

# **APPENDIX L. CONSTRAINED BUDGET METHODOLOGY**



This memo lays out the methodology for developing the constrained budget for the Connect Central Virginia 2045 Long Range Transportation plan (LRTP). The constrained budget methodology is part of Task 2: Constrained Budget, of the Scope of Work for this effort. This memo constitutes the deliverable for Sub-Task 2b: Budget Methodology.

The steps detailed below propose a process for determining anticipated federal and state funds for new construction projects and transit projects within the TPO area. The proposed methodology includes revenue estimates for bike and pedestrian projects as a subset of the highway project funding, allowing the TPO to prioritize specific bike and pedestrian based on reasonably expected funding. Additionally, Attachment A compares the preliminary budget estimate for Highway Projects (created using the methodology detailed below) to the comparable estimates in the most recent LRTPs of ten MPOs across the Commonwealth.

### Time Horizons

The budget will consist of a near-term horizon of 2021-2024 and a long-term horizon of 2025-2045. Research conducted during Task 2a showed most MPOs in the Commonwealth divided revenue forecasts into two or three time horizons. Using fiscal years 2021-2024 for the near-term aligns the LRTP with the TPO's Transportation Improvement Program (TIP). The remaining 26 years constitute the Long-Term horizon of 2025-2045.

### Data Sources

The methodology relies on the CVTPO's previous four TIPs (2012-2015, 2015-2018, 2018-2021, and 2021-2024) and VDOT's FY 2022 Six-Year Improvement Program (SYIP). The TIPs informed the highway projects and transit project budgets, while the SYIP provided a basis for estimating revenues for bike and pedestrian projects.

### Methodology

The steps for determining the three budgets are detailed below. All three estimates use a 3% yearly inflation rate for revenues beyond 2021. While the Bike and Pedestrian budget is listed separately, it is a subset of the Highway projects funding. Both the Highway and Bike and Pedestrian budgets are revenues for new construction projects and do not include funding revenues from maintenance programs.

### Highway Projects Budget

1. Review the non-maintenance funding estimates in the previous four TIPs.
2. Sum the federal and state revenue estimates for the first three Federal Fiscal Years (FFY) of each TIP (the fourth years were excluded because they overlap, so they are less accurate estimates than each TIP's first year).
3. Average the sum for each FFY to get a baseline yearly revenue estimate.



4. For the Near-Term (2021-2024), the FFY estimates for the four years in the 2021-2024 TIP are the estimated budget.
5. For the Long-Term (2025-2045), a 3% inflation rate is applied to the baseline estimate from Step 3.
6. Sum the total costs for all highway projects and project groupings in the 2021-2024 TIP and subtract from the revenue estimates in the TIP Financial Plan to calculate the outstanding balances in the TIP.
7. Subtract the balance from Step 6 from the Long-Term revenue total calculated in Step 5 to arrive at the available budget for the Long-Term time horizon.
8. Subtract the values for the Bike and Pedestrian Budget, outlined below.

**Bike and Pedestrian Projects Budget**

1. Review bike and pedestrian projects within the TPO in the FY 2022 SYIP.
2. Average the yearly funding revenues to get a baseline yearly revenue estimate.
3. Apply a 3% inflation rate to the baseline estimate for each year beyond 2021.

**Transit Projects Budget**

1. Review the transit projects included in the 2021-2024 TIP.
2. Sum the yearly Federal revenues for the 5307 and 5339 programs to get a baseline yearly funding estimate.
3. For the Near-Term (2021-2024), the FFY estimates for the four years in the 2021-2024 TIP are the estimated budget.
4. For the Long-Term (2025-2045), a 3% inflation rate is applied to the baseline estimate from Step 3.



## Attachment A – MPO Budget Estimate Comparison

Using the methodology outlined above, the Central Virginia TPO can expect roughly \$409,498,542 in state and federal funds for non-maintenance highway projects from 2020 to 2045. To validate this estimate, we compared it to the estimates for non-maintenance highway projects provided in the most recent Long Range Transportation Plans (LRTPs) of ten Metropolitan Planning Organizations (MPOs) in Virginia. The MPOs selected for comparison are listed below:

- Bristol MPO
- Charlottesville-Albemarle MPO
- Fredericksburg Area MPO
- Staunton-Augusta-Waynesboro MPO
- Harrisonburg-Rockingham MPO
- Hampton Roads TPO
- New River Valley MPO
- Richmond Regional TPO
- Roanoke Valley TPO
- Winchester-Frederick MPO

The Danville MPO was not selected because its constrained list is the set of projects in its Transportation Improvement Program (TIP), so it is not comparable to the estimate created in this undertaking. The Metropolitan Washington Council of Governments was not selected because it is too different from the CVTPO region in size, with roughly 5.6 million people. The Tri-Cities Area MPO's most recent LRTP was not available on the organization's website at the time of this effort.

It should be noted that there are differences in how the LRTPs breakdown, categorize, and/or describe their funding estimates, so it is possible that relevant numbers could have been omitted or incorrectly considered due to inconsistencies in how the LRTPs express the funding estimates. We are confident in their validity as benchmarks, but these figures should be considered in the context of this memo, and not as the authoritative estimate for federal and state non-maintenance highway funding for these MPOs over their respective planning horizons.

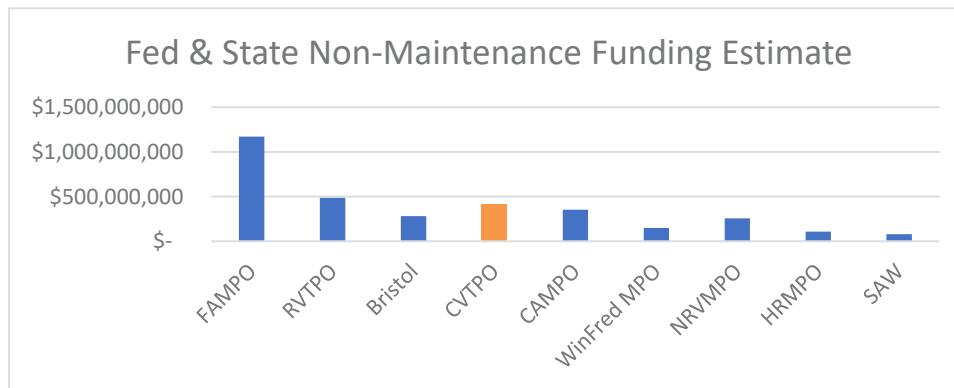
To validate our estimate, we used three benchmark statistics. All three benchmarks suggest that the estimate for the Central Virginia region is valid. Each measure is described below, followed by a table and charts that visualize trends among them. **Table 1** shows the MPO funding characteristics. **Figure 1** charts the funding estimates for the MPOs, excluding the two outliers, HRTPO and RRTPO.



Table 1. MPO Funding comparison

MPO Name	Horizon Year	Base Year Population	Fed & State Non-Maintenance Funding Estimate	Funding Est. Per Capita	Ratio of CVTPO Population	Ratio of CVTPO Funding Estimate	Notes
HRTPO	2045	1,725,777	\$ 10,993,000,000	\$ 6,370	10.6	26.8	Includes CMAQ funding estimates
RRTPO	2045	1,091,680	\$ 14,462,700,000	\$ 13,248	6.7	35.3	Includes CMAQ funding estimates
FAMPO	2045	350,916	\$ 1,171,200,000	\$ 3,338	2.2	2.9	
RVTPPO	2040	230,457	\$ 485,474,656	\$ 2,107	1.4	1.2	
Bristol	2040	229,534	\$ 282,293,972	\$ 1,230	1.4	0.7	Includes Tennessee population
CVTPO	2045	162,816	\$ 409,498,542	\$ 2,515	1.0	1.0	
CAMPO	2045	127,659	\$ 354,000,000	\$ 2,773	0.8	0.9	
WinFred MPO	2040	107,115	\$ 148,397,475	\$ 1,385	0.7	0.4	
NRVMPO	2045	92,757	\$ 527,270,609	\$ 5,684	0.6	1.3	Includes \$271mil allocation for the I-81 Improvement Program
HRMPO	2040	81,409	\$ 108,367,420	\$ 1,331	0.5	0.3	
SAW	2045	78,794	\$ 358,874,549	\$ 4,555	0.5	0.9	Includes \$271mil allocation for the I-81 Improvement Program

Figure 1. Funding estimates



## Funding Per Capita

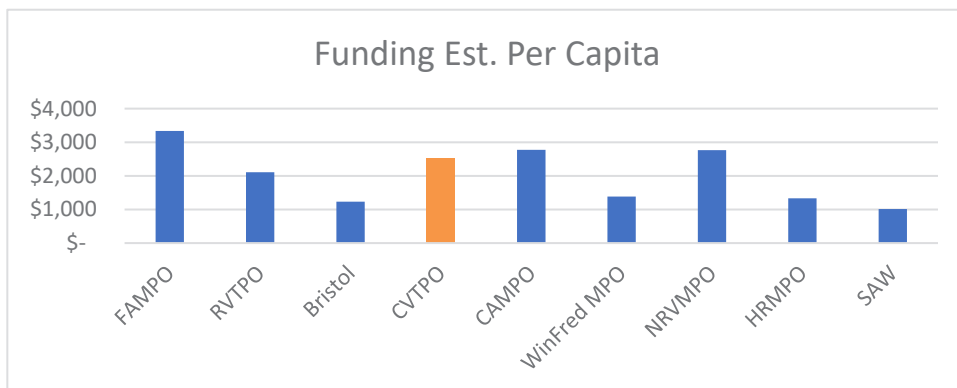
We calculated each MPO's funding estimate as a per capita amount by dividing the funding estimate by the MPOs' base year population. The CVTPO funding per capita of \$2,515 is similar to most other MPO per capita rates. Two exceptions are HRTPO and RRTPO. Both MPOs have large enough population sizes to qualify for CMAQ funding, a funding source for air pollution mitigation that the CVTPO does not qualify for. The average of the estimates excluding HRTPO, RRTPO, and CVTPO is \$2,800. This suggests that the CVTPO estimate is a plausible amount.

**Figure 2** shows that funding per capita, excluding the two outliers, HRTPO and RRTPO.





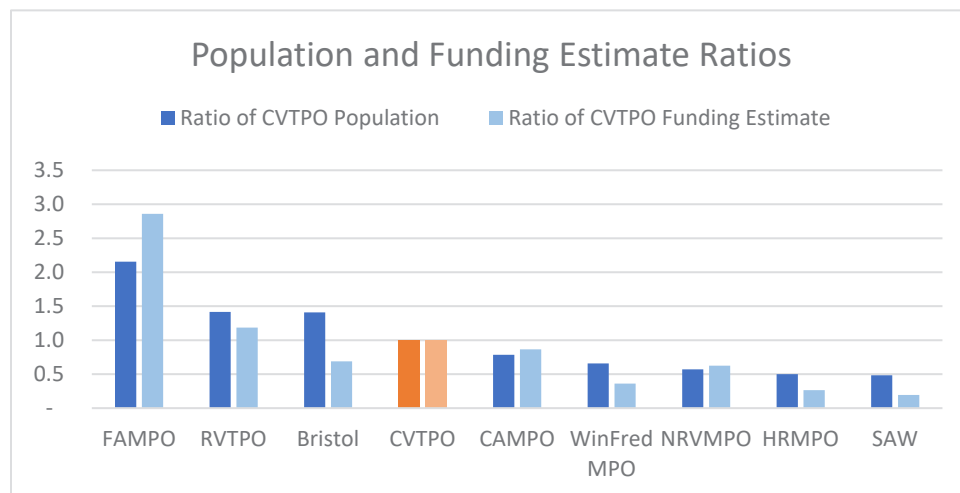
Figure 2. Funding estimates as a per capita rate



## Population and Funding Estimate Ratios

The two ratio statistics complement each other. The first is the ratio of each MPO's base year population to the CVTPO's base year population. The second is the ratio of each MPO's funding estimate to the CVTPO's funding estimate. Together, the two ratios show the plausible trend that larger MPOs generally forecasted higher amounts of funding. This trend suggests that the CVTPO estimate fits the overall pattern. **Figure 3** shows the two ratios side by side for each MPO, excluding HRTPO and RRTPO.

Figure 3. MPO populations and funding estimates as ratios of the CVTPO population and estimate



Three outliers are Bristol, NRVMPPO and SAW. The Bristol MPO is partly in Virginia and partly in Tennessee. The Bristol 2040 LRTP split out the Tennessee funding estimates from the Virginia estimates, and the Tennessee estimates were generally lower than the Virginia estimates. Therefore, the lower than expected funding percentage ratio could be explained by the difference in either the allocation of federal funds to the two states or from the two state



Department of Transportation to the Bristol MPO. U.S. Interstate 81 traverse both NRVMP and SAW, and consequently they both are slated to receive large apportionments from the I-81 Improvement Program. Removing the I-81 allocations gives NRVMP a funding percentage ratio of 0.6 and SAW a ratio of 0.2, as would be expected if they, like CVTPO, did not forecast interstate improvement funds.

