SECTION 102.01 PREQUALIFICATION OF BIDDERS of the Specifications is amended as follows:

The eighth paragraph is replaced by the following:

When the Contractor's actual progress is more than 10 percent behind anticipated progress, as computed in accordance with the early dates of the accepted Detailed CPM Schedule, notification may be given that if the next monthly progress estimate shows more than a 10 percent delinquency, the Contractor may be removed from the list of prequalified bidders. Prior to the recommendation for removal, the Contractor may meet with the Engineer to establish that such delinquency is due to conditions beyond the Contractor's control. If removed, the Contractor will not be reinstated as a prequalified bidder until progress has improved to where, in the judgment of the Department, the work can be completed within the contract time or the project is satisfactorily completed.

The first sentence of the tenth paragraph is replaced by the following:

When the dollar value of completed critical operations has reached 100 percent of the dollar value of the latest approved earning schedule, progress will be determined at the time of the monthly progress estimate by comparing the percentage of time used with the percentage of critical operations completed.

SECTION 103.06 CONTRACT DOCUMENTS of the Specifications is amended to replace 103.06(e) with the following:

(e) The principles and definitions of the terms used herein shall be as set forth in the current edition of the As-Built CPM Schedule Handbook, published by The Associated General Contractors of America (AGC).

GENERAL REQUIREMENTS

The Contractor shall prepare and maintain a CPM schedule in accordance with the requirements of this CPM Progress Schedule Special Provision, and shall be fully responsible for the scheduling assumptions, sequencing, durations and scope of work, all of which are to be based upon the entirety of the Contract documents.

After notice of award and prior to notice to proceed, the Contractor shall attend a Scheduling Conference with the Engineer to discuss the schedule requirements and the Contractor's work plan.

The Project requires the following schedule submittals by the contractor:

- Preliminary CPM Schedule
- Detailed CPM Schedule
- Short Term Construction Schedule
- Time Impact Analysis Schedule

Details regarding these schedules will follow.

PROJECT SCHEDULER

The Contractor shall designate a project scheduler and submit his/her qualifications for the Engineer's approval. This approval is required before submission of any schedule work. The project scheduler shall have at least three years of verifiable experience in preparing and maintaining CPM project schedules on contracts of the same or similar size and complexity.
The project scheduler is the person primarily responsible for development and maintenance of the Contractor's CPM schedule, and shall represent the Contractor in all issues and discussions/meetings regarding the project schedule. Replacement of the project scheduler by the Contractor will require written approval from the Engineer.

SCHEDULING SOFTWARE SYSTEM
The Contractor shall furnish the Department two licensed copies of the latest version of the approved Scheduling Software System used by the Contractor to develop the Detailed CPM Schedule for this project. The licensing agreement shall provide for a full service maintenance contract for the software beginning with project award and extending one year beyond project completion. The approved scheduling software shall be functionally equal to and totally compatible with Primavera Project Planner software.

The approved Scheduling Software System shall be capable of baseline comparison analysis. The scheduling software shall have the capability to develop a schedule of anticipated earnings in the form of a series of cost earnings curves representing earnings or a percentage of contract value based on early start, early finish, late start and late finish of activities. The scheduling software shall also be capable of producing a listing of partial-payment estimates by pay period and accumulation of cost-to-date.

SCHEDULE SUBMITTAL REVIEWS/ACCEPTANCE
The Department shall review schedules for conformance with the requirements of the Contract Documents. Schedule review comments by the Engineer may address whether items of Work are omitted, activity durations are reasonable, or that the level of labor, materials, and equipment, the means, methods, timing and sequencing of the Work are practicable. The planning, scheduling or execution of the Work and the accuracy of any such Schedule details shall remain the sole responsibility of the Contractor.

The Department's review and acceptance of the Contractor's Detailed CPM Schedule submittal does not represent approval of the Contractor's estimate of resources (labor, material and equipment), method of operation, or methods of construction or production rates.

The Department will review/accept, in writing, the Contractor's schedule submission within twenty-five (25) calendar days after receipt of all required information. The Contractor’s proposed scheduling software will be evaluated for final approval in conjunction with the initial submission of the Detailed CPM Schedule. Conditional approval of the scheduling software may be granted during the Scheduling Conference.

If the Contractor fails to submit the Preliminary CPM Schedule or the Detailed CPM Schedule or electronic file or revisions thereof, within the time prescribed the Department may withhold approval of progress payment estimates until such time as the Contractor submits the required information.

The Contractor shall be required to participate in any discussions and meetings necessary to facilitate acceptance of the CPM Schedule and subsequent CPM Schedule updates and revisions, thereof.

If any of the required submissions are returned to the Contractor for corrections or revisions, they shall be resubmitted along with a new electronic file for approval, within fifteen (15) calendar days after the return mailing or transmittal date. Resubmittals shall be in the same scope as noted herein below. The Department will review and respond to all resubmittals within fifteen (15) calendar days after receipt of each new submission.

The review and acceptance by the Department of the Contractor's Detail CPM Schedule shall in no way serve to relieve the Contractor of its responsibility to complete the work within the contract time.
PRELIMINARY CPM SCHEDULE REQUIREMENTS

Within the 21 calendar days after the Execution of Contract, the Contractor shall submit to the Engineer for review and acceptance, the Preliminary CPM Schedule package. Submittal of the Preliminary CPM Schedule package, acceptable to the Engineer, shall be a condition of the first partial payment for mobilization. The Preliminary CPM Schedule package shall include those items listed in the schedule submission requirements below.

The Preliminary CPM Schedule shall contain detailed work activities for the first 120 calendar days of the Contract and summary level activities for completion of the balance of the entire Work in accordance with the Contract Milestones. The work activities identified for the first 120 calendar days shall be in sufficient detail to support the Monthly Estimate during that period, including all activities that the Contractor is required or plans to perform and for which the Contractor intends to request for payment application. The summary level activities for the remainder of the Work shall be in sufficient detail and content, and include logic ties, durations, and summary cost loading. The logic should be in sufficient detail and content to show the Contractor's general plan for completion of the Work and for meeting all Milestones, to identify the anticipated critical path and sub-critical paths, and to permit delay and impact analysis.

A schedule narrative shall be submitted that describes the Contractor’s plan for construction and describes the equipment and labor utilization for the first 120 calendar days of the contract. The narrative shall also describe the flow of Work for all activities on the critical path.

The Preliminary CPM Schedule shall be valid following its review and acceptance for a period not to exceed 120 calendar days as measured from Notice to Proceed. This schedule shall be superseded and replaced by the Detailed CPM Schedule following its’ review and acceptance.

DETAILED CPM SCHEDULE REQUIREMENTS

Within 45 calendar days after the Execution of Contract, the Contractor shall submit to the Engineer for review and acceptance, the Detailed CPM Schedule package, using the critical path method (CPM), for all activities for the entire project. Submittal of the Detailed CPM Schedule package, acceptable to the Engineer, shall be a condition of the second partial payment for mobilization. The accepted Detailed CPM Schedule package shall be used by the Contractor to manage and plan the work and shall be the basis for determining allowable extensions of time. The Detailed CPM Schedule package shall include those items listed in the schedule submission requirements below.

The Detailed CPM Schedule shall show the sequence and interdependence of activities required for completion of the work, beginning with Notice to Proceed and ending on project completion. The Detailed CPM Schedule shall include a network diagram and tabular reports showing all activity numbers, descriptions, total float, activity duration, preceding and succeeding activity numbers, multiple daily shift operations, early and late start and finish dates and intermediate completion milestones. The network diagram shall clearly depict the order, interdependence and duration for each activity and delineate the critical path. The network diagram shall be computer generated, with each sheet showing the date and revision number.
The CPM Schedule shall include the following data for each activity in the initial submittal and in all subsequent updates and revisions following:

1. Activity ID Number
2. Task/Activity Description
3. Original Duration
4. Remaining Duration
5. Percent Complete
6. All quantities in accordance with pay items
7. Number of work days per week for activity
8. Number of shifts per work day and hours per shift for activity
9. Major equipment and corresponding hours per activity
10. Manpower by trade or entity and corresponding hours per activity
11. Dollar value of activity
12. Early Start
13. Early Finish
14. Late Start
15. Late Finish
16. Actual Start
17. Actual Finish
18. Total Float per activity
19. Free Float per activity

All activities shall be grouped or coded together by area (e.g. location, work product, etc.) and responsibility (e.g. type of work, subcontractor(s), supplier(s), etc.). Titles and subtitles shall be provided to identify activity groups. Sheet size of diagram shall be 24 by 36 inches minimum and time scaled in weeks unless approved otherwise. Each sheet shall include a title block containing as a minimum the following information:

1. Project Title
2. VDOT Project Number
3. Contractor
4. Date of Submittal and/or Revision
5. Progress Computation Date (i.e. Data Date)
6. Version Number (see below)
7. Legend of Symbols and Abbreviation as applicable

In addition, the Detailed CPM Schedule submittal shall include a written certification on the face of the schedule, as well as on any diagrams and drawings, stating that the Detailed CPM Schedule is within the contractual requirements. The written certification shall also state that the submitted Detailed CPM Schedule is identical to that supplied to the Department and is the only schedule the Contractor will use for all work activities. This same written certification shall be included on all Detailed CPM Schedule updates and revisions and other schedule submittal requirements identified herein.
FLOAT - Should the Detailed CPM Schedule submittal indicate an earlier completion date than the allotted time for completion set forth in the Contract, the Detailed CPM Schedule shall identify any float developed between an early completion point and the Contract completion date as part of the project float.

Float is the amount of time between the early start date and the late start date of any of the activities in the network analysis of the Detailed CPM Schedule. It is herein defined and shall be understood by the Contractor and the Department that float is a shared commodity. Float time is not time for the exclusive use or benefit of either the Department or the Contractor. Either party has the right to full use of the float until such time that all of the float is depleted.

The use of float suppression techniques and activity splitting in the Detailed CPM Schedule is not allowed.

Negative float conditions during the initial CPM Schedule submission will not be allowed. Negative float is a condition that exists when the early start of an activity or activities is computed to be later than the late start and finish dates.

Free float, is float that can be used without affecting the early start time of all succeeding activities in a given float path.

SCHEDULE CALENDARS - The CPM Schedule shall also include coordination of anticipated events, such as utility relocations, adverse weather, major sporting events, major community events, etc. The CPM Schedule shall account for the normal range of inclement weather and its impact on work operations. For this Contract, normal range shall be defined as the 10-year mean maximum and minimum as published by the National Oceanic and Atmospheric Administration, U.S. Department of Commerce. A schedule calendar for work activities sensitive to adverse weather shall be included which indicates the anticipated non-work days due to weather.

DURATIONS - Activity durations shall be in workdays. The maximum duration for any on-site work activity shall be ten (10) workdays.

ACTIVITY ID - Each activity shall be assigned a unique Activity ID number, using a smart activity identification structure, which shall not be changed once assigned. Activity ID shall be in increments of at least 10, to allow insertion of additional activities for schedule updates and logic changes. Prior to the start of the development of the CPM Schedule, the Department must agree to the smart activity identification structure.

ABBREVIATIONS - Abbreviations used in the Detailed CPM Schedule shall be clearly defined in a legend of symbols.
LOGIC - All schedule activities shall have a minimum of one predecessor and one successor and shall not be constrained by any means other than logic ties to predecessor and successor activities with the following exceptions: the starting activity and the completion activity, the Notice-to-Proceed, required interim and final completion milestones, and work scheduled and performed by outside agencies and/or utility companies which may be scheduled with start or completion date constraints.

Relationships between similar activities shall reflect crew restraints based on the assumed number of crews for a given type of work consistent with the Narrative Progress Report.

PROCUREMENT AND PERMIT ACTIVITIES - Procurement of material and structures shall, at minimum, include activities for preparation of shop drawings, review of shop drawings, resubmittals, approval, fabrication and delivery. Obtaining permits shall include development of any work plans, processing/review time, and implementation of any permit conditions.

COST LOADING - The Preliminary and Detailed CPM Schedule submittal(s) shall contain cost for all activities that the contractor expects to receive payment. See section 109.03 Scope of Payment for additional information.

The dates shown in the Contractor's Detailed CPM Schedule shall comply with all contract requirements regarding maintenance of traffic, including seasonal and daily maintenance of traffic requirements, and limitations on operations. Failure to include any element of work required for the schedule performance of this contract shall not excuse the Contractor from completing the work in accordance with the requirements of the Contract Documents.

SHORT TERM CONSTRUCTION SCHEDULE
The Short Term Construction Schedule, either electronically produced or hand drawn, details the Contractor's daily work activities, including multiple shift work, in a bar chart format. The daily activities shall correspond to the CPM Progress Schedule activities but shall be at a greater level of detail. This Short Term Construction Schedule shall display all completed work for the preceding 2 weeks and all planned work for the next 2 weeks ("a two week look ahead schedule") and shall be submitted every Thursday.

The Contractor is expected to discuss the Short Term Construction Schedules, in detail, with the Engineer to coordinate field inspection staff requirements, schedule of work affecting abutters and corresponding work with affected utilities.

SCHEDULE SUBMISSION REQUIREMENTS
With each submission of the Preliminary CPM Schedule or the Detailed CPM Schedule, the Contractor shall submit:

1. An electronic file of the CPM Schedule on either 3.5 inch 1.44 Mb computer diskette(s) or CD-Rom disk.
2. Tabular schedule reports; sorted by a) total float, b) work areas, and c) a detailed predecessor and successor report sorted by activity number.
3. Time scaled logic diagram indicating the Critical Activities, early start, total float, sorted and grouped in such a manner as to best display the flow of work.
4. A Narrative Progress Report of the CPM Schedule which should;
   a. Explain the Contractor’s plan of operations for meeting the interim milestones and final completion date
   b. Identify and explain the assumptions, sequencing and restraints such as manpower, material and equipment for major work categories
   c. Describe each element of work shown,
   d. List the Contractor’s anticipated workdays per week, holidays, number of shifts per day, number of hours per shift, and anticipated days lost due to weather per month.
   e. A Resource Analysis Report by principal trades and equipment type in the aggregate, and in accordance with the requirements of the Detailed CPM Schedule. The analysis shall display the equipment type and equipment-days/hours of usage and the number of man-days of effort, for each month, over the life of the project. This submission shall be correlated with the resources assigned to each activity of the Detailed CPM Schedule. The Resource Analysis Report shall be updated monthly and shall include the resources actually expended by trade and equipment type as of the current report period and the resources required to complete all remaining contract work.

5. Earnings Schedule of cash flow projection
The contractor shall submit five (5) paper copies of all reports and graphics.

The Contractor shall electronically store (save) an original version of the approved Contractor’s CPM Schedule as the baseline “As-Planned” schedule for comparative analysis. A copy shall also be provided to the Engineer. As work progresses, the Contractor shall provide graphics displaying actual progress bars versus baseline or target bars.

SCHEDULE UPDATES
Coinciding with the monthly progress estimate, the Contractor shall submit an updated Detailed CPM Schedule with revised reports and network diagram reflecting actual progress (i.e. start/finish dates and percent complete). The Detailed CPM Schedule update shall include a Narrative Progress Report denoting work completed in the preceding month, work planned for the upcoming month, any changes to the project’s critical path and any changes to the previously accepted schedule.

The Narrative Progress Report shall identify all problem areas, current and anticipated, delaying factors and their impact, and an explanation of corrective actions taken or proposed. Each updated schedule submittal shall clearly identify modifications to activity durations, logic, values or descriptions. If the Contractor fails to submit a monthly Detailed CPM Schedule update for review when due, the Department will not release current estimate payment or any further estimate payments until such time that the satisfactorily Detailed CPM Schedule update is submitted.

In addition to submission of the Detailed CPM Schedule described hereinbefore, the Contractor shall keep the Engineer informed of planned or contemplated operations on a continuing basis through the process of updating and schedule updating meetings.

The initial updating shall take place during the first week after approval of the Contractor’s initial Detailed CPM Schedule. Subsequent updates shall be scheduled to coincide with each monthly pay estimate thereafter for the duration of the contract. The updated Detailed CPM Schedule shall be reviewed jointly at a meeting with the Department and Department’s authorized representative for the purpose of verifying:
Actual start dates;
Actual completion dates;
Cost value of work reported in place;
Activity percent completion
Revised logic (as built and projected) and changes in activity durations, cost, and manpower and equipment assigned;
Influence of work orders;
Revisions due to unauthorized modifications;
Incorporation of approved time extensions.

The Department will inform the Contractor of the date, time and place of each updating meeting.

The Contractor shall come to the updating meetings with the above data prepared in advance for each meeting to provide, as of the end of the updating period, a complete and accurate report of current procurement and construction progress and a depiction of how the Contractor plans to continue the work of this project to meet all contract interim milestones and completion dates. Both parties shall consider all network changes and status data resolved during each update as acceptable unless written notice of any exceptions is given by an objecting party within ten (10) calendar days after receipt of the Contractor's update submission. For major network changes that cannot be resolved during an updating meeting, the Contractor shall submit, in writing, such revisions for the Department's approval prior to inserting such changes into the network. Submissions may be in the form of marked-up networks or fragnets, provided they are submitted with a letter of transmittal. The submission and approval procedures for this information shall follow the same timetable as described for work orders, Delays, and Time Extensions noted herein.

SCHEDULE UPDATES SUBMISSION REQUIREMENTS
With each submission of the updated Preliminary and Detailed CPM Schedule, the Contractor shall submit:

1. An electronic file of the Schedule on either 3.5 inch 1.44 Mb computer diskette or CD-Rom disk.
2. Tabular schedule reports sorted by; a) total float, b) work areas, and c) a detailed predecessor and successor report sorted by activity number
3. Time scaled logic diagram indicating the Critical Activities, early start, total float, sorted and grouped in such a manner as to best display the flow of work.
4. A Narrative Progress Report describing;
   a. The physical progress during the report period
   b. Plans for continuing the work during the forthcoming report period
   c. Actions planned to correct any negative float predictions
   d. An explanation of potential delays and/or problems and their estimated impact on performance and the overall project completion date.
   e. Alternatives for possible schedule recovery to mitigate any potential delay and/or cost increases should be included for consideration by the Department.
5. Earnings Schedule of cash flow projection
6. Resources Analysis Report
The contractor shall submit five (5) paper copies of all reports.

These reports should be submitted to the department within 5 calendar days after each updating meeting.

If the Contractor fails to submit any of the update deliverable in a timely manner, the Department may withhold approval of progress payment estimates until such time as the Contractor submits the required update reports.

SECTION 108 PROSECUTION AND PROGRESS OF WORK of the Specifications is amended as follows:

Section 108.08 Progress Schedule of the Specifications is deleted.

Section 108.09 – Determination of Extension of Contract Time Limit is amended to replace the second, third and fourth paragraphs with the following:

If the satisfactory fulfillment of the Contract with extensions and increases authorized in accordance with the requirements of Sections 104.02 and 104.03 requires the performance of work in greater quantities than those specified in the Contract, the Contract Time Limit or Interim Milestones may be increased according to the time allowances as may be agreed on and/or set forth in the extra work order that covers the additional work.

With a fixed-date contract, if the Notice to Proceed is not issued within 45 days after the opening of bids, or the Contractor is unable to commence work because of any failure or delay on the part of the Department, the Contractor may be granted a day to day time extension to the Contract Time Limit and the Interim Milestones for the number of days delayed beyond the 45 days after opening of bids. However, no time extension will be allowed for a delay in the issuance of the Notice of Proceed when the delay is the fault of the Contractor.

During prosecution of the work, the Contractor shall identify the causes for any delays attributable to conditions it deems to be beyond its control and shall identify the particular impacted construction operation(s) and time period(s) of delay.

When work orders or delays are experienced by the Contractor and the Contractor requests an extension of time, the Contractor shall submit to the Department a written Time Impact Analysis illustrating the influence of each change or delay on the current contract schedule completion date or Interim Milestones.

Each Time Impact Analysis shall include a fragnet demonstrating how the Contractor proposes to incorporate the work order or delay into the Detailed CPM Schedule.

A fragnet is defined as a sequence of new activities and/or activity revisions that are proposed to be added to the existing Detailed CPM Schedule to demonstrate the influence of the delay and the method for incorporating delays and impacts into the project schedule as they are encountered.

Each analysis shall demonstrate the estimated time impact based on the events of delay, the date the change was given to the Contractor, the status of construction at that point in time, and the event time computation of all activities effected by the change or delay. The event times used in the analysis shall be those included in the latest update of the Detailed CPM Schedule or as adjusted for the events of delay.
Upon mutual agreement by the Department and the Contractor, fragments illustrating the influence of work orders and delays shall be incorporated into the Detailed CPM Schedule during the first update after such agreement is reached.

The Detailed CPM Schedule update must clearly show that the schedule has used, in full, all the float time available for the work involved in this request. The Department will review/accept, in writing, the Contractor’s schedule submission within fifteen (15) calendar days after receipt of all required information. The Department’s determination as to the total number of days of contract extension will be based upon the current Detailed CPM Schedule update for the time period in question and all other relevant and pertinent data and documentation available that may substantiate the request. Actual delays in activities that, according to the Detailed CPM Schedule update do not affect the extended and predicted Contract Completion Date or Interim Milestones shown by the network critical path, will not be the basis for a change to the Contract Completion Date or Interim Milestones.

The timely submission to the Engineer of such information is essential for the Department to make an adequate evaluation of any subsequent consideration of an extension of the Contract Time Limit or Interim Milestones.

SECTION 109 MEASUREMENT AND PAYMENT of the Specifications is amended as follows:

SECTION 109.03 SCOPE OF PAYMENT of the Specifications is amended include the following after the last paragraph:

The Detailed CPM Schedule shall include a means to develop and output progress payment requests, payment certifications, and a planned earnings schedule of cash flow projections. The total project cost shall be broken down, distributed, and assigned to activities for which cost will be expended. An activity cost shall be assigned to each activity that has monetary value, based on normal working and economic conditions including costs of labor, fringes, material, equipment, including all subcontractor and vendor costs and other resources. Cost items such as overhead, profit and bonds and insurance may be prorated on a weighted basis throughout all activities that have a monetary value. At the Department’s discretion, the Contractor may be required to make cost adjustments to activities that may appear to be unbalanced or front-end loaded.

For periodic updates of the Detailed CPM Schedule, the Contractor shall make a report of the cost value of the work in place for each activity as of the status date. Adjustments to the Contract that increase or decrease cost shall be made for all activities added or for those whose scope has changed.

No payment will be made for changed or extra work not yet incorporated in the Detailed CPM Schedule. Payment progress shall not be reported against unrelated activities. In the event of cost disputes, additions or revisions to an activity reflecting changed or extra work conditions shall be incorporated into the Detailed CPM Schedule, with appropriate approved logic changes. Costs may be added to the related activity or string of activities when an agreement has been reached.

SECTION 109.07 PARTIAL PAYMENTS of the Specifications is amended as follows:

The third sentence in the first paragraph is replaced by the following:

Partial payments will be made once each month for the work performed in accordance with the contract requirements except when the sum of the work performed during the month’s estimate period is less than $5000.00.
The fifth paragraph is replaced with the following:

The Department will deduct an amount equivalent to 5 percent of the monthly progress estimate on all unbonded contracts and will retain such monies until final payment is made in accordance with the requirements of Section 109.09. The balance less all previous partial payments will be vouchered for payment. After 50 percent of the total contract value has been completed and 5 percent has been retained on this amount, the Department will make the remaining partial payments in full provided the Contractor is maintaining a satisfactory rate of progress. Total contract value will be considered to mean the original amount of the contract except when the contract is increased or decreased by more than 20 percent, in which case, the adjusted total will be considered as the total contract value. The Department will not deduct retainage on bonded contracts provided the Contractor achieves and maintains a satisfactory rate of progress.

The sixth paragraph is replaced with the following:

If the Contractor’s progress falls more than 10 percent behind the latest approved progress schedule on either a bonded or unbonded contract, the Contractor may be notified that if the next monthly progress estimate shows a delinquency of more than 10 percent, progress will be considered unsatisfactory and 5 percent retainage will be withheld each month the Contractor is behind the progress schedule by more than 10 percent.

MEASUREMENT AND PAYMENT

No separate measurement and payment will be made for the Detailed CPM Schedule, schedule revisions, schedule updates and for furnishing specified scheduling software and licensing and maintenance agreement and for conforming to all other requirements as set forth in this special provision, the cost for such shall be included in the price bid for other appropriate contract items.