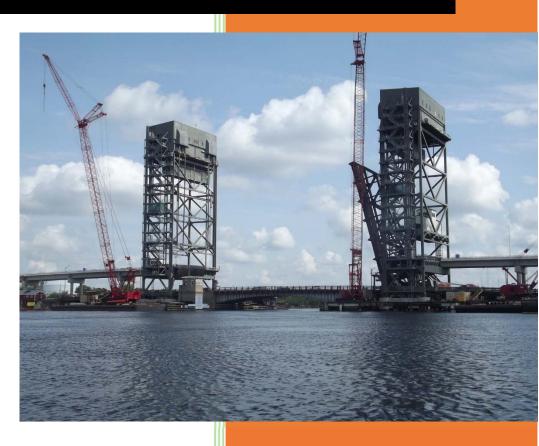
2020

As-built Schedule Tracker User Guide



Construction Division

Virginia Department of Transportation 7/16/2020

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Overview

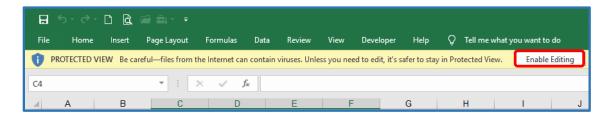
The As-built Schedule Tracker is a multi-functional spreadsheet tool that can be used by the project team and other key stakeholders to view, analyze, or track a static version of the project CPM schedule in MS Excel. Furthermore, the As-built Schedule Tracker can be used to:

- 1. View various aspects of the schedule using pre-defined activity filters.
- 2. View schedule variances between the Current Schedule and the SOR or Previous Update.
- 3. Document as-built schedule information in real time, which can be used to validate the contractor's monthly schedule updates for accuracy or to resolve time-related issues.
- 4. Perform schedule delay analysis using the Contemporaneous Period Analysis (CPA) method.
- 5. Analyze and track periodic schedule performance and trends.

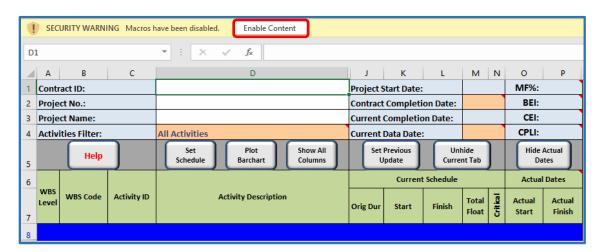
1. Downloading a Copy of the As-built Schedule Tracker – Download and save a copy of the As-built Schedule Tracker file using the link below:

http://www.virginiadot.org/business/resources/const/AsbuiltScheduleTracker.xlsb

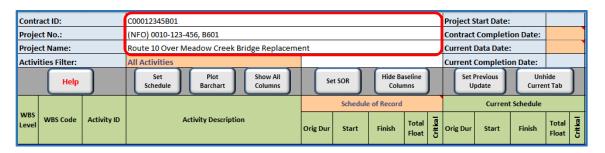
- 2. Preparing the As-built Schedule Tracker for the Initial or Revised Baseline Anyone with access to the project CPM schedule in Primavera P6 can prepare the As-built Schedule Tracker. The following are guidelines for setting-up the As-built Schedule Tracker for the Initial Baseline Schedule (SOR) or a subsequent Revised Baseline Schedule:
 - 1. Obtain a copy of the blank template, save, and rename for a specific project (For example: C00012345C01_B01_Asbuilt Schedule Tracker).
 - 2. Open the file. If the PROTECTED VIEW message appears on top of the worksheet, click on the *Enable Editing* button.



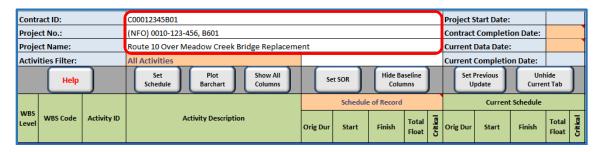
3. If the SECURITY WARNING message appears on top of the worksheet, click on the *Enable Content* button to enable the application add-ins and built-in macros.



4. In Cells D1 to D3 of the As-built worksheet, enter the required project information.

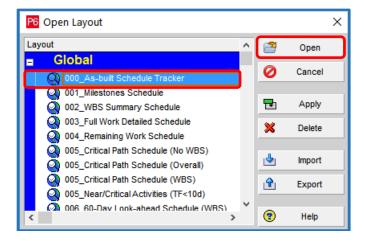


5. In Cells D1 to D3 of the As-built worksheet, enter the required project information.

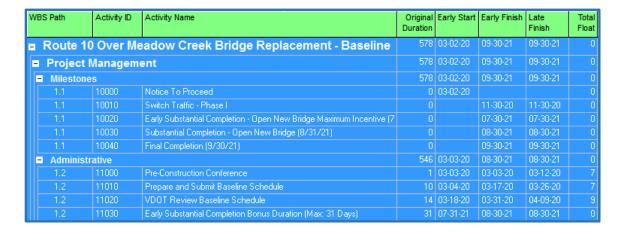


6. In Primavera P6, open the project SOR CPM schedule, then open the "As-built Schedule Tracker" layout. (For Primavera P6 stand-alone users, you may use the link below to download a copy of the Primavera P6 As-built Schedule Tracker Layout file):

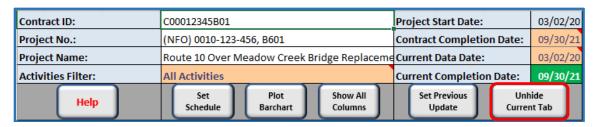
http://www.virginiadot.org/business/resources/const/As-builtScheduleTrackerLayout.plf



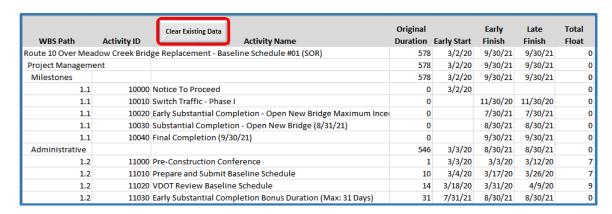
7. Click on the Project node at the top of the layout, scroll down to the bottom, hold down the *Shift* key and select the last activity, then right-click, and then click on *Copy* to copy the current schedule data.



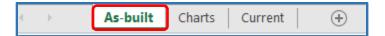
8. If the Current worksheet tab is not visible, then click on the *Unhide Current Tab* button to display the Current worksheet.



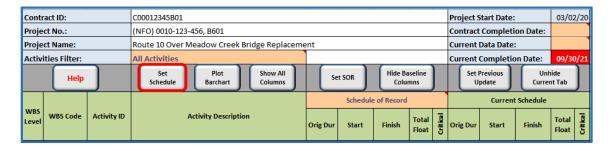
9. In the Current worksheet, click on the *Clear Existing Data* button to clear any existing data. Then select Cell A1, then right-click, and then click on Paste to paste the CPM schedule data into the Current worksheet.



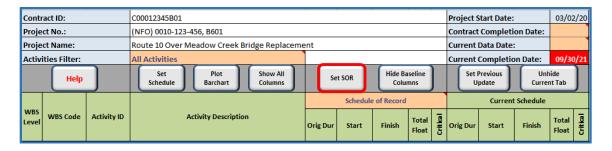
10. Click on the As-built worksheet tab at the bottom to display the As-Built worksheet.



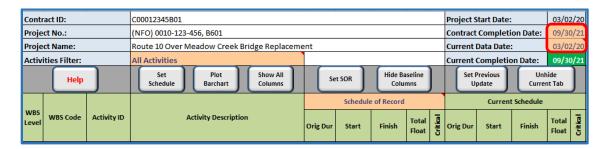
11. In the As-built worksheet, click on the *Set Schedule* button to set up the form to receive the current schedule.



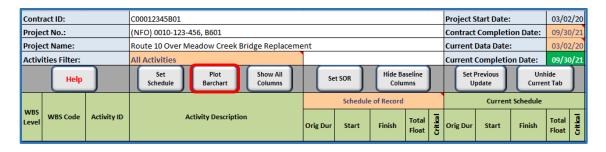
12. Click on the *Set SOR* button to save a copy of the current schedule as the Schedule of Record (SOR). (Note: This step should only be performed when setting up the Initial Baseline Schedule or a subsequent Revised Baseline Schedule).



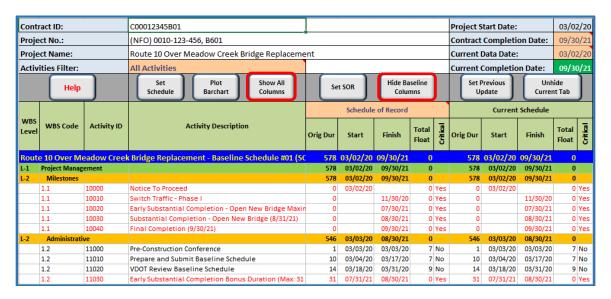
13. In the As-built worksheet, enter the project *Contract Completion Date* in Cell M2 and the *Current Schedule Data Date* in Cell M3.



14. Click on the Plot Barchart button to set the bar-chart timescale and to plot the activity bars.

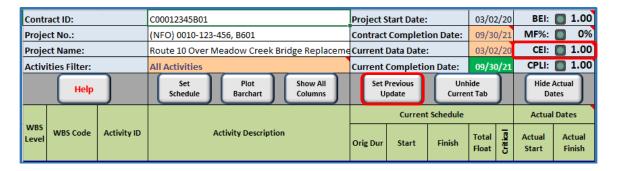


15. You may click on the *Show All Columns* button to display all available columns or click on *Hide Columns* button to hide associated columns, as needed.

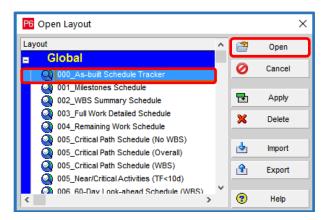


16. Save a copy of the file. (<u>Note</u>: Save a separate file for each schedule, naming each file to reflect the Contract ID, submission type and number, and Data Date. For example: C000012345B01_B01_3-2-20_As-built Schedule Tracker).

- **3. Preparing the As-built Schedule Tracker for Monthly Updates –** The following are guidelines for setting-up the As-built Schedule Tracker for each monthly update:
 - 1. Open the previously saved file, and then save and rename for the current update (For example: C00012345C01_U01_4-4-20_Asbuilt Schedule Tracker).
 - 2. Click on the *Set Previous Update* button to save a copy of the current schedule and any recorded "As-built" information as the previous. (<u>Note</u>: The CEI value should generally revert to 1.00 upon setting the previous schedule update).



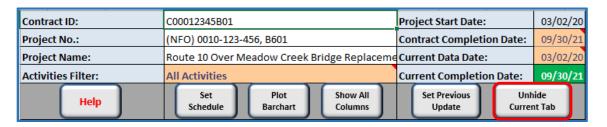
3. In Primavera P6, open the current project schedule update using the *As-built Schedule Tracker* layout.



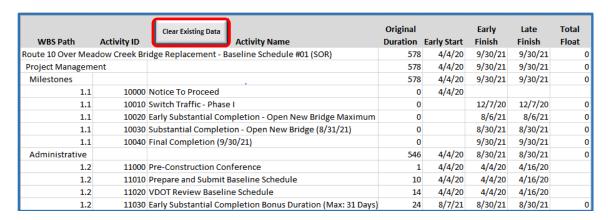
4. Click on the Project node at the top of the layout, scroll down to the bottom, hold down the *Shift* key and select the last activity, then right-click, and then click on *Copy* to copy the current schedule data.



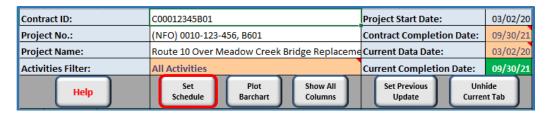
5. Click on the *Unhide Current Tab* button to display the Current worksheet.



6. In the Current worksheet, click on the *Clear Existing Data* button to clear any existing data prior to pasting the current data. Then select Cell A1, then right-click and then click *Paste* to paste the current schedule data.



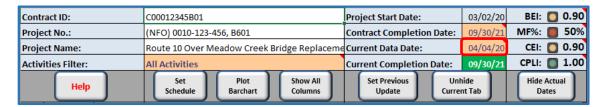
- 7. If activities have been added or deleted in the current schedule, then perform the following steps to avoid errors or omissions. Otherwise, skip this step.
 - 1. Click on the Set Schedule button to adjust the form for the added or deleted activities.



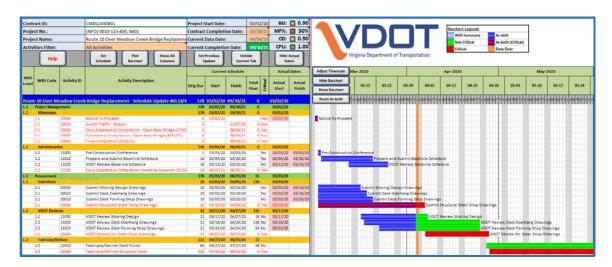
2. If the form is being used to record as-built information, then click on the *Reset As-built* button to reset the as-built information using information saved in the previous schedule.



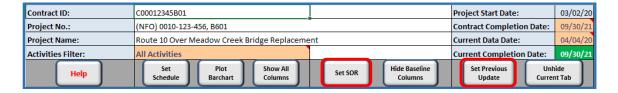
8. Adjust the Current Data Date (Cell M3) to correspond with the current schedule Data Date.



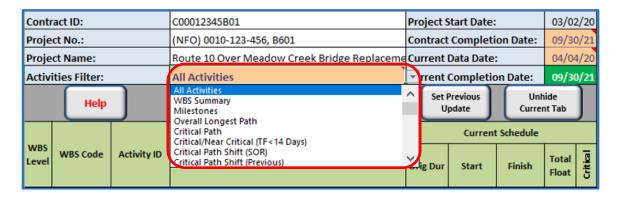
9. Click on the *Plot Barchart* button to re-plot the bar-chart. Then save the file.



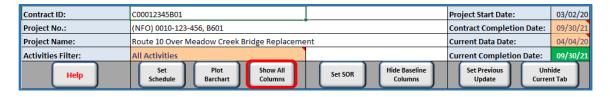
- **4. Using the As-built Schedule Tracker** The As-built Schedule Tracker provides an alternate means of using the project schedule to monitor and control the project. The following are guidelines for using the As-built Schedule Tracker:
 - 1. <u>DO NOT</u> click on the Set SOR or Set Previous Update buttons. These buttons are only used when preparing the form to save a copy of the Current Schedule as the SOR or Previous Update, as described above.



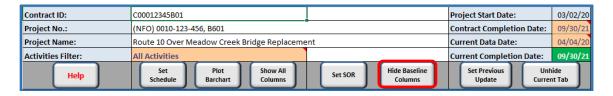
2. Click on the *Activities Filter* drop box (Cell D4), then click on the drop-down arrow, and then select from the list a filter with which to display activities that meet the criteria for the selected filter. For additional details on each filter, see the next section: Using the Activities Filter.



3. To view hidden columns, click on the Show All Columns button to display all available columns.



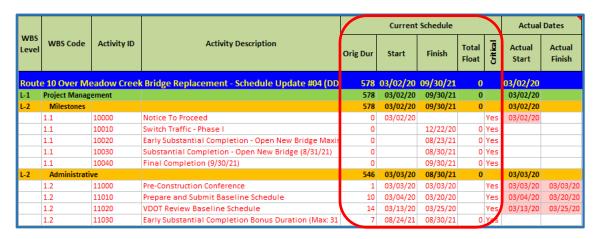
4. To hide columns, click on Hide Columns button to hide associated columns, as needed.



5. You may display the Baseline columns, as needed to view the schedule information for the selected baseline. Click on Cell E6, then select from the baseline drop box Schedule of Record or Previous Update to view the SOR or Previous Update as the baseline to compare the Current Schedule against. (Note: Depending on the selected activities filter (Cell D4), Schedule of Record or Previous Update is automatically selected for comparison).



6. The Current Schedule columns display the current schedule activity information.



7. The *Actual Dates* columns display the actual dates as shown in the Current Schedule or as recorded by the user. The recorded as-built dates supersede the Current Schedule actual dates.

					Current		Actual Dates			
WBS Level	WBS Code	Activity ID	Activity Description	Orig Dur	Start	Finish	Total Float	Critical	Actual Start	Actual Finish
Rout	e 10 Over Mo	eadow Creek	Bridge Replacement - Schedule Update #04 (DD	578	03/02/20	09/30/21	0		03/02/20	
L-1	Project Manag	ement		578	03/02/20	09/30/21	0		03/02/20	
L-2	Milestones			578	03/02/20	09/30/21	0		03/02/20	
	1.1	10000	Notice To Proceed	0	03/02/20			Yes	03/02/20	
	1.1	10010	Switch Traffic - Phase I	0		12/22/20	0	Yes		
	1.1	10020	Early Substantial Completion - Open New Bridge Maxir	0		08/23/21	0	Yes		
	1.1	10030	Substantial Completion - Open New Bridge (8/31/21)	0		08/30/21	0	Yes		
	1.1	10040	Final Completion (9/30/21)	0		09/30/21	0	Yes		
L-2	Administrati	ve		546	03/03/20	08/30/21	0		03/03/20	
	1.2	11000	Pre-Construction Conference	1	03/03/20	03/03/20		Yes	03/03/20	03/03/20
	1.2	11010	Prepare and Submit Baseline Schedule	10	03/04/20	03/20/20		Yes	03/04/20	03/20/20
	1.2	11020	VDOT Review Baseline Schedule	14	03/13/20	03/25/20		Yes	03/13/20	03/25/20
	1.2	11030	Early Substantial Completion Bonus Duration (Max: 31	7	08/24/21	08/30/21	0	Yes		

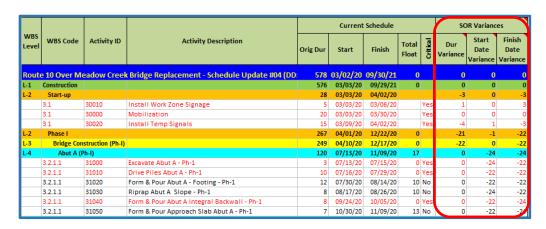
8. The *Percent Complete* columns display the current activity percent complete for the Current Schedule, SOR and Variance. The percent complete calculations are based on activity duration.

					Current	Schedule	Percent Complete				
WBS Level	WBS Code	Activity ID	Activity Description	Orig Dur	Start	Finish	Total Float	Critical	Current Percent Complete	SOR Percent Complete	Percent Complete Variance
Rout	e 10 Over M	eadow Creel	Bridge Replacement - Schedule Update #04 (DD:	578	03/02/20	09/30/21	0		21.5%	21.5%	0.0%
L-1	Construction			576	03/03/20	09/29/21	0		21.4%	21.4%	0.0%
L-2	Start-up			28	03/03/20	04/02/20			100.0%	100.0%	0.0%
	3.1	30010	Install Work Zone Signage	5	03/03/20	03/06/20		Yes	100.0%	100.0%	0.0%
	3.1	30000	Mobilization	20	03/03/20	03/30/20		Yes	100.0%	100.0%	0.0%
	3.1	30020	Install Temp Signals	15	03/09/20	04/02/20		Yes	100.0%	100.0%	0.0%
L-2	Phase I			267	04/01/20	12/22/20	0		35.6%	38.8%	-3.2%
L-3	Bridge Con	struction (Ph-I)		249	04/10/20	12/17/20	0		32.9%	37.0%	-4.0%
L-4	Abut A (F	Ph-I)		120	07/13/20	11/09/20	17		0.0%	12.5%	-12.5%
	3.2.1.1	31000	Excavate Abut A - Ph-1	3	07/13/20	07/15/20	0	Yes	0.0%	100.0%	-100.0%
	3.2.1.1	31010	Drive Piles Abut A - Ph-1	10	07/16/20	07/29/20	0	Yes	0.0%	60.0%	-60.0%
	3.2.1.1	31020	Form & Pour Abut A - Footing - Ph-1	12	07/30/20	08/14/20	10	No	0.0%	0.0%	0.0%
	3.2.1.1	31030	Riprap Abut A Slope - Ph-1	8	08/17/20	08/26/20	10	No	0.0%	0.0%	0.0%
	3.2.1.1	31040	Form & Pour Abut A Integral Backwall - Ph-1	8	09/24/20	10/05/20	0	Yes	0.0%	0.0%	0.0%
	3.2.1.1	31050	Form & Pour Approach Slab Abut A - Ph-1	7	10/30/20	11/09/20	13	No	0.0%	0.0%	0.09

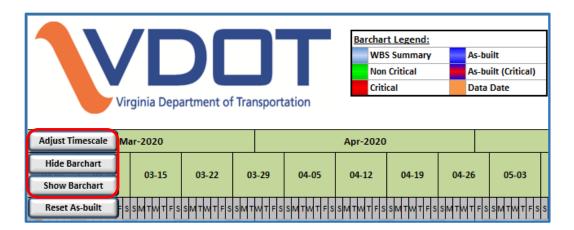
9. The *As-built Durations* columns display the current schedule activity Actual Duration, Remaining Duration and At Completion Duration.

					Current	As-built Durations					
WBS Level	WBS Code	Activity ID	Activity Description		Start	Finish	Total Float	Critical	Actual Dur	Rem Dur	At Compl Dur
Rout	te 10 Over M	eadow Creek	s Bridge Replacement - Schedule Update #04 (DD	578	03/02/20	09/30/21	0		124	454	578
L-1	Construction			576	03/03/20	09/29/21	0		123	453	576
L-2	Start-up			28	03/03/20	04/02/20			31	0	31
	3.1	30010	Install Work Zone Signage	5	03/03/20	03/06/20		Yes	4	0	4
	3.1	30000	Mobilization	20	03/03/20	03/30/20		Yes	20	0	20
	3.1	30020	Install Temp Signals	15	03/09/20	04/02/20		Yes	19	0	19
L-2	Phase I			267	04/01/20	12/22/20	0		94	172	266
L-3	Bridge Con	struction (Ph-I)		249	04/10/20	12/17/20	0		85	167	252
L-4	Abut A (F	Ph-I)		120	07/13/20	11/09/20	17		0	120	120
	3.2.1.1	31000	Excavate Abut A - Ph-1	3	07/13/20	07/15/20	0	Yes	0	3	3
	3.2.1.1	31010	Drive Piles Abut A - Ph-1	10	07/16/20	07/29/20	0	Yes	0	10	10
	3.2.1.1	31020	Form & Pour Abut A - Footing - Ph-1	12	07/30/20	08/14/20	10	No	0	12	12
	3.2.1.1	31030	Riprap Abut A Slope - Ph-1	8	08/17/20	08/26/20	10	No	0	8	8
	3.2.1.1	31040	Form & Pour Abut A Integral Backwall - Ph-1	8	09/24/20	10/05/20	0	Yes	0	8	8
	3.2.1.1	31050	Form & Pour Approach Slab Abut A - Ph-1	7	10/30/20	11/09/20	13	No	0	7	

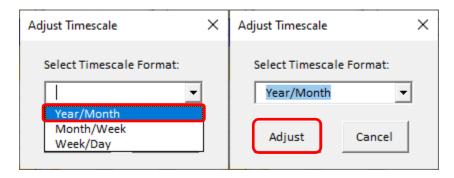
10. The *Variance* columns display the variances in activity durations, start date, and finish date. The variances are based the selected baseline in Cell E6, SOR or Previous Update.



11. You may click on the Barchart area buttons, as needed to perform the bar-chart functions as described below.

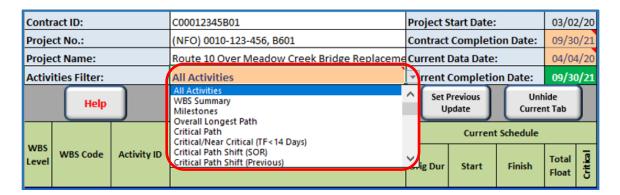


1. The timescale can be used to collapse or expand the bar-chart area as needed. Click on the *Adjust Timescale* button, then select from the drop-down list, and then click on *Adjust* to change the bar-chart timescale format. The default is "Month/Week".



- 2. Click on the *Hide Barchart* button to hide the barchart area to view/print the Activity Table only, as needed.
- 3. Click on the *Show Barchart* button to display the barchart area, as needed.

5. Using the Activities Filter – The Activities Filter is key to using the As-built Schedule Tracker. It provides the ability to select specific activities using a variety of pre-defined filters, which allows the user to focus on various aspects of the schedule. Click on the Activities Filter drop box (Cell D4), then click on the drop-down arrow, and then select a filter to display the specific activities that meet the criteria for the selected filter.



The following are available pre-defined filters that can be used to view various aspects of the schedule. Description, criteria, and suggestions for how each filter can be used are as follows:

- 1. <u>All Activities</u>: Select *All Activities* to view all available activities. This filter can be used to review/analyze the schedule to determine:
 - a) If all individual activities required to complete the project are included.
 - b) If the durations of the individual activities are reasonable.
 - c) If the overall sequence and logic are reasonable.
 - d) If the current status of the individual activities are accurate.
 - e) What work is scheduled to be performed, where and when?
 - f) How many concurrent operations are going at the same time or at the same location?
 - g) Does the Contractor have sufficient resources to support the schedule?
 - h) Are there any potential conflicts? If any, determine potential impact and possible mitigation strategies.
- 2. <u>WBS Summary</u>: Select *WBS Summary* to view summary level information at each WBS node. This filter can be used to review/analyze the schedule at a higher level to determine:
 - a) If the WBS reflects a complete breakdown of the entire scope of work. Are there are major phases, stages or elements of work not shown?

- b) If the WBS reflects a reasonable and logical breakdown and flow of the Work.
- c) The overall time and status of major phases, stages or elements of work. Is the overall status of each WBS element reasonable and accurate?
- d) What major element of work is ahead or behind schedule relative to the SOR or Previous Schedule?
- e) If there are concurrent work scheduled at the same time? If any, is it feasible or is further evaluation of the schedule necessary to determine if adjustments are necessary?
- 3. <u>Milestones</u>: Select *Milestones* to view all milestone activities, typically activities with zero (0) duration that do not consume time or resources. Milestones are either contract mandated or are used to mark the start or finish of key events such as a phase or stage. This filter can be used to review/analyze the schedule to determine:
 - a) If all Contract milestones are included and are designated as milestones, as required by specifications.
 - b) If other key dates required for monitoring and controlling the project are included and are designated as milestones.
 - c) Status of the Contract milestones. Are the milestones being met or are they are ahead or behind schedule? Are corrective actions necessary?
- 4. Overall Longest Path: Select Overall Longest Path to view all critical path activities from the beginning of the project to the end. The activities on the left side of the Data Date represent the "As-built Critical Path" while the activities on the right side represent the "Critical Path". This filter can be used primarily to review/analyze the schedule to determine:
 - a) If the sequence and logic are realistic relative to past performance.
 - b) If there are any out of sequence logic? If so, does the schedule need adjustments?
 - c) If there are concurrent critical activities, are they based on logic changes, actual progress, or out-of-sequence progress?
 - d) What critical path activities have taking longer? Are the durations of the remaining activities reasonable relative to past performance?
 - e) If there are gaps along the critical path? If so, what are the causes of the gaps?
 - f) What is the controlling critical path activity, why and what is its current status? If ongoing, monitor performance to ensure timely completion.
 - g) If there are any shifts in the critical path since the previous schedule. If so, why?

- 5. <u>Critical Path</u>: Select *Critical Path* to view the critical path activities for the remaining work as of the Data Date. These are the activities that must be completed on time to ensure that the project completes on time as currently planned. This filter can be used to review/analyze the schedule for upcoming critical path work to determine:
 - a) If the overall sequence and logic are realistic.
 - b) If the critical path activities are based on mandatory or discretionary logic.
 - c) If there are concurrent critical activities, and what are the potential risks?
 - d) If there are gaps along the critical path? If so, why and can the gaps be avoided?
 - e) If the durations of the individual activities are reasonable relative to past performance.
 - f) What is the controlling critical path activity, why and what is its current status? If ongoing, monitor performance to ensure timely completion.
 - g) If there are any shifts in the critical path since the previous schedule. If so, why?
 - h) If there are any opportunities for fast-tracking or collapsing the schedule, if needed.
- 6. <u>Critical/Near Critical (TF<10)</u>: Select *Critical/Near Critical (TF<10)* to view remaining activities that are either on the critical path or have total float (TF) values of less than 10. These are activities that are more likely to delay the project or (a constrained milestone) if they are delayed beyond the number of days of available TF. Such activities should be monitored closely. This filter can be used to review/analyze the schedule to determine:
 - a) If the sequence and logic are realistic.
 - b) If the critical path activities are based on mandatory or discretionary logic.
 - c) If there are concurrent critical activities, and what are the potential risks?
 - d) If there are gaps along the critical path? If so, why and can the gaps be avoided?
 - e) If the durations of the individual activities are reasonable relative to past performance.
 - f) What is the controlling critical path activity, why and what is its current status?
 - g) If there are any shifts in the critical path since the previous schedule. If so, why?
 - h) What near critical activities are at risk of becoming critical and what are the potential impacts?
 - i) If there are any opportunities for fast-tracking or collapsing the schedule, if needed.

- 7. <u>Critical Path Shift (SOR)</u>: Select *Critical Path Shift (SOR)* to view activities that are now on the critical path, but were not on the critical path in the SOR; or activities that were on the critical path in the SOR, but are not on the current schedule critical path. This filter can be used to review/analyze the schedule to determine if there are any shifts in the critical path since the SOR. If so:
 - a) What activities are involved?
 - b) Where the shifts caused by logic or duration changes? If so, why, and were the changes documented in the narrative and are the changes reasonable and acceptable?
 - c) Where the shifts caused by out-of-sequence progress? If so, are logic revisions necessary to ensure that the schedule reflects the current plan?
 - d) Where the shifts caused by lack of progress or other delays. If so, the issues should be documented and monitored closely and any potential issues that may arise should be evaluated.
 - e) Are the shifts significant and permanent? If so, all involved parties should be informed.
- 8. <u>Critical Path Shift (Previous)</u>: Select *Critical Path Shift (Previous)* to view activities that are now on the critical path, but were not on the critical path in the previous update; or activities that were on the critical path in the previous update, but are not on the current schedule critical path. This filter can be used to review/analyze the schedule to determine if there are any shifts in the critical path since the previous update. If so:
 - a) What activities are involved?
 - b) Where the shifts caused by logic or duration changes? If so, why, and were the changes documented in the narrative and are the changes reasonable and acceptable?
 - c) Where the shifts caused by out-of-sequence progress? If so, are logic revisions necessary to ensure that the schedule reflects the current plan?
 - d) Where the shifts caused by lack of progress or other delays. If so, the issues should be documented and monitored closely and any potential issues that may arise should be evaluated.
 - e) Did the shift cause a schedule impact on a contract milestone or the project completion date? If so, the causes and impacts should be documented.
 - f) Are the shifts significant and permanent? If so, all involved parties should be informed.

- 9. <u>Added Activities (SOR)</u>: Select *Added Activities (SOR)* to view activities added to the schedule since the SOR. This filter can be used to review/analyze the schedule to determine if activities have been added to the schedule since the SOR. If so:
 - a) What activities were added?
 - b) Where the activities added for new work or changes to the work. If so, were the changes documented in the narrative or a SIA, with explanations and any resulting impact? And are the changes reasonable and acceptable?
 - c) Where the activities added for omitted work, splitting existing activities, or to further define the scope of work. If so, were the changes, explanations and any resulting impact documented in the narrative? And are the changes reasonable and acceptable?
 - d) Are the sequence of work and logic realistic and acceptable?
 - e) Are the durations reasonable relative to past performance?
 - f) Did the added activities cause a significant impact on the schedule, critical path, milestones, the project completion date, or costs. If so, consider re-baselining.
- 10. <u>Added Activities (Previous)</u>: Select *Added Activities (Previous)* to view activities added to the schedule since the previous update. This filter can be used to review/analyze the schedule to determine if activities have been added to the schedule since the previous update. If so:
 - a) What activities were added?
 - b) Where the activities added for new work or changes to the work. If so, were the changes documented in the narrative or a SIA, with explanations and any resulting impact? And are the changes reasonable and acceptable?
 - c) Where the activities added for omitted work, splitting existing activities, or to further define the scope of work. If so, were the changes, explanations and any resulting impact documented in the narrative? And are the changes reasonable and acceptable?
 - d) Are the sequence of work and logic realistic and acceptable?
 - e) Are the durations reasonable relative to past performance?
 - f) Did the added activities cause a significant impact on the schedule, critical path, milestones, the project completion date, or costs. If so, consider re-baselining.

- 11. <u>VDOT Activities</u>: Select *VDOT Activities* to view activities for which the Department may be responsible or involved. This filter relies on key words in the activity description such as VDOT, review, approve, approval, accept, acceptance, inspect, inspection, and punch list. This filter can be used to review/analyze the schedule to determine, if any:
 - a) What are the VDOT activities and when are they scheduled? Are all VDOT responsible activities required to complete the project included?
 - b) Are the durations of the VDOT activities are reasonable with respect to the Contract?
 - c) Are the sequence and logic with related work are reasonable?
 - d) Is the status of the VDOT activities accurate, including actual start/finish dates?
 - e) Are there upcoming VDOT responsible work? If so, plan accordingly to avoid or mitigate delays.
- 12. <u>Winter Periods</u>: Select *Winter Periods* to view activities that are scheduled to be performed during the months of November, December, January, February, February, and March. This filter can be used to review/analyze the schedule to determine:
 - a) What activities, if any, are currently at risk of being pushed into the winter period when the weather is typically not conducive for prosecuting the work? And what actions can be taken to avoid or mitigate potential delays?
 - b) If there are any weather-sensitive activities scheduled to be performed when the weather is typically not conducive for prosecuting the work. If so, an appropriate winter calendar should be assigned to restrict weather sensitive activities from being scheduled during the winter periods.
 - c) If there are activities scheduled to be performed during the winter period, whose rate of progress could be negatively impacted by winter weather. If so, are the durations of such activities realistic?
 - d) If there are activities scheduled to be performed during the winter period, whose quality could be negatively impacted by winter weather. If so, what actions or protective measures are needed or planned to avoid potential quality issues?
- 13. <u>Completed</u>: Select *Completed* to view the activities that have been completed to date as of the Data Date. This filter can be used to review/analyze the schedule to determine:
 - a) What activities, if any, are reported as complete as of the Data Date?
 - b) If the activities reported as complete are actually complete as of the Data Date.
 - c) If there are any activities that are actually complete, but are not reported as complete?
 - d) If the as-built dates (actual start and actual finish) are accurate. If not, any inaccuracies should be documented and reported to the contractor for corrections.

- 14. <u>In Progress</u>: Select *In Progress* to view activities that have started, but have not finished as of the Data Date. This filter can be used to review the schedule to determine:
 - a) What activities are currently ongoing as of the Data Date, where, and by whom?
 - b) What activities are currently ongoing as of the Data Date, but are not shown? If any, ensure that the contractor corrects the schedule for accuracy.
 - c) If any, are the on-going activities progressing as planned? If not, why and what are the potential impact? Monitor progress, available float and criticality.
 - d) If the remaining durations of the on-going activities are realistic based on past performance and amount of work remaining as of the Data Date.
 - e) If there are any on-going critical path or near critical activities (Total Float value of 10 days or less)? If any, monitor performance to ensure timely completion.
- 15. <u>Remaining Work</u>: Select *Remaining Work* to view activities that are either on-going or have not started as of the Data Date. This filter can be used to review/analyze the schedule to determine:
 - a) What activities are currently on-going or have not started, where, when, and by whom?
 - b) If all activities required to complete the remaining work are included.
 - c) What activities are currently being performed as of the Data Date, but are not shown? If any, ensure that the contractor corrects the schedule for accuracy.
 - d) If any, are the on-going activities progressing as planned? If not, why and what are the potential impact? Monitor available float and criticality.
 - e) If the durations, sequence of work and logic are realistic relative to past performance and amount of work remaining as of the Data Date.
 - f) If there are several activities stacked-up against the Data Date line? If so, determine if the work will be performed as planned or if adjustments are necessary.
 - g) If there are concurrent activities scheduled at the same time or at the same place, and if feasible, concerning resource availability and safety.
 - h) If there are any on-going or scheduled critical path or near critical activities (Total Float value of 10 days or less)? If any, monitor performance to ensure timely completion.
 - i) If there are any opportunities to mitigate or avoid delays on the project.

- 16. <u>Not Started</u>: Select *Not Started* to view activities that are yet to begin as of the Data Date. This filter can be used to review/analyze the schedule to determine:
 - a) What activities have not started, where, when, and by whom?
 - b) What activities have actually started as of the Data Date, but are not shown? If any, ensure that the contractor corrects the schedule for accuracy.
 - c) If there are several activities stacked-up against the Data Date line? If so, determine if the work will be performed as planned or if adjustments are necessary.
 - d) What activities have not started, but should have started relative to the previous schedule? If any, determine why, when they will start; available float and criticality and whether corrective actions are necessary.
 - e) If there are any opportunities to mitigate or avoid delays on the project.
- 17. <u>2-Week Look-ahead</u>: Select 2-Week Look-ahead to view on-going or remaining activities that are scheduled to be performed during the period between the Data Date and the next 14 days from the Run Date (Today). This filter can be used to review/analyze the schedule to:
 - a) Determine what, where, when, and by whom? Plan accordingly.
 - b) Determine their criticality and available float. If there are any on-going or scheduled critical path or near critical activities (Total Float value of 10 days or less)? If any, monitor performance to ensure timely completion.
 - c) Determine if the work is progressing as planned. If not, determine why and any potential impact.
 - d) Document actual start, actual finish dates; and any non-work days and why.
- 18. <u>30-Day Look-ahead</u>: Select *30-Day Look-ahead* to view activities scheduled to be performed in the next 30 days as of the Data Date. This filter can be used to determine:
 - a) What activities, where, when, and by whom? Check for missing activities.
 - b) Their criticality and available float. If there are any on-going or scheduled critical path or near critical activities (Total Float value of 10 days or less)? If any, monitor performance to ensure timely completion.
 - c) If there are on-going activities as of the Data Date line. Check reported progress and remaining duration for accuracy relative to past performance.
 - d) If there are remaining activities stacked-up against the Data Date line. Determine if the current plan is reasonable or if adjustments are necessary.
 - e) If the work is progressing as planned. If not, determine why and any potential impact.

- 19. <u>60-Day Look-ahead</u>: Select <u>60-Day Look-ahead</u> to view activities scheduled to be performed in the next 60 days as of the Data Date. This filter can be used to review/analyze the schedule to:
 - a) Determine what, where, when, and by whom? Check for missing activities.
 - b) Determine their criticality and available float. If there are any on-going or scheduled critical path or near critical activities (Total Float value of 10 days or less)? If any, monitor performance to ensure timely completion.
 - c) Determine if there are on-going activities as of the Data Date line. Check reported progress and remaining duration for accuracy relative to past performance.
 - d) Determine if there are remaining activities stacked-up against the Data Date line. Determine if the current plan is reasonable or if adjustments are necessary.
 - e) Determine if the work is progressing as planned. If not, determine why and any potential impact.
- 20. <u>Due Today</u>: Select *Due Today* to view activities that are currently scheduled to be complete on the Run Date (Today) based on the current schedule. This filter can be used to review/analyze the schedule to determine, if any:
 - a) What activities are scheduled to be complete today, where, and by whom?
 - b) What activities will not be completed by the end of the day? Why and when will they finish?
 - c) What is the criticality and available float of the activities?
 - d) What are the potential impacts if the activities are not completed by the end of the day?
- 21. <u>Overdue</u>: Select *Overdue* to view remaining activities that should have been completed as of the Run Date (Today) based on the current schedule. This filter can be used to review/analyze the schedule to determine, if any:
 - a) What activities should have been completed as of today, where, and by whom?
 - b) Why are the activities late and when will they finish?
 - c) What is the criticality and available float of the activities?
 - d) What are the potential impacts?
 - e) What adjustments, if any, are needed to avoid or mitigate delays?

- 22. <u>Progress Last Period</u>: Select *Progress Last Period* to view activities that were updated since the previous schedule. This filter can be used to review/analyze the schedule to determine, if any:
 - a) What activities were performed, where, and by whom?
 - b) Are there other activities performed that should have been progressed and are not shown?
 - c) Are the actual start and actual finish dates accurate? If not, document and notify the contractor for corrections in the next schedule submission.
 - d) Are there are any activities with actual dates on or beyond the Data Date. If any, notify the contractor for corrections in the next schedule submission.
 - e) Are the reported progress and remaining duration for ongoing activities accurate? If not, document and notify the contractor for corrections in the next schedule submission.
- 23. <u>Schedule Delay Analysis (CPA Method)</u>: Select *Schedule Delay Analysis (CPA Method)* to view the activities that were performed during the last period; as well as the current critical path activities. This filter displays the *Previous Update* and *Previous Update Variance* columns and can be used to review/analyze the schedule for any delays that occurred during the last period to determine:
 - a) What activities were performed during the last period and by whom?
 - b) What activities started later or are scheduled to start later than planned relative to the previous schedule? If any, determine and document cause, criticality, available total float, and who is responsible.
 - c) What activities finished later or are scheduled to finish later than planned relative to the previous schedule? If any, determine and document cause, criticality, available total float, and who is responsible.
 - d) What activities took longer or are scheduled to take longer than planned relative to the previous schedule? If any, determine and document cause, criticality, available total float, and who is responsible.
 - e) What is the current controlling critical path activity? Determine the current status and whether it is ahead or behind schedule relative the previous schedule. If it is behind, determine why, available total float, and who is responsible. Also, have there been any shifts in the critical path since the previous schedule?
 - f) If the schedule has gained or lost time relative to a milestone or the project *Completion Date* since the previous schedule? Did a critical delay occur, what caused the delay, is it related to the controlling critical activity, and who is responsible? Document findings in available *Schedule Delay Analysis* worksheet.

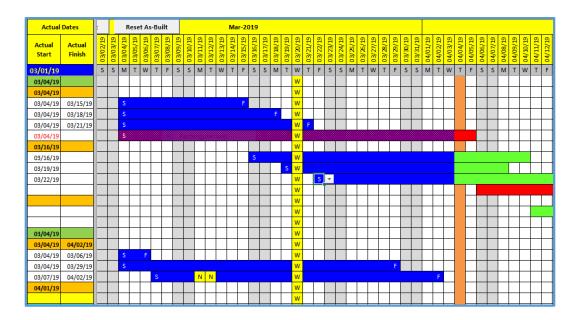
- 24. <u>Schedule Slippage (Previous)</u>: Select *Schedule Slippage (Previous)* to view the remaining activities that have slipped relative to the previous schedule. This filter displays the *Previous Update* and *Previous Update Variance* columns and can be used to review/analyze the schedule to determine:
 - a) What remaining activities have slipped relative to the previous schedule, if any?
 - b) Current status, criticality, and available total float.
 - c) Controlling activities and primary cause of the schedule slippages.
 - d) Potential for further delays based on past performance and possible impact.
 - e) If adjustments or corrective measures are needed to mitigate or avoid potential impact.
- 25. <u>Missed Start (SOR)</u>: Select *Missed Start (SOR)* to view activities that actually started late or are scheduled to start later than planned relative to the SOR. This filter displays the *Schedule of Record* and *SOR Variance* columns. It is intended to provide an early warning signal to alert you of how much the current schedule has deviated from the SOR in terms of activity start date. Furthermore, this filter can be used to review/analyze the schedule to determine:
 - a) How many and what activities started late or are scheduled to start later than planned relative to the SOR? If any, determine why, current status, criticality, and available float.
 - b) If there is a re-occurring trend that pertains to certain types of activities? If so, determine primary cause and potential impact; and if adjustments are necessary.
 - c) If there are fewer, same, or greater number of missed starts each month? If same or greater, consider further evaluation of the schedule to determine cause, potential impact; and if adjustments are necessary.
- 26. <u>Missed Start (Previous)</u>: Select *Missed Start (Previous)* to view activities that actually started late or are scheduled to start later than planned relative to the previous schedule update. This filter displays the *Previous Update* and *Previous Update Variance* columns. It is intended to provide an early warning signal to alert you of how realistic the current schedule is in terms of activity start date. Furthermore, this filter can be used to review/analyze the schedule to determine:
 - a) How many and what activities started late or are scheduled to start later than planned relative to the previous schedule update? If any, determine why, current status, criticality, and available float.
 - b) If there is a re-occurring trend that pertains to certain types of activities? If so, determine primary cause and potential impact; and if adjustments are necessary.
 - c) If there are fewer, same, or greater number of missed starts each month? If same or greater, consider further evaluation of the schedule to determine cause, potential impact; and if adjustments are necessary.

- 27. Missed Finish (SOR): Select Missed Finish (SOR) to view activities that actually finished late or are scheduled to finish later than planned relative to the SOR. This filter displays the Schedule of Record and SOR Variance columns. The displayed activities count is used to calculate the Missed Finish Percentage (MF%). The MF% is a ratio of the cumulative count of activities that have missed their planned finish dates to the cumulative count of activities that should have been completed relative to the SOR. The MF% is an early warning indicator to alert you of how much the current schedule has deviated from the SOR in terms of activity finish date. Furthermore, this filter can be used to review/analyze the schedule to determine:
 - a) How many and what activities failed to finish on time relative to the SOR? If any, determine the reasons, current status, criticality, and available float.
 - b) If there is a re-occurring trend that pertains to certain types of activities? If so, determine primary cause and potential impact; and if adjustments are necessary.
 - c) If there are fewer, same, or greater number of missed finishes each month? If same or greater, consider further evaluation of the schedule to determine cause, potential impact; and if adjustments are necessary.
 - d) Is the current MF% below acceptable range and has a negative trend manifested? If so, does the current schedule require corrective action to realign it with the SOR?
- 28. <u>Missed Finish (Previous)</u>: Select *Missed Finish (Previous)* to view activities that actually finished late or are scheduled to finish later than planned relative to the previous schedule update. This filter displays the *Previous Update* and *Previous Update Variance* columns. It provides an early warning indicator to alert you of how realistic the current schedule is in terms of activity finish date. Furthermore, this filter can be used to review/analyze the schedule to determine:
 - a) How many and what activities failed to finish on time relative to the previous schedule update? If any, determine the reasons, current status, criticality, and available float.
 - b) If there is a re-occurring trend that pertains to certain types of activities? If so, determine primary cause and potential impact; and if adjustments are necessary.
 - c) If there are fewer, same, or greater number of missed finishes each month? If same or greater, consider further evaluation of the schedule to determine cause, potential impact; and if adjustments are necessary.
- 29. <u>BEI Activities</u>: Select *BEI Activities* to view activities that should have been completed to date relative to the SOR. The Baseline Execution Index (BEI) Activities filter displays the activities used to calculate the BEI metric. The BEI is a ratio of the cumulative count of activities that were actually completed to date out of the cumulative count of activities that should have been completed relative to the SOR. The BEI is an early warning indicator of how well the contractor has executed the baseline plan to date. Furthermore, this filter can be used to review/analyze the schedule to determine:

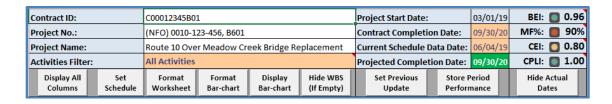
- a) What activities have slipped relative to the SOR? If any, determine the reasons, current status, criticality, and available float.
- b) Are durations of the remaining activities reasonable relative to past performance? If not, consider further assessment of the schedule to determine if adjustments are necessary.
- c) Are there repeated occurrences by similar types of activities? If so, determine primary cause and potential impact; and if adjustments are necessary.
- d) Is the current BEI below acceptable range and has a negative trend manifested? If so, does the current schedule require corrective action to realign it with the SOR?
- 30. <u>CEI Activities</u>: Select *CEI Activities* to view activities that are complete or should have been completed during the last period relative to the previous schedule update. The Current Execution Index (CEI) Activities filter displays the activities used to calculate the CEI metric. The CEI is a ratio of the number of activities completed during the last period to the number of activities that should have been completed relative to the previous schedule update. The CEI is an indicator of how well the contractor is executing the current plan. This filter can be used to review/analyze the schedule to determine, if any:
 - a) What activities have slipped relative to the previous schedule update? If any, determine the reasons, current status, criticality, and available float.
 - b) Are durations of the remaining activities reasonable relative to past performance? If not, consider further assessment of the schedule to determine if adjustments are necessary.
 - c) Are there repeated occurrences by similar types of activities? If so, determine primary cause and potential impact; and if adjustments are necessary.
 - d) Is the current CEI below acceptable range and has a negative trend manifested? If so, does the current schedule require corrective action to avoid or mitigate delays?
- 31. <u>Variance (SOR) Duration (-)</u>: Select *Variance (SOR) Duration (-)* to view completed or on-going activities that have taken longer or are scheduled to take longer than planned relative to the SOR. This filter also displays the *Schedule of Record* and the *Variance* columns. It is intended to to alert you of how much the current schedule has deviated from the SOR in terms of activity duration. Furthermore, this filter can be used to review/analyze the schedule to determine:
 - a) How many and what activities took longer than planned relative to the SOR? If any, determine the reasons, current status, criticality, and available float.
 - b) If the durations of the remaining activities are reasonable relative to past performance? If not, consider further assessment of the schedule for any required adjustments.

- c) If there is a trend of similar types of activities that are taking longer? If so, determine primary cause and potential impact; and if adjustments are necessary.
- d) If activities taking longer has become a regular occurrence? If so, determine primary cause and potential impact; and if adjustments are necessary.
- 32. <u>Variance (Previous) Duration (-)</u>: Select *Variance (Previous) Duration (-)* to view completed or on-going activities that have taken longer or are scheduled to take longer than planned relative to the previous schedule update. This filter also displays the *Previous Update* and the *Variance* columns. It is intended to provide insight on how well the contractor is executing the short-term plan and how realistic the current schedule is in terms of activity duration. Furthermore, this filter can be used to review/analyze the schedule to determine:
 - a) How many and what activities took longer relative to the previous schedule update? If any, determine the reasons, current status, criticality, and available float.
 - b) If the durations of the remaining activities are reasonable relative to past performance? If not, consider further assessment of the schedule for any required adjustments.
 - c) If there is a trend of similar types of activities that are taking longer? If so, determine primary cause and potential impact; and if adjustments are necessary.
 - d) If activities taking longer has become a regular occurrence? If so, determine primary cause and potential impact; and if adjustments are necessary.
- 33. <u>Variance (SOR) Percent Complete (-)</u>: Select *Variance (SOR) Percent Complete (-)* to view activities that are behind progress in terms of percent complete relative to the SOR. This filter also displays the *Schedule of Record* and the *Percent Complete* columns. It is intended to alert you of how much the current schedule has deviated from the SOR in terms of activity percent complete. Furthermore, this filter can be used to review/analyze the schedule to determine:
 - a) How many and what remaining activities are currently behind progress relative to the SOR? If any, determine the reasons, current status, criticality, and available float.
 - b) If there is a trend of similar types of activities that are falling behind? If so, determine primary cause and potential impact; and if adjustments are necessary.
 - c) If activities falling behind has become a regular occurrence? If so, determine primary cause and potential impact; and if adjustments are necessary.
- 34. <u>Variance As-built Dates</u>: Select *Variance As-built Dates* to view activities with differing as-built dates (field recorded actual start or actual finish dates) from the contractor's schedule. *Please note that if the form is not being used to record as-built dates, then the filter will select all progressed activities*. This filter can be used to review/analyze the schedule to determine:
 - a) What activities have actual start or actual finish dates that are different from the asbuilt dates recorded in the field?

		b)	What activities have actual start or actual finish dates, with no field as-built dates?
		c)	If adjustments to the schedule are necessary to ensure that the as-built dates and as- built critical path are accurate for the purposes of reviewing the schedule for accuracy or for resolving time-related issues.
			or for resolving time-related issues.
6.	to doc	umei	ng As-built Schedule Dates – The As-built Schedule Tracker can be used by the field staff nt when the individual activities were actually performed. This information is beneficial ng the contractor's schedule updates for accuracy or for resolving time related issues.
	act		ument when an activity was actually performed, click on the cell at the intersection of an and a date to select from a drop list the activity status ("S", "F", "N", or "W"), as ble.



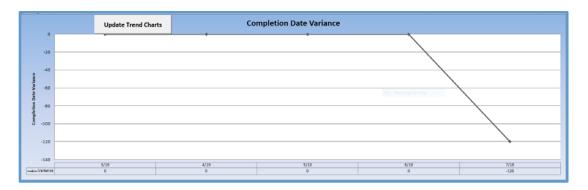
- 2. Select "S" to record when an activity actually started.
- 3. Select "F" to record when an activity was actually completed.
- 4. Select "N" to record the days when work was not performed on an on-going activity on a regularly scheduled work day.
- 5. Select "W" to record the weather days when work was not performed on the project or an ongoing activity on a regularly scheduled work day due to weather. If no work was performed on the entire project on a weather day, you may select the first cell of the day and select "W", then hold down the "Shift" key, then scroll down and select the last cell of the same day, then click on "Fill", and then "Down" to assign a "W" for the entire day for all activities.
- 6. If the current schedule does not contain contractor defined actual start or actual finish date(s) for an activity, then the form will automatically record in the Actual Start and/or Actual Finish columns accordingly based on the selected "S" or "F" date(s).
- 7. Otherwise, if the current schedule contains contractor defined actual start or actual finish date(s) for an activity and the dates differ from the VDOT recorded "S" or "F" dates, or if no "S" or "F" selections are made, then Actual Start or Actual Finish date cells are shaded in light red to indicate a difference in the dates or no "S" or "F" selections.
- 7. Tracking Performance The As-built Schedule Tracker has built-in performance metrics that can be used to identify performance trends. This information can be used to track performance to determine when further evaluation of the schedule or corrective measures are necessary to avoid or mitigate delays on the project.



- **1. Performance Metrics:** The As-built Schedule Tracker includes the following Performance Metrics:
 - 1. <u>Missed Finish % (MF%)</u>: The Missed Finish % (MF%) is an early warning indicator of how well the original plan is being executed. It is based on the number of activities have missed their originally planned finish dates as of the data relative to the SOR. The MF% performance indicator is:
 - a) Green : when value <= 25
 - b) Yellow : when value < 50 and > 25
 - c) Red \blacksquare : when value >= 50
 - 2. <u>Baseline Execution Index (BEI)</u>: The Baseline Execution Index (BEI) is an indicator of how well the contractor has performed overall relative to the SOR. The BEI measures the ratio of the number activities completed to date to the number of activities that should have been completed as of the Data Date. The BEI performance indicator is:
 - a) Green : when value >= 0.95
 - b) Yellow □: when value < 0.95 and >= 0.80
 - c) Red : when value < 0.80
 - 3. <u>Current Performance Index (CEI)</u>: The Current Performance Index (CEI) is an indicator of how well the contractor has performed each month relative to the previous update. It measures the ratio of the number of activities completed each month to the number that should have been completed relative to the previous update. The CEI performance indicator is:
 - a) Green : when value >= 0.95
 - b) Yellow □: when value < 0.95 and >= 0.80
 - c) Red : when value < 0.80
 - 4. <u>Critical Path Length Index (CPLI)</u>: The Critical Path Length Index (CPLI) is an indicator of the efficiency at which the critical path work is currently planned to be performed. It is

calculated based on the critical path length and total float for the remaining work. The CPLI performance indicator is:

- a) Green \square : when value >= 0.95
- b) Yellow : when value < 0.95 and >= 0.80
- c) Red : when value < 0.80
- 2. Performance Trends Chart: The As-built Schedule Tracker includes built-in Charts for each performance metric. Click on the "Charts" worksheet tab to view the performance data curves for each performance metric. Review each chart to determine if a negative trend is evident and if corrections to the contractor's work plan are necessary.
 - Completion Date Variance: The Completion Date Variance chart depicts in a line graph the
 cumulative number days the project has gained or slipped each performance period relative
 to the Contract Completion date. Review for dips and if the curve is trending upwards or
 downwards each period. The ideal curve is one that reflects values trending towards 0.



2. <u>Missed Finish % (MF%)</u>: The MF% chart depicts in a line graph the monthly MF%. Review to determine if the current MF% is greater than 50% and if the curve is trending upwards or downwards each period. The ideal curve is one that reflects values trending towards 0%.



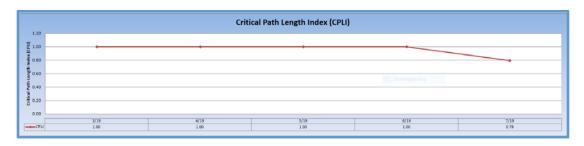
3. <u>Baseline Execution Index (BEI)</u>: The BEI chart depicts in a line graph the monthly BEI. Review for peaks and valleys and if the curve is trending upwards or downwards each period. The ideal curve is one that reflects BEI values ranging between 0.95 and 1.0.



4. <u>Current Performance Index (CEI)</u>: The CEI chart depicts in a line graph the monthly CEI. Review for peaks and valleys and if the curve is trending upwards or downwards each period. The ideal curve is one that reflects CEI values ranging between 0.95 and 1.0.



5. <u>Critical Path Length Index (CPLI)</u>: The CPLI chart depicts in a line graph the monthly CPLI. Review for peaks and valleys and if the curve is trending upwards or downwards each period. The ideal curve is one that reflects CPLI values ranging between 0.95 and 1.0.



6. To view the charts data table, click on the "Charts" worksheet tab at the bottom of the spreadsheet, right-click, then click on Unhide, and then select "ChartsData".

				_				_			
Project St	art Date:				3/1/19	BEI:	0.82				
Contract C	ompletion I	Date:			9/30/20	MF%:	88%				
Current U	pdate Data I	Date:			7/4/19	CEI:	0.50				
Projected Completion Date:					1/28/21	CPLI:	0.79				
Final Com	Final Completion Date Variance:				-120						
		Projected						Last Period	SOR		
Schedule	Month/	Completion						Completed	To Complete	Last Period	Last Period
Update	Year	Date	Variance	BEI	MF%	CEI	CPLI	To Date	To Date	Completed	To Complete
0	3/19	9/30/20	0	1.00	0%	1.00	1.00	1	1	1	1
1	4/19	9/30/20	0	0.90	73%	0.90	1.00	9	10	9	10
2	5/19	9/30/20	0	1.00	89%	1.00	1.00	21	21	12	12
3	6/19	9/30/20	0	0.96	90%	0.80	1.00	25	26	4	5
4	7/19	1/28/21	-120	0.82	88%	0.50	0.79	27	33	2	4

For assistance or questions, please contact Frank Gbinije:

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