SECTION 01 32 16.13

NETWORK ANALYSIS SCHEDULES - MAJOR CONSTRUCTION PROJECT

DESIGN-BID-BUILD

PART 1 - GENERAL:

1.1 DESCRIPTION:

A. The Contractor shall develop a fully Resource loaded (cost and manpower) Network Analysis System (NAS) plan/diagram and computer generated schedule demonstrating fulfillment of the entire contract requirements, shall keep the plan and computer generated schedule up-to-date in accordance with the specification requirements of this section and shall utilize the plan for scheduling, coordinating, mitigating and monitoring work under this contract (including all activities of subcontractors, equipment vendors and suppliers) and verification of every Periodic Progress updates and Payment Submittals of the work under this contract. The Contractor’s initial NAS Diagram submission will be the basis for their initial project schedule and will be designated as a Day 1 diagram submission. After review and approval of first schedule by VA, this schedule will be designated as the approved Baseline Schedule.

B. Conventional Critical Path Method (CPM) Precedence Diagramming Method (PDM) technique shall be utilized to satisfy both time and cost applications. All schedule data and reports required under this specification section shall be based upon total float, not free float schedules. The approved baseline NAS diagram and the schedule becomes the official project schedule of record governing schedule management, oversight, and actions on the corresponding contract.

1.2 CONTRACTOR'S REPRESENTATIVE:

A. The contractor shall designate a representative on the site (Usually the Project Executive or Manager) who will be responsible for the preparation, timeliness, quality and the accuracy of the network diagram, review, and report progress of the project with and to the Contracting Officer's representative.

B. The Contractor's representative shall have direct project control and complete authority to act on behalf of the Contractor in fulfilling the

requirements of this specification section and such authority shall not be interrupted throughout the duration of the project.

1.3 CONTRACTOR'S CONSULTANT:

A. To fulfill all the requirements of this specification section, the Contractor shall engage an **independent CPM consultant** who is skilled in the time and cost application of scheduling using (PDM) network techniques for similar sized construction projects. The cost of which is included in the Contractor's bid proposal price. This consultant shall not have any financial ties, business ties, affiliation with or a subsidiary company of the Contractor. The consultant is expected to provide unbiased professional services to the contractor and to VA's representatives in developing and maintaining the project schedule.

B. Prior to engaging a consultant, and within 10 calendar days after award of the contract, the Contractor shall submit to the Contracting Officer:

1. The name and address of the proposed consultant and Company.
2. Sufficient information to show that the proposed consultant has the qualifications to meet the requirements specified in this specification section.
3. A list of at least three similar prior construction projects, along with selected PDM network diagram samples on current projects which the proposed consultant has performed complete project scheduling services. These network diagram and schedule samples must show complete project planning for a project of similar size and scope as covered under this contract.

C. The Contracting Officer has the right to approve or disapprove employment of the proposed consultant and will notify the Contractor of the VA decision within seven calendar days from receipt of information. In case of disapproval, the Contractor shall resubmit another consultant within 10 calendar days for renewed consideration. The contractor must have their CPM Consultant approved prior to Notice to Proceed (NTP).

1.4 PRIOR TO BASELINE SCHEDULE ACCEPTANCE:

A. At the time of the Pre-Construction Conference, prior to the issuance of the project Notice to Proceed, the Contractor and the Contractor's Scheduling Consultant shall arrange a separate meeting with the Contracting Officer and/or his representative to discuss the

requirements of this specification in detail. The Contractor and the Contractor's CPM Consultant shall acknowledge, in writing, their understanding and compliance with the requirements of this specification.

B. With exception of bonds, insurance, and limited mobilization cost associated with preparatory work such as site trailers, staging areas, haul roads etc., the approval of the baseline NAS schedule is a condition precedent to:
   1. Processing of contractor's pay request(s) for any construction activities/items of work.
   2. Review of any schedule updates.

C. Government review comments on the contractor's schedule shall not relieve the contractor from compliance with requirements of this specification section and the remaining contract documents.

PART 2 - SCHEDULE CRITERIA / DATA REQUIREMENTS:

2.1 COMPUTER PRODUCED SCHEDULE DEVELOPMENT CRITERIA:

A. The computer produced schedule shall be prepared and maintained using Primavera P6 software.

B. Work activity/event relationships shall be restricted to Finish-to-Start (FS) and Start-to-Start (SS) only without lead or lag constraints. Note: Some exception may be allowed for lag in SS relationship but must be approved by the VA's contracting officer on case-by-case basis prior to inclusion in the schedule.

C. Subsequent schedule updates work activity/event relationships shall reflect planned sequence of work, with actual status of completed or for in-progress work.

D. Activity/event date constraints, not required by the contract, will not be accepted unless submitted to and approved by the Contracting Officer. The contractor shall make a separate written detailed request to the Contracting Officer identifying these date constraints and secure the Contracting Officer's written approval before incorporating them into the network diagram. The Contracting Officer's separate approval of the network diagram shall not excuse the contractor of this requirement.

E. Logic events (non-work) will be permitted where necessary to reflect proper logic among work events but must have zero duration. The

complete computer schedule shall reflect the Contractor's approach to pursuing the entire project.

F. Intermediate Phasing milestones contained in the contract documents shall be clearly shown in the schedule.

G. The Contractor’s initial Day 1 submission, prior to VA review and approval, in its original form shall reflect only the original contract scope of work.

H. Early Project Completion or “Short Schedule” - VA will not approve any baseline schedule which shows completion date prior to the contract completion date. Also, there should not be any “filler or “contingency” type of activities to fill the entire contract duration. VA has no obligation to accelerate activities to support a proposed early contract completion. However, if the subsequent updates show that early handover is feasible due to “ahead of schedule” situation, VA may accept the facility earlier at no additional cost to the government.

I. The Baseline Schedule Critical Path of the project shall be limited to:
   1. No more than 20% of the work activities shall be on the critical and near-critical path(s). Critical path is defined as activities with zero (0) day total float. Near-Critical path(s) is defined as activities with one (1) to twenty (20) days of total float.
   2. Multiple Critical paths will not be allowed.

J. The Contractor shall show activities/events for:
   1. Contractor's time required for submittal of shop drawings, templates, fabrication, delivery and similar pre-construction work.
   2. Contracting Officer's and Architect-Engineer's review and approval of shop drawings, equipment schedules samples, template, or similar items with time duration of **no less than 20 workdays**.
   3. Shutdowns or Interruption of VA Medical Center utilities, delivery of Government furnished equipment (GFE), and rough-in drawings, project phasing and any other specification requirements.
   4. VC/VV Equipment - All significant VC (VA furnished and Contractor installed) and VV (VA furnished and VA installed) equipment shall be clearly shown in the schedule. Any smaller VC and VV Equipment shall also be logically grouped together and shown in the schedule.

5. Test, balance and adjust various systems and pieces of equipment, maintenance and operation manuals, instructions, and preventive maintenance tasks.
6. Commissioning (CX)Activities - Based upon the project specific Commissioning plan and project specification section 01 91 00, the contractor shall include in the Day 1 NAS Diagram all the systems commissioning activities (see systems covered in Division 7, 8, 21, 22, 23, 26, 28, 31 and others as specified) such as startup, Pre-functional check list, Pre-test, individual component and system level Functional test, Operator's training, O.& M. Manuals etc.(including any deficiency correction and re-testing). Most commissioning activities should be completed as part of the normal construction schedule and finalized prior to the construction contract completion date. To this end, it is imperative that the Commissioning Agent and the Contractor collaborate to integrate commissioning activities into the Contractor's overall construction schedule. All commissioning activities shall be cost loaded as required in the later paragraphs. e Commissioning Plan will identify critical commissioning activities and associated construction/start up tasks that must precede these activities to allow for successful execution of the commissioning activities. To coordinate these activities with the construction schedule, a Commissioning Duration Schedule should be provided by the Commissioning Agent to the VA SRE and the Contractor to provide a rational basis for integration of commissioning into the Day 1 NAS diagram and the construction schedule. The Commissioning Duration Schedule should include the following information:
   a. Description of Commissioning Activity
   b. Prerequisite Construction Tasks Required to Execute the CX Activity
   c. Elapsed Time Duration of Each Activity
   d. Documentation Associated with Each Task/Document Responsibility
7. Once the duration schedule is delivered to the Contractor, the Contractor will collaborate with the Commissioning Agent to integrate all commissioning activities into the fixed duration construction schedule in accordance with VA NAS requirements for scheduling the project. The Baseline Schedule, as approved by the VA

at the beginning, may not have all necessary Cx details, but the contractor is required to subsequently update the commissioning activities as more detailed **Commissioning Duration Schedule** is being developed.

K. VA inspection and acceptance activity/event with a minimum duration of five workdays at the end of each phase and immediately preceding any VA move activity/event required by the contract phasing for that phase. Schedule these activities/events so that only one phase is scheduled for completion within the same 30 consecutive calendar day period (except for those phases immediately preceding the final acceptance). Maintain this scheduling condition throughout the length of the contract unless waived by the Contracting Officer's representative in writing.

L. Work activities/events for the asbestos abatement bid item shall have a trade code of ASB.

M. Bid items other than the Base Bid (ITEM 1) and Asbestos Abatement item shall have trade codes corresponding to the appropriate bid item number (e.g., ITM 3, ITM 4 and other items).

1. Show not only the activities/events for actual construction work for each trade category of the project, but also trade relationships to indicate the movement of trades from one area, floor, or building, to another area, floor, or building, for at least five trades who are performing major work under this contract.
2. Break up the work into activities/events shall have:
   a. Duration no longer than 20 workdays each, except as to non-construction activities/events (i.e., procurement of materials, delivery of equipment, concrete and asphalt curing) and any other activities/events for which the Contracting Officer may approve the showing of a longer duration.
   b. Submittal / Shop Drawings- The duration for VA approval of any required submittal, shop drawing, or other submittals shall not be less than 20 workdays. Some long lead items and complex system shop drawings and submittal approval process will require longer than 20 workdays and should be clearly portrayed in the baseline schedule. Refer to drawing CPM-1 for some typical VA approval activities/events which will require minimum duration longer than 20 workdays. The construction time as determined by the CPM

schedule from early start to late finish for any sub-phase, phase or the entire project shall not exceed the contract time(s) specified or shown.

c. An activity/event shall only reflect the work of one entity (subcontract or craft).

d. The activity/event once began can continue unimpeded until the activity/event is complete.

3. Describe work activities/events clearly, so the work is readily identifiable with clear scope for assessment of completion. Activities/events labeled "start," "continue," or "completion," are not specific and will not be allowed. Lead and lag time activities will not be acceptable (Refer to item 2.1 B above for some exceptions).

4. Uniquely number each activity/event ID with ALPHA-NUMERIC value in ascending order. The network diagram should be generally numbered in such a way to reflect trade discipline, phase, or location of the work.

2.2 WORK ACTIVITY/EVENT COST AND TRADE RESOURCE DATA:

A. Cost Loading - The Contractor shall cost load all work activities/events except procurement activities. The cost loading shall reflect the appropriate level of effort of the work activities/events. The cumulative amount of all cost loaded work activities/events (including alternates) shall equal the total contract price. Prorate overhead, profit and general conditions on all work activities/events for the entire project length. The contractor shall generate from this information cash flow curves indicating graphically the total percentage of work activity/event dollar value scheduled to be in place on early finish, late finish. These cash flow curves will be used by the Contracting Officer to assist him in determining approval or disapproval of the cost loading. In the event of disapproval, the Contractor shall revise and resubmit in accordance with Article, THE INITIAL DAY ONE SCHEDULE SUBMITTAL (Item 3.1B below). Negative work activity/event cost data will not be acceptable, except on VA issued contract changes.

B. The Contractor shall cost load work activities/events for guarantee period services, test, balance and adjust various systems in accordance with the provisions in the FAR 52.232 - 5 (PAYMENTS UNDER FIXED-PRICE

CONSTRUCTION), Article, and VAAR 852.232 - Article 71 Including NAS-CPMfor (PAYMENTS UNDER FIXED-PRICE CONSTRUCTION).

C. The Contractor shall cost load work activities/events for ASBESTOS ABATEMENT. The sum of asbestos abatement work activity/event costs shall equal the value of the asbestos bid item in the Contractors' bid.

D. The Contractor shall cost load work activities/events for all BID ITEMS. The sum of the cost loading for each bid item work activities/events shall equal the value of the item in the Contractors' bid.

E. Work activities/events for Contractor bond shall have a trade code and area code of BOND.

F. General contractor work requirement code - The scope of work activities that will be performed solely by the general contractor must be identified clearly and a unique code assigned to each activity so that it can be sorted and summarized in a report. The purpose is to ascertain that the general contractor is meeting his contractual share of work content (as outlined in the signed contract documents). Care must be taken to estimate individual activity costs realistically, so these are not unreasonably inflated or deflated in the schedule.

G. Manpower loading - In accordance with Article PERFORMANCE OF WORK BY THE CONTRACTOR in FAR 52.236 - 1 and VAAR 852.236 - 72, the Contractor shall submit, simultaneously with the cost per work activity/event of the construction schedule required by this Section, a responsibility code for all activities/events of the project for which the Contractor's forces will perform the work. This shall be the basis for the "Resource loading" of the schedule and the contractor shall provide "Manpower loading" reports by trades and the overall Trade manpower requirements, when requested by the contracting officer or his/her representatives.

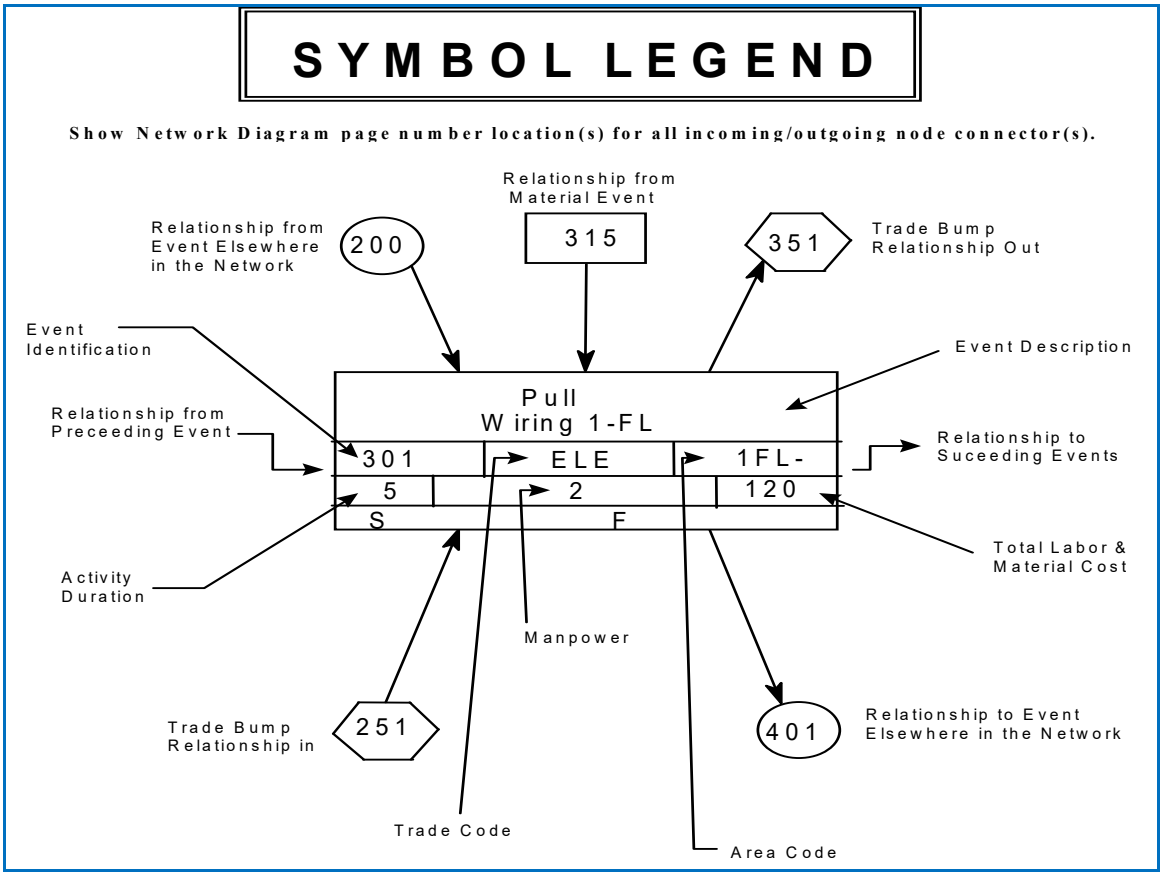
2.3 NETWORK DIAGRAM (NAS) DATA REQUIREMENTS:

A. The Day 1 NAS diagram is the logical plan and forms the basis for contractor's baseline schedule. Participation and input of key construction personnel from the General contractor and the major subcontractors is a mandatory requirement in the baseline schedule development. The Day 1 NAS diagram in its original form shall reflect the original contract scope of work and contain no contract changes or delays which may have been incurred during the final NAS diagram and

baseline schedule development period and shall reflect the entire contract duration as defined in the bid documents. Show on the NAS diagram the sequence and interdependence of work activities/events required for complete performance of all items of work. In preparing the NAS diagram, the Contractor shall:

1. Exercise sufficient care to produce a clear, legible, and accurate network diagram, in pure logical PDM format, refer to the construction document (CD) drawing, CPM-1 (Sample CPM Network). Computer plotted network diagrams shall legibly display and plot all information required by the VA CPM activity/event legend, otherwise the computer plotted network diagram will not be accepted. If the computer plotted network diagram is not found acceptable by the contracting officer's representative, then the network diagram will need to be created through other means to meet legibility requirements. Provide a key plan on each network diagram sheet showing the project area associated with the work activities/events shown on that sheet. VA will accept electronic version of this legible NAS diagram instead of hard copy, if the contractor so choses.
2. Show the following on each work activity/event:
   a. Activity/Event ID number, driven by WBS coding structure.
   b. Concise description of the work represented by the location and activity/event.
   c. Activity coding - Provide activity coding (five alpha characters or less) for Trades (GEN, MECH, ELEC, CARP, PLAST, or other acceptable abbreviations), Area, Phasing etc. Provide a dictionary of all coding in the front page of the NAS Diagram.
   d. Duration (in workdays.)
   e. Cost (in accordance with Article, ACTIVITY/EVENT COST DATA of this section and less than $9,999,999 per activity).
   f. Manpower required (average number of workers per day). Load manpower for each activity with proper trade codes in the "resource" field of P6 for ease of generating individual Trade and overall manpower profile required to plan and complete the project.
   g. No open-ended activities will be accepted, except for Notice to Proceed and the Final Completion activities.

h. The SYMBOL LEGEND format shown below and, on the drawing, CPM-1 (Sample CPM Network) is mandatory and shall be followed in preparing final network diagrams.



B. To the extent that the network diagram or any revised network diagram shows anything not jointly agreed upon, it shall not be deemed to have been approved by the Contracting Officer. Failure to include any element of work required for the performance of this contract shall not excuse the Contractor from completing all work required within any applicable completion date of each phase regardless of the Contracting Officer's approval of the network diagram.

C. Compact Disk Requirements and CPM Activity/Event Record Specifications: Submit to the VA (Senior Resident Engineer and CPM Schedule Analyst) an electronic file(s) containing one file of the data required to produce a Primavera (P6), (PDM) produced schedule, reflecting all the activities/events of the complete project network diagram being submitted.

2.4 CONSTRUCTION SCHEDULE RISK ANALYSIS / MITIGATION PLAN:

A. Schedule Risk Analysis – The contractor shall conduct the statistical schedule risk analysis based on the above detailed construction activities in the baseline schedule, identifying major schedule risk areas and recommend risk mitigation plans as outlined below.

B. The risk analysis shall be conducted by a person or firm skilled in the statistical method of schedule risk analysis based on the (PDM) network techniques for major construction projects, preferably in the major health care related projects. The cost of this service shall be included in the Contractor's proposal.

C. The Contracting Officer has the right to approve or disapprove the Person or firm designated to perform the risk analysis.

2.5 RISK ANALYSIS FORMAT / DATA REQUIREMENTS:

A. Conduct Risk Analysis – Based on the approved software / format, the consultant shall perform statistical risk analysis on the detailed approved Day 1 diagram and the baseline schedule. The contractor shall review and utilize any previous Risk analysis performed by the A/E of record based on the "semi-detailed" (yet at an overall level) construction logic and schedule to ensure the continuity of previous schedule risk analysis. The contractor's project manager and Superintendent shall identify the major schedule risk areas and proper risk mitigation strategy/plan and record it in a narrative format, with electronic file submission to the VA as directed by the VA Contracting officer.

B. The submittal shall include three copies of a computer-produced risk analysis results, or as requested, predicting the various meaningful probability graphs of achieving the contract schedules. It shall also include a detailed narrative list of all major and minor potential and specific schedule and cost risk areas and impact of them on the overall project, and a contractor's recommendations of mitigating the identified risks which must be addressed by the VA Project and Resident engineer teams to maintain the contract schedule.

C. The contractor shall, as a part of Risk monitoring, prepare a detailed **Project Risk Register (PRR)**, identifying each risk items, risk assessment and its response plan. This PRR, at the discretion of VA SRE and CO, shall be discussed in a monthly risk management meeting for mitigation.

PART 3 - SUBMITTALS, DELIVERABLES, AND UPDATE PROCESS:

3.1 SUBMITTALS:

A. The independent CPM consultant Qualification Submittal: Within 10 calendar days after award of the contract, the Contractor shall submit to the Contracting Officer for review and approval the qualifications of their proposed independent CPM consultant. The submittal information shall be in accordance with PART 1 GENERAL, ARTICLE 1.3 CONTRACTOR'S CONSULTANT of this Specification.

B. THE INITIAL Day 1 SCHEDULE SUBMITTAL: Within 30 calendar days (45 calendar days on projects over $50,000,000) after receipt of Notice to Proceed, the Contractor shall submit the initial Day 1 schedule submittal package, including schedule narrative that describes, not limited to, phasing, work breakdown structure, overall sequence of work, activity calendars, updates process, project start/finish/total duration, deliverables, and milestones, for the Contracting Officer's review and approval. This Day 1 schedule submittal shall consist of:

1. Two hard copies of the complete Day One network (NAS) diagram on sheets of paper 765 x 1070 mm (30 x 42 inches) activities sorted by physical work area, as well as an electronic version of the NAS diagram or as requested otherwise.
2. Computerized Schedule;
   a. An electronic file in a compressed Primavera (P6) computerized schedule, (PDM) format.
   b. Three hard copies of a computer-produced activity/event ID schedule showing all requirements project duration; phase completion dates; and other data, including event manpower and cost. Each activity/event on the computer-produced schedule shall contain as a minimum, but not limited to, activity/event ID, description, duration, predecessor and successor relationships, trade code, area code, budget amount, manpower, early start date, early finish date, late start date, late finish date and total float. The Contracting Officer’s separate approval of the network diagram shall not excuse the contractor of this requirement.
3. Supporting Data include the following data:
   a. The proposed number of working days per week.
   b. The holidays to be observed during the life of the contract (by day, month, and year).

c. The planned number of shifts per day.

d. The number of hours per shift. List the major construction equipment to be used on the site, describing how each piece relates to and will be used in support of the submitted network diagram work activities/events.

e. Provide a typed, doubled spaced description, at least one page in length, of the sequencing plan and contractor's approach to constructing the project.

f. Failure of the Contractor to include this data will delay the review of the submittal until the Contracting Officer is in receipt of the missing data.

C. VA RESPONSE TO INITIAL SCHEDULE SUBMITTAL - BASELINE SCHEDULE: Within 30 calendar days after receipt of the complete INITIAL Day 1 SCHEDULE SUBMITTAL Package (3.1.B), the Contracting Officer or his representative will do one or both of the following:

1. Notify the Contractor concerning the acceptability of the Day 1 Schedule Submittal Package and any additional actions, opinions, and objections to the package.
2. A meeting with the Contractor at or near the job site for joint review, correction or adjustment of the proposed plan will be scheduled if required. Within 14 calendar days after the joint review, the Contractor shall revise and shall submit three hard copies of the revised network diagram, three copies of the revised computer-produced activity/event ID schedule and a revised electronic P6 file as specified by the Contracting Officer. The revised submission will be reviewed by the Contracting Officer and/or representative and, if found to be as previously agreed upon, will be approved.
3. The contractor submitted NAS diagram, the corresponding computer-produced schedule(s) and the submitted supporting data, when approved, shall constitute the official Baseline Schedule until subsequently revised in accordance with the requirements of this section.

D. COMPUTER PRODUCED SCHEDULES submittals:

1. Within 7 calendar days of periodic (monthly) update meeting, the contractor shall submit to the VA Senior Resident Engineer (SRE) and CPM Schedule Analyst (simultaneously), computer-produced time/cost

loaded schedules and reports generated from monthly project updates. This monthly computer service will include: electronic file copies of up to five different reports (inclusive of all pages), available within the user defined reports of Primavera (P6), to the contracting officer's representatives; a hard copy listing of all project schedule changes, and associated data, made at the update; an electronic file of this data in Primavera (P6) format; and the resulting monthly updated schedule reports in a compressed electronic file in Primavera (P6), (PDM) format. These schedule reports must be submitted along with the modified Look ahead report (with % complete progress) made at the periodic (Monthly) update meeting signed by the contractor and VA); and substantively support the contractor's monthly payment request. The SRE shall identify the five different report formats that the contractor shall provide based upon the monthly schedule updates.

2. The contractor is responsible for the correctness and timeliness of the computer-produced reports. The Contractor is also responsible for the accurate and timely submittal (within 7 calendar days as noted above) of the updated project schedule and all CPM data necessary to produce the computer reports and payment request that is specified.

E. VA RESPONSES TO COMPUTER PRODUCED SCHEDULE submittals: The VA may report errors in computer-produced reports to the Contractor's representative within ten calendar days from receipt of reports, indicating approval or disapproval. In case of disapproval, the Contractor will reprocess the computer-produced reports and associated compact disk(s), when requested by the Contracting Officer's representative, to correct errors which affect the payment and schedule for the project. In certain large and complex project, as determined by the Contracting Officer, this periodic (monthly) reporting shall be formal submittal and approval process. The next periodic (month) update shall not proceed without timely submittal and approval of the previous periodic update.

F. FIRST UPDATE SCHEDULE SUBMITTAL: Within 30 calendar days of VA acceptance of the project baseline schedule, the Contractor shall submit the first update of the schedule. This update shall contain any progress of the work the contractor wishes to receive payment for from

contract notice to proceed. Any changes/delays shall be entered at the first update after the final network diagram has been approved. The Contractor should provide their requests for time and supporting time extension analysis for contract time because of contract changes/delays, after this update, and in accordance with Article, ADJUSTMENT OF CONTRACT COMPLETION. These changes/delays shall be analyzed (entered) at the first update after the final network diagram and baseline schedule have been approved. The Contractor should provide their requests for time and supporting time extension analysis for contract time because of contract changes/delays, after this update, and in accordance with Article, ADJUSTMENT OF CONTRACT COMPLETION.

G. Periodic Progress and payment Submittals: The Contractor is entitled to a periodic (not less than monthly) progress payment upon approval.
   1. The contractor shall submit the AIA application and certificate for payment documents G702 & G703 reflecting updated schedule activities and cost data in accordance with the provisions of the following Article 3.2, PAYMENT AND PROGRESS REPORTING, as the basis upon which progress payments will be made pursuant to Article FAR 52.232 - 5 (PAYMENTS UNDER FIXED-PRICE CONSTRUCTION), and VAAR 852.232 - Article 71 Including NAS-CPM for (PAYMENTS UNDER FIXED PRICE CONSTRUCTION).
   2. If the Contractor fails or refuses to furnish to the Contracting Officer the information and the associated updated Primavera (P6), (PDM) schedule in electronic format, which, in the sole judgment of the Contracting Officer, is necessary for processing the monthly progress payment, the Contractor shall not be deemed to have provided an estimate and supporting schedule data upon which progress payment may be made.

H. RISK ANALYSIS PROCEDURE SUBMITTAL: Within 30 calendar days (45 calendar days on projects over $50,000,000) after receipt of Notice to Proceed, the Contractor shall submit for the Contracting Officer's review and approval:
   1. The qualifications of a consultant or representative who will be conducting the Risk Analysis.
   2. The software to be utilized.
   3. The methodology of performing the analysis.
   4. The format of presenting the data.

5. A sample of the reports to be given to VA.

I. RISK ANALYSIS REPORT SUBMITTAL: Quarterly a risk analysis exercise shall be performed and/or updated and submitted to the VA Contracting Officer. The VA Contracting Officer can request additional risk analysis.

1. The submittal shall include three copies of a computer-produced risk analysis results, predicting the various meaningful probability graphs of achieving the contract schedules. It shall also include a detailed narrative list of all major and minor potential and specific schedule and cost risk areas and impact of them on the overall project, and a contractor's recommendations of mitigating the identified risks which must be addressed by the VA Project and Resident engineer teams to maintain the contract schedule.
2. The Contractor shall, as a part of Risk Analysis Submittal, prepare a detailed **Project Risk Register (PRR)**, identifying each risk items, risk assessment and its response plan. This PRR, at the discretion of the SRE and the CO, shall be discussed in a monthly risk management meeting for mitigation.

3.2 PAYMENT AND PROGRESS REPORTING – SCHEDULE UPDATES:

A. **Schedule update meeting** – Monthly job site schedule update meeting shall be held on dates mutually agreed to by the Contracting Officer (or Contracting Officer's representative) and the Contractor. Contractor and his CPM consultant will be required to attend all monthly update meetings. Presence of Subcontractors during update meeting is optional unless required by the Contracting Officer (or Contracting Officer's representative). The Contractor shall update the project schedule and all other data required by this section shall be accurately filled in and completed draft (Pencil copy) prior to the monthly update meeting. The Contractor shall provide this information to the Contracting Officer or the VA representative in completed form **three work days** in advance of the update meeting. The contractor shall use only **approved previous month's schedule** to report progress (% complete) in "pencil copy" and shall not change this in any shape or form. Logic or duration changes for future incomplete activities should be entered later and shown in the resulting reports. Job progress will be reviewed to verify:

1. Actual start and/or finish dates for updated/completed activities/events.
2. Remaining duration, required to complete each activity/event started, or scheduled to start, but not completed.
3. Logic, time and cost data for change orders (CO), and supplemental agreements (SA) that are to be incorporated into the network diagram and computer-produced schedule. Submit "Fragnets" for each CO and SA for VA approval prior to monthly parallel run. Changes in activity/event sequence and duration should be made pursuant to the provisions of following Article, ADJUSTMENT OF CONTRACT COMPLETION.
4. Percentage for completed and partially completed activities/events.
5. Logic and duration revisions required by this section of the specifications, particularly if the Day 1 logic / sequence have changed significantly, which could potentially alter or impact the critical path of the schedule. Highlight and request VA approval prior to making any logic, durations, manpower and cost loading changes.
6. Activity/event duration and percent complete shall be updated independently, meaning that the Remaining Durations (RD) shall be reviewed for all "in-progress" activities and entered manually based on realistic remaining work content, and shall not be left to "auto-calculate" by the software.
7. Out of sequence progress - Activities that have progressed before all preceding logic has been satisfied (Out-of-Sequence progress) are not allowed except on a rare case by case basis, subject to approval by the contracting officer. Propose logic corrections to eliminate out of sequence progress or justify not changing the sequencing for approval prior to submitting updated monthly schedule. Correct out of sequence progress that continues for more than two update cycles by logic revision, as approved by the contracting officer. Also, submit complete revised schedule when more than 5% of the remaining activities are out of sequence. Calculate multiple float paths option is not allowed.
8. Logic changes - Specifically identify and discuss all logic changes pertaining to change orders (see section item 3.2.E below), contractor proposed changes in work plan or sequence, correction to schedule logic for out-of-sequence progress etc. that have been made

pursuant to contract provisions. VA will only approve logic revisions to keep the schedule valid in terms of its usefulness in calculating a realistic completion date, correcting erroneous logic ties, and accurately sequencing the work.

B. **Schedule Narrative** - The Contractor, in addition to the 5 schedule reports, as requested by SRE, shall submit a narrative report as a part of his monthly update reporting prepared after the update meeting, in a form agreed upon by the Contractor and the Contracting Officer. The narrative report shall be **prepared by the contractor's authorized representatives (Project manager, Superintendent, or other responsible official, and not by the CPM consultant)**; shall include, at a minimum, a description of major construction problem areas; resources issues; current and anticipated delaying factors and their estimated impact on performance of other activities/events and completion dates; and an explanation of corrective action being taken or proposed. This narrative shall also include:

1. Any forward Logic Revisions.
2. Any added or deleted activities;
3. Any cost loading or budget changes;
4. Any change order and its impact;
5. Any missed major milestones. This monthly schedule narrative should also briefly discuss the potential schedule risks / mitigation effort, as required by the item 3.1.G above. This report is in addition to the daily reports pursuant to the provisions of Article, DAILY REPORT OF WORKERS AND MATERIALS in the GENERAL CONDITIONS.

C. **Cash Flow S-curve** or Schedule Variance Control (SVC) Diagram - With each schedule submission, provide an SVC diagram showing **Scheduled and Actual (earned value)** Project cost curve (both incremental and cumulative) based on both projected early and late activity finish dates. Also, revise the Cash Flow S-curve when the contract is modified, or as directed by the Contracting Officer.

D. After completion of the joint review and the Contracting Officer's approval of all entries, the contractor will generate an updated computer-produced calendar-dated schedule and submit to the contracting Officer's representative with reports in accordance with the Article, COMPUTER PRODUCED SCHEDULES, specified. These reports shall be submitted **within 7 calendar days** after the monthly update meeting to

the SRE and the VA CPM Schedule analyst simultaneously via electronic media, as noted earlier.

E. **Parallel Runs / Time Impact Analysis (TIA)** – After completing the monthly schedule update, the contractor's CPM consultant shall rerun **all current period contract change(s) as a batch against the previous month's approved monthly project schedule with the approved "Fragnet"** (Fragments of network or sub-network) logic and durations. **The Change Order Fragnet should be driven by the pure logical ties; and there should not be any "Plug in" date ahead of the data date or at the time of impact.** The analysis shall only include original workday durations and schedule logic previously agreed upon during the update meeting by the contractor and the SRE for the contract change(s), and preferably shall be submitted as a part of the C.O. proposal and before any physical C.O. work is performed. Fragnet logic shall include only relevant procurement and physical C.O. work activities and **shall not include any RFI (Request for Information) or non-work activities time. Note: If timely resolution of the RFI is potentially impacting the contract schedule, in contractor's opinion, the contractor must provide tangible proof with CPM data and immediately submit in writing to the Contracting Officer's review. Only selective RFIs for the CO or SA shall be allowed in the schedule of record only when approved by the contracting officer or his representative.** When there is a disagreement on Fragnet logic and/or durations, the contractor shall use the Fragnet provided and approved by the SRE. The contractor must also allocate cost and average manpower loading to each CO or SA Fragnet activities as required by the section 2.3 – Network Diagram Requirements above. **Note: Insertion of any CO or SA activities into the CPM database (as a placeholder for cost only) with faulty logic ties like NTP (predecessor) and Project complete (successor) and zero (0) duration will not be accepted.** The proper "Fragnet" logic and durations must be used as approved by the SRE, tied to the related activities at physical work area of the schedule. After each rerun update, the resulting electronic project schedule data file shall be appropriately identified and submitted to the VA SRE and the CPM Analyst in accordance to the requirements listed in articles 3.2.D. This electronic submission is separate from the regular monthly project schedule reports requirements and shall be submitted to the SRE **within fourteen (14) calendar days** of

completing the regular schedule update meeting. Before inserting the contract changes durations, care must be taken to ensure that only the original durations of the change will be used for the analysis, not the reported durations (as-built) after the progress. In addition, once the final network diagram is approved, the contractor must recreate all manual progress payment updates on this approved network diagram and associated reruns for contract changes in each of these update periods as outlined above for regular update periods. This will require detailed record keeping for each of the manual progress payment updates.

F. **RFI activities not allowed – RFIs are only contractor inquiries and not legitimate work activities; and VA does not allow indiscriminate inclusion of any RFIs in any project schedule updates.** The contractor must provide, in advance and in writing, to the contracting officer the valid justification for including any RFIs, on an exception basis, in the project schedule updates; and **must obtain VA approval** prior to its inclusion in the schedule of record.

G. **Retroactive TIA** – Retroactive TIA long after (generally over 3 months) the initiation of impact with "as-built" logic / duration **will not be accepted as a normal practice.** The contractor is required to perform TIA (as required by Item 3.2.E above) **within a month of VA issued Change or** other directives to proceed with additional work.

H. **Concurrency in Time Extension delays** – Whenever there are several delays (due to change orders impact or other Government or contractor caused delays) occurring at the same time frame (same point of initiation), the contractor is required to perform one single TIA with individual Fragnets for each change inserted in the same base schedule and determine which one is impacting the critical or longest path. Analyze and **assign responsibilities to each individual changes or other delay (Government or contractor caused) with graphics and narratives to show if and how various delay impacts becoming concurrent.** The VA is only responsible for granting the amount of delay caused by them (apportioned delay) in the longest or critical path, discounting effects of any contractor caused delay that has been occurring concurrently in that time frame. The contractor is required to provide justification narrative, and then submit summary results for VA approval and acceptance.

I. **Revised NAS Diagram** – After VA acceptance and approval of the final NAS diagram and the schedule, and after each monthly update, the contractor shall submit to the Contracting Officer electronic copies of a revised complete NAS diagram showing all completed and partially completed activities/ events, contract changes and logic changes made on the intervening updates or at the first update on the final diagram. The Contracting Officer **may elect to have the contractor do this on a less frequent basis**, but it shall be done when the Baseline schedule is revised, or when requested by the Contracting Officer.

J. **Schedule Coordination/ Progress review meeting** – Following approval of the CPM schedule updates, the VA, the General Contractor, its approved CPM Consultant, RE office representatives, and all subcontractors needed, as determined by the SRE, shall meet to discuss the monthly updated schedule. This schedule coordination meeting shall be chaired by the VA SRE and will occur after each monthly project schedule update meeting utilizing the resulting schedule reports from the previous schedule update. The main emphasis shall be to address work activities to avoid slippages of project schedule and to identify any necessary corrective actions required to maintain project schedule during the reporting period. VA representatives and the Contractor should conclude the meeting with a clear understanding of those work and administrative actions necessary to maintain project schedule status during the reporting period. **If the project is behind schedule, discussions should concentrate on ways to prevent further slippage as well as ways to improve the project schedule status**, as appropriate. Furthermore, the critical Change Orders that impact the contract schedule, the contractor must include a reasonable **"work-around"** plan or re-planning effort (submit narrative) including revised logic sequence for the downstream base contract work, durations adjustments and crew re-allocation from less critical to the new critical path areas, without adversely impacting the change order cost to the government to minimize/mitigate the impact of the time delay. This should not be implied as a direction to accelerate the schedule, rather a **reasonable mitigation effort within the current work plan**.

K. **Ownership of Project Float** – Project float is the length of time between the contractor's predicted completion milestone and the contract completion date milestone. Project Float available in the

schedule, at any time, shall not be considered for the exclusive use of either the VA or the Contractor.

3.3 RESPONSIBILITY FOR COMPLETION / PROJECT DELAY / RECOVERY:

A. Whenever it becomes apparent from the current monthly progress review meeting or the monthly schedule update that phasing or contract completion dates will not be met, the Contractor shall execute some or all of the following remedial actions:

1. Increase construction manpower in such quantities and crafts as necessary to eliminate the backlog of work.
2. Increase the number of working hours per shift, shifts per working day, working days per week, the amount of construction equipment, or any combination of the foregoing to eliminate the backlog of work.
3. Reschedule the work in conformance with the specification requirements to recover all of the delay for which the contractor is responsible.

A. Prior to proceeding with any of the above actions, the Contractor shall notify and obtain approval from the Contracting Officer for the proposed schedule changes. If such actions are approved, the contractor shall incorporate this **"Recovery schedule"** with all the CPM revisions into the next update, **at no additional cost to the Government.**

3.4 CHANGES TO NETWORK DIAGRAM AND REVISED SCHEDULE:

A. Within 30 calendar days after VA acceptance and approval of any updated computer-produced schedule, the contractor shall **submit a revised network diagram and schedule**, the associated compact disk(s), and a list of any activity/event changes including predecessors and successors for any of the following reasons:

1. Delay in completion of any activity/event or group of activities/events; that indicate an extension of the project completion by 20 working days or 10 percent of the remaining project duration, whichever is less. Such delays which may be involved with contract changes, strikes, unusual weather, and other delays will not relieve the Contractor from the requirements specified unless the conditions are shown on the CPM as the direct cause for delaying the project is beyond the acceptable limits.
2. Delays in submittals, or deliveries, or work stoppage are encountered which make rescheduling of the work necessary.

3. The schedule does not represent the actual prosecution and realistic progress of the project, or when more than 5% of the remaining activities are "out of sequence" as noted earlier (Ref.3.2.A.7).
4. When there is, or has been, a substantial revision to the activity/event costs of the network diagram regardless of the cause for these revisions.

B. CPM revisions made under this paragraph which affect the previously approved computer-produced schedules for Government furnished equipment, vacating of areas by the VA Medical Center, contract phase(s) and sub phase(s), utilities furnished by the Government to the Contractor, or any other previously contracted item, must be furnished in writing to the Contracting Officer for approval.

B. Contracting Officer's approval for the revised NAS diagram and schedule and all relevant data is contingent upon compliance with all other paragraphs of this section and any other previous agreements by the Contracting Officer or the VA representative.

C. The cost of revisions to the network diagram resulting from contract changes will be included in the proposal for changes in work as specified in Article, FAR 52.243 -4 (CHANGES), and will be based on the complexity of the revision or contract change, man hours expended in analyzing the change, and the total cost of the change.
The cost of revisions to the network diagram and schedule, not resulting from contract changes is the responsibility of the Contractor.

3.5 ADJUSTMENT OF CONTRACT COMPLETION DATE / TIME EXTENSION DUE TO CHANGES TO THE CONTRACT:

A. **Contract Time Extension due to Changes to Contract** - The contract completion time will be adjusted only for causes specified in this contract. The contractor shall submit Request for a time extension to the contract within reasonable time frame **(within 1 month of the issuance of the Change order or before signing of the bilateral Supplemental Agreement**) and must provide a justification, CPM data and supporting evidence as the Contracting Officer may deem necessary for determination if the Contractor is entitled to a time extension under the provisions of the contract. Submission of proof based on approved Fragnet; i.e. revised activity/event logic, durations (in work days) and costs is obligatory to any approvals. The schedule must clearly

display that the Contractor has used, in full, all the float time available for the work involved in this request. The Contracting Officer's determination as to the total number of days of contract extension will be based upon the current computer-produced calendar-dated schedule for the time period in question and all other relevant information.

B. Actual delays in activities/events which, according to the computer-produced calendar-dated schedule, **do not affect the original or extended contract completion dates shown by the critical path in the network, will not be the basis for a change to the contract completion date**. The Contracting Officer will within a reasonable time after receipt of such justification and supporting evidence, review the facts and advise the Contractor in writing of the Contracting Officer's decision. The burden of proof to request the time extension is the sole responsibility of the contractor, and the contractor is required to revise the Time analysis or provide further documentation when requested by the Contracting Officer.

C. The contractor shall submit each request for a change in the contract completion date to the Contracting Officer in accordance with the provisions specified under Article, FAR 52.243 -4 (CHANGES). The contractor shall include, as a part of each change order proposal, a sequence of activities showing all CPM logic revisions (Fragnets), duration (in work days) changes, and cost changes, manpower loading for work in question and its relationship to other activities on the approved network diagram (as specified above in item 3.2.E - Parallel Run /Time Impact Analysis).

3.6 ADJUSTMENT OF CONTRACT COMPLETION DATE / TIME EXTENSION DUE TO WEATHER:

Weather Delays - All delays due to Weather shall be analyzed on a month by month basis. The unusual weather events and its "after-effects" must impact the work activities on or near critical path work to qualify for weather delay extension. Any weather-related delays claimed by the contractor must be "above and beyond" the "normal weather" pattern (10- year average) and shall be supported by the data shown in the National Oceanic and Atmospheric Administration (NOAA) for the region of the country where the project site is located. The weather delay analysis (along with NOAA weather charts) shall be submitted to the VA within 30 calendar days after the weather event has passed. VA

considers Time extension due to the weather is "non-compensable" time only.

3.7 ADJUSTMENT OF CONTRACT COMPLETION DATE / NON-WORK ACTIVITIES/EVENTS:

A. All delays due to non-work activities/events such as RFI's, STRIKES, and similar non-work activities/events shall be analyzed on a month by month basis and must be supported with a justification, CPM data and supporting evidence as the Contracting Officer may deem necessary for determination as to whether the Contractor is entitled to an extension of time. Note: As noted earlier, RFI activities are not allowed and VA does not allow indiscriminate inclusion of any RFIs in any project schedule updates.

B. Actual delays in activities/events which, according to the computer produced calendar dated schedule, do not affect the original or extended contract completion dates shown by the critical path in the network, will not be the basis for a change to the contract completion date. The burden of proof to request the time extension is the sole responsibility of the contractor.

C. The Contractor shall submit each request for a change in the contract completion date to the Contracting Officer in accordance with the provisions specified under Article, FAR 52.243 -4 (CHANGES). The Contractor shall include, as a part of each change order proposal, a sequence of activities showing all CPM logic revisions (Fragnets), duration (in workdays) changes, and cost changes, manpower loading for work in question and its relationship to relevant activities on the approved network diagram (as specified above in item 3.2.E - Parallel Run /Time Impact Analysis).

D. The cost of revisions to the network diagram not resulting from VA actions or inactions is the responsibility of the contractor.

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