

Hot-spot Analyses and Project-Level Conformity Determinations

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Introduction

Transportation conformity is required under Clean Air Act (CAA) section 176(c) (42 U.S.C. 7506(c)) to ensure that federally supported highway and transit project activities are consistent with (conform to) the purpose of a state air quality implementation plan (SIP). Conformity to the purpose of the SIP means that transportation activities will not cause or contribute to new air quality violations, worsen existing violations, or delay timely attainment of the relevant national ambient air quality standards (NAAQS) or required interim milestones. The U.S. Environmental Protection Agency's (EPA) transportation conformity rule (40 CFR 51.390 and Part 93) establishes the criteria and procedures for determining whether transportation activities conform to the SIP. Transportation conformity applies to transportation activities in nonattainment or maintenance areas for the criteria pollutants of ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), and particulate matter (PM₁₀, and PM_{2.5}) (see definitions of "nonattainment area" and "maintenance area" at 40 CFR 93.101).

A hot-spot analysis is defined in 40 CFR 93.101 as an estimation of likely future localized pollutant concentrations and a comparison of those concentrations to the relevant NAAQS. A hot-spot analysis assesses the air quality impacts on a scale smaller than an entire nonattainment or maintenance area, including, for example, congested highways or transit terminals. Such an analysis of the area substantially affected by the project demonstrates that CAA conformity requirements are met for the relevant NAAQS in the "project area." Under the transportation conformity rule, a quantitative PM hot-spot analysis only applies to highway and transit projects that are identified in 40 CFR 93.123(b)(1). When a hot-spot analysis is required, it is included within a project-level conformity determination.

The Frequently Asked Questions (FAQs) below pertain to project-level transportation conformity determinations and reference EPA's current hot-spot guidance, as appropriate, including the [PM Hot-Spot Guidance](#) and guidance for [Using MOVES in Project-Level CO Analyses](#).¹ EPA is providing these FAQs to supplement these guidance documents and the previous [PM Hot-spot Analysis FAQs](#).² All of these documents can be found on EPA's [Project-Level Conformity and Hot-Spot Analyses](#) website.

These FAQs provide clarification to the relevant existing guidance documents and do not create any new requirements. The Clean Air Act (CAA) and the transportation conformity regulations described in this document contain legally binding requirements. These FAQs are not a substitute for those provisions or regulations, nor are they regulations in themselves. Thus, they do not impose legally binding requirements on EPA, the Department of Transportation (DOT), states, or the regulated community, and may not apply to a particular situation based upon the circumstances. EPA retains the discretion to adopt approaches on a case-by-case basis that may differ from these FAQs but still comply with the statute and applicable regulations. These FAQs may be revised periodically without public notice.

¹ See EPA's [PM Hot-Spot Guidance: Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas](#), October 2021, EPA-420-B-21-037, and EPA's [Using MOVES3 in Project-Level Carbon Monoxide Analyses](#), December 2021, EPA-420-B-21-047.

² [PM Hot-spot Analyses: Frequently Asked Questions](#), EPA-420-F-18-011, June 2018.

Placing Air Quality Modeling Receptors on Sidewalks, Bus Shelters, and Bike Paths for PM Quantitative Hot-spot Analyses

1. For a PM hot-spot analysis done for a project-level transportation conformity determination, should receptors be placed on public sidewalks, bus shelters, and bike paths, even if they are closer than five meters to the edge of the road?

Yes, placing receptors on public sidewalks, bus shelters, and bike paths (also known as cycle paths) will need to be considered when these facilities are part of or affected by the project, even when they are closer than five meters. Public sidewalks, bus shelters, and bike paths, by definition, are part of ambient air where the general public has access, and consistent with EPA's ambient air policy, receptors are required to be placed in ambient air for demonstrations under the Clean Air Act and EPA regulations.³

Receptors, for conformity purposes, are locations in the project area where an air quality model estimates future PM concentrations. The PM Hot-Spot Guidance includes a discussion of where to site receptors for PM hot-spot analyses of transportation projects, in light of EPA's regulations and guidance. The PM Hot-spot Guidance says:

Receptors should be placed in areas that are considered ambient air (i.e., where the public generally has access). Examples of areas where receptors should not be placed include a median strip of a highway, a right-of-way on a limited access highway, or an approach to a tunnel. (7.6.2, p. 78)

The term "ambient air" is defined at 40 CFR 50.1(e):

Ambient air means that portion of the atmosphere, external to buildings, to which the general public has access.

The concept of ambient air applies beyond just transportation hot-spot modeling. Some areas are excluded from the scope of ambient air under this definition, including areas to which the general public does not have access. Receptors do not need to be placed in locations that are not ambient air. Generally, the public does not have access to the median strip of highway, a right-of-way on a limited access highway, or an approach to a tunnel, and therefore they are specifically mentioned in the PM Hot-Spot Guidance as areas where receptors should not be placed. In addition, receptors should not be placed on crosswalks or pedestrian refuge islands within a road that is part of the project being modeled, because receptors are not placed within sources. When sidewalks or bike paths are within five meters of the project, receptors should not be placed in the area between the sidewalk/bike path and the project, if such an area exists (e.g., a grassy strip between the road and the sidewalk or bike path).

Public sidewalks, bus shelters, and bike paths, however, are examples of where the general public has access, since their purpose is to provide public access for pedestrians and cyclists. Since these features are accessible to the general public, they would be within ambient air. Generally, these features are not present in the right-of-way of a limited access highway but could be present within the right-of-way of an unrestricted access highway, such as an arterial highway.

³ See EPA's [Revised Policy on Exclusions from "Ambient Air" Memorandum](#), December 2, 2019, available on EPA's "Ambient Air" Guidance website.

The PM Hot-Spot Guidance states:

Receptors should be sited as near as five meters from a source (e.g., the edge of a traffic lane or a source in a terminal), except possibly with projects involving urban street canyons where receptors may be appropriate within 2-10 meters of a project.

[Footnote 115]

[Footnote 115] See 40 CFR Part 58, Appendix D, Section 4.7.1(c)(1); Appendix E, Section 6.3(b) and Table E-4. The interagency consultation process should be used to determine when these provisions are relevant for a given analysis. (7.6.2, p. 79)

The above sentence in EPA's PM Hot-Spot Guidance was not intended to eliminate the possibility that receptors may need to be placed closer than five meters. Under the transportation conformity rule, a quantitative PM hot-spot analysis does not apply to all transportation projects in a PM nonattainment or maintenance area, but only to highway and transit projects that involve a significant number or significant increase in the number of diesel vehicles (40 CFR 93.116 and 93.123(b)(1)). Highway projects that need a hot-spot analysis tend to be located on limited access highways, such as interstates, where sidewalks, bus shelters, and bike paths would not be present.

However, recently in implementation of the PM hot-spot requirement in EPA's transportation conformity rule, there have been cases where projects that need a PM hot-spot analysis include sidewalks, present or planned, in the vicinity of the project being modeled. These cases highlighted the need to clarify that receptor placement to adequately capture ambient air, where the public has access, takes precedence over the statement in our guidance that "receptors should be sited as near as five meters from a source...."

Examples of projects where receptors may need to be placed closer than five meters from the source to adequately capture ambient air include, but are not limited to:

- A project on a limited access highway where sidewalks, bus shelters, or bike paths are present or planned at a different elevation.
- A project that involves an unrestricted access highway where sidewalks, bus shelters, or bike paths are present or planned.

These examples are not meant to be limiting, and there may be other situations where ambient air is present closer than five meters as well. As other cases in the field arise, please contact the relevant EPA Regional Office and use interagency consultation to determine where receptors need to be placed, per 40 CFR 93.105(c)(1)(i), to ensure ambient air is represented.

When sidewalks, bus shelters, or bike paths are present within five meters of the project, receptors closer than five meters would represent ambient air and meet EPA requirements, and the statement in the PM Hot-Spot Guidance that receptors should be sited "as near as five meters" should not be taken to exclude these areas. In addition, placing receptors on publicly accessible locations adjacent to a transportation facility also meets 40 CFR 93.123(c) that requires "...The total concentration must be estimated and analyzed at appropriate receptor locations in the area substantially affected by the project."

This FAQ does not change layout of receptor grids discussed in Section 7.6.2 of the PM Hot-Spot Guidance, which indicates that a grid should start five meters away from the project. However, if there are sidewalks, bus shelters, or bike paths within five meters of the project, the receptor grid should be supplemented with additional discrete receptors to ensure that receptors are placed in areas considered ambient air.

The choice of source type in the modeling can impact the receptor placement strategy. For roads characterized using the AREA or LINE source type in AERMOD, receptors can be placed within five meters of the source. However, when using VOLUME sources to characterize the road, receptors that are within the source’s “exclusion zone,”⁴ are not included in concentration calculations. Therefore, when using volume sources to model a road with an adjacent sidewalk, bus shelter, or bike path, care must be taken to define the volume source so that receptors are not in the exclusion zone. Where this is a concern, the interagency consultation process should be used to consider a solution, such as whether another source type may need to be used. For additional detail, please refer to the PM Hot-spot Guidance, Appendix J.

MOVES AVFT Guidance for Hot-Spot Analyses

2. What guidance is available for projecting electric vehicle fractions for transportation conformity hot-spot analyses? Can the MOVES4 AVFT Tool be used for Project Scale analyses?

For PM_{2.5}, PM₁₀, and CO hot-spot analyses, project sponsors should refer to the [MOVES4 Technical Guidance](#) for the latest guidance about modeling future electric vehicles in transportation conformity hot-spot analyses. In all three MOVES analysis scales (Default, County, and Project), modelers can include the fraction of each vehicle type that uses a specific type of fuel, such as gasoline, diesel, compressed natural gas (CNG), or electricity. More information is below.

The transportation conformity regulation at 40 CFR 93.111(a) requires the use of the latest emissions model for transportation conformity determinations, whether they be for transportation plans, transportation improvement programs, or individual transportation projects. The regulation also provides for a grace period at 40 CFR 93.111(b), during which either the latest emissions model or the one that preceded it can be used for transportation conformity purposes.

EPA released MOVES4 in September 2023, with a two-year grace period that ends September 25, 2025.⁵ During this grace period, project sponsors can use either MOVES3 or MOVES4 for project-level hot-spot analyses. While either MOVES3 or MOVES4 can be used during the grace period, we recommend modelers use MOVES4 to take advantage of the improvements it includes.⁶

⁴ The exclusion zone around a volume source is defined as $(2.15\gamma + 1)$ meter, where γ (or “Syinit”) is the initial lateral dispersion of the volume source. For additional information, see EPA’s [PM Hot-spot Guidance](#), Appendix J.

⁵ See EPA’s *Federal Register* Notice of Availability, [88 FR 62567](#), September 12, 2023; and EPA’s [MOVES4 Policy Guidance: Use of MOVES for State Implementation Plan Development, Transportation Conformity, General Conformity and Other Purposes](#), EPA-420-B-23-009, August 2023.

⁶ For more information about the improvements included in MOVES4, please see the fact sheet, [EPA Releases MOVES4 Mobile Source Emissions Model](#), EPA-420-F-23-019, August 2023, and EPA’s [Overview of EPA’s Motor Vehicle Emission Simulator \(MOVES4\)](#), EPA-420-R-23-019, August 2023.

One of the differences between MOVES3 and MOVES4 is the ability to model additional fuel/vehicle combinations, such as electric heavy-duty trucks. In MOVES, modelers define the percentages of each vehicle type that use each fuel type, including gasoline, diesel, CNG, and electricity, in the “AVFT” (Alternate Vehicle Fuel and Technologies) Table. EPA added a new tool to MOVES4 – the AVFT Tool – to help modelers create appropriate AVFT Tables. The AVFT Table is one of four tables that is included in the Fuel Input.

With MOVES4, EPA also released the [MOVES4 Technical Guidance](#), an updated version of guidance for using MOVES for SIP inventories and regional emissions analyses in transportation conformity. The MOVES4 Technical Guidance generally applies to County Scale analyses done for these purposes. In the MOVES4 version of this guidance, EPA updated the guidance given for modeling fuel types in future years and also provided guidance for using the AVFT Tool.

The guidance documents that inform how to use MOVES at the Project Scale in transportation conformity hot-spot analyses - the [PM Hot-spot Guidance](#) and [Using MOVES in Project-Level CO Analyses Guidance](#) (see footnote 1) – are based on MOVES3. Regardless of whether they are using MOVES3 or MOVES4, project sponsors should continue to follow those guidance documents, as they generally continue to apply for MOVES4. However, both of these guidance documents point to the MOVES Technical Guidance for additional information about the Fuel Input, which is the same at both County and Project Scales.⁷ Section 4.8 of the MOVES4 Technical Guidance includes more information about the Fuel Inputs in general that may be helpful when using MOVES for hot-spot modeling.

For specific guidance for changing the composition of the fleet in terms of fuel types in the future, project sponsors should refer to Section 4.8.3 of the MOVES4 Technical Guidance, regarding the AVFT input. The AVFT input is the same at both County and Project Scales of the model, and project sponsors using MOVES4 can use the AVFT Tool to create an AVFT Table for a project-level MOVES run. For more information about this tool, please refer to Section 4.8.3.1 of the MOVES4 Technical Guidance, the detailed instructions within the tool itself (“AVFT Tool Help”), and the MOVES4 Hands-On Training, found at the [MOVES Training](#) website. Note that the AVFT Tool can be used only with MOVES4; it cannot be used with MOVES3.

EV Charging Infrastructure

3. **Is a transportation conformity determination required for an EV charging infrastructure project funded or approved by FHWA/FTA?**

EPA’s transportation conformity regulation (40 CFR part 93 subpart A) states that transportation conformity determinations in nonattainment or maintenance areas are required for FHWA/FTA projects (40 CFR 93.102). The transportation conformity regulation defines an FHWA/FTA project, highway project, and transit project in 40 CFR 93.101.

⁷ Note that at the time these guidance documents were released, the latest version of the Technical Guidance was for MOVES3. Project sponsors should now refer to the latest version of the Technical Guidance, which is currently the MOVES4 version.

FHWA/FTA project is defined in 40 CFR 93.101 as:

any highway or transit project which is proposed to receive funding assistance and approval through the Federal-Aid Highway program or the Federal mass transit program or requires Federal Highway Administration (FHWA) or Federal Transit Administration (FTA) approval for some aspect of the project, such as connection to an interstate highway or deviation from applicable design standards on the interstate system.

Highway project is defined in 40 CFR 93.101 as:

an undertaking to implement or modify a highway facility or highway-related program. Such an undertaking consists of all required phases necessary for implementation. For analytical purposes, it must be defined sufficiently to: (1) Connect logical termini and be of sufficient length to address environmental matters on a broad scope; (2) Have independent utility or significance, i.e., be usable and be a reasonable expenditure even if no additional transportation improvements in the area are made; and (3) Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

Transit project is defined in 40 CFR 93.101 as:

an undertaking to implement or modify a transit facility or transit-related program; purchase transit vehicles or equipment; or provide financial assistance for transit operations. It does not include actions that are solely within the jurisdiction of local transit agencies, such as changes in routes, schedules, or fares. It may consist of several phases. For analytical purposes, it must be defined inclusively enough to: (1) Connect logical termini and be of sufficient length to address environmental matters on a broad scope; (2) Have independent utility or independent significance, i.e., be a reasonable expenditure even if no additional transportation improvements in the area are made; and (3) Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

As long as a project does not fit within the definition of a highway or transit project in 40 CFR 93.101, it would also not be a FHWA/FTA project, and thus a project-level conformity determination would not be required. Under EPA's understanding of these terms, an EV charging station itself would not connect logical termini and thus would not generally fit within the definition of a highway or transit project in 40 CFR 93.101.

However, if an EV charging infrastructure project funded or approved by FHWA or FTA also includes infrastructure beyond the charging stations that would fit the definition of a highway or transit project in 40 CFR 93.101, such infrastructure may need a project-level conformity determination, unless exempt under 40 CFR 93.126.

Similarly, with respect to metropolitan transportation plan/transportation improvement program (TIP) conformity, because EV charging stations would not themselves generally fit within the definition of a highway or transit project in 40 CFR 93.101 under EPA's interpretation of these terms, a transportation conformity determination on the plan/TIP

amendment would not be required if such amendment is for adding EV charging stations only with no other changes. However, if an EV charging infrastructure project includes non-exempt additions that do fit within the definition of highway or transit project in 40 CFR 93.101, a transportation conformity determination on the plan/TIP amendment that includes the project would be necessary.

Note that the above answer, which EPA coordinated with FHWA, is consistent with similar information in FHWA's [National Electric Vehicle Infrastructure \(NEVI\) Formula Program Q&A](#), Question 14.1.