

AAMPO



2024

TRANSPORTATION CONFORMITY DETERMINATION

2050 METROPOLITAN TRANSPORTATION PLAN
AND FY 2025-2028 TRANSPORTATION
IMPROVEMENT PROGRAM FOR THE ALAMO AREA



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LIST OF ABBREVIATIONS

AERR	Air Emissions Reporting Requirements
APU	Auxiliary Power Unit
ATR	Automated Traffic Recorder
CAAA	Clean Air Act Amendments of 1990
CDB	MOVES County Database
CFR	Code of Federal Regulations
CMAQ	Congestion Mitigation and Air Quality Improvement Program
CO	Carbon Monoxide
CSJ	Control-Section-Job
DOE	Department of Energy
DOT	Department of Transportation
EI	Emissions Inventory
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HC	Hydrocarbon
HPMS	Highway Performance Monitoring System
MoSERS	Mobile Source Emission Reduction Strategies
MOVES	MOtor Vehicle Emission Simulator
MPA	Metropolitan Planning Area
MPO	Metropolitan Planning Organization
MTP	Metropolitan Transportation Plan
MVEB	Motor Vehicle Emissions Budget
NAAQS	National Ambient Air Quality Standards
NOx	Nitrogen Oxides
OBD	On-Board diagnostics
OD	Origin-Destination

PACP	Pre-Analysis Consensus Plan
PM	Particulate Matter
RIF	Road Idle Fraction
RTP	Regional Transportation Plan
SHEI	Source Hours Extended Idling
SHO	Source Hours Operating
SHP	Source Hours Parked
SIP	State Implementation Plan
TAZ	Traffic Analysis Zone
TCEQ	Texas Commission on Environmental Quality
TCM	Transportation Control Measures
TDM	Travel Demand Model
TERM	Transportation Emission Reduction Measure
TIP	Transportation Improvement Program
TTI	Texas A&M Transportation Institute
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds

1. EXECUTIVE SUMMARY

1.1 CONFORMITY OVERVIEW

The Clean Air Act Amendments of 1990 (CAAA) require transportation plans, programs, and projects in nonattainment and maintenance areas, funded or approved by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA), to conform to the Motor Vehicle Emissions Budgets (MVEBs) established in the State Implementation Plan (SIP) and deemed adequate or approved by the U.S. Environmental Protection Agency (EPA). Nonattainment areas with no MVEB must demonstrate conformity by satisfying an interim emissions test(s). Satisfying MVEBs (budgets) or interim emissions tests ensures that transportation plans, programs, and projects do not produce new air quality violations, worsen existing violations, or delay the timely attainment of National Ambient Air Quality Standards (NAAQS). Section 176(c)(4) of the 1990 CAAA requires Metropolitan Planning Organizations (MPOs) with areas designated as nonattainment and/or maintenance for a NAAQS to conduct an air quality conformity analysis to demonstrate that Metropolitan Transportation Plans (MTPs)/Regional Transportation Plans (RTP) and/or Transportation Improvement Programs (TIPs) are consistent with the region's air quality goals.

Effective July 22, 2024, the Alamo Area MPO (AAMPO) is classified Serious for Ozone nonattainment but does not yet have an approved SIP MVEB. Therefore, this conformity analysis must satisfy both “build/no build” and the “less-than-baseline” interim emissions tests. For the “build/no build” test, the regional transportation network “build” (or action scenario) emissions for each analysis year must be less than the “no build” (or baseline scenario) emissions for the analysis year. For the “less-than-baseline” test, the “build” (or action scenario) emissions for each analysis year must be less than the baseline year¹ emissions.

As the MPO for the San Antonio region, **AAMPO** is responsible for conducting the air quality conformity analysis to address the **2015 8-hr ozone** National Ambient Air Quality Standards (NAAQS).

1.2 AIR QUALITY AND NONATTAINMENT AREA

1.2.1 Air Pollution

Pollutant(s) covered in this conformity analysis:

Precursors to Ozone: Volatile Organic Compounds (VOC) and Nitrogen Oxides (NOx) – *“Ground-level ozone is a colorless compound formed when NOx and VOC chemically react in the presence of sunlight. It is not directly*

¹ The less-than-baseline test's baseline year (applicable to NAAQSs promulgated after 1997) is the most recent year for which EPA's Air Emission Reporting Rule (40 CFR Part 51, Subpart A) required submission of on-road mobile source emissions inventories, as of the effective date of nonattainment designation. For example, an area designated nonattainment in 2018 would have a baseline year of 2017, the most recent year of Texas' triennial on-road mobile emission inventory (emissions inventory (EI) submittal to EPA under the Air Emissions Reporting Requirements (AERR)), at the time of designation.

emitted into the air. Ground level ozone is known to trigger a variety of health problems and is particularly harmful to children, older adults, and people of all ages who have lung diseases, such as asthma.” (Source: US EPA.)

1.2.2 Nonattainment Area

Description of the nonattainment area history 2015 8-hr ozone NAAQS from Texas Commission on Environmental Quality (TCEQ) website:

<https://www.tceq.texas.gov/airquality/sip/san/san-status>

2015 Eight-Hour Ozone Standard Designations: Moderate Nonattainment (Bexar County), effective July 22, 2024 ([89 FR 51829](#))

On October 1, 2015, the EPA lowered the primary and secondary eight-hour ozone NAAQS to 0.070 parts per million (ppm) (effective December 28, 2015, ([80 FR 65292](#)). On July 25, 2018, the EPA designated Bexar County as nonattainment with a marginal classification and designated Atascosa, Bandera, Comal, Guadalupe, Kendall, Medina, and Wilson Counties as attainment/unclassifiable, effective September 24, 2018. On October 7, 2022, the EPA reclassified Bexar County from marginal to moderate nonattainment, effective November 7, 2022 ([87 FR 60897](#)). The attainment date for this moderate nonattainment area was September 24, 2024 with a 2023 attainment year. On June 20, 2024, the EPA reclassified Bexar County from moderate to serious nonattainment, effective July 22, 2024 ([89 FR 51829](#)). The attainment date for this serious nonattainment area is September 24, 2027 with a 2026 attainment year. ²

²see [https://www.epa.gov/newsreleases/epa-reclassifies-three-ozone-nonattainment-areas-moderate-serious#:~:text=DALLAS%2C%20TEXAS%20\(June%202026%2C,of%20the%20current%20ozone%20standard.](https://www.epa.gov/newsreleases/epa-reclassifies-three-ozone-nonattainment-areas-moderate-serious#:~:text=DALLAS%2C%20TEXAS%20(June%202026%2C,of%20the%20current%20ozone%20standard.)

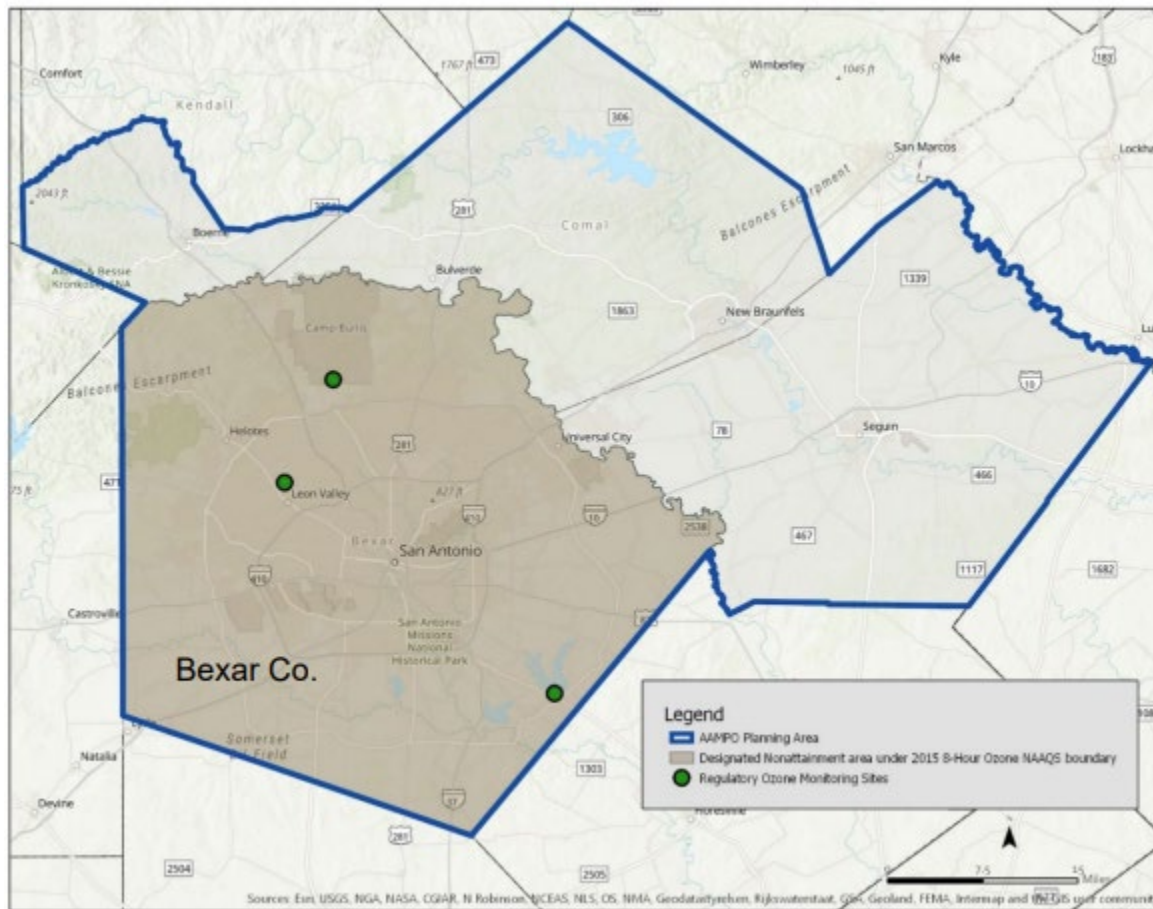


Figure 1-1. Alamo Area MPO Study Area

1.3 MOBILITY 2050, AS AMENDED AND FY 2025-28 TIP

This conformity determination is being prepared to ensure that amendments to AAMPO's Metropolitan Transportation Plan, *Mobility 2050, as amended*, and the FY 2025-2028 Transportation Improvement Program (TIP) meet the conformity-related requirements of the CAAA, SIP, and the final conformity rule (Title 40 Code of Federal Regulations (CFR), Parts 51 and 93).

Per [23 CFR§450.324](#) all projects are constrained by the financial resources estimated to be reasonably available within the transportation plan timeframe. A list of the projects in *Mobility 2050, as amended* and the FY 2025-2028 TIP that affect this conformity analysis is included in Appendix C of this conformity report.

1.4 ANALYSIS

This emissions analysis for determining conformity was performed under the Code of Federal Regulations [Title 40, Part §93.109\(c\)\(2\)\(ii\)\(B\)](#).

The analysis years for this conformity are 2017 (baseline year), 2025, 2035, 2045, and 2050 (*Mobility 2050's* horizon year).

The AAMPO area is currently classified as Serious nonattainment for ozone and does not have an approved SIP MVEB.

For each analysis year “build” emissions are less than “no build” emissions as well as less than baseline year emissions. “Build” refers to the “Action” scenario, while the “Baseline” scenario includes existing and committed projects. The baseline year is **distinct** from the “Baseline” scenario and is established in the 2015 8-hour Ozone NAAQS.

- (i) The emissions predicted in the “Action” scenario are less than the emissions predicted in the “Baseline” scenario, and this can be reasonably expected to be true in the periods between the analysis years; and
- (ii) The emissions predicted in the “Action” scenario are lower than emissions in the baseline year for that NAAQS as described in [paragraph \(e\)](#) of this section by any nonzero amount, see [40 CFR § 93.119\(b\)\(1\)](#).

1.5 FINDINGS

The Nitrogen Oxides (NOx) and Volatile Organic Compounds vehicle summer weekday emission results shown below demonstrate AAMPO meets the regional air quality conformity requirements of the 2015 8-hr ozone NAAQS.

Table 1-1. Emissions Analysis for Regional Conformity Determination (2017–2050)

Analysis Year	NOx - Build (“Action”) – including CMAQ (tons/day)	NOx - No-build (“Baseline”) (tons/day)	VOC - Build (“Action”) – including CMAQ (tons/day)	VOC - No-build (“Baseline”) (tons/day)
2017	39.431	N/A	17.445	N/A
2025	22.286	22.308	10.275	10.277
2035	18.848	19.049	6.522	6.730
2045	20.388	20.622	6.301	6.509
2050	22.205	22.461	6.639	6.843

The results of the conformity determination demonstrate that *Mobility 2050, as amended* and the FY 2025-2028 TIP meet the requirements of the air quality SIP for the Alamo Area MPO and per the CAA ([42 U.S.C. 7504, 7506 \(c\) and \(d\)](#)), as amended on November 15, 1990, and the final conformity rule ([40 CFR Parts 51 and 93](#)).

2. TRANSPORTATION CONFORMITY REQUIREMENTS

2.1 WHAT IS TRANSPORTATION CONFORMITY?

As mandated under the [CAA Section 176\(c\)](#), transportation conformity ensures that federally supported transportation activities align with and conform to the objectives outlined in each state's State Implementation Plan (SIP). A SIP serves as the state air quality blueprint for meeting the National Ambient Air Quality Standards (NAAQS). It consists of a compilation of legally enforceable rules and regulations crafted by a state or local air quality agency. The governor of the state submits this plan to the EPA for approval. The primary goal of a SIP is to enhance air quality by achieving, progressing toward, or maintaining compliance with the NAAQS. Each SIP specifies emissions reductions for every pollutant or precursor, categorized by source type, including on-road motor vehicles, non-road equipment and vehicles, stationary sources, and area sources.

Before an MTP or TIP can be adopted, approved, or accepted in nonattainment areas, MPOs and the US Department of Transportation (DOT) must make conformity determinations on these documents. As described in [Section 176\(c\)\(1\)](#) of the CAAA of 1990, transportation conformity is granted when the following conditions are met:

- (A) conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards and achieving expeditious attainment of such standards; and
- (B) that such activities will not:
 - (i) cause or contribute to any new violation of any standards in any area;
 - (ii) increase the frequency or severity of any existing violation of any standard in any area; or
 - (iii) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

A new conformity determination must be performed any time an MTP is amended in a significant manner, when a region or state's air quality goals change, and/or every four years.

2.2 CONFORMITY REQUIREMENTS

The CAAA of 1990 requires transportation plans, programs, and projects in nonattainment and maintenance areas, which are funded or approved by the FHWA or the FTA, to conform to the Motor Vehicles Emissions Budgets (MVEBs) established in the SIP, or to satisfy applicable interim emissions tests, absent MVEBs. A regional emissions analysis is the key analytic component of the Transportation Conformity process. It is conducted to demonstrate regional emissions from on-road sources:

- (A) Do not exceed the established MVEB or satisfy interim emissions test(s), absent an MVEB;
- (B) Do not cause or contribute to violations of the EPA's NAAQS; and

(C) Ensures transportation activities are consistent with air quality goals identified in the SIP.

As stipulated by the Clean Air Act Amendment of 1990, requirements for conformity analysis include:

- Use the latest planning assumptions. ([40 CFR Part 93.110](#))
- Analysis based on the latest emission estimation model available. ([40 CFR Part 93.111](#))
- Interagency consultation, and a public involvement process, must be conducted during the analysis. ([40 CFR Part 93.112](#))
- Timely implementation of Transportation Control Measures (TCMs). ([40 CFR Part 93.113](#))
- A transportation plan and TIP that are consistent with the MVEBs established in the applicable SIP (if there is an adequate or approved SIP budget). ([40 CFR Part 93.118](#))
- Inclusion of all regionally significant projects expected in the nonattainment and maintenance area in the transportation plan and/or TIP ([40 CFR Part 93.114 & 115](#)).

The determination of the analysis is a two-step process in metropolitan areas. The first step is for the MPO to make the initial Transportation Conformity Determination at the local level. For the Alamo Area, the Transportation Policy Board makes this decision. The second step is for the FHWA and the FTA to make a joint Transportation Conformity Determination at the federal level. Upon federal approval, a four-year window begins during which projects, programs, and policies identified in the MTP and TIP may move toward implementation.

2.3 EMISSION ANALYSIS

A regional emissions analysis is the key analytic component of the Transportation Conformity process. It is conducted to demonstrate regional emissions from on-road sources do not exceed the established MVEBs (or, if no MVEB for the area, analysis year “build” emissions do not exceed analysis year “no build” emissions as well as do not exceed baseline year emissions), causing or contributing to violations of EPA NAAQS, and ensures transportation activities are consistent with air quality goals identified in the SIP.

2.3.1 Regional Inventory

This conformity analysis of the Alamo Area accounts for emissions resulting from the nonattainment area’s *Mobility 2050, as amended*, including all regionally significant projects located within the Alamo Area, and the effects of emission control programs adopted by an enforcing jurisdiction.

2.3.2 Emissions Tests

Conformity determinations must demonstrate consistency between expected emissions from implementing the MTP and TIP with the MVEBs in the applicable implementation plan.

This conformity analysis must satisfy both “build/no build” and the “less-than-baseline” interim emissions tests. For the “build/no build” test, the regional transportation network “build” (or action scenario) emissions for each analysis year must be less than the “no build” (or baseline scenario) emissions for the analysis year. For the “less-than-baseline” test, the “build” (or action scenario) emissions for each analysis year must be less than the baseline year³ emissions.

As the MPO for the greater San Antonio region, AAMPO is responsible for conducting the air quality conformity analysis to address the 2015 8-Hour Ozone NAAQS for Bexar County.

2.3.3 Analysis Years

For the emission budget test, according to the conformity rule, [40 CFR 93.106](#), the regional emission analysis years should be selected according to the following:

- Any years within the timeframe of the transportation plan, provided they are not more than ten years apart.
- Any year with an emission analysis budget.
- The attainment year.
- The transportation plan horizon year.

Table 2-1. Conformity Analysis Years¹ shows the conformity analysis years and describes their corresponding requirements for calculations.

Table 2-1. Conformity Analysis Years

Requirements	Years
Baseline year	2017
Any years within timeframe	2025, 2035, 2045
Any year with an emissions analysis budget	N/A
Attainment year	N/A
MTP horizon year	2050

2.4 CHECKLIST

Table 2-2. Checklist of Items Required in this Conformity Review² shows the checklist detailing information relevant to this conformity document.

³ The less-than-baseline test’s baseline year (applicable to NAAQSs promulgated after 1997) is the most recent year for which EPA’s Air Emission Reporting Rule ([40 CFR Part 51, Subpart A](#)) required submission of on-road mobile source emissions inventories, as of the effective date of nonattainment designation. For example, an area designated nonattainment in 2018 would have a baseline year of 2017, the most recent year of Texas’ triennial on-road mobile (EI submittal to EPA under the AERR), at the time of designation.

Table 2-2. Checklist of Items Required in this Conformity Review

Item	Regulation Referenced	Item Format	Location within Report
Documents			
Mobility 2050, as amended	Part 93 Subpart A	Independent Self-Supporting Document (Electronic File)	Link as listed in Appendix B
FY 2025-2028 TIP	Part 93 Subpart A	Independent Self-Supporting Document (Electronic File)	Link as listed in Appendix B
2024 Transportation Conformity Determination	Part 93 Subpart A	Independent Self-Supporting Document (Electronic File)	This Document
MOtor Vehicle Emission Simulator (MOVES)			
Description of Version of MOVES Model Being Used	40 CFR Part 93.111	Discussion Contained in Conformity Document	Chapter 5.1
MOVES Input and Output Files		Electronic (ASCII or txt File Format)	Appendix D
MOVES Emission Factors		Electronic (ASCII or txt File Format)	Appendix D
MOVES Activity		Electronic (ASCII or txt File Format)	Appendix D
MOVES External Reference Files		Electronic (ASCII or txt File Format)	Appendix D
MOVES Utilities		Electronic (ASCII or txt File Format)	Appendix D
Mobile Source Emissions Reduction Strategies (MoSERS)			
MoSERS Methodology and Calculation Descriptions		Electronic File	N/A
MoSERS Project Listing		Electronic File	N/A
Travel Demand Model (TDM)			
Highway Performance Monitoring System Adjustment(s), Factors, Approach	40 CFR 93.122(b)(3)	Discussion Contained in Conformity Document	Chapter 4.4
Description of Travel Demand Model Validation, Including Validation Year	40 CFR 93.106(a)(1)(ii)	Discussion Contained in Conformity Document	Chapter 4.1 and Appendix C.1
Vehicle Miles of Travel		Electronic File	Appendix C.2
Average Loaded Speeds		Electronic File	Appendix C.2
Centerline Mile Summaries for Each Analysis Year		Electronic File	Appendix C.2
Definition of Regionally Significant Roadway System		Discussion Contained in	Chapter 3.3

Item	Regulation Referenced	Item Format	Location within Report
		Conformity Document	
Network Link Listing for Each Analysis Year		Discussion Contained in Conformity Document (Electronic File) (Electronic Files Should Include TransCAD Files, SHAPE Files, and Spreadsheet Files)	Chapter 4.5 and Appendix C.3
Files Containing Hourly Distribution by County, Roadway Type, and Vehicle Type for: <ul style="list-style-type: none"> • Vehicle Miles of Travel • Vehicle Hours • Average Operational Speed • Vehicle Population • NO_x Emissions • VOC Emissions 		Electronic Files in Tab Delimited Summary Tables	Appendix D.5
SIP Requirements			
TCMs in SIP, Including Emission Reductions, Methodologies, Implementation Dates, etc.		Electronic File	Appendix E
Timely Implementation of TCMs	40 CFR 93.113	Discussion Contained in Conformity Document	Chapter 6.2.2.1
Project Listings			
Congestion Mitigation and Air Quality Projects (CMAQ) Containing Emission Benefits, Methodologies, and Implementation Dates		Identified in TIP: Independent Self-Supporting Document (Electronic File)	Link as listed in Appendix B
Roadway System (Capacity Staging)		Electronic File	Appendix C.3
List of Non-Federal Projects	In Response to March 2, 1999, Court Ruling	Identified in TIP: Independent Self-Supporting Document (Electronic File)	Link as listed in Appendix B
List of Exempt Projects	40 CFR 93.105(c) 40 CFR 93.126 40 CFR 93.127 40 CFR 93.128	Identified in TIP: Independent Self-Supporting Document (Electronic File)	Link as listed in Appendix B
Evidence of Fiscal Constraint	40 CFR 93.108	Identified in TIP: Independent Self-Supporting	Link as listed in Appendix B

Item	Regulation Referenced	Item Format	Location within Report
		Document (Electronic File)	
Evidence of MTP Specifically Describing the Transportation System Envisioned for Each Analysis Year	40 CFR 93.106(a)	Identified in TIP: Independent Self-Supporting Document (Electronic File)	Link as listed in Appendix B
Public, State, and Federal Involvement			
Evidence of Public Participation and Response to Comments	40 CFR 93.105	Electronic File	Appendix G.2
General			
Endorsements and/or Resolutions		Electronic File	Appendix A
Memorandum of Agreements		Electronic File	N/A
Applicable Federal Register Notices and Related Documents		Discussion Contained in Conformity Document	Throughout the conformity document and appendices
Interagency Consultation		Electronic File	Appendix F

3. LONG-RANGE TRANSPORTATION PLAN (LRTP) AND SHORT-RANGE TRANSPORTATION PLAN (TIP)

3.1 MOBILITY 2050 , AS AMENDED AND FY 2025-2028 TIP

3.1.1 Overview

AAMPO serves three-and-a-half counties in the Greater San Antonio region. This region includes the San Antonio nonattainment area for the 2015 8-hour Ozone NAAQS, which covers Bexar County.

On July 22, 2024, amendments to *Mobility 2050* and local adoption of the FY 2025-2028 TIP were considered for approval by AAMPO’s Transportation Policy Board. *Mobility 2050, as amended* covers a planning period of 2025 through 2050 and contains a list of projects fiscally constrained by estimates of reasonably available revenues. This update reflects the priorities for transportation investments within the AAMPO Metropolitan Planning Area (MPA). A complete listing of fiscally constrained projects, as proposed under this conformity determination, is provided in Appendix B. This listing denotes projects that are regionally significant or otherwise subject to transportation conformity and those projects that are exempt from transportation conformity, exempt from regional emissions analysis, or have been determined to be not regionally significant.

3.1.2 Submittal Frequency

Consistent with the requirements of [Title 23 U.S.C. 134](#), the transportation plan and/or TIP are required to be updated every four years. Since the Alamo Area is a non-attainment area for the 2015 8-hour Ozone NAAQS, every amendment or update to the transportation plan and/or TIP must show conformity to the air quality budgets coming from the latest revisions to the SIP. If more than four years elapse after DOT’s Transportation Conformity determination for a plan update, a 12-month grace period shall be in force. At the end of this 12-month grace period, the existing DOT’s Transportation Conformity determination will lapse.

A conformity determination for a transportation plan must be based on the transportation plan and all amendments. According to [40 CFR 93.104](#), each new transportation plan and/or TIP update or amendment must be demonstrated to conform before amendments are approved by the Transportation Policy Board or accepted by DOT unless the amendment merely adds or deletes exempt projects listed in [40 CFR 93.126](#), [93.127](#), or [93.128](#).

According to [Title 42 U.S.C. 7506 I\(2\)\(E\)](#), the MPO must re-determine conformity of existing transportation plans and programs not later than two years after the date on which the Administrator:

- i. finds a motor vehicle emissions budget to be adequate per [40 CFR 93.118\(e\)\(4\)](#) (as in effect on October 1, 2004);
- ii. approves an implementation plan that establishes a motor vehicle emissions budget if that budget has not yet been determined to be adequate per clause (i); or

- iii. promulgates an implementation plan that establishes or revises a motor vehicle emission budget.

Once the SIP amendment(s) containing the MVEB are established by one of these three criteria for the San Antonio nonattainment area, AAMPO will be required to use the MVEB for emissions analysis.

3.1.3 Fiscal Constraints

All transportation plans prepared by the MPO are required to be fiscally constrained. Fiscal constraint is demonstrated by a financial plan that outlines reasonably available future revenues to implement the projects listed in the transportation plan.

- **Long-Range Financial Constraint:** The transportation plans' financial element must identify all sources of funds reasonably expected to be available and any innovative financial strategies that may be necessary to implement the transportation plans.
- **Short-Range Financial Constraint:** Financial constraint is also required for a conforming TIP, with funds programmed being equal to the total funds available. The TIP comprises the first four years of transportation activities in the transportation plan.

3.2 REGIONAL SIGNIFICANT CONTROL PROGRAM

Each implementation plan submitted by a state under Section 110 of the CAAA of 1990 shall include enforceable emission limitations and other control measures, means, or techniques, as well as schedules and timetables for compliance to meet the applicable requirements of the Act. No MPO designated under [Title 23 U.S.C 134](#), shall give its approval to any project, program, or plan that does not conform to an implementation plan.

As of June 2024, the EPA has not published a notice of adequacy for any motor vehicle emissions budget (MVEB) in the Alamo Area. However, TCEQ has submitted several SIP elements to EPA including an attainment demonstration with MVEBs, a Reasonably Available Control Technology (RACT) revision, and an I/M program which are pending full EPA review and approval.

Development of an MVEB meeting the requirements for a "Serious" nonattainment area under the 2015 8-hour Ozone NAAQS will be developed to meet attainment demonstration and reasonable further progress SIP requirements under Serious classification. [See 1.2.2.](#)

3.3 REGIONALLY SIGNIFICANT TRAVEL PROJECTS/PROGRAMS

Per [40 CFR 93.101](#), regionally significant projects are transportation projects (other than an exempt project) that are on a facility that serves regional transportation needs (such as access to and from the area outside of the region, major activity centers in the region, major planned developments, such as new retail malls, sports complexes, etc., or

transportation terminals as well as most terminals themselves) and would normally be included in the modeling of a metropolitan area's transportation network, including at a minimum, all principal arterial highways and all fixed guideway transit facilities that offer an alternative to regional highway travel.

Regionally Significant Roadways include:

- Those facilities federally functionally classified as interstate freeways, other freeways or expressways;
- Those facilities federally functionally classified as principal arterials;
- Roadways and intermodal connectors included in the federally adopted National Highway System;
- Roads designated as SH or US routes;
- Community connections that provide direct, continuously signed connections between nearby or adjacent census defined urbanized areas, urban clusters and population centers with more than 5,000 people;
- Roadways between activity centers that serve as primary regional connectors to an otherwise unserved regional activity center;
- Extensions of Regionally Significant Roadways to connect non-connecting termini;
- Fixed guideway transit facilities that offer an alternative to regional highway travel;
- Tollways as documented in the Metropolitan Transportation Plan; and
- Grade-separated interchange projects on Regionally Significant Roadways where no access existed previously.

Roadway systems that meet the definition of regionally significant are shown in Figure 3-1. These roads are subjected to transportation and project-level conformity determinations.

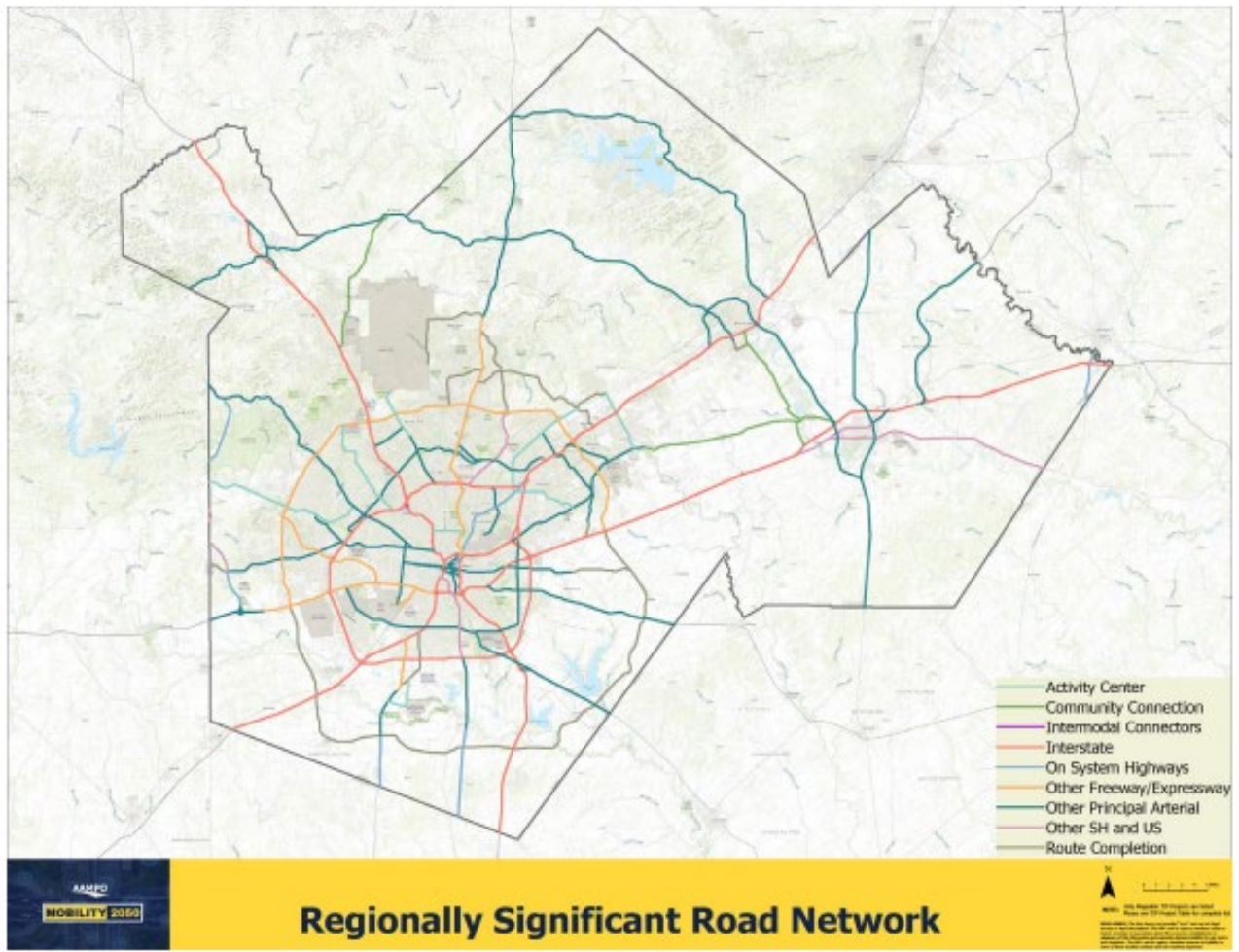


Figure 3-1. Regionally Significant Roads in MPO MPA

3.4 OTHER PROJECTS/PROGRAMS

3.4.1 Non-Federal Projects/Programs

Non-federal projects funded by sources such as local governments and local transportation authorities, such as signal improvements, intersection improvements, and local roadway widening, may be of insufficient scale or scope to require inclusion within a transportation conformity regional emissions analysis. These “non-regionally significant” projects that do not require any federal project approval actions (e.g., environmental clearance or permit approvals) are not individually listed within the transportation plan and/or TIP.

3.4.2 Exempt Projects/Programs

[40 CFR 93.126](#) identifies several project types exempt from the requirement of a conformity determination. When a conforming transportation plan or TIP is revised by the addition or deletion of an exempt project, a new conformity determination is not required. Some of the exempt projects listed under [40 CFR 93.126](#) include the continuation of ridesharing and vanpooling promotion activities at current levels, bicycle and pedestrian

facilities, railroad/highway crossing, fencing, shoulder improvements, purchasing replacement transit vehicles, and road landscaping. [40 CFR 93.127](#) identifies project types that are exempt from a regional emissions analysis, but that may require project-level conformity. These include intersection channelization projects, intersection signalization projects at individual intersections, interchange reconfiguration projects, changes in vertical and horizontal alignment, truck size and weight inspection stations, and bus terminals and transfer points. [40 CFR 93.128](#) exempts traffic signal synchronization projects; however, regionally significant traffic signal synchronization projects must be included in subsequent regional emissions analyses.

4. VEHICLE ACTIVITY ESTIMATION

4.1 OVERVIEW OF THE TRAVEL MODEL

The Alamo Area MPO's Travel Demand Model (TDM), called SAMM 5.1, validated using 2020 (pre-COVID-19) data, serves as the source for forecasting vehicle miles of travel (VMT) and other travel characteristics for the Alamo Area. The TDM is executed in the TransCad 8.0 environment. The air quality conformity base year is 2017, with emissions for that year established by TTI as historical and fixed. The model base year is 2020 and the forecasted years are 2025, 2035, 2045, and 2050. The model was calibrated using household survey data. Lastly, the model was validated using real-world traffic counts, comparing the Percent Root Mean Square (%RMS) to observed data, to statistically compare the effectiveness of the model. The overall %RMS, for the model when originally validated, was 23.5% when comparing links to one another, which generally indicates a statistically strong link-based match.

The fields available on the TDM include: Functional Class, Facility Type, Area Type (zonal density), Lanes, Direction (1-way/2-way), Access (divided/undivided), Average Daily Speed, Congested (loaded) Speed, Capacity, Counted/Forecast Traffic Volumes, Annotations (Letting Years), Descriptions (for Projects), TxDOT Control-Section-Job (CSJ) ID's, and MPO Project IDs, among others.

Transportation Modeling Process

The forecasting technique is based on a four-step sequential process designed to model travel behavior and predict the level of travel demand at regional, sub-area, or small-area levels. These four steps are Trip Generation, Trip Distribution, Mode Choice, and Roadway Assignment.

A more detailed explanation is available in Appendix C.1.

4.1.1 Trip Generation Model

The basic geographic unit for the travel demand modes is the traffic analysis zone (TAZ). Trip generation was performed using TripCal 6, which is TxDOT's latest trip generation program. The model contains 1,359 TAZs, of which 1,317 are internal zones and 42 are external zones or stations. Table 4-1 shows a list of trip purposes.

Table 4-1. Example of Trip Purpose Table

Code	Trip Purpose
HBW	Home-Based Work
HBED1	Home-Based Education K-12
HBED2	Home-Based College/University
HBSH	Home-Based Shopping
HBO	Home-Based Other
NHBS	Non-Home-Based Special (e.g. tourism)
AIR	Airport

TRTX	Commercial Truck and Taxi
EXLO-C	External-Local Commercial Trucks
THUR	External Through

The demographic estimates and forecasts were developed by AAMPO staff and their consultant, using data from the Texas Demographic Center (TDC), US Census American Community Survey (ACS), and Texas Education Agency (TEA) among others.

Table 4-2 Forecasting Methods

Variables	Forecasting method
Population	<p>No change.</p> <p><i>County-Level Control Totals:</i> Texas Demographic Center (TDC) 2018 population <i>Disaggregate Data:</i> AAMPO 2015 TAZ Data; ACS 5-year data and 1-year data projections</p>
Employment	<p>No change.</p> <p><i>County-Level Control Totals:</i> Texas Demographic Center (TDC) <i>Disaggregate Data:</i> 2020 point-level employment data by NAICS code (InfoUSA); Texas Education Agency (TEA)</p>
Socio-economic	<p>No change.</p> <p><i>Avg. household (HH) size:</i> ratio of residential population to households</p> <p><i>Median HH income:</i> ACS 5- and 1-yr data, utilized directly and adjusted to Base Year 2020 Dollars (USD)</p>

Variables	Forecasting method
	<p><i>Avg. workers per HH:</i> ACS 5- and 1-yr data, utilized directly</p> <p><i>Area type:</i> calculated based on household and employment totals</p>
Other	<p>No change.</p> <p>A panel of local experts was constituted to help identify and confirm specific opportunities and constraints to development, and to guide the allocation of growth in the AAMPO model area. AAMPO’s Travel Demand Modeling (TDM) consultant, Cambridge Systematics (CS), prepared detailed information on existing development patterns and the latest thinking on future economic activity for the region to a panel of local experts to spur discussion and feedback. The panel of local experts ensured a multifaceted understanding of the full region and the growth potential of communities and environments that comprise the region. This approach led to a defensible demographic forecast to support transportation planning for the region.</p> <p>Population, households, and employment were utilized for the TDC county-level totals as control totals. County-level data were apportioned to the block-group level based on ACS data and then further disaggregated to TAZs using the 2015 AAMPO TAZ data. County-level totals of employment were apportioned to TAZs based on a combination of InfoUSA and Texas Education Agency (TEA) data. The InfoUSA point data were categorized into Basic, Retail, Service, and Education employment then aggregated to the TAZ-level. The TEA data was a secondary source of data for Education employment. Both sets of inputs were adjusted by comparing to the 2015 AAMPO TAZ dataset, satellite imagery, and available GIS layers of zoning, development type, and developability of vacant land.</p> <p>The special generators were retained from the 2015 AAMPO dataset and updated as appropriate. The special generator population and employment were manually updated based on demographic update data sets. For some special generators, primary sources of population and employment totals were obtained by directly contacting the special generator institution. Block-group level median household income and workers per household were obtained directly from ACS and allocated to TAZs based on share of TAZs within each block-group. All other TAZ-level TripCAL6 inputs were calculated based on the other input data, such as average household size and area type, or left blank.</p>

Trip Distribution Model (Destination Choice)

The Trip Distribution Model determines the Person or Vehicle trip interactions among all 1359 Traffic Analysis Zones (TAZ) within the 5-county Travel Demand Modeling area. It connects trip ends estimated in the trip generation model, creating Origin-Destination (OD) TAZ pairs, and resulting in OD trip matrices for all TAZ and Externals. It is performed using the Destination Choice model for all Person Trip purposes and a gravity model for TRTX, EXLO-C, and EXLO-NC Vehicle Trips.

Trip distribution models were calibrated for home-based work (HBW) trips, home-based non-work trips (HBNW), including Home-Based Education K-12 (HBED1), Home-Based College/University (HBED2), Home-Based Shopping (HBSH), and Home-Based Other (HBO), Non-Home-Based (NHB), Non-Home-Based Special (NHB-S) and Airport trips. Calibration was conducted to properly replicate observed 2020 Trip Length Frequency Distributions, Census Journey-to-Work data & Travel Parameters from travel demand surveys. (Household, Workplace, Commercial Truck & External). The models were further validated to extensive Traffic Counts and Transit Ridership (from VIA's On-board Transit surveys).

Mode Choice Model

The Mode Choice Model subsequently determines the mode of travel selected by travelers. It is performed using an FTA-approved nested logit model. These decisions are based on characteristics of (1) the trip maker (income and auto sufficiency), (2) the trip (purpose, length, and orientation), and (3) the availability and utility of the competing transportation modes. Table 4-2 shows the Mode Choices included.

Table 4-3. Example of Mode Choices Modeled Table

#	Mode Choices
1	Auto
2	Transit
3	Non-Motorized

Roadway Assignment Model

The Roadway Assignment Model loads the travel demand (trips) to the roadway network, calculates delay for congested links, and reassigns as necessary to achieve network equilibrium. It is performed using an equilibrium assignment model.

4.2 SPEED ESTIMATION PROCEDURE

As part of the TDM calibration process, speeds for each roadway facility type are estimated and further categorized by area type. These input speeds reflect the average daily travel speeds.

4.3 MODEL ADJUSTMENTS

An adjustment factor based on TxDOT's Highway Performance Monitoring System (HPMS) was applied to the TDM's VMT to ensure consistent reporting across the state. The HPMS

adjustment factor is applied to the model estimated time-of-day VMT before the estimation of time-of-day speed. In this way, the time-of-day speeds used in the estimation of emissions are based upon HPMS-adjusted VMT.

Based on comparing the HPMS VMT to the TDMs, the adjustment factor was calculated to be 0.823578.

4.3.1 Seasonal and Daily Adjustments

Seasonal adjustment factors are used to adjust the TDM's VMT to summer weekday VMT. The seasonal, daily, and hourly adjustment factors were developed using aggregated Automated Traffic Recorder (ATR) data over the years 2013 through 2021. To adjust the representative seasonal weekday traffic VMT from TDM to the specified day types in the summer season, ratios are calculated. The seasonal adjustment factor is 1.059054 for the baseline year of 2017 and 1.016998 for future years.

4.3.2 Hourly Adjustments

County-level, summer weekday, and hourly travel factors were developed and used to allocate the 24-hour link VMT/volume estimates to each hour of the day. Table 4-3 lists the hourly VMT distribution used.

Table 4-4. Example of Summer Weekday Hourly VMT Distribution

Period	Hour	24-hour Hourly VMT Distribution	4-Period Hourly VMT Distribution
AM Peak	6-7 a.m.	0.051057	0.299803
AM Peak	7-8 a.m.	0.063415	0.372368
AM Peak	8-9 a.m.	0.055830	0.327829
Mid-Day	9-10 a.m.	0.049034	0.153124
Mid-Day	10-11 a.m.	0.048956	0.152880
Mid-Day	11 a.m.-12 p.m.	0.052019	0.162445
Mid-Day	12-1 p.m.	0.055056	0.171929
Mid-Day	1-2 p.m.	0.056194	0.175483
Mid-Day	2-3 p.m.	0.058966	0.184139
PM Peak	3-4 p.m.	0.066296	0.236230
PM Peak	4-5 p.m.	0.072336	0.257752
PM Peak	5-6 p.m.	0.077721	0.276940
PM Peak	6-7 p.m.	0.064289	0.229078
Overnight	7-8 p.m.	0.047634	0.208160
Overnight	8-9 p.m.	0.038526	0.168360
Overnight	9-10 p.m.	0.032755	0.143141
Overnight	10-11 p.m.	0.024753	0.108172
Overnight	11 p.m.-12 a.m.	0.017106	0.074754
Overnight	12-1 a.m.	0.010179	0.044483

Period	Hour	24-hour Hourly VMT Distribution	4-Period Hourly VMT Distribution
Overnight	1-2 a.m.	0.006953	0.030385
Overnight	2-3 a.m.	0.006082	0.026579
Overnight	3-4 a.m.	0.006675	0.029170
Overnight	4-5 a.m.	0.010915	0.047699
Overnight	5-6 a.m.	0.027253	0.119097

4.4 ESTIMATION OF ON-NETWORK ACTIVITY

4.4.1 Transit Systems

VIA Metropolitan Transit services 14 member cities primarily Bexar County. Its service area is 1,210 square miles.

4.4.2 Roadway VMT

The summer weekday roadway VMT totals by scenario and analysis year are shown in Table 4-4.

Table 4-5. Roadway VMT

Bexar County	2017	2025	2035	2045	2050
Build	47,416,323	58,969,990.098	69,600,938.246	80,503,609.410	86,283,563.145
No Build	N/A	58,969,990.098	69,490,063.553	80,305,948.460	85,952,636.629

4.4.3 Average Loaded Speeds

Average Loaded Speeds are provided by county by functional class. Final average loaded speeds are listed in Appendix D.2.

4.4.4 Centerline and Lane Miles.

Centerline miles and lane miles are provided by functional class and area type for each analysis year are listed in Appendix C.2.

4.5 ESTIMATION OF OFF-NETWORK ACTIVITY

County-level, hourly estimates of the Source Hour Parked (SHP) and starts activity were required for each vehicle type to estimate the off-network (or parked vehicle) emissions. Source Hours Extended Idling (SHEI) and Auxiliary Power Unit (APU) hours estimates were needed for combination long-haul trucks. For the estimation of the SHP and vehicle starts vehicle population estimates were also needed.

The vehicle population and hourly SHP, starts, SHI, and APU hours are available in Appendix D.

4.5.1 Source Hours Parked

The first activity measure needed to estimate the off-network emissions is county-level estimates of SHP by hour and vehicle type. The SHP was estimated as a function of total hours (hours a vehicle exists) minus its hours of operation on roads (Source Hours Operating [SHO] is the same as Vehicle Hours Travel [VHT]).

The vehicle type SHP estimates were calculated for each hour of the day based on the link VMT and speeds, the VMT mix used in the link-based emissions analysis, and the vehicle population estimates.

The VMT mix was applied to the link VMT to produce VMT estimates by vehicle type. Link VMT was divided by the link speed to produce SHO estimates. SHO was aggregated across links and then subtracted from source hours (equal to vehicle population since source hours equal the number of hours in the period) resulting in SHP estimates by vehicle type. This was performed for each analysis year, county, and hour of day.

4.5.2 Starts

Vehicle starts were estimated using county-level vehicle type populations and data from MOVES representing the average number of vehicles starts per vehicle type per hour. The starts per vehicle were calculated using MOVES with data on the age distribution and fuel fractions of the local fleet.

The starts per vehicle were calculated using MOVES with data on the age distribution and fuel fractions of the local fleet. Texas A&M Transportation Institute (TTI) used local age distributions and fuel fractions inputs to MOVES combined with MOVES default parameters (“startsageadjustment”, “startsmothadjust” [June through August average], and “startspervehicle”) to produce hourly starts per vehicle output representative of the June through August summer period. The output was then post-processed to produce the scenario-specific starts per vehicle for the summer (or non-school) period defined by the study scope.

MOVES was used to calculate starts per vehicle (i.e., the average number of starts per vehicle type per hour) for weekday day type for the June through August summer period. To produce the scenario-specific non-school period (10 June through 10 August), the MOVES output summer period starts per vehicle were multiplied by conversion factors based on period weighted average MOVES default startsmothadjust data. Using the startsmothadjust default data, the non-school conversion factor is the ratio of non-school-period-to-average June through August summer period.

The local vehicle start activity estimates were calculated as the product of national default starts/vehicle and the local vehicle type population estimates. The weekday vehicle start estimates for each vehicle type were calculated by county, analysis year, and hour of day.

4.5.3 Source Hours Extended Idling and Auxiliary Power Unit Hours

County, analysis year, and summer weekday hotelling hours were first estimated using 24-hour weekday hotelling hour estimates for a 2017 baseline year (from the most recent

TCEQ extended idling study); baseline and analysis year scenario VMT, speeds, and VMT mix; and analysis year scenario SHP estimation data.

The baseline year county hotelling hours estimates for a 24-hour weekday from the TCEQ study were scaled to each analysis scenario using the ratio of analysis scenario-to-baseline combination long-haul truck 24-hour VMT (as truck VMT increases, so does the hotelling activity).

The 24-hour hotelling estimates were then distributed to each hour of the day using the hotelling hours hourly distribution calculated for the analysis scenario as the inverse of the hourly distribution of VHT (or SHO, from the SHP calculation process) for combination long-haul trucks. Within each hour, SHP and hotelling hours were compared, and if hotelling hours exceeded SHP, hotelling hours were set equal to SHP.

SHEI and APU hours components of hotelling hours were then estimated for each hour using the hourly hotelling hours estimates, combination long-haul truck travel fractions (calculated from local age distributions and MOVES default relative mileage accumulation rates), and hotelling activity distributions for each model year.

The SHEI and APU hours activity distribution fractions (see Table 4-5) were each first multiplied by the travel distribution (model year operating mode activity fraction multiplied by the associated model year travel fraction). The product of the SHEI fractions and travel fractions were then summed to produce the total SHEI fraction, and the same process was performed for APU hours to produce the total APU hours fraction. (The sum of the SHEI and APU hours fractions subtracted from 1.0, results in the fraction of hotelling hours with electric power or no power in use.)

Table 4-6. Hotelling Activity Distribution by Model Year in MOVES 3.1

First Model Year	Last Model Year	Extended Idling	Hotelling Diesel Aux	Hotelling Battery AC	Hotelling APU Off
1960	2009	0.8	0	0	0.2
2010	2020	0.73	0.07	0	0.2
2021	2023	0.48	0.24	0.08	0.2
2024	2026	0.4	0.32	0.08	0.2
2027	2060	0.36	0.32	0.12	0.2

The total SHEI and APU hours fractions were then each multiplied by the hotelling hours for each hour of the day to produce the SHEI and APU hours estimates for each hour. This was performed for each analysis scenario (analysis year summer weekday).

4.5.4 Off-Network Idling

Off-network idling (ONI) is idling activity that occurs while a vehicle is idling in a parking lot, drive-through, driveway while waiting to pick up passengers or loading/unloading cargo. ONI applies to all MOVES source types.

TTI estimates ONI hours activity (i.e., source hours idling [SHI] off-network) for each hour of the day using the following formula.

$$ONI\ hours = (SHO_{network} \times SHI_{network}) / (1 - TIF)$$

Where:

- $SHO_{network}$ - the source hours operating on each link. This is calculated by dividing the VMT associated with each link by the link's congested speed.
- $SHI_{network}$ - the total source hours idling that occurs on the network (idling that occurs as a component of drive cycles) and is calculated by multiplying $SHO_{network}$ by a road idle fraction (RIF). RIF is the proportion of idling (in units of time) that occurs within a drive-cycle at a specified operational speed. Default values for RIF were used as defined in the MOVES data table "roadidlefraction".
- TIF - The total idle fraction or total idling time on and off-network divided by total SHO on and off-network: $TIF = (SHI_{network} + ONI) / (SHO_{network} + ONI)$. Default values for TIF were used as defined in the MOVES data table "totalidlefraction".

5. EMISSIONS FACTOR ESTIMATION

A regional emissions analysis must be conducted for multiple analysis years to satisfy the requirements of [40 CFR Part 93.109](#) of the conformity rule for ozone nonattainment areas. Specifically, the regional emissions analysis is used to conduct the emission budget test (or interim emission tests) and to determine any contributions to emission reductions. The procedures for determining regional transportation-related emissions are described in [40 CFR Part 93.118](#) of the conformity rule. The following sections discuss the analysis years and a description of the modeling processes used to conduct the analysis.

5.1 EMISSIONS FACTOR ESTIMATION MODEL

According to [40 CFR 93.111](#) of the conformity rule, the determination must be based on the latest emission estimation model. The EPA released the new Motor Vehicle Emission Simulator (MOVES) model, MOVES4, in late 2023, with an effective date of September 12, 2023. However, this analysis uses MOVES3.1.0 under EPA's established two-year grace period for MOVES4, which ends September 2025.⁴

As outlined in the Pre-Analysis Consensus Plan (PACP), included in Appendix F.1, the Interagency Consultation Partners approved the use of MOVES3.1.0 to develop vehicle emission factors for all analysis years. Emission factors are one component to determine Volatile Organic Compounds (VOC) and Nitrogen Oxides (NOx) emissions from the region's on-road vehicles.

MOVES3.1.0 input parameters are listed in Tables 5-1 through Table 5-7 with the appropriate data source and/or methodology applied. The information listed applies to Bexar County and all analysis years unless otherwise specified.

⁴ Federal Register Notice on MOVES4 Grace Period: <https://www.govinfo.gov/content/pkg/FR-2023-09-12/pdf/2023-19116.pdf>.

Table 5-1. MOVES Input Parameters and Data Source

Input Parameter	Description	Base Data Source	Notes
Vehicle Population by Source Type	Input the number of vehicles in the geographic area to be modeled for each source type.	TxDMV data (year-end 2018 and 2021), MOVES default for rate runs.	<ul style="list-style-type: none"> Local gasoline and diesel-powered source type populations by analysis year were estimated for use external to MOVES in the estimation of county-level vehicle starts and source-hours-parked, needed in the external emissions calculations, per TTI's rates-per-activity, TDM-based method. Since no 2017 registration data is available for use with the 2017 baseline, the 2018 TxDMV data will be used for the 2017 baseline. The 2021 TxDMV data will be used for the future analysis years. Populations by SUT and fuel type are a function of TxDMV year-end vehicle registration data and VMT mix, and in the case of base and future years, population scaling factors.
Fleet Age Distribution by Source Type	Input that provides the distribution of vehicle counts by age for each calendar year and vehicle type. TxDMV registration data were used to estimate the age distribution of vehicle types up to 31 years.	TxDMV data (year-end 2018 and 2021), MOVES defaults for refuse trucks, motor homes, and buses.	<ul style="list-style-type: none"> Age distributions were developed using TxDMV registration data aggregated at the county level for all source types except for short-haul source types, which are region level; long-haul source types, which are statewide level; and buses, refuse trucks, and motor homes, which are MOVES defaults. Since no 2017 registration data is available for use with the 2017 baseline, the 2018 TxDMV data will be used for the 2017 baseline. The 2021 TxDMV data will be used for the future analysis years. The distribution of age fractions sum up to 1.0 for each source use type for each analysis year.
Fleet VMT by HPMS Vehicle Type	MOVES default VMT is distributed to 5 HPMS vehicle types.	MOVES default for rate runs.	<ul style="list-style-type: none"> Local activity estimates were applied in emissions calculations external to MOVES.
Road Type VMT distributions	Input MOVES default VMT by road type.	MOVES default for rate runs.	<ul style="list-style-type: none"> Local activity estimates were applied in emissions calculations external to MOVES. VMT fraction was distributed between the road type and must sum to 1.0 for each source type.
Average Speed Distribution	Input average speed data specific to vehicle type,	MOVES default for rate runs.	<ul style="list-style-type: none"> Local activity estimates were applied in emissions calculations external to MOVES.

Input Parameter	Description	Base Data Source	Notes
	road type, and hour of day/type of day into 16 speed bins.		<ul style="list-style-type: none"> The sum of speed distribution over all speed bins for each road type, vehicle type, and hour/day type is 1.0.
Fuel Supply (Table 5-2)	Input to assign existing fuels to counties, months, and years, and to assign the associated market share for each fuel.		<ul style="list-style-type: none"> For each analysis year and season, the fuel supply consisted of one conventional gasoline formulation and one biodiesel formulation.
Fuel Formulation (Table 5-3)	Input Texas fuel region-specific fuel properties applicable to the county.	Department of Energy (DOE) state-level biodiesel (BD) consumption estimates and MOVES defaults for parameters.	<ul style="list-style-type: none"> Conventional gasoline (CG) formulations based on TCEQ's summer 2017 and summer 2023 (latest available) fuel survey samples from Bexar County. <ul style="list-style-type: none"> The 2017 CG properties are actual 2017 averages (fuel grade averages weighted by relative sales volumes). The Future Years (2024+) CG properties are latest available actual 2023 averages except with RVP, average sulfur level, and average benzene content set to the "expected" values (MOVES3 defaults, consistent with the pertinent regulatory standards). The 2017 diesel sulfur level is the statewide average from TCEQ's 2017 survey. Future years (2024+) diesel sulfur was set to the current expected future year value (6 ppm), which is conservative and consistent with the statewide diesel sulfur average from TCEQ's latest (2023) survey. The BD ester volume percentages for 2017 and future years were based on 2017 and the latest available (2021) DOE state-level transportation sector BD consumption estimates. Fuel subtype IDs 12 and 21 are 10% ethanol-blend gasoline and biodiesel, respectively.
Fuel Engine Fraction / Diesel Fraction	Input fuel engine fractions (i.e., gasoline vs. diesel vs. flex fuel engine types in the vehicle population) by model year for all vehicle types.	TxDMV year-end 2021 and year-end 2018 registration data for particular source type diesel fractions; MOVES defaults for other source types.	<ul style="list-style-type: none"> Locality-Specific/MOVES default (renormalized with setting CNG fractions to zero). Since no 2017 registration data is available for use with the 2017 baseline, the 2018 TxDMV data will be used for the 2017 baseline. The 2021 TxDMV data will be used for the future analysis years. TTI developed the evaluation year-specific local diesel fractions for the MOVES single unit and combination truck source use

Input Parameter	Description	Base Data Source	Notes
			types using the corresponding TxDMV data, for all analysis years, aggregated to the statewide level.
Meteorology (Table 5-4)	County Specific data on temperature, humidity, and barometric pressure	Average hourly from weather stations within Bexar County	<ul style="list-style-type: none"> The summer season temperature and humidity data in this MOVES3-based conformity emissions analysis are the same values used in the previous MOVES2014b-based Mobility 2050 transportation conformity emissions analysis. These inputs were based on 2017 Bexar County weather station data, provided by TCEQ, and are consistent with the TCEQ's latest (2017) Bexar County periodic emissions inventory submittal to EPA required under the Air Emissions Reporting Rule [AERR]).
I/M Coverage (Table 5-5. I/M Inputs)	Input I/M coverage records for each combination of pollutants, process, county, fuel type, regulatory class, and model year are specified using this input.	TCEQ provided I/M program statistics for calculating the compliance factor input. TTI developed these inputs essentially in consultation with TCEQ.	<ul style="list-style-type: none"> Begin and end model year (X, Y) define the range of model years covered – where X and Y, respectively, are calculated as YearID – 24, and YearID – 2. I/M compliance factor estimates were calculated by TTI using the MOVES I/M compliance factor equation; Alamo Area I/M-program-specific I/M waiver rates and failure rates, and statewide average I/M compliance rates; in combination with MOVES3 regulatory class coverage adjustments. The model processes/pollutants affected were starting and running exhaust hydrocarbon (HC), CO, NOx, and tank vapor venting HC; fuel type is gasoline; frequency is annual.

Table 5-2. Fuel Supply

Fuel Type	Fuel Formulation ID	Market Share	Market Share CV ¹
Gasoline	17702, 2472	1.0	N/A
Diesel	30176, 30600	1.0	N/A

¹Market Share CV – the coefficient variation of the market share. MOVES requires that market shares of all fuel types be included in order to run the model, including alternative fuel types of E85, CNG, and electricity.

Table 5-3. Fuel Properties

Factor	Information			
	Gasoline	Diesel	Gasoline	Diesel
Fuel Type	Gasoline	Diesel	Gasoline	Diesel
Fuel Formulation ID	17702	30176	2472	30600
Fuel Subtype ID	12	21	12	21
Analysis Year	2017	2017	2024+	2024+
Season	Summer	Summer	Summer	Summer
RVP	7.54	0	7.8	0
Sulfur Level	21.28	6.37	10.00	6.00
ETOH Volume	9.66	0	9.70	0
MTBE Volume	0	0	0	0
ETBE Volume	0	0	0	0
TAME Volume	0	0	0	0
Aromatic Content	25.35	0	28.39	0
Olefin Content	8.33	0	9.35	0
Benzene Content	0.76	0	0.99	0
e200	49.45	0	50.25	0
e300	82.68	0	84.40	0
Vol to Wt Percent Oxy	0.3653	0	0.3653	0
BioDieselEster Volume	\N	4.68	\N	3.13
Cetane Index	\N	\N	\N	\N
PAH Content	\N	\N	\N	\N
T50	203.73	0	199.01	0
T90	327.68	0	322.32	0

MOVES requires all on-road mobile fuel types to run, so MOVES default E85, CNG, and electricity fuel formulations were included in the input.

Table 5-4. Hourly Meteorological Data

Factor	Information	
County/Area(s)	Bexar	
Season	Summer	
Hour	Temperature (°F)	Relative Humidity (%)
00:00 am - 01:00 am	78.99	77.90
01:00 am - 02:00 am	77.82	81.39
02:00 am - 03:00 am	76.91	84.04
03:00 am - 04:00 am	76.21	85.87
04:00 am - 05:00 am	75.69	87.13
05:00 am - 06:00 am	75.26	88.00
06:00 am - 07:00 am	74.88	88.78
07:00 am - 08:00 am	75.43	87.31
08:00 am - 09:00 am	77.66	81.44
09:00 am - 10:00 am	80.33	72.68
10:00 am - 11:00 am	82.98	64.24
11:00 am - 12:00 pm	85.47	57.70
12:00 pm - 13:00 pm	87.72	52.12
13:00 pm - 14:00 pm	89.53	48.18
14:00 pm - 15:00 pm	91.03	44.94
15:00 pm - 16:00 pm	92.13	43.00
16:00 pm - 17:00 pm	92.60	42.18
17:00 pm - 18:00 pm	92.48	42.81
18:00 pm - 19:00 pm	91.50	44.95
19:00 pm - 20:00 pm	89.54	50.16
20:00 pm - 21:00 pm	86.61	56.89
21:00 pm - 22:00 pm	84.11	62.97
22:00 pm - 23:00 pm	82.12	68.75
23:00 pm - 24:00 pm	80.42	73.82

Table 5-5. I/M Inputs

Factor	I/M Information	
Test Standards Description	Exhaust OBD Check	Evaporative Gas Cap and OBD Check
Test Standards ID	51	45
Year ID	2035, 2045, 2050	2035, 2045, 2050
I/M Program ID	140, 160	140, 160
Source Use Type*	21, 31, 32	21, 31, 32
Begin Model Year	X	X
End Model Year	Y	Y
I/M Compliance	21 – 95.77% 31 – 92.05% 32 – 72.08%	21 – 95.77% 31 – 92.05% 32 – 72.08%

*Source Use Type: 21 – Passenger Car, 31 – Passenger Truck, 32 – Light Commercial Truck

Table 5-6. MOVES Emissions Factor Post-Processing to be Performed by County and Year

Strategy and Post-processing Result	Analysis Year	Counties
Texas Low Emission Diesel Fuel (TxLED)¹	All analysis years	Bexar

¹ On February 2023 the EPA updated the method used to calculate emissions reductions for TxLED. The method used for post processing TxLED should be consistent with latest EPA guidance. EPA's new guidance is available here: [Guidance on Quantifying NOx Benefits for Cetane Improvement Programs for Use in SIPs and Transportation Conformity \(pdf\)](#) (470 KB, February 2023, [EPA-420-B-23-006](#)). This guidance updates and supersedes the 2004 Guidance on these programs. Updates were made to account for changes in fleet composition and control technology that have occurred since 2004, which have greatly reduced the emissions reductions attributable to these types of programs.

Table 5-7. Emission Controls Used for Conformity Credit

Emission Reduction Strategy and Years Covered	Modeling or Post-Processing Approach	Analysis Year
Intersection Improvements	Post	2025-50
Transit Service	Post	2025-50
High Occupancy Vehicle/Managed Lanes	N/A	N/A
Park-n-Ride Lots	N/A	N/A
Vanpools	N/A	N/A
Grade Separations	N/A	N/A
Traffic Signal Improvements	Post	2025
Intelligent Transportation Systems	N/A	N/A
Clean Vehicle Commitments⁵	Post	2025-50
Bicycle/Pedestrian Facilities	Post	2025-50
Employer Trip Reduction Programs	Post	2025
Sustainable Development	N/A	N/A
Public Education/Ozone Season Fare Reduction	N/A	N/A

5.2 MODELED EMISSION ESTIMATES

Modeled emission estimates are calculated using TTI emission inventory estimation utilities using moves: MOVES3.1.0⁶, developed by TTI for MOVES. This utility combines vehicle activity and emissions factors to create emission estimates at the link level.

⁵ Strategies to reduce vehicle emissions in the Alamo Area include the use of alternative fuel vehicles such as Compressed Natural Gas (CNG), electric, or biodiesel in public fleets (e.g., VIA buses, city vehicles), as well as CMAQ-funded projects to purchase clean or alternative-fuel transit vehicles. Fleet modernization efforts involve replacing aging diesel vehicles with newer, lower-emission models (e.g., Tier 4 engines), and upgrading school bus and transit fleets with clean-burning or electric engines. Emission reduction technologies include retrofits like diesel oxidation catalysts and particulate filters, along with idle-reduction technologies used in municipal and regional fleets. Funding and incentive programs such as CMAQ, CRP, TERP, and DERA support these initiatives through grants and coordinated efforts with local partners. These strategies are reflected in the conformity analysis as post-process emissions reductions, as shown in Table 5-7 of the conformity document, covering modeling years 2025 through 2050.

⁶ More information is available at: [US EPA MOVES3.1.0 webpage](#).

6. REGIONAL EMISSIONS DETERMINATION

To report final emission analysis results, it is necessary to account for modeled link level emission inventories, emission factor adjustments, and Mobile Source Emission Reduction Strategies (MoSERS) emission benefits.

6.1 MODELED EMISSIONS

Alamo Area is classified as Serious nonattainment for ozone and does not have an approved MVEB.

Table 6-1. Emissions Analysis for Regional Conformity Determination Modeled Prior to off-model Adjustments (2017–2050)

Analysis Year	NO _x – Build (“Action”) (Tons/day)	VOC – Build (“Action”) (Tons/day)	NO _x – No-Build (“Baseline”) (Tons/day)	VOC – No-Build (“Baseline”) (Tons/day)
2017	39.430	17.450	N/A	N/A
2025	22.308	10.277	22.308	10.277
2035	19.043	6.736	19.049	6.730
2045	20.582	6.515	20.622	6.509
2050	22.376	6.841	22.461	6.843

*2017 is a historical year; hence, there is no No-build analysis.

6.2 IMPACTS FROM ADJUSTMENTS AND MOSERS

6.2.1 Adjustments to Emission Factors

Post-processing adjustments are applied to the emission factor post-process utility developed by TTI. These adjustments are applied either before or simultaneously with the emission calculation procedures to establish the model results. This process is listed in Chapter 5.

6.2.2 MoSERS Projects

MoSERS is a collection of transportation projects or related activities with identifiable emission reduction benefits. To meet the requirements of the SIP, nonattainment areas may make specific commitments in their SIP to implement MoSERS, called Transportation Control Measures (TCMs) (see 6.2.2.1 below). Finally, a nonattainment area may include Transportation Emission Reduction Measures (TERMs) in transportation conformity analysis that are outside of commitments in their SIP.

6.2.2.1 Transportation Control Measures

Transportation Control Measures (TCMs) are projects, programs, and related activities designed to achieve on-road mobile source emission reductions and are included as control measures in an applicable SIP. TCMs are strategies to reduce vehicle use or change traffic flow and/or congestion conditions to decrease vehicular emissions. TCMs have not been established for Bexar County in any SIP. Therefore, they are not included in this analysis.

6.2.2.2 Transportation Emission Reduction Measures

Transportation Emission Reduction Measures (TERMs) are transportation projects and related activities that are designed to achieve on-road mobile source emission reductions but are not included as control measures in the SIP. TERMS were included in this analysis, which are described in the following section 6.2.2.3.

6.2.2.3 CMAQ and Other Federal Funded Projects

The Congestion Mitigation and Air Quality Improvement Program (CMAQ) is a primary funding source for many of the Mobile Source Emission Reduction Strategies (MoSERS) used in this analysis. A list of CMAQ funded and other federally funded projects that were quantified and used in the post-processing emission reduction calculations for this conformity determination is provided in Table 6-2. Emission reductions associated with these projects were calculated using MoSERS, which was developed for use with MOVES3.1.0 outputs. This tool applies project-specific assumptions including affected vehicle activity, control efficiency, and duration of effectiveness. For the purposes of this conformity analysis, project life spans were assigned based on project type, in accordance to the FHWA's 2020 CMAQ Cost-Effectiveness Table. For example: bicycle/pedestrian facilities projects provide emission benefits for the expected life of the project, typically 15 years⁷.

Table 6-2. Projects with Quantified Emission Reductions

Estimated Implementation Year	MPO Project ID	Project Life Span End Year	Type of Project	NOx Reduction (lbs/day)	VOC (lbs/day)
2025	9162	2025	HERO Program	43.237	5.188
2028	9218, 9237, 9238	2048	TSMO: Operational	45.840	23.536
2026	9161	2041	Bicycle/Pedestrian	0.014	0.012
2026	9160	2041	Bicycle/Pedestrian	0.183	0.161
2027	9157	2042	Bicycle/Pedestrian	1.193	1.069
2025	9156	2027	Transit	0.106	0.000
2026	9150	2030	Transit	0.974	1.920
2026	5576.2	2028	TSMO: TDM Program	0.152	0.000
2031	9148	2046	Bicycle/Pedestrian	0.058	0.022
2031	9168	2051	TSMO: Operational	0.043	0.048
2032	9224	2052	TSMO: Operational	2.116	0.117
2032	9220	2052	TSMO: Operational	340.270	403.760

6.2.2.4 MoSERS Emission Reduction

MoSERS are a collection of transportation projects that have been identified and quantified for having emission reduction benefits. Emissions reduction from the sum of MoSERS are listed in Table 6-3.

⁷ More information is available at: [FHWA 2020 Cost-Effectiveness Tables Update](#)

Table 6-3. The Sum of MoSERS Benefits

Analysis Year	NOx (Tons/day)	VOC (Tons/day)
2025	0.022	0.002
2035	0.195	0.214
2045	0.194	0.214
2050	0.171	0.202

6.3 FINAL ANALYSIS RESULTS

Table 6-4 shows the final mobile emission results of this conformity analysis.

Table 6-4. Final Analysis Results

Analysis Year	NOx – Build (“Action”) – including CMAQ (Tons/day)	NOx – No-Build (“Baseline”) (Tons/day)	VOC – Build (“Action”)– including CMAQ (Tons/day)	VOC – No-Build (“Baseline”) (Tons/day)
2017	39.431	NA	17.445	NA
2025	22.286	22.308	10.275	10.277
2035	18.848	19.049	6.522	6.730
2045	20.388	20.622	6.301	6.509
2050	22.205	22.461	6.639	6.843

Emissions reductions for each analysis year are evaluated using two comparative tests required under the transportation conformity rule (40 CFR 93.119):

1. Build vs. No-Build Test (Action vs. Baseline Scenario)

This test compares the projected emissions from the Action (Build) scenario to those from the Baseline (No-Build) scenario.

- The Action (Build) scenario represents the future transportation system that includes all programmed and regionally significant projects expected to be completed by each analysis year, as reflected in the MTP and TIP.
- The Baseline (No-Build) scenario represents existing conditions, excluding any new or programmed projects. It reflects the transportation system if no additional projects were implemented beyond what currently exists.
- To demonstrate conformity under this test, emissions in the Action scenario must be less than or equal to emissions in the Baseline scenario for each analysis year.

2. Less-Than-Baseline-Year Test (Action vs. Baseline Year 2017)

This test compares emissions from the Action scenario in each analysis year to the

emissions level from a designated Baseline Year (2017 for the 2015 ozone NAAQS).

- The purpose of this test is to ensure that future emissions from the planned transportation system remain below the emissions levels of the Baseline Year.
- To pass this test, the emissions from the Action scenario for each analysis year must be less than, or in certain cases not greater than, the Baseline Year emissions.

For conformity to be demonstrated, both conditions must be met:

- Emissions from the Action scenario must be below those from the Baseline (No-Build) scenario; and
- Emissions from the Action scenario must be no greater than the Baseline Year (2017) emissions, by at least a non-zero margin of 0.001 tons per day.

7. INTERAGENCY CONSULTATION

7.1 INTERAGENCY CONSULTATION PROCESS

[40 CFR 93.112](#) of the conformity rule includes procedures for interagency consultation, resolution of conflict, and public consultation of the conformity analysis affecting the MTP and TIP. Local, state, and federal transportation and air quality agencies affected by this conformity analysis were consulted on the scope, methodologies, and products of the conformity finding. A conformity steering committee composed of representatives from AAMPO, TxDOT, TCEQ, TTI, FHWA, FTA⁸, and EPA was consulted regularly during the conformity process. The purpose of this group is to ensure the modeling methodology utilized in this conformity analysis is consistent with the on-road modeling utilized in the SIP and that the most recent planning assumptions were used.

A comprehensive list of the steering committee's meeting agenda and decisions can be found in Appendix F.2.

⁸ The FHWA acts as executive agent for the FTA.

8. PUBLIC INVOLVEMENT

8.1 PUBLIC INVOLVEMENT PROCESS

Public participation is recognized as an integral part of the planning process. The public participation process for Transportation Conformity Determination and other transportation plans, projects, and policies includes timely public notice, full public access to technical and policy information, opportunities for early and continuing involvement, and explicit consideration and response to public input.

Public participation strategies and procedures are designed to inform the public about transportation and air quality issues, provide opportunities to involve the public in the decision-making process, and seek public and stakeholder feedback. Additionally, this process builds support among the public who are stakeholders in transportation investments. Public views and opinions are included in the final MTP and TIP documents.

Generally, each meeting consisted of an overview presentation, a question-and-answer session, an open house for viewing exhibits and gathering more information, and various avenues for submitting public comments. All meetings began at 5:30 p.m. and were similar in content and format. The public meeting presentation was made available on AAMPO's website. The public meeting dates, location addresses, and links to the meeting's presentation and materials are provided in Table 8-1.

Table 8-1. Public Involving Meeting Information

#	Meeting Date	Address	Link to meeting presentation and materials
1	4/15/2024	375 South Castell Ave., New Braunfels, TX 78130	https://www.alamoareampo.org/yourmove/
2	4/17/2024	313 West Nolte St., Seguin, TX 78155	https://www.alamoareampo.org/yourmove/
3	4/25/2024	17 Old San Antonio Rd., Boerne, TX 78006	https://www.alamoareampo.org/yourmove/
4	4/29/2024	1021 San Pedro Ave., San Antonio, TX 78212	https://www.alamoareampo.org/yourmove/

Public input was collected via an online public engagement tool developed by AAMPO GIS staff. The tool featured an interactive overview of the FY25-28 TIP, the Transportation Conformity Determination (TCD), and a feature to record comments on the draft TIP and TCD. In total, 21 comments were received. A full list of comments and AAMPO's responses, as well as presentations and outreach materials, can be found in Appendix G.

APPENDIX A – RESOLUTION OF ADOPTION

APPENDIX B – MTP AND TIP

B.1 *MOBILITY 2050, AS AMENDED: FULL DOCUMENT*

B.2 FY2025-2028 TIP

B.3 – MTP PROJECT LISTING: PDF | CSV | EXCEL

APPENDIX C – TRANSPORTATION MODELING SYSTEM

C.1 – TRAVEL MODEL VALIDATION

C.2 - LINKS, MILES, AND LANE MILES SUMMARIES

C.3 – LINK LISTING AND CAPACITY STAGING: BUILD | NO BUILD

C.4 – ROADWAY NETWORK FILES

APPENDIX D – EMISSIONS MODELING INFORMATION

D.1 - MOVES INPUTS AND OUTPUTS

D.2 – MOVES EMISSION FACTORS (USED FOR THE EMISSIONS ANALYSIS)

D.3 – ACTIVITY

D.4 – EMISSIONS MODELING UTILITIES

D.5 – VMT, SPEED AND EMISSIONS SUMMARY

APPENDIX E – TIMELY IMPLEMENTATION DOCUMENTATION FOR TCM

- *Alamo Area nonattainment area does not have listed TCMs in SIP.*

APPENDIX F – INTERAGENCY CONSULTATION PROCESS

F.1 – APPROVED PACP

F.2 – CONSULTATION REVIEW AND MEETING SUMMARY

APPENDIX G – PUBLIC INVOLVEMENT PROCESS

G.1 – MEETING INFORMATION

G.2 – PUBLIC COMMENT SUMMARY