BANGOR AREA COMPREHENSIVE
BACTS
TRANSPORTATION SYSTEM

BACTS METROPOLITAN TRANSPORTATION PLAN 2018-2038

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Introduction

The Bangor Area Comprehensive Transportation System (BACTS) was designated in 1982 as the Metropolitan Planning Organization (MPO) responsible for continuing, cooperative and comprehensive transportation planning in the Greater Bangor Urbanized Area (UZA) and is governed by a Policy Committee. The BACTS Metropolitan Planning Area (MPA) includes all of Bangor, Brewer, Penobscot Indian Island, Veazie; and portions of Bradley, Hampden, Hermon, Milford, Old Town, Orono, and Orrington. With the 2010 Decennial Census, the UZA boundaries shifted slightly to include a portion of the Town of Hermon and exclude the Town of Eddington.

As an MPO, BACTS primary responsibility is to develop regional plans that coordinate various elements of transportation networks into one cohesive regional transportation system and identify transportation investment priorities within the region. BACTS evaluates and approves proposed transportation improvement projects; facilitates communication between member communities and local, state and federal transportation agencies; and sponsors and conducts studies to assist in the transportation planning process with the goal of executing a continuing, cooperative and comprehensive planning process in the region. This Metropolitan Transportation Plan (MTP) outlines existing services and conditions, identifies gaps and deficiencies, estimates demand and offers recommendations intended to develop an integrated intermodal transportation system that facilitates the safe and efficient movement of people and goods.

Demographics

The BACTS area is the third largest urban center in the State of Maine. The 11 municipalities that comprise the BACTS region cover a total of 318 square miles with a total population of 84,220, with the urbanized area (UZA) occupying slightly more than $^{1}/_{8}$ of the total area and including nearly ¾ of the total population. Bangor, Brewer, Hermon, Orono, and a part of Old Town make up a regional service center cluster. Residents of nearly half the State's area regularly travel into the region for employment, education, health care, government and retail services.

The total population of the BACTS region has decreased inconsequentially; with population growth in the suburb communities offsetting the population decreases in the more urban communities. This is representative of the trend of residents enjoying a more rural lifestyle with accessibility to the benefits and opportunities within the urban/metropolitan area. Overall population in the BACTS region is forecasted to increase slightly through 2040 with the majority of the growth continuing to happen in suburb communities. Maine has the oldest population in the Nation. Although the BACTS region population is younger than that of the State as a whole, the region's population is still aging. The median age in the BACTS region increased from 36.8 in 2000 to 41.7 in 2015. With the baby-boomer generation reaching retirement age, the decline in native births, stagnant in-migration, and the resulting decrease in the available skilled workforce creates the potential for a distressed economic situation. A high dependency ratio strains resources and services needed to care for the aging population, but of even more concern is this situation will make maintaining the current workforce difficult, and create obstacles to attracting development and new business.

Eighty-eight percent of employed individuals living in the BACTS region are also employed within the BACTS region. The number of available jobs to the number of workers is a reflection of the role the area plays as a regional service center for eastern and central Maine. In 2015, there were 2.03 jobs to every employed resident in the cities of Bangor and Brewer. Out of Penobscot County's 25 largest employers, 24 are based in the greater Bangor area importing more than 41,000 employees from outside the region

into the BACTS area for work. The average employee residing within the BACTS region spends over 19 minutes traveling to work by single-occupancy vehicle.

The Bangor Metropolitan Labor Market Area (LMA) includes the 11 BACTS municipalities as well as 35 additional municipalities from Penobscot, Hancock and Waldo Counties. The 2010 total population of the entire LMA was 133,528, nearly two-thirds of which reside within the BACTS region. While the working-age population increased between 2010 and 2015; the number of people in the labor force decreased and the number of people not in the labor force increased. Forecasts show the LMA total civilian workforce will increase by just under 12% from 2016 to 2040. With unemployment rates at 15-year lows, employers are beginning to experience difficulty finding employees to fill vacant and/or new positions.

Employment and population growth in the BACTS region is expected to be modest over the next 20 years. The majority of the growth in population is anticipated outside the urbanized area, while job growth is expected within the urbanized area. This imbalance will accentuate the current trend of increasing numbers of trips originating outside the urban area and will have the most impact on radial routes serving the urban area. The apparent out-migration of the population from the urban areas into their surrounding suburbs is a pattern is not unique to this area, reflecting a widespread desire for a more rural lifestyle, without discarding the benefits of urban opportunities. The low level of expected growth is not likely to cause any significant systemic traffic congestion problems for the region. The potential for workforce shortages is concerning for the State's economic vitality; however, the BACTS region is poised to be an attractive area for economic and business development opportunities if proactive measures are taken to draw in-migration of out of state residents to the region to ensure a skilled and available workforce is able to meet the needs of expanding and/or relocating businesses. To attract highly skilled and entrepreneurial migrants (either native or foreign) to the area, it will be imperative to expand and foster a vibrant, well-connected diverse transportation network that allows for easy and convenient mobility to economic and employment centers.

Mission Statement, Goals and Policy Issues

The BACTS Policy Committee mission statement, specific goals, and priorities for region are consistent with the Fixing America's Surface Transportation Act (FAST Act) federal goals and the State policy objectives outlined in the Maine Sensible Transportation Policy Act (MSTPA). The mission statement, *"to provide for the safe, economical, efficient, and convenient movement of people and goods over a balanced multimodal transportation system compatible with the socio-economic and environmental characteristics of the region,"* guides the six regional goals and supportive regional priorities of BACTS.

Public Transportation

Community Connector, which is owned and operated by the City of Bangor, is the urban fixed-route transit system in the BACTS region. Community Connector operates 11 routes over a 29-square mile area in the municipalities of Bangor, Brewer, Hampden, Veazie, Orono and Old Town. The bus runs on a flag-stop, pulse system with the majority of routes meeting at the bus depot located at Pickering Square in downtown Bangor. Bus ridership hit its peak in 2013 with 1,016,068 trips and has decreased annually since. The dramatic increases in ridership from 2011 through 2013 can be attributed to the number of monthly bus passes sold for MaineCare transportation riders. Although the number of reported trips in 2015 shows a continuation of the trend in decreasing annual ridership, the total number of trips is similar to that reported prior to the spike caused by the MaineCare bus pass sales. Following MaineCare's switch to a brokerage system in August 2013, the stabilization of fuel prices in 2014, fare increases and the elimination of the Odlin Road route in 2015, and the suspension of Saturday bus service in Hampden in 2016, all contribute to the decrease in ridership.

Federal funding for transit has been authorized at consistent levels through 2020, but is limited. The amount of money needed to operate the public transit system, increase the number of vehicles running in a state of good repair, increase operating hours and routes exceeds current availability. STIC funding has supplemented the Community Connector federal funding since 2013. It is essential that Community Connector implement strategies to increase ridership and meet the benchmarks required for eligibility in the STIC funding categories. Bus riders have expressed interest, and need, for extended evening hours, additional weekend service, shorter headways and shuttle service in the downtown Bangor area. While these requests are all reasonable, they come at a cost. In order for additional services to be added, it is essential to acquire a sufficient and reliable bus fleet. Some relatively easy to implement and inexpensive strategies for providing a more efficient and reliable service to riders include designating fixed bus stops, providing real-time information (i.e., Google Transit), streamlining routes and schedules in an easy to understand manner, and ensuring buses are inviting to passengers by being clean, reliable and convenient.

Opportunities for better connectivity between public transportation providers servicing the greater Bangor area exist. Coordination between operators to assist passengers in determining how, when and where to switch from one provider to the other could encourage increased use of public transportation within and beyond the BACTS region. It is difficult for visitors to the region to determine which, or whether, public transportation options are available when arriving in the Bangor area. As a regional service center, individuals from nearly half the State make their way into Bangor on a daily basis to obtain employment, healthcare, and retail services. In addition to providing connectivity for residents and employees in the region, there exists an opportunity to assist visitors making their way to and from the Bangor region via airplane or bus.

Public transit is an essential part of the region's transportation system and should be planned for and incorporated into municipal and regional project and development processes, policies and plans. It is essential that municipal planners, engineers, economic development staff, planning boards and/or city and town councils understand the importance of fully considering, reviewing and planning for the physical and infrastructure requirements for a transit bus to maneuver in and around developments to safely drop off and pick up passengers. In addition to the physical infrastructure and design considerations, it is critical to consider resources, identify whether or not the proposed development is within an already established bus route, or take early and proactive steps to work with the transit provider to determine whether or not the public transportation system has the financial and/or human resources to extend a route which could service the area of the development.

Highway Network

The highway network is the largest and most developed transportation system in the BACTS area. The overwhelming majority of people and goods are transported over the region's 183 miles of collector and arterial roadways.

Since 2004, there has been no new alignment construction using federal or state funding in the BACTS region. Maine DOT has completed two major transportation studies in the BACTS area since that time.

An I-95 study in Bangor was completed in January 2011. The purpose of the study was to evaluate the long-term needs of the I-95 Corridor in Bangor and to identify a set of recommendations to provide safe and efficient transportation service through the year 2030. Recommendations from this Study included increasing acceleration and/or deceleration lengths at interchange ramp junctions, improving intersections near interchanges, modifying lane use signing,

Environmental studies for a potential route from the end of I-395 near the Brewer/Holden line to Route 9 have been ongoing since 2000. In 2015, the Final Environmental Impact Statement (FEIS) was completed and in June 2016, FHWA issued the Record of Decision identifying "Alternative 2B-2 as the preferred alternative. This completion of the NEPA process allowed MaineDOT to begin final design and the right-of-way process. Survey and preliminary design have begun and final design is estimated to be complete in 2020 with possible construction complete in the 2023 to 2025 timeframe.

A review of past traffic counts from 2003 to 2014 indicated that volume of traffic has decreased or remained level except for a few local corridors. The decreases occurred during an economic recession and increased fuel costs. As the economy improves and fuel prices remain relatively steady, we can expect a slight increase in volumes. BACTS will continue to monitor traffic volumes to analyze any significant trends.

BACTS' major trucking companies have seen a dramatic drop in employment and output due to massive closures of the paper industry in this area. Total employment at trucking firms in Penobscot County dropped more than 29% between 2007 and 2016, from 1,763 to 1,245. The industry's total Bangor region output shrank more than 17% between 2007 and 2014, from $128 million to $106 million. This has forced many of these companies to shift their business south to survive.

In 2011, the U.S. House and Senate passed a transportation bill that included allowing trucks weighing up to 100,000 pounds on the Maine Interstate system for the next 20 years. This change will allow heavy trucks on the Interstate rather than on Maine's secondary roads.

In 2014, Maine experienced its lowest number of fatalities (131) since 1996. Unfortunately, the next year the number of fatalities rose to 156

Each year, MaineDOT publishes a list summarizing the previous three years' worth of crash data and identifies high-crash locations statewide. According to the 2014-2016 edition, there were 82 high-crash locations on BACTS roads in six of the ten BACTS municipalities: 63 in Bangor, 5 in Brewer, 3 in Old Town, 8 in Orono, 2 in Milford, and 1 in Hampden.

Active Transportation

Active transportation is an integral component of an efficient transportation network. A transportation network that facilitates fast and efficient movement of vehicles from origin to destination point is essential for growing the economy and supporting mobility to connect the region to the rest of the world. However, transportation networks in urbanized areas require a more multifunctional design to accommodate and provide connectivity with other modes of transportation. Effective bicycle and pedestrian accommodations enhance quality of life and health, strengthen communities, increase safety for all modes of transportation, reduce congestion, offer recreational benefits, and benefit the environment.

Residents of the BACTS region are becoming increasingly conscious of the importance of creating more livable and sustainable communities by improving mobility. A higher percentage of residents in the BACTS area use active transportation as a primary means of commuting to and from work than Penobscot County and the State as a whole, emphasizing the importance and necessity for a well-designed, safe and accessible pedestrian and bicycle network and associated facilities to be incorporated into transportation projects and plans in the area. The BACTS region has a higher percentage of workers using active transportation as a means of commuting to work than Penobscot County and the State. The percentage of workers from the Town of Orono using active transportation is exceeded by only one other municipality in the State, Bar Harbor. BACTS is committed to developing a multi-modal transportation system which

includes well-used, safe, and accessible facilities for pedestrians and bicyclists, encouraging municipalities to adopt a Complete Streets approach.

Throughout the State, the number of crashes and resulting fatalities involving pedestrians and bicyclists is cause for great concern and increased scrutiny. Together, pedestrian and bicycle fatalities are increasing as a share of total traffic deaths. An evaluation of the crash data shows that there is no identifiable single common factor contributing to these crashes, making it difficult to identify priorities for focusing efforts and implementing mitigation strategies. Because of this, the Maine Department of Transportation (DOT) is spearheading a project to increase awareness and engage municipal leaders and the public in programs and initiatives designed to mitigate hazards and reduce the number of bicycle and pedestrian crashes and fatalities on Maine roadways.

To ensure active transportation facilities are adequately inventoried, gaps identified and priorities established, BACTS will develop a stand-alone Regional Active Transportation Plan that will update the current Bicycle and Pedestrian Study developed in June 2009 by Broadreach Planning & Design and Stantec Consulting Services, Inc.

Freight Transportation

Maine's freight system is multifaceted and multimodal, consisting of seaports, airports, border-crossings, intermodal facilities, distribution centers, and a network of rail and road connections. The largest and most important component of Maine's transportation system is its highway network. Factors that contribute to determining which mode of freight transportation is most effective and efficient include size, weight, and resource of the product and location of both customer and seller. However, the primary factors that determine the transportation decisions are how much it costs to get freight from origin to destination, reliability and consistency of the arrival/departure of freight and the amount of time it takes to get from origin to destination.

The majority of Maine's freight tonnage is carried by commercial vehicle on Maine's Interstate Highway system. Trucks are the most common mode used to move imports and exports between international gateways and inland locations. This trend is expected to continue with tonnage of international trade forecast to grow at a rate of 3.4 percent per year through 2040. Trucks are, and will likely continue to be, the most dominant freight carrier mode in Maine. The primary Maine truck route, as measured by truck annual average daily traffic (AADT), is the I-95 and I-295 north-south corridor between Bangor and Kittery. Other major truck routes, with significantly lower AADT, include I-95 between Bangor and Houlton, U.S. Route 1 between Houlton and Presque Isle, Maine Route 9 between Calais and Brewer, U.S. Route 2 between Newport and Farmington, and Maine Route 4 between Farmington and Auburn.

Interstate 95 passes through more states than any other Interstate highway, running 1,919 miles starting in Miami and ending in Houlton at the Canadian International Border. Interstate 395, the Bangor Industrial spur, is approximately 5 miles long running from Bangor International Airport (BGR), U.S. Route 2 (Hammond Street) and I-95 east to Brewer and U.S. Route 1A (Wilson Street), providing access to downtown Bangor, the center of Brewer, and the trucking corridor east to U.S. Route 1A and State Route 9.

The Back Winterport Road has become a de facto bypass for commuters and trucks seeking to avoid congestion along U.S. Route 1A in Hampden. State Route 15 between Bucksport and Bangor is a minor arterial roadway that connects the commercial, business, tourism and residential activities of the coastal communities south and east of Bucksport to Bangor. State Route 9 is a major east-west corridor connecting I-95 and the greater Bangor area to the west and Washington County and the Canadian Maritime Provinces to the east. U.S. Routes 1 and 1A, and SR 15, are all-purpose routes that cater to the

access and mobility needs of abutters and longer-distance travelers as well. The routes are not congested, except for short durations at peak times in the more urban areas of Bangor, Brewer, and Hampden.

Border crossings are potential bottlenecks in the freight transportation network. The FHWA monitors truck crossing times at 15 U.S./Canadian border crossings. Three of these borders are located in Maine, including the border crossing at the terminus of U.S. I-95 in Houlton. The border crossings in Maine are among those that have the swiftest crossing time.

Maine has over 3,500 miles of coastline with 12 significant ports and harbors. Five of these ports: Portland, Searsport, Eastport, Bucksport, and Bangor are well-suited to handle the requirement of most modern cargo vessels. The remaining ports serve local commercial fisherman and recreational activities. Over the last several years, there has been a decline in commercial marine traffic upstream of the Bucksport area, with the movement of fuel, raw materials and products moving away from Maine's coast and inland rivers to trucks, rail lines, and pipelines.

The Penobscot River corridor extends from Searsport to Bangor on the west side of the river, and from Verona Island to Brewer on the east side. The corridor includes several highways, the Penobscot River, the Bangor International Airport (BGR), two rail lines, and commercial port facilities at Searsport, Bucksport, and Brewer. It also includes facilities such as the Maritimes and Northeast pipeline, which crosses the Penobscot River at Orrington. Although there has been minimal commercial marine transportation north of Bucksport, other than occasional asphalt and petroleum barge shipments; large components being manufactured in Brewer are being shipped by barge at a deep water facility in Brewer.

The State of Maine's three ports of Eastport, Portland and Searsport have shown steady, consistent growth. The three ports collectively handle over 1.5 million tons of dry cargo annually and Portland and Searsport also handle roughly 125 million barrels of petroleum products.

Freight rail service is primarily privately owned, operated and maintained and infrastructure investment is related to market forces and business cycle with little to no influence by governmental policy or priority. Unlike much of the rest of the United States in which rail systems were established to connect regions to the rest of the country, many of Maine's rail lines were designed to link the state and its ports to Montréal and the Great Lakes. Maine's freight rail system consists of two Class II railroads, six Class III railroads, and one terminal and switching operation. Of the 1,197 miles of total serviceable lines, 94 percent (1,130 miles) are currently active freight lines connected to the North American rail system. The remaining 6 percent (67 miles) are operational track segments that are not currently providing freight service.

The freight rail service operating in the BACTS region is Central Maine & Québec Railway (CMQ), a Class III freight railroad. CMQ provides rail freight transportation between Montréal and the Atlantic coast of Maine primarily transporting forest and paper products, construction materials, chemicals and fertilizers, grains and feeds, and energy products and fuels. CMQ offers the shortest, most-direct rail link between northern Maine, Saint John, New Brunswick and Montréal. In addition, CMQ provides access to the port facilities at Searsport. Northern Maine Junction in Hermon is the only rail yard located within the BACTS region. Interchange volume and the yard's active tracks have has reduced significantly over the last few years. Interchange usage at the yard is limited and is now primarily used to support local industry established within and near the yard.

Air freight is a small yet critical component of the freight system in Maine. Air freight is especially important for the transportation of low-weight/high-value commodities such as semiconductors, and of perishable commodities, such as seafood. These two commodities are important components of the Maine economy and rely on air cargo services for shipment to inland and overseas destinations. The BACTS region is home to Bangor International Airport (BGR), one of the two airports in Maine which handles

the majority of air cargo activity in the State. BGR is owned and operated by the City of Bangor and is classified by the Federal Aviation Administration (FAA) as a commercial service, primary, small hub airport. BGR accommodates a wide variety of both civilian and military aviation activity and is capable of handling any commercial cargo carrier presently flying. Commodities commonly transported via air cargo from BGR include seafood, seasonal berries, textiles, semiconductors and other computer components, and bank documents. A variety of U.S. and foreign all-cargo carriers fly into Bangor. BGR is also served by a number of domestic and international charter/on-demand cargo carriers that operate large aircraft. The majority of large cargo (vs. small packages and mail) is outbound and typically is enplaned at BGR and flown out of the county. In addition to the all-cargo carriers, the three passenger airlines also carry belly cargo, although it represents a small share of the total cargo. The airport's location allows for air freight to be conveniently transferred by truck and connected to rail and/or deep-water port freight service within an hour.

Intermodal transportation involves moving freight between points of origin and destination using two or more modes. Intermodal connectors are critical components of the Maine freight system which provide access between major intermodal facilities, such as ports and truck/pipeline terminals, and the highway. BGR is the only Federal Highway Administration (FHWA) designated intermodal connector in the BACTS region. It is located along highway routes to the northeast metropolitan areas and eastern Canada with immediate access to the Interstate which provides direct access to northern and eastern Maine, the Atlantic Provinces of Canada, northern New England, Quebec and upstate New York.

The BACTS region is in a strategic location which serves as an uncongested transportation gateway to Canada, the Northeast and the Atlantic Seaboard. It is located along highway routes to the northeast metropolitan areas and eastern Canada with immediate access to the Interstate 95.

In May 2016, the Bangor Region Chamber of Commerce, MaineDOT and BACTS sponsored an FHWA Roundtable to advance the dialogue on the freight economy and support smart solutions for freight under the FAST Act and beyond where key members of the freight industry identified challenges specific to the region. In this process, FHWA prepared projections of the region's freight transportation through 2045. It is anticipated that freight demand in Maine will grow from 78.6 million tons in 2012 to 128 million tons in 2045, with slight decrease in truck mode of transporting and increase in pipeline transport. It is projected that the types of commodities shipped from Maine will remain the same and top trading partners will continue to be the New England states and Canada through 2045.

Passenger Transportation

Passenger transportation is facilitated by one of four modes - road, air, rail, and waterway. The vast majority of passenger travel in the BACTS region occurs on the road network by passenger vehicle.

As discussed in the Public Transportation section, local fixed-route bus service is available to passengers in the urban areas of Bangor, Brewer, Veazie, Orono and Old Town. In addition, regularly scheduled regional and inter-city bus services located in the BACTS area provide passengers with service to destinations within and outside of the State. Cyr Bus Lines, headquartered in Old Town, offers passengers daily service between Bangor and Caribou and connects with Concord Coach and Greyhound bus lines in Bangor and Hermon, respectively. The Concord Coach transportation center is located in Bangor and provides various service with stops within the State, as well as service to Boston. The Greyhound terminal is located in Hermon and also offers service with stops within the State and out of state. Taxi and ride services are often used by public transportation dependent persons for trips at times when public transportation (fixed-route or on-demand) is not available, and for those destinations not served. The importance of the role played by ride service, for all riders, is likely to grow in the future.

Regularly scheduled commercial passenger air service in the BACTS region is available through Bangor International Airport (BGR) located in Bangor. It is a full-service regional airport offering non-stop domestic service through four airlines, and serves as a transit point for commercial and international flights, as it is the closest full-service airport to Europe with fuel and customs services available 24-hours a day, seven days a week and all-weather access. BGR is capable of processing 1,000 passengers per hour and provides service to just under a half-million passengers per year. Commercial passenger service accounts for approximately one-third of the Airport's daily operations. DeWitt Field (OLD) located in Old Town is a general aviation airport with no scheduled passenger service, but accommodates a variety of private jets and offers air taxi and charter services. Aircraft based at OLD include 30 single-engine airplanes, 1 multi-engine airplane, 6 helicopters and 1 ultralight.

There are no passenger rail services located in or serving the BACTS region; however, residents of the greater Bangor area can connect from Concord Coach to Amtrak Downeaster service either at the Portland Transportation Center via the Bangor, Augusta & L-A to Portland, Boston & Logan Airport route or at the Brunswick Visitors Center via the Midcoast Maine to Portland, Boston & Logan Airport route. Although there has been interest expressed and initiatives to gather support for bringing passenger rail service to the Bangor area, attempts to secure funding and resources required to conduct the required feasibility studies have not been successful. To implement new services, capital investments to existing railroad infrastructure will be required to achieve passenger operating standards, expand capacity to protect ongoing freight needs, and to develop station locations **Note: After completion of this plan update, it was announced that the Northern New England Passenger Rail Authority (NEPRA) is actively exploring extending Downeaster service north, with seasonal and weekend-only service, to Rockland from Brunswick.**

There are no passenger marine services in the BACTS region; however, recreational marine traffic is increasing. Bangor and Brewer are both implementing waterfront redevelopment plans that are improving opportunities for recreational boating and passenger ferry opportunities. The Bangor Landing is open throughout the fresh water boating season and offers two public docks able to accommodate private vessels of virtually all sizes. Turtle Head Marina in Hampden includes two boat launch ramps and a marina facility leased to privately-owned Hamlin Marina, providing seasonal dockage. Dock rental is limited and reserved for customers who purchase boats at Hamlin's Marina, but mooring facilities are available to the general public.

Opportunities exist to improve intermodal connectivity for workers coming into the BACTS region for employment, patients and clients accessing services in the area living outside the region, as well as visitors and tourists arriving and leaving from the BACTS region to enjoy the tourist attractions in the area, as well as those located in eastern and northern Maine.

Economic Development and Tourism

One of the most important issues facing metropolitan areas is ensuring economic competitiveness in a global economy. Businesses rely on an efficient and dependable transportation system to move people, products and services. Highway accessibility was ranked the number two site selection factor behind only the availability of skilled labor in a 2015 survey of corporate executives by Area Development Magazine. With the decline in population segments making up the available workforce, the region will have to implement strategies to attract an in-migration of skilled individuals to provide the needed workforce – including those that consider walkable neighborhoods with good transit access and safe streets for pedestrian and bicycle travel. Providing convenient, safe and affordable transportation options is going to be essential in attracting and retaining a skilled workforce.

Maine's tourism industry depends on a reliable, safe transportation system. Overnight visitors and day travelers, whose principle mode of travel is the highway system, account for 27 million trips and directly spend a total of $4.9 billion annually. The condition and reliability of the region's transportation system impacts the accessibility of activities and stimulates economic activity. The region's proximity to mountains, lakes, and the coast attracts hundreds of thousands of visitors annually. According to 2016 statistics from the Maine Office of Tourism, Tourism is one of Maine's largest industries, providing approximately one out of every six jobs in the State with a total economic impact estimated at $9 billion.

Land Use, Livability, Sustainability and Environment

Transportation and land use planning are strongly connected. Transportation systems impact important local land use decisions, which ultimately influence a region's connectivity and economic vitality. If land uses are not appropriately designed to ensure the most effective and efficient use of public infrastructure, facilities and systems, the transportation system will not work well and may impede economic growth, feasibility of expansion and opportunity. Urban sprawl and segregation of land uses, creating gaps between housing from commercial and retail uses has created localized traffic congestion, created challenges in providing convenient and efficient transit, and ultimately reduces the accessibility of jobs. The impact of expanding rural residential development is already being felt by transportation and social service providers in the region. Aging residents living in relatively remote rural homes are creating a challenge for transit and paratransit providers and will require creative solutions to effectively serve an increasingly dispersed elderly and disabled population.

The most successful, and desirable, transportation systems result from planned land use designed with attention to density, diversity and distance between land uses, and design which preserves the character of the community or region. Creating livable communities through a "Complete Streets" approach and redefining the transportation network may require changes to planning, design, maintenance and funding decisions but can lead to cost savings and improved safety for all users. The concept of designing livable communities in the region which encourage neighborhoods and easy access to public transit and safe and convenient infrastructure and facilities for active modes of transportation is a noble goal with tangible benefits. However, the BACTS region includes communities which are predominantly rural serving populations with diverse needs. Even those who regularly commute by modes other than automobile may require use of an automobile from time to time. Having ready access to an affordable, convenient and reliable automobile when needed provides security to individuals. Car sharing services may provide that alternative; however, there are no car sharing services currently available within the BACTS region. Car sharing is a relatively new concept, allowing for hourly and daily shared use of a vehicle.

BACTS promotes the development of transportation options that support livability and sustainability by including non-automobile modes in its evaluation of potential highway projects for the BACTS Transportation Improvement Program (TIP). Through the TIP project evaluation criteria and project scoring, projects that support alternative modes and their integration into the transportation system score higher and are more likely to be funded. BACTS has developed some transportation system management and operations strategies in the planning process designed to optimize the performance of the transportation system and allow for a more immediate response to traveler concerns than capacity projects offer while improving the reliability, security, and safety of the multimodal transportation system. Regional stakeholder groups are cooperating to develop regional plans which address traffic incident management issues in each region in a coordinated and thorough way.

Electric vehicles (EV) are the most common alternative fuel vehicle utilized in Maine. Although usage of alternative fuel vehicles is increasing and becoming more mainstream, readily available public facilities and infrastructure for these vehicles is concentrated in the southern part of the State. In the greater Bangor area, availability is severely limited and the only EV charging station north of the BACTS region is located

in Millinocket at Baxter State Park. In addition to the four EV charging locations, there are two liquid propane gas stations in the BACTS area.

Transportation Performance Management, Measures and Targets

Performance management requirements are intended to promote the most efficient investment of Federal transportation funds, increase accountability and transparency of the Federal-aid highway program and provide a framework to support improved investment decision-making through a focus on performance outcomes for key national transportation goals. MPOs are required to establish regional targets for all applicable measures and document the strategies and investments used to achieve the targets in new and existing plans and programs; as well as report on progress toward meeting the targets through new and existing mechanisms. MPOs must integrate performance-based goals, objectives, measures and targets, directly or by reference, in the metropolitan transportation planning process. This requirement includes integration of and reporting of plans required as part of a performance-based program to be developed by the State Department of Transportation and public transportation providers.

BACTS will either support the MaineDOT performance target or establish a separate quantifiable regional target for each applicable FHWA performance measure within 180 days of the established State target. The Safety performance targets will be set by BACTS on or before February 27, 2018 and included in all new, updated or amended metropolitan transportation plans, programs and processes on or before May 28, 2018. The Pavement, Bridge and System performance targets will be established by BACTS following MaineDOT performance target development which is due on or before May 20, 2018. These performance measures and related targets will be included in all new, updated or amended metropolitan transportation plans, programs and processes on or before May 28, 2019.

BACTS Transit Asset Management State of Good Repair (SGR) targets have been established for fiscal year 2018 and incorporated into this document. Community Connector will provide the public transit established SGR targets to BACTS on or before October 31 each year in conjunction with the required reporting to the National Transit Database (NTD). Public Transit Providers must complete the initial Transit Asset Management (TAM) Plan due on or before October 1, 2018 at which time, BACTS is required to include, directly or by reference, Community Connector's TAM plan and performance targets in regional metropolitan transportation plans, programs and processes, as well as track performance in meeting those targets and. Transit Safety Performance Management is pending final regulation. Once published, Transit Providers will have one year to establish a Public Transportation Agency Safety Plan, including development of agency performance targets. The MPO will be required to establish regional performance targets 180 days after the date of the final rule plus one year.

Financial Issues

Metropolitan Transportation Plans must be fiscally constrained so that it proposes only projects that have a chance of receiving funding based on projected revenues over the next twenty years.

BACTS Policy Committee gets to choose some of the STP/NHS projects in each TIP using a predetermined allocation. The projects are titled MPO Sponsored in the BACTS TIP.

The amount of funding allocated by MaineDOT to BACTS over the past sixteen years is approximately 39 percent of the costs of projects submitted by the municipalities for consideration in each TIP. The municipal list of essential projects would be much greater if more funding were available. The municipalities submit only those projects that are most in need of repair and have a chance of rating high enough for possible selection for funding. Projects that go unfunded either: 1) continue to deteriorate further, resulting in even higher construction/maintenance costs; or 2) force municipalities to pay a much

higher percent of the construction costs instead of typical local match amount of 10 or 20 percent needed for state and federally funded projects. The process of prioritizing important projects becomes increasingly difficult with flat or declining funding levels. This trend is not likely to change.

1.0 Introduction

1.1 Statement of Purpose

The Bangor Area Comprehensive Transportation System (BACTS) was designated in 1982 as the Metropolitan Planning Organization (MPO) to coordinate the continuing, cooperative, and comprehensive performance-based multimodal transportation planning process in the urbanized area surrounding Bangor. The BACTS metropolitan planning area consists of 11 municipalities (3 cities, 7 towns and 1 Indian Nation), which make up the 2010 Census designated Greater Bangor urbanized area (UZA). These municipalities include Bangor, Brewer, Veazie, Penobscot Indian Island and portions of Hampden, Orono, Old Town, Milford, Bradley, Orrington and Hermon. The 2010 Census indicates that 61,210 people live in the BACTS urbanized area, making it the third largest urban center in the state of Maine. The geographic boundaries of the MPO are shown in Figure 1.

The Policy Committee governs BACTS. This committee is comprised of sixteen municipal officials, a representative from Community Connector, and a Maine Department of Transportation (Maine DOT) representative. There are also four non-voting members, representing the Bangor Region Chamber of Commerce, the Comprehensive Economic Development Strategy (CEDS) transportation subcommittee, the Federal Highway Administration (FHWA), and the Federal Transit Administration (FTA). The Policy Committee meets regularly to establish transportation priorities and to allocate specific categories of federal funds to meet the area's transportation needs. The Policy Committee can, and does, authorize ad hoc advisory committees as needed to provide advice.

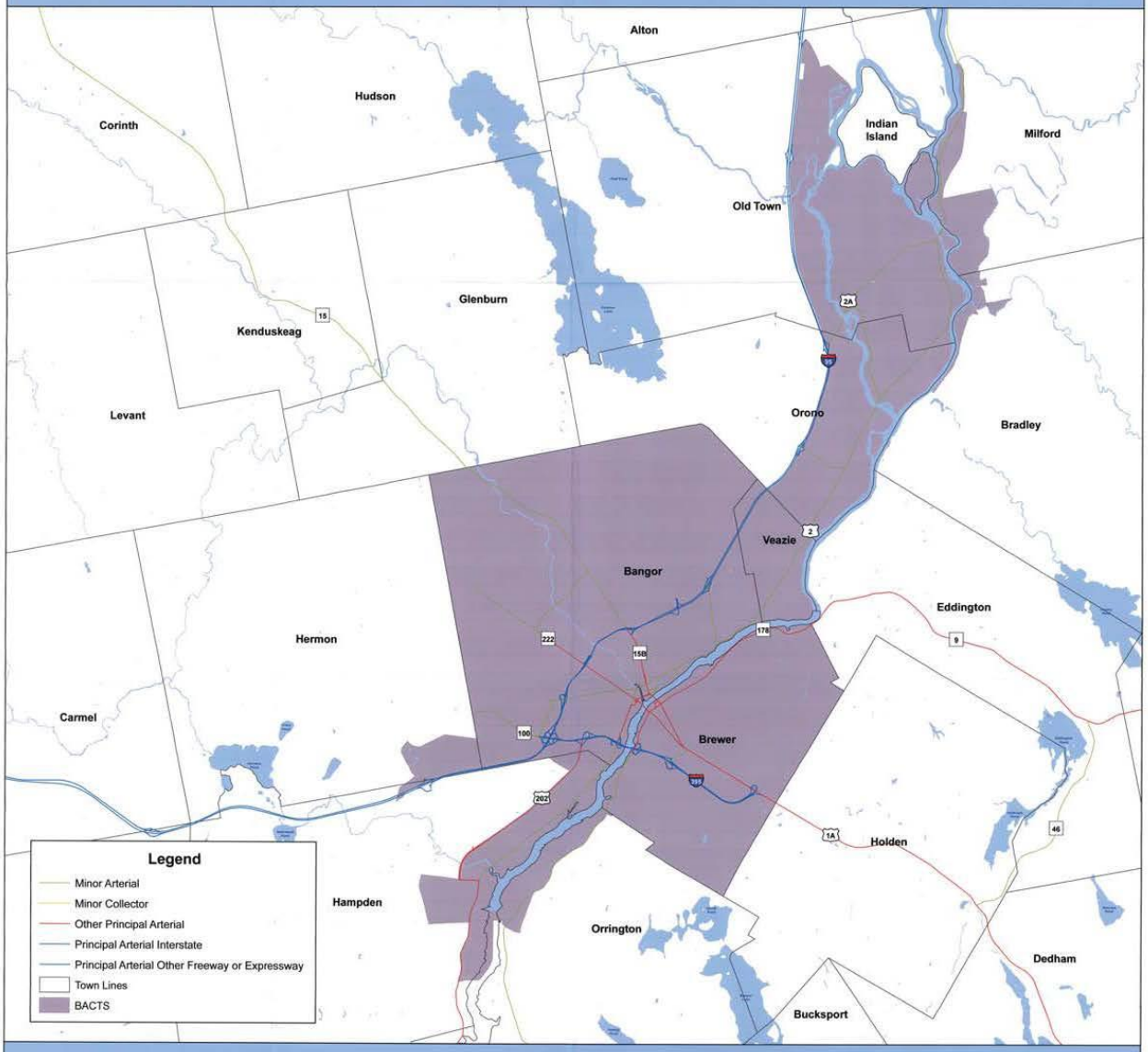
In order to receive Federal funding for transportation projects in the urbanized area, BACTS is required to produce a broad-based, long-range, multimodal transportation plan addressing the needs of its constituency. To meet this mandate, BACTS prepares and presents an updated Metropolitan Transportation Plan (MTP) every five years. This plan represents several iterations of input and feedback from the primary users -- the traveling public within the urbanized area, considered by the Policy Committee to determine the present and future transportation needs of the region.

This plan is intended to serve as a guide for coordinated decision-making and long-term planning and investment in transportation projects at the municipal, regional, and state levels. BACTS has considered all locally available modes of transportation in compiling this plan, including the existing and future highway system, railroads, air travel, marine transport, public transit, bicycle and pedestrian travel, and methods for improving intermodal connections for passengers and freight. The plan also considers less quantifiable aspects of transportation planning, such as the potential for future business development and tourism in the Bangor region and quality-of-life concerns for area residents. Elements of the plan include an inventory of the current BACTS transportation system, a listing of current and future problems that will need to be addressed, as well as recommendations to alleviate or eliminate these problems in order to achieve the stated goals and objectives by the year 2038.

1.2 Overview of the Metropolitan Transportation Plan

The BACTS MTP for the next two decades focuses on maintaining existing infrastructure, increasing intermodal connectivity and making the Bangor region a more attractive and convenient place to live, work, shop, and play. Good transportation planning does not occur in a vacuum; many of the long-range goals focus on coordinating local and regional transportation initiatives with land planning, access management, and environmental protection, to permit economic growth without sacrificing the high quality of life, which residents and visitors to the Bangor area currently enjoy.

Bangor Area Comprehensive Transportation System (BACTS)
Metropolitan Planning Area (MPA) - Boundary 2013



2013 Metropolitan Planning Area (MPA) Metadata

1. Contact Information
Name: Bangor Area Comprehensive Transportation System
Acronym: BACTS
Address: 12 Acme Road, Brewer, Maine 04412
Telephone: 207.974.3111
Fax: n/a
Website: http://www.bactsmpo.org/

2. Executive Director and/or Transportation Contact
Name: Rob Kenerson, Director
E-mail: robk@bactsmpo.org
Telephone: 207.974.3111

3. Designation
Date of Designation: June , 2013
Areas Served: Bangor, Brewer, Veazie, Hampden, Hermon, Orono, Old Town, Milford, Bradley, Orrington and the Penobscot Nation
TMA Status: No
2010 MPO Census Population: 61,210

Approved by BACTS Policy Committee:
Signature — Date: 9/30/2013

Approved by Federal Highway Administration:
Signature — Date: 1/6/2014

Approved by Maine Department of Transportation:
Signature — Date: 12/18/13

N W E S

MaineDOT

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Miles

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Chapter 2 describes the existing demographics in the metropolitan area with an analysis of socioeconomic conditions. Chapter 3 presents the BACTS mission statement, Federal planning factors, State policy objectives, Regional goals and BACTS priorities. Chapters 4 through 9 address the existing conditions and trends, deficiencies, and recommendations for individual modes. These chapters describe the BACTS vision for the year 2038 and what it will take to get there. Chapters 10 and 11 focus on economic development and tourism; climate change, livability, and sustainability; all interwoven issues important to the region and required by FHWA. Chapter 12 discusses the legislative requirement and timeframe to integrate performance measures in the planning and decision-making process. Chapter 13 outlines financial conditions including issues and constraints. Chapter 14 provides a compilation of all recommendations from each chapter.

Appendix A contains a schedule of public involvement for this Long Range Plan and the compilation of public comments on the plan, with a specific response to each, if warranted. Appendix B contains classifications of all BACTS arterials and collectors, traffic volumes, and an historic list of BACTS Transportation Improvement Projects. Appendix C is acronyms used in transportation planning while Appendix D contains definitions used in transportation planning.

1.3 Legislative Mandates

All transportation initiatives undertaken by BACTS must adhere to standards specified in existing federal and state legislation. In addition to the Fixing America's Surface Transportation Act (FAST Act) investment goals listed in Chapter 3, the BACTS planning process is subject to the prescriptions of the Maine Sensible Transportation Policy Act (MSTPA), the Clean Air Act Amendment (CAA), the National Environmental Policy Act (NEPA), the Americans with Disabilities Act (ADA), and Title VI of the Civil Rights Act.

1.4 Public Participation Process

The FAST Act and MSTPA require each MPO to develop a public involvement process for the development and implementation of its transportation planning initiatives. Title VI of the Civil Rights Act requires a means of ensuring that transportation projects are not selected on the basis of discriminatory practices. Informed public review and feedback help to ensure that the proposed transportation alternatives truly meet the needs of the local community. It is particularly critical to get the opinions of users whose concerns may otherwise be overlooked in the transportation planning process, including low-income residents and workers, disabled individuals, the elderly, bicyclists, and pedestrians.

In order to maximize public input to the MTP, BACTS staff members solicit public feedback in structured and well-publicized meetings and focus groups, as well as through informal face-to-face visits, written commentary, the BACTS website, e-mail, and telephone conversations. An extensive computerized database is used to continually expand the contact list of interested and affected parties and special interest groups for working advisory committees and informational mailings. A schedule of public involvement for this Metropolitan Transportation Plan is included in Appendix A. A copy of the BACTS public participation document, detailing methods and timelines for soliciting public participation for transportation planning and decision-making may be found on the BACTS website at: www.bactsmpo.org. This Public Participation Plan was last reviewed and updated in 2015.

2.0 Demographics

2.1 Introduction

Generally regional travel demand is closely related to the region's population size, characteristics, and employment. Travel demand is the combined effect of the need to make trips to satisfy personal, household, commercial, and community needs. However, in Maine, well over 70 percent of all employment, retail sales and all services, such as hospitals, social services, education institutions, cultural activities, and government occur within just over 14 percent of the State's municipalities. These cities and towns are referred to as service centers.

The BACTS area is one of the State's service centers, providing services to a populous much larger than that which resides within the area. Services in the greater Bangor area are regularly utilized by and, in many cases, are the closest services for residents living in almost half of the State. Therefore, travel demand for the area is inflated by the daily influx of individuals making their way into the region for employment, education, health care and retail services.

2.2 Geographical Distribution

In land area, Maine is the largest state in New England, representing almost half of the region's total area. In 2016, the U.S. Census Bureau reported Maine is the least densely populated state on the eastern seaboard, with just 43.1 people per square mile. Maine is nearly 90 percent forested which causes the population to be unevenly distributed. The most populated county in the State, Cumberland County, is home to 22 percent of the State's total population but covers only 4 percent of the State's land area; and although the four counties to the east and north of Penobscot County make up 50 percent of the State's land area, only 13 percent of the population inhabit those areas.

The State is divided into 16 counties and 491 municipalities - 431 towns, 34 plantations, 23 cities, as well as 3 Indian Nations. Bangor, the third largest city in Maine, is the county seat of Penobscot County, the third most populated county of Maine. There are 60 municipalities within Penobscot County's 3,397 square miles, accounting for 12.2 percent of the State's municipalities, 11.0 percent of the land area and 11.6 percent of the population.

Figure 2.1

BACTS METROPOLITAN PLANNING AREA MUNICIPALITIES 1990 - 2010		
2010	**2000**	**1990**
Bangor	Bangor	Bangor
Bradley	Bradley	Brewer
Brewer	Brewer	Hampden
Hampden	Eddington	Old Town
Hermon	Hampden	Orono
Milford	Milford	Veazie
Old Town	Old Town	
Orono	Orono	
Orrington	Orrington	
Penobscot Indian Island	Penobscot Indian Island	
Veazie	Veazie	

The BACTS metropolitan planning area consists of 11 municipalities (3 cities, 7 towns and 1 Indian Nation), which make up the 2010 Census designated Greater Bangor urbanized area (UZA). There are only three UZAs in Maine – the Greater Portland Area, Lewiston-Auburn Area, and the Greater Bangor Area. The designated Greater Bangor UZA has changed with each decennial census, as shown in Figure 2.1. A UZA is a census-designated urban area with 50,000 or more residents. An urban area is defined by the census is an area consisting of a central core and adjacent densely settled area that together contain at least 2,500 residents. The Federal Highway Administration (FHWA) defines an urban area as an area having a population of 5,000 or more.

Figure 2.2

GEOGRAPHICAL DISTRIBUTION									
	Percent of State			Percent of Penobscot County			Percent of Metropolitan Planning Area		
	Land Area	Population	Municipalities	Land Area	Population	Municipalities	Land Area	Population	Municipalities
Greater Bangor UZA	0.14%	4.61%	2.24%	1.25%	39.77%	18.33%	13.37%	72.68%	100%
BACTS Metropolitan Planning Area	1.03%	6.34%	2.24%	9.35%	54.72%	18.33%			
Penobscot County	11.02%	11.59%	12.22%						

In total, the 11 municipalities in the BACTS metropolitan planning area have a combined land area of 318 square miles and a total (2010) population of 84,220. These 11 communities represent 18.33 percent of the municipalities in Penobscot County, 9.35 percent of land area and 54.72 percent of the population. Although all 11 municipalities make up the metropolitan planning area, the UZA includes only the urban portions of these communities. The UZA contains .14 percent of the State's land area, 1.25 percent of Penobscot County and 13.37 percent of the metropolitan planning area; and represents 4.61 percent of the total Maine population, 39.77 percent of Penobscot County and 72.68 percent of the metropolitan planning area. (Figure 2.2)

Figure 2.3

Land Area and 2010		
	Square Miles	Density
Bangor	34	965.2
Bradley	51	29.5
Brewer	15	622.6
Hampden	38	190.5
Hermon	37	147.3
Milford	46	66.6
Old Town	45	175.0
Orono	20	529.2
Orrington	26	141.5
Indian Island	3	217.1
Veazie	3	613.1
Greater Bangor UZA	43	1,440.2
Penobscot County	3,397	45.3
Maine	30,843	43.1

The density in the Greater Bangor UZA is 1,440 persons per square mile, compared to 265 for the Metropolitan Planning Area, 45 for Penobscot County and 43 for the State. (Figure 2.3) In 2010, 42.4 percent of Penobscot County residents lived in urban areas, the majority located within the BACTS area. Slightly more than one-third (38.7%) of the State of Maine's residents live within an urban area. As shown in Figure 2.3, the percentage of residents living in urban areas of BACTS municipalities varies greatly from community to community. More than 90 percent of residents in Bangor, Orono and Penobscot Indian Island live in urban areas, while less than 50 percent of residents in Bradley, Hampden, Hermon and Orrington live in urban areas.

Figure 2.4

Urban and Rual Population Changes 2000-2010												
	Total			Urban			Rural			Percent of Total Population in Urban Area		
	2010	2000	Change	2010	2000	Change	2010	2000	Change	2010	2000	Change
Bangor	33,039	31,473	4.98%	30,949	29,736	4.08%	2,090	1,737	20.32%	93.67%	94.48%	-0.81%
Bradley	1,492	1,242	20.13%	461	436	5.73%	1,031	806	27.92%	30.90%	35.10%	-4.21%
Brewer	9,482	8,987	5.51%	7,803	7,552	3.32%	1,679	1,435	17.00%	82.29%	84.03%	-1.74%
Hampden	7,257	6,327	14.70%	2,659	2,868	-7.29%	4,598	3,459	32.93%	36.64%	45.33%	-8.69%
Hermon	5,416	4,437	22.06%	14	0	NA	5,402	4,437	21.75%	0.26%	0.00%	0.26%
Milford	3,070	2,950	4.07%	1,854	1,696	9.32%	1,216	1,254	-3.03%	60.39%	57.49%	2.90%
Old Town	7,840	8,130	-3.57%	5,754	6,298	-8.64%	2,086	1,832	13.86%	73.39%	77.47%	-4.07%
Orono	10,362	9,112	13.72%	9,372	8,138	15.16%	990	974	1.64%	90.45%	89.31%	1.14%
Orrington	3,733	3,526	5.87%	473	400	18.25%	3,260	3,126	4.29%	12.67%	11.34%	1.33%
Penobscot Indian Island	610	562	8.54%	608	560	8.57%	2	2	0.00%	99.67%	99.64%	0.03%
Veazie	1,919	1,744	10.03%	1,263	1,177	7.31%	656	567	15.70%	65.82%	67.49%	-1.67%
BACTS Area	84,220	78,490	7.30%	61,210	58,861	3.99%	23,010	19,629	17.22%	72.68%	74.99%	-2.31%
Penobscot County	153,923	144,919	6.21%	65,186	63,784	2.20%	88,737	81,135	9.37%	42.35%	44.01%	-1.66%
Maine	1,328,361	1,274,923	4.19%	513,542	512,878	0.13%	814,819	762,045	6.93%	38.66%	40.23%	-1.57%

Source: U.S. Decennial Census 2000, 2010 SF1

2.3 Population

Between 2000 and 2010 the BACTS area, as well as Penobscot County and the State as a whole, experienced population gains. The State of Maine total population increased by just over four percent. Just as the BACTS area experienced an overall 7.3 percent increase in population from 2000 to 2010, but a decrease of 1.67 percent in population living in urban areas, Penobscot County experienced a 6.21 percent increase in population, but the number of residents living in urban areas decreased by 1.66 percent. The apparent out-migration of the population from the urban areas into their surrounding suburbs is a pattern that has been repeated all over the nation. Though in each urban area there may be particular reasons for the phenomenon, it reflects a widespread desire for a more rural lifestyle, without discarding the benefits of urban opportunities.

Since then, based on intercensal annual population estimates, the State's total population remained relatively even with a modest increase of .28 percent from 2010 to 2016. Penobscot County population decreased by1.34 percent, and the BACTS area population remained relatively even as well with a .7 percent decrease. The population growth experienced in the BACTS area is occurring in suburb communities. Although Bangor's population decreased, it is reported that the towns of Orono and Hermon stand among the fastest-growing towns in the State. (Figure 2.5)

Figure 2.5

POPULATION ANNUAL ESTIMATES
2000 - 2016

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Bangor	31,512	31,743	31,968	32,264	32,131	32,292	32,687	32,721	33,008	33,044	33,033	32,967	32,802	32,740	32,654	32,309	31,985
Bradley	1,229	1,257	1,285	1,316	1,341	1,368	1,398	1,430	1,454	1,476	1,491	1,491	1,491	1,483	1,484	1,476	1,467
Brewer	9,008	9,068	9,129	9,205	9,229	9,275	9,354	9,420	9,459	9,477	9,471	9,450	9,397	9,346	9,309	9,221	9,107
Hampden	6,353	6,451	6,553	6,663	6,746	6,837	6,947	7,061	7,140	7,211	7,258	7,275	7,266	7,284	7,390	7,381	7,348
Hermon	4,382	4,492	4,604	4,722	4,823	4,927	5,046	5,168	5,264	5,354	5,432	5,501	5,589	5,695	5,756	5,794	5,865
Milford	2,913	2,932	2,952	2,976	2,988	3,003	3,026	3,052	3,061	3,068	3,067	3,066	3,049	3,038	3,035	3,004	2,969
Old Town	7,882	7,885	7,891	7,908	7,892	7,884	7,900	7,918	7,897	7,869	7,835	7,810	7,761	7,720	7,691	7,612	7,518
Orono	9,340	9,519	9,674	9,885	9,622	9,748	10,106	9,919	10,293	10,339	10,348	10,333	10,578	10,706	10,755	10,721	11,242
Orrington	3,521	3,546	3,572	3,604	3,620	3,641	3,672	3,705	3,719	3,728	3,737	3,730	3,715	3,710	3,706	3,687	3,672
Penobscot Indian Island	559	564	571	578	582	587	593	600	605	608	609	609	606	605	604	599	593
Veazie	1,793	1,807	1,822	1,840	1,851	1,863	1,880	1,900	1,909	1,915	1,917	1,911	1,899	1,889	1,882	1,864	1,840
BACTS Total	78,492	79,264	80,021	80,961	80,825	81,425	82,609	82,894	83,809	84,089	84,198	84,143	84,153	84,216	84,266	83,668	83,606
Penobscot County	144,937	146,110	147,298	148,759	148,814	149,726	151,446	152,232	153,372	153,770	153,872	153,814	153,589	153,518	153,500	152,478	151,806
Maine	1,277,072	1,285,692	1,295,960	1,306,513	1,313,688	1,318,787	1,323,619	1,327,040	1,330,509	1,329,590	1,327,730	1,328,231	1,328,895	1,329,076	1,330,719	1,329,453	1,331,479

https://www.census.gov/data/datasets/2016/demo/popest/total-cities-and-towns.html

Population by Age

Maine's population has always been among the oldest in the nation and continues to age at an increasing rate. This trend, largely attributable to the baby-boomer generation reaching retirement age; the following generation having fewer children than generations before; and the decline in child-bearing age population, is occurring throughout the United States. Residents age 65 and older made up 15.2 percent of the population in the United States in 2016.

Figure 2.6

BACTS Municipalities Median Age Youngest to Oldest Ranking in the State 2015		
	Median Age	Ranking
Orono	21.7	4
Old Town	33.5	13
Bangor	35.4	16
Penobscot Indian Island	37.2	24
Hermon	40.7	72
Brewer	41.7	91
Hampden	42.6	115
Veazie	43.0	126
Milford	45.0	199
Bradley	48.5	315
Orrington	48.6	319

Figure 2.7

School-Age and Senior Population as Percentage of Total Population 2000 - 2015				
		Total	5 - 17	65+
Bangor	2000	31,473	15.52%	14.08%
	2010	33,039	12.28%	14.39%
	2015	32,695	13.51%	15.27%
Bradley	2000	1,242	16.75%	14.33%
	2010	1,492	15.68%	14.68%
	2015	1,471	13.12%	19.51%
Brewer	2000	8,987	16.96%	16.67%
	2010	9,482	14.89%	17.11%
	2015	9,341	14.57%	16.34%
Hampden	2000	6,327	21.51%	10.72%
	2010	7,257	18.88%	12.99%
	2015	7,329	18.77%	14.33%
Hermon	2000	4,437	21.34%	9.92%
	2010	5,416	17.74%	12.00%
	2015	5,664	17.14%	10.82%
Milford	2000	2,950	18.47%	10.85%
	2010	3,070	14.10%	12.05%
	2015	3,043	13.64%	13.11%
Old Town	2000	8,130	15.04%	13.86%
	2010	7,840	12.60%	13.79%
	2015	7,726	9.20%	14.30%
Orono	2000	9,112	9.02%	9.30%
	2010	10,362	6.48%	10.37%
	2015	10,617	5.81%	12.37%
Orrington	2000	3,526	18.04%	12.08%
	2010	3,733	17.12%	13.47%
	2015	3,714	17.91%	16.18%
Penobscot Indian Island	2000	562	26.51%	9.61%
	2010	610	20.49%	8.69%
	2015	789	18.88%	11.66%
Veazie	2000	1,744	18.41%	14.56%
	2010	1,919	14.90%	16.68%
	2015	2,045	18.63%	17.26%
All BACTS Communities	2000	78,490	16.08%	13.06%
	2010	84,220	13.27%	13.76%
	2015	84,434	13.33%	14.60%
Penobscot County	2000	144,919	21.18%	13.06%
	2010	153,923	18.63%	14.46%
	2015	153,437	17.70%	16.0%
Maine	2000	1,274,923	20.77%	14.39%
	2010	1,328,361	18.18%	15.89%
	2015	1,329,100	17.50%	17.60%

In 2016, the U.S. Census Bureau stated the median age in Maine is the highest in Nation at 44.6 years, followed by New Hampshire (43.0) and Vermont (42.7). Maine's median age is high because of the lower percentage of residents between the ages of 15 and 44 and the higher percentage of residents over 45 years old.

The median age of all residents in the BACTS area has consistently been younger than that of the State as a whole. Based on the 2015 5-year population estimates, the Town of Orono has the youngest population in Penobscot County and the fourth youngest population in the State with a median age of 21.7 years. The community in Penobscot County with the oldest median age, 63.2, is the unorganized township of Kingman. In the BACTS area, Orrington has the oldest population with a median age of 48.6. (Figure 2.6)

School age and senior populations require services that are dependent on local, state and federal funding programs. With limited resources, it is essential that programs and services that will best serve the community, region, and state as a whole are identified and strategies to use available funding in the most cost-effective and efficient manner are implemented to ensure proper care and services for our most dependent population segments. (Figure 2.7)

Funding for education is shared by the State and municipality. (Figure 2.8) In fiscal year 2016, the Maine Department of Education reported a statewide average operating cost of $11,349 per pupil, an increase of 17.5 percent from 2010. In the BACTS area the average operating cost per pupil was $12,285, with the highest cost per pupil for Penobscot Indian Island and the lowest cost per pupil in Hermon. More than 18 percent

Figure 2.8

Per Pupil Operating Costs			
	Elementary	Secondary	Total
STATE TOTALS	**$10,682.37**	**$12,858.13**	**$11,348.78**
Bangor	$10,516.96	$10,889.68	$10,621.06
Brewer	$9,201.05	$13,100.73	$10,349.31
Hermon	$8,798.54	$10,943.77	$9,418.30
Indian Island	$26,134.26	$10,458.93	$22,802.57
Milford	$10,915.47	$11,181.08	$11,002.18
Orrington	$8,364.17	$12,196.37	$9,422.14
RSU 22	$9,124.15	$11,767.21	$9,905.30
RSU 26	$13,923.16	$13,143.63	$13,670.88
RSU 34	$10,702.20	$13,118.06	$11,378.79
Veazie Public Schools	$15,521.61	$12,232.25	$14,275.12

Source: http://www.maine.gov/education/data/ppcosts/index.html

of the total population in each community of Hampden, Penobscot Indian Island and Veazie are school age and less than ten percent of the population in both Old Town and Orono are school age.

Maine's State Plan on Aging 2016-2020, indicates that nearly two-thirds of all individuals age 65 and older will need long-term services. With an aging population, the State is facing a high dependency ratio which strains resources and services and creates a serious consequence to the economy and available workforce. A smaller number of residents will be available to pay the increasing amount of services needed for the senior population. The baby boomer generation is beginning to retire and leaving the workforce with a smaller population available to fill the positions left vacant. This situation will make maintaining the current workforce of the State difficult, and create obstacles to attracting development and new business. Businesses tend to base relocation and expansion decisions on the availability of a skilled workforce.

Figure 2.9

Median Age and Working Age Population to Senior Population Ratio

		Median Age	Working Age to Senior Ratio
Bangor	2000	36.1	4.6
	2010	36.7	4.7
	2015	35.4	4.3
Bradley	2000	38.9	4.4
	2010	40.0	4.3
	2015	48.5	3.3
Brewer	2000	39.2	3.7
	2010	41.1	3.7
	2015	41.7	3.9
Hampden	2000	38.8	5.8
	2010	40.8	4.8
	2015	42.6	4.4
Hermon	2000	36.8	6.4
	2010	40.4	5.4
	2015	40.7	6.1
Milford	2000	35.9	6.0
	2010	39.7	5.7
	2015	45.0	5.3
Old Town	2000	33.8	4.8
	2010	33.0	5.0
	2015	33.5	4.9
Orono	2000	22.3	8.5
	2010	21.8	7.8
	2015	21.7	6.4
Orrington	2000	40.3	5.3
	2010	43.5	4.8
	2015	48.6	4.0
Penobscot Indian Island	2000	32.0	5.9
	2010	33.6	7.0
	2015	37.2	5.4
Veazie	2000	40.3	4.2
	2010	43.4	3.8
	2015	43.0	3.5
BACTS Area Total	2000	36.8	5.0
	2010	40.0	4.9
	2015	41.7	4.6
Penobscot County	2000	37.2	4.6
	2010	39.9	4.3
	2015	41.3	3.8
Maine	2000	38.6	4.6
	2010	42.7	4.2
	2015	43.8	3.8

In 2015, while the State and Penobscot County averaged 3.8 working persons for every senior person, the BACTS area as a whole averaged 4.6 working age persons for every senior person. The towns of Hermon, Milford, Old Town, Orono and Penobscot Indian Island all had the lowest working-age to senior ratios in the BACTS area. In the 2015 report on Economic Implications of Maine's Changing Age Structure, the data showed that a common thread among the counties with a higher percentage of workers to seniors was the proximity to Interstate 95 and a metropolitan area. (Figure 2.9)

Figure 2.10

Percent of Residents Who Lived Outside Maine in the Previous Year 2015	
Bangor	**3.66%**
Bradley	0.75%
Brewer	2.10%
Hampden	0.75%
Hermon	**3.85%**
Milford	0.53%
Old Town	2.20%
Orono	**8.68%**
Orrington	0.54%
Penobscot Indian Island	0.77%
Veazie	1.58%
Total BACTS Communities	3.37%
Penobscot County	2.66%
Maine	2.83%

Geographic Mobility

Society is very mobile. A higher percentage of residents report living in a different community from the past year in the BACTS area than in Penobscot County and the State. This may be attributable to the concentration of higher education institutions in the BACTS area, as evidenced in the high rates shown in Orono, the host community to the University of Maine flagship campus.

The BACTS area is attracting in-migration of residents from other states at a higher rate than Penobscot County and the State. (Figure 2.10) Again, this may be attributable to the influx of students to the area. In 2015, of the residents of BACTS area communities living in a different home than the previous year, 3.37 percent report they lived in a state other than Maine, compared to 2.66 percent in Penobscot County and 2.83 percent of the State. Bangor, Hermon and Orono all have a higher percentage of out of state in-migration

than Penobscot County and the State as a whole. Hermon and Orono have been reported among the fastest growing towns in the State; however, the total population in Bangor has decreased annually since 2009. (Figure 2.11)

Geographic Mobility in the Past Year for Current Residence 2010 and 2015

	Total	Same House	Same City or Town	Same County	Same State	Different State	Abroad	Residing in Same Community	Residing in Different Community
Bangor									
2010	32,562	24,459	3,126	1,986	1,888	856	247	84.72%	15.28%
2015	32,353	24,709	2,207	1,901	2,353	1,082	101	83.19%	16.81%
Bradley									
2010	1,384	1,174	0	182	5	23	0	84.83%	15.17%
2015	1,468	1,353	0	58	46	11	0	92.17%	7.83%
Brewer									
2010	9,372	8,014	453	380	220	297	8	90.34%	9.66%
2015	9,241	8,095	230	575	147	194	0	90.09%	9.91%
Hampden									
2010	7,002	6,448	12	358	104	56	24	92.26%	7.74%
2015	7,295	6,306	215	377	342	55	0	89.39%	10.61%
Hermon									
2010	5,220	4,711	0	293	39	167	10	90.25%	9.75%
2015	5,583	4,857	0	421	90	201	14	87.00%	13.00%
Milford									
2010	3,024	2,481	165	333	45	0	0	87.50%	12.50%
2015	3,028	2,742	0	270	0	16	0	90.55%	9.45%
Old Town									
2010	7,804	6,117	424	727	267	232	37	83.82%	16.18%
2015	7,623	6,062	327	854	212	111	57	83.81%	16.19%
Orono									
2010	10,130	5,344	1,543	822	1,796	550	75	67.99%	32.01%
2015	10,561	6,486	688	837	1,633	849	68	67.93%	32.07%
Orrington									
2010	3,682	3,440	0	225	0	17	0	93.43%	6.57%
2015	3,714	3,552	0	131	11	20	0	95.64%	4.36%
Penobscot Indian Island									
2010	592	510	0	54	19	9	0	86.15%	13.85%
2015	779	680	0	84	9	6	0	87.29%	12.71%
Veazie									
2010	1,992	1,656	0	255	73	8	0	83.13%	16.87%
2015	2,021	1,753	0	212	24	32	0	86.74%	13.26%
Total BACTS Communities									
2010	82,764	64,354	5,723	5,615	4,456	2,215	401	84.67%	15.33%
2015	83,666	66,595	3,667	5,720	4,867	2,577	240	83.98%	16.02%
Penobscot County									
2010	151,307	125,450	6,259	10,001	5,906	3,210	481	87.05%	12.95%
2015	152,011	127,655	4,384	9,811	6,123	3,698	340	86.86%	13.14%
Maine									
2010	1,313,667	1,132,559	37,598	69,180	39,221	31,621	3,488	89.08%	10.92%
2015	1,316,671	1,131,604	35,701	72,585	39,472	32,716	4,593	88.66%	11.34%

Source: American Community Survey 5 - Year Estimates, 2006-2010 and 2011-2015

An amalgamation of factors such as the aging population, decline in native births due in part to the limited numbers of child-bearing aged residents, and young adults migrating to larger cities for educational and career opportunities, is causing the growth to stagnate at best, and decline in many cases. These trends are warning indicators of a potential distressed economic situation developing. It demonstrates the urgency of developing effective strategies for attracting an in-migration of young workers who can power businesses, pay taxes, and won't dip into social security for decades.

Figure 2.12

BACTS Area Population Forecast to 2040

	1980	1990	2000	2010	2020	2030	2040
Bangor	31,643	33,181	31,473	33,039	32,735	33,008	**33,281**
Bradley	1,149	1,136	1,242	1,492	1,573	1,691	**1,810**
Brewer	9,017	9,021	8,987	9,482	9,529	9,676	**9,822**
Hampden	5,250	5,974	6,327	7,257	7,828	8,472	**9,116**
Hermon	3,170	3,755	4,437	5,416	6,101	6,850	**7,600**
Milford	2,160	2,884	2,950	3,070	3,381	3,653	**3,924**
Old Town	8,422	8,317	8,130	7,840	7,670	7,473	**7,276**
Orono	10,578	10,573	9,112	10,362	9,881	9,707	**9,532**
Orrington	3,244	3,309	3,526	3,733	3,894	4,064	**4,234**
Penobscot Indian Island	458	476	562	610	662	713	**763**
Veazie	1,610	1,633	1,744	1,919	2,006	2,113	**2,219**
Total	**76,701**	**80,259**	**78,490**	**84,220**	**85,259**	**87,419**	**89,579**

<u>Population Forecasts</u>

Population forecasts were determined using a linear regression formula based on the reported Decennial Census values from 1980 to 2010. The trends predict growth between now and 2040 strictly by formula and does not account for the many ambiguities and uncertainties created by the aging population, decline in births and limited in-migration, which have the potential to significantly affect rates of growth. Nor, does the formula account for potential of increased in-migration of working and child-bearing age individuals to the area with the potential to multiply forecasted growth over the next couple decades.

The overall population in the BACTS area is forecasted to increase by 6.36 percent between 2010 and 2040, with the majority of growth happening in the suburb communities. The most significant change is predicted in Hermon, with a 40.32 percent forecasted increase in population. (Figure 2.12)

The current local population trends do not necessarily adhere to the same principles and analysis as other areas. For example, the City of Bangor is experiencing an overall decrease in population. However it has a lower median age, a lower percentage of dependent population (population aged 0-17 and 65+), a greater number of worker to senior population ratio, and a higher percentage of in-migration from out of state. (Figure 2.13)

Population Analysis Summary 2015

	Count			2015				
	2010 Decennial	2015 Estimated	2010- 2015 Change	Density (sq. mi.)	Median Age	Dependent Population	Senior Dependancy Ratio	Out of State In-Migration
Bangor	33,039	32,695	(344)	965.2	35.4	33.80%	4.3	3.66%
Bradley	1,492	1,471	(21)	29.5	48.5	35.76%	3.3	0.75%
Brewer	9,482	9,341	(141)	622.6	41.7	35.85%	3.9	2.10%
Hampden	7,257	7,329	72	190.5	42.6	36.73%	4.4	0.75%
Hermon	5,416	5,664	248	147.3	40.7	33.72%	6.1	3.85%
Milford	3,070	3,043	(27)	66.6	45.0	30.83%	5.3	0.53%
Old Town	7,840	7,726	(114)	175.0	33.5	30.51%	4.9	2.20%
Orono	10,362	10,617	255	529.2	21.7	20.76%	6.4	8.68%
Orrington	3,733	3,714	(19)	141.5	48.6	35.35%	4.0	0.54%
Penobscot Indian Island	610	789	179	217.1	37.2	37.01%	5.4	0.77%
Veazie	1,919	2,045	126	613.1	43.0	39.56%	3.5	1.58%
Total	84,220	84,434	214	1,440.2	41.7	32.50%	4.6	3.37%
Penobscot County	153,923	153,437	(486)	45.3	41.3	38.50%	3.8	2.66%
Maine	1,328,361	1,329,100	739	43.1	43.8	40.00%	3.8	2.83%

2.4 Bangor Metropolitan Labor Market Area

Bangor Metropolitan Labor Market Area Population Forecasted to 2040							
Municipalities within the Greater Bangor UZA							
	1980	**1990**	**2000**	**2010**	**2020**	**2030**	**2040**
Bangor	31,643	33,181	31,473	33,039	32,735	33,008	33,281
Bradley	1,149	1,136	1,242	1,492	1,573	1,691	1,810
Brewer	9,017	9,021	8,987	9,482	9,529	9,676	9,822
Hampden	5,250	5,974	6,327	7,257	7,828	8,472	9,116
Hermon	3,170	3,755	4,437	5,416	6,101	6,850	7,600
Milford	2,160	2,884	2,950	3,070	3,381	3,653	3,924
Old Town	8,422	8,317	8,130	7,840	7,670	7,473	7,276
Orono	10,578	10,573	9,112	10,362	9,881	9,707	9,532
Orrington	3,244	3,309	3,526	3,733	3,894	4,064	4,234
Indian Island	458	476	562	610	662	713	763
Veazie	1,610	1,633	1,744	1,919	2,006	2,113	2,219
Total	**76,701**	**80,259**	**78,490**	**84,220**	**85,259**	**87,419**	**89,579**
Municipalities Outside of the Greater Bangor UZA							
	1980	**1990**	**2000**	**2010**	**2020**	**2030**	**2040**
Alton	468	771	816	890	1,032	1,146	1,254
Amherst	203	226	230	265	281	300	319
Argyle	225	202	253	277	291	308	324
Aurora	110	82	121	114	119	121	123
Bradford	888	1,103	1,186	1,290	1,423	1,551	1,679
Burlington	322	360	351	363	378	391	405
Carmel	1,695	1,905	2,416	2,794	3,154	3,519	3,884
Charleston	1,037	1,187	1,397	1,409	1,565	1,695	1,824
Clifton	462	607	743	921	1,067	1,219	1,371
Corinth	1,711	2,177	2,511	2,878	3,277	3,669	4,061
Dedham	841	1,229	1,422	1,681	1,971	2,254	2,536
Dixmont	812	1,007	1,065	1,181	1,308	1,432	1,555
EC Penobscot		12	324	343	546	723	901
Eddington	1,769	1,947	2,052	2,225	2,363	2,510	2,658
Edinburg	126	107	98	131	124	125	127
Enfield	1,397	1,476	1,616	1,107	1,142	1,057	971
Etna	758	977	1,012	1,246	1,364	1,516	1,668
Exeter	823	937	997	1,092	1,179	1,269	1,358
Garland	718	1,064	990	1,105	1,242	1,373	1,504
Glenburn	2,319	3,198	3,964	4,594	5,384	6,138	6,893
Greenbush	1,064	1,309	1,421	1,491	1,646	1,782	1,919
Holden	2,554	2,952	2,827	3,076	3,218	3,384	3,550
Howland	1,602	1,435	1,362	1,241	1,121	1,000	880
Hudson	797	1,048	1,393	1,536	1,810	2,063	2,317
Kenduskeag	1,210	1,234	1,171	1,348	1,356	1,395	1,434
Lagrange	509	557	747	708	812	888	964
Levant	1,117	1,627	2,171	2,851	3,400	3,978	4,556
Newburg	1,228	1,317	1,394	1,551	1,643	1,749	1,855
Newport	2,755	3,036	3,017	3,275	3,389	3,545	3,701
Osborn	47	72	69	67	74	80	85
Otis	307	355	543	672	790	911	1,031
Passadumkeag	430	428	441	374	368	351	334
SE Piscataquis UT	183	247	254	253	280	300	321
Stetson	618	847	981	1,202	1,378	1,567	1,756
Winterport	2,675	3,175	3,602	3,757	4,176	4,536	4,897
Total	**33,780**	**40,213**	**44,957**	**49,308**	**54,671**	**59,846**	**65,014**
Bangor Metropolitan LMA	**110,481**	**120,472**	**123,447**	**133,528**	**139,930**	**147,265**	**154,593**

Sources: U.S. Decennial Census 1980, 1990, 2000, 2010
2015 Labor Market Area as defined by U.S. OMB Bulletin No. 15-01 and provided by Maine Department of Labor at http://www.maine.gov/labor/cwri/LMADefinitions.html.

***Populations were forecasted using a linear regression formula based on the reported Decennial Census values from 1980-2010.**

The Bangor Metropolitan Labor Market Area (LMA) gained 10,081 individuals between 2000 and 2010, compared to 2,975 persons between 1990 and 2000. From 2000 to 2010, most of the communities in the Bangor Metropolitan LMA experienced increases in population, including all communities within the urban region. The majority of population losses in the LMA occurred in communities clustered along Route 155 (Enfield, Howland, Lagrange, Passadumkeag and Southeast Piscatquis UT). This area experienced a loss in population of 737. These losses may be attributed to the turmoil and decline of Maine's pulp and paper industry. Since then, five of Maine's paper mills shut down, four of which were located in Penobscot County. Verso in Bucksport, Expera in Old Town, and Great Northern Paper in East Millinocket all closed their facilities in 2014; Lincoln Paper and Tissue closed its facility in 2015; and Madison Paper Industries closed its Madison facility in 2016. (Figure 2.14)

Labor Force and Economic Characteristics

The employment market in the Greater Bangor area is a reflection of the major role that the Bangor area plays as the major service center for eastern and central Maine. The market is expected to continue to focus on services as shown in Figure 2.15.

BACTS MEMBER MUNICIPALITIES
LABOR FORCE AND ECONOMIC CHARACTERISTICS
2010 - 2015

	2010	2011	2012	2013	2014	2015
EMPLOYMENT STATUS						
Population 16 years and over	69,836	70,494	71,022	71,369	71,234	71,330
In labor force	46,152	46,369	46,578	46,200	45,610	45,089
Civilian labor force	46,018	46,277	46,465	46,058	45,435	44,928
Employed	43,770	43,392	43,418	42,593	42,049	41,420
Unemployed	2,248	2,885	3,047	3,465	3,386	3,508
Armed Forces	134	92	113	142	175	161
Not in labor force	23,684	24,125	24,444	25,169	25,624	26,241
OCCUPATION - Civilian employed population						
Management, business, science, and arts occupations	15,974	15,831	16,314	16,316	16,354	16,300
Service occupations	8,671	8,872	8,972	9,083	8,887	9,320
Sales and office occupations	11,959	11,817	11,261	10,814	10,620	10,061
Natural resources, construction, and maintenance occupations	3,245	3,250	3,143	2,923	2,916	2,644
Production, transportation, and material moving occupations	3,921	3,622	3,728	3,457	3,272	3,095
INDUSTRY - Civilian employed population						
Agriculture, forestry, fishing and hunting, and mining	536	472	488	379	293	277
Construction	2,161	2,205	2,209	2,043	2,041	2,048
Manufacturing	2,113	2,047	1,917	1,901	1,682	1,680
Wholesale trade	1,103	974	912	931	923	772
Retail trade	6,225	6,356	6,450	6,144	6,132	6,284
Transportation and warehousing, and utilities	1,745	1,599	1,842	1,665	1,547	1,527
Information	907	861	876	721	718	704
Finance and insurance, and real estate and rental and leasing	2,366	2,225	1,819	1,860	2,077	2,049
Professional, scientific, and management, and administrative and waste management services	3,492	3,680	3,493	3,346	3,418	3,298
Educational services, and health care and social assistance	15,056	14,972	15,679	15,843	15,409	15,128
Arts, entertainment, and recreation, and accommodation and food services	4,496	4,297	4,245	4,274	4,390	4,252
Other services, except public administration	1,762	1,913	2,004	1,870	1,849	1,757
Public administration	1,808	1,791	1,484	1,616	1,570	1,644
CLASS OF WORKER - Civilian employed population						
Private wage and salary workers	33,731	33,767	33,829	33,148	32,634	32,091
Government workers	7,483	6,906	7,040	7,271	7,219	7,154
Self-employed in own not incorporated business workers	2,477	2,627	2,494	2,121	2,166	2,150
Unpaid family workers	79	92	55	53	30	25
INCOME AND BENEFITS						
Total households	33,915	33,994	34,157	34,280	34,023	33,795
Median household income (dollars)	$48,676	$47,832	$48,387	$48,541	$49,853	$48,317
Mean household income (dollars)	$58,542	$59,266	$60,170	$61,585	$62,668	$62,009
With earnings	26,092	26,173	26,233	26,137	25,678	25,436
Mean earnings (dollars)	$59,701	$60,225	$61,383	$62,938	$64,569	$64,425
With Social Security	9,687	9,761	9,941	10,623	11,015	10,935
Mean Social Security income (dollars)	$14,985	$15,669	$16,055	$16,107	$16,050	$15,854
With retirement income	5,904	5,763	5,665	5,599	5,711	5,550
Mean retirement income (dollars)	$17,480	$18,059	$18,110	$20,075	$20,530	$20,019
With Supplemental Security Income	1,762	1,842	2,086	2,291	2,262	2,356
Mean Supplemental Security Income (dollars)	$7,985	$9,019	$8,511	$9,549	$11,984	$10,617
With cash public assistance income	1,991	1,887	2,017	1,955	1,829	1,764
Mean cash public assistance income (dollars)	$3,121	$3,800	$3,522	$2,958	$2,636	$2,105
With Food Stamp/SNAP benefits in the past 12 months	4,662	5,154	5,932	6,476	6,533	6,551
Per capita income (dollars)	$23,852	$23,699	$24,123	$25,016	$25,646	$25,604
Median earnings for workers (dollars)	$24,748	$24,851	$25,119	$26,047	$26,132	$26,291
Median earnings for male full-time, year-round workers (dollars)	$43,021	$45,121	$43,319	$44,873	$46,962	$47,388
Median earnings for female full-time, year-round workers (dollars)	$34,272	$35,739	$36,174	$36,340	$37,397	$37,514

Source: DP03 American Community Survey 5-Year Estimates 2010, 2011, 2012, 2013, 2014, 2015

In 2016, BACTS residents made up 63.64 percent of the total workforce in the Bangor Labor Market Area, 58.36 percent of Penobscot County and 6.5 percent of the State. These percentages have remained fairly consistent since 2010. The Greater Bangor area serves as an employment hub for population greater than that of the area and immediate surrounding communities. In the City of Bangor, there are 36,462 jobs and a civilian labor force of 16,827. (Figure 2.16)

Figure 2.16

Civilian Labor Force 1990 - 2016

	Total Civilian Workforce by Geography				BACTS Perentage of Workforce		
	BACTS	Bangor LMA	Penobscot County	Maine	Bangor LMA	Penobscot County	Maine
1990	42,322	63,220	74,551	633,069	66.94%	56.77%	6.69%
1991	42,501	64,013	75,492	645,139	66.39%	56.30%	6.59%
1992	41,864	63,914	75,427	644,489	65.50%	55.50%	6.50%
1993	41,504	62,995	73,758	628,854	65.88%	56.27%	6.60%
1994	40,495	62,059	72,535	621,684	65.25%	55.83%	6.51%
1995	41,693	63,591	74,131	637,534	65.56%	56.24%	6.54%
1996	42,325	64,967	75,547	656,737	65.15%	56.02%	6.44%
1997	42,280	64,680	74,793	656,709	65.37%	56.53%	6.44%
1998	42,212	65,123	74,997	653,210	64.82%	56.28%	6.46%
1999	43,401	67,430	77,190	668,497	64.36%	56.23%	6.49%
2000	42,578	66,426	75,494	678,164	64.10%	56.40%	6.28%
2001	42,772	66,725	75,763	674,319	64.10%	56.45%	6.34%
2002	42,963	67,119	76,195	675,232	64.01%	56.39%	6.36%
2003	43,646	68,226	76,852	683,535	63.97%	56.79%	6.39%
2004	43,187	67,899	75,961	686,000	63.60%	56.85%	6.30%
2005	43,970	69,202	77,286	697,153	63.54%	56.89%	6.31%
2006	44,199	69,491	77,596	701,541	63.60%	56.96%	6.30%
2007	44,891	70,406	78,551	700,468	63.76%	57.15%	6.41%
2008	45,083	70,726	78,814	701,646	63.74%	57.20%	6.43%
2009	44,701	70,411	78,535	696,219	63.49%	56.92%	6.42%
2010	45,091	70,944	79,052	695,182	63.56%	57.04%	6.49%
2011	45,506	71,590	79,570	699,281	63.56%	57.19%	6.51%
2012	45,852	72,143	79,865	702,636	63.56%	57.41%	6.53%
2013	46,180	72,639	80,294	707,368	63.57%	57.51%	6.53%
2014	45,567	71,695	78,962	696,593	63.56%	57.71%	6.54%
2015	44,575	70,088	76,761	682,701	63.60%	58.07%	6.53%
2016	44,910	70,566	76,955	690,624	63.64%	58.36%	6.50%

Source: http://www.maine.gov/labor/cwri/laus1.html

Labor Force Projections

Just like the population forecasts, forecasts for the labor force predicts growth between now and 2040 strictly by formula and does not account for the natural and manufactured dynamic that have the potential to significantly affect economic growth. Based on the formula forecast, the civilian workforce of the Bangor Labor Market Area is expected to increase by 11.68 percent between now and 2040. (Figure 2.17)

BANGOR LABOR MARKET AREA FORECASTED LABOR FORCE STATISTICS 2020 - 2040

	Civilian Labor Force	Employed	Unemployed	Unemployment Rate
2020	71,865	68,768	3,096	4.3%
2025	73,868	70,396	3,472	4.7%
2030	75,514	71,581	3,933	5.2%
2035	77,160	72,766	4,394	5.7%
2040	78,806	73,951	4,855	6.2%

Forecasts were calculated using 2000 - 2016 historical values provided by the Maine Department of Labor and the AAA version of the Exponential Smoothing (ETS) algorithm.

There has been a growing emphasis and concern on the effects of the aging population, stagnant in-migration and decline in birth rates on the available workforce, and ultimate potential for an economic crisis in the State. This is the result of conditions that have been developing over a number of years. There is great concern that the implications of population trends are lower tax revenue, greater demands on services, smaller school populations and an inadequate workforce. In order to attract new and expanding enterprises to the area, businesses will require an available, skilled workforce. If the workforce is unavailable, locating here will not be attractive and economic growth will not occur.

Employment

In 2016, BACTS residents made up 63.64 percent of the total workforce in the Bangor Labor Market Area, 58.36 percent of Penobscot County and 6.5 percent of the State. These percentages have remained fairly consistent since 2010. The Greater Bangor area serves as an employment hub for population greater than that of the area and immediate surrounding communities. In the City of Bangor, there are 36,462 jobs and a civilian labor force of 16,827. (Figure 2.16)

The Bangor LMA, as well as the State and Penobscot County, are experiencing the lowest unemployment rates in 15 years. Since 2010, the unemployment rate has decreased from 8.10 percent to 3.90 percent for the State as a whole and from 7.80 percent to 3.80 percent for the Bangor LMA. In 2016, BACTS communities had some of the lowest unemployment rates in Penobscot County. Edinburg had the lowest unemployment rate (1 out of 78 people in the labor force are unemployed), followed by Orono at 2.7. At 5.1 Penobscot Indian Island had the highest unemployment rate of all BACTS communities; however, lower than 54 percent of all the communities in Penobscot County.

Figure 2.18

2016 Annual Average Civilian Labor Force			
	Labor Force	Employment	Unemployment Rate
Bangor	16,827	16,207	3.7
Bradley	779	741	4.9
Brewer	5,062	4,894	3.3
Hampden	4,398	4,276	2.8
Hermon	3,415	3,310	3.1
Milford	1,640	1,557	5.1
Old Town	4,226	4,075	3.6
Orono	5,220	5,079	2.7
Orrington	2,127	2,060	3.1
Penobscot Indian Island	255	242	5.1
Veazie	961	929	3.3
Bangor Labor Market Area	70,570	67,890	3.8
Penobscot County	76,955	73,593	4.4
Maine	690,624	664,010	3.9

According to the Maine Development Foundation, 24,300 nonfarm payroll jobs were created in the State between 2010 and 2016. Of those jobs, 27.6 percent, or 6,700 jobs, were created between 2015 and 2016. With unemployment rates at 15-year lows, employers are reporting difficulty in finding an adequate workforce. (Figure 2.18)

Of Penobscot County's top 25 largest employers, only one, Millinocket Regional Hospital, is not based in the Greater Bangor area. Eight of the top 25 largest employers in Penobscot County are also among the top 50 private employers in the State.

Figure 2.19

Top 25 Largest Emplyers Penobscot County 2016			
Rank	Name	Employment Range	Business Description
1	EASTERN MAINE MEDICAL CENTER	4,001 to 4,500	General medical and surgical hospitals
2	ST JOSEPH HOSPITAL INC	1,001 to 1,500	General medical and surgical hospitals
3	WAL MART / SAM'S CLUB	1,001 to 1,500	Warehouse clubs and supercenters
4	HANNAFORD BROS CO	501 to 1,000	Supermarkets and other grocery stores
5	EMHS	501 to 1,000	Office administrative services
6	PENOBSCOT COMMUNITY HEALTH CARE	501 to 1,000	Offices of physicians, except mental health
7	HUSSON UNIVERSITY	501 to 1,000	Colleges and universities
8	ACADIA HOSPITAL CORP	501 to 1,000	Psychiatric and substance abuse hospitals
9	BANGOR SAVINGS BANK	501 to 1,000	Savings institutions
10	GENERAL ELECTRIC CO	1 to 500	Switchgear and switchboard apparatus mfg.
11	HC BANGOR LLC	1 to 500	Casino hotels
12	PENQUIS C.A.P., INC.	1 to 500	Other individual and family services
13	EMERA MAINE	1 to 500	Electric power distribution
14	OHI	1 to 500	Services for the elderly and disabled
15	DYSARTS SERVICE INC	1 to 500	Other gasoline stations
16	GLOBAL SPECTRUM LP	1 to 500	Promoters with facilities
17	COMMUNITY HEALTH AND COUNSELING SVC	1 to 500	Other individual and family services
18	SARGENT CORPORATION	1 to 500	Nonresidential site preparation contractors
19	DARLINGS	1 to 500	New car dealers
20	JOHN T CYR AND SON INC	1 to 500	School and employee bus transportation
21	LOWES HOME CENTERS LLC	1 to 500	Home centers
22	UPS SOLUTIONS	1 to 500	Couriers and express delivery services
23	VERIZON WIRELESS	1 to 500	Electronics stores
24	MICRODYNE OUTSOURCING INC	1 to 500	Telemarketing and other contact centers
25	MILLINOCKET REGIONAL HOSPITAL	1 to 500	General medical and surgical hospitals

Source: http://www.maine.gov/labor/cwri/qcew3.html

Occupations

The occupations with the highest percentage of positions in Penobscot County include Administrative, Sales and Related, Education, and Management. The Maine Center for Workforce Research and Information estimates that the top five highest growing occupations between now and 2024 in the State will be Healthcare Practitioners and Technical Occupations, Healthcare Support Occupations, Food Preparation and Serving Related Occupations, Personal Care and Service Occupations and Computer and Mathematical Occupations. The highest paying occupations in 2016 for the Bangor Labor Market Area were Management Occupations, Computer and Mathematical Occupations and Healthcare Practitioner and Technical Occupations.

Figure 2.20

2016
Hourly Wage by Occupation
Bangor MSA

Occupation	Estimated Employment	Mean (Average)	Median (50th Percentile)
Total all occupations	**64,230**	**$20.01**	**$15.76**
Management Occupations	3,300	$41.94	$36.10
Business and Financial Operations Occupations	2,210	$27.81	$25.68
Computer and Mathematical Occupations	1,090	$35.28	$30.11
Architecture and Engineering Occupations	600	$27.31	$24.55
Life, Physical, and Social Science Occupations	390	$28.74	$24.37
Community and Social Services Occupations	1,760	$22.01	$20.28
Legal Occupations	390	$31.24	$23.99
Education, Training, and Library Occupations	4,700	$23.16	$20.53
Arts, Design, Entertainment, Sports, and Media Occupations	840	$18.69	$15.94
Healthcare Practitioners and Technical Occupations	5,050	$36.86	$29.20
Healthcare Support Occupations	2,670	$13.66	$12.89
Protective Service Occupations	1,430	$16.66	$15.21
Food Preparation and Serving-Related Occupations	6,160	$10.52	$9.40
Building and Grounds Cleaning and Maintenance Occupations	2,580	$12.49	$11.34
Personal Care and Service Occupations	2,930	$11.67	$10.92
Sales and Related Occupations	6,790	$14.92	$10.97
Office and Administrative Support Occupations	9,810	$16.09	$15.08
Farming, Fishing, and Forestry Occupations	150	$17.07	$16.92
Construction and Extraction Occupations	2,580	$18.60	$17.57
Installation, Maintenance, and Repair Occupations	2,770	$20.86	$19.12
Production Occupations	2,320	$16.28	$14.53
Transportation and Material Moving Occupations	3,720	$16.28	$14.72

Source: http://www.maine.gov/labor/cwri/oes1.html

Industry

The highest percentage of jobs in Penobscot County are in Healthcare, Retail, and Education Industries. That largest sector is Healthcare, and is expected to be the sector with the highest growth rate through 2024. The State projects that the highest growth will occur in Health Care and Social Assistance, Professional and Business Services, Educational Services, Leisure and Hospitality and Service-Providing industries.

Travel to Work

As is the case throughout the State of Maine, the majority of workers in the BACTS area, travel individually by passenger automobile. However, compared to the State and Penobscot County, a higher percentage of the worker population in the BACTS area use alternate transportation modes of transportation. Workers from Old Town (14.0%) and Penobscot Indian Island (23.90%) carpool to work at a significantly higher percentage of all BACTS communities, Penobscot County and the States.

The percentage of Orono residents who use alternate modes (transit, walk and bicycle) of transportation to get to work is significantly higher than any other community. More than 20 percent of the civilian workforce walk to work, and almost 2 percent bicycle to work. Penobscot Indian Island and Bangor residents also have a higher percentage of workers walking to work at 7.6% and 5.2%, respectively. Old Town residents have a notable percentage (2.3%) of workers using bicycles as a means of transportation to work. Veazie residents use public transit at a higher rate (2.6%) than of workers of any of the other communities. (Figure 2.21)

Figure 2.21

MEANS OF TRANSPORTATION TO WORK
2015

	Total Workers (16 years and older)	Car, Truck or Van							Alternate Transportation				Worked at home
		Total	SOV	Carpool				Workers per car, truck, or van	Public Transit	Active Transportation		Taxicab, motorcycle or other	
				Total	2-person	3-person	4-person			Walked	Bicycle		
Bangor	14,942	12,940	11,371	1,584	1,330	164	90	15,988	224	777	30	299	672
Bradley	726	675	632	43	43	0	0	748	0	14	0	0	37
Brewer	4,941	4,481	3,973	509	445	30	35	5,237	25	44	5	168	222
Hampden	4,009	3,776	3,508	269	204	0	60	4,169	0	24	0	0	208
Hermon	3,040	2,909	2,642	264	198	36	33	3,192	0	0	0	36	97
Milford	1,620	1,523	1,374	147	105	44	0	1,717	0	11	0	60	28
Old Town	3,758	3,217	2,694	526	477	34	15	4,096	34	98	86	210	113
Orono	4,617	3,333	2,881	452	351	65	37	4,986	46	951	83	18	180
Orrington	1,887	1,757	1,628	128	128	0	0	1,962	0	17	0	0	113
Penobscot Indian Island	330	291	212	79	61	14	4	383	3	25	0	3	8
Veazie	934	867	782	85	66	18	1	990	24	7	0	14	22
BACTS Total	40,804	35,770	31,697	4,087	3,409	404	275	43,470	356	1,968	204	809	1,701
Penobscot County	70,797	63,434	56,496	6,938	5,947	637	425	75,045	425	2,761	212	1,062	2,903
Maine	635,475	561,124	495,671	65,454	54,015	6,355	4,448	679,958	3,813	25,419	2,542	7,626	34,316

Source: S0801 2011-2015 American Community Survey 5-Year Estimates

The average of all BACTS area residents spend less time traveling to work than the County and State as a whole. Between 2010 and 2015, mean travel time to work for residents of BACTS communities decreased slightly, but increased for Penobscot County and the State as a whole over the same time period. In 2015, workers from both Bradley and Milford spent more than 23 minutes traveling to work, the highest in the BACTS area, but consistent with the State as a whole. The most significant changes in mean travel time between 2010 and 2015 for BACTS area residents include a decrease of 6.20 minutes for Milford residents and an increase of 2.6 minutes for Penobscot Indian Island residents. (Figure 2.22)

MEAN TRAVEL TIME TO WORK
(in minutes)
2010 - 2015

	2010	2011	2012	2013	2014	2015	2010-2015 Change
Bangor	15.20	15.70	15.40	15.20	14.60	14.70	-0.50
Bradley	22.70	23.60	24.40	22.60	21.90	23.70	1.00
Brewer	16.70	17.90	18.20	16.90	17.70	18.40	1.70
Hampden	20.00	20.40	19.80	20.30	19.50	20.40	0.40
Hermon	20.40	19.80	21.90	19.60	19.50	19.70	-0.70
Milford	29.50	28.80	25.30	25.90	25.90	23.30	-6.20
Old Town	18.90	19.50	18.90	19.80	19.50	19.90	1.00
Orono	16.40	16.90	16.00	16.30	15.50	15.30	-1.10
Orrington	20.00	20.40	20.20	20.10	18.80	20.70	0.70
Penobscot Indian Island	14.80	14.50	16.00	16.40	17.80	17.40	2.60
Veazie	20.10	20.50	20.10	21.70	22.70	19.00	-1.10
BACTS Municipalities (Average)	19.52	19.82	19.65	19.53	19.40	19.32	-0.20
Penobscot County	21.50	22.10	22.00	22.00	21.90	22.30	0.80
Maine	22.80	23.00	23.30	23.30	23.50	23.60	0.80

Source: DP03 American Community Survey 5-Year Estimates 2010, 2011, 2012, 2013, 2014, 2015

The Maine Department of Labor reports that within a 30-mile range of Bangor, there is a total of 185,239 residents; a civilian labor force of 97,311; and 82,626 jobs. As shown in Figure 2.23, in 2015 there was a 58,169 worker population in the BACTS area, with only 16,978 BACTS area residents filling those jobs. Meaning 41,191 individuals travel into and within the BACTS area on a daily basis for employment. Although, not necessarily in the same community of their residence, 88 percent of BACTS area residents are also employed within the BACTS area. Twelve percent travel outside of the BACTS area for employment.

Figure 2.23

WORKERS COMMUTING TO BACTS AREA MUNICIPALITIES BY PLACE OF EMPLOYMENT 2013 - 2015

	2013			2014			2015		
	Worker Population	Resident	In Flow	Worker Population	Resident	In Flow	Worker Population	Resident	In Flow
Bangor	36,311	10,776	25,535	35,485	10,349	25,136	35,165	10,014	25,151
Bradley	265	69	196	300	76	224	286	93	193
Brewer	6,057	1,490	4,567	6,482	1,459	5,023	6,621	1,478	5,143
Hampden	2,409	580	1,829	2,240	613	1,627	2,241	540	1,701
Hermon	2,423	618	1,805	2,522	615	1,907	2,415	645	1,770
Milford	597	280	317	541	237	304	460	176	284
Old Town	2,733	1,070	1,663	2,980	1,171	1,809	2,905	1,056	1,849
Orono	6,724	2,300	4,424	6,922	2,447	4,475	7,048	2,535	4,513
Orrington	511	269	242	553	279	274	508	232	276
Penobscot Indian Island	206	147	59	204	149	55	221	139	82
Veazie	280	42	238	278	51	227	299	70	229
Total	58,516	17,641	40,875	58,507	17,446	41,061	58,169	16,978	41,191

Source: U.S. Census Bureau, 2009-2013 American Community Survey

2.6 Demographic Challenges

Both employment and population in the BACTS area are expected to grow very slowly. While the majority of population growth will occur outside the BACTS area, most of the job growth will occur within it. This imbalance will accentuate the current trend of increasing numbers of vehicular trips to the urban area originating outside the urban area.

Workforce challenges are expected to become more acute in the near future, as the population ages and the current workforce retires. Many of the baby boomers that are still in the labor force will be retiring. If current conditions persist, there will be a lack of available workers to maintain, much less grow, the workforce in the coming years.

While the overall outlook for the State's economy is fairly concerning because of the potential workforce shortages that will be experienced should nothing change, the BACTS area is poised to be an attractive area for economic and business development opportunities if proactive measures are taken to induce in-migration of out of state residents to the area. The BACTS area is a metropolitan area, located along the Interstate 95 corridor, with available public transportation and a lower than average median age (for Maine). Transportation assets should be improved and expanded to ensure that the area remains attractive for business development.

2.7 Recommendations

- Increase transportation alternatives for senior populations
- Implement strategies to attract in-migration of non-native residents to the area
- Increase the availability, reliability and accessibility of public transportation

Resources:

https://statisticalatlas.com/metro-area/Maine/Bangor/Overview
https://datausa.io/profile/geo/penobscot-county-me/
Maine State Plan on Aging 2016 - 2020.
http://www.maine.gov/dhhs/oads/trainings-resources/documents/STATEPLANONAGING2016-2020DRAFT.pdf
https://onthemap.ces.census.gov/

3.0 Mission Statement, Goals, and Policy Issues

3.1. Introduction

BACTS has developed a mission statement, specific goals, and priorities for the greater Bangor metropolitan area that is consistent with the FAST Act goals. The BACTS Mission Statement is listed first, followed by the Federal planning factors, State policy objectives, Regional goals and the BACTS priorities.

Non-modal policy issues are addressed at the end of this chapter and include a discussion on regional coordination in transportation and land use planning and BACTS committee membership requirements mandated by federal legislations.

3.2 BACTS Mission Statement

Provide for the safe, economical, efficient, and convenient movement of people and goods over a balanced multimodal transportation system compatible with the socio-economic and environmental characteristics of the region.

3.3 Legislation

The two landmark bills that brought surface transportation into the 21st century—the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Transportation Equity Act for the 21st Century (TEA-21) shaped the highway program to meet the Nation's changing transportation needs.

On August 10, 2005, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was signed into law, authorizing federal transportation funding appropriations through the end of fiscal year 2009. The Act was extended nine times and expired at the end of federal fiscal year 2012. SAFETEA-LU built on the foundation of ISTEA and TEA-21 by providing funding, as well as a refined programmatic framework for investments needed to maintain and grow the Nation's vital transportation infrastructure.

Moving Ahead for Progress in the 21st Century Act (MAP-21), was signed into law on July 6, 2012 authorizing federal transportation funding appropriations through the end of fiscal year 2014. MAP-21 created a streamlined and performance-based surface transportation program building on many of the highway, transit, bike, and pedestrian programs and policies established in 1991. This Act was extended five times through December 4, 2015.

On December 4, 2015, the Fixing America's Surface Transportation Act (FAST Act) was signed into law. The FAST Act builds on the changes made by MAP-21 and funds surface transportation programs for federal fiscal years 2016 through 2020. It is the first long-term surface transportation authorization enacted in a decade that provides long-term funding certainty for surface transportation.

Federal Planning Factors

The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) joint rule, published in the Federal Register on May 27, 2016, updating 23 CFR Part 450 and 49 CFR Part 613 added two planning factors to the MAP-21 federal goals to address in consideration and implementation of projects, strategies, and services in the transportation planning process. The ten factors include:

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity and efficiency;
2. Increase the safety of the transportation system for motorized and non-motorized users;

3. Increase the security of the transportation system for motorized and non-motorized users;
4. Increase the accessibility and mobility for people and freight;
5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
7. Promote efficient system management and operation;
8. Emphasize the preservation of the existing transportation system;
9. Improve the resiliency and reliability of the transportation system and reduce or mitigate storm water impacts of surface transportation; and
10. Enhance travel and tourism.

State Policy Objectives

In addition to the above federally identified planning factors, the rule implementing the Maine Sensible Transportation Policy Act outlines objectives for transportation planning, capital investment and project development decisions. The ten policy objectives include:

1. Minimize the harmful effects of transportation on public health, air and water quality, land use and natural resources;
2. Coordinate the efficient use of all available and potential future modes of transportation;
3. Give preference to non-highway new capacity projects before building new highway capacity when such non-highway new capacity projects are cost effective, feasible and meet the identified purpose and need for the transportation investment;
4. Repair, maintain and improve Maine's transportation system to provide a safe, efficient, and adequate transportation network;
5. Reduce the state's reliance on foreign oil and promote reliance on energy efficient forms of transportation;
6. Meet the diverse transportation needs of the people of the State, including rural and urban populations and the unique mobility needs of the elderly and disabled;
7. Be consistent with the purposes, goals and policies of the Comprehensive Planning and Land Use Regulation Act;
8. Incorporate a public participation process in which state, regional and local governmental bodies and the public have timely notice and opportunity to identify and comment on concerns related to transportation planning decisions, capital investment decisions and project decisions;
9. Promote investment incentives for communities that adopt and implement land use plans that minimize over-reliance on the state highway network; and
10. Be cost effective and operate within fiscal constraints.

Regional Goals

The BACTS Policy Committee has identified six regional transportation goals and supportive regional priorities. The goals, listed in no particular order of importance, are as follows:

1. *Fiscal Responsibility* - Planning and programming within our means, focusing on the greatest needs and getting the greatest returns by targeting regional needs, leveraging partnerships, and sharing investment burdens appropriately.

2. *Economic Prosperity and Livability* – Promote transportation investments that support sustainable community and economic development.

3. *Safety and Security* – Ensure that BACTS has an ongoing process to improve the safety and security of our transportation system in the BACTS area.

4. *Public-Private Partnership and Coordination* - Local, state and federal stakeholders should be involved in partnerships to promote cost-effective decision-making: land use and transportation connections, coordinated capital investments, and joint purchasing, etc.

5. *Environmental Stewardship* - Ensure that the transportation system meets the social, cultural, historic, scenic and environmental needs of the public.

6. *Customer Oriented Focus* - Inclusive, balanced, early and effective public involvement that considers not only if projects should be done, but how.

3.4 BACTS Priorities

Fiscal Responsibility

- Seek increased funding for construction projects in the urbanized areas.
- Support the protection and integrity of Maine's Highway Fund.
- Optimize capacity to the existing system before increasing capacity through road building activities.
- Investigate ways to leverage federal funds using an equitable mix of state and local funds.
- Develop and implement a regional transportation process that produces cost savings through regionalization.
- Seek innovative techniques for transportation projects to extend project life.

Economic Prosperity and Livability

- Restore passenger rail transportation with intermodal connections in the Bangor area.
- Consider shoulder paving on all highway projects.
- Strengthen intermodal links between the Bangor area and Portland, Boston, Greenville, Millinocket, and the Trenton area.
- Consider paving priorities on roadways identified in the BACTS Bicycle/Pedestrian Plan.
- Incorporate bike/pedestrian facilities on existing or potential high-use roadway crossings of interstates and rivers.
- Seek to allocate funds for providing transit service from suburban areas into and between service centers.
- Give high priority to projects that provide for connections between modes.
- Provide for the efficient movement of goods.
- Target access to key economic sites.
- Provide better/improved access to housing, employment, services, and major recreational facilities.
- Plan for streetscaping.

Safety and Security

- Work with safety and security agencies to develop a safer and more secure transportation system.
- Give high priority to the elimination of safety hazards in all modes.

- Evaluate the movement of hazardous materials on all transportation modes and encourage the use of safer modes.

Public-Private Partnership and Coordination

- Assist towns in their access management efforts.
- Seek to integrate access management, corridor planning, and broad-based transportation considerations in their comprehensive planning process.
- Encourage communities to consider land use practices, policies and standards that reduce vehicle miles of travel.
- Restore and increase freight rail transportation in the Bangor area.
- Facilitate the establishment of passenger rail or bus transfer points in established downtown areas wherever feasible.
- Improve communication and coordination between BACTS and MaineDOT on project scoping and prioritization
- Assist in developing and providing more expertise in land-use planning as is related to transportation.

Environmental Stewardship

- Support projects that result in reduced vehicle emissions and other impacts such as noise.
- Reduce adverse impacts on wetlands, critical habitat, water bodies and other environmentally sensitive areas.
- Support projects that promote resource efficiency and energy conservation.
- Concentrate mitigation for regional projects in areas of high environmental significance.

Customer Oriented Focus

- Continue to include open citizen participation in the transportation planning process.
- Increase the membership of the MPO committees to include mode representatives and/or major stakeholders.
- Promote communication with public on BACTS activities.

4.0 Public Transportation

4.1 Introduction

Public transportation is a key component of the region's transportation system. While most travel in the BACTS area is accomplished by automobile, there is a significant and growing segment of the population that relies on public transportation to fulfill its needs. In addition, visitors who have traveled to the region by non-automobile modes need public transportation to travel in the area during their visit. Public transportation is provided by a mixture of for-profit and non-profit organizations, supplying intercity, fixed route urban, fixed route rural, and demand response bus services.

4.2 Fixed Route Bus Service

The fixed route bus service in the BACTS area is provided by Community Connector, which is owned and operated by the City of Bangor. Community Connector operates within the Greater Bangor urbanized area servicing Bangor, Brewer, Hampden, Old Town, Orono, the University of Maine (Orono) and Veazie. The 2015 Community Connector National Transit Database (NTD) report shows the system supplied 602,553 annual vehicle revenue miles, 47,210 annual vehicle revenue hours, and provided 888,223 annual unlinked trips over an area of 29 square miles comprising approximately 90 percent of the population within the Bangor Urbanized Area (UZA).

Community Connector offers bus service Monday through Saturday in all areas, except Hampden, where service runs Monday through Friday. The system is operated on a "pulse system" designed to facilitate the transfer of riders from one route to another. This system requires buses from all routes operating out of Pickering Square in downtown Bangor to arrive and depart from the Pickering Square bus depot at approximately the same time, to minimize layover time for passengers transferring from one route to another. All routes meet at Pickering Square with the exception of the Black Bear Orono Express shuttle service, which operates within the Town of Orono primarily servicing the University of Maine and student housing areas; and the Mall Hopper shuttle, which originates from the Airport Mall linking to the Broadway Shopping Center, the Bangor Mall and back to the Airport Mall.

<u>Routes</u>

The current Community Connector route structure operates on a flag stop basis, allowing for pick up and drop off of passengers at any safe location passengers request along the bus route. The routes are within walking distance of the majority of the population within the communities serviced. The routes are described below:

1. The *Hammond Street Route* serves the Union Street-Hammond Street area by a one-way loop via Union Street, Vermont Avenue, Maine Avenue, Texas Avenue, Hammond Street, West Broadway, Buck Street, 3rd Street, Cedar Street, and Main Street. The service is provided by a single bus operating on 30 minute headways on weekdays and 60-minute headways on Saturdays. On Saturdays, this vehicle interlines with the Center Street Route. This route begins weekdays at 5:53 a.m. at University College and ends at 6:10 p.m. at the Pickering Square Depot, and Saturdays begins at 9:15 a.m. at Pickering Square and ends at 5:40 p.m. at Pickering Square.

2. The *Capehart Route* serves the Ohio Street-Union Street Corridor, including Bangor International Airport and the Capehart housing complexes via Ohio Street and Union Street. The service is provided by two buses, giving 30-minute headways on weekdays and Saturdays. During weekday

peak travel demand, a third bus is assigned to this route. This route begins weekdays at 6:06 a.m. at Capehart and ends at 6:27 p.m. at DHHS/BIA on Texas Avenue. On request, the bus will make an additional stop at the Airport Mall following the last stop. Saturday service starts at 7:06 a.m.at Capehart and ends at 6:11 p.m. at Bolling Drive. On request, the bus will also make an additional stop at DHHS/BIA and/or the Airport Mall following the last stop.

3. The *Center Street Route* serves the Center Street Corridor and the Husson University area via Center Street, Broadway, and Kenduskeag Avenue. The service is provided by a single bus operating on 30-minute headways on weekdays and 60-minute headways on Saturdays. On Saturdays, this vehicle interlines with the Hammond Street bus. This route begins weekdays at 6:15 a.m. at Pickering Square and ends at 6:08 p.m. at Pickering Square, and Saturdays begins at 8:45 a.m. at Pickering Square and ends at 5:08 p.m. at Pickering Square.

4. The *Mount Hope Route* serves the area of Mount Hope Avenue, Hogan Road, Eastern Maine Community College and the Bangor Mall. The service is provided by one bus, giving 30-minute headways on weekdays and Saturdays. This route begins at 6:15 a.m. at Pickering Square and ends at 6:05 p.m. at Pickering Square.

5. The *Stillwater Avenue Route* serves the area of Broadway, Stillwater Avenue, the Bangor Mall and Ridgewood Drive. The service is provided by one bus, giving 60-minute headways on weekdays and Saturdays. This route begins at 6:45 a.m. at Pickering Square and ends at 6:35 p.m. at Pickering Square.

6. The *Mall Hopper Route* provides a direct link between the Bangor Mall, the Airport Mall, and the Broadway Shopping Center. Service begins and ends at the Airport Mall but does not directly link to the downtown terminal. There are three routes that connect with the Mall Hopper at various locations: the Capehart route at Airport Mall, the Center Street route at Broadway Shopping Center, and the Stillwater Route at the Bangor Mall, giving 60-minute headways on weekdays and Saturdays. This route begins at 6:55 a.m. at the Airport Mall and ends at 6:45 p.m. at the Airport Mall.

7. The *Brewer North Route* serves the more urbanized areas of the City of Brewer via North Main Street, Wilson Street, Parkway North, and State Street. The service is provided by one bus giving 60-minute headways on weekdays and Saturdays. This route begins at 7:15 a.m. at Pickering Square and ends at 5:48 p.m. at Mardens. On request, the bus will also make a stop at North Brewer and/or at the depot at Pickering Square following the last stop.

8. The *Brewer South Route* serves the more urbanized areas of the City of Brewer, via South Main Street, Parkway South, and Wilson Street. The service is provided by one bus, giving 60-minute headways on weekdays and Saturdays. This route begins at 6:45 a.m. at Pickering Square and ends at 6:22 p.m. at the Brewer Shopping Center. On request, the bus will also make a stop at South Main and Elm and/or the depot at Pickering Square following the last stop.

9. The *VOOT (Veazie, Orono, Old Town) Route* serves the U.S. Route 2 corridor to Orono, and the US Route 2/ Stillwater Avenue/ College Avenue loop through Old Town and Orono. The service is provided by two buses on 60-minute headways on weekdays and by a single bus on 2-hour headways on Saturdays. This route begins weekdays at 5:45 a.m. at the University of Maine Union and ends at 7:00 p.m. at Pickering Square, and Saturdays begins at 6:15 a.m. at Pickering Square and ends at 7:05 p.m. at Pickering Square.

10. The *Hampden Route* serves the US Route 1A corridor from Bangor to Hampden. The route is served by a single bus operating on 60-minute headways on weekdays. This route begins at 6:15 a.m. at Pickering Square and ends at 6:10 p.m. at Pickering Square. There is no service on Saturdays.

11. The *Black Bear Orono Express Shuttle* Route operates during the academic year and serves the University of Maine campus and areas of Mill Street and Orchard Trails housing. The route is served by a single bus operating on 30-minute headways on weekdays starting at 6:55 a.m. at Mill Street and ending at 9:55 p.m. at Mill Street. The route also operates a single bus on Saturdays that serves the University, Mill Street, Orchard Trails, the University Mall and Godfrey Drive with 30-minute headways beginning at 12:13 p.m. at the University of Maine Union and ending at 4:43 p.m. at the University of Maine Union. The Black Bear Orono Express Shuttle is funded jointly by the Town of Orono and the University of Maine and is offered to riders fare-free.

Fare**s**

The Community Connector has an integrated fare system. Bus drivers distribute free transfer vouchers to passengers who wish to transfer from one route to another. Current fares are listed in Table 4.1 below.

Table 4.1

Single ticket/Cash Fare	$1.50
Book of 5-ride tickets	$6.00
Monthly pass	$45.00
High school student monthly pass	$20.00
Senior Cash Half-Fare	$0.75
Students Cash Half-Fare	$0.75
Children up to age 5 (with paying adult)	FREE

As of July 2017, University of Maine at Orono, University of Maine at Augusta Bangor Campus, Eastern Maine Community College, Husson University and Beal College have all entered into agreements with Community Connector to provide free bus rides to students, faculty and staff who show a valid ID card.

Fixed-Route Ridership

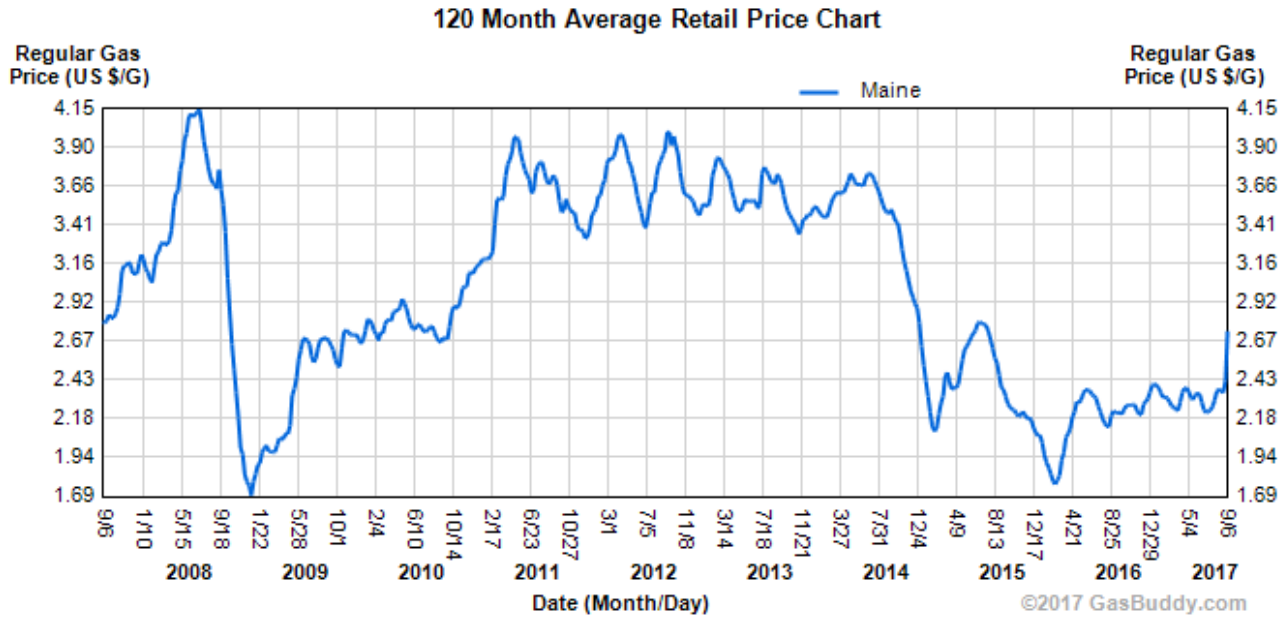
Ridership for the Community Connector steadily increased from fiscal years 2000 to 2010. This decade of upward trend in ridership may be attributed to many different factors. Improvements and changes implemented as a result of a study to evaluate the public transportation system in the BACTS area and a transit route design study conducted by Tom Crikelair Associates prompted an offering of monthly bus pass option, increased marketing efforts, and changes to routes and schedules. In addition, the average gas price in Maine reached a record $4.12 per gallon in July 2008 (Figure 4.1). The price of gas in Maine dropped to $2.68 per gallon in 2009. Between 2010 and 2011 ridership slumped slightly (Figure 4.2a & 4.2b). The dramatic increase in ridership between 2011 and 2013 may be attributed to gas prices rising again in 2010 and an arrangement in which monthly bus passes were provided to MaineCare Transportation Program riders living along the fixed bus routes. An estimated annual monthly pass sales of approximately 430,000 passes per year were sold for MaineCare transportation program riders.

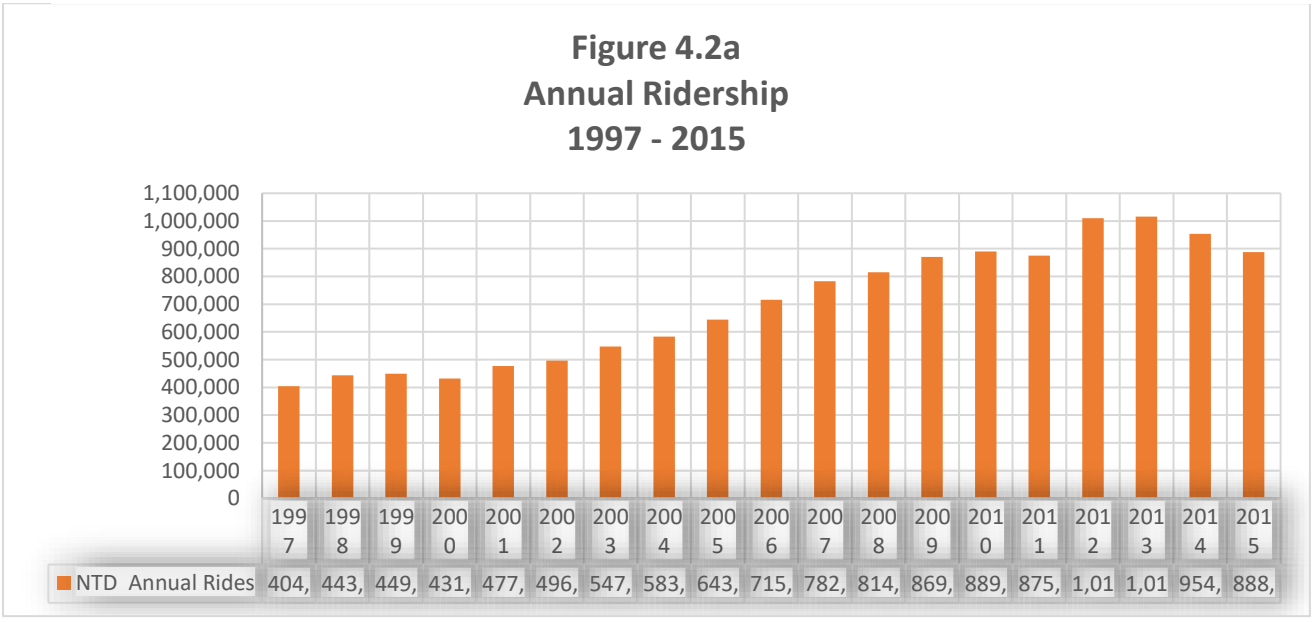
MaineCare, Maine's name for Medicaid, will pay for rides to MaineCare funded services such a medical appointments. Prior to the introduction of the brokerage system, Penquis provided monthly passes to MaineCare recipients who had more than three MaineCare trips per month, as providing three or more

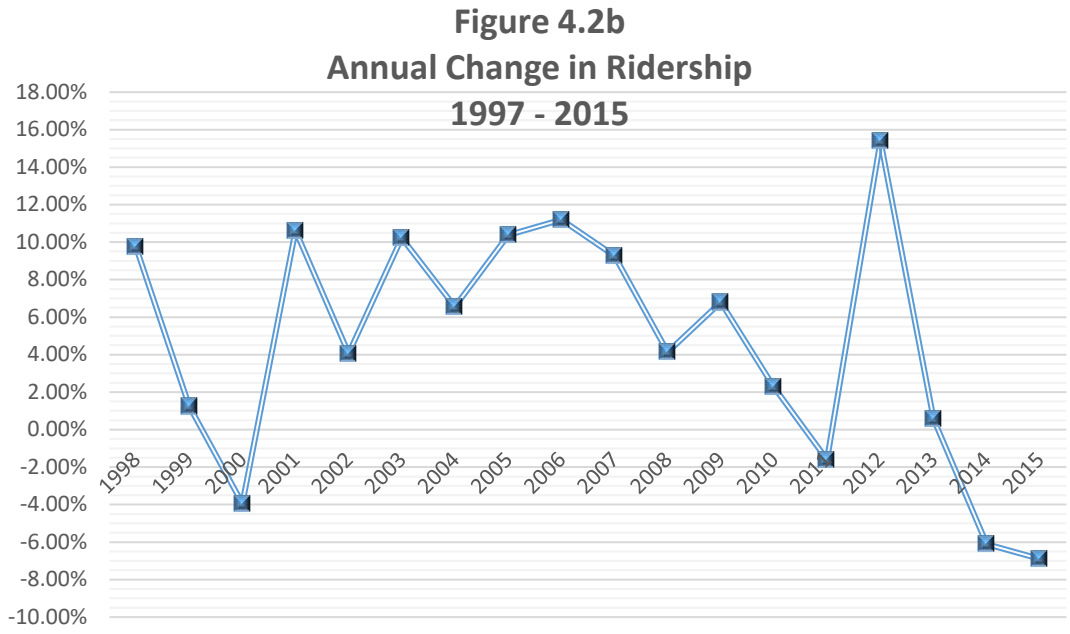
rides on Penquis transportation alternatives would cost more than the price of a monthly bus pass. There was also the advantage of the pass recipient being able to make unlimited rides on Community Connector.

Since 2013 ridership numbers have decreased annually. The dramatic decrease from 2013 to 2014 may be attributed to the August 2013 change to the MaineCare transportation program, which was intended to reduce the overall cost of the MaineCare transportation program. MaineCare implemented a brokerage system to arrange rides for members to covered appointments in the most cost-efficient manner based on qualification determination by the Broker. The Broker determined that providing monthly bus passes was not the least expensive way to provide rides for MaineCare appointments. During this time, gas prices continued to stabilize and dramatically decreased in 2014. During fiscal year 2015, Community Connector increased fares and discontinued the Odlin Road route. Saturday service on the Hampden route was discontinued in fiscal year 2016.

Figure 4.1







from: https://www.gasbuddy.com/Charts

Americans with Disabilities Act (ADA) Compliance

The Americans with Disabilities Act of 1990 (ADA) prohibits discrimination and ensures equal opportunity and access for persons with disabilities. As no entity shall discriminate against an individual with a disability in connection with the provision of transportation service, the FTA requires public transportation agencies, providers, and operators receiving federal funding to certify that practices in the provision of public transit services comply with FTAs mission to enhance the social and economic quality of life for all Americans.

Public transportation agencies must maintain and make provisions for alternate reasonable accommodations in instances of failure or vehicles taken out of service for repair of accessibility features on vehicles used in public transit operations. Public transit agencies must also ensure personnel are trained as appropriate to their duties. They must be able to operate vehicles and equipment safely and properly assist individuals with disabilities using the service in a respectful and courteous way, with appropriate attention to the difference among individuals with disabilities.

If a fixed route system has stops that service more than one bus line, ADA requires the operator to either announce or provide automated announcements to identify bus line, stop, transfer and route locations both outside and inside the vehicle.

ADA Complementary Paratransit Service

Fixed route public transit providers are required to provide ADA complementary paratransit services comparable to the fixed route service within ¾ mile of the fixed route on the same days and during the same hours as fixed route service. However, unlike the regular fixed-route service, ADA complementary paratransit service operates as a demand service and must be scheduled the day prior to the requested ride. Rides may be scheduled for up to one hour before or after the requested time. Service must be provided regardless of the nature of the trip with no restrictions or priorities based on trip purpose.

Transit providers determine eligibility for complementary paratransit service to individuals who are not able to use accessible fixed route services due to a disability. Establishing and following an accurate ADA paratransit eligibility process is critical both to protecting individuals' civil rights under the ADA and to managing demand so that paratransit service is available for those who need it.

Community Connector performs eligibility determinations, receives trip requests and forwards the scheduled trips to Penquis Transportation Services (the Lynx), who provides vehicles, equipment, maintenance and operation of the ADA complementary paratransit service.

Funding for Urban Fixed Route Bus Service

The Fixing America's Surface Transportation (FAST) Act was signed into law in December 2015. The Act, which supports transit funding through fiscal year 2020, reauthorizes FTA programs and includes changes to improve mobility, streamline capital project construction and acquisition, and increase the safety of public transportation systems across the country. The Act's five years of predictable formula funding enables transit agencies to better manage long-term assets and address the backlog of state of good repair needs. It also includes funding for new competitive grant programs for buses and bus facilities, innovative transportation coordination, workforce training, and public transportation research activities. Funding for Community Connector's operations is provided through fare box receipts, local municipal funds, state funds, contract agreements with local higher education providers, and Federal Transit Administration (FTA) funds. The municipalities served by Community Connector are invoiced by the City of Bangor on a quarterly basis for the local share of costs associated with system operations, equipment, maintenance and capital expenses.

Federal Funding

FTA Federal funding is made available to designated recipients that are public bodies with the legal authority to receive and dispense federal funds. In Maine, the Governor acts as the designated recipient for urbanized areas (UZA) with populations between 50,000 and 200,000. Prior to the 2013 federal fiscal year, Community Connector received FTA federal funding as a sub-recipient of the State of Maine. In February 2012, Governor Paul LePage made the determination that funding recipients in the urbanized areas have the legal, financial, and technical capacity to serve as direct grant recipients for FTA funding and have the capacity to administer such grants in cooperation with the FTA Regional office, local funding recipients, and in consultation with MaineDOT.

This declaration shifted direct recipient status and responsibility for these areas from MaineDOT to a designee within each UZA giving more opportunity, determination and responsibility for local control over the provision of transit services, including operations, administration, and capital procurement. With the start of the 2013 federal fiscal year (October 1, 2012), the City of Bangor – Community Connector was designated by the Governor as the direct recipient of FTA Section 5307 funding in the Greater Bangor UZA and is directly apportioned to the City of Bangor by formula based on the level of transit service provision, population and other factors (Figure 4.3).

Figure 4.3

GREATER BANGOR UZA
FTA FEDERAL FUNDING
2009 - 2017

	49 USC §5307 Urbanized Area Grants			FTA 49 USC §5339 Bus and Bus Facilities Program Grants			
FFY	Formula	STIC Funding	Total §5307	Formula	Competitive	Total §5339	Total FTA Funding
2009	$ 707,511	$ 140,553	$ 848,064				$ 848,064
2010	$ 705,162		$ 705,162				$ 705,162
2011	$ 706,737		$ 706,737				$ 706,737
2012	$ 709,172		$ 709,172				$ 709,172
2013	$ 781,716	$ 541,382	$ 1,323,098	$ 81,981		$ 81,981	$ 1,405,079
2014	$ 791,608	$ 576,049	$ 1,367,657	$ 83,905		$ 83,905	$ 1,451,562
2015	$ 790,064	$ 377,575	$ 1,167,639	$ 85,687		$ 85,687	$ 1,253,326
2016	$ 806,035	$ 378,864	$ 1,184,899	$ 77,372	$ 1,441,600	$ 1,518,972	$ 2,703,871
2017	$ 819,065	$ 382,076	$ 1,201,141	$ 93,469		$ 93,469	$ 1,294,610

Figure 4.4

GREATER BANGOR UZA
COMMUNITY CONNECTOR
CHANGE IN FTA §5307 FORMULA FUNDING
2009 - 2017

FFY	Annual Change
2009	
2010	-0.33%
2011	0.22%
2012	0.34%
2013	10.23%
2014	1.27%
2015	-0.20%
2016	2.02%
2017	1.62%

§5307, Urbanized Area Formula Grants

Federal funding for Community Connector operations comes from FTA's 49 USC §5307, Urbanized Area Formula Grants, the largest of FTA's grant programs. Funding is apportioned annually by formula (based on the level of transit service provision, population and other factors) and allocated directly to The City of Bangor - Community Connector by FTA (Figure 4.4). The increase in funding in 2013 coincides with the MAP-21funding authorization bill. However, formula funding has remained consistent and predictable since then and is expected to continue through 2020 as provided by the FAST Act implementation in 2016.

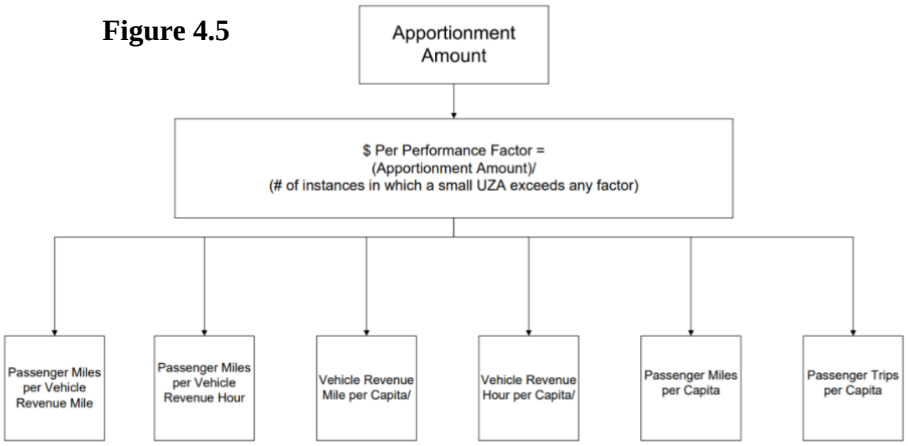
Transit Agencies may use §5307 funding for eligible activities such as planning, engineering, design and evaluation of transit projects and other technical transportation-related studies; capital investments in bus and bus-related activities such as replacement, overhaul and rebuilding of buses, crime prevention and security equipment and construction of maintenance and passenger facilities; and capital investments in new and existing fixed guideway systems including rolling stock, overhaul and rebuilding of vehicles, track, signals, communications, and computer hardware and software. In addition, associated transit improvements and certain expenses associated with mobility management programs are eligible under the program. All preventive maintenance and some ADA complementary paratransit service costs are considered capital costs.

Small Transit Intensive Cities (STIC) Formula Funding

The Small Transit Intensive Cities (STIC) funding, a component of the §5307 program, is a performance-based incentive program that rewards small urban systems that are generating significant ridership. The STIC formula was first included in SAFETEA-LU (2005) to provide fixed amounts of funding to small urbanized areas (less than 200,000 in population) that exceed the averages of larger urbanized areas (over 200,000 in population) for one or more of the FTA set six service factors (Figure

4.5). Eligibility for this funding is not assured, as the averages used for benchmarks are calculated based on previous performance of both the larger systems and the local system and are subject to change each year, making it difficult to know whether or not eligibility for funding has or will be met.

Figure 4.5



The six service factors for the STIC program have not changed since 2005, but the amount of §5307 set-aside for the program increased from 1% to 1.5% of the overall allotment. The FAST Act increases funding for the STIC program set-aside to 2% of the overall allotment beginning in fiscal year 2019. Increases in the program allotment does not cause any increase of the total federal transit spending, it simply allocates the existing allotment differently (Figure 4.6).

Although the number of factors met have changed, Community Connector has been awarded STIC funding every year for the past five years.

Figure 4.6

GREATER BANGOR UZA STIC FUNDING AS A PERCENTAGE OF COMMUNITY CONNECTOR TOTAL FTA §5307 FUNDING			
FFY	Total STIC Funding	Factors Met	Percentage of Total
2009	$ 140,553	1	16.57%
2010	$ -	0	0.00%
2011	$ -	0	0.00%
2012	$ -	0	0.00%
2013	$ 541,382	3	40.92%
2014	$ 576,049	3	42.12%
2015	$ 377,575	2	32.34%
2016	$ 378,864	2	31.97%
2017	$ 382,076	2	31.81%

§5339, Bus and Bus Facilities Program Grants

Community Connector receives FTA 49 USC §5339 Bus and Bus Facilities formula funds annually as allocated by the MaineDOT Multimodal Planning Division, as the designated recipient authorized by the Governor responsible for administering the §5339 program in Maine (Figure 4.7). This funding is provided to assist in financing capital projects to replace, rehabilitate, purchase buses and related equipment, and to construct bus-related facilities.

Figure 4.7

GREATER BANGOR UZA COMMUNITY CONNECTOR CHANGE IN FTA §5339 FORMULA FUNDING 2013 - 2017	
FFY	Annual Change
2014	2.35%
2015	2.12%
2016	-9.70%
2017	20.80%

In addition to the formula grant program under 49 USC §5339, this funding also includes a discretionary grant program whereby transit agencies competitively apply for funding for capital projects to replace, rehabilitate, purchase buses and related equipment, and to construct bus-related facilities. In 2016, FTA awarded Community Connector a discretionary §5339 grant for $1,441,600 to purchase five new buses for the system.

Bus Fleet

In fiscal year 2017, Community Connector's bus fleet consisted of 24 vehicles. Two of these buses are out of service and are anticipated to be disposed of in fiscal year 2018. The Community Connector rolling

stock bus fleet is aging (Figure 4.8). Many of the vehicles are experiencing regular breakdowns and require more and more extensive repair. Overall, 62.50% of the fleet, or 15 out of 24 buses, have met or exceeded the defined ULB.

Figure 4.8

COMMUNITY CONNECTOR BUS FLEET AS OF JULY 1, 2017												
Rolling Stock		Fleet			Age of Fleet				Assets that Meet or Exceed ULB			
Sub-Category	Class	Total	Additions	Disposals	Average	Median	Newest	Oldest	ULB	Total	FY 17 Performance	FY 18 Target
Bus (BU)	(S) Standard	12	3	6	10.75	13.0	1.0	16.0	14	6	73.33%	50.00%
Bus (BU)	(E) Extended Life	6	2	0	12.33	15.0	7.0	15.0	18	0	0.00%	0.00%
BU Subcategory Total		18	5	6	11.28	14.5	1.0	16.0		6	57.89%	33.33%
Cutaway Bus (CU)		4	0	1	10.5	11.0	9.0	11.0	10	3	80.00%	75.00%
Total		**22**	**5**	**7**	**11.14**	**11.5**	**1.0**	**16.0**		**9**	**62.50%**	**40.91%**

In fiscal year 2018, it is anticipated that two new 2017 Gillig buses (BU), two overhauled previously-owned 2003 New Flyer buses (BU-E), and one previously-owned 2004 Gillig bus (BU) will be added to the fleet. With these additions, five buses with advancing age and deteriorating condition will be identified for disposal. Based on the anticipated fleet changes and the competitive §5339 grant monies awarded by FTA for the purchase an additional five new buses (to be added to the fleet over the next few years), the percentage of rolling stock meeting or exceeding ULB is expected to continue decreasing significantly.

It is the intent of the Community Connector to eventually eliminate Cutaway Buses (CU) from the fleet. Until the time that these buses can be replaced and completely removed from the fleet, this subcategory will exceed the ULB. The improvement in performance shown from FY 2017 to FY 2018 in the Cutaway Bus subcategory is a result of an anticipated disposal and removal from the fleet.

Bus Facilities

Administrative and Maintenance Facilities

The Community Connector administrative office is situated within the City of Bangor Motor Pool complex on Maine Avenue in Bangor. The administrative office has limited space and needs significant renovation. The City of Bangor has approved the construction of a new administrative office with anticipated completion in late fall 2017. The new office will be a stand-alone building located at the same address at the City's Motor Pool complex.

Bus drivers no longer sell bus tickets and passes on the bus, but passengers can purchase bus tickets and bus passes in several locations. The Pickering Square bus depot has the only automatic vending machine for passengers to purchase tickets and passes. Passengers may purchase tickets and passes at the Community Connector administrative office, the Bangor Public Library and the municipal offices in Bangor, Old Town, Orono, and Veazie. Several retail establishments along the bus routes also sell bus tickets and passes, including Fairmount Market; Garland Street Market; Hannaford Supermarket in Bangor, Brewer, Hampden and Old Town; Paradis Shop N' Save; Bell's IGA; Leadbetter's Superstop - Hammond Street, Ohio Street and Wilson Street; and Weebeez Deli & Market - Court Street, Mt. Hope Avenue and Blue Hill East.

General maintenance and repairs of the fleet are performed by the City of Bangor Motor Pool at the Motor Pool Garage on Maine Avenue in Bangor. The University of Maine Motor Pool in Orono provides a limited amount of light maintenance to buses that serve the Black Bear Orono Express shuttle (BBOE).

Painting, major overhaul and rebuilds are conducted off-site by a third-party vendor. Except for the BBOE Shuttle buses, which have been stored outdoors at the Town of Orono Fire Department, the fleet is garaged in the bus barns located on Maine Avenue in Bangor. In order to ensure reliability during the winter months, options for sharing the BBOE shuttle buses indoors are being explored. The bus wash facility is adjacent to the bus barns.

Passenger and Parking Facilities

Passenger and parking facilities are often collectively referenced as "passenger facilities." The Community Connector combined passenger and parking facility is located at Pickering Square on Broad Street in Bangor. The passenger facilities are located on the street level of the Pickering Square side of the parking garage.

Fixed-Route Transit Bus Hub

In 2014, the City of Bangor, with financial assistance from MaineDOT, contracted with Tom Crikelair Associates to perform a study on alternatives for the Community Connector bus hub. The report concluded the current Pickering Square location, with some improvements, is the most affordable and viable site for the Community Connector bus hub. Although the report recommended to keep the bus hub at Pickering Square, the City of Bangor later identified an alternate option for Community Connector bus hub. No formal study or analysis has yet been conducted on the identified site.

Inter-urban

Current transit and paratransit services linking the urban area and the surrounding more rural areas, are limited in passenger capacity. The formation of a suburban ring of population in towns around the urban area poses a problem and a challenge for public transportation. It would be beneficial if people could travel to and from the urban area without having to drive automobiles and contribute to traffic congestion. However, the low densities of the rural communities make regular transit operations inefficient, and uneconomical.

4.3 Other Public Transportation Services Operating Within the BACTS Region

The Lynx, which is operated by Penquis Transportation Services (Penquis), is a demand response transportation provider. A significant number of the trip destinations provided by the Lynx are in Bangor, with lower but still significant numbers in Dover-Foxcroft, Lincoln, Millinocket, Old Town, and Brewer. Penquis is the regional rural public transportation provider for Penobscot (and Piscataquis) County as a sub-recipient of Maine DOT §5311 Rural Area Systems funding.

In addition to providing rural public transportation to the general public in Penobscot County, The Lynx provides transportation services under funding agreements with and/or for many different social service programs for specific populations such as the elderly and disabled, cancer patients, low-income and MaineCare qualified individuals. Individuals who use the transportation services under these programs must meet the requirements of the funding sources in order to qualify for the transportation services or pay a fare as a general public rider.

The Lynx is also the provider of the fixed route ADA Paratransit services under agreement with Community Connector. Eligible individuals within ¾ mile of a bus route who cannot access the fixed route service are provided curb-to-curb accessible transportation to any location within ¾ of a mile of the fixed route during the same set operational hours of the fixed route service.

The Cyr Bus Line, owned by John T. Cyr & Sons, Inc., is a privately owned bus company headquartered in Old Town, which operates an intercity bus service between Bangor and Caribou. The Bangor-Caribou route runs round trip daily 365 days per year between the two communities.

Most of the people who ride the Bangor-Caribou route are students and older people travelling between Northern Maine and the Bangor area. Financial support for the Bangor-Caribou route comes from FTA 49 USC §5311 grant funding, MaineDOT, fares and freight. The Bangor-Caribou route is the only route operated by Cyr Bus Line which receives a federal funding subsidy. This route has stops in Caribou, Presque Isle, Mars Hill, Houlton, Oakfield, Sherman, Medway, Howland and makes connecting stops in Bangor at the Concord Coach Lines transportation center and Hermon at the Greyhound terminal. The route terminates in Old Town at the Cyr Bus Terminal.

In addition to the intercity bus service provided by Cyr Bus Line, Concord Coach Lines and Greyhound provide daily competing services from Bangor to southern Maine and beyond.

Concord Coach Lines offers daily service from Orono to Boston, with stops in Bangor, Waterville, Augusta, Auburn and Portland. Concord Coach Lines also offers daily service from Orono to Boston along coastal US Route 1, with stops in Bangor, Searsport, Belfast, Lincolnville, Camden/Rockport, Rockland, Waldoboro, Damariscotta, Wiscasset, Bath, Brunswick and Portland. From the Portland Transportation Center, service continues directly to Boston via the Interstate. From the Portland Transportation Center, passengers can continue south on Concord Coach to Concord and Nashua New Hampshire, and New York City, or connect to the Amtrak Downeaster rail service. There are no connecting transfers from the Portland Transportation Center to the Greyhound station two miles away or the Portland International Jetport three miles away, but taxi service and local bus services are available. The Concord Coach Transportation Center is located on Union Street in Bangor.

Greyhound offers daily service from Bangor to Boston, with stops in Waterville, Augusta, Lewiston, Brunswick, Portland, Wells and Portsmouth. From Boston's South Station Transportation Center, passengers can either continue travel with Greyhound to New York or connect with other providers and alternate modes of transportation. The Greyhound terminal is located at Dysarts on Coldbrook Road in Hermon.

West Coastal Connection provides daily service from Calais to Bangor through Hancock and Washington Counties via U.S. Routes 1A and 1. DownEast Transportation provides service from Bar Harbor to Bangor on Mondays and Fridays year-round (except for holidays) via Ellsworth, along U.S. Route 1A. DownEast Transportation also operates a daily subscriber service from Bangor to the Jackson Lab in Bar Harbor. Waldo County Transportation operates a bus between Belfast and Bangor on Fridays, with stops in Searsport, Stockton Springs, Prospect, Franklin and Winterport. Concord Coach offers a daily trip between Bangor and Portland via Route 1 with stops in Searsport and Belfast.

Taxi service is very often used by public transportation dependent persons in the Greater Bangor area for trips at times when public transportation (fixed-route or on-demand) is not available, and for those destinations not served. The importance of the role played by taxi service, for all riders, is likely to grow in the future.

There is no formal **intermodal facility** where all riders can transfer easily between providers even though there are several public transportation providers operating within the Bangor urbanized area. This results in a loss of potential riders and revenues for all providers. In 2014, as part of a study the City of Bangor commissioned to examine conditions at, and possible alternatives to, the Pickering Square bus hub,

consultants investigated the possibility of developing a bus hub that could also serve as an intermodal facility near Bangor International Airport (BIA). The consultant determined that an intermodal facility at that location would not serve as the Community Connector system well as a bus hub.

The Bangor area does not have a formal bus transportation center where riders can interchange between modes and services; however, the Concord Coach Transportation Center on Union Street in Bangor operates as a defacto bus transportation center. Cyr Bus Line, West's Transportation and DownEast Transportation pick up and drop off passengers at this location. Community Connector also provides service to the Concord Coach station, which has passenger facilities including a waiting room, bathrooms, and a parking area which can accommodate day and overnight vehicle storage (limited to two weeks).

4.4 Current Issues

The Bangor region has undergone substantial economic development in recent years; however the types and locations of economic growth trends have changed over the last several years. Downtown retail and eatery areas have been revitalized, while Malls are struggling to retain and attract retail occupants. The Hogan Road/Stillwater Avenue area in Bangor has had several stand-alone storefronts and Mall storefronts vacated by retailers who are choosing to close local stores.

Earlier growth and its associated increase in traffic congestion have had negative impacts on the efficiency of the region's public transit system. One of the recurring issues that has surfaced over the last few years is an increase in public transit needs resulting from new development. New construction and development that did not consider transit service and/or functional design needs at project proposal have caused issues in being able to provide service at locations where it is needed. It is essential that municipal planners, engineers, economic development staff, planning boards and/or city and town councils understand the importance of fully considering, reviewing and planning for the physical needs of a transit bus to maneuver in and around developments to safely drop off and pick up passengers. In addition to the physical infrastructure and design considerations, it is critical to also identify whether or not the proposed development is within an already established bus route, or take early and proactive steps to work with the transit provider to determine whether or not the public transportation system has the financial and/or human resources to extend a route which could service the area of the development.

Demand for Additional Service

Community Connector has always received requests for bus service in areas not served. Some of the requests have been from residents needing service where they live. However, many requests have been from businesses and organizations wanting service at their locations. These requests reflect the importance placed upon the bus service by both residents and business owners. Community Connector has addressed these requests for additional service whenever feasible. However, this has often been accomplished by stretching the existing schedules so those additional destinations could be served. Increased traffic related to Bangor's economic growth makes it very difficult to maintain the stretched schedules. Increased boarding and alighting times further stress current schedules.

Flag Stop, Pulse System

Community Connector operates a pulse system designed to facilitate the timely transfer of riders from one route to another. The pulse system requires buses from all routes to meet at Pickering Square at approximately the same time to ensure passengers do not have to wait too long transferring between routes. Community Connector also operates on a flag stop system, whereby passengers can request boarding and alighting anywhere on a route. In this type of system, there are very few designated stops and limited

signage provided to guide passengers as to where they might be picked up by the bus. In addition to the limited signage, the combination of the flag stop and pulse system creates stressed schedules and passengers have expressed the desire for routes to provide for shorter headways.

Community Connector is in the process of outlining a plan to institute a designated bus stop service. As of summer 2017, GPS data showing boardings and alightings has been gathered on the majority of the routes. When the data is analyzed, Community Connector staff will propose designated stops that are central to the locations identified with the highest number of requests and provide signage and/or shelters in appropriate areas. Implementation of the designated stop project is anticipated for Spring 2018.

Additional Buses

Additional vehicles would enable service to be extended to areas currently not served, without reduction of service in other areas. Operating an expanded fleet of vehicles, however, requires additional operational and maintenance funding. Community Connector received four rehabilitated end-of-life buses between fiscal years 2016 and 2017. Two brand new buses have been ordered and are being custom built with an expected delivery in Fall 2017. In 2016 Community Connector was also awarded a §5339 grant to purchase five new buses. The Community Connector fiscal year 2018 budget capital improvement program outlines their plan to add these five new vehicles to the fleet over a four-year period, beginning in 2019 with one new vehicle, two new vehicles in 2020, and one new vehicle in both 2021 and 2022.

Service Hours

With the exception of the Black Bear Express, there is no evening service on the Community Connector's regular routes where runs generally end sometime between 6 p.m. and 7 p.m. This gap in service does not allow transportation-dependent people the opportunity to get to and/or from after-hour employment or activities such as shopping, recreation and socializing. There is also no Sunday service, which presents similar constraints. Over the last few years, desire and need for later service hours has been a consistently identified area of interest with a high level of importance for passengers. Community Connector has established a Public Advisory Committee, which will be working on the goal of increasing evening service. The Community Connector fiscal year 2018 budget capital improvement plan also indicates a plan to expand service hours in 2022, which aligns with the anticipated timeframe of adding the last of the five new buses to the fleet.

Increasing Headways

Increasing headways (the time interval between successive bus arrivals) makes bus service less frequent and consequently less convenient. Riders would have to bear increased travel times by waiting longer for their scheduled bus or having to board an earlier bus. Multi-systems, a transportation consulting firm, uses a formula to predict changes in ridership on transit routes. The formula predicts that increasing headways from 30 minutes to 60 minutes would result in a 27.6% drop in ridership. This prediction can be validated by experience in the Bangor area. Community Connector estimates that ridership dropped by at least a third in the mid-1980s on the Old Town route, when service on that route was cut back from 30-minute to 60-minute headways. Desire to decrease headways has been expressed, specifically on the VOOT route.

Extending routes to serve additional areas increases ridership potential. However, because the route is longer, riders may be forced to spend extra time on the bus in order to reach their destination. During the early 1970s when Community Connector (then Citibus) was originally designed, all routes were one-hour routes. Customer dissatisfaction with long tours of the neighborhoods prompted the redesign of the routes resulting in much improved point-to-point times.

Service Gaps

Geographic coverage. Areas that may have service gaps include outer Essex Street, outer Broadway, and outer Mount Hope, where there have been occasional requests for service. There are several large mobile home parks along these routes, which suggest there may be potential ridership. Additional buses would be needed to serve these areas, and it is not clear whether there is enough demand at this time. The Community Connector also no longer connects with Greyhound, which relocated to Hermon outside the Community Connector's service area.

Time of day/weekends. With the exception of the Black Bear Express (UMO service that ends around 9:30 p.m. to 10 p.m., and only during the school year), there is no evening service on the Community Connector's regular routes where runs generally end sometime between 6 p.m. and 7 p.m. This gap in service does not allow transportation-dependent people the opportunity to get to and/or from after-hour employment or activities such as shopping, recreation and socializing. There is also no Sunday service, which presents similar constraints.

Clients. Gaps in services for transit dependent groups include those individuals who work evenings and/or Sundays and populations traveling to or from outside the service area, such as those mentioned under gaps in geographic coverage.

Service Quality. Generally, the quality of service in terms of safety, ride comfort and timeliness is good, although a number of buses have been taken out of service because of extensive corrosion damage, and due to the age of the fleet, buses experience frequent break-downs, which require them to be removed from service for repairs. The cleanliness of the bus fleet has been identified as an area of concern. Community Connector is in the process of identifying alternatives for cleaning services and revising bus cleaning practices and procedures to address this concern.

Facilities and Equipment. There are no identified gaps in terms of accessibility of buses. Community Connector buses have bike racks and are wheelchair accessible, with wheelchair tie-downs on the buses. Gaps include the lack of video cameras on older buses and the need for having more clustered bus stops instead of buses stopping at every intersection. Signage is currently inadequate; however, Community Connector has obtained bus stop signs which will be deployed when designated stops have been identified. Although it does not present a service deficiency for riders, bus drivers are currently counting riders manually using denominators. These denominators are not adequate to record all the available types of fare categories, which limits the analysis of ridership data. Community Connector is currently working on an RFP to acquire technology, which will provide an automated digital tracking system that allows for an unlimited number of bus stops and fare types.

4.5 Performance Measures

Transit providers must set state of good repair (SGR) and safety performance targets and provide the targets and supporting documentation to the MPO each year. MPOs are required to set regional targets and incorporate performance tracking into plans and decision-making processes. BACTS will incorporate transit asset management and safety performance measures, as established by Federal and State agencies, into plans and programs and set regional targets that address these performance measures. To the maximum extent possible, BACTS will coordinate with Community Connector to establish targets and track progress toward those goals.

4.6 Transit Asset Management

The purpose of Transit Asset Management (TAM) is to help achieve and maintain a state of good repair (SGR) for the nation's public transportation assets. The TAM rule develops a framework for transit agencies to monitor and manage public transportation assets, improve safety, increase reliability and performance, and establish performance measures.

All recipients of Federal transit funds that own, operate, or manage capital assets used in the provision of public transportation must collect and report data (for all assets used in the provision of public transportation service, regardless of funding source, and whether used by the recipient or sub-recipient directly, or leased by a third-party) for Equipment and Service Vehicles, Rolling Stock, and Facilities. Although, infrastructure is also a required performance measure, it applies only to rail fixed guideway, track, signals and systems; which is not operated in the Greater Bangor area.

Transit Asset State of Good Repair Performance Targets

The performance-based planning regulations require an MPO to assess progress of a transit provider's performance to substantiate funding decisions that support regional targets and goals for achieving SGR. Community Connector is currently the only urban transit provider in the BACTS region. For this reason, BACTS has defined the initial Useful Life Benchmarks (ULB) for rolling stock as defined and requested by Community Connector as shown in Figure 4.9.

BACTS METROPOLITAN PLANNING AREA
TRANSIT ASSET CATEGORY: ROLLING STOCK
DEFINITIONS AND BENCHMARKS

Subcategory		Class		Definition	ULB (Years)	
BU	Bus	S	Standard	Revenue Service Vehicles 30 feet or greater in length, regardless of duty	14	From date of manufacture
		E	Extended Life	Revenue Service Vehicles 30 feet or greater in length, regardless of duty, significant and purposeful investments made to rebuild mechanical systems with the intent of enhancing reliability and extending the vehicle's life	18	From date of manufacture
CU	Cutaway Bus			Revenue Service Vehicles 27 feet in length, with a bus body mounted on the chassis of a van or light-duty truck	10	From date of manufacture

Actual performance of rolling stock in fiscal year 2017 was 62.50% of assets meeting or operating beyond the ULB. In fiscal year 2018, the BACTS target for rolling stock is 40.91% of assets meeting or operating beyond the ULB.

Facilities condition benchmarks are based on the FTA Transit Economic Requirements Model (TERM) scale as shown below. Facilities which fall below an adequate (3.0) TERM rating are considered exceed the condition benchmark (Table 4.2).

Table 4.2

Rating	Condition	Description
5 to 4.8	Excellent	New or near new condition, no visible defects, may still be under warranty if applicable
4.7 to 4.0	Good	Good condition, but no longer new, showing minimal signs of wear, may be slightly defective or deteriorated
3.9 to 3.0	Adequate	Reached mid-life condition, moderately deteriorated or defective

2.9 to 2.0	Marginal	Reaching or just exceeded useful life, defective or deteriorated in need of replacement, increasing maintenance needed
1.9 to 1.0	Poor	Well beyond useful life, critically damaged or in need of immediate repair

Actual performance in fiscal year 2017 was 28.57% of facilities meeting or exceeding the condition benchmark. In fiscal year 2018, the BACTS target for facilities is 14.29% meeting or exceeding the condition benchmark.

Agency Transit Asset Management Plan

As an operator with less than 100 revenue service vehicles, Community Connector is a Tier II Agency and is required to address only the following four elements in their Transit Asset Management (TAM) Plan.

1. An inventory of assets
2. A condition assessment of inventoried assets
3. Description of a decision support tool
4. A prioritized list of investments

The initial TAM plan must be completed on or before October 1, 2018, covering a four-year horizon, which promotes coordinated capital investments aimed at bringing the transit system into and maintaining a state of good repair for all transit assets. The Plan must be updated at least once every four years and shared with BACTS, including supporting documents of performance targets, investment strategies, and annual condition assessments, to be included in the MPO planning process. In order for BACTS to be able to formulate TIPs for inclusion in the State STIPs, BACTS must have a current inclusive metropolitan plan in place, including the required TAM elements.

Once completed, Community Connector's Transit Agency Plan will be referenced and incorporated into BACTS regional planning documents and processes. In addition, BACTS will concurrently develop a procedure for the annual submission of transit projects and financial plans to be integrated within the TIP development and obligated project approval process to prioritize transit investments by anticipated project year to achieve or maintain a state of good repair and track performance in meeting targets for the region.

Public Transportation Agency Safety Plan

FTA 49 USC §5329, Safety is pending final regulation. When the final rule is published, Community Connector will be required to develop a Public Transportation Agency Safety Plan including defining a Safety Management System and setting safety performance targets within one year. All transit agencies, regardless of mode, size, or operating characteristics are required to develop and self-certify their Public Transportation Agency Safety Plans within one year of the final rule and re-certify annually.

Taking proactive action to ensure the safety and security of all staff and riders on the fixed-route bus system is of utmost importance to BACTS and is critical to providing a safe and reliable public transportation service. Regardless of, and separate from, the pending regulation on Agency Safety Plans and Performance Targets, BACTS strongly recommends Community Connector develop, document and implement a Transit Safety and Security Plan consistent with FTA guidance. The Plan should address emergency response procedures and protocol related to criminal activity and/or terrorism (i.e., hazardous material, bomb threat, suspicious package/ explosives, active shooter), and may also address weather related/natural disaster plans and protocol (i.e., hurricane, winter (snow/ice), summer/heat, tornado, flood,

earthquake, fire, etc.), Special events plans (i.e., parades, festivals, concerts, sporting events, etc.) and Evacuation plans.

As with the performance targets related to transit asset management, BACTS is responsible for developing regional transit safety performance targets for use in the metropolitan transportation planning processes and will, to the maximum extent possible, work jointly with Community Connector to develop the regional transit safety performance targets.

4.7 Recommendations

- Provide evening and weekend bus service system-wide.
- Ensure bus fleet is in a state of good repair and able in order to minimize disruptions of service because of breakdown and failures.
- Encourage Community Connector to develop a transit asset management plan that promotes timely and planned replacement of vehicles
- Work with Community Connector to develop a long-range capital plan
- Develop commuter Park and Ride lots with a designated transit stop to reduce traffic congestion.
- Using technology to provide additional service and service coordination (real-time apps, shared ride services, links between other public and private transit providers to make services more accessible).
- Coordinating with transit providers outside of the Greater Bangor area for more efficient and convenient connections.
- Addressing sprawl issues where development is geographically challenging to provision of transit service. The trend is that Millennials are moving into urban areas, but Seniors are aging in place.
- Protecting the environment by ensuring newly acquired transit vehicles are environmentally friendly and equipped with accessible features (i.e., low-floor, lifts, etc.)
- Coordinating between the transit operator and municipal planning staff/decision-makers to include public transit factors as part of the application and approvals process for new and proposed developments.
- Connecting services [for students] to regional transit hubs (e.g., Boston, New York) for travel from school to home easily. Non-Maine residents are entering post-secondary schools in this area at a large rate.
- Exploring train service in the area.
- Separating right of way or otherwise creating bus way alternatives.
- Providing convenient and reliable transit service for telecommuting workers employed by organizations in larger cities (outside of the area) who occasionally travel to and from the employer's office.
- Linking transit in the area to other systems further north of Bangor and into Canada through a coordinated system.
- Coordinating transit services from Brewer to Bar Harbor/Acadia National Park to eliminate congestion through Route 1A from Brewer into Bar Harbor and into ANP.
- Organizing services and marketing between other regional and inter-city transit providers coming into and out of the Bangor area so travelers make seamless transitions from one service to the next without too much layover time.
- Partnering with the local business community to fund additional transit service geared toward enhancing customer/client base experiences (i.e., EMMC – parking issues, several employees, patients and visitors each day).
- Partnering with businesses to institute promotional programs (e.g., a paid transfer program with retail establishments where the retailers would provide customers with free transfer vouchers to ride the bus from their store).
- Creating more frequent and closer to door access for high traffic medical facilities and complexes in the area.
- Creating a system that meets the need of, and supports, the level of importance placed on transit, by making it more accessible, available, convenient, frequent and connected to non-motorized/active transportation infrastructure.
- Determining impacts and role of autonomous/self-driving vehicles to public transportation services.
- Making bus services easier to use by clarifying where or when the bus is coming, providing route maps that are explicit and clear, as well as available where riders are (i.e., bus stop locations) and providing real time information on where the bus is and where it will be.

- Utilizing GPS/GIS technology integration for bus route maps.
- Ensuring transit can accommodate the different types of active transportation that are also used by bus riders to ensure easy transition from one mode to another (e.g., BBOE route occasionally cannot accommodate all the bike space required for riders).
- Changing the perception of transit use by providing assistance to those needing extra guidance on how to use the bus as well as increasing marketing and outreach efforts to explain bus services.
- Explore non-conventional and private funding sources to expand services.
- Reduce headways/increase frequency of service to 30 minutes, particularly Old Town route.
- Provide/improve passenger amenities – benches, shelters, landscaping, lighting, walkways, signage, etc.
- Improve marketing through local TV, radio, local access channel, and city channel.
- Examine cost effective options for providing ADA Complementary Paratransit service, as use of the service increases.
- Investigate partnerships with potential large ridership generators, such as colleges, hospitals, and employers.
- Implement an ITS-based – traveler information system – next bus arrival, etc.
- Implement transit priority at signalized intersections.
- Ensure that sidewalks are provided along all bus routes.
- Coordinating the public transportation services in the BACTS area, including the siting of an intermodal passenger facility.
- Better integration of taxi service with other transportation options in the Bangor area.
- Improve routes and schedules to ensure ease of understanding and identification of different routes by color, unique name and/or symbol.
- Implement fixed bus stop locations.
- ADA automated audible internal and external announcement of bus route, next stop, etc.
- Update maps and real-time visual route service stops showing landmarks and previous and next stops.
- App and/or visual board at bus stop/hub showing real-time bus status
- Medical facility transit service more frequent and closer to entrance.
- VOOT Route configuration and schedule is overly complicated and confusing and 60-minute headway is not sufficient to meet rider needs.
- Employer/local business programs to subsidize shuttle services for clients/employees

http://www.maine.gov/mdot/planning/docs/2017/smp.pdf

5.0 Highway Transportation

5.1 Introduction

The highway network is the largest and most developed transportation system in the BACTS area. The overwhelming majority of people and goods are transported over the region's 183 miles of collector and arterial roadways. The present-day network has been shaped by a number of historical factors:

- The formation of compact urban centers around major waterways in the 18th and 19th centuries, and the development of primitive roadways for pedestrians and horse-borne travelers and traders;
- The mass production of motor vehicles and subsequent construction of the Maine state highway system from 1925 to 1960, including the construction of Interstate I-95 during the 1950s and subsequent development in areas close to the exit ramps; and
- The opening of the I-395 spur including the third Penobscot River Bridge in the mid 1990's.

In 1991, Maine adopted the Sensible Transportation Policy Act (STPA) to help reduce demands on the highway system. In 2003 and 2007, the State Legislature amended the Act to mandate a better connection between transportation and land use planning – and, specifically, between the STPA and the State's Growth Management Act. The common goals of the two laws include facilitating orderly growth and development, promoting economic development, reducing impacts on natural and cultural resources, and providing better solutions to transportation problems. Importantly, both laws recognize that transportation and land use patterns operate at a regional scale, and both encourage inter-community planning, financing, and regulation. The BACTS highway inventory, as a result, has remained essentially static for the past 25 years.

Sustainability and livability have been important characteristics of transportation planning for decades. Recently, they have gained more widespread and formalized attention due to tighter budgets, people's desire for more transportation choices with easy transitions between modes, people wanting better quality of life where they live and work, and climate change issues being considered. BACTS has worked on improving sustainability and livability in our area and is committed to continuing these efforts. Land Use, sustainability, livability, and environment are discussed in detail in Chapter 11.

5.2 Existing Conditions

Federal Functional Classification System

The federal functional classification (FFC) system designates all urban roads within one of six possible categories, based on their capacity and strategic significance within the highway network. These classifications are from highest to lowest: principal arterial-Interstate (hereafter referred to as "Interstate"); principal arterial-other (hereafter referred to as "principal arterial"); minor arterial; major urban collector; minor collector and local. Local roads are excluded from the BACTS inventory, falling under the jurisdiction of each municipality. For the remaining functional classifications, BACTS receives federal funding based on the total mileage for each classification within the highway network. Table 5.1 lists the lane mileage by FFC within the BACTS area. A listing of all the arterials and collectors currently in the BACTS planning area is presented in Table B.1 in Appendix B.

Table 5.1 Federal Functional Centerline (Lane) Mileage

Municipality	Major Urban Collector	Minor Collector	Minor Arterial	Other Principal Arterial	Principal Arterial Interstate	Total Mileage
Bangor	35.32 (74.39)	1.30 (2.60)	19.52 (47.22)	6.97 (18.41)	30.36 (50.53)	**93.47 (193.15)**
Bradley	2.70 (5.40)	0	0	0	0	**2.70 (5.40)**
Brewer	4.16 (8.40)	0	2.40 (4.97)	10.54 (25.87)	10.08 (16.47)	**27.18 (55.71)**
Hampden	1.87 (3.63)	0	3.61 (7.30)	7.72 (16.38)	2.48 (4.40)	**15.68 (31.71)**
Hermon	.77 (1.53)	0	0	0	1.93 (3.71)	**2.7 (5.24)**
Milford	1.22 (2.44)	3.56 (7.23)	0	0	0	**4.78 (9.67)**
Old Town	11.71 (23.25)	0.2 (0.4)	6.31 (14.58)	0	.01 (.01)	**18.23 (38.24)**
Orono	1.73 (3.41)	1.09 (2.18)	7.57 (16.24)	0	.59 (.59)	**10.98 (22.42)**
Orrington	.01 (.04)	3.28 (6.58)	0	0	0	**3.29 (6.62)**
Veazie	.31 (.56)	0	1.91 (3.81)	0	2.15 (4.29)	**4.37 (8.66)**
Total	**59.80 (123.05)**	**9.43 (18.99)**	**41.32 (94.12)**	**25.23 (60.66)**	**47.60 (80.00)**	**183.38 (376.82)**

The federal functional classifications have special significance in relation to the Penobscot Indian Nation. The BACTS metropolitan area includes Indian Island, but all roads on the island are currently classified as local and therefore not included in the BACTS highway inventory. The Penobscot Indian Nation is represented on the BACTS Policy Committee with a voting member.

National Highway System

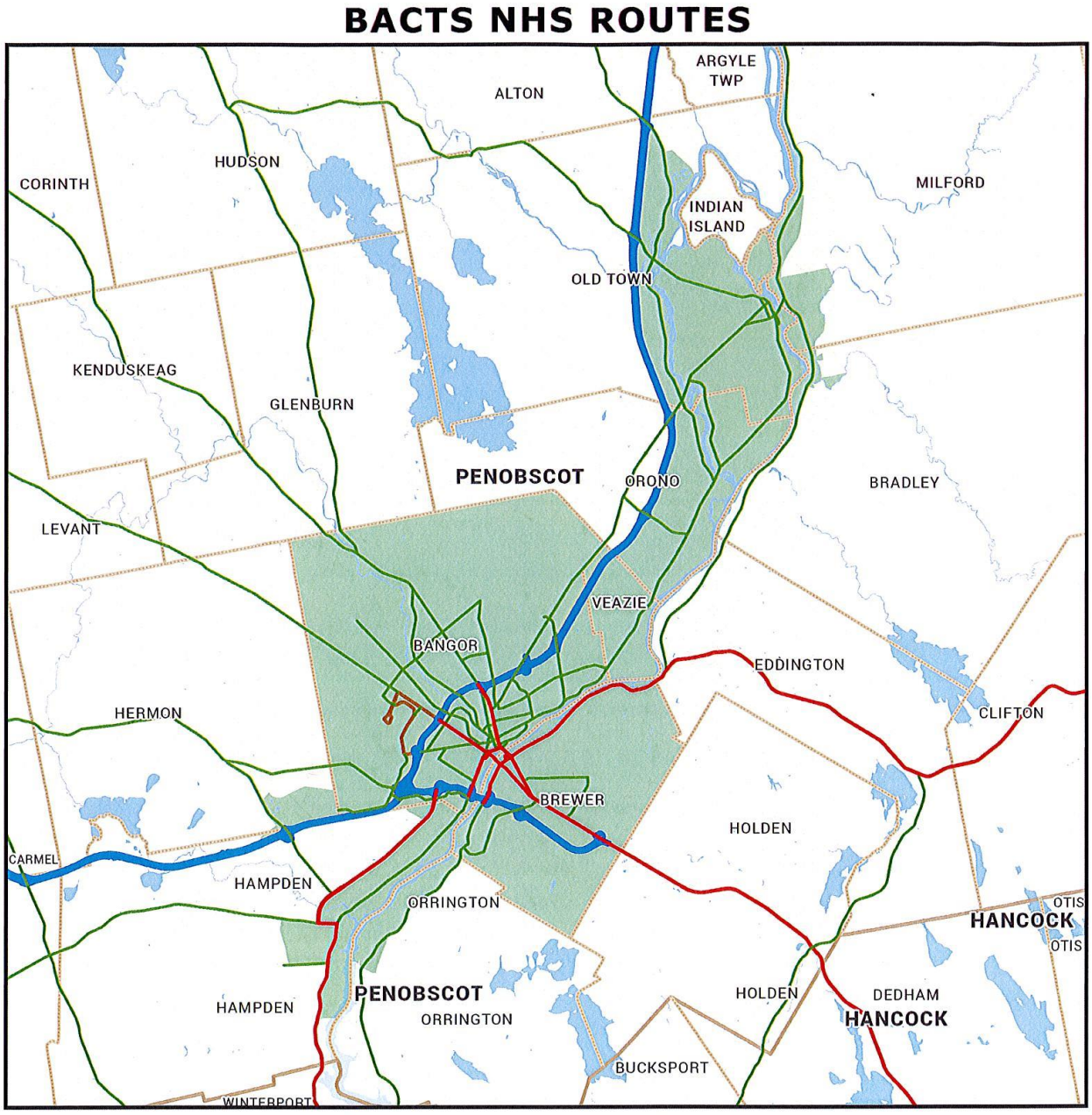
The National Highway System (NHS) concept was a cornerstone of the original Intermodal Surface Transportation Efficiency Act (ISTEA) legislation, and development of the NHS remains a high priority under the Fixing America's Surface Transportation (FAST) Act. The purpose of the NHS, according to ISTEA (Section 1006), is to "provide an interconnected system of principal arterial routes which will serve major population centers, international border crossings, ports, airports, public transportation facilities, and other intermodal transportation facilities and other major travel destinations; meet national defense requirements; and serve interstate and interregional travel." More than one-third of all federal transportation funds are dedicated to the maintenance and improvement of NHS roads.

The National Highway System (NHS) includes the following subsystems of roadways:

- Interstate: The Eisenhower Interstate System of highways retains its separate identity within the NHS.
- Other Principal Arterials: These are highways which provide access between an arterial and a major port, airport, public transportation facility, or other intermodal transportation facility.
- Intermodal Connectors: These highways provide access between major intermodal facilities and the other four subsystems making up the National Highway System.
- Strategic Highway Network (STRAHNET): This is a network of highways that are important to the United States' strategic defense policy. They provide defense access, continuity and emergency capabilities for defense purposes. There are not any of these in the BACTS area.
- Major Strategic Highway Network Connectors: These highways provide access between major military installations and highways that are part of the Strategic Highway Network. There are not any of these in the BACTS area.

The following highways are designated NHS routes in the BACTS area and are shown in Figure 5.1:

Figure 5.1



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3.5 Miles

1 inch = 4.09 miles

Date: 9/28/2017
Time: 7:53:07 PM

LEGEND

National Highway System 2

- NHS - Interstate
- NHS - Other
- NHS - Intermodal connector
- Fed aid non-NHS

Interstate:

- Interstate 95 (I-95);
- Interstate 395 (I-395);

Other Principal Arterials:

- Bangor: I-395 off ramps to Main St. (Route 1A). Route 1A continues north to Cedar St.; then east to Summer St.; then north to Union Street and to the Brewer city line on the Chamberlain Bridge.
- Brewer: Wilson Street (Route 1A) from Bangor city line on the Chamberlain Bridge east to the Holden town line.
- Bangor: Broadway (Route 15B) from the I-95 southbound on ramps east to Oak Street and continuing east to the Brewer city line on the Penobscot Bridge.
- Brewer: State Street from Bangor city line on the Penobscot Bridge east to Wilson Street (Route 1A).
- Bangor: Union Street (Rt. 222) from I-95 northbound off ramp east to Summer Street (Route 1A).
- Bangor: Independence Street from Union Street (Route 222) north to Washington Street continuing north to Oak Street (Route 15B).
- Brewer: Main Street (Route 9) from Betton Street (Route 15B) north to the Eddington town line.
- Brewer: Main Street (Route 15B) from the I-395 eastbound off ramp to Betton Street; west to Penobscot Street to State Street.
- Hampden: Main Road South (Route 1A) from Kincaid Road north to Western Avenue (Route 9); then west to US Route 202; then north to I-395 in Bangor.

Intermodal Connectors:

- Bangor: Hammond Street from I-95 northbound off ramp to Maine Ave to Godfrey Blvd to the Airport Terminal; and
- Bangor: Union St. from I-95 northbound off ramp to Godfrey Blvd to Airport Terminal.

<u>I-395/Route 9 Connector</u>

MDOT has investigated various options for a safer and more efficient route for east-west traffic across Maine for decades. In the Bangor region, the focus for this route has been primarily from the end of I-395 near the Brewer/Holden line to Route 9.

MDOT began an Environmental Assessment (EA) Study in 2000 under the National Environmental Policy Act (NEPA). A Public Advisory Committee (PAC) was formed and numerous meetings were held between 2001 and 2003. The PAC, MDOT and FHWA analyzed more than 70 alternative routes, shown on Map in the Appendix B. The PAC retained Alternative 3EIK-2 and the No Build options for more detailed analysis, but in 2005, based on environmental concerns, the study was elevated to an Environment Impact Study (EIS), beginning the analysis and review again.

In the spring of 2009, based on the greater environmental impacts with the central alternatives, the federal agencies requested that Alternative 2B-2 be reconsidered. In December 2010, MaineDOT and the agencies identified four alternatives for final consideration: No Build, Alternative 2B-2, Alternative 5A2B-2, and Alternative 5B2B-2.

In October 2011, MaineDOT and the agencies identified Alternative 2B-2 as the Preferred Alternative. In 2012 the Draft Environmental Impact Statement (DEIS) was published, and a formal public hearing was held on the DEIS. In 2013, the US Army Corp of Engineers (USACE) issued their determination that Alternative 2B-2 was the Least Environmentally Damaging Practicable Alternative (LEDPA).

In November of 2013, the US Fish and Wildlife Service (USFWS) requested additional consultation based on the proposed listing of the Northern Long Eared Bat and in 2015, the Final Environmental Impact Statement (FEIS) was completed.

In June 2016, FHWA issued the Record of Decision (ROD). The ROD identified "Alternative 2B-2, shown on Figure 5.1, as the preferred alternative. As the environmentally preferred alternative, it was selected as the build alternative to be designed, and built. This was the final step in the NEPA process.

This completion of the NEPA process allowed MaineDOT to begin final design and the right-of-way process. The schedule presented by MDOT at the July 20, 2016 Public Meeting in Eddington is shown in Table 5.2 below.

Table 5.2

Survey	2016/2017
Preliminary Design	2017/2018
Preliminary Public Meeting	2017/2018
Final Design	2017/2020
Final Public Meeting	2019/2020
Construction Begin	2021/2022
Open to Traffic	2023/2025

For more information on the I-395/Route 9 Connector see:
http://maine.gov/mdot/projects/I395rt9connector/ .

Interstates 95 and 395

There have been many attempts for years to allow 100,000 pound trucks on the Maine Interstate system. In 2009, the United States Senate authorized a one-year pilot project allowing trucks up to 100,000 pounds on the Maine Interstate system. A report was requested as part of this pilot project, listing impacts found during this period. Maine DOT finished the report in 2010 titled, *Interstate Highway Truck Weights*. The report stated that allowing 100,000-pound trucks on Maine's Interstate system would result in a net benefit to the entire transportation system.

In 2011, the U.S. House and Senate passed a transportation bill that included allowing trucks weighing up to 100,000 pounds on the Maine Interstate system for the next 20 years. This change allows heavy trucks on the Interstate rather than on secondary roads. It should provide safer secondary roads and reduce the rate of pavement deterioration caused by the heavy trucks on these roads.

A Maine DOT study along I-95 in Bangor was completed in January 2011. The purpose of the study was to evaluate the long-term needs of the I-95 Corridor in Bangor and to identify a set of recommendations to provide safe and efficient transportation service through the year 2030.

With the growth of traffic that has occurred in the 55 years of its existence, I-95 is facing greater challenges in meeting the safety and mobility needs of its users. Incidents anywhere along the highway create traffic hazards that can temporarily reduce highway capacity and produce massive traffic backups. On and off-ramps designed over 50 years ago are operating poorly under today's traffic volumes. The goal of the Bangor I-95 Corridor Study is to provide a direction for future investments in this corridor to address these deficiencies and ensure that I-95 can function effectively into the future.

Study recommendations included:

- Increase acceleration and/or deceleration lengths at interchange ramp junctions;
- Improve intersections at/near interchanges;
- Create park and ride lot;
- Improve bridge surface sensing;
- Upgrade median treatment;
- Modify lane use signing;
- Plan freeway management system;
- Implement service patrol;
- Install traffic monitoring;
- Evaluate future potential for new interchange north of Hogan Road; and
- Evaluate future potential of a new northbound on ramp at the Exit 186 interchange.

Several of these recommendations resulted in construction projects on or near I-95 and I-395 in the last six years. Some of the major projects were:

- Replacement of Hammond Street and Union Street I-95 overpass bridges;
- Replacement of I-395 bridge over Webster Avenue;
- Realignment of Union Street northbound on ramp;
- Improvements to Broadway, southbound ramp intersections, and Alden Street;
- Improvements to the Orono Exit 193 northbound off ramp and Stillwater Avenue intersection;
- Placement of raised median barrier on I-95 near Broadway; and
- Realignment of the end of the I-95 off ramp at Stillwater Avenue to allow left turns.

There are several projects in the planning stage for the I-95 corridor. The most significant project is constructing a diverging diamond interchange at Hogan Road. Currently this interchange has safety concerns, congestion and no adequate bicycle and pedestrian access. The diverging diamond interchange design addresses each of these concerns. It is planned for construction within the next three years. More information on this design is available at http://www.maine.gov/mdot/projects/bangor/ddi/.

Several I-95 bridges are scheduled for reconstruction or replacement including the Ohio Street and Broadway overpasses. I-95 acceleration and/or deceleration ramps are being analyzed for possible lengthening and realignment at various interchanges along the Bangor corridor. More new variable message signs are scheduled for placement along the state's I-95 corridor. A study of the I-395/ Odlin Road intersection and nearby I-95 southbound ramps is included in the BACTS CY 2018-2019 work plan.

BACTS has included in the draft CY 2018-2019 UPWP a BACTS Road Pavement Analysis and Recommended Action Plan that will include an inspection of the BACTS road system network and collecting pavement-related data. This data will then be used to formulate optimum strategies to maintain and improve these roadways. This project is scheduled for the second half of 2018.

Traffic Volumes

MaineDOT has historically monitored traffic growth in the BACTS area using fixed and movable monitoring systems. MaineDOT conducts, on a rotating basis, 48-hour traffic counts on selected routes to calculate the Annual Average Daily Traffic (AADT) carried by a particular highway. BACTS has an in-house 48-hour traffic count program that increases the number of annual counts performed on roads in the BACTS area. This permits a more timely response to specific requests from individual BACTS

municipalities and reduces the backlog of MaineDOT traffic counts within the region. Most importantly, the BACTS counts are directional whereas the majority of MaineDOT counts are total vehicle only. Table B.2 in Appendix B provides AADT and percentage growth figures for points along major BACTS traffic corridors since 2003.

Truck Traffic

The *Maine Integrated Freight Strategy Final Report* produced for Maine DOT in 2014 stated that trucking is still the dominant mode for freight shipments, accounting for almost 87 percent of all freight tonnage moved to, from, and within the State. In 2011, 92 million tons of freight moved into, out of, or within, the State. These shipments had an estimated value of $92 billion. By 2040, these freight flows are projected to grow 74 percent by weight (to 160 million tons) and more than 103 percent by value (to $186 billion). Consistent with past trends in the State, trucking is still the dominant mode of freight transportation in the State.

An article in the Bangor Daily News on September 19, 2017 by Matthew Stone titled, "*This Bangor industry reflects all the rest — and it's slowly shrinking and moving south",* states that the massive closures of the paper industry in this area has had a dramatic effect on the region's trucking industry. Total employment at trucking firms in Penobscot County dropped more than 29 percent between 2007 and 2016, to 1,245 from 1,763. The industry's total Bangor-region output shrank more than 17 percent between 2007 and 2014, to $106 million from $128 million.

The BDN article states, the major trucking companies in the area have had to shift their business south to survive. Hartt Transportation Systems Inc. finished work on a new, $7 million terminal in Auburn, Maine in 2015 and about 200 of the company's 440 trucks are based there. They opened a Sumter, South Carolina, terminal in 2006 to serve a manufacturing customer that also has operations in Auburn. Today, South Carolina is the home base for 175 to 200 of Hartt's trucks.

Barry Pottle, president and CEO of Bangor-based Pottle's Transportation, told Matthew Stone, "When your customers all move out of the area, you have to follow them." For Pottle's, that means the company's Allentown, Pennsylvania, terminal — which is about 15 years old — is much busier than its Bangor operation. Allentown is in the heart of a region where major retailers, both brick-and-mortar and online, have been setting up and expanding distribution centers to supply the Northeast. About 65 percent of Pottle's drivers are based in Allentown.

Stone reported that H.O. Bouchard in Hampden was affected by the housing market collapse a decade ago. The collapse caused their loads of lumber to go from 50 a day to zero, and stayed at zero," Today, H.O. Bouchard's specialty is in tanker trucks equipped for hauling heating fuels and liquid asphalt for road construction, as well in dry-bulk cement trailers for hauling cement powder.

An area of hope for more trucking in the area is Poland Spring's plans to pump water and possibly locate a bottling plant in Lincoln. Poland Spring has said it will truck water it pumps from the Lincoln Water District to its existing Maine bottling plants. As for locating a bottling plant in the region, the company has said the availability of faster rail service would factor into its decision. In a statement, the company said it would use "the most efficient combination of transportation services" if it located a bottling plant in the Lincoln area.

BACTS Truck Route Study

A study performed by Gorrill Palmer Consulting Engineers Inc. for BACTS in 2007 identified a list of spot improvements at specific locations impacted by trucks on the local street system. While these improvements are no substitute for a change in regional policy, they should aid in increasing truck mobility and safety for the interim period. Those locations include:

- Bangor-Route 1A railroad underpass at Mobil Depot
- Bangor-Route 2 (Hammond Street) at Odlin Road.
- Bangor- Perry Road at Farm Road.
- Bangor- Griffin Road at Union Street.
- Bangor Route 202 at Mecaw Road.
- Bangor-Main Street at Union Street.
- Bangor – Hancock Street at Oak Street.
- Bangor – Broadway at Griffin/Burleigh Road
- Bangor Hildreth Street at Outer Hammond Street.
- Bangor- Harlow Street at Kenduskeag Avenue.
- Bangor–Washington Street at Broad Street.
- Brewer–State Street at Wilson Street.
- Brewer–Wilson Street at North Main Street.
- Brewer Route 15 near Orrington Town Line
- Brewer- State Street at North Main Street.
- Hampden- Route 1A at Coldbrook Road.
- Old Town–Route 2 (Main Street) and Water Street at Route 2A
- Old Town-Route 16

Now that 100,000 trucks are allowed on the Interstate, many of these locations no longer have many trucks trying to negotiate difficult maneuvers. The BACTS Policy Committee will consider updating the Truck Study in the near future. In the meantime, if BACTS or Maine DOT considers any construction at any of these locations, truck design will be considered in that design.

Many BACTS communities restrict truck traffic on certain local roads. However, only the City of Bangor formally identifies specific roads as designated truck routes. Bangor seeks to direct truck traffic away from sensitive land uses and onto compatible roadways.

Traffic Signals

The primary function of traffic control signals is to assign the right-of-way at intersecting streets or highways where, without such control, a continual flow of vehicles on one roadway would cause excessive delay to vehicles (or pedestrians) waiting on the other roadway. A properly designed, operated and maintained traffic control signal can be a very valuable device for the control of vehicle and pedestrian traffic.

New technology in traffic signals has resulted in improved system components and tools for traffic control signal operations. Software programs have been developed to monitor traffic signals and traffic patterns from a central command center. BACTS has five coordinated corridor systems set up within its boundaries.

Each BACTS municipality is responsible for signal operations and maintenance within their boundary. BACTS has developed an inventory of equipment and their locations in the past. Recent warnings

concerning arc flash liability when opening a traffic signal control cabinet has prompted the necessity of only allowing certified traffic signal technicians to open the cabinets. Maine DOT is working to offer this certification training to anyone who works on these signals.

The Maine DOT Commissioner recently tasked a Traffic Mobility Working Group with investigating highway congestion issues in Maine and producing a report outlining the issues and recommending solutions that could reduce congestion. The Working Group has recognized the two major reasons for traffic congestion in Maine, inefficient traffic signal systems and traffic incidents on principal arterials like the Maine Turnpike and the Interstate system. Some of the preliminary suggestions are for Maine DOT to take responsibility of the maintenance of traffic signals on Priority 1 and 2 Corridors, and to encourage more Traffic Incident Management (TIM) statewide coordination and training of first responders. The report is due out by the end of 2017.

Traffic signals are an essential element of Intelligent Transportation Systems (ITS). ITS encompasses a broad range of wireless and wire line communications-based information, control and electronics technologies. ITS, when integrated into the transportation infrastructure, and in the future, into personal vehicles, will help monitor and manage traffic flow, reduce congestion, increase safety and reduce travel costs.

MaineDOT currently has permanent variable message signs (VMS) installed in 4 areas within the BACTS Region. Along the I-95 Corridor there are two VMS, one located in Hampden and one in Bangor. In Brewer there is one on I-395 and the final VMS is located on Route 9 in Eddington. In addition to these variable message signs, the MaineDOT also has eleven variable speed signs (VSS) which have cameras in them to monitor weather conditions and traffic congestion and alert drivers to decrease their speed. These are located along the I-95 Corridor between Hampden and Old Town. MaineDOT is currently planning to replace existing VMS and VSS along the I-95 and install additional signs ensuring a sign between each Interstate exit in the Bangor/Brewer area. These signs will be used in part to alert drivers of traffic incidents ahead and provide guidance for detours if needed.

The Statewide Traffic Incident Management team is in the planning stages of developing detour routes along the Maine Interstate system in the event of major incidents. These routes would be signed and the VMS would indicate which detour to take. BACTS and MDOT are also investigating a special traffic signal timing plan for all signals along these routes that could be triggered when the detour is needed.

Transportation Crashes

According to Maine DOT's statistics, in 2014 Maine experienced its lowest number of fatalities (131) since 1996. Unfortunately, the next year the number of fatalities rose to 156. A crash rate is defined as the number of crashes per hundred million vehicle miles (hmvm) driven. Maine's crash rate decreased in 2011, but is above the national average. Maine's crash rate is 215.6 crashes per hmvm. The latest national rate in 2006 was 198 crashes per hmvm. Maine's fatality rate of 1.07 fatalities per hmvm is a decrease over 2007's rate of 1.22 fatalities per hmvm. Maine's fatality rate continues to be below the national rate of 1.27 fatalities per hmvm.

MaineDOT obtains and analyzes reported crash data from the Maine State Police to determine high-crash locations throughout the state. The standard comparison statistic is known as the Critical Rate Factor (CRF). The CRF is determined by comparing the historical crash rate on a section of roadway (link) or intersection (node) to what would be expected based on road type, traffic volume, and a statewide average of crash rates at similar locations. A CRF greater than 1.0 indicates that the number of crashes exceeds expectations (the location is more dangerous than average), while a CRF less than 1.0 indicates that the

location is safer than average. A node or link must have a CRF of more than 1.0 and at least eight reportable crashes occurring over a three-year period to meet the criteria for listing as a high-crash location.

Each year, MaineDOT publishes a list summarizing the previous three years' worth of crash data and identifies high-crash locations statewide. According to the 2014-2016 edition, there were 82 high-crash locations on BACTS roads in six of the ten BACTS municipalities: 63 in Bangor, 5 in Brewer, 3 in Old Town, 8 in Orono, 2 in Milford, and 1 in Hampden.

Table 5.2 below lists BACTS highway locations that are considered especially serious due to a CRF of 3.0 or greater, 20 or more crashes in a three-year period, or both.

Table 5.3 High Crash Location

Intersection Location	Town	CRF	No. of Accidents
Exit 182: I 395 EB weave at I 95 SB off ramp and I 95 NB on ramp	Bangor	4.88	28
Broadway, Earle Av, and Center St slip lane	Bangor	4.69	33
Exit 182: End of I 95 SB off ramp at I 395 WB	Bangor	4.64	18
Longview Dr and Springer Dr	Bangor	4.30	9
Exit 182: I 95 SB weave at I 95 SB on ramp and I 395 WB off ramp	Bangor	3.55	25
Essex St and Grandview Av	Bangor	3.41	11
Exit 184: I 95 SB cross of Union St off ramp with Ohio St on ramp	Bangor	3.21	9
Broadway, Burleigh Rd, and Griffin Rd	Bangor	1.72	45
Griffin Rd and Ohio St	Bangor	1.64	44
Stillwater Av at end of I 95 NB off ramp and Kohl's parking lot entrance	Bangor	1.36	48
Hancock St, Otis St, and State St	Bangor	1.27	32
Bangor Mall Blvd, Hogan Rd, and Springer Dr	Bangor	1.21	41
Griffin Rd and Union St	Bangor	1.13	33
Parkway South and Wilson St	Brewer	1.13	30
Main St and Wilson St	Brewer	1.11	32

Source: MaineDOT, Traffic Engineering, Crash Records Section

BACTS Area Planning Studies

BACTS has contracted with consultants on several transportation planning studies since 2011. A summary of these studies is listed below.

BACTS Old Town-Milford Route 2 Traffic Study

This study conducted by James Sewall Company in 2014, examined the section of Route 2 beginning at the County Road intersection and continuing to Main Street in Old Town. During the school year, weekday morning traffic was very high travelling in the westbound direction along Route 2 from Milford to Old Town. Between the morning hours of 7:00 AM to 8:00 AM, significant delays and vehicle queuing was experienced along Route 2 by motorists coming from Milford and wishing to travel through downtown Old Town. Delays were also experienced for Old Town eastbound motorists on Center Street (Route 2) during the evening peak hour; however, these delays were typically not as lengthy as those experienced during the morning periods in Milford.

The purpose of this study was to review the current operation of the major intersections within this portion of Old Town and Milford and to determine if minor modifications to the traffic signal timing, phasing, and lane use might help alleviate some of the delays and congestion that are typical during the weekday commuting periods. In addition, this study included a traffic signal warrant analysis for the intersection of County Road and Route 2 to determine if a traffic signal installation was warranted at this intersection.

Some of Sewall's major recommendations for this study were:

- Utilize a shorter traffic signal cycle length during the weekday morning and evening peak hours at the intersections of Center Street/Main Street and Center Street/Water Street.
- Change the lane use for the westbound exclusive left turn lane at the intersection of Water Street/Center Street to a combined left-through lane, to reduce delays and queuing. Provide additional signage to help motorists navigate through the two closely spaced intersections.
- The Route 2 – County Road intersection did not warrant a traffic signal at that time.

A copy of this study is on the BACTS website at:

Bangor Broadway Corridor Study

This study conducted by TY Lin International in 2015, examined the Broadway corridor in Bangor from the southerly intersection of the Interstate 95 Northbound On-Ramp approximately 0.8 miles north to Grandview Avenue.

The two primary study goals were to:

- Preserve existing roadway capacity over the long term (2035 design year) to facilitate through traffic movement and minimize congestion while providing safe vehicular access to new and existing development along Broadway; and
- Maintain the functional integrity and safety of the corridor, while accommodating the public and private needs for access and adjacent land parcels.

Some of TY Lin International's corridor recommendations were to:

- Retime, coordinate and upgrade traffic signal equipment.
- Restripe Broadway for a wider curb lane for better bicycle conditions.
- Implement corridor-wide ADA improvements.
- Add/enhance existing sidewalk and crosswalks.
- Implement access management/driveway improvements on Broadway.
- Revise the site plan review standards to include consideration of inter-parcel connections, shared parking, and either shared driveways or a minimum of one curb cut fronting Broadway.
- Meet Bangor's Complete Streets Policy.

Further details of this study can be found on the BACTS website at: http://bactsmpo.org/transportation-studies/.

Old Town Stillwater Avenue Corridor Study

This study conducted by Gorrill-Palmer in 2017, examined the Stillwater Avenue corridor from The Orono-Old Town line to the College Avenue intersection.

Maine DOT was preparing to replace the two bridges over the Stillwater River on this corridor and the College Avenue intersection was not operating at maximum efficiency.

The study goal was to determine what improvements could be made along this section of Stillwater Avenue and its approaches to result in a vibrant Complete Street, safely serving not only motorized traffic and transit at an acceptable level of service, but also non-motorized users such as bicyclists and pedestrians.

Some of Gorrill-Palmer's corridor recommendations were to:

- Improve the two signalized intersection's antiquated traffic signal systems and comply with ADA standards.
- Improve each of the corridor's intersections geometry to provide clear, safe guidance for all users.
- Provide travel lane edge lines along the corridor to provide a shoulder for bicyclists to ride and possibly slow Stillwater Avenue traffic.
- Tie in the improvements recommended in this study with the MaineDOT bridge project. That project will be replacing the Stillwater Avenue bridges with a single travel lane in each direction, shoulders to accommodate bicycles, and a sidewalk on the westerly side to accommodate pedestrians.
- Widen the College Avenue approaches to Stillwater Avenue and Stillwater Avenue from College Avenue to the Stillwater River bridges to allow more capacity at the Stillwater Avenue-College Avenue intersection.
- Improve safety and access to the businesses immediately north of the College Avenue intersection with a functional center turn lane.
- Pedestrian facility improvements are proposed throughout the study area to better accommodate
- pedestrians.

A copy of this study is located on the BACTS website at: http://bactsmpo.org/transportation-studies/.

Proposed Orono Park Street Study

Over the last decade, there has been a significant increase in University student private rental housing development on the east side of Park Street, north of Rangeley Road. There have also been some changes in retail development in the Park Street/Rangeley Road Intersection.

The Maine Department of Transportation has plans to construct a roundabout at this same intersection with advertisement for construction anticipated to go out in December 2017 and construction complete in one year.

In November 2016, the Town of Orono placed a one-year moratorium on development in this area until a study of development impacts including traffic is studied.

The Town of Orono is preparing to hire a consultant in late 2017 to assess and analyze the Traffic System Management improvements that could be made on Park Street (Route 2) from the Orono/Old Town municipal line to College Avenue.

Transportation Improvement Projects

The BACTS Policy Committee selected 29 highway projects, including highway reconstruction, resurfacing, rehabilitation, drainage, and intersection improvements, during the 2016-2021 BACTS Transportation Improvement Programs (TIP).

The Maine DOT selects the remaining projects in the BACTS area for inclusion in the BACTS TIP. This includes projects for highway paving, maintenance, bicycle and pedestrian facilities, airports, public transportation, bridges, marine, railroad, and planning studies. Highway projects continue to dominate the BACTS transportation planning and budgeting process as well. For a complete list of all the BACTS selected 2016-2021 TIP projects, see Table B.3 in Appendix B.

Major River Crossings

The Penobscot River runs the length of the BACTS metropolitan area. It is crossed by three highway bridges between Bangor and Brewer. The bridges are the Veterans Memorial Bridge on I-395, the Joshua Chamberlain Bridge on U.S.1A/Route 9, and the Penobscot Bridge on Route 15. The twin bridges between Old Town and Milford provide a fourth highway crossing of the Penobscot, 12 miles upriver, on U.S. 2. The Stillwater River and Kenduskeag Stream are major tributaries of the Penobscot. Three highway bridges cross the Stillwater within the BACTS area, two in Old Town and one in Orono. Eleven bridges cross the Kenduskeag within the BACTS area, all located in Bangor. The Kenduskeag is channeled through the downtown area to its confluence with the Penobscot.

Performance Measures and Targets

BACTS must set highway performance measures and targets in accordance with the latest federal regulations. More information is available on subject in Chapter 12 of this Plan

5.3 Deficiencies

Lack of adequate funding

There is currently not enough funding to address all the highway needs in the BACTS area. The BACTS Policy Committee members submit construction projects for consideration of Federal and State funding for each TIP. The estimated costs of these projects is always at least two or three times the amount of available funding. This does not include the projects that the members do not submit because they know only the highest scoring projects will realistically have a chance of receiving funding. Some roadways have a higher strategic value than others do in terms of traffic volume, safety, economic benefit, and connectivity with other roads within the overall highway network. As these higher-priority projects are selected for funding, the remaining projects (including most of the collector road system) continue to deteriorate. In these cases, the municipality or state must maintain them without the 80% federal funding. The BACTS Policy Committee has recently shifted a majority of the available funding to pavement preservation projects and less on more costly reconstruction projects. More information about BACTS project funding can be found in Chapter 13.

Critical Problem Areas

The following highway segments in the BACTS region have been identified as critical problem areas, in which the current and predicted traffic volumes and land use demands already exceed the capabilities of the existing road design. If left unaddressed, these roadways could prove to be a hindrance to future

growth and development within the BACTS region. BACTS has identified the following highway segments, in no particular order of priority, as those with existing problems that will require special attention during the 2018-2038 period.

Bangor

- I-95 – I-395 Exit 182 Interchange;
- I-95 Exit 187 Interchange;
- Broadway at I-95 NB ramps and Earle Street;
- Hammond Street at I-95 ramps;
- Union Street from I-95 to Griffin Road;
- Broadway – Pushaw Road intersection;
- Maine Avenue from Griffin Avenue to Hammond Street;
- Cross-town connector roads between major inbound/outbound routes; e.g., Burleigh Road, Griffin Road;

Brewer

- WB I-395 ramps at Main Street;
- State Street - Wilson Street intersection;
- State Street - North Main Street intersection;
- South Main Street –Pendleton Street intersection;

Hampden

- Route 1A – Route 9 intersection;

Old Town/Orono

- Stillwater Avenue, Old Town – College Avenue intersection and corridor to the Orono line;
- Route 2 – intersections at Main Street and Water Street;
- Stillwater Avenue Bridges in Old Town;
- Route 16 (Bennoch Rd.) in Orono/Old Town Route 2 to Stillwater Avenue; Orono
- Park Street corridor from College Avenue to Old Town line.

Signal Conditions

Interconnecting and coordinating signal systems aid in the continuous moving of vehicular traffic on the roadways by implementing a traffic-responsive operation. This reduces delays and congestion during both peak and non-peak travel periods. BACTS continually studies and implements projects to interconnect and coordinate corridors within the region. BACTS will continue to monitor Connected and Autonomous Vehicle technology as it becomes more tested in other areas.

The Policy Committee will continue to approve traffic signal improvement projects that were recommended in various studies.

5.4 Future Conditions and Issues

If the BACTS region grows in population and commercial development increases along our roadways, the demand on our current highway network will also increase. Congestion will become an issue and acceptable condition of our roadways will become increasingly costly to maintain. A review of past growth from 2003 to 2014 indicated that volume of traffic was decreased or remained level except for a few local corridors

The decreases occurred during an economic recession and increased fuel costs. As the economy improves and fuel prices remain relatively steady, we can expect a slight increase in volumes. BACTS will continue to monitor traffic volumes to analyze any significant trends.

5.5 Recommendations

The BACTS Policy Committee has identified several strategies to improve the highway network in the BACTS area as listed below.

Performance Measures and Targets:

- Work with the Maine DOT to produce highway performance measures and set targets.

Traffic Volume:

- Advocate for the recommended improvements to the I-95 corridor in the 2011 I-95 study and continue to monitor and advocate for improvements for the traffic operations at ramp intersections with area arterials.
- Continue to review and provide input on the design and reconstruction of the Stillwater Avenue improvements from the Orono/Old Town line to and including the College Avenue intersection. The success on the reconstruction of the Stillwater Bridge projects in this corridor is contingent on the successful design and construction on both approaches, especially the College Avenue intersection.
- Study intersections listed in the Critical Problem Areas section of this Chapter.
- Continue to review and provide input on the design and improvements to Route 1A in Hampden southerly to Route 9.
- Continue to review and provide input on the design and construction of the proposed Diverging Diamond Interchange at Exit 187 at Hogan Road in Bangor.
- BACTS should hire a consultant to produce a "Road Pavement Analysis and Recommended Action Plan" that will include an inspection of the BACTS road system network and collecting pavement-related data.
- Implement recommendations outlined in completed corridor studies as funds become available and as appropriate.
- Work to improve cross-town connector roads between major inbound/outbound routes in Bangor such as Burleigh Road and Griffin Road.
- Promote and invest in alternative transportation methods like car-pooling, park and ride lots and bicycle and pedestrian facilities.

Traffic Signals:

- BACTS should continue to study signal coordination, phasing/timings along all major corridors in the region.
- Continue to provide input and monitor the findings of the Maine DOT Traffic Mobility Working Group.
- BACTS should update the signal equipment inventory, review standardization of this equipment and work with the Maine DOT and municipalities to implement a maintenance plan for all signals within the region.
- BACTS should continue to monitor technology improvements that could be implemented in the BACTS area.

6.0 Bicycle and Pedestrian Transportation

6.1 Introduction

Active transportation refers to travel powered by human energy — primarily walking and bicycling. For purposes of this plan, walking and pedestrian refers to anyone traveling on foot or in a wheelchair, or other type of mobility device. A transportation network that facilitates fast and efficient movement of vehicles from origin to destination point is essential for growing the economy and supporting mobility to connect the region to the rest of the world. However, transportation networks in urbanized areas – particularly in neighborhoods and downtowns - require a more multifunctional design to accommodate a greater range of activities and users.

Bicycling and walking are integral components of an efficient transportation network. Appropriate bicycle and pedestrian accommodations provide the public, including the disabled community, with access to the transportation network, connectivity with other modes of transportation, and independent mobility regardless of age, physical constraint, or income. Effective bicycle and pedestrian accommodations enhance quality of life and health, strengthen communities, increase safety for all modes of transportation, reduce congestion, offer recreational benefits, and benefit the environment. Bicycling and walking are successfully accommodated when travel by these modes is efficient, safe, and comfortable for the public.

Figure 6.1

WORKERS USING ACTIVE TRANSPORTATION AS PRIMARY MEANS OF COMMUTING TO EMPLOYMENT 2015				
	Total Workers (16 years +)	Percent of Workers Using Active Transportation		
		Bus	Walk	Bike
Bangor	14,942	1.50%	5.20%	0.20%
Bradley	726	-	1.90%	-
Brewer	4,941	0.50%	0.90%	0.10%
Hampden	4,009	-	0.60%	-
Hermon	3,040	-	-	-
Milford	1,620	-	0.70%	-
Old Town	3,758	0.90%	2.60%	2.30%
Orono	4,617	1.00%	20.60%	1.80%
Orrington	1,887	-	0.90%	-
Penobscot Indian Island	330	0.90%	7.60%	-
Veazie	934	2.60%	0.70%	-
BACTS Total	40,804	0.87%	4.82%	0.50%
Penobscot County	70,797	0.60%	3.90%	0.30%
Maine	635,475	0.60%	4.00%	0.40%

Source: S0801 2011-2015 American Community Survey 5-Year Estimates

Residents of the BACTS area, like many urban areas across the country, are becoming increasingly conscious of the importance of creating a more livable and sustainable community. In order to reach this goal, communities are developing plans to outline ideas for improving mobility. People are beginning to look for alternative modes of travel as the cost of automobile travel increases and the awareness of the environmental effects of motor vehicle travel increases (Figure 6.1). It is important for urban areas to provide adequate facilities for non-motorized travel. A higher percentage of residents in the BACTS area use active transportation as a primary means of commuting to and from work than Penobscot County and the State as a whole, emphasizing the importance and necessity for a well-designed, safe and accessible pedestrian and bicycle network and associated facilities to be incorporated into transportation projects and plans in the area.

BACTS has made a commitment to develop a multi-modal transportation system, including well-used, safe, and accessible facilities for pedestrians and bicyclists of all ages and abilities that contribute to the region's economic vitality, health, and quality of life. An expanding network of sidewalks, bikeways and accommodating roadways will provide users with a wide array of safe and secure transportation choices to any destination.

6.2 Issues and Challenges

The lack of designated bikeways and sidewalks is a factor that often prevents people from traveling by bicycle or on foot. Bicycle users prefer a safe, continuous and direct path to their destinations, but many roadways in the region were constructed before local development policies and standards required consideration of bicycle elements. BACTS supports the integration of bicycle and pedestrian accommodations early in planning and design stages, as well as in the implementation in all transportation facilities, whenever possible.

Maintaining active transportation infrastructure is another challenge. Sidewalks, shared-use-paths, and shoulders sometimes are not deemed as high a priority for limited maintenance funds as facilities for automobiles (e.g., highways, arterials and local streets). Communities are encouraged to review maintenance policies and include provisions in local budgets for bicycle/pedestrian system preservation and routine maintenance.

The most current Bicycle and Pedestrian study developed in 2009 provides guidance on design and development of facilities and infrastructure improvements to accommodate bicycle and pedestrian travel; however, it is outdated and does not reflect an adequate inventory and description of current active transportation facilities, improvements and initiatives in the region. Rather than duplicate the 2009 information in this Plan, BACTS has decided to undertake the development of a more comprehensive stand-alone Regional Active Transportation Plan. Once completed and approved, this Plan will serve as guidance for short-term and long-term planning and be incorporated into the metropolitan transportation plan by reference.

6.3 Complete Streets

A multimodal transportation system is crucial to the safety and economic vibrancy of businesses, villages, downtowns, neighborhoods, and the rural areas of Maine. Addressing the needs of non-motorized and transit users early in the transportation project planning process is cost-effective, efficient, and critical to the development of a balanced and safe transportation system. Road network design incorporating complete streets policies is often a precursor to the street becoming a place where people want to be, instead of just a corridor to pass through. It reconfigures the road network to best serve the people who need to use it, whether they're drivers, pedestrians, or bicyclists.

The MaineDOT Complete Streets Policy outlines how the State and its project partners will consider the needs of all users when planning and developing projects funded partially or in full through MaineDOT. This includes all MPO and Local Project Administration Program projects, regardless of the reason the project was initiated. The policy must be adhered to for any relevant new construction, rehabilitation and reconstruction projects.

State of Maine DOT Complete Streets Policy: http://www.maine.gov/mdot/completestreets/
http://www.maine.gov/mdot/completestreets/docs/MaineDOTCompleteStreetsPolicyFinal061814.pdf

MaineDOT Complete Streets Related Policies, Rules and Guides

- ADA Standards for Accessible Design
- Entrance Permit Policies and Procedures
- MaineDOT Bridge Design Guide
- MaineDOT Design Exception Processes
- MaineDOT Flexible Design Practices

- MaineDOT Guidelines on Crosswalks
- MaineDOT Guidelines for the Use of Traffic Calming Devices
- MaineDOT Highway Design Guide
- MaineDOT Local Cost-Sharing Policy
- MaineDOT Local Project Administration Guide
- MaineDOT Practical Design Guidance
- MaineDOT Practical Design Roadway Widths
- MaineDOT Shoulder Surface Type Policy
- Traffic Movement Policies and Procedures

6.4 Road Diet

A Road Diet is generally described as "removing travel lanes from a roadway and utilizing the space for other uses and travel modes." The most common Road Diet reconfiguration is the conversion of an undivided four lane roadway to a three-lane undivided roadway made up of two through lanes and a center two-way left-turn lane. The reduction of lanes allows the roadway cross section to be reallocated for other uses such as bicycle lanes, pedestrian refuge islands, transit uses, and/or parking.

MaineDOT Road Diet Guidelines: http://maine.gov/mdot/edi/docs/RoadDietGuidelines.pdf

6.4 Pedestrian Travel

Pedestrians vary significantly in their skills, experience, and willingness to walk different distances. Strong determining factors for pedestrians are the time and mobility required to reach their destinations, particularly if they need to cross high-volume or high-speed roads. Time and mobility constraints also dictate the pedestrian's usable geographic space. Few urban pedestrians will venture more than one mile from point to point; most actually will only undertake trips shorter than half a mile.

Access to safe sidewalks and roadways allow residents to walk to nearby shops, schools and parks. FHWA's long-term goal is to increase the percentage of short trips, defined as one mile or less for pedestrians, to 30 percent by 2025.

In 2015, approximately 4.9 percent of the workforce residing in BACTS communities, reported walking as their primary means of transportation to employment, compared to 4.0 percent for the State overall and 3.9 percent in Penobscot County.

The BACTS area sidewalk inventory was last updated in 2010 as part of a project to identify sidewalks within ¾ mile of existing bus routes. BACTS is in the process of developing an updated sidewalk inventory to include ADA maintenance and inspection criteria to ensure that projects include and follow ADA guidelines and are responsive in creating an accessible path of travel on sidewalks, curbs, and crosswalks. It is expected the sidewalk inventory update will be completed in 2018-2019, along with identification of marked crosswalks in the BACTS area, and will be included in the BACTS stand-alone Active Transportation/Bike/Ped Plan anticipated to be completed in 2019.

Each community has different rules and regulations regarding local sidewalk and crosswalk maintenance. Most communities adopt policies which require home and business owners to maintain the sidewalks adjoining their property. Sidewalks that do not adjoin private property are generally the responsibility of the federal, state, or municipal authority that controls the sidewalk. BACTS municipalities are encouraged to develop and adopt local crosswalk standards and policies. MaineDOT Crosswalk Guidelines can be found at http://maine.gov/mdot/edi/docs/2016/crosswalkpolicy%20EI_C6%20revised101316.pdf.

6.5 Bicycle Travel

Bicyclists skill and experience levels vary significantly. To develop a truly functional non-motorized system, transportation facilities must be designed to permit mobility and reasonably safe use for the vast majority of these users. In the BACTS region, .5 percent of residents used bicycled as the primary means of commuting to and from work in 2015. Although, this represents a small percentage of workers, the percentage is higher than Penobscot County (.3%) and the State as a whole (.4%).

FHWA's long-term goal is to increase the percentage of short trips, 5 miles or less for bicyclists, to 30 percent by 2025.

6.6 Bicycle and Pedestrian Infrastructure/Facilities

Sidewalks and Walkways are pedestrian lanes that provide people with space to travel within the public right-of-way that is separated from roadway vehicles. They are typically constructed of concrete and parallel to a street that provides a means for pedestrians to travel within the public right-of-way while physically-separated from vehicular traffic.

Marked Crosswalks indicate optimal or preferred locations for pedestrians to cross and warn motorist to expect pedestrian crossings and designate right-of-way for motorists to yield to pedestrians. Crosswalks are often installed at signalized intersections and other selected locations. Crosswalks are also sometimes supplemented with markings and warning signs and signals for motorists.

Marked Shared Roadways are general purpose travel lanes marked with shared lane markings used to encourage bicycle travel and proper positioning within the lane. In constrained conditions, markings are placed to discourage unsafe passing by motor vehicles. On a wide outside lane, the markings can be used to promote bicycle travel next to (to the right of) motor vehicles.

Signed Shared Roadways are facilities shared with motor vehicles. They are typically used on roads with low speeds and traffic volumes. However they can be used on higher volume roads with wide outside lanes or shoulders. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist, unless a wide outside lane or shoulder is provided.

Bicycle Boulevards provide a bicycle-priority route designed to offer convenient, low-stress access to local destinations and through neighborhoods. Combinations of access management, traffic calming, and crossing treatments work in concert to enhance the bicycling experience.

Bike Lanes are facilities for exclusive use by bicyclists that is located within or directly adjacent to the roadway and is physically separated from motor vehicle traffic with a vertical element.

Off-road shared use paths are separate paths for bicycles and pedestrians that are at least ten-foot wide with a surface that is ADA compliant. Shared use paths are best used to serve areas that are not served by streets. Placing shared use paths adjacent to roadways is only advisable where there are no driveways that need to cross the path and the adjacent roadway is not readily appropriate for use by bicyclists. Shared use paths should provide special routes for bicyclists and pedestrians that are not available on the existing roadway system.

Bright, visible **signage** raises awareness of the pedestrian environment and provides guidance to pedestrians and drivers alike.

Pedestrian countdown signals indicate the time remaining for pedestrians to cross the street safely.

Shoulders benefit pedestrians and bicyclists by providing additional space on roadways and enhancing safety and mobility.

Street Furniture provides pedestrians and bicyclists a place to rest and may promote social interaction and an increased sense of community.

6.7 Desire Lines

When planning and designing infrastructure for active transportation desire lines are an indicator of how and where people will reach their destinations. Desire lines track the links between origins and destinations for bicyclists and pedestrians and represent where people want to go.

6.8 Intermodal Connections

Pedestrians and bicyclists can expand their transportation range and options greatly by connecting with other modes such as public transit. It is not unusual for several different municipalities or agencies to maintain independent control over the various facilities that are used by someone walking or cycling to and from a single transit stop. Unless the different parties cooperate in assessing, planning, and enhancing non-motorized transit access, major impediments to pedestrian and bicycle access may persist or grow in severity.

6.9 ADA Compliance

MaineDOT updated its ADA Compliance Policy for Construction and Maintenance in August 2016 to better define MaineDOT's approach to ADA on all projects. Whenever pedestrian walkways or other right-of-way elements intended to assist pedestrian traffic are altered as part of a roadway improvement effort, those walkways and elements must be upgraded to meet current ADA standards. While many maintenance activities are not considered alterations and do not trigger requirements to perform ADA upgrades, most other work, including surface paving treatments and traffic signal replacements, do cause ADA improvements to be made.

Municipalities are responsible for year-round maintenance of all existing, new or replaced/rehabilitated pedestrian facilities. MaineDOT reserves the right to perform maintenance and invoice a municipality if appropriate maintenance is not satisfactorily performed by the municipality.
http://www.maine.gov/mdot/civilrights/docs/ada/ADACompliancePolicy.pdf

6.10 Safety

For individuals to feel comfortable walking and spending time on a street, it must be safe. Too many people are killed or seriously injured in non-motorist accidents each year. Together, pedestrian and bicycle fatalities are increasing as a share of total traffic deaths. These conflicts are intensified in urban areas where the numbers of vehicles and non-motorized travelers are higher. Ensuring there is adequate infrastructure for those walking and biking (e.g., sidewalks, protected bike lanes, crosswalks, and medians) is critical to making the street a safe place for all users.

MaineDOT's Safety Office collects data on all traffic accidents, including pedestrian and bicycle crashes. Non-motorized fatal and serious injury statistics show that between the years of 2012 and 2016, the

BACTS area experienced 49 serious injuries related to non-motorist accidents and 9 fatalities. Although the total numbers may not seem excessive, when put in perspective as a percentage of all fatalities and serious injuries resulting from all types of crashes (motorist and non-motorist), pedestrian fatalities make up *24.3 percent* of all fatalities; and bike and pedestrian serious injuries make up 20.6 percent of all serious injuries (Figure 6.2). NHTSA National Center for Statistics and Analysis reports that in 2015, pedestrian fatalities accounted for *15 percent* of total crash fatalities.

Figure 6.2

Total Fatalities and Pedestrian Fatalities in Traffic Crashes, 2006–2015

Year	Total Fatalities	Pedestrian Fatalities	Percentage of Total Fatalities
2006	42,708	4,795	11%
2007	41,259	4,699	11%
2008	37,423	4,414	12%
2009	33,883	4,109	12%
2010	32,999	4,302	13%
2011	32,479	4,457	14%
2012	33,782	4,818	14%
2013	32,893	4,779	15%
2014	32,744	4,910	15%
2015	35,092	5,376	15%

Source: Fatality Analysis Reporting System (FARS) 2006-2014 Final File, 2015 Annual Report File (ARF).

In the BACTS area, there were six communities with recorded pedestrian crashes over the five-year period from 2012 – 2016 (Figure 6.3). During that period, there were 151 reported crashes with pedestrians in the BACTS area with 37 serious injuries and 9 fatalities recorded. This accounts for 79 percent of all pedestrian crashes, and 70 percent of the pedestrian fatalities in Penobscot County.

Figure 6.3

Pedestrian Crashes and Fatalities
2012 - 2016

	2012		2013		2014		2015		2016		5-Year Total		5-Year Average	
	Crashes	Fatalities	Crashes	Fatalities	Crashes	Fatalities	Crashes	Fatalities	Crashes	Fatalities	Crashes	Fatalities	Crashes	Fatalities
Bangor	26	2	16	1	14	0	21	2	28	0	105	5	15.00	0.71
Brewer	2	0	4	0	4	1	2	0	5	1	17	2	2.43	0.29
Hampden	0	0	0	0	0	0	1	0	1	0	2	0	0.29	0
Milford	0	0	0	0	2	0	1	0	0	0	3	0	0.43	0
Old Town	3	0	1	0	2	1	2	0	1	0	9	1	1.29	0.14
Orono	5	0	3	1	1	0	2	0	4	0	15	1	2.14	0.14
Total BACTS Communities	**36**	**2**	**24**	**2**	**23**	**2**	**29**	**2**	**39**	**1**	**151**	**9**	**30.20**	**1.80**
Penobscot County	45	3	37	3	31	3	31	3	47	1	191	13	38.2	2.6
State of Maine	301	10	256	10	287	8	292	18	254	16	1390	62	278	12.4

Source: https://mdotapps.maine.gov/MaineCrashPublic/PublicQueryStats#totals

Between 2012 and 2016, there were 75 reported crashes involving bicyclists in the BACTS area, 84 percent of all the bicyclist crashes in Penobscot County (Figure 6.4). There were 12 serious injuries and no reported fatalities during this timeframe. Serious injuries related to bicycle crashes represent 5.0 percent of all serious injuries resulting from all crashes in the BACTS area during that timeframe. The State of Maine as a whole experienced 11 fatalities as a result of a bicycle crash in the five years between 2012 and 2016.

Figure 6.4

Bicycle Crashes
2012 - 2016

Community	2012	2013	2014	2015	2016	5-Year Total	5-Year Average
Bangor	9	12	2	9	9	41	5.86
Brewer	2	3	3	4	1	13	1.86
Milford	0	0	1	0	0	1	0.14
Old Town	2	1	5	1	1	10	1.43
Orono	0	1	4	5	0	10	1.43
Total	**13**	**17**	**15**	**19**	**11**	**75**	**15.00**

Source: https://mdotapps.maine.gov/MaineCrashPublic/PublicQueryStats#totals

* No bicycle crash fatalities reported from 2012 - 2016 in the BACTS MPO area

The number of pedestrian ***crashes*** in Maine has hovered in the 250 - 300 range for the past 10 years; but pedestrian ***fatalities*** are on the rise (Figure 6.5). In 2015 and 2016, 19 and 17 pedestrians, respectively, died as a result of a crash. Senior leadership at MaineDOT, in response to urging from citizens, legislature and the media, has supported the development of demographically targeted initiatives for mitigating non-motorized crash fatalities. The "Heads Up" program targets geographic areas in the State which have experienced a greater than average number of pedestrian and bicycle crashes. The 21 communities identified make up almost 22% of the population in the state and account for one-third of all the fatalities. Four of the 21 identified municipalities are in the BACTS area (Bangor, Brewer, Old Town and Orono).

Figure 6.5

Bicycle Crashes
State and Penobscot County
2012 - 2016

	2012		2013		2014		2015		2016		5-Year Total		5-Year Average	
	Crashes	Fatalities	Crashes	Fatalities	Crashes	Fatalities	Crashes	Fatalities	Crashes	Fatalities	Crashes	Fatalities	Crashes	Fatalities
Penobscot County	16	0	22	1	17	0	20	0	14	0	89	1	17.8	0.2
State of Maine	213	1	209	4	207	2	189	0	197	4	1015	11	203	2.2

MaineDOT has developed a five-phase strategy to be implemented over a two-year period beginning in 2017. This strategy includes providing education and outreach, with a pilot project focused on providing tailored programs to population segments identified as the most vulnerable (the homeless population; the elderly and disabled population; and those with limited English comprehension). BACTS will actively participate in these education and outreach programs to assist in raising awareness in all user groups and enforcement officials of the shared rights and responsibilities of bicyclists, pedestrians, and motorists to obey the rules of the road and trails and engage in safe operating behavior.

BACTS will support local, regional and state-wide efforts aimed at decreasing crashes and injuries through better crash investigation and reporting that can reveal existing hazardous areas, stricter enforcement of existing laws and regulations, physical reconfigurations of hazardous conditions, more local regulations that encourage good bicycling and walking environments, and greater awareness of other users of the transportation system.

<u>Safety Performance Targets</u>

FHWA's long-term goals for pedestrian and bicycle safety is to achieve an 80 percent reduction in pedestrian and bicycle fatalities in 15 years and zero pedestrian and bicycle fatalities and serious injuries in the next 20 to 30 years.

In Maine, non-motorized fatal and serious injury is a complex category that includes both bicycle and pedestrian data and fatal and serious injury outcomes. The five-year average of non-motorized fatalities and serious injuries in Maine for 2016 is reported as 91.2. MaineDOT forecasts 90 fatalities and serious injuries in 2017 and 88 in 2018. The 2018 forecast represents a 1.3% improvement from the 5-year average calculated in 2016. A focused pedestrian outreach program has been developed by MaineDOT with the hope it will provide the information and safety mitigation measures required to reduce the number of pedestrian fatalities currently experienced.

BACTS will be setting safety performance targets for the greater Bangor metropolitan area in early 2018.

6.11 Potential Funding Sources

Funding for bicycle and pedestrian improvements at the local level is vital to improving conditions within Maine communities. Most of the grant programs require a local match either with actual funding, or materials and labor. In addition, because grant funding is competitive and not nearly enough to make all of the improvements necessary, local funding is imperative to improving bicycle and pedestrian connections.
Bicycle and pedestrian system improvements in the BACTS area scheduled in the MaineDOT 2017 to 2019 workplan are shown in Figure 6.6.

Work Plan Year	Town(s)	Asset(s)	Description	WIN/ID	Scope of Work	Highway Corridor Priority	Estimated Funding
2017	Bangor	River Walk	Beginning at Front Street and extending east 0.14 of a mile. A new sidewalk along Front Street for 0.03 of a mile.	021767.00	New Construction	N/A	$ 461,600
2018/19	Bangor	Bicycle - Pedestrian Trail	Beginning at the end of Sylvan Road and extending west 0.39 of a mile Stillwater Avenue	022208.00	New Construction	N/A	$ 550,000
2018/19	Bangor	Union Street	Beginning at Vermont Avenue and extending northwest 0.79 of a mile to Griffin Road.	022210.00	Sidewalk Construction	Varies	$ 389,300
2018/19	Brewer	Riverwalk Trail Phase 2	Beginning at Wilson Street and extending northeast 0.40 of a mile to the Penobscot Bridge, including pedestrian spot improvements in the downtown area.	018858.00	New Construction	N/A	$ 1,315,300
2017	Orrington	Route 15	Beginning at Pebble Creek Drive and extending north 0.82 of a mile to Harrison Avenue.	018884.00	Bicycle-Pedestrian - PE Only	2	$ 28,000

6.12 Recommendations:

While there has been much progress in making the BACTS area more bicycle and pedestrian friendly over the last several years, there are still areas or situations where deficiencies exist in the regional system.

- Develop a stand-alone Regional Active Transportation Bike/Ped Plan which, when complete, will complement the Metropolitan Transportation Plan. The Plan will inventory current on-street and off-street pedestrian and bicycle facilities and identify potential improvements to pathways, trails, roadway infrastructure, utility and drainage easements, open spaces and parks. The plan will outline strategies for developing an interconnected transportation network with access to neighborhoods, parks, activity centers, employment centers, parking facilities, bus stops, schools, places of interest, and connectivity to the trails and pathway systems. It will serve as a guide for planning, prioritizing, and for constructing bicycle and pedestrian network improvements in the region.

7.0 Air Transportation

7.1 Introduction

In the BACTS region, cargo, military and commercial passenger air service is available through Bangor International Airport (BGR), while general aviation service is available at both BGR and DeWitt Field in Old Town.

7.2 DeWitt Field – Old Town Municipal Airport

DeWitt Field (OLD) is a publicly-owned general aviation airport. The airport is owned by the City of Old Town and located on approximately 360 acres on the north end of Marsh Island. The airport has two asphalt paved runways, a seaplane landing area, and 32 hangar slots in 6 hangar units. The primary runway (12-30) is 4,000 feet in length and 100 feet wide; the secondary runway (4-22) measures 2,800 feet by 75 feet. The Maine Forest Services is headquartered adjacent to the airport and has its own seaplane base at DeWitt Field.

Because of trees growing into the Runway 30 approach, the City of Old Town decided to shift the location of the runway. In 2014 and 2015, improvements to the airport included installation of a new beacon, replacement of all edge lighting, reconstruction of all runways, installation of new PAPI's, as well as reconstruction of the airport access road. Runway 4-22 was shortened from 3,200 to 2,800 feet during reconstruction.

As of August 2014, the most recent available reported data, aircraft based at the field included 30 single-engine airplanes, 1 multi-engine airplane, 6 helicopters and 1 ultralight aircraft. The Maine Forest Service is headquartered at Dewitt Field and has its own seaplane base located on the Penobscot River adjacent to the airport. Annual operations reported for 2014 were 22,630, with 53 percent representing general aviation, 44 percent transient general aviation and 2 percent military operations.

It is estimated that the airport will need approximately five additional hangars by 2035 and the Airport Master Plan recommends planning for much more by reserving space to accommodate hangar development as demand dictates. It is also recommended that 39 additional automobile parking spaces be included as part of hangar expansion projects. Improvements to the sea plane base and access ramp will also be required, as well as additional miscellaneous facility improvements to Instrument Approach Procedures, Fuel Storage and Sales.

The majority (90 percent) of the funding for airport improvements comes from the Federal Aviation Administration (FAA). The municipal local share of improvements is typically five percent of project cost, as well as MaineDOT providing five percent of the project cost. The capital improvement plan for Dewitt Field and the MaineDOT workplan indicate safety and infrastructure improvements, including an apron expansion project, will be completed within the next couple years (Figure 7.1).

Work Plan Year	Description	Scope of Work	Estimated Funding
2019	Safety and infrastructure improvements that may include apron expansion at Dewitt Field, Old Town Municipal Airport (OLD).	New Construction	$ 592,300

http://maine.gov/mdot/projects/workplan/

7.3 Bangor International Airport

Bangor International Airport (BGR) is situated on 2,079 acres in, and owned by, the City of Bangor. BGR is located along highway routes to the northeast metropolitan areas and eastern Canada with immediate access to the Interstate, which provides direct access to northern and eastern Maine, the Atlantic Provinces of Canada, northern New England, Quebec and upstate New York. In addition, Bangor is home to several large trucking firms, provides convenient access to rail service, and a deep-water port an hour away.

BGR is classified by the FAA as a commercial service small hub airport and can accommodate both scheduled and non-scheduled service by large air carrier aircraft (defined by FAA as having at least 31 passenger seats), and provide emergency services to aircraft 200 feet in length and greater. It provides refueling, aircraft servicing, passenger and cargo services, and all transit needs for passenger, cargo, military and corporate flights. BGR also hosts a Foreign Trade Zone that consists of a 33 acre on-airport complex containing a central import processing building. There are 25 acres of industrial lots located within the Zone. The site includes 29,000 square feet of heated warehouse or light manufacturing space.

The airport offers domestic air service to the region and serves as a transit point for commercial and international flights. It is the closest full-service U.S. airport to Europe with fuel and customs services available 24 hours a day, seven days a week with all-weather access. BGR accommodates a wide variety of both civilian and military aviation activity and is capable of handling any commercial cargo carrier presently flying.

As of 2016, of the 59 aircraft were based at BGR, 28 of which are military aircraft. Daily operations are split approximately one-third commercial; one-third transient general aviation; one-quarter military and one-twelfth local general aviation flights. Aircraft operations at BGR have declined significantly since 1990 when total aircraft operations for the year reached a high of 130,666. In the 25 years between 1991 and 2016, total aircraft operations at BGR decreased approximately 67 percent. In 2016, total annual aircraft operations was 42,905, a 5 percent increase from 2015. Figure 7.2, shows BGR annual aircraft operations for 2001 to 2016.

Figure 7.2

Bangor International Airport
Operational Statistics
2001-2016

Calendar Year	Itinerant					Local			Total Operations
	Air Carrier	Air Taxi	General Aviation	Military	Total	Civil	Military	Total	
2001	2,510	21,047	21,807	11,081	56,445	13,423	15,542	28,965	85,410
2002	2,182	21,939	20,284	9,262	53,667	15,075	17,812	32,887	86,554
2003	2,956	22,670	18,528	11,727	55,881	18,178	21,211	39,389	95,270
2004	4,057	20,913	17,930	11,242	54,142	11,954	18,434	30,388	84,530
2005	3,951	22,025	16,942	10,097	53,015	13,074	14,057	27,131	80,146
2006	3,503	19,940	16,139	9,860	49,442	12,862	12,997	25,859	75,301
2007	13,005	18,160	15,599	9,642	56,406	9,031	10,623	19,654	76,060
2008	4,631	14,525	15,780	9,656	44,592	9,499	10,333	19,832	64,424
2009	3,164	13,416	13,016	10,858	40,454	4,299	5,317	9,616	50,070
2010	4,704	11,479	12,896	11,445	40,524	4,841	3,939	8,780	49,304
2011	6,342	9,835	13,278	9,470	38,925	6,225	3,750	9,975	48,900
2012	5,975	8,851	13,932	7,987	36,745	4,137	3,516	7,653	44,398
2013	6,522	8,185	13,155	9,021	36,883	2,380	2,024	4,404	41,287
2014	6,253	8,175	12,394	9,659	36,481	3,154	1,908	5,062	41,543
2015	4,971	8,647	13,227	8,726	35,571	3,260	1,958	5,218	40,789
2016	4,692	9,911	13,152	9,620	37,375	3,813	1,717	5,530	42,905

Source: https://aspm.faa.gov/opsnet/sys/Airport.asp

7.4 Airport Facilities

General Aviation Facilities

General Aviation (GA) facilities include a terminal and aircraft parking apron, both of which are operated and maintained by Bangor Aviation Services, a division of Bangor Airport. The GA parking apron was reconstructed and reconfigured in 2012, and the new apron provides dedicated parking positions for corporate jets allowing them to power-in and power-out of each position. The new apron provides more than adequate capacity for existing levels of traffic. The GA terminal building includes waiting lounge, rest rooms, flight planning room, pilot room, offices, and snack room. The GA hangars are currently full, and additional capacity will be needed for future demand, particularly transient corporate aircraft. The existing hangars are presently full, and the GA operations manager has noted a need for a new heated hangar to store transient corporate aircraft.

Two firms provide aircraft maintenance, repair and overhaul (MRO) services at BGR; C&L and Maine Aero Service. C&L provides MRO services for regional and other large aircraft, and Maine Aero Services provides maintenance for a variety of general aviation aircraft. They are an authorized service center for Cessna aircraft and other manufacturers and provide avionics (radio) installation and service, as well as metal fabrication and fuel tank installation for transatlantic ferry flights.

Air Carrier, Air Cargo (Heavy Duty), and Joint Use Aircraft Facilities

There are three parking aprons for large transient aircraft: the air carrier, air cargo (heavy duty), and Joint Use apron. All three aprons are used by a variety of civilian and military aircraft. Each of the three aprons can accommodate aircraft up to design group VI (AN-124, B-747-800, and Airbus A-380). There are nine designated parking positions (hard stands) on the Joint Use apron for Air Guard KC-135 aircraft, and 4 parking positions for large aircraft on the cargo apron. Parking positions on the cargo (heavy duty) apron have hydrant fueling.

The international terminal building has four jet bridges that can accommodate aircraft up to the B-747-400. There is adequate space to maneuver into and out of each gate at the international terminal (typically power-in and tug-out), as well as provide remote parking for passenger and cargo aircraft. The three aprons provide a great deal of flexibility to accommodate scheduled, charter, and irregular operations (IROPS) aircraft on an as-needed basis. There is no need for additional air carrier, cargo, or joint use parking apron capacity. All three aprons are used on a regular basis by military and civilian jet aircraft, and based on projected activity levels, will continue to serve that purpose.

Air Freight/Cargo

Air freight is a small yet critical component of the freight system in Maine. Air, multiple modes and mail, and other modes account for 51.8 percent of the value of shipments moved more than 2,000 miles. Air freight is especially important for the transportation of low-weight/high-value commodities. Commodities commonly transported from Maine via air cargo include seafood, seasonal berries, textiles, semiconductors and other computer components, and bank documents. There are no airports in Maine that are considered air cargo hubs, international gateways or intercontinental hubs. Two airports in Maine handle the majority of air cargo activity in the state, Portland International Jetport and Bangor International Airport.

Although there is no scheduled air cargo service at BGR, a variety of U.S. and foreign all-cargo carriers fly into Bangor. Wiggins Airways flies under contract to UPS and FedEx on daily cargo feeder flights from Manchester-Boston Regional Airport (MHT). BGR is also served by a number of domestic and international charter/on-demand cargo carriers that operate large aircraft, such as Volger Dneper, Polar, Centurion, World Airways, and DHL. The majority of large cargo (vs. small packages and mail) is outbound and typically is enplaned at BGR and flown out of the U.S. In addition to the all-cargo carriers, the three passenger airlines also carry belly cargo, although it represents a small share of the total cargo.

Figure 7.3

Bangor International Airport
Cargo in Landed Weight (pounds)
2000 - 2016

	Weight	Rank	Total
2016	24,482,261	126	136
2015	27,805,952	122	132
2014	22,768,983	121	131
2013	25,030,289	120	128
2012	81,756,100	116	126
2011	135,480,506	103	125
2010	188,029,455	93	124
2009	152,685,224	102	122
2008	255,012,872	83	124
2007	129,801,617	112	124
2006	49,057,900	NA	115
2005	23,173,600	119	122
2004	71,481,104	116	121
2003	108,700,780	113	119
2002	30,487,860	117	118
2001	64,665,702	115	118
2000	49,888,804	NA	NA

Source: https://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/

There are no dedicated air cargo hangars, ramps, or sorting facilities at BGR. However, charter cargo aircraft use the cargo (heavy duty), joint use, and the GA aprons to upload and offload cargo as needed. Air cargo jets (up to the B-747 and AN-225) use the cargo (heavy duty) and joint use aprons, while turboprops, corporate jets, and piston-engine cargo aircraft typically use the GA apron. In 2016, 24,482,261 pounds of cargo landed at BGR, a 14 percent decrease from 2015. The amount of cargo, in landed weight, has varied significantly over the last 15 years, with a high of 255,012,872 pounds in 2008 and a low of 22,768,983 pounds in 2014 (Figure 7.3).

Freight Intermodal Facilities

Intermodal transportation involves moving freight between points of origin and destination using two or more modes. Intermodal connectors are critical components of the Maine freight system which provide access between major intermodal facilities, such as ports and truck/pipeline terminals, and the highway.

There are 18 FHWA-designated intermodal connectors in Maine. The only FHWA designated connector location in the BACTS area is Bangor International Airport. The connectors and their descriptions are shown in Figure 7.4

Figure 7.4

Facility	Type	Connector No.	Connector Description	Connector Length	Facility ID
Auburn Intermodal Truck/Rail Transfer Facility	Truck/Rail Facility	1	From I-495 (ex 12)/SW on SR 4: NW 1.9 mi on Kittyhawk Rd, northerly 0.7 mi on Lewiston Jct Rd	2.2	ME10R
Bangor International Airport	Airport	1	From I-95 (ex 46): E on U.S. 2/ Hammond St, northerly on Maine Ave, SW on Godfrey Blvd to the terminal	2	ME8A
Bangor International Airport	Airport	2	From I-95 (ex 47): NW on SR 222/ Union Street, SW on Godfrey Blvd and join main connector	2	ME8A
Merrill Marine Terminal (Port)	Port Terminal	1	From I-295 (exit 5): 1.2 mi SE on Portland Connector, 0.2 mi E on U.S. 1A	1.4	ME4P
Merrill Marine Terminal (Port)	Port Terminal	2	From I-295 (exit 4): 1.0 E on U.S. 1 to intersection with U.S. 1A (and join connector No. 1)	1	ME4P
Merrill Marine Terminal (Rail)	Truck/Rail Facility	1	From I-295 (exit 5): same as record 4P	0	ME11R
Merrill Marine Terminal (Rail)	Truck/Rail Facility	2	From I-295 (exit 4): Same as record 4P	0	ME11R
Portland Freight Terminal District	Truck/Rail Facility	1	From I-95 (exit 7): south 2.1 mi on ME Turnpike Approach Road to U.S. 1	2.1	ME1R
Portland International Marine Terminal	Port Terminal	1	From connector terminating at Merrill Marine Terminal: NE 1.0 mi on U.S. 1A to Park St (Term. Entr.)	1	ME12P
Portland Jetport	Airport	1	From I-95 exit 46 to SR 9 in Portland	0.43	ME2A
Portland Jetport	Airport	2	From I-295 (exit 5): SW 2.4 mi on SR 9/SR 22 to Jetport Access Road	2.4	ME2A
Portland Jetport	Airport	3	From I-295 (exit 3): NW 1.7 mi on SR 9 to Jetport Access Road in South Portland	1.68	ME2A
TOTAL				**24.51**	

Source: FHWA National Highway System Intermodal Connectors http://www.fhwa.dot.gov/planning/national_highway_system/intermodal_connectors/maine.cfm. Accessed July 30, 2013.

Air Cargo Forecast

Air cargo traffic contains both domestic and international freight/express and mail. The demand for air cargo is a derived demand resulting from economic activity. Cargo moves in the bellies of passenger aircraft and in dedicated all-cargo aircraft on both scheduled and nonscheduled service. Cargo carriers face price competition from alternative shipping modes such as trucks, container ships, and rail cars.

Between 2016 and 2037, domestic cargo RTMs are forecast to increase at an average annual rate of 1.3 percent. In 2016, all-cargo carriers carried 89.0 percent of domestic cargo RTMs. The all-cargo share is forecast to grow to 90.5 percent by 2037 based on increases in capacity for all-cargo carriers and ongoing security considerations. International cargo RTMs fell 2.4 percent in 2016 after posting a 0.9 percent increase in 2015 as slow growth in the U.S. and Europe along with the slowdown in China's economic growth slowed worldwide trade. Growth is expected to turn positive in 2017 to 1.3 percent as global trade growth resumes. For the forecast period (2016-37) international cargo RTMs are forecast to increase an average of 3.8 percent a year based on projected growth in world GDP with the Pacific region having the fastest growth, followed by the Other International, Atlantic, and Latin regions, respectively. The share of international cargo RTMs flown by all-cargo carriers increased from 49.3 percent in 2000 to 70.8 percent in 2016. Continuing the trend experienced over the past decade, the all-cargo share of international RTMs flown is forecast to increase modestly to 77.1 percent by 2037.

Military Activity

Military aircraft activity at BGR is diverse. Bangor Airport has been the port of entry for over a million servicemen and women returning from the First and Second Gulf Wars, Operation Iraqi Freedom/Operation Enduring Freedom, and the NATO operations IFOR and SFOR in Bosnia and Herzegovina.

The Maine Air and Army National Guard are based at BGR. Based military aircraft are comprised of the Maine Air National Guard 101st Air Refueling Wing TB), known as the MAINEiacs, KC-135R refueling aircraft; and the Maine Army National Guard 521st Troop Command, which includes the 126th Aviation and 142nd Aviation Units, UH-60 and HH-60 Blackhawk, and UH-72A Lakota helicopters. Based military cantonment areas encompass aircraft operating areas and various support facilities. The amount of space that each unit needs is dependent on a variety of factors including type and number of aircraft they operate, the missions they support, their level of activity, and the support facilities and services needed.

The Maine Air National Guard 101st Air Refueling Wing cantonment area encompasses approximately 300 acres. There are nine designated parking positions (hard stands) on the Joint Use apron for Air Guard KC-135 aircraft. The reconstruction of the Joint Use Apron was financed by the Maine Air Guard.

The Maine Army Guard's 521st Troop Command cantonment area encompasses 47 acres situated south of the terminal building. Facilities include two parking aprons with tie-down pads for 22 helicopters, taxiways, support buildings and hangars. The helipad is lit for night operations and is primarily used by the Maine Army National Guard, but is occasionally used by civilian helicopters (i.e., Maine LifeFlight), and the U.S. Coast Guard. When the Army Guard is at full operations at BGR, meaning there are no deployments elsewhere, the helipad incurs an estimated 20 to 40 operations per day.

BGR also serves a wide variety of transient U.S. and foreign military units. Every branch of the service cycles aircraft through BGR, particularly those that are enroute to/from Europe or the Middle East. Because of its strategic location relative to the North Atlantic, BGR is also used by a large number of

European and other foreign air forces that are ferrying aircraft to/from the U.S. for training and/or maintenance.

Military operations are projected to remain flat at just under 14,000 operations annually through 2040. More than 73% of the operations are projected to be transient.

7.5 Passenger Air Transportation

Bangor International Airport (BGR) is an enterprise funded entity operated by the City of Bangor and is supported solely through Airport generated revenue. It is a full-service regional airport offering non-stop flights through four airline carriers.

Allegiant provides direct, non-stop jet service to Orlando/Sanford Airport and Tampa/St. Petersburg Airport.

American Airlines provides regular non-stop service to Philadelphia and Washington D.C.'s Reagan National. Seasonally, American Airlines also provides non-stop service to Charlotte, NC.

Delta offers daily non-stop service from Bangor to New York's LaGuardia and JFK Airports.

United provides regular direct service to Newark Liberty and seasonal service to Chicago O'Hare Airport.

BGR offers 24-hour access to U.S. Customs and Border Protection, U.S. Dept. of Agriculture, Public Health and Animal/Plant quarantine services. BGRs International Arrivals Terminal is specifically designed to handle clearing flights and is capable of processing 1,000 passengers per hour.

Figure 7.5

Bangor International Airport Annual Passenger Statistics		
	Passengers	Change
2012	460,268	
2013	487,775	5.98%
2014	489,977	0.45%
2015	477,244	-2.60%
2016	492,671	3.23%

Between 2012 and 2016, the passenger traffic at Bangor International Airport increased by 7 percent (Figure 7.5). The recent remodel of the Peter R. D'Errico Passenger Terminal and the addition of a new gate and jet bridge gives BGR more capacity for growth.

While the total number of passengers increased from 2015 to 2016, the number of passenger enplanements decreased slightly, demonstrating that more passengers are arriving at BGR than leaving (Figure 7.6a & b). A dramatic decrease in the number of enplanements was experienced between 2010 and 2015.

Figure 7.6a

Bangor International Airport Passenger Enplanements 2015 - 2016		
2016	2015	Change
269,013	273,829	-1.76%

Figure 7.6b

Bangor International Airport Passenger Enplanements 2000 - 2016		
Year	Enplanements	5-Year Change
2000	272,833	
2005	433,816	59.00%
2010	416,328	-4.03%
2015	273,829	-34.23%

Because of its strategic location BGR is used regularly as a diversion destination by U.S. and

foreign airlines, the military, and other aircraft operators. Bangor Airport accommodates the most irregular operations (IROPS) of any airport in the U.S. The long runway (11,440 feet), support facilities (such as its CAT III instrument landing system and terminal facilities), U.S. customs and immigration facilities, ground handling services, emergency medical and law enforcement services are also key reasons BGR serves as the primary U.S. option for transatlantic flights that need to divert.

Between 2005 and 2016, BGR handled 1,191 emergency diversions: 709 for fuel-related issues, 254 because of bad weather, 95 for medical emergencies, 90 due to mechanical problems and 43 prompted by security threats. The Airport has a reputation as a go-to facility for technical stops and serves as a primary refueling hub for overseas military flights carrying personnel and cargo. The joint-use agreement with the local Air National Guard provides that in return for BGR providing 24/7 operational services for the Guard, the military unit provides the airport with aircraft rescue and firefighting support equipment and personnel.

Passenger Facilities

Automobile parking. The domestic and international terminals are served by several ground level parking lots with a total capacity of 884 parking spaces. The parking lots operate at and above capacity during peak periods. The airport has recently expanded ground level parking to meet growing demand by adding 440 temporary overflow spaces. The greatest demand for parking typically occurs between February and May, with the peaks corresponding with winter and spring school breaks. During the peak period there can be as many as 1,200 vehicles parked at BGR. Approximately 30 percent of that demand is comprised of cross-border Canadian passengers. A parking study, including a parking garage design, has been completed in order to analyze parking needs and options. Several specific ground level parking areas are designated as shown in Table 7.1.

Table 7.1
BANGOR INTERNATIONAL AIRPORT
PARKING FACILITIES

	Number of Spaces	Average Daily Occupancy Rate
Short-Term Parking Lot	172	35%
Long-Term Parking Lot	705	73%
Handicap Parking	23	50%
Employee Parking Lot	140	60%
Overflow Parking Lot	440	

Terminal Buildings. BGR has two terminal buildings that define the overall terminal complex: the domestic terminal building totals approximately 73,000 square feet of passenger processing and related support space, and has three jet loading bridges as well as ground level ramp gates for regional aircraft. The adjacent international terminal building is approximately 55,000 square feet in size, and has four jet loading bridges that can accommodate up to B-747-400 aircraft, and associated hold rooms. The two buildings are connected through a single security checkpoint and other secure corridors. The total curb length in front of the terminal measures 310 linear feet.

The domestic terminal houses a number of concessions, as well as hold rooms, public waiting area, airline ticket counters and office space, baggage claim, and security areas. The international terminal also has U.S. customs and immigration offices and screening facilities for international passengers. Situated in the international terminal is also BGR Airport's dispatch office, and the airport's administrative offices are situated between the international and domestic terminal buildings.

Terminal Concessions. There are a number of concessions in the terminal building, including rental cars, restaurants and shops. The concession operators pay building rent and a concession fee to the airport.

Hotel. There is a hotel with 111 guest rooms connected to the terminal building. The hotel, under various ownership and brands, has been located at the Airport since the early 1980s.

Ground transportation. In addition to rental cars, the Airport is served by taxis and limousines, and buses.

General aviation (non-airline) businesses – in addition to the passenger airlines serving the Airport (Allegiant, American Airlines, Delta, and United), there are several businesses situated on Airport property that provide a variety of service to aviation users, including aircraft maintenance and pilot and flight instructor training.

Passenger Intermodal Facilities

Bangor International Airport lacks passenger intermodal connectivity to many of the region's tourist attractions. There is a service gap in direct transportation connections at BGR to tourist destinations in the Maine Highlands area and National Park areas (Acadia National Park/Bar Harbor, Sugarloaf, the Moosehead area, and Baxter State Park).

Although several public transportation providers operate within the Bangor urbanized area, there is no formal intermodal facility where all riders can transfer easily between providers. In 2014, as part of a study the City of Bangor commissioned to examine conditions at, and possible alternatives to, Pickering Square as the Community Connector bus hub, consultants investigated the possibility of developing a bus hub that could also serve as an intermodal facility near Bangor International Airport (BIA); however, the consultant determined that location would not serve the public transit fixed-route bus system well as its depot.

7.6 Capital Improvements and Funding

The FAA provides about $8 million annually to Maine for airport improvement purposes. FAA funds are administered by MaineDOT, and are made available on a 95/2.5/2.5 (federal/state/local) percentage matching basis. Since 1969, the State of Maine has approved bond issues every two years to provide the match for FAA funds, and to support engineering studies for future airport improvement projects.

Improvement projects at BGR since the last update of the BACTS MTP, include renovations to escalators and reconstruction of the Airport entrance at Godfrey Boulevard, construction of a passenger boarding bridge and terminal gate holding area and a multi-year modernization project to which implemented improvements to facilitate better passenger flow on the first floor and more efficient operations in the entire Domestic Terminal.

Work Plan Year	Description	Scope of Work	Estimated Funding
2018/19	Safety and infrastructure improvements that may include design and reconstruction of Taxiway "A" south (Taxiway "K" to Runway 33) and light bar rehabilitation at the Bangor International Airport (BGR).	Reconstruction	$ 9,888,000
2019	Safety and infrastructure improvements that may include design and reconstruction of Taxiway "A" north and light bar rehabilitation at the Bangor International Airport (BGR).	Reconstruction	$ 1,442,000
2017	Safety and infrastructure improvements that may include design and construct LED Taxiway lighting project at the Bangor International Airport (BGR).	Lighting	$ 278,100

http://maine.gov/mdot/projects/workplan/

The next multi-year project planned for BGR and included in MaineDOT's 2017 to 2019 workplan (Figure 7.7) is the design and construction for rehabilitating Taxiway A, as well as other safety and infrastructure improvement projects to taxiway lighting.

7.7 Forecast

Fundamentally, over the medium and long term, demand for aviation is driven by economic activity, and a growing U.S. and world economy provides the basis for aviation to grow over the long run. The 2017 FAA forecast calls for U.S. carrier passenger growth over the next 20 years to average 1.9 percent per year. System traffic in revenue passenger miles is projected to increase by 2.4 percent a year between 2017 and 2037. U.S. carrier system capacity measure in available seat miles is forecast to grow in line with the increases in demand.

The FAA long-term outlook for general aviation is stable to optimistic, as the active general aviation fleet is forecast to increase 0.1 percent a year between 2016 and 2037, resulting in an increase in the fleet of about 3,400 units. Although fleet growth is minimal, the number of general aviation hours flown is projected to increase an average of 0.9 percent per year through 2037, as growth in turbine, rotorcraft,

BGR TERMINAL AREA FORECAST
Forecast Issued January 2012 - Source: FAA APO

	Pass. Enplanements			AIRCRAFT OPERATIONS: Itinerant Operations					Local Operations			Total	
Fiscal Year	Air Carrier	Commuter	Total	Air Carrier	Air Taxi & Commuter	GA	Military	Total	Civil	Military	Total	Operations	Based Aircraft
2011	36,287	166,559	202,846	5,777	10,332	13,087	10,143	39,339	4,511	3,616	8,127	47,466	43
2012	36,464	168,557	205,021	5,801	10,426	12,801	10,143	39,171	4,106	3,616	7,722	46,893	44
2013	36,643	170,581	207,224	5,825	10,521	12,883	10,143	39,372	4,148	3,616	7,764	47,136	44
2014	36,823	172,629	209,452	5,849	10,617	12,966	10,143	39,575	4,190	3,616	7,806	47,381	45
2015	37,004	174,701	211,705	5,873	10,714	13,049	10,143	39,779	4,232	3,616	7,848	47,627	46
2016	37,186	176,798	213,984	5,897	10,812	13,133	10,143	39,985	4,275	3,616	7,891	47,876	46
2017	37,369	178,920	216,289	5,921	10,911	13,217	10,143	40,192	4,318	3,616	7,934	48,126	47
2018	37,553	181,068	218,621	5,945	11,011	13,302	10,143	40,401	4,361	3,616	7,977	48,378	47
2019	37,738	183,241	220,979	5,969	11,112	13,388	10,143	40,612	4,406	3,616	8,022	48,634	48
2020	37,923	185,440	223,363	5,993	11,213	13,474	10,143	40,823	4,451	3,616	8,067	48,890	49
2021	38,108	187,666	225,774	6,017	11,315	13,561	10,143	41,036	4,496	3,616	8,112	49,148	49
2022	38,294	189,917	228,211	6,041	11,418	13,648	10,143	41,250	4,542	3,616	8,158	49,408	50
2023	38,481	192,196	230,677	6,065	11,523	13,736	10,143	41,467	4,588	3,616	8,204	49,671	51
2024	38,670	194,504	233,174	6,089	11,628	13,824	10,143	41,684	4,634	3,616	8,250	49,934	51
2025	38,860	196,837	235,697	6,113	11,734	13,913	10,143	41,903	4,682	3,616	8,298	50,201	52
2026	39,051	199,198	238,249	6,137	11,841	14,002	10,143	42,123	4,730	3,616	8,346	50,469	53
2027	39,243	201,588	240,831	6,161	11,949	14,092	10,143	42,345	4,778	3,616	8,394	50,739	54
2028	39,437	204,007	243,444	6,185	12,058	14,182	10,143	42,568	4,828	3,616	8,444	51,012	55
2029	39,631	206,455	246,086	6,209	12,168	14,273	10,143	42,793	4,878	3,616	8,494	51,287	56
2030	39,826	208,931	248,757	6,233	12,278	14,364	10,143	43,018	4,928	3,616	8,544	51,562	57
2031	40,022	211,438	251,460	6,257	12,390	14,456	10,143	43,246	4,979	3,616	8,595	51,841	58
2032	40,219	213,975	254,194	6,281	12,503	14,549	10,143	43,476	5,030	3,616	8,646	52,122	59
2033	40,417	216,542	256,959	6,305	12,617	14,642	10,143	43,707	5,081	3,616	8,697	52,404	60
2034	40,616	219,140	259,756	6,329	12,732	14,736	10,143	43,940	5,133	3,616	8,749	52,689	61
2035	40,816	221,769	262,585	6,353	12,848	14,830	10,143	44,174	5,185	3,616	8,801	52,975	62
2036	41,017	224,430	265,447	6,378	12,965	14,925	10,143	44,411	5,237	3,616	8,853	53,264	63
2037	41,219	227,122	268,341	6,403	13,083	15,020	10,143	44,649	5,290	3,616	8,906	53,555	64
2038	41,422	229,847	271,269	6,428	13,202	15,116	10,143	44,889	5,343	3,616	8,959	53,848	65
2039	41,626	232,605	274,231	6,453	13,322	15,213	10,143	45,131	5,398	3,616	9,014	54,145	66
2040	41,831	235,396	277,227	6,478	13,443	15,310	10,143	45,374	5,453	3,616	9,069	54,443	67
							Percent Change						
1990-2010	-80.3%	146.8%	-28.8%	-68.4%	-18.1%	-35.4%	-1.0%	-29.9%	-76.6%	-67.8%	-72.3%	-47.1%	-35.9%
2011-2030	9.8%	25.4%	22.6%	7.9%	18.8%	9.8%	0.0%	9.4%	9.2%	0.0%	5.1%	8.6%	32.6%
2030-2040	5.0%	12.7%	11.4%	3.9%	9.5%	6.6%	0.0%	5.5%	10.7%	0.0%	6.1%	5.6%	17.5%
2011-2040	15.3%	41.3%	36.7%	12.1%	30.1%	17.0%	0.0%	15.3%	20.9%	0.0%	11.6%	14.7%	55.8%

and experimental hours more than offset a decline in fixed wing piston hours. Figure 7.8 shows Bangor International Airport operations forecasts through 2040.

General Aviation. BGR projects both local and itinerant (transient) general aviation to increase by 18 percent between 2011 and 2040. The transatlantic ferry traffic is comprised of corporate jets (both new aircraft deliveries as well as companies flying between the U.S. and Europe), as well as piston-engine and turboprop aircraft deliveries. The volume of aircraft delivery flights is directly affected by the sales of new aircraft. Corporate turbine aircraft sales are projected to experience steady growth through 2020, so that volume of transatlantic traffic at Bangor Airport should continue to increase.

Corporate aircraft business travel is also slowly rebounding after the 2008-2009 recession, with international corporate travel growing faster than domestic traffic, and is projected to continue growing through the forecast period. Rising airline fares and enhanced airline passenger security procedures stimulate demand for corporate travel. Deliveries of new piston engine aircraft will continue but at a relatively lower level. Other types of piston and small turboprop transatlantic flights (business & recreational) will also continue at a relatively low level but are sensitive to fuel prices and availability of 100LL avgas at foreign airports, which are anticipated to become scarcer.

Air carrier and air taxi operations are projected to increase by almost 24 percent between 2011 and 2040. Assuming that future airline consolidations or business disruptions (e.g. bankruptcies) do not significantly change airline service levels at BGR, FAA's forecast for future growth is reasonable. It is anticipated that scheduled passenger service will continue to be hub-oriented.

Total aircraft operations are projected to increase by almost 12 percent between 2011 and 2040. Growth in airline and GA activity, particularly corporate traffic, will lead the growth curve. Local operations (military and GA) are not anticipated to experience much, if any, growth through 2040.

FAA projects **passenger enplanements** will increase by almost 37 percent by 2040, with the largest increase expected in commuter enplanements. That is also reflected in the forecasted share of commuter enplanements, which is projected to rise from 82 percent of total passengers in 2011 to 85 percent by 2040.

Based aircraft are projected to increase from 43 to 67, an increase of 56 percent between 2011 and 2040. There are a number of new general aviation aircraft makes and models for sale, largely in the sport pilot market, as well as new corporate jets. It is likely that the FAA forecast represents the high-end of the potential based aircraft at BGR given rising fuel prices, higher cost of airplane ownership, and the uncertainty surrounding the future of 100LL avgas.

7.8 Recommendations

- BGR lacks passenger intermodal connectivity to many of the region's tourist attractions. Direct transportation connections at BGR, via rail or bus, to tourist destinations such as Acadia, Sugarloaf, the Moosehead area, and Baxter State Park would make BGR much more marketable, thus attracting additional air service providers. Passenger rail service to Bangor, restoration of the Calais Branch with a connection at BGR, and regional bus service at BGR would allow tourists to fly into BGR and immediately board a bus or train to their favorite destination.

- Promote and support the construction of a major conference center in Bangor which will make BGR more attractive to air service providers.

- Explore the feasibility of developing a containerized inland port, or intermodal facility, near BGR or Northern Maine Junction and supported by future port expansion at Searsport.

- Conduct a study to determine the feasibility of developing air cargo services at BGR for niche markets such as Maine lobster.

Resources:
2016 Maine's Infrastructure Report Card: https://www.infrastructurereportcard.org/state-item/maine/

2014 Bangor International Airport Master Plan

FAA Aerospace Forecast 2017 – 2037:
https://www.faa.gov/data_research/aviation/aerospace_forecasts/media/FY2017-37_FAA_Aerospace_Forecast.pdf

2016 Comprehensive Plan Update City of Old Town, Maine
http://www.maine.gov/dacf/municipalplanning/comp_plans/Old_Town_2016.pdf

8.0 Rail Transportation

8.1 Introduction

Rail service is an important component of the transportation mix in Maine and is particularly cost-effective and energy efficient when moving high-volume, low-value commodities over long distances as it minimizes heavy truck traffic on roads. Maine has 1,119 miles of active railroad. Although railroads in Maine are not capacity-constrained by volume, sections of active track will not support 286,000-pound rail cars, the standard with Class I railroads. In 2015, Maine had nearly 4.7 million tons of freight moved annually by rail. Freight rail service, operations and infrastructure investment are directly related to market forces and the business cycle and typically are not influenced by governmental policy.

8.2 Freight Transportation

Maine's Freight System consists of seaports, airports, border crossings, intermodal facilities, distribution centers, and a network of rail and road connections. The largest and most important component of Maine's transportation system is its highway network. Trucking is the dominant mode for freight shipments accounting for almost 90 percent of all freight tonnage moved to, from, and within the State. Key Transportation Facilities and Freight Hubs in the Bangor area are depicted in Figure 8.1

Key Regional Transportation Facilities and Freight Hubs

HIGHWAYS	I-95 , I-395
RAILROADS	Central Maine and Quebec Railroad,Pan Am Railways, Northern Maine Junction
AIRPORTS	Bangor International Airport
FREIGHT GENERATORS	General Electric, Old Town Canoe, UPS

Factors that contribute to determining which mode of freight transportation is most effective and efficient include size, weight, and resource of the product and location of both customer and seller. However, the primary factors that determine the transportation decisions are how much it costs to get freight from origin to destination, reliability and consistency of the arrival/departure of freight and the amount of time it takes to get from origin to destination. Trucks carry the largest shares by value, tons, and ton-miles for shipments moving 750 or fewer miles, while rail is the dominant mode by tons and ton-miles for shipments moved from 750 to 2,000 miles. Air, multiple modes and mail, and other modes accounted for more than half of the value of shipments moved more than 2,000 miles.

8.3 Freight Rail Lines

Unlike much of the rest of the United States in which rail systems were established to connect regions to the rest of the country, many of Maine's rail lines were designed to link the state and its ports to Montréal and the Great Lakes. Maine's freight rail system consists of two Class II railroads, six Class III railroads, and one terminal and switching operation. The Class II rail system and Class III system comprise approximately 51 percent and 49 percent of the State's active route miles, respectively. Of the 1,197 miles of total serviceable lines, 1,130 miles are currently active freight lines connected to the North American rail system. The remaining 67 miles are operational track segments that are not currently providing freight service.

8.4 Operators

Freight rail service is primarily privately owned, operated and maintained, and infrastructure investment is related to market forces and business cycle with little to no influence by governmental policy or priority. While government may establish policy and funding priorities, planning for rail is unlike other modes of transportation that rely on publicly owned and maintained infrastructure.

In October 2010, Montreal, Maine and Atlantic Railway (MMA), filed a Notice of Intent to abandon 233 miles of its track in northern Maine between Millinocket and Madawaska. To avoid economic loss from disruptions in service to northern Maine, the State purchased the track and signed a lease and operating agreement for the Aroostook Lines with Maine Northern Railway in July 2011. Subsequent to the Lac Megantic derailment and explosion in July 2013, MMA filed for bankruptcy in both the United States and Canada. Central Maine and Quebec Railway (CMQ) purchased more than 470 route miles of former Montreal Maine and Atlantic (MMA) track in June 2014 (Figure 8.2).

Total Active Freight Rail Lines in Maine by Operating Railroad (2013)

Railroad Operator	Mileage
Class II Rail System	
Central Maine and Quebec Railway	222.23
Pan Am Railway	394.67
Class III Rail System	
Maine Northern Railway	232.64
Maine Eastern Railroad	90.69
Eastern Maine Railway	137.31
Saint Lawrence and Atlantic Railroad	85.00
New Hampshire North Coast Railroad	.30
Terminal and Switching	
Turner's Island LLC	1.57

Source: Maine State Rail Plan. July 2014. http://maine.gov/mdot/ofbs/docs/Rail Plan 7-9-2015.pdf

Maine Eastern Railroad (MER) operated the state-owned Rockland Branch rail line from 2003 until the end of 2015, providing freight service year-round and passenger service seasonally between Brunswick and Rockland. Operations ended at the end of 2015 as a result of MaineDOT selecting Central Maine and Quebec Railway to operate the line starting January 1, 2016.

Central Maine and Quebec Railway (CMQ) began operations in June 2014 after purchasing the former MMA track and now owns 207 miles of track from Millinocket to Searsport as well as a line from Brownville Junction to the international border west of Jackman and into Canada. CMQ also has a ten-year lease, which began January 2016, for the state-owned Rockland Branch.

CMQ provides the shortest, most-direct rail link between northern Maine, Saint John, New Brunswick and Montreal. In addition, CMQ provides access to port facilities at St. John, New Brunswick and Searsport. The route between Searsport and Montréal is able to accommodate double stack intermodal services and the newer 286,000 pound rail cars. CMQ primarily transports forest and paper products, construction materials, chemicals and fertilizers, grains and feeds, and energy products and fuels. In addition to connecting with Pan Am Railways at the Northern Maine Junction in Hermon, with CN at St. Leonard and EMR at Brownville Junction; CMQ also connects with two Class I railroads outside of Maine.

Maine Northern Railroad (MNR) is owned by the JD Irving Company and operates the 233 miles of railroad acquired by MaineDOT when MMA abandoned it in 2010. The rail lines serve Caribou, Presque Isle, Easton and Houlton. MNR connects with the CMQ in Millinocket and its sister railroad the Eastern Maine Railway in Madawaska. Forest products are the major commodity carried on MNR which include finished lumber, wood products, wood chips and paper. Also carried are paper mill chemicals, propane, diesel oil, vegetable oil, fertilizer and aggregate.

Pan Am Railways (PAR) is North America's largest regional railroad system. Pan Am began in 1981, then known as the Guilford Transportation Industries, when it purchased the former Maine Central Railroad operating from Portland to the north. Guilford Transportation Industries then purchased the

bankrupt Boston & Maine railroad in 1983 operating from Portland to the south. In 2006, following the purchase and rebranding of bankrupt Pan Am Airways, the railroad was rebranded as Pan Am as well.

Based in Waterville, PAR's main freight line runs from South Berwick to Mattawamkeag with branches to most of the major paper mills. A critical link for PAR is not just their southern mainline, but also their connection to the Canadian provinces through the EMR. PAR owns at total of 372 miles of rail in Maine and connects to many Class I railroads. PAR also connects to the St. Lawrence & Atlantic Railroad (SLR) at Danville Junction, which was upgraded in 2012.

St. Lawrence & Atlantic Railroad (SLR) operates on 85 miles of track in Maine from Portland west to New Hampshire and into Montreal. SLR provides a key transportation link through Lewiston/Auburn, Mechanic Falls, and South Paris and serves warehouse distribution, intermodal and bulk transloading facilities in Maine, including the SLR operated 35-acre Maine Intermodal Terminal in Auburn. The primary commodities transported by SLR include forest products of lumber, pulp and paper, as well as chemicals and agricultural products.

Eastern Maine Railway (EMR) is a non-operating subsidiary of New Brunswick Southern Railroad (NBSR), a holding company of JD Irving Company, with 100 miles of track between Brownville Junction and Vanceboro. EMR connects to CMQ at Brownville and NBRS connects at the Maine/New Brunswick border in Vanceboro. In addition, the EMR operates the 26 mile Van Buren subdivision between Madawaska making a connection with the MNR and Van Buren where it connects at the border with the CN.

8.5 General Purpose Freight Interchange Facilities

In the normal course of moving commodities from origin to destination it is often necessary for a railcar to move from lines owned by one railroad to lines owned by another railroad. The interchanges between the state's rail providers are key areas for improvement to the flow of goods into and out of Maine. Figure 8.3 shows the General Freight Rail Yards in Maine as presented in the 2014 Maine State Rail Plan.

Location Name of Yard	General Description	Overall Length of Yard	Number of Functional tracks at present time	Clear Length of Longest tracks	Function
		PAN AM RAILWAY			
Mattawamkeag	Small yard where Maine Central connected to Canadian Pacific	5,700'	5	3,200'	Currently is end of Pan Am Railway and interchange with Eastern Maine RR
Bucksport	Small yard stretched out along end of branch at Bucksport	7,300'	14 tracks strung out in several groups over the 7,300' plus a number of tracks into mill	2,000'	Currently supports Verso Bucksport mill. Was some oil traffic in past and copper ore transload.
Bangor (Bucksport connection)	Several tracks at junction of Bucksport & Freight Main. Long track is runaround	3,275'	4 - inc. run-around	2,500'	Long track needed to reverse direction as Bucksport Branch connects in North direction.
Northern Maine Junction	On Pan Am, interchange with MM&A. Long, series of yards, max. of 4 tracks wide.	10,565'	8 tracks	5,700'	Currently regional yard. Supports freight main to Mattawamkeag, Bucksport Br. & local businesses.
		CENTRAL MAINE & QUEBEC			
Searsport	Port side yard plus oil loading tracks and to Mack Point.	3,000'	4 tracks plus various loading tracks beyond and adjacent to main yard.	2,400'	Serves port and nearby chemical plant. Major commodities were coal, then oil. Four tracks removed in main yard.
		PAN AM RAILWAY			
Mattawamkeag	Small yard where Maine Central connected to Canadian Pacific	5,700'	5	3,200'	Currently is end of Pan Am Railway and interchange with Eastern Maine RR
Bucksport	Small yard stretched out along end of branch at Bucksport	7,300'	14 tracks strung out in several groups over the 7,300' plus a number of tracks into mill	2,000'	Currently supports Verso Bucksport mill. Was some oil traffic in past and copper ore transload.
Bangor (Bucksport connection)	Several tracks at junction of Bucksport & Freight Main. Long track is runaround	3,275'	4 - inc. runaround	2,500'	Long track needed to reverse direction as Bucksport Branch connects in North direction.
Northern Maine Junction	On Pan Am, interchange with CMQ. Long, series of yards, max. of 4 tracks wide.	10,565'	8 tracks	5,700'	Currently regional yard. Supports freight main to Mattawamkeag, Bucksport Br. & local businesses.
Waterville	Larger yard with system shops, intermodal facility	5,100'/ 7,690'	17 in main yd. + shop	4,200'/ 6,200'	System shop, unused I. M facility, supports Sappi & Madison mills, E. Augusta Br & local businesses.
Danville Junction	Small interchange yard with St. Lawrence & Atlantic	3,000'	4 (shared with SLA)	2,150'	Recently reconfigured to improve interchange operations. Several other sidings in area.
Rigby Yard	Large	7800'	13 tracks 2 thru tracks	5200'	Regional classification and switching yard
		PAN AM RAILWAY			
Rumford	Small yard that supports adjacent New Page mill with some cars for Rileys	2,600'/ 5,100'	8 in main yd. + 7 - 8	2,100'	Car storage and switching for mill at Rumford and also for mill at Rileys(Jay)
Rileys (Jay)	Long, narrow yard that supports adjacent Verso Androscoggin Mill	7,000'	15-16	2,000'	Long layout of several smaller yards with numerous tracks extending to pulp & paper mill
		SAINT LAWRENCE & ATLANTIC			
Lewiston Junction	Three tracks along main line, loco shop and adjacent Port of Auburn tracks	5,500	3 + 6 shorter	5,000'	Long range plans to add several more tracks along main line
Danville Junction	Small interchange yard with Pan Am Railway	3,000'	4 (shared with PAR)	2,150'	Recently reconfigured to improve interchange operations. Several other sidings in area.
South Paris	Two storage tracks along main line plus tracks near center of S. Paris.	1,825'	2	1,410'	Used to store cars and switch cluster of industries in South Paris & south towards Mechanic Falls
		MAINE EASTERN			
Rockland	Small yard and round house at Rockland.	1,485'	4	900'	Used mostly to support Dragon Cement plant at Thomaston, passenger excursion, loco servicing.
Brunswick	Interchange track and siding.				

Northern Maine Junction in Hermon is the only railyard located within the BACTS area. It was once a very large, active yard where tens of thousands of cars per year were interchanged between the Maine Central Railroad (now PAR) and the Bangor & Aroostook Railroad (now CMQ). Most recently, interchange volume has reduced to several thousand cars per year and the yard's active tracks have been reduced. It is currently primarily used to handle the interchange volumes and to support local industry that has established itself within and near the yard.

8.6 Intermodal/Transloading Facilities

More than 90 percent of all freight shipments in Maine are moved by truck for at least part of their journey. Intermodal rail facilities are locations within the rail network where international and domestic containers or trailers are exchanged between the rail mode and highway or port mode of transporting freight. Figure 8.4 shows the intermodal facilities identified in the 2014 Maine State Rail Plan.

Location Name of Facility	General Description	Number and Length of transfer tracks	Number and Length of support tracks	Comments on Operations
MAINE NORTHERN RAILROAD				
Presque Isle Intermodal Facility	Small facility located within airport property	1 at 1,200'	N/A	Intermittent Operation. Handles frozen foods, various mulch material
Truck/Rail Log/Chip Transfer	There are a dozen or more siding locations where logs and chips are transferred between modes	Note 2	Note 2	
PAN AM RAILWAY				
Waterville Intermodal Facility	Two 3,000' ramp (loading) tracks, with 100' between. Created by removing yard tracks	2 at 3,000'	Numerous - see Waterville Yd.	Facility idle for last seven years.
Turners Island, LLC	Bulk cargo, roll on-rolloff loading, 98 acres openstorage, 9,000 SF drywarehouse			Short line rail way connects to Pan Am at Rigby Yard.
SAINT LAWRENCE & ATLANTIC				
Auburn Intermodal Facility	Small facility, paved with compacted gravel.	2 at 1,200'	1 at 1,700' +tracks nearby	Has been successful in attracting related economic development – trucking and warehousing to the region.
Port of Auburn	Single ended yard for storage plus tracks for ethanol and bunker "C" oil transload	6-8 at 900'–1,100'		Primarily rail car storage and transload of bulk materials.
Savage, Auburn	Extensive rail to truck transload facility for dry and liquid chemicals and food grade products	9-10 tracks from 400' to 1,110' long		This facility has seen steady growth as intermodal services (bulk) have replaced direct rail service for some regions within the state.
MAINE EASTERN				
Rockland Cement Pier	Small facility used to transfer bulk cement from rail car to barge using vacuum system	1 at 350'	N/A	One double ended siding where specialized covered hoppers are vacuum discharged to a barge.

Auburn Intermodal Facility opened in 1994. The facility was originally a 35-acre terminal that has since been expanded to over 50 acres increasing trailer/container storage. The facility consists of two 1,200-foot long tracks that accommodate transfer of containers and trailers between truck and rail. The greater portion of the facility is used for trailer/container parking, containerized storage, and a weighing and freight control center. The cargo is lifted between flatbed rail cars and trucks via a side loader. Several trucking companies service the Auburn Intermodal facility which is located less than three miles from I-95.

Savage-Safe Handling facility is located in Auburn on SLR and is a major bulk transload operation dealing in industrial chemicals and food grade products such as edible oils, flour and corn syrup. It is also a major toll processing company, mixing and repackaging various products for other companies. There are over a half dozen tracks for transferring various liquid and dry products between rail cars and trucks and also buildings for toll processing.

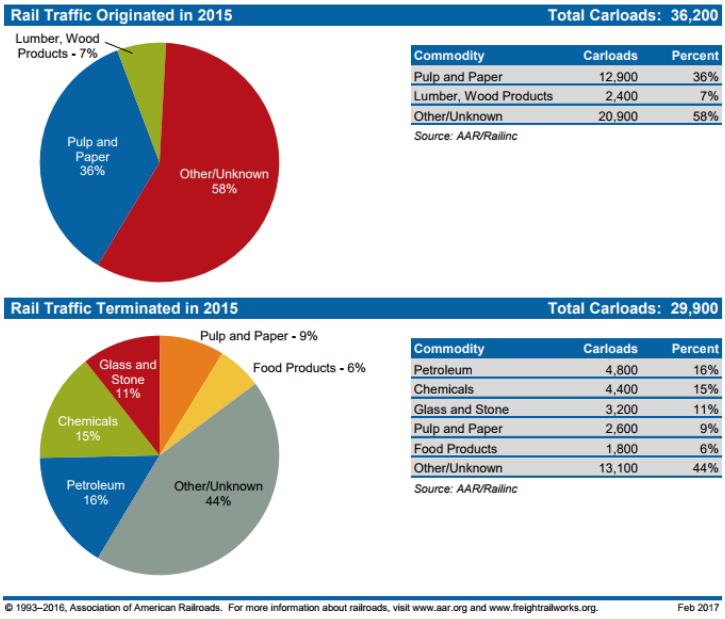
The Port of Auburn is served by SLR and is comprised of rail facilities around Lewiston Junction in Auburn, including a U.S. Customs station and warehouse space that are all within a foreign trade zone (FTZ).

Turners Island Terminal is a privately owned and operated marine-rail cargo terminal located in South Portland. The facility can handle almost any cargo that can be shipped by either rail or barge. The 1.6 mile terminal railway connects with PAR for shipping destinations nationwide. Goods are shipped by barge or rail via bulk cargo off-loading areas, roll on/roll off ramp for marine-marine or marine-rail transfers, heavy lift services, construction and demolition debris transloading area, and bulk storage. The bulk storage consists of 14 acres of open storage at the terminal, 84 acres of open storage accessible by rail and located in Scarborough and 9,000 square feet of dry warehouse space with loading docks, parking, and rail access.

Rockland Cement Pier is a Cement Transfer Terminal (CTT) where cement is transferred from rail cars to barges through means of a pneumatic pumping system. The cement is moved by rail car the four to five miles to the pier head in special pressure differential rail cars where the cement is transferred to barges via a vacuum system.

The Waterville Intermodal Facility is served by PAR. After several years of inactivity, the Waterville facility was revitalized in 2016 when Poland Springs bottling plant in Kingfield started trucking containers of bottled water to the Waterville facility where the containers are shipped to South Portland and connected to the train into Massachusetts.

Figure 8.5



Commodities

According to the Association of American Railroads (AAR), pulp and paper products are the top originating commodities transported by rail in Maine followed by lumber and wood products. The top commodities terminating in Maine include petroleum, chemicals, glass and stone. Total tonnage of goods hauled by Maine's railroads continues to decline, as is the case nationally. Two rail systems, Pan AM Railways and Central Maine and Quebec Railway (CMQ), which provides freight rail connections to Canada and the remainder of the United States, run through the BACTS area (Figure 8.5).

8.7 Freight Rail Funding

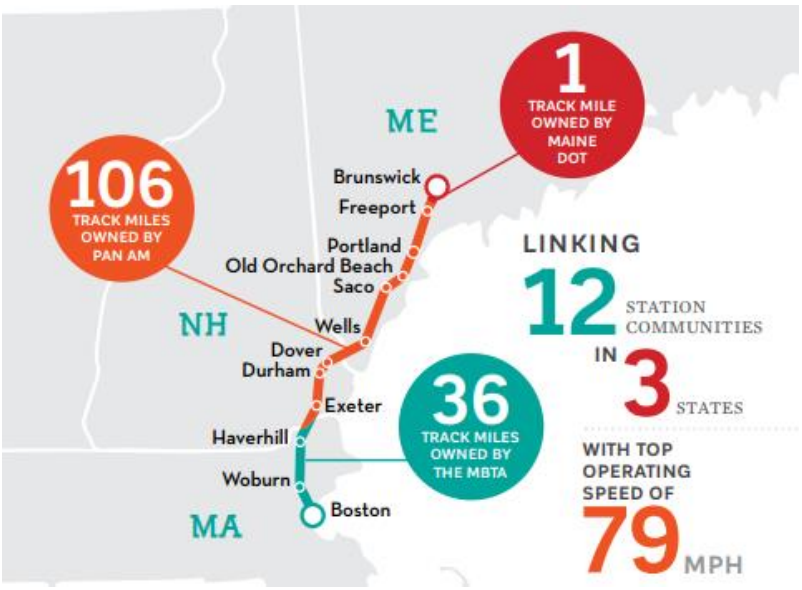
MaineDOT and private railroads work jointly on several capital projects around the state. MaineDOT's three year work plan budgets $1.2 million annually in FHWA crossing safety funds for improving safety at highway-rail crossings, which typically funds between four and five crossing improvement projects annually.

In 2015, Maine received a federal TIGER grant of $20 million for the Maine Regional Railways Project to improve 384 miles of track and increase system usage and ensure the Maine railroad network remains an efficient and effective means of passenger and freight transportation. Pan Am Railways committed to contribute $4 million to a $10 million project to increase train speed to 25 mph from 10 mph between

Northern Maine Junction in Hermon to their large yard in Waterville. Central Maine & Quebec Railway committed to contribute $4 million to a $10 million project to replace 34,650 ties and provide new ballast and new rail on 78-miles between Hermon and Searsport, which will allow trains to operate at increased speeds (from 10 mph to 25 mph). The Maine Northern Railway and Eastern Maine Railway committed to contribute $6.5 million toward a $17.4 million project to upgrade the line connecting Maine railroads with New Brunswick, Canada which will allow increased speeds of 40 mph (from 25 mph). The project is expected to be completed in 2017.

8.8 Passenger Transportation

There are no passenger rail facilities located in or serving the BACTS area. However, residents of the Greater Bangor area can leave the area on the Concord Coach Lines bus and easily make direct transfers to Amtrak Downeaster service in two different locations. The Bangor, Augusta & L-A to Portland bus route connects to Amtrak Downeaster service at the Portland Transportation Center, and the Midcoast Maine to Portland bus route connects to Amtrak Downeaster service at the Brunswick Visitors Center (Figure 8.6).



Source: Northern New England Passenger Rail Authority Annual Report Fiscal Year 2016.
http://www.nnepra.com/sites/default/files/NNEPRA_FY16_AR_M1-web.pdf

Northern New England Passenger Rail Authority (NNEPRA) operates the Amtrak Downeaster passenger. Daily runs from Portland to Brunswick and a new stop in Freeport were added in 2012. A stop in Kennebunk is being developed and is planned to open in 2018. NNEPRA completed a layover and maintenance facility in Brunswick in 2016, and secured $1.15 million in funding for a new rail siding in Cumberland.

Amtrak Downeaster currently operates from six stations in Maine (Wells, Saco, Old Orchard Beach, Portland, Freeport and Brunswick). The Downeaster makes five round-trips each day between Portland and Boston, two of which extend to Freeport and Brunswick. After completion of the Royal Junction Siding project, expected in 2018, all five trips will be between Brunswick and Boston. In fiscal year 2016, Amtrak reported an increase of 8.1 percent in the Downeaster ridership from the previous year, with 35 percent of the riders living in counties other than York and Cumberland.

Although there has been some interest expressed in bringing passenger rail up to the Bangor area, there are no current plans to expand the Downeaster service or implement service with a different operator. To implement new services, capital investments to existing railroad infrastructure will be required to achieve passenger operating standards, expand capacity to protect ongoing freight needs, and to develop station locations. The overall goals of such investments are to enhance mobility, encourage more sustainable land development patterns and to reduce the growth of highway congestion in the region. Maine continues to develop its tourism business and opportunities for "car free" tourism is viewed as essential to maintaining the quality of life for both tourists and residents. A 2013 study of extending passenger service from

Portland to Lewiston-Auburn estimated the cost of such an expansion to be $138 million. Bangor is five times the distance of Lewiston.

8.9 Intermodal Facilities

The Bangor area does not have passenger rail service; however, Concord Coach bus connects to Amtrak Downeaster service either at the Portland Transportation Center and the Brunswick Visitors Center, providing intermodal connectivity from Amtrak rail to Concord bus into and out of the Greater Bangor area.

8.10 Recommendations

- Encourage efforts to increase intermodal freight traffic through improved highway-rail and water-rail intermodal connectivity.
- Support efforts to increase passenger mobility options and access to intercity rail service via other transit modes through the proximity of new stations and/or system expansions.
- Encourage improved coordination among freight and intercity passenger systems with other modes of transportation among the railroads, Federal Government, Canada and other states in the New England region.
- Explore potential for incremental passenger rail improvements such as new stations, passing sidings, new and/or expanded services.
- Encourage linking rail transportation and land use planning in regional and statewide development practices.
- Support enhancements to the quality of service and market served by the Downeaster intercity passenger rail service to provide alternatives to medium and long distance highway and air travel.
- Support the State's efforts to conduct reviews with municipalities for redundant crossing locations and alternative traffic pattern opportunities to improve efficiency of the rail systems;
- Support the State's efforts to develop policies to increase and improve intermodal freight transportation, including improving data collection;

June 2014 Maine Integrated Freight Strategy:
http://www.maine.gov/mdot/ofbs/docs/FreightStrat.pdf

July 2014 Maine State Rail Plan:
http://maine.gov/mdot/ofbs/docs/Rail_Plan_7-9-2015.pdf

ASCE 2016 Report Card for Maine's Infrastructure:
https://www.infrastructurereportcard.org/wp-content/uploads/2016/10/Maine-Report_Card_final_booklet.pdf

9.0 Marine Transportation

9.1 Introduction

The American Society of Civil Engineers reports Maine's waterways are in good condition. Maine has over 3,500 miles of coastline with 12 significant ports and harbors. Five of these ports: Portland, Searsport, Eastport, Bucksport, and Bangor are well-suited to handle the requirement of most modern cargo vessels. The remaining ports serve local commercial fisherman and recreational activities. Over the last several years, there has been a decline in commercial marine traffic upstream of the Bucksport area.

9.2 Freight Transportation

The Penobscot River Corridor

The Penobscot River has played a key role in shaping the development of central and eastern Maine. Beginning in the late 1700s, the River was used to provide transportation to the region, to power sawmills, and to float and boom logs used in the 1800s in the lumber and ship-building industries. The River was later used to generate power and support pulp and paper mills, as well as other industries. The importance of the River to the economy of the region has declined in recent years as the movement of fuel, raw materials and products have moved away from Maine's coast and inland rivers to trucks, rail lines, and pipelines.

The Penobscot River corridor extends from Searsport to Bangor on the west side of the river, and from Verona Island to Brewer on the east side. The corridor includes several highways, the Penobscot River, the Bangor International Airport (BGR), two rail lines, and commercial port facilities at Searsport, Bucksport, and Brewer. The Corridor also includes facilities such as the Maritimes and Northeast pipeline, which crosses the Penobscot River at Orrington. The Penobscot River carries a variety of freight, passenger and recreational vessels.

The Western Penobscot Corridor highways include U.S. Route 1A in Bangor extending to Stockton Springs, U.S. Route 202 in Bangor extending (and parallel to U.S. Route 1A) to U.S. Route 1A in Hampden, and U.S. Route 1 in Searsport extending to the Penobscot Narrows Bridge between Prospect and Verona. These roads are all two-lane rural highways, except for U.S. Route 202 in Hampden, which is a two-lane limited-access highway and functions as a bypass around Hampden for vehicular traffic. The Eastern Penobscot Corridor highway routes include U.S. Route 1 in Searsport extending north across the Penobscot Narrows Bridge to Verona Island and Bucksport, then north along Route 15 to Brewer and Bangor. Route 46 intersects with U.S. Route 1/Route 15 in Bucksport and provides an alternative connection to Route 1A in Holden and on to northern Hancock and Washington Counties.

Pilotage is required in both the Penobscot Bay and Penobscot River for foreign vessels and U.S. vessels under register in the foreign trade, with a draft of nine feet or more. Large vessels bound for upriver usually need a tug to assist in making the turns and in docking. Five tugs are available in Belfast for such assistance. The controlling depth in the marked channel is 13 feet between Winterport and Bangor. The head of navigation for commercial vessels is immediately downstream of the Joshua Chamberlain Bridge, while smaller recreational vessels can travel to a point about one mile upstream of the Penobscot Bridge. Ice impedes, but usually does not prevent, navigation above Winterport during the winter months. The river is kept free of ice to a point just upstream of the I-395 Veterans Remembrance Bridge by a Coast Guard icebreaker.

Although there has been minimal commercial marine transportation north of Bucksport, other than occasional asphalt and petroleum barge shipments, Cianbro Constructors' manufacturing of prefabricated components of industrial structures in Brewer has increased demand for water transportation on the Penobscot River. These components are shipped on the Penobscot River by barge at a deep water facility in Brewer.

9.3 Marine Ports

The State of Maine's three ports of Eastport, Portland and Searsport have shown steady, consistent growth. The ports collectively handle over 1.5 million tons of dry cargo. Additionally, Portland and Searsport also handle roughly 125 million barrels of petroleum products.

The Port of Eastport sits at the mouth of the Bay of Fundy and is the east coast's deepest shipping port, providing easy access to Eastern Canadian markets. The Estes Head Cargo Terminal can accommodate ships of 900 feet in Berth A and up to 550 feet in Berth B. Berth B is also an excellent berth for barges. The 55-acre site has several open storage areas, three 20,000 square foot, drive-thru warehouses, and one 43,000 square foot warehouse. Approach depths to this pier are in excess of 100 feet and the mean low water depth is 64 feet. The Eastport Breakwater Terminal has berthing for a vessel up to 700 ft. An equipment maintenance shop, the Eastport Port Authority office, US Customs, and Coast Station. The downtown Fish Pier berths the Port's two tugboats on the North side, and has slips for transient boats on the South side. Approach depths to the Breakwater are over 100 feet and the mean low water depth is 42 feet. The Breakwater is also used by the aquaculture industry, commercial fishermen, and recreational boaters and fishermen.

The Port of Portland is the largest container seaport in the state closest to Europe. The cargo and passenger terminals are centrally located on the waterfront with easy access to air, rail and road based freight forwarding services. Portland's nine terminals (Table 9.1) are capable of accepting all types of cargo, including petroleum, bulk, break-bulk, project and containerized commodities. Recently Eimskip built its northeast facility in Portland, helping to solidify the Portland International Marine Terminal as the container shipping hub for the State of Maine. Portland is participating in the New England Marine Highway Project (NEMHP), a short-sea shipping initiative to design, build and operate a containerized Articulated Tug Barge (ATB) along the M-95 Marine Highway servicing ports from Portland to New York/New Jersey.

Terminal Name	Primary Cargo Service
Merrill	Bulk, Break Bulk, Project
Sprague Energy	Petroleum
Mobil	Petroleum
Global	Petroleum
Citgo/Turner's Island	Petroleum, Bulk, Break Bulk
International Marine Terminal	Containerized, Project
Portland Pipeline Pier #1	Petroleum
Gulf Oil	Petroleum
Portland Pipeline Pier #1	Petroleum

The Port of Searsport is an intermodal distribution center that serves coastal Maine and inland areas between Bangor and Augusta. The Port of Searsport has become a major shipping destination for wind energy developers with projects across the region. The Dry Cargo Pier has with two berths which can both accommodate vessels of 800 feet. Dry cargo commodities handled at the Port include minerals (salt),

cement clinker, chemicals, fertilizer, aggregate, agricultural products, gypsum, iron oxide, and copper slag. The Liquid Cargo Pier is a multipurpose hose platform with two berths, one which can accommodate a vessel of 700 feet and another of 500 feet. Liquid cargo commodities handled at the Port include heating oil, gasoline, diesel fuel, bio fuel, petroleum products, and kaolin. There are several storage areas, which include a 1.6 million barrel active tank, truck and rail loading racks, 5 paved storage pads, 90,000 square feet of warehousing, truck and rail access and more than 70 acres of land that is available for further development.

Sprague Energy Corporation owns and operates the liquid-bulk pier used to ship and receive petroleum products, logs, caustic soda, and dry bulk commodities that include coke, coal, salt, iron oxide, gypsum rock, cement clinker, and silica sand. Bunkering and fueling of vessels is also available at this pier. The dedicated dry bulk pier is located a mile and a half east of the Mack Point Marine Intermodal Cargo Terminal and is operated by Sprague Energy Corporation and Irving Oil Corporation.

The Port has recently undergone a major reconstruction effort positioning it to effectively serve the needs of shippers moving product both into and out of Maine, and through the onsite rail yard of the Central Maine and Quebec Railway (CMQ), to provide service within the United States and Canada. The rail is currently handing approximately 3,000 cars per quarter and can support 286,000 pounds including the railcar. The rail infrastructure is in need of rehabilitation and expansion, which will be completed as part of a project funded through a TIGER grant awarded to MaineDOT in 2015. The improvements planned include installation of 8 new turnouts as well as 18,000 linear feet of new rail.

An existing fuel oil pipeline runs from the Searsport terminal through Bangor to the Loring Commerce Centre in Limestone. The 200-mile long pipeline was decommissioned in 1994 and a portion of the corridor is now used for natural gas transmission by Bangor Natural Gas, which purchased the rights to the pipeline in 2012.

Improvements since 2012 include a new Liebherr mobile harbor crane that is used to move bulk materials including salt, petcoke, kaolin, and wind turbine components. Maintenance dredging has also been performed at the liquid cargo pier and future dredging is anticipated. Plans are also under development for additional pier structures that would support the construction of off-shore wind turbines.

A $3 million dredging project to dig out the existing shipping channel and ship turning area and a $6.4 million upgrade to the Port is planned for 2018 and 2019. The upgrade to the piers at Mack Point will be completed in two phases. The initial work to expand the fuel dock at Sprague Energy will be funded from fees paid by docking ships and construction of a crane platform next to the fuel dock, currently in the engineering phase, will be paid for separately. The construction will depend on whether Aqua Ventus, an offshore wind pilot project to collect data for a future floating wind farm that developers hope to locate offshore in the Gulf of Maine moves forward as planned. If so, two 6-megawatt wind turbines will be floated downriver in pieces from Hampden and assembled in Searsport at Mack Point. After the floating turbines are erected, they will be towed out to the mooring location at the Monhegan Island site.
Foreign imports at the Port of Searsport in 2015 totaled $567,636,823. Exports in 2015 were $1,649,762. The value of container cargo imported into Port of Searsport represented 2.7% of all vessel imports, $15,296,985 versus $567,636,823. The top countries sending goods to Port of Searsport were Canada, Denmark, Russia, China and Italy and the top countries receiving goods were Turkey, Japan, India and Sweden.

Local Facilities

Bangor Harbor is a United States port of entry about 30 miles upriver from Penobscot Bay. It is owned by the City of Bangor and open through the fresh water boating season from mid-May until mid-October.

In 2015, foreign imports to Bangor Harbor were $4,332,023 and exports were $2,916,798. The value of container cargo imported into Bangor Harbor represented 0.8% of all vessel imports.

Exxon-Mobil Oil Corporation maintains a privately-owned petroleum facility located in Bangor. The facility includes an earth-filled timber crib bulkhead with a gravel deck approximately 30 feet wide and 40 feet long, nine storage tanks, two tanks for storing additives and a single-story building used as an office and warehouse. The Exxon-Mobil facility receives its gasoline, heating oil, diesel, and kerosene via a pipeline from South Portland and, while maintaining the capability to accommodate barges as a contingency measure, seldom uses its pier for shipping or receiving petroleum products.

Pike Industries is a privately owned liquid asphalt supply facility located in Hermon. The facility includes one 700 foot pier, seven medium sized storage tanks, office, and boiler building. The storage tanks are used to store liquid asphalt, a petroleum product used in the production of highway paving. Pike Industries receives its asphalt products via barge.

Webber Energy Fuels operates a privately owned petroleum facility located in Bangor. The facility includes a steel and concrete dock 30 feet wide by 40 feet long, 11 storage tanks and an office building. Webber receives the majority of its petroleum products via pipeline originating in South Portland. Fuel is occasionally delivered by barge to the Bangor Webber facility.

Cold Brook Energy is a privately-owned petroleum facility located in Hampden that includes a 20' by 30' dock and nine storage tanks. Cold Brook Energy receives its diesel fuel, heating oil, and kerosene via pipeline from South Portland but maintains a docking facility for occasional barge deliveries.

Dead River Company operates a privately owned petroleum facility located in Brewer that includes a timber crib dock approximately 30 feet wide by 40 feet long, five storage tanks, and an office building. Dead River receives the majority of its heating oil, diesel fuel, and kerosene via truck originating from their Bucksport terminal facility. Dead River maintains a pier for the occasional barge delivery.

Cianbro's Eastern Manufacturing Facility features a deep water bulkhead that will accommodate large ocean-going barges for transporting 1,000 ton modules for industrial process plants. Cianbro is also constructing a smaller commercial dock system located immediately upriver of the deep water bulkhead which will be available to meet the marine shipping needs of other BACTS area businesses.

9.4 Intermodal Facilities

Intermodal connectivity is critical to the long-term success of shipping and handling cargo through Maine's ports. The two most critical modal connectors, highways and rail, provide avenues for moving freight to and from port terminals.

There are 18 FHWA-designated intermodal connectors in Maine. The only FHWA designated connector in the BACTS area is Bangor International Airport. However, there are a number of other terminals that have statewide and/or regional impact on transporting freight in the State. One such facility that has the greatest impact on the BACTS region is Mack Point at the Port of Searsport. In the past few years, Central Maine and Quebec Railroad (CMQ), which took over the former Montreal Maine and Atlantic line, has invested over $22 million upgrading its tracks and infrastructure connecting Montreal to the port of Searsport. Since their first quarter of taking over in 2014, they have increased service from 3,000 carloads per quarter to over 7,000 carloads per quarter today.

9.5 Passenger Transportation

There are no passenger marine services in the BACTS area. However, recreational marine traffic is increasing due primarily to improved dockage facilities and increased mooring space. The present river depth of 11 feet at low water is adequate for most recreational vessels. Bangor and Brewer are both implementing waterfront redevelopment plans that are improving opportunities for recreational boating and passenger ferry opportunities.

The cities of Bangor and Brewer are at the head of navigation of the Penobscot River. The deepest draft ordinarily trading to Bangor is about 16 feet. Three fixed highway bridges and a railroad swing bridge connect Bangor with Brewer. The first bridge has a clearance of 74 feet and the second has a clearance of 22 feet. There is no navigation above the third bridge. The river between the second and third bridge is used only to moor small craft.

Bangor Landing is owned by the City of Bangor and open through the fresh water boating season from mid-May until mid-October. It is located at river front park immediately downstream of the Joshua Chamberlain Bridge. The landing offers two public docks for recreational vehicles and three floating docks with steel ramps. Water and power are available, as are pump-out services. Docks can handle private vessels of virtually all sizes, although larger vessels are required to provide advance of arrival. A float replacement and expansion project on the Bangor waterfront is scheduled in the MaineDOT workplan for 2018-2019.

Turtle Head Marina off Route 1A in Hampden has two public boat launch ramps for recreational vessels and a marina facility, which is leased to a private operator, Hamlin Marina. Hamlin Marina on the Penobscot River provides seasonal dockage. Dock rental is limited and reserved for customers who purchase boats at Hamlin's Marina, but mooring facilities are available to the general public.

The Orrington Public Boat Landing is a publicly owned ramp located off an old section of State Route 15 in South Orrington. The facility provides parking for vehicles and boat trailers.

9.6 Recommendations

Maine's seaports are in good condition with more than $80 million in State and Federal funds invested over the last eight years. Projected growth will require an additional $120 million for necessary investments in areas of industrial infrastructure, intermodal connections, cruise ship terminals, and municipal fishing and recreational facilities. The Federal Maritime Commission projects an annual rate of growth around 5 percent for containerized shipments to East Coast ports; the marine route from Portland to New York/New Jersey was included in America's Marine Highway Program; and cruise ship calls increased 6% in 2016.

- Encourage improved mobility and safety on U.S. Route 1A (from the Port of Searsport to the greater Bangor area) and Route 15 (from Brewer to Bucksport) including access management, constructing passing lanes, reducing level grade crossings and improving road shoulders to facilitate more efficient movement of goods and people.
- Promote and support efforts to encourage deep draft vessel traffic and channel improvements on the Penobscot River, such as dredging the Penobscot River.

- Encourage MDOT to perform a feasibility study on the potential for an intermodal facility at the Bangor/Brewer waterfront.

- Support investment in Maine's industrial ports with emphasis on waterfront infrastructure, intermodal connections, rail connectivity, upland storage facilities, and short sea shipping.

Resources:

2016 Trade and Transportation Overview:
http://www.mitc.com/wp-content/uploads/2014/07/Trade-and-Transportation-Overview-2016.pdf

Report Card for Maine's Infrastructure 2016: https://www.infrastructurereportcard.org/wp-content/uploads/2016/10/Maine-Report_Card_final_booklet.pdf

https://www.ustradenumbers.com/ports/port/port-of-bangor-maine/
http://www.worldportsource.com/trade/USA_ME_Bangor_Harbor_1788.php

August 3, 2017 Intermodal Commodity Studies:
http://maine.gov/mdot/ofbs/docs/SearsportIntermodalCommodityReport_FINAL_20170803.pdf
http://maine.gov/mdot/ofbs/docs/EastportIntermodalCommodityReport_FINAL_20170803.pdf

FHWA's Roundtable on the Freight Economy in Bangor, Maine:
https://www.fhwa.dot.gov/freighteconomy/bangor.cfm

2015 Freight Facts and Figures:
https://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/FFF_complete.pdf

June 2011 Multi-Modal Corridor Management Plan for the Penobscot River Corridor:
http://www.hcpcme.org/transportation/needs/penobscotriver/PenobscotRiverCorridorPlan070811.pdf

10.0 Economic Development and Tourism

10.1 Introduction

One of the most important issues facing metropolitan areas is ensuring economic competitiveness in a global economy. More employers are recognizing that recruiting and retaining employees from across a region requires safe, convenient and affordable transportation options. With the aging population, stagnant birth rate and decrease in child-bearing age population, the region will have to implement strategies to attract an in-migration of skilled individuals to provide the needed workforce. Competing for talented young workers will require economic development strategies that consider walkable neighborhoods with good transit access and safe streets for pedestrian and bicycle travel.

The Greater Bangor area is the employment, commercial, communication, banking, transportation, distribution, educational, healthcare and governmental center serving central, eastern and northern Maine and more than one-third of the State's population. The Bangor region serves as northern New England's economic link to the Canadian Maritimes and Eastern Quebec and beyond. The region's proximity to mountains, lakes, and the coast attracts hundreds of thousands of visitors annually.

10.2 Retail Market

Bangor serves as one of the largest retail markets in Maine. It serves an extensive geographic area ranging from Eastern Maine to the Canadian Maritimes with an estimated population of over three million people. The Bangor Economic Statistical Area (ESA) generated 8.3 percent of the State's total taxable retail sales in 2016 (Figure 10.1).

Annual Taxable Retail Sales
2011 - 2016
(thousands)

Economic Statistical District / Area		Annual Totals						Annualized	Percentage Change	
		2011	2012	2013	2014	2015	2016	2011-2016	2011-2016	2015-2016
PENOBSCOT	BANGOR	$1,567,772	$1,571,890	$1,614,456	$1,658,560	$1,710,368	$1,773,123	2.49%	13.10%	3.67%
	BANGOR SUB	$345,601	$355,413	$369,525	$375,104	$393,977	$410,270	3.49%	18.71%	4.14%
PENOBSCOT Total		**$2,229,409**	**$2,248,466**	**$2,314,470**	**$2,380,451**	**$2,464,881**	**$2,564,938**	**2.84%**	**15.05%**	**4.06%**
State Total		**$17,035,969**	**$17,544,822**	**$18,277,622**	**$18,973,743**	**$19,909,865**	**$21,288,888**	**4.56%**	**24.96%**	**6.93%**

Source: Governor's Office of Policy and Management April 13, 2017

The Bangor ESA includes Bangor, Brewer, Great Works, Indian Island, Old Town, Orono, Stillwater and Veazie.

The Bangor Sub ESA includes Alton, Argyle Twp, Bradley, Cardville, Carmel, Clifton, Corinna, Corinth, Costigan, Dixmont, Eddington, Etna, Exeter, Glenburn, Greenbush, Greenfield, Hampden, Hermon, Holden, Hudson, Kenduskeag, Levant, Milford, Newburgh, Newport, Olamon, Orrington, Plymouth and Stetson.

10.3 Regional Economic Development

Regional economic development aims at creating more employment and a rising standard of living in the region through expansion of profitable business activity in the region. In the Greater Bangor area, either genuine or perceived factors to impeding economic growth and development include high energy costs, lack of digital infrastructure, remote location, a limited customer base, poor roads and transportation infrastructure and a general lack of collaboration between agencies and businesses.

Eastern Maine Development Corporation (EMDC) is a private nonprofit organization established in 1967. The Corporation is located in Bangor and serves Hancock, Penobscot, Piscataquis, and part of Waldo Counties. EMDC's economic vision is to improve economic opportunity and increase wealth for the region's communities, businesses and individuals.

EMDC identifies infrastructure and environment as one of the six drivers of growth and prosperity in the region. Addressing transportation and logistical infrastructure challenges will be critical to the region for economic growth across industries. The EMDC identified issues of importance are included in the 2016 Comprehensive Economic Development Strategy.

Four Directions Development Corporation (FDDC) is a non-profit community development corporation and Community Development Financial Institution (CDC/CDFI), which was established in March of 2001 by the Penobscot Nation, a federally recognized Native American Tribe with reservation land in Maine.

The mission of the FDDC is to improve the social and economic conditions of the four Native American tribes in Maine — the Maliseet, Micmac, Passamaquoddy, and Penobscot — through education and investment in affordable housing, tribal business ventures, and Native entrepreneurship. Through its Board of Directors and Advisory Board, FDDC is governed and managed by the four Wabanaki tribes of Maine. FDDC's boards are composed of tribal leaders, councilors, and directors of tribal departments, as well as non-Native members specializing in sectors such as banking, small business, community development, and housing.

The Bangor Region Chamber of Commerce (the Chamber) was established in 1911. It is one of the oldest and largest Chambers in the State, representing 21 communities, and includes all 11 of the BACTS communities. The Chamber advocates on behalf of the communities they represent through initiatives designed to take a proactive approach to policies and goals that enhance and develop a healthy business environment in the region.

The Chamber's mission is to promote and advance a vital, healthy business environment, which includes being an advocate for public policy aimed to help the region prosper. To that end, the Chamber's Governmental Affairs Committee identified, and the Board of Directors endorsed, priorities that address issues of concern and importance for the Bangor region. The Chamber understands and appreciates the importance of a reliable and resilient transportation system in supporting economic growth, job creation, and enhancing quality of life. They have specifically committed to transportation related issues and initiatives that preserve, maintain and expand the transportation network. This includes amenities for non-motorized modes of transportation, as well as supporting marketing, and other developmental efforts and initiatives that serve to support the region's transportation related potential in commercial and industrial trade and production, and tourism.

10.4 Small Business Incubators

The University of Maine Foster Center for Student Innovation helps students and community members develop a mindset and skill set for creating, testing, and achieving ideas. The center offers free business coaching to college students with a business idea, runs a student business incubator, offers academic courses in innovation, consults with businesses implementing innovation, and manages the Innovate for Maine Fellows Program, a statewide college internship program focused on innovation.

The UpStart Center for Entrepreneurship is a 20,000 square-foot facility located in Orono that leases office space to a variety of different companies, from the small one person start-up to the larger 8-10

person company. The UpStart Center is also home to the UpStart Incubator, which provides coaching services and support to entrepreneurs in order to build competitive, market-oriented companies.

Bangor International Enterprise Center operates in a 25,000 square-foot building at 40 Johnson Avenue in the Bangor International Airport Complex. The incubator is designed to support small businesses during their start-up and early growth stages. It is a valuable resource for entrepreneurs providing flexible operating space at affordable rental rates. The facility can accommodate manufacturers, distributors and business service companies for one to two years after which the businesses graduate to other locations within the community. The facility has seven individual offices and eight flex space areas for rent. The flex space areas range from several hundred to three thousand square feet and are suitable for activities from warehousing to manufacturing. The building has a truck-height loading dock, four drive-in overhead doors, a forklift and other equipment available for tenant use.

10.5 Higher Education

Founded in 1865, the **University of Maine** is a land and sea grant institution, and the flagship campus of the University of Maine System. It is located in Orono along the banks of the Stillwater River serving Maine, the nation, and the world through its teaching, research and outreach mission. UMaine students come from every county in Maine, more than 49 other states and 63 countries. UMaine offers 90 undergraduate majors and academic programs, 85 master's degree programs, and 35 doctoral programs.

University College, formerly the University of Maine at Bangor and Bangor Community College, became a satellite campus of the University of Maine at Augusta in 1995. The campus is located at the former Dow Air Force Base and provides associate degrees in liberal studies along with specialties in legal technology, dental hygiene, animal medical technology, human services, health information management, and landscape horticulture. About 1,000 students attend University College, which has 73 faculty members at its 160-acre campus next to Bangor International Airport.

Husson University's 208-acre primary campus is located in Bangor, with education centers in Westbrook and Presque Isle. Established in 1898 as the Shaw School of Business in downtown Bangor, the school's current campus is on Husson Avenue. In 1982, the school merged with the Eastern Maine Medical School of Nursing and began offering nursing degrees. The school merged with the New England School of Communications in 1997. In October 2008, the school changed its name from Husson College to Husson University. There are approximately 2,800 undergraduate students, 700 graduate program students on the Bangor campus. Students come from all over Maine, the country and the world. In addition to offering business, nursing, and broadcasting degrees, the school also offers programs in occupational therapy, physical therapy, criminal justice, paralegal studies, and physical education.

New England School of Communications, originally the New England School of Broadcasting, is an affiliate of Husson University with classrooms on the Husson campus. It offers a two-year program in broadcast communications, with concentrations in radio, television, multimedia, advertising and public relations, and general communications.

Eastern Maine Community College is part of Maine's six-campus community college system. It was established in downtown Bangor in 1966 as Eastern Maine Vocational Technical Institute. Two years later the school moved to its current 72-acre campus on Hogan Road. The school offers one-year certificates and two-year degrees in such areas as mechanical, engineering, and construction industries; nursing; and business. About 500 full-time and 750 part-time students attend the school, which has 50 full-time and 80 adjunct faculty members. The school changed its name from Eastern Maine Technical College on July 1, 2003.

Bangor Theological Seminary was established in 1814 and is one of the oldest in the United States. The school is open to high school and college graduates who want to go into the ministry. The school offers degrees in Master of Divinity, Master of Arts, and Doctor of Ministry with a satellite campus in Portland. The school moved from its 12-acre campus near the middle of Bangor to the Husson University campus in August 2005. The school had been at its Union Street campus since 1824.

Beal College was founding in 1891 and is primarily a business school located on Farm Road in Bangor. The school offers associate degrees in accounting, medical administrative assisting, office management, and law enforcement. Enrollment at is approximately 500 students. The school does not go by a traditional semester calendar. Instead, it uses a mod system, in which courses are always starting in a matter of weeks year round.

10.6 Healthcare

Healthcare is also an important segment of Bangor's economy. In addition to providing a major portion of the jobs filled by residents in the Bangor Labor Market Area, the majority of residents in Penobscot County also come to the BACTS area to obtain hospital and/or surgical care.
There are six hospitals in Penobscot County, four located in Bangor - Eastern Maine Medical Center, Acadia Hospital, Dorothea Dix Psychiatric Center and St. Joseph Hospital. These four hospitals comprise 94 percent of all licensed and 92 percent of all setup and staffed hospital beds in the County. In addition, there are three Veterans Affairs (VA) sites in Penobscot County, two of which are located in Bangor. Penobscot County also has two ambulatory care surgery centers, both located in Bangor, and two ambulatory end-stage renal disease (ESRD) centers, one of which is in Bangor. Of the 50 primary care practices in Penobscot County there are four dedicated pediatric practices, three located in Bangor and one in Brewer. There are two school-based health centers located in Penobscot County, both are located in Brewer.

A 2016 report on transportation as a barrier to healthcare access in Bangor, reports that a significant barrier to accessing care in this area, especially for the underserved population, is transportation. Patients indicate a general unawareness of the types of transportation resources available and medical schedulers indicate regular appointment cancellations due to lack of transportation.

10.7 Travel and Tourism

Tourism is another important segment of the economy. Economic impact begins when a visitor spends money in an area. According to 2016 statistics from the Maine Office of Tourism, Tourism is one of Maine's largest industries, employing about 106,000 people, one out of every six jobs in the State. The total economic impact is estimated at $9 billion.

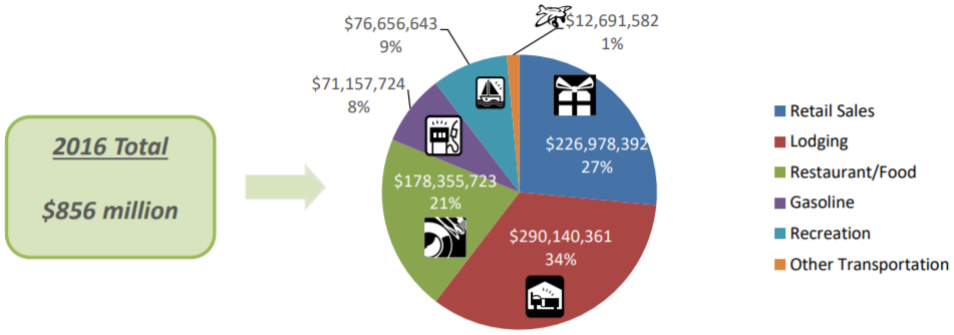
Maine's tourism industry depends on a reliable, safe transportation system. Overnight visitors and day travelers, whose principle mode of travel is the highway system, account for 27 million trips and directly spend a total of $4.9 billion annually. The condition and reliability of a region's transportation system impacts the accessibility of activities and destinations such as conferences, trade shows, sporting and entertainment events, parks, resort areas, social events and everyday business meetings. An improved transportation system increases the accessibility of leisure/tourism and business travel destinations, which stimulates economic activity.

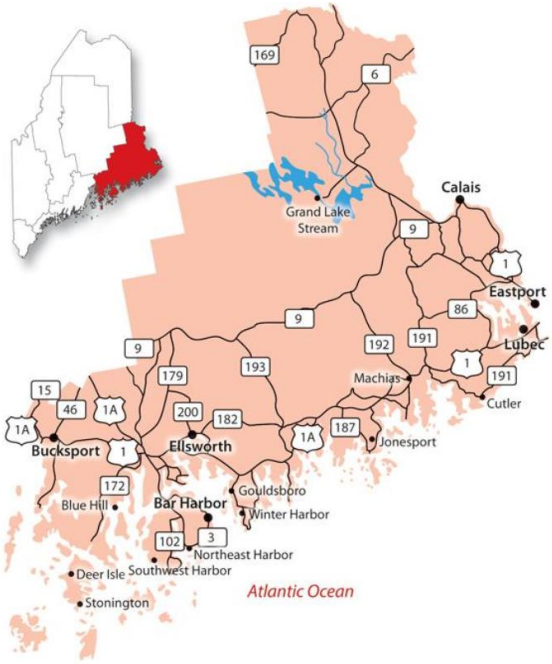
Bangor International Airport makes the region easily accessible by air, and proximity to major roadways makes traveling by motor coach or car simple. Bangor is centrally located in the state and is within a 90-minute drive of Acadia National Park, Bar Harbor, Baxter State Park and the Moosehead Lake Region.

Maine Highlands (Figure 10.2a and 10.2b)

The Maine Highlands region is located in the center of Maine. The area offers tourists outdoor adventure, including dozens of lakes and rivers, over 200 waterfalls and thousands of miles of trails. The Maine Highlands includes Baxter State Park, home of Maine's highest peak, Mount Katahdin; and Baxter Peak, the northern terminus of the Appalachian Trail. The Maine Highlands also encompasses Moosehead Lake, Maine's largest lake.

An estimated 4.4 million people visited the Maine Highlands in 2016 (an increase of 9.9% from 2015), and spent $856 million (an increase of 20.1% from 2015). Tourist spending supported 14,714 jobs, $280,128,838 in earnings and $78,134,192 in total taxes. The figure depicts the sectors benefiting from these tourism dollars.





Downeast and Acadia (Figure 10.3)

Although the Greater Bangor area is not included in the Downeast/Acadia tourism area, many of the more than three million people who visit Acadia National Park each year come through the Bangor area.

Maine's Downeast and Acadia region encompasses the easternmost portion of the state, stretching along the coast to the Canadian border. Popular destinations include Bar Harbor, Lubec, Bucksport, and the Penobscot Narrows.

The Downeast and Acadia region is made up of six similar, yet very distinct subregions. The ocean tides are some of the highest on the planet, with highs and lows occurring twice daily. Acadia, Maine's National Park, is the top tourist destination in this area and offers 120 miles of hiking trails and 55 miles of Rockefeller-built carriage roads. North of Acadia, the village of Grand Lake

Stream is home to the most concentrated population of Registered Maine Guides in the state. The fishing and hunting are unmatched, as are the opportunities to simply relax and enjoy the great outdoors. Roosevelt Campobello International Park offers a guided tour of FDR's historic 34-room summer cottage.

Greater Bangor Convention and Visitors Bureau

The Greater Bangor Convention & Visitors Bureau (GBCVB) is a nonprofit membership organization that exists to stimulate economic vitality by promoting the Greater Bangor Region as the preferred destination for meetings, conventions and visitors. GBCVB provides destination marketing and visitor services for the Greater Bangor Region, including the Bar Harbor Coastal area.

10.8 Recommendations

A diverse, efficient and safe transportation network is vital in connecting people locally, regionally and globally. The economy is dependent on facilitating the import and export of goods and people. With the aging population stagnating and the resulting potential workforce shortage facing the Greater Bangor area, attracting new and innovative enterprises and developing strategies to in-migrate a skilled and active workforce is essential.

- Investigate opportunities for more frequent and inter-connected public transit services which allow individuals outside of the urban area to more easily access employment, retail and healthcare services in the urban area.

- Encourage the development of transportation options and intermodal connectors for passengers, specifically from Bangor International Airport to the most popular tourist destinations in the Acadia and Maine Highlands areas.

- Encourage the development of intermodal connector facilities for movement of freight into and out of the area.

- Investigate non-traditional funding sources to supplement the area's transportation system maintenance needs.

- Support the Greater Bangor Region Chamber of Commerce and the Greater Bangor Convention and Visitors Bureau efforts in attracting economic development and tourist activity in the area.

Resources

2017 Maine Development Foundation Measures of Growth: http://www.mdf.org/files/MOGReport2017-WEB_1493056448.pdf/800/
http://www.mdf.org/files/17-026_MDF-ExecutiveSummary-Letter_1493312007.pdf/803/

October 2016 TRIP Maine Transportation by the Numbers:
http://www.tripnet.org/docs/ME_Transportation_by_the_Numbers_TRIP_Report_October_2016.pdf

2016 Transportation as a barrier to access to care in Bangor and the surrounding Penobscot County area:
http://scholarworks.uvm.edu/cgi/viewcontent.cgi?article=1215&context=fmclerk

Greater Bangor Chamber of Commerce Issues of Impact:
https://www.bangorregion.com/business-advocacy/issues-of-impact/

EMDC 2016 Comprehensive Economic Development Strategy.
https://www.emdc.org/image_upload/CEDS%202016%20FINAL%20COMBINED.pdf

2016 Maine Highlands Area Tourism Reports:
https://visitmaine.com/assets/downloads/2016-RegionalReport-MaineHighlands.pdf
https://visitmaine.com/assets/downloads/2016-EconImpact-MaineHighlands.pdf

2018 Downeast Acadia Area Tourism Reports:
https://visitmaine.com/assets/downloads/2016-RegionalReport-DownEastAcadia.pdf
https://visitmaine.com/assets/downloads/2016-EconImpact-DownEastandAcadia.pdf

Local Economic and Community Development Programs

City of Bangor - http://www.bangormaine.gov/ced
http://www.choosebangor.com/
City of Brewer - http://brewermaine.gov/economic-development/
Town of Hampden - http://www.hampdenmaine.gov/business
Town of Hermon - https://www.hermon.net/economic-development/
City of Old Town - http://www.developoldtown.com/old-town-the-region/
Town of Orono - http://www.oronoedc.org/
Town of Orrington - http://www.orrington.govoffice.com/index.asp?SEC=ED2E4238-0302-4BCF-AC15-3218E8268F7A&Type=B_BASIC
Penobscot Indian Island - http://www.fourdirectionsmaine.org/
Town of Veazie - http://www.veazie.net/Public_Documents/VeazieME_EDCMin/

11.0 Land Use, Livability, Sustainability and Environment

11.1 Introduction

Transportation and land use planning are strongly connected. Transportation systems impact important local land use decisions, which ultimately influence a region's connectivity and economic vitality. If land uses are not appropriately designed to ensure the most effective and efficient use of public infrastructure, facilities and systems, the transportation system will not work well and may impede economic growth, feasibility of expansion and opportunity.

Typical of many Maine arterial highways, commercial and residential development pressures along the major highways result in increasing friction from driveways and entrances. Development presents local economic opportunities but also reduces mobility while raising transportation costs for businesses and commuters, affects the efficient delivery of municipal services, and results in a higher number of entrance-related vehicle crashes.

Maine's population and jobs are spreading out of urban centers and into suburban areas. The typical, low density development pattern separates residential areas from business and shopping requiring more commuting between destinations. Sprawling development and isolating housing from commercial and retail centers are at the root of an inefficient transportation system. The car has become the only option for getting around, and there are unintended consequences as a result. Most households have more than one car per household. People are taking more and longer trips for shopping and recreation. There are relatively few alternatives to vehicle travel in the suburban and rural areas, and safe pedestrian and bicycle routes are not always available.

Zoning that leads to urban sprawl and the separation of jobs, housing and retail creates traffic congestion, makes it hard provide transit, and reduces the accessibility of jobs. The impact of expanding rural residential development is already being felt by transportation and social service providers in the region. Aging residents living in relatively remote rural homes are creating a challenge for transit and paratransit providers and will require creative solutions to effectively serve an increasingly dispersed elderly and disabled population.

11.2 Livable Communities

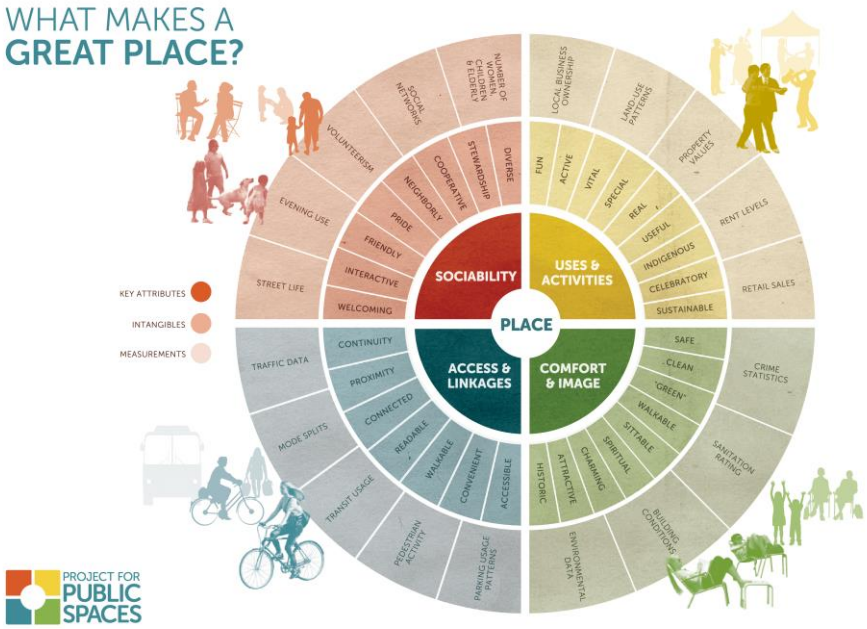
The U.S. Department of Transportation (DOT) defines livable communities as "places where transportation, housing and commercial development investments have been coordinated so that people have access to adequate, affordable and environmentally sustainable travel options." The most successful, and desirable, transportation systems result from planned land use designed with attention to density, diversity and distance between land uses and design which preserves the character of the community or region. These considerations have the objective of managing traffic, reducing congestion, and increasing options for moving traffic along corridors.

Density of development is a predictor of the viability of buses and other alternative forms of transportation. Transit is feasible when residential land use is developed with three to five units per acre, with viability of improved service frequency and route design, and with land use development.

Diversity and distance between land uses refers to mix of uses within half a mile of residences. The traditional neighborhood, which is predominantly residential interspersed with non-residential amenities frequented by residents (e.g., stores, restaurants, schools, parks, places of worship, etc.), offers a mixture

of uses in close enough proximity to each other that daily activities could easily be accomplished by walking, biking or otherwise traveling on a local street.

Design or "sense of place" is anything which captures the character of the unique combination of elements that define a place and give it a distinct identity to those who live, work, or visit it. (Figure 11.1)



When a street can be easily accessed by walking, biking, and transit, it attracts a wider variety of people to it than if it is only within reach of those with a car. Streets that function as places prioritize the pedestrian. People lingering and walking along a street make it a more vital and vibrant place. Pedestrian-friendly streets often have shorter block lengths, which facilitates more encounters and interactions among people and creates better access and egress points to the street.

11.3 Transportation Alternatives

There is growing interest in Maine to promote transportation alternatives for daily travel needs. In order for alternative transportation to be viable, land use and development must provide for public spaces and streetscapes that are inviting for pedestrians while still providing adequate car access; encourage individuals to walk between home, work, shopping, and recreation; create safe and direct bicycle and pedestrian routes; connect neighborhoods with workplaces, shops, schools, and other destinations; and provide for and connect with transit service that is reliable, convenient, and reasonably time and price competitive with driving a car.

<u>Ridesharing</u>

GO Maine is the statewide commuter services program sponsored by MaineDOT and the Maine Turnpike Authority. There are a total of 5,528 members of the GO Maine rideshare community and 166 reported commuting to destinations within 20 miles of Bangor. The green place markers on the map (Figure 11.2) show the location of commuters' residence and the red place markers show place of employment or school within a 30 mile radius of Bangor. The map also depicts the location of park and ride lots and electric vehicle charging stations.

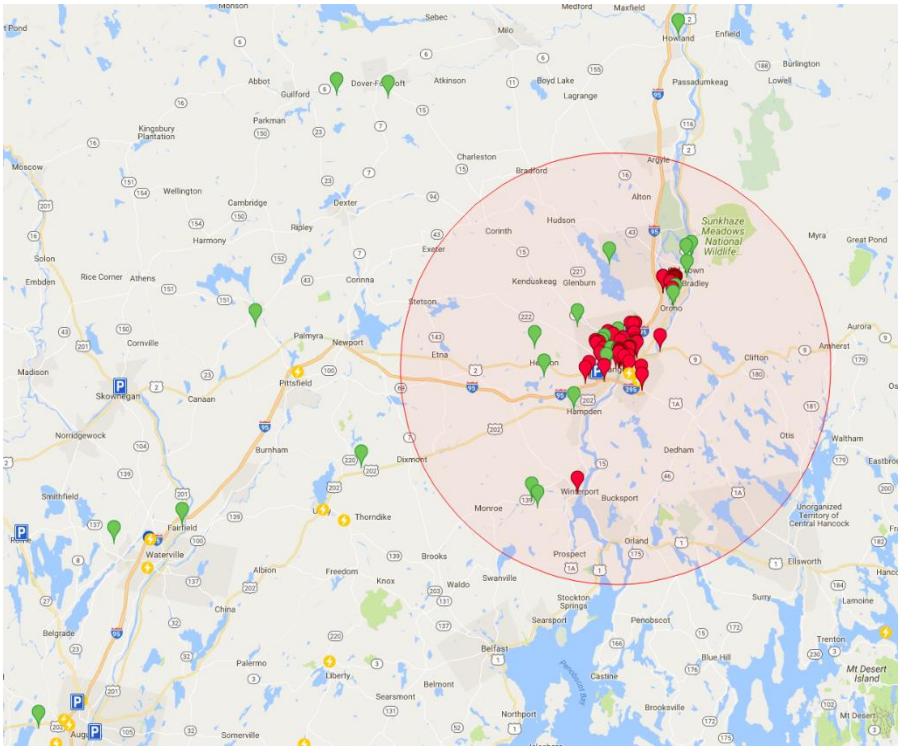


Figure 11.2

Source: GO Maine. https://gomaine.nuride.com/

Car Sharing

Car share services replace an estimated 20 passenger vehicles for every car share vehicle operated. Car sharing service is a relatively new concept which allows for hourly and daily shared use of a vehicle. These services are currently only available in locations of the State south of the BACTS area.

ZipCar offers service at the campuses of University of New England in Biddeford, Bowdoin College in Brunswick, Bates College in Lewiston and Colby College in Waterville.

Uhaul Car Share offers service at Southern Maine College and five other locations within the City of Portland.

Alternative Fuels

Alternative fuels are derived from sources other than petroleum, and largely create less pollution than gasoline or diesel. Most alternative fuels are produced domestically (reducing dependence on imported oil), and some are derived from renewable sources. In the BACTS area, alternative fuel stations readily available to the public are electric vehicle charging and liquified petroleum.

Electric vehicles are the most common alternative fuel vehicle utilized in Maine. Hybrid and electric vehicles accounted for slightly more than one percent of the 1,604,088 vehicles registered in Maine during calendar year 2016.

There are 120 public alternative fueling stations in Maine. The majority of those stations are electric vehicle (EV) charging stations. Of the 107 public EV charging stations in Maine, 102 are located in the southern part of the State and there is only one public EV charging station north of the BACTS area located at Baxter State Park in Millinocket. In the BACTS area, there are four locations with public EV charging stations (one in Bangor with two outlets, two in Brewer with a total of nine outlets, and one in Orono with one outlet).

Other public alternative fueling stations in Maine include 11 liquid propane gas (LPG) stations. Two LPG fueling locations are in the BACTS area, one in Hampden and the other in Bangor. Maine has two biodiesel (BD) fueling locations, both located outside of the BACTS area. (Figure 11.3)

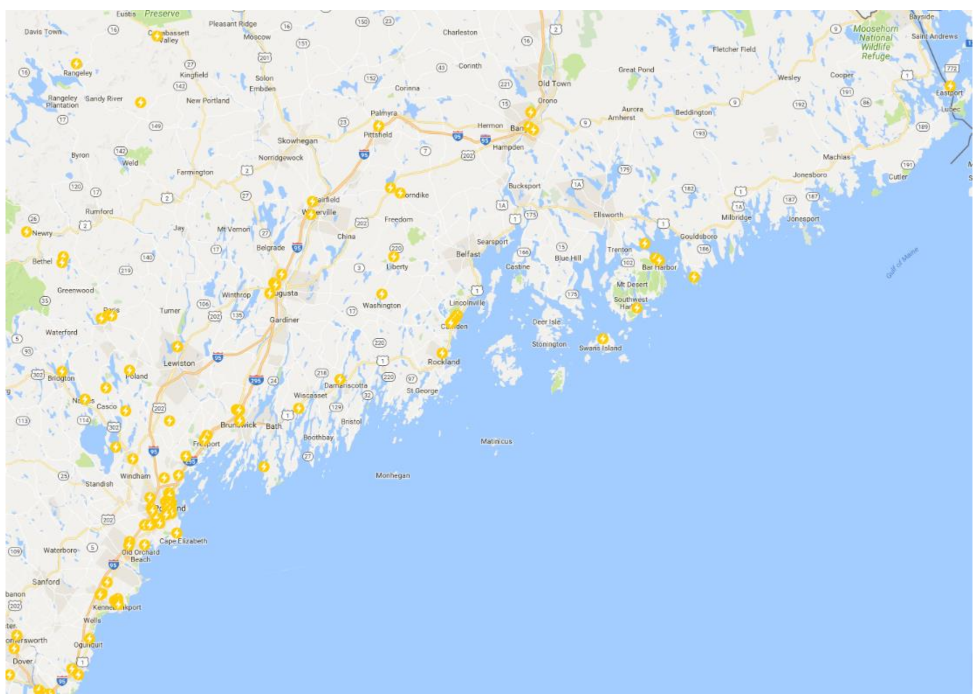
Public Alternative Fuel Station Locations in the BACTS Area

Fuel Type Code	Station Name	Street Address	City	Availability	EV Connector Types
Electric	Darling's Nissan	114 Sylvan Rd	Bangor	Dealership business hours	J1772 CHADEMO
Electric	Dunkin Donuts	271 State St	Brewer	24 hours daily	J1772
Electric	Ruby Tuesday - Tesla	5 Walton Dr	Brewer	24 hours daily; for Tesla use only	TESLA
Electric	University of Maine	35 Flagstaff Rd	Orono	24 hours daily	J1772
Liquefied Petroleum	Propane Inc.	490 Broadway	Bangor	24 hours daily; training and card keyrequired	NA
Liquefied Petroleum	RH Foster Energy - Foster Kardlock	110 Mecaw Rd	Hampden	24 hours daily	NA

Source: https://www.afdc.energy.gov/

Electric Vehicle Corridor

Several major interstate highways including I-95, were designated as alternative-fuel corridors by the U.S. Department of Transportation, recognizing the state support for electric vehicles (EV) in the region and setting the stage for the expansion of electric vehicle travel in the northeast and mid-Atlantic. In Maine, I-95 was designated in the section from Kittery to Augusta to build support infrastructure for alternative fuel vehicles (Figure 11.4).



https://www.afdc.energy.gov/states/me
http://www.uspirg.org/news/usp/response-lawsuit-highway-administration-reinstates-transportation-clean-air-rule

11.4 Complete Streets

Complete Streets are those designed and operated to enable safe access by all users. They are designed to make it easy to cross the street, walk to shops or transit stations and bicycle to work. Implementing a Complete Streets approach may require changes to transportation planning, design, maintenance and funding decisions but can lead to cost savings and improved safety for all users.

The intent of a Complete Streets policy is to ensure that transportation projects are planned and designed to meet the needs of every user regardless of age, ability or mode of travel and provide safe and efficient access to the transportation system. Addressing the needs of bicyclists, motorists, pedestrians, and transit users early in the system planning process is cost-effective, efficient, and critical to the development of a balanced and safe transportation system.

MaineDOT strongly supports a multimodal transportation system, and recognizes that pedestrian and bicycle infrastructure such as sidewalks, bicycle lanes, separated facilities, transit stops, ADA-accessible routes, and travel lanes are important elements of the transportation system. Such a multimodal system is crucial to the safety and economic vibrancy of businesses, villages, downtowns, neighborhoods, and rural areas. Compliance with the MaineDOT Complete Streets policy applies to all relevant projects, regardless of the reason the project was initiated that are funded (in full or in part) by MaineDOT. This includes Metropolitan Planning Organization and Local Project Administration Program projects.

11.5 Stormwater

The environmental costs related to stormwater, wetlands, endangered species, and other regulations can clearly affect the overall cost of transportation projects. Failure to integrate stormwater requirements early in the project development process can cause project delays, leading to additional costs.

11.6 Livability and Sustainability

Livability is about tying the quality and location of transportation facilities to broader opportunities such as access to good jobs, affordable housing, quality schools, and safe streets. Sustainable transportation provides exceptional mobility and access to meet development needs without compromising the quality of life of future generations. Livability and Sustainability can be addressed together since a strategy for pursuing one will often be appropriate for the other.

BACTS promotes the development of transportation options that support livability and sustainability by including non-automobile modes in its evaluation of potential highway projects for the BACTS Transportation Improvement Program (TIP). Through the TIP project evaluation criteria and project scoring, projects that support alternative modes and their integration into the transportation system score higher and are more likely to be funded. As an example, a highway project that includes sidewalks, provisions for transit, or bicycling would score additional points over the same project that did not. In addition, a highway project at a location that already has provisions for alternative modes also gets credit for those modes in its scoring as a potential highway project.

The strategy of implementing Access Management along highway corridors can preserve the highway's capacity so that mobility is not compromised, access to destinations is made safer, and investment in public and private infrastructure is protected. Site access along highways is controlled by local municipal ordinance and the MaineDOT's traffic movement permitting process. BACTS is frequently invited to participate in the traffic movement permitting process. Some BACTS communities have developed successful access management plans for significant corridors, such as Brewer's Wilson Street.

11.7 Transportation Operations

BACTS has recognized for decades that traffic congestion occurs more frequently throughout the day and on more roadways than in the past. Funding for major new highway and transit capacity projects is limited, and it often takes years to plan and construct the new infrastructure necessary to reduce this congestion. At the same time, much of the traffic delay on roadways is caused by inefficient or nonexistent traffic control devices, crashes, weather conditions, special events, and other factors that require more immediate solutions and are not solved solely through transportation infrastructure.

BACTS has developed some transportation system management and operations strategies in the planning process designed to optimize the performance of the transportation system. They allow for a more immediate response to traveler concerns than capacity projects offer while improving the reliability, security, and safety of the multimodal transportation system.

One of these initiatives is the outcome of concerns about quick and efficient response to traffic incidents along the Interstate 95 corridor through Maine. Regional stakeholder groups are being created to bring those involved together to craft regional plans that will address the Incident Management issues in each region in a coordinated and thorough way.

BACTS' efforts to assist in the management and operations of existing transportation systems are becoming ever more important for several reasons. Travel demand continues to increase and the amount of new infrastructure that can be developed is limited. The worsening of congestion is impacting mobility, the environment and economic productivity, and highlights the need for attention in transportation planning.

11.8 Climate Change

As more scientific evidence supports the climate change phenomenon, various groups in the public and private sectors are paying more attention to its long-term harmful effects on both the natural and human environment. The harmful effects of climate change can affect the quality of life, or livability, and sustainability of a community, region, and state. Livability is inclusive of many factors that influence a community and its residents' quality of life.

There are two ways of looking at the links between transportation and climate change - how transportation systems affect the climate and how climate change is likely to influence the various modes of the transportation system.

The climate change that the world is currently experiencing is now generally accepted by experts in the field to be associated with elevated levels of so-called greenhouse gases (GHG). Efforts are underway around the world to reduce emissions of GHG. However, even if excess GHG emissions were eliminated by the end of the century, climate change would continue, because the already accumulated elevated levels of GHG would persist for thousands of years unless further efforts were made to actively scrub GHG from the atmosphere.

Transportation is not only a major contributor to GHG emissions, but also will be significantly affected by the results of climate change.

11.9 National Perspective

Transportation Research Board Report 290 makes the following observations:

Climate Change Impacts of Greatest Relevance for U.S. Transportation

- *Increases in very hot days and heat waves.* It is highly likely (greater than 90 percent probability of occurrence) that heat extremes and heat waves will continue to become more intense, longer lasting, and more frequent in most regions during the 21st century. In 2007, for example, the probability of having five summer days at or above 43.3°C (110°F) in Dallas was about 2 percent. In 25 years, this probability increases to 5 percent; in 50 years, to 25 percent; and by 2099, to 90 percent.

- *Increases in Arctic temperatures.* Arctic warming is virtually certain (greater than 99 percent probability of occurrence), as temperature increases are expected to be greatest over land and at most high northern latitudes. As much as 90 percent of the upper layer of permafrost could thaw under more pessimistic emission scenarios. The greatest temperature increases in North America are projected to occur in the winter in northern parts of Alaska and Canada as a result of feedback effects of shortened periods of snow cover. By the end of the 21st century, projected warming could range from as much as 10.0°C (18.0°F) in the winter to as little as 2.0°C (3.6°F) in the summer in the northernmost areas. On an annual mean temperature basis for the rest of North America, projected warming ranges from 3.0°C to 5.0°C (5.4°F to 9.0°F), with smaller values near the coasts.

- *Rising sea levels.* It is virtually certain (greater than 99 percent probability of occurrence) that sea levels will continue to rise in the 21st century as a result of thermal expansion and loss of mass from ice sheets. The projected global range in sea level rise is from 0.18 m (7.1 in.) to 0.59 m (23.2 in.) by 2099, but the rise will not be geographically uniform. The Atlantic and Gulf Coasts should experience a rise near the global mean, the West Coast a slightly lower rise, and the Arctic Coast a rise of only 0.1 m (3.9 in.). These estimates do not include subsidence in the Gulf and uplift along the New England Coast. Nor do the global projections include the full effects of increased melting of the Greenland and Antarctic ice masses because current understanding of these effects is too limited to permit projection of an upper bound on sea level rise.

- *Increases in intense precipitation events.* Intense precipitation events are highly likely (greater than 90 percent probability of occurrence) to become more frequent in widespread areas of the United States.

- *Increases in hurricane intensity.* Increased tropical storm intensities, with larger peak wind speeds and more intense precipitation, are projected as likely (greater than 66 percent probability of occurrence). No robust projections concerning the annual global number of tropical storms have yet emerged from modeling studies, but more detailed analyses focused on the Atlantic Ocean suggest no significant increases in the annual number of Atlantic tropical storms.

11.10 Regional Perspective

Based on the national perspective (above), quoted from TRB report 290, and Maine's Climate Future (University of Maine); Maine is likely to be affected by climate change as follows:

There will be a strong trend in Maine toward warmer and generally wetter conditions in all four seasons over the 21st century with the exception of summer precipitation. Projected increases in both temperature and precipitation tend to be greatest in the north, and least along the coast. These warming trends imply a significant shift in the regional hydrology, from a snowmelt-dominated regime to one that shows significant runoff during winter. This shift, coupled with projected precipitation increases in winter, will likely pose challenges for flood mitigation.

Vulnerability of Transportation Infrastructure

Although a recent study has evaluated some types of economic impact of sea-level rise for coastal York County (Colgan and Merrill 2008), there has not been a statewide assessment of the impact of climate change on Maine's infrastructure.

Some climate changes will be beneficial for Maine's transportation system; the expected decrease in the length and severity of the winter season will likely reduce the cost of snow and ice control, provide safer travel conditions, and lengthen the construction season. However, depending upon location, roads, bridges, and other transportation infrastructure may become vulnerable to chronic or acute failure. Flooding and erosion associated with major storms may cause road washouts, rendering transportation infrastructure inoperable for long periods of time and requiring unplanned and high-cost replacement and repair (MaineDOT 2008).

The Maine Emergency Management Agency (MEMA) has designated certain roads as Emergency Evacuation routes. The routes have distinctive blue signage and are intended to expedite the evacuation of coastal areas of Maine in the event of severe weather, such as a tsunami. The evacuation routes are intended to guide traffic fleeing the affected areas into safer, unaffected regions. The routes were developed cooperatively with the county emergency management agencies and the Maine Department of Transportation.

Maintaining the integrity and continuity of evacuation routes passing through the BACTS area is critical to the public safety of residents and visitors to eastern Maine. Unintentional or purposeful severance of an evacuation route should be avoided during planning, project development and construction.

While there is a lot of focus on the direct effects of climate change, such as flooding due to sea level rise (SLR), very little attention has been paid to the tertiary effects, such as population migration. This has begun to change. Researchers at the University of Georgia have published county level preliminary work showing where people displaced by SLR effects will migrate.

It appears that, due to topography, there will be little direct impact of SLR on this part of Maine. However, Penobscot County could be a receiving county with a forecast of in-migration of up to 50,000 persons. Such a forecast can only be considered preliminary and will likely be refined.

Using the forecast as an estimate for magnitude, it would appear that a significant investment in public infrastructure such as, transportation, drainage, and sewerage, would be required.

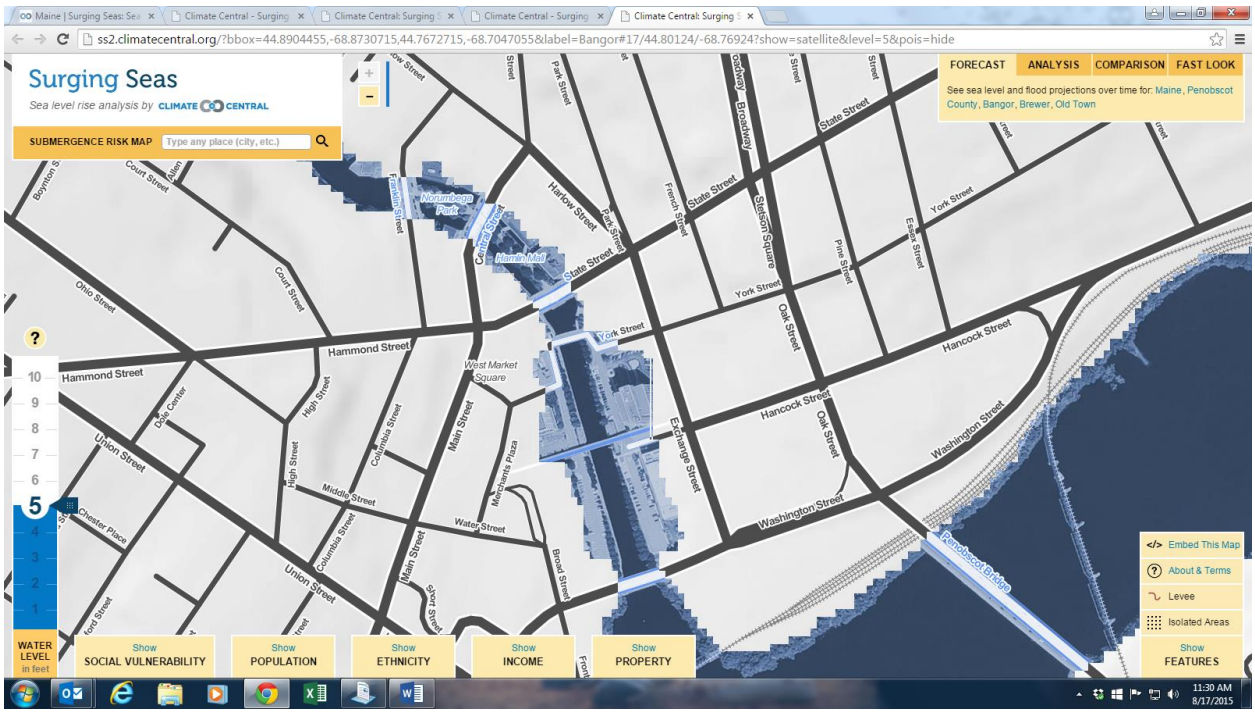
Reducing GHG Emissions

Efforts to reduce GHG emissions from transportation are essentially the same as those used to address ground level ozone precursors. Notwithstanding the global extent of elevated GHG levels and the small geographic extent of the BACTS area, reduction of GHG emissions need to be focused on the reduction of use of GHG generating fuel and the increased use of alternative fuels that produce less or no GHG.

Goals/Objectives/Strategies

The Transportation Research Board of the National Academy of Sciences has made the following recommendations: inventory critical infrastructure such as coastal roads, railways, transit systems, and runways to assess their vulnerability to flooding due to severe storms and sea-level rise; factor anticipated climate change into investment and land-use planning decisions; integrate evacuation and emergency response to extreme weather events into transportation operations; and develop and implement monitoring technologies to give advance warning of infrastructure failures due to water levels, waves, and wind (TRB 2008).

Regardless of contentious debate about cause of Climate Change, it would seem that a prudent course would be to prepare for its reasonably foreseeable effects. For example, areas that would likely flood first in a scenario that envisioned a general rise in sea level are readily identifiable. Areas in the BACTS area that have been flooded historically would be candidates for inclusion in the vulnerable areas list. For example, in Downtown Bangor, the areas immediately adjacent to the Kenduskeag Stream.



The map above (Figure 11.5) shows areas that would be inundated if there were a 5ft flood. Analysis of tides, storm surges, and elevated sea level, indicates that the likelihood of a 5 ft. flood before 2020 is 10%, and before 2030 is 30%. The likelihood of there being a 5ft. flood before 2060 is 100%.

In addition to the impacts on network connectivity of flooding, there would be other effects that would not be so immediate or visible. Repeated or prolonged inundation of soils compromises the load bearing capacities of soils and foundations. The stability of structures in or beside flooded areas could be brought in to doubt.

Flooding related to tides and storm surges, though significant, may not be the most disruptive flooding that may be experienced. Heavy downpours also cause problems. The extent of these sporadic events may be limited, but depending on the locations, they may have large impacts on traffic flow. The areas most vulnerable are those that historically have already experienced flooding. For instance, Wilson

Street, Brewer has flooded on several occasions in recent times. In those cases, the rain was so heavy that it accumulated on the pavement to a depth of several inches.

Also, intense heavy rain over short time periods can reduce slope stability, causing mud slides. (RT1A Dedham Summer 2015). While intense rain events are undoubtedly inconvenient and can cause hazards to travelers, mitigation can be relatively low cost such as diversions and barricades. Permanent solutions will be more expensive.

Design elements that may need to be addressed to reduce vulnerability to intense rain events:

- culvert size
- slope gradients
- enclosed drainage design, open drainage design
- impermeable surface area regulation
- pavement design

11.11 Future Conditions and Issues

Responding to the challenges of climate change and the establishment of livable and sustainable communities requires a long range effort because the challenge will still be there well beyond the lifetime of this particular long range plan. Yet it is possible that strategies can be implemented in the short term that will eventually position the Greater Bangor Area so that it can maintain and improve its economic vitality and livability, while reducing local impacts from climate change. In fact, some immediate factors are already playing a part in adapting the transportation system to meet the challenges. The increasing costs of gasoline and other user costs promote the use of alternatives, as does the ageing of the population. The resulting changes in traveler behavior will exploit existing supportive policies, services and infrastructure, and demand more.

A regular, systematic monitoring of travel demand and the condition of BACTS infrastructure will enable officials to anticipate and plan for impacts to our transportation system resulting from climate change.

11.12 Recommendations

- To achieve regional transportation goals, BACTS must work with local governments, agencies and other local-level stakeholders to encourage better coordination of transportation and land use.
- Encourage municipalities to adopt and implement Complete Streets policies
- Participate in local livable communities programs
- Encourage future development policies that preserve key natural features and the small town/rural character of most of the corridor while promoting economic prosperity;
- Develop checklist and urge municipal planners and leaders to integrate consideration of public transit needs, complete street design and stormwater mitigation requirements early in project development and prior to the approval process to avoid project delays, inefficient or inaccessible developments, and additional project implementation costs
- Promote measures that remove or minimize major traffic bottlenecks and safety hazards in the region's service centers;
- Encourage municipal coordination with adjacent municipalities to recognize the important link between land use transportation mobility.
- Integrate Complete Streets considerations more thoroughly into project selection evaluation and funding, to ensure that prioritized projects are those that do the most to meet a comprehensive set of regional goals that include safety, public health and equity.

- Promote alternative modes; transit, van pool, carpool, walk, and bike.
- Promote land use policies that are supportive of alternative modes such as Transit Oriented Developments, higher density developments, and mixed use developments.
- Assist with the Bangor region Incident Management group.
- Survey weather related vulnerabilities of existing infrastructure.
- Develop projects and policies to reduce weather vulnerabilities.
- Incorporate climate vulnerability criteria into project selection, design, specifications.
- Monitor climate effects on infrastructure.

Municipal Comprehensive Plans and Land Use Ordinances

City of Bangor

2012 Comprehensive Plan:
http://www.bangormaine.gov/filestorage/422/424/1317/1334/BangorCompPlan2012WEB_(1).pdf
Land Use Ordinance: https://ecode360.com/6891121?all=true

Town of Bradley

2004 Comprehensive Plan and Land Use Ordinance:
http://www.townofbradley.net/ordinances-and-policies/4573906846

City of Brewer

2015 Comprehensive Plan: http://brewermaine.gov/planning/comprehensive-plan/
Land Use Ordinance: http://brewermaine.gov/planning/land-use-code/

Town of Hampden

2010 Comprehensive Plan: http://www.hampdenmaine.gov/index.asp?SEC=8893026B-CC6E-44CE-B09F-63E609D20E5B&Type=B_BASIC
Land Use (Zoning) Ordinance: http://www.hampdenmaine.gov/vertical/sites/%7B1FCAF0C4-5C5E-476D-A92E-1BED5B1F9E05%7D/uploads/Zoning_Ordinance.pdf

Town of Hermon

2010 Comprehensive Plan:
https://www.hermon.net/wp-content/uploads/2016/10/ComprehensivePlanBook2.pdf
https://www.hermon.net/wp-content/uploads/2016/10/ComprehensivePlanBook1.pdf
Land Use Ordinance:
http://library.amlegal.com/nxt/gateway.dll/Maine/hermon_me/townofhermonmainecodeofordinances?f=templates$fn=default.htm$3.0$vid=amlegal:hermon_me

Town of Milford

Land Use Ordinance: http://milfordmaine.org/images/ordinances/land_use_ordinance-001.pdf

City of Old Town

1995 Comprehensive Plan:
http://oldtownftp.bizcompasscloud.com/City%20Website/Documents/Code%20Enforcement/Comprehensive%20Plan.PDF
*2016 Comprehensive Plan:
http://www.maine.gov/dacf/municipalplanning/comp_plans/Old_Town_2016.pdf
2016 Comprehensive Plan retrieved from the Maine Department of Agriculture, Conservation and Forestry website.
Land Use (Zoning) Ordinance:
http://oldtownftp.bizcompasscloud.com/City%20Website/Documents/Code%20Enforcement/Zoning%20Ordinance.PDF

Town of Orono

2014 Comprehensive Plan: http://orono.org/DocumentCenter/View/683
http://orono.org/DocumentCenter/View/684
Land Use Ordinance:
https://library.municode.com/me/orono/codes/code_of_ordinances?nodeId=PTIIOR_CH18LAUS

Town of Orrington

Land Use Ordinance: http://www.orrington.govoffice.com/vertical/sites/%7B66869F6F-0C7F-4D86-A31D-781DC0391C4D%7D/uploads/Orrington_Land_Use_Ordinance_2016.pdf

Penobscot Indian Island Reservation

Land Use/Comprehensive Plan: https://www.narf.org/nill/codes/penobscot/ch10.PDF

Town of Veazie

Land Use Ordinance: http://www.veazie.net/Public_Documents/VeazieME_Charter/Section%2015

12.0 Transportation Performance Management, Measures and Targets

12.1 Introduction

Requirements for performance management to promote the most efficient investment of Federal transportation funds increases the accountability and transparency of the Federal-aid highway program and provides for a framework to support improved investment decision-making through a focus on performance outcomes for key national transportation goals. The rules address requirements established by the Moving Ahead for Progress in the 21st Century Act (MAP-21) and reflects passage of the Fixing America's Surface Transportation (FAST) Act to more effectively evaluate and report on safety, infrastructure condition, on-road mobile source emissions, and surface transportation performance.

An MPO will be required to integrate in the metropolitan transportation planning process, directly or by reference, the goals, objectives, performance measures, and targets described in other State transportation plans and transportation processes, as well as any plans developed by providers of public transportation required as part of a performance-based program including:

- The State asset management plan for the NHS
- The State Transit Asset Management Plan
- Applicable portions of the HSIP, including the SHSP
- The Public Transportation Agency Safety Plan
- Other safety and security planning and review processes, plans, and programs, as appropriate
- The Congestion Mitigation and Air Quality Improvement Program performance plan, as applicable
- Appropriate (metropolitan) portions of the State Freight Plan
- The congestion management process, if applicable
- Other State transportation plans and transportation processes required as part of a performance-based program.

12.2 Transportation Performance Management Framework Background

<u>Highway Safety Improvement Program and Safety Performance Measures Rules</u>

The Federal Highway Administration (FHWA) published the Highway Safety Improvement Program (HSIP) and Safety Performance Management Measures (Safety PM) Final Rules on March 15, 2016, with an effective date of April 14, 2016. The rules implement the performance management requirements, including the specific safety performance measure requirements for the purpose of carrying out the HSIP to assess serious injuries and fatalities on all public roads. It establishes five performance measures as the five-year rolling averages for:

- Number of Fatalities,
- Rate of Fatalities per 100 million Vehicle Miles Traveled (VMT),
- Number of Serious Injuries,
- Rate of Serious Injuries per 100 million VMT, and
- Number of Non-motorized Fatalities and Non-motorized Serious Injuries.

<u>Bridge, Pavement, CMAQ and System Performance Programs and Performance Measures</u>

On May 20, 2017, FHWA finalized* six interrelated performance rulemakings to implement the Transportation Performance Management (TPM) framework established by the Moving Ahead for Progress in the 21st Century Act (MAP-21) and the Fixing America's Surface Transportation (FAST) Act. Collectively, the rules address challenges facing the U.S. transportation system, including:

- improving safety;
- maintaining infrastructure condition;
- reducing traffic congestion;
- improving efficiency of the system and freight movement;
- protecting the environment; and
- reducing delays in project delivery.

**The effective date of the portions of the final rule pertaining to GHG measure has been delayed indefinitely.*

The rules establish national performance measures. State Departments of Transportation (DOTs) and Metropolitan Planning Organizations (MPOs) will establish targets for applicable measures for:

- the performance of the Interstate and non-Interstate National Highway System (NHS) to carry out the National Highway Performance Program (NHPP);
- freight movement on the Interstate system; and
- traffic congestion and on-road mobile source emissions for the purpose of carrying out the Congestion Mitigation and Air Quality Improvement (CMAQ) Program.

Figure 12.1

Implementation Timeline

Final Rule	Effective Date	States Set Targets By	MPOs Set Targets By	LRSTP, MTP, STIP and TIP Inclusion
Safety Performance Measures (PM1)	April 14, 2016	Aug. 31, 2017	Up to 180 days after the State sets targets, but not later than Feb. 27, 2018	Updates or amendments on or after May 27, 2018
Pavement/ Bridge Performance Measures (PM2)	May 20, 2017	May 20, 2018	No later than 180 days after the State(s) sets targets	Updates or amendments on or after May 20, 2019
System Performance Measures (PM3)	May 20, 2017	May 20, 2018	No later than 180 days after the State(s) sets targets	Updates or amendments on or after May 20, 2019

12.2 Performance Management Elements and Framework

FHWA defines Transportation Performance Management (TPM) as a strategic approach that uses system information to make investment and policy decisions to achieve national performance goals. Performance management outcomes are grouped into six elements.

National Goals: Congressionally established goals or program purpose to focus the Federal-aid highway program into specific areas of performance.

Measures: FHWA-established measures to assess performance/condition in carrying out performance-based Federal-aid highway programs.

Targets: Targets established by Federal-aid highway funding recipients for the measures to document future performance expectations

Plans: Development of strategic and/or tactical plans by Federal funding recipients to identify strategies and investments that address performance needs.

Reports: Development of reports by Federal funding recipients that document progress toward target achievement, including the effectiveness of Federal-aid highway investments.

Accountability and Transparency: FHWA-developed requirements for Federal funding recipients to use to achieve or make significant progress toward targets.

National Goals

The National FHWA program performance goals as established by Congress are:

Safety - To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.

Infrastructure Condition - To maintain the highway infrastructure asset system in a state of good repair.

Congestion Reduction - To achieve a significant reduction in congestion on the National Highway System.

System Reliability - To improve the efficiency of the surface transportation system.

Freight Movement and Economic Vitality - To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.

Environmental Sustainability - To enhance the performance of the transportation system while protecting and enhancing the natural environment.

Reduced Project Delivery Delays - To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

12.3 Safety Performance Measures

FHWA established five performance measures for which State DOTs and MPOS must establish annual safety targets. These safety performance measures are applicable to all public roads regardless of ownership or functional classification.

- Number of Fatalities
- Rate of Fatalities per 100 million Vehicle Miles Traveled (VMT)
- Number of Serious Injuries
- Rate of Serious Injuries per 100 million VMT
- Number of Non-motorized Fatalities and Non-motorized Serious Injuries.

States will establish statewide targets for each of the safety performance measures annually, beginning in August 2017 for calendar year 2018 and report the targets to the FHWA in the HSIP report due on August 31 of each year. MPOs must also set a target for each of the five measures for all public roads in the MPO

planning area within 180 days of the State establishing each target. While States report their HSIP targets to FHWA in their annual HSIP report, MPOs do not report their HSIP targets directly to FHWA. To meet the report due date of August 31, MPOs must establish HSIP targets and report to the State DOT no later than February 27 of each year.

An MPO may adopt and support the State's HSIP targets, develop their own HSIP targets, or use a combination of both. Whether an MPO agrees to support a State HSIP target or establishes its own HSIP target, the MPO must include a report evaluating the condition and performance of the transportation system with respect to the safety performance targets in the Metropolitan Transportation Plan (MTP), including progress achieved by the MPO in achieving safety performance targets. MPOs' targets are reported to the State DOT, which must be able to provide the targets to FHWA, upon request.

FHWA will determine whether a State DOT has met or made significant progress toward meeting HSIP targets, but will not directly assess MPO progress. FHWA will review MPO performance as part of ongoing transportation planning process reviews, including the Transportation Management Area certification review and the Federal Planning Finding associated with the approval of the Statewide Transportation Improvement Program.

A State is considered to have met or made significant progress toward meeting its safety targets when at least 4 of the 5 targets are met or the outcome for the performance measure is better than the baseline performance the year prior to the target year. If FHWA determines the State has not met or made significant progress towards meeting safety targets, the State will be required to use obligation authority equal to the baseline year HSIP apportionment only for safety projects.

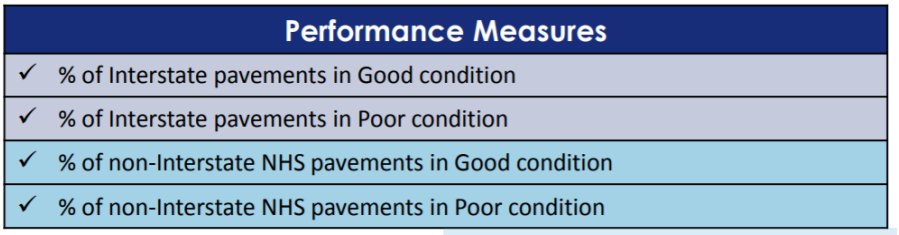
12.4 Pavement and Bridge Condition Performance Measures

This Pavement and Bridge Condition Performance Measures final rule establishes measures for State DOTs to carry out the NHPP and to assess the condition of pavements on the non-Interstate NHS; pavements on the Interstate System; and bridges carrying the NHS, including on- and off-ramps connected to the NHS.

Pavement

Pavement Performance Measures set by FHWA include the percent of interstate and non-interstate NHS roads that have good or poor pavement conditions. FHWA defines conditions as Good if no major investment is needed, or Poor if major reconstruction investment is needed.

Figure 12.2



State DOTs must establish targets, regardless of ownership, for the full extent of the Interstate and non-Interstate NHS; establish statewide 2- and 4-year targets for the non-Interstate NHS and 4-year targets for the Interstate by May 20, 2018 and report by October 1, 2018. Targets may be adjusted at the mid

performance period progress report (October 1, 2020). MPOs can choose to either support the relevant State 4- year target or establish their own by 180 days after the State DOT target is established.

If FHWA determines the State DOT's Interstate pavement condition falls below the minimum level for the most recent year, the State DOT must obligate a portion of National Highway Performance Program (NHPP) and transfer a portion of Surface Transportation Program (STP) funds to address Interstate pavement condition.

Figure 12.3 Implementation Timeframe

Key Dates	
May 20, 2017	Final rule effective date.
January 1, 2018	1st 4-year performance period begins.
May 20, 2018	State DOT targets must be established.
January 1, 2018	State DOTs collect data for Interstate pavements that conform to the final rule (IRI, Rutting, Cracking %, Faulting, and Inventory).
Within 180 days of relevant State DOT(s) target establishment	MPOs must commit to support state target or establish separate quantifiable target.
October 1, 2018	Baseline Performance Period Report for 1st Performance Period due. State DOTs report 4-year targets for Interstate and 2-year and 4-year targets for non-Interstate NHS; etc.
April 15, 2019, and each April 15 thereafter	State DOTs submit first Interstate data that conform to the final rule.
January 1, 2020	State DOTs collect data for non-Interstate NHS pavements that conform to the final rules.
October 1, 2020	Mid Performance Period Progress Report for the 1st Performance Period due. State DOTs report 2-year condition/performance; progress toward achieving 2-year targets; etc.
June 15, 2021, and each June 15 thereafter	State DOTs submit non-Interstate NHS data that conform to the final rule.
December 31, 2021	1st 4-year performance period ends.
October 1, 2022	Full Performance Period Progress Report for 1st Performance Period due. State DOTs reports 4-year condition/performance; progress toward achieving 4-year targets, etc. Baseline Performance Period Report for 2nd Performance Period due. State DOTs report 2-year and 4-year targets for Interstate and non-Interstate NHS; baseline condition; etc.

Bridges

Condition-Based Performance Measures set by FHWA include the percent of NHS bridges classified as having good or poor deck areas. The classification is based on National Bridge Inventory (NBI) condition ratings for item 58 - Deck, 59 - Superstructure, 60 - Substructure, and 62 - Culvert. Condition is determined by the lowest rating of deck, superstructure, substructure, or culvert. If the lowest rating is greater than or equal to 7, the bridge is classified as good; if it is less than or equal to 4, the classification is poor. (Bridges rated below 7 but above 4 will be classified as fair; there is no related performance measure.) Deck area is computed using NBI item 49 - Structure Length, and 52 - Deck Width or 32 - Approach Roadway Width (for some culverts).

Figure 12.4

Performance Measures
✓ % of NHS bridges by deck area classified as in Good condition
✓ % of NHS bridges by deck area classified as in Poor condition

State DOTs must establish targets for all bridges carrying the NHS, which includes on- and off-ramps connected to the NHS within a State, and bridges carrying the NHS that cross a State border, regardless of ownership. Statewide 2- and 4- year targets must be established by May 20, 2018, and reported by October 1, 2018, in the Baseline Performance Period Report. Four-year targets may be adjusted at the mid performance period progress report (October 1, 2020). MPOs can either support the relevant State 4-year targets or establish their own by 180 days after the State target is established.

If for 3 consecutive years more than 10.0% of a State DOT's NHS bridges' total deck area is classified as Structurally Deficient, the State DOT must obligate and set aside National Highway Performance Program (NHPP) funds for eligible projects on bridges on the NHS.

State DOT targets should be determined from asset management analyses and procedures and reflect investment strategies that work toward achieving a state of good repair over the life cycle of assets at minimum practicable cost. State DOTs may establish additional measures and targets that reflect asset management objectives.

Figure 12.5 Implementation Timeframe

Key Dates	
May 20, 2017	Final rule effective date.
January 1, 2018	1st 4- year performance period begins.
May 20, 2018	Initial 2- and 4-year targets established.
October 1, 2018	Baseline Performance Period Report for the 1st Performance Period due. State DOTs report 2-year and 4-year targets; etc.
Within 180 days of relevant State DOT(s) target establishment	MPOs must commit to support State target or establish separate quantifiable target.
October 1, 2020	Mid Performance Period Progress Report for the 1st Performance Period due. State DOTs report 2-year condition/performance; progress toward achieving 2-year targets; etc.
December 31, 2021	1st 4-year performance period ends.
October 1, 2022	Full Performance Period Progress Report for 1st performance period due. State DOTs report 4-year condition/ performance; progress toward achieving 4-year targets; etc. Baseline report due for 2nd performance period due. State DOTs report 2- and 4-year targets; baseline condition, etc.

12.5 System Performance

There are two system performance measures:

% of reliable person-miles traveled on the Interstate
% of reliable person-miles traveled on the noninterstate NHS

Travel Time Reliability

Level of Travel Time Reliability (LOTTR) is defined as the ratio of the longer travel times (80th percentile) to a "normal" travel time (50th percentile), using data from FHWA's National Performance Management Research Data Set (NPMRDS) or equivalent. Data are collected in 15-minute segments during all time periods between 6 a.m. and 8 p.m. local time. The measures are the percent of person-miles traveled on the relevant portion of the NHS that are reliable. Person-miles take into account the users of the NHS. Data to reflect the users can include bus, auto, and truck occupancy levels.

Implementation Timeframe

Implementation differs for the Interstate and non-Interstate NHS measures for the first performance period. State DOTs must establish 2- and 4- year targets for the Interstate, but only a 4-year target for the non-Interstate NHS, by May 20, 2018. Those targets will be reported in the State's baseline performance period report due by October 1, 2018. The State DOTs have the option to adjust 4-year targets in their mid performance period progress report, due October 1, 2020. For the first performance period only, there is no requirement for States to report baseline condition/performance or 2-year targets for the non-Interstate NHS before the mid performance period progress report. This will allow State DOTs to consider more complete data. The process will align for both Interstate and non-Interstate measures with the beginning of the second performance period on January 1, 2022.

MPOs must either support the State target or establish their own quantifiable 4- year targets within 180 days of the State target establishment.

Freight Reliability

Freight movement and travel time reliability on the Interstate System will be assessed by the Truck Travel Time Reliability (TTTR) Index. This measure considers factors that are unique to this industry, such as the use of the system during all hours of the day and the need to consider more extreme impacts to the system in planning for on-time arrivals.

Reporting is divided into five periods: morning peak (6-10 a.m.), midday (10 a.m.-4 p.m.) and afternoon peak (4-8 p.m.) Mondays through Fridays; weekends (6 a.m.-8 p.m.); and overnights for all days (8 p.m.-6 a.m.). The TTTR ratio will be generated by dividing the 95th percentile time by the normal time (50th percentile) for each segment. The TTTR Index will be generated by multiplying each segment's largest ratio of the five periods by its length, then dividing the sum of all length-weighted segments by the total length of Interstate.

State DOTs and MPOs will have the data they need in FHWA's National Performance Management Research Data Set (NPMRDS) as data set includes truck travel times for the full Interstate System.

Implementation Timeframes

State DOTs must establish 2- and 4-year targets by May 20, 2018. Those targets will be reported in the State's baseline performance period report due by October 1, 2018. The State DOTs have the option to adjust 4-year targets in their mid performance period progress report, due October 1, 2020. MPOs must either support the State target or establish their own quantifiable 4- year targets within 180 days of the State target establishment.

Congestion Management and Air Quality (CMAQ) Improvement Measures

There are two CMAQ performance measures:

- Traffic congestion
  - Peak Hour Excessive Delay (PHED) measure: annual hours of PHED per capita
  - Non-Single Occupancy Vehicle Travel (SOV) measure: % of non-SOV travel
- On-road mobile source emissions
  - Total emission reductions

Peak Hour Excessive Delay

Traffic congestion will be measured by the annual hours of peak hour excessive delay (PHED) per capita on the NHS. The threshold for excessive delay will be based on the travel time at 20 miles per hour or 60% of the posted speed limit travel time, whichever is greater, and will be measured in 15-minute intervals. Peak travel hours are defined as 6-10 a.m. local time on weekday mornings; the weekday afternoon period is 3-7 p.m. or 4-8 p.m. local time, providing flexibility to State DOTs and MPOs. The total excessive delay metric will be weighted by vehicle volumes and occupancy.

Initially, the rule applies to urbanized areas of **more than 1 million people** that are **also in nonattainment or maintenance areas for ozone, carbon monoxide or particulate matter**. In the second performance period (which begins on January 1, 2022), the population threshold changes to **more than 200,000**. States and MPOs with NHS mileage within an applicable urbanized area must coordinate on a single, unified target.

The BACTS urbanized area does not meet the thresholds for required applicability of the performance measure, and therefore will not set performance targets related to this measure.

Single-Occupancy Vehicle (SOV)

Non-SOV travel (carpool, van, public transportation, commuter rail, walking, or bicycling as well as telecommuting) will be measured to assist in carrying out the Congestion Mitigation and Air Quality Improvement (CMAQ) Program. The program recognizes investments that increase multimodal solutions and vehicle occupancy levels as strategies to reduce both criteria pollutant emissions and congestion.

Initially, the rule applies to urbanized areas of **more than 1 million people** that are **also in nonattainment or maintenance areas for ozone, carbon monoxide or particulate matter**. In the second performance period (which begins on January 1, 2022), the population threshold changes to **more than 200,000**.

The BACTS urbanized area does not meet the thresholds for required applicability of the performance measure, and therefore will not set performance targets related to this measure.

On-Road Mobile Source Emissions

State DOTs whose geographic boundaries include any part of a nonattainment or maintenance area for ozone, carbon monoxide, or particulate matter will establish separate targets for each of these applicable criteria pollutants and precursors. The measure does not apply to a State that does not have any of these nonattainment or maintenance areas.

Total emissions reduction of on-road mobile source emissions will be measured to assist in carrying out the Congestion Mitigation and Air Quality Improvement (CMAQ) Program. Total emissions reduction is calculated by summing 2- and 4-year totals of emissions reductions of applicable criteria pollutant and precursor, in kilograms per day, for all projects funded with CMAQ funds.

The first performance period for this measure begins October 1, 2017 and ends on September 30, 2021. States required to establish 2- and 4- year targets must do so by May 20, 2018, for the first performance period. The targets will be reported in the first State baseline performance period report due October 1, 2018.

MPOs must either support the State target or establish their own quantifiable targets within 180 days of the State target establishment. MPOs with a population more than 1 million population and with designated nonattainment and maintenance areas must develop both 2-year and 4-year quantifiable targets. Otherwise, only 4-year targets are required.

The BACTS urbanized area is in air quality attainment, so does not meet applicability requirements of the performance measure and therefore will not set performance targets related to this measure.

12.6 Transportation Asset Management

State DOTs must complete a Transportation Asset Management Plan as a strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on engineering and economic analysis based upon quality information, to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the lifecycle of the assets at minimum practicable cost. In simple terms, asset management is a strategic process for managing physical assets in a state of good repair over their lifecycle at minimum practicable cost.

The elements addressed within this Plan must include:

- Summary listing and condition description of the NHS pavements and bridges
- NHS pavements and bridges targets
- Asset management objectives and measures
- Performance gap analysis--State DOTs must include performance gaps that affect NHS pavements and bridges regardless of physical condition or ownership.
- Risk analysis
- Life-cycle planning
- Financial plan (minimum 10 years)
- Developing investment strategies

Figure 12.6 Implementation Timeframes

Key Dates	
By April 30, 2018	State DOTs submit initial plans describing asset management plan processes.
By June 30, 2019	State DOTs submit fully compliant asset management plans.
At least every 4 years thereafter	Updated processes submitted for recertification.
Not later than August 31, 2019, and not later than July 31 in each year thereafter	Annual determination by FHWA of whether the State DOT has developed and implemented a State asset management plan consistent with this final rule.
Beginning October 1, 2019, and in each fiscal year thereafter	If a State DOT has not developed and implemented a compliant asset management plan, the maximum Federal share on National Highway Performance Program (NHPP) projects and activities carried out by the State in that fiscal year shall be reduced to 65% for that fiscal year.

12.7 Transit Performance Management

Transit Asset Management

The Transit Asset Management final rule was published in the Federal Register on July 26, 2016 with an effective date of October 1, 2016. The purpose of transit asset management (TAM) is to help achieve and maintain a state of good repair (SGR) for the nation's public transportation assets. The TAM rule develops a framework for transit agencies to monitor and manage public transportation assets, improve safety, increase reliability and performance, and establish performance measures.

All recipients of Federal transit funds that own, operate, or manage capital assets used in the provision of public transportation must collect and report data (for all assets used in the provision of public transportation service, regardless of funding source, and whether used by the recipient or sub-recipient directly, or leased by a third-party) for the following performance measures:

- Equipment/(non-revenue) Service Vehicles
- Rolling Stock
- Facilities
- Infrastructure –*applies only to rail fixed guideway, track, signals and systems*

The rule requires FTA grantees to develop asset management plans for their public transportation assets, including vehicles, facilities, equipment, and other infrastructure and establish a strategic and systematic process of operating, maintaining and improving public transportation capital assets effectively through their entire life cycle.

Figure 12.7 Implementation Timeframes

Due Date	Product
January 1, 2017	Transit Agency establish SGR targets by class for next fiscal year
June 30, 2017	MPO establish SGR performance targets for next fiscal year
October 1, 2018	Transit Agency Complete Initial Transit Asset Management Plan
October 1, 2018	MPO reflects performance measures and targets in MTP and TIP
October 1, 2018	Reflect performance measures and targets in Statewide LRTP and STIP
October 30, 2018	Transit Agency submits AIM and FY 19 performance targets to NTD and shares with MPO
October 30, 2019 and annually thereafter	Transit Agency submit AIM, FY performance targets, and narrative report on changes and progress of performance targets in last fiscal year to NTD and shares with MPO
September 30, 2022	Transit Agency first update of Transit Asset Management Plan

Public Transportation Safety

The final rule relating to establishment of a public transportation agency safety plan is pending final regulation.

Figure 12. 8 Proposed Implementation Timeframe

Due Date	Product
Date of Final Rule plus 1 year	Establish Public Transportation Agency Safety Plan, including Agency safety performance targets
180 days after Date of Final Rule plus 1 year	Establish MPO performance targets

13.0 Financial Issues

13.1 Existing Conditions

Metropolitan Transportation Plans must be fiscally constrained so that it proposes only projects that have a chance of receiving funding based on projected revenues over the next twenty years. Table 13.1 summarizes project funding levels and sources covering the last several BACTS TIPs and projects the funding level for the next twenty years. These projections are not adjusted for inflation.

Table 13.1 BACTS Project Funding Levels for TIPs

Revenue Source	2011-2012	2013-2014	2015-2016	Biennial Average	20-Year Estimate
STP/NHS	$8,139,790	$5,580,622	$6,209,931	$6,643,448	**$6,643,4480**
Pedestrian Facilities	$93,300	$667,494	$117,600	$296,131	**$296,1310**
Bridge	$1,772,372	$97,314	$6,604,523	$2,824,736	**$28,247,360**
Interstate	$3,852,565	$1,831,359	$3,027,223	$2,903,716	**$29,037,160**
State	$2,223,384	$1,139,205	$1,874,633	$1,745,741	**$17,457,410**
Local/other	$519,627	$1,264,469	$630,238	$804,778	**$8,047,780**
MPO Planning			$312,347	$312,347	**3,123,470**
Total	**$16,601,038**	**$10,590,463**	**$18,776,495**	**$15,530,897**	**$155,308,970**

Airport and railroad projects are not included in this table. Those projects will be funded through Federal Aviation Administration (FAA), the Federal Railroad Administration (FRA), and sources other than FTA and FHWA. The level of funding for those projects is determined on a statewide basis by MaineDOT. However, BACTS Policy Committee to choose some of the STP/NHS projects in each TIP using a predetermined allocation. The projects are titled MPO Sponsored in the BACTS TIP.

Historic FTA funding is detailed in the Public Transportation Chapter. Table 3.2 summarizes the FTA project funding level sources from 2011 to 2016 and projects funding level for the next twenty years, without any adjustment for inflation.

Table 13.2 BACTS FTA Funding Levels

Revenue Source	2011-2012	2013-2014	2015-2016	Biennial Average	20-Year Estimate
Formula Funds					
§5307 Urbanized Area	$ 1,415,909	$ 1,573,324	$ 1,596,099	$ 1,528,444	$ 15,284,440
§5339 Bus and Bus Facilities		$ 165,886	$ 163,059	$ 164,473	$ 1,644,725
§5303 Metropolitan Transportation Planning Program	$ 130,606	$ 148,331	$ 150,230	$ 143,056	$ 1,430,557
Competitive/Discretionary Funds					
§5307 STIC	$ 0	$ 1,117,431	$ 756,439	$ 624,624	$ 6,246,240
§5339 Bus and Bus Facilities			$ 1,441,600		
Total	**$ 1,546,515**	**$ 3,004,972**	**$ 4,107,427**	**$ 2,460,596**	**$ 24,605,955**

Additional funding sources for the fixed route bus system will be necessary in order to expand service days and hours, service areas, and regularly replace aging vehicles before they begin to fail and so that the bus fleet is operating in a reliable state of good repair.

13.2 Future Conditions and Issues

MaineDOT determines the amount of STP/NHS funding allocated to collector and arterial projects in the MPO area while BACTS determines which projects receive funding. BACTS TIP funding details, such as the number of projects submitted and their value, are presented in Table 13-3. The majority of these projects are resurfacing and intersection improvements.

Table 13-3 BACTS STP/NHS Funding

Capital Work Plan Year	# of projects submitted by BACTS municipalities for consideration	Value of these submitted projects	# of BACTS Projects accepted in that year's CWP	Value of BACTS STP/NHS projects accepted in TIP
2006-2007	42	$15,989,479	12	$5,426,000
2008-2009	33	$7,106,000	12	$3,212,438
2010-2011	38	$17,361,538	11	$4,940,300
2012-2013	42	$12,658,363	21	$4,940,300
2014-2015	45	$12,318,122	10	$4,940,300
2016-2017	27	$13,264,887	8	$4,940,300
2018-2019	32	$18,070,441	13	$4,940,300
2020-2021	19	$8,593,516	7	$4,940,300*

* Estimated amount. Maine DOT has not finalized this figure.

The amount of funding allocated by MaineDOT to BACTS over the past sixteen years is approximately 39 percent of the costs of projects submitted by the municipalities for consideration in each TIP. The municipal list of essential projects would be much greater if more funding were available. The municipalities submit only those projects that are most in need of repair and have a chance of rating high enough for possible selection for funding. Projects that go unfunded either: 1) continue to deteriorate further, resulting in even higher construction/maintenance costs; or 2) force municipalities to pay a much higher percent of the construction costs instead of typical local match amount of 10 or 20 percent needed for state and federally funded projects. The process of prioritizing important projects becomes increasingly difficult with flat or declining funding levels. This trend is not likely to change. The BACTS Policy Committee has recently been shifting its' funding priorities to more pavement preservation and rehabilitation projects and less on reconstruction.

13.3 Recommendations

The BACTS Policy Committee has identified the following recommendations:

- Seek increased funding for transportation projects in the BACTS area from all possible funding sources including MaineDOT, FHWA, FTA, Federal TIGER grants, research funding sources and grant sources.
- Analyze the BACTS roadway pavement conditions and develop a plan that recommends improvements that are most cost effective.
- Continue to optimize capacity in the existing transportation system, where prudent, through increased efficiency and effectiveness of traffic signal systems and Complete Street designs.

- Investigate ways to leverage federal dollars using an equitable mix of state and local funds.
- Work with MaineDOT to seek innovative techniques for transportation projects to extend project life.

14.0 Recommendations

2.0 Demographics

- Increase transportation alternatives for senior populations
- Implement strategies to attract in-migration of non-native residents to the area
- Increase the availability, reliability and accessibility of public transportation

4.0 Public Transportation

- Provide evening and weekend bus service system-wide.
- Ensure bus fleet is in a state of good repair and able in order to minimize disruptions of service because of breakdown and failures.
- Encourage Community Connector to develop a transit asset management plan that promotes timely and planned replacement of vehicles prior
- Work with Community Connector to develop a long-range capital plan
- Develop commuter Park and Ride lots with a designated transit stop to reduce traffic congestion.
- Using technology to provide additional service and service coordination (real-time apps, shared ride services, links between other public and private transit providers to make services more accessible).
- Coordinating with transit providers outside of the Greater Bangor area for more efficient and convenient connections.
- Addressing sprawl issues where development is geographically challenging to provision of transit service. The trend is that Millennials are moving into urban areas, but Seniors are aging in place.
- Protecting the environment by ensuring newly acquired transit vehicles are environmentally friendly and equipped with accessible features (i.e., low-floor, lifts, etc.)
- Coordinating between the transit operator and municipal planning staff/decision-makers to include public transit factors as part of the application and approvals process for new and proposed developments.
- Connecting services [for students] to regional transit hubs (e.g., Boston, New York) for travel from school to home easily. Non-Maine residents are entering post-secondary schools in this area at a large rate.
- Exploring train service in the area.
- Separating right of way or otherwise creating bus way alternatives.
- Providing convenient and reliable transit service for telecommuting workers employed by organizations in larger cities (outside of the area) who occasionally travel to and from the employer's office.
- Linking transit in the area to other systems further north of Bangor and into Canada through a coordinated system.
- Coordinating transit services from Brewer to Bar Harbor/Acadia National Park to eliminate congestion through Route 1A from Brewer into Bar Harbor and into ANP.
- Organizing services and marketing between other regional and inter-city transit providers coming into and out of the Bangor area so travelers make seamless transitions from one service to the next without too much layover time.
- Partnering with the local business community to fund additional transit service geared toward enhancing customer/client base experiences (i.e., EMMC – parking issues, several employees, patients and visitors each day).
- Partnering with businesses to institute promotional programs (e.g., a paid transfer program with retail establishments where the retailers would provide customers with free transfer vouchers to ride the bus from their store).

- Creating more frequent and closer to door access for high traffic medical facilities and complexes in the area.
- Creating a system that meets the need of, and supports, the level of importance placed on transit, by making it more accessible, available, convenient, frequent and connected to non-motorized/active transportation infrastructure.
- Determining impacts and role of autonomous/self-driving vehicles to public transportation services.
- Making bus services easier to use by clarifying where or when the bus is coming, providing route maps that are explicit and clear, as well as available where riders are (i.e., bus stop locations) and providing real time information on where the bus is and where it will be.
- Utilizing GPS/GIS technology integration for bus route maps.
- Ensuring transit can accommodate the different types of active transportation that are also used by bus riders to ensure easy transition from one mode to another (e.g., BBOE route occasionally cannot accommodate all the bike space required for riders).
- Changing the perception of transit use by providing assistance to those needing extra guidance on how to use the bus as well as increasing marketing and outreach efforts to explain bus services.
- Explore non-conventional and private funding sources to expand services.
- Reduce headways/increase frequency of service to 30 minutes, particularly Old Town route.
- Provide/improve passenger amenities – benches, shelters, landscaping, lighting, walkways, signage, etc.
- Improve marketing through local TV, radio, local access channel, and city channel.
- Examine cost effective options for providing ADA Complementary Paratransit service, as use of the service increases.
- Investigate partnerships with potential large ridership generators, such as colleges, hospitals, and employers.
- Implement an ITS-based – traveler information system – next bus arrival, etc.
- Implement transit priority at signalized intersections.
- Ensure that sidewalks are provided along all bus routes.
- Coordinating the public transportation services in the BACTS area, including the siting of an intermodal passenger facility.
- Better integration of taxi service with other transportation options in the Bangor area.
- Improve routes and schedules to ensure ease of understanding and identification of different routes by color, unique name and/or symbol.
- Implement fixed bus stop locations.
- ADA automated audible internal and external announcement of bus route, next stop, etc.
- Update maps and real-time visual route service stops showing landmarks and previous and next stops.
- App and/or visual board at bus stop/hub showing real-time bus status
- Medical facility transit service more frequent and closer to entrance.
- VOOT Route configuration and schedule is overly complicated and confusing and 60-minute headway is not sufficient to meet rider needs.
- Employer/local business programs to subsidize shuttle services for clients/employees

5.0 Highway Transportation

Performance Measures and Targets:

- Work with the Maine DOT to produce highway performance measures and set targets.

Traffic Volume:

- Advocate for the recommended improvements to the I-95 corridor in the 2011 I-95 study and continue to monitor and advocate for improvements for the traffic operations at ramp intersections with area arterials.
- Continue to review and provide input on the design and reconstruction of the Stillwater Avenue bridges over the Stillwater River in Old Town.
- Study intersections listed in the Critical Problem Areas section of this Chapter.
- Continue to review and provide input on the design and improvements to Route 1A in Hampden southerly to Route 9.
- Continue to review and provide input on the design and construction of the proposed Diverging Diamond Interchange at Exit 187 at Hogan Road in Bangor.
- BACTS should hire a consultant to produce a "Road Pavement Analysis and Recommended Action Plan" that will include an inspection of the BACTS road system network and collecting pavement-related data.
- Implement recommendations outlined in completed corridor studies as funds become available and as appropriate.
- Work to improve cross-town connector roads between major inbound/outbound routes in Bangor such as Burleigh Road and Griffin Road.

Traffic Signals:

- BACTS should continue to study signal coordination, phasing/timings along all major corridors in the region.
- Continue to provide input and monitor the findings of the Maine DOT Traffic Mobility Working Group.
- BACTS should update the signal equipment inventory, review standardization of this equipment and work with the Maine DOT and municipalities to implement a maintenance plan for all signals within the region.
- BACTS should continue to monitor technology improvements that could be implemented in the BACTS area.

6.0 Active Transportation

Develop a stand-alone Regional Active Transportation Bike/Ped Plan which, when complete, will complement the Metropolitan Transportation Plan. The Plan will inventory current on-street and off-street pedestrian and bicycle facilities and identify potential improvements to pathways, trails, roadway infrastructure, utility and drainage easements, open spaces and parks. The plan will outline strategies for developing an interconnected transportation network with access to neighborhoods, parks, activity centers, employment centers, parking facilities, bus stops, schools, places of interest, and connectivity to the trails and pathway systems. It will serve as a guide for planning, prioritizing, and for constructing bicycle and pedestrian network improvements in the region.

7.0 Air Transportation

- BGR lacks passenger intermodal connectivity to many of the region's tourist attractions. Direct transportation connections at BGR, via rail or bus, to tourist destinations such as Acadia, Sugarloaf, the Moosehead area, and Baxter State Park would make BGR much more marketable, thus attracting additional air service providers. Passenger rail service to Bangor, restoration of the Calais Branch with a connection at BGR, and regional bus service at BGR would allow tourists to fly into BGR and immediately board a bus or train to their favorite destination.

- Promote and support the construction of a major conference center in Bangor which will make BGR more attractive to air service providers.

- Explore the feasibility of developing a containerized inland port, or intermodal facility, near BGR or Northern Maine Junction and supported by future port expansion at Searsport.

- Conduct a study to determine the feasibility of developing air cargo services at BGR for niche markets such as Maine lobster.

8.0 Rail Transportation

- Encourage efforts to increase intermodal freight traffic through improved highway-rail and water-rail intermodal connectivity.
- Support efforts to increase passenger mobility options and access to intercity rail service via other transit modes through the proximity of new stations and/or system expansions.
- Encourage improved coordination among freight and intercity passenger systems with other modes of transportation among the railroads, Federal Government, Canada and other states in the New England region.
- Explore potential for incremental passenger rail improvements such as new stations, passing sidings, new and/or expanded services.
- Encourage linking rail transportation and land use planning in regional and statewide development practices.
- Support enhancements to the quality of service and market served by the Downeaster intercity passenger rail service to provide alternatives to medium and long distance highway and air travel.
- Support the State's efforts to conduct reviews with municipalities for redundant crossing locations and alternative traffic pattern opportunities to improve efficiency of the rail systems;
- Support the State's efforts to develop policies to increase and improve intermodal freight transportation, including improving data collection;

9.0 Marine Transportation

Maine's seaports are in good condition with more than $80 million in State and Federal funds invested over the last eight years. Projected growth will require an additional $120 million for necessary investments in areas of industrial infrastructure, intermodal connections, cruise ship terminals, and municipal fishing and recreational facilities. The Federal Maritime Commission projects an annual rate of growth around 5 percent for containerized shipments to East Coast ports; the marine route from Portland to New York/New Jersey was included in America's Marine Highway Program; and cruise ship calls increased 6% in 2016.

- Encourage improved mobility and safety on U.S. Route 1A (from the Port of Searsport to the greater Bangor area) and Route 15 (from Brewer to Bucksport) including access management, constructing passing lanes, reducing level grade crossings and improving road shoulders to facilitate more efficient movement of goods and people.
- Promote and support efforts to encourage deep draft vessel traffic and channel improvements on the Penobscot River, such as dredging the Penobscot River.

- Encourage MDOT to perform a feasibility study on the potential for an intermodal facility at the Bangor/Brewer waterfront.

- Support investment in Maine's industrial ports with emphasis on waterfront infrastructure, intermodal connections, rail connectivity, upland storage facilities, and short sea shipping.

10.0 Economic Development and Tourism

A diverse, efficient and safe transportation network is vital in connecting people locally, regionally and globally. The economy is dependent on facilitating the import and export of goods and people. With the aging population stagnating and the resulting potential workforce shortage facing the Greater Bangor area, attracting new and innovative enterprises and developing strategies to in-migrate a skilled and active workforce is essential.

- Investigate opportunities for more frequent and inter-connected public transit services which allow individuals outside of the urban area to more easily access employment, retail and healthcare services in the urban area.

- Encourage the development of transportation options and intermodal connectors for passengers, specifically from Bangor International Airport to the most popular tourist destinations in the Acadia and Maine Highlands areas.

- Encourage the development of intermodal connector facilities for movement of freight into and out of the area.

- Investigate non-traditional funding sources to supplement the area's transportation system maintenance needs.

- Support the Greater Bangor Region Chamber of Commerce and the Greater Bangor Convention and Visitors Bureau efforts in attracting economic development and tourist activity in the area.

11.0 Land Use, Livability, Sustainability, and Environment

- To achieve regional transportation goals, BACTS must work with local governments, agencies and other local-level stakeholders to encourage better coordination of transportation and land use.
- Encourage municipalities to adopt and implement Complete Streets policies
- Participate in local livable communities programs
- Encourage future development policies that preserve key natural features and the small town/rural character of most of the corridor while promoting economic prosperity;
- Develop checklist and urge municipal planners and leaders to integrate consideration of public transit needs, complete street design and stormwater mitigation requirements early in project development and prior to the approval process to avoid project delays, inefficient or inaccessible developments, and additional project implementation costs
- Promote measures that remove or minimize major traffic bottlenecks and safety hazards in the region's service centers;
- Encourage municipal coordination with adjacent municipalities to recognize the important link between land use transportation mobility.
- Integrate Complete Streets considerations more thoroughly into project selection evaluation and funding, to ensure that prioritized projects are those that do the most to meet a comprehensive set of regional goals that include safety, public health and equity.
- Promote alternative modes; transit, van pool, carpool, walk, and bike.
- Promote land use policies that are supportive of alternative modes such as Transit Oriented Developments, higher density developments, and mixed use developments.
- Assist with the Bangor region Incident Management group.
- Survey weather related vulnerabilities of existing infrastructure.
- Develop projects and policies to reduce weather vulnerabilities.

- Incorporate climate vulnerability criteria into project selection, design, specifications.
- Monitor climate effects on infrastructure.

13.0 Financial Issues

- Seek increased funding for transportation projects in the BACTS area from all possible funding sources including MaineDOT, FHWA, FTA, Federal TIGER grants, research funding sources and grant sources.
- Analyze the BACTS roadway pavement conditions and develop a plan that recommends improvements that are most cost effective.
- Continue to optimize capacity in the existing transportation system, where prudent, through increased efficiency and effectiveness of traffic signal systems and Complete Street designs.
- Investigate ways to leverage federal dollars using an equitable mix of state and local funds.
- Work with MaineDOT to seek innovative techniques for transportation projects to extend project life.

Appendix A: BACTS Public Participation Schedule and Public Comments

A.1 Schedule of Public Involvement for Metropolitan Transportation Plan

November 27, 2017.....Posting for Public Comments

December 1, 2017 .....Public Meeting, 10:30 a.m. Bangor City Hall Council Chambers

December 6, 2017 .....Public Meeting, 6:30 p.m. Bangor City Hall Council Chambers

APPENDIX B: BACTS Highway Classification, Volumes, and TIP Projects

Table B.1 Federal Functional Classifications

Town Name	Street Name	Current Federal Functional Classification
Bangor	Broadway	Other principal arterial/Minor arterial
Bangor	Buck St.	Major/urban collector
Bangor	Burleigh Rd.	Major/urban collector
Bangor	Cedar St.	Other principal arterial
Bangor	Center St.	Major/urban collector
Bangor	Central St.	Minor arterial
Bangor	Cumberland St.	Major/urban collector
Bangor	Essex St.	Major/urban collector
Bangor	Exchange St.	Major/urban collector
Bangor	Farm Rd.	Major/urban collector
Bangor	Fourteenth St.	Major/urban collector
Bangor	Gallagher Pl.	Other principal arterial
Bangor	Garland St.	Major/urban collector
Bangor	Godfrey Blvd.	Major/urban collector
Bangor	Grandview	Major/urban collector
Bangor	Griffin Rd.	Major/urban collector/Minor arterial
Bangor	Grove St.	Major/urban collector
Bangor	Hammond St.	Minor arterial
Bangor	Hancock St.	Minor arterial
Bangor	Harlow St.	Major/urban collector/Other principal arterial
Bangor	Hogan Rd.	Major/urban collector/Minor arterial
Bangor	Howard St.	Major/urban collector
Bangor	Hudson Rd.	Major/urban collector
Bangor	I-395 EB & WB	Principal arterial interstate
Bangor	I-95 NB & SB	Principal arterial interstate
Bangor	Independent St.	Other principal arterial
Bangor	Kenduskeag Ave.	Major/urban collector
Bangor	Main St.	Other principal arterial/Minor arterial
Bangor	Maine Ave.	Major/urban collector
Bangor	Mt. Hope Ave.	Major/urban collector
Bangor	Oak St.	Other principal arterial
Bangor	Odlin Rd.	Major/urban collector/Minor arterial
Bangor	Ohio St.	Major/urban collector
Bangor	Outer Hammond St.	Minor arterial
Bangor	Park St.	Major/urban collector
Bangor	Perry Rd.	Major/urban collector
Bangor	Pushaw Rd.	Major/urban collector
Bangor	Short St.	Other principal arterial
Bangor	State St.	Minor arterial
Bangor	Stillwater Ave.	Major/urban collector
Bangor	Summer St.	Other principal arterial
Bangor	Thatcher St.	Major/urban collector

Table B.1 Federal Functional Classifications (Continued)

Town Name	Street Name	Current Federal Functional Classification
Bangor	Union St.	Other principal arterial/Minor arterial
Bangor	US Rt. 202	Other principal arterial
Bangor	Vermont Ave.	Major/urban collector
Bangor	Washington St.	Other principal arterial/Minor arterial
Bangor	Webster Ave.	Major/urban collector
Bradley	Main St.	Major/urban collector
Brewer	Betton St.	Other principal arterial
Brewer	Eastern Ave.	Major/urban collector
Brewer	Elm St.	Major/urban collector
Brewer	I-395 EB & WB	Principal art interstate
Brewer	Mill St.	Minor collector
Brewer	No. Main St.	Other principal arterial
Brewer	Parkway South	Major/urban collector/Minor arterial
Brewer	Penobscot St..	Other principal arterial
Brewer	Pierce Rd.	Major/urban collector
Brewer	So. Main St.	Minor arterial/Other principal arterial
Brewer	State St.	Other principal arterial
Brewer	Wilson St.	Other principal arterial
Hampden	Kennebec Rd.	Major/urban collector
Hampden	Main Rd. North	Minor arterial
Hampden	Main Rd. South	Other principal arterial
Hampden	US Rt. 202	Other principal arterial
Hampden	Western Ave.	Other principal arterial/Major/urban collector
Hermon	Coldbrook Rd.	Major/urban collector
Milford	Bradley Rd./Rt. 178	Major/urban collector
Milford	Main Rd.	Minor arterial
Old Town	Bennoch Rd.	Major/urban collector
Old Town	Brunswick St.	Major/urban collector
Old Town	Center St.	Minor arterial
Old Town	Chester St.	Major/urban collector
Old Town	College Ave.	Minor arterial
Old Town	Gilman Falls Ave.	Major/urban collector
Old Town	No. Main St.	Major/urban collector
Old Town	Rt. 116	Minor collector
Old Town	So. Main St.	Minor arterial
Old Town	Stillwater Ave.	Minor arterial/Major/urban Collector.
Old Town	Water St.	Major/urban collector
Orono	Bennoch Rd.	Major/urban collector
Orono	College Ave.	Minor arterial
Orono	Forest Ave.	Major/urban collector
Orono	Kelley Rd.	Minor arterial
Orono	Main St.	Minor arterial
Orono	Park St.	Minor arterial

Table B.1 Federal Functional Classifications (Continued)

Town Name	Street Name	Current Federal Functional Classification
Orono	Stillwater Ave.	Minor arterial
Orono	Woodhaven Rd.	Minor arterial
Orrington	River Rd.	Minor arterial
Veazie	I-95 NB and SB.	Principal arterial interstate
Veazie	Mt. Hope Ave.	Major/urban collector
Veazie	School St.	Major/urban collector
Veazie	State St.	Minor arterial
Veazie	Stillwater Ave.	Major/urban collector

Table B.2 Traffic Volumes

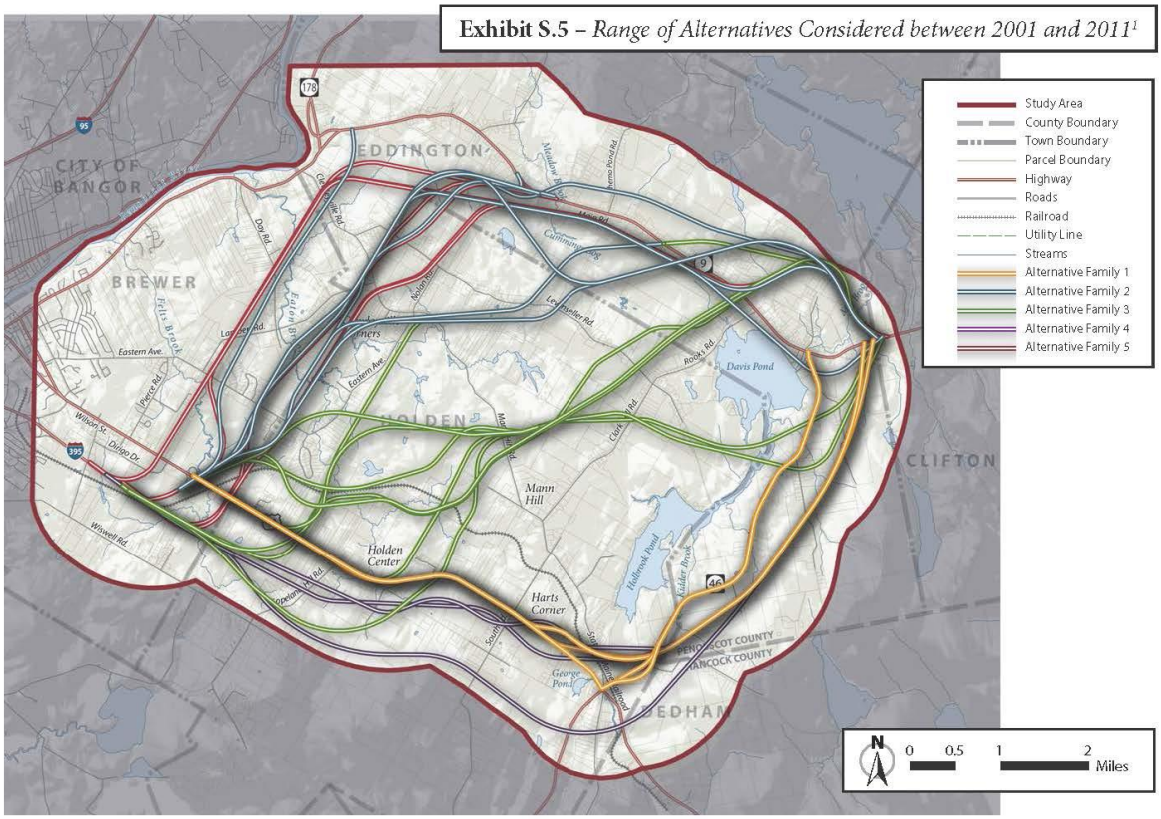
Town	Location	AADT 2003	AADT 2008	AADT 2014	%Growth 2008-2014	% Growth 2003-2014
Bangor	Joshua Chamberlain Bridge@ Brewer TL	16770	16280	13830	-18%	-15%
Bangor	Penobscot Bridge @ Brewer TL	21930	22970	23610	8%	3%
Bangor	Broadway SE/O Kenduskeag	11120	11180	11180	1%	0%
Bangor	Hammond@ Bangor/Hermon TL	9960	10320	11180	12%	8%
Bangor	Hogan N/O I95	25020	25710	22270	-11%	-13%
Bangor	State NE/O Hogan Rd	4930	5170	4590	-7%	-11%
Bangor	Stillwater N/E of Hogan	6420	5340	7797	21%	46%
Bangor	Union NW/O Davis	8070	9010	8290	3%	-8%
Bangor	Union NW/O Vermont	19170	19730	19153	0%	-3%
Bangor	Washington SW/O Exchange	11810	10840	9479	-20%	-13%
Bre-Orr	Rt.15@ Brewer /Orrington TL	11410	9140	10210	-11%	12%
Brewer	S. Main St. NO Industrial PKWY Entrance	16580	13200	13060	-21%	-1%
Brewer	SR9/178 N Main St. NE/O Chamberlain St.	15490	12530	11620	-25%	-7%
Brewer	US1A Wilson St. @ Holden TL	23330	20290	21660	-7%	7%
Bradley	SR 178 @ Eddington TL	3410	3470	3020	-11%	-13%
Hampden	US1A S/O Kennebec	8670	8720	8630	0%	-1%
Hampden	Western Ave E/O US 202	11040	10880	9880	-11%	-9%
Hampden	Western W/O Mayo	4530	4740	3660	-19%	-23%
Hermon	Coldbrook SE Odlin	N/A	10760	10770	N/A	0%
Milford	SR178 SO US2	6800	6220	5720	-16%	-8%
Milford	US2 SW/O SR 178	15810	13820	12960	-25%	-14%
Milford	US2 NO County Rd	9220	7780	6920	-8%	2%
Old Town	Center W/O US 2/43	13300	11720	10040	-17%	-8%
Old Town	Rt. 43 SE/O Bennoch	5030	4530	4620	22%	34%
Old Town	Stillwater @ Stillwater River	20070	17990	16640	22%	42%
Orono	Park St. NE/O Rangeley Rd.	10970	10020	13390	-10%	8%

Orono	College@ Orono/Old Town TL	7160	6160	8720	-8%	-2%
Orrington	Rt. 15 SW/O Snows Corner	7940	6590	7140	-29%	-11%
Veazie	Chase Rd NO O Rt. 2 State St.	1860	1750	1710	-18%	-15%
Veazie	Rt. 2 State St NEO School	7290	5870	5200	8%	3%

Table B.3 BACTS Transportation Improvement Projects 2016-2021

YEAR	PROJECT LOCATION	CATEGORY	TOTAL COST
2016-2017	BANGOR: Broadway, Husson to Center	Preservation	**$872,612**
2016-2017	BANGOR: Union St.; I-95 to Vermont	Preservation	**$467,964**
2016-2017	BANGOR: Union St.; Vermont to Griffin	Preservation	**$830,503**
2016-2017	BREWER: Parkway South; Elm to Liberty	Preservation	**$829,258**
2016-2017	ORONO: Stillwater Ave.; TL to I-95	Preservation	**$330,515**
2016-2017	HAMPDEN: Main Road North	Development	**$1,299,218**
2016-2017	BANGOR: Independent and Broad	OSI: G & E	**$262,543**
2016-2017	BREWER: North Main and Betton	OSI: G & E	**$47,688**
2018	ORONO: 59 Main St culvert replacement	Rehabilitation	**$512,367**
2018	BANGOR: Maine Ave - Johnson St to Venture Way	Preservation	**$567,828**
2018	BREWER: Wilson Street, Thompson to Dirigo	Preservation	**$468,320**
2018	BANGOR: Maine Ave - Venture Way to Hammond	Preservation	**$577,410**
2018	HAMPDEN: Main Road North .3 miles north of Old County to Daisy Ln	Development	**$4,650,000**
2018	BANGOR: Union and Fourteenth	OSI: G & E	**$240,865**
2018	BANGOR: Ohio and Fourteenth	OSI: E only	**$210,837**
2018	BREWER: Wilson St and Walton Dr	OSI: E only	**$34,925**
2019	ORRINGTON: Route 15 TL to Snows Corner	Preservation	**$475,000**
2019	OLD TOWN: Stillwater From Center to Abbot St.	Preservation	**$310,295**
2019	BREWER: South Main St. - Abbot to Elm St.	Preservation	**$650,000**
2019	BANGOR: Union and Main Street	OSI - E only	**$257,330**
2019	HERMON: Cold Brook Rd and Emerson Dr	OSI - E only	**$87,525**
2020	BANGOR: State Street Hancock to Hogan	PE Only	**$69,117**
2020	BANGOR: Hogan Road Mt. Hope to Haskell	Preservation	**$582,705**
2020	BANGOR: Main St. Dutton to Hampden TL	Preservation	**$831,588**
2020	BREWER: Wilson and Dirigo	OSI - E only	**$91,147**
2020	BANGOR: Forest Ave. and State Street	OSI - E only	**$205,593**
2021	BANGOR: State Street Hancock to Hogan	Rehabilitation	**$879,895**
2021	BANGOR: Penobscot Corridor	OSI - E only	**$693,839**
2021	BREWER: Penobscot Corridor	OSI - E only	**$206,416**

Exhibit S.5 – *Range of Alternatives Considered between 2001 and 2011*[1]



[1] **Note:** *Alternative alignments shown here have been grouped into families. For a detailed discussion of each family, please refer to Appendix C in the DEIS.*

APPENDIX C Acronyms

AADT	Annual Average Daily Traffic
AAR	Association of American Railroads
ADA	Americans with Disabilities Act
AMTRAK	Brand name of National Rail System
ARW	Air Refueling Wing
ATB	Articulated Tug Barge
BACTS	Bangor Area Comprehensive Transportation System
BBOE	Black Bear Orono Express
BD	Biodiesel
BGR	Bangor International Airport
BU	Grillig Buses
BU-E	New Flyer Buses
CAA	Clean Air Act
CEDS	Comprehensive Economic Development Strategy
CFR	Code of Federal Regulations
CMAQ	Congestion Mitigation and Air Quality Program
CMQ	Central Maine and Quebec Railway
CRF	Critical Rate Factor
CTT	Cement Transfer Terminal
CU	Cutaway Buses
DEIS	Draft Environmental Impact Statement
DOT	Department of Transportation
EA	Environmental Assessment
EMDC	Eastern Maine Development Corporation
EMR	Eastern Maine Railway
ESA	Economic Statistical Area
ESRD	End State Renal Disease
EV	Electric Vehicle
FAA	Federal Aviation Administration
FAST Act	Fixing America's Surface Transportation Act
FDDC	Four Directions Development Corporation
FEIS	Final Environmental Impact Statement
FFC	Federal Functional Classification
FHwA	Federal Highway Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FTZ	Foreign Trade Zone
FY	Fiscal Year
GA	General Aviation
GHG	Greenhouse Gases
GIS	Geographic Information Systems
GPS	Global Positioning System
GBCVB	Greater Bangor Convention and Visitors Bureau
GPS	Global Positioning Systems
HSIP	Highway Safety Improvement Program
IROPS	Irregular Operations
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITS	Intelligent Transportation Systems
LEDPA	Least Environmentally Damaging Practicable Alternative
LMA	Labor Market Area
LOTTR	Level of Travel Time Reliability
LPG	Liquid Propane Gas
MaineDOT	Maine Department of Transportation

MEMA	Maine Emergency Management Agency
MER	Maine Eastern Railroad
MHT	Manchester-Boston Regional Airport
MMA	Montreal, Maine and Atlantic Railway
MPO	Metropolitan Planning Organization
MRO	Maintenance, Repair and Overhaul
MSTPA	Maine Sensible Transportation Policy Act
MTP	Metropolitan Transportation Plan
NEMHP	New England Marine Highway Project
NEPA	National Environmental Policy Act
NHPP	National Highway Performance Program
NHS	National Highway System
NHTSA	National Highway Traffic Safety Administration
NNEPRA	Northern New England Passenger Rail Authority
NPMRDS	National Performance Management Research Data Set
NTD	National Transit Database
OLD	DeWitt Field, Old Town
PAC	Public Advisory Committee
PAR	Pan Am Railways
PHED	Peak Hour Excessive Delay
RFP	Request for Proposal
ROD	Record of Decision
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Ace: A Legacy for Users
SGR	State of Good Repair
SLR	St. Lawrence & Atlantic Railroad
SOV	Single-Occupancy Vehicle
STIC	Small Transit Intensive Cities
STP	Surface Transportation Program
STPA	Sensible Transportation Policy Act
STRAHNET	Strategic Highway Network
TAM	Transit Asset Management
TEA-21	Transportation Equity Act for the 21st Century
TIM	Traffic Incident Management
TERM	Transit Economic Requirements Model
TIP	Transportation Improvement Plan
TPM	Transit Performance Management
TRB	Transportation Research Board
ULB	Useful Life Benchmarks
UPWP	Unified Planning Work Program
USACE	US Army Corp of Engineers
USC	United States Code
USFWS	US Fish and Wildlife Service
UZA	Urbanized Area
VA	Veterans Affairs
VMS	Variable Message Signs
VMT	Vehicle Miles Traveled
VSS	Variable Speed Signs

Appendix D Glossary of Terms

1-Hour Ozone NAAQS	The 1-hour ozone national ambient air quality standard codified at 40 CFR 50.9.
23 CFR 420	Planning and Research Program Administration
23 CFR 450	Planning Assistance and Standards
23 CFR 460	Public Road Mileage for Apportionment of Highway Safety Funds
23 CFR 470	Highway Systems
23 CFR 500	Management and Monitoring Systems
23 CFR 652	Pedestrian and Bicycle Accomodations and Projects
23 CFR 710	Right-of-way and Real Estate
23 CFR 750	Highway Beautification
23 CFR 751	Junkyard control and acquisition
23 CFR 752	Landscape and Roadside Development
23 CFR 771	Environmental Impact and Related Procedures
23 CFR 772	Procedures for Abatement of Highway Traffic Noise and Construction Noise
23 CFR 777	Mitigation of Impacts to Wetlands and Natural Habitat
23 CFR 940	Intelligent Transportation System Architecture and Standards
23 USC 134	Metropolitan Planning
23 USC 135	Statewide Planning
23 USC 149	Congestion Mitigation and Air Quality Improvement Program
23 USC 162	National Scenic Byways Program
23 USC 202	Allocation of Highway Trust Funds for the Federal Lands Highway Program including the IRR Program.
23 USC 204	The administration of the Federal Lands Highway Program including the IRR Program.
23 USC 206	Recreational trails Program
23 USC 217	Bicycle Transportation and Pedestrian Walkways
23 USC 505	State Planning and Research
25 CFR 170	Rules for the administration of the IRR Program by the Bureau of Indian Affairs (BIA).
40 CFR 51	Requirements for Preparation, Adoption, and Submittal of Implementation Plans; Subpart T-Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Developed, Funded or Approved Under Title 23 U.S.C. or the Federal Transit Laws; Section 51.390, Implementation Plan Revision
40 CFR 52	Approval and Promulgation of Implementation Plans; Sections 5230-5234, Sanctions
40 CFR 93	Determining Conformity of Federal Actions to State or Federal Implementation Plans

42 USC 61	The Uniform Relocation Assistance and Real Property Acquisition Policies for Federal and Federally Assisted Programs
42 USC 85	Law regarding Air Pollution Prevention and Control
49 CFR 17	Intergovernmental Review of Department of Transportation Programs and Activities
49 CFR 18	Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments
49 CFR 19	Uniform Administrative Requirements for Grants and Agreements with Institutions of Higher Education, Hospitals and Other Non-Profit Organizations
49 CFR 20	New Restrictions on Lobbying
49 CFR 21	Nondiscrimination in Federally-Assisted Programs of the Department of Transportation-- Effectuation of Title VI of the Civil Rights Act of 1964
49 CFR 24	Uniform Relocation and Real Property Acquisition for Federal and Federally Assisted Programs
49 CFR 26	Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs
49 CFR 27	Nondiscrimination on the Basis of Disability in Programs or Activities Receiving Federal Financial Assistance
49 CFR 29	Government Wide Debarment and Suspension (Non procurement)
49 CFR 32	Government-wide Requirements for Drug-Free Workplace (Financial Assistance)
49 USC 53	Law regarding Mass Transportation
8-Hour Ozone NAAQS	The 8-hour ozone national ambient air quality standard codified at 40 CFR 50.10.
Accident	An incident involving a moving vehicle. Includes collisions with a vehicle, object, or person (except suicides) and derailment/left roadway. (FTA2) Occurrence in a sequence of events that produces unintended injury, death or property damage. Accident refers to the event, not the result of the event. (NSC1)
Accident (Aircraft)	As defined by the National Transportation Safety Board, an occurrence incidental to flight in which, as a result of the operation of an aircraft, any person (occupant or nonoccupant) receives fatal or serious injury or any aircraft receives substantial damage.
Air Carrier	The commercial system of air transportation comprising large certificated air carriers, small certificated air carriers, commuter air carriers, on-demand air taxis, supplemental air carriers, and air travel clubs.
Air Quality Conformity	The link between air quality planning and transportation planning
Airplane	An engine-driven fixed-wing aircraft heavier than air, that is supported in flight by the dynamic reaction of the air against its wings. (14CFR1)
Airport	A landing area regularly used by aircraft for receiving or discharging passengers or cargo.

Airship	An engine-driven lighter-than-air aircraft that can be steered. (14CFR1)
Alcohol Concentration (AC)	The concentration of alcohol in a person's blood or breath. When expressed as a percentage it means grams of alcohol per 100 milliliters of blood or grams of alcohol per 210 liters of breath. (49CFR383)
Allocation	An administrative distribution of funds for programs that do not have statutory distribution formulas.
Alternative Fuels	The Energy Policy Act of 1992 defines alternative fuels as methanol, denatured ethanol, and other alcohol; mixtures containing 85 percent or more (but not less than 70 percent as determined by the Secretary of Energy by rule to provide for requirements relating to cold start, safety, or vehicle functions) by volume of methanol, denatured ethanol, and other alcohols with gasoline or other fuels. Includes compressed natural gas, liquid petroleum gas, hydrogen, coal-derived liquid fuels, fuels other than alcohols derived from biological materials, electricity, or any other fuel the Secretary of Energy determines by rule is substantially not petroleum and would yield substantial energy security and environmental benefits.
Altitude	The vertical distance of a level, a point or an object considered as a point measured in feet Above Ground Level (AGL) or from Mean Sea Level (MSL). 1) MSL Altitude. Altitude expressed in feet measured from mean sea level. 2) AGL Altitude. Altitude expressed in feet measured above ground level. 3) Indicated Altitude. The altitude as shown by an altimeter. On a pressure or barometric altimeter it is altitude as shown uncorrected for instrument error and uncompensated for variation from standard atmospheric conditions. (FAA4)
American Association of State Highway & Transportation Officials (AASHTO)	A nonprofit, nonpartisan association representing highway and transportation departments in the 50 states, the District of Columbia and Puerto Rico. It represents all five transportation modes: air, highways, public transportation, rail and water. Its primary goal is to foster the development, operation and maintenance of an integrated national transportation system.
American Institute of Certified Planners (AICP)	The American Planning Association's professional institute that provides recognized leadership nationwide in the certification of professional planners, ethics, professional development, planning education, and the standards of planning practice.
American Planning Association (APA)	A nonprofit public interest and research organization committed to urban, suburban, regional, and rural planning. APA and its professional institute, the American Institute of Certified Planners, advance the art and science of planning to meet the needs of people and society.
American Public Transportation Association (APTA)	Acting as a leading force in advancing public transportation, APTA serves and leads its diverse membership through advocacy, innovation, and information sharing to strengthen and expand public transportation.
Americans With Disabilities Act (ADA)	The legislation defining the responsibilities of and requirements for transportation providers to make transportation accessible to individuals with disabilities. (FTA1)

Amtrak	Operated by the National Railroad Passenger Corporation, this rail system was created by the Rail Passenger Service Act of 1970 (Public Law 91-518, 84 Stat. 1327) and given the responsibility for the operation of intercity, as distinct from suburban, passenger trains between points designated by the Secretary of Transportation.
Analysis of Alternatives	Understanding how the transportation system and its components work such as information on the costs, benefits and impacts of potential chances to the system.
Annual Funding Agreement	A negotiated annual written funding agreement between a Self-Governance Indian Tribal Government (ITG) and the Secretary of the Interior, authorizing the ITG to plan, conduct, consolidate, and administer programs, services, functions, and activities or portions thereof previously administered by the Department of the Interior through the BIA, and other programs for which appropriations are made available for the ITG through the Secretary of the Interior from agencies other than Department of the Interior (DOI).
Apportionment	1) A term that refers to a statutorily prescribed division or assignment of funds. An apportionment is based on prescribed formulas in the law and consists of dividing authorized obligation authority for a specific program among the States. 2) The distribution of funds as prescribed by a statutory formula.
Appropriation	Authorization of funding expenditures from Congress.
Appropriations Act	Action of a legislative body that makes funds available for expenditure with specific limitations as to amount, purpose, and duration. In most cases, it permits money previously authorized to be obligated and payments made, but for the highway program operating under contract authority, the appropriations act specifies amounts of funds that Congress will make available for the fiscal year to liquidate obligations.
Area Source	Small stationary and non-transportation pollution sources that are too small and/or numerous to be included as point sources but may collectively contribute significantly to air pollution (e.g., dry cleaners).
Areawide Control Schedule	An accounting and project management tool that is developed from tribal Transportation Improvement Programs, tribal control schedules, and tribal priority lists to identify detailed project information for the expenditure of IRR funds for the current and next four fiscal years.
Arterial	A class of roads serving major traffic movements (high-speed, high volume) for travel between major points.
Arterial Highway	A major highway used primarily for through traffic.
Arterial Street	A class of street serving major traffic movements (high-speed, high volume) for travel between major points.
Asphalt	A dark brown to black cement-like material containing bitumen as the predominant constituent. The definition includes crude asphalt and finished products such as cements, fluxes, the asphalt content of emulsions, and petroleum distillates blended with asphalt to make cutback asphalt. Asphalt is obtained by petroleum processing.

Association of Metropolitan Planning Organizations (AMPO)	AMPO is a nonprofit, membership organization established in 1994 to serve the needs and interests of "metropolitan planning organizations (MPOs)" nationwide. AMPO offers its member MPOs technical assistance and training, conferences and workshops, frequent print and electronic communications, research, a forum for transportation policy development and coalition building, and a variety of other services.
Attainment Area	An area considered to have air quality that meets or exceeds the U.S. Environmental Protection Agency (EPA) health standards used in the Clean Air Act. Nonattainment areas are areas considered not to have met these standards for designated pollutants. An area may be an attainment area for one pollutant and a nonattainment area for others.
Audit	Periodic investigation of financial statements and their relationships to planned or permitted expenditures.
Authorization	Basic substantive legislation or that which empowers an agency to implement a particular program and also establishes an upper limit on the amount of funds that can be appropriated for that program
Authorization Act	Basic substantive legislation that establishes or continues Federal programs or agencies and establishes an upper limit on the amount of funds for the program(s). The current authorization act for surface transportation programs is the Transportation Equity Act for the 21st Century (TEA-21).
Auto inspection and maintenance (IM)	Programs require the testing of motor vehicles in parts of the country with unhealthy air and the repair of those that do not meet standards.
Automobile	A privately owned and/or operated licensed motorized vehicle including cars, jeeps and station wagons. Leased and rented cars are included if they are privately operated and not used for picking up passengers in return for fare. (FHWA3)
Average Annual Daily Traffic (AADT)	The total volume of traffic on a highway segment for one year, divided by the number of days in the year.
Average Annual Daily Truck Traffic (AADTT)	The total volume of truck traffic on a highway segment for one year, divided by the number of days in the year.
Average Haul	The average distance, in miles, one ton is carried. It is computed by dividing ton-miles by tons of freight originated.
Average Passenger Trip Length (Bus/Rail)	Calculated by dividing revenue passenger-miles by the number of revenue passengers.
BIA Area Certification Acceptance Plan	A plan prepared by a specific area office which delineates how it will meet certification acceptance requirements under 23 U.S.C., Section 117(a). {This section of law was deleted in the Transportation Equity Act for the 21st Century. CA is being replaced by Stewardship Agreements.}
BIA Atlas Map	A series of maps which depict the IRR/BIA road system by reservation and jurisdictions.
BIA Classification of Roads	An identification of specific roads or trails that take into account current and future traffic generators, and relationships to connecting or adjacent BIA, State, county, Federal, and/or local roads.

BIA Roads System	Those existing and proposed roads for which the BIA has or plans to obtain legal right(s)-of-way. This includes only roads for which the BIA has the primary responsibility to construct, improve, and maintain. Any additions or deletions to this system must be supported by resolution from the ITG.
BIA/FHWA Memorandum of Agreement	An agreement between the BIA and the FHWA which contains mutually agreeable roles and responsibilities for the administration of the IRR and Highway Bridge Replacement and Rehabilitation programs.
Bicycle	A vehicle having two tandem wheels, propelled solely by human power, upon which any person or persons may ride. (23CFR217)
Bikeway	1) Any road, path, or way which in some manner is specifically designated as being open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes. (23CFR217) 2) A facility designed to accommodate bicycle travel for recreational or commuting purposes. Bikeways are not necessarily separated facilities; they may be designed and operated to be shared with other travel modes.
Blind Spot	An area from which radio transmissions and/or radar echoes cannot be received. The term is also used to describe portions of the airport not visible from the control tower. (FAA4)
Blood Alcohol Concentration (BAC)	Is measured as a percentage by weight of alcohol in the blood (grams/deciliter). A positive BAC level (0.01 g/dl and higher) indicates that alcohol was consumed by the person tested. A BAC level of 0.10 g/dl or more indicates that the person was intoxicated. (NHTSA3)
Blood Alcohol Concentration (Highway)	A measurement of the percentage of alcohol in the blood by grams per deciliter.
Bodily Injury	Injury to the body, sickness, or disease including death resulting from any of these. (49CFR387)
Bow	The front of a vessel. (MARAD2)
Brake	An energy conversion mechanism used to stop, or hold a vehicle stationary. (49CFR393)
Bridge Management System (BMS)	A systematic process that provides, analyzes, and summarizes bridge information for use in selecting and implementing cost-effective bridge construction, rehabilitation, and maintenance programs
Budget Authority	Empowerment by Congress that allows Federal agencies to incur obligations that will result in the outlay of funds. This empowerment is generally in the form of appropriations. However, for most of the highway programs, it is in the form of contract authority.
Budget Resolution	A concurrent resolution passed by Congress presenting the Congressional Budget for each of the succeeding 5 years. A concurrent resolution does not require the signature of the President.
Bulk Carrier (Water)	A ship with specialized holds for carrying dry or liquid commodities, such as oil, grain, ore, and coal, in unpackaged bulk form. Bulk carriers may be designed to carry a single bulk product (crude oil tanker) or

	accommodate several bulk product types (ore/bulk/oil carrier) on the same voyage or on a subsequent voyage after holds are cleaned.
Bureau Of Economic Analysis (BEA)	The Bureau of Economic Analysis is an agency of the U.S. Department of Commerce
Bureau Of Labor Statistics (BLS)	The Bureau of Labor Statistics (BLS) is the principal fact-finding agency for the Federal Government in the broad field of labor economics and statistics. The BLS is an independent national statistical agency that collects, processes, analyzes, and disseminates essential statistical data to the American public, the U.S. Congress, other Federal agencies, State and local governments, business, and labor. The BLS also serves as a statistical resource to the Department of Labor. BLS data must satisfy a number of criteria, including relevance to current social and economic issues, timeliness in reflecting today's rapidly changing economic conditions, accuracy and consistently high statistical quality, and impartiality in both subject matter and presentation.
Bureau of Transportation Statistics (BTS)	The Bureau was organized pursuant to section 6006 of the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 (49 U.S.C. 111), and was formally established by the Secretary of Transportation on December 16, 1992. BTS has an intermodal transportation focus whose missions are to compile, analyze and make accessible information on the Nation's transportation systems; to collect information on intermodal transportation and other areas; and to enhance the quality and effectiveness of DOT's statistical programs through research, the development of guidelines, and the promotion of improvements in data acquisition and use. The programs of BTS are organized in six functional areas and are mandated by ISTEA to 1) Compile, analyze, and publish statistics 2) Develop a long-term data collection program 3) Develop guidelines to improve the credibility and effectiveness of the Department's statistics 4) Represent transportation interests in the statistical community 5) Make statistics accessible and understandable and 6) Identify data needs. (OFR1)
Bus	Large motor vehicle used to carry more than 10 passengers, including school buses, intercity buses, and transit buses.
Bus Lane	1) A street or highway lane intended primarily for buses, either all day or during specified periods, but sometimes also used by carpools meeting requirements set out in traffic laws. (APTA1) 2) A lane reserved for bus use only. Sometimes also known as a "diamond lane."
Caboose	A car in a freight train intended to provide transportation for crew members. (49CFR223)
Calendar Year	The period of time between January 1 and December 31 of any given year. (DOE6)
Capacity	A transportation facility's ability to accommodate a moving stream of people or vehicles in a given time period.
Capital Gains or Losses, Other	Gains or losses on no operating assets, investments in other than marketable equity securities, and troubled debt restructuring. (BTS4)

Capital Program Funds	Financial assistance from the Capital Program of 49 U.S.C. This program enables the Secretary of Transportation to make discretionary capital grants and loans to finance public transportation projects divided among fixed guideway (rail) modernization; construction of new fixed guideway systems and extensions to fixed guideway systems; and replacement, rehabilitation, and purchase of buses and rented equipment, and construction of bus-related facilities.
Carbon Dioxide (CO2)	1) A fluid consisting of more than 90 percent carbon dioxide molecules compressed to a supercritical state. (49CFR195) 2) A colorless, odorless gas. It is not a liquid under standard temperature and pressure.
Carbon Monoxide (CO)	A colorless, odorless, highly toxic gas that is a normal by-product of incomplete fossil fuel combustion. Carbon monoxide, one of the major air pollutants, can be harmful in small amounts if breathed over a certain period of time. (DOE6)
Carpool	An arrangement where two or more people share the use and cost of privately owned automobiles in traveling to and from pre-arranged destinations together. (ATPA1)
Census	The complete enumeration of a population or groups at a point in time with respect to well-defined characteristics for example, population, production, traffic on particular roads. In some connection the term is associated with the data collected rather than the extent of the collection so that the term sample census has a distinct meaning. The partial enumeration resulting from a failure to cover the whole population, as distinct from a designed sample enquiry, may be referred to as an "incomplete census." (DOE5)
Census Division	A geographic area consisting of several States defined by the U.S. Department of Commerce, Bureau of the Census. The States are grouped into nine divisions and four regions. (DOE4)
Certification Acceptance ((CA))	A procedure authorized by 23 U.S.C. 117(a) wherein the FHWA can delegate any of the 23 U.S.C. responsibilities for planning, design, and construction of projects, not on the Interstate System, to other qualified governmental entities. {This section of law was deleted in the Transportation Equity Act for the 21st Century. CA is being replaced by Stewardship Agreements. BIA area offices and ITGs may apply for Stewardship Agreements.}
Certification of Public Road Mileage	An annual document (certification) that must be furnished by each state to Federal Highway Administration (FHWA) certifying the total public road mileage (kilometers) in the state as of December 31 of the preceding year. (FHWA2)
Certified Capacity	The capability of a pipeline project to move gas volumes on a given day, based on a specific set of flowing parameters (operating pressures, temperature, efficiency, and fluid properties) for the pipeline system as stated in the dockets filed (and subsequently certified) in the application for the Certificate of Public Convenience and Necessity at the Federal Energy Regulatory Commission. Generally, the certificated capacity represents a level of service that can be maintained over an extended

	period of time and may not represent the maximum throughput capability of the system on any given day. (DOE1)
Charter Bus	A bus transporting a group of persons who pursuant to a common purpose, and under a single contract at a fixed price, have acquired the exclusive use of a bus to travel together under an itinerary. (APTA1)
Class	1) With respect to the certification, ratings, privileges, and limitations of airmen, means a classification of aircraft within a category having similar operating characteristics. Examples include single engine; multiengine; land; water; gyroplane; helicopter; airship; and free balloon; and 2) With respect to the certification of aircraft, means a broad grouping of aircraft having similar characteristics of propulsion, flight, or landing. Examples include airplane; rotorcraft; glider; balloon; landplane; and seaplane. (14CFR1)
Class 1 Road	Hard surface highways including Interstate and U.S. numbered highways (including alternates), primary State routes, and all controlled access highways. (DOI3)
Class 2 Road	Hard surface highways including secondary State routes, primary county routes, and other highways that connect principal cities and towns, and link these places with the primary highway system. (DOI3)
Class 3 Road	Hard surface roads not included in a higher class and improved, loose surface roads passable in all kinds of weather. These roads are adjuncts to the primary and secondary highway systems. Also included are important private roads such as main logging or industrial roads which serve as connecting links to the regular road network. (DOI3)
Class 4 Road	Unimproved roads which are generally passable only in fair weather and used mostly for local traffic. Also included are driveways, regardless of construction. (DOI3)
Class 5 Road	Unimproved roads passable only with 4 wheel drive vehicles. (DOI3)
Class I Railroad	Railroad with an annual operating revenue of at least $266.7 million.
Clean Air Act Amendments (CAAA)	The original Clean Air Act was passed in 1963, but the national air pollution control program is actually based on the 1970 version of the law. The 1990 Clean Air Act Amendments are the most far-reaching revisions of the 1970 law. The 1990 Clean Air Act is the most recent version of the 1970 version of the law. The 1990 amendments made major changes in the Clean Air Act.
Code of Federal Regulations (CFR)	A compilation of the general and permanent rules of the executive departments and agencies of the Federal Government as published in the Federal Register. The code is divided into 50 titles that represent broad areas subject to Federal regulation. (DOE5)
Collector (Highway)	In rural areas, routes that serve intra-county rather than statewide travel. In urban areas, streets that provide direct access to neighborhoods and arterials.
Combination Truck	A power unit (truck tractor) and one or more trailing units (a semitrailer or trailer).

Commercial Bus	Any bus used to carry passengers at rates specified in tariffs; charges may be computed per passenger (as in regular route service) or per vehicle (as in charter service).
Commercial Driver's License (CDL)	A license issued by a State or other jurisdiction, in accordance with the standards contained in 49 CFR 383, to an individual which authorizes the individual to operate a class of a commercial motor vehicle. (49CFR383)
Commercial Service Airport	Airport receiving scheduled passenger service and having 2,500 or more enplaned passengers per year.
Commute	Regular travel between home and a fixed location (e.g., work, school). (TRB1)
Commuter	A person who travels regularly between home and work or school. (APTA1)
Commuter Air Carrier	Different definitions are used for safety purposes and for economic regulations and reporting. For safety analysis, commuter carriers are defined as air carriers operating under 14 CFR 135 that carry passengers for hire or compensation on at least five round trips per week on at least one route between two or more points according to published flight schedules, which specify the times, days of the week, and points of service. On March 20, 1997, the size of the aircraft subject to 14 CFR 135 was reduced from 30 to fewer than 10 passenger seats. (Larger aircraft are subject to the more stringent regulations of 14 CFR 121.) Helicopters carrying passengers or cargo for hire, however, are regulated under CFR 135 whatever their size. Although, in practice, most commuter air carriers operate aircraft that are regulated for safety purposes under 14 CFR 135 and most aircraft that are regulated under 14 CFR 135 are operated by commuter air carriers, this is not necessarily the case. For economic regulations and reporting requirements, commuter air carriers are those carriers that operate aircraft of 60 or fewer seats or a maximum payload capacity of 18,000 pounds or less. These carriers hold a certificate issued under section 298C of the Federal Aviation Act of 1958, as amended.
Commuter Lane	Another name for "High-Occupancy Vehicle Lane." (APTA1)
Commuter Rail	Long-haul passenger service operating between metropolitan and suburban areas, whether within or across the geographical boundaries of a state, usually characterized by reduced fares for multiple rides, and commutation tickets for regular, recurring riders. (FTA1)
Commuter Rail (Transit)	Urban passenger train service for short-distance travel between a central city and adjacent suburb. Does not include rapid rail transit or light rail service.
Compressed Natural Gas	Natural gas compressed to a volume and density that is practical as a portable fuel supply. It is used as a fuel for natural gas-powered vehicles.
Conformity	Process to assess the compliance of any transportation plan, program, or project with air quality implementation plans. The conformity process is defined by the Clean Air Act.

Congestion Management System (CMS)	Systematic process for managing congestion. Provides information on transportation system performance and finds alternative ways to alleviate congestion and enhance the mobility of people and goods, to levels that meet state and local needs.
Congestion Mitigation & Air Quality Improvement Program (CMAQ)	A categorical Federal-aid funding program created with the ISTEA. Directs funding to projects that contribute to meeting National air quality standards. CMAQ funds generally may not be used for projects that result in the construction of new capacity available to SOVs (single-occupant vehicles).
Constant Dollars	Dollar value adjusted for changes in the average price level by dividing a current dollar amount by a price index. See also Chained Dollar and Current Dollar.
Containerized Cargo	Cargo that is transported in containers that can be transferred easily from one transportation mode to another
Contract Authority (CA)	A form of Budget Authority that permits obligations to be made in advance of appropriations. Most of the programs under the Federal-Aid Highway Program operate under Contract Authority.
Contract Carrier	Carrier engaged in interstate transportation of persons/ property by motor vehicle on a for-hire basis, but under continuing contract with one or a limited number of customers to meet specific needs.
Control Strategy Implementation Plan Revision	The implementation plan which contains specific strategies for controlling the emissions of and reducing ambient levels of pollutants in order to satisfy CAA requirements for demonstrations of reasonable further progress and attainment (including implementation plan revisions submitted to satisfy CAA sections 172(c), 182(b)(1), 182(c)(2)(A), 182(c)(2)(B), 187(a)(7), 187(g), 189(a)(1)(B), 189(b)(1)(A), and 189(d); sections 192(a) and 192(b), for nitrogen dioxide; and any other applicable CAA provision requiring a demonstration of reasonable further progress or attainment).
Corporate Average Fuel Economy Standards (CAFÉ)	Originally established by Congress for new automobiles and later for light trucks. This law requires automobile manufacturers to produce vehicle fleets with a composite sales-weighted fuel economy not lower than the CAFE standards in a given year. For every vehicle that does not meet the standard, a fine is paid for every one-tenth of a mile per gallon that vehicle falls below the standard.
Corridor	A broad geographical band that follows a general directional flow connecting major sources of trips that may contain a number of streets, highways and transit route alignments. (APTA1)
Crash (Highway)	An event that produces injury and/or property damage, involves a motor vehicle in transport, and occurs on a trafficway or while the vehicle is still in motion after running off the trafficway.
Cubic Foot	Conversion equivalents 1,728 cubic inches, 60 pints, 8/10 bushel, 0.028 cubic meter, 28.32 liters. (TNDOT1)
Current Assets	Cash and cash equivalents, as well as current receivables and short-term investments, deposits and inventories. (BTS4)

Current Flight Plan	The flight plan, including changes, if any, brought about by subsequent clearances. (FAA4)
Current Liabilities	Current portion of long-term debt and of capital leases, air travel liabilities and other short-term trade accounts payable. (BTS4)
Dedicated Funds	Any funds raised specifically for transit purposes and which are dedicated at their source (e.g., sales taxes, gasoline taxes, and property taxes), rather than through an allocation from the pool of general funds. (FTA1)
Degree of (Critical) Hazard	A situation in which collision avoidance was due to chance rather than an act on the part of the pilot. Less than 100 feet of aircraft separation would be considered critical. (FAA10)
Degree of (No Hazard) Hazard	A situation in which direction and altitude would have made a midair collision improbable regardless of evasive action taken. (FAA10)
Degree of (Potential) Hazard	An incident which would have resulted in a collision if no action had been taken by either pilot. Closest proximity of less than 500 feet would usually be required in this case. (FAA10)
Demand Responsive Vehicle (Transit)	A nonfixed-route, nonfixed-schedule vehicle that operates in response to calls from passengers or their agents to the transit operator or dispatcher.
Demand-Responsive	Descriptive term for a service type, usually considered paratransit, in which a user can access transportation service that can be variably routed and timed to meet changing needs on an as-needed basis.
Department of Energy (DOE)	The Department of Energy's overarching mission is to advance the national, economic and energy security of the United States; to promote scientific and technological innovation in support of that mission; and to ensure the environmental cleanup of the national nuclear weapons complex. The Department has four strategic goals toward achieving the mission: Defense Strategic Goal: To protect our national security by applying advanced science and nuclear technology to the Nation's defense; Energy Strategic Goal: To protect our national and economic security by promoting a diverse supply and delivery of reliable, affordable, and environmentally sound energy; Science Strategic Goal: To protect our national and economic security by providing world-class scientific research capacity and advancing scientific knowledge; and Environment Strategic Goal: To protect the environment by providing a responsible resolution to the environmental legacy of the Cold War and by providing for the permanent disposal of the Nation's high-level radioactive waste.
Department of Health and Human Services (HHS)	The Department of Health and Human Services is the United States government's principal agency for protecting the health of all Americans and providing essential human services, especially for those who are least able to help themselves.
Department of Housing and Urban Development (HUD)	HUD's mission is to increase homeownership, support community development and increase access to affordable housing free from discrimination. To fulfill this mission, HUD will embrace high standards of ethics, management and accountability and forge new partnerships--particularly with faith-based and community organizations--that

	leverage resources and improve HUD's ability to be effective on the community level.
Department of Transportation (DOT)	Establishes the nation's overall transportation policy. Under its umbrella there are ten administrations whose jurisdictions include highway planning, development and construction; urban mass transit; railroads; aviation; and the safety of waterways, ports, highways, and oil and gas pipelines. The Department of Transportation (DOT) was established by act of October 15, 1966, as amended (49 U.S.C. 102 and 102 note), "to assure the coordinated, effective administration of the transportation programs of the Federal Government" and to develop "national transportation policies and programs conducive to the provision of fast, safe, efficient, and convenient transportation at the lowest cost consistent therewith." (OFR1)
Depreciation and Amortization	All depreciation and amortization expenses applicable to owned or leased property and equipment including that categorized as flight equipment or ground property and equipment. (BTS4)
Deregulation	Revisions or complete elimination of economic regulations controlling transportation. For example, the Motor Carrier Act of 1980 and the Staggers Act of 1980 revised the economic controls over motor carriers and railroads. (MARAD1)
Dial-A-Ride	Term for demand-responsive systems usually delivering door-to-door service to clients, who make request by telephone on an as-needed reservation or subscription basis.
Direct Funding	Funds transferred directly from the Secretary of the Interior to the ITG upon request for programs contracted or compacted under P.L. 93-638 as amended.
Direct Service Tribes	ITGs that receive services directly from the BIA.
Domestic	Produced in the United States, including the Outer Continental Shelf (OCS). (DOE5)
Domestic Freight (Water)	All waterborne commercial movement between points in the United States, Puerto Rico, and the Virgin Islands, excluding traffic with the Panama Canal Zone. Cargo moved for the military in commercial vessels is reported as ordinary commercial cargo; military cargo moved in military vessels is omitted.
Domestic Operations (Air Carrier)	All air carrier operations having destinations within the 50 United States, the District of Columbia, the Commonwealth of Puerto Rico, and the U.S. Virgin Islands.
Donut Areas	Geographic areas outside a metropolitan planning area boundary, but inside the boundary of a nonattainment or maintenance area that contains any part of a metropolitan area(s). These areas are not isolated rural nonattainment and maintenance areas.
Driver	1) A person who operates a motorized vehicle. If more than one person drives on a single trip, the person who drives the most miles is classified as the principal driver. 2) An occupant of a vehicle who is in physical control of a motor vehicle in transport or, for an out of-control vehicle,

	an occupant who was in control until control was lost. (FHWA3) (NHTSA3)
Driver's License	A license issued by a State or other jurisdiction, to an individual which authorizes the individual to operate a motor vehicle on the highways. (49CFR383)
Driving Under the Influence (DUI)	The driving or operating of any vehicle or common carrier while drunk or under the influence of liquor or narcotics. (FTA1)
Emergency Preparedness Plan	A comprehensive plan which identifies potential emergencies and their impact on the community, and identifies operating procedures and actions to put in place during actual emergencies.
Emissions Budget	The part of the State Implementation Plan (SIP) that identifies the allowable emissions levels, mandated by the National Ambient Air Quality Standards (NAAQS), for certain pollutants emitted from mobile, stationary, and area sources. The emissions levels are used for meeting emission reduction milestones, attainment, or maintenance demonstrations.
Emissions Inventory	A complete list of sources and amounts of pollutant emissions within a specific area and time interval.
Energy Efficiency	The ratio of energy inputs to outputs from a process, for example, miles traveled per gallon of fuel (mpg).
Energy Information Administration (EIA)	An independent agency within the U.S. Department of Energy that develops surveys, collects energy data, and analyzes and models energy issues. The Agency must meet the requests of Congress, other elements within the Department of Energy, Federal Energy Regulatory Commission, the Executive Branch, its own independent needs, and assist the general public, or other interest groups, without taking a policy position. (DOE5)
Enhancement Activities	Refers to activities related to a particular transportation project that 'enhance' or contribute to the existing or proposed project. Examples of such activities include provision of facilities for pedestrians or cyclists, landscaping or other scenic beautification projects, historic preservation, control and removal of outdoor advertising, archaeological planning and research, and mitigation of water pollution due to highway runoff.
Environmental Impact Statement (EIS)	Report developed as part of the National Environmental Policy Act requirements, which details any adverse economic, social, and environmental effects of a proposed transportation project for which Federal funding is being sought. Adverse effects could include air, water, or noise pollution; destruction or disruption of natural resources; adverse employment effects; injurious displacement of people or businesses; or disruption of desirable community or regional growth.
Environmental Justice (EJ)	Environmental justice assures that services and benefits allow for meaningful participation and are fairly distributed to avoid discrimination.
Environmental Protection Agency (EPA)	The federal regulatory agency responsible for administering and enforcing federal environmental laws, including the Clean Air Act, the Clean Water Act, the Endangered Species Act, and others.

Environmental Restoration	Re-establishment (including all site preparation activities) of natural habitats or other environmental resources on a site where they formerly existed or currently exist in a substantially degraded state. This can include the restitution for the loss, damage, or destruction of natural resources arising out of the accidental discharge, dispersal, release or escape into or upon the land, atmosphere, watercourse, or body of water of any commodity transported by a motor carrier. This also may include the on-site or offsite replacement of wetlands and other natural habitats lost through development activities. (49CFR387 and 23CFR 777)
Environmentally Sensitive Area	An area of environmental importance having natural resources which if degraded may lead to significant adverse, social, economic or ecological consequences. These could be areas in or adjacent to aquatic ecosystems, drinking water sources, unique or declining species habitat, and other similar sites. (49CFR194)
Ethanol	A clear, colorless, flammable oxygenated hydrocarbon with a boiling point of 78.5 °C in the anhydrous state. It is used in the United States as a gasoline octane enhancer and oxygenate (10 percent concentration). Ethanol can be used in high concentrations in vehicles optimized for its use. Otherwise known as ethyl alcohol, alcohol, or grain-spirit.
Evaluation of alternatives	A synthesis of the information generated by an analysis in which judgments are made on the relative merits of alternative actions.
Expenditures	1) Actual cash (or electronic transfer) payments made to the States or other entities. Outlays are provided as reimbursement for the Federal share for approved highway program activities. 2) A term signifying disbursement of funds for repayment of obligations incurred. An electronic transfer of funds, or a check sent to a State highway or transportation agency for voucher payment, is an expenditure or outlay.
Expressway	A controlled access, divided arterial highway for through traffic, the intersections of which are usually separated from other roadways by differing grades.
Fatality	For purposes of statistical reporting on transportation safety, a fatality is considered a death due to injuries in a transportation crash, accident, or incident that occurs within 30 days of that occurrence.
Federal Aviation Administration (FAA)	FAA provides a safe, secure, and efficient global aerospace system that contributes to national security and the promotion of US aerospace safety. As the leading authority in the international aerospace community, FAA is responsive to the dynamic nature of customer needs, economic conditions, and environmental concerns.
Federal Aviation Administration (FAA)	Formerly the Federal Aviation Agency, the Federal Aviation Administration was established by the Federal Aviation Act of 1958 (49 U.S.C. 106) and became a component of the Department of Transportation in 1967 pursuant to the Department of Transportation
Federal Aviation Regulations (FAR)	The set of regulatory obligations contained in Title 14 of the Code of Federal Regulations which FAA is charged to enforce in order to promote the safety of civil aviation both domestically and internationally. (FAA1)

Federal Energy Regulatory Commission (FERC)	The federal agency with jurisdiction over, among other things, gas pricing, oil pipeline rates, and gas pipeline certification.
Federal Finance System (FFS)	An automated accounting system used by the DOI for tracking obligations and expenditures.
Federal Highway Administration (FHWA)	A branch of the US Department of Transportation that administers the federal-aid Highway Program, providing financial assistance to states to construct and improve highways, urban and rural roads, and bridges. The FHWA also administers the Federal Lands Highway Program, including survey, design, and construction of forest highway system roads, parkways and park roads, Indian reservation roads, defense access roads, and other Federal lands roads. The Federal agency within the U.S. Department of Transportation responsible for administering the Federal-Aid Highway Program. Became a component of the Department of Transportation in 1967 pursuant to the Department of Transportation Act (49 U.S.C. app. 1651 note). It administers the highway transportation programs of the Department of Transportation under pertinent legislation
Federal Lands Highway Program (FLHP)	Provides funds to construct roads and trails within (or, in some cases, providing access to) Federal lands. There are four categories of FLHP funds: Indian Reservation Roads, Public Lands Highways, Park Roads and Parkways, and Refuge Roads. Funds available to the US Forest Service may be used for forest development roads and trails. To be eligible for funding, projects must be open to the public and part of an approved Federal land management agency general management plan. 23 U.S.C. 204.
Federal Motor Carrier Safety Regulations (FMCSR)	The regulations are contained in the Code of Federal Regulations, Title 49, Chapter III, Subchapter B. (FHWA2) (FHWA4)
Federal Railroad Administration (FRA)	The purpose of the Federal Railroad Administration is to promulgate and enforce rail safety regulations, administer railroad financial assistance programs, conduct research and development in support of improved railroad safety and national rail transportation policy, provide for the rehabilitation of Northeast corridor rail passenger service, and consolidate government support of rail transportation activities. The FRA was created pursuant to section 3(e)(1) of the Department of Transportation Act of 1966 (49 U.S.C. app. 1652). (OFR1)
Federal Register	Daily publication which provides a uniform system for making regulations and legal notices issued by the Executive Branch and various departments of the Federal government available to the public. (USCG1)
Federal Transit Administration (FTA)	A branch of the US Department of Transportation that is the principal source of federal financial assistance to America's communities for planning, development, and improvement of public or mass transportation systems. FTA provides leadership, technical assistance, and financial resources for safe, technologically advanced public transportation to enhance mobility and accessibility, to improve the Nation's communities and natural environment, and to strengthen the national economy. (Formerly the Urban Mass Transportation

	Administration) operates under the authority of the Federal Transit Act, as amended (49 U.S.C. app. 1601 et seq.). The Federal Transit Act was repealed on July 5, 1994, and the Federal transit laws were codified and re-enacted as chapter 53 of Title 49, United States Code. The Federal Transit Administration was established as a component of the Department of Transportation by section 3 of Reorganization Plan No. 2 of 1968 (5 U.S.C. app.), effective July 1, 1968. The missions of the Administration are 1) to assist in the development of improved mass transportation facilities, equipment, techniques, and methods, with the cooperation of mass transportation companies both public and private. 2) to encourage the planning and establishment of area-wide urban mass transportation systems needed for economical and desirable urban development, with the cooperation of mass transportation companies both public and private. and 3) to provide assistance to State and local governments and their instrumentalities in financing such systems, to be operated by public or private mass transportation companies as determined by local needs; and 4) to provide financial assistance to State and local governments to help implement national goals relating to mobility for elderly persons, persons with disabilities, and economically disadvantaged persons. (OFR1)
Federal-aid Highway Program (FAHP)	An umbrella term for most of the Federal programs providing highway funds to the States. This is not a term defined in law. As used in this document, FAHP is comprised of those programs authorized in Titles I and V of TEA-21 that are administered by FHWA.
Federal-Aid Highways	Those highways eligible for assistance under Title 23 U.S.C. except those functionally classified as local or rural minor collectors. (23CFR500)
Ferry Boat	A boat providing fixed-route service across a body of water. (APTA1)
Ferryboat (Transit)	Vessels that carry passengers and/or vehicles over a body of water. Generally steam or diesel-powered, ferryboats may also be hovercraft, hydrofoil, and other high-speed vessels. The vessel is limited in its use to the carriage of deck passengers or vehicles or both, operates on a short run on a frequent schedule between two points over the most direct water routes other than in ocean or coastwise service, and is offered as a public service of a type normally attributed to a bridge or tunnel.
Financial analysis	Estimating costs, establishing a revenue baseline, comparing revenues with costs and evaluating new revenue sources.
Financial Capacity	Refers to the ISTEA requirement that an adequate financial plan for funding and sustaining transportation improvements be in place prior to programming Federally-funded projects. Generally refers to the stability and reliability of revenue in meeting proposed costs.
Financial Planning	The process of defining and evaluating funding sources, sharing the information, and deciding how to allocate the funds.
Financial Programming	A short-term commitment of funds to specific projects identified in the regional Transportation Improvement Program (see TIP).
Fine Particulates	Particulate matter less than 2.5 microns in size (PM-2.5). A micron is one millionth of a meter. See "Particulate matter" below.

Fiscal Constraint	Making sure that a given program or project can reasonably expect to receive funding within the time allotted for its implementation.
Fiscal Year (FY)	The yearly accounting period beginning October 1 and ending September 30 of the subsequent calendar year. Fiscal years are denoted by the calendar year in which they end (e.g. FY 1991 began October 1, 1990, and ended September 30, 1991).
Fixed-Route	Term applied to transit service that is regularly scheduled and operates over a set route; usually refers to bus service.
For Hire Carrier	Carrier that provides transportation service to the public on a fee basis.
Formula Capital Grants	Federal transit funds for transit operators; allocation of funds overseen by FTA.
Freedom of Information Act (FOIA)	Allows all U.S. citizens and residents to request any records in possession of the executive branch of the federal government. The term "records" includes documents, papers, reports, letters, films, photographs, sound recordings, computer tapes and disks
Freeway	A divided arterial highway designed for the unimpeded flow of large traffic volumes. Access to a freeway is rigorously controlled and intersection grade separations are required.
Freight Revenue (Rail)	Revenue from the transportation of freight and from the exercise of transit, stopoff, diversion, and reconsignment privileges as provided for in tariffs.
Future Needs	Represents the gap between the vision and the current or projected performance of the system
Gasohol	A blend of finished motor gasoline (leaded or unleaded) and alcohol (generally ethanol but sometimes methanol) limited to 10 percent by volume of alcohol.
Gasoline	A complex mixture of relatively volatile hydrocarbons, with or without small quantities of additives that have been blended to produce a fuel suitable for use in spark ignition engines. Motor gasoline includes both leaded or unleaded grades of finished motor gasoline, blending components, and gasohol. Leaded gasoline is no longer used in highway motor vehicles in the United States.
General Accounting Office (GAO)	The General Accounting Office is the audit, evaluation, and investigative arm of Congress. GAO exists to support the Congress in meeting its Constitutional responsibilities and to help improve the performance and ensure the accountability of the federal government for the American people. GAO examines the use of public funds, evaluates federal programs and activities, and provides analyses, options, recommendations, and other assistance to help the Congress make effective oversight, policy, and funding decisions. In this context, GAO works to continuously improve the economy, efficiency, and effectiveness of the federal government through financial audits, program reviews and evaluations, analyses, legal opinions, investigations, and other services. GAO's activities are designed to ensure the executive branch's accountability to the Congress under the Constitution and the government's accountability to the American

	people. GAO is dedicated to good government through its commitment to the core values of accountability, integrity, and reliability.
General Aviation	1) All civil aviation operations other than scheduled air services and nonscheduled air transport operations for taxis, commuter air carriers, and air travel clubs that do not hold Certificates of Public Convenience and Necessity. 2) All civil aviation activity except that of air carriers certificated in accordance with Federal Aviation Regulations, Parts 121, 123, 127, and 135. The types of aircraft used in general aviation range from corporate multiengine jet aircraft piloted by professional crews to amateur-built single-engine piston-driven acrobatic planes to balloons and dirigibles.
Geographic Information System (GIS)	1) Computerized data management system designed to capture, store, retrieve, analyze, and display geographically referenced information. 2) A system of hardware, software, and data for collecting, storing, analyzing, and disseminating information about areas of the Earth. For Highway Performance Monitoring System (HPMS) purposes, Geographical Information System (GIS) is defined as a highway network (spatial data which graphically represents the geometry of the highways, an electronic map) and its geographically referenced component attributes (HPMS section data, bridge data, and other data including socioeconomic data) that are integrated through GIS technology to perform analyses. From this, GIS can display attributes and analyze results electronically in map form. (FHWA2)
Goals	Generalized statements which broadly relate to the physical environment to values
Grants	A federal financial assistance award making payment in cash or in kind for a specified purpose. The federal government is not expected to have substantial involvement with the state or local government or other recipient while the contemplated activity is being performed. The term "grants-in-aid" is commonly restricted to grants to states and local governments. (BTS3)
Gross Domestic Product (GDP)	1) The total value of goods and services produced by labor and property located in the United States. As long as the labor and property are located in the United States, the supplier (that is, the workers and, for property, the owners) may be either U.S. residents or residents of foreign countries. (DOE3) 2) The total output of goods and services produced by labor and property located in the United States, valued at market prices. As long as the labor and property are located in the United States, the suppliers (workers and owners) may be either U.S. residents or residents of foreign countries.
Gross National Product (GNP)	A measure of monetary value of the goods and services becoming available to the nation from economic activity. Total value at market prices of all goods and services produced by the nation's economy. Calculated quarterly by the Department of Commerce, the Gross National Product is the broadest available measure of the level of economic activity. (DOE6)

Gross Vehicle Weight (GVW)	The combined total weight of a vehicle and its freight.
Gross Vehicle Weight Rating (Truck)	The maximum rated capacity of a vehicle, including the weight of the base vehicle, all added equipment, driver and passengers, and all cargo.
Hazardous Material	Any toxic substance or explosive, corrosive, combustible, poisonous, or radioactive material that poses a risk to the public's health, safety, or property, particularly when transported in commerce.
Heavy Rail (Transit)	An electric railway with the capacity to transport a heavy volume of passenger traffic and characterized by exclusive rights-of-way, multicar trains, high speed, rapid acceleration, sophisticated signaling, and high-platform loading. Also known as: Subway, Elevated (railway), or Metropolitan railway (metro).
High Occupancy Vehicle (HOV)	Vehicles carrying two or more people. The number that constitutes an HOV for the purposes of HOV highway lanes may be designated differently by different transportation agencies.
High Occupancy Vehicle Lane	Exclusive road or traffic lane limited to buses, vanpools, carpools, and emergency vehicles. (APTA1)
Highway	Is any road, street, parkway, or freeway/expressway that includes rights-of-way, bridges, railroad-highway crossings, tunnels, drainage structures, signs, guardrail, and protective structures in connection with highways. The highway further includes that portion of any interstate or international bridge or tunnel and the approaches thereto (23 U.S.C. 101a). (FHWA2)
Highway Bridge Replacement and Rehabilitation Program (HBRRP)	Established under 23 U.S.C., Section 144, to enable the several states to replace and rehabilitate highway bridges when it is determined that the bridge is unsafe because of structural deficiencies, physical deterioration, or functional obsolescence.
Highway Trust Fund (HTF)	An account established by law to hold Federal highway user taxes that are dedicated for highway and transit related purposes. The HTF has two accounts: the Highway Account, and the Mass Transit Account.
Highway-Rail Grade Crossing (Rail)	A location where one or more railroad tracks are crossed by a public highway, road, street, or a private roadway at grade, including sidewalks and pathways at or associated with the crossing.
Highway-User Tax	A charge levied on persons or organizations based on their use of public roads. Funds collected are usually applied toward highway construction, reconstruction, and maintenance.
Historic Preservation	Protection and treatment of the nation's significant historic buildings, landmarks, landscapes, battlefields, tribal communities, and archeological sites; prominent federally-owned buildings; and State and privately-owned properties. [National Park Service, Historic Preservation Services]
Hydrocarbons (HC)	Colorless gaseous compounds originating from evaporation and the incomplete combustion of fossil fuels.

Imports	Receipts of goods into the 50 States and the District of Columbia from foreign countries and from Puerto Rico, the Virgin Islands, and other U.S. possessions and territories. (DOE3)
Indian Lands	Indian reservation or Indian trust land or restricted Indian land which is not subject to fee title alienation without the approval of the Federal Government, or Indian and Alaska Native villages, group, or communities in which Indians and Alaskan Natives reside, whom the Secretary of the Interior has determined are eligible for services generally available to Indians under Federal laws specifically applicable to Indians.
Indian Reservation Roads (IRR)	Public roads that are located within or provide access to an Indian reservation or Indian trust land or restricted Indian land which is not subject to fee title alienation without the approval of the Federal Government, or Indian and Alaska Native villages, group, or communities in which Indians and Alaskan Natives reside, whom the Secretary of the Interior has determined are eligible for services generally available to Indians under Federal laws specifically applicable to Indians. Roads on the BIA Road System are also IRR roads.
Indian Tribal Government (ITG)	Duly formed governing body of an Indian Tribe.
Indian Tribe	Means any Indian or Alaska Native tribe, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges to exist as an Indian tribe pursuant to the Federally Recognized Indian Tribe List Act of 1994, 25 U.S.C. 479a.
Infrastructure	1) In transit systems, all the fixed components of the transit system, such as rights-of-way, tracks, signal equipment, stations, park-and-ride lots, but stops, maintenance facilities. 2) In transportation planning, all the relevant elements of the environment in which a transportation system operates. (TRB1) 3) A term connoting the physical underpinnings of society at large, including, but not limited to, roads, bridges, transit, waste systems, public housing, sidewalks, utility installations, parks, public buildings, and communications networks.
Inland And Coastal Channels	Includes the Atlantic Coast Waterways, the Atlantic Intracoastal Waterway, the New York State Barge Canal System, the Gulf Coast Waterways, the Gulf Intracoastal Waterway, the Mississippi River System (including the Illinois Waterway), the Pacific Coast Waterways, the Great Lakes, and all other channels (waterways) of the United States, exclusive of Alaska, that are usable for commercial navigation.
Inspection and Maintenance (I/M)	An emissions testing and inspection program implemented by States in nonattainment areas to ensure that the catalytic or other emissions control devices on in-use vehicles are properly maintained.
Integrated Transportation and Land-Use Package (ITLUP)	The Institute of Transportation Engineers (ITE), an international individual member educational and scientific association, is one of the largest and fastest-growing multimodal professional transportation organizations in the world. ITE members are traffic engineers, transportation planners and other professionals who are responsible for meeting society's needs for safe and efficient surface transportation

	through planning, designing, implementing, operating and maintaining surface transportation systems worldwide.
Intelligent Transportation Systems (ITS)	The application of advanced technologies to improve the efficiency and safety of transportation systems.
Intercity Class I Bus	As defined by the Bureau of Transportation Statistics, an interstate motor carrier of passengers with an average annual gross revenue of at least $1 million.
Intercity Truck	A truck that carries freight beyond local areas and commercial zones.
Intermodal	The ability to connect, and the connections between, modes of transportation.
Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)	Legislative initiative by the U.S. Congress that restructured funding for transportation programs. ISTEA authorized increased levels of highway and transportation funding from FY92-97 and increased the role of regional planning commissions/MPOs in funding decisions. The Act also required comprehensive regional and Statewide long-term transportation plans and places an increased emphasis on public participation and transportation alternatives.
International Airport	1) Any airport designated by the Contracting State in whose territory it is situated as an airport of entry and departure for international air traffic. 2) An airport of entry which has been designated by the Secretary of Treasury or Commissioner of Customs as an international airport for customs service. 3) A landing rights airport at which specific permission to land must be obtained from customs authorities in advance of contemplated use. 4) Airports designated under the Convention on International Civil Aviation as an airport for use by international commercial air transport and/or international general aviation. (FAA4)
International Passenger	Any person traveling on a waterborne public conveyance between the United States and foreign countries and between Puerto Rico and the Virgin Islands and foreign countries. (TNDOT1)
International Transportation	Transportation between any place in the United States and any place in a foreign country; between places in the United States through a foreign country; or between places in one or more foreign countries through the United States. (49CFR171)
Intersection	1) A point defined by any combination of courses, radials, or bearings of two or more navigational aids. 2). Used to describe the point where two runways, a runway and a taxiway, or two taxiways cross or meet. (FAA4)
Interstate	Limited access divided facility of at least four lanes designated by the Federal Highway Administration as part of the Interstate System. (NHTSA3)
Interstate Commerce	Trade, traffic, or transportation in the United States which is between a place in a State and a place outside of such State (including a place outside of the United States) or is between two places in a State through another State or a place outside of the United States. (49CFR390)

Interstate Highway	Limited access, divided highway of at least four lanes designated by the Federal Highway Administration as part of the Interstate System.
Interstate Highway (Freeway or Expressway)	A divided arterial highway for through traffic with full or partial control of access and grade separations at major intersections. (FHWA3)
Interstate Highway System (IHS)	The system of highways that connects the principal metropolitan areas, cities, and industrial centers of the United States. Also connects the US to internationally significant routes in Canada and Mexico.
Interstate Maintenance (IM)	The Interstate Maintenance (IM) program provides funding for resurfacing, restoring, rehabilitating and reconstructing (4R) most routes on the Interstate System.
Intrastate	Travel within the same state. (BOC3)
Intrastate Commerce	Any trade, traffic, or transportation in any State which is not described in the term "interstate commerce." (49CFR390)
IRR Inventory	An inventory of roads which meet the following criteria: a) public roads strictly within reservation boundaries, b) public roads that provide access to lands, to groups, villages, and communities in which the majority of residences are Indian, c) public roads that serve Indian lands not within reservation boundaries, and d) public roads that serve recognized Indian groups, villages, and isolated communities not located within a reservation.
IRR Program Stewardship Plan	The plan which details the roles and responsibilities of the BIA, FHWA and ITGs in the administration and operation of the IRR Program.
IRR Road/Bridge Inventory	An inventory of BIA owned IRR and bridges.
IRR TIP	A multi-year listing of road improvement projects programmed for construction by a BIA area office, with IRR Program funds, for the next 3-5 years. A separate IRR TIP is prepared for each State within the area office's jurisdiction.
IRR Transportation Planning Funds	Funds provided under 23 U.S.C., Section 204 (j), for transportation planning by ITGs.
Isolated Rural Nonattainment and Maintenance Areas	Areas that do not contain or are not part of any metropolitan planning area as designated under the transportation planning regulations. Isolated rural areas do not have Federally required metropolitan transportation plans or TIPs and do not have projects that are part of the emissions analysis of any MPO's metropolitan transportation plan or TIP. Projects in such areas are instead included in statewide transportation improvement programs. These areas are not donut areas.
Just in Time (JIT)	Cargo or components that must be at a destination at the exact time needed. The container or vehicle is the movable warehouse.
Land Use	Refers to the manner in which portions of land or the structures on them are used, i.e. commercial, residential, retail, industrial, etc.
Land Use Plan	A plan which establishes strategies for the use of land to meet identified community needs.
Large Regionals (Air)	Air carrier groups with annual operating revenues between $20 million and $99,999,999.

Large Truck	Trucks over 10,000 pounds gross vehicle weight rating, including single-unit trucks and truck tractors.
Level of Service (LOS)	1) A qualitative assessment of a road's operating conditions. For local government comprehensive planning purposes, level of service means an indicator of the extent or degree of service provided by, or proposed to be provided by, a facility based on and related to the operational characteristics of the facility. Level of service indicates the capacity per unit of demand for each public facility. 2) This term refers to a standard measurement used by transportation officials which reflects the relative ease of traffic flow on a scale of A to F, with free-flow being rated LOS-A and congested conditions rated as LOS-F.
Light Rail	A streetcar-type vehicle operated on city streets, semi-exclusive rights-of-way, or exclusive rights-of-way. Service may be provided by step-entry vehicles or by level boarding.
Light Truck	Trucks of 10,000 pounds gross vehicle weight rating or less, including pickups, vans, truck-based station wagons, and sport utility vehicles.
Light-Duty Vehicle	A vehicle category that combines light automobiles and trucks.
Limitation on Obligations	Any action or inaction by an officer or employee of the United States that limits the amount of Federal assistance that may be obligated during a specified time period. A limitation on obligations does not affect the scheduled apportionment or allocation of funds, it just controls the rate at which these funds may be used.
Limited Maintenance Plan	A maintenance plan that EPA has determined meets EPA's limited maintenance plan policy criteria for a given NAAQS and pollutant. To qualify for a limited maintenance plan, for example, an area must have a design value that is significantly below a given NAAQS, and it must be reasonable to expect that a NAAQS violation will not result from any level of future motor vehicle emissions growth.
Liquefied Natural Gas (LNG)	Natural gas, primarily methane, that has been liquefied by reducing its temperature to -260 °F at atmospheric pressure.
Liquefied Petroleum Gas (LPG)	Pro-pane, propylene, normal butane, butylene, isobutane, and isobutylene produced at refineries or natural gas processing plants, including plants that fractionate new natural gas plant liquids.
Local Street	A street intended solely for access to adjacent properties.
Local Technical Assistance Program Center	These Centers are responsible for providing transportation assistance to State and local governments that includes, but is not limited to, circuit rider programs, providing training on intergovernmental transportation planning and project selection, and tourism recreation travel.
Locomotive	Railroad vehicle equipped with flanged wheels for use on railroad tracks, powered directly by electricity, steam, or fossil fuel, and used to move other railroad rolling equipment.
Logistics	All activities involved in the management of product movement; delivering the right product from the right origin to the right destination, with the right quality and quantity, at the right schedule and price.

Long Range Transportation Plan (LRTP)	A document resulting from regional or statewide collaboration and consensus on a region or state's transportation system, and serving as the defining vision for the region's or state's transportation systems and services. In metropolitan areas, the plan indicates all of the transportation improvements scheduled for funding over the next 20 years.
Long Term	In transportation planning, refers to a time span of, generally, 20 years. The transportation plan for metropolitan areas and for States should include projections for land use, population, and employment for the 20-year period.
Maintenance Area	Maintenance area is any geographic region of the United States previously designated nonattainment pursuant to the CAA Amendments of 1990 and subsequently redesignated to attainment subject to the requirement to develop a maintenance plan under section 175A of the CAA, as amended.
Majors (Air)	Air carrier groups with annual operating revenues exceeding $1 billion.
Management Systems	(1) Systems to improve identification of problems and opportunities throughout the entire surface transportation network, and to evaluate and prioritize alternative strategies, actions and solutions. (2) A systematic process, designed to assist decision-makers in selecting cost-effective strategies/actions to improve the efficiency and safety of, and protect the investment in, the nation's transportation infrastructure.
Maritime	Business pertaining to commerce or navigation transacted upon the sea or in seaports in such matters as the court of admiralty has jurisdiction. (MARAD2)
Maritime Administration (MARAD)	The Maritime Administration was established by Reorganization Plan No. 21 of 1950 (5 U.S.C. app.) effective May 24, 1950. The Maritime Act of 1981 (46 U.S.C. 1601) transferred the Maritime Administration to the Department of Transportation, effective Aug
Mass Transportation	Another name for public transportation. (APTA1)
Mass Transportation Agency	An agency authorized to transport people by bus, rail, or other conveyance, either publicly or privately owned, and providing to the public general or special service (but not including school, charter or sightseeing service) on a regular basis. (FTA1)
Measures of Effectiveness	Measures or tests which reflect the degree of attainment of particular objectives.
Memorandum of Understanding (MOU)	A document providing a general description of the responsibilities that are to be assumed by two or more parties in their pursuit of some goal(s). More specific information may be provided in an associated SOW.
Methanol	A light, volatile alcohol produced commercially by the catalyzed reaction of hydrogen and carbon monoxide. Methanol is blended with gasoline to improve its operational efficiency.
Methyl-Tertiary-Butyl-Ether (MTBE)	A colorless, flammable, liquid oxygenated hydrocarbon that contains 18.15 percent oxygen. It is a fuel oxygenate produced by reacting methanol with isobutylene.

Metropolitan Planning Area	The geographic area in which the metropolitan transportation planning process required by 23 U.S.C. 134 and section 8 of the Federal Transit Act (49 U.S.C. app. 1607) must be carried out. (23CFR420)
Metropolitan Planning Organization (MPO)	1) Regional policy body, required in urbanized areas with populations over 50,000, and designated by local officials and the governor of the state. Responsible in cooperation with the state and other transportation providers for carrying out the metropolitan transportation planning requirements of federal highway and transit legislation. 2) Formed in cooperation with the state, develops transportation plans and programs for the metropolitan area. For each urbanized area, a Metropolitan Planning Organization (MPO) must be designated by agreement between the Governor and local units of government representing 75% of the affected population (in the metropolitan area), including the central cities or cities as defined by the Bureau of the Census, or in accordance with procedures established by applicable State or local law (23 U.S.C. 134(b)(1)/Federal Transit Act of 1991 Sec. 8(b)(1)). (FHWA2)
Metropolitan Statistical Area (MSA)	Areas defined by the U.S. Office of Management and Budget. A Metropolitan Statistical Area (MSA) is 1) A county or a group of contiguous counties that contain at least one city of 50,000 inhabitants or more, or 2) An urbanized area of at least 50,000 inhabitants and a total MSA population of at least 100,000 (75,000 in New England). The contiguous counties are included in an MSA if, according to certain criteria, they are essentially metropolitan in character and are socially and economically integrated with the central city. In New England, MSAs consist of towns and cities rather than counties. (DOE4) (DOE5) (FHWA3)
Metropolitan Status	A building classification referring to the location of the building either located within a Metropolitan Statistical Area (MSA) or outside a MSA. (DOE5)
Metropolitan Transportation Plan (MTP)	The official intermodal transportation plan that is developed and adopted through the metropolitan transportation planning process for the metropolitan planning area, in accordance with 23 U.S.C. 134, 23 USC 135 and 49 U.S.C. 5303.
Mile	A statute mile (5,280 feet). All mileage computations are based on statute miles. (BTS5) (BTS6)
Miles Per Gallon (MPG)	A measure of vehicle fuel efficiency. Miles Per Gallon (MPG) represents "Fleet Miles per Gallon". For each subgroup or "table cell", MPG is computed as the ratio of the total number of miles traveled by all vehicles in the subgroup to the total number of gallons consumed. MPGs are assigned to each vehicle using the Environmental Protection Agency (EPA) certification files and adjusted for on-road driving. (DOE4) (DOE5)
Milestone	The meaning given in CAA sections 182(g)(1) and 189(c) for serious and above ozone nonattainment areas and PM10 nonattainment areas, respectively. For all other nonattainment areas, a milestone consists of an emissions level and the date on which that level is to be achieved as

	required by the applicable CAA provision for reasonable further progress towards attainment.
Minor Arterials (Highway)	Roads linking cities and larger towns in rural areas. In urban areas, roads that link but do not penetrate neighborhoods within a community.
Mobile Source	1) The mobile source-related pollutants are carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NOx), and particulate matter (PM-10 and PM 2.5). 2) Mobile sources include motor vehicles, aircraft, seagoing vessels, and other transportation modes. The mobile source related pollutants are carbon monoxide (CO), hydrocarbons (HC) or volatile organic compounds (VOCs), nitrogen oxides (NOx), and small particulate matter (PM-10).
Mobile Source Air Toxics (MSATS)	Identified by the EPA, MSATs are the 21 hazardous air pollutants generated in large part by transportation sources.
Mobility	The ability to move or be moved from place to place.
Mode	A specific form of transportation, such as automobile, subway, bus, rail, or air.
Motor Carrier Safety Administration (FMCS)	The Federal Motor Carrier Safety Administration (FMCSA) was established as a separate administration within the U.S. Department of Transportation on January 1, 2000, pursuant to the Motor Carrier Safety Improvement Act of 1999. The primary mission of FMCS is to reduce crashes, injuries, and fatalities involving large trucks and buses. FMCSA is headquartered in Washington, DC. We employ more than 1,000 individuals, in all 50 States and the District of Columbia, dedicated to improving bus and truck safety and saving lives.
Motor Vehicle Emissions Budget	The portion of the total allowable emissions defined in the submitted or approved control strategy implementation plan revision or maintenance plan for a certain date for the purpose of meeting reasonable further progress milestones or demonstrating attainment or maintenance of the NAAQS, for any criteria pollutant or its precursors, allocated to highway and transit vehicle use and emissions.
Motorbus (Transit)	A rubber-tired, self-propelled, manually steered bus with a fuel supply onboard the vehicle. Motorbus types include intercity, school, and transit.
Motorcycle	A two- or three-wheeled motor vehicle designed to transport one or two people, including motor scooters, minibikes, and mopeds.
Motorized Vehicle	Includes all vehicles that are licensed for highway driving. Specifically excluded are snow mobiles and minibikes. (FHWA3)
Multimodal	The availability of transportation options using different modes within a system or corridor.
Multimodal Transportation	Often used as a synonym for intermodalism. Congress and others frequently use the term intermodalism in its broadest interpretation as a synonym for multimodal transportation. Most precisely, multimodal transportation covers all modes without necessarily including a holistic or integrated approach. (BTS2)

National Airspace System (NAS)	The common network of U.S. airspace; air navigation facilities, equipment, and services; airports or landing areas; aeronautical charts, information, and services; rules, regulations, and procedures; technical information, manpower, and material. Included are system components shared jointly with the military. (FAA4) (FAA8)
National Ambient Air Quality Standards (NAAQS)	Federal standards that set allowable concentrations and exposure limits for various pollutants. The EPA developed the standards in response to a requirement of the CAA. Air quality standards have been established for the following six criteria pollutants: ozone (or smog), carbon monoxide, particulate matter, nitrogen dioxide, lead, and sulfur dioxide.
National Cooperative Highway Research Program (NCHRP)	The cooperative research, development, and technology transfer (RD&T) program directed toward solving problems of national or regional significance identified by States and the FHWA, and administered by the Transportation Research Board, National Academy of Sciences. (23CFR420)
National Cooperative Transit Research and Development Program	A program established under Section 6a) of the Urban Mass Transportation Act of 1964, as amended, to provide a mechanism by which the principal client groups of the Urban Mass Transportation Administration can join cooperatively in an attempt to resolve near-term public transportation problems through applied research, development, testing, and evaluation. NCTRP is administered by the Transportation Research Board. (TRB1)
National Environmental Policy Act of 1969 (NEPA)	Established a national environmental policy requiring that any project using federal funding or requiring federal approval, including transportation projects, examine the effects of proposed and alternative choices on the environment before a federal decision is made.
National Highway System (NHS)	This system of highways designated and approved in accordance with the provisions of 23 U.S.C. 103b). (23CFR500)
National Highway Traffic Safety Administration (NHTSA)	The Administration was established by the Highway Safety Act of 1970 (23 U.S.C. 401 note). The Administration was established to carry out a congressional mandate to reduce the mounting number of deaths, injuries, and economic losses resulting from motor vehicle crashes on the Nation's highways and to provide motor vehicle damage susceptibility and ease of repair information, motor vehicle inspection demonstrations and protection of purchasers of motor vehicles having altered odometers, and to provide average standards for greater vehicle mileage per gallon of fuel for vehicles under 10,000 pounds (gross vehicle weight). (OFR1)
National Historic Trail (NHT)	A historic or prehistoric route of travel of significance to the entire Nation. It must meet three criteria listed in Section 5(b)(11) of the National Trails System Act, and be established by Act of Congress. 16 U.S.C. 1241-51.
National ITS Architecture	A systems framework to guide the planning and deployment of ITS infrastructure. The national ITS architecture is a blueprint for the coordinated development of ITS technologies in the U.S. It is unlikely that any single metropolitan area or state would plan to implement the entire national ITS architecture.

National Scenic Byways Program (NSBP)	Designates roads that have outstanding scenic, historic, cultural, natural, recreational, and archaeological qualities as All-American Roads or National Scenic Byways, and provides grants for scenic byway projects. 23 U.S.C. 162
National Scenic Trail (NST)	A continuous, primarily nonmotorized route of outstanding recreation opportunity, established by Act of Congress. 16 U.S.C. 1241-51.
National Trails System (NTS)	The network of scenic, historic, and recreation trails created by the National Trails System Act of 1968. These trails provide for outdoor recreation needs, promote the enjoyment, appreciation, and preservation of open-air, outdoor areas and historic resources, and encourage public access and citizen involvement. 16 U.S.C. 1241-51.
Native American Local Technical Assistance Programs	Primarily responsible for transportation related technology transfer to Native Americans through Tribal Technical Assistance Program (TTAP) Centers.
Natural Gas	A naturally occurring mixture of hydrocarbon and nonhydrocarbon gases found in porous geologic formations beneath the Earth's surface, often in association with petroleum. The principal constituent is methane.
Natural Gas Policy Act of 1978 (NGPA)	Section 311 Construction, allows an interstate pipeline company to transport gas "on behalf of" any intrastate pipeline or local distribution company. Pipeline companies may expand or construct facilities used solely to enable this transportation service, subject to certain conditions and reporting requirements. (DOE1)
Nitrogen Oxide Emissions	Nitrogen oxides (NOx), the term used to describe the sum of nitric oxide (NO), nitrogen dioxide (N02) and other oxides of nitrogen, play a major role in the formation of ozone. The major sources of man?made NOx emissions are high?temperature combustion processes, such as those occurring in automobiles and power plants.
Nitrogen Oxides	A product of combustion of fossil fuels whose production increases with the temperature of the process. It can become an air pollutant if concentrations are excessive. (DOE6)
Noise Standards	23 U.S.C. 109(i)
Nonattainment Area (NAA)	Any geographic area that has not met the requirements for clean air as set out in the Clean Air Act of 1990.
Noncompliance	Failure to comply with a standard or regulation issued under 46 U.S.C. Chapter 43, or with a section of the statutes. (USCG1)
Noncurrent Liabilities	Non-current portion of long-term debt and of capital leases, advances to associated companies and other liabilities not due during the normal business cycle. (BTS4)
Nonoccupant (Automobile)	Any person who is not an occupant of a motor vehicle in transport (e.g., bystanders, pedestrians, pedalcyclists, or an occupant of a parked motor vehicle).
Nonresident Commercial Driver's License	A commercial driver's license (CDL) issued by a State to an individual domiciled in a foreign country. (49CFR383)

Notice of Funding Availability	Written notice to the respective area tribes that the BIA area office has received contractible program funds.
Objectives	Specific, measurable statements related to the attainment of goals.
Obligation	The Federal government's legal commitment (promise) to pay or reimburse the States or other entities for the Federal share of a project's eligible costs.
Obligation Limitation	A restriction, or "ceiling" on the amount of Federal assistance that may be promised (obligated) during a specified time period. This is a statutory budgetary control that does not affect the apportionment or allocation of funds. Rather, it controls the rate at which these funds may be used.
Obligational Authority (OA)	The total amount of funds that may be obligated in a year. For the Federal-Aid Highway Program this is comprised of the obligation limitation amount plus amounts for programs exempt from the limitation.
Occupancy	The number of persons, including driver and passenger(s) in a vehicle. Nationwide Personal Transportation Survey (NPTS) occupancy rates are generally calculated as person miles divided by vehicle miles. (FHWA3)
Occupant	Any person who is in or upon a motor vehicle in transport. Includes the driver, passengers, and persons riding on the exterior of a motor vehicle (e.g., a skateboard rider who is set in motion by holding onto a vehicle). (NHTSA3)
Occupant (Highway)	Any person in or on a motor vehicle in transport. Includes the driver, passengers, and persons riding on the exterior of a motor vehicle (e.g., a skateboard rider holding onto a moving vehicle). Excludes occupants of parked cars unless they are double parked or motionless on the roadway.
Office of Management and Budget (OMB)	OMB's predominant mission is to assist the President in overseeing the preparation of the federal budget and to supervise its administration in Executive Branch agencies. In helping to formulate the President's spending plans, OMB evaluates the effectiveness of agency programs, policies, and procedures, assesses competing funding demands among agencies, and sets funding priorities. OMB ensures that agency reports, rules, testimony, and proposed legislation are consistent with the President's Budget and with Administration policies. In addition, OMB oversees and coordinates the Administration's procurement, financial management, information, and regulatory policies. In each of these areas, OMB's role is to help improve administrative management, to develop better performance measures and coordinating mechanisms, and to reduce any unnecessary burdens on the public.
Other 2-Axle 4-Tire Vehicles (Truck)	Includes vans, pickup trucks, and sport utility vehicles.
Other Freeways And Expressways (Highway)	All urban principal arterials with limited access but not part of the Interstate system.
Other Principal Arterials (Highway)	Major streets or highways, many of multi-lane or freeway design, serving high-volume traffic corridor movements that connect major generators of travel.

Other Revenue Vehicles (Transit)	Other revenue-generating modes of transit service, such as cable cars, personal rapid transit systems, monorail vehicles, inclined and railway cars, not covered otherwise.
Outlays	Actual cash (or electronic transfer) payments made to the States or other entities. Outlays are provided as reimbursement for the Federal share for approved highway program activities.
Oxygenated gasoline	Gasoline enriched with oxygen bearing liquids to reduce CO production by permitting more complete combustion.
Oxygenates	Any substance that when added to motor gasoline increases the amount of oxygen in that gasoline blend. Includes oxygen-bearing compounds such as ethanol, methanol, and methyl-tertiary-butyl-ether. Oxygenated fuel tends to give a more complete combustion of carbon into carbon dioxide (rather than monoxide), thereby reducing air pollution from exhaust emissions.
Ozone 03	Ozone is a colorless gas with a sweet odor. Ozone is not a direct emission from transportation sources. It is a secondary pollutant formed when VOCs and NOx combine in the presence of sunlight. Ozone is associated with smog or haze conditions. Although the ozone in the upper atmosphere protects us from harmful ultraviolet rays, ground-level ozone produces an unhealthy environment in which to live. Ozone is created by human and natural sources.
P.L. 93-638 - Indian Self-Determination and Education Assistance Act, as amended	The response by Congress, in recognition of the unique obligation of the United States, to the strong expression of the Indian people for self-determination, assuring maximum Indian participation in the direction of education as well as other Federal services for Indian communities so as to render such programs and services more responsive to the needs and desires of Indian communities.
Paratransit	1) Comparable transportation service required by the American Disabilities Act (ADA) for individuals with disabilities who are unable to use fixed route transportation systems. (49CFR37) (APTA1) 2) A variety of smaller, often flexibly scheduled-and-routed transportation services using low-capacity vehicles, such as vans, to operate within normal urban transit corridors or rural areas. These services usually serve the needs of persons that standard mass-transit services would serve with difficulty, or not at all. Often, the patrons include the elderly and persons with disabilities.
Park	A place or area set aside for recreation or preservation of a cultural or natural resource. (DOI4)
Parking Area	An area set aside for the parking of motor vehicles. (DOI4)
Parkway	A highway that has full or partial access control, is usually located within a park or a ribbon of park-like developments, and prohibits commercial vehicles. Buses are not considered commercial vehicles in this case. (FHWA2)
Participating Agency	A federal department or agency which transferred (consolidated) vehicles to the Interagency Fleet Management System (IFMS). (GSA2)

Particulate Matter (PM10 and PM2.5)	Particulate matter consists of airborne solid particles and liquid droplets. Particulate matter may be in the form of fly ash, soot, dust, fog, fumes, etc. These particles are classified as "coarse" if they are smaller than 10 microns, or "fine" if they are smaller than 2.5 microns. Coarse airborne particles are produced during grinding operations, or from the physical disturbance of dust by natural air turbulence processes, such as wind. Fine particles can be a by-product of fossil fuel combustion, such as diesel and bus engines. Fine particles can easily reach remote lung areas, and their presence in the lungs is linked to serious respiratory ailments such as asthma, chronic bronchitis and aggravated coughing. Exposure to these particles may aggravate other medical conditions such as heart disease and emphysema and may cause premature death. In the environment, particulate matter contributes to diminished visibility and particle deposition (soiling).
Particulate Matter Emissions (PM)	Particulate matter (PM) is the general term used for a mixture of solid particles and liquid droplets founclin the air. They originate from many different stationary and mobile sources as well as from natural sources, including fuel combustion from motor vehicles, power generation, and industrial facilities, as well as from residential fireplaces and wood stoves. Fine particles are most closely associated with such health effects as increased hospital admissions and emergency room visits for heart and lung disease, increased respiratory symptoms and disease, decreased lung function, and even premature death.
Parts Per Million (PPM)	A measure of air pollutant concentrations.
Passenger Car	A motor vehicle designed primarily for carrying passengers on ordinary roads, includes convertibles, sedans, and stations wagons.
Passenger Mile	1) One passenger transported one mile. Total passenger miles are computed by summation of the products of the aircraft miles flown on each inter-airport flight stage multiplied by the number of passengers carried on that flight stage. (AIA1) (FAA11) (NTSB1) 2) The cumulative sum of the distances ridden by each passenger. (FTA1)
Passenger Revenue	1) Rail Revenue from the sale of tickets. 2) Air Revenues from the transport of passengers by air. 3) Transit Fares, transfer, zone, and park-an
Passenger Service	Both intercity rail passenger service and commuter rail passenger service. (49CFR245)
Passenger Vessels (Water)	A vessel designed for the commercial transport of passengers.
Pavement Management System	A systematic process that provides, analyzes, and summarizes pavement information for use in selecting and implementing cost-effective pavement construction, rehabilitation, and maintenance programs. Pavement includes all road surface types including paved, gravel, and improved or unimproved earth.
Pedestrian	Any person not in or on a motor vehicle or other vehicle. Excludes people in buildings or sitting at a sidewalk cafe. The National Highway Traffic Safety Administration also uses another pedestrian category to refer to pedestrians using conveyances and people in buildings. Examples of pedestrian conveyances include skateboards, non-

	motorized wheelchairs, roller skates, sleds, and transport devices used as equipment.
Pedestrian Walkway (or Walkway)	A continuous way designated for pedestrians and separated from the through lanes for motor vehicles by space or barrier. (23CFR217)
Performance Measures	Indicators of how well the transportation system is performing with regard to such things as average speed, reliability of travel, and accident rates. Used as feedback in the decision-making process.
Person Trip	A trip taken by an individual. For example, if three persons from the same household travel together, the trip is counted as one household trip and three person trips.
Person-Miles	An estimate of the aggregate distances traveled by all persons on a given trip based on the estimated transportation-network-miles traveled on that trip.
Petroleum (Oil)	A generic term applied to oil and oil products in all forms, such as crude oil, lease condensate, unfinished oils, petroleum products, natural gas plant liquids, and nonhydrocarbon compounds blended into finished petroleum products.
Planning Funds (PL)	Primary source of funding for metropolitan planning designated by the FHWA.
Port	1) Harbor with piers or docks; 2) left side of ship when facing forward; 3) opening in a ship's side for handling freight. (MARAD2)
Possible Injury	Any injury reported or claimed that is not evident. Includes, among others, momentary unconsciousness, claim of injuries not obvious, limping, complaint of pain, nausea, and hysteria.
Private Carrier	A carrier that provides transportation service to the firm that owns or leases the vehicles and does not charge a fee.
Privately Owned Vehicle (POV)	1) A privately-owned vehicle or privately-operated vehicle. 2) Employee's own vehicle used on official business for which the employee is reimbursed by the government on the basis of mileage. (GSA1)
Problem Identification	An element in the planning process which represents the gap between the desired vision, goals and objectives and the current or projected performance of the system
Program Development	An element in the planning process in which improvements are formalized in the transportation improvement program and provides more detailed strategies.
Programming	Prioritizing proposed projects and matching those projects with available funds to accomplish agreed upon, stated needs.
Project	A locally sponsored, coordinated, and administered program, or any part thereof, to plan, finance, construct, maintain, or improve an intermodal passenger terminal, which may incorporate civic or cultural activities where feasible in an architecturally or historically distinctive railroad passenger terminal. (49CFR256)

Property Damage (Transit)	The dollar amount required to repair or replace transit property (including stations, right-of-way, bus stops, and maintenance facilities) damaged during an incident.
Public Authority	A Federal, State, county, town or township, Indian tribe, municipal or other local government or instrumentality thereof, with authority to finance, build, operate, or maintain highway facilities, either as toll or toll- free highway facilities. (23CFR460)
Public Crossing	A location open to public travel where railroad tracks intersect a roadway that is under the jurisdiction and maintenance of a public authority. (FRA3)
Public Entity	1) Any state or local government; 2) Any department, agency, special purpose district, or other instrumentality of one or more state or local governments; and 3) The National Railroad Passenger Corporation (Amtrak) and any commuter authority. (49CFR37)
Public Hearings	23 U.S.C. 128
Public Liability	Liability for bodily injury or property damage and includes liability for environmental restoration. (49CFR387)
Public Meeting or Hearing	A public gathering for the express purpose of informing and soliciting input from interested individuals regarding transportation issues.
Public Participation	The active and meaningful involvement of the public in the development of transportation plans and programs.
Public Transit	Passenger transportation services, usually local in scope, that is available to any person who pays a prescribed fare. It operates on established schedules along designated routes or lines with specific stops and is designed to move relatively large numbers of people at one time. (TRB1)
Public Transit Agencies	A public entity responsible for administering and managing transit activities and services. Public transit agencies can directly operate transit service or contract out for all or part of the total transit service provided. (FTA1)
Public Transit System	An organization that provides transportation services owned, operated, or subsidized by any municipality, county, regional authority, state, or other governmental agency, including those operated or managed by a private management firm under contract to the government agency owner. (APTA1)
Public Transportation	Transportation by bus, rail, or other conveyance, either publicly or privately owned, which provides to the public general or special service on a regular and continuing basis. Also known as "mass transportation", "mass transit" and "transit." (APTA1)
Public Road	Any road under the jurisdiction of and maintained by a public authority (federal, state, county, town or township, local government, or instrumentality thereof) and open to public travel.
Rail	A rolled steel shape laid in two parallel lines to form a track for carrying vehicles with flanged steel wheels. (TRB1)

Rapid Rail Transit	Transit service using railcars driven by electricity usually drawn from a third rail, configured for passenger traffic, and usually operated on exclusive rights-of-way. It generally uses longer trains and has longer station spacing than light rail.
Recreational Trails Program (RTP)	Provides funds to the States to develop and maintain recreational trails and trail-related facilities for motorized and non-motorized recreational trail uses. 23 U.S.C. 206.
Reformulated Gasoline	1) Gasoline whose composition has been changed to meet performance specifications regarding ozone-forming tendencies and release of toxic substances into the air from both evaporation and tailpipe emissions. Reformulated gasoline includes oxygenates and, compared with gasoline sold in 1990, has a lower content of olefins, aromatics, volatile components, and heavy hydrocarbons. 2) Gasoline specifically developed to reduce undesirable combustion products.
Regional Planning Organization (RPO)	An organization that performs planning for multi-jurisdictional areas. MPOs, regional councils, economic development associations, rural transportation associations are examples of RPOs.
Regional Railroad	Railroad defined as line haul railroad operating at least 350 miles of track and/or earns revenue between $40 million and $266.7 million.
Regionally Significant Project	A project that is on a facility which serves regional transportation needs.
Relative Need Formula	An allocation formula used by BIADOT to distribute construction funds to the 12 BIA area offices.
Reliability	Refers to the degree of certainty and predictability in travel times on the transportation system. Reliable transportation systems offer some assurance of attaining a given destination within a reasonable range of an expected time. An unreliable transportation system is subject to unexpected delays, increasing costs for system users
Remote Areas	Sparsely populated areas such as mountains, swamps, and large bodies of water. (FAA8)
Research	Investigation or experimentation aimed at the discovery of new theories or laws and the discovery and interpretation of facts or revision of accepted theories or laws in the light of new facts. (49CFR171)
Research and Special Programs Administration (RSPA)	The Administration was established formally on September 23, 1977. It is responsible for hazardous materials transportation and pipeline safety, transportation emergency preparedness, safety training, multimodal transportation research and development activities, and collection and dissemination of air carrier economic data. It includes the Office of Hazardous Materials Safety; the Office of Pipeline Safety; the Office of Research Technology, and Analysis; the Office of University Research and Education; the Office of Automated Tariffs; the Office of Research Policy and Technology Transfer; the Volpe National Transportation Systems Center; and the Transportation Safety Institute. (OFR1)
Restricted Area	Airspace designated under Federal Aviation Regulations (FAR), Part 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use and

	Intermediate Fix/Visual Flight Rules IF/VFR operations in the area may be authorized by the controlling Air Traffic Control (ATC) facility when it is not being utilized by the using agency. Restricted areas are depicted on en route charts. Where joint use is authorized, the name of the ATC controlling facility is also shown. (FAA8)
Restricted Road	Public road with restricted public use. (DOI3)
Revenue	Remuneration received by carriers for transportation activities.
Revenue Aligned Budget Authority (RABA)	The adjustment in funding made annually to the highway program, beginning in FY 2000, as a result of the adjustment in the firewall level for highways. The firewall level is adjusted to reflect revised receipt estimates for the Highway Account of the Highway Trust Fund. Then, adjustments equal to the firewall adjustment-are made to Federal-Aid highway authorizations and obligation limitation for the fiscal year.
Revenue Passenger-Mile	One revenue passenger transported one mile.
Revenue Ton-Mile	One short ton of freight transported one mile.
Revenue Vehicle-Miles (Transit)	One vehicle (bus, trolley bus, or streetcar) traveling one mile, while revenue passengers are on board, generates one revenue vehicle-mile. Revenue vehicle-miles reported represent the total mileage traveled by vehicles in scheduled or unscheduled revenue-producing services.
Right of Way	The land (usually a strip) acquired for or devoted to highway transportation purposes. (FHWA2)
Road	An open way for the passage of vehicles, persons, or animals on land. (DOI4)
Road Class	The category of roads based on design, weatherability, their governmental designation, and the Department of Transportation functional classification system. (DOI3)
Road Functional Classification	The classification of a road in accordance with the Bureau of Land Management (BLM) 9113.16. Code as follows C-collector, L-local, R-resource. (DOI2)
Rural Highway	Any highway, road, or street that is not an urban highway.
Rural Mileage (Highway)	Roads outside city, municipal district, or urban boundaries.
Safety Management System	A systematic process that has the goal of reducing the number and severity of transportation related accidents by ensuring that all opportunities to improve safety are identified, considered and implemented as appropriate.
School Bus	A passenger motor vehicle that is designed or used to carry more than 10 passengers, in addition to the driver, and, as determined by the Secretary of Transportation, is likely to be significantly used for the purpose of transporting pre-primary, primary, or secondary school students between home and school.
Self-Propelled Vessel	A vessel that has its own means of propulsion. Includes tankers, containerships, dry bulk cargo ships, and general cargo vessels.
Serious Injury (Air Carrier/General Aviation)	An injury that requires hospitalization for more than 48 hours, commencing within 7 days from the date when the injury was received;

	results in a bone fracture (except simple fractures of fingers, toes, or nose); involves lacerations that cause severe hemorrhages, or nerve, muscle, or tendon damage; involves injury to any internal organ; or involves second- or third-degree burns or any burns affecting more than 5 percent of the body surface.
Shortline Railroad	Freight railroads which are not Class I or Regional Railroads, that operate less than 350 miles of track and earn less than $40 million.
Small Particulate Matter (PM-10)	Particulate matter which is less than 10 microns in size. A micron is one millionth of a meter. Particulate matter this size is too small to be filtered by the nose and lungs.
Smart Growth	A set of policies and programs design to protect, preserve, and economically develop established communities and valuable natural and cultural resources.
Sources	Refers to the origin of air contaminants. Can be point (coming from a defined site) or non-point (coming from many diffuse sources).[Stationary sources include relatively large, fixed facilities such as power plants, chemical process industries, and petroleum refineries. Area sources are small, stationary, non-transportation sources that collectively contribute to air pollution, and include such sources as dry cleaners and bakeries, surface coating operations, home furnaces, and crop burning. Mobile sources include on-road vehicles such as cars, trucks, and buses; and off-road sources such as trains, ships, airplanes, boats, lawnmowers, and construction equipment.
Sponsor	Any private owner of a public-use airport or any public agency (either individually or jointly with other public agencies) that submit to the Secretary of Transportation, in accordance with the Airport & Airway Improvement Act of 1982, an application for financial assistance. (FAA2)
Sprawl	Urban form that connotatively depicts the movement of people from the central city to the suburbs. Concerns associated with sprawl include loss of farmland and open space due to low-density land development, increased public service costs, and environmental degradation as well as other concerns associated with transportation.
Stakeholder	Person or goup affected by a transportation plan, program or project. Person or group believing that are affected by a transportation plan, program or project. Residents of affected geographical areas.
Stakeholders	Individuals and organizations involved in or affected by the transportation planning process. Include federal/state/local officials, MPOs, transit operators, freight companies, shippers, and the general public.
State	As defined in chapter 1 of Title 23 of the United States Code, any of the 50 States, comprising the United States, plus the District of Columbia and the Commonwealth of Puerto Rico. However, for some purposes (e.g., highway safety programs under 23 U.S.C. 402), the term may also include the Territories (the U.S. Virgin Islands, Guam, American Samoa, and the Northern Mariana Islands) and the Secretary of the Interior (for Indian Reservations). For the purposes of apportioning

	funds under sections 104, 105, 144, and 206 of Title 23, United States Code, the term "State" is defined by section 1103(n) of the TEA-21 to mean any of the 50 States and the District of Columbia.
State Implementation Plan (SIP)	Produced by the state environmental agency, not the MPO. A plan mandated by the CAA that contains procedures to monitor, control, maintain, and enforce compliance with the NAAQS. Must be taken into account in the transportation planning process.
State Infrastructure Bank (SIB)	A revolving fund mechanism for financing a wide variety of highway and transit projects through loans and credit enhancement. SIBs are designed to complement traditional Federal-aid highway and transit grants by providing States increased flexibility for financing infrastructure investments.
State Planning and Research Funds (SPR)	Primary source of funding for statewide long-range planning.
State Routing Agency	An entity (including a common agency of more than one state such as one established by Interstate compact) which is authorized to use state legal process pursuant to 49 CFR 177.825 to impose routing requirements, enforceable by State agencies, on carriers of radioactive materials without regard to intrastate jurisdictional boundaries. This term also includes Indian tribal authorities which have police powers to regulate and enforce highway routing requirements within their lands. (49CFR171)
State Transportation Agency	The State highway department, transportation department, or other State transportation agency to which Federal-aid highway funds are apportioned. (23CFR420)
State Transportation Improvement Program (STIP)	A staged, multi-year, statewide, intermodal program of transportation projects, consistent with the statewide transportation plan and planning processes as well as metropolitan plans, TIPs, and processes.
State-Designated Route	A preferred route selected in accordance with U.S. DOT "Guidelines for Selecting Preferred Highway Routes for Highway Route Controlled Quantities of Radioactive Materials" or an equivalent routing analysis which adequately considers overall risk to the public. (49CFR171)
Statewide Comprehensive Outdoor Recreation Plan (SCORP)	A statewide recreation plan required by the Land and Water Conservation Fund Act of 1965. Addresses the demand for and supply of recreation resources (local, State, and Federal) within a State, identifies needs and new opportunities for recreation improvements, and sets forth an implementation program to meet the goals identified by its citizens and elected leaders. [National Park Service] NOTE: Metropolitan and statewide transportation plans plans should be coordinated with SCORPs.
Statewide Transportation Plan	The official statewide intermodal transportation plan that is developed through the statewide transportation planning process.
Stationary Source	Relatively large, fixed sources of emissions (i.e. chemical process industries, petroleum refining and petrochemical operations, or wood processing).

Streetcars	Relatively lightweight passenger railcars operating singly or in short trains, or on fixed rails in rights-of-way that are not always separated from other traffic. Streetcars do not necessarily have the right-of-way at grade crossings with other traffic.
Sub-Allocation	An administrative distribution of funds from BIA Central Office down to the BIA area.
Surface Transportation Program (STP)	Federal-aid highway funding program that funds a broad range of surface transportation capital needs, including many roads, transit, sea and airport access, vanpool, bike, and pedestrian facilities.
Tanker	An oceangoing ship designed to haul liquid bulk cargo in world trade.
Telecommuting	Communicating electronically (by telephone, computer, fax, etc.) with an office, either from home or from another site, instead of traveling to it physically.
Third party Logistics (3PL)	Provider. A specialist in logistics who may provide a variety of transportation, warehousing, and logistics related services to buyers or sellers. These tasks were previously performed in house by the customer.
Throughput	Total amount of freight imported or exported through a seaport measured in tons or TEUs.
Title VI	Title VI of the Civil Rights Act of 1964. Prohibits discrimination in any program receiving federal assistance.
Ton mile	A measure of output for freight transportation; reflects weight of shipment and the distance it is hauled; a multiplication of tons hauled by the distance traveled.
Ton-Mile (Water)	The movement of one ton of cargo the distance of one statute mile. Domestic ton-miles are calculated by multiplying tons moved by the number of statute miles moved on the water (e.g., 50 short tons moving 200 miles on a waterway would yield 10,000 ton-miles for that waterway). Ton-miles are not computed for ports. For coastwise traffic, the shortest route that safe navigation permits between the port of origin and destination is used to calculate ton-miles.
Total Benefit/Cost Ratio	The sum of five categories of quantifiable project benefits divided by the annualized cost of the project.
Trafficway (Highway)	Any right-of-way open to the public as a matter of right or custom for moving persons or property from one place to another, including the entire width between property lines or other boundaries.
Train Line Mileage	The aggregate length of all line-haul railroads. It does not include the mileage of yard tracks or sidings, nor does it reflect the fact that a mile of railroad may include two or more parallel tracks. Jointly-used track is counted only once.
Train-Mile	The movement of a train, which can consist of many cars, the distance of one mile. A train-mile differs from a vehicle-mile, which is the movement of one car (vehicle) the distance of one mile. A 10-car (vehicle) train traveling 1 mile is measured as 1 train-mile and 10

	vehicle-miles. Caution should be used when comparing train-miles to vehicle-miles.
Transit Vehicle	Includes light, heavy, and commuter rail; motorbus; trolley bus; van pools; automated guideway; and demand responsive vehicles.
Transport	Movement of natural, synthetic, and/or supplemental gas between points beyond the immediate vicinity of the field or plant from which produced except 1) For movements through well or field lines to a central point for delivery to a pipeline or processing plant within the same state or 2) Movements from a city gate point of receipt to consumers through distribution mains. (DOE5)
Transportation Administration and Support	All activities associated with transportation administration, revenue vehicle movement control and scheduling including supervision and clerical support. (FTA1)
Transportation Agreement	Any contractual agreement for the transportation of natural and/or supplemental gas between points for a fee. (DOE5)
Transportation Bill	The bill refers to the market value of all purchases of transportation services and facilities; it includes all domestic expenditures made by an economy for transportation purposes. Although the transportation bill does not reflect several significant non-market costs, it is a useful indicator of a country's transportation expenditures, and transportation analysts closely follow changes in the bill and its components. (BTS1)
Transportation Conformity	Process to assess the compliance of any transportation plan, program, or project with air quality implementation plans. The conformity process is defined by the Clean Air Act.
Transportation Control Measures (TCM)	Transportation strategies that affect traffic patterns or reduce vehicle use to reduce air pollutant emissions. These may include HOV lanes, provision of bicycle facilities, ridesharing, telecommuting, etc. Such actions may be included in a SIP if needed to demonstrate attainment of the NAAQS.
Transportation Demand Management (TDM)	Programs designed to reduce demand for transportation through various means, such as the use of transit and of alternative work hours.
Transportation Enhancement Activities (TE)	Provides funds to the States for safe bicycle and pedestrian facilities, scenic routes, beautification, restoring historic buildings, renovating streetscapes, or providing transportation museums and visitors centers. 23 U.S.C. 101(a) and 133(b)(8).
Transportation Equity Act for the 21st Century (TEA-21)	Authorized in 1998, TEA-21 authorized federal funding for transportation investment for fiscal years 1998-2003. Approximately $217 billion in funding was authorized, which was used for highway, transit, and other surface transportation programs.
Transportation Improvement Program (TIP)	A document prepared by a metropolitan planning organization that lists projects to be funded with FHWA/FTA funds for the next one- to three-year period.
Transportation Infrastructure	A federal credit program under which the USDOT may provide three forms of credit assistance - secured (direct) loans, loan guarantees, and standby lines of credit - for surface transportation projects of national or regional significance. The fundamental goal is to leverage federal funds

	by attracting substantial private and non-federal co-investment in critical improvements to the nation's surface transportation system.
Transportation Management Area (TMA)	1) All urbanized areas over 200,000 in population, and any other area that requests such designation. 2) An urbanized area with a population over 200,000 (as determined by the latest decennial census) or other area when TMA designation is requested by the Governor and the MPO (or affect local officials), and officially designated by the Administrators of the FHWA and the FTA. The TMA designation applies to the entire metropolitan planning area(s). (23CFR500)
Transportation Research Information Services (TRIS)	The Transportation Research Board-maintained computerized storage and retrieval system for abstracts of ongoing and completed research, development, and technology transfer (RD&T) activities, including abstracts of RD&T reports and articles. (23CFR420)
Travel Advisory Program	The Department of State manages a travel advisory program which publicizes 1) Travel warnings which are issued when State decides to recommend that Americans avoid travel to a certain country and 2) Consular information sheets, issued for every country, which advise travelers of health concerns, immigration and currency regulations, crime and security conditions, areas of unrest or instability, and the location of U.S. embassies or consulates. (USTTA1)
Travel Agencies	Establishments primarily engaged in furnishing travel information and acting as agents in arranging tours, transportation, rental of cars, and lodging for travelers. (BOC1)
Travel Model Improvement Program (TMIP)	TMIP supports and empowers planning agencies through leadership, innovation and support of planning analysis improvements to provide better information to support transportation and planning decisions.
Tribal Control Schedule	The implementing document for the Tribal TIP. The ITG may elect to develop the tribal control schedule under Self-Governance compact or Indian Self-Determination contract. The tribal control schedule is an accounting and project management tool that is developed from the tribal TIP. It contains detailed project and tasks information for all projects identified in the tribal TIP. Project information is included in the area-wide control schedule without changing the total dollar amounts.
Tribal Lands	Land held in trust for Indian people, restricted Indian land which is not subject to fee title alienation without the approval of the Federal Government, and fee lands owned by tribal governments.
Tribal Priority List	A list of transportation projects which the ITG considers a high priority.
Tribal Technical Assistance Program Center (TTAP)	These centers are responsible for providing transportation assistance to native Americans that includes, but is not limited to, circuit rider programs, providing training on intergovernmental transportation planning and project selection, and tourism recreation travel.
Tribal TIP	A multi-year, financially constrained, list of proposed transportation projects to be implemented within or providing access to Indian country during the next 3-5 years. It is developed from the tribal priority list.

Trolley Bus	Rubber-tired electric transit vehicle, manually steered and propelled by a motor drawing current, normally through overhead wires, from a central power source.
Truckload (TL)	Quantity of freight required to fill a truck, or at a minimum, the amount required to qualify for a truckload rate.
Trust Fund	A fund credited with receipts that are held in trust by the government and earmarked by law for use in carrying out specific purposes and programs in accordance with an agreement or a statute.
Trust Funds	Accounts that are designated by law to carry out specific purposes and programs. Trust Funds are usually financed with earmarked tax collections.
Tug Boat	A powered vessel designed for towing or pushing ships, dumb barges, pushed-towed barges, and rafts, but not for the carriage of goods.
Turner-Fairbank Highway Research Center (TFHRC)	TFHRC provides FHWA and the world highway community with the most advanced research and development related to new highway technologies. The research focuses on providing solutions to complex technical problems through the development of more economical, environmentally sensitive designs; more efficient, quality controlled constructions practices; and more durable materials. The end result is a safer, more reliable highway transportation system.
Twenty foot Equivalent Unit (TEU)	The 8 foot by 8 foot by 20 foot intermodal container is used as a basic measure in many statistics and is the standard measure used for containerized cargo.
U.S. Flag Carrier or American Flag Carrier (Air)	One of a class of air carriers holding a Certificate of Public Convenience and Necessity, issued by the U.S. Department of Transportation and approved by the President, authorizing scheduled operations over specified routes between the United States (and/or its territories) and one or more foreign countries.
Unified Planning Work Program (UPWP)	The management plan for the (metropolitan) planning program. Its purpose is to coordinate the planning activities of all participants in the planning process.
Union of Soviet Socialist Republic (U.S.S.R)	Consisted of 15 constituent republics Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgystan, Latvia, Lithuania, Moldava, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. As a political entity, the U.S.S.R. ceased to exist as of December 31, 1991. (DOE3)
United States (U.S.) Territories	Include Samoa, Guam, the Northern Marianas, Puerto Rico and the Virgin Islands. (FHWA2)
United States Code	Contains a consolidation and codification of all general and permanent laws of the U.S. (USCG1)
United States Travel and Tourism Administration (USTTA)	An agency in the Commerce Department; it's principal mission is to implement broad tourism policy initiatives for the development of international travel to the U.S. as a stimulus for economic stability. (USTTA1)

Unlinked Passenger Trips (Transit)	The number of passengers boarding public transportation vehicles. A passenger is counted each time he/she boards a vehicle even if the boarding is part of the same journey from origin to destination.
Unpaved Road Surface	Gravel/soil and unimproved roads and streets (Surface/Pavement Type Codes 20, 30 and 40). (FHWA2)
Urban Highway	Any road or street within the boundaries of an urban area. An urban area is an area including and adjacent to a municipality or urban place with a population of 5,000 or more. The boundaries of urban areas are fixed by state highway departments, subject to the approval of the Federal Highway Administration, for purposes of the Federal-Aid Highway Program.
Urbanized Area	Area that contains a city of 50,000 or more population plus incorporated surrounding areas meeting size or density criteria as defined by the U.S. Census.
Vanpool (Transit)	Public-sponsored commuter service operating under prearranged schedules for previously formed groups of riders in 8- to 18-seat vehicles. Drivers are also commuters who receive little or no compensation besides the free ride.
Vehicle Identification Number (VIN)	A set of about 17 codes, combining letters and numbers, assigned to a vehicle at the factory and inscribed on a small metal label attached to the dashboard and visible through the windshield. The vehicle identification number (VIN) is a unique identifier for the vehicle and therefore is often found on insurance cards, vehicle registrations, vehicle titles, safety or emission certificates, insurance policies, and bills of sale. The coded information in the VIN describes characteristics of the vehicle such as engine size and weight. (DOE4) (DOE5)
Vehicle Miles of Travel (VMT)	The number of miles traveled nationally by vehicles for a period of 1 year. VMT is either calculated using 2 odometer readings or, for vehicles with less than 2 odometer readings, imputed using a regression estimate. (DOE5)
Vehicle-Miles (Highway)	Miles of travel by all types of motor vehicles as determined by the states on the basis of actual traffic counts and established estimating procedures.
Vehicle-Miles (Transit)	The total number of miles traveled by transit vehicles. Commuter rail, heavy rail, and light rail report individual car-miles, rather than train-miles for vehicle-miles.
Visioning	A variety of techniques that can be used to identify goals.
Volatile Organic Compounds (VOCs)	VOCs come from vehicle exhaust, paint thinners, solvents, and other petroleum-based products. A number of exhaust VOCs are also toxic, with the potential to cause cancer.
Waterborne Transportation	Transport of freight and/or people by commercial vessels under U.S. Coast Guard jurisdiction.
Waybill	A document that lists goods and shipping instructions relative to a shipment.

Zone	The smallest geographically designated area for analysis of transportation activity. A zone can be from one to ten square miles in area. Average zone size depends on the total size of study area.