

SECTION 00 73 13 .10**SUPPLEMENT –****DFM - PROJECT SCHEDULING GUIDELINES**

The following provides supplemental direction on the establishment and maintenance of the Contractors construction and submittal schedules

Preliminary Schedule:**Initial Schedule.****Within 10 Days of the date of Award, the contractor shall submit a preliminary schedule**

The owner will use the initial schedule to monitor progress until the baseline schedule is accepted. Prepare and submit a schedule for the first 60 calendar days of work in accordance with subsections 3.1 and 3.2, plus a summary bar chart schedule for the balance of the project. Activity durations on the summary chart may not exceed 15 working days.

3. Schedule Submission Requirements.

Submit the following items:

3.1.1 A transmittal letter to the owner identifying which schedule in the database is being submitted for review .1 A narrative report

3.2 Preparing Schedule on Separate Database. If the schedule is prepared using Primavera Version 6.0, Primavera for Contractors, or some other software compatible with Primavera Version 6.0, then, for each schedule submission, submit the following items:

3.2.1 A transmittal letter

3.2.2 A narrative report

3.2.3 A Primavera Version 6.0 compatible electronic file of the schedule on a computer disc (CD)

3.2.4 The critical path in bar chart format (Longest Path sort)

3.2.5 Work paths with total float values within 20 workdays of the critical path's total float value in bar chart format. For example, if the critical path has a total float value of zero, then show all of the work paths with total float values of 20 or less.

3.2.6 An activity network diagram plotted in color, on E-size paper, with each sheet of the plot including a title, match data for diagram correlation, a page number, and a legend. The activity network diagram should only be submitted with schedules with revised relationships or activity durations.

3.2.7 A Predecessor/Successor report with the following items for each activity:

3.2.7.1 Activity ID and description

3.2.7.2 Original duration

3.2.7.3 Remaining duration

3.2.7.4 Calendar ID

3.2.7.5 Predecessors and Successors

3.2.7.6 Early start date

3.2.7.7 Early finish date

3.2.7.8 Late start date

3.2.7.9 Late finish date

3.2.7.10 Total float

3.2.7.11 Relationship type

3.2.7.12 Lags

3.2.7.13 Constraints

Baseline Schedule

The contractor shall submit a Baseline (Initial) CPM (Critical Path Method) Schedule for use in coordinating and monitoring the Work specified in the Contract documents.

The schedule will include activities for long lead and other major submittal/procurement/delivery items as well as activities for installing and constructing the specified Work. It will indicate the starting and finishing dates of all activities. The baseline schedule shall have 0 progress. The Data Date will be the date of the project's 'Commencement.' Once accepted, the Contractor shall adhere to the schedule with adjustments accepted in subsequent progress schedules. Updated (Progress) Schedules shall be submitted as directed by the Owner.

Purpose of Project Schedules

The Project Schedules shall be used for evaluating all issues related to time for this Contract. The Project Schedules shall be used by the Owner and Contractor for the following purposes as well as any other purpose where the issue of time is relevant:

- To communicate to the Owner the Contractor's current plan for carrying out the Work;
- To identify work paths that are critical to the timely completion of the Work,
- To identify upcoming activities on the critical path(s);
- To evaluate the best course of action for mitigating the impact of unforeseen events;
- As the basis for analyzing the time impact of changes in the Work,
- As a reference in determining the cost associated with increases or decreases in the Work;
- To identify and prioritize activities, for which the Owner is responsible;
- To document the actual progress of the Work;
- To integrate the Work with the operational requirements of the Owner's facilities;
- To schedule and coordinate interfaces with adjacent contracts;
- As a basis for determining valid acceleration plans; and
- To facilitate efforts to complete the Work in a timely manner.
- To validate contract requirements for the commissioning process have been incorporated by the contractor into the schedule

The Project Schedules provide a basis for Owner decisions that may impact the Work under this Contract. The Contractor shall submit schedule submittals in a timely manner. The Project Schedules shall at all times accurately reflect the Contractor's current plan for the Work and shall be updated as described in this specification and elsewhere in the project documents.

Baseline and Progress Schedule Submittals - All Progress Schedules shall be submitted as a complete package, including all supporting narrative, and reports as required. Incomplete packages will be considered not submitted

PROJECT SCHEDULING SOFTWARE

The Project Schedule shall employ the Critical Path Method (CPM) using retained logic for the planning, scheduling and reporting of the work to be performed under the Contract. The schedule will be produced utilizing any version of Oracle's Primavera Project Planning Software or any other software system fully transferable to any Oracle Primavera project planning and scheduling software system. The scheduling software used by the Contractor shall be fully capable of importing/exporting data to/from Oracle Primavera software. The proposed software shall be capable of transferring the information without degradation in the data, including, but not limited to, scheduling logic and sequencing, activities, durations, cost loading, calendars, etc. The type of schedule shall be PDM (Precedence Diagramming Method).

Along with a legible PDF rendition of the project's network, all schedules shall be submitted in CPM format (xer in Oracle's P6 Software) fully compatible with Oracle's P6 Software via email or flash drive as a single compressed database. If electronic submission is used, it is the Contractor's responsibility to verify that the documents submitted are in a format compatible with the Owner's and Architect's and that the submission has been received by the Owner and Architect.

SCHEDULING DEFINITIONS AND REQUIREMENTS

Activity Constraints - Activity Constraints can only be used if specified by the Contract or agreed to by the Owner. For example, if a Phase of the project must be completed by a specific date, that activity for completion of the Phase shall be "Constrained" to that date specified. The use of negative lags or the use of any other float suppression techniques is also prohibited from use in project schedules.

Activity Dates - Early and Late start and Finish dates of activities shall be calculated for each activity based upon the schedule data date, actual dates, % completes, schedule logic, schedule constraints, calendars, and original duration or remaining duration, in accordance with the scheduling parameters defined in this specification.

Activity Description - The activity description shall identify the unique scope of the activity. There shall not be any two activities with the same activity description. It shall not be necessary to investigate activity code assignments or logic relationships to identify the scope of an activity. For example, the description "POUR FOOTING" will not be acceptable; the description "POUR FOOTING RAMP RT-Sta. 42+00-42+50" will be acceptable. At the same time the Activity Description shall be concise enough so as to not require excessive column width in the Oracle Primavera P6 layout. The terms "Miscellaneous", or other vague adjectives shall not be used in an activity description. All activity descriptions shall include a verb. Activity descriptions shall not be modified, except at the direction or with the consent of the Owner.

Activity Duration - All activity durations shall be reflected in Calendar Days. Unless otherwise specified or approved, all construction activities shall have durations not exceeding 14 calendar days. The Contractor shall substantiate the need for specific activities having longer durations than stated herein. Once accepted, Original Durations of activities shall not be modified without explicit approval by the Owner.

Activity Identification - Each activity in the Project Schedules shall have an activity identifier (Activity ID). The Contractor shall utilize an Activity ID that is simple and allows space between existing activities

for the future addition of activities for continuing sort and display capability. The Activity ID of an existing activity shall not be modified or assigned to another activity. The scope of work for an activity shall not be substantially changed once the Baseline Schedule is accepted.

Activity Predecessors and Successors - Every activity shall have logically assigned predecessors and successors. The logical predecessors for each activity will be limited to those activities whose scope of work necessarily must be completed or, in some instances, started, in order to perform the current activity. Unless otherwise specified, Commencement/Notice To Proceed shall be the only activity in the Project Schedule without a predecessor. Unless otherwise specified, Contractual substantial completion shall be the only activity in the Project Schedule without a successor.

Activity Percent Complete - Activity percent complete shall be entered in the Project Schedule by the Contractor as appropriate to indicate activity progress and status as of the current Data Date for the update.

Activity Relationships - The schedule CPM logic for each activity shall be constructed in conformance with the following requirements:

- **Determine predecessors** - Activities that must be completed before the activity can start.
- **Determine parallel activities** - Activities that can occur concurrently with the activity.
- **Determine successors** - Activities that cannot start until the activity is complete.

Baseline Schedule - The Baseline Schedule comprises the plan and schedule that the Contractor intends to use to perform and complete the Work. Upon acceptance by the Owner, the Baseline Schedule shall be the schedule of record for the project until subsequent updated (progress) schedules are accepted by the Owner.

Calendars - Calendars shall be developed and assigned to each activity. All durations should be reflected in calendar days. A calendar that incorporates unanticipated adverse weather (see **Weather**) shall be assigned to activities that may be affected by adverse weather conditions. A calendar that incorporates a 7-day workweek shall be developed and assigned to appropriate activities (concrete cure, contractual substantial completion milestone, etc. Other calendars (including incorporation of Federal and State observed holidays) appropriate for the scoped contract work shall be developed and assigned to appropriate activities.

Critical Path - The Critical Path is defined as the longest continuous series of activities through the network to the Substantial Completion Deadline.

Critical Path Method (CPM) – The Critical Path Method (CPM) is a scheduling technique that utilizes activity durations and network logic to calculate the schedule for an entire project. A CPM schedule is a network-based schedule that graphically depicts the timing of activities, interrelationships between the activities, and the project critical path. Every project, regardless of size or complexity, has a critical path; however, only a critical path schedule identifies the critical path.

Written Narrative - A Narrative is a written document which provides an outline of the plan on which the schedule is based. This document is submitted along with any project Schedule and is used to communicate problems encountered throughout the progress period along with the overall plan to complete the remaining Work.

Data Date – The day after the date through which a schedule is current. Everything occurring earlier than the Data Date is “as-built” and everything on or after the Data Date is “planned”.

Milestone Activities - An activity with zero duration that typically represents a significant event, such as the beginning and end of a project, milestones set forth in the Contract, construction stages, a major work package, Substantial Completion Date and Final Completion Date.

Recovery Schedule – If at any point during the course of the project the Architect, Owner, or the Owner’s scheduling consultant determines that there is slippage in the Project finish forecast, Scope Addition, or Omission or a change in the Construction Methodology or Constructability method, the contractor may be required to produce a **Recovery Schedule** that reflects an adjustment in project durations, resources, or other methodology to show completion of the project within the required duration or completion date established. The Recovery Schedule shall have the same requirements for submission as that of the baseline schedule.

Schedule Progress Updates - Schedule Progress Updates are submitted monthly (or as directed by the Owner) by the Contractor to update the Current Baseline Schedule with status during the period of the update and to reflect the Contractor’s current plan for performing the remaining Work. Each Contractor’s Application for Payment must be accompanied by an approved Construction Schedule Update as precedent for payment.

1. Submission of any Schedule Updates must include all required documents. No partial schedule submissions will be acknowledged. The Date of the submittal and the start of the review will commence only after a complete submission is made to the Architect and copied to the Owner and the Owner’s Scheduling Consultant where applicable.
2. No new activity shall be added, nor shall any existing activity be modified in any schedule update to imply specific responsibility of delays or extensions to the associated duration of any tasks that have not been approved and documented in the form of an official Change Order to the contract.

Submittal and Procurement Activities – Activities detailing materiel submittals to include manufacturers product data, shop drawings, samples, etc. Provide a duration of at least 21 calendar days for activities required for review and approval of working drawings and materials by the Owner.

The Contractor shall include separate activities for each required submittal item in coordination with the Submittal Schedule. Activities shall be added for each to reflect:

1. **Contractor Submittal** - Early and late finish dates shall reflect the dates upon which the contractor must submit a complete submittal package to the Architect to avoid delay to successive activities.
2. **Architect Review and Approval** – This reflects the appropriate time frame for the review and approval of the submittal package. Duration as noted above should be no less than 21 calendar days.
3. **Order Materials/Equipment** – Reflects the dates that materials must be ordered to avoid delay to the project. Duration should reflect the appropriate lead time required as verified by the material and equipment suppliers
4. **Material/Equipment Delivered**. Reflects the dates required in order that the material is delivered to the site without delaying associated installation activities.

The Contractor's response to any Rejected Submittal requiring revision and resubmission is due within 3 days of the receipt of requirement for resubmission.

Total Float - Total Float (TF) for an activity shall be defined as the number of days from the Early Finish date (EF) to the Late Finish date (LF) of the activity. Total Float shall be calculated relative to the Contractual Substantial Completion Deadline. **Total Float is the difference between the schedule's finish date and the contract completion date.** Float is not for the exclusive use or benefit of either the Owner or the Contractor, but is an expiring resource available to all parties, acting in good faith, as needed to meet the Substantial Completion Deadline.

WBS – Work Breakdown Structure – is defined as “a deliverable-oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create the required deliverables.”

Weather – Depending on the type of work, some projects (or several activities in most projects) will be more apt to be affected by adverse weather conditions than others. The contractor shall prepare and submit a calendar that reflects the (5) year average of weather delays for each month based on NOAA (National Oceanic and Atmospheric Administration) or similar data acceptable to the Owner. After review of the historical data, and once the Owner and the Contractor agree on the (5) year average for each month, this calendar will act as the reference toward determining adverse weather delays to the project.

In the event the weather experienced at the project site during a particular month, surpasses the reflected (5) year historical average agreed upon for the similar month, the Contractor shall submit a time impact analysis reflecting the delays caused to critical path activities. If the weather delays reported by the contractor for the period exceed the average for the similar month as indicated in historical data, the Contractor may be granted a non-compensable time extension to account for those days impacted by the unusually severe weather. No time extensions will be granted for delays affecting activities not on the critical path.

WRITTEN NARRATIVES

Baseline Schedule Narrative

The Baseline Schedule narrative shall demonstrate a feasible approach to achieving the work as planned in the accompanying schedule. It should provide the following information:

1. Identification of the Data Date and schedule file name.
2. A description of the planned flow of work, identifying all key or driving resources.
3. A summary of planned labor utilization for the Contract.
4. A summary of planned equipment utilization for the Contract.
5. An explanation of how adverse weather conditions have been addressed in the Baseline Schedule.
6. The narrative shall address the Contractor's material procurement plan and identify the strategy for any long lead item(s).
7. The narrative shall indicate the sequence of contract required commissioning activities

Schedule Progress Update Narrative

Update submittal packages shall include a narrative containing the following information:

1. Identification of the update period, the Data Date, and the schedule file name.
2. Identification of activities with critical float that were planned to occur during the update period, of which did not occur or occurred later than the scheduled Late Start or Late Finish date, and

- an explanation of these delays.
3. Identification of delays occurring to activities taking place off the Project site, e.g., submittal preparation, fabrication, and delivery activities.
 4. A summary of planned labor utilization for the Contract.
 5. Revisions to logic or duration(s) by the Contractor: These revisions shall contain the following information:
 - a. Identification of the activities changed.
 - b. description of the scope of the logic change and identification of the advantages and disadvantages of implementing the change.
 - c. Identification of all driving resources, if any.
 - d. Identification of key constraints influencing the Contractor's approach to the Work.

Changes and Time Impact Analysis

The Contractor shall develop and submit a time impact analysis and a Proposed Schedule Update when one or more of the following conditions occur:

- a. The Contractor's plan for the Work as reflected in the Current Baseline Schedule is materially changed;
- b. The Owner has approved a Change Order that affects the Critical Path of the Work necessitating an adjustment in a Completion Deadline;
- c. The Contractor's progress on the Work is behind the Substantial Completion date by thirty (30) Days or more;
- d. In the Owner's opinion, the Current Baseline Schedule no longer accurately reflects the Contractor's plan for performing the Work;
- e. The Contractor is required by the Contract or chooses to submit a time impact analysis demonstrating entitlement to an adjustment to a Completion Deadline or to submit a plan demonstrating how the Contractor intends to recover delay; or
- f. Any allowable change has occurred according to the Contract.
- g. Unless otherwise agreed to by the Owner, Contractor's requests for additional cost and/or time associated with any change to the scope of work shall be submitted to the Owner within 7 days of the associated direction from the Owner or Architect. In accordance with State law, no work can proceed on any changed scope that would constitute an increase in cost or time prior to written approval by the owner including the associated increase to the contractors purchase order where additional cost is merited.
- h. With the exception of providing Actual Completion dates for activities, in any Schedule update or Time Impact Analysis, no new activities should be added, and no existing activities should be changed without prior submission, to and approval of the owner.
- i. Activities associated with time delays - All changes to activities in any schedule update or Time Impact Analysis shall be detailed, providing the activity number, name, and reference to the approval of the change or addition of the activity by the Owner in the narrative accompanying that schedule submission.
- j. No new activity shall be added, nor shall any existing activity be modified to imply specific responsibility of delays or extensions to the associated duration of any tasks that have not been approved and documented in the form of an official Change Order to the contract.

Contractor's Responsibility

It is the Contractor's responsibility to ensure that all Project Schedule documents comply with the requirements of the Contract. Errors in any Project Schedule document accepted by the

Owner, including but not limited to activity durations, relationships between activities, resource allocation or other float suppression techniques that do not accurately reflect the Work, may be identified at any time and once identified, shall be corrected by the Contractor. The Owner is not responsible for any erroneous assumptions or information in any Project Schedule document, regardless of origin.

Project Milestones - Unless specific milestones for this project are otherwise identified in the project documents, the Contractor shall prepare and submit for review and approval by the Owner/ Architect, individual milestones appropriate to identify key areas of the work.

The Owner and/or Architect may request additional milestones and/or activities be added in order to allow for efficient tracking of the work of the project.