



SECTION 19 – CONTRACTOR’S CONSTRUCTION SCHEDULE AND REPORTS

19-1 PROGRESS OF THE WORK

It is expressly understood and agreed that the time of beginning, the rate of progress, and the time of completion of the Work are of the essence in this Contract. The Work shall be executed with such progress as required to prevent any delay to other contractors working on other contracts at the Site, the Contract milestones, the Contract Completion Date and approved Construction Schedule.

19-2 CONTRACTOR'S CONSTRUCTION SCHEDULER.

The Contractor is required to employ or retain the services of a Construction Scheduler, an individual other than the Contractor's Project Engineer. The Construction Scheduler shall have at least five (5) years of verifiable experience as the person primarily responsible for preparing and maintaining detailed Project schedules on projects of the same or similar size and nature as this Project. The Contractor shall submit the Construction Scheduler's background data to the Engineer at the Pre-Construction Scheduling Conference. The Construction Scheduler is required to attend all meetings pertaining to scheduling and progress of the Work, including weekly job meetings. If the Construction Scheduler leaves the employ of the Contractor, the Contractor will be required to fulfill the requirements of Subsection 19-2 within thirty (30) Days.

Within five (5) Days after the Notice of Award date, the Contractor shall provide a statement to the Engineer with the following:

- 1) Identification, qualifications, and experience of the Contractor's Construction Scheduler and all other members of the Contractor's scheduling staff.
- 2) References of not less than two (2) previous projects on which the Contractor's Construction Scheduler has utilized CPM scheduling.
- 3) A description of the Scheduling System to be utilized.

The Engineer reserves the right to disapprove any candidate or Scheduling System proposed for the Project. The Engineer reserves the right to remove, without rights to Work on the Project, any member of the Contractor's scheduling staff that is, in the Engineer's or Inspector's opinion, not performing scheduling work in accordance with the scheduling requirements.

19-3 GENERAL.

The scheduling method to be used shall be a Critical Path Method schedule in the form of an activity on node Precedence Diagram Network (PDN) with capabilities of identifying the critical path. The principles and definitions of the terms used herein shall be as set forth in the Associated General Contractors of America's publication "The Use of CPM in Construction,"



latest edition. To the extent there are any conflicts between the Associated General Contractors of America's publication and the Contract Documents, the Contract Documents shall govern.

The Contractor shall submit to the Engineer for approval, at the Pre-Construction Scheduling Conference, all of the following:

- 1) A Work Breakdown Structure.
- 2) The associated alphanumeric coding structure to implement the Work breakdown structure.
- 3) The activity identification system for labeling all Work activities.

The first code field shall designate the bid item. The second code field shall identify the type of activity. (Types of activities shall be defined as "submittal," "review/approval," "procurement/fabrication," "delivery," "construction/installation" or "Change Order.") The third code field shall identify which Specification Section the activity shall be paid under. The fourth code field shall identify who is responsible to perform the activity (e.g., Contractor, Subcontractor(s) by trade, Supplier, etc.). The fifth code field shall identify the area being worked in or the facility, if appropriate. The sixth code field shall identify the construction phase or Project element (if phasing of Work or Project elements are identified in the Contract.) All Change Orders and Notices of Non-Compliance shall be included as separate code fields.

The Contractor shall use the latest version of Primavera Project Planner (P3) for Windows, latest edition, and a hardware system commensurate with the size of the Project. This shall be referred to as the Scheduling System. The system shall be capable of handling, processing, printing, and plotting data to satisfy all requirements of these Contract Documents. The Contractor shall maintain the Scheduling System, the schedule, and the scheduling staff on Site or at a location approved by the Engineer.

Within fifteen (15) Days after the Notice to Proceed, the Contractor shall submit a separate submittal schedule listing all submittals required under the Contract. This schedule shall show when each submittal will be submitted.

[PE: The paragraph below is optional. Use to provide incentive for the Contractor to submit schedule. If used, delete "liquidated damages" paragraph in 19-9.]

[The Contractor will receive an additional incentive payment of \$_____ for the Baseline Construction Schedule and \$_____ amount per month for submitting monthly schedules that meet specified requirements. Schedules must be submitted in the time specified and must include the items listed in Section 19 each month or that month's incentive payment will be forfeited.]

19-4 PRE-CONSTRUCTION SCHEDULING CONFERENCE.



The Engineer will schedule and conduct a Pre-Construction Scheduling Conference with the Contractor's Project Manager, General Superintendent, and Construction Scheduler within seven (7) Days after the Notice of Award date, to commence development of the required Preliminary Construction Schedule. At this meeting, the requirements of this Section will be reviewed. The Contractor shall be prepared to review and discuss methodology for the schedule and sequence of operations plus cost, labor, and equipment-loading methodology.

19-5 CONTRACTOR'S PRELIMINARY CONSTRUCTION SCHEDULE.

Within seven (7) Days after the Pre-Construction Scheduling Conference, the Contractor shall submit to the Engineer the Preliminary Construction Schedule for the first ninety (90) Days of Work after the Notice to Proceed date, as well as a general approach for the remainder of the Work.

The Engineer, Inspector, Contractor and its Construction Scheduler shall meet within seven (7) Days after submittal of the Preliminary Construction Schedule to review and make any necessary adjustments or revisions. The Contractor shall submit the revised Preliminary Construction Schedule within five (5) Days after receiving comments. The Preliminary Construction Schedule, when revised, will represent the Contractor's planned means, methods, and sequences for performance of the Work during the first ninety (90) Days after the Notice to Proceed date and is to be incorporated as the first ninety (90) Days of the Contractor's Baseline Construction Schedule.

The Preliminary Construction Schedule shall include all resources assigned to each activity. Costs assigned will generally conform to the Contractor's bid item unit prices and/or such lump sum bid item breakdowns as the Inspector shall approve. The schedule of labor and costs shall be realistic and level, avoiding any unusual labor requirements.

The resultant Preliminary Construction Schedule, when approved by the Engineer, shall be the sole basis of partial or progress payments made for Work performed during the first ninety (90) Days after the Notice to Proceed.

Submittal and approval of the Preliminary Construction Schedule is a condition precedent to the issuance and payment of progress payments. Therefore, no construction Work will be permitted and no progress payments will be made until the Engineer has approved the Preliminary Construction Schedule.

The Preliminary Construction Schedule shall be updated monthly during the first ninety (90) Days after the Notice to Proceed date, as a part of the payment application process.

19-6 CONTRACTOR'S BASELINE CONSTRUCTION SCHEDULE.

Seven (7) Days after approval of the Preliminary Construction Schedule, the Engineer shall meet with the Contractor and its Construction Scheduler to receive an update on the progress in the



development of the Baseline Construction Schedule. The Contractor shall prepare and submit to the Engineer the Baseline Construction Schedule within fifteen (15) Days after approval of the Preliminary Construction Schedule.

The Baseline Construction Schedule shall show the sequence and interdependence of activities required for complete performance of the Work, beginning with the date of the Notice to Proceed and concluding with the Contract Completion Date shown in the Contract Documents.

Pursuant to the float sharing requirements of the Contract, use of float suppression techniques such as preferential sequencing, special lead/lag logic restraints, extended activity times or imposed dates shall be cause for rejection of the Baseline Construction Schedule and any revisions or updates. The use of float time disclosed or implied by the use of alternative float suppression techniques shall be shared as directed by the Engineer.

If the Contractor submits a Baseline Construction Schedule showing completion of the Work more than thirty (30) Days in advance of the Contract Completion Date, the Contractor agrees that the Agency may, at no cost to the Agency, decrease the Contract duration by issuance of a Change Order which will change the appropriate Milestone Date(s) and the Contract Completion Date to the completion date reflected on the Monthly Updated Project Schedule. Any approved schedule, revision, or update having an early completion date shall show the time between the early completion date and the current Contract Completion Date as "project float." Unless the Contractor can demonstrate that he/she bid the Project based upon the early completion schedule, the Agency will also deduct the home office and field overhead costs associated with the amount of time the Contract duration is decreased.

The Engineer will review and make comments on the Baseline Construction Schedule. Meetings will be held between the Engineer, the Contractor, Construction Scheduler and all major Subcontractors and Suppliers to resolve any conflicts between the Baseline Construction Schedule and the intent of the Contract. (The term "major Subcontractors and Suppliers" as used in this Section, shall include any Subcontractor or Supplier with five percent (5%) or more of the value of the Contract.) Other Subcontractor or Supplier representatives whom the Contractor may desire to invite or whom the Engineer may request, shall attend.

Comments made by the Engineer on the Baseline Construction Schedule, during review, will not relieve the Contractor from compliance with requirements of the Contract Documents. To the extent that there are any conflicts between the approved schedule and the requirements of the Contract Documents, the Contract Documents shall govern.

19-7 NETWORK DETAILS.

The Baseline Construction Schedule shall include time-scaled network diagrams, as well as computer tabulations. It shall be constructed to show the order in which the Contractor proposes to carry out the Work, to indicate restrictions of access and to show availability of Work areas, and availability and use of labor, materials and equipment. The Contractor shall utilize the



Baseline Construction Schedule in planning, scheduling, coordinating, and performing the Work under the Contract (including all activities of Subcontractors, equipment vendors, and Suppliers). The Contractor will provide the Engineer with written confirmation of the concurrence of all major Subcontractors and Suppliers with the Baseline Construction Schedule and all revisions and updates.

The following criteria shall form the basis for assembly of the schedule logic:

- 1) Which activity must be completed before a subsequent activity can be started?
- 2) Which activities can be done concurrently?
- 3) Which activity must be started immediately following a completed activity?
- 4) What major economic facility or labor restrictions are required for sequencing these activities?

The Baseline Construction Schedule shall provide the Engineer with a tool to monitor and follow the progress of all phases of the Work. The Baseline Construction Schedule submitted to the Engineer shall comply with all limits imposed by the scope of Work, with all contractually specified intermediate milestone and completion dates, and with all constraints, restraints or sequences included in the Contract. The degree of detail shall include factors to the satisfaction of the Engineer, including, but not limited to each of the following:

- 1) Physical and structural breakdown of the Project.
- 2) Contract milestones and completion dates, Substantial Completion dates, constraints, restraints, sequences of Work shown in the Contract, the planned Substantial Completion date, and the Contract Completion Date.
- 3) Type of Work to be performed, the sequences, and the labor trades involved.
- 4) All purchase, submittal, submittal review, manufacturing, test, delivery, and installation activities for all major materials and equipment, and a separate list of all major material items or items of equipment for which the Contractor intends to seek payment prior to installation.
- 5) Deliveries of Agency-furnished equipment and/or materials in accordance with the dates or schedule windows of such items set forth in the Contract or furnished by the Engineer.
- 6) Preparation, submittal, and approval of shop and/or working drawings, and material samples showing a thirty (30) Day minimum time specified for the Engineer's review of all submittals, or longer as identified in the Contract. The same time frame shall be allowed for at least one (1) resubmittal on all major submittals so identified in the Contract Documents.
- 7) Approvals required by regulatory agencies or other third parties.
- 8) Plans for all subcontract Work.
- 9) Assignment of responsibility for performing specific activities.
- 10) Access to and availability of work areas including all anticipated shutdowns.
- 11) Identification of interfaces and dependencies with preceding, concurrent and follow-on Contractors and utilities.
- 12) Resource loading for cost, labor, material, and equipment.



- 13) Actual tests, submission of test reports, and approval of test results.
- 14) All start up, testing, training, and assistance required under the Contract.
- 15) Planning for phased or total takeover by the Agency.
- 16) Punchlist and final cleanup.
- 17) Identification of any labor, material, or equipment restrictions, as well as any activity requiring unusual shift Work, such as two shifts, six (6) day weeks, specified overtime, or Work at times other than regular days or hours, shall be clearly identified in the Baseline Construction Schedule.

The activities included in the Baseline Construction Schedule shall be analyzed in detail to determine activity time durations in units of days. Durations shall be based on the labor (crafts), equipment, and materials required to perform each activity on a normal workday basis. No activity shall have a duration over fifteen (15) Days except non-construction activities such as submittals, submittal reviews, procurement and delivery of materials or equipment, and concrete curing. All construction activities shall be shown in their resource-loaded state to reflect cost, labor, materials and equipment except for those activities under Subsection 19-7. All durations shall be the result of definitive labor and resource planning by the Contractor to perform the Work according to the Contract Documents. The labor to be assigned by craft, definition, equipment, and bid item designation, shall be shown for each construction activity for the network on a tabular listing, and in information furnished in accordance with Subsections 19-16 and 19-17. All crafts necessary to execute an activity must be shown. No more than five (5) crafts may be assigned to a specific activity. If more crafts are required, then the activity in question must be broken down into additional activities.

The Contractor is required to use labor or equipment restraints, separately noted, to optimize and level labor and equipment requirements. Such resource leveling shall reflect a reasonable plan for accomplishing the Work. The individual activities involved may be sequenced within the limits of the available total float. However, when this leveling technique is used in establishing the initial schedule, it shall be reflected in the logic with restraints identified as "restraint for labor or equipment leveling purposes only." Critical or near critical paths resulting from the use of labor restraints shall be kept to a minimum. Near critical paths shall be defined as those paths having fifteen (15) Days or less of total float at the time of initial submission.

The estimated cost to perform each Work activity shall be noted for each activity in the network on a tabular listing. The sum of the costs assigned to all activities shall equal the Contract value. No activity costs shall be assigned to submittals or submittal reviews. The accepted cost-loaded Baseline Construction Schedule shall constitute the Schedule of Values from which monthly progress payments will be made in accordance with the provisions of Subsection 9-3.

The network diagram shall be prepared on (E) size sheets (twenty-eight [28] inches by forty [40] inches), shall have a title block in the lower right-hand corner, and a timeline on each page. Exceptions to the size of the network sheets and the use of computer graphics to generate the networks shall be subject to the approval of the Engineer.



All networks shall be drafted time scaled to show a continuous flow of information from left to right. The primary path(s) of criticality shall be clearly and graphically identified on the network(s).

As part of each update submission, the status of Work in progress shall also be similarly identified and the reported percent complete graphically indicated for each activity remaining in progress as of the last report period.

19-8 BASELINE CONSTRUCTION SCHEDULE.

The Baseline Construction Schedule submitted to the Engineer shall include the time scaled network diagram (for the full network of activities as well as the Master Summary Schedule described below). Network diagrams shall be based on early start and early finish dates of activities shown. The network diagrams submitted to the Engineer shall also be accompanied by a computer-generated mathematical analysis for each activity included in the Baseline Construction Schedule. Such mathematical analysis shall be submitted to the Engineer and shall include at a minimum, all of the following:

- 1) Activity number and description.
- 2) Predecessor and successor activity numbers and descriptions.
- 3) Activity code(s).
- 4) Schedule and actual/remaining duration for each activity.
- 5) Earliest start date (by calendar date).
- 6) Earliest finish date (by calendar date).
- 7) Actual start date (by calendar date).
- 8) Actual finish date (by calendar date).
- 9) Latest start date (by calendar date).
- 10) Latest finish date (by calendar date).
- 11) Float days.
- 12) Monetary value of each activity.
- 13) Percentage of activity completed and remaining duration for incomplete activities.
- 14) Cumulative value of Work completed, based on the Contractor's reported portion of activities completed and accepted.

The computer program(s) used in making the mathematical computation shall be capable of compiling the total dollar value of complete and partially complete activities. The program shall also be capable of accepting revised completion dates, as modified by approved time extensions, and re-computing all activity dates and float accordingly.

Each of the following computer outputs shall be required as part of the Baseline Construction Schedule submittal and each revision or Monthly Updated Construction Schedule thereafter as a condition precedent to receipt of progress payments:

- 1) Activity sort activity number (PDN) from lowest to highest.
- 2) Activity sort by the amount of total float, then in order of preceding event or activity number.
- 3) Activity sort by early start, for the next ninety (90) Days, then in order of



- preceding event or activity number.
- 4) Activity sort(s) by organizational responsibility including submittals to the Engineer for all items of material and equipment, the number of shifts, crew sizes of each craft, and construction equipment to accomplish the activity.
 - 5) A sublisting of materials and equipment sorted by Specification Section number. The sublisting of materials and equipment shall include the following activities: preparation of shop drawings, submittal to the Engineer, review by the Engineer, and fabrication, testing, and/or delivery of material and equipment which shall be interfaced with the earliest start date that the material or equipment is to be installed on the Project.

Outputs 1) and 2) above shall show all activities, including restraints, for the duration of the Project.

The Contractor shall also prepare and submit a time-scaled Master Summary Schedule on a single sheet that shows the total Project in approximately twenty-five (25) to one hundred (100) activities, as agreed to by the Contractor and the Engineer. This schedule will accurately summarize the current Baseline Construction Schedule and shall have common events for correlating the two levels of schedule indenture. All Contract milestones shall be shown. The Master Summary Schedule shall be updated monthly.

19-9 APPROVAL OF BASELINE CONSTRUCTION SCHEDULE.

The Contractor shall submit to the Engineer within fifteen (15) Days after approval of the Preliminary Construction Schedule, five (5) color printed copies of each of the following for approval:

- 1) Baseline Construction Schedule network diagram and Master Summary Schedules.
- 2) Computer tabulations (copies 8 ½" x 11" in size).
- 3) Labor Projections and Summary according to Subsection 19-16 (copies 8 ½" x 11" in size).
- 4) Cash Flow Projections and Summary according to Subsection 19-13 (copies 8 ½" x 11" in size).
- 5) Equipment Projections and Summary according to Subsection 19-17 (copies 8½" x 11" in size).
- 6) All required reports specified in Subsections 19-7 and 19-8.
- 7) Written confirmation of concurrence of all major trade Subcontractors and Suppliers.

The Contractor shall provide to the Engineer, two electronic copies on CD or 3½" DS, HD 1.44 Mb computer disk of all schedules and reports.



The Engineer shall approve or disapprove, in writing, the Contractor's submission within twenty-one (21) Days after receipt of all required information. The Preliminary Construction Schedule, once approved, becomes the Baseline Construction Schedule which shall be used for monitoring and evaluating all facets of Contract performance, including, but not limited to progress, changes, and delays.

The Contractor, the Contractor's Construction Scheduler, and all major Subcontractors and Suppliers shall be required to participate in all meetings necessary to reach mutual agreement and approval of the Baseline Construction Schedule, the Master Summary Schedule, the Labor Requirements Forecast, and the Cash Flow Projection.

The Contractor shall revise the schedule, as required by the Engineer, to reflect Project construction. If any of the required submissions are returned to the Contractor for corrections or revisions, they shall be resubmitted along with two (2) computer diskettes and five (5) printed copies of each change for approval within seven (7) Days after receipt. Resubmittals shall be as required in Subsection 19-9. Review and response by the Engineer shall be given within seven (7) Days after receipt of each new submission.

When submitting the Baseline Construction Schedule for approval, the Contract shall include in its letter of transmittal, any variances from the requirements of the Contract Documents. Otherwise, the Contractor will not be relieved of the responsibility for executing the Work in strict accordance with the requirements of the Contract Documents.

If the Contractor fails to submit the initial Baseline Construction Schedule, the Master Summary Schedule, the Labor Requirements Forecast, the Cash Flow Projection, major Subcontractor and Supplier confirmation in writing, or the computer diskettes, within the time prescribed, or revisions thereof within the required time, it is within the Engineer's discretion to stop the Contractor's Work at no additional cost to the Agency. Further, no mobilization progress payments shall be made until such time as the Contractor submits the required information and obtains approval of the Baseline Construction Schedule.

[PE: If scheduling incentive language in Section 19-3 will be used, delete paragraph below]

Failure of the Contractor to submit the Baseline Construction Schedule or any required resubmittals, in a timely, accurate manner and in accordance with the requirements of this Section will result in costs to the Agency. Therefore, the Contractor shall pay the Agency Liquidated Damages in the amount of \$[] per Day, for every Day the schedule submittal, revision, or resubmittal is late. This amount shall be subtracted from any monies due to the Contractor and shall be forfeited by the Contractor.

19-10 REVISIONS TO APPROVED BASELINE CONSTRUCTION SCHEDULE.



The Contractor shall prosecute the Work in accordance with the approved Baseline Construction Schedule. Out of sequence construction, defined as a change in the Baseline Construction Schedule, requires prior approval of the Engineer as defined below.

Upon approval of a Change Order, a Time and Materials (T&M) Change Order, or a Unilateral Change Order, the change shall be reflected in the next schedule submittal by the Contractor.

No change to the approved Baseline Construction Schedule shall be made without the prior written approval of the Engineer. If the Contractor desires to make a change to the approved Baseline Construction Schedule, the Contractor shall request permission from the Engineer in writing, stating the reasons for the change as well as the specifics, such as revisions to activities, logic, durations, etc. The Engineer will provide a response within seven (7) Days.

If the Engineer considers a schedule change to be of a major nature, the Engineer may require the Contractor to revise and submit for acceptance all of the affected portion(s) of the Baseline Construction Schedule and an analysis to show the effect on the entire Project. The proposed revision and analysis shall be submitted to the Engineer within fifteen (15) Days after the Engineer notifies the Contractor the revision is of a major nature. A change will be considered to be 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 will be met, or if the change impacts the Work of other contractors at the Site. Changes to activities having adequate float shall 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. (Activities that have adequate float are activities that are not critical after the change is made.)

Only upon approval of a change by the Engineer shall it be reflected in the next schedule update submitted by the Contractor.

19-11 SCHEDULE UPDATES AND PROGRESS PAYMENTS.

The initial Monthly Updated Construction Schedule shall be submitted within the first week after approval of the Baseline Detailed Project Schedule. The Contractor shall submit subsequent Monthly Updated Construction Schedules to the Engineer for review and approval, five (5) Days before the end of each month throughout the duration of the Project. All updated or revised schedules shall be submitted in the same detail as the Baseline Construction Schedule, unless modified in writing by the Engineer, and shall include written confirmation of the major Subcontractors and Suppliers. The updates shall be cost and resource loaded.

The Baseline Construction Schedule and computer tabulations shall be reviewed jointly by the Contractor's Project Manager and Construction Scheduler and representatives of all major Subcontractors and Suppliers at a joint monthly update meeting with the Engineer and the Inspector for the purpose of verifying all of the following:



- 1) Actual start dates.
- 2) Actual completion dates (when an activity is deemed substantially complete by the Engineer, then such activity will no longer be treated as an activity affecting the critical path or successor activities on the project).
- 3) Cost value of accepted Work reported in place.
- 4) Activity percent completion.
- 5) Incorporation of approved changes and approved time extensions.
- 6) Status of outstanding Notices of Non-Compliance.

The proposed update schedule prepared by the Contractor shall include all information available as of the cutoff date established by the Engineer. A detailed list of all proposed schedule changes (logic, duration, status, additions, and deletions) and revised histograms and tabular reports for labor and construction equipment as required by Subsections 19-16 and 19-17 shall be submitted with the update. Prior to the monthly update review meeting, the Contractor shall obtain from his/her Subcontractors, Suppliers, and staff the necessary information as required to reflect progress to date. A proposed Monthly Update Construction Schedule containing all of the information set forth below shall be available for review at the meeting:

- 1) For activities started and/or completed during the previous period: Actual start and actual completion dates, number of Days, number of shifts, crew sizes by craft, and construction equipment used to accomplish the activity.
- 2) For activities begun but not yet complete to date: number of shifts, crew sizes by craft, construction equipment required, remaining duration of the Work, and estimated completion date.
- 3) For activities not yet started: Estimated start dates, number of shifts, crew sizes by craft, construction equipment required, revised durations, and estimated completion dates, as necessary.
- 4) For authorized Change Orders: Revised activities, number of shifts, crew sizes by craft, construction equipment required, and durations, where required.
- 5) The Monthly Updated Construction Schedule shall be for the month preceding the meeting and for the remainder of the Project. The previous month's activities shall be reported as they actually took place and designated as actually complete, if actually completed, on the network diagram update.
- 6) Portions of the Monthly Updated Construction Schedule on which all activities are complete need not be reprinted and submitted in subsequent updates. However, the electronic disk file of the submitted Monthly Updated Construction Schedule and the related reports shall constitute a clear record of progress of the Work from the Notice to Proceed date to final completion.
- 7) The Contractor shall provide to the Engineer, printed copies of the Predecessor/Successor Report, a printed list of all changes made to the previously approved Monthly Updated Construction Schedule, and the Schedule Narrative Report.
- 8) The monthly submittal to the Engineer shall be accompanied by five bound copies of the Schedule Narrative Report. The Schedule Narrative Report shall describe



the physical progress during the report period, plans for continuing the Work during the forthcoming report period, actions planned to correct any negative float predictions, and an explanation of potential delays and/or problems and their estimated impact on performance and the Contract Completion Date. In addition, alternatives for possible schedule recovery to mitigate any potential delay and/or cost increases shall be included for consideration by the Engineer. The bound report shall follow the outline set forth below:

CONTRACTOR'S SCHEDULE NARRATIVE REPORT OUTLINE

- 1) Contractor's Transmittal Letter
- 2) Description of problem areas
- 3) Current and anticipated delays
 - a) Cause of the delay
 - b) Corrective action and schedule adjustments to correct the delay
 - c) Impact of the delay on other activities, milestones, and completion dates
- 4) Changes in construction sequences
- 5) Pending items and status thereof
 - a) Permits
 - b) Change Orders
 - c) Time extensions
 - d) Non-Compliance Notices
- 6) Contract Completion Date(s) status
 - a) Ahead of schedule and number of Days
 - b) Behind schedule and number of Days
- 7) Other Project or scheduling concerns including any shutdowns, duration of each shutdown, and analysis of any work to be performed during the shutdown period
- 8) Include reviewed and updated Monthly Updated Construction Schedule and Reports
- 9) Include revised Cost Loading and Cash Flow Information (Subsection 19-13)
- 10) Include revised labor information (Subsection 19-16)
- 11) Include revised construction equipment information (Subsection 19-17)

All network changes and status dates agreed to during each update meeting shall be considered as acceptable by all parties unless written notice of exception is given by an objecting party within three (3) Days after the update meeting. For major network changes that cannot be agreed to during an update meeting, the Contractor shall submit, in writing, such revisions for the Engineer's approval prior to inserting such changes into the Monthly Updated Construction Schedule. Submissions may be in the form of marked-up networks, fragments, or schedule abstracts provided they are submitted with a letter of transmittal. The submission and approval procedures for this information shall follow the same timetable described in Subsection 19-15.

Predicated on the results of the Engineer's review of monthly submissions of schedules and reports, the Contractor may be required to revise the Baseline Construction Schedule. Conditions under which a revision will be made are as follows:



- 1) When a delay in the completion of any Work item or sequence of Work items results in an indicated extension of the Contract Completion Date or interim milestone dates detailed herein by fifteen (15) Days or more.
- 2) When delays in submittals or deliveries or Work stoppages are encountered which make replanning, rescheduling, or resequencing of the Work necessary.
- 3) When the schedule does not represent the actual execution and progress of the Work.

Required revisions of the Monthly Updated Construction Schedules are due within five (5) Days of notice by the Engineer that a revision is required. All revisions and additions to the Baseline Construction Schedule are subject to the review of the Engineer. No changes are to be implemented in the schedule by the Contractor without the prior approval of the Engineer. When the proposed Monthly Updated Construction Schedule or its required revision is approved by the Engineer, it then becomes the Monthly Updated Construction Schedule. The current month's approved Monthly Updated Construction Schedule will be used for the period from which it is approved until its successor is submitted and approved.

Five (5) color copies of the final Schedule Narrative Report, the updated Baseline Construction Schedule (networks, and computer computations), the Master Summary Schedule, the Cash Flow Projection and Summary, the updated Monthly Updated Construction Schedule, updated computer disks reflecting the status of the Project agreed to at the updating meeting, and the Labor Projections and Summary shall be submitted to the Engineer within five (5) Days after each updating meeting in accordance with this Section.

The proposed Monthly Updated Construction Schedule shall show the activities or portions of activities completed during the reporting period and their total value as the basis for the Contractor's periodic request for payment. Payments made pursuant to Subsection 9-3, will be based on the total value of such activities completed or partially completed after verification by the Inspector. The report shall state the percentage of the Work actually completed and scheduled as of the report date and the progress along the critical path in terms of Days ahead or behind the allowable dates. If the Project is behind schedule, progress along other paths with negative float shall also be reported.

[PE: The paragraph below is optional. If used, delete the highlighted incentive language in 19-3 above.]

Failure of the Contractor to submit Monthly Updated Construction Schedule in a timely, accurate manner and in accordance with the requirements of this Section will result in costs to the Agency. Therefore, the Contractor shall pay the Agency Liquidated Damages in the amount of \$[] per day for every Day the submittal is late or not in full compliance with the requirements of this Section. This amount shall be deducted from any monies due to the Contractor, and forfeited by the Contractor. In addition to the Liquidated Damages, if the Contractor continues to fail to submit any of the update deliverables, or to meet any of the other updating requirements, for a period of thirty (30) Days or more beyond the required submittal



date, progress payments will be withheld until such time as the Contractor submits the required update requirements.

19-12 WEEKLY PROGRESS REPORTS.

Once each week, on a date established by the Engineer, the Contractor shall submit two progress schedules:

- 1) The first shall be a progress schedule listing the activities completed and in progress for the previous week and the activities scheduled for the succeeding two (2) weeks. The activity designations shall be consistent with the activity designations in the Monthly Updated Construction Schedule. A color bar chart shall be used to display the information in pictorial form.
- 2) The second shall be a utility work/access alteration report and a schedule listing the activities completed by activity designation from the Monthly Updated Construction Schedule and in progress for the previous week and the activities scheduled for the succeeding four (4) weeks. This report and schedule shall include all Work on utilities and equipment, as well as shutdowns and access alterations.

19-13 CASH FLOW PROJECTIONS AND SUMMARY.

With the Baseline Construction Schedule submittal, each Monthly Updated Construction Schedule, and subsequent revisions, the Contractor shall also submit a schedule of cost loading and cash flow to the Engineer. There shall be a strict correlation between the sum of individual activity costs and the total values indicated for Bid items. That is, each individual activity within the Detailed Project Schedule shall employ a code, which, in summary, attaches its cost, if any, to the appropriate Bid items. The sum of activity costs within a specific code, then, shall equal the cost of its corresponding Bid items and approved Change Orders.

Expected payment requests for each month shall be included with proposed Monthly Updated Construction Schedule, as well as the cumulative payment requests to date for each month of the Project. The net payment requests for each month and the cumulative payment requests to date shall also be shown after deducting retainage and any other monies withheld. The cash flow shall be shown in tabular format and in graphic format.

The Contractor, at the Pre-Construction Scheduling Conference, shall explain in detail the procedure to be used to develop the schedule activity cost loading and Cash Flow Projection and Summary. This procedure is subject to the review and approval of the Engineer and the Inspector. Receipt and approval of the schedule activity resource loading and Cash Flow Projection and Summary methodology is a condition precedent to the making of any payments under the Contract. Therefore, failure to submit an acceptable methodology and Cash Flow Projection and Summary shall be cause for withholding any progress payments due under this Contract.



In accordance with the updating procedures, when an activity is deemed substantially complete by the Engineer, then such activity will no longer be treated as an activity affecting the critical path or successor activities on the Project. The cost of correction of any punchlist items associated with substantially completed activities will be covered by withheld retention or other amounts deemed by the Engineer to be adequate to cover such costs.

19-14 RESPONSIBILITY OF COMPLETION.

Whenever it becomes apparent from a schedule review progress meeting or the current Monthly Updated Construction Schedule that any milestone date(s) or the Contract Completion Date will not be met, the Contractor shall take some or all of the following actions:

- 1) Increase construction labor in such quantities and crafts as shall substantially eliminate the backlog of Work and meet the current Contract Completion Date.
- 2) Increase the number of working hours per shift, the number of shifts per day, the number of Working Days per week, or the amount of construction equipment, or any combination of the foregoing sufficient to substantially eliminate the backlog of Work.
- 3) Reschedule Work items to achieve concurrent accomplishment of Work activities.

Prior to implementing any of the above actions, the Contractor shall notify and obtain approval from the Engineer. If such actions are approved, the Contractor shall incorporate the revisions into the next Monthly Updated Construction Schedule.

Under no circumstances will the addition of equipment or construction forces, increasing the working hours or any other method, manner, or procedure to return to the Contract Completion Date be considered justification for a Change Order or be treated as acceleration where the need for a recovery schedule has been caused by the Contractor and/or its Subcontractors or Suppliers, at any tier.

The Engineer may elect to withhold progress payments until the Contractor's progress indicates that the milestone date(s) and/or the Contract Completion Date will be met.

19-15 SCHEDULE TIME EXTENSIONS.

When Change Orders or delays are experienced by the Contractor and a time extension is requested, the Contractor shall submit to the Engineer, a written Time Impact Analysis illustrating the influence of each change or delay on the current Contract schedule Completion Date utilizing the approved Monthly Updated Construction Schedule. Each Time Impact Analysis shall include a fragnet demonstrating how the Contractor proposes to incorporate the Change Order or delay into the Monthly Updated Construction Schedule. A fragnet is defined as a sequence of new and/or activity revisions that are proposed to be added to the approved Baseline Construction Schedule or Monthly Updated Construction Schedule in effect at the time



the change or delay is encountered to demonstrate the influence of the delay and the method for incorporating the delay and its impact into the schedule as they are encountered.

Each Time Impact Analysis shall demonstrate the estimated time impact based on the date of the event, the date the proposed change and Change Order(s) were given to the Contractor, the status of construction at that point in time, and the event time computation of all activities affected by the change or delay and its impact on the Baseline Construction Schedule. The event times used in the Time Impact Analysis shall be those included in the latest update of the Monthly Updated Construction Schedule, in effect at the time the change or delay was encountered.

Time extensions will be granted only to the extent that equitable time adjustments for the activity or activities affected exceed the total or remaining float along the critical path of activities at the time of actual delay, or at the time the proposed change and Change Order(s) were issued. Float or slack time is not for the exclusive use or benefit of the Agency or the Contractor but is an expiring resource available to all parties as needed to meet Contract milestones and the Contract Completion Date. Time extensions shall not be granted nor delay damages paid until both of the following occur:

- 1) A delay occurs which is beyond the control and without the fault or negligence of the Contractor and its Subcontractors or Suppliers, at any tier.
- 2) The delay extends actual performance of the Work beyond the applicable current Contract Completion Date and the most recent date predicted for completion of the Project on the approved schedule update current as of the time of the delay or as of the time of issuance of the proposed change and Change Order(s).

Each Time Impact Analysis shall be submitted in triplicate, within fifteen (15) Days after a delay occurs, or issuance of the proposed change and Change Order(s). If the Contractor does not submit a Time Impact Analysis for a specific Change Order or delay within the specified period of time, the Contractor shall be deemed to have irrevocably waived any rights to additional time and cost.

Since float time within the Baseline Construction Schedule and Monthly Updated Construction Schedule is jointly owned it is acknowledged and agreed by the Contractor that Agency-caused delays on the Project may be offset by Agency-caused time savings (including, but not limited to: critical path submittals returned in less time than allowed for in the Contract, approval of Substitution requests which result in a savings of time along the critical path for the Contractor, etc.). In such an event the Contractor shall not be entitled to receive an extension of time or delay damages until all Agency-caused time savings are exceeded and the Contract Completion Date also exceeded.

Approval or rejection of each Time Impact Analysis by the Engineer shall be made within fifteen (15) Days after receipt of each Time Impact Analysis, unless subsequent meetings and negotiations are necessary. Upon approval, a copy of a Time Impact Analysis signed by the Engineer shall be returned to the Contractor for incorporation into the schedule.



Upon mutual agreement by both parties, fragments illustrating the influence of Change Orders and delays shall be incorporated into the Baseline Construction Schedule or Monthly Updated Construction Schedule during the first update after agreement is reached.

In the event the Contractor does not agree with the decision of the Engineer regarding the impact of a change or delay, it shall be resolved in accordance with Section 3.

19-16 LABOR PROJECTIONS AND SUMMARY.

The Contractor shall submit with the initial Baseline Construction Schedule a histogram depicting total Project craft labor and craft labor for its own forces and for each of its Subcontractors for each month. The histogram shall be based upon and shall be in substantive agreement with the number of shifts and crew sizes by craft in the Baseline Construction Schedule and shall be updated monthly and submitted with the monthly progress report. The update shall show actual labor for each month during the construction period to date and required labor for both base scope and Change Order Work each month necessary to complete all remaining activities, including Change Order Work, to insure timely Project completion.

19-17 EQUIPMENT PROJECTIONS AND SUMMARY.

The Contractor shall submit with the initial Baseline Construction Schedule a tabular report listing each major piece of construction equipment and each major piece of construction equipment for each of its Subcontractors for each month. Each major piece of the Contractor's and the Subcontractor's equipment shall be separately described, identified, and numbered in the report. The tabular report shall be based upon and in substantive agreement with the number of shifts and crew sizes by craft in the Baseline Construction Schedule and shall be updated monthly and submitted with the monthly progress report. The update shall show actual construction equipment for each month during the construction period to date and required construction equipment for each month necessary to complete all remaining activities, including Change Order Work, on the early finish date.

19-18 MEASUREMENT AND PAYMENT.

Submitting and maintaining the construction schedule and reports required under this specification is considered incidental to other bid items, and no separate payment will be made.

END OF SECTION 19



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