SUBASE New London Joint Land Use Study Implementation Project:

Regional Plan for Housing and Transportation Associated with Expansion of Submarine Shipbuilding in Southeastern Connecticut

SUBASE New London JLUS

SCCOG Southeastern Connecticut Council of Governments

October 2019

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I. Executive Summary

This study assesses the potential regional impacts of expanded activities at SUBASE New London and Electric Boat on the southeastern Connecticut region, with a particular focus on the housing market and transportation. The overall intent is to determine if the region has the capacity to accommodate anticipated additional residents and workers resulting from approximately 5,000 net new jobs at Electric Boat (including replacement hires for retirees) from 2019 through 2030. This study incorporates a detailed analysis of existing socioeconomic, housing, and transportation conditions and concludes with recommendations for the region and its municipalities to consider in order to respond to additional employment impacts.

The JLUS Implementation Study was conducted under the guidance of a JLUS Implementation Committee, which was formed in 2018, following the conclusion of the SUBASE New London JLUS. The Committee includes membership from SCCOG, the SUBASE, municipal governments of surrounding communities, and the State of Connecticut Office of Military Affairs. The Committee has met regularly since its inception, and guided this study process over the course of the 11-month project, with the assistance of technical staff of the municipalities as well as representatives from Electric Boat.

In addition, this study sought to engage the general public as well as the SUBASE, Electric Boat, and key stakeholders who are involved in housing and transportation in the region. The engagement strategy targeted these stakeholders through various means, including public workshops, small focus group meetings, online surveys, and one-on-one interviews. The team also maintained a project website that provided updates on opportunities for public involvement and interim project deliverables.

Key Takeaways

1. ***Net Electric Boat employment growth from current contracts should increase regional employment and help to mitigate recent population declines.***

   From 2012 to 2017, the SCCOG region lost a total of over 5,600 residents, or 2% of its total population. Although the Connecticut Data Center has projected modest population growth through 2040, that scenario would require a reversal of the past five years of population declines by 2020, then steady growth through the remainder of the period. A lower-growth scenario, based on recent demographic trends, would predict a continued slow population decrease through 2040. The actual population change is likely to fall somewhere in between the two scenarios, probably at the lower end.

   The demand for new workers at Electric Boat – who will come from within the region as well as outside – combined with anticipated retirements of existing workers, will mitigate some of the population decreases that the region has experienced in recent years. These workers, many of whom are already living in the region as submarine design and engineering work is well underway, can be expected to generate positive economic spillover effects for regional employment and the housing market. In fact,

input-output modeling of county labor and commodity flows estimates that every new job at Electric Boat will generate 0.9 additional jobs in other industries. This is clearly a major economic benefit.

2. ***Employment growth will increase demand for housing in the region, both increasing the value of existing homes and supporting the need for new housing. However, greater housing demand will put additional pressure on housing affordability, which will remain an issue to be addressed.***

   Some of the additional jobs in the region will be held by residents who already live in southeastern Connecticut; however, some will need to be filled by new residents moving into the region. These shifts will help to strengthen the overall housing market, which has not yet fully recovered from the economic recession. From 2010 to 2017, the median value of housing in the SCCOG region fell by 12%. Greater demand should improve housing prices, providing flexibility for homeowners who may be interested in selling, and opening up more of the existing housing stock for purchase. In addition, new workers as well as downsizing seniors and empty-nesters may seek new housing, which suggests that future development of both multi-family housing as well as other types of homes will be warranted.

   However, existing issues of housing affordability may be exacerbated with greater housing demand, and some new workers may find challenges in locating the types of housing they seek in the locations they want. A number of housing programs are active in the state and should be explored, to facilitate new housing at varied income levels, and to support rehabilitation of existing housing stock, in order to help homeowners bring their houses up to modern standards to be attractive to potential buyers.

3. ***Growth of additional workers and residents is manageable and supports the need for minor traffic improvements as well as projects already planned or proposed.***

   The projected traffic growth results in moderate impacts to traffic operations within the local area, with most intersections still experiencing acceptable operations. More significant impacts were noted at specific intersections in the immediate vicinity of the Electric Boat facility in Groton, as well as key regional roadways in the area. This study identifies a number of conceptual improvement plans that can mitigate both existing and projected impacts, as well as address other transportation planning goals, including bicycle- and pedestrian-friendliness. In addition, a potential new parking structure at the Electric Boat facility should be supported to address parking impacts throughout the vicinity.

   Several planned projects in the region were evaluated as part of this study, and the projected regional impacts on housing and employment support their implementation. The most significant planned project is the widening of I-95 from two through lanes to three from Branford to Stonington. This project is being studied by CTDOT and should continue to be supported as a priority regional project.

4. ***Impacts on bus transit in the region should be minimal, but positive. Additional changes in service and land use policies could serve to strengthen the transit system.***

   Projected household growth in the local study area is not expected to significantly impact demand for public transit service, but will add demand for some additional local service and regional connections

in Groton. Except for this localized impact, projected new employment and household growth in the region will not be significant enough to merit large increases in bus transit capacity beyond that recommended as part of the 2015 SEAT Bus Study. Recommendations to respond to these impacts include creating a Groton transit hub, realigning and expanding SEAT service in Groton, exploring the use of microtransit, and implementing targeted service changes on the bus system.

5. ***Additional quality-of-life and placemaking efforts should be supported throughout the SCCOG member municipalities, to bolster economic development initiatives and help communities both attract and retain residents.***

Creating jobs and housing are the first steps in community development. Now that these efforts appear to be bearing fruit in southeastern Connecticut, attention should also focus on making the region's municipalities places where new employees will want to remain, even if they leave the job that brought them to the region.

With this in mind, SCCOG should encourage its member municipalities to advance initiatives in placemaking—focusing on individual municipal assets and the potential to create public areas that will draw residents together for face-to-face interactions in order to build community. Efforts could be oriented around a cultural institution, recreational space, or shopping hub with low-cost activation of the area through public art or streetscape amenities that are accessible and welcoming to all residents, from seniors to children, and long-time residents to newcomers. These placemaking initiatives should be pursued with other basic quality-of-life improvements both at a municipal level and throughout the region. A prime example of a key quality-of-life improvement is the planned I-95 widening project, discussed above. This improvement would not only enhance commuting conditions for many workers in the region, but it could relieve congestion on Route 1 and local roads that serve as a back-up to I-95 in peak travel periods, particularly during the summer tourism season.

Another key recommendation that could have an impact both on quality-of-life and placemaking would be creation of a Groton Transit Hub, a concept that was recommended in the 2015 SEAT Bus Study. This study recommends a hub location to be considered as part of a cooperative regional effort with SEAT and the Town of Groton, with the ideal location in an area that could support higher-density land uses and attract more riders. It is noted that the 2015 study recommended the hub be located at the Groton Square shopping center, while this study recommends additional analysis of other sites that might meet criteria including direct highway access, a strong anchor, and access to bike and pedestrian facilities. The ultimate hub location would affect proposed changes to other Groton routes and is a near-term priority.

Summary of Recommendations

The table below provides a summary of the housing and transportation recommendations contained within this report, as well as lead implementing organization and potential partners, general timeframe, and order-of-magnitude cost, based on the following parameters:

Timeframe

- Short-Term (1-3 years)
- Medium-Term (4-7 years)
- Long-Term (8+ years)

Order-of-Magnitude Cost

- Low (under $100,000)
- Medium ($100,000-$500,000)
- High (Greater than $500,000)

	Recommendation	Responsible Parties (Lead(s) in Bold)	Anticipated Timeframe	Estimated Costs
HOUSING				
1.	Continue to encourage development as desired by municipalities.	**SCCOG** Municipalities	Ongoing	Low
2.	Consider a variety of affordability levels, especially for both single-family and rental units.	**SCCOG** CHFA CT Dept. of Housing Municipalities	Ongoing	Low
3.	Explore municipally based first-time buyer programs.	**CHFA** SCCOG CT Dept. of Housing Municipalities.	Ongoing	Low
4.	Explore homeowner rehabilitation programs.	**CHFA** SCCOG CT Dept. of Housing Municipalities.	Ongoing	Low
TRANSPORTATION				
1.	Route 32 Safety Study (Project H)	**CT DOT** SCCOG City of New London Town of Waterford	Short-Term	Medium
2.	Route 85 I-95 & I-395 Interchange Safety Monitoring (Projects I and J)	**CT DOT** Town of Waterford	Short-Term	Low
3.	SUBASE Access & Circulation Study (Project K)	**SUBASE** Town of Groton SCCOG DOD OEA	Short-Term	Medium
4.	City of Groton Parking Study (Project L)	**City of Groton** SCCOG Electric Boat	Short-Term	Medium
5.	Five Corners Improvements (two options, Projects 4A and 4B)	**City of Groton** CTDOT SCCOG	Medium-Term	High
6.	Bridge Street at I-95 Ramps Improvements (Project 5)	**City of Groton** CTDOT SCCOG	Short-Term	Low
7.	Route 12 Corridor Signal Upgrades (Projects 6A, 6B, and 6C)	**CTDOT** Town of Groton	Medium-Term	High

		SCCOG DOD OEA		
8.	Eastern Point Rd. Pedestrian Safety Improvements (Projects 7, 8, and 9)	**City of Groton** CTDOT SCCOG DOD OEA	Medium-Term	High
9.	Route 349 at Route 649/Brandegee Ave. and Meridian/Meridian Extension (Projects 10 & 11)	**City of Groton** CTDOT SCCOG	Short-Term	Low
10.	Route 649 at Rainville Ave. & Old Farm Rd. (Project 12)	**City of Groton** CTDOT SCCOG	Medium-Term	Medium
11.	Multi-use trail connection (Project 13)	**Town of Groton** SCCOG CTDOT	Medium-Term	High
12.	North St. & Mitchell St. complete streets improvements (Projects 14A and 14B)	**City of Groton** CTDOT SCCOG	Medium-Term	High
13.	Eastern Point Rd. complete streets improvements (Project 15)	**City of Groton** CTDOT SCCOG	Medium-Term	High
14.	Benham Rd. complete streets improvements (Projects 16A and 16B)	**City of Groton** CTDOT SCCOG	Medium-Term	High
15.	Bridge St. on-street parking (Project 17)	**City of Groton**	Short-Term	Low
16.	Electric Boat parking garage (Projects 18A and 18B)	**Electric Boat** City of Groton CT OMA	Medium-Term	High
17.	Implement SCCOG Regional Bicycle & Pedestrian Plan	**SCCOG** Municipalities CTDOT	Medium-Term	Ranges by project
18.	Introduce Groton bike-share program	**Town/City of Groton** CTDOT SCCOG	Short-Term	High
19.	Implement 2015 SEAT Bus Study Plan C (increase service span and frequency, plus new routes)	**SEAT** CTDOT	Medium-Term	High
20.	Increase frequency on SEAT Route 2	**SEAT**	Medium-Term	High
21.	Realign and expand SEAT bus service in Groton	**SEAT** Town/City of Groton	Short-Term	High
22.	Improve New London hub	**SEAT** City of New London	Short-Term (funded)	High
23.	Create a Groton transit hub (recommended by SEAT study, as modified by this study)	**SEAT** Town of Groton DOD OEA	Long-Term	High
24.	Install bus stops, shelters/seating across region	**SEAT** Municipalities	Medium-Term	Medium
25.	Install shelters and lighting at SEAT stops by SUBASE	**SEAT** SUBASE Town of Groton	Medium-Term	Low
26.	Create Crystal Lake Road mobility hub	**SEAT** Town of Groton SUBASE	Long-Term	High

	(Potential subject of application for further Department of Defense OEA funding.)	DOD OEA		
27.	Install new SUBASE pedestrian gate at Ohio Ave.	**SUBASE** Town of Groton	Short-Term	Low
28.	Microtransit pilot project	**SEAT** Town of Groton SUBASE DOD OEA	Short-Term	Medium
29.	CTDOT support of cross-honoring of SLE fares on additional Amtrak trains serving New London.	**CTDOT** Amtrak	Short-Term	Medium
30.	Extend 1-2 additional peak hour Shore Line East trains from Old Saybrook to New London.	**CTDOT**	Medium-Term	High
31.	Support long range plans for SLE extension into RI	**CTDOT**	Long-Term	High
32.	Private shuttle between SUBASE and Electric Boat, providing direct employee access to secure locations	**SUBASE** **Electric Boat** DOD OEA	Short-Term	Medium
33.	Employer-provided incentives/disincentives	**SUBASE** **Electric Boat** Other employers	Short-Term	Low

II. Introduction

In December 2017, the Southeastern Connecticut Council of Governments (SCCOG) completed a Joint Land Use Study (JLUS) focused around Submarine Base New London (SUBASE) and the neighboring Towns of Groton, Ledyard, Waterford, and Montville, and Cities of Groton and New London. The JLUS was intended to facilitate mutually compatible land use planning between SUBASE New London and its surrounding communities, and to reduce operational impacts of the SUBASE on nearby properties. The study outlined recommendations including transit improvements, updates to local zoning regulations, and ongoing shared-service agreements. A JLUS Implementation Committee, composed of key members of the study's Policy and Technical Committees, was tasked with initiating implementation of recommendations, monitoring progress, and encouraging stakeholders to revise and update the strategies as needed.

Subsequent to the completion of the JLUS, Electric Boat, with major facilities in the Cities of Groton and New London, announced Navy contracts to design and build Columbia-class and Virginia-class submarines to replace older submarines as well as expand the Navy's submarine fleet. Virginia-class submarines are currently under production at a rate of two per year, while Columbia-class construction will begin in 2019 and ramp up to peak activities by 2030. These contracts are expected to increase employment at Electric Boat by approximately 5,000 net new jobs (including secondary employment), from 2019 through 2030, with another 3,000 jobs anticipated to replace retirees.

Electric Boat shipyard in Groton, CT
Source: ASG Planning, 2018

As a result of these operational shifts at Electric Boat – and the ongoing need to implement the JLUS recommendations – SCCOG received funding from the U.S. Department of Defense Office of Economic Adjustment to undertake a two-part JLUS implementation project:

- **Part 1** assessed local economic and market conditions in the immediate vicinity of SUBASE New London, develop proposals for revised zoning regulations and local transportation improvements, and conduct local stakeholder outreach within the community.

- **Part 2** analyzed the potential regional impacts of expanded activities at SUBASE New London and Electric Boat, with a particular focus on the housing market and transportation (vehicular, transit, and alternative modes).

Part 1, a *Land Use and Transit Study for the Town of Groton*, was led by Horsley Witten Group, in collaboration with Camoin Associates for economic analysis and Union Studio Architecture and Community Design for urban design. Part 2 of the study, focusing on the *Long-Range Planning to Mitigate Compatibility Issues Related to Expansion of Submarine Shipbuilding in Southeastern Connecticut: Regional Land Use and Transit Strategies*, was led by BFJ Planning, in collaboration with Urbanomics for housing analysis, ASG Planning for transit planning, and Tighe & Bond for traffic planning. This report addresses Part 2 of the JLUS Implementation Project; Part 1 is addressed in a separate document. Therefore, all references in this report to the "JLUS Implementation Project" relate to Part 2 only.

A. Project Overview and Context

1. Review of Recent Planning Efforts

The JLUS Implementation Project builds upon previous studies undertaken by SCCOG and its member municipalities, in particular the following:

SUBASE New London Joint Land Use Study (2017)

A Joint Land Use Study (JLUS) is a cooperative land use planning effort between local governments and military installations. It seeks to ensure the lasting compatibility of military installations and their neighboring communities. A JLUS creates a policy framework and recommends strategies that support a healthy economy, environment, and community, while safeguarding the military mission.

Beginning in December 2016, SCCOG and six of its member municipalities most directly affected by the SUBASE – the Town and City of Groton; the City of New London; and the Towns of Ledyard, Montville, and Waterford – embarked on a yearlong JLUS process. The project involved four phases: a summary of the study area, a compatibility analysis, development of implementation strategies, and preparation of a study report. Stakeholder engagement included public workshops and a project survey.

The following is a summary of the strategies developed for consideration by the JLUS communities as part of the study process:

Transportation

- Develop a "Mobility Hub" on Crystal Lake Road to accommodate bus stop and pick-up/drop-off area.
- Modify the SEAT Route 2 route to stop closer to the Main Gate, and increase its frequency.
- Provide shuttle service, as needed, among the SUBASE, Electric Boat, other employment centers, and housing.
- Develop a traffic management plan to relieve congestion along Crystal Lake Road.
- Encourage bicycling to the SUBASE through a variety of measures.
- Implement a bike share between the SUBASE and Electric Boat.
- Minimize transportation impacts through development review and enforcement.

Thames River

- Develop mutually beneficial solutions to turning movement/dredging/marina conflicts.
- Designate a no-wake zone and educate about proper boater behavior near the SUBASE.
- Raise awareness of the SUBASE's environmental efforts.
- For projects that will increase in-water traffic, coordinate with municipalities and developers to build awareness of security concerns.
- Support the Connecticut Department of Energy and Environmental Protection's (DEEP's) efforts to maintain in-water disposal sites for clean dredged material.
- Continue coordinating on climate change best management practices.

Land Use and Development

- Update the Nautilus Memorial Design District regulations to encourage compatible development on Crystal Lake Road.
- Coordinate planning efforts between the SUBASE and the Towns of Waterford and Groton to ensure compatible development. Where views are a concern, consider purchasing property for open space or reducing the allowed development capacity.
- Provide a communication channel for residents to voice their concerns to the SUBASE about noise, light, and air quality impacts. Where possible, alleviate those issues.
- Update the JLUS municipalities' zoning regulations to encourage new housing development.
- Plan and pursue funding to improve the livability (e.g., encourage more pedestrian-friendly and mixed uses) in downtowns and neighborhood centers.
- Sustain and enhance communication between Electric Boat and associated municipalities regarding growth.

Coordination and Cost Sharing

- Continue shared-service arrangements (e.g., fire, water) and explore opportunities to enhance services and more efficiently allocate resources.
- Expand efforts to coordinate joint military and civilian activities and open on-base programs.
- Establish a memorandum of understanding (MOU) among JLUS parties to guide JLUS implementation steps.
- Address issues with cost sharing for education by researching best practices, advocating for more Federal Impact Aid, and seeking additional funds for local school districts.

SCCOG Regional Plan of Conservation and Development (2017)

Connecticut's Councils of Government, like its municipalities, are required to update their plans of conservation and development (POCDs) every 10 years. The regional POCD is intended to identify strategies that SCCOG, its member organizations, and other partners can implement to address southeastern Connecticut's challenges including an aging population that will reduce the available workforce while requiring additional services, a continued over-reliance on a few key industries, and a pattern of dispersed development that makes it difficult to expand public transportation options. The regional POCD identified the following key issues:

Economy and Fiscal Health: As a significant portion of residents in the region enter retirement, a potential shortage of workers could impact the region's key industries: casino gaming, defense manufacturing, and defense. Also, the heavy dependence on property tax revenue by municipalities in the region affects their fiscal health. There is a growing recognition that diversifying the regional economy and retaining existing manufacturers is needed.

Housing: It is increasingly difficult for households in the region to find affordable housing and there are limited choices beyond single-family homes in a rural or suburban context. A variety of options to meet the needs of all residents is needed.

Transportation: The region's dispersed development patterns have affected its ability to provide public transportation service at frequencies and to locations that serve its residents. This is a particular challenge for residents who cannot drive or lack access to a vehicle. This issue is likely to increase with an aging population.

Utilities: Rural and some of the suburban areas may be limited in their capacity to provide adequate utility infrastructure and service to support denser housing and increased commercial activity. This is due to limited public water, wastewater treatment, and natural gas supplies.

Agriculture: This vital part of the region's history, identity, and economy is changing. The number of small farms is growing, though farmed acreage has not kept pace with this growth. Also, more than half of farmers in the region are 60 or older.

Historic Preservation: The age of buildings in the region adds complexity and cost to maintenance and retrofit projects which can delay development.

Open Space and Natural Resources: Protecting the region's open space and natural resources is key to its economy and quality of life. Water quality, in particular, is necessary for fishing and outdoor recreation tourism.

Resilience: Some locations such as downtown New London, Mystic, and important natural habitats will experience increased flooding due to sea level rise and more frequent severe storms.

Local Capacity and Participation: In the face of decreasing aid from the State of Connecticut, there is a growing need to share resources and expertise among cities and towns in the region.

Southeastern Connecticut Housing Needs Assessment (2018)

This study, undertaken by SCCOG, sought to identify both the quantity and type of housing that will be needed by residents of southeastern Connecticut over the next 15 years. The study found that there is an existing shortage of lower-income, rental housing in the region, and that trend is likely to be exacerbated by overall projected household growth of 6.3% between 2015 and 2030. Most of that household growth is expected in senior households, as much of the 65+ age cohort is expected to age in place. As many seniors remain in their homes, there is a lack of affordable, quality housing available to younger

households moving in. Notably, the 2018 housing study projections were based on previous projections of population growth developed by the Connecticut State Data Center and do not incorporate the impacts of additional hiring by Electric Boat. It also does not appear to take into account increases in housing supply resulting from known projects in the pipeline. Nevertheless, the housing study provides an important baseline for understanding the housing picture in the SCCOG region, particularly related to the regulatory environment for the development of new multifamily housing, as discussed below.

SEAT Bus Study (2015)

In 2015, SCCOG and the Southeast Area Transit (SEAT) District released an analysis identifying service improvements to the SEAT system that would better serve existing riders, improve the overall efficiency of SEAT service, and attract more riders. The study proposed three alternative service plans, two of which would be cost-neutral on a system-wide basis, with the third option outlining priorities for system expansion if additional funding were to become available. The three alternatives are described below:

- *Cost-Neutral Improvement Plan A* would increase frequency of buses on Route 600 between Norwich and New London, strengthening service in the corridor that serves as the "backbone" of the SEAT system. Some express service would also be introduced in this corridor. Offsetting the proposed service enhancement, Plan A called for the discontinuation of three existing routes, in East Lyme, Stonington, and New London.

- *Cost-Neutral Improvement Plan B* offered similar improvements to Plan A, but instead of discontinuing service in Stonington, would scale back the increased service along the New London- Norwich corridor. SEAT selected Plan B as the preferred alternative of the two cost-neutral options.

- *System Expansion Plan C* would increase service between New London and Norwich and in certain other routes, restore service in Stonington and East Lyme (including a new seasonal Mystic shuttle), launch a new route connecting Norwich with Foxwoods Resort Casino, and institute a new Groton local route to link to employment opportunities including the SUBASE. This alternative was viewed as a longer-term option that could be pursued in conjunction with seeking additional capital funding.

Comprehensive Economic Development Strategy for the Southeastern Connecticut Economic Development District (2017)

The regional Comprehensive Economic Development Strategy (CEDS) was prepared by the Southeastern Connecticut Enterprise Region (seCTer), a nonprofit, public/private agency serving the region, and was co-adopted by SCCOG. The report identified the high costs of living and doing business in the region as growth barriers, and noted an overdependence on large, legacy institutions for economic strength. It also cited the need for greater housing choice and affordability to attract millennials, and an underutilized transportation system in need of investment. The CEDS is organized around six industry clusters: defense, bioscience, tourism, maritime, creative, and agriculture. Key projects in the JLUS study area include the Thames River Innovation Places Initiative in New London and a water taxi dock at the Nautilus Museum.

Because this JLUS Implementation Project looks at land use, housing, and transportation recommendations to mitigate impacts from expanded activities at the SUBASE and Electric Boat, the project team reviewed the Plans of Conservation and Development (POCDs) and other planning studies for the municipalities most directly affected by these operations: the Town and City of Groton and the City of New London. Summaries of these plans are found below.

Town of Groton Plan of Conservation and Development (2016)

The Town's most recent Plan of Conservation and Development (POCD) outlined a series of recommendations in response to planning goals, including regulatory changes to support redevelopment and adaptive reuse of historic buildings, expansion of allowable housing types such as accessory units, incentives to promote mixed-use development, pursuit of a passenger rail platform in downtown Groton, and improvements to bike and pedestrian transportation options.

Town of Groton Economic and Market Trends Analysis (2016)

This report incorporated a comprehensive analysis to identify issues and opportunities for facilitating economic growth in Groton. It was noted that the Town's "Big 3" (the SUBASE, Electric Boat, and Pfizer) make up nearly 60% of the Town's workforce, which creates a lack of economic diversity and an overdependence on those entities which is not sustainable in the long-term. Recommendations include a focus on mixed-use development; targeting small-scale (niche) manufacturers; ramping up marketing efforts; and embracing placemaking initiatives, particularly along the Route 1 corridor.

Town of Groton Zoning Regulations Rewrite Project (2019)

As follow-up to the Town's POCD and Economic & Market Trends Analysis, Groton is undertaking a comprehensive update of its zoning regulations. Preliminary recommendations include creation of three mixed-use zones: a "town center" along Route 1, a "village center" for the Poquonnock Bridge area, and a downtown Mystic district. The zoning update does not incorporate changes to the existing Nautilus Memorial Design District (NMDD) along Crystal Lake Road and Route 12 near the SUBASE. However, this area is expected to be addressed in Part 1 of this JLUS Implementation Project; that work element is being undertaken by the same consultant team that is leading the Town-wide zoning rewrite.

City of Groton Plan of Conservation and Development (2019)

The City recently adopted a new POCD with a focus on strengthening key nodes through placemaking, promoting economic development, improving bike and pedestrian transportation, diversifying the housing stock, and preserving assets of strength such as open space and coastal resources. Mixed-use development is envisioned along the Thames Street corridor and in the Five Corners area (the intersection of Poquonnock Road, Mitchell Street, Benham Road, and Chicago Avenue). Five Corners is noted as the "front door" to Electric Boat and presents opportunities for housing and amenities to serve those employees. The City's POCD also supports the development of new housing and retrofits to existing stock to facilitate aging in place.

City of New London Plan of Conservation and Development (2017)

The City adopted a two-part POCD in 2017, incorporating a "Strategic Plan" to address existing conditions and a vision for the 10-year planning period (the "big picture"), and an "Implementation Element," intended to be updated annually, outlining the actions to be considered to accomplish the overall strategies. The Strategic Plan set out a three-pronged planning vision for New London: 1) Grow Strategically; 2) Promote Livability; and 3) Leverage Assets. Recommendations included targeting development to key areas such as the Fort Trumbull Maritime & Mixed Use District and the waterfront; an ongoing focus on downtown revitalization; promotion of adaptive reuse of historic properties and targeted infill of vacant and underutilized sites; and expanding bike, pedestrian, and transit alternatives.

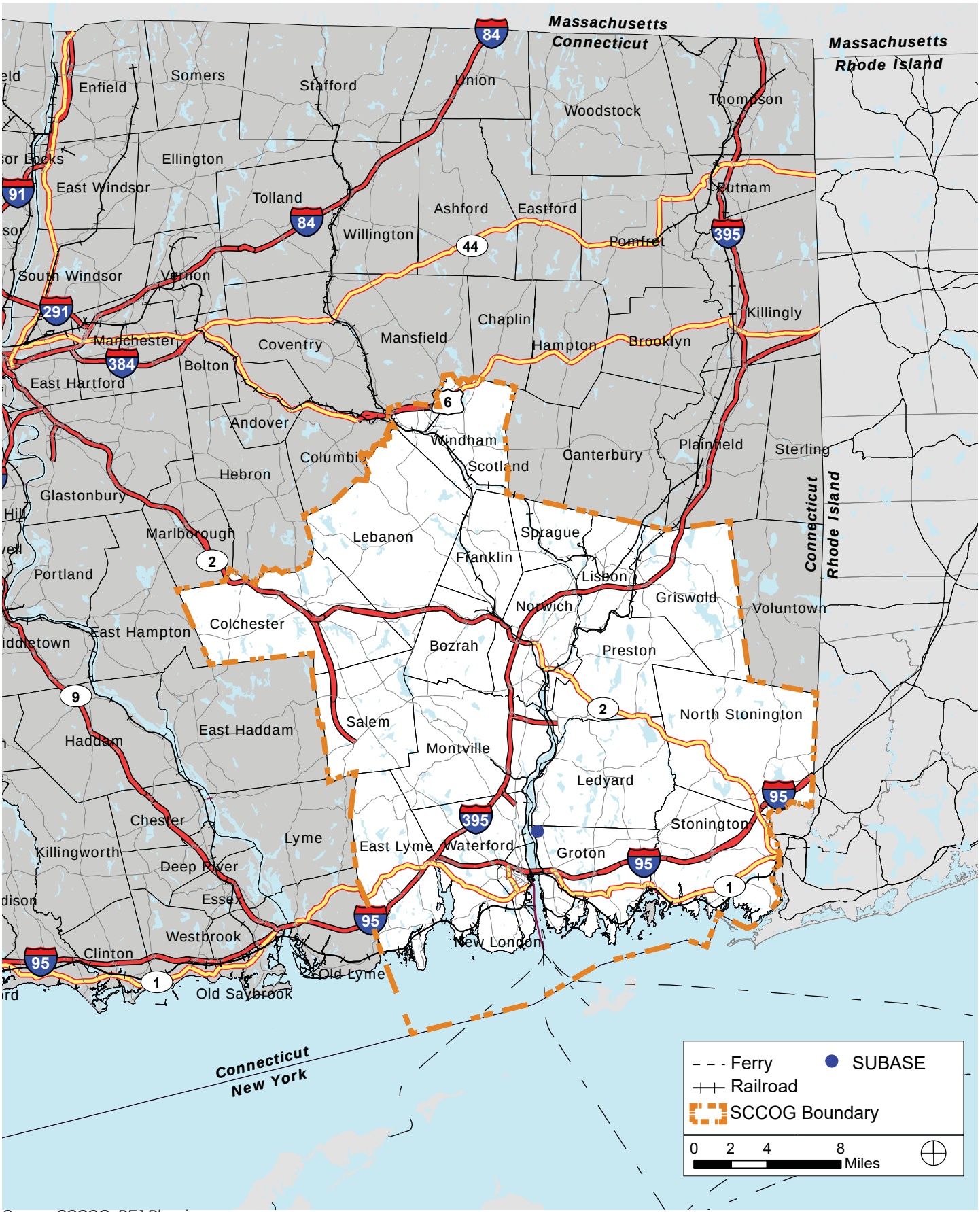
2. Housing and Transportation Planning Nexus

The use of land is closely linked to regional transportation facilities and modes of travel, and vice versa. Regional transportation systems get people where they need to travel, which can factor into their decisions about where to live and work. Meanwhile, major land uses, such as residential developments, employment or retail centers, can attract people that then require transportation systems to reach them. Transportation and land use need to be considered together in regional planning, in order to ensure efficient movement of people and goods, and to achieve a strong quality-of-life at the local level. This JLUS Implementation Study is focused on the anticipated regional impacts from increased employment at SUBASE New London and Electric Boat. The key impacts to be addressed are housing and transportation, and they are strongly connected. New jobs in the region may bring new residents, who will require places to live and the transportation networks to reach their jobs and the goods and services they need. New housing development should consider existing transportation capacity as well as the potential to respond to demand for alternative travel modes, such as transit, walking, and biking.

B. Southeastern Connecticut Regional Overview

SCCOG is a public agency formed in 1992 to provide a basis for intergovernmental cooperation in addressing a range of issues facing southeastern Connecticut. Its predecessor agency, the Southeastern Connecticut Regional Planning Agency (SCRPA), was created in 1961. Today, SCCOG consists of 22 member towns, cities, and boroughs, encompassing a 616-square-mile region with a resident population of over 286,000 people (see Figure 1). While the 2017 JLUS focused on the six municipalities, the study area for this JLUS Implementation Project covers the entire SCCOG region.

Southeastern Connecticut is oriented to its major water bodies: Long Island Sound and the Thames River; their confluence historically provided a convenient harbor for the shipping industry. Density of development and population are greatest along the shoreline, where maritime industries and trade were established in the 17th century. Today, the Thames River is home to some of the region's key institutions and economic drivers. The U.S. Navy's Submarine Base and the main Electric Boat facility are on the east side of the river in the Towns of Groton and Ledyard. The University of Connecticut's Avery Point campus is located along the Long Island Sound coastline in Groton, while across the River are New London's three higher education institutions: Connecticut College, Mitchell College, and the U.S. Coast Guard Academy. Following the River to the north, the region includes two major entertainment and employment destinations: the Mohegan Sun Resort and Casino and Foxwoods Resorts Casino.



Source: SCCOG, BFJ Planning

Figure 1: Regional Context

According to the Regional Plan of Conservation and Development, almost half (46%) of southeastern Connecticut's residents live in one of its four urban communities (Norwich, Groton, New London, and Windham). Most of the remaining residents live in the nine suburban communities, with just 9% of residents living in one of the six rural communities.[1] There is variation in residential density within each municipality, with historic village centers or downtowns generally surrounded by lower-density suburban development, and rural towns stretched across the north-central portion of the region.

From the mid-19th century through 1950, the region's cities saw the strongest growth, driven by water-related industries and strong port and rail connections. Suburban growth sharply increased in the post-World War II era. Regional growth has been flat or slow since the 1980s, although from 2000 to 2010 the region grew at a faster rate (6.2%) than Connecticut (4.9%) and most of the six New England states (second only to New Hampshire at 6.5% growth).

1. Land Use

Reflecting southeastern Connecticut's low-density nature, 42% of the region's land is considered undeveloped (see below), with the remaining land area either developed (37%) with residential, commercial, industrial, institutional, and transportation/utility uses, or devoted to open space/agricultural use (20%). Tribal land makes up the remaining 1% of land area.[2]

Residential

Residential uses make up about one-quarter (23%) of land area in the region. Most of these residential uses are low-density, defined as less than one housing unit per acre. In fact, the amount of land area used for housing in the region is more than three times larger than the combined amount used for commercial, industrial, or institutional uses. Medium- and higher-density housing is found in urban municipalities, suburban and rural village centers, and in isolated pockets elsewhere. Only in the four urban communities does the amount of higher-density residential land exceed low-density residential land.

Commercial

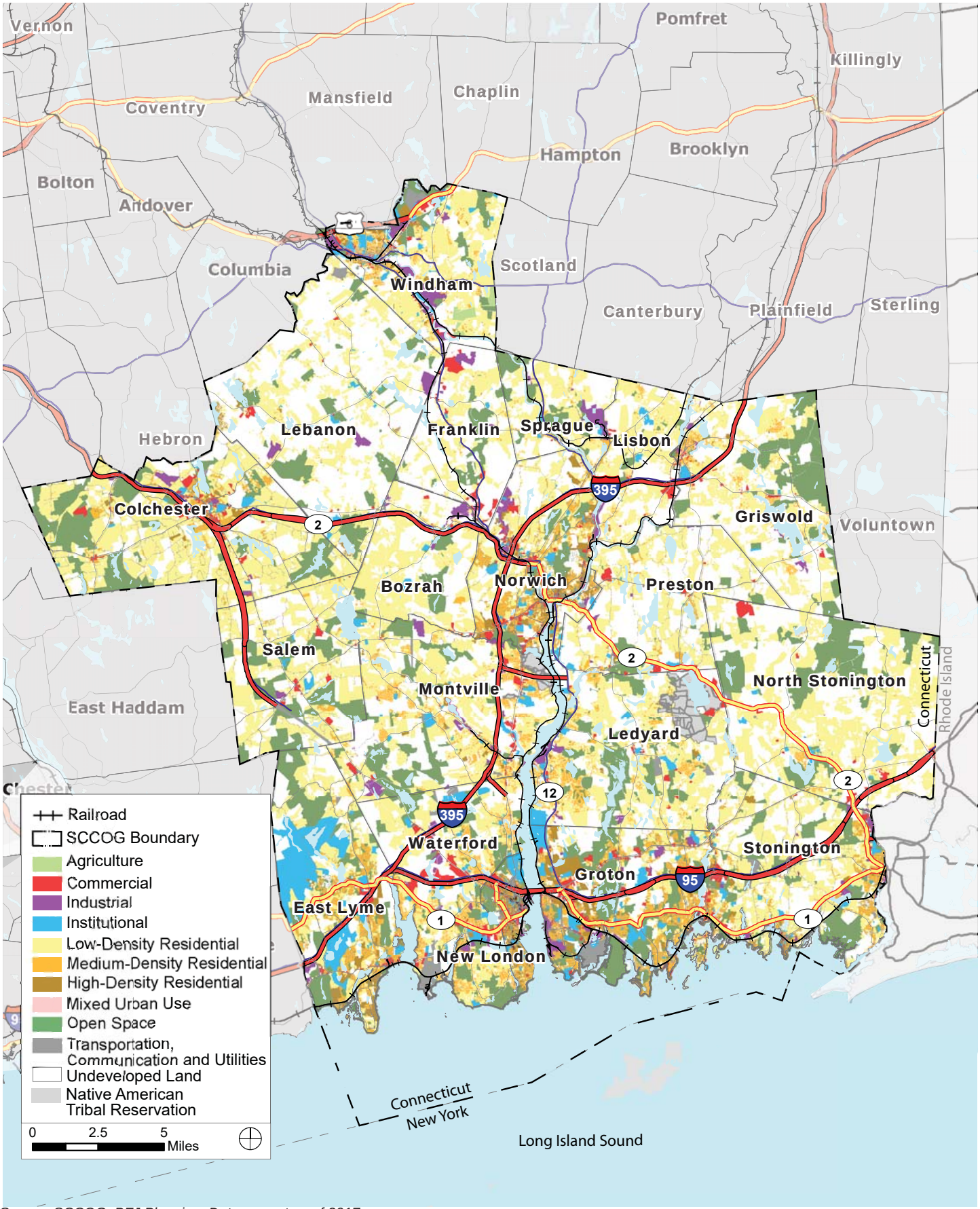
Commercial uses (including industrial and institutional/municipal uses) total about 7% of the region's land area, and include retail, wholesale, services, and offices. More than half (56%) of commercial land area is located in suburban towns, with another 28% in urban areas and 16% in the region's rural towns.

Infrastructure

About 7% of land in southeastern Connecticut is devoted to infrastructure and utilities: state and local roadways, utility lines and facilities, water treatment plants, etc.

[1] As per SCCOG's definitions, urban municipalities are those with population densities of 900 persons per square mile or higher, suburban towns are those with densities of 200 to 899 persons per square mile, and rural towns are those with fewer than 200 persons per square mile.

[2] The land use information in this section is from the 2017 Regional Plan of Conservation and Development, based on data gathered from 2015 to 2016.



Source: SCCOG, BFJ Planning. Data current as of 2017

Figure 2: Current Land Use

Agriculture and Open Space

Public parks, cemeteries, agricultural land, and other open spaces make up about 20% of the region's land area. At least 3% of agricultural land is preserved under the State's Farmland Preservation Program, while many parks are protected through deed restrictions. However, some land currently devoted to open space may not be legally protected from future development.

Vacant and Underdeveloped Land

As noted, SCCOG has classified 42% of the land area in the region as undeveloped; however, this figure includes both vacant land and very low-density residential uses (the excess land area over 5 acres for a single-family lot), and may therefore be considered "underutilized" land. Over half (56%) of the land in the rural communities is classified as either vacant or underutilized, while 39% of suburban land falls in that category. Vacant/underutilized land area makes up 16% of urban communities. Development of this land may be constrained by the presence of wetlands or lack of water/sewer utilities.

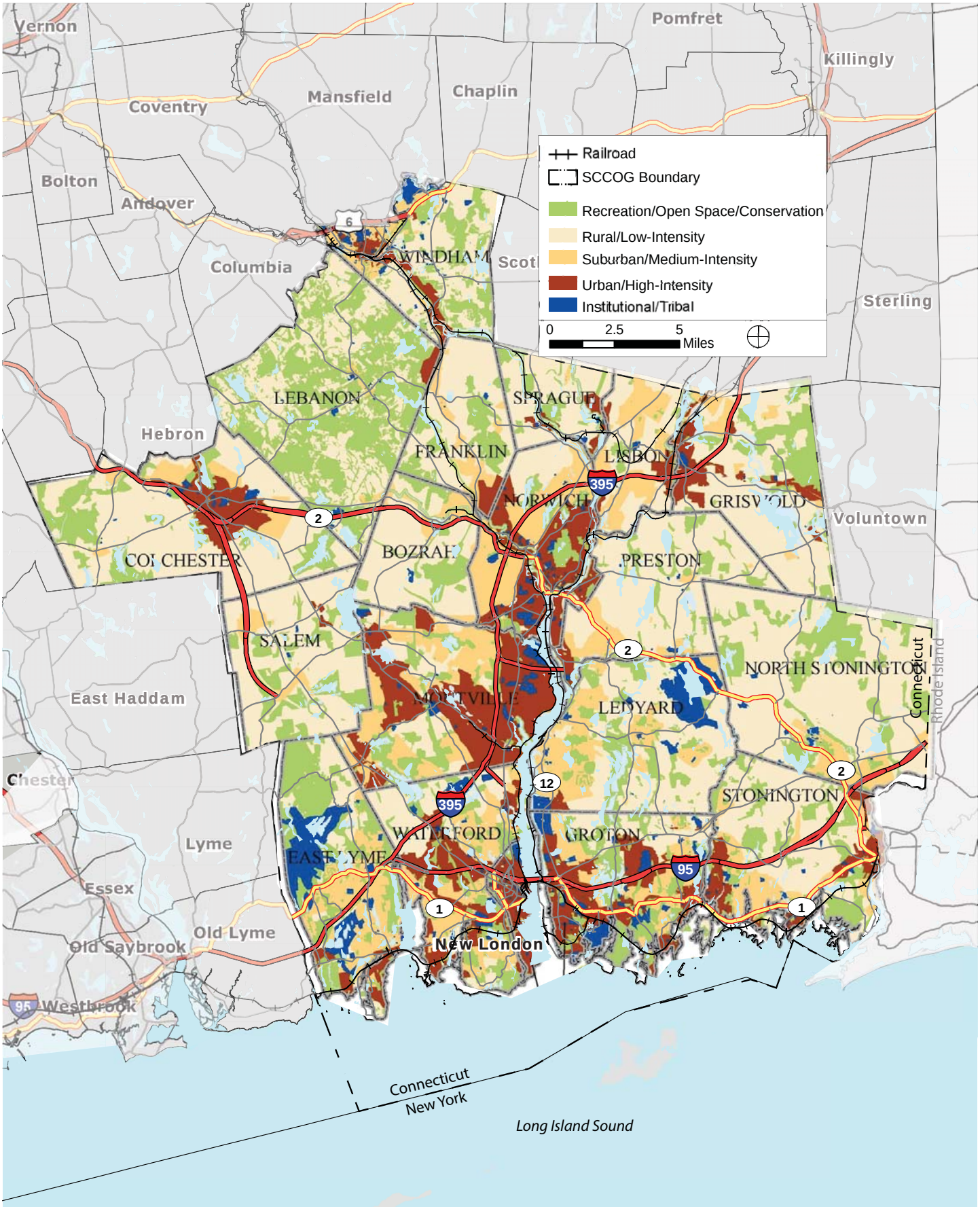
Villages, Urban Downtowns, and Centers

There are pockets of higher-density commercial and residential land uses throughout the region, reflecting earlier settlement patterns in which stores and housing spread around factories, along waterfront areas, and at key transportation crossroads. Many of the rural towns and suburban areas have multiple village centers that provide important residential amenities and form a major part of a town's identity. Although the Regional POCD does not quantify the amount of land area devoted to mixed uses (residential in combination with retail or office uses) most mixed uses that exist are likely found in the nearly 50 centers identified in the plan.

2. Zoning

Zoning powers are under the jurisdiction of individual municipalities or quasi-municipal associations with special powers granted by State statute. The region has 27 individual zoning ordinances. A regional map of zoning in the SCCOG region is not available. However, because zoning has its legal basis in the comprehensive plan prepared by each municipality, the future land use plans developed at the local level should generally match the zoning districts for the municipalities. SCCOG's Future Land Use Plan map, developed for the 2017 Regional POCD and shown in Figure 3, can approximate the high-level zoning controls in the region. The Future Land Use Plan for the region was developed based on the existing land use inventory and land use plans for each municipality as reviewed by local planning staff. The map indicates concentrated development along the Long Island Sound coastline and either side of the Thames River, as well as in other key nodes such as Windham, Colchester, and Jewett City. Most of the rest of the region is envisioned either as open space/conservation or a rural, low-intensity pattern of development, with medium-intensity development providing a transition between urban/high-intensity and rural areas.

For the purposes of this study, the key zoning question is how each municipality regulates residential uses. The 2018 Housing Needs Assessment identified a shortage of affordable rental housing, and the plans of conservation and development for the Town and City of Groton and New London – as well as the regional CEDS and the Town of Groton's Economic Trends and Market analysis – all highlighted a need for mixed-use development. Thus, it is useful to look at where, and how, multifamily housing is allowed in the region.

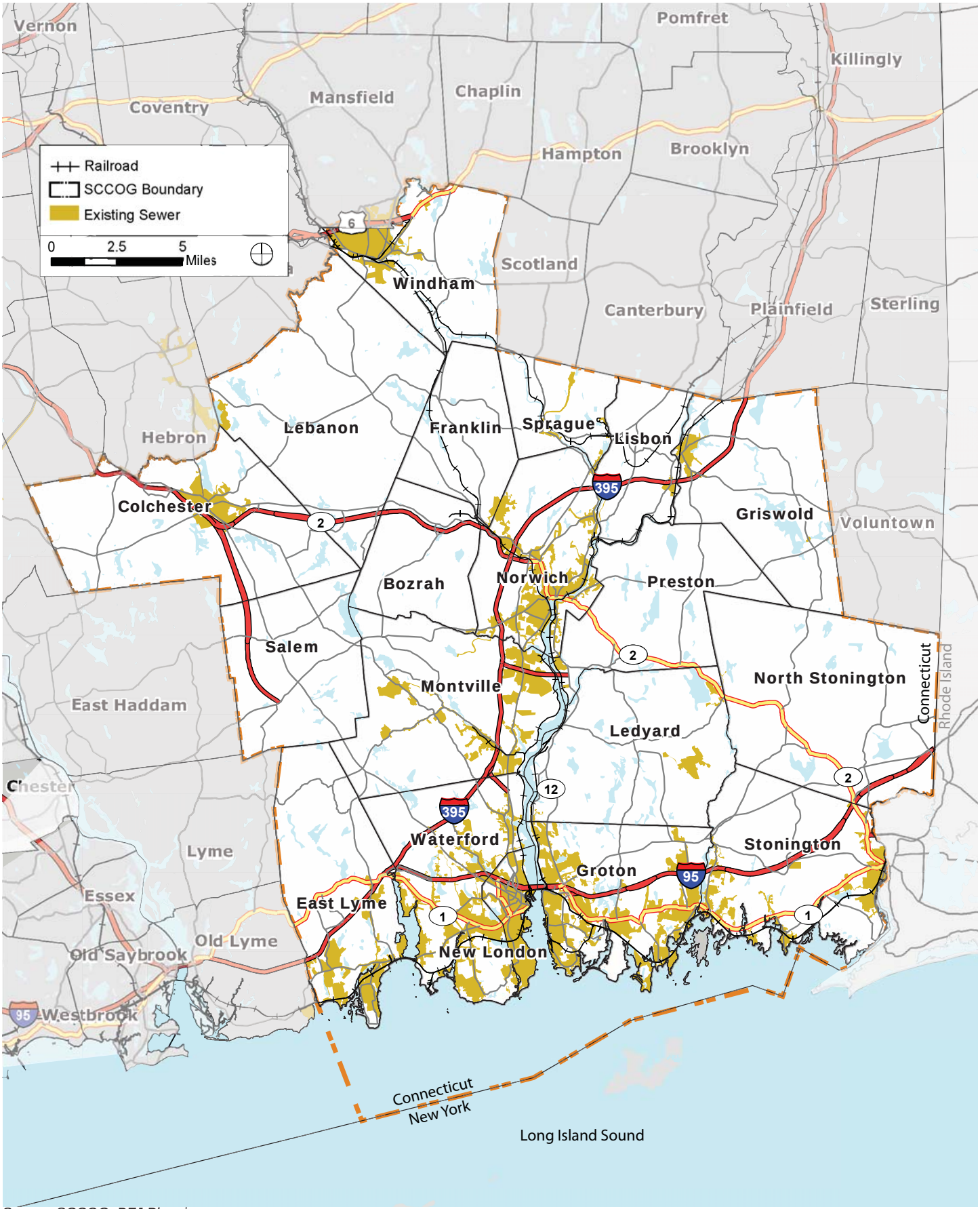


Source: SCCOG, BFJ Planning

Figure 3: Future Land Use

New London is a dense, compact urban area with a centrally located multi-modal transit hub.
Source: ASG Planning, 2018

In southeastern Connecticut, housing development is largely dependent on both the availability of land and the availability of land with sewer connections. As shown in Figure 4, existing sewer service is found in East Lyme, New London, Waterford, the Town and City of Groton, the Town and Borough of Stonington, Ledyard, Montville, Norwich, Jewett City, Colchester, and Windham. Although digital and/or GIS zoning maps were not publicly available for all municipalities, the zoning regulations for sewer-served municipalities were reviewed as to how multifamily development is permitted. In each case, multifamily development is allowed, either as-of-right or by special permit, in one or more zoning districts within the municipality. Generally, the districts where multifamily is allowed are also areas that are served by sewer; in some cases, public sewer connection is a required condition of multifamily development. Thus, looking at the regional land use map in combination with the sewer services map is a good indicator of where there is potential for the development of multifamily housing.



Source: SCCOG, BFJ Planning
**Dots distributed evenly, do not indicate specific addresses.*

Figure 4: Sewer Service in Southeastern Connecticut

C. Project Purpose and Scope

1. Expansion at Electric Boat

Naval operations and shipbuilding have long been integral parts of southeastern Connecticut's economic picture and culture. The Navy's SUBASE New London is an operating installation with the primary missions of deploying fast-attack submarines and training the submarine force. The SUBASE occupies approximately 700 acres along the Thames River in the Town of Groton, with more than 160 major facilities; and has a daily workforce of about 15,000 sailors, civilians, and contract employees. The SUBASE is home to 15 nuclear-powered submarines, and its submarine school provides comprehensive training of crew, from basic enlisted sailors to commanding officers.

Since the early 1900s, Electric Boat has operated a shipyard in the City of Groton, which remains its main shipyard operation. While the company's operations became more geographically dispersed in the region with the opening of the Quonset Point facility in North Kingstown, Rhode Island, and the engineering facility in New London – plus smaller satellite operations in the Towns of Groton and North Stonington – the shipyard on Eastern Point Road remains a critical aspect of its operations and employment.

Electric Boat began work on Virginia-class submarines for the U.S. Navy in the late 1990s, with contracts for Virginia-class Blocks IV and V extending Virginia-class construction into at least the late 2020s. In 2017, the Navy awarded Electric Boat a $5.1 billion contract to complete the design of the next-generation Columbia-class ballistic missile submarine, and to build 12 ships in the class, which will replace the aging Ohio-class submarines. The company is the prime contractor on the design/build effort and will perform about 80% of the work, with the remainder to be sub-contracted to Newport News Shipbuilding. Early construction began in 2017 at Electric Boat's Quonset Point facility, and design work in underway at the New London facility. Final assembly and test of the first Columbia-class submarines will begin in 2024 at the Groton shipyard. As part of the contract, Electric Boat's parent company, General Dynamics, is investing $1.8 billion in capital expenditures to expand its facilities to support construction.

History of Electric Boat Workforce

As discussed above, Electric Boat has been a significant employer in Groton and the region for decades; however, the level of employment has fluctuated based on the company's work flow, and its work force has become more dispersed with the opening of additional facilities. Electric Boat's peak employment was in 1976, when it had 27,000 employees, primarily located in Groton. The Quonset Point facility was added only in 1973, and by 1978, that location had about 4,600 workers, compared with Groton's 20,000.

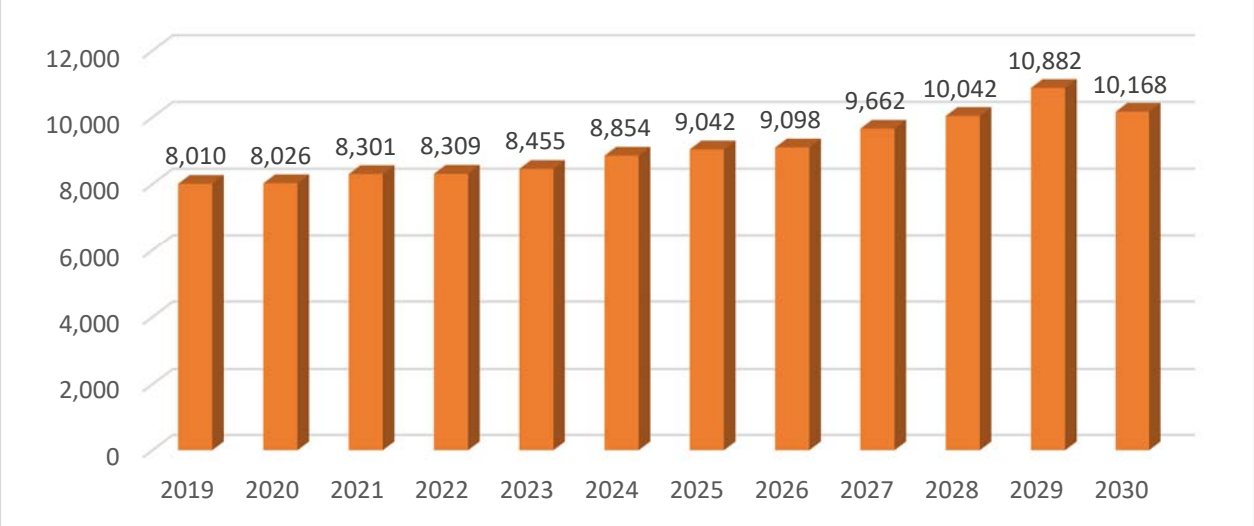
Through the 1980s, Electric Boat employment hovered around 25,000, distributed between Groton and Quonset Point, but still heavily concentrated in Groton. During this time, it was common for homeowners in the City near the shipyard to rent out their backyards – and in some cases their front yards – as parking space for Electric Boat commuters. The company's employment in the region began declining in the mid-1990s, and by the early 2000s, had dropped to a low of about 5,000. However, steady growth began again in 2004, and the company grew its presence in southeastern Connecticut throughout the next decade,

starting in 2010 with the move of engineers to the former Pfizer property in New London, and continuing with the purchase of the King's Highway facility in the Town of Groton in 2015.

Profile of Current and Projected Electric Boat Employment

As of February 1, 2019, there were 10,119 Electric Boat employees working in the New London and Groton facilities, according to information received from the company. By May 1, 2019, this number had already increased to 12,150. As of the May date, expected hiring had been completed for the engineering and most administrative positions. Electric Boat expects to hire an additional 2,400 new employees, as well as another 2,900 replacement hires, including retirees, expected to be brought on board by peak employment in 2028. Total employment at the Groton/New London facilities is expected to reach 14,533 at that time. New hires are expected to be brought on at the expanded Groton facility. The chart that follows shows the total number of employees at that facility through 2030.

Chart 1: Electric Boat Groton Facility Projections, 2019-2030[3]



Source: Electric Boat 2019
Note: Comparable workforce data are not available for other Electric Boat facilities; however, the company confirmed with the consultant team that future new hires in southeastern Connecticut will be focused on the Groton facility, as the other Connecticut sites had already completed hiring for the current Navy contracts as of the date of this study.

New hires are likely to be between the ages of 25 and 44, with the exception of the new 500 sub crew members, who will likely be between the ages of 18-24 and live on-base. The starting salary for trades personnel is $40,000 (average salary of $60,000); starting for salaried employees is $70,000 (average of $90,000). There are no data available on the demographic characteristics of existing Electric Boat employees, due to privacy concerns. However it was stated by company representatives that about 1 in 3 employees is eligible for retirement at any given time.

Groton and New London Electric Boat employees live throughout the region and beyond, as shown in the table below. The largest share live in Groton (21.1%), followed by New London (7.3%), Montville (6.7%),

[3] This includes all direct EB and SUPSHIP employees.

Waterford and Norwich (6.3% each), Stonington (5.6%), and Ledyard (4.9%). All other communities have fewer than 500 Electric Boat employees in residence.

Table 1: Place of Residence of Electric Boat Employees

	Existing Employees, 2019 Update	Percent of Total
Total	12,150	100.0%
SCCOG Region	9,130	75.1%
Other	3,020	24.9%
Groton and Mystic portion of Stonington (Zip Codes 06340, 06355, 06372, 06388, and 06349)	2,564	21.1%
New London	887	7.3%
Montville	818	6.7%
Waterford	771	6.3%
Norwich	763	6.3%
Stonington	686	5.6%
Ledyard	599	4.9%
Griswold/Lisbon/Voluntown (Zip Code 06351)	511	4.2%
East Lyme	322	2.7%
Colchester	311	2.6%
North Stonington	282	2.3%
Preston	216	1.8%
Salem	208	1.7%
Lebanon	71	0.6%
Bozrah	53	0.4%
Franklin	38	0.3%
Windham	30	0.2%

Source: Electric Boat, 2019
Note: If a SCCOG Region municipality is not listed, there are no Electric Boat employees residing in that municipality.

Given the widespread nature of the current worker pool, it is expected that the majority of new and replacement hires will be drawn from the existing labor force. However, for the purposes of this study, it was assumed that just over one-third of new hires (37.5%, or 1,986 workers) will be drawn from outside of the SCCOG region.

2. Other Regional Economic Forces

It is recognized that there are a number of economic factors within southeastern Connecticut that have had, and will continue to have, an impact on employment, housing, and transportation in the region. One of these is the declining/aging workforce.

After applying labor force participation rates by age to population projections from the Connecticut Data Center, it was determined that the total number of persons in the labor force will hold steady through 2040, and the SCCOG region will mirror the national average, with 25% of the labor force being 55 or older by the year 2020. Further, if the assumptions of net migration to the region are less robust and

subsequently the workforce under the age of 35 does not continue to grow, while at the same time labor force participation rates for persons over the age of 65 continue to grow for reasons of both choice and necessity, the share of senior workers could approach 35% by mid-century.

While older workers have advantages in terms of experience and knowledge; the fact that one in four workers at-large (one in three at Electric Boat according to the company) could retire at any time, can lead to a level of insecurity for employers. It is a necessity that the employers and regional municipalities work together to ensure that local companies and communities are places that a diverse array of workers will want to respectively, work and live.

As a result of the lingering impacts of the Great Recession, the region saw substantial job losses in several of its key industries, including the two casinos, the pharmaceutical industry with a downsizing and closure of Pfizer's New London facility, and shrinking of smaller manufacturing facilities elsewhere in the region.

However, there are emerging economic initiatives that have the potential to improve both the employment picture in southeastern Connecticut and the fiscal condition of some municipalities. Examples include the State of Connecticut's $4.5 million bond award in January 2017 to support repairs and improvements at the State Pier at the Port of New London, part of an overall public investment of $35.5 million, and plans to support an emerging off-shore wind industry with construction staging based in New London. While these and other emerging activities may have the potential for significant job creation, they cannot be quantified at this point. The purpose of this JLUS Implementation Study is to address potential impacts of the expanded Electric Boat employment only. However, this report acknowledges the possibility for additional impacts from future industrial expansion in the region beyond shipbuilding.

D. Project Process and Timeline

1. JLUS Implementation Committee

The JLUS Implementation Committee was formed in 2018, following the conclusion of the SUBASE New London JLUS. The Committee includes membership from SCCOG, the SUBASE, municipal governments of surrounding communities, and the State of Connecticut Office of Military Affairs. The Committee has met regularly since its inception, and guided this study process over the course of the project, with the assistance of technical staff of the municipalities as well as representatives from Electric Boat.

2. Timeline

The JLUS Implementation Study entailed an approximately 11-month-long planning process, covering four interrelated phases:

1. Project Start-Up (November 2018)
   In this phase, the project team kicked off the planning process by meeting with the JLUS Implementation Committee, touring the SUBASE, and reviewing previous relevant studies and documents.

2. Stakeholder Engagement (November 2018 to May 2019)
   This phase involved meeting with key stakeholders and the larger public to provide context for the study and seek feedback and ideas. As described below, engagement included public workshops, small focus groups and stakeholder meetings, and one-on-one interviews, as well as two targeted online surveys.

3. Analysis (November 2018 to May 2019)
   This phase entailed a comprehensive analysis of existing conditions pertaining to socioeconomics, land use, and transportation, to establish a baseline understanding of issues facing the SCCOG region. The team also assessed the employment expansion plans by both Electric Boat and SUBASE New London, together with known development in the pipeline, to determine future demand for housing in the region and potential impacts on transportation networks.

4. Draft and Final Deliverables (April 2019 to October 2019)
   The final phase of the project involved development of recommendations to address regional housing demand and transportation impacts. These strategies will give policy guidance to SCCOG member municipalities in managing anticipated future growth, and provide a basis for decisions on potential transportation improvements by both the municipalities and the State. This phase culminated in the adoption of the JLUS Implementation Study by the SCCOG board.

3. Stakeholder Outreach

The JLUS Implementation Study sought to engage the general public as well as the SUBASE, Electric Boat, and key stakeholders who are involved in housing and transportation in southeastern Connecticut. The consultant team developed an engagement strategy to target these stakeholders through various means, including public workshops, small focus group meetings, online surveys, and one-on-one interviews. The public engagement process is summarized below, and demonstrates that the project team received a substantial amount of public and stakeholder input, from a variety of sources. This input directly informed many of the study's strategies and recommendations. However, not all input was relevant to the scope of the study. The appendix contains a summary of public input, and how the study responded to the feedback.

Public Workshops

Two regional public workshops were held during the study. The first workshop, on January 29, 2019 in the Town of Groton Public Library, introduced the project to the public and gathered feedback on existing conditions and strategies that should be considered to address regional impacts as a result of the influx of new Electric Boat employees. The session began with a presentation on the study's goals and the existing regional housing market, demographics, road network, and transit options. Attendees then had an opportunity to ask questions in a facilitated "Town Hall" session. About 60 people attended the workshop, consisting of elected officials, municipal staff, members of the JLUS Implementation Committee, and the general public. Key comments included a desire to focus future housing development to existing centers; exploring alternative transportation including biking, walking, transit, and ride-share; and ensuring that future housing matches the demands of the regional workforce.

The second public workshop was held on July 15, 2019, in the City of Groton Municipal Building, and was attended by approximately 40 members of the public, elected officials, municipal staff, and JLUS Implementation Committee members. As with the first workshop, the session began with a presentation by the consultant team, which summarized findings on existing conditions and projections for the future regional housing market, road network, and transit options. Following the presentation, the team solicited feedback through roundtable discussions centered around three planning areas: housing, overall transportation, and transit. Each table discussed the topic area with a member of the consultant team and representatives from the Committee. At the end of the discussion, a volunteer from each table shared the key points discussed with the larger group. Some key issues discussed included how to ensure that future housing is of the appropriate type and location needed to serve future residents and workers; strategies to increase the use of transit in the region; and several transportation improvement concepts that the consultant team prepared at key locations in Groton and New London.

Focus Group and Stakeholder Meetings

Introductory Stakeholder Meeting: In January 2019, the consultant team and key members of the JLUS Implementation Committee met with representatives of Electric Boat to discuss the overall profile of the company's workforce, transportation issues, and data needs for the study. This meeting was also attended by planning staff of the Town of Groton and Horsley Witten, the consultant leading Part 1 of the JLUS Implementation Study.

Cities of Groton and New London: The team met in April 2019 with representatives of the Cities of Groton and New London to discuss their issues of concern related to expansion at Electric Boat. Also attending was a representative of Ninigret Partners, a consulting firm that conducted an economic development study of the Thames Street/Bridge Street corridors in Groton and the Hodges Square area in New London.

Town of Groton: In May 2019, the team met with the Town of Groton planner to discuss projects in the pipeline and their potential impact on housing stock in the region.

Representatives of Electric Boat Management: At this meeting in May 2019, the team confirmed Electric Boat's current and projected employment, wage assumptions, employee place of residence, and other characteristics.

Navy SUBASE Housing: The team met with representatives from the SUBASE to discuss how military housing is managed and any potential issues that should be addressed to ensure the housing stock adequately meets the demand. This meeting also included a representative of Balfour Beatty Communities, which operates a public-private venture with the Navy to provide military housing off-base.

One-on-One Interviews

Felix Reyes, New London Economic Development: Urbanomics interviewed Mr. Reyes to gain insights on development in New London and the region; identify developers; categorize developments in pipeline; determine expectations of secondary impacts; and get other feedback to inform JLUS strategies.

***Nancy Cowser, SeCTer*:** Urbanomics spoke with Ms. Cowser regarding what she has been told by Electric Boat regarding housing demand of new and onboarding employees.

Home Lenders and Mortgage Brokers: Urbanomics contacted 10 local financial institutions to gain insights into the local housing finance programs and barriers to finance. Two individuals, one from a bank and another a mortgage broker, were willing to speak. According to both, the major barriers to financing are lack of inventory and poor credit of applicants.

Online Surveys

Two online surveys were distributed in order to acquire qualitative information to inform the analysis and recommendations of the study. These are summarized below and discussed further in Section IV.

Realtor Survey: Between April 23, and May 4, 2019, responses were collected for a survey consisting of 24 questions. A total of 30 realtors from throughout the SCCOG region responded. Key findings were:

- The majority of realtors said that most clients were seeking single-family homes.
- Those seeking multi-family housing and rental housing tended to be either millennials or seniors.
- The most important amenities for all housing types include being within budget, having off-street parking, proximity to school/work/services/activities, and being move-in ready.
- Most respondents felt that available single-family and condominium housing stock meets client needs but that available rental housing is lacking.

Electric Boat Employee Survey: Between August 5, and August 15, 2019, responses were collected for an eight-question survey of housing and transportation preferences. A total of 1,986 responses were received. Key findings included:

- The majority of demand (80%) is for single-family homes among all Electric Boat employees, and 77% would prefer homeownership.
- However, among new employees (at Electric Boat for less than three years) roughly one-third preferred apartment or condominium housing and almost 40% would prefer to rent.
- Two-thirds of employees, regardless of age, would prefer new construction.
- Most employees would not consider more than $1,500 per month an affordable housing cost.
- While there is interest in alternative modes of transportation, most employees would drive alone to work and would prefer to travel less than 30 minutes each way. However, younger employees (under 35) are significantly more interested in walking and biking to work than employees overall.

Project Website

Throughout the study process, the consultant team created and maintained a standalone project website, subasenewlondonjlus.com, to update the public on the work progress and additional opportunities to get involved. The site included a project overview, links to background studies and documents, information about public workshops, interim project deliverables, and a form to send comments or questions.

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III. Socioeconomic Analysis and Forecast

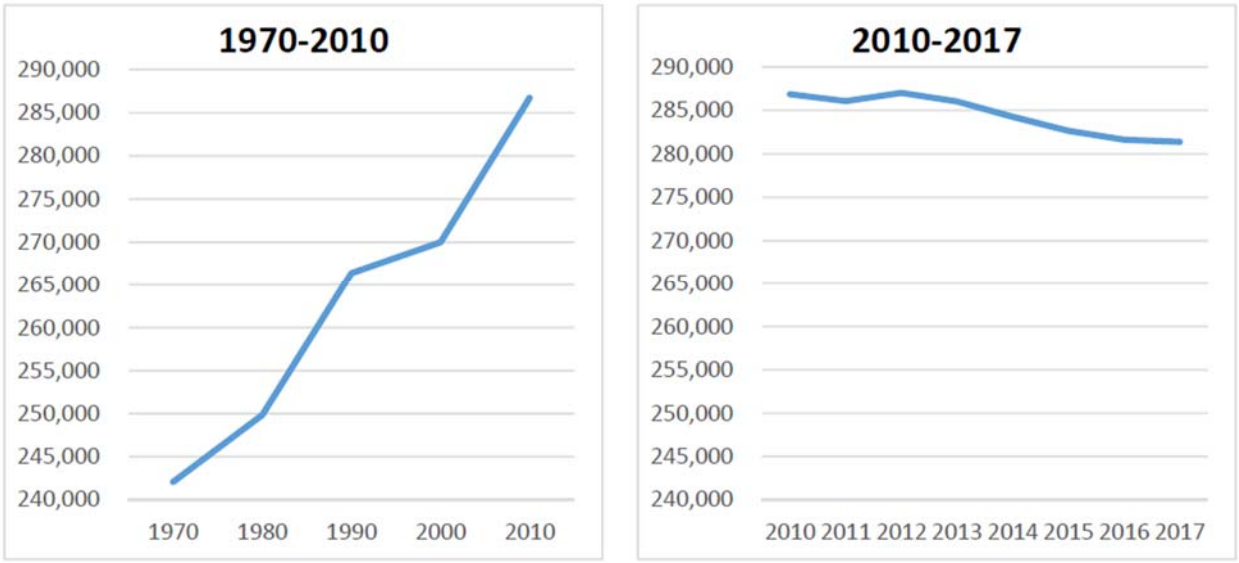
This section presents highlights of the socioeconomic analysis, focusing on the region as a whole, the high and low points of comparison, and Groton and New London as the primary locations of the SUBASE and Electric Boat employment. See the Appendix for more detailed data on the 22 SCCOG municipalities.

A. Existing Conditions

1. Population

Since the 1970s, as shown in Chart 2, the population of the SCCOG Region has risen from 242,074 residents in 1970 to 286,862 in 2010, reaching a peak of 287,019 residents in 2012. During these years, the region's suburban communities experienced strong growth, while the cities of New London and Norwich both lost residents. Since 2012, however, the region's population has decreased, falling by 2%, or 5,644 residents, over the five-year period from 2012 to 2017. During this time, the largest drop in population occurred in the Town of Groton (-1,158 or -2.9%) followed by Norwich (-1,067 or -2.6%). Only Stonington gained residents (+38 or +0.2%). In New London, the third-largest city after Groton and Norwich, the population fell by 1.9% from 27,584 to 27,072 residents.

Chart 2: Southeastern Connecticut Total Population, 1970-2017



Source: U.S. Census Bureau, 1970-2010 Decennial Censuses; U.S. Census Bureau July 1st Population Estimates, 2010-2017

As shown in Figure 5, the region's population remains most dense in urban communities along Long Island Sound and the Thames River. Other higher-density areas include Willimantic in Windham, Jewett City in Griswold, Colchester Center in Colchester, and Oakdale in Montville. The SCCOG region has a population density of 473 persons per square mile, ranging from highs of 4,886 and 4,835 persons per square mile in Jewett City and New London, respectively, to a low of 97 persons per square mile in North Stonington. The Town of Groton has moderate density compared with the region as a whole, with 1,273 persons per mile, while the City of Groton has considerably higher density at 2,978 persons per square mile.

Source: Population, US Census Bureau, 2013-2017 ACS

Figure 5: Southeastern Connecticut Population Density, 2017

2. Age

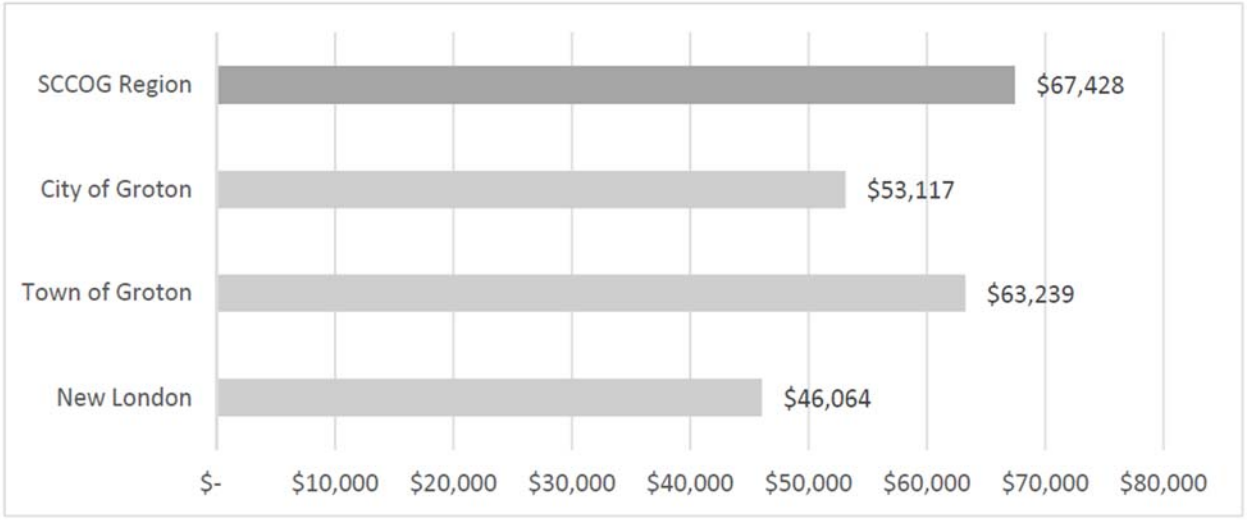
Over time, the age distribution of the region's population has skewed increasingly older. The share of residents under age 45 decreased from 72% of the population in 1970 to 56% in 2017. At the same time, seniors (aged 65 or older) increased from 8.8% of the population in 1970 to 16% in 2017. Both the Town of Groton and City of New London remain comparatively youthful with lower shares of senior residents than the region as a whole (13.8% and 11.2%, respectively, in 2017).

As shown in Figure 6, the share of older homeowners aged 75 or older are concentrated in the waterfront communities of Stonington, East Lyme, Waterford, and Groton, as well as parts of Montville, Norwich, and Windham. As these homeowners move out of their single-family homes, these communities will likely see a rise in housing available on the market. Some of these same communities, including the Mystic area of Stonington and Groton and the Niantic neighborhood of East Lyme, are highly desirable areas, with some of the highest home values in the region. Housing turnover in these areas may reduce home values to a minimal extent, while housing prices in less expensive areas such as Taftville and Occum in Norwich, the northern section of New London, the southern section of the City of Groton, and the Eastern Connecticut State University area of Windham, may be more significantly affected.

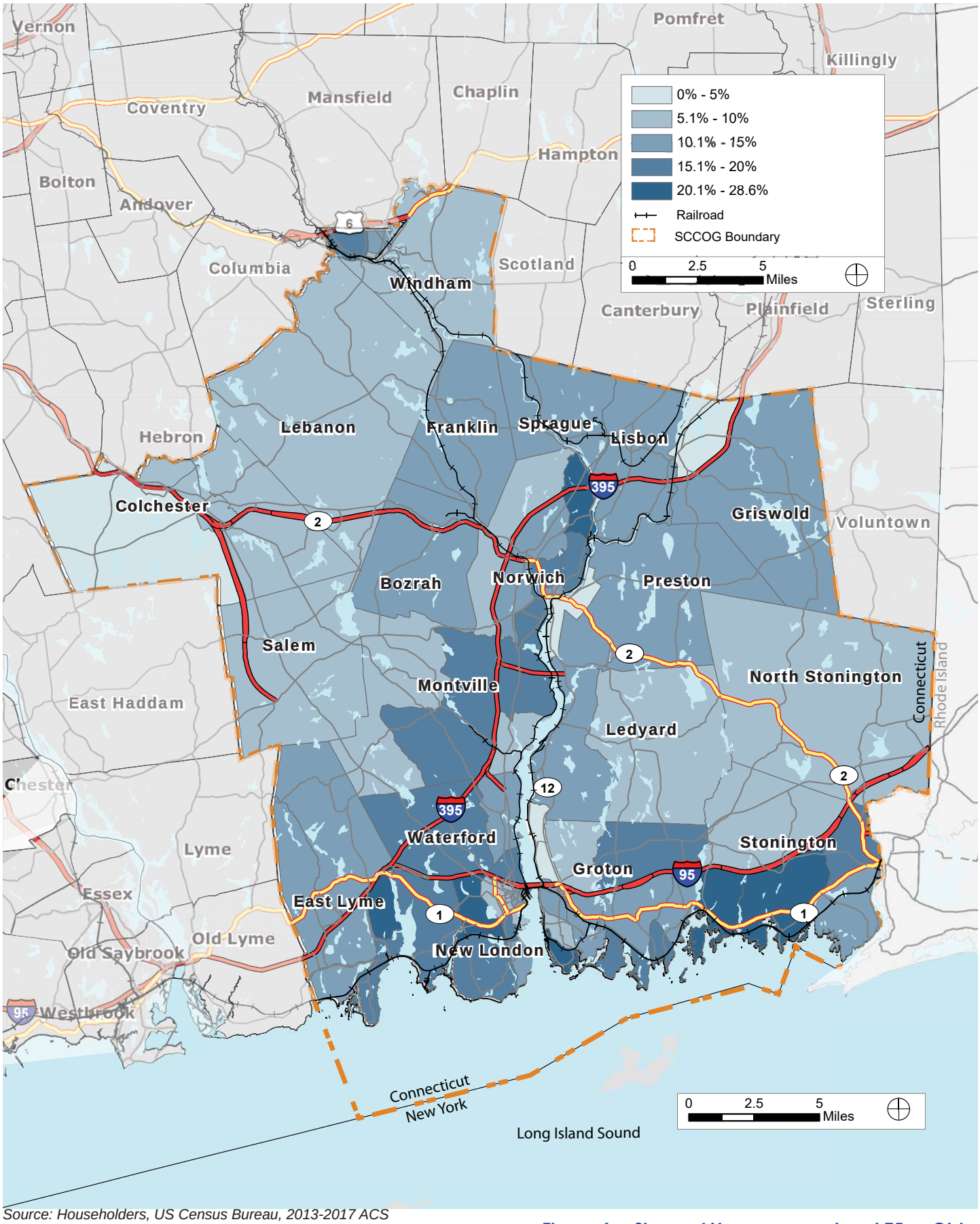
3. Household Income

The SCCOG municipalities range widely in terms of wealth, with the lowest median annual household income in Windham at $43,241 in 2018, followed by urban areas such as New London ($46,064), the Borough of Jewett City ($47,301), the City of Groton ($53,117), and Norwich ($54,677). The highest household income was located in suburban communities such as Salem ($105,383), Colchester ($98,128), and East Lyme ($89,908). Median annual household income in the SCCOG region as a whole was $67,428, more than 50% higher than in Windham, the town with the lowest income in the region.

Chart 3: Median Household Income in the SCCOG Region, Groton & New London, 2018



Source: ESRI, 2018 Socioeconomic Forecasts
Note: The illustrative analysis of existing socioeconomic conditions in the SCCOG region focused on the region as a whole and the municipalities where Electric Boat's major facilities are located: Groton and New London.



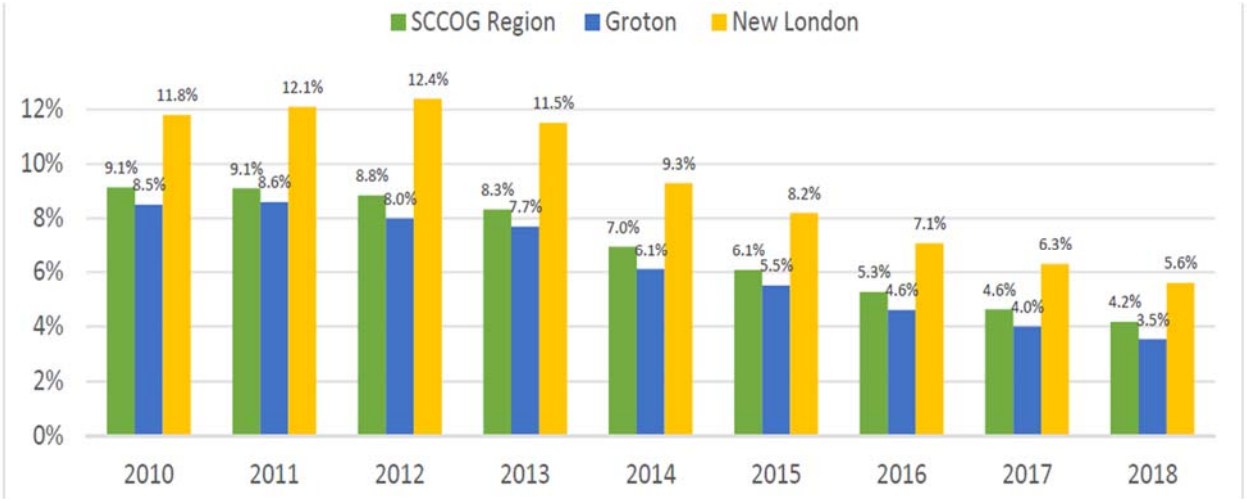
Source: Householders, US Census Bureau, 2013-2017 ACS

Figure 6: Share of Homeowners Aged 75 or Older

4. Labor Force

Following national trends, the unemployment rate in the SCCOG region has dropped dramatically, falling from 9.1% in 2010 to 4.2% in 2018 (see Chart 4). New London's unemployment rate dropped 6.8 percentage points from 12% to 5.6% over that period, but is still higher than the SCCOG region rate of 4.2% and the national rate of 3.9%. In the Town of Groton, the unemployment rate has consistently held below the regional level, falling from 8.5% in 2010 to 3.5% in 2018. At year-end 2018, the unemployment rate ranged from as high as 5.6% in New London to as low as 3.4% in both Ledyard and Stonington.

Chart 4: Annual Average Unemployment Rates, 2010-2018



Source: CT Department of Labor, LAUS Program, 2010-2018
Note: The illustrative analysis of existing socioeconomic conditions in the SCCOG region is focused on the region as a whole and the municipalities where Electric Boat's major facilities are located: Groton and New London.

5. Employment and Wages

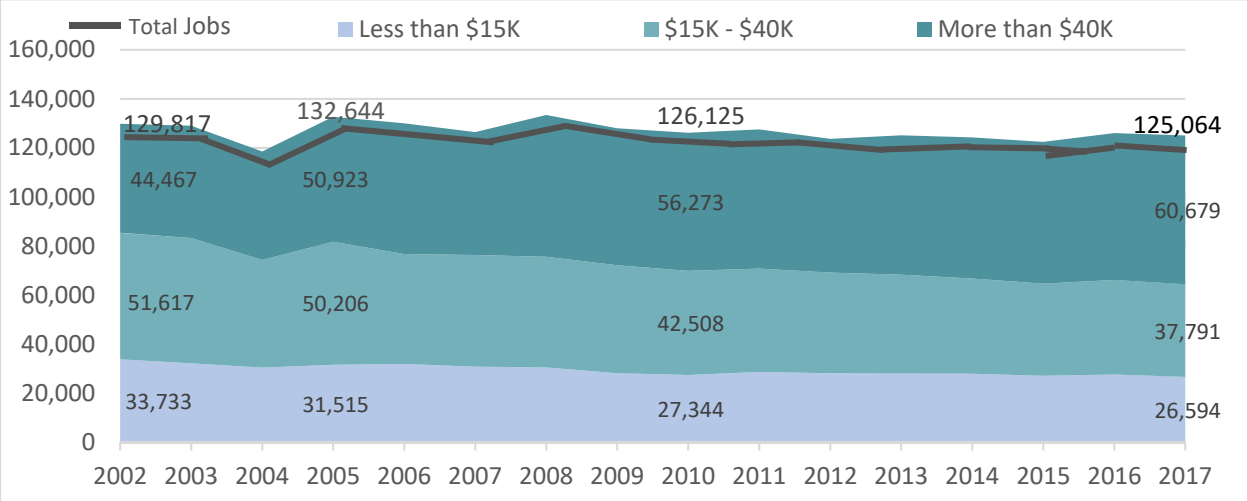
Over the last 50 years, the Norwich-New London metro area has lagged behind other Connecticut metro areas in terms of jobs added and average wages, and current trends remain unchanged. Job losses have been particularly significant in the manufacturing sector of New London County, which currently employs 10% of the workforce, down from 29% in 1969. Since 2002, manufacturing employers in the Town of Groton added 46 jobs, and New London added one job. In the SCCOG region, employment has fallen from 129,817 workers in 2002 to 125,064 workers in 2015, a loss of 3.7% (see Chart 5 and Table 2).

Employment losses during this time varied by sector, with the most losses occurring in the industries of manufacturing (-3,851 jobs), followed by arts/entertainment/recreation (-3,631 jobs) and public administration (local government, -974 jobs) where employment is categorized from casino establishments such as Mohegan Sun and Foxwoods.[4] Local area casino job losses over the last decade reflect increased competition from newly opened or expanded casinos in the Northeast such as Empire City Casino at Yonkers Raceway (4,000 slot machines added in 2007), the Aqueduct Casino in Queens, New York (5,000 slots and 500 table games added in 2011), and Twin River Casino in Rhode Island (table games added in 2013). Since 2015, several casinos in New York, Massachusetts, and Rhode Island have opened,

[4] Mohegan Sun and Foxwoods are run by tribal governments, and as such are classified as local government.

with plans underway for more. Thus, further job losses in these industry sectors should be expected. Other industries with major job losses from 2002 to 2017 include the administration/waste management and remediation sector (-957 jobs), information (-855 jobs), and utilities sector (-666 jobs).

Chart 5: Total Employment and Employment by Annual Wage Level among Employers Located in the SCCOG Region, 2002-2017



Source: U.S. Census Longitudinal Employer Household Dataset
Note: Numbers are not adjusted for inflation.

Table 2: Employment by Industry in the SCCOG Region, 2002-2015

	Count				2002-2017 Change	
	2002	2005	2010	2017	Percent	Absolute
Total	*129,817*	*132,644*	*126,125*	*125,06*	*-3.6%*	*-4,712*
Agriculture, Forestry, Fishing and Hunting	1,585	1,740	1,042	1,260	-20.5%	-325
Mining, Quarrying, and Oil and Gas	53	57	68	68	+28.3%	+15
Utilities	2,169	1,911	2,090	1,503	-30.7%	-666
Construction	3,999	4,583	3,480	3,734	-6.6%	-265
Manufacturing	20,390	20,233	16,544	16,539	-18.9%	-3,851
Wholesale Trade	2,570	2,615	3,026	3,335	+29.8%	+765
Retail Trade	14,555	14,580	13,074	13,956	-4.1%	-599
Transportation and Warehousing	2,415	3,149	3,139	3,037	+25.8%	+622
Information	2,309	2,016	1,692	1,454	-37.0%	-855
Finance and Insurance	2,033	2,129	2,120	1,954	-3.9%	-79
Real Estate and Rental and Leasing	1,190	1,148	905	965	-18.9%	-225
Professional and Business Services	4,924	5,084	5,390	5,246	+6.5%	+322
Management of Companies	408	363	420	523	+28.2%	+115
Admin. Waste Mgmt and Remediation	4,254	3,745	3,093	3,297	-22.5%	-957
Educational Services	10,598	11,380	12,414	11,814	+11.5%	+1,216
Health Care and Social Assistance	17,869	18,447	20,125	20,332	+13.8%	+2,463
Arts, Entertainment, and Recreation	19,673	21,288	18,606	16,042	-18.5%	-3,631
Accommodation and Food Services	9,857	9,750	10,925	11,768	+19.4%	+1,911
Other Services	3,335	3,477	3,434	3,621	+8.6%	+286
Public Administration	5,631	4,951	4,543	4,588	-18.5%	-1,043

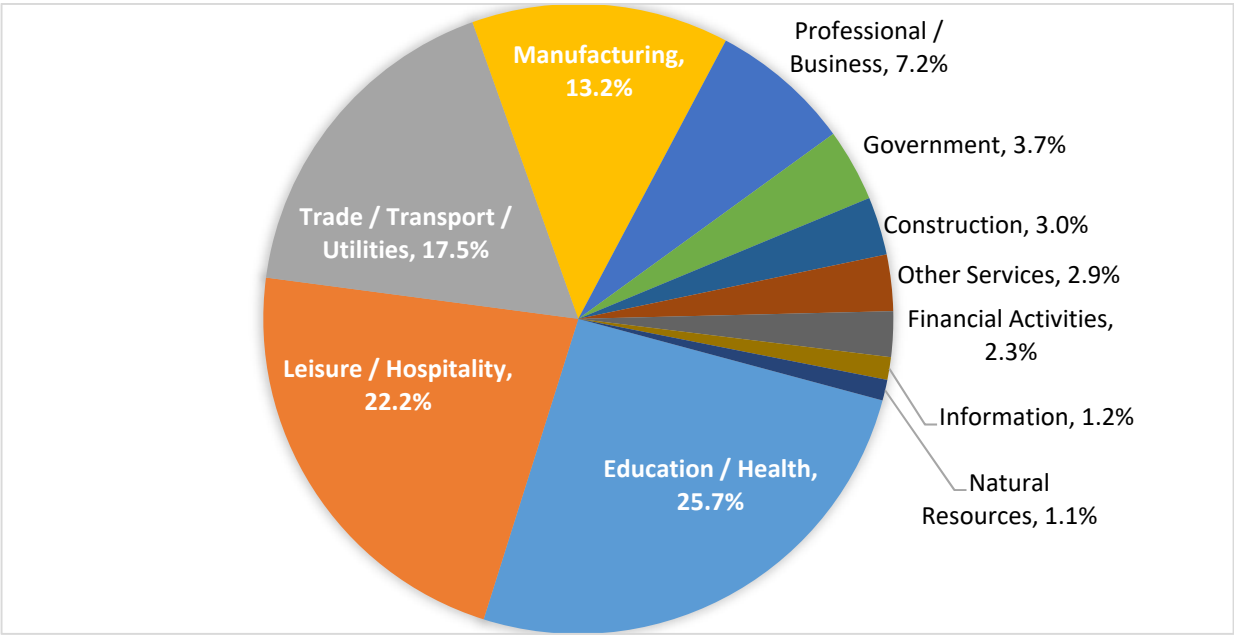
Source: U.S. Census Longitudinal Employer Household Dataset

Industries with growth of more than 1,000 jobs in the SCCOG region from 2002-2017 included health care/social assistance (+463 jobs), accommodations/food services (+1,911 jobs), and educational services (+1,216 jobs).

As of 2017, the largest industry sector in the SCCOG region in terms of number of workers was education/health at 26% of total employment, followed by leisure/hospitality (22%), trade/transport and utilities (both 17%), and manufacturing (13%). All other industry groups totaled less than 10% of total employment each.

As average wages rose by 25% in the SCCOG region from 2000 to 2017, manufacturing wages stagnated, falling by 1.6%. Manufacturing wages of workers employed in the SCCOG region remain higher than all other industry groups except for information, financial activities, and professional/business services. Average annual wages for workers employed in the region were $36,317 in 2017 and ranged from a high of $82,407 in the Town of Groton to a low of $27,593 in Lisbon. Average wages of workers employed in New London were higher than the region overall at $54,130. As shown in Chart 5, the number of workers earning over $40,000 a year has grown from 44,467 workers in 2002 to 60,679 workers in 2017 (+36.5%), while those earning wages of $15,000 or less, roughly equivalent to the federal poverty level for a two-person family, fell by 26% over the period. [5]

Chart 6: Distribution of Employment by Industry in the SCCOG Region, 2017



Source: U.S. Census Longitudinal Employer Household Dataset
Note: In the above chart, casino workers are grouped in leisure/hospitality.

[5] The federal poverty level for a two-person household in 2017 was $16,240.

The SCCOG region's eight largest employers employ more than 45,000 workers in locations along the Thames River in Groton, New London, and Waterford, and in the Mohegan and Mashantucket Pequot Tribal Nations. These include more than 22,000 workers in Groton (Electric Boat, SUBASE, and Pfizer), and 6,000 workers in New London (Electric Boat and Lawrence + Memorial Hospital), as well as 10,000 workers at Mohegan Sun on the Mohegan Tribe Reservation, 6,700 workers at Foxwoods at the Mashantucket Pequot Reservation in Ledyard, and 1,650 workers at Dominion Nuclear in Waterford.

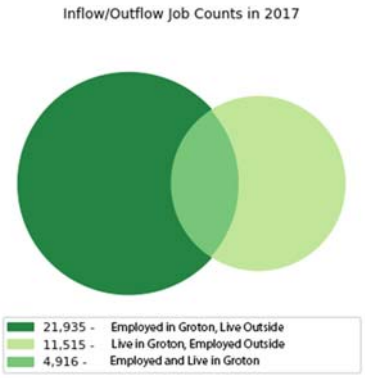
6. Commutation

The SCCOG region is largely a self-contained labor market area, with nearly two-thirds (64.9% or 79,702) of the 122,891 workers employed in the region in 2015 also living within it. Just over half of workers employed in the SCCOG region traveled less than 10 miles to work. Another 28% traveled 10-24 miles, while the remaining 21% traveled 25 miles or longer. Regional employment is concentrated along the Thames River and the Long Island Sound in communities such as New London, Groton, and Norwich.

As shown in Chart 7, the Town of Groton had some 26,851 jobs in 2017. The Town is a net importer of labor, with local employers staffed predominantly (21,935, or 81.7%) by residents of communities outside of Groton. Nearly half (49.5%) of the Town's workers live in other communities in the SCCOG Region.

The Town of Groton's resident labor force of 16,431 workers were employed throughout the greater area, with over two-thirds (67.4%) working in the SCCOG region. Top work destinations include the Town of Groton (29.9%), New London (8.6%), and Stonington (7.2%).

Chart 7: Town of Groton Commutation Trends, 2015



Source: US Census Longitudinal Employer Household Dataset

Where Workers Live, 2017			Where Residents Work, 2017		
	Count	Share		Count	Share
All	26,851	100.0%	All	16,431	100.0%
Groton	4,916	18.3%	Groton	4,916	29.9%
Stonington	1,793	6.7%	New London	1,413	8.6%
Ledyard	1,744	6.5%	Stonington	1,177	7.2%
New London	1,552	5.8%	Ledyard	823	5.0%
Waterford	1,428	5.3%	Waterford	787	4.8%
Norwich	1,385	5.2%	Norwich	640	3.9%
Montville	1,242	4.6%	Montville	592	3.6%
East Lyme	1,213	4.5%	Hartford	368	2.2%
Westerly	1,063	4.0%	East Lyme	269	1.6%
North Stonington	495	1.8%	Westerly	240	1.5%
All Other Locations	10,020	37.3%	All Other Locations	5,206	31.7%

B. Socioeconomic Forecasts

1. Employment

Projections of future employment from the Connecticut Department of Labor are not available for the SCCOG region, but are shown in Table 3 for the Eastern Connecticut Workforce Development Area (WDA), which includes the SCCOG region and all municipalities to the north.

Table 3: Employment by Occupation Forecast for the Eastern Connecticut WDA, 2016-2026

NAICS Code	Industry Title	Base Employment 2016	Projected Employment 2026	Numeric Change	Percent Change
0	Total All Industries	192,286	197,475	5,189	2.7
67	Self Employed and Unpaid Family Workers, All Jobs	10,970	11,454	484	4.4
67	Self Employed and Unpaid Family Workers, All Jobs	10,970	11,454	484	4.4
11	Agriculture, Forestry, Fishing and Hunting	1,381	1,564	183	13.3
21	Mining	167	185	18	10.8
23	Construction	5,480	5,672	192	3.5
31	Manufacturing	22,072	26,230	4,158	18.8
44	Retail Trade	21,532	21,166	-366	-1.7
48	Transportation and Warehousing	6,237	5,943	-294	-4.7
51	Information	1,605	1,685	80	5.0
52	Finance and Insurance	2,597	2,620	23	0.9
53	Real Estate and Rental and Leasing	1,212	1,463	251	20.7
54	Professional, Scientific, and Technical Services	6,482	7,078	596	9.2
55	Management of Companies and Enterprises	1,156	1,550	394	34.1
56	Administrative and Support and Waste Management and Remediation Services	4,445	4,912	467	10.5
61	Educational Services	23,571	23,112	-459	-2.0
62	Health Care and Social Assistance	27,307	29,929	2,622	9.6
71	Arts, Entertainment, and Recreation	14,991	2,750	-12,241	-81.7
72	Accommodation and Food Services	17,771	25,802	8,031	45.2
81	Other Services (except Government)	6,503	7,127	624	9.6
9	Government	11,043	11,084	41	0.4
91	Total Federal Government Employment	2,620	2,779	159	6.1
92	State Government, Excluding Education and Hospitals	2,695	2,503	-192	-7.1
93	Local Government, Excluding Education and Hospitals	5,728	5,802	74	1.3

Source: CT Department of Labor

While these forecasts show overall employment growth of 2.7%, much of this is recovery to pre-recession levels. The greatest job increases are expected to be seen in Accommodations and Food Services (+8,031), followed by Manufacturing (+4,158). The greatest losses are expected in Arts, Entertainment, & Recreation (-12,241) reflecting further decline of the gaming industry.

SCCOG's share of Eastern CT WDA employment is roughly 64% of the 2016 total; therefore, assuming that share remains constant, the number of jobs in the SCCOG region in 2026 would be 126,241, and the increase in jobs would be 3,321.

2. Labor Force

Labor shortages are a concern throughout the country, especially in the production occupations as more workers shift to less physically demanding service sector jobs. Compounding the issue is slowing population growth in terms of both natural increase (births-deaths) and net migration. Determining if there is a workforce available to meet projected demand is a necessity.

Table 4 shows the CT Data Center population forecasts for the SCCOG region by major age cohort. The working age population is expected to hold steady at a 0.3% increase from 2015 to 2040, although the working age share of total population is expected to decline over time.

Table 4: Southeastern Connecticut Population Forecasts by Major Age Cohort

	2015	**2020**	**2025**	**2030**	**2035**	**2040**	**% Change 2015-2040**
Children <15	49,274	49,462	49,633	50,424	50,145	49,672	0.8%
Working Age 15-64	197,118	197,036	195,857	194,703	195,713	197,676	0.3%
Retirement 65+	43,479	47,858	52,987	56,607	57,645	56,437	29.8%
	Share of Total Population						
	2015	2020	2025	2030	2035	2040	% Point Change in Share
Children	17.0%	16.8%	16.6%	16.7%	16.5%	16.4%	-0.6
Working Age	68.0%	66.9%	65.6%	64.5%	64.5%	65.1%	-2.9
Retirement	15.0%	16.3%	17.8%	18.8%	19.0%	18.6%	3.6

Source: CT Data Center

The table below presents the likely number of persons participating in the labor force by age group from 2015 to 2040. Applying the most recent (2017) labor force participation rates by age cohort to the forecasts of population over the age of 15 provides a projection of the labor force through the year 2040. Using this methodology, the SCCOG labor force will total 165,000 in 2025—more than sufficient to fill SCCOG's share of employment as projected for the Eastern CT WDA, given that the majority of jobs can be expected to be filled by previously unemployed workers, based on regional unemployment rates.

Table 5: Southeastern Connecticut Regional Labor Force Projections

Age Group	Labor Force Participation Rate	2020	2025	2030	2035	2040
15-19	51.4%	10,405	10,476	10,245	10,620	10,447
20-24	82.3%	18,786	18,642	18,903	18,509	18,752
25-29	86.4%	16,730	17,258	17,067	17,510	17,438
30-34	81.8%	15,138	15,567	15,881	15,570	16,024
35-39	84.7%	14,951	15,570	15,999	16,216	15,877
40-44	84.7%	15,013	15,985	16,693	17,143	17,323
45-49	85.9%	16,005	15,604	16,608	17,405	17,873
50-54	85.9%	17,624	16,004	15,567	16,488	17,281
55-59	79.6%	17,053	15,659	14,290	13,844	14,568
60-64	63.5%	12,795	12,761	11,831	10,813	10,397
65-69	32.8%	5,094	5,725	5,670	5,276	4,827
70-74	32.8%	3,747	4,022	4,476	4,346	3,994
75-79	7.5%	627	718	771	857	828
80-84	7.5%	431	510	583	629	698
85+	7.5%	509	517	571	637	690
Total		**164,908**	**165,018**	**165,153**	**165,863**	**167,015**
		Change in LF	2015-2030:	846	2030-2040:	2,108

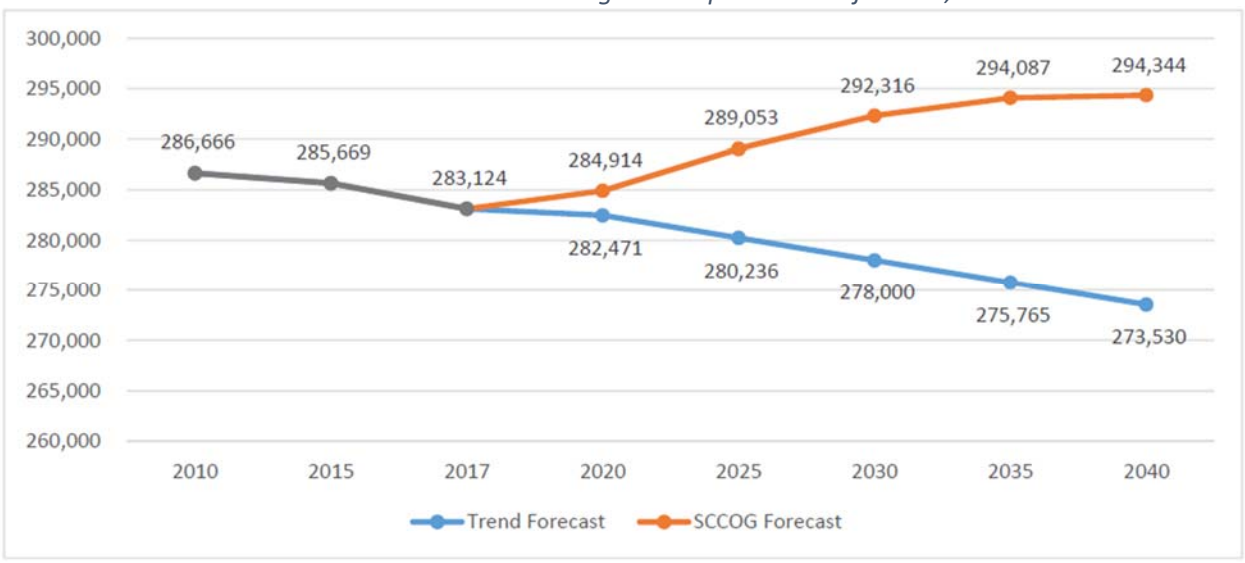
Source: CT Data Center, 2017 ACS, Urbanomics

The aging of the workforce is an issue of concern. Table 5 indicates the SCCOG region will mirror the national average, with 25% of the labor force being 55 or older by the year 2020. Further, if the assumptions of net migration to the region are less robust and subsequently the workforce under the age of 35 does not continue to grow, while at the same time labor force participation rates for persons over the age of 65 continue to grow for reasons of both choice and necessity, the share of senior workers could approach 35% by mid-century.

3. Population

Urbanomics prepared two forecasts using population by age and headship rates by age to determine housing demand. The first is based on the Connecticut Data Center's population by age forecasts for the SCCOG municipalities through the year 2040, re-benchmarked to 2017 data. These were prepared before 2015 and assumed future growth rates similar to the period from 2005 to 2011. Because the region has not yet fully recovered from the last recession, these projections are now considered to be an unlikely high growth scenario, which can be used to test the limits of regional capacity. The second is a linear regression forecast that incorporated more recent downward trending population data from 2012 through 2017—during which time the population decreased by 5,600 residents. The second forecast can be viewed as a worse-case scenario. Neither projection directly incorporates projected growth from hiring at Electric Boat; household forecasts including the additional hiring are discussed in Section IV.F. The chart below compares the two forecasts, which differ by about 10,000 by 2025 and 20,000 by 2035.

Chart 8: Southeastern Connecticut Regional Population Projections, 2010-2040

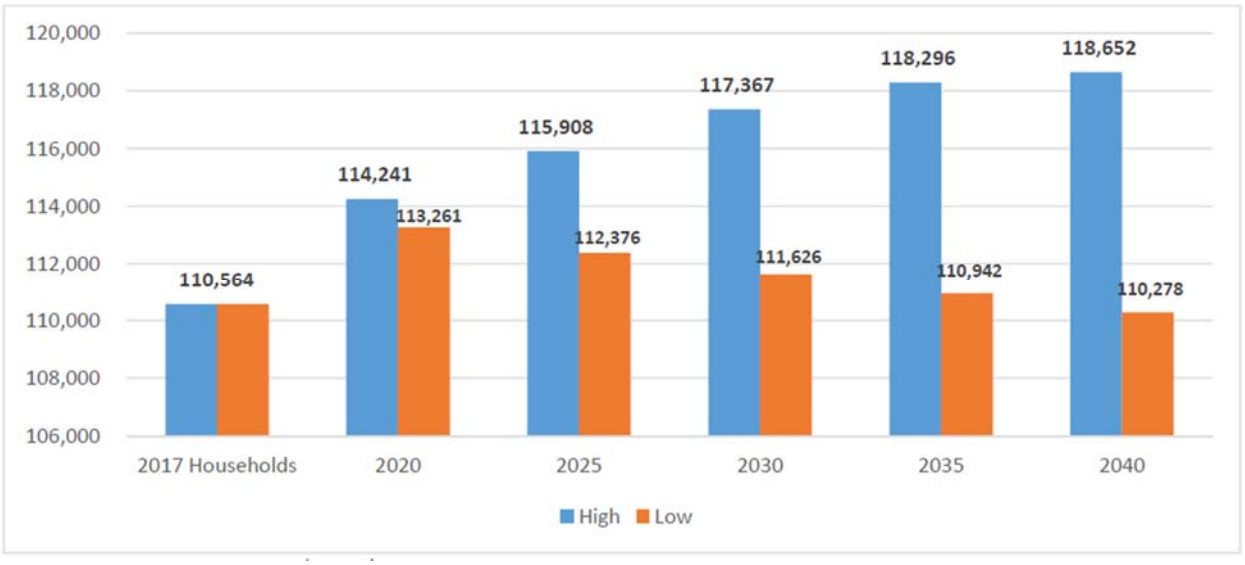


Source: U.S. Bureau of the Census, SCCOG, and Urbanomics
Note: The "SCCOG Forecast" is based on the CT Data Center, rebenchmarked to the 2017 base year, while the "Trend Forecast" is based on actual recent population trends.

4. Households

Setting the baseline to which households established by Electric Boat employment will be added, both population forecasts were converted to households using the application of headship rates by age to the population age cohorts. As shown in the chart that follows, the optimistic regional forecast has households increasing to 118,652 region-wide by 2040. The lower, trend-based forecast has households declining in number to 110,278 by 2040—fewer than existed in 2017. As discussed in Section IV, the additional households created by an influx of Electric Boat employees will bolster a sagging housing market.

Chart 9: SCCOG Region High and Low Household Forecasts 2017-2040



Source: CT State Data Center, Urbanomics

IV. Housing

A. Housing Units

The SCCOG region's housing supply saw rapid growth during the second half of the 20th century, increasing by 20%, or 15,721 units, during the 1970s, and 15% or 13,968 units, during the 1980s. Growth slowed in the 1990s (+5.6%), 2000s (+9.1%), and the period from 2010 to 2017 (+1.4%). It is notable that housing units since 2010 increased at all, given that the number of households in the region actually fell by 0.2% over that period. Housing unit growth has historically outpaced household growth in the region due to the area's popularity with vacationers, who have supported a sizeable second-home market, especially in East Lyme, Stonington, and Groton. New London added the largest number of new housing units from 2010 to 2017 (+580 or +4.9%) while Griswold lost the most units (-133 or -2.6%) either due to demolition or conversion. The Town of Groton added 95 units (+0.5%), and the City of Groton added 57 units (+1.2%).

B. Vacancies

Vacant housing units may be grouped into two categories:

- Off-market vacancies which include units that are unoccupied but not available for sale or lease such as those units undergoing major repairs or renovations, being used for storage, held in probate, or simply abandoned.; and
- On-the-market vacancies including units immediately available for rent or sale.

According to the U.S. Census Bureau, off-market vacancies increased in the SCCOG region from 6,132 units in 2000, to 7,037 units in 2010, and 10,238 units in 2017, a gain of 67% from 2000 to 2017. Just over 90% of the gain in off-market vacancies was due to the increase in units classified by the Census Bureau as "other" vacancies, which includes units held for undergoing major repairs or renovations, being used for storage, held in probate, or simply abandoned. These units are more likely to be located in buildings with 2-4 units and constructed prior to World War II than the region's housing stock as a whole.

Among on-the-market vacancies, the number of unoccupied units available for sale or lease in the SCCOG region increased from 3,405 in 2000 to 5,400 in 2010, and has since decreased to 4,157 units as of 2017.

C. Tenure

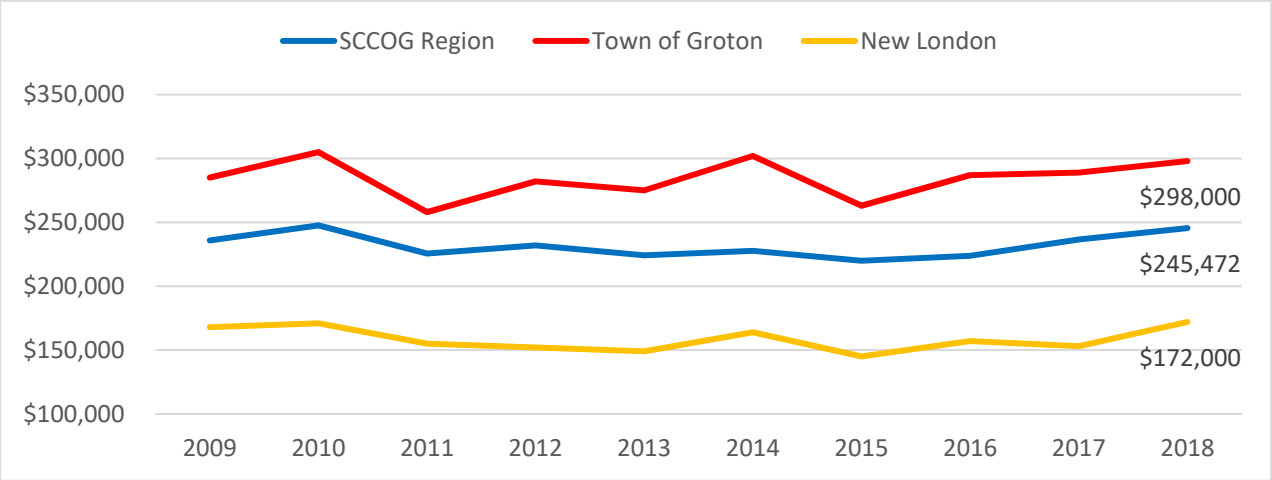
The share of occupied housing units owned by homeowners has remained largely stable since 1970. The share of such units in the SCCOG region increased from 62% to 64% in 2017. Groton and New London are both majority renter communities; New London had the smallest share of homeowner households in the region at 37%, followed by the City of Groton at 40%. The Town of Groton had 46%, well below the average for SCCOG municipalities of 71%. The Town of Salem had the highest share of owner-occupied units in 2017 at 93%.

D. Owner-Occupied Housing

Home Values

According to Berkshire Hathaway Home Services' SmartMLS data, single-family home prices in the SCCOG region and both the Town of Groton and City of New London have recovered in 2018 from the lows of 2009 (see Chart 10).[6] At year-end 2018, the average single family home sale price in the SCCOG Region was $245,472. Average sales prices varied widely across the region, from just $135,000 in Windham to $441,000 in Stonington. With some of the highest home values in the region concentrated in the Mystic area of Groton and Stonington, the Town of Groton had a relatively high average selling price of $298,000, compared with just $172,000 across the Thames River in New London; only Norwich and Windham had lower average sales prices than New London. Just over 3,100 single-family homes were sold in 2018 in the SCCOG region, with the largest share of sales by town occurring in Norwich (12.6% or 395 sales), followed by the Town of Groton (11% or 346 sales). The City of New London had 161 sales, accounting for 5.1% of regional sales, and Franklin had the fewest sales in the region (16 sales or 0.5%).

Chart 10: Average Single-Family Home Sales Price, 2009-2018



Source: SmartMLS and Berkshire Hathaway Home Services, 4Q 2018 Market Report
Note: The illustrative analysis of socioeconomic conditions is focused on the SCCOG region as a whole and the municipalities where EB's major facilities are located: Groton and New London.

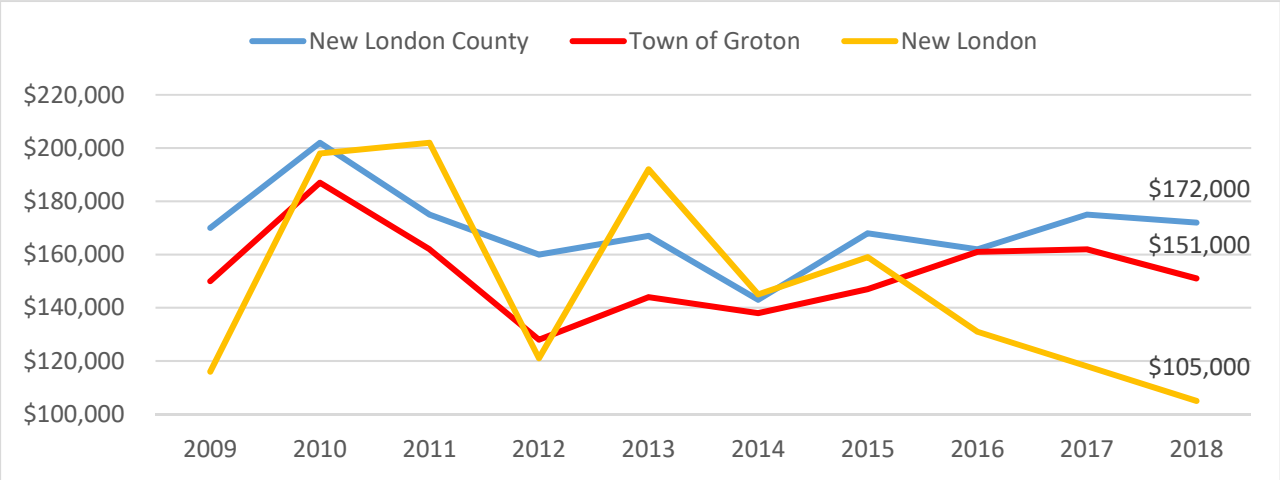
With much less inventory than single-family homes, average condominium sales prices in New London County[7] fluctuated greatly from 2009 to 2018 (see Chart 11). From 2012 to 2018, these prices were relatively stable in the Town of Groton and the County, as prices in New London trended downward, below 2009 levels. Multifamily condos, more affordable than single-family units, had an average sale price

[6] Market data from Berkshire Hathaway Home Services is sourced from SmartMLS, Connecticut's only statewide Multiple Listing Service and the only residential property listing service serving the SCCOG Region. SmartMLS data represents 88% of residential listings in Connecticut and 96% of realtors.

[7] Multifamily inventory and market statistics for individual SCCOG municipalities were unavailable; thus, the average sales price for the SCCOG Region is not known. However, New London County is a good "stand-in" for these data.

of $172,000 in the fourth quarter of 2018, and roughly 60% were sold for less than $150,000. Stonington had the highest average unit sold price of $381,000, while Montville had the lowest at $60,000.

Chart 11: Average Condominium/Townhouse Sales Price, 2009-2018



Source: SmartMLS and Berkshire Hathaway Home Services, 4Q 2018 Market Report
Note: Condo sales data not available for the entire SCCOG region. The Illustrative analysis of socioeconomic conditions is focused on the SCCOG region as a whole and the municipalities where EB's major facilities are located: Groton and New London.

Owner-Occupied Housing Costs

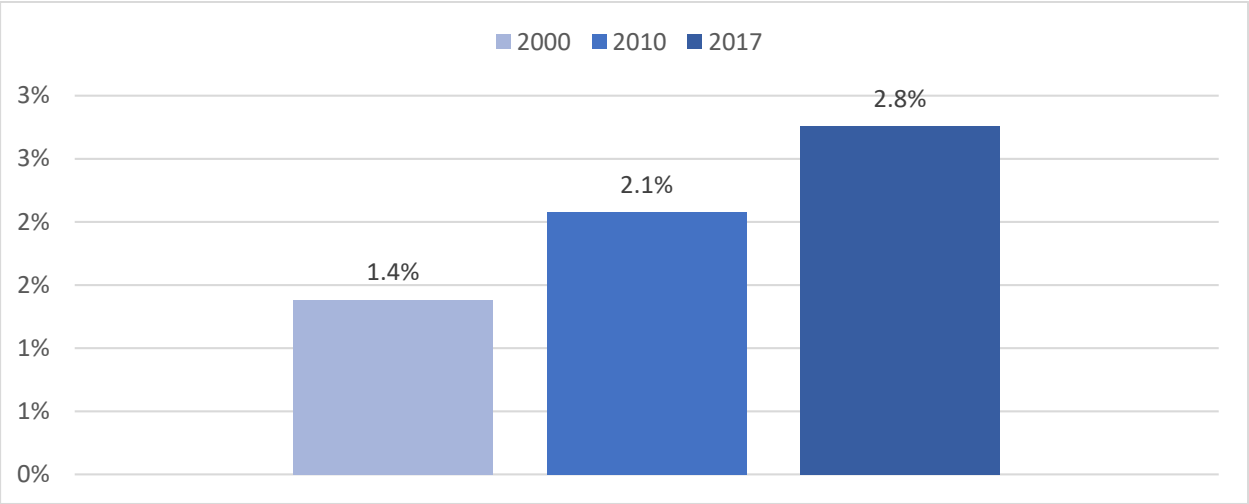
Homeowners with a mortgage paid much more in housing costs[8] than renters. While roughly half of such households in the region (53.7%) spent $1,000-$1,999 a month on housing, 39% spent over $2,000. The highest median housing costs for homeowners with a mortgage was in the Borough of Stonington at $2,920, followed by North Stonington ($2,160), while the lowest housing costs were in Windham ($1,594), followed by Montville ($1,597). Monthly housing costs in the City of Groton ($1,672) were slightly more expensive than in New London ($1,621), but not as expensive as the Town of Groton ($1,834).

Vacancies in Owner-Occupied Units

Homeowner vacancy rates have continued to remain low in all areas of the region at 2.8% region-wide in 2017 (see Chart 12). Vacancies were less than 0.5%[9] in the City of Groton, Bozrah, Franklin, and Preston, a sign of major local housing shortages, and as high as 5.9% in Jewett City. The Town of Groton and New London had healthy owner-occupied vacancy rates of 3% and 2.8%, respectively.

[8] Including mortgages, real estate taxes, various insurances, utilities, fuels, mobile home costs, and condo fees.
[9] Vacancy rates under 0.5% are estimated as 0% by the U.S. Census Bureau.

Chart 12: Owner-Occupied Housing Vacancy Rates by Tenure in the SCCOG Region, 2000-2017



Note: Excludes off-market vacant housing units.
Source: U.S. Census Bureau, 2000 & 2010 Decennial Censuses; American Community Survey, 2013-2017 5-Year Estimate

E. Rental Housing

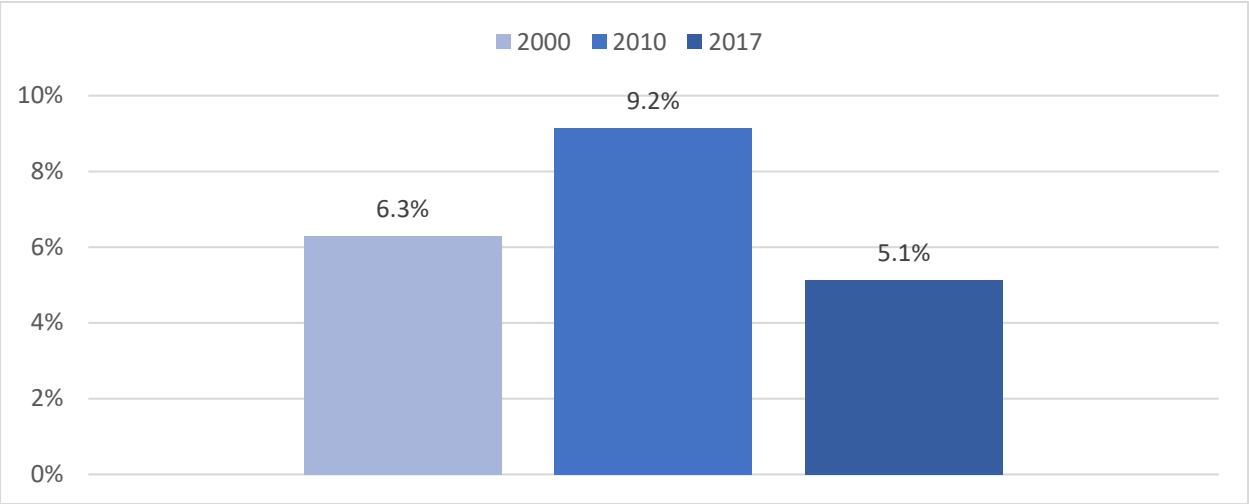
Monthly Rents

Although homeowner housing values have declined across the SCCOG region, monthly rental rates have risen since 2010. The region has a wide range of housing options in terms of cost, with low-cost housing available near major employment centers in urban areas, as well as in rural areas. Housing costs were highest in the region's lower-density, highly desirable waterfront areas. Gross rent (including contract rent and utilities) ranged from as high as $1,408 per month in the Borough of Stonington to as low as $812 in Windham in 2017, with median rent in the Town of Groton at $1,183, and $950 in New London. In the region as a whole, nearly half (49.7%) of households spent $1,000-$1,999 on gross rent, and just 3.8% spent $2,000 or more.

Rental Vacancies

Renter vacancy rates hit a recent high in 2010 but have since dropped in most areas of the region, with the exception of the City of Groton, where vacancy rates have remained high at 12%. Rates were somewhat lower in the Town of Groton at 7.5%. The region overall has a rental vacancy rate of 5.1%, ranging from a low of under 0.5% in Montville, Bozrah, Lebanon, Lisbon, and North Stonington, to a high of 16% in Salem. In New London, the rental vacancy rate is considered healthy at 5.3%.

Chart 13: Renter Housing Vacancy Rates in the SCCOG Region, 2000-2017

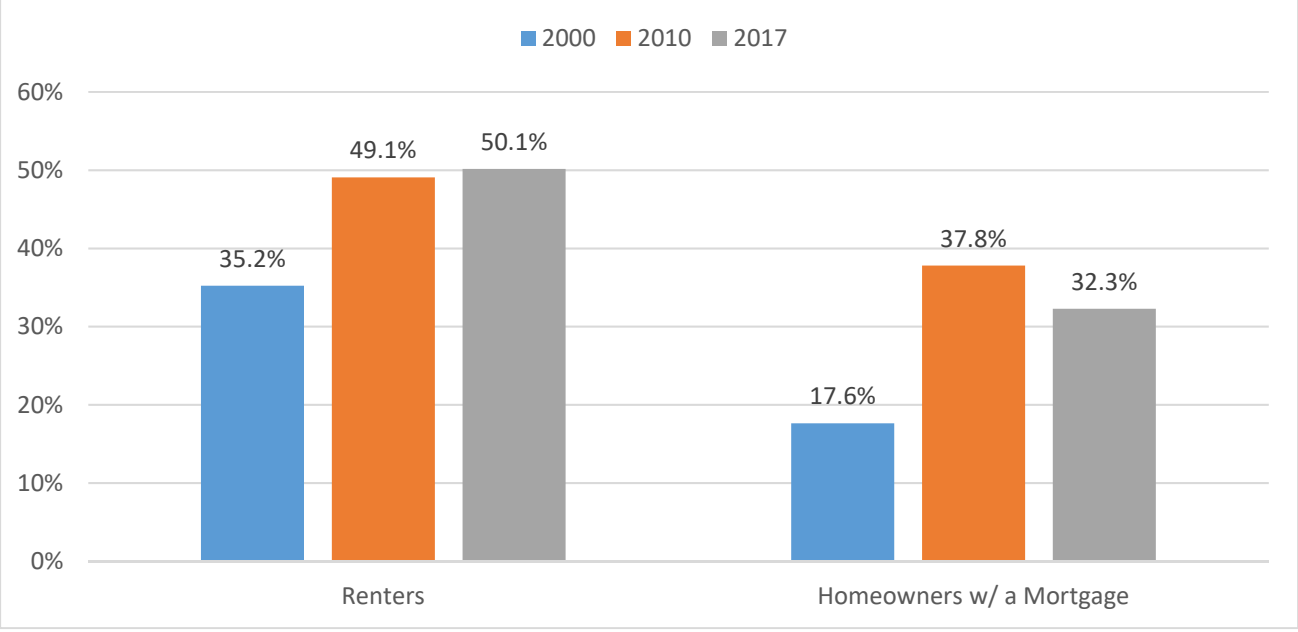


Source: U.S. Census Bureau, 2000 & 2010 Decennial Censuses; American Community Survey, 2013-2017 5-Year Estimate
Note: Excludes off-market vacant housing units.

F. Affordability

As shown in Chart 14, within the region a higher share (50.1%) of renter households spend 30% or more of income on housing, than homeowners with a mortgage (32.3%). Such housing cost-burdened homeowners with a mortgage ranged from a regional high of 54% of such households in Jewett City to a low of 20% in Ledyard. Such households totaled 40% in New London, 32% in the City of Groton and 34% in the Town of Groton.

Chart 14: Share of SCCOG Region Households Spending 30% or More of Income on Housing by Tenure



Source: U.S. Census Bureau, 2000 Summary File 3; American Community Survey, 2006-2010 and 2013-2017 5-Year Estimates

While the share of homeowners with a mortgage spending a high amount of income on housing has dropped in most areas since 2010, the share of renters spending 30% or more of income on housing has increased in most areas. In New London, this trend is particularly evident, with the share of renter households spending 30% of income on housing increasing from 39.2% in 2000 to 45.7% in 2010 to 59% in 2017. Compared with the SCCOG region share of 50%, renters in the City and Town of Groton were somewhat less cost-burdened. Such households accounted for 40% and 46% of renters, respectively. Salem had the lowest share of cost-burdened renters at 24.8%.

Based on an analysis of median home sales prices and area taxes, average annual manufacturing job earnings of $60,923 in the SCCOG region are estimated to be enough to afford[10] the purchase of a single-family home in Groton and New London, as well as in Montville, Griswold, Lisbon, Norwich, Preston, Sprague, and Windham. Multifamily condos and townhomes are also estimated to be affordable in Groton and New London, as well as in Montville, Ledyard, Waterford, Colchester, and Norwich. Rental housing is affordable[11] throughout the SCCOG region for manufacturing workers at regional average earnings.[12]

G. Projected Housing Demand

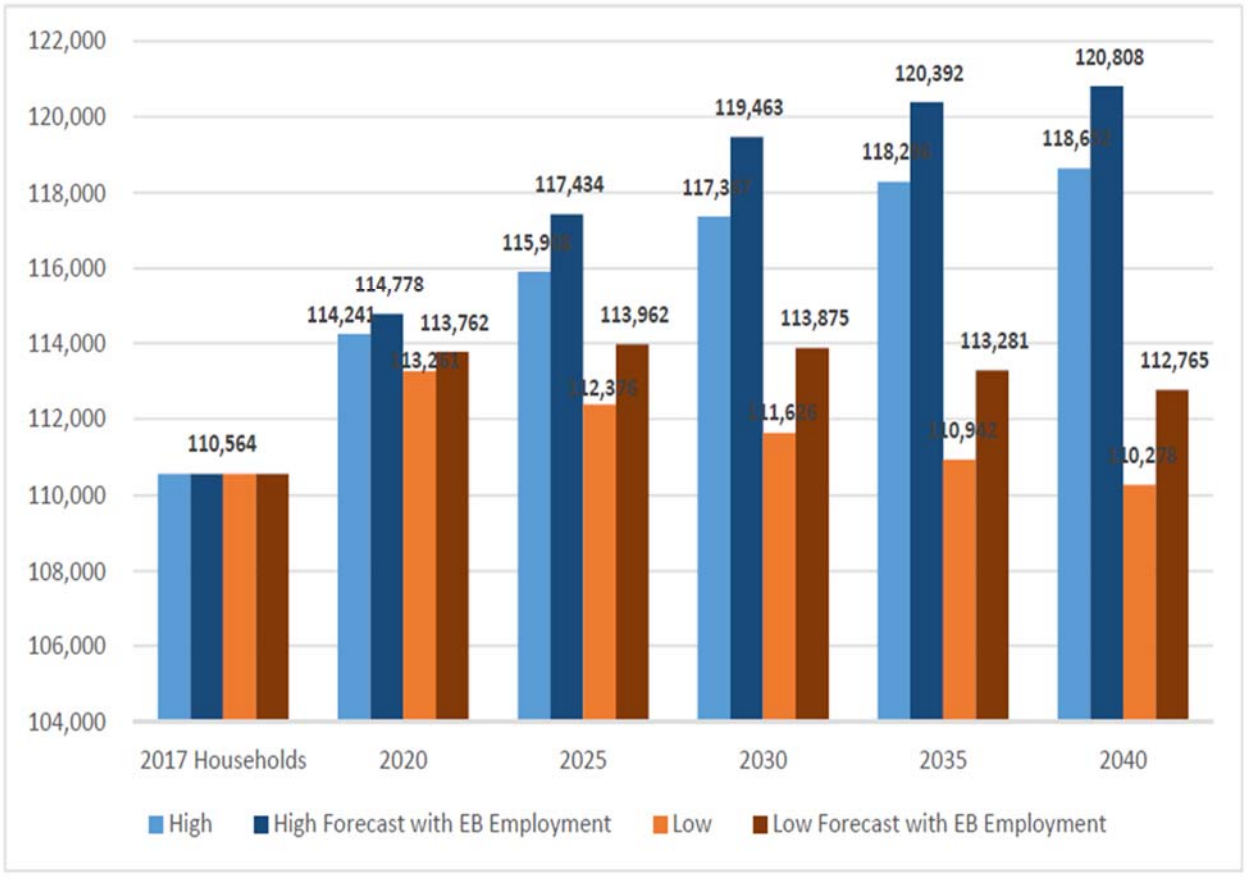
To determine the impacts of net new Electric Boat employment and replacement employment, the new employees likely to be drawn from outside of the region was incorporated to provide an estimate of the full demand to be met by the market given the influx of new workers. Additional Electric Boat hires beyond those already working were phased to the peak employment year of 2028. Further, after discussions with Electric Boat and SCCOG, it was assumed that only 37.5% of net new and replacement hires would be drawn from outside of the SCCOG region: 30% of new hires through 2025, and 60% of new hires from 2025-2030.

Each individual Electric Boat hire was modeled as a new household of 2.51 individuals, instead of as a single new person in the region, in order to accommodate the employment multiplier effect. Assuming an increase of 1,986 households associated with Electric Boat hiring and indirect employment, the high forecast with Electric Boat employment would increase to 120,808 households by 2040 (an increase of roughly 7.3% to 2040), while the low forecast, even with Electric Boat employment, would peak in 2020 before declining back toward 2017 levels, as shown in the chart that follows. Overall, Electric Boat's impact is roughly 1.8% more growth in the high scenario and 2.4% in the low scenario.

In either scenario, the inclusion of additional Electric Boat employment will bolster the household forecasts, especially in the lower, linear regression trend. Urbanomics further examined forecasted housing demand by Town. These detailed results are found in the appendix.

[10] Based on threshold of 30% of income spent on housing costs for homeowners.
[11] Based on threshold of 30% of income spent on gross rent (rent and utilities) for renters.
[12] It should be noted that new manufacturing hires would likely be making 25% less than the average wage.

Chart 15: SCCOG Region High and Low Household Forecasts, 2017-2040



Source: CT State Data Center, Urbanomics

1. Housing Preferences

In addition to quantifying the total impact of Electric Boat hiring on the number of households in the region, a key question is where those additional households can be expected to locate within the region. The choice of residence is based on a range of factors including cost and availability of housing, commutation needs, and personal preferences. In order to determine housing preferences of future Electric Boat employees and Navy staff, the consultant team looked at current trends and preferences as shown by existing employees and staff. In this process, the team had many person-to-person conversations with and prepared two online surveys, one for realtors and a second for current Electric Boat employees. Current employees were asked to think about their optimal housing choice if they were looking for a new home today. The following sections on housing preferences discuss current conditions based on data (either quantitative or anecdotal) provided by Electric Boat, supplemented by responses to the two online surveys.

Locational Preferences

Place of residence is a personal decision that varies greatly by individual and family. Data from Electric Boat show that 45% of Electric Boat employees live in Groton, New London, or neighboring communities, but 25% of employees live outside the SCCOG Region.

Table 6: Place of Residence of Current Electric Boat Employees

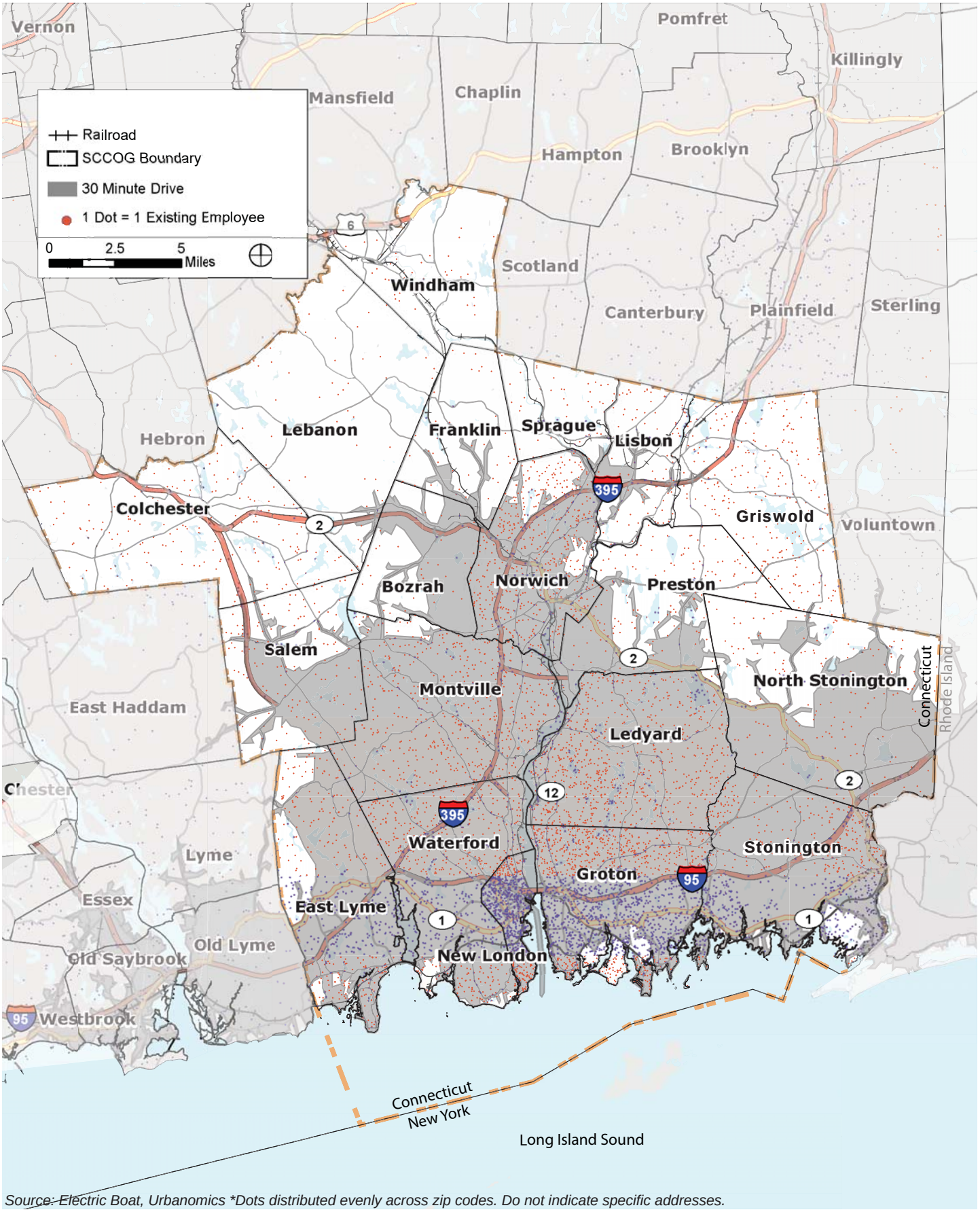
SCCOG	Existing Employees
Total	**12,150**
SCCOG Region	9,130
Other CT	*3,020*
Groton	2,564
New London	887
Montville	818
Waterford	771
Norwich	763
Stonington	686
Ledyard	599
Griswold/Lisbon/Voluntown	511
East Lyme	322
Colchester	311
North Stonington	282
Preston	216
Salem	208
Lebanon	71
Bozrah	53
Franklin	38
Windham	30

Source: Electric Boat Human Resources, Spring 2019

Figure 7 shows a map of the areas located within a 30-minute drive time from the Electric Boat Groton shipyard facility during the weekday morning traffic peak, as well as the residential pattern of current employees.

The widespread distribution of employees is, along with diverse price points, an indicator of the complexity of the regional housing market. The relatively short commute times from the communities surrounding Groton and New London indicate that housing development throughout the region would generally be attractive to Electric Boat employees.

Further, in response to the Electric Boat employee survey question: “How much time are you willing to spend traveling to work (one way)?” more than three-quarters of respondents, regardless of age or number of years working at the company, would prefer to live within a 30-minute commute of work.



*Source: Electric Boat, Urbanomics *Dots distributed evenly across zip codes. Do not indicate specific addresses.*

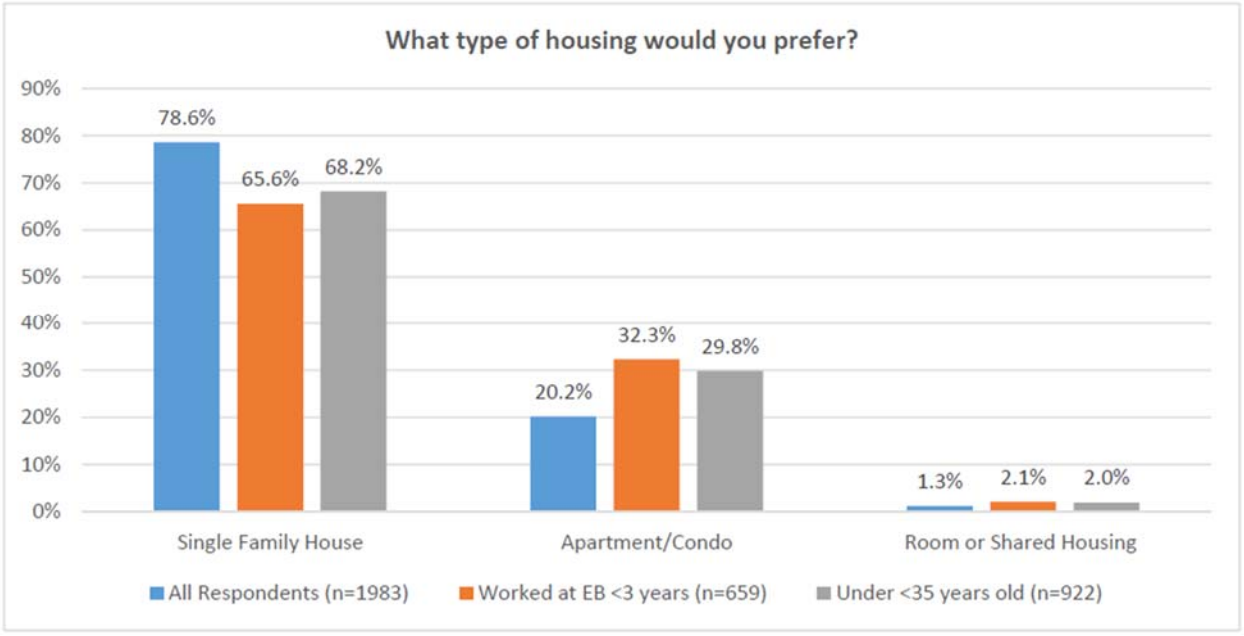
Figure 7: Place of Residence of Electric Boat Employees with 30-Minute Drive Time

Housing Type

Electric Boat human resources representatives and realtors in the region anecdotally reported that the "average EB Employee" is looking to own a single-family home with a garage/shop where they can work on projects. While this may be true for employees at-large, the survey of current employees showed a variety of responses.

Although 79% of all respondents did say they would prefer a single-family home, 1 in 5 preferred a multi-family apartment or condominium living as shown in the chart that follows. When responses were limited to new employees (those who have worked at Electric Boat for fewer than three years) or employees younger than 35, apartment/condo demand increased to 30% or more. This corresponds to realtor input, which indicated that those seeking multi-family options tended to be millennials or seniors. This section presents the results of the Electric Boat employee housing preferences survey for all respondents as well as young and new employees, as the latter groups will best reflect housing demand for new hires.

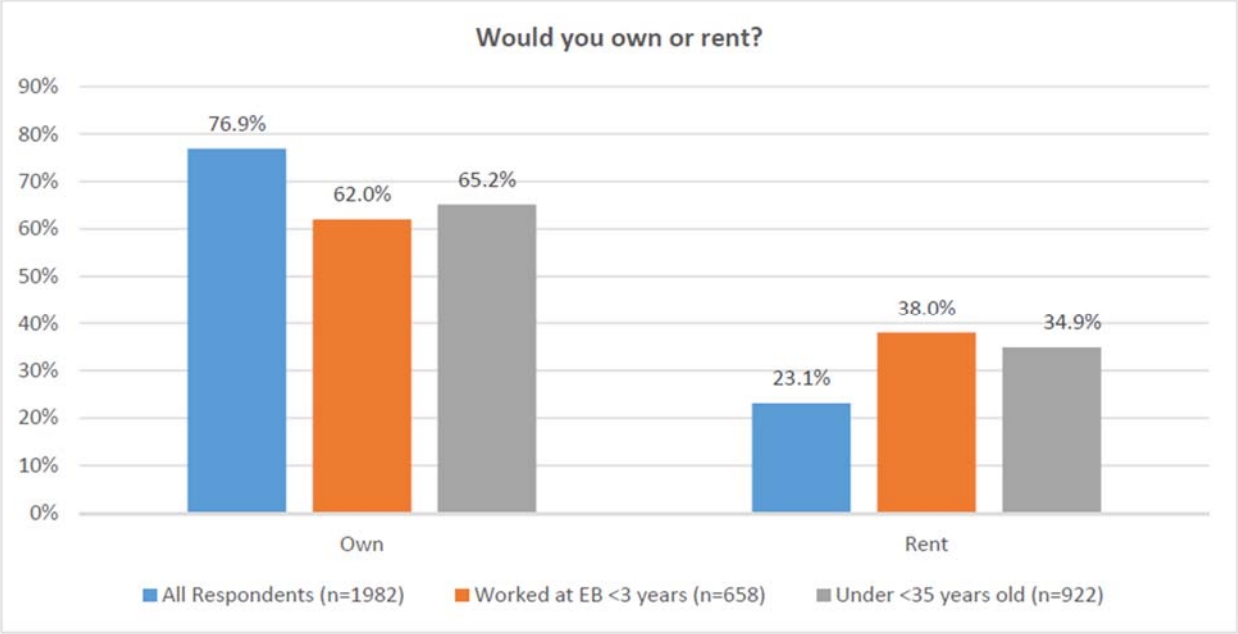
Chart 16: Electric Boat Employee Preferences on Housing Type



Source: EB Employee Survey August 2019

In terms of preference for ownership or rental (tenure), the majority of survey respondents did say they would prefer to own their home. However, that is not to say there is not demand for rental housing, because among new employees, 2 in 5 (almost 40%) stated they would prefer to rent.

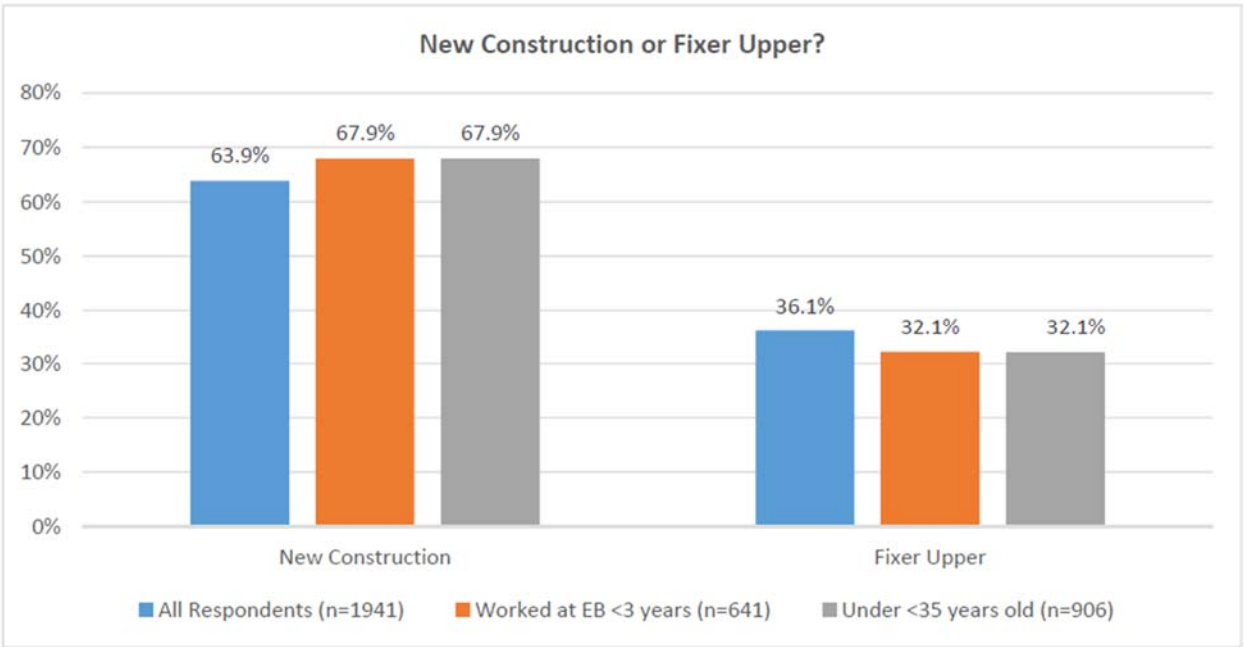
Chart 17: Electric Boat Employee Preferences on Housing Tenure



Source: EB Employee Survey August 2019

Further supporting demand for new housing development is the response to the question regarding construction type. As shown in the chart that follows, 64% of all employees and just under 80% of all new and younger employees would prefer to live in new construction.

Chart 18: Electric Boat Employee Preferences on Housing Condition



Source: EB Employee Survey August 2019

Realtors agreed that being move-in ready was important to most clients. Other key amenities for all housing types include having off-street parking, and proximity to school/work/services/activities.

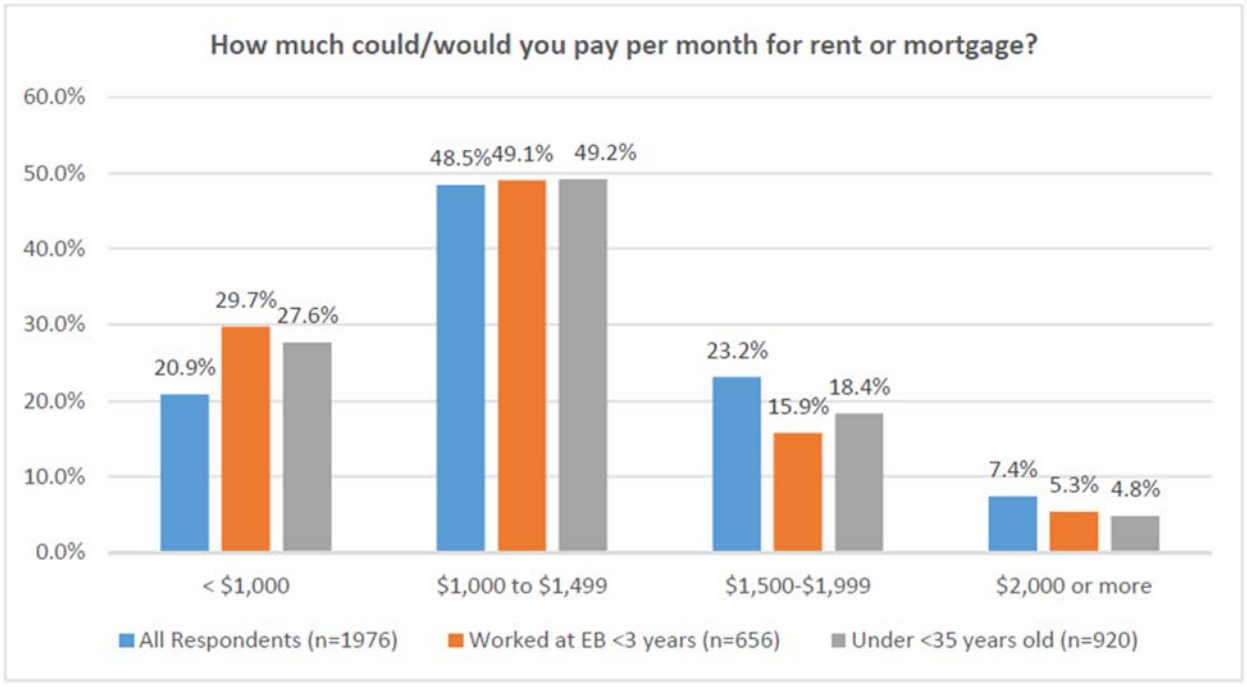
Housing Cost

Not unexpectedly, housing cost being within budget was the most important characteristic to most house hunters, according to the realtors who responded to the survey.

Based on information received from Electric Boat, the new employees to be hired will be making a starting wage of $40,000 and an average wage of $60,000.[13] A household is considered cost-burdened (paying more than it can afford) if more than 30% of household income is spent on housing costs (rent, mortgage, property taxes, maintenance, etc.). Given these parameters,[14] those Electric Boat employees making the starting wage of $40,000 per year can afford $1,000 in housing costs each month. Those making $60,000 can afford to pay $1,500 per month.

Those Electric Boat employees who responded to the survey are of a similar mind. As shown in the following chart, roughly 70% of all respondents and 80% of younger and new workers indicated that they could afford to spend less than $1,500 per month on housing costs.

Chart 19: Electric Boat Employee Preferences on Housing Age



Source: EB Employee Survey August 2019

[13] These amounts are used to provide a baseline and do not include overtime, as that will vary by individual.
[14] Because no data are available on household formation/family type of Electric Boat employees, this study assumes that new employees are in single-earner households. It is likely that many family households will be multi-earner and may therefore be able to afford higher housing costs.

The difficultly may be in finding housing that is affordable given existing salaries. The table that follows shows average 2018 end-of-year listing prices for condos, townhomes, and single-family houses in the region, as well as asking rents from May of 2019 by SCCOG municipality. Amounts in **gold italics** are affordable to households with income of $60,000 or more; amounts in **red underline** are affordable to households with an income equal to the Electric Boat starting trades wage of $40,000.

Table 7: Current Housing Prices in the SCCOG Region

Place	End of Year 2018 Median Listing Price		
	Condo/Townhomes	Single-Family	Asking Rents 5/24/2019
Bozrah		***$176,000***	$1,800
Colchester		$264,900	***$1,430***
East Lyme	***$189,900***	$310,000	$1,717
Franklin	$280,000	$289,900	-
Griswold		***$189,900***	***$1,090***
Town of Groton		***$239,000***	$1,860
Lebanon	$146,500	***$229,900***	$1,600
Ledyard		***$227,450***	***$1,355***
Lisbon	$83,900	***$199,900***	***$1,150***
Montville	-	***$195,000***	***$1,295***
New London	$64,999	$159,900	***$1,208***
North Stonington	$99,450		$1,800
Norwich		$142,100	***$1,134***
Preston	$119,700	***$229,900***	***$1,458***
Salem		$274,900	$1,655
Sprague		***$179,900***	$1,000
Stonington		$329,450	$2,550
Waterford	$359,000	$249,000	$1,632
Windham	$140,950	$139,900	***$1,213***

Source: Berkshire Hathaway Home Properties, Coldwell RE MLS

As seen in the table, households with incomes of $60,000 or more should be able to afford average rents/housing prices of varying types in most communities throughout the region. However, those at the $40,000 level will be limited to condo/townhomes, or select areas for single-family homes or rentals.

Housing Financing Programs

Programs for Individuals

Because not all housing in the region is affordable to trades workers with entry-level wages and, as stated in the previous section, a large share or residents are paying more than is considered affordable for housing, the consultant team reached out to mortgage brokers and home lenders to assess the current market and programs. Dorothy Satti, owner/manager of Gateway Mortgage Services, and Karen Roman, VP, Senior Residential Lending Originator at Dime Bank, were willing to respond to questions. Both indicated that the market is stable, and the only systemic barrier to housing financing is the limited inventory.

Urbanomics research confirmed that several statewide down-payment assistance programs are in place, but new FHA restrictions may limit programs in the future.

The Connecticut Housing Finance Authority (CHFA) offers a range of mortgage products to Connecticut households subject to maximum household income limits on most borrowers eligible for CHFA mortgages as well as maximum sales prices for homes eligible for CHFA mortgages.

- Income & Sales Price Limits: vary by town and city to correspond with differences in cost of living and median incomes.
    - Income limits of $98,800 for 1-2 person households and $111,320 for 3+ person households in all towns except for Colchester and Lebanon where respective limits of $110,200 and $126,730 exist.
    - Maximum sales price limit of $283,345 for homes eligible for CHFA mortgages in all towns except for New London ($346,315) and Windham ($294,975).

- Targeted Areas: Reduced mortgage eligibility rules in place at for homes purchased in areas of the state targeted for revitalization including select census tracts in New London, Groton, Norwich, and Windham.
    - Income limits of $116,160 for 1-2 person households and $135,520 for 3+ person households in targeted area census tracts in New London, Groton and Norwich.
    - Maximum sales price limit of $346,315 for homes eligible for CHFA mortgages in all targeted area census tracts in New London, Groton, Norwich; limit of $360,530 in Windham census tracts.

- CHFA Homebuyer Mortgage Programs for targeted area properties, first time homebuyers or those who have not owned in 3 years
    - HFA Advantage® and HFA Preferred™ Loan Programs: no upfront mortgage insurance costs and low monthly mortgage insurance costs
    - Homebuyer Mortgage Program: below market interest rates and down payment assistance
    - Homeownership for Residents of Public Housing: below market interest rates and down payment assistance for tenants of public housing recipients of rental assistance

- Disabled Persons Homeownership Program: below market interest rates and down payment assistance for households with disabled family members
- Police Homeownership Program: additional discounts to below market rate loans and down payment assistance for municipal police officers
- Military Homeownership Program: additional discounts to below market rate loans and down payment assistance for military officers and veterans or unmarried, surviving spouses or civil union partners of veterans who died as a result of Military Service or service-connected disabilities
- Teachers Mortgage Assistance Program: additional discounts to below market rate loans and down payment assistance for individuals holding a valid Connecticut teacher certificate

Down-payment and closing cost assistance programs are available from:

- CHFA's Down Payment Assistance Program: provides financing to cover down payments and low-interest rate second mortgages. Household savings above $10,000 must be used towards down payment unless for Police and Teacher program loans
- Housing Development Fund Programs: provides financing for first time home buyers for down payment and closing costs. Eligibility is submit to income limits of $96,200 in New London County and $95,300 in Windham County
    - HDF Smart Move Connecticut Program: down payment and closing cost assistance resulting in homebuyers putting down as little as 1% of purchase price.
    - HDF Smart Close Connecticut Program: 0% interest loan of up to $5,000 to help borrowers with closing costs.
    - HDF Live Where You Work Program: 0% interest loan to help borrowers with down payment and closing costs for income-qualified first time homebuyers seeking to purchase homes in the same town where they work. Income guidelines are set at 80% of area median income limits.

Additionally, for properties located in rural area identified by the USDA (includes all SCCOG towns except for New London, Groton, Norwich and parts of Waterford and Stonington) two mortgage products are available:

- Single Family Housing Direct Home Loans: for household below the 80% of Area Median Income limit, down payment-free 100% loans are available for up to a 33/38 payback period.
- Single Family Housing Guaranteed Loan Program: for household below the 115% of Area Median Income limit, a 90% loan guarantee is available to approved lenders in order to reduce the risk of extending 100% loans to eligible rural homebuyers.

Senior homeowners wishing to downsize could access to repair, improve and modernize homes to make them more attractive to younger buyers, using programs including the following:

- CHFA Single Family Housing Repair Loans & Grants
- USDA Housing Repair Loans and Grants

Programs for Housing Developers

High construction costs can make developing affordable housing a challenge. In order to meet this need, municipalities in the region may wish to pursue a number of available state and federal programs/grants including the following:

- State of Connecticut affordable housing funds:
  - CHAMP: gap funding in the form of loans or grants to developers of proposed multifamily properties.
  - CDBG Small Cities: funding and technical support for cities with populations of less than 50,000 for local community, affordable housing, and economic development projects.
  - HTCC: tax credits for non-profit affordable housing developers.

- HOME Investment Partnership Grants: May be used for both community and individual housing improvements, as long as 90% of families benefited have incomes at or below 60% of HUD-adjusted median family income (HAMFI):
  - Development of non-luxury housing:
    - New construction of housing
    - Real property acquisition
    - Site improvements
    - demolition
  - Individuals
    - Tenant-based rental assistance
    - Housing rehabilitation

- Capacity Building for Community Development and Affordable Housing funds are distributed through five non-profits, of which Enterprise Community Partners and Local Initiatives Support Corporation (LISC) have TOD funding initiatives.

- Connecticut Housing Trust Fund: May be used for construction, rehabilitation, and preservation of rental homes and homeownership. Funds may be used for housing of households with income of up to 120% of Area Median Income. Eligible applicants include municipalities, non-profit organizations, local housing authorities, for-profit organizations and CHFA.

H. Ability of Region to Accommodate Housing Growth

1. Existing Inventory

According to the U.S. Bureau of the Census, there were 110,564 occupied housing units in the SCCOG region in 2017. In addition, there were another 4,157 units that were vacant for rent or for sale.[15] According to SCCOG, an additional 1,063 units were completed in 2017 and 2018. The greatest number of recently completed units are in East Lyme (280), followed by Norwich (235), Stonington (187), New London (107), Groton (98), Waterford (90), Colchester (34), and Ledyard (32). The addition of these units to the market brings the regional housing unit total to 115,784 as of the end of 2018: roughly 5,000 units short of the higher estimate of regional demand in 2040, even at full occupancy.

2. Development Activity

Over the last several years, commercial developers have been active in the SCCOG region. Nearly 1.5 million square feet of commercial non-residential space was built from 2013 to 2018, including 268,000 SF in Montville, 205,000 SF in the Town of Groton, 192,000 SF in North Stonington, and 169,000 SF in New London. Another 2.2 million square feet of non-residential commercial space is currently in the pipeline in the SCCOG region, either approved, proposed, or under construction, including 603,000 SF in Bozrah, 393,000 SF in the Town of Groton, and 96,000 SF in New London. Additionally, the 400-acre Preston Riverwalk (formerly Norwich State Hospital) is being redeveloped by the Mohegan Tribe into a major mixed-use site over the next 20 years. Although a final development plan has not yet been determined, the future mix may include housing, retail, and large format entertainment uses.

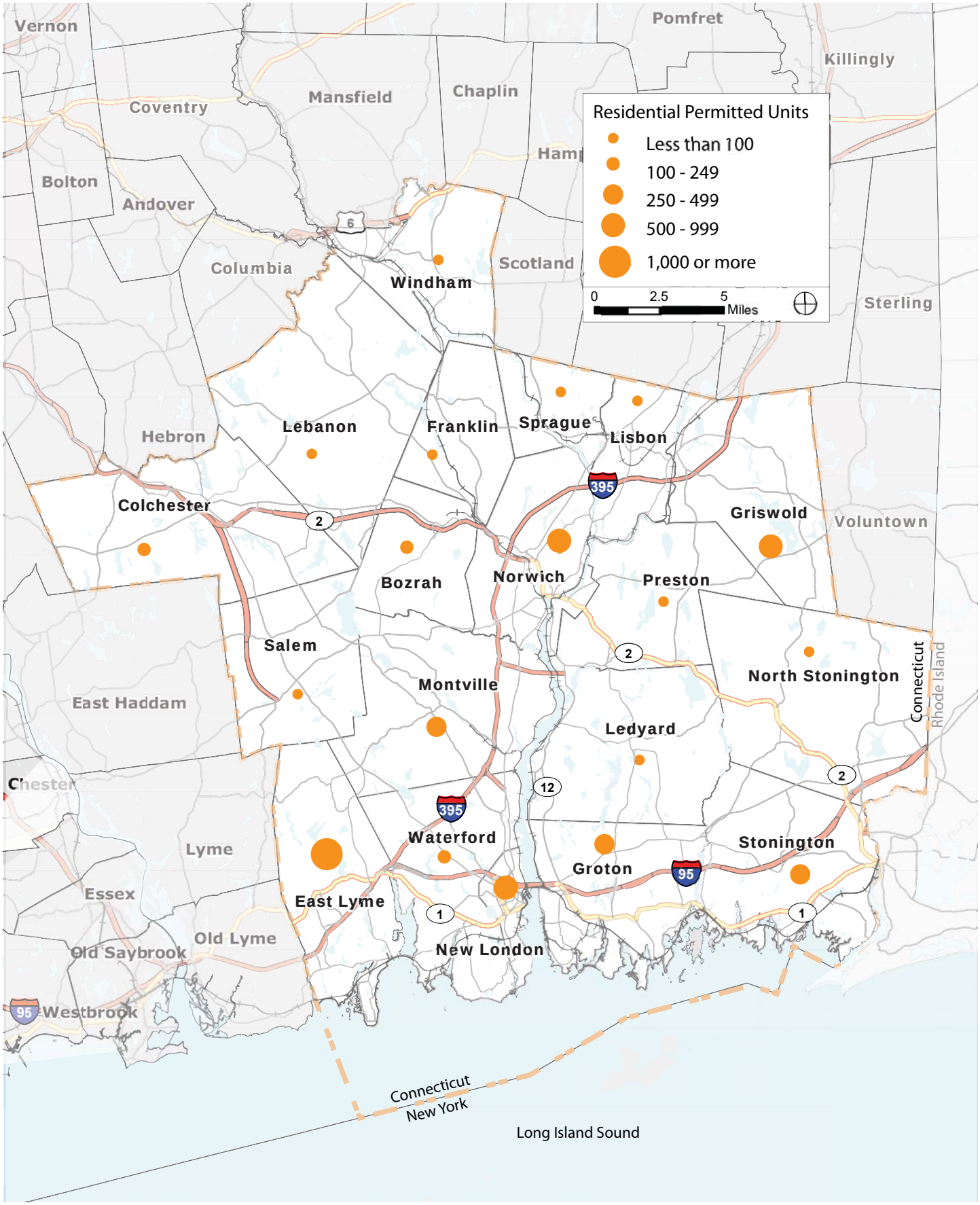
Permitted Dwelling Units and Dwelling Units in the Pipeline[16]

Over 5,000 potential new housing units have been proposed in the SCCOG region and received initial development approvals to move forward. According to SCCOG's compilation of permitted units as of December 31, 2018, there were 4,600 units permitted throughout the region, including 1,211 in East Lyme, 797 in New London, 749 in Griswold, 530 in Norwich, 454 in Stonington, and others.

Of these permitted units, 4,100 units (approximately 90%) are in attached housing (apartments, condos, townhomes), with another 500 single-family units. This should alleviate realtor and mortgage financiers' concerns about the lack of available housing stock, especially multi-family. Some 600 units of the total 4,600 permitted units are age-restricted, primarily in attached housing stock (including assisted-living). When looking at the permitted units by type and affordability, just over half (58%) of the 4,100 attached units are market-rate units, while 90% of the single-family units are market-rate.

In addition to permitted residential units, there are another 3,500 units pending approval region-wide, located primarily in Groton (~2,000) and New London (~1,000).[17]

[15] Housing units that are were identified as vacant for seasonal use or other vacant were excluded from the inventory assessment as they are rarely on the market for full time occupancy.
[16] For the purposes of forecasting, only approved/permitted units are included in the housing pipeline.
[17] Based on input from Groton and New London planning/economic development staff.



Source: Urbanomics

Figure 8: Approved Residential Units in the SCCOG Region

I. Market Response

In addition to the development activity in the pipeline, as demand increases the market will respond to the need. Between 2009 and 2018, 290 housing units per year were permitted in the SCCOG region. Even at this very low development rate, 5,802 units could be anticipated to be permitted between 2020 and 2040. This assumption, however, requires an assessment of the ability of the region to accommodate additional permitted building activity based on the existing and planned built environment and the various environmental constraints that may limit future development.

1. Build-Out Analysis

The team prepared a regional build-out analysis to determine if the region has the capacity under existing growth designations to meet potential additional market demand. To calculate the development potential, we began by estimating the amount of vacant or underdeveloped land area, based on data provided by SCCOG as used in the 2017 Regional Plan of Conservation and Development. The next step was to remove areas designated in the Regional Future Land Use Plan as recreation/open space/conservation or institutional/tribal. The analysis then removed from the potentially developable land any area with environmental constraints that preclude future development (wetlands, floodplains, and steep slopes), based on GIS data from SCCOG. The result yielded 62,426 acres of developable land.

The final step of the analysis was to assign density assumptions for the remaining developable land area, according to the designations in the Regional Future Land Use Plan and consultation with SCCOG. These assumptions were as follows:

- ***High Density, with sewer (existing or proposed)*** – average 10 units per acre
- ***Medium Density, with sewer (existing or proposed)*** – average 3 units per acre
- ***High and Medium density with no sewer*** – 1 unit per acre
- ***Rural Low-Intensity*** – 1 unit per 5 acres

The build-out analysis, as detailed in the table and figure below, indicates the potential for approximately 41,000 additional new units in the SCCOG region, an amount that should be sufficient to meet any additional demand without requiring changes to desired density of land use.

It is important to note that a build-out analysis is a theoretical exercise illustrating a potential saturation point which assumes that all of the vacant or underdeveloped land in the region is developed according to the maximum desired residential density. This information is intended as a guide, and does not suggest actual building levels; in actuality, the total build-out scenario is unlikely to be reached.

A build-out analysis at a regional level is further complicated by the fact that zoning data for each of the 22 SCCOG member municipalities is not available. Thus, the analysis is based primarily on two factors: 1) the density categories outlined in the Regional Plan of Conservation and Development, and 2) available or proposed sewer infrastructure. These factors are not a substitute for the zoning regulations in place or for actual conditions on the ground. Nonetheless, the regional build-out analysis is useful in approximating regional development potential as it relates to potential demand.

Table 8: Build-Out Analysis of the SCCOG Region

Land Use Category	Undeveloped Area (excl. open space, tribal lands, institutional uses)	Environmentally Constrained Lands (sq. ft.)	Developable Land Area (sq. ft.)	Developable Land Area (acres)	Density	Results (units)
High Intensity						
With Sewer	51,746,262	15,057,264	36,688,998	842.26	10 units/ac	8,423
Proposed Sewer	26,230,700	6,248,159	19,982,541	458.74	10 units/ac	4,587
No Sewer	406,956,962	125,572,292	281,384,671	6,459.70	1 unit/ac	6,460
Total	*484,933,925*	*146,877,715*	*338,056,209*	*7,760.70*		*19,470*
Medium Intensity						
With Sewer	19,677,343	4,431,882	15,245,461	349.99	3 units/ac	1,050
Proposed Sewer	63,212,700	16,796,085	46,416,615	1,065.58	3 units/ac	3,197
No Sewer	491,410,733	129,281,611	362,129,122	8,313.34	1 unit/ac	8,313
Total	574,300,776	150,509,579	423,791,197	9,728.91		12,560
Rural/Low Intensity						
Total	*2,729,716,272*	*772,281,114*	*1,957,435,158*	*44,936.53*	0.2 units/ac	*8,987*
					TOTAL	***41,017***

Source: BFJ Planning, based on data from SCCOG

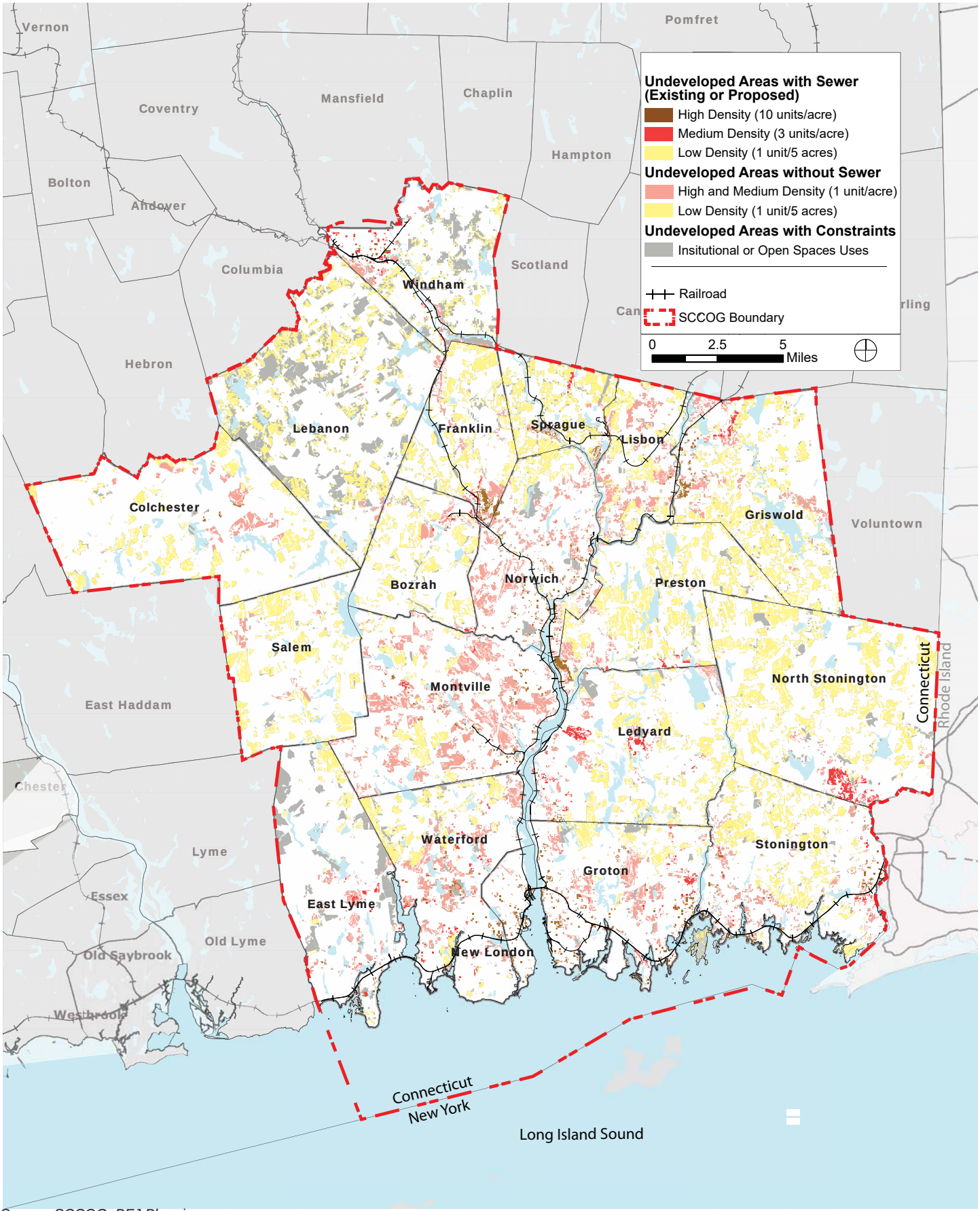
Of the estimated build-out capacity, 32% would be in the region's higher-density areas, 46% in moderate-density areas (1-3 units per acre), and 22% in rural or low-density areas. With 5,500 permitted units in the pipeline and another 5,800 proposed that the building industry could construct, all likely growth scenarios could be accommodated. Only the high growth scenario of 10,244 new households would reach the potential growth in supply of 11,300 pipeline/proposed units given a low regional vacancy rate of 3.6%.

2. Demographic Trends Affecting Future Inventory

A number of economic factors in southeastern Connecticut have had, and will continue to have, an impact on employment, housing, and transportation in the region. One of these is the declining/aging workforce.

After applying labor force participation rates by age to population projections from the Connecticut Data Center, it was determined that the total number of persons in the regional labor force will hold steady through 2040, and the SCCOG region will mirror the national average, with 25% of the labor force being 55 or older by the year 2020. Further, if the assumptions of net migration to the region are less robust and subsequently the workforce under the age of 35 does not continue to grow, while at the same time labor force participation rates for persons over the age of 65 continue to grow for reasons of both choice and necessity, the share of senior workers could approach 35% by mid-century.

While older workers have advantages in terms of experience and knowledge; the fact that one in four workers at large (1 in 3 at Electric Boat according to the company) could retire at any time can lead to a level of insecurity for employers. It is a necessity that the employers and regional municipalities work together to ensure that local companies and communities are places that a diverse array of workers will want to respectively, work and live.



Source: SCCOG, BFJ Planning

Figure 9: Build Out Analysis of the SCCOG Region

3. Local Job Market

As a result of the lingering impacts of the Great Recession, southeastern Connecticut saw substantial job losses in several of its key industries, including the two casinos, the pharmaceutical industry with a downsizing and closure of Pfizer's New London facility, and shrinking of smaller manufacturing facilities elsewhere in the region.

However, there are emerging economic initiatives that have the potential to improve both the regional employment picture and the fiscal condition of some municipalities. Examples include the State of Connecticut's $4.5 million bond award in January 2017 to support repairs and improvements at the State Pier at the Port of New London, part of an overall public investment of $35.5 million, and the State's plan to construct up to 1,000 wind turbines off the coast of New London.

For each of these projects that comes to fruition, there will be a ripple effect throughout the regional economy as the new economic activity will support additional jobs in complementary, supporting, and service industries as materials and services are purchased both for new contracts throughout the region. For Electric Boat's new employment alone, input-output modeling of economic impacts indicate that 0.9 new jobs are created in other industries for every new job at the company.

4. Anticipated Future Housing Development

Developers are looking at a variety of multifamily options including some adaptive reuse of former commercial stock in downtown New London, Norwich, and Windham. Following national and regional trends in housing choice among millennials and seniors, developers are pursuing a variety of multifamily development types in downtowns that favor amenity-rich, mixed-use, walkable neighborhoods. Examples of mixed-use projects with active permits in the SCCOG Region include:

- Tamashe, LLC Mixed-Use Apartments: 26 housing units and 3,600 SF of commercial space approved at 245 Route 32 in Montville
- Central Hall: 12 housing units and 7,950 SF of retail space under construction at 18 - 22 West Main Street in Groton
- Marriott Plaza: 36 rental units and 17,500 SF of retail space approved for 1360 Route 32 in Montville
- Hendels Mystic: 8 housing units and 4,000 SF of commercial space approved for 48 Washington Street in Stonington
- Heritage River Village Association: 393 housing units and 47,000 SF of commercial space approved for 213 Preston Road in Griswold
- Taftville Landing: 12 housing units and 7,246 SF of retail space approved for 3 North Second Street in Norwich

J. Recommendations

This analysis shows that the addition of new Electric Boat employees can be largely accommodated by the existing housing market in both high and low population scenarios, as long as the real estate market responds. Indications are that the market will respond, as suggested by the current development either approved or pending approval, with projected residential development at minimum of roughly 550 units/year through 2030, plus an additional 130 units/year from 2030-2040.

The following recommendations are suggested to further facilitate future development and rehabilitation of housing in the region to respond to future changes in employment and demographics:

- ***Continue to encourage development as desired by municipalities.***
  Initial concerns were raised during the study process of a potential mismatch between housing preferences of Electric Boat employees (single-family) and proposed development (multi-family). However, this concern has been partially mitigated given that one in three new Electric Boats hires would prefer multifamily or rental housing. Further, multi-family development creates housing options for downsizing homeowners who wish to remain the area, leading to potential turnover in single-family homes. Continued development of a full range of housing types should be encouraged throughout the region, based on available infrastructure and municipal planning.

- ***Consider a variety of affordability levels, especially for both single family and rental units.***
  The increase in housing demand will help housing values continue to increase; however this will drive up costs for renters and first-time buyers.

- ***Explore municipally based first-time buyer programs.***
  Municipally managed programs, generally funded through HUD's Community Development Block Grants and/or the HOME Partnership Program, exist in Connecticut.

- ***Explore homeowner rehabilitation programs to help seniors.***
  These programs, which could be municipally managed, would focus on making homes safe/energy efficient and ultimately easier to sell when the owner moves on.

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V. Transportation

A. Roadway System Assessment

1. Current Conditions

The assessment of current transportation conditions includes an extensive data collection process to establish the current condition of the transportation system[18], through the following elements:

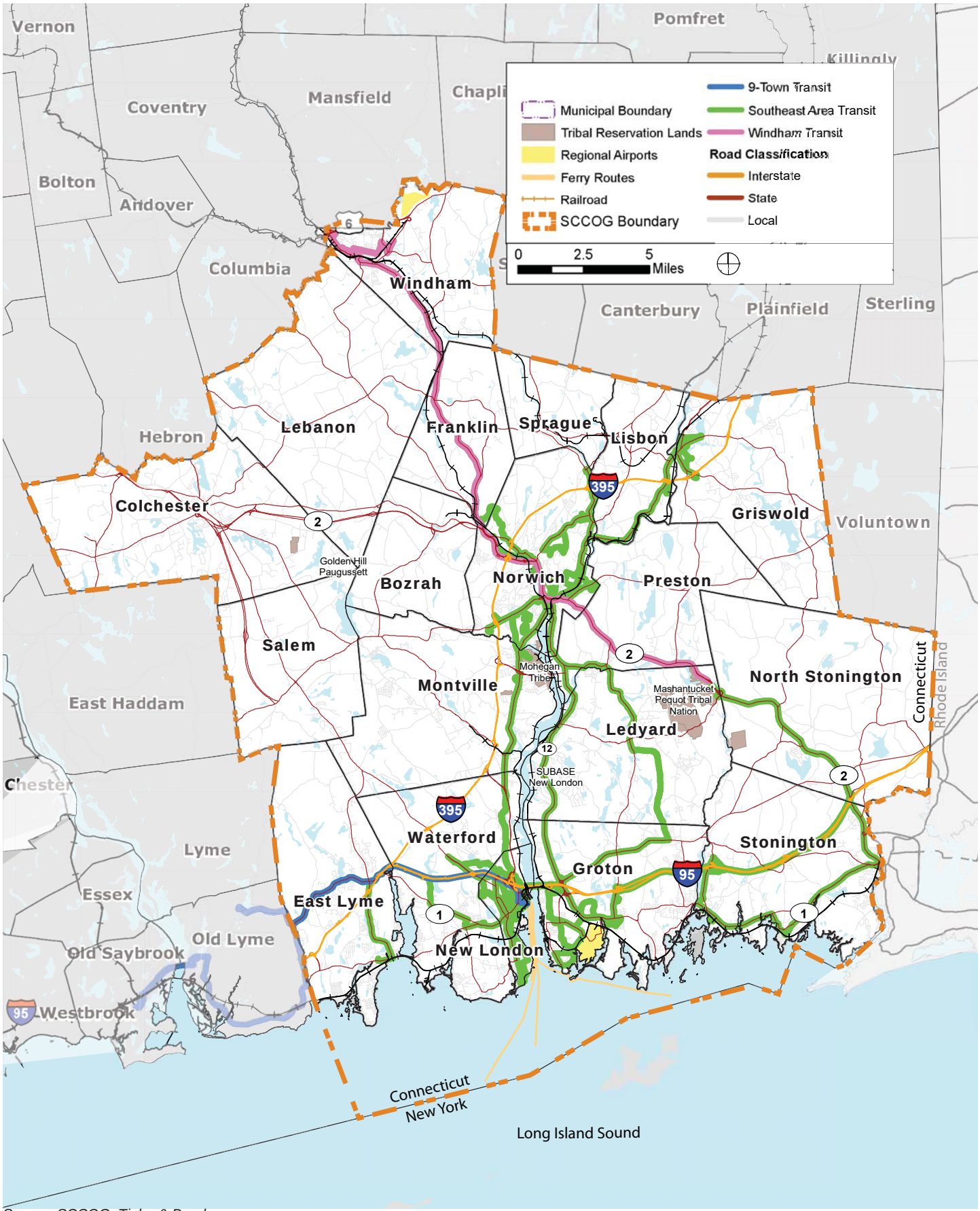
- Reviewing the existing transportation system and identifying needs and deficiencies;
- Observing traffic volumes, major employers, and travel times/speeds along select major transportation corridors;
- Analyzing traffic safety for all travel modes; and
- Identifying areas of interest/concern, which will be reviewed for potential improvements.

Transportation Infrastructure and Major Traffic Generators

The primary roadways were reviewed in the field to observe the condition of the roadway network and identify any deficiencies. These roadways are classified as Interstates, Major State Routes, and local Town Roads as shown in Figure 10, along with other key regional transportation services, including rail, transit, and ferry services, that are further described in other sections of this report.

The main interstate highways serving the region are I-95 and I-395. The 2018 Long Range Transportation Plan for the State of Connecticut "focuses on major improvements to I-95 and to passenger service on the Shore Line East, freight rail lines on the New England Central railroad, the Providence and Worcester line, and the Port of New London" (Section 6.1.4). The plan suggests the continued maintenance of bridges and roadway pavement on I-95 as well as access ramp improvements and the addition of a third lane where needed to ameliorate congestion. In the New London-Groton area, I-95 is already three lanes and becomes five lanes on the Gold Star Bridge (I-95 over the Thames River). I-95 functions relatively well in the immediate New London-Groton area because of this roadway capacity. As a result, there is less air pollution from congestion, less time lost due to travel delays, and fewer people using Route 1 as an alternative route. I-95 significantly changes west of New London between Waterford and East Lyme, where the road narrows to two lanes in each direction, which creates one of the higher congestion segments along I-95 in the area. Recently, overpasses have been widened in anticipation of a six-lane roadway in the future.

[18] The discussion of transportation focuses primarily on the six municipalities studied in the 2017 Joint Land Use Study (JLUS) and, particularly within the City and Town of Groton, as this area is most likely to face direct transportation impacts related to expanded activity at the SUBASE and Electric Boat. This area of localized impact is referred to as the "local study area" while the larger region is referred to as the "regional area".



Source: SCCOG, Tighe & Bond

Figure 10: Transportation Infrastructure

I-395 provides north-south access through the region connecting I-95 to Norwich and continuing to the Connecticut-Massachusetts border. I-395 provides two through lanes in each direction with auxiliary lanes for an additional lane at key interchanges. The roadway provides adequate capacity for current conditions; however, operational and safety improvements to the interchange with I-95 are being reviewed. Further detail is provided in Section V.A.4, Planned Improvements.

On a more localized level within the New London and Groton area, there are several key State routes, classified by the Connecticut Department of Transportation (CTDOT) as a mix of expressways and principal and minor arterials, providing connectivity from the local roadways:

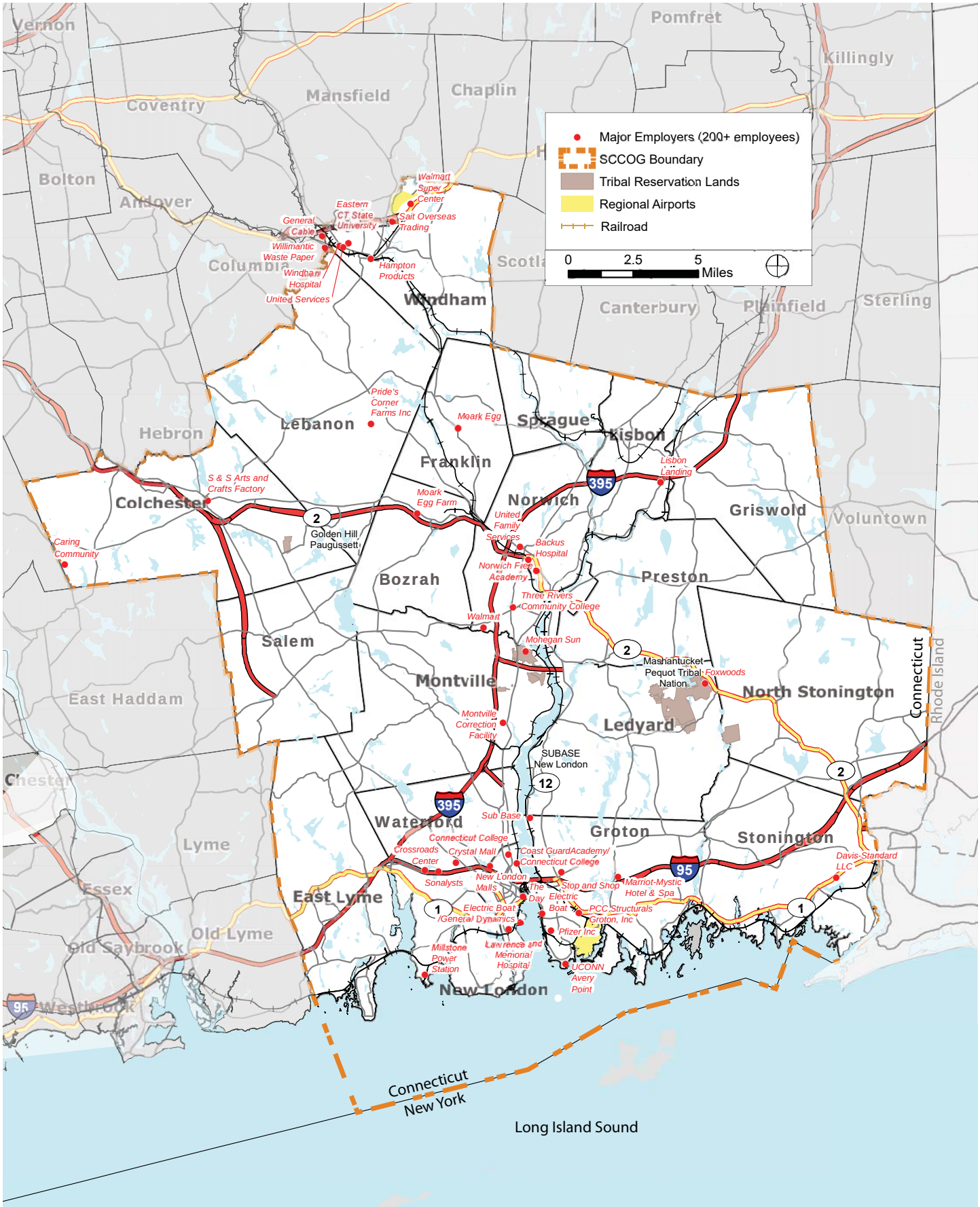
- Route 12: Principal Arterial facilitating north-south access on the east side of the Thames River.
- Route 32: Expressway & Principal/Minor Arterial facilitating north-south access on the west side of the Thames River.
- Route 85: Principal Arterial facilitating access to and from the northwest.
- Route 184: Minor Arterial facilitating access to and from the northeast and east.
- U.S. Route 1: Principal/Minor Arterial facilitating east-west access.
- Routes 156, 213, and 349: Minor Arterials & Collectors facilitating access to the major traffic generators and employers within New London and Groton.

This transportation network provides access to many major employers within the region, as shown in Figure 11. Of note for this study, the SUBASE and the various Electric Boat sites generate a significant amount of regional traffic, along with other major commercial employers focused in the New London and Groton downtown areas. The following section will quantify the traffic volumes accessing the six-town area to identify key routes within the region.

Traffic Volumes

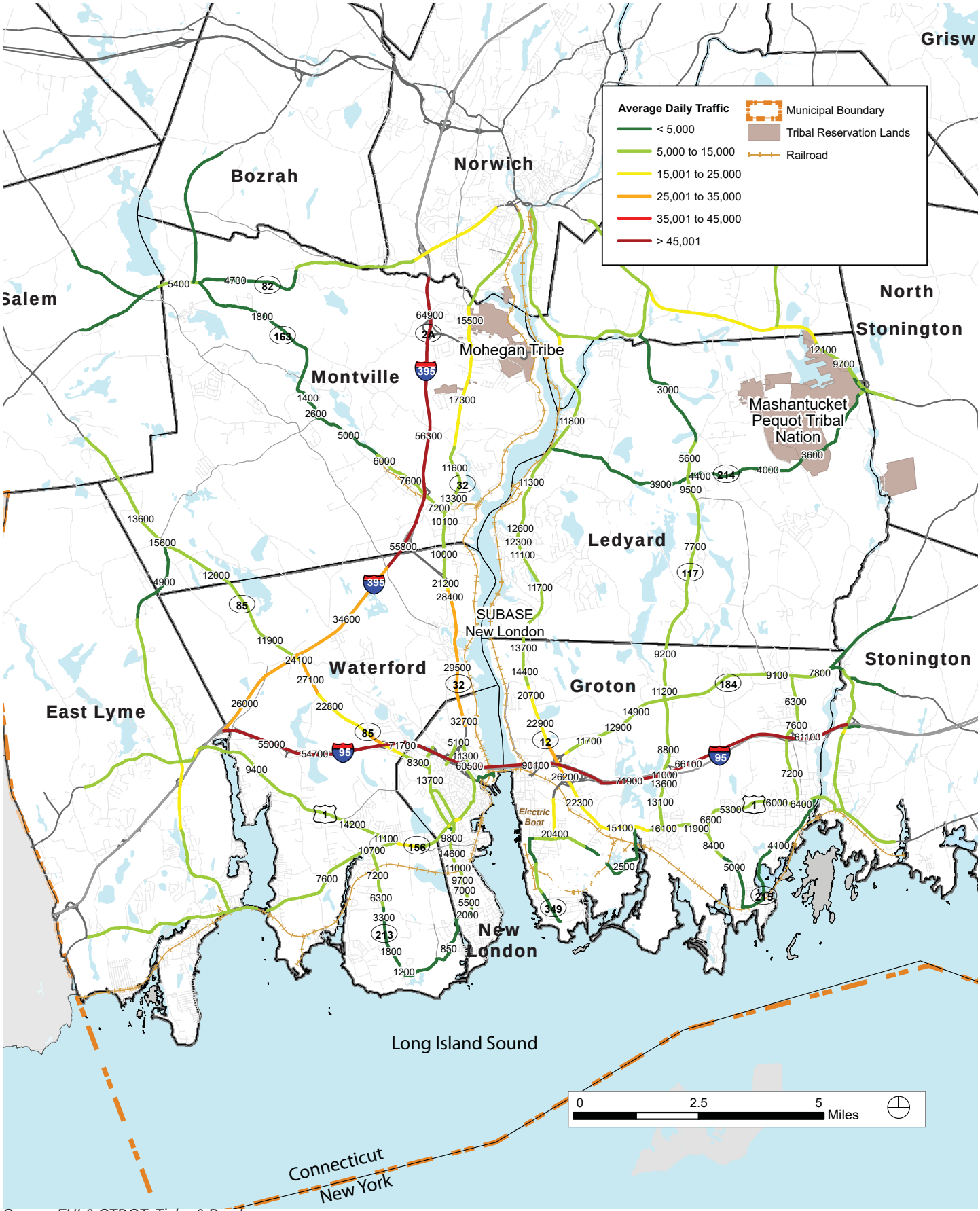
Available traffic data were reviewed to quantify the volumes using the key routes and accessing the major traffic generators and employers. As indicated in Figure 12, I-95 and I-395 experience the highest traffic volumes, with well over 50,000 daily trips, peaking at 90,000 daily trips on the I-95 segment over the Thames River between the Route 12 and Route 32 corridors. On the State roadways, Route 12, Route 32, Route 85, and Route 1 experience volumes above 20,000 daily trips, peaking at 32,700 on Route 32 just north of I-95.

Traffic turning movement volumes for the local area were collected from the Electric Boat expansion traffic impact study to assess traffic operations under existing conditions and to establish a baseline for future impacts of both the expansion and future traffic growth. These 2019 Existing Traffic Volumes are provided in the technical appendix.



Source: SCCOG & Infogroup via CT Department of Labor, Tighe & Bond

Figure 11: Major Employers in the SCCOG Region



Source: FHI & CTDOT, Tighe & Bond

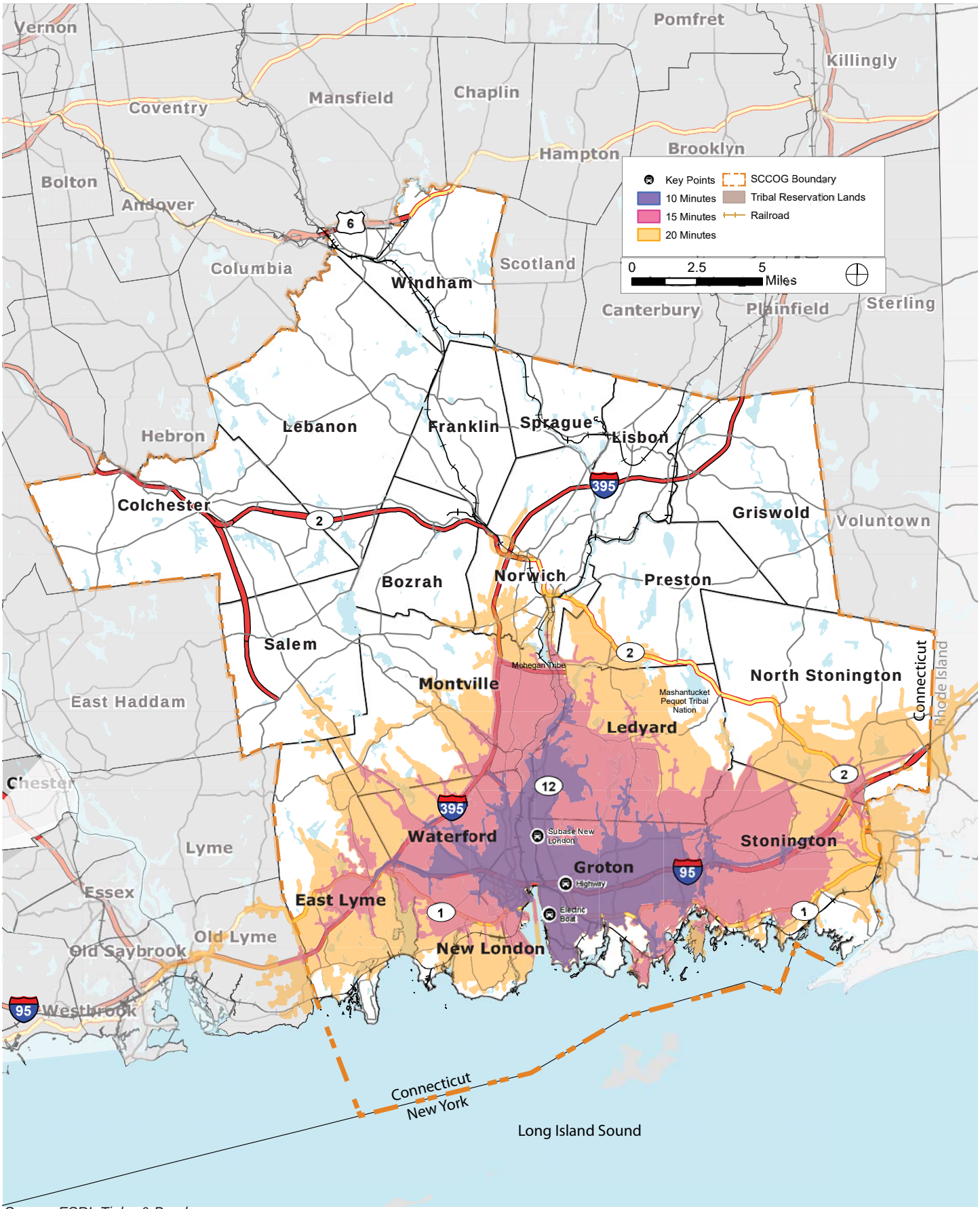
Figure 12: Average Daily Traffic Volumes (2015)

Travel Times

Supplementing the transportation infrastructure, traffic volume, and major employer review, travel time analysis is another important metric to observe the efficiency of traffic operations. Travel time analyses were performed via a geographic information system (GIS) network analysis tool provided by ESRI that calculates travel time zones to and from key points (Groton Electric Boat facilities and the SUBASE) based on the roadway network layout and average traffic delays. The analysis is shown in Figure 13 and Figure 14. The figures show three travel time zones for each peak period, which illustrate a drive time of 10 minutes (blue), 15 minutes (pink), and 20 minutes (orange). Areas in Groton that are in white are not accessible by vehicles (i.e. these areas do not have roads). As shown, vehicles can reach most of the local study area within a 20-minute drive, with the exception of the far reaches of the northwest corner due to the lack of direct State route access. In addition, within a 10-minute drive, vehicles can traverse the southern portion of the six-town area from east to west via I-95, and can traverse the central portion of the local area north to south via Route 12.

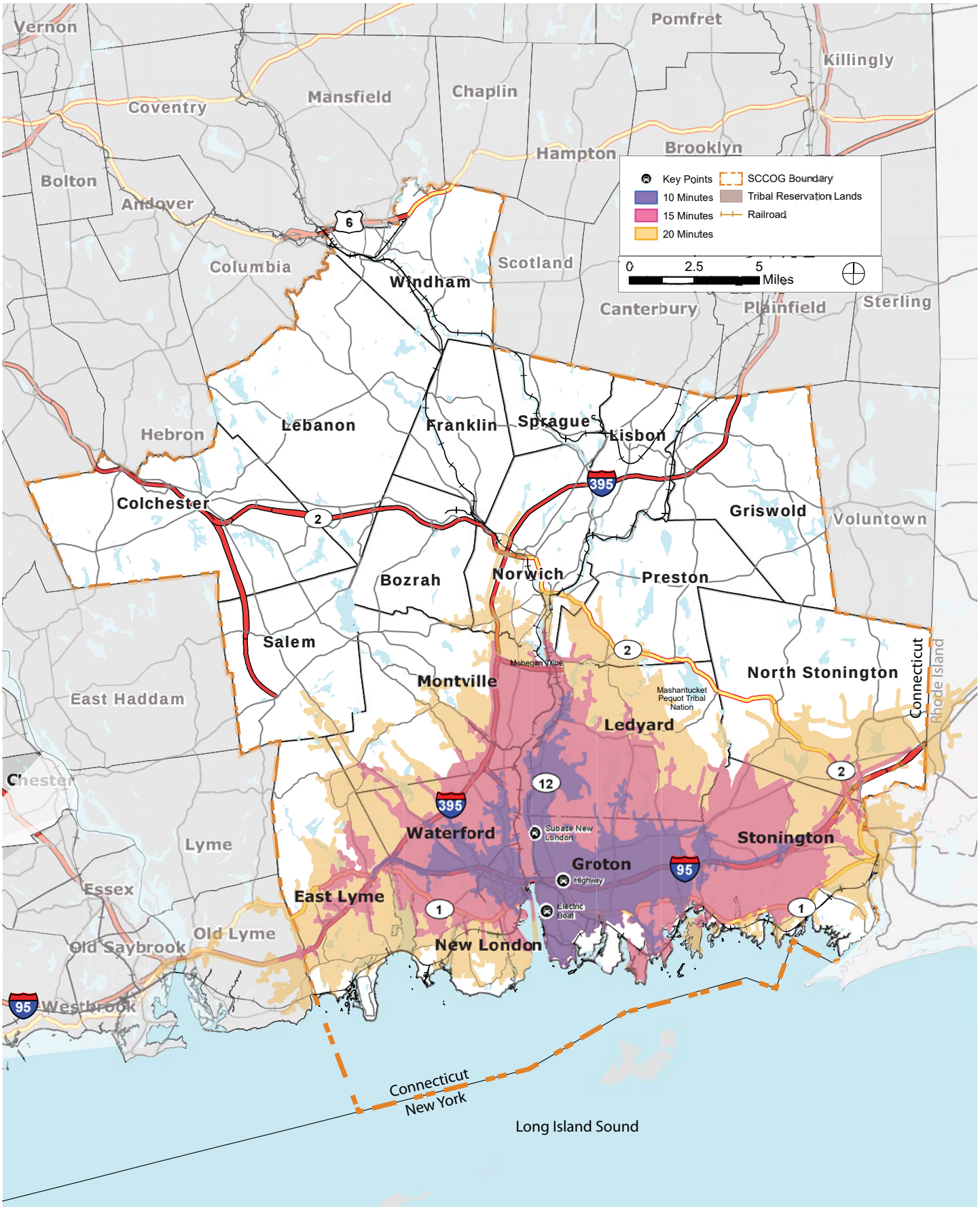
Supplementing the GIS data, travel time surveys along select corridors were conducted by the study team during the morning and afternoon peaks to corroborate the data provided by the GIS tool and identify key congestion segments and intersections. As expected, the travel time analysis supported the results of the GIS analysis, with the following approximate travel times:

- 10-12 minutes for the Route 12 Corridor between I-95 and Gales Ferry, with 3- to 4-minute travel times between I-95 and Crystal Lake Road (SUBASE Main Entry).
- 10 minutes for the Route 32 Corridor between I-95 and I-395.
- 4-5 minutes for the Route 85 corridor between I-95 and I-395 and the Route 184 corridor between Route 12/I-95 and Route 117.
- 4-6 minutes for major routes between I-95 and the Electric Boat main campus.



Source: ESRI, Tighe & Bond

Figure 13: Travel Time Analyses, Morning Peaks (2019)



Source: ESRI, Tighe & Bond

Figure 14: Travel Time Analyses, Evening Peaks (2019)

Traffic Operations Analysis

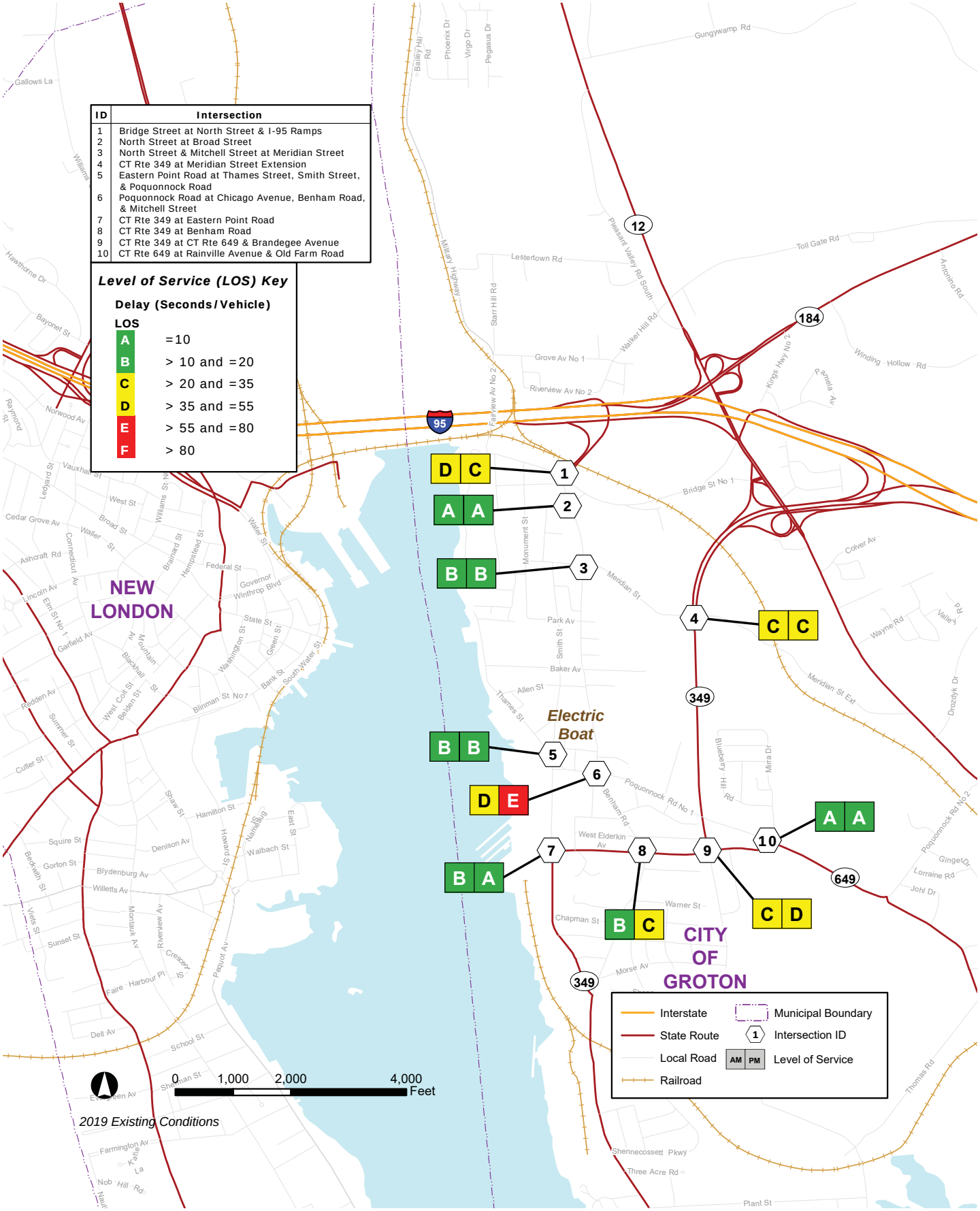
Existing traffic operations were evaluated for the weekday morning and weekday afternoon peak hours. Capacity and queue analyses were conducted using *Trafficware's Synchro 10 – Traffic Signal Coordination Software*, based on the *Highway Capacity Manual (HCM) 6th Edition* methodology.

An intersection's qualitative operational condition is described by the HCM in terms of average control delay per vehicle, which is used to assign a Level of Service (LOS) to a particular intersection or intersection approach movement. LOS is defined by letter grades A through F to indicate the efficiency of the traffic control at an intersection. In general, intersections that exhibit LOS A or B are considered to have excellent to good operating conditions with little congestion or delay. LOS C and D indicates an intersection with acceptable/tolerable operations with average delays approaching one minute. Intersections with Levels of Service E and F are operating with poor or failing conditions and typically warrant a more thorough review and possible improvement to mitigate the capacity issues. Improvements can include geometric, lane use, timing modifications, or a different form of traffic control to mitigate the operational issues and reduce average delay. In the context of this planning process, during the analyses of both existing and future conditions, intersections exhibiting LOS E and F were identified for further analysis and potential improvements to mitigate poor or failing operations.

In addition to LOS, the HCM methodology also allows for the calculation of queues. Queues are the expected length of vehicles waiting at an intersection due to the delay incurred by the traffic control. The 50th percentile queues, or average queues, are the average lengths of vehicle queues expected on an approach at any given time. The 95th percentile queues, or design queues, are the maximum expected queues on a given approach.

The existing conditions traffic operation analysis is summarized in Figure 15 on the following page with detailed results provided in Tables 1 and 2 of the Traffic Analysis Technical Appendix.

As shown, most intersections exhibit overall LOS D operation or better during both the morning and afternoon peaks. However, the intersection of Poquonnock Road at Chicago Avenue, Benham Road, and Mitchell Street operates at overall LOS E with some individual turning movements operating at LOS F in the afternoon. Select individual turning movements at the intersections of Bridge Street at North Street and the I-95 Ramps, as well as Route 349 at SR 649 and Brandegee Avenue, also experience LOS E or F operations during both peaks. Minor queueing issues also exist at these intersections depending on the peak and movement.



Source: Synchro Analyses, Tighe & Bond

Figure 15: Local Traffic Operations Analysis - 2019 Existing Conditions

Based on the observations of traffic operations, the travel time analyses, and the traffic operations analyses, the following locations were identified as congestion centers and will be a focus of the improvement review as the future conditions:

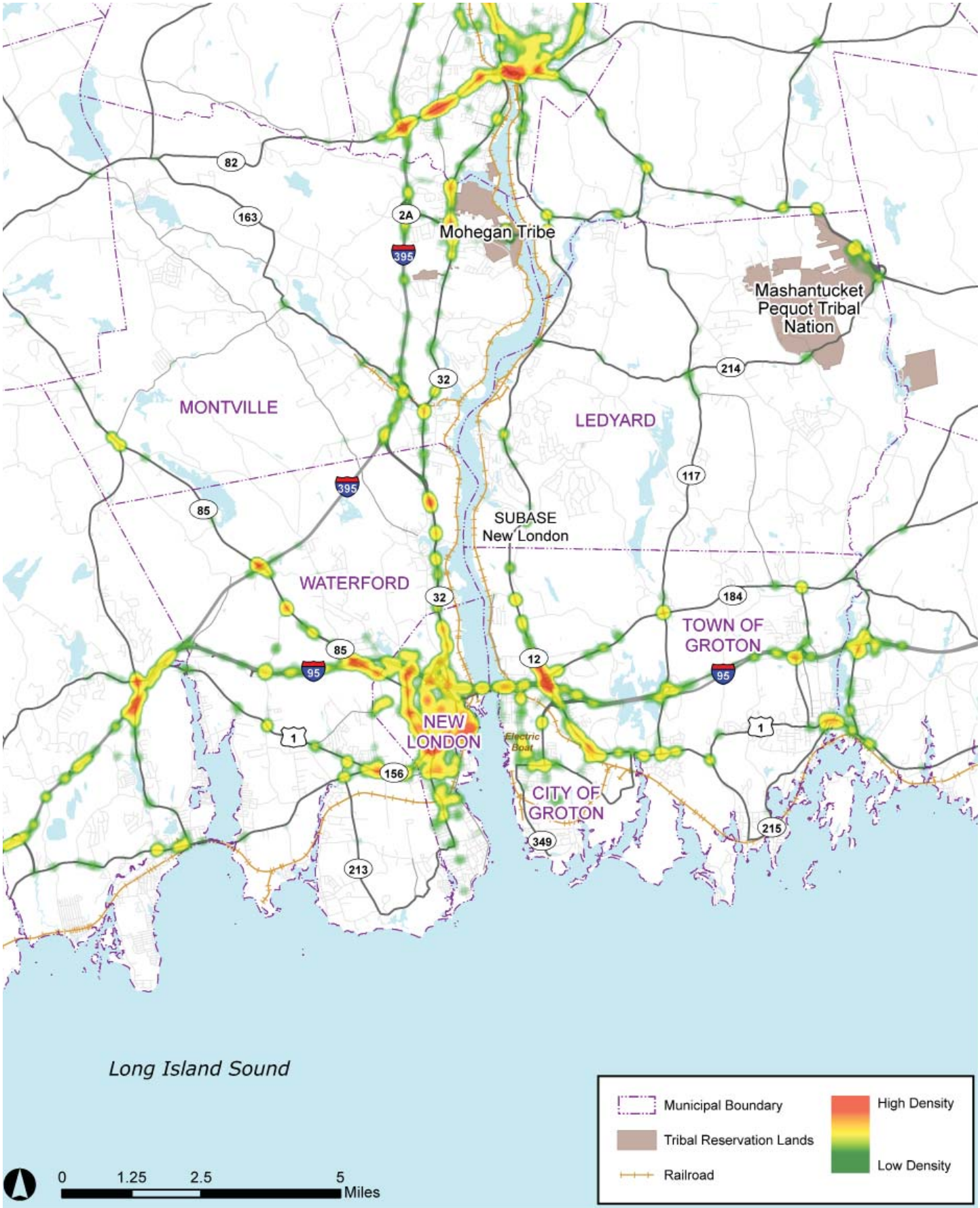
- Route 12 and Military Highway northbound, approaching the SUBASE, in the morning and southbound, approaching I-95, in the afternoon.
- Selected intersections within the City of Groton on key routes between I-95 and Electric Boat, particularly Route 349 at Route 649; I-95 exit 85 at Bridge Street/North Street; Thames Street/Poquonnock Road at Eastern Point Road/Smith Street; and Poquonnock Road at Mitchell Street/Chicago Avenue/Benham Road.
- Route 85 at I-95 exit 82.
- Route 184 interchange ramps with Route 12.
- Route 32 in the area of Connecticut College.

Crash History

Motor vehicle collision history data were collected from the Connecticut Crash Data Repository for the most recent three-year period of available data. A collision heat map (see Figure 16) was created, with higher concentrations of crashes indicated in red and lower concentrations in green. As shown, the heavy volume, non-expressway corridors experience the highest concentration of collisions due to the friction in the travel streams caused by high-volume signalized intersections. The following areas are identified as areas of concern for further review and potential improvement as they are planned:

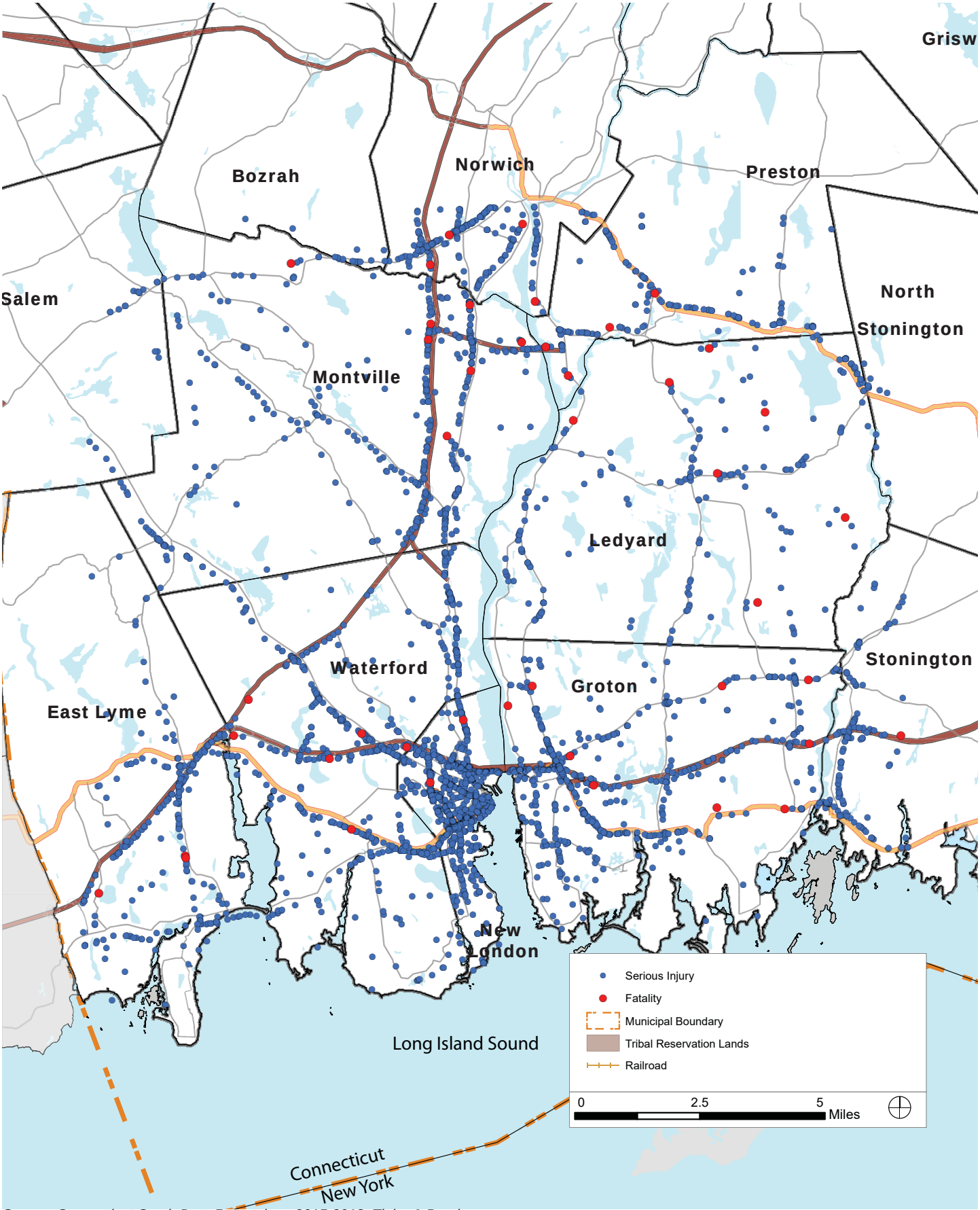
- Route 85 interchanges with I-95 and I-395.
- Route 12 corridor in the area of the I-95 Interchange and the segment between Meridian Street Extension & Poquonnock Road.
- I-95 between the Thames River and the Routes 12 and 184 interchange.
- Route 32 at key signalized intersections.
- I-395 between the Routes 32 and 163 interchanges.
- Selected intersections within Groton on key routes between I-95 and Electric Boat, particularly Route 349 at Route 649; I-95 exit 85 at Bridge Street/North Street; Thames Street/Poquonnock Road at Eastern Point Road/Smith Street; and Poquonnock Road at Mitchell Street/Chicago Avenue/Benham Road.

In addition to the heat map, Figure 17 shows the locations of all crashes that resulted in serious injury (blue dot) and fatality crashes (red dot). Of the 8,635 reported crashes over the three-year period, 29 fatalities occurred and 1,793 serious injuries were reported. The areas listed above include many of the serious injury collisions and some fatalities, and will be reviewed for potential safety improvements.



Source: Connecticut Crash Data Repository 2015-2018, Tighe & Bond

Figure 16: Crash Heat Map



Source: Connecticut Crash Data Respository 2015-2018, Tighe & Bond

Figure 17: Fatal and Serious Injury Crashes

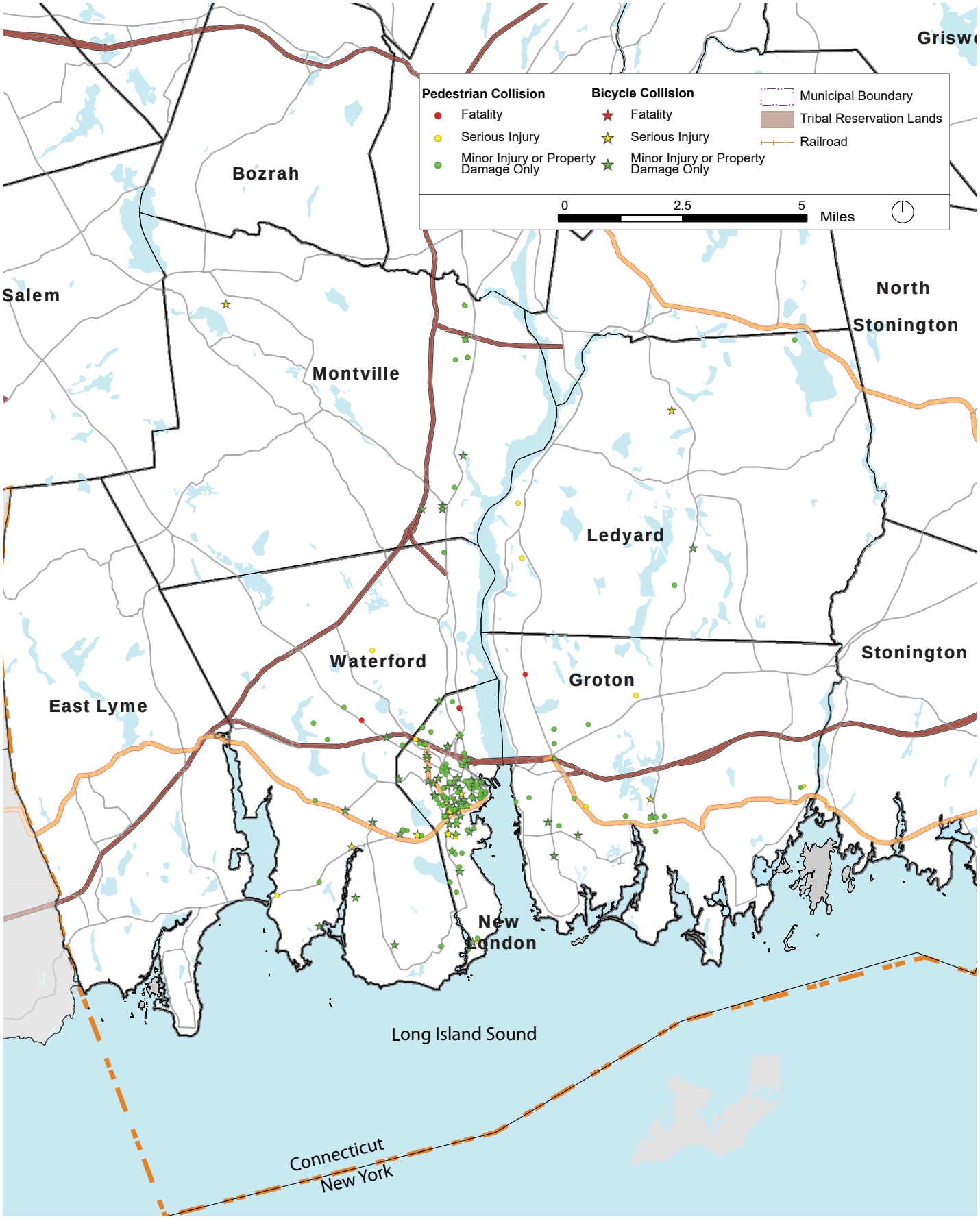
Finally, Figure 18 shows the location of incidents involving a bicycle or pedestrian along with the severity of the crash. A total of 109 bicycle collisions (no fatal, 6 serious injury) and 126 pedestrian collisions (3 fatal, 15 serious injury) occurred over the three year period. The majority of the bicycle and pedestrian collisions occurred in New London where denser urban development and higher bicycle, pedestrian, and vehicular traffic volumes are present.

2. Future Traffic Projections

Future traffic volume projections were based on the available current and historical traffic volume data and the regional transportation model maintained by CTDOT. The regional transportation model utilizes historical traffic volume trends, pending/approved but yet-to-be constructed developments, and expected near-term future development based on information provided from local municipalities to forecast future traffic volumes growth rates on a regional level. Although a review of the historical Average Daily Traffic (ADT) volumes in the region for the last 15 years shows a relatively flat and/or slightly decreasing volume trend, the recent and planned economic development within the region suggests a regional growth rate of 0.5% per year from 2015 to 2040. This rate is supportable, and is conservative, based upon the regional housing growth projections outlined in Section IV.H. The projected increase in 2040 ADT volumes increase from the 2015 volumes presented in Figure 12 is shown in Figure 19. As shown in the figures, the highest ADT volumes and total increases occur on the interstates and major roadways providing regional connectivity. Traffic growth on the majority of the segments, shown by the green and yellow colored segments, represent moderate traffic growth that can be accommodated on the roadways. The interstates, where the increase in traffic volume is more pronounced, but still at moderate levels, largely have the capacity to accommodate this moderate traffic growth within the region with the planned improvements that are outlined in Section V.A.4, Planned Improvements.

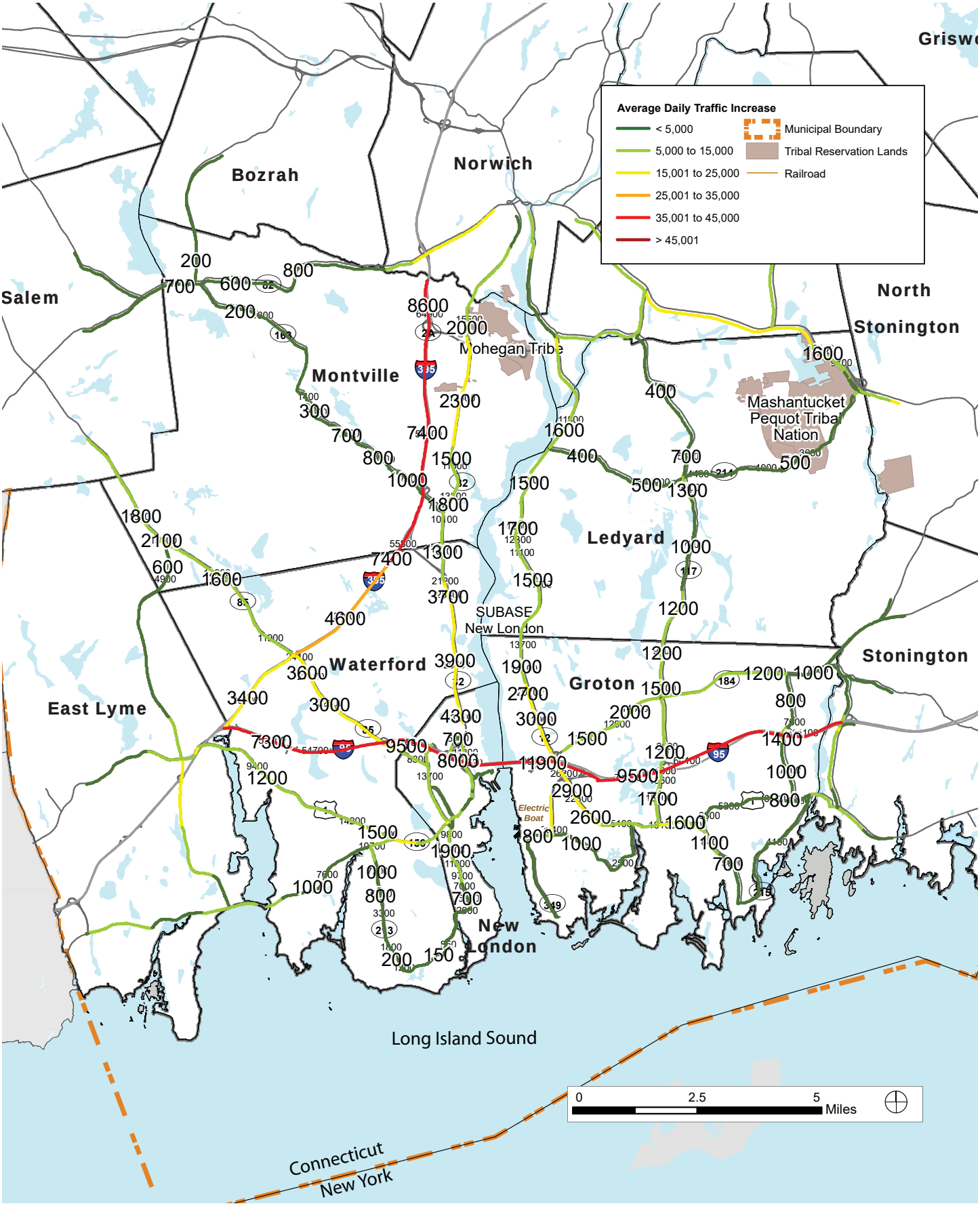
For the local traffic turning movement counts, a similar annual growth rate of 0.5% was utilized to project the existing 2019 volumes to 2030, when the planned Electric Boat expansion is expected to reach its peak employment. In addition, site generated traffic from the company's expansion, taken from the traffic impact study prepared by Electric Boat for the City of Groton approval process, was also added to the local roadway network. As stated in the traffic impact study, the site-generated traffic of the Electric Boat expansion was based upon a projection of the increased number of employees accessing the campus via the existing parking facilities proximate to the Electric Boat Groton campus and/or the potential parking area B that is located just south of the expanded campus on Route 349. The growth rate and Electric Boat expansion volumes were combined in order to estimate the 2030 Future Traffic Volumes, which are included in the appendix to this study.

Figure 18: Pedestrian & Bicycle Collisions



Source: Connecticut Crash Data Respository 2015-2018, Tighe & Bond

Figure 18: Pedestrian and Bicycle Collisions



Source: ConnDOT, FHI

Figure 19: Projected Average Daily Traffic Increase (2015 - 2040)

3. Future Traffic Operations Analysis

Future Traffic Operations were analyzed using the Local 2030 Future Traffic Volumes with the existing geometry and traffic signal settings from the 2019 Existing Conditions analyses and the methodology detailed above. Figure 20 summarizes the results of the analyses for the 2030 Future Traffic Operations for the local area, assuming the traffic related to increased Electric Boat employment, but without any traffic improvements (i.e. the "no-build" condition). A more detailed summary of the operations is provided in Tables 1 and 2 in the Traffic Analyses Technical Appendix.

As expected, the projected traffic growth results in moderate impacts to traffic operations within the local area. Most intersections still experience acceptable operations of overall LOS D or better with the increases in traffic. The most severe impacts occur at the intersection of Bridge Street at North Street and the I-95 ramps, which exhibits overall LOS F in the morning peak; and the intersection of Poquonnock Road at Chicago Avenue, Benham Road, and Mitchell Street, which experiences LOS E and F operations in the morning and afternoon peaks, respectively. In addition, individual movements with existing capacity issues under existing conditions experienced increased delays and queuing as well. Individual movements experience LOS E/F operations at the Route 349 intersection with Meridian Street Extension during the morning peak, and the Route 349 intersections with Benham Road and Route 649/Brandegee Avenue in the afternoon peak.

4. Recommended Regional Projects

There are several previously planned improvement projects within the region that were reviewed and evaluated as part of this study. The analysis concluded that these previously planned projects are consistent with the study goals and would benefit transportation operations in the region. The following sections briefly summarize the scope, benefits, and timeline for the planned regional projects, as well as recommendations specific to this study. Both sets of recommendations are shown in Figure 21.

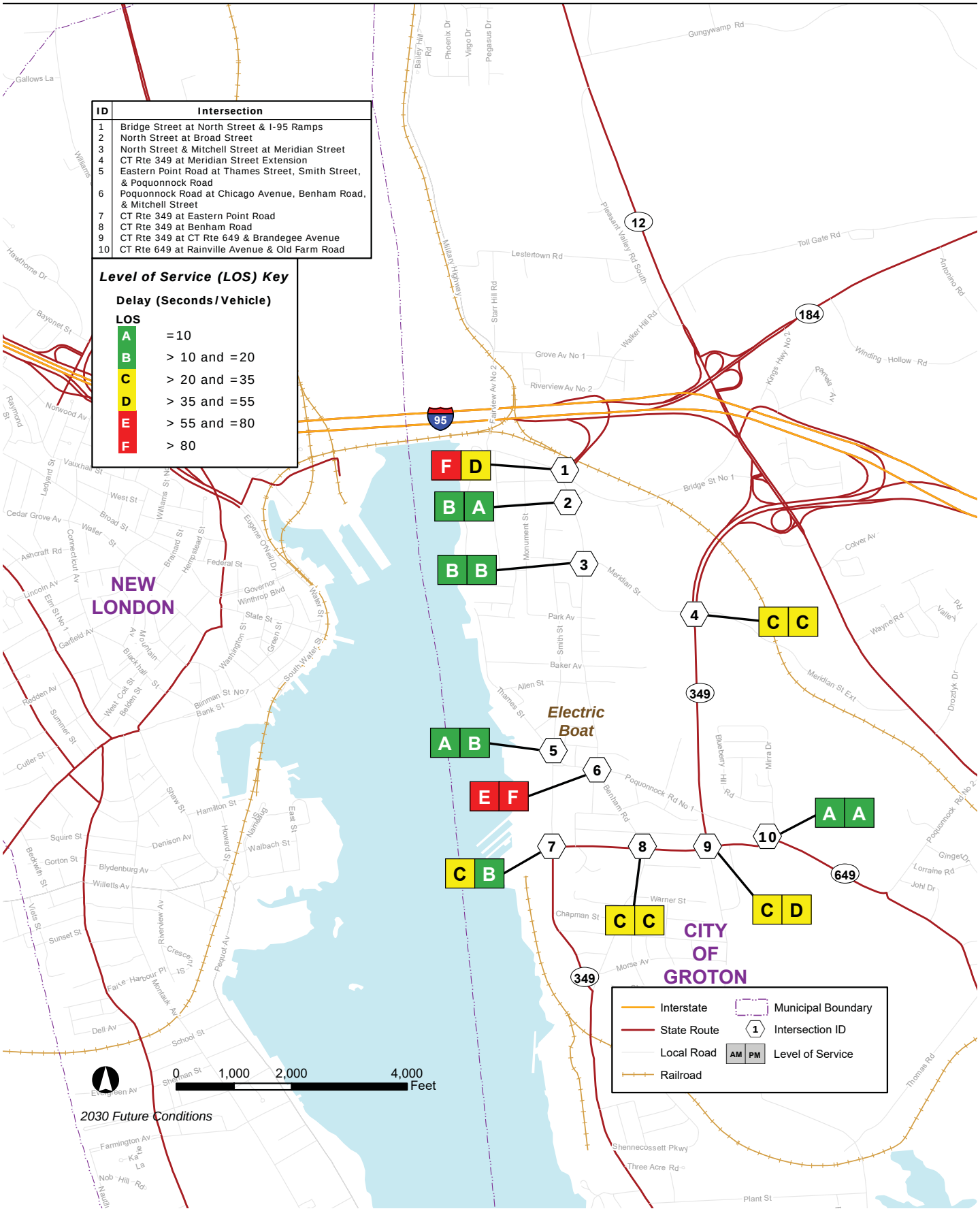
Previously Planned Regional Projects

Project A: I-95 Widening to Three Lanes

CTDOT has initiated a study investigating strategies to reduce congestion and improve safety along I-95 from the New York to Rhode Island state borders. Of note within the regional and local study area, CTDOT is investigating the widening of I-95 from two through lanes to three through lanes from Branford to Stonington. The study is in the planning stages, with initial estimates of $150 million construction costs for short-term improvements to the areas surrounding Interchanges 54 & 55 and 88 through 90; $830 million for mid-term improvements at Interchanges 70 to 74, 80 to 82, and the Route 32 Interchange; and further study required to determine construction costs for widening between Interchanges 54 and 69.

Project B: I-95 at I-395 Interchange Reconstruction

Within the larger study for comprehensive improvements to the I-95 corridor in Connecticut, CTDOT has initiated a study of improvements to the I-95 interchange with I-395. The improvements suggest the realignment of the interchange to mitigate congestion and safety concerns with the current interchange geometrics. The study is in the planning stages, with an initial construction cost estimate of $900 million.



Source: Synchro Analyses, Tighe & Bond

Figure 20: Local Traffic Operations Analysis - 2030 Future Conditions

Project C: I-95 Interchange 74 (Route 161) Improvements (SPN 044-156)

The I-95 Interchange 74 Improvement project (State Project Number [SPN] 044-156) aims to improve operations and safety as well as upgrade deficient bridge structures. The project includes safety improvements along the I-95 mainline, geometric improvements to the Route 161 on and off ramps, and the replacement of the bridges at the interchange. The project is in the pre-design stage with an estimated advertising date of November 2020 with an estimated project cost of $150 million.

Project D: William Street Pedestrian/Bicycle Improvements (SPN 094-258)

The William Street Pedestrian and Bicycle Improvements Project (SPN 094-258) seeks to address a lack of pedestrian and bicycle accommodations along William Street west of Connecticut College and the associated safety concerns. Approximately 1,700 feet of sidewalk is planned to be installed on the east side of the roadway from Chapel Way to the Waterford Town line, including a raised crosswalk at Briggs Street and a raised intersection at Chapel Way. This project is in the pre-design stage and has an estimated advertising date of June 2020 with an estimated cost of $1.25 Million.

Project E: New London LRARP Improvements (SPN 094-260)

The New London Local Road Accident Reduction Plan (LRARP) Improvement Project (SPN 094-260) aims to address traffic safety and operational concerns at the Bank Street intersections with Sparyard Street and Tilley Street and the intersection of Green Street at Tilley Street. The plan recommends converting Green Street to a two-way roadway and providing a right-turn lane from Tilley Street onto Green Street. Additionally, new MUTCD compliant traffic signals, accessible pedestrian improvements, and an emergency pre-emption system are planned for the intersection. The project is in the pre-design stage and is estimated to have an advertising date of January 2021 with an estimated project cost of $960,000.

Project F: District 2 Pavement Preservation (SPN 172-482 & 172-483)

The District 2 Pavement Preservation Projects (SPN 172-482 & 483) are part of CTDOT's ongoing maintenance program and seek to address poor pavement conditions and deterioration on sections of State roads in CTDOT District 2. The project includes patching, crack sealing, and the placement of a new wearing course on various sections of state roads in 17 municipalities including Montville, Waterford, and Groton within the local study area. This project is undergoing contract-processing and construction will occur in 2019 with a total project cost of approximately $16.25 million.

Project G: Water Street Parking Garage Expansion

The Water Street Parking Garage Expansion project is planned to create additional parking supply to address concerns over parking capacity during peak weekday and seasonal weekends at the Water Street garage in New London. The 400-space expansion to the garage is planned to serve the future National Coast Guard (NCG) Museum and to provide parking supply for downtown visitors, employees, and ferry passengers. The project is in the planning and design stage, with construction of the NCG Museum to begin in 2020.

District 2 Signal Equipment Upgrades (SPN 172-480 & 485)

The District 2 Signal Equipment Upgrades will replace aging, non-MUTCD compliant traffic signal equipment, LED signals, and select traffic controllers, install signal head backplates and video detection, and remove programmed nighttime flashing operations for traffic signals within CTDOT District 2 including several signals within the local study area. This work is separated into two projects: SPN 172-480 and SPN 172-485 with both projects are in the pre-design stage with estimated advertising dates and construction costs of December 2019 and $2 million and December 2021 and $5.3 million, respectively.

SCCOG Regional Bicycle & Pedestrian Plan

The SCCOG Regional Bicycle & Pedestrian Plan identifies deficiencies in bicycle and pedestrian accommodations and large-scale improvements to bicycle and pedestrian infrastructure to promote alternative mode usage within the SCCOG region. The study's existing conditions report was issued in spring 2019, the Recommendations and Tactical Engagement process conducted in summer 2019, and a Draft Final Report is expected in October 2019.

Regional Projects Recommended in This Study

Improvement concepts were developed for the study area to address existing deficiencies and future transportation needs resulting from forecasted travel demand. The improvements were developed to mitigate current and future areas of concern and address future traffic growth, improve safety, increase accessibility, and promote alternative modes of travel. Recommendations were categorized as either regional or local depending on the extent of the scope. Regional improvements are general and geographically wider-ranged. Local improvements are specific and more directly impact traffic operations, safety and mobility related to the Electric Boat and SUBASE expansion.

Additionally, improvement concept plans were developed for several of the proposed improvements as referenced in the following sections. The concepts can be found in the Transportation Concept Improvement Plans Appendix. In some cases, two potential improvements are presented at a particular location and are noted as Improvement A and Improvement B, respectively.

Project H: Route 32 Safety Study (H)

A high number of crashes along Route 32 between I-395 and I-95 were identified in the crash history analyses as shown on the Crash Heat Map, Figure 16. The Route 32 corridor serves an important role in regional commuter travel connecting I-395 and points north to I-95 and downtown New London as well as providing access to Connecticut College and the Coast Guard Academy, which generate a significant amount of pedestrian and alternative mode trips. In order to fully assess the safety deficiencies and obtain the public vision for the corridor, a transportation planning and safety study of this segment of Route 32 is recommended. The study will allow the region, Towns, and the users to re-envision the Route 32 corridor to improve safety for all roadway users. The study should include a traffic engineering analysis, detailed safety study, and roadway safety audit to identify collision patterns along with a comprehensive public stakeholder and input process to obtain consensus on the recommended improvement plan that mitigates current safety concerns and plans for the future of the corridor. SCCOG has received funding to do this work along a portion of the corridor.

Projects I & J: I-95 Interchange 82 (Route 85) & I-395 Interchange 2 (Route 85) Safety Monitoring

Similar to the Route 32 corridor, a high number of crashes were identified on Route 85 in the area of the I-95 Interchange from Waterford Commons to the New London Town line and in the area of the I-395 interchange. Traffic safety monitoring should be conducted and if the crash rate persists, a detailed safety study and roadway safety audit should be considered in order to identify crash patterns and propose mitigating improvements.

Project K: SUBASE Access & Circulation Study

As determined through field observations and discussions with SUBASE personnel, opportunities exist to improve and facilitate access to and circulation within the SUBASE. The recently completed reconstruction of Crystal Lake Road project (SPN 058-327), implemented with monies from the Special Transportation Fund and the Town of Groton, installed anti-terrorism force protection (AT/FP) measures by realigning the main SUBASE gate intersection with Crystal Lake Road, Military Highway, and on the west end of Crystal Lake Road as well as installing a multi-use trail along the south side of Crystal Lake Road and on the west side of Route 12 extending south to the trail on Pleasant Valley Road for improved bicycle and pedestrian access. However, the following additional items are suggested to further improve access:

- Investigate improvements to the traffic signal operations at the main SUBASE gate to mitigate issues with vehicles blocking the intersection turning movements. Outside of the morning peak hours, only one entry gate is active to process vehicles into the SUBASE, and the traffic signal requires that vehicles entering from Military Highway to the south and Crystal Lake Road to the east merge together to form a single lane. Vehicles entering from Crystal Lake Road have uncontrolled, continual access with a green right turn arrow into the gate, causing delays and queues for vehicles entering from Military Highway as they await entering, and causing vehicles to be stuck within the intersection and blocking other movements. Signal phasing could be modified or additional signage could be installed to stop Crystal Lake traffic while Military Highway vehicles enter, or to require Crystal Lake Road vehicles to yield to Military Highway traffic to reduce the likelihood of queuing through the intersection. In lieu of potential signal improvements, the SUBASE could consider maintaining two active entry gates at all times.

- Investigate the potential for public transit vehicles to enter and circulate the SUBASE to provide efficient and convenient access.

- Consider alternative points of access for bicycles and pedestrians, particularly at the previous gate location on Route 12 at the intersection with Ohio Avenue which could facilitate direct pedestrian and/or bicycle access from the Trident Park townhomes development to the east of Route 12.

- Consider alternative design of entrance gates to facilitate access by bicycles or review the potential implementation of a bicycle share program with potential storage locations on either side of the SUBASE pedestrian gates to allow access to and circulation around the SUBASE without safety concerns with bicycles entering and exiting.

Further detail on the alternative mode improvements is provided in Section V.C.4. In order to fully review and vet these potential improvements, a detailed SUBASE Access & Circulation Study is suggested. The study should consider ways to facilitate and incentivize bicycle, pedestrian, and transit access to the SUBASE as well as options for these modes to circulate within the base. The efforts should consider strong participation from SUBASE personnel during the study process to receive feedback while ensuring AT/FP and maintaining preferred security measures at the SUBASE both externally and internally.

Project L: City of Groton Parking Study

The City of Groton contains a significant amount of surface parking lots, structured parking, on-street parking, and small accessory parking lots to provide supply for key employers including Electric Boat and Pfizer, and other municipal residents and visitors. In addition, Electric Boat operates a shuttle service to its satellite parking areas both within and outside of the City to provide parking for their employees. A detailed parking study of the City of Groton should be conducted to quantify the locations, supply, utilization, and need for parking to determine if improvements can be made to modify current parking related regulations, consolidate parking areas, relocate parking areas to preferred locations, or expand parking supply in certain areas within the City based on need. The study should be a collaborative effort among the City, key stakeholders, and the public to create a parking management plan that identifies preferred parking locations while allowing for development of currently underutilized land. Land use, zoning districts and regulations should be reviewed and considered for revisions to best accommodate the economic development goals with the parking supply and demand requirements.

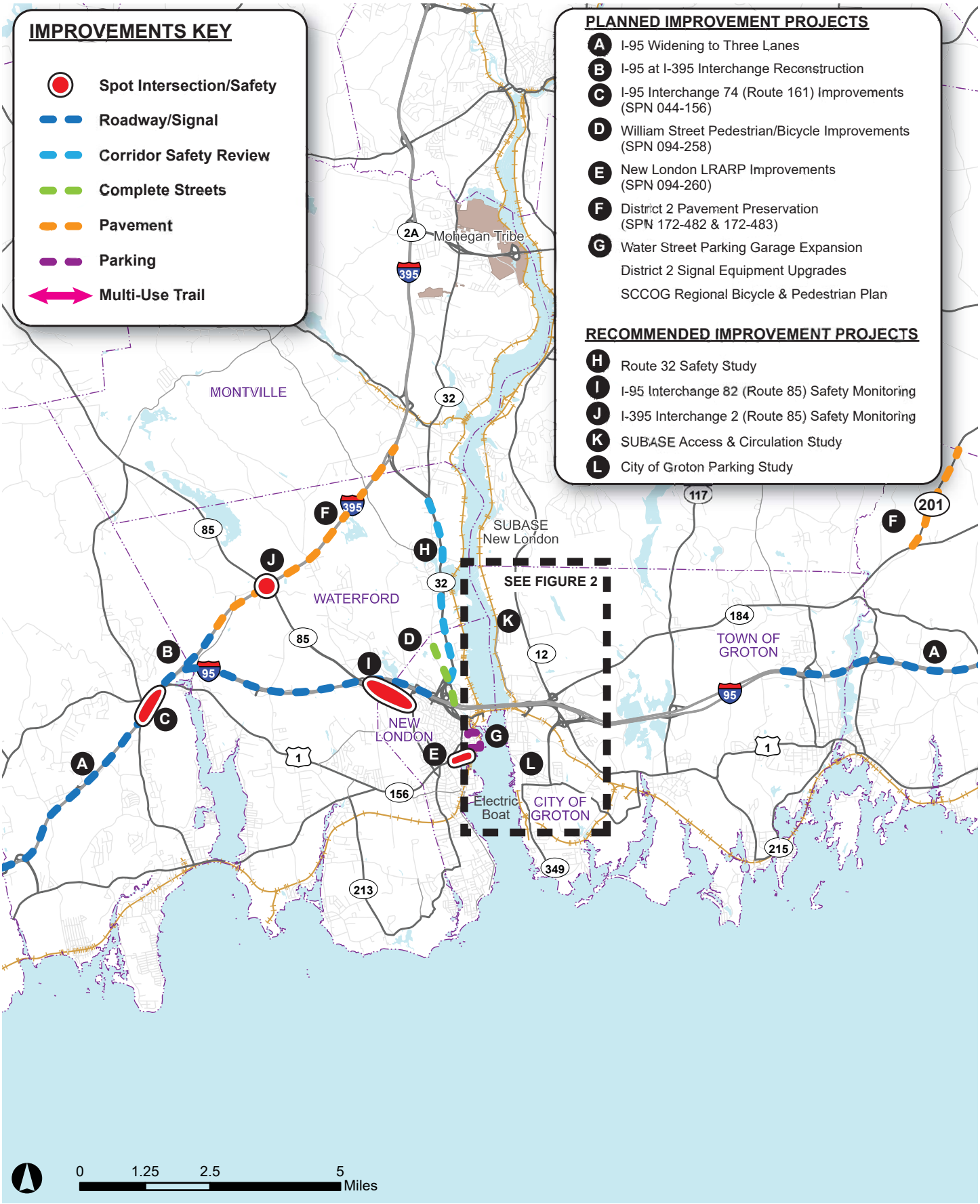
5. Recommended Local Projects

As with the regional projects, there are some previously planned improvement projects in Groton and New London that were reviewed and evaluated as part of this study. The analysis concluded that these previously planned projects are consistent with the study goals and would benefit transportation operations in the region. The following sections briefly summarize the scope, benefits, and timeline for the planned regional projects, as well as recommendations specific to this study. Both sets of recommendations are shown in Figure 22.

Previously Planned Local Projects

Project 1: Thames River Reconnection Study

The Thames River Reconnection Study, commissioned by the Cities of New London and Groton, included the preparation of a redevelopment analysis of the Thames Street/Bridge Street Area of the City of Groton and the Hodges Square Neighborhood in New London. As stated in the recently completed final report from July 2019, “the goal of this study was to produce a high-level, policy-oriented document that would guide future action in the two study areas, while reserving some of the funding for the implementation of select near-term recommendations. The plans would provide conceptual-level strategies for strengthening the sense of place and vitality of each area, and would outline real estate and physical improvement recommendations that would serve as a guide for future investment in the two communities.”



Source: ConneDOT, Tighe & Bond

Figure 21: Regional Planned & Recommended Improvements

Project 2: Poquonnock Road Reconstruction

The Poquonnock Road Reconstruction Project is a Local Transportation Capital Improvement Project (LOTCIP) to address poor roadway conditions and geometric and sidewalk accessibility deficiencies on Poquonnock Road in the City of Groton. The project includes complete roadway reconstruction for 3,000 linear feet of roadway, adjustment to the roadway profile, utility improvements, and the installation of accessible sidewalks and crossings on Poquonnock Road between Mitchell Street and Rainville Avenue. This project design RFP was issued on April 26, 2019, with an estimated construction cost of approximately $2.2 million available under the LOTCIP funding.

Project 3: Route 12 Road Diet Study

CTDOT is conducting a study of all multi-lane, undivided state roadways to determine if the number of lanes can be reduced to address safety concerns and alternative mode accommodations along the corridors. Traffic volumes reviewed along Route 12 within Groton between Crystal Lake Road and Gungywamp Road indicated that a reduced cross section may be feasible based on an initial screening process, and further testing is underway to determine if the segment will continue to a more formal traffic engineering and concept development assessment. This project is in the study phases and potential implementation timeframe is undetermined.

District 2 Signal Equipment Upgrades & SCCOG Regional Bicycle & Pedestrian Plan

As discussed, the CTDOT District 2 Signal Equipment Upgrades and the SCCOG Regional Bicycle & Pedestrian Plan regional projects include direct improvements within the local study area.

Local Projects Recommended in This Study

Project 4: Five Corners

The traffic analyses identified existing congestion and safety issues at the intersection of Poquonnock Road at Chicago Avenue, Benham Road, and Mitchell Street due to the inefficient five-legged configuration. Traffic operations further deteriorate under the future traffic volume projections. Two concepts were developed in order to mitigate this deterioration and improve traffic safety. Improvement Option A includes the construction of a single-lane modern roundabout shown in Plan 4A provided in the Transportation Concept Improvement Plans Appendix. The concept improves traffic operational issues (See Improved Traffic Operations Section) and mitigates safety concerns. It includes private property takings and/or easements to ensure that the roundabout is of proper size to accommodate vehicle turns. In terms of capacity, the roundabout operates well with future volumes, with significant excess capacity to handle additional traffic above projections. In terms of turning movements, the concept calls for a 120-inch diameter roundabout, which can accommodate a westbound tractor-semitrailer with a 48-foot trailer (WB-62 vehicle). Full design and the availability of the property on the corners will dictate the ability for large vehicles to circulate the roundabout. This concept should also be coordinated with and connected to the adjacent City of Groton Poquonnock Road Reconstruction Project to the east.

Alternatively, Improvement Option B, shown in Plan 4B of the Transportation Concept Improvement Plans Appendix, considers less aggressive revisions, maintaining the signalized operation of the intersection, by

revising the operation of Chicago Avenue and signal phasing to consolidate access to the intersection and increase operational efficiency. Currently the signal has three separate side street phases for Chicago Avenue, Mitchell Street, and Benham Road, which causes significant congestion. Improvement B includes revising Chicago Avenue to one-way southbound away from the signalized intersection to allow the removal of the Chicago Avenue signal phase and the potential combination of the Mitchell Street and Benham Road side street movements into one signal phase. The resulting two signal phase operation, including pedestrian phase - compared to the existing six-phase operation, significantly increases capacity (See Improved Traffic Operations Section). The project should also include accessible pedestrian ramps and crossings of all legs of the intersection while also coordinating with the Poquonnock Road Reconstruction project to facilitate pedestrian access to/from the east.

Project 5: Bridge Street at I-95 Ramps/North Street

Traffic analyses identify future congestion issues at the intersection of Bridge Street with the I-95 Ramps and North Street. To mitigate these potential future issues, Improvement Option A recommends that signal operations be regularly monitored, and the traffic signal phasing timings be adjusted as traffic volumes increase over time. These improvements largely mitigate the traffic congestion issues at the intersection (See Improved Traffic Operations Analysis Section). If congestion issues persist and/or traffic volume projections are exceeded, Improvement Option B recommends revisions to the traffic signal phasing including the addition of a protected left turn only phase for North Street northbound and I-95 Ramp southbound traffic while allowing the through and right turn movements to be concurrent (currently North Street and the I-95 Ramp approaches have their own signal phase). Improvement Option B results in acceptable operations for the projected traffic volumes with some reserve capacity for additional volume (See Improved Traffic Operations Analysis Section) while maintaining traffic safety for left turns with their protected only phase. Concurrent with this study, the City of Groton has been developing plans to renovate this intersection to manage congestion as well as significantly improve bicycle/pedestrian conditions and the intersection's function as a gateway to the City.

Project 6: Route 12 Corridor Signal Upgrades

The Route 12 corridor contains aging, non-Manual of Uniform Traffic Control (MUTCD) compliant traffic signal equipment and lacks pedestrian accommodations between the I-95/Route 184 interchange and the SUBASE. Plans 6A through 6C in the Transportation Concept Improvement Plans Appendix identify improvements to the traffic signal equipment and the pedestrian accommodations to mitigate the existing deficiencies including the following:

- Replacement of traffic signal equipment and replacement and/or installation of pedestrian signal equipment at six intersections to replace aging equipment installed in the early 1990s or equipment that is not present.

- Install pedestrian signal accommodations including exclusive pedestrian crossing phases, accessible pedestrian ramps and/or crosswalk markings. Crossings should be as direct as possible to reduce crossing distances and improve pedestrian safety.

- Installation of sidewalk extensions to connect existing facilities to create a continuous sidewalk network, where possible, and connect developments on both sides of Route 12 to signalized pedestrian crossings.

It is also important to note that the improvements recommended under Project 6 leverage the recently completed Crystal Lake Road Reconstruction Project (see above) improvements by providing better pedestrian accommodations connecting to the new multi-use trail from residential developments and commercial developments on the east side of the Route 12 corridor which will facilitate access to and from the SUBASE. Concurrent with this study, SCCOG's Regional Bicycle & Pedestrian Plan is recommending a multi-use trail be installed along Pleasant Valley Road South, parallel to Route 12 south of the SUBASE.

Finally, although field observations and travel time studies did not reveal significant congestion along the Route 12 corridor, the traffic signals along Route 12 are coordinated and the coordinated cycle length and signal phase timings could be revised to optimize operations and improve efficiency along the corridor as traffic volumes increase.

Projects 7-9: Eastern Point Road & Mumford Avenue Pedestrian Safety

The Eastern Point Road and Mumford Avenue corridor serve as an important collector roadway providing vehicular access between I-95 and Groton to the north and Electric Boat, Pfizer, UCONN Avery Point, and other key destinations to the south. Combined with this vehicle-centric purpose, the roadways contain several parking areas and provide pedestrian accommodations for access to the Electric Boat campus on the west side of Eastern Point Road. In general, the roadways lack pedestrian accommodations, accessible pedestrian routes, and pedestrian warning enhancements that would improve pedestrian safety. To address these deficiencies, Plans 7 through 9 in the Transportation Concept Improvement Plans Appendix presents the following recommended improvements:

- Replace existing flashing beacon with a rectangular rapid flashing beacon (RRFB) at the intersection of Mumford Avenue with Chester Street. Consider the use of active pedestrian detection in lieu of pedestrian activation due to the high volume of pedestrian traffic. Also, consider a raised intersection or textured pavement crossings and enhanced roadway illumination to improve pedestrian identification by drivers.

- Install pedestrian crossings with accessible pedestrian ramps and pedestrian warning signage at key intersections, pedestrian exits from parking areas, and across from Electric Boat pedestrian entrance gates. Consider RRFBs, raised crosswalks, and textured pavement for enhanced warning and identification at the crossings. Consider sidewalk bump-outs at the crossings to reduce pedestrian crossing distance.

- Replace and repair existing deteriorated or non-accessible sidewalks and include a sidewalk extension along the west side of Thames Street from Eastern Point Road to Baker Avenue.

- Install accessible pedestrian ramps and crossings at the signalized Eastern Point Road intersections with Chester Street and Thames Street/Smith Street/Poquonnock Road on all applicable legs.

These recommendations have been created in coordination with the deficiencies outlined and identified within the SCCOG Bicycle & Pedestrian Plan Existing Conditions Report, discussed in the previous section.

Projects 10 & 11: Route 349 at Route 649/Brandegee Avenue and Route 349 at Meridian Street/Meridian Extension

Similar to the Bridge Street intersection with North Street and the I-95 Ramps, minor to moderate congestion issues were identified in the future traffic analyses at the Route 349 intersections with Route 649/Brandegee Avenue and Meridian Street/Meridian Street Extension. Both intersections serve as key junctions along the main access route between I-95 to the north and Electric Boat, Pfizer, UCONN Avery Point, and other key destinations to the south. Traffic operations at these intersections should be regularly monitored as traffic volumes increase in the area with adjustments made to the traffic signal timing to optimize capacity. The traffic analyses presented in the Improved Traffic Operations Analysis section show that signal optimization largely mitigates the congestion issues at the intersection resulting in overall acceptable traffic operations. Concurrent with this study, the City of Groton has been developing plans to install additional crosswalks, sidewalks, and multi-use paths along Meridian Street to improve bike and pedestrian access, including at the intersection with Route 349.

Project 12: Route 649 at Rainville Avenue/Old Farm Road

Field observations revealed that the Route 649 (Poquonnock Road) intersection with Rainville Avenue and Old Farm Road lacks pedestrian accommodations for the pedestrian traffic received from the Electric Boat M-Lot surface parking lot to the southeast on Poquonnock Road. In addition, the M-Lot has a mid-block pedestrian crossing of Poquonnock Road approximately 450 feet east of the Rainville Avenue and Old Farm Road signalized intersection. Plan 12 in the Transportation Concept Improvement Plans Appendix presents the following recommended improvements to improve pedestrian access and safety:

- Upgrade traffic signal equipment and pedestrian signal equipment/timing and include crosswalks on all legs and accessible pedestrian ramps on all corners of the Route 649 at Rainville Avenue/Old Farm Road intersection.

- Eliminate existing mid-block crossing to direct and encourage pedestrian crossing at the Route 649 at Rainville Avenue/Old Farm Road intersection.

- Install a sidewalk connection on the south side of Poquonnock Road from the M-Lot surface parking lot to the intersection with Rainville Avenue and Old Farms Road intersection and on the south side of Rainville Avenue and up to connect to the existing sidewalk at Litton Avenue.

In addition, these improvements should coordinate with the Poquonnock Road Reconstruction Project currently under design (see above discussion).

Project 13: Multi-Use Trail Connection

The multi-use trail running from running from Crystal Lake Road at the SUBASE Main Gate, along Route 12 and Pleasant Valley Road, ends at the Walker Hill Road intersection without a multi-use trail connection to the Gold Star Bridge pathway. Plan 13 in the Transportation Concept Improvement Plans Appendix shows potential alternative routing concepts along Walker Hill Road and Riverview Avenue and through the potential Seeley School development parcel to connect the two facilities and create a continuous trail network from the SUBASE to Groton and across the Gold Star Bridge to New London to the south. The project should be coordinated with the results of the SCCOG Bicycle and Pedestrian Plan and ongoing planning efforts within the City of Groton to improve bicycle and pedestrian access from the south.

Project 14-16: North Street/Mitchell Street, Eastern Point Road, and Benham Road Complete Streets Improvements

Field observations, stakeholder feedback, and public input stressed the importance of a transportation system that can accommodate all roadway users. Within roadway corridors, accommodating all roadway users is known as Complete Street. The North Street/Mitchell Street, Eastern Point Road, and Benham Road corridors serve as key connections between major employers and destinations within the City of Groton while also providing access to virtually all of City's residential neighborhoods. The corridors lack pedestrian and bicycle accommodations that would allow them to be accessed and safely utilized by all modes to connect these residential neighborhoods to the key commercial destinations. These roadways have excess pavement width via wide travel lanes and/or additional through travel lanes between key intersections and some available right of way that could be utilized to serve bicycle and pedestrian transportation. Complete streets improvements to these corridors could also focus vehicular traffic on the Route 349, Route 649, Route 12, and U.S. Route 1 corridors, which contain higher capacity for trips to the key destinations within the City.

Plans 14A & 14B, Plan 15, and Plans 16A & B in the Transportation Concept Improvement Plans Appendix contain potential complete street alternatives along the North Street/Mitchell Street, Eastern Point Road, and Benham Road corridors, respectively. These enhancements include the reduction of the vehicle travel lanes to a standard 11- to 12-foot width to allow wider shoulders/bike lanes (5-foot minimum shoulder width required for bike lanes) and/or the installation of sidewalks, widening of existing sidewalks, or installation of a sidewalk buffer to facilitate bicycle and pedestrian travel along the corridors. It is important to note that these are simply concept alternatives provided to illustrate where complete streets exist in the City of Groton. A detailed review and potential corridor study including a comprehensive public input process should be conducted for these potential improvements prior to implementation, as stakeholders may have strong opinions on the use and reuse of the roadway width and right of way. A similar process, with a focus on corridor revitalization and redevelopment, was followed for Thames Street north of Electric Boat under the Thames River Reconnection Study (see above). Finally, Eastern Point Road (State Route 349) is being reviewed as part of the CTDOT Road Diet Study (See Local Project Route 12 Road Diet Study for more information) with the potential for rehabilitation of the pavement in 2020 and the complete streets improvement should be coordinated, if possible.

Project 17: Bridge Street On-Street Parking

Field observations and feedback from stakeholders identified that there is a high demand for on-street parking along Bridge Street. To address the demand and formalize parking requirements, existing parking regulations should be investigated and potential installation of striped parking stalls along the roadway with appropriate regulatory signage should be considered. Regular enforcement of parking regulations should also be included in any parking program to ensure that the parking operations do not impede roadway travel or result in traffic safety concerns.

Project 18: EB Garage Concept

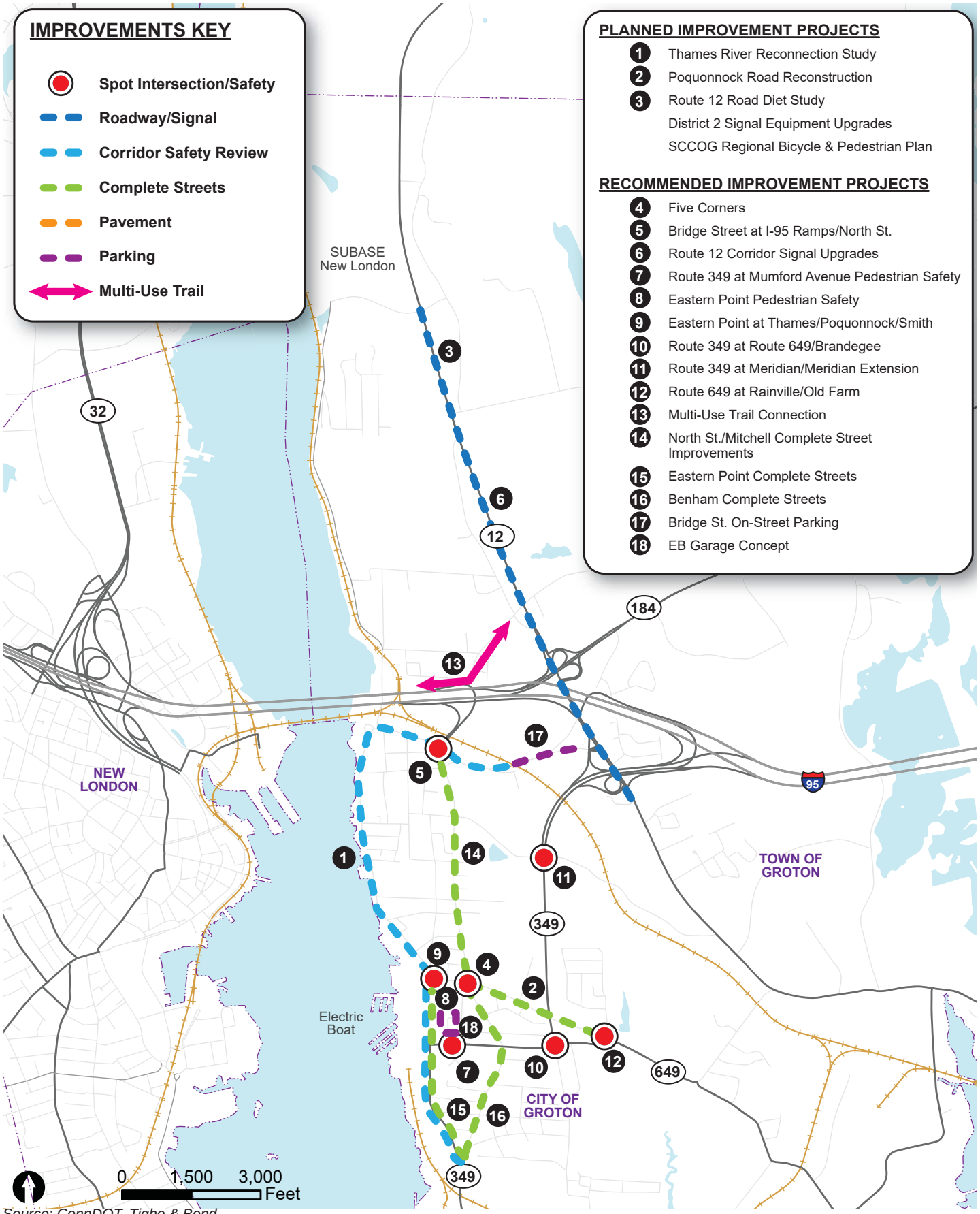
Electric Boat generates a high demand for parking near the facility during peak shift periods. Surface parking lots, private structured parking, small accessory parking lots, and remote parking facilities with shuttles serve the parking demand for Electric Boat. A potential parking garage next to the shipyard facility in Groton could consolidate some parking areas to facilitate better access to the facility by employees, provide parking for municipal purposes during off-peak hours, and allow development sites currently used for parking. Plan 18A and 18B in the Transportation Concept Improvement Plans Appendix present a conceptual layout of a potential parking garage on the corner of Eastern Point Road, Chester Street, and Mumford Avenue, replacing the existing Electric Boat surface parking lot. As presented, the three-level (ground plus two floors) garage could provide about 400 additional parking spaces at the Electric Boat facility. The structure should be planned in conjunction with a City of Groton Parking Study (see Regional Project L) that quantifies the parking supply, occupancy, location, and need of parking in the City.

6. Improved Traffic Operations Analysis

Traffic operations were analyzed for the Local 2030 Future Traffic Volumes with the recommended concepts incorporated to assess the benefits of the potential improvements. Figure 23 below and Tables 1 and 2 in the Traffic Analysis Technical Appendix summarize traffic operations following implementation of the potential alternatives.

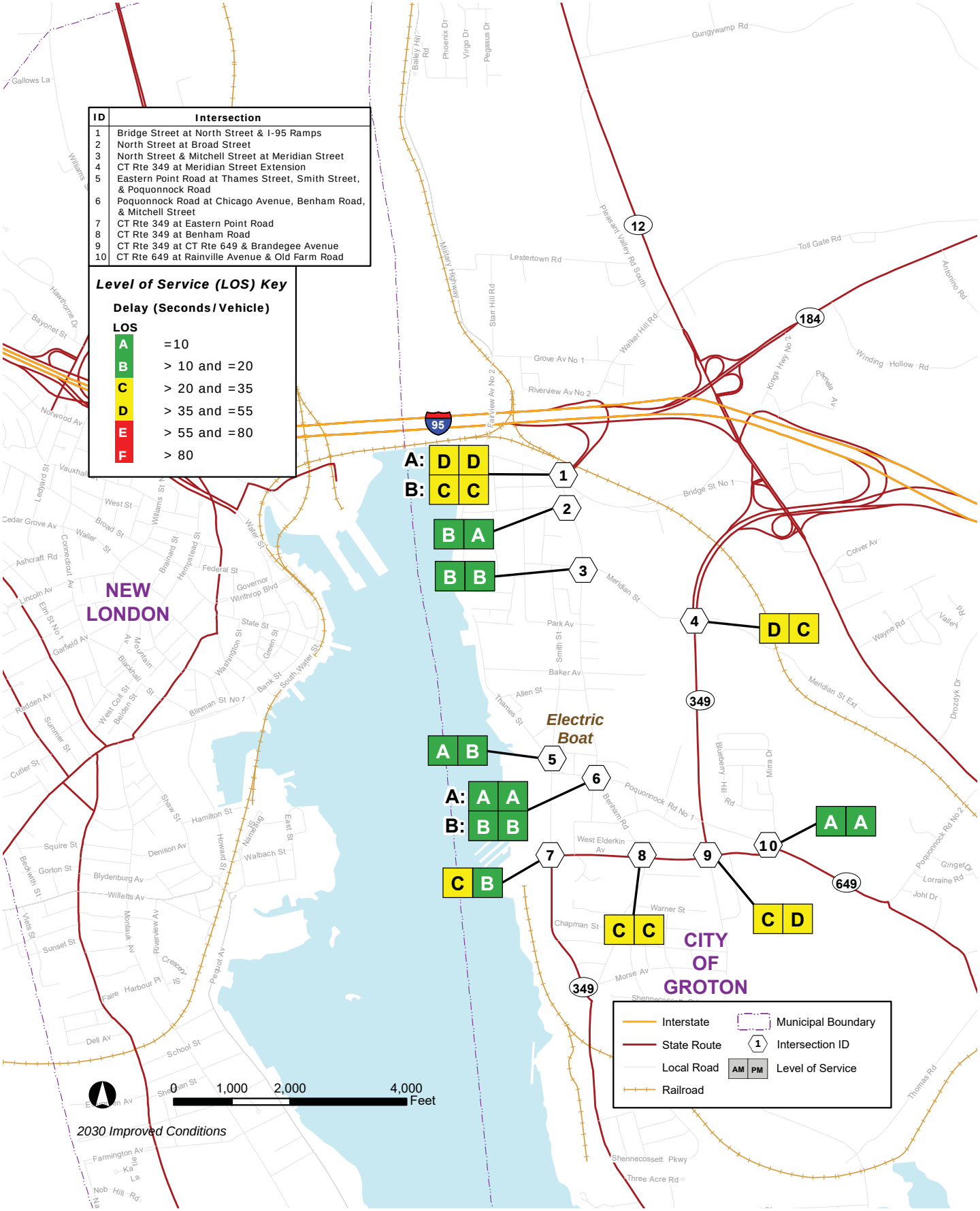
At the Route 349 intersections with Meridian Street Extension and Route 649/Brandegee Avenue, traffic signal timing optimizations resulted in improvements to acceptable overall and individual movement LOS C/D operations during the morning and afternoon peak hours. At the Bridge Street intersection with North Street and the I-95 Ramps, the traffic signal timing optimizations under Improvement A improve overall LOS operations to LOS D during both peaks; however, eastbound and westbound individual movements operations stay at LOS E. If the full traffic volume projections at the intersection are realized and failing operations persist, the phasing changes under Improvement B mitigate the congestion resulting in overall LOS C operation during both peak hours, with individual movements operating at LOS D or better.

The roundabout proposed at the intersection of Poquonnock Road at Chicago Avenue, Benham Road, and Mitchell Street, Project 4 - Improvement A, significantly improves traffic operations with overall LOS A operation during both peak hours and individual movement LOS A/B operations and short queue lengths. Potential revisions to convert Chicago Avenue to one-way southbound and allow the Mitchell Street and Benham Road signal phases to operate concurrently, presented in Improvement B, also improves operations with overall LOS B during both peaks and individual movement operations of LOS C or better.



Source: ConnDOT, Tighe & Bond

Figure 22: Local Planned & Recommended Improvements



Source: Synchro Analyses, Tighe & Bond

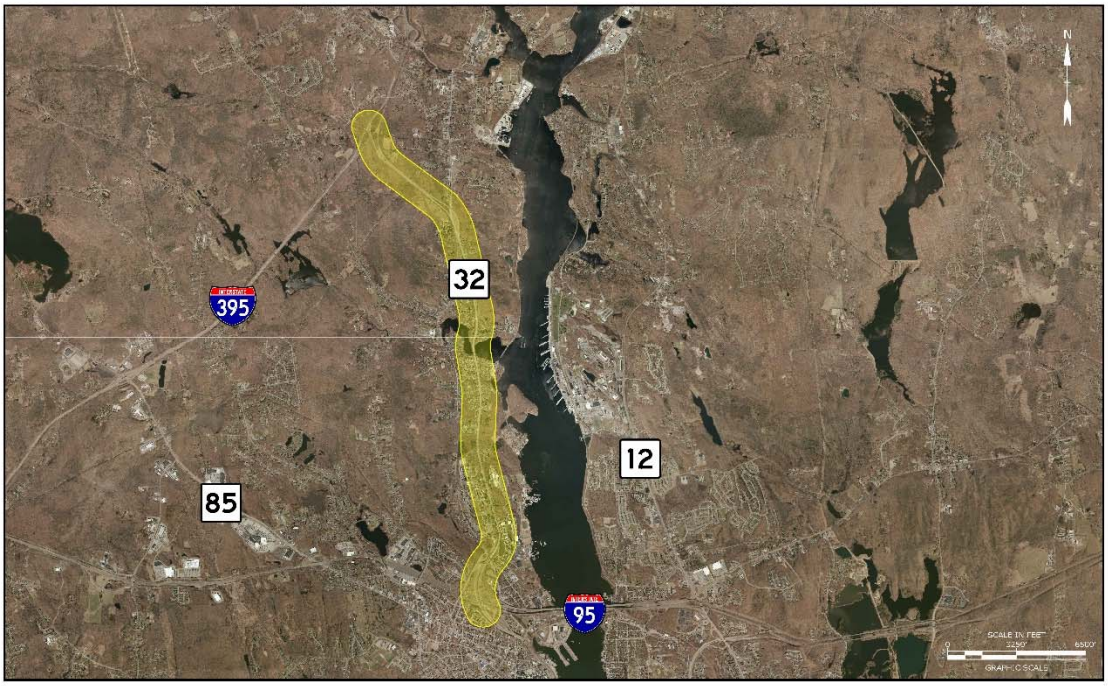
Figure 23: Local Traffic Operations Analysis - 2030 Improved Conditions

7. Summary and Cost Estimates for Recommended Projects

The following tables summarize each of the recommended improvement projects and describe them in terms of the goals, scope of the improvements, and the opinion of probable project costs. Project costs have been estimated following the guidelines published by the CTDOT and are presented in 2019 dollars. Project costs may require inflation factors looking out into the future to determine actual funding needs for funding programming. The "Preliminary Cost Estimating Guidelines" provide unit costs and percentage based lump sum costs to facilitate the estimation of project costs at the Preliminary Engineering level of project development. The approximate project costs presented in this study are limited to the construction item costs and exclude costs related to rights-of-way actions, environmental impacts and remediation, and engineering soft costs. The estimates include contingency (25%) and incidentals (25%) in the total opinion of probable costs for each project.

Project H: Route 32 Safety Study	
Project Goals:	Assess the need for improvements to address traffic safety concerns along the Route 32 corridor between I-395 and I-95
Study Budget:	$400,000
Major Elements:	▪ Conduct a detailed review of roadway collision data and perform a roadway safety audit to assess existing collision patterns and geometric deficiencies. ▪ Review alternatives and recommend improvements to the corridor that improve the safety of operations and fit the community vision for the corridor. ▪ Conduct a comprehensive public engagement process to refine and build consensus on the recommended improvement plan.

Key Map:



Projects I & J: I-95 Interchange 82 (Route 85) & I-395 Interchange 2 (Route 85) Safety Monitoring	
Project Goals:	Monitor traffic collision data to assess roadway safety issues on Route 85 in the area of the I-95 and I-395 Interchanges.
Study Budget:	$75,000 For Each Location
Major Elements:	▪ Monitor traffic collision data to assess roadway safety issues and determine if a more detailed review is necessary. ▪ If deemed necessary, conduct a detailed review of roadway collision data and perform a roadway safety audit to assess existing collision patterns and geometric deficiencies. ▪ Review alternatives and recommend improvements to the corridor that improve the safety of operations.

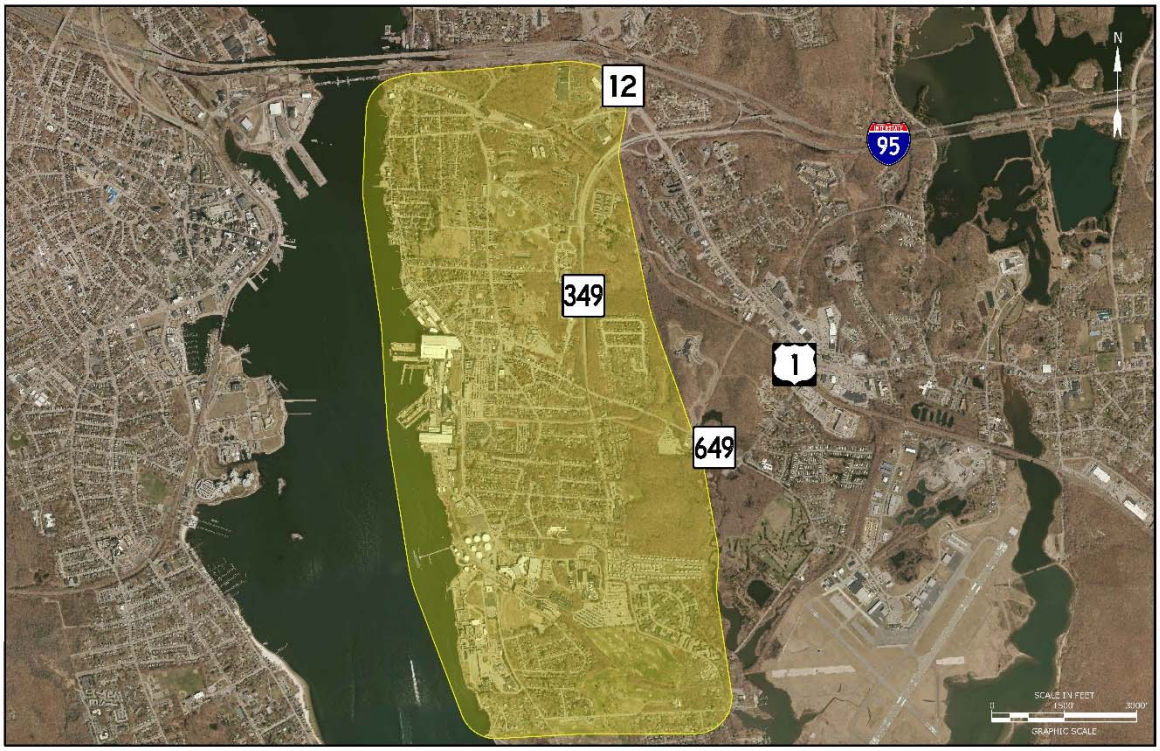
Key Map:

Project K: SUBASE Access & Circulation Study	
Project Goals:	Review the potential to improve access to and circulation within the SUBASE, building upon recently completed improvements to Crystal Lake Road.
Study Budget:	$300,000
Major Elements:	▪ Review options to improve main gate entry operations including modifications to signal phasing and/or additional signage to reduce the likelihood of vehicles queuing within the Crystal Lake Road at Military Highway and SUBASE gate intersection. ▪ Investigate the potential for public transit vehicles to enter and circulate the campus to provide efficient and convenient access. ▪ Consider alternative points of access for bicycles and pedestrians, particularly at the Route 12 and Ohio Avenue intersection to facilitate access to/from the Trident Park Townhomes development. ▪ Consider alternative design of entrance gates to facilitate access by bicycles or review the potential implementation of a bicycle share program to promote bicycle usage and facilitate circulation around the campus.

Key Map:

Project L: City of Groton Parking Study	
Project Goals:	Create a Groton downtown parking plan to quantify the supply, occupancy, and need for parking while selecting appropriate locations for consolidation or expansion. Review zoning regulations to align parking requirements with economic development and land use objectives.
Study Budget:	$300,000
Major Elements:	▪ Conduct a detailed parking study to quantify the supply, occupancy, location, and need of parking to determine if improvements can be made to consolidate parking areas, relocate parking areas to preferred locations, or expand parking supply in certain areas within Groton based on need. ▪ The study should be a collaborative effort between Groton, key stakeholders, and the public to create a parking management plan that identifies preferred parking locations while allowing for development of currently underutilized land. ▪ Review land use, zoning, and zoning regulations for potential revisions to identify the potential locations where parking should be allowed and prohibited

Key Map:



Project 4: Five Corners (Plans 4A & 4B)	
Project Goals:	Modify the existing intersection of Poquonnock Road, Mitchell Street, Benham Road, and Chicago Avenue due to existing and future congestion and safety concerns.
Project Cost:	Improvement A: $2,000,000 (Property acquisitions: SW Corner 700 SF; SE Corner 2,200 SF; NE Corner 750 SF; NW Corner 650 SF)
Major Elements:	▪ Improvement A: Construct Single Lane Modern Roundabout: o Remove existing traffic signal equipment and replace with roundabout. o Use a minimum 60' radius circle and stamped concrete truck apron to accommodate WB-62 truck turning movements. o Install splitter islands at each roadway approach to channelize vehicles into roundabout and provide median crossing refuge for pedestrians. o Reconstruct sidewalks along all roadway approaches.

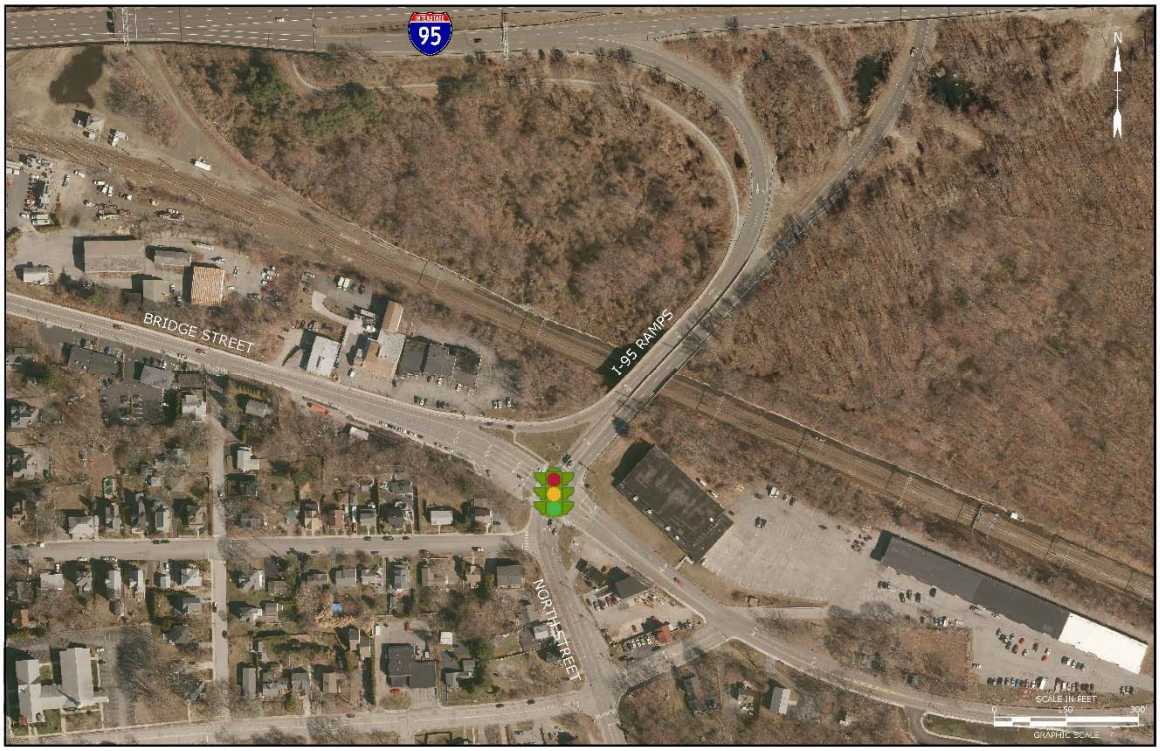
Plan 4A – Improvement A:

Project 4: Five Corners (Plans 4A & 4B)	
Project Goals:	Modify the existing intersection of Poquonnock Road, Mitchell Street, Benham Road, and Chicago Avenue due to existing and future congestion and safety concerns.
Project Cost:	Improvement B: $300,000
Major Elements:	▪ Improvement B: Signalized Intersection Upgrades: o Investigate potential to convert section of Chicago Avenue to one-way southbound to reduce intersection to four approaches. o Optimize signal timing and consider phasing revisions for concurrent Mitchell Street and Benham Road phase. o Update pedestrian signal equipment to accessible standards. o Install accessible sidewalk ramps on all corners.

Plan 4B:

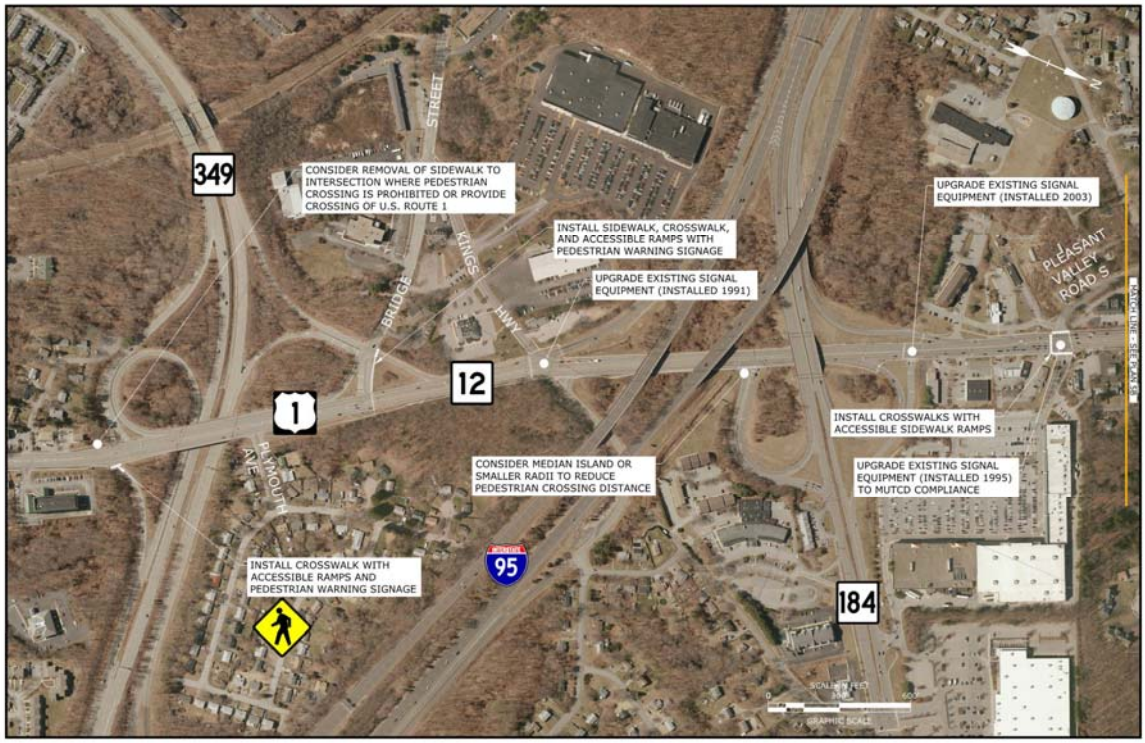
Project 5: Bridge Street at I-95 Ramps & North Street	
Project Goals:	Mitigate future congestion associated with future traffic projections.
Project Cost:	Improvement A: <$30,000; Improvement B: <$80,000
Major Elements:	▪ Improvement A: Signal Timing Optimization o Monitor traffic operations and optimize traffic signal timing based upon increase traffic volumes. ▪ Improvement B: Signal Phasing Revisions o Revision of the North Street and I-95 Ramps phases for the addition of a protected only left turn phase while allowing the through and right turn movements to be performed concurrently.

Key Map:



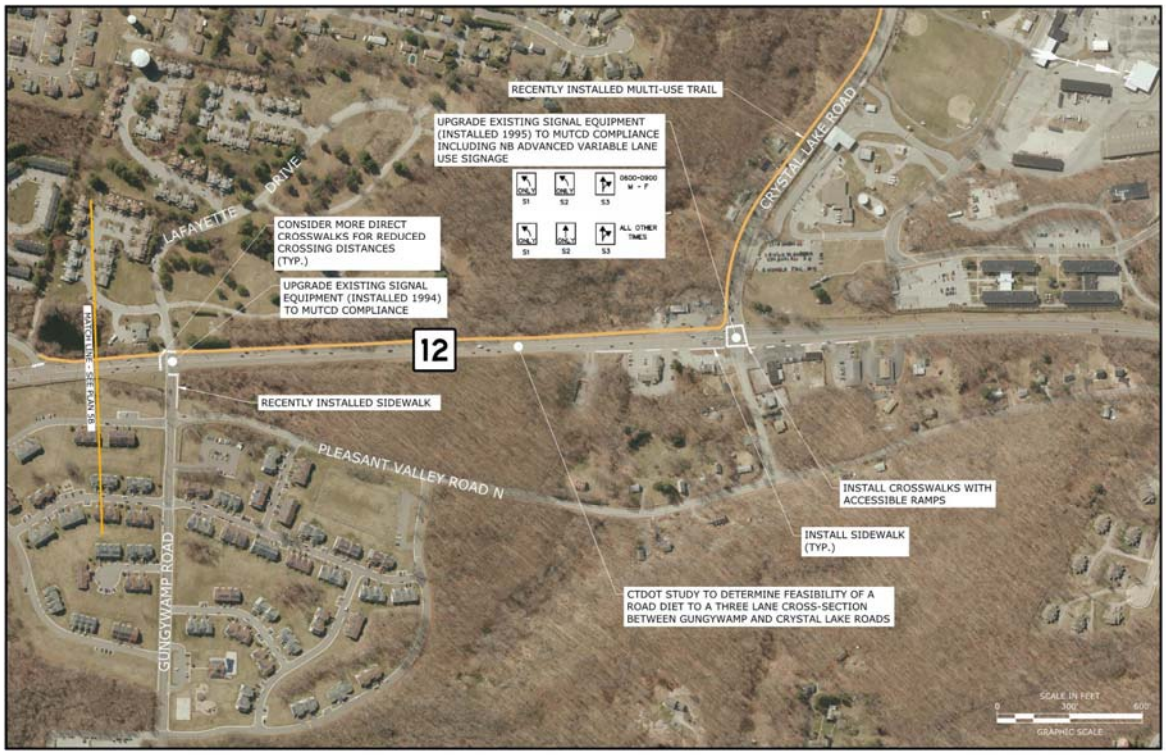
Project 6: Route 12 Corridor Signal Upgrades (Plans 6A, 6B, & 6C)	
Project Goals:	Upgrade aging, non-MUTCD compliant traffic signal equipment and address lack of pedestrian accommodations along Route 12 from Route 349 to Crystal Lake Road.
Project Cost:	$4,100,000
Major Elements:	▪ Traffic Signals: o Replace all traffic signal equipment with state-of-the-art traffic signal equipment that meets current regulatory standards to maximize efficiency. o Investigate potential to modify coordinated cycle length and phase timing splits to increase operational efficiency. o Update regulatory signage including new variable lane use signage at Crystal Lake Road. ▪ Pedestrian Accommodations: o Install pedestrian signal equipment and accessible sidewalk ramps. o Provide pedestrian warning signage at unsignalized crossings. o Install new crosswalks and revise existing crosswalks for reduced crossing distances. o Construct additional sidewalks to improve pedestrian network connectivity.

Plan 6A:



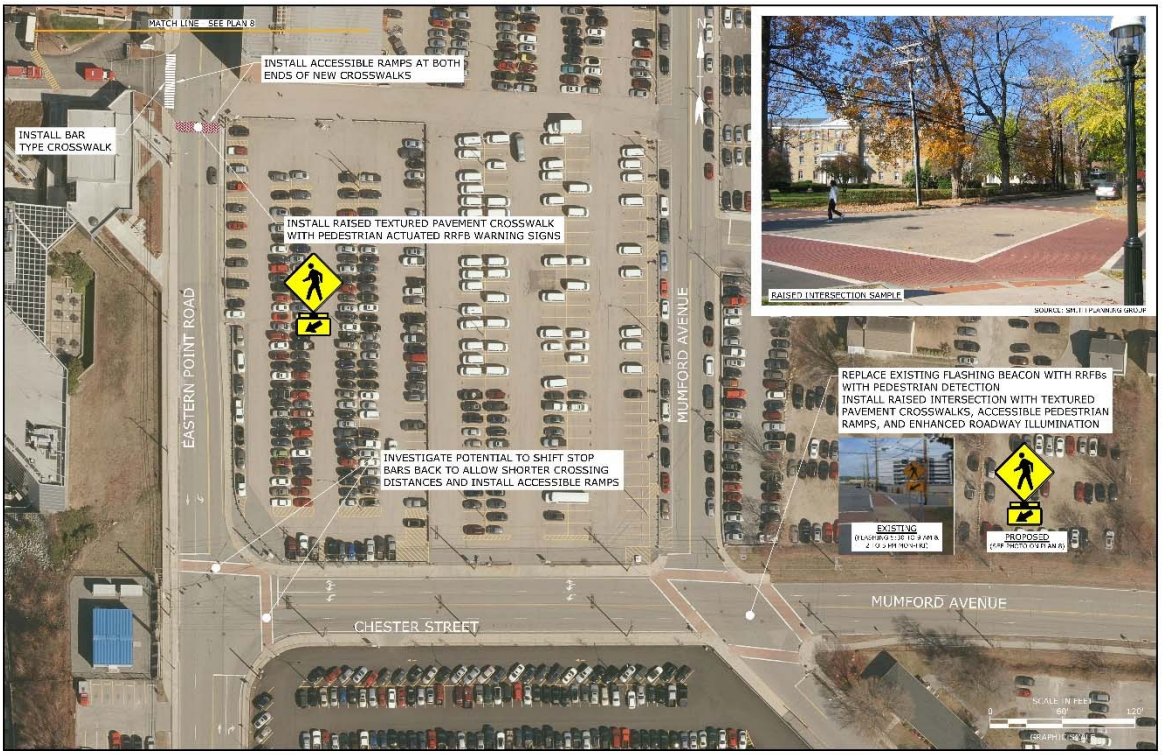
Plan 6B:

Plan 6C:

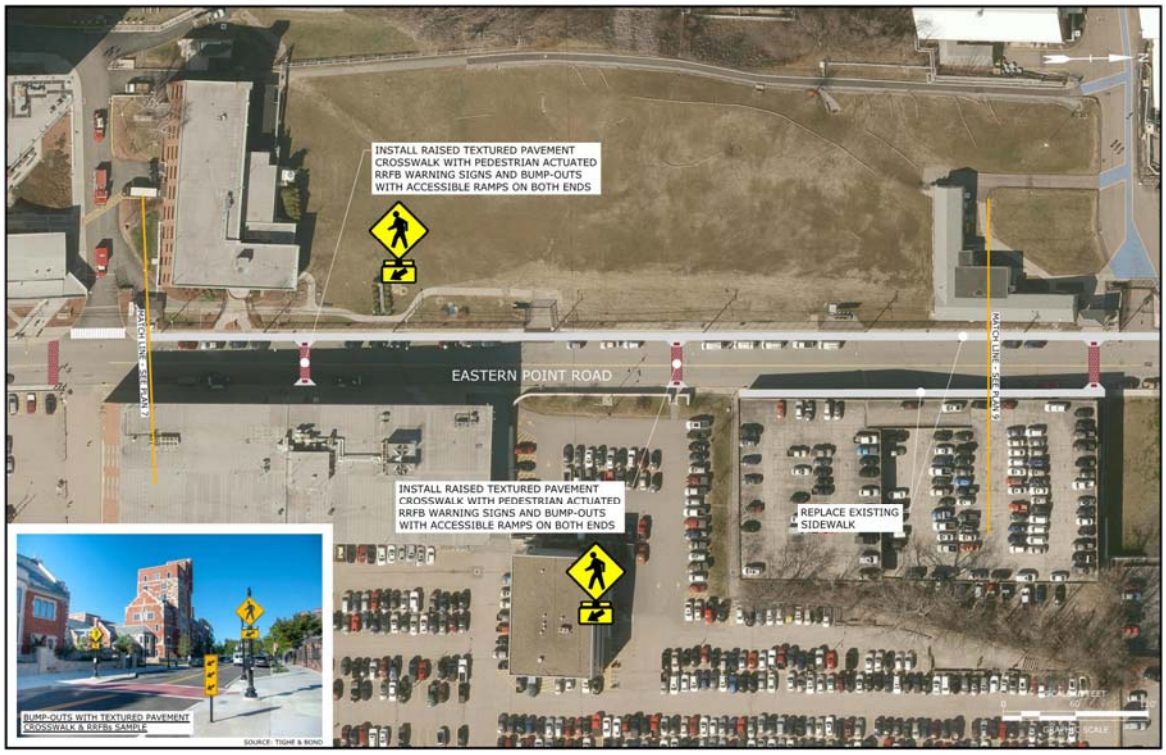


Projects 7-9: Eastern Point Road Pedestrian Safety Improvements (Plans 7, 8, & 9)	
Project Goals:	Improve pedestrian accessibility and pedestrian warning infrastructure along Eastern Point Road from Chester Street to Thames Street to accommodate high pedestrian volumes.
Project Cost:	$1,300,000
Major Elements:	▪ Accessibility: o Install accessible sidewalk ramps and bump-outs at crosswalks. o Reconstruct sections of deteriorated concrete sidewalk. o Install new sidewalk along western side of Thames Street from Eastern Point Road to next crossing. ▪ High-Visibility Crosswalk Treatments: o Construct raised, textured pavement crosswalks with pedestrian-actuated RRFB warning signs. o Stripe additional bar type crosswalks at intersection with Poquonnock Road and Smith Street. o Install raised intersection at Mumford Avenue and Chester Street with textured pavement crosswalks and enhanced roadway illumination.

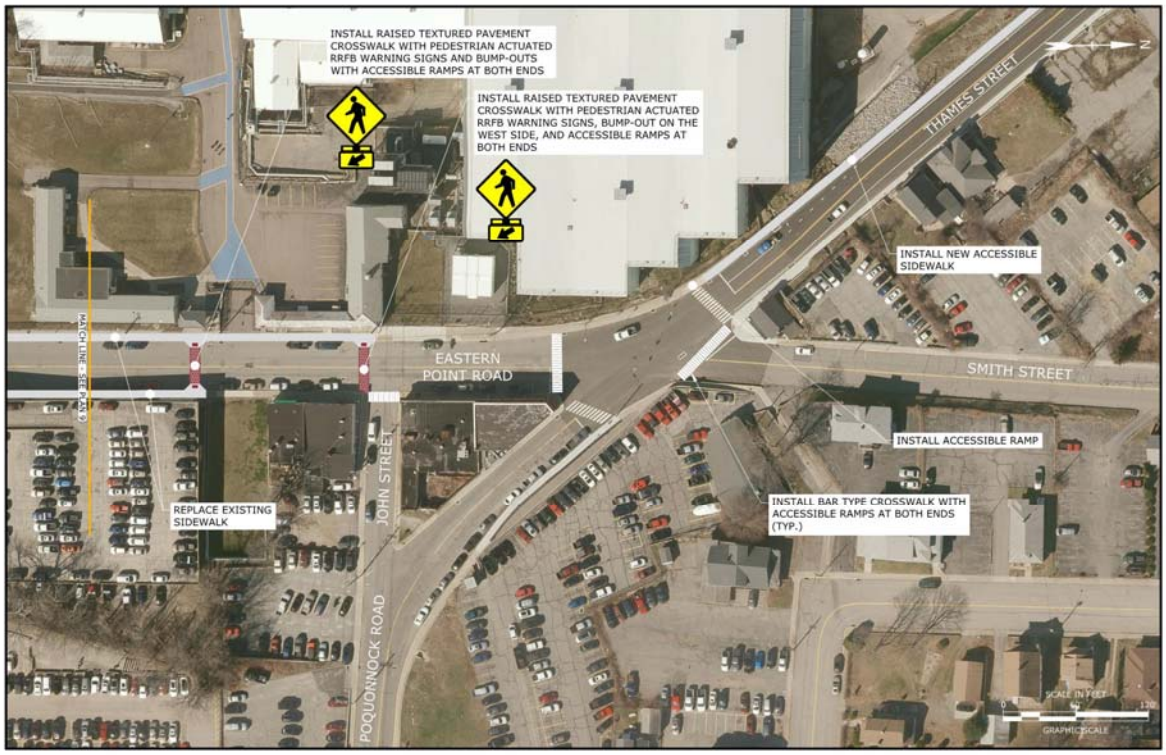
Plan 7:



Plan 8:

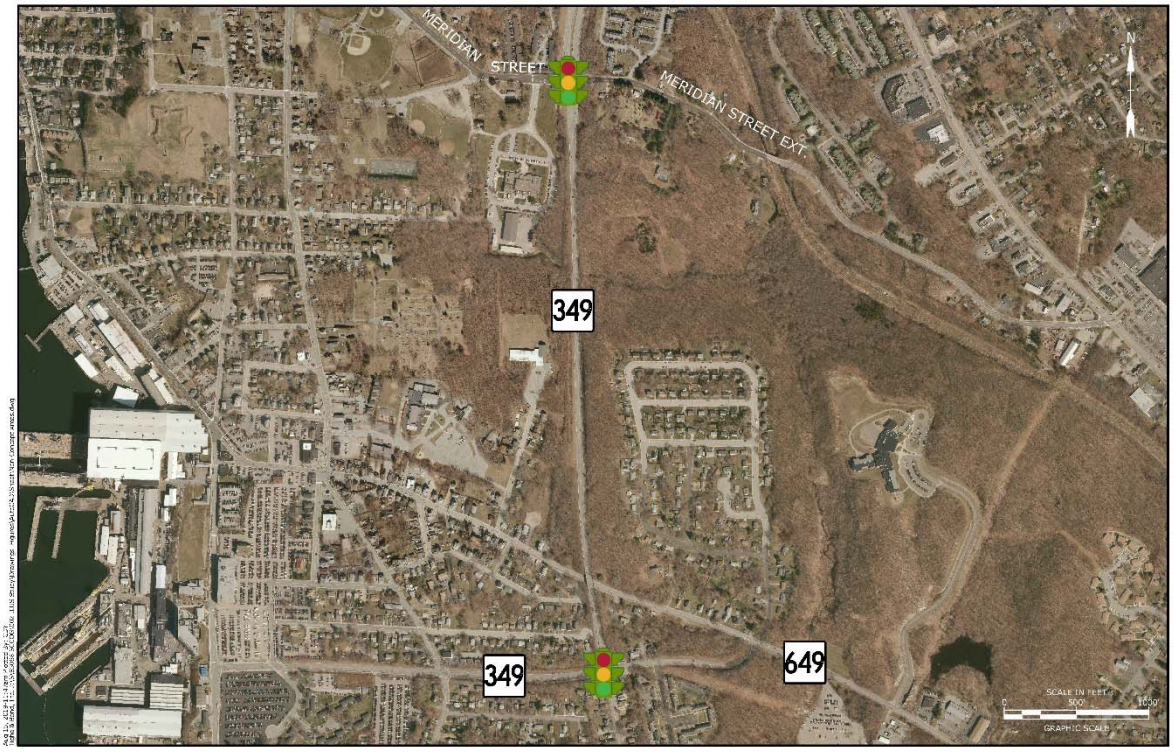

INSTALL RAISED TEXTURED PAVEMENT CROSSWALK WITH PEDESTRIAN ACTUATED RRFB WARNING SIGNS AND BUMP-OUTS WITH ACCESSIBLE RAMPS ON BOTH ENDS
EASTERN POINT ROAD
INSTALL RAISED TEXTURED PAVEMENT CROSSWALK WITH PEDESTRIAN ACTUATED RRFB WARNING SIGNS AND BUMP-OUTS WITH ACCESSIBLE RAMPS ON BOTH ENDS
REPLACE EXISTING SIDEWALK
BUMP-OUTS WITH TEXTURED PAVEMENT CROSSWALK & RRFBs SAMPLE
SOURCE: TIGHE & BOND

Plan 9:


INSTALL RAISED TEXTURED PAVEMENT CROSSWALK WITH PEDESTRIAN ACTUATED RRFB WARNING SIGNS AND BUMP-OUTS WITH ACCESSIBLE RAMPS AT BOTH ENDS
INSTALL RAISED TEXTURED PAVEMENT CROSSWALK WITH PEDESTRIAN ACTUATED RRFB WARNING SIGNS, BUMP-OUT ON THE WEST SIDE, AND ACCESSIBLE RAMPS AT BOTH ENDS
THAMES STREET
INSTALL NEW ACCESSIBLE SIDEWALK
EASTERN POINT ROAD
SMITH STREET
INSTALL ACCESSIBLE RAMP
REPLACE EXISTING SIDEWALK
JOHN STREET
INSTALL BAR TYPE CROSSWALK WITH ACCESSIBLE RAMPS AT BOTH ENDS (TYP.)
POQUONNOCK ROAD

Projects 10 & 11: Route 349 at Route 649/Brandegee Avenue and at Meridian/Meridian Extension	
Project Goals:	Mitigate future congestion issues caused by future traffic projections at the Route 349 intersections with Route 649/Brandegee Avenue and Meridian/Meridian Extension.
Project Cost:	<$25,000 For Each Location
Major Elements:	▪ Monitor traffic operations and optimize traffic signal timing based upon increase traffic volumes.

Key Maps:



Project 12: Route 649 at Rainville Avenue & Old Farm Road (Plan 12)	
Project Goals:	Improve pedestrian accommodations at Route 649 at Rainville Avenue & Old Farm Road and install new pedestrian connection between M-Lot and Rainville Avenue.
Project Cost:	$500,000
Major Elements:	▪ Construct new sidewalk along the southern side of Rainville Avenue from Litton Avenue to Route 649. ▪ Construct new sidewalk along the southern side of Route 649 from Rainville Avenue to M-Lot. ▪ Upgrade traffic signal equipment at the intersection of Route 649 and Rainville Avenue & Old Farm Road with pedestrian signal timing, crosswalks, and accessible sidewalk ramps. ▪ Install accessible sidewalk ramps and crosswalk at Litton Avenue. ▪ Remove mid-block crosswalk at M-Lot driveway.

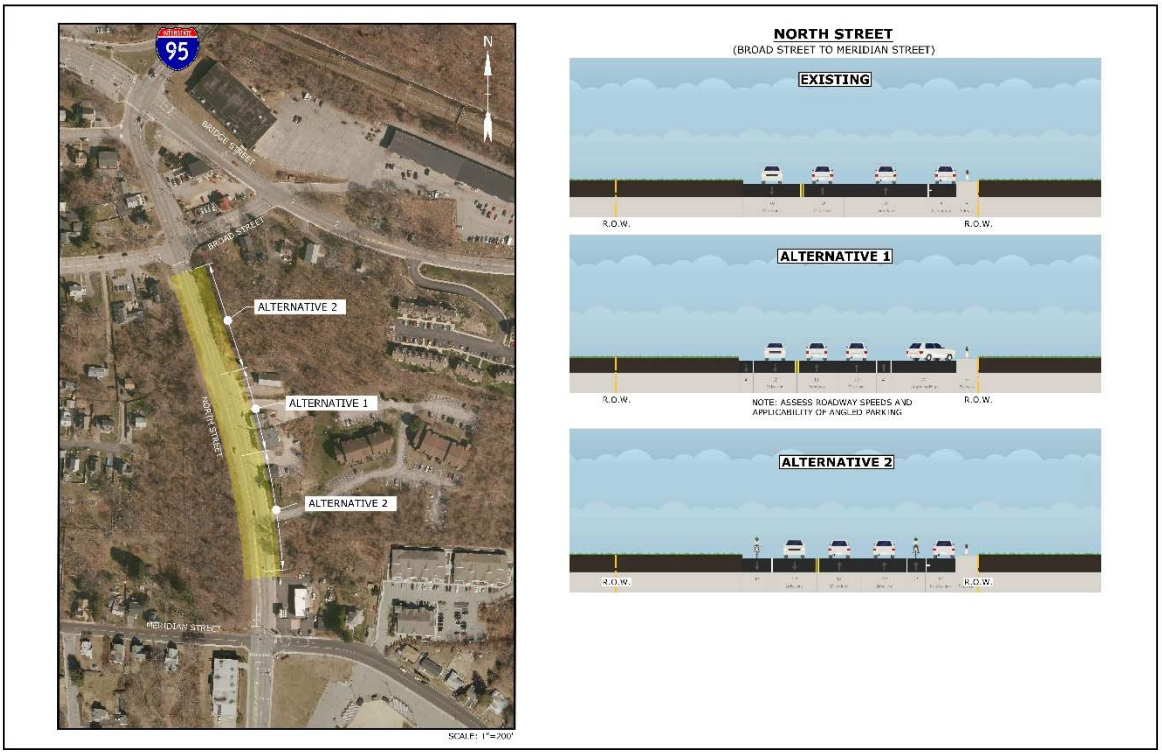
Plan 12:

Project 13: Multi-Use Trail Connection (Plan 13)	
Project Goals:	Connect existing multi-use trails along Crystal Lake Road, Route 12, and Pleasant Valley Road, and the Gold Star Memorial Bridge to facilitate bicycle and pedestrian access.
Project Cost:	$1,000,000
Major Elements:	▪ Construct a new off-road multi-use trail from the intersection of Pleasant Valley Road and Walker Hill Road to the Gold Star Memorial Bridge Pathway entrance south of Riverview Avenue. ▪ Utilize section of Walker Hill Road between Grove Avenue and Riverview Avenue as an on-road bike route. ▪ Investigate potential for trail parking area on Riverview Avenue.

Plan 13:

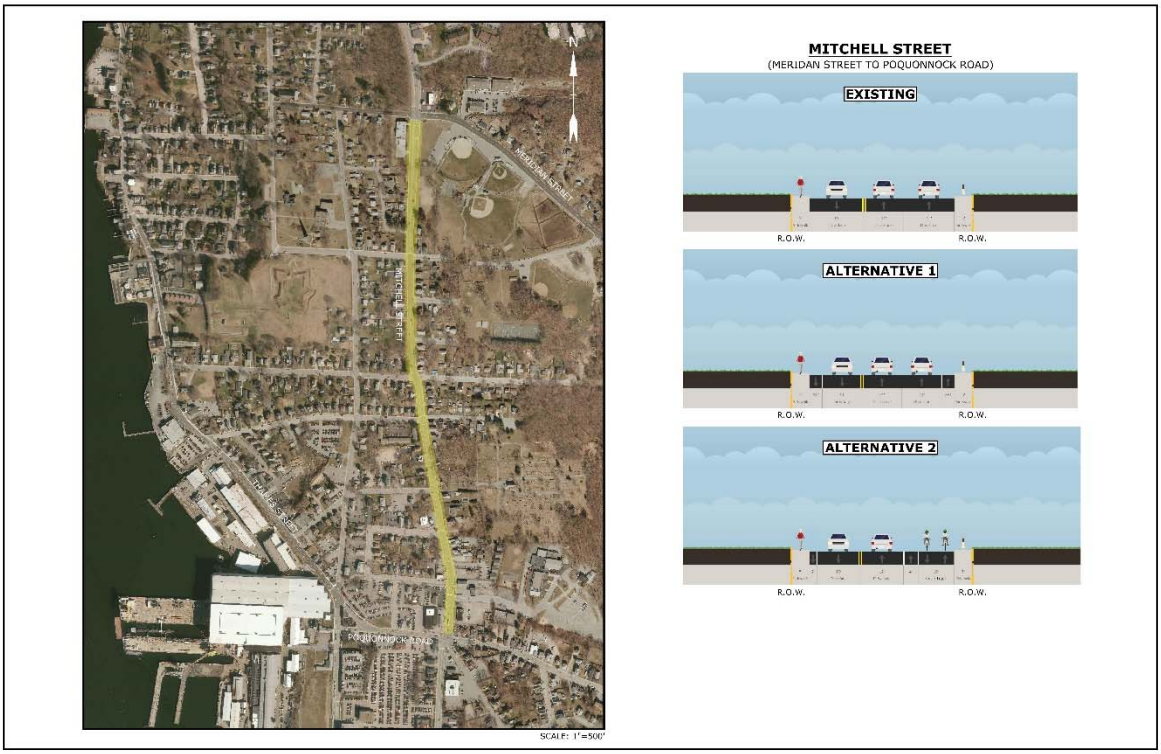
Project 14: North Street & Mitchell Street Complete Street Improvements (Plans 14A & 14B)	
Project Goals:	Repurpose existing pavement width to improve pedestrian and bicyclist accommodations between Poquonnock Road and Broad Street.
Project Cost:	$1,100,000
Major Elements:	▪ North Street: o Narrow existing travel lanes to 11 or 12 feet to reduce vehicular travel speeds. o Reuse excess pavement width for shoulders and/or bike lanes in both directions. o Stripe on-street angled or parallel parking spaces along eastern side of roadway.

Plan 14A:



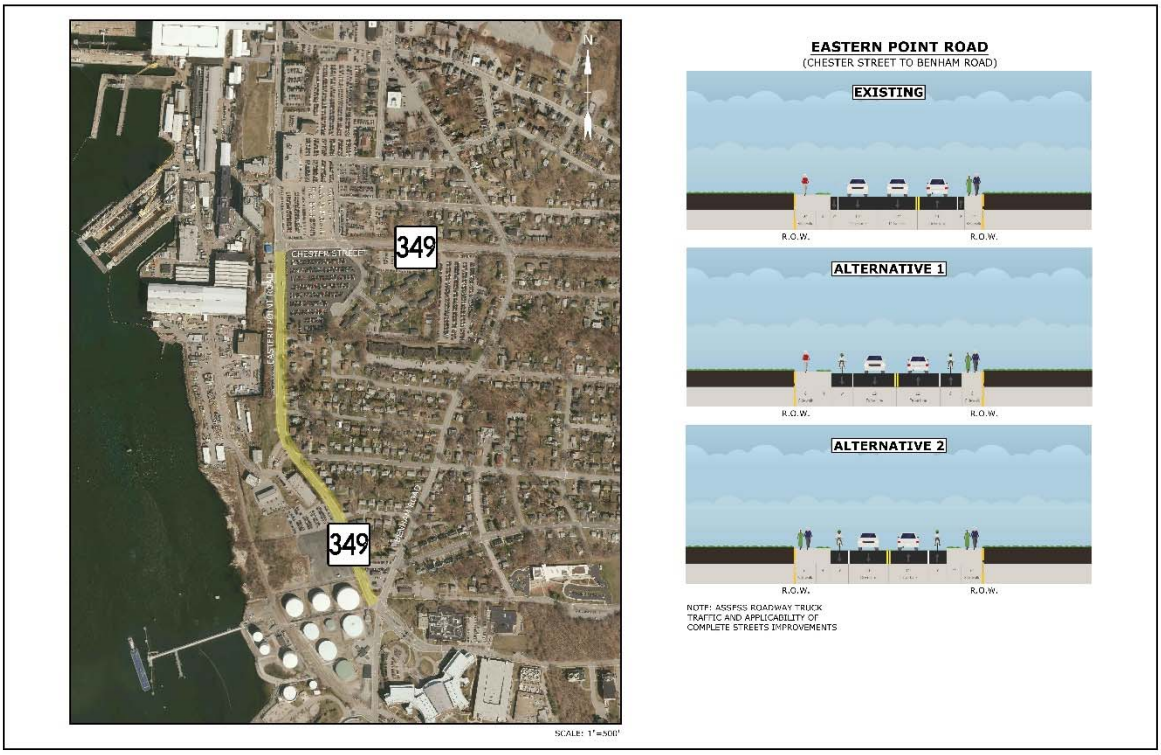
Project 14: North Street & Mitchell Street Complete Street Improvements (Plans 14A & 14B)	
Project Goals:	Repurpose existing pavement width to improve pedestrian and bicyclist accommodations between Poquonnock Road and Broad Street.
Project Cost:	$1,100,000
Major Elements:	▪ Mitchell Street: o Narrow travel lanes to 11 or 12 feet to reduce travel speeds and allow for wider shoulders (Alternative 1). o Reduce two northbound travel lanes to one 12-foot lane between major intersections to allow for the installation of a two-way buffered cycle track (Alternative 2). o Provide new pedestrian crossings at key locations.

Plan 14B:



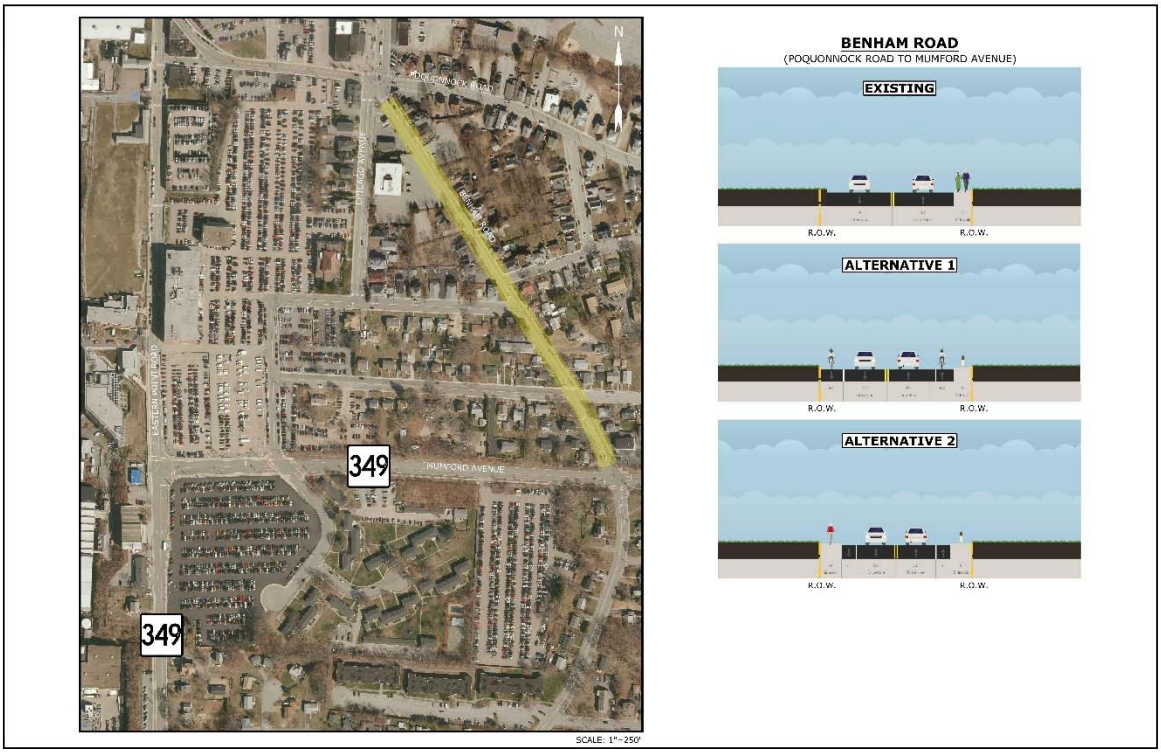
Project 15: Eastern Point Road Complete Street Improvements (Plan 15)	
Project Goals:	Repurpose existing pavement width to improve pedestrian and bicyclist accommodations between Benham Road and Chester Street.
Project Cost:	$600,000
Major Elements:	▪ Reduce two southbound travel lanes to one 12-foot lane to provide one-way 6 foot bike lanes on either side of the roadway (Alternative 1). ▪ Reduce two southbound travel lanes to one 11-foot lane to provide 5-foot shoulders on both sides of the roadway that can accommodate bicycle traffic and sidewalk buffer and wider sidewalk on the east side of the roadway (Alternative 2). ▪ Provide new pedestrian crossings at key locations.

Plan 15:



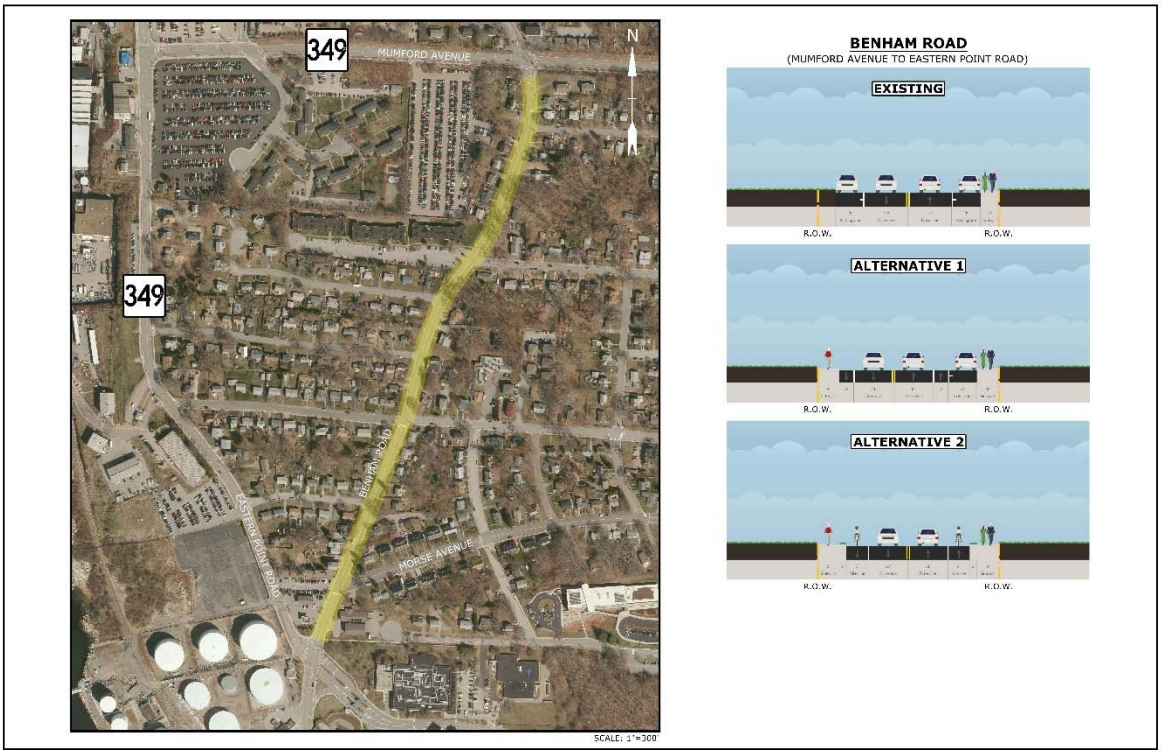
Project 16: Benham Road Complete Street Improvements (Plans 16A & 16B)	
Project Goals:	Repurpose existing pavement width to improve pedestrian and bicyclist accommodations between Eastern Point Road and Poquonnock Road.
Project Cost:	$1,900,000
Major Elements:	▪ Mumford Avenue to Eastern Point Road: o Narrow travel lanes to 12 feet to provide wider shoulders than can accommodate bicycle traffic and/or bike lanes in both directions (Alternative 1). o Narrow travel lanes to 11 feet to allow 4-foot shoulders than can accommodate bicycle traffic and the installation of a sidewalk on the west side of the roadway (Alternative 2). o Provide new pedestrian crossings at key locations.

Plan 16A:



Project 16: Benham Road Complete Street Improvements (Plans 16A & 16B)	
Project Goals:	Repurpose existing pavement width to improve pedestrian and bicyclist accommodations between Eastern Point Road and Poquonnock Road.
Project Cost:	$1,900,000
Major Elements:	▪ Mumford Avenue to Eastern Point Road: o Narrow travel lanes to 11 feet and remove southbound on-street parking (intermittent) to allow 4-foot shoulders in both directions that can accommodate bicycle traffic and the installation of a sidewalk on the west side of the roadway (Alternative 1). o Narrow travel lanes to 11 feet and remove on-street parking to allow 6-foot bike lanes in both directions, a sidewalk buffer and the installation of a sidewalk on the west side of the roadway (Alternative 2). o Provide new pedestrian crossings at key locations.

Plan 16B:

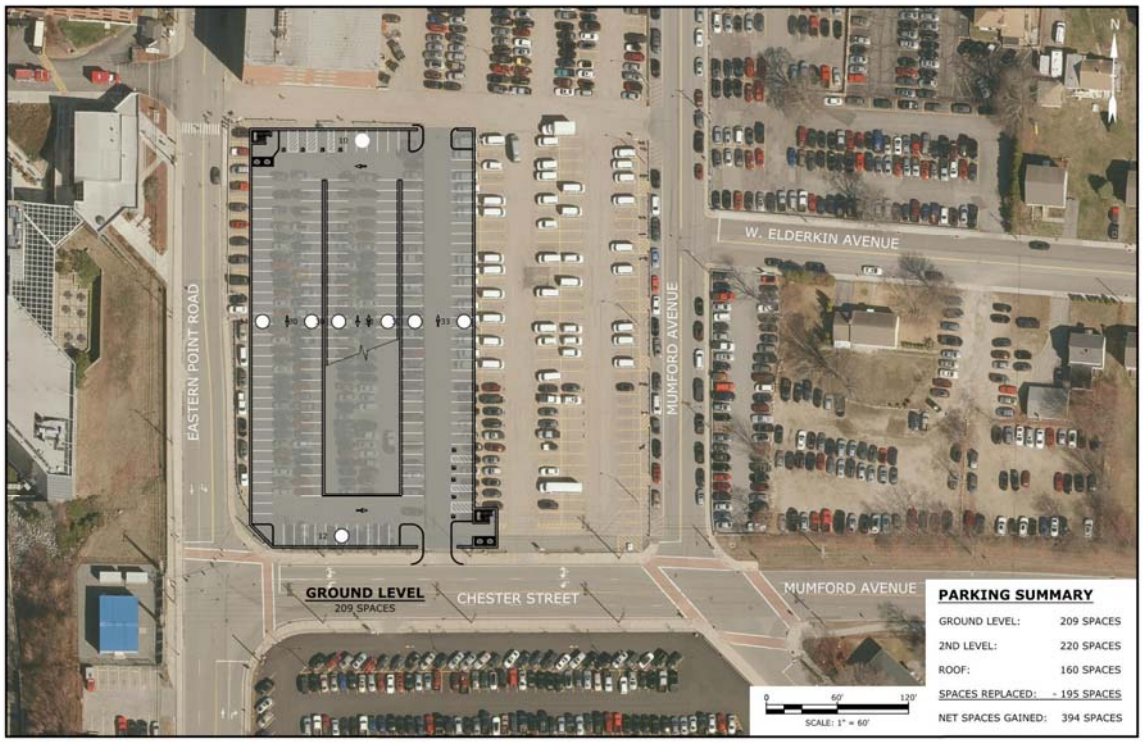


Project 17: Bridge Street On-Street Parking	
Project Goals:	Manage high demand for on-street parking along Bridge Street.
Project Cost:	<30,000
Major Elements:	▪ Review existing parking regulations for Bridge Street. ▪ Consider installation of striped parking stalls with appropriate regulatory signage. ▪ Consider regular enforcement of parking regulations to ensure that parking operations do not impede roadway travel or result in traffic safety concerns.

Key Map:

Project 18: Electric Boat Parking Garage (Plan 18A & 18B)	
Project Goals:	Provide additional parking capacity proximate to Electric Boat by constructing a parking garage within the existing Electric Boat visitor parking lot.
Project Cost:	$21,000,000 (589 spaces at $35,000 per space)
Major Elements:	▪ Construct three-level parking garage with approximately 589 total spaces replacing a portion of the existing surface parking lot. ▪ Garage footprint replaces 195 surface spaces for a net gain of approximately 394 spaces.

Plan 18A (See Transportation Concept Improvement Plans Appendix for Plan 18B):



B. Bicycle and Pedestrian Infrastructure

Four off-street multi-use trails exist within the local study area in the vicinity of the SUBASE and Electric Boat. These are shown on Figure 10:

- The 1-mile G&S Trolley Trail connecting the Groton Long Point and Poquonnock Bridge neighborhoods.
- A 1.6-mile path along Crystal Lake Road, Route 12, and Pleasant Valley Road in Groton.
- A narrow (< 48" wide) multi-use path on the northern span of the Gold Star Bridge.
- A short (about ¼ mile) recreational trail along New London's waterfront.

Other streets within the area have been marked with bike sharrows or signed for bicycle use. SCCOG takes periodic counts of bicycle facilities. Recent counts found:

- An average of 3.4 users per hour on the G&S Trolley Trail over a 40-day period in June and July 2019
- An average of about 4.5 bicyclists per hour in each direction during the AM and PM peak periods on the Gold Star Bridge (May 2018)

Several community programs provide for the free use of shared bikes, including the SUBASE and the Connecticut College Spokespeople club, which each provide free bicycles for their communities. All SEAT buses provide a rack accommodating two bicycles at a time. There is no charge to load bikes while riding the bus.

1. Projected Bicycling Demand

In 2017, only an estimated 0.34% of commuters in the SCCOG region used bicycles to commute to work, a rate similar to the statewide average. This is very low compared with other commute modes, but reflects a nearly 50% increase over the region's 0.23% rate in 2014.[19]

Between 2000 and 2017, bicycle commuting rates increased by 43% across the nation, and by 105% in "bike-friendly communities," suggesting that infrastructure and safety enhancements can greatly affect the rate of bicycling. For example, New Haven, which has devoted significant resources to the development of protected bike lanes and was designated in 2018 as a Silver-Level Bicycle-Friendly Community by the League of American Cyclists, had a bicycling commuting rate of 3.5% in 2017.[20]

While the number of bicycle commuters in the region is relatively small, it is clearly growing, particularly in more urbanized areas such as Groton and New London where commutes are relatively short. The implementation of bicycle infrastructure and safety measures will likely have a large effect in terms of increasing usage rates over time.

[19] American Community Survey, 2014 and 2017.
[20] League of American Bicyclists: Where We Ride, A Report on 2017 American Community Survey Data (2017), and Bicycle Commuting Data.

2. Planned Bike and Pedestrian Improvements

Chart 20: Planned or Proposed Bike/Pedestrian Improvements

Planned Bike/Pedestrian Improvements

- New London Bike Share program, with at least six initial docking stations.
- Bike sharrows, improved pedestrian facilities, and other streetscape improvements in various locations in New London.
- Upgrades to the waterfront recreational trail in New London which, combined with on-street improvements above, will provide an improved bike/pedestrian connection between Union Station and Fort Trumbull.

Proposed Bike/Pedestrian Improvements

- A *Regional Bike and Pedestrian Plan* will be released by SCCOG in October 2019, making recommendations for ADA accessibility upgrades to sidewalks, bike lanes and route signage, safety improvements, and new trail connections.

Sources: Conversations with staff at SCCOG and SUBASE, February, 2019.

3. Recommendations on Bike and Pedestrian Transportation

In addition to the "Complete Streets" improvements described above that incorporate bike and pedestrian elements, the following improvements should be considered:

New Bicycle Infrastructure

- ***Introduce Bike Share to Groton:*** Originally recommended as part of the 2017 JLUS Study (Phase 1), the area on and around the SUBASE provides a good environment for a bike share program. The base has a fairly large population without access to private vehicles, and commutes to off-base housing are short. Off-road, multi-use trails along Crystal Lake Road and Pleasant Valley provide safe connections to military housing developments, the Gold Star Bridge and other Groton locations. A scooter-share program could also be explored as an add-on or alternative to a bike share system.

  Bike share programs are offered on or around other military bases including military-only programs: 1) on the Naval Base in San Diego (dockless Lime Bikes); and 2) at the Joint Base Lewis-McChord south of Tacoma, WA, where GO Bikes can be checked out for free up to two weeks at a time and participants are rewarded for logging their bicycle miles. In Norfolk, VA, home to Naval Station Norfolk, the City sponsors a public bikeshare program (Pace). Students, seniors, active-duty military, and veterans can purchase the monthly plan at a 50% discount. Across the river in Hampton Roads, VA, a private shipbuilding enterprise (Newport News Shipbuilding) has an internal bike share program for employees, which helps mitigate the fact that no personal vehicles or bikes are allowed onto the work site.

  Implementation of a bike share program requires a lead entity or sponsor. A Groton program could be sponsored by the SUBASE as a military-only program, expanded as demand grows, or as

a publicly sponsored Town of Groton program. The potential for creating an integrated Groton/New London program might also be explored.

Seed funding and/or ongoing revenues from sponsorship and advertising are also needed. Costs vary depending on technology, scale, and demand. (High-end = $5,000 per bike to start, and $100-$200 per bike per year).

New Pedestrian Infrastructure

- ***New SUBASE Pedestrian Gate:*** A second pedestrian only (or pedestrian-bike) gate should be installed across from Ohio Avenue. This location would allow for bus riders and pedestrians from Trident Park to access the gate without walking more nearly ¾ mile to access the new gate on Crystal Lake Road, plus the distance needed to reach their ultimate on-base destination. This gate would also support commuters on SEAT Route 2, which stops in this location.

C. Public Bus Transit

This section reassesses public bus transit strategies recommended as part of prior studies (the 2015 SEAT Bus Study and the 2017 JLUS Phase 1 Study), given anticipated near-term employment and household growth in the region.

1. Existing Bus Transit Services and Infrastructure

The Southeast Area Transit (SEAT) District serves nine member towns (Griswold, East Lyme, Lisbon, Montville, New London, Norwich, Groton, Waterford, and Stonington). Sixteen bus runs cover the region, operating every 60 or 120 minutes on weekdays and less often on weekends. ADA paratransit services are provided within three-quarters of a mile of these routes (see Figure 24).

SEAT carried an estimated 959,468 riders in FY2019. This represents an 18% drop in ridership since 2014, which is consistent with national trends; however, ridership has stabilized over the last two years, and June 2019 ridership increased 1.3% over the prior year. Lower ridership over the past few years can largely be attributed to lower gas prices, a strong economy, and competition from transportation network companies such as Uber and Lyft.

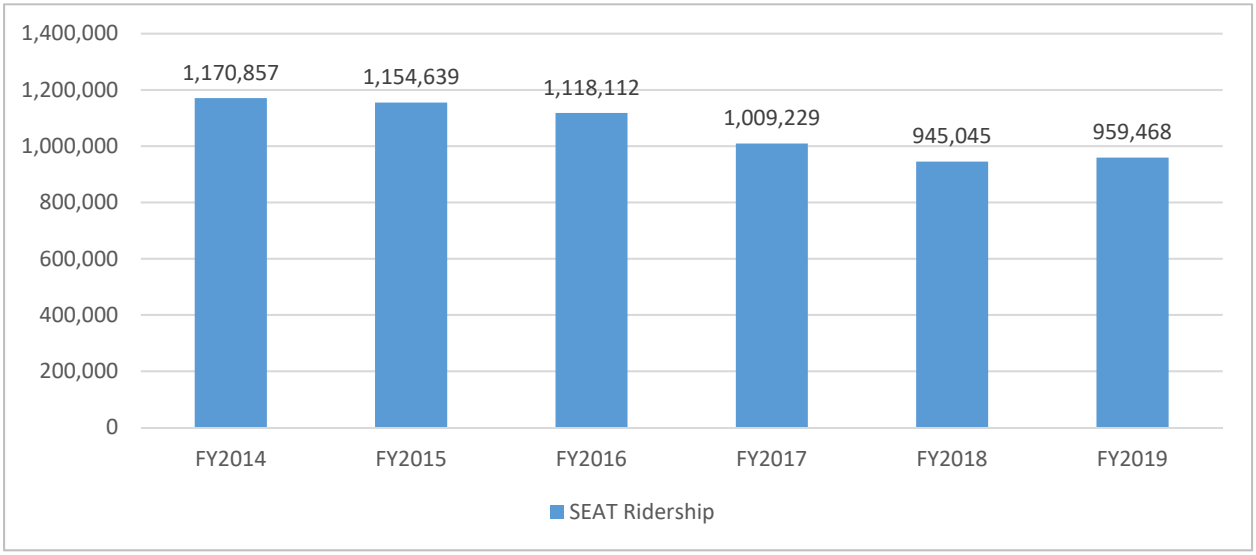
SEAT also operated a temporary shuttle crossing the Gold Star Bridge from August to November 2018, when construction required a closure of the pedestrian path. The shuttle was free and operated every 30 minutes between the pedestrian access points in New London and Groton. Utilization averaged 22 riders per day, or less than one rider

SEAT transfer sites: Water Street in New London (top); Plaza Court in Groton (bottom).

Source: Google Earth

per trip. Although ridership was low, the shuttle was intended to serve only the bicyclists and pedestrians who relied on the bridge's pedestrian path, and did not connect to SEAT transfer points in New London or Groton.

Chart 21: Annual SEAT Ridership



Source: Southeast Area Transit, August 2019

SEAT transfer and connection points in the six-town region include:

- Union Station in New London (served by seven routes);
- Groton Square shopping plaza (served by three routes); and
- Groton Plaza Court (served by two routes).

A passenger shelter and benches are available at the New London hub, and passengers can use public amenities in the adjacent Union Station building. Passenger shelters are provided at a few additional locations, including Groton's Plaza Court.

Additional bus service in the SCCOG region includes:

- 9 Town Transit operates six daily roundtrips between Old Saybrook, Old Lyme, East Lyme, and New London's Union Station hub.

- Windham Regional Transit District serves two SCCOG municipalities – Windham and Lebanon, and connects Willimantic to Norwich and Foxwoods Casino.

- Greyhound intercity buses serving New London's Union Station and connecting to Mohegan Sun, Foxwoods, New Haven, and Providence, Rhode Island.

Source: SCCOG, ASG

Figure 24: Existing Transit Conditions

2. Planned and Previously Proposed Bus Transit Improvements

Chart 22: Planned and Proposed Bus Service Improvements in the Local Study Area

Planned Bus Service Improvements

- Streetscape and pedestrian improvements at SEAT's New London hub.
- Statewide integration of regional bus transit districts into CTtransit's smart card payment system.
- Bus stop signage and shelters throughout the system.

Proposed Bus Service Improvements

SEAT Bus Study, 2015

- A 25% increase in overall SEAT service levels, focused in urban areas with higher ridership demand.
- Express trips between Norwich and New London and Bus Rapid Transit-type infrastructure upgrades.
- Realigned, more direct local service in Groton.
- Add a new Groton route connecting Avery Point, major employers along Thames Street, and the SUBASE.

JLUS Phase 1 Study, 2017

- Increased frequency on SEAT Route 2 Norwich - Groton.
- Divert SEAT Route 2 off Highway 12 to SUBASE Main Gate on Crystal Lake Road.
- Mobility hub on Crystal Lake Road

Note: Planned Bus Service Improvements based on phone conversation with SCCOG and CTDOT staff, February 2019. Proposed Bus Service Improvements from *Draft Southeastern CT Metropolitan Transportation Plan* (SCCOG, January 2019), JLUS Phase 1 Study (2017), and *SEAT Bus Study* (SCCOG, 2016)

3. Projected Transit Demand

Today, about 80% of people living in the SCCOG region drive alone to work and 1.5% commute using transit (bus, rail or ferry). The regional use of transit is significantly lower (about one third less) than in the State overall (see Table 9).

Table 9: Commuting Modes in the State, SCCOG Region, and Local Study Area

	% Drive Alone	% Use Transit	% Rideshare	% Walk	% Other[1]	% Work at Home
Connecticut	78.2	4.9	8.1	2.9	1.1	4.8
SCCOG Region	80	1.5	8.9	3.6	1.2	4.8
New London	65.1	3.0	9.8	11.5	2.4	8.2
City of Groton	73.5	2.5	14.0	4.9	2.3	2.9
Town of Groton	71.1	1.7	8.9	9.2	1.6	7.6
Ledyard	82.8	0.6	11	0.2	1.7	3.8
Montville	86.8	0.7	10.2	1.3	0.2	0.8
Waterford	85.7	0.7	6.7	1.0	1.7	4.2

Source: American Community Survey, 2017. Commuting by Place of Residence.

1. "Transit" includes public bus, railroad, and ferryboat.

2. "Other" includes bicycle, taxi, motorcycle, scooter and possibly other modes.

Transit demand is largely a function of land use density, convenience (trip time and frequency), and cost. In the SCCOG region, it is challenging for local transit to compete with the convenience of auto travel. Higher-density residential and employment centers are dispersed throughout the region and surrounded by lower-density uses. Exceptions in the JLUS study area include New London, and parts of Groton and Waterford, where jobs, housing and other activities are clustered in closer proximity. However, for those with access to vehicles, auto commutes are typically faster and more convenient than transit.

More than 45% of commuters working in New London or Groton reside in the local (six town) study area, can drive to work in less than 20 minutes, and generally park for free once they arrive. About 5,000 people both live and work in Groton and have even shorter commutes. Conversely, public bus transit service operates fairly infrequently (every 60 or 120 minutes), does not serve all work sites, and typically takes longer than traveling by private car. The rate of commuting by public bus in 2017 was 2.5% statewide and 1.2% in the SCCOG region (with railroad commuting representing 2.2% of statewide transit commutes).

As shown in Table 10, projected household growth in the local study area is not expected to significantly impact demand for public transit service. Near-term growth is expected to bring an additional 4,779 households to the JLUS study area. Based on current transit usage and labor force participation rates, there would be an estimated 140 additional daily one-way public bus commutes made by residents of the local study area by 2030. If regional bus commutes occurred at a rate equal to the statewide average (2.5), there would be about 206 new daily bus trips to be made by workers living in the study area.

Table 10: Estimate of Additional Bus Trips in Six Town Area (2030)

	Est. new Households[1]	Est. new daily work trips by bus[2]	Est. new daily bus commutes (at State rate of 2.5%)	Est. new daily non-work trips by bus[3]	Total new daily bus trips
Groton	3,047	104	154	285	438
Ledyard	205	2	12	17	28
Montville	263	2	6	33	39
New London	896	28	24	106	130
Waterford	368	2	10	43	54
Total	**4,779**	**140**	**206**	**484**	**689**

Source: ASG Planning, August 2019.

1. *Estimated new households reflect housing forecasts by municipality that incorporate Electric Boat hiring as well as background population (see Appendix D), as redistributed based on a most likely build scenario given housing development in the region that has already been approved/permitted.*
2. *New daily bus trips based on current household labor force participation by town and mode share for bus commutes.*
3. *Assumes new household members > 18 make 3.37 trips per day (per 2017 National Household Survey) and use bus for those 2.5% of those trips, similar to the statewide average for bus transit commutes.*

The number of non-work trips taken on transit would also likely grow. According to the Federal Highway Administration's 2017 National Household Travel Survey, work trips make up about two-thirds of all daily travel. If adult residents living in new households used the bus for non-work trips at a rate similar to the

state average for work commutes (2.5%) there would about 484 new bus trips for non-work purposes in the local study area each weekday and 689 total new weekday bus trips. About 438 of the new daily bus trips would be made by Groton residents. In 2014, when SEAT ridership was greater and the number of regional commutes made by bus was slightly higher (1.5%), there were 404 daily boardings in Groton. Thus, the new riders projected above would approximately double Groton's 2014 weekday bus ridership.

Except for Groton, projected new employment and household growth in the region will not be significant enough to merit large increases in bus transit capacity beyond that recommended as part of the 2015 SEAT Bus Study. Groton is anticipated to realize significant household growth and new bus ridership. However, Groton was the focus of several 2015 SEAT Bus Study recommendations, including the addition of a new bus route serving Electric Boat, the creation of a new transit hub, and better transit connections to New London. These improvements continue to be merited, and projected growth emphasizes their urgency. Groton continues to be the focus of additional and updated recommended actions below.

New London will realize less near-term household growth than Groton, is already well served by transit, and was also the focus of a number of bus service recommendations in 2015 (including express service from Norwich and other span and frequency improvements). New London area recommendations should continue to be pursued.

Other Electric Boat Groton employees that wish to ride SEAT will live throughout the SCCOG region emphasizing the need for a Groton hub where transfers can easily be made to a Groton-Thames Street route. Others will be dispersed beyond the SCCOG region where current and projected transit demand is very low. There is park and ride capacity throughout the region to support additional vanpooling and carpooling although, as detailed below, evidence suggests many existing carpools are informally formed with family and neighbors. Recommendations below include policy incentives and other actions to increase the use of these alternative modes.

4. Bus Transit Recommendations

The 2015 SEAT Bus Study's *System Expansion "Plan C"* recommended increases in SEAT bus service, as well as new routes and realignments, and improvements to bus stops and hubs; some of these changes have already been implemented. The region should continue to pursue this action plan to help meet existing transit needs as well as projected growth. Table 14 at the end of this section provides a summary list of recommendations, including previous bus transit recommendations impacting the local study area and new or modified recommendations, as follows:

Create a Groton Transit Hub

Near-term growth in Groton will increase overall density and make transit more effective. A Groton hub would focus bus transfers at a single location, and help highlight the availability of SEAT service. The 2015 SEAT study recommended a hub at the Groton Square shopping center; this is a strong anchor, but time-consuming for buses to circle through. Other sites may better meet SEAT and Town objectives. More study is needed of other potential sites that meet the criteria shown at right. The ultimate hub location would affect proposed changes to other Groton routes and is a near-term priority.

Groton Transit Hub Location Criteria

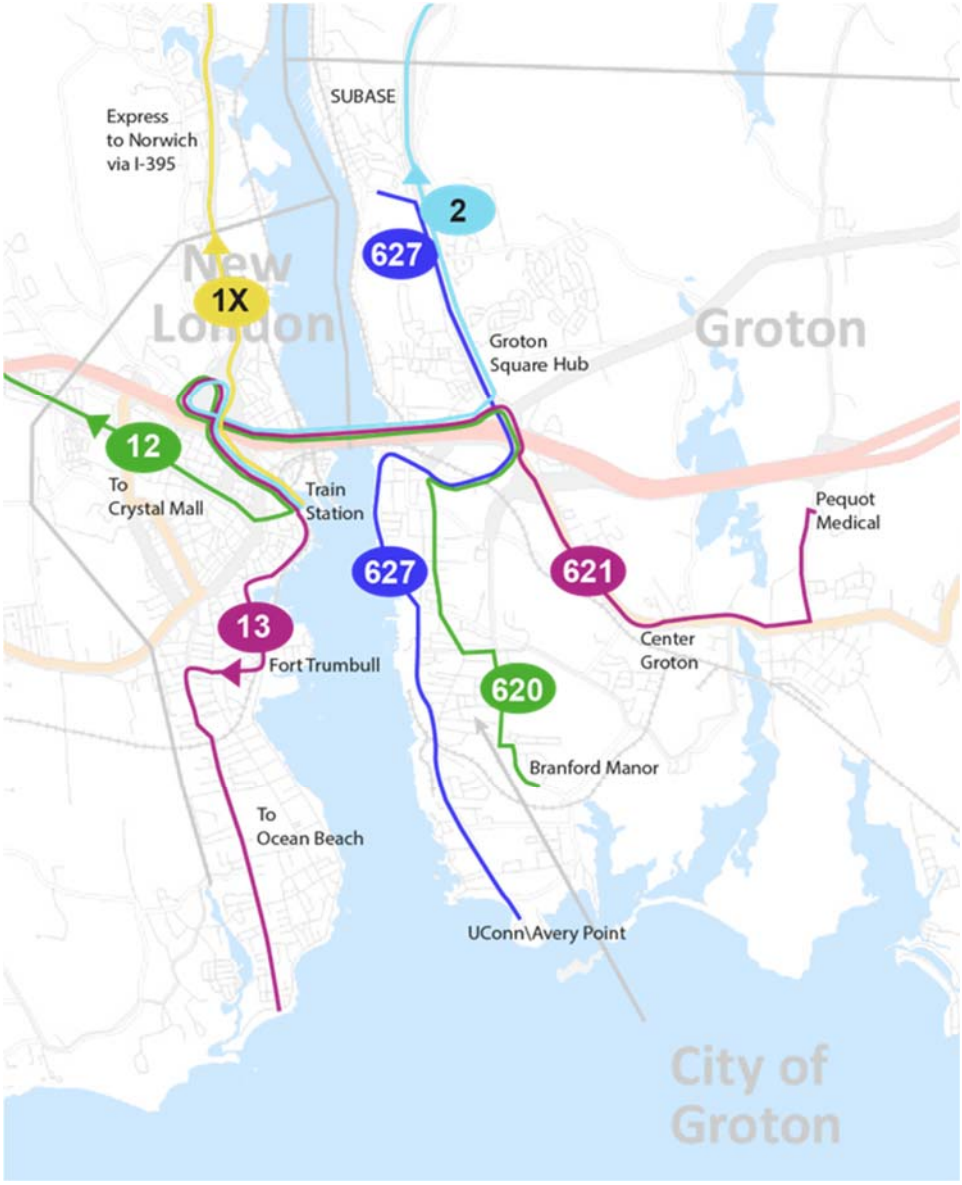
- Direct access for buses coming from:
  - I-95 SB and NB
  - Highway 12
  - City of Groton
  - Center of Groton
- Strong anchor (e.g. multi-family housing, employment center, retail, mixed use)
- Site ownership/availability/capacity
- Bicycle and pedestrian access
- Compatibility with future SLE rail extension
- Meets other local planning objectives

Realign and Expand SEAT Bus Service in Groton

Today, Groton is served by four SEAT routes. Route 11 provides local service in a large loop between Groton Center, Avery Point, and Groton Square. Routes 2, 3, and 108 provide regional connections and hourly service across the Gold Star Bridge (Figure 24). The 2015 SEAT Bus Study proposed a realignment and expansion of service (see Figure 25).

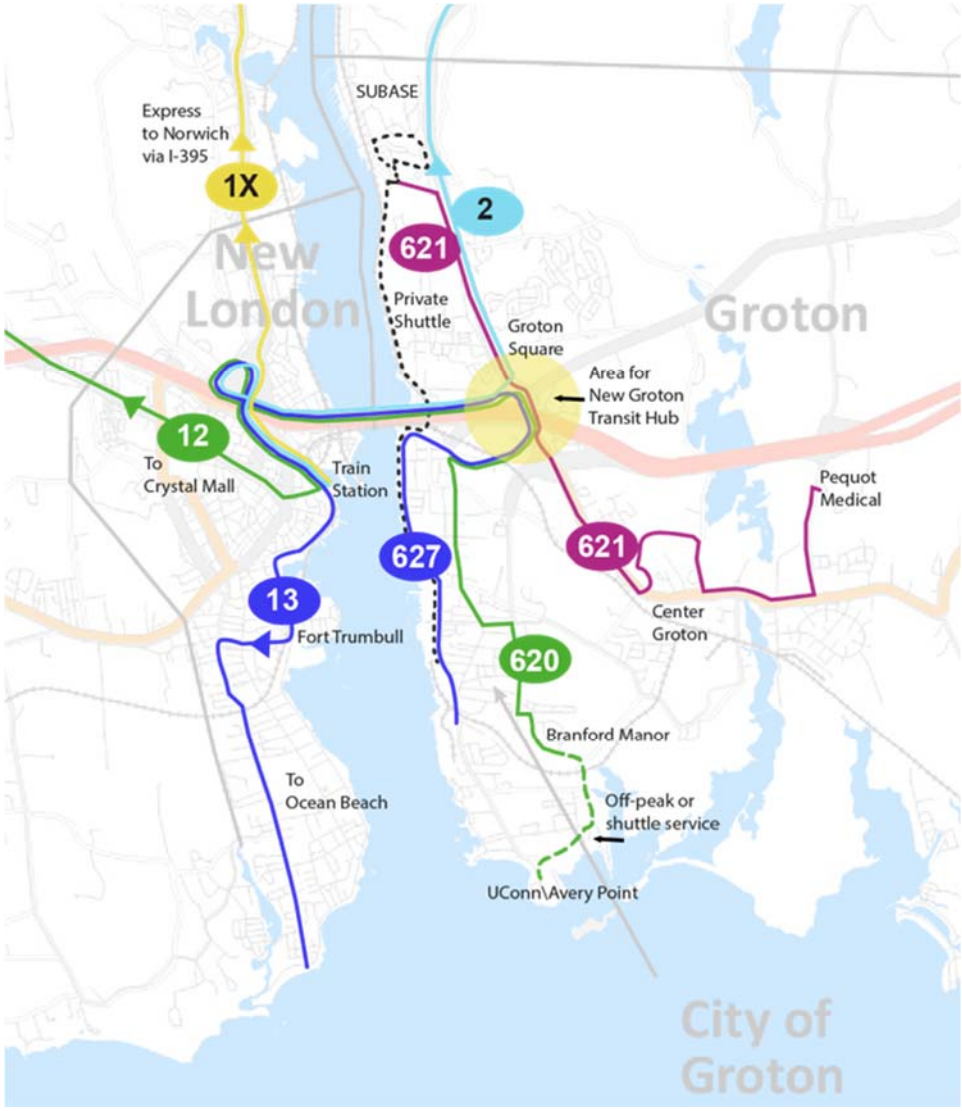
A second option is shown in Figure 26, which would more directly link Thames Street in Groton with New London and increase bus service frequency over the Gold Star Bridge, and suggests private shuttles are the most appropriate method to link the SUBASE and Thames Street employers in the City of Groton.

Figure 25: JLUS Area Bus Service Changes Proposed in SEAT Bus Study Expansion Plan C



JLUS Area Bus Service Changes Proposed in SEAT Bus Study Expansion Plan C
▪ Split Route 11 Groton into two routes that would provide more direct local service, cross the Gold Star Bridge, and be interlined with local New London services: o Route 620 Branford Manor-Crystal Mall o Route 621 Center Groton-Ocean Beach ▪ Introduce a new Route 627 Avery Point-SUBASE via Thames Street. ▪ Introduce express trips between New London and Norwich via I-395 ▪ Realign Route 2 Norwich-New London to operate bi-directionally along Route 12 (already implemented)

Figure 26: Modified Bus Transit Changes for JLUS Area



Recommended Modifications to Expansion Plan C
▪ Route 620 would continue to operate between Branford Manor in Groton and Crystal Mall in Waterford. Avery Point could be served on off-peak trips or by a UConn shuttle. Ridecheck data from 2014 showed only 6 daily boardings at this location, and the additional time needed to serve this location would affect on-time performance during peak traffic. ▪ Increase frequency on Route 620 to 30 minutes, to effectively increase transit service across the Gold Star Bridge between Groton and New London to 30 minutes (currently 60 minutes). ▪ Modify Route 621 to operate from Groton Center via Long Hill Road to the SUBASE. ▪ Modify Route 627 to run between Pfizer and New London, extending to Ocean Beach. ▪ A private shuttle is suggested to link Electric Boat and SUBASE, allowing for access and circulation on-base. A shuttle could also be considered to connect UConn/Avery Point to a new Groton hub.

Note that the location and bus access of a future Groton hub will affect the routing and cycle time of proposed SEAT route modifications. Final alignments should be developed as part of any hub study.

Increase Frequency on Route 2

SEAT Route 2 Norwich-Groton-New London runs every 120 minutes along Route 12. As suggested in the JLUS Phase 1 Study, frequency should be increased to hourly once the former state hospital site in Preston is developed and provides another strong ridership generator along the route.

Create Crystal Lake Road Mobility Hub

A "mobility hub" on Crystal Lake Road was suggested in the JLUS Phase 1 Study. Given the large, adjacent resident population on the SUBASE, this makes a suitable site to locate a number of multi-modal mobility options and other amenities. Depending on land availability, this should be developed once a new local Groton bus route and bike share program are implemented. The mini-hub would serve as the terminus for SEAT Route 621 or 627, be a potential Microtransit stop (see below), and host bike-share, car sharing (e.g. Zip cars), Uber/Lyft drop zones, travel information, and Amazon lockers.

Install SUBASE Pedestrian Gate at Ohio Avenue

SUBASE has added a pedestrian gate at the commercial gate on Crystal Lake Road, just west of the intersection of Highway 12. This gate now provides direct access to the SUBASE from a nearby SEAT bus stop. An additional pedestrian gate is recommended across from Ohio Avenue, providing SEAT riders and Trident Park residents direct access into the central and northern parts of the SUBASE.

Snapshot of Proposed SUBASE Mobility Improvements

- Increased frequency SEAT Route 2
- New local SEAT service to Crystal Lake Road
- Mobility hub on Crystal Lake Road served by SEAT, bike share, Uber/Lyft drop zone, Zipcar, Amazon lockers, travel information.
- New pedestrian gate across from Ohio Avenue providing pedestrians and transit riders with direct access to base.
- Shelters and lighting at SUBASE bus stops
- Private shuttle to Electric Boat shipyard
- Seasonal water taxi at Nautilus Museum

Install Shelter and Lighting at SUBASE Pedestrian Gates

A shelter with seating and appropriate lighting should be installed on both sides of Highway 12 at the existing and proposed SUBASE pedestrian gates. These amenities would provide a more attractive and convenient location for bus riders, and would highlight the availability and presence of transit.

Introduce/Test Microtransit

Many transit districts are testing the effectiveness of on-demand circulators to replace fixed route transit (see inset box). These services are still new and being piloted to assess their suitability and effectiveness in different environments. Microtransit could be piloted to serve two parts of Groton:

- **SUBASE – Military Housing – Groton Transit Hub:** Connecting the SUBASE with military housing and SEAT fixed-route services at Groton Square or a new hub. This could operate as a public service, dropping SUBASE personnel at a Crystal Lake Road mini-hub, but would likely be more successful if operated as a closed-door service authorized to enter SUBASE. Late-night service on weekends could also be tested.

- **Groton Center:** Replacing proposed local service with Microtransit to connect Groton Center, Long Hill Road, the Pequot Medical Center, and destinations along Route 184 with a Groton hub and SEAT fixed routes.

What is Microtransit?

Microtransit is an on-demand service using smaller transit vehicles in designated zones. Real-time trip requests are grouped and routed using navigational software.

Microtransit typically connects lower-density areas with fixed-route transit.

9 Town Transit is piloting **XtraMile**, a microtransit service in Old Saybrook, Westbrook and Centerbrook.

5. Recommended Amendments to 2015 SEAT Bus Study (System Expansion Plan C)

The 2015 SEAT Bus Study estimated the cost of various improvement scenarios, including System Expansion Plan C. Added operating and maintenance costs were estimated based on the relative increase over current year costs (which was FY2016, at the time of the study). The study estimated that SEAT Expansion Plan C would increase the cost of service by $25.7 million over SEAT's FY16 operating budget.

This JLUS Study largely reaffirms the recommendations put forth in SEAT Expansion Plan C. It provides an additional option for realigning service to connect the City of Groton with New London and increase frequency over the Gold Star Bridge. These modified recommendations would increase SEAT service and annual operating costs by an estimated 36.1% over FY16. As shown in Table 11, this represents an additional 10.4% over SEAT Plan C, or another $650,000 annually. This potential increase over SEAT Plan C can be attributed to:

- SEAT Route 2 Norwich-Groton-New London
  - Increased weekday frequency from every 120 minutes to 60 minutes
  - Expanded service span

- Increased frequency over Gold Star Bridge
  - Route 627 Groton-New London frequency would be reduced from 60 to 30 minutes

- Increased service span on Route 627 serving Thames Street in Groton

Gold Star Bridge

Source: ASG Planning, 2018

Table 11: Estimated Additional Operating Cost for SEAT Expansion

	SEAT FY16 Operations	SEAT Expansion Plan C	New JLUS Option
Annual Hours of Service (RVH)	64,439	81,005	104,259
Annual Operating Cost[1]	$6.26M	$7.87M	$8.52
Increase over FY14		25.7%	36.1%
Increase over SEAT Plan C			10.4%

Source: ASG Planning, 2019

Note: Increased costs for SEAT Expansion Plan C and the new JLUS option are relative to SEAT's FY16 budget. SEAT's FY20 Operating Budget is $6.43M, an increase of 2.6% over FY16 which reflects inflation as well as some changes made since FY16, including some recommended as part of the 2015 SEAT Bus Study.

Bus maintenance costs are included in the estimated operating costs. ADA service requirements would not vary from SEAT Plan C.

Capital costs associated with the modified JLUS implementation plan would also be in the range of $3 to $4 million higher than SEAT Expansion Plan C, depending on the cost of developing a Groton hub (see Table 12, below).

Due to increased service frequencies, an additional three buses would be required. The cost of Gillig buses for SEAT in CTDOT's FY2018 to FY2020 Public Transit Asset Management Plan are $850,000 each, an increase of $230,000 over the vehicles costs assumed in SEAT Expansion Plan C. The three additional vehicles would add $2.6 million in vehicle costs over SEAT Plan C (assuming the cost of vehicles under SEAT Plan C would now be $4.25M).

Table 12: Estimated Additional Capital Costs for SEAT Expansion

	Unit Cost FY14	Unit Cost FY20	SEAT Expansion Plan C	New JLUS Option	Increase over SEAT Plan C
Fleet Expansion	$620,000	$850,000	$3.10 M[1]	$6.80 M[2]	$2.6 M[3]
Bus Stop Shelter/Bench	$15,000	$20,000[4]	$0.51 M	$0.53 M	$0.02 M
Groton Square Hub	$40,000	TBD	$0.40 M	TBD	$0 -$1.5 M
				Increase over SEAT Plan C	$2.8 to $4.3 M

Source: ASG Planning, 2019

Notes:

1. *Assumes 5 vehicles at $620,000 each.*
2. *Assumes 8 vehicles at $850,000 each*
3. *Cost of 3 vehicles at $850,000. Note that the cost of 5 buses under SEAT Plan C costs would now be $4.25 M.*
4. *Assumes lighting costs added to bus shelter sites at four locations near SUBASE.*

The modified plan also suggests new shelters with benches and lighting on both sides of Route 12 across from SUBASE pedestrian gates. SEAT bus stop costs assumed a shelter and bench, but no site-specific lighting. Assuming these locations would be priority stops for the installation of amenities, it is assumed that an additional $5,000 for each of the four SUBASE shelters would be needed. Using a higher cost of $20,000 per location, but assuming that these would be priority locations for stop these new amenities, would add up to $80,000.

The cost of a Groton hub would vary depending on whether a simple Groton Square hub remains the preferred location and design concept, or if the final selected alternative involved the potential need for land acquisition and/or site improvement costs.

Other Electric Boat Groton employees that wish to ride SEAT will live throughout the SCCOG region emphasizing the need for a Groton hub where transfers can easily be made to a Groton-Thames Street route. Others will be dispersed beyond the SCCOG region where current and projected transit demand is very low. There is park and ride capacity throughout the region to support additional vanpooling and carpooling although, as detailed below, evidence suggests many existing carpools are informally formed with family and neighbors. Recommendations below include policy incentives and other actions to increase the use of these alternative modes.

D. Other Alternative Transportation Modes

1. Private Employee Shuttles, Vanpools, and Carpools

This section describes programs and facilities for vanpools, carpools and Electric Boat-operated shuttles.

Existing Park-Ride Infrastructure and Carpool/Vanpool Programs

There are two State-owned park-and-ride lots in the local study area (on Route 85 in Waterford and Route 117 in Groton), and a municipally owned 250-space garage on Water Street in New London. This garage, across from Union Station and SEAT's New London hub, is typically fully utilized, particularly in the summer months, and is partially leased by Electric Boat for employee parking. The company also leases a satellite

lot ("M Lot") for employees on Poquonnock Road in Groton. Of these facilities, only the Water Street Garage is served by transit.

Twelve additional publicly-owned parking facilities are located within the SCCOG region; the following six are served by SEAT buses:

- A large 165-space public garage at the Norwich Transportation Center (NTC);
- I-95 at exit 92 Park Ride Lot, Stonington;
- Mystic Amtrak Station parking, Stonington;
- State-owned lots at:
  - I-95 at exit 74, East Lyme;
  - Route 12 at Route 2A in Preston; and
  - Route 2 at Route 78 in Stonington.

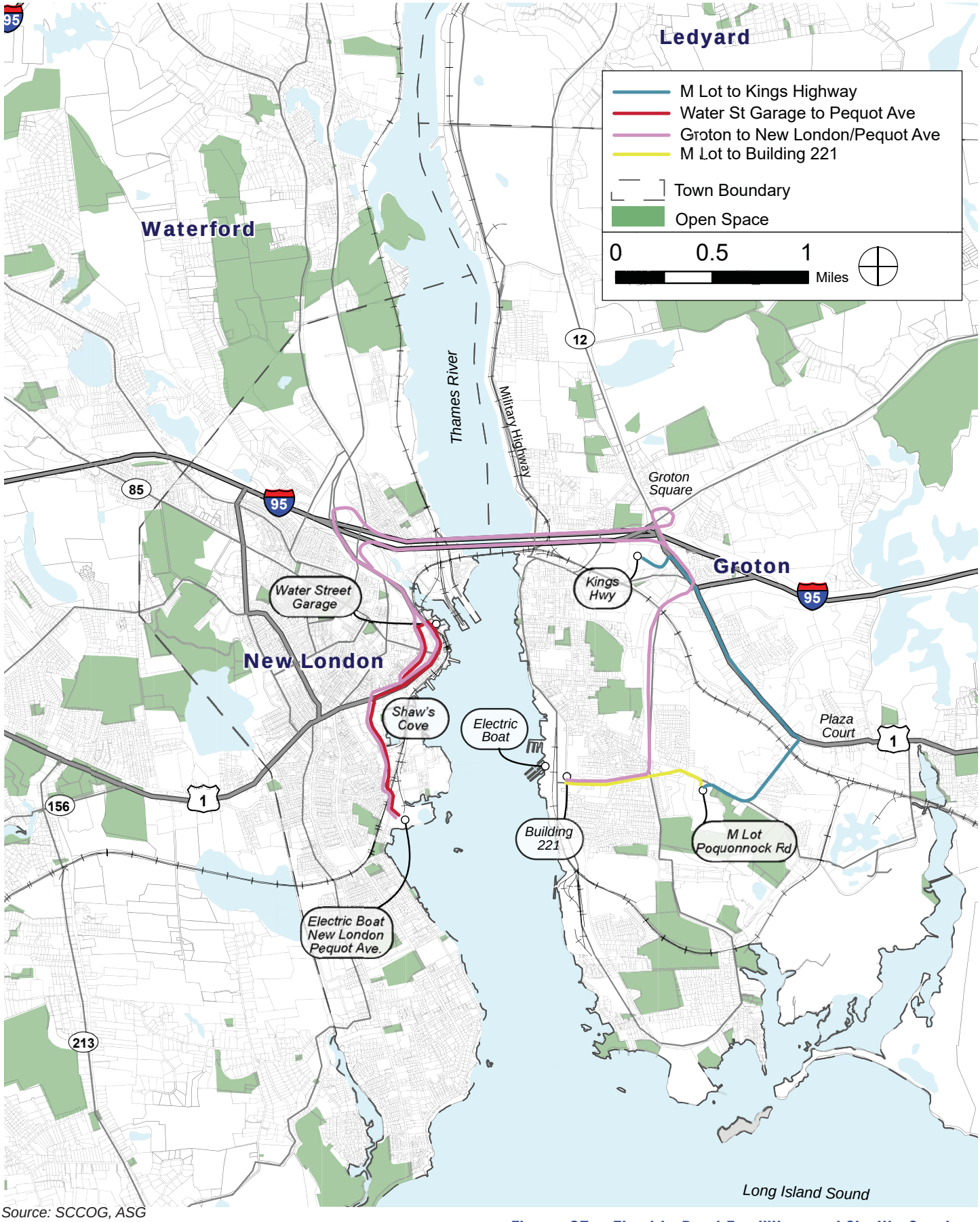
SCCOG staff conduct quarterly counts of State-owned commuter lots in the region and, with the exception of the 50-space lot on Route 117 in Groton, most are less than 50% utilized.

CT*rides* is a statewide commuter program sponsored by CTDOT that helps form carpools and offers trip planning, guaranteed rides home, and other incentives directly to consumers. A private company, Enterprise, provides vanpool vehicles for shared commutes, seating up to 15 people. Participants pay a monthly fee, but drivers of larger vanpools can receive discounts, and some employers subsidize vanpool costs for their employees. Enterprise also offers emergency rides home and other support.

Two of the area's largest employers, Electric Boat and the SUBASE, offer some incentives to encourage employees to commute using alternative modes. Electric Boat does not subsidize vanpools, but provides free vanpool parking at its Groton facility and subsidizes vanpool parking at New London's Water Street garage. Company employees working in southeastern Connecticut have formed 76 vanpools (57 to Groton, 18 to New London, and one to Stonington).[21] Carpools are not provided free or preferential parking. The SUBASE participates in the Department of Defense's Transit Incentive Program, which encourages active duty military and civilian employees to use alternative commutes. Participants are eligible for up to nearly $300 per month for pre-approved mass transit commuting expenses (e.g. bus or vanpooling). According to SUBASE representatives, current participation in this program is very low, likely due to the fact that free employee parking is provided on-base.

Finally, Electric Boat operates six private shuttle vehicles on four routes in the local study area (see Figure 27). These shuttles transport employees to and from two remote parking areas (the satellite "M Lot" on Poquonnock Road in Groton and the Water Street Garage in New London) and also between work sites for mid-shift meetings. Each weekday, these routes make about 150 trips and carry about 1,500 riders, making them a significant part of the area's transportation network.[22] Private taxis and transportation network companies, such as Uber and Lyft, also operate in the region and local study area.

[21] Phone interview with Electric Boat Security Coordinator, February 2019.
[22] Based on November-December 2018 shuttle ridership counts provided by Electric Boat.



Source: SCCOG, ASG

Figure 27: Electric Boat Facilities and Shuttle Services

Chart 23: Planned or Proposed Park-and-Ride and Carpool/Vanpool Improvements

Planned Improvements

- The City of New London applied for a grant in the summer of 2019 to expand the Water Street garage.

Proposed Improvements

- SCCOG's 2019 *Metropolitan Transportation Plan* indicates a need for more park-ride capacity in Groton; no site is recommended.

Source: ASG Planning, August 2019

Projected Carpool/Vanpool Demand

People living in the SCCOG region use carpools and vanpools at a rate slightly higher than the statewide average (see Table 9), and residents of the local study area use these modes at an even higher rate. Most (82%) of these "pooled rides" are two-person carpools, which likely include many formed with other household members or neighbors, rather than at park-ride lots. Table 13 provides an estimate of new carpools and vanpools that may be formed as employment growth is realized in the local study area.

Table 13: Estimate of Additional Vanpool/Carpool Commuters in Six Town Area (2030)

	Projected New Households by 2030	Est. new daily car/vanpool trips based on today's usage	Est. new daily trips in car/vanpools with 3+ persons	Est. no. of new daily 3+ person car/vanpools
Groton	3,047	546	98	33
Ledyard	205	51	9	3
Montville	263	26	5	2
New London	896	92	17	6
Waterford	368	28	5	2
Total	**4,779**	**743**	**134**	**46**

Source: ASG Planning, 2019
Note: New daily trips based on current household labor force participation by town and current mode share for car and vanpools.

Groton is anticipated to see the highest rate of new carpool and vanpool formation. However, only about 18% of these (or about 46 "pools") would be in 3+ person carpools or vanpools, which represents a 60% increase over the current number of vanpools serving Electric Boat today.

Recommendations on Private Shuttles, Carpools, and Vanpools

Private shuttles, carpools, and vanpools can often better connect commuters to outlying centers of employment, particularly in areas such as southeastern Connecticut, where many large job sites are outside the urban core. Residents of the local study area are already using these modes at a relatively high rate, and excess regional park-ride capacity provides opportunities for additional carpooling. Recommendations to increase the usage of shared rides include:

1. **Private Shuttle: Electric Boat to SUBASE**: Phase 1 of the JLUS Study (2017) recommended that shuttle service be provided between the SUBASE and Electric Boat in Groton. Unlike a public bus, a private vehicle carrying passengers with security clearance could enter the SUBASE providing a faster trip between nodes and bringing riders closer to final destinations on base. If operated by Electric Boat as part of their shuttle fleet, it would also meet Electric Boat security requirements.

2. **Employer-Provided Incentives/Disincentives**: Cost is a key factor affecting mode choice. Commuting incentives or disincentives offered or imposed by employers can affect commuting behavior and mode. Some examples include:
    - Parking cash out programs, where employees get a "bonus" for giving up their parking;
    - Bonuses and other support for carpools, bike and walk commutes as part of employee wellness programs;
    - Incentivize alternative modes: free or subsidized transit passes or bike share memberships; and
    - Parking fees (even nominal).

Given the current capacity at existing park-ride lots, no new lots are recommended at this time unless Electric Boat offers new shuttle services and/or additional incentives for carpooling. The estimated 743 new car/vanpool trips projected for 2030 represent 372 new commuters. There is sufficient capacity within the regional park-ride network to accommodate the vehicles owned by these commuters, especially since many would continue on as the driver of the carpool. Any expansion of the region's park-ride infrastructure should ensure that new lot capacity is on SEAT-served routes.

2. Rail and Water Transportation

Existing Rail and Water Infrastructure

Shore Line East Commuter Rail

Shore Line East (SLE) commuter rail operates along the Northeast Corridor between New London and New Haven, with a few trains continuing on to Stamford. The service is operated by Amtrak under contract to CTDOT, and is primarily oriented toward New Haven- or New York-bound commuters.

There are six westbound and five eastbound trips into New London each weekday, but only one peak period round trip supports New London-bound commuters (arriving at 6:30 AM, departing at 6:10 PM). More service (and peak service) is afforded to stations west of New London (e.g. 18 trips in each direction serving Old Saybrook). With CTDOT support, Amtrak "cross-honors" SLE passes on eight daily Amtrak trains. These additional commute options are also largely oriented toward New Haven- or New York-bound commuters.

Weekday SLE ridership averaged 1,344 in November 2018, down 34% since 2015.[23] Some portion of this decline can be attributed to ongoing track upgrades, which are resulting in service disruptions, significant delays, and the use of temporary bus shuttles in place of rail service.

Amtrak

Amtrak provides intercity rail service to New London's Union Station, with regional connections to Old Saybrook, New Haven, and Mystic, CT; Westerly, Rhode Island; and other destinations along the Northeast Corridor. In January 2019, 22 Amtrak trains stopped in New London each weekday, 11 in each direction.[24]

New London is the third-busiest Amtrak Station in Connecticut, with total boardings and alightings of 161,916 in FY2017.[25] Only four Amtrak trains serve New London during peak commute times, including one morning and two afternoon trains connecting with Westerly, and a 4:52 PM departure to New Haven. These trains do not currently cross-honor SLE fares, but give New London commuters morel travel options.

In the 2010-2015 period, the federal government undertook a northeast rail corridor study with a concurrent federal Environmental Impact Statement (EIS). The EIS evaluated several alternatives to provide higher-speed rail service between New York and Boston, including both a coastal and inland route (along I-84) in Connecticut. The preferred option is an upgrade of the existing corridor, with some segments of new track including a bypass in southeastern Connecticut, including the New London area. Connecticut and Rhode Island have been asked to conduct more detailed studies to finalize the alignment of a potential future bypass. Although a coastline alternative would have beneficial long term impacts for the region and particularly New London, a high-speed bypass may free up track capacity for additional local service and new stations along the coast.

Other Railroad Rights of Way

Two freight rail lines owned by Genesee & Wyoming pass through the local study area. One travels along the west side of the Thames River and serves the Port of New London. The other runs on the east side of the river and passes through the SUBASE, briefly running east along the Northeast Corridor, then turning south and circling back to serve freight customers in the City of Groton. Although past proposals have considered the potential use of these lines for future passenger rail, SCCOG's 2019 *Southeastern CT Metropolitan Transportation Plan* does not prioritize such action.

[23] CT Rail Council Operating Reports, https://ctcommuterrailcouncil.org/sample-page/
[24] Amtrak's schedule is adjusted seasonally.
[25] Amtrak State Fact Sheet, 2017.

Water Transportation

New London is served by three regional ferries. The Cross Sound Ferry provides year-round service to Orient Point, New York, while two seasonal ferries operate in summer months connecting to Block Island, Rhode Island, and Fishers Island, New York.

The Thames River Heritage Park Foundation operates a summer water taxi. The service operates on Friday afternoons, weekends, and holidays, in a one-way loop connecting Fort Trumbull State Park and City Pier in New London, then Thames River Landing in Groton. Trips run hourly and take about 20 minutes between each pier. An estimated 6,647 passengers used the service in 2018.

Public Groton dock used by water taxi.
Source: ASG Planning, 2018

Planned Improvements to Rail and Water Transportation

Chart 24: Planned or Proposed Rail Service Improvements in the Local Study Area

Planned Rail Service Improvements

- Ongoing Shore Line East (SLE) track upgrades.
- Accessibility improvements and other repairs at New London's Union Station.
- Overhaul of SLE locomotives.
- CT*rail* integrated fare payment "app" for SLE, Metro North and New Haven-Hartford rail services.

Proposed Rail Service Improvements

- Upgrade Shore Line East (SLE) stations and parking.
- Increase SLE service levels.
- Build new SLE station in Niantic.
- Extend SLE service east into Rhode Island.
- Long-term Amtrak vision to build a high-speed rail bypass; regional service would continue to serve existing station

Note: Planned Rail Service Improvements based on phone conversation with SCCOG, February 2019. Proposed Rail Service Improvements from Southeastern CT Metropolitan Transportation Plan (SCCOG, March 2019); CT Statewide Long Range Transportation Plan (CTDOT, 2018); and NEC Futures (Amtrak, 2017).

Chart 25: Planned or Proposed Water Transportation Improvements

Planned Water Transportation Improvements

- Purchase of a third vessel for Thames River Heritage Park water taxi service.
- Construction of a new dock at the Submarine Force Museum/USS Nautilus, to be served by the water taxi beginning in summer 2020.

Source: Thames River Heritage Park RFP for Water Taxi Operator, December 2019.

Projected Demand for Rail and Water Transportation

As shown in Table 9 at the beginning of this section, an estimated 1.5% of commuters in the SCCOG region use public transit (bus, rail, or ferry) to travel to work. Most of these transit commutes are by bus; rail commutes make up 0.2% and ferry commutes are insignificant (0.06%).

Improvements to SLE infrastructure and service should help boost rail ridership. However, current service along the Northeast Corridor is oriented toward New Haven and does not effectively serve New London-bound commuters, and actions should be taken to help the region better capitalize upon rail service operating through the area.

Recommendations on Rail and Water Transportation

Current Shore Line East improvements and ongoing CTDOT collaboration with Amtrak provide a good foundation for future enhancements to better support rail commutes into New London. The following actions are recommended:

Additional SLE service into New London

Shore Line East should extend one or two additional peak hour trains from Old Saybrook to New London. For example, morning peak trains leaving New Haven at 6:25 AM and/or 6:55 PM currently terminate in Old Saybrook and could be extended to provide AM peak service into New London. Evening peak trains departing Old Saybrook at 4:30 PM and/or 6:13 PM could be extended to originate in New London. These changes would provide two additional peak period roundtrips by rail into New London.

Cross Honor SLE Fares on New London Trains

CTDOT should be encouraged to expand current fare agreements with Amtrak to accept SLE fares on trains serving New London-bound commuters from New Haven and Westerly. For example, SLE fares could be honored on the 4:52 PM Amtrak departure from New London to New Haven, providing an added westbound evening commute option. Cross-honoring could also be explored on up to three Amtrak trains supporting peak period commutes between Westerly and New London. CTDOT currently pays $10 per SLE ticket used on Amtrak trains; however, this rate is anticipated to be renegotiated in the near future.

Continue to Support Long Range Plans

Although not likely to be implemented in time to support near-term regional growth, longer-term plans to extend SLE into Rhode Island should be supported. The region should also carefully consider the benefits and impacts of a future Amtrak high-speed rail bypass in the area, including the feasibility of a future station in Groton.

Additional Concepts Not Recommended for Implementation

Public comment and input over the course of the study suggested a number of additional rail and water improvements that are not included in the recommendations above, for the reasons discussed below:

- ***Year-Round Weekday Water Taxi:*** The Thames River Water Taxi operates on Friday afternoons and weekends during summer months, with roundtrip fares set at $10. A fare this high is prohibitive for most commuters, and expanding to a year-round, daily schedule at a

lower fare would require significant additional subsidies. In addition, a ferry that lands directly at Electric Boat would be difficult due to security concerns, so riders would have to walk or bike from the ferry terminal to their ultimate destination, further extending trip times. If stakeholders wanted to test local (non-tourist) interest, a discounted 10-ride fare could be offered during summer months.

- ***North-South Commuter Rail:*** The concept of commuter rail along the Genesee and Wyoming line was studied in the *Central Corridor Passenger Rail Feasibility Study* (2017) by Massachusetts. Only about 78 daily riders were projected for New London, meaning limited benefits when compared with overall costs. Furthermore, it is unlikely that rail service could be implemented over the near-term to support the employment growth evaluated as part of this JLUS study.

- ***New Groton station:*** This station would be most effective as part of a proposed SLE extension into Rhode Island. Currently, key employers and other activity centers are not in the immediate vicinity of the Groton rail alignment, so intermodal connections would be required for first/last mile travel.

Table 14: Summary of Recommendations to Increase Use of Transit & Other Alternative Travel Modes

Previous Bus Transit Recommendations: Implement As-Is	Previous Study
1. Extend service span on most SEAT routes.	SEAT 2015
2. Increase frequency on SEAT Route 1 New London-Norwich, offering consistent hourly service.	SEAT 2015
3. Operate express New London-Norwich trips	SEAT 2015
4. Improve New London hub	SEAT 2015
5. Create Bus Stops, Install Shelters/Seating	SEAT 2015
Previous Bus Transit Recommendations: Modified	**Previous Study**
6. Create a Groton transit hub	SEAT 2015
7. Realign and Expand SEAT Bus Service in Groton	SEAT 2015
8. Increase frequency on SEAT Route 2	JLUS 2017
9. Create Crystal Lake Road Mobility Hubs	JLUS 2017
New Bus Transit Recommendations	
10. New SUBASE Pedestrian Gate @ Ohio Avenue	
11. Install Shelters and Lighting at SEAT bus stops on Highway 12 by SUBASE	
12. Microtransit Pilot Project	
Carpool/Vanpool/Shuttle Recommendations	
13. Private Shuttle between SUBASE and Electric Boat, providing direct employee access to secure locations	
14. Employer-Provided Incentives/Disincentives	
Rail Recommendations	
15. Extend 1-2 additional peak hour Shore Line East trains from Old Saybrook to New London.	
16. CTDOT support of cross-honoring of SLE fares on additional Amtrak trains serving New London.	
17. Support long range plans for SLE extension into RI	

E. Projects for Bus Transit and Alternative Transportation: Priority Actions

- ***Study Future Groton Transit Hub Location:*** A formal Groton Transit hub has been recommended as part of this study, as well as by the 2015 SEAT Bus Study. The identification of a preferred site should be a priority, as location of this hub will affect the routing and cycle time of local Groton bus routes. Hub locations should be considered as part of a cooperative regional effort with SEAT and the Town of Groton, and ideally would be located in an area that could support higher-density land uses and attract more riders. Note that the ultimate location and its bus access will affect the routing and cycle time of proposed SEAT route modifications. Final alignments should be developed as part of any hub study.

- ***SEAT Bus Service Expansion:*** The JLUS Implementation Committee should work with the SEAT Board of Directors and CTDOT's Transit Division to continue implementation of SEAT service improvements and expansions, as modified herein and with a focus on Groton area improvements. Groton was identified as needing improved transit services in the 2015 SEAT Bus Study, and most near-term household growth anticipated with increased regional employment is anticipated to occur in Groton.

- ***Bike Share Program:*** Stakeholders interested in a potential Groton Bike Share program should be identified and should collectively reach out to vendors to better understand factors affecting program viability and appropriate scale. A Request for Expressions of Interest (RFEI) could then be issued to solicit interest and provide input on cost, scale, technology, and the potential for integrating programs across the Thames River.

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APPENDIX A

EXISTING SOCIOECONOMIC TRENDS AND CONDITIONS

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APPENDIX A

Population Trends

Total Population, 1970-2010

	Count					Change, 1970-2010	
Area	**1970**	**1980**	**1990**	**2000**	**2010**	**Absolute**	**Percent**
SCCOG Region	**242,074**	**249,853**	**266,399**	**269,995**	**286,711**	**44,637**	**+18.4%**
Bozrah	2,036	2,135	2,297	2,357	2,627	**591**	**+29.0%**
Colchester	6,603	7,761	10,980	14,551	16,068	**9,465**	**+143.3%**
East Lyme	11,399	13,870	15,340	18,118	19,159	**7,760**	**+68.1%**
Franklin	1,356	1,592	1,810	1,835	1,922	**566**	**+41.7%**
Griswold	7,763	8,967	10,384	10,807	11,951	**4,188**	**+53.9%**
Groton, City of	8,933	10,086	9,837	10,010	10,389	**1,456**	**+16.3%**
Groton, Town of	38,523	41,062	45,144	39,907	40,115	**1,592**	**+4.1%**
Jewett City, Borough of	3,372	3,294	3,349	3,053	3,487	**115**	**+3.4%**
Lebanon	3,804	4,762	6,041	6,907	7,308	**3,504**	**+92.1%**
Ledyard	14,558	13,735	14,913	14,687	15,051	**493**	**+3.4%**
Lisbon	2,808	3,279	3,790	4,069	4,338	**1,530**	**+54.5%**
Montville	15,662	16,455	16,673	18,546	19,571	**3,909**	**+25.0%**
New London	31,630	28,842	28,540	25,671	27,620	**-4,010**	**-12.7%**
North Stonington	3,748	4,219	4,884	4,991	5,297	**1,549**	**+41.3%**
Norwich	41,433	38,074	37,391	36,117	40,493	**-940**	**-2.3%**
Preston	3,593	4,644	5,006	4,688	4,726	**1,133**	**+31.5%**
Salem	1,453	2,335	3,310	3,858	4,151	**2,698**	**+185.7%**
Sprague	2,912	2,996	3,008	2,971	2,984	**72**	**+2.5%**
Stonington	15,940	16,220	16,919	17,906	18,545	**2,605**	**+16.3%**
Stonington, Borough of	N/A	1,228	1,100	1,032	929	**N/A**	**N/A**
Waterford	17,227	17,843	17,930	19,152	19,517	**2,290**	**+13.3%**
Windham	19,626	21,062	22,039	22,857	25,268	**5,642**	**+28.7%**

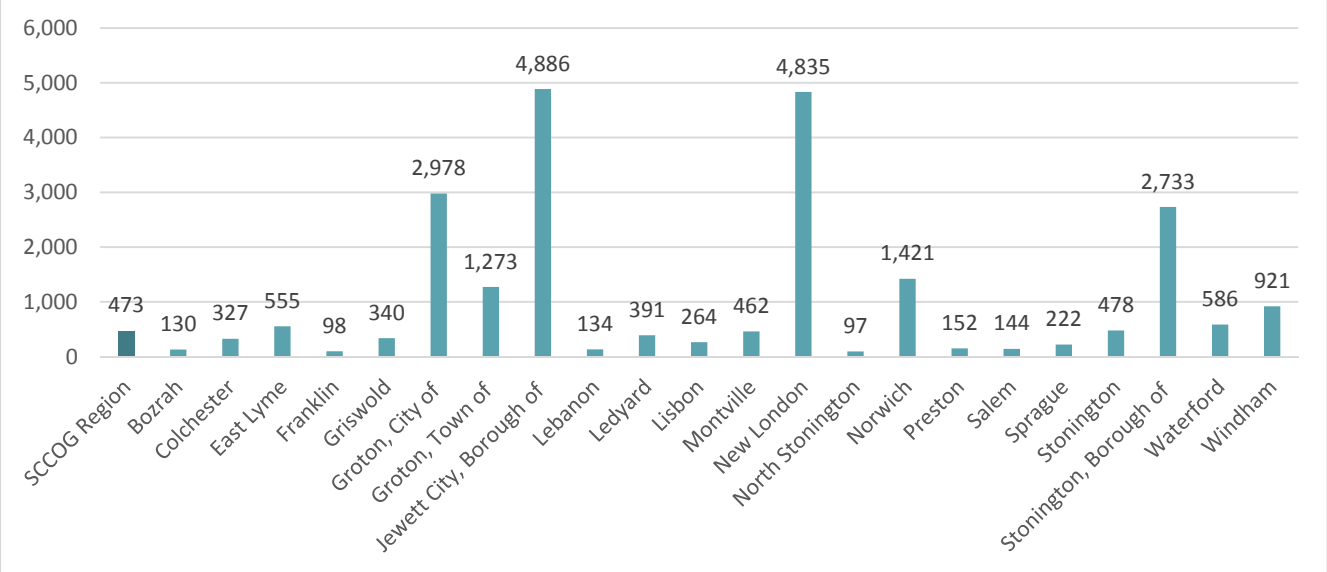
Source: US Census Bureau, 1970-2010 Decennial Censuses

Total Population, 2010-2017

	Count								Change, 2010-2017	
	2010	2011	2012	2013	2014	2015	2016	2017	Absolute	Percent
SCCOG Region	**286,862**	**286,070**	**287,019**	**286,015**	**284,254**	**282,649**	**281,627**	**281,375**	**-5,487**	**-1.9%**
Bozrah	2,625	2,628	2,632	2,625	2,607	2,587	2,569	2,563	-62	-2.4%
Colchester	16,046	16,081	16,130	16,091	16,055	15,977	15,937	16,029	-17	-0.1%
East Lyme	19,134	18,507	18,871	18,863	18,683	19,190	18,804	18,789	-345	-1.8%
Franklin	1,920	1,984	1,989	1,980	1,971	1,958	1,946	1,944	24	+1.3%
Griswold	11,955	11,951	11,981	11,926	11,862	11,770	11,705	11,687	-268	-2.2%
Lebanon	7,330	7,325	7,343	7,303	7,282	7,226	7,194	7,209	-121	-1.7%
Ledyard	15,044	15,025	15,058	15,028	15,021	14,911	14,846	14,837	-207	-1.4%
Lisbon	4,337	4,330	4,352	4,339	4,322	4,291	4,275	4,274	-63	-1.5%
Montville	19,589	19,689	19,683	19,717	19,583	19,283	19,187	19,149	-440	-2.2%
New London	27,617	27,640	27,584	27,390	27,244	27,075	27,087	27,072	-545	-2.0%
North Stonington	5,297	5,286	5,298	5,274	5,259	5,228	5,261	5,270	-27	-0.5%
Norwich	40,551	40,495	40,537	40,375	40,154	39,836	39,578	39,470	-1,081	-2.7%
Preston	4,727	4,728	4,746	4,735	4,724	4,677	4,671	4,666	-61	-1.3%
Salem	4,153	4,164	4,183	4,172	4,146	4,144	4,139	4,141	-12	-0.3%
Sprague	2,984	2,986	2,988	2,976	2,969	2,942	2,921	2,914	-70	-2.3%
Stonington	18,533	18,502	18,555	18,496	18,422	18,285	18,614	18,593	60	+0.3%
Town of Groton	40,087	39,837	40,233	40,124	39,757	39,335	39,169	39,075	-1,012	-2.5%
Waterford	19,503	19,491	19,521	19,427	19,309	19,149	19,045	19,007	-496	-2.5%
Windham	25,430	25,421	25,335	25,174	24,884	24,785	24,679	24,686	-744	-2.9%

Source: US Census Bureau July 1st Population Estimates, 2010-2017

Population Density per Square Mile, 2017



Source: US Census Bureau, 2010 Decennial Census & July 1st Population Estimate, 2017

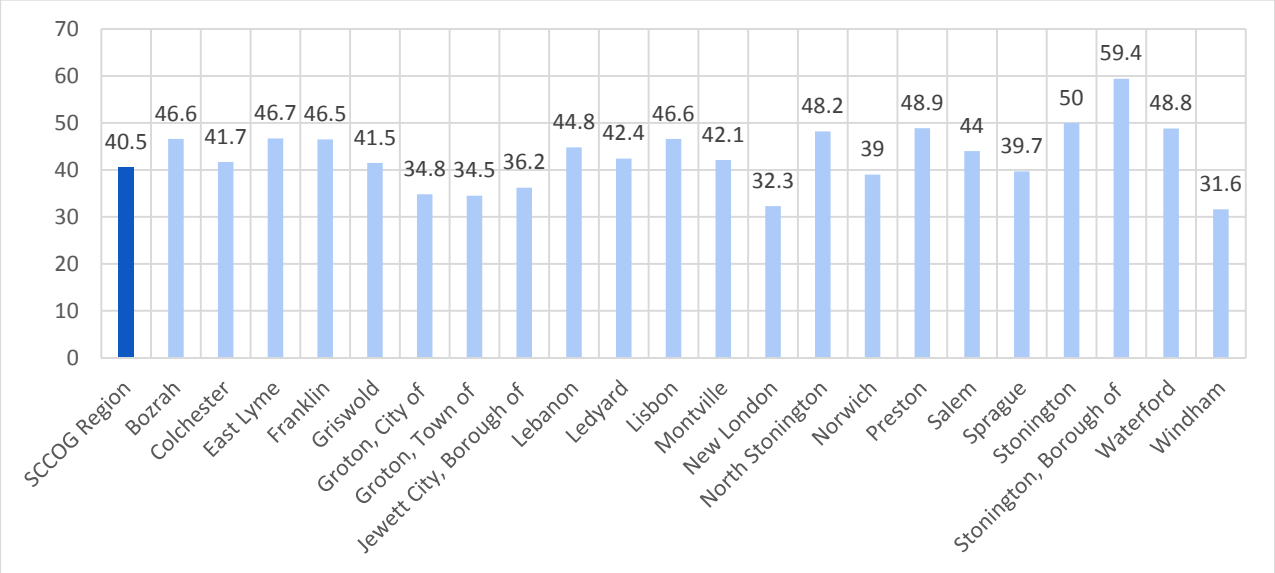
Age Trends

Distribution of Population by Age, 1970 & 2017

	< 45		45-64		65+	
	1970	2017	1970	2017	1970	2017
SCCOG Region	**72.4%**	**56.4%**	**18.8%**	**27.7%**	**8.8%**	**15.9%**
Bozrah	71.8%	48.3%	21.0%	32.5%	7.2%	19.2%
Colchester	73.1%	54.8%	17.4%	32.4%	9.6%	12.8%
East Lyme	73.6%	46.6%	18.3%	31.4%	8.1%	21.9%
Franklin	70.9%	44.3%	19.8%	37.2%	9.3%	18.5%
Griswold	69.0%	57.7%	21.4%	28.5%	9.6%	13.9%
Groton, City of	72.8%	65.0%	19.7%	22.4%	7.5%	12.6%
Groton, Town of	81.0%	63.7%	13.7%	22.5%	5.3%	13.8%
Jewett City, Borough of	64.6%	66.9%	23.9%	23.5%	11.5%	9.6%
Lebanon	74.1%	48.6%	19.0%	35.0%	7.0%	16.5%
Ledyard	86.7%	55.4%	10.8%	30.7%	2.4%	13.9%
Lisbon	72.5%	49.4%	20.4%	33.1%	7.2%	17.5%
Montville	80.4%	52.2%	14.8%	31.3%	4.8%	16.5%
New London	69.2%	64.8%	19.1%	24.0%	11.7%	11.2%
North Stonington	78.6%	48.4%	15.8%	37.2%	5.6%	14.4%
Norwich	65.5%	60.7%	22.8%	24.4%	11.7%	15.0%
Preston	73.8%	47.3%	19.7%	33.6%	6.5%	19.1%
Salem	72.1%	51.6%	19.6%	33.0%	8.3%	15.4%
Sprague	69.4%	52.9%	20.0%	32.6%	10.6%	14.5%
Stonington	65.5%	43.1%	23.1%	32.4%	11.4%	24.5%
Stonington, Borough of	N/A	28.1%	N/A	36.5%	N/A	35.4%
Waterford	66.6%	45.0%	24.2%	32.5%	9.2%	22.4%
Windham	67.7%	67.9%	20.7%	20.1%	11.6%	12.0%

Source: US Census Bureau, 1970 Decennial Census & ACS 2013-2017 5-Year Estimate

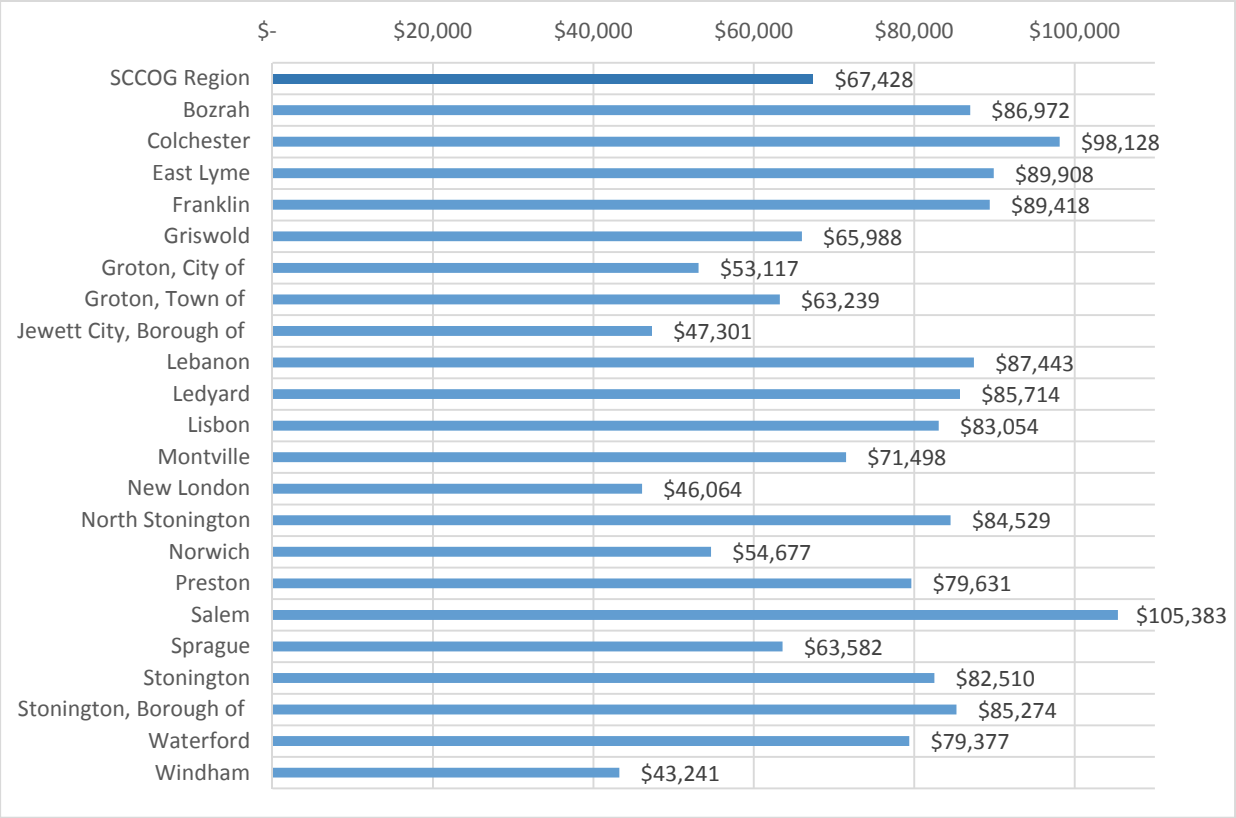
Median Age, 2018



Source: ESRI, 2018 Population Forecast

Household Income Trends

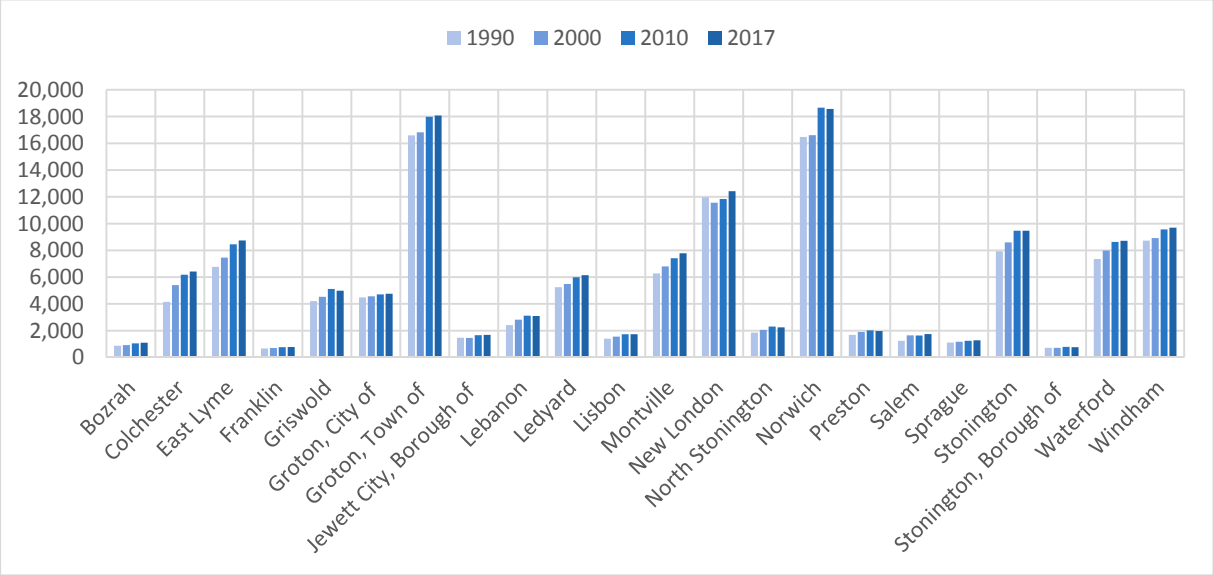
Median Household Income, 2018



Source: ESRI, 2018 Population Forecast

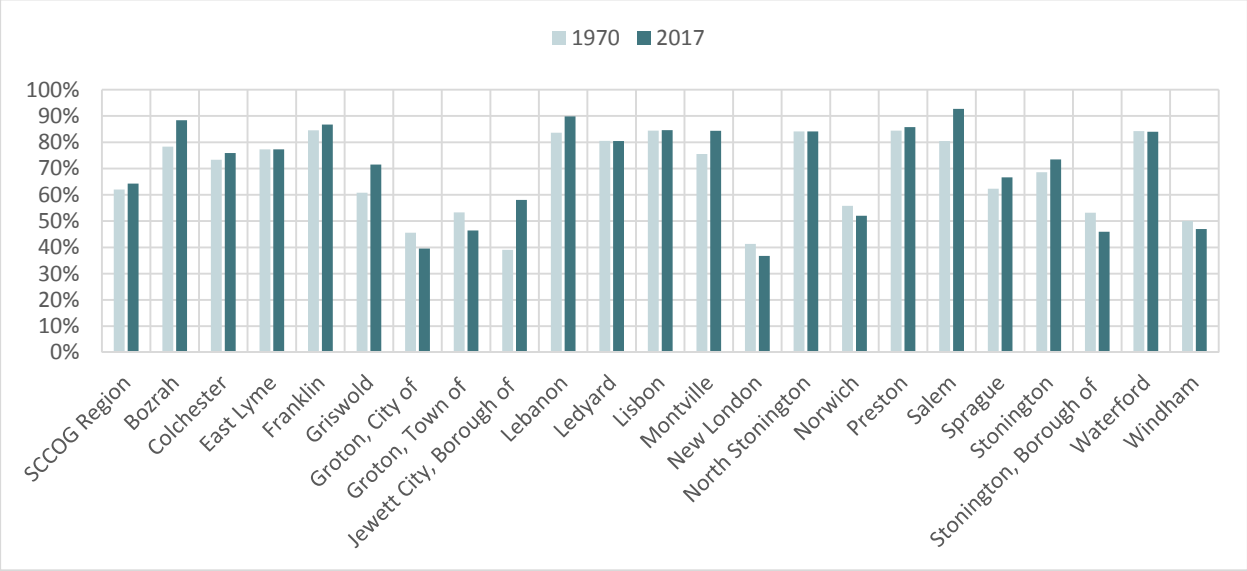
Housing Trends

Total Housing Units, 1990-2017



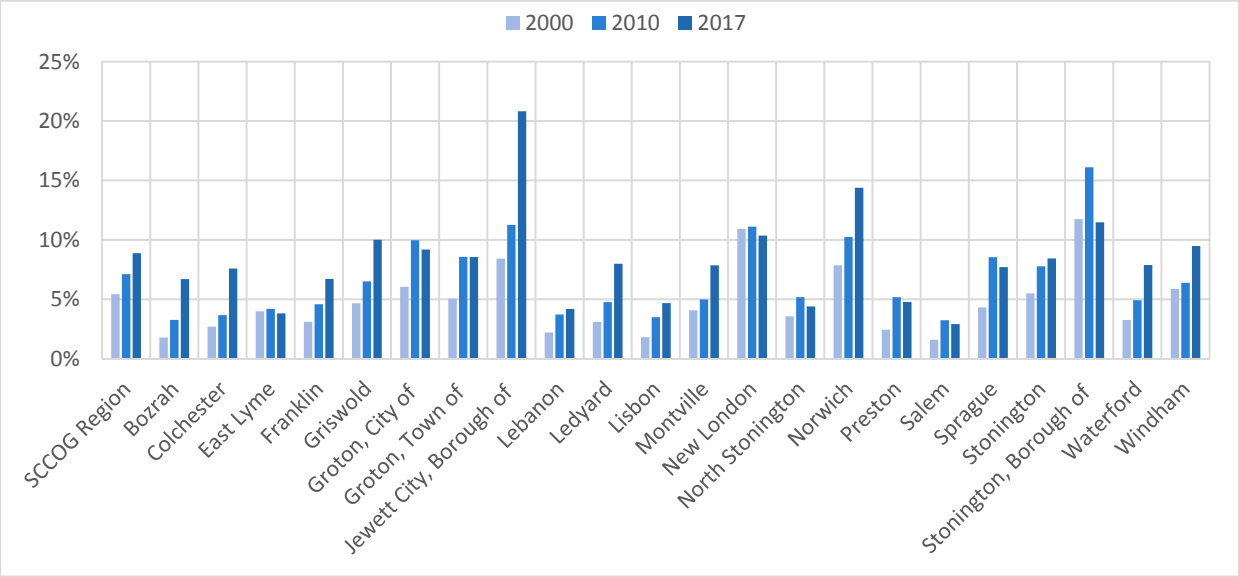
Source: US Census Bureau, 1990-2010 Decennial Census & ACS 2013-2017 5-Year Estimate

Share of Owner Occupied Households, 1970-2017



Source: US Census Bureau, 1970-2010 Decennial Census & ACS 2013-2017 5-Year Estimate

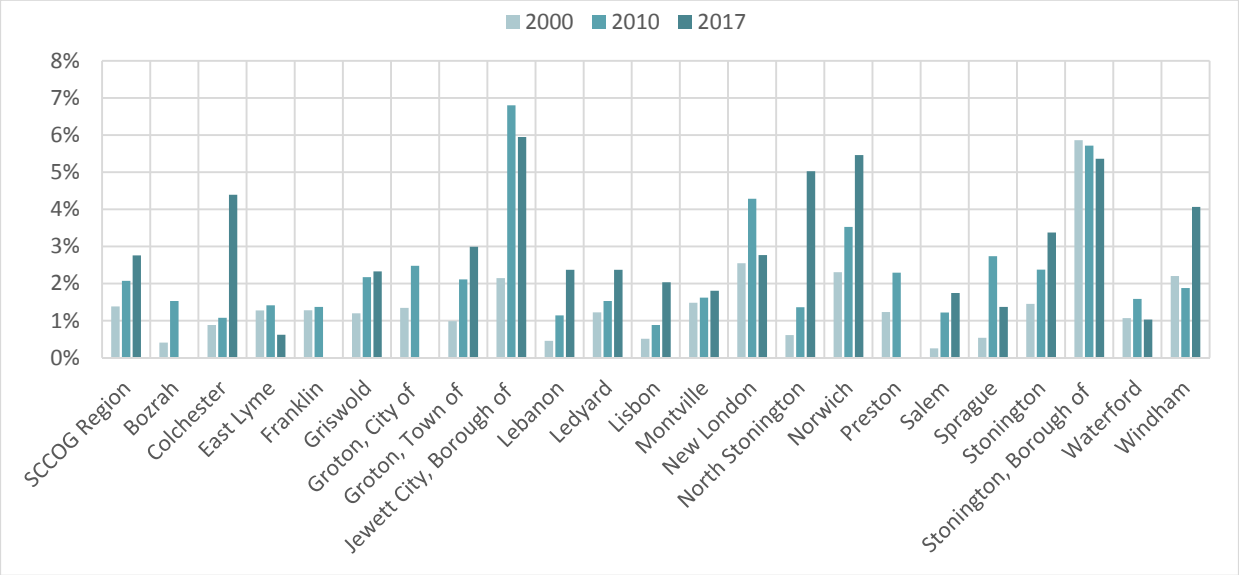
Housing Vacancy Rates, 2000-2017



Note: Excludes units for seasonal, recreational, or occasional use. Vacancy rates under 0.5% are estimated as 0% by the US Census Bureau.

Source: US Census Bureau, 2000-2010 Decennial Census & ACS 2013-2017 5-Year Estimate

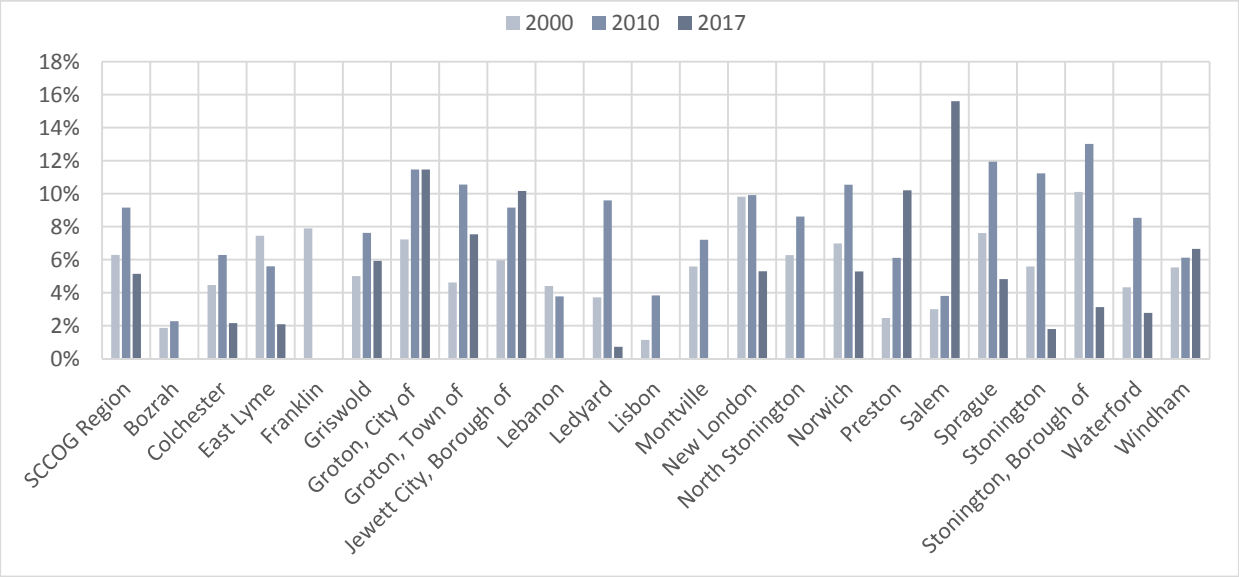
Homeowner Housing Vacancy Rates, 2000-2017



Note: Vacancy rates under 0.5% are estimated as 0% by the US Census Bureau.

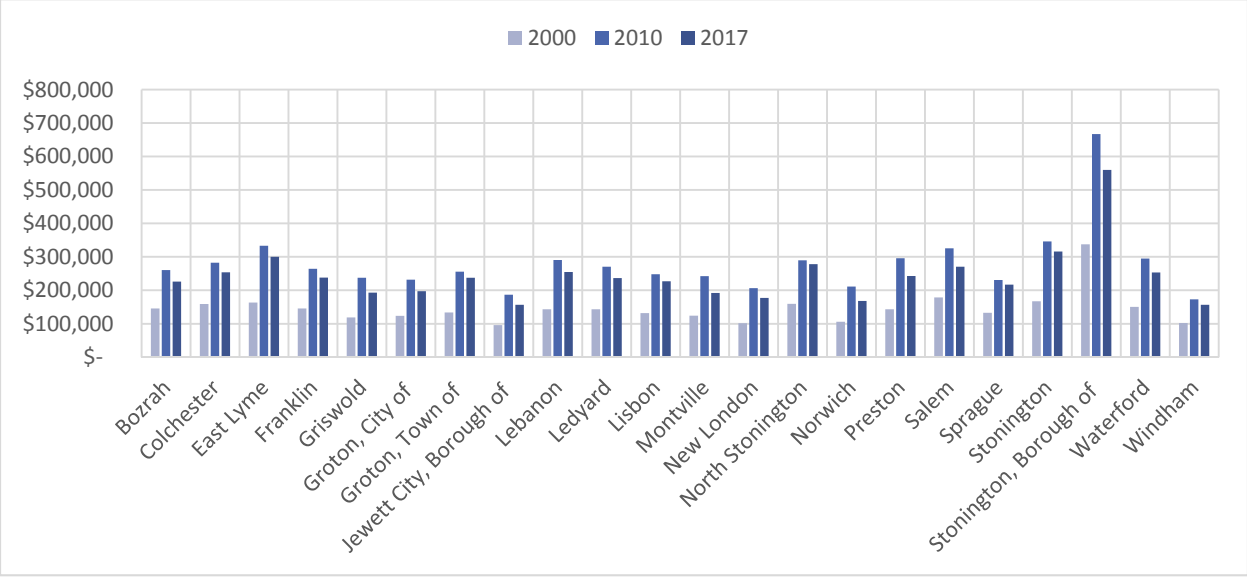
Source: US Census Bureau, 2000-2010 Decennial Census & ACS 2013-2017 5-Year Estimate

Renter Housing Vacancy Rates, 2000-2017



Note: Vacancy rates under 0.5% are estimated as 0% by the US Census Bureau.
Source: US Census Bureau, 2000-2010 Decennial Census & ACS 2013-2017 5-Year Estimate

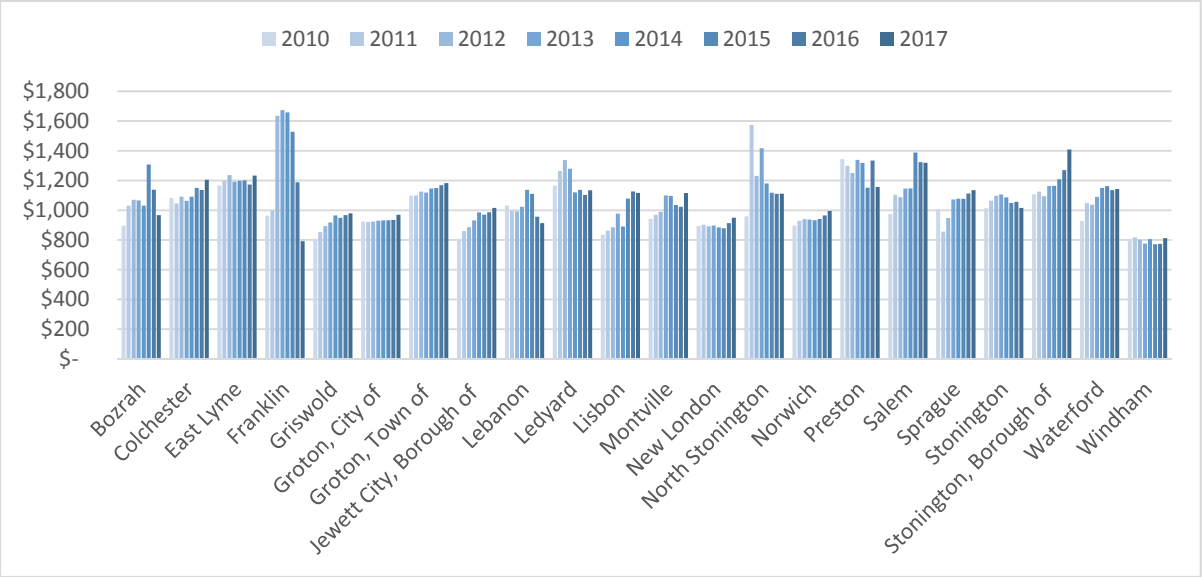
Homeowner-Occupied Home Value, 2000-2017



Source: US Census Bureau, 2000 Summary File 3 & ACS 2006-2010 and 2013-2017 5-Year Estimates

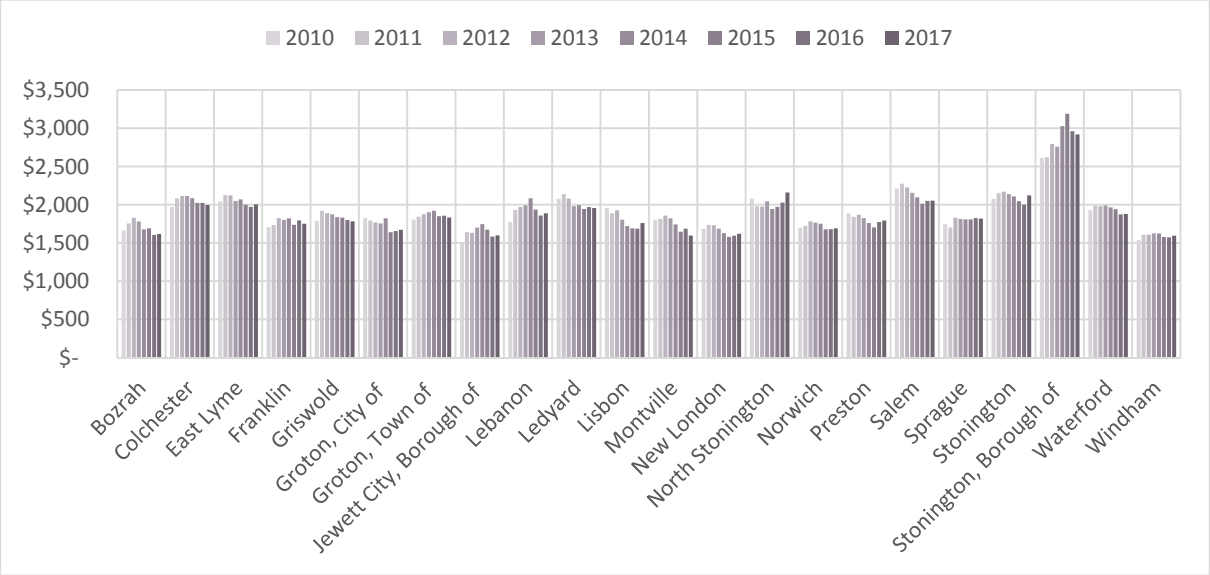
Housing Affordability Trends

Monthly Gross Rent, 2010-2017



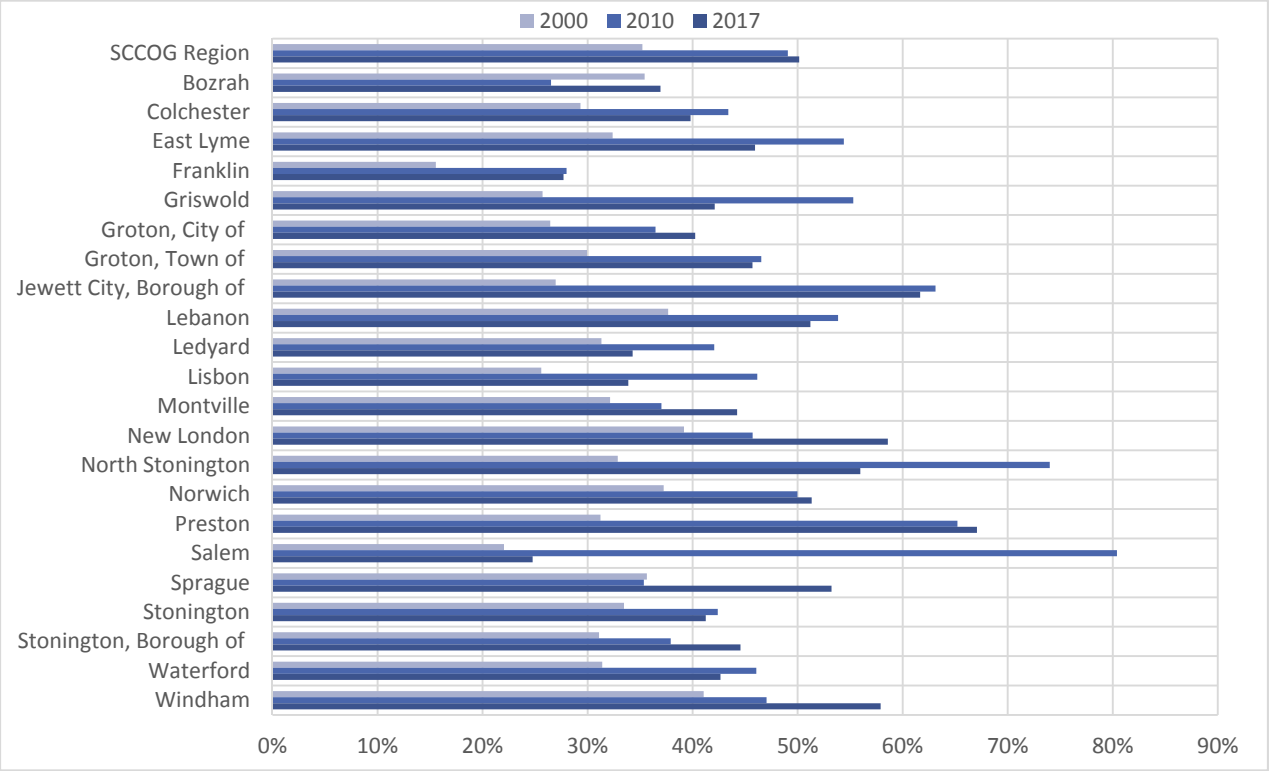
Source: US Census Bureau, 2000 Summary File 3 & ACS 2006-2010 and 2013-2017 5-Year Estimates

Monthly Owner Costs for Homeowners with a Mortgage, 2010-2017



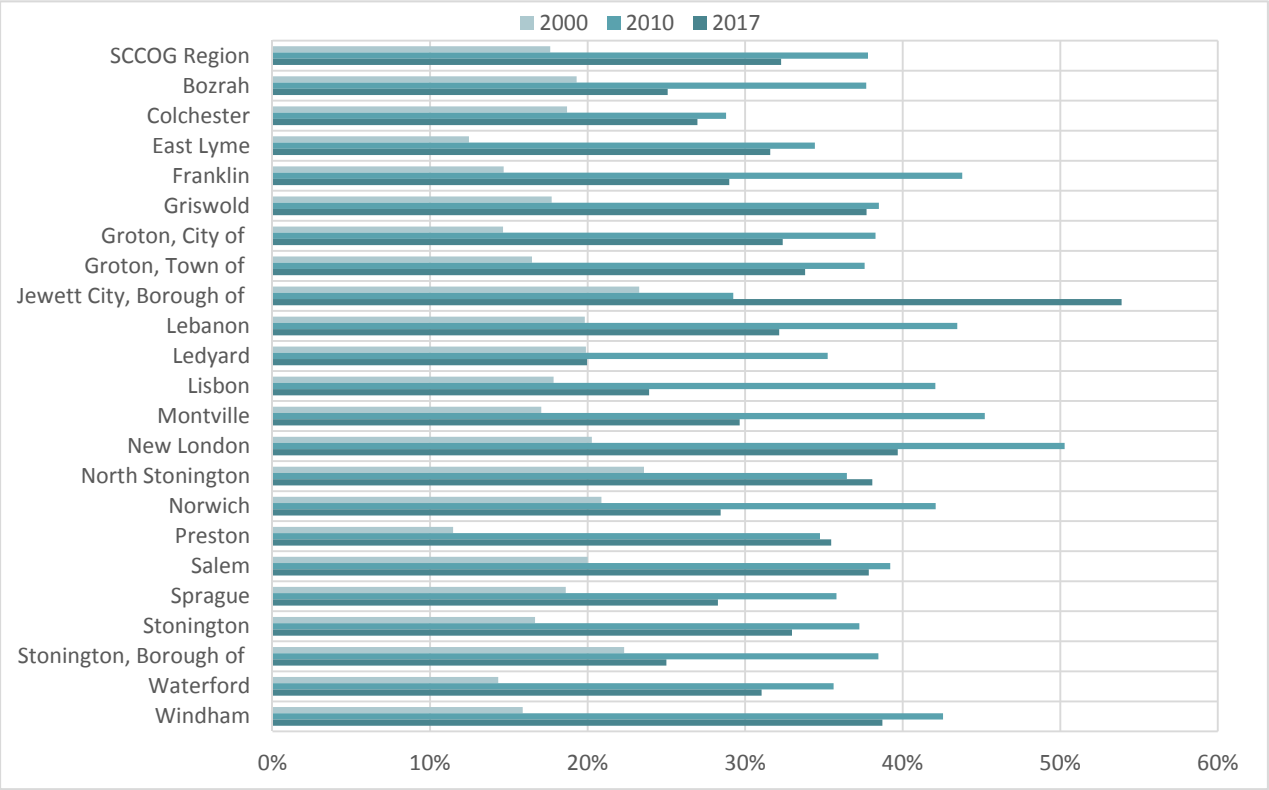
Source: US Census Bureau, 2000 Summary File 3 & ACS 2006-2010 and 2013-2017 5-Year Estimates

Share of Renter Households Spending 30% or More of Income on Housing, 2000-2017



Source: US Census Bureau, 2000 Summary File 3 & ACS 2006-2010 and 2013-2017 5-Year Estimates

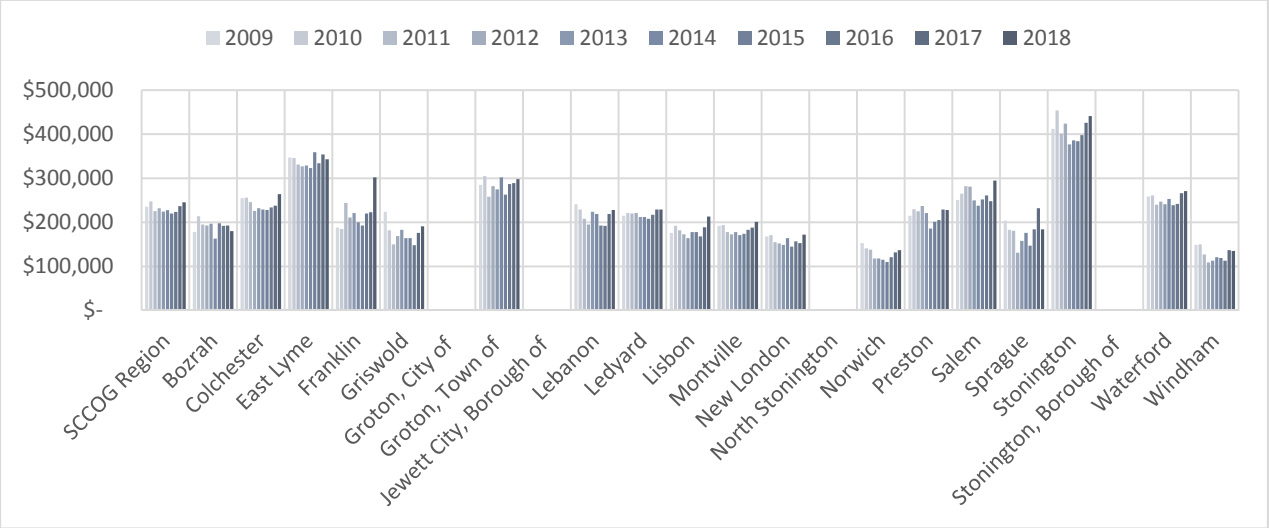
Share of Homeowner Households with a Mortgage Spending 30% or More of Income on Housing, 2000-2017



Source: US Census Bureau, 2000 Summary File 3 & ACS 2006-2010 and 2013-2017 5-Year Estimates

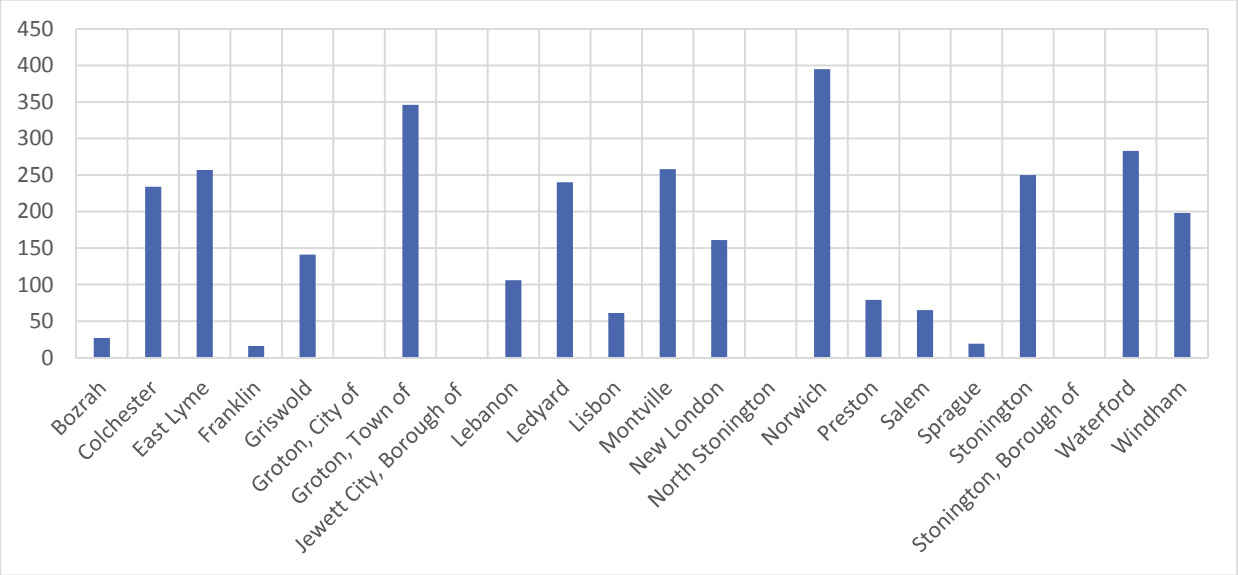
Residential Real Estate Trends

Average Single Family Home Sales Price, 2009-2018



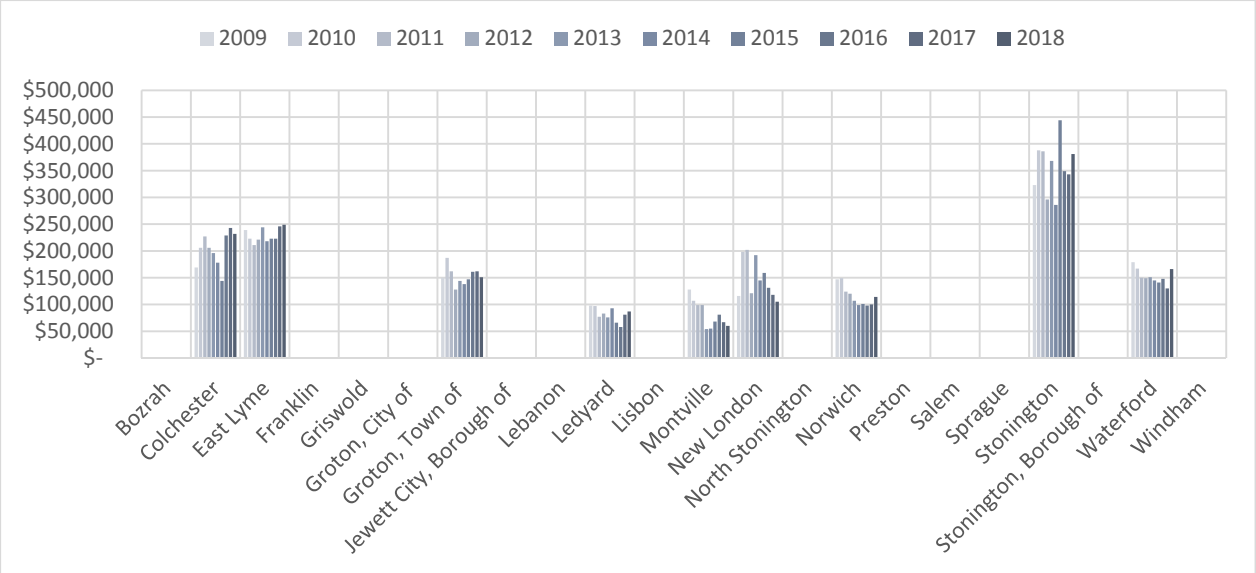
Note: No sales data was available for the City of Groton and Boroughs of Jewett City and Stonington.
Source: Berkshire Hathaway Home Services, 4Q 2018 Market Report

Single Family Home Annual Sales, 2018



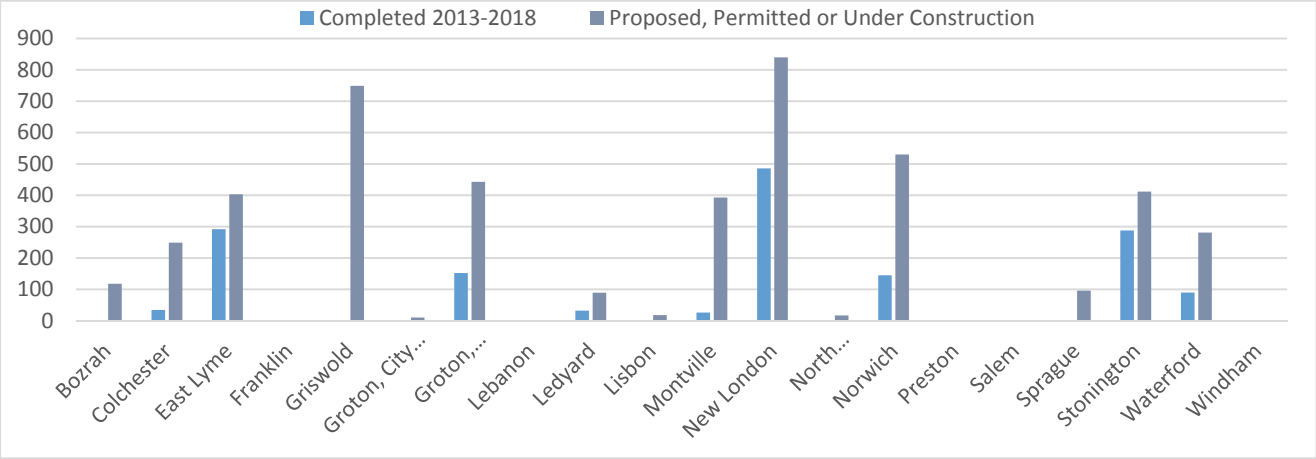
Note: No sales data was available for the City of Groton and Boroughs of Jewett City and Stonington.
Source: Berkshire Hathaway Home Services, 4Q 2018 Market Report

Average Condominium Home Sales Price, 2009-2018



Note: No sales data was available for the City of Groton and Boroughs of Jewett City and Stonington.
Source: Berkshire Hathaway Home Services, 4Q 2018 Market Report

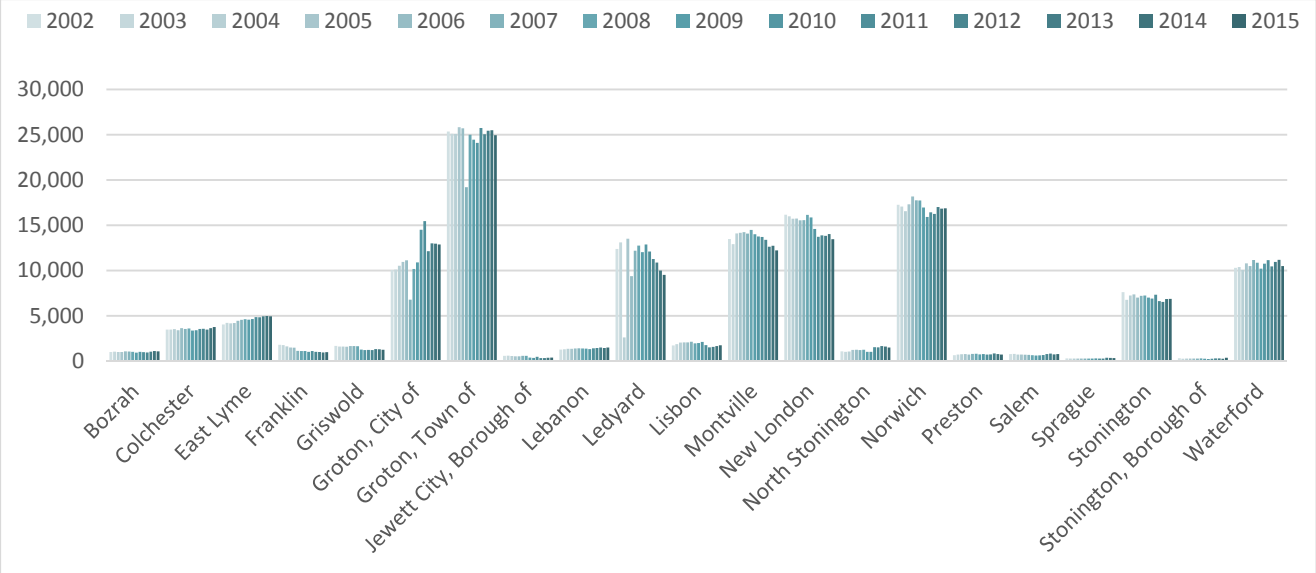
Residential Units Recently Constructed or in the Pipeline



Source: SCCOG Region Municipal Planning Departments, 2018

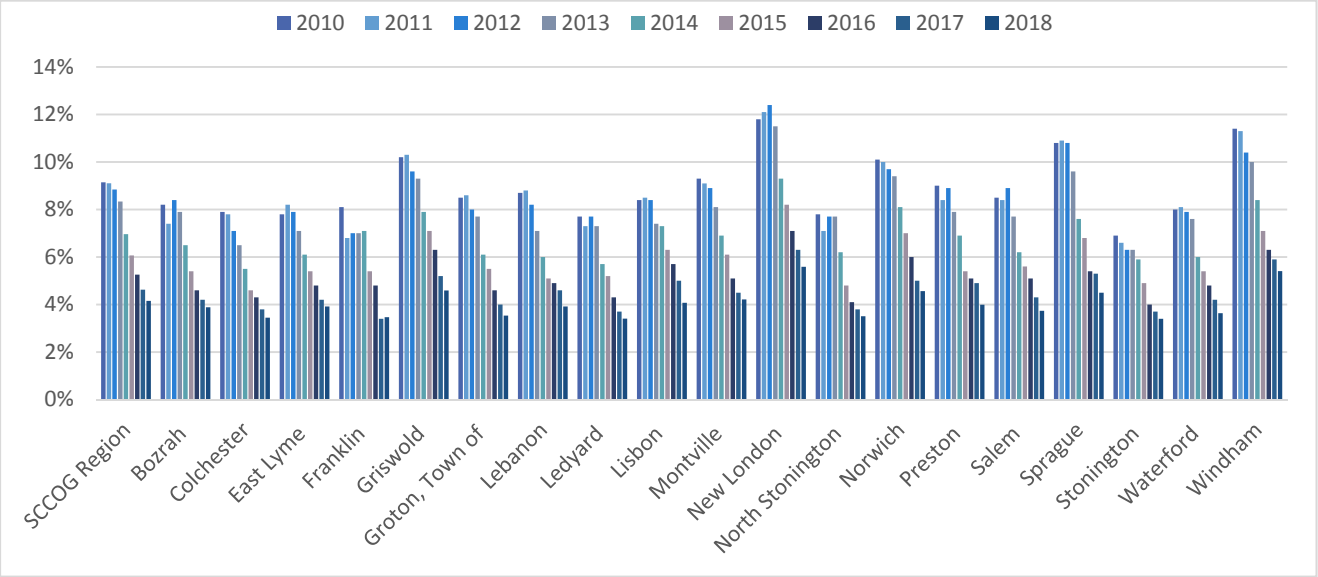
Employment Trends

Annual Employment, 2002-2015



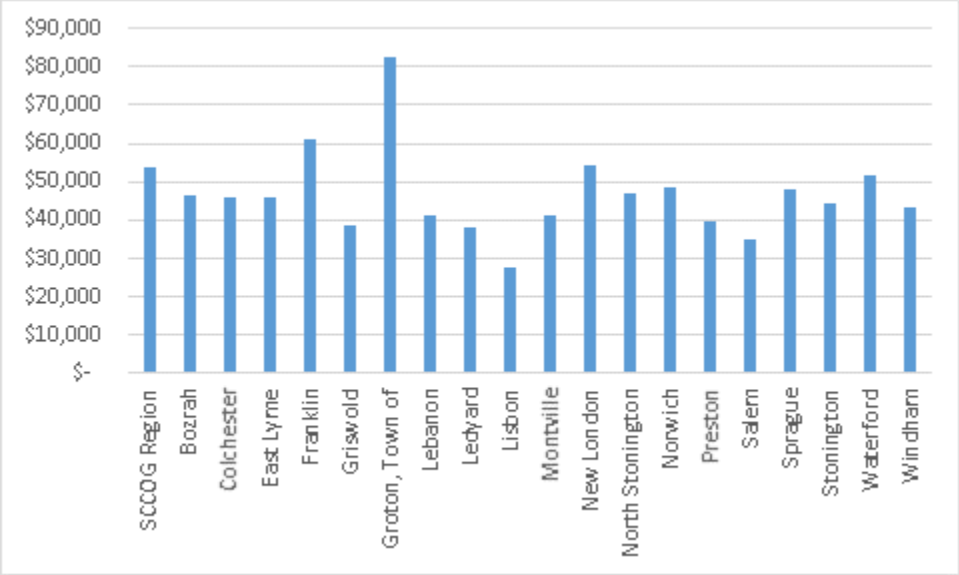
Source: US Census Bureau, Longitudinal Employer-Household Dynamics Program, 2015

Annual Average Unemployment Rates, 2010-2018



Source: CTDOL, LAUS Program, 2010-2018

Average Annual Wages, 2017



Source: CT Department of Labor, Quarterly Census of Employment and Wages, 2017

Note: Average wage data is sourced from the QCEW, which is only available at the County Subdivision (Town) level in Connecticut. As a result no data is available for smaller-level geography, including the City of Groton, Borough of Stonington, and Borough of Jewett City.

Commercial Real Estate Trends

Commercial Buildings Available for Lease by Type and Total Square Feet, 2019

		Single Use			Mixed-Use			
	All Types	Office	Retail	Industrial	All Mixed-Use Types	Office / Retail	Flex-Office / Industrial	Retail / Housing
SCCOG Region	**1,610,503**	**180,293**	**98,755**	**684,690**	**683,729**	**389,437**	**234,544**	**-**
Bozrah	25,840			21,840	4,000		4,000	
Colchester	3,180				3,180	3,180		
East Lyme	74,344	5,520	3,254		65,570	5,570	45,000	
Franklin	409,433	42,664	900	396,650	6,183	6,183	36,964	
Griswold								
Groton, City of	34,258	9,412			24,846	24,846		
Groton, Town of	144,828	43,613	3,302	29,000	68,913	29,801	14,000	
Jewett City, Borough of								
Lebanon								
Ledyard	4,337	4,337						
Lisbon								
Montville	14,566		1,766		12,800	10,400	2,400	
New London	141,760	58,797	13,290		69,673	18,673		
North Stonington								
Norwich	524,751	14,000	4,800	235,600	270,351	144,471	120,280	
Preston								
Salem								
Sprague	2,056		2,056					
Stonington	150,031		33,858	1,600	114,573	100,273	14,300	
Stonington, Borough of	500				500	500		
Waterford	53,534	18,865		18,900	15,769	2,150	11,000	
Windham	95,185	1,950	37,295		55,940	55,940		

Source: Connecticut Economic Resource Center, CERC Sitefinder, Retrieved on 1/9.2019

Commercial Buildings Available for Lease by Type and Number of Listings, 2019

	All Types	Single Use			Mixed-Use			
		Office	Retail	Industrial	All Mixed-Use Types	Office / Retail	Flex-Office / Industrial	Retail / Housing
SCCOG Region	**106**	**32**	**13**	**10**	**52**	**33**	**12**	
Bozrah	2			1	1		1	
Colchester	1				1	1		
East Lyme	8	1	1		6	2	3	
Franklin	7	2	1	3	2	2	1	
Griswold								
Groton, City of	4	2			2	2		
Groton, Town of	26	12	2	2	10	5	1	
Jewett City, Borough of								
Lebanon								
Ledyard	2	2						
Lisbon								
Montville	3		1		2	1	1	
New London	20	10	4		6	5		
North Stonington								
Norwich	14	1	1	2	10	7	2	
Preston								
Salem								
Sprague	1		1					
Stonington	10		1	1	8	6	2	
Stonington, Borough of	1				1	1		
Waterford	8	3		1	4	2	1	
Windham	4	1	1		2	2		

Source: Connecticut Economic Resource Center, CERC Sitefinder, Retrieved on 1/9/2019

Commercial Buildings Available for Lease by Type and Average Annual Leasing Price per Square Foot, 2019

City	All Types	Single Use			Mixed-Use			
		Office	Retail	Industrial	All Mixed-Use Types	Office / Retail	Flex-Office / Industrial	Retail / Housing
SCCOG Region	**$11**	**$13**	**$11**	**$3**	**$14**	**$16**	**$10**	
Bozrah	$6			$0	$6		$6	
Colchester	$15				$15	$15		
East Lyme	$10	$2	$23		$10	$6	$12	
Franklin	$3	$9	$14	$3	$11	$11	$8	
Griswold								
Groton, City of	$12	$11			$12	$12		
Groton, Town of	$14	$16	$35	$9	$14	$12	$15	
Jewett City, Borough of								
Lebanon								
Ledyard	$5	$5						
Lisbon								
Montville	$11		$10		$12	$14	$4	
New London	$15	$16	$20		$13	$10		
North Stonington								
Norwich	$14	$20		$6	$14	$19	$10	
Preston								
Salem								
Sprague	$9		$9					
Stonington	$17		$30	$11	$14	$15	$8	
Stonington, Borough of	$28				$28	$28		
Waterford	$7	$7	$0	$0	$8	$11	$6	
Windham	$16	$20			$17	$17		

Source: Connecticut Economic Resource Center, CERC Sitefinder, Retrieved on 1/9/2019

Commercial Buildings Available for Sale by Type and Total Square Feet, 2019

City	All Types	Single Use			Mixed-Use			
		Office	Retail	Industrial	All Mixed Use Types	Office / Retail	Flex-Office /Industrial	Retail / Housing
SCCOG Region	**920,260**	**221,860**	**133,096**	**119,868**	**501,650**	**230,668**	**122,957**	**26,439**
Bozrah	21,840			21,840				
Colchester								
East Lyme	8,869		1,357		7,512	7,512		
Franklin	60,962	36,964		51,650	9,312	3,312	42,964	
Griswold	5,000				5,000	5,000		
Groton, City of	20,102				20,102	20,102		
Groton, Town of	98,215	66,313	1,200		30,702	27,666	3,036	
Jewett City, Borough of	5,000				5,000	5,000		
Lebanon	2,452				2,452	2,452		
Ledyard	7,488				7,488		7,488	
Lisbon								
Montville	169,660	8,400		9,660	160,000		8,400	
New London	88,646	9,524	31,623	5,402	42,097	14,472		17,825
North Stonington								
Norwich	315,595	97,578	26,621	31,316	170,930	141,767	36,721	3,292
Preston								
Salem	8,000				8,000			
Sprague	5,853				5,853	531		5,322
Stonington	12,404				12,404	12,404		
Stonington, Borough of								
Waterford	41,239	3,081	35,000		3,158	3,158		
Windham	74,037		37,295		36,742	12,394	24,348	

Source: Connecticut Economic Resource Center, CERC Sitefinder, Retrieved on 1/9/2019

Commercial Buildings Available for Sale by Type and Number of Listings, 2019

City	All Types	Single Use			Mixed-Use			
		Office	Retail	Industrial	All Mixed-Use Types	Office / Retail	Flex-Office /Industrial	Retail / Housing
SCCOG Region	**82**	**19**	**13**	**8**	**45**	**31**	**10**	**4**
Bozrah	1			1				
Colchester								
East Lyme	5		2		3	3		
Franklin	4	1		2	2	1	2	
Griswold	1				1	1		
Groton, City of	1				1	1		
Groton, Town of	12	6	1		5	4	1	
Jewett City, Borough of	1				1	1		
Lebanon	1				1	1		
Ledyard	1				1		1	
Lisbon								
Montville	3	1		2	1		1	
New London	17	3	6	1	7	4		2
North Stonington								
Norwich	24	6	2	2	15	11	4	1
Preston								
Salem	1				1			
Sprague	2				2	1		1
Stonington	2				2	2		
Stonington, Borough of								
Waterford	4	2	1		1	1		
Windham	4		1		3	2	1	

Source: Connecticut Economic Resource Center, CERC Sitefinder, Retrieved on 1/9/2019

Commercial Buildings Available for Sale by Type and Average Sales Price per Square Foot, 2019

	All Types	Single Use			Mixed-Use			
		Office	Retail	Industrial	All Mixed-Use Types	Office / Retail	Flex-Office /Industrial	Retail / Housing
SCCOG Region	**$59**	**$69**	**$74**	**$50**	**$53**	**$83**	**$46**	**$46**
Bozrah	$45			$45				
Colchester								
East Lyme	$120		$55		$131	$131		
Franklin	$54	$50		$48	$86	$83	$55	
Griswold	$60				$60	$60		
Groton, City of	$60				$60	$60		
Groton, Town of	$104	$108	$163		$93	$94	$82	
Jewett City, Borough of	$60				$60	$60		
Lebanon	$102				$102	$102		
Ledyard	$29				$29		$29	
Lisbon								
Montville	$19	$51		$78	$16		$51	
New London	$74	$111	$82	$42	$63	$88		$29
North Stonington								
Norwich	$63	$45	$82	$49	$76	$83	$59	$68
Preston								
Salem	$100				$100			
Sprague	$93				$93	$165		$86
Stonington	$54				$54	$54		
Stonington, Borough of								
Waterford	$67	$144	$56		$114	$114		
Windham	$47		$75		$18	$37	$8	

Source: Connecticut Economic Resource Center, CERC Sitefinder, Retrieved on 1/9/2019

Commercial Land Available for Sale by Type and Number of Acres, 2019

	All	Office	Retail	Industrial	Multi-Family	Accommodations/ Recreation
SCCOG Region	**2,171**	**558**	**795**	**1,354**	**399**	**565**
Bozrah	154.01	7.01	154.01	147		
Colchester	70.28	5.28	70.28			3.35
East Lyme	85.1	1.93		1.93	83.17	1.93
Franklin	236.37	64.77	97.6	222.57	8.8	
Griswold	171.74	162.74	171.74	171.74		27.97
Groton, City of						
Groton, Town of	22.25	16.54	15.6	0.52	19.76	14.05
Jewett City, Borough of						
Lebanon	87.11	22.11	22.11	22.11	87.11	
Ledyard	188.18	14.99		178.99	9.19	164
Lisbon	5	5	5			
Montville	187.84	8.2	17.2	83.89	86.75	
New London	2.65	2.65	2.65		2.65	2.65
North Stonington	208.55	2.96	68.55	2		140
Norwich	182.54	150.75	68.18	150.89	84.54	44.8
Preston	1.03		1.03			
Salem						
Sprague	148					148
Stonington	14.54	0.21	0.21			
Stonington, Borough of						
Waterford	343.97	47.24	47.24	325.32	16.64	16.64
Windham	62.22	46.11	53.93	47.26		1.15

Note: Individual properties may be counted under multiple use types.

Source: Connecticut Economic Resource Center, CERC Sitefinder, Retrieved on 1/9/2019

Commercial Land Available for Sale by Type and Number of Listings, 2019

	All	Office	Retail	Industrial	Multi-Family	Accommodations/ Recreation
SCCOG Region						
Bozrah	2	1	2	1		
Colchester	3	2	3			1
East Lyme	2	1		1	1	1
Franklin	12	6	4	10	1	
Griswold	3	2	3	3		1
Groton, City of						
Groton, Town of	6	5	4	1	2	1
Jewett City, Borough of						
Lebanon	2	1	1	1	2	
Ledyard	4	2		3	1	1
Lisbon	1	1	1			
Montville	11	4	4	4	3	
New London	1	1	1		1	1
North Stonington	4	2	3	1		1
Norwich	17	10	8	7	6	1
Preston	1		1			
Salem						
Sprague	1					1
Stonington	2	1	1			
Stonington, Borough of						
Waterford	8	3	3	6	1	1
Windham	7	2	5	3		1

Note: Individual properties may be counted under multiple use types.

Source: Connecticut Economic Resource Center, CERC Sitefinder, Retrieved on 1/9/2019

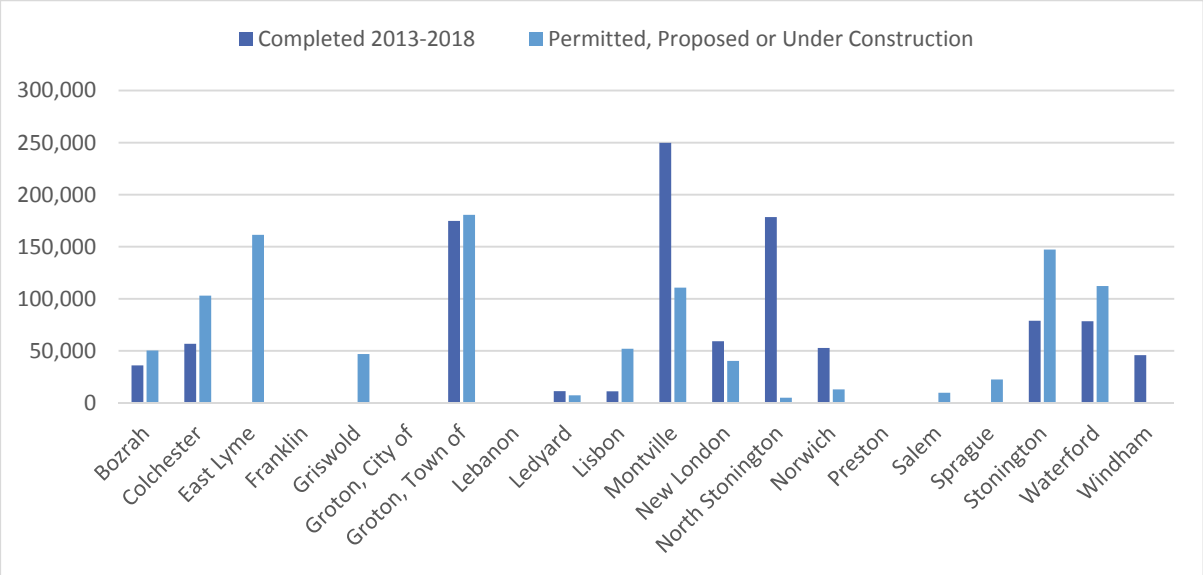
Commercial Land Available for Sale by Type and Average Sales Price per Acre, 2019

	All	Office	Retail	Industrial	Multi-Family	Accommodations/ Recreation
SCCOG Region	**$725**	**$607**	**$918**	**$709**	**$490**	**$890**
Bozrah	$1,073	$675	$1,073	$1,470		
Colchester	$732	$598	$732			$595
East Lyme	$1,330	$160		$160	$2,500	$160
Franklin	$486	$292	$860	$534	$149	
Griswold	$1,990	$2,650	$1,990	$1,990		$1,800
Groton, City of						
Groton, Town of	$237	$215	$166	$105	$325	
Jewett City, Borough						
Lebanon	$407	$525	$525	$525	$407	
Ledyard	$423	$510		$510	$250	
Lisbon	$995	$995	$995			
Montville	$482	$811	$901	$153	$280	
New London	$1,495	$1,495	$1,495		$1,495	$1,495
North Stonington	$1,910	$169	$1,946	$180		$1,800
Norwich	$378	$346	$477	$424	$283	$162
Preston	$1,545		$1,545			
Salem						
Sprague	$1,050					$1,050
Stonington	$738	$375	$375			
Stonington, Borough						
Waterford	$1,072	$858	$858	$1,267	$900	$900
Windham	$803	$1,100	$975	$749		$48

Note: Individual properties may be counted under multiple use types.

Source: Connecticut Economic Resource Center, CERC Sitefinder, Retrieved on 1/9/2019

Commercial Building Square Feet Recently Constructed or in the Pipeline



Source: SCCOG Region Municipal Planning Departments, 2018

APPENDIX B

PUBLIC WORKSHOP SUMMARIES

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PUBLIC ENGAGEMENT EVENT #1 SUMMARY

SUBASE New London JLUS Implementation Project
Southeastern Connecticut Council of Governments (SCCOG)

January 29, 2019, 7:00 PM - 9:00 PM

Groton Public Library

On Tuesday January 29, 2019, the Southeastern Connecticut Council of Governments, with its consultants BFJ Planning, Urbanomics, ASG Planning, and Tighe & Bond, held the first of two public engagement events for the SUBASE New London JLUS Implementation Project. The event was held at the Groton Public Library, and attended by approximately 60 members of the public, elected officials, and members of the steering committee. The workshop started with a presentation on the study's goals and the existing regional housing market, demographics, road network and transit options. Following the presentation, the project team solicited public feedback during a question and answer period moderated by James Butler, Executive Director of SCCOG.

The purpose of this meeting was to introduce the scope and purpose of the SUBASE New London JLUS Implementation Project, and gain feedback from members of the public on existing conditions and strategies that the final report will produce to address regional impacts projected as a result of the influx of new employees at Electric Boat (EB).

Mr. Butler opened the public workshop with introductory remarks explaining the purpose of the study and role of the consultant team and steering committee. Frank Fish, Principal of BFJ Planning; Tina Lund, Principal of Urbanomics; Chris Granatini, Senior Project Manager at Tighe & Bond; and Anne Galbraith, Principal of ASG Planning, presented an overview of the project scope and timeline and existing conditions in the region.

Following the presentation, Mr. Butler moderated a question and answer session. Members of the consultant team and SCCOG representatives responded directly to questions from the audience, as outlined on the following pages.

Presentation

Frank Fish, BFJ Planning, introduced the steering committee, consultant team, and scope and timeline of the project. The SUBASE New London JLUS Implementation Project will build upon the work of previous planning efforts, including a 2015 SEAT Bus Study, the 2017 SCCOG Regional Plan of Conservation and Development, the 2018 Southeastern Connecticut Housing Needs Assessment, and – most directly – the 2017 Joint Land Use Study. The Implementation Project currently underway is a two-phased effort. The first phase, which is the subject of the BFJ team's work and the focus of the public workshop, will analyze potential regional impacts of expanded activities at SUBASE New London and EB, with a focus on housing and transportation. The second phase, which will be completed by Horsley Witten in a separate project, is an assessment of local economic and market conditions in the immediate vicinity of SUBASE New London, resulting in proposed zoning revisions

Mr. Fish discussed the timeline of the BFJ team's work, which is currently in the stakeholder engagement and analysis of existing and future conditions phase. The consultant team has begun meeting with stakeholders from the SUBASE and EB, and has had its first meeting with the committee. Ongoing stakeholder outreach, an additional two committee meetings, and a public workshop to be announced will follow. The study will conclude in September 2019, with two major outcomes: a housing plan (proposed future housing supply to meet demand), and a transportation and transit improvements plan. The final document will present a menu of strategies that SCCOG's 22 member towns can reference as changes occur in the region.

Tina Lund, Urbanomics, discussed regional demographic and housing trends. Initial research of existing conditions indicates that the region's overall population has recently decreased, while the median age has increased. Population density is clustered around the shoreline in New London, Groton, and the Thames River in Norwich. In the SCCOG region, Ledyard has the highest median household income in the region, with the lowest median household income in New London. Housing vacancy has been on the rise in the region, up from just over 5% in 2000 to 8.5% in 2017, and areas with lower home values have higher vacancy rates. Median home value has decreased in the region, but housing costs remain a high percentage of household income for both homeowners and renters. Benchmarked population forecasts indicate a modest increase in population in the SCCOG region, independent of EB growth. There are over 5,000 residential units in the pipeline in Southeastern Connecticut, and 2.2 million square feet of commercial projects are approved, proposed, or under construction. Unemployment in the region has decreased steadily since 2010. In the Town of Groton, approximately 30% of workers live and work in Groton, with the remainder leaving the Town for work. About 80% of those who work in Groton come from other towns. This leads to consideration of the regional transportation network.

Chris Granatini, Tighe & Bond, described the vehicular transportation network in the SCCOG region. Traffic volumes are heaviest on I-95, and areas of heaviest congestion generally align with major traffic generators in the region. These include local shopping centers, institutions, job centers, and parks. Data indicate that commuters are generally able to travel solid distances during peak hours. Workers living as far as Westerly, RI, or Old Lyme, CT are generally able to reach Groton in 20 minutes during morning and

afternoon peaks. Vehicular crash data for the region show the majority of crashes occurring on major roadways in areas of higher traffic.

Anne Galbraith, ASG Planning, discussed transit options and alternative travel modes in the region. Overall, transit use is low in Southeastern Connecticut, and the majority of people (80%) commute by car. SEAT bus service in the region has undergone recent improvements, and a 2015 study provided options for future modifications to streamline routes. There have been efforts to improve bike and pedestrian infrastructure in the region, and SCCOG is currently working on its first bike/pedestrian plan. Other alternative modes of transportation include car and vanpools, Uber/Lyft, private employer shuttles and rail. However, these modes of transportation are limited in the region, and make up only a small portion of current commuting.

At the end of the presentation, Mr. Fish discussed next steps, including a workshop in the spring of 2019 (likely to be scheduled in May or June). Mr. Fish and Mr. Butler then opened the floor to questions, discussed in the next section.

Public Comments

Transportation related comments:

1. Could you speak to transit oriented housing and its benefits? How does that service the needs of the community?
    a. Haven't formulated recommendations yet. Housing near transit lines will be a consideration.
    b. Low density environment and SUBASE/EB employment is scattered – TOD could locate employees/workers in one area.
2. Will the study look at considerations for water transit?
    a. Thames River Heritage Park foundation has operated ferry for 3 years sponsored by Groton Town/City and New London. Water taxi is intended to be a tourist/resident attraction, linking historic venues along the river (e.g. Fort Griswold, Fort Trumbull). Runs during summer months only.
    b. Have talked to EB about water taxi, but they don't have a dock to accommodate, and they're not interested in water taxis docking in the EB shipyard. Security concerns – they don't want employees traveling with the greater public with secure documents.
    c. There is potential to run up to the Nautilus Memorial; dock will be built there in the near future. Potential to use the Thames for commuting could be considered.
    d. When the DOT notified SCCOG they were shutting down pedestrian path on the Goldstar Bridge, SEAT made up for this during the closure. This indicates demand for cross-river commuting.
3. Is there a way to reduce the incidence of vehicular transportation? Can this be incorporated as a goal of the project? Biking is not safe.
    a. Won't be expanding transportation infrastructure/roadways in the near future.
    b. SCCOG is updating the long range transportation plan for the region, identifying the region's goals, not recommending new roads.
    c. It is a goal of the project to get people to take other modes of transit to work.

4. Study should look at where people at EB currently live – most don't live in town of Groton. Understanding that, commuting is important, give you an idea of the trends going forward. Also, a train from Norwich to Groton could be useful, and biking is possible 10 months a year.
    a. The rail line – P&W is a freight line and potential passenger service has been discussed but there has not historically been interest – this could be looked at again.
    b. SCCOG is doing its first pedestrian and bike plan. There aren't a lot of bike facilities in the region, in urban centers there are sidewalks.
5. Seasonal coastline traffic influx is extensive, community's population increases. Preston Landing will bring more traffic in, should be considered.
    a. Preston Landing will be considered.
6. Lyft and Uber – this is on the forefront, should be considered. The housing market itself will determine what will be built/will work.
    a. One goal of the study is to help inform the market. It's a matter of informing the communities of where they're likely to see market demand to give them an idea of how to form policies to address this. Can include a look at what new residents are looking for in new housing.
    b. Use of transit is trending down, more people owning cars because gas is cheap, economy is good and ride-share is on the rise. It is expensive to commute via Uber/Lyft, but some do. More commonly, it supplements the public transportation network. A lot of places around the country are attempting to partner with ride-sharing apps with subsidized Uber/Lyft in more rural parts of transit systems.

Housing related comments:

7. Historical perspective – what was the employee rate for EB in its heyday? Did it exceed 20,000 employees? Where were those people living?
    a. Study team will confirm the historical peak. Should be noted that SEAT bus was created due to demand by EB employees many years ago. EB is now in New London as well, which changes the picture somewhat.
8. When EB had large employment numbers, how many people worked there? What if EB contracts again? Concern about over-development and negative factors like additional traffic, impacts on air quality. TOD and additional opportunities for people who rely on public transit – more population is moving to cities. These factors should be considered.
    a. How much housing will actually be required for new staff? Is it already there? TOD could be a good solution for some additional housing needed, e.g. seniors looking to leave their single family homes and young professionals. Also will look at helping homeowners do rehab on their homes to make them more saleable. The intention is not to recommend lots of new housing that will in 30 years be vacant.
    b. Policies – people have low mode share and low number of people who are using transit. Most people have a car and get free parking at work.
    c. The team is aware that EB has secured various contracts with the Navy for the next 10 years to design and build Columbia-class and Virginia-class submarines. The shipyard has other contracts as well, employment should be high for the foreseeable future.

9. Looking at current capacity and demand, what future demand will be and how to achieve it? Can we go further and see how to attain that capacity? EB trade-level employees are lower salaried workers, but development in the pipeline is for the higher end.
    a. Will be looking at price points and best strategies.
    b. Employees could be at different salary levels, this will be considered.
10. Vacancies – how are these defined? Is a house for sale vacant? Where is this data from?
    a. Housing for sale, for rent or just empty not for sale or rent. Data is from the Census Bureau. Next step will be to do outreach with realtors in the area.
11. Housing should go in places where there is already infrastructure. Revitalizing and reusing New London will be better than urban sprawl. Taxes in New London are what hold people back; if this were to change, more people would want to live there and there would be a greater tax base, which would help New London improve and revitalize.
    a. The study will look at urban centers, as well as other towns. There is interest in TOD and we want to encourage transit use.
12. Does the study include manufactured housing? Banks won't give loans for this, but there are units for sale for $5,000-15,000. Good stock of housing for a lot of people.
    a. The study will look at all types of housing as a potential to meet demand.
13. Scope is based on housing and transportation and historic trends. Opportunities now with new folks coming in – what are they expecting of the community, e.g. better Internet bandwidth? People are interested in walking, biking, these are important, but need to look at other infrastructure, school systems for families, and activities for young people and how that will affect traffic flow. Concerns about building for what we think they will want, then there's a downturn and it's not what's right for those who are left.
    a. Study is narrowly defined by the funding source. Other efforts, including the Chamber of Commerce Community Concierge program, set up to welcome people moving into the region – for new employees coming in to connect them with existing resources in the region. Offshoot of SE CT Cultural Coalition work done a few years ago.
    b. Consultants will talk to HR and management/union liaison person at EB to get in touch with existing employees and recent hires to gain their interests in location, types of housing, how they're getting to work, etc.

Other comments:

14. Will you meet with banks? They will need to finance projects.
    a. Project team to reach out to local banks for their perspective.
15. Quality of life side of the project – the SUBASE – talk to family relations, they are a transient population and may have different needs.
16. High mill rates in New London and Norwich – is there any thought on how proposed tolls may affect this. Would be approximately $300 per year.
    a. The State is years away from that situation. There is a lot that will happen between now and then. Many unknowns about how tolling could work.
17. Will there be an opportunity to attend committee meetings?
    a. Yes, the website will have information. All information can go through Jim Butler.
    b. All meeting items are on Facebook and www.seccog.org
    c. Presentation will be on the JLUS and COG websites.

PUBLIC ENGAGEMENT EVENT #2 SUMMARY

SUBASE New London JLUS Implementation Project
Southeastern Connecticut Council of Governments (SCCOG)

July 15, 2019, 7:00 – 9:00 PM

City of Groton Municipal Building

On Monday July 15, 2019, the Southeastern Connecticut Council of Governments (SCCOG), with its consultants BFJ Planning, Urbanomics, ASG Planning, and Tighe & Bond, held the second of two public engagement events for the SUBASE New London JLUS Implementation Project. The event was held at the City of Groton Municipal Building, and attended by approximately 40 members of the public, elected officials, and members of the steering committee. The workshop started with a presentation on the existing conditions and projections for the future regional housing market, road network and transit options. Following the presentation, the project team solicited public feedback through roundtable discussions centered around the three planning areas: housing, transit and transportation. Each table discussed the topic area with a member of the consultant team and representatives from the steering committee. At the end of the discussion, a volunteer from each table summarized the key points discussed to the full group.

The purpose of this meeting was to discuss the consultant team's findings on the projected impacts resulting from the influx of new employees at Electric Boat (EB) on the housing, transit and road network in the region, and to gain feedback from members of the public that should be considered in addressing regional impacts.

James Butler, executive director of SCCOG, opened the public workshop with introductory remarks explaining the purpose of the study and role of the consultant team and steering committee. Frank Fish, Principal of BFJ Planning; Tina Lund, Principal of Urbanomics; Chris Granatini, Senior Project Manager at Tighe & Bond; and Anne Galbraith, Principal of ASG Planning, presented an overview of the existing conditions in the region and projections based on EB's future hiring.

Following the presentation, members of the public were invited to join roundtable discussions focused on one of three topics: housing, transit or transportation. Members of the consultant team and SCCOG

representatives moderated discussion at the tables and provided additional information on projections and concepts presented.

Presentation

Frank Fish, BFJ Planning, introduced the steering committee, consultant team, and scope and timeline of the project. The consultant team has met with the committee and various stakeholders, including the SUBASE and Electric Boat. Through stakeholder engagement and analysis of housing, transit and road network conditions, the consultants have put together a draft existing conditions report. The presentation covered these findings as well as initial projections for future conditions and potential concepts for improvements to the road network that will mitigate any potential congestion that new growth could generate. The study will conclude in September 2019, with a final report and a presentation to the SCCOG's 22 member municipalities.

Tina Lund, Urbanomics, discussed regional demographic and housing trends, including existing housing stock, location of EB employees, development in the pipeline, and the projected demand that will be generated by new employment figures. Research indicates that the new hires at EB and associated growth in other job sectors will help to stem recent population declines in the region, and will provide a "shot in the arm" to the housing market, where values have not recovered since the 2008 recession. As a result of the new hiring, EB and Navy employment from current submarine construction contracts will peak in 2029. Most of EB's facilities are fully staffed already, with remaining hiring planned to occur at the Groton facility. The net new hires will bring about 2,400 workers to EB and 500 sub crew members. Approximately 3,000 workers are anticipated to retire during this time period. Additional jobs expected to be generated as a result of secondary impacts of the new hiring will include another 0.9 jobs in related service industries in the region. Urbanomics examined two projections, a high growth and low growth scenario. In both cases, the change that will occur will be manageable and beneficial to the region, offsetting recent population decreases. In order to determine potential future housing needs in the region, Urbanomics looked at existing place of residence for EB employees, and projected out similar dispersion based on new employment figures. Larger concentrations of residents are expected in areas with greater existing density, such as New London, Groton and other Thames River towns. The consultant team collected data on residential projects in the pipeline to analyze how the real estate market is expected to meet this potential new demand. New development is anticipated to include more multi-family units, and appears to be growing in line with the region's projected needs. Increase in housing demand could have an additional beneficial impact on housing values in the region.

Chris Granatini, Tighe & Bond, described the projected impacts on the vehicular transportation network in the SCCOG region at-large and focused on targeted potential improvements based on new employment figures. Tighe & Bond analyzed traffic volumes to project average daily traffic increases, which will be low. The largest increases will occur where traffic is heaviest now, along I-95 and I-395. Targeted local improvements may be appropriate to address hot spots along local road networks. These may include complete street improvements, and bike and pedestrian measures that could facilitate greater connectivity across the Thames River. Additional congestion mitigation concepts include planned widening of I-95, improvements to the five corners intersection in Groton and creating a parking garage at the EB Groton facility. These concepts were discussed in greater detail at roundtables.

Anne Galbraith, ASG Planning, discussed the role of transit options and alternative travel modes in the region. The use of transit in the region is relatively low, but it is anticipated that new employment has

the potential to boost transit use. One objective of this study is to increase the effectiveness of the existing network of alternative travel modes. The SEAT bus study and JLUS recommended modifications remain relevant given the projected population and demographic shifts.

At the end of the presentation, Mr. Fish outlined the next steps for the rest of the meeting and discussed the consultant team's timeline moving forward. Mr. Fish invited members of the public to join a roundtable discussion and prepare a short overview of what was discussed for the final 10 minutes of the meeting. Following the meeting, the consultant team will work to draft a final report for the committee in late August. The final report will be presented to the SCCOG in early fall.

Public Comments

Following the presentation, members of the public joined a roundtable discussion led by members of the consultant team and committee. The discussions centered around three topics: transit, transportation and housing. Following approximately 45 minutes of discussion, a representative from each table reported back to the larger group what they had discussed. These comments are summarized below:

Transportation

- Discussion of the potential roundabout at the Five Corners intersection:
    - How would changing Chicago Street to one-way affect business?
    - The table discussed both positive and negative potential impacts of the roundabout. Positives would be higher capacity than having lights. There was also concern expressed over roundabout and property takings.
    - The table discussed questions about pedestrians and roundabouts – there are raised islands where pedestrians can wait halfway across for traffic to go through. This could be better for pedestrians than the current intersection.
- Mitchell Street – Reducing this to two lanes from three - what the impact would be? An EB traffic study says it's doable.
- Route 12 – discussion of improved/upgraded signals to make it more pedestrian friendly and more mobility-friendly. Some bike lanes have been added near the SUBASE.
- Discussion of how to make the area more pedestrian safe –
    - Support for raising intersections for pedestrian enhancement.
    - Question of adding a sidewalk on 649 from Poquonnock to Rainville and whether this is feasible and a sidewalk cutting through the woods from M lot to Rainville.
    - Trail connections to pedestrian bridge discussion.
    - Community connectivity grant could potentially fund some improvements.
    - Rainville is a state road, some concerns for finding funding.
- Converting North Street and others to more neighborhood oriented streets. Road diet to reduce to two lanes and adding a bike lane to slow things down.
- Parking garage down the street from EB would add 400 parking spaces- concern over how much this would clog up the neighborhoods.

Housing

- The two tables discussed the focus on multi-family units – the assumption is that retirees would move into multifamily units. However, the single family homes seniors/retirees would move out of would not be in the right price range for the EB average wages.
- It's difficult to know where EB workers are looking and what the price point could be. This is an important piece of the report. Question of what kind and where the housing units are needed.
- Is school choice being made available? This could increase people's ability to live in different areas.
- Subcontractors not accounted for in the multiplier – only service related. This could add to the number of jobs generated by new EB employment.
- Survey going out to EB employees should go to union and salary employees. Some concern over the purpose of the study – don't want it to determine where housing should go. Multi-family housing should be deliberately placed in town centers.
- The opportunity for more centers is important.
- Discussion of senior housing/empty nester housing. There are waitlists, high demand for this type of housing currently.
- Potential mismatch for EB workers – do they really want single family housing and can they afford it? Multi-family - there is a lot of demand from EB employees as well as empty nesters.
- Groton could replicate the success of New London's multifamily development.
- Discussion of where EB employees live, maybe think about incentivizing additional density, not just replicating the existing pattern.
- Look at the EB employees who live outside of the region – need to show these employees on the map.
- Accessory apartments – towns without sewer could use these in lieu of multi-family to increase density without adding new infrastructure.

Transit

- Transit is not widely used to get to work, discussion of how to get people to use it.
    - Subsidy, lowering the costs would be the number one way of improving this.
    - Faster transit would increase the usage.
    - Rail as an option would make people want to use it.
- Utilize existing rail infrastructure – connect New London and Westerly.
- Focus on centers – Groton Center, EB, New London, Norwich.
- Prepare for driverless technology. Microbuses and automated or on demand networks could take advantage of this.
- Build bicycle infrastructure. Adding bike routes and considering bikeshare could help.
- Leverage private sector wherever possible to help pay for these improvements.

The consultants will start producing draft final reports toward the end of August/beginning of September and will meet with the COG representatives this fall to discuss the results of the plan. Members of the public can reach out to SCCOG with questions or comments, which can be passed along to the consultants.

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APPENDIX C

SUMMARY OF PUBLIC INPUT
WITH RESPONSES

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Summary of Public Input with Responses

Employment

- Need to provide the historical context of EB employment, recognizing that employment for the current contracts will not reach the historical peak, and EB's facilities are now more dispersed than they were at that peak. Also need to show EB employees that live outside the region.
    - *This information is discussed in the final report.*

- Are the number of EB retirements being quantified? There may be programs that facilitate retirees moving to more suitable housing, which could open up housing stock for incoming residents.
    - *The anticipated EB retirements have been factored in to the analysis based on consultation with EB.*

- Have EB subcontractors been accounted for in the multiplier for secondary employment?
    - *The secondary employment multiplier incorporates service-related employment (retail, restaurants, personal-services). Employment related to increased hiring at subcontractors related to EB's Navy contracts is likely captured outside the region. However, the study team evaluated whether any such contractors are present in Southeastern Connecticut, and if so, potential impacts on that employment.*

- Request for a detailed demographic breakdown of EB employees, particularly those hired within the last two years.
    - *This information was requested from EB, but not provided due to privacy concerns.*

- Concerns raised about the ability of EB to attract enough workers from outside the region to fill the necessary jobs. Suggestion that the study should recommend investments in amenities to attract more workers.
    - *It is not the purpose of the study to identify strategies for EB to attract workers. The company indicated that it has an aggressive program to attract and retain talent. Other groups within the region are working on various initiatives to provide amenities and infrastructure for workforce development. These efforts will and should continue; however, they are outside the scope of this study.*

Housing

- Support for transit-oriented housing to service the needs of future employees and the existing community. This could be a good option for empty-nesters seeking to downsize. The study should encourage development to locate near transit lines.
    - *The current low-density environment of the Southeastern Connecticut region and the limited service of existing service makes true transit-oriented development (TOD) difficult. Data collected from the study indicate that Electric Boat employees are highly dispersed, and this broad pattern is likely to continue given buyer preferences and the availability of affordable housing. However, the study has examined where development is proposed and could occur given infrastructure and environmental constraints. Areas near developed centers and with available sewer are likely to receive most future development, and this*

situation should be encouraged to continue. The actual placement of future development is dependent on real estate market and the local zoning in place. It is not the purpose of this study to identify specific locations for future housing.

- Given past fluctuations of employment, the report should not recommend housing that will not be needed in the long-term.
    - *The report only looks at housing needs related to the specific EB contracts that are known at this time. As the analysis shows, substantial new housing will not be needed, based on the actual projected employment numbers and the residential development already approved or in the pipeline. However, the housing market may need to respond to reflect the preferences of residents in the region and their affordability constraints, and the report addresses the need for programs to assist homebuyers as well as owners who are looking to sell their homes but need rehab assistance.*

- How is vacant housing defined? Note that some of the region's housing is seasonal.
    - *The report relies on available Census data, supplemented with input from realtors in the region. The seasonality of the housing stock is considered.*

- Does the study look at manufactured housing? This could be a good affordable option.
    - *This type of housing is sometimes not permitted by municipal zoning. Specific recommendations on a town-by-town basis for where and how to permit housing are beyond the scope of this report.*

- The study should look at the potential for accessory apartments to be allowed in towns without sewer, in-lieu of multi-family, to increase density without adding infrastructure.
    - *Specific recommendations on a town-by-town basis for where and how to permit housing are beyond the scope of this report. In addition, accessory apartments, if allowed, would likely provide a minimal amount of housing at a regional scale.*

- The study should look at community amenities (e.g. school systems, wireless infrastructure, activities for young people) and whether these are appropriate both for new residents coming into the region and those that are already here. In addition, the SUBASE population is more transient and may have different needs.
    - *The study is narrowly defined by the funding source, and most of these types of amenities are beyond the scope. The consultant team did discuss desired amenities both with realtors and with HR representatives at EB, and also met with housing representatives of the SUBASE to better understand the needs of individuals and families living in base housing. These discussions are reflected in the final report.*

- Currently, EB workers are highly dispersed in the region, but the housing recently approved or in the pipeline is concentrated in just a few areas, and is all multi-family. Concerns were raised that this creates a mismatch in preferences (EB workers may prefer single-family homes), but also that EB trades workers may not be able to afford single-family homes in many areas. Others raised concerns

that younger workers may prefer to live in more urbanized areas. It was noted that there appears to be high demand for housing to serve seniors (empty-nesters) looking to downsize.

- *The regional housing market is complex, and people make housing choices based on a range of variables, including affordability, commutation, preferred style, age of housing, proximity to family, and schools. This study cannot predict where all EB workers will see to live, nor does it seek to dictate where they should live. The report finds that the real estate market appears to be able to respond adequately to housing demand in terms of raw numbers (i.e., the number of units approved/planned will meet the supply needed). However, it is recognized that new housing may not match all EB workers' price points or preferences, nor will the existing single-family housing stock (including housing being vacated by downsizing empty-nesters). The report recommends strategies to address issues of affordability as well as the need to rehab existing single-family homes.*

- Are any of the approved residential units designated for residents 55 and older?
  - *It does not appear that any of the housing units in the pipeline are age-restricted; however, it is anticipated that the multifamily units approved and planned will be attractive to seniors looking to downsize, whether or not they are specifically designated as senior housing.*

- Concern about the reliability of the units either approved or proposed actually being built, especially those units that are still pending approval.
  - *The data on units that have received approvals or have been proposed comes from SCCOG. While there can be no assurance that these units will be built, the assumption is that the approvals granted makes this likely, given the current economy and the investment made by the developers. The units "pending approval" come from consultation with planners/ economic development primarily in New London and the City/Town of Groton. While these are more speculative, the municipal staff have confidence that these residential proposals are both "real" and viable.*

Transportation

- Will the study look at considerations for water transit?
  - *The Thames River Heritage Park Foundation currently operates a seasonal water taxi service between New London and Groton, primarily as a tourist attraction. The consultant team discussed with Electric Boat the potential to expand this service to serve EB employees; however, the company has security concerns with its employees utilizing public transit, and is not interested in water taxis docking at the EB shipyard. Given the dispersed nature of the regional workforce, the fact that vehicular commute times are generally short, and the availability of free employee parking, the team concluded that a water taxi would have limited viability without significant subsidy.*

- Is there a way to reduce the incidence of vehicular transportation and can this be incorporated as a key goal of the project?
  - *The study has examined a number of ways to improve bicycle and pedestrian infrastructure, including concept plans for specific corridors and intersections.*

- Potential for improved rail service (e.g. between Norwich and Groton between New London and Westerly).
    - *While the study has identified some issues with existing rail service, opportunities for increased service are limited due to the highly dispersed nature of the regional workforce. Advocacy for service expansion or improvements are beyond the scope of the study.*

- Need to account for seasonal coastline traffic.
    - *Seasonal fluctuations are incorporated in the traffic analysis.*

- Need to consider opportunities for rideshare (Lyft and Uber) and bikeshare and prepare for driverless technology.
    - *These options were evaluated, as feasible, in the transit analysis.*

- Concepts for the Five Corners Intersection – concerns were raised about the impact of converting Chicago Street to one-way, the need for property takins, and pedestrian safety.
    - *This concept is one of two presented in the report that the City of Groton may consider, balancing potential positive vs. negative impacts and funding availability. Further study is needed.*

- How would reducing Mitchell Street impact traffic?
    - *This is one concept presented in the report that the City of Groton may consider, balancing potential positive vs. negative impacts and funding availability. Further study is needed.*

- A number of ideas were discussed to improve overall pedestrian conditions in the study area, including the potential for raised intersections, adding sidewalks, and improving trail connections. Further study is needed.
    - *A number of concepts are presented in the report for the Town and City of Groton to consider, balancing potential positive vs. negative impacts and funding availability. Further study would likely be needed.*

- Concerns were raised with constructing a parking garage at EB, with potential added traffic in the neighborhoods.
    - *This is one concept presented in the report that the City of Groton may consider, balancing potential positive vs. negative impacts and funding availability. Further study is needed.*

General

- Will the study team meet with banks? They will need to finance projects.
    - *The project team reached out to local banks for their perspective.*

- New London and Norwich have high mil rates. Is there any thought to how proposed tolls may affect this situation?
    - *These issues are beyond the scope of the study.*

- Survey to EB employees – this should go to union as well as salaried employees. Concerns also raised that the survey will not have enough questions to provide useful data (e.g. age of respondents).
    - *A short survey was developed to target both union and salaried workers at EB. In agreeing to distribute the survey, EB required that it be kept short (5-6 questions). One of the questions asked how long the respondent had been with EB; this was intended to get at the age of the respondent without expressly asking the age, as some respondents may not answer a direct question on age.*

- Any information on what the small businesses should do to market to the new population?
    - *That issue is outside the scope of this study.*

- Is sustainable development an official goal of this plan?
    - *This is not an "official" goal of the study, but it is a goal to increase the usage of transit modes and to inform the market as to where market demand is likely, to give municipalities a sense of how to formulate policies to encourage housing where it is appropriate.*

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APPENDIX D

HOUSING FORECASTS BY MUNICIPALITY

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Unconstrained Housing Demand Optimistic/High Scenario Forecasts + EB Employment

		Household Forecast				
	2017 Households	2020	2025	2030	2035	2040
Bozrah	1,018	1,068	1,111	1,154	1,188	1,216
Colchester	5,851	6,385	6,748	7,109	7,412	7,683
East Lyme	7,446	7,798	8,024	8,242	8,392	8,563
Franklin	723	739	749	758	763	764
Griswold	4,457	4,727	4,889	5,050	5,153	5,230
Groton	16,002	16,288	16,749	16,762	16,518	16,192
Lebanon	2,703	2,792	2,890	2,981	3,054	3,112
Ledyard	5,625	5,780	5,927	6,011	6,024	6,007
Lisbon	1,651	1,788	1,858	1,927	1,985	2,034
Montville	7,027	7,496	7,826	8,148	8,373	8,560
New London	10,984	10,975	11,071	11,167	11,275	11,328
North Stonington	2,000	2,136	2,189	2,233	2,265	2,287
Norwich	15,795	16,601	16,938	17,239	17,397	17,470
Preston	1,855	1,947	1,994	2,048	2,076	2,095
Salem	1,637	1,731	1,790	1,858	1,901	1,936
Sprague	1,185	1,191	1,198	1,202	1,200	1,191
Stonington	8,024	8,107	8,161	8,201	8,146	8,052
Waterford	7,896	8,136	8,127	8,102	7,976	7,812
Windham	8,685	9,093	9,192	9,271	9,296	9,275
SCCOG Region	110,564	114,778	117,434	119,463	120,392	120,808

Unconstrained Housing Demand Trend/Low Scenario Forecasts + EB Employment

		Household Forecast				
	2017 Households	2020	2025	2030	2035	2040
Bozrah	1,018	1,059	1,078	1,098	1,114	1,130
Colchester	5,851	6,330	6,544	6,763	6,954	7,143
East Lyme	7,446	7,731	7,780	7,841	7,872	7,966
Franklin	723	732	726	721	715	710
Griswold	4,457	4,687	4,744	4,810	4,841	4,871
Groton	16,002	16,116	16,325	16,145	15,795	15,449
Lebanon	2,703	2,768	2,802	2,836	2,864	2,893
Ledyard	5,625	5,730	5,749	5,724	5,658	5,593
Lisbon	1,651	1,772	1,801	1,833	1,861	1,890
Montville	7,027	7,432	7,589	7,755	7,860	7,964
New London	10,984	10,881	10,738	10,630	10,590	10,546
North Stonington	2,000	2,118	2,124	2,126	2,127	2,128
Norwich	15,795	16,459	16,423	16,401	16,321	16,243
Preston	1,855	1,931	1,937	1,953	1,954	1,955
Salem	1,637	1,716	1,736	1,768	1,785	1,802
Sprague	1,185	1,181	1,161	1,143	1,125	1,107
Stonington	8,024	8,038	7,914	7,805	7,645	7,491
Waterford	7,896	8,067	7,882	7,711	7,487	7,269
Windham	8,685	9,014	8,908	8,812	8,712	8,615
SCCOG Region	110,564	113,762	113,962	113,875	113,281	112,765

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APPENDIX E

RESULTS OF REALTOR AND ELECTRIC BOAT EMPLOYEE SURVEYS

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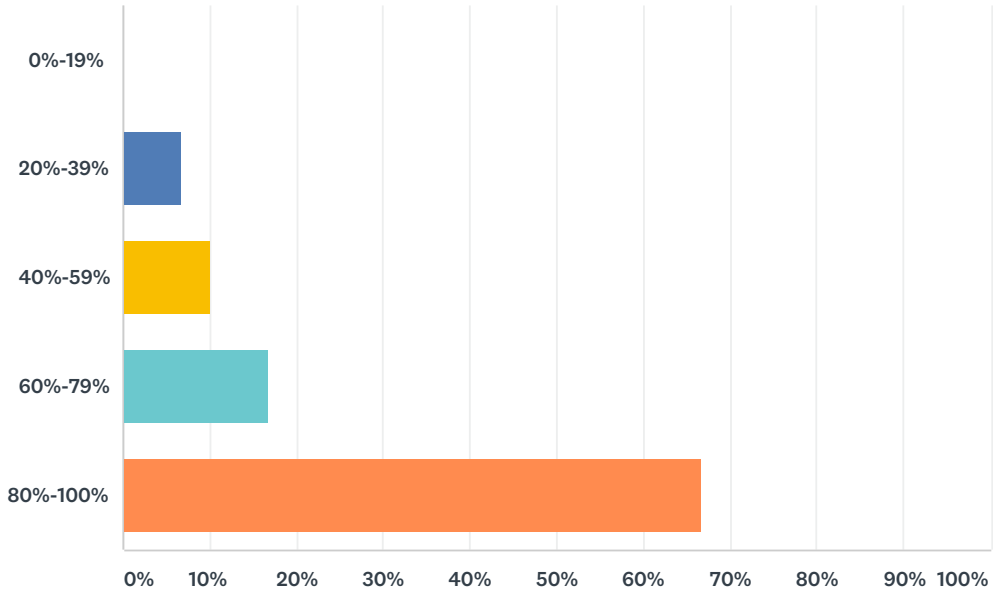
Q1 What percentage of your clients are seeking single-family homes?

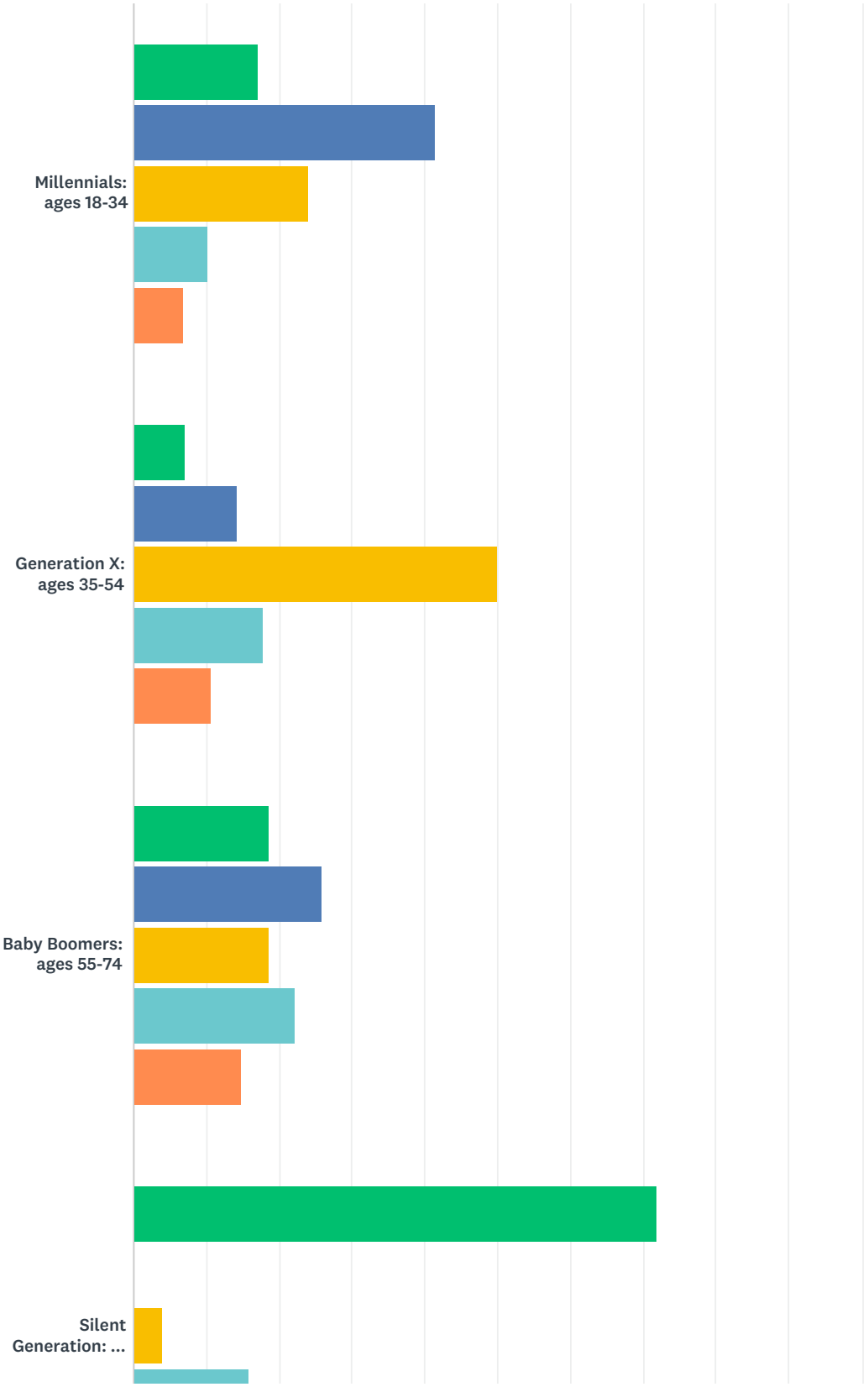
Answered: 30 Skipped: 1

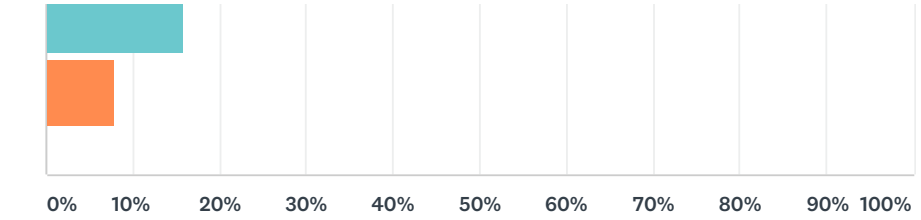


ANSWER CHOICES	RESPONSES	
0%-19%	0.00%	0
20%-39%	6.67%	2
40%-59%	10.00%	3
60%-79%	16.67%	5
80%-100%	66.67%	20
TOTAL		30

Q2 Please roughly estimate the share of clients seeking single-family homes by age of householder:

Answered: 30 Skipped: 1

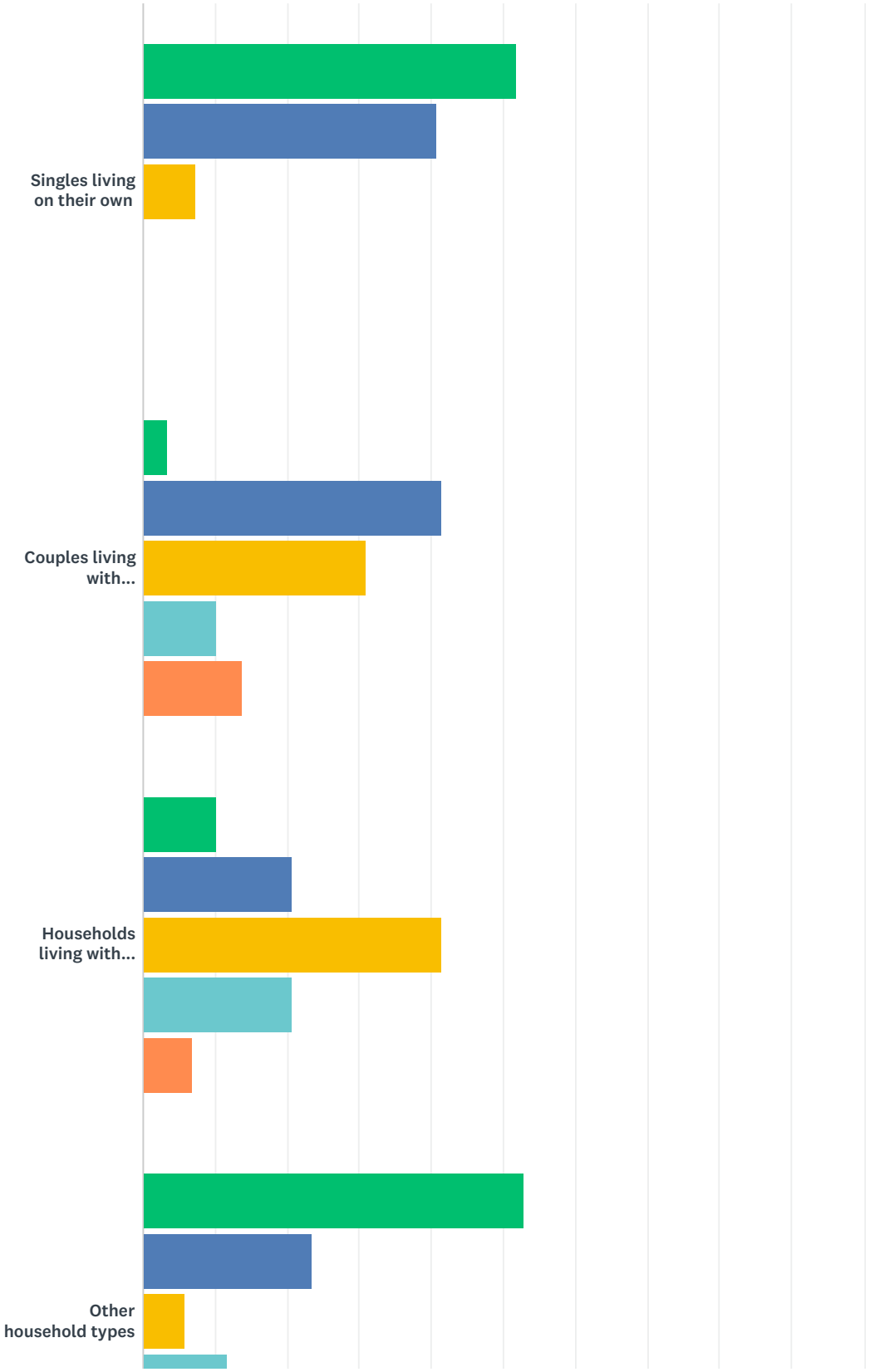


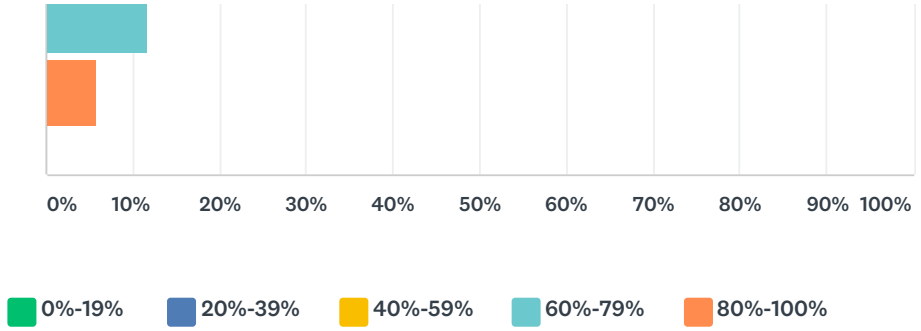


	0%-19%	20%-39%	40%-59%	60%-79%	80%-100%	TOTAL	WEIGHTED AVERAGE
Millennials: ages 18-34	17.24% 5	41.38% 12	24.14% 7	10.34% 3	6.90% 2	29	2.48
Generation X: ages 35-54	7.14% 2	14.29% 4	50.00% 14	17.86% 5	10.71% 3	28	3.11
Baby Boomers: ages 55-74	18.52% 5	25.93% 7	18.52% 5	22.22% 6	14.81% 4	27	2.89
Silent Generation: age 75+	72.00% 18	0.00% 0	4.00% 1	16.00% 4	8.00% 2	25	1.88

Q3 Please roughly estimate the share of clients seeking single-family homes by household type:

Answered: 30 Skipped: 1

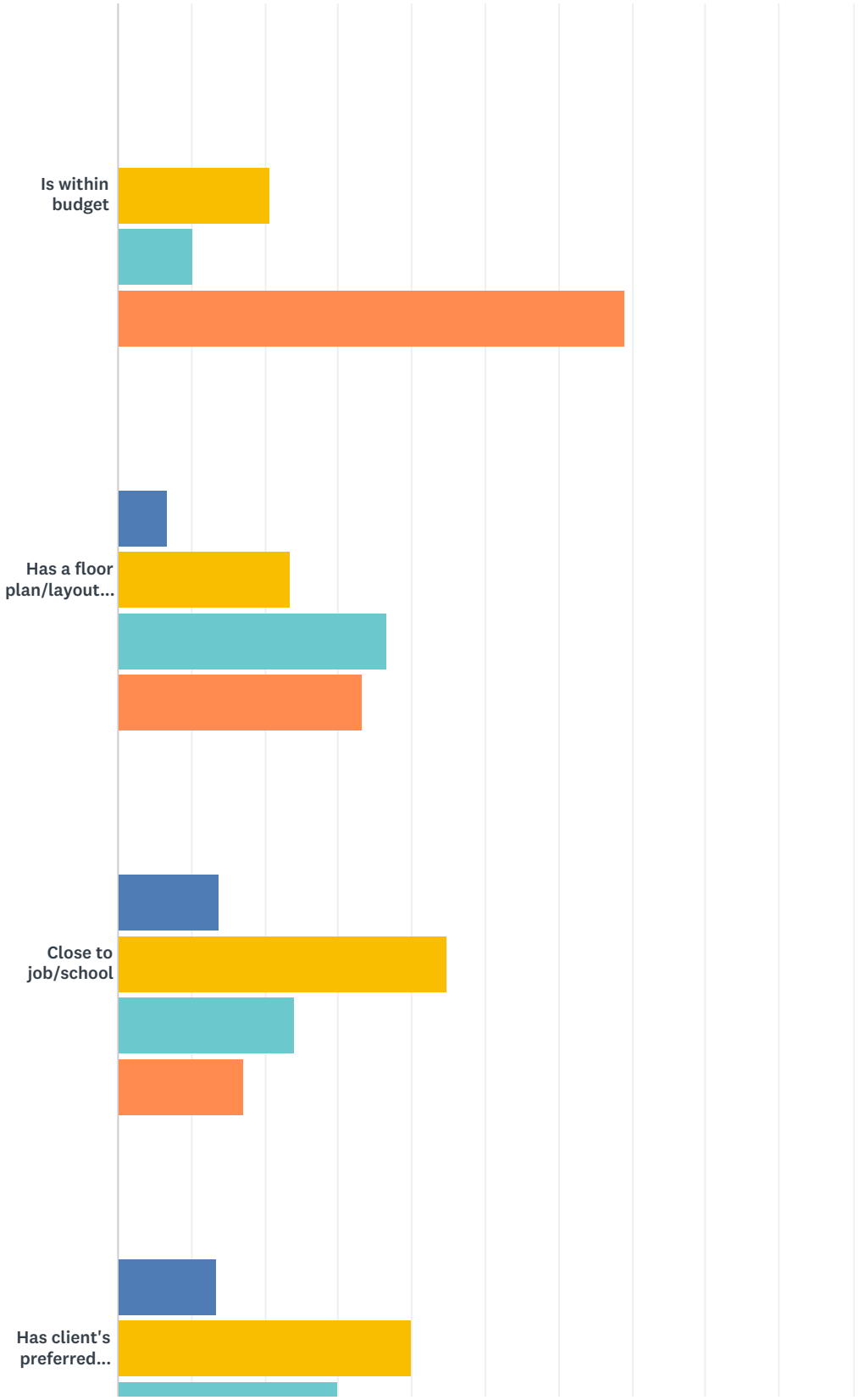


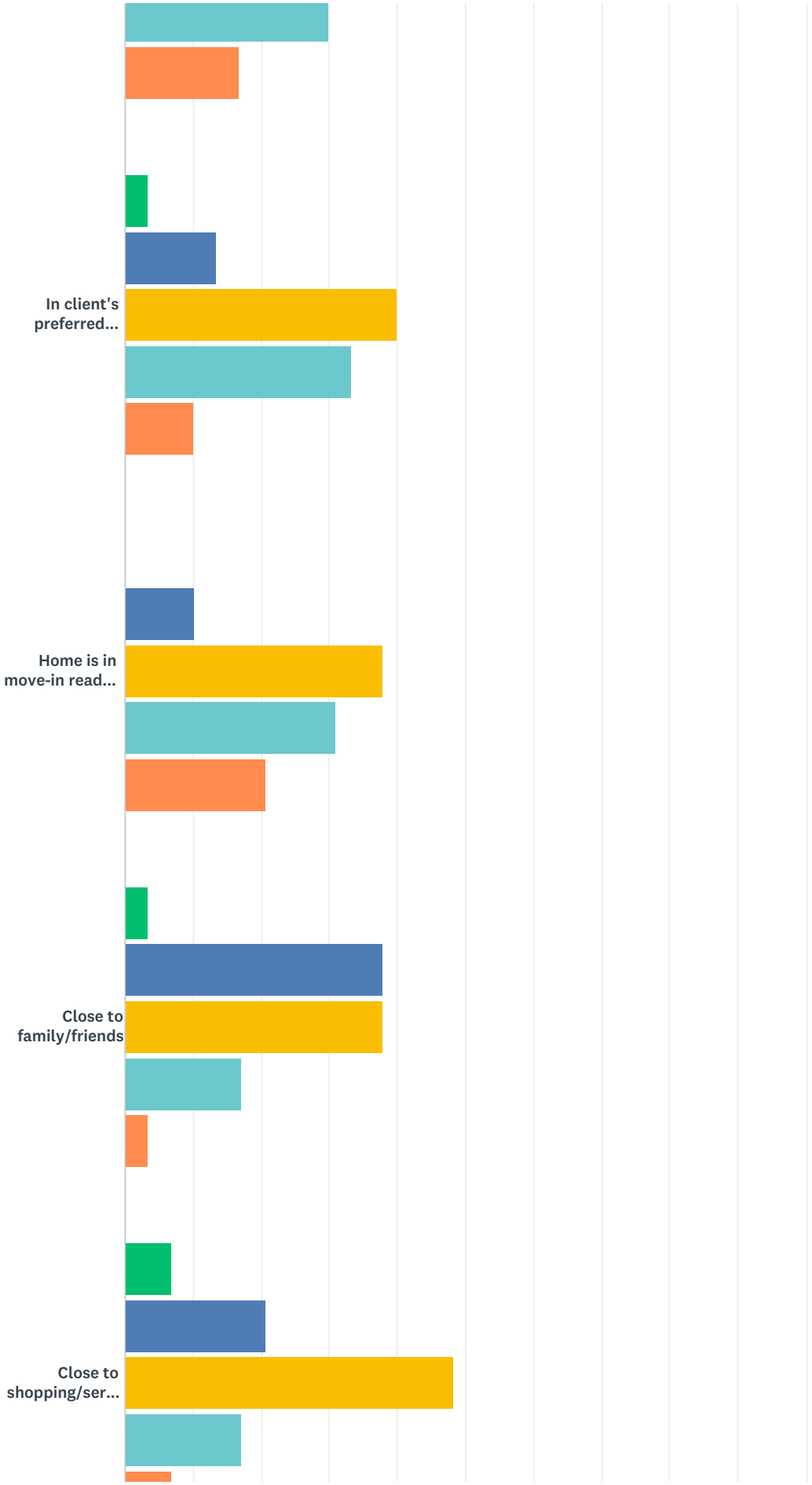


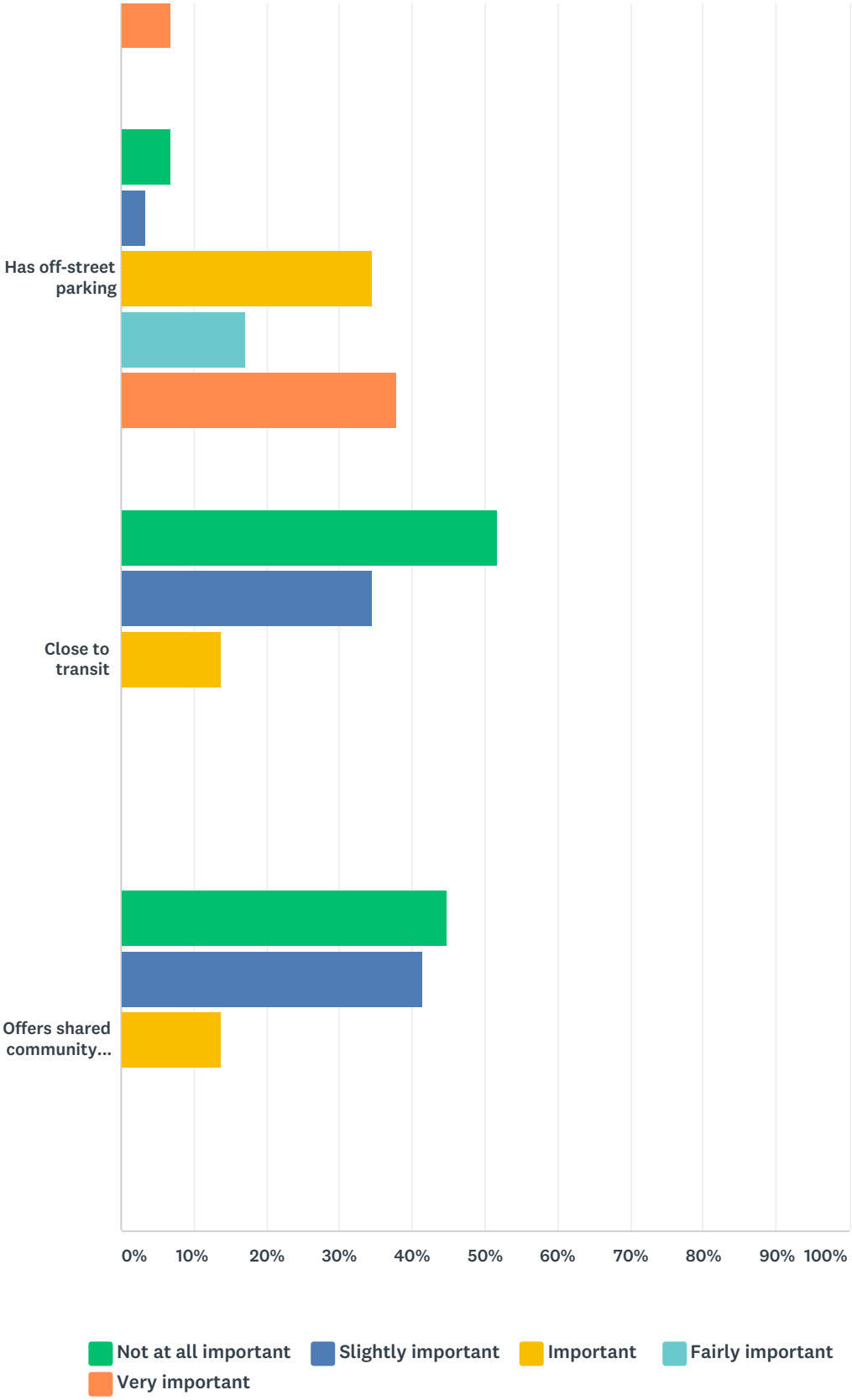
	0%-19%	20%-39%	40%-59%	60%-79%	80%-100%	TOTAL	WEIGHTED AVERAGE
Singles living on their own	51.85% 14	40.74% 11	7.41% 2	0.00% 0	0.00% 0	27	1.56
Couples living with spouse/partners, no children under age 18	3.45% 1	41.38% 12	31.03% 9	10.34% 3	13.79% 4	29	2.90
Households living with children under age 18	10.34% 3	20.69% 6	41.38% 12	20.69% 6	6.90% 2	29	2.93
Other household types	52.94% 9	23.53% 4	5.88% 1	11.76% 2	5.88% 1	17	1.94

Q4 Please rank the following amenities in terms of the average single-family home seeking client preferences:

Answered: 30 Skipped: 1




In client's preferred...
Home is in move-in read...
Close to family/friends
Close to shopping/ser...

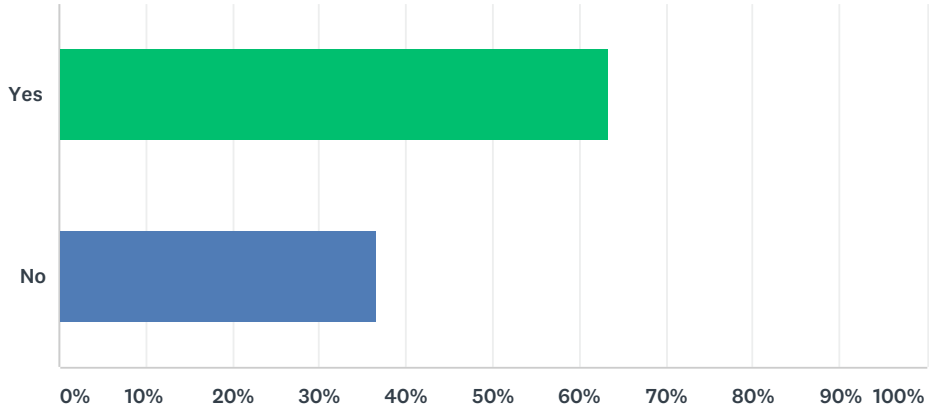


	NOT AT ALL IMPORTANT	SLIGHTLY IMPORTANT	IMPORTANT	FAIRLY IMPORTANT	VERY IMPORTANT	TOTAL	WEIGHTED AVERAGE
Is within budget	0.00% 0	0.00% 0	20.69% 6	10.34% 3	68.97% 20	29	4.48

Has a floor plan/layout that fits client needs	0.00% 0	6.67% 2	23.33% 7	36.67% 11	33.33% 10	30	3.97
Close to job/school	0.00% 0	13.79% 4	44.83% 13	24.14% 7	17.24% 5	29	3.45
Has client's preferred size/square footage	0.00% 0	13.33% 4	40.00% 12	30.00% 9	16.67% 5	30	3.50
In client's preferred neighborhood	3.33% 1	13.33% 4	40.00% 12	33.33% 10	10.00% 3	30	3.33
Home is in move-in ready condition	0.00% 0	10.34% 3	37.93% 11	31.03% 9	20.69% 6	29	3.62
Close to family/friends	3.45% 1	37.93% 11	37.93% 11	17.24% 5	3.45% 1	29	2.79
Close to shopping/services/leisure activities	6.90% 2	20.69% 6	48.28% 14	17.24% 5	6.90% 2	29	2.97
Has off-street parking	6.90% 2	3.45% 1	34.48% 10	17.24% 5	37.93% 11	29	3.76
Close to transit	51.72% 15	34.48% 10	13.79% 4	0.00% 0	0.00% 0	29	1.62
Offers shared community amenities	44.83% 13	41.38% 12	13.79% 4	0.00% 0	0.00% 0	29	1.69

Q5 Does single-family housing for sale on the market meet the needs of most clients?

Answered: 30 Skipped: 1

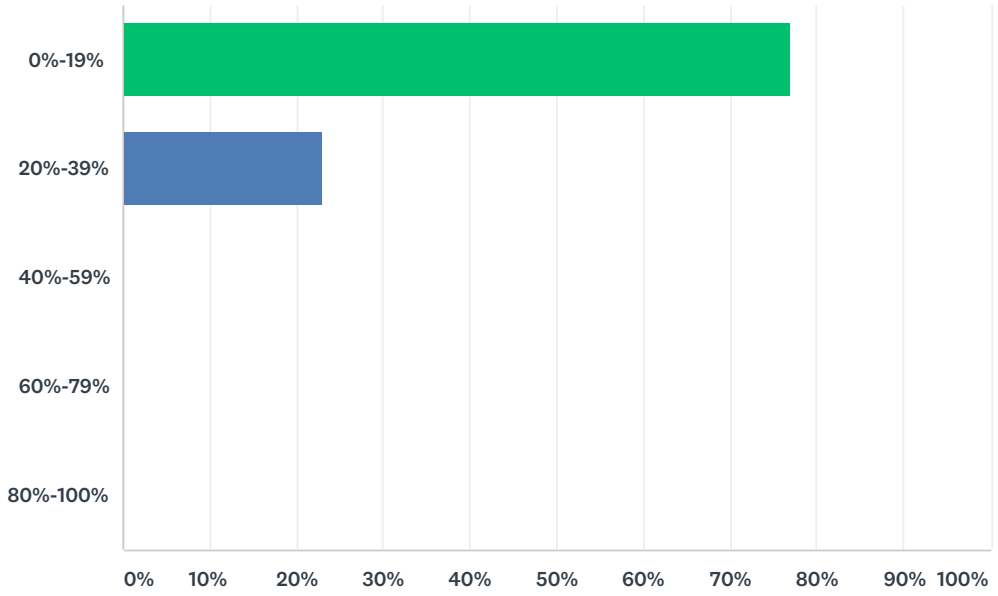


ANSWER CHOICES	RESPONSES	
Yes	63.33%	19
No	36.67%	11
TOTAL		30

#	IF NO, WHAT IS LACKING IN THE AVAILABLE HOUSING?	DATE
1	Poorly maintained	4/30/2019 4:28 PM
2	Updated energy efficient homes. Lots of houses in need of a lot of work, updating.	4/29/2019 10:42 PM
3	Affordable housing is lacking	4/25/2019 10:13 PM
4	Inventory	4/25/2019 9:50 AM
5	Updating	4/24/2019 5:22 PM
6	Not enough inventory within the purchasing power	4/24/2019 5:15 PM
7	market price has grown to exclude some younger buyers	4/24/2019 4:57 PM
8	High taxes	4/24/2019 3:20 PM
9	I have several clients that are using CHFA or FHA financing and can not find them a home in good enough condition and in their price range.	4/24/2019 3:00 PM
10	Inventory is very low right now so selection is limited	4/24/2019 2:53 PM
11	Manufactured home decent finance and VA, FHA and others when on leases land.	4/24/2019 2:48 PM

Q6 What percentage of your clients are seeking condominium housing?

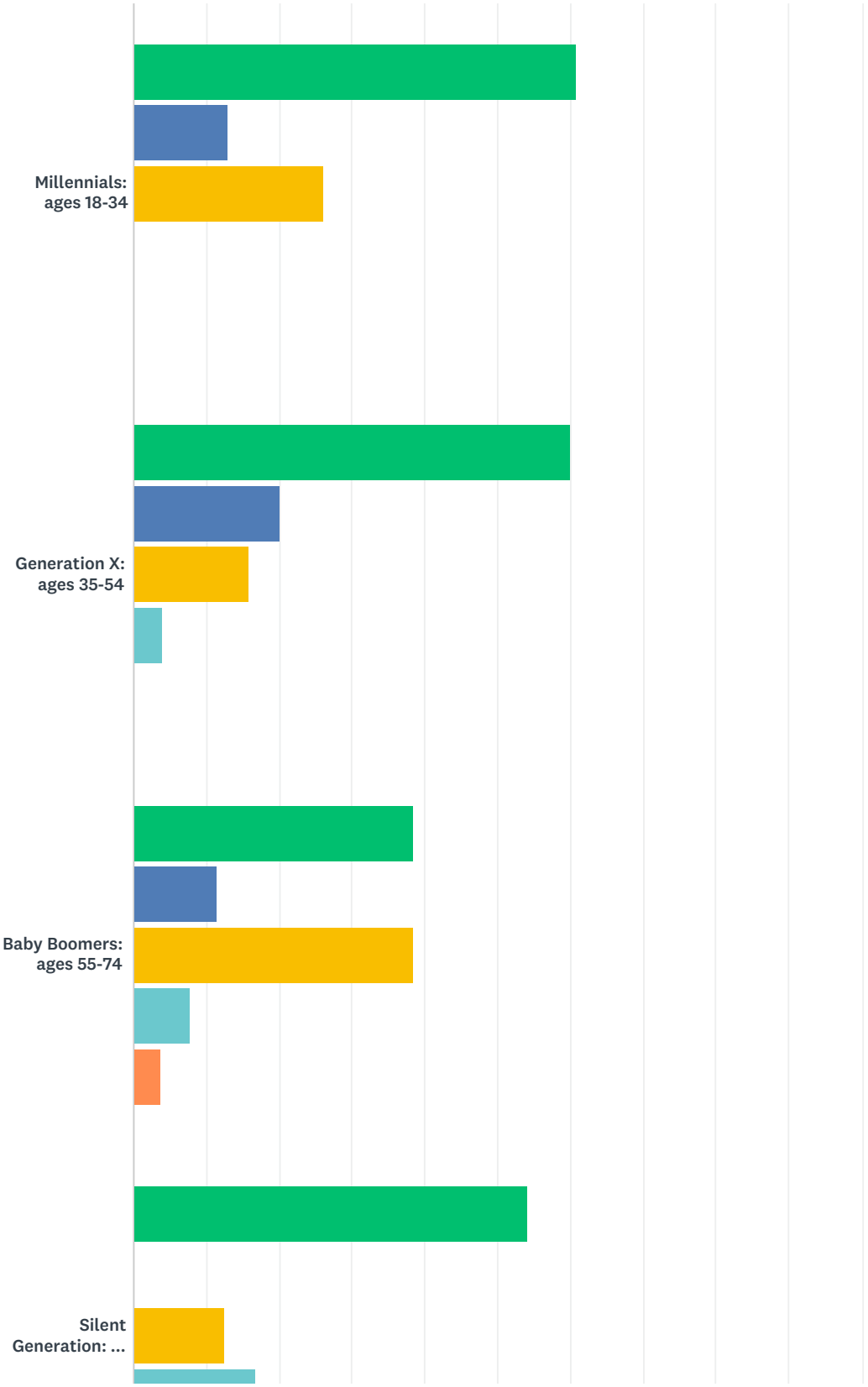
Answered: 26 Skipped: 5

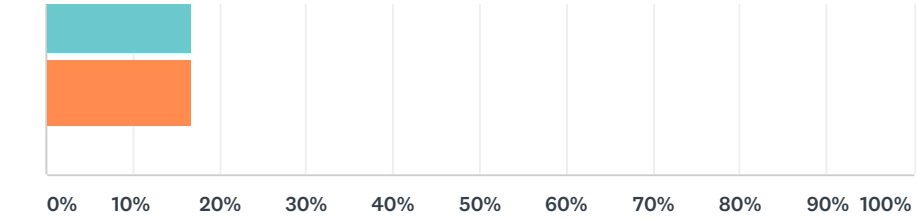


ANSWER CHOICES	RESPONSES	
0%-19%	76.92%	20
20%-39%	23.08%	6
40%-59%	0.00%	0
60%-79%	0.00%	0
80%-100%	0.00%	0
TOTAL		26

Q7 Please roughly estimate the share of clients seeking condominium homes by age of householder:

Answered: 27 Skipped: 4

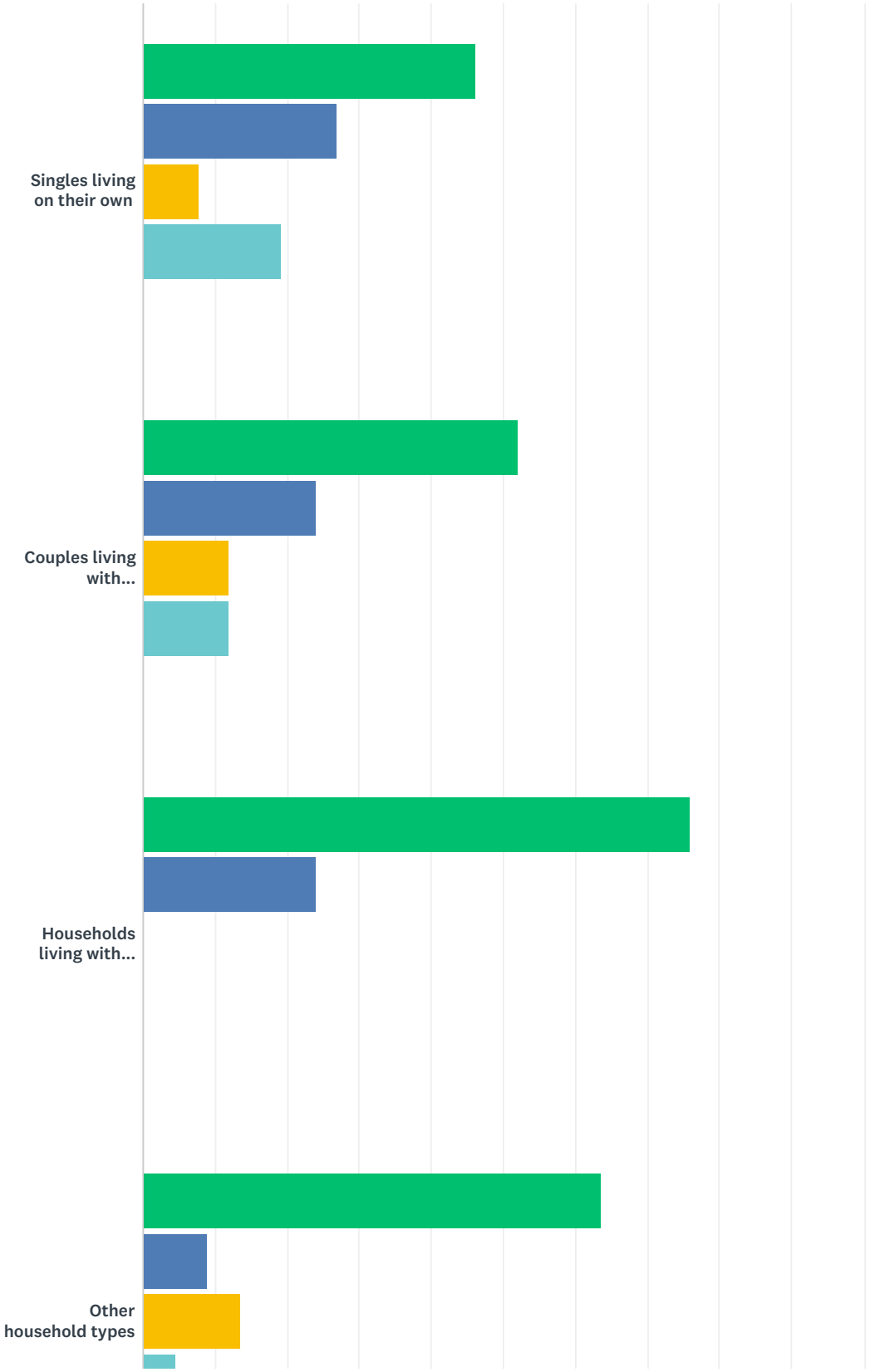


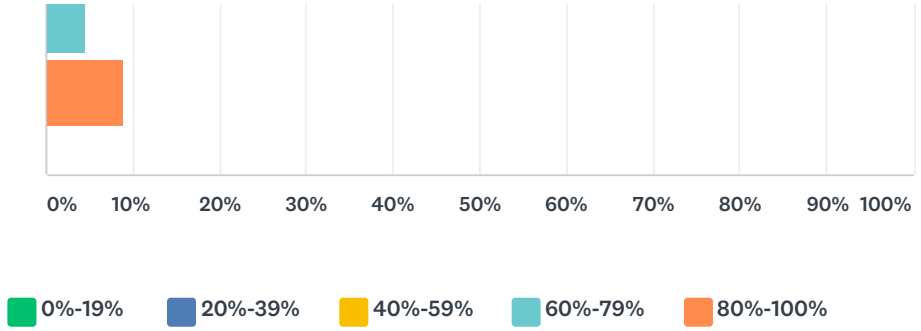


	0%-19%	20%-39%	40%-59%	60%-79%	80%-100%	TOTAL	WEIGHTED AVERAGE
Millennials: ages 18-34	60.87% 14	13.04% 3	26.09% 6	0.00% 0	0.00% 0	23	1.65
Generation X: ages 35-54	60.00% 15	20.00% 5	16.00% 4	4.00% 1	0.00% 0	25	1.64
Baby Boomers: ages 55-74	38.46% 10	11.54% 3	38.46% 10	7.69% 2	3.85% 1	26	2.27
Silent Generation: age 75+	54.17% 13	0.00% 0	12.50% 3	16.67% 4	16.67% 4	24	2.42

Q8 Please roughly estimate the share of clients seeking condominium homes by household type:

Answered: 27 Skipped: 4

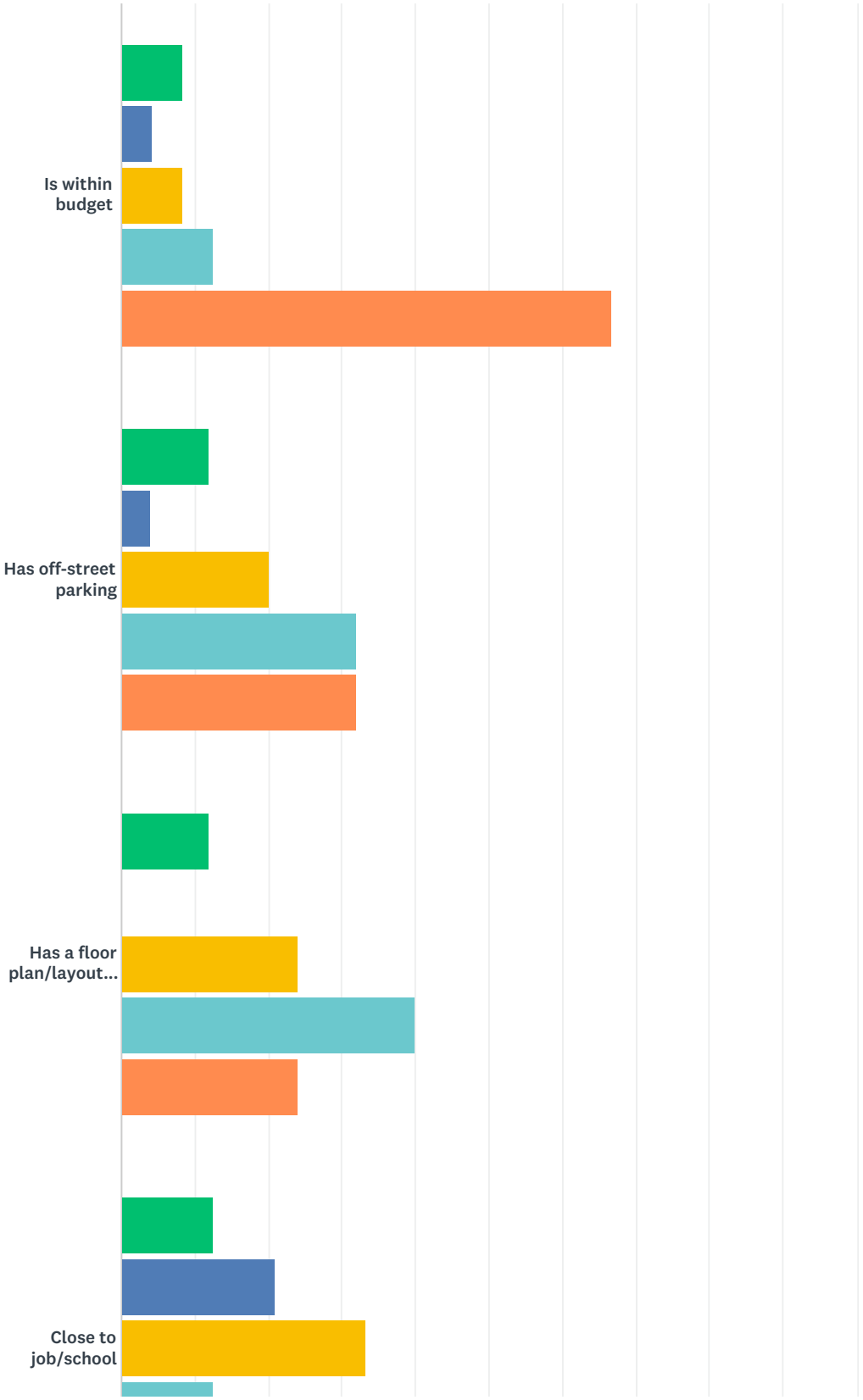


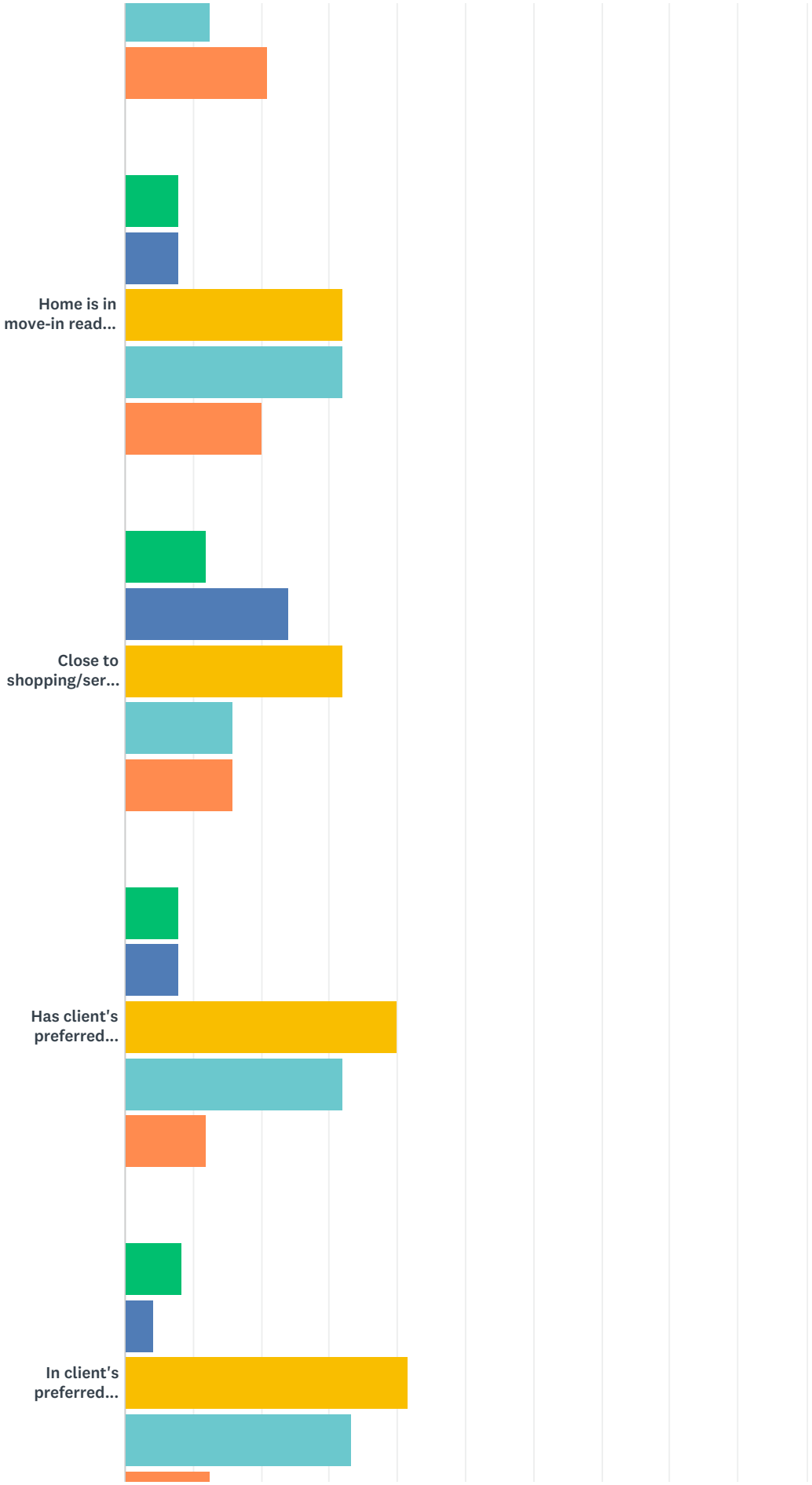


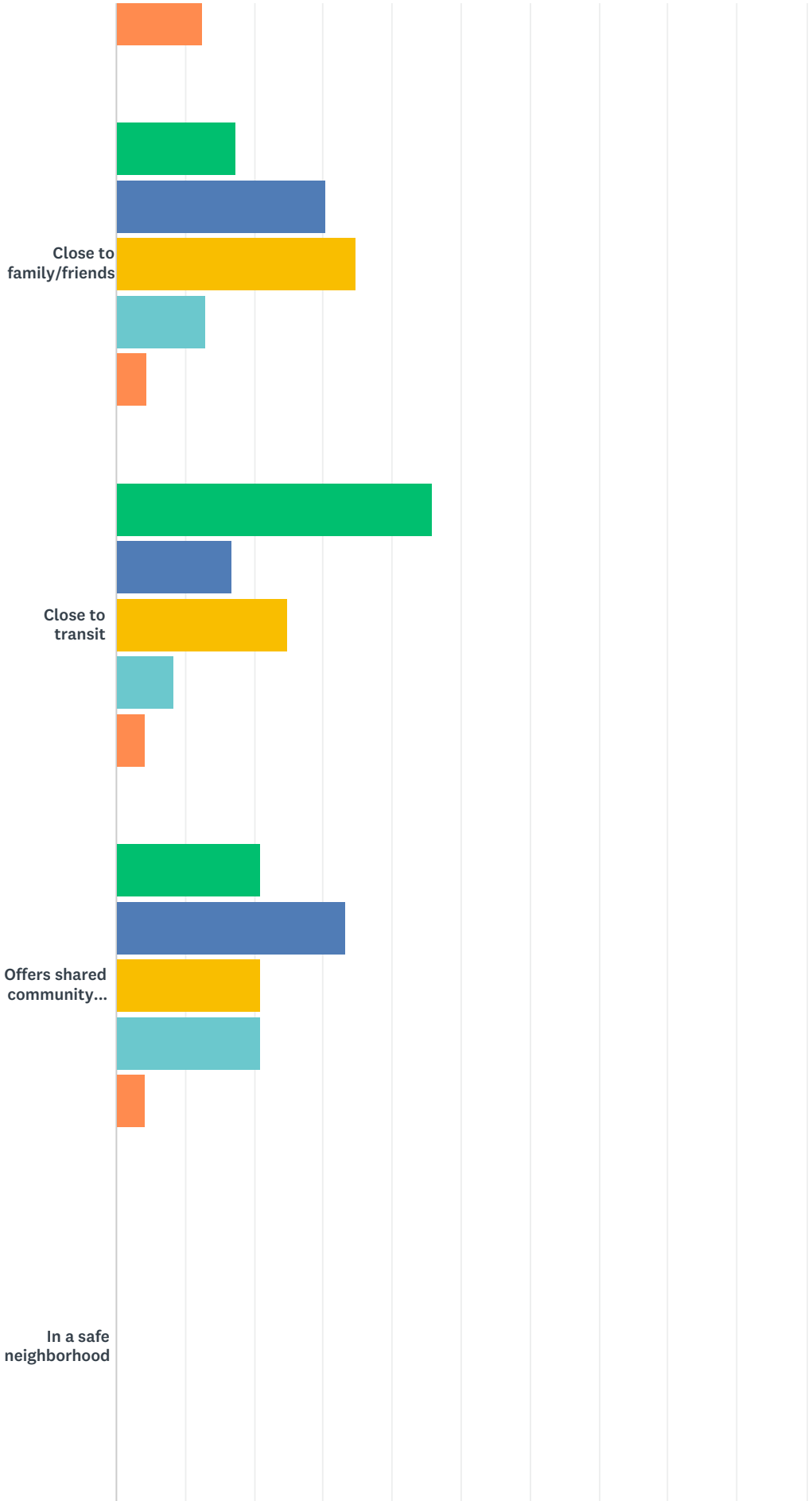
	0%-19%	20%-39%	40%-59%	60%-79%	80%-100%	TOTAL	WEIGHTED AVERAGE
Singles living on their own	46.15% 12	26.92% 7	7.69% 2	19.23% 5	0.00% 0	26	2.00
Couples living with spouse/partners, no children under age 18	52.00% 13	24.00% 6	12.00% 3	12.00% 3	0.00% 0	25	1.84
Households living with children under age 18	76.00% 19	24.00% 6	0.00% 0	0.00% 0	0.00% 0	25	1.24
Other household types	63.64% 14	9.09% 2	13.64% 3	4.55% 1	9.09% 2	22	1.86

Q9 Please rank the following amenities in terms of the average condominium home seeking client preferences:

Answered: 25 Skipped: 6




Home is in move-in read...
Close to shopping/ser...
Has client's preferred...
In client's preferred...

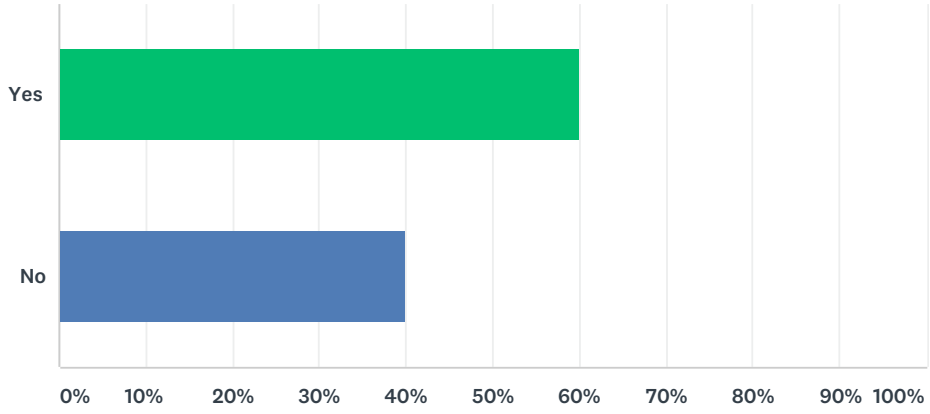

Close to family/friends
Close to transit
Offers shared community...
In a safe neighborhood

	NOT AT ALL IMPORTANT	SLIGHTLY IMPORTANT	IMPORTANT	FAIRLY IMPORTANT	VERY IMPORTANT	TOTAL	WEIGHTED AVERAGE
Is within budget	8.33% 2	4.17% 1	8.33% 2	12.50% 3	66.67% 16	24	4.25
Has off-street parking	12.00% 3	4.00% 1	20.00% 5	32.00% 8	32.00% 8	25	3.68

Has a floor plan/layout that fits client needs	12.00% 3	0.00% 0	24.00% 6	40.00% 10	24.00% 6	25	3.64
Close to job/school	12.50% 3	20.83% 5	33.33% 8	12.50% 3	20.83% 5	24	3.08
Home is in move-in ready condition	8.00% 2	8.00% 2	32.00% 8	32.00% 8	20.00% 5	25	3.48
Close to shopping/services/leisure activities	12.00% 3	24.00% 6	32.00% 8	16.00% 4	16.00% 4	25	3.00
Has client's preferred size/square footage	8.00% 2	8.00% 2	40.00% 10	32.00% 8	12.00% 3	25	3.32
In client's preferred neighborhood	8.33% 2	4.17% 1	41.67% 10	33.33% 8	12.50% 3	24	3.38
Close to family/friends	17.39% 4	30.43% 7	34.78% 8	13.04% 3	4.35% 1	23	2.57
Close to transit	45.83% 11	16.67% 4	25.00% 6	8.33% 2	4.17% 1	24	2.08
Offers shared community amenities	20.83% 5	33.33% 8	20.83% 5	20.83% 5	4.17% 1	24	2.54
In a safe neighborhood	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Has preferred number of bedrooms	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Is energy efficient	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00
Has preferred number of bathrooms	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0	0.00

Q10 Does condominium housing for sale on the market meet the needs of most clients?

Answered: 25 Skipped: 6

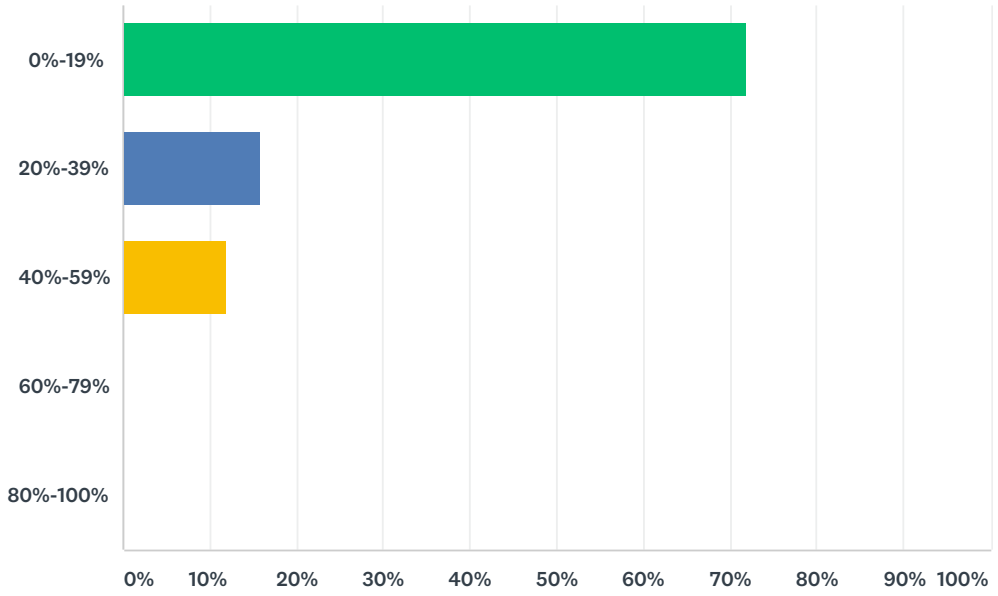


ANSWER CHOICES	RESPONSES	
Yes	60.00%	15
No	40.00%	10
TOTAL		25

#	IF NO, WHAT IS LACKING IN THE AVAILABLE HOUSING?	DATE
1	not enough available in S.E. Ct.	5/5/2019 2:34 PM
2	Too far from downtown areas	4/30/2019 4:30 PM
3	Inventory	4/25/2019 10:15 PM
4	Inventory	4/25/2019 9:54 AM
5	I do not have any clients seeking condos at the moment	4/25/2019 6:54 AM
6	Amenties	4/24/2019 5:26 PM
7	A level living	4/24/2019 3:24 PM
8	Main floor living	4/24/2019 3:03 PM
9	Very few condo communities offer amenities such as pools, gym facilities, etc.	4/24/2019 2:56 PM
10	Two car garages - Often to small - public utilities	4/24/2019 2:53 PM

Q11 What percentage of your clients are seeking rental housing?

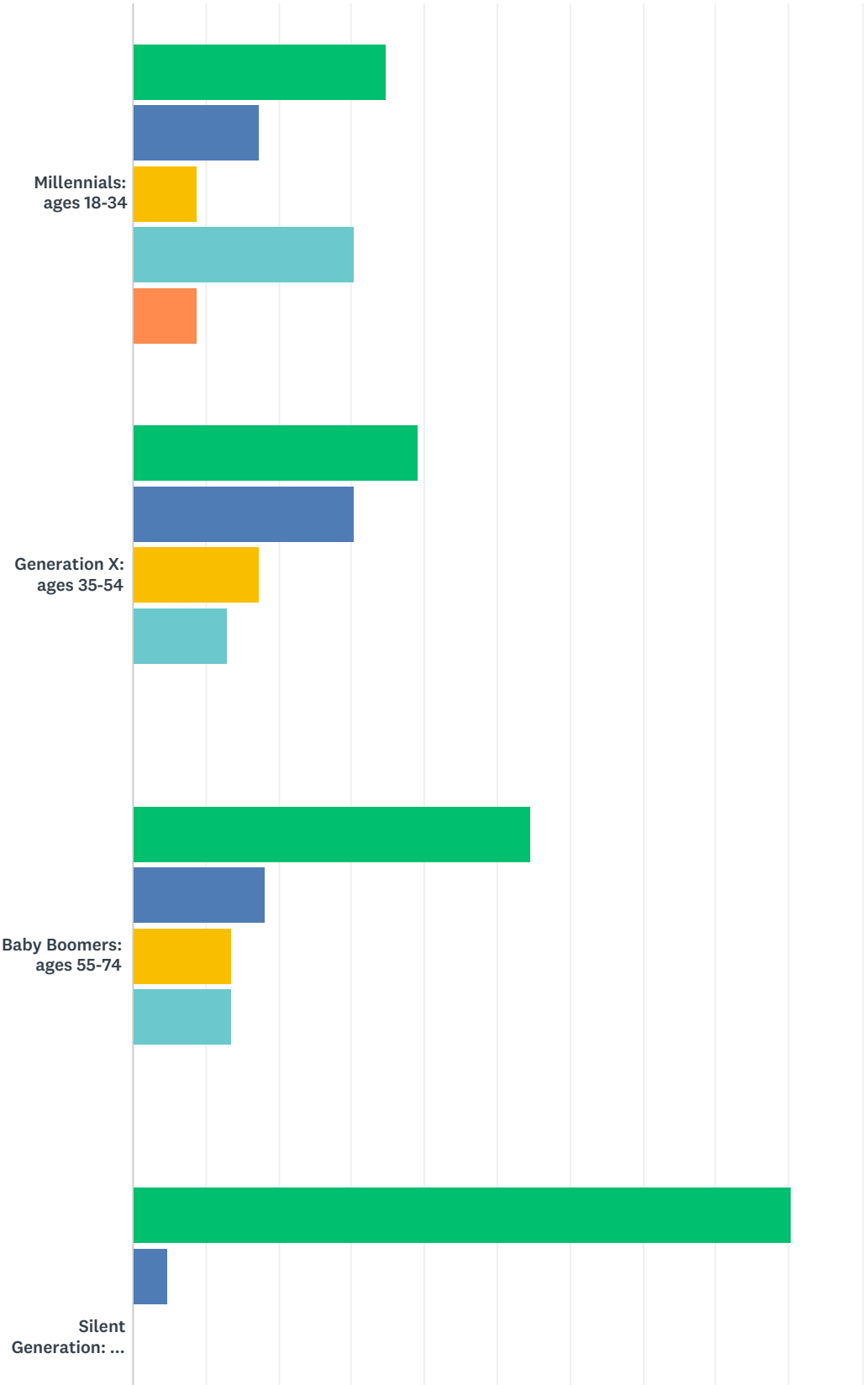
Answered: 25 Skipped: 6

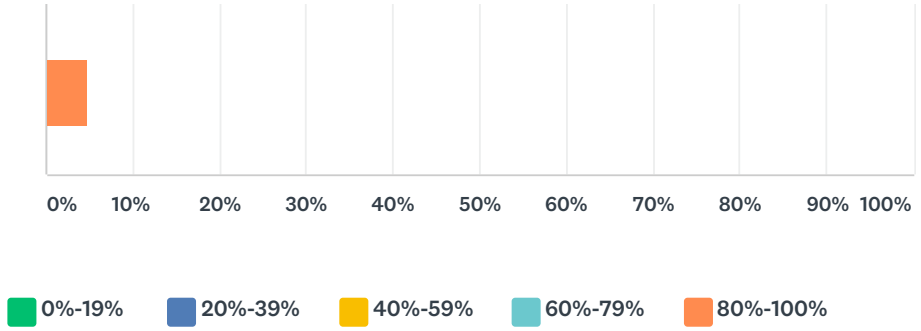


ANSWER CHOICES	RESPONSES	
0%-19%	72.00%	18
20%-39%	16.00%	4
40%-59%	12.00%	3
60%-79%	0.00%	0
80%-100%	0.00%	0
TOTAL		25

Q12 Please roughly estimate the share of clients seeking rental units by age of householder:

Answered: 24 Skipped: 7

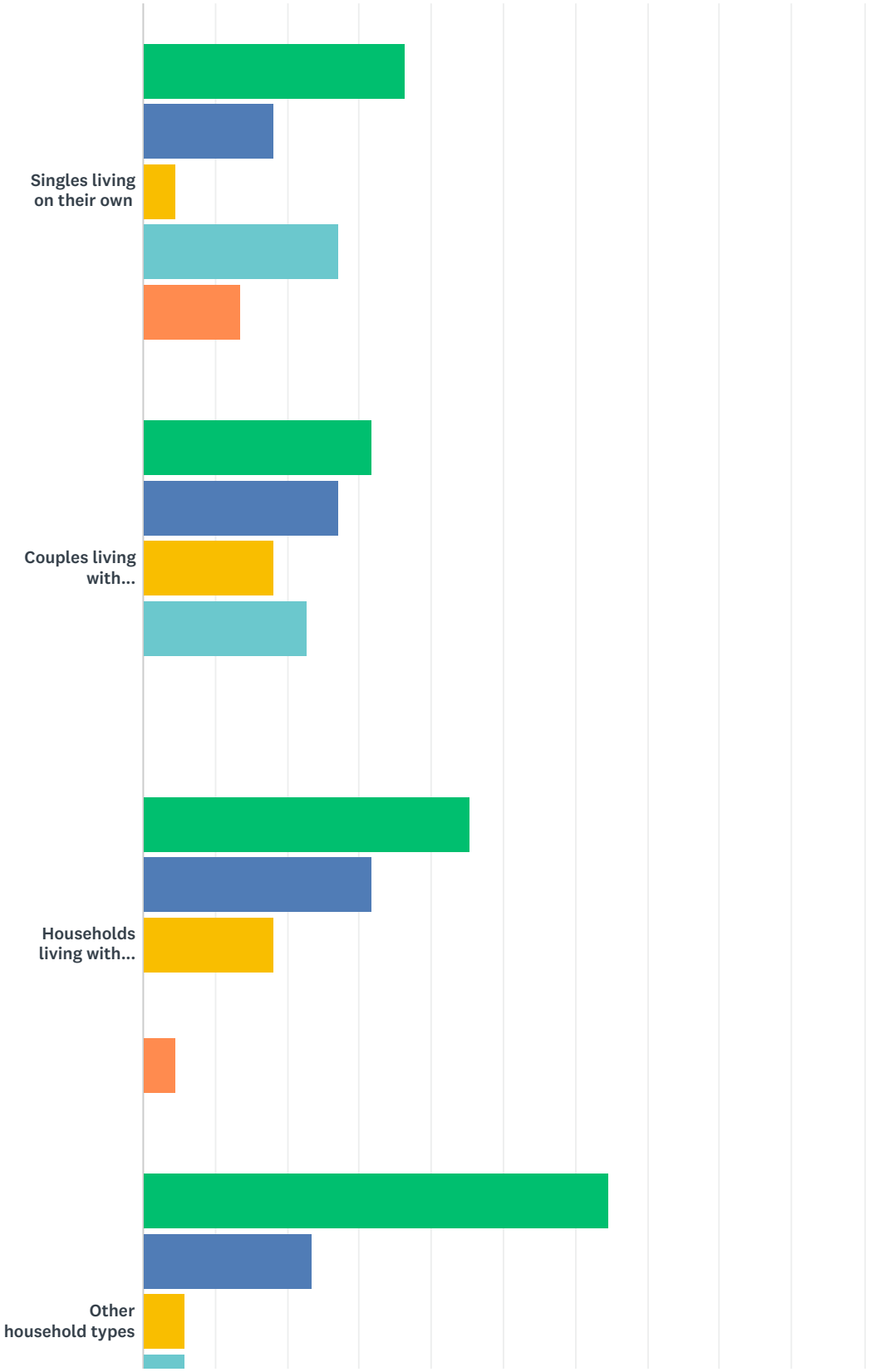


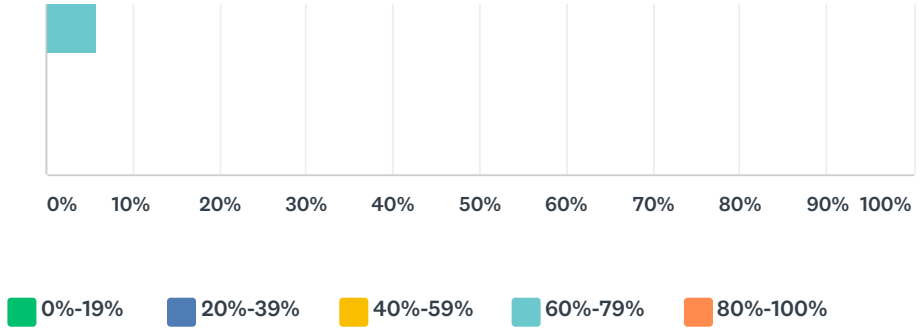


	0%-19%	20%-39%	40%-59%	60%-79%	80%-100%	TOTAL	WEIGHTED AVERAGE
Millennials: ages 18-34	34.78% 8	17.39% 4	8.70% 2	30.43% 7	8.70% 2	23	2.61
Generation X: ages 35-54	39.13% 9	30.43% 7	17.39% 4	13.04% 3	0.00% 0	23	2.04
Baby Boomers: ages 55-74	54.55% 12	18.18% 4	13.64% 3	13.64% 3	0.00% 0	22	1.86
Silent Generation: age 75+	90.48% 19	4.76% 1	0.00% 0	0.00% 0	4.76% 1	21	1.24

Q13 Please roughly estimate the share of clients seeking rental units by household type:

Answered: 22 Skipped: 9

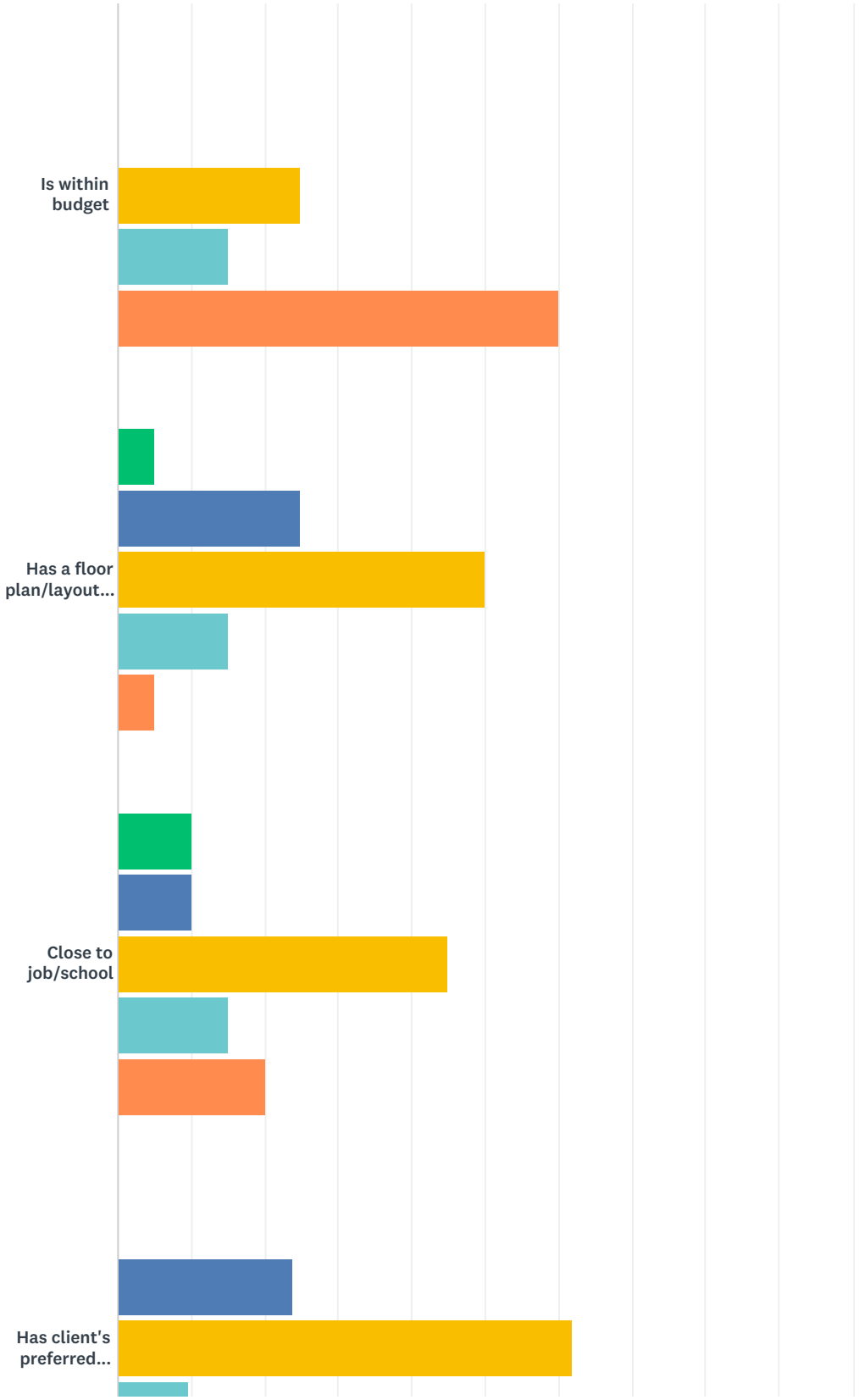


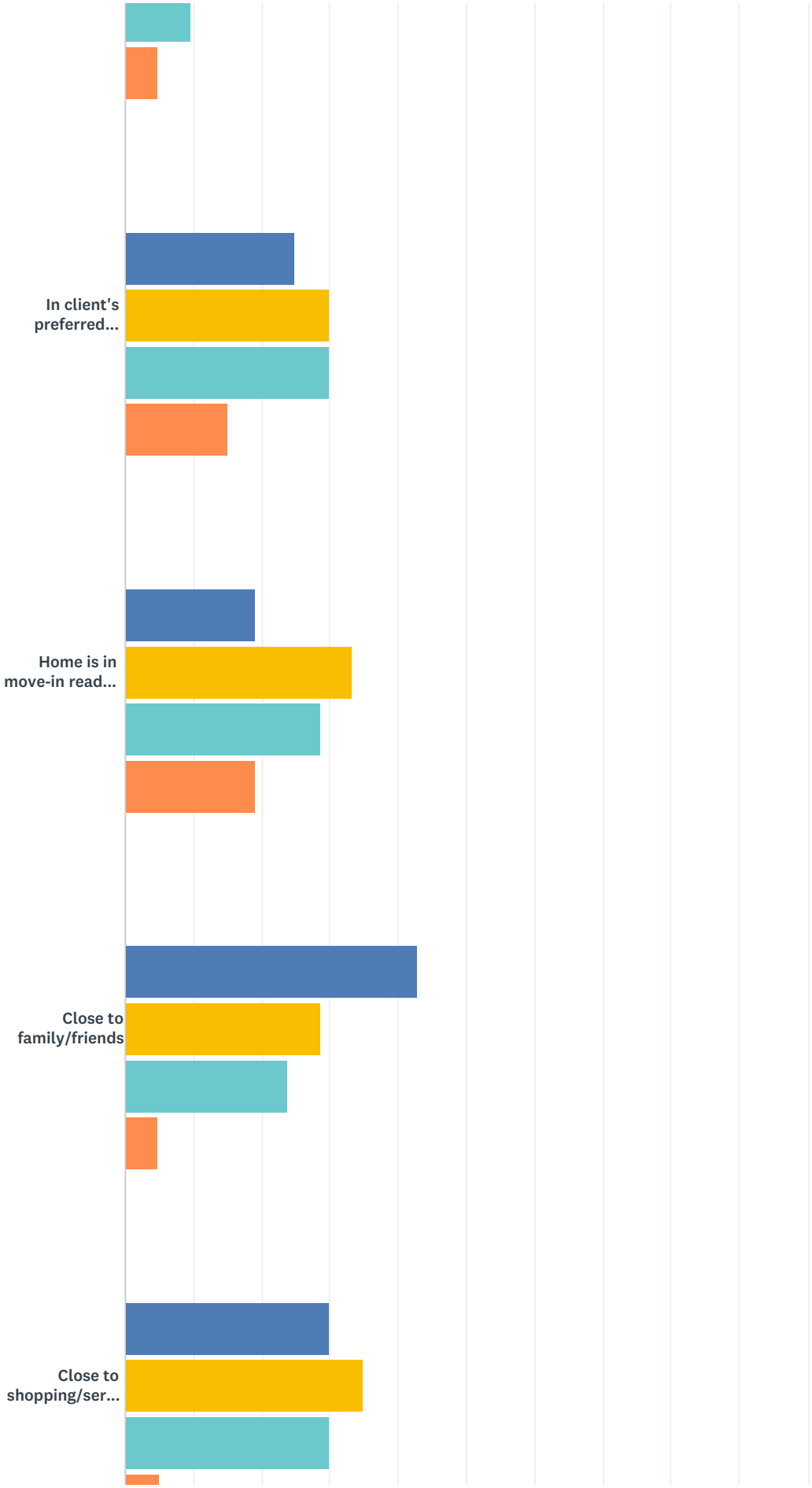


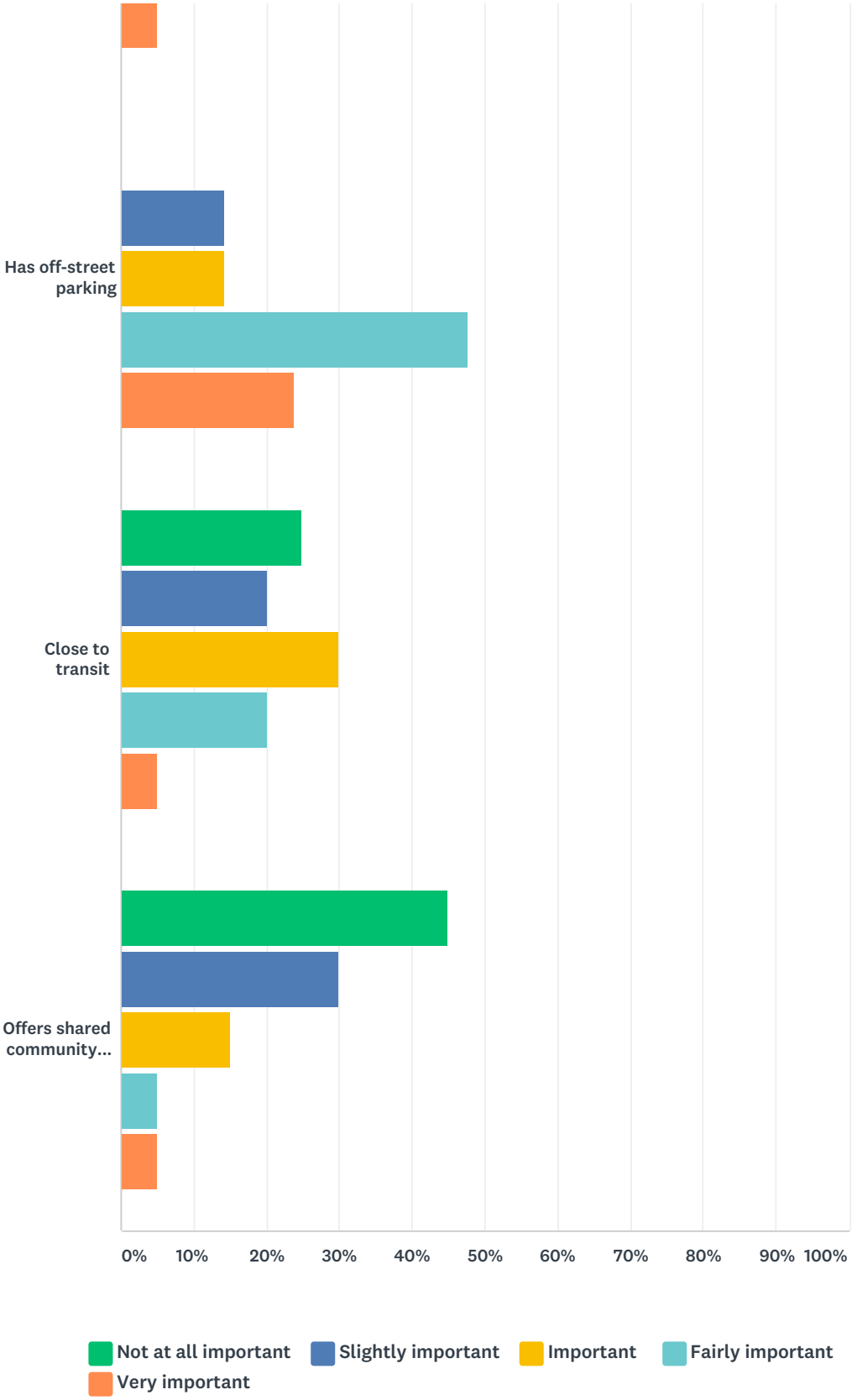
	0%-19%	20%-39%	40%-59%	60%-79%	80%-100%	TOTAL	WEIGHTED AVERAGE
Singles living on their own	36.36% 8	18.18% 4	4.55% 1	27.27% 6	13.64% 3	22	2.64
Couples living with spouse/partners, no children under age 18	31.82% 7	27.27% 6	18.18% 4	22.73% 5	0.00% 0	22	2.32
Households living with children under age 18	45.45% 10	31.82% 7	18.18% 4	0.00% 0	4.55% 1	22	1.86
Other household types	64.71% 11	23.53% 4	5.88% 1	5.88% 1	0.00% 0	17	1.53

Q14 Please rank the following amenities in terms of the average rental housing seeking client preferences:

Answered: 21 Skipped: 10




In client's preferred...
Home is in move-in read...
Close to family/friends
Close to shopping/ser...

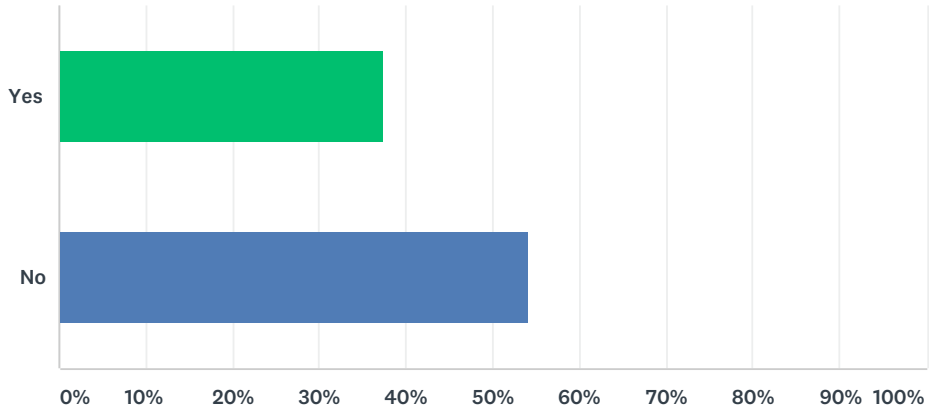


	NOT AT ALL IMPORTANT	SLIGHTLY IMPORTANT	IMPORTANT	FAIRLY IMPORTANT	VERY IMPORTANT	TOTAL	WEIGHTED AVERAGE
Is within budget	0.00% 0	0.00% 0	25.00% 5	15.00% 3	60.00% 12	20	4.35

Has a floor plan/layout that fits client needs	5.00% 1	25.00% 5	50.00% 10	15.00% 3	5.00% 1	20	2.90
Close to job/school	10.00% 2	10.00% 2	45.00% 9	15.00% 3	20.00% 4	20	3.25
Has client's preferred size/square footage	0.00% 0	23.81% 5	61.90% 13	9.52% 2	4.76% 1	21	2.95
In client's preferred neighborhood	0.00% 0	25.00% 5	30.00% 6	30.00% 6	15.00% 3	20	3.35
Home is in move-in ready condition	0.00% 0	19.05% 4	33.33% 7	28.57% 6	19.05% 4	21	3.48
Close to family/friends	0.00% 0	42.86% 9	28.57% 6	23.81% 5	4.76% 1	21	2.90
Close to shopping/services/leisure activities	0.00% 0	30.00% 6	35.00% 7	30.00% 6	5.00% 1	20	3.10
Has off-street parking	0.00% 0	14.29% 3	14.29% 3	47.62% 10	23.81% 5	21	3.81
Close to transit	25.00% 5	20.00% 4	30.00% 6	20.00% 4	5.00% 1	20	2.60
Offers shared community amenities	45.00% 9	30.00% 6	15.00% 3	5.00% 1	5.00% 1	20	1.95

Q15 Does rental housing on the market meet the needs of most clients?

Answered: 24 Skipped: 7



ANSWER CHOICES	RESPONSES	
Yes	37.50%	9
No	54.17%	13
TOTAL		24

#	IF NO, WHAT IS LACKING IN THE AVAILABLE HOUSING?	DATE
1	price, price.	5/5/2019 2:38 PM
2	Don’t know, do not encounter tenants	4/30/2019 4:31 PM
3	Low inventory and overpriced	4/26/2019 2:40 PM
4	I don't deal with rentals	4/26/2019 9:46 AM
5	Affordable housing	4/25/2019 10:20 PM
6	More opportunities available on Craigslist than on our listing service.	4/25/2019 8:07 PM
7	Inventory	4/25/2019 9:57 AM
8	Prices are way out of control non affordable	4/25/2019 7:00 AM
9	Not enough housing available.	4/24/2019 5:30 PM
10	First floor bedroom	4/24/2019 3:27 PM
11	Not enough good rentals on the market	4/24/2019 3:03 PM
12	Limited rental properties in NE CT	4/24/2019 2:58 PM
13	Lack quality - AC & Heating	4/24/2019 2:57 PM
14	Low inventory	4/24/2019 2:56 PM

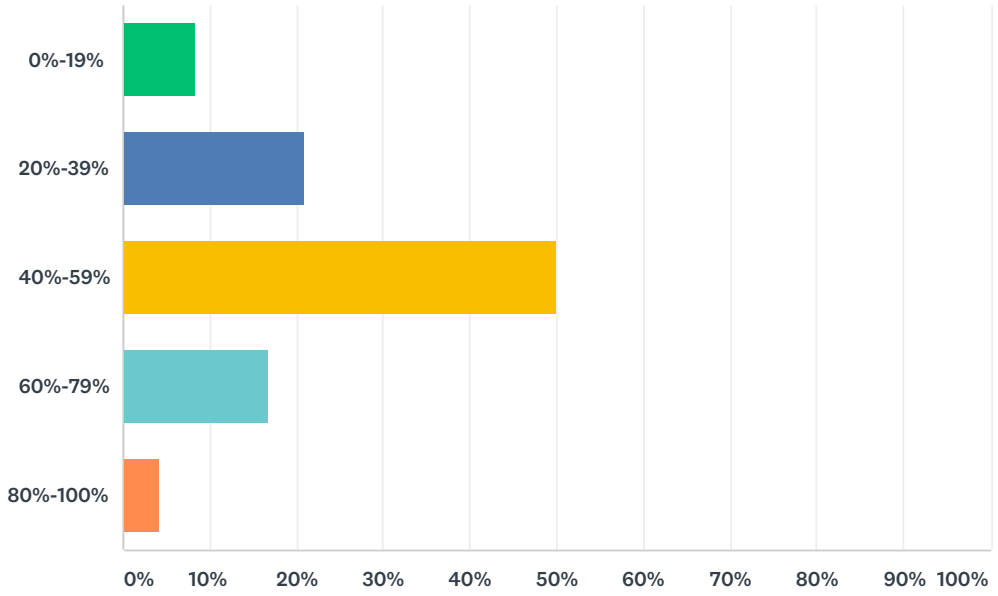
Q16 Please describe any changes to trends in those seeking to buy or rent housing in Eastern CT in the past 10 years.

Answered: 11 Skipped: 20

#	RESPONSES	DATE
1	available lower price homes needed (under $250M)	5/5/2019 2:38 PM
2	Since January in the market	4/30/2019 4:31 PM
3	Many renters want to have pets, fenced in yards, ability to have an investment property, smaller houses, open floor plans, updated and energy efficiency programs.	4/29/2019 10:46 PM
4	More are buying as rental prices are quite high and interest rates are staying low	4/26/2019 2:40 PM
5	I don't deal with rentals	4/26/2019 9:46 AM
6	Younger buyers want their homes to be move in ready- not willing or able to provide fix-up sweat equity. Older buyers have already done the fix-up projects and do not want to do it again. Condition is an important factor	4/25/2019 10:20 PM
7	I have only been involved in Real Estate for 3 years. I have noticed people want a lot for less . The younger generation is looking a condos and middle aged homes	4/25/2019 7:00 AM
8	people are not willing to settle for something and work their way up to desired property.	4/24/2019 5:30 PM
9	Buyers I work with are looking for updated move in ready homes. They don’t have the time or interest to do the updates.	4/24/2019 3:22 PM
10	High demand - Rents rising - Subsidized housing attracting older citizens	4/24/2019 2:57 PM
11	Rents gave gone up and there is low inventory, also no one will accept pets.	4/24/2019 2:56 PM

Q17 What share of homes for sale are listed by elderly/retired owners?

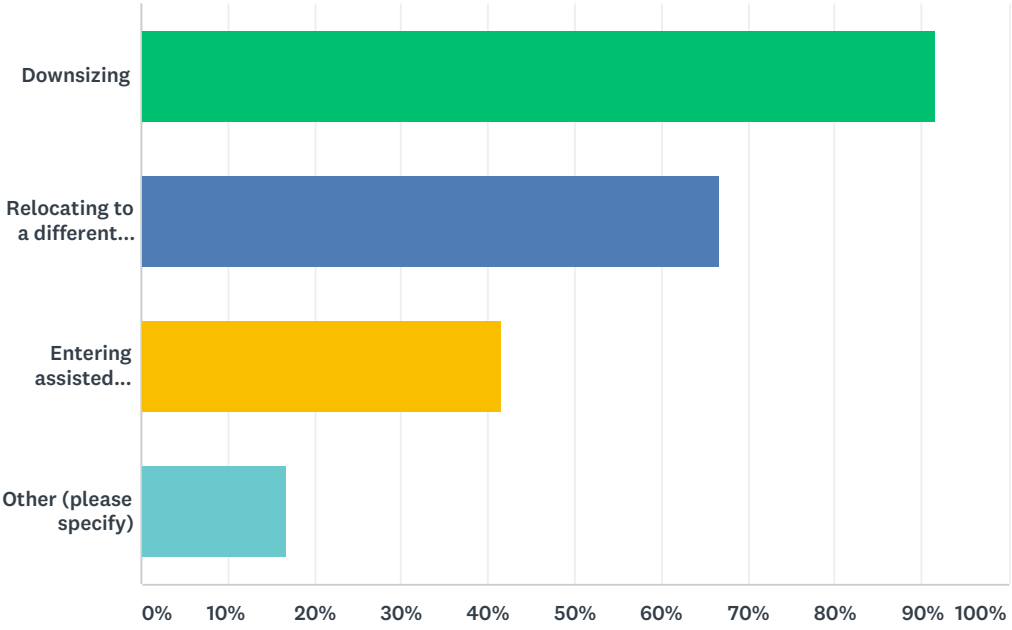
Answered: 24 Skipped: 7



ANSWER CHOICES	RESPONSES	
0%-19%	8.33%	2
20%-39%	20.83%	5
40%-59%	50.00%	12
60%-79%	16.67%	4
80%-100%	4.17%	1
TOTAL		24

Q18 What are their reasons for selling?

Answered: 24 Skipped: 7

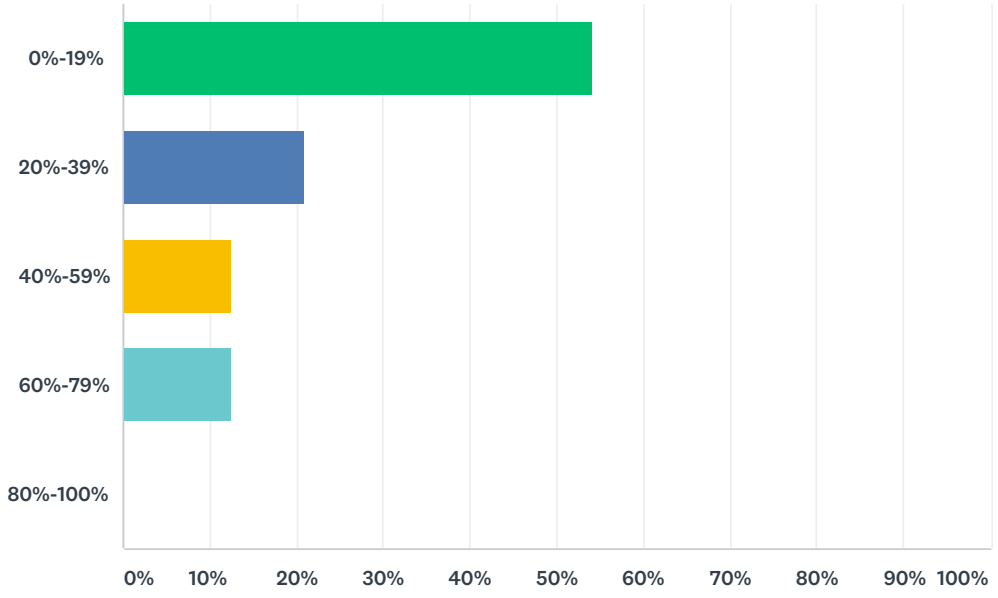


ANSWER CHOICES	RESPONSES	
Downsizing	91.67%	22
Relocating to a different community	66.67%	16
Entering assisted living/other care facilities	41.67%	10
Other (please specify)	16.67%	4
Total Respondents: 24		

#	OTHER (PLEASE SPECIFY)	DATE
1	Moving out of state	4/30/2019 4:31 PM
2	Estate sales	4/26/2019 9:46 AM
3	Relocating out of state	4/25/2019 9:40 PM
4	Moving South Deceased	4/24/2019 2:59 PM

Q19 What percentage say they are choosing to stay in Eastern CT after the sale?

Answered: 24 Skipped: 7



ANSWER CHOICES	RESPONSES	
0%-19%	54.17%	13
20%-39%	20.83%	5
40%-59%	12.50%	3
60%-79%	12.50%	3
80%-100%	0.00%	0
TOTAL		24

Q20 Contact Information

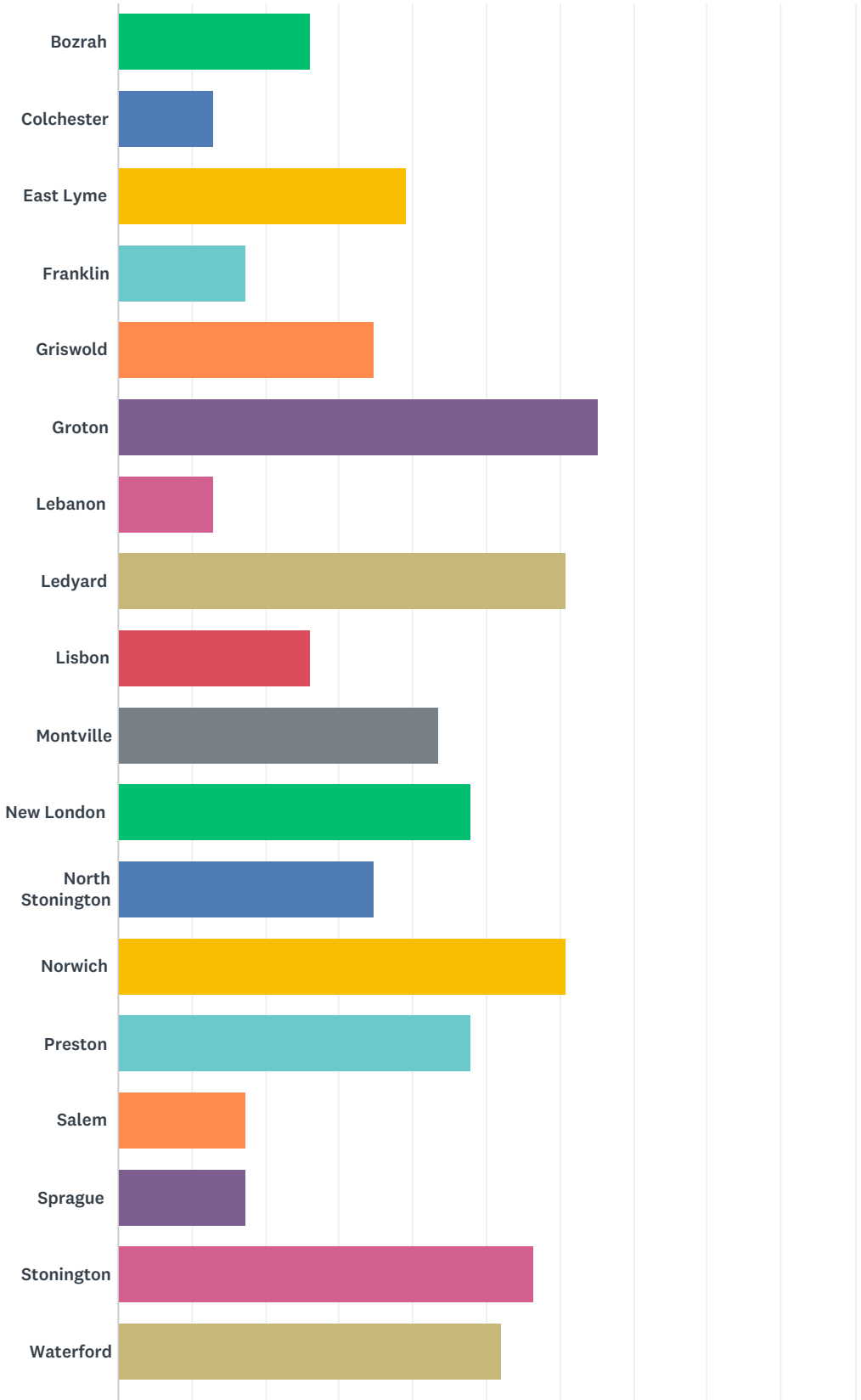
Answered: 17 Skipped: 14

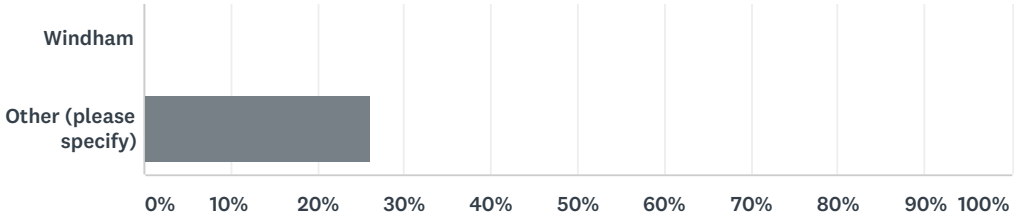
ANSWER CHOICES	RESPONSES	
Name of respondent	100.00%	17
Name of associated real estate company	100.00%	17
Location of primary business office	100.00%	17
Phone number	88.24%	15
Email address	100.00%	17

NOTE: Contact information removed for privacy.

Q21 What town(s) do you work in most often? (Select as many as you'd like.)

Answered: 23 Skipped: 8



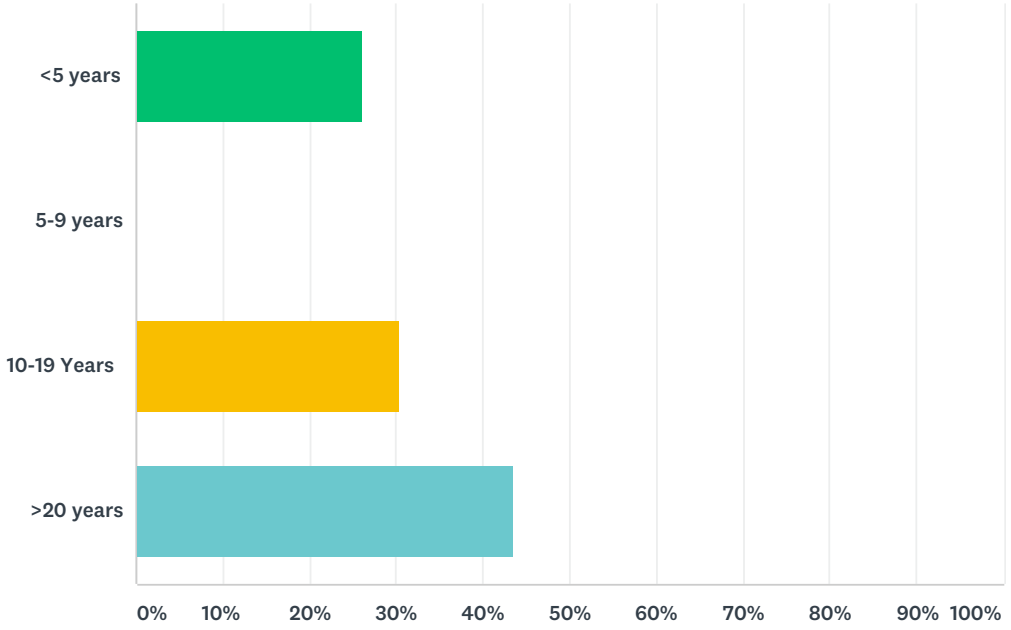


ANSWER CHOICES	RESPONSES	
Bozrah	26.09%	6
Colchester	13.04%	3
East Lyme	39.13%	9
Franklin	17.39%	4
Griswold	34.78%	8
Groton	65.22%	15
Lebanon	13.04%	3
Ledyard	60.87%	14
Lisbon	26.09%	6
Montville	43.48%	10
New London	47.83%	11
North Stonington	34.78%	8
Norwich	60.87%	14
Preston	47.83%	11
Salem	17.39%	4
Sprague	17.39%	4
Stonington	56.52%	13
Waterford	52.17%	12
Windham	0.00%	0
Other (please specify)	26.09%	6
Total Respondents: 23		

#	OTHER (PLEASE SPECIFY)	DATE
1	Old Lyme	4/26/2019 2:45 PM
2	Windham and New London County	4/25/2019 8:08 PM
3	Northeast corner	4/24/2019 5:33 PM
4	Thompson,Putnam,Woodstock,Pomfret,Killingly,Plainfield "Windham County"	4/24/2019 5:09 PM
5	Windam County	4/24/2019 3:01 PM
6	Thompson, Putnam, Killingly, Brooklyn, Plainfield, Woodstock, Pomfret	4/24/2019 3:00 PM

Q22 How long have you been a realtor in Eastern CT?

Answered: 23 Skipped: 8



ANSWER CHOICES	RESPONSES	
<5 years	26.09%	6
5-9 years	0.00%	0
10-19 Years	30.43%	7
>20 years	43.48%	10
TOTAL		23

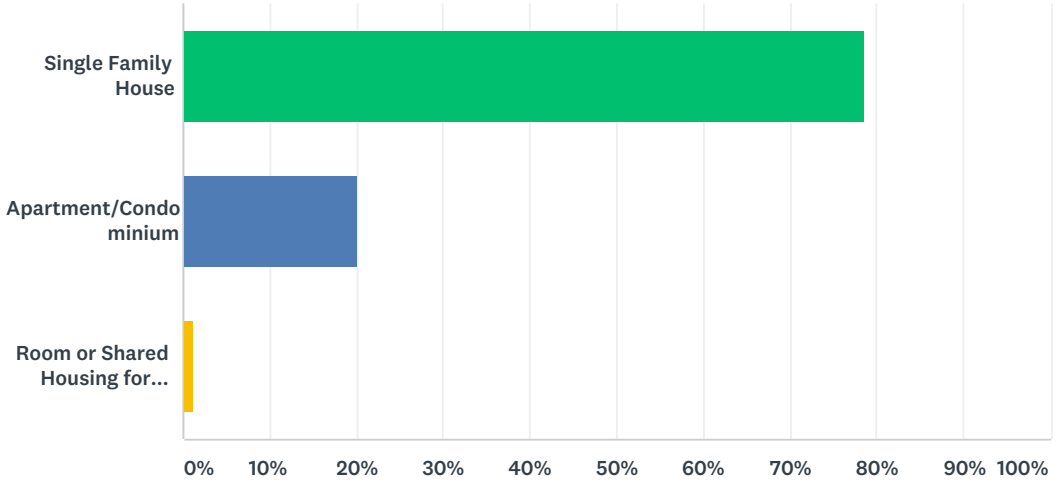
Q23 Is there anything else we should be aware of for our analysis?

Answered: 4 Skipped: 27

#	RESPONSES	DATE
1	Many years ago I was on a committee speaking to towns and assure the people that the casinos were not affecting their home values, now new people coming in for higher paying jobs, still do not want to overspend.	5/5/2019 2:43 PM
2	Inventory is quite low for the demand	4/26/2019 2:45 PM
3	no	4/24/2019 5:33 PM
4	no	4/24/2019 5:09 PM

Q1 What type of housing would you prefer?

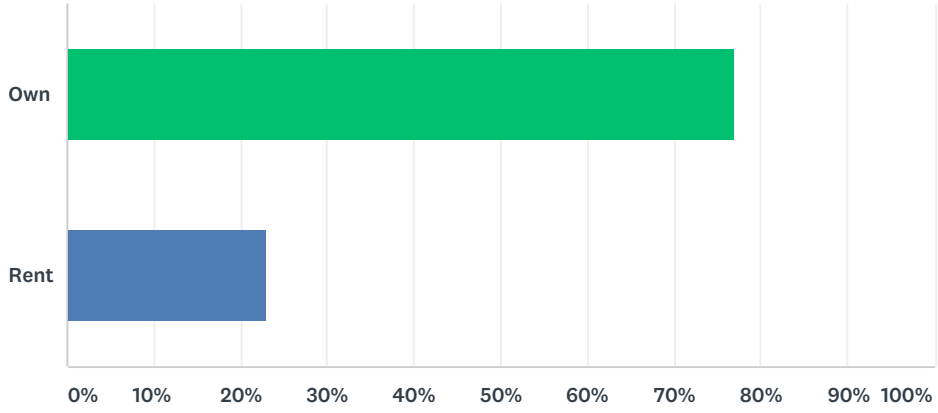
Answered: 1,983 Skipped: 3



ANSWER CHOICES	RESPONSES	
Single Family House	78.57%	1,558
Apartment/Condominium	20.17%	400
Room or Shared Housing for work week only	1.26%	25
TOTAL		1,983

Q2 Would you Own or Rent?

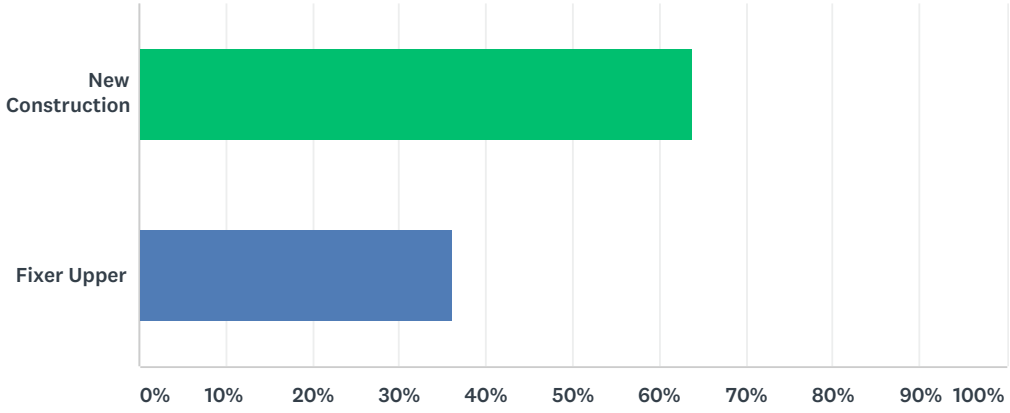
Answered: 1,982 Skipped: 4



ANSWER CHOICES	RESPONSES	
Own	76.94%	1,525
Rent	23.06%	457
TOTAL		1,982

Q3 New Construction or Fixer Upper?

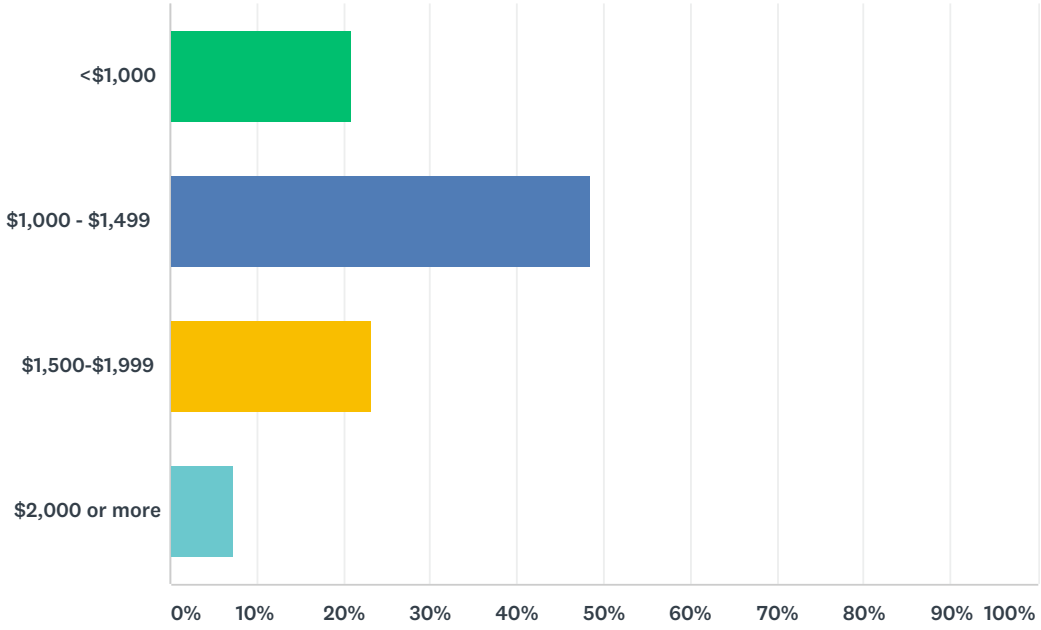
Answered: 1,941 Skipped: 45



ANSWER CHOICES	RESPONSES	
New Construction	63.88%	1,240
Fixer Upper	36.12%	701
TOTAL		1,941

Q4 How much could/would you pay per month for rent or mortgage?

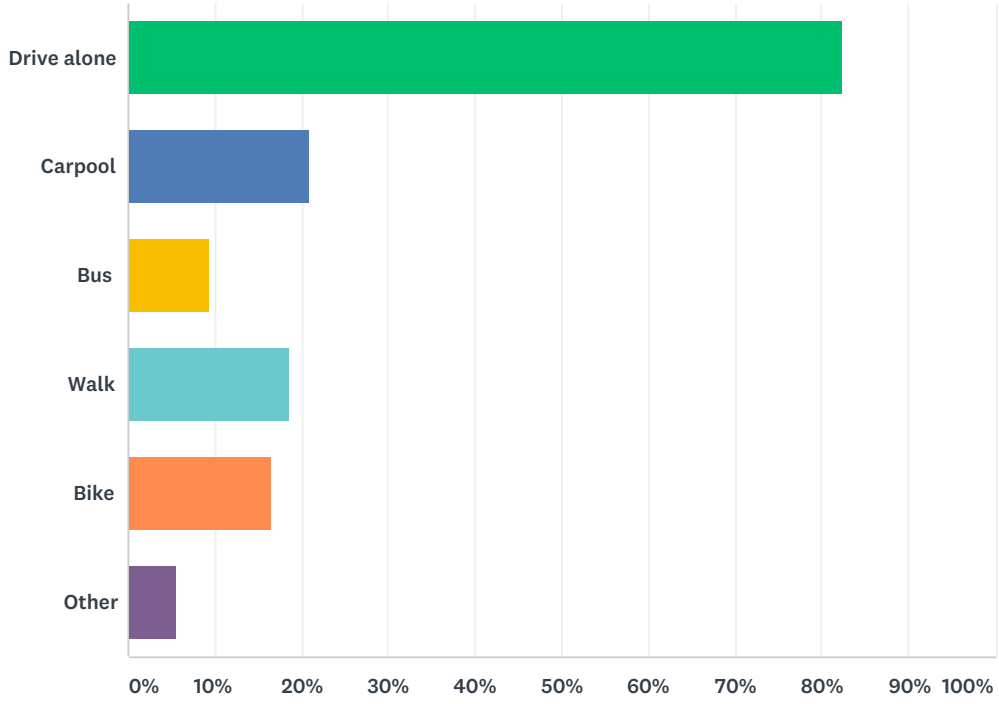
Answered: 1,978 Skipped: 8



ANSWER CHOICES	RESPONSES	
<$1,000	20.93%	414
$1,000 - $1,499	48.48%	959
$1,500-$1,999	23.21%	459
$2,000 or more	7.38%	146
TOTAL		1,978

Q5 Preferred means of transportation to work?

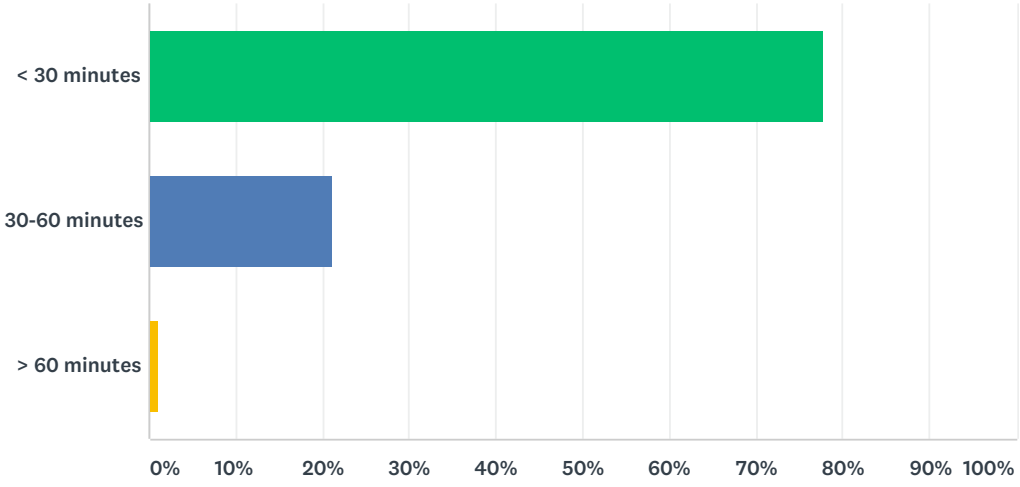
Answered: 1,983 Skipped: 3



ANSWER CHOICES	RESPONSES	
Drive alone	82.40%	1,634
Carpool	20.93%	415
Bus	9.43%	187
Walk	18.71%	371
Bike	16.49%	327
Other	5.65%	112
Total Respondents: 1,983		

Q6 How much time are you willing to spend traveling to work (one way)?

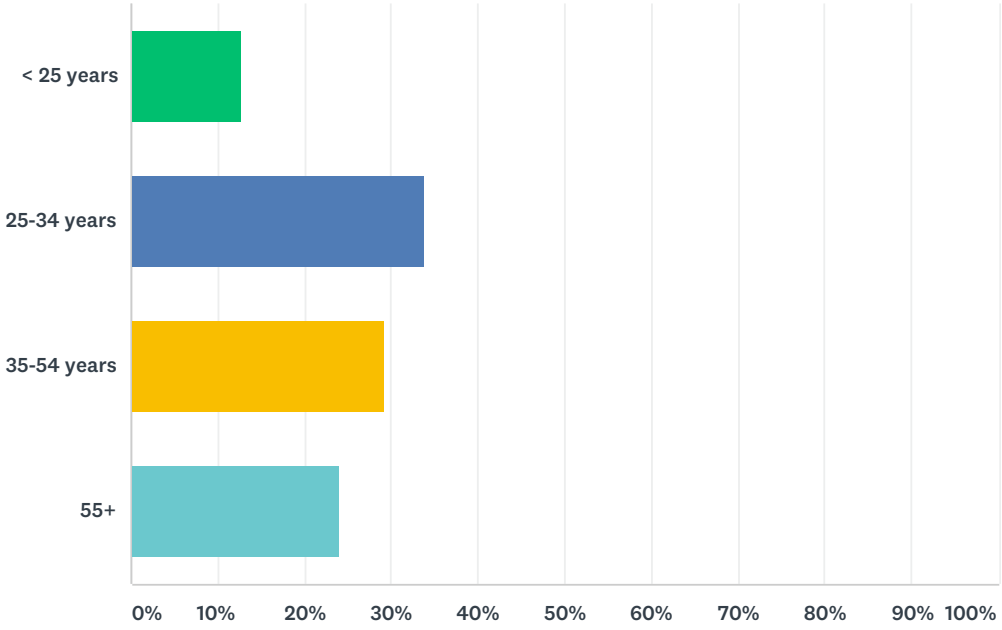
Answered: 1,984 Skipped: 2



ANSWER CHOICES	RESPONSES	
< 30 minutes	77.82%	1,544
30-60 minutes	21.17%	420
> 60 minutes	1.01%	20
TOTAL		1,984

Q7 How old are you?

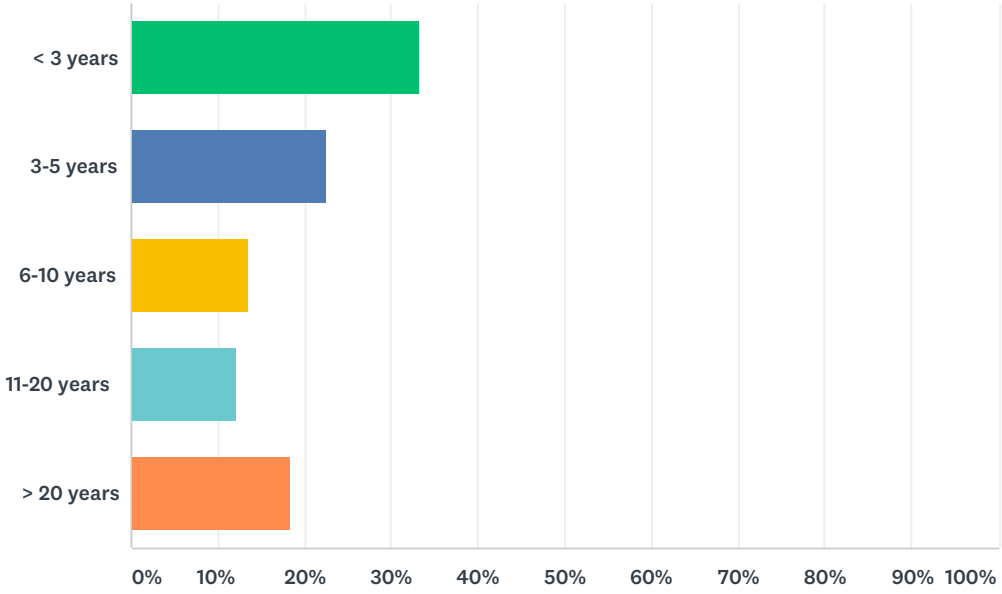
Answered: 1,980 Skipped: 6



ANSWER CHOICES	RESPONSES	
< 25 years	12.83%	254
25-34 years	33.79%	669
35-54 years	29.24%	579
55+	24.14%	478
TOTAL		1,980

Q8 How long have you worked at Electric Boat?

Answered: 1,984 Skipped: 2



ANSWER CHOICES	RESPONSES	
< 3 years	33.27%	660
3-5 years	22.53%	447
6-10 years	13.66%	271
11-20 years	12.10%	240
> 20 years	18.45%	366
TOTAL		1,984