

Chapter 15 - Air Quality Conformity

Background

This Chapter documents the results of the transportation conformity analysis in the Richmond, Virginia ozone maintenance area for the Richmond Metropolitan Planning Organization's (MPO) *2026 Long-Range Transportation Plan (LRTP)*. The Richmond ozone maintenance area includes the counties of Hanover, Henrico, Chesterfield and parts of Charles City, along with the cities of Colonial Heights, Richmond, and Hopewell, and the Town of Ashland. The two MPOs, Richmond and Tri-Cities, along with the Virginia Department of Transportation (VDOT) are responsible for developing conformity demonstrations for transportation plans and programs within this area.

The Richmond, Virginia region was classified by the U.S. Environmental Protection Agency (EPA) as a moderate ozone nonattainment area on November 6, 1991. EPA approved Virginia's request for redesignation for the Richmond moderate ozone nonattainment area from nonattainment to maintenance and approved the area's maintenance plan on November 17, 1997. This redesignation is based upon three years of quality-assured ambient air monitoring data for the area, which demonstrates that the national ambient air quality standards (NAAQS) for ozone have been attained.

Ground-level ozone is formed when two sets of pollutants, nitrogen oxides (NO_x) and volatile organic compounds (VOC) are exposed to heat and sunlight to form a dangerous gas. Ground-level ozone is a major component of smog, can damage lung tissue, aggravate respiratory disease, and make people more susceptible to respiratory infections. Vehicle emissions are one of the major contributors of these ozone precursors.

As a result of Richmond area's maintenance status, the MPO and VDOT must demonstrate that the area's NO_x and VOC emissions are within the state implementation plan (SIP) budgets. The SIP establishes emissions budgets for various source categories which are stationary, area-wide, and mobile. Projected emissions levels for the LRTP must be within this established budget in order to be in conformance with the SIP. Once the budgets are satisfied and attainment can be demonstrated, the region is said to "conform" to the SIP.

The approved mobile source emissions budget for the Richmond ozone maintenance area is shown in Figure 15-1 below.

***Figure 15-1 Mobile Source Emissions Budget
for the Richmond, Virginia Ozone Maintenance Area***

Budget Year	VOC (tons/day)	NO_x (tons/day)
1993 (attainment year)	40.41	59.56
1999	35.94	59.56
2007	31.86	61.07
2015	35.64	67.71

Model Methodology and Procedures

The EPA promulgated a final rule establishing “criteria and procedures for determining conformity to state and federal implementation plans of transportation plans, programs, and projects funded or approved under Title 23 U.S.C. or the Federal Transit Act.” This rule (40 CFR Part 51, Subpart T) was developed to implement section 176(c) of the Clean Air Act (CAA), as amended, which requires that federal agencies and MPOs not approve any transportation project, program, or plan that does not conform with an approved State Implementation Plan (SIP).

The Transportation Conformity Rule identifies the following criteria and procedures that apply to transportation conformity determinations:

- Conformity determinations must be based upon the latest planning assumptions in force at the time of the determination.
- The latest emissions model must be used for the conformity analysis.
- The conformity determination must be made in accordance with the consultation procedures outlined in the Rule. These procedures include (1) providing reasonable opportunity for consultation with state agencies, local air quality and transportation agencies, DOT and EPA and (2) establishing a proactive public involvement process that provides an opportunity for public review and comment prior to taking formal action on a conformity determination.
- The steps necessary to demonstrate that the LRTP provides for timely implementation of transportation control measures (TCMs) and is not interfering with this implementation is detailed.
- A currently conforming LRTP and currently conforming TIP is required at the time of project approval.
- Each project must come from a conforming transportation plan and program.
- The LRTP and TIP must be consistent with the motor vehicle emissions budget in the applicable SIP.
- All regionally significant projects included in the LRTP or TIP must be included in the regional emissions analysis.
- Certain types of projects (i.e., safety, transit, and intersection improvements) that do not have adverse emission impacts are allowed to be exempt from being included in the regional emissions analysis and can proceed forward in the absence of a conforming LRTP or TIP.

Demonstrating conformity requires estimating the region-wide emissions for VOC and NO_x from motor vehicle activity on the forecasted transportation system. To accomplish this, the transportation network as identified in the Richmond and Tri-Cities LRTPs (with proposed projects constructed and in place at certain future years) are analyzed to simulate travel patterns and estimate future transportation system demand. Emissions resulting from the vehicle activity on the network are calculated and compared to the mobile source emissions budget in the SIP. A determination of conformity can be made when the emissions levels resulting from the proposed projects contained in the LRTPs are equal to or less than the appropriate budget.

The conformity analysis uses a traditional 4-step transportation planning model, an emissions factor model, and post-processing software to estimate total regional emissions for the study area network. Emission rates for the vehicle fleet were prepared using MOBILE 6.2, an emissions factor model. These rates were then applied to the estimated vehicle-miles-traveled (VMT) from TP+, the Richmond area travel demand forecasting model, to compute the daily emissions totals from the modeled network. These emission totals were added to emissions calculated “off-line” (outside of the TP+ model) for collector and local roads (collector and local roads are not part of the model network). The total daily emissions computed were used to perform the emission tests required for a demonstration of conformity.

The models, processors, and analysis methods used to demonstrate conformity are discussed in detail in VDOT’s technical report titled *Richmond, Virginia Ozone Maintenance Area, Transportation Conformity Analysis for the 2026 Long-Range Transportation Plan*.

Emissions Budget Estimates

The Build scenario emissions for each analysis year must be less than the VOC and NO_x emissions budgets established in the SIP. Figure 15-2 provides a summary of the emissions budget test for the 2026 LRTP for the Richmond ozone maintenance area. The table includes VOC and NO_x comparisons between 2007 Build emissions and the 2007 emissions budget, between 2017 Build emissions and the 2015 emissions budget, and between 2026 Build emissions and the 2015 emissions budget.

Figure 15-2 Emission Levels and Conformity Tests for the 2026 LRTP

	VOC	NO _x
Emission Test	(tons/day)	(tons/day)
2007 Build / 2007 Emissions Budget	26.67 / 31.86	42.77 / 61.07
2017 Build / 2015 Emissions Budget	23.92 / 35.64	56.40 / 67.71
2026 Build / 2015 Emissions Budget	22.81 / 35.64	63.22 / 67.71

As Figure 15-2 shows, the 2026 LRTPs for the Richmond and Tri-Cities areas meet the requirements of the maintenance period for both VOC and NO_x. Based on these results, the Richmond 2026 LRTP is found to be in conformity with the maintenance SIP. As seen in this plan, a balanced, multimodal transportation system provides the best means for reducing harmful mobile emissions and meeting air quality conformity requirements.

