

**SECTION 01 32 16**  
**CONSTRUCTION PROGRESS SCHEDULE**

PART 1 - GENERAL

1.1 SUMMARY

- A. The purpose of the Construction Progress Schedule is to allow the Lead Contractor's Scheduling Consultant to prepare an orderly plan to aid in the timely completion of the Project.
  - 1. For clarity, activities performed by the Lead Contractor's Scheduling Consultant are indicated as the responsibility of the Lead Contractor, who retains contractual responsibility for their timely completion.
- B. The approved Construction Schedule will be used to plan and execute the work, to measure the progress of the work, to aid in evaluating time extensions, and to provide the basis for all progress payments.
- C. Contractors must cooperate and coordinate with each other, and with the Associate and the Owner, to provide all Contract Document scheduling requirements in their respective schedules.
- D. Failure to maintain the Construction Schedule in an approved status may result in the Contracting Authority withholding a monetary penalty against the responsible Contractor(s) until the schedule is approved.
- E. Related Sections:
  - 1. General Conditions Paragraphs 4.3.

1.2 PROJECT SCHEDULING SEQUENCE REQUIREMENTS

- A. Upon receipt of a Notice to Proceed, the Lead Contractor will prepare a Construction Schedule for all work included under the scope of each Contract, in accordance with Subparagraph 4.3.1 of the General Conditions.
  - 1. The Lead Contractor will schedule and conduct a Schedule Kick-Off Meeting within two weeks of receipt of the Notice to Proceed. Contractors are required to attend.
    - a. The Lead Contractor will prepare and furnish to all contractors a Master Activity Coding template, in hard copy and disk, defining the Responsibility Code, Work Area Code, Milestones, Phase Code, etc. for the Construction Schedule, as outlined in this section. Contractors must submit subsequent schedule requirements in accordance with the Master Activity Code template to achieve continuity in merging scheduling input.
    - b. The Lead Contractor will prepare and distribute a schedule framework of proposed construction sequence to all Contractors.
  - 2. The Lead Contractor will prepare and furnish a detailed schedule framework, in hard copy and disk, to Contractors within 30 calendar days after the Notice to Proceed
    - a. Contractors must utilize the detailed schedule framework to prepare their Construction Schedule for their specific scope of work.

- b. The Lead Contractor will schedule and conduct a minimum of two Schedule Sequence Review Meetings with mandatory attendance by all Contractors to meet the Construction Schedule submission requirement within 60 calendar days after the Notice to Proceed is issued.
- B. Contractors must provide Construction Schedule requirements specified herein to the Lead Contractor so that they can prepare a fully coordinated Construction Schedule. The Lead Contractor must include in their bid and procure scheduling consultant services to meet these requirements, in accordance with the General Conditions.
  - C. The Lead Contractor will submit the proposed Construction Schedule with signatures indicating approval by all contractors to the Associate within 60 days of Notice to Proceed.
    1. If acceptable, the Associate and Contracting Authority will accept the schedule.
    2. If not acceptable, the schedule will be returned to the Lead Contractor for revision. The revised schedule, with approval signatures for all Contractors, must be resubmitted.

## PART 2 - PRODUCTS

### 2.1 SCHEDULE SOFTWARE

- A. The computer software utilized by the Lead Contractor to produce the project schedule will be Primavera Products as marketed by Primavera Systems, Inc. or an approved substitution.

## PART 3 - EXECUTION

### 3.1 CRITICAL PATH METHOD

- A. The Critical Path Method (CPM) of network calculations will be used to generate the schedule. The Lead Contractor must provide the schedule in either the Precedence Diagram Method (PDM) or the Arrow Diagram Method (ADM).

### 3.2 LEVEL OF DETAIL REQUIRED

- A. With the exception of the preliminary schedule submission, the Construction Schedule must include an appropriate level of detail. Failure of the Lead Contractor to develop or update the schedule or provide resource information will result in the disapproval of the schedule.
- B. Activity Durations:
  1. Submit the following data to support the schedule calendar as it relates to durations. Failure of the Lead Contractor to include this data will delay the review of the submittal until the Associate receives the missing data.
    - a. The proposed number of working days per week.
    - b. The holidays to be observed during the life of the contract (by day, month and year).
    - c. The planned number of shifts per day.
    - d. The number of hours per shift.

- e. Break up the work into activities of a duration no longer than 20 work days each, except as to non-construction activities (i.e., procurement of materials, delivery of equipment, concrete and asphalt curing) and any other activities for which the Owner may approve a longer duration.

C. Procurement Activities:

1. Prepare the schedule in chronological order of submittals. Show specification section of the submittal, name of contractor and generic description of work covered. Include activities to cover the complete procurement process to include but not limited to: submittal, review, approval, resubmittal, procurement, fabrication, delivery, permits, and similar pre-construction work.

D. Manpower:

1. Activities must have an estimate of the average number of workers per day that are expected to be used during the execution of the activity.
2. Identification of manpower, material, or equipment restrictions, as well as any activity requiring unusual shift work, such as two shifts per day, six day work week, specified overtime, or work at times other than regular days or hours must clearly be identified in the Project Schedule.
3. Critical or near Critical Paths resulting from the use of manpower or equipment restraints must be kept to a minimum. Near Critical Paths are defined as paths having 10 workdays or less of total float.

E. Cost:

1. All activities must be cost loaded in a logical manner tying to each Contractor's Schedule of Values.

F. Responsibility:

1. All activities must be identified in the Construction Schedule by the party responsible to perform the work. Responsibility includes, but is not limited to, the Contracting Firm, the Subcontracting Firm, Contractor Workforce, or Agency performing a given task. Activities must not belong to more than one responsible party. The responsible party for each activity must be identified by the Responsibility Code.

G. Work Areas:

1. Arrange the schedule to show each major area of construction for each major category or unit of work.
2. All activities must be identified in the Construction Schedule by the work area in which the activity occurs. Activities must not be allowed to cover more than one work area. The work area of each activity must be identified by the Work Area Code.

H. Modification or Claim Number:

1. Any activity that is added or changed by a change order or used to justify any claimed time, must be identified by change order code that changed the activity. Activities may not belong to more than one change order.

I. Milestones:

1. Milestone dates are defined in calendar days following the date set forth in the Notice to Proceed and are required to be met by all Contractors. Time is of the essence for the completion of Milestones and for the Contract Completion date.
2. The following Milestone dates are defined in calendar day from the Notice to Proceed, and are to be adhered to by each Contractor.
  - a. Milestone M1 – 70 calendar days for Contract Completion

### **3.3 SCHEDULED PROJECT COMPLETION**

#### **A. Project Start Date:**

1. The Construction Schedule may start no earlier than the date that the Notice to Proceed (NTP) was issued. The Lead Contractor must include as the first activity in the Construction Schedule an activity called "Notice to Proceed." The "Notice to Proceed" activity must have: an "ES (early start) constraint, a constraint date equal to the date that the NTP was issued, and a zero day duration.

#### **B. Constraint of Last Activity:**

1. Completion of the last activity in the schedule must be constrained by the contract completion date. Calculation on project updates must be such that if the early finish of the last activity falls after the contract completion date, then the float calculation must reflect a negative float on the Critical Path. The Lead Contractor must include as the last activity in the Project Schedule an activity called "Contract Complete". The "Contract Complete" activity must have a: "LF" (late finish) constraint, a constraint date equal to the completion date equal to the date identified in the NTP for the project, and a zero day duration.

### **3.4 INTERIM COMPLETION DATES (MILESTONES)**

- A. Contractually specified interim completion dates (Milestone dates) must also be constrained to show negative float if early finish date of the last activity in that phase falls after the interim completion date.

### **3.5 HAMMOCK ACTIVITIES FOR CONTRACTS**

- A. The Lead Contractor must include a hammock type activity for each Contractor. The Contractor activity must be logically tied to the earliest and latest activities in the Contractor's Scope of Work. Hammock activities must be identified within "HA" at the beginning of the Activity ID.

### **3.6 DEFAULT PROGRESS DATA DISALLOWED**

- A. Actual Start and Finish dates must not be automatically updated by default mechanisms that may be included in the CPM Scheduling Software Systems. Actual Start and Finish dates and Remaining Durations on the CPM Schedule must match those dates provided from Contractor Daily Reports for every in progress or completed activity and insure that the data contained on the Daily Reports is the sole basis for schedule updating. Failure to comply may result in the disapproval of schedule.

### **3.7 OUT OF SEQUENCE PROGRESS**

- A. Activities that have posted progress without predecessors being completed (Out of Sequence Progress) must be allowed only by the case by case approval of the Owner. The Associate may direct that changes in schedule logic be made to correct any or all Out of Sequence Work.

3.8 NEGATIVE LAG(S)

- A. Lag durations contained in the schedule must not have a negative value.

3.9 DEFINITION OF, AND CONDITIONS RELATING TO FLOAT

- A. Float is defined as the amount of time between the early start date and the late start date, or the early finish date and the late finish date, of any activity in the schedule. Total float is defined as the amount of time any given activity or path of activities may be delayed before it will affect the project completion time.
- B. Float is not time for the exclusive use or benefit of the Contractor, and must be used in the best interest of completing the project on time.
- C. Extensions of time for performance required under the General Conditions pertaining to equitable time adjustment will be granted only to the extent that the equitable time adjustment exceeds total float in the activity or path of activities affected at the time approval was issued for the change.
- D. Use of float suppression techniques such as preferential sequences, special lead/lag logic restraints, extended activity times, or imposed dates, other than as required by the Contract, must be cause for rejection of the Construction Schedule and any revisions or updates.

3.10 PRELIMINARY (90 DAY) CONSTRUCTION SCHEDULE SUBMISSION

- A. The preliminary Construction Schedule, defining the Contractor's planned operations for the first 90 calendar days must be submitted for approval within 30 calendar days after Notice to Proceed is issued. The approved preliminary schedule must be used for payment purposes and the basis for measuring Contractor progress not to exceed 90 days after Notice to Proceed is issued.
- B. Schedule Review and Comments
  - 1. Comments made by the Associate on the Construction Schedule during review must not relieve the Contractors from compliance with the requirements of the Contract Documents.
  - 2. Following the Contractor's receipt of the Associate's review comments, the Contractors must correct the schedule to identify missing activities and relationships relevant to the Scope of Work. No time extensions will be granted to complete activities not initially included in the Contractor's Construction Schedule.
  - 3. To the extent that there are any conflicts between the approved Construction Schedule and the requirements of the Contract Documents, the Contract Documents must govern.
- C. Resubmittal of Project Schedule Following Disapproval
  - 1. Should the Associate disapprove the Lead Contractors submission of the Construction Schedule, the Contractor must comply with the Associate's direction and must resubmit the Construction Schedule and all associated submittals within seven calendar days.
- D. Construction Schedule Submission Requirements
  - 1. The Final Construction Schedule must be submitted for approval within 60 calendar days after Notice to Proceed is issued. It must provide a reasonable sequence of activities which represent work through the entire project and a reasonable level of detail.

2. The Construction Schedule must show the sequence and interdependence of activities required for complete performance of the work, beginning with Contractor's receipt of the Notice to Proceed and concluding with the date of Final Completion of the Contract. The Project Schedule must show all activities in workdays, with allowance for holidays and the effects of normal weather conditions on outside work.
3. The Construction Schedule must comply with all limits imposed by the Scope of Work, with all contractually specified intermediate milestones and completion dates, and with all constraints, restraints, or sequences included in the Contract.
4. The Construction Schedule network (graphic presentations) and computer tabulations, the Resource Loading curve and the Contractor's signatures must be submitted to the Associate for approval in six copies. Additionally, the Lead Contractor must submit two copies of the Primavera Products data on 3-1/2 inch DS, HD computer diskettes, containing the resource loaded Construction Schedule.
5. The following computer generated reports in hard copy must be required as part of the Preliminary Construction and Final Construction Schedule submittals:
  - a. Activity ID Report
  - b. Total Float/Early Start Report
  - c. Logic Report
  - d. Resource Report
  - e. Coding Dictionary
6. The schedule network (graphic presentation) must include:
  - a. Activity ID
  - b. Activity Description
  - c. Original Durations
  - d. Remaining Durations
  - e. Early Start and Finish Dates
  - f. Baseline Start and Finish Dates
  - g. Total Float
  - h. Percent Complete
7. The schedule must be sorted by Early Start and Total Float and must show both the Early and Target Schedule.
8. The Owner must approve or disapprove, in writing, the Lead Contractor's submission of the Construction Schedule and the associate submittals within 14 calendar days after the receipt of all required information. If the Construction Schedule is disapproved, the Owner must provide comments in writing to the Lead Contractor stating the reasons why the submission was disapproved.

E. Periodic Schedule Updates

1. The following computer generated reports in hard copy and on computer diskettes must be required as a part of the monthly update thereof as a condition precedent to the receipt of progress payments under the Contract.
2. The Contractor's monthly narrative report is to include:
  - a. Activities started in the month (with actual start dates).
  - b. Activities completed during the month (with actual start and completion dates).
  - c. Activities in progress (with estimated remaining durations).
  - d. Activities scheduled to start in the next month (with estimated start dates).
  - e. A list of approved logic changes.
  - f. A list of proposed logic changes, new activities, and deleted activities.
  - g. Recommendations for adjusting the Construction Schedule to meet milestone completion and Contract completion dates (include why the schedule needs adjusting, i.e., change order, weather, contractor resources, etc.).
  - h. Attach copies of the Contractors' weekly schedule reports.
3. The Contractors graphic presentation of the schedule is to include:
  - a. Activity ID.
  - b. Activity Description.
  - c. Original Durations.
  - d. Remaining Durations.
  - e. Early Start and Finish Dates.
  - f. Baseline Start and Finish Dates.
  - g. Total Float.
  - h. Percent Complete.
  - i. The schedule must be sorted by Early Start and Total Float and should show both the early schedule and the target schedule.
4. One 3-1/2 inch data disk for the update must be provided.
5. Computer generated reports are to include:
  - a. Activity ID Report.
  - b. Total Float/Early Start Report.

- c. Logic Report.
- d. In Progress or Planned to Start Report.
- e. In Progress or Planned to Finish Report.
- f. Resource Report.

F. Two Week Look Ahead Schedule Submission

1. The Lead Contractor must provide a two week Look Ahead Schedule for review at the Weekly Progress/Coordination Meeting that occurs closest to the 15th of each month. The Look Ahead Schedule will be based on the most recent monthly update and will show only those activities that are scheduled to begin or are in progress during the week before and for two weeks after the 15th of the current month. The two week Look Ahead Schedule reports will contain the following information for each activity and will be required from the Contractor throughout the duration of the project unless directed otherwise by the Associate.
  - a. Activity I.D.
  - b. Activity Description
  - c. Original Duration
  - d. Remaining Duration
  - e. Early Start Date
  - f. Early Finish Date
  - g. Percent Complete
  - h. Total Float
  - i. Bar Graph Presentation

G. Standard Activity Coding Dictionary

1. The Lead Contractor must submit, with the Construction Schedule, a coding scheme that must be used throughout the project for all activity codes contained in the schedule. The coding scheme submitted must list the values for each activity code category and translate those values into project specific designations. For example, A Responsibility Code Value, "ELE", may be identified as "Electrical Subcontractor". Activity code values must represent the same information throughout the duration of the contract. Once approved with the Preliminary (first 90 calendar day) Project Schedule Submission, changes to the activity coding scheme must be approved by the Associate.

3.11 DATA DISKS

- A. One 3-1/2 inch data disk containing the preliminary, target and update Construction Schedules must be provided.
- B. File Medium:



1. Only the following industry standard 3-1/2 inch diskettes formatted using at minimum Windows 95 based operating system, are acceptable in order of preference: Double sided, high density, 1.44 megabytes; Double sided, double density, 720K bytes.

C. Disk Label:

1. The Lead Contractor must affix a permanent exterior label to each disk submitted. The label must indicate the type of schedule (preliminary, target, update or change), full contract number, project name, project location, data date, name and telephone number of person responsible for the schedule, and file name.

D. File Name:

1. The Lead Contractor must insure that each file submitted has a name related to the schedule data date, project name, or contract number. The Lead Contractor must develop a naming convention that will insure that the names of all the files submitted are unique. The Lead Contractor must submit the file naming convention to the Associate.

### 3.12 APPROVED CHANGES VERIFICATION

- A. Only Construction Schedule changes that have been previously approved by the Associate must be included in the schedule submission. The narrative report must specifically reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.
- B. The Contractor must prosecute the work in accordance with the approved Construction Schedule. Out of sequence construction, defined as a change from the Construction Schedule in the Contractor's actual operation requires prior approval from the Associate.
- C. Upon the approval of a change order or the issuance of a unilateral change order by the Department the agreed upon change order activities, activity durations, logic and impacts must be reflected in the next schedule submittal by the Lead Contractor.
- D. No change to the approved activities, original activity durations, logic, interdependencies, milestones, planned sequence of operations, or resource loading of the Construction Schedule must be made without prior approval from the Associate. If the Contractor desires to make a change to the approved Construction Schedule, the Contractor must request permission from the Associate in writing, stating the reasons for the change as well as the specifics, such as the proposed changes in activities, original activity durations, logic, interdependencies, milestones, planned sequence of operations, or resource loading of the baseline Construction Schedule. The Associate must respond within 14 calendar days after the receipt of the Contractor's request.
- E. If the Associate considers the Construction Schedule change requested by the Contractor to be a major change, it may require the Contractor to revise and submit for approval, without additional cost to the Owner, all of the affected portions of the network diagrams, and any schedule reports, or construction equipment reports deemed necessary to show the probable effect on the entire project. The proposed network revision and required reports must be submitted to the Associate within seven calendar days after the Associate notifies the Contractor that the requested revision is a major change. Only upon the approval of the requested change by the Associate may it be reflected in the next Construction Schedule update submitted by the Contractor.
- F. A change will be considered of a major nature if the time estimated for an activity or sequence of activities is varied from the original plan to the degree that there is reasonable doubt that the Contract Completion date or milestones will be met, or if the change impacts the work of other Contractors at the job site. Changes to activities having adequate float may be considered as minor changes, except

that an accumulation of minor changes may be considered a major change when such changes affect the Contract Completion date or milestones.

### 3.13 SCHEDULE REPORTS

- A. The format of each activity for the schedule reports listed below must contain:
1. Activity ID Number(s).
  2. Activity Description.
  3. Original Duration.
  4. Remaining Duration.
  5. Early Start Date.
  6. Early Finish Date.
  7. Baseline Start Date.
  8. Baseline Finish Date.
  9. Total Float.
  10. Actual Start and Actual Finish dates must be printed for those activities in progress or completed.
- B. Activity ID Report: A list of all activities sorted according to Activity ID number and then sorted according to Early Start Date. For completed activities the Actual Start Date must be used as the secondary sort.
- C. Logic Report: A list of preceding and succeeding activities for every activity in ascending order by activity number and then sorted according to Early Start Date. For completed activities the Actual Start Date must be used as the secondary sort.
- D. Total Float Report: A list of all activities sorted in ascending order of total float. Activities which have the same amount of total float must be listed in ascending order of Early Start Dates.

### 3.14 NETWORK DIAGRAM (GRAPHIC PRESENTATION)

- A. The network diagram is required on the preliminary, baseline and monthly schedule submissions. The network diagram must depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The Associate will use, but is not limited to, the following conditions to review compliance with this paragraph:
1. Continuous Flow: Diagrams must show a continuous flow from left to right. The Activity ID, description, original duration, remaining duration, early start and finish dates, target start and finish dates, total float and percent completed must be shown on the diagram.
  2. Project Milestone Dates: Dates must be shown on the diagram from start of any project, any contract required interim completion dates, and contract completion dates.
  3. Critical Path(s): The Critical Path(s) must be clearly shown.

4. Banding: Activities must be grouped to assist in the clear understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.

END OF SECTION 01 32 16