

School Building Authority of West Virginia
CONSTRUCTION (CPM) SCHEDULE
SBA FORM 187

I. INTRODUCTION

For the purpose of planning, developing and executing a school construction project each project shall be accompanied by a progress construction schedule. The construction progress schedule shall be developed in the Critical Path Method (CPM). Not only shall the progress construction schedule be used as a resource by the Prime Contractors in the execution the Work, but also so the Owner and its assigned representatives are able to monitor progress and be reasonably assured the project is progressing toward its completion within the timeline requirements.

II. DEFINITIONS

- a. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of the project. This method calculates the minimum completion time for a project along with the possible start and finish time for the project activities.
- b. Notice to Proceed: A written notice from the Owner or Owner's representative to the Contractor(s) in which the Contractor(s) is authorized to proceed with the work on a specified date. The Notice to Proceed date shall be considered the basis of commencement of the contract construction duration as specified in the Contract Documents, unless otherwise indicated.
- c. Contract Construction Duration: The amount of time specified by the Contract Documents for the completion of the Project.
- d. Contract Completion: The Contract Completion date is the projected project completion date based on the commencement of work on Notice to Proceed date and Contract Construction Duration; as may also be specified in the Owner's published Notice to Proceed (NTP). The Contractor's Completion date obligations and the Owner's Claims for Delay obligation are based on the Contract Completion Date.
- e. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - i. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - ii. Predecessor Activity: An activity that precedes another activity in the network.
 - iii. Successor Activity: An activity that follows another activity in the network.
- f. Event: The starting or ending point of an activity.
- g. Duration: The amount of time estimated to complete an activity in the time scale used in the schedule (work days). Planned production rates and available resources will define the duration used in a given schedule. A defined activity duration shall be no longer than 15 work days, unless otherwise approve by the Owner or Owner's representative in advance.

- h. Early Start: The first day of a project on which work on an activity can start if all preceding activities are completed as early as possible.
- i. Early Finish: The first day of a project on which work on an activity is complete, assuming work began on its early start.
- j. Late Start: The last day or deadline for the start of an activity before it will delay the completion of the project.
- k. Late Finish: The last day or deadline for the completion of an activity before it will delay the completion of the project.
- l. Actual Start: The date that an activity actually began.
- m. Actual Finish: The date that an activity finished.
- n. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall project duration and contains no float.
- o. Float: The measure of leeway in starting and completing an activity. The difference (in days) between the early start / finish and late start / finish.
 - i. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - ii. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned project completion date.
 - iii. Float shall not be for the exclusive use or benefit of either Owner or Contractor(s), but is a jointly owned, expiring project resource available to both parties as needed to meet schedule milestones and contract completion date.
- p. Milestone: Zero duration activities that call attention to noteworthy events in the project schedule. They can represent a variety of significant events and may indicate either the start or completion of a significant series of events (i.e. – “topped-out”, “dry-in”, equipment delivery, etc.)
- q. Constraint: A limitation placed on a project schedule activity that affects the start or end date of an activity or series of activities. Constraints have been used to fix imposed dates for a work activity.
 - i. As Soon As Possible is the default constraint type. This constraint schedules the work item to the earliest possible time that the work activity can start, based on the existing project logic.
 - ii. Start No Earlier Than is used to restrict an activity to start on or after a specified constraint date. A constraint date must be specified before which the task must not start.
 - iii. Finish No Later Than is used to restrict an activity to complete on or before a specified constraint date. A constraint date must be specified after which the task must not start.
- r. Fragnet: A sequence of new activities that are proposed to be added to the existing schedule. The fragnet shall identify the predecessors to the new activities and demonstrate the impact to the successor activities
- s. Baseline Schedule: A fixed project schedule that is the standard which project performance is measured. The current schedule is copied into the baseline schedule that remains frozen until it is reset. Resetting the baseline is done when the scope of the project has been changed significantly. At that point, the original or current baseline become invalid and should not be compared with the current schedule.

- t. As-Built Schedule: The record of the history of the construction project in the form of a schedule, and is comprised of a bar-chart record of the start and end dates of every activity that actually took place, without necessarily having any logic links.
- u. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.
- v. Approval of Schedule: The general and unanimous executed agreement by the Contractor(s), Owner, Architect, Consultant, and/or Construction Manager of the CPM schedule. *The Owner or Owner Representative's approval of the submitted schedule in no way established an obligation on the Owner for Claims for Delay by the Contractor based on the Contractor early completion. Any Claims for Delay by the Contractor shall be based on the provision of this specification which only contemplates impact to the proposed contract completion date.*
- w. Schedule Consultant: An independent third party responsible for the planning, development, update, maintenance, monitoring and reporting of the CPM schedule. The schedule consultant may be contracted by either the Contractor or Owner.
- x. Early Completion: Early completion of the project is permitted, however, neither the Contractor(s) nor the Owner are bound to an early completion, even if projected by and approved in the final version of the CPM schedule. The Contractor's completion date obligation and the Owner's Claims for Delay obligations under this agreement are associated with the proposed contract completion date as defined by the Contract Documents, not an approved Contractor proposed early completion date. Notwithstanding the preceding, the Owner reserves the right to reject a proposed CPM Schedule that shows an early completion date if the schedule appear to be unreasonable or unrealistic.
- y. Delay Claims: A period of time for which the project has been extended or work has not been performed which are excusable in accordance with the Contract Documents. A delay must be excusable in order to be the basis for an extension of time or additional compensations.
- z. Excusable Delay: An excusable delay shall be defined by the Contract Documents and typically involve matters beyond the Contractor(s) control. Examples of excusable delay include design errors and omissions, owners initiated changes, weather impact, or acts of God.
- aa. Non-Excusable Delay: A non-excusable delay is a delay for which the Contractor(s) has assumed the risk in accordance with the Contract Documents. It is the responsibility of the Contractor to prevent acts, or negligence, by the Contractor(s) which may be cause for delay.
- bb. Concurrent Delay: A concurrent delay is a second independent delay occurring during the same time period as the delay for which recover is sought. A Contractor seeking increased compensation is ultimately responsible for the concurrent delay and may not be able to recover any compensation for the initial delay.

III. EXECUTION

- a. Outline Schedule and Sequence Plan
 - i. An outline schedule and sequence plan shall be provided to the Prime Contractor(s) in the Bid Documents.
 - ii. The outline schedule and sequence has been developed to coordinate Prime Contractors in a Multiple Prime Contract, and shall be the basis for the CPM

construction schedule. In the event a project is selected by the Owner as a Single Prime Contract, the Prime Contractor shall be responsible for development and distribution of an outline schedule and sequence plan to subcontractor, vendors, etc.

- iii. The Prime Contractors have the right to make changes to the outline schedule and sequence plan; however any changes shall require the unanimous approval and sign-off by all Prime Contractors, Architect and Owner. In the event of modifications by the Prime Contractors the project duration shall remain in effect (i.e. - 424 calendar days).
- iv. If the Prime Contractor(s) has sufficient reason to modify the outline schedule they shall provide in writing to the Owner and/or Owner's representative:
 1. Reason for modification to the outline schedule and sequence plan
 2. Unanimous approval by all Prime Contractors of modified outline schedule and plan.

b. Scheduling Requirements

- i. At the Pre Construction Meeting, the Owner's representative shall review the CPM schedule requirements as indicated in the Contract Documents with the Prime Contractor(s).
- ii. Responsibilities:
 1. Means and Methods: AIA A201,3.3.1 - *"The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequence and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters."*
 2. General Trades Contractor:
 - a. Unless otherwise specified, the General Trades Contractor shall be responsible for the construction progress schedule development, maintenance, monitoring and reporting, and shall schedule meetings to facilitate / coordinate / maintain a CPM schedule for the duration of the project.
 - b. The General Trades Contractors shall demonstrate to the Owner specialized experience in the development, maintenance, monitoring and reporting of CPM scheduling. A minimum of three (3) years full-time (exclusive) or five (5) years part-time (with other responsibilities) experiences with CPM schedules of similar size and complexity shall be required. The name and experiences shall be submitted to the Owner and/or Owner's representative, along with examples of the individual's past schedules.
 - i. In the event the Owner and /or Owner's representative determines the General Trades Contractor does not possess the capability in-house to perform the requirements of the CPM Schedule, the Owner may elect,

at no additional cost to the Owner, to require the General Trades Contractor to hire a Schedule Consultant that possess the specialized experience in performing the requirements as stated herein.

- c. Receive input from each Prime Contractor for the development, maintenance, monitoring and reporting of the progress construction schedule.
3. Prime Contractors:
 - a. Provide General Trades Contractor with sufficient information / feedback regarding activities, duration and logic associated with the development, maintenance, monitoring, reporting, and overall information required to properly maintain the construction progress schedule.
- c. Schedule Development
 - i. The construction progress schedule development shall be conducted in a meeting, or series of meetings, for the purpose of generating a feasible plan to execute the construction project.
 1. The General Trades Contractor shall chair / conduct the meeting(s) related to the construction progress schedule. The General Trades Contractor shall be responsible for setting the meeting agenda, regulating and ensuring the meeting is productive in the development of the construction progress schedule. The meeting agenda shall be submitted in advance to the Owner for review.
 2. The schedule development meeting(s) should be held no later than 2 weeks after the preconstruction meeting. This will allow the Prime Contractors (and subcontractors) to assign staff, procure subcontracts, review documents and develop a plan to execute the work. It is critical the personnel responsible for directing the Work in the field be in attendance. These individual shall also be familiar with the project requirements and be prepared to participate in the meeting(s).
 3. Prime Contractor(s) shall attend with major subcontractor ready to discuss the plan to execute the Work. The construction progress schedule shall be developed and phased according to the order the work will occur (i.e. – site, concrete, masonry, steel, roof, MEP, finishes).
 4. For the purpose of the CPM schedule development, the General Trades Contractor shall solicit from the other Prime Contractors a list of activities included with activity durations and at least one (1) predecessor and successor activity (i.e. – activity - block fill paint / duration – 3 days / predecessor – rub masonry walls / successor – first finish coat paint). These activities shall be provided to the General Trades’ Contractor prior to meeting. The General Trades Contractor shall incorporate the activities, durations and initial logic from the other Prime Contractors into the schedule software. *It may be recommended the General Trades Contractor schedule an individual and*

separate meeting with each of the Prime Contractor prior to scheduling a meeting with all Prime Contractors together.

5. From the information provided by the Prime Contractor(s), the General Trades Contractor shall prepare the CPM schedule. The CPM schedule will be distributed to the Prime Contractor(s) for their review and feedback. If needed, additional meetings may be held to review the CPM schedule with the Prime Contractor(s). The additional meetings shall be at the General Trades Contractors and/or Owner's discretion, or as may be requested by a Prime Contractor.
6. Once the CPM schedule has been reviewed with feedback from the Prime Contractors, the General Trades Contractor shall make the necessary final adjustment and distribute the proposed Baseline CPM Schedule to the Prime Contractors for execution / signatures. The General Trades Contractor shall provide a signature line for each Prime Contractor on the Baseline CPM Schedule. **The executed Baseline CPM Schedule, as defined above under Approval of the Schedule, shall be considered the Approved Construction Progress Schedule only after review and agreement by the Owner.**
7. The Baseline Schedule (and updates) shall then be submitted to the Owner and/or Owner's representatives for review.
 - a. When submitting a CPM schedule to the Owner it shall be in the Gantt Chart View with the following columns in display.
 - i. Task Name
 - ii. Percentage Complete
 - iii. Original Duration
 - iv. Remaining Duration
 - v. Early Start
 - vi. Early Finish
 - vii. Actual Start
 - viii. Actual Finish
 - ix. Total Float / Slack
 - x. Resource Group (assigned to each Prime Contractor)
8. The Approved Construction Progress Schedule shall be submitted for use not later than 45 calendar days after the date establish for the Notice to Proceed; otherwise, in accordance with the Contract Documents (SBA Supplemental Conditions, General Conditions, Section II), "*... an approved construction schedule must be in place prior to the second pay application being requested. Failure to comply with this provision will result in delayed processing of this and all future pay applications until the owner and SBA approved schedule is in place.*"
9. The construction progress schedule shall be developed and consist of activity categories as follows, but not limited to, milestones, critical submittals, civil / site, structural systems, building envelope, systems rough-ins, mechanical /

electrical / telecom rooms, interior finishes and close-out; each category consists of furthermore individual activities.

The below table of activities provides a list of typical minimal individual activities that should be included in the CPM schedule. The activities in this table are intended to represent activities that are typical of school construction projects, and it is understood depending on the specific design of individual projects these activities may somewhat vary.

The CPM schedule shall be further arranged by Phase / Sequence / Area. The activity categories and representative individual activity should be duplicated within each Phase / Sequence / Area. The following is a representative example of how this shall occur.

Example:

Area A

Structural Systems

Foundations
U/G Plumbing
U/G Electrical
Masonry to Finish Floor
Concrete Slab on Grade
Etc.

Building Envelope

Roof Blocking
Roof Mechanical Curbs
Roof Insulation & Membrane
Etc.

Area B

Structural Systems

Foundations
U/G Plumbing
U/G Electrical
Masonry to Finish Floor
Concrete Slab on Grade
Etc.

Building Envelope

Roof Blocking
Roof Mechanical Curbs
Roof Insulation & Membrane
Etc.

Area C

Etc.

Table of Activities:

MILESTONES	CRITICAL SUBMITTALS	CIVIL / SITE	STRUCTURAL SYSTEMS	BUILDING ENVELOPE
Notice to Proceed	Site Utility Structures	Excavation	Foundation / Footers	Roof Blocking
Building Utility Connections (each type)	Concrete Reinforcing Steel	Storm Sewer	U/G Plumbing	Roof Mechanical Curbs
Major Equipment Delivery	Doors, Frames and Hardware	Sanitary Sewer	U/G Electrical	Roofing System
Building Dry-in (Each Phase / Area)	Steel Lintels	Water Service	Masonry to Finish Floor Elevation	Roofing System Soffits, Coping & Flashing
Building Conditioned Air (Temporary / Permanent) (Each Phase / Area)	Structural Steel	Gas Service	Concrete Slab on Grade / Deck	Exterior Veneer System
Substantial Completion	Steel Joist & Deck	Electrical / Telecom Service	Door Frames	Exterior Window Frames / Glazing
Final Completion	Kitchen Equipment	Site Concrete Paving	Masonry (Bearing)	Exterior Doors
	Mechanical Equipment	Site Asphalt Paving	Steel Joists & Bridging	
	Electrical Switchgear & Panel Boards	Site Finishes	Metal Deck	

Cont'd

SYSTEMS ROUGH-IN	MECHANICAL / ELECTRICAL / TELECOM ROOMS	INTERIOR FINISHES	CLOSE OUT
Electrical Panelboards	Equipment Pads	Paint Block Fill / Prime Coat	Testing, Adjustment & Balance
Electrical / Fire Raceways Alarm Rough-in	Electrical Panelboards	Paint First Finish Coat	Commissioning
Electrical Conductors / Wire	Electrical Transformers	Paint Second Finish Coat	Training & Demonstration
Fire Alarm Annunciator Panel	Electrical Raceway Rough-in	Paint Exposed Ceiling	A/E Prepare Punchlist
Fire Alarm Wire	Electrical Conductors/Wire	Above Ceiling Inspection	Fire Marshall Inspection / Occupancy Permit
Cable Tray	Data Racks & Switches	Ceiling Grid	Substantial Completion
Telecom / Security Cable	Fire Sprinkler Valve / Riser Assembly	Electrical Light Fixtures	Contractor Perform Punchlist
Storm Pipe Rough-in	Fire Sprinkler Pipe Rough-in	HVAC Registers & Grills	Final Completion
Storm Pipe Insulation	Domestic Water Rough-in	Fire Sprinkler Drops & Heads	
Sanitary Rough-in	Domestic Water Insulation	Plumbing Fixtures	
Domestic Water Rough-in	Plumbing Backflow Preventer	Floor Finishes & Base (each type)	
Domestic Water Insulation	Plumbing Equipment (i.e. – hot water tank, etc.)	Metal Lockers	
Fire Sprinkler Rough-in	Gas Piping Rough-in	Casework	
HVAC Duct Rough-in	HVAC Duct Rough-in	GWB Bulkheads	
HVAC Duct Insulation	HVAC Duct Insulation	ACT Ceilings	
HVAC Pipe Rough-in	HVAC Pipe Rough-in	Doors & Hardware	
HVAC Pipe Insulation	HVAC Pipe Insulation	Electrical / Fire Alarm / Telecom / Security / HVAC Controls Devices & Trim	
HVAC Equipment (i.e. – fan coils, UV, VAV, RTU, heater, etc.)	HVAC Equipment (i.e. – chiller, boilers, pumps, AHU DOA, etc.)	Signage	
HVAC Controls & Wire	HVAC Controls & Wire	Toilet Partitions & Accessories	
	HVAC Equipment Start-up	Display Boards & Accessories	

d. Schedule Update

- i. The General Trades Contractor shall schedule a monthly meeting, of which they shall chair / conduct, to facilitate / coordinate the construction progress schedule update with the Prime Contractor(s).
 1. The schedule update shall be conducted in coordination with the application for payment timelines established by the Contract Administrator. It is recommended the construction progress schedule update meetings be performed on-site and coincide with the Owner's Progress Meetings. The schedule update meeting will be scheduled in advance by the General Trades Contractor, with input from the Owner and/or Owner's representative.
 2. Prime Contractors shall provide the General Trades Contractor with activity actual start and finish dates. If an activity has started, and is in progress, the estimated remaining days to complete the activity shall be provided in lieu of a finish date. The General Trades Contractor shall solicit progress update information from Prime Contractors a minimum of seven (7) work days prior to the progress update meeting. *The update information shall be provided to the General Trades Contractor a minimum of three (3) work days prior to the update meeting.*
 3. Upon receipt of the update information, the General Trades Contractor shall include the actual start and finish dates, and remaining days into the schedule software and run a project update. The progress update / status date shall be consistent from month to month (i.e. – 15th of each month). The General Trades shall then provide the other Prime Contractors with a copy of the progress update a minimum of one (1) day prior to the update meeting.
 4. Prime Contractor(s) shall advise the General Trades Contractor of any sequence and/or logic and/or coordination changes that need to be made to conform to the progress of the Work. *These changes to the construction progress schedule shall be performed during the progress update meeting.*
 5. From the information provided by the Prime Contractors, the General Trades Contractor shall complete the update to the CPM schedule. The construction progress schedule update will be distributed to the Prime Contractors for their review, feedback and acceptance.
 6. Once the updated CPM schedule has been reviewed with feedback from the Prime Contractor(s), the General Trades Contractor shall make the final adjustment necessary and distribute the approved updated construction progress schedule to the Prime Contractors, Owner and Owner's representative.
- ii. The construction progress schedule shall be able to be sort by each Prime Contractor and distributed accordingly. Distribution of the construction progress schedule shall be sorted and provided to the Prime Contractors, Owner and Owner's representative as follows:
 - a. Incomplete Activities
 - b. Critical Activities

- c. By Each Prime Contractor's Activities
 - d. Otherwise requested by the Owner and/or Owner's representative
- iii. Each month's progress schedule update shall be submitted with each Prime Contractors application for payment. Failure to provide a progress schedule update with the *application for payment may be reason for Owner to withholding one or all Prime Contractor's progress payments for said month.*
- e. Two –Week Look Ahead
 - i. The General Trades Contractor shall distribute each Prime Contractors two-week look ahead schedules for the Owner's Progress Meetings, which shall be provided to the Prime Contractors a minimum of one (1) day prior to the update meeting.
 - ii. A copy of each Prime Contractor's two-week look ahead shall also be provided to the Owner and Owner's representative at the meeting; along with a progress update sort by Critical Activities.
- f. Baseline Schedule Changes
 - i. In the event significant modifications are required, which may cause changes to the overall sequence / phasing of Work, the progress construction schedule baseline will need to be re-established. Upon these modifications being made to the CPM schedule, the General Trades Contractor shall establish a new construction progress schedule baseline.
 - ii. Whenever a new schedule baseline is establish it shall require the unanimous approval and sign-off by all Prime Contractor(s), Architect and Owner.
 - iii. The General Trades Contractor shall make the necessary adjustment and distribute the proposed new Baseline CPM Schedule to the Prime Contractors for review and feedback. Once feedback is provided by the Prime Contractors the newly established Baseline CPM Schedule shall be prepared for execution / signatures by the Prime Contractors. The General Trades Contractor shall provide a signature line for each Prime Contractor on the newly established Baseline CPM Schedule. **The executed newly established Baseline CPM Schedule, as defined above under Approval of the Schedule, shall be considered the revised Approved Construction Progress Schedule only after the review and agreement by the Owner.**
 - iv. A revised Baseline Schedule shall then be submitted to the Owner and/or Owner's representatives for review. *Once an Approved Schedule is in place, the Owner and /or Owner's representative have to the authority to reject any submission where it revises the approved schedule's baseline if it is not deemed to be in the express interest of the Owner.*
- g. Schedule Recovery
 - i. In the event the schedule update indicates the project progress is more than 10 days behind a separate recovery schedule shall be required showing the means by

which the Prime Contractor(s) responsible for the delay intend to regain compliance.

- ii. The Prime Contractor(s) identified in delay shall provide the General Trades Contractor, the Architect and Owner with a written plan of recovery. This recovery plan shall be incorporated into the recovery schedule (by the General Trades Contractor), which will be submitted to the Architect and Owner for approval.
- iii. In addition to the written plan of recovery, the General Trades Contractor shall schedule a meeting with the Prime Contractor(s) identified in the delay. The CPM schedule shall reflect the Prime Contractor(s) plan to bring the project back in compliance.
- iv. The recovery schedule shall be completed and submitted prior to final submission of the application for payment to the Owner. Application for payment shall not be approved without an attached recovery schedule.

h. Claims of Delay

- i. Delays and related claims shall be governed by the Contract Documents; specifically, but not limited to, the AIA 201 – General Conditions of the Construction Contract, Articles 8 & 15, and the SBA Supplemental Conditions – Appendix J, Part II . In the event of a conflict, the requirements of these conditions shall take precedence over the stipulations provided in this section.
- ii. In addition to the requirements of the Contract Documents, the Prime Contractor(s) bringing claim for delay must provide / substantiate said claim to the Owner and/or Owner’s representative.
- iii. The premise of all delay claims shall be based on the approved construction progress schedule. Delays related to non-critical activities shall not be considered a legitimate delay as they do not extend the project completion date. The basis of delays shall be associated with critical activities, also known as Critical Path Activities. The delay to the Critical Path shall be established by the insertion of a fragnet into the CPM schedule.
- iv. All claims for extensions of time shall be accompanied by the following documentation:
 1. written notice no more than seven (7) calendar days after the beginning of the delay,
 2. complete detailed report of the delay, including all support documentation for the delay event,
 3. a fragnet to the approved construction progress schedule. When submitting a fragnet, the Contract shall compute two finish dates. The first finish date shall be computed without consideration of any impact by the fragnet. The second finish date shall be computed with consideration of any impact by the fragnet,
- i. Any / all delay claims, including support documentation, must be submitted to the Owner and/or Owner’s representative by no later than 15th of the month following

the conclusion of the delay. In the event a delay last more than two (2) consecutive months, the available delay support documentation must be submitted to the Owner / Owner's representative starting on the 15th of the month (and every month thereafter) at the conclusion of the second consecutive month of the delay event.

j. Schedule As-Built

- i. At the conclusion of the project an as-built schedule showing actual start and finish dates for all work activities shall be provided to the Owner by the General Trades Contractor. The Prime Contractor(s) shall provide the required information necessary to complete this task.
- ii. The as-built schedule shall be considered a project close out requirement and shall be included with, along with the Baseline(s) / Approved Schedule(s), in the General Trades Contractor's O&M manual.