

March 1, 2007

CRITICAL PATH METHOD CONSTRUCTION SCHEDULES

General

This supplemental specification addresses the Critical Path Method (CPM) construction schedule requirements for SCDOT contracts. The Contractor will provide and update a construction schedule to the SCDOT, which will be used as a quantitative basis for:

- Monitoring and evaluating the Contractor's progress in completing contracted work;
- Evaluating requests for additional contract time;
- Budgeting for construction estimate payments; and
- Managing SCDOT engineering and inspection personnel.

The Contractor's construction schedule shall encompass the entire contract period, and be developed consistent with the contract milestones and the contract maintenance of traffic plan. Critical path activities shall be identified for the duration of the work.

The schedule shall reflect the utility relocations noted in the contract documents and include activities of appropriate duration for the utility adjustments. Where utility durations are unknown, the Contractor shall provide a reasonable estimate of duration. Utility durations will be reviewed in the baseline approval process as outlined in the section "Submission, Review, and Acceptance Process." Utility durations will be presented at the Preconstruction Conference for concurrence by the utility provider. In the event that the utility representative cannot provide concurrence at the Preconstruction Conference, the Contractor, the Resident Construction Engineer, and the utility provider shall work diligently to reach acceptable durations. If there is no concurrence or input from the utility provider concerning the Contractor's utility durations within 15 days following the Preconstruction Conference, the submission with the Contractor's estimate of utility duration will be reviewed for baseline acceptance. Further utility duration changes beyond this point in time will be assessed in monthly schedule updates. Failure to include activities for any element of work or any known utility work will not relieve the Contractor from completing the work within the allotted contract time.

The schedule shall also include sufficient information *as outlined in this supplemental specification* to provide for monetary and quantitative tracking of the work by the SCDOT.

Schedule Types

Contractors shall maintain CPM schedules for all projects using Primavera 5.0 (or current version) or Primavera Contractor.

Templates for the CPM schedules are available to download at the SCDOT construction Extranet site (http://www.scdot.org/doing/const_extranet.shtml).

When submitting schedules to the SCDOT, the Contractor shall assign file names to each schedule file (baseline and updates) according to the following conventions (dates are YYMMDD):

Type of Schedule Submitted:	Baseline	Update
File Name Convention:	[File Number]b[Data Date]	[File Number]u[Data Date]
File Name Example:	32.82571b060201	32.82571u060201

Note on Data Dates - The initial Baseline Construction Schedule shall have a data date equal to the date of submission of the schedule and not include any work to date. Monthly schedule updates shall have a data date set the same as the most recent estimate period end date.

Schedule Submissions

All submissions shall be made within the time frames defined under “Submission, Review and Acceptance Process.”

Electronic File: Each baseline construction schedule and monthly update submission shall be uploaded to the SCDOT Construction Extranet site in .xer format. The site can be found at: (http://www.scdot.org/doing/const_extranet.shtml)

Hard Copies: A hard copy of each baseline construction schedule and monthly update submission shall be provided to the District Scheduler and the Resident Construction Engineer. Printout shall include the following columns on 11 inch x 17 inch paper: Activity ID, Activity Name, Early Start, Actual Start, Early Finish, Actual Finish, Schedule % Complete, Physical % Complete, Budgeted Total Cost, Actual Total Cost, Original Duration, Remaining Duration, and Total Float.

Schedule Narrative: Submit a Schedule Narrative Report with the baseline and each monthly update schedule describing current project schedule status and identifying potential delays. This report will include a description of the progress made since the previous schedule submission and objectives for the upcoming 30 calendar days.

- 1) The report shall indicate if the project is *on schedule*, *ahead of schedule* or *behind schedule* as compared to the accepted baseline. If the project is ahead of schedule or behind schedule, the report shall include the specific number of calendar days. If the project is behind schedule, the report shall include a detailed recovery plan that will put the project back on schedule.
- 2) The report will describe the *current critical path* of the project including the lowest total float value and indicate if this has changed in the last 30 calendar days. Discuss current successes or problems that have affected either the critical path’s length or have caused a shift in the critical path within the last 30 calendar days. Identify specific activities, progress, or events that may reasonably be anticipated to impact the critical path within the next 30 calendar days, either to affect its length or to shift it to an alternate path.
- 3) List all schedule logic or duration changes that have been made to the schedule since the previous submission. Provide an explanation for any *constraint* used. For each change, describe the basis for the change and specifically identify the affected activities by identification number.
- 4) Identify activities, either in progress or scheduled to occur within the following 30 days, that require Department participation, review, approval, etc.
- 5) Identify any calendars used that are not DOT specific, and explain the details of those calendars.
- 6) Identify schedule settings used.
- 7) An explanation of lag for each activity lag is associated with.
- 8) Description of how the schedule is organized (e.g. broken down by road or activity).
- 9) Narrative will be submitted with a naming convention of [File Number]n[Data Date].doc (e.g 32.82571n060201.doc). Contractor will upload the electronic copy [in .doc format] to the South Carolina Department of Transportation Construction Extranet site (http://www.scdot.org/doing/const_extranet.shtml).

Schedule Details

Data Date - The Baseline Construction Schedule shall have a data date equal to the date of submission of the schedule and not include any completed work to date. Monthly schedule updates shall have a data date set the same as the most recent estimate period end date.

Milestones - Schedule shall identify the following milestones as a minimum:

- **Notice to Proceed Date (NTP):** Issuance of this date indicates the project site is available to the Contractor and contract time has begun. The NTP is determined in coordination between the Engineer and the Contractor and shall be within 45 days of the Award Date unless extenuating circumstances warrant setting the NTP more than 45 days after the Award Date. Include any extenuating circumstances in the narrative. The Notice to Proceed Date shall be the first milestone in the schedule.
- **Work Begin Date:** Actual date that on-site work commences.
- **Interim Completion Dates or Interim Milestones:** When interim completion dates or interim milestones (associated with project stages) are included in the contract specifications.
- **Start of Paving:** Date paving production and placement is to start.
- **Substantial Work Complete Date:** Anticipated date that work will be substantially complete. Facility will be available for the safe and convenient use of motorists; only allowable work remaining at substantial completion is placement of permanent pavement markings and resolution of punch list items.
- **Contract Completion Date:** Date defined by the Department as the latest date for contract completion. This is the last milestone and will establish the finish date of the project schedule. The schedule may indicate a completion date in advance of the contract completion date. However, the Department will not be liable for the Contractor's failure to complete the project prior to the Contract Completion Date. Any additional costs, including extended overhead incurred between the Contractor's schedule completion date and the completion of the contract time, shall be the responsibility of the Contractor.

Activities – Each Activity shall be part of the logic driven network and include a predecessor (excepting the first activity) and a successor (excepting the last activity). Each activity duration shall be limited to 30 days. As a minimum, the schedule shall include the following activities when related work is part of the contract, but there shall be sufficient detail in included activities to determine monthly progress of work and forecast of inspection and cost. The Contractor shall use the Activity Codes provided in the template for organizing activities. Activities for deliverables and reviews shall be included in the schedule.

- **Mobilization:** preparations for and moving of equipment, etc., to the project site.
- **Clearing & Grubbing:** Self-explanatory.
- **Utility Relocations:** The schedule must reflect the utility relocations noted in the contract documents and include activities of appropriate duration for the utility adjustments. Where utility durations are unknown, the Contractor shall provide a reasonable estimate of duration.
- **Earthwork:** Unclassified & borrow excavation, compaction, fine grading, etc.
- **Drainage:** Pipe, catch basins, manholes, etc.
- **Base Course:** Graded aggregate base courses, cement modified bases, etc.
- **Paving:** Hot mix asphalt base, intermediate, and surface courses; Portland cement concrete pavements, etc.
- **Structures:** Bridges, box culverts, retaining walls, etc.

The Department requires retained logic be used in scheduling projects. In situations where a Contractor has to address activities out of sequence, the Contractor may request to use the “progress override” option. The monthly schedule update narrative shall provide justification for selecting this option and quantify any logic change(s).

Resources – The Department will not require any input to the resource component of the schedule by the Contractor.

Expenses – Contractor shall assign the SCDOT contract items as expenses to each activity. SCDOT contract items will be included as Expense Categories and will be made part of the SCDOT schedule template available to download from the construction Extranet site. These shall be the only expense categories associated with activities. Other fields under expenses that shall be populated include Budgeted Units, Price/Unit, and Actual Units.

SUPPLEMENTAL SPECIFICATION

Calendars – Contractor shall assign an appropriate SCDOT calendar to each activity in the schedule. Alternate calendars may be assigned, but specifics of the alternate calendars must be justified in the baseline narrative. Contractor shall assign all calendars as project specific. Acceptance of the alternate calendars is subject to review by the SCDOT. Considerations for weather shall be addressed within the activities – calendars shall not be modified to account for weather considerations. Calendars have been created to address established seasonal restrictions.

The Baseline Construction Schedule shall not extend beyond the number of working days or contract completion date originally provided in the contract.

Cost Loading – All schedule activities shall be cost loaded using the contract items and unit prices under “Expenses” in Primavera.

Float – Float is not for the exclusive use or benefit of either the Department or the Contractor. Initial baseline schedules shall not attribute negative float or negative lag to any activity.

Schedule Layout – Schedule shall be structured consistent with the phasing and staging noted in the contract documents. Activity Codes for area and stage are included in the template. These codes shall be used to organize each activity included in “Schedule Details – Activities” as appropriate to provide a detailed schedule layout. Activities shall not be allowed to cover more than one stage of the contract.

Default Values – Contractor shall use the following defaults, physical percent complete, retain logic, and longest path critical activities.

Submission, Review and Acceptance Process

Baseline Schedule – Contractor shall submit a Critical Path Method (CPM) Contract Schedule and Narrative to the District Scheduler within 30 calendar days after award of the Contract or 15 days prior to the preconstruction conference, whichever is earlier. The CPM Schedule and Narrative shall be submitted via upload to the Extranet. Upon upload, the Contractor shall immediately notify the District Scheduler and the Resident Engineer via email that the CPM schedule has been submitted.

Upon receipt of the CPM Construction Schedule, SCDOT shall review and provide comments to the Contractor within 10 days of receipt. The Contractor will have 5 business days to respond to SCDOT comments. This process will continue until the Engineer and the District Scheduler determine the construction schedule is acceptable.

The Contractor shall present their accepted schedule at the Preconstruction Conference. In the event the schedule has not been accepted (i.e. review process is ongoing), the most current schedule under review shall be presented.

Acceptance of the submitted schedule by the SCDOT will establish the baseline schedule for the contract. This acceptance by SCDOT does not serve to excuse any omissions or errors in the Contractor's schedule (i.e. activities not included in baseline will not be considered in any time extensions).

Review and acceptance of baseline schedule is required prior to start of work. Delays in reaching this acceptance will not constitute a basis for granting additional contract time. If there is no concurrence or input from the utility provider concerning the Contractor's utility durations within 15 days following the Preconstruction Conference, the submission with the Contractor's estimate of utility duration will be reviewed for baseline acceptance. Further utility duration changes beyond this point in time will be assessed in monthly schedule updates.

SUPPLEMENTAL SPECIFICATION

Monthly Updates – Monthly updates shall be made no later than 15 days following the most recent estimate and shall have a data date the same as the estimate period end date. Upon upload, the Contractor shall immediately notify the District Scheduler and the Resident Engineer via email that the CPM schedule has been submitted. Failure to submit acceptable schedule updates as required will result in the withholding of estimate payments. Updates shall include the following:

- Updated schedule to show actual progress on activities
- Updated schedule to show actual costs on activities
- Updated schedule to show actual completion on milestones
- Narrative to describe progress, planned activities, issues, adjustments to remedy any activities or milestones behind schedule, etc., in the format described in **Schedule Submissions**.

As-Built Schedule – A final As-Built Schedule shall be submitted within 45 days following substantial completion of the work or within 15 days following the contract completion, whichever is later.

Baseline Schedule Changes – Once the baseline schedule has been accepted, all subsequent schedules provided will be considered schedule updates and compared to the original baseline. A new baseline will only be considered when significant changes in contract scope, changes in SCDOT priorities, or delays beyond the control of the Contractor occur.

If a baseline change is needed, the Contractor shall provide, in writing, a request to the Resident Construction Engineer with the following information:

- An electronic copy of the proposed baseline schedule using the following naming convention and in accordance with **Schedule Types** (included previously)

Type of Schedule Submitted:	Updated Baseline
File Name Convention:	[File Number]ub[Data Date]
File Name Example:	32.82571ub060201

- Narrative identifying changes warranting a new baseline

A decision for an updated baseline will be made jointly between the Resident Engineer and the District Scheduler within 10 days of receipt of request.

Measurement and Basis of Payment

The Department will make partial payments according to Section 109, Standard Specifications for Highway Construction, and as modified by the following schedule:

Basis of Payment	Percentage of Contract Unit Price of Item
After the Engineer has approved the CPM Baseline schedule	60
After the Engineer has approved the As-Built CPM schedule	40

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

Item	Description
1080300	CPM Progress Schedule