GEC) schedules, PM/CM schedules, CE&I schedules, rolling stock manufacturing and fare collection vendor schedules, and construction contractor schedules.
  - c. Hierarchical Structure – Describe how the Project Work Breakdown Structure (WBS), activity coding, and sequence of project phasing. Describe how the project phasing and components can be organized, sorted by level of detail using the file layout structure, hammocks or level of effort tasks.
  - d. Standard Cost Codes (SCC) – Review the schedule to ensure that it can be grouped and summarized according to SCC codes.
  - e. Calendars – Explain the schedule calendars and how they are applied to work tasks. Are calendars appropriately defined and utilized; including allowances for seasonal weather variations? Refer to Exhibit C “Example Calendar Description”.
  - f. Resource Loading – Characterize the extent to which the schedule has been resource loaded?
    - i. Do quantities and costs as defined in the cost estimate match the resource/costs assigned to the activities in the schedule?
    - ii. Explain the application of material, equipment and labor resource allocation applied to schedule tasks.
    - iii. Have labor and material availability been factored into construction durations?
  - g. Cost Loading – Characterize the extent to which the schedule has been cost loaded?
    - i. Do contract and project component subtotal amount match project budget estimate subcomponents and total?
    - ii. Can the schedule cost code structure be organized and sorted into SCC and proposed contractor progress payment line items?
    - iii. Describe how the Sponsor will use cost loading the project execution phase.
  - h. Software Settings – The Sponsor procedures and contractual requirements must address which scheduling software settings shall be used for all scheduling parties as a claims avoidance technique and schedule management standardization best practice.
  - i. Schedule File Log – Is the schedule mechanically correct and complete, free of material inaccuracies or incomplete information? Generate and review a Schedule File Log within the scheduling software as a quality control check to verify use of milestones and constraints, errors and warnings within schedule logic and activity relationship connections, existence of open-ended activities, poor schedule maintenance, and out-of-sequence progressing for progress update schedules.
  - j. Critical Path – A review check to verify the existence of a discernible critical path extending completely from the start to completion activities. The critical path analysis is performed during the fundamental soundness step below.
2. Fundamental and Reasonable Soundness Check
- a. Characterize the schedule quality and detail.

- b. Does the schedule adequately represent the project scope of work including the approved environmental documents?
- c. Is the schedule sufficiently developed to determine the validity, stability and reasonableness of the critical path? Are near critical paths easily identifiable and reasonable in terms of their logic and proximity to the critical path?
- d. Durations –
  - i. Review and evaluate the justification of schedule activity durations contained in the Basis of Schedule; are the activity original durations reasonable, given quantities of work, local conditions, available resources and realistic and achievable expectations?
  - ii. Does the schedule include adequate time and appropriate sequencing for:
    - 1. FTA review and approval cycles for:
      - a. Environmental documents?
      - b. Request to Enter Engineering?
      - c. FFGA/SSGA Application and execution?
      - d. Potential LONP requests?
      - e. Risk Assessments?
      - f. PMP and sub-plan reviews?
      - g. Reviews by applicable local, state and federal jurisdictions and third parties?
    - 2. Agreements associated with real estate acquisition, utility providers, railroad operators, and other interagency agreements?
    - 3. Funding time frames and/or milestones for FTA and non-FTA sources?
  - iii. How were the durations determined? Does the Basis of Schedule indicate what percent of each activity's duration contains built-in patent contingency?
  - iv. Are the activity durations overly optimistic, aggressive or conservative?
  - v. Are durations sufficient during Project Development and the Engineering phases and continuing into subsequent design phases?
  - vi. Are durations sufficient for professional services, material and equipment procurement, and construction contractor procurements (DB, DBB, DBOM, etc.)?
  - vii. For summary schedules typically developed prior to the Engineering phase, are phase durations reasonable and adequately justified with supportable backup documentation?
  - viii. For Engineering phase schedules containing detailed construction tasks: did the Sponsor develop contract time determination (CTD) schedules in order to derive contract durations for incorporation into contractual documents?
- e. Schedule Sequencing:
  - i. Does the schedule follow an expected work sequence and tasks are logically sequenced?
  - ii. Does the sequence include consideration for opportunities to optimize economies of scale, maximize crew production, optimize equipment utilization, and perform concurrent work activity?
  - iii. Can similar work activity be accomplished with available labor and materials?
  - iv. Does sequencing account for temporary construction, site access and logistics, and physical construction constraints?



- v. Is real estate acquisition properly incorporated into Engineering activities and connected to phase construction segments, contracts or relevant contract package phasing in order to efficiently use resources?
- vi. Are long-lead material and equipment procurement adequately represented?
- vii. Is the use of constraints justified and reasonable? (The use of constraints should be kept to a minimum and should be completely removed when the schedule is used to conduct a schedule risk analysis).
- viii. Does the critical path run through a logical and reasonable sequence of activities?
- ix. Are the major milestones achievable and logically sequenced?
- f. Schedule Contingency: Explain the exposed and hidden (patent and latent) contingency in the schedule and how well it is documented in the Basis of Schedule.
  - i. Describe the PMOC's approach to identifying latent contingency if the Sponsor did not properly document their assumptions in the Basis of Schedule.
  - ii. Do built-in contingencies allow for potential delays; including interagency work; utility relocation, civil, architectural, and systems work's Sponsor operations and maintenance mobilization; and integrated pre-revenue testing?

### 3. Schedule Contingency

Per the requirements of *Schedule Contingency Analysis and Recommendation* section of OP40b, perform a review of the schedule contingency to ensure that appropriate hold points are included, sufficient contingency time is in the schedule commensurate with the stage of project development, a draw-down curve has been prepared using both forward pass and step-back analysis as defined in the *Schedule Contingency Draw-down Curve* section of OP 40b. Also, refer to the requirements of OP40a, Appendix G Risk and Contingency Management Plan Structure, Schedule Contingency Management Plan to ensure that the schedule itself is fully coordinate with the Sponsor's plan.

### 4. Readiness to perform OP 40 Schedule Risk Analysis

During the project, the FTA may direct the PMOC to conduct/refresh an OP 40 Risk Assessment. The risk assessment includes a cost and schedule risk analysis as described in OP40a, OP40b and OP40c. In order to perform a schedule risk analysis the project schedule must first be reviewed or characterized (OP 34) and adjustments must be made if so determined by the PMOC. Most importantly, similar to the project budget estimate, the project schedule must be completely stripped of all contingencies (patent and latent). Secondly, the project schedule must be stripped of all constraint dates and types.

1. Once all contingencies have been identified and documented during the Technical Review, all contingencies must be removed from the project schedule.
2. Once all constraints are identified and documented during the Technical Review, all constraint must be removed from the project schedule.

The removal of contingency and constraints can be performed on the project schedule or by using a separate copy of the project schedule in order to maintain the original project schedule.

## 7.0 REPORT, PRESENTATION, RECONCILIATION

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

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

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