SP-150540
(New)

SPECIAL PROVISIONS
FOR
PROGRESS SCHEDULING (CRITICAL PATH METHOD)

JOHNSON COUNTY
NHS-080-6(329)239--11-52
NHS-080-6(332)239--11-52
NHS-080-6(336)239--11-52
NHS-080-6(339)239--11-52
NHS-080-6(342)239--11-52
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NHS-080-6(354)239--11-52
NHS-080-6(357)239--11-52
NHS-080-6(359)239--11-52
NHS-080-6(361)239--11-52
NHS-080-6(371)239--11-52
NHS-080-6(379)239--11-52
NHS-080-6(401)239--11-52
NHS-080-6(402)239--11-52
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Effective Date
July 30, 2019

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

150540.01 GENERAL.

A. Submit a Critical Path Method (CPM) Progress Schedule (Schedule) as described below for the Engineer's review before work can be started. Work shall not commence without a Baseline CPM schedule reviewed by the Engineer. The Engineer may authorize, at the Contractor's request, specific work items to begin prior to the approval of the Baseline Schedule.

B. No compensation will be allowed for working longer hours or using extra shifts; and working on weekends or during Holidays; working during winter months, etc. to meet the specified

Completion Date, except in cases of extra work approved by the Engineer that effects the controlling operation.

C. Prepare, revise, and update a detailed progress schedule based upon the Critical Path Method (CPM). Perform time impact analysis of the progress schedule based upon the various revisions and updates as they occur.

D. Use CPM Progress Schedule for coordination and monitoring of work under the contract including activities of subcontractors, vendors, and suppliers. Include in the Schedule provisions for traffic control, staging, and other events to complete the work. Use the Schedule to plan, organize, and execute the work; record and report actual performance and progress; and forecast remaining work.

120540.02 DEFINITIONS.

Cost Loading
The allocation of direct and indirect costs to each activity based on Iowa DOT bid items, utilizing the scheduling software's resources and cost accounting unless approved otherwise by the Engineer.

Critical Path
The longest continuous chain of activities in the CPM network from start of the project to the finish of the project. In general, a delay to an activity on the critical path could extend the scheduled completion date. The critical path shall be identified as the longest path as determined by the scheduling software when the definition of critical activities is set to "Longest Path."

Critical Path Method (CPM)
A network-based planning technique using activity durations and the relationships between activities to mathematically calculate a Schedule for the entire project.

Data Date
The date through which a Schedule is current. Everything occurring earlier than the data date is "as-built" and everything after the data date is "planned."

Float
The difference between the earliest and latest allowable start or finish times for an activity.

Early Dates
The early start dates and early finish dates, i.e., the dates each Activity will start and finish if each is started at the earliest end of the range of dates that the CPM Schedule indicates the Activities can be performed.

Late Dates
The late start dates and the late finish dates; i.e., the dates each Activity will start and finish if each is started at the latest end of the range of dates that the CPM Schedule indicates the Activities can be performed and still achieve the milestones and Contract Time.

Milestone
An event activity that has zero duration and is typically used to represent a point in time.

Near Critical Path
A chain of activities with total float exceeding that of the critical path but having no more than 10 days of total float.

Predecessor Activity
An activity, which precedes another activity (to which it is logically tied) in the network. Each schedule activity except the project start milestone shall have a logical predecessor.

Successor Activity
An activity, which follows another activity (to which it is logically tied) in the network. Each schedule activity except the project completion milestone shall have a logical successor.

Total Float
Number of working days by which a part of the Work in the Progress Schedule may be delayed from its Early Dates without necessarily extending the Contract Time.

150540.03 SUBMITTAL OF A CPM PROGRESS SCHEDULE.

A. Submitting Baseline CPM Progress Schedule.
Submit a baseline CPM progress schedule to the Engineer within 30 calendar days of the award of the Contract and at least 5 calendar days prior to the preconstruction conference.

B. Submittal Format
Submit CPM progress schedule (baseline, revision, update or recovery) for review via e-Builder, according to Article 1105.03, E, 2, a, of the Standard Specifications. In addition to the PDF submittal file specified, also submit an electronic copy of the Schedule in a format reviewable by the Engineer.

C. Compliance with Intended Work.
Upon receipt of CPM progress schedule, the Engineer will review for compliance with the intended work and other requirements specified in the contract documents.

D. Review Process.

1. The Engineer will notify the Contractor in writing, within 14 calendar days after receiving any Schedule submittal (baseline, revision, update or recovery) or resubmittal, if the schedule is accepted or if any corrections or revisions are required. If corrections or revisions are required to the submitted CPM progress schedule, submit the revised Schedule to the Engineer within 7 calendar days after receiving the Engineer's request for corrections or revisions.

2. Submittals required to be revised and resubmitted shall have revisions clouded or annotated to designate revisions. Resubmittals made in accordance with this provision will have a review time as stated above. Resubmittals not in accordance with this provision will be allowed a review time of 30 calendar days.

3. Baseline Schedule resubmittal in response to the Engineer's initial review shall be 7 or more calendar days prior to the preconstruction conference. When Baseline Schedule is accepted it will be designated as the "Schedule" and only be changed as specified below.

150540.04 REQUIREMENTS FOR THE CPM PROGRESS SCHEDULE.

Develop Schedule using latest edition of Primavera project management software, published by Primavera Systems, Inc. or similar software that is compatible with the latest edition of Primavera project management software and approved by the Engineer. Submit the Schedule as a Gantt chart with a tabular data report for each activity and accompanied by a narrative report.

A. Format.
Ensure electronic schedule format contains the following:

- Project Name.
- Template: Construction.
- Type and edition of software.
- Planning Unit: Days (calendar or working).
- Number/Version: Original or update number.
- Start Date of contract work.
- Milestone Completion Date(s) as specified in contract documents.
- Project Title: Contract number.
- Company Name: Contractor's name.
- Submittal date.
- Data date.
- Page number.

B. Calendars for Completion Date Contracts.

Ensure base calendar shows proposed working days of the week and proposed number of work hours per day.

C. Schedule Development.

1. Incorporate entire contract time in the detailed schedule. Construction time, as determined by the CPM progress schedule, for the entire contact or any milestone shall not exceed the specified contract period. The minimum number of activities shown on the schedule shall represent the work incorporating bid items whose aggregate contract value constitutes 80% of the total contract value. These bid items shall be determined by starting with the bid item with the largest individual contract value and adding subsequent bid item contract values in descending order until 80% of the contract value has been attained. Additional activities required to complete the contract beyond 95% and any additional activities required to maintain continuity of the schedule logic shall also be shown.

2. Schedule shall exclusively use Finish-to-Start (FS) relationships. Do not use activity constraints without approval of the Engineer. Lead or lag duration between schedule activities should be avoided and any employed shall be brought to the attention of the Engineer in the narrative.

3. Incorporate in the Schedule critical closure periods and limitations of operations specified in the contract documents.

4. Work requiring coordination of work in another contract shall be scheduled in cooperation with the other Contractor(s). All such interdependent work items shall be identified on the Schedule. Approval of any submittal of the CPM progress schedule will be contingent upon interdependent work items being appropriately coordinated.

5. In cases where interdependent contracts are awarded at different times, parts of the CPM progress schedule of the first contract that include work that is interdependent with an adjacent project or contract that will be awarded later, will be given conditional approval based on the Engineer's judgment. The CPM progress schedule of the first contract shall be reviewed in conjunction with the CPM progress schedule of the second contract, at the time when the CPM Schedule of the second contract is being developed, and revised as necessary, based on cooperative effort between the Contractors. The revised CPM progress schedule shall be submitted to the Engineer for approval. CPM progress schedule updates and revisions throughout the duration of the contract shall be coordinated with the CPM progress schedules of all adjacent contracts with interdependent work.

D. Schedule Presentation - Gantt Chart.

1. Include the following for each activity in the graphic part of the Schedule in Gantt chart format:
   a. Activity Identification (ID) Numbers. Utilize numerical designations to identify each activity. Numbering of activities shall be in increments of not less than ten digits.
   b. A description of the work represented by the activity (maximum 45 characters). The use of descriptions referring to a percentage of a multi-element item (i.e., construct deck 50%) shall not be used. Separate activities shall be included to represent different elements of multi-element items (i.e., forms, reinforcing, concrete, etc.). Multiple activities with the same work description shall include a location as part of the description.
   c. Show proposed activity duration in whole days. Provide production rates to justify the activity duration. Schedule duration shall be contiguous and not interruptible.
   d. The sequence and interdependence of activities required for the prosecution of the work. The schedule logic shall not be violated.
   e. The critical path to milestone and contract completion. Only one controlling item shall be designated at any point in time on the schedule.

2. Break activities down such that each activity encompasses a single operation or tightly-integrated operations in a single, contiguous and continuous area of the project. Each activity shall have a duration of not more than 20 working days, except for non-work type activities such as mobilization, settlement durations, or submittal preparation, unless otherwise approved by the Engineer.

3. Include dates for the following:
   a. Starting and completing the various stages of the work, including milestones identified in the contract document.
   b. Placing material orders, delivery of materials and equipment.
   c. Preparation, submittal and approval of all required submittals to the Contracting Authority
   d. Interdependent activities performed by other Contractors.
   e. All work activities and field construction operations.
   f. Equipment installation, testing and balancing.

4. Calculate total Float as finish float. Calculate the schedule using retained logic. Do not sequester float by calendar manipulations or extended duration. Float is not for the exclusive use or benefit of either the Department or Contractor. Define critical activity for total float less than or equal to “0”.

5. Include a legend with every CPM progress schedule defining all abbreviations, terms, or symbols used.

E. Schedule Presentation - Tabular Data Reports.

1. A tabular data report is required with each progress schedule submittal and may be printed on the same pages as the Gantt chart.

2. The heading of each tabular data report, if not printed on the same pages as the Gantt chart, shall include, but not be limited to, the project name, contract number, Contractor name, report (submittal) date, data date, report title and page number.

3. Each of the tabular reports shall contain the following minimum information for each activity.
   - Activity ID.
   - Activity Description.
   - Original Duration (calendar day/working day).

- Remaining Duration (calendar day/working day).
- Intended production rate.
- Start Date.
- Finish Date.
- Percent Complete.
- Total Float.
- Calendar ID.
- Subcontractor identity if activity is performed by a subcontractor.

F. Narrative Report.
Prepare a written narrative report to be included in each CPM progress schedule submittal.

1. Baseline Narrative.
Ensure the narrative report submitted with the baseline Schedule includes the following:
a. Description of the critical path.
b. Identification of potential problem areas.
c. Proposed solutions to potential problems.
d. Detailed description of the approach to weather days, including an estimated number of weather days for each month of the contract, and an explanation of how they are incorporated in the Schedule. A weather day is defined as a day when adverse weather including rain, snow, wind, flood, extreme heat, and the results thereof, such as inaccessibility or non-workability of materials, do not allow productive work on the critical path, if that work would otherwise be performed on that day. Adverse weather days will not be considered justification for an extension of the contract time and thus must be planned for.

2. Update Narrative.
Ensure the narrative report submitted with each updated Schedule highlights progress during the past update period. This written report shall include the following:
a. Summary of work accomplished during past update period.
b. Contract milestone comparison chart, if applicable.
c. Analysis of critical path.
d. Analysis of time lost/gained during the update period.
e. Identification of problem areas.
f. Recommended solutions to current problems.
g. Actual number of weather days during the update period compared to the baseline estimate. Documentation of weather days is for information only, and shall not be considered as justification for an extension of the contract time.

3. Recovery or Revision Narrative.
Ensure the narrative report submitted with any Recovery or Revised Schedule explains the reason(s) for changes and how submitted changes address the reason(s). This written report shall include the following:
a. Summary reason(s) for the Recovery or Revised Schedule.
b. Contract milestone comparison chart, if applicable.
c. Analysis of critical path.
d. Summary of how the Recovery or Revised CPM progress schedule resolves the issues/reasons requiring the submittal.

150540.05 USE OF CPM PROGRESS SCHEDULE IN CONSTRUCTION OPERATIONS.

A. Deviation from the accepted Schedule by not following the logical sequence of the critical path will result in progress payments being withheld for bid items for affected activities until a revised

Schedule is submitted and accepted by the Engineer.

B. Updates.
Submit updated Schedule monthly by the 7th calendar day of the month and use the 1st of the month as the data date.

1. Plot updates against the Accepted Schedule. Do not make changes to original duration, activity relationships, constraints or costs, and do not add or delete activities, or alter Baseline Schedule's logic when updating Schedule.

2. Include with the updated information the original schedule detail and the following:
- **a.** Actual start dates
- **b.** Actual finish dates
- **c.** Activity percent completion
- **d.** Remaining duration of activities in progress
- **e.** Identified or highlighted critical activities

3. The Engineer will withhold all progress payments if scheduled updates are not submitted as required.

4. Upon receipt of the updated Schedule, the Engineer will review Schedule for conformance with the contract documents and degree of detail. The Engineer, within 14 calendar days after receipt of updated Schedule and supporting documents, will accept or reject it with written comments. If the updated Schedule is rejected, submit a revised updated Schedule within 7 calendar days after the date of rejection.

5. The updated Schedule shall accurately represent the project's current status.

C. Three-Week Look-Ahead Schedules

1. During construction include with each submittal a Three-Week Look-Ahead Schedule including the following:
- **a.** Activities underway and as-built dates for the past period.
- **b.** Actual dates for completed activities through final acceptance for the contract.
- **c.** Planned work for the upcoming period, including all planned closures.
- **d.** Specifically call out work having the potential to impact the railroad right-of-way including work over the railroad or equipment operating outside the right-of-way.
- **e.** Activities underway and upcoming submittals based on the CPM Schedule.
- **f.** Details on other activities not represented on the CPM Schedule

D. Revisions.
Revisions to Baseline Schedule may be initiated by a proposal by the Contractor or by direction from the Engineer.

1. Contractor Changes to the Baseline Schedule.
Comply with the following requirements regarding proposed changes to Baseline Schedule:
- **a.** If Contractor proposes changes in Baseline Schedule, notify Engineer in writing, stating reasons for the change, identifying each changed activity (including duration and interrelationships between activities) and providing a submittal including compact discs and printed copies of the proposed revised schedule. Every effort shall be made to retain the original Activity ID numbers.
- **b.** The Engineer may accept or reject the proposed change(s) in the Baseline Schedule and will do so in writing within 14 calendar days following receipt of the submittal. If the Engineer accepts the change in Baseline Schedule, all future monthly updates shall be plotted against the new Baseline Schedule.

c. If the Engineer accepts a portion of the change to the Baseline Schedule, submit a revised schedule incorporating such change(s) within 7 calendar days following the partial approval along with a written description of change(s) to the Schedule.

2. Engineer Changes to the Baseline Schedule.

a. The Engineer may direct the accepted Baseline Schedule be revised. Reasons for such direction are limited to the following:
(1) changes in work,
(2) re-phasing the project or any phase,
(3) a change in duration of the project or phase, and
(4) acceleration of project or phase.

b. The Engineer will direct Contractor to provide a revised Schedule in writing.

c. Submit revised Schedule within 10 calendar days of receipt of the Engineer's written direction.

d. The Engineer may accept or reject the revised Schedule and will do so in writing within 14 calendar days following receipt of the submittal. If the Engineer accepts the revised Schedule, such schedule will be designated the new "Baseline Schedule".

e. If the Engineer accepts a portion of the change to the Baseline Schedule, submit a revised schedule incorporating such change(s) within 7 calendar days following the partial approval along with a written description of change(s) to the schedule.

E. Recovery.

1. Maintain adequate labor, equipment, and materials to meet Baseline Schedule. If Engineer is of the judgement the Contractor is failing to meet the Baseline Schedule, including any Contract milestones, the Engineer will direct Contractor, in writing, to submit a Recovery Schedule.

2. Submit Recovery Schedule within 10 calendar days of receipt of Engineer's written direction.

3. Recovery Schedule shall set forth a plan to eliminate the schedule slippage (negative float). The plan shall be specific to show methods to achieve recovery of time, i.e. increasing staffing, working overtime, weekend work, or employing multiple shifts. Costs associated with implementing Recovery Schedule shall be borne by Contractor.

4. Upon receipt of Recovery Schedule, Engineer will review the Schedule for conformance with the contract documents and degree of detail. The Engineer may accept or reject the Recovery Schedule with written comments within 14 calendar days of receipt of the Recovery Schedule. If the Engineer accepts the Recovery Schedule, such schedule will be designated the new Baseline Schedule.

5. If the Recovery Schedule is rejected, submit a revised Recovery Schedule within 7 calendar days of the date of rejection.

F. Acceptance or approval of any progress schedule by the Engineer shall not be construed to imply approval of any method of construction, sequence of construction, or implied or stated rate of production. Acceptance will not act as a waiver of the obligation to complete the work in accordance with the contract documents, modify rights or obligations of the Contracting Authority as set forth in the Contract, or imply obligation of a third party. Acceptance shall not be construed to modify or amend the contract or the time limit(s). Acceptance shall not relieve Contractor of responsibility for accuracy of information included on the schedule. Failure to include in the schedule any element of work required for the performance of the Contract, any sequence of work required by the Contract, or any known or anticipated condition affecting the work shall not excuse the Contractor from completing all work required within the time limit(s) specified in the

Contract notwithstanding acceptance of the Schedule by the Engineer.

150540.06 METHOD OF MEASUREMENT AND BASIS OF PAYMENT.

The cost of preparing, updating and revising the CPM Progress Schedule shall be included in the bid item Progress Scheduling (Critical Path Method).