



AIR QUALITY CONFORMITY DETERMINATION

INTRODUCTION

The 1990 Clean Air Act Amendments (CAAA) require metropolitan planning organizations within nonattainment areas to perform air quality conformity determinations prior to the approval of Transportation Plans and Transportation Improvement Programs (TIP), and at such other times as required by regulation. A nonattainment area is one that the United States Environmental Protection Agency (EPA) has designated as not meeting certain air quality standards. A conformity determination is a demonstration that plans, programs, and projects are consistent with the State Implementation Plan (SIP) for attaining the air quality standards. The CAAA requirement to perform a conformity determination ensures that federal approval and funding go to transportation activities that are consistent with air quality goals. This chapter presents information and analyses for the air quality conformity determination of the Amendment to the JOURNEY TO 2030 Plan, as required by federal regulations (40 CFR Part 93) and the Massachusetts Conformity Regulations (310 CMR 60.03). It also includes the regulatory framework, conformity requirements, planning assumptions, mobile source emissions budgets, and conformity consultation procedures related to the determination.

Legislative Background

The 1970 Clean Air Act defined a one-hour national ambient air quality standard (NAAQS) for ground-level ozone. The one-hour ozone standard is 0.12 parts per million, averaged at each monitor over one hour and not to be exceeded more than once per year. Hourly values are determined by readings recorded at air quality monitors located throughout the state. The 1990 CAAA further classified degrees of nonattainment of the one-hour standard based on the severity of the

monitored levels of the pollutant. The entire Commonwealth of Massachusetts was classified as being in serious nonattainment for the one-hour ozone standard, with a required attainment date of 1999. The attainment date was later extended, first to 2003 and a second time to 2007.

In 1997, the EPA proposed a new, eight-hour ozone standard that replaced the one-hour standard, effective June 15, 2005. Scientific information had shown that ozone could affect human health at lower levels, and over longer exposure times than one hour. The new standard was challenged in court, and after a lengthy legal battle, the courts upheld it. It was finalized in June 2004. The eight-hour standard is 0.08 parts per million, averaged over eight hours and not to be exceeded more than once per year. Nonattainment areas were again further classified based on the severity of the eight-hour values. Massachusetts as a whole was classified as being in moderate nonattainment for the eight-hour standard, but it was separated into two nonattainment areas—Eastern Massachusetts and Western Massachusetts.

The Eastern Massachusetts nonattainment area includes all of Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Suffolk, and Worcester counties. With this nonattainment classification, the CAAA requires the Commonwealth to reduce its emissions of volatile organic compounds (VOCs) and nitrogen oxides (NOx), the two major precursors to ozone formation, to achieve attainment of the eight-hour ozone standard by 2009.

In addition, on April 1, 1996, the cities of Boston, Cambridge, Chelsea, Everett, Malden, Medford, Quincy, Revere, and Somerville were classified as being in attainment for carbon monoxide (CO). As part of the Plan, an air quality conformity analysis must still be completed for these communities, as they have a carbon monoxide maintenance plan approved as part of the SIP. The 2010 CO motor vehicle emission budget established for the Boston CO attainment area

with a maintenance plan is 228.33 tons of CO per winter day.

As of April 22, 2002, the community of Waltham was redesignated as being in attainment for CO, with an EPA-approved limited-maintenance plan. In areas with approved limited-maintenance plans, federal actions requiring conformity determinations under the transportation conformity rule are considered to satisfy the “budget test” (as budgets are treated as not constraining in these areas for the length of the initial maintenance period). Any requirements for future “project-level” conformity determinations for projects located



within this community will continue to use a “hot-spot” analysis to ensure that any new transportation projects in this CO attainment area do not cause or contribute to CO nonattainment.

On January 31, 2008, the Massachusetts Department of Environmental Protection (DEP) submitted to the EPA a revision of the Massachusetts SIP that included a revised eight-hour ozone attainment demonstration for eastern Massachusetts. This SIP revision included a 2009

mobile-source emission budget for VOC and NOx emissions in the eastern Massachusetts Ozone Nonattainment Area. The EPA found the eight-hour budget adequate for conformity purposes on March 18, 2008. The Boston Region MPO must show conformity with this eight-hour budget.

Conformity Regulations

Designated MPOs are required to perform conformity determinations by ozone nonattainment area for their Transportation Plans and TIPs. Section 176 of the CAAA defines conformity to a State Implementation Plan to mean conformity to the plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of the standards. The Boston Region MPO must certify with regard to the activities outlined in the Transportation Plan and TIP that:

- None will cause or contribute to any new violation of any standard in any area.
- None will increase the frequency or severity of any existing violation of any standard in any area.
- None will delay the timely attainment of any standard or any required interim emission reductions or other milestones in any area.

The EPA issued final conformity regulations in the November 24, 1993, *Federal Register*, and DEP issued conformity regulations effective December 30, 1994. They set forth requirements for determining conformity of Transportation Plans, TIPs, and individual projects. The federal conformity regulations were amended several times through January 2008. The components of the required conformity analysis are listed below and are explained in detail subsequently.

Conformity Criteria

- Horizon years
- Latest planning assumptions
- Latest emission model used

- Timely implementation of transportation control measures (TCMs)
- Conformity in accordance with the consultation procedures and SIP revisions
- Public participation procedures
- Financially constrained document

Procedures for Determining Regional Transportation Emissions

The Conformity Test

- Consistent with emission budgets set forth in SIP
- Contributes to reductions in CO nonattainment areas

This conformity determination will show the consistency of the Plan with the 2009 mobile-source emission budget for VOC and NOx in the Eastern Massachusetts Ozone Nonattainment Area and with the CO emission budget for the Boston, Cambridge, Chelsea, Everett, Malden, Medford, Quincy, Revere, and Somerville maintenance area.

CONFORMITY DETERMINATION CRITERIA

This conformity determination has been prepared in accordance with 40 CFR Part 93, Transportation Conformity Rule Amendments: Flexibility and Streamlining: Final Rule. It shows that the Transportation Plan has been prepared following all the guidelines and requirements of the Rule.

Horizon Year Requirements

The horizon years for regional model analysis have been established following 40 CFR 93.106(a) of the Federal Conformity Regulations. The years for which emissions are calculated are shown below.

- 2000 – Milestone Year: This year is currently being used as the base year for calculation of emission reductions of VOCs and NOx.
- 2010 – Milestone Year and Analysis Year: This year is used to show conformity with the

CO budget in the Boston nonattainment area. This year is also used to show conformity with the 2009 ozone budget in eastern Massachusetts.

- 2020 – Analysis Year
- 2030 – Horizon Year: Last forecast year of the Plan

Current Planning Assumptions

Section 93.110 of the Federal Conformity Regulations outlines the requirements for the most recent planning assumptions that must be in place at the time of the conformity determination. Assumptions must be derived from current estimates and future projections of population, household, employment, travel, and congestion data developed by the MPO. Analysis for the Plan is based on U.S. census data and information obtained from the Metropolitan Area Planning Council (MAPC), MassHighway, and other sources. The following is a list of the sources of data used for model calibration in this analysis:

- **Population, households, and household size:** Summary File 1 Data for Massachusetts from the 2000 U.S. Census of Population and Housing.
- **Employment:** CTPS's Eastern Massachusetts Site-Level Employment Database for 2000, finalized in 2007.
- **Household income, resident workers, and vehicle ownership:** Summary File 3 data for Massachusetts from the 2000 U.S. Census of Population and Housing.
- **Household workers:** Census Transportation Planning Package Part 1 for Massachusetts from the 2000 U.S. Census of Population and Housing.
- **Traffic volumes:** Massachusetts Highway Department, 2003 Traffic Volumes for the Commonwealth of Massachusetts (contains data from 1992–2003), June 2004. Additional traffic counts taken by MassHighway and CTPS.
- **Population, household, and employment forecasts:** The forecasts of population, households and employment for the 101 cities and towns within the Boston Region MPO were developed by the Metropolitan Area Planning Council (MAPC) using what is called the “MetroFuture” scenario. This scenario was developed by altering a number of assumptions from their previous Extended Growth scenario. The MetroFuture scenario seeks to channel regional growth and development by targeting the majority of growth to denser areas with already available water, sewer and transit infrastructure. In this scenario, it is assumed that a greater percentage of residents will be living within walking distance of transit and of major activity centers. The forecasts of population, households and employment for the 63 cities and towns outside of the Boston Region MPO were developed by EOT and RPAs.
- **Project-level data:** Obtained from the responsible implementing agency.



Transit Service Policy Assumptions

The transit service assumptions used in ridership modeling for the Plan were based on MBTA service in the spring of 2000. The model calibration was performed using the following:

- *Ridership and Service Statistics*, 8th edition, MBTA, 2002.
- The Central Artery/Third Harbor Tunnel Regional Transit Mitigation Program, as outlined in agreements between the Massachusetts DEP and Executive Office of Transportation (EOT).

The operating policies and assumed transit ridership have not changed since the conformity determination prepared for the JOURNEY TO 2030 Regional Transportation Plan in April 2007.

Emission Inventory Assumptions

For the Plan, conformity is determined in relation to the SIP mobile-source emission budgets that were approved in March 2008 for VOC and NO_x. The VOC mobile-source emission budget for 2009 for the Eastern Massachusetts Ozone Nonattainment Area has been set at 63.5 tons per summer day, and the 2009 mobile-source budget for NO_x is 174.96 tons per summer day.

The Boston Region MPO area's VOC and NO_x emissions are included with those in the following MPO regions to show conformity with the SIP in the Eastern Massachusetts Ozone Nonattainment Area:

- Cape Cod MPO
- Central Massachusetts MPO
- Merrimack Valley MPO
- Montachusett Region MPO
- Northern Middlesex MPO
- Old Colony MPO

* These regions are considered to be MPOs for planning purposes



- Southeastern Region MPO
- Martha's Vineyard Commission*
- Nantucket Planning and Economic Development Commission*

CO emission projections have been set for the nine cities in the Boston area classified as being in attainment for CO. An emission attainment inventory for CO of 501.53 tons per winter day was established for all sources of CO emissions (mobile, industrial, and all other sources) for the redesignation year 1993. Of that 501.53 tons, 305.43 tons per winter day was allocated for mobile sources. In addition to the attainment year inventory, the EPA required that emission projections for every five years through 2010 be developed for all sources to ensure that the combination of all CO emissions will not exceed the 501.53 tons per winter day maximum allowance in the future. The mobile-source emission projection of 228.33 tons per winter day has been set for 2010. Emissions from the nine towns in the

Boston area may not exceed the amount in the last year of the maintenance plan (2010).

EOT's Office of Transportation Planning estimated the results for all of the MPOs in the Eastern Massachusetts Ozone Nonattainment Area using a statewide travel demand model (the Boston Region MPO model results were included as the latest planning assumptions for the conformity analysis). The air quality analysis has been finalized for all of the MPOs, and EOT has made the final conformity determination for this ozone nonattainment area.

Latest Emission Model

Emission factors used for calculating emission changes were determined using MOBILE 6.2, the model used by DEP in determining the mobile-source budget. Emission factors for motor vehicles are specific to each model year, pollutant type, temperature, and travel speeds. MOBILE 6.2 requires a wide range of input parameters, including inspection and maintenance program information and other data such as hot/cold start mix, emission failure rates, vehicle fleet mix, and fleet age distribution.

The input variables used in this conformity determination were received from DEP. The inputs used for the 2000 Base Year were the same as those used in determining the latest emissions inventory for the Commonwealth of Massachusetts. The inputs used for the years 2009 through 2030 were also received from DEP and include information on programs that were submitted to the EPA as the strategy for the Commonwealth to obtain ambient air quality standards.

Timely Implementation of Transportation Control Measures

Transportation control measures (TCMs) were required in the SIP in revisions submitted to the EPA in 1979 and 1982 and those submitted as part of the Central Artery/Tunnel project. The TCMs included in the 1979 and 1982 submissions were accomplished through construction

or through implementation of ongoing programs. The only exceptions are the bus immersion-heater program, the Newton Rider bus service, the private bus insurance discount concept, and the pedestrian malls in Lynn, Cambridge, and Needham. Other services have been substituted for these TCMs. These projects were all included in past Boston Region MPO Transportation Plans and TIPs.

TCMs were also submitted as a SIP commitment as part of the Central Artery/Tunnel project mitigation. The status of these projects has been updated using the Administrative Consent Order (ACO) signed by EOT and the Executive Office of Environmental Affairs (EOEA) in September 2000 and January 2005, and the Project Update and Schedule, which was submitted by the MBTA to DEP in March 2009. All of the projects are included in the Plan as recommended or completed projects. They include:

- Southeast Expressway High-Occupancy-Vehicle (HOV) Lane
- HOV Lane on I-93 to Mystic Avenue
- 20,000 New Park-and-Ride Spaces



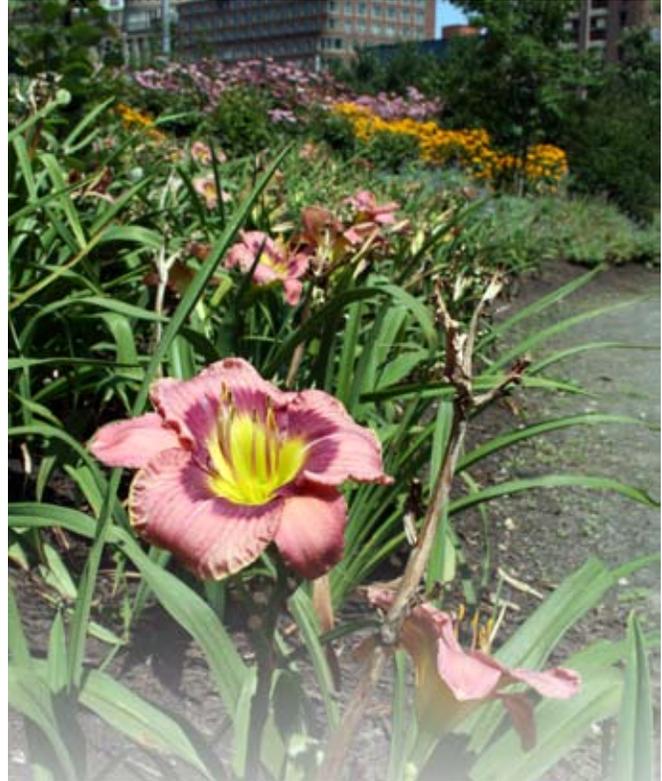
- Ipswich Commuter Rail Extension to Newburyport
- Old Colony Commuter Rail Extension
- Framingham Commuter Rail Extension to Worcester
- South Boston Piers Transitway

Reevaluation Process of SIP TCMs

The September 2000 ACO reconciled and adjusted dates of completion for all projects required as mitigation for the Central Artery/Tunnel project that had not been completed at that time. The conformity determination of this Plan includes all projects that are part of the ACO. The two transit TCM SIP commitment projects in the ACO that were not completed on schedule were the Greenbush Line of the Old Colony Commuter Rail Service and the Arborway Restoration project. Interim substitute projects were submitted to DEP for these projects.

An amended ACO was signed in January 2005 by the transportation agency in meeting public transit commitments that are part of mitigation measures for the Central Artery/Tunnel project. It outlines revised schedules, mitigation measures, a supplemental environmental project, and financial penalties to address violations. All projects included in both ACOs are included in this Plan and conformity determination.

As outlined in the ACOs, several SIP TCM commitments are outstanding. The former Office for Commonwealth Development (OCD), EOT, and DEP were interested in reevaluating the uncompleted projects to ensure that any further transportation investments fund the best regionally significant projects that meet air quality goals and requirements. Transportation planning and decision-making have changed significantly since adoption of the original Central Artery/Tunnel SIP commitments. The agencies embarked upon a reevaluation process for three projects—the Green Line Arborway Restoration, the Red Line–



Blue Line Connector, and the Green Line Extension to Ball Square/Tufts University.

In 2003, the MBTA completed a new Program for Mass Transportation (PMT). The PMT is the MBTA's long-range planning document and the foundation for transit capital planning in eastern Massachusetts. The 2003 PMT prioritized projects within modes and by investment category. It expanded on the evaluation criteria that were used in previous PMTs and determined overall project ratings based on factors such as utilization, mobility, cost-effectiveness, air quality, service quality, economic and land use impacts, and environmental justice. The PMT rated the Arborway Restoration, Red Line–Blue Line Connector, and Green Line to Ball Square/Tufts University projects as medium-priority rapid transit expansions. The PMT ratings suggested that these projects may no longer be the best investments for the region.

The Executive Office of Transportation and the Boston Region MPO both place a significant emphasis on objective criteria, and this focus has been reflected in the transportation decision-

making process. In 2003, EOT developed objective criteria and presented them to the Commonwealth's MPOs and the general public. The Boston Region MPO had already begun work on objective criteria, and its criteria were similar to those developed for statewide use. The MPO applied the objective criteria to all of its TIPs beginning in 2005. The use of objective selection criteria for programming funds is an important change within the Commonwealth. The state, along with its MPOs, has adopted a more rational, transparent approach to project prioritization.

For these reasons, OCD, EOT, and DEP, along with other partners, began the process of re-examining the Red Line–Blue Line Connector, Green Line Extension to Ball Square/Tufts University, and Arborway Restoration projects. OCD, EOT, and DEP recognized the importance of this effort, since the timely implementation of TCM's is critical for the Commonwealth to achieve federal air quality conformity and its own air quality goals.

Correspondence between EOT and DEP has been ongoing since the adoption of the 2004 Plan. On December 8, 2003, DEP's then Commissioner Golledge sent a letter to EOT's then Secretary Grabauskas notifying EOT that there are areas of noncompliance with the ACO and requesting a meeting between the two agencies. The agencies met, and on January 22, 2004, Commissioner Golledge sent a follow-up letter reasserting the need for the agencies to work together to address outstanding issues. He stated that a process needed to be established to involve and solicit input from the public.

At the May 18, 2004, Central Artery/Tunnel Project Environmental Oversight Committee meeting, Commissioner Golledge said there was a need to revisit the mitigation projects. He stated that this would be done in a public, open, and transparent manner. If there were to be any changes, the overall goal would be to ensure that the air quality benefits are equal to those of the existing mitigation projects. Mobility, ridership, service quality, environmental justice, land use, and economic development would also be considered.

EOT developed a process in consultation with DEP and included input from the public to determine if the existing mitigation projects were the projects that would provide the best air quality benefits to the public. The Boston Region MPO was involved in that process.

On September 2, 2004, EOT submitted the Transit Commitments 2004 Project Schedule and Project Update to the Massachusetts Department of Environmental Affairs. In the cover letter transmitting the report, EOT recognized the air quality benefits of the transit commitments and was dedicated to providing equal or greater benefits if any changes were made to the existing list of projects. They outlined their intentions for a comprehensive public involvement process and for working cooperatively with concerned MPOs should any changes to the SIP be necessary. In the letter, EOT asked DEP to confirm the air quality benefits to be derived from the remaining projects. The confirmation allowed EOT to begin an open and transparent process for developing a possible new set of projects, or even a single new project, to attain the air quality benefits of the transit commitments.

On October 26, 2004, Commissioner Golledge responded by calling for a joint public meeting on the remaining transit commitments. He also agreed with the estimates of emission reductions that were included in the September 2, 2004, letter.

On November 10, 2004, EOT submitted a summary of the reasoning that prompted the revisiting of the SIP commitments to FHWA, FTA, and DEP. The six-step process began in December 2004, with an estimated completion date, at that time, of December 2005.

The first step of the process included initial outreach and air-quality goal setting. This process began with a public meeting, sponsored by EOT and DEP, held on December 14, 2004, at the Gardner Auditorium, located in the State House. Two additional public meetings were scheduled because a number of people commented that many could not attend on December 14

because the meeting was held during the day. Public meetings were held in Jamaica Plain and Somerville subsequently.

DEP reviewed the public comments and provided an air quality budget in a letter to EOT dated March 25, 2005, that quantified the air quality benefits needed to complete the Commonwealth's remaining obligations to the SIP. DEP's then Commissioner Golledge established the air quality benefits associated with the three projects being reevaluated with an overall upward adjustment of 10 percent.

EOT and the Boston Region MPO completed step two of the process—the evaluation of the original and alternative SIP TCM projects. This step involved the examination of the high-priority transit projects included in the PMT and all outstanding SIP transit commitments in the Boston Region MPO area using the state's objective criteria to determine the most important regional projects. EOT presented their preferred alternative to the three projects to DEP in a letter dated May 18, 2005, and to the Boston Region MPO in meetings on May 26, 2005, and June 14, 2005. The preferred alternative includes:

- Enhanced Green Line extended beyond Lechmere to Medford Hillside and Union Square
- Fairmount Line Improvements
- 1,000 Additional Parking Spaces in the Boston Region

The MPO posted this information on its Web site and scheduled a public meeting to hear comments concerning these changes on June 22, 2005. On July 19, 2005, the MPO sent EOT a letter detailing the outcome of EOT's consultation with the MPO on the reevaluation process.

EOT and DEP proposed a SIP revision of regulatory changes. DEP agreed to consider regulatory changes, after EOT reevaluated the remaining SIP commitments. The primary reason for these changes is the infeasibility thresholds of engineering, environment, and economics. EOT submitted



the SIP substitutions along with suggested regulatory changes required to implement the projects, in a letter from EOT Secretary Cogliano to DEP's then Commissioner Golledge on August 10, 2005.

DEP published a notice of public hearing on the proposed amendments to 310 CMR 7.36. The public hearing took place on December 21, 2005. The comment period closed on January 17, 2006. DEP reviewed over 500 written comments that were received and discussed them with the state agencies.

DEP agreed with the three TCM changes and included a fourth commitment—complete a final design of the Red Line–Blue Line Connector from the Blue Line at Government Center to the Red Line at Charles Station. The final draft of the revised regulation was reviewed by the EOE and submitted to the Executive Office of Administration and Finance (A&F). It was approved by A&F, filed with the Secretary of State, and published in the *Massachusetts Register*, effective December 1, 2006. DEP submitted the revised regulation to EPA on December 15, 2006, for their review.

EPA completed their review and approved the four proposed projects for inclusion in the SIP as noted in the Federal Register dated July 31, 2008. The Boston Region MPO has included these projects in the Plan.

Consultation Procedures

The conformity regulations require the MPO to make a conformity determination according to consultation procedures set out in the state and federal regulations and to follow public involvement procedures established by the MPO under federal metropolitan transportation planning regulations.

Both the state and federal regulations require that the Boston Region MPO, EOT, MassHighway, DEP, EPA (Region 1), and FHWA (Region 1) consult on the following issues:

- Selection of regional emissions analysis models, including model development and assessing project design factors for modeling.
- Selection of inputs to the most recent EPA-approved emissions factor model.
- Selection of CO hot-spot modeling procedures, as necessary.
- Identification of regionally significant projects to be included in the regional emissions analysis.
- Identification of projects, which have changed in design and scope.
- Identification of exempt projects.
- Identification of exempt projects that should be treated as non exempt because of adverse air quality impacts.
- Identification of the latest planning assumptions and determination of consistency with SIP assumptions.

These issues have all been addressed through consultation among the agencies listed above.

Public Participation Procedures

Title 23 CFR Sections 450.324 and 40 CFR

90.105(e) require that the development of the Transportation Plan, TIP, and related certification documents provide an adequate opportunity for public review and comment.

Section 450.316(b) establishes the outline for MPO public participation programs. The Boston Region MPO's public participation program was formally adopted in March 2002. The development and adoption of this program conforms to these requirements. The program guarantees public access to the Transportation Plan and TIP and all supporting documentation, provides for public notification of the availability of the Transportation Plan and TIP and the public's right to review the documents and comment on them, and provides a public review and comment period prior to the adoption of the Transportation Plan and TIP and related certification documents by the MPO.

On November 2, 2009, a public notice was placed in the *Boston Globe* informing the public of its right to comment on this draft document. On November 19, 2009, the Boston Region MPO voted to approve the Plan and its Air Quality Conformity Determination. This allowed ample opportunity for



public comment and MPO review of the draft document. These procedures comply with the associated federal requirements.

Financial Consistency

Title 23 CFR Section 450.324 and 40 CFR 93.108 require the Transportation Plan to “be financially constrained by year and include a financial plan that demonstrates which projects can be implemented using current revenue sources and which projects are to be implemented using proposed revenue sources.”

This Boston Region Transportation Plan, JOURNEY TO 2030 Amendment, is financially constrained to projections of federal and state resources reasonably expected to be available during the appropriate time frame. Projections of federal resources are based upon the estimated apportionment of the federal authorizations contained in SAFETEA-LU, the six-year transportation reauthorization bill, as allocated to the region by the state or as allocated among the various MPOs according to federal formulas or MPO agreement. Projections of state resources are based upon the allocations contained in the current Transportation Bond Bill and historic trends. Therefore, the Plan complies with federal requirements relating to financial planning.

PROCEDURES FOR DETERMINING REGIONAL TRANSPORTATION EMISSIONS

The federal conformity regulations set forth specific requirements for determining transportation emissions. The requirements and the procedures used for the Plan are summarized below.

Demographics, Employment, and Transportation Demand

Specific sources of population, household, employment, and traffic information used in the Plan have been listed above under the Latest Planning Assumptions section. Chapter 13 outlines recommendations for specific projects for the time period ending in 2030 for the Boston region.

Only regionally significant projects are required to be included in the travel-demand modeling efforts. The final federal conformity regulations define regionally significant as follows:

A transportation project (other than an exempt project) that is on a facility which 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, sport complexes, etc., or transportation terminals as well as most terminals themselves) and would 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.

In addition, specific projects have been exempt from regional modeling emissions analysis. The categories of exempt projects 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
- Bus terminals and transfer points

The Recommended Plan Network in this conformity determination is composed of projects proposed in the approved Transportation Improvement Programs, projects in the Plan, and projects in the MBTA capital budget. A list of the projects that meet these criteria and are included in the Recommended Plan network and this conformity determination is provided in Table 15-1. The list includes all regionally significant projects in the Eastern Massachusetts Ozone Nonattainment Area.

TABLE 15-1

JOURNEY TO 2030: FUTURE NEEDS ANALYSIS RECOMMENDED PLAN NETWORKS

BOSTON REGION MPO PROJECTS	2010 BUILD	2020 BUILD	2030 BUILD
MIDDLESEX TURNPIKE IMPROVEMENTS PHASE 3 (BEDFORD, BURLINGTON, & BILLERICA)		X	X
EAST BOSTON HAUL ROAD/CHELSEA TRUCK ROUTE (BOSTON)		X	X
FAIRMOUNT LINE IMPROVEMENTS (BOSTON)		X	X
RED LINE/BLUE LINE CONNECTOR – DESIGN ONLY (BOSTON)			
RUSSIA WHARF FERRY TERMINAL (BOSTON)		X	X
SULLIVAN SQUARE (BOSTON)		X	X
RUTHERFORD AVENUE (BOSTON)			X
CONSOLIDATED RENTAL CAR FACILITY (BOSTON LOGAN AIRPORT)		X	X
BRAINTREE SPLIT - I-93/ROUTE 3 INTERCHANGE (BRAINTREE)		X	X
I-93/I-95 INTERCHANGE (CANTON)			X
I-95 (NB)/DEDHAM STREET RAMP/DEDHAM STREET CORRIDOR (CANTON)		X	X
ROUTE 2/CROSBY'S CORNER (CONCORD AND LINCOLN)		X	X
ROUTE 126/135 GRADE SEPARATION (FRAMINGHAM)			X
ROUTE 53 FINAL PHASE (HANOVER)		X	X
ROUTE 85 IMPROVEMENTS (HUDSON)		X	X
ROUTE 1 IMPROVEMENTS (MALDEN, REVERE, SAUGUS)			X
ROUTE 139 WIDENING (MARSHFIELD)		X	X
NEEDHAM STREET/HIGHLAND AVENUE (NEWTON & NEEDHAM)			X
QUINCY CENTER CONCOURSE, PHASE 2 (QUINCY)		X	X
I-93/I-95 INTERCHANGE (READING & WOBURN)			X
WONDERLAND PARKING GARAGE (REVERE)		X	X
BRIDGE STREET (SALEM)		X	X
1000 ADDITIONAL PARK AND RIDE SPACES (REGIONWIDE)		X	X
ASSEMBLY SQUARE ORANGE LINE STATION (SOMERVILLE)		X	X
ASSEMBLY SQUARE ROADWAYS (SOMERVILLE)		X	X
GREEN LINE LECHMERE TO COLLEGE AVENUE (SOMERVILLE)		X	X
GREEN LINE COLLEGE AVENUE TO MYSTIC AVENUE (SOMERVILLE)		X	X
SOUTH WEYMOUTH NAVAL AIR STATION ACCESS IMPROVEMENTS (WEYMOUTH, HINGHAM, & ROCKLAND)		X	X
ROUTE 18 CAPACITY IMPROVEMENTS (WEYMOUTH)		X	X
MONTVALE AVENUE (WOBURN)		X	X
NEW BOSTON STREET BRIDGE (WOBURN)		X	X
CAPE COD REGION PROJECTS			
BARNSTABLE AIRPORT ACCESS (BARNSTABLE)		X	X
YARMOUTH ROAD/ROUTE 28 (WIDENING TO 4 LANES) WITH HYANNIS ROTARY IMPROVEMENTS (BARNSTABLE)		X	X
BOURNE ROTARY LONG-TERM IMPROVEMENTS (BOURNE)			X
BOURNE-SANDWICH PARKWAY (WIDENING TO 4 LANES) (BOURNE & SANDWICH)			X
CENTRAL MASSACHUSETTS REGION PROJECTS			
ROUTE 20 WIDENING (CHARLTON & OXFORD)		X	X
ROUTE 20 WIDENING – SELECTED LOCATIONS (AUBURN, SHREWSBURY, & WORCESTER)		X	X
I-290/VERNON STREET / KELLEY SQUARE (NEW INTERCHANGE AND SQUARE REALIGNMENT) (WORCESTER)		X	X
ROUTE 146 IMPROVEMENTS – ADD FRONTAGE ROADS TO CREATE LIMITED ACCESS ROADWAY BETWEEN A NEW INTERCHANGE (AT BOSTON RD.) AND EXISTING I-90 INTERCHANGE (MILLBURY & SUTTON)			X
MARTHA'S VINEYARD REGION PROJECTS - NONE			

TABLE 15-1 (CONT.)

JOURNEY TO 2030: FUTURE NEEDS ANALYSIS RECOMMENDED PLAN NETWORKS

MERRIMACK VALLEY REGION PROJECTS	2010 BUILD	2020 BUILD	2030 BUILD
ROUTE 110 FROM I-495 TO I-95 (WIDEN FROM 2 LANES TO 4) (AMESBURY)		X	X
BURTT ROAD EXTENSION – IMPROVE ACCESS TO ROUTE 125 (ANDOVER)		X	X
TRI-TOWN INTERCHANGE (NEW “LOWELL JUNCTION” INTERCHANGE ON I-93 BETWEEN ROUTE 125 AND DASCOMB RD.) AND I-93 WIDENING TO 4 LANES IN EACH DIRECTION FROM NEW INTERCHANGE/CURRENT “LANE DROP” AREA TO I-495 (ANDOVER)		X	X
GEORGETOWN INDUSTRIAL PARK ACCESS ROAD FROM ROUTE 133 (GEORGETOWN)		X	X
ROUTE 114 (WIDENING FROM I-495 TO WAVERLY ROAD) (LAWRENCE)		X	X
I-495 OVER MERRIMACK RIVER (WIDENING AND ADD NEW RAMPS) (LAWRENCE)		X	X
ROUTE 110/113 (METHUEN ROTARY – NEW INTERCHANGE RAMPS AT I-93) (METHUEN)		X	X
I-95 OVER MERRIMACK RIVER (WHITTIER BRIDGE WIDENING FROM 6 TO 8 LANES) (NEWBURYPORT & AMESBURY)		X	X
I-93 – WIDENING TO 4 TRAVEL LANES IN EACH DIRECTION FROM I-495 TO NH LINE (ANDOVER & METHUEN)			X
HALE STREET INDUSTRIAL PARK ACCESS FROM I-95 (NEWBURYPORT)			X
MONTACHUSETT REGION PROJECTS			
NEW INTERCHANGE ON ROUTE 2 AT SOUTH ATHOL ROAD (ATHOL)		X	X
ROUTES 12 AND 13 (VARIOUS IMPROVEMENTS TO ON AND OFF RAMPS) (FITCHBURG, LEOMINSTER, & STERLING)		X	X
NANTUCKET REGION PROJECTS - NONE			
NORTHERN MIDDLESEX REGION PROJECTS			
MIDDLESEX TURNPIKE IMPROVEMENTS PHASE 3 – WIDENING PLANK ST. TO MANNING RD. (BILLERICA)		X	X
TRI-TOWN INTERCHANGE (NEW “LOWELL JUNCTION” INTERCHANGE ON I-93 BETWEEN ROUTE 125 AND DASCOMB RD.) (TEWKSBURY)		X	X
OLD COLONY REGION PROJECTS			
ROUTE 18 - WIDENING TO 4 LANES FROM ROUTE 139 TO HIGHLAND PLACE (ABINGTON)		X	X
ROUTE 3 - ADD SB ON RAMP FROM CRANBERRY DR (NEAR KINGSTON RAIL STATION) (KINGSTON)		X	X
ROUTE 3 – EXPAND TO FULLY DIRECTIONAL INTERCHANGE AT CLARK RD. (EXIT 3) (PLYMOUTH)		X	X
ROUTE 24 - ADD NORTHBOUND SLIP RAMP FROM ROUTE 104 WB TO ROUTE 24 NB NORTHBOUND (BRIDGEWATER)			X
MAIN STREET, WARREN AVENUE, SPRING STREET, WEST ELM STREET, BELMONT STREET – RE-ESTABLISH TWO-WAY CIRCULATION (BROCKTON)			X
ROUTE 123 - WIDEN FROM ROUTE 24 TO LINWOOD STREET (BROCKTON)			X
ROUTE 3 - WIDENING FROM 4 TO 6 LANES BETWEEN HINGHAM AND ROUTE 44 (KINGSTON & PLYMOUTH)			X
ROUTE 25 - ADD NEW INTERCHANGE BEFORE EXIT 1 AND CONNECT TO BOURNE ROAD (PLYMOUTH)			X
ROUTE 3 - ADD NB OFF-RAMP TO PLIMOUTH PLANTATION HIGHWAY AND SB ON/OFF RAMP TO CAMELOT DR. (PLYMOUTH)			X
ROUTE 3 - ADD NORTHBOUND ON-RAMP AT LONG POND ROAD (EXIT 5) (PLYMOUTH)			X
ROUTE 106 - WIDENING FROM 2 TO 4 LANES BETWEEN ROUTE 24 AND ROUTE 28 (WEST BRIDGEWATER)			X
SOUTHEASTERN MASSACHUSETTS REGION PROJECTS			
ROUTE 6 (FAUNCE CORNER RD) / I-195 INTERCHANGE - BRIDGE WIDENING TO 4 LANES (DARTMOUTH)		X	X
NEW BRIGHTMAN STREET BRIDGE (WIDENING FROM 2 TO 4 LANES) (FALL RIVER & SOMERSET)		X	X
ROUTE 24 - NEW INTERCHANGE (EXIT 8) (FREETOWN)		X	X
ROUTE 140 / I-495 NEW SOUTHBOUND ON-RAMP (MANSFIELD)		X	X
KINGS HIGHWAY - CORRIDOR WIDENING (NEW BEDFORD)		X	X
ROUTE 44 - WIDENING FROM ROUTE 24 TO ROUTE 58 AND REMOVE MIDDLEBOROUGH ROTARY (MIDDLEBOROUGH)		X	X
ROUTE 79/DAVOL STREET (INTERCHANGE IMPROVEMENTS AND NEW TRAFFIC CIRCULATION) (FALL RIVER)			X
ROUTE 24 / 140 - INTERCHANGE RECONSTRUCTION (TAUNTON)			X
ROUTE 24 - WIDENING FROM ROUTE 140 TO I-495 (TAUNTON, RAYNHAM)			X

TABLE 15-2

SUMMARY OF EMISSIONS FROM OFF-MODEL SOURCES OF VMT IN EASTERN MASSACHUSETTS

VOC EMISSIONS						
MODE	2010		2020		2030	
	GRAMS	TONS	GRAMS	TONS	GRAMS	TONS
BUSES	44,000	0.049	44,000	0.049	44,000	0.049
COMMUTER RAIL	455,000	0.502	66,000	0.073	66,000	0.073
COMMUTER BOAT	392,000	0.432	392,000	0.432	392,000	0.432
TURNPIKE PARK-AND-RIDE	-6,400	-0.007	-3,300	-0.004	-3,000	-0.003
TOTAL	884,600	0.976	498,700	0.550	499,000	0.551

NO _x EMISSIONS						
MODE	2010		2020		2030	
	GRAMS	TONS	GRAMS	TONS	GRAMS	TONS
BUSES	1,793,000	1.976	1,793,000	1.976	1,793,000	1.976
COMMUTER RAIL	9,194,000	10.130	2,549,000	2.810	2,549,000	2.810
COMMUTER BOAT	741,000	0.817	741,000	0.817	741,000	0.817
TURNPIKE PARK-AND-RIDE	-15,800	-0.017	-4,100	-0.005	-2,600	-0.003
TOTAL	11,712,200	12.906	5,078,900	5.598	5,080,400	5.600

In addition to emissions calculated using the regional transportation model (includes emissions from cars, trucks, and motorcycles), a separate analysis was performed off model to determine emissions from commuter rail, commuter boat, and the MBTA bus program. These calculations are shown in Table 15-2.

Changes in Project Design Since the Last Conformity Determination Analysis

The Commonwealth requires that any change in project design from the previous conformity determination for the region be identified. The last conformity determination was performed on the original JOURNEY TO 2030, in April 2007. Changes that have occurred since the last conformity determination are as follows:

- Demographic projections have been updated and are included in the transportation demand model.
- The list of recommended projects in the Plan has changed.
- Conformity determination must comply with the new mobile source emission budget approved by EPA in March 2008.
- Mobile 6.2 emission factors have been updated.

Model-Specific Information

40 CFR Part 93.111 outlines requirements pertaining to the network-based transportation demand models. These requirements include modeling methods and functional relationships that are to be used in accordance with accepted

professional practice and are to be reasonable for purposes of emission estimation. The Boston Region MPO has used the methods described in the conformity regulations in the analysis of this Plan.

Highway Performance Monitoring System Adjustments

As stated in EPA guidance, all areas of serious ozone and carbon monoxide nonattainment must use FHWA's Performance Monitoring System (HPMS) to track daily vehicle-miles of travel (VMT) prior to attainment to ensure that the state is in line with commitments made in reaching attainment of the ambient air quality standards by the required attainment dates. MassHighway provided HPMS information to DEP. DEP used this information in setting mobile-source budgets for VOCs, NOx, and CO in all SIP revisions prior to 1997. DEP has since revised its VOC and NOx budgets using transportation-demand model runs. However, the models must still be compared to HPMS data since HPMS is currently the accepted tracking procedure as outlined in the regulations.

The conformity regulations require that all model-based VMT be compared with the HPMS VMT to ensure that the region is in line with VMT and emission projections made by DEP. An adjustment factor that compares the 2000 HPMS VMT to the 2000 transportation model VMT has been developed. This adjustment factor is then applied to all modeled VOC and NOx emissions for the years 2010 through 2030 to ensure consistency with EPA-accepted procedures.

$$\frac{2000 \text{ HPMS VMT}}{2000 \text{ Modeled VMT}} = \text{Adjustment factor for VOC and NOx}$$

HPMS adjustment factors, calculated on a regional basis, are applied to the model output of future scenarios, and they occasionally change as base-year models are updated or improved. The latest HPMS factors for the Eastern Massachusetts Ozone Nonattainment Area are shown in Table 15-3.

TABLE 15-3
HPMS ADJUSTMENT FACTORS

	2000 HPMS	2000 TRAVEL DEMAND	HPMS/MODEL
REGION	VMT (MILES)	MODEL VMT (MILES)	CONVERSION FACTOR
CAPE COD	6,204,000	4,763,248	1.302
CENTRAL MASS.	12,920,000	14,533,106	0.889
MARTHA'S VINEYARD	219,000	159,409	1.374
MERRIMACK VALLEY	8,920,000	8,563,266	1.042
BOSTON	59,139,000	79,040,650	0.748
MONTACHUSETT	5,366,000	4,815,154	1.114
NANTUCKET	108,000	56,498	1.912
NORTHERN MIDDLESEX	7,261,000	6,907,993	1.051
OLD COLONY	6,058,000	6,590,912	0.919
SOUTHEASTERN MASS.	14,007,000	13,631,934	1.028
TOTAL EASTERN MA	120,202,000	139,062,169	0.864

Since the CO emission budget for the Boston CO attainment area was determined using the HPMS method rather than the transportation model, a different adjustment factor is applied to the CO emissions for the nine cities and towns in that area. This was done by comparing the 1990 CO emissions from the nine cities and towns resulting from the 1990 base year model run to the 1990 HPMS-generated CO emissions data submitted as part of the SIP. The HPMS data was divided by the model data to determine the CO adjustment factor to be applied to all modeled CO emissions for future years. The CO HPMS adjustment factor is 0.71.

THE CONFORMITY TEST

Consistency with Emission Budgets Set Forth in the SIP

The Boston Region MPO has conducted an air quality analysis of the JOURNEY TO 2030 Amendment. The purpose of the analysis is to evaluate the air quality impacts of the projects included in the Plan on the SIP. The analysis evaluates the change in ozone-precursor (VOCs and NOx) emissions and CO emissions due to implementation of the Plan. The modeling procedures and assumptions used in this air quality analysis follow the EPA's final conformity regulations. They are also consistent with procedures used by DEP to develop Massachusetts's "1990 Base Year Emission Inventory," "1996 Reasonable Further Progress Plan," "Post-1996 Reasonable Further Progress Plan," "1996 Rate of Progress Report," and "Ozone Attainment Demonstration" for the SIP. All consultation procedures were followed to ensure that a complete analysis of the Plan was performed and was consistent with the SIP.

The primary test for showing conformity with the SIP is to demonstrate that the air quality conformity of this Plan is consistent with the emission budgets set forth in the SIP. The Massachusetts Reasonable Further Progress Plan (RFP) was deemed complete by the EPA on June 5, 1997. The EPA determined that the 15 percent RFP SIP

submittal contained an adequate mobile source emissions budget to conduct conformity determinations using the conformity criteria. In addition, the 2009 mobile-source emission budget for eastern Massachusetts was found adequate for conformity purposes by the EPA in March 2008.

The MPO staff estimated VOC and NOx emissions for the Boston region. EOT included the Boston Region MPO emissions estimates in the final emission totals for all areas and all MPOs in Massachusetts. The VOC mobile-source emission budget for 2009 for the Eastern Massachusetts Ozone Nonattainment Area has been set at 63.5 tons per summer day, and the 2009 mobile-source budget for NOx is 174.96 tons per summer day. As shown in Tables 15-4 and 15-5, the results of the air quality analysis demonstrate that the VOC and NOx emissions from all build scenarios are less than the VOC and NOx emissions budgets for the Eastern Massachusetts Ozone Nonattainment Area.

The CO mobile-source attainment inventory for 1993 for the nine cities in the Boston area recently reclassified as being in attainment is 305.43 tons per winter day. The projection of mobile sources for the Boston area is 228.33 tons per winter day for 2010. Estimates of CO emissions for the nine cities in the Boston maintenance area for various years are shown in Table 15-6. The CO emissions are less than the CO emission budget.

In addition, the Boston MPO has decided to include estimations of carbon dioxide (CO₂) emissions in all of its planning work. Estimates of CO₂ emissions for the Boston MPO region are shown below:

- 2000 Base – 43,443 tons/day
- 2010 Action – 44,931 tons/day
- 2020 Action – 47,951 tons/day
- 2030 Action – 49,161 tons/day
- 2030 No-Action – 49,885 tons/day

TABLE 15-4

**VOC EMISSIONS ESTIMATES FOR THE EASTERN MASSACHUSETTS OZONE NONATTAINMENT AREA
(ALL EMISSIONS EXPRESSED IN TONS PER SUMMER DAY)**

YEAR	BOSTON REGION ACTION EMISSIONS	EASTERN MASS. ACTION EMISSIONS	EMISSION BUDGET	DIFFERENCE (ACTION - BUDGET)
2000	N/A	166.545	N/A	N/A
2010	27.456	59.155	63.500	-4.345
2020	15.151	32.415	63.500	-31.085
2030	14.068	30.412	63.500	-33.088

TABLE 15-5

**NOx EMISSIONS ESTIMATES FOR THE EASTERN MASSACHUSETTS OZONE NONATTAINMENT AREA
(ALL EMISSIONS EXPRESSED IN TONS PER SUMMER DAY)**

YEAR	BOSTON REGION ACTION EMISSIONS	EASTERN MASS. ACTION EMISSIONS	EMISSION BUDGET	DIFFERENCE (ACTION - BUDGET)
2000	N/A	287.877	N/A	N/A
2010	67.948	162.637	174.960	-12.323
2020	20.480	48.148	174.960	-126.812
2030	11.966	32.743	174.960	-142.217

TABLE 15-6

**WINTER CARBON MONOXIDE (CO) EMISSIONS ESTIMATES FOR THE CO MAINTENANCE AREA FOR THE NINE CITIES IN THE BOSTON AREA
(ALL EMISSIONS EXPRESSED IN TONS PER WINTER DAY)**

YEAR	BOSTON BUILD EMISSIONS	EMISSION BUDGET	DIFFERENCE (ACTION - BUDGET)
2010	157.36	228.33	-70.97
2020	121.54	228.33	-106.79
2030	120.17	228.33	-108.16

CONCLUSION

The Clean Air Act Amendments of 1990 established air quality conformity requirements for transportation plans, programs, and projects. The EPA published a final rule in the November 24, 1993, *Federal Register*, with several amendments through January 2008, providing procedures to be followed by the U.S. Department of Transportation in determining conformity of transportation plans, programs, and projects with the SIP for meeting air quality standards. Eastern Massachusetts has been designated a “moderate” ozone nonattainment area for the eight-hour ozone standard. Federal conformity regulations require that the impact of transportation plans, programs, and projects on nonattainment areas be evaluated.

The Boston Region MPO has conducted an air quality analysis for projects in the JOURNEY TO 2030 Amendment. The purpose of the analysis is to evaluate the air quality impacts of the Plan on the SIP. The analysis evaluates the change in ozone precursor emissions (VOCs and NOx) and CO emissions due to the implementation of the Plan. The modeling procedures and assumptions used in this air quality analysis follow the EPA’s and the Commonwealth’s guidelines and are consistent with all present and past procedures used by the Massachusetts DEP to develop and amend the SIP.

EOT has found the emission levels from all areas and all MPOs in eastern Massachusetts, including emissions resulting from implementation of the Plan, to be in conformance with the SIP according to state and federal conformity criteria. Specifically, the following conditions are met:

- The VOC emissions for the build scenarios are less than the 2009 VOC mobile-source emission budget for analysis years 2010 through 2030.

- The NOx emissions for the build scenarios are less than the 2009 NOx mobile-source emission budget for analysis years 2010 through 2030.
- The CO emissions for the build scenarios are less than projections for analysis years 2010 through 2030 for the nine cities in the Boston CO maintenance area.

In accordance with Section 176(c)(4) of the Clean Air Act as amended in 1990, the Boston Region MPO has completed this review and hereby certifies that JOURNEY TO 2030, with its amendments and its latest conformity determination, conditionally conform with 40 CFR Part 93 and 310 CMR 60.03 and are consistent with the air quality goals in the Massachusetts State Implementation Plan.

