

## **Review Construction Schedules**

This Construction Scheduling procedure focuses on the items the Construction Scheduling Engineer should examine, not the step by step procedures of how to use Primavera to access the data. (The step-by-step Primavera procedures can be obtained from other sources.)

The Construction Scheduling will perform a detailed review of the Final Design Submission. They will be provided with copies of all required contract documents, including plans, specifications, estimates, and schedules. They will not use the contract documents to perform Quality Control functions; they need all the documents to fully understand what is included in the project.

The Construction Scheduling Engineer reviews project schedules to provide input and feedback on the entire schedule and provide comments on the entire schedule including comments from a Constructability point of view.

Schedulers work with the Designer to provide advice related to schedule during Preliminary Engineering and Final Design.

Project schedules are reviewed at the Final Design and PS&E submissions. There is a review for Final Design comment compliance and dates should also be verified.

Construction Scheduling verifies the schedule is appropriate for the size and complexity of the project.

Highlights of Standard factors to be considered, Best practices, and Standard coding items that should be reviewed are presented here and detailed in the Scheduling Manual.

### **Standard factors to be considered**

When reviewing the project schedule during working sessions with the Project Manager and Designer, the Construction Scheduling Engineer focuses on issues related to constructability. Among the list of routine considerations, the following should be addressed:

- Does Critical Path make sense?
- Working Drawing Timeframes
- Long Lead Items
- Restrictions
- Activity Logic
- Ensure the Substantial Completion and Completion dates shown in the schedule are in agreement with the dates shown in the specs.
- Utility notification and work duration time frames shown in the schedule agree with the dates and time frame presented in the spec.

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There are routine items that should be performed by the Construction Scheduling Engineer when reviewing project schedules. Suggested items include the following:

- The Construction Scheduling reviewer should receive two copies of the schedule, a printed copy and an electronic copy that should contain a backup of the progress schedule.
- The Construction Scheduling Engineer restores the schedule in Primavera and reviews the schedule by opening a new copy of the schedule. The Construction Scheduling Engineer should not work off the original copy of the file.
- The Construction Scheduling Engineer reviews the project Constraints and the Calendars. (Refer to the Scheduling Manual for details on the constraints, templates, and Designer formatted Road, Bridge, and Specialty calendars.)
- The Construction Scheduling Engineer reviews the Schedule Coding.
  - Sort and review schedule by coding
  - View different columns
  - Check Logic
- The Construction Scheduling Engineer reviews the Schedule narrative. The schedule narrative requirements are:
  - Anticipated production rates
  - Anticipated workforce (e.g., number of crews, size, crew type etc.)
  - Anticipated number of workdays for Bridge and Roadwork work during the Winter Season (December through March inclusive). The department has specific dates for winter construction work shutdown.
  - Permit requirements
  - Utility requirements
  - ROW requirements
  - Community commitments
  - Lead time for special materials
  - Detours and anticipated timeframe
  - Any critical milestones/interim completion dates (i.e. road/ramp openings, critical stages etc.)
  - Any anticipated problems meeting the schedule (ROW, Utilities etc.)
  - Description of any acceleration applied to the project's schedule
  - The number of working days for each operation as shown in Appendix D of the Scheduling Manual. This is only for Federal participating projects.
- Run the Primavera Error Report

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## List of Standard Factors

The Constructability Scheduling Engineer should consider the following Standard factors when reviewing a Construction Schedule:

- Scheduling the advertisement of small, short duration projects in order to allow construction to be completed in one construction season (Designer Contract Time Determination only).
- Can the Schedule be reduced? Make requests to Designer to show a compressed schedule (overtime, multiple shifts, and weekend work) with associated costs.
- Multi-year projects require cost loaded schedules.
- Seasonal limitations such as concrete construction, paving, Hot Mix Asphalt (HMA) availability, curb, placement of long life traffic stripes, landscaping and bridge painting.
- Utility relocation's (each utility treated separately - work on the same pole line must be treated sequentially, not concurrently).
- No natural gas service interruptions during the winter months. Normally from October 1 to April 1, to be verified through the Utility Coordination Unit.
- Right-of-way availability (each parcel treated separately)
- Work hour restrictions due to staging and traffic volumes
- Marine, bridge openings, or railroad traffic
- Staged construction
- Concrete curing time
- Embankment settlement time
- Coordination with other projects
- Winter shutdown
- Working drawing processing and approvals (each one treated separately)
- Availability, fabrication, and delivery of materials. This includes an analysis of any "Buy American" requirements.
- Permit restrictions (fish spawning, etc.)
- Work area restrictions (wetlands, historic sites, parkland, etc.)
- Hazardous material excavation and disposal
- Payment restrictions due to limits in multi-year funding
- Work restrictions due to local activities, holiday seasons on roads with shopping centers, or in seasonal areas such as shore communities.
- Local noise restriction ordinances

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- Impacts to Authorities (e.g., NJ Turnpike Authority, NJ Highway Authority, South Jersey Transportation Authority etc.)

## **Scheduling Best Practices**

(From the Scheduling Manual) In developing a schedule, three basic items make Capital Program Management scheduling work:

- Clearly defined activities
- Realistic durations
- Good logic

Other Best Practices include:

- Negative lags are not permitted.
- Do not use a Finish to Start relationship with a lag. An activity must be added to represent the lag time.
- A project shall have one beginning and one end. All activities shall have a predecessor and successor except the project's start and finish milestones. No "Open Ends" will be permitted.
- "Suspension of Dates" will not be permitted. An activity must be added.
- If an activity has a Start-to-Start relationship - it shall be closed with a Finish-to-Finish or Finish-to-Start relationship. (No open ends)
- The completion date of the Critical Path Method schedule shall be the completion date in Subsection 108.10 (Contract time) of the project's Special Provisions, which shall be input as a Finish Milestone with a Late Finish Constraint. If required, intermediate milestones (Interim Completion Dates) required in the Contract shall be shown in proper logical sequence and input as either the "Start-no-Earlier-Than" or "Finish-no-Later-Than" date. Mandatory Finish and Mandatory Starts shall not be used.
- When updating, all "Out of Sequence" activities shall be corrected to reflect the current construction operations.
- Original durations shall not be changed from the approved Baseline Schedule.

## **Standard coding items that should be reviewed**

As a means of monitoring progress schedules, the Department has developed with the Consultant and Construction industries, common coding structures and procedures to be utilized from Design through Construction. The latest standard coding items are included in the Primavera template.

Refer to the Scheduling Manual for a list of standard coding items the Construction Scheduling Engineer should consider when reviewing project schedules.

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