

4 Affected Environment, Environmental Consequences, and Mitigation

4.5 Socioeconomics

4.5.1 Introduction

This section provides a socioeconomic profile of the local and regional project areas and assesses the socioeconomic impacts of the No Build Alternative and the Build Alternative. **Appendix 4.5, Socioeconomics Technical Report**, supplements this section.

4.5.1.1 Regulatory Context

The Massachusetts Department of Transportation (MassDOT) prepared this socioeconomic assessment in accordance with Federal Highway Administration Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*.

4.5.1.2 Methodology and Study Area

This assessment addresses existing socioeconomic conditions, including population, households, housing, employment, and real estate, as well as projections of population growth. Sources include the following:

- U.S. Census Bureau American Community Survey 5-year estimates
- Massachusetts Executive Office of Labor and Workforce Development
- U.S. Department of Commerce
- UMass Donahue Institute population, household, and employment projections
- Proprietary data sources: CoStar *Property Information Systems* and Claritas *Site Reports*

The assessment of impacts for the Build Alternative included traffic data and analyses provided by the following:

- TREDIS transportation impact model for assessing the regional economic effects of the Build Alternative compared to the No Build Alternative in 2050
- Construction cost data provided by MassDOT
- R/ECON input-output model for assessing the economic and tax effects of construction expenditures on the economy of Massachusetts

For the No Build Alternative, analysis includes review of interviews and reports prepared by the following:

- Cape Cod Commission
- Senators Elizabeth Warren and Ed Markey and Representative Bill Keating, Cape Cod Bridges Replacement: An Urgent Need, October 2023

The analysis examines data for 10 geographic areas (where data are available):

- Census Tracts: [137](#), [138](#), and [139](#) in the town of Bourne
- Towns: Bourne, Plymouth, and Sandwich
- Counties: Barnstable, Dukes, and Nantucket
- State: Massachusetts

[The Study Area is comprised of Census Tracts 137, 138, and 139, as illustrated in Figure 4.5-1, along with the refined Project Limits.](#)

4.5.2 Affected Environment

4.5.2.1 Population

Table 4.5-1 presents population changes across each geographic area between 2010 and 2022. Most areas experienced population growth during this period. Dukes County (27%) and Nantucket County (nearly 40%) experienced the greatest increases. The population in the town of Sandwich declined while the other areas increased.

Table 4.5-1 Population, 2010 and 2022

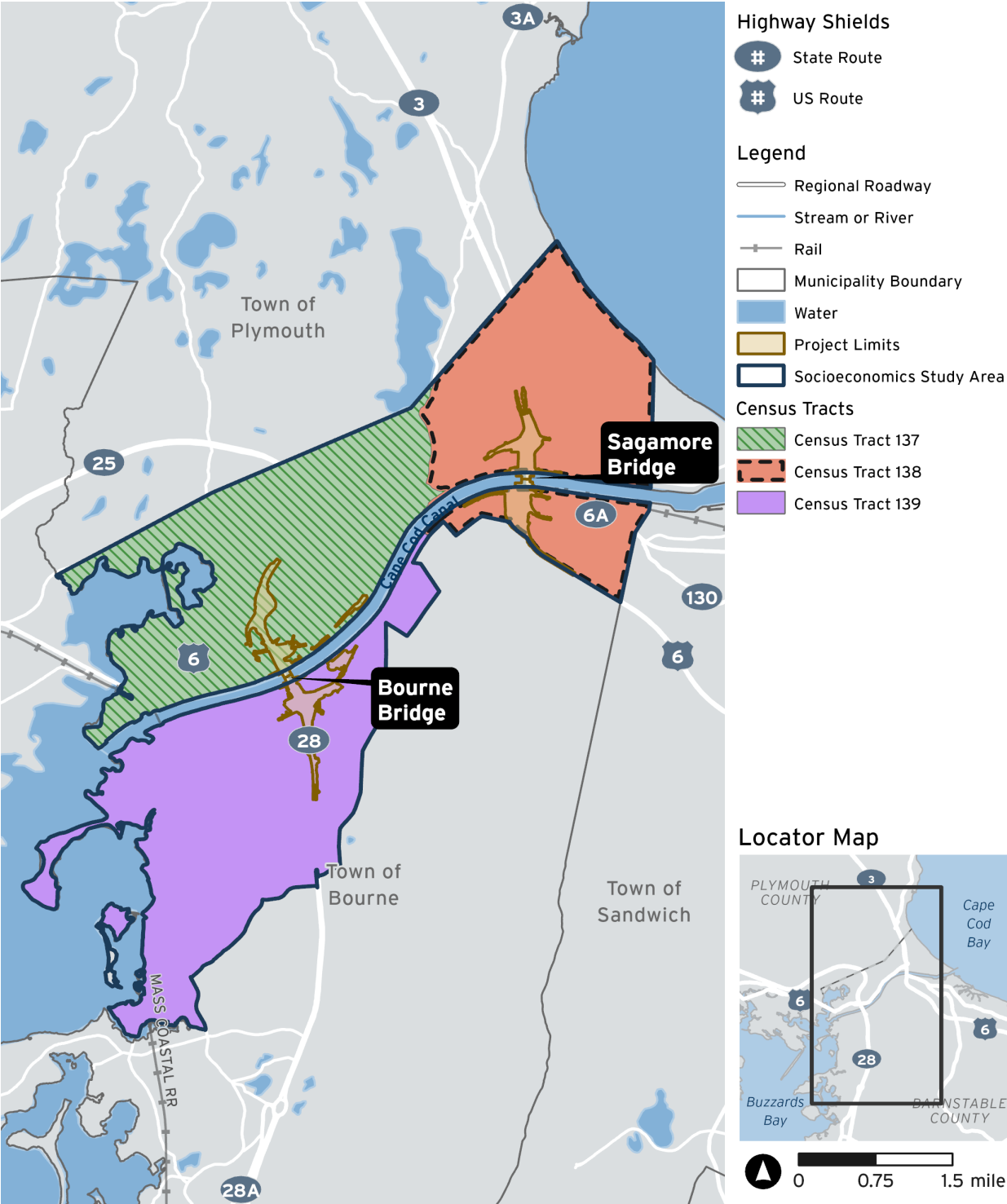
Geographic Area	2010	2022	Percentage Change
Census Tract 137 (Bourne)	4,865	4,285	-11.9%
Census Tract 138 (Bourne)	4,968	5,504	10.8%
Census Tract 139 (Bourne)	4,497	5,046	12.2%
Town of Bourne	19,577	20,455	4.5%
Town of Plymouth	55,606	61,628	10.8%
Town of Sandwich	20,628	20,419	-1.0%
Barnstable County	217,483	229,436	5.5%
Dukes County	16,155	20,543	27.2%
Nantucket County	10,069	14,065	39.7%
Massachusetts	6,477,096	6,984,205	7.8%

Source: American Community Survey 5-year estimates 2006-2010 and 2018-2022, Table DP05

4.5.2.2 Population Projections

The town of Plymouth and Dukes County are expected to experience overall population growth, with increases of 14.3% and 14.2%, respectively ([Table 4.5-2](#)), between 2019 and 2050. Nantucket County shows moderate growth initially, but by 2050 it is projected to decline by 12.8% from 2040 levels. In contrast, Barnstable County exhibits the steepest overall decline, with a projected 17.4% population decrease by 2050.

Figure 4.5-1. Socioeconomics Study Area



Source: Massachusetts Department of Transportation, [2025](#)

Table 4.5-2. Population Projections, 2019-2050

Geographic Area	2019	2030	2040	2050	Change (2019-2050)	Change (2030-2050)	Change (2040-2050)
Town of Bourne	19,762	18,032	21,352	18,916	-4.3%	4.9%	-11.4%
Town of Plymouth	61,528	71,487	64,342	70,312	14.3%	-1.6%	9.3%
Town of Sandwich	20,169	19,387	21,412	19,893	-1.4%	2.6%	-7.1%
Barnstable County	212,990	216,048	190,000	176,007	-17.4%	-18.5%	-7.4%
Dukes County	17,332	20,923	19,975	19,793	14.2%	-5.4%	-0.9%
Nantucket County	11,399	15,873	14,000	12,212	7.1%	-23.1%	-12.8%

Source: Estimates are from UMass Donahue Institute V2024 Population Projections, May 2024. Data for census tracts are not available.

4.5.2.3 Households

Household growth trends diverged between 2010 and 2022. The census tracts and towns have experienced growth in the number of households, with some areas seeing increases of nearly 20%. The counties and the Commonwealth of Massachusetts have shown more moderate growth, with only marginal changes in household numbers in certain areas ([Table 4.5-3](#)).

Table 4.5-3. Change in Number of Households and Household Size, 2010 and 2022

Geographic Area	Total Households (2010)	Total Households (2022)	Change (2010-2022)	Average Household Size (2010)	Average Household Size (2022)
Census Tract 137 (Bourne)	1,587	1,916	20.7%	2.11	2.09
Census Tract 138 (Bourne)	1,879	2,217	18.0%	2.64	2.47
Census Tract 139 (Bourne)	1,943	2,314	19.1%	2.31	2.18
Town of Bourne	7,730	8,715	12.7%	2.34	2.30
Town of Plymouth	21,177	25,217	19.1%	2.52	2.38
Town of Sandwich	7,635	7,977	4.5%	2.66	2.54
Barnstable County	98,164	99,969	1.8%	2.17	2.27
Dukes County	5,530	6,899	26.2%	2.92	2.94
Nantucket County	3,623	4,659	28.6%	2.58	2.96
Massachusetts	2,512,552	2,740,995	9.1%	2.48	2.46

Source: American Community Survey 5-year estimates 2006-2010 and 2018-2022, Table DP02.

The data show variations in household size across Massachusetts, with Barnstable County having the smallest average household size. Conversely, Nantucket and Dukes Counties have the largest average household size.

Household Projections

The variations in household size can significantly influence household projection data by shaping assumptions about future population growth, housing needs, and demographic shifts. Regions with smaller household sizes, like Barnstable County, may see slower household growth despite stable or declining populations, leading to increased demand for single-occupancy units or senior housing. Conversely, areas with larger household sizes, such as Nantucket and Dukes Counties, may experience faster household growth tied to younger or expanding populations. However, Dukes and Nantucket Counties have highly seasonal economies, so their current higher household sizes might not reflect long-term trends.

The household projection data from 2019 to 2050 vary across the study area. Dukes County and the town of Plymouth are projected to increase by 38.3% and 29.7%, respectively. Nantucket County is also projected to grow initially, but then decline, leading to an overall 28.7% increase by 2050. In contrast, Barnstable County and the town of Bourne are projected to experience declines, with Barnstable County losing 12.7% of households and the town of Bourne decreasing by 4.8%. The town of Sandwich is projected to see growth of 4.4% ([Table 4.5-4](#)).

Table 4.5-4. Number of Households, Projections 2019-2050

Geography	2019	2030	2040	2050	Change (2019-2050)	Change (2030-2050)	Change (2040-2050)
Town of Bourne	8,611	8,289	8,960	8,200	-4.8%	-1.1%	-8.5%
Town of Plymouth	23,345	28,869	28,465	30,283	29.7%	4.9%	6.4%
Town of Sandwich	7,818	7,991	8,232	8,159	4.4%	2.1%	-0.9%
Barnstable County	94,323	100,263	86,173	82,313	-12.7%	-17.9%	-4.5%
Dukes County	6,765	9,085	9,170	9,359	38.3%	3.0%	2.1%
Nantucket County	3,713	6,026	5,875	4,780	28.7%	-20.7%	-18.6%

Source: Estimates are from UMass Donahue Institute Population, Household, and Employment Projections 2010 – 2050, Statewide Model Run 97, July 2023.

Median Household Income

Median household incomes vary across geographic areas ([Table 4.5-5](#)). Nantucket County stands out with the highest median income, followed by the towns of Sandwich and Plymouth. In contrast, Dukes County and Census Tract 139 have the lowest median income, falling below \$80,000, while Massachusetts has a median income of just under \$100,000.

Between 2010 and 2022, Census Tract 137 and Nantucket County saw the largest percentage increases in nominal incomes. Barnstable County and Massachusetts also experienced substantial growth, with

nominal increases of around 50%. In comparison, Dukes County and Census Tract 139 saw the smallest nominal changes, with increases of 24.0% and 21.7%, respectively ([Table 4.5-5](#)).

Table 4.5-5. Median Household Income, 2010-2022

Geographic Area	Median Household Income (2010\$)	Median Household Income (2022\$)	Percentage Change
Census Tract 137 (Bourne)	\$53,274	\$88,370	65.9%
Census Tract 138 (Bourne)	\$68,597	\$100,152	46.0%
Census Tract 139 (Bourne)	\$70,197	\$85,429	21.7%
Town of Bourne	\$61,418	\$90,640	47.6%
Town of Plymouth	\$74,767	\$107,067	43.2%
Town of Sandwich	\$83,325	\$121,038	45.3%
Barnstable County	\$60,317	\$90,447	50.0%
Dukes County	\$62,407	\$77,392	24.0%
Nantucket County	\$83,347	\$135,590	62.7%
Massachusetts	\$64,509	\$96,505	49.6%

Source: American Community Survey 5-year estimates 2006-2010 and 2018-2022, Table DP03.

4.5.2.4 Housing

[Table 4.5-6](#) indicates increases in the number of occupied housing units across all regions from 2010 to 2022. The town of Plymouth experienced the largest rise (adding more than 4,000 housing units) followed by Barnstable County (1,805 additional units). Nantucket and Dukes Counties also saw notable increases in occupied housing. Nantucket and Dukes Counties also show the highest growth rates, at 28.6% and 24.8%, respectively. The towns of Plymouth and Bourne also experienced growth, nearing 20% and 13%, respectively. Barnstable County and the town of Sandwich showed smaller increases.

Owner Versus Renter-Occupied Housing Units

Owner-occupied housing dominates in most areas, particularly in the town of Sandwich and Barnstable County, where over 80% of housing units are owner-occupied. Nantucket County and Dukes County have higher proportions of renter-occupied units, yet most areas show a clear preference for homeownership when compared to the statewide average ([Table 4.5-7](#)).

Table 4.5-6. Occupied Housing Units, 2010-2022

Geographic Area	Occupied Housing Units (2010)	Occupied Housing Units (2022)	Absolute Change	Percentage Change
Census Tract 137 (Bourne)	1,587	1,916	329	20.7%
Census Tract 138 (Bourne)	1,879	2,217	338	18.0%
Census Tract 139 (Bourne)	1,943	2,314	371	19.1%
Town of Bourne	7,730	8,715	985	12.7%
Town of Plymouth	21,177	25,217	4,040	19.1%
Town of Sandwich	7,635	7,977	342	4.5%
Barnstable County	98,164	99,969	1,805	1.8%
Dukes County	5,530	6,899	1,369	24.8%
Nantucket County	3,623	4,659	1,036	28.6%
Massachusetts	2,512,552	2,740,995	228,443	9.1%

Source: American Community Survey 5-year estimates 2006-2010 and 2018-2022, Table DP04.

Table 4.5-7. Owner-Versus Renter-Occupied Housing Units, 2022

Geographic Area	Owner-Occupied Housing Units (percentage)	Renter-Occupied Housing Units (percentage)
Census Tract 137 (Bourne)	73.8%	26.2%
Census Tract 138 (Bourne)	79.8%	20.2%
Census Tract 139 (Bourne)	81.5%	18.5%
Town of Bourne	76.5%	23.5%
Town of Plymouth	79.7%	20.3%
Town of Sandwich	88.9%	11.1%
Barnstable County	81.4%	18.6%
Dukes County	76.6%	23.4%
Nantucket County	71.1%	28.9%
Massachusetts	62.4%	37.6%

Source: American Community Survey 5-year estimates 2006-2010 and 2018-2022, Table DP04.

Median Home Value

Most areas experienced a substantial increase in median home values from 2010 to 2020. In Dukes County, median home values surged by 154.2%, far exceeding other regions. Nantucket County, while already having the highest median home values, saw a more moderate increase of 26.6%, but still maintained the highest absolute home values ([Table 4.5-8](#)).

Table 4.5-8. Median Home Value, 2010-2022

Geographic Area	Median Home Value (2010\$)	Median Home Value (2022\$)	Percentage Change
Census Tract 137 (Bourne)	\$306,300	\$441,600	44.2%
Census Tract 138 (Bourne)	\$373,800	\$488,300	30.6%
Census Tract 139 (Bourne)	\$370,900	\$473,900	27.8%
Town of Bourne	\$364,000	\$482,600	32.6%
Town of Plymouth	\$354,500	\$461,500	30.2%
Town of Sandwich	\$381,200	\$482,300	26.5%
Barnstable County	\$392,700	\$519,100	32.2%
Dukes County	\$392,700	\$998,100	154.2%
Nantucket County	\$1,000,000	\$1,265,600	26.6%
Massachusetts	\$352,300	\$483,900	37.4%

Source: American Community Survey 5-year estimates 2006-2010 and 2018-2022, Table DP04. Year Structure Built

4.5.2.5 Employment

Total Employment and Business Characteristics

From 2010 to 2022, employment increased across all listed areas, with Nantucket County experiencing the highest percentage growth at 39.6% (2,259 jobs). Other notable increases include the town of Sandwich (16.9%) and Dukes County (16.1%). The town of Plymouth saw the largest absolute growth among the towns, adding 3,297 jobs (14.5%), while Barnstable County added 6,076 jobs (6.9%). Massachusetts experienced a 14.1% increase in employment, with 444,943 new jobs ([Table 4.5-9](#)).

[Table 4.5-10](#) shows projected employment for each of the towns and counties (latest projection data available). All geographies except the town of Plymouth are projected to lose jobs by 2050. The projected employment decline in most areas likely reflects an aging population, with retirees leaving the workforce and fewer young workers replacing them. Seasonal economies in Dukes and Nantucket Counties further limit year-round job opportunities, while outmigration of younger residents and shifts in local industries contribute to shrinking employment. The town of Plymouth's modest growth may result from its more diversified economy and proximity to employment hubs.

A decline in employment could reduce the number of vehicle trips and average miles traveled as fewer workers commute to jobs, especially in areas with aging populations or seasonal economies. Outmigration of younger workers may further decrease travel demand, while retirees and remaining residents might generate fewer daily trips due to reduced work-related travel. Conversely, areas like the town of Plymouth, with modest employment growth, could see stable or slightly increased vehicle trips and miles traveled. However, the effect on Cape Cod bridge traffic might be limited, as the town of Plymouth is located off Cape Cod.

Table 4.5-9. Employment, 2010 and 2022

Geographic Area	2010	2022	Absolute Change (2010-2022)	Percentage Change (2010-2022)
Town of Bourne	7,273	8,101	828	11.4%
Town of Plymouth	22,779	26,076	3,297	14.5%
Town of Sandwich	5,291	6,185	894	16.9%
Barnstable County	88,699	94,775	6,076	6.9%
Dukes County	7,735	8,981	1,246	16.1%
Nantucket County	5,704	7,963	2,259	39.6%
Massachusetts	3,151,206	3,596,149	444,943	14.1%

Source: Massachusetts Executive Office of Labor and Workforce Development, ES202 dataset. Data for census tracts are not available.

Table 4.5-10. Projected Total Employment, 2019-2050

Geographic Area	2019	2030	2050	Change (2019-2050)	Percentage Change (2019-2050)
Town of Bourne	8,350	7,236	6,183	-2,167	-26.0%
Town of Plymouth	26,627	27,764	27,247	620	2.3%
Town of Sandwich	6,159	5,885	4,312	-1,847	-30.0%
Barnstable County	97,672	90,863	75,299	-22,373	-22.9%
Dukes County	9,069	7,330	8,362	-707	-7.8%
Nantucket County	7,789	7,085	6,212	-1,577	-20.3%

Source: UMass Donahue Institute and Massachusetts Department of Transportation, Planning, 2024

Average Annual Wage

While most areas fall below the state’s wage level, particularly the towns of Plymouth and Sandwich, the gap has narrowed. The state’s 2022 average wage still stands higher than all the Study Areas. In terms of nominal wage growth, all regions have experienced increases from 2010 to 2022, with Dukes County showing the most increase, more than doubling its average wage over this period. Similarly, the town of Bourne, Barnstable County, and Nantucket County have also posted gains, with nominal growth rates close to or exceeding 100% (Table 4.5-11).

Table 4.5-11. Annual Average Nominal Wages, 2010 and 2022

Geographic Area	Average Wage (2010\$)	Average Wage (2022\$)	Percentage Change (2010-2022)
Town of Bourne	\$41,080	\$63,648	54.9%
Town of Plymouth	\$43,056	\$58,708	36.4%
Town of Sandwich	\$38,844	\$54,028	39.1%
Barnstable County	\$39,156	\$57,980	48.1%
Dukes County	\$41,912	\$66,716	59.2%
Nantucket County	\$45,552	\$75,296	65.3%
Massachusetts	\$57,824	\$89,804	55.3%

Source: Massachusetts Executive Office of Labor and Workforce Development, ES202 dataset. Data are not inflation adjusted. Data for census tracts are not available.

4.5.2.6 Real Estate

Existing conditions and historical trends in the inventory, occupancy, vacancies, and lease prices for commercial real estate in Barnstable County reveal a market that has seen little growth in the supply or occupancy of retail and office space over the past 18 years (2006-2024) (Table 4.5-12). Lease prices have been flat except for industrial space. Only industrial space (primarily warehouse) is projected to grow on an average annual basis greater than the historical average and to have high enough lease prices to support modest additional development.

Table 4.5-12. Existing (2024) Conditions and Historical Growth in Commercial Real Estate in Barnstable County

Category	Inventory (square feet) (2024)	Average Annual Supply Growth (square feet) (2006-2024)	Occupancy (square feet) (2024)	Average Annual Occupancy Growth (square feet) (2006-2024)
Retail	16,000,000	14,000	15,700,000	7,000
Office	5,900,000	20,000	5,733,000	15,000
Industrial	5,000,000	26,000	4,800,000	26,000

Source: CoStar Property Information Systems, 2024

4.5.3 No Build Alternative

The primary source of information for the analysis of the No Build Alternative is a report prepared by Senator Elizabeth Warren, Senator Ed Markey, and Representative Bill Keating, together representing the Congressional Delegation for Cape Cod, Martha's Vineyard, and Nantucket.¹ The senators and representatives sent 36 “letters of inquiry” to stakeholders on July 21, 2023, including state elected officials, local elected officials, Tribal leaders, and community organizations. The letters asked respondents about the following:

- Impacts on communities of the state of disrepair of the bridges to date—including economic impacts to tourism, local workers, businesses, families, and community members—and impacts to supply chains and the availability and accessibility of goods
- The potential future impacts if the bridges continue to deteriorate
- The benefits of replacing the bridges, including the job creation and economic benefits of the Cape Cod Bridges Program (Program)

Of the 36 letters sent, the following entities responded:

- Cape Cod Region Chamber of Commerce
- Cape Cod Chamber of Commerce
- Town of Bourne
- Town of Oak Bluffs
- Town of Provincetown
- Town of Sandwich
- Association to Preserve Cape Cod
- Cape Cod Commission
- State Senator Julian Cyr
- State Senator Susan Moran
- Barnstable County Board of Regional Commissioners

For those who replied, the replacement of the bridges is of paramount importance to their constituents and members. The commonality of congestion-related issues, across towns and across agencies and institutions, strongly supports the fundamental arguments that underpin the report.

The following findings and observations explain how repeated lane closures required for the No Build Alternative would continue (as they have in the past) to affect Cape Cod communities:

- Sagamore Bridge and Bourne Bridge are of “significant” importance to businesses and workers, including as the daily conduit of 31,000 jobs filled by workers residing on Cape Cod who work off Cape Cod and 21,000 jobs on Cape Cod held by off-Cape residents. Delays affect worker

¹ Senators Elizabeth Warren and Ed Markey and Representative Bill Keating. 2023. [Cape Cod Bridges: An Urgent Need](https://www.warren.senate.gov/imo/media/doc/Final%20Cape%20Cod%20Bridges%20Report.pdf). October. <https://www.warren.senate.gov/imo/media/doc/Final%20Cape%20Cod%20Bridges%20Report.pdf>

productivity and the ability of local businesses to attract workers, as well as freight costs on and off Cape Cod. Additional freight costs affect the price of goods on Cape Cod as well as the ability of local firms to serve off-Cape markets. The prospect of ongoing delays during maintenance required for the No Build Alternative, as well as the unpredictability of the magnitude of lane closures and delays, would constrain the prospects of new business developing on Cape Cod.

- Possible future delays and bridge closures could affect tourism. A report for the Cape Cod Commission² posited the following scenarios:
 - A complete shutdown of one bridge for two to five years
 - A complete shutdown of one bridge for six months
 - 16 months of lane closures

The firm’s analyses suggested that there would be a substantial loss of jobs and business output for any of these scenarios.

- Continued service disruptions already affect the health and welfare of local area residents by inducing stress getting to and from work and other appointments, as well as the time students spent traveling to and from school because the canal splits the town of Bourne in two. The northern section of the town of Bourne, where the business and historic centers are located, is subjected to traffic backups of as much as 10 miles during routine maintenance of the bridges, effectively isolating them from the rest of town. These problems are expected to be exacerbated for the No Build Alternative where more frequent and extensive lane closures will worsen current conditions.

4.5.4 Build Alternative

4.5.4.1 Operational Impacts

This section assesses potential social and economic impacts of the Build Alternative following completion of the Program. These impacts are called “operational” (or ongoing annual) effects to distinguish them from those that would occur on a one-time (not annually recurring) basis during the construction phase. The travel times and other effects of the Build Alternative compared to the No Build Alternative in 2050 reflect improvements in transportation efficiency. These reduce the costs of goods movements and lower the travel times for workers, each of which boosts productivity for businesses.

Regional Economic Impacts

MassDOT used TREDIS software to evaluate and compare predicted economic impacts for the No Build Alternative and Build Alternative for 2050. To isolate the regional economic impacts that would result in response to the Build Alternative, the induced economic impacts were estimated using TREDIS. This analysis considered the amount of “ripple effect” economic activity that would be created because of

² Technical Memorandum from the Eastern Research Group, Inc. (ERG) Team to the Cape Cod Commission, August 9, 2024.

bridge replacement. The No Build Alternative would result in no induced economic impacts, as the existing bridges would remain and continue to be operated and maintained by USACE as part of the Cape Cod Canal Federal Navigation Project. The induced economic impacts of a potential bridge replacement for the Build Alternative are provided in [Table 4.5-13](#).

As presented in [Table 4.5-13](#),³ the results of this analysis show that for 2050 there would be a net increase in economic output, value added, jobs, and labor income for Cape Cod and the Islands, Plymouth County, and the rest of Massachusetts for the Build Alternative when compared to the No Build Alternative. The net increase in economic output within Cape Cod and the Islands would be 49% of the total increase for Massachusetts. While the net increase in the total headcount of jobs for Cape Cod and the Islands in 2050 would comprise over half of the total increase in Massachusetts, the increase in labor income generated from these jobs is estimated to be only 43% of the total increase in labor income for Massachusetts.

Table 4.5-13. Economic Impacts: TREDIS Analysis, 2050

Region	Output (2022\$)	Output as % of State Total	Value Added (2022 \$)	Jobs (headcount)	Head count as % of State Total	Labor Income (2022\$)	Labor Income as % of State
Cape Cod and Islands	\$10,380,000	49%	\$4,570,000	21	53%	\$2,610,000	43%
Plymouth County	\$3,360,000	16%	\$1,650,000	8	20%	\$1,030,000	17%
Rest of Massachusetts	\$7,370,000	35%	\$3,960,000	11	28%	\$2,440,000	40%
Total Massachusetts	\$21,100,000		\$10,180,000	40		\$6,080,000	

Source: TREDIS Analysis

³ These and other tables may not total due to rounding, especially in the case of jobs measures.

The TREDIS analysis also compares tax collection for state and local taxes, including both those levied on households and businesses, for the No Build Alternative and Build Alternative. As presented in [Table 4.5-14](#), net tax collections for the Build Alternative would be about \$426,000 (in 2022 dollars) greater than that of the No Build Alternative. Of this, 49% would be garnered from Cape Cod and Islands.

Table 4.5-14. State and Local Tax Impacts, 2050 (2022 dollars)

Region	Tax Revenue
Cape Cod and Islands	\$209,000
Plymouth County	\$90,000
Rest of Massachusetts	\$127,000
Total Massachusetts	\$426,000

Source: TREDIS Analysis

TREDIS estimates total social benefits as well as economic impacts. The social benefits include cost savings that are adapted and used to inform the economic impact analysis but also benefits that do not result in monetary transfers. These savings—in the form of saved time, crashes, and pollutants emitted—are monetized following U.S. Department of Transportation guidance. Some social benefits are enjoyed directly by travelers, but others, such as environmental benefits or business time savings, are enjoyed by other stakeholders, such as local firms or the community.

Among monetary benefits, households—and to some degree businesses—would enjoy savings in vehicle maintenance costs and fuel. Businesses would also benefit from shipping costs saved. These items (represented by Vehicle Operating Costs, Business Time, and Shipper/Logistics Costs categories in [Table 4.5-15](#)) were inputs into the economic analysis model that produced the results shown in [Table 4.5-13](#) and [Table 4.5-14](#).

Table 4.5-15. Social Benefits in 2050 (2022 dollars)

Benefits Category	Value
Vehicle Operating Costs Savings	\$8,600,000
Business Time Savings	\$11,600,000
Shipper/Logistics Costs Savings	\$200,000
Value of Personal Time Savings	\$82,100,000
Safety Cost Savings	\$10,300,000
Environmental Cost Savings	\$4,100,000
Total	\$116,900,000

Source: TREDIS Analysis

At the same time, all system users would enjoy time savings (valued under the categories Value of Personal Time and Business Time). Averted crashes—which result in saved lives, injuries, and property damage—were monetized per the U.S. Department of Transportation guidance to find a total Safety Cost category. Finally, reduced volumes of pollutants in the environment were monetized and reported in the Environmental category.

Local Economic Effects

The travel-time savings afforded by the Build Alternative would have effects on the reach of retailers, employers, and employees. Table 4.5-16 summarizes the impact of a representative 3-minute reduction in travel time from the vicinity of each bridge. As shown, for an average commute of 30 minutes, the Build Alternative would increase the effective reach of jobs for workers and the labor pool for employers by about one-third compared to the No Build Alternative. This means, for example, that a worker commuting 30 minutes under No Build conditions would have access to a third more jobs with the Build Alternative, all because of a 3-minute time savings. To put it another way, a 30-minute trip for this worker for the Build Alternative would have taken 33 minutes for the No Build Alternative.

Table 4.5-16. Access to Jobs with 3-minute Travel-Time Saving from Each Bridge

Bridge	No Build Alternative Jobs within 30-minute Drive	Build Alternative Jobs within 30-minute Drive	Number Increase	Percentage Increase
Sagamore Bridge	145,400	191,000	45,400	31%
Bourne Bridge	192,000	256,000	64,000	33%

Source: TREDIS Analysis

Extended market areas for retailers would accrue further benefits from the average travel-time savings for the Build Alternative compared to the No Build Alternative (Table 4.5-17). Retailers typically define market areas in terms of drive times, with a 20-minute drive time considered to be the maximum time consumers are willing to drive for all but the largest stores and highly specialized store types. A travel-time savings of 3 minutes would enable retailers to expand their effective market areas and consumers to expand their consumption opportunities.

Table 4.5-17. Increase in Access to Consumer Expenditures with 3-minute Travel-Time Saving from Vicinity of Each Bridge

Bridge	No Build Alternative Retail Expenditures within 20-minute Drive (2024\$)	Build Alternative Retail Expenditures within 20-minute Drive (2024\$)	Difference (2024\$)	Percentage Difference
Sagamore Bridge	\$1,844,275,000	\$2,555,444,000	\$711,169,000	39%
Bourne Bridge	\$1,861,995,000	\$2,709,828,000	\$847,832,740	45%

Source: TREDIS Analysis

4.5.4.2 Economic Impacts of Construction

Based on the May 2024 Cape Cod Bridges Program Conceptual Program construction expenditures estimate, MassDOT assessed the direct, indirect, and induced economic effects of these one-time (construction period) impacts using the R/ECON Input-Output Model ([Table 4.5-18](#)).⁴

The direct, indirect, and induced expenditures for the Program were also estimated to generate \$604,000,000 in taxes, which include the following approximate amounts:

- \$70 million in local taxes (primarily real estate taxes paid by workers within their communities of residence)
- \$129 million in state taxes (primarily corporate and individual income taxes)
- \$405 million in federal taxes

Table 4.5-18. Economic and Fiscal Effects in Massachusetts of Cape Cod Bridges Replacement Conceptual Program Expenditure Estimates

Distribution of Effects	Output (2024\$)	Employment (Jobs)	Earnings (2024\$)	Gross Domestic Product (2024\$)
Direct Effects	\$3,242,081,600	16,000	\$1,418,259,200	\$1,521,945,800
Indirect Effects	\$1,268,506,000	5,154	\$437,377,800	\$1,521,945,800
Induced Effects	\$1,246,224,400	6,717	\$417,744,600	\$733,412,400
Total Effects	\$5,756,812,100	27,879	\$2,273,381,700	\$2,917,736,700

Source: R/ECON Input-Output Model

4.5.5 Mitigation

Potential effects, and mitigation, during construction on households and businesses are addressed in **Section 4.2, Transportation, Traffic, and Safety**. With only minor projected increases in jobs (21 net new [permanent](#) jobs on Cape Cod and the Islands) for the Build Alternative, impacts on land use would be negligible as discussed in **Section 4.22, Indirect Effects**.

⁴ “Direct effects” reflect the initial expenditures, jobs, and income attributable to the construction project and its immediate suppliers. “Indirect effects” reflect the inputs of suppliers to the industries supporting direct expenditures. “Induced effects” reflect the spending of workers engaged in the direct and indirect effects serving industries on personal consumption. **Appendix 4.5, Socioeconomics Technical Report**, explains the terms “output,” “employment,” “earnings,” and “gross domestic product.”