

Boston-Logan International Airport



EDR

2014 Environmental Data Report

September 2015
EOEA #3247

SUBMITTED TO
Executive Office of Energy and
Environmental Affairs, MEPA Office

SUBMITTED BY
Massachusetts Port Authority
Strategic & Business Planning

PREPARED BY



IN ASSOCIATION WITH
Harris Miller Miller & Hanson, Inc.
KB Environmental Sciences, Inc.
ICF International, Inc.

Boston-Logan International Airport



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September 30, 2015

The Honorable Matthew Beaton, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114

Re: *Boston-Logan International Airport 2014 Environmental Data Report (2014 EDR) - EEA #3247*

Dear Secretary Beaton:

On behalf of the Massachusetts Port Authority (Massport), I am pleased to submit for your review, the *Boston-Logan International Airport 2014 Environmental Data Report (2014 EDR)*. Massport is proud of its decades-long commitment to providing timely and extensive information to the public and regulators on Logan Airport environmental conditions; passenger activity levels and aircraft operations; ground access; planning activities; and updates on mitigation programs. Massport is the only airport in the United States that has consistently reported on environmental conditions on an annual basis since 1978. This “environmental report card” documents Massport’s commitment to operating Logan Airport safely and efficiently, while minimizing impacts to the community and environment.

Logan Airport continues to experience change. In 2014 it saw an increase in passengers’ activity levels that marked a continued recovery from the recent economic recession, as airlines serving Logan Airport continued to upgrade their fleets with newer and larger aircraft with improved environmental performance. Massport opened the new Rental Car Center – Logan’s first LEED® Certified Gold building. The long-awaited East Boston Greenway Connector opened in July 2014, as work on the Neptune Road Edge Buffer commenced.

Air traffic increases continued to be driven primarily by the growth of low-cost carriers, including JetBlue Airways and Southwest Airlines, and a significant increase in demand for international air service to existing and new destinations. In 2014, Logan Airport served 31.6 million passengers, exceeding the previous 2013 historic peak. Despite this growth in number of passengers, annual aircraft operations were nearly 140,000 operations below the historic peak of over 507,000 annual operations, reached in 1998 when Logan Airport served 26.5 million passengers.

As described throughout the *2014 EDR*, Massport remains fully committed to minimizing the effects of Airport operations and to a continued collaboration with the community. The contents of the *2014 EDR* are outlined below.

Content and Structure

The *2014 EDR* responds fully to the Secretary’s Certificate on the *Boston-Logan International Airport 2012/2013 Environmental Data Report*, including responding to all comments. The document reports on the status of airport operations, environmental conditions, and Massport milestones achieved in 2014 and provides updates on more recent significant Logan Airport planning activities. The EDR also updates 2014 conditions for the following categories:

- Passenger levels, aircraft operations, aircraft fleets, and cargo volumes;
- Planning, design, and construction activities at Logan Airport;
- Regional transportation statistics and initiatives;

- Key environmental indicators (Ground Access, Noise Abatement, Air Quality/Emissions Reduction, and Water Quality/Environmental Compliance and Management);
- Status of Logan Airport project mitigation; and
- Sustainability initiatives.

The 2014 EDR also includes:

- Secretary's Certificate on the *Boston-Logan International Airport 2012/2013 EDR* and other comment letters received on the *2012/2013 EDR*;
- Proposed scope for the *2015 EDR*;
- Distribution list; and
- Supporting technical appendices (included in the attached CD).

Review Period, Distribution, and Consultation

A 30-day public comment period for the *2014 EDR* will begin on **October 7, 2015**, the publication date of the next Environmental Monitor, and will end on **November 6, 2015**. The distribution list included as Appendix D indicates which listed parties will receive a digital and/or printed copy of the *2014 EDR*. The full *2014 EDR* will also be available on Massport's website (www.massport.com).

A MEPA consultation session on the *2014 EDR* is scheduled for **October 20, 2015 at 4:00 PM**, in the Noddle Island Community Room of the new Rental Car Center, 15 Transportation Way, East Boston (Logan Airport). Additional copies of the *2014 EDR* may be obtained by calling (617) 568-3507 or emailing sdalzell@massport.com during the public comment period.

Future Filings and Timing

Starting in 1997, Massport has followed a five-year filing cycle for the *EDRs* and Environmental Status and Planning Reports (*ESPRs*), with *EDRs* filed for each year between the *ESPRs*. The last Logan Airport *ESPR* was filed for calendar year 2011, a combined *2012/2013 EDR* was filed in December, 2014 and this *2014 EDR* will be filed on September 30, 2015. The *2015 EDR* is planned to be filed in late 2016.

Massport hopes that you and the other reviewers of the *2014 EDR* find it informative and complete. We look forward to your review of this document and to close consultation with you and other reviewers in the coming weeks. Please feel free to contact me at (617) 568-3524, if you have any questions.

Very truly yours,

Massachusetts Port Authority



Stewart Dalzell, Deputy Director
Environmental Planning & Permitting,
Strategic & Business Planning Department

cc: 2014 EDR Distribution List (Appendix D in the *2014 EDR*)
Betty Desrosiers, Massport

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Introduction/ Executive Summary

Introduction

Massport is pleased to continue its practice of providing the community with an extensive, almost three-decade record of Boston-Logan International Airport (Logan Airport or Airport) environmental trends, development planning, operations and passenger levels, and Massport’s mitigation commitments in this *Logan Airport 2014 Environmental Data Report (EDR)*. Logan Airport, owned and operated by the Massachusetts Port Authority (Massport), is New England’s primary international and domestic airport. The *2014 EDR* is one in a series of annual environmental review documents submitted to the Massachusetts Environmental Policy Act (MEPA)¹ Office since 1979 to report on the cumulative environmental effects of Logan Airport’s operations and activities. Logan Airport is the first airport in the nation for which an annual environmental report card on airport activities was prepared; Massport continues to be a leader in environmental reporting.

Approximately every five years, Massport prepares an Environmental Status and Planning Report (ESPR), which provides an historical and prospective view of Logan Airport. EDRs, prepared annually in the intervals between ESPRs, provide a review of environmental conditions for the reporting year compared to the previous year. Since 2000, environmental impacts associated with Logan Airport have been steadily decreasing, as reported on each year in the EDR/ESPR filings. This *2014 EDR* follows the *2012/2013 EDR* and reports on 2014 conditions. In 2014 at Logan Airport, the air quality and noise environment are substantially better than conditions reported during the 1990s and



Annual Environmental Data Reports and Environmental Status and Planning Reports since 1991.
Source: VHB

¹ Massachusetts General Laws Chapter 30, Sections 61-62H. MEPA is implemented by regulations published at 301 Code of Massachusetts Regulations (CMR) 11.00 (the “MEPA Regulations”).

2014 EDR

Boston-Logan International Airport

early 2000s. This improvement is a result of both Massport's efforts to mitigate environmental impacts and airline industry trends towards greater efficiency.

The scope for this *2014 EDR* was established by the Secretary of the Executive Office of Energy and Environmental Affairs' (EEA) Certificate dated February 6, 2015, which is included in *Appendix A, MEPA Certificates and Responses to Comments*. This *2014 EDR* updates and compares the data presented in the *2012/2013 EDR*, and for 2014 presents information on:

- Activity Levels (including aircraft operations, passenger activity, and cargo)
- Airport Planning activities and upcoming projects
- Logan Airport's role in the regional transportation network
- Ground Access to and from the Airport
- Noise Abatement
- Air Quality Emissions Reduction
- Water Quality/Environmental Compliance
- Mitigation Commitments
- Sustainability and Resiliency

To enhance the usefulness of this *2014 EDR* as a reference document for reviewers, this report also presents historical data on the environmental conditions at Logan Airport dating back to 1990, in instances where historical information is available. Historical data are included in the technical appendices (CD only).

EOEA # 3247

Submitted By

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Logan Airport Planning Context

Logan Airport, New England’s primary domestic and international airport, plays a key role in the metropolitan Boston and New England passenger and freight transportation networks and is a significant contributor to the regional economy. Logan Airport fulfills a number of roles in the local, New England, and national air transportation networks. It serves as the primary airport serving the Boston metropolitan area, is the principal New England airport for long-haul services, and is a major U.S. international gateway airport for transatlantic services. Logan Airport serves as a regional connecting hub for small northern

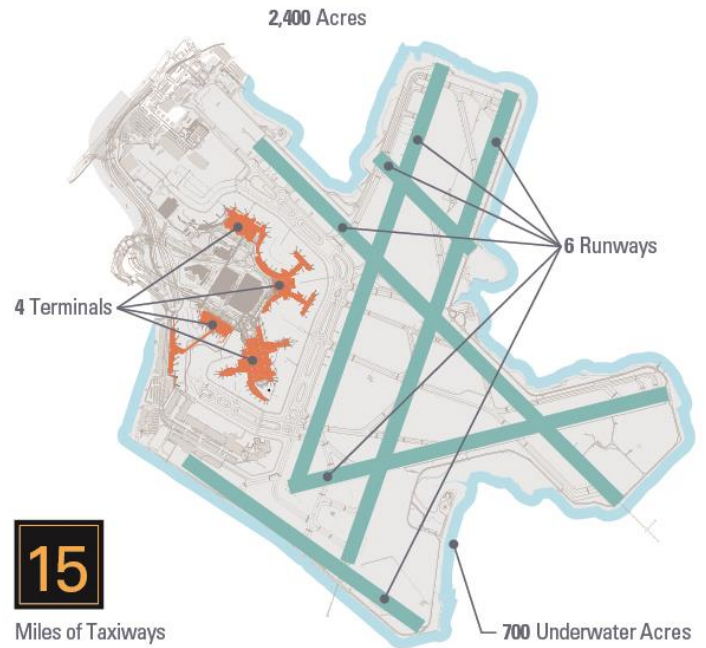


New England markets and the Massachusetts maritime counties of Barnstable, Dukes, and Nantucket; the Airport is also the busiest air cargo center in New England.

The Airport boundary encompasses approximately 2,400 acres in East Boston and Winthrop, including approximately 700 acres underwater in Boston Harbor. Logan Airport, shown in Figures 1-1, 1-2, and 1-3, is one of the most land-constrained airports in the nation, and is surrounded on three sides by Boston Harbor.

Logan Airport is close to downtown Boston and is accessible by two public transit lines and a well-connected roadway system. The airfield comprises six runways, approximately 15 miles of taxiway, and approximately 240 acres of concrete and asphalt apron. Logan Airport has four passenger terminals (Terminal A, B, C, and E), each with its own ticketing, baggage claim, and ground transportation facilities. Massport continues to evaluate and implement enhancements to Logan Airport’s security, operational efficiency, and accessibility to and from the Boston metropolitan area, while carefully monitoring the environmental effects of Logan Airport operations.

Figure 1-1 Logan Airport Layout



2014 EDR

Boston-Logan International Airport

In 2014, Logan Airport was the 18th busiest U.S. commercial airport in North America as ranked by aircraft operations, and the 19th busiest in North America ranked by number of passengers.² In the international sector, in 2014 Logan Airport ranked as the 7th largest U.S. international transatlantic gateway, and 12th largest international gateway globally. Boston is an important national and international destination, and air carriers are looking to expand international service at Logan Airport based on current and anticipated demand.

In 2014, approximately 12,000 people were employed at Logan Airport. This included approximately 960 Massport airport staff and administration employees.³ Including airport-related activities, Logan Airport contributes \$13.4 billion annually to the local economy. The Massachusetts Department of Transportation (MassDOT) Aeronautics Division's Statewide Airport Economic Impact Study found that in 2014, Logan Airport supported approximately 132,000 jobs. The total economic impact includes on-Airport, visitor-related, construction, and all associated multiplier impacts.⁴

Figure 1-2 Aerial View of Logan Airport

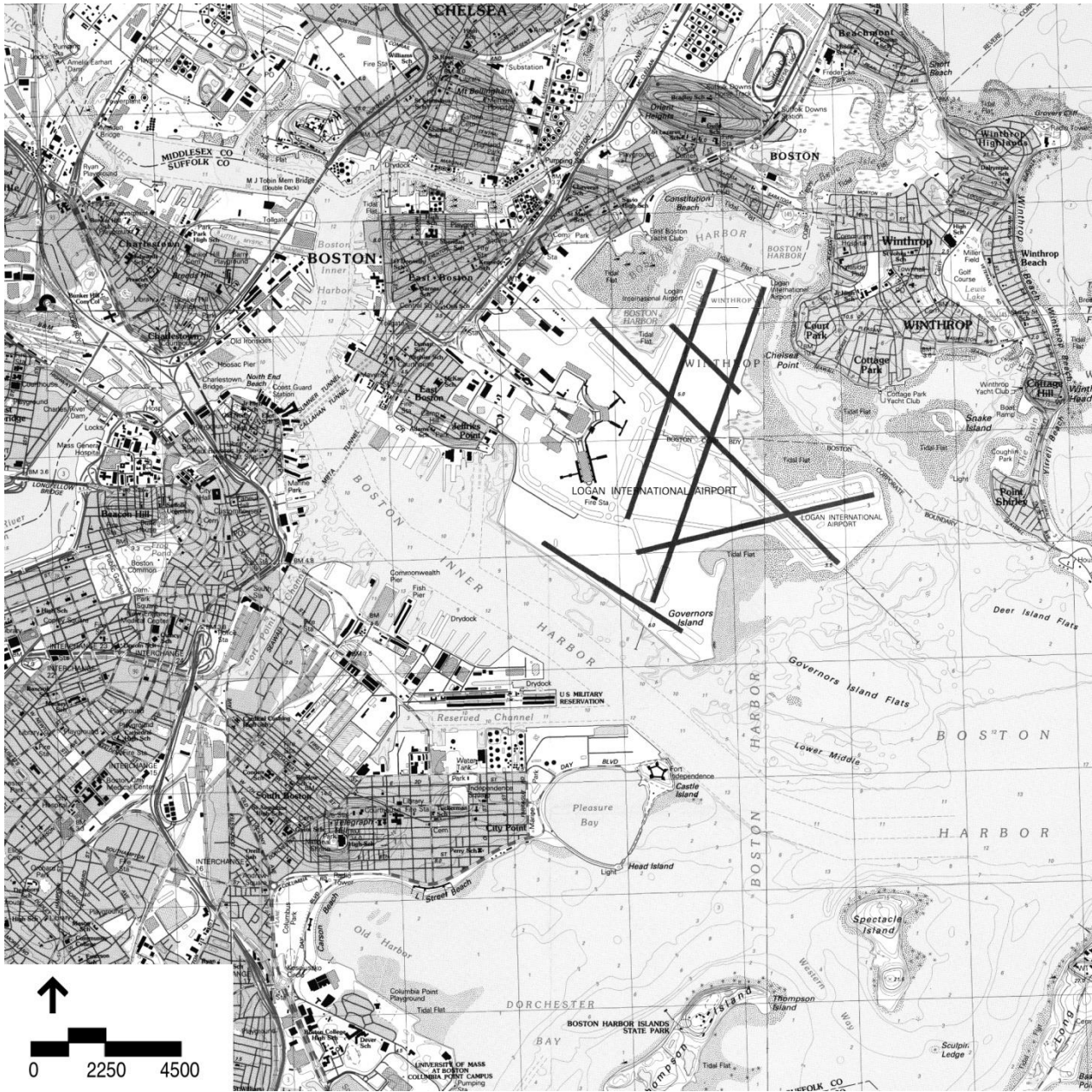


Source: Aerial photo, Massport, 2012.

2 Airports Council International, 2014 North American Air Traffic Report.
3 Massport Comprehensive Financial Report, 2015
4 MassDOT Statewide Airport Economic Impact Study, 2014.


2014 EDR
Boston-Logan International Airport

Figure 1-3 Logan Airport and Environs



Source: U.S. Geological Service.

2014 Highlights and Key Findings

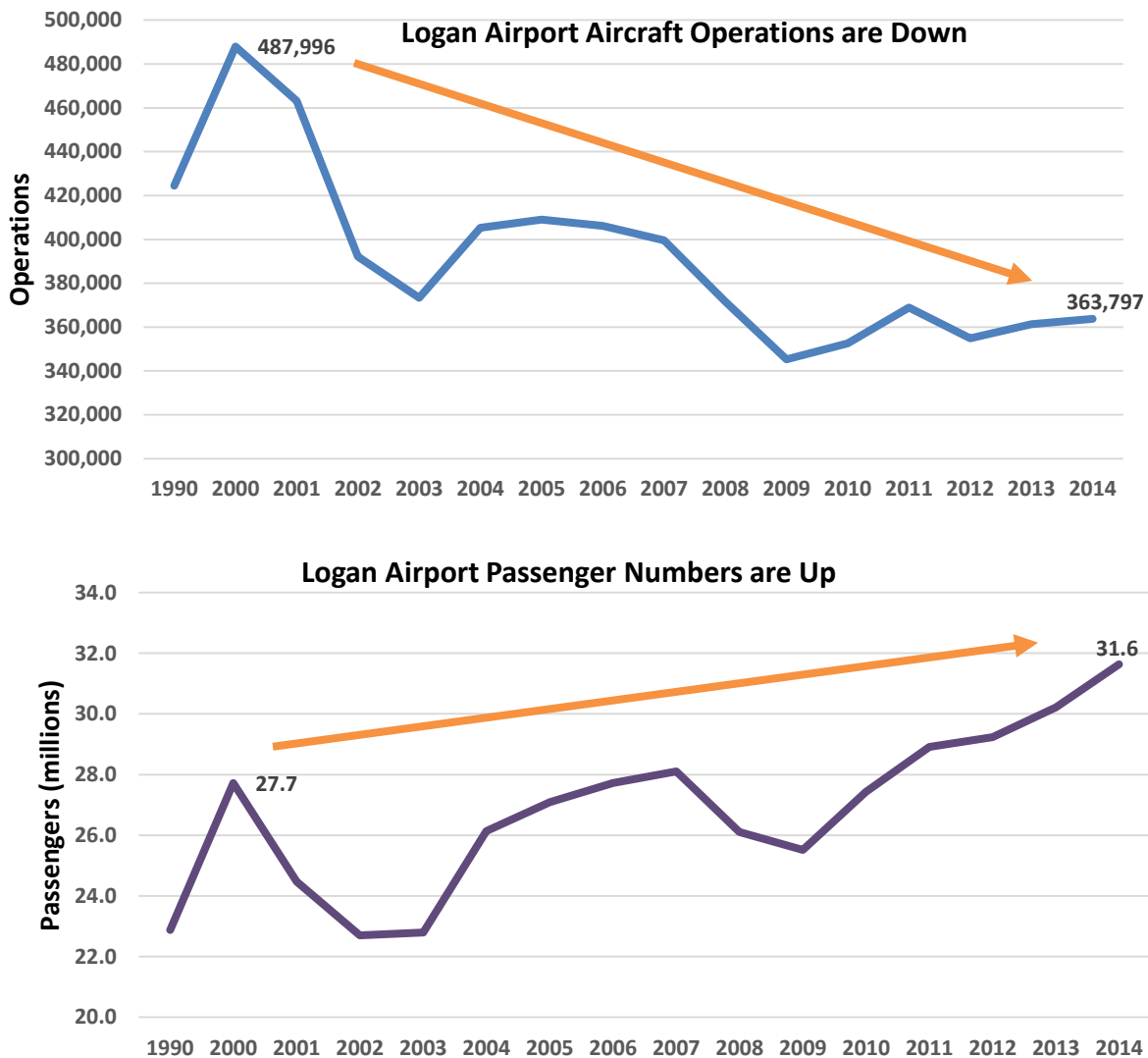
This section provides a brief overview of key findings, by chapter, at Logan Airport in 2014. Additional information concerning Airport activities is provided in subsequent chapters. Massport's efforts to further sustainability through specific projects and initiatives are highlighted with a sustainability leaf. 

Activity Levels

- The total number of air passengers increased by 4.7 percent to 31.6 million in 2014, compared to 30.2 million in 2013 (Figures 1-4 and 1-5). The 2014 passenger level represents a new record high for Logan Airport.
- Passenger-aircraft operations accounted for 91 percent of total aircraft operations. The total number of aircraft operations increased slightly from approximately 361,339 in 2013 to 363,797 in 2014, a 0.7-percent increase. This was preceded by a 2.4-percent increase in 2013. Despite the increase, aircraft operations at Logan Airport remained well below the 487,996 operations in 2000 and the historical peak achieved in 1998. In 1986, Logan Airport served only 21.7 million air passengers compared to 31.6 million in 2014 with roughly the same number of total operations (363,995 operations).
- Aircraft efficiency continued to increase in 2014 as the average number of passengers per aircraft operation grew from 83.6 in 2013 to 87.0 in 2014. (Figure 1-4). This positive trend is indicative of the industry-wide shift toward higher aircraft load factors and greater efficiency and an increase in the number of domestic and international destinations.

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Figure 1-4 Logan Airport Annual Passenger Activity Levels and Operations, 1990, 2000-2014



Source: Massport.

Logan Airport is an important origin and destination (O&D)⁵ airport both nationally and internationally and has been one of the fastest growing major U.S. airports, in terms of number of passengers, over the last four years. There has been growth in both domestic and international passenger numbers. In 2014, there were approximately 4.9 million international and 26.5 million domestic passengers (excluding general aviation [GA]).

While both domestic and international passenger numbers are increasing, international passenger demand is projected to increase at a faster rate than domestic passenger demand. Total international annual passenger

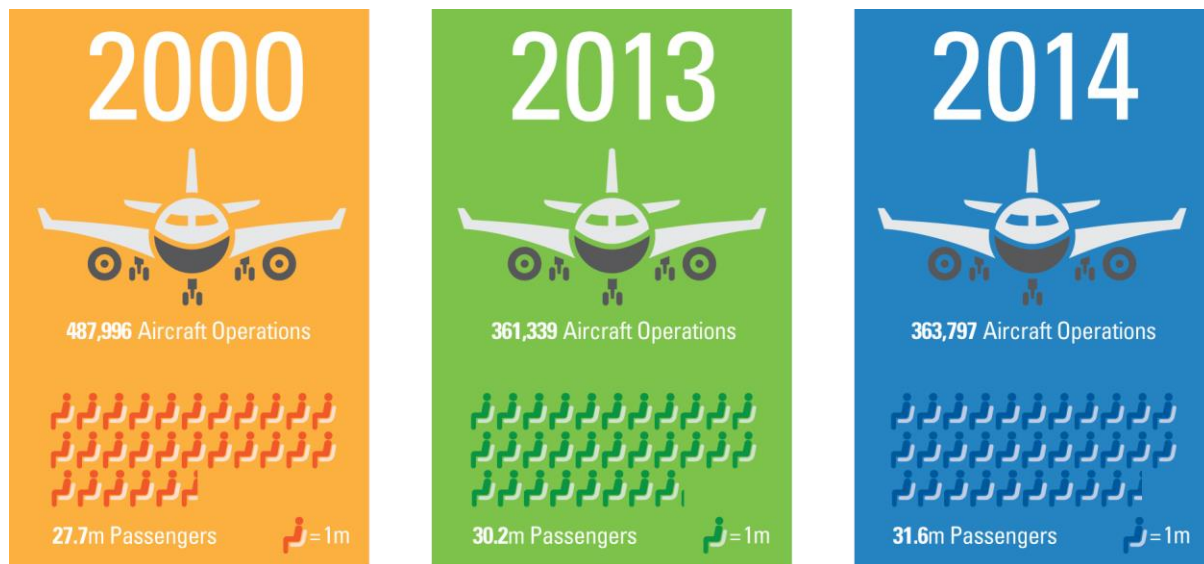
⁵ "Origin and destination" traffic refers to the passenger traffic that either originates or ends at a particular airport or market. A strong O&D market like Boston generates significant local passenger demand, with many passengers starting their journey and also ending their journey in that market. O&D traffic is distinct from connecting traffic, which refers to the passenger traffic that does not originate or end at the airport but merely connects through the airport enroute to another destination.

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numbers increased from 4.4 million in 2013 to 4.9 million in 2014, a 9.8-percent increase. The strong international passenger growth was driven by several new nonstop services introduced by a number of foreign airlines including Emirates, Turkish Airlines, Hainan Airlines, and Cathay Pacific. Recently launched international destinations include Mexico City, Tokyo, Beijing, Dubai, Istanbul, Panama City, Hong Kong, and Shanghai.

Figure 1-5 Logan Airport Annual Passenger and Operations, 2000, 2013, 2014



A series of positive factors have combined to produce this exceptional passenger growth. Continued economic growth is the key determinant of Logan Airport's long-term passenger demand. The forecast presented in the *2011 ESPR* was updated as part of an ongoing strategic planning effort. In the short-term, Logan Airport is projected to reach 32.9 million passengers in 2015.⁶ According to the forecast scenario, Logan Airport's passenger traffic is forecast to reach 35 million annual passengers by 2022 or sooner.

International passengers made up approximately 16 percent of total Airport passengers in 2014, and this is projected to increase steadily to over 19 percent of the total by 2030. International air passengers are anticipated to reach 6 million by 2022 and 8 million by 2030.

Additional information is provided in *Chapter 2, Activity Levels*.

Airport Planning

Logan Airport facilities have been accommodating recent increases in passenger activity and operations on the airside, but the terminal, roadways, and parking facilities are strained by the increase in passengers. Upcoming planning projects and initiatives need to support this growth and projected future demand. Massport's key planning initiatives are focusing on meeting international passenger demand, providing an efficient roadway system and parking facilities, and enhancing passenger convenience. Select planning initiatives are described below. The status of all planning projects are described in *Chapter 3, Airport Planning*.

⁶ Massport and InterVISTAS forecast.

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Airport Projects

- **Parking Consolidation Project.** Massport is consolidating 2,050 temporary parking spaces as an addition to the West Garage and at the existing surface lot between the Logan Office Center and the Harborside Hyatt. These spaces constitute all the remaining spaces permitted under the Logan Airport Parking Freeze.⁷ The West Garage addition is atop the existing Hilton Hotel parking lot. The project will incorporate sustainable design and resiliency elements. The consolidation is expected to be completed in 2015.

- **Terminal E Renovation and Enhancements Project.** This project includes interior and exterior improvements at Terminal E to accommodate regular service by wider and longer Group VI aircraft. The project does not include any new gates, but will reconfigure three existing gates to accommodate Group VI aircraft (including the Airbus A380 and Boeing 747-8 primarily used by international air carriers).

An addition to the west side of Terminal E will allow passenger holdrooms to be reconfigured to accommodate the larger passenger loads associated with larger aircraft. The project also includes modifications to the airfield to meet required Federal Aviation Administration (FAA) safety and design standards to accommodate the larger aircraft. An Environmental Assessment (EA) was filed and FAA issued a Finding of No Significant Impact (FONSI) on July 29, 2015. Construction commenced in 2015.



Boeing 787-8 aircraft at Logan Airport.
Source: Massport

- **Terminal E Modernization Project.** To accommodate existing and long range forecasted demand for international service in an efficient, environmentally-sound manner that also improves customer service, Massport is planning to extend the existing International Terminal E. Modernizing Terminal E would add the three contact gates approved in 1996 as part of the International Gateway West Concourse project (EEA #9791), which were never constructed, and an additional two to four additional new gates in an extended concourse. The facility would be designed to function as a noise barrier. New passenger handling and passenger holdrooms are being planned, as well as possible additional Federal Inspection Services (FIS) and Customs and Border Patrol facilities to supplement the existing FIS areas in Terminal E. Previously a Satellite FIS Facility was planned and permitted in 2001 for Terminal B but never constructed (EEA # 9791). A key feature of this project is the first direct pedestrian connection from the MBTA Blue Line Airport Station to the terminal complex at Logan Airport. This project would also include improvements to Airport roadways to facilitate access. The project is in the conceptual design phase and initial construction would likely begin before 2018. Massport expects to file an Environmental Notification Form (ENF) in the very near future.

⁷ 310 Code of Massachusetts Regulations 7.30 and 40 CFR 52.1120.

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- **Logan Airport Greenway Connector Project.** The Logan Airport Greenway Connector (“Greenway Connector”) is a pedestrian/bicycle path connecting the Bremen Street Park to the future City of Boston Narrow Gauge Connector, a pedestrian/bicycle path that begins at the Greenway Overlook and continues to Constitution Beach. The Greenway Connector and the City of Boston Link provide a continuous pedestrian/bicycle path from Massport’s Piers Park on the East Boston waterfront to Constitution Beach. Construction of the Greenway Connector began in spring 2013 and was completed in July 2014.



East Boston Greenway Connector
Source: VHB

- **Landside Ground Access Operating Improvements.** A series of recent projects have been designed to yield substantial environmental benefits, particularly in the areas of ground access efficiencies and associated air quality emissions reductions on-Airport and in East Boston, as documented below.

- The Rental Car Center (RCC) reduces Airport VMT as well as improves roadway and intersection operations through: consolidating the rental car shuttle bus fleet and some Massport shuttle buses into a unified shuttle route system resulting in the elimination of eight rental car bus fleets (a net total of 66 buses have been eliminated); intersection and roadway infrastructure improvements including signal coordination and dedicated ramp connections; and creating a Ground Transportation Operations Center (GTOC), enabling efficient planning and operation of Airport-wide transit activities.



Logan Airport Rental Car Center
Source: Massport

- Logan Airport’s new bus fleet, comprising 18 compressed natural gas (CNG) buses and 32 clean diesel/electric buses, has fully replaced the entire fleet of diesel rental car shuttle buses now that the RCC is fully operational. Four additional new CNG buses were put into service in the summer of 2015, bringing the total to 22 buses.
- The Green Bus Depot serves as Logan Airport’s on-Airport maintenance facility for Massport’s new clean-fuel bus fleet. By shifting the bus maintenance operations out of the community, Massport is reducing bus traffic in East Boston and Chelsea.

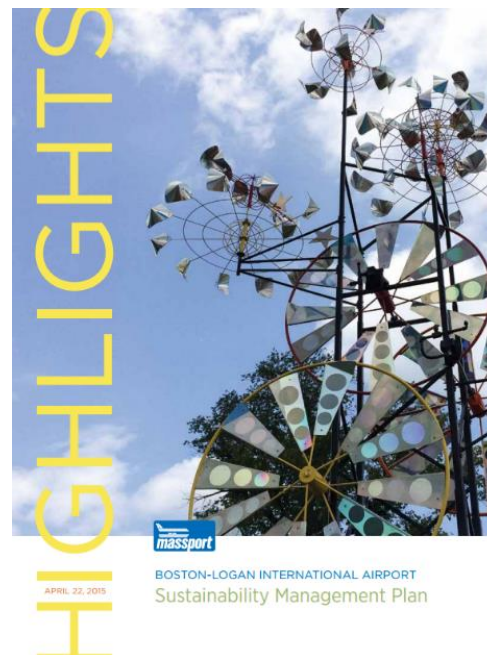
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- ❑ The Martin A. Coughlin Bypass reduces commercial traffic through East Boston by providing a direct link between Logan Airport's North Service Area to the City of Chelsea for Airport-related vehicle trips.
- ❑ The Economy Parking Garage simplified and reduced on-Airport circulation by consolidating multiple overflow parking lots throughout the Airport into a single location served by a single shuttle route. Overall traffic circulating throughout the Airport has decreased, resulting in significant operational and environmental benefits.

Planning Initiatives

- **Strategic Planning.** In 2013, Massport began a strategic planning effort to position the Authority's aviation, maritime, and real estate lines of business, and its administrative support structures and workforce to meet the region's 21st century transportation and economic development challenges. The strategic planning initiative's primary goal formulates a vision for Massport as a transportation and economic development engine for the Commonwealth of Massachusetts in the 21st century.
- **Resiliency Planning.** At the end of 2013, Massport initiated the Disaster and Infrastructure Resiliency Planning Study (DIRP) for Logan Airport, the Port of Boston, and Massport's waterfront assets in South and East Boston. The DIRP Study includes a hazard analysis, modeling sea-level rise and storm surge, and projections of temperature and precipitation and anticipated increases in extreme weather events. The DIRP Study provides recommendations regarding short-term adaptation strategies to make Massport's facilities more resilient to the likely effects of climate change. The study was completed and a request for proposals for implementing its recommendations was issued in September 2014; work commenced in later 2014.
- **Logan Airport Sustainability Management Plan (SMP).** In 2013, Massport was awarded a grant by the FAA to prepare a SMP for Logan Airport. The Logan Airport SMP planning effort began in May 2013, and was completed in April 2015. The Logan Airport SMP takes a broad view of sustainability including economic vitality, social responsibility, operational efficiency, and natural resource conservation considerations, and is intended to promote and integrate sustainability Airport-wide and to coordinate ongoing sustainability efforts across the Authority. A copy of the SMP can be found at <https://www.massport.com/environment/sustainability-management-plan/>



Logan Airport Sustainability Management Plan
Source: Massport

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Regional Transportation

The New England region is anchored by Logan Airport and a system of 10 other commercial service, reliever, and GA airports (regional airports).⁸ Together, these 11 airports accommodate nearly all of New England's air travel demand (Figure 1-6). Logan Airport serves as a major domestic origin and destination market and acts as the primary international gateway for the region.

- Passenger traffic at the New England airports in 2014 represented the highest passenger traffic level for the region since the economic downturn in 2008. The increase in the region's passenger traffic was largely driven by continued growth at Logan Airport. In 2014, the total number of air passengers utilizing New England's commercial service airports, including Logan Airport, increased by 3.1 percent from 45.4 million in 2013 to 46.8 million annual air passengers in 2014.
- Of the 46.8 million passengers using New England's commercial service airports in 2014, 67.6 percent of passengers (31.6 million) used Logan Airport compared to 66.6 percent (30.2 million) in 2013.
- While passenger activity levels have increased (as noted above), aircraft operations in the New England region have decreased. In 2014, regional aircraft operations decreased by 4.3 percent, from 1.02 million operations in 2013 to 0.97 million operations in 2014.

Additional information is provided in *Chapter 4, Regional Transportation*.

Figure 1-6 New England Regional Transportation System



Ground Access to and from Logan Airport

Massport has continued to invest in and operate Logan Airport with a goal of increasing the number of passengers arriving by transit or other high occupancy vehicle (HOV) modes. The HOV/transit mode share at Logan Airport continues to rank at the top of U.S. airports.

Despite Massport's industry-leading efforts promoting and providing high occupancy vehicle (HOV)/shared-ride mode use, private passenger vehicle trips continue to increase with growth in air travel. As Logan Airport air traveler numbers have increased, a constrained parking supply at Logan Airport has resulted in an increase in "pick-up/drop-off" vehicle trips. The greater number of vehicle trips means

⁸ The New England Regional Airports Air Passenger Service Study (Federal Aviation Administration, 1995) defined the Bradley International, T.F. Green, Manchester-Boston Regional, Portland International Jetport, Bangor, Burlington, Worcester Regional, and Tweed-New Haven Airports as the region's principal commercial airports, other than Logan Airport, since all of these airports either supported or had previously supported commercial jet passenger services. Subsequently, in 1999, limited commercial passenger service was introduced at Hanscom Field and at Portsmouth International Airport, though neither airport has been able to sustain commercial airline services over the long-term. These 11 airports are included in the New England Regional Airport System Plan Study, which was published in 2006.

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increasing vehicle miles traveled (VMT) and attendant emissions – the opposite effect of what the Logan Airport Parking Freeze regulation was intended to achieve.

Massport remains concerned that a constrained parking supply at the Airport will continue to cause an increase in both vehicle trips and curbside congestion due pick-up/drop-off activity by private vehicles. These trips increase automobile emissions both locally and regionally, which is contrary to the intended air quality goals of the Massachusetts State Implementation Plan (SIP).⁹ As part of its Long-Term Parking Management Plan, Massport is considering a series of remedies to minimize increases in this type of pick-up/drop-off activity.

Key findings in 2014 are:

- The 2013 Air Passenger Survey revealed that 28 percent of air passengers use HOV/shared-ride modes to access the Airport. Massport continues to provide and actively promote HOV/shared-ride options to air passengers, including Logan Express bus service, free Silver Line boardings, water shuttle service, and free, frequent shuttle bus service to and from the Blue Line subway station.
- In 2014, VMT on-Airport decreased by 10.5 percent. The substantial decrease in on-Airport VMT is reflective of Massport's efforts to reduce VMT through the opening of the RCC, which: (1) consolidated rental car operations to one location; (2) provides one unified rental car shuttle; (3) relocated the taxi and limousine/bus pool closer to terminal area roadways; and (4) included additional improvements to alternative transportation systems. Now that these changes have been made, it is expected that VMT should grow at roughly the same pace as gateway traffic volumes. However, given that gateway traffic volumes grew by 5.3 percent in 2014 and corresponding parking activity grew by only 1.3 percent, trends indicate that vehicle pick-up/drop-off activity (and associated VMT to the Airport) is increasing at a much faster rate.
- Massport continued to be in full compliance with the Logan Airport Parking Freeze¹⁰ regulations throughout 2014. Despite an increase in terminal area parking rates on July 1, 2014, daily parking demand more frequently approached the Parking Freeze cap in 2014. Massport is consolidating 2,050 temporary parking spaces in an addition to the West Garage and at the existing surface lot between the Logan Office Center and the Harborside Hyatt. These spaces constitute all remaining spaces permitted under the Logan Airport Parking Freeze.
- As air passenger levels have reached over 30 million, Logan Airport faces real challenges managing demand for on-Airport parking, resulting in a growing number of days in which arriving vehicles are diverted or moved to non-garage parking areas on (and sometimes off) the Airport. Increases in weekday peak commercial parking demand places additional pressure on roadway and parking operations under the Logan Airport Parking Freeze. In 2014, for example, due to high demand on Tuesdays, Wednesdays, and Thursdays, 30,314 cars were diverted to another garage or lot and 56,634 cars were valeted/stacked (when cars are parked in aisles, have their keys taken, and then are re-parked in empty spaces as they become vacant); this represents over a 50-percent increase since 2013. There were about 40 weeks in which one or more of these measures were put into effect in 2014.
- The constrained parking supply at Logan Airport has led to an increase in the pick-up/drop-off activity at the Airport. Pick-up/drop-off is the least desirable mode choice, since it can generate up to four vehicle

⁹ The Clean Air Act requires states to develop a general plan to attain and maintain the National Ambient Air Quality Standards (NAAQS) in all areas of the country and a specific plan to attain the standards for each area designated nonattainment for a NAAQS. These plans, known as State Implementation Plans or SIPs, are developed by state and local air quality management agencies and submitted to EPA for approval.

¹⁰ 310 Code of Massachusetts Regulations 7.30 and 40 Code of Federal Regulations 52.1120.

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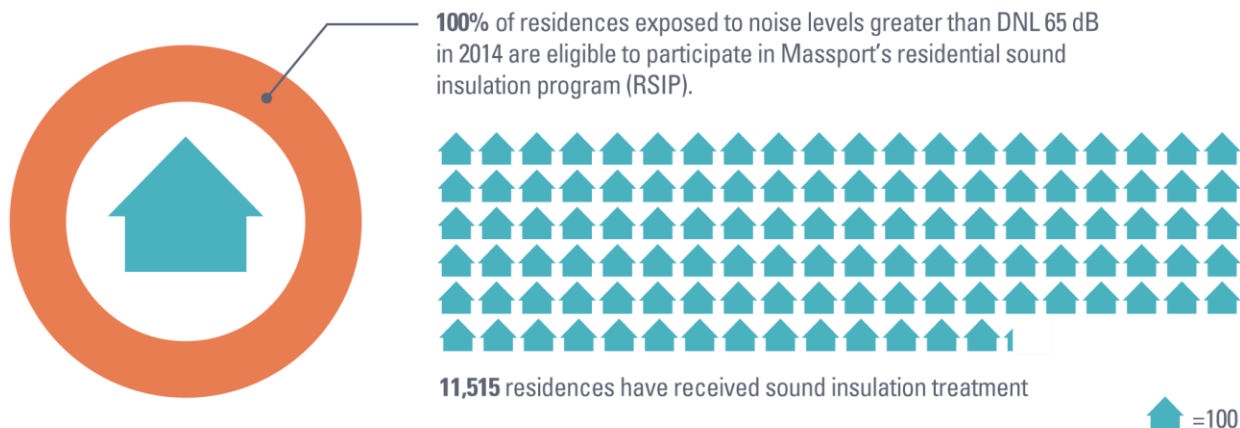
trips per air passenger trip.¹¹ As mentioned above, Massport is considering options to address this situation.

Additional information is provided in *Chapter 5, Ground Access to and from Logan Airport*.

Noise Abatement

Massport strives to minimize the noise effects of Logan Airport operations on its neighbors through a variety of noise abatement programs, procedures, and other tools. Logan Airport has one of the most extensive noise abatement programs of any airport in the nation. Massport's comprehensive noise abatement program includes a dedicated Noise Abatement Office; residential and school sound insulation programs; flight tracks designed to optimize over-water operations (especially during nighttime hours); and preferential runway use goals. In 2014, an additional 106 residential units received sound insulation bringing the program total to 11,515 residential units treated, amongst the highest in the nation (Figure 1-7).

Figure 1-7 Residences Treated through Massport Residential Sound Insulation Program (RSIP)



Since 2000, the number of daily aircraft operations has declined by almost 27 percent (from 1,355 operations per day in 2000 to 997 operations per day in 2014). This trend reflects an increase in the use of larger aircraft in the fleet, airline consolidation, and increased efficiencies on the part of airlines. As described throughout this EDR, this evolution towards fewer flights with larger, more efficient and quieter aircraft has yielded substantial environmental benefits. Compared to 2000, in 2014:

- Jet operations made up 86 percent of operations compared to 66 percent in 2000;
- Overall operations were down by 25 percent while overall passengers were up by 14 percent compared to 2000; and
- The number of people exposed to DNL 65 dB has declined by 50 percent since 2000.

11 For example, if an air passenger is dropped off by a friend when they depart on an air trip and is picked-up by a friend when she returns, that one air passenger generates a total of four ground-access trips: two for the drop-off trip (one inbound to Logan Airport, one outbound from Logan Airport) and two for the pick-up trip (one inbound to Logan Airport, one outbound from Logan Airport).

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Compared to 2013, the 2014 DNL 65 dB noise contours were larger in most areas around the Airport. The DNL contour was larger over East Boston, Winthrop, and Revere. There were several temporary FAA- mandated airfield/airspace operating factors that influenced the contour changes in 2014, including:

- Due to safety concerns at airports across the United States in June of 2014, the FAA temporarily halted the use of head-to-head operations,¹² or opposite direction operations, in which planes arrive on a runway in one direction and depart in the opposite direction. When in use at Logan Airport, the procedure has aircraft departing from Runway 15R and landing on Runway 33L during the late night (typically midnight to 5:00 AM) when weather conditions are appropriate, including good visibility and little wind. At Logan Airport, head-to-head operations are an important part of the use of the late night noise abatement runway (Runway 15R-33L) since this keeps operations over Boston Harbor. Use of this procedure was restored in early 2015.
- FAA also restricted the use of converging runways across the United States in January 2014 due to safety concerns. At Logan Airport, Runways 22L and 22R and Runway 27 were affected by this change. While Runway 22R is in use for departing aircraft, arrivals that would typically be directed to Runway 27 were sent by the FAA Air Traffic Control to arrive on Runway 22L. This restriction has since been lifted.
- Runway 15L-33R was closed for a short period of time (eight weeks) during the summer of 2014 for Runway Safety Area Improvements. This resulted in aircraft using Runway 15R-33L, Runway 4L, and Runway 22L more frequently in 2014 than in 2013. The construction activity also resulted in short closures of the intersecting Runway 4L-22R and Runway 4R-22L, which increased usage of Runway 15R-33L.

An additional factor influencing the contour changes was an increase in overall operations and nighttime operations in 2014 compared to 2013. Nighttime operations increased for passenger flights as airlines expanded destinations and the number of flights per day. Several new international airlines began service at Logan Airport in 2014.

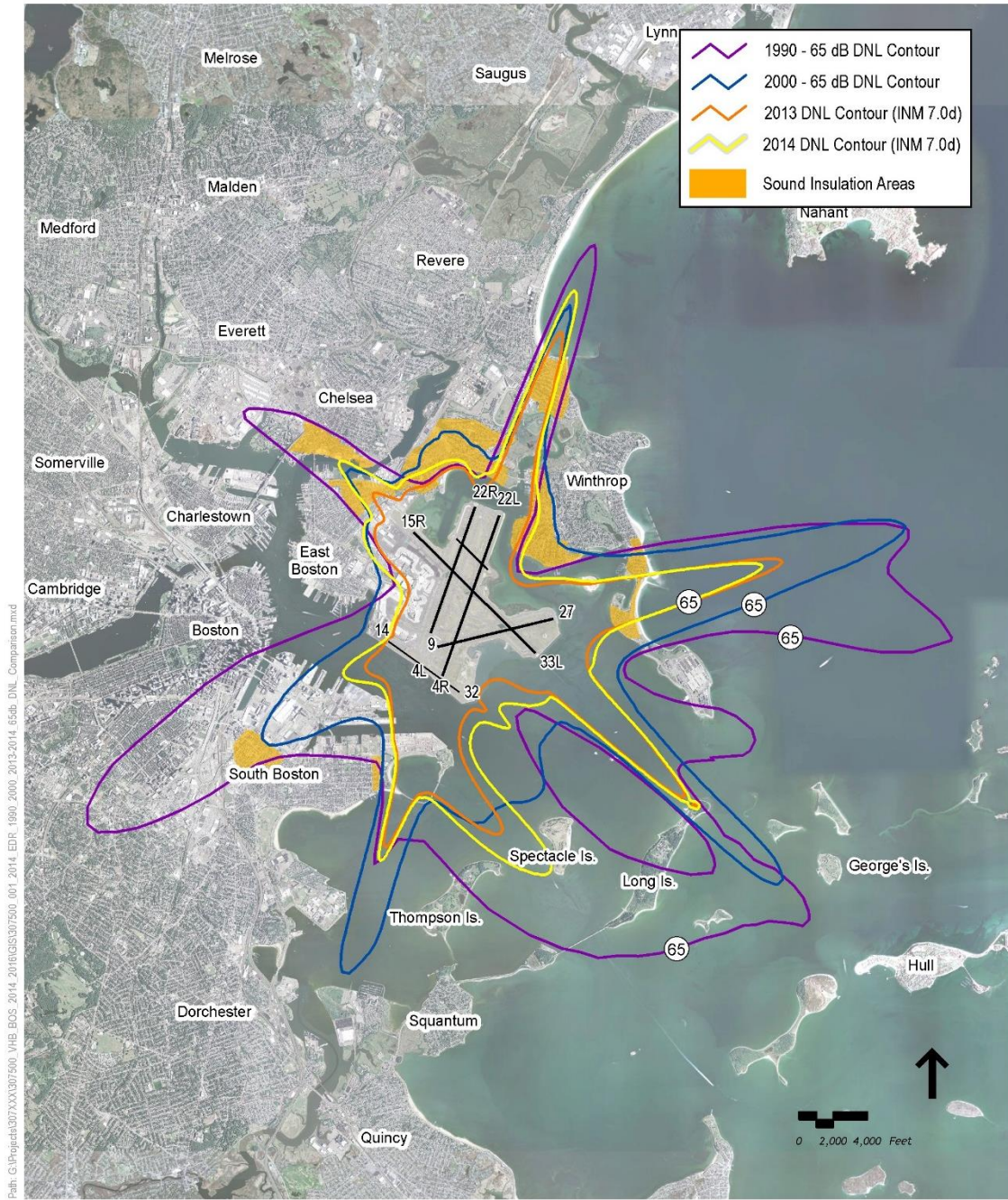
As shown in Figure 1-8, the 2014 DNL 65 dB contour is somewhat larger than the 2013 DNL 65 dB contour. All homes within the expanded contour are within the previously approved sound insulation areas.

Additional information is provided in *Chapter 6, Noise Abatement*.

¹² Head-to-head operations, or opposite direction operations, occur when aircraft depart from a runway end and aircraft are cleared to land to the opposite end of that runway. This results in aircraft overflights off only one end of the runway and is typically used as a noise abatement procedure when traffic levels are light.

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Figure 1-8 Comparison DNL 65 dB Noise Contours (1990, 2000, 2013, and 2014)



Source: HMMH, MassGIS, USDANAP 2014

**Comparison of Historical and Current
65 dB DNL Contours - 1990, 2000,
2013, and 2014**

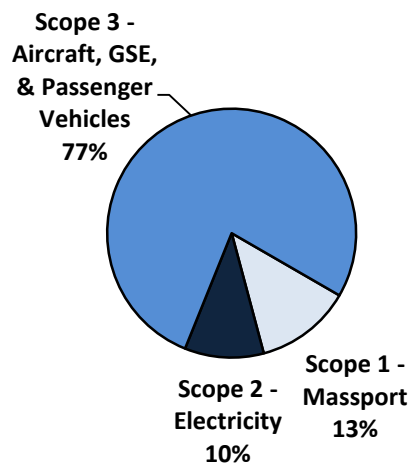
Air Quality/Emissions Reduction

Total air quality emissions from all sources associated with Logan Airport in 2014 are significantly less than they were a decade ago. This continuous downward trend is consistent with Massport’s longstanding objective to accommodate the demands of increasing passenger and cargo activity levels with fewer aircraft operations generating less emissions. In 2014, calculated emissions of volatile organic compounds (VOC), oxides of nitrogen (NO_x), and particulate matter (PM) went up slightly. This was primarily attributable to changes in the modeling software, MOVES2014.

Overall, modeled air quality emissions were similar in 2014 to 2013 conditions and followed recent trends. The changes in 2014 modeled air quality emissions, as compared to 2013, are primarily due to technical changes in the model itself. Inputs to the model include aircraft operations, fleet mix characteristics, and airfield taxi times combined with ground service equipment (GSE) usage, motor vehicle traffic volumes, and stationary source utilization rates. Model versions used in the 2014 analyses differed in terms of emission factors, most notably in the motor vehicle emission EPA model. The modeled air quality conditions in 2014 for Logan Airport were:

- Total VOC emissions went up by 3 percent (1,177 kilograms per day [kg/day]) in 2014 compared to 2013. The small increase is primarily due to the corresponding increase in aircraft landing and take-offs (LTOs) and an increase in jet fuel and gasoline usage when compared to 2013. For comparison, total VOC emissions were 1,777 kg/day in 2000.
- Total NO_x emissions went up by less than 1 percent in 2014 (4,040 kg/day) compared to 2013. This slight increase in 2014 is mostly attributable to the larger number of air carrier operations during this time period. For comparison, total NO_x emissions were 5,707 kg/day in 2000.
- Total CO emissions went down by 5 percent in 2014 (6,987 kg/day) compared to 2013. This decrease is mostly attributable to the decrease in GSE factors and motor vehicle emission factors in accordance with MOVES2014. For comparison, total CO emissions were 13,111 kg/day in 2000.
- Total PM₁₀/PM_{2.5} emissions went up by approximately 3 percent in 2014 (95 kg/day) compared to 2013. This small increase is primarily attributable to the higher emission factors of MOVES2014.
- Total greenhouse gas (GHG) emissions went down by approximately 1 percent (0.60 MMT) in 2014 compared to 2013. The year 2014 marks the eighth consecutive year in which Massport has voluntarily prepared a GHG emissions inventory for the EDR/ESPR. This decrease was primarily due to a decrease in vehicle miles traveled (VMT). Sources of GHG emissions are shown in Figure 1-9.

Figure 1-9 Sources of GHG Emissions, 2014



Note: Scope 1 emissions are from sources that are owned or controlled by Massport, Scope 2 emissions are from electrical consumption, which are generated off-Airport at power generating plants, and Scope 3 emissions are from aircraft, GSE, and ground transportation to and from the Airport.

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- Massport's Air Quality Initiative¹³ (AQI) has tracked NO_x emissions since the benchmark year of 1999. Total NO_x emissions in 2014 were 722 tons per year (tpy) lower than the 1999 benchmark - which represents an overall decrease of 31 percent in NO_x emissions since 1999 when the program was initiated. For comparison, NO_x emissions in 2013 were 730 tpy lower than the benchmark.

Additional information is provided in *Chapter 7, Air Quality/Emissions Reduction*.

Water Quality/Environmental Compliance and Management

Massport's approach to environmental management and compliance is a key component of its commitment to sustainability and responsible stewardship at Logan Airport. Environmental performance is assessed through monitoring and documentation, allowing policies and programs to be developed, implemented, evaluated, and continuously improved.

Massport's primary water quality goal is to prevent or minimize pollutant discharges, thus limiting adverse water quality impacts associated with airport activities. Massport employs several programs to promote awareness of Massport and tenant activities that may impact surface and groundwater quality, thus improving water quality. Programs include implementing best management practices (BMPs) for pollution prevention by Massport, its tenants, and its construction contractors; training of staff and tenants; and a comprehensive stormwater pollution prevention plan. Massport continues to comply with water quality and other environmental regulations.

Additional information is provided in *Chapter 8, Water Quality/Environmental Compliance and Management*.

Sustainability at Logan Airport

Massport is committed to a robust sustainability program. Sustainability has redefined the values and criteria for measuring organizational success by using a "triple bottom line" approach that considers economic, ecological, and social well-being. Applying this approach to decision-making is a practical way to optimize economic, environmental, and social capital. Massport is taking a broad view of sustainability that builds upon the triple bottom line concept, and considers the airport-specific context. Consistent with the Airports Council International - North America's (ACI-NA) definition of Airport Sustainability¹⁴ (Figure 1-10), Massport is focused on a holistic approach to managing Logan Airport to ensure Economic viability, Operational efficiency, Natural resource conservation, and Social responsibility (EONS). Massport is committed to implement environmentally sustainable practices Authority- and Airport-wide, and continues to make

Figure 1-10 EONS Approach to Sustainability



13 Massport developed the AQI as a 15-year voluntary program with the overall goal to maintain NO_x emissions associated with Logan Airport at, or below, 1999 levels.


14 Airports Council International (ACI). *Airport Sustainability: A Holistic Approach to Effective Airport Management*. Undated. <http://www.aci-na.org/static/entransit/Sustainability%20White%20Paper.pdf>. Accessed July 17, 2013.

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progress on a range of initiatives. Many of the long-term and multifaceted sustainability initiatives undertaken by Massport which are more fully described in individual chapters of this *2014 EDR* where appropriate, are described below.

Logan Airport Sustainability Management Plan (SMP)













Massport is committed to reducing local environmental impacts without sacrificing service level; Massport's robust sustainability program is indicative of this commitment. In 2013, Massport was awarded a grant by the FAA to prepare a Sustainability Management Plan (SMP) for Logan Airport. The purpose of the SMP is to enhance the efficiency and sustainability of Logan Airport's operations and to support the broader sustainability principles of the Commonwealth. The Logan Airport SMP planning effort began in May 2013 and was completed in April 2015. The plan, which takes a broad, holistic view of sustainability, is intended to promote and integrate sustainability Airport-wide and to coordinate ongoing sustainability efforts across the Authority. A baseline data assessment was completed in winter 2014 to assess current sustainability performance at the Airport. The Logan Airport SMP developed a framework and implementation plan, with metrics and targets, designed to track progress over time. Massport is currently advancing a series of short-term initiatives to help reach its goals (Table 1-1) in the areas of energy and greenhouse gas emissions; community, employee, and passenger well-being; resiliency; materials, waste management, and recycling; and water conservation. The Logan Airport SMP is available online at: https://www.massport.com/media/320786/LoganSMP_Report.pdf.

Logan Airport Sustainability Goals

As part of the SMP, Massport set a number of sustainability goals to improve and track Logan Airport's performance. Goals were set for 10 categories: Energy and Greenhouse Gases; Water Conservation; Community, Employee, and Passenger Well-being; Materials, Waste Management, and Recycling; Resiliency; Noise Abatement; Air Quality Improvement; Ground Access and Connectivity; Water Quality/Stormwater; and Natural Resources. Table 1-1 describes each goal as defined in the Logan Airport SMP. Massport's progress towards each goal and sustainability-related performance will be reported on in annual sustainability reports.

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Table 1-1 Logan Airport Sustainability Goals and Descriptions

Sustainability Category	Goal	Sustainability Category	Goal
Energy and Greenhouse Gas Emissions 	Reduce energy intensity and greenhouse gas emissions while increasing portion of Logan Airport's energy generated from renewable sources.	Water Conservation 	Conserve regional water resources through reduced potable water consumption.
Community, Employee, and Passenger Well-being 	Promote economically prosperous, and healthy communities and passenger and employee well-being.	Materials, Waste Management, and Recycling 	Reduce waste generation, increase the recycling rate, and utilize environmentally sound materials.
Resiliency 	Become an innovative model for resiliency planning and implementation among port authorities.	Noise Abatement 	Minimize noise impacts from Logan Airport's operation.
Air Quality Improvement 	Decrease emissions of air quality criteria pollutants from Logan Airport sources.	Ground Access and Connectivity 	Provide superior ground access to Logan Airport through alternative and HOV travel modes.
Water Quality/Stormwater 	Protect water quality and minimize pollutant discharges.	Natural Resources 	Protect and restore natural resources near Logan Airport.

Sustainability in Planning, Design and Construction

The following sections outline Massport’s sustainability achievements in the planning, design, and construction of projects.

LEED® Green Buildings at Logan Airport

The USGBC LEED® Green Buildings rating system is the most widely recognized third-party green building certification system in North America. Massport is striving to achieve LEED certification for new and substantial rehabilitation of building projects over 20,000 square feet. Some recent examples of LEED certified buildings at Logan Airport are the new RCC and the Green Bus Depot (Table 1-2). The new RCC in the Southwest Service Area (SWSA) began construction in 2010 and was completed in 2013. Massport is very proud that the RCC was awarded Logan Airport’s first LEED Gold Certification in 2015. The LEED Silver Green Bus Depot shifted bus maintenance operations on-Airport from an off-Airport location. This reduced bus trips and unnecessary emissions on congested neighborhood roadways. Further details are available in *Chapter 3, Airport Planning*.

Figure 1-11 LEED® Certified Facilities at Logan Airport



Sustainable Design Standards and Guidelines (SDSG)

For smaller building projects and non-building projects, Massport uses the SDSG to incorporate sustainability into capital improvement projects. The SDSG, revised and reissued in March 2011, provides a sustainable building framework for design and construction of both new construction and rehabilitation projects for both building and non-building projects (for example, pavement projects). The SDSG applies to a wide range of project-specific criteria, such as site design, project materials, energy management and efficiency, air emissions, water management quality and efficiency, indoor air quality, and occupant comfort. The new standards have been used to guide over \$200 million in capital projects Massport-wide between fiscal years 2010 to 2013, including over \$30 million for maritime projects.

Table 1-2 LEED® Certified Buildings at Logan Airport

Terminal A (LEED Certified) Completed 2005/2006

- Priority curb locations for high occupancy vehicles (HOV) and bicycles
- Retrofitting with solar panels on the Terminal A roof
- Stormwater filtration
- Reflective roof
- Water use reduction features
- Natural daylighting paired with advanced lighting technologies for energy efficiency
- Use of recycled and regionally sourced materials
- Measures to enhance indoor air quality
- Roof-top solar



Signature Flight Support General Aviation Facility (LEED Certified) Completed 2007/2008

- Mechanisms to reduce water use
- Natural day lighting paired with advanced lighting technologies for energy efficiency
- Window glazing and sunshades to maximize daylight and minimize heat build-up
- Recycled and regionally sourced materials
- Measures to enhance indoor air quality



Green Bus Depot (LEED Silver Certified) Completed 2012

- Rooftop solar panels
- Water and energy saving features
- Vehicle miles traveled (VMT) reduction
- New shuttle fleet including 50 clean diesel/electric hybrid buses and CNG buses
- Sustainably grown, harvested, produced, and transported building materials



Rental Car Center (LEED Gold Certified) Completed 2013

- Green building materials
- Rooftop solar panels
- Bike and pedestrian access and connections
- Natural day lighting paired with advanced lighting technologies for energy efficiency
- Use of recycled and regionally sourced materials
- Enhanced indoor air quality
- Plug-in stations for electric vehicles and other alternative fuel sources such as E-85 (ethanol)
- Rental car fleets which include hybrid/alternative fuel/low emitting vehicles
- Pedestrian connections
- Bicycle facilities and employee showers/changing
- Water reclamation for vehicle wash water, and use of stormwater for non-potable uses such as vehicle washing and landscaping irrigation
- VMT reduction



Logan Airport Environmental Review Process

This *2014 EDR* is part of a well-established, state-level environmental review process that assesses Logan Airport's cumulative environmental impacts. The process provides a context against which individual Airport projects meeting state and federal environmental review thresholds are evaluated on a project-specific basis. The Airport-wide and project-specific environmental review processes are described below.

Historical Context for the Logan Airport EDR/ESPR

In 1979, the Secretary of the Executive Office of Environmental Affairs (EOEA) (now EEA) issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the Airport through a Generic Environmental Impact Report (GEIR). The Certificate also required interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR evolved into an effective planning tool for Massport and provided projections of environmental conditions so that the cumulative effects of individual projects could be evaluated within a broader context.

EEA eliminated GEIRs following the 1998 revisions to its MEPA Regulations. However, the Secretary's Certificate on the 1997 Annual Update¹⁵ proposed a revised environmental review process for Logan Airport resulting in Massport's preparation of subsequent EDRs/ESPRs. The more comprehensive ESPRs provide a long-range analysis of projected operations and passengers while EDRs are prepared annually to provide review of environmental conditions for the reporting year compared to the previous year. In the last several years, aircraft operations and passenger activity levels and associated environmental effects have remained well below levels previously analyzed for Logan Airport. Thus, the forecasted aviation growth presented in the *2004 ESPR*, the predicate upon which the ESPR schedule was initially established, has not occurred. Accordingly, with the approval of the Secretary, Massport prepared *2009* and *2010 EDRs* in lieu of the ESPR originally planned for 2009. The *2011 ESPR*, filed in early 2013, reported on calendar year 2011 updated passenger activity level and aircraft operations forecasts. The *2012/2013 EDR* presented conditions for both calendar years 2012 and 2013.

This *2014 EDR* provides a comprehensive, cumulative analysis of the effects of all Logan Airport activities based on actual passenger activity and aircraft operation levels in 2014 and presents environmental management plans for addressing areas of environmental concern. Massport proposes to prepare a *2015 EDR* to report on activity levels and environmental conditions for that year. The next anticipated ESPR will report on calendar year 2016. The *2016 ESPR* will report on updated passenger activity levels, aircraft operations forecasts, and environmental conditions forecasts. Where appropriate, Massport will continue to identify and address any longer-term aviation and environmental trends in both EDRs and ESPRs.

Project-Specific Review

While this Airport-wide review provides the broad planning context for proposed projects and future planning concepts, certain Airport projects are also subject to a project-specific, public environmental review process when state environmental review thresholds are met. When required, Massport and Airport tenants submit ENFs and Environmental Impact Reports (EIRs) pursuant to MEPA. Similarly, where National Environmental Policy Act (NEPA)¹⁶ environmental review is triggered, projects are reviewed under the NEPA environmental review process.

¹⁵ Certificate of the Secretary of the Executive Office of Environmental Affairs on the Logan Airport 1997 Annual Update, issued on October 16, 1998.

¹⁶ 42 USC Section 4321 et seq. The Federal Aviation Administration implements NEPA through Federal Aviation Administration Order 1050.1E, Environmental Impacts: Policies and Procedures, Federal Aviation Administration, United States Department of Transportation, Effective Date: March 20, 2006.

Organization of the 2014 EDR

The remainder of this 2014 EDR includes:

- **Chapter 2, Activity Levels**, presents aviation activity statistics for Logan Airport in 2014 and compares activity levels to the prior year. The specific activity measures discussed include air passengers, aircraft operations, fleet mix, and cargo/mail volumes.
- **Chapter 3, Airport Planning**, provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2014. It also describes known future planning, construction, and permitting activities and initiatives.
- **Chapter 4, Regional Transportation**, describes activity levels at New England's regional airports in 2014 and updates recent regional planning activities.
- **Chapter 5, Ground Access to and from Logan Airport**, reports on transit ridership, roadways, traffic volumes, and parking for 2014.
- **Chapter 6, Noise Abatement**, updates the status of the noise environment at Logan Airport in 2014 and describes Massport's efforts to reduce noise levels.
- **Chapter 7, Air Quality/Emissions Reduction**, provides an overview of Airport-related air quality in 2014 and efforts to reduce emissions.
- **Chapter 8, Water Quality/Environmental Compliance and Management**, describes Massport's ongoing environmental management activities including National Pollutant Discharge Elimination System (NPDES) compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan, and tank management.
- **Chapter 9, Project Mitigation Tracking**, reports on Massport's progress in meeting its MEPA Section 61¹⁷ mitigation commitments for specific Airport projects.

Supporting appendices include:

Appendices

- **MEPA Appendices:** These include the Secretary of EEA's Certificate on the 2012/2013 EDR, comment letters received on the 2012/2013 EDR and responses to those comments, Secretary Certificates on the annual reports issued for reporting years 2004 through 2011, a list of reviewers to whom the 2014 EDR was distributed, and a proposed scope for the 2015 EDR.

Appendix A – MEPA Certificates and Responses to Comments

Appendix B – Comment Letters and Responses

Appendix C – Proposed Scope for the 2015 EDR

Appendix D – Distribution List

¹⁷ Massachusetts General Law, Chapter 30, Section 61 (M.G.L. c. 30, § 61) states that all agencies must review, evaluate, and determine environmental impacts of all projects or activities and shall use all practicable means and measures to minimize damage to the environment. For projects requiring an Environmental Impact Report, Section 61 Findings will specify all feasible measures to be taken to avoid or mitigate environmental impacts, the party responsible for funding the mitigation measures, and the anticipated implementation schedule for mitigation measures.

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- **Technical Appendices**¹⁸: These include detailed analytical data and methodological documentation for the various environmental analyses presented in and conducted for this 2014 EDR.

Appendix E – Activity Levels

Appendix F – Regional Transportation

Appendix G – Ground Access

Appendix H – Noise Abatement

Appendix I – Air Quality/Emissions Reduction

Appendix J – Water Quality/Environmental Compliance and Management

Appendix K – 2014 Peak Period Pricing Monitoring Report

Appendix L – Reduced/Single Engine Taxiing at Logan Airport Memoranda

¹⁸ Technical appendices are included on the attached CD.

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Activity Levels

Introduction

This chapter reports on annual air traffic activity at Logan Airport in 2014, including air passengers, aircraft operations, aircraft fleet mix, and cargo volumes. Air traffic activity levels at Logan Airport form the basis for the evaluation of vehicle miles traveled (VMT), noise, and air quality impacts associated with the Airport. In this chapter, current activity levels at the Airport are compared to prior-year levels, and historical passenger and operation trends at Logan Airport dating back to 2000 are reviewed.¹

Logan Airport is an important origin and destination (O&D)² airport both nationally and internationally and has been one of the fastest growing major U.S. airports, in terms of number of passengers, over the last four years. Passenger activity levels reached an all-time high of 31.6 million passengers and aircraft operations totalled 363,797 in 2014.

This chapter specifically describes 2014 activity levels, changes over the prior year, and historical trends for:

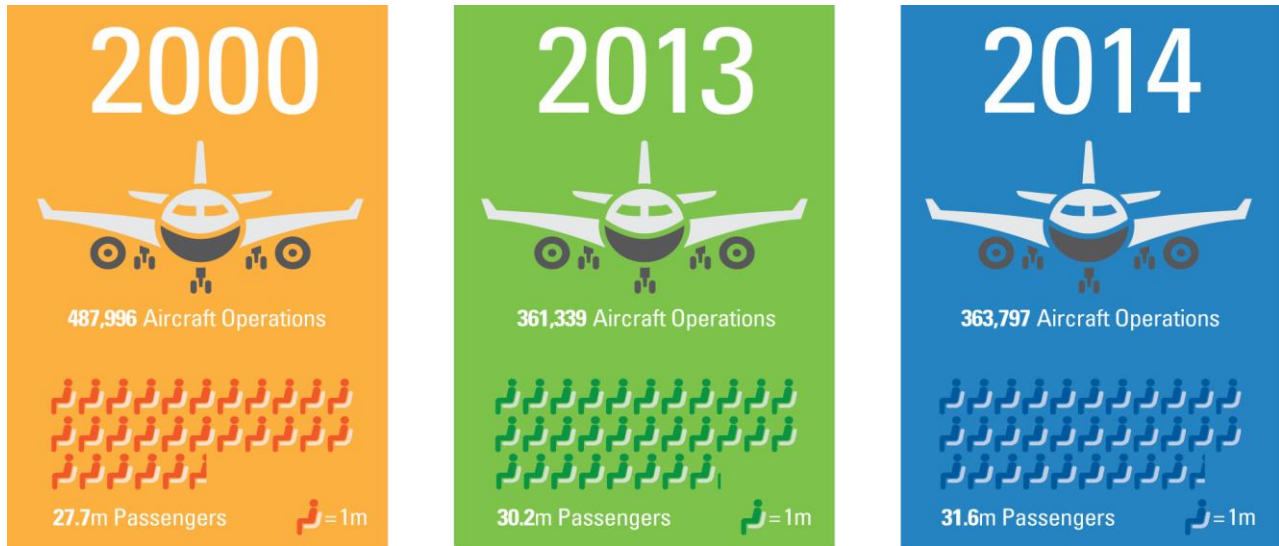
- Air passengers and aircraft operations
- Cargo and mail volumes
- Airline services

¹ Refer to *Appendix E, Activity Levels* for available information dating back to 1980.

² "Origin and destination" traffic, refers to the passenger traffic that either originates or ends at a particular airport or market. A strong O&D market like Boston generates significant local passenger demand, with many passengers starting their journey and also ending their journey in that market. O&D traffic is distinct from connecting traffic, which refers to the passenger traffic that does not originate or end at the airport but merely connects through the airport enroute to another destination.

2014 Activity Levels Highlights and Key Findings

Notable changes in passenger, operations, and cargo activity at Logan Airport in 2014 are described below.



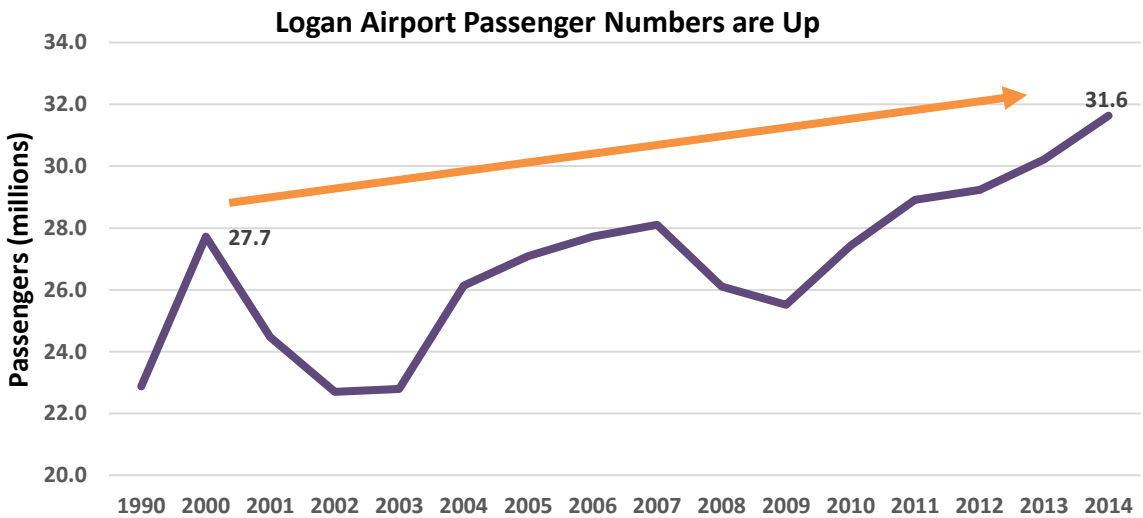
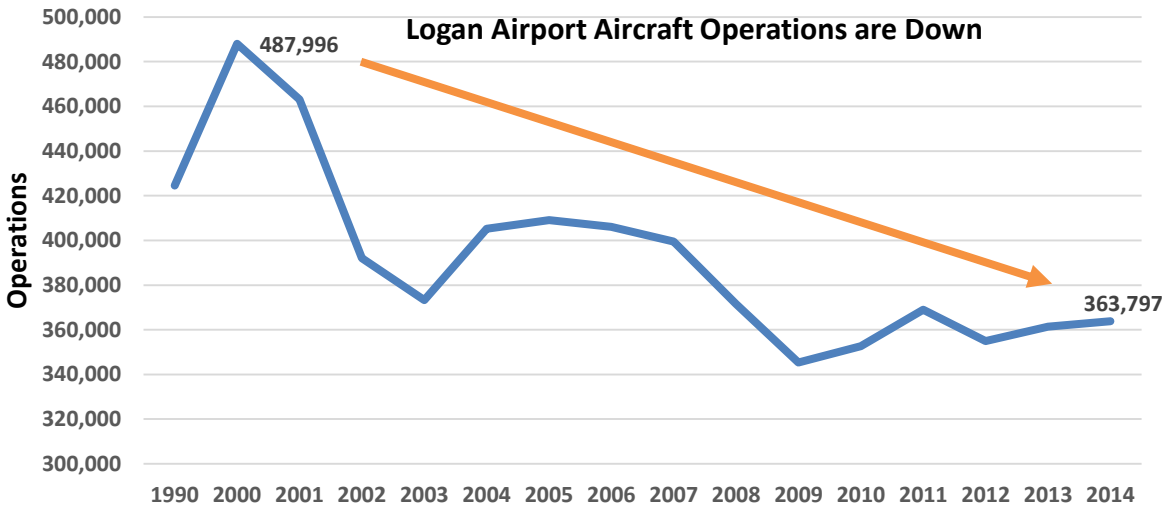
- From 2000 to 2014, the annual number of passengers at Logan Airport increased by 14.1 percent, while the annual number of aircraft operations³ decreased by 25.5 percent.
- The total number of air passengers increased by 4.7 percent to 31.6 million in 2014, compared to 30.2 million in 2013 (Figure 2-1). The 2014 passenger level represents a new record high for Logan Airport.
- While both domestic and international passenger numbers are increasing, international passenger demand is projected to increase at a faster rate than domestic passenger demand. Total international annual passenger numbers increased from 4.4 million in 2013 to 4.9 million in 2014, a 9.8-percent increase. In 2014, there were 26.5 million domestic passengers⁴ (excluding general aviation [GA]). The strong international passenger growth was driven by several new nonstop services introduced by a number of foreign airlines including Emirates, Turkish Airlines, Hainan Airlines, and Cathay Pacific. Recently launched international destinations include Mexico City, Tokyo, Beijing, Dubai, Istanbul, Panama City, Hong Kong, and Shanghai.
- The total number of aircraft operations at Logan Airport increased from 361,339 in 2013 to 363,797 in 2014, a 0.7-percent increase. This was preceded by a 2.4-percent increase from 2012 to 2013. Despite the increase, aircraft operations at Logan Airport remained well below the 487,996 operations in 2000 and the historic peak achieved in 1998. In 1986, Logan Airport served only 21.7 million air passengers, compared to 31.6 million in 2014, with roughly the same number of total operations as 2014.

³ An aircraft operation is defined as one arrival or one departure.

⁴ Excluding general aviation passengers.

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Figure 2-1 Logan Airport Annual Passenger Activity Levels and Operations 1990, 2000-2014



Source: Massport

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- Passenger aircraft operations accounted for 91 percent of total aircraft operations in 2014. While domestic operations remain the largest share of commercial operations, international operations have been growing steadily at Logan Airport. In 2014, domestic operations increased by 0.2 percent while international operations increased by 5.3 percent.
- JetBlue Airways' continued to expand at Logan Airport, increasing its total operations by 3.9 percent in 2014. As Logan Airport's largest carrier, JetBlue Airways accounted for 24.9 percent of total aircraft operations and 26.6 percent of total passengers in 2014.
- GA operations, which accounted for 7 percent of total operations in 2014, decreased by 1 percent from 2013.⁵ This marked a continued contraction in GA activity after the rebound that occurred in 2010/2011 following the economic downturn. The 26,416 GA operations in 2014 remain well below the 35,233 GA operations that Logan Airport handled in 2000. Hanscom Field handled 133,700 GA operations in 2014.
- Air carrier efficiency continued to increase as the average number of passengers per aircraft operation grew from 83.6 in 2013 to 87.0 in 2014. At Logan Airport, the increasing number of passengers per flight reflects a shift away from smaller aircraft and rising load factors as airlines have reduced or restricted capacity growth after several airline mergers.
- Air cargo volumes, including shipments transported in the belly compartments of passenger aircraft, increased from 558 million pounds in 2013 to 593 million pounds in 2014, a 6.3-percent increase. Dedicated air cargo operations increased from 5,403 to 5,711, a 5.7-percent increase.
- A series of positive factors have combined to produce this exceptional passenger growth. Continued economic growth is the key determinant of Logan Airport's long-term passenger demand. The forecast presented in the 2011 *Environmental Status and Planning Report (ESPR)* was updated as part of an ongoing strategic planning effort. In the short-term, Logan Airport is projected to reach 32.9 million passengers in 2015.⁶ According to the forecast scenario, Logan Airport's passenger traffic is forecast to reach 35 million annual passengers by 2022 or sooner.
- International passengers made up approximately 16 percent of total Airport passengers in 2014 and this is projected to increase steadily to over 19 percent of the total by 2030. International air passengers are anticipated to reach 6 million by 2022 and 8 million by 2030.

Air Passenger Levels in 2014

The following section provides an overview of air passenger levels in 2014 for Logan Airport.

Logan Airport Passengers

Logan Airport is the principal airport for the greater Boston metropolitan area and the international and long-haul gateway for much of New England. Logan Airport was ranked the 18th busiest airport in North America in terms of passengers in 2014. Logan Airport served 31.6 million passengers in 2014, an increase of 4.7 percent over 2013. This represented a historic high for Logan Airport, exceeding the previous record of 30.2 million in 2013. Logan Airport is one of the fastest growing large hub airports in the U.S., with passenger growth continuing to outpace overall U.S. passenger growth. Total scheduled passenger traffic in the U.S. increased by only 3.1 percent⁷ in 2014 compared to

⁵ General Aviation (GA) is defined as all aviation activity other than commercial airline and military operations.

⁶ Massport and InterVISTAS forecast.

⁷ Bureau of Transportation Statistics, 2014.

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the passenger growth of 4.7 percent at Logan Airport. Factors that contributed to the strong passenger growth at Logan Airport in 2014 included:

- Strengthening economic growth and a gradual recovery in air travel demand across the nation;
- JetBlue Airways continued expansion at Logan Airport; and
- The introduction of new international services at Logan Airport and growing international passenger demand.

International passenger traffic at Logan Airport, in particular, has exhibited strong growth over the past several years. After two periods of decline and gradual recovery, Logan Airport’s international traffic finally surpassed 2000 levels for the first time in 2013. In 2014, international passengers increased by an additional 9.8 percent. Since 2010, the international passenger segment has averaged 7.9 percent annual growth. This growth has been driven by the expansion of JetBlue Airways and Delta Airlines international service at Boston, as well as a rapid increase in foreign carrier service in recent years. Boston is currently the 12th largest U.S. gateway for international air travel, as well as the third largest U.S. gateway airport (after Honolulu and Fort Lauderdale) that is not also a connecting U.S. airline hub. The O&D strength of the Boston market makes Logan Airport an attractive gateway for foreign flag airlines. Additional trends in new aircraft technology allowing for smaller and more fuel efficient aircraft on international routes are also expected to continue to benefit mid-size O&D markets like Boston.

As shown in Table 2-1, domestic air passengers represent Logan Airport’s largest market segment, accounting for 83.9 percent of total passengers in 2014. The domestic passenger market increased by 3.8 percent in 2014. Growth in JetBlue Airways’ service network from Logan Airport and modest economic growth were the main contributors to growth in domestic passengers. JetBlue Airways carried 6.8 million domestic passengers at Logan Airport in 2014, compared to 6.6 million in 2013. However, other carriers at Logan Airport continued to contract in 2014 after a period of industry consolidation through airline mergers. JetBlue Airways’ growth in the domestic market offset losses by other carriers in 2014.

	1990	2000	2010	2011	2012	2013	2014	Percent Change (2013-2014)	Avg. Annual Growth (2010-2014)
Domestic	19,519,247	23,100,645	23,688,471	24,579,780	24,743,008	25,578,080	26,545,978	3.8%	2.9%
International	3,358,944	4,513,192	3,681,739	4,215,071	4,383,945	4,546,018	4,992,225	9.8%	7.9%
Europe/ Middle East	N/A	2,948,542	2,672,635	2,939,226	2,896,002	2,901,529	3,194,109	10.1%	4.6%
Bermuda/ Caribbean	N/A	693,620	486,911	700,267	793,953	863,842	887,301	2.7%	16.2%
Canada	N/A	833,669	518,088	573,660	614,879	643,987	669,546	4%	6.6%
Asia/Pacific	N/A	37,451	0	0	78,484	104,235	170,867	63.9%	New
Central/South America	N/A	0	4,105	1,918	627	32,425	70,402	117.1%	103.5%
General Aviation	N/A	112,996	58,752	114,416	109,134	94,872	96,242	1.4%	13.1%
Total Passengers	22,878,191	27,726,833	27,428,962	28,909,267	29,236,087	30,218,970	31,634,445	4.7%	3.6%

Source: Massport.

N/A Not available

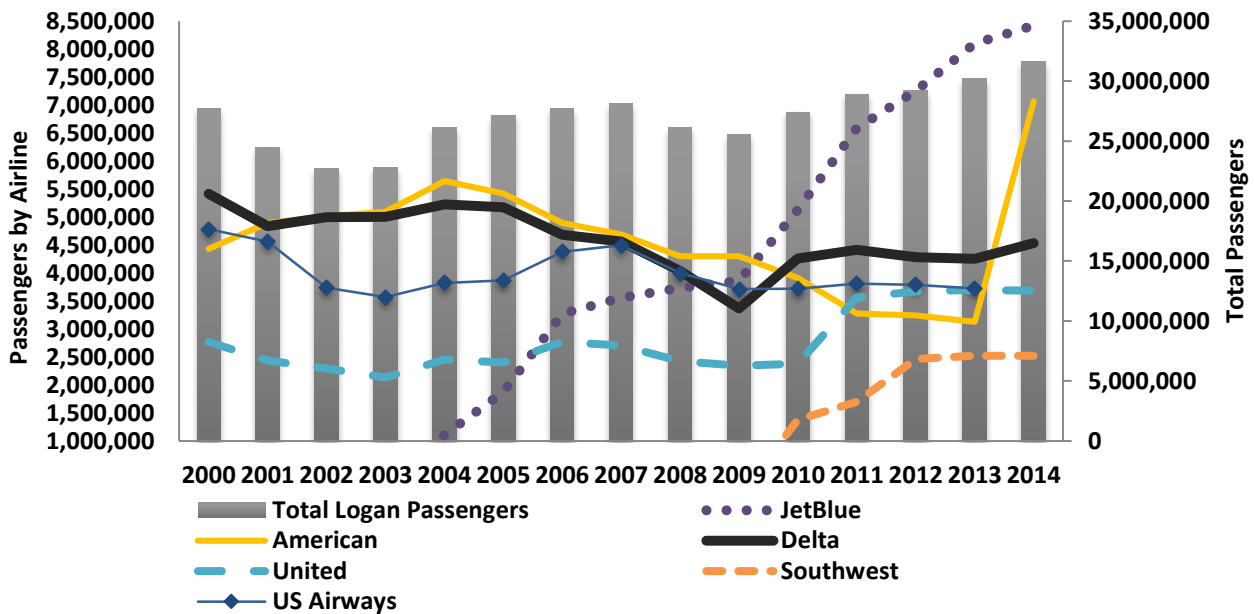
Notes: Numbers in parenthesis () indicate negative number.

Reported International passengers include only international passengers using Logan Airport as an international gateway; a significant number of international O&D passengers also board domestic flights from Logan to connect over other U.S. gateways to international destinations.

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Figure 2-2 shows the total annual passengers for the five dominant airlines at Logan Airport and highlights the rapid expansion of JetBlue Airways since 2004. Overall, the substantial low-cost carrier (LCC) growth at the Airport over the past decade – particularly the entry of JetBlue Airways in 2004 and its subsequent decision to expand and make Logan Airport one of its focus cities – has exceeded recent consolidation and contraction among other carriers serving Logan Airport.⁸ Domestic passenger activity levels have recovered from the recent economic downturn in 2009, when domestic air passengers fell to 21.8 million, reaching a new peak of 26.5 million in 2014.

Figure 2-2 Annual Passengers at Logan Airport Served by Top Six Airlines, 2000-2014



Source: Massport.

Notes: United Airlines totals in this chart include Continental Airlines beginning in 2011 (following 2010 merger), Delta Air Lines totals include Northwest Airlines beginning in 2010 (following 2009 merger), US Airways include America West Airlines beginning in 2005 (following 2005 merger), Southwest Airlines include AirTran Airways beginning 2012, United Airlines totals include Continental Airlines beginning in 2011, and American Airlines includes US Airways beginning in 2014. Totals for American Airlines, Delta Air Lines, United Airlines and US Airways include Delta Shuttle, US Airways Shuttle, and contract carriers doing business as Delta Connection, United Express, US Airways Express, American Eagle, or American Connection.

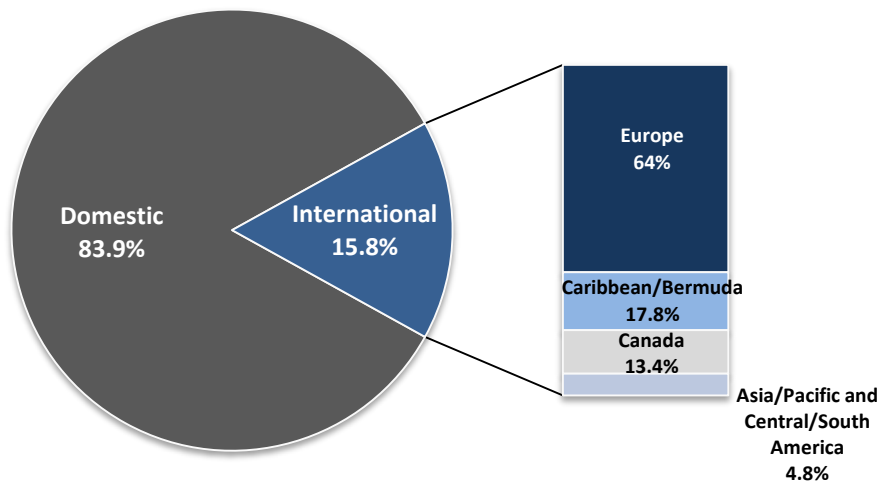
Logan Airport experienced substantial growth in international passenger activity levels in both 2013 and 2014 as airlines introduced a number of new international services. In 2013, international passenger traffic at Logan Airport increased by 3.7 percent over 2012 to reach 4.5 million, exceeding the historic international passenger peak achieved in 2000. International passenger growth accelerated in 2014, growing by 9.8 percent to reach a record 4.9 million. JetBlue Airways and Delta Airlines have both expanded international services at Logan Airport in recent years, with JetBlue Airways continuing to grow its Caribbean network and Delta Airlines introducing new nonstop service to Amsterdam, London Heathrow, and Paris De Gaulle. Logan Airport has also attracted a significant amount of foreign carrier service, including new service by Japan Airlines in 2012, Copa Airlines in 2013, and Emirates, Turkish Airlines, and Hainan Airlines in 2014.

⁸ Delta Air Lines and Northwest Airlines merged in 2009, United Airlines and Continental Airlines merged in 2010 and Southwest Airlines and AirTran Airways merged in 2012, but maintained separate schedules and operating identities through 2013. At Logan Airport, total passengers carried by the consolidated Delta Air Lines decreased 3.0 percent in 2012 and 0.7 percent in 2013. Total Logan Airport passengers carried by the consolidated United Airlines decreased by 1.7 percent in 2012 and increased by 5.6 percent in 2013. Total Logan Airport passengers for the combined Southwest Airlines/AirTran Airways entity decreased by 14.8 percent in 2012 and increased by 2.5 percent in 2013.

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Figure 2-3 shows the distribution of Logan Airport passengers by market segment. Europe/Middle East was the dominant international destination market, accounting for 64.0 percent of international traffic and 10.1 percent of total traffic at Logan Airport. Passenger traffic to Europe/Middle East was up 10.1 percent in 2014, driven by new services to the Middle East by Emirates and Turkish Airlines. The Bermuda/Caribbean regions and Canada accounted for 17.8 percent and 13.4 percent of international passengers respectively in 2014, with traffic to Canada increasing by 4.0 percent. Asia/Pacific and Central/South America passenger traffic accounted for 3.4 percent and 1.4 percent of international passengers respectively, following the introduction of new airline service to those regions in 2014.

Figure 2-3 Distribution of Logan Airport Passengers by Market Segment, 2014



Source: Massport.
 Note: General Aviation accounted for 0.3 percent of Logan Airport Passengers in 2014.

Aircraft Operation Levels in 2014

This section reports on aircraft operations levels for Logan Airport, including passenger aircraft operations, GA operations, all-cargo aircraft operations, and aircraft load factors.

Logan Airport Aircraft Operations

From 1990 to 2014, Logan Airport passengers increased by 38.3 percent, while aircraft operations decreased by 14.3 percent. The total number of aircraft operations at Logan Airport increased by 0.7 percent from 361,339 in 2013 to 363,797 in 2014 (Table 2-2). As shown in Figure 2-4, passenger operations account for 91.2 percent of total aircraft operations, while GA and all-cargo operations account for 7.3 percent and 1.6 percent respectively. Overall, aircraft operations have decreased as a result of continuing increases in passenger load factors (the percentage of seats occupied by paying passengers) and the substitution of larger capacity aircraft for smaller capacity aircraft. Figure 2-5 depicts passengers and operations data since 1990, and shows how passenger levels have grown at Logan Airport while overall aircraft operations have decreased to levels well below the historical peak year of 2000 of 487,996 operations.

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Table 2-2 Logan Airport Aircraft Operations (1990, 2000, and 2010 - 2014)

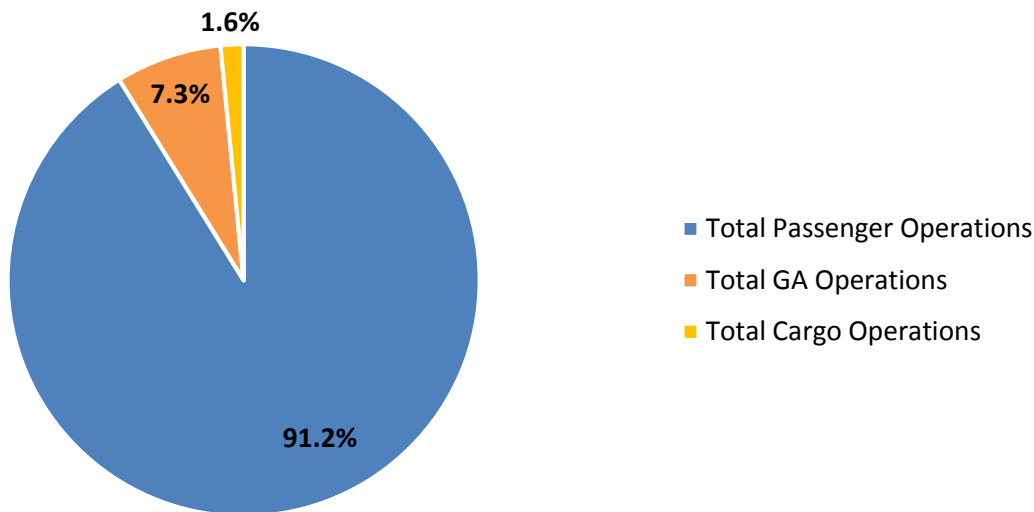
Category	1990	2000	2010	2011	2012	2013	2014	Percent change (2013-2014)	Avg. Annual Growth (2010-2014)
Total Aircraft Operations	424,568	487,996	352,643	368,987	354,869	361,339	363,797	0.7%	0.8%
Operations by Type and Aircraft Class									
Passenger Jet	N/A	254,968	214,307	223,083	225,166	233,072	240,254	3.1%	2.9%
Passenger Regional Jet	N/A	37,600	66,498	61,704	46,753	47,875	44,079	(7.9%)	(9.8%)
Passenger Non-Jet	N/A	147,913	50,882	49,700	49,599	48,307	47,339	(2.0%)	(1.8%)
Total Passenger Operations	N/A	440,481	331,687	334,487	321,518	329,254	331,672	0.7%	0.0%
GA Jet Operations	N/A	20,595	11,430	21,129	21,042	21,237	21,025	(1.0%)	16.5%
GA Non-Jet Operations	N/A	14,638	3,252	7,101	7,072	5,445	5,391	(1.0%)	13.5%
Total GA Operations	24,976	35,233	14,682	28,230	28,114	26,682	26,416	(1.0%)	15.8%
Cargo Jet	N/A	11,788	5,332	5,053	4,220	4,647	4,910	5.7%	(2.0%)
Cargo Non-Jet	N/A	494	942	1,217	1,017	756	799	5.7%	(4.0%)
Total Cargo Operations	N/A	12,282	6,274	6,270	5,237	5,403	5,709	5.7%	(2.3%)

Source: Massport

NA Not Available

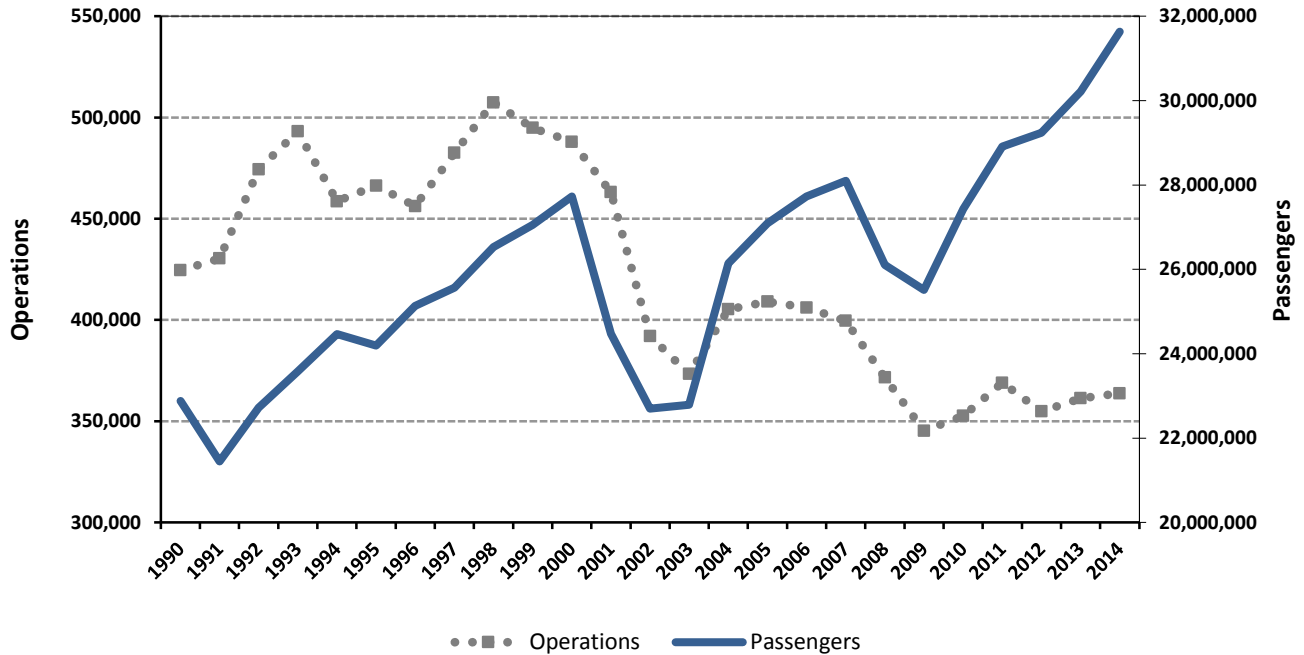
Notes: Jet includes the Embraer E-190, which is a regional jet configured with 88-100 seats, but is similar in size to some traditional narrow-body jets. Numbers in parenthesis () indicate negative numbers.

Figure 2-4 Logan Airport 2014 Aircraft Operations by Type



Source: Massport

Figure 2-5 Logan Airport Historical Air Passenger and Aircraft Operations, 1990-2014



Source: Massport

Passenger Operations

Logan Airport accommodated 331,672 passenger aircraft operations in 2014, a 0.7-percent increase from 2013. Passenger aircraft operations represented 91.2 percent of total aircraft operations in 2014, GA operations represented 7.3 percent, and cargo operations represented 1.6 percent (Figure 2-4).

The dominant carriers at Logan Airport based on the number of aircraft operations in 2014 are shown in Figure 2-6. JetBlue Airways, the newly merged American Airlines/US Airways, Delta Air Lines, Cape Air, and United Airlines were the top carriers in 2014 based on the number of aircraft operations.⁹ In 2014, JetBlue Airways accounted for approximately 82,595 operations, American Airways/US Airways accounted for 69,844 operations, and Delta Air Lines ranked third with 46,975 operations. Cape Air, United Airlines, and Southwest Airlines ranked fourth, fifth, and sixth, respectively, in 2014 with 35,080 operations, 30,019 operations, and 18,525 operations respectively.

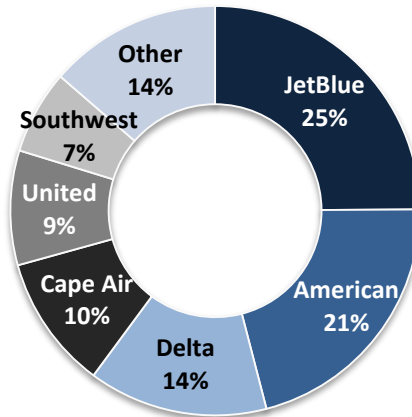
Passenger Regional Jet (RJ) operations (jet aircraft with fewer than 90 seats) and non-jet passenger operations decreased by 7.9 percent and 2.0 percent respectively in 2014, while jet passenger operations increased by 3.1 percent.¹⁰ RJ operations have been declining steadily since 2006, as airlines eliminated unprofitable services to small and medium size markets and consolidated services after a period of airline mergers. The decreases in RJ operations reflected the retirements of smaller RJs with 30 to 50 seats.

⁹ Airline rank is based on total number of operations for carrier "families," including activity for all regional airlines partners and subsidiaries.
¹⁰ In this report, the term regional jet refers to small jet aircraft with fewer than 90 seats. The Embraer-190, operated by JetBlue Airways and US Airways at Logan Airport, carries up to 100 and 99 passengers respectively, and is considered a jet.

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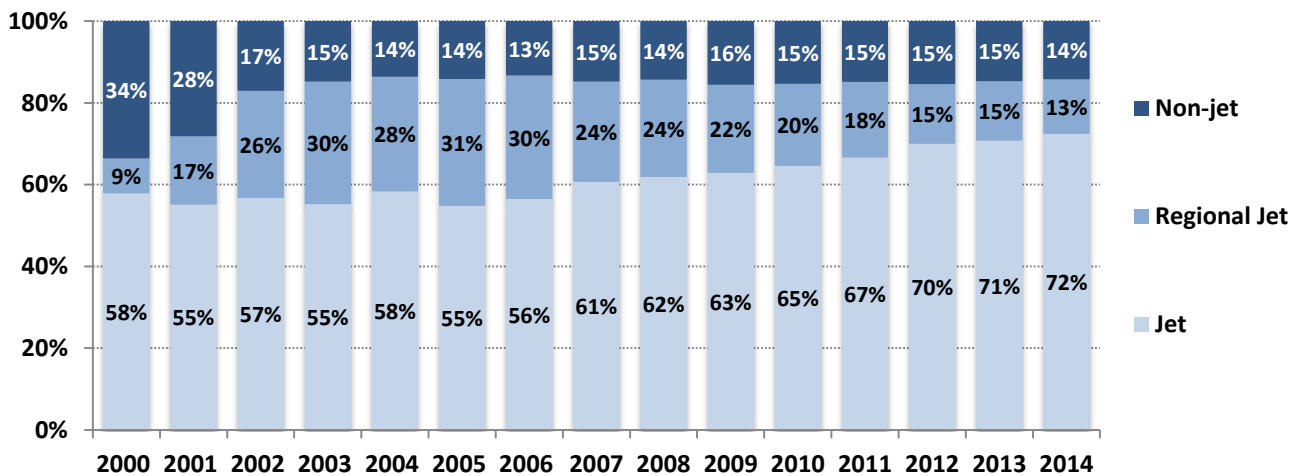
The change in mix of passenger aircraft operations since 2000 is shown in Figure 2-7. RJs accounted for 13 percent of total passenger operations in 2014, compared to 31 percent at the peak level in 2005. Similarly, non-jets have declined from a high of 34 percent in 2000 to 14 percent in 2014.

Figure 2-6 Dominant Passenger Carriers at Logan Airport by Aircraft Operations, 2014



Notes: Totals for American Airlines, Delta Air Lines, and United Airlines include all regional affiliates and contract carriers. American Airlines includes US Airways (2014 merger) and Southwest Airlines includes AirTran Airways (2012 merger) "Other" category includes all other carriers which have a smaller portion of aircraft operations at Logan Airport. This category includes but is not limited to Air Canada, Porter Airlines, British Airways, and Lufthansa, which provide year-round and seasonal service to Logan Airport.

Figure 2-7 Passenger Aircraft Operations at Logan Airport by Aircraft Type, 2000-2014



Source: Massport.

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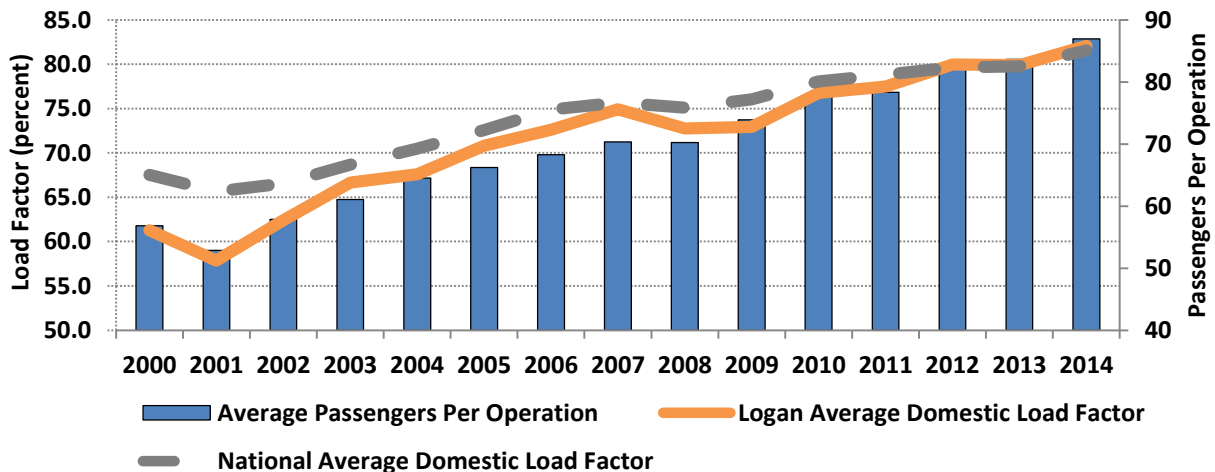
Passengers Per Aircraft and Load Factors

The average number of passengers per aircraft operation increased in 2014, continuing the trend seen over the past decade. An increase in the average number of passengers per aircraft operation indicates an increase in the average aircraft seating capacity and/or an increase in the percentage of aircraft seats occupied by passengers (i.e., load factor). In 2014, Logan Airport operations accommodated an average of 87 passengers per flight compared to 83.6 in 2013 (Table 2-3). The average number of passengers per flight has risen by 11.8 percent since 2010, when the average number of passengers per flight was 77.8. At Logan Airport the increasing number of passengers per flight reflects a shift away from smaller aircraft and rising load factors as airlines have retired many of the small RJs, introduced larger capacity, new generation narrow-body jets, and restricted capacity growth. In 2014, Logan Airport’s average domestic load factor increased to 82.1 percent from 79.9 percent in 2013. The national average domestic load factor has also been increasing, rising from 79.8 percent in 2013 to 81.6 percent in 2014.¹¹ Changes in passengers per operation and load factor are shown in Figure 2-8.

Year	Air Passengers	Percent Change from Previous Year	Aircraft Operations	Percent Change	Average Number of Passengers per Operation	Net Change from Previous Year (No. Pass/Op.)	Logan Airport Average Domestic Load Factor	Net Change from Previous Year
2010	27,428,962	7.5%	352,643	2.1%	77.8	3.9	76.8%	3.8%
2011	28,909,267	5.4%	368,987	4.6%	78.3	0.6	77.5%	0.7%
2012	29,235,643	1.1%	354,869	(3.8%)	82.4	4.0	80.0%	2.5%
2013	30,218,631	3.4%	361,339	1.8%	83.6	1.2	79.9%	(0.1%)
2014	31,634,445	4.7%	363,797	0.7%	87.0	3.3	82.1%	2.2%

Sources: Massport; U.S. Department of Transportation (DOT), T100 Database
 Notes: Numbers in parenthesis () indicate negative numbers.
 Includes scheduled passenger service only.

Figure 2-8 Passengers per Aircraft Operation and Aircraft Load Factor, 2000-2014



Source: Massport.

¹¹ U.S. DOT, T100 Database.

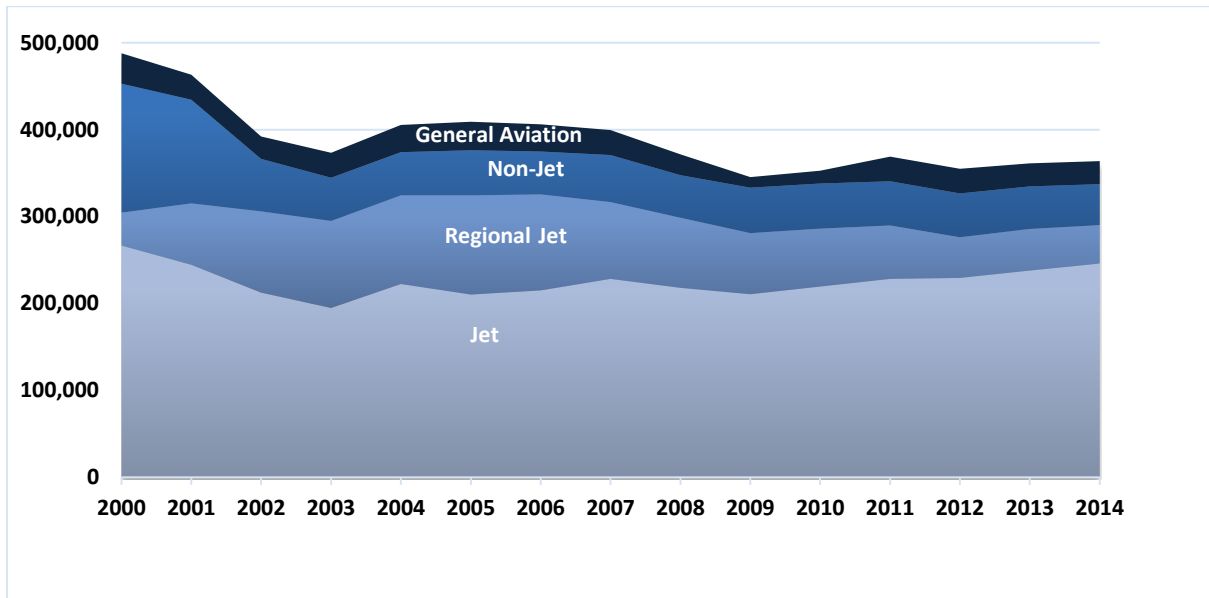
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General Aviation Operations

GA is defined as all aviation activity other than commercial airline and military operations. It encompasses a variety of aviation activities at Logan Airport including corporate/business aviation, private business jet charters, law-enforcement, and emergency medical/air ambulance services. GA operations are conducted with a diverse group of private and business aviation aircraft ranging from single-engine piston driven aircraft to high-performance, long-range jets. In 2010 to 2011, GA activity at Logan Airport showed a recovery from the steep decline during the 2008/2009 economic recession. However, GA operations have declined since 2011, as a result of economic uncertainty and sluggish economic growth. GA operations totaled 26,416 operations in 2014, down from 26,682 operations in 2013.

In 2014, GA operations accounted for 7.3 percent (26,416 operations) of aircraft activity at Logan Airport (Figure 2-4). In comparison, Hanscom Field accommodated approximately 133,700 GA operations in 2014, with GA representing 99.6 percent of Hanscom Field’s aircraft activity. Hanscom Field remains the primary GA airport for the Greater Boston region, accommodating over five times the number of GA operations at Logan Airport. Figure 2-9 depicts changes in Logan Airport aircraft operations by category since 2000.

Figure 2-9 Aircraft Operations at Logan Airport by Aircraft Class, 2000-2014



Source: Massport.
 Notes: Jet, regional jet, and non-jet operations are associated with commercial passenger and all-cargo airlines.
 General Aviation operations also include jet and non-jet aircraft, but are associated with private charter and corporate use.

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All-Cargo Operations

Operations by cargo-dedicated aircraft represent less than 2 percent of aircraft activity at Logan Airport. In 2014, all-cargo operations at Logan Airport totaled 5,711 operations, an increase of 5.7 percent compared to the prior year. Changes in all cargo aircraft operations reflect changes in demand, which is strongly linked to economic activity, and changes in the aircraft fleets of cargo airlines, which are moving to larger capacity aircraft. All-cargo carriers include FedEx, UPS, DHL, Atlas Air, and a few other small carriers.

Airline Passenger Service in 2014

Airlines can adjust service at an airport or on a specific route in two ways: changing the number of flights operated, or changing the size of the aircraft. Changes in flight frequency and changes in aircraft size both affect the number of seats available to passengers, also known as seat capacity. Airline services are therefore typically discussed in terms of seat capacity as well as the number of flight departures.¹² This section examines changes in airline departures and seat capacity at Logan Airport in 2014 and provides an overview of new and discontinued routes.

Service Developments at Logan Airport

In 2014, 32 airlines provided scheduled passenger service from Logan Airport to 115 non-stop destinations. The major changes in Logan Airport's scheduled passenger services in 2014 are described below. The average non-stop stage length (the average length of non-stop flights) of scheduled domestic flights from Logan Airport increased in 2014 to 806 miles from 793 miles in 2013. The average non-stop stage length of scheduled international flights increased from 1,768 miles in 2013 to 1,939 miles in 2014.

Changes in Domestic Passenger Service

As shown in Table 2-4, the total number of scheduled domestic flights at Logan Airport remained largely the same in 2014, increasing by 0.2 percent compared to 2013. Legacy carrier flights increased by 2.2 percent from 107,162 operations in 2013 to 109,470 operations in 2014. This marked the first year that overall legacy carrier operations have increased since 2008; past years were characterized by legacy carrier reductions related to airline consolidation or capacity cuts (due to the challenging operating environment). Total domestic LCC operations grew by 1.3 percent in 2014, increasing from 104,104 operations in 2013 to 105,384 operations in 2014. LCCs accounted for 36.1 percent of Logan Airport's total scheduled domestic operations in 2014. JetBlue Airways, the dominant LCC at Logan Airport, continued to expand, increasing its domestic operations by 3.9 percent from 73,374 operations in 2013 to 76,247 operations in 2014. JetBlue Airways' growth helped to offset continued declines in Southwest Airlines operations following its merger with AirTran Airways and the elimination of redundant services at Logan Airport. Regional commuter flights were down by 4.1 percent in 2014 due to slight reductions by Cape Air and Delta Air Lines, United Airlines and US Airways regional affiliates.

¹² A departure is an aircraft take-off at an airport. While aircraft operations include both departures and arrivals, airline services are typically described in terms of departures, as the number of scheduled departures generally equals the number of scheduled arrivals. Changes in departures translate to changes in overall operations.

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Table 2-4 Domestic Air Passenger Operations by Airline Category, 2010-2014

Category	2010	2011	2012	2013	2014	Percent change 2013-2014	Avg. Annual Growth (2010-2014)
Total Jet Operations	203,081	207,369	203,376	211,176	214,854	1.7%	1.4%
Legacy Carriers	117,877	111,761	108,374	107,162	109,470	2.2%	(1.8%)
Low-Cost Carriers	85,204	95,608	95,002	104,014	105,384	1.36%	5.5%
Regional/Commuter	94,535	89,586	79,790	79,922	76,682	(4.1%)	(5.1%)
Total Scheduled Domestic	297,616	296,955	283,166	291,098	291,536	(0.2%)	(0.5%)

Source: Massport.

Notes: LCCs serving Logan Airport in 2013 included AirTran Airways, Frontier, JetBlue Airways, Southwest Airlines, Spirit Airlines, Sun Country Airlines, and Virgin America.

Numbers in parenthesis () indicate negative numbers.

Highlights of key domestic airline service changes at Logan Airport in 2014 include:

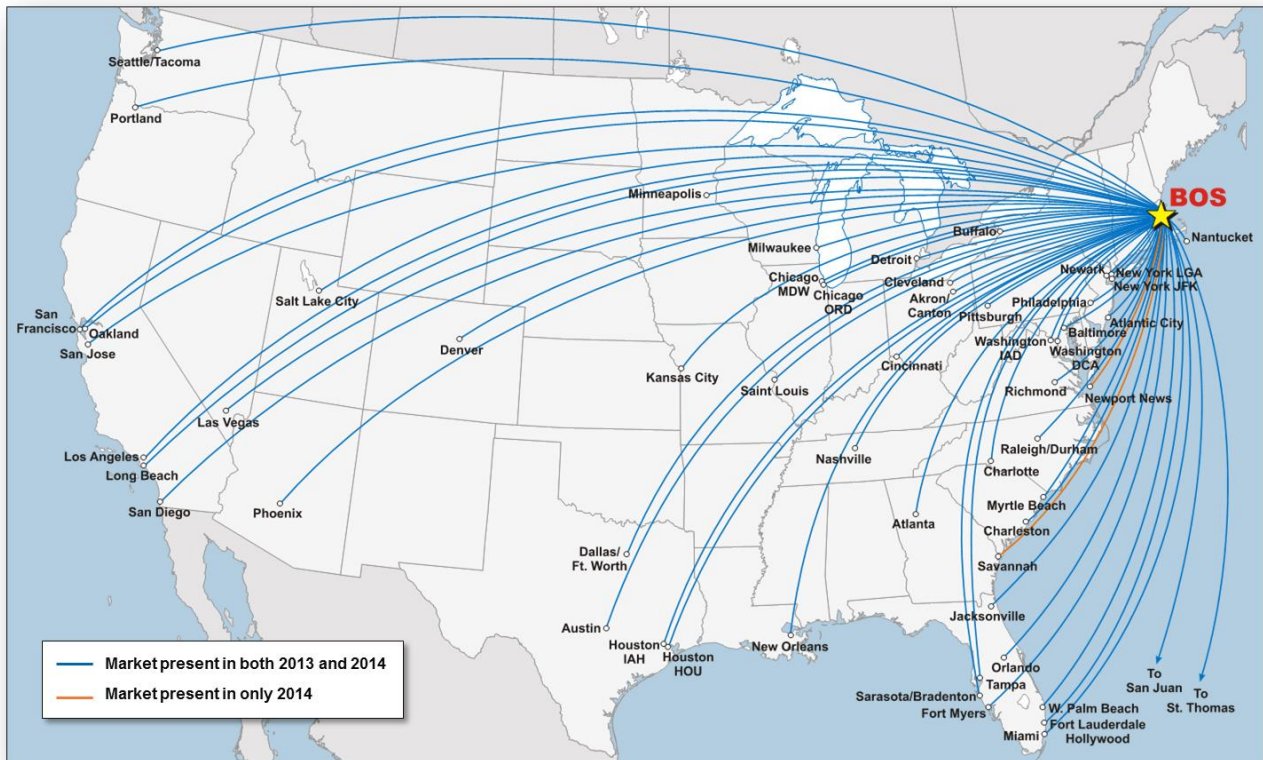
- JetBlue Airways continued to increase its operations from Logan Airport as it progressed towards its goal of operating 150 daily departures from Logan Airport by the end of 2015. In 2014, JetBlue Airways operated up to 122 daily domestic departures from Logan Airport. New domestic destinations introduced in 2014 included Savannah and Detroit. Service levels in other markets have not changed significantly since 2013.
- With the merger of American Airlines and US Airways in December 2013, the new American Airlines became the second largest carrier, following JetBlue Airways, at Logan Airport in terms of both passengers and aircraft operations. Combined American Airlines/US Airways service levels did not change significantly in 2014, with scheduled frequencies increasing by 0.3 percent compared to the prior year. Some service reductions may still occur going forward, as the merged carrier reconciles its network at Logan Airport and eliminates any service redundancies.
- Delta Air Lines introduced new nonstop services from Logan Airport to Jacksonville (Florida), Las Vegas (seasonal), and Richmond in 2014. Seasonal nonstop service introduced to Los Angeles in 2013 was converted to year-round service in 2014. Services were discontinued to some markets including Memphis and Norfolk.
- Southwest Airlines continued to reduce services slightly at Logan Airport, as it integrated AirTran Airways into its route network. In 2014, Southwest Airlines continued to reduce service frequency in the Baltimore market and discontinued non-stop service to Orlando. In 2013, Southwest Airlines introduced new services to Houston Hobby and Kansas City.

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- Budget carrier start-up, People Express Airlines, briefly operated nonstop service between its home base, Newport News, and Logan Airport in 2014. Nonstop service was introduced in June 2014, but was discontinued when the carrier ceased operations in September 2014.

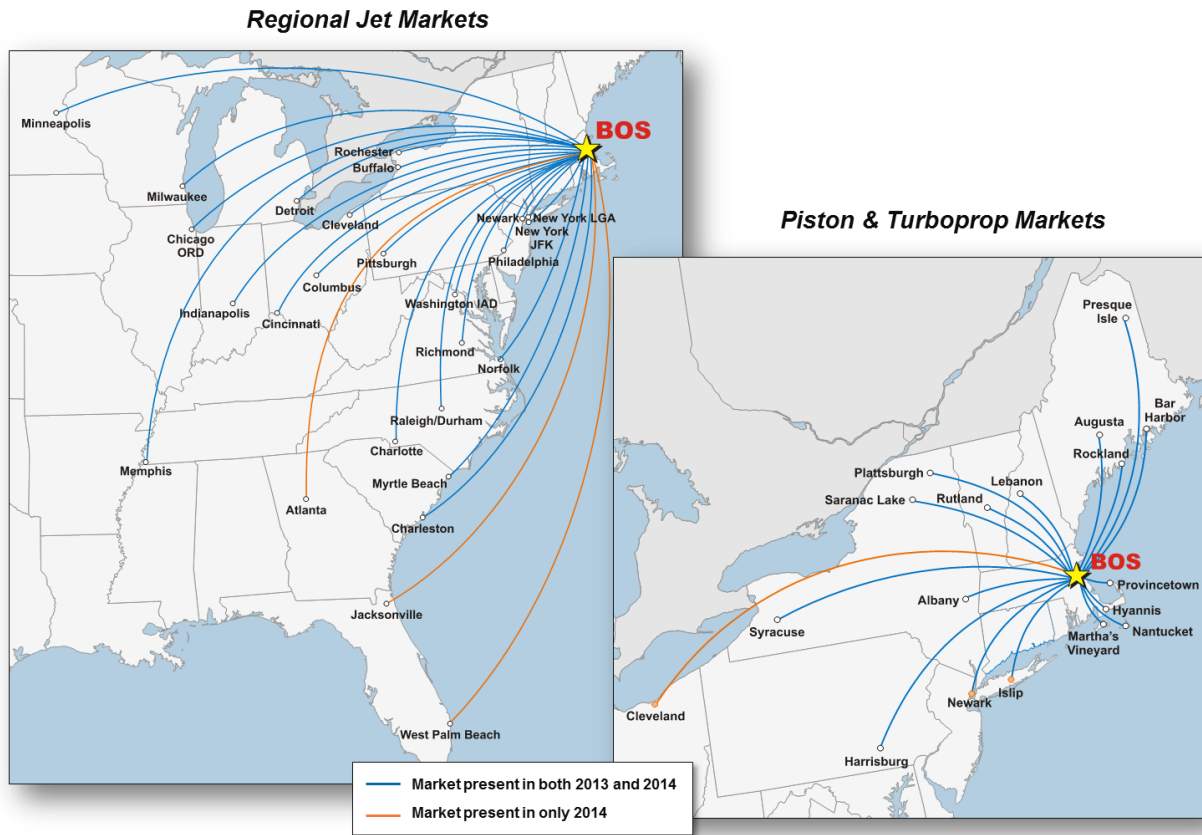
A complete listing of all changes in scheduled departures by domestic destination is in *Appendix E, Activity Levels*. Logan Airport’s scheduled domestic large jet and domestic regional services in 2014 are illustrated in Figure 2-10 and Figure 2-11.

Figure 2-10 Domestic Non-stop Large Jet Markets Served from Logan Airport, July 2014



Source: Official Airline Guide.
 Note: 32 airlines provided scheduled passenger service from Logan Airport to 115 non-stop destinations.

Figure 2-11 Domestic Passenger Non-stop Regional Markets Served from Logan Airport, July 2014



Source: Official Airline Guide.

Changes in International Passenger Service

Total scheduled international passenger operations at Logan Airport increased by 5.6 percent in 2014. There were approximately 39,785 annual international passenger operations at Logan Airport in 2014, up from 37,679 operations in 2013, as summarized in Table 2-5 (for details on the changes in operations by carrier, see Appendix E, Activity Levels).

Canada represents Logan Airport’s largest international destination region in terms of aircraft operations, accounting for approximately 40 percent of total scheduled international passenger operations in 2014. In 2014, passenger operations to Canada decreased by 2.3 percent. Passenger operations to Europe, Logan’s second largest international market in terms of operations and largest international market in terms of passengers, increased 2.1 percent in 2014. Operations to the Bermuda/Caribbean market increased by 5.6 percent in 2014, with some service additions introduced by JetBlue Airways and Delta Air Lines. Passenger operations to the Middle East, Asia, and Central America also increased significantly in 2014 due to new nonstop services introduced by foreign carriers. Logan Airport’s scheduled international air service markets are shown in Figure 2-12.

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Category	2010	2011	2012	2013	2014	Percent change 2013-2014	Avg. Annual Growth (2010-2014)
Scheduled							
Canada	16,399	16,290	16,787	16,125	15,748	(2.3%)	(1.0%)
Europe	12,750	14,782	13,890	13,530	13,816	2.1%	2.0%
Bermuda/Caribbean ¹	4,116	6,054	6,752	7,031	7,428	5.6%	15.9%
Middle East	0	0	0	0	1,052	n/a	n/a
Asia	0	0	474	646	1,011	56.5%	n/a
Central/South America	0	0	0	347	730	110.4%	n/a
Total Scheduled International	33,265	37,126	37,903	37,679	39,785	5.6%	4.6%

Source: Massport.

Notes: Numbers in parenthesis () indicate negative number.

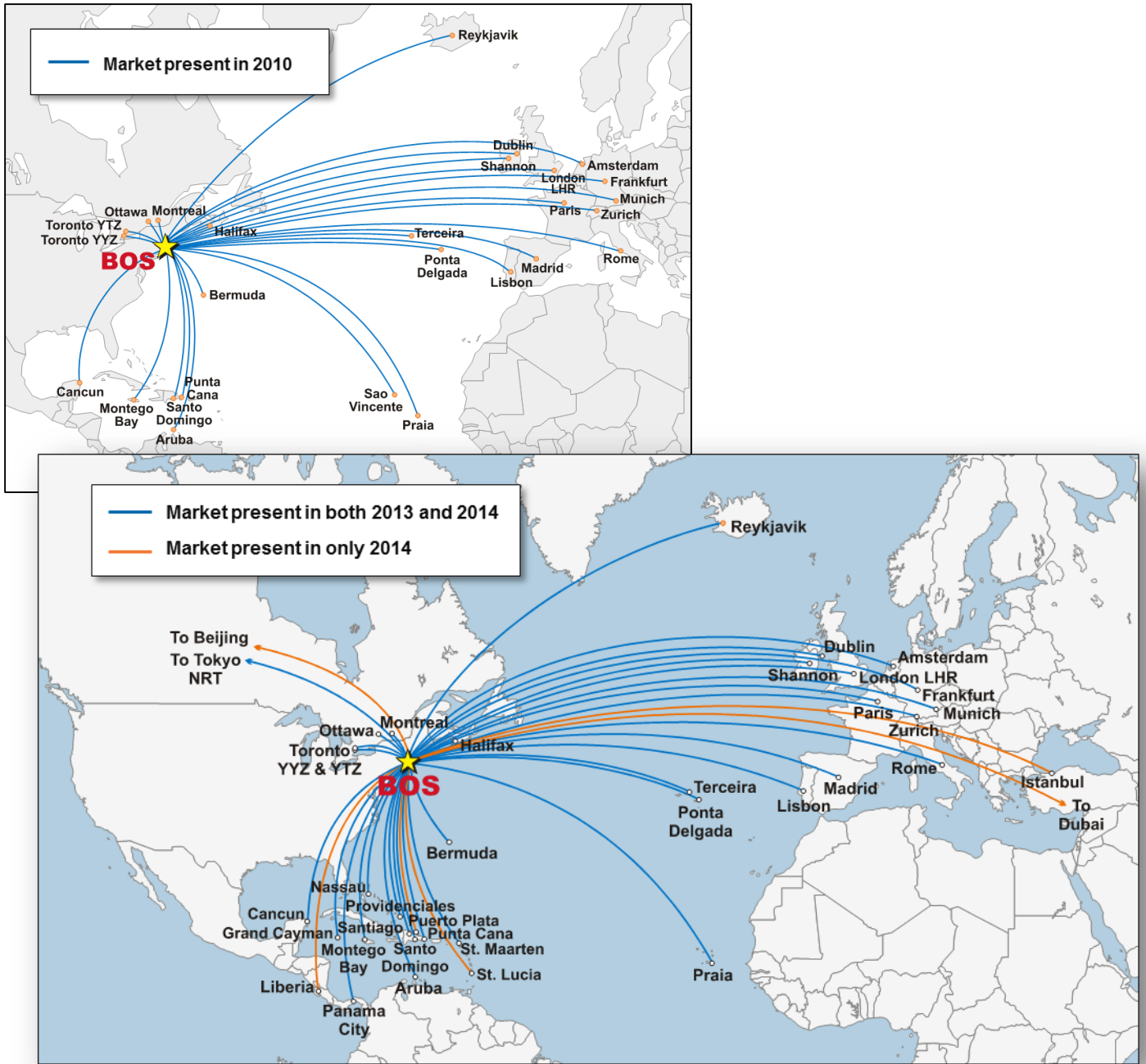
¹ Includes Puerto Rico and U.S. Virgin Islands.

Logan Airport has seen a notable trend of international service increases in recent years. As shown in Table 2-5, Logan Airport gained service to Asia in 2012 with new Japan Airlines' nonstop Tokyo service. Logan Airport also gained service to Central/South America in 2013 with new Copa Airlines' Panama City nonstop service. In 2014, Logan Airport continued to attract significant new foreign carrier service and also saw continued international expansion by carriers such as JetBlue Airways and Delta Air Lines. New and expanded international passenger service at Logan Airport in 2014 included:

- In 2014, JetBlue Airways continued to expand its service offering to the Caribbean adding new nonstop seasonal service to Puerto Plata (Dominican Republic), St. Lucia, and Liberia (Costa Rica).
- Delta Air Lines introduced new seasonal service to Nassau (Bahamas) and Providenciales (Turks and Caicos Islands) in 2014. Delta Air Lines also expanded existing seasonal service to Cancún.
- In March 2014, Emirates introduced new nonstop service to its Dubai connecting hub, Logan Airport's first scheduled nonstop service to the Middle East.
- In May 2014, Turkish Airlines introduced new nonstop service to Istanbul, Logan Airport's second scheduled nonstop service to the Middle East.
- Hainan Airlines introduced new nonstop service to Beijing in June 2014, Logan Airport's second scheduled nonstop service to Asia following Japan Airlines' Tokyo Narita service launched in 2012. The Hainan Airlines service operated with next-generation Boeing 787 aircraft.
- Porter Airlines increased its service to Toronto, extending peak season service to seven daily departures in 2014.
- Aer Lingus increased its Shannon service from four times weekly in 2013 to daily in 2014.

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Figure 2-12 International Non-stop Markets Served from Logan Airport, July 2014



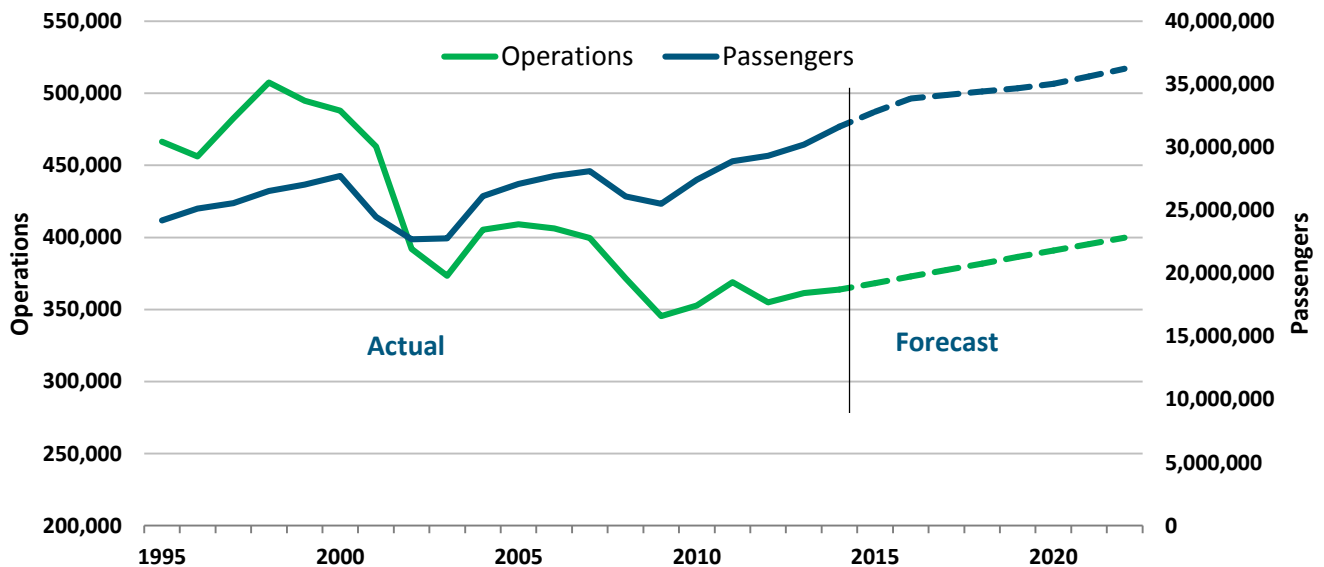
Source: Official Airline Guide Market Files.

Aviation Activity Forecasts

Logan Airport has been one of the fastest growing major U.S. airports over the last four years. A series of positive factors have combined to produce this exceptional passenger growth, and continued economic growth is the key determinant of Logan Airport’s long-term passenger demand. The forecast presented in the 2011 *ESPR* was updated as part of an ongoing strategic planning effort. The refined forecast reflects the most up-to-date short-term (2015 and 2016) and long-term (2035) activity outlooks. The new forecast is reflective of the recent sharp growth in traffic and service at Logan Airport, the diminished market share held by the regional airports, Massachusetts’ robust short-term economic outlook, and 24 years of historical relationships to the main drivers of air transport demand at Logan Airport, including the economy, air fares, and regional share.

Demand for passenger service is determined by many external factors including economic growth, cost of travel, and demographic shifts. In the short-term, Logan Airport is projected to reach 32.9 million passengers in 2015 and 34.0 million passengers in 2016.¹³ According to the medium- to long-term scenarios, Logan Airport’s passenger traffic is forecast to reach 35 million annual passengers by the end of 2020. These forecasts are substantially lower than those developed in 1990, when it was anticipated that by 2010 Logan Airport would be serving between 37.5 million and 45.0 million air passengers. The forecast demand of 35 million annual passengers by 2020 reflects an assumption that aircraft operations will increase, but will remain below historic highs as airlines will deploy larger Group VI aircraft with continued high load factors (Figure 2-13).

Figure 2-13 Logan Airport Historic and Forecasted Activity Levels, 1995 - 2022



Source: Massport and InterVISTAS Forecast.

13 Massport and InterVISTAS forecast.

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On the international passenger side, the dramatic rise in international travel among Boston’s business and leisure passengers has helped fuel passenger growth at Logan Airport. This is consistent with Logan Airport’s role of accommodating international and long-haul passenger service demand for the New England region and domestic passenger demand for greater Boston and Massachusetts. International traffic is growing at a faster rate than domestic traffic at Logan Airport (Table 2-6) with new non-stop service since 2012 to Beijing, Tokyo, Dubai, Istanbul, Israel, and Panama City. As of March 2015, Logan Airport provides nonstop service to 44 international destinations. These routes have opened New England and Boston to hubs in Asia, the Middle East, and Latin America and are expected to bring an additional \$735 million in annual economic impact to Massachusetts.

Category	2014	2015	2020	2022
International (millions of passengers)	4.9	5.3	5.9	6.3
Domestic (millions of passengers)	26.5	27.6	29.1	29.9
International (percent of total)	15.8%	16.0%	17.0%	17.4%
Domestic (percent of total)	84.2%	84.0%	83.0%	82.6%

Source: Massport and InterVISTAS forecast.

Cargo Activity Levels in 2014

In 2014, Logan Airport ranked 21st among U.S. airports in total cargo volume.¹⁴ Air cargo is carried in the belly compartments of passenger aircraft or by dedicated all-cargo carriers, including FedEx, UPS, and DHL in all-cargo aircraft. The express/small package segment dominates Logan Airport cargo activity, accounting for 62.5 percent of the total non-mail cargo volume. Table 2-7 shows all-cargo aircraft operations and cargo volumes at Logan Airport for 1990, 2000, and 2010 to 2014.

In 2014, the number of all-cargo aircraft operations at Logan Airport increased by 5.7 percent while total cargo volume, including mail, increased by 6.3 percent (Table 2-7). However, compared to 2000, all-cargo operations at Logan Airport have declined by approximately 54 percent, while total cargo volume has declined by approximately 43 percent. A number of factors are responsible for the decline in cargo shipments (including freight, express and non-express mail and packages) at Logan Airport, as well as nationally. Cargo carriers, particularly the integrators that provide door-to-door delivery services, have significantly increased their use of trucks to move cargo in shorter haul markets because it is more cost-effective than air transport. In addition, the widespread acceptance and use of the internet and e-mail has greatly reduced mail volumes overall.

FedEx carried 39.8 percent of the total cargo volume through Logan Airport in 2014 and was the ninth largest air carrier at the Airport in terms of total flights. UPS was the next largest cargo operator and accounted for 12.4 percent of Logan Airport’s cargo volume in 2014. Passenger airlines carried 38.4 percent, or 227 million pounds, of Logan Airport’s cargo as belly cargo in 2014, compared to 365 million pounds that were shipped on all-cargo carriers. These numbers are presented in Figure 2-14.

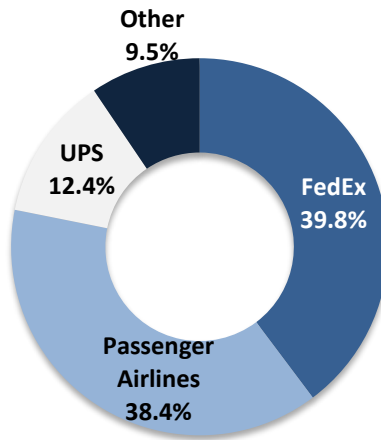
¹⁴ Airports Council International, 2014 North American Air Traffic Report.

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	1990	2000	2010	2011	2012	2013	2014	Percent change (2013-2014)	Avg. Annual Growth (2009-2013)
All-Cargo Aircraft Operations	n/a	12,282	6,274	6,270	5,237	5,403	5,711	5.7%	(2.3%)
Volume (lbs.)									
Express/Small Packages	n/a	484,490,143	339,485,424	332,896,322	327,234,464	334,315,119	356,717,555	6.7%	1.2%
Freight	n/a	367,857,011	206,893,979	204,055,228	204,596,956	203,877,671	213,911,167	4.9%	0.8%
Mail	119,818,113	194,902,513	25,904,205	24,566,806	21,546,316	19,407,316	22,087,150	13.8%	(3.9%)
Total	753,253,075	1,047,259,667	572,283,608	561,518,356	553,377,736	557,600,528	592,715,872	6.3%	0.9%

Source: Massport.
 Note: Numbers in parenthesis () indicate negative numbers.

Figure 2-14 Cargo Carriers - Share of Logan Airport Cargo Volume, 2014



Note: Passenger airlines carry cargo as belly cargo (in the belly of planes); Other includes Atlas Air (which flies for DHL), ABX Air, and Mountain Air Cargo.

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3

Airport Planning

Introduction

This chapter describes the status of projects underway or completed at Logan Airport by the end of 2014 and provides updates for projects underway through the filing date of this report. Specific topics include terminal area projects, service area projects, buffer/open space projects, Airport parking projects, airside area projects, high occupancy vehicle (HOV) improvements, and Airport-wide projects.

Logan Airport facilities have been accommodating recent increases in activity and operations on the airside, but the terminal, roadways, and parking facilities are strained by the increase in passengers. Following a two-year strategic planning effort, Massport is in the process of identifying priority planning projects and initiatives to accommodate the increased demand in international travel, to enhance ground access to and from the Airport, as well as improve on-Airport roadways and parking.

As discussed in *Chapter 1, Introduction/Executive Summary* of this 2014 *Environmental Data Report (EDR)*, any proposed project that triggers a threshold under the Massachusetts Environmental Policy Act (MEPA) or the National Environmental Policy Act (NEPA) will undergo the appropriate project-specific state and/or federal environmental review.

2014 Planning Highlights and Key Findings

Recent progress on planning initiatives and individual projects at Logan Airport during 2014 is described below.

Airport Projects

- **Southwest Service Area (SWSA) Redevelopment Program (EEA 14137).** The Rental Car Center (RCC) project was fully operational and the full benefits of the project began to be realized in 2014. Consolidation of rental car operations and associated shuttle bus service into a single coordinated shuttle bus fleet operation resulted in customer service improvements, reduced on-Airport vehicle miles traveled (VMT) with associated emission reductions, and stormwater system enhancements. In keeping with Massport's commitment to sustainability, the Authority is proud that the RCC was awarded Logan Airport's first Gold Certification in Leadership in Energy and Environmental Design (LEED)® in 2015. In 2010,

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Logan Airport Rental Car Center.
Source: Massport.

construction began on the new RCC, and rental car and bus operations began in the centralized facility on September 25, 2013. The remaining quick-turnaround areas, permanent taxi pool, bus and limousine pools, and the SWSA edge buffers were completed in 2014. The status of mitigation efforts for the RCC is provided in *Chapter 9, Project Mitigation Tracking*.

■ **Logan Airport Runway Safety Area (RSA) Improvements Project at Runway Ends 33L and 22R (EEA 14442).** Construction of the Runway 33L RSA improvements commenced in June 2011 and was completed ahead of

schedule in November 2012. The Runway 22R RSA improvements were completed in late 2014. The status of mitigation for the RSA projects is provided in *Chapter 9, Project Mitigation Tracking*. Mitigation efforts associated with Runway 33L and Runway 22R safety improvements are ongoing.

- **Runway 15L-33R RSA Improvement.** As part of an ongoing program to improve safety at Logan Airport, and in close coordination with the Federal Aviation Administration (FAA), Massport proposed shifting existing Runway 15L-33R to accommodate an expanded RSA at the westernmost end (Runway 15L approach) of the runway. The project shifted the runway 200 feet to the southeast to comply with FAA standards requiring safety areas of 150 feet wide by 300 feet long at both ends of the runway. FAA issued a Categorical Exclusion under the National Environmental Policy Act (NEPA) on April 1, 2014. The project was completed in late 2014.
- **Renovations and Improvements at Terminal B, Pier A.** By modifying and expanding existing facilities to meet airlines' needs and providing a connection between Piers A and B, the project improves and simplifies the passenger traveling experience. The renovations included new ticket counters, a modified and enlarged passenger checkpoint, reconfigured departure lounges, concessions, new inbound and outbound baggage system, and a new airline club. The new facilities opened on April 30, 2014.
- **Logan Airport Greenway Connector Project.** The Logan Airport Greenway Connector ("Greenway Connector") is a pedestrian/bicycle path connecting the Bremen Street Park path to the future City of Boston Narrow Gauge Connector, a pedestrian/bicycle path that begins at the Greenway Overlook and continues to Constitution Beach. The Greenway Connector and the City of Boston Link provide a continuous pedestrian/bicycle path from Massport's Piers Park on the East Boston waterfront to Constitution Beach. Construction began in spring 2013 and was completed in July 2014.
- **Hangar Projects.** Architectural design commenced in December 2010 for two hangar upgrades in the North Cargo Area (NCA). The renovated JetBlue Airways hangar opened in 2012. The new American Airlines



Logan Airport Greenway Connector.
Source: Massport.

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hangar, formerly occupied by Northwest Airlines, was refurbished in 2013. Demolition of the former American Airlines hangar (Hangar 16) commenced in 2014 and was completed in August 2015.

- **Parking Consolidation Project.** Massport is consolidating 2,050 temporary parking spaces as an addition to the West Garage and at the existing surface lot between the Logan Office Center and the Harborside Hyatt. These spaces constitute all the remaining spaces permitted under the Logan Airport Parking Freeze.¹ The West Garage addition is on the site of the existing Hilton Hotel parking lot. The project will incorporate sustainable design and resiliency elements. The consolidation commenced in spring 2015 and is expected to be completed in late 2015.
- **Terminal E Renovation and Enhancements Project.** To accommodate regular service by wider and longer Group VI aircraft at Terminal E, this project includes interior and exterior improvements. The project does not include any new gates, but will reconfigure three existing gates to accommodate Group VI aircraft (including the Airbus A380 and Boeing 747-8 primarily used by international air carriers). An addition to the west side of Terminal E will allow passenger holdrooms to be reconfigured to accommodate the larger passenger loads associated with larger aircraft. The project also includes modifications to the airfield to meet required FAA safety and design standards to accommodate the larger aircraft. An Environmental Assessment (EA) was filed, and FAA issued a Finding of No Significant Impact (FONSI) on July 29, 2015. Construction is underway.
- **Terminal E Modernization Project.** To accommodate existing and long-range forecasted demand for international service in an efficient, environmentally sound manner that also improves customer service, Massport is planning to extend the existing International Terminal E. Modernizing Terminal E would add the three gates approved in 1996 as part of the International Gateway West Concourse project (EEA # 9791), which were never constructed, and an additional two to four additional gates in an extended concourse. The facility would be designed to function as a noise barrier. New passenger handling and passenger holdrooms are being planned, as well as possible additional Federal Inspection Services (FIS) and Customs and Border Patrol facilities to supplement the existing FIS areas in Terminal E. Previously a Satellite FIS Facility was planned and permitted in 2001 for Terminal B but never constructed (EEA # 9791). A key feature of this project is the first direct pedestrian connection from the MBTA Blue Line Airport Station to the terminal complex at Logan Airport. This project would also include improvements to Airport roadways to facilitate access. Terminal E, Logan Airport's international terminal, needs to accommodate anticipated demand. If no improvements are implemented, the passenger experience and environmental conditions will diminish. The project is in the conceptual design phase and initial construction would likely begin in 2018. Massport expects to file an Environmental Notification Form (ENF) in the very near future.



International aircraft at Terminal E.
Source: Massport.



- **Landside Ground Access Operating Improvements.** A series of recent projects have been designed to yield substantial environmental benefits, particularly in the areas of ground access efficiencies and associated air quality emissions reductions on-Airport and in East Boston, as documented below.
 - The RCC reduces Airport VMT as well as improves roadway and intersection operations through: consolidating the rental car shuttle bus fleet and some Massport shuttle buses into a unified shuttle

¹ 310 Code of Massachusetts Regulations 7.30 and 40 CFR 52.1120.

route system resulting in the elimination of eight rental car bus fleets (a net total of 66 buses would be eliminated); intersection and roadway infrastructure improvements including signal coordination and dedicated ramp connections; and creating a Ground Transportation Operations Center (GTOC) enabling efficient planning and operation of Airport-wide transit activities.

- ❑ Logan Airport's new bus fleet, comprising 18 CNG buses and 32 clean diesel/electric buses, has fully replaced the entire fleet of diesel rental car shuttle buses now that the RCC is fully operational. Four additional new CNG buses were put into service in the summer of 2015, bringing the total to 22 buses.
- ❑ The Green Bus Depot serves as Logan Airport's on-Airport maintenance facility for Massport's new clean-fuel bus fleet. By shifting the bus maintenance operations out of the community, Massport is reducing bus traffic in East Boston and Chelsea.
- ❑ The Martin A. Coughlin Bypass reduces commercial traffic through East Boston by providing a direct link from Logan Airport's North Service Area (NSA) to Chelsea for Airport-related vehicle trips.
- ❑ The Economy Parking Garage simplified and reduced on-Airport circulation by consolidating multiple overflow parking lots throughout the Airport into a single location served by a single shuttle route. Overall traffic circulating throughout the Airport has decreased, resulting in significant operational and environmental benefits.

Planning Initiatives

- **Strategic Planning.** In 2013, Massport began a strategic planning effort to position the Authority's aviation, maritime, and real estate lines of business, and its administrative support structures and workforce to meet the region's 21st century transportation and economic development challenges. The strategic planning initiative's primary goal was to formulate a vision for Massport as a transportation and economic development engine for the Commonwealth of Massachusetts in the 21st century.
- **Resiliency Planning.** At the end of 2013, Massport initiated the Disaster and Infrastructure Resiliency Planning (DIRP) Study for Logan Airport, the Port of Boston, and Massport's waterfront assets in South and East Boston. The DIRP Study includes a hazard analysis, modeling sea-level rise and storm surge, and projections of temperature and precipitation and anticipated increases in extreme weather events. The DIRP Study will make recommendations regarding short-term adaptation strategies to make Massport's facilities more resilient to the likely effects of climate change. Massport published Flood Proofing Design Guidelines in November 2014, with a revision in April 2015.
- **Logan Airport Sustainability Management Plan (SMP).** In 2013, Massport was awarded a grant by the FAA to prepare a SMP for Logan Airport. The Logan Airport SMP planning effort began in May 2013, and was completed in April 2015. The Logan Airport SMP takes a broad view of sustainability including economic vitality, social responsibility, operational efficiency, and natural resource conservation considerations, and is intended to promote and integrate sustainability Airport-wide and to coordinate on-going sustainability efforts across the Authority. A copy of the SMP Highlights Report can be found at <https://www.massport.com/environment/sustainability-management-plan/>.

Table 3-1 provides a summary of the status of each planning concept, as of December 31, 2014. Descriptions are provided in subsequent sections of this chapter.

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Table 3-1 Logan Airport Short- and Long-Term Planning Initiatives							
	Completion				Completion		
	Status as of Dec. 31, 2014	Short-Term 2017	Long-Term 2030		Status as of Dec. 31, 2014	Short-Term 2017	Long-Term 2030
Terminal Area Projects/ Planning Concepts				Buffer Projects/ Open Space (continued)			
Terminal E International Gateway, Phase 1 and Phase 2	C			Navy Fuel Pier	C		
Terminal E, Renovations and Enhancements	D	→		Bremen Street Park	C		
Terminal E Modernization (incorporates three West Concourse gates previously approved but not constructed)	E		→	Airport Parking Projects/ Planning Concepts			
Massport Satellite FIS Facility Project	E		→	Economy Parking Project in the NCA	C		
Terminal B Renovations	C			Parking Garages Consolidation (West Garage additions and other surface locations)	U	→	
Terminal B Walkway Extension	E			Airside Area Projects/ Planning Concepts			
Terminal B Garage Repair and Rehabilitation	C			Airside Improvements Planning Project	C	→	
Terminal C to E Connector	D	→		Taxiway N Realignment/other taxiway improvements	E	→	
Terminal A to B Connector	E		→	Runways 22R and 33L Runway Safety Area Improvements	C		
Terminal B to C Connector	E		→	Former American Airlines Hangar Demolition	U	→	
Service Area Projects/ Planning Concepts				Runway 15L-33R RSA Project	C		
Relocated CNG Station in the NCA	E		→	Runway 4R Light Pier Replacement	E		→
Replacement Cargo Facilities in the NCA	E		→	Runway Incursion Mitigation (RIM)	E		→
Replacement Hangar in the NCA	E		→	Governors Island Aircraft Parking	H		→
New/Replacement GSE Consolidated Facility in the NCA	E		→	Airport-Wide Projects/ Planning Concepts			
Green Bus Depot in the NSA	C			Logan Airport Wayfinding System	C ¹		
Flight Kitchen Consolidation in the NSA	C			Central Commissary	E		→
SWSA Program (Rental Car Center)	C			Massport Strategic Plan	C		→
Ground Transportation Operations Center	C			Resiliency Planning	C	→	
NSA Roadway Corridor Project	C			Logan Sustainability Management Plan	C	→	
Buffer Projects/ Open Space				Joint Operations Center (JOC)	E		→
SWSA Buffer (Phase 2)	C	→					
Neptune Road Airport Edge Buffer	U	→					
North Service Area Roadway Corridor	C	→					
Greenway Connector	C						

Notes: Anticipated completion dates and status as of December 31, 2014 as denoted by →.
Short-term projects are anticipated to be completed by 2017 and long-term projects are anticipated to be completed by 2030.
Details of each project or planning concept are provided in the sections that follow.

C – Completed prior to or during 2014.
D – Project in design, or awaiting funding
E – Planning concepts undergoing evaluation and/or feasibility analysis
H – Project or planning concept on hold
1 – Design has been completed. At this time, the project is not funded; all Wayfinding Improvements are being achieved on a project-by-project basis.

X – Project cancelled
U – Project under construction
R – Project undergoing MEPA, NEPA/FAA, or other review

FIS – Federal Inspection Services
CNG – Compressed Natural Gas
NCA – North Cargo Area
GSE – Ground Support Equipment
NSA – North Service Area
SWSA – Southwest Service Area

Terminal Area Projects/Planning Concepts

The terminal area accommodates most of the passenger functions at Logan Airport including the passenger terminals, terminal area roadways, central parking facilities, and the Hilton Hotel. Table 3-2 presents information on the status of each ongoing terminal area project. In addition, both Massport and its tenants are proposing projects or exploring planning concepts to modernize and carry out future improvements to the existing terminal facilities. These planning concepts are also detailed in Table 3-2. The location of the ongoing terminal area projects and the planning concepts are shown on Figure 3-1.



Terminal E curbside.
Source: Massport.



Parking at Terminal E.
Source: Massport.

Figure 3-1 Location of Projects/Planning Concepts in the Terminal Area



Source: Massport.

Notes: See Table 3-2 for a description of the numbered projects. Status as of December 31, 2014.

- 1 International Gateway Project (Phases 1 and 2)
- 2 Terminal E Renovation and Enhancements
- 3 Terminal E Modernization (incorporates formerly proposed West Concourse)
- 4 Renovations and Improvements at Terminal B
- 5 Terminal C to E Connector
- 6 Terminal A to B Connector
- 7 Terminal B to C Connector
- 8 Terminal C Roadway Enhancements
- 9 Parking Consolidation Project (construction underway over the Hilton Hotel parking lot and at the existing surface lot between the Logan Office Center and Harborside Hyatt)

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Table 3-2 Description and Status of Projects/Planning Concepts in the Terminal Area (December 31, 2014)	
Description	Status
Massport Projects/Planning Concepts	
<p>1. International Gateway Project (Terminal E) This project expanded and upgraded Terminal E to provide better service to international passengers. This project was constructed in phases:</p> <p>Phase 1 – A weather-protected airside bus portico linking the ground floor with the second floor to accommodate passengers arriving from remotely parked aircraft.</p> <p>Phase 2 – Expanded Federal Inspection Services (FIS) Facility, and improved meeter/greeter lobby and the ticketing area to maximize passenger convenience and reduce processing times. Includes accommodation for bicycles.</p>	<p>Completed in 2004.</p> <p>Completed in 2007.</p>
<p>2. Terminal E Renovation and Enhancements Project This project includes interior and exterior improvements at Terminal E to accommodate regular service by wider and longer Group VI aircraft. The project also includes airfield improvements to allow safe and efficient operations of these aircraft. The project does not include any new gates, but does include the reconfiguration of three existing gates to accommodate Group VI aircraft (including the A380 and B747-8 used by international air carriers). An approximately 94,000-square-foot addition to the west side of Terminal E will allow passenger holdrooms to be reconfigured to accommodate the passenger loads associated with larger aircraft. Additionally, interior renovations throughout the terminal are planned to enhance overall passenger service. The project also includes modifications to the airfield to meet required FAA safety and design standards. Airfield modifications include stabilizing select runway shoulders and taxiway turning areas (fillets).</p>	<p>Massport advanced the Terminal E Renovation and Enhancements Project that focused on upgrading three gates at Terminal E to meet Group VI aircraft requirements. This project will help meet the immediate needs to serve Group VI aircraft, without adding new gates.</p> <p>Planning was initiated in 2014. An Environmental Assessment (EA) was filed in July 2015 and the FAA issued a Finding of No Significant Impact (FONSI) on July 29, 2015. Construction is underway.</p>

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Table 3-2 Description and Status of Projects/Planning Concepts in the Terminal Area (December 31, 2014) (Continued)

Description	Status
Massport Projects/Planning Concepts	
<p>3. Terminal E Modernization Project (incorporates West Concourse Project)</p> <p>To accommodate existing and long-range forecasted demand for international service in an efficient, environmentally sound manner that also improves customer service, Massport is considering an extension of the existing International Terminal E. The modernization of Terminal E would include the three gates approved in 1996 as part of the West Concourse project, but never constructed, and could add up to two to four additional new aircraft contact gates. New passenger handling and gate areas are being considered, as well as additional FIS¹ and customs and border patrol facilities to supplement the existing FIS areas in Terminal E. A new direct passenger connection to the MBTA Blue Line Airport Station would be also be constructed and roadway improvements would be required to facilitate access.</p> <p>4. Renovations and Improvements at Terminal B The airline industry continues to react to financial and other operating pressures. This has led to a number of consolidations and realignments within the airlines. To address these changes and the continuing need for airlines to relocate with new partners, Massport has initiated analysis of terminal changes to better accommodate these ongoing airline partnership changes and facilitate broader flexibility in terminal utilization. This includes renovation of existing spaces, connection of the Terminal B Piers, construction of some new spaces, and reconfiguration of eight aircraft gates to better facilitate passenger processing.</p> <p>5. Terminal C to E Connector Massport is connecting Terminals C and E to provide a greater post-security connectivity between terminals and to provide greater flexibility for airlines. The project will include improvements to concessions that will further enhance the passenger experience.</p> <p>6. Terminal A to B Connector As part of an Airport-wide effort to enhance terminal connectivity post-security, a connector between Terminals A and B is under consideration.</p>	<p>The project is in the conceptual design phase. Massport is expecting to file an ENF with the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) in the very near future. To initiate the environmental review process under the Massachusetts Environmental Policy Act (MEPA). It is also expected that an EA would be prepared for the project to comply with FAA's review under NEPA.</p> <p>Following permitting and design, the initial construction could begin in 2018.</p> <p>Construction of the Terminal B renovations and improvements commenced in 2012 and were completed in 2014. Approximately 79,000 square feet of existing space was renovated and approximately 84,000 square feet of new space was added. Eight existing aircraft loading gates were reconfigured.</p> <p>The Terminal C to E Connector is under construction. Construction is expected to be completed in April 2016.</p> <p>The connector from Terminals A to B is still being considered, but this project is not currently in the five-year Capital Program. Completion would not occur until after 2017.</p>

**Table 3-2 Description and Status of Projects/Planning Concepts in the Terminal Area
 (December 31, 2014) (Continued)**

Description	Status
Massport Projects/Planning Concepts	
<p>7. Terminal B to C Connector Also part of the Airport-wide effort to enhance terminal connectivity post-security, a connector between Terminals B and C is under consideration.</p>	<p>The connector from Terminals B to C is still being considered but this project is not currently in the five year Capital Program. Completion would not occur until after 2017.</p>
<p>8. Terminal C Roadway Enhancements Massport is currently evaluating options to modify the layout of Terminal C on both the arrival and departure levels to alleviate congestion and better manage peak hour traffic operations.</p>	<p>This project is in the conceptual alternatives evaluation phase.</p>
<p>9. Parking Consolidation Project. Massport is consolidating 2,050 temporary parking spaces as an addition to the West Garage and at the existing surface lot between the Logan Office Center and the Harborside Hyatt. These spaces constitute all remaining spaces permitted under the Logan Airport Parking Freeze. The West Garage addition is atop the existing Hilton Hotel parking lot. The project will incorporate sustainable design and resiliency elements.</p>	<p>On March 20, 2014, the EEA issued an Advisory Opinion confirming that no MEPA review was required for this parking consolidation. The consolidation is expected to be completed in late 2015.</p>

Notes: See Figure 3-1 for the location of terminal area projects/planning concepts.
 1 Previously, a Satellite FIS Facility was planned and permitted in 2001 for Terminal B but never constructed.

Service Area Projects/Planning Concepts

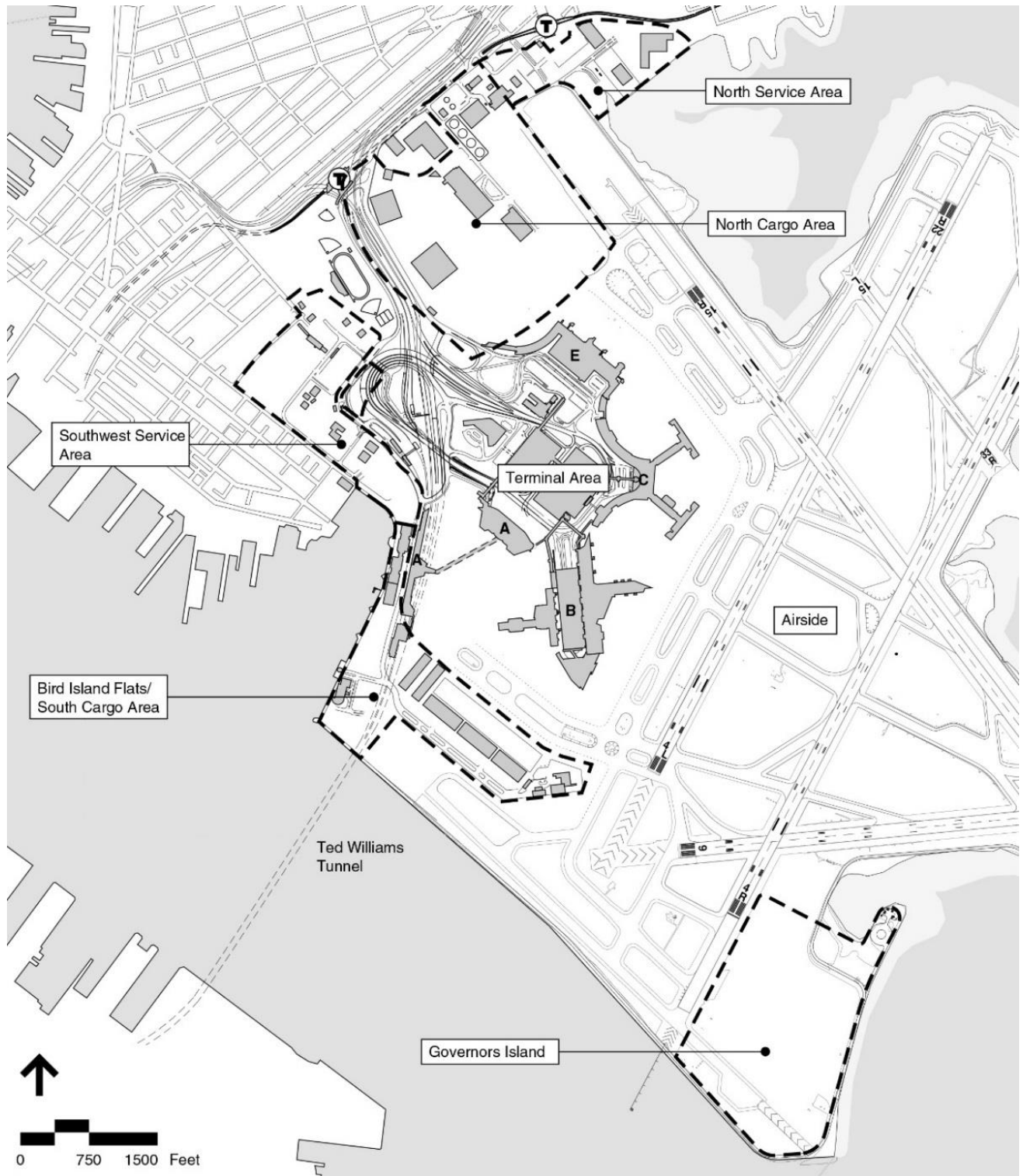
Logan Airport’s service areas contain airline support businesses and operations. Land uses in the service areas continually evolve in response to changing airline business, customer, and tenant needs, as well as public works projects. Massport continues to explore ways of efficiently using the limited land resources in the service areas. The five service areas at Logan Airport are shown in Figure 3-2 and are described below.

- **North Cargo Area (NCA)** is in Logan Airport’s northwest corner. It is bounded by the main Logan Airport outbound roadway to the south, Route 1A to the west, the Jet Fuel Storage Facility to the north, and the airside apron area to the east. The NCA, which is adjacent to Logan Airport’s airside area, is the Airport’s primary airline support area. It accommodates air cargo and essential airline support businesses including hangars, ground service equipment (GSE) maintenance, and aircraft parking. The NCA will remain the most appropriate location for operations that require contiguous airside access. The NCA is the likely location for terminal gates, aircraft parking, hangars, and cargo. In the interim, portions of the NCA will continue to be used for economy parking.
- **North Service Area (NSA)** is north of the NCA near the Massachusetts Bay Transportation Authority’s (MBTA) Wood Island Station and Runway End 15R. The NSA includes two flight kitchens, weather and navigation equipment, the temporary bus/limousine pool, Neptune Road Airport edge buffer, and the Green Bus Depot. Massport recently completed the Greenway Connector running parallel to the MBTA Blue Line corridor in this section of the Airport.

- **Southwest Service Area (SWSA)** is south of Logan Airport's main access roadway and is bounded on the east by Harborside Drive. Because of its proximity to the terminals and the regional highway system, the SWSA functions as Logan Airport's primary ground transportation hub and includes the taxi and bus/limousine pools. The entire SWSA was redeveloped to accommodate the new RCC and associated activities. As an interim measure during RCC construction, the bus and limousine pools were temporarily relocated to the NSA. The taxi pool was temporarily relocated to Lot B, which is on Harborside Drive between the Logan Office Center Garage and the Hyatt Hotel. These functions returned to the SWSA in 2015.
- **Bird Island Flats/South Cargo Area (BIF/SCA)** is south and southeast of the Logan Airport's SWSA, and is generally bounded on the south by Boston Harbor and on the east and north by Logan Airport's airside area. The BIF/SCA is two service areas connected by Harborside Drive. The BIF portion has landside access via Harborside Drive and water access via the system of water taxis that shuttle passengers between downtown Boston, the South Shore, and Logan Airport. BIF development includes the Hyatt Hotel and Conference Center, the Logan Office Center and adjoining garage, an employee parking lot (Lot B), the Water Shuttle Dock, the Logan Airport Rescue and Fire Fighting Facility Marine Dock, and the Harborwalk that is a publicly accessible promenade along the harbor's edge. The SCA portion, which provides landside access and secured airside access, is Logan Airport's primary cargo area. It also accommodates domestic and some international cargo operations and temporary relocation of the taxi pool during SWSA redevelopment. During construction of the RCC project, the Lot B surface employee lot was used as the interim taxi pool. After the taxi pool was relocated to its permanent new home along Porter Street in the SWSA, Lot B was returned to its former use as an employee parking lot and commercial overflow lot.
- **Governors Island** is at Logan Airport's southern tip and is bounded by Runway 14-32 and Boston Harbor to the east and south, by Runway 4R to the west, and Runway 9 to the north. Governors Island has functioned as a storage site for the Central Artery/Tunnel (CA/T) Project and for construction stockpiles. The area also contains an Aircraft Rescue and Fire Fighting Facility training area, parking for snow removal equipment, a biocell remediation area, and FAA aircraft navigation equipment. The area has been considered as a future location of remain overnight (RON) aircraft parking.

Table 3-3 presents information on the status of each ongoing project and planning concept in the service areas. Both Massport and Logan Airport tenants are proposing projects or exploring planning concepts to modernize and carry out future improvements to the service areas. These planning concepts are also detailed in Table 3-3. The location of the ongoing service area projects and planning concepts that may potentially be constructed in the future are shown on Figure 3-3.

Figure 3-2 Logan Airport Service Areas



Source: VHB.

Figure 3-3 Location of Projects/Planning Concepts in the Service Areas



Source: Massport.

Notes: See Table 3-3 for a description of the numbered projects. Status as of December 31, 2014.

- 1 SWSA Redevelopment Program, RCC, and GTOC
- 2 Relocated Compressed Natural Gas Station in the NCA (Location TBD)
- 3 Replacement Cargo Facilities in the NCA (Location TBD)
- 4 NSA Roadway Corridor Project
- 5 Replacement Hangar in the NCA (Location TBD)
- 6 Centralized Commissary (Location TBD)
- 7 New/Replacement Ground Support Consolidated Facility in the NCA (Location TBD)
- 8 Joint Operations Center (JOC) (Location TBD)

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Table 3-3 Description and Status of Projects/Planning Concepts in the Service Areas (December 31, 2014)	
Description	Status
Massport Projects/Planning Concepts	
<p>1. Southwest Service Area (SWSA) Redevelopment Program</p> <p>The SWSA Redevelopment Program consolidated on-Airport and most off-Airport rental car operations and facilities into one integrated facility (Rental Car Center [RCC]) to better serve tenants and the traveling public, reduce ground transportation and air quality impacts on-Airport and in the surrounding neighborhoods, and reduce associated off-Airport impacts. The program also accommodates a portion of off-Airport rental car operations. Redevelopment of the SWSA was needed because the existing SWSA and rental car facilities were inefficient and inadequate in meeting future needs at the Airport.</p> <p>The SWSA Redevelopment Program replaced and upgraded existing ground transportation uses within the SWSA. The redevelopment included a consolidated car rental facility with a four-level garage to accommodate rental car retail operations and storage; support facilities for the car rental operations; a new clean-fuel unified shuttle bus system; a relocated and reconfigured taxi pool; bus and limousine pool; and roadway improvements, pedestrian and bicycle facilities, and site landscaping. It also includes a customer service center and four quick turn-around maintenance and service facilities. Leadership in Energy and Environmental Design® (LEED) Gold certification was awarded in 2015.</p> <p>RCC construction was preceded by numerous enabling activities that reorganized the SWSA through multiple sub-phases allowing for enough of the site to be cleared for staging and construction. Some of these enabling projects included reorganization of rental car operations within the SWSA. Others included temporary relocation of ground transportation operations for a limited time, including the taxi pool to Lot B, the Cell Phone Lot to an existing open parking lot across from the Logan Airport gas station, and the bus and limousine pool to the North Service Area (NSA). The project also included the demolition of the existing flight kitchen to allow the extension of Hotel Drive.</p> <p>Phase 2 of the SWSA Buffer (EEA #14137) (see Table 3-5) was integrated with the proposed SWSA Redevelopment Program.</p>	<p>A Final Environmental Impact Report/Environmental Assessment (EIR/EA) was prepared in accordance with the Secretary of Energy and Environmental Affairs' Certificate on the Notice of Project Change (NPC). The Final EIR/EA was filed on March 1, 2010. An extended comment period closed on May 24, 2010. The Secretary's Certificate finding that the Final EIR adequately and properly complies with the Massachusetts Environmental Policy Act (MEPA) was issued on May 28, 2010. This project was completed in late 2014. A FONSI was issued by FAA on March 1, 2010.</p> <p>The SWSA Airport Edge Buffer was completed in late 2014.</p>



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Table 3-3 Description and Status of Projects/Planning Concepts in the Service Areas (December 31, 2014) (Continued)

Description	Status
Massport Projects/Planning Concepts	
<p>1. Southwest Service Area (SWSA) Redevelopment Program (Continued) Ground Transportation Operations Center (GTOC) The new GTOC within the RCC facility functions as the hub for management of ground transportation at the Airport. GTOC staff will assume direct responsibility for:</p> <ul style="list-style-type: none"> ▪ Shuttle bus management and reporting via computer-aided dispatch (CAD) and automatic vehicle location (AVL) technology; ▪ Real-time bus and transit information collection and dissemination to Airport users; and ▪ Coordination with internal and external agencies related to ground transportation. <p>The GTOC includes a video wall to graphically display information from a variety of sources including vehicle location and status information from the CAD/AVL system, curbside camera feeds from the Consolidated Camera Surveillance System (CCSS), flight arrival and departure information from Flight Information Display System (FIDS), the status of curbside Dynamic Message Signs (DMS), emergency alerts, and other information.</p> <p>2. Relocated Compressed Natural Gas (CNG) Station in the North Cargo Area (NCA) This would relocate Massport's existing CNG Station to accommodate the airside operations in the NCA.</p> <p>3. Replacement Cargo Facilities in the NCA Construction of new cargo facilities in the NCA would compensate for the loss of cargo facilities that resulted from the Central Artery/Tunnel (CA/T) Project, as well as for the projected growth in cargo demand.</p> <p>4. North Service Area (NSA) Roadway Corridor Project The NSA Roadway Corridor Project coordinates the roadway and urban design vision for North Service Road and Frankfort Street with on-going design and construction efforts in the NSA. The project coordinates with the NCA Logan Airport Economy Parking Garage, East Boston- Chelsea Bypass Project, the SWSA redevelopment enabling projects, and the NSA Buffer Project to produce a unified utility, roadway, and landscape vision for the NSA roadway corridor between Prescott Street and Neptune Road.</p>	<p>Construction of the GTOC was completed in 2013 as part of the RCC project.</p> <p>Massport continues to examine several potential on-Airport parcels for relocation of the existing CNG station. Relocation is not expected to occur before 2017.</p> <p>The project remains under evaluation. If a decision were made to proceed with this project, construction would likely commence after 2017. Hangar upgrades for Buildings 8 and 9 are complete.</p> <p>The project was completed in 2012.</p>

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Table 3-3 Description and Status of Projects/Planning Concepts in the Service Areas (December 31, 2014) (Continued)	
Description	Status
Massport Projects/Planning Concepts	
<p>5. Replacement Hangar in the NCA The former American Airlines Hangar has been demolished because it could no longer serve the American Airlines fleet. Plans are underway for a new hangar that could accommodate Group V aircraft. The location of the replacement hanger in the NCA is still under consideration.</p>	<p>Demolition of the former American Airlines hangar commenced in 2014, and was completed in August 2015. Prior to demolition, American Airlines relocated to the refurbished Northwest Hangar.</p>
Tenant Projects/Planning Concepts	
<p>6. Centralized Commissary Massport is planning for a centralized Commissary that will streamline inspection of deliveries of food, beverages, and other goods destined for the sterile areas of the Airport. The facility will allow for a centralized location for security inspections before entry and will also have the benefit of removing trucks from the terminal curbs. A location for the Commissary has not yet been determined.</p>	<p>Construction of the Commissary would be complete after 2017.</p>
<p>7. New/Replacement Ground Support Equipment (GSE) Consolidated Facility in the NCA This planning concept would provide multi-tenant maintenance facilities for GSE.</p>	<p>Construction would be complete after 2017.</p>
<p>8. Joint Operations Center (JOC). The JOC is envisioned as a state-of-the-art enterprise wide-operations and situational awareness center that consolidates Massport's complex and dispersed operations into a unified management center with a Common Operational Picture (COP). The goal of the JOC is to capture the security and response benefits afforded through integrated incident dispatch and mobile response for public safety and security services. The program plans for bringing the Operations Center, State Police Dispatch, Maritime Monitoring (with future Hanscom Field and Worcester Airport monitoring), TSA staff, and camera monitoring within the structure of one common facility. The JOC will be supported by a Physical Security Information Management (PSIM) Common Interface Platform.</p>	<p>Massport is in the pre-design and planning phase of development of a common command and control JOC.</p>

Note: See Figure 3-3 for the location of service area projects/planning concepts.

Airside Area Projects/Planning Concepts

The airside area includes all Logan Airport land from the edge of the terminal buildings to the Logan Airport harbor boundary, incorporating the Logan Airport apron, runways, gates, and other airfield operating facilities. Airside improvements include upgrades and improvements to the airfield to enhance the operational efficiency and safety of Logan Airport. Table 3-4 describes the status of projects (shown on Figure 3-4) and planning concepts under consideration for Logan Airport’s airside area as of December 31, 2014.

Figure 3-4 Location of Projects/Planning Concepts on the Airside



- Source: Massport.
 Notes: See Table 3-4 for a description of numbered projects. Status as of December 31, 2014.
- 1 Runway 22R and 33L RSA Improvements
 - 2a Straightening and realignment of Taxiway N
 - 2b Reduction in approach minimums on Runways 22L, 27, 15R, and 33L by the FAA (Operational change)
 - 3 Replace Runway 4R Approach Light Pier
 - 4 Governors Island Aircraft Parking
 - 5 Runway 15L/33R RSA Improvement
 - 6 Runway Incursion Program (RIM)
- Logan Airside Improvements Planning Project (not shown on map)

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Table 3-4 Description and Status of Projects/Planning Concepts on the Airside (December 31, 2014)

Description	Status
<p>1. Runway 22R and 33L Runway Safety Area (RSA) Improvements</p> <p>The Federal Aviation Administration (FAA) requires RSAs to accommodate aircraft overruns, undershoots, and veer-offs in emergency situations. Consistent with FAA requirements, Massport is continuously looking for opportunities to increase the margin of safety for all runways and where practicable providing FAA standard RSAs at all locations. At Logan Airport, the FAA standard RSA is typically 500 feet wide by 1,000 feet long at each runway end. Where this space is not available, the FAA has approved the use of Engineered Materials Arresting System (EMAS) for aircraft overrun protection. EMAS uses a system of collapsible concrete blocks that can stop an aircraft by exerting predictable forces on the landing gear while minimizing aircraft damage.</p> <p>In 2004, the FAA approved installation of a 190-foot section of EMAS at Runway 22R. The FAA also directed Massport to evaluate opportunities for additional safety enhancements at this location. Massport installed a 158-foot of EMAS at Runway 33L in 2006, in anticipation of full environmental review of additional improvements.</p> <p>A detailed alternatives analysis was conducted to evaluate options for safety enhancements at both runway-ends. As described in the Final EA/EIR, an Inclined Safety Area (ISA) similar to what was constructed at Runway-End 22L was constructed for Runway End 22R. A pile-supported deck with EMAS approximately 460 feet long by 300 feet wide was approved for Runway End 33L.</p> <p>Runway 33L Light Pier Replacement. The Runway 33L timber light pier was constructed in 1960 and extended to the southeast 2,400-feet from the runway end, predominantly over Boston Harbor. The Runway 33L RSA project initially proposed replacing the landward 500-feet of the light pier. During RSA construction, it was determined that the remaining 1,900-feet of the light pier should be replaced due to its advanced age and efficiencies of combining the construction with the RSA project in summer 2012 while the runway was already closed.</p>	<p>Massport filed an Environmental Notification Form (ENF) with the Massachusetts Environmental Policy Act (MEPA) office on June 30, 2009, that described the proposed RSA enhancements at both runway ends. A Draft Environmental Assessment (EA)/ Environmental Impact Report (EIR) was filed on July 15, 2010. A Final EA/EIR was filed January 31, 2011, and the Secretary's Certificate was issued March 18, 2011. Remaining environmental permits were secured by May 2011, and construction of the 33L RSA was completed ahead of schedule in November 2012. Runway End 22R enhancements were completed in late 2014, including replacement of the EMAS installed in 2005.</p> <p>Massport filed a Notice of Project Change (NPC) to the RSA project in January 2012. The Secretary's Certificate was issued March 9, 2012. All local, state, and federal permits were secured for the additional work in June 2012 and the full replacement was completed in October 2012. As part of this project, the Runway 33L Instrument Landing System (ILS) approach, originally approved in the Airside Improvements Planning Project, was upgraded from Category I to Category III. Reduction in approach minimums on Runway 15R and Runway 33L was implemented in 2013 following the completion of the 33L Light Pier replacement and FAA testing of new ILS equipment.</p>

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**Table 3-4 Description and Status of Projects/Planning Concepts on the Airside
(December 31, 2014) (Continued)**

Description	Status
<p>2. Logan Airside Improvements Planning Project The project included construction of a new unidirectional Runway 14-32, Centerfield Taxiway, extension of Taxiway D, realignment of Taxiway N, improvements to the southwest corner taxiway system, relocation of cargo buildings, and reduction in approach minimums on Runways 22L, 27, 15R, and 33L. These airfield improvements were to reduce current and projected levels of aircraft delay and enhance airfield safety at Logan Airport.</p> <p>The new unidirectional Runway 14-32, Centerfield Taxiway, extension of Taxiway D, improvements to the southwest corner taxiway system, and relocation of cargo buildings are all complete.</p> <p>The remaining components of this project and status are presented below.</p> <p>2a. Straightening and realigning Taxiway N. Other taxiway modifications are under consideration.</p> <p>2b. Reduction in approach minimums on Runways 22L, 27, 15R, and 33L by FAA. (Operational change)</p> <p>3. Runway 4R Light Pier Replacement. In the next five years, Massport plans to replace the aging Runway 4R approach light pier. This will likely be a replacement of the existing wooden light pier with concrete pier/pilings.</p>	<p>As part of its Record of Decision (ROD) for the Airside Improvements Planning Project under the National Environmental Policy Act (NEPA), the FAA initially deferred its decision on Centerfield Taxiway (Taxiway M) pending an operational review to identify any other potential beneficial actions. The FAA directed the technical work on the operational review and conducted briefings with a citizen panel. The FAA divided the study into two phases. Phase 1 focused on current conditions and Taxiway N, and Phase 2 included operations with both Taxiway N and the Centerfield Taxiway. Both of these Phases were completed and the public comment period on the project ended in September 2007. The FAA approved the Centerfield Taxiway in April 2007. Construction of the Centerfield Taxiway began in spring 2008 and was completed in August 2009. The Centerfield Taxiway is being used as intended by the Environmental Impact Statement (EIS) for taxiing for long-haul domestic and international flights using Runway 22L and to improve flow on the airfield and reduce taxiway congestion. Massport paved the taxiway with warm mix asphalt, which reduces energy consumption and has air quality benefits.</p> <p>This project component is anticipated to be complete after 2017.</p> <p>Reduction in approach minimums on Runways 15R and 33L was approved in the Airside EIS/EIR. Implementation will be affected by realignment of the ILS localizer. Construction impacts from relocating the Instrument Landing System (ILS) localizer were addressed as part of the proposed enhancements to the RSA at the end of Runway 33L (see above). The new Runway 33L RSA deck accommodated the relocation of the localizer. Additional navigational upgrades were installed as part of the Runway 33L Light Pier Replacement Project in 2012. Runway 33L began operating as a Category III ILS in March 2013.</p> <p>This project is still in the early planning phase as of this filing.</p>

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**Table 3-4 Description and Status of Projects/Planning Concepts on the Airside
(December 31, 2014) (Continued)**

Description	Status
<p>4. Governors Island Aircraft Parking</p> <p>Massport has considered providing additional aircraft parking at Governors Island for the following: Remain overnight (RON) aircraft, cargo aircraft, and international aircraft. RON aircraft are generally commercial passenger aircraft that fly into the Airport at night and fly out in the morning. Airlines sometimes schedule and position more aircraft than there are gate positions, therefore remote aircraft parking positions are required. Remote aircraft parking is appropriate for cargo aircraft that generally arrive in the morning and remain on the ground until their late evening departure. Some international scheduled and charter aircraft that have long turnaround times should be parked remotely when there is a high demand for gates.</p>	<p>Preliminary concepts evaluated by Massport involve the development of 20 to 50 aircraft positions and ancillary uses. This project is on hold. If the concept is deemed feasible and planning continues, it is anticipated that construction would occur after 2017.</p>
<p>5. Runway 15L-33R RSA Improvement</p> <p>As part of an ongoing program to improve safety at Logan Airport, and in close coordination with the FAA, Massport proposed shifting existing Runway 15L-33R to accommodate an expanded RSA at the westernmost end (Runway 15L approach) of the runway. The project shifted the runway 200 feet to the southeast in order to comply with FAA standards requiring safety areas of 150 feet wide by 300 feet long at both ends of the runway.</p>	<p>FAA issued a Categorical Exclusion on April 1, 2014. The project was completed in late 2014.</p>
<p>6. Runway Incursion Program (RIM)</p> <p>FAA recently initiated a new, comprehensive multi-year Runway Incursion Management (RIM) program to identify, prioritize, and develop strategies to help airport sponsors mitigate risk. Runway incursions occur when an aircraft, vehicle, or person enters the Airport's designated area for aircraft landings and take-offs.¹ Risk factors may include unclear taxiway markings, airport signage, and more complex issues such as runway or taxiway layout.</p>	<p>Massport is working with the FAA to identify areas that need to be addressed and plan for implementation of measures.</p>

Notes: See Figure 3-4 for the location of airside projects/planning concepts.
 1 Information on the FAA's RIM program can be found at https://www.faa.gov/airports/special_programs/rim/.

Airport Buffer Areas and Other Open Space

Massport has committed up to \$15 million for the planning, construction, and maintenance of four Airport edge buffer areas and two parks along Logan Airport's perimeter. These buffers have now been completed and include the Bayswater Buffer, Navy Fuel Pier Buffer, SWSA Buffer Phase I, and the SWSA Buffer Phase 2. Planning and design of the Neptune Road Airport Edge Buffer began in 2012, and it opened in 2015. These areas are located generally along Logan Airport's perimeter boundary and are intended to provide attractive landscape buffers between Airport operations and adjacent East Boston neighborhoods. The buffer design occurs in consultation with Logan Airport's neighbors and other interested parties in an open community planning process. To collaborate in East Boston open space planning, Massport also participates in meetings with other agencies including Massachusetts Department of Transportation (MassDOT), the City of Boston, and the Massachusetts Bay Transportation Authority (MBTA). Table 3-5 describes the status of ongoing buffer projects and other Massport green space projects under consideration as of December 2014. Figure 3-5 shows the location of these buffer projects.



Neptune Road Airport Edge Buffer.
Source: Massport.



Figure 3-5 Location of Airport Buffer Projects/Open Space



- Source: Massport.
 Notes: See Table 3-5 for a description of the numbered projects. Status as of December 31, 2014.
- 1 SWSA Buffer
 - 2 Neptune Road Airport Edge Buffer
 - 3 Navy Fuel Pier Buffer
 - 4 Bayswater Embankment
 - 5 Bremen Street Park
 - 6 The Greenway Connector
 - 7 North Service Area Roadway Corridor

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Table 3-5 Description and Status of Airport Edge Buffer Projects/Open Space (December 31, 2014)

Description	Status
<p>1. Southwest Service Area (SWSA) Buffer Phase 1 of this project involved the construction of an approximately half-acre area with landscaping and lighting improvements along Maverick Street that included evergreen and deciduous trees, ornamental shrubs, and groundcovers.</p> <p>Phase 2 of this project involved additional landscaping and solid barriers. Phase 2 consisted of installing landscaping (i.e., densely planted or planted atop earth berms for enhanced separation) and solid barriers such as fences and walls. The project enhanced bicycle and pedestrian connectivity between Maverick Street and East Boston Memorial Park and Stadium with extensive landscaping including trees, shrubs, flowering perennials, and decorative fences.</p> <p>2. Neptune Road Airport Edge Buffer The Neptune Road Airport Edge Buffer (the Neptune Road Buffer) is a Massport community mitigation project intended to buffer the East Boston Neighborhood at Logan Airport's northwestern edge. The 1.5-acre Neptune Road Buffer is at the nexus of Neptune Road, Vienna, and Frankfort Streets and is adjacent to the Massachusetts Bay Transportation (MBTA's) Wood Island Station. The majority of the parcel is located within the runway protection zone (RPZ) for Runway 15R/33L. The project consists of Olmsted-inspired landscape with various interpretive elements that will complement the adjacent North Service Area Roadway Corridor and be a continuation of the Corridor's pedestrian/bicycle path to Bennington Streets.</p> <p>The landscape elements reference Frederick Law Olmsted's original choice of materials and designs for Wood Island Park while preserving some of the existing trees. A pedestrian/bikeway link along Vienna Street to Bennington Street from the North Service Area Roadway Corridor was included as well as a historical timeline, cast-iron neighborhood sculptures, foundation ghosting of the last two demolished residential structures, and cast-iron house number plaques in the sidewalk along Neptune Road. Additional buffer elements include low stone walls, concrete sidewalks, bicycle racks, solar trash compactors, fencing, and period light fixtures.</p> <p>3. Navy Fuel Pier Buffer The Navy Fuel Pier Buffer project began with the Army Corps of Engineers' (ACOE) remediation of the former Navy Fuel Pier, which was completed in 2001. The project involved beautification of the property (0.7 acres) through landscape improvements and stabilization of the waterfront perimeter.</p> <p>4. Bayswater Embankment This project involved creation of a landscaped buffer between Bayswater Street and Boston Harbor.</p>	<p>Phase I construction was completed in 2006.</p> <p>Phase 2 of the SWSA Buffer design has been integrated with the SWSA Redevelopment Program. The Secretary's Certificate on the SWSA Redevelopment Project Final Environmental Impact Report (FEIR) was issued in May 2010. Construction of the SWSA Phase 2 Buffer was completed in fall 2014.</p> <p>The Neptune Road Buffer was completed in June 2015.</p> <p>Construction of the buffer was completed in 2007.</p> <p>Construction of this Airport edge buffer was completed in 2003.</p>

Table 3-5 Description and Status of Airport Edge Buffer Projects/Open Space (December 31, 2014) (Continued)	
Description	Status
<p>5. Bremen Street Park The 18-acre Bremen Street Park was constructed by the Central Artery/Tunnel (CA/T) Project as East Boston's second largest neighborhood park. The park contains a variety of facilities, a direct pedestrian connection to MBTA Blue Line Airport Station, and a half-mile segment of the three-mile East Boston Greenway. The park was built on land previously used as off-Airport parking.</p>	<p>Final construction of the park was completed in 2008. Massport continues to operate the park and provide community facilities.</p>
<p>6. The Greenway Connector The one-half mile pedestrian/bicycle path connects the Bremen Street Park pedestrian/bicycle path to the future City of Boston/ Narrow Gauge (currently in final planning phase) Connector to Constitution Beach. When completed there will be a continuous pedestrian/bicycle path from Piers Park to Constitution Beach that will connect Piers Park, Bremen Street Park, Stadium Park, and Constitution Beach.</p>	<p>Construction of the Greenway Connector between Bremen Street Park and an Overlook at Wood Island Marsh was completed by Massport in 2014. Massport continues to coordinate with the City of Boston on its pedestrian/bicycle path, known as the "Narrow Gauge Connector," from the Overlook to Constitution Beach.</p>
<p>7. North Service Area (NSA) Roadway Corridor The North Service Area Corridor Project (the NSA Corridor) is an approximately 7-acre project that created a unified streetscape, landscape context, and pedestrian/bicycle path connection for the future Neptune Road Airport Edge Buffer at Logan Airport's northwestern edge. The project encompasses various parcels along Airport Service Road that parallel an elevated section of Route 1A Highway. Cognizant of the importance of establishing a public space along Logan Airport's northwestern edge, Massport restored and relocated WindWheels, an important William Wainwright mobile sculpture and Massport's first piece of public art, to a prominent location at the Corridor's Neptune Road entrance.</p>	<p>Massport completed construction of the project in spring 2012 and has committed to the ongoing maintenance of the NSA Corridor.</p>

Note: See Figure 3-5 for the location of Airport edge buffer projects/planning concepts.

Airport Parking Projects/Planning Concepts

The total number of employee and commercial parking spaces permitted at Logan Airport is limited by the Logan Airport Parking Freeze under the State Implementation Plan (SIP) and the MassDEP air quality regulations (310 Code of Massachusetts Regulations 7.30). Parking supply at Logan Airport has varied with respect to the specific locations and sizes of individual lots, the mix of parking spaces for air travelers and employee spaces, and the number of spaces in and out of service at any one time due to construction projects, while at all times remaining in compliance with the Logan Airport Parking Freeze. *Chapter 5, Ground Access to and from Logan Airport* contains additional information on the historic and existing supply of parking at Logan Airport. Table 3-6 describes current commercial parking projects at Logan Airport. The locations of parking projects are shown on Figure 3-6.

Figure 3-6 Location of Airport Parking Projects/Planning Concepts



Source: Massport.
Notes: See Table 3-6 for a description and status of numbered projects. Status as of December 31, 2014.
1 Parking Consolidation Project (construction underway over the Hilton Hotel lot and at the existing surface lot between the LOC and the Harborside Hyatt).

Table 3-6 Description and Status of Airport Parking Projects/Planning Concepts (December 31, 2014)	
Description	Status
<p>1. Parking Consolidation Project. Massport is consolidating 2,050 temporary parking spaces as an addition to the West Garage and at the existing surface lot between the Logan Office Center and the Harborside Hyatt. These spaces constitute all remaining spaces under the Logan Airport Parking Freeze. The West Garage addition is atop the existing Hilton Hotel parking lot. The project will incorporate sustainable design and resiliency elements.</p>	<p>The consolidation project is underway and construction is expected to be completed in 2015. On March 20, 2014, the EEA issued an Advisory Opinion confirming that no MEPA review was required for the consolidation of existing on-Airport parking spaces.</p>

Note: See Figure 3-6 for the location of Airport parking projects/planning concepts.

Massport-wide Projects and Plans

Massport is undertaking several Massport-wide planning initiatives including:

- **Strategic Plan.** In 2013, Massport began a strategic planning effort to position the Authority’s aviation, maritime, and real estate lines of business, and its administrative support structures and workforce to meet the region’s 21st century transportation and economic development challenges. The strategic planning initiative’s primary goal was to formulate a vision for Massport as a transportation and economic development engine for the Commonwealth of Massachusetts in the 21st century focusing on the horizon years of 2022 and beyond. While Massport has periodically prepared and implemented strategic plans for its various lines of business and major assets, the most recent effort is the first time that Massport has ever prepared an Authority-wide strategic plan. One outcome of this effort is Massport’s updated vision: *A world class organization of people moving people and goods – and connecting Massachusetts and New England to the world – safely and securely and with a commitment to our neighboring communities.*

During this process, the importance of viewing the Authority as a single consolidated entity has become clear: Massport’s transportation and economic assets have a synergistic impact on many key sectors of the regional economy. Boston’s knowledge economy benefits simultaneously from Logan Airport’s growing network of international destinations, Hanscom Field’s general aviation (GA) facilities used by major corporations, and Real Estate development on Massport properties in the South Boston Waterfront. Through the “One Massport” lens, Massport’s critical role in the region’s visitor economy becomes clear.

- Over 31.6 million passengers traveled through Logan International Airport in 2014.
- Since JetBlue initiated commercial flights at the Worcester Regional Airport in late 2013, nearly 200,000 passengers have used this convenient service.
- Hanscom Field continues to serve as the region’s premier corporate and business aviation facility and serves as a critical GA reliever for Logan Airport. In 2014, Hanscom Field handled more than five times the number of GA operations than occurred at Logan Airport.
- Nearly 350,000 vacationers now use Cruiseport Boston annually.
- In 2014, the Conley Terminal handled a record 214,243 TEUs (twenty-ton equivalent units).

The strategic planning analysis has identified several strategic challenges for Massport's three airports. At Logan Airport, passengers are up, but flights are down; the increase in passengers will continue to result in pressure points on terminal and landside facilities. The focus of the Worcester Regional Airport will be to provide commercial air service and premier general aviation services to the greater Worcester region; Massport and its tenants are already advancing projects to improve the Airport's all-weather reliability and to create a new first-class Fixed Based Operator (FBO) facility. Hanscom Field is envisioned to remain as the premier corporate and business aviation facility for the Boston and New England region and will also remain as a commercial/general aviation and limited cargo facility.

Ground access at Logan Airport will continue to face strategic challenges as we strive to minimize the traffic, environmental, and community impacts of surface transportation while providing air passengers and our employees with as many options as possible for convenient travel to and from the Airport. To meet these challenges, Massport's overarching ground access goal is to minimize the number of motor vehicles used traveling to and from Logan Airport.

The findings of this effort were presented to the Massport Board in late 2014 and sets the direction for future investments and plans at Logan Airport.

- **Resiliency Planning.** At the end of 2013, Massport initiated a Disaster and Infrastructure Resiliency Planning Study (DIRP) for Logan Airport, the Port of Boston, and Massport's waterfront assets in South and East Boston. The DIRP Study includes a hazard analysis, modeling sea-level rise and storm surge, and projections of temperature and precipitation and anticipated increases in extreme weather events. The DIRP Study provides recommendations regarding short-term adaptation strategies to make Massport's facilities more resilient to the likely effects of climate change. The study was completed and a request for proposals for implementing its recommendations was issued in September 2014; work commenced in late 2014.

In addition to the DIRP Study and its related initiatives, Massport has completed an Authority-wide risk assessment, as part of its strategic planning initiative; issued its Floodproofing Design Guide; and has developed a resilience framework that will provide consistent metrics for the short- and long-term resilience of its critical facilities and infrastructure. Beyond physical resiliency, Massport is also focused on incorporating social and economic resilience into its long-term operational and capital planning. Massport's Floodproofing Guidelines were published in November 2014 and revised in April 2015.

- **Sustainability Management Plan (SMP).** The purpose of the Logan Airport SMP is to enhance the efficiency and sustainability of Logan Airport's operations and to support the broader sustainability principles of the Commonwealth. In 2013, Massport was awarded a grant by the FAA to prepare a SMP for Logan Airport. The Logan Airport SMP planning effort began in May 2013 and was completed in April 2015. The Logan Airport SMP takes a broad view of sustainability including economic vitality, social responsibility, operational efficiency, and natural resource conservation considerations. The Logan Airport SMP is intended to promote and integrate sustainability Airport-wide and to coordinate on-going sustainability efforts across the Authority. A baseline data assessment was completed in winter 2014 to assess current sustainability performance at the Airport. The Logan Airport SMP developed a framework and implementation plan, with metrics and targets, designed to track progress over time. Massport is currently advancing a series of short-term initiatives to help reach its goals in the areas of energy and greenhouse gas emissions; community, employee, and passenger well-being; resiliency; materials waste management, and recycling; and water conservation. The Logan Airport SMP is available online at: https://www.massport.com/media/320786/LoganSMP_Report.pdf.

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Regional Transportation

Introduction

This chapter places Logan Airport in the context of the New England region's intermodal transportation system and reports on the status of the region's airports in 2014. Logan Airport, one of three airports¹ owned by the Massachusetts Port Authority (Massport), operates within a larger network of New England regional airports. Massport has committed ongoing efforts to support an efficient regional air and surface transportation network. Current air traffic levels and airline service trends at the New England regional airports are discussed in this chapter. Airport improvement projects and long-range regional transportation planning efforts relevant to the regional transportation network are also discussed. This chapter focuses on 2014 and specifically describes:

- Passenger and aircraft activity levels at New England regional airports including:
 - ❑ Bradley International Airport, CT;
 - ❑ T.F. Green Airport, RI;
 - ❑ Manchester-Boston Regional Airport, NH;
 - ❑ Portland International Jetport, ME;
 - ❑ Burlington International Airport, VT;
 - ❑ Bangor International Airport, ME;
 - ❑ Tweed-New Haven Airport, CT;
 - ❑ Portsmouth International Airport at Pease, NH;
 - ❑ Worcester Regional Airport, MA; and
 - ❑ Hanscom Field, MA.
- Changes in airline service levels and other factors that have contributed to trends in regional airport activity.
- The status of current improvement plans and projects at the regional airports.
- Massport's initiatives and joint efforts with other transportation agencies to improve the efficiency of the New England regional transportation system.
- Regional long-range transportation planning efforts.

¹ Massport owns and operates Boston-Logan International Airport, Hanscom Field, and Worcester Regional Airport.

2014 Regional Transportation Highlights and Key Findings

Key findings for New England regional airports, the regional transportation system in 2014, and status updates for long-range planning efforts include:

- The New England region is anchored by Logan Airport and a system of 10 other commercial service, reliever, and general aviation (GA) airports² (regional airports). Together, these 11 airports accommodate nearly all of New England’s air travel demand. Logan Airport serves as a major domestic origin and destination market and acts as the primary international gateway for the region. The region is also served by rail service (provided by Amtrak) which connects Boston to the New York/Washington D.C. metropolitan areas to the south and Portland, ME to the north.
- In 2014, the total number of air passengers utilizing New England’s commercial service airports, including Logan Airport, increased by 3.1 percent from 45.4 million in 2013 to 46.8 million annual air passengers in 2014. The increase in the region’s passenger traffic was largely driven by continued growth at Logan Airport. Among the other regional airports, Bradley International Airport and Worcester Regional Airport also saw some increase in passenger traffic. Passenger levels at the majority of other regional airports remained flat or continued to decline due to continued airline service reductions in 2014. Due to a slow and uneven recovery in the economy following the recession in 2008/2009 and volatile fuel prices, U.S. airlines have continued to face a challenging operating environment. Airlines have attempted to maintain tighter capacity control, which has resulted in ongoing service cuts at various secondary and tertiary airports across the nation. In 2014, total passenger traffic at the regional airports excluding Logan Airport decreased by 0.1 percent from the previous year, while passenger traffic at Logan Airport increased by 4.7 percent. Overall passenger growth in the New England region tracked closely to the overall U.S. passenger market, which saw an average increase of 3.1 percent in 2014.³
- Passenger traffic at the New England airports in 2014 represented the highest passenger traffic level for the region since the economic downturn in 2008. However, passenger traffic in the region has yet to return to the peak 2005 to 2007 levels, which exceeded 47.0 million. In comparison, U.S. passenger traffic reached a record high in 2014, exceeding the previous national peak in 2007.
- Of the 46.8 million passengers using New England’s commercial service airports in 2014, 67.6 percent of passengers (31.6 million) used Logan Airport compared to 66.6 percent (30.2 million) in 2013. Despite the recent increases in Logan Airport’s regional share, it remains below the regional peak of 73 percent in 1985.⁴
- Worcester Regional Airport, offering recently-launched JetBlue Airways service to Orlando and Fort Lauderdale, handled approximately 116,700 passengers⁵ in 2014. Aircraft load factors were consistently over 80 percent. A new, state-of-the-art, corporate hangar facility is under construction. For aircraft arriving and departing in low visibility conditions, Massport has begun the environmental and design process for construction of a Category (CAT) III approach system.

² The New England Regional Airports Air Passenger Service Study (Federal Aviation Administration, 1995) defined the Bradley International, T.F. Green, Manchester-Boston Regional, Portland International Jetport, Bangor, Burlington, Worcester Regional, and Tweed-New Haven Airports as the region’s principal commercial airports, other than Logan Airport, since all of these airports either supported or had previously supported commercial jet passenger services. Subsequently, in 1999, limited commercial passenger service was introduced at Hanscom Field and at Portsmouth International Airport, though neither airport has been able to sustain commercial airline services over the long-term. These 11 airports are included in the New England Regional Airport System Plan Study, which was published in 2006.

³ Based on U.S. DOT, Bureau of Transportation Statistics for scheduled passenger traffic.

⁴ Based on airport passenger statistics from 1985 to 2013.

⁵ Based on Worcester Airport Records; includes JetBlue Airways passengers and a small number of charter passengers.

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- Aircraft operations activity levels have declined significantly throughout the region since 2000, as part of an ongoing trend of higher aircraft load factors, larger aircraft size, and reduced service levels. Total aircraft operations in the region have declined from 1.6 million in 2000 to 972,723 in 2014.
- Aircraft operations in the New England region decreased by 4.3 percent in 2014, from 1.02 million operations in 2013 to 972,723 operations in 2014. Driven by declines at Hanscom Field, regional GA operations showed the largest decline in 2014, decreasing by 11.7 percent (46,940 operations). Although military operations decreased by 3.0 percent (950 operations) in 2014, commercial airline operations in the region increased slightly by 0.4 percent (2,320 operations) overall.
- Massport continued to engage in metropolitan cooperative planning efforts including MassDOT's GreenDOT initiative, the Healthy Transportation Compact,^{6,7} the South Boston Waterfront Transportation Plan, and the Boston Metropolitan Planning Organization (Boston MPO).
- Massport is cooperating with MassDOT's efforts to expand Boston's South Station to meet the current and future demand for rail mobility within Massachusetts and along the Northeast Corridor.
- Massport participates with the MassDOT, the City of Boston, and the Massachusetts Convention Center Authority to advance the improvements listed in the South Boston Waterfront Transportation Plan.
- MassDOT and the other New England state transportation agencies collaborated with the Federal Aviation Administration (FAA) on the *New England Regional Airport System Plan – General Aviation* study to provide an understanding of general aviation airports, infrastructure and capital needs for the New England region.

New England Regional Airport System

As shown in Figure 4-1, the New England region is anchored by Logan Airport and a system of 10 other commercial service, reliever and GA airports (regional airports).⁸ Together, these 11 airports accommodate nearly all of New England's air travel demand. Logan Airport serves a major domestic origin and destination market and acts as the primary international gateway for the region. The regional airports range in role and activity levels from Bradley International Airport, which served close to 6 million commercial passengers in 2014, to Hanscom Field, which does not currently handle any commercial or charter flights but serves as New England's largest GA facility.

6 Massachusetts Department of Transportation, www.eot.state.ma.us/default.asp?pgid=content/releases/pr060210_GreenDOT&sid=release, June 2, 2010.

7 Massachusetts Department of Transportation, www.massdot.state.ma.us/main/healthytransportationcompact.aspx.

8 The New England Regional Airports Air Passenger Service Study (FAA, 1995) defined the Bradley International, T.F. Green, Manchester, Portland International Jetport, Bangor, Burlington, Worcester Regional and Tweed-New Haven Airports as the region's principal commercial airports, other than Logan Airport, since all of these airports either supported or had previously supported commercial jet passenger services. Subsequently, in 1999, limited commercial passenger service was introduced at Hanscom Field and at Portsmouth International Airport, though neither airport has been able to sustain commercial airline services over the long-term. These 11 airports are included in the New England Regional Airport System Plan (NERASP) Study, which was published in 2006.

Figure 4-1 New England Regional Transportation System



Massport owns and operates two of the regional airports, Hanscom Field and Worcester Regional Airport. Both of these airports play important roles in the New England regional transportation system, as described below.

- Worcester Regional Airport (ORH) is located in central Massachusetts, approximately 50 miles west of Logan Airport. Worcester Regional Airport is recognized as an important aviation resource that can accommodate both corporate GA activity and commercial airline services. Massport assumed operation of Worcester Regional Airport in 2000 and later acquired the Airport from the City of Worcester in June 2010. Aircraft operations at Worcester Regional Airport totaled approximately 32,000 operations in 2014, with GA accounting for close to 90 percent of aircraft activity. Allegiant Air served the Airport for only nine months in 2009 and Direct Air served Worcester Regional Airport from November 2008 to March 2012, shortly

before the carrier filed for bankruptcy. After the cessation of Direct Air's services, Massport, in conjunction with the City of Worcester and other community stakeholders, actively promoted the reintroduction of scheduled airline service at the airport and successfully secured new services from JetBlue Airways. On November 7, 2013, JetBlue Airways commenced non-stop services to Orlando International and Fort Lauderdale-Hollywood airports using 100-seat Embraer 190 aircraft. This service has proven to be highly popular, with JetBlue Airways realizing consistently high load factors (85 percent on average) and handling over 115,000 passengers in 2014.

- Hanscom Field (BED) is a full-service GA airport that accommodates a wide variety of GA activities, including corporate aviation, private flying, commuter air services, as well as some charters and light cargo. Located in Bedford, MA, approximately 20 miles northwest of Logan Airport, Hanscom Field is New England's premier facility for business/corporate aviation and serves a critical role as a GA reliever airport for Logan Airport. In 2014, Hanscom Field accommodated approximately 133,700 GA operations, more than five times the number of GA operations that occurred at Logan Airport. Consistent with its role as a premier corporate airport, new hangars are being built to accommodate the need for corporate jet services. In addition to its role as a GA facility, Hanscom Field has also accommodated niche commercial airline services in the past.

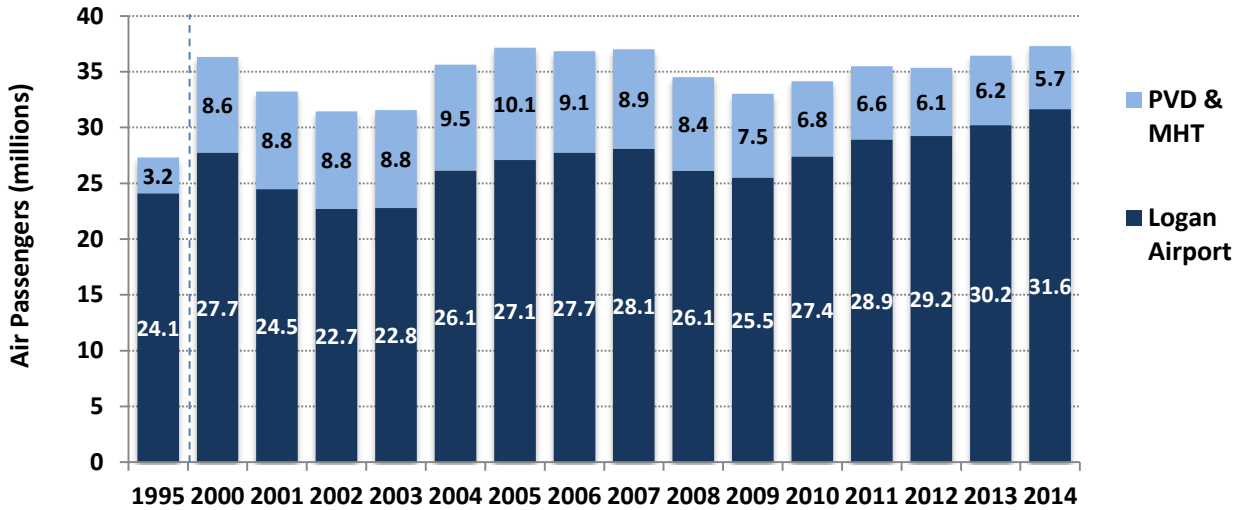
Apart from Hanscom Field and Worcester Regional Airport, the regional airports closest to Logan Airport are T.F. Green Airport (PVD) in Warwick, RI and Manchester-Boston Regional Airport (MHT) in Manchester, NH. Because of their proximity to Logan Airport and overlapping market areas, these airports may be convenient choices for some passengers in the Greater Boston Area. The New England Regional Airport System Plan (NERASP) Study, which was published in 2006, identified a high degree of cross-airport utilization within the Greater Boston airport system, which encompasses Logan Airport, T.F. Green Airport, and Manchester-Boston Regional Airport. In effect, the three airports act as a system of airports, with significant numbers of passengers choosing the most convenient airport in terms of access, airfares, and available air services depending on their individual air travel needs.⁹

Prior to 2005, the Central Artery/Tunnel (CA/T) construction project and high fares made Logan Airport less attractive for many air travelers in the Greater Boston area. Many passengers viewed T.F. Green Airport and Manchester-Boston Regional Airport as convenient alternatives to Logan Airport. After the introduction of low-cost services on Southwest Airlines, these two airports captured an increasing share of the Greater Boston market. However, with the completion of major portions of the CA/T project in 2004, as well as JetBlue Airways' entry and expansion at Logan Airport, the Airport began to recapture passengers from its core service area that were previously using the regional airports.

Logan Airport is well-positioned in terms of access and competitive airfares, and available air services to meet the demands of the core Boston passenger market. Passenger traffic at T.F. Green Airport and Manchester-Boston Regional Airport peaked in 2005, and declined significantly in recent years due to an industry-wide trend of airline service reductions at smaller airports. However, T.F. Green Airport and Manchester-Boston Regional Airport remain well situated to serve their own catchment areas and continue to accommodate considerably more passengers than before the entry of Southwest Airlines in the late 1990s. In 2014, T.F. Green and Manchester-Boston Regional Airports' share of the combined Greater Boston passenger market continued the declining trend from recent years. In 2014, the two airports served 15 percent (5.7 million) of the combined passengers at the three main commercial airports serving the Greater Boston area, down from 17 percent (6.2 million) in 2013 and a high share of 28 percent (8.8 million) in 2002. Figure 4-2 depicts the historical distribution of air passengers for Logan Airport, T.F. Green Airport, and Manchester-Boston Regional Airport.

⁹ *New England Regional Airport System Plan*, Federal Aviation Administration, 2006.

Figure 4-2 Passenger Activity Levels at Logan Airport and T.F. Green (PVD) and Manchester-Boston Regional (MHT) Airports, 1995-2014



Source: Massport and individual airport data reports.

In addition to Logan Airport and the regional airports discussed above, a third tier of airports serves relatively isolated communities or provides niche commercial airline services in New England. These airports include: Hyannis Airport, Martha’s Vineyard Airport, Nantucket Memorial Airport, New Bedford Regional Airport, and Provincetown Municipal Airport in MA; Augusta State Airport, Bar Harbor Airport, Rockland Airport, and Northern Maine Regional Airport in ME; Lebanon Municipal Airport in NH; Block Island State Airport and Westerly State Airport in RI; and Rutland Southern Vermont Regional Airport in VT. The third-tier airports support frequent commercial service to Logan Airport and, in some instances, T.F. Green Airport during the summer months. Most of these third-tier airports are not in close proximity to Logan Airport and are isolated due to geographic factors. Because of their remoteness and/or limited market areas, many of these airports are unlikely to attract passengers that now fly from Logan Airport. Instead, many of these airports are dependent on Logan Airport for connecting services.

Air Passenger Trends

The following section provides an overview of air passenger trends for the regional airports over the last decade.

Regional Airport Passengers

In 2014, New England’s 11 commercial airports accommodated 46.8 million passengers. As shown in Table 4-1, total air passenger traffic at the New England airports increased by 3.1 percent in 2014, up from 45.4 million in 2013. Passenger traffic at the New England airports in 2014 represented the highest passenger traffic level for the region since the economic downturn in 2008. However, passenger levels in the region have yet to return to the peak 2005 to 2007 levels, which exceeded 47.0 million. Passenger traffic growth in the New England region

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tracked closely with overall growth in the U.S. passenger market, which increased by 3.1 percent in 2014.¹⁰ In comparison, U.S. passenger traffic reached a record high in 2014, exceeding the previous peak in 2007.

Passenger traffic increases at Logan Airport in 2014 helped to offset continued declines at a number of the regional airports. In 2014, air passengers at Logan Airport grew by 1.4 million or 4.7 percent over the prior year. Overall passenger traffic at the regional airports excluding Logan Airport declined slightly by approximately 13,000 passengers or 0.1 percent compared to 2013. The 10 regional airports accounted for a total of 15.16 million passengers in 2014, compared to 15.17 million passengers in 2013. Consequently, the ten regional airports' share of New England passengers decreased to 32.4 percent in 2014, compared to 33.4 percent in 2013 (Figure 4-3). The decline in passenger traffic at the regional airports reflects the volatile operating environment facing U.S. airlines and is consistent with the national trend at secondary and tertiary airports. The global economic downturn that began in 2008 resulted in a drop in passenger demand and widespread airline capacity reductions, particularly at the smaller regional airports. Airlines eliminated less profitable routes, cut frequencies in smaller markets, and reduced flying with small regional jets (RJs), which had become uneconomical to operate with sustained high fuel prices. Airlines have remained conservative with growth plans and have not increased overall capacity significantly at the regional airports as of 2014. Despite the recent declines in regional airport passengers, the regional airports continue to accommodate a significant share of the region's passengers, up substantially from their share of 27.0 percent in 1985.

Table 4-1 Passenger Activity at New England Regional Airports and Logan Airport, 2010-2014

Airport	Passenger Levels (millions) ¹					Percent Change (2013-2014)
	2010	2011	2012	2013	2014	
Bradley International	5.34	5.61	5.38	5.42	5.88	8.4%
T.F. Green	3.94	3.88	3.65	3.80	3.57	(6.2%)
Manchester-Boston Regional	2.81	2.71	2.45	2.42	2.10	(13.5%)
Portland International Jetport	1.71	1.68	1.62	1.68	1.67	(0.5%)
Burlington	1.30	1.30	1.23	1.23	1.22	(1.0%)
Bangor	0.39	0.43	0.46	0.49	0.49	1.8%
Worcester Regional	0.07	0.11	0.03	0.02	0.12	670.6%
Tweed-New Haven	0.07	0.08	0.08	0.07	0.07	(8.1%)
Hanscom Field	0.00	0.01	0.01	0.00	0.00	NA
Portsmouth International ²	0.00	0.00	0.03	0.04	0.06	29.2%
Subtotal	15.63	15.81	14.93	15.17	15.16	(0.1%)
Logan Airport	27.43	28.91	29.24	30.22	31.63	4.7%
Total	43.06	44.72	44.14	45.36	46.79	3.1%

Source: Massport and individual airport data reports.

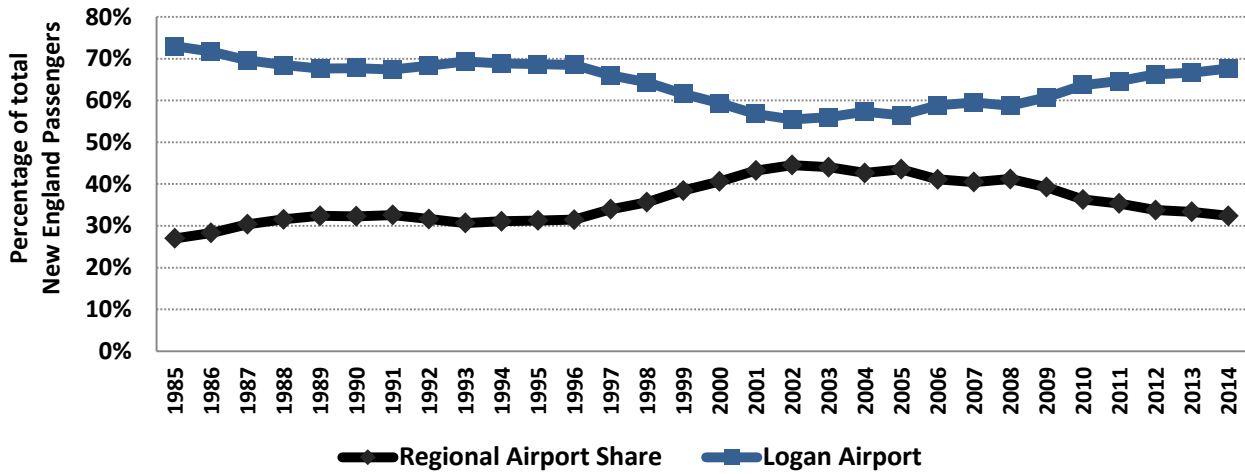
Note: Data for Logan Airport includes international and connecting passengers.

1 All passengers in millions. Passenger levels are enplaned plus deplaned passengers (where available) or enplaned passengers times two.

2 Portsmouth International passengers revised for 2012 and 2013 to reflect existing records. Portsmouth International includes charter flight passengers starting in 2012

¹⁰ Based on U.S. DOT, Bureau of Transportation Statistics for scheduled passenger traffic.

Figure 4-3 Regional Airports' Share of New England Passengers, 1985-2014



Source: Massport and individual airport data reports.

Among the regional airports, Bradley International Airport and Worcester Regional Airport experienced some passenger traffic growth in 2014, while passenger levels at the majority of other regional airports remained flat or continued to decline slightly. An increase in airline service at Bradley International Airport resulted in passenger traffic growth, with passenger’s activity levels growing by 453,826 or 8.4 percent in 2014. Worcester Regional Airport also saw passenger traffic growth of 101,565 following the introduction of commercial service by JetBlue Airways in November 2013. Manchester-Boston Regional and T.F. Green Airports experienced the largest declines, with passengers decreasing by 13.5 percent (326,428) and 6.2 percent (236,817) respectively in 2014. Portland International Jetport and Burlington International Airport passengers also decreased slightly in 2014, while Bangor International Airport and Portsmouth International Airport passenger traffic increased slightly.

Aircraft Operation Trends

This section reports on recent aircraft operations trends for the regional airports, including passenger aircraft operations, GA operations, all-cargo aircraft operations, and aircraft load factors.

Regional Airports Aircraft Operations

As shown in Table 4-2, total aircraft operations in the New England region (including Logan Airport) decreased by 4.3 percent in 2014, from 1.0 million operations in 2013 to 972,723 operations in 2014. The overall decrease in aircraft operations was primarily driven by declines in aircraft operations at the 10 regional airports in 2014. In 2014, total aircraft operations at the 10 regional airports declined by 7.0 percent (46,100 operations), whereas aircraft operations at Logan Airport increased slightly by 0.7 percent (2,500 operations) compared to the previous year.

Commercial operations in the New England region increased slightly from approximately 582,210 operations in 2013 to 584,530 operations in 2014. This represented a year-over-year change of 0.4 percent in 2014. Commercial operations at Logan Airport increased by 0.8 percent in 2014, helping to offset a decline of 0.2 percent at the other regional airports. This reflects a continuation in the trend of airlines monitoring and controlling capacity carefully following the more severe airline service cuts associated with fuel price increases

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in 2008 and the economic recession of 2008/2009. The same trend was seen across the nation. Aircraft operations have increased at a slower pace than passenger demand, with airlines moving towards larger aircraft sizes and operating with higher passenger loads. Total U.S. commercial aircraft operations declined by 2.0 percent, while U.S. passengers increased by 3.1 percent in 2014.¹¹

Combined GA operations at the regional airports and Logan Airport totaled 355,340 operations in 2014, a decline of 11.7 percent from 2013. GA operations at Logan Airport declined by 1.0 percent in 2014, while GA operations at the other regional airports declined by 12.4 percent. A decline in GA operations at Hanscom Field contributed significantly to the overall decrease in the region's GA operations. GA operations at Hanscom Field declined by 14 percent in 2014, due mostly to a drop in single engine piston local operations. Military operations at the regional airports increased slightly by 3.0 percent in 2014 following years of continued decline.

GA operations continue to be the dominant type of aircraft activity at the regional airports. In 2014, GA accounted for 54.0 percent of total aircraft operations at the regional airports. In comparison, GA represented only 7.3 percent of aircraft activity at Logan Airport, which primarily accommodates the region's domestic and international commercial airline operations. Commercial airline operations accounted for 40.6 percent of total operations at the regional airports in 2014. In comparison, commercial operations accounted for 92.7 percent of total operations at Logan Airport in 2014.

Overall, the regional airports accommodated a much greater share of the region's aircraft operations than their share of air passengers due to high levels of GA traffic. In 2014, the regional airports accounted for 32.4 percent of the region's passenger traffic, but 62.6 percent of aircraft activity. On average, there were approximately 24.9 passengers per aircraft operation at the regional airports compared to 87.0 passengers per operation at Logan Airport in 2014, largely reflecting aircraft sizes.

Total aircraft operations in the region in 2014 are well below the region's level of aircraft operations in 2000. Total aircraft operations are down by almost 40 percent, falling from 1.6 million in 2000 to approximately 972,700 in 2014. There were similarly large reductions in all three categories of activity – commercial, GA, and military. A number of factors have contributed to the declines. A shift to larger capacity aircraft and higher passenger load factors and a concurrent reduction in airline services at smaller regional airports have contributed to the declining trend in commercial airline operations. Factors negatively affecting GA operations include high fuel prices, a declining private pilot base, economic recessions, and slow economic growth. Annual aircraft operations from 2000 to 2014 are provided in *Appendix F, Regional Transportation*.

¹¹ Airports Council International, 2012 Worldwide Airport Traffic Report.

Table 4-2 Aircraft Operations by Classification for New England's Airports, 2013 and 2014

Airport	2013				2014				Percent Change (2013-2014)			
	Commercial ¹	General Aviation ²	Military ²	Total	Commercial ¹	General Aviation ²	Military ²	Total	Commercial ¹	General Aviation ²	Military ²	Total
Bradley International	78,213	15,192	2,558	95,963	78,968	14,709	2,660	96,337	1.0%	(3.2%)	4.0%	0.4%
T.F. Green	48,340	24,729	435	73,504	43,888	16,105	622	60,615	(9.2%)	(34.9%)	43.0%	(17.5%)
Manchester-Boston Regional	43,572	11,432	1,224	56,228	38,674	12,293	908	51,875	(11.2%)	7.5%	(25.8%)	(7.7%)
Portland International Jetport	31,076	20,021	471	51,568	29,538	16,535	560	46,633	(4.9%)	(17.4%)	18.9%	(9.6%)
Burlington	26,814	40,413	6,972	74,199	26,057	40,858	6,842	73,757	(2.8%)	1.1%	(1.9%)	(0.6%)
Bangor ³	14,707	15,535	11,045	41,287	14,428	15,466	11,527	41,421	(1.9%)	(0.4%)	4.4%	0.3%
Tweed-New Haven	4,094	28,794	423	33,311	4,795	26,273	529	31,597	17.1%	(8.8%)	25.1%	(5.1%)
Worcester Regional	173	35,064	593	35,830	2,521	28,565	978	32,064	1357.2%	(18.5%)	64.9%	(10.5%)
Portsmouth International	560	28,951	7,573	37,084	8,278	24,440	7,621	40,339	1378.2%	(15.6%)	0.6%	8.8%
Hanscom Field	0	155,469	612	156,081		133,684	604	134,288	NA	(14.0%)	(1.3%)	(14.0%)
Subtotal	247,549	375,600	31,906	655,055	247,147	328,928	32,851	608,926	(0.2%)	(12.4%)	3.0%	(7.0%)
Logan Airport	334,657	26,682	NA	361,339	337,381	26,416	NA	363,797	0.8%	(1.0%)	NA	0.7%
Total	582,206	402,282	31,906	1,016,394	584,528	355,344	32,851	972,723	0.4%	(11.7%)	3.0%	(4.3%)

Source: Massport; FAA Tower Counts; FAA Terminal Area Forecast; individual airport data reports.

Notes: Commercial operations at Hanscom Field include Streamline operations only; other air taxi operations included with GA. FAA tower counts used for MHT, PWM, HVN

1 May include some Air Taxi operations by fractional jet operators. FAA Tower counts combine some fractional jet operations with small regional/commuter airline operations.

2 Includes itinerant and local operations at the regional airports. Military operations at Logan Airport are negligible and not included in Massport counts.

3 Commercial operations at Bangor International Airport include international aircraft making a technical stop.

NE New England

Airline Passenger Service in 2014

Airlines can adjust service at an airport or on a specific route in two ways: by increasing or decreasing the number of flights operated; and/or by changing the size of the aircraft flown on the route. Changes in flight frequency and changes in aircraft size both affect the number of seats available to passengers, also known as seat capacity. Airline services are therefore typically discussed in terms of seat capacity as well as the number of flight departures.¹² This section examines changes in airline departures and seat capacity at the regional airports in 2014 and provides an overview of new and discontinued routes.

Service Developments at the Regional Airports

In 2014, a total of 11 airlines provided scheduled passenger service from the 10 regional airports to 39 non-stop destinations.¹³ A few of the regional airports including Bradley International, Worcester Regional, and Portsmouth International Airports saw an increase in scheduled commercial services in 2014, but the majority of other airports experienced service declines. The steep airline service cuts seen after 2007 due to the 2008/2009 economic recession and high fuel prices have largely come to an end. However, airlines continue to be conservative in growing capacity, focusing on profitability and continuing to reduce frequencies on less profitable routes.

Table 4-3 shows the share of scheduled domestic departures for Logan Airport and the ten regional airports for the August peak travel month from 2010 to 2014. The regional airports’ share of scheduled domestic departures in the New England region declined slightly from 39.1 percent in 2013 to 38.9 percent in 2014. The combined share for the medium-size airports – Bradley International Airport, T.F. Green Airport, and Manchester-Boston Regional Airport – fell from 26.3 percent in 2013 to 25.8 percent in 2014, while the smaller airports increased their share slightly from 12.8 percent to 13.1 percent. Details of scheduled passenger operations by market and carrier for the regional airports for the years 2000 to 2014 are presented in *Appendix F, Regional Transportation*.

Table 4-3	Share of Scheduled Domestic Departures - Logan Airport and the Ten Regional Airports, 2010-2014 (for August peak travel month)				
	2010	2011	2012	2013	2014
Logan Airport	57.8%	57.5%	59.6%	60.9%	61.1%
Bradley International Airport; Manchester-Boston Regional Airport; T.F. Green Airport	29.5%	29.2%	27.6%	26.3%	25.8%
Bangor International Airport; Burlington International Airport; Hanscom Field; Portland International Jetport; Portsmouth International Airport; Tweed-New Haven Airport; Worcester Regional Airport	12.7%	13.3%	12.8%	12.8%	13.1%

Source: Official Airline Guide Market Files.

¹² A departure is an aircraft take off at an airport. While aircraft operations include both departures and arrivals, airline services are typically described in terms of departures, as the number of scheduled departures generally equals the number of scheduled arrivals. Changes in departures translate to changes in overall operations.

¹³ Includes Allegiant Air, which serves Bangor International Airport (Punta Gorda, Sanford and St. Petersburg/Clearwater service), Burlington International Airport (Sanford service), and Portsmouth International Airport (Punta Gorda and Sanford service).

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Bradley International Airport

Annual seat capacity at Bradley International Airport in Windsor Locks, CT increased by 6.4 percent in 2014. Expanded services by Southwest Airlines/AirTran Airways, JetBlue Airways, American Airlines, American Eagle, and Delta Air Lines resulted in some increase in scheduled departures and seat capacity. In 2014, Southwest Airlines (now fully merged with AirTran Airways) continued to operate new Atlanta service introduced by AirTran Airways in late 2013. JetBlue Airways had added new service to Fort Myers and Tampa in late 2013, and also introduced new service to Washington National Airport in 2014. American Airlines and American Eagle increased capacity on some routes, but also discontinued service to Los Angeles in 2014. United Airlines added new service to Houston Intercontinental Airport, but cut scheduled capacity overall, including on the Cleveland and Newark routes. Delta Air Lines increased capacity to Atlanta and also added new regional jet service to Cleveland.

T.F Green Airport

T.F. Green Airport (RI) saw continued reductions in scheduled departures and available seat capacity by the majority of airlines. The most significant cutbacks were implemented by Southwest Airlines, which discontinued service completely to Denver and cut frequencies on its Baltimore/Washington route in 2014. Other notable service cuts include the discontinuation of United Express service to Cleveland and the reduction of scheduled capacity by US Airways to Charlotte. Overall, scheduled seat capacity at T.F. Green Airport decreased by 7.0 percent in 2014. The Rhode Island Airport Corporation continues to seek new service offerings including international destinations.

Manchester-Boston Regional Airport

Manchester-Boston Regional Airport (NH) also experienced significant cutbacks by Southwest Airlines, United Airlines, and other carriers in 2014. Southwest Airlines had discontinued non-stop service to Philadelphia and Denver in 2013 and further reduced scheduled capacity on its Baltimore/Washington and Orlando routes in 2014. United Airlines exited the Cleveland market and further reduced frequencies to Newark in 2014. US Airways and Delta Connection also implemented service reductions. Scheduled seat capacity at Manchester decreased overall by 11.3 percent in 2014.

Portland International Jetport

Portland International Jetport (ME) experienced a 4.2 percent decline in airline seat capacity in 2014. Delta Airlines reduced frequencies on its Atlanta route and down-gauged from large jet to RJ service on its New York La Guardia route. United Express discontinued service to Cleveland and also reduced frequencies in the Newark market. Southwest Airlines was the one carrier that expanded services at Portland International Jetport, introducing new limited seasonal service to Orlando and Chicago Midway in 2014.

Burlington International Airport

Burlington International Airport (VT) gained new service by Allegiant Air, but also experienced overall declines in airline capacity in 2014. In 2014, JetBlue Airways continued to reduce scheduled seat capacity in the New York JFK market. United Express discontinued service to Cleveland, and US Airways also reduced scheduled frequencies in the Washington National Airport market. Low-cost leisure airline Allegiant Air launched operations at Burlington International Airport in 2014, introducing new large jet service to Orlando/Sanford. Overall, scheduled seat capacity at Burlington International Airport decreased by 2.5 percent in 2014.

Bangor International Airport

Bangor International Airport (ME) experienced some service additions in 2014, but these gains were offset by service reductions implemented by other carriers. In 2014, United Express introduced new service to Chicago O'Hare, and Allegiant Air added service to its third destination, Punta Gorda, from Bangor International Airport. However, Delta Connection reduced capacity in the La Guardia market and US Airways Express reduced

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frequencies on its Washington National and Philadelphia routes. Overall, scheduled seat capacity at Bangor International Airport decreased slightly by 0.9 percent in 2014

Worcester Regional Airport

Worcester Regional Airport (MA) regained scheduled commercial service with the introduction of JetBlue Airways service to Fort Lauderdale and Orlando in 2013. Prior to the entry of JetBlue Airways, Worcester Regional Airport was served only by Direct Air, which operated regularly scheduled charter services from 2008 to 2012. When Direct Air filed for Chapter 7 bankruptcy in April 2012, Worcester Regional Airport lost all commercial service. A concerted marketing effort on the part of Massport and the local Worcester community resulted in the launch of JetBlue Airways at the Airport in November 2013. JetBlue operated year-round daily regional jet service to both Fort Lauderdale and Orlando in 2014, accounting for a five-fold increase in overall seat capacity compared to the prior year. Over 200,000 passengers have used Worcester Regional Airport since JetBlue Airways' start.

Tweed-New Haven Airport, Portsmouth International Airport, and Hanscom Field

Among the other smaller regional airports, Tweed-New Haven Airport (CT) experienced a decline in capacity as US Airways, the only carrier offering scheduled service, reduced seat capacity by 3.1 percent in 2014. Portsmouth International Airport, which had lost scheduled commercial service in 2008 when Allegiant Air left the market, regained commercial service in 2013 when Allegiant Air re-entered the market providing non-stop service to Orlando-Sanford. In 2014, Allegiant Air added service to a second destination, Punta Gorda, from Portsmouth International Airport, resulting in a significant increase in airline seat capacity compared to the prior year. Hanscom Field currently has no scheduled commercial service; public charter carrier, Streamline Air, introduced regularly scheduled service on turboprop aircraft from Hanscom Field to Trenton, NJ in 2011, but this service was later discontinued in 2012.

Regional Reliance on Logan Airport

Despite the service reductions at the regional airports in 2014, the trend of decreased reliance on connecting service through Logan Airport continued. Figure 4-4 shows that the share of flights between the regional airports and Logan Airport has been declining steadily since the mid-1990s. In the early 1990s, scheduled service to Logan Airport represented over 20 percent of regional airport flights. This share dropped as regional airports gained more non-stop service to both origin and destination (O&D) airports and airline connecting hubs. In 2010, the last scheduled flights from the regional airports to Logan Airport were eliminated entirely. The significance of this trend is that it reduces pressure on Logan Airport to provide connecting service for small planes from small communities to other destinations; this results in more convenient air service routings for passengers and opens up capacity at Logan Airport for transcontinental and international flights.

However, while service between the 10 regional airports and Logan Airport has been eliminated, other remote communities in New England continue to rely on Logan Airport for connecting services. Logan Airport acts as a connecting hub for a number of other New England airports, such as the Cape Cod and Island Airports. Logan Airport remains the sole commercial air service destination for some communities, such as Augusta, Presque Isle, and Rockland, ME, as well as Rutland, VT.

Regional Aviation Economic Impact Study

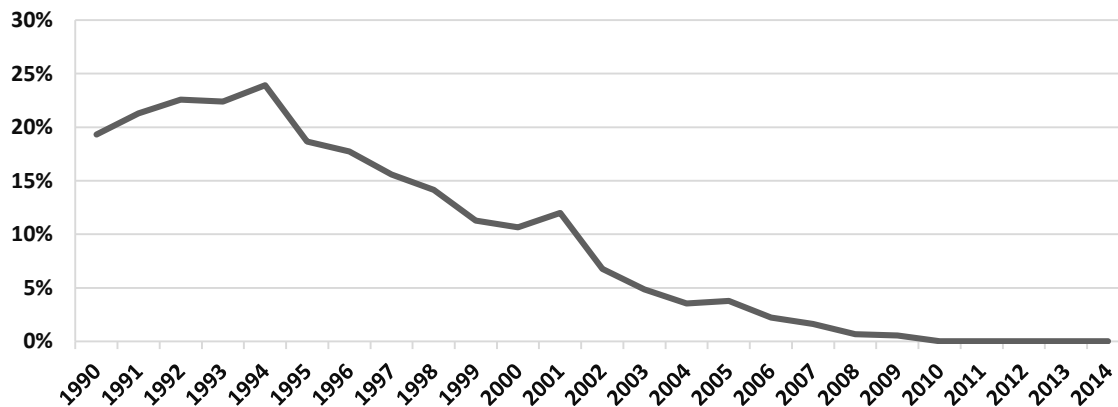
In 2014, the Aeronautics Division of MassDOT completed a wide-ranging economic impact study of the statewide airports system's (the 39 public use airports including Logan Airport) contribution to the economy of Massachusetts. The analysis found that Massachusetts public use airports generated \$16.6 billion in total economic activity, including \$6.1 billion in total annual payroll resulting from 162,250 jobs that can be traced to

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the aviation industry.¹⁴ In particular, Massport's three airports are noted to make significant contributions to the regional economy generating approximately \$15.1 billion or 91 percent of the overall economic benefits generated by the Massachusetts airport system.¹⁵ Specifically, Logan Airport supported approximately 132,000 jobs in Massachusetts and the total economic impact is now estimated at approximately \$13.4 billion per year.¹⁶ Hanscom Field supported 12,355 jobs and a total impact of \$1.6 billion while Worcester Regional Airport supported 360 jobs and a total economic impact of \$46.4 million. Hanscom Field is particularly important for its function as an active military facility, which is aided by its proximity to Boston-area technology and research industry. For every \$100 spent by aviation-related businesses, an additional multiplier impact of \$56 is created within Massachusetts according to the study. While the economic impact of the region's airports was the focus of the study, it also noted qualitative benefits of the state's airports including:

- Facilitating emergency medical transport;
- Providing police support;
- Supporting aerial surveying, photography, and inspection operations;
- Conducting search-and-rescue operations;
- Supporting the U.S. military and other government operations; and
- Providing youth outreach activities.

Figure 4-4 Share of Flights Originating at Regional Airports with Logan Airport as Destination, 1990-2014



Source: Official Airline Guide Market Files (August for each year).
Note: Includes all New England airports with scheduled airline service.

14 Massachusetts Department of Transportation Aeronautics Division. *Massachusetts Statewide Airport Economic Impact Study Update Executive Summary*. (2014). <http://www.massdot.state.ma.us/portals/7/docs/airportEconomicImpactSummary.pdf> Accessed July 26, 2015.

15 Ibid.

16 Ibid.

Regional Airport Facility Improvement Plans

The following section describes significant airport improvements that are planned or under construction at the regional airports in the near future.

T.F. Green Airport

In September 2011, the FAA issued a favorable Record of Decision (ROD) approving the Preferred Alternative for the T.F. Green Airport Improvement Program, which will allow an extension to the airport's main runway to allow for non-stop flights to the West Coast as well as Runway Safety Area improvements on the crosswind runway, and other projects. In January 2013, the FAA issued a final Written Reevaluation of the ROD, as project design and construction phasing had changed since the ROD was issued. Construction of project elements of the T.F. Green Airport Improvement Program began in July 2013 and are expected to continue through 2017. The Airport Improvement Program includes the following projects:

- The Runway 16 End Safety Area improvements involved installation of Engineered Material Arresting System (EMAS), airfield electrical improvements on the Runway 16 end, and reconfiguration of the taxi lane from the northeast ramp to the Runway 16 end. This project is complete.
- The demolition of Hangar 1 was completed in July 2014.
- Construction for the Runway 34 End Safety Area improvements began in 2014. Major elements of the project include the reconstruction of 1,650 feet of Runway 16-34, EMAS construction at the Runway 34 end, partial reconstruction of Taxiway C, and construction of the associated airport service road. Construction is expected to be completed by the end of 2015.
- The Runway 5 extension is expected to begin in 2016 and be completed by the end of 2017. This project involves extension of the primary runway from its current length of 7,166 feet to 8,700 feet, which will allow for long haul flights to West Coast destinations. The project also involves an extension of the parallel Taxiway M and construction of an EMAS at the Runway 5 end. The Main Avenue relocation (an enabling project for the runway extension) is scheduled to begin June 2015 and will take one year to complete.
- The Runway 5 extension required the relocation of Winslow Park, which commenced in June 2014 and was completed in the summer of 2015. Work included replacement of the existing soccer and softball fields, playground facility, concession and restroom facilities as well as roadway calming treatments and landscaping improvements.

Separate from the T.F. Green Airport Improvement Program, construction of a Deicer Management System, which will collect and treat the glycol used to de-ice aircraft at T.F. Green Airport, began in 2013. Field construction was completed in April 2015. The system is expected to be operational by the end of 2015.

Manchester-Boston Regional Airport

Since the early 1990s, over \$500 million was invested in Manchester-Boston Regional Airport to improve and develop landside and airside facilities and infrastructure. Projects included a 158,000-square foot passenger terminal and two subsequent 75,000-square foot terminal additions, a 4,800-space parking garage with an elevated pedestrian walkway connection to the terminal, roadway improvements, runway safety area improvements, and extensive runway reconstruction and lengthening. Recent customer service enhancement initiatives have included the construction of a new cell phone lot in 2007 for motorists waiting to pick up passengers and various concessions improvements through 2008 and 2009.

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Manchester-Boston Regional Airport completed an Airport Master Plan Update in 2011. The master plan update provides a blueprint for development and improvement of airport facilities and infrastructure through 2030. Recent and on-going improvement projects at the airport include:

- The Terminal Ramp Replacement Project to rehabilitate the concrete apron areas adjacent to the terminal building began in 2012 and was completed in 2013.
- Demolition of structures in the runway protection zone (RPZ) of Runway 6 will remove buildings with usages deemed non-compatible with RPZs as defined by the FAA. Elements of the project include demolishing the Highlander Inn and Conference Center and associated buildings.
- Upgrades to the terminal building heating, ventilation, and air conditioning (HVAC) systems will address certain deficiencies in the terminal cooling system and will provide significant improvements to customer comfort levels within areas of the terminal building.
- Parking Lot A Access improvements.
- Overlaying a portion of Taxiway M.

Other potential projects over the coming years include: roadway and parking improvements; curbside enhancements; refurbishing and expansion of baggage claim equipment; construction of a glycol collection/treatment facility; and construction of a snow removal equipment storage building.

Bradley International Airport

A \$200 million airport modernization project at Bradley International Airport was completed in 2010. Originally launched in 2000, the modernization project introduced a refurbished and expanded Terminal A with an additional 260,000 square feet of new concourse, ticket counters and waiting areas, major gate renovations, and a state-of-the-art security and communications system. A 28,000-square foot International Arrivals Building was also completed.

In 2011, the Connecticut Airport Authority (CAA) was established to oversee the operation and development of Bradley International Airport. The CAA, a quasi-public agency consisting of an 11-member board, manages day-to-day operations at Bradley International Airport, as well as at five GA airports in Connecticut. The goal of the CAA is to transform Bradley International Airport and the state's five GA airports (Danielson, Groton/New London, Hartford Brainard, Waterbury-Oxford, and Windham airports) into economic drivers for the state. Bradley International Airport was previously run by a board under the Connecticut Department of Transportation.

A three-year renovation project for the airport hotel, the Sheraton Bradley Airport Hotel, was completed in 2011, featuring newly outfitted guest rooms, a redesigned lobby, and an expanded fitness center and pool. More recently the CAA has announced the completion of a food court renovation as well as the opening of a new cell phone waiting lot. The 2010 to 2013 *Bradley International Airport Strategic Plan* highlights several airport improvement projects between 2012 and 2013. These projects include:

- A sound insulation program;
- Rehabilitating Taxiway C North;
- Rehabilitating Taxiway C South;
- Utility relocation and obstruction removal;
- Demolishing old Murphy Terminals and designing of new Terminal B; and
- Constructing roadway realignment.

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The airport's \$280 million capital improvement program for FY 2014 through FY 2018 includes the following projects:

- A consolidated rental car facility;
- Demolishing the Murphy Terminal;
- Roadway demolition and re-alignment;
- Utility relocation; and
- Airfield improvements.

Hanscom Field

Massport continues to invest in Hanscom Field to improve and upgrade facilities and maintain a safe, secure, and efficient airport. Past and future capital investments ensure that Hanscom Field can continue to serve its role as a GA reliever to Logan Airport and premiere business aviation facility for the region. In FY 2012 and 2013, Massport invested over \$5 million in airfield, terminal, equipment, and other facility improvements at Hanscom Field. Massport invested another \$2.2 million in facility improvements in FY 2014. These airport improvement projects are summarized in the annual reports on *The State of Hanscom*.¹⁷

Massport's recent capital investment projects at Hanscom Field included:

- Maintenance of vegetation removal areas and the trail system that connects two Massport-owned parcels with portions of conservation land and open spaces in the towns of Bedford and Concord.
- Development of the *2014 to 2018 Vegetation Management Plan Update*. The Vegetation Management Plan Update and Notice of Intent for vegetation removal was submitted to four towns' conservation commissions. All four conservation commissions issued Orders of Conditions.
- Massport installed a wildlife exclusion fence near the Shawsheen River.
- Replacement of the electrical infrastructure to Hangar 3.
- Pavement rehabilitation surrounding the Pine Hill T-hangars was completed.

Planned projects for FY 2015 and beyond include:

- The field maintenance garage roof will be replaced.
- Airfield pavement replacement will continue to be an ongoing project in coming years.
- Runway 5 safety area beyond the runway end will be rehabilitated.
- Portions of the perimeter security fence will be replaced.
- Signage and landscaping will be implemented at the entrance of Hanscom Drive.
- The electrical feeders for Hangars 1 and 2 will be replaced.

In addition to Massport's investments, the Authority solicits third-party development of facilities that support and enhance Hanscom Field's role in the regional transportation system. Many of the hangars at Hanscom Field are owned or leased by tenants who are responsible for maintaining them.

On-going third-party projects at Hanscom Field include:

¹⁷ Massport. *The State of Hanscom*. <https://www.massport.com/media/310211/StateOfHanscom-2014.pdf>. Accessed July 26, 2015.

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- In 2012, Rectrix was selected by Massport to develop fixed-base operator (FBO) facilities at the former Hangar 24 site. Demolition of the hangar was completed in September 2012. In 2013, Rectrix obtained required permits and began construction of the new hangar and FBO facility. Rectrix completed construction and opened the facility in 2014.
- The Massport Board approved a proposal by Jet Aviation, a current FBO operator at Hanscom Field, to replace Hangar 17 with a more modern facility. In 2012 and 2013, Jet Aviation undertook the planning and design process. In 2013, Jet Aviation submitted an Environmental Assessment to the FAA to begin the permitting process. In 2014 the permitting process continued and The Massachusetts Department of Environmental Protection approved the project in March 2015. Construction began in July 2015.
- Massport is in the process of working with General Services Administration (GSA) to acquire a parcel of land north of the airfield currently owned by the U.S. Navy. The transfer is expected to be complete by early 2016. Initial planning for aviation uses of this parcel is underway.

Worcester Regional Airport

The Worcester Regional Airport Master Plan Update, completed in 2008, was funded by the FAA and the former Massachusetts Aeronautics Commission. The Worcester Master Plan provides a strategic roadmap to guide airport development through 2020. Near-term projects were focused on maintaining essential operations, safety, and security functions and included runway pavement reconstruction, runway safety area upgrades, and a vegetation removal and maintenance plan. Long-term initiatives include upgraded



JetBlue Airways at Worcester Regional Airport
Source: Massport.

corporate/GA facilities including a FBO facility and hangars, a new Airport Rescue and Firefighting Facility (ARFF), and ongoing runway and taxiway pavement rehabilitation. Various demand-driven projects including terminal enhancements and additional parking facilities were also identified; however, these projects depend on the level and type of future aviation activity realized at Worcester Regional Airport.

Massport is currently pursuing enhancements to Worcester Regional Airport's all-weather capability including upgrading the Runway 11 Instrument Landing Systems (ILS) from a CAT I to a CAT III system, and its associated required infrastructure and navigation aids along with a partial parallel taxiway.

This project, which would allow aircraft to land on Runway 11 during virtually all weather conditions, is a safety and operational priority for the Airport. Massport submitted an Environmental Notification Form (ENF) for the *Worcester Regional Airport CAT-III Instrument Landing System and Taxiway Project* to the Massachusetts Executive Office of Energy and Environmental Affairs in January 2014. The MEPA Office determined that no further review is required. The FAA issued a Finding of No Significant Impact (FONSI) in February 2015; construction is underway.

Massport started a \$3 million renovation project in April 2014 that includes the demolition of the control tower, safety upgrades, and a Category III ILS.

In January 2012, Massport approved a proposal by Rectrix to develop an aircraft hangar and office space at Worcester Regional Airport. The FAA issued a Finding of No Significant Impact (FONSI) on August 13, 2013.

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Construction started on the \$6.7 million project in August 2013. The Rectrix project includes 27,000 square feet of hangar and office space that will house large corporate jets and a regional aircraft maintenance facility. Rectrix will offer private jet charters and FBO services, including transient aircraft parking and fueling services from the new hangar facility. The FAA issued a FONSI on April 4, 2014. Construction is underway and expected to be complete in 2015.

In October 2014, Massport received a FONSI from FAA for a future maintenance hangar at Worcester Regional Airport. A developer for the proposed 40,000 – 50,000 square foot hangar has yet to be identified.

Massport and third party developers have committed to invest in the following additional airside and landside improvement projects over the next few years:

- Installation of a new terminal roof and HVAC system;
- Airside and landside pavement rehabilitation;
- Rehabilitation of the existing ARFF station (underway);
- Security improvements; and
- Obstruction removal.

Long-term Worcester Roadway Improvements

In 2008, the Central Massachusetts Regional Planning Commission (CMRPC) initiated the *Worcester Regional Mobility Study*¹⁸ that was envisioned as a transportation plan with the goal of improving the movement of people and goods throughout the Greater Worcester Region. The final Study was released in May 2011. One of the Study's objectives was to improve ground transportation access between the regional roadways and Worcester Regional Airport within the context of an "economic development corridor" that could benefit other local businesses. Several alternative routes were identified and recommended for further study including a new interchange off Interstate 90 in the vicinity of Route 56. The Study also assessed a range of alternatives to address regional mobility concerns and recommended 13 roadway infrastructure improvements intended to reduce congestion, enhance regional mobility, and address existing interchange/intersection constraints. The study presented the recommended phasing and packaging of recommended alternatives into short-term (zero to five years), mid-term (five to 10 years), and long-term actions (over 10 years).

Near-term Worcester Directional Signage Improvement Program

CMRPC also supported Massport's goal to identify immediate actions for improving roadway access to Worcester Regional Airport through a signage improvement program. In collaboration with MassDOT and the City of Worcester, Massport identified six primary routes now used by travelers to access Worcester Regional Airport. The team also developed a sign design and placement plan. The goal was to improve directional signage on these roads between Worcester and the Massachusetts Turnpike and Interstate 290 by achieving the following objectives:

- To ensure that key decision points would be adequately signed;
- To reduce sign "clutter" by removing old and unnecessary signs; and
- To design and install new airport trailblazer signs consistent with Massport's and MassDOT's way finding standards.

¹⁸ Central Massachusetts Regional Planning Commission. *Worcester Regional Mobility Study*. http://www.cmrpc.org/sites/default/files/download/Worcester_Mobility_Study_RFP_02262008.pdf. Accessed July 26, 2015.

MassDOT has installed the desired signs that were produced by the Massport Sign Shop. To date, more than 80 signs have been installed including several signs on Auburn roads approved by the Town of Auburn in March 2011.

Regional Long-Range Transportation Planning

A balanced regional intermodal transportation network would reduce reliance on Logan Airport as the region's primary transportation hub and provide New England travelers with a greater range of viable transportation options. This section highlights efforts to achieve this balance through cooperative transportation planning at a broad array of transportation agencies and concerned parties to promote an integrated, multi-modal regional transportation network.

In 2009, MassDOT was created to unify the state's various transportation agencies. The unified MassDOT brought together many Commonwealth entities that plan, build, own, operate, and maintain all modes of transportation, under a five-member board of directors. In 2015 the MassDOT Board was expanded to an 11-member board of directors and a separate five-member MBTA Financial Oversight Board. (Massport remains an independent authority focused on airport and seaport needs with its own board of directors, including the Secretary of MassDOT). The creation of MassDOT was intended to help integrate, coordinate, and prioritize multimodal transportation policy and investment in Massachusetts, resulting in a more effective, efficient, equitable, rational, and innovative transportation system. As a fundamental part of the transportation framework in the Boston metropolitan area, and for all of New England, Massport supports an integrated multimodal transportation policy to improve the efficient use of transportation infrastructure on both a metropolitan and a regional scale. In 2011, MassDOT continued to make strides in improving the existing transportation infrastructure by addressing structurally deficient infrastructure with innovative construction techniques, developing a comprehensive environmental responsibility and sustainability initiative, and continuing to invest in the Boston metropolitan area's rapid transit.

Logan Airport's functional role is New England's premier commercial airport, providing an essential and efficient connection between the New England states and the global economy. Recent studies have indicated that there is a serious lack of usable aviation capacity in the coastal mega-regions¹⁹ (although not in Boston itself) and identify a need for access to alternative forms of short-distance travel across these regions.²⁰ Since the construction of a second major Boston airport has been judged impractical in the past, the potential of high-speed rail is increasingly being viewed as an important complementary component in the regional transportation system and aviation planning.²¹ Given the comparable travel times, proximity of service to downtown Boston, and the potential for highly efficient electrified propulsion, high-speed rail could provide efficient intercity connectivity for city-pairs in a corridor up to 600 miles long, which would be competitive with air travel.²² Boston's South Station is undergoing planning and design for expansion that would support the current and future rail mobility in Massachusetts and along the Northeast Corridor (NEC) including supporting future high-speed rail. In 2012, Amtrak services in the NEC had a 54 percent share²³ of the Boston-New York City markets (excluding traffic by other surface modes such as private car and bus).

19 The coastal mega-regions are the continuously urbanized areas along the east and west coasts of the U.S. (Washington, DC, Philadelphia, New York City, Hartford, Boston)

20 FAA: *Capacity Needs in the National Airspace System 2007-2025* (commonly referred to as FACT-2) and TRB: *ACRP Report 31: Innovative Approaches to Addressing Aviation Capacity Issues in Coastal Mega-regions*.

21 Transportation Research Board *ACRP 03-23: Integrating Aviation and Passenger Rail Planning*.

22 "Where High-Speed Rail Works Best" America 2050 - <http://www.america2050.org/pdf/Where-HSR-Works-Best.pdf> Page 1-2

23 Latest available statistics from Amtrak; nothing more recent has been released.

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Massachusetts Statewide Airport System Plan (MSASP)

The MassDOT Aeronautics Division completed the *Massachusetts Statewide Airport System Plan (MSASP)* in 2010. The MSASP provides guidance to state policy makers for the long term development of the Commonwealth's airport system. It documents the status of the current airport system; provides a long term vision for the system; identifies system goals and related improvements; establishes priorities for system and airport funding; and provides supporting data and materials.

Boston and Statewide Long-term Transportation Vision

The Boston MPO is currently developing a long-range vision for the region and its transportation network in 2040 titled *Charting Progress to 2040*.²⁴ The vision described by the Boston MPO identifies the Boston metropolitan region as continuing to be an economic, educational, and cultural hub which will continue to contribute to the high quality of life. The high quality of life will be supported by a well-maintained transportation system consisting of safe, healthy, efficient, and varied options. The variety of transportation options will allow people to find jobs and services within easy reach of affordable housing, and will reduce environmental impacts thereby improving air and environmental quality. This vision is possible through attentive maintenance, cost-effective management, and strategic investment in the region's transportation system. This vision is broad-based; more specifically for the Airport, the long-range vision finds that support for air cargo is critical as the State Freight Plan²⁵ finds air freight shipping to grow more quickly than any other shipping mode.

Although the other New England states have statewide long-term transportation plans, Massachusetts currently does not. MassDOT is currently undertaking the Commonwealth's first statewide strategic multi-modal transportation plan known as *weMove Massachusetts*.²⁶ The philosophy behind *weMove Massachusetts* is that MassDOT needs to make logical, defensible, and smart choices on how to invest the agency's limited resources based on the articulated values. The goals of *weMove Massachusetts* are to engage stakeholders through a bottom-up approach as well as internal agency stakeholders in a discussion about the present and future needs of the transportation system, to build action-oriented policies based on stakeholder feedback that can serve as a bridge between MassDOT's values and investments, and to develop a forward thinking, data-driven, decision-making methodology to assist MassDOT in implementing its priorities transparently and measurably.

Massport is an active participant in the development of the Boston MPO long-range transportation plan and has a representative on the *weMove Massachusetts* Stakeholder Advisory Group.

Regional Cooperative Planning Efforts

Several regional transportation cooperation planning efforts are underway, as described below.

New England Regional Airport System Plan (NERASP)

In fall of 2006, the FAA New England Region, in concert with the New England Airport Directors and New England State Aviation Directors, completed the NERASP. The results of this study describe the foundation of a regional strategy for the air carrier airport system to support the needs of air passengers through 2020. To date, the development of that strategy has been instrumental in facilitating the investment and development of the primary commercial airport system in New England.

24 Boston Region Metropolitan Planning Organization. *Charting Progress to 2040*.

25 Massachusetts Department of Transportation. *State Freight Plan*. September 2010.

26 <https://www.massdot.state.ma.us/wemove/Home.aspx>

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During preparation of the 2006 NERASP study, which analyzed the primary commercial airports in New England, the group recognized that a similar evaluation of GA would also prove useful. It would provide state aviation officials with a greater understanding of airport roles and infrastructure investment. Faced with the current economy, rising airport and aircraft operational costs, declining operational activity, an aging infrastructure and with limited state and federal funds to address improvements, the importance of developing both a short-range and long-range perspective on the future performance of the New England GA airport system is clear.

New England Regional Airport System Plan – General Aviation (NERASP-GA)

The New England state aviation officials, in partnership with the FAA, are currently conducting a study of the GA airport system in New England, including primary commercial service airports that service a GA component. This assessment of the New England GA airport system will provide state aviation officials with a common understanding of their state airport system in relation to the New England region as a whole. Assisted by this information, the FAA will be better positioned to make decisions regarding priority capital investments. Moreover, the NERASP study proved that the geographic boundary of the New England region, as well as its cultural identity, makes an overall study of New England an effective planning approach. Information on the NERASP-GA study can be found at <http://www.nerasp-ga.com>.

Conference of New England Governors and Eastern Canadian Premiers

The Conference of New England Governors and Eastern Canadian Premiers (NEG/ECP) is a formally established body that coordinates regional policy programs in the areas of economic development, transportation, environment, energy, and health, among others. The NEG/ECP focuses on aviation and intercity passenger rail, particularly in the northeastern coastal mega-region, as part of a larger transportation system that needs modal balance. Efficient use of this multi-state network affects the overall viability of the highway, aviation, freight, and commuter rail transportation networks that serve the region and the nation. Improved planning coordination between airports and intercity passenger rail services and related ground transportation offers the potential to achieve complementary investments in airport and rail capacity and services. MassDOT has a representative on the NEG/ECP Transportation and Air Quality Committee which covers regional transportation issues and infrastructure development, use, and efficiency. The NEG/ECP and other policy decision makers throughout the region have been able to utilize strategies and information developed in the NERASP, which provides a framework for integrated regional aviation policy and planning. This organization serves an important function to help achieve a greater balance between air, rail, and auto trips, and ultimately help to increase overall transportation capacity without overburdening Logan Airport and the New England aviation system.

In 2011, the NEG/ECP passed a resolution on transportation which provided direction on enhancing alternative-fuel vehicle infrastructure in the region, increasing multi-modal transportation options, and improving freight and passenger rail networks.²⁷

Regional Rail Transportation Initiatives

This section reports on recent developments and current rail service originating in Boston, the status of air-rail linkages in the Northeast Corridor, and the expanding Pilgrim Partnership, which provides commuter rail between Massachusetts and Rhode Island.

27 Conference of New England Governors and Eastern Canadian Premiers. Resolution 35-4, "Resolution Concerning Transportation". July 11, 2011.

Amtrak Northeast Corridor

Amtrak's NEC is an intercity rail line that operates between Boston-South Station and Washington, DC via New York City. Other major destinations served by the route include Providence, RI; New Haven, CT; Philadelphia, PA; and Baltimore, MD. Logan Airport passengers can connect directly to Boston-South Station via Silver Line bus rapid transit (BRT) service or via taxi. Amtrak operates two services between Boston and Washington, DC: the Acela Express (high-speed, limited-stop service) and the Northeast Regional (lower-speed service that makes local stops along the route). Travel times on the Acela Express range from 3.5 hours from Boston to New York to just over 6.5 hours from Boston to Washington, DC. Travel times on the Northeast Regional range from about 4.25 hours from Boston to New York to approximately 7.75 hours from Boston to Washington, DC. A total of 19 daily departures are offered from Boston-South Station to Penn Station in New York, of which about half are Acela Express. Most trips continue south to Washington, DC, and a smaller number of Northeast Regional trains continue further south to Newport News, Virginia.

System-wide Amtrak ridership was 30.9 million one-way trips in Fiscal Year 2014, an increase of 0.2 percent over Fiscal Year 2013. The NEC represented about 36 percent of total system-wide Amtrak ridership. In Fiscal Year 2014, the NEC carried 11.6 million passengers for a total increase of 3.3 percent (0.2 million passengers) over the number of passengers in 2013 (11.4 million). In 2014, Acela Express accounted for 3.55 million passengers, while the Northeast Regional accounted for 8.08 million passengers. Overall NEC ridership reached a new record in 2014, matching and surpassing the previous 2008 peak of 10.9 million passengers and up significantly from 8.4 million in 2000. Amtrak's share of the Northeast total passenger market has increased substantially since the introduction of Acela Express service in 2000.

Recent forecasts of Amtrak ridership along the NEC indicate that ridership could reach 17.4 million passengers in 2020, 26.2 million passengers in 2030, and expand to 43.5 million passengers in 2040. This forecast indicates that the substantially reduced travel times of high-speed rail transportation would become more attractive along the NEC.²⁸

Northeast Corridor Infrastructure Master Plan and Next-Generation High Speed Rail Plan

The *Northeast Corridor Infrastructure Master Plan*, a new regional rail planning study, was released in May 2010. The Master Plan documents NEC growth needs through 2030, including expanded capacity and improvements in Boston-New York and New York-Washington intercity travel times. A 76 percent increase in rail ridership from 13 million to 23 million²⁹, a 36 percent increase in train movements from 154 average weekday to 210 average weekday, and the need for \$52 billion in additional capital investment is expected over the next 20 years. Amtrak is currently preparing a future plan for the Northeast Corridor. This is being evaluated in a Tier 1 Draft Impact Statement which is expected to be completed at the end of 2015.

To follow up on the release of the Northeast Corridor Infrastructure Master Plan, Amtrak also unveiled a Next-Generation High-Speed Rail proposal in September 2010 titled *A Vision for High-Speed Rail in the Northeast Corridor*. The proposal outlines a brand-new 426-mile two-track corridor running from Boston to Washington, offering high-speed rail service with sustained maximum speeds of 220 mph. The route would allow for an 84-minute trip time between Boston and New York and a three-hour trip time between Boston and Washington. Under this Next-Generation high speed rail plan, the New York City – Boston market would see a further shift from auto and air to rail due to the dramatic improvements in rail travel times, and it projects that the air market between the two city-pairs to be nearly eliminated by 2050.³⁰ This plan states that traveler's shift to high speed rail would reduce delays on competing modes (air and auto) and the shift away from

28 "The Amtrak Vision for the Northeast Corridor: 2012 Update Report." Amtrak. July 2012.

29 Includes ridership on Amtrak and state rail lines, but excludes ridership on commuter rail lines.

30 "A Vision for High-Speed Rail in the Northeast Corridor" Amtrak September 2010, Page 21.

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shorter and smaller intraregional flights would free up air transport capacity for higher-value transnational and international flights.³¹

An update to the *Northeast Corridor Infrastructure Master Plan* and *A Vision for High-Speed Rail in the Northeast Corridor* was released in July 2012. Since these two documents were released, the two programs have been integrated into a single coherent service and investment program, called the Northeast Corridor Capital Investment Program. The Northeast Corridor Capital Investment Program would advance the near-term projects outlined in the Master Plan to benefit the NEC while incrementally phasing improvements to the Acela Express high-speed service to support the next-generation high-speed rail proposed.³² The near-term NEC improvements are identified to occur between 2012 and 2025 and the long-term Next-Generation High-Speed Rail improvements are identified to occur between 2025 and 2040. The publication of the 2012 update is the first step in “improving the NEC for all users in order to sustainably support the population and economic growth facing the Northeast over the next 30 years” but a considerable amount of additional planning work is required by all stakeholders.³³

In 2011, the U.S. DOT awarded Amtrak and the New York State DOT \$745 million for two high-speed rail projects on the NEC. A major upgrade to tracks and overhead wires will be conducted along a 24-mile stretch in New Jersey, allowing for an improvement in Acela Express train speeds from 135 mph today to 160 mph. Improvements to the Harold railroad interlocking in Queens, NY will also be completed, eliminating delays and reducing commuting time for Amtrak riders.

Boston-South Station Expansion

In support of the Northeast Corridor Capital Investment Program, MassDOT is currently designing and planning to expand of Boston-South Station to meet the infrastructure and capacity needs of the NEC. At present, South Station operates above its design capacity for efficient train operations and orderly passenger queuing. Operating with only 13 tracks, South Station constrains the current and future rail mobility within Massachusetts and through New England and the NEC.³⁴ The proposed expansion of South Station will result in the following benefits to rail mobility:³⁵

- Improve the performance of existing and future high-speed and intercity passenger rail service to and from Boston. Today’s NEC on-time performance is approximately 85 percent for Acela Express and 75 percent for Northeast Regional trains. The 2030 target for on-time performance is 95 percent for Acela Express and 90 percent for Northeast Regional. Without expanding South Station and its support facilities, not only will these targets be missed, but on-time performance will deteriorate even further.
- Enable growth in high-speed and other intercity passenger rail service in the northeastern U.S., at a time when both the roadway and aviation networks are at or over capacity.
- Support sustainable economic growth and improved quality of life in NEC metropolitan areas, including Boston.
- Support a more attractive and increased Massachusetts Bay Transportation Authority (MBTA) Commuter Rail service, with associated benefits such as increased statewide transportation access, environmental sustainability, and improved personal mobility.

31 “A Vision for High-Speed Rail in the Northeast Corridor” Amtrak September 2010, Page 21.

32 “The Amtrak Vision for the Northeast Corridor: 2012 Update Report.” Amtrak. July 2012.

33 *Ibid.* pg. v.

34 “Boston South Station High Speed Intercity Passenger Rail Expansion Project.” Massachusetts Department of Transportation. August 6, 2010.

35 Massachusetts Department of Transportation. “South Station Expansion Project Website.” <http://www.massdot.state.ma.us/southstationexpansion/Home.aspx>. Accessed August 2, 2012.

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For the South Station track expansion to be implemented as currently conceived by MassDOT, the existing U.S. Postal Service (USPS) General Mail Distribution Facility located adjacent to South Station must be relocated. The USPS has undergone a national study of its facilities for streamlining and consolidation. While that process is still continuing, it is currently assumed that the USPS facility will remain in its current location and thus needs to be relocated for track expansion to occur. Massport has worked cooperatively with MassDOT, the MBTA and the USPS to identify a site on Massport property in South Boston that could be the recipient site of a relocated USPS facility should that become necessary. The project is currently undergoing MEPA review.

Commuter Rail Services


The Pilgrim Partnership is an arrangement between the MBTA and the Rhode Island Department of Transportation (RIDOT), under which RIDOT allocates some of its federal funding to the MBTA in return for commuter rail service to Boston from Rhode Island. Sixteen daily round-trips are provided between Boston and Providence. Expanded commuter rail service to T.F. Green Airport in Warwick, RI was introduced in December 2010. Travel time between Boston and Warwick is approximately 1.25 hours, and 10 of the 16 daily Boston-Providence departures currently continue on to Warwick. Expanded service to Wickford, RI commenced in 2012, with an eventual extension to Kingston, RI also planned. RIDOT has initiated design and environmental permitting for Barnum Station in Kingston, RI.

The extended commuter rail enhances ground access options from the Boston metropolitan area to T.F. Green Airport. The passenger catchment areas of T.F. Green Airport and Logan Airport overlap, and this new commuter rail service has the potential to attract passengers in the overlapping catchment area living along the Providence/Stoughton MBTA commuter rail line to T.F. Green Airport.

Other Regional Cooperative Planning Efforts

Recognizing that Logan Airport is a substantial trip generator and key transportation resource in the metropolitan area, Massport participates in several interagency transportation planning forums pertaining to enhancing a variety of travel modes.

GreenDOT

 GreenDOT is a comprehensive sustainability initiative with three primary goals: reduce greenhouse gas (GHG) emissions; promote the healthy transportation options of walking, bicycling, and public transit; and support smart growth development. GreenDOT is MassDOT's policy mechanism to achieve the GHG reduction targets set out in the Executive Office of Energy and Environmental Affairs (EEA) GHG reduction plan enabled by the Global Warming Solutions Act of 2008. Massport is fulfilling the intention of GreenDOT by working to reduce GHG emissions associated with surface transportation to the Airport, and by providing more accommodations for walking, bicycling, and public transit. MassDOT's mode shift goal is to triple the current mode share of bicycling, public transit, and walking, each by 2030. Massport supports GreenDOT's smart growth development goal by actively working to improve public transportation in the metropolitan area, a key component of smart growth principles (information on GreenDOT provided at www.massdot.state.ma.us/GreenDOT.aspx).

Massport has participated in an interagency Transportation Sustainability Committee organized by MassDOT, leading up to the development of MassDOT's GreenDOT Implementation Plan. The final GreenDOT Implementation Plan was completed in December 2012 and developed to serve as the framework for embedding the sustainability goals of GreenDOT into the core business and culture of MassDOT. The Implementation Plan captures current MassDOT innovations, leading sustainability policies of the Commonwealth, and national best practices and presents a guide to achieve the sustainability and livability vision of MassDOT.³⁶ The Implementation Plan identifies fifteen sustainability goals organized under seven sustainability themes: Air; Energy; Land; Materials; Planning, Policy & Design; Waste; and Water. These goals work towards decreasing resource use, minimizing ecological impacts, and improving public health outcomes from MassDOT's operations and planning processes.

Healthy Transportation Compact

The Healthy Transportation Compact interagency initiative brings together the state departments of Health and Human Services, Energy and Environmental Affairs, the Commissioner of Public Health, the MassDOT Highway Division and the MassDOT Rail and Transit Division with the intention of facilitating transportation decisions that balance the needs of all transportation users, expand mobility, improve public health, support a cleaner environment and create stronger communities. Actions include facilitating better accommodations for those with mobility limitations; increasing opportunities for physical activities; increasing bicycle and pedestrian travel through additional, safer, and better connected bicycle and pedestrian infrastructure; a statewide complete streets policy; implementing health impact analyses for transportation decisions; and the federal Safe Routes to School program.

Massport activities at Logan Airport will support the Healthy Transportation Compact through its ongoing development of the Southwest Service Area and North Cargo Area. The projects include an improved pedestrian environment for employees, neighborhood residents, and visitors. Streetscape improvements and new pedestrian and bicycle routes strengthen connections between the neighborhood, terminals; airport buffers; mass transit and the Harborwalk (a multimodal off-road path); Bremen Street Park and the Greenway Connector; as well as the Logan Office Center and the on-Airport shuttle bus. Pedestrian actuated crossings are planned at signalized intersections along Harborside Drive and sidewalks provided along Harborside Drive, Jeffries Street, and Porter Street. Midblock crossings or crosswalks at unsignalized intersections will consider street and pedestrian level lighting, as well as advanced warning signs and/or systems, as necessary. As described previously, bicycle access and parking is planned in secured locations for public and employee use.

South Boston Waterfront Transportation Plan

Massport, the City of Boston, Massachusetts Department of Transportation, and the Massachusetts Convention Center Authority, all participated in and manage the new sustainable transportation plan for the South Boston Waterfront. The resulting Plan, featuring an unprecedented collaboration of the private and public sectors, is a blueprint for improving the growth of the Waterfront, proposing real solutions to meet the growing and changing transportation needs of the district, improve the public realm of the area, all while preserving the quality of life for the surrounding neighborhoods.

The Plan benefitted from the input of area stakeholders through five community meetings and more than 50 outreach meetings throughout the process. We see its completion as the beginning of continued collaboration to refine and implement Plan recommendations.

³⁶ "Draft GreenDOT Implementation Plan." Massachusetts Department of Transportation. June 2012.

Boston Metropolitan Planning Organization (Boston MPO)

Massport supports multimodal transportation planning and improving integration with its facilities through its permanent voting membership on the Boston MPO, providing input on policy and programming decisions.

MPOs are established in large metropolitan areas and are responsible for conducting a federally required cooperative, comprehensive, and continuous metropolitan transportation planning process. Based on this planning, MPOs determine which surface transportation system improvements will receive federal capital (and occasionally, operating) transportation funds. The Boston MPO's mission is to establish a vision and goals for transportation in the region and then develop, evaluate, and implement strategies for achieving them.

Massport plays an active role on the MPO's decision-making board, participating in policy decisions related to the Long-range Regional Transportation Plan and project programming for the Transportation Improvement Program. The MPO also guides the work conducted by Central Transportation Planning Staff (CTPS) via its Unified Planning Work Program. CTPS are occasionally used by Massport to support its ground transportation planning initiatives.

Metropolitan Area Planning Council (MAPC)

Massport is also an ex-officio member of MAPC, which is a regional planning agency serving the people who live and work in Metropolitan Boston. The MAPC mission is to promote smart growth and regional collaboration, which includes protecting the environment, supporting economic development, encouraging sustainable land use, improving transportation, ensuring public safety, advancing equity and opportunity among people of all backgrounds, and fostering collaboration among municipalities. MAPC membership includes 101 municipal government representatives, 21 gubernatorial appointees, 10 state officials (including Massport), and three City of Boston officials. A staff of approximately 40 individuals supports the Council and its Executive Committee of 25 selected members. Massport was not an executive committee member in 2014.

Summary of Regional Long-Range Transportation Planning Efforts

The aim of regional transportation planning efforts is to reduce reliance on Logan Airport, and to provide New England travelers with a variety of viable transportation options. The NERASP study conducted in 2006 has helped to develop the primary commercial airport system in New England in order to support these benefits. Meanwhile, the NEG/ECP works to coordinate the highway, aviation, freight, and commuter rail transportation networks. Rail service such as the Amtrak Northeast Corridor and proposed improvements such as the Boston-South Station Expansion, also help to balance the passenger load among various forms of transportation. Other supporting planning forums include GreenDOT, the Healthy Transportation Compact, and Boston MPO.

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Ground Access to and from Logan Airport

Introduction

This chapter describes Massport’s achievements in diversifying and enhancing ground transportation options (for passengers and employees) to minimize impacts to the transportation system and environment, while providing air passengers with as many alternatives as possible for convenient travel to and from the Airport. Massport’s comprehensive ground transportation strategy is designed to maximize transit and shared-ride options for travel to and from Logan Airport and minimize vehicle trips by providing convenient transit, shuttle, and pedestrian connections at the Airport.

In addition to highlighting recent changes to ground transportation services, operations, and pricing, this chapter reports on ground access conditions and activity levels in 2014, which are compared to past conditions. Activity levels include measures of ridership, traffic volumes, and parking demand and its impacts under Logan Airport’s constrained parking supply.¹

Despite Massport’s industry-leading efforts promoting and providing high occupancy vehicle (HOV)/ shared-ride mode use, private passenger vehicle trips continue to increase with growth in air travel. As Logan Airport air traveler numbers have increased, a constrained parking supply at Logan Airport has resulted in an increase in “pick-up/drop-off” vehicle trips. The greater number of vehicle trips means increasing vehicle miles traveled (VMT) and attendant emissions – the opposite effect of what the Logan Airport Parking Freeze² regulation was intended to achieve.

Massport remains concerned that a constrained parking supply at the Airport will continue to cause an increase in both vehicle trips and curbside congestion due to pick-up/drop-off activity by private vehicles. These trips increase automobile emissions both locally and regionally, which is contrary to the intended air quality goals of the Massachusetts State Implementation Plan (SIP).³ As part of its Long-Term Parking

¹ Appendix G, *Ground Access* includes additional figures.

² 310 Code of Massachusetts Regulations 7.30 and 40 Code of Federal Regulations 52.1120.

³ The Clean Air Act requires states to develop a general plan to attain and maintain the National Ambient Air Quality Standards (NAAQS) in all areas of the country and a specific plan to attain the standards for each area designated nonattainment for a NAAQS. These plans, known as State Implementation Plans or SIPs, are developed by state and local air quality management agencies and submitted to EPA for approval.

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Management Plan, Massport is considering a series of remedies to minimize increases in this type of pick-up/drop-off activity.

Improving the multimodal connectivity of the Airport can provide traffic and environmental benefits by reducing vehicle trips, miles traveled, and greenhouse gas (GHG) emissions associated with travel to and from Logan Airport. The cost, speed, convenience, safety, and attractiveness of all modes of transportation connecting to the Airport affect how passengers and employees choose among these access modes. Offering a range of multimodal transportation options also reduces transportation costs and improves customer service for air passengers, employees, and other Airport users.

Regional transportation efforts, as they relate to the Airport and planning efforts to diversify transportation options in the New England region (primarily through commuter, passenger, and high-speed rail), are discussed in *Chapter 4, Regional Transportation*.

2014 Ground Access Highlights and Key Findings

- Massport has continued to invest in and operate Logan Airport with a goal of increasing the number of passengers arriving by transit or other HOV/shared-ride modes. Logan Airport continues to rank at the top of U.S. airports in terms of HOV/transit mode share. The 2013 Logan Airport Air Passenger Ground Access Survey found that 28 percent of air passengers use HOV/shared-ride modes to access the Airport. Massport continues to provide and actively promote HOV/shared-ride options to air passengers, including Logan Express bus service, free Silver Line boardings, water shuttle service, and free, frequent shuttle bus service to and from the Blue Line subway station.
- In 2014, VMT on-Airport decreased by 10.5 percent. The substantial decrease in on-Airport VMT is reflective of Massport's efforts to reduce VMT through the opening of the Rental Car Center (RCC), which: (1) consolidated rental car operations to one location; (2) provides one unified rental car shuttle; (3) relocated the taxi and limousine/bus pool closer to terminal area roadways; and (4) included additional improvements to alternative transportation systems. Now that these changes have been made, it is expected that VMT should grow at roughly the same pace as gateway traffic volumes. However, given that gateway traffic volumes grew by 5.3 percent in 2014 and corresponding parking activity grew by only 1.3 percent, trends indicate that vehicle pick-up/drop-off activity (and associated VMT to the Airport) is increasing at a much faster rate.
- Since 2000, the highest average weekday VMT estimated at Logan Airport was in 2007, when VMT was 184,613. Although VMT was estimated at significantly lower levels in 2014 (as discussed below), a direct comparison between values cannot be made. The current VMT model (adopted in 2011) includes a substantially bigger on-Airport study area than the previous model, which was limited to terminal access roads only. Therefore, VMT reduction is potentially understated.
- Massport continued to be in full compliance with the Logan Airport Parking Freeze regulations throughout 2014. Despite an increase in terminal area parking rates on July 1, 2014, daily parking demand more frequently approached the Parking Freeze cap in 2014. Massport is consolidating 2,050 temporary parking spaces in an addition to the West Garage and at the existing surface lot between the Logan Office Center and the Harborside Hyatt. These spaces constitute all remaining spaces permitted under the Logan Airport Parking Freeze.
- As air passenger levels have reached over 30 million, Logan Airport faces real challenges managing demand for on-Airport parking, resulting in a growing number of days in which arriving vehicles are

diverted or moved to non-garage parking areas on (and sometimes off) the Airport. Increases in weekday peak commercial parking demand places additional pressure on roadway and parking operations under the Logan Airport Parking Freeze. In 2014, for example, due to high demand on Tuesdays, Wednesdays, and Thursdays, 30,314 cars were diverted to another garage or lot and 56,634 cars were valeted/stacked (when cars are parked in aisles, have their keys taken, and then are re-parked in empty spaces as they become vacant); this represents over a 50-percent increase since 2013. There were about 40 weeks in which one or more of these measures were put into effect in 2014.

- The constrained parking supply at Logan Airport has led to an increase in the pick-up/drop-off activity at the Airport. Pick-up/drop-off is the least desirable mode choice since it can generate up to four vehicle trips per air passenger trip.⁴ As mentioned above, Massport is considering options to address this situation.

Ground Transportation Modes of Access to Logan Airport

For the purposes of tracking ground-access mode share over the years, Massport defines the following modes:

HOV (Shared-Ride) Modes

- Public transit (Blue Line rapid transit, Silver Line bus rapid transit, MBTA bus, and water transportation);
- Logan Express scheduled bus service;
- Scheduled buses and vans;⁵
- Courtesy shuttle buses;
- Charter buses; and
- Unscheduled private limousines and vans.

Non-HOV (Automobile) Modes

- Private Autos;
- Taxis (regardless of the number of passengers in a vehicle); and
- Rental Cars.

⁴ For example, if an air passenger is dropped off by a friend when they depart on an air trip and is picked-up by a friend when they return, that single air passenger generates a total of four ground-access trips: two for the drop-off trip (one inbound to Logan Airport, one outbound from Logan Airport) and two for the pick-up trip (one inbound to Logan Airport, one outbound from Logan Airport).

⁵ Includes ride-booking services such as Uber and Lyft.

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Although private automobiles, taxis, and rental cars often carry multiple occupants, they are not categorized as HOV modes.⁶ The *Ground Access Planning Considerations* section later in this chapter includes further discussion of the Logan Airport HOV mode share goal.

Massport has been rethinking the relationship between the different ground access modes and focusing on the trip generation associated with these modes. Air passengers have three major options for getting to Logan Airport: (1) transit, HOV or shared-ride service; (2) drive to Logan Airport and park; or (3) pick-up/drop-off mode, which can involve a private vehicle, taxi, limousine or taxi alternative. In this categorization, the major “modes” are:

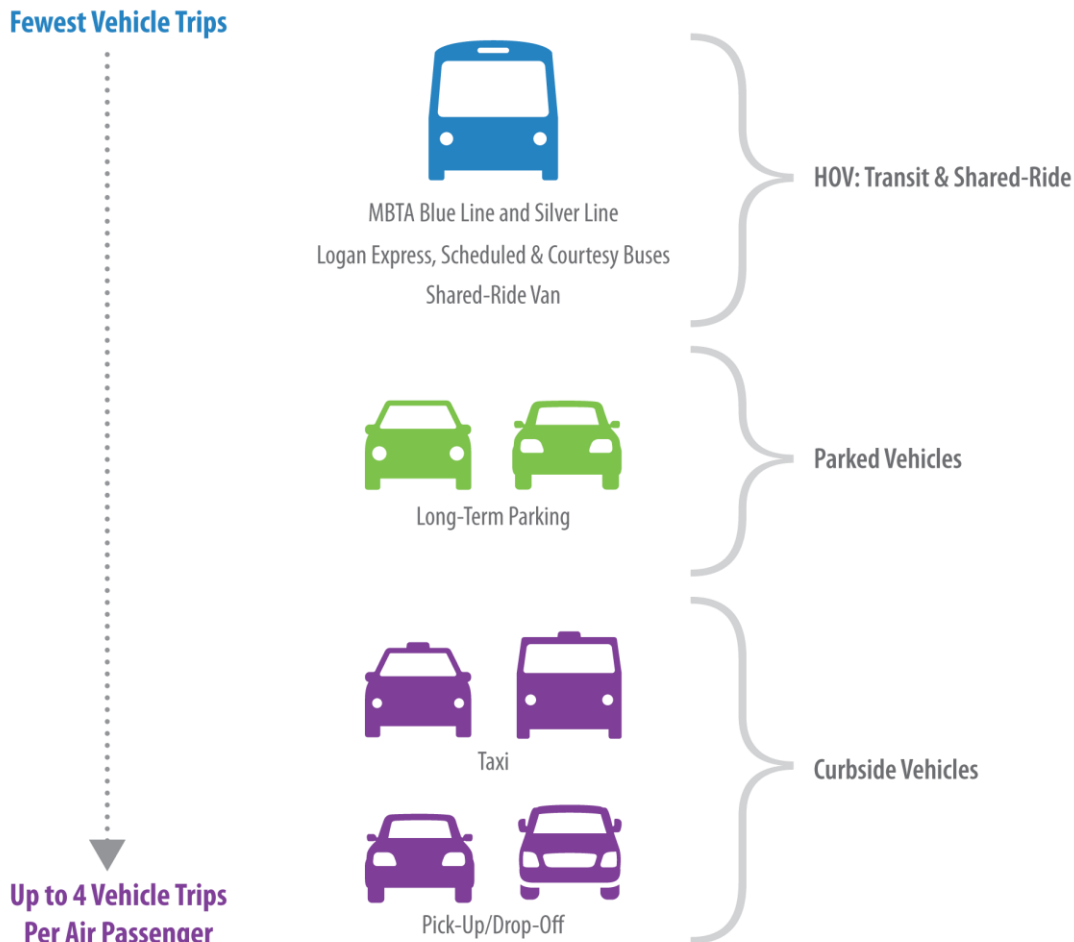
- Transit and shared-ride:
 - MBTA services (Blue Line, Silver Line);
 - Massport services (Logan Express); and
 - Private operators (scheduled coach express bus, shared-ride vans, courtesy shuttles).
- Private vehicles that are parked for the duration of the trip.
- Vehicles that drop-off or pick-up passengers at the terminal curbs, but do not remain on-Airport:
 - Private vehicles that do not park for the duration of a passenger’s trip;
 - Taxicabs; and
 - “Black car” limousines.

As noted in Figure 5-1, transit and shared-ride modes are designed for use by more than one travel party (or multiple travelers). With a higher occupancy, the Airport vehicle trips per passenger for the transit and shared-ride modes is quite low. Private vehicles that park at the Airport (or an off-Airport lot), generate a single vehicle trip to the Airport for the departing passenger (and a single vehicle trip from the Airport for the arriving passenger). Vehicles that do not remain on the Airport for a passenger’s trip duration, such as those private vehicles that have dropped off a passenger at the curb, generate a trip to and a trip from the Airport for a departing passenger. In the case of taxicabs and black car limousines, many of them depart Logan Airport empty after dropping off a passenger. As Figure 5-1 shows, when measured in terms of vehicle trips generated, the most environmentally desirable mode is transit/HOV/shared-ride, followed by drive-and-park, with the least desirable mode being pick-up/drop-off.

⁶ The 2013 Logan Airport Air Passenger Ground Access Survey indicates that the average occupancy of these automobile modes (private automobiles, taxis, and rental cars) is 1.9 persons per vehicle, indicating that Massport is somewhat conservative in the calculation of HOV/SOV split. The HOV mode share goal is based on modal categories and not on actual vehicle occupancy.

Figure 5-1 Ground-Access Mode Choice Hierarchy

Hierarchy of Ground-Access Mode Choices (Based on Vehicle Trips per Passenger)



Note: Short-term parking is included under "pick-up/drop-off"

On-Airport Vehicle Traffic: Volumes and Vehicle Miles Traveled (VMT)

This section reports on Logan Airport’s traffic-related activity for 2014, specifically:

- Traffic volumes
- VMT calculations

Central to these components is Massport’s leadership in and commitment to developing, promoting, and providing alternative means of ground transportation for access to and from Logan Airport. The diverse range of environmentally-responsible transportation modes to access the Airport by air travelers, employees and other Airport users has reduced reliance on automobile travel, thus reducing traffic congestion and contributing to improvements in air quality. Figure 5-2 shows the roadway infrastructure at Logan Airport in 2014.

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Gateway Traffic Volumes

Gateway roadways are defined as access points to/from Logan Airport, which include the Route 1A roadway ramps, Ted Williams Tunnel (TWT) (Interstate 90) ramps, Frankfort Street/Neptune Road, and Maverick Street.

Data Collection and Annual Average Daily Calculation Method

All of the Airport’s gateway roadways are now equipped with permanent traffic count stations, as part of the Airport-wide Automated Traffic Monitoring System (ATMS). These stations provide data to calculate:

- AADT, annual average daily traffic;
- AWDT, annual average weekday daily traffic; and
- AWEDT, annual average weekend daily traffic.

Since the data are collected continuously throughout the year, seasonal adjustment factors are only necessary when significant gaps in the data occur (typically due to equipment failure/malfunction or construction activity). When seasonal adjustment factors are used, these are based on a combination of the seasonality (monthly variation) of counts from other ATMS stations, air passenger levels, and parking exits. On occasion, traditional automated traffic recorder (ATR) counts are collected to supplement the ATMS data.

Annual Average Daily Activity Levels

Table 5-1 summarizes the daily gateway traffic volumes at Logan Airport for the years 2009 through 2014. It includes AADT, AWDT, AWEDT, and annual air passengers, for reference.

The AADT entering and departing Logan Airport via its gateway roadways increased by 5.3 percent between 2013 and 2014. The change in average daily traffic can be attributed to:

- A 4.7-percent increase in air passenger activity in 2014;
- A 5-percent increase in taxi dispatches in 2014; and
- A 1.3-percent increase in parking activity (exits) in 2014.

Year	AADT		AWDT		AWEDT		Annual Air Passengers	
	Volume	Percent Change	Volume	Percent Change	Volume	Percent Change	Level of Activity	Percent Change
2010	94,179	5.1%	98,968	5.7%	82,595	4.7%	27,428,962	7.5%
2011	99,449	5.6%	104,863	6.0%	85,879	4.0%	28,907,938	5.4%
2012	99,281	(0.2%)	104,439	(0.4%)	86,494	0.7%	29,235,643	1.5%
2013	102,771	3.5%	107,656	3.1%	90,822	5.0%	30,218,631	3.4%
2014	108,172	5.3%	113,564	5.5%	94,881	4.5%	31,634,445	4.7%

Source: Massport
 Notes: Numbers in parentheses () represent negative numbers.
 AADT Annual average daily traffic.
 AWDT Annual average weekday daily traffic.
 AWEDT Annual average weekend daily traffic.

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Historically, the highest AADT recorded at Logan Airport was in 2007, when AADT was 110,690; AWDT was 119,200; and AWEDT was 91,320. These gateway traffic volumes corresponded to an annual air passenger level of 28,102,455 passengers. These values are 2 to 5 percent lower than current on-Airport traffic volumes despite an almost 12.6-percent increase in passenger levels from 2007 to 2014.

On-Airport Vehicle Miles Traveled (VMT)

On-Airport VMT is calculated as the total number of miles traveled by all vehicles within the Logan Airport roadway system. VMT is an important metric because it is used to calculate motor vehicle air quality emissions, and it is one indication of the traffic levels on roadways within specific areas and at specific times.

Calculation Method and Model Description

In 2011, Massport began using its on-Airport VISSIM⁷ model to estimate VMT. This model can be adapted to reflect changes in the evolving Logan Airport roadway transportation network and is more robust than the previous model developed in 1994 and based on the prior terminal roadway system. The VISSIM model was developed for a larger study area than the original VMT model, which only focused on the major Airport gateways, the circulation roadways, and the terminal areas. The VISSIM model now accounts for a larger on-Airport study area from Lovell Street and the North Cargo Area (NCA) to Harborside Drive and the South Cargo Area (SCA), and includes the Southwest Service Area (SWSA). The overall VMT growth due to the slightly larger study area is negligible. The study area of the VISSIM model roadway network can be found in *Appendix G, Ground Access*. The VISSIM model not only estimates VMT associated with curbside activity and parking, but also with Logan Airport operations, rental car activity, and hotel activity.

The model was modified for 2014 to include the following changes:

- The addition of the RCC building and associated roadway infrastructure;
- The relocation of the taxi and bus/limo pools; and
- Curbside reallocations at all terminals in support of the RCC.

These modifications changed vehicle routes, eliminated individual rental car vendor shuttles, and added a unified shuttle to RCC and Airport Station. While the RCC was open and fully operational throughout 2014, some of the related changes (such as relocation of the taxi and bus/limo pools) were not made until the end of the year. Reallocation of annual average volume data, particularly in the NCA, were estimated to reflect the full set of modifications.

The model was calibrated to existing evening (PM) peak hour volume data to improve the accuracy of the results. Adjustment factors were determined to calculate morning, highest 8-hour, and average weekday VMT from the updated VISSIM model. The adjustment factors for the 2014 VMT calculations were determined by using 2011 to 2014 gateway, Airport roadway, and parking volume averages. Tables provided in *Appendix G, Ground Access* compare existing and simulated traffic volumes at Logan Airport for the 2014 condition.

7 PTV America. (2011). *Verkehr In Städten Simulationsmodell- VISSIM version 5.40* [computer software]. Portland, OR.

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Estimated VMT Calculations and Modeling Results

Consistent with previous years, the following specific time periods were analyzed for 2014:

- Morning peak hour (AM Peak Hour);
- Evening peak hour (PM Peak Hour);
- Highest consecutive 8-hour (High 8-Hour); and
- Average AWDT.

Table 5-2 summarizes the VMT estimates for Logan Airport-related traffic from 2010 through 2014. From 2013 to 2014 the VMT decreased by 10.5 percent, despite a 5.5-percent increase in AWDT. Since 2010, the weekday VMT has decreased by 2.7 percent, while air passenger and traffic volume grew by 15.3 percent and 14.8 percent, respectively, for the same time period. The decrease in VMT is reflective of Massport’s efforts to reduce VMT by consolidating rental car operations to one location (on-Airport in the SWSA); eliminating each rental car vendor shuttle and providing one unified shuttle; relocating the taxi and limousine/bus pool closer to terminal area roadways; and additional improvements to alternative transportation systems. Now that these operational changes have been made, it would be expected that VMT would grow at the same pace as gateway traffic volumes. However, given that gateway traffic volumes grew by 5.3 percent in 2014 and corresponding parking activity grew by only 1.3 percent, trends indicate that pick-up/drop-off activity (and associated VMT) is increasing at a much faster rate.

Details of the 2014 VMT modeling results are presented in *Appendix G, Ground Access*.

Analysis Year	AM Peak Hour	PM Peak Hour	High 8-Hour	Average Weekday	Average Weekday Percent Change
2010 (VMT model)	8,451	10,887	78,185	162,885	4.8%
2011 (VISSIM model)	8,391	10,978	76,920	167,647	2.9%
2012 (VISSIM model)	8,387	10,974	76,883	167,564	(0.05%)
2013 (VISSIM model)	9,006	11,407	80,088	177,094	5.7%
2014 (VISSIM model)	8,155	10,107	71,361	158,443	(10.5%)

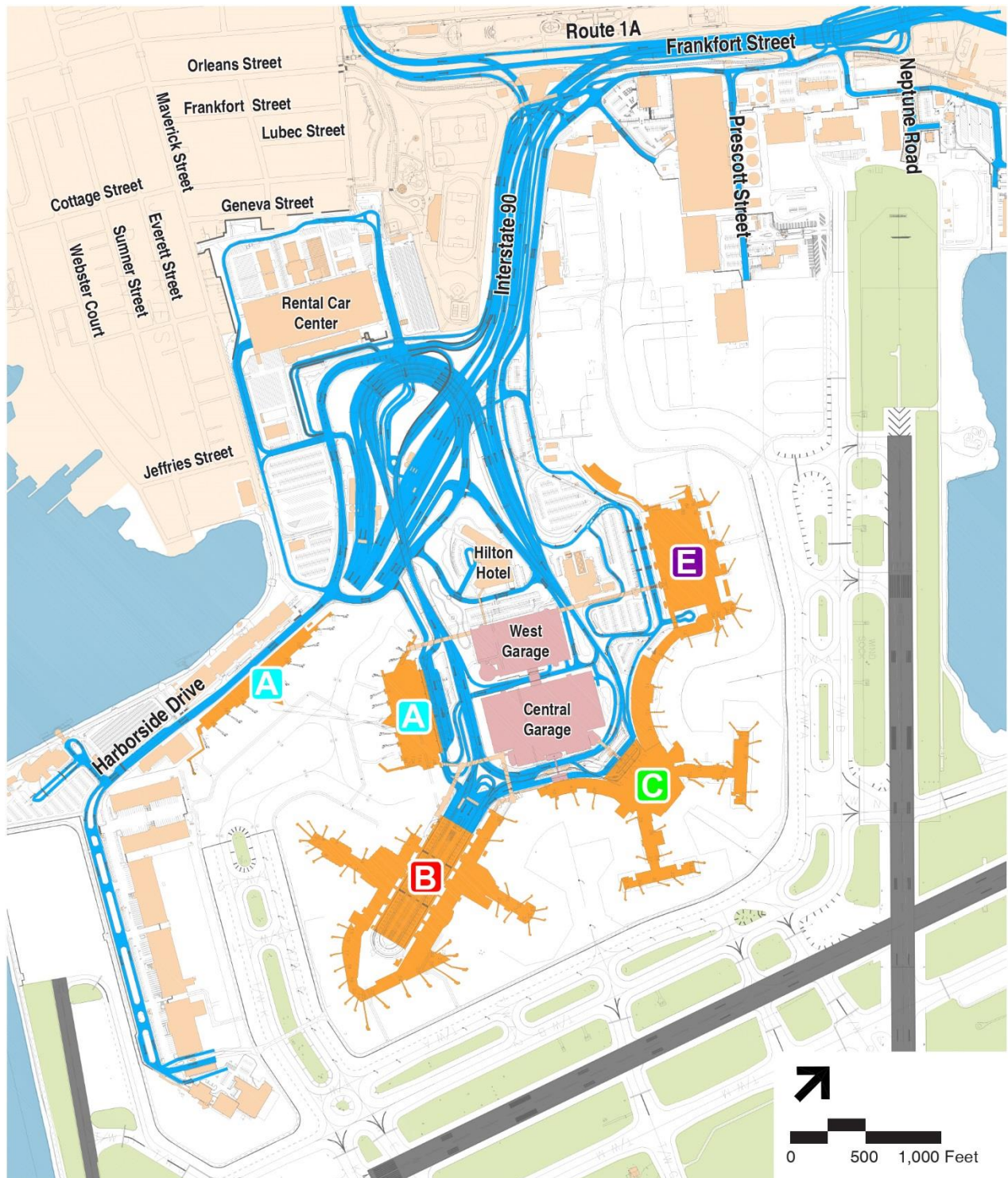
Source: VHB and Massport.

Note: Numbers in parentheses () represent a reduction in VMT.

As discussed above, the 10.5-percent decrease in VMT can be attributed to the addition of the RCC, relocation of the taxi and bus/limo pools, and terminal curbside reallocations in support of the unified shuttle.

Since 2000, the highest average weekday VMT estimated at Logan Airport was in 2007, when VMT was noted to be 184,613. Although VMT was estimated at significantly lower levels in 2014, a direct comparison between values cannot be made. The current VMT model (adopted in 2011) includes a substantially bigger on-Airport study area than the previous model, which was limited to terminal access roads. Therefore, VMT reduction due to the infrastructure improvements Massport has invested in over the past 15 years is potentially understated.

Figure 5-2 Logan Airport Roadway Network, 2014



Parking Conditions

This section reports on Massport’s monitoring and management of:

- On-Airport parking conditions, including parking facilities and supply, demand, and parking rates; and
- Parking programs (including preferred parking for hybrid vehicles).

Massport manages the on-Airport parking supply at Logan Airport to: (1) promote long-term rather than short-term parking (thus reducing the number of daily trips to Logan Airport); (2) support efficient utilization of parking facilities; (3) provide good customer service; and (4) comply with the provisions of the Logan Airport Parking Freeze. Details on current conditions are presented in the following sections.

Logan Airport Parking Freeze⁸

The number of commercial and employee parking spaces allowed at Logan Airport is regulated by the Logan Airport Parking Freeze (310 Code of Massachusetts Regulations 7.30), which is an element of the Massachusetts State Implementation Plan (SIP) under the Federal Clean Air Act (42 U.S.C. §7401 et seq. [1970]). As required, Massport submits semi-annual filings to the Massachusetts Department of Environmental Protection (MassDEP) demonstrating Massport’s compliance with the Logan Airport Parking Freeze. The reports for March and September of 2014 are provided in *Appendix G, Ground Access*.

The Logan Airport Parking Freeze sets an upper limit to the supply of commercial and employee parking spaces at Logan Airport. As permitted (and encouraged) by the Parking Freeze provisions, Massport has converted employee spaces to commercial spaces, within the overall limit imposed by the Parking Freeze. As explained in Table 5-3, Massport has also transferred Airport-related park-and-fly spaces from the East Boston Parking Freeze⁹ to the Logan Parking Freeze. Table 5-3 presents the total number of parking spaces permitted on-Airport and the allocation of those spaces as between commercial and employee spaces.

Under the Parking Freeze regulations, Massport must monitor the number of commercial and employee vehicles parked on-Airport and ensure that the total numbers of parked commercial and employee vehicles do not exceed the Parking Freeze limits. If the number of commercially parked vehicles exceeds the allocated commercial parking limit under the freeze on any day, those additional vehicles are considered to be using “Restricted Use Parking Spaces.” Use of Restricted Use Parking Spaces is allowed under the regulation when Logan Airport experiences “extreme peaks of air travel and corresponding demand for parking spaces” and may be made available for use only at such times, up to ten days in any calendar year, and must be provided free of charge when demand exceeds the limit. Additional information on parking demand and conditions under constrained parking is provided later in this section.

⁸ 310 Code of Massachusetts Regulations 7.30 and 40 CFR 52.1120.

⁹ 310 Code of Massachusetts Regulations 7.31.

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Year	Type of Spaces		
	On-Airport Commercial Spaces	On-Airport Employee Spaces	Total Logan Airport Spaces Permitted
1992 - 1994	12,215	7,100	19,315
1995 - 1997	12,890	6,425	19,315
1998 - 2000	14,090	5,225	19,315
2001 - 2006	15,467	5,225	20,692 ¹
2007 - 2010	17,319	3,373	20,692
2011 - 2012	18,019	2,673	20,692
2012 - 2013	18,265	2,673	20,938 ²
2013 - 2014	18,415	2,673	21,088 ³

Source: Massport.

- 1 In 2000, the Massachusetts Department of Environmental Protection and the U.S. Environmental Protection Agency approved an amendment to the Logan Airport Parking Freeze to permit the transfer of 1,377 spaces relocated from the East Boston Parking Freeze Area to the Logan Airport Parking Freeze Area.
- 2 In July 2012, Massport acquired property at 135B Bremen Street in East Boston, which supported 246 park-and-fly spaces that were in the East Boston Parking Freeze inventory. Massport's relocation of those park-and-fly spaces from the East Boston Parking Freeze Area to the Logan Airport Parking Freeze Area led to a revised Parking Freeze inventory for Logan Airport and East Boston.
- 3 In June 2013, Massport acquired property at 413-419 Bremen Street in East Boston which had 150 park-and-fly spaces that were located within the East Boston Parking Freeze Area. Massport's relocation of those park-and-fly spaces from the East Boston Parking Freeze Area (shifting space allocation to the Logan Airport Parking Freeze Area) led to a revised Parking Freeze inventory for Logan Airport and East Boston.

The intent of the Logan Airport Parking Freeze is to reduce emissions by shifting air passengers to travel modes requiring fewer vehicle trips. However, by constraining parking on-Airport, survey data has consistently shown that constrained parking has the unintended consequence of shifting air passengers to travel modes with a higher number of vehicle trips, despite Massport's extensive efforts to provide and encourage use of HOV travel modes. According to the *2013 Logan Airport Air Passenger Ground Access Survey*, if parking was not an option for passengers who parked on-Airport, three-quarters would use pick-up/drop-off modes (i.e., dropped off or picked up by private vehicles, taxi, or black car/limousine service). Prior surveys of Logan Airport air passengers have consistently shown this same result.

Parking Space Availability Changes

Table 5-4 provides a summary of the Logan Airport commercial parking space inventory.

Daily Parking Occupancy

On-Airport commercial parking occupancy typically peaks mid-week (Tuesday through Thursday) with lower occupancies occurring on other days. The number of vehicles parked at Logan Airport in commercial spaces over the course of any 24-hour period was obtained from parked vehicle count data for Tuesdays, Wednesdays, and Thursdays, which are collected throughout the year. The peak daily parking occupancy data are presented in Figure 5-3.

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Table 5-4 Logan Airport Parking Freeze: Allocation of Commercial Parking Spaces, 2011-2014

Location and Facility	Number of Spaces					Status
	March 2011	March 2012	March 2013	March 2014	March 2015	
Terminal Area						
Central Garage and West Garage	10,375	10,344	10,396	10,267	10,267	
Terminal B Garage	2,380	2,632	2,553	2,254	2,254	
Terminal E Lot 1	269	269	269	275	243	
Terminal E Lot 2	257	257	251	248	248	
Terminal E Lot 3	229	222	222	219	219	
North Cargo Area (NCA)						
Economy Parking Garage	2,880 <i>(+666 in temp. lots)</i>	2,789	2,809	2,809	2,809 <i>(+832 in overflow lots)</i>	
Total in-service revenue commercial spaces	17,056	16,513	16,500	16,072	16,872	Excludes hotel and general aviation (GA) spaces (noted below)
Signature Flight Support (General Aviation)	35	35	35	35	35	
Hotel (Hilton, Hyatt)	505	505	505	505	305	One Hilton lot eliminated for West Garage expansion
Total in-service commercial spaces	17,596	17,053	17,040	16,612	17,212	Includes hotel and GA spaces
Total commercial spaces (Freeze limit)^{1,2}	17,619	18,019	18,265	18,415	18,415	Includes in-service and designated spaces

Source: Massport, Parking Freeze Inventory, March 2011, March 2012, March 2013, March 2014, and March 2015.

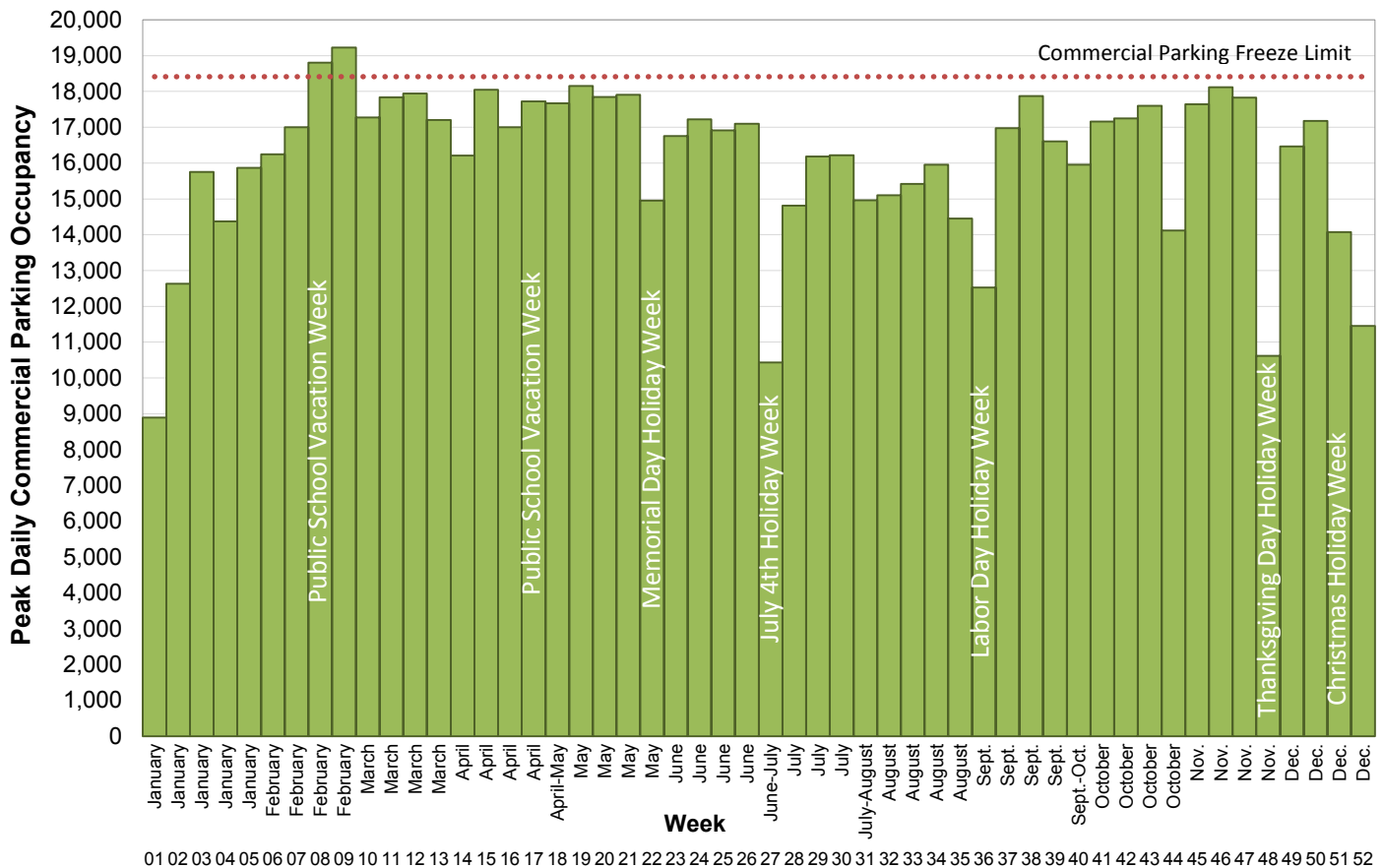
1 In July 2012, 246 spaces were transferred from the East Boston freeze allocation to the Logan Airport Commercial Parking Spaces inventory through the acquisition of Paul's Parking at 135B Bremen Street.

2 In June 2013, 150 spaces were transferred from the East Boston Freeze Area to the Logan Airport Parking Freeze Area through the acquisition of Paul's Parking at 413-419 Bremen Street.

Peak day demand for on-Airport parking has been increasing, resulting in daily demand frequently nearing the Logan Airport Parking Freeze cap (see Figures 5-3 and 5-4). Massport continued to be in full compliance with the Logan Airport Parking Freeze¹⁰ throughout 2014. Massport diverted or valet-parked passenger vehicles 103 out of 260 working days. Vehicle diversions primarily occurred on Tuesdays and Wednesdays, during hours of peak parking demand. Activity in 2014 seems to indicate that peak day parking demand has not dampened despite the July 2014 parking rate increases for on-Airport parking.

¹⁰ 310 Code of Massachusetts Regulations 7.30 and 40 CFR 52.1120.

Figure 5-3 Commercial Parking: Weekly Peak Daily Occupancy, 2014

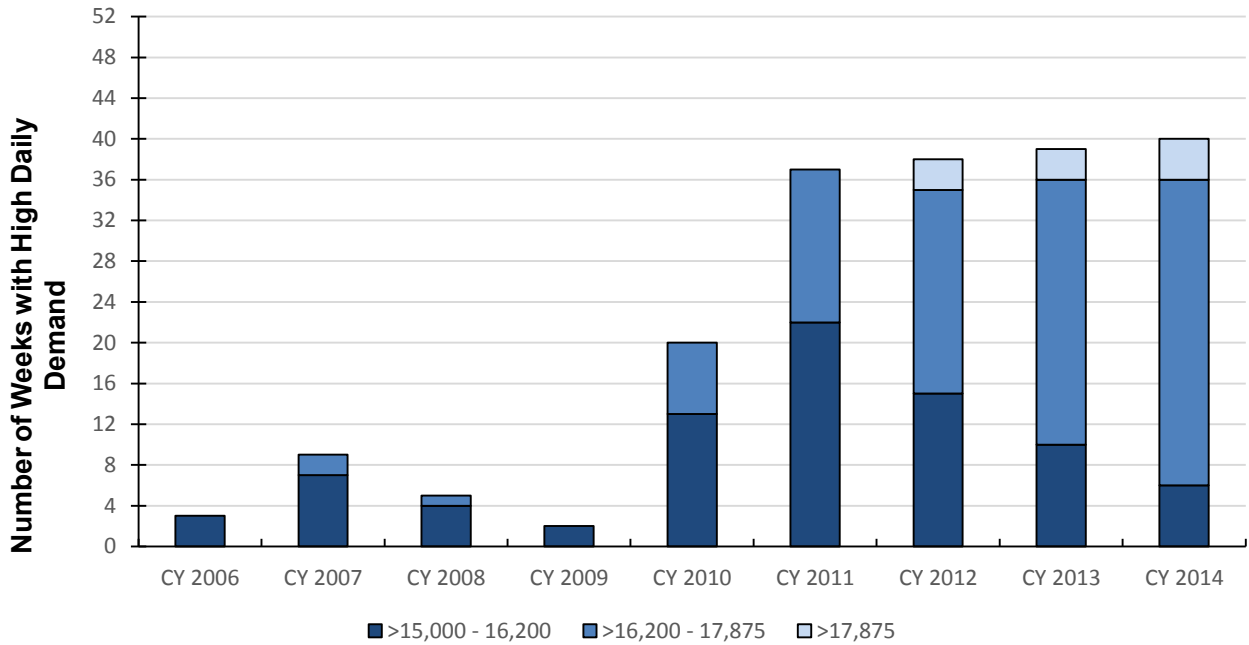


Source: Massport.
 Notes: The chart shows the highest daily count for each week in 2014.
 Since June 2013, the maximum number of commercial parking spaces permitted by the Logan Airport Parking Freeze is 18,415.
 At no time in 2014 did the Parking Freeze limit on Restricted Use Spaces exceed the allowed 10 days. Massport was at all times in full compliance with the Parking Freeze regulations in 2014.

Operational Adjustments to Meet Parking Demand

The inadequate supply of parking causes air passengers to circulate on Airport roadways to find parking, and in overflow conditions, cars are diverted or moved to non-garage parking areas, including overflow lots, some at off-Airport parking locations. Not only does parking demand activity above capacity lower customer service levels, it also increases on-Airport roadway vehicle emissions related to circulating traffic. Diversions and valeting have become a regular occurrence at Logan Airport. These diversions decrease operational efficiency and compromise customer service.

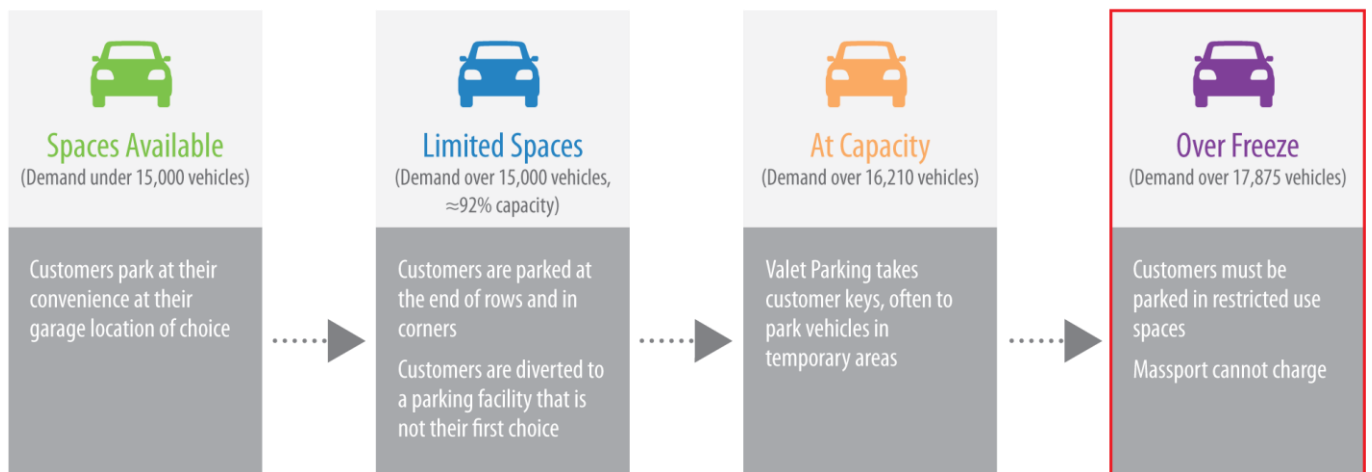
Figure 5-4 Demand for Parking: Number of Weeks per Calendar Year with High Daily Parking Demand



Source: Massport

Figure 5-5 Parking Demand and Capacity

Parking Demand Above Capacity Lowers Customer Service Level and Increases Operating Costs



Source: Massport

Note: 17,875 represents the spaces within the parking freeze allocated to airport users and subtracts hotel and general aviation uses from the commercial parking freeze limit.

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The number of diverted and valeted vehicles has increased significantly over the past several years, approaching 90,000 annually in 2014. These vehicle diversions increase on-Airport VMT. The peak of valet operations coincides with peak parking demand, requiring Airport operations to maximize available space to meet parking demand.

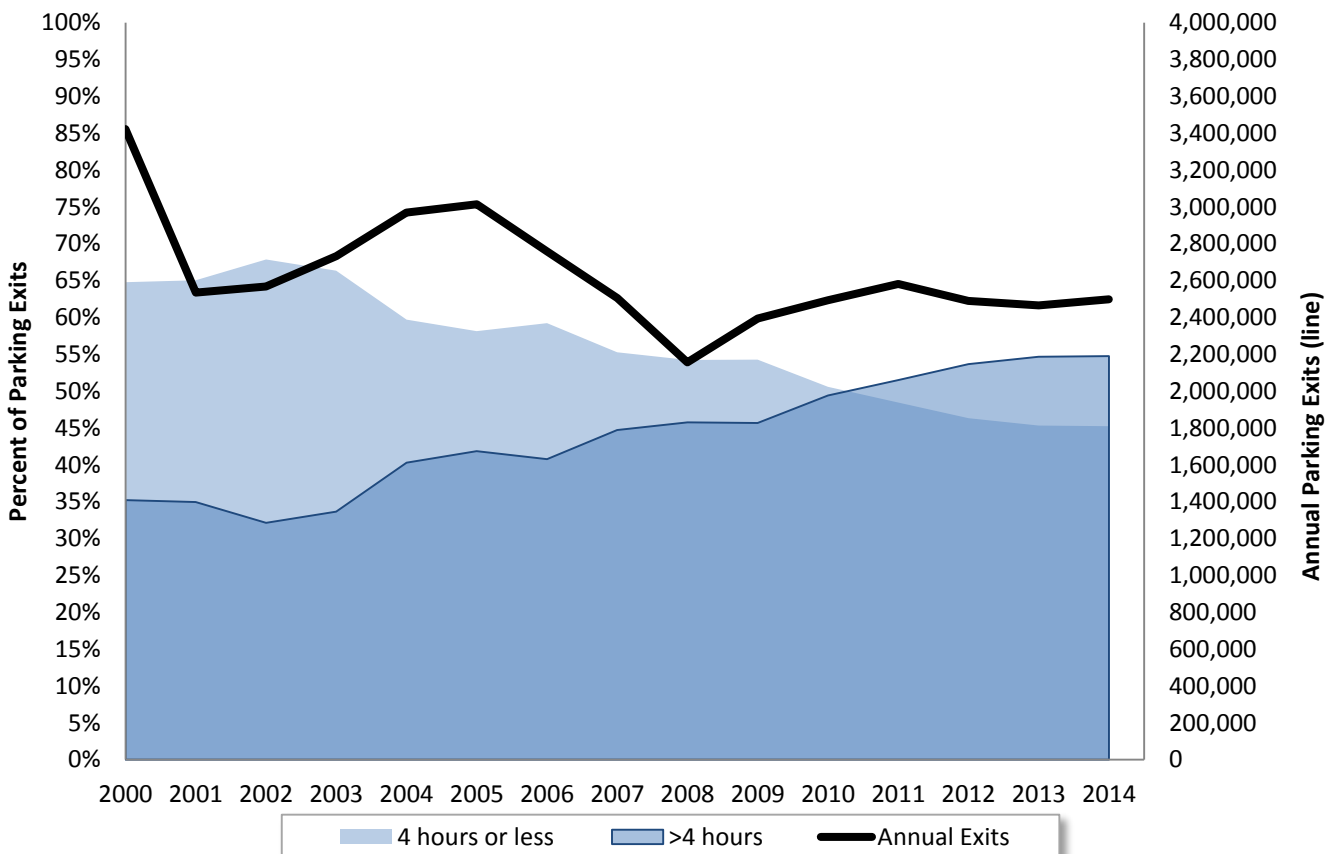
Parking Exits by Duration

Both peak-day parking demand as well as total annual parking activity (as defined by revenue parking exits) have increased since 2013, as presented in Table 5-5. The distribution of parking exits by length of stay have stayed relatively constant between 2014 and 2013, with a 1.3-percent increase since 2013 (Figure 5-6). The trend for the last few years has been to have vehicles generally parked for longer durations than in the past. This increase in parking duration likely contributed to a lower turnover of parking spaces, and therefore resulted in the higher peak days as shown earlier in Figure 5-3.

Table 5-5		Parking Exits by Length of Stay (Parking Duration)				
		0-4 hrs.	>4-24 hrs.	>1-4 days	>4 days	Total
2010	Tickets	1,261,813	230,260	741,706	260,240	2,494,019
	Percent	51%	9%	30%	10%	
2011	Tickets	1,251,956	235,039	800,188	295,270	2,582,453
	Percent	48%	9%	31%	11%	
2012	Tickets	1,153,781	215,028	815,266	305,925	2,490,000
	Percent	46%	9%	33%	12%	
2013	Tickets	1,118,218	209,437	823,187	315,295	2,466,137
	Percent	45%	8%	33%	13%	
2014	Tickets	1,130,560	213,567	830,545	324,332	2,499,004
	Percent	45%	9%	33%	13%	
Percent change – 2013 to 2014		1.1%	2.0%	0.9%	2.9%	1.3%

Source: Massport.

Figure 5-6 Percent of Parking Exits by Duration: Short vs. Long-Term Parking



Source: Massport.

2014 Commercial Parking Rates

One important reason for Massport periodically assessing its parking rate structure is to support its ground access strategy. As detailed in Table 5-6, parking rates in the central parking garage were increased in July 2014, while parking rates for Logan Express remote parking have remained substantially lower than those at Logan Airport. As noted earlier, however, demand for on-Airport parking in the terminal area is not price-sensitive and these parking rate increases have so far failed to dampen parking demand.

With a pay-on-foot system, Massport requires parking fees to be pre-paid at kiosks inside the terminals and garage access points at the pedestrian walkways, thus improving parking exit flow, and reducing vehicle idling and associated emissions at exit plazas. Pay stations are located in the terminals and at the pedestrian entrances to the Central Garage, Terminal B garage, and Terminal E parking lot. Approximately 80 percent of parking patrons use the pay-on-foot system to pre-pay their parking fees before exiting.

Several off-Airport parking facilities, such as PreFlight Airport Parking in Chelsea, are privately owned and operated, and they are outside of the Logan Airport Parking Freeze area. Massport has no control over rates at off-Airport parking lots. The parking rates for the three major off-Airport parking providers (PreFlight, Park Shuttle & Fly, and Thrifty) vary from \$15.95 to \$20.00 for daily parking and from \$96 to \$120 for weekly parking.

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Terminal Area Facility	2010	2011	2012	2013	2014	Economy Parking	2010	2011	2012	2013	2014
Central/West Parking Garage, Terminal B Garage, Terminal E Lots											
						Economy Parking Garage					
0 to 30 minutes	\$3	\$3	\$3	\$3	\$3	Daily Rate	\$18	\$18	\$18	\$18	\$20
31 minutes to 1 hour	\$6	\$6	\$6	\$6	\$6	Additional days 0 to 6 hours	\$9	\$9	\$9	\$9	\$10
1 to 1.5 hours	\$9	\$9	\$9	\$9	\$11	Additional days 6 to 24 hours	\$18	\$18	\$18	\$18	\$20
1.5 to 2 hours	\$12	\$12	\$12	\$12	\$14	Weekly Rate (6-7 days)	\$108	\$108	\$108	\$108	\$120
2 to 3 hours	\$15	\$15	\$17	\$17	\$19						
3 to 4 hours	\$18	\$18	\$21	\$21	\$23						
4 to 7 hours	\$22	\$22	\$25	\$25	\$27						
7 to 24 hours (Daily)	\$24	\$24	\$27	\$27	\$29						
Additional days 0 to 6 hours	\$12	\$12	\$14	\$14	\$15						
Additional day(s) 6 to 24 hours	\$24	\$24	\$27	\$27	\$29						

Source: Massport; most recent rates effective July 1, 2014.

Long-Term Parking Management Plan

As part of its ongoing review of ground access and strategic planning initiatives, Massport has been reviewing recent parking demand trends. That analysis shows that in 2014, Massport diverted or valet-parked private passenger vehicles to various on-Airport locations approximately 103 out of 260 work days. While Logan Airport has experienced diversions in the past, the number of days per year diversions occur has increased over the past several years. As presented in previous EDR/ESPR filings, diverting or valeting cars is inefficient and reduces customer service.

Massport is committed to an aggressive program of ground access and parking management designed to achieve a number of inter-related objectives:

- Minimize the environmental and traffic impacts associated with ground access to Logan Airport;
- Minimize the environmental impacts associated with the operation of Logan Airport;
- Provide excellent customer service to air passengers and others traveling to Logan Airport; and
- Operate the Airport, its road system, and its parking supply as efficiently as possible.

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The Long-Term Parking Management Plan, which was first included in the 2012/2013 EDR, lays out a multi-part strategy for efficiently managing parking supply, pricing, and operations – both at Logan Airport and at Massport-controlled off-Airport locations – to maximize transit/shared-ride ground access while minimizing both drive-and-park and pick-up/drop-off modes. The Plan represents Massport’s current strategy to manage parking pricing, supply, and demand within the current Logan Airport Parking Freeze. Table 5-7 describes each parking plan element and progress to date. Massport is actively working to manage Airport parking and encourage the use of multi-occupant vehicle access to Logan Airport. Additional measures are currently under discussion as part of Massport’s strategic planning efforts.

The focus of the Long-Term Parking Management Plan is limited to setting out the efforts that Massport has undertaken, and will continue to implement in the future, to manage the supply, pricing, and operation of parking that it controls both at Logan Airport and at Massport-controlled off-Airport locations to achieve its ground access objectives.

Table 5-7 Long-Term Parking Management Plan Elements and Progress	
Parking Plan Element	Progress to Date
<p>Parking Supply:</p> <ul style="list-style-type: none"> • Massport will add revenue-controlled parking spaces in the terminal area to bring supply up to the maximum number of spaces allowed under the Logan Airport Parking Freeze • Work to increase the supply of Massport-controlled off-Airport parking at Logan Express sites 	<ul style="list-style-type: none"> • Massport has begun construction of approximately 2,050 additional spaces at the Central Garage with anticipated completion late 2015. This project is consistent with the Logan Airport Parking Freeze and builds out the maximum number of allowed spaces. • A new 1,100 car parking garage opened in Framingham on April 15, 2015, increasing capacity at that location by approximately 600 spaces.
<p>Parking Pricing:</p> <ul style="list-style-type: none"> • Discourage air passengers from driving and parking at Logan Airport by ensuring that the least expensive Massport-controlled parking will be provided at remote Logan Express sites • Encourage more efficient use of available on-Airport parking by maintaining a meaningful price differential between rates at the Economy Parking Garage and terminal-area parking garages • Evaluate increased parking prices for terminal-area parking to encourage Airport passengers and visitors to consider transit and shared-ride alternatives 	<ul style="list-style-type: none"> • Massport has reduced parking rates at Logan Express facilities, from \$11.00 per day to \$7.00 per day. • Massport has maintained a \$9.00 per day price differential between terminal-area parking garages (\$29.00 per day) and Economy Spaces (\$20.00 per day). • Massport implemented a price increase on July 1, 2014 (\$2.00 per day increase) raising the near-terminal rate to \$29 per day and Economy rate to \$20 per day. The rates are scheduled to increase on July 1, 2016 by \$3.00 per day.

Table 5-7 Long-Term Parking Management Plan Elements and Progress (Continued)	
Parking Plan Element	Progress to Date
<p>Parking Operations:</p> <ul style="list-style-type: none"> • Work to improve the efficiency of its current system of addressing overflow conditions • Continue to explore other options that could reduce the number of days that Logan Airport operates in an overflow condition, such as a parking reservation system 	<ul style="list-style-type: none"> • To improve the valet operation, Massport will be implementing an automated valet system September 2015.
<p>Parking Demand:</p> <ul style="list-style-type: none"> • Increase alternative mode options to decrease use of private vehicles 	<ul style="list-style-type: none"> • Implemented new Back Bay Logan Express scheduled bus service in May 2014. • Offered discounted parking and bus fares at all Logan Express locations during peak air travel periods. • Placed signage in all terminals to help promote the use of the regional express bus carriers. <p>Massport supports free outbound Silver Line bus service and allows free fare of Back Bay Logan Express service for MBTA pass holders.</p>
<p>Employee Parking:</p> <ul style="list-style-type: none"> • Continue to work to reduce the number of Airport employees commuting by private automobile and parking at the Airport by: providing off-Airport parking both near Logan Airport and at Logan Express sites; and implementing measures to enhance employee commuting options. 	<ul style="list-style-type: none"> • Massport provides employee parking in Chelsea with free bus transportation to the Airport. • Massport continues to offer employee rates to encourage the use of Logan Express facilities. • Additional early morning and late night bus service has been added to Logan Express sites to encourage use and better serve Logan Airport employee schedules.

Pedestrian Facilities and Bicycle Parking



Massport has made substantial progress in providing Airport-wide pedestrian access. Sidewalks along Harborside Drive and Hotel Drive connect to the terminals, where a series of overhead, enclosed walkways connect to the Central and West Parking garages as well as the Hilton Hotel. The sidewalks along Harborside Drive, Transportation Way, North Service Road, Maverick Street, and the Harborwalk facilitate pedestrian access to the Airport water shuttle boat dock, MBTA Blue Line Airport Station, and the pedestrian and bicycle pathways at Memorial Stadium Park, Bremen Street Park, and the East Boston Greenway.

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Bicycle parking racks are provided at many landside facilities. Generally, these racks are expected to primarily serve employees, but are open for use by air passengers as well. Terminal A, Terminal E, the Logan Office Center, Signature General Aviation Terminal, the Economy Parking Garage, the Green Bus Depot, and Airport MBTA Station all have bicycle racks. The RCC has covered bicycle parking racks for use by both employees and passengers.

Pedestrian and bicycle safety is further enhanced through the design of streetscape, intersections, lighting, and defined vehicle zones with new curbing, crosswalks, sidewalks, plantings, and fencing. Bicycle connections are available around Airport Station, Memorial Park, Bremen Street Park, and the East Boston Greenway. As part of the RCC construction, connections in the SWSA now allow employees and customers of the Airport to arrive via bicycle and park in a secure covered area at the new RCC. Commuters can utilize the unified bus system or pedestrian connections to the terminals. In the North Service Area, connections to/from Bremen Street Park and the Greenway Connector were complete in early 2015. These improvements connect the existing shared-use path to a new, northern connector of the East Boston Greenway. The Logan Airport portion of this connection was completed in July 2014.



Pedestrians along the East Boston Greenway (left) and Bicycle Racks and the Logan Office Center (right).
Source: VHB.

Ground Transportation Ridership and Activity Levels in 2014

This section of the chapter:

- Provides an overview of transportation services available to Logan Airport users from the Boston metropolitan area;
- Reports on 2014 ridership levels and recent historical trends;
- Notes Massport's progress in meeting ground access goals; and
- Reports on Massport's cooperative planning ventures with other transportation agencies in Massachusetts.

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Logan Express, MBTA Transit, and Water Transportation Modes

Annual ridership levels for HOV/transit/shared-ride transportation modes serving Logan Airport are summarized in Table 5-8.

Year	<u>MBTA Transit</u>		<u>Logan Express Bus</u>			<u>Water Transportation³</u>	
	Blue Line ¹	Silver Line ²	Air Passengers	Employees	Total	MBTA Ferry ³	Private Water Taxis
2010	2,270,241	831,323	644,412	467,020	1,111,432	34,794	54,382
2011	2,277,311	900,359	649,609	536,513	1,186,122	33,403	58,879
2012	2,442,085	906,177	681,040	624,149	1,305,189	31,197	60,840
2013	2,597,306	N/A	733,005	634,693	1,367,698	N/A	70,378
2014	2,378,965	N/A	788,151	632,011	1,420,162 ⁴	N/A	67,479
Percent Change (2013-2014)	(8%)	N/A	8%	0%	4%	N/A	(4%)

Source: Massport

Notes: Numbers in parentheses () represent negative numbers.

N/A Not available.

1 Airport Station fare gate entrances only. Automatic Fare Collection introduced in January 2007. The Bremen Street Park entrance to MBTA Airport Station opened June 2007; station activity is not limited to only Airport-related passengers.

2 Boardings at Logan Airport. Silver Line: 2012 and 2013 values are estimates. No information available for 2014.

3 MBTA Ferry is the Harbor Express F2/F2H service, Quincy/Hull-Logan and Long Wharf. Service from Quincy Fore River was suspended in 2013. Private water taxis includes: City Water Taxi and Rowes Wharf Water Transport.

4 Ridership of 152,892 for the Back Bay Logan Express not included in this total.

Logan Express Bus Service

Massport provides frequent, scheduled, express coach bus service to Logan Airport for air passengers and Logan Airport employees from park-and-ride lots in Braintree, Framingham, Woburn, and Peabody. Full service bus terminals and secure parking are provided at all four locations. In addition, a service from Back Bay, described below, was introduced in April 2014 (May 2014 was its first full month of operation). A new parking facility was opened in Framingham in April 2015 for Logan Express customers. More information related to this facility will be provided in the 2015 EDR. Figure 5-7 depicts Logan Express bus locations with respect to the regional transportation network.

The round-trip adult fare is \$22; reduced fares are offered to seniors, and children under the age of 17 ride free. To encourage greater ridership, a parking rate restructuring went into effect in 2012, which featured lower parking rates at \$7 per day (from \$11 per day) at Logan Express parking lots. On weekdays and Sunday afternoons/evenings, scheduled half-hour headways are provided between the Braintree, Woburn, and Framingham locations and Logan Airport; one-hour headways are provided at these locations on Saturdays and Sunday mornings. Scheduled bus service to/from Peabody is provided hourly. Service hours for all four locations are roughly 3:00 AM to 1:00 AM the next day.

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Recent annual ridership trends for Logan Express are shown in Table 5-8. Air passenger ridership on Logan Express increased by approximately 8 percent from 2013 to 2014. Employee ridership stayed roughly the same between 2013 and 2014. A detailed breakdown of the Logan Express ridership is presented in *Appendix G, Ground Access*.

Back Bay Logan Express (Trial Service)

On April 28, 2014, Massport initiated the Back Bay Logan Express service with pick-up locations at the Copley MBTA Green Line Station and the Hynes Convention Center. The Back Bay Logan Express operates daily between the hours of 5:00 AM and 10:00 PM. Fares are \$5 per passenger and riders with a current, valid MBTA pass are allowed to ride for free. The goals of the service are to provide an improved service to those transit riders impacted by the Government Center Green Line Station closure (a major transfer point to the Blue Line for Logan Airport passengers and employees) and to increase HOV mode use from the inner Boston area, which generates many vehicle trips. Ridership for the Back Bay Logan Express from April 28

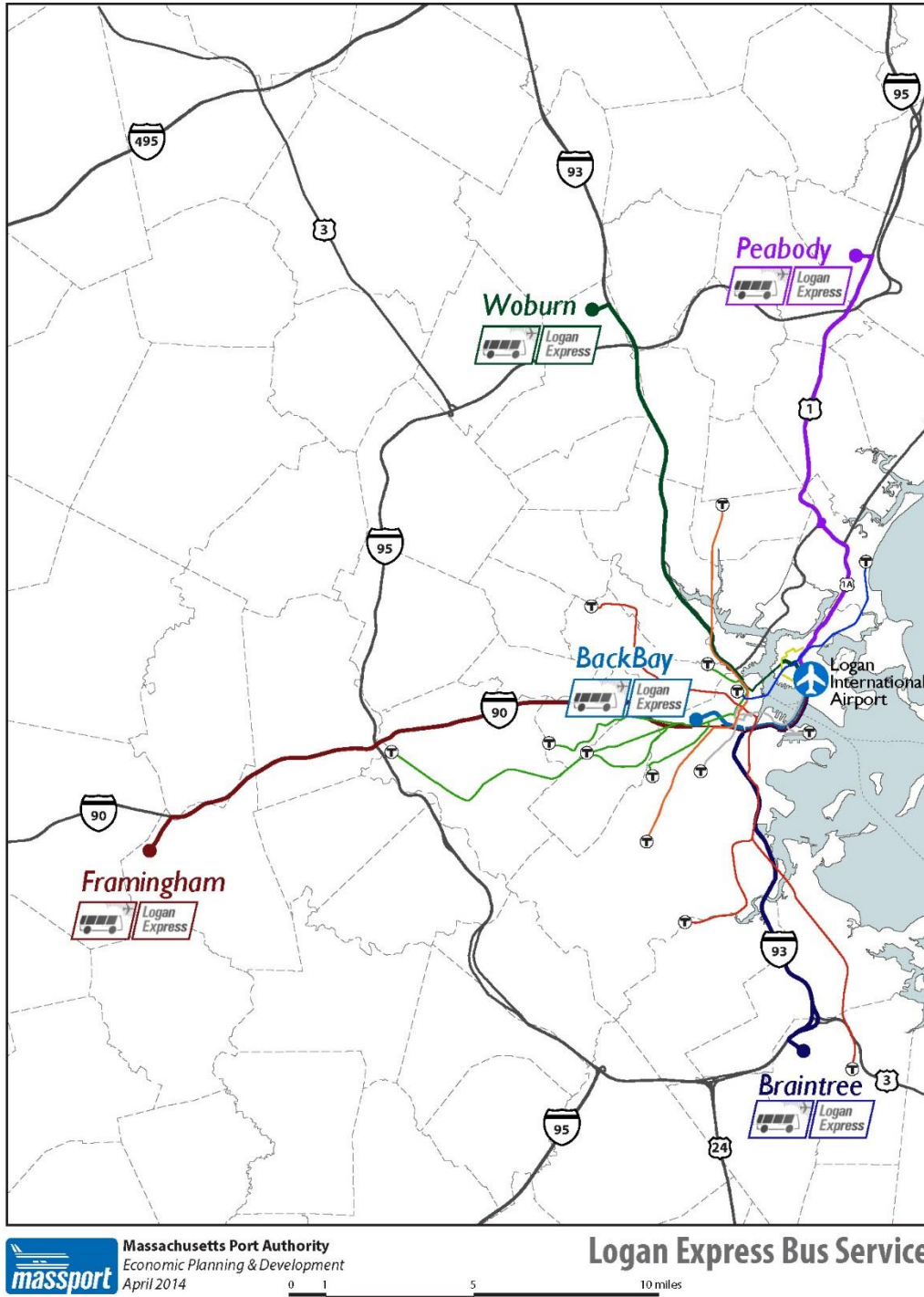
through December 31, 2014, was 152,892 passengers, an average of about 624 riders per day (and a daily high ridership of 1,294 passengers).



Back Bay Logan Express bus.
Source: Massport

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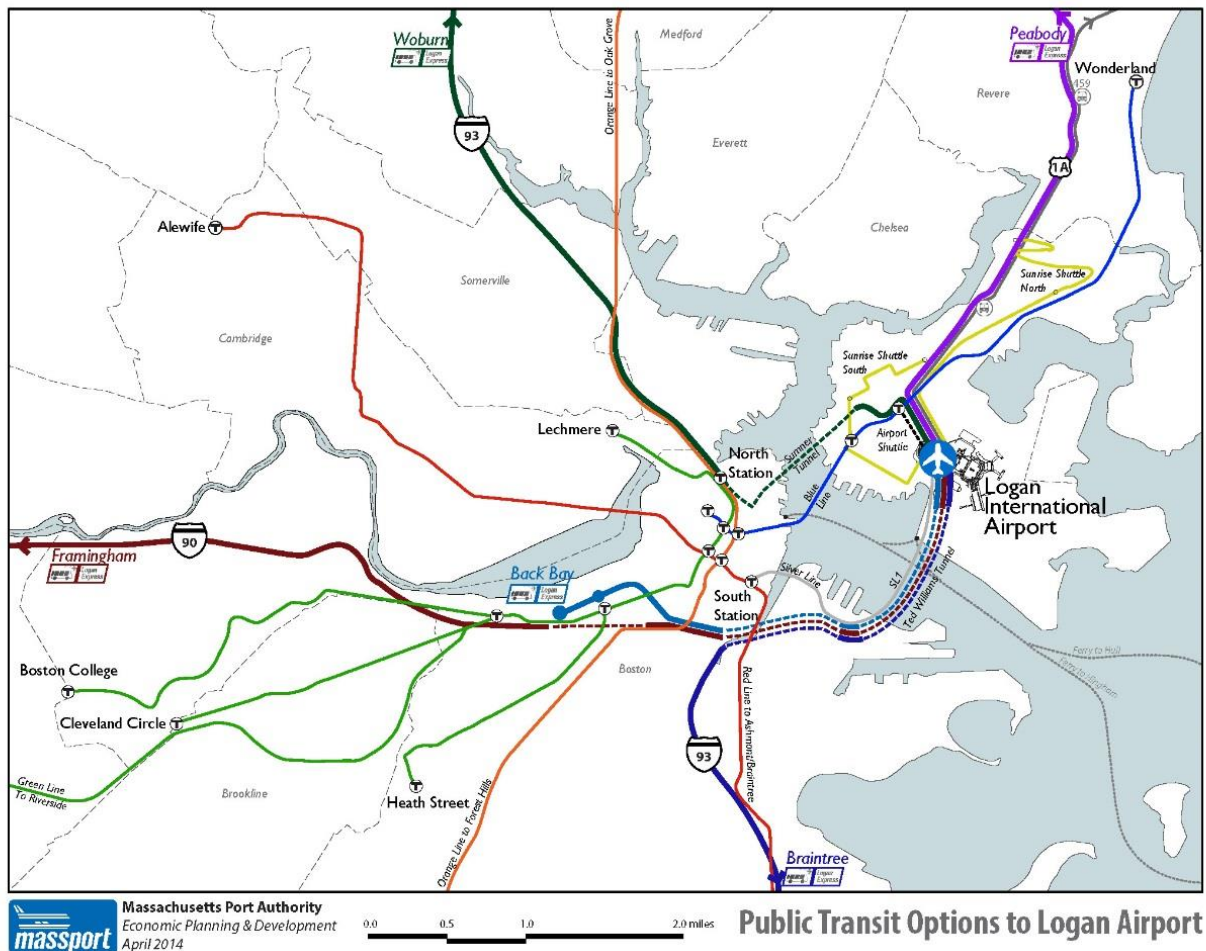
Figure 5-7 Logan Airport - Logan Express Bus Service Locations and Routes, 2014



Rapid Transit

The MBTA provides direct connections to Logan Airport via the Blue Line subway at Airport Station and via the Silver Line bus to each of the terminals. According to the 2013 *Logan Airport Air Passenger Ground Access Survey*, these services are used by over 7 percent of Logan Airport's air passengers (almost 17 percent of passengers with trip origins in Boston, Cambridge, Brookline, and Somerville used MBTA public transit to travel to the Airport). Both services are important for reducing automobile travel to the Airport; according to the survey, the majority of users of the Blue Line and Silver Line indicated that their alternative mode of travel to Logan Airport would have been a taxi or they would have been dropped off at the Airport by private vehicle. Figure 5-8 illustrates the public transportation options to access Logan Airport.

Figure 5-8 Logan Airport - Public Transportation Options, 2014



Blue Line Ridership / Airport Station Activity

Fare gate data indicate that nearly 2.4 million riders entered Airport Station in 2014 (see Figure 5-9). This is about an 8-percent decrease compared to 2013. As noted in previous reportings, fare gate data do not distinguish between Airport related riders and East Boston users. Airport passenger ridership levels on the Blue Line can no longer be directly identified as part of the Environmental Status and Planning Report (ESPR)/EDR reporting.¹¹ Since fare gate data are combined, there is no way of discerning whether the drop in boardings at this station are related to air passengers or East Boston riders.

Silver Line (SL1) Ridership

The Silver Line bus rapid transit service to Logan Airport provides a direct connection between South Station and the Airport terminals via the South Boston Transitway and the I-90 Ted Williams Tunnel (TWT). The introduction of free boardings of the Silver Line Airport buses (SL1) at Logan Airport has eliminated the need for fareboxes; thus, 2014 figures of passenger boardings are not available (see Figure 5-9). Massport is consulting with the MBTA on the potential for Automated Passenger Counting (APC) systems as a means to continue to collect ridership data.

Eight SL1 buses are owned by Massport and are operated by the MBTA with a Massport subsidy. The Silver Line is the only MBTA rapid transit service that provides a direct, one-seat connection to each Airport terminal (the Blue Line requires a second-seat ride on a free Massport shuttle to connect riders to terminals, while express MBTA transit buses connect only at Terminal C, and local bus service to the Airport is very limited). Transfers between the Silver Line and the Red Line at South Station are free. At South Station, passengers may also connect to the MBTA commuter rail, Amtrak, and regional intercity buses.

 **Water Transportation: Water Taxis and MBTA Ferries**

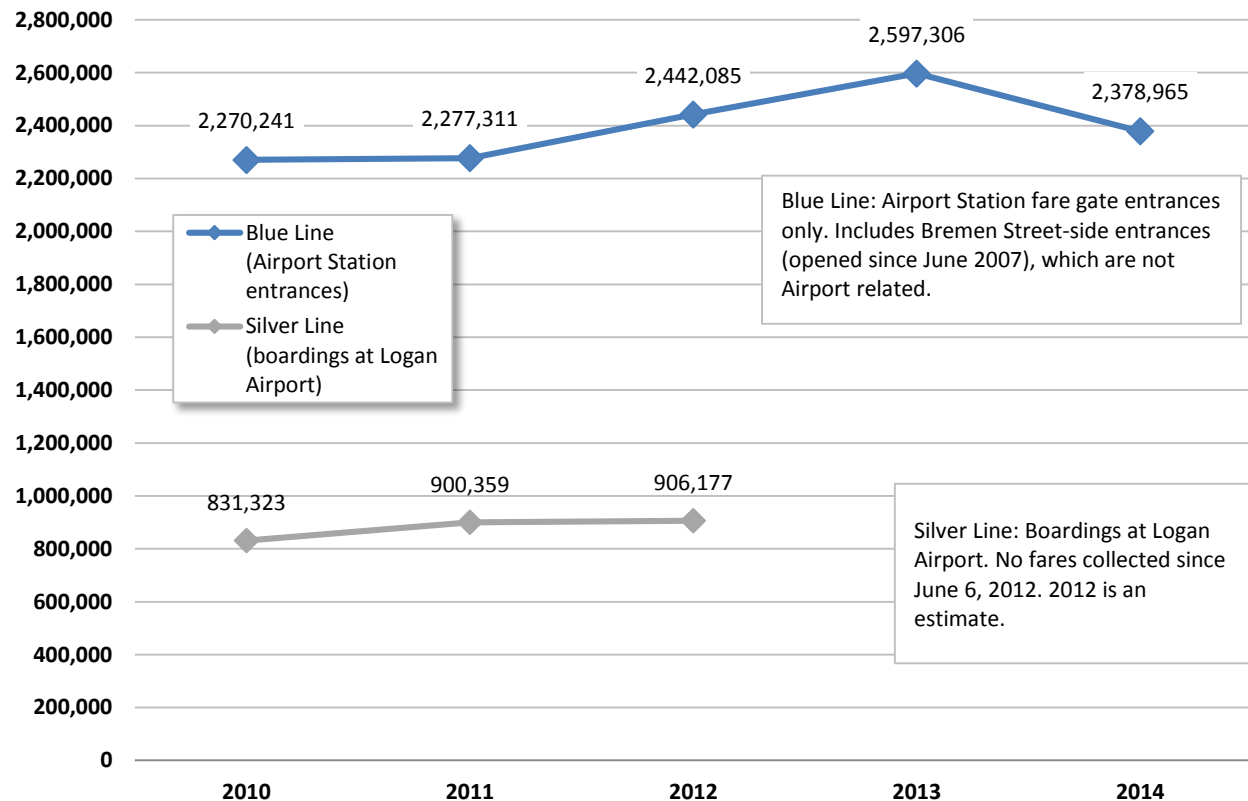
Three companies provide water transportation within the Boston area: City Water Taxi, Rowes Wharf Water Shuttle, and the MBTA's Harbor Express. Collectively, these companies serve numerous destinations throughout Boston Inner Harbor. The water taxi landing locations include: Long, Rowes, and Central Wharfs; the World Trade Center and the Moakley Courthouse in South Boston; Lovejoy Wharf near North Station; and stops in the North End, Charlestown, Chelsea, and East Boston. The MBTA Harbor Express provides services to Long Wharf and destinations outside of the Inner Harbor, including Hingham and Hull.¹² The water transportation services stop at the Logan Airport dock on Harborside Drive. Massport provides a courtesy shuttle bus service between the Logan Airport dock, the MBTA Airport Station, and all Airport terminals. Massport provides an employee subsidy for water transportation modes.

Water transportation accounts for less than 1 percent of the mode share to Logan Airport, according to the *2013 Logan Airport Air Passenger Ground Access Survey*. Annual ridership on privately-provided water transportation experienced a decrease of 4 percent in 2014 compared to 2013 (Table 5-8).

¹¹ Based on automated fare gate entrance counts, approximately 50 percent of entrances occur via the Bremen Street Park fare gates at Airport Station. Based on Massport curbside observations, approximately 45 percent of Airport Station entrances are by airport users.

¹² The MBTA ferry schedule from Quincy/Hull to the Logan Ferry Dock is not as frequent as Blue Line and Silver Line services, and does not run on frequent and consistent headways throughout the day. Headways between ferries range from one hour to several hours. There are 14 MBTA ferries to Logan Airport on weekdays, however there are no MBTA ferries direct to Logan Airport from the South Shore during morning commuting times. The one-way fare to cross the Boston Harbor from Long Wharf to Logan Airport costs \$13.75, and \$17 from Quincy/Hull (twice the regular fare to Boston). The MBTA suspended ferry service from Quincy's Fore River stop in fall 2013, and has since added service to the Hingham service, which has incorporated the Hull stop.

Figure 5-9 Passenger Activity - Blue Line (Airport Station) and Silver Line (SL1), 2010-2014



Source: Massport

Other HOV Modes: Scheduled Buses, Shared-Ride Vans, Courtesy Vehicles, and Limousines

Massport provides priority, designated curb areas at all Airport terminals, to support the use of HOV/transit modes, including privately-operated scheduled buses and shared-ride vans and limousine services. The majority of scheduled shared-ride carriers use a combination of 15- to 40-passenger vehicles and 40+ passenger coach buses. Scheduled express bus service is offered by several privately-operated carriers from outlying areas of the Boston metropolitan area and neighboring states. Shared-ride van services include services between Logan Airport and many hotels in the Greater Boston area. Shared-ride vans also provide service from western Massachusetts and other regional points throughout New England.

As shown in Table 5-9, the use of these HOV modes increased slightly in 2014 compared to 2013, with a switch from the use of scheduled vans and limousines to the use of unscheduled limousines. The use of scheduled buses stayed relatively constant between 2013 and 2014.

Table 5-9 Activity Levels (Estimated Ridership) for Other Scheduled and Unscheduled HOV Modes: Scheduled Buses, Shared-Ride Vans, Courtesy Vehicles, and Limousines, 2010 - 2014				
Year	Scheduled and Unscheduled HOV Modes			
	Scheduled Buses	Scheduled Vans & Limousines	Courtesy Vehicles	Limousines (unscheduled)
2010	375,223	391,122	635,127	1,035,195
2011	360,237	473,199	594,706	1,095,420
2012	377,608	311,737	653,728	1,199,011
2013	374,792	207,738	646,739	1,168,774
2014	373,138	148,048	651,583	1,506,705
Percent Change (2013-2014)	(<1%)	(29%)	<1%	29%

Source: Massport

Notes: Numbers in parentheses () represent negative numbers.

Ridership is estimated based on dispatched vehicles, according to records from the Logan Airport bus/limousine pool, and the average occupancy per vehicle, according to the ground-access survey.

Scheduled van and limousine service decreased by 29 percent in 2014 while unscheduled limousine service increased by 29 percent. Scheduled service providers have been decreasing the number of trips offered. This trend, in conjunction with ride-booking services like Uber and Lyft, are pushing up unscheduled limousine trips.

Massport offers a 50-percent discount on the ground access fees for alternative fuel vehicles that use compressed natural gas (CNG) or are powered by electricity.

Non-HOV (Automobile) Modes

Logan Airport passengers can access the Airport by a number of automobile modes, including private automobiles, taxis, and rental cars. These modes account for about 72 percent of the access modes used by air passengers, based on the *2013 Logan Airport Air Passenger Ground Access Survey*. Although these modes are categorized as non-HOV, they frequently carry more than one passenger per vehicle. Based on the 2013 survey results, the average vehicle occupancy for these automobile modes is estimated at 1.9 to 2.1 passengers per vehicle.

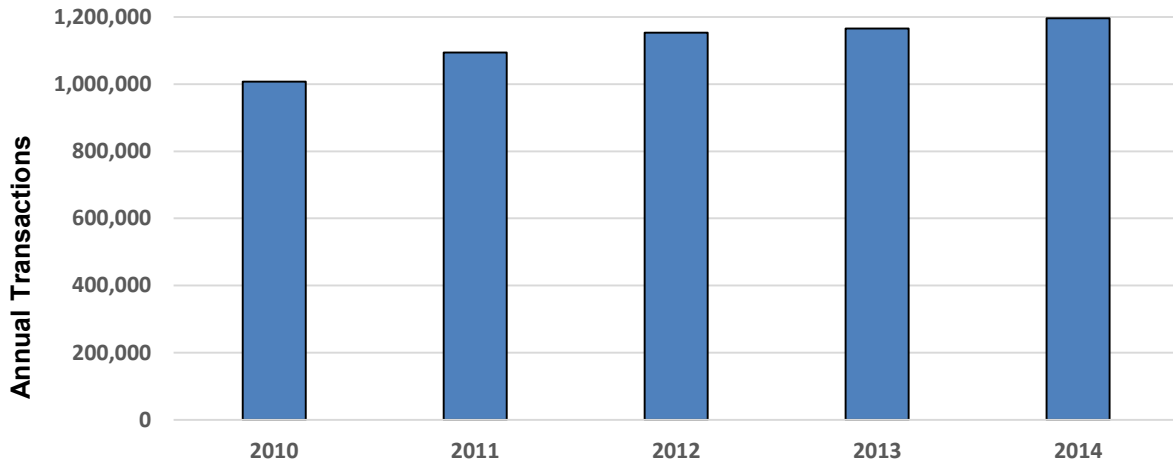
Automobile Access

Private automobile access to the Airport is classified as either curbside drop-off or parked on-Airport (terminal area or remote/Economy). Traffic conditions associated with these trips are described in this chapter’s section on traffic conditions.

Rental Car

At the opening of the RCC in 2013, nine rental car brands were serving Logan Airport: Advantage, Alamo, Avis, Budget, Dollar, Enterprise, Hertz, National, and Thrifty. Payless and Firefly initiated operations in 2014 and Zipcar began operations at Logan Airport at the end of 2013. Rental car transactions (see Figure 5-10) have been increasing in recent years, following the trend of air passenger activity.

Figure 5-10 Annual Rental Car Transactions at Logan Airport, 2010-2014



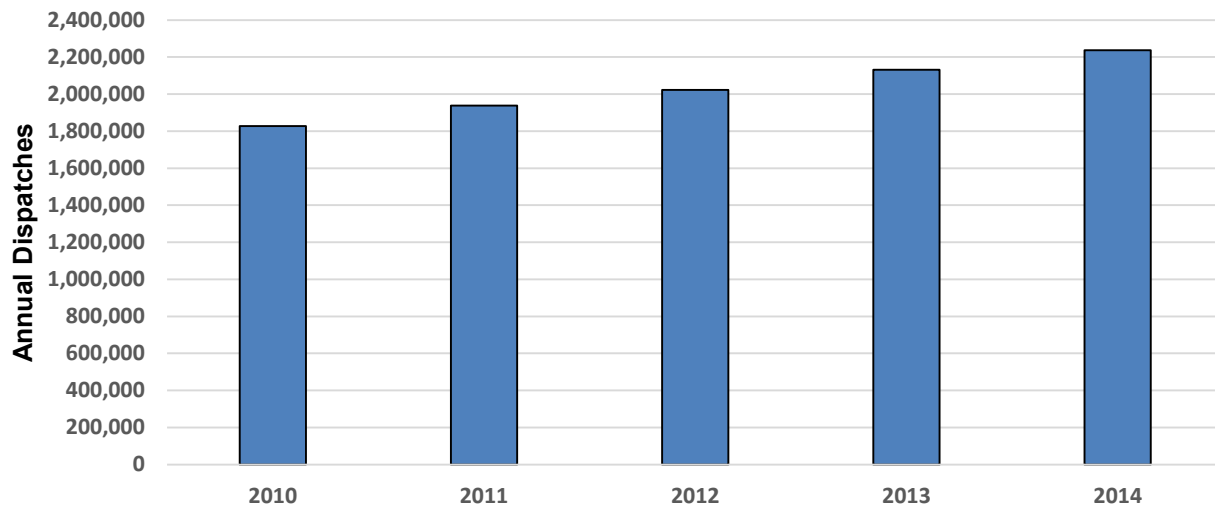
Source: Massport

Taxis

Taxi ridership trends are reflected in the total number of taxis dispatched from Logan Airport (serving outbound passengers). The number of taxis dispatched rose in 2014 by 5 percent over the 2013 level (Figure 5-11). However, in 2014, there were approximately 342 hours (experienced on 187 days) during which Logan Airport had a shortage of cabs and had to resort to multiple passenger/party loading at the curbs.

Taxi dispatches reflect the increase in air passenger levels. Taxi use in 2014 almost reached the highest recorded level at Logan Airport (2.14 million dispatches in 2000 when Logan Airport served 27.7 million annual air passengers).

Figure 5-11 Annual Taxi Dispatches at Logan Airport, 2009-2014



Source: Massport

Green Cab Program



Since 2007, Massport has sponsored a “Head-of-Line” hybrid vehicle taxi incentive program, in partnership with the City of Boston. Under this program Boston taxis that qualify as clean-fuel vehicles may obtain permission to proceed to the short job lane at Logan Airport's taxi pool; this allows these “green cabs” to be dispatched to the terminals in a shorter amount of time.

Ground Access Planning Considerations

Surface transportation modes have environmental impacts, and are considered a standard component of airport GHG emissions inventories (see *Chapter 7, Air Quality/ Emissions Reduction*). Enhancing multimodal transportation options is one way an airport can reduce GHG emissions and improve its environmental footprint.

Potential emissions reductions are one reason why Massport is committed to a long-term goal to promote and support public and private HOV/shared-ride services aimed at serving air passengers, Airport users, and employees. Other benefits include:

- Reducing congestion on the terminal roadways and curbside pick-up/drop-off areas;
- Alleviating limited parking facilities; and
- Customer service (providing a range of transportation options for different traveler markets).

Passenger HOV Mode Share Goal

Massport’s current ground access goal is to attain a 35.2-percent passenger HOV mode share when annual air passenger levels reach 37.5 million. The 35.2-percent HOV mode share figure was developed by a planning process involving Massport staff and was first presented in the Logan Growth and Impact Control (LOGIC) planning studies that were completed in the early 1990s.¹³ In subsequent environmental documents, the 35.2-percent HOV mode share became a declared goal related to ground access to Logan Airport.¹⁴

Progress toward this goal is measured using the triennial air passenger ground-access survey. The latest survey, which was conducted in 2013, revealed an air passenger ground-access mode share of 28 percent for HOV/shared-ride modes, which is a share consistent with past surveys. Historically, there has not been a significant shift in HOV mode share since 2004. This result demonstrates that Logan Airport has been able to maintain its HOV mode share in concert with improvements to roadway access to the Airport and despite increases in air passenger levels. Also, the result confirms Logan Airport’s rank at the top of U.S. airports with respect to HOV/shared-ride mode share.¹⁵ The next survey is scheduled to be completed in spring 2016.

Although generally useful, the calculation of overall HOV mode share is limited in that some modes can operate as both high occupancy and low occupancy vehicles (Table 5-10). Many automobile modes carry

¹³ *Logan Growth & Impact Control Study (LOGIC) Phase I Report* (1990) and *Logan Growth & Impact Control Study (LOGIC), Phase II Final Report* (June 1993).
¹⁴ *West Garage Final EIR* (January 31, 1995) and *1994 & 1995 Annual Update of the Final Generic Environmental Impact Report (GEIR), vol. 1* (July 1996), which presents for the first time “Massport’s Ground Access Management Plan” and states that its goals are “to achieve a 35 percent high-occupancy vehicle (HOV) mode share by air passengers...” [p. I-7-4]
¹⁵ It is useful to note that there is no standard aviation industry definition with respect to categorizing ground access modes as HOV versus SOV. While some modes (e.g., Logan Express and the Silver Line) clearly fall into the HOV mode category, the appropriate category for a limousine or taxi is less clear.

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multiple passengers; for example, as seen in Table 5-10, the 2013 air passenger survey results indicate an average occupancy of 2.0 air passengers per private vehicle used for airport ground access.

Mode	Vehicle Occupancy	% SOV Trips
Private Vehicle	2.0	24%
Taxicab	1.8	28%
Rental Vehicle	1.6	37%
Subtotal for Automobile Modes	1.9	28%
Car Service ("black car" limousine by reservation)	1.9	30%
Courtesy Shuttle	3.6	7%
Shared-Ride Van or Limousine (scheduled or reservation)	4.4	7%

Source: Massport, 2013 Logan Airport Air Passenger Ground-Access Survey. Based on air passengers departing on both weekdays and weekend days.
 Notes: The true average occupancy per vehicle arriving at the Airport cannot be computed from the responses to the survey because it is not possible to identify multiple travel parties arriving in a single vehicle. Average occupancy in this table was calculated as the average occupancy of arriving vehicles across survey respondents.
 An SOV (single occupancy vehicle) passenger is defined as an air passenger that arrives at the Airport with no other air passengers in the vehicle. Air passengers can arrive as the only traveling air passenger in any of the above modes; thus, drivers and/or occupants who are not traveling are excluded from the occupancy calculation.

Through the strategic planning process, Massport has concluded that its overarching ground access goal must be to minimize the number of motor vehicles used by both passengers and employees traveling to and from Logan Airport. Achieving this goal will require balancing the need to accomplish three objectives:

- Maximizing the availability and use of transit, HOV, and shared-ride options for Logan Airport passengers and employees;
- Minimizing the number of pick-up/drop-off trips, particularly “dead head” trips in which a vehicle brings a passenger to Logan Airport and leaves with only the driver, effectively doubling the number of vehicle trips needed for that passenger to get to and from the Airport; and
- Managing parking supply, pricing, and operations to promote use of transit/HOV/shared-ride options and reduce the amount of diversions/valeting, all without increasing the number of pick-up/drop-off trips due to a constrained parking supply.

Massport is investigating alternative methods to describe the mode use and travel patterns of air passengers using Logan Airport to better reflect these considerations and track progress toward meeting all of its ground access goals, including, but not limited to, maintaining its high HOV mode share.

Conditions Under Constrained Parking

According to research conducted for Massport, Logan Airport is the only airport in the country with a parking freeze.¹⁶ As described earlier in this chapter, during many weeks in 2014, vehicles were periodically diverted from Central Parking to Economy Parking or Terminal E lots, or valeted to other areas until lined spaces became available. Peak-day demand is not showing signs of dampening, and overflow conditions

¹⁶ LeighFisher, August 2011.

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persist. These conditions exist despite the supply of over 2,700 parking spaces off-Airport at nearby private lots, and despite the increases in Logan Express use since the lowering of its parking rates.

With the Logan Airport Parking Freeze (and current capacity levels) in place, weekday demand is outpacing supply on a regular basis. Under such conditions, travelers arriving at the Airport to park on Tuesdays and Wednesdays would find themselves unable to park their cars on-Airport.

In March 2014, Massport reconfirmed with the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) that providing additional structured parking spaces up to the total allowed by the Parking Freeze does not require further environmental review.¹⁷ Thus, construction of the West Garage expansion began in 2014 and will consolidate new structured and existing surface parking facilities. This project will establish defined physical striped spaces for vehicles that would come to Logan Airport with or without the construction of the spaces. In other words, spaces in these areas will help to reduce overflow conditions and the need for vehicle diversions on peak- parking-demand days.

Planning for Passenger Ground Access

In the past, the ground access strategy has operated within the constraints of the Logan Airport Parking Freeze. Future efforts will need to better address the growing use of pick-up/drop-off modes that include private vehicles, taxis, limousine, and alternative taxi modes. Pick-up/drop-off vehicle activity is growing in response to the constrained parking supply.

Regularly conducted passenger surveys have shown that under constrained parking conditions, three-quarters of “would be” parkers opt for “pick-up/drop-off” modes rather than HOV/shared-ride modes. Accordingly, an unintended effect of constrained parking supply has been an increase in the total number of vehicle trips generated by Logan Airport passengers.

Therefore, the challenge is how to influence a mode shift so that the passengers generating the excess parking demand are encouraged to use sustainable transportation modes (including public transit, Logan Express, and other shared-ride services) rather than increase taxi and private vehicle drop-off and pick-up activity that would generate increased levels of traffic and curbside congestion (and associated emissions) at Logan Airport. As passenger levels have increased, the lack of commercial parking spaces has had the counterproductive effect of inducing more pick-up/drop-off travel which entails more trips, VMTs, and air emissions than trips by people who park at the Airport. This is a key planning issue that Massport will address in future Airport-wide planning efforts. Massport’s longer-range ground access strategy will balance the need to maximize the HOV/transit/shared-ride mode share, manage on-Airport parking, and reduce pick-up/drop-off vehicle trips.

Ground Access Initiatives

Massport promotes ridership on HOV/transit/shared-ride modes and maintains efficient transportation access and parking options in and around Logan Airport to reduce the reliance on automobile modes as a means to achieving the HOV mode share goal. Measures implemented by Massport include a blend of strategies related to pricing (incentives and disincentives), service availability, service quality, marketing,


¹⁷ MEPA Advisory Opinion letter, March 20, 2014.

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and traveler information. Because of the diverse market segments of the air passenger traveler, no single measure will accomplish the goal.

HOV/Transit/Shared-Ride Initiatives

-  In April 2014, Massport initiated the Back Bay Logan Express service. Using Massport's 42-foot CNG buses, this service provides travelers with three scheduled trips per hour between the Hynes Convention Center, Copley Square (at the MBTA's Green Line Station), and Logan Airport. Aside from serving an area that generates a significant number of trips to the Airport, the service serves transit riders inconvenienced by the two-year closure of Government Center station, where the Green Line meets the Blue Line.
-  Massport has expanded its Logan Express bus service, including spending \$30 million to build a 1,100-space parking garage in Framingham to meet growing passenger and employee demand. The Framingham Logan Express carries the highest number of non-employee passengers of all the Logan Express services. This new facility opened in early 2015 and will be discussed further in the 2015 EDR.

Parking Programs and Initiatives

Cell Phone Waiting Lot

The cell phone waiting lot in the vicinity of Terminal E provides 61 parking spaces where drivers waiting for passengers on arriving flights may park. Before the creation of the Cell Phone Waiting Lot, drivers who were waiting for arriving passengers either used the short-term parking, circulated around the Airport, or dwelled at the curb until asked to move by State Police officers. This facility reduces vehicle emissions by minimizing idling and on-Airport VMT by such motorists. The maximum wait time permitted at this parking lot is 30 minutes and parking is free of charge.

PASSport Gold and Parking PASSport

Parking PASSport Gold and Parking PASSport allow users to enter and exit Logan Airport's parking garages and lots with an access card that is linked to an established account for faster payment transactions. Parking fees are automatically charged to a registered credit card and the receipt is emailed to the account holder. Customers in the Parking PASSport programs account for approximately 3 to 4 percent of parking exits at Logan Airport.

Massport offers guaranteed parking through its Parking PASSport Gold program. Parking PASSport Gold eliminates the need for a motorist to circle the garage looking for available spaces. First implemented in 2006, the Parking PASSport Gold program had 9,011 customers as of December 31, 2014, compared to 7,544 at the end of 2013. About 8 percent of spaces in the Central/West Parking garage and 12 percent of spaces in the Terminal B garage are set aside for these customers.

Hybrid/Alternative Fuel Vehicle Preferred Parking

In the State's first preferred parking program for hybrid and alternative fuel vehicles (AFVs), Massport began offering preferred parking for customers driving hybrid and AFVs in the spring of 2007. Massport provides designated parking spaces at Logan Airport's Central Garage, Terminal B Garage, Terminal E surface lot, and Economy Parking.

Employee Ground Transportation Initiatives

Airport employee transportation has different ground access considerations than passenger transportation. Airport employees often have non-traditional (and often unpredictable) working hours that are difficult to match to typical transit service hours (MBTA service does not start until after 5:00 AM and ends by 1:00 AM). Due to the time-sensitive nature of airline operations, on-time reliability is important for employee transportation, as is flexibility during severe weather or other delays that may extend a typical employee workday or work shift.

Massport strives to reduce the number of Airport employees commuting by private automobile, to enhance commuter options, and to reduce traffic and parking demands at Logan Airport. To help accomplish these objectives Massport continues to:

- Provide off-Airport employee parking in Chelsea, which is served by frequent shuttle bus service to the terminals (Route 77) 24 hours a day, 7 days a week;
- Run free employee shuttle buses between Airport Station and employment areas in the SWSA and the SCA locations (Routes 44, 66, and Logan Office Center);
- Operate early morning and late night Logan Express bus trips for commuters.
- Support the Logan Transportation Management Association (TMA);
- Support the Sunrise Shuttle for early morning bus service from East Boston prior to the start of MBTA service;
- Create and maintain a comprehensive sidewalk/walkway system on Logan Airport to facilitate pedestrian access; and
- Provide bicycle racks.¹⁸

Two of these initiatives that are exclusively targeted to employees are described below.

Logan Transportation Management Association (TMA)

The Logan TMA advises Airport employers on transit benefits and provides information on available commuting transportation alternatives, ride-matching services, and reduced-rate HOV/transit fare options. Massport contributes \$65,000 annually to the Logan TMA. Benefits and services provided by the Logan TMA in 2014 included:

- East Boston early morning shuttle service (Sunrise Shuttle) (further details are provided below);
- Computerized ride-matching services for participating in carpools and vanpools; and
- Advocacy for improved service and reduced fares for its members from Massport, the MBTA, or other providers of mass transit and other alternative forms of transportation.

¹⁸ Bicycle racks are provided at Terminal A, Terminal E, Logan Office Center, MBTA's Airport Station, Economy Parking Garage (covered), Signature general aviation terminal, the Green Bus Depot (Bus Maintenance Facility), and the Rental Car Center (covered).



Sunrise Shuttle

Originally launched in August 2007, this shuttle service provides low-cost transportation to Airport employees who live in nearby East Boston and Winthrop. A second shuttle route was added in October 2011 that serves East Boston's Orient Heights neighborhood and Winthrop.

The Sunrise Shuttle services operate outside of MBTA service hours between 3:00 AM and 6:00 AM, with shuttles every half-hour transporting employees to the Airport terminals. Ridership levels have steadily increased since the shuttle's launch. The two-route service has reached over 1,000 riders per month.



Ground Access Goals

Table 5-11 lists each ground access goal and updates Massport's initiatives associated with each goal. Initiatives are planned, designed, implemented, and continuously refined to account for the changing national, regional, and local conditions that affect Logan Airport and its users.

Table 5-11 Ground Access Planning Goals and Progress (2014)

Goal	2014 Update
<p>Increase air passenger ground access (high-occupancy vehicle) HOV mode share to 35.2 percent by the time Logan Airport accommodates 37.5 million annual air passengers</p>	<p>The <i>2013 Logan Airport Air Passenger Ground Access Survey</i> revealed that 28 percent of air passengers use HOV/shared-ride modes to access the Airport.</p> <p>Massport continues to provide and actively promote numerous HOV/shared-ride options to air passengers, including Logan Express bus service, the Silver Line, water shuttle service, and frequent, free shuttle bus service to and from the Massachusetts Bay Transportation Authority (MBTA) Blue Line rapid transit Airport Station. Massport is investigating ways to increase HOV mode share by implementing new HOV initiatives and pricing strategies.</p> <p>Massport continues its partnership with the MBTA to offer free boardings of the Silver Line bus at the Airport. The promising results of reduced dwell times and faster travel times through the terminal area led Massport to extend the free-fare program indefinitely.</p> <p>Next-bus arrival digital dynamic signs have been added to the Terminal curb bus stops to now include Airport Shuttle, Blue Line/Rental Car, and Logan Express (in addition to Silver Line previously installed).</p> <p>Massport continues to improve wayfinding for ground transportation (with an emphasis on public transportation) within the terminals, resulting in enhanced directional signs in the terminals for arriving air passengers.</p> <p>In April 2014, the Boston Back Bay Logan Express service was implemented.</p>
<p>Reduce employee reliance on commuting alone by private automobile</p>	<p>Massport continues to support the Logan Transportation Management Association (TMA) with \$65,000 annually (no dues are collected from Airport employers). Massport uses funds from the Logan TMA to operate the two early morning Sunrise Shuttle services that operate in East Boston and Winthrop.</p> <p>For employees who reside in neighborhoods and communities closer to the Airport, bicycle parking options have increased with bicycle racks offered at Terminals A and E, the Economy Garage, the Green Bus Depot, the Rental Car Center, the Logan Office Center, and the Signature general aviation terminal. Massport is also investigating ways to improve bicycle access to/around Logan Airport facilities. For example, the East Boston Greenway Connector construction was completed in July 2014.</p>

Table 5-11 Ground Access Planning Goals and Progress (Continued)

Goal	2014 Update
 <p>Increase the overall efficiency of the metropolitan transportation system through interagency coordination</p>	<p>Massport participates in the Metropolitan Planning Organization (MPO) to promote planning and funding of transportation system options that enhance access to the Airport. Massport and the MBTA have worked together on several initiatives including the renovated Blue Line Airport Station and the Silver Line SL1 service to Logan Airport. Massport has also partnered with the MBTA, MassDOT, the City of Boston, and the Convention Center Authority in developing transportation improvement plans for the South Boston Waterfront, including alternatives that would improve Silver Line access between South Station, the South Boston Waterfront, and the Airport.</p>
 <p>Improve management of on-Airport ground access and infrastructure through technology</p>	<p>Massport disseminates ground access and parking information through the Internet (www.massport.com), social media (Twitter and Facebook), a toll-free telephone number (1-800-23-LOGAN), Smartraveler, and in-Airport kiosks. Massport's redesigned website has an interactive tool that helps users access Logan Airport, while providing multimodal options.¹⁹</p> <p>In 2014, Logan Airport continued to experience peak levels of parking demand for the terminal area parking garages. In an effort to reduce the operational impacts of peak parking, Massport began the expansion of the West Garage in 2014.</p> <p>The total number of parking spaces at the Airport remains within the Logan Airport Parking Freeze limits.</p>

¹⁹ Massport, GetUthereApp, www.massport.com/massport/gtu/Pages/default.aspx.

6

Noise Abatement

Introduction

The Massachusetts Port Authority (Massport) strives to minimize the noise effects of Logan Airport operations on its neighbors through a variety of noise abatement programs, procedures, and other tools. Logan Airport has one of the most extensive noise abatement programs of any airport in the nation. Massport's comprehensive noise abatement program includes a dedicated Noise Abatement Office, residential and school sound insulation programs; flight tracks designed to optimize over-water operations (especially during nighttime hours); and preferential runway use goals. The foundation of Massport's program is the *Logan Airport Noise Abatement Rules and Regulations*¹ (the Noise Rules), which have been in effect since 1986. Massport's Noise Abatement Office is responsible for implementing noise abatement measures and generally monitoring community complaints and other aspects of the noise effects from Logan Airport operations. The chapter describes predicted noise conditions at Logan Airport related to aircraft operations during 2014 and compares the findings to those for 2013. Historical comparisons are also made to the year 1990 and 2000.

Noise conditions for 2014 were assessed primarily through computer modeling, supplemented by the analysis of measured noise levels from Logan Airport's noise monitoring system. This chapter presents summaries of the operational data used in the noise modeling, as well as the resultant annual Day-Night Average Sound Level (DNL) noise contours, a comparison of the modeled results with measured levels from the noise monitoring system, and estimates of the population residing within various increments of noise exposure. Analyses also include a number of supplemental noise metrics including Logan Airport's Cumulative Noise Index (CNI) and reporting on the Time Above (TA) various threshold sound levels and periods of dwell and persistence of noise levels. Massport's progress on implementing noise abatement measures also is presented.

Appendix H, Noise Abatement provides historical details back to 1990 of operations, runway use, the sound insulation program, and noise exposed population. The appendix also contains the *Flight Track Monitoring Report* for 2014 and a *Fundamentals of Acoustics and Environmental Noise* section, which gives an overview of key noise issues, noise metric definition, and terminology for the general reader.

¹ The *Logan International Airport Noise Abatement Rules and Regulations*, effective July 1, 1986, are codified as 740 Code of Massachusetts Regulations (CMR) 24.01 et seq (also known as the Noise Rules).

2014 Noise Abatement Highlights and Key Findings

Since 2000, the number of daily aircraft operations has declined by almost 27 percent (from 1,355 operations per day in 2000 to 997 operations per day in 2014). This trend reflects an increase in the use of larger aircraft in the fleet, airline consolidation, and increased efficiencies on the part of airlines. As described throughout this EDR, this evolution towards fewer flights with larger, more efficient and quieter aircraft has yielded substantial environmental benefits. Compared to 2000, in 2014:

- Jet operations made up 86 percent of operations compared to 66 percent in 2000;
- Overall operations were down by 25 percent while overall passengers were up by 14 percent compared to 2000; and
- The number of people exposed to sounds levels of DNL 65 dB or higher has declined by 50 percent since 2000.

Operations and Fleet Mix

- Passenger volumes continue to increase at a higher rate than aircraft operations. Aircraft operations in 2014 increased 0.7 percent while passenger volumes increased by 4.7 percent compared to 2013.
- General Aviation (GA) operations in 2014 (26,416) remain well below the 35,233 GA operations that Logan Airport handled in 2000. GA operations decreased 1.0 percent from 2013 to 2014. GA operations continue to represent only a small percentage (7.3 percent in 2014) of total Logan Airport operations.
- Over 97 percent of all commercial jet operations at Logan Airport met the strictest Stage 4 international noise limits. One hundred percent of all commercial jet operations now meet Stage 3 noise standards. None of the older aircraft that were modified to meet Stage 3 noise recertification requirements remain in Logan Airport's commercial fleet.
- In 2014, for the first time, there were no Stage 2 jet operations (less than 75,000 pounds) operating at Logan Airport. This is a significant milestone on the FAA's phase out of older, noisier civil aircraft.
- There were several temporary FAA-mandated airfield/airspace operating factors that influence contour changes in 2014, including:
 - Due to safety concerns, at airports across the United States in June of 2014, the FAA temporarily halted the use of head-to-head operations², or opposite direction operations, in which planes arrive on a runway in one direction and depart in the opposite direction. When in use at Logan Airport, the procedure has aircraft departing from Runway 15R and landing on Runway 33L during the late night (typically midnight to 5:00 AM) when weather conditions are appropriate, including good visibility and little wind. At Logan Airport, head-to-head operations are an important part of the use of the late night noise abatement runway (Runway 15R-33L) since this keeps operations over Boston Harbor. Use of this procedure was restored in early 2015.
 - FAA also restricted the use of converging runways across the United States in January 2014 due to safety concerns. At Logan Airport, Runways 22L and 22R and Runway 27 were affected by this change. While Runway 22R is in use for departing aircraft, arrivals that would typically be directed to Runway 27 were sent by the FAA Air Traffic Control to arrive on Runway 22L. This restriction has since been lifted.

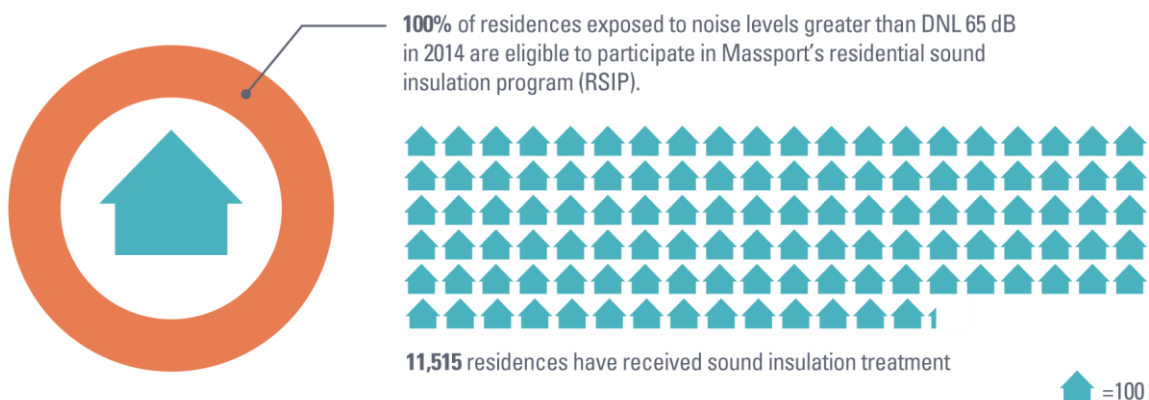
² Head-to-head operations, or opposite direction operations occur when aircraft depart from a runway end and aircraft are cleared to land to the opposite end of that runway. This results in aircraft overflights off only one end of the runway and is typically used as a noise abatement procedure when traffic levels are light.

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- Runway 15L-33R was closed for a short period of time (eight weeks) during the summer of 2014 for Runway Safety Area Improvements. This resulted in aircraft using Runway 15R-33L, Runway 4L, and Runway 22L more frequently in 2014 than in 2013. The construction activity also resulted in short closures of the intersecting Runway 4L-22R and Runway 4R-22L which increased usage of Runway 5R- 33L.
- An additional factor influencing contour changes was an increase in overall operations and nighttime operations in 2014 compared to 2013. Nighttime operations increased for passenger flights as airlines expanded destinations and the number of flights per day. Several new international airlines began service at Logan Airport in 2014.

Noise Levels and Population

- The 2014 contours are significantly smaller than the 2000 contours in most areas and are similar in size over the Eagle Hill area of East Boston. This is the result of quieter engines and fewer flights. Compared to 2013, the 2014 DNL 65 dB noise contours were larger in most areas around the Airport. Noise contour changes specific to 2014 in comparison to 2013 are discussed below.
- The DNL and population levels in 2014 remain well below the peak levels reached in 1990 and 2000. The 2014 population counts are below year 2000 levels when 17,745 people were exposed to DNL noise levels greater than 65 dB and 1,551 people were exposed to DNL levels greater than 70 dB. However, due to the combination of the factors described above, in 2014 the overall number of people exposed to DNL values greater than 65 dB increased from 4,307 people in 2013 to 8,922 people in 2014.³ All of the residences exposed to levels greater than DNL 65 dB in 2014 have been eligible to participate in Massport's residential sound insulation program (RSIP).



- In 2014, an additional 106 residential units received sound insulation bringing the program total to 11,515 residential units treated. Massport is a national leader in sound insulation mitigation, and will continue to seek funding for sound insulation for properties that are eligible and whose owners have chosen to participate.

³ Population data were derived from the most recent 2010 United States Census.

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- The 2014 CNI of 152.9 Effective Perceived Noise Decibels (EPNdB)⁴ remained well below the cap of 156.5 EPNdB established under Massport's noise regulations.
- Massport responded to 12,855 noise complaints in 2014. All complaints were also forwarded to the FAA.

Airspace Reporting and Update

- The FAA's Record of Decision (ROD) approving construction of the unidirectional Runway 14-32 required that the FAA, Massport, and the Logan Airport Community Advisory Committee (CAC) jointly undertake a study to determine whether changes to existing noise abatement flight track corridors might further reduce noise impacts. The primary focus of the Boston Logan Airport Noise Study (BLANS) is to determine viable ways to reduce noise from aircraft operations to and from Logan Airport without diminishing airport safety and efficiency.⁵ The aRea NAVigation (RNAV) departure portions of Phase 1 of the project, first implemented in 2010, continued to be utilized in 2014.
- Phase Three of BLANS is a test of a Runway Use Program which began in 2014 and will continue throughout 2015. Starting in November of 2014, the FAA selected runway use configurations in the morning (6:00 AM to 9:30 AM), when weather conditions permit, which are different from the configuration used the night before. This is designed to reduce the persistence of noise on residential communities.
- The 2014 Flight Track Monitoring reports in *Appendix H, Noise Abatement* show that 99 percent of shoreline crossings (locations where aircraft which have departed over the water pass back over land) are by aircraft above 6,000 feet, reflecting the same level as 2013. This is beneficial to communities under those flight paths.
- The percentage of aircraft following the Runway 27 departure procedure was at 77 percent for 2014 (an increase from 75 percent in 2013), which continued to remain in compliance with the Runway 27 ROD.⁶ The FAA determined in early 2012 that no further evaluation of the Runway 27 departure flight corridor is needed.⁷ Massport will continue to monitor and publish compliance with the procedure in the annual Flight Track Monitoring Report in this and subsequent Environmental Data Report (EDR)/Environmental Status and Planning Report (ESPR) filings.

Noise Metrics

The common metrics used in this chapter to describe and evaluate aircraft noise are:

- The dB – The decibel is the standard unit of measure for sound. It is a logarithmic quantity reflecting the ratio of the pressure of the sound source of interest and a reference pressure. This logarithmic conversion of sound pressure to sound pressure level results in a sound pressure level of about zero dB for the quietest sounds that one can detect and sound pressure levels of about 120 dB for the loudest sounds we can hear without pain. Many sounds in our daily environment have sound pressure levels on the order of 30 to 100 dB.
- The DNL – The Day-Night Average Sound Level is a measure of the cumulative noise exposure over a 24-hour day. It is the 24-hour, logarithmic (or energy) average; A-weighted sound pressure level with a 10

4 EPNdB is the metric used for Aircraft Noise Certification and forms the basis of the CNI.

5 For more information, visit the BLANS website at www.bostonoverflightnoisestudy.com/index.aspx.

6 FAA. Runway 27 Record of Decision. 1996.

7 FAA. Runway 27 Advisory Committee Meeting Notes 01/23/12, published March 5, 2012.

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dB penalty applied to the nighttime event levels that occur between 10:00 PM and 7:00 AM. The DNL is the FAA-defined metric for evaluating noise and land use compatibility.

- TA – The Time Above metric describes the total number of minutes that instantaneous sound levels (usually from aircraft) are above a given threshold. For example, if 65 dB is the specified threshold, the metric would be referred to as “TA65.” The TA metric is typically associated with a 24-hour annual average day but can be used to represent any time period. Any threshold may be chosen for the TA calculation. For this study, TA65, TA75, and TA85 were computed at each of the monitoring sites.
- Effective Perceived Noise Level (EPNL) – A time series of “tone corrected” perceived noise levels are used to compute EPNL, which is expressed in units of EPNdB. The tone corrected perceived noise level is determined by measuring the perceived noise level and adding to that value a “pure-tone” correction of up to 6 dB. The EPNdB is an international standard for the noise certification of aircraft and is used in this report in the calculation of the CNI.

Regulatory Framework

The noise regulatory framework that this 2014 EDR follows is defined in *Appendix H, Noise Abatement*. Regulations discussed include:

- Logan Airport Noise Abatement Rules and Regulations
- Federal Aviation Regulation (FAR) Part 36
- FAR Part 150
- FAR Parts 91 and 161

Noise Modeling Process

The DNL, CNI, and TA noise metrics reported annually by Massport provide various means of understanding and comparing Logan Airport’s complex noise environment from one year to the next. The noise context is influenced by numbers of operations, types of aircraft operating during the day and at night, use of various runway configurations, and the location and frequency of use of flight paths to and from the runways. Changes in any one of these operational parameters from one year to the next can cause changes in the values of the noise metrics and alter the shapes of the noise exposure contours that represent the accumulation of noise events during an average day.

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Massport continues to make use of state-of-the-art improvements in the noise modeling process, which has been updated each year. These developments in noise modeling technologies and techniques, which were first employed in the preparation of the *2005 EDR*, and have continued through this *2014 EDR*, are discussed below.

- Continued use of the latest version update to the FAA's Integrated Noise Model (INM), while retaining the unique capability to account for over-water sound propagation and hill effects at Logan Airport. Massport's use of the latest FAA-approved version of the INM (INMv7.0d⁸ to model the 2014 noise conditions) along with additional provisions approved by FAA to accommodate the Airport's unique water and terrain characteristics that have been shown through earlier technical studies to affect sound propagation into surrounding neighborhoods, has improved the modeling results. Logan Airport is the only airport in the world that incorporates these features into its approved modeling process.
- This *2014 EDR* is the sixth year Exelis data have been used for all aspects of the modeling process. The measured noise and the flight track data all come from the Massport Noise and Operations Management System (NOMS).
- The flight operations data from the NOMS includes more information with each flight record, such as aircraft registration numbers, wherever possible providing better INM aircraft type selection. This allows for the assignment of the modeled INM aircraft type based on the specific aircraft and engine combination used on each flight at Logan Airport during 2014.
- The modeling process includes continued use of U.S. Geological Survey (USGS) digital terrain data. INMv7.0d uses the detailed terrain data to evaluate each receptor location at its proper elevation, which enhances the accuracy of the results.
- Inputs to the modeling process include use of automated altitude profile and noise contour generation software. Massport purchased licenses to run two additional software packages, RealProfiles™ and RealContours™.^{9 10}
 - RealContours™ automates the production of noise contours directly from every individual radar trace. In 2014, approximately 355,451 traces were collected and 345,090 retained enough information to be modeled in the RealContours™ system. Each radar trace was converted to an INM model track, ensuring that the lateral dispersion of radar tracks was retained in the modeling. The operations on these radar traces were then scaled to account for all of the 363,797 operations in 2014. This method also helps to develop more accurate noise contours by retaining the actual runway used and time of each operation.
 - RealProfiles™ analyzes each radar trace and automatically produces custom aircraft performance profiles using the INM aircraft database. The INM typically uses pre-defined profiles to "fly" each aircraft along the ground track. The custom profiles are designed to follow the actual flight of each aircraft allowing the INM to model each flight at its actual location on the ground and in the sky. For 2014, 320,417 flight tracks (92.8 percent) used these specially designed profiles of which 166,842 (98.7 percent) of the available departure profiles and 153,575 (87.3 percent) of the available arrival profiles were developed from the actual radar data.
- Accurate altitude modeling, using the aircraft performance profiles developed by RealProfiles™ from the radar data, enhances the modeled noise results at each of the monitoring sites.

8 INM Version 7.0d was released in May 2013 with a technical update in Sept 2013.

9 RealProfiles™ and RealContours™ are methods to provide more accurate inputs to the INM but do not change or modify the algorithms of the FAA-required INM.

10 The *2004 ESPR* included a comparative analysis of the results of the standard INM modeling approach with RealProfiles™ and RealContours™.

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- This software incorporates the FAA-approved INM as the computational engine for calculating noise, but provides greater detail through the uses of individual flight tracks taken directly from radar systems rather than relying on consolidated, representative flight tracks data.

RealContours™ improves the precision of modeling by:

- Directly converting the radar flight track for every identified aircraft operation to an INM track, rather than assigning all operations to a limited number of prototypical or representative tracks;
- Modeling each operation for the actual time of day and on the specific runway that it actually used, rather than applying a generalized distribution to broad ranges of aircraft types;
- Selecting the specific airframe and engine combination to model, on an operation-by-operation basis, based on the aircrafts registration or a published composition of the fleets of the specific airlines operating at Logan Airport; and
- Using each aircraft's actual performance and altitude profile to develop inputs to the model, which define the actual arrival, or departure profile.

RealContours™ uses INM to produce computations for each day of radar data and then compiles annual average noise exposure contours and supplemental metrics from each of the 365 days of computations. All of these enhancements are examples of Massport's continued commitment to improving the monitoring, reporting, and understanding the noise environment at Logan Airport. The following section of this chapter summarizes the basic operational data used to compute the DNL, CNI, and TA noise metrics reported for 2014.

Noise Model Inputs

For this 2014 EDR, the most recent available version of the FAA's INM was used (version INM 7.0d). The FAA's INMv7.0d was released for general use on May 23, 2013 with a Software Service Update on September 24, 2013. The latest version was used for the 2013 and 2014 DNL contour in this report as the primary analytical tool to assess the noise environment at Logan Airport. Several new air carrier jets were added to the model replacing substitutes used in the prior version of the INM model. The Boeing 787-8, 747-800 and 777-300ER were added along with the Embraer family of aircraft. Further details on the enhancements of INMv7.0d are included in *Appendix H, Noise Abatement*.

The INM requires detailed operational data as inputs for its noise calculations, including numbers of operations per day by aircraft type and by time of day, which runway for each arrival and for each departure, and flight track geometry for each track. These data are summarized in tables that follow or are included in *Appendix H, Noise Abatement*. The following section summarizes the average-day operations for each year, 2014, as used in the noise modeling and compares them to the previous year's data.

The FAA has released a new model that will replace the INM called the Aviation Environmental Design Tool (AEDT). This model was released on May 29, 2015 well after development of the 2014 DNL contours was complete. The new model combines the noise and air quality modeling into one modeling system. Massport plans to use the AEDT system to develop 2015 noise contours which will be documented in the next EDR along with comparisons to the legacy INM model. Massport is also committed to working with the FAA to continue the use of the airport specific adjustments to the AEDT noise model for Logan Airport.

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Fleet Mix

Since 2004, Massport has relied primarily on radar data as the main source of input for noise calculations, since radar data typically are more accurate than the information reported by air carriers. The radar data result in a list of approximately 500 different aircraft types that use Logan Airport during a year, including the wide variety of small corporate jets and propeller aircraft flown by GA users, as well as the large passenger and cargo jets operated by air carriers.

For 2014, the aircraft types identified by the radar data were matched to the INMv7.0d database, which contains individual noise and performance profiles for 279 different fixed-wing aircraft types, 164 of which represent civilian aircraft, the balance being military aircraft.¹¹ For those aircraft recorded in radar data that are not in the INM's database, the radar type is paired with the best available alternative using a standard FAA-approved substitution list. The final list of modeled aircraft, used as an input to the INM, is presented in detail in *Appendix H, Noise Abatement*.

Operations by aircraft type are summarized into several key categories: commercial (passenger and cargo) operations; Stage 2 or Stage 3 jet aircraft; and turboprop and propeller (non-jet) aircraft. Aircraft that meet Stage 4 jet requirements are also broken out from the Stage 3 jet aircraft data for 2014. These Stage 4 aircraft are defined as aircraft certified as Stage 4 and all Stage 3 aircraft, which, if recertified, would qualify as Stage 4 aircraft. FAA does not require aircraft to be recertified and there are no plans at this time to restrict Stage 3 operations. In addition, the operations are split into daytime and nighttime periods, where nighttime hours are defined as 10:00 PM to 7:00 AM, consistent with the definition of DNL. Table 6-1 summarizes the numbers of operations by categories of aircraft operating at Logan Airport in 2014 and includes similar data for 2011 and prior years back to 2000. Data prior to 2000 are included in *Appendix H, Noise Abatement*.

¹¹ Some of these are military types as well as older Stage 1 and 2 airplanes that no longer operate in the U.S. or do not operate at Logan Airport. There are ordinarily no military aircraft operations at Logan Airport.

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Table 6-1		Modeled Average Daily Operations by Commercial and General Aviation Aircraft¹						
		1990³	2000³	2010²	2011²	2012²	2013²	2014²
Commercial Aircraft (Passenger and Cargo)								
<i>Stage 2 Jets⁴</i>	Day	312.40	5.13	0.01	0.01	0.01	0.01	0.00
	Night ⁵	19.99	0.26	0.01	0.00	0.00	0.00	0.00
	Total	332.39	5.39	0.02	0.01	0.01	0.01	0.00
<i>Stage 3 Jets (All)</i>	Day	288.89	727.09	674.25	684.19	649.22	667.65	670.00
	Night	57.25	103.66	107.92	109.38	106.55	115.91	123.60
	Total	346.14	830.75	782.17	793.57	755.77	783.56	793.61
Air Carrier Jets	Day	NA ⁶	648.95	521.64	540.75	530.76	546.27	556.59
	Night	NA ⁶	99.79	93.98	96.24	98.68	107.17	115.84
	Total	NA⁶	748.74	615.62	636.99	629.44	653.44	672.43
Regional Jets	Day	NA ⁶	78.14	152.61	143.44	118.46	121.38	113.41
	Night	NA ⁶	3.87	13.94	13.14	7.87	8.74	7.77
	Total	NA⁶	82.01	166.55	156.58	126.33	130.12	121.18
<i>Non-Jet Aircraft</i>	Day	444.41	409.62	138.53	135.18	133.92	132.33	128.45
	Night	11.72	21.58	5.21	4.73	3.06	3.21	2.28
	Total	456.13	431.20	143.74	139.91	136.98	135.54	130.73
Total Commercial Operations	Day	1,045.70	1141.84	812.78	819.39	783.14	799.99	798.45
	Night	88.96	125.51	113.13	114.11	109.62	119.12	125.88
	Total	1,134.66	1267.35	925.91	933.50	892.76	919.12	924.33
GA Aircraft								
<i>Stage 2 Jets⁴</i>	Day	NA ⁷	7.29	0.27	0.08	0.25	0.31	0.00
	Night	NA ⁷	0.64	0.04	0.00	0.04	0.02	0.00
	Total	NA⁷	7.93	0.30	0.08	0.29	0.33	0.00
<i>Stage 3 Jets</i>	Day	NA ⁷	40.08	27.80	52.51	52.93	51.21	52.64
	Night	NA ⁷	3.21	3.21	5.35	7.20	5.10	4.65
	Total	NA⁷	43.29	31.01	57.87	60.13	56.31	57.29
<i>Non-Jets</i>	Day	NA ⁷	34.57	8.19	18.18	15.16	13.06	13.95
	Night	NA ⁷	1.83	0.72	1.29	1.29	1.15	1.13
	Total	NA⁷	36.40	8.92	19.48	16.45	14.22	15.08
Total GA Operations	Day	NA ⁷	81.94	36.26	70.78	68.35	64.58	66.59
	Night	NA ⁷	5.68	3.97	6.65	8.52	6.28	5.78
	Total	NA⁷	87.62	40.22	77.43	76.86	70.85	72.37
Total	Day	1045.70	1,223.78	849.03	890.16	851.49	864.57	865.05
	Night	88.96	131.19	117.10	120.76	118.13	125.40	131.66
	Total³	1,134.66	1,354.97	966.13	1,010.92	969.61	989.97	996.70

Source: Massport's Noise Monitoring System, Revenue Office, HMMH 2014.

1 Operations include scheduled and unscheduled operations. Data for years prior to 2010 are available in *Appendix H, Noise Abatement*.

2 After 2009, the split between air carrier jets and regional jets (RJs) is 90 seats with RJs having less than 90 seats.

3 Prior to 2010, the split between air carrier jets and RJs is 100 seats with RJs having less than 100 seats.

4 Stage 2 aircraft are exempt from meeting newer federal Stage 3 noise limits when their certificated maximum gross takeoff weight (MGTO) is less than or equal to 75,000 pounds through 12/31/2015.

5 Nighttime operations occur between 10:00 PM and 7:00 AM.

6 RJs were not tracked separately prior to 1999.

7 Totals prior to 1998 do not include GA operations.

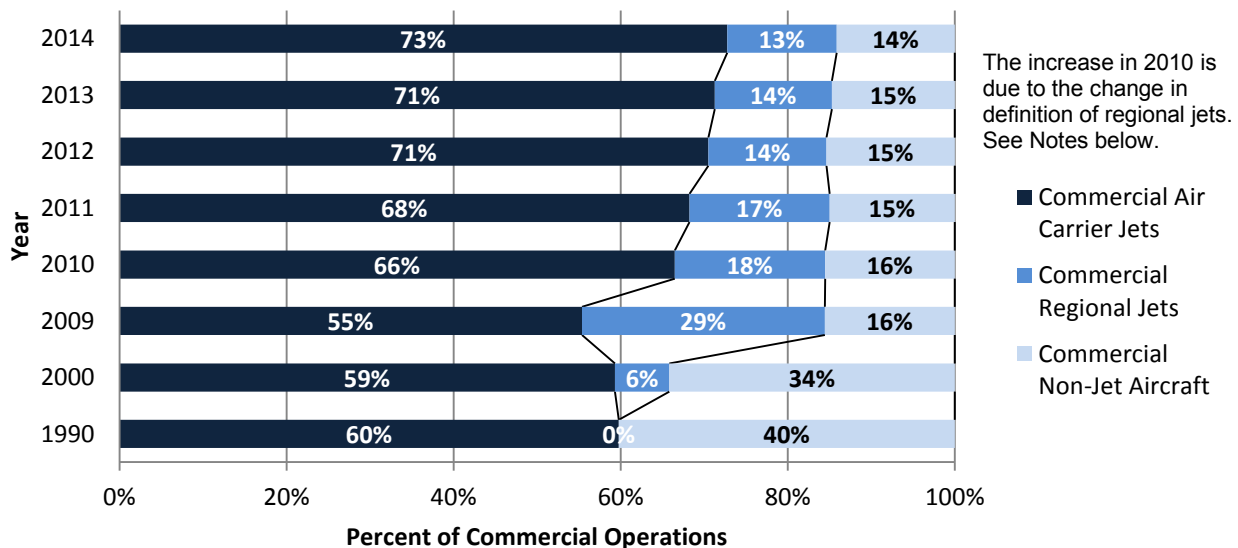
Commercial Operations

Regional jets (RJ) are defined as those aircraft with 90 or fewer seats, consistent with the categorization in *Chapter 2, Activity Levels*.¹² For years prior to 2010, the RJs in this chapter were classified as aircraft with fewer than 100 seats. When RJs first started gaining popularity, the aircraft types available were typically 50 seats or fewer with the traditional air carrier jet being 100 seats and higher. As newer aircraft types have become available, the smaller 35 to 50 seat types have been replaced by 70 to 99-seat types, with the 90 and above seat types flying many of the traditional air carrier routes. The majority of the newer types fall into two categories: the 70 to 75-seat category, which remain categorized as RJs, and the 91 to 99-seat category, which are categorized as air carrier jets.

The percent of RJs and Non-Jets in the overall commercial fleet each fell 1 percent between 2013 and 2014 (Figure 6-1). These decreases were offset by a 2.0 percent increase in commercial air carrier jet operations, which accounted for 73 percent of commercial operations in 2014 compared to 71 percent in 2013.

Figure 6-1 presents the commercial operations groups in terms of percent of the total for each year from 2009 through 2014 and including 1990 and 2000 for historical context. Figure 6-1 also shows the decrease in commercial non-jet operations after 2000 (34 percent of the fleet) and the rise of RJs, which were just 6.0 percent of the fleet in 2000 and increased to almost 30 percent of the fleet by 2009.

Figure 6-1 Fleet Mix of Commercial Operations (Passenger and Cargo) at Logan Airport



Source: HMMH, 2014.

Notes: Includes both passenger and cargo operations.

After 2009, the split between air carrier jets and RJs is 90 seats with RJs having fewer than 90 seats.

Prior to 2010, the split between air carrier jets and RJs is 100 seats with RJs having fewer than 100 seats.

The 2011 Percentage between air carrier jets and RJs was incorrect and has been corrected in this graphic.

¹² United States Code, 2006 Edition, Supplement 3, Title 49 – Transportation Subtitle VII – Aviation Programs Part A – Air Commerce and Safety, Subpart II, Economic Regulation, Chapter 417 - Operations or Carriers, Subchapter III - Regional Air Service Incentive Program, Sec. 41762 – Definitions – defines regional jet air carrier service to be aircraft with a maximum of 75 seats. Therefore, this report categorizes aircraft with 70-75 seats and below as regional jets and aircraft with 90 seats and higher aircraft as air carriers (Note: there are no aircraft types with 75 to 90 seats).

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Compared to 2013, the 2014 number of average daily operations (Table 6-1) indicates a modest increase in air carrier activity, with overall commercial traffic increasing by 0.6 percent in 2014. In 2014 there was a continued shift of operations away from the smaller RJ aircraft to larger air carrier aircraft on many routes increasing the number of passengers carried but not operations. Several new airlines started service at Logan Airport in 2014 including Emirates and Hainan Airlines. There were also increases in flights by Delta Air Lines, Southwest Airlines, and JetBlue Airways. The number of RJ operations decreased between 2013 and 2014 (a decrease of almost nine operations per day). Night operations by commercial operators increased in 2014 compared to 2013 by approximately seven operations per night. The majority of the increase in operations is due to an increase in passenger and cargo flights at night as airlines expand destinations and the number of flights per day. Commercial non-jet operations decreased slightly between 2013 and 2014 (dropped from 135 operations per day to 131 operations per day).

General Aviation Operations

Modeled GA activity in 2014 rose slightly compared to 2013, from 71 operations per day in 2013 to 72 operations per day in 2014 (Table 6-1). Use of Stage 2 GA jets reduced to zero in 2014 from 0.3 operations per day in 2013. Data prior to 2000 are included in *Appendix H, Noise Abatement*.

Stage 2, Stage 3, and Stage 4 Jet Aircraft

Jet aircraft currently operating at Logan Airport are categorized by FAA into the three groups: Stage 2, Stage 3, and Stage 4. As described previously, the designation refers to a noise classification specified in FAR Part 36 that sets noise emission standards based on an aircraft's maximum certificated weight. Generally, the heavier the aircraft, the more noise it is permitted to make within the limits established by FAR Part 36.

Because of the noise differences among Stage 2, recertificated Stage 3, Stage 3 aircraft, and aircraft that meet Stage 4 requirements, Massport tracks operations by these categories to follow their trends. Table 6-2 provides the percentage of commercial jet operations by stage since 2009 with 2000 and 1990 reported for historical context. As noted by Table 6-2, 97 percent of the commercial jet fleet at Logan Airport met Stage 4 requirements in 2013 and in 2014.

Year	Stage 4 Requirements ²	Certificated Stage 3	Recertificated Stage 3 ⁴	Stage 2 Greater than 75,000 lbs.	Total
1990	N/A	51.1%	0.0%	48.9%	100%
2000	N/A	70.0%	21.0% ⁵	9.0%	100%
2010	93.2% ³	98.9% ³	1.1% ⁵	0.0%	100%
2011	95.5% ³	99.5% ³	0.5% ⁵	0.0%	100%
2012	95.8% ³	99.9% ³	0.1% ⁵	0.0%	100%
2013	97.4% ³	100.0% ³	0.0%	0.0%	100%
2014	97.4% ³	100.0% ³	0.0%	0.0%	100%

Source: Massport's Noise Monitoring System, Revenue Office numbers, HMMH 2014.

Notes:

- 1 Data for years prior to 2010 are available in *Appendix H, Noise Abatement*.
- 2 Aircraft that meet Stage 4 requirements are aircraft that are certificated Stage 4 or would qualify if recertificated. Certificated Stage 4 aircraft were not available until 2006 and the level of aircraft that meet Stage 4 requirements has not been determined prior to 2008.
- 3 All aircraft listed as meeting Stage 4 requirements are also listed as Stage 3 aircraft.
- 4 Recertificated Stage 3 aircraft are aircraft originally manufactured as a certificated Stage 1 or 2 aircraft under FAR Part 36 that either have been retrofitted with hushkits or have been re-engined to meet Stage 3 requirements.
- 5 Prior to 2013, only one commercial carrier, with more than 100 annual operations, continued to use recertificated Stage 3 aircraft at Logan Airport (Federal Express). A few charter operators also use these aircraft.

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Nighttime Operations

Although Stage 2 aircraft over 75,000 pounds have been banned since January 1, 2000, aircraft certificated as Stage 2, which weigh less than 75,000 pounds, have continued to operate in the U.S. The Stage 2 aircraft currently allowed to operate are small corporate jet aircraft that are primarily in the GA fleet. However, FAA has issued a final ruling¹³ on a prohibition of these aircraft operations after December 31, 2015. Logan Airport’s Noise Rules prohibit Stage 2 aircraft of less than 75,000 pounds from using the Airport between the hours of 11:00 PM and 7:00 AM. In 2014, there were no Stage 2 operations at any time of day.

In addition, Massport monitors flights that operate between the broader DNL nighttime periods of 10:00 PM to 7:00 AM, when each modeled flight is penalized 10 dB in calculations of noise exposure. Table 6-3 shows this nighttime activity by different groups of aircraft. Nighttime flights by commercial jet operations increased by 6.6 percent between 2013 and 2014. Nighttime flights by commercial non-jet operations decreased by 29.0 percent from 2013 to 2014. Nighttime flights by GA operations decreased by 8.0 percent from 2013 to 2014. These changes resulted in an overall increase in nighttime operations of 5.0 percent in 2014. The majority of nighttime operations (between 10:00 PM and 7:00 AM) occurred either before midnight or after 5:00 AM. These nighttime operations represent 13.2 percent of total operation for 2014 at Logan Airport.

	Commercial Jets	Commercial Non-Jets	General Aviation	Total
1990	77.24	11.72	NA ²	88.96
2000	103.92	21.58	5.68	131.19
2010	107.93	5.21	3.97	117.10
2011	109.38	4.73	6.65	120.76
2012	106.55	3.06	8.52	118.13
2013	115.91	3.21	6.28	125.40
2014	123.6	2.28	5.78	131.66
Change (2013 to 2014)	7.69	-0.93	-0.5	6.26
Percent Change	6.64%	-29.06%	-7.99%	4.99%

Source: Massport and Exelis radar data. HMMH, 2014.

Note:

1 Data for years prior to 2010 are available in *Appendix H, Noise Abatement*.

2 Totals prior to 1998 do not include GA operations

Cargo operations accounted for 7.2 percent of all commercial nighttime operations in 2013 and 6.1 percent in 2014. Nighttime Cargo operations decreased slightly from 2013 to 2014 (reduced by 0.5 operations per night) but are a smaller percentage due to the larger increase of passenger nighttime operations.

¹³ FAA Final Rule “Adoption of Statutory Prohibition on the Operation of Jets Weighing 75,000 Pounds or Less that Are Not Stage 3 Noise Compliant”, issued July 2, 2013 Federal Register, Volume 78 Issue 127.

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Similar to conditions reported in 2013, flights by cargo operators using recertificated Stage 3 aircraft made up almost no commercial nighttime activity in 2014. For comparison, in 2000, flights by cargo operators using recertificated Stage 3 aircraft accounted for 8.0 percent of the commercial nighttime activity. Though ICAO and the FAA are not expected to require the phase-out of the remaining recertificated operations prevalent among cargo operators, the use of these aircraft will continue to remain at a minimum as these aircraft age and are taken out of service.

Increases to nighttime commercial activity were due to passenger operations primarily resulting from the overall growth in domestic air carrier flights. In addition to this however, nighttime operations on new routes to European and Middle Eastern destinations were introduced in 2014 and also contributed to the overall increase in 2014 nighttime activity.

Runway Use

Logan Airport's runways are shown in Figure 6-2. Runway use refers to the frequency of which aircraft utilize each of these runways during the course of the year, as dictated or permitted by availability, wind, weather, aircraft performance, demand, and air traffic control conditions. Runway 15R-33L and Runway 4R-22L are Logan Airport's longest runways; each is just over 10,000 feet in length.

 In 2014, Runway 15R-33L was the preferred runway to use at night to reduce community noise, with arrivals to Runway 33L and departures from Runway 15R, (known as the head-to-head procedure) thus keeping flights over Boston Harbor (these flights do fly over South Shore communities but at relatively high altitudes).

However, due to safety concerns FAA halted the use of head-to-head operations at airports across the U.S. in June 2014. During this period (which is defined as Midnight to 6:00 AM for reporting purposes) when compared to the first half of the year the following changes were noted (see Table 6-4):

- Arrivals to Runway 33L decreased by 31 percent and to Runway 4R by 4 percent;
- Departures from Runway 15R decreased by 12 percent and from Runway 9 by 5 percent;
- This change was in effect for only half of the year, however it had a greater effect because it was during the nighttime period, when noise events are assigned a 10 dB penalty and the change distributed flights over residential communities;
- These changes resulted in increased flights over residential areas and increased noise complaints during the overnight period in 2014; and
- These changes increased the use of other runways during this period as shown in Table 6-4.

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Runway	Change in Arrivals (%)	Change in Departures (%)
4R	(4.1)	2.4
9	0.0	(4.9)
15R	6.4	(12.0)
22L	19.2	1.9
22R	0.0	3.6
27	9.2	3.3
33L	(30.6)	5.8

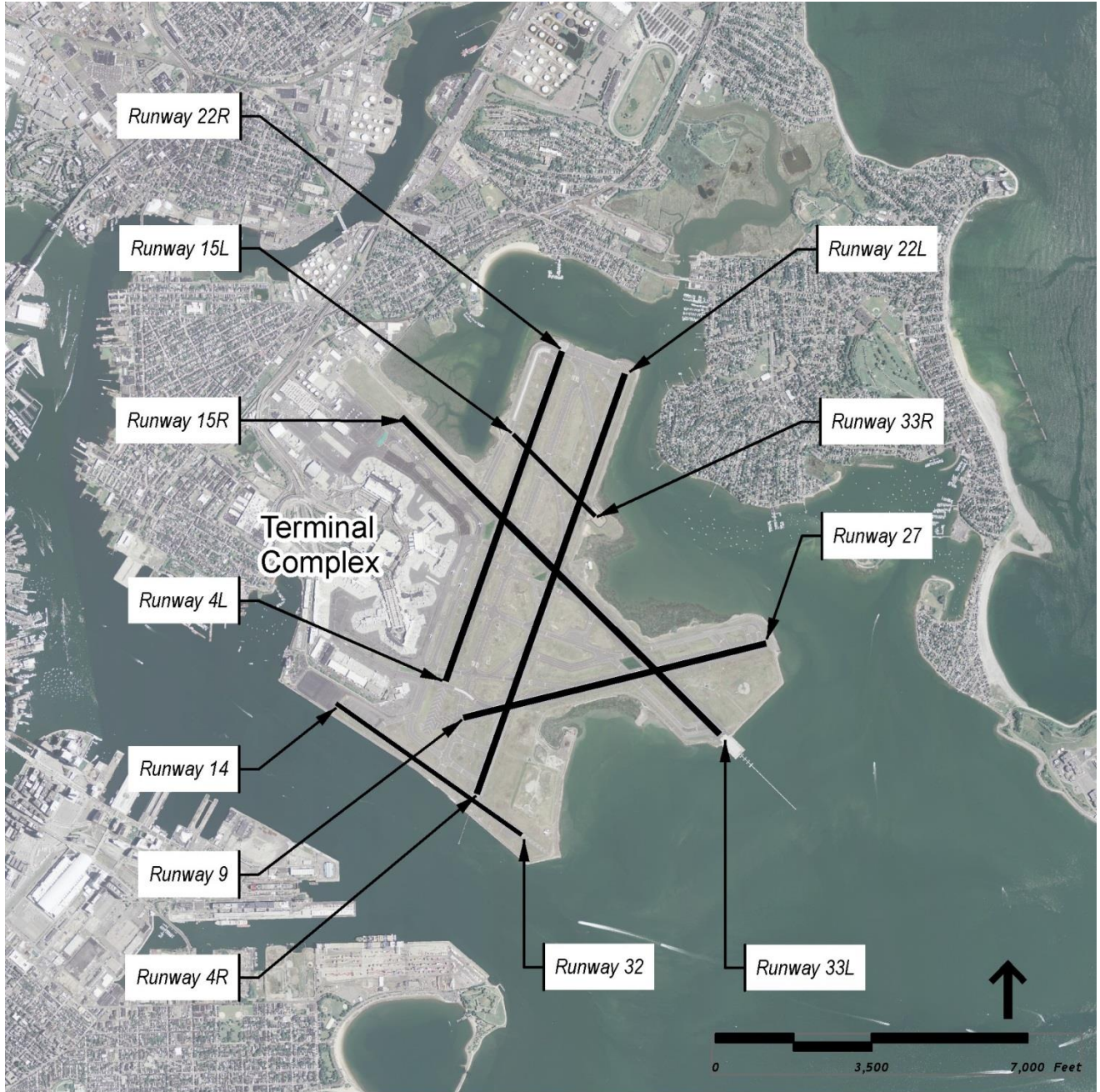
Notes: Runways not shown (4L, 14, 15L, 32, 33R) had no use during this period
 Bold values are decreases in activity.
 Time period evaluated (Midnight to 6:00 AM)

During other periods of the day, Runway 9 is used primarily for departures, and Runway 4R is used primarily for arrivals. Runway 22R is primarily used for departures, and Runways 15R, 27, 22L and 33L are used for both arrivals and departures.

FAA suspended Converging Runway Operations (CRO) in January of 2014. Runway 27 and Runway 22R are known as CRO runways since their extended centerlines cross within a short distance. These operations were suspended due to safety concerns primarily when aircraft are departing Runway 22R and landing on Runway 27. While Runway 22R is in use for departing aircraft, arrivals that would typically be directed to Runway 27 were sent by the FAA Air Traffic Control to arrive on Runway 22L.

Runway 14-32 is unidirectional; there are no arrivals to Runway 14 and no departures from Runway 32. Additionally, Runway 14-32 can be used only during northwest or southeast wind conditions when winds are 10 knots or greater. Under certain northwest wind conditions, Runway 32 provides the FAA with a second arrival runway, thereby reducing delays at the Airport. Runway 14 is available for departures but is rarely used in that manner. Runway 15L-33R is Logan Airport's shortest runway at under 3,000 feet long. This runway is primarily used for small non-jet aircraft arrivals.

Figure 6-2 Logan Airport Runways



Source: HMMH, Inc. 2015, U.S. Department of Agriculture, National Agriculture Imagery Program (NAIP), 2014.

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Jet runway use conditions in 2014 are summarized in Table 6-5 and were as follows:

- Combined arrivals to Runways 4L and 4R remained at 35 percent in 2014 as in 2013. In 2014, departures from Runway 4R decreased by 1.0 percent to 5.0 percent in 2014.
- For 2014, arrivals to Runway 22L increased by 9.0 percent to 25 percent, with departures remaining at 2.0 percent compared to 2013. Runway 22R departures decreased by 7.0 percent to 28 percent in 2014. Runways 22R and 9 consistently remained the most used departure runways at Logan Airport.
- Departures on Runway 27 increased by 1.0 percent to 13 percent in 2014. Departures on Runway 9 increased 1.0 percent to 31 percent in 2014. Arrivals to Runway 27 decreased substantially from 32 percent in 2013 to 21 percent in 2014.
- Since opening in late November 2006, Runway 14-32 has been used primarily for arrivals of RJs and turboprops over Boston Harbor, consistent with FAA operations restrictions based on wind direction (NW or SE) and speed (greater than 10 knots).
- Departures from Runway 33L increased from 12 percent in 2013 to 17 percent in 2014 with arrivals increasing slightly from 15 percent in 2013 to 16 percent in 2014. Runway 15R departures remained the same as 2013 at 2 percent with Runway 15R arrivals increasing from 1 percent to 2 percent in 2014.

Runway use for all aircraft types (Jet and Non-Jet) for 2013 and 2014 is provided in *Appendix H, Noise Abatement*.

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Table 6-5 Summary of Annual Jet Aircraft Runway Use¹										
	Runway									
	4L	4R	9	14²	15R	22L	22R	27	32²	33L
1990										
Departures	0%	3%	21%	NA	10%	2%	36%	20%	NA	7%
Arrivals	1%	25%	0%	NA	2%	14%	0%	28%	NA	29%
2000										
Departures	0%	8%	35%	NA	4%	3%	30%	15%	NA	6%
Arrivals	4%	40%	0%	NA	1%	7%	0%	28%	NA	20%
2010										
Departures	5%	28%	0%	-	1%	15%	0%	32%	1%	16%
Arrivals	0%	4%	28%	<1%	8%	2%	31%	10%	-	17%
2011										
Departures	0%	6%	36%	<1%	5% ³	2%	36%	7%	-	7% ³
Arrivals	7%	37%	0%	-	<1% ³	16%	0%	28%	1%	11% ³
2012										
Departures	<1%	6%	34%	<1%	4% ³	3%	38%	6%	-	8% ³
Arrivals	6%	34%	0%	-	1% ³	16%	<1%	34%	<1%	9% ³
2013										
Departures	<1%	5%	30%	<1%	5%	2%	35%	12%	-	12%
Arrivals	6%	29%	0%	-	1%	16%	<1%	32%	1%	15%
2014										
Departures	0%	5%	31%	<1%	5%	2%	28%	13%	-	17%
Arrivals	5%	30%	0%	-	2%	25%	<1%	21%	1%	16%

Source: Massport Noise Office and HMMH, 2014.

Notes: These data reflect actual percentages of jet aircraft operations on each runway end. They should not be confused with effective runway use, which is used by the Preferential Runway Advisory System (PRAS) to derive recommendations for use of a particular runway.

Jet aircraft are not able to use Runway 15L or 33R due to its length of only 2,557 feet.

Values may not add to 100 percent due to rounding.

NA = Not Available.

1 Data for years prior to 2010 are available in *Appendix H, Noise Abatement*.

2 Runway 14-32 opened in late November 2006. (Runway 14-32 is unidirectional with no arrivals to Runway 14 and no departures from Runway 32).

3 Runway 15R-33L was closed for 3 months in 2011 and 2012.

Preferential Runway Advisory System (PRAS)

Developed in 1982 and enhanced in 1990 and subsequent years, the PRAS is a set of short-term and long-term runway use goals that include the use of a computer program that recommends to FAA air traffic controllers runway configurations that will meet weather and demand requirements and provide an equitable distribution of Logan Airport’s noise impacts on surrounding communities. The two primary objectives of the PRAS goals are to distribute noise on an annual basis and to provide short-term relief from continuous operations over the same neighborhoods at the ends of the runways.

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In February 2004, the FAA upgraded to the Standard Terminal Automation Replacement System (STARS) and Integrated Information Display & Dissemination System version 5 (IDS5)¹⁴ radar during the consolidation of the Boston Terminal Control Center (TRACON) at the new facility in Merrimack, New Hampshire. As a result of this upgrade, a shutdown of the PRAS system computer was necessary. Updated PRAS software was installed in 2007. Technical difficulties related to processing input from the FAA’s IDS5 system have continued.

During Phase 2 of the on-going BLANS the Logan Airport CAC voted to abandon PRAS because it had not achieved the intended noise abatement.¹⁵ Phase 3 of the BLANS is focusing on the development of an updated Runway Use Program. Operational tests of a new program began in November 2014 and will continue throughout 2015.

For this 2014 EDR, Massport continues to present the annual comparison data to the PRAS goals. Under the PRAS, each runway end has a specific annual utilization goal, defined separately for departures and arrivals. The goals are defined in terms of effective usage, which applies a factor of 10 to nighttime (10:00 PM to 7:00 AM) operations, equivalent to increasing nighttime exposure by 10 dB so that a change in effective utilization is roughly proportional to the change in DNL.

Table 6-6 provides a comparison of effective runway use¹⁶ in 2014 to that of 2013, 2012, and to the PRAS goals. The 2014 utilizations shown in bold indicate improvements toward the goals for each runway compared to 2013. The effective jet runway use in 2014 moved closer to the PRAS goals. Four of the arrival percentages moved closer to the PRAS goals in 2014 and five of the departure percentages moved toward the PRAS goals.

Runway End	PRAS Effective Usage Goals		2012 Effective Usage		2013 Effective Usage		2014 Effective Usage	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
4R/L	21.1%	5.6%	32.3%	5.7%	34.6%	4.6%	28.1%	4.9%
9	0.0%	13.3%	0.0%	28.0%	0.0%	29.9%	0.0%	24.2%
15R	8.4%	23.3%	0.8%	14.7%	1.0%	4.9%	2.1%	11.6%
22L/R	6.5%	28.0%	26.3%	37.8%	16.0%	36.6%	30.4%	29.2%
27	21.7%	17.9%	25.5%	6.5%	32.1%	11.6%	15.4%	15.0%
33L	42.3%	11.9%	15.0%	7.3%	15.3%	12.4%	23.4%	15.1%
14 ¹	NA	NA	-	<0.1%	-	<0.1%	0.0%	<0.1%
32 ¹	NA	NA	0.2%	-	0.9%	-	0.6%	0.0%

Source: Massport Noise Office and HMMH, 2014.

Notes: PRAS goals are stated in terms of effective jet operations which exclude non-jet flights, but which multiply each nighttime (10:00 PM to 7:00 AM) operation by a factor of 10.

PRAS goals have not yet been established for Runways 14 and 32.

Bold text indicates runways use that is closer to PRAS goals from the prior year.

Runway 14-32 opened in late November 2006. (Runway 14-32 is unidirectional with no arrivals to Runway 14 and no departures from Runway 32).

14 STARS is FAA’s replacement radar equipment and software for TRACON and tower facilities. Integrated Information Display & Dissemination System version 5 (IDS5) is an advanced information management toolset designed for air traffic control by Systems Atlanta, which works with the STARS system.

15 BLANS Level 3 Screening Analysis, FAA, December 2012, Page E-2.

16 Effective Runway use refers to runway use which applies a factor of 10 to the night operations similar to DNL.

Flight Tracks

As described in the Methodology section, Massport continued to use the pair of software packages known as RealProfiles™ and RealContours™. *Appendix H, Noise Abatement* provides a summary discussion of RealProfiles™ and RealContours™. The software package RealContours™ is used to develop the INM inputs based on available radar tracks. Instead of using representative model tracks, RealContours™ converts each radar track to an INM model track and then models the scaled operation on that track.¹⁷ This allows Massport to take into account runway closures and/or temporary or permanent airspace changes which occur during the year.

For this 2014 EDR, 345,090 flight tracks were modeled to calculate the noise levels surrounding Logan Airport for calendar year 2014. Figures 6-3 through 6-9 provide examples of flight tracks used with RealContours™ to develop the 2014 contours.¹⁸ The figures show arrivals and departures separately for each of three aircraft categories: air carrier jets, RJs, and non-jets. The following figures are from April 2014, when the runway use was similar to the 2014 yearly average presented previously.

Additional figures and associated text at the end of this chapter describe the RNAV¹⁹ standard instrument departure (SID) procedure and any changes that were in effect during 2014. The RNAV procedures implemented at Logan Airport are part of a national FAA initiative which is being implemented to improve safety and efficiencies in the airspace system. These procedures result in consolidated flight paths and greater predictability along the flight route. Similar procedures have been implemented at Denver, Minneapolis, Chicago Midway, and Seattle.

- Figure 6-3 displays air carrier jet departures following the recommended departure routes. The departure procedures reflect updated FAA RNAV routes implemented in 2013 and 2014, shown in this graphic. The Runway 33L RNAV procedure was first implemented by the FAA in June of 2013.
- Figure 6-4 displays air carrier jet arrivals. The RNAV arrival procedures are very evident in the 2014-modeled data with a narrowing of the flight tracks into concentrated areas.
 - In the beginning of 2014, JetBlue Airways conducted a test of a RNAV visual approach procedure²⁰ which overlays the standard visual approach to Runway 4L. This procedure is visible arriving over Dorchester to line up on final approach and would give aircraft with advanced navigational capabilities a more stabilized approach to the visual Runway 4L.
- Figure 6-5 displays the RJ departures following the RNAV departure routes with flights remaining north of the Hull peninsula and passing over the Nahant Causeway.

17 This method provides a one-to-one correspondence of radar tracks to model tracks and ensures that the lateral and vertical dispersion of aircraft types are consistent with the radar data.

18 Runway use from each month was developed and compared to the annual runway use information. April 2014 provided the closest match to annual results.

19 RNAV enables aircraft to fly on any desired flight path within the coverage of ground or space-based navigation aids, or within the limits of the capability of aircraft self-contained systems, or a combination of both capabilities.

20 Boston-Logan Runway 4 Left Area Navigation RNAV Visual Flight Procedure Test CATEX, approved 6/26/2013.

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- Figure 6-6 displays the RJ arrivals that utilize both east and west sides of the Airport for arrivals. Arrivals to Runway 32 are also displayed on this graphic.
- Figure 6-7 displays the non-jet departures that tend to turn early off the runways and do not follow the jet departure routes. Non-jet departures from Runways 4L, 22R, 33L, and 27 are allowed to turn over populated areas whereas the jet aircraft are not. This also keeps the non-jet aircraft out of the jet departure paths allowing for efficient jet departures.
- Figure 6-8 displays the non-jet arrivals and includes the Boston Harbor route for non-jet aircraft arriving to Runway 4L. The graphic also displays the non-jet arrivals to Runways 22R and 33R in addition to the other runways, which also accommodate jets.
- Figure 6-9 displays the night jet arrivals using the Light Visual Approach²¹ to Runway 33L during April 2014. This is a procedure developed from the BLANS project, which is available only during visual conditions in which pilots can follow a route offshore to reduce noise impacts. These flights remain offshore and avoid overflying Cohasset and Hull at night. Flights arriving to Runway 33L from the west pass over Saugus and Nahant at a higher altitude and then head south over the Boston Harbor to intersect with the visual approach procedure.
- In the fall of 2013, JetBlue Airways began a test of an RNAV visual approach procedure²² which overlays the standard visual approach. This procedure would give aircraft with advanced navigational capabilities a more stabilized approach to the visual Runway 33L. Use of this procedure can be seen in the April 2014 tracks in Figure 6-9.

Meteorological Data

The INM has several settings that reflect aircraft performance profiles and sound propagation based on meteorological data. Meteorological settings include average temperature, barometric pressure, and relative humidity at the Airport. Massport obtained weather data for 2014 from the National Climatic Data Center (NCDC). Average daily values for each of the settings were used in the development of the 2014 noise conditions. The average conditions for each day allowed the modeling system used by Massport to develop performance profiles based on each day's conditions and allowed the INM model to use each day's conditions to assess the propagation of noise. The use of daily values allows the INM to better model aircraft profiles on days significantly different than the average, such as during the winter and summer months.

²¹ A Visual Approach procedure can only be used when weather conditions permit and the pilots follow visual landmarks to follow the procedure.

²² Boston-Logan Runway 33 Left Area Navigation RNAV Visual Flight Procedure Test CATEX, approved 6/26/2013.

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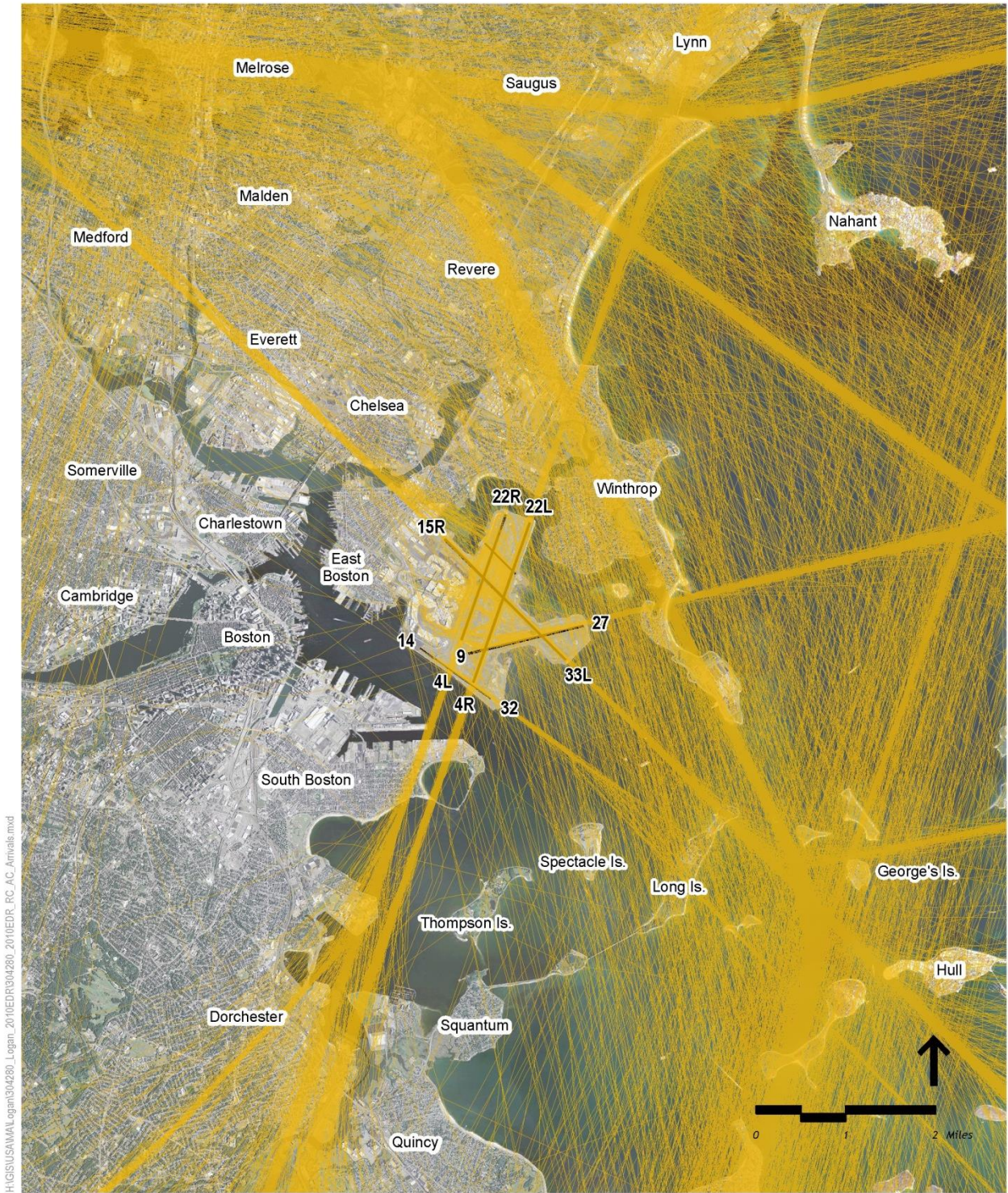
Source: Massport, Exelis NOMS, MassGIS, USDA NAIP 2014.

RealContours™ Air Carrier Jet Departure Tracks (April 2014)

— Departure Flight Tracks (April 2014)

Figure 6-3

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Source: Massport, Exelis NOMS, MassGIS, USDA NAIP 2014.

**RealContours™ Air Carrier Jet Arrival Tracks
(April 2014)**

— Arrival Flight Tracks (April 2014)

Figure 6-4

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Source: Massport, Exelis NOMS, MassGIS, USDA NAIP 2014.

**RealContours™ Regional Jet Departure
(April 2014)**

— Departure Flight Tracks (2014)

Figure 6-5

**2014 EDR
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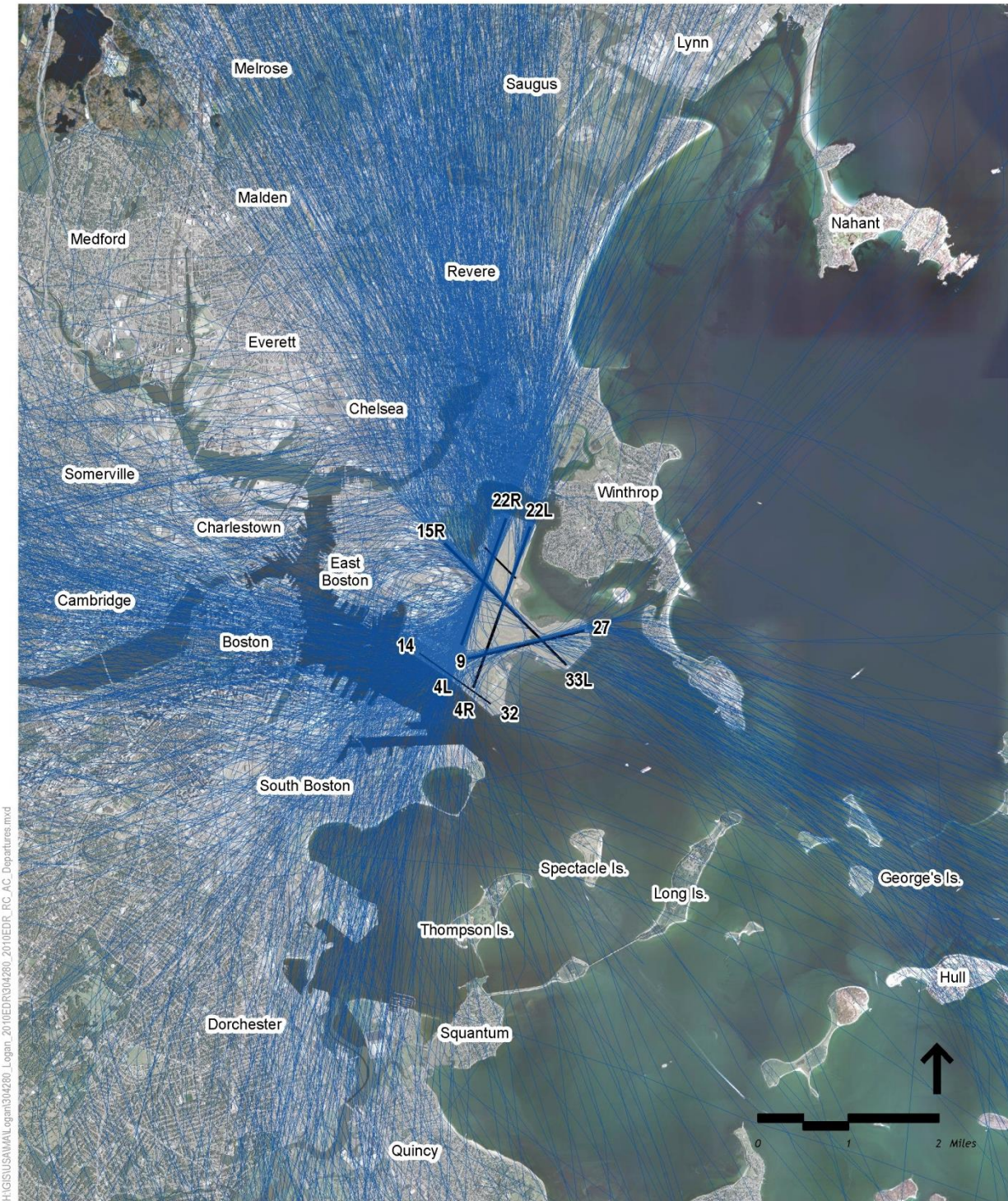
Source: Massport, Exelis NOMS, MassGIS, USDA NAIP 2014.

**RealContours™ Regional Jet Arrival Tracks
(April 2014)**

— Arrival Flight Tracks (2014)

Figure 6-6

**2014 EDR
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Source: Massport, Exelis NOMS, MassGIS, USDA NAIP 2014.

**RealContours™ Non-Jet Departure Tracks
(April 2014)**

— Departure Flight Tracks (2014)
Note: Non-Jet tracks are non-RNAV

Figure 6-7

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H:\GIS\USAWAY\Logan\304280_1\logan_2010EDR\304280_2010EDR_RC.AC_Airvals.mxd

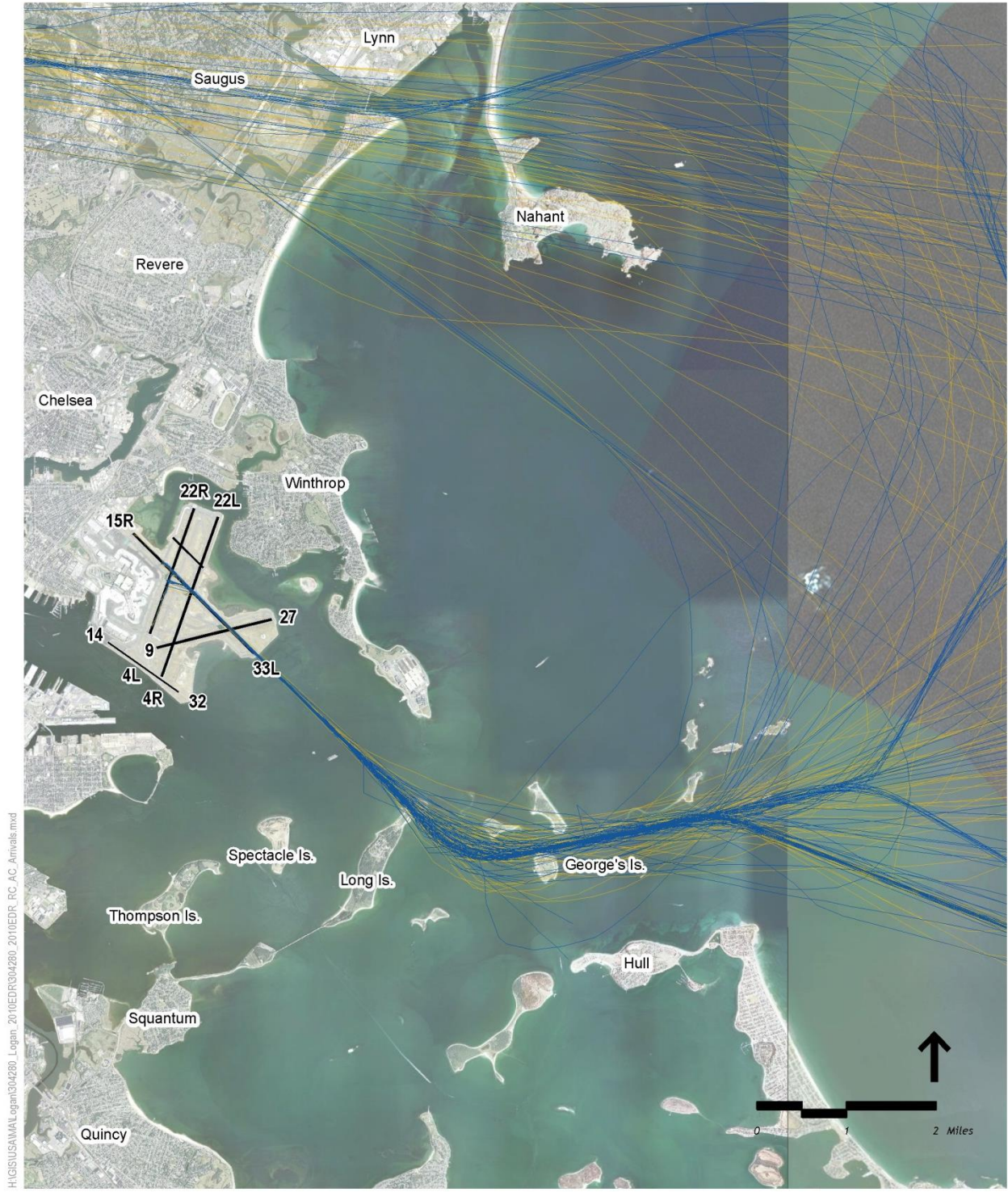
Source: Massport, Exelis NOMS, MassGIS, USDA NAIP 2014.

**RealContours™ Non-Jet Arrival Tracks
(April 2014)**

— Arrival Flight Tracks (2014)
Note: Non-Jet tracks are non-RNAV

Figure 6-8

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H:\GIS\USAM\logan304280_Logan_2010\EDR\304280_2010\EDR_RC_AC_Arrivals.mxd

Source: Massport, Exelis NOMS, MassGIS, USDA NAIP 2014.

Runway 33L Night (10:00pm - 07:00am)
Light Visual Approach Tracks (April 2014)

- Arrival Flight Tracks (2014)
- Arrival Flight Tracks (2013)

Figure 6-9

Noise Levels in 2014

Day-Night Noise Contours for 2014

The 2014 DNL contours were prepared using FAA's most recently available version of the INM (INMv7.0d) and are shown in Figure 6-10 for DNL values of 60, 65, 70, and 75 dB. Figure 6-11 provides a comparison of the DNL 65 dB contours for 2013 and 2014 and how they compare to the historical 1990 and 2000 DNL 65 dB contour. Generally contours at Logan Airport change slightly due to changes in runway use and fleet mix from one year to the next. However, in 2014 two temporary factors and one long term factor resulted in changes to the contour compared to 2013. All homes within the expanded contour are within the previously approved sound insulation areas. Both the 2013 and 2014 DNL contours in Figure 6-11 continue to include the FAA-approved adjustments for over-water sound propagation and hill effects in Orient Heights, unique to Logan Airport.

In general, the shapes of the 2014 DNL 60 and 65 dB contours differ from the 2013 contours for three primary reasons:

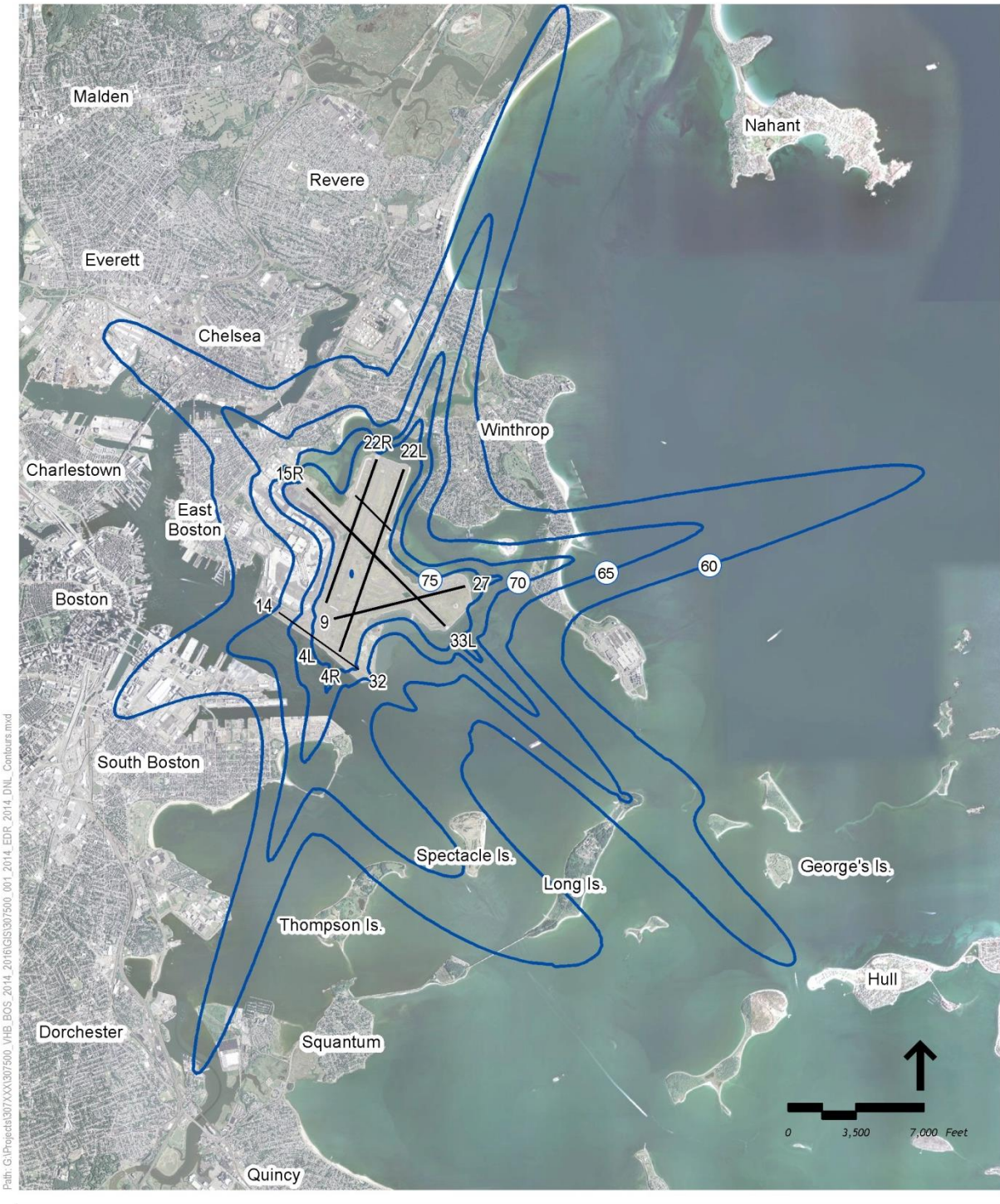
- Elimination of the head-to-head procedure resulted in expanded use of other runways at night. This change also resulted in one way use of Runway 15R-33L (both arrivals and departures to Runway 33L or arrivals and departures to Runway 15R). This extended suspension of the procedure resulted in DNL contour increases over East Boston (additional analysis of this suspension is provided towards the end of this chapter).
- FAA's increased use of Runway 22L for arrivals and reduction to Runway 27 due to Converging Runway Operations (CRO) also contributed to increases over Revere.
- The short term closure of Runway 15L-33R for Safety Area improvements including short term closures of intersecting Runways 4R-22L and 4L-22R resulted in higher uses of Runway 15R-33L.

In 2014 the first full year of RNAV use on all of Logan Airport's runways was in place and RNAV procedures tended to concentrate and elongate the contour. For the DNL 65 dB contour, this only applies to the contour lobe extending out over Boston Harbor from Runway 22L/R departures. The shape of the DNL 60 dB contour over Chelsea and South Boston also follows the RNAV routes.

The DNL 65 dB contour increased in size over Revere primarily due to increases in arrivals to Runway 22L. Over Winthrop, a small increase in the use of Runway 22L for departures at night and the arrivals to Runway 22L caused the DNL 65 dB contour to increase in extent. Over the Point Shirley section of Winthrop, the DNL contour remained similar in size, as arrivals to Runway 27 decreased but departures from Runway 9 increased. Slight increases in arrivals to Runway 33L and 32 resulted in the DNL contour expanding out over Boston Harbor. Departures from Runway 22R did not increase between 2013 and 2014; however use of the runway by heavier, larger aircraft especially at night resulted in increases out towards Spectacle Island. Increased used of Runway 27 departures resulted in the DNL contour increasing slightly towards South Boston. Daytime increases in departures from Runway 33L and arrivals to Runway 15R during the winter months resulted in the largest increase in the extent of the contour over East Boston in 2014.

It is important to note that the 2014 DNL 65 dB contour is within populated areas already sound insulated by Massport (refer to the Noise Abatement discussion presented later on in this chapter). See Figure 6-11.

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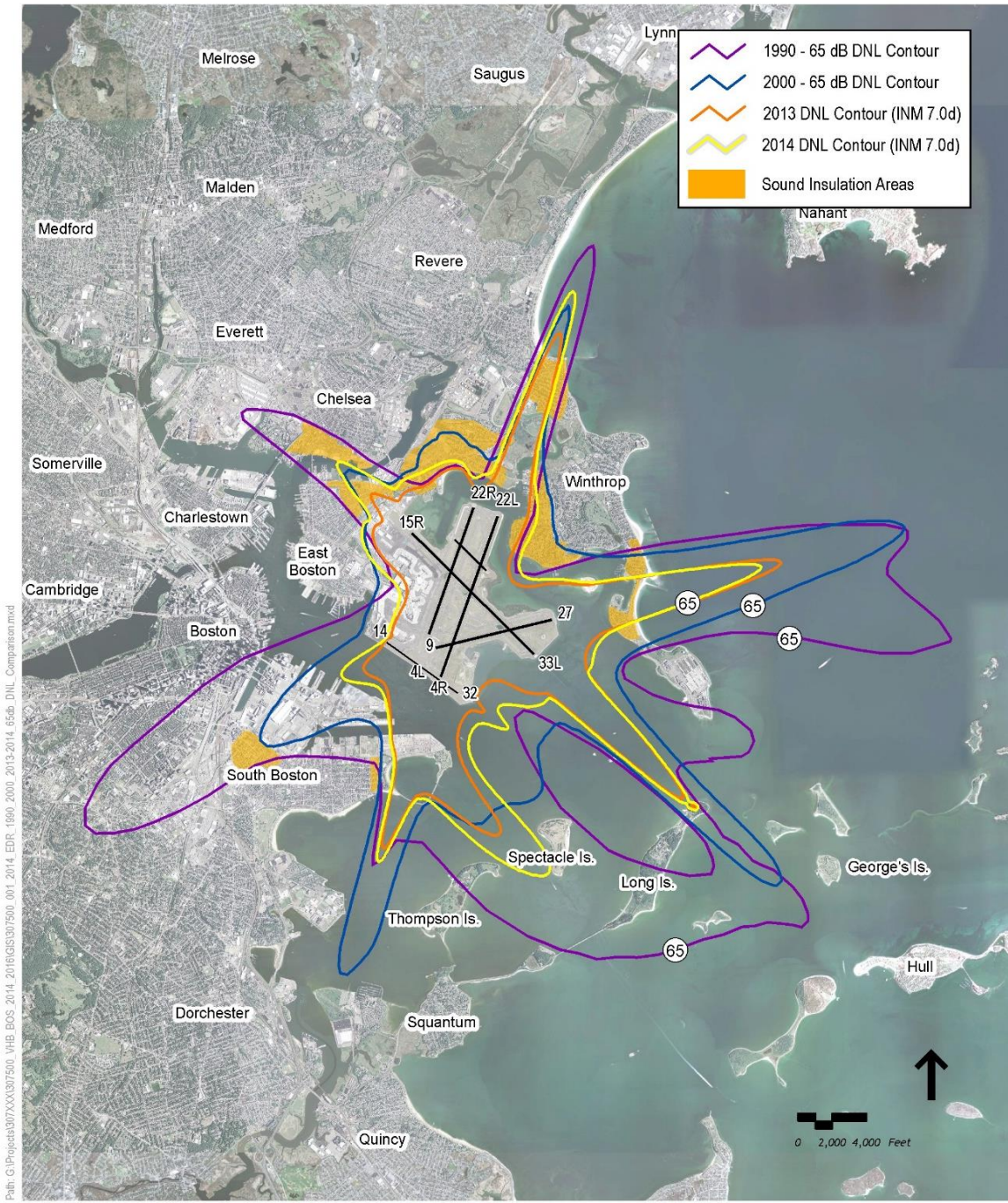
Source: HMMH, MassGIS, USDA NAIP 2014

**60-75 DNL Contours for 2014 Operations
Using INM 7.0d**

Figure 6-10

 2014 DNL Contour (INM 7.0d)

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Source: HMMH, MassGIS, USDANAIP 2014

**Comparison of Historical and Current
 65 dB DNL Contours - 1990, 2000,
 2013, and 2014**

Figure 6-11

Population Impact Assessment

Population counts within selected 5dB increments of exposure are reported each year to indicate how Logan Airport's noise environment changes over time. Population counts for 2014 are shown in Table 6-7 by community and are compared to previous years. The 2010 U.S. Census data, previously reported in the 2010 EDR, were used to determine population counts. Population counts from 2000 through 2009 are based on U.S. Census data for 2000. *Appendix H, Noise Abatement* presents counts for calendar year 2010 from both sets of Census data. The 2010 Census data include updated population counts and can be used to demonstrate the changes in population in an area over a ten year period.

Both the FAA and the U.S. Department of Housing and Urban Development (HUD) consider DNL exposure levels above 65 dB to be incompatible with residential land use. Table 6-7 compares impacted populations for each year, using the latest INM results. The noise analysis is based upon the most recently FAA-approved INM model (Version 7.0d for 2014). Table 6-8 provides an additional breakdown of the estimated population in East Boston and South Boston residing within the DNL 65 dB contour.

The differences in affected population between 2013 and 2014 in Tables 6-7 and 6-8 are primarily due the elimination of the head-to-head procedure at night, shifting of arrival operations to Runway 22L due to Converging Runway Operations, and the short term closure of runways due to the construction of safety areas for Runway 15L-33R. The differences in the contours are attributed mostly to the increased usage, both day and night, of Runway 15R-33L. Shifts in the flight tracks due to the new RNAV procedures have little effect on the DNL 65 dB contour except for the departure turns from Runway 22L and 22R. These procedures also concentrate the flight tracks over a smaller area, which can tend to elongate the contours, but did not significantly change the contours for 2014.

Due to the combination of all these factors in 2014, the total number of people exposed to DNL values greater than 65 dB increased to 8,922 people in 2014 from 4,307 people in 2013 (an increase of 4,615 people). All of the additional people within the DNL 70 dB contour compared to 2013 are located in East Boston and described in greater detail below. The number of people residing within the DNL 70 dB contour increased from 130 people in 2013 to 164 people in 2014. These levels are still well below the number of people exposed in 2000 when 17,745 people were exposed to DNL noise levels greater than 65 dB and 1,551 people were exposed to DNL levels greater than 70 dB. All of the residences exposed to levels greater than DNL 65 dB in 2014 have been eligible to participate in Massport's RSIP.

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Table 6-7 Noise-exposed Population by Community¹

Boston						Revere					
Year	Census	> 75 DNL	70-75 DNL	65 ² -70 DNL	Total (65+) ² DNL	Year	Census	> 75 DNL	70-75 DNL	65 ² -70 DNL	Total (65+) ² DNL
1990	1990	0	1,778	28,970	30,748	1990	1990	0	0	4,274	4,274
2000	2000	0	234	9,014 ³	9,248 ³	2000	2000	0	0	2,496	2,496
2010 (7.0b)	2010	0	0	689	689	2010 (7.0b)	2010	0	0	2,413	2,413
2011 (7.0b)	2010	0	0	331	331	2011 (7.0b)	2010	0	0	2,547	2,547
2011 (7.0c)	2010	0	0	331	331	2011 (7.0c)	2010	0	0	2,547	2,547
2012 (7.0c)	2010	0	0	439	439	2012 (7.0c)	2010	0	0	2,772	2,772
2012 (7.0d)	2010	0	0	421	421	2012 (7.0d)	2010	0	0	2,762	2,762
2013 (7.0d)	2010	0	0	612	612	2013 (7.0d)	2010	0	0	2,505	2,505
2014 (7.0d)	2010	0	34	4,151	4,185	2014 (7.0d)	2010	0	0	2,832	2,832

Chelsea						Winthrop					
Year	Census	> 75 DNL	70-75 DNL	65 ² -70 DNL	Total (65+) ² DNL	Year	Census	> 75 DNL	70-75 DNL	65 ² -70 DNL	Total (65+) ² DNL
1990	1990	0	0	4,813	4,813	1990	1990	676	1,211	2,420	4,307
2000	2000	0	0	0	0	2000	2000	247	1,070	4,684	6,001
2010(7.0b)	2010	0	0	0	0	2010 (7.0b)	2010	0	130	598	728
2011 (7.0b)	2010	0	0	0	0	2011 (7.0b)	2010	0	130	939	1,069
2011 (7.0c)	2010	0	0	0	0	2011 (7.0c)	2010	0	130	939	1,069
2012 (7.0c)	2010	0	0	0	0	2012 (7.0d)	2010	0	200	1,325	1,525
2012 (7.0d)	2010	0	0	0	0	2012 (7.0d)	2010	0	200	1,186	1,386
2013 (7.0d)	2010	0	0	0	0	2013 (7.0d)	2010	0	130	1,060	1,190
2014 (7.0d)	2010	0	0	0	0	2014 (7.0d)	2010	0	130	1,775	1,905

Everett						All Communities					
Year	Census	> 75 DNL	70-75 DNL	65 ² -70 DNL	Total (65+) ² DNL	Year	Census	> 75 DNL	70-75 DNL	65 ² -70 DNL	Total (65+) ² DNL
1990	1980	0	0	0	0	1990	1980	676	2,989	40,477	44,142
2000	2000	0	0	0	0	2000	2000	247	1,304	16,194	17,745
2010 (7.0b)	2010	0	0	0	0	2010 (7.0b)	2010	0	130	3,700	3,830
2011 (7.0b)	2010	0	0	0	0	2011 (7.0b)	2010	0	130	3,817	3,947
2011 (7.0c)	2010	0	0	0	0	2011 (7.0c)	2010	0	130	3,817	3,947
2012 (7.0c)	2010	0	0	0	0	2012 (7.0c)	2010	0	200	4,536	4,736
2012 (7.0d)	2010	0	0	0	0	2012 (7.0d)	2010	0	200	4,369	4,569
2013 (7.0d)	2010	0	0	0	0	2013 (7.0d)	2010	0	130	4,177	4,307
2014 (7.0d)	2010	0	0	0	0	2014 (7.0d)	2010	0	164	8,758	8,922

Source: HMMH 2014, Massport.

Notes: Population counts for 2009 are based on the 2000 U.S. Census block data and the contours beginning in 2004 from the RealContours™ system.

Population counts for 2010 through 2013 are provided for the 2010 U.S. Census block data (as indicated) and the contours are from the RealContours™ system.

1 Data for years prior to 2010 are available in *Appendix H, Noise Abatement*. 7.0b, 7.0c, and 7.0d refer to INMv7.0b, INMv7.0c, and INMv7.0d respectively.

2 65 dB DNL is the federally-defined noise criterion used as a guideline to identify when residential land use is considered incompatible with aircraft noise.

3 These values reflect the effect of the FAA-approved terrain adjustment in Orient Heights.

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Due to the change in runway use in 2014, East Boston had an increase in the number of people exposed to noise levels DNL 65 dB or greater compared to 2013, the number of people exposed increased from 612 to 4,185. For historical context, noise impacts were greater in 2000 when 8,979 people were exposed to levels DNL 65 dB or greater in East Boston and 269 people in South Boston.

The higher use of Runways 4R for departures and Runway 22L for arrivals in 2014 resulted in 327 more people exposed to DNL 65 dB in Revere. There was also an increase of 715 people in Winthrop exposed to DNL 65 dB and above due to increased use of arrivals to Runway 22L and a small increase in night departures from Runway 22L. Similar to Boston, Winthrop has experienced a significant reduction in exposed population dropping from 6,001 in 2000 to 1,905 in 2014.

Year	Census Base	Boston			Chelsea	Revere	Winthrop	Everett	All Communities
		East Boston	South Boston	Total					
1990	1980	NA	NA	30,748	4,813	4,274	4,307	0	44,142
2000	2000	8,979 ³	269	9,248 ³	0	2,496	6,001	0	17,745
2010	2010	689	0	689	0	2,413	728	0	3,830
2011	2010	331	0	331	0	2,574	1,069	0	3,947
2012	2010	439	0	439	0	2,772	1,525	0	4,736
2012	2010	421	0	421	0	2,762	1,386	0	4,569
2013	2010	612	0	612	0	2,505	1,190	0	4,307
2014	2010	4,185	0	4,185	0	2,832	1,905	0	8,922
Change from 2013 (7.0d) to 2014 (7.0d)		3,573	0	3,573	0	327	715	0	4,615

Source: HMMH 2014, Massport.

Notes: Population counts for 2000 are based on the 2000 U.S. Census block data and for 1990 from the 1980 U.S. Census block data.

Population counts for 2010 through 2012 are provided for the 2010 U.S. Census block data (as indicated) and the contours are from the RealContours™ system.

Within the DNL 65 dB contour there was difference reduction in the number of people between the two 2011 INM model runs.

1 65 dB DNL is the federally-defined noise criterion used as a guideline to identify where residential land use is considered incompatible with aircraft noise.

2 Data for years prior to 2010 are available in *Appendix H, Noise Abatement*.

3 These values reflect the effect of the FAA-approved terrain adjustment in Orient Heights.

The total population exposed to noise levels between DNL 70 to 75 dB increased in 2014 to 164 people. Compared to 2000, there has been a significant reduction in the people exposed to the higher noise levels. The number in Boston has dropped from 234 people exposed in 2000 to 34 in 2014. Revere has remained at zero compared to 2000 with Winthrop having reductions from 1,317 people exposed in 2000 to 130 in 2014.

Comparing Measured and Modeled Noise Levels

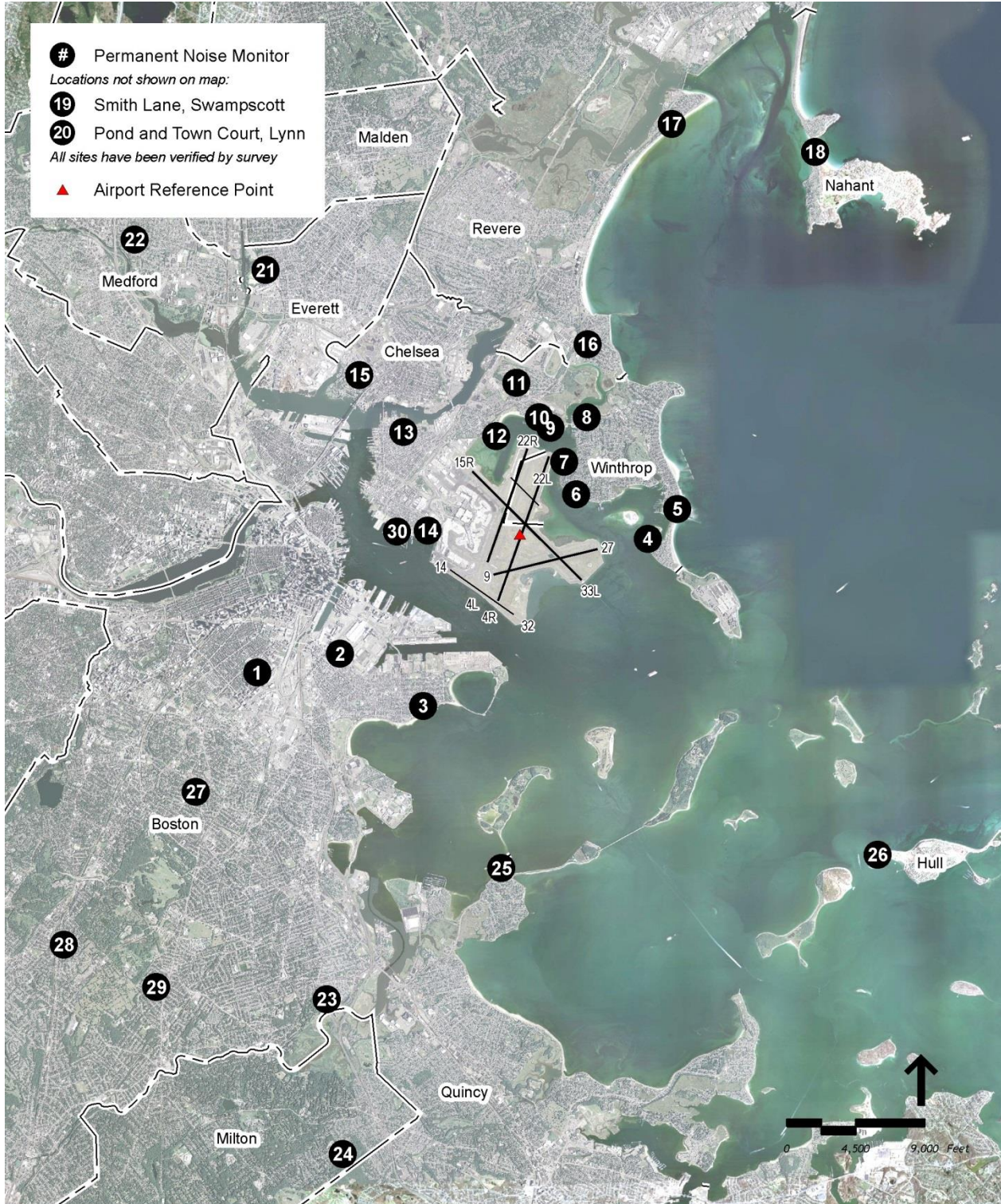
When changes in noise exposure are predicted by the INM, it is important to substantiate these modeled findings with actual noise measurements, such as those taken with Massport's permanent noise monitoring system. Massport's system continuously measures the noise levels at each of the 30 microphone locations around the Airport and environs, as shown in Figure 6-12. During normal operation, noise monitors at the microphone locations measure noise exposure levels as well as a variety of metrics associated with individual noise events that exceed preset threshold sound levels. Noise monitoring data are transmitted back to Massport's Noise Office, where daily DNL values and other noise metrics are computed for each location and summarized in various reports.

This 2014 EDR compares the measured annual average DNL values from the monitors to INM-computed values of DNL at each of the specific noise monitor sites to check for reasonableness. Many sites produced small differences between measurements and predictions, particularly as adjustments were incorporated into the modeling process to account for the over-water sound propagation and hill effects. However, results at more distant locations have often produced substantial differences of 10 dB or more, especially at measurement sites where DNL values were often less than 60 dB. For 2013 and 2014, with the Airport's noise measurement equipment and monitoring system and its ability to correlate measured noise events with individual flight tracks, combined with the improvements in the INM database, differences between measured and modeled values have narrowed from the values even more than reported in previous EDRs and ESPRs.²³

Aircraft altitude is a second factor that contributes to the differences between measured and modeled DNL values (especially at the more-distant noise monitoring sites). Typical noise modeling uses distance from origin to destination to determine the appropriate climb profile for an aircraft; however, many aircraft climb more slowly than the standard profiles would suggest, especially if the pilot must make a turn shortly after takeoff. By modeling the actual climb profile, instead of selecting the best fit among a standard set, better measured versus modeled results should be expected. This technique was applied and resulted in modeling lower altitudes over many of the farther out monitoring sites, which is a better reflection of reality, and further reduced the differences between measured and modeled sound levels at those locations. Finally, latitudes and longitudes of each measurement site were verified by survey and their exact coordinates entered into the INM. These improvements in modeling techniques are now fully integrated into the measured-versus-modeled INM comparisons that follow.

²³ Several factors have resulted in better agreement between measured versus modeled levels. Beginning with the 2009 EDR, flight track data and measurement data have come from the new monitoring system. The more accurate flight track data are used for the modeling inputs and for the measured aircraft event correlation.

Figure 6-12 Noise Monitor Locations



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Table 6-9 compares the measured 2013 DNL values to the measured 2014 DNL values at each location. Measured sound levels generally increased between 2013 and 2014. In 2014, three locations had decreases of more than 2 dB while eight had an increase of more than 2 dB; the remaining 16 locations had changes in levels of less than 2 dB. The average measured value for 27 of the sites was 55.5 dB in 2014, an increase from 54.4 in 2013 (Sites 3, 12 and 30 are excluded from the averages due to issues at each site). During 2013, Site 3 had issues due to noise interference from an outside source, which was resolved in 2014. Site 12 was decommissioned in 2010 and will be relocated at a future date. Site 30 also had an issue during 2014 and recorded a high DNL value. To keep the sites used for the averages consistent between the two years, Site 3, 12 and 30 were excluded from the computations.

Changes at various sites typically follow changes in runway use. For example, Site 22 in Medford, Site 15 in Chelsea, and Site 13 in East Boston all recorded increases of 2 dB or more due to the increased use of Runway 15R-33L. Site 24 in Milton increased slightly by 0.9 dB due to increased use of Runway 4L for arrivals, and Site 23 in Quincy also increased for the same reason.

Distances reported in Table 6-9 and Table 6-10 are computed from the Airport Reference Point which is located along Runway 4L-22R near the intersection with Runway 15R-33L. This location is shown on Figure 6-12. Table 6-10 compares the measured 2013 and 2014 DNL values at each measurement site to the modeled DNL values.

The average measured value for 27 of the sites is 55.5 dB in 2014 and the average modeled value is 58.4 dB in 2014 (Sites 3, 12 and 30 are excluded from the averages due to issues at each site). The average of the difference between the measured versus modeled values for 2013 is 2.8 dB, and 2.9 dB in 2014. In general, due to the modeled values being larger than the measured at most of the more distant monitors, the average difference will always be a positive value.

Using RealContours™, Massport is able to compute the modeled DNL for exactly the same periods for which the noise monitoring system was collecting data at each site. It is also able to capture runway use and airspace changes as they occur. The model however, only computes noise from aircraft and while it includes terrain it does not include other factors such as local weather phenomenon and the influence such as shielding from local buildings and trees.

As shown in Table 6-10, nine of the sites in 2014 have a difference between measured and modeled less than 1 dB. In 2013 and 2014, for the majority of locations where modeled values exceed measured values, the measured levels are below DNL 60 dB. It is not unusual to experience differences between measured and modeled levels at the locations with lower measured DNL values. The monitor identification of aircraft noise events becomes more difficult, and long distance effects can reduce levels that the model cannot duplicate. Differences at these sites farther from the Airport can easily increase the overall difference between measured and modeled results. Site 13 at the East Boston High School matches well with the modeling and both the modeling and the measured levels reflect an increase, which is expected due to the increased traffic on Runway 15R-33L in 2014.

The measured data are not used to calibrate the model but are shown here to compare to the modeled values and in general, they should reveal similar trends. For example, both the measured and the modeled values in East Boston, Chelsea, and Medford increased due to the increased usage of Runway 15R-33L in 2014.

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Table 6-9 Measured Versus Measured - Comparison of Measured DNL Values From 2013 to 2014

Location	Site	Distance from Logan Airport (miles)	2013 Measured Aircraft (DNL)	2014 Measured Aircraft (DNL)	Difference 2014 minus 2013
South End – Andrews Street	1	3.7	54.6	56.0	1.4
South Boston – B and Bolton	2	2.9	54.1	56.6	2.5
South Boston – Day Blvd. near Farragut	3	2.5	69.5	60.5	(9.0)
Winthrop – Bayview and Grandview	4	1.6	71.2	71.0	(0.2)
Winthrop – Harborview and Faun Bar	5	1.9	63.2	63.4	0.2
Winthrop – Somerset near Johnson	6	0.8	60.3	62.5	2.2
Winthrop – Loring Road near Court	7	1.0	64.4	65.7	1.3
Winthrop – Morton and Amelia	8	1.6	58.1	59.6	1.5
East Boston – Bayswater near Annavoy	9	1.3	65.6	67.3	1.7
East Boston – Bayswater near Shawsheen	10	1.3	60.4	55.2	(5.2)
East Boston – Selma and Orient	11	1.8	54.5	55.3	0.8
East Boston Yacht Club	12	1.2			
East Boston High School	13	1.9	59.9	62.0	2.1
East Boston – Jeffries Point Yacht Club	14	1.2	54.6	55.8	1.2
Chelsea – Admiral’s Hill	15	2.8	58.3	60.8	2.5
Revere – Bradstreet and Sales	16	2.4	67.6	68.6	1.0
Revere – Carey Circle	17	5.3	58.7	60.2	1.5
Nahant – U.S.C.G. Recreational Facility	18	5.9	42.0	39.2	(2.8)
Swampscott – Smith Lane	19	8.7	39.8	42.0	2.2
Lynn – Pond and Towns Court	20	8.4	51.7	52.7	1.0
Everett – Tremont near Prescott	21	4.5	47.4	51.7	4.3
Medford – Magoun near Thatcher	22	6.0	48.5	52.2	3.7
Dorchester – Myrtlebank near Hilltop	23	6.3	55.0	55.6	0.6
Milton – Cunningham Park near Fullers	24	8.1	48.1	49.0	0.9
Quincy – Squaw Rock Park	25	4.2	39.7	42.7	3.0
Hull – Hull High School near Channel Street	26	6.0	56.9	58.3	1.4
Roxbury – Boston Latin Academy	27	5.3	53.4	54.4	1.0
Jamaica Plain – Southbourne Road	28	7.7	44.0	45.4	1.4
Mattapan – Lewenburg School	29	7.3	35.9	35.3	(0.6)
East Boston – Piers Park	30	1.5	47.4	63.7	16.3
Arithmetic Average			54.4	55.5	1.1

Source: HMMH.
Notes: Changes in () represent a decrease in measured noise level.
Distance from Logan Airport calculated from the Airport Reference Point.
Site 12 is no longer operational.
Site 3 had interference from an outside source in 2013 and Site 30 in 2014
Sites 3, 12 and 30 are not included in the Average values.

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Table 6-10 Measured Versus Modeled - Comparison of Measured DNL Values to RealContours™-modeled DNL Values, 2013 and 2014

Location	Site	Distance from Logan Airport (miles)	2013	2013	2014	2014	2013	2014
			Measured Aircraft – Only DNL	Modeled RC Results INMv7.0d (DNL) ¹	Measured Aircraft – Only DNL	Modeled RC Results INMv7.0d (DNL) ¹	Difference Modeled minus Measured	
South End – Andrews Street	1	3.7	54.6	53.8	56.0	55.1	(0.8)	(0.9)
South Boston – B and Bolton	2	2.9	54.1	57.9	56.6	59.3	3.8	2.7
South Boston – Day Blvd. near Farragut	3	2.5	69.5	60.5	60.5	60.6	(9.0)	0.1
Winthrop – Bayview and Grandview	4	1.6	71.2	72.8	71.0	72.0	1.6	1.0
Winthrop – Harborview and Faun Bar	5	1.9	63.2	64.2	63.4	64.1	1.0	0.7
Winthrop – Somerset near Johnson	6	0.8	60.3	62.3	62.5	63.7	2.0	1.2
Winthrop – Loring Road near Court	7	1.0	64.4	68.5	65.7	71.8	4.1	6.1
Winthrop – Morton and Amelia	8	1.6	58.1	62.6	59.6	63.5	4.5	3.9
East Boston – Bayswater near Annavoy	9	1.3	65.6	70.7	67.3	72.2	5.1	4.9
East Boston – Bayswater near Shawsheen	10	1.3	60.4	62.6	55.2	65.1	2.2	9.9
East Boston – Selma and Orient ²	11 ²	1.8	54.5	57.3	55.3	57.7	2.8	2.4
East Boston Yacht Club	12	1.2		68.1		69.6		
East Boston High School	13	1.9	59.9	60.0	62.0	62.0	0.1	0.0
East Boston – Jeffries Point Yacht Club	14	1.2	54.6	56.1	55.8	56.8	1.5	1.0
Chelsea – Admiral's Hill	15	2.8	58.3	58.8	60.8	61.2	0.5	0.4
Revere – Bradstreet and Sales	16	2.4	67.6	67.6	68.6	68.9	0.0	0.3
Revere – Carey Circle	17	5.3	58.7	59.6	60.2	60.6	0.9	0.4
Nahant – U.S.C.G. Recreational Facility	18	5.9	42.0	44.6	39.2	45.7	2.6	6.5
Swampscott – Smith Lane	19	8.7	39.8	44.9	42.0	46.3	5.1	4.3
Lynn – Pond and Towns Court	20	8.4	51.7	53.6	52.7	54.7	1.9	2.0
Everett – Tremont near Prescott	21	4.5	47.4	51.7	51.7	54.4	4.3	2.7
Medford – Magoun near Thatcher	22	6.0	48.5	50.8	52.2	53.4	2.3	1.2
Dorchester – Myrtlebank near Hilltop	23	6.3	55	54.2	55.6	54.3	(0.8)	(1.3)
Milton – Cunningham Park near Fullers	24	8.1	48.1	54.0	49.0	54.5	5.9	5.5
Quincy – Squaw Rock Park	25	4.2	39.7	47.7	42.7	47.8	8.0	5.1
Hull – Hull High School near Channel Street	26	6.0	56.9	58.1	58.3	58.6	1.2	0.3
Roxbury – Boston Latin Academy	27	5.3	53.4	52.9	54.4	54.3	(0.5)	(0.1)
Jamaica Plain – Southbourne Road	28	7.7	44	49.1	45.4	50.5	5.1	5.1
Mattapan – Lewenburg School	29	7.3	35.9	46.6	35.3	47.6	10.7	12.3
East Boston – Piers Park	30	1.5	47.4	53.5	63.7	54.3	6.1	(9.4)
Arithmetic Average ³			54.4	57.1	55.5	58.4	2.8	2.9

Source: HMMH.

Note: 2013 and 2014 Modeled results were computed for the whole year.
Distance from Logan Airport calculated from the Airport Reference Point.
NA = Not available.

1 INMv7.0d with adjusted database. (Database modifications as described in the *Logan Airport 1994/1995 Generic Environmental Impact Report*).

2 Includes FAA-approved terrain adjustment modifying normal INMv7.0d result for Site 11.

3 Sites 3, 12 and 30 are not included in the average values.

Supplemental Metrics

To further describe the noise environment, this 2014 EDR includes supplemental noise metrics: CNI, dwell and persistence, and times above a noise threshold.

Cumulative Noise Index (CNI)

Massport reports total annual fleet noise at Logan Airport, as defined in the Logan Airport Noise Rules by a metric referred to as the CNI. The CNI is a single number representing the sum of the entire set of single-event noise energy from each operation experienced at Logan Airport over a full year of operation. The CNI is weighted similarly to DNL so that activity occurring at night is penalized by adding an extra 10 dB to each event. This penalty is equivalent to multiplying the number of nighttime events of each aircraft by a factor of 10.

The Logan Airport Noise Rules define CNI in units of EPNdB²⁴ and require that the index be computed for the fleet of commercial aircraft operating at Logan Airport throughout the year. In addition, in EDRs and ESPRs, Massport reports partial CNI values of noise at Logan Airport, so that various subsets of the fleet (cargo, night operations, passenger jets, etc.) are identified. Utilizing the expanded data available from the NOMS, all of the available aircraft registration data were used to select the proper noise certification levels from the latest aircraft noise registration database.²⁵

The Noise Rules, adopted by Massport following public hearings held in February 1986, established a CNI limit of 156.5 EPNdB. The CNI generally has decreased since 1990, remaining below that cap, and typical changes from one year to the next have been within a few tenths of a dB. The CNI has increased slightly each year since 2010 primarily due to increases in commercial operations or night operations. In 2014, the CNI increased to 152.9 EPNdB representing a 0.6dB change from 2013, but remained well below the cap of 156.5 EPNdB. The partial CNI decreased in four categories and increased in 14 categories for 2014 when compared to 2013.

Partial Cumulative Noise Index Calculations

Partial CNI values were obtained by summing the noise from particular segments of Logan Airport's total operations. They are useful for identifying the greatest contributors to overall noise. As shown in Table 6-11, the sectors of the fleet with the highest numbers of partial CNI indicate a greater contribution to total noise. Table 6-11 also indicates that for 2014:

- The passenger jets' contribution increased in 2014 due to increased operations; and
- The overall nighttime CNI contribution continued to increase compared with daytime due to an increase in nighttime passenger operations.

²⁴ EPNdB is the noise metric used to certify aircraft by the FAA.

²⁵ Type-certificate data sheet for noise database available from the European Aviation Safety Agency; [//easa.europa.eu/certification/type-certificates/noise.php](http://easa.europa.eu/certification/type-certificates/noise.php).

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Table 6-11 Cumulative Noise Index (EPNdB)¹								
Logan Airport CNI Cap – 156.5 EPNdB								
	1990	2000	2010	2011	2012	2013	2014	Change (2013- 2014)
Full CNI								
(Entire Commercial Jet Fleet)	156.4	154.7	151.9	152.1	152.2	152.3	152.9	0.6
Total Passenger Jets	155.2	153.6	150.9	150.6	151.3	151.4	152.2	0.8
Total Cargo Jets	150.1	148.2	145.1	146.7	144.9	145.1	144.5	(0.6)
Total Daytime	152.5	149.5	146.8	146.9	147.0	147.0	147.5	0.5
Total Nighttime	154.4	153.1	150.3	150.6	150.6	150.8	151.3	0.5
Total Stage 2 Jets	NA	124.7	113.6	110.8	104.9 ²	111.3 ³	NA	NA
Total Stage 3 Jets	NA	154.7	151.9	152.1	152.2	152.3	152.9	0.6
Daytime Stage 2	NA	122.6	103.6	NA	104.9	101.4	NA	NA
Nighttime Stage 2	NA	120.5	113.1	110.8	NA	110.8	NA	NA
Daytime Stage 3	NA	149.5	146.8	146.9	147.0	147.0	147.5	0.5
Nighttime Stage 3	NA	153.1	150.3	150.6	150.6	150.8	151.3	0.5
Passenger Jet Stage 2	NA	124.2	NA	NA	104.9 ²	101.4	NA	NA
Passenger Jet Stage 3	NA	153.6	150.9	150.6	151.3	151.4	152.2	0.8
Cargo Jet Stage 2	NA	114.8	113.6	110.8	NA	110.8	NA	NA
Cargo Jet Stage 3	NA	148.2	145.1	146.7	144.9	145.1	144.5	(0.6)
Daytime Passenger	NA	149.3	146.6	146.5	146.8	146.8	147.3	0.5
Nighttime Passenger	NA	151.6	149.0	148.5	149.4	149.6	150.5	0.9
Daytime Cargo	137.1	137.5	134.5	136.6	134.0	133.6	134.9	1.3
Nighttime Cargo	149.9	147.8	144.7	146.3	144.5	144.8	144.0	(0.8)
Daytime Passenger Stage 2	NA	122.3	NA	NA	104.9 ²	101.4	NA	NA
Daytime Passenger Stage 3	NA	149.2	146.6	146.5	146.8	146.8	147.3	0.5
Nighttime Passenger Stage 2	NA	119.8	NA	NA	NA	NA	NA	NA
Nighttime Passenger Stage 3	NA	151.6	149.0	148.5	149.4	149.6	150.5	0.9
Daytime Cargo Stage 2	NA	111.1	103.6	NA	NA	NA	NA	NA
Daytime Cargo Stage 3	NA	137.5	134.4	136.6	134.0	133.6	134.9	1.3
Nighttime Cargo Stage 2	NA	112.3	113.1	110.8	NA	110.8	NA	NA
Nighttime Cargo Stage 3	NA	147.8	144.7	146.3	144.5	144.8	144.0	(0.8)

Source: HMMH 2014.

Notes: General aviation and non-jet aircraft are not included in the calculation.

NA = Not available.

¹ Data for years prior to 2010 are available in *Appendix H, Noise Abatement*.

² The Stage 2 results are from a Falcon 20 aircraft arrival and departure flown by a Charter Operator during 2012.

³ The Stage 2 results during 2013 are from a GII-B aircraft flown by a Charter Operator and a LEAR 25 flown by a Cargo Operator.

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Table 6-12 provides the number of flight operations, the resulting CNI by airline for 2013 and 2014, and the partial CNI per operation for 2013, and 2014. The table shows the relative contribution of each airline to total CNI and reflects the contributions of individual aircraft noise levels and the frequency with which they occur. The table is sorted by the partial CNI by operation for 2014 and shows the major cargo operators at the top of this list, since they operate primarily at night. JetBlue Airways, with the largest number of operations, has the second highest CNI per airline at 145.9 in 2013 and 145.7 in 2014, but its partial CNI by operation is well below the other major airlines in part due to its use of newer, quieter aircraft. Federal Express has less than one tenth of the operations that JetBlue Airways has but its total CNI per airline is 143.8 in 2013 and 143.2 in 2014, or only less than two below JetBlue Airways. The partial CNI by operation for FedEx is the highest of all airlines due to their use of older DC10 and MD11 aircraft. These are the primary aircraft in the FedEx fleet and account for half of their nighttime operations. The noisier signatures of these aircraft combined with the 10 dB nighttime DNL penalty results in the proportionally larger FedEx contribution to the CNI.

Regional carriers generally contribute the least to the partial CNI per operation whereas the international carriers, which operate larger aircraft and generally have more operations at night, are just below the cargo operators in rank. The relative positions for the domestic carriers are due mainly to their fleet characteristics and number of night operations. United Airlines has similar number of operations to Delta Air Lines and much fewer than JetBlue Airways; however, 22.5 percent of its operations are at night as compared to JetBlue Airways, which had only 14.4 percent at night. Delta Air Lines only has 12.7 percent of its operations at night but it flies an older fleet consisting of MD-80s and Boeing 767s.

Table 6-12 Annual Operations and Partial CNI by Airline and per Operation, 2013 and 2014

Airlines with more than 100 flights in 2014	2013 Operations ¹	2013 Total Airline CNI (EPNdB)	2014 Operations ¹	2014 Total Airline CNI (EPNdB)	Partial CNI (EPNdB) per Operation			Airline Category
					2012	2013	2014	
FedEx	3,049	143.8	3,315	143.2	109.0	109.0	108.0	Cargo
United Parcel Service	1,408	137.4	1,435	137.5	105.8	106.0	105.9	Cargo
Atlas Air	205	130.9	489	132.7	N/A	107.8	105.8	Cargo
British Airways	2,576	137.3	2,678	138.2	104.8	103.2	104.0	International
Air France	960	131.1	899	131.8	104.8	101.2	102.3	International
Turkish Airlines	N/A	N/A	452	128.8	N/A	N/A	102.3	International
Lufthansa	1,725	132.6	1,714	134.1	100.6	100.2	101.8	International
Emirates Airlines	N/A	N/A	1,190	132.4	N/A	N/A	101.7	International
Virgin Atlantic	1,066	127.5	716	129.5	97.7	97.2	100.9	International
Alitalia	542	125.3	550	128.1	96.9	97.9	100.7	International
Swiss Air	720	128.0	722	128.7	98.7	99.5	100.2	International
SATA International	468	126.4	533	127.3	100.3	99.7	100.1	International
United Airlines	25,239	142.8	34,609	144.7	98.8	98.8	99.3	Domestic
American Airlines	22,984	141.7	22,626	142.3	97.8	98.1	98.8	Domestic
Southwest Airlines	15,937	140.6	18,525	141.5	98.2	98.6	98.8	Domestic
Alaska Airlines	2,661	132.1	6,180	136.3	98.0	97.8	98.4	Domestic
Iberia Air Lines Spain	404	123.1	332	123.3	97.0	96.8	98.1	International

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Table 6-12 Annual Operations and Partial CNI by Airline and per Operation, 2013 and 2014 (Continued)

Airlines with more than 100 flights in 2014	2013 Operations ¹	2013 Total Airline CNI (EPNdB)	2014 Operations ¹	2014 Total Airline CNI (EPNdB)	Partial CNI (EPNdB) per Operation			Airline Category
					2012	2013	2014	
People Express	N/A	N/A	170	120.1	N/A	N/A	97.8	Domestic
Spirit Airlines	2,721	132.3	2,945	132.3	97.4	97.4	97.6	Domestic
Delta Air Lines	24,011	141	29,557	141.7	96.8	96.6	97	Domestic
Japan Airlines	646	125.1	731	125.6	N/A	96.9	97	International
Virgin America	6720	134.9	3198	132.0	97.8	98.6	97	Domestic
Hainan Airlines Co. Ltd.	N/A	N/A	280	121.5	N/A	N/A	97.0	International
Aer Lingus	1,513	129.1	2,964	131.5	97.1	97.0	96.7	International
JetBlue Airways	79,512	145.9	82,595	145.7	96.9	97.1	96.6	Domestic
Air Canada	1,748	126.8	1,112	126.6	95.3	95.1	96.1	International
TACV-Cabo Verde	214	124.5	186	118.7	102.3	100.7	96	International
US Airways	35,806	141.1	35,993	141.3	95.8	95.4	95.7	Domestic
Shuttle America Corp	12,047	135.4	9,751	134.3	94.8	93.7	94.4	Regional
Sun Country Airlines	943	124.2	1027	124.3	95.1	93.8	94.2	Regional
GoJet Airlines	N/A	N/A	476	120.8	N/A	N/A	94	Domestic
AirTran Airways	7764	133.3	3442	129.2	94.7	94.4	93.9	Domestic
Sky Regional Airlines Inc.	N/A	N/A	3,981	129.5	N/A	N/A	93.5	International
Copa Airlines	347	119	730	122.0	N/A	N/A	93.3	International
SkyWest Airlines	469	118.9	1152	123.8	N/A	N/A	93.2	Domestic
Pinnacle Airlines	5,829	129.7	7,310	131.7	89.4	91.9	93.1	Regional
Icelandair	1,120	123.9	1,227	124.0	93.4	93.0	93.1	International
Mesa Airlines	886	119.4	1,404	124.3	95.3	93.3	92.9	Regional
US Airways Express/Republic	3,250	127.5	3290	127.5	93.2	92.8	92.4	Regional
AWAC - US Air Express	6,440	129.9	6,165	129.9	91.4	91.4	92	Regional
Delta Connection/Atlantic SE	4744	128.3	6965	129.7	91.6	91.5	91.3	Domestic
Chautauqua	3,387	125.9	1,870	122.6	90.2	91.9	89.9	Regional
Air Canada Jazz	5,131	126.8	14,353	131.3	90.2	89.9	89.8	International
Trans States Airlines	181	114.2	160	111.8	90.3	89.8	89.8	Regional

Source: HMMH, Massport. 2015.

Notes: NA = Airline had no operations at Logan Airport.

1 Operations for some carriers differ to those in *Chapter 2, Activity Levels* and *Chapter 7, Air Quality/Emissions Reduction* because this table only includes jet aircraft and not turboprops, and because it includes both scheduled and unscheduled air carriers.

Dwell and Persistence Reduction Goals

Another supplemental measure of noise impact relates to the length of time noise impacts occur. To provide temporary relief to neighborhoods affected by regular overflights during single or multi-day periods, the PRAS Advisory Committee established two short-term goals for the system in addition to the annual goals:

- Provide relief from excessive dwell. Exceedance is defined as more than seven hours of operations over a given area during any day between the hours of 7:00 AM and midnight.
- Provide relief from excessive persistence. Exceedance is defined as more than 23 hours of operations over an area between 7:00 AM and midnight during a period of three consecutive days.

In contrast to the annual goals that count the number of equivalent operations on a runway, dwell and persistence are measured by the number of hours that a given location or area is subject to jet aircraft overflights. The PRAS Advisory Committee designated eight runway end combinations for computing the effects of dwell and persistence on the communities, as shown in Table 6-13.

Runway	Representative Affected Neighborhoods
4L and 4R Arrivals	South Boston (Farragut St.), Dorchester, Quincy, Milton, Weymouth, and Braintree
32 and 33L Arrivals	Boston Harbor, Hull, Cohasset, Hingham, Scituate, and other South Shore locations
14 and 15R Departures	Boston Harbor, Hull, Cohasset, Hingham, Scituate, and other South Shore locations
22L and 22R Departures	South Boston (Farragut Street), Boston Harbor, Hull, Cohasset, Hingham, Scituate, and other South Shore locations
27 Departures	South Boston (Fan Pier), Roxbury, Jamaica Plain, South End, West Roxbury, Roslindale, Brookline, Hyde Park, and other points South and West
4L and 4R Departures plus 22L and 22R Arrivals	East Boston (Bayswater, Orient Heights), Winthrop (Court Road), Revere, and Nahant
9 Departures plus 27 Arrivals	Winthrop (Point Shirley), Boston Harbor, and other points North
33 Departures plus 15 Arrivals	East Boston (Eagle Hill), Chelsea, Everett, Medford, Somerville, Arlington, Cambridge, and other points South and West

Source: Massport.

As required by Massport’s commitments for the Logan Airside Improvements Planning Project,²⁶ this 2014 EDR reports on noise dwell and persistence levels. Higher levels of dwell or persistence for overwater areas represent a benefit since this produces a corresponding decrease in total hours over populated areas. Figures 6-13 and 6-14 illustrate the annual hours of dwell and persistence by runway end for 2009 through 2014. The RSA construction which altered annual runway use during 2011 and 2012 is evident in the figures as those two years are lower in the arrivals to Runway 15R and departures from Runway 33L runway end and higher in most of the remaining runway ends. Use of the runways returned to pre-construction levels in 2013. In 2013 and 2014, the largest contributor to dwell and persistence remained arrivals to Runway 27 and departures from Runway 9; persistence and dwell both increased in 2014 compared to 2013. This was due to the higher use of Runway 9 for departures during 2014. Dwell and persistence has substantially increased for Runway 15R arrivals and Runway 33L departures and also for Runways 32 and 33L arrivals in 2014.

²⁶ Logan Airside Improvements Planning Project Final EIS, Section 4.2.3 PRAS Monitoring and Reporting June 2002.

Figure 6-13 Comparison of Annual Hours of Dwell Exceedance by Runway End, 2010 to 2014

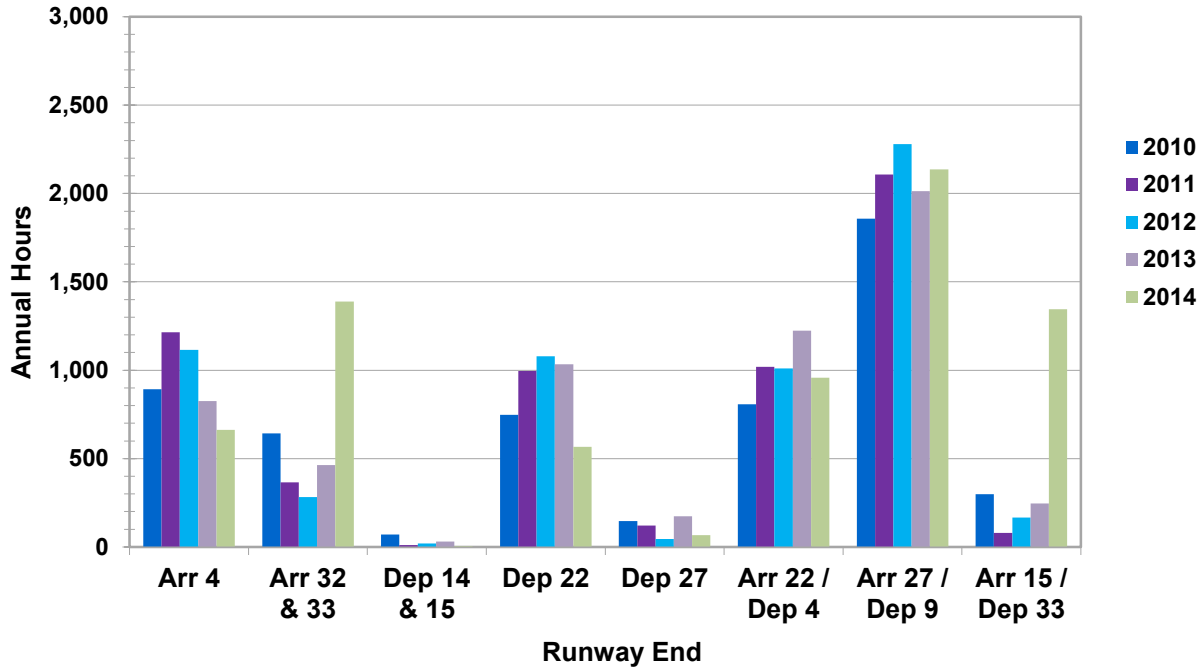
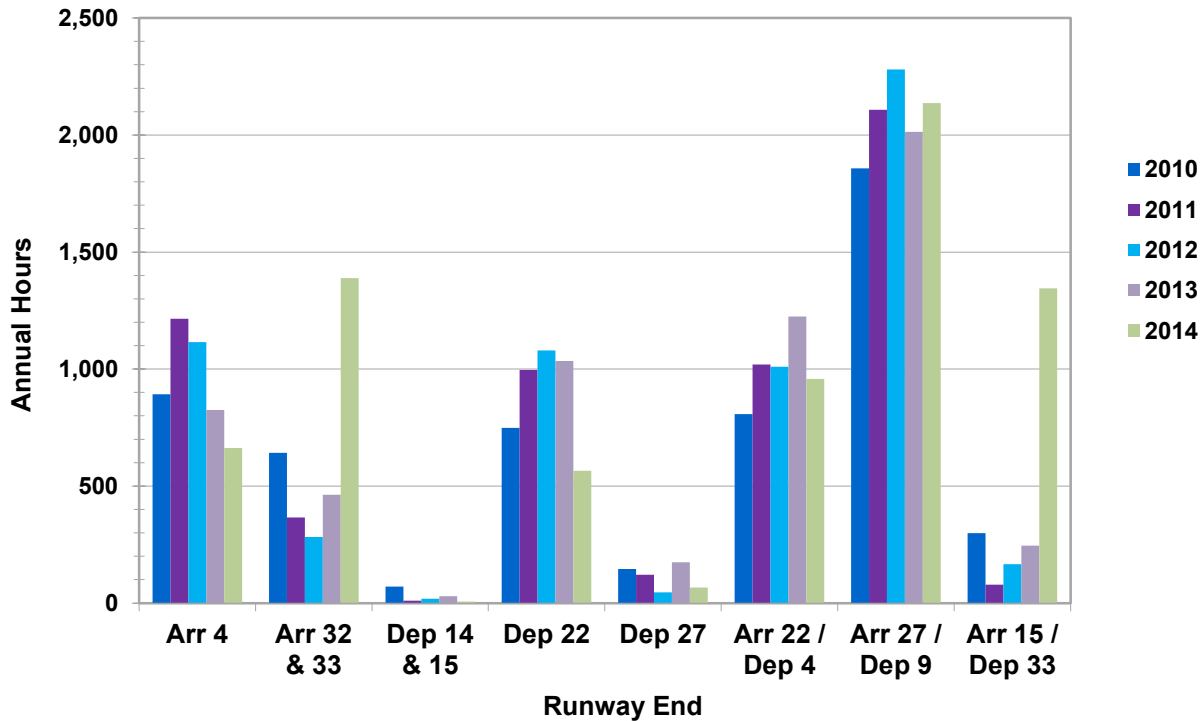


Figure 6-14 Comparison of Annual Hours of Persistence Exceedance by Runway End, 2010 to 2014



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Time Above (TA)

The third supplemental noise metric reported in this 2014 EDR is the amount of time that aircraft noise is above each of three predefined threshold sound levels. The measure is referred to generally as TA, and the threshold sound levels used in the analysis are 65, 75, and 85 dBA (A-weighted dBs). Like DNL values, these times are computed using the FAA-approved INM as modified for Logan Airport. The calculations are made at each of Massport's permanent noise monitoring locations and are based on an average 24-hour day during the year as well as for the average nine-hour nighttime period from 10:00 PM to 7:00 AM. The threshold sound levels of 65, 75, and 85 dBA reflect different degrees of speech interference depending on factors such as whether people are outdoors, indoors with their windows open, or indoors with windows closed. Findings for 2014 include:

- The TA results at many of the sites correspond to the change in the contour levels. At Site 2, which is affected by Runway 27 departures, the 24-hour TA₆₅ level increased from 18.1 minutes in 2013 to 20.4 minutes in 2014. This is consistent with the higher use of Runway 27 during 2014.
- At Site 13 (East Boston High School), TA values increased from 22.7 minutes in 2013 to 32.2 minutes in 2014 reflecting the increased use of Runway 15R-33L in 2014.

Tables 6-14 and 6-15 present a summary of the calculated TA values for 2013 and 2014.

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Table 6-14 Time Above (TA) dBA Thresholds in a 24 Hour Period for Average Day¹

Location	Site	Distance from Logan Airport (miles)	Minutes above Threshold			Minutes above Threshold			Modeled Day-Night Sound Levels	
			2013			2014			2013 ²	2014 ²
			85 dBA	75 dBA	65 dBA	85 dBA	75 dBA	65 dBA		
Winthrop – Bayview and Grandview	4	1.6	13.1	43.5	92.0	10.5	36.8	79.3	72.8	72.0
Winthrop – Harborview and Faun Bar	5	1.9	0.2	14.7	81.8	0.2	14.6	71.8	64.2	64.1
Winthrop – Somerset near Johnson	6	0.8	0.0	3.7	96.4	0.1	4.1	99.5	62.3	63.7
Winthrop – Loring Road near Court	7	1.0	2.5	26.7	154.5	2.4	24.2	149.1	68.5	71.8
Winthrop – Morton and Amelia	8	1.6	0.0	3.7	60.5	0.0	3.9	61.8	62.6	63.5
East Boston – Bayswater near Annavoy	9	1.3	1.7	25.2	74.1	2.2	29.6	82.9	70.7	72.2
East Boston – Bayswater near Shawsheen	10	1.3	0.2	6.2	42.8	0.3	6.6	50.5	62.6	65.1
East Boston – Selma and Orient	11	1.8	0.0	0.9	9.1	0.0	0.9	10.0	57.3	57.7
East Boston Yacht Club	12	1.2	1.0	38.6	171.5	1.3	34.8	156.6	68.1	69.6
East Boston High School	13	1.9	0.1	5.0	22.7	0.1	7.4	32.2	60.0	62.0
East Boston – Jeffries Point Yacht Club	14	1.2	0.0	0.5	10.2	0.0	0.7	11.0	56.1	56.8
East Boston – Piers Park	30	1.5	0.0	0.3	4.6	0.0	0.3	5.1	53.5	54.3
Chelsea – Admiral's Hill	15	2.8	0.1	3.8	20.1	0.1	6.3	29.6	58.8	61.2
Revere – Bradstreet and Sales	16	2.4	1.6	14.2	35.1	2.5	19.7	47.6	67.6	68.9
Revere – Carey Circle	17	5.3	0.0	1.2	26.6	0.0	1.5	36.7	59.6	60.6
Nahant – U.S.C.G. Recreational Facility	18	5.9	0.0	0.0	0.3	0.0	0.0	0.3	44.6	45.7
Everett – Tremont near Prescott	21	4.5	0.0	0.2	7.2	0.0	0.4	11.9	51.7	54.4
Medford – Magoun near Thatcher	22	6.0	0.0	0.1	6.1	0.0	0.2	10.0	50.8	53.4
Swampscott – Smith Lane	19	8.7	0.0	0.0	0.9	0.0	0.0	1.1	44.9	46.3
Lynn - Pond and Towns Court	20	8.4	0.0	0.0	7.6	0.0	0.0	11.5	53.6	54.7
South End – Andrews Street	1	3.7	0.0	0.3	10.9	0.0	0.4	12.6	53.8	55.1
South Boston – B and Bolton	2	2.9	0.0	2.5	18.1	0.0	3.4	20.4	57.9	59.3
South Boston – Day Blvd. near Farragut	3	2.5	0.1	4.1	54.1	0.0	3.8	53.1	60.5	60.6
Roxbury – Boston Latin Academy	27	5.3	0.0	0.2	9.5	0.0	0.2	11.4	52.9	54.3
Jamaica Plain - Southbourne Road	28	7.7	0.0	0.0	3.1	0.0	0.0	4.2	49.1	50.5
Mattapan – Lewenburg School	29	7.3	0.0	0.0	0.7	0.0	0.0	0.8	46.6	47.6
Dorchester – Myrtlebank near Hilltop	23	6.3	0.0	0.0	12.8	0.0	0.0	12.7	54.2	54.3
Milton – Cunningham Park near Fullers	24	8.1	0.0	0.0	13.2	0.0	0.0	15.4	54.0	54.5
Quincy – Squaw Rock Park	25	4.2	0.0	0.0	0.6	0.0	0.0	0.4	47.7	47.8
Hull – Hull High School near Channel Street	26	6.0	0.0	0.3	25.8	0.0	0.3	26.3	58.1	58.6
Average TA Value			0.7	6.5	35.8	0.7	6.7	37.2	63.4	64.5

Source: HMMH 2015.

Notes: Distance from Logan Airport calculated from the Airport Reference Point.
dBA = A-weighted decibel

1 Modeled using RealContours™ and RealProfiles™ using INM (v7.0d).

2 INMv7.0d for all of 2013 and 2014 (12 months) with adjusted database. (Database modifications as described in the Logan Airport 2004 ESPR).

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Table 6-15 Time Above (TA) dBA Thresholds in a Nine Hour Night Period for Average Day¹

Location	Site	Distance from Logan Airport (miles)	Minutes above Threshold			Minutes above Threshold			Modeled Day-Night Sound Levels	
			During the Night 2013			During the Night 2014			2013 ²	2014 ²
			75 dBA	65 dBA	65 dBA	85 dBA	75 dBA	65 dBA		
Winthrop – Bayview and Grandview	4	1.6	1.2	3.8	8.4	1.0	3.3	7.5	72.8	72.0
Winthrop – Harborview and Faun Bar	5	1.9	0.0	1.4	7.4	0.0	1.4	6.6	64.2	64.1
Winthrop – Somerset near Johnson	6	0.8	0.0	0.6	13.0	0.1	1.3	17.5	62.3	63.7
Winthrop – Loring Road near Court	7	1.0	0.3	3.1	20.9	0.6	4.5	25.9	68.5	71.8
Winthrop – Morton and Amelia	8	1.6	0.0	0.5	9.3	0.1	0.9	12.2	62.6	63.5
East Boston – Bayswater near Annavoy	9	1.3	0.3	4.5	13.7	0.5	5.9	16.8	70.7	72.2
East Boston – Bayswater near Shawsheen	10	1.3	0.0	0.5	8.5	0.1	1.3	11.0	62.6	65.1
East Boston – Selma and Orient	11	1.8	0.0	0.0	0.5	0.0	0.0	1.0	57.3	57.7
East Boston Yacht Club	12	1.2	0.2	5.6	25.2	0.6	6.9	27.8	68.1	69.6
East Boston High School	13	1.9	0.0	0.6	2.7	0.0	1.0	3.9	60.0	62.0
East Boston – Jeffries Point Yacht Club	14	1.2	0.0	0.0	1.2	0.0	0.0	1.7	56.1	56.8
East Boston – Piers Park	30	1.5	0.0	0.0	0.4	0.0	0.0	0.6	53.5	54.3
Chelsea – Admiral’s Hill	15	2.8	0.0	0.5	2.4	0.0	0.9	3.7	58.8	61.2
Revere – Bradstreet and Sales	16	2.4	0.4	3.4	7.9	0.6	4.2	9.8	67.6	68.9
Revere – Carey Circle	17	5.3	0.0	0.2	6.4	0.0	0.3	8.0	59.6	60.6
Nahant – U.S.C.G. Recreational Facility	18	5.9	0.0	0.0	0.0	0.0	0.0	0.1	44.6	45.7
Everett – Tremont near Prescott	21	4.5	0.0	0.0	0.8	0.0	0.1	1.8	51.7	54.4
Medford – Magoun near Thatcher	22	6.0	0.0	0.0	0.7	0.0	0.0	1.3	50.8	53.4
Swampscott – Smith Lane	19	8.7	0.0	0.0	0.1	0.0	0.0	0.2	44.9	46.3
Lynn - Pond and Towns Court	20	8.4	0.0	0.0	2.2	0.0	0.0	2.8	53.6	54.7
South End – Andrews Street	1	3.7	0.0	0.0	1.7	0.0	0.1	2.3	53.8	55.1
South Boston – B and Bolton	2	2.9	0.0	0.4	2.6	0.0	0.7	3.5	57.9	59.3
South Boston – Day Blvd. near Farragut	3	2.5	0.0	0.2	5.3	0.0	0.2	6.1	60.5	60.6
Roxbury – Boston Latin Academy	27	5.3	0.0	0.0	1.4	0.0	0.1	2.1	52.9	54.3
Jamaica Plain - Southbourne Road	28	7.7	0.0	0.0	0.5	0.0	0.0	0.8	49.1	50.5
Mattapan – Lewenburg School	29	7.3	0.0	0.0	0.0	0.0	0.0	0.1	46.6	47.6
Dorchester – Myrtlebank near Hilltop	23	6.3	0.0	0.0	1.3	0.0	0.0	1.4	54.2	54.3
Milton – Cunningham Park near Fullers	24	8.1	0.0	0.0	1.6	0.0	0.0	2.0	54.0	54.5
Quincy – Squaw Rock Park	25	4.2	0.0	0.0	0.0	0.0	0.0	0.0	47.7	47.8
Hull – Hull High School near Channel Street	26	6.0	0.0	0.1	5.1	0.0	0.1	6.2	58.1	58.6
Average TA Value			0.1	0.9	5.0	0.1	1.1	6.2	63.4	64.5

Source: HMMH 2015.

Notes: Distance from Logan Airport calculated from the Airport Reference Point.

dBA = A-weighted decibel

1 INMv7.0d for all of 2013 and 2014 (12 months) with adjusted database. (Database modifications as described in the 2004 ESPR).

2 Modeled using RealContours™ and RealProfiles™ using INM v7.0d.

Noise Abatement

Massport's noise abatement program continues to play a critical role in helping to limit and monitor noise impacts. Massport's emphasis on noise abatement has focused on the benefits of better analysis tools and improved modeling techniques to identify the causes of noise problems. Massport also continues to coordinate with the FAA and the Logan Airport (CAC) on matters related to runway use and the on-going BLANS project.

Installed in 2008, the upgraded NOMS system includes vastly improved analysis and mapping capabilities, better quality flight tracking data, use of multilateration radar (a separate and unique source of operational data), and direct correlation of noise events with radar flight paths and complaints (a feature that the prior system did not have). This latter capability has improved the ability of the system to differentiate between aircraft and community noise sources. All measured data and complaint information in this report were generated through the new NOMS.

Other continuing elements of Massport's noise mitigation program are discussed below.

- The Massport Noise Abatement Office, which was initiated in 1977. The Noise Office also maintains the noise section of the Massport website.²⁷ The site provides information on Massport's sound insulation program, the Airport's noise monitoring system, various abatement measures, and other information of interest to the public.
- Preferred runway use designed to optimize Boston Inner Harbor operations (especially during nighttime hours).
- One of the most extensive residential and school sound insulation programs in the nation. To date, Massport has installed sound insulation in 5,467 residences, including 11,515 dwelling units, and 36 schools in East Boston, Roxbury, Dorchester, Winthrop, Revere, Chelsea, and South Boston.
- Historically, the percentage of eligible homeowners who have responded and whose dwellings are ultimately treated varies significantly by community from a high of nearly 90 percent in Revere to a low of about 50 percent in South Boston. Eighty to 85 percent of homeowners in East Boston and Winthrop have historically participated. Approximately 8 percent of applicants also choose the Room-of-Preference option that allows the owner to identify a room (usually a bedroom or living room) for extra acoustical treatment.
- The Massport RSIP program is almost complete within all areas currently eligible; if the DNL contour expands into untreated areas Massport would apply to the FAA for funds to sound insulate these areas.
- Development of annual noise contours (Figure 6-11 compares the DNL 65 dB contours for 2013 and 2014).
- A website that features an internet flight tracking system known as PublicVue. (<http://www.massport.com/environment/environmental-reporting/noise-abatement/flight-monitor/>). The PublicVue site allows the user to view flight tracks in near-real time, replay flight tracks, and enter noise complaints.

27 www.massport.com/environment/environmental-reporting/Noise%20Abatement/overview.aspx.

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- Summary reports of operations by airline, runway, aircraft type, and other parameters that help the Noise Office track potential changes in the noise environment. Tables 6-12 and 6-14 are examples of these reports.
- Where appropriate as part of the BLANS process, FAA designed (with Massport in an advisory role) RNAV procedures to avoid highly populated areas and the use of an overwater visual approach at night to keep aircraft offshore as much as possible.

Airline Fleet Improvements

Commercial air carrier and cargo operators are deploying the newest engine technology at Logan Airport. Table 6-16 summarizes each airline operator and the percentage of its fleet that were originally manufactured as Stage 3 or Stage 4 aircraft prior to 2013. For 2013 and 2014, the table reports the percent of the airlines' fleet which is Stage 3 or Stage 4 equivalent. All of the major U.S. airlines at Logan Airport are using a fleet which is composed of 100 percent originally manufactured Stage 3 or Stage 4 aircraft. All of the new carriers at Logan Airport in 2014 are utilizing Stage 4 equivalent aircraft.

Massport recently initiated terminal and airfield improvements designed to safely handle the next generation of larger and more efficient Group VI aircraft including the Airbus A380, the world's largest and quietest commercial aircraft. Use of these larger aircraft will help to continue the trend of carrying more passengers in fewer flights.

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Table 6-16 Airline Operations (percent) in Original Stage 3 or Equivalent Stage 4 Aircraft¹ (2013 to 2014)

Airlines with more than 100 flights	Number of Flights		Percentage of Original Stage 3 and 4 Operations ²			
	2013	2014	2013 Stage 3	2013 Stage 4 Equiv.	2014 Stage 3	2014 Stage 4 Equiv.
Jetblue Airways	79,512	82,595	0%	100%	0%	100%
US Airways	35,806	35,993	1%	99%	0%	100%
United Airlines	25,239	34,609	0%	100%	0%	100%
Delta Air Lines	24,011	29,557	10%	90%	13%	87%
American Airlines	22,984	22,626	0%	100%	0%	100%
Southwest Airlines	15,937	18,525	19%	81%	18%	82%
Air Canada Jazz	5,131	14,353	0%	100%	0%	100%
Shuttle America Corp	12,047	9,751	0%	100%	0%	100%
Pinnacle Airlines	5,829	7,310	0%	100%	0%	100%
Delta Connection/Atlantic SE	4,744	6,965	0%	100%	0%	100%
Alaska Airlines	2,661	6,180	0%	100%	0%	100%
AWAC - US Air Express	6,440	6,165	0%	100%	0%	100%
Sky Regional Airlines Inc	3,141	3,981	0%	100%	0%	100%
AirTran Airways	7,764	3,442	0%	100%	0%	100%
Federal Express	3,049	3,315	32%	68%	40%	60%
US Airways Express/Republic	3250	3,290	0%	100%	0%	100%
Virgin America	3,360	3,198	0%	100%	0%	100%
Aer Lingus	1,513	2,964	0%	100%	0%	100%
Spirit Airlines	2,721	2,945	0%	100%	0%	100%
British Airways	2,576	2,678	0%	100%	0%	100%
Chautauqua	3,387	1,870	0%	100%	0%	100%
Lufthansa	1,725	1,714	0%	100%	0%	100%
United Parcel Service	1,408	1,435	0%	100%	0%	100%
Mesa Airlines	886	1,404	0%	100%	0%	100%
Icelandair	1120	1,227	0%	100%	0%	100%
Emirates Airlines	NA	1,190	N/A	N/A	0%	100%
SkyWest Airlines	469	1152	0%	100%	0%	100%
Air Canada	1748	1112	0%	100%	0%	100%
Sun Country Airlines	943	1027	0%	100%	0%	100%
Air France	960	899	0%	100%	0%	100%
Japan Airlines	646	731	0%	100%	0%	100%
Copa Airlines	347	730	0%	100%	0%	100%
Swiss Air	720	722	0%	100%	0%	100%
Virgin Atlantic	712	716	0%	100%	0%	100%
Alitalia	542	550	0%	100%	0%	100%
SATA International Airlines	468	533	0%	100%	0%	100%
Atlas Air	205	489	100%	0%	100%	0%
GoJet Airlines	NA	476	N/A	N/A	0%	100%
Turkish Airlines	NA	452	N/A	N/A	0%	100%
Iberia Air Lines Of Spain	404	332	0%	100%	0%	100%
Hainan Airlines Co. Ltd.	NA	280	N/A	N/A	0%	100%
TACV-Cabo Verde	214	186	0%	100%	0%	100%
People Express	NA	170	N/A	N/A	100%	0%
Trans States Airlines	181	160	0%	100%	0%	100%
Delta Connection/Comair	0	0	N/A	N/A	N/A	N/A
Compass Airlines	0	0	N/A	N/A	N/A	N/A
DHL Airways	0	0	N/A	N/A	N/A	N/A
Frontier Airlines	0	0	N/A	N/A	N/A	N/A

Source: Massport, 2014.

NA Not Available

1 Operations for some carriers differ with those in Chapter 2, Activity Levels, and Chapter 7, Air Quality/Emissions Reduction because the table only includes jet aircraft, not turboprops, and it includes scheduled and unscheduled air carriers.

2 Original Stage 3 means originally manufactured as a certificated Stage 3 aircraft under FAR Part 36. Stage 4 equivalent means the aircraft is either certificated Stage 4 or certificated Stage 3 and meets Stage 4 requirements.

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Noise Complaint Line

In 2014, Massport received 12,855 noise complaints from 82 communities, a substantial increase from 2013 which logged 6,809 noise complaints from 74 communities. The increase in complaints was associated with the changes in runway use in 2014, most notably due to the elimination of the nighttime noise abatement procedure for over half of the year, increasing traffic over residential neighborhoods, as well as concentrations of flight tracks due to FAA RNAV procedures.

Table 6-17 is a summary of noise complaints from the Massport Noise Abatement Office. The summary table presents the top ten communities for both 2013 and 2014 in terms of the number of complaints and number of callers. The communities listed below represent 86 percent of the complaints in 2013 and 82 percent of the complaints in 2014. All of the remaining communities are summed together into a single line above the Grand total. *Appendix H, Noise Abatement* has a full listing of the complaints by community.

Table 6-17 Noise Complaint Line Summary					
Town	2013		2014		Change (2013 to 2014)
	Calls	Callers	Calls	Callers	
Belmont	605	65	1,658	116	1,053
Cambridge	266	33	585	71	319
East Boston	124	42	354	106	230
Hull	923	156	1,855	332	932
Hyde Park	189	6	50	16	(139)
Lynn	405	5	482	5	77
Medford	49	33	742	154	693
Milton	1,925	222	2,669	189	744
Nahant	17	9	109	20	92
Roxbury	74	5	113	9	39
Somerville	166	72	938	239	772
South Boston	438	22	67	26	(371)
Watertown	196	44	541	72	345
Weymouth	217	7	83	7	(134)
Winthrop	252	86	237	98	(15)
Total (Only for Towns listed above)	5,846	807	10,483	1,460	4,637
Total Complaints from Other Towns	963	302	2,372	624	1,409
Total Complaints for 2014	6,809	1,109	12,855	2,084	6,046

Source: Massport, 2014.

Note: The top ten communities for each year are listed above. The complete list of complaints is in *Appendix H, Noise Abatement*.

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Boston Logan Airport Noise Study

The FAA's ROD approving construction of the unidirectional Runway 14-32 required that the FAA, Massport, and the Logan Airport CAC jointly undertake a study to determine whether changes to existing noise abatement flight track corridors might further reduce noise impacts. In addition, the Massachusetts Environmental Policy Act (MEPA) Certificate for the *Boston-Logan Airside Improvements Planning Environmental Impact Report (EIR)* directed Massport to work with the FAA and local communities on a review of the Logan Airport PRAS. FAA has been implementing RNAV procedures at airports across the country such as Phoenix and Minneapolis-St. Paul. The noise study was able to influence the design of these RNAV procedures for implementation at Logan Airport.

Phase 1

This FAA study is being conducted in multiple phases. Phase 1, which was known as the Boston Overflight Noise Study (BONS), was initiated in the winter of 2004 and was completed in fall of 2007. During Phase 1, 55 airspace and operational alternatives to reduce noise related to Logan Airport overflights were identified and screened for safety, operational, and noise benefits. Of the 55 alternatives, 13 measures were identified as potentially implementable in the near term. This phase was completed in 2007 and a National Environmental Policy Act (NEPA) Categorical Exclusion was issued by FAA in October 2007 for several flight path changes mostly along the northeast and southeast shores from the Airport.²⁸

The conventional and radar vectored²⁹ changes which could be implemented without airspace changes were implemented in February 2008. RNAV and other changes began taking place in 2009 when FAA completed design of these procedures. RNAV procedures were published by FAA on October 22, 2009 and were implemented in 2010.

Eight new RNAV procedures were implemented by FAA in 2010 and 2011 for Runways 4R, 9, 15R, 22R and 22L. Under these procedures, aircraft immediately depart the Airport similar to existing procedures but then aircraft follow a precise path over Boston Harbor, then aircraft cross the shoreline and return back over land at a higher altitude than previous procedures. In 2013, Runways 27 and 33L were added to these procedures:

- Starting on 2/1/2010 all six RNAV procedures were in use from Runway 9;
- Starting on 5/3/2010 all six RNAV procedures were in use from Runway 4R;
- Starting on 11/18/2010 all six RNAV procedures were in use from Runways 15R, 22R, and 22L;
- Starting on 3/10/2011 all eight RNAV procedures were in use from Runways 4R, 9, 15R, 22R and 22L;
- Starting on 3/7/2013 all eight RNAV procedures were in use Runways 4R, 9, 15R, 22R, 22L, and 27; and
- Starting on 6/5/2013 all eight RNAV procedures were in use Runways 4R, 9, 15R, 22R, 22L, 27, and 33L.

On December 14, 2011, three new RNAV STARs were also implemented by FAA. These concentrate arrivals on routes leading into the Logan Airport's airspace and improve efficiency of arrivals. These have little effect on the noise environment close to the Airport and the DNL contours. However, usage of these procedures has increased since they were introduced and this increased usage is evident in the modeled flight track graphics.

²⁸ FAA Documented Categorical Exclusion Record of Decision, October 16, 2007.

²⁹ Radar vector is the heading issued to aircraft to provide guidance by radar.

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The Runway 33L departure is the last RNAV to be implemented. FAA completed a separate Environmental Assessment (EA) in January 2013. The FAA issued a Finding of No Significant Impact/ Record of Decision (FONSI/ROD) for the Runway 33L RNAV SID Final EA on June 4, 2013. The FAA also committed to a six-month and 12-month post-implementation review of the RNAV procedure. The reviews were posted by the FAA in April 2014 and September 2014³⁰. Both reviews concluded that the BOS Runway 33L RNAV SID is performing as designed with aircraft successfully flying within the confines of the procedure's design. All other major Logan Airport runways that are capable of accommodating RNAV procedures have been implemented by the FAA previously and are in operation today. Since the modeling is based on the radar data tracks, all of these changes as they have been implemented have been included in the EDR modeling for each year.

Implementation of several of these procedures has increased noise complaints in some towns surrounding Logan Airport; however, the procedures themselves have resulted in aircraft at higher altitudes and in more patterns that are concentrated over the communities.

Phase 2

Phase 2 of BLANS, which began in late 2007, included consideration of 53 proposed arrival, departure, and ground noise measures. After the first level of screening completed in 2009, 32 measures advanced to the next level of screening. Nine of these measures address ground noise issues, six are approach measures, and 11 address departure measures. The remaining measures address local air traffic issues such as helicopters and altitudes for VFR flights. The Level 2 screening was completed in 2011 and of the 32 measures, 10 were passed on to Level 3, five were determined as completed, and 17 were eliminated. The Level 3 analysis, which consists of noise modeling for each individual measure along with a change analysis against the future baseline, was completed in 2012. The Level 3 Screening Report was published by the FAA in December 2012. Two of the flight measures were modified resulting in 12 measures evaluated (two measures are related to ground movements and 10 are related to flight procedures). Of these measures, eight were recommended for implementation by the Logan CAC (the two ground movements and six flight procedures) and four flight procedures were rejected. The FAA and Massport reviewed the Logan Airport CAC recommendations and determined that the two ground measures would meet the criteria for implementation; however, the FAA determined that none of the flight procedures would meet the criteria for noise abatement under BLANS.

The two approved measures, with their status, are described below:³¹

- **Preferred Location for Run-ups away from Communities.** Massport has already tested this measure and identified a new location at the end of Runway 32 to be used when operationally feasible.
- **Holding Area for Delayed Departures.** Massport is prepared to commit to working with the FAA to seek approval and funding (subject to FAA operations/safety approval, environmental review, Massport capital budget process, availability of FAA funds) for construction of a hold pad to allow for short-term staging of aircraft at or near the midpoint of the airfield.

In addition, Massport and the FAA agreed to implement supplemental programmatic measures recommended by the Logan Airport CAC. One example is Massport's commitment to establish an airport/community noise advisory group (Massport CAC) that will meet on a regular basis to continue dialogue on airport related noise concerns.

³⁰ http://www.faa.gov/air_traffic/environmental_issues/ared_documentation/#Performance_Based_Navigation_PBN.

³¹ BLANS Level Three Screening Analysis, FAA, December 2012, Page E-3.

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Phase 3

Phase 3 began in August 2013 and is evaluating various runway use measures with the goal of developing a runway use program that can be implemented at Logan Airport to further reduce noise. The Logan CAC voted to abandon the PRAS in April 2012 with the goal of Phase 3 to look at runway use measures that can be successfully implemented. Massport will continue to report PRAS goals and information until a new program is in place.

In November of 2014, the FAA began the first of up to four runway use tests designed to change runway use during periods of the day to better distribute activity. This test recommends different runway configurations between 6:00 AM and 9:30 AM than the configurations used between 9:00 PM and midnight.

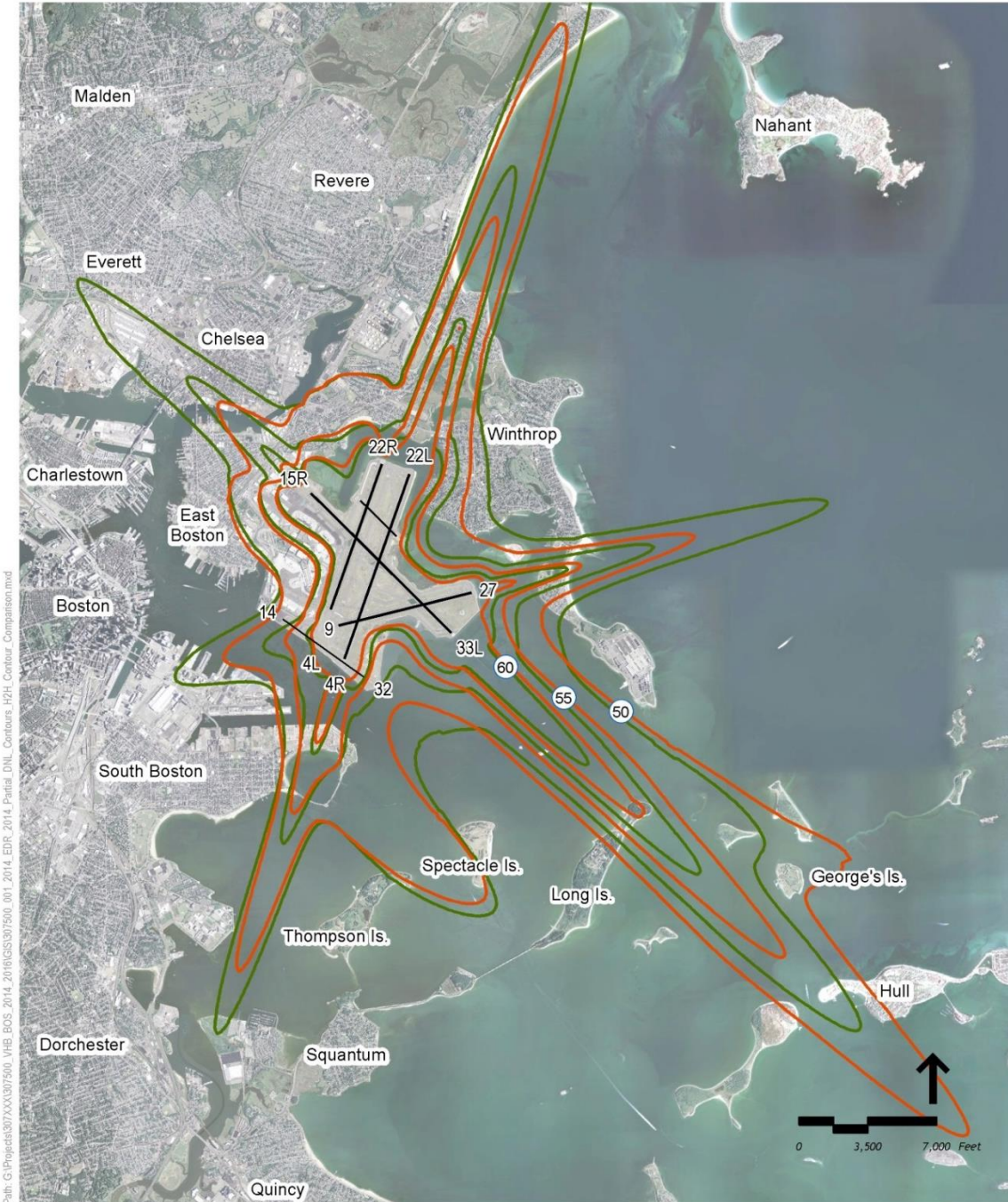
Head-to-Head Analysis

Due to safety concerns, at airports across the United States in June of 2014 the FAA halted the use of head-to-head operations or opposite direction operations, in which planes arrive on a runway in one direction and depart toward the opposite direction. When in use at Logan Airport, the procedure has aircraft departing from Runway 15R and landing on Runway 33L during the late night (typically midnight to 5:00 AM) when weather conditions are appropriate, including good visibility and little wind. At Logan Airport, head-to-head operations are an important part of the use of the late night noise abatement runway (Runway 15R-33L) since this keeps operations over Boston Harbor. Use of this procedure was restored in early 2015.

The head-to-head procedure has never been unavailable for such a long period before at Logan Airport. Massport used this opportunity to evaluate the effectiveness of the procedure during the overnight period. Using RealContours™ inputs developed for the 2014 EDR, two contour comparisons were created to evaluate the noise effects with and without head-to-head operations in place for the June 17, 2014 to December 31, 2014 time period.



From the baseline case (without head-to-head operations) and adjusted case (with an estimate of head-to-head operations), partial DNL contours for the June 17, 2014 to December 31, 2014 conditions were modeled for the midnight to 6:00 AM time period. The fleet mix for both of these cases was kept the same and only the runway use was modified for the estimated head-to-head procedure. Figure 6-15 compares the partial DNL for these conditions. Note that the contour levels shown are partial DNL 50, 60, and 65 dB for this time period of the day only and do not directly compare to total annual DNL contours. Without the head-to-head procedure in place, the contours to the northwest from arrivals to Runway 15R and departures from Runway 33L are approximately 5 to 7 dB larger and the contours to the southeast out over the harbor from arrivals to Runway 33L and departures from Runway 15R are reduced by approximately 3 dB. Noise levels over other residential areas are approximately 1 to 2 dB greater also, specifically off the ends of Runways 9, 22L and 27, due to additional traffic.

Figure 6-15 Partial DNL Comparison Baseline (No Head-to-Head Operations) and Adjusted Case (With Head-to-Head Operations) 2014



Source: HMMH, MassGIS, USDANAIP 2014

50-60 dB Partial DNL June 17 to December 31, 2014 midnight-6am Operations Using INM 7.0d

-  Estimated Partial DNL Contours with Head to Head Operations Allowed
-  Partial DNL Contours with Head to Head Operations Not Allowed

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Reduced Engine Taxiing

Single or reduced engine taxiing has the potential to reduce noise at Logan Airport. When used, the largest benefit is achieved by reducing the use of the engines on the side of the aircraft closest to the community; however, this is not always practicable due to airline procedures, taxiway routings, and safety considerations. Massport has reached out to the airlines and encouraged the use of this procedure whenever practicable. The letter sent to airport users for 2014 from Massport is published in *Appendix L, Reduced/Single Engine Taxiing at Logan Airport Memorandum*.

In 2009, the Massachusetts Institute of Technology (MIT) in cooperation with Massport and FAA conducted a survey of pilots at Logan Airport and found that the procedure was widely used on arrivals but not frequently used on departures.³² Key reasons cited for not using the procedure were safety-related or practical reasons such as a short taxi time. The survey indicated that for the procedure to be considered for arrivals, the taxi-in time would have to exceed 10 minutes and for departures, exceed 20 minutes. The average taxi-out times for Logan Airport for 2013 exceeded 20 minutes only during the 5:00 to 7:00 PM period and for 2014 only exceeded 20 minutes between the 7:00 to 8:00 AM and 5:00 to 6:00 PM periods. During 2013 and 2014, the average taxi-in time never exceeded 10 minutes. The total average departure taxi out time at Logan Airport for 2013 was 18.2 minutes and the average taxi-in time is 6.8 minutes (the total average taxi/delay time for 2013 is 12.6 minutes). The total average departure taxi out time at Logan Airport for 2014 increased to 18.3 minutes and the average taxi-in time decreased to 6.6 minutes (the total average taxi/delay time for 2014 is 12.5 minutes).³³ These small changes year to year occur due to several factors such as; changes in schedules, weather, and use of the runways. Mandatory single engine taxiing was also one of the proposed measures in the BLANS but was rejected by FAA due to safety concerns, and it is currently being implemented as a voluntary measure, when conditions are appropriate.

Noise Abatement Management Plan

Massport's noise abatement goals are achieved through the implementation of multiple elements. Table 6-18 lists these goals and the associated plan elements, and reports on progress toward achieving these goals.

³² The full report was published in the 2009 EDR in *Appendix L, Survey of Airline Pilots Regarding Fuel Conservation Procedures for Taxi Operations*.

³³ FAA Aviation System Performance Metrics: Avg. Taxi Time: Standard Report –accessed 06/30/2015.

Table 6-18 Noise Abatement Management Plan

Noise Abatement Goal	Plan Elements	2014 Progress Report
Limit total aircraft noise	Limit on Cumulative Noise Index (CNI)	The CNI value for 2014 was 152.9 EPNdB which is well below the cap of 156.5 EPNdB.
	Stage 3 percentage Requirement in Noise Rules	In 2014, Stage 3 operations represented 100 percent of Logan Airport's total commercial jet traffic.
Mitigate noise impacts	Residential Sound Insulation Program (RSIP)	106 dwelling units were sound insulated in 2014, bringing the total of treated dwelling units to 11,515 since the start of the program in 1986. See <i>Appendix H, Noise Abatement</i> for additional details.
	School Sound Insulation Program	36 eligible schools have been sound insulated since this program began.
	Noise Abatement Arrival and Departure Procedures	Flight track monitoring and data analysis were used to verify adherence to noise abatement flight procedures. See <i>Appendix H, Noise Abatement</i> for copies of the 2013 and 2014 Monitoring Report.
	Preferential Runway Advisory System (PRAS) Runway End Use Goals	The PRAS computer system was last used early in 2004 but due to system changes is not in use. However, FAA and Massport continue to work toward the current goals. Phase 3 of BLANS is currently underway and will be developing a new runway use plan.
	Runway Restrictions	Noise-based use restrictions 24 hours per day on departures from Runway 4L and arrivals on Runway 22R were continued.
	Reduced-Engine Taxiing	Voluntary use of reduced-engine taxiing is encouraged when appropriate and safe.
Improve Noise Monitoring System	Replace Existing Noise Monitors, Install Multilateration Antennas for Flight Track Monitoring, and Install New Robust Software	The Airscene noise monitoring system is completely installed and in use at Logan Airport. The noise monitors provide 1/3 octave band data at all sites to aide with aircraft identification. Noise events, flight events, and complaints are all linked. Multilateration provides improved radar coverage near the ground to help in identification of aircraft and runway assignment. In 2014, Massport received the latest version of the noise monitoring software and upgraded the community web portal for flight tracks.
	Minimize nighttime noise	Nighttime Stage 2 Aircraft Prohibition
Address/respond to noise issues and complaints	Nighttime Runway Restrictions	Prohibitions on use of Runway 4L for departures and Runway 22R for arrivals between 11:00 PM and 6:00 AM were continued.
	Maximization of Late-Night Over-Water Operation	Efforts to maximize late-night over-water operations were continued. Use of Runway 15R for departures and Runway 33L for arrivals continued.
	Nighttime Engine Run-up and APU Restrictions	Restriction on nighttime engine run-ups and use of auxiliary power units (APUs) was continued.
	Noise Complaint Line	Massport continued operation of Noise Complaint Line, (617) 561-3333. In 2014, Massport's Noise Abatement Office responded to 12,855 calls from callers living in 82 communities. (See <i>Appendix H, Noise Abatement</i>).
	Special Studies	Massport continued to provide technical assistance and analysis using noise monitoring system to support FAA and others in monitoring jet departure tracks from Runway 27 and Runway 33L. The BLANS Phase 3 is underway and will evaluate and establish a runway use program.

Source: Massport.

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Air Quality/ Emissions Reduction

Introduction

This chapter describes the air quality conditions at Logan Airport in 2014 and compares them to 2013 conditions. This information is based on an up-to-date emissions inventory of modeled Airport-related volatile organic compounds (VOCs), oxides of nitrogen (NO_x), carbon monoxide (CO), and particulate matter (PM).¹ An inventory of greenhouse gases (GHGs) is included. Status reports are also provided on Massport's Air Quality Initiative (AQI), the Massport Air Quality Monitoring Study, and other Massport air quality and emissions reduction initiatives.

2014 Air Quality Highlights and Key Findings

Total emissions from all sources associated with Logan Airport in 2014 are significantly less than they were a decade ago. This continuous downward trend is consistent with Massport's longstanding objective to accommodate the demands of increasing passenger and cargo activity levels with fewer aircraft operations and to reduce vehicle miles traveled (VMT) generated by Massport-controlled ground transport systems.

- Overall, modeled air quality emissions were similar in 2014 compared to 2013 and followed recent trends. The changes in 2014 modeled air quality emissions, as compared to 2013, are primarily due to technical changes in the model itself. Inputs to the model include aircraft operations, aircraft fleet mix characteristics, and airfield taxi times combined with ground service equipment (GSE) usage, motor vehicle traffic volumes, and stationary source utilization rates. A synopsis of these model input variables and model updates for 2014 at Logan Airport includes:
 - Aircraft operations went up by approximately 0.7 percent (i.e., 180,670 landing and take offs (LTOs) in 2013 versus 181,899 LTOs in 2014)² and aircraft taxi times went down by approximately 1 percent (i.e., 25.0 minutes in 2013 versus 24.9 minutes in 2014). For comparison to historical conditions, there were 243,998 LTOs in 2000 and the corresponding aircraft taxi times were about 27 minutes. On-Airport VMT went down by approximately 10.5 percent in 2014 compared to 2013. This change was largely due to the roadway and transportation improvements implemented by Massport associated with the Rental

¹ PM less than or equal to 10 microns (PM₁₀) and PM less than or equal to 2.5 microns (PM_{2.5}) are subsets of PM.

² Due to rounding of the operations (1 LTO = 2 Operations) there may be some very small differences (+/-) between the values reported here and those reported in *Chapter 2, Activity Levels*. In 2014 there were a total of 363,797 aircraft operations.

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Car Center and its consolidated shuttle bus system. (See *Chapter 5, Ground Access to and from Logan Airport*, for additional information).

- Motor vehicle emission factors for the 2014 analysis were obtained from the newest version of the United States Environmental Protection Agency's (EPA's) Motor Vehicle Emission Simulator model (MOVES2014) combined with Massachusetts Department of Environmental Protection (MassDEP) - recommended motor vehicle fleet mix data, operating conditions, and other Massachusetts-specific input parameters. For comparative purposes, the previous version of MOVES (MOVES2010b) was also evaluated.

In general, when compared to MOVES2010b, the MOVES2014 emission factors increased for VOC and PM₁₀/PM_{2.5} and decreased for NO_x and CO. This resulted in a modeled increase in VOC and PM₁₀/PM_{2.5} emissions despite the decrease in vehicle miles traveled. The GSE emission factors from the Emissions Dispersion Modeling System (EDMS) database decreased in 2014 when compared to 2013, as the model assumes fleet modernization from year to year. The lower emission factors resulted in a modeled decrease in GSE emissions despite the increase in aircraft operations.

- Natural gas usage by stationary sources (e.g., boilers, snow melters, and space heaters) increased by approximately 4 percent in 2014 when compared to 2013 (i.e., 402 million cubic feet and 419 million cubic feet, respectively). Diesel fuel usage by the snow melters decreased in 2014 when compared to 2013 (231,130 gallons in 2013 and 124,480 gallons in 2014).

The modeled air quality conditions in 2014 for Logan Airport were as follows:

- Total VOC emissions went up by 3 percent (1,177 kilograms per day [kg/day]) in 2014 compared to 2013. The small increase is primarily due to the corresponding increase in aircraft LTOs and an increase in jet fuel and gasoline usage when compared to 2013. For comparison, total VOC emissions were 1,777 kg/day in 2000.
- Total NO_x emissions went up by less than 1 percent in 2014 (4,040 kg/day) compared to 2013. This slight increase in 2014 is mostly attributable to the larger number of air carrier operations during this time period. In 2000, total NO_x emissions were 5,707 kg/day.
- Total CO emissions went down by 5 percent in 2014 (6,987 kg/day) compared to 2013. This decrease is mostly attributable to the decrease in GSE emission factors and motor vehicle emission factors in accordance with MOVES2014. For comparison, total CO emissions were 13,111 kg/day in 2000.
- Total PM₁₀/PM_{2.5} emissions went up by approximately 3 percent in 2014 (95 kg/day) compared to 2013. This small increase is primarily attributable to the higher emission factors of MOVES2014.
- Total GHG emissions went down by approximately 1 percent (0.60 Million Metric Tons [MMT]) in 2014 compared to 2013. The year 2014 marks the eighth consecutive year in which Massport has voluntarily prepared a GHG emissions inventory for the EDR/ESPR. This decrease was primarily due to a decrease in on-Airport VMT. In 2014, Logan Airport's GHG emissions made up less than 1 percent of state totals.
- Massport's AQI³ has tracked NO_x emissions since the benchmark year of 1999. Total NO_x emissions in 2014 were 722 tons per year (tpy) lower than the 1999 benchmark - which represents an overall decrease of 31 percent in NO_x emissions since 1999 when the program was initiated. For comparison, NO_x emissions in 2013 were 730 tpy lower than the benchmark.

3 Massport developed the AQI as a 15-year voluntary program with the overall goal to maintain NO_x emissions associated with Logan Airport at, or below, 1999 levels.

Regulatory Framework

The federal Clean Air Act (CAA), the National Ambient Air Quality Standards (NAAQS), and similar state laws govern air quality issues in Massachusetts. The NAAQS and the Massachusetts State Implementation Plan (SIP), which describes measures that the state will take to attain NAAQS compliance, regulate air quality issues in the Boston metropolitan area and the state, and are discussed in the next section.

National Ambient Air Quality Standards

EPA established NAAQS for a group of criteria air pollutants to protect public health, the environment, and the quality of life from the detrimental effects of air pollution. These NAAQS are set for the following seven pollutants: CO, lead (Pb), NO₂, ozone (O₃), PM₁₀, PM_{2.5}, and sulfur dioxide (SO₂). The NAAQS primary standards (designed to protect human health) and secondary standards (designed to protect human welfare) are summarized on Table 7-1.

Based on air monitoring data and in accordance with the CAA, all areas within Massachusetts are designated as either *attainment*, *nonattainment*, *maintenance*, or *unclassifiable* with respect to the NAAQS.⁴ An area with air quality better than the NAAQS is designated as attainment; an area with air quality worse than the NAAQS is designated as nonattainment; and an area that is in transition from nonattainment to attainment is designated as attainment/maintenance. An area may also be designated as unclassifiable when there is a temporary lack of data to form a basis for determining attainment status. Nonattainment areas can be further classified as extreme, severe, serious, moderate, and marginal by the degree of non-compliance with the NAAQS. The current attainment/nonattainment designations for the Boston metropolitan area are summarized in Table 7-2.

The Boston area is currently designated as attainment/maintenance for CO, indicating that it is in transition back to attainment for this pollutant. Historically, the entire Boston metropolitan area has been designated as attainment for all other criteria pollutants except O₃, for which it was designated as “moderate” nonattainment based on the former 1997 eight-hour ozone standard (see Table 7-2). This O₃ nonattainment area consisted of 10 counties in Massachusetts (Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk, and Worcester). Logan Airport is located in Suffolk County. In May 2012, EPA issued a Clean Data Finding for the Boston area ruling that the area has attained the 1997 NAAQS for O₃, designating the area as attainment/maintenance so long as the area continues to demonstrate attainment based on monitoring data. Even despite the clean data finding, the anti-backsliding requirements of the federal CAA (i.e., a rule established to ensure that air quality is not deteriorated due to EPA relaxing or revoking NAAQS) still obligates the MassDEP to enforce select elements of any federally enforceable SIP prepared to attain the 1997 NAAQS. In April 2012, EPA began implementing the 2008 eight-hour O₃ standard of 0.075 parts per million (ppm).

With respect to the 2008 O₃ NAAQS, in 2014 Massachusetts experienced its first ozone season without an exceedance of the 75 parts per billion (ppb) standard. This was due in part to weather patterns that resulted in fewer days above 90 degrees F. Attainment of the standard is based on the most recent three-year period. Preliminary O₃ values for 2012 - 2014 show Massachusetts attains the 0.075 ppm standard statewide. MassDEP submitted the state’s State Implementation Plan (SIP) for Ozone to EPA in 2014 for adequacy review and the outcome is still pending; thus the area remains attainment/unclassifiable.

⁴ Environmental Protection Agency, The Green Book Nonattainment Areas for Criteria Pollutants (www.epa.gov/air/oaqps/greenbk/).

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Pollutant	Averaging Time	Standard		Notes:
		ppm	µg/m ³	
Carbon Monoxide (CO)	1 hour	35	40,000	Not to be exceeded more than once a year.
	8 hour	9	10,000	Not to be exceeded more than once a year.
Lead (Pb)	Rolling 3-Month Average	—	0.15	Not to exceed this level. Final rule October 2008.
	Quarterly	—	1.5	The 1978 standard (1.5 µg/m ³ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
Nitrogen Dioxide (NO ₂)	1 hour	0.100	188	The three-year average of the 98 th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm.
	Annual	0.053	100	Not to exceed this level.
Ozone (O ₃)	8 hour ¹	0.08	—	The average of the annual 4 th highest daily 8-hour maximum over a three-year period is not to exceed this level.
	8 hour ²	0.075	—	The average of the annual 4 th highest daily 8-hour maximum over a three-year period is not to exceed this level.
Particulate Matter with a diameter ≤ 10µm (PM ₁₀)	24 hour	—	150	Not to be exceeded more than once a year on average over three years.
Particulate Matter with a diameter ≤ 2.5µm (PM _{2.5})	24 hour	—	35	The three-year average of the 98 th percentile for each population-oriented monitor within an area is not to exceed this level.
	Annual (Primary)	—	12	The three-year average of the weighted annual mean from single or multiple monitors within an area is not to exceed this level.
	Annual (Secondary)	—	15	The three-year average of the weighted annual mean from single or multiple monitors within an area is not to exceed this level.
Sulfur Dioxide (SO ₂)	1 hour	0.075	196	Final rule signed June 2, 2010. The three-year average of the 99 th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed this level.
	3 hour	0.5	1,300	Not to be exceeded more than once a year.

Source: EPA, 2015 (www.epa.gov/air/criteria.html).

1 The 1997 NAAQS for ozone.

2 The 2008 NAAQS for ozone.

ppm Parts per million

µg/m³ Micrograms per cubic meter

Pollutant	Designation
Carbon monoxide (CO)	Attainment/Maintenance ¹
Nitrogen Dioxides (NO ₂)	Attainment
Ozone (Eight-hour, 1997 Standard)	Attainment/Maintenance ¹
Ozone (Eight-hour, 2008 Standard)	Attainment/Unclassifiable ²
Particulate matter (PM ₁₀)	Attainment
Particulate matter (PM _{2.5})	Attainment
Sulfur Dioxide (SO ₂)	Attainment
Lead (Pb)	Attainment

Source: EPA, 2015 (www.epa.gov/air/oaqps/greenbk/).

- 1 The Boston area was previously designated nonattainment for this pollutant but has since attained compliance with the NAAQS.
- 2 Attainment/Unclassifiable means that the initial data shows attainment but additional data is needed to verify longer term conditions.

State Implementation Plan (SIP)

A SIP is a state’s regulatory plan for bringing nonattainment areas within that state into compliance with the NAAQS. As indicated previously, the entire Boston metropolitan area was formerly designated as “moderate” nonattainment for the 1997 eight-hour O₃ standard, but has since received a Clean Air Determination from the EPA classifying the area as “attainment/maintenance.” Additionally, as stated above, the area has been designated attainment/unclassifiable for the 2008 eight-hour O₃ standard, and accordingly SIP preparation relative to this standard are pending for the Boston area.

For the former CO attainment/maintenance designation, MassDEP has also developed another 10-year Maintenance Plan which is currently under review by EPA. The most current SIP submittals for the Boston area are summarized in Table 7-3.

Standard	Title	Status	Comments
Carbon Monoxide	Maintenance Plan	Published in 2014, under review by EPA	This Maintenance Plan is required for any area that was formerly designated as non-attainment to show that it will not digress. It is expected that this plan will be approved by EPA.
Ozone	2008 SIP	Submitted to EPA in 2014 for review	As of April 2014, MassDEP has determined that the Boston area is still compliant with the 2008 standard, thus the SIP status is currently pending. ¹

Source: MassDEP (<http://www.mass.gov/eea/agencies/massdep/air/reports/state-implementation-plans.html>).

Notes: The number of commercial and employee parking spaces allowed at Logan Airport is regulated by the Logan Airport Parking Freeze (310 Code of Massachusetts Regulations 7.30 and 40 CFR 52.1120), which is an element of the Massachusetts State Implementation Plan (SIP) under the Federal Clean Air Act.

- 1 In 2007, the EPA promulgated a new eight-hour NAAQS for ozone. Informally called the “2008 standard” to differentiate it from the former “1997 standard”, this new standard is more strict (i.e., lower) than the former standard.

Logan Airport Air Quality Permits for Stationary Sources of Emissions

Massport was granted a Title V Air Quality Operating Permit for Logan Airport in September 2004; a renewal permit was granted in January 2013. This permit covers all of the Massport-operated stationary sources including the Central Heating and Cooling Plant, snow melters, fuel dispensers, boilers, emergency electrical generators, and fuel storage tanks.

Methodology

For the purposes of the EDR, the analysis of air emissions associated with Logan Airport operations includes the following source categories, each of which has its own assessment methodology, database, and assumptions as described below.

- **Aircraft Emissions** — The Federal Aviation Administration's (FAA) EDMS was used for this analysis. However, EDMS was replaced with FAA's Aviation Environmental Design Tool (AEDT) on May 29, 2015. Since, the air quality modeling was begun before this date, EDMS was used to complete the analysis. The next EDR and subsequent EDRs and ESPRs will deploy the AEDT model with a comparison to the EDMS model in the 2014 EDR. The last, most recent, version of EDMS was used (EDMS v5.1.4.1).

As with recent ESPRs and EDRs, the actual aircraft fleet mix at Logan Airport in 2014 was used as a model input to analyze annual conditions. In a few instances where the aircraft/engine type or combinations operating at Logan Airport were not available in the EDMS database, consistent with FAA guidance, substitutions were made based on the closest match of aircraft type and engine performance characteristic. Tables I-4 and I-5 in *Appendix I, Air Quality/Emissions Reduction* contains the data that were used, including aircraft types, engine, LTOs, and aircraft taxi/delay times for 2014. For the analysis, the aircraft are grouped into four categories: commercial air carriers, commuter aircraft, general aviation (GA), and cargo aircraft.

From 2013 to 2014, total LTOs increased by less than 1 percent overall with air carrier LTOs increasing by 2 percent, commuter LTOs decreasing by three percent, air cargo LTOs increasing by about 6 percent, and GA decreasing by less than 1 percent.

Updated aircraft taxi/delay times are based on data obtained from the FAA Aviation System Performance Metrics (ASPM) database for 2014.⁵ According to this database, the average aircraft taxi/delay times at Logan Airport decreased from 25.0 minutes to 24.9 minutes from 2013 to 2014, or about one percent. These parameters also served as inputs into the air quality modeling.

- **Ground Service Equipment/Auxiliary Power Units** — Estimates of GSE emissions were based on EDMS emission factors and continue to reflect emission reductions attributable to Massport's Alternative Fuel Vehicle (AFV) Program and the conversion of Massport and/or tenant GSE and fleet vehicles to compressed natural gas (CNG) or electricity. The GSE emission factors from the EDMS database decreased measurably for most equipment in 2014 when compared to 2013. Model input data are based on an on-site GSE time-in-mode survey conducted in May 2012 at the Airport as part of the *2011 ESPR*, combined with

5 FAA Aviation System Performance Metrics (ASPM) database for 2014 (aspm.faa.gov/).

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the most recent information regarding GSE fuel use (e.g., gasoline, diesel, CNG, liquid petroleum gas (LPG), and electric) from the Logan Airport Vehicle Aerodrome Permit Application documentation.⁶

- **Motor Vehicles** — Motor vehicle emission factors were obtained from the new, and most recent, version of EPA’s MOVES model (MOVES2014) combined with MassDEP-recommended motor vehicle fleet mix data, operating conditions, and other Massachusetts-specific input parameters.⁷ For comparative purposes, both MOVES2010b and MOVES2014 were evaluated. The emission factors obtained from MOVES2014 were measurably higher for VOC and PM and comparably lower for CO and NO_x. The MOVES input/output files are included in *Appendix I, Air Quality/Emissions Reduction*. In addition, *Chapter 5, Ground Access to and from Logan Airport* of this 2014 EDR provides a discussion of the on-Airport VMT data used for this analysis. Starting with the 2011 *ESPR*, on-Airport VMT and vehicle speed data were predicted by the traffic simulation model, VISSIM.⁸ (Refer to *Chapter 5, Ground Access to and from Logan Airport* for more information on ground transportation to and from Logan Airport, as well traffic conditions at the Airport).
- **Other Sources** — Emissions associated with fuel storage and handling, the Central Heating and Cooling Plant, snow melters, generators, space heaters, and fire training at Logan Airport were based on annual fuel throughput records for 2014, combined with appropriate EPA emission factors (e.g., compilation of *Air Pollution Emission Factors (AP-42)* or emission factors obtained from NO_x Reasonably Available Control Technology (RACT) compliance testing). When 2014 is compared to 2013, No. 2 fuel oil, No. 6 fuel oil, and natural gas usage from boilers usage increased approximately 1 percent, 335 percent, and 4 percent, respectively, while diesel fuel from snow melters decreased by approximately 46 percent.
 - In November 2014, Massport converted the Central Heating Plant (CHP) fuel oil system from No. 6 to No. 2 fuel oil. During the conversion, the CHP retained the ability to burn natural gas, which it burns approximately 97 percent of the time. Converting the CHP fuel oil system allows Massport to reduce energy use and air emissions while maintaining the ability to use backup fuel oil in the event of a disruption of natural gas service. Before switching to No. 2 fuel oil, Massport used all the remaining No. 6 fuel oil. Therefore, the increased use of No. 6 fuel oil in 2014 is attributable to this conversion combined with an unusually cold winter in early 2014; the 53rd coldest winter on record in the Boston area.
- **Particulate Matter** — Estimates of PM emissions associated with Logan Airport were first reported in the 2005 EDR in response to the then recent availability of an FAA-updated method (i.e., *First Order Approximation*) for computing aircraft PM₁₀/PM_{2.5} emission factors. PM₁₀/PM_{2.5} emissions are now routinely reported in the EDRs/ESPRs - including this 2014 EDR.
- **Greenhouse Gases** — GHG emissions were calculated in much the same way the criteria pollutants (and their precursors) were calculated - through the use of input data such as activity levels or material throughput rates (i.e., fuel usage, VMT, electrical consumption) that are applied to appropriate emission factors (i.e., in units of GHG emissions per gallon of fuel). Input data were either based on Massport records, or data and information derived from the EDMS v5.1.4.1. Emission factors were obtained from the U.S. Energy Information Administration (EIA), the International Panel on Climate Change (IPCC), and the EPA.

6 All vehicles and equipment (including GSE) that operate on the airfield must obtain a Logan Airport Vehicle Aerodrome Permit. The application form for this permit was modified in 2007 to request the fuel-type information (e.g., gasoline, diesel, etc.).

7 The U.S. EPA MOVES model is an advancement to the former MOBILE6 model as it contains the most up-to-date emission factors, emission control measures, and other area-specific parameters for motor vehicle fleets nationwide (including the Boston area). For consistency with the Massachusetts State Implementation Plan (SIP), MOVES is also recommended for use by the MassDEP.

8 PTV America. (2011). Verkehr In Städten Simulationsmodell- VISSIM version 5.40 [computer software]. Portland, OR.

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Consistent with prior EDR years, the 2014 GHG emissions inventory includes aircraft operations within the ground-based taxi-idle/delay mode and up to the top of the 3,000-foot LTO cycle.⁹ Again, GHG emissions associated with GSE/auxiliary power unit (APU), motor vehicles, a variety of stationary sources, and electricity usage were also included. Of note, Massport has direct ownership or control over a very small percentage (approximately 13 percent in 2014) of these GHG emissions and their sources (i.e., limited to Massport fleet vehicles, stationary sources, and electrical consumption within Massport buildings). As with most commercial service airports, the vast majority of the emission sources at Logan Airport are owned or controlled by the airlines, other airport tenants, and the general public (motor vehicles). Massport undertakes a variety of programs to reduce non-Massport emissions through its support of high-occupancy-vehicle (HOV) initiatives, including subsidizing free Silver Line Service, and supporting use of alternative fuels by airport taxis, the CNG station, and providing electric plug-ins for GSE, 400 Hz Power, and pre-conditioned air (PCA) at airplane gates.

Emissions Inventory in 2014

This section provides a summary of the 2014 Logan Airport emissions inventory for the pollutants VOC, CO, NO_x, and PM₁₀/PM_{2.5}. Emissions of O₃ are not directly computed as it is a secondary pollutant formed by the interactions of NO_x and VOCs throughout the region. Emissions of SO₂ and Pb are also not computed, as Logan Airport emission sources are very small generators of these two compounds.

As stated above, the aircraft emissions inventory was computed based on the actual number of aircraft operations (i.e., LTOs), fleet mix, and operational times-in-mode (TIM) at the Airport in 2014. Similarly, emissions associated with GSE, motor vehicles, fuel storage and transfer facilities, and a variety of stationary sources (e.g., steam boilers, snow melters, live-fire training, emergency generators, etc.) associated with Logan Airport were also computed based on actual conditions.

As in preceding EDRs, the results of the 2014 emissions inventory are primarily used for comparison to the results for the prior year (i.e., 2013). Additionally, the 2014 results are compared with previous years extending back to 1990. For ease of review, the data summary figures contain the previous results for 1990 and 2000 and then annually for 2010 to 2014. In this way, the changes in Logan Airport air quality conditions can be evaluated in both the short- and long-term time frame and on a common basis. For the AQI, estimates of NO_x emissions are also provided as a way of tracking the progress of this voluntary emission management program. Finally, the results for the intervening years (e.g., 1995, 1996, 1997, etc.) are shown in previous EDRs and contained in *Appendix I, Air Quality/Emissions Reduction*.

⁹ Following the guidance issued by the Airport Cooperative Research Program, ACRP Report 11, *Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories*.

Volatile Organic Compounds

In 2014, total modeled VOC emissions at Logan Airport were 474 tpy (1,177 kg/day) – a computed increase of approximately 3 percent from 2013 levels. This increase is due mostly to the increase in VOC emissions associated with slightly higher aircraft operations at the Airport during this time period. Importantly, Figure 7- 1 depicts an overall, long-term downward trend in modeled VOC emissions at Logan Airport and Figure 7-2 shows the 2014 percent breakdown of these emissions by source category. Similarly, Table 7-4 shows the computed VOC emissions in kg/day for each emission source from 1990, 2000, and 2010 to 2014. Other key findings from this analysis include the following:

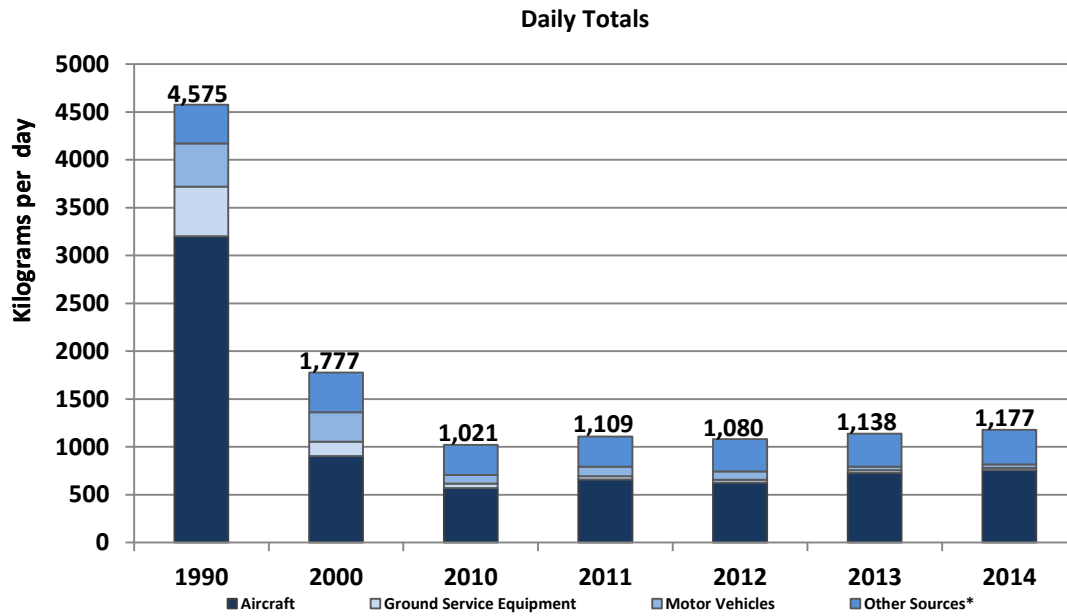
- Total aircraft-related VOC emissions were approximately 4 percent higher in 2014, when compared to 2013. This increase was mostly due to the increase in aircraft LTOs.
- GSE-related VOC emissions were approximately 12 percent lower in 2014 than in 2013. This decrease was largely due to the decrease in GSE emission factors.
- VOC emissions from motor vehicles in 2014 increased by about 6 percent from 2013 levels, despite reduced on-Airport VMT. This increase in motor vehicle emissions is attributable to higher emission factors for VOC computed by MOVES2014.
- The effect on 2014 VOC emissions using the new MOVES2014 motor vehicle emissions model was a model-related apparent increase of 100 percent in total motor vehicle emissions when compared to using MOVES2010b. If MOVES2010b was used for the 2014 analysis, motor vehicle VOC emissions would have decreased from 2013 values by about 47 percent.¹⁰
- VOC emissions from stationary and other non-mobile sources (e.g., fuel storage/handling, Central Heating and Cooling Plant, snow melter usage, and firefighter training) increased by approximately 4 percent from 2013 to 2014 - mostly due to the higher fuel storage/handling of jet fuel and gasoline.

As shown in Figure 7-2, in 2014 aircraft continued to represent the largest source (64 percent) of VOC emissions associated with Logan Airport, followed by stationary sources (31 percent), motor vehicles (3 percent), and GSE (2 percent). The 2014 results shown in Table 7-4 show a 3-percent increase of total modeled emissions of VOCs when compared to 2013. However, the overall, long-term trend over the past two decades reveals a substantial overall decrease in these emissions associated with the Airport.

¹⁰ Further details can be found in EPA MOVES2014 Questions and Answers, www.epa.gov/otaq/models/moves.

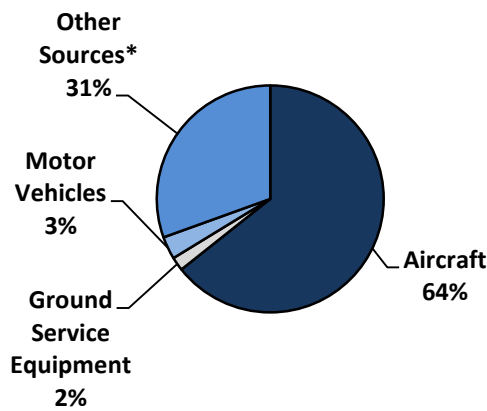
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Figure 7-1 Modeled Emissions of VOCs at Logan Airport, 1990, 2000, and 2010-2014



* Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.) and fueling sources.

Figure 7-2 Sources of VOC Emissions, 2014



* Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.) and fueling sources.

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Aircraft/GSE Model:	Logan Dispersion Modeling System (LDMS)	EDMS v4.03	EDMS v5.1.2	EDMS v5.1.3	EDMS v5.1.3	EDMS v5.1.3	EDMS v5.1.4.1			
	Motor Vehicle Model:	MOBILE 5a	MOBILE 6.0	MOBILE 6.2.03		MOBILE 6.2.03	MOBILE 6.2.03	MOVES 2010b	MOVES 2014	
Year:	1990	2000	2010		2011	2012	2013		2014	
Aircraft Sources										
Air carriers	2,175	514	292	292	305	378	448	447	480	480
Commuter aircraft	681	140	129	125	110	91	91	91	85	85
Cargo aircraft	303	207	70	70	69	63	44	44	48	48
General aviation	44	42	81	81	176	93	149	149	144	144
Total aircraft sources	3,203	903	572	568	660	626	732	731	757	757
Ground Service Equipment²										
	518	153	49	49	33	30	26	26	23	23
Motor Vehicles										
Ted Williams Tunnel through-traffic	N/A	12	— ³	— ³	— ³	— ³	— ³	— ³	— ³	— ³
Parking/curbside ⁴	192	89	20	20	20	18	17	5	3	4
On-airport vehicles	258	206	68	68	81	70	67	31	16	34
Total motor vehicle sources	450	307	88	88	101	88	84	36	19	38
Other Sources										
Fuel storage/handling ⁵	400	412	311	311	311	332	340	340	354	354
Miscellaneous sources ⁵	4	2	5	5	4	4	5	5	5	5
Total other sources	404	414	316	316	315	336	345	345	359	359
Total Airport Sources	4,575	1,777	1,025	1,021	1,109	1,080	1,187	1,138	1,158	1,177

Source: Massport

Notes: Years 2010 and 2013 were computed with previous years EDMS version to provide for a common basis of comparison. Years 2013 and 2014 were also computed with the previous year motor vehicle emission factors model.

kg/day = kilograms per day. 1 kg/day is equivalent to approximately 0.40234 tons per year (tpy).

N/A Not Available.

1 See Appendix I, Air Quality/Emissions Reduction for 1993 to 2009 emission inventory results.

2 GSE emissions include aircraft APUs as well as vehicles and equipment converted to alternative fuels.

3 Due to the new roadway configuration and opening of the Ted Williams Tunnel there was no Ted Williams Tunnel through-traffic (which is defined as traffic passing through but not destined for the Airport) at Logan Airport beginning in 2003.

4 Parking/curbside is based on VMT analysis.

5 Includes the Central Heating and Cooling Plant, emergency electricity generation, snow melter usage, and other stationary sources.

Oxides of Nitrogen

In 2014, total NO_x emissions from all Airport-related sources were estimated to be 1,625 tpy (4,040 kg/day), which is an increase of less than 1 percent from 2013 levels. However, this occurrence should also be taken within the context of an overall decrease of 30 percent from 1999 levels. As discussed later in this chapter, the year 1999 is the benchmark of the AQI for NO_x emissions associated with the Airport. Figure 7-3 depicts these short- and long-term trends in NO_x emissions and Table 7-5 shows the NO_x contribution for each emission source in 1990, 2000, and 2010 through 2014.

Other findings related to the NO_x emissions inventory results include the following:

- When compared to 2013 values, total aircraft-related NO_x emissions were 3 percent higher in 2014. This increase is largely due to the increase in air carrier and cargo operations compared to other aircraft in the fleet.¹¹
- GSE emissions of NO_x decreased by 8 percent in 2014 compared to 2013, due mostly to the decrease in GSE emission factors.
- NO_x emissions from motor vehicles in 2014 decreased by approximately 54 percent from 2013 levels. This reduction is attributable mostly to lower NO_x emission factors computed by MOVES2014 and 10.5 percent lower on-Airport VMT.
- Stationary sources show an increase of approximately 3 percent in NO_x emissions in 2014 compared to 2013, mostly due to the higher usage of the boilers that year (due to the cold, snowy winter).
- The effect on 2014 emissions calculations on NO_x by the MOVES2014 model was a decrease of about 33 percent in total modeled motor vehicle emissions when compared to MOVES2010b.¹² If MOVES2010b was used for the 2014 analysis, total motor vehicle NO_x emissions would have decreased about 31 percent from 2013 levels.

Again, the overall, long-term trend over the past two decades reveals a substantial decrease in total NO_x emissions associated with the Airport.

¹¹ Larger aircraft are generally higher NO_x emitters than commuter or general aviation aircraft.

¹² Further details can be found in EPA MOVES2014 Questions and Answers, www.epa.gov/otaq/models/moves.

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Table 7-5 Estimated NO_x Emissions (in kg/day) at Logan Airport, 1990, 2000, and 2010-2014¹										
Aircraft/GSE Model:	Logan Dispersion Modeling System (LDMS)	EDMS v4.03	EDMS v5.1.2	EDMS v5.1.3	EDMS v5.1.3	EDMS v5.1.3	EDMS v5.1.4.1			
	Motor Vehicle Model:	MOBILE 5a	MOBILE 6.0	MOBILE 6.2.03		MOBILE 6.2.03		MOBILE 6.2.03	MOVES 2010b	MOVES 2014
Year:	1990	2000	2010		2011	2012	2013		2014	
Aircraft Sources										
Air carriers	4,554	4,202	3,031	3,037	3,128	3,154	3,090	3,158	3,245	3,245
Commuter aircraft	133	125	203	204	199	182	168	152	155	155
Cargo aircraft	237	284	197	197	196	192	188	188	203	203
General aviation	13	49	29	26	43	115	46	48	48	48
Total aircraft sources	4,937	4,660	3,460	3,464	3,566	3,644	3,492	3,546	3,651	3,651
Ground Service Equipment²										
	603	333	198	198	173	164	145	145	134	134
Motor Vehicles										
Ted Williams Tunnel through-traffic	N/A	26	— ³	— ³	— ³	— ³	— ³	— ³	— ³	— ³
Parking/curbside ⁴	25	52	12	12	11	10	9	16	11	6
On-airport vehicles	232	425	144	144	148	128	117	131	90	62
Total motor vehicle sources	257	503	156	156	159	137	126	147	101	68
Other Sources										
Fuel storage/handling ⁵	0	0	0	0	0	0	0	0	0	0
Miscellaneous sources ⁶	344	211	166	166	179	154	182	182	187	187
Total other sources	344	211	166	166	179	154	182	182	187	187
Total Airport Sources	6,141	5,707	3,980	3,984	4,077	4,099	3,945	4,020	4,073	4,040

Source: Massport

Notes: Years 2010 and 2013 were computed with previous years EDMS version to provide for a common basis of comparison. Years 2013 and 2014 were also computed with the previous year motor vehicle emission factors model.

kg/day - kilograms per day. 1 kg/day is approximately equivalent to 0.40234 tons per year (tpy).

N/A Not Available

1 See Appendix I, Air Quality/Emissions Reduction for 1993 to 2009 emission inventory results.

2 GSE emissions include APUs as well as vehicles and equipment converted to alternative fuels.

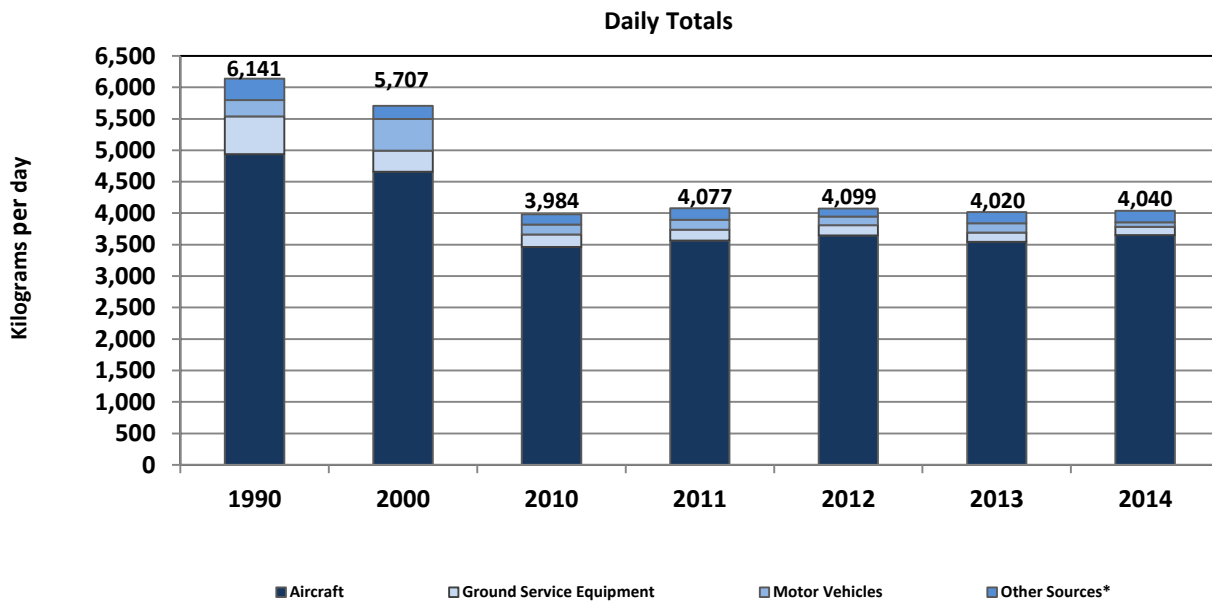
3 Due to the new roadway configuration and opening of the Ted Williams Tunnel (TWT) there was no TWT through-traffic at Logan Airport beginning in 2003.

4 Parking/curbside data is based on VMT analysis.

5 Fuel storage/handling facilities are not a source of NO_x emissions.

6 Includes the Central Heating and Cooling Plant, emergency electricity generation, snow melter usage, and other stationary sources.

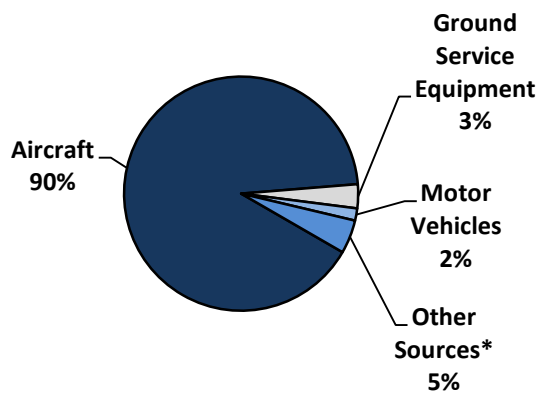
Figure 7-3 Modeled Emissions of NO_x at Logan Airport, 1990, 2000, and 2010 to 2014



* Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, firefighter training, etc.).

As shown in Figure 7-4, aircraft continued to represent the largest source (90 percent) of NO_x at Logan Airport, followed by stationary sources (5 percent), GSE (3 percent), and motor vehicles (2 percent).

Figure 7-4 Sources of NO_x Emissions, 2014



* Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.).

Carbon Monoxide

Total modeled CO emissions at Logan Airport in 2014 were 2,811 tpy (6,987 kg/day), approximately 5 percent lower than 2013 levels. Figure 7-5 depicts a continued long-term downward trend (60 percent overall reduction from 1990 to 2014) in CO emissions associated with Airport activities. Table 7-6 also shows the breakdown of these emissions, by source category, for the years 1990, 2000, and 2010 to 2013. Other notable findings of the analysis include:

- Aircraft-related CO emissions increased in 2014 by less than 1 percent compared to 2013 levels, due mostly to the increase in aircraft LTOs.
- GSE CO emissions decreased by approximately 9 percent in 2014 compared to 2013, due mostly to the decrease in GSE emission factors.
- CO emissions from motor vehicles declined in 2014 by approximately 34 percent from 2013 levels. This reduction is attributable mostly to the lower emission factors of the motor vehicle fleet, which are reflected in the MOVES2014 database, and a decrease in on-Airport VMT.¹³
- Stationary sources show a decrease of approximately 2 percent in CO emissions in 2014 compared to 2013, largely due to the lower usage of the snow melters. Reduction in snow melter use for the year 2014 is a result of the unusually delayed snow fall during the 2014/2015 winter. The majority of snowfall occurred in 2015.
- The effect on 2014 modeled motor vehicle emissions of CO by the MOVES2014 model was an increase of 5 percent in total motor vehicle emissions when compared to MOVES2010b.¹⁴ If MOVES2010b was used for the 2014 analysis, the decrease in motor vehicle CO emissions from 2013 would have been 37 percent.

Again, as with total emissions of VOCs and NO_x, the overall, long-term trend over the past two decades reveals a substantial decrease in total CO emissions (60 percent since 1990) associated with the Airport.

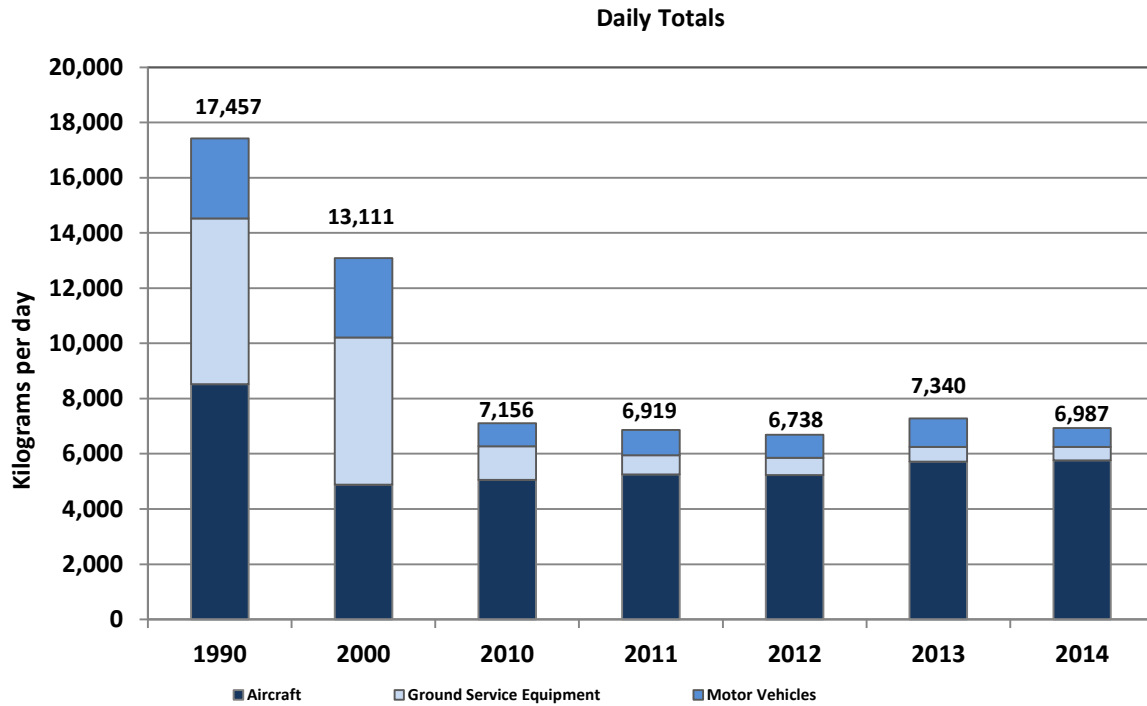
As shown in Figure 7-6, for 2014, aircraft emissions continued to represent the largest source (82 percent) of CO at Logan Airport, followed by motor vehicles (10 percent), GSE (7 percent), and stationary sources (less than 1 percent).

¹³ Further details can be found in EPA MOVES2014 Questions and Answers, www.epa.gov/otaq/models/moves.

¹⁴ Ibid.

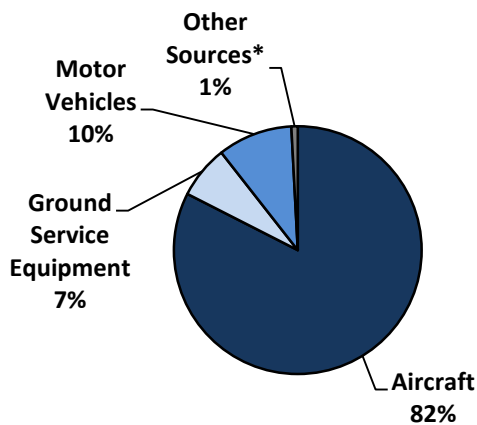
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Figure 7-5 Modeled Emissions of CO at Logan Airport, 1990, 2000, and 2010 to 2014



Note: Other stationary sources not shown (this source made up less than 1 percent of the total).

Figure 7-6 Sources of CO Emissions, 2014



* Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.).

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Aircraft/GSE Model:	Logan Dispersion Modeling System (LDMS)	EDMS v4.03	EDMS v5.1.2	EDMS v5.1.3	EDMS v5.1.3	EDMS v5.1.3	EDMS v5.1.4.1			
	Motor Vehicle Model:	MOBILE 5a	MOBILE 6.0	MOBILE 6.2.03		MOBILE 6.2.03		MOBILE 6.2.03	MOVES 2010b	MOVES 2014
Year:	1990	2000	2010		2011	2012	2013		2014	
Aircraft Sources										
Air carriers	6,613	2,994	2,531	2,531	2,592	2,816	3,320	3,323	3,486	3,486
Commuter aircraft	977	1,188	2,629	2,086	2,042	1,928	1,978	1,907	1,795	1,795
Cargo aircraft	576	400	248	259	246	183	155	155	164	164
General aviation	352	295	177	173	370	304	345	334	319	319
Total aircraft sources	8,518	4,876	5,585	5,049	5,250	5,232	5,798	5,719	5,764	5,764
Ground Service Equipment²										
	6,001	5,335	1,222	1,222	694	618	533	533	484	484
Motor Vehicles										
Ted Williams Tunnel through-traffic	N/A	133	— ³	— ³	— ³	— ³	— ³	— ³	— ³	— ³
Parking/curbside ⁴	1,218	495	106	106	110	104	104	94	57	51
On-airport vehicles	1,689	2,245	726	726	806	737	742	935	591	630
Total motor vehicle sources	2,907	2,873	832	832	916	840	846	1,029	648	681
Other Sources										
Fuel storage/handling ⁵	0	0	0	0	0	0	0	0	0	0
Miscellaneous sources ⁶	31	27	53	53	59	48	59	59	58	58
Total other sources	31	27	53	53	59	48	59	59	58	58
Total Airport Sources	17,457	13,111	7,692	7,156	6,919	6,738	7,236	7,340	6,954	6,987

Source: Massport

Notes: Years 2010 and 2013 were computed with previous years EDMS version to provide for a common basis of comparison. Years 2013 and 2014 were also computed with the previous year motor vehicle emission factors model.

N/A Not Available

1 See Appendix I, Air Quality/Emissions Reduction for 1993 to 2009 emission inventory results.

2 GSE emissions include aircraft APUs as well as vehicles and equipment converted to alternative fuels.

3 Due to the new roadway configuration and opening of the Ted Williams Tunnel there was no Ted Williams Tunnel through-traffic at Logan Airport beginning in 2003.

4 Parking/curbside is based on VMT analysis.

5 Fuel storage/handling facilities are not a source of NO_x emissions.

6 Includes the Central Heating and Cooling Plant, emergency electricity generation, snow melter usage, and other stationary sources.

Particulate Matter

Table 7-7 shows that total estimated PM₁₀/PM_{2.5} emissions at Logan Airport in 2014 were 38 tpy (95 kg/day), or approximately 3 percent higher than 2013 levels. Explanations of these results and other key findings include:

- Estimated aircraft-related PM₁₀/PM_{2.5} emissions remained approximately the same in 2014 compared to 2013 levels.
- Modeled PM₁₀/PM_{2.5} associated with GSE/APU emissions also remained approximately the same in 2014 when compared to 2013.
- PM₁₀/PM_{2.5} emissions from motor vehicles increased approximately 20 percent in 2014 when compared to 2013 levels, primarily attributable to the higher emission factors computed by MOVES2014.
- Stationary source emissions of PM₁₀/PM_{2.5} remained approximately the same in 2014 compared with 2013.
- The effect on calculated 2014 emissions of PM₁₀/PM_{2.5} by the MOVES2014 motor vehicle emissions model was an increase of 29 percent in total motor vehicle emissions when compared to MOVES2010b. If MOVES2010b was used for the 2014 analysis, motor vehicle PM₁₀/PM_{2.5} emissions would be approximately 7 percent less than in 2013.

As shown in Figures 7-7 and 7-8, aircraft represent the largest (65 percent) source of PM₁₀/PM_{2.5} followed by motor vehicles (19 percent), GSE (13 percent), and stationary sources, such as the Central Heating and Cooling Plant, snow melter usage, and fire training (3 percent).

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Table 7-7 Estimated PM ₁₀ /PM _{2.5} Emissions (in kg/day) at Logan Airport, 2010-2014 ¹								
Aircraft/GSE Model:	EDMS v5.1.2	EDMS v5.1.3	EDMS v5.1.3		EDMS v5.1.3	EDMS v5.1.4.1		
Motor Vehicle Model:	MOBILE 6.2.03		MOBILE 6.2.03		MOBILE 6.2.03	MOVES 2010b	MOVES 2014	
Year:	2010		2011	2012	2013		2014	
Aircraft Sources								
Air carriers	34	34	35	43	41	48	48	48
Commuter aircraft	4	4	3	2	2	7	7	7
Cargo aircraft	3	3	3	3	2	3	3	3
General aviation	2	2	4	3	3	4	4	4
Total aircraft sources	43	43	45	51	48	62	62	62
Ground Service Equipment²								
	13	13	13	13	12	12	12	12
Motor Vehicles								
Parking/curbside ⁴	<1	<1	<1	<1	<1	<1	<1	<1
On-airport vehicles	6	6	6	6	6	14	14	18
Total motor vehicle sources	6	6	6	6	6	15	14	18
Other Sources								
Fuel storage/handling ⁵	0	0	0	0	0	0	0	0
Miscellaneous sources ⁶	2	2	3	2	3	3	3	3
Total other sources	2	2	3	2	3	3	3	3
Total Airport Sources	64	64	67	72	69	92	91	95

Source: Massport

Notes: Years 2010 and 2013 were computed with previous years EDMS version to provide for a common basis of comparison. Years 2013 and 2014 were also computed with the previous year motor vehicle emission factors model.

kg/day - kilograms per day. 1 kg/day is approximately equivalent to 0.40234 tons per year (tpy); PM - particulate matter

1 It is assumed that all PM are less than 2.5 microns in diameter (PM_{2.5}). See *Appendix I, Air Quality/Emissions Reduction* for 2005 to 2009 emission inventory results.

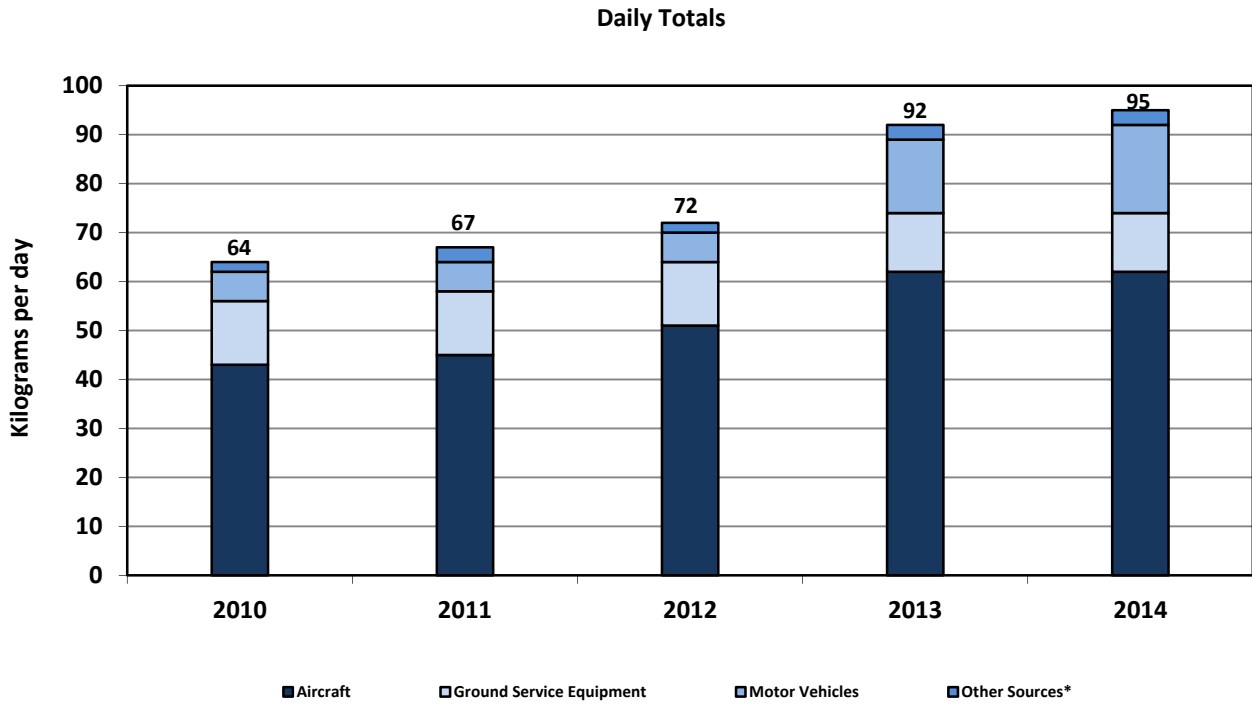
2 GSE emissions include APUs as well as vehicles and equipment converted to alternative fuels.

4 Parking/curbside is based on VTM analysis.

5 Fuel storage and handling facilities are not sources of PM emissions.

6 Includes the Central Heating and Cooling Plant, emergency electricity generation, fire training, snow melters, and other stationary sources.

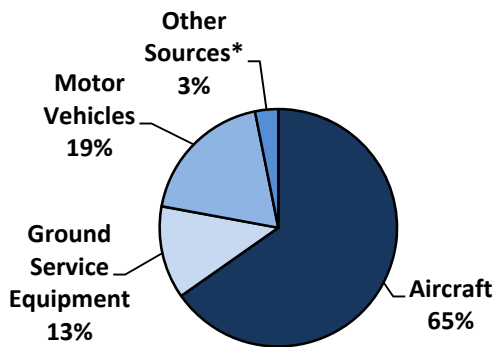
Figure 7-7 Modeled Emissions of PM₁₀/PM_{2.5} at Logan Airport, 2010-2014



Note: The increase in emissions from 2012 to 2013 were primarily due to changes in the current EDMS and MOVES computer models.

* Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.).

Figure 7-8 Sources of PM₁₀/PM_{2.5} Emissions, 2014



* Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.)

Greenhouse Gas Assessment

GHGs are known to contribute to climate change (also known as global warming), although there is still some uncertainty regarding the global magnitude of this impact and the associated short- and long-term remedies. In April 2009, the EPA issued a proposed finding that GHGs also contribute to air pollution that may endanger public health or welfare. This action has laid the initial legal groundwork for the regulation of GHG emissions nation-wide under the CAA, although currently there are no specific U.S. laws or regulations that call for the regulation of GHGs for airports directly.¹⁵ Current estimates of aviation-related GHG emission contributions to man-made totals range from 2 to 4 percent world-wide, and approximately 3 percent in the United States.^{16,17}

In May 2010, the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) revised the *Massachusetts Environmental Policy Act (MEPA) Greenhouse Gas Emissions Policy and Protocol*.¹⁸ Under the revised policy, certain projects subject to review under MEPA (though not specifically these annual EDR/ESPR filings) are required to:

- Quantify the GHG emissions generated by a proposed project; and
- Identify measures to avoid, minimize, or mitigate such emissions.¹⁹

With respect to the GHG emissions inventory²⁰ conducted for 2014, the following information is noteworthy:

- Even though the 2014 EDR is not subject to the MEPA GHG policy, since it does not propose any discrete projects, Massport has voluntarily prepared an inventory of GHG emissions directly and indirectly associated with the Airport starting with the 2007 EDR.
- The 2014 GHG emission inventory was again prepared following methodological guidance by the Transportation Research Board's (TRB) Airport Cooperative Research Program (ACRP).²¹ The inventory assigns GHG emissions based on ownership or control (whether it is controlled by Massport, the airlines or other airport tenants, or the general public).
- For this assessment, the 2014 GHG emissions inventory includes aircraft operations within the ground-based taxi-idle/delay mode and up to the top of the 3,000-foot LTO cycle. GHG emissions associated with GSE/APU, motor vehicles, a variety of stationary sources, and electricity usage were also included.
- Massport has direct ownership or control over a small percentage of these GHG emission sources (i.e., Massport fleet vehicles, stationary sources, and electrical consumption within Massport buildings).

15 GHG emission reduction measures have been adopted by the EPA for new aircraft engines, but these regulations do not apply directly to airports.

16 Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, New York City, NY. November 2014.

17 U.S. Governmental Accountability Office (GAO), Aviation and the Environment, NextGen and Research and Development Are Keys to Reducing Emissions and Their Impact on Health and Climate, May 6, 2008.

18 Revised MEPA Greenhouse Gas Emissions Policy and Protocol, Massachusetts Executive Office of Energy and Environmental Affairs, effective May 5, 2010.

19 These GHG are comprised primarily of carbon dioxide (CO₂), methane (CH₄), nitrous oxides (N₂O), and three groups of fluorinated gases (i.e., sulfur hexafluoride [SF₆], hydrofluorocarbons [HFCs], and perfluorocarbons [PFCs]). GHG emission sources associated with airports are generally limited to CO₂, CH₄, and N₂O.

20 This EDR GHG inventory is one of the three that Massport prepares annually; however, the other two comprise only stationary sources of GHGs and are filed with MassDEP and the EPA respectively. These reports are for Massport-owned and -operated equipment only, and do not cover any tenant owned/operated-equipment or facilities.

21 Transportation Research Board, Airport Cooperative Research Program, ACRP Report 11, Project 02-06, Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories. See http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_011.pdf for the full report.

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The vast majority of the emission sources are owned or controlled by the airlines, other airport tenants (such as rental car companies), and the general public (such as passenger motor vehicles).

- Massport also prepares two other GHG emissions inventories for stationary sources at Logan Airport:
 - A 2014 GHG emissions inventory for the MassDEP GHG Emissions Reporting Program for those sources meeting the criteria for Category 1 and Scope 1 (i.e., only those sources under the direct ownership and control of Massport);²² and the
 - EPA Greenhouse Gas Summary Report.²³

This EDR analysis followed the EEA guidelines and uses widely-accepted emission factors that are considered appropriate for airports, including International Organization for Standardization (ISO) New England electricity-based values. The analysis is also consistent with the ACRP guidance.

For the EDR, GHG emissions are segregated by ownership and control into Categories including: (1) emissions related to Massport activities were assigned to the Massport category; (2) emissions related to airport tenants were assigned to the tenant category; and (3) emissions related to the public, such as private automobiles, were assigned to the public category. These three categories (identified in Table 7-8) are also characterized by the degree of control that the airport operator (Massport) has over GHG emissions.

- Category 1 – GHG emissions from sources that are owned and controlled by the reporting entity (e.g., Massport). Category 1 typically represents sources which are owned by the entity - or sources which are not owned by the entity, but over which the entity can exert control. At Logan Airport, these sources include airport-owned and controlled stationary sources (e.g., boilers, generators, etc.), fleet vehicles, and purchased electricity. On-airport ground transportation and off-airport employee vehicle trips are included as Category 1 emissions as they are partly controlled by the airport.
- Category 2 – This category comprises sources owned and controlled by airlines and airport tenants, and include aircraft (i.e., on-ground taxi/idle and within the LTO up to 3,000 feet), GSE/APU, electrical consumption, and employee vehicles.
- Category 3 – This category generally comprises GHG emissions associated with passenger ground access vehicles. These include private automobiles, taxis, limousines, buses, shuttle vans, etc. operating on the off-airport roadway network.

Consistent with the ACRP guidelines, once the ownership categories are determined, the operational boundaries are also set, reflecting the Scope of the emission source (refer to Table 7-8) and include:

- Scope 1 /Direct – GHG emissions from sources that are owned and controlled by the reporting entity (e.g., Massport) such as stationary sources and airport-owned fleet motor vehicles.
- Scope 2 /Indirect – GHG emissions associated with the generation of electricity consumed, but generated off-site at public utilities.
- Scope 3 /Indirect and Optional – GHG emissions that are associated with the activities of the reporting entity (e.g., Massport), but are associated with sources that are owned and controlled by others. These include aircraft-related emissions, emissions from airport tenant’s activities, as well as ground transportation to and from the airport.

22 Boston Logan International Airport, Massachusetts Department of Environmental Protection GHG Emissions Reporting Program, April 13, 2015.

23 U.S. EPA Greenhouse Gas Summary Report for Boston Logan International Airport for calendar year 2014.

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Owning/Controlling Entity Categories	Source	Category/Scope
Massport Owned and/or Controlled	Massport Fleet Vehicle	Category 1/Scope 1
	On-airport Ground Transportation	Category 1/Scope 1
	Off-airport Employee Vehicle Trips	Category 1/Scope 3
	On-airport Parking Lots	Category 1/Scope 1
	Stationary Sources (includes generators, boilers, etc.)	Category 1/Scope 1
	Fire Training	Category 1/Scope 1
	Electrical Consumption	Category 1/Scope 2
Tenant Owned and/or Controlled (includes airlines, government, concessionaires, aircraft operators, fixed-based operators, etc.)	Aircraft (on-ground, within the LTO up to 3,000 feet)	Category 2/Scope 3
	Auxiliary Power Units	Category 2/Scope 3
	Ground Support Equipment	Category 2/Scope 3
	Off-airport Employee Vehicle Trips	Category 2/Scope 3
	Electrical Consumption	Category 2/Scope 2
Public Owned and Controlled	Off-airport Vehicle Trips (Includes private automobiles, taxis, limousines, buses, shuttle vans, etc., operating on the off-airport roadway network)	Category 3/Scope 3

Source: Massport

Note: Follows Airport Cooperative Research Program (ACRP) guidance.
 LTO Landing and Takeoff.

The GHG emissions inventory included in this 2014 EDR is consistent with the data provided in the MassDEP and EPA GHG inventories for Logan Airport. However, the 2014 EDR GHG emissions inventory is more comprehensive, as it covers all three scopes of GHG emissions including those from tenants and the public, which is consistent with ACRP guidance.²⁴ By comparison, the EPA GHG Reporting Program covers only stationary sources (i.e., Category 1 and Scope 1).

Table 7-9 presents the 2014 GHG emissions inventory, reported in CO₂ equivalent values.²⁵ As shown, Massport-controlled emissions represent only 13.0 percent of total GHG emissions at the Airport. By comparison, aircraft, GSE, and other tenant-based emissions represent 67.8 percent, purchased electricity represents 10.2 percent, and passenger ground access vehicle emissions represent 9.0 percent of total GHG emissions. Aircraft represent the largest source of emissions followed by motor vehicles and electricity generation as shown in Figure 7-9.

When segregated by Scopes, aircraft, GSE, and passenger vehicles (Scope 3) represent the largest source of GHG emissions at 77 percent, with electrical consumption (Scope 2) at 10 percent, and Massport-controlled sources (Scope 1) at 13 percent (refer to Figure 7-9). Overall, total GHG emissions associated with the Airport in 2014 were lower by 3 percent when compared to 2011 levels including aircraft GSE and other tenant-based emissions. Moreover, total GHG emissions in 2014 decreased by 1 percent from 2013 levels due partly to a decrease in passenger automobile traffic (on-Airport VMT) during this timeframe. Massport plans to continue to update this GHG Emissions Inventory for Logan Airport annually.

²⁴ However, aircraft cruise mode emissions above the 3,000-foot LTO cycle were not included.

²⁵ CO₂ equivalent values are based upon the Global Warming Potential values of 1 for CO₂, 25 for CH₄, and 298 for N₂O (based on a 100 year period) as presented in the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report, 2007.

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Table 7-9 Estimated Greenhouse Gas Emissions Inventory (in MMT of CO₂eq) at Logan Airport, 2014¹

Source	Category	Scope	CO ₂	N ₂ O	CH ₄	Totals
<i>Massport-Controlled Emissions</i>						
Ground Support Equipment ²	1	1	<0.01	<0.01	<0.01	0.01
Massport Shuttle Bus	1	1	<0.01	<0.01	<0.01	<0.01
Massport Express Bus	1	1	<0.01	<0.01	<0.01	<0.01
On-Airport Roadways ³	1	1	0.03	<0.01	<0.01	0.03
Off-Airport Roadways (Employees) ⁴	1	3	<0.01	<0.01	<0.01	<0.01
Parking Lots	1	1	<0.01	<0.01	<0.01	<0.01
Stationary Sources ⁵	1	1	0.03	<0.01	<0.01	0.03
Total Massport Emissions (13.0%)			0.08	<0.01	<0.01	0.08
<i>Tenant Emissions</i>						
Aircraft – Ground ⁶	2	3	0.19	<0.01	<- ¹¹	0.19
Aircraft – Ground to 3000 feet ⁷	2	3	0.17	<0.01	<0.01	0.17
Aircraft Engine Startup	2	3	<0.01	<0.01	<0.01	<0.01
Ground Support Equipment	2	3	0.01	<0.01	<0.01	0.01
Auxiliary Power Units	2	3	0.01	<0.01	- ¹¹	0.01
Off-Airport Roadways (Employees) ⁴	2	3	0.02	<0.01	<0.01	0.02
Total Tenant Emissions (67.8%)			0.40	<0.01	<0.01	0.41
<i>Purchased Electricity Emissions⁸</i>						
Massport	1	2	0.01	<0.01	<0.01	0.01
Tenant and Common Area	2 and 3	2	0.06	<0.01	<0.01	0.06
Total Purchased Electricity Emissions (10.2%)			0.06	<0.01	<0.01	0.06
<i>Passenger Vehicle Emissions</i>						
Off-Airport Roadways ⁴	3	3	0.05	<0.01	<0.01	0.05
Total Passenger Vehicle Emissions (9.0%)			0.05	<0.01	<0.01	0.05
Total Logan Airport Emissions⁹			0.59	<0.01	<0.01	0.60
Percent of Statewide Totals ¹⁰			<1.0%	<1.0%	<1.0%	<1.0%

Source: Massport

1 MMT - million metric tons of CO₂ equivalents (1 MMT = 1.1M Short Tons). CO₂ equivalents (CO₂eq) are bases for reporting the three primary GHGs (e.g., CO₂, N₂O, and CH₄) in common units. Quantities are reported as "rounded" and truncated values for ease of addition.

2 Ground Support Equipment include the Logan Airport fleet. Emissions were calculated based on fuel usage.

3 On-airport roadways based on on-site vehicle miles traveled (VMT) and includes all vehicles.

4 Off-site roadways based on off-site Airport-related VMT and an average round trip distance of 60.5 miles (2010 Passenger Ground Access Survey).

5 Other sources include Central Heating and Cooling Plant, emergency generators, snow melters, and live fire training facility.

6 Aircraft – Ground emissions include taxi-in, taxi-out and ground-based delay emissions.

7 Aircraft – Ground to 3,000 feet include takeoff, climbout, and approach emissions up to a height of 3,000 feet (as specified by the ACRP guidance).

8 Emissions from electrical consumption occurs off-airport at power generating plants.

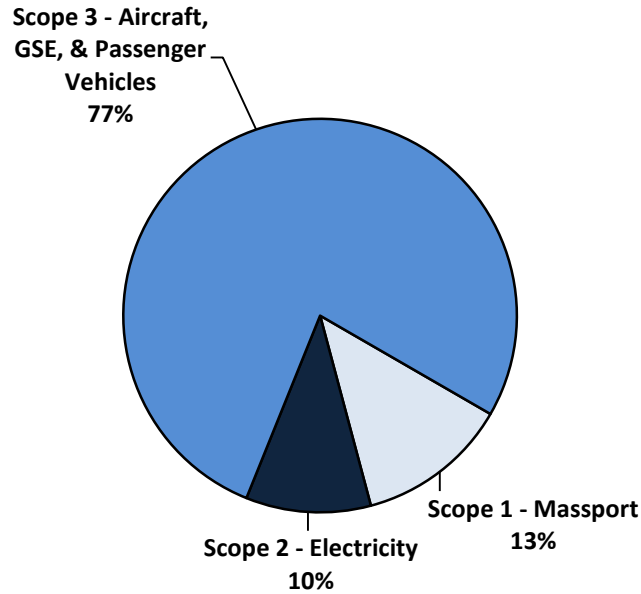
9 Total Emissions = Airport + Tenant + Public.

10 Percentage based on relative amount of total emissions to statewide total from World Resources Institute (cait.wri.org).

11 Contributions of CH₄ emissions from commercial aircraft are reported as zero. Years of scientific measurement campaigns conducted at the exhaust exit plane of commercial aircraft gas turbine engines have repeatedly indicated that CH₄ emissions are consumed over the full emission flight envelope [Reference: Aircraft Emissions of Methane and Nitrous Oxide during the Alternative Aviation Fuel Experiment, Santoni et al., Environ. Sci. Technol., July 2011, Volume 45, pp. 7075-7082]. As a result, the EPA published that: "...methane is no longer considered to be an emission from aircraft gas turbine engines burning Jet A at higher power settings and is, in fact, consumed in net at these higher powers." [Reference: EPA, Recommended Best Practice for Quantifying Speciated Organic Gas Emissions from Aircraft Equipped with Turbofan, Turbojet, and Turboprop Engines, May 27, 2009 [EPA-420-R-09-901], <http://www.epa.gov/otaq/aviation.htm>]. In accordance with the following statements in the 2006 IPCC Guidelines (IPCC 2006), the FAA does not calculate CH₄ emissions for either the domestic or international bunker commercial aircraft jet fuel emissions inventories. "Methane (CH₄) may be emitted by gas turbines during idle and by older technology engines, but recent data suggest that little or no CH₄ is emitted by modern engines." "Current scientific understanding does not allow other gases (e.g., N₂O and CH₄) to be included in calculation of cruise emissions." (IPCC 1999).

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Figure 7-9 Sources of GHG Emissions, 2014



Note: Scope 1 emissions are from sources that are owned or controlled by Massport, Scope 2 emissions are from electrical consumption, which are generated off-Airport at power generating plants, and Scope 3 emissions are from aircraft, GSE, and ground transportation to and from the Airport.

Table 7-10 provides a comparison between Airport-related GHG emissions from 2007 through 2014. Total GHG emissions in 2014 were slightly higher (7.1 percent) than 2010 levels. For ease of comparison to previous years, the 2014 emissions are summarized in a manner similar to previous years.

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Table 7-10 Comparison of Estimated Total Greenhouse Gas (GHG) Emissions (MMT of CO₂eq) at Logan Airport - 2007 through 2014

Source	2007	2008	2009	2010	2011	2012	2013	2014
Direct Emissions²								
Aircraft ³	0.22	0.21	0.19	0.18	0.19	0.19	0.19	0.20
GSE/APUs	0.08	0.08	0.02	0.02	0.02	0.02	0.02	0.02
Motor vehicles ⁴	0.03	0.03	0.03	0.03	0.04	0.03	0.05	0.05
Other sources ⁵	0.04	0.03	0.03	0.03	0.03	0.02	0.03	0.03
Total Direct Emissions	0.37	0.35	0.27	0.27	0.28	0.26	0.29	0.29
Indirect Emissions⁶								
Aircraft ⁷	0.18	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Motor vehicles ⁸	0.05	0.05	0.05	0.05	0.06	0.05	0.08	0.07
Electrical consumption ⁹	0.09	0.08	0.07	0.07	0.08	0.08	0.06	0.06
Total Indirect Emissions	0.32	0.30	0.29	0.29	0.30	0.30	0.31	0.30
Total Emissions¹⁰	0.69	0.65	0.56	0.56	0.58	0.57	0.60	0.60
Percent of State Totals¹¹	<1	<1	<1	<1	<1	<1	<1	<1

Sources: Massport and KBE.

1 MMT – million metric tons of CO₂ equivalents (1 MMT = 1.1M Short Tons). CO₂ equivalents (CO₂eq) are bases for reporting the three primary GHGs (e.g., CO₂, N₂O and CH₄) in common units. Quantities are reported as "rounded" and truncated values for ease of addition.

2 Direct emissions are those that occur in areas located within the Airport's geographic boundaries.

3 Direct aircraft emissions based engine start-up, taxi-in, taxi-out and ground-based delay emissions.

4 Direct motor vehicle emissions based on on-site vehicle miles traveled (VMT).

5 Other sources include Central Heating and Cooling Plant, emergency generators, snow melters and live fire training facility.

6 Indirect emissions are those that occur off the Airport site.

7 Indirect aircraft emissions are based on take-off, climb-out and landing emissions which occur up to an altitude of 3,000 ft., the limits of the LTO cycle

8 Indirect motor vehicle emissions based on off-site Airport-related VMT and an average round trip distance of approximately 60 miles.

9 Electrical consumption emissions occur off-airport at power generating plants.

10 Total Emissions = Direct +Indirect.

11 Percentage based on relative amount of Airport total of direct emissions to statewide total from World Resources Institute (cait.wri.org)

Air Quality Emissions Reduction

As part of implementing the ongoing air quality management strategy for Logan Airport, Massport has established a number of goals and objectives to address air emissions from Airport operations, including the minimization of Airport-related emissions, through the AQI and the reduction of GSE and Massport fleet emissions with AFV. This section presents an update on the AQI and the AFV Program at Logan Airport.

Air Quality Initiative (AQI)

Massport developed the AQI as a 15-year voluntary program with the overall goal to maintain NO_x emissions associated with Logan Airport at, or below, 1999 levels. The AQI has four primary commitments, shown below, along with Massport's progress in meeting the AQI commitments.

- **Expand on the air quality initiatives already in-place at Logan Airport.** See Table 7-14 for the initiatives in place at the time the AQI was developed.
- **As necessary to maintain NO_x emissions at or below 1999 levels, retire emissions credits, giving priority to mobile sources.** Massport updates the AQI inventory of NO_x emissions annually to reflect new information and changing conditions associated with the Airport's operations. Table 7-11 presents the updated NO_x emissions inventory and shows that, in 2014, again it was not necessary to purchase and retire mobile source emission credits to maintain NO_x emissions at, or below, 1999 levels.
- **Report the status and progress of the AQI in the ESPR or EDR.** Massport reports on the status of the AQI in the Logan Airport EDRs and ESPRs and has done so since 2001 (Table 7-11).
- **Continue to work at international and national levels to decrease air emissions from aviation sources.** Massport maintains memberships and active participation in a number of organizations involved in addressing aviation-related environmental issues, including air quality. These include serving on Environmental Committees of the American Association of Airport Executives (AAAE) and Airports Council International (ACI).

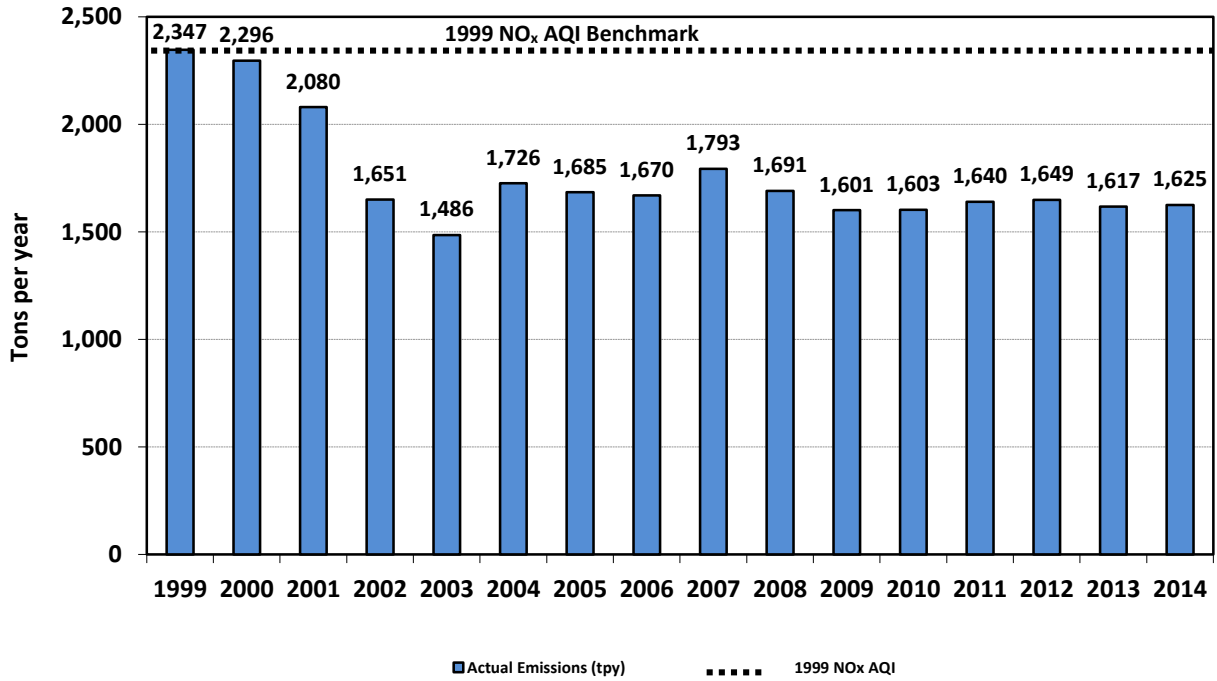
As shown in Table 7-11, NO_x emissions at Logan Airport in 2014 (net total with reductions) were approximately 722 tpy lower than the 1999 AQI benchmark. Since 1999, this trend represents a 31 percent decrease in 2014. Between 1999 and 2014, the greatest reductions of NO_x emissions were associated with aircraft, GSE, and on-Airport motor vehicles at 21 percent, 70 percent, and 87 percent reductions, respectively.

Figure 7-10 compares the 1999 AQI threshold level of 2,347 tpy of NO_x emissions to modeled NO_x emissions for 2001 through 2014. Cumulatively, and as of December 31, 2014, NO_x emissions at Logan Airport were approximately 9,417 tons below the benchmark set by the AQI. As shown in Table 7-10, based upon current projections, Massport expects that because the emission inventory is projected to be well below the 1999 threshold of 2,347 tpy through 2015, no credits will need to be purchased through the entire AQI timeframe.

The AQI was undertaken at a time when most emissions at Logan Airport were declining due to cleaner burning, more efficient internal combustion engines. NO_x emissions were, however, predicted to increase due to aircraft engine technologies. With the retiring of many older, less efficient aircraft after September 11, 2001, and the dramatic reduction in aircraft operations, the growth in NO_x emissions was never realized.

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Figure 7-10 Modeled NO_x Emissions Compared to AQI¹



¹ Includes emission reductions from the use of alternative fuel vehicles, shuttle buses, and ground service equipment. See Table 7-11.

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Table 7-11 AQI Inventory Tracking of Modeled NO _x Emissions (in tpy) ¹ for Logan Airport							
Actual Conditions ²							
	2000	2009	2010	2011	2012	2013	2014
Total Annual Emissions	2,315	1,609	1,608	1,647	1,654	1,627	1,628
Above (Below) 1999 Levels Before Reductions	(32)	(738)	(739)	(700)	(693)	(720)	(719)
Potential Reductions/ Increases³							
Alternative Fuel Vehicles/Shuttle Bus	(4)	(4)	(2)	(1)	0	(6)	0
Alternate Fuel Ground Service Equipment ⁴	(14)	(4)	(3)	(6)	(5)	(4)	(3)
Total Potential Reductions	(19)	(8)	(5)	(7)	(5)	(10)	(3)
Above (Below) 1999 Levels After Reduction	(51)	(746)	(744)	(707)	(698)	(730)	(722)
Credit Trading ⁵	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Net Total w/Reductions and Credits	2,296	1,601	1,603	1,640	1,649	1,617	1,625

Source: Massport

Notes: Values in parentheses, such as "(250)" are negative values. Values without parentheses are positive values.

N/A Not available.

1 For consistency with the AQI, the NO_x emission values in this table are reported in tpy. The EDR/ESPR Emissions Inventory values are reported in kg/day. A conversion factor of 0.40234 is used to convert kg/day to tpy.

2 The 2009 analysis was completed using EDMS v5.1.2 and MOBILE6.2.03. The 2010 through 2012 analysis was completed using EDMS v5.1.3 and MOBILE6.2.03. The 2013 analysis was completed using EDMS v5.1.4.1 and MOVES2010b. The 2014 analysis was completed using EDMS v5.1.4.1 and MOVES2014.

3 Other initiatives that Massport and Logan Airport tenants may use for possible emission reductions include: Central Heating and Cooling Plant boilers, 400-Hz power at gates, and low NO_x fuels in Logan Express buses.

4 Massport's current plan for the conversion of GSE to alternative fuels is being re-evaluated based on the new diesel rule (2007). GSE AFV credits were based on fuel type data obtained from the aerodrome vehicle permit applications beginning in 2007.

5 Since the AQI threshold is not exceeded in 2014, nor are the emissions expected to exceed the threshold in the near future, no credits will need to be purchased in the immediate term.

As part of the reporting process, the AQI also calls for an itemization of NO_x emissions generated by activities at Logan Airport according to the individual airline operator. Table 7-12 shows the estimated amounts of NO_x air emissions in 2014 generated by each airline in units of tpy and tons per LTO.

Based on Table 7-12, international carriers are the higher NO_x emitters per LTO because their longer stage lengths require aircraft equipped with larger and/or additional engines and heavier takeoff weights. Overall, international carriers emit 19 percent of the total aircraft NO_x emissions at Logan Airport in 2014. Other notable findings include:


- Carriers with the greatest number of flights tended to generate the highest percentage of total NO_x emissions;
- Combined, the four largest air carriers (by LTO), emitted 52 percent of the total aircraft NO_x emissions in 2014;
- Commercial airlines (excludes cargo and GA) accounted for 93 percent of total aircraft NO_x emissions in 2014;
- Cargo aircraft operators accounted for 6 percent of total aircraft NO_x emissions in 2014; and
- GA aircraft accounted for 1 percent of total aircraft NO_x emissions in 2014.

Air Carrier, by Airline	Total Emissions (tons/year)		Normalized Emissions (tons/LTO)	Air Carrier, by Airline	Total Emissions (tons/year)		Normalized Emissions (tons/LTO)
	LTOs	NO _x	NO _x per LTO		LTOs	NO _x	NO _x per LTO
ABX Air	12	0.27	0.023	Miami Air	24	0.25	0.010
Aer Lingus	966	27.27	0.028	Mountain Air Cargo	23	0.02	0.001
Air Canada ¹	5,737	13.19	0.002	Other Air Carrier	19	0.51	0.027
Air France	450	25.08	0.056	Other International	19	1.09	0.057
Airtran Airways	1,721	12.00	0.007	People Express	85	0.63	0.007
Alaska Airlines	1,545	18.27	0.012	Peninsula Air	2,191	1.15	0.001
Alitalia	275	7.26	0.026	Porter Airlines	2,150	1.86	0.001
American Airlines ²	11,316	145.70	0.013	Republic Airlines	1,758	4.46	0.003
Atlas Air	244	6.81	0.028	SATA International	267	4.56	0.017
British Airways	1,339	95.59	0.071	Shuttle America	4,875	12.72	0.003
Chautaugua	935	2.78	0.003	SkyWest	575	1.58	0.003
Copa	365	3.70	0.010	Southwest Airlines	9,262	87.39	0.009
Delta Air Lines ³	16,996	179.51	0.011	Spirit	1,473	15.29	0.010
Emirates	301	12.46	0.041	Sun Country	514	5.78	0.011
Expressjet	1,791	5.82	0.003	Swift Air	43	0.38	0.009
FedEx	1,651	61.83	0.037	Swiss International	361	11.67	0.032
GA	13,235	19.83	0.001	Turkish Airlines	225	7.49	0.033
GoJet	238	0.78	0.003	TACV-Cabo Verde	93	1.63	0.018
Hainan Airlines	140	3.74	0.027	Trans States	80	0.24	0.003
Hyannis Air Service	17,540	0.48	<0.001	United Airlines	12,199	153.25	0.013
Iberia	166	5.51	0.033	UPS Airlines	718	18.39	0.026
Icelandair	614	12.99	0.021	US Airways ⁴	21,982	160.23	0.007
Japan Airlines	366	9.77	0.027	Virgin	358	13.88	0.039
JetBlue Airways	41,297	294.43	0.007	Virgin America	1,599	16.27	0.010
Lufthansa	857	34.35	0.040	Wiggins	207	0.03	<0.001
Mesa	702	2.33	0.003				
				Total	181,899	1,522.52	0.008

Notes: Other International may include: AeroMexico, Saudi Arabian Airlines, etc.
 The "Other" Categories may include airlines with less than 10 operations.
 Normalized emissions are based on a Landing and Takeoff Cycle (LTO).
 This list combines the major airlines with their commuters (i.e., Jazz with Air Canada, American Eagle with American Airlines, etc.)
 Cargo carriers include: ABX, Atlas, FedEx, Mountain Air Cargo, UPS, and Wiggins.
 GA – General Aviation

1 Includes Jazz.
 2 Includes American Eagle.
 3 Includes Delta Connection and Delta Shuttle.
 4 Includes US Airways Express.

Alternative Fuel Vehicles Program



A component of Massport's Air Quality Management Program is the AFV Program. The AFV Program is designed to replace Massport's conventionally-fueled fleet with alternatively fueled or powered vehicles, when feasible, to help reduce emissions associated with Logan Airport operations. Massport now operates 99 vehicles powered by CNG, propane, E85 flex fuel, or operates hybrids powered by gasoline or diesel. Massport established a vehicle procurement policy in 2006 that requires consideration of AFVs when purchases are made. For example, beginning in 2013, as part of the Southwest Service Area (SWSA) redevelopment, the existing fleet of diesel rental car shuttle buses was replaced by CNG or clean diesel-electric hybrid buses. For 2014, five additional pick-up trucks powered by E85 flex fuel were acquired. Table 7-13 shows the number of Massport AFVs by vehicle type in 2014. As discussed in *Chapter 1, Introduction/Executive Summary*, several projects and programs support AFVs at Logan Airport including:

- The replacement of 94 diesel rental car buses and older CNG buses with a fleet of 50 alternative fuel (diesel-electric hybrids and CNG) buses, serves the new Rental Car Center (RCC), Massport terminals and other shuttle routes. This project was partially funded by the FAA's Voluntary Airport Low Emissions (VALE) Program grant. Four additional CNG buses were put into service in September 2015.
- Operation for almost two decades of one of the largest privately operated, publicly-accessible, CNG stations in New England, which in 2014, dispensed approximately 21,500 gasoline-equivalent gallons per month for Massport vehicles.
- The use of battery powered tugs and belt loaders for the Delta Air Lines ground service fleet at Terminal A.
- In 2012, Massport installed 13 electric vehicle charging stations to accommodate a total of 26 vehicles in the Central Garage and Terminal B parking areas. There are also two charging stations at the new Framingham Logan Express Garage.
- Renovation to the existing gas station in the North Cargo Area in 2008, which included the installation of an E85 (first-generation biofuel) fuel dispensing tank.
- Continued operation of Massport's "CleanAirCab" incentive program for AFVs, which allows hybrid or alternative fuel taxis to go to the head of the taxi line to serve passengers.

In addition, Logan Airport's new Green Bus Depot is designed to maintain the expanded CNG-fueled and clean diesel-electric hybrid shuttle bus fleet. Massport also began offering preferred parking for customers driving hybrid and AFVs in the spring of 2007.

Table 7-13 Massport’s Alternative Fuel Vehicle Fleet Inventory at Logan Airport

Fuel Type	Vehicle	2014
Diesel/Electric Hybrid	Shuttle Bus ¹	32
Compressed Natural Gas (CNG)	Van	3
	Pick-Up Truck	5
	Honda Civic	9
	CNG NABI Bus ²	18
Gasoline/Electric Hybrid	Ford Escape	8
Propane	Non-Road Vehicles (Forklifts)	2
E85 Flex Fuel	Pick-Up Truck	18
	Van	2
	Ford Escape	2
	Total	99

Source: Massport.

Note:

- 1 The 32 diesel/electric hybrid shuttle buses, added to the fleet in 2013, replaced the diesel rental car buses.
- 2 The CNG NABI buses replaced the 26 aging CNG shuttle buses.

Air Quality Management Goals

Massport’s air quality management strategy for Logan Airport focuses on decreasing emissions, when feasible, from all Airport-related sources, in addition to studying innovative means to achieve emissions reductions. Massport’s air quality improvement goals, the measures proposed to accomplish them, and some 2011/2012 milestones are listed in Table 7-14.

Massport continues to comply with the Logan Airport Parking Freeze²⁶, in accordance with 10 CMR 7.30 and 40 CFR 52.1135. For a discussion of Massport’s compliance with of the Parking Freeze regulation, and the counterproductive effect of constrained parking at Logan Airport on VMT and attendant emissions, see *Chapter 5, Ground Access to and from Logan Airport*.

²⁶ 310 Code of Massachusetts Regulations 7.30 and 40 Code of Federal Regulations 52.1120.



Table 7-14 Air Quality Management Strategy Status

Air Quality Emissions		
Reduction Goals	Plan Elements	2014 Status
Reduce emissions from Massport fleet vehicles	Convert Massport fleet vehicles to electricity or compressed natural gas (CNG) by retrofitting or procurement.	Massport uses the Energy Policy Act (EPAct) of 1992 to expedite Massport's Alternative Fuel Vehicle (AFV)/Alternative Power Vehicle (APV) program. In 2014, five additional pick-up trucks powered by E85 flex fuel were acquired.
Encourage use of alternative fuel and alternative power vehicles by private fleet and airside service vehicle owners	Provide infrastructure to support alternative fuels including CNG and electricity.	Massport continues to operate one of New England's largest retail CNG stations, which is open to the public. In calendar year 2014, the CNG station pumped approximately 21,500 gallon equivalents per month for all Massport fleet vehicles (non-Massport vehicles were also using CNG). Massport plans to support the current and future standard systems for plug-in electric vehicles (EVs). For example, the RCC in the Southwest Service Area (SWSA) includes the infrastructure necessary to accommodate future plug-in stations for electric vehicles. In 2012, Massport installed 13 electric vehicle charging stations to accommodate a total of 26 vehicles in the Central Garage and Terminal B parking areas. There are also two charging stations at the new Framingham Logan Express Garage.
	Work with ground access fleet and airside service-vehicle owners to encourage conversion.	Massport encourages conversion to AFVs/APVs by others through such policies as 50 percent discounts in AFV/APV ground access fees to limousines, vans, and buses; limited "front-of-line" taxi pool privileges to hybrid and AFVs/APVs; and preferred parking for hybrid and AFVs/APVs at Logan Airport parking facilities.
	Use of pre-conditioned air (PCA) at new and renovated terminals and terminal gates.	The majority of contact gates have PCA and/or 400-Hz power. This reduces the need for auxiliary power unit (APUs) and, consequently, reduces associated emissions. The recent improvements of Terminal B included the installation of PCA at all renovated gates.
Minimize emissions from motor vehicles	Implement a program to increase high occupancy vehicle (HOV) ridership by air passengers.	As described in detail in <i>Chapter 5, Ground Access to and from Logan Airport</i> , there are a number of HOV services serving Logan Airport that are aimed at air passengers, including the MBTA Blue Line and Silver Line, Logan Express, and water transportation. Massport promotes the use of these services by employees, primarily through the Logan Airport Employee Transportation Management Association (Logan TMA) and various pricing incentives.
	Expand the Logan TMA for Airport employees.	Massport continues to provide commuting information to all Airport employees including Sunrise and Logan Express Shuttles with reductions in employee parking.
	Encourage employees to use bicycling as a mode of commuting.	Massport includes bike racks at all new facilities and at appropriate existing facilities to promote employees biking to work. Bicycle racks are currently provided at Terminal A, Terminal E, Logan Office Center, MBTA's Airport Station, Economy Parking Garage, Signature general aviation facility, and the Green Bus Depot (Bus Maintenance Facility). Additional racks were installed at the RCC facility in 2014.

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Table 7-14 Air Quality Management Strategy Status (Continued)		
Air Quality Emissions		
Reduction Goals	Plan Elements	2014 Status
Minimize emissions from Construction Equipment	Incorporate Clean Air Construction Initiative (CACI) into major earthwork construction projects.	For all construction projects, heavy construction equipment is required to be equipped with diesel particulate filters or diesel oxidation catalysts in accordance with CACI.
Reduce emissions from fuel vapor loss	Provide state-of-the-art fuel storage and distribution equipment. Implement Tank Management Program.	The Fuel Storage and Distribution System is in operation. Refer to <i>Chapter 8, Water Quality/Environmental Compliance and Management</i> . Tank management focuses on proper maintenance.
Reduce emissions from stationary sources	Employ Reasonable Available Control Technologies (RACT) for NO _x at Central Heating/Cooling Plant. Use alternative fuels in snow melters. Incorporate green building technologies and energy use reduction strategies. On-site renewable energy	RACT policies have been implemented. Massport is required to use Ultra Low Sulfur Diesel (ULSD) fuel is used in all Massport snow melting equipment. Logan Airport has four U.S. Green Building Council Leadership in Energy and Environmental Design® (LEED) certified facilities. Terminal A (the first LEED certified terminal in the world), the Signature Flight Support GA Facility, the Green Bus Depot (LEED Silver certified), and the RCC (LEED Gold certified). Additionally, Terminal E features green building elements. An overview of sustainability initiatives is presented in <i>Chapter 1, Introduction/Executive Summary</i> . Massport has installed and is planning to expand on-site renewable energy systems in the form of Solar Photovoltaic (Solar PV) panels and micro-wind turbines. Further details on these installations can be found in <i>Chapter 1, Introduction/Executive Summary</i> .

Table 7-14 Air Quality Management Strategy Status (Continued)

Air Quality Emissions		
Reduction Goals	Plan Elements	2014 Status
Reduce aircraft emissions	Work with the FAA to study and implement airfield-improvement concepts and operational changes that may have air quality benefits.	Massport promoted such concepts through the <i>Logan Airside Improvements Planning Project Environmental Impact Statement</i> , which recommended physical and operational improvements to Logan Airport including construction of the new Runway 14-32 and Centerfield Taxiway, and taxiway improvements. Runway 14-32 became operational in November 2006 and the Centerfield Taxiway was fully opened in summer of 2009. In addition, in coordination with Massport, the Massachusetts Institute of Technology (MIT) completed a detailed survey of pilots at Logan Airport to better understand the use of single engine taxiing and issued a paper in March 2010, and in January 2011, MIT issued a paper on aircraft pushback control strategy to reduce congestion and taxi delay.
Reduce energy intensity and greenhouse gas emissions while increasing portion of Logan Airport's energy generated from renewable sources	<p>Reduce energy consumption</p> <p>Increase the portion of Massport's energy being generated from renewable sources</p> <p>Reduce overall GHG emissions associated with energy consumed in Massport operated facilities at Logan Airport</p> <p>Reduce GHG emissions from Massport-operated mobile sources</p>	This goal was identified as part of the Logan Airport Sustainability Management Plan (SMP) ¹ , which was released in April 2015. Progress on this goal will be reported on in annual sustainability reports.

¹ Progress towards goals identified as part of the Logan Airport Sustainability Management Plan (SMP) will be reported separately, as part of Massport's annual sustainability reporting.

Updates on Other Air Quality Efforts

This section highlights other Logan Airport-related air quality efforts in 2014.

Massachusetts Department of Public Health Study

In 2004, the Massachusetts Legislature appropriated funds for the Department of Public Health (DPH) to undertake an assessment of potential health impacts of Logan Airport in the East Boston section of the city and any other communities located within a five-mile radius of the Airport, with a focus on noise and air quality. This study was completed in May 2014 and consists of an epidemiological survey combined with computer modeling of noise levels and air pollution concentrations. Massport has cooperated in this effort by providing funding to complete the study and Airport operational data in support of the study. In the spring of 2011, Massport also gave technical assistance in support of the DPH study by providing geographic information systems (GIS) analysis of the roadway network in and around Logan Airport in a format compatible with the FAA's EDMS. Massport is working with DPH and East Boston Health Center on implementing DPH recommendations related to Massport.

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In response to the DPH study recommendations, Massport has:

- Entered into an agreement to provide funding to The East Boston Neighborhood Health Center to help expand the efforts of their Asthma and chronic obstructive pulmonary disease (COPD) Prevention and Treatment Program in East Boston and launch a program in Winthrop including screening children, providing asthma kits, and home visits, among others.
- Entered into an agreement with the Massachusetts League of Community Health Centers for the evaluation and assessment of the Asthma and COPD Prevention and Treatment Program, and engagement of community health centers in the North End, Charlestown, Chelsea, and South Boston. The East Boston Neighborhood Health Center will conduct the same evaluations for the East Boston and Winthrop community programs.
- Massport entered into an agreement with the MA DPH to expand or establish the Asthma and COPD Prevention and Treatment Program in South Boston, the North End, Chelsea, and Charlestown in collaboration with the Massachusetts General Hospital, South Boston Neighborhood Health Center, and conduct training on the Community Health Worker assessments.

The findings from this Study can be viewed from the DPH website at:

<http://www.mass.gov/eohhs/gov/departments/dph/programs/environmental-health/investigations/logan-airport-health-study.html>.

Massport Air Quality Monitoring Study

Massport has also completed a \$1.6 million air quality monitoring study in and around Logan Airport in compliance with its MEPA Section 61 findings for the Centerfield Taxiway component of the Logan Airside Improvements Project. The study gathered air quality data in the communities around Logan Airport before and after the new Centerfield Taxiway became operational, with an emphasis on ambient (i.e., “outdoor”) levels of particulate matter and hazardous air pollutants (HAPs). The intent of the study was to assess potential air quality changes related to the operation of the new taxiway. Massport worked cooperatively with MassDEP and DPH to develop the scope of the monitoring study.

Air monitoring commenced in 2007 at ten different stations located on and off the Airport. The monitoring comprised both “real-time” and “time-integrated” monitoring methods, and includes measurement of fine particulates, VOCs, carbonyls, black carbon, and polynuclear aromatic hydrocarbons (PAHs). Massport also met periodically with MassDEP and DPH regarding the progress and results of the air monitoring.

The first year of the two-year study was completed September 2008 and the second phase concluded in September 2011 following the completion of the Centerfield Taxiway, which is now fully operational. The report is posted on Massport’s website. For details on the study see Massport’s website at:

<https://www.massport.com/environment/environmental-reporting/air-quality/centerfield-taxiway-study/>

Single Engine Taxiing

Single engine taxiing is one measure that is being used by air carriers to help reduce fuel use and emissions. As a result, Massport supports the use of single engine taxiing, when it can be done safely, voluntarily and at the discretion of the pilot. Massport has conducted three surveys of Logan Airport air carriers (2006, 2009, and 2010) to understand the extent single engine taxiing is used at Logan Airport. In addition, Massport is an active member of the FAA Partnership for Air Transportation Noise and Emissions Reduction (PARTNER) program

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on reducing noise and emissions. In 2009, Massport offered to facilitate a more detailed survey of pilots at Logan Airport by the Massachusetts Institute of Technology (MIT) to better understand the use of single engine taxiing. MIT completed its survey and issued a paper in March 2010, which was provided in the 2009 EDR. The MIT survey confirms earlier Massport survey findings that single engine taxiing is an important operational measure used by airlines to conserve fuel and is extensively used at Logan Airport. MIT issued a paper in January 2011 reporting on a control strategy to minimize airport surface congestion, and thus taxiing time, by regulating the rate at which aircraft are pushed back from their gates. Also in January 2011, Massport sent a memorandum to air carriers in support of single engine taxiing when consistent with safety procedures. The memorandum highlighted best practices for single engine taxiing use based on the MIT survey findings. In May 2014, Massport sent an additional memoranda to air carriers in support of single/reduced-engine taxiing and the use of idle reverse thrust as strategies. Copies of these memoranda are provided in *Appendix L, Reduced/Single Engine Taxiing at Logan Airport Memoranda*.

MIT and the Center for Air Transportation Systems Research developed a methodology to account for single engine taxi procedures during the taxi-in or -out modes.^{27,28,29} Some of the single engine taxi challenges noted in these studies include: (1) excessive thrust and associated issues; (2) maneuverability problems, particularly related to tight taxiways turns and weather; (3) problems starting the second engine; and (4) distractions and workload issues. Thus, pilots do not use single engine taxiing during each aircraft operation in practice, and when they do use it, it is not for the entire operation. Pilots use it even less often during taxi out.

When using the MIT methodology and available data (such as aircraft pilot surveys) applied to the most recent set of aircraft operational data for Logan Airport (i.e., 2014), the results show a savings of approximately 1,400,000 gallons of jet fuel and the reduction of approximately 13,900 metric tons of GHG emissions associated with this initiative.

Logan Airport Energy Planning

In 2009, Massport began preparing an Energy Master Plan for all Massport facilities. The planning process involved data collection and establishing regulatory targets and baselines. The Energy Master Plan will provide Massport with a comprehensive strategy to reduce energy use using a portfolio of achievable measures that will result in quantifiable energy savings and cost reduction. In 2010, the Massport Board approved the Energy Master Plan and approved funding to implement energy efficiency improvements.

Southwest Service Area Redevelopment Program

The principal feature of the SWSA Redevelopment Program is the new RCC and associated support facilities. The RCC consolidates on-airport rental car operations and facilities into one integrated user-friendly facility to better serve both the tenants and the traveling public, and reduce ground transportation and air quality impacts on-Airport and off-Airport in the surrounding neighborhoods. The RCC was designed, constructed and is according to Leadership in Energy and Environmental Design® (LEED) certification; the RCC was awarded LEED Gold certification in 2015 and meets the Massachusetts LEED Plus sustainable design and construction standards established by the Commonwealth's Executive Office for Administration and Finance.³⁰

²⁷ A Survey of Airline Pilots Regarding Fuel Conservation Procedures for Taxi Operations, Massachusetts Institute of Technology.

²⁸ Opportunities for Reducing Surface Emissions through Airport Surface Movement Optimization, Massachusetts Institute of Technology, 2008.

²⁹ Analysis of Emissions Inventory for Single Engine Taxi-out Operations, Center for Air Transportation Systems Research.

³⁰ According to Executive Order 484, titled "Leading by Example: Clean Energy and Efficient Buildings," all new construction and significant renovation projects for state government buildings over 20,000 square feet must meet the Massachusetts LEED* Plus green building standard.

By constructing an on-site consolidated rental car facility, the RCC reduced the need for the rental car operators to shuttle vehicles from off-Airport storage locations, resulting in fewer on- and off-Airport VMT and lower air emissions (including mobile source GHG emissions) within the East Boston community, Route 1A, and adjacent neighborhoods. Through the implementation of the Unified Bus System, the new RCC facilitates the reduction of the current rental car shuttle bus fleet by 70 percent and the associated on-Airport VMTs, and air emissions. The Unified Bus System utilizes clean fuels (CNG and clean diesel-electric hybrid), further reducing emissions compared to the former rental car bus fleet. Also, the Unified Bus System includes combining the rental car shuttle bus service with existing Massport buses that service the Massachusetts Bay Transportation Authority (MBTA) Blue Line Airport Station (routes 22/33/55), resulting in further decreases to the size of the overall bus fleet serving the Airport, and reduced on-Airport VMT and air emissions. Other air quality benefits of the SWSA Redevelopment Program include the reduction of curb-side congestion at the main terminal complex through implementation of the Unified Bus System and reduced overall energy demand (and associated stationary source GHG emissions) through improved building energy design.

On May 28, 2010, the Secretary of EEA issued a Certificate that determined that the project adequately and properly complies with MEPA. *Chapter 3, Airport Planning* provides detail on the environmental and operational benefits of the SWSA Redevelopment Program related to the consolidation of ground transportation facilities and services, and traffic circulation and access improvements. Benefits of the consolidation will include customer service improvements, environmental management enhancements, reduced on-Airport VMT and the associated reductions in air emissions. RCC construction began in July 2010, starting with various enabling phases of construction and was completed in 2014.

Engagement in Aviation-Related Environmental Issues

Massport maintains memberships and active participation in a number of organizations involved in addressing aviation-related environmental issues, including air quality. These include serving on environmental committees for the Transportation Research Board, American Association of Airport Executives, and Airport Council International of North America.

Ultrafine Particles (UFP)

To date, there are no Massachusetts or Federal air quality standards for the emissions or the ambient levels of UFP due to limited health effects evidence and air quality data.³¹ Future ESPRs/EDRs will report on UFP standards as they develop. The monitoring of UFP is being conducted at two airports in the U.S. but the data from these programs are preliminary and not necessarily adaptable to other airports. These UFP monitoring studies include the following:

- T.F. Green Airport (PVD) – Located in Warwick R.I., this UFP monitoring study is being conducted by the Rhode Island Airport Cooperation (RIAC) in accordance with state regulations. Under this multi-year program, UFP are being measured continuously at four sites located around the perimeter of the airport. Weather data (i.e., wind direction and speed) are also being collected. The UFP data from this program are provided to the Rhode Island Department of Environmental Management (RIDEM), but no findings or relationships to airport activity have been reported thus far.
- Los Angeles International Airport (LAX) – UFP were measured at this California airport as part of a research study undertaken by Los Angeles World Airports. In this study, UFPs were measured over two seasonal

31 National Ambient Air Quality Standards for Particulate Matter, Final Rule, "Federal Register 78:10 (15 January 2013) p. 3122.

campaigns at locations both on and off the airport property. Again, meteorological data were collected along with airport operational data as a means of evaluating the source(s) of the UFP. To date, this study found that UFPs in the vicinity of LAX result from the combined contributions from airport activities, motor vehicles traveling on the off-airport roadway network, nearby power plants, and from the transport of particles from other outlying sources.

Statewide, National and International Initiatives

Advancements on the national and international levels to decrease Airport-related air emissions have continued to focused primarily on three initiatives through the 2012 and 2013 time-periods: the advanced quantification of PM and HAPs emissions from aircraft engines; the continued phasing-in of AFV; and the implementation of GHG emissions reduction strategies. These initiatives are briefly described below.

- **Particulate Matter and Hazardous Air Pollutant Research**—Conducted by the FAA/National Aeronautics and Space Administration (NASA)/EPA and others, research continues to better characterize PM and HAPs emissions from aircraft engines. Similarly, air quality monitoring efforts at other airports were also conducted at various locations to advance what is known about ambient (“outdoor”) levels of air pollutants in the vicinities of the nation’s airports.³² In addition to conducting its own air monitoring programs (Measured NO₂ Concentrations [*Appendix I, Air Quality/Emissions Reduction*]) and Massport Air Quality Monitoring Study [above]), Massport continues to closely track these issues through its involvement in aviation industry organizations such as ACI and AAAE.
- **Alternative Fuel Vehicle Conversions**—Airlines and other GSE users are continually replacing their older fossil-fueled vehicles and equipment with more fuel-efficient, low- and non-emitting (e.g., electric) technologies. Airport-fleet vehicles are also being converted to alternative fuels (e.g., propane). In response, GSE and automobile manufacturers are offering a wider selection of AFVs, many of which are designed specifically for airport use. Massport continues to support the conversion of fossil-fueled vehicles and equipment to alternative or lower-emitting fuels.
- **Participation in Massachusetts Climate Protection Plan**—Massport was one of 15 state agencies and authorities that participated in the development of the state’s Climate Protection Plan: the Commonwealth’s initial step towards reducing GHG. Massport is participating on two of the Plan’s teams: Transportation System Planning and Transportation Technologies and Operations, with a focus in GHG emission reductions associated with Airport operations. Current reduction strategies include:
 - Include energy use and GHG emissions as criteria in transportation decisions;
 - Maintain and update public transit systems;
 - Expand programs to promote efficient travel;
 - Seek opportunities to reduce emissions at Logan Airport;
 - Improve aircraft movement efficiency;
 - Promote the use of cleaner vehicles and fuels in public transit fleets;
 - Continue to promote the use of clean diesel equipment on publicly-funded construction projects;
 - Eliminate unnecessary idling of buses; and
 - Advocate for aircraft efficiency at regional and national levels.

32 These air quality monitoring programs at other airports include T.F. Green Airport (Providence, R.I.); Los Angeles International and Santa Monica Airports in CA.

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8

Water Quality/ Environmental Compliance and Management

Introduction

The Massachusetts Port Authority's (Massport's) approach to environmental management and compliance is a key component of its commitment to sustainability and responsible stewardship at Logan Airport (refer to *Chapter 1, Introduction/Executive Summary* for details). Through monitoring and documentation, environmental performance is assessed, allowing policies and programs to be developed, implemented, evaluated, and continuously improved. Since 2006, Massport has had an International Organization for Standardization (ISO) 14001 certified Environmental Management System (EMS) in place. The EMS is a systematic approach that Massport uses to promote continual improvement of environmental management at Logan Airport. In 2015, Massport completed a comprehensive Sustainability Management Plan (SMP) for Logan Airport, which integrates with the existing EMS framework to promote continuous environmental improvement. The completion of the SMP demonstrates Massport's leadership and commitment to environmental stewardship.

Massport's primary water quality goal is to prevent or minimize pollutant discharges, thus limiting adverse water quality impacts associated with airport activities. Massport employs several programs to promote awareness of Massport and tenant activities that may impact surface and groundwater quality, thus improving water quality. Programs include implementing best management practices (BMPs) for pollution prevention by Massport, its tenants, and its construction contractors; training of staff and tenants; and a comprehensive stormwater pollution prevention plan. Massport complies with the Massachusetts Contingency Plan (MCP) by monitoring fuel spills and tracks the status of spill response actions. The MCP lays out a set of regulations that govern the reporting, assessment, and cleanup of spills of oil and hazardous materials in Massachusetts.¹ Massport also maintains a Tank Management Program, which includes a tank permitting, monitoring, upgrade, and replacement program. Information on Massport's Logan Airport Stormwater Pollution

¹ 310 Code of Massachusetts Regulations (CMR) 40.0000.

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Prevention Plan (SWPPP)², Spill Prevention Control and Countermeasure Plan (SPCC)³, and the MCP are provided in this chapter.

The federal Clean Water Act (CWA) requires permits for pollutant discharges into U.S. waters from point sources and for stormwater discharges associated with industrial activities. Massport holds permits under the U.S. Environmental Protection Agency's (EPA) and Massachusetts Department of Environmental Protection's (MassDEP) National Pollutant Discharge Elimination System (NPDES) Program. The NPDES permit covers Massport and its co-permittees at Logan Airport. It establishes effluent limitations and monitoring requirements for discharges from specified stormwater outfalls.

Massport is responsible for ensuring compliance with applicable state and federal environmental laws and regulations. Massport promotes appropriate environmental practices through pollution prevention and remediation measures. Massport also works closely with airport tenants and airport operations staff in an effort to improve compliance. Massport's environmental programs pertaining to water quality and environmental compliance and management include:

- Stormwater management;
- Water quality management;
- Fuel use and spills;
- MCP compliance;
- Storage tank compliance;
- Compliance auditing and inspections;
- Environmental Management System (EMS) implementation; and
- Clean State Initiative and Leading by Example Program participation.

2014 Water Quality/Environmental Compliance Highlights and Key Findings

The following summarizes the key water quality and compliance findings for 2014:

- International Organization for Standardization (ISO) 14001 certification for Facilities II (Vehicle Maintenance, Landscaping, and Snow Removal) began in December 2006. In 2010, Massport expanded the Logan Airport EMS to include Facilities I (Central Heating and Cooling Plant), Facilities II (Vehicle Maintenance, Landscaping, and Snow Removal), and Facilities III (Electrical and Structural). The most recent certification audit took place in June 2014, and a certificate was issued in July 2014; this certificate expires in July 2017.
- In 2014, there were 17 oil and hazardous material spills that required reporting to MassDEP, seven of which involved a storm drainage system.⁴ Further details on spills can be found in the *Fuel Use and Spills* section of this chapter.

2 In accordance with the requirements of the current Logan Airport NPDES stormwater permit that was issued on July 31, 2007, Massport and its co-permittees were required to develop SWPPPs.

3 In accordance with the Clean Water Act, 40 CFR 112, *Oil Pollution Prevention*.

4 State environmental regulations require that oil spills of 10 gallons or more in volume be reported to MassDEP.

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- In 2014, 99 percent of samples were in compliance with standards (Table J-13). Out of 234 samples (inclusive of oil and grease, total suspended solids, and pH), 232 were at or below NPDES permit limits.
- Only two of the 234 samples in 2014 exceeded NPDES permit limits. One outfall sample out of a total of 24 samples at the West Outfall and one sample out of a total of 24 samples at the Maverick Street Outfall exceeded the regulatory limits of the NPDES Permit for total suspended solids (TSS) at the North, West, Northwest, Porter Street, and Maverick Street Outfalls. These exceedances were reported in August and April 2014, respectively, as required. Massport's SWPPP addresses stormwater pollutants in general and also addresses deicing and anti-icing chemicals, potential bacteria, fuel and oil, and other sources of stormwater pollutants. The 2014 Annual Certificates of Compliance were submitted to EPA and MassDEP on December 18, 2014, for Massport and each tenant co-permittee.
- In accordance with the MCP, Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination. Massport is working towards achieving regulatory closure of the remaining Logan Airport MCP sites associated with known releases, as well as addressing sites encountered during construction. Progress has been made for all MCP sites with updates included in Table 8-4.

ISO 14001 Certified Environmental Management System

The ISO 14001 certified EMS is a systematic approach that Massport uses to promote continual improvement of environmental impacts at Logan Airport. The goals of Massport's EMS are to meet regulatory requirements and to improve Massport's environmental performance beyond compliance on an ongoing basis.

The EMS consists of policies, procedures, and records that collectively are used by Massport employees to prevent pollution and address potential environmental impacts associated with airport operations. Responding to environmental regulations and international standards, Logan Airport's EMS provides a structure for regulatory compliance and monitoring of a wide range of activities at the Airport that affect the environment, such as air quality, recycling, stormwater pollution prevention, and energy use.

Logan Airport's EMS is independently certified to the ISO 14001:2004 international standard. Certification for Facilities II (Vehicle Maintenance, Landscaping, and Snow Removal) began in December 2006. In 2010, Massport expanded the Logan Airport EMS to include Facilities I (Central Heating and Cooling Plant), Facilities II (Vehicle Maintenance, Landscaping, and Snow Removal), and Facilities III (Electrical and Structural). The most recent certification audit took place in June 2014, and a certificate was issued in July 2014; this certificate expires in July 2017.

Stormwater Management in 2014

On July 31, 2007, EPA and MassDEP issued an individual NPDES Stormwater permit for Logan International Airport (NPDES Permit MA0000787). The new permit became effective on September 29, 2007, replacing the previous NPDES Permit dated March 1, 1978. The NPDES permit is on EPA's website at: www.epa.gov/NE/npdes/logan/pdfs/finalma0000787permit.pdf. Massport holds a separate NPDES permit for the Fire Training Facility (NPDES Permit MA0032751). The following sections describe the requirements of the two permits, and Massport's compliance with these requirements.

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Stormwater Outfall NPDES Permit Requirements and Compliance

The following sections describe stormwater outfalls that are subject to the NPDES Permit, the monitoring requirements, and the monitoring results for 2014.

Outfalls Subject to the NPDES Permit

The NPDES permit regulates stormwater discharges from the North, West, Northwest, Porter Street, and Maverick Street Outfalls, and all of the airfield outfalls. The areas drained by the outfalls are the North Drainage Area (152 acres); West Drainage Area (560 acres); Northwest Drainage Area (23 acres); Porter Street Drainage Area (127 acres); Maverick Street Drainage Area (40 acres); and the Airfield Outfall Drainage Areas (A1 through A44), which drain the remainder of the airfield including runways, taxiways, and the perimeter roadway (910 acres). The North and West Drainage Areas also drain a portion of the airfield. These drainage areas are shown in Figure 8-1 and further described in Table 8-1. The North and West Outfalls have end-of-pipe pollution control facilities to remove debris and floating oil and grease from stormwater prior to discharge into Boston Harbor.

Table 8-1 Stormwater Outfalls Subject to NPDES Permit Requirements			
Outfall Name and Number	Drainage Area (Acres)	Boston Harbor Discharge Location	Major Land Uses
North (001)	152	Wood Island Bay	Terminal E, apron, taxiway, cargo areas, fuel farms, and runways
West (002)	560	Bird Island Flats	Taxiways, terminal areas, aprons, cargo areas, runways, and roadways
Porter Street (003)	127	Bird Island Flats	Hangars, vehicle maintenance facilities, cargo areas, car rental facilities, and
Maverick Street (004)	40	Jeffries Cove	Car rental facilities, bus/limousine pools, parking areas
Northwest (005)	23	Wood Island Bay	Flight kitchen, bus maintenance facility
Airfield (A1 through A44) ¹	910	Perimeter of Airfield	Runways, taxiways, and perimeter roadway

Source: Massport

¹ In accordance with the requirements of the NPDES permit, Massport developed an Airfield Stormwater Outfall Sampling Plan (March 27, 2008). The Plan requires quarterly wet weather sampling at a minimum of seven of the airfield outfalls (A1 through A44) to obtain representative samples of the quality of stormwater runoff from the airfield.

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Monitoring Requirements

The NPDES permit requires grab samples (single samples collected at a particular time and place) to be taken monthly from the North, West, Porter Street, and Maverick Street Outfalls. Samples are tested for pH, oil and grease, TSS, benzene, surfactants, fecal coliform bacteria, and *Enterococcus* bacteria during both wet and dry weather. Grab samples are also taken quarterly from these four outfalls during wet weather to test for eight different polycyclic aromatic hydrocarbons (PAHs).

Additional sampling requirements of the NPDES permit include sampling for deicing compounds twice during the deicing season (October through April) at the North, West, and Porter Street Outfalls. The NPDES permit sets discharge limitations for pH, oil and grease, and TSS from the North, West, and Maverick Street Outfalls and for pH from the Porter Street Outfall. The NPDES permit does not include any discharge limitations for the Northwest Outfall, airfield outfalls, or the deicing monitoring, and requires only that the sampling results be reported. *Appendix J, Water Quality/ Environmental Compliance and Management* contains additional information on the sampling requirements of the NPDES permit.

Monitoring Results

Ninety-nine percent of samples were in compliance with standards (Table J-13). Out of 234 samples (inclusive of oil and grease, total suspended solids, and pH), 232 were at or below NPDES permit limits.

During 2014, one out of 21 stormwater samples collected from the West Outfall and one out of 19 stormwater samples collected from the Maverick Street Outfall exceeded the limit for TSS established in the NPDES permit. The 2014 TSS exceedance at the West Outfall occurred on August 13, 2014 and the TSS exceedance at the Maverick Street Outfall occurred on April 15, 2014.

A wet weather sample collected at the Maverick Street Outfall on April 15, 2014, had a TSS concentration of 130 milligrams per liter (mg/L) which exceeded the 100 mg/L daily maximum limit for TSS. A wet weather sample collected at the West Outfall had a TSS concentration of 250 mg/L.

Field staff noted that the sample from the Maverick Street Outfall was gray and contained suspended solids. Massport was immediately notified of the exceedance upon receipt of the laboratory results. Prior to the April 15, 2014 sampling event, there had been six days of dry weather followed by a significant amount of rain (0.62 inches) on the day of sampling, which may have contributed to the TSS concentration. The TSS concentration at the Maverick Street Outfall collected the next week on April 21, 2014 during the dry weather event was below the Permit limit at 31 mg/L, and the sample was observed to be clear and free of suspended solids.

TSS was measured above the permit limit of 100 mg/L at a concentration of 250 mg/L in the wet weather sample collected from the West Outfall on August 13, 2014. Field staff noted that the sample had a gray tint and contained some black suspended solids. Prior to the August 13, 2014, sampling event, there had been 15 days of dry weather followed by a significant amount of rain (1.06 inches) on the day of sampling, which may have contributed to the TSS concentration.

In 2014, there were no TSS exceedances reported at the North Outfall. The highest concentration of TSS observed at the North Outfall was 87 mg/L, which occurred on February 13, 2014. There were no other exceedances for the other NPDES permit discharge limits in 2014, which include oil and grease and pH.

Figure 8-1 Logan Airport Outfalls



Source: Aerial photo, Massport

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The NPDES permit requires only that sampling results be reported for the Porter Street, Northwest Outfall and airfield outfalls, and the permit does not contain discharge limits for these outfalls. In 2014, the highest average concentrations observed at the Porter Street Outfalls were 310 mg/L of TSS (February 13, 2014) and 22 mg/L of oil and grease (February 13, 2014). In 2014, the highest concentration of TSS observed at the Northwest Outfall was 68 mg/L (December 9, 2014). Oil and grease was not measured above the laboratory detection limit (<4.0 mg/L) in any of the samples collected from the Northwest Outfall in 2014. The highest average concentrations observed at the airfield outfalls were 36 mg/L of TSS (June 4, 2014) and 0 mg/L of oil and grease (all samples below laboratory detection limit of <4.0 mg/L).⁵

Deicing sampling at the North, West, Porter Street, and airfield outfalls occurred during wet weather in February 2014. Sampling results are reported as required by the EPA and MassDEP (see Table J-12 in *Appendix J, Water Quality/ Environmental Compliance and Management*).⁶

The NPDES water quality monitoring results are posted on Massport's website (<http://www.massport.com/environment/environmental-reporting/water-quality/monitoring-results/>), and Massport provides copies of the monitoring results to EPA and MassDEP.

Due to the large size of the drainage areas and relatively low concentration of pollutants, it is not always possible to trace exceedances to specific events. Where a known event such as a spill is reported, Massport routinely checks the drainage system for impacts from the event and takes corrective actions if necessary. The 2014 water quality monitoring results for discharge from the outfalls is provided in *Appendix J, Water Quality/ Environmental Compliance and Management* along with the history of water quality monitoring results that dates back to 1993.

Stormwater and Sanitary Sewer System Inspections and Repairs

Between 2006 and 2008, Massport conducted inspections of the sanitary sewer and stormwater drainage system serving Logan Airport to document the condition of the systems and identify potential impacts from the sewer to the stormwater drainage system. Such impacts could result from leaks or breaks from the sanitary sewer or from direct, inadvertent, illegal cross-connections to the stormwater drainage system. As a result of these surveys, the Boston Water and Sewer Commission (BWSC) completed replacement of sections of the sanitary sewer during 2009 and 2010.

The sanitary sewer inspections identified deficiencies in the sewer maintained by Massport at several locations throughout the Airport. Massport retained the engineering services of a consulting engineer to review the sewer investigation report, supplement the investigations, design sewer line repairs to address the deficiencies, and prepare construction documents. In 2012, the consultant completed cleaning and camera inspection of the system and identified additional sections of sewer line that required repair.

Construction bid documents for the sewer repair work were completed in July 2013. The work was completed in November 2013 at a total cost of approximately \$550,000, which includes engineering and construction costs. The nature of the repairs and locations are listed in Table 8-2.

⁵ The 2007 NPDES permit does not set maximum daily discharge limitations for the Runway/Perimeter Stormwater Outfalls.

⁶ Wet weather deicing monitoring was only required during the first and third year of the NPDES permit.

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Table 8-2 Sewer Repair Work and Locations

Location	Repairs
Lovell Street	300 linear feet (LF) of cured-in-place liner; repair MH brickwork
Facilities III Parking Lot	165 LF of cured-in-place liner; clear intruding taps
U.S. Air Hangar Parking Lot	Excavate and replace 240 LF of pipe
Airside near Facilities II and U.S. Air Hangar	375 LF of cured-in-place liner
Airside near Signature Ramp	410 LF of cured-in-place liner
Airside near Signature Ramp	Grout-in-place sleeve for spot repair
Arrivals Roadway near West Garage	105 LF of cured-in-place liner
Terminal C	Grout-in-place sleeve at three locations; 170 LF of cured-in-place liner

Source: Massport

In 2014, Massport’s Facilities Department conducted inspections and cleaning of manhole and catch basin structures at locations throughout the Airport. In accordance with Part I.B.10.h of the Logan Airport NPDES Permit, the inspection and cleaning activities focused on structures within 100 yards of aircraft, vehicle, and equipment maintenance facilities. A total of 300 manhole and catch basin structures were inspected in 2014. Sediment depths were recorded and the sediment was then removed, as necessary, from the structures. Approximately 10 percent of the structures required cleaning. A total of approximately 20 cubic yards of sediment and debris was removed during cleaning of the structures in 2014. In addition to the inspection and cleaning of manhole and catch basin structures, Massport’s Facilities Department is responsible for inspecting and cleaning 52 water quality control structures (i.e., stormceptor units). The units were inspected and cleaned twice in 2014, during the months of May and November. The condition of the units was documented and any accumulated sediment or debris was removed.

Bacteria Source Tracking

Massport continues to monitor bacteria levels at stormwater outfalls by obtaining samples during wet weather and dry weather sampling events for laboratory analysis. Review of the analytical data indicates that bacteria levels continue to be highly variable, with no consistent trends that would indicate an ongoing source such as a cross-connection to a sanitary sewer line. Sampling results are available in *Appendix J, Water Quality/Environmental Compliance and Management*.

On October 29, 2014, Massport met with the EPA, MassDEP, and the Division of Marine Fisheries (DMF) as part of the NPDES Permit renewal process. During the meeting, Massport reviewed the Comprehensive Sewer Investigation and the sewer repairs that were completed following the investigation. The results of ongoing bacteria monitoring at stormwater outfalls were also reviewed. The monitoring data are included in the Discharge Monitoring Reports submitted to the EPA in accordance with the NPDES Permit.

Massport has continued to track the development of bacteria source tracking technologies and evaluate the appropriateness of additional testing.

Fire Training Facility NPDES Permit Requirements and Compliance

NPDES Permit No. MA0032751⁷ regulates treated wastewater from the Fire Training Facility on Governors Island (Figure 8-1). The treated wastewater from fire training exercises is stored, treated by separation and a carbon filter to remove fuel contaminants, and is typically beneficially reused onsite to recharge the fire training pit. If no storage is available, treated wastewater is tested prior to discharge to the storm sewer to ensure compliance with the Fire Training Facility's NPDES Permit. Discharge monitoring reports are submitted monthly to EPA. In 2014, Massport reused all but approximately 17,600 gallons of wastewater generated at the Fire Training Facility. The excess water was shipped off-site for disposal at an appropriately permitted facility.

Fuel Use and Spills in 2014

Management of fueling operations at Logan Airport is designed to minimize impacts on water quality by implementing Stormwater Pollution Prevention BMPs, including the use of reliable storage, secondary containment, and effective spill cleanup procedures. Massport's jet fuel storage and distribution infrastructure, installed in 2000 and 2001, includes a zoned leak detection system for underground fuel piping, which identifies volumetric changes of product in the pipe at operating pressure and zero pressure. The system combined the storage facility with a hydrant fuel system that reduced the need for trucks and dispensing. The former fuel farms were removed in 2000.

The fuel storage and distribution system was designed to ensure, to the extent technologically feasible, the reliable detection of leaks. The above ground jet fuel storage facility and distribution system are leased and operated by a single party, BOSFUEL, an airline consortium. The management of the facility by one entity was put in place to minimize potential fuel spills and maximize water quality protection for the storage and distribution facilities. Cathodic protection, leak detection, secondary containment, and tank overflow protection methods such as alarms, inventory gauging sensors in the tanks, and emergency fuel shut-off systems have been installed. The operation and maintenance of these controls have been included in the Operation and Maintenance Manual used by BOSFUEL's contractor to operate and maintain the facility. Built-in environmental controls, unified operations, and the ongoing contingency planning provide heightened environmental protection and more efficient fuel handling operations than the previous system. In 2010, BOSFUEL, in coordination with Massport, completed the replacement of the portion of the jet fuel distribution system that had not been part of the fuel storage and distribution system improvements completed in 2001. The fuel line replacement, which began in 2008, involved the installation of approximately 6,500 linear feet of pipe in the vicinity of Terminals B and C.

The Massport Fire Rescue Department keeps logs of all spills at Logan Airport (see Table 8-3). State environmental regulations require that oil spills of 10 gallons or more in volume be reported to MassDEP. Spills that enter storm drains of any volume must also be reported to Massport. During 2014, seven of the fuel spills entered the storm drainage system. Massport keeps records of all spills, including those less than the reporting threshold. In 2014, of the oil and hazardous material spills reported to the Massport Fire Rescue Department, 17 spills (13.2 percent) were reportable, due to their volume. Of the 17 reportable spills in 2014, commercial airlines were responsible for nine of the spills; Massport was responsible for three of the spills; three spills were the result of aircraft fueling; a private aircraft was responsible for one spill; and one spill was the result of construction. By volume, jet fuel spills accounted for 28.2 percent of total fuel spilled; hydraulic oil

⁷ NPDES Permit No. MA0032751 - Logan International Airport Fire Training Facility. Issued November 1, 2006.

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accounted for 3.5 percent; diesel fuel accounted for 65.0 percent; gasoline accounted for 0.3 percent; and other fuels accounted for 3.0 percent. A summary of Logan Airport jet fuel usage and spill records from 1990 to 2014, and greater detail pertaining to type and quantity of the spills can be found in *Appendix J, Water Quality/Environmental Compliance and Management*.

Table 8-3 Logan Airport Oil and Hazardous Material Spills¹ and Jet Fuel Handling

Year	Total Number of all Spills	Total Number of all Spills >10 gallons	Total Volume of all Spills (Gallons)	Estimated Volume of Jet Fuel Handled (Gallons)	Total Volume of Jet Fuel Spilled (Gallons)
2004	126	18	894	373,996,141	574
2005	97	15	2,319	368,645,932	585
2006	92	11	752	364,450,864	644
2007	108	7	604	367,585,187	361
2008	99	20	944	345,631,788	662
2009	95	6	1,004	327,358,619	915
2010	87	15	476	335,693,997	360
2011	108	12	572	340,421,373	337
2012	132	5	593	343,731,127	439
2013	94	6	452	349,397,940	351
2014	129	17	2,785	370,222,342	785

Source: Massport Fire Rescue Department and Massport Environmental Management Department.

Notes: Oil and hazardous material spills and jet fuel handling data from 1990 through 2014 is provided in *Appendix J, Water Quality/Environmental Compliance and Management*.

1 Materials include: jet fuel, hydraulic oil, diesel fuel, gasoline, and other materials such as glycol and paint.

Tank Management Program

Since 1993, Massport has had a Tank Management Program in place that is designed to ensure that all Massport-owned tanks are in regulatory compliance with federal and state tank regulations. From 1993 through 2005, Massport completed six construction phases of storage tank modifications that included removal, replacement, and upgrades to existing tanks and the related piping systems to comply with federal and state tank regulations. In 2009, Massport installed a remote tank monitoring system for heating oil underground storage tanks (USTs) to allow for continuous monitoring of inventory levels, as well as leak detection. As a BMP, Massport continues to monitor tank systems and upgrade facilities, as needed.

In 2014, Massport and its tenant tank owners continued to comply with new state storage tank regulations.⁸ These new regulations transferred jurisdiction of all USTs from the Department of Fire Services (DFS) to MassDEP. Jurisdiction of all aboveground storage tanks (ASTs) with capacity volumes greater than 10,000 gallons remains with the DFS, and those ASTs with less than a 10,000-gallon capacity are now under local (Massport Fire Department) jurisdiction. There are three ASTs at Logan Airport with volumes greater than 10,000 gallons; two of these tanks are located in the North Service Area, and contain glycol; and the third tank is located at the Central Heating Plant, and is used for storage of heating oil. Compliance with the new tank regulations included the following:

⁸ 527 Code of Massachusetts Regulations (CMR) 9.00.

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- Re-permitting all ASTs using a newly created Massport Fire Department annual permit;⁹ and
- Updating and tracking of AST permit status, using the Massport AST database.

Massport is also implementing a successful tank release prevention strategy, which includes:

- A continuing program of monthly inspections, testing, and minor repairs of all Massport-owned tanks, related piping, and tank monitoring systems. Annual Stage II Vapor Recovery testing was conducted in May 2014, for Massport's USTs and piping systems at four facility locations. Stage II Vapor Recovery Systems collect gasoline vapors from vehicles' fuel tanks when customers dispense gasoline products into their vehicles at gasoline dispensing facilities. The Stage II system uses special nozzles and coaxial hoses at each gasoline pump to capture vapors from vehicle fuel tanks during the refueling process and reroute them to the station's storage tank(s). Testing included replacement of defective hoses and/or nozzles, as needed.
- Annual DFS inspections of all three of Massport's ASTs greater than 10,000-gallons in volume, and submittal to MA Department of Fire Services.
- Review of all proposed tenant tank upgrades, installations, and tank removals (under Massport's Tenant Alteration Application process) to ensure compliance with applicable state and federal regulations and with Massport policy.
- Ongoing upgrade and maintenance of a database that contains information on all USTs located on Massport property. For each tank, the database tracks location, permit status, compliance status with applicable tank regulations, and tank and monitoring system equipment summaries. Information on ASTs is kept in a separate database which was developed in 2010.
- Massport also provides tenants with information regarding the revised storage tank regulatory requirements and offers assistance with tenants' tank permitting procedures.

Site Assessment and Remediation

The MCP (310 Code of Massachusetts Regulations 40.0000), which is administered by the MassDEP, pertains to releases of oil or hazardous materials into the environment. The MCP prescribes the site cleanup process based on the nature and extent of a release's contamination. The MCP defines the roles for those parties affected by and potentially responsible for the release and establishes the release reporting program and submission deadlines for tracking events from initial release to regulatory closure.

In accordance with the MCP, Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination. There are a number of phases for the investigation of contaminated sites. Phase I involves initial site investigations for the presence of contamination and Phase II assessments are more comprehensive site investigations. Phase III identifies, evaluates, and selects remediation actions and Phase IV involves the implementation of selected remedial actions. Phase V involves the operation, maintenance and/or monitoring of the remediation program. Massport leads the performance of a variety of response actions, including remediation at sites where Massport is the responsible party, where there are multiple responsible

⁹ Although ASTs with a capacity of less than 10,000-gallons is no longer under the jurisdiction of the Massachusetts DFS, the ASTs are still subject to the Massachusetts fire regulations and therefore must obtain an annual permit through the Massport Fire Department which has jurisdiction over the less than 10,000-gallon ASTs. ASTs with capacity of over 10,000-gallons also need to obtain this annual permit before those tank owners may obtain a permit from DFS.

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parties, and where no responsible party has been identified. Table 8-4 describes Massport's progress in 2014 in achieving regulatory closure of the MCP sites identified in Figure 8-2.

Figure 8-2 Massachusetts Contingency Plan Sites



Note: Refer to Table 8-4 for the numbered projects.

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Table 8-4 MCP Activities Status of Massport Sites at Logan Airport

Location (Release Tracking Number) and MassDEP Reporting Status	Action/Status
1. Fuel Distribution System (3-1287) (continued)	
2010	Inspection and monitoring reports were submitted to the MassDEP detailing monitoring and product recovery efforts along the FDS between September 2009 and September 2010. A RAM Completion Report for the BOSFUEL Project was submitted in February, and the report was revised in March 2010.
2011	A Periodic Review of the Temporary Solution for the FDS was submitted in April 2011. Additionally, three Post-Class C RAO Status Reports were submitted for the FDS in February, June, and December 2011, summarizing the routine inspection and monitoring activities.
2012	Post-Class C RAO Status Reports were submitted in May and November 2012, summarizing the routine inspection and monitoring activities.
2013	Post-Class C RAO Status Reports were submitted in May and November 2013, summarizing the routine inspection and monitoring activities.
2014	Post-Class C RAO Status Reports were submitted in May and November 2014, summarizing the routine inspection and monitoring activities. In addition, a RAM Plan was submitted in April 2014 to address construction in the area of the FDS followed by a RAM Completion Report submitted in August 2014.
2. North Outfall (3-4837)	
2010	No change in status.
2011	No change in status. Massport provided updated data for the MassDEP website.
2012	Response Action Outcome submitted to DEP on December 27, 2012. No further MCP response action is required.
3. Former Robie Park (3-10027)	
2010	Two Remedy Operation Status Reports were submitted on September 29, 2010 and March 28, 2011. The next status report was scheduled for September 30, 2011.
2011	Phase IV Project Status Reports 2 and 3 were submitted in March and September 2011, respectively.
2012	Phase V Status Reports 4 and 5 were submitted in March and September, 2012, respectively.
2013	Phase V Status Reports 6 and 7 were submitted in March and September, 2013, respectively.
2014	Phase V Status Reports 8 and 9 were submitted in March and September, 2014, respectively.
4. Former Robie Property (3-23493)	
2010	A Class A-3 RAO was submitted on January 4, 2010, corresponding with the recording of an AUL. On May 21, 2010, a RAM Plan for the Economy Parking Structure was submitted. The first RAM Status Report was submitted on September 21, 2010. An AUL Amendment was recorded on December 9, 2010.
2011	A RAM Completion Statement was submitted on March 15, 2011. Regulatory closure has been achieved. No further response actions are required.
5. Tomahawk Drive (3-27068)	
2010	No further response actions were required.
2011	No further response actions required.

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Table 8-4 MCP Activities Status of Massport Sites at Logan Airport (Continued)	
Location (Release Tracking Number) and MassDEP Reporting Status	Action/Status
6. Fire Training Facility (3-28199)	
2010	A RAM Plan was submitted to MassDEP on August 6, 2010. A RAM Status Report was submitted to MassDEP on December 3, 2010.
2011	A RAM Completion Statement was submitted on April 25, 2011. A Phase II Scope of Work was prepared and submitted to MassDEP on January 18, 2011. Phase II and Phase III Reports were submitted on December 8, 2011. A RAM Completion Statement was submitted on April 25, 2011.
2012	Phase 4 Status Report transmitted in June 2012; the Phase IV Remedy Implementation Plan was submitted in December 2012.
2013	Phase 4 Status Report transmitted in June 2013, the Phase IV Completion Report was transmitted in December 2013.
2014	Phase 5 Remedy Operation Status Reports submitted in June and December, 2014.
7. Southwest Service Area (3-28792)	
2010	A Class B-1 RAO was submitted to MassDEP on October 18, 2010. No further response actions required.
2011	No further response actions required.
8. Airfield Duct Bank Site (3-29716)	
2010	Release notification form was submitted on December 22, 2010.
2011	A Class A-1 RAO was submitted on December 23, 2011. No further response actions required.
9. West Outfall Release (3-29792)	
2011	Release notification form was submitted on April 8, 2011. Two IRA Status Reports were submitted to MassDEP on June 9 and December 5, 2011. An RAO was submitted on February 13, 2012. No further response actions required.
10. Hertz Parking Lot Site (3-30260)	
2011	Release notification form was submitted on August 29, 2011 RAM Plan was submitted to MassDEP on September 1, 2011.
2012	A Class A-2 RAO was submitted on September 10, 2012. No further response actions required.
11. Former Butler Aviation Hangar (3-30654)	
2012	Verbal notification of a release was provided to the DEP on February 14, 2012, when RCC construction encountered an unidentified underground storage, and a Release Notification Form was submitted on April 23, 2012. An IRA Plan was submitted on May 21, and IRA Status Reports were submitted on June 18 and December 26, 2012.
2013	Phase I Report and Tier Classification submitted February 21, 2013 and IRA Completion Report submitted on July 11, 2013
2014	A Permanent Solution Statement was submitted in October 2014. No further response actions required. Release Notification Form submitted August 4, 2014.
12. Hangar 16 (3-32351)	
	Release Notification Form submitted August 4, 2014.

Source: Massport

Notes: This list includes Massport MCP sites only. Additional sites are the responsibility of Logan Airport tenants. Refer to Figure 8-2 for location of MCP sites. Complete information dating back to 1997 is included in *Appendix J, Water Quality/Environmental Compliance Management*.

AUL	Activity and Use Limitation	Phase I	Initial Site Investigation
MCP	Massachusetts Contingency Plan	Phase II	Comprehensive Site Assessment
RAM	Release Abatement Measure	Phase III	Identification, Evaluation, and Selection of Comprehensive Remedial Actions
RAO	Response Action Outcome	Phase IV	Implementation of Selected Remediation Action
FDS	Fuel Distribution System	Phase V	Operation, Maintenance and/or Monitoring
IRA	Immediate Response Action		

Environmental Compliance and Management

Massport works to minimize environmental impacts at Logan Airport through ongoing programs and new initiatives. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable design principles.

"Massachusetts Port Authority (Massport) is committed to operate all of its facilities in an environmentally sound and responsible manner. Massport will strive to minimize the impact of its operations on the environment through the continuous improvement of its environmental performance and the implementation of pollution prevention measures, both to the extent feasible and practicable in a manner that is consistent with Massport's overall mission and goals."

Massport's overall environmental compliance and management efforts address the following goals:

- Protect water quality Airport-wide;
- Protect groundwater resources;
- Protect surface water resources (Boston Harbor);
- Minimize air quality impacts;
- Protect resources during construction;
- Mitigate construction impacts;
- Reduce occurrences of fuel leaks and spills; and
- Preserve coastal resources adjacent to the Airport.

The progress report for environmental compliance and management in Table 8-5 summarizes Massport's mechanisms for implementing these goals and details where changes to these efforts occurred in 2014.

Table 8-5 Progress Report for Environmental Compliance and Management

Plan Elements	Progress Report for 2014
Environmental Compliance Inspections	In 2014, Massport performed tenant inspections at a number of its National Pollutant Discharge Elimination System (NPDES) co-permittees' (Logan Airport tenants) leaseholds and made recommendations suggesting how to rectify issues identified during the inspections.
Environmental Management System (EMS) and International Organization for Standardization (ISO) 14001	ISO 14001 certification began for Facilities II (Vehicle maintenance, Landscaping, and Snow Removal) in December 2006. In 2010, Massport expanded the Logan Airport EMS to include Facilities I (Central Heating and Cooling Plant), Facilities II and Facilities III (Electrical and Structural). The most recent certification audit took place in June 2014, and a certificate was issued in July 2014; this certificate expires in July 2017.
Tenant Technical Assistance	Massport continued publication of <i>EnviroNews</i> , a quarterly newsletter that informs tenants of regulatory calendar milestones, permitting requirements, pollution prevention, and best management practices (BMPs). It recommends use of sustainable materials and provides information on Massport and other environmental requirements (2014 newsletters are provided in <i>Appendix J, Water Quality/Environmental Compliance and Management</i>).
Stormwater Pollution Prevention Plan (SWPPP)	In accordance with the requirements of the current stormwater outfall NPDES permit for Logan Airport that was issued on July 31, 2007, Massport and 25 other co-permittees were required to develop SWPPPs. Massport completed its SWPPP in December of 2007. An update to the SWPPP was completed in December 2014 and distributed to Massport and all stormwater co-permittees. Massport's SWPPP addresses stormwater pollutants in general, and also addresses deicing and anti-icing chemicals, potential bacteria, fuel and oil, and other sources of stormwater pollutants. BMPs are included in the SWPPP. In accordance the other requirements of the NPDES permit, Massport is required to conduct training for personnel responsible for implementing activities identified in the SWPPP. The 2014 Annual Certificates of Compliance were submitted to EPA and MassDEP in December 2014 for Massport and each of its co-permittees.
Construction	<p>Massport developed Sustainable Design Standards and Guidelines (SDSG) for use by architects, engineers, and planners who manage capital improvement projects for Massport (More information on SDSG is provided in <i>Chapter 1, Introduction/Executive Summary</i>). The SDSG, first issued in 2009 and revised in 2011, are designed to foster innovation yet include clear targets to achieve more sustainable project design and practices. The SDSG are intended to evolve over time, based on changes in technologies and industries.</p> <p>Massport provides a generic SWPPP to contractors for all Logan Airport construction projects, which provides guidance in preparing project-specific SWPPPs and BMPs to control sedimentation and other pollutants from construction projects. Massport monitors construction projects at Logan Airport for compliance with project SWPPPs and regulatory requirements. For all construction projects, Massport requires the use of ultra-low-sulfur diesel fuel in construction equipment, recycling of all construction waste to the maximum extent possible, and construction equipment retrofits with pollution control devices such as diesel oxidation catalysts and/or particulate filters.</p>

Table 8-5 Progress Report for Environmental Compliance and Management (Continued)

Plan Elements	Progress Report for 2014
Spill Prevention Control and Countermeasure (SPCC) Plans	Tenants meeting certain thresholds are required to prepare their own SPCC plans for their facilities. Massport checks for SPCC plans during its environmental compliance inspections. Additionally, tenants receive information on Massport BMPs, which focus on spill management and prevention.
Air Emissions Reduction	All Massport diesel vehicles are now fueled with ultra-low-sulfur diesel. In 2007, Massport investigated the use of parking heaters, which operate independently of a vehicle's engine, to measure fuel savings/air emissions reductions of reduced vehicle idling during snow operations. The investigation was discontinued in 2008 after Massport found that the parking heaters resulted in draining vehicle batteries. Massport will continue to explore anti-idling technologies as part of the EMS.

Source: Massport



Logan Airport Sustainability Management Plan (SMP)

In 2013, Massport was awarded a grant by the FAA to prepare a Sustainability Management Plan (SMP) for Logan Airport. The Logan Airport SMP planning effort began in May 2013 and was completed in April 2015. The SMP takes a broad view of sustainability including economic vitality, social responsibility, operational efficiency, and natural resource conservation considerations. The Plan builds on Massport's rich history of advancing sustainability and serves as a roadmap for prioritizing initiatives and moving goals forward. The SMP is intended to guide Massport's sustainability practices over the next decade and supports the Authority's ongoing commitment to environmental stewardship.

The SMP represents the combined efforts of over 125 employees and tenants who came together to establish Massport's baseline sustainability performance, shape goals, and identify new sustainability initiatives. Massport is focused on a holistic approach with an emphasis on economic viability, operational efficiency, natural resource conservation, and social responsibility. As part of the SMP process, Massport developed a Sustainability Mission Statement:

"Massport will maintain its role as an innovative industry leader through continuous improvement in operational efficiency, facility design and construction, and environmental stewardship while engaging passengers, employees, and the community in a sustainable manner."

The SMP also included several groundbreaking elements including the launch of an Authority-wide sustainability engagement calendar and the development of Sustainability Planning Optimization Tools (SPOT™). The SMP Highlights Report and calendar can be viewed on Massport's website at the following address: <http://massport.com/environment/sustainability-management-plan/>.

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Project Mitigation Tracking

Introduction

This 2014 *Environmental Data Report (EDR)* provides an update on the Massachusetts Port Authority's (Massport) mitigation commitments under the Massachusetts Environmental Policy Act (MEPA) for Logan Airport projects where an Environmental Impact Report (EIR) was filed. Each of the projects completed the state and federal environmental review processes and adopted a mitigation plan that has been formalized with individual Section 61 Findings.¹ Massport tracks both Massport and Logan Airport tenants' progress toward implementing and meeting their environmental mitigation commitments on schedule and according to the requirements set out in the Section 61 Findings for each project. As each project moves forward through its design and construction phases, its mitigation plan is implemented with ongoing tracking to ensure compliance. This chapter provides Section 61 mitigation commitment updates in 2014 for projects for which mitigation is ongoing or upcoming (Tables 9-1 through 9-7). Projects for which mitigation has been completed are not reported on in Environmental Data Reports (EDRs) and Environmental Status and Planning Reports (ESPRs). For projects with ongoing requirements, once those projects are constructed, mitigation tracking will report only on the continuing requirements.

Projects with Ongoing Mitigation

- **West Garage Project**, Executive Office of Environmental Affairs (EOEA, now Executive Office of Energy and Environmental Affairs (EEA)) #9790 (Phase I and Phase II construction is complete). The status of continuing requirements is documented.
- **International Gateway Project**, EEA #9791 (Phase I was completed in 2004; Phase II was completed in 2007; the final phase is not expected to be completed before 2015). The status of continuing requirements for Phases I and II are documented. As part of a separate project, Massport is considering extending the existing International Terminal E. The Terminal E Modernization Project would accommodate existing and long range forecasted passenger demand for international service and would include the three gates permitted and approved as part of the West Concourse Project in 1996, and up to two to four additional new aircraft contact gates. An Environmental Notification Form (ENF) for the Terminal E Modernization Project is forthcoming in the very near future (see *Chapter 3, Airport Planning* for additional information).

¹ Massachusetts General Law, Chapter 30, Section 61 (M.G.L. c. 30, § 61).

- **Replacement Terminal A Project**, EEA #12096 (Terminal A opened March 16, 2005). The status of continuing mitigation requirements is documented.
- **Logan Airside Improvements Planning Project**, EEA #10458 (Runway 14-32 opened on November 23, 2006. The Centerfield Taxiway was completed and became fully operational in 2009). The status of continuing mitigation requirements is documented.
- **Southwest Service Area (SWSA) Redevelopment Program**, EEA #14137; on May 28, 2010, the Secretary of EEA issued a Certificate that determined that the Final EIR adequately and properly complied with MEPA and its implementing regulations. The Section 61 Findings for the SWSA Redevelopment Program were approved on June 17, 2010. Construction of the Rental Car Center (RCC) program began in summer of 2010, and the first phase of the facility opened in the fall of 2013. Other phases of the project were completed in 2014. The status of ongoing mitigation requirements is documented.
- **Logan Airport Runway Safety Areas (RSA) Project**, EEA #14442; on March 18, 2011, the Secretary of EEA issued a Certificate that determined that the Final Environmental Assessment (EA)/EIR adequately and properly complied with MEPA and its implementing regulations. Construction on the Runway 33L RSA began in June 2011 and was completed in November 2012. The replacement of the Runway 33L approach light pier was completed concurrently with Runway 33L RSA construction. Construction of the Runway 22R Inclined Safety Area (ISA) was completed in fall 2014. The status of the Runway 33L RSA enhancement project ongoing mitigation requirements is documented.

Projects with Section 61 Mitigation

The following section documents the status of projects with Section 61 mitigation commitments, in chronological order starting with the West Garage Project from 1995 to the Runway Safety Area Improvement Project which recently completed its final phase. Massport will continue to report on the status of mitigation in EDRs and ESPRs to provide a solid accounting of Massport's commitment to regulatory compliance and to provide information to the community.

West Garage Project - EOE #9790

Permitting History

- Certificate on the Final EIR issued on March 16, 1995
- Section 61 Findings approved on March 27, 1995

Project Status

The West Garage Project (Figure 9-1) was initially proposed to be constructed in two phases. Phase I of the Project provided 3,150 parking spaces that were consolidated from other areas of Logan Airport. The West Garage is directly connected to the Central Garage, centralizing the two structures' parking into a larger, single functioning, easily accessible garage. The West Garage Project also included construction of elevated walkways connecting the West Garage to Terminals A and E, and improvements to the terminal roadways. The original design of Phase II of the West Garage included the construction of a new structured parking facility adjacent to the West Garage. Instead, Massport concluded it was more cost efficient to proceed with Phase II by adding three additional levels (Levels 5, 6, and 7) to the existing Central Garage. Phase II of the West Garage Project provided approximately 2,800 additional parking spaces.

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- Phase I – Construction commenced in October 1995 and the garage opened on September 8, 1998. The elevated walkways to the terminals were completed in 2002. Improvements to terminal roadways were completed in 2003.
- Phase II – Permitting completed in 2000 to add three levels to the Central Garage. Construction commenced in 2004 and the entire facility enhancement was completed in 2007.

Table 9-1 lists each of the continuing Section 61 mitigation commitment for the West Garage Project and Massport's progress in achieving these measures. Table 9-2 details the elements and status of the Alternative Fuels Program, which was a key mitigation effort associated with the West Garage Project. The mitigation measures in Tables 9-1 and 9-2 are from Section 61 Mitigation of the *West Garage Project Final EIR*, January 31, 1995, and those measures referenced in the Massport Board vote on the West Garage Project. Many of the mitigation measures for this project have long since been implemented but it is noted in the tables when there have been recent updates.

Unrelated to this project, Massport is consolidating 2,050 temporary parking spaces as part of an addition to the West Garage and at the existing surface lot between the Logan Office Center and the Harborside Hyatt. These spaces constitute all remaining spaces under the Logan Airport Parking Freeze. On March 20, 2014, the EEA issued an Advisory Opinion confirming that no MEPA review was required for this consolidation of existing on-Airport parking spaces. Construction is expected to be completed in late 2015.

Figure 9-1 West Garage Project



Phase I West Garage Construction
Phase II Addition to Central Garage

Table 9-1 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2014)	
Mitigation Measure	Status
<p>Parking Pricing</p> <p><i>Parking pricing initiatives: keeping first-hour price high enough to provide a disincentive for pick-up/drop-off.</i></p> <p><i>Parking pricing initiatives: keeping the weekly price low enough to encourage vacation travelers to park for a week.</i></p> <p><i>Massport will consider means to encourage the use of limited amount of on-Airport commercial parking for long-term parking and promote environmentally positive modes of airport access by air passengers.</i></p> <p><i>Once sufficient data have been collected, Massport will evaluate parking behavior that may be attributable to the modified rates and consider further adjustments in pricing that will assist in achieving Massport's ground transportation goals.</i></p> <p><i>Executive Director shall report to Massport annually regarding the effectiveness of parking pricing policy in achieving Massport's ground access goals initiatives and recommend appropriate policy adjustments.</i></p>	<p>Implemented. Massport continues to evaluate and adjust the first-hour price of parking. In light of the security prohibition on curbside parking, in 2002, Massport reduced the cost of the first half-hour from \$4 to \$2, the first time it had changed since the first-hour free rate was rescinded in 1998. In June 2007, rates increased to \$3 for the first half-hour. Parking rates increased in March 2012 for on-Airport parking; further details on parking rate increases are provided in Table 5-6 of <i>Chapter 5, Ground Access to and from Logan Airport</i>.</p> <p>Implemented. Massport encourages long-term parking by providing lower cost parking at its Economy Lot. Data on long-term parking use are provided in <i>Chapter 5, Ground Access to and from Logan Airport</i>.</p> <p>Implemented. An important element of Massport's strategy to reduce the impact of Airport-related traffic on regional highways and local streets in neighboring communities is the Massport Parking Pricing Policy. Historically, Massport's Parking Pricing Policy encouraged long-term parking over short-term parking. That was accomplished by charging a premium for time spent in the on-Airport parking facilities between one and four hours and substantially reducing the per hour rate for parking durations longer than four hours. This strategy has proved to be a successful incentive for passengers to drive themselves and park long-term at Logan Airport rather than having someone else drop them off or pick them up. Additional information on parking is provided in <i>Chapter 5, Ground Access to and from Logan Airport</i>.</p> <p>Implemented. Massport's parking rate structure is compatible with continued growth in long-term parking, and the continued goal to increase the total high occupancy vehicle (HOV) use by air passengers toward 35.2 percent HOV access mode share. Adjustments to hourly parking rates have been made over time to reflect usage patterns. Additional information on parking pricing is provided in <i>Chapter 5, Ground Access to and from Logan Airport</i>.</p> <p>Implemented. In October 2001, the Massport Board granted approval of commercial parking rates consistent with Massport's ground access goals. The higher rates went into effect November 12, 2001. In addition, in light of the new security restrictions on curbside parking, Massport reduced the cost of parking for the first half-hour from \$4 to \$2. In June, 2007, the cost of parking for the first half-hour increased to \$3. These modifications foster the use of alternate forms of transportation for getting to Logan Airport, whereas the weekly cap at Economy Parking encourages long-term parking over pick-up and drop-off as a mode of access. Please refer to <i>Chapter 5, Ground Access to and from Logan Airport</i>, for additional details on Massport's parking pricing efforts.</p>

Table 9-1 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2014) (Continued)	
Mitigation Measure	Status
Concurrent Ground Access Improvement Mitigation Measures	
Employee Trip Reduction Measures	
<p><i>Massport will form a Transportation Management Association (Logan TMA) for Logan Airport employees to provide new opportunities for the development of targeted transportation demand management (TDM) strategies for Massport and airport tenant employees.</i></p>	<p>Implemented. In the 1995 Board Resolution, Massport's Executive Director was authorized to expend an initial amount of up to \$50,000 for the purpose of organizing the Logan TMA. The Logan TMA was created in March 1997. Massport continues to support the Logan TDM strategies by funding the Logan Sunrise Shuttle at an annual cost of \$65,000.</p>
<p><i>Massport will seek to develop, coordinate, and implement effective TDM strategies to reduce the number of single-occupant trips made by all Logan Airport employees.</i></p>	<p>Implemented. Massport continues to work with the MassDOT to support the Logan TMA. The 1995 Board Resolution authorized Massport to actively explore with the Logan TMA the feasibility of implementing various services. Massport assists the Logan TMA in providing services and by periodically conducting the Logan Airport Employee Survey (a survey was conducted in 2010). Results of the 2010 survey are summarized in <i>Chapter 5, Ground Access to and from Logan Airport</i>. The next survey is planned for 2016.</p>
<p><i>Massport will encourage participation by all employees, but will particularly target the airport's largest employers.</i></p>	<p>Implemented. Massport continues to target Logan Airport's largest employers. Refer to <i>Chapter 5, Ground Access to and from Logan Airport</i> for more details on the Logan TMA.</p>
<p><i>Massport will report on the formation and activities of the Logan TMA in the next Generic Environmental Impact Report (GEIR).</i></p>	<p>Implemented. The Environmental Status and Planning Reports (ESPRs) and Environmental Data Reports (EDRs) provide information on the Logan TMA. on the current status of the Logan TMA is summarized in <i>Chapter 5, Ground Access to and from Logan Airport</i>.</p>
<p><i>Massport proposes to implement a new Logan Express service or other HOV service depending on the needs of the targeted market before Phase II of the West Garage Project is operational.</i></p>	<p>Implemented. The Peabody Logan Express facility opened in September 2001 (See <i>Chapter 5, Ground Access to and from Logan Airport</i> for additional information on Peabody Logan Express). Despite low ridership, Massport continues to operate this service. In 2014, Massport initiated the Back Bay Logan Express service, which provides travelers with three scheduled trips per hour between the Hynes Convention Center, Copley Square Station, and Logan Airport.</p>

Table 9-1 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2014) (Continued)	
Mitigation Measure	Status
<p><i>Provide an airport shuttle service from South Station Transportation Center. Massport is preparing a feasibility and business plan for a South Station-Logan Airport shuttle service and will implement this service when the Third Harbor Tunnel is opened for commercial traffic. This service will be modeled on the existing, successful Logan Express services and will include frequent bus service between South Station and the airport terminals.</i></p>	<p>Implemented. In 1997, Massport sponsored the development of a joint public/private partnership with intercity bus operators serving the South Station Transportation Center. This partnership resulted in a bus connection that both the carriers and Massport. The service had limited success largely because of variable operator schedules and the fact that the service operates out of the South Station Transportation Center instead of a location closer to the South Station Red Line stop.</p> <p>Following the interim Logan DART service between Logan Airport and South Station in 2000, in June 2005, Massport and the Massachusetts Bay Transportation Authority (MBTA) jointly commenced full Silver Line Airport Service providing a direct connection between South Station and each Logan Airport terminal. Refer to <i>Chapter 5, Ground Access to and from Logan Airport</i> for additional information on the Silver Line.</p>
<p><i>Massport will regularly evaluate the frequency of, and demand for, such shuttle service and will provide such service at the greatest frequency that is practical and effective.</i></p>	<p>Implemented. Massport continues regular collaboration with MBTA on the Silver Line Airport Service and makes adjustments as necessary. Since May 2012, Massport has sponsored a pilot program offering free rides on the Silver Line from Logan Airport to downtown Boston to promote HOV usage and heighten awareness of public transit options. The purpose of the pilot program is to promote ridership, operations, and customer service. Free service will continue as of the date of this 2014 EDR.</p>
<p><i>Massport will implement a new water shuttle service in Boston Harbor before the opening of Phase I of the West Garage Project. The water shuttle would run between Logan Airport and one, or possibly, more sites in the Harbor.</i></p>	<p>Implemented. Massport identified a number of possible destinations for a new water shuttle service, with the Quincy Shipyard and Long Wharf sites meeting the basic service parameters. Harbor Express was chosen as the water shuttle operator and began operation between the Airport and these two sites in November 1996. Massport continues to support the Rowes Wharf Water Taxi and City Water Taxi operations. Refer to <i>Chapter 5, Ground Access to and from Logan Airport</i> for water shuttle ridership information.</p>
<p><i>The Executive Director shall make recommendations to Massport for budgetary appropriations to establish and implement the new ground access services on a schedule that permits Massport to implement the new ground access services within these time frames.</i></p>	<p>Implemented. The Executive Director/CEO recommends budgetary appropriations for ground access services on an annual basis.</p>
<p>Enhancement of Existing HOV Services: Logan Express</p> <p><i>Expand Logan Express hours of service.</i></p>	<p>Implemented. Service is offered from Braintree as early as 3:00 AM and as late as 11:00 PM; from Framingham as early as 3:15 AM and as late as 11:00 PM; from Woburn as early as 3:00 AM and as late as 11:00 PM; and from Peabody as early as 3:15 AM and as late as 10:45 PM. Buses leave every hour or half hour. Logan Express buses now depart from Logan Airport as late as 1:15 AM. The Logan Express schedule is available at https://www.massport.com/logan-airport/to-and-from-logan/logan-express/.</p>
<p><i>Provide a guaranteed ride home for Logan Express users.</i></p>	<p>Implemented and subsequently modified. From January 1995 until November 2001, Massport provided this service for air passengers and Logan TMA members. Due to financial constraints following September 11, 2001, this program was suspended for those passengers arriving after midnight with pre-purchased round-trip Logan Express tickets.</p>

Table 9-1 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2014) (Continued)	
Mitigation Measure	Status
<i>Provide Logan Express price incentives.</i>	Implemented. Massport continues to monitor price incentives and implements additional incentives to promote Logan Express ridership, particularly during vacation periods and other periods of peak airport activity. In April 2011, Logan Express sites offered a discounted rate for parking. A survey of Logan Express passengers revealed that drop off activity at Logan Airport was reduced and the demand for parking at Logan Airport was reduced during the period of the discounted Logan Express parking. To encourage greater ridership, Massport restructured parking rates, which lowered parking rates to \$7 per day from \$11 per day at Logan Express parking lots. These rates went into effect on March 1, 2012 and are still in effect today (and resulted in increased Logan Express passenger activity at rates greater than the increase in Logan Airport air passengers). Additional seasonal and holiday promotions are also offered.
<i>Develop an additional Logan Express service.</i>	Implemented. Massport opened a fourth Logan Express in Peabody, Massachusetts in September 2001, several years before the Section 61 Commitment date of the opening of Phase II of the West Garage Project. While the new service was initially planned to operate on a half-hour schedule like the Braintree, Framingham, and Woburn services, because of the dramatic air passenger reductions after September 11, 2001, (during Peabody's first week of service), to cut costs, Massport operated the Peabody Logan Express on hourly headways. In January 2004, in light of low levels of ridership on the Peabody Logan Express, Massport doubled service by going to a half-hourly schedule in an effort to stimulate ridership growth at Peabody. The service now operates on an hourly weekday schedule. In 2014, Massport initiated the Back Bay Logan Express service, which provides travelers with three scheduled trips per hour between the Hynes Convention Center, Copley Square Station, and Logan Airport.
Enhancement of Existing HOV Services: Water Transportation	
<i>In conjunction with the MBTA, Massport will pursue joint ticketing opportunities for the Hingham Commuter Boat and the Logan Airport Water Shuttle.</i>	Implemented. This ticketing program was explored, implemented in mid-1995 and discontinued in 2000 since many of the former users of this program now use the Harbor Express Service direct from Quincy to Logan Airport.
<i>Massport is reviewing the fee schedules and operating requirements of the dock to make it more accessible and convenient to potential water taxi operators.</i>	Implemented. In the fall of 1995, Massport made physical improvements to a low-freeboard float at the Logan Dock to create a dock capable of accommodating smaller vessels such as water taxis. In the fall of 2002, Massport completed expansion of the Harborside dock to accommodate the demand of additional vessels and to comply with handicapped accessibility requirements. The improved dock increases capacity from a two float system to a seven float system to accommodate the various water shuttles, taxis, and charter boats that are licensed to use it.
<i>Initiate a new Boston Harbor Water shuttle service.</i>	Implemented. Harbor Express service, between Logan Airport and the South Shore, began in November 1996, well before the opening of Phase I of the West Garage in September 1998. In 2001, the MBTA took over operations of this service.
<i>Expand docking capacity at Logan Airport for water taxi and other services.</i>	Implemented. Massport accommodates water taxi services, enhanced the dock as described above, provides communication links for passengers to call the taxi, and allows taxi passengers to use the free water shuttle buses to access the terminals from the dock. Water taxi information is posted on the Massport website. Details on the Water Taxi are provided in <i>Chapter 5, Ground Access to and from Logan Airport.</i>

Table 9-1 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2014) (Continued)	
Mitigation Measure	Status
<p>Other Measures Coordinate with public and private entities to provide more extensive radio, television, and telephone announcements of poor traffic conditions with suggestions for alternative access modes.</p> <p>HOV Marketing and advertising. Massport will continue the advertising and marketing programs for HOV services with an emphasis on promoting MBTA, Logan Express and water shuttle services to and from the airport.</p>	<p>Implemented. The 1-800-23LOGAN Customer Information Line includes the number of the telephone text information line. Callers to Customer Information Line may access the latest traffic information, flight status, parking information, cell phone waiting lot information, or learn about alternative forms of transportation to and from Logan Airport. Starting in August 1999, real-time traffic information and parking became accessible on Massport's website.</p> <p>Massport regularly contacts the media to inform the public about roadway changes, parking shortages and to encourage travelers to use HOV services. Similar information is disseminated on the Logan Airport e-mail subscriber list, the Massport website, Facebook, and on Twitter at twitter.com/bostonlogan.</p> <p>Implemented. Massport continues to marketing Logan Express services via Massport's website and other media. Massport continues to promote HOV services including availability, schedules and fares to consumers through the ground transportation Information Line at 1-800-23LOGAN and the website that provides up to the minute information. HOV advertising boards, schedules, and maps are placed at all Logan Airport terminals, at the MBTA Airport Station and at all shuttle bus pick-up/drop-off locations.</p> <p>Massport has actively promoted passenger water transportation in Boston Harbor for more than 20 years, playing a leadership role in policy development, planning, and promotions. This has included promoting vessel services at Logan Airport in the following ways:</p> <ul style="list-style-type: none"> ■ Annual updates and in-terminal and citywide distribution of a brochure promoting water transportation at Logan Airport; ■ Annual updates of harbor-wide water transportation map showing routes serving Logan Airport and other routes and landings as well – Massport provides this map to the MBTA, area non-profits, and others interested in promoting passenger water transportation in Boston Harbor; ■ Updated information promoting passenger water transportation at Logan Airport on 1-800-23-Logan and www.massport.com; and ■ Collecting, tracking, and disseminating passenger water transportation ridership data for Logan Airport passengers to aid in planning and facility development.

Table 9-1 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2014) (Continued)	
Mitigation Measure	Status
<p><i>Prepare an inventory of private scheduled services including origins/destinations, schedule, and cost.</i></p>	<p>Implemented. Massport continues to update and track information and services by more than 700 privately operated passenger services certified to operate at Logan Airport. Industry changes with such operations make publication of reliable service and schedule information impractical, if not impossible. However, Massport continued to expand and update information on transportation options to Logan Airport using the latest information technologies, including:</p> <ul style="list-style-type: none"> ■ Information and links to transportation companies on the Massport website. Some sites accessed through internet links provided passengers with on-line reservation services; ■ Most scheduled service operators provided placards with current schedules posted in bus stop shelters located on the curb at each terminal. Individual bus schedules were also available at the information booths; and ■ Transportation information database for on-line assistance at Logan Airport terminal information booths.
<p><i>Proceed with environmental review and seek funding for construction of People Mover system.</i></p>	<p>Implemented. Massport completed the Environmental Assessment (EA) and Major Investment Study for the Logan Airport Inter-modal Transit Connector (AITC). The AITC evolved out of the People Mover process and evaluated new access routes to both the Blue Line and the South Station Transportation Center.</p> <p>On February 25, 1997, Massport submitted to the U.S. House Committee on Transportation and Infrastructure an application for the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) funds for the next phase of environmental review, planning and design of the AITC. Congressman J. Joseph Moakley was the congressional sponsor; the project also has the support from the Secretary of Transportation and the U.S. Environmental Protection Agency (EPA). The Logan AITC was included, for an unspecified funding level, in the 1997 ISTEA reauthorization bill.</p> <p>In 1998, Massport received a certificate on a Notice of Project Change (NPC) for the People Mover from the Secretary of EEA and a Finding of No Significant Impact (FONSI) on an EA from the Federal Transit Authority. In June 2001, Massport and the MBTA executed an interagency agreement for the purchase of eight Silver Line dual mode buses and the Massport Board approved the expenditure of approximately \$13 million for this purchase. In 2004, Massport and the MBTA finalized the 10-year/\$20 million dollar Inter-Agency Operating & Maintenance Agreement. Initial Silver Line service to the Airport began in December 2004 and full service began in June 2005 (refer to <i>Chapter 5, Ground Access to and from Logan Airport</i> for additional details).</p>
<p><i>Alternative Fuels program. Massport is carrying out an extensive program to convert existing Massport-owned service vehicles to environmentally preferable sources.</i></p>	<p>Implemented. Table 9-2 of this 2014 EDR details Massport's progress in achieving these measures.</p>

Table 9-1 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2014) (Continued)	
Mitigation Measure	Status
<i>Measuring, Monitoring, and Evaluating Ground Access Improvements</i>	
<i>Massport will assess progress towards the achievement of HOV goals using on-Airport Automated Traffic Monitoring Systems (ATMS).</i>	Implemented. Massport has an ATMS plan that provides daily traffic counts at all gateways and other critical locations. Massport uses technologies that utilize on-Airport traffic signal controllers and loops for traffic counting. The Logan ATMS uses technologies that detect vehicle movement: inductive loop lines, and microwave sensors. Upgrades of the ATMS equipment, program software and infrastructure are underway and will result in accurate, meaningful vehicle counts. With the completion of the Terminal Area Roadway system and other regional highways expected in the near future, The project is complete and the upgraded ATMS is functioning as planned and designed.
<i>Massport will assess progress towards the achievement of HOV goals by monitoring parked vehicles using systems such as the parking and revenue control (PARC) system.</i>	Implemented. Massport monitors all parking activity at Logan Airport and inventories all commercial parking facilities on a daily basis. Updated PARC systems were installed in the Terminal B Garage in 2004, with Central/West Garage following in 2005. Terminal E parking areas and the Economy Garage also have PARC systems.
<i>Monitor HOV Services (Logan Express, MBTA, water shuttle, limousine/bus, and taxi).</i>	Implemented. Massport maintains a “real time” log of dispatcher reports for Logan Express, the taxi pool, and the bus/limousine pool and other ground transportation operations at Logan Airport. Massport coordinates with the MBTA and the operators of all water shuttles serving Logan Airport to track ridership and service schedules. Daily Logan Express ridership and operations data are submitted monthly to Massport. Massport maintains a Passenger Water Transportation Ridership Summary on a monthly basis.
<i>Monitor passenger activity and employee modes of transportation.</i>	Massport maintains a continuing record, the Ground Transportation Unit (GTU) Daily Event Log, of all occurrences impacting the Airport roadways, terminal curbs, and access roads. This log cites such events as accidents, lane closures, bus delays, as well as routine and non-transportation events.
<i>Massport supports the use of Automated Vehicle Identification (AVI) to monitor, manage, and facilitate efficient traffic operations at Logan Airport and elsewhere on the regional transportation system.</i>	Implemented. The most recent air passenger survey was conducted in the spring of 2013 and is summarized in <i>Chapter 5, Ground Access to and from Logan Airport</i> . The next survey is scheduled for spring 2016.
<i>Track the effectiveness of ground access measures.</i>	Implemented. An AVI system for Massport’s Logan Airport shuttles and Logan Express buses was implemented. All new buses are being procured with AVI/global positioning system (GPS), in anticipation of a planned “next bus” arrival notification system. In addition, the new Rental Car Center (RCC) has an operations room with the required equipment to track the new clean-fuel unified bus fleet.
<i>Track the effectiveness of ground access measures.</i>	Implemented. Massport continues to track the effectiveness of its ground access mitigation programs in its annual MEPA filings. See <i>Chapter 5, Ground Access to and from Logan Airport for 2014 details</i> .

Source: Massport

Note: Text in italics detailing the mitigation measures is from Section IV, Mitigation of the West Garage Final EIR, January 31, 1995.

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Table 9-2 describes the Alternative Fuels Program, which was part of the West Garage Section 61 commitments.

Table 9-2 Alternative Fuels Program – Details of Ongoing Section 61 Mitigation Measures for the West Garage Project (as of December 31, 2014)		
Program Element	Projected Date of Completion/ Acquisition	Status
<i>Purchase four electric passenger utility vehicles</i>	Winter 1995	Implemented.
<i>Purchase five electric sedans</i>	Winter and Summer 1995	Implemented.
<i>Build compressed natural gas (CNG) quick-fill station</i>	Spring 1995	Implemented. The CNG station has been operational since 1995. It is one of New England's largest retail CNG quick fill stations and serves approximately 30 of Massport's CNG vehicles (18 of which are the Massport-owned 42' CNG buses) along with a dozen Airport tenants including nearby hotel CNG shuttle bus fleets. In calendar year 2014, the station pumped approximately 32,983 gallon equivalents per month. Sixty-five percent of the fuel is purchased by Massport and 35 percent by outside vendors.
<i>Purchase five electric buses</i>	Spring and Summer 1995	Implemented. Massport purchased two electric buses and leased one. These vehicles operated at Logan Airport between 1996 and 2001. After more than six years of testing and evaluation, Massport determined that electric buses are neither durable nor dependable enough to function effectively in the demanding operating environment at Logan Airport. Massport's new unified bus fleet includes clean diesel/electric hybrid buses. Massport will continue to evaluate electric and other alternative fuel vehicles (AFV) as new technologies become available.
<i>Purchase five electric pick-up trucks</i>	Spring 1995	Implemented.
<i>Use soy-blend diesel fuel</i>	Spring 1995	Implemented. Massport's shuttle fleet operated on soy diesel from 1995 to 1999. In 1999, all the buses were replaced with CNG buses. This fleet was fully replaced in 2012 by CNG and clean-diesel/electric hybrid buses.
<i>Purchase additional AFVs</i>	Spring 1995	Implemented. Refer to <i>Chapter 7, Air Quality/ Emission Reductions</i> for a list of AFVs.
<i>Purchase six CNG buses</i>	Summer 1995	Implemented. The initial fleet of 26 CNG shuttle buses was fully replaced in 2012 with 32 60-foot clean diesel/electric hybrid buses and 18 42-foot CNG buses.
<i>Purchase four electric vans</i>	Summer 1995	Implemented.
<i>Install quick-charge kiosks for electric vehicles</i>	Summer 1995	Implemented.
<i>Develop slow-charge infrastructure</i>	Ongoing	Implemented. The electric charging infrastructure included 15 inductive charging locations but these are not in use since there are no vehicles currently using inductive charging. In 2012, Massport installed 13 new electric vehicle (EV) charging stations to accommodate a total of 26 vehicles in the Central and Terminal B parking areas. The new Framingham Logan Express Garage also has two EV charging stations.

Source: Massport

International Gateway Project (Terminal E) - EOE #9791**Permitting History:**

- Certificate on the Final EIR issued on December 2, 1996
- Section 61 Findings submitted to EEA June 26, 1997

Project Status

The International Gateway Project (Figure 9-2) expanded and upgraded Terminal E to provide better service to international passengers. The original Terminal E was opened in 1974 and over time became outdated and too small to accommodate the growth in international travel. This project is being constructed in phases:

- **Phase 1 – Complete.** This phase of the project included a weather-protected outside airside bus portico with an elevator and escalator linking the ground floor with the second floor to accommodate passengers arriving on remotely parked aircraft that are unable to park at a gate because it is occupied by another aircraft.
- **Phase 2 – Complete.** This phase of the project enlarged Logan Airport’s congested Federal Inspection Services (FIS) Facility, and improved the meeter/greeter lobby and the ticketing area of Terminal E to maximize passenger convenience and reduce processing times in the terminal. The project called for the reconstruction and expansion of Terminal E in and around the existing terminal while keeping it operational and safe. The new departure hall includes high ceilings, wood paneling, built-in artwork, and views of the city skyline. Additionally, to reduce curb and roadway congestion at Terminal E, this project also included a new separated roadway system for arrivals and departures.
- **Future Phase – Pending.** The West Concourse element of the International Gateway Project and its three additional gates were approved but never constructed. Planning for future terminal improvements is underway as part of the ongoing strategic planning effort and the Terminal E Modernization Project.

Construction of this project commenced in the summer of 1998. Phase 1 was completed in 2004. The departure level of the terminal, including the new ticketing hall and departure level roadway, opened in May 2003. Enlargement of the FIS Facility and construction of the new arrivals level was completed in July 2007. Phase 2 is now complete. Preliminary work was completed for the West Concourse including planning for three additional contact gates that were never built. Additional information on the status of this project is available in *Chapter 3, Airport Planning*.

As part of a separate new project, Massport is planning further modernization of the existing International Terminal E. The Terminal E Modernization Project would accommodate existing and long range passenger forecasted demand for international service and would include the three permitted but not built gates from the West Concourse project, and up to two to four additional new aircraft contact gates. An ENF is expected to be filed in the very near future (see *Chapter 3, Airport Planning* for additional information).

Table 9-3 lists each of the continuing mitigation measures for the International Gateway Project in the Section 61 Findings along with Massport’s progress in achieving these measures through the end of 2014. Many of the mitigation measures for this project have long since been implemented but it is noted in the tables when there have been recent updates. Completed design and construction phase measures are described in previous EDRs.

Figure 9-2 International Gateway Project



Note: Runway 14-32 construction completed in November, 2006.

**Table 9-3 International Gateway Project Status Report (EOEA #9791)
 Section 61 Mitigation Measures (as of December 31, 2014)**

Mitigation Measure	Status
<p>Alternative Fuel Outreach Program</p> <p><i>Massport is working cooperatively with the Environmental Protection Agency (EPA) and regional utility providers in coordinating an ongoing outreach program aimed at promoting the use of clean-burning alternative fuels. This program, which is also supported by fuel providers, vendors, and state and federal agencies, will offer information to airport tenants in the following areas:</i></p> <ul style="list-style-type: none"> ■ <i>Notification of grant programs or other financial incentives for vehicle conversions.</i> ■ <i>Assistance in cost-benefit analysis for conversion of conventionally fueled vehicles to AFVs.</i> ■ <i>Assistance in placing airport tenants in contact with alternative fuel suppliers and product vendors.</i> 	<p>Implemented. Massport continues to work cooperatively with Eversource, Alternative Vehicle Service Group (AVSG), the City of Boston, and the Massachusetts Clean Cities Coalition to promote the implementation and integration of Alternative Fuel Vehicles (AFVs) into local private and public fleets. In May 2007, Massport adopted two new policies to promote alternative fuel and hybrid vehicle usage at Logan Airport by others: 1) limited front-of-line taxi pool privileges; and 2) preferred Parking locations in the Central Garage and the new Economy Garage. These policies remain in effect.</p>
<p>High Occupancy Vehicle (HOV) Promotion</p> <p><i>Massport will reserve terminal space for ground transportation ticket sales, reservations, and information.</i></p> <p><i>Attractive and distinctive signage and graphics will be utilized inside the terminal and out at the curb to clearly mark access to Logan Express, MBTA, water transportation, and other HOV options.</i></p> <p><i>As HOV services continue to develop and expand at Terminal E, Massport will expand its web page to encompass these new services and initiatives.</i></p> <p><i>Massport and the MBTA will offer, on a trial basis, the sale of MBTA tokens via a vending machine in the baggage claim area of Terminal C.</i></p>	<p>Implemented. This space has been provided in a staffed information area in the arrivals area of the new terminal. In a joint venture with Massachusetts Bay Transportation Authority (MBTA) Charlie Card automated fare collection equipment was installed in all Logan Airport terminals in 2006. In mid-2012, in an effort to encourage greater transit ridership, Massport commenced a pilot program for free boarding of the Silver Line at Logan Airport. Free Silver Line boarding continued throughout 2013 and 2014.</p> <p>Implemented. Signage has been installed in the terminal and at the curbside identifying HOV curb locations. In 2012, Massport installed new digital signage at all terminal Silver Line curb locations to indicate next bus wait times which has improved passenger convenience.</p> <p>Implemented. Massport continues to reflect service changes on its website.</p> <p>Implemented. The MBTA Charlie Card machines are located at the MBTA's Blue Line Airport Station and in each of the Logan Airport passenger terminals. Massport continues to offer free service to Airport Station and the water shuttle dock with its fleet of CNG and clean diesel/electric hybrid buses. Since the summer of 2012, Massport has also sponsored a pilot program offering free rides on the Silver Line from Logan Airport to downtown Boston.</p>

Note: Text in italics detailing the mitigation measures is excerpted from the Section 61 Findings submitted to the EEA, June 26, 1997.

Replacement Terminal A Project - EOE #12096

Permitting History

- Certificate on the Final EIR issued on November 16, 2000
- Section 61 Findings submitted to EEA on August 31, 2001

Project Status

The Replacement Terminal A Project (Figure 9-3) involved the complete demolition of the pre-existing Terminal A and construction of a new facility by Delta Air Lines, consisting of a main terminal linked to a satellite concourse. The old Terminal A was closed in May 2002 and demolition commenced shortly thereafter. The project was designed to be constructed in five phases. However, as a result of September 11, 2001, air traffic at Logan Airport reduced dramatically allowing Massport to relocate the airlines at Terminal A to other terminals with minimal impact, and to shut down Terminal A entirely rather than having to phase construction concurrent with passenger activity. As a result, construction progressed ahead of schedule in 2003 and 2004. Terminal A opened on March 16, 2005.

In the spring of 2006, Delta Air Lines and Massport submitted an application for certification of Terminal A under the U.S. Green Building Council Leadership in Energy and Environmental Design® (LEED) Green Building Rating System™. LEED certification was awarded in June 2006, making Terminal A the first airport terminal in the world to be awarded LEED certification.

The following sustainable elements were incorporated into the design of Terminal A:

- Water conservation — low-flow toilets, and drip rather than spray irrigation.
- Atmosphere protection — zero use of chlorofluorocarbon (CFC)-based, hydrochlorofluorocarbon (HCFC) based, or halon refrigerants.
- Energy conservation — special roofing and paving materials that reflect solar radiation. Solar panels were installed on the roof of Terminal A in 2012.
- Materials and resources conservation — more than 10 percent of all the building materials used to construct the terminal were from recycled materials.
- Enhanced indoor environmental air quality — low and volatile organic compound (VOC) free adhesives, sealants, paints, and carpets were used.
- Sustainable sites — bicycle racks were installed in proximity to bus and subway systems.

Figure 9-3 Replacement Terminal A Project



Table 9-4 lists each mitigation measure in the Section 61 Findings along with Massport’s progress in achieving these measures through the end of 2014.

**Table 9-4 Replacement Terminal A Project Status Report (EOEA #12096)
 Section 61 Mitigation Measures (as of December 31, 2014)**

Mitigation Measure	Status
<p>Project Design Mitigation</p>	
<p>Logan Transportation Management Association (TMA)</p>	
<p>Participation</p>	
<p><i>Delta Air Lines, Inc. has joined Massport's Logan TMA. Delta Air Lines will designate an Employee Transportation Advisor at Terminal A to be the conduit between the Logan TMA Coordinator and Delta Air Lines employees.</i></p>	<p>Implemented. Delta Air Lines joined the Logan TMA and designated an Employee Transportation Advisor.</p>
<p><i>Additionally, Delta Air Lines will provide the following services as part of their Transportation Demand Management Program through the Logan TMA Transportation subsidy for full-time Delta Air Lines employees at Logan Airport; ride matching/carpooling; vanpooling; guaranteed ride home; preferential parking for HOVs; shuttle to and from employee parking.</i></p>	<p>Implemented. Transportation Demand Management (TDM) services are provided through Delta Air Lines and the Logan TMA.</p>
<p>Recycling Program</p>	
<p><i>The Replacement Terminal A will be included in within Massport's terminal recycling program.</i></p>	<p>Implemented. Paper, plastic, aluminum, glass, and cardboard are recycled at Terminal A.</p>
<p>High Occupancy Vehicle (HOV) Promotion</p>	
<p><i>HOV access can be accommodated on the departures level and will be designated near main entrances to the terminal building to ensure efficient and convenient unloading by air passengers who use these mode-types to access the Airport.</i></p>	<p>Implemented. Curbside HOV lanes give HOV modes preferential access to Terminal A for passenger convenience at both the arrival and departure levels.</p>
<p><i>The inner-most curb of [the arrivals level] will be designated exclusively for HOVs and taxis, similar to the departures level.</i></p>	<p>Coinciding with the opening of the Rental Car Center (RCC) (and its new on-Airport shuttle bus operations), in September of 2013, Massport made improvements to the terminal curbsides to increase access for HOV/transit/shared-ride modes. The improvements followed several general principles: situate HOV modes to the curb closest to the terminal and locate the airport's Blue Line/RCC shuttle stop adjacent to the Silver Line stop. Terminals B, C, and E underwent the most significant changes; in fact, the ground level of the Terminal B garage was converted to a taxi and limo pick-up area, eliminating all commercial parking from that level, and allowing extra curb space to be better allocated among the remaining HOV and other modes. Terminal A, which already had the primary HOV modes pick-up at the terminal curb (and private vehicles pick-up at the second/outer curb), underwent the fewest changes (notably relocating the Silver Line bus stop to be adjacent to the Blue Line/RCC shuttle stop). The curb improvements also included adding electronic "next bus arrival time" displays for the Massport shuttles and the Logan Express buses.</p>

Table 9-4 Replacement Terminal A Project Status Report (EOEA #12096) Section 61 Mitigation Measures (as of December 31, 2014) (Continued)	
Mitigation Measure	Status
<p>Ground Service Equipment (GSE) Conversion</p> <p><i>In conjunction with the Project, Delta Air Lines will implement a program for conversion of its entire GSE fleet at Terminal A as soon as viable alternative fueled fleet vehicles become available and can be effectively integrated into Delta Air Lines' operations at Terminal A. Delta Air Lines will introduce battery powered baggage tugs and belt loaders with the replacement terminal and convert this portion of the GSE fleet by the end of 2008. This represents over 40 percent of Delta Air Lines' current GSE fleet.</i></p> <p><i>Delta Air Lines will also examine the feasibility of locating a Compressed Natural Gas (CNG) fill station at Terminal A. The availability of a CNG fueling station would facilitate conventionally-fueled vehicles to be replaced with CNG-fueled vehicles where this vehicle option is offered. Delta Air Lines will introduce these vehicles into its GSE fleet as soon as they become available and are determined to be feasible and practicable for use at Terminal A.</i></p> <p><i>Where new alternative fuel vehicles (AFVs) are developed and determined to be cost effective and in available supplies, Delta Air Lines will integrate their use into its Terminal A GSE fleet operations.</i></p> <p><i>Finally, Delta Air Lines will provide Massport with an annual status report/update on the GSE conversion program at Terminal A, for inclusion in Massport's annual Environmental Data Report (EDR).</i></p>	<p>Implemented. Terminal A incorporates infrastructure for GSE charging. In September 2009, Massport approved a \$3 million dollar loan to Delta Air Lines for the purchase of battery-powered baggage tugs and battery powered-baggage conveyor belt vehicles. Delta Air Lines purchased 50 electric baggage cart tugs, 25 electric baggage conveyor belt vehicles, and charging stations for each vehicle. Thirty-two GSE charger installations have been completed, and are currently serving electric GSE.</p> <p>Implemented. Delta Air Lines examined the feasibility of locating the CNG fill station at Terminal A and determined it to be infeasible given that the GSE conversions are trending toward electric vehicles and electric vehicle infrastructure meets demand. A public access CNG fuel facility is available on the Airport at 81 North Service Road.</p> <p>Implemented. As described earlier, Delta Air Lines has purchased electric baggage tugs and belt loaders and will continue to determine the feasibility of integrating other alternative fuel GSE, as available.</p> <p>Implemented. Terminal A includes 32 electric charging stations for Delta Air Lines' electric ramp vehicles. Delta Air Lines continues to study which AFVs and infrastructure are best suited for its future GSE operations.</p>
<p>Operational Mitigation Measures</p> <p><i>Minimizing nighttime movement of aircraft to and from hardstand positions.</i></p>	<p>Implemented. In accordance with the Noise Rules, Massport continues to restrict nighttime movement of aircraft under their own power between 10:00 PM and 7:00 AM, and Massport also requires towing during this time period.</p>

Table 9-4 Replacement Terminal A Project Status Report (EOEA #12096) Section 61 Mitigation Measures (as of December 31, 2014) (Continued)	
Mitigation Measure	Status
<p><i>Using single engine taxiing and pushback to the extent feasible and practicable, recognizing that such use always at the discretion of the pilot in charge of the aircraft based upon his or her experience and safety and operational considerations.</i></p>	<p>Implemented. Massport has conducted two surveys of Logan Airport air carriers (2006 and 2009) to understand the extent single engine taxiing is used at Logan Airport. Massport also issued letters to air carriers in support of single engine taxiing when consistent with safety procedures. Massport is an active member of the Federal Aviation Administration (FAA) Partnership for Air Transportation Noise and Emissions Reduction (PARTNER) program on reducing noise and emissions. In 2009, Massport offered to facilitate the undertaking by the Massachusetts Institute of Technology (MIT) of a more detailed survey of pilots at Logan Airport to better understand the use of single engine taxiing. MIT completed its survey and issued a paper in March 2010 (as provided in the <i>2010 Environmental Data Report [2010 EDR]</i>). The MIT survey confirms earlier Massport survey findings that single engine taxiing is an important operational measure used by airlines to conserve fuel and is extensively used at Logan Airport. Based on the more detailed survey results, Massport will tailor future communication to airlines to further encourage the use of single engine taxiing, when safe to do so, within the Logan Airport operational context. In 2014, Massport sent letters to the Boston Airline Community and the Logan Airport user community encouraging them to consider the use of single engine taxiing when safe to do so. This is provided in <i>Appendix L, Reduced/Single Engine Taxiing at Logan Airport Memoranda</i> of this 2014 EDR.</p>
<p><i>Testing alternative de-icing methods to reduce the amount of glycol usage.</i></p>	<p>Ongoing. Delta Air Lines is currently using sodium formate, an environmentally friendly deicing material, for pavement deicing.</p>

Source: Massport
 Note: Text in italics detailing the mitigation measures is excerpted from the Section 61 Findings submitted to the EEA, August 31, 2001.
 1 Details are available in the Section 61 Findings.

Logan Airside Improvements Planning Project - EOE #10458

Permitting History

- Certificate on the Final EIR issued on June 15, 2001.
- Section 61 Findings dated June 8, 2001 on the Final EIR.
- In June 2002, the Federal Aviation Administration (FAA) filed a Final Environmental Impact Statement (FEIS) and issued the Record of Decision (ROD) in August 2002 approving a unidirectional runway and other improvements, but deferred a decision on the centerfield taxiway pending additional review by the FAA.
- In November 2003, the Superior Court of the Commonwealth modified a 1976 injunction prohibiting construction of a new runway at Logan Airport, pending further environmental review. The injunction modification allowed construction of the runway in accordance with the MEPA Certificate on the Final EIR and the FAA's ROD on the Final EIS.
- In accordance with the Secretary of EEA's Certificate on the Final EIR, Massport amended its final Section 61 Findings issued in 2001 to incorporate mitigation measures added or refined through the federal environmental review process. As a result, Massport amended its initial Section 61 Findings on October 21, 2004, to include mitigation measures required of it in the FAA's ROD.
- In April 2007, the FAA issued a ROD on the centerfield taxiway improvements based on its review of supplemental information.

Project Status

- Project construction commenced in 2004. Runway 14-32 opened on November 23, 2006. 2007 was the first full year of operation of Runway 14-32.
- Realignment of the southwest corner taxiway system was completed in 2007.
- Taxiway D extension was completed in 2010.
- Taxiway N realignment is anticipated to commence after 2015.
- Reduction in approach minimums on Runway 15R and 33L was implemented in 2013 following completion of the 33L Light Pier replacement and FAA testing of new Instrument Landing System (ILS) equipment.

The Logan Airside Improvements Planning Project (Figure 9-4) involved the construction of a new unidirectional Runway 14-32 and centerfield taxiway, extension of Taxiway D, realignment of Taxiway N, improvements to the southwest corner taxiway system, and reduction in approach minimums on Runways 22L, 27, 15R, and 33L. Reduction in approach minimums on Runway 15R and 33L were approved in the EIS. However, implementation for approach minimum reductions depended upon realignment of the ILS. The construction impacts of relocating the ILS localizer and new CAT III ILS equipment were addressed in the environmental review of the RSA enhancements for Runway 33L (EOEA #14442). The CAT III ILS began operations in 2013.

Table 9-5 summarizes the mitigation measures contained in the amended Section 61 Findings issued on October 21, 2004 and reports on the status of implementation. Table 9-5 addresses only ongoing requirements, and it is noted when there are recent updates. Documentation on design and construction measures is contained in previous EDRs.

Figure 9-4 Logan Airside Improvements



Note: Runway 14-32 construction completed in November, 2006.

Table 9-5 Logan Airside Improvements Planning Project (EOEA #10458) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2014)	
Mitigation Measures	Status
Runway 14-32 Operations and Construction Mitigation	
<p>Operational procedures for unidirectional Runway 14-32 will include over water flight operations only, arrival operations in east-to-west direction from Runway 32 approach end, and departure operations from west-to-east direction from the Runway 14 departure end. Massport will enter into contract with appropriate government body and/or community group(s) to enforce intended unidirectional runway, if requested. Lighting, marking, and instrumental components of Runway 14-32 will be designed for a unidirectional runway. No parallel or other type taxiway facility will be constructed to allow east-to-west direction departures from the Runway 32 end.</p> <p><i>The Federal Aviation Administration (FAA) endorsed the unidirectional limitations on Runway 14-32 and has agreed to develop air traffic control procedures to ensure safe and efficient operation of the unidirectional limitation, subject to variances that may be required to accommodate particular aircraft emergencies.</i></p>	<p>Implemented. Runway 14-32 was constructed for unidirectional operation. All lighting, marking, and navigational instrumentation was constructed and is operated for unidirectional use only. There is no parallel or other type of taxiway facility that would facilitate east-to-west direction departures from the Runway 32 end. The construction mitigation measures were incorporated into the final design specifications and were implemented during construction. Runway 14-32 opened on November 23, 2006.</p>
Wind-Restricted Use of Runway 14-32	
<p>Restrict the use of Runway 14-32 to those times when winds are equal to or greater than 10 knots from the northwest or southeast (between 275 degrees and 005 degrees, or 095 degrees and 185 degrees, respectively).</p>	<p>Implemented. Massport provided initial data to support FAA's effort. The FAA implements the wind restriction in compliance with the federal Record of Decision (ROD).</p>
Mitigation Policies/Programs	
Regional Transportation Policy	
<p><i>Engage in promoting increased utilization of regional airports</i></p> <p><i>Cooperative transportation planning with the various transportation agencies to ensure an integrated regional transportation infrastructure (i.e., improved highways, public transportation, high-speed rail, private transportation services to improve regional airport access).</i></p> <p><i>Massport will continue to exercise operational control over Worcester Regional Airport.</i></p>	<p>Implemented. During 2001, Massport, together with the FAA and the six New England Regional State Aviation Directors developed a scope of work and selected a technical team to undertake the New England Regional Aviation System Plan (NERASP) Update study. In 2002, the Massport Board approved 10 percent funding with a 90 percent federal match toward the \$1.6 million study. Please refer to <i>Chapter 4, Regional Transportation</i>, for additional information on Massport's cooperation on regional transportation efforts.</p> <p>Implemented. The Authority exercised operational control over Worcester Regional Airport as part of Massport's agreement with the City of Worcester which went into effect on January 15, 2000. In April 2004, Massport and the City of Worcester agreed to a three-year extension of the Operating Agreement, extending Massport's operation of the Airport through June 2007. Subsequently, both parties agreed to a further extension. Legislation was passed in 2009 requiring Massport to assume ownership of Worcester Regional Airport. Massport's ownership of Worcester Regional Airport commenced on July 1, 2010.</p>

Table 9-5 Logan Airside Improvements Planning Project (EOEA #10458) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2014) (Continued)	
Mitigation Measure	Status
<p><i>Massport will continue to attract new air service to Worcester Regional Airport</i></p>	<p>Implemented. Following the events of September 11, 2001, the last commercial operator, US Airways Express, ceased operations out of Worcester in early 2003. In 2003 and 2004, Massport continued to work with the City to attract passenger service for the Worcester Regional Airport. Service by Allegiant Airways commenced in December 2005 but ceased in September 2006. Commercial passenger service was regained when Direct Air began scheduled charter services in November 2008, but commercial passenger services ceased again in 2012. Massport continues to work with carriers and make other facility improvements to develop and sustain commercial service from Worcester. In 2013, JetBlue Airways began commercial service to two Florida locations from Worcester Regional Airport; as of this filing, over 200,000 passengers have been served.</p>
<p><i>Traveler and air service awareness will be provided to Worcester Regional Airport via marketing campaigns.</i></p>	<p>Implemented. Massport continues to aggressively market the Airport to potential commercial air service carriers. Massport worked with JetBlue Airways to begin service out of Worcester Regional Airport in November 2013.</p>
<p><i>Develop and maintain an aviation information database to include: aviation trend tracking reports for distribution to interested parties; statistical summaries of passenger levels, aircraft operations and airline schedule data at major New England regional airports; include a summary of regional airport trends and service developments an Annual Report.</i></p>	<p>Implemented. Massport collects regional airport data. A summary of individual airport activity is published annually in the Environmental Data Reports (EDR), and in the Environmental Status and Planning Reports (ESPR).</p>
<p><i>Participate in other regional/state aviation forums.</i></p>	<p>Implemented. The NERASP study was completed in the fall of 2006. Massport continues to participate in regional and state aviation forums as they exist. Please refer to <i>Chapter 4, Regional Transportation</i>, for additional information on Massport's cooperation on regional transportation efforts.</p>
<p><i>Continue to work with FAA/regional airport directors to complete a New England Airports System Study to evaluate regional airports performance. FAA committed to work with other participants in the preparation of the study.</i></p>	<p>Implemented. The NERASP Study was published in October 2006.</p>
<p><i>Encourage transportation initiatives (i.e., commuter rail, rail or other links between regional airports) by relevant agencies or other governmental bodies through Transportation Bond Bill or other legislative initiatives to implement an improved effective regional transportation system.</i></p>	<p>Implemented. Massport continues to provide support for regional transportation legislation and funding for other modes of transportation including the MBTA Silver Line and water transportation. Massport's support was instrumental in the opening of the Anderson Regional Transportation Center (RTC) in Woburn which provides a station building for ticketing, baggage and passenger services, approximately 2,400 parking spaces for daily and overnight parking, loading platforms for Logan Express and local buses, improved access from Interstate 93 via a new interchange constructed and opened by the Massachusetts Department of Transportation (MassDOT, formerly the Massachusetts Highway Department) and a new high-level platform commuter rail station.</p>

Table 9-5 Logan Airside Improvements Planning Project (EOEA #10458) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2014) (Continued)	
Mitigation Measure	Status
<p><i>Continue to support inter-city rail planning through the Boston Metropolitan Planning Organization (MPO).</i></p> <p><i>Allow Massport’s Logan Express satellite parking lots and stations available for third-party bus and park-and-ride connections to other regional airports, including Worcester, Manchester, and Providence.</i></p>	<p>Implemented. Massport continues to actively participate in the Boston MPO and contributes to the policy discussions in all modes of transportation.</p> <p>Implemented. Upon request and review, Massport will continue to allow third party bus operators to provide service to regional airports from Logan Express facilities. In 2007, Massport enacted an agreement with Manchester-Boston Regional Airport to allow operation of a shuttle service between Manchester- Boston Regional Airport and the RTC in Woburn. That pilot program was replaced by hourly van service in 2008.</p>
Sound Insulation	
<p><i>Sound insulation is being provided within the Boston Logan Airside Improvements Planning Project Mitigation Contour including the affected residences of Chelsea, East Boston, Winthrop, and Revere. Through special project mitigations, FAA funding will be provided for residences with building code considerations to allow for the necessary upgrades thereby ensuring eligibility and participation in the sound insulation program. If FAA funding is unavailable to complete sound insulation to residences within the DNL 65 dB contour as a result of project implementation, Massport will provide the funding.* See Chapter 6, Noise Abatement for additional details on Sound Insulation.</i></p>	<p>Implemented. Sound insulation is being implemented in full compliance with state and federal regulatory requirements and mitigation commitments. Since 1986, Massport has sound insulated nearly 6,000 residential buildings totaling over 11,515 dwelling units.</p>
Preferential Runway Advisory System (PRAS)	
<p><i>Massport will develop and implement a PRAS monitoring system and a new distribution system for reporting that will expand the contents of Massport’s Quarterly Noise Reports and will involve the expansion of the distribution list to include the Logan Airport Citizens Advisory Committee (CAC). Runway utilization, dwell, and persistence reports will be included in the ESPR filings with MEPA. Massport will continue to work with FAA to design additional reports to enhance the attainment of PRAS and Massport will begin to work with CAC to update PRAS. The current PRAS system will remain in place until superseded.</i></p>	<p>Implemented. Massport, FAA, and the CAC initiated a noise study of Logan Airport. PRAS review and reporting are incorporated into the noise study. During Phase 2 of the on-going Boston Logan Airport Noise Study (BLANS) the Logan Airport Community Advisory Committee (CAC) voted to abandon PRAS because it had not achieved the intended noise abatement. For additional information, refer to <i>Chapter 6, Noise Abatement</i>. Runway utilization, dwell and persistence reports continue to be included in the annual ESPR and EDR filings.</p>
Noise Abatement Study	
<p><i>FAA has committed to undertake a noise abatement study that will include enhancing existing or developing new noise abatement measures applicable to aircraft overflight impacts, which will take into account environmental benefit, operational impact, aviation safety and efficiency, and consistency with applicable legal requirements. The scope of this study has been completed through the joint efforts of FAA, the CAC, and Massport as required by the ROD. Massport will work with the CAC and FAA to assess the existing PRAS at Logan Airport in accordance with Section 10.0 of the Section 61 Findings and will continue to participate in the noise study as contemplated in the ROD.</i></p>	<p>Implemented. The FAA, in conjunction with Massport and the Logan Airport CAC, initiated the Boston Overflight Noise Study (BONS). Phase 1 of the study, completed in early 2007, defined and will seek to implement changes to flight tracks to minimize impacts from aircraft overflights which do not require a detailed Environmental Assessment (EA). Federal funding for Phase 2 was requested early to ensure seamless continuation of the study and transition. Phase 2, of the Boston Logan Airport Noise Study (BLANS), was completed in 2012. It addressed additional noise abatement alternatives that will require detailed analysis to meet FAA environmental requirements. FAA has begun implementing new aRea NAVigation (RNAV) procedures that were designed in Phase 1. Please refer to website www.bostonoverflight.com for more details.</p>

Table 9-5 Logan Airside Improvements Planning Project (EOEA #10458) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2014) (Continued)	
Mitigation Measure	Status
<p>Peak Period Monitoring and Demand Management Program (DMP) <i>Massport will develop and implement a Peak Period Pricing (PPP) program or an alternative DMP. Massport will identify standards to allow airlines to accurately predict scheduling costs and modify accordingly. Massport will establish and maintain a monitoring system.</i></p> <p><i>Massport will comply with its commitments with respect to PPP or alternate DMP. FAA has indicated in the ROD that it stands ready to assist Massport in this endeavor.</i></p>	<p>Implemented. In July 2004, Massport filed a proposed rule with the Office of the Massachusetts Secretary of State to formally initiate the state rulemaking process and public review of a proposed rule to establish a peak period surcharge during designated peak delay periods at Logan Airport. The filing was followed by a public comment period that lasted through November 15, 2004. During the comment period, Massport conducted two public hearings to receive comments on the proposed regulation. The Massport Board voted to establish the peak period surcharge program on January 16, 2005. The program has been in place since that date. Please refer to <i>Appendix K, 2014 Peak Period Pricing Monitoring Report.</i></p>
<p>Single Engine Taxi Procedures <i>Develop and implement a program designed to maximize the use of single engine procedures by all tenant airlines, consistent with safety requirements, pilot judgment and Federal law requirements.</i></p>	<p>Implemented. Massport supports the use of single engine taxiing when it can be done safely, voluntarily and at the discretion of the pilot. Massport has conducted two surveys of Logan Airport air carriers (2006 and 2009) to understand the extent single engine taxiing is used at Logan Airport. Massport also issued a letters to air carriers in support of single engine taxiing when consistent with safety procedures. Massport is an active member of the FAA Partnership for Air Transportation Noise and Emissions Reduction (PARTNER) program on reducing noise and emissions. In 2009, Massport offered to facilitate the undertaking by MIT of a more detailed survey of pilots at Boston Logan Airport to better understand the use of single engine taxiing. MIT completed its survey and issued a paper in March 2010 (as provided in <i>Appendix L, Demonstration of Reduced Airport Congestion through Pushback Rate Control of the 2011 ESPR</i>). The MIT survey confirms earlier Massport survey findings that single engine taxiing is an important operational measure used by airlines to conserve fuel and is extensively used at Logan Airport. In 2014, Massport issued letters to air carriers in support of single engine taxiing when consistent with safety procedures. A copy of these letters is included in <i>Appendix L, Reduced/Single Engine Taxiing at Logan Airport Memoranda of this 2014 EDR.</i></p>
<p>Report on Progress of Logan Transportation Management Association (TMA)</p>	<p>Implemented. <i>Chapter 5, Ground Access to and from Logan Airport of the 2011 ESPR</i> discusses the status of the Logan TMA and efforts to increase Logan TMA membership and overall high occupancy vehicle (HOV) access to Logan Airport. Since MassRIDES began management of the Logan TMA in January 2006, the joint focus has been on expanding Logan TMA services, broadening HOV options, and supporting all major Logan Airport tenants to become members and actively participate in the Logan TMA. In 2007, the Logan TMA implemented three new programs: Sunrise Shuttles; Logan TMA Preferential Carpooling; and Commuter Cash program.</p>

Source: Massport

Note: The mitigation measures in italics are those that were referenced in the FAA's ROD and later incorporated into the October 21, 2004 amended Section 61 Findings.

Southwest Service Area (SWSA) Redevelopment Program, EOE # 14137

Permitting History

- Certificate on the Final EIR issued on May 28, 2010
- Section 61 Findings submitted to EEA on June 29, 2010

Project Status

Massport is redeveloping the SWSA and has completed the new RCC. In addition to customer service benefits, consolidation of the rental car operations and their shuttle buses into one coordinated operation will result in reduced vehicle miles traveled (VMT) and associated air emissions. See *Chapter 5, Ground Access to and from Logan Airport*, for additional information on VMT reductions.

Construction of enabling projects commenced in late summer 2010 as final design of the facility continued through 2011. All RCC facilities (the Garage Structure, Customer Service Center (CSC), permanent Quick Turnaround Areas (QTAs) 1 and 2, and temporary QTAs 3 and 4) would be constructed first. The first rental car companies moved into the QTA 1 in mid-2013 and the remaining companies by early 2014. By the end of 2015, the entire project will be completed and operational. Table 9-6 outlines the SWSA Redevelopment Program Section 61 commitments which Massport, the construction contractors, and the rental car companies will implement as part of the design, construction and operation of the facility. This project is now complete and there is updated progress for each mitigation measure.

Table 9-6 Southwest Service Area (SWSA) Redevelopment Program (EEA # 14137) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2014)	
Mitigation Measure	Status
Site Design	
Stormwater Management	
<p><i>Improve quality of runoff by upgrading stormwater management facilities site-wide, reducing the volume of flow to the Maverick Street Outfall by increasing pervious area site-wide, utilization of Low Impact Design elements, and replacing uncovered parking areas with buildings.</i></p>	<p>Implemented. These stormwater design features were included in the final project design and are part of the project. The stormwater features include 27 stormceptors that were constructed as part of this project. Stormceptors are prefabricated, underground units that separate oils, grease, and sediment from stormwater runoff when installed as part of a pipe conveyance system.</p>
<p><i>Design new sanitary and drainage systems to result in an overall reduction in combined sewer overflow volumes at the Porter Street Outfall and eliminate discharge to Maverick Street Outfall and Bird Island Flats/West Outfall.</i></p>	<p>Implemented. The sanitary sewer system designed for the RCC project adds new connections at Gove Street and Harborside Drive. Sanitary flows to the Maverick Street sewer will be significantly reduced once the connection is completed. Massport submitted a pre- and post-development stormwater analysis with the Notice of Intent (NOI) for the RCC project, as required by the Massachusetts Department of Environmental Protection's (MassDEP's) Stormwater Management Regulations. The stormwater analysis shows an overall reduction in the post- development stormwater flows for the project, as well as reductions in flows to the Porter Street and West Outfalls and elimination of stormwater flow to the Maverick Street Combined Sewer. Both the sanitary sewer system and stormwater drainage system are completed.</p>
Remediation and Underground Fuel Storage Systems	
<p><i>Remove all existing car rental fueling systems and associated tanks and replace with current, state-of-the-art vehicle fueling and washing facilities.</i></p>	<p>Implemented. This element has been implemented as part of the quick turnaround facilities.</p>
<p><i>Develop a Soil Management Plan and submit to the MassDEP prior to construction for the Activity and Use Limitations (AUL) areas.</i></p>	<p>Implemented. As required by the RCC project specifications, the Project Contractor submitted an Excavated Materials Management & Disposal Plan prepared by a Licensed Site Professional (LSP) and submitted it on March 25, 2011 for Massport review and approval. Two Release Abatement Measure (RAM) Plans for work within AUL areas were submitted by the Contractor's LSP to MassDEP in accordance with the Massachusetts Contingency Plan (MCP). Construction occurred within two AUL areas, associated with MCP sites identified by Release Tracking Number (RTNs) 3-00956 and 3-2690, and submittal of the RAM Plans were required to detail procedures for managing contaminated soil. RAM Status Reports have been submitted on a 6-month schedule documenting soil management activities, and electronic files of these reports can be accessed by searching the RTNs on the MassDEP website.</p>

**Table 9-6 Southwest Service Area (SWSA) Redevelopment Program (EEA # 14137)
Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2014) (Continued)**

Mitigation Measure	Status
Noise Reduction Measures	
<p><i>Eliminate individual rental car shuttle buses and combine Massport Airport Station buses (routes 22/33/55) through the Unified Bus System; thereby, reducing the overall number of rental car-related buses circulating on-airport and associated noise.</i></p>	<p>Implemented. Massport purchased a new Bus Fleet which was put into operation in 2012. The bus fleet is comprising 18 compressed natural gas (CNG) buses and 32 clean diesel/electric buses that have already replaced Massport's older fleet of 26 CNG buses and have replaced the entire fleet of diesel rental car shuttle buses with the RCC opening in 2013. Four additional CNG buses were put into service in September 2015, bringing the total to 22 buses.</p>
<p><i>Incorporate noise reduction strategies into site design, such as solid fences/walls, gateway signs/walls, and landscaped berms.</i></p>	<p>Implemented. This element was completed.</p>
Phase 2 SWSA Airport Edge Buffer and Other Site Landscaping	
<p><i>Construct other site landscaping that encourages walking/biking by providing safe and welcoming corridors, reduces environmental impact (water efficient; reduce and filter runoff), and screens the SWSA from neighboring properties.</i></p>	<p>Implemented. This element is included in the final design and will be part of the completed project, which is under construction and set to be completed by the end of 2015.</p>
Building Design	
Energy Efficiency	
<p><i>Optimize daylight and natural ventilation within the Garage Structure (a Code classification for an "open parking structure") to eliminate the need for substantial mechanical ventilation systems.</i></p>	<p>Implemented. This element is included in the completed project.</p>
<p><i>Reduce energy consumption by a minimum of 20 percent (as required by MA LEED Plus) by properly sizing building mechanical systems and incorporating high performance/energy efficient mechanical and electrical building systems, such as highly-reflective (high-albedo) roofing materials, reduced lighting intensities, high-efficient heating and cooling systems, and daylighting techniques with window and skylight glazing.</i></p>	<p>Implemented. This element is included in the completed project.</p>
<p><i>Reduce overall electricity consumption by 2.5 percent through the use of on-site renewable energy (which contributes to the overall 20 percent energy efficiency performance criteria above).</i></p>	<p>Implemented. This element is included in the completed project.</p>
<p><i>Conduct a third-party commissioning process to ensure the effectiveness of building systems (as required by MA LEED Plus).</i></p>	<p>Implemented. Third party commissioning is planned upon building completion.</p>

Table 9-6 Southwest Service Area (SWSA) Redevelopment Program (EEA # 14137) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2014) (Continued)	
Mitigation Measure	Status
Water Efficiency and Wastewater Reduction	
<i>Reduce water use demand by a minimum of 20 percent (as required by MA LEED Plus) and to strive for a 30 percent reduction through utilization of high-efficiency/ low-flow plumbing fixtures and car wash water reclamation systems.</i>	Implemented. This element is included in the completed project.
<i>Reduce water use demand and wastewater generation by reclaiming and reusing car washing water.</i>	Implemented. This element is included in the completed project.
<i>Potential collection of and reuse of stormwater runoff for irrigation of landscaped areas.</i>	Not implemented. This element is was considered as part of the final design. A rain garden was not included in the final design as a method to control stormwater runoff due to financial and environmental challenges.
Noise Reduction Measures	
<i>Improve the Quick Turnaround Areas (QTAs), including the elimination of outdoor loudspeakers, elimination of car drying blowers through state-of-the-art equipment, enclosed vacuum compressors, and incorporation of six to eight-foot high solid walls/fences designed to further reduce noise from activities at the QTA facilities, including car washing and vehicle movements.</i>	To be implemented. This element is included in the completed project.
Transportation and Parking	
Roadway Improvements	
<i>Reconstruct Porter Street, including turnaround for exiting taxis.</i>	To be implemented. This element is included in the completed project.
<i>Reconfigure SR-14 and new alignment of Ramp 1A-S.</i>	Implemented. This element is included in the final design and the completed project.
<i>Construct new dedicated Unified Bus System access and ramp off of SR-14.</i>	Implemented. This element is completed.
<i>Reconstruct traffic signals and pedestrian accommodations at the Harborside Drive/Porter Street intersection.</i>	Implemented. This element is included in the final design and the completed project.
<i>Reconstruct, widen and convert Jeffries Street to one-way northbound, between Harborside Drive and Tomahawk Drive.</i>	Implemented. This reconfiguration is complete.
<i>Reconstruct traffic signals and pedestrian accommodations at the Harborside Drive/Jeffries Street intersection.</i>	Implemented. This element is completed.
<i>Construct the extension of Tomahawk Drive –a one-way westbound roadway connecting Harborside Drive with the Maverick Street Gate and Garage Structure.</i>	Implemented. This element is completed.

Table 9-6 Southwest Service Area (SWSA) Redevelopment Program (EEA # 14137) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2014) (Continued)	
Mitigation Measure	Status
<i>Reconstruct traffic signals and pedestrian accommodations at the Harborside Drive/Hotel Drive intersection.</i>	Implemented. This element is completed.
<i>Reconfigure inbound lane of the Maverick Street Gate to provide additional queue storage.</i>	Implemented. This element is completed.
Airport Transportation System Improvements	
<i>Reduce the rental car shuttle bus fleet by approximately 70 percent through the creation of the Unified Bus System when compared to the 2007 Existing Condition and future No-Build/No-Action Conditions.</i>	Implemented. Massport purchased a new Unified Bus Fleet of diesel/electric hybrid and CNG buses. The initial buses were put into operation in 2012. Full implementation of the new bus fleet occurred when the RCC opened in the fall of 2013.
<i>Reduce rental car shuttle bus terminal curbside congestion through the creation of the Unified Bus System resulting in reduced emissions.</i>	Implemented upon project opening. Massport purchased a new Unified Bus Fleet which was put into initial operation in 2012.
<i>Utilize clean- and low-emission fuel for the Unified Bus System to further reduce emissions.</i>	Implemented upon project opening. Massport has purchased a new Unified Bus Fleet. The new fleet is comprised of diesel/electric hybrid and CNG buses.
<i>Install Intelligent Transportation System features, as part of the Unified Bus System to further reduce emissions and improve operational efficiency.</i>	Implemented upon project opening. Massport purchased a new Unified Bus Fleet which was put into initial operation in 2012.
<i>Implement new wayfinding signage to increase the efficiency of the circulating vehicles within and around the SWSA.</i>	Implemented upon project opening.
Pedestrian and Bicycle Facilities	
<i>Provide new pedestrian and bicycle facilities, including secure and covered bicycle storage at the Customer Service Center (CSC) and QTA buildings for employees, customers and the general public, as well as shower/changing facilities within the QTA buildings for employees.</i>	To be implemented. This element is completed.
<i>Provide enhanced pedestrian connections to and from the SWSA, airport terminals, the Logan Office Center, Memorial Stadium Park, Bremen Street Park, the Harborwalk, on-airport buses, public transit (MBTA Airport Station), along Porter Street, and surrounding East Boston neighborhoods.</i>	To be implemented. This element is completed.
<i>Provide street and pedestrian-level lighting and advanced warning signals and/or systems at crosswalks.</i>	To be implemented. This element is completed.
Transportation Demand Management (TDM) Plan <i>Provide limited SWSA employee parking on-site.</i>	Implemented.

Table 9-6 Southwest Service Area (SWSA) Redevelopment Program (EEA # 14137) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2014) (Continued)	
Mitigation Measure	Status
<i>Provide new access to public transit through the Unified Bus System (direct connection to MBTA Blue Line at Airport Station) and new/enhanced pedestrian facilities at the station.</i>	Implemented.
<i>Require rental car companies to participate in the Logan Transportation Management Association (TMA).</i>	Implemented. This requirement is included in new RCC tenant leases.
<p>Alternative-Fuel Vehicles <i>The rental car companies would provide fuel-efficient and/or alternative-fueled rental vehicles (quantity to be determined by the rental car companies).</i></p>	Implemented. This requirement is included in new RCC tenant leases.
<p>Off-Airport Improvements/Benefits <i>Reconstruct Frankfort Street/Lovell Street intersection to provide a new traffic signal control and pedestrian-related improvements (for temporary impacts of the relocation of the Bus and Limousine Pools to the North Service Area (NSA) during construction).</i></p>	Implemented. This element is completed.
<i>Reduce the amount of off-airport car shuttling to and from off-airport locations, further reducing traffic on Route 1A and local roadways surrounding the airport due to the consolidated and expanded rental car “ready/return” parking spaces and QTA areas at the SWSA.</i>	Implemented upon project opening.
<p>Construction Management <i>Aim to divert/reduce construction waste to landfills.</i></p>	Implemented during construction
<i>Implement Erosion and Sedimentation Control Program.</i>	Implemented during construction.
<i>Retrofit certain diesel construction equipment types with diesel oxidation catalyst and/or particulate filters (in accordance with the DEP Clean Air Construction Initiative).</i>	Implemented during construction
<i>Require the use of ultra-low sulfur diesel fuel for off-road construction vehicles and/or equipment.</i>	Implemented during construction
<i>Construction worker vehicle coordination and trip limitation, including requiring contractors to provide off-airport parking and use of high-occupancy vehicle transportation modes for employees.</i>	Implemented during construction
<i>To ensure no changes in the conditions of abutting homes due to pile driving, Massport will require the Contractor to inspect the conditions of the abutting homes prior to and following pile driving activities.</i>	Implemented. Preconstruction residential survey completed.

Source: Massport

Logan Airport RSA Project - EEA #14442

Permitting History

- Certificate on the Final EA/EIR issued on March 18, 2011.
- The FAA issued a Finding of No Significant Impact (FONSI) on April 4, 2011, which documents that the proposed Federal action is consistent with the National Environmental Policy Act of 1969 (NEPA) and other applicable environmental requirements and will not significantly affect the quality of the human environment with the mitigation requirements referenced in Table 9-7.
- Section 61 Findings were submitted to EEA on May 27, 2011, and published in the *Environmental Monitor* on June 8, 2011.
- Certificate on the Notice of Project Change (NPC) for the replacement of the Runway 33L approach light pier issued on March 9, 2012.
- On April 12, 2012 the FAA found that the replacement of the Runway 33L approach light pier was a Categorical Exclusion and thus exempt from further consideration under NEPA.

Project Status

- The first construction season for the Runway 33L RSA commenced in June 2011 and ended in November 2011. The second construction season started in June 2012 and the project was completed in November 2012.
- Replacement of the Runway 33L approach light pier commenced in July 2012 and was completed in November 2012. The upgraded CAT III system was put in service in 2013.
- The Runway 22R improvements were completed in 2014.

As described in previous EDRs/ESPRs, Massport has periodically undertaken RSA improvement projects at other Logan Airport runways. Massport has completed safety improvements for Runways 22L, 4L/4R, and 27 under EEA #5122. In 2005, Massport began undertaking safety improvements at Runway 22R with the construction of an Engineered Materials Arresting System (EMAS) bed at the end of the runway in compliance with FAA directives, although no MEPA review was needed. In 2006, as part of a separate project, Massport installed an EMAS bed at the Runway 33L End. The current project, the Logan Airport RSA Project, considered further enhancements to the Runway 33L and Runway 22R RSAs. Massport prepared a combined EA in accordance with NEPA and an EIR in accordance with MEPA for the proposed enhancements at the Runway 33L and Runway 22R RSAs. The ENF was filed with MEPA on June 30, 2009, and the Draft EA/EIR was submitted to FAA and EEA on July 15, 2010. The Final EA/EIR was submitted to FAA and EEA on January 30, 2011. Figure 9-5 indicates the status of RSA projects at Logan Airport.

The Runway 33L RSA improvements include a 600-foot long RSA with an EMAS bed, portions of which are on a 460-foot long by 303-foot wide pile-supported deck extending over Boston Harbor. Additional elements of the RSA improvements include two emergency access ramps located on either side of the deck and relocation of the perimeter access road. Construction of the pile-supported deck was completed in November, 2012.

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The current Runway 33L RSA project replaced the inner 500 feet of the light pier. As construction progressed on the Runway 33L RSA improvements, Massport determined that it would be feasible to replace the remaining Runway 33L approach light pier. In summer of 2012, Massport began replacing the outer approximately 1,900 feet of the existing timber light pier that extends approximately 2,400 feet southeast of Runway End 33L. The existing timber pier was replaced with a new concrete structure along the runway centerline, approximately 10 feet south of the old pier, using concrete pilings. The in-kind replacement reduced the total number of pilings significantly (from over 500 to approximately 150). As part of the reconstruction, the new light pier was also constructed to accommodate upgraded navigational aids. The pier improvements provide the infrastructure necessary to support navigational aids that facilitated implementation of the reduced aircraft approach minimums previously reviewed and approved by the FAA in a ROD dated August 2, 2002, for the *Logan Airside Improvements Planning Project (Airside Project)*. Massport filed a NPC with MEPA for the proposed light pier replacement on January 31, 2012. On March 9, 2012, the EEA Secretary issued an NPC Certificate determining that no further MEPA review was required for the light pier replacement. On April 12, 2012 the FAA found that the replacement of the Runway 33L approach light pier was eligible for a Categorical Exclusion and thus exempt from further review under NEPA.

The Runway 22R improvements that were completed in 2014 enhanced the existing RSA at this location by constructing an inclined safety area (ISA), similar to the ISA constructed at the Runway 22L end. Construction of the Runway 22R ISA is completed. Table 9-7 lists the Section 61 commitments for the Logan Airport RSA Project and Massport's progress in achieving these measures.

Figure 9-5 Runway End Safety Improvements



Table 9-7 Logan Airport Runway Safety Area Improvement Program (EEA # 14442) Section 61 Mitigation Commitments to be Implemented (as of December 31, 2014)	
Mitigation Measure	Status
Protected Resources	
<i>Eelgrass</i>	
Develop a mitigation program that will replace lost eelgrass area and functions by creation of new eelgrass, at a 3:1 replacement to loss ratio.	Implemented. Eelgrass was transplanted in 2011, but did not survive through 2012. In 2012, Massport continued to work with the Eelgrass Mitigation Working Group (comprised of federal, state, and local agencies) through 2013 to identify alternative means of eelgrass mitigation. In 2013, state and federal agencies agreed that Massport's implementation of a conservation mooring program would be a suitable replacement alternative to the initial eelgrass transplantation. In 2015, Massport completed replacement of nearly 240 traditional moorings in eelgrass with conservation moorings in Boston and four other Commonwealth harbors.
Implement sediment control measures during construction.	Implemented. Sedimentation control measures were installed and fully maintained.
Store construction barges outside of any eelgrass beds overnight during construction.	Implemented. There was no overnight barge storage in or immediately adjacent to eelgrass beds.
Restrict barge movement to designated construction corridors outside of the eelgrass bed during construction.	Implemented. There was limited barge movement in or immediately adjacent to eelgrass beds.
Provide post-construction monitoring and restoration or any additional areas of eelgrass beds that are inadvertently damaged during construction.	Implemented. The post-construction monitoring was conducted in November, 2012.
<i>Salt Marsh</i>	
Restore new salt marsh at a 2:1 replacement to loss ratio.	Implemented as part of Runway 22R habitat mitigation at Rumney Marsh.
Monitor compensatory salt marsh for success and invasive plant species, and implement an invasive species control plan.	To be implemented as part of Runway 22R habitat mitigation at Rumney Marsh.
Implement erosion and sedimentation control measures according to the Soil Erosion and Sediment Control Plan.	Implemented during construction.
<i>Shellfish</i>	
Monitor pilings and substrate at Runway 33L.	Implemented. Monitoring conducted summer 2013, 2014, and 2015.
Restore approximately 1.1 acres of habitat.	Implemented as part of Runway 22R habitat mitigation at Rumney Marsh.
Harvest and transplant shellfish from the footprint of the Runway 22R Inclined Safety Area (ISA).	The MA Division of Marine Fisheries (MassDMF) has identified a risk of shellfish disease in the Logan Airport flats, including 22R and has determined that the shellfish should not be relocated.
Execute Memorandum of Agreement with the Massachusetts Division of Marine Fisheries for resource enhancement.	Implemented. A Memorandum of Agreement (MOA) with MassDMF was executed on July 30, 2012 and the requirements of the MOA have been implemented.

Table 9-7 Logan Airport Runway Safety Area Improvement Program (EEA # 14442) Section 61 Mitigation Commitments to be Implemented (as of December 31, 2014) (Continued)	
Mitigation Measure	Status
<p><i>State-Listed Rare Species</i></p> <p>Identify equivalent area of pavement for removal to maintain area of available habitat at Logan Airport for the upland sandpiper if required by the Massachusetts Natural Heritage and Endangered Species Program.</p>	<p>To be implemented. The Massachusetts Natural Heritage & Endangered Species Program (NHESP) has determined that construction time of year restrictions will avoid impacts to state-listed species. These seasonal restrictions will be implemented when construction of Taxiway C-1 is initiated in the future.</p>
<p><i>Cultural Resources</i></p> <p>Develop an Unanticipated Discovery Plan in accordance with the Board of Underwater Archaeological Resources' Policy Guidance</p>	<p>Implemented. An Unanticipated Discovery Plan was developed in accordance with the Board of Underwater Archaeological (BUA) Resources' Policy Guidance and approved by BUA. No resources were discovered during Runway 33L construction.</p>
<p><i>Water Quality</i></p> <p>Develop and implement a comprehensive Soil Erosion and Sediment Control Plan in accordance with NPDES and MassDEP standards.</p>	<p>Implemented. A comprehensive Soil Erosion and Sediment Control Plan was developed and implemented at the outset of Runway 33L construction in June 2011 and maintained through the end of construction in 2012.</p>
<p>Apply water to dry soil to prevent dust production.</p> <p>Stabilize any highly erosive soils with erosion control blankets and other stabilization methods, as necessary.</p>	<p>Implemented. Completed for Runway 33L and 22R construction.</p> <p>Implemented. Completed for Runway 33L and 22R construction.</p>
<p>Use sediment control methods (such as silt fences and hay bales) during excavation to prevent silt and sediment entering the stormwater system and waterways.</p>	<p>Implemented. Completed for Runway 33L and 22R construction.</p>
<p>Maintain equipment to prevent oil and fuel leaks.</p>	<p>Implemented. Completed for Runway 33L and 22R construction.</p>
<p>Use silt curtains and semi-permanent (overnight) debris booms and other secondary booms and silt fencing around barges for additional containment.</p>	<p>Implemented. Completed for Runway 33L and 22R construction.</p>
<p>Contain and pump slurry and/or silty water to a containment area on a construction barge to contain runoff</p>	<p>Implemented. Completed for Runway 33L and 22R construction.</p>
<p><i>Noise</i></p> <p>Maintain mufflers on construction equipment.</p>	<p>Implemented. Completed for Runway 33L and 22R construction.</p>
<p>Keep truck idling to a minimum in accordance with Massachusetts anti-idling regulations.</p>	<p>Implemented. Completed for Runway 33L and 22R construction.</p>
<p>Fit any air-powered equipment with pneumatic exhaust silencers.</p> <p>Do not allow nighttime construction.</p>	<p>Implemented. Completed for Runway 33L and 22R construction.</p> <p>Implemented. Completed for Runway 33L and 22R construction.</p>
<p><i>Air Quality</i></p> <p>Keep truck idling to a minimum in accordance with Massachusetts anti-idling regulations.</p>	<p>Implemented. Completed for Runway 33L and 22R construction.</p>
<p>Retrofit appropriate diesel construction equipment with diesel oxidation catalyst and/or particulate filters.</p>	<p>Implemented. Completed for Runway 33L and 22R construction.</p>

Table 9-7 Logan Airport Runway Safety Area Improvement Program (EEA # 14442) Section 61 Mitigation Commitments to be Implemented (as of December 31, 2014) (Continued)	
Mitigation Measure	Status
Implement construction worker vehicle trip management, including requiring contractors to provide off-airport parking, use high-occupancy vehicle transportation modes for employees, and join the Logan TMA.	Implemented. Completed for Runway 33L and 22R construction. Contractors assemble offsite and access the airfield in shared vans. Contractors have access to Logan Airport Transportation Management Association (TMA) services through MassRIDES.
<i>Traffic</i> Limit construction traffic to federal or state highways, restricting the use of East Boston local roadways by construction vehicles.	Implemented. Completed for Runway 33L and 22R construction.
Implement construction worker vehicle trip management, including requiring contractors to provide off-airport parking, use high-occupancy vehicle transportation modes for employees, and join the Logan TMA.	Implemented. Completed for Runway 33L and 22R construction. Contractors assemble offsite and access the airfield in shared vans. Contractors have access to Logan TMA services through MassRIDES.

MEPA Appendices

- Appendix A – MEPA Certificates and Responses to Comments on the *2012/2013 Environmental Data Report*
- Appendix B – Comment Letters and Responses
- Appendix C – Proposed Scope for the *2015 EDR*
- Appendix D – Distribution List

2014 EDR
Boston-Logan International Airport

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MEPA Certificates and Responses to Comments

- Secretary of the Executive Office of Energy and Environmental Affairs Certificates on the *Logan Airport 2012/2013 Environmental Data Report (EDR)* and Massport's Responses to Comments raised in the Certificate.
- Copies of Secretary of the Executive Office of Energy and Environmental Affairs Certificates issued for the reporting years 2004, 2005, 2006, 2007, 2008, 2009, 2010, and 2011.

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Secretary of the Executive Office of Energy
and Environmental Affairs Certificate on
the Logan Airport *2012/2013*
Environmental Data Report and Massport's
Responses to Comments Raised in the
Certificate

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February 6, 2015

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
 ON THE
 2012-2013 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME : 2012-2013 Environmental Data Report
 PROJECT MUNICIPALITY : Boston / Winthrop
 PROJECT WATERSHED : Boston Harbor
 EOEА NUMBER : 3247
 PROJECT PROPONENT : Massachusetts Port Authority
 DATE NOTICED IN MONITOR : December 10, 2014

As Secretary of Executive Office of Energy and Environmental Affairs (EEA), I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (MEPA) (M.G.L. c. 30, ss. 61-62I) and with its implementing regulations (301 CMR 11.00).

Background

The environmental review process for Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become, consistent with the objectives of the MEPA regulations, part of the Massachusetts Port Authority's (Massport) long-range planning process. The ESPR provides a "big picture" analysis of the environmental impacts of current and anticipated levels of activities, and presents an overall strategy to minimize impacts. The ESPR is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments associated with project-specific Environmental

Impact Reports (EIR). The ESPR is generally updated on a five-year basis; the most recent ESPR for the year 2011 was filed in April of 2013. Environmental Data Reports (EDRs) (formerly referred to as Annual Updates) are filed in the years between ESPRs. During the review of the 2011 ESPR, Massport requested that the 2012 and 2013 EDRs be combined into one document. The 2012-2013 EDR is the subject of this review. Additionally, this Certificate contains a Scope for the 2014 EDR.

The 2012-2013 EDR provides a comprehensive, cumulative analysis of the effects of all Logan Airport activities based on actual and predicted passenger activity and aircraft operation levels in 2012 and 2013, and presents environmental management plans for addressing areas of concern. The technical studies in the 2012-2013 EDR include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality and environmental management. The 2012-2013 EDR updates and compares the data presented in the 2011 ESPR, and presents activity levels (including aircraft operations and passenger activity) and environmental conditions at Logan Airport for the calendar years 2012 and 2013. It also reports on the status of project mitigation.

Passenger levels at Logan Airport reached a new peak in 2013, exceeding the 2007 historic peak, while aircraft operations at Logan Airport remained well below the historic peak reached in 1998. The 2012-2013 EDR examines the effects of airlines operating much more efficiently with quieter fleets and flying more passengers per aircraft operation. As discussed in the 2011 ESPR, the 2012-2013 EDR anticipates further increases in activity levels and some increases in environmental impacts compared to recent years.

Scope for the 2014 EDR

General

The 2014 EDR should follow the general format of the 2012-2013 EDR status report. The 2014 EDR should include an Executive Summary and Introduction, similar to previous ESPRs and EDRs. Massport must provide background information on the environmental policies and planning that form the context of the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport to provide context for reviewing agencies and the public.

A1

The 2014 EDR should provide an update on conditions at Logan Airport for calendar year 2014, including passenger and aircraft operation activity levels. It should continue to serve as a background/context against which projects at Logan Airport can be evaluated. It should also report on the cumulative effects of Logan Airport operations and activities, compared to previous years, as appropriate. It should provide a status report on Massport's proposed planning initiatives, projects, and mitigation measures.

A2

The technical studies in the 2014 EDR should include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. The 2014 EDR must also

A3

respond to those issues explicitly noted in this Certificate and the comments received on the 2012-2013 EDR.

A distribution list for the 2014 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2004 Logan ESPR (issued on August 16, 2006) to provide context for reviewers. Supporting technical appendices should be provided as necessary.

A4

Response to Comments

The 2014 EDR Responses to Comments section should address all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments chapter included in the 2012-2013 EDR is well-constructed and cross-referenced. I encourage Massport to use the same format in the 2014 EDR.

A5

The majority of comments received on the 2012-2013 EDR focus on noise related issues, including measurement of noise, modeling of noise contours, and noise abatement, and emission reduction issues. In addition to responding to these comments, the 2014 EDR should continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commenters where appropriate.

A6

Activity Levels

The Activity Levels chapter provides a solid analysis of major activity issues and the technical appendix contains useful and detailed information. This chapter presents aviation activity statistics for Logan Airport in 2012 and 2013. Logan Airport is New England's primary domestic and international airport, operating as an origin-destination airport, rather than a connecting hub for major airlines. In 2012, Logan Airport was the 23rd busiest commercial aviation facility in North America ranked by aircraft operations, and the 20th busiest in North America ranked by number of passengers. In 2013, Logan Airport was the 21st busiest commercial aviation facility in North America ranked by aircraft operations, and remained the 20th busiest in North America ranked by number of passengers.

The total number of air passengers at Logan Airport increased by 1.1 percent to 29.2 million in 2012 and by 3.4 percent to 30.2 million in 2013, compared to 28.9 million in 2011. The 2013 passenger level represents a new record high for Logan Airport. At the same time, the total number of aircraft operations fell from approximately 368,987 in 2011 to 354,869 in 2012, a decrease of 3.8 percent. In 2013, aircraft operations increased by 1.8 percent to 361,339. Despite the increase in airport operations from 2012 to 2013, aircraft operations at Logan Airport remained well below the 487,996 operations accommodated in 2000 and the historic peak of 507,449 operations reached in 1998. Passenger aircraft operations, which accounted for 91 percent of total aircraft operations, increased by 2.4 percent in 2013 after decreasing by 3.9 percent in 2012, compared to 2011 levels.

General aviation (GA) operations which is defined as aviation activity other than commercial airline activity, accounted for seven percent of total operations in 2013. GA decreased by 0.4 percent in 2012 and decreased by 5.1 percent in 2013. The 26,682 GA operations in 2013 remain below the 35,233 GA operations that Logan Airport handled in 2000.

Airline efficiency continued to increase as the average total number of passengers per aircraft operation increased from 78.3 percent in 2011 to 82.4 percent in 2012 and 83.6 percent in 2013. The average number of passengers per aircraft operation in 2012 and 2013 represented approximately 74 percent of average aircraft seat capacity. At Logan Airport, the increasing number of passengers per flight reflects a shift away from smaller aircraft and rising load factors because airlines have reduced or restricted capacity growth after several airline mergers.

Air cargo volumes, including shipments transported in the belly compartments of passenger aircraft, decreased from 562 million pounds in 2011 to 553 million pounds in 2012, a decline of 1.4 percent compared to 2011. Over the same period, all-cargo aircraft operations fell by 16.5 percent to 5,237 million pounds. All-cargo aircraft operations fell at a faster rate than cargo volumes, because all-cargo airlines introduced larger capacity aircraft into service at Logan Airport. In 2013 air cargo volumes increased by 0.8 percent to 558 million pounds and all-cargo operations increased by 3.2 percent to 5,403 million pounds, compared to 2012.

The 2014 EDR should report on airport activity levels and aircraft operations, including:

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport;
- Passenger activity levels;
- Cargo and mail activities;
- Compare 2014 aircraft operations, cargo/mail operations, and passenger activity levels to 2013 activity levels; and
- Report on national aviation trends in 2014 and compare to trends at Logan Airport.

A7

It should also report on Massport's activity level forecasts that will become the basis for the planning and impact sections that follow and for Massport's strategic planning initiatives for the future ESPR. Massport should address comments related to activity levels in the 2014 EDR.

A8

Sustainability at Logan Airport

The 2012-2013 EDR describes Massport's airport wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision.

The 2012-2013 EDR describes Massport's continued efforts including Massport-wide sustainability. In 2013, Massport was awarded a grant by the Federal Aviation Administration (FAA) to prepare a Sustainability Management Plan (SMP) for Logan Airport. The Logan

Airport SMP planning effort began in May 2013, and is expected to be completed in 2015. The 2012-2013 EDR indicates that the Logan Airport SMP is intended to promote and integrate sustainability, formulate a list of priority initiatives, and engage employees and tenants in the process. The 2012-2013 EDR provides an excellent overview of Massport's commitment to incorporate sustainability into all aspects of Massport's activities: Planning and Design; Construction; Operations, Maintenance and Management; and Monitoring of Environmental Performance. It also identifies specific practices to reduce impacts associated with construction and efforts to address energy intensity, percentage of renewable energy, and GHG reductions.

A specific example includes compliance with the Leading by Example Executive Order which requires state agencies to procure 15 percent of their electricity from renewable resources by 2012. The Leading by Example program has influenced Massport's own operations including its offices, heating plants, and garages resulting in Massport receiving the Leading by Example award in 2008. As part of the Leading by Example program, all new construction and major renovations over 20,000 square feet constructed by Commonwealth agencies must meet the Massachusetts LEED Plus green building standard established by the Massachusetts Sustainable Design Roundtable.

I commend Massport for its commitment and expect progress on the SMP will be incorporated into subsequent EDRs and ESPRs. The focus in the 2014 EDR should include reporting on data, identifying goals and priorities for specific Massport and tenant projects at Logan Airport that have undergone MEPA review to include energy efficiency/greenhouse gas reduction, water conservation, and waste management and recycling.

A9

The 2014 EDR should report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have undergone MEPA review, including whether they are under construction or completed. The status of mitigation commitments made in the Section 61 Findings for the following projects should also be reported:

A10

- West Garage/Central Garage (EEA #9790)
- International Gateway (EEA #9791)
- Logan Airside Improvements Planning Project (EEA #10458)
- Terminal A Replacement Project (EEA #12096)
- Southwest Service Area Redevelopment Program/Rental Car Center (EEA #14137)
- Logan Runway Safety Area Improvements Project (EEA #14442)

Planning

The Airport Planning chapter in the 2012-2013 EDR provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2012 and 2013. It also describes future planning, construction, and permitting activities and initiatives. It includes the following Airport Projects:

- Southwest Service Area (SWSA) Redevelopment Program (EEA #14137);
- Logan Airport Runway Safety Area (RSA) Improvements Project at Runway Ends 33L and 22R (EEA #14442);

- Logan Airport Runway 33L Light Pier Replacement Project (EEA #14442);
- Green Bus Depot (EEA #14629);
- Martin A. Coughlin (East Boston-Chelsea) Bypass Project (EEA #14661);
- Renovations and Improvements at Terminal B;
- Terminal B Garage Improvement Project;
- North Service Area Roadway Corridor Project;
- Greenway Connector Project a pedestrian/bicycle path connecting the Bremen Street Park path to the future City of Boston pedestrian/bicycle path; and
- Hangar Upgrade Projects.

At the end of 2013, Massport initiated the Disaster and Infrastructure Resiliency Planning (DIRP) Study for Logan Airport, the Port of Boston, and Massport’s waterfront assets in South and East Boston according to the 2012-2013 EDR. The DIRP Study includes a hazard analysis, modeling projected sea-level rise and storm surge, and projections of temperature and precipitation and anticipated increases in extreme weather events. The study is nearing completion. The 2014 EDR should address the DIRP Study and identify which recommendations Massport will implement in the short term to increase the resiliency of its facilities to the potential effects of climate change.

A11

Massport is in the process of developing a long-term parking management plan for Logan Airport. The Long-Term Parking Management Plan will lay out a multi-part strategy for efficiently managing parking supply, pricing, and operations – both at Logan Airport and at off-Airport locations controlled by Massport – to maximize access for transit and shared-ride vehicles while minimizing both drive-and-park and pick-up/drop-off modes. The 2014 EDR should provide updates on this plan.

A12

The 2014 EDR should also continue to assess planning strategies for improving Logan Airport’s operations and services in a safe, secure, more efficient, and environmentally sensitive manner. As owner and operator of Logan Airport, Massport also must accommodate and guide tenant development. Therefore, the 2014 EDR should also describe the status of planning initiatives for the following areas:

- Roadway Corridor Project;
- Airport Parking;
- Terminal Area;
- Airside Area;
- Service and Cargo Areas; and
- Airport Buffers and Landscaping.

A13

The 2014 EDR should provide a status report on long-range planning activities. This chapter should include the status and effectiveness of the ground access changes, including roadway and parking projects, that will consolidate and direct airport-related traffic to centralized locations and minimize airport-related traffic on external streets in adjacent neighborhoods.

A14

Regional Transportation

The 2012-2013 EDR describes activity levels at New England's regional airports in 2012 and 2013 and provides an update on regional planning activities, including long-range transportation efforts.

Overall, aviation activity at New England's regional airports decreased in 2012 and 2013. In 2012, the total number of air passengers utilizing New England's commercial service airports, including Logan Airport, decreased by 1.3 percent from 44.7 million in 2011 to 44.1 million annual air passengers. The decline in the region's passenger traffic largely reflects airline service reductions at many of the regional airports in 2012. Airlines have attempted to maintain tighter capacity control, which has resulted in ongoing service cuts at various secondary and tertiary airports across the nation. While passenger traffic at Logan Airport increased slightly in 2012, reduced passenger levels at regional airports resulted in an overall decline for the region. In 2013, however, overall passenger traffic at New England commercial airports recovered somewhat, increasing 2.8 percent from 44.1 million to 45.4 million passengers. Passenger traffic at New England airports in 2013 was the highest since the economic downturn in 2008. In 2013, total passenger traffic at the regional airports increased 1.6 percent from the previous year, while passenger traffic at Logan Airport increased by 3.4 percent.

The 2014 EDR should describe Logan Airport's role in the region's intermodal transportation system by reporting on the following:

Regional Airports

- 2014 regional airport operations, passenger activity levels, and schedule data within an historical context;
- Status of plans and new improvements as provided by the regional airport authorities;
- Ground access improvements; and
- Role of the Worcester Regional Airport and Hanscom Field in the regional aviation system and Massport's efforts to promote these airports.

A15

Regional Transportation System

- Massport's role in managing the regional transportation facilities within the restructured Massachusetts Department of Transportation (MassDOT);
- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and
- Report on metropolitan and regional rail initiatives and ridership.

Ground Access to and from Logan Airport

The 2012-2013 EDR reports on transit ridership, roadways, traffic volumes, and parking for both 2012 and 2013. Specifically, the average daily vehicular traffic on Airport roadways decreased by 0.2 percent from 99,449 in 2011 to 99,281 in 2012, and then increased by 3.5 percent to 102,771 between 2012 and 2013. The 2012-2013 EDR also updates information on the Logan Parking Freeze limit which is set at 21,088, of which 18,415 are dedicated to commercial

parking spaces and 2,673 are dedicated to employee parking spaces. The EDR indicates that Massport continued to be in full compliance with the Parking Freeze throughout 2012 and 2013.

The 2012-2013 EDR includes key findings for ground access activity to and from the Airport which include:

- Massachusetts Bay Transportation Authority (MBTA) Silver Line bus boardings at the Airport continued to grow, based on ridership estimates.
- In 2012, Blue Line transit boardings at Airport Station increased about seven percent over 2011 levels. In 2013, MBTA Blue Line ridership increased six percent over 2012 levels.
- In 2012, ridership levels on all types of water transportation to the Airport remained flat in comparison to the previous year. Ridership on the MBTA ferry continues to decline, while private water taxi use has grown slightly since 2007. In 2013, ridership on private water taxis increased by three percent.
- In 2012, air passengers using Logan Express bus service increased 10 percent compared to 2011 levels; employee use of Logan Express increased by 16 percent and non-employee passengers increased nearly five percent. In 2013, non-employee passenger ridership increased nearly eight percent over 2012 levels, and employee passenger activity increased almost two percent.
- In September 2013, Massport solicited an operator for a Back Bay express shuttle bus service, which commenced in April 2014. The Back Bay Logan Express, provides improved service to those transit riders who are affected by the two-year Government Center MBTA Station closure and increases high occupancy vehicle (HOV) use from the inner Boston area.

The 2014 EDR should report on the following conditions and provide a discussion of analysis in 2014 and compare them to 2013:

- Detailed description of compliance with Logan Airport Parking Freeze;
- High occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Water Transportation, and Logan Express);
- Massport's cooperation with other transportation agencies to increase transit ridership to and from Logan Airport via the Blue Line and Silver Line;
- Logan Airport Employee Transportation Management Association (Logan TMA) services;
- Logan Airport gateway volumes;
- On-airport traffic volumes;
- On-airport vehicle miles traveled (VMT);
- Parking demand and management (including rates and duration statistics);
- Status of long-range ground access management strategy planning; and
- Results of the 2013 Logan Airport Passenger Survey.
- Massport's target HOV mode share along with incentives; and,
- Non-Airport through-traffic;

A16

Noise Abatement

The 2012-2013 EDR updates the status of the noise environment at Logan Airport in 2012 and 2013, and describes Massport's efforts to reduce noise levels. Many of the issues raised in the noise analysis are ongoing and require continuous monitoring. The 2014 EDR should address the noise issues raised by numerous commenters on the 2012-2013 EDR

Compared to 2011, the 2012 Day-Night Average Sound Level (DNL) 65-decibel (dB) contours were slightly larger in East Boston, Revere, South Boston, and Winthrop and smaller over Boston Harbor towards Long Island and south towards Columbia Point. The 2012 contours remained substantially smaller than the 2000 contours. There are several factors that influenced the contour changes, including: Runway 15R-33L, the nighttime noise abatement runway, was temporarily closed from June 16, 2012 through October 2, 2012 to allow for the second and final period of construction of the enhanced Runway 33L RSA. There were also partial construction closures of the runway before and after this period. Typically, this runway is used during these periods for head-to-head operations (arrivals to Runway 33L and departures from Runway 15R) at night, which keeps air traffic over Boston Harbor, and away from the community. The 2012 RSA construction closure was extended for longer period than in 2011, which also extended the use of other runways for nighttime operations during 2012. During this period, night operations primarily used Runway 22R and Runway 9 for departures and Runway 4R, 27, and 22L for arrivals.

Compared to 2012, the 2013 DNL 65 dB contours were slightly larger in East Boston and slightly smaller in Revere, South Boston, and Winthrop. The 2013 contours remained substantially smaller than the 2000 contours. There are several factors that influenced the contour changes, including:

- Runway use in 2013 was reflective of a typical year (return to pre-construction conditions), with an increased use (compared to 2012) of Runway 15R-33L and Runway 27;
- The availability of all runway configurations in 2013, resulted in lower levels of arrivals to Runways 22L, 27, and 4R;
- Due to the runway closure, the overall number of people exposed to DNL values greater than 65 dB increased to 4,736 people in 2012 from 3,947 people in 2011 (an increase of 789 people); and
- In 2013 with runway use back to pre-construction patterns, the overall number of people exposed to DNL values greater than 65 dB decreased to 4,307 people in 2013 from 4,736 people in 2012 (a decrease of 429 people).

The number of people residing within the DNL 70 dB contour increased from 130 people in 2011 to 200 people in 2012 and returned to 130 people in 2013. These levels are still well below the number of people exposed in the year 2000 when 17,745 people were exposed to DNL noise levels greater than 65 dB and 1,551 people were exposed to DNL levels greater than 70 dB. All of the residences exposed to levels greater than DNL 65 dB in 2012 and 2013 have been eligible to participate in Massport's residential sound insulation program (RSIP). Participation in the program is voluntary and Massport has provided sound insulation to all of homeowners who

have chosen to participate. An additional 76 residential units received sound insulation treatment in 2013 bringing the program total to 11,409 residential units. Massport will continue to seek funding for this program.

Massport is participating in a FAA aircraft noise study as part of the Airside Improvement Project mitigation. The primary focus of the Boston Logan Airport Noise Study (BLANS) is to determine viable ways to reduce noise from aircraft operations to and from Logan Airport without diminishing airport safety and efficiency. The Runway Navigation (RNAV) departure portions of Phase 1 of the project, first implemented in 2010, continued to be utilized in 2012 and 2013. The 2012-2013 EDR detailed the Flight Track Monitoring reports in Appendix of Noise Abatement.

The information in the Noise Abatement chapter is very informative and I encourage Massport to continue with detailed analysis in the 2014 EDR. I strongly advise Massport to consider and address the comments on noise and noise related issues.

The 2014 EDR should provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter should report on 2014 conditions and compare those conditions to those of 2013 for the following:

- Fleet Mix, including Stage II, Recertified (Hushkitted) Stage III, newly manufactured Stage III, and qualifying Stage IV aircraft;
- Nighttime operations;
- Runway utilization (report on aircraft and airline adherence with runway utilization goals);
- Preferential runway advisory system (PRAS) tracking; and
- Flight tracks.

A17

The 2014 EDR should also report on 2014 conditions and compare those to 2013 conditions for the following noise indicators:

- Using the FAA's most current version of the Integrated Noise Model (INM), and RealContours™ and RealProfiles™, produce an accurate set of Day-Night Sound Level (DNL) noise contours.
- Update on FAA's combined air quality and noise modeling tool (Aviation Environmental Design Tool - AEDT)
- Noise-impacted population;
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the use of RealContours™ and RealProfiles™;
- Cumulative Noise Index (CNI);
- Times-Above for 65, 75, and 85 dBA threshold values/Dwell and Persistence of noise levels;
- Installation and benefits of the new noise monitoring system; and
- Flight track monitoring noise quarterly reports.

A18

The 2014 EDR should also report on noise abatement efforts, results from Boston Logan Airport Noise Study (BLANS) study, and provide a status update on the new noise and operations monitoring system.

Air Quality/Emissions Reduction

The 2012-2013 EDR provides an overview of airport-related air quality issues in 2012 and 2013 and also efforts to reduce emissions. The air quality modeling reported in 2012-2013 EDR is based on aircraft operations, fleet mix characteristics, and airfield taxiing times combined with ground support equipment (GSE) usage, motor vehicle traffic volumes, and stationary source utilization rates. Motor vehicle emissions for the 2012 analysis were obtained from the United States Environmental Protection Agency's (EPA's) MOBILE model (MOBILE6.2.03) combined with MassDEP-recommended motor vehicle fleet mix data, operating conditions, and other Massachusetts-specific input parameters. The most up-to-date EPA mobile model, Motor Vehicle Emission Simulator (MOVES), was used to develop 2013 motor vehicle emission factors. For comparative purposes, both MOBILE and MOVES were used to generate the 2013 motor vehicle emission factors.

The following is a summary of modeled air quality conditions for Logan Airport in the 2012 to 2013 time-period:

- Total volatile organic compound (VOC) emissions in 2012 were 1,080 kilograms per day (kg/day), or approximately three percent lower than 2011 levels. By comparison, total VOC emissions in 2013 were 1,138 kg/day, or 5 percent higher than 2012 levels. For comparison, total VOC emissions were 1,777 kg/day in 2000.
- Total emissions of oxides of nitrogen (NO_x) in 2012 were 4,099 kg/day, or less than one percent higher than 2011 levels. However, total emissions of NO_x in 2013 were 4,020 kg/day, or two percent lower than 2012 levels. For comparison, total NO_x emissions were 5,707 kg/day in 2000.
- Total emissions of carbon monoxide (CO) in 2012 were 6,739 kg/day, or three percent lower than 2011 levels. However, total emissions of CO in 2013 were 7,340 kg/day, or nine percent higher than 2012 levels. For comparison, total CO emissions were 13,111 kg/day in 2000.
- Total emissions of particulate matter (PM)₁₀/PM_{2.5} increased in 2012 by approximately seven percent to 72 kg/day compared to 2011 levels. This particular increase is unique and is mostly attributable to a change the MOBILE6.2.03 model. Total modeled emissions of PM₁₀/PM_{2.5} again increased in 2013 by approximately 28 percent to 92 kg/day compared to 2012 levels. This increase is primarily attributable to the updated computer modeling (i.e., Emissions and Dispersion Modeling System [EDMS] and MassDEP-preferred model –MOVES) used to calculate aircraft and motor vehicle emissions.
- With respect to Massport's Air Quality Initiative (AQI) 1999 benchmark, total NO_x emissions in 2012 were 698 tons per year (tpy) lower than the benchmark and in 2013 emissions were 730 tpy lower than the benchmark. This represents an overall decrease of 31 percent in NO_x emissions since 1999. For comparison, total NO_x emissions in 2000 were 51 tpy lower than the benchmark or a decrease of 2 percent since 1999.

The year 2013 marks the seventh consecutive year in which Massport has voluntarily prepared a greenhouse gas (GHG) emissions inventory for the EDR/ESPR. The 2012 and 2013 GHG emission inventory was again prepared following methodological guidance by the Transportation Research Board's (TRB) Airport Cooperative Research Program (ACRP). Total Logan Airport GHG emissions in 2012 were approximately three percent lower than 2011 levels primarily due to lower fuel consumption by stationary sources. Total Logan Airport GHG emissions in 2013 were approximately six percent higher than 2012 levels primarily due to the increase in usage of passenger ground access vehicles on off-airport roadways. In 2012, Massport-related emissions represented 10 percent of total GHG emissions at the Airport; tenant-based emissions represented approximately 69 percent; electrical consumption represented 14 percent; and passenger vehicle emissions represented six percent. Similarly, in 2013, Massport-related emissions represented 13 percent of total GHG emissions at the Airport, tenant-based emissions represented approximately 66 percent, electrical consumption represented 10 percent, and passenger vehicle emissions represented 10 percent.

The 2014 EDR should include an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The 2014 EDR should provide discussion on progress on the national and international levels to decrease air emissions. It should also include analysis methodologies and assumptions and report on 2014 conditions using the most recent versions of the EDMS and MOVES models. The 2014 EDR should include an emissions inventory for CO, NO_x, VOCs, and PM. It should include NO₂ monitoring and identify NO_x emissions by airline.

A20

The 2014 EDR should also report on the following AQI for 2014:

- AQI Emissions Monitoring and Tracking;
- Massport's and Tenant's Alternative Fuel Vehicle Programs; and
- The status of Logan Airport air quality studies undertaken by Massport or others, as available.

A21

Massport has also committed to include an inventory of GHG emissions from Logan Airport in 2014. GHG emissions should be quantified for aircraft, GSE, motor vehicles and stationary sources using emission factors and methodologies outlined in the MEPA Greenhouse Gas Emissions Policy and Protocol. The results of the 2014 GHG emissions inventory should be compared to the 2013 results. This chapter should also include an update on Massport's efforts to encourage the use of single engine taxiing under safe conditions.

A22

Water Quality/Environmental Compliance

The 2012-2013 EDR describes Massport's ongoing environmental management activities including National Pollutant Discharge Elimination System (NPDES) compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan (MCP), and tank management.

The 2014 EDR should report on the 2014 status of:

- NPDES Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility;
- Jet fuel usage and spills;
- MCP activities;
- Tank management;
- Update on the environmental management plan; and
- Fuel spill prevention.

It should also identify any planned stormwater management improvements.

A23

Conclusion

I have determined that the 2012-2013 EDR for Logan Airport has adequately compiled with MEPA. Massport may prepare a 2014 EDR for submission in 2015 consistent with the scope included in this Certificate.

February 6, 2015

Date



Matthew A. Beaton

Comments received:

01/14/2015	Frank J. Ciano
01/26/2015	Cindy L. Christiansen
01/26/2015	City of Somerville, Mayor Joseph Curtatone
01/27/2015	The Boston Harbor Association
01/27/2015	Nancy S. Timmerman
02/02/2015	Massachusetts Department of Public Health

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2014 EDR
Boston-Logan International Airport

Comment #	Author	Topic	Comment	Response
A.1	Matthew A. Beaton, Secretary	General	The 2014 EDR should follow the general format of the 2012/2013 EDR status report. The 2014 EDR should include an Executive Summary and Introduction, similar to previous ESPRs and EDRs. Massport must provide background information on the environmental policies and planning that form the context of the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport to provide context for reviewing agencies and the public.	The 2014 Logan Airport EDR will follow the format specified.
A.2	Matthew A. Beaton, Secretary	General	The 2014 EDR should provide an update on conditions at Logan Airport for calendar year 2014, including passenger and aircraft operation activity levels. It should continue to serve as a background/context against which projects at Logan Airport can be evaluated. It should also report on the cumulative effects of Logan Airport operations and activities, compared to previous years, as appropriate. It should provide a status report on Massport's proposed planning initiatives, projects, and mitigation measures.	The 2014 Logan Airport EDR includes the specified sections as follows: Chapter 2, Activity Levels; Chapter 3, Airport Planning; Chapter 9, Project Mitigation Tracking.
A.3	Matthew A. Beaton, Secretary	General	The technical studies in the 2014 EDR should include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. The 2014 EDR must also respond to those issues explicitly noted in this Certificate and the comments received on the 2012/2013 EDR .	The 2014 Logan Airport EDR includes the specified sections as follows: Chapter 4, Regional Transportation; Chapter 5, Ground Access to and from Logan Airport; Chapter 6, Noise Abatement; Chapter 7, Air Quality/Emissions Reduction; Chapter 8, Water Quality/Environmental Compliance .
A.4	Matthew A. Beaton, Secretary	General	A distribution list for the 2014 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2004 ESPR (issued on August 16, 2006) to provide context for reviewers. Supporting technical appendices should be provided as necessary.	The 2014 EDR includes the specified sections as follows: Appendix D, Distribution List, Appendix A, MEPA Certificates and Responses to Comments .
A.5	Matthew A. Beaton, Secretary	Response to Comments	The 2014 EDR Responses to Comments section should address all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments chapter included in the 2012/2013 EDR is well-constructed and cross-referenced. I encourage Massport to use the same format in the 2014 EDR .	The 2014 EDR includes the specified sections as follows: Appendix B, Comment Letters and Responses.

**2014 EDR
Boston-Logan International Airport**

Comment #	Author	Topic	Comment	Response
A.6	Matthew A. Beaton, Secretary	Response to Comments	The majority of comments received on the 2012/2013 EDR focus on noise related issues, including measurement of noise, modeling of noise contours, and noise abatement, and emission reduction issues. In addition to responding to these comments, the 2014 EDR should continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commenters where appropriate.	Chapter 6, Noise Abatement, includes information on noise tracking and abatement.
A.7	Matthew A. Beaton, Secretary	Activity Levels	<p>The 2014 EDR should report on airport activity levels and aircraft operations, including:</p> <ul style="list-style-type: none"> • Aircraft operations, including fleet mix and scheduled airline services at Logan Airport; • Passenger activity levels; • Cargo and mail activities; • Compare 2014 aircraft operations, cargo/mail operations, and passenger activity levels to 2013 activity levels; and • Report on national aviation trends in 2014 and compare to trends at Logan Airport. 	The 2014 EDR includes the specified sections in Chapter 2, Activity Levels.
A.8	Matthew A. Beaton, Secretary	Activity Levels	It should also report on Massport's activity level forecasts that will become the basis for the planning and impact sections that follow and for Massport's strategic planning initiatives for the future ESPR. Massport should address comments related to activity levels in the 2014 EDR.	The 2014 EDR includes the specified sections in Chapter 2, Activity Levels.
A.9	Matthew A. Beaton, Secretary	Sustainability	The focus in the 2014 EDR should include reporting on data, identifying goals and priorities for specific Massport and tenant projects at Logan Airport that have undergone MEPA review to include energy efficiency/greenhouse gas reduction, water conservation, and waste management and recycling.	The 2014 EDR includes an updated section on sustainability initiatives at Logan Airport in Chapter 1, Introduction/Executive Summary. This EDR also references the Logan Airport Sustainability Management Plan, which was released April 2015 and is available on Massport's website (https://www.massport.com/media/320786/LoganSMP_Report.pdf). Massport plans to report on sustainability initiatives, including energy efficiency, greenhouse gas reduction, water conservation, and waste management/recycling in annual sustainability reports, which will be referenced in the EDR and available online.

Comment #	Author	Topic	Comment	Response
A.10	Matthew A. Beaton, Secretary	Sustainability	<p>The 2014 EDR should report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have undergone MEPA review, including whether they are under construction or completed. The status of mitigation commitments made in the Section 61 Findings for the following projects should also be reported:</p> <ul style="list-style-type: none"> • West Garage/Central Garage (EEA #9790) • International Gateway (EEA #9791) • Logan Airside Improvements Planning Project (EEA #10458) • Terminal A Replacement Project (EEA #12096) • Southwest Service Area Redevelopment Program/Rental Car Center (EEA # 14137) • Logan Runway Safety Area Improvements Project (EEA # 14442) 	<p>The 2014 EDR includes the specified sections in Chapter 9, Project Mitigation Tracking.</p>
A.11	Matthew A. Beaton, Secretary	Planning	<p>The 2014 EDR should address the DIRP Study and identify which recommendations Massport will implement in the short term to increase the resiliency of its facilities to the potential effects of climate change.</p>	<p>DIRP Study findings are reported on in Chapter 1, Introduction/Executive Summary and Chapter 3, Airport Planning.</p>
A.12	Matthew A. Beaton, Secretary	Planning	<p>Massport is in the process of developing a long-term parking management plan for Logan Airport. The Long-Term Parking Management Plan will lay out a multi-part strategy for efficiently managing parking supply, pricing, and operations -both at Logan Airport and at off-Airport locations controlled by Massport -to maximize access for transit and shared-ride vehicles while minimizing both drive-and-park and pick-up/drop-off modes. The 2014 EDR should provide updates on this plan.</p>	<p>The 2014 EDR includes the specified sections in Chapter 3, Airport Planning .</p>

**2014 EDR
Boston-Logan International Airport**

Comment #	Author	Topic	Comment	Response
A.13	Matthew A. Beaton, Secretary	Planning	<p>The 2014 EDR should also continue to assess planning strategies for improving Logan Airport's operations and services in a safe, secure, more efficient, and environmentally sensitive manner. As owner and operator of Logan Airport, Massport also must accommodate and guide tenant development. Therefore, the 2014 EDR should also describe the status of planning initiatives for the following areas:</p> <ul style="list-style-type: none"> • Roadway Corridor Project; • Airport Parking; • Terminal Area; • Airside Area; • Service and Cargo Areas; and • Airport Buffers and Landscaping. 	<p>The 2014 EDR includes the specified sections in Chapter 3, Airport Planning .</p>
A.14	Matthew A. Beaton, Secretary	Planning	<p>The 2014 EDR should provide a status report on long-range planning activities. This chapter should include the status and effectiveness of the ground access changes, including roadway and parking projects, that will consolidate and direct airport-related traffic to centralized locations and minimize airport-related traffic on external streets in adjacent neighborhoods.</p>	<p>The 2014 EDR includes the specified sections in Chapter 5, Ground Access to and from Logan Airport .</p>

Comment #	Author	Topic	Comment	Response
A.15	Matthew A. Beaton, Secretary	Regional Transportation	<p>The 2014 EDR should describe Logan Airport's role in the region's intermodal transportation system by reporting on the following:</p> <p>Regional Airports</p> <ul style="list-style-type: none"> • 2014 regional airport operations, passenger activity levels, and schedule data within an historical context; • Status of plans and new improvements as provided by the regional airport authorities; • Ground access improvements; and • Role of the Worcester Regional Airport and Hanscom Field in the regional aviation system and Massport's efforts to promote these airports. <p>Regional Transportation System</p> <ul style="list-style-type: none"> • Massport's role in managing the regional transportation facilities within the restructured Massachusetts Department of Transportation (MassDOT); • Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and • Report on metropolitan and regional rail initiatives and ridership. 	<p>The 2014 EDR includes the specified sections in Chapter 4, Regional Transportation.</p>

**2014 EDR
Boston-Logan International Airport**

Comment #	Author	Topic	Comment	Response
A.16	Matthew A. Beaton, Secretary	Ground Access	<p>The 2014 EDR should report on the following conditions and provide a discussion of analysis in 2014 and compare them to 2013:</p> <ul style="list-style-type: none"> • Detailed description of compliance with Logan Airport Parking Freeze; • High occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Water Transportation, and Logan Express); • Massport's cooperation with other transportation agencies to increase transit ridership to and from Logan Airport via the Blue Line and Silver Line; • Logan Airport Employee Transportation Management Association (Logan Airport TMA) services; • Logan Airport gateway volumes; • On-airport traffic volumes; • On-airport vehicle miles traveled (VMT); • Parking demand and management (including rates and duration statistics); • Status of long-range ground access management strategy planning; and • Results of the 2013 Logan Airport Passenger Survey. • Massport's target HOV mode share along with incentives; and, • Non-Airport through-traffic. 	<p>The 2014 EDR includes the specified sections in Chapter 5, Ground Access to and from Logan Airport.</p>
A.17	Matthew A. Beaton, Secretary	Noise	<p>The 2014 EDR should provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter should report on 2014 conditions and compare those conditions to those of 2013 for the following:</p> <ul style="list-style-type: none"> • Fleet Mix, including Stage II, Recertified (Hushkitted) Stage III, newly manufactured Stage III, and qualifying Stage IV aircraft; • Nighttime operations; • Runway utilization (report on aircraft and airline adherence with runway utilization goals); • Preferential runway advisory system (PRAS) tracking; and • Flight tracks. 	<p>The 2014 EDR includes the specified sections in Chapter 6, Noise Abatement.</p>

2014 EDR
Boston-Logan International Airport

Comment #	Author	Topic	Comment	Response
A.18	Matthew A. Beaton, Secretary	Noise	<p>The 2014 EDR should also report on 2014 conditions and compare those to 2013 conditions for the following noise indicators:</p> <ul style="list-style-type: none"> Using the FAA's most current version of the Integrated Noise Model (INM), and RealContours™ and RealProfiles™, produce an accurate set of Day-Night Sound Level (DNL) noise contours. Update on FAA's combined air quality and noise modeling tool (Aviation Environmental Design Tool - AEDT) Noise-impacted population; Measured versus modeled noise values, including reasons for differences and any improvements attributable to the use of RealContours™ and RealProfiles™; Cumulative Noise Index (CNI); Times-Above for 65, 75, and 85 dBA threshold values/Dwell and Persistence of noise levels; Installation and benefits of the new noise monitoring system; and Flight track monitoring noise quarterly reports. 	<p>The 2014 EDR includes the specified sections in Chapter 6, Noise Abatement.</p>
A.19	Matthew A. Beaton, Secretary	Noise	<p>The 2014 EDR should also report on noise abatement efforts, results from Boston Logan Airport Noise Study (BLANS) study, and provide a status update on the new noise and operations monitoring system.</p>	<p>The 2014 EDR includes the specified sections in Chapter 6, Noise Abatement, and associated Appendix H, Noise Abatement</p>
A.20	Matthew A. Beaton, Secretary	Air Quality / Emissions Reduction	<p>The 2014 EDR should include an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The 2014 EDR should provide discussion on progress on the national and international levels to decrease air emissions. It should also include analysis methodologies and assumptions and report on 2014 conditions using the most recent versions of the EDMS and MOVES models. The 2014 EDR should include an emissions inventory for CO, NOx, VOCs, and PM. It should include NO2 monitoring and identify NOx emissions by airline.</p>	<p>The 2014 EDR includes the specified sections in Chapter 7, Air Quality.</p>

**2014 EDR
Boston-Logan International Airport**

Comment #	Author	Topic	Comment	Response
A.21	Matthew A. Beaton, Secretary	Air Quality / Emissions Reduction	<p>The 2014 EDR should also report on the following AQI for 2014:</p> <ul style="list-style-type: none"> • AQI Emissions Monitoring and Tracking; • Massport's and Tenant's Alternative Fuel Vehicle Programs; and • The status of Logan Airport air quality studies undertaken by Massport or others, as available. 	<p>The 2014 EDR includes the specified sections in Chapter 7, Air Quality .</p>
A.22	Matthew A. Beaton, Secretary	Air Quality / Emissions Reduction	<p>Massport has also committed to include an inventory of GHG emissions from Logan Airport in 2014. GHG emissions should be quantified for aircraft, GSE, motor vehicles and stationary sources using emission factors and methodologies outlined in the MEPA Greenhouse Gas Emissions Policy and Protocol. The results of the 2014 GHG emissions inventory should be compared to the 2013 results. This chapter should also include an update on Massport's efforts to encourage the use of single engine taxing under safe conditions.</p>	<p>The 2014 EDR includes the specified sections in Chapter 7, Air Quality .</p>
A.23	Matthew A. Beaton, Secretary	Water Quality	<p>The 2014 EDR should report on the 2014 status of:</p> <ul style="list-style-type: none"> • NPDES Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility; • Jet fuel usage and spills; • MCP activities; • Tank management; • Update on the environmental management plan; and • Fuel spill prevention. <p>It should also identify any planned storm water management improvements.</p>	<p>The 2014 EDR includes the specified sections in Chapter 8, Water Quality .</p>

Copies of Secretary of the Executive Office of Energy and Environmental Affairs Certificates issued for the Reporting Years 2004, 2005, 2006, 2007, 2008, 2009, 2010, and 2011.

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August 16, 2006

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS

ON THE
 ENVIRONMENTAL STATUS AND PLANNING REPORT

PROJECT NAME : 2004 Logan Environmental Status and Planning Report
 PROJECT MUNICIPALITY : Boston / Winthrop
 PROJECT WATERSHED : Boston Harbor
 EOE NUMBER : 3247
 PROJECT PROPONENT : Massachusetts Port Authority
 DATE NOTICED IN MONITOR : June 7, 2006

As Secretary of Environmental Affairs, I hereby determine that the Environmental Status and Planning Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62H) and with its implementing regulations (301 CMR 11.00).

The environmental review process at Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become (consistent with the objectives of the MEPA regulations) part of Massachusetts Port Authority's (Massport) long range planning. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific EIRs. The ESPR is currently updated on a five-year basis, with much less detailed Environmental Data Reports filed in the years between submission of the ESPRs. The 2004 ESPR is the subject of this Certificate.

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs (EOEA) issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of Interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions

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ESPR Certificate

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where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the 1997 Annual Update proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

This 2004 ESPR was originally scheduled to be completed in 2003, but was postponed until 2006. The 2004 ESPR was delayed because of delays associated with the completion of the New England Regional Aviation System Plan (NERASP). Massport adopted the NERASP forecasts for its 2020 Logan Airport forecast of aviation activity in this ESPR, and upon which the analysis of 2020 environmental conditions is based. Postponing completion of the 2004 ESPR ensured that the forecasts used in the ESPR are the most current and accurate forecasts available.

Review of the 2004 ESPR

In general, the ESPR has responded to the scope. In particular, the ESPR contains a wealth of useful data on activity levels and impacts, and lays out a forecast for trends in the future years. The technical studies in the 2004 ESPR included reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking.

As always, EOEA remains committed to evaluating and addressing the cumulative impacts of airport operations on the nearby communities. In June 2001, Massport agreed to work with EOEA on structuring a proposed Air Quality Initiative (AQI). The Certificate indicated that Massport was "to solicit project submissions from local governments and community groups, which will be reviewed in an objective, science-based process by a neutral organization such as NESCAUM." This Certificate on the ESPR reiterates that Massport has committed to the Air Quality Initiative, a key program designed to mitigate the cumulative air quality impacts of airport operations. The 2005 EDR should detail how Massport is meeting this commitment. The 2005 EDR must also address all of the air quality issues raised by the commenters.

Although Massport has presented a detailed ESPR, I remain concerned with a number of environmental issues, specifically air quality and noise related issues, as outlined below.

Follow-up

Massport should submit the next EDR (analyzing conditions for the 2005 calendar year no later than December 15, 2006). I recognize that this Certificate requires the inclusion of considerable follow-up in that document. However, ESPRs invariably raise important issues which require follow-up sooner rather than later, and this ESPR is no exception. I anticipate that the EDR in a year following the publication of an ESPR will always have to include such analytical follow-up to the ESPR and respond to comments on the ESPR. Other EDRs should provide more of a

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"snapshot" of the previous year's operations and impacts, with more substantial analysis awaiting the next GEIR. EDRs in years other than the year immediately following publication of an ESPR should therefore be considerably less voluminous and Massport should strive to submit these documents by July 31 of the year following the subject year.

Responses to Comments

The next EDR must include Responses to Comments which addresses all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments included in this ESPR is well-constructed and cross-referenced (although several comments have complained of general responses or document references in response to specific questions). Massport may follow the same format in addressing comments in the next EDR, although the Responses to Comments should pay particular attention to increased specificity, where necessary.

The majority of comments received on the EDR focused on air quality and noise related issues, including measurement of noise, modeling of noise contours, and noise abatement. In addition to responding to these comments, the 2005 EDR and future EDRs should also continue to report on the refinements to noise tracking and abatement efforts.

Airport Activity Levels

The ESPR included a chapter on airport activity levels, including information on aircraft operations, fleet mix, passenger activity levels, and cargo and mail operations. This chapter also reported on Massport's forecasts that will become the basis for Massport's strategic planning initiatives over the next few years. Past forecasts were based on low, medium, and high passenger activity levels. New forecasts are now based on the forecasts for 2020 developed for the New England Regional Airport System Plan (NERASP) study. This chapter included aircraft operations and passenger activity forecasts, and provided a discussion of methodologies and assumptions, including anticipated fleet mix changes and other trends in the aviation industry.

Air passenger traffic at Logan Airport continued to rebound in 2004, but remained below the peak year level reached in 2000. The total number of passengers using Logan Airport in 2004 increased by 14.7 percent over 2003 levels to 26.1 million passengers. Although the recovery in passenger demand was underway in 2004 at Logan Airport and throughout the industry, legacy commercial airlines continued to struggle financially as competition from low cost carrier (LCC) rivals increased and fuel prices remained high.

For the first time since 1998, total annual aircraft operations (arrivals and departures) at Logan Airport increased compared to the previous year and were at their highest level since 2001. Daily operations in 2004 averaged approximately 1,107 compared to approximately 1,027 in 2003, an increase of about 80 operations per day or about 8.6 percent. 2004 levels remain below historic peaks. The growth in aircraft activity was driven primarily by the entry and expansion of LCCs at Logan Airport in 2004. This increase in LCC services in 2004 stimulated growth in airport

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passenger demand.

In 2004, Logan Airport ranked 19th among US airports in total cargo volume. All-cargo operations at Logan Airport declined by less than 1 percent in 2004. However, total cargo volume, including cargo carried in the belly compartments of passenger aircraft, rose by 0.6 percent.

Airport Planning

This section described the status of planning initiatives and projects through the planning horizon year (2020) for the Terminal Area; Airside Area; Service and Cargo Areas; and Edge Buffers and Landscaping. The Airport Planning Chapter also reported on the status of public works projects implemented by other agencies within the boundaries of Logan Airport.

Several projects were completed in 2004:

- The majority of construction of the main terminal and satellite concourse of Delta Air Lines' Replacement Terminal A Project was completed in 2004.
- A dedicated hourly parking area opened on the lower level of the Terminal B Garage in July 2004.
- Massport also launched Exit Express, Massport's convenient way to pay for parking.
- The Massachusetts Bay Transportation Authority's (MBTA's) \$23 million new Blue Line Airport Station opened in June 2004.
- Demolition of the old MBTA Airport Station was completed in 2004.
- By the end of 2004, completion of the Central Artery/Tunnel (CA/T) Project and improvements to the roadway system were complete, allowing for a more efficient roadway network with shorter and more direct routes between destinations in the airport and the regional highway system.
- The Silver Line, the most recent addition to the transit system and Boston's first Bus Rapid Transit line, began limited service to Logan Airport in December 2004.

Both Massport and Logan Airport's tenants are proposing projects or exploring planning options to modernize and carry out future improvements at Logan Airport. Massport's planning criteria for Logan Modernization are based on accommodating 45 million annual passengers in airport terminals, facilities, and on airport roadways. Future projects and planning concepts include:

- Both Massport and Logan Airport's tenants are proposing projects or exploring planning options to modernize and carry out future improvements to the existing terminal facilities. Some projects and planning concepts include ongoing expansion and upgrade of Terminal E and constructing a new satellite Federal Inspectional Services (FIS) Facility at the southeast end of Terminal B.
- Some projects and planning concepts that are underway or under consideration include, consolidating flight kitchen facilities in the north service area, constructing new multi tenant maintenance facilities for ground service equipment (GSE), and constructing new

- hangar facilities in the north cargo area.
- Airside improvements include upgrades and improvements to the airfield to enhance the operations efficiency and safety of Logan Airport. Some projects and planning concepts that are underway or under consideration include, installing a security wall along the perimeter of the air operations area, providing additional aircraft parking for certain types of aircraft, and an airside improvements planning project to reduce current and projected levels of aircraft delay.
- Buffer areas are being designed in consultation with Logan Airport's neighbors and other interested parties in an open community planning process. Some future airport buffer projects and planning concepts include, landscaping the former Navy Fuel Pier at Jefferies Point, installing a landscaped border in conjunction with the north service area Economy Parking Lot construction, and constructing a half-acre linear area with landscaping and lighting improvements along Maverick Street.
- Massport is considering a parking strategy to address future on-airport parking demands. Some ongoing and future parking projects and planning concepts include redeveloping three parcels into a combined economy parking facility with the capacity for up to 1,750 vehicles, proposed parking facility in the Southwest Service Area, and a new consolidated facility for all car rental operations

Regional Transportation Context

Overall, aviation activity levels at New England's regional airports increased in 2004, as passenger demand continued to rebound both within the region and nationally after the 2001 downturn. Just as the passenger decline seen at the regional airports in the wake of September 11, 2001 was less severe than the declines experienced at Logan Airport, the traffic recovery seen at the regional airports in 2004 was not as strong as the rebound experienced at Logan Airport. Growth at Logan Airport was largely fueled by a growing presence of LCC services. At the same time, regional airports continued to experience growth in 2004 and served a significant (42.5 percent) share of the region's air passenger traffic. Several factors have contributed to the success of the regional airports in recent years:

- Many of the regional airports benefited from the introduction and growth of LCC services over the past several years. This trend began when Southwest Airlines entered the New England market in 1996 by serving T.F. Green Airport in Warwick, Rhode Island and later expanding into the Manchester and Hartford/Bradley International Airports. The trend continued in 2004 when Spirit Airlines began service from T.F. Green Airport, Independence Air5 initiated low-fare service at several of the regional airports, and Southwest Airlines continued to increase service from its New England airports.
- Several of the smaller airports, particularly Burlington, Bangor, and Tweed-New Haven continued to benefit from the introduction of regional jets and gained new non-stop services to airline connecting hubs, which increase service options for regional airport passengers.

Ground Transportation

The chapter reported on 2004 conditions and provided a comparison of 2004 findings to previous years for variety of ground transportation indicators. The chapter also presented a discussion of analysis methodologies and assumptions for future year conditions for the planning horizon year 2020 for Traffic volumes, On-airport Vehicle miles traveled (VMT) and Parking demand.

- Completion of the CA/T and Logan Airport Modernization projects created a more efficient roadway network with shorter and more direct routes to destinations within Logan Airport.
- With the exception of water transportation, all scheduled and unscheduled high occupancy vehicle (HOV) transportation to Logan Airport saw increased ridership in 2004.
- Overall HOV mode share for air passengers increased from 25.8 percent in 1990 to 32 percent in 2003. Although the data shows a slight decrease to 30.3 percent in HOV modes in 2004, the 2003 HOV mode share was an all-time high, reflecting Massport's success in generally maintaining or increasing the percentage of passengers using HOV modes in all market segments.
- The most recent employee survey showed an employee HOV mode share of 26.8 percent.
- Airport-related average annual daily traffic (ADDT) volumes increased by 12.6 percent in 2004 over 2003 volumes. Despite this increase in ADDT volumes, the vehicle miles traveled (VMT) on Logan Airport's roadway system only increased by 3.5 percent in 2004 compared with the 2003 VMT. This reflects the effects of the changes in the airport roadway system resulting from the CA/T and Logan Airport Modernization projects, which result in a shorter average trip length, creating a much smaller increase in total VMT than in average weekday daily traffic volumes.
- Massport executed a Memorandum of Understanding with the MBTA to commence Silver Line bus rapid transit service in late 2004. Massport's support of the Silver Line Airport service will total more than \$30 million over ten years.

Between 2003 and 2004, membership in the Transportation Management Association (TMA) declined by 800 employees, a 13.3% reduction. Massport stated in the ESPR that significant TMA funds had been expended for administrative functions resulting in underfunded programming. The Executive Office of Transportation's MassRIDES program will now provide a TMA coordinator at state expense. The EOT identified its expectation that Massport will "maintain its current level of effort, including both cash contributions and in-kind services.

The Secretary's June 15, 2001 Certificate on the AIPP directs Massport to require that all Logan employers join the TMA at the earliest possible opportunity. This mitigation measure is not listed in Table 10-7 and no plan is presented for meeting this requirement. A plan should be detailed in the 2005 EDR.

The ESPR indicated that two FAA programs had relocated to New Hampshire in 2004 and that Beacon-Skanska, having completed the construction of Terminal A, was no longer at Logan. Four additional corporate members left the TMA in 2004. The 2005 EDR should provide explanation for this.

The 2003 EDR stated that TMA shuttle ridership declined by 32.4 percent due to the elimination of services at mid-year due to lack of funding, but that the decrease in shuttle ridership had been more than off-set by increased Logan Express use. Massport should identify any efforts such as more active marketing of car/ridesharing options targeted to those who previously used the cancelled shuttles. This information should be provided in the 2005 EDR.

Noise

This chapter began with an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, the methodologies used to track noise, and what if any changes there was in noise modeling. The information in this chapter built upon the findings of the Boston Logan Overflight Noise Study. This chapter also updates the status Massport's efforts to reduce noise levels and provides noise contours population counts for 2020.

- Massport has continued to make improvements in the noise modeling process as the sophistication of noise models and data acquisition systems has advanced. Recent developments in noise modeling technologies and techniques employed in this 2004 ESPR and to be used in future years include: use of a new radar data acquisition system, known as a long-range PASSUR, for the source of all radar-based operations data; a new upgrade to Massport's radar data processing software; use of the latest update to the FAA's Integrated Noise Model, while retaining the unique capability to account for over-water sound propagation and hill effects unique to Logan Airport; incorporation of more than 1,800 modeled flight tracks, checked and updated where necessary to reflect 2004 radar data; use of radar data to determine the "best-fit" match among each of the nearly 402,000 radar traces captured by Logan Airport's noise monitoring system and the available climb profile contained within the INM database; procurement of an improved noise and operations monitoring system; procurement of automated altitude profile and noise contour generation software.
- From May to August 2004, Runway 4L-22R was closed either completely or partially to accommodate repaving. Due to this closure, jet aircraft departures on Runway 22R decreased by approximately 23 percent compared to 2003 while departures on other runways increased.
- As a result of changes in airport operations in 2004, the number of people exposed to Day-Night Sound Level (DNL) values greater than 65 dB increased compared to the number in 2003. An estimated 10,720 people were exposed to DNL levels greater than 65 dB in 2004, compared to 7,183 in 2003, and 8,309 in 2002. The majority of the increase occurred in East Boston off the northwest end of Runway 33L. The increases within the

65dB are in areas that were previously sound insulated. Despite these increases, the total count of people exposed to 65 dB DNL and above was 23 percent lower than in 2001.

- The 2004 Cumulative Noise Index (CNI) of 153.4 Effective Perceived Noise Level (EPNdB) remained well below the cap of 156.5 EPNdB. Although CNI also increased compared to 2003 and 2002 as a result of the increased number of operations, the 2004 level remained below the 2001 CNI value.
- The number of residential dwelling units for which Massport provided sound insulation in 2004 was 791. Since the program's inception, the total number of dwelling units receiving sound insulation is now 8,615. In addition, Massport completed sound insulation of a 36th school – the new Center School located in Winthrop.

The Logan Airport Noise Study is now expected to be conducted in at least three phases. I strongly encourage Massport to include a phase for the monitoring and assessment of altered flight paths so that any necessary modifications can be identified and implemented.

In addition, the ESPR indicated that there will be an increase from 2004 to 2020 in the number of Boston residents who will experience noise in the 70-75 DNL and the 75-80 DNL due to the use of parallel runways. Massport strive to identify ways to ensure that these increases do not occur. The 2005 EDR should include a preliminary discussion about how Massport will address projected exceedances.

Air Quality

This chapter presented an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. It also predicts emission levels for 2020.

- To ensure consistency and comparability between 1999 and 2004 air quality emissions, the 1999 air emissions inventory was updated with information that was not available when first reported and 1999 emissions were recalculated using the new version of the FAA's Emissions and Dispersion Modeling System (EDMS) v4.21. Additional data were also added to the 2004 inventory in order to increase the accuracy of the results, for example curbside queue times were updated and new parking areas were added to the inventory.
- In 2004, the emission inventory results were driven by an 8 percent increase in aircraft operations compared to 2003 activity levels. Increases in stationary source (fuel storage facilities, heating plant, etc.) emissions further contributed to the increase in levels of volatile organic compounds (VOCs) and oxides of nitrogen (NOx).
- In 2004, total VOC emissions at Logan Airport were estimated to be approximately 1,360

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ESPR Certificate

kilograms (kg)/day, which is an increase of 17 percent from 2003 levels. However, total VOC emissions at Logan Airport were 41 percent lower in 2004 than in 1999. The increase of VOC emissions between 2003 and 2004 was due to the increase in aircraft operations in 2004.

- In 2004, total NOx emissions from all airport-related sources were estimated to be 4,290 kg/day, which is an increase of 16 percent from 2003 levels, but is a 26 percent decrease as compared to 1999 levels. Once again, the increase in aircraft operations contributed the most to this increase in airport-related NOx in 2004.
- Total carbon monoxide (CO) emissions at Logan Airport in 2004 were estimated to be 9,852 kg/day, or 3 percent below 2003 levels. In 2004, total CO emissions at Logan Airport were 32 percent lower than 1999 levels. While CO emissions from aircraft increased due to increased aircraft operations, the use of alternative fuel vehicles (AFVs) and the lower emission rates of the motor vehicle fleet helped to reduce the overall CO emissions in 2004. Massport added three new AFVs to its fleet in 2004.

- Massport developed an Air Quality Initiative (AQI) in 2001 as a long-range program with the overall goal to maintain NOx emissions associated with Logan Airport at or below the 1999 level of 2,347 tpy. In 2004, NOx emissions from all airport-related sources were estimated to be 1,726 tpy, well below the 1999 level.

Through the June 15, 2001 Certificate of the Secretary of EOEA on the FEIR for the AIPP, Massport was directed to develop a program to maximize the use of single-engine taxiing procedures by all of its tenant airlines. Massport must describe in the 2005 EDR how it presently encourages reduced-engine (single-engine) taxiing. The cited issues of safety and practicality should be discussed and the program that will be implemented as noted in Table 10-7 of the 2005 ESPR should be outlined.

Massport was also directed in the same Certificate to conduct follow-up air quality monitoring in neighborhoods surrounding the airport and surrounding flight paths. This mitigation measure does not appear in Table 10-7, "Logan Airside Improvements Planning Project, Details of Ongoing Section 61 Mitigation Measures." The 2005 EDR should address this measure in detail.

Table 7-13 of the 2004 ESPR, "Inventory of Tracking of NOx Emissions in tons per year for Logan Airport," contains numbers that have been "adjusted to reflect know reductions achieved by Massport and its tenants at Logan Airport." The 2005 EDR should include unadjusted numbers and detailed information about the means for achieving reductions and the emissions value of each reduction method.

Massport had agreed to work with EOEA on structuring a proposed Air Quality Initiative (AQI) in the June 2001 Certificate for the AIPP. The Certificate indicated that Massport was "to solicit

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project submissions from local governments and community groups, which will be reviewed in an objective, science-based process by a neutral organization such as NESCAUM." There is no information in the ESPR about the substance and status of any process with EOEA or about the solicitation of information and objective, neutral, scientific review. The 2005 EDR should address this matter in detail.

Environmental Management/Water Quality/Environmental Compliance

This chapter reported on the activities of Massport's Environmental Management Unit in meeting the state's environmental regulatory requirements.

- In 2004, of the 126 spills reported to the Logan Airport Fire-Rescue Department, 18 spills (14 percent) were ten gallons or greater in quantity. Jet fuel spills accounted for 82 (65 percent) of the total spills, with 12 spills (15 percent) being ten gallons or greater in quantity. The remaining 44 spills involved gasoline, hydraulic oil, diesel fuel, ethylene glycol, propylene glycol, paint, and AVGAS. Of these spills, 6 (14 percent) were ten gallons or greater. Since 2002 there has been a reduction in the total volume of all spills.
- In accordance with the Massachusetts Contingency Plan (MCP), Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination.

Massport indicates that it has had limited success in identifying the causes of exceedances due to "first flush" pollutants in stormwater, the number of potential sources at Logan, and the size of drainage areas serving outfalls. Massport needs to develop a plan for maximizing its ability to identify causes. This plan should be identified in the 2005 EDR. Massport should also include in the 2005 EDR copies of any new NPDES stormwater and fire training permits.

Sustainability Initiatives

This Chapter presented Massport's on-going and upcoming sustainability initiatives at Logan Airport. Massport continues to demonstrate forward thinking in sustainability policies and practices for transportation agencies. I encourage Massport to require tenant participation and compliance with all elements of the plan as leases are renewed.

As I stated at the beginning of this Certificate, the 2005 EDR must provide responses to the issues raised in comments received. The 2005 EDR must include a copy of this Certificate and a copy of each comment letter received on the 2004 ESPR. In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, and noise abatement. Massport should consult directly with individual commentors where necessary.

A distribution list for the 2005 EDR (indicating those receiving documents, CDs, or Notices of

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Availability) should be provided in the document. This section must also include copies of all GEIR/Annual Update Certificates issued since 1995 to provide context for reviewers. Supporting technical appendices should be provided as necessary.

August 16, 2006

Date


Robert W. Colledge, Jr.

Comments received:

- 07/25/06 Stephen Kaiser
- 08/08/06 Nancy Timmerman
- 08/09/06 MA Executive Office of Health and Human Services
- 08/09/06 John Vitagliano
- 08/09/06 Bruce Egan, Egan Environmental
- 08/10/06 City of Boston Environment Department
- 08/14/06 Boston Transportation Department

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February 15, 2007

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
ON THE
2005 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME : 2005 Environmental Data Report
PROJECT MUNICIPALITY : Boston / Winthrop
PROJECT WATERSHED : Boston Harbor
EOEA NUMBER : 3247
PROJECT PROPONENT : Massachusetts Port Authority
DATE NOTICED IN MONITOR : December 23, 2006

As Secretary of Environmental Affairs, I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62H) and with its implementing regulations (301 CMR 11.00).

The environmental review process at Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become (consistent with the objectives of the MEPA regulations) part of Massachusetts Port Authority's (Massport) long range planning. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific EIRs. The ESPR is currently updated on a five-year basis, with much less detailed Environmental Data Reports (EDR) filed in the years between submission of the ESPRs. The 2005 EDR is the subject of this Certificate.

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02/14/07

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs (EOEA) issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the *1997 Annual Update* proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

Review of the 2005 EDR

In general, the EDR has fulfilled its purpose of providing a "snapshot" of year 2005 passenger and impact levels at Logan Airport. Most environmental parameters showed significant improvement in calendar year 2005. In particular, the technical studies in the 2005 EDR included reporting on and analysis of key indicators of airport activity levels, airport planning, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking.

As always, EOEA remains committed to evaluating and addressing the cumulative impacts of airport operations on the nearby communities. In June 2001, Massport agreed to work with EOEA on structuring a proposed Air Quality Initiative (AQI). The Certificate indicated that Massport was "to solicit project submissions from local governments and community groups, which will be reviewed in an objective, science-based process by a neutral organization such as NESCAUM." The 2005 EDR reiterates that Massport has committed to the Air Quality Initiative, a key program designed to mitigate the cumulative air quality impacts of airport operations. The 2005 EDR details how Massport is meeting this commitment. The 2006 EDR should continue to report on the details of Massport's commitment. In addition to the environmental issues listed below, the 2006 EDR should address all of the air quality and noise related issues raised by the commenters during the review of the 2005 EDR.

Follow-up

Massport should file the next EDR (covering operations for the 2006 calendar year) in calendar year 2007. The EDR should provide more of a "snapshot" of the 2006 operations and impacts, with more substantial analysis awaiting the next GEIR. Massport should also address the comments received on the current EDR when developing its 2006 EDR.

Responses to Comments

The next EDR must include Responses to Comments which addresses all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments

included in this EDR is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the next EDR, although the Responses to Comments should pay particular attention to increased specificity, where necessary.

The majority of comments received on the 2005 EDR focused on air quality and noise related issues, including measurement of noise, modeling of noise contours, and noise abatement. In addition to responding to these comments, the 2006 EDR and future EDRs should also continue to report on the refinements to noise tracking and abatement efforts.

Activity Levels

The Activity Levels chapter presents aviation activity statistics for Logan Airport in 2005 and compares activity levels to the prior year including air passengers, aircraft operations, fleet mix, and cargo/mail volumes. Air passenger traffic at Logan Airport continued to rebound in 2005, but remained below the peak year level reached in 2000. Specifically, the total number of passengers using Logan Airport in 2005 increased by 3.6 percent over the prior year to 27.1 million passengers. In 2005, total aircraft operations (409,066 operations) at Logan Airport increased by 0.9 percent over 2004 levels. While 2005 passenger traffic at Logan Airport was approximately equal to 1999 levels, in 2005 these passengers were being carried on approximately 86,000 fewer flights (495,000 flights in 1999 versus 409,066 flights in 2005). Several commenters raised concerns with the increase in passenger levels requesting long-term solutions to meeting demand which do not include expansion of Logan Airport's capacity or footprint. I advise Massport to consider and attempt to address these comments in the next 2006 EDR.

Planning

The Airport Planning chapter provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2005. It also describes known future planning, construction, and permitting activities. Specifically, several projects were completed in 2005 including the majority of construction of the main terminal and satellite concourse of Delta Air Lines' Replacement. Terminal A Project was completed in 2004, with final fit up and commissioning in 2005. Massport also launched Exit Express as part of an on-going program to improve parking facilities and improve air quality through enhanced circulation and reduced idling at the toll booths. In addition, as part of a cooperative venture between the Massachusetts Bay Transportation Authority (MBTA) and Massport, initial Silver Line service to the airport began in December 2004. Full Silver Line service to Logan Airport began on June 1, 2005.

The chapter also includes future planning including: ongoing expansion and upgrade of Terminal E and completion of West Garage Phase II (Central Garage Expansion); more efficient ways of using the limited land resources in the service areas; airside improvements include upgrades and improvements to the airfield to enhance the operations, efficiency and safety of Logan Airport; In addition, buffer areas are being designed in consultation with Logan Airport's neighbors and other interested parties in a community planning process. Massport is also considering a parking strategy to address future on-airport parking demands. Some ongoing and future parking projects and planning concepts include redeveloping three parcels into a combined economy parking

facility with the capacity for up to 1,750 vehicles and a new consolidated facility for all car rental operations.

Regional Transportation

This chapter describes activity levels at New England's regional airports in 2005 and updates recent planning activities. Overall, the number of air passengers utilizing New England's primary commercial service airports in 2005 rose by 5.3 percent over 2004. When measured by aircraft operations, however, activity levels fell by 0.6 percent. This reflects sweeping changes in both the commercial aviation and general aviation (GA) sectors of the industry. Passenger numbers rose despite capacity reductions as airlines operated at higher load factors. Carriers flew fewer flights to the regional airports than in 2004, but used larger aircraft on average in 2005, and carried more passengers. GA operations at New England airports declined by 3.8 percent from the 2004 levels. The Boston Transportation Department has raised a number of suggestions related to the Regional Transportation that Massport should consider in the 2006 EDR.

Ground Transportation

This chapter reports on transit ridership, roadways, traffic volumes, and parking for 2005. Specifically, ground transportation activity levels increased from 2004 to 2005 as a result of a 3.6 percent increase in the number of air passengers. In addition, traffic volumes on airport roadways increased by 5.8 percent, while the vehicle miles traveled (VMT) on the airport increased by 4.2 percent. The lower VMT growth when compared to overall traffic volume growth suggests that more direct connections over shorter roadway distances are provided. The facilities at the MBTA Blue Line Airport Station were also substantially improved in 2005, including the conversion from a manual to an automated fare collection system. In addition, full MBTA Silver Line service to Logan Airport began on June 1, 2005. In 2005, Terminal A and its associated access roadways were fully opened for operation. There were no other roadway modifications completed in 2005. In addition, contract negotiations began between Massport and the C & J Bus Company in New Hampshire to expand early morning transportation between New Hampshire and Logan Airport. This service began in 2006. Massport also re-bid its Logan Airport Transportation Management Association (Logan TMA) contract with the Executive Office of Transportation (EOT) through the MassRIDES program.

Noise

The Noise Abatement chapter updates the status of the noise environment at Logan Airport in 2005, and describes Massport's efforts to reduce noise levels. In 2005, the number of people exposed to Day-Night Sound Level (DNL) values greater than 65 decibels (dB) decreased compared to 2004. An estimated 6,477 people were exposed to DNL levels greater than 65 dB in 2005, compared to 9,438 in 2004, and 7,183 in 2003. The total count of people exposed to 65 dB Day-Night Sound Level (DNL) and above was 55 percent lower than in 2001. Winthrop, which has always experienced the highest levels of noise exposure of any community around Logan Airport, continued its decline in the number of people exposed to levels greater than 65 DNL. This number has dropped 81 percent since reaching its peak in 1998. The number of residents

exposed to noise over 75 DNL increased from 2004 but still remained below 2001 levels.

The 2005 Cumulative Noise Index (CNI) of 153.2 Effective Perceived Noise Level (EPNdB) remained well below the cap of 156.5 EPNdB. The CNI decreased slightly compared to 2004 even with a slight increase in the number of operations in 2005. This decrease is primarily due to decreased use of recertified aircraft by cargo operators. Massport provided sound insulation for 471 residential dwelling units in 2005. Since the program's inception, Massport has sound insulated a total of 9,086 dwelling units. The majority of the units insulated in 2005 were in Winthrop.

The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2006 EDR. I also strongly advise Massport to consider and address the numerous comments received that have raised noise related concerns in comments.

Air Quality

The Air Quality/Emissions Reduction chapter provides an overview of airport-related air quality issues in 2005 and efforts to reduce emissions. The 2005 emissions inventory results are driven by the small increase in aircraft operations at Logan Airport compared to 2004 levels. Compared to 2004 levels, total emissions of volatile organic compounds (VOCs) are estimated to have decreased by approximately 6 percent to 1,285 kilograms per day (kg/day). In 2005, total emissions of oxides of nitrogen (NOx) were estimated to be 4,187 kg/day, which is a 2 percent decrease from 2004 levels. Total emissions of carbon monoxide (CO) in 2005 were 9,556 kg/day, or 3 percent lower than 2004 levels.

For the first time, estimates of particulate matter emissions associated with Logan Airport are reported in this 2005 EDR in response to the recent availability of an FAA-approved method for computing particulate matter emission factors for aircraft. Total emissions of particulate matter (PM_{2.5}) at Logan Airport in 2005 were approximately 83 kg/day [33 tons/year (tpy)]. NOx emissions at Logan Airport in 2005 were approximately 662 tpy lower than 1999 levels—a 28 percent decrease. It appears that there is an ongoing trend of decreasing nitrogen dioxide (NO₂) concentrations at both the Massport and Massachusetts Department of Environmental Protection (MassDEP) monitoring sites located in the general vicinity of Logan Airport. In addition, annual NO₂ concentrations at all monitoring locations were well below the NO₂ air quality standards in 2005. The 2006 EDR should continue updates on the information presented in the 2005 EDR.

Water Quality/Environmental Compliance

This chapter describes Massport's ongoing environmental management activities including NPDES compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan, and tank management. Specifically, of the 97 spills reported in 2005, 15 (15 percent) were ten gallons or greater in quantity. Jet fuel spills accounted for 66 (68 percent) of the total spills, 12 of the jet fuel spills (18 percent) were ten gallons or greater in quantity. The remaining 31 spills involved gasoline, hydraulic oil, diesel fuel, and other substances. Of these spills, only

three (10 percent) were ten gallons or greater. In 2005, only eight samples exceeded the regulatory limits. The North Outfall had two samples which exceeded the 15 milligrams per liter (mg/L) National Pollutant Discharge Elimination System (NPDES) limit for oil and grease, and the Porter Street Outfall had one sample exceed this limit. The North Outfall had two samples which exceeded the 0.3 milliliters per liter (ml/L) daily maximum limit for settleable solids, and the West Outfall had three samples exceed this limit. No other exceedances occurred. In accordance with the Massachusetts Contingency Plan (MCP), Massport should continue to report in the 2006 EDR how Massport will assess, remediate, and bring to regulatory closure areas of subsurface contamination.

Sustainability at Logan Airport

This chapter describes Massport's airport wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision. This chapter describes Massport's continued efforts.

As I stated at the beginning of this Certificate, the 2006 EDR must provide responses to the issues raised in comments received. The 2006 EDR must include a copy of this Certificate and a copy of each comment letter received on the 2005 EDR. In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, and noise abatement. Massport should consult directly with individual commentors where necessary.

A distribution list for the 2006 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all GEIR/Annual Update Certificates issued since 1995 to provide context for reviewers. Supporting technical appendices should be provided as necessary.

February 15, 2007

Date



Ian A. Bowles

Comments Received:

01/30/07	State Representative Robert A. DeLeo
01/31/07	Joseph Felzani
02/05/07	Boston Transportation Department
02/06/07	Nancy Timmerman
02/07/07	Stephen Kaiser
02/13/07	City of Boston Environment Department

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November 1, 2007

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
2006 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME : 2006 Environmental Data Report
PROJECT MUNICIPALITY : Boston / Winthrop
PROJECT WATERSHED : Boston Harbor
EOEA NUMBER : 3247
PROJECT PROPONENT : Massachusetts Port Authority
DATE NOTICED IN MONITOR : September 25, 2007

As Secretary of Executive Office of Energy and Environmental Affairs (EEA), I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62H) and with its implementing regulations (301 CMR 11.00).

The environmental review process at Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long range plans. It has thus become (consistent with the objectives of the MEPA regulations) part of Massport's long range planning. In recognition of the increased role of planning in the GEIR process, the name of the document was changed to ESPR. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific EIRs. The ESPR is currently updated on a 5-year basis, with much less detailed Environmental Data

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11/01/07

Reports (formerly Annual Updates) filed in the years between ESPRs. The 2006 EDR is the subject of this Certificate.

In general, the EDR has fulfilled its purpose of providing a "snapshot" of year 2006 passenger and impact levels at Logan Airport. Most environmental parameters showed improvement in calendar year 2006. In particular, the technical studies in the 2006 EDR included reporting on and analysis of key indicators of airport activity levels, airport planning, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. Mitigation of noise impacts and air quality remain key concerns both of this office and the commenters. These commitments take the form of project-specific Section 61 Findings, as well as more general mitigation that has emerged from the ESPR process.

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the 1997 Annual Update proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

Review of the 2006 EDR

As always, EEA remains committed to evaluating and addressing the cumulative impacts of airport operations on the nearby communities. In June 2001, Massport agreed to work with EEA on structuring a proposed Air Quality Initiative (AQI). The Certificate indicated that Massport was "to solicit project submissions from local governments and community groups, which will be reviewed in an objective, science-based process by a neutral organization such as NESCAUM." The 2006 EDR reiterates that Massport has committed to the Air Quality Initiative, a key program designed to mitigate the cumulative air quality impacts of airport operations. The 2006 EDR details how Massport is meeting this commitment. The 2007 EDR should continue to report on the details of Massport's commitment and address the concerns raised by the City of Boston's Environment Department on this issue. In addition to the environmental issues listed below, the 2007 EDR should address all of the air quality and noise related issues raised by the commenters during the review of the 2006 EDR.

Procedural

Given the overall strength of the analysis in the 2006 EDR, the 2007 EDR can restrict itself to providing an update on 2007 conditions, and respond to those issues explicitly noted in this

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operations decreased in 2006 even though the total number of air passengers increased because airlines increased the number of passengers per aircraft operation. Specifically, the total number of aircraft operations declined from 409,066 in 2005 to 406,119 in 2006 which is a decrease of 0.7 percent. Air cargo volumes continued to decline from 728 million pounds in 2005 to 679 million pounds in 2006 with the largest volume decrease in the express/small packages. I advise Massport to consider and attempt to address all comments related to activity levels in the next 2007 EDR.

Planning

The Airport Planning chapter provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2006. It also describes known future planning, construction, and permitting activities. Specifically, several projects were completed in 2006. The new Terminal A, which opened on March 16, 2005, achieved Leadership in Energy and Environmental Design (LEED) certification in June 2006. It is the first airport terminal in the U.S. to earn this ranking. In addition, in November, 2006 the MBTA Silver Line service was enhanced with the addition of the Massachusetts Bay Transportation Authority's (MBTA) Charlie Card automatic fare collection kiosks in all Logan Airport terminals. Several construction projects were also completed, including the construction of the North Service Road (SR-2) Roadway Buffer, which consists of a sidewalk linking the Blue Line Airport Station to Logan Airport Terminals, and a landscaped area adjacent to the sidewalk. Construction of Phase I of the Southwest Service Area (SWSA) buffer, which began in 2005, was completed in the fall of 2006, and the Navy Fuel Pier Edge Buffer was completed in December 2006.

Regional Transportation

This chapter describes activity levels at New England's regional airports in 2006 and updates recent planning activities. Massport has demonstrated that it is coordinating its planning with other transportation agencies, and that this planning effort is aimed at minimizing cumulative impacts from Logan Airport operations. The 2006 EDR includes estimates of potential passenger diversions from Logan, and outlines how Massport planning encourages those diversions.

In general, the 2006 EDR has met the requirements laid out in the EDR Certificate. The directives in the EDR Certificate were laid out to have Massport look at potential diversions, and explain how its planning and coordination with other agencies could impact potential diversions. The 2006 EDR has performed this task.

Overall, the number of air passengers utilizing New England's primary commercial service airports in 2006 declined marginally, from 48.0 million to 47.9 million. When measured by the number of aircraft operations, however, activity levels fell by 4.4 percent, from 1.4 million operations to 1.3 million operations. This reflects substantial changes in the commercial aviation sector and the continued decline of general aviation (GA) noted in the 2005 EDR. Major airlines

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Certificate and the comments received as requiring response in the next EDR. The EDR should provide a "snapshot" of the 2007 operations and impacts, with more substantial analysis awaiting the next EDR. Massport should file the 2007 EDR no later than October 15, 2008 (although I encourage Massport to file sooner, given the relatively few requirements for the next EDR).

A distribution list for the 2007 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all EDR and EDR Certificates issued since the 2004 Logan Environmental Status and Planning Report (issued on August 16, 2006) to provide context for reviewers. Supporting technical appendices should be provided as necessary.

Responses to Comments

The comments received on the 2006 EDR are thoughtful and detailed although I note that some of the comments were received only one day before this Certificate was to be issued. I request that during the review of the 2007 EDR that commenters make every attempt to submit comments by the close of the comment period to allow time for review. The 2007 EDR must include Responses to Comments which addresses all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments included in this EDR is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the next EDR, although the Responses to Comments should pay particular attention to increased specificity, where necessary.

The majority of comments received on the 2006 EDR focused on air quality and noise related issues, including measurement of noise, modeling of noise contours, and noise abatement. In addition to responding to these comments, the 2007 EDR and future EDRs should also continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commenters where necessary.

Organization of the Certificate

I have organized the remainder of this Certificate to respond to issues raised roughly in the order in which they were presented in the 2006 EDR, although I have for the most part incorporated discussion of issues raised in the technical appendix into the discussion of the environmental impact analyses.

Activity Levels

The Activity Levels chapter provides a solid analysis of major activity issues and the technical appendix contains useful and detailed information. This chapter presents aviation activity statistics for Logan Airport in 2006 and compares activity levels to the prior year including air passengers, aircraft operations, fleet mix, and cargo/mail volumes. Air passenger traffic at Logan Airport reached 27.7 million, up from 27.1 million in 2005. The total number of aircraft

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primarily because of decreased use of recertificated aircraft by cargo operators.

Massport provided sound insulation for 857 residential dwelling units in 2006. This is the largest number of units to receive sound insulation in the vicinity of the Airport in any one year since the beginning of the program. Since the program's inception, Massport has sound insulated a total of 9,943 dwelling units. The majority of the units insulated in 2006 were in Chelsea.

The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2007 EDR. I also strongly advise Massport to consider and address the comments received that have raised noise related concerns.

Air Quality

The Air Quality/Emissions Reduction chapter provides an overview of airport-related air quality issues in 2006 and efforts to reduce emissions.

The emissions inventory results are driven largely by improvements to the FAA Emissions and Dispersion Modeling System (EDMS), v5.0.1. These include the addition of aircraft main engine startup VOC emissions; adjustments to how aircraft performance profiles are modeled, which changed aircraft times-in-mode and thus emissions of all pollutants; an advanced method to calculate aircraft PM10/PM2.5 emissions; and updated ground support equipment (GSE) emission factors using NONROAD2005. The in-place air quality initiatives at Logan Airport and other ongoing efforts by Massport to minimize emissions also played a role, as did changes to aircraft taxi time, fleet mix, and number of operations.

The 2006 EDR reports that emissions inventory changes show an increase in VOC over 2005 levels attributed to the changes to EDMS. The 2006 EDR reported that total VOC emission number is up 34 percent (1,724 kg/day). The total NO_x emissions were one percent lower than reported in the 2005 EDR. In 2006, NO_x emissions at Logan Airport were approximately 677 tons per year (tpy) lower than the 1999 threshold level established by Massport's Air Quality Initiative. This represents a 28 percent decrease since 1999. There was a continuing trend of decreasing NO₂ concentrations at both the Massport and Massachusetts Department of Environmental Protection (MDEP) monitoring sites located in the general vicinity of Logan Airport. In addition, in 2006 the annual NO₂ concentrations at all monitoring locations were well below the NO₂ air quality standards.

For the second year (2005 EDR was the first year), estimates of particulate matter emissions associated with Logan Airport are reported in this 2006 EDR in response to the recent availability of an FAA-approved method for computing particulate matter emission factors for aircraft. The total CO decreased 15 percent and the total PM₁₀/PM_{2.5} decreased seven percent below the 2005 EDR reported numbers.

The 2006 EDR emissions inventory analysis used the actual aircraft fleet mix, except in the few

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reduced capacity at the regional airports in 2006 as they reconfigured their operations in an effort to consolidate gains made in bankruptcy and near-bankruptcy restructuring. Passenger declines were generally consistent with capacity reductions. In addition, the average aircraft size of scheduled flights to the regional airports declined in 2006 as airlines substituted regional jet service for mainline jets on certain routes. Declines in GA activity in New England (declined by 4.2 percent from 2005 levels) continue to outpace declines in the rest of the country. According to the FAA as reported in the 2006 EDR, GA activity declined by 1.3 percent nationally in 2006, largely due to rising fuel costs.

Ground Transportation

The 2006 EDR serves its purpose of updating 2006 ground access conditions on the airport, and has also adequately addressed the larger ground access issues identified in previous Certificates, as discussed below.

This chapter reports on transit ridership, roadways, traffic volumes, and parking for 2006. Specifically, ground transportation activity levels increased across the board from 2005 to 2006 as a result of a 2.4 percent increase in the number of air passengers. Also, a portion of I-90 connecting the City of Boston and areas to the south and west of Boston to Logan Airport was closed from July 2006 until early 2007, which is believed to have reduced traffic flows to and from the Airport. The 2006 EDR reports that ridership on the MBTA, Logan Express, water transportation, scheduled and unscheduled HOV Services, and taxis increased in 2006. This is due in part to the completion of roadway and other construction projects at the Airport, and to the closure of the I-90 connector to the Airport for much of 2006. Massport-subsidized service provided by the C & J Bus Company began in 2006 providing early morning transportation between New Hampshire and Logan Airport. The 2006 EDR also reports that the number of on-airport parkers decreased by 8.4 percent in 2006.

Noise

The Noise Abatement chapter updates the status of the noise environment at Logan Airport in 2006, and describes Massport's efforts to reduce noise levels. The technical appendix contains useful and detailed information, while the main text provides a solid analysis of major noise issues. Many of the issues raised in the noise analysis are ongoing and require continuous monitoring a point raised by several commenters. The EDR represents an appropriate forum to serve this updating function.

In 2006, the overall number of people exposed to Day-Night Sound Level (DNL) values greater than 65 decibels (dB) decreased in 2006 compared to 2005. An estimated 5,583 people were exposed to DNL levels greater than 65 dB in 2006, compared to 6,477 in 2005, and 9,438 in 2004. For the second year in a row, fewer than 7,000 people experienced levels of 65 dB DNL and above. The 2006 Cumulative Noise Index (CNI) of 152.6 Effective Perceived Noise Level (EPNdB) remained well below the cap of 156.5 EPNdB. The CNI decreased compared to 2005

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instances where aircraft/engine types or combinations were not available in the EDMS database. Data included aircraft type, engine, landing and takeoff operations (LTOs) and aircraft taxi times. Aircraft types are divided into four categories: commercial air carriers, commuter aircraft, general aviation and cargo.

The 2007 EDR should continue updates on the information presented in the 2006 EDR and address comments received related to air quality. In particular the City of Boston has raised several concerns the Massachusetts Department of Public Health's (DPH) Logan Airport Health Study and the air quality monitoring study. The 2007 EDR should update the status of discussions with the City of Boston related to this concern.

Last, I ask that Massport consult with the MEPA office regarding the recently promulgated Greenhouse Gas Emissions Policy and Protocol prior to subsequent filings.

Water Quality/Environmental Compliance

This chapter describes Massport's ongoing environmental management activities including NPDES compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan, and tank management. Specifically, Logan Airport experienced 92 hazardous material spills in 2006, 11 (12 percent) were considered reportable (i.e., over 10 gallons) under the applicable environmental regulations. Jet fuel spills accounted for 65 (71 percent) of the total spills, with nine of the jet fuel spills exceeding 10 gallons. The remaining 27 spills (29 percent) involved gasoline, hydraulic oil, diesel fuel, and other substances, including two reportable spills.

In 2006, only four of 332 outfall samples exceeded the regulatory limits. The West Outfall and the Maverick Street Outfall each had one sample which exceeded the 15 milligrams per liter (mg/L) National Pollutant Discharge Elimination System (NPDES) limit for oil and grease. The North Outfall had two samples which exceeded the 0.3 milliliters per liter (ml/L) daily maximum limit for settleable solids. This is an improvement compared to 2005, when eight samples exceeded the regulatory limits. In accordance with the Massachusetts Contingency Plan (MCP), Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination. In 2006, two of its five MCP sites were closed out, and Massport was working towards achieving regulatory closure of the three remaining MCP sites. In accordance with the Massachusetts Contingency Plan (MCP), Massport should continue to report in the 2007 EDR how Massport will assess, remediate, and bring to regulatory closure areas of subsurface contamination.

Sustainability at Logan Airport

This chapter describes Massport's airport wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable

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design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision.

This chapter describes Massport's continued efforts including Massport-wide sustainability and details how sustainability is incorporated into many aspects of Massport's activities: Planning and Design; Construction; Operations, Maintenance and Management; and Monitoring of Environmental Performance.

Massport has been a leader in sustainable development. Terminal A, which opened in 2005, received LEED certification in 2006. It is the first airport terminal in the country to receive such certification, and is a model for other airports in the country. In addition, in an effort to reduce air pollutants, Massport is phasing in alternative fuel vehicles in place of conventionally-fuel vehicles. At the airport, Massport maintains electric vehicles infrastructure, as well as a privately operated CNG station to power newer vehicles. The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2007 EDR.



Ian A. Bowles

November 1, 2007

Date

Comments Received:

- 10/24/07 Nancy Timmerman
- 10/25/07 Stephen Kaiser
- 10/26/07 **Town of Lincoln**, Lincoln Board of Selectmen
- 10/31/07 City of Boston's Environment Department
- 10/31/07 The Boston Harbor Association

IAB/ACC/act



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October 31, 2008

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
ON THE
2007 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME : 2007 Environmental Data Report
PROJECT MUNICIPALITY : Boston / Winthrop
PROJECT WATERSHED : Boston Harbor
EOEA NUMBER : 3247
PROJECT PROPONENT : Massachusetts Port Authority
DATE NOTICED IN MONITOR : September 24, 2008

As Secretary of Executive Office of Energy and Environmental Affairs (EEA), I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62I) and with its implementing regulations (301 CMR 11.00).

The environmental review process at Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long range plans. It has thus become (consistent with the objectives of the MEPA regulations) part of Massport's long range planning. In recognition of the increased role of planning in the Generic Environmental Impact Report (GEIR) process, the name of the document was changed to ESPR. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific EIRs. The ESPR is currently updated on a 5-year basis, with much less detailed Environmental Data Reports (EDR) (formerly Annual Updates) filed in the years between ESPRs. The 2007 EDR is the subject of this Certificate.

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In general, the EDR has fulfilled its purpose of providing a "snapshot" of year 2007 passenger and impact levels at Logan Airport. Most environmental parameters showed improvement in calendar year 2007. In particular, the technical studies in the 2007 EDR included reporting on and analysis of key indicators of airport activity levels, airport planning, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. Mitigation of noise impacts and air quality remain key concerns both of this office and the commenters. These commitments take the form of project-specific Section 61 Findings, as well as more general mitigation that has emerged from the ESPR process.

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the 1997 Annual Update proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

Review of the 2007 EDR

As always, EEA remains committed to evaluating and addressing the cumulative impacts of airport operations on the nearby communities. In June 2001, Massport agreed to work with EEA on structuring a proposed Air Quality Initiative (AQI). The Certificate indicated that Massport was "to solicit project submissions from local governments and community groups, which will be reviewed in an objective, science-based process by a neutral organization such as NESCAUM." The 2007 EDR reiterates that Massport has committed to the Air Quality Initiative, a key program designed to mitigate the cumulative air quality impacts of airport operations. The 2007 EDR details how Massport is meeting this commitment. The 2008 EDR should continue to report on the details of Massport's commitment and address the concerns raised by the commenters on this issue. In addition to the environmental issues listed below, the 2008 EDR should address all of the air quality and noise related issues raised by the commenters during the review of the 2007 EDR.

Procedural for 2008 EDR

Given the overall strength of the analysis in the 2007 EDR, the 2008 EDR can restrict itself to providing an update on 2008 conditions, and respond to those issues explicitly noted in this Certificate and the comments received as requiring response in the next EDR. The EDR should

provide a "snapshot" of the 2008 operations and impacts, with more substantial analysis awaiting the next ESPR. Massport should file the 2008 EDR no later than October 15, 2009 (although I encourage Massport to file sooner).

A distribution list for the 2008 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2004 Logan Environmental Status and Planning Report (issued on August 16, 2006) to provide context for reviewers. Supporting technical appendices should be provided as necessary.

Responses to Comments

The comments received on the 2007 EDR are thoughtful and detailed. The 2008 EDR must include Responses to Comments which addresses all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments included in this EDR is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the next EDR, although the Responses to Comments should pay particular attention to increased specificity, where necessary.

The majority of comments received on the 2007 EDR focused on air quality and noise related issues, including measurement of noise, modeling of noise contours, and noise abatement. In addition to responding to these comments, the 2008 EDR and future EDRs should also continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commentators where appropriate.

Organization of the Certificate

I have organized the remainder of this Certificate to respond to issues raised roughly in the order in which they were presented in the 2007 EDR, although I have for the most part incorporated discussion of issues raised in the technical appendix into the discussion of the environmental impact analyses.

Activity Levels

The Activity Levels chapter provides a solid analysis of major activity issues and the technical appendix contains useful and detailed information. This chapter presents aviation activity statistics for Logan Airport in 2007 and compares activity levels to the prior year including air passengers, aircraft operations, fleet mix, and cargo/mail volumes. In 2007, the total number of air passengers reached 28.1 million, up from 27.7 million in 2006. The increase in the number of air passengers at Logan Airport was 1.4 percent compared to 2.4 percent in the previous year. Specifically, the total number of aircraft operations declined from 406,119 in 2006 to 399,537 in 2007, a decrease of 1.6 percent. Operations by general aviation (GA) aircraft

decreased most significantly (8.9 percent) in 2007 as compared to passenger and cargo operations. As a result of continued passenger growth and a reduction in operations, the number of air passengers per aircraft operation continued to increase in 2007. Air cargo volumes, continued to decline from 679 million pounds in 2006 to 632 million pounds in 2007. In addition to reporting the analysis of major activity issues, I advise Massport to consider and attempt to address all comments related to activity levels in the 2008 EDR.

Planning

The Airport Planning chapter provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2007. It also describes known future planning, construction, and permitting activities. Several projects were completed in 2007 including the International Gateway Project (Terminal E) Phase 2. The Federal Inspection Services (FIS) facility was enlarged and the new arrivals level was constructed with the other Phase 2 improvements. The replacement GA Facility in the North Cargo Area was completed and opened in June, 2007 and the southwest corner of Taxiway D was realigned. In addition, the Terminal Area Roadway Landscaping was completed in 2007 and significant portions of Bremen Street Park were completed in early 2007. Also Phase II of the West Garage Project was completed which added three levels of parking to the Central Garage.

Regional Transportation

In general, the 2007 EDR has met the requirements laid out in the ESPR Certificate with respect to regional transportation issues. This chapter describes activity levels at New England's regional airports in 2007 and updates recent planning activities. Massport has demonstrated that it is coordinating its planning with other transportation agencies, and that this planning effort is aimed at minimizing cumulative impacts from Logan Airport operations. The 2007 EDR includes estimates of potential passenger diversions from Logan, and outlines how Massport planning encourages those diversions. The total number of air passengers using New England's primary commercial service airports in 2007 increased marginally, from 47.13 million in 2006 to 47.2 million. Of the 47.2 million air passengers using New England's primary commercial service airports in 2007, 60 percent utilized Logan Airport as compared to 88 percent in 1995. When measured by the number of aircraft operations, activity levels fell by 2.1 percent, from 1.33 million operations in 2006 to 1.31 million operations in 2007.

The directives in the ESPR Certificate were laid out to have Massport look at potential diversions, and explain how its planning and coordination with other agencies could impact potential diversions. The 2007 EDR has performed this task. I direct Massport to continue the directive from the ESPR Certificate for the 2008 EDR.

This chapter also reflects that passenger traffic at the regional airports fell by 1.6 percent. Major airlines reduced capacity at the regional airports in 2007 because they eliminated unprofitable

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routes and reduced their domestic flying to deal with the high and rising cost of fuel. Passenger declines were generally consistent with capacity reductions. Declines in GA activity in New England (declined by 3.5 percent compared with 2.6 percent nationally in 2007) continue to outpace declines in the rest of the country, which is largely attributed to the impact of rising fuel costs on recreational flying.

Ground Transportation

The 2007 EDR serves its purpose of updating 2007 ground access conditions on the airport, and has also adequately addresses the updating of the three new programs to support employees' use of alternative transportation options.

This chapter reports on transit ridership, roadways, traffic volumes, and parking for 2007. Specifically, ground transportation activity levels increased across the board from 2006 to 2007 as a result of a 1.4 percent increase in the number of air passengers. The re-opening of Interstate 90 (I-90) connecting the City of Boston and areas to the south and west of Boston to Logan Airport resulted in increased traffic flows to and from the Airport when compared to previous years. The 2007 EDR reports that ridership on water transportation, scheduled and unscheduled high occupancy vehicle (HOV) services, and employee ridership on Logan Express increased over 2005 levels. The 2007 EDR also reports that the number of on-Airport parkers decreased by 16.9 percent in 2007 compared to 2005. A portion of this decrease is likely due to the increase of pick-up and drop-off at the Airport.

I also note that this chapter discusses that the Logan Employee Transportation Management Association (Logan TMA) introduced and implemented three new programs to support employees' use of alternative transportation options: the Sunrise Shuttle, which provides shuttle services between 3:00 AM and 5:30 AM for Airport employees who reside in East Boston; the Logan TMA Preferential Carpooling, which provides free terminal garage parking to employees in Logan TMA member companies who carpool in groups of three or more; and the Commuter Cash program, which financially rewards employees (\$3/day) who switch from driving alone to either carpooling, bicycling, walking, or using public transportation. The 2008 EDR should continue to update 2008 ground access conditions on the airport and report on the use of the three new programs to support employees' use of alternative transportation options.

Noise

The Noise Abatement chapter updates the status of the noise environment at Logan Airport in 2007, and describes Massport's efforts to reduce noise levels. The technical appendix contains useful and detailed information, while the main text provides a solid analysis of major noise issues. Many of the issues raised in the noise analysis are ongoing and require continuous monitoring, a point raised by several commenters. The future 2008 EDR represents an appropriate forum to serve this updating function.

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2007 was the first full year of operation for Runway 14-32. Consistent with the 2002 Record of Decision (ROD) on the Airside Improvements Planning Project and based on FAA data, the runway was used primarily for arrivals over Boston Harbor during 2007. Consistent with historical patterns, despite the introduction of Runway 14-23, the FAA continued to rely on Logan Airport's north-south traffic flow in 2007. However, within the north-west flow, the FAA increased reliance on Runway 33L for departures with an associated reduction in Runway 27 departures. The changes in runway utilization in 2007 have led to changes in the noise environment. Since 2006, the noise contours over East Boston increased in extent and, over the same period, decreased over South Boston, Revere, and Winthrop.

The population within the 75-80 decibel (dB) DNL contours decreased in 2007 compared to 2006. In 2006, the population in the 75-80 dB DNL contour was 104 but in 2007 zero population was located in this contour. In 2006, the population in the 70-75 dB DNL contour was 597 compared to 416 in 2007. The overall number of people exposed to Day-Night Sound Level (DNL) values greater than 65 decibels (dB) increased 36 percent compared to 2006. An estimated 7,591 people were exposed to DNL levels greater than 65 dB in 2007, compared to 5,583 in 2006. This is still well below the pre-September 11, 2001, level of 17,745. The residences exposed to DNL levels greater than 65 dB in 2007 are located within the 65 dB sound insulation contour, and thus are within areas that have been sound insulated by Massport. The comments from the Boston Transportation Department, the City of Cambridge as well as from individuals such as Mr. Peter Koff and Ms. Nancy Timmerman have raised a number of concerns and suggestions related to noise that Massport should consider incorporating into the 2008 EDR.

In 2007, Massport provided sound insulation to 548 homes, the majority of which were in Chelsea. Since the inception of Massport's Sound Insulation program, 10,461 homes in East Boston, South Boston, Winthrop and Chelsea have received sound insulation.

The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2008 EDR. I also strongly advise Massport to consider and address the comments received that have raised noise related concerns.

Air Quality

The Air Quality/Emissions Reduction chapter provides an overview of airport-related air quality issues in 2007 and efforts to reduce emissions. The emissions inventory results were driven largely by three factors: changes in the aircraft fleet mix at the Airport (the airlines' substitution of select narrow-body aircraft with wide-body and commuter aircraft); the reported change in the aircraft average taxi/delay times at Logan Airport; and continual improvements to the FAA Emissions and Dispersion Modeling System (EDMS), v5.0.2, particularly in regard to the advanced method for calculating particulate matter (PM) emissions from aircraft engines. Because of the changes to the EDMS model, total modeled emissions of PM10/PM2.5 associated

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with Logan Airport in 2007 appeared to have increased by approximately 64 percent to 128 kilograms per day (kg/day) compared to 2006 levels. By comparison, using the EDMS version available in 2006 (v5.0.1) total emissions of PM10/PM2.5 would have increased by approximately 5 percent to 82 kg/day due to a combination of changes in aircraft fleet mix and aircraft taxi/delay time. This data shows that the estimated increase in PM10/PM2.5 was due mostly to the updated EDMS model and not the result of significant changes in Airport operations. Nonetheless, the increases in modeled emissions are notable and I encourage Massport to revisit all feasible efforts to mitigate PM10/PM2.5 emissions.

The 2007 EDR reports that the total emissions of volatile organic compounds (VOC) were 1,673 kg/day, or 3 percent lower than 2006 levels. Total emissions of carbon monoxide (CO) were 9,233 kg/day, or 13 percent higher than 2006 levels. Total emissions of oxides of nitrogen (NOx) were 4,457 kg/day, or 7 percent higher than 2006 levels. In 2007, total NOx emissions at Logan Airport were approximately 541 tons per year lower than the 1999 Air Quality Initiative (AQI) benchmark which represents a 27 percent decrease in NOx emissions at Logan Airport since 1999. There was also a continuing trend of decreasing nitrogen dioxide (NO2) concentrations at both the Massport and Massachusetts Department of Environmental Protection (MA DEP) monitoring sites located in the general vicinity of Logan Airport. In addition, the annual NO2 concentrations at all monitoring locations in 2007 were within the NO2 Air Quality Standards.

In the 2007 EDR Massport for the first time has voluntarily submitted its first emission inventory of greenhouse gas (GHG) emissions directly and indirectly associated with Logan Airport. "Direct emissions" are those that occur in areas located within the Airport's geographic boundaries and "indirect emissions" are those that occur off the Airport site. "Direct" GHG emissions associated with Logan Airport in 2007 were 0.37 million metric tons (MMT), and the sum of "direct" and "indirect" emissions was 0.69 MMT (less than 0.1 percent of state-wide totals). Massport has control of only 18 percent of these combined totals and will implement plans by 2009 to reduce further GHGs associated with its operations at Logan Airport helping minimize the Airport's carbon footprint.

The 2008 EDR should continue updates on the information presented in the 2007 EDR and address comments received related to air quality. In particular the Mr. Peter Koff has raised several concerns related to air quality monitoring and the Massachusetts Department of Public Health's (DPH) Logan Airport Health Study. The 2008 EDR should clarify this issue and update the status of any air quality monitoring related to this concern.

Water Quality/Environmental Compliance

This chapter describes Massport's ongoing environmental management activities including NPDES compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan, and tank management.

I note on July 31, 2007, the Environmental Protection Agency (EPA) and MA DEP issued a new National Pollutant Discharge Elimination System (NPDES) Program permit for Logan Airport's stormwater outfalls. The new NPDES permit regulates stormwater discharges from the North, West, Northwest, Porter Street, and Maverick Street Outfalls, and all of the airfield outfalls. The previous NPDES permit regulated stormwater discharges only from the North, West, Porter Street, and Maverick Street Outfalls. The new NPDES permit also has additional sampling requirements, including the requirement to sample for deicing compounds. In 2007, three of 404 outfall samples exceeded the regulatory limits contained in the NPDES permit. The Maverick Street Outfall had two samples exceed the 100 milligrams per liter (mg/L) daily maximum limit for Total Suspended Solids (TSS) and the West Outfall had one sample exceed this limit. This is an improvement compared to 2004 and 2006 when four samples exceeded the regulatory limits, and 2005 when eight samples exceeded the regulatory limits.

In 2007, Massport completed an update to the Airport's Stormwater Pollution Prevention Plan (SWPPP). The SWPPP addresses stormwater pollutants in general, and also addresses deicing and anti-icing chemical, potential bacteria, fuel and oil, and other sources of stormwater pollutants. Best management practices (BMPs) are included in the SWPPP. Also in accordance with the Massachusetts Contingency Plan (MCP), Massport continued to assess, remediate, and bring to regulatory closure areas of subsurface contamination. In 2007, Massport worked towards achieving regulatory closure of six remaining MCP sites. Massport should continue to report in the 2008 EDR how Massport will assess, remediate, and bring to regulatory closure areas of subsurface contamination.

Sustainability at Logan Airport

This chapter describes Massport's airport wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision.

This chapter describes Massport's continued efforts including Massport-wide sustainability and details how sustainability is incorporated into many aspects of Massport's activities: Planning and Design; Construction; Operations, Maintenance and Management; and Monitoring of Environmental Performance which are detailed in this chapter. The replacement GA Facility in the North Cargo Area, which was constructed in early 2007 and opened in June 2007, is an example of planning and design sustainability initiatives being undertaken at Logan Airport. The new GA Facility incorporates sustainable design, construction, and operational elements. On the operations and maintenance in 2007, Massport created preferred parking areas in garages and

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parking areas throughout Logan Airport to promote use of lower emitting vehicles. In cooperation with the City of Boston, in the spring of 2007, Massport began a limited head-of-line privilege program for taxis using AFVs, helping to increase the use of alternatively-powered taxis. Additionally, in 2007, Massport created a Cell Phone Waiting Lot, a new parking area where drivers picking up arriving passengers can park for a maximum of 30 minutes. The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2008 EDR.

Conclusion

As I stated at the beginning of this Certificate, the 2008 EDR must provide responses to the issues raised in comments received. The 2008 EDR must include a copy of this Certificate and a copy of each comment letter received on the 2007 EDR. In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, noise abatement, and air quality issues. Massport should consult directly with individual commentors where appropriate.

October 31, 2008

Date



Ian A. Bowles

Comments Received:

- 10/20/2008 Boston Transportation Department
- 10/20/2008 Peter L. Koff, Engel & Schulz, LLP
- 10/24/2008 Stephen H. Kaiser, PhD
- 10/27/2008 City of Cambridge, Robert Healy, City manager
- 10/28/2008 Nancy Timmerman

IAB/ACC/acc



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November 13, 2009

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
 ON THE
 2008 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME : 2008 Environmental Data Report
 PROJECT MUNICIPALITY : Boston / Winthrop
 PROJECT WATERSHED : Boston Harbor
 EOE NUMBER : 3247
 PROJECT PROPONENT : Massachusetts Port Authority
 DATE NOTICED IN MONITOR : October 7, 2009

As Secretary of Executive Office of Energy and Environmental Affairs (EEA), I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62I) and with its implementing regulations (301 CMR 11.00).

The environmental review process at Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long range plans. It has thus become (consistent with the objectives of the MEPA regulations) part of Massport's long range planning. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific EIRs. The ESPR is currently updated on a 5-year basis, with less detailed Environmental Data Reports (EDR) (formerly Annual Updates) filed in the years between ESPRs. The EDR addressing airport operations during 2008 is the subject of this Certificate.

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EDR Certificate

November 13, 2009

In general, the EDR has fulfilled its purpose of providing a "snapshot" of year 2008 passenger and impact levels at Logan Airport. Most environmental parameters showed improvement in calendar year 2008. In particular, the technical studies in the 2008 EDR included reporting on and analysis of key indicators of airport activity levels, airport planning, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. Mitigation of noise impacts and air quality remain key concerns both of this office and the commenters. These commitments take the form of project-specific Section 61 Findings, as well as more general mitigation that has emerged from the ESPR process.

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the 1997 *Annual Update* proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

The last Logan ESPR was filed for calendar year 2004. Following the recent sequence of annual environmental filings, the environmental filing scheduled for next year was previously anticipated to be in the form of an ESPR rather than an EDR. However, due to the current economic downturn, as described in this 2008 EDR, activity levels at Logan Airport and associated environmental impacts continue to remain well below historic levels and recent peaks. In 2009, near-term activity levels and associated environmental effects are also expected to remain well below levels previously analyzed for Logan Airport. Thus, the forecasted aviation growth presented in the 2004 ESPR, the predicate upon which the ESPR schedule was initially established, has not occurred. Therefore, I will allow Massport to prepare a 2009 EDR in lieu of the scheduled ESPR. The 2009 EDR should address the activity levels observed in 2009 in comparison with those predicted in the 2004 ESPR. The 2009 EDR should explain Massport's proposed schedule for filing the next ESPR in light of observed and expected activity levels and any other changes in airport operations that have occurred since the 2004 ESPR was filed. Where appropriate, Massport must continue to identify and address any longer term aviation and environmental trends in each annual filing whether that will be in the form of an EDR or ESPR.

Review of the 2008 EDR and Scope for the 2009 EDR

Procedural for 2009 EDR

The 2009 EDR must provide an annual update on conditions at Logan Airport for calendar year 2009. The 2009 EDR should continue to serve as a background/context against which projects at Logan Airport can be evaluated. It should also report on the cumulative effects of Logan Airport operations and activities, compared to 2008.

The 2009 EDR must respond to those issues explicitly noted in this Certificate and the comments received in the next EDR. The EDR should provide a "snapshot" of the 2009 operations and impacts, with more substantial analysis awaiting the next ESPR. Massport should file the 2009 EDR no later than October 15, 2010.

A distribution list for the 2009 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2004 Logan Environmental Status and Planning Report (issued on August 16, 2006) to provide context for reviewers. Supporting technical appendices should be provided as necessary.

Responses to Comments

The comments received on the 2008 EDR are thoughtful and detailed. The 2009 EDR must include Responses to Comments which addresses all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments included in this EDR is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the next EDR, although the Responses to Comments should pay particular attention to increased specificity, where necessary.

The majority of comments received on the 2008 EDR focused on air quality and noise related issues, including measurement of noise, modeling of noise contours, and noise abatement. In addition to responding to these comments, the 2009 EDR and future EDRs should also continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commentators where appropriate.

Organization of the Certificate

I have organized the remainder of this Certificate to respond to issues raised roughly in the order in which they were presented in the 2008 EDR, although I have for the most part incorporated discussion of issues raised in the technical appendix into the discussion of the environmental impact analyses.

Activity Levels

The Activity Levels chapter provides a solid analysis of major activity issues and the technical appendix contains useful and detailed information. This chapter presents aviation activity statistics for Logan Airport in 2008 and compares activity levels to the prior year including air passengers, aircraft operations, fleet mix, and cargo/mail volumes. The total number of air passengers at Logan Airport dropped to 26.1 million from 28.1 million in 2007. The decrease in the total number of air passengers was 7.1 percent. In addition, the total number of aircraft operations declined from 399,537 in 2007 to 371,604 in 2008, a decrease of 7 percent. The 2008 EDR also reports that the passenger aircraft operations decreased by 6.4 percent and operations by general aviation (GA) aircraft also declined by 16.8 percent from 2007. The average domestic load factor (average number of passengers per available seat) for flights also dropped to 72.8 percent, from 74.9 percent in 2007. However, the number of air passengers per aircraft operation was similar to the previous year with an average of 70.2 passengers per aircraft operation in 2008. In response to high and rising fuel prices and declining passenger demand, both low-cost carriers (LCCs) and legacy airlines reduced the number of aircraft operations at Logan Airport. Air cargo volumes, excluding mail, continued to decline from 652 million pounds in 2007 to 588 million pounds in 2008.

For the 2009 EDR, the Activity Levels chapter should include:

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport;
- Passenger activity levels;
- Cargo and mail activities;
- A comparison of the 2009 aircraft operations, cargo/mail operations, and passenger activity levels to 2008 activity levels; and
- A report on national aviation trends in 2009 and a comparison to trends at Logan Airport.

In addition to reporting the analysis of major activity issues, I advise Massport to consider and attempt to address all comments related to activity levels in the 2009 EDR.

Planning

The Airport Planning chapter provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2008. It also describes known future planning, construction, and permitting activities. In 2008 the replacement Signature Flight Support GA Facility in the North Cargo Area (NCA) was certified under the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) Green Building Rating System. In addition, several other projects were also completed in 2008. The southwest corner taxiway system was realigned and the northern portion of the centerfield taxiway was constructed and was operational in 2008. Also Phase 1 of the Consolidated Maintenance Facility was constructed in the NCA and Phase 2, involving rehabilitation of the existing Facilities Building Number 2, began. Massport also completed renovations of the existing gas station in the NCA, which included installing Logan Airport's first E85 fuel dispensing tank. (E85 is an alcohol fuel

mixture that typically contains a mixture of up to 85 percent denatured ethanol and gasoline or other hydrocarbon.) In 2008 Massport also completed the final construction of the Bremen Street Park. In addition, a security wall was installed along the perimeter of the air operations area in the North Service Area.

For the 2009 EDR, the Airport Planning chapter should describe the status of planning initiatives for the:

- Terminal Area;
- Airside Area;
- Service and Cargo Areas; and
- Airport Buffers and Landscaping.

The chapter should also report on the status of public works projects implemented by other agencies within the boundaries of Logan Airport. Massport should continue to assess planning strategies for improving Logan Airport's operations and services in a, safe, secure, efficient, and environmentally sensitive manner.

Regional Transportation

In general, the 2008 EDR has met the requirements with respect to regional transportation issues. This chapter describes activity levels at New England's regional airports in 2008 and updates recent planning activities. Massport has demonstrated that it is coordinating its planning with other transportation agencies, and that this planning effort is aimed at minimizing cumulative impacts from Logan Airport operations. The 2008 EDR includes estimates of potential passenger diversions from Logan, and outlines how Massport planning encourages those diversions. The total number of air passengers utilizing New England's primary commercial service airports decreased from 47.2 million in 2007 to 44.4 million in 2008. This represents a passenger traffic decline of 5.9 percent. Activity levels as measured by the number of aircraft operations fell by 7.7 percent, from 1.31 million operations in 2007 to 1.21 million operations in 2008.

The decreases in passenger traffic and aircraft operations at New England airports reflect national trends in the face of volatile fuel prices and a worsening global economy. Specifically, of the 44.4 million air passengers using New England's primary commercial service airports, 59 percent of air passengers used Logan Airport in 2008 and 60 percent in 2007, as compared to 88 percent in 1995. In addition, air passenger traffic in the region fell more quickly than in the overall U.S. domestic market. As reported in the 2008 EDR, airlines introduced major reductions in operations through the year, eliminating less profitable routes and cutting frequencies in smaller markets. Fuel prices also forced airlines to ground less fuel efficient aircraft, as well as aircraft with high per seat operating costs, such as the small regional jets (with 50 seats or fewer) prevalent at the regional airports. As a result, the average number of seats per scheduled flight at the regional airports increased from 84 in 2007 to 88 in 2008. In comparison to 2007 levels, the operations by GA aircraft at New England regional airports declined by 7.6

percent. Declines in GA activity in New England also outpaced declines in the rest of the country. According to the FAA, GA activity fell by 5.6 percent nationally in 2008, due to high fuel costs resulting in a sharp decrease in recreational flying.

The directives in the EDR Certificate were laid out to have Massport look at potential diversions, and explain how its planning and coordination with other agencies could impact potential diversions. The 2008 EDR has performed this task.

I direct Massport to continue the directive from the EDR Certificate for the 2009 EDR. In addition, for 2009 EDR the chapter on Regional Transportation should describe Logan Airport's role in the region's intercity transportation system by reporting on the following related to Regional Airports and Regional Transportation System:

- 2009 regional airport operations, passenger activity levels, and schedule data within an historical context;
- Status of plans and new improvements as provided by the regional airport authorities;
- Ground Access improvements to the regional airports; and
- The role that Worcester Regional Airport and Hanscom Field play in the regional aviation system and Massport's efforts to promote these airports.

Regional Transportation System

- Massport's efforts in strengthening the regional transportation system;
- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and
- Report on metropolitan and regional rail initiatives and ridership.

Ground Transportation

The 2008 EDR serves its purpose of updating 2008 ground access conditions on the airport, and has also adequately addresses the updating of the three new programs to support employees' use of alternative transportation options.

This chapter reports on transit ridership, roadways, traffic volumes, and parking for 2008. Specifically, ground transportation activity levels associated with Logan Airport generally decreased for all surface transportation modes from 2007 to 2008 as a result of a 7 percent decline in the annual number of air passengers. In addition, the average daily traffic on Airport roadways decreased by 13 percent from 2007 to 2008, while vehicle miles traveled (VMT) decreased by 11 percent. This can be attributed directly to a decrease in annual passengers at the Airport. Air passenger ridership on Logan Express bus service also decreased by 14 percent in 2008 compared to 2007. However, Silver Line boardings at the Airport increased 5 percent. The increase in Silver Line ridership is likely due to new ridership as well as diversion from other services, such as from water transportation, limousines, and taxis. Ridership on water transportation decreased by 12 percent, limousine ridership decreased by 19 percent, and taxi

dispatches decreased 9 percent.

The 2008 EDR also documented that over the past several years, transit services have seen substantial increases in employee use. In 2008, the number of employees using Logan Express increased by 7 percent. In 2008, the Logan Transportation Management Association (Logan TMA) continued the operation of three programs that were introduced in 2007: 1) Sunrise Shuttle, which provides shuttle services between 3:00 A.M. and 5:30 A.M. for Airport employees who reside in East Boston; 2) Logan TMA Preferential Carpooling, which provides free parking at the West Garage to employees of Logan TMA member companies who carpool in groups of three or more; and 3) the Commuter Cash program, which financially rewards employees (\$3/day) who switch from driving alone to either carpooling, bicycling, walking, or using public transportation. The number of vehicles parked on-Airport decreased by 14 percent in 2008 compared to 2007. The most significant change to the parking supply was the 40 percent reduction of spaces in the Economy Lot due to construction activities during most of the year.

The 2009 EDR should continue to update 2009 ground access conditions on the airport and report on the use of the three new programs to support employees' use of alternative transportation options. The chapter should also report on 2009 conditions and provide a comparison of 2009 findings to those of 2008 for the following:

- High occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Scheduled, Unscheduled, Water Transportation, and Logan Express);
- Logan Airport Employee Transportation Management Association (Logan TMA) membership and services;
- Logan Airport gateway volumes;
- On-airport traffic volumes;
- On-airport vehicle miles traveled (VMT). VMT will be calculated using the updated model created in 2004 that is based on the full build roadway network;
- Parking demand and management (including rates and duration statistics); and
- Ground access management strategy.

Noise

The Noise Abatement chapter updates the status of the noise environment at Logan Airport in 2009, and describes Massport's efforts to reduce noise levels. The technical appendix contains useful and detailed information, while the main text provides a solid analysis of major noise issues. Many of the issues raised in the noise analysis are ongoing and require continuous monitoring, a point raised by several commenters. The future 2009 EDR represents an appropriate forum to serve this updating function.

The decrease in aircraft operations in 2008 led to changes in the noise environment. The 2008 Day-Night Sound Level (DNL) contours were smaller in almost all locations compared to 2007. The 65 decibel (dB) DNL contour decreased in size in East Boston pulling back from

across the Chelsea River to the East Boston waterfront. Over Winthrop and Revere, the DNL 65 dB contour decreased slightly with additional reductions out over Boston Harbor. The population exposed to noise levels greater than DNL 70 dB decreased in 2008 compared to 2007. In 2007, the population exposed to noise levels greater than DNL 70 dB was 416 but in 2008 the number dropped to 249. The overall number of people exposed to DNL values greater than 65 dB decreased 26 percent in 2008 compared to 2007. An estimated 5,968 people were exposed to DNL levels greater than 65 dB as depicted in the 2008 contour, compared to 8,099 in 2007. The residences exposed to DNL levels greater than 65 dB in 2008 are located within the 65 dB sound insulation contour, and thus are within areas that already have been sound insulated by Massport.

In 2008, Massport provided sound insulation to 388 homes, the majority of which were in Chelsea. The focus of this program in Chelsea is to fulfill federal and state mitigation commitments related to the opening of Runway 14-32. Since the inception of Massport's Sound Insulation program, 10,849 homes have received sound insulation in East Boston, South Boston, Winthrop, and Chelsea.

In 2008, Massport continued installing an improved Noise Monitoring System (NOMS). The flight tracking system and all new noise monitors were operational in 2008. Combined with new noise monitor software, the system has an improved capability of correlating measured noise events with individual flight tracks. This has greatly reduced differences between measured and modeled DNL values.

The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2009 EDR. I also strongly advise Massport to consider and address the comments received that have raised noise related concerns. Several commenters have requested further explanation of the reasons for the increased use of Runway 33L for jet aircraft departures and corresponding decrease in use of Runway 27. The comments from the Boston Transportation Department, the Town of Winthrop, the City of Cambridge, as well as from individuals such as Mr. Peter Koff and Ms. Nancy Timmerman have raised a number of concerns and suggestions related to noise that Massport should incorporate into the 2009 EDR.

For 2009 the Noise Abatement chapter should provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter should report on 2009 conditions and compare 2009 conditions to those of 2008 for the following:

- Fleet Mix, including Stage II, Recertified (Hushkitted) Stage III, newly manufactured Stage III, and any qualifying Stage IV aircraft;
- Nighttime operations;
- Runway utilization (report on aircraft and airline adherence with runway utilization goals);
- Preferential runway advisory system (PRAS) compliance; and
- Flight tracks, including a discussion of the update on the Standard Terminal Automation

Replacement System (STARS) radar and consolidation of the Boston Terminal Radar Approach Control (TRACON) at Merrimac, plus Massport's installation and use of PASSUR data.

The chapter should also report on 2009 conditions and compare those to 2008 conditions for the following noise indicators:

- Using the Federal Aviation Administration's (FAA) most current version of the Integrated Noise Model (INM), and RealContours and RealProfiles, produce an accurate set of Day-Night Sound Level (DNL) noise contours. Adjustments made to account for over-water sound propagation and the propagation of sound to areas of higher terrain will be reported;
- Noise-impacted population;
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the use of RealContours and RealProfiles;
- Cumulative Noise Index (CNI);
- Times-Above for 65, 75, and 85 dBA threshold values;
- Installation and benefits of the new noise monitoring system; and
- Flight track monitoring noise quarterly reports.

The chapter should also report on noise abatement efforts and provide a status update on the new noise and operations monitoring system.

Air Quality

The Air Quality/Emissions Reduction chapter provides an overview of airport-related air quality issues in 2008 and efforts to reduce emissions. The modeled emissions inventory results were driven principally by three factors: the lower number of aircraft operations at Logan Airport compared to 2007; the reported change in the aircraft average taxi/delay times at the Airport; and continual improvements to the FAA Emissions and Dispersion Modeling System (EDMS), v5.1, which has revised methods for calculating particulate matter (PM) and hydrocarbon (HC) emissions from aircraft engines, and has new functionality of calculating PM emissions from auxiliary power units (APUs). Because of the changes to the EDMS model and decreased air traffic, total emissions of PM10/PM2.5 associated with Logan Airport have decreased by approximately 37 percent to 81 kilograms per day (kg/day) compared to 2007 levels. By comparison, using the earlier version of EDMS total emissions of PM10/PM2.5 would have decreased by approximately 20 percent to 102 kg/day. This difference is attributed to modifications in the EDMS versions.

The 2008 EDR reports that the total emissions of volatile organic compounds (VOC) were 1,208 kg/day, or 28 percent lower than 2007 levels. The total emissions of carbon monoxide (CO) were 8,361 kg/day, or 9 percent lower than 2007 levels and the total emissions of

oxides of nitrogen (NOx) were 4,204 kg/day, or 6 percent lower than 2007 levels. In 2008, total NOx emissions at Logan Airport (net total with reductions) were approximately 656 tons per year (tpy) lower than Massport's 1999 Air Quality Index (AQI) benchmark. This represents a 28 percent decrease in NOx emissions since 1999. The 2008 EDR notes that other contributing factors to the results of the emissions inventory include the change in stationary source fuel usage, and the change in VMT and parking volumes. Air quality initiatives in place at the Airport and other ongoing efforts by Massport to minimize emissions also played a role. For example, there is a continuing trend of decreasing nitrogen dioxide (NO2) concentrations at both the Massport and Massachusetts Department of Environmental Protection (MassDEP) monitoring sites located in the general vicinity of Logan Airport since 1999. In addition, the annual NO2 concentrations at all monitoring locations in 2008 were well within the National Ambient Air Quality Standards (NAAQS) for NO2.

For the second year, Massport prepared an emission inventory of greenhouse gas (GHG) emissions directly and indirectly associated with Logan Airport. "Direct" GHG emissions are those that occur in areas located within the Airport's geographic boundaries and "indirect emissions" are those that occur off the Airport site. "Direct" GHG emissions associated with Logan Airport were 0.35 million metric tons (MMT), and the sum of "direct" and "indirect" emissions was 0.65 MMT, or less than 1 percent of statewide totals. Massport operations at Logan Airport contribute only 18 percent of these combined totals. GHG emissions in 2008 were 6 percent lower than 2007 levels.

As part of the Section 61 findings for the centerfield taxiway component, the first phase of a two-phase Massport Air Quality Monitoring Study was initiated in September 2007 at ten locations on- and off-airport using both real time and time-integrated methods to measure fine particulates, volatile organic compounds (VOC), carbonyls, black carbon, and polynuclear aromatic hydrocarbons (PAHs). The 2008 EDR states that this first phase commenced in September 2007 and was completed September 2008, with a report summarizing the findings expected to be completed before the end of 2009. Massport has committed to post this report on Massport's website when completed. The study collected ambient data on a variety of air pollutants over a two year period and assessed air quality changes due to the operation of the new centerfield taxiway. Massport should consult with the Massachusetts Department of Public Health (DPH), the Massachusetts Department of Environmental Protection (MassDEP), the City of Boston Environment Department and Boston Public Health Commission (BPHC) to discuss the second phase of the protocol.

The 2009 EDR should continue updates on the information presented in the 2008 EDR and address comments received related to air quality. For 2009 the Air Quality/Emissions Reductions chapter should include an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The chapter should also discuss analysis methodologies and assumptions and report on 2009 conditions using the most recent versions of the Emissions Dispersion Modeling System

(EDMS) and MOBILE motor vehicle emissions. The chapter should also include:

- Emissions inventory for carbon monoxide (CO);
- Emissions inventory for oxides of nitrogen (NOx);
- Emissions inventory for volatile organic compounds (VOCs);
- Emissions inventory for particulate matter (PM);
- Nitrogen dioxide (NO₂) monitoring; and
- NO_x emissions by airline.

This chapter should also report on the following air quality initiatives (AQI) for 2009:

- Air Quality Initiative Tracking;
- Massport's and Tenant's Alternative Fuel Vehicle Programs; and
- The status of other Logan Airport air quality studies undertaken by Massport or others.

The Air Quality Chapter should also include an inventory of GHG emissions from Logan Airport in 2009. GHG emissions should be quantified for aircraft, GSE, motor vehicles and stationary sources using emission factors and methodologies outlined in the Greenhouse Gas Emissions Policy and Protocol issued by EEA. The results of the 2009 GHG emissions inventory should be compared to the 2008 results. The 2008 EDR indicates that Massport commissioned a study to evaluate operational, economic and environmental benefits of cogeneration as a way to reduce air emissions associated with the Central Utility Plant. If cogeneration is found feasible, energy consumption could be reduced Airport-wide as could the emissions of criteria pollutants (i.e., CO, NO_x, etc.) and GHGs. The status of this study is not described. Therefore, an update should be provided in the 2009 EDR.

Water Quality/Environmental Compliance

This chapter describes Massport's ongoing environmental management activities including NPDES compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan, and tank management. In accordance with the requirements of the current NPDES permit for Logan Airport that was issued on July 31, 2007, Massport and all 27 co-permittees and tenants began preparation of updated Stormwater Pollution Prevention Plan (SWPPP). Massport completed its SWPPP in December of 2007 and tenant SWPPPs were completed in March 2008. Massport's SWPPP addresses stormwater pollutants in general, and also addresses deicing and anti-icing chemical, potential bacteria, fuel and oil, and other sources of stormwater pollutants.

The 2008 Annual Certificates of Compliance were submitted to U.S. Environmental Protection Agency and MA DEP in December 2008 for Massport and each co-permittee. Three out of a total of 73 outfall samples exceeded the regulatory limits of the National Pollutant Discharge Elimination System (NPDES) Program permit for the Airport's permitted outfalls. Two out of 23 samples exceeded the limits at the Maverick Street Outfall and one out of 24 samples exceeded a limit at the West Outfall. Over the past five years, the number of samples that exceeded the regulatory limits has ranged from three (2007) to eight (2005). Due to the large

size of the drainage areas and relatively low concentration of pollutants, it is typically not possible to trace exceedances to specific events. Where a known event, such as a spill, is reported, Massport routinely checks the drainage system for possible impacts from the event and takes corrective actions if necessary.

In accordance with the Massachusetts Contingency Plan (MCP), the 2008 EDR reports that Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination. The 2008 EDR states that Massport is working towards achieving regulatory closure of the remaining MCP sites. In addition, preparation of the Environmental Management System (EMS) for facilities, where fleet and field maintenance activities are conducted, was ongoing in 2008.

For 2009 the Water Quality/Environmental Compliance and Management chapter should report on the 2009 status of:

- National Pollutant Discharge Elimination System (NPDES) Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility
- Jet fuel usage and spills
- Massachusetts Contingency Plan (MCP) Activities
- Tank Management
- Update on the environmental management plan
- Fuel spill prevention
- Future stormwater management improvements (if any)
- Future MCP and tank management activities

Massport should continue to report in the 2009 EDR how Massport will assess, remediate, and bring to regulatory closure areas of subsurface contamination.

Sustainability at Logan Airport

This chapter describes Massport's airport wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision.

This chapter describes Massport's continued efforts including Massport-wide sustainability and details how sustainability is incorporated into many aspects of Massport's activities: Planning and Design; Construction; Operations, Maintenance and Management; and Monitoring of Environmental Performance which are detailed in this chapter. The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2009 EDR.

The 2008 EDR outlines how Massport is committed to sustainable practices to help reduce impacts associated with construction. For example, Massport requires contractors to comply with construction guidelines regarding demolition waste recycling, soil reuse, and air emissions from construction equipment. In addition, in 2008, Logan Airport became the first airport in the U.S. to use warm mix asphalt for its airfield pavement (Runway 4R). Warm-mix as opposed to hot-mix asphalt is heated to a lower temperature, which saves energy resulting in 20 percent lower GHG emissions than hot-mix asphalt. It also contains 18 percent recycled material. Another environmental benefit of warm mix asphalt is that it can be applied in a thicker layer, requiring fewer passes with construction vehicles and fewer emissions of associated pollutants.

Massport has several programs in place that contribute to the environmentally sustainable operation and maintenance of Logan Airport and its facilities. Massport also encourages its tenants to do the same. These programs and other sustainability initiatives include developing a policy that states that new development projects obtain certification under the U.S. Green Building Council Leadership in Energy and Environmental Design® (LEED) Green Building Rating System™ and include LEED accredited professionals on the design team. Massport is also establishing and implementing an Alternative Fuel Vehicle Policy (AFV) Policy that requires key personnel to review and consider AFVs when there is a request for a new or replacement vehicle and to select AFVs unless there is a compelling reason not to. In March 2008, Massport installed twenty 10-foot-tall wind turbines on the roof of Logan Office Center. The wind turbines are expected to generate approximately 100,000 kWh annually, or about 2 percent of the building's monthly energy use.

In 2008 Massport completed renovations to the existing gas station in the NCA to include installing an E85 fuel dispensing tank. As discussed earlier in this Certificate, E85 is a first-generation biofuel. Massport also established a bicycle security program with State Police Troopers providing additional patrols on bicycle, which helps to reduce vehicle-related emissions and fossil fuel use. Finally, Massport created preferred parking areas in garages and parking areas throughout Logan Airport to promote use of lower emitting vehicles. I commend Massport for the existing and planned sustainability measures.

For 2009, this chapter should report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have commenced construction. The mitigation commitments were made in the Section 61 Findings for the following projects which should be reported:

- West Garage/Central Garage;
- International Gateway;
- Runway Ends 22R and 33L Safety Improvements;
- Replacement Terminal A; and
- Logan Airside Improvements Planning.

This chapter should also update the status of Massport's mitigation commitments and identify

projects for which mitigation is complete.

Conclusion

I have determined that the 2008 EDR for Logan Airport has adequately complied with MEPA and that Massport may prepare a 2009 EDR in lieu of a multi-year ESPR for submission in 2010. As I stated at the beginning of this Certificate, the 2009 EDR must provide responses to the issues raised in comments received. The 2009 EDR must include a copy of this Certificate and a copy of each comment letter received on the 2008 EDR. In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, noise abatement, and air quality issues. Massport should consult directly with individual commentors where appropriate.



November 13, 2009

Date

Ian A. Bowles

Comments Received:

- 10/26/2009 Peter L. Koff, Engel & Schultz, LLP
- 10/28/2009 Town of Winthrop, Noise Air Pollution & Airport Hazards Committee
- 11/05/2009 Nancy Timmerman
- 11/06/2009 City of Cambridge, Robert Healy, City Manager
- 11/09/2009 Boston Transportation Department
- 11/10/2009 City of Boston Environment Department

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November 12, 2010

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE

2009 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME : 2009 Environmental Data Report
PROJECT MUNICIPALITY : Boston / Winthrop
PROJECT WATERSHED : Boston Harbor
EOEA NUMBER : 3247
PROJECT PROPONENT : Massachusetts Port Authority
DATE NOTICED IN MONITOR : October 6, 2010

As Secretary of Energy and Environmental Affairs (EEA), I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62I) and with its implementing regulations (301 CMR 11.00). The Proponent, the Massachusetts Port Authority (Massport) should submit an Environmental Data Report containing 2010 data no later than October 15, 2011.

The environmental review process at Logan Airport has been structured to occur on two levels: airport-wide and project-specific. With respect to airport-wide impacts, the periodic Environmental Status and Planning Report (ESPR) process has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long range plans. It has thus become part of Massport's long range planning (consistent with the objectives of the MEPA regulations), and a vehicle for analyzing cumulative impacts associated with airport operations. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation

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commitments made by Massport in the context of project-specific environmental impact review. In addition, between preparation of each ESPR, Massport also provides more frequent (annual) Environmental Data Reports (EDRs) that contain data for the prior year's airport operations and impacts. EDRs also provide an updating on the status of outstanding mitigation commitments for all airport projects. The EDR addressing airport operations during 2009 is the subject of this Certificate.

In general, the EDR has fulfilled its purpose of providing a "snapshot" of year 2009 passenger and impact levels at Logan Airport. The technical studies in the 2009 EDR included reporting on and analysis of key indicators of airport activity levels, airport planning, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. Most environmental parameters showed improvement in calendar year 2009. However, mitigation of noise impacts and air quality remain key concerns both of this office and the commenters. In addition, there appears to be a trend of increased parking demand at the airport that should be carefully monitored by Massport, and which requires a corresponding focus on increasing public transit use. Finally, assessing the cumulative changes in airport operations and impacts associated with several recent Massport projects (e.g., the Consolidated Car Rental Facility, the Green Bus Depot, the East Boston-Chelsea Bypass and the parking consolidation in the North Cargo Area/Robie parcel) should be a priority of the airport-wide impact assessment reports moving forward. I expect that these topics will be addressed by Massport in the 2010 EDR (to be filed by October 15, 2011) as outlined further below. The next ESPR document containing farther-reaching planning and assessment measures will need to be submitted the following year.

Environmental Data Reporting Process

In 1979, the Secretary of the Executive Office of Environmental Affairs issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the 1997 Annual Update proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of periodic ESPR documents (typically every five years) and provides data updates annually through the EDRs.

The last Logan ESPR was filed for calendar year 2004. However, due to the current economic downturn, as described in this 2008 EDR submitted in the October, 2009, activity levels at Logan Airport and associated environmental impacts continued to remain well below historic levels. Therefore it was anticipated that in 2009, near-term activity levels and associated environmental effects were also expected to remain well below levels previously analyzed for

Logan Airport. As a result, the forecasted aviation growth presented in the 2004 ESPR, the predicate upon which the ESPR schedule was initially established, had not occurred. Therefore, I allowed Massport to prepare a 2009 EDR in lieu of the scheduled ESPR.

Massport has indicated in the 2009 EDR that in 2010, near-term activity levels and associated environmental effects continue to remain well below levels previously analyzed for Logan Airport. Because the forecasted aviation growth presented in the 2004 ESPR has not occurred, Massport has requested to delay filing of the next ESPR until 2011. In addition, Massport is also currently in the process of updating its passenger and operations forecast for the next twenty years. Significantly, this data will allow Massport to more accurately project passenger and operation needs that will directly influence planning for future projects at Logan Airport. The data from this forecasting process will not be available in time for filing the next annual report. Therefore, I will allow Massport to prepare a 2010 EDR followed by a 2011 ESPR (which will be filed in 2012, containing data for 2011 as well as more comprehensive analysis of future plans). Given the two-year extension of the original filing deadline for the ESPR document, I expect Massport to ensure that the 2011 ESPR will not be delayed any further.

REVIEW OF THE 2009 EDR AND SCOPE FOR THE 2010 EDR

General

The 2010 EDR must provide an annual update on conditions at Logan Airport for calendar year 2010. It should address the activity levels observed in 2010 in comparison with those predicted in the 2004 ESPR and should also report on the cumulative effects of Logan Airport operations and activities compared to 2009. The 2010 EDR should continue to serve as a background/context against which projects at Logan Airport can be evaluated. Where appropriate, Massport must continue to identify and address any longer term aviation and environmental trends that will impact airport impacts or planning.

The 2010 EDR must respond to those issues explicitly noted in this Certificate and the comments received in the next EDR. The EDR should provide a "snapshot" of the 2010 operations and impacts, while more substantial analysis and longer-range planning are expected to be presented in the next ESPR. Massport should file the 2010 EDR no later than October 15, 2011.

A distribution list for the 2010 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2004 Logan Environmental Status and Planning Report (issued on August 16, 2006) to provide context for reviewers. In addition, the document should contain copies of any MEPA Certificates issued for projects at Logan airport in 2010. Supporting technical appendices should be provided as necessary.

Activity Levels

The Activity Levels chapter provides a solid analysis of major activity issues and the technical appendix contains useful and detailed information. This chapter presents aviation activity statistics for Logan Airport in 2009 and compares activity levels to the prior year including air passengers, aircraft operations, fleet mix, and cargo/mail volumes. The total number of air passengers at Logan Airport during 2009 dropped to 25.5 million, compared to 26.1 million in 2008. The decrease in the total number of air passengers was 2.3 percent, compared to a decrease of 7.1 percent in the previous year. In addition, the total number of aircraft operations declined from 371,604 in 2008 to 345,306 in 2009, a decrease of 7.1 percent. The 2009 EDR also reports that the passenger aircraft operations decreased by 3.8 percent and operations by general aviation (GA) aircraft also declined by a dramatic 48.6 percent in 2009. Also the 2009 EDR reports that the cargo operations decreased by 23.2 percent in 2009, compared to 2008.

The EDR presents data indicating that the number of air passengers per aircraft operation increased, from an average of 70.2 passengers per aircraft operation in 2008 to an average of 73.9 passengers per aircraft operation in 2009. The passenger load factor (the percentage of seats occupied by revenue passengers) also increased slightly from 72.8 to 72.9. This reflects greater air carrier efficiency. While legacy airlines, such as Delta Air Lines, Continental Airlines, and US Airways, reduced aircraft operations significantly at Logan Airport, low-cost carriers (LCCs) operations increased by 12.3 percent. In addition to a continuing expansion in service offerings by JetBlue Airways, Logan Airport saw operations for two new LCCs, Southwest Airlines and Virgin America, begin in 2009. In addition, the 2009 EDR reports that the air cargo volumes declined 12.1 percent from 621 million pounds in 2008 to 546 million pounds in 2009. The largest volume decrease occurred in the express/small packages segment.

For the 2010 EDR, the Activity Levels chapter should include:

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport;
- Passenger activity levels;
- Cargo and mail activities;
- A comparison of the 2010 aircraft operations, cargo/mail operations, and passenger activity levels to 2009 activity levels; and
- A report on national aviation trends in 2010 and a comparison to trends at Logan Airport.

In addition to reporting the analysis of major activity issues, I advise Massport to consider and attempt to address all comments related to activity levels in the 2010 EDR.

Planning

The Airport Planning chapter provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2009. It also describes known future

planning, construction, and permitting activities. Construction of a 9,300-foot long centerfield taxiway (Taxiway M) was completed and opened in summer of 2009. Also in 2009 Massport continued the permitting for redevelopment of the Southwest Service Area (SWSA) at Logan Airport which includes consolidation of the rental car operations and their shuttle buses into a single coordinated operation that will result in reduced vehicle miles traveled and the associated air emissions. A Final EIR for the project was filed in March 2010, and a Certificate that determined that the EIR adequately and properly complies with MEPA. In addition, in 2009, Massport began the MEPA review process for the proposed Logan Runway Safety Area (RSA) Improvements at Runway ends 33L and 22R. A Draft EIR was submitted on that project in 2010. Preliminary design of a proposed Green Bus Depot for bus maintenance in the North Service Area (NSA) began in 2009 and an expanded ENF for the Green Bus Depot was filed in 2010.

During 2009 Massport published the Sustainable Design Standards and Guidelines (SDSG) for use by architects, engineers, and planners working on capital improvement projects for Massport facilities. The 2009 EDR reports multiple projects in the planning and design phase. Planning commenced for two hangar upgrades. Massport also commenced with Terminal B Garage repair and rehabilitation where solar panel "trees" were installed on the roof. An extension to Taxiway D was completed and the Taxiway G realignment construction commenced.

Planning for the North Service Area (NSA) Roadway Corridor project began. The NSA Roadway Corridor Project coordinates the roadway and urban design vision for North Service Road and Frankfort Street with ongoing design and construction efforts in the NSA. The 2009 EDR reports that the planning commenced for the Logan Airport Parking Deck Project on the Robie Parcel within the North Cargo Area (NCA) with the construction beginning in spring 2010. The NSA Roadway Corridor project will coordinate the NCA Logan Airport Parking Deck Project, East Boston-Chelsea Bypass Project, the SWSA Redevelopment Project, and the NSA Buffer Project to develop a unified utility, roadway, and landscape vision for the NSA roadway corridor between Prescott Street and Neptune Road. Massport has also begun planning for the East Boston-Chelsea Bypass Project, to develop a limited access roadway between Logan Airport and the new Chelsea Street Bridge. An ENF for this project is currently under review by the MEPA Office.

For the 2010 EDR, the Airport Planning chapter should describe the status of planning initiatives for the:

- Roadway Corridor Projects;
- Airport Parking;
- Terminal Area;
- Airside Area;
- Service and Cargo Areas; and
- Airport Buffers and Landscaping.

I expect that this chapter will contain a comprehensive discussion about the coordination of parking efforts at Logan in light of the construction of the Parking Deck Project on the Robie Parcel, beyond what was presented in the 2009 EDR (or that such information will be presented elsewhere in the document). The discussion should include information on the use of the new Parking Deck (or a schedule for implementing use) and the corresponding changes in use (e.g., uses that have been shifted or eliminated) of other parking areas at Logan. I understand that data will also be available about parking patterns as a result of ongoing passenger surveys being undertaken by Massport and the results of these surveys should inform the discussions about airport-wide parking operations.

I also note that several of the projects described in the planning chapter of the 2009 EDR are designed, at least in part, to consolidate and direct airport-related traffic to centralized locations and to minimize airport-related traffic on external streets in adjacent neighborhoods. The 2010 EDR should report, to the extent possible, on the status and effectiveness of these cumulative efforts.

The EDR should also report on the status of public works projects implemented by other agencies within the boundaries of Logan Airport. Massport should continue to assess planning strategies for improving Logan Airport's operations and services in a safe, secure, efficient, and environmentally sensitive manner.

Regional Transportation

In general, the 2009 EDR has met the requirements with respect to regional transportation issues. The directives in the EDR Certificate were laid out to have Massport look at potential diversions, and explain how its planning and coordination with other agencies could impact potential diversions. The 2009 EDR has performed this task.

The chapter describes activity levels at New England's regional airports in 2009 and updates recent planning activities. Massport has demonstrated that it is coordinating its planning with other transportation agencies, and that this planning effort is aimed at minimizing cumulative impacts from Logan Airport operations. The 2009 EDR includes estimates of potential passenger diversions from Logan, and outlines how Massport planning encourages those diversions.

The decreases in passenger traffic and aircraft operations at New England airports reflect national trends in the face of volatile fuel prices and a worsening global economy. Specifically, of the total number of air passengers utilizing New England's primary commercial service airports, including Logan Airport, decreased from 44.4 million in 2008 to 42 million in 2009. This represents a passenger traffic decline of 5.4 percent. In the region, activity levels as measured by the number of aircraft operations fell by 14.2 percent, from 1.21 million operations in 2008 to 1.03 million operations in 2009. In addition, air passenger traffic at the regional

airports in New England declined, as the challenging operating environment for airlines affected smaller communities disproportionately. Airlines introduced major reductions in operations throughout the year, eliminating less profitable routes and cutting frequencies in smaller markets. LCCs, such as Southwest Airlines and JetBlue Airways, also stopped expanding their operations at regional airports in recent years, and are now instead focusing on expansion in larger air service markets with a strong business travel portfolio.

Massport also reported in the 2009 EDR that there were continued negotiations with the City of Worcester to purchase Worcester Regional Airport. In June 2010, the City of Worcester transferred the airport to Massport for \$17 million.

Massport should continue the directive from the EDR Certificate for the 2010 EDR. In addition, for 2010 EDR the chapter on Regional Transportation should describe Logan Airport's role in the region's intercity transportation system by reporting on the following related to Regional Airports and Regional Transportation System:

- 2010 regional airport operations, passenger activity levels, and schedule data within an historical context;
 - Status of plans and new improvements as provided by the regional airport authorities;
 - Ground Access improvements to the regional airports; and
 - The role that Worcester Regional Airport and Hanscom Field play in the regional aviation system and Massport's efforts to promote these airports.
- Regional Transportation System*
- Massport's efforts in strengthening the regional transportation system;
 - Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and
 - Report on metropolitan and regional rail initiatives and ridership.

Ground Transportation

The 2009 EDR serves its purpose of updating 2009 ground access conditions on the airport, and has also adequately addresses the updating of the three new programs to support employees' use of alternative transportation options.

This chapter reports on transit ridership, roadways, traffic volumes, and parking for 2009. Specifically, ground transportation activity levels associated with Logan Airport generally decreased for all surface transportation modes from 2008 to 2009 as a result of a 2.3 percent decline in the annual number of air passengers. The 2009 EDR reports that the average daily traffic on airport roadways decreased by 7 percent from 2008 to 2009, while vehicle miles traveled decreased by 5 percent.

Data in the 2009 EDR reports that Massachusetts Bay Transportation Authority (MBTA)

transit ridership to the Airport, including the Blue Line and the Silver Line, increased in 2009. Silver Line boardings at the Airport continued to grow, increasing by 11 percent in 2009 (compared to a 5 percent increase in 2008). In contrast, air passenger ridership on Logan Express bus, by water transportation, and by limousine decreased in 2009. From 2008 to 2009, Logan Express air passenger ridership decreased by 8 percent, ridership on water transportation decreased by 8 percent, limousine ridership decreased by 11 percent, and taxi dispatches decreased 7 percent. The 2009 EDR reports that over the past several years, transit services, including Logan Express, have experienced substantial increases in employee use. In 2009, employee use of Logan Express increased 4 percent over 2008 levels.

Despite improvements in use of the MBTA's Blue Line and Silver Line, the number of vehicles parked on-Airport increased by 11 percent in 2009 compared to 2008. The EDR states that Massport continued to comply with the Logan Airport Parking Freeze, and the document contained copies of Massport's bi-annual Parking Space Inventory reports that are submitted to the Massachusetts Department of Environmental Protection to document Massport's compliance with the Parking Freeze.

The 2010 EDR should continue to update 2010 ground access conditions on the airport and report on the use of the three new programs to support employees' use of alternative transportation options. The chapter should also report on 2010 conditions and provide a comparison of 2010 findings to those of 2009 for the following:

- Detailed description of compliance with the Logan Airport Parking Freeze;
- High occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Scheduled, Unscheduled, Water Transportation, and Logan Express);
- Logan Airport Employee Transportation Management Association (Logan TMA) membership and services;
- Logan Airport gateway volumes;
- On-airport traffic volumes;
- On-airport vehicle miles traveled (VMT). VMT will be calculated using the updated model created in 2004 that is based on the full build roadway network;
- Parking demand and management (including rates and duration statistics); and
- Ground access management strategy.

I am troubled by the increased demand for vehicle parking at Logan demonstrated by the 2009 data reported in the EDR, a concern that I understand is shared by Massport. Although Massport has already dedicated significant resources to encouraging transit use, the increased parking demand data suggest that greater efforts are warranted. The 2010 EDR should report on Massport's efforts in this regard. In addition, I expect that this will be a significant component of the long-range planning efforts Massport is currently undertaking.

Noise

The Noise Abatement chapter updates the status of the noise environment at Logan Airport in 2009, and describes Massport's efforts to reduce noise levels. The technical appendix contains useful and detailed information, while the main text provides a solid analysis of major noise issues. Many of the issues raised in the noise analysis are ongoing and require continuous monitoring. The future 2010 EDR represents an appropriate forum to serve this updating function.

The decrease in the number of aircraft operations in 2009 resulted in changes in the noise environment. The 2009 Day-Night Sound Level (DNL) contours were smaller in many locations compared to 2008. The 65 dB DNL contour decreased in size in East Boston. The contour reduced in size over Winthrop and towards South Boston from Runway 27, but increased slightly north of the Airport over Revere due to an increase in departures from Runway 4R. The contour also increased south of the Airport over South Boston due to an increase in arrivals to Runways 4L and 4R. These changes are due to extended closings of Runway 9-27 for resurfacing in 2009.

In 2009 Massport completed installation of an improved Noise Monitoring System (NOMS). The Era Systems Corporation's (ERA) flight tracking system and all new noise monitors were operational in 2009. Combined with new noise monitor software, the system has an improved capability of correlating measured noise events with individual flight tracks.

The 2009 EDR reports that the overall number of people exposed to DNL values greater than 65 decibels (dB) decreased by 43 percent in 2009 compared to 2008. An estimated 4,335 people were exposed to DNL levels greater than 65 dB, as depicted in the 2009 contour, compared to 7,579 in 2008. This is the first time that the number of people exposed to the 65 dB noise level has been fewer than 5,000 since reporting this data in the EDR format. The total population exposed to noise levels greater than DNL 70 dB decreased from 249 in 2008 to 243 in 2009. There was a reduction of noise for 73 people in Winthrop but an increase of noise for 67 people exposed to greater than DNL 70 dB in Boston. The EDR reports that all of the residences exposed to DNL levels greater than 65 dB in 2009 that have chosen to participate in the soundproofing program have been sound-insulated by Massport. In 2009, Massport provided sound insulation to 83 homes, nearly half of which were in Chelsea. The focus of this program in Chelsea was to fulfill federal and state mitigation commitments related to the opening of Runway 14-32. Since the inception of Massport's sound insulation program, 11,136 homes have been sound-insulated in East Boston, South Boston, Winthrop, Revere, and Chelsea.

The information in this chapter is very informative and I encourage Massport to continue this format in the 2010 EDR. I also strongly advise Massport to consider and address the comments received that have raised noise related concerns. Commenters have requested further explanation of the reasons for the increased use of Runway 33L for jet aircraft departures and corresponding decrease in use of Runway 27. The comments from the City of Cambridge, as well as from individuals such as Ms. Timmerman, P.E., have raised a number of concerns and

suggestions related to noise that Massport should incorporate into the 2010 EDR.

For 2010 the Noise Abatement chapter should provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter should report on 2010 conditions and compare 2010 conditions to those of 2009 for the following:

- Fleet Mix, including Stage II, Recertified (Hushkitted) Stage III, newly manufactured Stage III, and any qualifying Stage IV aircraft;
- Nighttime operations;
- Runway utilization (report on aircraft and airline adherence with runway utilization goals);
- Preferential runway advisory system (PRAS) compliance; and
- Flight tracks, including a discussion of the update on the Standard Terminal Automation Replacement System (STARS) radar and consolidation of the Boston Terminal Radar Approach Control (TRACON) at Merrimac, plus Massport's installation and use of PASSUR data.

The chapter should also report on 2010 conditions and compare those to 2009 conditions for the following noise indicators:

- Using the Federal Aviation Administration's (FAA) most current version of the Integrated Noise Model (INM), and RealContours and RealProfiles, produce an accurate set of Day-Night Sound Level (DNL) noise contours. Adjustments made to account for over-water sound propagation and the propagation of sound to areas of higher terrain will be reported;
- Noise-impacted population;
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the use of RealContours and RealProfiles;
- Cumulative Noise Index (CNI);
- Times-Above for 65, 75, and 85 dBA threshold values;
- Installation and benefits of the new noise monitoring system; and
- Flight track monitoring noise quarterly reports.

The chapter should also report on noise abatement efforts and provide a status update on the new noise and operations monitoring system.

Air Quality

The Air Quality/Emissions Reduction chapter provides an overview of airport-related air quality issues in 2009 and efforts to reduce emissions. The modeled emissions inventory results were driven principally by the lower number of aircraft operations at the Airport compared to 2008, and continual refinements to the FAA Emissions and Dispersion Modeling System

(EDMS). The 2009 EDR reports that the total emissions of volatile organic compounds (VOC) were 980 kg/day, or 19 percent lower than 2008 levels. Total emissions of oxides of nitrogen (NOX) were 3,979 kg/day, or 5 percent lower than 2008 levels. In 2009, total NOX emissions at Logan Airport (net total with reductions) were approximately 746 tons per year (tpy) lower than the 1999 Massport's Air Quality Initiative (AQI) benchmark. This represents a 32 percent decrease in NOX emissions since 1999. Total emissions of carbon monoxide (CO) were 7,925 kg/day, or 5 percent lower than 2008 levels. Because of the refinements to the EDMS model and decreased air traffic, total emissions of particulate matter (PM) PM10/PM2.5 associated with operations at Logan Airport have decreased by approximately 12 percent to 71 kilograms per day (kg/day) compared to 2008 levels. By comparison, using the earlier EDMS v5.1 total emissions of PM10/PM2.5 would have decreased by approximately 2 percent to 79 kg/day. This variation is attributed to differences in the EDMS versions.

As part of the Section 61 findings for the centerfield taxiway component, the first phase of a two-phase Massport Air Quality Monitoring Study was initiated in September 2007 at ten locations on- and off-airport using both real time and time-integrated methods to measure fine particulates, volatile organic compounds (VOC), carbonyls, black carbon, and polynuclear aromatic hydrocarbons (PAHs). The 2009 EDR reports that since 1999 there has been a continuing trend of decreasing nitrogen dioxide (NO2) concentrations at both the Massport and Massachusetts Department of Environmental Protection (MassDEP) monitoring sites located in the general vicinity of Logan Airport. In addition, the annual NO2 concentrations at all monitoring locations in 2009 were well within the National Ambient Air Quality Standards (NAAQS) for NO2. The first phase of a two-phase Massport Air Quality Monitoring Study commenced in September 2007, and was completed September 2008, and a final report will be issued summarizing the findings. The study is collecting ambient data on a variety of air pollutants over a two-year period and will assess air quality changes attributable to the operation of the new centerfield taxiway. The second phase of the study will begin in September 2010 now that the centerfield taxiway is completed and fully operational.

Massport prepared an emission inventory of greenhouse gas (GHG) emissions directly and indirectly associated with Logan Airport. The 2009 GHG emission inventory has been updated incorporating guidance developed by the Transportation Research Board's (TRB) Airport Cooperative Research Program (ACRP). The ACRP guidance was published in April 2009 to be used by airport operators developing an airport specific GHG emissions inventory. While not including emissions from the cruise phase of flight above 3,000 feet, in a change from previous EDRs, the 2009 inventory assigns emissions based on ownership and control boundaries (i.e., emissions and sources associated with Massport, airport tenants and the general public). The vast majority of the emission sources at Logan Airport are owned or controlled by the airlines, other airport tenants, and passenger vehicles. Massport operations contribute only 11 percent of the total GHG emissions for the Airport. Total Logan Airport GHG emissions in 2009 were 14 percent lower than 2008 levels.

Massport has also made attempts to reduce aircraft emissions by working with the FAA to study and implement airfield-improvement concepts and operational changes that may have air quality benefits. Massport promoted such concepts through the Logan Airside Improvements Planning Project Environmental Impact Statement, which recommended physical and operational improvements to Logan Airport including construction of the new Runway 14-32 and centerfield taxiway, and other taxiway improvements. Runway 14-32 became operational in November 2006 and the centerfield taxiway was fully opened in summer 2009. In addition, in coordination with Massport, the Massachusetts Institute of Technology (MIT) completed a detailed survey of pilots at Logan Airport to better understand the use of single engine taxiing and issued a paper in March 2010 which was included in Appendix L. Commenters on the 2009 EDR have requested that Massport increase efforts to encourage the use of single engine taxiing. An update of these efforts should be reported in the 2010 EDR.

The 2010 EDR should continue updates on the information presented in the 2009 EDR and address comments received related to air quality. For 2010 the Air Quality/Emissions Reductions chapter should include an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The chapter should also discuss analysis methodologies and assumptions and report on 2010 conditions using the most recent versions of the Emissions Dispersion Modeling System (EDMS) and MOBILE motor vehicle emissions. The chapter should also include:

- Emissions inventory for carbon monoxide (CO);
 - Emissions inventory for oxides of nitrogen (NOx);
 - Emissions inventory for volatile organic compounds (VOCs);
 - Emissions inventory for particulate matter (PM);
 - Nitrogen dioxide (NO2) monitoring; and
 - NOx emissions by airline.
- This chapter should also report on the following air quality initiatives (AQI) for 2010:

- Air Quality Initiative Tracking;
- Massport's and Tenant's Alternative Fuel Vehicle Programs; and
- The status of other Logan Airport air quality studies undertaken by Massport or others.

The Air Quality Chapter should also include an inventory of GHG emissions from Logan Airport in 2010. GHG emissions should be quantified for aircraft, GSE, motor vehicles and stationary sources using emission factors and methodologies outlined in the Greenhouse Gas Emissions Policy and Protocol issued by EEA. The results of the 2010 GHG emissions inventory should be compared to the 2009 results.

Water Quality/Environmental Compliance

This chapter describes Massport's ongoing environmental management activities including NPDES compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan, and tank management. In accordance with the requirements of the current

NPDES permit for Logan Airport that was issued on July 31, 2007, Massport and all 27 co-permittees and tenants began preparation of updated Stormwater Pollution Prevention Plan (SWPPP). Massport completed its SWPPP in December of 2007 and tenant SWPPPs were also completed in March 2008. Massport's SWPPP addresses stormwater pollutants in general, and also addresses deicing and anti-icing chemical, potential bacteria, fuel and oil, and other sources of stormwater pollutants. The 2009 Annual Certificates of Compliance were submitted to the U.S. Environmental Protection Agency (EPA) and MassDEP on December 28, 2009, for Massport and each co-permittee.

In accordance with the Massachusetts Contingency Plan (MCP), the 2009 EDR reports that Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination. The 2009 EDR states that Massport is working towards achieving regulatory closure of the remaining MCP sites. In addition, preparation of the Environmental Management System (EMS) for facilities, where fleet and field maintenance activities are conducted, was ongoing in 2009.

In 2009, there were six reportable oil and hazardous material spills detailed in the 2009 EDR. Massport received a Notice of Noncompliance (NON) from the MassDEP on September 18, 2009. The NON listed a total of 13 stormwater discharge samples that exceeded permit limits in the period since the NPDES permit was issued in July 2007. In response to the NON, Massport implemented corrective actions throughout the Airport directed at specific issues identified in the NON, as well as generally reviewing and updating standard practices at the Airport. One of the outfall samples out of a total of 72 samples at the Maverick Street Outfall exceeded the regulatory limits of the NPDES permit for the North, West and Maverick Street outfalls which was reported.

In accordance with the requirements of the NPDES permit for Logan Airport, Massport conducted a water quality study to evaluate the potential biological, chemical, and toxicological impacts of de-icer discharges on Boston Harbor. The study concluded that de-icer discharges do not negatively impact dissolved oxygen levels in the harbor, do not contain materials in concentrations over water quality criteria or toxicological benchmarks, and do not adversely affect the designated uses of the receiving waters.

For 2010 the Water Quality/Environmental Compliance and Management chapter should report on the 2010 status of:

- National Pollutant Discharge Elimination System (NPDES) Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility
- Jet fuel usage and spills
- Massachusetts Contingency Plan (MCP) Activities
- Tank Management
- Update on the environmental management plan
- Fuel spill prevention

- Future stormwater management improvements (if any)
- Future MCP and tank management activities

Massport should continue to report in the 2010 EDR how Massport will assess, remediate, and bring to regulatory closure areas of subsurface contamination.

Sustainability at Logan Airport

This chapter describes Massport's airport wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision.

This chapter describes Massport's continued efforts including Massport-wide sustainability and details how sustainability is incorporated into many aspects of Massport's activities: Planning and Design; Construction; Operations, Maintenance and Management; and Monitoring of Environmental Performance which are detailed in this chapter. The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2010 EDR.

The 2009 EDR outlines how Massport is committed to sustainable practices to help reduce impacts associated with construction. For example, Massport requires contractors to comply with construction guidelines regarding demolition waste recycling, soil reuse, and air emissions from construction equipment. In 2009, Massport undertook the 2010 Environmental Benchmarking Survey sponsored by Airport Council International North America (ACI-NA) to assess solar power, purchase of renewable energy, availability of low emission ground transportation, recycling and "green" purchasing.

The new Signature Flight Support GA Facility in the North Cargo Area, opened in 2007, the first LEED certified GA facility in the United States. This GA Facility at Logan Airport is serving as a model for new Signature Flight Support GA facilities around the U.S., including at Chicago O'Hare International Airport. The 2009 EDR also reports on the International Standards Organization (ISO) 14001 standard certification for Massport's Logan Airport Facilities II (vehicle maintenance, landscaping, and snow removal) that was completed in December 2006 and was recertified in December 2009. ISO Certification for Facilities I (Central Heating and Cooling Plant) and Facilities III (Electrical and Structural) is scheduled for 2010. Massport began construction in 2010 on the new Consolidated Rental Car Facility (ConRAC). It will meet the Commonwealth of Massachusetts "LEED Plus" requirements and strive for LEED Silver level certification or better. The ConRAC will include the infrastructure necessary to accommodate future plug-in stations for electric vehicles and other alternative fuel sources such

as E-85 (ethanol). The ConRAC could accommodate car sharing services, such as ZipCar, at a later date. The ConRAC design includes pedestrian and bicycle accommodations including secure bicycle storage. The facility will include efficient water systems including water reclamation for vehicle wash water, and use of stormwater for non-potable uses such as vehicle washing and landscaping irrigation. At least 2.5 percent of the proposed program's overall electricity needs will be met with solar or wind power, or another form of renewable energy. Rental car companies have pledged to maintain rental car fleets which include hybrid or alternative/fuel/ low-emitting vehicles.

In 2009, Massport began a four-year rehabilitation of the Terminal B parking garage, which includes the installation of solar panels on the top parking deck and high efficiency Light-Emitting-Diode (LED) lighting throughout the structure. The use of motion-detecting LED fixtures will use approximately 50 percent less electricity than the existing lighting, reducing existing usage by 2,261,218 kilowatt-hours (kWhs) of electricity per year. This, along with other energy conservation measures, will reduce 1,307 metric tons of carbon dioxide (CO2) the equivalent of not using 3,040 barrels of oil or 148,385 gallons of gasoline annually. The Airport expects a savings of \$3.8 million in electrical usage over the next 20 years based on costs of \$0.12 per kWh. Additionally, the installation of 16 solar panel trees is expected to produce 83,980 kWh of electricity, or 2.5 percent of the total garage annual consumption. This is equal to the reduction of 50 metric tons of CO2 the equivalent of not using 115 barrels of oil or 5,637 gallons of gasoline annually. Each solar panel is a single structure design with a stem and steel frame that uses solar panels as a roof over parked cars. The design has the added benefit of collecting rainwater that will be used for landscaping and cleaning projects on the Airport. Each solar array is mounted on an air ventilation unit on the roof of the garage and does not affect parking operations or the number of spaces available to travelers.

For 2010, this chapter should report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have commenced construction. The mitigation commitments were made in the Section 61 Findings for the following projects which should be reported:

- West Garage/Central Garage;
- International Gateway;
- Runway Ends 22R and 33L Safety Improvements;
- Replacement Terminal A;
- The Consolidated Rental Car Facility; and
- Logan Airside Improvements Planning.

This chapter should also update the status of Massport's mitigation commitments and identify projects for which mitigation is complete.

Responses to Comments

The 2010 EDR must include Responses to Comments which addresses all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments included in this EDR is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the next EDR, although the Responses to Comments should pay particular attention to increased specificity, where necessary.

The majority of comments received on the 2009 EDR focused on noise related issues, including measurement of noise, modeling of noise contours, and noise abatement, and emission reduction issues. In addition to responding to these comments, the 2010 EDR should continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commentors where appropriate.

Conclusion

I have determined that the 2009 EDR for Logan Airport has adequately complied with MEPA and that Massport may prepare a 2010 EDR in lieu of a multi-year EDR for submission in 2011.

November 12, 2010

Date



Ian A. Boyles

Comments Received:

11/04/10 Darryl Pomicter (email)
 11/05/10 Nancy Timmerman
 11/05/10 City of Cambridge, Executive Department
 11/09/10 Jerome Falbo

IAB/ACC/acc



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December 16, 2011

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
 ON THE

2010 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME : 2010 Environmental Data Report
 PROJECT MUNICIPALITY : Boston and Winthrop
 PROJECT WATERSHED : Boston Harbor
 EOE NUMBER : 3247
 PROJECT PROPOSER : Massachusetts Port Authority (Massport)
 DATE NOTICED IN MONITOR : November 9, 2011

As Secretary of Executive Office of Energy and Environmental Affairs (EEA), I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62I) and with its implementing regulations (301 CMR 11.00).

The environmental review process for Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become, consistent with the objectives of the MEPA regulations, part of Massport's long range planning. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific Environmental Impact Reports (EIR). The ESPR is generally updated on a five year basis, with much less detailed Environmental Data Reports (EDR) (formerly Annual Updates) filed in the years between

EEA #3247

2010 EDR Certificate

December 16, 2011

ESPRs. The 2010 EDR is the subject of this review. In addition, the Scope for the 2011 ESPR is provided in this Certificate.

In general, the EDR has fulfilled its purpose of providing a "snapshot" of 2010 passenger and impact levels at Logan Airport. Most environmental parameters showed improvement in calendar year 2010. In particular, the technical studies in the 2010 EDR included reporting on and analysis of key indicators of airport activity levels, airport planning, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. Mitigation commitments for noise impacts and air quality remain key concerns both of this office and the commenters, and are presented in the form of project-specific Section 61 Findings, as well as more general mitigation that has emerged from the ESPR process.

The majority of comments received on the EDR focused on noise issues, including measurement of noise, modeling of noise contours, and noise abatement. In addition to responding to these comments, the 2011 ESPR and future EDRs should also report on the progress and other refinements for tracking noise and abatement efforts, as further described in the Scope for the 2011 ESPR below.

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the *1997 Annual Update* proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

The last Logan ESPR was filed for calendar year 2004. However, due to the current economic downturn, as described in the 2008 and 2009 EDRs, activity levels at Logan Airport and associated environmental impacts continue to remain well below historic levels. Therefore it was anticipated that in 2010, near-term activity levels and associated environmental effects were also expected to remain well below levels previously analyzed for Logan Airport. Thus, the forecasted aviation growth presented in the 2004 ESPR, the predicate upon which the ESPR schedule was initially established, did not occur. Therefore, I allowed Massport to prepare a 2010 EDR in lieu of the scheduled ESPR. Massport has prepared the 2010 EDR, which will be followed by a 2011 ESPR. Massport proposed a schedule for filing the next ESPR in light of observed and expected activity levels and any other changes in airport operations that have occurred since the 2004 ESPR was filed.

Review of the 2010 EDR and Scope for the 2011 ESPR

General

The 2011 ESPR should follow the general format of the 2004 ESPR, presenting major policy discussions and an overview of the role of Logan Airport in the regional planning context. This should be followed by a status report on Massport's planning initiatives, projects, and mitigation measures. The ESPR should include an Executive Summary and Introduction, similar to previous ESPRs and EDRs. Massport must provide necessary background information to allow reviewing agencies and the public to understand the environmental policies and planning which form the context of the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport.

The 2011 ESPR should report on updated passenger and operations activity forecasts for Logan Airport and Massport's other airports, Hanscom Field and Worcester Regional Airport. The new forecast used should begin with 2011 as the base year and project activity forecasts forward to calendar year 2030. In addition, the 2011 ESPR should use the results of the 2010 Logan Airport Air Passenger Survey and the findings of the Sustainable Ground Access Strategy and Service Plan effort to inform future access planning.

The technical studies in the 2011 ESPR should include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. The 2011 ESPR must also respond to those issues explicitly noted in this Certificate and the comments received on the 2010 EDR.

A distribution list for the 2011 ESPR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2004 Logan Environmental Status and Planning Report (issued on August 16, 2006) to provide context for reviewers. Supporting technical appendices should be provided as necessary.

Responses to Comments

The 2011 ESPR must include responses to comments that address all of the substantive comments from the letters listed at the end of this Certificate. The responses to comments included in the 2010 EDR is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the 2011 ESPR.

The majority of comments received on the 2010 EDR focus on noise related issues, including measurement of noise, modeling of noise contours, and noise abatement, and emission

reduction issues. In addition to responding to these comments, the 2011 ESPR should continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commenters where appropriate.

Activity Levels

The Activity Levels chapter provides a solid analysis of major activity issues and the technical appendix contains useful and detailed information. This chapter presents aviation activity statistics for Logan Airport in 2010 and compares activity levels to the prior year, including air passengers, aircraft operations, fleet mix, and cargo/mail volumes.

There were a number of significant changes in activity at Logan Airport in 2010. The total number of air passengers at Logan Airport increased by 7.5 percent to 27.4 million, compared to 25.5 million in 2009. In comparison, between 2008 and 2009 the number of air passengers using Logan Airport declined by 2.3 percent. This is below the historic peak reached in 2007. Also the total number of aircraft flights grew from approximately 345,310 in 2009 to 352,640, an increase of 2.1 percent. This remains below the historic peak achieved in 1998. Passenger aircraft operations did, however, decrease by 1.6 percent compared to 2009 levels. Compared to a decline of 48.6 percent in 2009, general aviation (GA) operations increased 19.9 percent in 2010, particularly as businesses increased their travel and use of GA transportation as the economy transitioned. GA accounted for 4.2 percent of aircraft activity at Logan Airport in 2010. In addition, dedicated air cargo operations decreased by 5.8 percent compared to the previous year.

The EDR reflects data that shows that the number of air passengers per aircraft operation increased, from an average of 73.9 passengers per aircraft operation in 2009 to an average of 77.8 in 2010. While legacy air carriers continued to reduce the number of aircraft operations at Logan Airport, low-cost carrier (LCC) operations increased by approximately 40 percent in 2010. The increase in operations by LCCs, primarily JetBlue Airways and Southwest Airlines, accounted for nearly all of this growth. Even though the number of dedicated air cargo aircraft operations decreased in 2010, air cargo volumes increased from 546 million pounds in 2009 to 572 million pounds in 2010, an increase of 4.7 percent.

The 2011 ESPR must report on airport activity levels, including information on aircraft operations, including fleet mix, passenger activity levels, and cargo and mail operations. It should also report on Massport's activity level forecasts that will become the basis for the planning and impact sections that follow and for Massport's strategic planning initiatives over the next few years.

For the 2011 ESPR, the Activity Levels chapter should include:

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport;
- Passenger activity levels;

- Cargo and mail activities;
- Compare 2011 aircraft operations, cargo/mail operations, and passenger activity levels to 2010 activity levels; and
- Report on national aviation trends in 2011 and compare to trends at Logan Airport.

It should also report on Massport's forecasts that become the basis for the planning and impact sections that follow and for Massport's planning initiatives over the next five years. Future year analyses should be based on the 2030 forecast. It should update the aircraft operations and passenger activity forecasts, and provide a discussion of analysis methodologies and assumptions, including anticipated fleet mix changes and other trends in the aviation industry. It should also report on the following:

- Compare 2011 operations to historic trends (to 2000) and forecasts for planning horizon year 2030;
- Present updated forecasts of Logan Airport's passenger volume, aircraft operations, and fleet mix; and
- Compare forecast activity levels to historic trends, prior Logan Airport forecasts, and Federal Aviation Administration (FAA) forecasts for Logan Airport and the U.S. industry.

In addition to reporting the analysis of major activity issues, I advise Massport to consider and attempt to address all comments related to activity levels in the 2010 EDR.

Planning

The Airport Planning chapter provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2010. It also describes known future planning, construction, and permitting activities. In 2010 Massport completed the permitting process for redeveloping the Southwest Service Area (SWSA), a new consolidated rental car facility (ConRAC). Construction of this project began in July 2010. In July 2009, the MEPA review process began for the Logan Runway Safety Area (RSA) Improvements Project at Runway Ends 33L and 22R. In July 2010, Massport filed a combined federal/state Draft EA/EIR and the Final EA/EIR on January 31, 2011. Construction of the Runway 33L RSA improvements commenced in June 2011. In 2010 MEPA review was completed on the Green Bus Depot, a bus maintenance facility for Massport's clean fuel fleet buses in the North Service Area (NSA). The Green Bus Depot will be used to maintain the expanded shuttle bus fleet that will replace the Airport's aging compressed natural gas (CNG) bus fleet and the rental car company diesel shuttle buses. Construction of this project began in 2011.

The 2010 EDR reports multiple projects in the planning and design phase. Planning for the East Boston-Chelsea Bypass project commenced to develop a limited access roadway between Logan Airport and the new Chelsea Street Bridge. The Bypass roadway is expected to improve commercial vehicle access to the Airport, as well as reduce congestion on local East

Boston streets in the vicinity of Day Square, Eagle Square, and the Neptune Road corridor by directing airport-related commercial traffic to the new Bypass roadway. Massport filed an ENF on October 15, 2010, for which I determined that no further MEPA review was required. Construction is underway as of 2011. Massport also initiated planning for the Logan Airport Parking Deck Project (Economy Garage) along Prescott Street in the North Cargo Area (NCA) in 2010. The project was not subject to MEPA review and construction of the economy garage began in summer of 2010 and was completed and fully opened to the public in early 2011. Massport installed solar panel "trees" on the roof of the parking deck, and energy-efficient lighting throughout.

In the 2010 EDR, Massport also discusses completing the North Service Area (NSA) Roadway Corridor Project with final landscaping in 2011, which is a project to unify the existing roadway with new landscape. Construction of the NSA Roadway Corridor Project also began in 2010. Architectural design also commenced in December 2010 for two hangar upgrades in the NCA. In addition, Terminal B Garage repair and rehabilitation continued in 2010 where 32 solar panel trees (200 kilowatt (kW)) were installed on the top floor and the entire garage was fitted with high efficiency Light-Emitting Diode (LED) lighting. Taxiway G realignment construction was completed in 2010.

The 2011 ESPR should continue to assess planning strategies for improving Logan Airport's operations and services in a safe, secure, more efficient, and environmentally sensitive manner. As owner and operator of Logan Airport, Massport must accommodate and guide tenant development. The ESPR should describe the status of planning initiatives for the following areas:

- Roadway Corridor Project;
- Airport Parking;
- Terminal Area;
- Airside Area;
- Service and Cargo Areas; and
- Airport Buffers and Landscaping.

The 2011 ESPR should also indicate the status of long-range planning activities, including the status of public works projects implemented by other agencies within the boundaries of Logan Airport. The ESPR should also indicate the status and effectiveness of ground access changes, including roadway and parking projects, that consolidate and direct airport-related traffic to centralized locations and minimize airport-related traffic on streets in adjacent neighborhoods.

Regional Transportation

In general, the 2010 EDR has met the requirements with respect to regional transportation issues. It describes activity levels at New England's regional airports in 2010 and updates recent

planning activities. Massport has demonstrated that it is coordinating its planning with other transportation agencies, and that this planning effort is aimed at minimizing cumulative impacts from Logan Airport operations. The 2010 EDR includes estimates of potential passenger diversions from Logan, and outlines how Massport planning encourages those diversions.

The total number of air passengers utilizing New England's commercial service airports, including Logan Airport, increased from 42.0 million in 2009 to 43.1 million annual air passengers, an increase of 2.5 percent in 2010. While Logan Airport passenger traffic grew, air passenger levels continued to decline at the other regional airports. Passenger levels at the regional airports declined by 5.2 percent in 2010, compared to an increase of 7.5 percent at Logan Airport. This was largely due to legacy carriers withdrawing from smaller secondary markets and reducing their use of small regional jets.

Aircraft operations in the New England region remained largely flat, increasing slightly by 0.7 percent, from 1.03 million operations in 2009 to 1.04 million operations in 2010. The 2010 EDR reports that commercial airline operations declined by 0.25 percent. General aviation and military flights increased by 1.9 percent and 4.7 percent respectively. For the 2011 ESPR, Massport should continue to engage in cooperative metropolitan planning efforts including GreenDOT and the Healthy Transportation Compact, and the Boston Metropolitan Planning Organization (Boston MPO).

The directives in the last ESPR Certificate were laid out to have Massport look at potential diversions, and explain how its planning and coordination with other agencies could impact potential diversions. The 2010 EDR has performed this task.

The 2011 ESPR should describe Logan Airport's role in the region's intercity transportation system by reporting on the following:

- 2011 regional airport operations, passenger activity levels, and schedule data within a historical context;
- Status of plans and new improvements as provided by the regional airport authorities;
- Ground access improvements to the regional airports; and
- The role that Worcester Regional Airport and Hanscom Field play in the regional aviation system and Massport's efforts to promote these airports, including the updated 2030 forecasts for both airports.

Regional Transportation System

- Overview of the restructured Massachusetts Department of Transportation (MassDOT) and Massport's role in managing regional transportation facilities;
- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and
- Report on metropolitan and regional rail initiatives and ridership.

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Ground Transportation

The 2010 EDR reported on 2010 ground access conditions at the airport. This chapter reports on transit ridership, roadways, traffic volumes, and parking for 2010. Specifically, the total number of annual air passengers at Logan Airport increased 7.5 percent to 27.4 million, compared to 25.5 million in 2009. During the same period, average daily traffic on airport roadways increased by 5.1 percent from 2009 to 2010, while vehicle miles traveled (VMT) at the Airport increased by 4.8 percent. The number of vehicles parked at the Airport increased by four percent from 2009 to 2010. As stated previously, Massport began construction of the Logan Airport Parking Deck Project, located on the 1,000-space Economy Lot in the NCA. It consolidates an additional 2,000 commercial parking spaces from various on-airport temporary commercial parking lots into a single structured parking facility containing approximately 3,000 commercial parking spaces. The garage maintains on-airport parking capacity in compliance with the limits imposed by the Logan Airport Parking Freeze. The garage was fully opened in March 2011.

Ground access activity to Logan Airport generally increased for all travel modes from 2009 to 2010. In 2010, Massport administered the periodic *Logan Airport Air Passenger Ground Access Survey* which indicates that mode shares for high-occupancy vehicles (HOV) to the Airport have returned to 2004 levels (30 percent HOV mode share) after having decreased by two percent in the *2007 Air Passenger Ground Access Survey*. MBTA Silver Line boardings at the Airport continued to grow, increasing by five percent in 2010, while Blue Line boardings at Airport Station decreased slightly compared to 2009. In 2010, ridership on water transportation to the Airport increased by about one percent in comparison to the previous year. Limousine ridership increased by an estimated 16 percent, and taxi dispatches increased 12 percent from 2009 to 2010. In 2010, Logan Express air passenger ridership increased by about one percent compared to 2009 levels, whereas employee use of Logan Express increased by four percent, and accounts for 42 percent of the service's ridership.

The 2011 ESPR should report on 2011 ground access conditions at the airport and provide a comparison of 2011 findings to those of 2010 for the following:

- Detailed description of compliance with Logan Airport Parking Freeze;
- High-occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Water Transportation, and Logan Express);
- Logan Airport Employee Transportation Management Association (Logan TMA) services;
- Logan Airport gateway volumes;
- On-airport traffic volumes;
- On-airport vehicle miles traveled (VMT);
- Parking demand and management (including rates and duration statistics);
- Status of long-range ground access management strategy planning; and

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- Results of the 2010 Logan Airport Air Passenger Survey.

The chapter should present a discussion of analytical methodologies and assumptions for the planning horizon year (2030) for traffic volumes, on-airport vehicle miles traveled (VMT) and parking demand.

- The 2011 ESPR should present a discussion of the following topics:
- Massport's target HOV mode share along with incentives;
 - Non-Airport through-traffic;
 - Massport's cooperation with other transportation agencies to increase transit ridership to and from Logan Airport via the Blue Line, Silver Line, Water Transportation, and Logan Express;
 - Report on Logan Express usage and efforts to increase capacity and usage;
 - Progress on enhancing water transportation to and from Logan Airport;
 - Progress on rental car consolidation;
 - Report on results of ground access study; and
 - Strategies for enhancing services and increasing employee membership in the Logan Airport TMA.

Noise

The EDR updates the status of the noise environment at Logan Airport in 2010, and describes Massport's efforts to reduce noise levels. The technical appendix contains useful and detailed information, while the main document provides a solid analysis of major noise issues. Many of the issues raised in the noise analysis are ongoing and require continuous monitoring. The future 2011 ESPR represents an appropriate forum to serve this updating function.

The 2010 Day-Night Sound Level (DNL) contours are similar in size compared to 2009. The DNL 65 decibel (dB) contour remained the same in Revere and in most of Winthrop. The extent of the DNL 65 dB contour decreased slightly in the Point Shirley section of Winthrop due to the reduced number of departures from Runway 9 and the reduced number of aircraft arrivals over South Boston and East Boston. The geographic extent of the DNL 65 dB contour, however, did increase in East Boston near the Airport and over Boston Harbor due to an increase in departures from Runway 15R.

The 2010 EDR also reported on the findings of the Integrated Noise Model's (INM) results of the population impacted by airport noise and used both the 2010 and 2000 U.S. Census data as a basis for comparison. Using the 2000 Census, the overall number of people exposed to values greater than DNL 65 dB decreased by 11 percent in 2010, compared to 2009. An estimated 3,870 people were exposed to levels greater than DNL 65 dB as depicted in the 2010 contour, compared to 4,335 in 2009. This is the first time that the number of people exposed to the DNL 65 dB noise level has been fewer than 4,000 and that the number of people within the

DNL 65 dB in Boston has dropped below 1,000 to 711 people. Also the total population exposed to noise levels greater than DNL 70 dB decreased in 2010 compared to 2009. In 2009, the total population exposed to greater than DNL 70 dB was 243, and in 2010 the number dropped to 198.

The 2010 EDR also reports that in 2010, Massport provided sound insulation to 83 homes, nearly half of which are in Chelsea. The focus of this program in Chelsea was to fulfill federal and state mitigation commitments related to the opening of Runway 14-32. Since the inception of Massport's Sound Insulation program, 11,219 homes have received sound insulation treatment in East Boston, South Boston, Winthrop, Revere, and Chelsea.

The information in this chapter is very informative and I encourage Massport to continue with more detailed analysis in the 2011 ESPR. I strongly advise Massport to consider and address the comments received that have raised noise related concerns. The comments from the City of Cambridge, as well as from individuals have raised a number of concerns and suggestions related to noise that Massport should address into the 2011 ESPR.

The 2011 ESPR should provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, the methodologies used to track noise, and any changes in noise modeling. The chapter must report on 2011 conditions and compare 2011 conditions to those of 2010 for the following:

- Fleet Mix, including Stage II, Recertified (Hushkitted) Stage III, newly manufactured Stage III, and qualifying Stage IV aircraft;
- Nighttime operations;
- Runway utilization (report on aircraft and airline adherence with runway utilization goals);
- Preferential runway advisory system (PRAS) tracking; and
- Flight tracks.

The chapter must report on 2011 conditions and compare those to 2010 conditions for the following noise indicators:

- Using the Federal Aviation Administration's (FAA) most current version of the Integrated Noise Model (INM) produce an accurate set of Day-Night Sound Level (DNL) noise contours;
- Noise-impacted population (using the 2010 Census data);
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the use of most current version of the Integrated Noise Model (INM);
- Cumulative Noise Index (CNI);
- Times-Above for 65, 75, and 85 dBA threshold values/Dwell and Persistence of noise levels;
- Installation and benefits of the new noise monitoring system; and
- Flight track monitoring noise quarterly reports.

The chapter should report on noise abatement efforts, results from Boston Logan Airport Noise Study (BLANS) study, and provide a status update on the new noise and operations monitoring system. This chapter should also present a discussion of analysis methodologies and assumptions, including fleet mix and runway use assumptions, and report on future year conditions for 2030 for the following noise indicators:

- Runway utilization;
- DNL noise contours; and
- Population counts.

The chapter should also report on noise abatement efforts and provide a status update on any new noise and operations monitoring system. At the public meeting held on November 16, 2011, several residents of the Point of Pines section of Revere requested that their homes be included in Massport's Residential Sound Insulation Program (RSIP). As discussed at the public meeting and shown in the 2010 EDR, Point of Pines falls outside the 60 DNL contour, and, therefore, is ineligible for funding in the FAA's RSIP that begins at the 65 DNL contour. However, in response to a resident's and the City Council's request, Massport has already committed to conducting supplemental noise monitoring during 2012 in the Point of Pines area to validate the results of the permanent noise monitor (Carey Circle, #17) in that section of Revere. The results of that analysis should be reported in the 2011 ESPR.

Air Quality

The 2010 EDR provides an overview of airport-related air quality issues in 2010 and efforts to reduce emissions. The 2010 EDR reports that the total emissions of volatile organic compounds (VOC) were 1,019 kilograms per day (kg/day). This number is four percent higher than 2009 levels but is still following a long-term, downward trend decreasing by almost 78 percent since 1990. The increase is primarily due to the increase in landing and takeoff operations (LTOs) when compared to 2009. The total emissions of oxides of nitrogen (NOX) were 3,989 kg/day, or less than one percent higher than 2009 levels. In 2010, total NOX emissions at Logan Airport (net total with reductions) were approximately 742 tons per year (tpy) lower than Massport's 1999 Air Quality Initiative (AQI) benchmark. This represents a 32 percent decrease in NOx emissions since 1999. The total emissions of carbon monoxide (CO) were 7,160 kg/day, or 10 percent lower than 2009 levels. Due to the decreased use of No. 6 fuel oil, total emissions of particulate matter (PM) PM10/PM2.5 associated with Logan Airport heating and cooling decreased in 2010 by approximately 10 percent to 64 kg/day compared to 2009 levels.

The 2010 EDR reports that since 1999, there has been a continuing trend of decreasing nitrogen dioxide (NO2) concentrations at both the Massport and Massachusetts Department of Environmental Protection (MassDEP) monitoring sites located in the vicinity of Logan Airport. In addition, the annual NO2 concentrations at all monitoring locations in 2010 continued to be well within the National Ambient Air Quality Standards (NAAQS) for NO2. The 2010 EDR

also reported on Massport's two-phased Air Quality Monitoring Study that is collecting data on a variety of ambient air pollutants over a two year period and assessing air quality changes attributable to the operation of the new centerfield taxiway. The second phase of the Study concluded in 2011, after the centerfield taxiway became fully operational. Massport will submit the findings from this study to MassDEP in late 2011 or early 2012. The results of this study should also be reported in the 2011 ESPR.

Massport prepared an inventory of greenhouse gas (GHG) emissions directly and indirectly associated with Logan Airport operations. The 2010 GHG emission inventory was updated incorporating guidance developed by the Transportation Research Board's (TRB) Airport Cooperative Research Program (ACRP). The ACRP guidance was published in April 2009 for airport operators to develop an airport-specific GHG emissions inventory. The 2010 inventory assigns emissions based on ownership or control (e.g., Massport, airlines and other airport tenants, and the general public). The vast majority of emission sources at Logan Airport are owned or controlled by the airlines, airport tenants, and the general public (through emissions from motor vehicles). According to the EDR, Massport sources contribute 12 percent of the total GHG emissions for the Airport. Total Logan Airport GHG emissions in 2010 were slightly lower (0.4 percent) than 2009 levels.

The 2011 ESPR should include an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The chapter should also discuss analytical methodologies and assumptions and report on 2011 conditions using the most recent versions of the Emissions Dispersion Modeling System (EDMS) and MOBILE motor vehicle emissions. The chapter should also include:

- Emissions inventory for carbon monoxide (CO);
- Emissions inventory for oxides of nitrogen (NOx);
- Emissions inventory for volatile organic compounds (VOCs);
- Emissions inventory for particulate matter (PM);
- Nitrogen dioxide (NO2) monitoring; and
- NOx emissions by airline.

This chapter must also report on the following air quality initiatives (AQI) for 2011:

- Air Quality Initiative Tracking;
- Massport's and Tenant's Alternative Fuel Vehicle Programs; and
- The status of Logan Airport air quality studies undertaken by Massport or others, as available.

The 2011 ESPR should also include an inventory of greenhouse gas (GHG) emissions from Logan Airport in 2011. GHG emissions should be quantified for aircraft, motor vehicles and stationary sources using emission factors and methodologies outlined in the *Greenhouse Gas Emissions Policy and Protocol* issued by EEA and the Transportation Research Board's

Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories (Airport Cooperative Research Program (ACRP) Report 11, Project 02-06). The results of the 2011 GHG emissions inventory should be compared to the 2010 results.

The ESPR should also present a discussion of analytical methodologies and assumptions and report on future year condition for 2030 for the following air quality indicators:

- Emissions Inventory for CO;
- Emissions Inventory for NOx;
- Emissions Inventory for VOCs; and
- Emissions Inventory for GHGs.

In a comment letter from Mr. Pomietter, there is a request for a program to encourage the use of single-engine taxing and suggested that Massport has not fulfilled its Section 61 mitigation commitments associated with the Logan Airside Improvements Project (EOEA #10458), specifically related to single-engine taxi procedures. The ESPR should include an update on Massport's efforts to encourage the use of single engine taxing under safe conditions. I encourage Massport to communicate with airlines regarding the use of single engine taxing, when safe to do so, within the Logan Airport operational context. An update of this effort should be provided in the 2011 ESPR.

The 2011 ESPR should also report on the status of the Logan Health Study, as requested by a commenter, which is currently underway by the Massachusetts Department of Public Health (DPH), portions of which were funded by Massport. This DPH study was initially fully funded by the Commonwealth, but was later cut by the legislature. Massport agreed to fund the shortfall for a total of \$195,000. This sum was transferred to the Commonwealth/DPH in December 2010 and that study is now progressing to completion. Massport should continue to provide data to DPH in support of this analysis. The commenter also questioned why the Commonwealth had not yet completed the legislated study of health effects of particulate air pollution (and specifically fine and ultrafine particulate matter) from surface and air transportation required by the Transportation Reform Act of 2009. Because there are presently no federal or state public health standards for ultrafine particulate matter, Massport committed to provide \$150,000 to MassDOT in support of the scoping of the analyses called for in the Transportation Reform Act. The 2011 ESPR should provide more details on this commitment.

Water Quality/Environmental Compliance

The 2010 EDR describes Massport's ongoing environmental management activities including National Pollutant Discharge Elimination System (NPDES) compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan, and tank management. In accordance with the requirements of the current NPDES permit for Logan Airport that was issued on July 31, 2007, Massport and all 27 co-permittees and tenants began preparation of an updated Stormwater Pollution Prevention Plan (SWPPP). Massport completed its SWPPP in December

of 2007 and tenant SWPPPs were completed in March 2008. Massport's SWPPP addresses stormwater pollutants in general, and also addresses detting and anti-icing chemical, potential bacteria, fuel and oil, and other sources of stormwater pollutants.

In accordance with the Massachusetts Contingency Plan (MCP), the 2009 EDR reported that Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination. The 2010 EDR states that Massport is working towards achieving regulatory closure of the remaining MCP sites. In addition, preparation of the Environmental Management System (EMS) for facilities where fleet and field maintenance activities are conducted was ongoing in 2010.

In 2010, there were 15 oil and hazardous material spills that required reporting to MassDEP, five of which involved a storm drainage system. One outfall sample out of a total of 19 samples at the Maverick Street Outfall and one outfall sample out of a total of 23 samples at the North Outfall exceeded the regulatory limits of the NPDES permit for the North, West, and Maverick Street Outfalls. The 2010 EDR reports that these exceedances were reported during April and November of 2010, respectively, as required. The 2010 Annual Certificates of Compliance were submitted to the U.S. Environmental Protection Agency (EPA) and MassDEP on December 21, 2010, for Massport and each tenant co-permittee.

The 2011 ESPR should report on the 2010 status of:

- NPDES Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility;
- Jet fuel usage and spills;
- Massachusetts Contingency Plan (MCP) activities;
- Tank management;
- Update of the environmental management plan; and
- Fuel spill prevention.

The chapter should also present a discussion of the following topics:

- Future stormwater management improvements (if any); and
- Future MCP and tank management activities.

Massport should continue to report in the 2011 ESPR how it will assess, remediate, and bring to regulatory closure areas of subsurface contamination.

Sustainability at Logan Airport

This chapter describes Massport's airport-wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy that articulates Massport's commitment to protect the environment and to implement sustainable design

principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision. It also identifies the actions necessary to achieve the goals, the staff members responsible for each sustainability goal, and the timeline for achieving the goals. The short-term goals set out in the Sustainability Plan were described in the 2010 EDR. Massport participated in the 2010 Environmental Benchmarking Survey sponsored by Airports Council International-North America (ACI-NA) to assess solar power, purchase of renewable energy, availability of low-emission ground transportation, recycling, and environmentally preferred purchasing.

The EDR describes Massport's continued sustainability efforts and details how sustainability is incorporated into many aspects of Massport's activities. The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2011 ESPR. The 2011 ESPR should report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have commenced construction. The mitigation commitments were made in the Section 61 Findings for the following projects which should be reported:

- West Garage/Central Garage;
- International Gateway;
- Runway Ends 22R and 33L Runway Safety Area Improvements
- Replacement Terminal A;
- Logan Airside Improvements Planning; and
- Southwest Service Area Redevelopment Program.

The 2011 ESPR should also update the status of Massport's mitigation commitments and also identify projects for which mitigation measures have been completed.

Distribution of the 2011 ESPR

Several commenters have requested more timely filings of future EDRs and the forthcoming 2011 ESPR and other information related to the airport. Massport should explore opportunities to advance the reporting of information through Massport's website. Massport should strive to collect and analyze the information required for the 2011 ESPR and report this information in a timely manner. Many commenters have suggested ways to improve the text, maps and graphics and Massport should consider those changes for future filings. For several recent projects, Massport has published bi-lingual meeting and project notices and made the services of an interpreter available upon request. Massport should consider continuing these services for the 2011 ESPR and future EDR submittals.

Conclusion

I have determined that the 2010 EDR for Logan Airport has adequately complied with MEPA and that Massport must submit a 2011 ESPR that responds to the issues raised in

comments received. The 2011 ESPR must include a copy of this Certificate and a copy of each comment letter received on the 2010 EDR. In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, noise abatement, and air quality issues.

December 16, 2011

Date


for Richard K. Sullivan Jr.

Comments Received:

12/09/2011	Air, Inc.
12/09/2011	City of Cambridge, Executive Department
12/09/2011	Nancy Timmerman
12/09/2011	Stephen Kaiser, PhD
12/09/2011	Darryl Pomictier
12/15/2011	Boston Transportation Department
12/15/2011	The Boston Harbor Association
12/15/2011	City of Boston Environment Department

RKS/ACC/acc

In general, the ESPR has responded to the scope. In particular, the 2011 ESPR contains a wealth of useful data on activity levels and impacts, and lays out a forecast for trends in the future years. The technical studies in the 2011 ESPR include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. The 2011 ESPR updates and compares the data presented in the 2010 EDR, and presents activity levels (including aircraft operations and passenger activity) and environmental conditions at Logan Airport for calendar year 2011. In addition to the annual report on 2011 conditions, two other primary functions of this 2011 ESPR are to provide a discussion of future activity levels at Logan Airport through the year 2030 based on an updated forecast, and to predict the associated potential environmental conditions at the Airport in 2030. The 2011 ESPR also presents historical data on the environmental conditions at Logan Airport dating back to 1990 in instances where historical information is available. Historical data are included in the technical appendices. Overall the 2011 ESPR provides a comprehensive, cumulative analysis of the effects of all Logan Airport activities based on actual and predicted passenger activity and aircraft operation levels in 2011 and 2030 and presents environmental management plans for addressing areas of environmental concern.

The majority of comments received on the 2011 ESPR focused on noise issues, including measurement of noise, modeling of noise contours, and noise abatement. In addition to responding to these comments, the 2012-2013 EDR should also report on the progress and other refinements for tracking noise and abatement efforts, as further described in the Scope below.

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the 1997 Annual Update proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

Review of the 2011 ESPR and Scope for the 2012-2013 EDR

Framework for the 2011 ESPR

Massport has adopted a new, long-term forecast for the long-range planning horizon,

The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
 100 Cambridge Street, Suite 900
 Boston, MA 02114



Deval L. Patrick
GOVERNOR

Timothy F. Murray
LIEUTENANT GOVERNOR

Richard K. Sullivan Jr.
SECRETARY

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June 14, 2013

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
 ON THE
 2011 LOGAN AIRPORT ENVIRONMENTAL STATUS AND PLANNING REPORT

PROJECT NAME : 2011 Environmental Status and Planning Report
 PROJECT MUNICIPALITY : Boston and Winthrop
 PROJECT WATERSHED : Boston Harbor
 FOEA NUMBER : 3247
 PROJECT PROPONENT : Massachusetts Port Authority (Massport)
 DATE NOTICED IN MONITOR : April 24, 2013

As Secretary of Environmental Affairs, I hereby determine that the Environmental Status and Planning Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62H) and with its implementing regulations (301 CMR 11.00).

The environmental review process for Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become, consistent with the objectives of the MEPA regulations, part of Massport's long range planning. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific Environmental Impact Reports (EIR). The ESPR is generally updated on a five year basis, with much less detailed Environmental Data Reports (EDR) (formerly Annual Updates) filed in the years between ESPRs. The 2011 ESPR is the subject of this review. In addition, Massport has requested to combine the 2012-2013 EDRs into one document. I have considered and granted this request. This Certificate also contains a Scope for the 2012-2013 EDR.

EEA #3247	2011 ESPR Certificate	June 14, 2013	<p>2030. Previous forecasts for the 1999 ESPR and the 2004 ESPR forecasts anticipated that Logan Airport would be handling 37.5 million annual passengers in 2015 and 42.8 million passengers in 2020, respectively. The 2011 ESPR revisits previous forecasts and revises them based on current and predicted conditions, and to consider a more distant time horizon.</p> <p>For this 2011 ESPR, Massport updated the Logan Airport long-range forecast with 2015, 2020, and 2030 as the forecast years. Three scenarios were also developed (Low, Moderate, and High). Massport views the Moderate forecast scenario as the most likely forecast of future activity levels at Logan Airport. Massport's forecast under the Moderate scenario predicts that there will be 39.8 million passengers using Logan Airport in 2030. The updated forecast takes into account slower-than-anticipated passenger growth (compared to previous forecasts), the increasing efficiency of aircraft (higher passenger load factors), and fleet mix trends, including a growing prevalence of larger capacity jet aircraft. This 2011 ESPR examines both airside and landside activities, including planned Massport projects, and projects being carried out by others that affect the Airport, such as the FAA's Boston Logan Airport Noise Study (BLANS). Future year projections incorporate available information about projects that have undergone or are currently under MEPA review.</p> <p>Cumulative analysis of airport activities are based on actual and projected passenger activity levels, aircraft operations, and the facilities and services needed to serve them. Analysis conditions for current and future years are used to assess environmental conditions and to develop, evaluate, and adjust environmental management actions.</p> <p><u>General</u></p> <p>The 2012-2013 EDR should follow the general format of the 2010 EDR status report on Massport's planning initiatives, projects, and mitigation measures. The 2012-2013 EDR should include an Executive Summary and Introduction, similar to previous ESPRs and EDRs. Massport must provide necessary background information to allow reviewing agencies and the public to understand the environmental policies and planning which form the context of the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport.</p> <p>Specifically, the 2012-2013 EDR should provide an update on conditions at Logan Airport for calendar year 2012 and 2013. The EDR should continue to serve as a background/context against which projects at Logan Airport can be evaluated. It should also report on the cumulative effects of Logan Airport operations and activities, compared to previous years, as appropriate.</p> <p>The 2012-2013 EDR should report on 2012 and 2013 passenger and aircraft operation activity levels. This will be followed by a status report on Massport's proposed planning initiatives and projects and mitigation. In this way, Massport should provide the necessary background information to allow the reviewer to understand the environmental policies and</p>
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EEA #3247	2011 ESPR Certificate	June 14, 2013	<p>planning which form the context of the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport.</p> <p>The technical studies in the 2012-2013 EDR should include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. The 2012-2013 EDR must also respond to those issues explicitly noted in this Certificate and the comments received on the 2011 ESPR.</p> <p>A distribution list for the 2012-2013 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2004 Logan Environmental Status and Planning Report (issued on August 16, 2006) to provide context for reviewers. Supporting technical appendices should be provided as necessary.</p> <p><u>Responses to Comments</u></p> <p>The 2012-2013 EDR must include responses to comments that address all of the substantive comments from the letters listed at the end of this Certificate. The responses to comments included in the 2011 ESPR is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the 2012-2013 EDR.</p> <p>The majority of comments received on the 2011 ESPR focus on noise related issues, including measurement of noise, modeling of noise contours, and noise abatement, and emission reduction issues. In addition to responding to these comments, the 2012-2013 EDR should continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commenters where appropriate.</p> <p><u>Activity Levels</u></p> <p>The Activity Levels chapter provides a solid analysis of major activity issues and the technical appendix contains useful and detailed information. This section in the 2011 ESPR specifically presents aviation activity statistics for Logan Airport in 2011 and compares activity levels to the prior year. The specific activity measures discussed include air passengers, aircraft operations, fleet mix, and cargo/mail volumes. This chapter also provides Massport's long-range 2030 aviation forecast for Logan Airport.</p> <p>The 2012-2013 EDR must report on airport activity levels, including information on aircraft operations, including fleet mix, passenger activity levels, and cargo and mail operations. A primary purpose of this section of the 2012-2013 EDR will be to report on airport activity levels for 2012 and 2013, including:</p> <ul style="list-style-type: none"> • Aircraft operations, including fleet mix and scheduled airline services at Logan Airport;
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EEA #3247	2011 ESPR Certificate	June 14, 2013	<ul style="list-style-type: none"> • Passenger activity levels; • Cargo and mail activities; • Compare 2012 and 2013 aircraft operations, cargo/mail operations, and passenger activity levels to 2011 activity levels; and • Report on national aviation trends in 2012/2013 and compare to trends at Logan Airport. <p>It should also report on Massport's activity level forecasts that will become the basis for the planning and impact sections that follow and for Massport's strategic planning initiatives over the next few years. In addition to reporting the analysis of major activity issues, I advise Massport to consider and attempt to address all comments related to activity levels in the 2010 EDR.</p> <p><u>Planning</u></p> <p>The Airport Planning chapter in the 2011 ESPR provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2011. It also describes known future planning, construction, and permitting activities and initiatives.</p> <p>The 2012-2013 EDR should continue to assess planning strategies for improving Logan Airport's operations and services in a safe, secure, more efficient, and environmentally sensitive manner. As owner and operator of Logan Airport, Massport also must accommodate and guide tenant development. Therefore, the 2012-2013 EDR should describe the status of planning initiatives for the following areas:</p> <ul style="list-style-type: none"> • Roadway Corridor Project; • Airport Parkings; • Terminal Area; • Airside Area; • Service and Cargo Areas; and • Airport Buffers and Landscaping. <p>The 2012-2013 EDR should continue to assess the status of long-range planning activities. The chapter should report on the status of public works projects implemented by other agencies within the boundaries of Logan Airport. The chapter will also report on the status and effectiveness of the ground access related changes including roadway and parking projects, which consolidate and direct airport-related traffic to centralized locations and minimize airport-related traffic on external streets in adjacent neighborhoods.</p> <p><u>Regional Transportation</u></p> <p>In general, the 2011 ESPR has met the requirements with respect to regional transportation issues. It describes activity levels at New England's regional airports in 2011 and updates recent regional planning activities.</p>
EEA #3247	2011 ESPR Certificate	June 14, 2013	<p>Overall, aviation activity at New England's regional airports increased in 2011, because the regional airports experienced a modest recovery after the 2008/2009 Economic Recession. Highlights for the regional airports and the status of long-range regional transportation planning efforts in the region which are relevant to Massport's three airports as well as the regional transportation network are provided in the 2011 ESPR.</p> <p>The 2012-2013 EDR should describe Logan Airport's role in the region's intermodal transportation system by reporting on the following:</p> <p><u>Regional Airports</u></p> <ul style="list-style-type: none"> • 2012 and 2013 regional airport operations, passenger activity levels, and schedule data within an historical context; • Status of plans and new improvements as provided by the regional airport authorities; • Ground access improvements to the regional airports; and • The role that Worcester Regional Airport and Hanscom Field play in the regional aviation system and Massport's efforts to promote these airports. <p><u>Regional Transportation System</u></p> <ul style="list-style-type: none"> • Massport's role in managing the regional transportation facilities within the restructured Massachusetts Department of Transportation (MassDOT); • Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and • Report on metropolitan and regional rail initiatives and ridership. <p><u>Ground Transportation</u></p> <p>The 2011 ESPR reported on transit ridership, roadways, traffic volumes and parking for 2011. It also provides forecasts for traffic volumes, parking, and VMT for the year 2030.</p> <p>The 2012-2013 EDR should report on 2012 and 2013 conditions and provide a comparison of 2012 and 2013 findings to those of 2011 for the following:</p> <ul style="list-style-type: none"> • Detailed description of compliance with Logan Airport Parking Freeze; • High occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Scheduled, Unscheduled, Water Transportation, and Logan Express); • Logan Airport Employee Transportation Management Association (Logan TMA) services; • Logan Airport gateway volumes; • On-airport traffic volumes; • On-airport vehicle miles traveled (VMT); • Parking demand and management (including rates and duration statistics); • Status of long-range ground access management strategy planning; and

EEA #3247	2011 ESPR Certificate	June 14, 2013
<ul style="list-style-type: none"> Results of the 2013 Logan Airport Passenger Survey. 	<p>Based on the 2030 forecast of aircraft operations and expected aircraft fleet mix, the following conditions are expected in 2030:</p> <ul style="list-style-type: none"> There is forecast to be a larger number of operations and a higher percent of jet fleet activity than in 2011. The higher level of operations is not a capacity challenge as the Airport has operated in the past with over 1,300 operations per day. The 2030 fleet mix consists of 81 percent commercial jets whereas the 2011 fleet mix consists of 78 percent commercial jets. The 2000 fleet mix had a lower proportion of commercial jets at 62 percent of the fleet. Total operations are expected to increase by 29 percent or 290 operations per day from 2011 to 2030, from 1,011 operations per day in 2011 to 1,301 operations per day in 2030. Compared to 2000, which is the last year that Logan Airport had over 1,300 daily operations, 2030 is forecasted to have 54 fewer daily operations (1,355 in 2000 and 1,301 in 2030). Daytime commercial operations are projected to increase by 254 operations per day from 819 in 2011 to 1,073 in 2030, however this is still fewer than the 1,142 daytime operations in 2000. Nighttime commercial operations are projected to increase from 114 in 2011 to 154 in 2030. This is an increase compared to 2000 when 126 daily operations occurred at night. The 2030 operations forecast produced a larger set of DNL noise contours with the number of people exposed to noise levels greater than DNL 65 dB increasing from 3,947 in 2011 to 12,211 people in 2030. This is still significantly fewer than the number of people exposed in 2000 (17,745 people). The number of people within the DNL 70 dB is also projected to increase from 130 in 2011 to 352 people in 2030 but still remaining well below the 1,551 people within the DNL 70 dB in 2000. All of the residences within the forecasted 2030 DNL 65 dB contour are in areas where Massport has implemented its sound insulation program. 	<p>June 14, 2013</p>
<p>The 2012-2013 EDR should also present a discussion of the following topics:</p> <ul style="list-style-type: none"> Definition of HOV; Massport's target HOV mode share along with incentives; Non-Airport through-traffic; Massport's cooperation with other transportation agencies to increase transit ridership to and from Logan Airport via the Blue Line and Silver Line; Report on Logan Express usage and efforts to increase capacity and usage; Progress on enhancing water transportation to and from Logan Airport; Progress on rental car consolidation; Report on results of ground access study; and Strategies for enhancing services and increasing employee membership in the Logan Airport TMA. 	<p>The information in this chapter is very informative and I encourage Massport to continue with detailed analysis in the 2012-2013 EDR. I strongly advise Massport to consider and address the comments on noise and noise related issues.</p> <p>The 2012-2013 EDR should provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter should report on 2012 and 2013 conditions and compare those conditions to those of 2011 for the following:</p> <ul style="list-style-type: none"> Fleet Mix, including Stage II, Recertified (Hushkitted) Stage III, newly manufactured Stage III, and qualifying Stage IV aircraft; Nighttime operations; Runway utilization (report on aircraft and airline adherence with runway utilization goals); Preferential runway advisory system (PRAS) tracking; and Flight tracks. 	<p>June 14, 2013</p>
<p>Noise</p> <p>The 2011 ESPR updates the status of the noise environment at Logan Airport in 2011, and describes Massport's efforts to reduce noise levels. It also provides noise contour population counts for 2030. The technical appendix contains useful and detailed information, while the main document provides a solid analysis of major noise issues. Many of the issues raised in the noise analysis are ongoing and require continuous monitoring. The future 2012-2013 EDR represents an appropriate forum to serve this updating function and to address the noise issues raised by numerous commenters on the 2011 ESPR.</p>	<p>In 2011 the following changes occurred in the Airport noise environment:</p> <ul style="list-style-type: none"> Compared to 2010, the 2011 DNL decibel (dB) contours were smaller in East Boston and over Boston Harbor toward Hull. The DNL 65 dB contour was slightly larger in Revere, South Boston, and in most of Winthrop for 2011. The overall number of people exposed to DNL values greater than 65 dB increased to 3,947 people in 2011 from 3,830 people in 2010 (an increase of 117 people). The number of people residing within the DNL 70 dB contour remained at 130 people. These levels are well below the numbers of people exposed in the year 2000 when 17,745 people were exposed to DNL noise levels greater than 65 dB and 1,551 people were exposed to DNL levels greater than 70 dB. In 2011, Massport provided sound insulation to 114 homes, 84 percent of which were in Chelsea. The focus of the program in Chelsea was to fulfill federal and state mitigation commitments related to the opening of Runway 14-32. Since the inception of Massport's residential sound insulation program (RSIP), 11,333 homes have received sound insulation treatment in East Boston, South Boston, Winthrop, Revere, and Chelsea. 	<p>June 14, 2013</p>

The 2012-2013 EDR should also report on 2012 and 2013 conditions and compare those to 2011 conditions for the following noise indicators:

- Using the Federal Aviation Administration's (FAA) most current version of the Integrated Noise Model (INM), and RealContours™ and RealProfiles™, produce an accurate set of Day-Night Sound Level (DNL) noise contours. Adjustments made to account for over-water sound propagation and the propagation of sound to areas of higher terrain will be reported;
- Noise-impacted population;
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the use of RealContours™ and RealProfiles™;
- Cumulative Noise Index (CNI);
- Times-Above for 65, 75, and 85 dBA threshold values/Dwell and Persistence of noise levels;
- Installation and benefits of the new noise monitoring system; and
- Flight track monitoring noise quarterly reports.

The 2012-2013 EDR should also report on noise abatement efforts, results from Boston Logan Airport Noise Study (BLANS) study, and provide a status update on the new noise and operations monitoring system.

Air Quality

The 2011 ESPR provides an overview of airport-related air quality issues in 2011 and efforts to reduce emissions. It also predicts emission levels for 2030. Overall total volatile organic compounds (VOC) emissions were 1,109 kilograms per day (kg/day), or 9 percent higher than 2010 levels, but still follow a long-range (i.e., a period of over 20 years) downward trend decreasing by almost 76 percent since 1990. This one-year increase is primarily due to the increase in landing and takeoff operations (LTOs) when compared to 2010 (176,322 LTOs in 2010 and 184,494 LTOs in 2011). Total emissions of oxides of nitrogen (NOX) were 4,077 kg/day, or 2 percent higher than 2010 levels. In 2011, total NOX emissions at Logan Airport were approximately 29 percent lower than 2000 levels. Also, total NOX emissions in 2011 were 707 tons per year (tpy) lower than Massport's 1999 Air Quality Initiative (AQI) benchmark. This represents an overall decrease of 30 percent in NOX emissions since 1999. Total emissions of carbon monoxide (CO) were 6,919 kg/day, or 3 percent lower than 2010 levels and 53 percent lower than 2000 levels; following the same long-range downward trend as VOCs and NOx. Total emissions of particulate matter (PM10/PM2.5) associated with Logan Airport increased in 2011 by approximately 5 percent to 67 kg/day compared to 2010 levels, but still following a long-range downward trend decreasing by 19 percent since 2005 (2005 is the first year that PM10/PM2.5 emissions were reported). This one-year increase is mostly attributable to the corresponding increase in stationary source use, particularly snow melters in conjunction with the unusually heavy snowfall in early 2011.

Since 1999, there has been a continuing trend of decreasing nitrogen dioxide (NO2) concentrations at both the Massport and Massachusetts Department of Environmental Protection (MassDEP) monitoring sites located in the vicinity of Logan Airport. In addition, the annual NO2 concentrations at all monitoring locations in 2011 continued to be well within the National Ambient Air Quality Standards (NAAQS) for NO2. The NO2 monitoring program was discontinued in 2012. Massport's Air Quality Monitoring Study is now complete, having collected data on a variety of ambient air pollutants over a two-year period as a means of assessing any air quality changes attributable to the operation of the Centerfield Taxiway which was completed in 2009. The findings from this Study will be submitted to MassDEP in 2013, and reported in the next Logan Airport EDR.

2011 marks the fifth consecutive year in which Massport has voluntarily prepared a greenhouse gas (GHG) emissions inventory for the EDR/ESPR. The 2011 GHG emission inventory was prepared following methodological guidance by the Transportation Research Board's (TRB) Airport Cooperative Research Program (ACRP). The 2011 inventory assigns GHG emissions based on ownership or control (whether it is controlled by Massport, the airlines or other airport tenants, or the general public). Total Logan Airport GHG emissions in 2011 were 5 percent higher than 2010 levels primarily due to the increase in aircraft operations and passenger vehicles accessing the Airport. Massport-related emissions represent only 12 percent of total GHG emissions at the Airport, tenant-based emissions represent approximately 68 percent, electrical consumption represents 14 percent; and passenger vehicle emissions represent 6 percent. This inventory is one of the three GHG emissions inventories Massport prepares annually; however, the other two only comprise stationary sources of GHGs and are filed with MassDEP and the U.S. Environmental Protection Agency (EPA) respectively.

The 2012-2013 EDR should include an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The chapter should provide discussion on progress on the national and international levels to decrease air emissions to provide context for this chapter. The chapter will also discuss analysis methodologies and assumptions and report on 2012 and 2013 conditions using the most recent versions of the Emissions Dispersion Modeling System (EDMS) and MOBILE motor vehicle emissions. The 2012-2013 EDR should include:

- Emissions inventory for carbon monoxide (CO)
- Emissions inventory for oxides of nitrogen (NOx)
- Emissions inventory for volatile organic compounds (VOCs)
- Emissions inventory for particulate matter (PM)
- Nitrogen dioxide (NO2) monitoring
- NOx emissions by airline

The 2012-2013 EDR should also report on the following air quality initiatives (AQI) for 2012 and 2013:

- Air Quality Initiative Tracking;

- Massport's and Tenant's Alternative Fuel Vehicle Programs; and
- The status of Logan Airport air quality studies undertaken by Massport or others, as available.

Massport has also committed to include an inventory of greenhouse gas (GHG) emissions from Logan Airport in 2012 and 2013. GHG emissions should be quantified for aircraft, ground service equipment (GSE), motor vehicles and stationary sources using emission factors and methodologies outlined in the MEPA Greenhouse Gas Emissions Policy and Protocol. The results of the 2012 and 2013 GHG emissions inventory should be compared to the 2011 results. This chapter should also include an update on Massport's efforts to encourage the use of single engine taxiing under safe conditions.

Water Quality/Environmental Compliance

The 2011 ESPR describes Massport's ongoing environmental management activities including National Pollutant Discharge Elimination System (NPDES) compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan (MCP), and tank management.

The 2012-2013 EDR should report on the 2012/2013 status of:

- National Pollutant Discharge Elimination System (NPDES) Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility;
- Jet fuel usage and spills;
- Massachusetts Contingency Plan (MCP) Activities;
- Tank management;
- Update on the environmental management plan; and
- Fuel spill prevention.

The chapter should also present a discussion of the following topics:

- Future stormwater management improvements (if any); and
- Future MCP and tank management activities.

Sustainability at Logan Airport

This chapter describes Massport's airport-wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy that articulates Massport's commitment to protect the environment and to implement sustainable design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision. It also identifies the actions necessary to achieve the goals, the staff members responsible for each sustainability goal, and the timeline for achieving the goals.

The 2012-2013 EDR should report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have undergone MEPA review and other commitments and have commenced construction. The status of mitigation commitments made in the Section 61 Findings for the following projects should also be reported:

- West Garage/Central Garage
- International Gateway
- Runway Ends 22R and 33L Runway Safety Area Improvements
- Replacement Terminal A
- Logan Airside Improvements Planning
- Southwest Service Area Redevelopment Program

This chapter should also update the status of Massport's mitigation commitments and also will identify projects for which mitigation is complete.

Distribution of the 2012-2013 EDR

Massport should explore opportunities to advance the reporting of information through for Massport's website. Massport should strive to collect and analyze the information required for the 2012-2013 EDR and report this information in a timely manner. For several recent projects, including the 2011 ESPR, Massport has published bi-lingual meeting and project notices and made the services of an interpreter available upon request. Massport should consider continuing these services for the 2012-2013 EDR submittal.

Conclusion

I have determined that the 2011 ESPR for Logan Airport has adequately complied with MEPA and that Massport must submit a 2012-2013 EDR that responds to the issues raised in comments received. The 2012-2013 EDR must include a copy of this Certificate and a copy of each comment letter received on the 2011 ESPR. In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, noise abatement, and air quality issues.

June 14, 2013

Date



Richard K. Sullivan Jr.

EEA #3247 2011 ESPR Certificate June 14, 2013

Comments Received:

- 06/06/2013 Philip Joehning
- 06/07/2013 Nancy Timmerman
- 06/07/2013 Stephen Kaiser, PhD
- 06/07/2013 Darryl Pomier
- 06/07/2013 Town of Milton
- 06/14/2013 The Boston Harbor Association

RKS/ACC/acc

B

Comment Letters and Responses

- The six comment letters received by the Massachusetts Environmental Policy Act (MEPA) Office on the 2012/2013 *Environmental Data Report (EDR)* are reprinted here in the order shown below. As requested in the Secretary of the Executive Office of Energy and Environmental Affairs' Certificate, Massport has provided responses to substantive comments raised in the following letters:
 - ❑ Cindy L. Christiansen, PhD., Town of Milton resident
 - ❑ Frank J. Ciano, Town of Arlington Citizen Advisory Committee representative
 - ❑ Suzanne K. Condon, Associate Commissioner; Director, Bureau of Environmental Health
 - ❑ Joseph A. Curtatone, Mayor, City of Somerville
 - ❑ Vivien Li, President, The Boston Harbor Association
 - ❑ Nancy S. Timmerman, P.E., consultant in Acoustics and Noise Control

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January 26, 2015

The Honorable Maeve Vallely Bartlett, Secretary
Executive Office of Energy and Environmental Affairs
Attn: MEP A Office
Anne Canaday, EEA No. 3247
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: Comments to Boston-Logan International Airport 2012/2013 Environmental Data Report
(2012/2013 EDR), EOE #3247

The Town of Milton appreciates the efforts to inform communities of Boston Logan International Airport's activities and environmental conditions through the 2012 Environmental Data report. Milton, a 13.5 square miles town south of Logan, is one of the most heavily burdened communities as the 2011 Environmental Status and Planning Report and this current EDR show. There are two departure RNAV paths (R27 and R33L), one RNAV arrival path (4R) and soon to be a second (4L) over our mostly residential community. These concentrated paths direct jets and turboprops over all of our six public school buildings, over the numerous private schools in our town, and our parks, sometimes for four or five days in a row with only a five hour break from the planes during the nighttime hours. Cunningham Park, where many families spend much of their summer time, is directly under the R4R RNAV that was implemented by the FAA in December 2011.

Although there are responses to comments from our May 28, 2013 letter regarding the 2011 Environmental Status and Planning Report, several have not received the attention they deserve.

1. This EDR, as in the 2011 ESPR, fails to acknowledge that Milton is an Affected Neighborhood for 27 Departures. Planes using the 27 RNAV disturb our residents greatly as they fly at low altitudes over the southwest neighborhoods of Milton. Residents report, using information from MASSPORT responses to noise complaints that most are at altitudes of 5,000-6,000 feet and still on their departure climb. Runway 27 departures begin around 5 a.m. and often these neighborhood wake-up jets begin five hours from when the 4R/4L arrivals stop the day before. Ending a day at midnight with low-flying jet arrivals over Milton and then beginning the next day at 5 a.m. with low-flying jet departures over Milton is unacceptable and shows complete disregard for our residents' health and well-being.

We disagree with the response that Milton is not a directly affected town from departing runway 27.

B1

2. Runway 4L currently uses a visual approach over Milton, MA. We learned that the FAA in coordination with JetBlue has been testing a visual RNAV for Runway 4L approaches. The parallel runways 4R and 4L are approximately 1,400 feet apart. Construction of new parallel runways cannot, by law, be built this close together today. The lack of separation, the overuse of these runways, and their common use when there are strong crosswinds sets up the likelihood of a catastrophic event over Milton. We have witnessed numerous turn-arounds when the 4R

and 4L runways are used simultaneously. The FAA has saturated the skies over Milton. These turn-arounds and near-misses are warnings that catastrophic events likely will occur. While the 33L RNAV EA was in litigation another RNAV over Milton was being tested. The 4L RNAV test did not include the cumulative impact of 33L (along with 4R arrivals and 27 departures) which overflies our town. However, the FAA claims "The implementation of this action will not result in any extraordinary circumstances in accordance with Order 1050.1E. See attached Initial Environmental Review dated June 25, 2013 for additional information." (See Appendix 2) The 33L RNAV EA also did not account for cumulative effects of another RNAV (4L) being implemented in the same town where 33L overflies.

B2

3. We recently learned through local news and our own research that BOS Logan International Airport is preparing one of its terminals for A380 Operations. The A380 is a super jumbo jet, the largest jet currently made. The use of the A380 by several airlines with service to and from Boston has been reported in several newspaper and online articles. The 4-engine 560 ton jet has a wing span slightly less than a football field and holds up to 555 passengers. This soon will be flying over densely populated residential areas in our town of Milton, MA which has over 50,000 arrivals per year that are at about 2,000 feet in altitude when over our residents. The use of the A380 super jumbo jet at Logan is significant new information relevant to environmental concerns and bears on the entire runway use at Logan. The potential for catastrophic results are amplified because of the overuse of 4R runway for arrivals and the 27 runway for departures, all of which fly over Milton, saturating our skies with noise and pollution.

B3

4. Our citizens report a pattern of non-compliance to FAA standards by the jets that overfly Milton. In the EA for the 33L RNAV the 33L flightpath designates the planes to fly to CBEAR waypoint before turning south. Many planes do not follow the designated flightpath and turn before CBEAR thus flying at lower altitude over Milton. Similarly to the non-compliance with the 33L RNAV, approaches to runway 4R over Milton typically are lower than the 4R RNAV standard. For example, at the MILTT waypoint, the standard altitude for arrivals is 1700 feet. However, according to information received from MASSPORT at Logan airport, the planes using the 4R RNAV are at 1,250 feet, on average, at MILTT. We request that MASSPORT provide non-compliance statistics based on its radar data that is used to calculate DNL estimates in this report. We also request comparisons of MASSPORT DNL estimates to that of the FAA when the REAL CONTOURS software is not used.

B4

5. Two years ago we asked that these reports include a measure of the impression of the DNL estimates (or the margin of error at the typical 95% confidence). The response was this was "noted". We respectfully request, again, that this be added to the reports. We believe the DNL estimates could be off by as much as 5 dB from information we received from a MASSPORT document referenced in the 33L EA.

B5

6. The May 2014 study by Hudda, et.al. of ultrafine particle counts as far as ten miles from the heavily used arrival runways at LAX indicate a concern for the amount of ultrafine particles residents of Milton are exposed to due to the heavily used 4R and 4L arrival runways. We understand that ultrafine particles currently are not regulated, but cell and animal studies indicate exposure to these particles likely have substantial negative health effects. We ask that

MASSPORT conduct measure studies of ultrafine particle counts along the 4R and 4L RNAV paths when in use for arrivals.

B6

7. MASSPORT's response encourages Milton to compare itself to Lynn with respect to actual DNL measures from the noise monitors because the monitor in Lynn is under the 22L arrival path. However, Lynn is not listed as an "affected neighborhood" for 22L arrivals in Table 6-12 on page 6-49 of the report. Although the measured DNL for Lynn's monitor is 0.3 higher than Milton's, MASSPORT cannot say with any level of certainty that Lynn's noise burden is higher than Milton's. It also is perplexing why the difference between the measured and model DNL estimates for Lynn are very similar whereas for Milton, the differences are as high as 5.9 dB (page 6-44). We would appreciate an explanation for this. Also, when assessing the "time-above" table on page 6-52, we question why the DNL estimates for Lynn and Milton are so similar but the time-above 65 dB for Milton is about double that for Lynn. Please explain.
8. We continue to note the unfair runway use distribution for arrivals. MASSPORT reports NE winds approximately 18% of the time and southeast winds about 17% of the time. However, runways 4R/4L arrivals receive almost 40% of the jet arrivals but 15R, what should be the runway of choice with SE winds, only receives about 1% of the arrivals. How is this equitable or fair and what will MASSPORT do to fix this inequity of noise and air pollution burden forced onto our town?
9. The non-jet arrivals and departures over Milton also are excessive. Our community is very concerned about the pollution from these low-flying planes from their use of leaded fuel. As the flight track maps in the report show, our community receives a substantial percentage of these flights too. We ask that MASSPORT conduct studies of lead poisoning in communities under these flight paths.
10. These increases in measures of noise burden for Milton residents--compared to the decrease in many areas closer to Logan--is consistent with the increasing number of individuals in our Town who report that the airplane noise wakes them and their family members (including children), interrupts their conversations, and interferes with the peaceful enjoyment of their home.

B7

B8

B9

B10

**Cindy L
Christiansen**

Digitally signed by Cindy L Christiansen
DN: cn=Cindy L Christiansen, o=Milton,
MA 02186, ou=59 Collamore Street,
email=clchristiansen@gmail.com, c=US
Date: 2015.01.26 18:42:18 -05'00'

Cindy L. Christiansen, PhD
59 Collamore St.
Milton, MA 02186
cLcMilton@gmail.com

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2014 EDR
Boston-Logan International Airport

Comment #	Author	Topic	Comment	Response
B.1	Cindy L Christiansen, PhD Town of Milton Resident	General	We disagree with the response that Milton is not a directly affected town from departing Runway 27.	This question was asked previously and responded to in the 2012/2013 Environmental Data Report (EDR) (please see comment B2 in the 2012/2013 EDR). Runway 27 departures do pass over Milton and several other communities to the west and south of the Airport. The communities identified in Table 6-12 in the 2012/2013 EDR are directly under the immediate arrival or departure path. Please note, that in response to the initial comment, Massport modified Table 6-12 in the 2012/2013 EDR to add broader geographic areas.
B.2	Cindy L Christiansen, PhD Town of Milton Resident	Operations	The 33L RNAV EA also did not account for cumulative effects of another RNAV (4L) being implemented in the same town where 33L overflies.	The Federal Aviation Administration (FAA) prepared the Runway 33L RNAV Environmental Assessment and a Record of Decision (ROD) was issued. It is Massport's understanding that this process is complete.
B.3	Cindy L Christiansen, PhD Town of Milton Resident	Noise	The use of the A380 super jumbo jet at Logan is significant new information relevant to environmental concerns and bears on the entire runway use at Logan Airport.	Logan Airport is a major international airport and accommodates all types of aircraft in use by commercial air carriers. The EDR/ESPR analyses evaluate noise-related impacts of all aircraft, which would include the Airbus A380 if and when these aircraft begin regular service at Logan Airport. The A380 meets Stage 4 noise standards, which is the quietest noise standard for aircraft available today.
B.4	Cindy L Christiansen, PhD Town of Milton Resident	Noise	We request that Massport provide non-compliance statistics based on its radar data that is used to calculate DNL estimates in this report. We also request comparisons of Massport DNL estimates to that of the FAA when the Real Contours software is not used.	The 2014 EDR noise analysis uses the latest version of the FAA's approved Integrated Noise Model (INM). Detailed information is provided in Appendix H, Noise Abatement. Massport utilizes actual radar flight tracks as input to the INM model.

2014 EDR
 Boston-Logan International Airport

Comment #	Author	Topic	Comment	Response
B.5	Cindy L Christiansen, PhD Town of Milton Resident	Noise	Two years ago we asked that these reports include a measure of the impression of the DNL estimates (or the margin of error at the typical 95% confidence) [and] we respectfully request, again, that this be added to the reports.	Massport follows FAA and industry accepted standards for noise data analysis and publishes the findings in the EDRs and ESPRs.
B.6	Cindy L Christiansen, PhD Town of Milton Resident	Air Quality	We ask that Massport conduct measure studies of ultrafine particle counts along the 4R and 4L RNAV paths when in use for arrivals.	Massport reports on pollutants (and their precursors) for which there are National Ambient Air Quality Standards (NAAQS) established by the U.S. Environmental Protection Agency (EPA). These NAAQS are set for carbon monoxide (CO), lead (Pb), nitrogen oxides (NO ₂), ozone (O ₃), particulate matter (PM ₁₀ , PM _{2.5}), and sulfur dioxide (SO ₂). Presently, there are no U.S. EPA or Massachusetts air quality standards for ultrafine particulates (UFP). However, as this is an emerging topic, future ESPRs/EDRs will report on the findings of UFP studies related to aircraft emissions and near airports as they develop – including the one at Los Angeles International Airport (LAX).

2014 EDR
 Boston-Logan International Airport

Comment #	Author	Topic	Comment	Response
B.7	Cindy L Christiansen, PhD Town of Milton Resident	Noise	We would appreciate an explanation for [discrepancies between the measured and modeled DNL estimates for Milton]. Also, when assessing the "time-above" table on page 6-52, we question why the DNL estimates for Lynn and Milton are so similar but the time-above 65 dB for Milton is about double that for Lynn. Please explain.	In 2013, the Milton monitor and the Lynn monitor captured a similar number of events, however more events at the Lynn monitor are at night resulting in a higher measured DNL value. For the modeling, the Milton monitor experienced higher levels of arrivals (to Runway 4L/4R) than the Lynn monitor (to Runway 22L), however the Lynn monitor experienced higher arrivals during the night time period. The Lynn monitor, also experiences arrival overflights to other runways such as Runway 27. This results in a modeled value similar to the Milton monitor from a lower level of flights (due to the addition of 10 dB to nighttime events). The higher level of arrivals over the Milton monitor results in the higher 24-hour Time Above level than at the Lynn monitor since this is based on the number of modeled events above 65 dB.
B.8	Cindy L Christiansen, PhD Town of Milton Resident	Air Quality	How is [current runway use distribution for arrivals] equitable or fair and what will Massport do to fix this inequity of noise and air pollution burden forced onto our town?	Massport is currently undertaking a runway use study with FAA and the Citizens Advisory Committee (CAC), of which Milton is an active member. The FAA makes the determination of which runways to use. A goal of the current runway use study is to provide the FAA guidance on runway use selection with the goal of reducing persistent use of runways.

2014 EDR
 Boston-Logan International Airport

Comment #	Author	Topic	Comment	Response
B.9	Cindy L Christiansen, PhD Town of Milton Resident	Air Quality	We ask that Massport conduct studies of lead poisoning in communities under these flight paths.	In 2013, only 0.004% of the fuel dispensed at Logan Airport was 100LL (i.e., low lead avgas). Moreover, the vast majority of this fuel is burned "in-route" and at altitude away from Logan Airport and neighboring communities – further minimizing the potential ground-level impacts and exposures. The U.S. EPA is completing a comprehensive study of airborne lead concentrations at 15 airports with the greatest leaded fuel use in the U.S. The initial results from this study indicate that the measured lead levels in the vicinities of these airports were well within the National Ambient Air Quality Standards for this pollutant – with only one exception. The exception was at a California general aviation airport where one lead monitor was located in the airport's restricted area adjacent to a stockade fence and roughly 20 meters from the aircraft run-up zone. Another nearby monitor at the same airport had much lower levels.
B.10	Cindy L Christiansen, PhD Town of Milton Resident	Noise	These increases in measures of noise burden for Milton residents - compared to the decrease in many areas closer to Logan - is consistent with the increasing number of individuals in our Town who report that the airplane noise wakes them and their family members (including children), interrupts their conversations, and interferes with the peaceful enjoyment of their home.	Since 2000, aircraft-related noise levels have been significantly reduced for all surrounding communities. Additionally, the total number of aircraft operations has decreased. Massport is actively working with FAA and the CAC on a runway use study to further assess aircraft noise.

COMMENT VIA EMAIL

From: frankieboy@aol.com [mailto:frankieboy@aol.com]

Sent: Wednesday, January 14, 2015 3:32 PM

To: Canaday, Anne (EEA)

Cc: myronkassaraba@gmail.com; smbyrne1987@gmail.com; jcurro@alumni.tufts.edu;
achapdelaine@town.arlington.ma.us

Subject: Massport Environmental Data Report of 12/10/14

Hon. Matthew A. Beaton,

I SERVE AS THE ARLINGTON REPRESENTATIVE TO THE CAC AND MY PERSONAL OFFICE ADDRESS IS 230 MSGR. OBRIEN HWY., CAMBRIDGE, MA. I WRITE YOU AS THE CAC REPRESENTATIVE AND SPEAK FOR MYSELF ALONE IN THAT CAPACITY. CONGRATULATIONS ON YOUR APPOINTMENT.

ARLINGTON HAD BEEN UNAFFECTED BY THE OPERATIONS OF MASSPORT, LOGAN, UNTIL THE FAA PUT INTO EFFECT THE RNAV SYSTEM IN JUNE 2013. CONTRARY TO THE EXPECTATIONS GIVEN ALL BY THE FAA, NAMELY THAT THERE WOULD BE NO ADVERSE EFFECT, ARLINGTON RESIDENTS IN EAST ARLINGTON HAVE BEEN DISTURBED TO THE POINT OF UTTER FRUSTRATION BY THE NOISE AND VIBRATION SOMETIMES EVERY 15 MINUTES OVER A 24HR PERIOD, FROM APPRX. 6/13 TO DATE.

THIS PROBLEM I HAVE LEARNED, IS FROM THE USE OF RUNWAY 33L AND THE BASICALLY SINGLE LANE ROUTES NOW IN EFFECT BY THE FAA. IN THE PAST THE ROUTES WERE DISBURSED AND NOW UNDER THE RNAV SYSTEM, THE ROUTES ARE BASICALLY ONE LANE ROUTES.

THIS NEW SYSTEM SHOULD NOT ADVERSELY AFFECT A COMMUNITY AS IT HAS AND IN SOME CASES 15% OF LOGAN FLIGHTS ARE OVER ARLINGTON AND THIS HAS RESULTED IN 258 CALLS OF COMPLAINTS FROM ARLINGTON IN 2014. IN PRIOR YEARS OF 2012 THERE WERE NO COMPLAINTS AND IN 2013, 6 COMPLAINTS.

THE NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) PROVIDES THAT NO COMMUNITY SHOULD BE ADVERSELY IMPACTED BY PROCESS OUTCOMES AS HAS OCCURED IN THIS CASE. ON 1/13/15, I CONVEYED THE SUBSTANCE OF THE ABOVE AT THE PUBLIC HEARING AT MASSPORT.

WE SEEK YOUR ASSISTANCE IN OUR EFFORT TO OBTAIN RELIEF FROM THE FAA.
WE, THANK YOU IN ADVANCE.
FRANK J. CIANO

C1

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**2014 EDR
Boston-Logan International Airport**

Comment #	Author	Topic	Comment	Response
C.1	Frank J. Ciano Town of Arlington CAC Representative	Noise	We seek your assistance in our effort to obtain relief from the FAA.	As reported in the 2012/2013 EDR, Massport is participating in an FAA aircraft noise study as part of the Airside Improvement Project mitigation. The Logan Airport Community Advisory Committee (CAC), in which Arlington is an active member is also participating in this study. The primary focus of the Boston Logan Airport Noise Study (BLANS) is to determine viable ways to reduce noise from aircraft operations to and from Logan Airport without diminishing airport safety and efficiency. The study is being completed in three phases. Phases 1 and 2 are complete. The current Phase 3 of the BLANS is focusing on the development of an updated Runway Use Program. The findings of this study will be reported in future EDRs and ESRs.

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The Commonwealth of Massachusetts
 Executive Office of Health and Human Services
 Department of Public Health
 Bureau of Environmental Health
 250 Washington Street, Boston, MA 02108-4619
 Phone: 617-624-5757 Fax: 617-624-5777
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CHARLES D. BAKER
 Governor
 KARYN E. POLITO
 Lieutenant Governor

MARYLOU SUDDERS
 Secretary
 EILEEN M. SULLIVAN
 Acting Commissioner
 Tel: 617-624-6000
 www.mass.gov/dph

AC
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January 26, 2015

The Honorable Matthew A. Beaton, Secretary Executive Office of
 Energy and Environmental Affairs
 Attn: MEPA Office
 Anne Canaday, EEA No. 3247 100 Cambridge
 Street, Suite 900
 Boston, MA 02114

Dear Secretary Beaton:

The purpose of this letter is to provide comments on the Boston-Logan International Airport 2012/2013 Logan Airport Environmental Data Report (2012/2013 EDR). As stated on page 7- 38, the Massachusetts Department of Public Health released the final report of the Logan Airport Health Study (LAHS) in May 2014. The 2012/2013 EDR acknowledges Massport's collaboration in providing important data to support the air dispersion modeling that was conducted as part of this effort. It also notes that Massport is working with DPH to implement the recommendations in the report. Much of this work involves funding by Massport for community health centers located in the high exposure area to enhance efforts to address respiratory health outcomes in children and adults living in closest proximity to the airport.

The 2012/2013 EDR summarizes Massport's initiatives to date to reduce air pollution impacts within their control (e.g., providing infrastructure for compressed natural gas (CNG) fuels and electricity charging stations, Alternative Fuel Vehicle Program). The LAHS recommended additional initiatives to reduce air pollution impacts could be considered by Massport in consultation with local communities that would serve to further reduce the burden of indoor and outdoor sources of air pollution on residents in closest proximity to the airport. While there have been significant reductions in total air pollution emissions since 1990, we believe that such initiatives are important given that the 2012/2013 EDR indicates that total emissions have not fluctuated significantly since 2009.

The results of the air dispersion modeling performed for the LAHS suggest that the most productive ambient air quality mitigation activities at Logan Airport should focus on ground-level sources and on emissions that occur at the terminal complex. Massport has implemented several mitigation strategies that address these areas including converting fleet vehicles to Compressed Natural Gas and encouraging "front line" taxi pool privileges to hybrid taxis.

D1

Additional conversion of APUs and other ground equipment to alternative fuels or electricity will also reduce emissions. Massport should also continue to evaluate comprehensive emission reduction strategies that target reduction of total emissions including strategies to reduce motor vehicle traffic congestion at the airport, reduce passenger vehicles to and from the airport by expanded use of public transit, incentivizing the use of low emission vehicles and alternatives to diesel vehicles, and optimizing the operation of equipment at reduced emissions rates.

D2

We also recommend that Massport consider the significant body of research conducted by the Partnership for Air Transportation, Noise, and Emission Reductions (PARTNER). PARTNER is a cooperative aviation research organization, and an FAA/NASA/Transport Canada-sponsored Center of Excellence. The research is conducted locally by the Massachusetts Institute of Technology (MIT) and Boston University School of Public Health.¹ For example, numerous studies have focused on exposure and health implications of aviation-related emissions, including characterizing roadway and aircraft contributions to ultrafine particle concentrations at airports.^{2,3} In addition, PARTNER has studied opportunities to enhance fuel efficiency and reduce emissions with initiatives aimed at improving air traffic efficiency.⁴ Below are suggested edits using track changes to section describing the LAHS on page 7-38.

Massachusetts Department of Public Health Study

This study was completed in May 2014 and consists of an epidemiological health survey combined with computer modeling of noise levels and air pollution concentrations. The overall goal of the Logan Airport Health Study (LAHS) was to determine whether residents living in areas with greater potential for airport-related exposures were more likely to experience respiratory, cardiovascular, or auditory effects compared to those residents living in areas with lesser potential for airport-related exposures. Massport has cooperated in this effort by providing funding to complete the study and Airport operational data in support of it. In the spring of 2011, Massport also gave technical assistance in support of the DPH study by providing geographic information systems (GIS) analysis of the road way network in and around Logan Airport in a format compatible with the FAA's EDMS. Massport is working with DPH on implementing DPH recommendations related to Massport.

D3

¹ <http://partner.mit.edu/projects/health-impacts-aviation-related-air-pollutants>

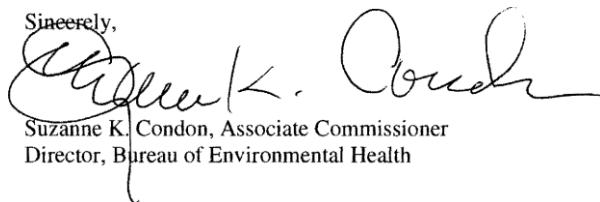
² Hsu, HH, Adamkiewicz G, Houseman EA, Vallarino J, Melly SJ, Wayson RL, Spengler JD, Levy JI. 2012. The Relationship Between Aviation Activities and Ultrafine Particulate Matter Concentrations Near a Mid-Sized Airport. Atmospheric Environment 50: 328-337.

³ Hsu HH, Adamkiewicz G, Houseman EA, Zarubiak D, Spengler JD, Levy JI. 2013. Contributions Of Aircraft Arrivals And Departures To Ultrafine Particle Counts Near Los Angeles International Airport. Sci Total Environ. 2013 Feb 1;444:347-55.

⁴ Aircraft Impacts on Local and Regional Air Quality in the United States Partnership for Air Transportation Noise And Emissions Reduction Project 15 Final Report
http://web.mit.edu/aeroastro/partner/reports/proj_15/proj15finalreport.pdf

We hope these comments are helpful to you. We look forward to continuing our work with EOEEA, Massport, and residents of LAHS communities to enhance mitigation efforts. Please contact us at 617-624-5757 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Suzanne K. Condon". The signature is fluid and cursive, with a large initial "S" and a long horizontal stroke at the end.

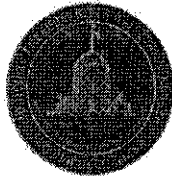
Suzanne K. Condon, Associate Commissioner
Director, Bureau of Environmental Health

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2014 EDR
Boston-Logan International Airport

Comment #	Author	Topic	Comment	Response
D.1	Suzanne K Condon Associate Commissioner, Director, Bureau of Environmental Health	Air Quality	Logan Airport should focus on ground-level sources and on emissions that occur at the terminal complex. Massport should also continue to evaluate comprehensive emission reduction strategies that target reduction of total emissions including strategies to reduce motor vehicle traffic congestion at the airport, reduce passenger vehicles to and from the airport by expanded use of public transit, incentivizing the use of low emission vehicles and alternatives to diesel vehicles, and optimizing the operation of equipment at reduced emissions rates.	Massport is committed to maintaining and advancing its programs and strategies aimed at reducing emissions of the U.S. EPA "criteria" pollutants (and their precursors) and greenhouse gases. These initiatives include providing both incentives and infrastructure that enable Massport, the Logan Airport tenants, and the public to participate in meaningful ways. Future EDRs and ESPRs will continue to report on the achievements and provide updates to the future plans of these emission-reduction measures.
D.2	Suzanne K Condon Associate Commissioner, Director, Bureau of Environmental Health	Air Quality	We also recommend that Massport consider the significant body of research conducted by the Partnership for Air Transportation, Noise, and Emission Reductions (PARTNER).	Massport is aware of the PARTNER research, the Airport Cooperative Research Program (ACRP) program as well as the research conducted by other local universities on air quality, health effects, and emission reductions as they pertain to airports. In some cases, Massport provides the researchers with supporting information and data for this research and will continue to do so to help advance what is known about these important and emerging topics. In other cases, Massport reviews the outcomes of the research and applies the information wherever possible.
D.3	Suzanne K Condon Associate Commissioner, Director, Bureau of Environmental Health	General	Below are suggested edits using track changes to section describing the LAHS on page 7-38: "The overall goal of the Logan Airport Health Study (LAHS) was to determine whether residents living in areas with greater potential for airport-related exposures were more likely to experience respiratory, cardiovascular, or auditory effects compared to those residents living in areas with lesser potential for airport-related exposures."	Comment noted. Massport has provided both financial and technical assistance as a means of advancing and completing the LAHS. Work is also underway by Massport to implement the recommendations contained in the report. Progress on this work will be reported upon in the next EDRs.

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CITY OF SOMERVILLE, MASSACHUSETTS
JOSEPH A. CURTATONE
MAYOR

January 26, 2015

Secretary Matthew Beaton
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office
Analyst Anne Canaday, EEA No. 3247
Cambridge Street, Suite 900
Boston, MA 02114

RE: Boston Logan International Airport 2012/2013 Environmental Data Report: EEA# 3247

Dear Secretary Beaton:

The City of Somerville has reviewed the Boston Logan International Airport 2012/2013 Environmental Data Report (EDR) submitted by Massport and provides the following comments.

Noise: Request for Noise Monitor and an analysis of increased Somerville complaints

There are several locations in the Greater Boston area including Somerville's neighbor, Medford, where there are permanent noise monitors operated by Massport. Somerville does not have permanent noise monitors located within the city even though the Gate that services runway 15R is serviced via both communities almost equally. Additionally, there has been a noticeable increase in recorded complaints. In 2011 there were 98 complaints by 45 callers, in 2012 there were 95 complaints by 26 callers and in 2013 there were 166 complaints by 72 callers. So there is an increase of 71 complaints in 2013 compared to 2012 and an increase of callers by 46 for the same period. The complaints from City of Somerville residents are increasing, both from more callers and more complaints. The City of Somerville requests 1) a determination as to why complaints are increasing, and 2) the installation of one or more permanent noise monitors.

E1





Air Quality: Request for public transportation Air Quality Impact Analysis in Somerville

The 2012/2013 EDR measures air quality in terms of localized ground operations at the airport. It also addresses Greenhouse Gas (GHG) emissions from these operations. Somerville Air Quality is affected due to mobile sources, primarily vehicles passing through Somerville to access the airport. Impact of public transportation in terms of private vehicle reductions passing through Somerville to Logan would provide some understanding of air quality impact on Somerville due to Logan Airport.

E2

For these reasons, the City of Somerville requests that additional Somerville specific data be provided as part of the Boston Logan International Airport 2012/2013 Environmental Data Report to address the increase in Somerville complaints regarding noise.

E3

Thank you for the opportunity to provide comment on this proposed project. Please contact my office with any questions.

Sincerely,

Joseph A. Curtatone
Mayor



**2014 EDR
Boston-Logan International Airport**

Comment #	Author	Topic	Comment	Response
E.1	Joseph A Curtatone Mayor of City of Somerville	Noise	The City of Somerville requests 1) a determination as to why complaints are increasing, and 2) the installation of one or more permanent noise monitors.	It is Massport's understanding that noise complaints are increasing due a combination of factors including weather conditions as well as additional concentration of flight tracks associated with the implementation of the FAA's Runway 33L RNAV procedures. Regarding the installation of permanent noise monitors, Massport has installed a network of permanent noise monitors based on the flight paths to/from Logan Airport. In order to capture the most accurate readings, noise monitors must be in locations directly under the main flight paths. This results in the greatest correlation between measured and modeled noise levels. The annual noise analysis conducted by Massport in the EDR follows the accepted industry standard protocols for capturing noise impacts on communities.
E.2	Joseph A Curtatone Mayor of City of Somerville	Air Quality	Request for public transportation Air Quality Impact Analysis in Somerville. Somerville Air Quality is affected due to mobile sources, primarily vehicles passing through Somerville to access the Airport. Impact of public transportation in terms of private vehicle reductions passing through Somerville to Logan would provide some understanding of air quality impact on Somerville due to Logan Airport.	While airport-related motor vehicle traffic traveling through Somerville likely accounts for some of the emissions in this airshed, it is unlikely that these emissions represent a significant portion compared to the overall total. Local and regional motor vehicle traffic and their emissions are expected to far outweigh the airport component. It is also noteworthy that a Health Study conducted by the Massachusetts Department of Public Health, designed to assess the potential effects of Logan Airport emissions on nearby communities, identified Somerville in the "low-to-medium" category (i.e., among the lowest possible ratings). The Logan Airport Health Study is available online at: http://www.mass.gov/eohhs/gov/departments/dph/programs/environmental-health/investigations/logan-airport-health-study.html
E.3	Joseph A Curtatone Mayor of City of Somerville	Noise	The City of Somerville requests that additional Somerville specific data be provided as part of the Boston Logan International Airport 2012/2013 Environmental Data Report to address the increase in Somerville complaints regarding noise.	Noise modeling includes all actual flight paths including those over the City of Somerville. These are reported in the EDRs and ESPRs.

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27 January 2015

Secretary Matthew Beaton
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114
ATT: MEPA Office

RE: EOE No. 3247- 2012/2013 Environmental Data Report
Boston-Logan International Airport, Boston

Dear Secretary Beaton:

The Boston Harbor Association, a non-profit, public interest organization founded in 1973 by the League of Women Voters and the Boston Shipping Association to promote a clean, alive, and accessible Boston Harbor, is in receipt of the Boston-Logan International Airport 2012/2013 Environmental Data Report. This report focuses on cumulative environmental impacts of Logan Airport's operations and activities. Since 1989, Massport, owner and operator of Logan Airport, has been required to submit 5-year Environmental Status and Planning Reports and annual Environmental Data Reports so that the cumulative environmental effects of individual projects can be considered in a broader planning context.

Passenger usage of Logan Airport increased to 30.2 million passengers in 2013, a record high. During the same period, the number of aircraft operations fell from 368,987 in 2011 to 361,339 in 2013. This was a result of greater airline efficiency, with the average number of passengers going from 78.3 per aircraft operation in 2011 to an average of 83.6 passengers in 2013. Air cargo volumes dropped from 562 million pounds in 2011 to 558 million pounds in 2013.

The Boston Harbor Association has commented over the past decade on both the 5-year Environmental Status and Planning Reports as well as the annual Environmental Data Reports. Our comments on the 2012/2013 Report follow:

Environmental Sustainability: As noted in the prior report as well as the current 2012/2013 Environmental Data Report, Massport's continued efforts on environmental sustainability have been recognized by numerous organizations. The new Green Bus Depot uses renewable energy from solar panels, houses a hybrid-powered bus fleet, and incorporates water conservation measures. Likewise, the Rental Car Center which opened in 2013 includes water reclamation in its vehicle washing, uses renewable energy (wind and solar), and has plug-in stations for electric vehicles. We commend these green buildings and sustainable measures.

As part of climate change mitigation/environmental sustainability efforts, Massport has also actively worked to promote mass transit usage by airport passengers. 2013 ground access mode share of passengers indicate that 71.2% took some form of automobile, with 43% driving themselves (Table 5-1, Environmental Data Report). Approximately 29% of passengers accessed the airport by shared ride/HOV modes in 2013, with 15% using mass transit on weekdays (12.1% transit usage on weekends).

During this reporting period, Massport initiated free Silver Line Airport service at the airport, which we strongly support. Silver Line usage by airport passengers ranged from 3.5% on weekends to 5.1% on weekdays in 2013. Given the level of Massport subsidy, we urge greater marketing of the free Silver Line service to South Boston and to South Station in an effort to further reduce automobile usage.

F1

We commend Massport for launching the new Logan Express bus service serving Back Bay hotels and Back Bay residents to the airport in 2014, and for coordinating with the MBTA to allow usage of the MBTA's Charlie Card on the new service. We are also very supportive of the multi-ride Logan Express ticket books at \$75 for ten rides from Peabody, Woburn, Framingham, and Braintree. Initiatives like these make mass transit usage much more attractive.

At the same time, however, Table 5-9 of the Environmental Data Report (page 5-19) documents a steady increase in parking spaces from 2012 to 2014. Logan Airport is subject to a parking freeze, which is an element of the Massachusetts State Implementation Plan under the Federal Clean Air Act. Parking spaces at the airport totaled 20,692 in 2012, increased to 20,938 spaces in 2013, and peaked at 21,088 spaces in 2014. Creative counting of parking spaces under the category "Restricted Use Parking Spaces" is allowed ten days a year during peak air travel periods, and such spaces must be provided free of charge. Providing free parking does not seem consistent with efforts to reduce vehicular miles traveled and required reductions in air quality emissions. Consistent with the Massachusetts State Implementation Plan, we support efforts to discourage automobile usage, and strongly urge that "Restricted Use Parking Spaces" currently provided free of charge be eliminated.

F2

The 2012-2013 Environmental Data Report further notes, "As noted above, however, demand for on-Airport parking in the terminal area is not price sensitive and these parking rate increases have so far failed to dampen parking demand" (page 5-24). While parking rates at the airport's central parking garage were raised \$3 and \$2, respectively, in 2012 and in 2014, the rates are still comparatively low compared to commercial parking rates in downtown Boston. Twenty-four hour parking at the central parking garage costs \$29, and only \$20 per day at the economy parking garage. Consistent with the goals of the State Implementation Plan under the Federal Clean Air Act, we support continued, significant parking rate increases to discourage automobile usage and to generate funds to further help subsidize transit options.

F3

Water Transportation: The 2012/2013 Environmental Data Report notes, "Water transportation accounts for less than 1 percent of the mode share to Logan Airport, according to the 2013 Logan Airport Air Passenger Ground Access Survey. Annual ridership on privately-provided water transportation experienced an increase of over 16 percent in 2013 compared to 2012 and an increase of 3 percent in 2012 compared to 2011" (page 5-31). The report notes that during the reporting period there were three providers of water transportation to the airport: City Water Taxi, Rowes Wharf Water Shuttle, and the MBTA's Harbor Express.

Footnotes state that MBTA ferry service from Quincy/Hull to Logan was not as frequent as Blue Line and Silver Line services, does not run on frequent and consistent headways throughout the day, and was significantly more expensive than other public transportation (Footnote 13, page 5-31). These factors may help explain the drop in MBTA ferry usage from a high of 37,861 passengers in 2009 to 31,197 passengers in 2012 (Table 5-13). During the same period, though, private water taxi usage increased significantly, from a low of 50,734 passengers in 2009 to 58,879 passengers in 2011, 60,840 passengers in 2012, and a high of 70,378 passengers in 2013.

Subsequent to the reporting period, the water transportation providers changed in 2014, with Boston Harbor Cruises, a fourth-generation water transportation company, now operating the services formerly provided by City Water Taxi and Harbor Express. Given the new but highly experienced operator now at the airport, we believe it would be timely for Massport to convene a meeting of water transportation operators, municipal officials, and advocates to discuss water transportation routes, fare structures, and marketing. Such a meeting should focus on short-term service (in the next 1-3 years), and long-term service taking into account expansion of the Boston Convention and Exhibition Center, opening of Wynn Everett casino, and the Boston 2024 Olympic bid. We believe that there are opportunities to better serve water transportation users beyond just the one percent of passengers who currently use water transportation to the airport.

F4

Open Spaces/Airport Buffer Areas/Resource Areas: Massport does an outstanding job of constructing and maintaining exceptional open spaces and Airport Buffer Areas. Summer 2014, Massport completed the East Boston Greenway Connector, an important connection between Bremen Street Park and an overlook at Wood Island Marsh linking Piers Park almost to Constitution Beach. It is a spectacular connection, advocated in 2009 by the Boston Conservation Commission, local residents, environmental organizations, and elected officials as part of the environmental commitments for the Logan Green Bus Depot. The Massport board approved the Connector project in 2011, and construction finally started in 2013. For all future projects, we ask that the Environmental Secretary require that the environmental commitment/mitigation be completed by the time of the issuance of a certificate of occupancy so that there is not a multi-year delay between project completion and completion of the environmental commitment/mitigation.

F5

Consistent with the City of Boston's 2014 Climate Action Plan, we ask that the Secretary require Massport's Logan Airport projects to be consistent with the City's goal of increasing the urban tree canopy by 35%. There have been several airport projects where tree and/or vegetation removal have been deemed necessary. We ask that the Secretary reinforce that tree removal should be avoided. In the event that tree removal cannot be avoided, the replacement ratio used by the Boston Conservation Commission (2:1 or 3:1 replacement ratio) would be a useful one to implement. Such tree replacement should occur in the immediate area of Logan Airport, including open spaces and Airport Buffer Areas and/or in the abutting neighborhoods and communities of East Boston and Winthrop.

F6

The Logan Airport Runway Safety Area Improvement Program caused a significant loss of eelgrass area (66,600 sq. ft. of eelgrass beds). The Secretary's Certificate called for a 3:1 replacement ratio. The eelgrass was transplanted in Boston Harbor in 2011, but did not survive through 2012. An alternative mitigation plan was devised, which called for conservation moorings on the North Shore and Cape Cod. Members of the Boston Conservation Commission as well as The Boston Harbor Association strongly supported having the mitigation in the same watershed area (Boston Harbor) adversely impacted by the airport project. We urge that the Secretary's Certificate require that any future mitigation measures required of Logan Airport projects be located in the same watershed area where the adverse impacts will occur.

F7

Water Quality: Massport continues to make progress on water quality issues. In 2012, 132 oil spills occurred at the airport, of which 5 were of 10 or more gallons (593 gallons spilled into Boston Harbor during the year). In 2013, there were 94 oil spills, of which 6 were of 10 or more gallons (452 gallons spilled into Boston Harbor). It appears that a number of these spills were the result of aircraft fueling, and highlights the importance of working with the airlines and/or their vendors to ensure compliance with water quality standards through spill prevention.

We continue to urge that Massport identify additional "snow farm" locations so that there is not a need to request permission to lift the ban on snow dumping into Boston Harbor except potentially during blizzards when there may be insufficient locations to handle snow from airport runways. In rare blizzard circumstances where there may not be sufficient "snow farm" locations, only "clean" snow with no chemicals, salt, sand, or deicing materials should be allowed into Boston Harbor, and only after permission has been granted by the MA Department of Environmental Protection and the local Conservation Commission.

F8

Climate-resilient projects: We commend Massport for hiring its first Program Manager for Resiliency in 2014. Robbin Peach is an experienced state manager and familiar with climate action. She will no doubt help move Massport forward on climate preparedness.

Prior to Robbin Peach's hire, the 2012/2013 Environmental Data Report noted that a Resiliency Working Group has been established to "identify threats, hazards, likely scenarios, and current vulnerabilities. The findings of the Working Group will inform overall strategic planning decisions and priority setting" (page 3-27). A Disaster and Infrastructure Resiliency Planning Study of the airport is also underway. We ask that the Secretary's Certificate have Massport distribute this latter study, at a minimum, to all commenters of the Environmental Data Report and to any interested parties who request it, and that Massport solicit comments from these parties and others on the study and implementation measures.

F9

Thank you for your consideration.

Sincerely,

Vivien Li
President
The Boston Harbor Association

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2014 EDR
Boston-Logan International Airport

Comment #	Author	Topic	Comment	Response
F.1	Vivien Li Boston Harbor Association President	Regional Transportation / Ground Access	Given the level of Massport subsidy, we urge greater marketing of the free Silver Line service to South Boston and to South Station in an effort to further reduce automobile usage.	Massport has an existing marketing strategy for the Silver Line including posters, notices on the website, and other general advertising. Massport will continue to look at ways to market the service and increase utilization.
F.2	Vivien Li Boston Harbor Association President	Ground Access	Consistent with the Massachusetts State Implementation Plan, we support efforts to discourage automobile usage, and strongly urge that "Restricted Use Parking Spaces" currently provided free of charge be eliminated.	The Logan Airport Parking Freeze requirement does not allow Massport to charge for these Restricted Use spaces.
F.3	Vivien Li Boston Harbor Association President	Ground Access	Consistent with the goals of the State Implementation Plan under the Federal Clean Air Act, we support continued, significant parking rate increases to discourage automobile usage and to generate funds to further help subsidize transit options.	Massport continually evaluates the parking rate structure at Logan Airport and will continue to do so in the future.
F.4	Vivien Li Boston Harbor Association President	Regional Transportation / Ground Access	Given the new but highly experienced operator now at the airport, we believe it would be timely for Massport to convene a meeting of water transportation operators, municipal officials, and advocates to discuss water transportation routes, fare structures, and marketing.	Massport would be happy to participate in such a group meeting with appropriate state agencies and stakeholders to discuss water transportation options.
F.5	Vivien Li Boston Harbor Association President	Mitigation	For all future projects, we ask that the Environmental Secretary require that the environmental commitment/mitigation be completed by the time of the issuance of a certificate of occupancy so that there is not a multi-year delay between project completion and completion of the environmental commitment/mitigation.	Massport will continue to meet its mitigation obligations as it has in the past. We are proud of our role in facilitating the public process and expediting concept, design and construction of the Greenway Connector Project.

2014 EDR
Boston-Logan International Airport

Comment #	Author	Topic	Comment	Response
F.6	Vivien Li Boston Harbor Association President	Mitigation	We ask that the Secretary reinforce that tree removal should be avoided. In the event that tree removal cannot be avoided, the replacement ratio used by the Boston Conservation Commission (2:1 or 3:1 replacement ratio) would be a useful one to implement. Such tree replacement should occur in the immediate area of Logan Airport, including open spaces and Airport Buffer Areas and/or in the abutting neighborhoods and communities of East Boston and Winthrop.	Over the past 20 years, Massport has continued to upgrade and improve Logan Airport's open space on the airport, and in adjacent communities and has dramatically increased the amount of tree planting, shrubs and landscaping at the airport.
F.7	Vivien Li Boston Harbor Association President	Mitigation	We urge that the Secretary's Certificate require that any future mitigation measures required of Logan Airport projects be located in the same watershed area where the adverse impacts will occur.	Massport has worked closely with the Massachusetts Department of Environmental Protection (MassDEP) and other agencies and stakeholders to find appropriate mitigation sites within the existing watershed area as well as outside, if necessary. We continue to comply with the requirements of the MassDEP as well as FAA's wildlife hazard management guidance.
F.8	Vivien Li Boston Harbor Association President	Operations	We continue to urge that Massport identify additional "snow farm" locations so that there is not a need to request permission to lift the ban on snow dumping into Boston Harbor except potentially during blizzards when there may be insufficient locations to handle snow from airport runways.	Massport has instituted policies to reduce the need to request snow dumping, except in extreme situations such as the winter of 2014/2015. In the event of a major storm, Massport has best management practices (BMPs) in place to limit the amount of snow that needs to be moved or placed in the harbor.
F.9	Vivien Li Boston Harbor Association President	General	We ask that the Secretary's Certificate have Massport distribute this latter study [DIRP Study], at a minimum, to all commenters of the Environmental Data Report and to any interested parties who request it, and that Massport solicit comments from these parties and others on the study and implementation measures.	Information on Massport's resiliency program is available on Massport's website at https://www.massport.com/business-with-massport/resiliency/ . Information on the Disaster and Infrastructure Resiliency Planning (DIRP) Study is reported on in the 2014 EDR. Please see Chapter 1, Introduction/Executive Summary and Chapter 3, Airport Planning.

Nancy S. Timmerman, P.E.
Consultant in Acoustics and Noise Control
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nancy.timmerman@alum.mit.edu
nancy_timmerman@comcast.net

January 27, 2015

The Honorable Matthew A. Beaton, Secretary
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office
Anne Canaday, EOE A No. 3247
100 Cambridge Street, Suite 900
Boston, MA 02114

Subject: EOE A #3247-Boston-Logan Airport 2012/2013 Environmental Data Report (EDR)

Dear Secretary Beaton:

These comments are being transmitted by email.

I have reviewed the 2012/2013 Environmental Data Report (EDR), EOE A #3247 and offer the following comments and questions.

It is a good thing that Massport has instituted the Boston Logan Express service, providing a direct link between downtown and the airport.

It is also a good thing that the MBTA Silver Line provides free transportation to South Station, where the connections to the rest of the MBTA service are also free. Do the customer service representatives point this out to the public, to encourage its use?

G1

In the Ground Transportation section, a grouping is made of Urban Core which is Boston, Brookline, Cambridge, and Somerville (according to the text with MBTA service). If this is true, why weren't the following cities included: Revere (Blue line), Quincy (Red line), Braintree (Red line), Milton (Red line), Medford (Orange line), and Everett (Orange line)? One would think at least Revere would be included.

G2

It is also a good thing that Massport has constructed the consolidated car rental facility. This single project improves congestion at the curb, reduces car rental vehicle trips and reduces the attendant emissions from their operation.

Member Firm, National Council of Acoustical Consultants

With respect to the Preferential Runway Advisory System (PRAS), how is Massport working with the FAA to encourage changing runway configuration use, since it is known that a change of runway configuration takes time and effort?

G3

Why was noise monitoring Site 12 decommissioned in 2010, and what has been the trouble at Site 3, since it cannot be relied upon?

G4

The comparison between modeled and measured noise levels for 2011 and 2012 continues to show a bias of measured DNL lower than modeled for virtually all monitoring locations, and especially for locations whose modeled levels are above 60 dB. It appears that thresholds are used in reporting the measured aircraft-only DNL. If the thresholds are too high, the assumed aircraft-only DNL will be too low.

G5

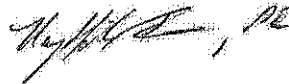
Runway 14/32 was constructed at considerable cost. Since it has been in operation, it has been used for at most 1% of operations. One would have thought the usage would be higher.

In Figure 6-3, the graphic for jet departures, it is clear that there were jet operations in October, 2013, from Runway 22R which flew straight out from the airport. What did the airport do to investigate these operations?

G6

Thank you for giving me the opportunity to comment on this report.

Sincerely,



Nancy S. Timmerman, P.E.

cc: T. Ennis, Massport
S. Dalzell, Massport
Letter to MEPA Office/EOEA #3247--2012/2013EDR

Member Firm, National Council of Acoustical Consultants

2014 EDR
Boston-Logan International Airport

Comment #	Author	Topic	Comment	Response
G.1	Nancy S. Timmerman, P.E. Consultant in Acoustics and Noise Control, Boston, MA	Regional Transportation / Ground Access	Do the customer service representatives point out [the Silver Line] to the public, to encourage its use?	Massport has an extensive public information program for the ground transportation services to and from Logan Airport. Signage is provided throughout the terminal complex and at the curbs, as well as on Massport's website. https://www.massport.com/logan-airport/to-and-from-logan/
G.2	Nancy S. Timmerman, P.E. Consultant in Acoustics and Noise Control, Boston, MA	Regional Transportation	In the Ground Transportation section, a grouping is made of Urban Core which is Boston, Brookline, Cambridge, and Somerville (according to the text with MBTA service). If this is true, why weren't the following cities included: Revere (Blue line), Quincy (Red line), Braintree (Red line), Milton (Red line), Medford (Orange line), and Everett (Orange line)?	The grouping was made for the purposes of describing ground-access travel behavior by Logan Airport air passengers. The Urban Core grouping represents those communities served by the MBTA rapid transit system that generate a high number of air passenger trips relative to other communities, and thus their shared characteristics presented a natural cut-off boundary.
G.3	Nancy S. Timmerman, P.E. Consultant in Acoustics and Noise Control, Boston, MA	Operations	With respect to the Preferential Runway Advisory System (PRAS), how is Massport working with the FAA to encourage changing runway configuration use, since it is known that a change of runway configuration takes time and effort?	As reported in the 2012/2013 EDR, Massport is participating in an FAA aircraft noise study as part of the Airside Improvement Project mitigation. The primary focus of the Boston Logan Airport Noise Study (BLANS) is to determine viable ways to reduce noise from aircraft operations to and from Logan Airport without diminishing airport safety and efficiency. The RNAV departure portions of Phase 1 of the project, first implemented in 2010, continued to be utilized in 2012 and 2013. During Phase 2 of the on-going BLANS the Logan Airport Community Advisory Committee (CAC) voted to abandon PRAS because it had not achieved the intended noise abatement. Phase 3 of the BLANS is focusing on the development of an updated Runway Use Program. The findings of this study will be reported in future EDRs and ESRPs.

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Boston-Logan International Airport

Comment #	Author	Topic	Comment	Response
G.4	Nancy S. Timmerman, P.E. Consultant in Acoustics and Noise Control, Boston, MA	Noise	Why was noise monitoring Site 12 decommissioned in 2010, and what has been the trouble at Site 3, since it cannot be relied upon?	Noise monitoring Site 12 was not decommissioned. Massport was asked to relocate the site by the property landlord and Massport will continue to work towards finding an alternative site for this noise monitor in East Boston. Massport is actively working on local technical issues concerning Site 3.
G.5	Nancy S. Timmerman, P.E. Consultant in Acoustics and Noise Control, Boston, MA	Noise	The comparison between modeled and measured noise levels for 2011 and 2012 continues to show a bias of measured DNL lower than modeled for virtually all monitoring locations, and especially for locations whose modeled levels are above 60 dB. It appears that thresholds are used in reporting the measured aircraft-only DNL. If the thresholds are too high, the assumed aircraft-only DNL will be too low.	The Noise monitors do use a threshold to help identify aircraft events from community events. Massport continually reviews these settings and makes adjustments where necessary.
G.6	Nancy S. Timmerman, P.E. Consultant in Acoustics and Noise Control, Boston, MA	Operations	In Figure 6-3, the graphic for jet departures, it is clear that there were jet operations in October, 2013, from Runway 22R which flew straight out from the airport. What did the airport do to investigate these operations?	Massport coordinates with the FAA regarding operational needs. From time to time, the FAA cannot follow noise abatement procedures due to factors such as weather or safety concerns.



Proposed Scope for the *2015 EDR*

PROJECT NAME: *Logan Airport 2014 Environmental Data Report*
PROJECT LOCATION: East Boston, Massachusetts
EOEA NUMBER: 3247
PROJECT PROPONENT: Massachusetts Port Authority (Massport)

Massport respectfully submits this proposed scope for the *Logan Airport 2015 Environmental Data Report (EDR)* for public review and comment. The *2015 EDR* would follow the *2014 EDR*, which was filed in September 2015. Massport will continue to use this process to evaluate the cumulative impacts associated with Logan Airport activities through preparation of an Environmental Status and Planning Report (ESPR) approximately every five years with data updates annually through the EDRs. The next ESPR will provide the most recent passenger and operations forecasts for Logan Airport and compare to historic trends. Massport will continue to provide updates on key environmental topics on the Massport website (<http://www.massport.com/environment>).

Purpose of the *Logan Airport 2015 EDR*

For over three decades, the Logan Airport EDRs and ESPRs have provided information to the public on planning activities, aircraft operations and passenger activity levels, and Massport initiatives at Logan Airport. The *2015 EDR* will provide an update on conditions at Logan Airport for calendar year 2015. The EDR will continue to serve as a background/context against which projects at Logan Airport can be evaluated. It also will report on the cumulative effects of Logan Airport operations and activities, compared to previous years, as appropriate.

The EDR/ESPRs serve as the baseline analyses for project-specific environmental reviews and provide a forum for updates on Massport's mitigation program. By providing the Airport-wide contexts for air quality, noise, ground transportation, and water quality, the EDR/ESPRs help focus the review processes for state Environmental Notification Forms (ENFs) and, if necessary, Environmental Impacts Reports (EIRs). In this manner, Massport ensures that segmented project review does not occur in the context of Massachusetts Environmental Policy Act (MEPA) review of projects at Logan Airport. The EDRs/ESPRs also provide context for any Federal National Environmental Policy Act (NEPA) reviews by the Federal Aviation Administration serving as the lead federal agency.

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Boston-Logan International Airport

Contents of the 2015 EDR

Generally, the 2015 EDR will follow the format of the 2014 EDR, presenting an overview of the role of Logan Airport in the regional planning context. The 2015 EDR will report on 2015 passenger and aircraft operation activity levels. This will be followed by a status report on Massport's proposed planning initiatives, projects, and mitigation. In this way, Massport will provide necessary background information to allow the reviewer to understand the environmental policies and planning which form the context of the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport.

The technical studies in the 2015 EDR will include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, water quality and environmental management, and project mitigation tracking. Sustainability initiatives are included throughout the document. Each chapter's contents are described below.

1. Introduction/Executive Summary

This chapter of the 2015 EDR will include:

- Highlights of 2015 planning and environmental conditions
- Overview of Logan Airport and place it in its environmental, geographic, and regulatory context
- Overview of the EDR/ESPR cycle
- Highlights of passenger activity levels and aircraft operations
- Description of the analysis framework for the environmental reporting and technical studies to be conducted
- Overview of the Logan Airport planning initiatives and projects
- Overview of sustainability initiatives at Logan Airport
- Organization of the 2015 EDR

2. Activity Levels

A primary purpose of this chapter will be to report on airport activity levels for 2015, including:

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport
- Domestic and International passenger activity levels
- Cargo and mail volumes
- Compare 2015 aircraft operations, cargo/mail operations, and passenger activity levels to 2014 activity levels
- Report on national aviation trends in 2015 and compare to trends at Logan Airport

3. Airport Planning

Massport continues to assess planning strategies for improving Logan Airport's operations and services in a safe, secure, more efficient, and environmentally sensitive manner. As owner and operator of Logan Airport, Massport also must accommodate and guide tenant development. This chapter will describe the status of planning initiatives for the following areas:

- Terminal Area
- Airside Area
- Service and Cargo Areas

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Boston-Logan International Airport

- Roadways and Airport Parking
- Airport Buffers and Landscaping

Massport is planning for the ongoing improvement of Logan Airport facilities as well as enhancing access to and from the Airport. The chapter will report on the status of projects implemented within the boundaries of Logan Airport either by Massport, its tenants, or other state entities. The chapter will also report on the status and effectiveness of the ground access related changes including roadway and parking projects, which consolidate and direct airport-related traffic to centralized locations and minimize airport-related traffic on external streets in adjacent neighborhoods.

4. Regional Transportation

The *2015 EDR* will describe Logan Airport's role in the region's intermodal transportation system by reporting on the following:

Regional Airports

- 2015 regional airport operations, passenger activity levels, and schedule data within an historical context
- Status of plans and new improvements as provided by the regional airport authorities
- Ground access improvements to the regional airports
- The role that Worcester Regional Airport and Hanscom Field play in the regional aviation system and Massport's efforts to promote these airports

Regional Transportation System

- Massport's role in managing regional aviation facilities.
- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations
- Report on metropolitan and regional rail initiatives and ridership

5. Ground Access to and from Logan Airport

The chapter will report on 2015 conditions and provide a comparison to those of 2014 for the following:

- Logan Airport Parking Freeze
- High occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Scheduled, Unscheduled, Water Transportation, and Logan Express)
- Logan Airport Employee Transportation Management Association (Logan TMA) services
- Logan Airport gateway volumes
- On-airport traffic volumes/vehicle miles traveled (VMT)
- Parking demand and management (including rates and duration statistics)
- Status of long-range ground access management strategy planning

This chapter will also present a discussion of the following topics:

- Massport's cooperation with other transportation agencies to increase transit ridership to and from Logan Airport via the Blue Line and Silver Line
- Report on Logan Express usage and efforts to increase capacity and usage
- Report on water transportation to and from Logan Airport
- Report on results of ongoing ground access studies, as relevant

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6. Noise Abatement

This chapter will provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter will report on 2015 conditions and compare those conditions to those of 2014 for the following:

- Fleet Mix, including Stage II, Recertified (Hushkitted) Stage III, newly manufactured Stage III, and qualifying Stage IV aircraft
- Nighttime operations
- Runway utilization (report on aircraft and airline adherence with runway utilization goals)
- Flight tracks

In 2015, the Federal Aviation Administration (FAA) introduced a new combined noise and air quality modeling tool, the Aviation Environmental Design Tool (AEDT) that is to be used for all airport projects. This new tool is a software system that dynamically models aircraft performance in space and time to produce fuel burn, emissions, and noise information. Noise contours for 2015 will be developed using AEDT and compared to the most recent version of the Integrated Noise Model (INM) which has been in place for all previous EDRs and ESPRs. Logan Airport-specific model adjustments made to account for over-water sound propagation and the propagation of sound to areas of higher terrain may be reported as an add-on to AEDT, if accepted by the FAA. This chapter will report on the following:

- Changes in annual noise contours and noise-impacted population
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the models deployed
- Cumulative Noise Index (CNI)
- Times-Above for 65, 75, and 85 dBA threshold values/Dwell and Persistence of noise levels
- Flight track monitoring noise reports

The chapter will also report on noise abatement efforts, results from Boston Logan Airport Noise Study (BLANS) study, and provide a status update on the noise and operations monitoring system.

7. Air Quality/Emissions Reductions

This chapter will begin with an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The chapter will provide discussion on progress on the national and international levels to decrease air emissions. The chapter will also discuss analysis methodologies and assumptions and report on 2015 conditions using the FAA's new AEDT model, described above. It will compare results to the most recent version of the Emissions Dispersion Modeling System (EDMS) that has been used in recent EDR/ESPR filings. The EPA required motor vehicle emissions modeling tool (MOtor Vehicle Emission Simulator (MOVES¹)) will continue to be used to assess vehicular emission on airport roadways. The chapter will include:

- Emissions inventory for carbon monoxide (CO)
- Emissions inventory for oxides of nitrogen (NO_x)
- Emissions inventory for volatile organic compounds (VOCs)
- Emissions inventory for particulate matter (PM)
- NO_x emissions by airline

¹ MOVES replaces the previous model for deriving on-road mobile source emissions, MOBILE6.2; MassDEP directed that MOVES should be used for the EDR analysis for consistency with the SIP and DEP's methodologies.

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This chapter will also report on the following ongoing air quality efforts for 2015:

- Air Quality Initiative (AQI) Tracking
- Massport's and tenant's alternative fuel vehicle programs
- The status of Logan Airport air quality studies undertaken by Massport or others, as available

This chapter will include Massport's voluntary inventory of greenhouse gas (GHG) emissions from Logan Airport in 2015. GHG emissions will be quantified for aircraft, ground service equipment (GSE), motor vehicles and stationary sources using emission factors and methodologies outlined in the Greenhouse Gas Emissions Policy and Protocol issued by the Executive Office of Energy and Environmental Affairs (EEA) and the Transportation Research Board's *Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories* (Airport Cooperative Research Program (ACRP) Report 11, Project 02-06). The results of the 2015 GHG emissions inventory will be compared to the 2014 results.

This chapter will also include an update on Massport's efforts to encourage the use of single engine taxiing under safe conditions.

8. Water Quality/Environmental Compliance and Management

This chapter will report on the 2015 status of:

- National Pollutant Discharge Elimination System (NPDES) Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility
- Jet fuel usage and spills
- Massachusetts Contingency Plan (MCP) Activities
- Tank management
- Update on the environmental management plan
- Fuel spill prevention

The chapter will also present a discussion of the following topics:

- Future stormwater management improvements (if any)
- Future MCP and tank management activities

9. Project Mitigation Tracking

This chapter will report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have undergone MEPA review and other commitments and have commenced construction. The status of mitigation commitments made in the Section 61 Findings for the following projects will be reported:

- West Garage/Central Garage (EOEA 9790)
- International Gateway (EOEA 9791)
- Logan Airside Improvements Planning Project (EOEA 10458)
- Terminal A Replacement Project (EOEA 12096)
- Southwest Service Area Redevelopment Program/Rental Car Center (EOEA 14137)
- Logan Runway Safety Area Improvements Project (EOEA 14442)

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This chapter will update the status of Massport's mitigation commitments and also will identify projects for which mitigation is complete.

Appendices

MEPA Documentation

These appendices will include a copy of the Secretary's Certificate and comment letters received on the 2015 EDR. Individual responses to items raised in the Secretary's Certificate on the 2014 EDR and comments in reviewers' letters will be provided. A distribution list for the 2015 EDR (indicating those receiving documents or CDs) will be provided. The document will also contain copies of any MEPA Certificates or documentation issued for projects at Logan Airport in 2015.

Supporting Technical Documentation

Supporting technical appendices will be provided as necessary.

D

Distribution

This 2014 *Environmental Data Report (EDR)* has been distributed to federal, state, and city agencies and to parties listed in this appendix. The list includes those entities that the Massachusetts Environmental Policy Act (MEPA) requires as part of the review of the document, representatives of governmental agencies, commenters on the 2012/2013 EDR, and community groups concerned with airport activities.

The 2014 EDR is also available on Massport’s website at www.massport.com and electronically on compact disc (CD). Limited CD or printed copies of the 2014 EDR may be requested from Stewart Dalzell, Massport, Suite 200S, Logan Office Center, One Harborside Drive, East Boston, MA 02128, telephone (617) 568-3507, e-mail: sdalzell@massport.com. Printed and electronic copies of this report are available for review at the following public libraries:

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^{P,C} Frank Chin
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^{P,C} Frank Ciano
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^{P,C} Robert Clifford
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^{P,C} Larry Costello
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^{P,C} James Cowdell
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^{P,C} Robert D'Amico
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 Nahant, MA 01908

^{P,C} Ralph Dormitzer
 111 Atlantic Avenue
 Cohasset, MA 02025

^{P,C} Dennis Duff
 33 Spruce St
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^{P,C} Jerome Falbo
 80 Jefferson Street
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^{P,C} Alex Geourtas
 39 Iona Street
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^{P,C} Donna Harris
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^{P,C} Christopher Marchi
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P.C Jonathan Walzer 864 South River Street Marshfield, MA 02050	P.C Rod Hobson 31 Deep Run Cohasset, MA 02025	P.C Allison Stieber 14 Wyatt Street Somerville, MA 02143
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C Don Harney Executive Director Chelsea Chamber of Commerce 308 Broadway Chelsea, MA 02150	C Rod Hobson 31 Deep Run Cohasset, MA 02025	

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° Martha Merson
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° Susan Morony
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° Robyn Ochs
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° Craig Sonnenberg
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° Gloribell Mota
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° Joe Ruggerio
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° Mary Ellen Welch
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° Michael Kelleher
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Point of Pines Beach Assoc.
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° Mr. William Spain
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■ **West Roxbury Community**

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° Carl Corcy
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° Keith Davison
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 Lynn, MA 01905

° Daniel McCormack R. S., C.H.O.
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° Kristen O'Brien
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<p>^C Stephen Schultz Engel & Schultz, LLP One Federal Street, Suite 2120 Boston, MA 02110</p>	<p>^C Amanda Veinotte Natural Heritage and Endangered Species Program 1 Rabbit Hill Road Westboro, MA 01581</p>	<p>^{P,C} Vivien Li, President The Boston Harbor Association 374 Congress Street, Suite 307 Boston, MA 02210</p>
<p>^C Eugene Benson, Executive Director Massachusetts Association of Conservation Commissions 10 Juniper Road Belmont, MA 02178</p>	<p>^C James Bryan McCaffrey Executive Director, Sierra Club 10 Milk Street Suite 417 Boston, MA 02108-4621</p>	<p>^C Karl Quakenbush CTPS State Transportation Building 10 Park Plaza, Suite 2150 Boston, MA 02116</p>
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<p>^C E. Heidi Roddis Massachusetts Audubon Society 208 South Great Road Lincoln, MA 01773</p>	<p>^C Gina Scalcione Gove Street Neighborhood Association 36 Frankfort Street East Boston, MA 02128</p>	<p>^C Bernadette Cantalupo 156 Porter Street Association 156 Porter Street East Boston, MA 02128</p>
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