

**EASTERN SHORE METROPOLITAN
PLANNING ORGANIZATION**

2040 LONG RANGE TRANSPORTATION PLAN

**APPENDIX A
PLAN DEVELOPMENT REPORT**

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OVERVIEW

The 2040 LRTP was developed in cooperation and coordination with local, State, and Federal planning partners, as well as the general public. The LRTP process has proceeded with full cooperation and coordination with the Cities of Spanish Fort, Daphne, and Fairhope; the Town of Loxley; Baldwin County; ALDOT; and FHWA. The process has also closely followed applicable Federal regulations and requirements. The development process begins with an inventory of existing conditions and the creation of a base highway network for the planning area. The Process culminates in plan recommendations for all modes of transportation within the constraints of expected future funding for the ESMPO study area. The following sections summarize the activities undertaken in the 2040 LRTP development process.

A.1 - DATA COLLECTION

Due to the complexity and breath of information needed to make informed decisions for the LRTP, data was collected from many sources, including private, local, state, and Federal agencies. A rigorous effort was made to collect the wide range of data needed to establish a valid database for the project base year and to confidently complete the needed analysis for future year projections. It is the base year data and the future year projections that are entered into the travel demand model which provides valuable information to the ESMPO and local citizens. Table A.1 lists the data resources obtained and utilized in completing the 2040 LRTP.

**Table A.1
Data Collection Summary**

Category:	Data Resources:
Plans	<ul style="list-style-type: none"> • City of Fairhope Comprehensive Plan • 2003 City of Daphne Comprehensive Plan • 2010 City of Spanish Fort Comprehensive Plan • 2009 Baldwin County Major Roadway Plan • 2013 Baldwin County Master Plan
Land Use	<ul style="list-style-type: none"> • City of Fairhope Comprehensive Plan • 2003 City of Daphne Comprehensive Plan • 2010 City of Spanish Fort Comprehensive Plan • 2013 Baldwin County Master Plan
Roadway Network	<ul style="list-style-type: none"> • ALDOT Traffic Count Viewer • Baldwin County Traffic Count Shape File • Baldwin County GIS Shape Files • 2009 Baldwin County Major Roadway Plan • ALDOT Updated Roadway Functional Classification Map; June 2013
Socio-Economic Data	<ul style="list-style-type: none"> • 2010 Bicentennial Census • 2007-2011 American Communities Survey 5-Year Data Profiles

Category:	Data Resources:
	<ul style="list-style-type: none"> • 2013 Lee County Businesses (InfoGroup) • ACS 2006-2010 Census Transportation Planning Package (CTPP) Profiles for Member Governments • Baldwin County School Enrollment Data • University of Alabama’s Center for Business and Economic Research
Transit System	<ul style="list-style-type: none"> • Eastern Shore MPO 2014 Transit Plan • 2008 Eastern Shore Chamber of Commerce Public Transportation Plan • 2009 BRATS Transit Study
Bicycle	<ul style="list-style-type: none"> • Bicycle Facility Inventory from Member Governments
Pedestrian	<ul style="list-style-type: none"> • Pedestrian Facility Inventory from Member Governments
Aviation	<ul style="list-style-type: none"> • 2013 H. L. “Sonny” Callahan FAA Airport Master Record
Geographic Information System (GIS) Files	<ul style="list-style-type: none"> • Baldwin County Commission • City of Fairhope • City of Daphne • City of Spanish Fort • City of Robertsdale • Town of Loxley • ESRI • United States Census Bureau • United States Census Tiger Files

A.2 - NEEDS IDENTIFICATION

It is critical to the Long Range Transportation Plan process to accurately identify the needs and deficiencies of an MPO’s transportation network. Citizens, staff from the MPO member governments, and other stakeholders were involved throughout entire developmental process of the LRTP and encouraged to provide feedback. MPO staff used adopted current planning documents to help determine the transportation needs and deficiencies in the ESMPO study area. Compiling and analyzing the collected data from each source produced concurrent data and formed a high level of confidence in the conclusions derived from the data.

A.2.1 - Stakeholder and Public Outreach

The ESMPO has three advisory committees that take part in regional planning processes for the area (the Technical Advisory Committee (TAC), the Citizens Advisory Committee (CAC), and the Bicycle and Pedestrian Advisory Committee (BPAC). All three committees played a role in the LRTP process. The Metropolitan Planning Organization Policy Board provided oversight throughout the entire LRTP process. The Policy Board authorized the formation of an LRTP Technical Subcommittee to review processes such as data collection, socioeconomic data forecasting, travel demand model development and validation, project identification and

selection, and LRTP review and approval. Public information meetings were also held in order to gather comments and input from citizens who live and work within the ESMPO planning area.

A copy of the MPO's most recent Public Participation Plan is available on the MPO website. Appendix B lists the activity and date for each committee meeting and public outreach meeting held and contains documentation and comments from each public meeting held

A.2.2 - Existing Plans Review

Baldwin County Master Plan 2013 (approved October 2013) – The Baldwin County Master plan was adopted to give guidance to elected and appointed officials, staff, and citizens in their efforts to manage growth and development in the county with regards to land uses, zoning, and the development of public improvement and infrastructure. The primary focus areas of the Baldwin County Master Plan include Intergovernmental Relations, Parks and Recreation, and Historic Preservation.

The Master Plan identifies four unique regions within Baldwin County: 1) South Baldwin with its large tourist industry; 2) Central Baldwin which serves as home to a thriving farming community and strong blue and white collar workforce; 3) East Baldwin which is home to nearly half of the county's population and serves as both a bedroom community to Mobile, Alabama, while maintaining a strong sense of self identity; and 4) North Baldwin (including Bay Minette, the county seat) is home to strong manufacturing, timber, and farming industries and continues to aggressively pursue larger manufacturing industries for the Baldwin County megasite along I-65. While the Eastern Shore MPO planning area intersects primarily with the East and Central regions of Baldwin County, the North and South regions have considerable impact on the transportation needs of the Eastern Shore.

City of Spanish Fort Comprehensive Plan 2010-2025 (approved December 2010) – The Spanish Fort Comprehensive Plan sets forth a vision of the kind of place that Spanish Fort's residents, businesses, and institutions would like the city to be in the future. The 15-year Plan provides exhaustive socio-economic data for Spanish fort and addresses key transportation issues facing the City including congestion on U.S. 31 and I-10. The Plan also identifies transportation opportunities for the City including the development of transit services, enhancement of corridors that serve as gateways to the City, enhancement to the local road system to form a more complete distributed network of roads.

Town of Loxley 2030 Comprehensive Plan (approved December 2009) – The Town of Loxley adopted its Comprehensive Plan with a mission to manage and direct growth in Loxley that embraces and enhances the Town's rural nature while maintaining the highest quality of life, attracting quality industry, and preserving and protecting the Town's small family values and heritage. Key concerns raised in the transportation section of the Plan included the increased stress placed on Loxley's road network by local population growth and the need to create better pedestrian access to neighborhoods. The Town of Loxley Comprehensive Plan sets forth eight transportation objectives regarding Loxley's future transportation needs.

City of Fairhope Comprehensive Plan 2005-06 Update (approved January 2007) – The current City of Fairhope Comprehensive Plan was initially adopted in 2000 and subsequently updated in 2005-06. The Fairhope Comprehensive Plan is understandably built around Fairhope’s unique history and community qualities. The plan adopts a village model of land use planning. Though the current Plan focuses primarily on land use it also addresses the transportation network. The Plan lists six objectives for the City transportation network seeking to reinforce the streets and rights-of-way as the most prominent and significant public spaces in the City.

City of Daphne Comprehensive Plan 2000-2020 (approved June 2003) – The City of Daphne Comprehensive Plan sets forth a vision for Daphne to be a safe, healthy, and caring community. The goal of the Plan is to manage and direct the City’s growth, ensure the highest quality of living for each resident, stimulate economic growth, and attract quality industry. The Daphne Comprehensive Plan enumerates seven implementation phases, with phases five through seven focusing to some degree on transportation and transit needs. The Plan includes a section devoted to transportation and notes key issues such as traffic congestion and improving regional access to I-65.

Baldwin County Major Roadway Plan 2000-2020 (Revised April 2009) – The Baldwin County Major Roadway Plan was prepared in 2007 through 2009 to evaluate the existing County roadway network and determine which infrastructure would be needed to accommodate traffic levels over the next twenty years. The Plan identifies twenty-eight recommended county roadway improvements, seven recommended ALDOT improvements, and five recommended future request projects. The projects combined make up the roadway Plan. The County Major Roadway Plan is administered by the Baldwin County Highway Department.

A.2.3 - Planning Environment

In order to create and implement a plan that will address the needs of the ESMPO planning area, an understanding of the planning environment must be established. The planning environment is driven by the socio-economic characteristics of the ESMPO planning area. The City of Spanish Fort, the City of Daphne, the City of Fairhope, the Town of Loxley, and Baldwin County share the same metropolitan planning area, but are different in their socio-economic characteristic and transportation needs.

Baldwin County was first organized into a county in 1809, ten years before Alabama entered the union as a U.S. State. Baldwin County is Alabama’s largest county covering over 1,600 square miles (larger than the State of Rhode Island). As result of Baldwin County’s long and rich history and large geographical size the county is home to a diverse group of citizens and industries. From 1990 to 2012 the population of Baldwin County near doubled (from 98,280 to 190,790). With rapid regional growth the population is expected to continue to climb with estimates suggesting a nearly 56% population increase (190,790 to 298,447) in Baldwin County from 2012 to 2040.

Baldwin County’s anticipated growth stems from robust economic development and the tourism industry within the County itself, as well as new companies such as Airbus establishing new

facilities in neighboring Mobile County. Baldwin County is actively pursuing an occupant or occupants for the megasite in north Baldwin County which will lead to further local growth. The average annual household income for Baldwin County residents is \$67,770 based on 2011 inflation adjusted dollars. The unemployment rate in Baldwin County is around 5.3%.

The County government is headquartered at the county seat in the City of Bay Minette and is governed by a four member county commission with all four members elected by a vote of the entire County. The Commissioners from districts two and three are voting members of the MPO Policy Board. The County Engineer and the Director of the Baldwin Rural Area Transit Authority (BRATS) serve as voting members on the MPO Technical Advisory Committee. Baldwin County also appoints two citizen representatives to the MPO Citizens Advisory Committee and the MPO Bicycle and Pedestrian Advisory Committee.

The **City of Spanish Fort** consists of roughly 27 square miles in Baldwin County, Alabama. It is bound by Mobile Bay and the Mobile-Tensaw River Delta to the west and the cities of Daphne, Loxley, and Bay Minette to the South, East, and North, respectively. Although Spanish Fort is a relatively new city, being incorporated in 1993, it has grown quickly from roughly 1542 acres in 1995 to approximately 17,561 acres in 2010. From 1990 to 2012 the population of Spanish Fort more than doubled (from 3732 to 7330) and with new housing developments the population could potentially increase by nearly 600% in the next ten to fifteen years.

Spanish Fort has grown economically since its incorporation as well. The once small community along I-10 and across the bay from the City of Mobile has developed its own economic base with commercial centers at the Eastern Shore Centre and the Spanish Fort Town Center. The average annual household income for Spanish Fort residents is \$70,355 based on 2011 inflation adjusted dollars. The unemployment rate in Spanish Fort is around 2.2%.

The City of Spanish Fort utilizes a Mayor-Council form of government. Both the Mayor and Council are elected by the people to four year terms. The Mayor is elected citywide, and five council members are elected by Districts. The Mayor sits on the City Council and has an equal vote. The Spanish Fort Mayor is a voting member of the MPO Policy Board. The Chairman of the Spanish Fort Planning Commission is a voting member on the MPO Technical Advisory Committee. The City of Spanish Fort appoints two citizen representatives to the MPO Citizens Advisory Committee and the MPO Bicycle and Pedestrian Advisory Committee.

The **City of Daphne** was incorporated 1927 with a population of 500. Since 1927 the City has continued to grow and develop around the U.S. Highway 98 corridor. Due to the lack of land between Highway 98 and Mobile bay, the City of Daphne does not have a centralized city center. Over the past decade the City has developed in a cylindrical manner with commercial developments dotted along the U.S. Highway 98 corridor and residential developments expanding out from there. Due to the City location directly below I-10 and the City of Spanish Fort, directly above the City of Fairhope, and on Mobile Bay, the majority of future expansion will need to take place on the eastern side of the City.

From 1990 to 2012 the population of Daphne has more than doubled (from 11,290 to 22,845). Because of the City of Daphne's development around U.S. Highway 98, the City commercial

centers service the large population individual from within and without the City who utilize Highway 98 for their daily commute. The average annual household income for Daphne residents is \$80,915 based on 2011 inflation adjusted dollars. The unemployment rate in Daphne is around 3.8%.

The City of Daphne utilizes a Mayor-Council form of government comprised of a full-time Mayor and seven council members elected by districts. The Mayor sits on the City Council and has an equal vote. The Daphne Mayor and Council President are voting members of the MPO Policy Board. The Public Works Director and the Community Development Director are voting members on the MPO Technical Advisory Committee. The City of Daphne appoints four citizen representatives to the MPO Citizens Advisory Committee and the MPO Bicycle and Pedestrian Advisory Committee.

The **City of Fairhope** has been a “planned” community since its inception in 1908. Founded as a Single-Tax Colony by E.B. Gaston, Fairhope was developed as a utopian settlement. Gaston and his followers believed in a concept called “cooperative individualism” and sought to negate the competition of capitalism, while allowing an individual to enjoy the fruits of his or her own labor. Fairhope was founded on the single governing principle that land was common property. Much of Fairhope’s unique history remains intact today, including the Single-Tax Colony which owns approximately 4,400 acres within the City limits. Single-Tax Colony property is leased to homeowners and businesses on long-term, automatically renewing leases.

From 1990 to 2012 the population of Fairhope nearly doubled (from 8,485 to 16,479). Fairhope has developed a national reputation as an ideal community for retirees. The City of Fairhope has a thriving downtown full of shops, small restaurants and condominiums, surrounded by traditional residential dwellings. A strong commercial presence also exists along U.S. Highway 98 in Fairhope with additional residential area extending further east. The average annual household income for Fairhope residents is \$78,686 based on 2011 inflation adjusted dollars. The unemployment rate in Fairhope is around 3.0%.

The City of Fairhope utilizes a Mayor-Council form of government comprised of a full-time Mayor and five council members elected city-wide. The Fairhope Mayor and Council President are voting members of the MPO Policy Board. The Planning and Zoning Director and the Director of Public Works are voting members on the MPO Technical Advisory Committee. The City of Fairhope appoints four citizen representatives to the MPO Citizens Advisory Committee and the MPO Bicycle and Pedestrian Advisory Committee.

The **Town of Loxley** started as a logging camp just south of what is now I-10 and slowly grew into a robust little town. The Town of Loxley was incorporated in March 1957. From 1990 to 2012 the Loxley has experienced moderate growth with a nearly 45% population increase (from 1161 to 1680). As growth in Baldwin County continues to extend east from the Mobile Bay’s eastern shore the town of Loxley is likely to experience strong growth in the years ahead.

Despite its smaller population, the Town of Loxley’s corporate city limits are quite extensive amounting to a land area of approximately 20,400 acres. Only sixteen percent (16%) of this land (or approximately 3,250 acres) is currently developed. The average annual household income for

Loxley residents is \$47,527 based on 2011 inflation-adjusted dollars. The unemployment rate in Loxley is around 5.6%.

The Town of Loxley utilizes a Mayor-Council form of government comprised of a Mayor and five council members elected at large. A Loxley councilmember serves as a voting member of the MPO Policy Board. The Superintendent of Utilities for the Town of Loxley serves as a voting member on the MPO Technical Advisory Committee. The Town of Loxley appoints two citizen representatives to the MPO Citizens Advisory Committee and the MPO Bicycle and Pedestrian Advisory Committee.

The ESMPO planning area includes two additional local government entities beyond those noted above. The **City of Robertsdale** and the **Town of Silverhill** sit side by side toward the outer eastern edge of the planning area. In 2012 the population of Robertsdale was estimated to be 5,547 and the population of Silverhill was estimated to be 729. Robertsdale has experience strong growth in the past ten years (over 45% population increase) and this growth is likely to continue with new businesses such as Wal-Mart planning to build in the city. Silverhill has experience slow but steady growth over the past ten years. Because Robertsdale and Silverhill do not fall within the MPO urban area, they have no voting members on the Policy Board.

Many residents in the MPO planning area work in Mobile even though they live on the Eastern Shore in Baldwin County. From the most distant point in the MPO planning area the commute to downtown Mobile is still less than 45 minutes in normal traffic. For residents of Spanish Fort, Daphne, and Fairhope, the commute is even less. For this reason the Eastern Shore has become an ideal bedroom community for both the white collar and blue collar workforce in and around downtown Mobile.

Year 2010, 2020, and 2040 population densities by Traffic Analysis Zone (TAZ) can be seen in Maps C.1 through C.3 in Appendix D. It is important to observe changes in the population density within an MPO area in order to determine whether or not the current or future roadway network will properly serve the population. A change in an area's population density may show whether new road construction or existing road widening is needed. In addition, population density is an important indicator in determining the feasibility of transit stops that would serve home-based trips.

As of 2010, the greater population densities within the MPO planning area appeared around the Spanish Fort, Daphne, and Fairhope city centers. Between 2010 and 2040, it is estimated that the City of Spanish Fort will experience significant growth, with the City of Daphne and the City of Fairhope also experiencing strong growth. Steady growth is also expected in the Town of Loxley and the unincorporated areas within the MPO Planning Area. Table A.2 provides the projected 2020 and 2040 populations for the local governments within the Planning Area.

**Table A.2
Data Collection Summary**

	2010 Population:	2020 Population:	2040 Population:
Spanish Fort:	7,071	11,927	29,262
Daphne:	21,868	26,500	35,196
Fairhope:	16,303	20,292	25,715
Loxley:	1,620	3,805	13,293
Robertsdale:	5,310	6,515	7,041
Baldwin County:	46,006	49,272	51,898
Misc. Increase:	N/A	363	1,089
TOTAL:	98,178	118,673	163,494

Existing and future employment densities are also essential in understanding where home base-work trips will be attracted to as well as trips to shops, schools, and manufacturing/industrial sites. Year 2010, 2020, and 2040 employment densities are shown in Maps C.4 through C.6 in Appendix D. As one would expect, in 2010, the areas of higher employment density were along US 98 in Fairhope, Daphne, and Spanish Fort; US 31 through Spanish Fort; and SR 181 in Spanish Fort and Daphne. In 2040, employment density follows the population trends with significant increases in Spanish Fort and strong increases in Daphne and Fairhope.

A.2.4 – Title VI and Environment Justice

Title VI as Part of the Planning Process

Title VI of the Civil Rights Act of 1964 ensures that no person is excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving federal financial assistance on the basis of race, color, national origin, age, sex, disability, or religion. The planning process is open to all members of the public. MPO staff work diligently to provide information about MPO planning activities to all interested parties.

Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was signed by President Clinton in 1994. It required that programs, policies, and activities affecting human health or the environment identify and avoid disproportionately high and adverse effects on minority and low-income populations. The intent was to ensure that no racial, ethnic, or socioeconomic group bears a disproportionate share of negative environmental consequences, including social and economic effects, throughout the planning process or during transportation project development. The MPO will ensure the full and fair participation by all potentially affected communities and prevent the denial of, reduction in, or significant delay in the receipt of benefits of transportation system improvements by minority and low-income populations.

The MPO evaluates residential, employment, and transportation patterns of low-income and minority populations, to the extent possible, using census information and socioeconomic data from reliable and available sources. The MPO interacts with community leaders representing

low-income and minority populations and groups by consulting with the Public Housing Authority, the Area Agency on Aging, local churches, and other agencies. The MPO encourage s the media, including TV, radio, and print, to disseminate information about transportation planning projects and activities. The MPO holds public meetings in locations and at times that are comfortable, familiar, and convenient.

Environmental Justice

Title VI, Executive Order 12898 and Section 450 of the Code of Federal regulations established environmental justice guidelines and regulations. The ESMPO is tasked with the responsibility to ensure that minority and low-income citizens in the MPO area are offered reasonable and fair opportunities to be involved in the metropolitan transportation planning process.

It is also the goal of the ESMPO to provide all citizens and other interested parties with reasonable and fair opportunities to be involved in the LRTP development process. Consideration of environmental justice communities is required during the project development and selection screening process since any project funded with Federal sources must comply with the environmental justice guidelines and regulations. Sponsors of the proposed 2040 LRTP projects stated that they were not aware of any environmental justice issues for their projects at this point in the development of their projects, or if issues were identified, explained how those issues were addressed. ESMPO staff have identified low-income and minority population areas within the MPO planning area and have posted flyers advertising the public information meetings that have been held for the 2040 LRTP Update process. Map B.1 in Appendix D shows the percent of the population below the poverty level by census tract. Map B.2 in Appendix D shows the percent of the population using food stamps by census tract. Map B.3 in Appendix D shows the unemployment rate by census tract. Map B.4 in Appendix D shows the percent minority by census block group. Map B.5 in Appendix D shows the percent minority by census block. The ESMPO will continue to identify low-income and minority population areas as updated Census data becomes available.

Limited English Proficiency (LEP)

As required by Title VI of the Civil Rights Act of 1964, Executive Order 13166, and FTA Circular FTA C 4702.1B, October 2012, the MPO has completed a Four Factor Analysis of the Eastern Shore Metropolitan Planning Area to determine requirements for compliance with the Limited English Proficiency (LEP) provisions. Based on the analysis, the MPO has identified a population within the MPA that may require MPO assistance in participating in the planning process.

According to the US Census Bureau's American Communities Survey, 2007-2011, 904 LEP persons (who speak Spanish) reside within the census tracts that intersect the Metropolitan Planning Area. (See ESMPO LAP Plan). Though more specific data does not exist, the likely number of LEP Spanish speaking persons actually residing within the MPA is estimated to be around 600. According to the same American Communities Survey, all other language groups with LEP persons are estimated at 500 or lower. The MPO is in the process of developing an LAP Plan to address the needs of Spanish speaking person residing within the MPA.

Rehabilitation Act of 1973, Section 504

Section 504 of the Rehabilitation Act prohibits discrimination based on disability in Federally assisted programs. No individual will be excluded from, denied the benefits of, or be discriminated against under any program receiving Federal funds. The Eastern Shore MPO will encourage participation from those with disabilities and will accommodate the needs of those with disabilities in order to allow participation throughout the planning process.

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) relates to civil rights and was signed into law in 1990. The ADA prohibits discrimination based solely on disability. It provides protections against discrimination similar to the Civil Rights Act of 1964, which is based on race, religion, sex, national origin, and other characteristics. ADA essentially defines disability as a physical or mental impairment that limits life activity. The ADA encourages the participation of people with disabilities in the development of transportation and paratransit plans and services. The Eastern Shore MPO will accommodate those with mobility limitations or other impairments in all aspects of the planning process.

All Title VI programs, processes, and Acts are included in the 2013 Eastern Shore Public Participation Plan located on the Eastern Shore MPO Website at <http://easternshorempo.org>. For further information regarding this Section, please view the 2013 PPP or contact an MPO staff person shown on page i of this document.

A.2.5 - Environmental Mitigation

Assessing the positive and negative impacts on environmentally sensitive areas and on environmental justice communities at the planning level is less quantifiable than other measures of effectiveness; instead the focus is on screening projects for potential impacts. MAP-21 requires State transportation agencies to consult with other agencies in order to eliminate or minimize conflicts with activities that could impact or be impacted by transportation. Furthermore, transportation decision makers must take into account the potential environmental impacts associated with a transportation plan or plan update, in order to mitigate those impacts.

Mitigation, as defined by the National Environmental Policy Act (NEPA), is a three-level concept. The first level is avoidance. For transportation agencies, this could be as simple as choosing an alternative that avoids a sensitive resource, such as an historic site or a wetlands area.

The second level is minimization, which means that if avoidance is not possible, then the transportation agency takes action to minimize impact to the sensitive resource. For example, spanning a stream or wetlands area would have considerably less impact than re-channeling the stream or filling the wetlands.

The third level is mitigation, which means impact to a resource can't be avoided. Examples here include recordation of a historic structure that must be demolished and compensation for filled wetlands by debits from a wetlands "bank."

A.2.6 – Extreme Weather Vulnerability

FHWA has determined that extreme weather vulnerability and climate issues should be integrated into transportation planning at the state, regional and local levels and that appropriate steps should be initiated to train MPO staff regarding analyzing the impacts of climate and extreme weather on transportation infrastructure.¹

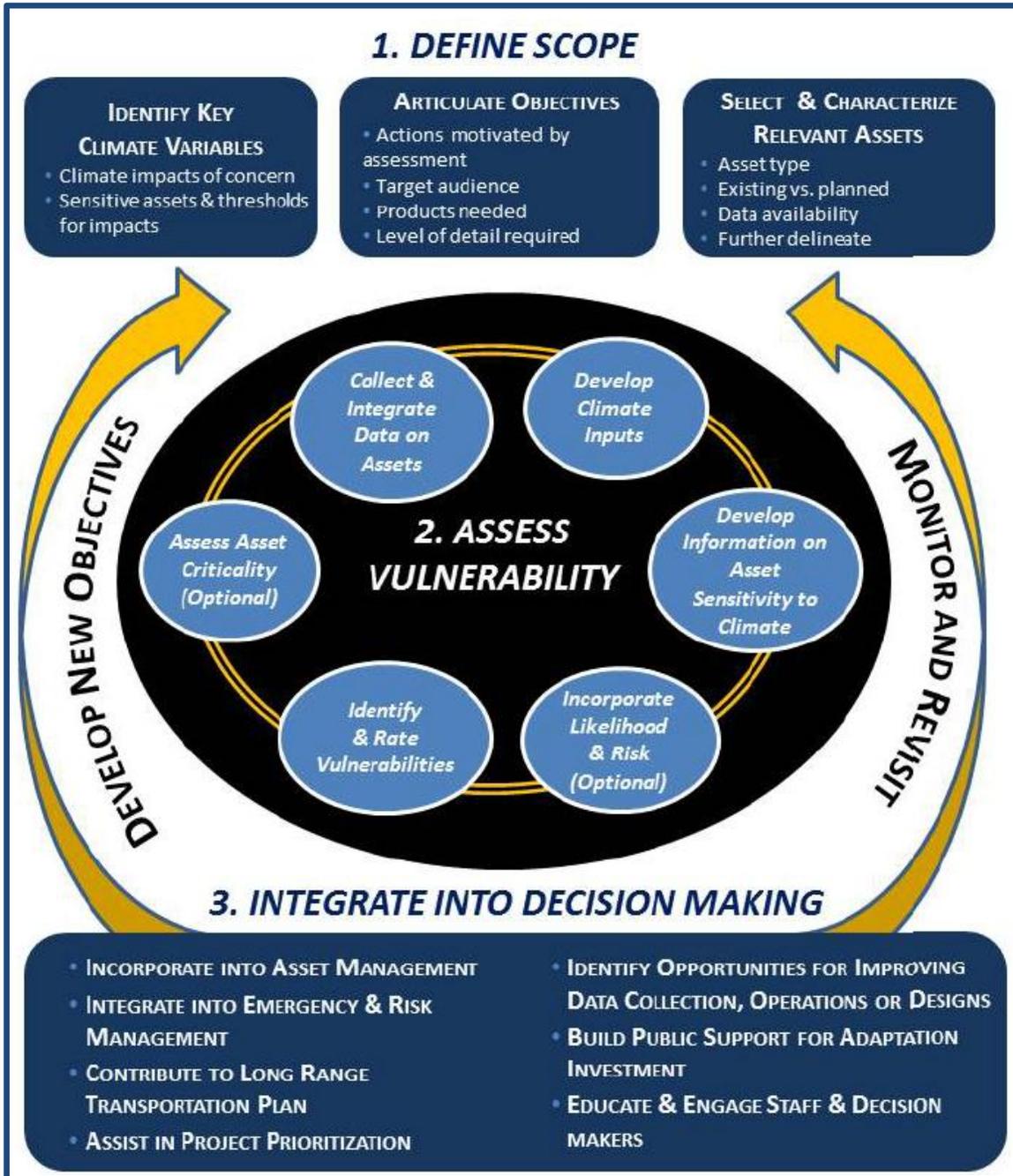
The vulnerability assessment framework developed by FHWA consists of three primary components, as shown in Figure A.2 below:

1. Defining objectives and scope.
2. Assessing vulnerability.
3. Integrating vulnerability into decision-making.

Figure A.6
FHWA Extreme Weather and Climate Vulnerability Assessment Framework
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¹ FHWA Publication No: FHWA-HEP-13-005; Climate Change & Extreme Weather Vulnerability Assessment Framework

Figure A.6
FHWA Extreme Weather and Climate Vulnerability Assessment Framework



MPO staff will undergo training to become better familiar with the Vulnerability Assessment Framework and will determine the appropriate steps to perform and assessment of transportation assets with the Metropolitan Planning Area.

A.2.7 - Technical Analysis Tools

Two technical analysis tools were used to perform the required analysis to complete the 2040 LRTP. The first is spatial analysis and the second is travel demand modeling. Spatial analysis was conducted utilizing Geographic Information System (GIS) mapping through software produced by ESRI known as ArcGIS. MPO staff utilized ArcGIS to map all existing and future forecasted socio-economic data. ArcGIS is a powerful tool that can be used to map socio-economic data and other demographic data and visualize the trends and characteristics in the ESMPO study area.

The travel demand model was developed for the base year of 2010 for the purposes of the 2040 LRTP. The Model Development Report in Appendix C goes into great detail regarding Model Development process, including the collection of socioeconomic data. The base year 2010 travel demand model network includes 796 centerline miles of roadway (6% interstate, 45% arterials, and 49% collectors). The Cube Voyager travel demand model uses a three step process to load vehicle trips generated by existing (year 2010) and future (year 2020 and 2040) socioeconomic data onto the roadway network. The following general steps were performed during the travel demand modeling process:

- Base year roadway network was created for year 2010 utilizing aerial photography, GIS shapefiles, and functional classification maps from ALDOT.
- Year 2010 socio-economic data was loaded into the travel demand model to produce a working base year 2010 travel demand model network. The 2010 model was then validated to ensure that it was satisfactorily replicating existing travel patterns.
- Committed roadway projects were added to the base year 2010 network to create the Existing Plus Committed (E+C) network. Trips generated by the projected 2020 and 2040 socio-economic data were loaded onto the E+C network to obtain a 2020 and 2040 E+C network.
- Proposed LRTP projects were added to the E+C network to create a preliminary Build network. Trips generated by the projected 2020 and 2040 socio-economic data were loaded onto the Build network to obtain a preliminary 2020 and 2040 build network.
- Based on the performance of the proposed projects, input from citizens and the local governments, and based on the financial constraint analysis, a final set of LRTP projects was identified and a final build network was modeled.

The travel demand model requires that the socio-economic data be divided into traffic analysis zones (TAZ). This allows the travel demand model to accurately replicate traffic volumes by loading vehicle trips onto the roadway network based on trip attractors (employment centers) and trip generators (residential homes) for each TAZ. The ESMPO study area is divided into 277 individual TAZs and each has their own set of socio-economic data.

To ensure that a reliable travel demand model was developed for the purposes of the 2040 LRTP process, the LRTP Technical Subcommittee reviewed a series of technical updates that focused on the collection and forecasting of the base year 2010 and future year 2020 and 2040 socio-economic data, the roadway network update process, and the travel demand model development and validation process. The technical updates were combined into a single final Model

Development Report found in Appendix C. From this review, the subcommittee concluded that the socioeconomic data and travel demand model developed for the 2040 LRTP was accurate, reliable, and ready for implementation into the LRTP process.

A.3 - PLAN DEVELOPMENT

The 2040 LRTP project lists were developed in order to improve the ESMPO study area's transportation network by helping address the transportation system's existing and future needs and problems. After reviewing the measures of effectiveness from the 2020 and 2040 E+C models, potential project lists were provided from the MPO Advisory Committees and Policy Board to be modeled into the final 2020 and 2040 build models

Projects identified through the LRTP process will be programmed into the FY 2016-2019 Transportation Improvement Program (TIP). Each project obtained by the MPO was placed into the year 2020 travel demand model and then sorted to help each stakeholder prioritize the need for each project. From this sorted list, each stakeholder reviewed the estimated cost for each project and created a list of projects to fit into the Financially Constrained list. Viable projects that did not make it into the Financially Constrained list of projects were placed in the Visionary List of projects to be considered in the next LRTP update.

A.4 - PLAN APPROVAL

Following a review by ALDOT and FHWA, the Draft 2040 LRTP was published to the public for comment in February and March of 2015. Comments were incorporated into the Draft Plan as appropriate. The Advisory Committees and MPO Policy Board approved the Draft LRTP at the April MPO meetings. The Plan was again published for public comment in May and June. Comments were once again incorporated into the Plan as appropriate. The Final LRTP was approved by the Advisory Committees and Policy Board at the July MPO meetings.