PINNELL/BUSCH MASTER SCHEDULING SPECIFICATION
27Jan05

NOTE: The project owner, whether it is a federal, state, or municipal agency, or other type of organization, is referred to as the Owner. The individual or firm responsible for overseeing construction is referred to as the Owner's Representative or Construction Manager and the designer is referred to as the Engineer (change to Architect on building projects).

FOOTNOTES: Comments and notes to the reader, and to the author for unfinished sections, are capitalized and enclosed in double carets (<< >>). The red superscript numbers refer to footnotes in Section III, which explain the reason for the wording of the various sections of the specifications and how it can be changed for specific projects. Both the comments and the superscripts should be removed from the published document.

ORGANIZATION: This document consists of the scheduling specification (Section I), followed by a commentary on other sections of the general and supplemental conditions affecting the schedule and scheduling claims (Section II), footnotes explaining when and why to use the various clauses of the scheduling specifications (Section III), and references to the documents used in preparing the specifications (Section IV).

CREDITS: Sections I and II of this document has been complied and edited from numerous other sources as listed in Section IV. Organizations wishing to use it are requested to contact Pinnell/Busch for permission to reproduce, modify, and distribute it within their organization.

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WARNING: This document has not been reviewed by legal counsel and the author takes no responsibility for reliance on any portion of it. Anyone using this document should consult with legal counsel before implementing the specification or relying on any portion of the document. <<I NEED TO REWRITE THIS PART>>

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SECTION 1 – SCHEDULING SPECIFICATIONS

1-08 PROSECUTION AND PROGRESS[1]

1-08.0 Preconstruction Conference

After the Contract has been executed, but prior to the Contractor beginning the work, a preconstruction conference will be held with the Contractor, the Engineer and any other interested parties that the Owner determines to invite. The Contractor attendees shall include the Project Manager, Project Superintendent, Scheduler, a representative from each major subcontractor, and other parties as requested by the Owner[2].

The purpose of the preconstruction conference will be to:

1. Review the initial (preliminary) progress schedule.[2a]
2. Establish a working understanding among the various parties performing or affected by the work, through either an informal partnering effort or a separate partnering workshop and followup.[3]
3. Establish and review procedures for progress payments, notifications, approvals, submittals, etc.
4. Verify normal working hours for the work.
5. Review safety standards, and traffic control if applicable.
6. Discuss any other related items that may be pertinent to the work.

The Contractor shall prepare and submit the following for approval, at or before the preconstruction conference:[3a]

1. A price breakdown (schedule of values) of all lump sum items.
2. A preliminary construction schedule.
3. A list of material sources for approval, if applicable.
4. Schedule of submittals.
5. Environmental, Traffic, Safety, and Other Plans for approval, as applicable.[3b]
6. Request to sublet, for approval by the Owner, of all subcontractors performing work valued at over one percent of the contract amount.

<<AFTER ALL EDITS ARE COMPLETE, RENUMBER THE FOOTNOTES>>

1-08.1 Subcontracting

Subcontractors shall be subject to approval by the Owner.

When required by the contract, the Contractor shall report on efforts made to solicit bids from disadvantaged, minority, and woman-owned subcontractors and suppliers and shall provide a list of all such subcontractors and suppliers and the amount of their contracts.

If a subcontractor's work is non-conforming to the contract and the work is not corrected within the specified time when directed by the Owner, the Contractor shall remove the subcontractor from the project. The Contractor shall replace the removed subcontractor with a subcontractor satisfactory to the Owner, at the Contractor's cost and without delaying the project.

<<ADD INFORMATION ABOUT COORDINATION OF SUBCONTRACTORS>>

1-08.2 Assignments

The Contractor shall not assign any part of the work without written approval of the Owner. Money due or that will become due to the Contractor may be assigned, if written notice if given and to the extent allowed by law. Assignment is subject to all setoffs, withholdings, and deductions required by the law and contract.

1-08.3 Progress Schedule

<<PROVIDE A GENERAL DESCRIPTION OF THE SCHEDULE, THAT IT IS THE CONTRACTOR'S BUT THAT THE OWNER HAS A VITAL INTEREST IN IT, WHICH REQUIRES THAT IT CONFORMS TO CERTAIN MINIMNUM STANDARDS>>

1-08.3(1) Scheduling – General

The Contractor is responsible for planning, scheduling, managing, and reporting the progress of the work in accordance with all of the specific methods and submittals described in this Section 1-08.3.

The Contractor shall use automated scheduling software and the Critical Path Method (CPM) to plan and schedule the work.[4] Where this specification refers to a Primavera P3 software feature or report and the Contractor is using different scheduling software, it shall apply to the most similar feature or report of that software.

Unless otherwise noted, all durations are in calendar days.

The schedule shall be prepared by a competent scheduler, whose qualifications are subject to approval by the Owner[5], and used by the Contractor to plan, prosecute, and coordinate the project work in an orderly and expeditious manner. The schedule will be used by the Owner and the Engineer to evaluate progress and status at the various stages of the Project, to allocate funds for progress payments, and to determine the impact of any changes to the contract.[6]

1-08.3(2) Scheduling – Hardware and Software

The Contractor shall use the latest version of Primavera P3, Primavera P3e/c, Primavera Contractor, SureTrak, or Microsoft Project for Windows network analysis software and IBM-compatible hardware.[7] In addition to the hardcopy diagrams and reports required in other parts of this section, the Contractor shall provide all project data and data updates on approved removable disk media.[8] The Owner may retain all elements of the submittals.

1-08.3(3) Scheduling – Review and Acceptance

Schedule submittals will be reviewed by the Owner; such review shall not constitute an approval, control, or direction over the Contractor's construction means, methods, or sequencing, or its ability to complete the Work in a timely manner.[9]

Required revisions to schedule submittals shall be submitted by the Contractor within 7 days, or as otherwise directed by the Owner. The Owner will review and return Preliminary schedule submittals within 14 days and update schedule submittals within 7 days.[10] Progress payments shall be contingent upon a current accepted schedule.[11]

The initial schedule is referred to as the Preliminary Schedule. Upon completion with all needed activities and acceptance by the Owner, it is referred to as the Baseline Schedule. Monthly revisions are termed Update Schedules. If major delays require a drastic revision to the schedule, it is referred to as a Recovery Schedule.

1-08.3(4) Preliminary Schedule[12] and Narrative Report[13]

The Preliminary Schedule and a Narrative Report that describes the work shall be provided at least seven days before the preconstruction conference. The Preliminary Schedule shall show, at a minimum, all work activities planned during the first 60 calendar days after Notice to Proceed. The general approach of the balance of the work shall be shown by summary activities.[14]

The Contractor's Scheduler, Project Manager, Project Superintendent, and key subcontractors shall meet with the Owner at the preconstruction conference to explain the Contractor's approach to scheduling the project.

1-08.3(5) Baseline Schedule[15] and Narrative Report

Within thirty calendar days after the preconstruction conference and prior to the first progress payment, the Contractor shall complete and submit the revised Preliminary Schedule with the added level of detail required to plan and control the rest of the work. The expanded Preliminary Schedule shall integrate the added activities with the activities of the original Preliminary Schedule and shall include all activities and time lines required for contract completion. It shall not reflect progress to date, but shall be based on the status when the work started. It shall have been reviewed and accepted by the key subcontractors and suppliers.[16] The Baseline Schedule shall be accompanied by a Narrative Report.

The schedule and narrative report shall be reviewed within 7 days of receipt by the Owner at a joint review session with the Contractor's Project Manager, Superintendent, Scheduler, and key subcontractors.[17]

At the joint review, the Contractor shall present an overview of the schedule strategy, a discussion of near-term and high-risk activities, an activity-by-activity review of critical and near-critical activities (less than 10 days total float), and a general discussion of the other activities. The review shall cover the approximate work quantities, general crew and equipment planned for each critical and near-critical activity, expected production rate (if known), duration, and relationship with preceding and succeeding activities. The Contractor shall then answer questions by the Owner who will accept or reject the proposed schedule within 7 days. If returned for revision, the Contractor shall revise and resubmit the schedule within 7 days.[18]

Upon acceptance by the Owner, the accepted Preliminary Schedule shall become the Baseline Schedule.

1-08.3(6) Update Schedules[19] and Narrative Reports

The Contractor shall provide a monthly Update Schedule and Narrative Report to reflect the current status of the Project, as of each progress payment date.[20] If a Baseline Schedule has not been accepted prior to the first monthly progress payment submittal, the first Update Schedule may be submitted with the expanded Preliminary Schedule for progress payment purposes and re-submitted, if necessary, after approval of the Baseline Schedule.

The Update Schedule shall show the status of all progressed activities with actual start and finish dates, completion percentages based on work-in-place, remaining durations.[21] It shall show pending activities including added activities, revised durations and network logic changes, and corrected logic for out-of-sequence progress.[22] **<<EDITED TO HERE>>**

The Contractor is encouraged to revise the schedule periodically as needed with added, deleted or modified activities that more accurately represent the Contractor's plans and actual progress. All such revisions are subject to approval of the Owner and shall not be used to hide delays or push problems 1into the future by unsupported reduction of planned durations of pending activity or by unjustified breaking of network logic relationships and constraints.[22a]

The Narrative Report shall describe progress and problems during the reporting period, anticipated problems for the next period and their solutions, and changes to planned activities.

The Owner shall jointly review the Updated Schedule with the Contractor's Project Manager, Superintendent, Scheduler, and key subcontractors within 7 days after its receipt.[23] The Contractor will briefly present the progress for the previous month on all critical and near-critical activities, describe any revisions to the schedule and current or expected delays, and answer questions from the Owner.[24]

If any critical path activity is behind schedule, the Contractor shall provide in its narrative report an explanation of the cause and propose remedial measures necessary to get back on schedule. The Contractor shall take such additional steps as are necessary in order to effectively eliminate or minimize such delays and to comply with the schedule.[25]

If the Contractor is behind schedule for non-excusable delays and the Owner determines that the Contractor's progress is not sufficient to ensure that the work will be completed within the contract time, the Contractor shall, when directed and at its own expense, take corrective action to recover the lost time. This may include any or all of the following: (1) provide its project superintendent on the job site not less than 10 hours per day, (2) increase its work force, equipment and/or working hours, (3) expedite material delivery, and (4) take other steps to complete the project on time.[26]

1-08.3(7) Recovery Schedule[27] and Narrative Report

If the project falls behind schedule more than 14 days or 10% of the remaining duration[28], whichever is less, for non-excusable delays or when requested by the Owner, the Contractor shall prepare a Recovery Schedule and Narrative Report that demonstrates how the lost time will be recovered. The Recovery Schedule is subject to review and acceptance by the Owner.

1-08.3(8) Scheduling – Required Information

1. Included Activities

The selection, coding, number of activities, and their relationships shall be subject to the Owner's acceptance. Except for materials procurement, no activity shall have a duration greater than one month or a value greater than $100,000[29] – unless accepted by the Owner.[30] The number of activities shall be sufficient to plan and control the work, and is subject to acceptance by the Owner.[31]

The schedule shall not exceed time limits established in the Contract Documents and must comply with any contract-specified milestone dates and sequences of construction. In calculating activity durations, normal inclement weather shall be considered.

The Contractor shall use an appropriate number of milestones and hammocks for overall tracking of progress, in addition to any contract-specified milestones.[32] Construction activities shall include at least one activity for every significant bid item.[33] Major long lead procurement materials shall be shown with separate activities for 'Prepare Shop Drawings', 'Review', and 'Fabricate And Deliver' for each item.[34] Construction activities shall include: approved change order work, mobilization and demobilization, and all other work to complete the project.[35]

In addition to construction activities, activities shall include: the preparation, review, and approval of submittals; the procurement, delivery and installation of major materials and equipment; significant testing, inspection, and building or structure commissioning activities; coordination of work with separate contractors; schedule or operating constraints imposed by the Owner; temporary traffic

control; activities for which the Owner is responsible; and dates of Award, Notice to Proceed, Substantial Completion, Final Completion, and any intermediate milestone dates.[36]

2. Activity Relationships[37] and Constraints[38]

Activity relationships will normally be finish-to-start, start-to-start, or finish-to-finish. Negative lags (overlap or lead) shall not be used with start-to-start relationships, but may be used for finish-to-start relationships.

Contractors shall use the scheduling option that retains the current logic ("Retained Logic" if using Primavera) of activities started out of sequence, and manually change the logic for those activities for which the relationship is no longer applicable.[38a]

The use of start and finish constraints shall be limited to only those activities that cannot be readily scheduled by using activity relationships. A milestone shall be assigned to the Notice To Proceed. Milestones shall also be assigned to the Contract Completion date and any contract-specified interim milestones, and they shall be constrained with 'Finish No Later Than' constraints.[39]

3. Activity Coding[40]

Activity identifiers shall be designated by the Contractor for the Contractor's convenience. However, simple activity identifier codes are encouraged, with separate code fields used to identify the responsibility and work areas for each activity.

Activities related to separate structures and features shall be separately identifiable by work area or the use of subnetworks or both. When practical, activities for large work items shall be subdivided into multiple activities and identified by separate work areas.[41]

The responsible subcontractor or general contractor crew, owner representative, or other party shall be identified for each activity.[42]

4. Schedule Report Content and Format

Each of the schedule reports shall be submitted as one reproducible and three copies. Variations of the following reports shall be provided at no additional cost, if requested by the Owner.[43]

The Preliminary Schedule, Baseline Schedule, Update Schedule, and Recovery Schedule submittals shall include all of the following elements:

1. Tabular Reports[44] Up to four different printed reports shall be provided as a part of each Schedule Submittal. The Owner will provide the specific report layouts and content at the preconstruction conference.

2. Calendar[44a] The Contractor shall provide a printed copy of the calendar(s) used by the scheduling software. If more than one calendar is used, the tabular reports shall identify the calendar for each activity.

3. Scheduling Report[44b] If using Primavera, the Contractor shall provide the Primavera Scheduling Report which lists: (1) start-no-earlier-than and finish-no-later-than constraints that override the network logic, (2) open-ended activities which have no successors, (3) out-of-sequence logic which results from successors beginning before the successor is finished, and (4) other statistics such as number of activities, number of critical activities, etc.

4. Narrative Report[45] The Contractor shall provide a Narrative Report with the Preliminary and Baseline Schedule submittals that gives an overview of planned progress, a description of anticipated problems and tentative solutions to the problems, and a description of the most

important activities with an explanation of their relationship with other activities and the basis for determining their duration.

Narrative Reports for Update and Recovery Schedules shall include a description of actual progress during the period just completed, problems encountered and their resolution, delays, impacts, schedule revisions such as changes in network logic or activity durations, and changes in the critical path. The report will also include a description of intermittent or reduced-effort work activities, changes in crews or network logic, work anticipated for the next period, and how the Contractor plans to recover any lost time. It shall list any added or deleted activities and the reason for the addition or deletion from the schedule.

5. Network Diagram[46] A time-scaled Network Diagram shall be provided with the Preliminary Schedule, the Baseline Schedule, any Recovery Schedule, and Update Schedules if requested by the Owner. It shall show each activity's identifier, description and duration, plus the network logic relationships to other activities as connecting lines. The critical path shall be clearly indicated.

   Networks shall be drawn on sheets no larger than 30 inches x 42 inches with title, sheet number, and data date on each sheet. A legend shall be provided to define abbreviations used. Where total float exists, activities shall be shown at the time they are scheduled to be accomplished.

1-08.3(9) Submittal Schedule and Submittal Log[47]

A preliminary Submittal Review Schedule shall be submitted at the preconstruction conference that lists anticipated dates of submittals for long lead and priority review items. Prior to the first progress payment, it shall be revised with all significant material procurement items and with a record of actual submittal and review actions to date. It shall be submitted and maintained throughout the duration of the project as the Submittal Log, which is described in Section 1-06.7 of these specifications. It shall be coordinated with the progress schedule to the satisfaction of the Owner.

1-08.3(10) Short-Interval Schedule[48]

At each weekly progress meeting, the Contractor shall provide a detailed, three-week short-interval (look-ahead) schedule for use by the Contractor's supervisors and subcontractors. Copies shall be provided to the Owner.

The short-interval schedule shall be a bar chart or in other format satisfactory to the Owner. It shall be based upon the most current Update Schedule and shall indicate the planned progress for the next three weeks, the actual progress achieved the previous week, and shall show the planned progress from the previous short-interval schedule. Each task on the short-interval schedule shall be referenced to an activity in the Update Schedule.

1-08.3(11) Notice of Delay[49]

The Contractor shall give timely notice of any delay or anticipated delay that affects the critical path and may delay the project. An estimate of the probable days of delay shall be included with any notice of delay. Failure to provide a notice of delay within 7 days of when a delay is or should be known waives the Contractor's right to a time extension for delays up to the date of untimely notice.

1-08.3(12) Scheduling – Failure To Comply[50]

Failure by the Contractor to provide the required schedule information at the required times, or to follow the currently approved schedule, may result in either default termination or denial of partial or all progress payments until such time as the required schedule information is submitted in the correct format, at the sole option of the Owner.

1-08.3(13) Schedule Float Utilization

Any float time of activities not on the critical path shall belong to the Project and may be used by the Contractor or the Owner to optimize its construction progress.[51]

1. Owner Use of Float Later Needed by Contractor[52]

If the Owner uses float which the Contractor later needs due to non-excusable Contractor delays that delay the project, liquidated damages will not be assessed against the Contractor for the days of float used by the Owner in the earlier period. Liquidated damages may be assessed for any additional non-excusable Contractor delay, beyond those days that the Owner used.

2. Early Completion Schedule[53]

Early completion schedules (i.e. substantial completion before the contract-specified completion date) are subject to acceptance by the Owner.

The Owner allocates its resources to a contract based on the total time allowed in the contract and may accept a progress schedule indicating an early physical completion date but cannot guarantee the Owner's resources will be available to meet the accelerated schedule. No additional compensation will be allowed if the Contractor is not able to meet their accelerated schedule due to the unavailability of Owner's resources or for other reasons beyond the Owner's control.

Contractors submitting an early completion schedule shall provide adequate documentation from their bid files showing that they bid the project to complete within the time proposed in their schedule submittal.[54] Acceptance of an early completion schedule by the City is also contingent upon the schedule complying with all portions of the specifications and the City being able to perform its activities within the time planned.

If requested by the City, in order to justify an early completion schedule, the Contractor shall do one or more of the following: (1) provide an analysis of the activity relationships that demonstrates they are reasonable; (2) provide an analysis of the work quantities, crew and equipment planned, and productivity rates that demonstrates that the critical and near-critical activity durations are reasonable; (3) provide written concurrence and commitment from the subcontractors that the durations of their activities are reasonable; and (4) resource load all critical and near-critical activities, and all other activities using the same resources (specified labor trades), to demonstrate adequate labor is available and that trade stacking will not occur.[55]

If the project records indicate a pattern of actual critical path and near-critical activity durations being significantly longer than planned and/or the actual sequence of construction taking significantly longer, the acceptance of an early completion schedule may be rescinded and the Contractor required to resubmit a schedule for review and acceptance by the City. The City retains the right to reject any further early completion schedules.[56]

1-08.3(14) Contemporaneous Time Impact Analyses[57]

Extensions of Contract Time may be granted only for excusable or compensable delays to activities that actually delay the project completion beyond the contract Substantial Completion date.

Timeliness

Requests for time extensions shall be submitted within 14 days after the extent of an excusable or compensable delay is, or should be, known.

If the delay extends beyond one schedule update period, the Contractor shall submit interim contemporaneous time extension requests and Time Impact Analyses for each schedule update period. Failure to submit a request, the Time Impact Analysis, narrative, or any requested

supplemental information within the time specified shall be a waiver of the Contractor's request for a time extension.

Time Impact Analysis
For any period in which a change in the Contract Time is anticipated, whether for a Change Order, a Change Order Proposal, an Owner directive or order, or a delay for which the Owner is responsible, the Contractor shall submit a Time Impact Analysis justifying any requested time extension. Each analysis shall include a detailed network diagram of the activities affected (a fragnet) demonstrating where the Contractor proposes to incorporate the change or delay in the current schedule. The network diagram(s) shall show: (1) the current activities affected by the change or delay and (2) the proposed activity logic relationships due to the change or delay.

Recovery Plan
When requested, the Time Impact Analysis shall also include an analysis of possible re-sequencing and acceleration to regain some or all of the lost time and an estimate of the probable cost of such effort.

Narrative
The Time Impact Analysis shall include a narrative containing the rationale used in developing the analysis. It shall address the contract basis for the time extension, the facts giving rise to the delay, and an analysis of how the event or actions for which the Owner is responsible delayed the overall project completion and why the Contractor is due additional time. The recitation of the facts shall reference the documents or statements of individuals supporting the asserted facts, and pertinent documents shall be attached to the narrative when practical.

Weather Delays[57a]
Delays for normal weather is not excusable. Delays by abnormal weather are excusable but non-compensable. Time Extension Requests for abnormal weather delays must show that the actual weather for the period in question was significantly worse than the typical weather for that period, as indicated by the past 10 year of National Oceanic and Atmospheric Administration (NOAA) records entitled "Local Climatological Data" for the locale of the Project. In addition, the request must explain how the abnormal weather affected the critical path and delayed the project, the amount of delay that would have occurred from normal weather, and the amount of additional delay due to the abnormal weather.

Avoidable Delays
Delays that could have been avoided by the exercise of reasonable care, prudence, foresight and diligence are not excusable.

Unavoidable Delays
Delays beyond the control of the Contractor and which could not have been avoided by the exercise of care, prudence, foresight and diligence on the part of the Contractor and its Subcontractors are excusable but non-compensable. These include delays caused by Force Majeure, war, public enemy, freight embargos, and strikes occurring despite the Contractor's reasonable efforts to avoid them.

Review and Additional Data Requested
If requested, the Contractor shall submit additional information within 14 days. The City will meet with the Contractor within 14 days of receipt of a time extension request, or the additional information if requested, to review the request.

1-08.3(15) Analysis of Multiple Delays[58]

If for some reason, the project has been subject to multiple delays over a period of time and contemporaneous impact analyses have not been used to analyze the time impact and possible time extensions, the Contractor may submit a global analysis of all delays to date using the 'Would Have Been, But For' approach, the 'Windows' approach, or some other approved methodology. The 'Collapsed As-Built' approach, where alleged delays are removed from the as-built schedule, shall not be used unless approved by the Owner.

1-08.4 Notice to Proceed, Prosecution and Hours of Work

Notice to Proceed will be given after the contract has been executed and the contract bond and evidence of required insurance have been filed with and approved by the Owner.[59] The Contractor shall not commence work until the Notice to Proceed has been given by the Owner.[60] The Contractor shall commence construction activities on the Project Site within ten days of the Notice to Proceed Date. The Work thereafter shall be prosecuted diligently, vigorously, and without unauthorized interruption until physical completion of the work.[61] Voluntary shutdown or slowing of operations by the Contractor shall not relieve the Contractor of the responsibility to complete the work within the time(s) specified in the Contract.[62]

1-08.4(1) Notice of Planned Overtime Work

If the Contractor elects to work on a Saturday, Sunday or other holiday, or longer than an 8-hour shift on a regular working day, an inspector and/or a survey may need to be present, at the discretion of the Owner. The Contractor shall notify the Owner at least 48 hours in advance of extended mid-week hours and 72 hours in advance for weekend work so that the inspector's and/or surveyor's time may be scheduled.[63]

1-08.4(2) General

The Preliminary, Baseline and all Update schedules shall not conflict with any time and order-of-work requirements in the contract.

If the Owner deems that any progress schedule does not provide the information required in this section, the Owner may withhold progress payments until a schedule containing the required information has been submitted by the Contractor and accepted by the Owner.[64]

The Owner's acceptance of any schedule shall not transfer any of the Contractor's responsibilities to the Owner. The Contractor alone shall remain responsible for adjusting forces, equipment, and work schedules to ensure completion of the work within the times specified in the contract.[65]

1-08.5 Time for Completion[66]

The entire project, including cleanup, shall be physically completed within the time set forth in the contract.

Each calendar day, including Saturdays, Sundays, and holidays, shall be counted when computing the total contract time for completion.

The time for completion of this contract has been determined considering weather patterns in the project area which could delay or hinder placement of concrete sidewalk, driveways, asphalt paving and placement of pavement markings, among other items. The Contractor should anticipate probable delays in the construction sequence due to rainfall and weather patterns in the area and allow time for such rainy

periods of weather in the construction schedule. Normal weather and environmental conditions will not be considered as an excusable delay to the Contractor in meeting the substantial completion date.

The Owner expects to approve the award of the contract to the lowest responsive, responsible bidder. Following the intent to award notice, the Contractor shall have ten calendar days to provide all required insurance documents and other required submittals. After receipt of all proper documentation, the contract will then be awarded by the authorized Owner representative. Following the actual award, the Owner will schedule a preconstruction conference with the Contractor which is planned to occur no later than the estimated date for issuance of Notice to Proceed.

If the Contractor does not achieve substantial completion within the specified contract time, the Owner will deduct from any money due or to become due to the Contractor, the liquidated damages calculated from Section 1-08.9 for each day of delay.

1-08.6 Suspension of Work[67]

The Owner may suspend all or part of the work if:

1. Unsuitable weather, force maejure, or other conditions beyond both the Contractor's and the Owner's control prevents satisfactory and timely performance of the work.
2. The Contractor does not comply with the contract or the Owner's orders.
3. Suspension is needed for the Owner's convenience or other reasons for which the Owner is contractually responsible.

If the suspension is for reasons #1 and #3 above, the period of suspension will not be counted as contract time. If suspended for reason #2, the period of suspension will be counted as contract time and the Contractor shall be liable for failure to complete all work within the then current contract period.

If the suspension is for reason #3, the Contractor may be due an equitable adjustment for any increase in costs due to the suspension, provided the Contractor has followed the procedures provided for in this section and Sections 1-04.5 and 1-09.11.

1-08.7 Maintenance During Suspension[68]

The Contractor shall protect the work from damage or deterioration before and during any suspension. If public access was provided during construction, the Contractor shall continue providing the same level of public access during the suspension.

If the work was suspended for non-compliance with the contract terms or direction of the Owner, the Contractor shall bear the cost of maintenance and continued access. Otherwise, the Owner shall reimburse the Contractor for the costs.

1-08.8 Extensions of Time[69]

Extensions of time shall be granted only after review and acceptance of the Contractor's Time Extension Request. Until then, the Contractor shall make every reasonable effort to maintain the schedule without accelerating.

Following notice that a time extension has been accepted, the activity data and network logic relationships in the Time Impact Analysis shall be incorporated into the current Update Schedule during

the next scheduled progress update. Added activities shall be identified in the same format and level of detail as the original activities in the Baseline Schedule and coded in a manner that they can be identified to the specific Change Order.

The reasons for and times of extensions shall be determined by the Owner, and such determination will be final as provided in Section 1-05.1.

1-08.9 Liquidated Damages[70]

Time is of the essence for this contract.

If the Contractor fails to perform within the time specified in the contract, the Contractor will be in breach of this contract and the Owner, as representative of the public in general and all users who benefit from the project, will suffer damages as a result of this breach.

Because the Owner finds it extremely difficult or impractical to calculate the actual cost of this delay, the Contractor shall pay liquidated damages in the following amounts: _____.

SECTION II – COMMENTARY ON OTHER SECTIONS AFFECTING THE SCHEDULE OR SCHEDULING CLAIMS

NOTE: This section contains general notes and/or specific language for other portions of the specifications that could affect the schedule, and help avoid or resolve delays and claims. It has not been reviewed by an experienced construction attorney and should be applied with caution. The authors and distributor of this document disclaims any responsibility for reliance on the document.

This section and the scheduling specification above are based on the Standard Specifications for Road, Bridge, and Municipal Construction, 2004, M41-10, published by the Washington State Department of Transportation (WSDOT). It is a continuing work in progress. When complete, it will be re-organized to match the U.S. Army Corps of Engineers standard specification format.

NOTE: This section

Other Sections Affecting Schedule Progress and Scheduling Claims

Numerous sections of a contract impact the likelihood of the Contractor completing on time and whether claims for delay and impact will be filed for time extensions and compensation. The goal should be that these other sections: (1) encourage good scheduling practices and pursuit of timely completion by the Contractor and (2) provide the contractual tools needed by the Owner to either force compliance with good scheduling practice or defend against unwarranted claims for additional time and cost.

The sections that need to be integrated with the scheduling specification include:

* Partnering
* Notice
* Schedule of Values and Progress Payments
* Submittals and Requests for Information
* Recordkeeping and Reporting by the Contractor (e.g. the Superintendent's Daily Reports, photographs, etc.)
* Meetings
* Time of completion and liquidated damages
* Project coordination (of subcontractors)
* Time of completion and liquidated damages
* Disputes and Claims

<<SSP TO CHECK ALL OF THE ABOVE SECTIONS IN OTHER CONTRACTS AND INCLUDE THEM IN THIS SECTION>>

0-00 CONTRACT

FOOTNOTE: The contract duration should to be stated in only one location, normally the contract.

COMMENTARY ON OTHER SECTIONS AFFECTING SCHEDULING OR SCHEDULE CLAIMS

1-01 DEFINITIONS AND TERMS

1-01.3 Definitions

Completion Dates
Substantial Completion Date is the day the Engineer determines the Contracting Agency has full and unrestricted use and benefit of the facilities, both from the operational and safety standpoint, and onlyh minor incidental work, replacement of temporary substitute facilities, or correction or repair remains for the physical completion of the total contract.

Physical Completion Date is the day all of the work is physically completed on the project. All documentation required by the contract and required by law does not necessary need to be furnished by the Contractor by this date.

Final *Completion Date is the day all the work specified in the contract is completed and all the obligations of the Contractor under the contract are fulfilled by the Contractor. All documentation required by the contract and required by law must be furnished by the Contractor before establishment of this date.*

FOOTNOTE: Clearly defining the various stages of completion will aid in finishing all work as soon as possible and avoid the issue of punchlist work being done during occupancy, with its attendant interference with the Owner's use of the facility. It will also aid in avoiding a protracted period of completing operations and maintenance manuals, as-built drawings, etc.

Owner
Whenever the contract refers to Owner, it includes any designated representative of the Owner, which may include a Construction Manager (Owner's Representative) or the Designer (Architect/Engineer).

Overhead
Overhead means those items which may be included in the Contractor's markup (general and administrative expense, overhead and profit) and that shall not be charged as a Direct Cost of the Work: wages or salary of personnel above the level of foreman (i.e., superintendents and project managers); costs of equipment owned or leased by the Contractor and not directly used in performing the work (i.e. job trailers, office equipment), small tools, expenses of the Contractor's offices including personnel; and overhead and general administrative expenses. <<FROM OSU SPECS, COULD BE IMPROVED>>

1-02 BID PROCEDURES AND CONDITIONS

1-02.1 Prequalification of Bidders

The WSDOT spec requires prospective bidders to submit a "Standard Questionnaire and Financial Statement" gives the agency the ability to deny bid proposal forms. The agency can then either deny prequalification or limit the size of contract the Contractor can bid upon, based on:

1. The extent of other work the bidder has under contract, or
2. Past or present work that has been less than satisfactory.

FOOTNOTE: This gives an Owner a great deal of power to avoid unsatisfactory contractors, and should be used when warranted – even though it may result in some litigation. Public owners in general have allowed too many unsatisfactory contactors – who do poor quality work, finish late, and file unwarranted claims – to continue bidding and being awarded their work.

One of the major reasons for utilizing alternative contacting methods (CM/GC and Design/Build) has been to avoid these contractors. A strong prequalification effort will enable public owners to continue using competitive low bid contracts while avoiding those contractors.

1-02.14 Disqualification of Bidders

A bidder may be deemed not responsible and the proposal rejected if:

1. Multiple proposals are submitted from a bidder using the same or different names.
2. Evidence of collusion.
3. Bidder is not prequalified for the work or for the full extent of the bid.
4. An unsatisfactory performance record exists based on past or current work.
5. The bidder has uncompleted work which might hinder or prevent completion of this work.
6. The bidder failed to settle bills for labor or materials on past or current contracts.
7. The bidder has failed to complete other work or been convicted of a crime from previous work.
8. The bidder is unable, financially or otherwise, to perform the work.
9. The bidder is not authorized to do work in the state.
10. There are other reasons deemed proper by the Contracting Agency.

FOOTNOTE: Even after being initially prequalified and submitting a bid, the agency can reject the bidder – if subsequent information is discovered that indicates that the bidder will not perform adequately.

1-02.15 Pre-Award Information

Before awarding a contract the agency can require the contractor to provide:

1. A complete statement of the origin and manufacture of all materials.
2. Samples of the materials for testing.
3. A progress schedule, in the form required, showing the order and time for the work.
4. A breakdown of costs assigned to any bid item.
5. Attendance at a conference with the Engineer.
6. Any other information or action deemed necessary to ensure the bidder is the lowest responsible bidder.

FOOTNOTE: This give further opportunity for the Owner to ensure that the low bidder will perform satisfactorily.

1-03 AWARD AND EXECUTION OF CONTRACT

FOOTNOTE: Prompt award, contract execution, and notice to proceed is needed to avoid delays into inclement weather and possible Contractor claims for impact for a delayed start of work.

1-04 SCOPE OF THE WORK

1-04.2 Coordination of Contract Documents, Plans, Special Provisions, Specifications, and Addenda

This provides the order of precedence of the contract documents (e.g. (1) addenda over (2) proposal form over (3) special provision over (4) plans over (5) amendment to standard specifications over (6) standard specifications, over (7) standard plans. Also, figured dimensions take precedence over scaled dimensions and work not described in detailed shall be performed in accordance with standard trade practice. In addition, work specified in one area but not another shall be required even if not mentioned in other parts of the contract.

FOOTNOTE: The last sentence can create unfair results, if a work item performed by one trade is in a specification section not normally reviewed by that trade.

1-04.4 Changes

This is a relatively standard changes clause and includes an adjustment in unit price for quantity variances over 25%.

1-04.5 Procedure and Protest by the Contractor

If in disagreement with an order from the Engineer, the Contractor shall:

1. Immediately give a signed written notice of protest before doing the work.
2. Provide a written protest w/in 15 days with a written statement of:
    * Date of the protested order.
    * Nature and circumstances causing the protest.
    * The contract provisions supporting the protest.
    * The estimated cost of the protest work and how the estimate was determined.
    * A schedule analysis showing the change or disruption, if claimed.
3. If the protest is continuing, provide other information as requested.
4. Keep complete records of the extra costs and time.

Failure to follow these procedures and those in section 1-09.11 results in waiver of any claims.

FOOTNOTE: Notice is an essential tool to control unwarranted extra work, allowing the Owner an opportunity to mitigate damages and control the work. Unfortunately, some owners are being unreasonable in their requirements, placing contractors at an unfair disadvantage and encouraging claims.

COMMENTARY ON OTHER SECTIONS AFFECTING SCHEDULING OR SCHEDULE CLAIMS

1-04.7 Differing Site Conditions (Changed Conditions)

Standard clause allowing type 1 or 2 changed conditions.

1-05 CONTROL OF WORK

1-05.3 Plans and Working Drawings

The Contractor shall submit supplemental working drawings as required for the performance of the work. Unless otherwise stated in the contract, the Engineer will require up to 30 days from the date the submittal or resubmittals is received until they are returned to the Contractor. The clause also notes that the Contractor will obtain written approval of the drawings before proceeding with the work and that approval does not relieve the Contractor of responsibility for the accuracy of the drawings or conformance with the contract.

FOOTNOTE: Thirty days is excessive in many cases; 15 or 20 days is more reasonable. Also, the wording should be '*may require'* .

1-05.10 Guarantee

The Contractor, mechanical and electrical subcontractor, and the _____ subcontractor(s) shall be available approximately 30 calendar days prior to the expiration of the guarantee period to tour the project with the Owner, in support of the Owner's effort to establish a list of corrective work required under the guarantee.

Upon receipt of written notice of such required corrective work, the Contractor and subcontractors shall pursue vigorously, diligently, and without unauthorized interruption of the Owner's operations, the work necessary to correct the listed items.

FOOTNOTE: This section may specify only the general contractor, depending upon the items guaranteed. The Owner and Engineer should prepare a preliminary list of items prior to the joint

1-05.11 Final Inspection

1-05.11(1) Substantial Completion Date

When the Contractor considers the work to be substantially complete, the Contractor shall notify the Owner and request the Owner to establish the Substantial Completion Date. To be considered substantially complete the following conditions must be met:

1. The Owner must have full and unrestricted use and benefit of the facilities, both from an operational and safety standpoint.
2. Only minor incidental work, replacement of temporary substitute facilities, or correction or repair work remains to reach physical completion of the work.

<<SEE PAGE 1-15 OF CITY OF KENT SPEC FOR ADDITIONAL LANGUAGE>>

<<DISCUSS PRE-FINAL INSPECTION PUNCH LIST PREPARATION AND COMPLETION BY THE GENERAL CONTRACTOR>>

1-05.11(2) Final Inspection and Physical Completion Date

When the Contractor find the work physically complete and ready for Final Inspection, the Contractor, by written notice, shall request the Owner to schedule a Final Inspection. The Owner will set a date for Final Inspection. <<SEE PAGE 1-15 FOR THE BALANCE OF THE SECTION>>

<<DISCUSS PAPERWORK: O&M MANUALS, AS-BUILT DRAWINGS, WARRANTIES, ETC. ALSO THAT THE CONTRACTOR SHALL PROCEED W/ALL DUE HASTE.

HOW ABOUT LIQUIDATED DAMAGES FOR LATE PHYSICAL COMPLETION AND LATE FINAL COMPLETION? OTHERWISE THE WORK COULD DRAG ON, COSTING THE OWNER MONEY W/NO LEVERAGE TO PRESSURE THE CONTRACTOR TO FINISH AS SOON AS POSSIBLE.>>

1-05.11(3) Operational Testing and Startup

Projects with substantial mechanical or electrical systems need to have a separate section of operational testing and startup.

1-05.12 Final Acceptance and Guarantee

This addresses the Final Acceptance Date and a Certificate of Completion (or Occupancy).

1-05.13 Superintendents, Labor, and Equipment of Contractor

The Contractor shall keep a complete and current set of plans at the work site. A competent and experienced superintendent shall be assigned with full authority to represent and act for the Contractor and shall remain on the site whenever the work is underway. Any superintendent who repeatedly fails to follow the Engineer's written or oral orders, or any incompetent, careless or negligent employee, shall be removed from the project and replaced.

The Engineer will rate the Contractor's performance and contract compliance in these categories and the rating used for prequalification on subsequent contracts:

1. Progress of work.
2. Quality of work.
3. Adequacy of equipment.
4. Administration, management, and supervision.
5. Coordination and control of subcontractors.

FOOTNOTE: This provides the feedback loop needed for the prequalification process and avoids the opportunity for a rejected bidder of using the charge of unreasonableness or bias in attempting to overturn a rejection of their prequalification application.

COMMENTARY ON OTHER SECTIONS AFFECTING SCHEDULING OR SCHEDULE CLAIMS

1-05.14 Cooperation With Other Contractors

The Owner shall not be responsible for any damages suffered by the Contractor resulting directly or indirectly from the performance or attempted performance of any other Owner contract or contracts existing or known to be pending at the time of bid.

FOOTNOTE 1: Work by other contractors may interfere with the Contractor's operations and be cause for claims – unless those other operations are identified and the responsibility for coordination placed on the Contractor. Known start dates should be stated if known; finish dates should not be stated, as late completion by the other contractor could expose the owner to potential claims.

FOOTNOTE 2: List the other projects, their projected start date, and other information of value to the Contractor.

1-05.15 Performance Incentive

It is imperative that _____ be completed by _____. Accordingly, and as an incentive to reach substantial completion of _____ as soon as possible, the Owner will pay the Contractor for early completion. The incentive shall be $500.00 for each calendar day, for a maximum of $50,000, before _____ that the _____ is substantially complete. The _____ completion date shall not be revised due to contract extensions of any kind. While the contract may be extended, payment of the performance incentive will be based on the specified _____ completion date.

This incentive shall remain dependent upon the Contractor's satisfactory performance and completion of all aspects of the Contract Work and acceptance by the Owner, and be subject to withholding for retainage as set forth in the contract.

FOOTNOTE: An excusable delay can cause the project or an interim milestone to be delayed, with severe consequences (e.g. late completion of a school past the scheduled start of the school year). To help minimize the possibility of such an event, a relatively small incentive can be offered that will encourage the contractor to complete early and avoid delay past the critical milestone date. The incentive should be large enough to encourage early completion but not enough to encourage a major claim for unwarranted time extension. It can be justified on the basis of reduced construction management costs along.

A time extension past the incentive date would not benefit the Owner and therefore the date is not extended for any reason (including excusable and even compensable delays). This has the added benefit of not encouraging unwarranted claims for time extensions in order to obtain the bonus.

1-06 CONTROL OF MATERIAL

1-06.7 Submittals

1-06.7(1) Submittal Schedule

The Contractor shall submit a schedule of all contract-specified, high-priority, and long-lead procurement submittals at or before the preconstruction conference and before the first progress

payment. The submittal schedule shall in Excel in the format provided by the City, or as mutually agreed, and be provided as three printed copies and in electronic form. It shall contain:

1. The project name and identifying number and the Contractor's name.
2. A sequential number for each planned submittal (e.g. 1, 2, 3, . . .).
3. Description of the submittal.
4. The relevant contract section and paragraph or drawing sheet number and detail.
5. The name of the subcontractor or supplier responsible for the submittal.
6. Scheduled submittal date.
7. Priority for processing.
8. For critical submittals, the date approval is needed.
9. Remarks

The submittal schedule may be modified, deducted from, or added to by the City. It shall allow a minimum of 21 days for review by the Owner and Engineer, unless otherwise allowed by the Owner. Submittal shall be submitted early enough to allow for unforeseen delays such as: (1) initial rejection for failure to conform to the specifications, (2) delays in assembly or manufacture, (3) delays in delivery, (4) labor disputes, and (5) other causes.

FOOTNOTE: In order to ensure timely submittals, some Owners require contractors to bid a specified amount (say $100,000) for preparing, submitting and processing to acceptance all of the submittals. They provide a list of submittals with a value for each plus an allowance for future unidentified submittals. This encourages the Contractor to expedite submittals and they pressure their subcontractors and vendors to ensure timely submittals and to limit resubmittals.

1-06.7(2) Submittal Transmittal Form

All submitted information shall be clear, sharp, high contract copies. Accompany each submittal with a letter of transmittal containing the following information:

1. The project name and identifying number and the Contractor's name.
2. A sequential tracking number for each new submittal (e.g. 1, 2, 3, . . .). Resubmittals shall have a sequential letter suffix (e.g. 1A, 1B, 1C, 2A, etc.).
3. Description of the submittal.
4. The specification section and paragraph or drawing sheet number and detail.
5. The subcontractor or vendor providing the item.
6. Priority for processing.
7. Date return is needed
8. Remarks.

1-06.7(3) Submittal Log

The Contractor shall maintain a log of all submittals with the information contained in the submittal schedule and submittal transmittal form. It shall be provided in both printed and electronic form in Excel and in the format provided by the City, or as mutually agreed. It shall contain the following data, in addition to that specified in section 1-06.7(1):

1. Actual submittal date.
2. Date needed to be returned
3. Date actually returned
4. Approval status

5. Action required

The submittal log shall be revised and resubmitted with each schedule update until all submittals are approved.

1-06.7(3) Daily Field Reports

The Contractor shall submit a daily field report by its onsite supervisor and by each subcontractor on the site, no later than the end of the following day. The report shall include, but not limited to:

* Weather: rainfall, high and low temperatures during working day, wind or other environmental factor, and the impact.
* List of the general contractor's separate crews, the size of the crews, and activities performed.
* List of subcontractors on the site, their crew size, and activities performed
* Total number of personnel working on site.
* List of equipment on site and used.
* Start and finish dates of network activities and milestones.
* Extra work being performed.
* Delays, disruptions, and loss of efficiency with the reason.
* Meetings, conversations with owner, designer, or other party.
* Accidents and unusual events.
* Meetings

FOOTNOTE: The daily field reports may be vital in analyzing time extension requests and claims for delay, acceleration and impact. They should be reviewed at least weekly, to identify developing delays and other problems, so that prompt corrective action can be taken.

1-07 LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

1-07.6 Permits and Licenses

FOOTNOTE: Unusual permits should be identified to ensure that the Contractor allows time for their procurement, while cautioning the Contractor that other permits may be required.

1-07.13 Contractor's Responsibility for Work

1-07.13(1) General

An extension of time will be granted for damage of the Contractor's work by acts of God, the public enemy, government authorities, or by others not related to the contract – providing the Contractor takes reasonable precautions to avoid or minimize such delays.

1-07.13(2) Relief of Responsibility for Completed Work

Upon written request, the Contractor may be relieved of the duty of maintaining and protecting certain portions of the work which have been completed in all respects.

<<INTERIM COMPLETION DATES

We should consider an interim completion date for erosion control, and provide a window for landscaping>>

1-07.17 Utilities and Similar facilities

FOOTNOTE: Delay of relocation of utilities is a common cause of project delay and claims. Field locates are sometimes not requested or inaccurate, utility companies are often late in performing their work, and the plans may not show some utilities or show them incorrectly.

1-07.28 Partnering

<<FIND A STANDARD PARTNERING CLAUSE – ASK BRASCHER>>

FOOTNOTE: Partnering is highly recommended as it improves working relationships, which in turn reduces delays and claims.

1-09 MEASUREMENT AND PAYMENT

1-09.4 Equitable Adjustment

The equitable adjustment provide for elsewhere in the contract shall be determined by either unit prices or as otherwise determined.

* Equipment rates shall be actual cost, but shall not exceed the rates set forth in the AGC/WSDOT equipment Rental Agreement.
* Concurrent delay shall result in a time extension but no compensation
* Claims for anticipated profit on deleted work will not be allowed.
* Claims for consequential damages will not be allowed.

1-09.6 Force Account

FOOTNOTE: WSDOT markup is as follows:

* Markup for labor shall be 29% of labor reimbursement costs to cover project overhead, general company overhead, profit, bonding, insurance, B&O tax, and any other costs incurred.

* Markup for materials shall be 21%.

* Rental rates for Contractor-owned equipment shall be based on the Rental Rate Blue Book as modified by the current AGC/WSDOT Equipment Rental Agreement; rental rates for rented equipment shall be at the invoiced rate plus the operating costs in accordance with the Blue Book Rental Rate as modified by the AGC/WSDOT Equipment Rental Agreement. Equipment markup is 21%. Small tools may be paid as outlined in the AGC/WSDOT Equipment Rental Agreement.

* Markup for subcontractor work shall be 12% for the first $25,000, 10% for the balance up to $100,000, and 7% for amounts greater than $100,000.

COMMENTARY ON OTHER SECTIONS AFFECTING SCHEDULING OR SCHEDULE CLAIMS

WSDOT markup for force account work is higher than many agencies, but appears to be fair. An alternative would be to compute actual jobsite and home office overhead costs and allow between 4% to 12% profit (plus labor-based insurance and bond), depending upon the risk and size of the change. For guidance on a reasonable profit, see the U.S. Army Corps of Engineers guidelines.

FOOTNOTE: OSU Markup is as follows:

* Labor	15%
* Equipment	10%
* Materials	10%
* Subcontract < $2,000	10%
* Subcontract > $2,000	05%

1-09.11 Disputes and Claims

1-09.11(1) Disputes

If unable to obtain satisfactory resolution of disputes through the project engineer under section 1-04.5, the Contractor shall follow the more formal procedures in section 1-09.11(2).

1-09.11(2) Claims

The Contractor is required to file a timely, compliant written notice and to provide the Owner reasonable access to actual cost records. The information required with a claim includes:

1. A detailed factual statement of claim with all necessary dates, locations, and items of work affected by the claim.
2. The date on which facts arose which gave rise to the claim.
3. The name of each agency individual involved or knowledgeable about the claim.
4. The specific provision of the contract which support the claim and why.
5. If related to a decision of the Engineer, all facts supporting it position relating to the decision.
6. Identification of documents and the substance of any oral communication supporting the claim.
7. Copies of documents supporting the claims.
8. if a time extension is requested, the information described in section 1-08.3(14) shall be provided.
9. If additional compensation is requested, the amount and a breakdown by labor, materials, equipment, subcontract, jobsite overhead, home office overhead, bond and insurance, and profit.
10. Certification under penalty of law for perjury or falsification.

FOOTNOTE: An alternate specification for the dispute resolution process is as follows:

Alternate Claim Review Process

* The contractor shall submit a written notice of intent to claim to the Owner within 5 days of the date of an event giving rise to a claim, or within 5 days of the date the Contractor knew or should have known of the problem.

* Within 7 days after mitigation of the cause of a claim, but in no case more than 30 days after the initial notice, the Contractor shall submit a complete and detailed description of the claim.

COMMENTARY ON OTHER SECTIONS AFFECTING SCHEDULING OR SCHEDULE CLAIMS

* The detailed notice shall include a detailed, factual statement of the basis of the claim, pertinent dates, contract provisions supporting the claim, references to documents supporting the claim, an analysis of the cost and the dollar value of the claim, and the time extension requested. If the claim involves subcontractor work, the Contractor will analyze and evaluate the merits of subcontractor claims before forwarding them and the analysis and evaluation to the Owner.

* The Owner will review all claims and within 10 days either: (1) request additional information, (2) inform the contractor when a response will be made, (3) reject the claim in whole or part and identify why, (4) recommend approval of all or part of the claim, or (5) propose an alternate resolution.

* The Owner's decision shall be final and binding on the Contractor unless appealed by written notice to the Owner within 15 days of receipt of the decision. The Contractor must present written documentation supporting the claim within 15 days of the notice of appeal. The Owner shall review the materials and render a decision within 30 days after receiving the appeal documents.

* The Owner's decision shall be final and binding unless the Contractor requests mediation within 15 days of receipt of the Owner's decision. The mediation process is non-binding. Both the Owner and the Contractor must participate in the mediation process prior to either or both proceeding to litigation.

* The mediator shall be an individual mutually acceptable to both parties. If the parties are unable to agree on a mediator, either party may request that the American Arbitration Association provide a mediator and the mediator selection shall follow the American Arbitration Association rules. Each party shall bear its own costs and the cost of the mediator shall be split equally between the two parties.

1-09.11(3) Time Limitation and Jurisdiction
This requires any claim to be filed within 180 days from the date of final acceptance and be in state court in the county where the Owner's main office is located.

1-09.12 Audits and Record Retention
The Contractor's wage, timecard, payroll, equipment use, and other cost records; correspondence, memorandums, meeting notes, daily reports, diaries, and other information records; photographs; schedules; and all other records maintained regarding the project either at the jobsite or home office shall be open to inspection or audit by the Owner or a representative of the Owner during the life of the project and for a period of two years after Final Completion.

If a claim, arbitration, or litigation is contemplated or initiated, all project records shall be preserved and made available until such claim, arbitration, or litigation is completed. Failure of the Contractor to maintain the records and the Owner's subsequent inability to use the records in determining a fair settlement amount, shall relieve the Owner of responsibility for paying for more than can be justified by the Owner's records.

FOOTNOTE: Alternately, you can list the documents needed, which would include:

1. Daily crew or individual time sheets and supervisors' daily reports

2. Equipment lists, rental rates, and use and maintenance records
3. Administrative, engineering, and managerial diaries
4. Collective bargaining agreements
5. Insurance, welfare, and benefits records
6. Payroll registers (and certified payroll reports, if required by the contract)
7. Earnings records
8. Payroll tax forms
9. Material invoices and requisitions
10. Vendors, rental agencies, subcontractors and lower tier sub-subcontractors invoices and subcontracts or purchase orders
11. Subcontractor and lower tier sub-subcontractor payment certificates
12. Canceled checks (payroll and vendors)
13. Job cost reports, including monthly totals and weekly labor reports
14. Job payroll ledger
15. General ledger
16. Cash disbursements journal
17. Financial statements for all years of the contract plus the preceding and following years.
18. Depreciation records of all company equipment, whether at the company or its accountant.
19. Other sources of establishing the cost of equipment use.
20. All documents related to any and all claims filed and settled.
21. Worksheets, software files, and all other documents used by the Contractor to prepare its bid.

1-09.13 Claims Resolution

1-09.13(1) General

Prior to seeking resolution through arbitration or litigation, the Contractor shall proceed through the administrative procedures described in sections 1-04.5, 1-09.11, and any special provisions in the contract for resolution of disputes. The provisions of those sections and this section 1-09.13 must be complied with in full, as a condition precedent to the Contractor's right to seek resolution through arbitration or litigation.

1-09.13(2) Nonbinding Alternative Disputes Resolution (ADR)

If the administrative procedures have failed, either party to the contract seeking resolution of a dispute shall pursue one or more forms of ADR before filing for arbitration or litigation. If the parties cannot agree on a mutually acceptable form of ADR, they shall first mediate the case with a mediator selected through the American Arbitration Association and in accordance with their procedures before filing for arbitration or litigation.

The cost of such alternative resolution shall be shared equally between the Contractor and the Owner, with each party bearing its own preparation and presentation costs.

The Contractor agrees that participation in nonbinding ADR does not in any way waive the requirement that binding arbitration or litigation proceedings must commence within 180 days of final acceptance of the contract.

Disputes Review Board (DRB)

COMMENTARY ON OTHER SECTIONS AFFECTING SCHEDULING OR SCHEDULE CLAIMS

If the contract has a Disputes Review Board (DRB) clause and if a DRB panel has been constituted and used throughout the contract, the Contractor shall first bring the dispute to the panel for their recommendation before proceeding with arbitration or litigation.

Project Re-Alignment
The parties may elect to use a facilitated process of teambuilding, investigation, and negotiation such as practiced by Team Technologies, Inc. of Olympia, Washington, or other organizations using a similar approach, to: (1) reach consensus on how to proceed with the executives of the parties in dispute, which may include the Owner, Contractor, Construction Manager, Designer(s), Subcontractors, and Suppliers; (2) jointly determine the facts and analyze those facts with the assistance of a technical team of neutral claim experts and a local construction attorney; (3) negotiate a facilitated settlement that will wipe the slate clean and allow the parties to either complete construction in a timely and economical manner if implemented mid-project, or close out the contract if all work is largely or completely finished.

FOOTNOTE: Project Re-Alignment can be very effective on large, difficult disputes involving months of delay, millions of dollars in dispute, and multiple parties – especially if the project is ongoing and if resolution of current disputes will allow a return to teamwork and effective progress.

Mediation
The parties may select a mediator and seek resolution through the mediation process.

1-09.13(3) Arbitration of Claims of $500,000 or Less
The parties mutually agree that those claims totaling $500,000 or less, submitted in accordance with section 1-09.11 and not resolved by nonbinding ADR processes, shall be resolved through mandatory and binding arbitration.

If the parties cannot mutually agree on an arbitrator(s) and arbitration procedures within 60 days of the request for arbitration by either party, either party may file for arbitration with the American Arbitration Association and arbitration will proceed in accordance with their procedures.

1-09.13(4) Arbitration or Litigation of Claims In Excess of $500,000
The Contractor and Owner mutually agree that those claims in excess of $500,000, submitted in accordance with Section 1-09.11 and not resolved by nonbinding ADR processes, shall be resolved through litigation unless the parties mutually agree to resolve the claim through binding arbitration.

SECTION III – FOOTNOTES

NOTE: This section consists of footnotes referring to the superscript numbers in the scheduling specification. It is not to be included in the specification, but is for the use of the specification writer in determining what portions of the master specification is to be included and whether and how it should be modified.

For additional information see the lecture notes and power point slides for the training session for Seminar Day Two, *Field Office Scheduling,* by Pinnell/Busch.

1. Level of Detail and Complexity of Scheduling Clause

Too exacting and detailed of a specification may unnecessarily increase the cost for scheduling. The goal is to cover the important issues while minimizing the length and complexity of the text.

Some Contractors may over-react to a detailed scheduling specification and allocate far too much money to meeting its requirements, or even not bid the project. This must be weighted against the benefits of a detailed schedule that forces contractors to adequately schedule and control progress. Keep in mind that scheduling-related claims on a $5 to $10 million project can easily exceed $500,000. If concerned about Contractor reaction, an informal survey and 'education' of the likely bidders may be advisable.

The requirements and level of detail of a scheduling specification should reflect the project size, complexity, and risk – and, to some extent, the capabilities of the bidders. The standard specification is based on a $5 to $20 million public works project, and can be expanded for larger projects or condensed for smaller projects. The footnotes are provided as a guide to the specification writer to guide them in adapting the standard specification to the project needs.

Related Contract Clauses
Please note that the schedule specification needs to be integrated with other sections of the contract, as noted in Section II. These sections include:

* Notice
* Submittals
* Payment
* Schedule of Values
* Partnering
* Recordkeeping and Reporting by the contractor (e.g. the Superintendent's Daily Reports, photographs, etc.)
* Time of completion and liquidated damages
* Project coordination (of subcontractors)
* Time of completion and liquidated damages
* Meetings

<<SSP TO VERIFY EACH OF THESE SECTIONS ARE ADDRESSED IN SECTION II>>

2. Attendance at Preconstruction Conference

It is important to have the both the person who prepared the schedule and the person(s) who will implement it attend all schedule review meetings.

The same holds true for safety, traffic control, and other critical personnel, who should attend the preconstruction meeting or any other meeting where their work is discussed. Non-highway projects will not, of course, have a Traffic Control Supervisor.

Ensuring that the subcontractors have participated preparing the schedule is key to having a viable schedule and avoiding later delays. Another reason for having the relevant subcontractors at important meetings is to ensure clear communication and to prevent the general contractor from hiding delays and problems from the Owner.

2a. Review the Preliminary Schedule

One of the tasks at the preconstruction conference is to review the Contractor's preliminary schedule to determine the Contractor's overall approach to the work, identify potential problems, and verify that the completed schedule with comply with all contract specified sequencing and milestones. The preliminary schedule should cover the first 60 days of work in detail and the balance of the project in summary. Ideally, it should be a complete schedule, ready for review and acceptance.

Review of the preliminary schedule at the preconstruction conference is normally limited to a presentation by the Contractor and questions by the Owner's Representative. More detailed discussions will normally be scheduled after completion of the preconstruction conference and be attended by only the affected personnel – either immediately if the Contractor has prepared a complete schedule, or within 30 days and before the first progress payment request if not.

3. Partnering

A formal partnering effort is recommended on most projects over $5 million, and highly recommended for large, complex, or high-risk projects. The partnering session can be as short as one-half day for smaller projects or one-day for medium-sized projects ($10 million or larger). For very large projects (> $100 million), two days may be recommended. For details, see the lecture notes and power point slides for seminar Day Two, *Field Office Scheduling,* by Pinnell/Busch.

3a. Schedule Training and Other Issues

If the Owner wishes to train their field personnel in critical path scheduling, recordkeeping, and change management, a joint training session with the contractor's personnel is recommended – especially if the training ties into the partnering effort. This will not only improve the skills of the personnel, but will also help with teambuilding and a positive relationship among the parties.

3b. Environmental, Quality Control/Quality Assurance, Traffic, Safety, and Other Plans

Various plans may be required by the Owner to help ensure satisfactory performance and on-time completion. These should be specified elsewhere in the contract, and submittal may be required at the preconstruction conference.

Permits and Licenses
The contract may also specify that the Contractor provide a list of permits and licenses being obtained and their status. Neglecting permits can sometimes delay a project.

FOOTNOTES

4. Scheduling Terms and Definitions

A general statement is generally sufficient, except on large, complex, time-critical projects. If appropriate you can state:

> *"The principles and definitions of terms herein are as set forth in the Associated General Contactors of America (AGC) publication, 'The Use of CPM in Construction, a Manual for General Contractors and the Construction Industry'. In the event of conflicts, the provisions of this Article shall govern."*

Please note that the AGC manual is out of date, with reference to i-j node scheduling and other obsolete methods. <<SSP: CHECK THE MANUAL TO CONFIRM IT IS NOT MISLEADING>>

5. Qualifications of Scheduler and Contractor Staffing

Although a general statement is usually adequate, the following language can be used if desired:

> *"Submit a statement of the proposed Scheduler's qualifications, which shall include at least three years experience as a scheduler and two projects with the same magnitude and complexity as this contract."*

On large, complex projects more detailed requirements may be specified. If a Contractor doesn't have the capability in-house, they can readily hire a consultant to prepare the schedule, although that sometimes results in the schedule being prepared without adequate input by the project superintendent.

Understaffing by Contractors of jobsite management, supervision, administration, engineering, and scheduling personnel is a perpetual problem – especially of projects that are encountering problems – although it is understandable, as the difference between low bidder and second low may be the jobsite overhead costs.

Understaffing by Owners and Architect/Engineers on problem projects can also be a problem. It is therefore essential that all parties adequately staff their projects for a normal workload and supplement those personnel during expected peak workload periods (especially the first few months) and if the project runs into problems.

6. Progress Payments – Schedule of Values on Unit Price Contracts

On buildings and other lump sum projects, we recommend that the activities be cost loaded, with the total contract amount spread among the activities and progress payment computed by a schedule report. This simplifies the monthly progress payments and helps focus the contractor's attention on getting the work complete. It also allows the Owner to require a cash flow chart to aid in overall tracking of planned and actual progress. <<SSP TO ADD A TYPICAL CLAUSE AND OTHER NOTES LATER>>

Contractors don't like to do this as it does create extra work for them. Also, Owners need to be careful that cost loaded schedules are not front-end loaded, by putting more of the cost than needed on early activities.

Cost loading the activities is not normally done on public works contracts as they are normally paid on a unit price basis and it is difficult to allocate the unit prices to the activities. For a few types of projects, i.e. a large bridge project on which the superstructure is usually bid as a lump sum item, the contract value

for the superstructure can be allocated to the bridge activities. The schedule report can then generate the payment for the superstructure and this value can be input to the normal schedule of values for that bid item.

7. Allowable Software

Requiring the latest version of the selected software avoids the possibility that a contractor will provide incompatible, unsupported data files that the owner's version cannot read. Offering the widest range of software allows the contractor to use software they are familiar with, which eliminates errors from using new software. The downside is that the owner may have to purchase a new software package, or retain a consultant with that software.

Although MS Project is not as robust as most of the Primavera products (P3, P3e/c, Contractor, and SureTrak), the latest version is reasonably capable and should be allowed on medium-sized projects ($5 to $10 million) if the contractor wants to use it. Large projects (greater than $50 million) should always be scheduled with Primavera P3 or P3e/c.

8. Contractor to Provide Electronic Copies of the Schedule

The Contractor should be required to provide electronic copies of the schedule and all updates, even if the Owner doesn't plan to independently review the schedule. If a claim is filed, electronic data will be needed for an independent analysis, instead of having to rely on the Contractor's analysis and printed reports. If there is a dispute, the Contractor may be reluctant to provide the files and may even claim to have "lost" them.

9. 'Acceptance' Recommended Over 'Approval' or 'Acknowledgement' of Schedule

'Approval' of the schedule is not recommended as it could be erroneously interpreted by a judge, jury, or arbitrator that the Owner accepted some responsibility for its shortcomings. Likewise, *'Acknowledgement'* is also not recommended, as failure to comment on or reject an inadequate schedule or one that is being used to 'set up' for a claim would open the City to risk. A reasonably good schedule is a safeguard against unwarranted claims.

The choice of words should be approved by legal counsel; most organizations prefer to use '*accept'.*

Just because a schedule shows a certain duration or relationship doesn't mean its true or that you can't challenge or correct it. When reviewing a schedule, or a schedule-based claim, you can challenge and reject any planned duration or relationship and substitute the duration and relationship that you believe should be used or would have occurred. A schedule can also be conditionally accepted, subject to satisfactory performance, with acceptance rescinded later if progress is unsatisfactory.

10. Schedule Review – Times and Content

Schedule review and revision times should be as short as practical, without putting undue stress on the parties or resulting in a superficial effort. Generally, 7 days (one week or 5 working days) should be sufficient for reviews and revisions, although 14 days may be needed for very large, complex projects with more than 1,000 activities. In any case, the review time will be substantially reduced by the required

joint review process, as the Contractor will be required to explain and justify the network logic and activity durations at an intensive, day-long meeting.

Checklist for Review of Initial Schedule
Things to check for when reviewing a schedule include compliance with:

* All contract-specified milestones: notice to proceed, interim milestones, non-work windows, substantial completion, and final completion.
* Specified work sequences.
* Specified Owner-furnished equipment delivery dates or activity durations.
* Specified access restrictions.
* Specified submittal review times, except for early, critical materials that can be reviewed faster.
* Specified or needed startup sequences and durations.
* Reasonable allocation of costs on cost-loaded schedules to avoid front-end loading.
* A reasonable calendar for workdays, holidays, and expected non-work days for inclement weather.

Checklist for Reviewing Updates
When reviewing updates, the following items should be checked to ensure that the schedule has been updated correctly:

* Verify that the 'Retained Logic' option (on Primavera software) has been used instead of the 'Progress Override' option when computing the schedule.
* Reject negative lags for start-to-start relationships – as impractical logic. Negative lag (lead) for finish-to-start activities is a normal means of scheduling and occurs often in construction.
* Verify that the contractor ran the scheduler after all of the edits were made. Contractors sometimes fail to re-run the scheduler after making last minute edits and the dates will be incorrect.
* If the scheduled dates don't make sense, check to see if the cause is the use of different calendars.
* Run the scheduling report and determine if the constraints used were reasonable. Also check for out-of-sequence progress and open ends (activities with no successor) and other statistics.
* Check to see if the data date is correct for the current project status.
* Check critical and near-critical activities scheduled as finish-to-start with no overlap (negative lag), which indicates that the contractor may have hidden float.

For more information, see the lecture notes and power point slides for Seminar Day 2, *Field Office Scheduling* by Pinnell/Busch.

11. Accepted Schedule Required for Payment

This general statement should cover the requirement that any progress payment requires an accepted progress schedule. You should not have to repeat the statement several times.

12. Preliminary Schedule

A Preliminary Schedule details the work activities from the Notice To Proceed (NTP) until some time after the baseline schedule is expected to be approved (usually 60 days is specified), with a summary of the work through to completion. This allows the Contractor time to complete the schedule, which often isn't possible until later as many of the subcontractors may not have been selected and the Contractor hasn't had time to plan the entire project in detail.

We strongly recommend that the Contractor focus efforts on scheduling during the time from Bid opening or award to the preconstruction meeting and NTP. Later, the Contractor's project team will be too busy

starting up and managing the project. This early preparation benefits both the Contractor and the Owner by having a better schedule.

We recommend to our Contractor clients that they submit a completed baseline schedule at the preconstruction conference.

On larger, time-critical projects, the Owner may specify some of the activities for the preliminary schedule. This may include: notice to proceed, permits, submittals of long-lead materials, initial site work, earthwork, specified work sequences and construction constraints, contract milestones, delivery of owner-furnished materials, major structural or mechanical work, electrical and instrumentation/control work, substantial completion, the contract completion date, etc.

13. Narrative Reports

A Narrative Report is a vital means of communicating the Contractor's plans to the Owner, and serving as a record of those plans. It should describe the critical, near-critical, and major activities in detail including the work quantities, assigned crew and equipment, risks, etc.

14. Cost Loading of Preliminary Schedule

If progress payments are to be generated by the schedule, a note should be added, somewhat as follows:

> *'The Preliminary Schedule shall be cost loaded for the first 60 days. Progress payments will be generated by the scheduling reports. Failure to submit an acceptable schedule will be cause for withholding all or partial payment.*

15. Baseline Schedule

The Baseline Schedule is created by adding the remaining activities through to completion to the Preliminary Schedule. Upon acceptance, it is the official contract schedule, against which progress is measured, until replaced by a revised baseline as part of a global settlement of all changes up until that point.

16. Concurrence and Commitment of Subcontractors

It is extremely important that at least the key subcontractors have agreed to the schedule and are committed to meeting their assigned time frames. This prevents the general contractor from presenting an unrealistic schedule, or one that forces the subcontractors into acceleration – which often results in reduced quality, cost overruns, and claims. Preferably, all subcontractors should have been consulted and agree to the schedule. On larger, risky or time-critical projects a written agreement may be required from the key subcontractors.

17. Joint Review of Baseline Schedule

A joint schedule review by the Owner's team (Owner's Project Manager, Designer, Construction Manager/Owner's Representative, and Scheduling Expert) and the Contractor's team (Project Manager, Superintendent, Scheduler, and key subcontractors) is a crucial element of good schedule management.

It ensures an adequate level of attention to scheduling by the Contractor. It avoids the 'ping pong' practice of submission, review without fully understanding the scheduler's intent, rejection, revision without fully understanding the reviewer's intent, and the subsequent delay. It allows the Owner's team to question and record all of the Contractors important thinking and assumptions, which may be needed later to refute unwarranted claims. The end product will be far better and will better meet the needs of all parties. It greatly reduces the actual time spent by the parties in schedule review and allows for a 'team' effort by everyone.

18. Recommended Training ***

For many clients, we recommend a short joint training session on critical path scheduling for the project team (Contractor, key subcontractors, designer, and owner's representative). This ensures that everyone is speaking the same language, that basic mistakes aren't made in preparing or reviewing the schedule, and that everyone is more likely to work together in resolving disputes over changes and delays.

19. Update Schedules

Update Schedules should be prepared each month, along with the progress payment requests, and should include actual start and finish dates, percent complete, and days remaining of progressed activities, in addition to changes in the activities and their relationships. They should be jointly reviewed with the Contractor and accepted shortly after review and approval of the progress payment request.

Some guidelines on reviewing update schedules include:

* Default Progress: Automatic updating by default mechanisms shall not be allowed. Preferably, and some contracts require, the activity start and finish dates should be based on a daily field report or other document of actual progress.
* Out-of-sequence progress will be allowed on a case-by-case basis, upon acceptance by the Owner. It is a common experience for some out-of-sequence progress by finish-to-start activities that overlap a few days in practice, especially when the project is behind schedule.
* Negative lags are allowed only for finish-to-start relationships.

For details, see _____ <<SSP'S TRAINING HANDOUTS AND OTHER MATERIAL>>

20. Synchronize Update Schedule with Progress Payments

It is preferred for the Update Schedules to have the same data date as the progress payments. Although this increases the administrative effort during a short period of time, it saves time overall and facilitates using the schedule and the progress payments together as a joint control and analysis tool.

21. Independent Verification of Actual Progress

Owners should independently verify the actual start and finish dates. Contractors sometimes fail to report the correct date, and sometimes mis-report dates in order to hide their delays or set up for a claim. Owners also need to remember that the percent remaining times the original duration is not necessarily the same as the days remaining.

Updates should include changes in the actual relationships of completed activities and anticipated minor changes of pending activities.

22. Out of Sequence Progress

Out-of-sequence progress is either: (1) when the successor of a finish-to-start relationship starts before its predecessor finishes or (2) when a contractor is forced to work out of sequence due to changes and suffers loss of efficiency. The former is quite common, is usually not a significant problem. It can, however, be an indication of poor planning and the scheduler should normally use the 'Retained Logic' option.

22a. Schedule Revisions

In addition to being updated monthly with progress, schedules should be revised whenever needed with more accurate information of actual progress and problems and revised expectations and plans. Contractors should be encouraged to do this as it is in the best interests of all parties to have a more accurate schedule that is used to plan and control the work. However, one must use caution to prevent the Contractor from using revisions to 'hide' delays and push the problem to a later date with attendant trade stacking and other problems. For example, reduced critical path activity durations should not be allowed unless the Contractor can demonstrate: (1) they have consistently achieved earlier estimated activity durations and/or (2) they have a documented plan to increase labor and/or equipment or use different methods to achieve the reduced activity durations. Likewise, loosening activity relationships to save time should also be carefully scrutinized to ensure they are realistic.

23. Review Time for Update Schedules

The joint schedule review for updates will normally be much shorter than the review of the baseline schedule.

24. Joint Review of Update Schedules

The review process for update schedules is similar to that for the baseline schedule, but in less detail provided progress is satisfactory.

25. Action if Delay by Contractor

There can be two levels of action when work falls behind schedule. Minor delays, on the order of a week, can be handled as a contractor action item on their narrative report. Major delays of two weeks (less near the end of a project) should be addressed by a Recovery Schedule that is subject to close review and acceptance by the Owner.

Some contracts have very specific actions the Contractor has to take if behind schedule.

> *"If the Contractor is more than 14 days behind schedule due to non-excusable delays, the Contractor shall increase the hours of work, the crew size and amount of equipment, the number of shifts, the amount of supervision, and take any other action to recover the lost time – at the Contractor's expense."*

26. Directed Acceleration

At some point the owner should direct the contractor to accelerate to bring the scheduled completion date back within the contract duration. This can be risky, as the owner may later be found liable for the delay. Therefore, it is essential that a careful review be made of the cause of delay before directing the Contractor to accelerate.

27. Recovery Schedules

Detailed requirements for a recovery schedule are generally not needed for a $5 to $10 million project. For larger projects, the specification could be as follows:

> *If the project is falling behind schedule because of a consistent pattern of critical-path activities taking longer than planned, and when directed by the City, the Contractor shall re-schedule the project and commit additional resources to ensure against further delays.*
>
> *The Recovery Schedule shall be resource loaded with crew sizes for each remaining critical and near-critical activity, and be supported by an analysis of work quantities, productivity rates, and durations for each of the critical and near-critical activities. In addition, a resource forecast shall be prepared and compared to the available resources to ensure that adequate resources are available.*
>
> *The Contractor shall not artificially improve expected progress by revising the schedule logic constraints or shortening further activity durations – unless an analysis can prove that such changes are reasonable. The Contractor may improve expected progress by performing sequential work activities concurrently, if separate crews are available for each task or if additional resources can be provided.*

28. Trigger to Require Recovery Schedule

Near the end of a project a recovery schedule is needed for fewer than 14 days delay. For example, if there were only 30 days remaining, this clause would require recovery action when the project was only 3 days behind schedule.

29. Maximum Activity Duration and Value

One month (20 work days) is a reasonable maximum activity size for typical $5-10 million construction projects. You may also want to state: *"or shorter than one day".* You may want some smaller or larger value as maximum value of any activity (if you're specifying cost loaded schedules). Some contracts state that no more than 2% of all non-procurement activities can have durations greater than one month.

The limit of $100,000 is arbitrary, and should be increased on larger projects.

30. Flexibility In Enforcing Activity Duration and Value Limits

Limits on activity size help encourage adequate detail, in order to facilitate planning, control, and tracking progress, but shouldn't be rigidly enforced.

FOOTNOTES

31. Minimum Number of Activities

Although some specifications specify a minimum number of activities, this isn't generally recommended. If the specified number is too low, some contractors will only provide the minimum number and that may not include important activities that the owner wants to see on the schedule. If the specified minimum is too high, it will result in unnecessary detail, which still may not include the desired activities.

32. Milestones

Milestones are major events with zero days duration and mark the beginning or end of an important phase of the work. Except for contract-specified milestones the selection of milestones and hammocks (summary activities) are up to the contractor. A reasonable number of additional milestones and hammocks are helpful in tracking progress and the owner should encourage the contractor to do so.

All project schedules should have milestones for notice to proceed, substantial completion and final completion. Building contracts should have milestones for building enclosed, certificate of occupancy, move-in, and other important events. Civil work projects should have similar milestones.

If a project has critical interfaces with other contracts, the Owner should specify interim milestones with liquidated damages to avoid interfering with those other contracts and to inform the Contractor when certain areas will be available. Interim milestones can also be used to ensure that progress is adequate

33. An Activity For Each Bid Item

On unit price contracts, all but the most minor bid item should be included in at least one activity, which can include more than one bid item.

34. Procurement and Long Lead Items

Major equipment and material deliveries should be included as activities in the schedule. Normally, these are: Shop Drawing Preparation, Owner Review, and Fabrication And Delivery. If there are owner-furnished materials or equipment, separate activities for these items should be required.

In addition to tracking procurement with a Submittal Schedule and Submittal Log, Owner furnished materials and the most important long lead procurement items should be included on the schedule, in order to ensure that they are fully integrated into the schedule and tracked to avoid delays.

35. Schedule Activities

Although not essential, the list can include the more important tasks that the Owner has identified to ensure that the Contractor include them in their schedule. This list could include:

1. Obtaining permits, submittals for early procurement, and long lead time items.
2. Mobilization and preliminary activities.
3. Initial site work.
4. Specified work sequences, constraints, and milestones, including substantial completion.

FOOTNOTES

5. Major equipment design, fabrication, factory testing, and delivery.
6. Delivery dates for owner-furnished products.
7. Sitework, concrete, structural steel, architectural features, conveying systems, equipment installation, mechanical, electrical, instrumentation and control, and interfaces with owner-furnished equipment.
8. Equipment and system startup and testing.
9. Final inspection and punch list.
10. Project closeout and cleanup.
11. Demobilization.
12. Permitting and design activities.
13. Procurement activities shall include: (1) shop drawing/submittal preparation, (2) submittal and Owner review and approval, and (3) fabrication and shipping.
14. Procurement activities shall include the following, when applicable: mechanical/electrical layout drawings; preparation and review and approval of O&M manuals; preparation and submittal of as-built drawings, HVAC testing, air balance, and commissioning; controls testing; performance verification; pre-final inspection; correction of punch list; and final inspection.

36. Other Activities

Non-construction activities can sometimes result in delays. Owners should ensure that the important items are identified and scheduled.

37. Activity Relationships

Activity relationships can include: (1) finish to start (the most common), (2) start to start (the most often misused), (3) finish to finish (seldom used), and (4) others depending upon the software.

Activities with finish to start relationships often end up being completed with overlap (i.e. negative lag), which is usually not a problem but can be abused. Contractors like to hide '*contingency float*' in finish to start relationships, that they can easily overlap if necessary. Excessive use of overlap can result in out-of-sequence progress.

Start to start relationships are often used with sequential operations, such as utility work (clear, trench, lay pipe, backfill, and restoration). Start-to-start relationships with zero lag are often erroneous and the prior of the successor activity should be changed to the correct prior. Another problem with start-to-start relationships is that if the prior activity is delayed after the successor has started the successor activity may also be delayed as there is usually an ongoing relationship between the two from start to finish of the prior.

38. Constraints

Constraints are needed to restrain the start of early season work until the expected weather is sufficient or to complete weather sensitive work before inclement weather. Constraints are also used to avoid scheduling work within an environmental window. However, they can be mis-used, and unless you run the Primavera's Scheduling Report or a similar report for Microsoft Project, you won't know what they are.

38a. Retained Logic

FOOTNOTES

For a finish-to-start relationship, the prior must be finished before the successor can start. In reality, however, the successor often starts before the successor finishes. If the overlap is relatively minor, there is no problem and the out-of-sequence work will not significantly affect the critical path and the original logic should be retained. However, in some cases, the original relationship may no longer hold true. In that case the logic should be manually changed.

Using the Progress Override option in Primavera (P3, P3e/c, Contractor, etc.) is not recommended as it may create erroneous results.

39. Negative Float

Assigning 'Finish No Later Than' dates to contract required completion dates and interim completion milestones will result in negative float if the schedule slips past those dates. This is used for contract milestones (e.g. substantial completion) and simplifies identification of delays.

40. Activity Coding

Activity Identifier
Assigning different categories to activities should generally be accomplished by using codes, instead of using the activity identifier to indicate the type of work, responsibility, work area, etc. Otherwise the activity identifier can be too long. A simple four- or five-digit number is recommended. For example, some building contractors use the two-digit CSI division for the first two letters of activity identifiers and three more numbers for the specific work item.

Cost Loading
Cost loading (allocating the total contract amount among the activities) is the preferred manner for progress payments on building construction and other lump sum projects. It generally does not work on unit price contracts such as public works projects.

Cost loading schedules simplifies the monthly progress estimate procedure and helps focus the Contractor's attention on the schedule. It can, however, be front end loaded more easily than a traditional schedule of values. Also, Contractors don't generally like it as it is more work.

The standard cost (cash flow/percent complete) report is cumulative curves for both the early start and late start schedules. It can aid in determining whether progress is falling behind schedule (when the actual percent complete/cash flow is too close to the late finish curve).

You may also want to state: (1) The sum of all activity costs shall equal the contract price, (2) An unbalanced or front-end-loaded schedule will not be acceptable, and (3) The accepted cost-loaded progress schedule shall constitute the schedule of values as specified in section _____.

Resource Loading, Forecasting, and Leveling and Crew Chases
Resource loading (assigning estimated labor and equipment use to each activity) isn't necessary for most projects, although crew chases can be a helpful way to ensure that planned critical resources usage don't overlap. Complex or time-critical projects can benefit from resource forecasting (and leveling), especially if resource availability might be a problem. If resource availability is a concern, the Contractor should be required to resource load all critical trades and equipment, and produce a resource forecast showing that there are sufficient resources available for the planned level of effort.

FOOTNOTES

Resource leveling is not required, except on very time-critical projects such as a paper machine shutdown. It can be accomplished by the software, which is a first-order approximation of what a skilled superintendent or foreman will actually accomplish in the field.

An alternate to resource loading and forecasting is the use of crew chases, that identifies critical crews and equipment and traces the crew through the schedule with the use of resource relationships – to avoid either 'dead time', when the crew or equipment is idle or demobilized, or overload, when the crew or equipment is scheduled for two activities at the same time.

41. Work Area Code

Breaking major work items into several activities by separate work area is helpful in tracking progress and identifying areas with varying impact or productivity. This should not be rigidly enforced.

42. Responsibility Code

Identifying the responsibility for every activity, by either subcontractor or the general contractor's different crews, will assist the Contractor in planning and controlling the work and the Owner in tracking progress.

43. Required Reports

The specific reports desired may not be known until the need arises. For that reason, the City should have the option of obtaining additional reports without a hassle about the extra cost (which would be minimal in any case). If necessary, the following language can be included in the contract:

> *"The Contractor shall provide the following tabular reports if using Primavera, or an equivalent report if using other software:*
>
> 1. *The 'Primavera Scheduling and Leveling Calculations – Scheduling Report' with scheduling statistics, constraints, open ends, and out-of-sequence activities.*
> 2. *A tabular report sorted by activity identifier, with data columns as requested.*
> 3. *A tabular report grouped as requested, sorted by float and then early start, and with data columns as requested.*
> 4. *A tabular 'Schedule Report - Predecessor and Successor' report sorted by activity identifier.*
> 5. *A bar chart report grouped as requested, with data columns as requested, sorted first by float and then early start, with a comparison of as-planned to current, and printed on 11 inch x 17 inch paper.*
>
> *The bar chart for Update Schedules shall include activity bars and data columns for both the current update and the baseline schedule."*

Pinnell/Busch's standard reports are as follows:

Report No. 1 Columns:
The filter can be all or selected contents, as required by the owner. The sort should be by float and then early start, with a 2nd version of the report by activity identifier if Report No. 2 is not used. Float lines are normally not used, unless the software can show only the controlling relationships. Grouping may be used, if requested by the Owner.

- Activity Identifier (ID)

- Activity Description
- Responsibility
- Work Area
- Original Duration
- Calendar (if multiple calendars used)
- Float
- Early Start
- Early Finish
- Late Start
- Late Finish
- Predecessors
- Successors
- Activity Bars (in the remaining space)

Report No. 2 Columns:
The standard P3 'Schedule Report 2 – Predecessor/Successor Detail'. The sort order requested is normally by activity ID.

Report No. 3 Columns:
Printed on 11" x 17" paper with the bars for both the current and the referenced schedule (normally the baseline). The same fields as Report No. 1, plus:

- <<SEE SSP NOTES>>

44. Tabular Reports

Tabular reports and bar chart reports are printed on 8 ½" x 11" or 11" x 17" paper. They can include both columnar data and bar (Gantt) charts, with the bar charts usually combined with some columnar data.

The required report layouts, filters, sorts, etc. can be provided at the preconstruction conference.

44a. Calendars

Scheduling software uses one or more calendars that contain the work week (normally Monday through Friday) and holidays. In addition, some projects are scheduled with two or more calendars, in order to automatically adjust the schedule for weather sensitive work during expected inclement weather or a winter shut down. This information is needed in order to analyze the schedule.

44b. Primavera Scheduling Report

Contractors using Primavera can generate this report when running the critical path scheduling routine and should provide it with each schedule submittal. It lists:

1. Start-no-earlier-than constraints that prevent an activity from starting even if the predecessors are complete. It is used to delay the start of weather-sensitive activities until expected good weather, to avoid an environmental window, etc.
2. Finish-no-later-than constraints override the network logic on the backward pass so that the late finish is constrained. It is used to identify an interim completion milestone or the contract completion date and will result in negative float if the early finish of the activity (or milestone) is later than the finish-no-later-than date.

3. Open-ended activities which have no successors and therefore erroneous float. They should be linked into another activity, if appropriate.
4. Out-of-sequence logic which results from successors beginning before the successor is finished, which may or may not be a problem.
5. Other statistics such as number of activities, number of critical activities, etc.

45. Narrative Reports

Narrative reports should have a cover letter stating the name of the project, date submitted, reporting period, and name of the report author. Narrative reports for updates need include only new and revised activities and should include:

* The Contractor's plan for management of the site (laydown, etc.), use of equipment, buildup of trade labor, and potential change proposals.
* A brief description of the more important critical and near-critical activities and how they will be accomplished
* Description of potential delays including their cause and steps to mitigate.

The information listed in a narrative report for a schedule update is, of course, different from a narrative report for the baseline schedule. It should include, in addition to revised or expanded plans:

* Number of days worked during the period, the subcontractors on site during the period and the composition of the contractor's own crews, the average size of each crew, and a general statement of the equipment on hand and equipment used.
* General progress of work, including a list of major milestones achieved, activities started and finished during the period, mobilization or demobilization of subcontractors, etc.
* Changes in logic and to the critical path.
* Added and deleted activities and changes in sequence.
* Documentation of weather delays and description of their impacts.

Listing added and deleted activities in the narrative report greatly helps tracking network changes and alleviates the need to use the separately available 'Claimdigger' software.

46. Network Diagram

Timescaled graphical display (connected bar charts or timescale logic diagrams) of time-variable data is a far better medium for communication than tabular reports – especially if well done. Primavera's Timescale Logic Diagram has bars representing the activities, with activity descriptions and durations plus relationships between activities shown as arrows. Contractors using MS Project can provide a Bar Chart with connecting lines.

More detail can be added describing the timescale network diagram: (1) Title Block: show the title of the project, Owner, date submitted, revision or update number, data date if an update, and the name of the scheduler; (2) indicate horizontally across the top the time frame by year, month, and day; (3) show, at a minimum, the controlling relationships between activities; (4) plot activities on a timescaled basis, with the length of each activity proportional to the current estimate of the duration and the start and finish date at the proper calendar location; and (5) provide a legend describing standard and special symbols used.

FOOTNOTES

We recommend that the network diagram not show non-working weekends, as it makes the diagram more difficult to read. <<BLAKE: CAN P3 AND/OR MS PROJECT DO THAT? ALSO CAN IT SHOW ONLY CONTROLLING RELATIONSHIPS?>>

Other language that could be specified includes:

"1. Diagrams shall show a continuous flow from left to right with no arrows from right to left.
2. Activities shall be grouped to assist in the understanding of the activity sequence. Typically, this will group activities by category of work, work area, and/or responsibility.
3. . . ."

On larger projects with multiple network diagram sheets, you can require a summary network diagram on a single sheet. The recommended language is:

"Summary Network Diagram
If a project is such a size that the entire network cannot be readily shown on a single sheet, a Summary Network Diagram shall be provided with the Preliminary Schedule, Baseline, and any Recovery Schedule submittal. The Summary Network Diagram shall consist of a minimum of 50 activities and a maximum of 150 activities, and shall be based on and supported by the Network Diagrams."

Arrows or lines between the activities can graphically show relationships. If there are a lot of relationships and the diagram is not laid out well, the lines overlap and become confusing and it is difficult to determine the relationships. If that happens, it is best to display only the controlling relationships (if the software has that option).

Bar charts and timescaled network diagrams are easier to read if nonworking weekends are not represented.

The critical path can be shown with color (usually red), heavier bars, or hatched bars.

Activities with positive float can be started any time between their early start date and late start date. If an activity is expected to start at other than the early start date, it should be shown starting on its scheduled date.

47. Materials Procurement – Submittal Review Schedule and Submittal Log

Late materials delivery is a frequent cause of delay and owners should ensure that the contractor obtains delivery of materials when needed. To control this data, contractors should have a submittal log (register) that: (1) identifies all long-lead items, (2) tracks the issuance of purchase orders for those materials, (3) anticipates the procurement times so as to have the material on site when needed, and (4) tracks the preparation, review and approval of shop drawings, and the fabrication and delivery of the materials. The submittal log should be coordinated with the progress schedule.

Submittals include:
* Shop drawings
* Product data (e.g. catalog cuts, diagrams, performance charts, etc.)
* Samples
* Required plans (safety, erosion control, testing, etc.)

FOOTNOTES

A submittal log is a vital tool for both the contractor and owner in avoiding material delivery delays, and should be described in a separate section of the contract. However, the log should start as a schedule for planned submittals, in order to alert the designer of the time frame for reviewing submittals and to ensure that the material procurement process has been integrated into the progress schedule.

In some cases, it is recommended that the designer initiate the submittal review schedule to the extent of identifying those items that should be included. Those items should be listed in the submittal section of the specifications.

The contract may state that:

> *"The review time shall commence on the date the submittal or re-submittal is received by the City."*

A submittal log for an owner should include the following information:

* A sequential submittal number, with a letter suffix for resubmittals of the same item.
* The specification section or drawing sheet number and detail describing the item.
* A description of the item.
* The name of the subcontractor or supplier responsible supplying or installing for the item.
* The name of the manufacturer or fabricator responsible for producing the item.
* Priority for review of the item.
* Approval status: Approved, Approved with corrections noted, or Revise and resubmit,
* Planned or actual dates for the following actions:
    - Signed subcontract or purchase order
    - Submittal of shop drawing or other type of submittal to the owner's representative
    - Forwarded to the designer of record (Architect/Engineer) – for owner logs
    - Returned from the designer of record – for owner logs
    - Approval of submittal and returned to contractor (with allowance for resubmittal if expected)
    - Delivery to the jobsite
    - When needed at the jobsite
* Comments

A submittal log should be maintained by both the contractor and the owner and copies should be exchanged, in order that it both copies are accurate and complete. Contractors should be requiring their subcontractors to maintain a submittal log.

A joint submittal review (charrette) will expedite review of shop drawings and other submittals. It requires a joint review meeting by all interested parties and can save weeks of time in getting approval and initiating fabrication of materials. The language requiring it can be written somewhat as follows:

> *"If requested by the Owner, the Contractor and affected subcontractor(s) and vendor(s) shall attend a joint submittal review meeting, and the affected manufacturer's representatives shall be available by telephone, to resolve problems with critical submittals."*

48. Short Interval Schedule

Contractors normally prepare a weekly short-interval, look-ahead schedule for the use of their foremen and subcontractors during the following week. This is an extremely important tool for managing the project and should be shared with the project owner. It is used by the subcontractors to plan and executive their work during the following week.

FOOTNOTES

Although normally not provided, a comparison bar chart schedule showing both the current week's plan and the previous week's plan below it (usually as narrower bars) graphically demonstrates how progress during the week just ended compared with planned progress. This greatly helps in identifying delays and helps prevent continual slippage in the schedule.

It is also important for each task on the short interval schedule be tied to an activity on the latest version of the progress schedule. This helps ensure that the project superintendent, who prepares the short-interval schedule, stays on the critical path. And, it makes it practical to use the short-interval schedules to create a more detailed as-built schedule if there is a dispute.

Meetings
This specification does not address meetings, which should be covered elsewhere. On most projects, the owner meets monthly with the contractor and the contractor meets with the subcontractors weekly. Meetings are also needed prior to operations or installation of critical items, which may include roofing, instrumentation and control systems, etc.

The owner should prepare the minutes of meetings. '*He who writes the history controls history.'*

49. Notice

Owners need timely notice of delays or pending delays, so that they can mitigate any delay.

Contractors must strictly comply with the contract notice provisions. Otherwise, depending upon the contract and state law, they may lose their right to payment for extra work or impact. At the very least they will have a more difficult time getting paid and will probably end up with considerably less compensation.

50. Failure To Comply with the Schedule

Withholding payment is one of the most powerful tools an owner has to require a contractor to comply with the contract.

51. Float Belongs to the Project

The generally accepted practice is that the float belongs to the project. Owner's misguided attempts to claim the float for their own use is grossly unfair and will lead to disputes. Contractors need only schedule their work to hide the float to largely avoid the effect of the clause.

52. Owner Use Of Float Later Needed by Contractor

Although the most common position is that the float belongs to the party who first needs it, this often results in the contractor distorting the schedule to hide float in order to: (1) avoid the possibility of having to pay liquidated damages when a previously available float was used by the Owner or (2) set up for a claim if the owner delays work on what would otherwise be an activity with float. This specification will help limit the tendency of Contractors to add unnecessary activities and lengthen the duration of noncritical activities to hide the float.

FOOTNOTES

53. Early Completion Schedules

Early Completion Schedules can be a problem for Owners. Although there is usually a need to finish as quickly as possible, the Contractor may be setting up for a claim. However, the Contractor may have passed on the savings from a shorter construction period and reduced jobsite overhead costs to the Owner in their bid. Absent a restriction in the contract, the courts have upheld the contractor's right to finish early.

The recommended approach to a proposed early completion schedule is as written. However, some Owners may not wish to take that approach, especially if the project being constructed cannot be used any early and is subject to substantial maintenance costs. These, however, are not in the spirit of partnering and may generate more problems than they solve.

Other Possible Owner Responses to Early Completion Schedule
Some owners require the contractor to sign a no-cost change order agreeing to the proposed early completion date and accepting liquidated damages for failure to meet that date. We do not recommend that approach, but believe that our approach provides the maximum incentive for early completion with a reasonable amount of risk to the owner.

Other project owners state that any float time between the end of the final construction activity and the final completion date shall belong to the City and may be used by the City in determining if additional contract days are to be awarded for changes in the contract or for delays to the contract caused by the City. The Contractor will not be entitled to any adjustment in the Contract Time, the currently accepted schedule, or the Contract Price, or to any additional payment of any sort by reason of the City's use of float time between the end of all final construction activities and the contract final completion date. We also do not recommend this approach.

54. Reduced General Conditions Costs

If the Contractor bid the project for a shorter duration than the contract completion date, they should be allowed to finish early, absent problems in the Owner completing their tasks. Proof that the Contractor bid the project for the reduced period is available in the estimated duration for the superintendent and other jobsite overhead costs.

Even if the Contractor did not bid the work for an early completion schedule, the Contractor still has the right to finish early – absent specific language to the contrary.

55. Justification For Early Completion Schedule

If concerned whether the Contractor can complete the work in a shorter construction period, the Owner can require additional evidence to support the planned early completion date. Although not normally required, none of the requirements listed are unreasonable for larger, more complex projects and should be done on many projects, but usually are not.

If resource loading and forecasting, keep in mind that the software resource leveling routines are not nearly as effective as the efforts of an experienced foreman or superintendent. They do, however, provide an adequate rough estimate of the labor required.

FOOTNOTES

56. Failure To Maintain An Early Completion Schedule

Actual progress consistently falling behind an early completion schedule indicates that the Contractor is not capable of meeting the shorter schedule and may have tried to set up for a claim. If it becomes apparent that the Contractor is not capable of maintaining an early completion schedule, the Owner should reject the conditionally accepted early completion schedule and require submittal of a schedule using the balance of the contract time.

57. Contemporaneous Time Impact Analyses

Contractors must prove their requests for a time extension. This requires a Time Impact Analysis (TIA) that includes: (1) a clear description of the facts, supported by the project records, (2) an analysis of entitlement that demonstrates why the Owner is responsible for the delay and/or increased costs, (3) an analysis that clearly shows how the initial cause resulted in the delay, and (4) reasonably computes the amount of delay.

Notice
The time for giving notice of a delay is as stated in the Notice clause. The 14 days here is the time that a formal request for time extension and the supporting documentation is required.

Timeliness
Contemporaneous time extension requests, and prompt resolution, are highly recommended. Delaying identification and resolution of delays can create major liabilities for the owner and adversely affect the working relationship of the parties. In addition, it is often less expensive to settle the cost of delays quickly. Contractors will often accept the overtime premium required to recover the time for owner-caused delays. And, if more extensive efforts are required, it is less expensive to accelerate early in a project than towards the end.

Graphical vs. Narrative Analysis
A graphical representation can be far superior to a narrative or tabular schedule report in explaining how an event or action delayed the critical path.

Recovery Analysis
Contractor's Time Impact Analyses should show not only how much and why the Contractor was delayed but also how the delay could be partially or wholly recovered at a reasonable cost.

Supporting Data
The Contractor's legal responsibility to prove their case requires them to provide all reasonably requested information to the Owner. Project Owners should not agree to a time extension or change order request without receiving adequate documentation and analysis proving the Contractor's position. If adequate information is not provided, request it and insist upon its receipt before proceeding with analysis, while notifying the contractor that they are not in compliance with the contract and will not be due interest costs for any further delay.

57a. Weather Delays

Contractors need to obtain the past 10 years records of the National Oceanographic and Atmospheric Administration (NOAA) for the nearest sampling site to the project. The Contractor then has to determine from the reports the average number of days that one would expect delay for the work allegedly impacted

and then to determine the actual number of delays that work was delayed by weather. A increase of 20% to 25% over the average delay should be sufficient to prove abnormal weather delay.

Weather affecting the critical path can be rainfall, snow, cold, extreme heat, wind, fog, high water, and other natural phenomenon. In addition, it is just not the amount of rainfall, but rather its variation from the norm and its impact on the work. For example, a light mist every day can have far more impact on exterior painting than a heavy rainstorm followed by sunny skies, even if the later results in more total precipitation. Likewise, an unexpected heavy rain when the Contractor has just opened up the site will have far more impact than one where the Contractor has had time to shape and roll the ground before it rains.

For example, one specification allows for a time extension if: (1) daily rainfall exceeds 0.5 inches in a month when the monthly average exceeds the norm by 25% or more and (2) the daily rainfall exceeds 0.75 inches at any one time.

Some Owners list the standard number of lost weather days per month and grant a time extension if the lost weather days exceed that number.

58. Analysis of Multiple Delays

Although all delays should be analyzed contemporaneously and time extensions be granted monthly when appropriate, this doesn't always happen. In those cases, Contractors should use the more reliable methods of analyzing delays from multiple issues that occur over an extended period of time.

The Would Have Been, But For approach determines what would have happened absent the delays for which the owner is responsible. This is normally done on a monthly basis (also called a 'Windows' approach) in which the delay is analyzed for each schedule update and the responsibility allocated on that basis. It can also be done on a daily basis, with each activity being evaluated for a different duration based on the effect of earlier delays.

The Collapsed As Built method is not recommended, except as a 'quick and dirty' indication of the effect of delays when the Contractor doesn't have the time and/or expertise to use a more accurate method and then the time is subject to negotiation to remove the probable excessive time requested.

59. Bid Evaluation, Contract Award and Execution, Bond and Insurance, and Notice To Proceed

If time is of the essence, the time between bid opening and award should be expedited as much as possible. Scheduling the bid opening a few days before the next meeting of the governing body can save time – if the paperwork can be accomplished in time. Otherwise, it may be advisable to schedule a special session of the governing body, if the project is important enough to warrant a special meeting and the time constraint is especially tight.

Normally, tabulating the bids and evaluation of bid alternatives can normally be accomplished in a day. Review of the low bidder's qualifications can take longer, if there are questions about their ability to perform. Evaluation of non-conforming bids can take longer, to determine whether the non-conformance is material and therefore non-responsive, should have been done at the time of bid opening and the non-responsive bid should have been rejected at that time.

Also, the time between award and execution of the contract and provision of the performance bond and proof of insurance should be expedited by the Contractor, in order to start work as soon as possible. If time is critical, Contractors should be encouraged to walk the paper work through instead of mailing.

The most common type of delay during this period is a bid protest, which can sometimes be avoided by clear contract language and other procedures – such as not reading the bid amount of bidders found to be non-responsive.

60. Early Start Before Notice To Proceed

On time-critical projects, contractors often start administrative work on a project as soon as they learn they are low bidder. This depends upon having the personnel available to start planning the work, scheduling, ordering materials, negotiating details with subcontractors, etc. It also depends on whether they expect problems with award or a late notice to proceed. All of this work, of course, is at the contractor's risk.

Contractors should not be allowed to enter onto the site until they have provided a performance bond and proof of insurance, and they should be warned that any work before the issuance of a notice to proceed is at their risk.

On some time-critical projects with long-lead procurement items, Owners sometimes will issue a partial notice to proceed or a letter of intent – in order that the contractor can initiate purchase orders (subject to cancellation) and/or subcontracts for those long-lead items.

61. Intermittent Progress and Pacing for Delays

Intermittent progress is when contractors reduce their crew size or pull a crew off of an activity, in order to perform other work on this project or another. This isn't normally a problem on non-critical activities but should not happen on the critical path. Owners need to record the crew size and note fluctuations in the crew size, in case there is a later claim for impact, as a smaller crew size may be the reason for activities taking longer than planned.

Pacing occurs when there is an unavoidable delay to the critical path and the contractor reduces the crew size or shifts workers off of previously critical activities in order to avoid completing all available work for a specified trade and having to disband the crew. That would result in later inefficiencies as the personnel may not be available later and a reconstituted crew would start with a lower efficiency than the current crew. Contractors need to notify Owners when they are pacing previously critical path activities, to avoid later charges of concurrent delay.

62. Prompt Initiation and Diligent Prosecution of the Work

Contractors sometimes have personnel and equipment tied up on another project which they plan to finish before starting your job. This can result in savings to the Owner, but in some cases can cause delays – especially if the other project is late.

63. Work Outside Normal Working Hours

FOOTNOTES

Most construction operations need to be inspected on either a continuous or intermittent basis, especially work outside of the normal working week when contractor supervisory staff may be reduced and standard procedures might be shortcut.

Some Owners assess Contractors for the overtime costs of their inspectors and surveyors for work outside of the normal work week. This is generally not recommended.

Section IV – Reference Sources

1. Initial Draft of City of Kent, Washington, Specification for the Green River Bridge
2. HOW TO GET PAID For Construction Changes, by Steve Pinnell, published by McGraw-Hill, 1998
3. *Making State of the Art Scheduling Specifications Work*, by Stuart Ockman, Ockman & Borden Associates, Wallingford, PA
4. Several scheduling specifications prepared by Dr. Anamaria Popescu.
5. The NAS master scheduling specification with edits by Mr. Jon Wickwire and others.
6. The Standard General Conditions of The Construction Contract prepared by the Engineers Joint Contract Documents Committee and published jointly by ACEC, NSPE, and ASCE.
7. The scheduling specification for the Rock Creek, Phase 6A project, prepared by CH2M Hill.
8. Several scheduling specifications from various U.S. Army Corps of Engineers projects.
9. Standard Specifications for Road, Bridge, and Municipal Construction, 2004 (M41-10) by the Washington State Department of Transportation.
10. General and Special Conditions for various projects of Oregon State University, Corvallis, Oregon.
11.

SECTION V – PBI NOTES – TO BE INCORPORATED INTO THE SPECIFICATION, COMMENTARY, AND/OR FOOTNOTES

1. Miscellaneous Notes

* Get Eric and Dan's slides
* Instead of multiple calendars to avoid winter shut-downs and non-working windows, use EPS and LAF constraints.
* Relationships can often be deduced from the finish date of the prior and the start date of the activity.
* When reviewing claims and you suspect the other party as 'tweaked' the schedule, check the run number. A high number of iterations compared to the update number indicates they have tweaked the schedule.
* Generally contractor provided actual start and finish dates are not reliable. Besides, what really is the start date and what is the finish date (prep work? cleanup work? a small amount of work & then stop? a minor item left undone?)
* Durations are recorded as continuous when the actual work may have been intermittent
* Logic is often not logical
* Weather impact
* Using costs to verify/determine entitlement (e.g. material costs exceed budget indicates that the labor cost overrun was probably an QTO error).
* Owners need to do an independent schedule analysis.
* Cost-time tradeoff analysis
* progress override vs. retained logic
* progressing w/percent complete instead of days remaining
* updating problems w/old versions of MS Project
* excessive or incurred lag/leads and start-to-start relationships
* Difficult to read reports and charges
* Changing durations, overlapping and re-sequencing to hide delays
* Failure to tie short interval schedule to master schedule.
* Extended jobsite overhead – only time-dependent costs and not during peak period (unless delay then).
* Contractors should shift all possible home office overhead costs to project costs (i.e. project managers labor, phone calls, etc.)
* Owner defenses for claims can include: Total Cost and Measured Mile.
* Owner defense on costs: see if QTO error by quantities being over budgeted, if labor or material rates are higher than anticipated (e.g. steel prices), and if left out item and no budget.
* To control costs, contractors must record weekly work quantities installed.
* Owners should require an "adequate' submittal or reject for that reason.
* A schedule is just a model of reality; it is never absolute.
* Require SDR from GC and all subs – require crew size and general record of work accomplished
* Owners – record approximate weekly quantities
* When claims – need to review true relationships and durations, not just what has been recorded
* Secret:
    - Good plans, specs, and contracts
    - Experienced (trained) personnel w/support as required
    - Partnering – win/win negotiation, teambuilding
    - Change Management – enforce the contract, keep good records, make timely fair and decisive decisions and action.

Global Settlements

* All extra costs and delays to date.

* How about future delay and impact and extended overhead? Acknowledged, known, or unknown as a result of the items being settled?

2. Prototype As-Planned vs. As-Built Comparison Schedule Report

To your Report 1a:

* Convert the activity descriptions to “Title Case”.
* Add Responsibility codes – see me about codes for the subcontractors and GC’s crews.
* Add hammocks to the case study: ROADWAY and BRIDGE and renumber the activities to facilitate use – see me about the numbering sequence.
* Options: grouping, filter, float lines, relationship lines, font size, paper size, and column width. <<BLAKE: IS THAT CORRECT?>>
* DO NOT EVER USE THOSE STUPID DIAMONDS AT THE BEGINNING AND END OF EACH ACTIVITY.

Possible Columns

* Activity ID
* Description
* Responsibility
* Work Area

* Percent Complete
* Original (As-Planned) Duration
* Revised Duration
* Remaining Duration
* Actual Duration

* Original Float
* Current Float

* As-Planned Early Start
* As-Planned Early Finish
* Early Start
* Early Finish
* Late Start
* Late Finish
* Actual Start
* Actual Finish

* Priors
* Successors

* Percent Complete
* As-Planned Duration

* Remaining Duration
* Actual Duration

* As-Planned Float
* Current Float

* As-Planned Start
* As-Planned Finish
* Current Planned Start
* Current Planned Finish

* Actual Start
* Actual Finish

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