PN 107 - 10/19/2018 - CRITICAL PATH METHOD PROGRESS SCHEDULE FOR MULTI-SEASON PROJECTS

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A. General. The progress schedule required for this project is the critical path method schedule (CPM schedule). The Contractor shall designate a Schedule Representative who shall be responsible for coordinating with the Engineer during the preparation and maintenance of the schedule. The requirements of this note replace the progress schedule requirements in 108.03 of the Construction & Material Specifications. The contractor shall submit an interim schedule followed by a baseline schedule, or only a baseline schedule, depending on when the contractor starts work as described below.

B. Interim Schedule. If the Contractor starts work within 60 days of execution of the contract, they shall submit an interim schedule. The interim schedule should be in CPM schedule format. The interim schedule shall include detailed activities for the work to be accomplished during the first 90 days of

the Contract, and summary activities for the balance of the work. Include in the interim schedule columns for Activity ID, Activity Description, Original Duration, Remaining Duration, Total Float, Start Date, Finish Date, and Calendar ID.

C. Baseline Schedule. The Contractor shall submit a baseline schedule within 60 days of the execution of the Contract. The baseline schedule will be in CPM schedule format and as described below. The Engineer will review the baseline schedule and will either "approve", "approve as noted" or "reject" the schedule within 21 days of receipt. If the Engineer does not provide written notification regarding the disposition of the baseline schedule within 21 days, the submission will be considered approved.

For baseline schedules that are "approved as noted", the Contractor shall make the necessary revisions and resubmit the revised schedule within 14 days. The Engineer will only reject baseline schedules that are not in compliance with contract requirements.

For baseline schedules that are "rejected", the Engineer shall indicate in writing all portions of the schedule that are not in compliance with the contract requirements. The Project Engineer shall conduct a mandatory meeting with the Contractor and the Contractor's Schedule Representative within 14 days of the Engineer's written notice. The purpose of this meeting is to resolve all issues with the baseline schedule. At this meeting the Contractor shall provide clarification and all requested information necessary for the Engineer to "approve" the baseline schedule.

In the event the baseline schedule is not "approved" within 120 days of execution of the contract, all work shall cease on the project until the baseline schedule is "approved".

Approval of the baseline schedule does not revise the Contract Documents. The baseline schedule must be "approved" or "approved as noted" by the Engineer prior to the Engineer evaluating any contractor claims associated with time impacts.

1. **Schedule Requirements.** Submit an .xer or .xml file (to be determined by the Engineer) prepared in Primavera software manufactured by Oracle. The Department will "Import" or accept progress schedule files from the Contractor. All Calendars assigned to activities must be project level Calendars not Global or Resource Calendars; all Activity Codes shall be project level and not Global or EPS level Activity Codes; no Resources shall be assigned to activities, and no Project Codes shall be assigned.

Table 1 – Schedule Filename Convention			
Progress Schedule	**1st Submission**	**2nd Submission**	**3rd Submission**
Interim Schedule	YYPPPP01IS	YYPPPP02IS	YYPPPP03IS
Baseline Schedule	YYPPPP01B	YYPPPP02B	YYPPPP03B
Schedule Update #1	YYPPPP01SU01	YYPPPP02SU01	YYPPPP03SU01
Schedule Update #2	YYPPPP01SU02	YYPPPP02SU02	YYPPPP03SU02
Delay Analysis	YYPPPP01TIA01	YYPPPP02TIA01	YYPPPP03TIA01
Weather Delay Analysis	YYPPPP01WD01	YYPPPP02WD01	YYPPPP03WD01
Recovery Schedule	YYPPPP01RS01	YYPPPP02RS01	YYPPPP03RS01

YY – Project Year   PPPP – Project Number

Provide a working day schedule that shows the various activities of work in sufficient detail to demonstrate a reasonable and workable plan to complete the Project by the Original Contract Completion Date. Show the order and interdependence of activities and the sequence for accomplishing the work. Describe all activities in sufficient detail so that the Engineer can readily identify the work and measure the progress of each activity. The baseline schedule must reflect the scope of work, required phasing, maintenance of traffic requirements, interim completion dates, the Completion Date, and other project milestones established in the Contract Documents. Include activities for submittals, working drawings, shop drawing preparation, submittal review time for the Department shop drawings, material procurement and fabrication, and the delivery of materials, plant, and equipment, and other similar activities.

The Contractor shall be responsible for assuring all work, including all subcontractor work, is included in the schedule. The Contractor shall be responsible for assuring that all work sequences are logical and that the schedule indicates a coordinated plan.

Failure by the Contractor to include any element of work required for performance of the Contract shall not excuse the Contractor from completing all work within the required time. The Engineer's review of the baseline schedule will be for compliance with the specifications and contract requirements. Approval by the Engineer will not relieve the Contractor of any of their responsibilities for the accuracy or feasibility of the schedule. Omissions and errors will be corrected as described in Section F or I in this note and will not affect contract time.

a) Administrative Identifier Information:

    i. Project Number

    ii. County

    iii. Route Number

    iv. FHWA Number

    v. PID Number

    vi. Contract Signed Date

    vii. Completion Date

    viii. Contractor's Name

    ix. Contractor's Dated Signature

    x. ODOT's Dated Approval Signature

b) Project Activities:

    i. Activity Identification (ID). Assign each activity a unique identification number. Activity ID length shall not exceed 10 characters. Once accepted, the Activity ID shall be used for the duration of the project.

    ii. Activity Name. Each activity shall have a narrative description consisting of a verb or work function (e.g.; form, pour, excavate) and an object (e.g.; slab, footing, underdrain). Do not include commas in the narrative description.

    iii. Activity Original Duration. Assign a planned duration in working days for each activity. Do not exceed a duration of 20 working days for any construction activity, unless approved by the Engineer. Activity durations will be in whole days, do not include decimals in the durations. Do not represent the maintenance of traffic, erosion control, and other similar items as single activities extending to the Completion Date. Break these Contract Items into component activities to meet the duration requirements of this paragraph.

    iv. Activity Relationships:

        o All activities, except the first activity, shall have a predecessor(s). All activities, except the final activity, shall have a successor(s).

        o Use only finish-to-start relationships with no leads or lags to link activities, or use start-to-start relationships with lags no greater than the predecessor

duration to link activities.

- o Use of finish-to-finish relationship is required when both activities are already linked with a start-to-start relationship.
- o Negative lags are not allowed with any relationship

c) Project Milestones:

   i.   Start Project: The Contractor shall include as the first milestone in the schedule, a milestone named "Start Project". The date used for this milestone is the date the contract is executed and signed by the Department.

   ii.   End Project Milestone: The Contractor shall include as the last activity in the project schedule, a milestone named "End Project". The date used for this milestone is considered the project completion date.

   iii.   Start Phase Milestone: The Contractor shall include as the first activity for a project phase, an activity named "Start Phase X", where "X" identifies the phase of work. The Contractor may include additional milestones but, as a minimum, must include all contractual milestones.

    iv. End Phase Milestone: The Contractor shall include as the last activity in a project phase, an activity named "End Phase X" where "X" identifies the phase of work. The Contractor may include additional milestones but, as a minimum, must include all contractual milestones.

d) Level of Effort Activities:
Use level of effort activities to show the duration of specified contract work periods, phases and road closures. The level of effort activity type is allowed to have a start-to-start relationship with the first activity in a series of activities and a finish-to-finish relationship with the last activity in a series of activities.

e) Constraints:
Use constraints sparingly in the schedule. If constraints are used, use only Early Constraints or Late Constraints.

f) Calendars:

Weather, seasonal (winter) and environmental shutdown periods shall be shown using non-work calendars. The activity can be assigned to a calendar indicating time periods of non-work. These custom calendars can be created to show days, weeks, or months of non-work. Weather and seasonal conditions, as shown in CMS 108.06-1, shall be evenly dispersed into the CPM schedule calendars as non-work days and be included in the planning and scheduling of all work. All calendars developed by the Contractor shall be established as Project Calendars, with the calendar name including the project year, project number and describing the function (i.e. 160345 – 5 day workweek, 160345 – earthwork, 160345 – structures, 160345 – asphalt, 160345 – concrete cure, 160345 – environmental restriction, 160345 – 7 day week, etc.). Each calendar should indicate an 8 hour workday. No Global Calendars shall be incorporated into any progress schedule submission. Project Calendars cannot inherit holidays and exceptions from a Global Calendar.

g) Activity Codes:

The Contractor shall, at a minimum, include Project Activity Codes for Area, Phase, and Responsibility for each activity. Work Breakdown Structure is permitted, but is not be used in lieu of Activity Codes. No Global Activity Codes shall be incorporated into any progress schedule submission.

h) Schedule Options:

The schedule may only be calculated using retained logic. Show open ends as non-critical. Total float shall be calculated as finish float. Ignore relationships to and from other projects.

2. **Submission Requirements.** Submit all schedules within the time frames specified. Submit the schedule and information in electronic file format via email or compact disc (CD) compatible with the Engineer's computer. Submit the following information along with the electronic baseline schedule:

a) A pdf of the baseline schedule in CPM format including the Administrative Identifier Information discussed in Section C.1.a on the first page of the schedule. For each activity on the chart, indicate the Activity ID, Activity Description, Original Duration, Remaining Duration, Total Float, Start Date, Finish Date, and Calendar ID. Use arrows to show the relationships among activities. Identify the critical path of the project on the bar chart in red. The critical path is defined as; the

longest path of activities in the project that determines the project completion date. The activities that make-up the critical path of activities are the "Critical Activities."

b) A pdf of the Six Week Look Ahead Schedule in CPM format. This schedule will have all the requirements of the baseline schedule in bar chart format except that it shall be limited to those activities that have an early start or early finish within a six week period of the data date.

c) A complete Scheduling/Leveling Report (SCHEDLOG.TXT file generated by the Primavera scheduling software application) which includes Schedule Settings, Statistics, Errors, Warnings, Scheduling/Leveling Results, Exceptions, Activities with unsatisfied constraints, Activities with unsatisfied relationships, and Activities with external dates. The statistics shall include, number of Activities, number of Activities Not Started, number of Activities In Progress, number of Activities Completed, number of Activity Relationships, and number of Activities with Constraints. Total number of activities on the critical path, percent complete, activities without predecessors, activities without successors, and activities out of sequence.

D. Float. Use of float suppression techniques, such as; preferential sequencing (arranging critical path through activities more susceptible to Department caused delay), lag logic restraints, zero total or free float constraints, extending activity times, or imposing constraint dates other than as required by the contract, shall be cause for rejection of the project schedule or its updates.

1. **Definitions of Float.** Total Float is the length of time along a given network path that the actual start and finish of activity(s) can be delayed without delaying the project completion date. Project Float is the length of time between the End Project Milestone and the Contract Completion Date.

2. **Ownership of Float.** Float available in the schedule, at any time shall not be considered for the exclusive use of either the Department or the Contractor. During the course of contract execution, any float generated due to the efficiencies of either party is not for the sole use of the party generating the float; rather it is a shared commodity to be reasonably used by either party. Efficiencies gained as a result of favorable weather within a calendar month, where the number of days of normally anticipated weather is less than expected,

will also contribute to the Project Float. A schedule showing work completing in less time than the contract time, and accepted by the Department, will be considered to have Project Float. Project Float will be a resource available to both the Department and the Contractor. No time extensions will be granted nor delay damages paid unless a delay occurs which impacts the project's critical path, consumes all available float and extends the work beyond the Contract Completion Date.

3. **Negative Float.** Negative float will not be a basis for requesting time extensions. Any extension of time will be addressed in accordance with the Section F. Scheduled completion date(s) that extend beyond the contract (or phase) completion date(s) may be used in computations for assessment of liquidated damages. The use of this computation is not to be construed as an order by the Department to accelerate the project.

E. Monthly Update Schedule. A monthly update schedule is a schedule in which only progress is updated from the prior data date to the current data date. Work added and/or excusable delays encountered since the prior data date must be represented as a schedule revision as described in Section F.

1. **Update Requirements.** On the tenth day of the current month, during the life of the Project, submit an updated schedule and all required information with a data date of the first day of the current month. The date for submission and data date may be adjusted to accommodate regularly scheduled progress meetings. Submit the monthly updated bar chart and the updated schedule in electronic format in Section C.2. The Engineer shall "approve" or "reject" the schedule update within 7 days of receipt of the updated CPM schedule. The Engineer may withhold estimates if the updated schedule is not submitted as required by this section. For each updated schedule, identify the actual start and finish dates for all completed activities and the actual start date and remaining duration for all activities in progress. Correct out-of-sequence progress listings generated by the Scheduling Statistics Report on the critical path only. The project schedule shall be reviewed at each monthly progress meeting. Any corrections shall be made prior to the next monthly progress meeting.

Submit the following with each updated schedule:

<ol type="i" start="1">
A pdf of the updated schedule in CPM format.
A pdf of the Six Week Look Ahead Schedule in CPM Format
Provide a written narrative that identifies any non-critical revisions or shifts in the critical path and submit reasons for the changes or shifts in the critical path.
A complete Scheduling/Leveling Report (SCHEDLOG.TXT) file generated by the Primavera scheduling software application.
A pdf of the Claim Digger Report (generated by the Primavera Software application) providing a comparison between this updated schedule and the previous Monthly Updated Schedule.
Electronic files (formatted as described above)

2. **Early Completion Monthly Update Schedule.** An Early Completion Monthly Update Schedule is defined as a monthly update schedule submitted by the Contractor in which the Finish Date precedes the Contract Completion Date. If after incorporating necessary revisions in accordance with Section F, the Finish Date precedes the Contract Completion Date by at least the number of days shown Table A the Engineer will initiate a change order amending the Contract Completion Date to the Early Completion Date shown on the accepted Early Completion Monthly Update. The amended Completion Date will be effective upon execution of that change order and all contract provisions concerning the Completion Date such as incentives, disincentives, excusable delays, compensable delays, and liquidated damages will be measured against the amended Completion Date. The Contractor may elect not to execute the change order amending the Completion Date; however, in so doing, the Contractor waives its rights to delay damages in meeting the projected early Completion Date and the time between the Early Completion Date and the Contract Completion Date is used as Project Float.

Table A

Original Project Duration	# days prior to Contract Completion Date
one year or less	30
one year to two years	60
two years or more	90

3. **Late Completion Monthly Update Schedule.** A Late Completion Monthly Update Schedule is defined as a monthly update schedule submitted by the Contractor in which the Finish Date exceeds the Contract Completion Date. In the event the Finish Date is more than 14 days beyond the current contract completion date and a schedule revision is not warranted, the contractor must proceed in accordance with Section H.

F. Revisions. The Work may require and/or the Contractor may make revisions to the CPM schedule. Addition of new activities or new calendars or changes to existing activities, calendars or logic constitute a revision.

1. Any revision which modifies the critical path or impacts an interim date or project completion date must be represented on a companion schedule submitted with the monthly update schedule. A fragnet shall be used to define the sequence of new activities that are proposed to be added to the existing schedule. The fragnet shall identify the predecessors to the new activities and demonstrate the impacts to successor activities. If submitted as a fragnet, the Contractor shall compute two Finish Dates. The first Finish Date shall be computed without consideration of any impact by the fragnet. The second Finish Date shall be computed with consideration of any impact by the fragnet. The Contractor shall also submit a written narrative stating the reason for the proposed revisions.

2. Any revision which does not modify the critical path or the interim date or project completion date can be submitted in a narrative form accompanying the monthly update schedule. The narrative shall include the reason for the revisions.

The Engineer shall "approve" or "reject" proposed revisions within ten days of receipt of appropriate schedules and narrative. All approved revisions will be incorporated into the Monthly Update Schedule which will become the Revised Monthly Update Schedule.

G. Time Extensions for Delays in Accordance with C&MS 108.06.B and 108.06.D. The Work may

require and/or the Contractor may request an extension of the Completion Date. Perform the following analysis to compute the duration of the time extension. Submit a pdf copy and an electronic copy of each analysis performed.

1. Determine project progress prior to circumstance(s) necessitating the time extension. The previous accepted monthly update, updated to the date of the circumstance alleging to have caused delay, shall be used to display the prior progress of the project. This schedule is referred to as the Un-impacted Schedule

2. Prepare a fragmentary network (fragnet) depicting the circumstance that is believed to have delayed the project.

3. Insert the fragnet into the Un-impacted Schedule, run the schedule calculations and determine the finish date. This schedule is referred to as the Impacted Schedule.

4. Compare the Impacted Schedule finish date with the Un-impacted Schedule finish date to determine the duration of any warranted time extension.

Submit the impacted schedule with the request for time extension. Include a narrative report describing the effects of new activities and relationships to interim and contract completion dates. All approved time extensions will be incorporated into the monthly update with the fragnet used to determine impacts incorporated into the schedule.

H. Weather Days in Accordance with C&MS 108.06.C. The Contractor may request and/or the Engineer will determine an extension of the completion date due to weather days. Perform the following analysis to compute the duration of the time extension. Submit a pdf copy and an electronic copy of each analysis performed.

1. The previously accepted monthly update shall be used to display progress of the project and planned activities for the next 30 day period that incurred weather days. Make a copy of the schedule file to use for the analysis. This schedule is referred to as the Non-weather Schedule.

2. Prepare a list of actual weather days believed to have delayed the project and the activities that were impacted.

3. Utilizing the calendar(s) of those impacted activities, remove any planned weather days. Insert the actual weather day(s) into the calendar(s) for the planned work as a non-work day. Run the schedule calculations and determine the finish date. This schedule is referred to as the Weather Schedule.

4. Compare the Weather Schedule finish date with the Non-weather Schedule finish date to determine the duration of any warranted time extension.

Submit the weather schedule with the request for time extension on a monthly basis. Include a narrative report describing the effects of weather days to interim and contract completion dates.

I. Recovery Schedule. If the Monthly Update Schedule or Revised Monthly Update Schedule projects a finish date for the Project more than 14 calendar days later than the current Completion Date, submit a recovery schedule showing a plan to finish by the current Completion Date if requested by the Engineer. The Department will withhold Estimates until the Engineer approves the recovery schedule. The Engineer will use the schedule to evaluate time extensions and associated costs requested by the Contractor. In the event the current Completion Date is in dispute; the recovery schedule will need to be submitted once the dispute has been resolved.

J. Basis of Payment. The Department will make partial payments according to C&MS 109.09 and as modified by the following schedule:

1. The Department will release 60 percent of the lump sum amount bid for CPM Progress Schedule to the Contractor with the first regular estimate payable after the Engineer has approved the CPM Baseline schedule submission.

2. The Department will release an additional 30 percent of the lump sum amount bid for CPM Progress Schedule to the Contractor with the first regular estimate payable after 50 percent of the original contract amount is complete.

3. The Department will release the remaining 10 percent of the lump sum amount bid for CPM Progress Schedule to the Contractor with the first regular estimate payable after 90 percent of the original contract amount is complete.

The Department will pay for the accepted quantities at the contract price as follows:

Item	Unit	Description
108E10000	Lump Sum	CPM Progress Schedule

Designer's Note: This note should be used for multi-season projects whose cost is greater than $10

million; which have more than 3 phases; or, as may otherwise be appropriate. The Critical Path Method Progress Schedule is a contract pay item as per Section J of the note and should be included in the Proposal as a pay item. It is recommended that this note be used when PN 120, PN 121, PN 122, PN 123 and PN 124 are specified. Any questions should be addressed to the Construction Administration Staff Specialist in the Office of Construction Management.