



CAPE COD
COMMISSION

2016 REGIONAL TRANSPORTATION PLAN
Technical Appendix N: Air Quality
Conformity

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Technical Appendix N: Air Quality Conformity

The transportation system is a critical component of the Commonwealth of Massachusetts' infrastructure; it facilitates economic development, access to goods and services, and social interaction and enrichment. While the system has numerous benefits that users depend upon daily, it also contributes over one third of the Bay State's greenhouse gas (GHG) emissions, a key cause of climate change. Sprawling development patterns and automobile dependence also contribute to physical inactivity, which is associated with various negative health outcomes, while motor vehicle pollution contaminates the air, causing respiratory and other health conditions.

AIR QUALITY CONFORMITY DETERMINATION

This section comes from a July 2018 Air Quality Conformity Determination prepared by the Massachusetts Department of Transportation. This section documents the air quality conformity determination for the Massachusetts metropolitan planning organizations' 2016 regional transportation plans (RTPs) for the 1997 ozone National Ambient Air Quality Standards (NAAQS). It consists of the analysis of future vehicle emissions of ozone precursor pollutants.

STATEWIDE OZONE PRECURSOR ANALYSIS

LEGISLATIVE BACKGROUND ON OZONE

The 1970 Clean Air Act defined a one-hour national ambient air-quality standard (NAAQS) for ground-level ozone. The 1990 Clean Air Act Amendments further classified degrees of nonattainment of the one-hour standard based on the severity of 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; this was later extended first to 2003, then to 2007.

In 1997, the U.S. Environmental Protection Agency (EPA) proposed a new, eight-hour ozone NAAQS to replace the one-hour standard, effective June 15, 2005. The new standard was challenged in court, and after a lengthy legal battle, the courts upheld the standard, which was finalized in June 2004. The eight-hour standard was 0.08 parts per million (ppm), 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 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. Both nonattainment areas were required to reduce its emissions of VOCs and NO_x to achieve attainment of the eight-hour ozone NAAQS by 2009.

In March 2008, EPA published revisions to the eight-hour ozone NAAQS that established a level of 0.075 ppm (March 27, 2008; 73 FR 16483). After reviewing data from Massachusetts monitoring stations, the EPA sent a letter on December 16, 2011, proposing that only Dukes County would be designated as being in nonattainment for the new, proposed 0.075 ozone standard. Massachusetts concurred with these findings.

On May 21, 2012, the final rule (77 FR 30088) was published in the Federal Register, defining the 2008 NAAQS at 0.075 ppm, the standard that was promulgated in March 2008. A second rule (77 FR 30160), published on May 21, 2012, revoked the 1997 ozone NAAQS; the rule was to become effective one year after the 2008 NAAQS became effective (July 20, 2012). Also on May 21, 2012, the air-quality designation areas for the 2008 NAAQS were published in the Federal Register. In this Federal Register, the only area in Massachusetts that was designated as being in nonattainment for ozone was Dukes County. All other counties were classified as unclassifiable/ attainment. Therefore, the 13 MPOs are not required to perform a conformity determination for ozone for their regional transportation plans (RTP).

All of the Massachusetts MPOs and MassDOT continue to meet the requirements of air quality conformity according to the Code of Federal Regulations, and as evaluated through inter-agency consultation. Specifically, on March 6, 2015, (80 FR 12264, effective April 6, 2015) EPA published the Final Rulemaking, "Implementation of the 2008 National Ambient Air Quality Standards (NAAQS) for Ozone: State Implementation Plan Requirements; Final Rule." This rulemaking removed transportation conformity to the 1997 Ozone NAAQS (the standard the subject of a December 23, 2014 DC Circuit Court decision). Link to Final EPA Rulemaking: <http://www.gpo.gov/fdsys/pkg/FR-2015-03-06/pdf/2015-04012.pdf>

Since the current LRTPs adopted by the MPOs in August 2015 were developed, reviewed, and approved after April 6, 2015, air quality conformity determinations to the 1997 Ozone NAAQS was no longer required, as those standards and all associated area designations were permanently replaced by the 2008 NAAQS, which (with actually a stricter level of allowable ozone concentration than the 1997 standards) no longer designate Massachusetts as a non-attainment area(s) for ozone except for Dukes County as discussed above.

Since the adoption of the current LRTPs in 2015, new guidance has been released by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) regarding transportation conformity requirements. The United States Court of Appeals for the DC Circuit issued a decision in the South Coast Air Quality

Management District v. EPA, No. 15-1115 in February 2018, which struck down portions of the 2008 Ozone NAAQS SIP Requirements Rule concerning the ozone NAAQS.

The portions of the 2008 Ozone NAAQS SIP Requirements Rule addressed implementation requirements of the 2008 ozone NAAQS as well as the anti-backsliding requirements (ensuring that areas do not revert back to nonattainment) associated with the revocation of the 1997 ozone NAAQS. The impact of the decision addresses two groups of ozone areas described in the decision, one of which affects Massachusetts. It affects areas that were designated as nonattainment for the 1997 ozone NAAQS at the time of revocation and are designated as attainment for the 2008 ozone NAAQS. These areas have not been required to make transportation conformity determinations for any ozone NAAQS since the 1997 ozone NAAQS were revoked by EPA in April 2016.

With this new court ruling, Massachusetts is required to perform a transportation conformity determination on any new RTP and transportation improvement program (TIP), updates, and amendments that include the addition of a project that is not exempt (also known as a regionally significant project) from transportation conformity.

In past transportation conformity determinations, it has been the policy that the TIP comes from an air quality conforming RTP. As a result of this recent court ruling and with the guidance of FHWA and FTA, the MPOs are now required to perform a conformity determination for ozone since a conformity determination was not performed for the current RTP. MassDOT, after consultation with FHWA, FTA, EPA, and the Massachusetts Department of Environmental Protection (DEP), has determined that the MPOs would perform a conformity determination on the current RTPs, allowing each TIP to come from an air quality conforming RTP. This will allow for the approval of each MPO's 2019–2023 TIP and any other TIP amendments that may occur over the next year, prior to the adoption of the new RTPs in May 2019.

LEGISLATIVE BACKGROUND ON CARBON MONOXIDE

Although this document reports on statewide ozone precursor emissions, reporting on another criteria pollutant, carbon monoxide (CO) is still federally required for some MPOs in Massachusetts. The cities of Boston, Cambridge, Chelsea, Everett, Malden,

Medford, Quincy, Revere, and Somerville within the Boston Region MPO were classified as being in attainment for CO emissions with a carbon monoxide maintenance plan approved as part of the SIP. A conformity analysis for carbon monoxide was done as part of the current LRTP in 2015. However as of April 1, 2016, the 20-year maintenance period for this carbon monoxide maintenance area expired and transportation conformity is no longer required for this pollutant in these communities.

This ruling is documented in a letter from the EPA dated May 12, 2016.

The Lowell, Waltham, Worcester and Springfield carbon monoxide areas are classified attainment with a limited maintenance plan in place. No regional air quality analysis is required in limited maintenance plan areas as emissions may be treated as essentially not constraining for the length of the maintenance period because it is unreasonable

to expect that such areas will experience so much growth in that period that a violation of the carbon monoxide NAAQS would result. Therefore, in areas with approved limited maintenance plans, Federal actions requiring conformity determinations under the transportation conformity rule are considered to satisfy the “budget test.” All other transportation conformity requirements under 40 CFR 93.109(b) continue to apply in limited maintenance areas, including project level conformity determinations based on carbon monoxide hot spot analyses under 40 CFR 93.116. The latest conformity determinations for Lowell, Waltham, Worcester and Springfield can be found in the respective MPO’s 2019–2023 TIPs.

AIR QUALITY ANALYSIS CRITERIA

The air quality analysis was prepared using the following criteria:

- The horizon years for the travel demand model analysis are established as 2012 (base year), 2020, 2030, and 2040.
- Projections for future population, employment, and households were developed jointly by MassDOT, the Metropolitan Area Planning Council, and the Donahue Institute of the University of Massachusetts. This was a cooperative and iterative process conducted throughout 2014 and into 2015, with input and comments from each MPO in the Commonwealth.
- Demographic projections were incorporated into the statewide travel demand model, along with updated travel characteristics, obtained through the 2010-2011 Massachusetts Travel Survey and the U.S. Census.
- The transit service assumptions for the MBTA were included in this analysis and were based on MBTA service in the spring of 2012. Travel demand model calibration was performed using the Ridership and Service Statistics, MBTA Blue Book.
- Factors used for calculating emissions changes were determined using the EPA’s latest emissions model, Motor Vehicle Emissions Simulator (MOVES) 2014. Inputs used for 2012 through 2040 were received from the DEP and include information about programs that were submitted to the EPA as the strategy for the Commonwealth to attain ambient air-quality standards.
- The Federal Highway Administration’s Highway Performance Monitoring System (HPMS) is used to track daily vehicle-miles of travel (VMT). For each MPO region, adjustment factors that compare the 2012 HPMS VMT to the 2012 base year VMT estimated by the travel demand models transportation model VMT were developed. The adjustment factors were then applied to all modeled VOC and NOx emissions for the years 2020 through 2040 to ensure consistency with EPA-accepted procedures.

INCLUSION OF REGIONALLY SIGNIFICANT TRANSPORTATION PROJECTS

Only “regionally significant” projects are included in the travel-demand modeling. Regionally significant projects are defined as follows:

A transportation project (other than an exempt project) that is on a facility that serves regional transportation needs (such as access to and from the area outside of the MPO region; major activity centers in the region; major planned developments, such as new retail malls and sport complexes; and 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.

The following table lists the regionally significant projects proposed in the RTPs:

TABLE 1. REGIONALLY SIGNIFICANT PROJECTS INCLUDED IN THE TRAVEL DEMAND MODEL

| ANALYSIS YEAR | COMMUNITY | PROJECT DESCRIPTION |
|---------------|-----------------------|--|
| 2020 | Bedford and Billerica | Middlesex Turnpike Improvements, From Crosby Drive North to Manning Road, Phase III |
| 2020 | Newton and Needham | Reconstruction of Highland Avenue, Needham Street and Charles River Bridge, from Webster Street to Route 9 |
| 2020 | Weymouth and Abington | Reconstruction and Widening on Route 18 (Main Street) From Highland Place to Route 139 |
| 2020 | Woburn | Reconstruction of Montvale Avenue, from I-93 Interchange to Central Street |
| 2020 | Woburn | Bridge Replacement, New Boston Street over MBTA |
| 2030 | Boston | Reconstruction of Rutherford Avenue, from City Square to Sullivan Square |
| 2030 | Framingham | Intersection Improvements at Route 126 and Route 135/MBTA and CSX Railroad |
| 2030 | Lexington | Route 4/225 (Bedford Street) and Hartwell Avenue |
| 2030 | Natick | Bridge Replacement, Route 27 (North Main St.) over Route 9 (Worcester St.) and Interchange Improvements |
| 2030 | Somerville | McGrath Boulevard Project |
| 2040 | Barnstable | Hyannis Access Improvements |
| 2030 | Westborough | Route 9 Improvements |
| 2030 | Oxford | Route 20 capacity improvement |
| 2030 | Millbury | Turnpike/Route 146 int. improve. |
| 2030 | Worcester | I-290 Bridge Expansion |
| 2030 | North Andover | Route 114 Reconstruction |
| 2030 | Athol | Route 2 Interchange @ S. Athol Rd |
| 2040 | Philipston to Athol | Route 2 Expansion |
| 2040 | Westford | Route 110 widening |
| 2040 | Tewksbury, Andover | Lowell Junction Interchange |
| 2020 | Abington, Weymouth | Route 18 Widening (funded in Boston Region) |
| 2020 | Wilbraham | Boston Road Reconstruction |
| 2020 | Hadley | Route 9 Phase 1 |
| 2030 | Hadley | Route 9 Phase 2 |
| 2030 | Hadley | Route 9 Phase 3 |
| 2030 | Middleborough | Routes 44/28/18 Rotary |
| 2040 | Taunton | Routes 24 & 140 Improvements |
| 2040 | Fall River | Route 79 Blvd |

EMISSIONS INVENTORY ASSUMPTIONS

This air quality analysis was done in relation to the State Implementation Plan mobile- source ozone emission projections that were approved in March 2008 for the revoked 1997 eight-hour NAAQS for VOC and NOx. The VOC mobile-source emission budget for 2009 for the Eastern Massachusetts Ozone Nonattainment Area was set at 63.50

tons per summer day and at 10.73 tons per summer day for the Western Massachusetts Ozone Nonattainment Area. The NOx mobile-source emission budget for 2009 for the Eastern Massachusetts Ozone Nonattainment Area was set at 174.96 tons per summer day and at 27.73 tons per summer day for the Western Massachusetts Ozone Nonattainment Area.

The Massachusetts Department of Transportation, Office of Transportation Planning (MassDOT Planning) estimated the results for the Eastern and Western Massachusetts Ozone Nonattainment Areas using the Statewide travel demand model set, based on the latest planning assumptions (as outlined in this document).

OZONE ANALYSIS RESULTS

MassDOT's Office of Transportation Planning conducted an air-quality conformity analysis for the Commonwealth's 13 MPO's 2016 Regional Transportation Plans. The purpose of the conformity test is to show consistency with the emissions budgets set forth in the SIP. Additional specific information regarding the analysis and modeling methods, latest planning assumptions, and consultation procedures are all detailed in each MPO's 2016 RTP (and appendices).

The test used in this analysis was to show that the RTPs are consistent with the emission budgets set for the revoked 1997 eight-hour ozone NAAQS as described above. The results are shown in the tables below. They include emissions from regionally significant projects as represented in the statewide travel demand model and off-model emissions from commuter rail, commuter boat, and buses:

The emissions from the following MPOs have been combined to show conformity with the SIP for the Eastern Massachusetts Ozone Nonattainment Area:

- Cape Cod MPO
- Central Massachusetts MPO
- Merrimack Valley MPO
- Boston MPO
- Montachusett Region MPO
- Northern Middlesex MPO
- Old Colony MPO
- Southeastern Region MPO
- Martha's Vineyard Commission*
- Nantucket Planning and Economic Development Commission*

*These regions do not contain any official urbanized areas, but are considered to be MPOs for planning purposes.

TABLE 2. VOC EMISSIONS ESTIMATES EASTERN MASSACHUSETTS OZONE NONATTAINMENT AREA
(ALL EMISSIONS IN TONS PER SUMMER DAY: TPSD)

| YEAR | VOC ACTION EMISSIONS | VOC BUDGET | DIFFERENCE (ACTION – BUDGET) |
|------|----------------------|------------|------------------------------|
| 2012 | 30.56 | n/a | n/a |
| 2020 | 6.68 | 63.50 | -56.82 |
| 2030 | 5.68 | 63.50 | -57.82 |
| 2040 | 4.69 | 63.50 | -58.81 |

TABLE 3. NOX EMISSIONS ESTIMATES EASTERN MASSACHUSETTS OZONE NONATTAINMENT AREA (TPSD)

| YEAR | NOX ACTION EMISSIONS | NOX BUDGET | DIFFERENCE (ACTION – BUDGET) |
|------|----------------------|------------|------------------------------|
| 2012 | 116.97 | n/a | n/a |
| 2020 | 27.24 | 174.96 | -147.72 |
| 2030 | 20.63 | 174.96 | -154.33 |
| 2040 | 14.02 | 174.96 | -160.94 |

The emissions from the following MPOs have been combined to show conformity with the SIP for the Western Massachusetts Nonattainment Area:

- Berkshire Region MPO
- Franklin Regional Council of Governments*
- Pioneer Valley MPO

This region does not contain any official urbanized areas, but is considered to be an MPO for planning purposes.

TABLE 4. VOC EMISSIONS ESTIMATES WESTERN MASSACHUSETTS OZONE NONATTAINMENT AREA (TPSD)

| YEAR | VOC ACTION EMISSIONS | VOC BUDGET | DIFFERENCE (ACTION – BUDGET) |
|------|----------------------|------------|------------------------------|
| 2012 | 3.61 | n/a | n/a |
| 2020 | 1.08 | 10.73 | -9.65 |
| 2030 | 1.02 | 10.73 | -9.71 |
| 2040 | 0.96 | 10.73 | -9.77 |

TABLE 5. NOX EMISSIONS ESTIMATES WESTERN MASSACHUSETTS OZONE NONATTAINMENT AREA (TPSD)

| YEAR | NOX ACTION EMISSIONS | NOX BUDGET | DIFFERENCE (ACTION – BUDGET) |
|------|----------------------|------------|------------------------------|
| 2012 | 13.10 | n/a | n/a |
| 2020 | 5.03 | 27.73 | -22.70 |
| 2030 | 3.97 | 27.73 | -23.76 |
| 2040 | 2.92 | 27.73 | -24.81 |

Based on the preceding results, MassDOT Planning has found that the combined emission levels from transportation projects contained in the 2016 Regional Transportation Plans and 2019–2023 Transportation Improvement Programs – for both former ozone nonattainment areas in Massachusetts – demonstrate conformity with the SIP, the Clean Air Act, and the EPA conformity regulations (40 CFR part 51).

Through the interagency air quality consultation process (involving U.S. Department of Transportation, EPA, DEP, MassDOT, and the MPOs) the latest EPA rulemakings, and the referenced legislative background and legal issues, currently applicable ozone standards, area designations, and requirements were all reviewed.

The ozone analysis outlined in this section demonstrates that the implementation of the 2016 RTPs and 2019–2023 TIPs meets the “budget test,” and therefore satisfy the air quality ozone and carbon monoxide conformity criteria, and is consistent with the air quality goals in the Massachusetts SIP.

GREENDOT POLICY AND GLOBAL WARMING SOLUTIONS ACT (GWSA)

In 2010, the Massachusetts Department of Transportation (MassDOT) launched its comprehensive sustainability initiative, the GreenDOT Policy. GreenDOT was born of numerous state laws and policies aimed at reducing GHG emissions, improving public health, and leading on environmental stewardship. The Global Warming Solutions Act (GWSA), which Governor Deval Patrick signed into law in 2008, set legally-enforceable goals of reducing GHG emissions by 25 percent below 1990 levels by 2020, and 80 percent below 1990 levels by 2050. The Healthy Transportation Compact, created by the 2009 Transportation Reform Law, is a coordinated multi-agency effort to encourage the healthy transportation modes of walking, bicycling, and public transit, and to ensure that public health factors are taken into account in transportation decision-making. In addition, Executive Orders 484 and 515, known as Leading by Example and Environmental Purchasing Policy respectively, require state agencies to invest public resources in ways that support environmental sustainability by conserving energy and water, implementing efficiency measures, and producing or purchasing renewable energy. Taken together, the Global Warming Solutions Act, Healthy Transportation Compact, and Leading by Example policy form the foundation for the GreenDOT Policy.

The GreenDOT Policy Directive, released in June 2010, set forth the primary goals of reducing GHG emissions; promoting the healthy transportation modes of walking, bicycling, and public transit; and supporting smart growth development. The 2012 GreenDOT Implementation Plan then outlined specific tasks and targets for achieving these goals, including the Mode Shift Goal, which calls for a tripling of the amount of walking, bicycling, and public transit ridership in Massachusetts between 2010 and 2030. The Cape Cod Regional Transportation Plan (RTP) reflects the vision of the GreenDOT with the Multimodal Options/Healthy Transportation Goal including a Performance Measure reflecting the state Mode Shift Goal.

GREENHOUSE GAS (GHG) ANALYSIS FOR HIGHWAY REGIONAL TARGET PROJECTS NOT INCLUDED IN THE STATEWIDE MODEL

Under MassDOT guidance, the impacts of RTP projects on GHG emissions have been evaluated and considered as a part of the project selection process. The anticipated GHG impacts from projects specifically identified in the RTP are as follows.

TABLE 6. HIGHWAY REGIONAL TARGET PROJECTS – ANTICIPATED GHG IMPACTS

| PROJECT | ANTICIPATED GHG IMPACT |
|--|--|
| Barnstable: Hyannis Access Improvements | Quantified Decrease in Emissions from Traffic Operational Improvement – Verified by statewide modeling |
| Route 28 Multimodal Improvements: Various Locations | Assumed Nominal Decrease in Emissions from Sidewalk and Bicycle Infrastructure |
| Route 6 Outer Cape Safety Improvements | Assumed Nominal Decrease in Emissions from Sidewalk and Bicycle Infrastructure |
| Canal Area: Belmont Circle/ Route 25 Ramp Improvements | Quantified Decrease in Emissions from Traffic Operational Improvement – To be verified by statewide modeling |
| Canal Area: Route 6 Exit 1C Reconfiguration | Quantified Decrease in Emissions from Traffic Operational Improvement – To be verified by statewide modeling |
| Cape Cod Rail Trail Expansion: S. Wellfleet to Provincetown | Assumed Nominal Decrease in Emissions from Bicycle Infrastructure |
| Infrastructure Improvements (Platform, Parking, etc.) for Buzzards Bay Commuter Rail Service | Assumed Nominal Decrease in Emissions from Other Improvements |
| Cape Cod Rail Trail Expansion: Barnstable to Sandwich | Assumed Nominal Decrease in Emissions from Bicycle Infrastructure |
| Shining Sea Bikepath Extension to Cape Cod Canal Bikepath | Assumed Nominal Decrease in Emissions from Bicycle Infrastructure |

More detailed GHG analysis of projects is conducted as they are considered for inclusion in the Transportation Improvement Program.

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