

Exhibit "A-2" - PC Draft
Comp Plan - 2-15-2023

City of Burlington

Comprehensive Plan

Volume II – Supporting Information

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10. Definitions

1 Introduction

The Burlington Comprehensive Plan is divided into two volumes. Volume I summarizes important information and includes the Comprehensive Plan's Goals and Policies. Volume II contains background information, studies, and supporting information used to develop the Comprehensive Plan.

2 Land Use

2.1 Introduction

The Comprehensive Plan must demonstrate that the City zoning regulations and planning policies will allow the City to accommodate 20 years of population and employment growth as well as the public facilities and services necessary to support this development. The City must also manage the use of land to protect critical areas, water quality, and to ensure consistency with other components of the Comprehensive Plan. This section describes how the City's development capacity was assessed and includes recommendations for accommodating future growth, protecting natural resources, and ensuring consistency with other planning policies. A summary of the key findings and recommendations is provided below along with a table showing the City's projected growth and estimated development capacity.

- **Population growth.** Based on the regulations and policies in effect prior to the development of the current Comprehensive Plan the City had sufficient capacity to accommodate population growth through the year 2036. An analysis conducted by the Community Development Department showed that all of the projected population growth could be accommodated within the City's existing municipal boundaries. The recommendations outlined in this section will further increase the City's population capacity.
- **Employment growth.** Based on the regulations and policies in effect prior to the development the current Comprehensive Plan the City would not have sufficient capacity to accommodate employment growth and economic development through the year 2036. The recommendations outlined in this section are intended to increase employment densities, allow limited commercial activities in residential areas, and encouraging mixed-use development. These changes are projected to accommodate employment growth and economic development through the year 2036.
- **Availability of suitable and affordable housing.** The land capacity analysis and the housing research conducted in support of the current Comprehensive Plan indicated a significant mismatch between the types of housing permitted under policies and regulations in effect at that time, and the types of housing needed to accommodate future residents. The recommendations outlined in this section are intended to accommodate a wider variety of housing types throughout the city and significantly increase residential densities in centrally located areas.
- **Public Facilities.** No additional land is required to accommodate planned public facilities; however, changes are needed to ensure consistency between the capital plans of other agencies and the City's Comprehensive Plan.

Table 2.1 Land Capacity Summary – Existing Conditions			
	Population	Housing Units	Jobs
Growth (2015 -2036)	3,808	1,448	3,516
Capacity	4,006	1,523	3,209
Surplus/(Deficit)	198	57	(307)

Table 2.2 Land Capacity Summary – With Proposed Changes			
	Population	Housing Units	Jobs
Growth (2015 -2036)	3,808	1,448	3,516
Capacity	8,476	3,223	4,055
Surplus/(Deficit)	4,668	1,775	539

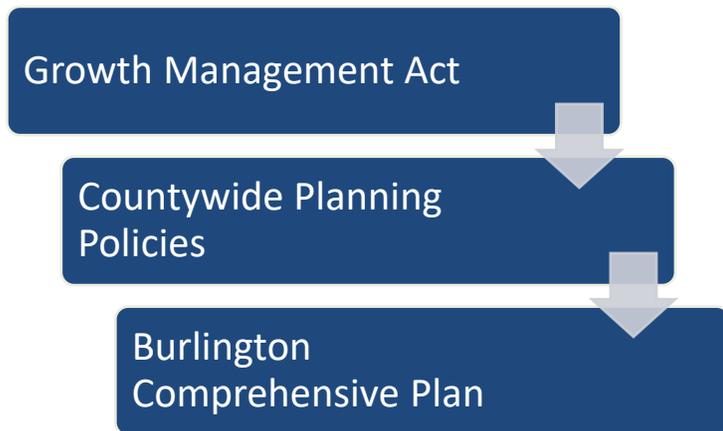
2.2 Requirements

The Growth Management Act (GMA) requires cities and counties to adopt comprehensive plans. The GMA further requires that plans adopted by the cities and counties be periodically reviewed, and if necessary, updated. The purpose of this periodic update requirement is to ensure that plans reflect current legal requirements, up-to-date technical knowledge, and changing local circumstances. A key component of the periodic update process is ensuring that urban growth areas (UGAs) have sufficient capacity for development based current population projections.

Urban growth areas are intended to concentrate growth and development within cities and limit sprawling development in rural areas. UGAs are also intended to reduce the cost of providing public services, such sewer, fire protection, and transportation. Under the GMA, counties, not cities, are responsible for determining the size and boundaries of a city’s UGA. UGAs must have enough land to accommodate twenty years of population and employment growth. UGAs must also have enough land to accommodate the public facilities necessary to serve the projected growth.

Skagit County, through a Growth Management Steering Committee, completed a countywide population and employment forecast in 2014. Through this process the Steering Committee also allocated a portion of countywide population and employment growth to each city in the County. The Steering Committee determined that between 2015 and 2036 the City of Burlington would grow by 3,808 people and 3,516 jobs. Based on the Steering Committee’s

work adjustments were made to a number of UGAs in Skagit County; however, the County chose not to increase the size of Burlington's UGA. This means that all of Burlington's projected growth and development must be accommodated within the City's existing UGA.



2.3 Existing Conditions

Based on the regulations and policies in effect prior to the adoption of the current Comprehensive Plan, a Development Capacity Analysis (DCA) was performed in partnership with Skagit County GIS. The methods used to develop the DCA are intended to be repeatable and to allow for a variety of land use scenarios to be modeled in a largely automated fashion through the use of GIS technology. Over the next 20 years, important land utilization indicators, such as residential densities, infill rates, and commercial floor area ratios will be monitored. Monitoring data will then be used to further refine the DCA during subsequent plan update cycles. This process of continual monitoring and refinement will allow the City to respond quickly and effectively to emerging land use needs.

2.3.1 Methods

In order to comply with the GMA the City must demonstrate that it can accommodate its projected population and employment growth, and that sufficient land exists for new public facilities. The City's ability to accommodate its projected growth is determined by three factors:

- The quantity of vacant land
- The amount of land that can be redeveloped and used more intensively
- The amount of development permitted by the City's zoning and land use regulations

The amount of vacant land available for development is essentially fixed by the size of Burlington's Urban Growth Area (UGA). The City can however, alter the amount of development permitted on existing vacant land by changing its zoning and development regulations. Changes to the City' zoning and development regulations also have the effect of increasing the amount, and intensity, of redevelopment permitted within the existing UGA.

In order to demonstrate compliance with the GMA and to determine if changes to the City’s land use policies and regulations are needed, it is necessary to know how much land in the City is vacant or available for redevelopment, and how much development this land can accommodate. In order to address these questions, an analytical model was created for assessing the City’s development capacity. This model was then applied by Skagit County GIS Services using parcel data and zoning information. A detailed description of the DCA is included Section 2.6 and a simplified diagram is provided below.

$$\begin{aligned}
 & \text{[All Parcels]} \\
 & - \\
 & \text{[Fully Developed Parcels]} \\
 & - \\
 & \text{[Land not Likely to Redevelop]} \\
 & - \\
 & \text{[Land for Public Facilities]} \\
 & + \\
 & \text{[Vacant Parcels x Permitted Development]} \\
 & + \\
 & \text{[Parcels Available for Redevelopment x Permitted Development]} \\
 & = \\
 & \text{[Total Development Capacity]}
 \end{aligned}$$

The DCA began by identifying and excluding undevelopable parcels. Parcels were considered to be undevelopable if they were owned by a charitable organization, institution, or government agency. Once the undevelopable parcels were excluded the remaining parcels were sorted into a number of broad use categories, roughly corresponding to the zoning designations that were in effect at the time of the analysis. Parcels were sorted into the following use categories; single family (R-1), duplex (R-2), multifamily (R-3 and R-S), mixed use residential (MR-NB), mixed used commercial (C-1 and B-1), exclusive commercial (C-2), and industrial (M-1 and BP).

The next step in the analysis involved sorting the parcels from each use category into three subcategories; vacant, partially vacant, and fully developed. Vacant parcels have either no improvements, or have improvements with an assessed value of less than \$5,000. Partially vacant parcels included parcels in the single-family or duplex use categories that had one existing dwelling but were at least twice the minimum lot size permitted by the zone in which they were located. In the commercial, mixed-used, and multi-family use categories, parcels were considered partially developed if they had an improvement to land value ratio of less than 50 percent.

A crucial step in the DCA process is estimating the quantity of land that is unlikely to be available for development over the course of the comprehensive plan (20 years). The methodology employed by the City identified both *categorical* exclusions and *site specific* exclusions. Categorical exclusions include groups of parcels with characteristics that make them unlikely to be developed or redeveloped. For example, publicly owned parcels, such as parks, were deducted from the analysis as these parcels cannot be developed. Other parcels were deducted because, as practical matter, redevelopment is not feasible.

Once the Skagit County GIS completed the automated portion of the analysis work, the initial results were screened by comparing a map of potentially developable parcels to aerial photos and Planning Department records. As a result of this final screening process a large number of parcels were excluded from the results.

2.3.2 Results

2.3.2.1 Residential Capacity

When the DCA was performed, the City had two comprehensive plan designations that were primarily residential, “Single Family and Duplex” (SF-D) and “Multifamily” (MF). These comprehensive plan designations were implemented by the R-1, R-2, and R-3 zones. The R-S zone was also primarily residential but was associated with the “Commercial Business” (CB) comprehensive plan designation. The R-S and R-3 zones were differentiated only by the fact that the R-S zone allowed professional offices in addition to multifamily housing. In order to speed the land capacity analysis the R-S and R-3 zones were combined into a single land use category.

At the time of the analysis approximately 30 percent of Burlington was zoned for single family (detached) housing. The City’s detached zones included four “sub-zones” within the R-1 zoning designation (R1-6, R1-7.6, R1-8.4, and R1-9.6). The R-1 zones permitted a range of lots sizes varying from 6,000 square feet to 9,600 square feet. With few exceptions the R-1 zones limited development to a single free standing home on each lot. Accessory dwelling units were also permitted in most circumstances and duplexes were permitted on corner lots with a conditional use permit. Combined the R-1 zones encompassed approximately 30 percent of the land in the City of Burlington.

To estimate the capacity of the R-1 zones, parcel area data and minimum zoning requirements were used. For example, a vacant lot located in the R1-6 zone with a lot area of 24,000 square feet has a total capacity of four dwelling units because the R1-6 zone requires a minimum lot size of 6,000 square feet ($24,000 \text{ sq. ft.} / 6,000 \text{ sq. ft.} = 4 \text{ dwelling units}$). The same calculation was also applied to partially vacant parcels (a lot with an existing house that is large enough to be divided) except that one unit was subtracted from the results to account for the existing home.

For practical and economic reasons it’s unlikely that every lot that is physically large enough will be further divided. Frequently, existing homes are located in such a way that they must be demolished in order to create additional lots. In such cases, if the existing home is in good condition and the number of lots resulting from the division is small, there is little financial incentive to divide the property. Also, subdividing land typically requires improvements (such as streets, sidewalks, and utility connections). Due to the expense of installing the required improvements, dividing smaller parcels is not always cost effective. Finally, some homeowners

simply enjoy having a large yard or being surrounded by open space, and have no interest in dividing their property.

In order to account for the practical and economic constraints described above, the DCA applied a categorical deduction to smaller partially vacant parcels. This deduction utilized a sliding scale based on the assumption that larger parcels are more likely to be divided than smaller parcels. For lots with an area 2 – 2.5 times the minimum lot size, 75 percent were deducted. Similarly, 50 percent of all partially vacant parcels with a minimum lot size larger than 2.5 times the minimum lot size, but less than 3 times the minimum lot size were deducted. All parcels with a lot area more than 3 times the minimum lot size were considered to be fully developable.

As a final step, a total of 223 potential dwelling units were deducted from the initial results. Most of these deductions were either common area parcels within subdivisions, such as storm-water ponds, or were severely constrained by critical areas such as steep slopes.

The final results showed that the City’s R-1 zones had the capacity for approximately 1,448 dwelling units. At the time of the analysis this accounted for approximately 75 percent of the available residential capacity in the City. Based the City’s average household size the R-1 zones had the capacity to house as many as 3,019 people.

Table 2.3 Detached Residential (R-1 Zones)					
Initial Results		Site Specific Deductions		Adjusted Results	
Dwelling Units	People	Dwelling Units	People	Dwelling Units	People
1,371	3,605	223	586	1,148	3,019

At the time the DCA was completed approximately two percent of the City was zoned R-2. The R-2 zone was identical to the R-1 zone except that two dwelling units were permitted on a single lot. The process described above for the R-1 zones was also used to calculate the capacity of the R-2 zones, except that each potential lot was considered to have capacity for two dwelling units. The results of the DCA indicated the R-2 zone had very little remaining capacity. Only 25 units, housing an estimated 65 people could be constructed in the R-2 zone, accounting for approximately two percent of the City’s available residential capacity.

Table 2.4. Residential Duplex (R-2 Zones)					
Initial Results		Site Specific Deductions		Adjusted Results	
Dwelling Units	People	None		Dwelling Units	People
25	66			25	66

The City’s two multifamily zones, R-3 and R-S allowed multifamily buildings and related accessory uses. The R-S zone also allowed professional offices. At the time of the analysis, about four percent of the City was zoned either R-3 or R-S. The majority of the land in the R-3 zone was located in the City’s northwest corner, while most of the land zoned R-S was located along Fairhaven Boulevard near the east end of downtown Burlington.

For the R-3 and R-S zones the capacity analysis assumed that development would occur at a density of approximately one unit for every 3,000 square feet of lot area (approximately 14.5 du/acre) since this is the maximum density permitted in these zones. A parcel was considered to be available for redevelopment if it had an improvement to land value ratio of less than 50 percent. Again, for practical and economic reasons many of the available parcels are unlikely to be redeveloped. To account for these parcels, 25 percent of the potential units were deducted from the results.

At the time of the analysis approximately 15 acres of land was available for new multifamily development. If fully developed, this land could accommodate 213 additional dwelling units housing as many as 560 people. This accounted for about 14 percent of the City’s available residential capacity.

Table 2.5 Residential Attached (R-3 & R-S Zone)

Initial Results			Site Specific Deductions			Adjusted Results		
Area (acres)	Dwelling Units	People	Area	Dwelling Units	People	Area (acres)	Dwelling Units	People
14.67	213	560	None			14.67	213	560

Three of the City’s zoning designations (C-1, B-1, and MR-NB) allowed a mix of commercial and residential development. With limited exceptions the C-1 and B-1 zones only allowed residential development as part of a mixed use project that also included commercial uses. The MR-NB zone allowed residential development as a stand-alone use.

The process used to calculate the residential capacity of these zones was identical to the process used for the R-3 and R-S zones with one exception. Because the mixed use zones allow both residential and commercial uses, potentially developable land was divided into a residential component and a commercial component. Because the C-1 and B-1 zones only allowed residential uses as part of a larger commercial project, and because the City had historically experienced very little mixed use development, only ten percent of potentially developable land in the C-1 and B-1 zones was allocated to residential development. Conversely, because the MR-NB zone allowed residential development as a stand-alone use, 80 percent of the developable land was allocated to commercial uses and 20 percent was allocated to residential development.

At the time of the analysis approximately 9.48 acres was available for residential development in the MR-NB, B-1, and C-1 zones. The balance of the land in these zones, 94.79 acres, was anticipated to be available for commercial development. The residential component had the potential to support 137 housing units and a population of 361 people. This represented a little over nine percent of the City’s residential capacity.

Table 2.6 Mixed Use Residential (MRNB)				
Initial Results	Site Specific Deductions	Adjusted Results		
3.23 (acres)	None	3.23 (acres)		
		Residential Area		Commercial Area
		.32 (acres)		2.91 (acres)
		Dwelling Units	People	Jobs
		4	11	50

Table 2.7 Mixed Use Commercial (C-1 & B-1 Zones)				
Initial Results	Site Specific Deductions	Adjusted Results		
96.26 (acres)	4.71 (acres)	91.55 (acres)		
		Residential Area		Commercial Area
		9.16 (acres)		82.40 (acres)
		Dwelling Units	People	Jobs
		133	350	1,401

2.3.2.2 Employment Capacity

Calculating employment capacity is more difficult and considerably less precise than calculating residential capacity. The number of people employed per acre can vary dramatically from one parcel to another. For example, a mini-storage facility may occupy a large site but employs very few people, while an office building can be expected to house a large number of people on a comparatively small site. Ultimately the City’s ability to accommodate new employment will depend on the exact mix of economic activities occurring over the next 20 years.

Instead of attempting to anticipate the City’s future economic makeup, average employment densities were used. The averages applied were developed by other jurisdictions using parcel level data from the Washington State Employment Security Department (ESD). Because businesses are required to report their location and the number of people they employ to ESD, it’s possible to develop an average number of employees per acre for different categories of land uses. For purposes of this study, the City assumed a commercial employment density of 17 employees per acre and an industrial employment density of 8 employees per acre. These assumptions were based on the development regulations and planning policies in effect at the time of the analysis.

The employment capacity of the City’s commercial and industrial zones was calculated by multiplying the average employment density for each zone by the land available for development or redevelopment. The process used to identify potentially developable land in the commercial and industrial zones was identical to the process used for the multifamily zones.

Table 2.8 Commercial (C-2 Zone)			
Initial Results	Site Specific Deductions	Adjusted Results	
79.45 (acres)	1.09 (acres)	Area	Jobs
		78.36 (acres)	1,332

Table 2.9 Industrial (M-1 & B-P Zones)			
Initial Results	Deductions	Adjusted Results	
63.42 (acres)	10.22 (acres)	Area	Jobs
		53.20 (acres)	426

The results of the 2018 DCA showed that the City could accommodate 3,209 new jobs, which is less than Burlington’s projected employment growth of 3,516. The chart below illustrates the distribution of available employment capacity by zoning designation based on the zoning designations in effect at the time of the analysis.

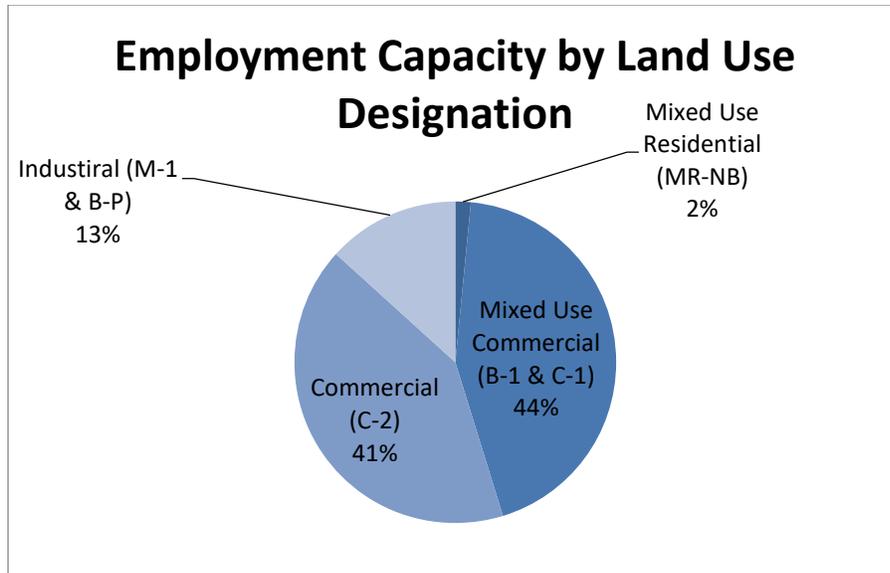


Figure 2.1

2.4 Recommendations

2.4.1 Residential

As table 2.1 shows, the development regulations in effect at the time the DCA was performed provide, on a strictly numerical basis, sufficient capacity to accommodate Burlington’s projected population growth through the year 2036. However, a significant imbalance was noted between the *types* of housing that will be needed and the types of housing that could be built under the City’s existing regulations. Importantly, while 48 percent of the City’s population currently lives in multifamily housing, 75 percent of the City’s available residential capacity is located in single-family zones (detached zones).

As documented in Chapter 3 (Housing), it is projected that at least 60 percent of the housing units produced through the year 2036 will be attached. Table 2.10 provides a breakdown of the City’s projected housing needs by category.

Table 2.10 Future Housing Needs			
Attached Housing	869 (60%)	Multiunit Buildings	652 (75%)
		Townhouses/Duplexes	174 (20%)
		ADU/Small Lot Housing	43 (5%)
Detached Housing	579 dwelling units (40%)		

While more specific recommendations will be prepared in conjunction with the Housing Element, the updated Comprehensive Plan and development regulations should incorporate the following changes to ensure the City has an adequate variety of housing types and densities to support future population growth:

- **Accessory Dwelling Units.** Increase the production of accessory dwelling units in single-family zones to accommodate young people, extended family, and the disabled or elderly. To accomplish this goal the City should relax the current ADU regulations to ensure ADUs can be constructed on all lots zoned for detached residential development.
- **Horizontally Attached Housing.** The R-2 zone should be changed from a “duplex” zone to an “attached residential” zone that allows townhomes, and small multiunit buildings, such as triplexes and funplexes. Additional land must also be added to the attached residential zone. In addition, changes should be made to allow duplexes, townhomes and other similar types housing in more areas. The types of buildings types identified above can accommodate entry level home buyers, young families, and others who need larger homes at lower price points.
- **Facilitate Additional Development in Multifamily Zones.** The design, setback, parking, and amenity standards for the City’s multifamily (attached) zones should be evaluated for consistency with modern housing types and development practices. The amount of land zoned for attached residential development should also be increased.
- **Promote Development in Mixed-Use Areas.** Changes should be made to facilitate a significant amount of development in mixed-use commercial areas. As documented in the chapters addressing housing and transportation, transportation related expenses are a major cost burden for lower income households. Increasing housing development in areas with good access to shopping, services, schools, and employment reduces household transportation burdens. Mixed use development also promotes economic development by increasing the amount of money households have for discretionary spending and increasing patronage of local businesses.

2.4.2 Employment and Economic Development

Absent changes to the Comprehensive Plan, the DCA shows that the City will not be able to accommodate projected employment growth through the year 2036. In addition, Chapter 5 (Economic Development) lays out specific goals that cannot be achieved without revisions to the City's planning policies and development regulations. The following general changes should be considered:

- **Expand Mixed-Use Commercial Areas.** Consider designating new commercial areas along highway 20 near the east and west entrances to the City. A significant amount of vacant and sparsely developed land is located in these areas. Much of this land is within the City's UGA and could be annexed and developed to provide highway oriented traveler and convenience services.
- **Increase Land Utilization and Employment Densities.** Based on historic development trends the DCA assumes relatively low employment densities and land utilization rates. Development regulations should be revised to promote greater site coverage, taller buildings, and mixed use development in core areas. Such changes could significantly increase employment densities and promote target industries, such as healthcare.
- **Broaden Allowed Uses in Mixed-Use Residential Areas.** Make changes to allow a wider variety of non-residential uses in the mixed-used residential zones. For example, despite being located in the City's historic downtown core, the only non-residential use allowed in the RS zone is "professional offices". The City should explore allowing a larger variety of small scale businesses in the mixed-use residential zones
- **Neighborhood Business Areas.** Some areas of the City currently lack convenient access to commercial areas. Consider creating a new "neighborhood business" zone that allows small scale commercial uses to meet the needs of surrounding residents. Also consider allowing a broader range of low impact commercial uses, such as childcare, professional offices, and homes businesses in residential zones.

2.4.3 Public Facilities and Services

To assess estimate future land needs for public facilities and services the City surveyed agencies providing services locally, including Dike District 12, the Burlington Edison School District, Skagit Area Transit, and Skagit County. None of the agencies contacted indicated a need for additional land through the year 2036. The City has identified a need for approximately 4.36 acres of developed park land. A small amount of land will also be required for future transportation improvements. The City should create unique comprehensive plan and zoning map designations for parks and public facilities. To ensure consistency a process should be created for continually monitoring, and adjusting, the quantity of land designated for parks and public facilities.

2.5 Summary of Changes and Results

2.5.1 Comprehensive Plan and Zoning Maps

In order to implement the recommendations outlined in this chapter, the zoning and comprehensive plan maps must be completely revised. The revised maps should include a new system of designations that better reflect the development types they are intended to accommodate. In addition, two new Comprehensive Plan designations should be created including a Public Facilities and Transportation (PFT) designation and an Urban Holding (UH) designation. The PFT designation is needed to accommodate public facilities, utilities, and transportation infrastructure. The UH designation is an overlay designation that should be used to phase growth in the City’s unincorporated UGA.

Old Designations		New Designations	
Comprehensive Plan Designation	Associated Zoning Map Designations	Comprehensive Plan Designation	Associated Zoning Map Designations
Single Family/Duplex (SFD)	R1-6	Residential Detached (RD)	RD-1 RD-2
	R1-7.6		
	R1-8.4		
	R1-9.6		
	R-2		
Multifamily (MF)	R-3	Residential Attached (RA)	RA-1 RA-2
Commercial – Business (CB)	RS	Mixed-Use Residential (MUR)	MUR-1 MUR-2
	MR-NB		Mixed-Use Commercial (MUC)
	B-1		
	C-1		
Heavy Commercial and Industrial	C-2	Commercial-Industrial (CI)	MUC-1 MUC-2
	BP		
	M-1		
Open Space and Agriculture (OSPA)	OSPA	Parks and Conservation (PC)	PC-1 PC-2
N/A	N/A	Public Facilities and Transportation (PFT)	PFT-1 PFT-2
N/A	N/A	Urban Holding	UH

In addition to a revised designation system, significant map revisions are also needed. The following significant changes should be reflected in the final maps included with the Comprehensive Plan:

- Change the designation of approximately 80 acres of land from Residential Detached (RD) to Residential Attached (RA) to increase the supply of land available for attached housing units such as townhomes, duplexes, and apartments.
- Assign all land owned by public agencies a PFT designation to ensure consistency between the Comprehensive Plan and the capital plans and spending decisions of public agencies.
- Change the designation of approximately 3.4 acres of land in the Downtown Priority Growth Area from Residential Attached (RA) to Mixed-Use Residential (MUR) to accommodate more employment uses.
- Change the designation of approximately 3.76 acres of land in the Western Gateway Special Development Area from RD to MUR to accommodate more attached housing and small businesses such as neighborhoods services.
- All park land, land owned public agencies for conservation, flood control, and storm-water management purposes, and other land permanently designated for such purposes should assigned a Parks and Conservation (PC) designation.

Table 2.1 – Land Area by Comprehensive Plan Designation (Revised Maps)			
Comprehensive Plan Map Designation	Area (acres)	Percentage	Planned Uses
Commercial & Industrial (CI)	542.24	19.8	Industrial, Storage, Outdoor Sales, Distribution
Mixed-Use Commercial (MUC)	567.90	20.8	Retail, Offices, Higher Density Residential, and Medical
Mixed-Use Residential (MUR)	65.12	2.4	Residential and Small Scale Commercial Uses
Parks and Conservation (PC)	319.75	11.7	Parks, Conservation Areas, Flood Control, and Surface Water Management
Public Facilities & Transportation (PFT)	353.02	12.9	Public Buildings, Streets, Freeways, Utilities, and Railroads
Residential Attached (RA)	223.96	8.2	Attached Dwellings
Residential Detached (RD)	655.82	24	Detached Dwellings
Total:	2,728	100	

2.5.2 Development Regulations

In order to address the housing and economic development needs outlined in section 2.4, the City's development regulations must be substantially revised. The proposed changes significantly increase the City's ability to accommodate population and employment growth. The changes are also intended to protect critical areas and water quality and to ensure consistency with the other elements of the Comprehensive Plan. A summary of the most significant changes is provided below:

- Revise zoning regulations for MUC zones to allow offices of all sizes and categorize medical facilities and clinics as outright permitted uses. Increase height limits and revise parking requirements and other design standards applicable for commercial development to promote more efficient development patterns and higher employment densities. Consistent with the Economic Development Element of the Comprehensive Plan, Burlington expects an increase in office and healthcare employment. The combined effect of the regulatory changes and the projected shift in employment types is expected to increase the average employment density for at least 25 percent of new commercial development from 17 employees per acre to 30 employees per acre.
- Revise development regulations to ensure appropriate facilities are provided to support mixed-use development, including fully connected street networks and enhanced pedestrian amenities.
- Created development regulations for the Gages Slough, Burlington Hill, and Skagit River Corridor Special Management Areas (SMAs) to protect critical areas, natural resources, and minimize exposure to natural hazards such as floods, wildfires, landslides, and erosion. Consistent with the Natural Resources Element the City's critical area regulation have also been significantly revised.

2.5.3 Results

Comprehensive Plan Map Designation	Population	Housing Units	Employment
Residential Detached (RD)	1,636 ⁽³⁾	622	N/A ⁽²⁾
Residential Attached (RA)	600 ⁽³⁾	228	N/A ⁽²⁾
Mixed-Use Residential (MUR)	200	76	163
Mixed-Use Commercial (MUC)	1,372 ⁽³⁾	522	2,454
Commercial Industrial (CI)	None	None	621
Parks and Conservation (PC)	None	None	None
Public Facilities and Transportation (PFT)	None	None	279
Total	3,808	1,448	3,516

Notes:

(1) This table represents the minimum projected growth for each Comprehensive Plan Map designation based on the total population and employment allocations issued by the Skagit Council of Governments (SCOG).

(2) A limited number of minor commercial uses are permitted in the RD and RA designations and some job growth is likely; however, it is not expected to be statistically significant and has not been included here.

(3) Based on recent development trends there is a high probability the percentage of attached housing may be significantly larger than represented here. As a result significantly more residential development would be expected in the MUC designation with a corresponding reduction in the RD designation.

Comprehensive Plan Map Designation	Population	Housing Units	Employment
Residential Detached (RD)	3,124	1,188	N/A ⁽²⁾
Residential Attached (RA)	1,491	567	173 ⁽³⁾
Mixed-Use Residential (MUR)			
Mixed-Use Commercial (MUC)	3,861	1,465	3,001
Commercial Industrial (CI)	None	None ⁽⁴⁾	602 ⁽³⁾
Parks and Conservation (PC)	None	None	None
Public Facilities and Transportation (PFT)	None	None ⁽⁵⁾	279
Total	8,476	3,220	4,055

Notes:

(1) This table represents the estimated population, housing, and employment capacity of each Comprehensive Plan Map designation. Capacity estimates are based on the Land Capacity Analysis in Volume II of the Comprehensive Plan, adjusted to account for the changes made as part of the Comprehensive Plan Update. (2) A limited number of minor commercial uses are permitted in the RD and RA designations and some job growth is likely; however, it is not expected to be statistically significant and has not been included here. (3) The MUR designation is associated with two zones (MUR-1 and MUR-2). The MUR-2 zones allows small scale industrial uses but no attempt has been made to separately estimate the industrial vs commercial capacity of each zone. As noted the CI designation has an estimated capacity deficit of 19 jobs. The allocation in Table 3.2 is based on the City's projected industrial employment growth which was only allocated to the CI designation. It's likely that some portion of this growth will be accommodated in the MUR designation, but no estimate is available.

2.6 Development Capacity Model

This section includes a detailed description of the City's Development Capacity Analysis.

2.6.1 Definitions

1. **Development Potential, Non-Residential, and Multifamily Residential:** The number of acres available for non-residential, mixed-use, and multifamily residential development in each industrial, commercial, mixed use, and multifamily zone. For purposes of this analysis, development potential is a subtotal expressing the gross capacity of vacant or re-developable parcels before the "total development potential" is calculated.
2. **Development Potential, Single-Family and Duplex Residential:** The potential number of lots or dwelling units that can be created by dividing or developing vacant or partially vacant parcels in zones where single-family residential development is permitted. For purposes of this analysis, development potential is a subtotal expressing the gross capacity of vacant or re-developable parcels before the "total development potential" is calculated.
3. **Partially Vacant Parcel:** A partially vacant parcel is a parcel which contains an existing dwelling unit but which is large enough to be divided.
4. **Public Purpose Land:** This term includes land which is needed to support development and provide public services such as streets, drainage facilities, parks, and open space areas.
5. **Redevelopment Factor:** A factor used to account for land which may, theoretically, be available for development, but which in practice may not be redeveloped due owner considerations, market conditions, parcel configuration, access, or existing development.
6. **Re-developable Parcel:** A parcel zoned for non-residential uses, mixed-use, or multifamily housing that has the potential to be redeveloped and used more intensively. A parcel with an improvement to land value ratio of less than 1:2 is considered re-developable.
7. **Total Development Potential, Non-Residential and Multifamily Residential:** The total gross quantity of land available for multifamily, mixed-use, or non-residential development before the redevelopment factor is subtracted.
8. **Total Net Capacity:** The total net capacity is the total quantity of new development that can be supported in each zoning designation after land needed for public purposes is subtracted. Total net capacity is expressed in "acres" for multifamily, mixed-use, and

non-residential zones and in “dwelling units” or available “lots” in single-family and duplex zones.

9. Undevelopable Parcel: Parcels which are not likely to be available for development because they are owned by a charitable organization, institution, or government agency. Undevelopable parcels shall be identified based on Assessor’s parcel data. Parcels which are listed as “tax exempt” based on Assessor’s parcel data shall be considered undevelopable.
10. Vacant Parcel: Is a parcel which is either vacant or has an improved value of less than \$4,000 based on Assessor’s parcel data. Parcels which contain a mobile or manufactured home shall not be considered vacant even if they have an improved value of less than \$4,000. Such parcels shall be classified as fully or partially developed based on their size.
11. Value: When the term value is used in this document it shall mean assessed value identified in the Skagit County Assessor’s database.

2.6.2 Assumptions

1. Employment Density: For non-residential, mixed-use, and multifamily zones the following assumptions should be used to calculate employment capacity:
 - a. Commercial and mixed use zones: 17 employees per acre
 - b. Industrial zones: 8 employees per acre
2. Public Purpose Land: 15 percent of land in all zones, except the parks and open space zone will be needed for public purpose. Parks and open space zones are not included because these areas are presumed to have no residential or commercial development capacity. This deduction is not applied to small residential land divisions (four or fewer lots) because the required public infrastructure is typically provided on a lot by lot basis. Also, because non-residential, mixed-use, and multifamily development is regulated by bulk and density limits, rather than lot size requirements, the land needed for public purposes is not separately accounted for in these zones. Instead land needed for public purposes is included in the redevelopment factor bellow.
3. Redevelopment Factor: It is assumed that 25 percent of all non-residential, mixed-use, and multifamily parcels with an improvement to land value of less than 1:2 will be available for redevelopment during the planning period (20 years from the date of the most recent periodic update).

4. Household Size: For purpose of this analysis an average household size of 2.63 shall be used. For each subsequent analysis, the most current census or American Community Survey data shall be used.
5. Use Ratio, Mixed-Use Residential: 20 percent of the capacity of all “mixed-use residential” zones will be used to support residential development and the remaining 80 percent will be used to support commercial development. Currently the City has only one “mixed-use residential” zone (MR-NB).
6. Use Ratio, Mixed-Use Commercial: 90 percent of the capacity of all “mixed-use commercial” zones will be used to support commercial development and the remaining 10 percent will be used to support residential development. The City’s B-1 and C-1 zones should be considered “mixed-use commercial” for purposes of this analysis.

2.6.3 Analysis Steps

2.6.3.1 General

1. Identify all undevelopable parcels. Undevelopable parcels should be removed from further consideration and analysis.
2. Sort parcels into the following categories based on their zoning designations. Parcels zoned parks and open space (OSPA) should be identified and removed from further consideration and analysis.
 - a. Single-family: R1-6, R1-7.6, R1-8.4, and R1-9.6 (each of these zones should also be sorted into subgroups)
 - b. Duplex: R-2
 - c. Multifamily: R-3 and RS
 - d. Mixed-Use Residential: MR-NB
 - e. Mixed-Use Commercial: B-1 and C-1
 - f. Commercial: C-2
 - g. Industrial: M-1 and BP

2.6.3.2 - Single-Family

1. Sort single-family parcels into two categories; (a) vacant and (b) partially vacant, based on the definitions provided in section one.
2. For each vacant and partially vacant parcel that is more than four times the size of the minimum lot size required by the zone in which it is located, deduct 15 percent to account for the land needed for public purposes.
3. For each single-family zoning designation calculate the development potential of all vacant parcels. The development potential of vacant parcels is determined by dividing the parcel area by the minimum lot size allowed in the zone and rounding down.
4. For each single-family zoning designation calculate the development potential of all partially vacant parcels. For purposes of this analysis, a partially vacant parcel is a parcel with one or more existing dwelling units that is at least twice as large as the minimum lot size allowed by the zone. Calculate the development potential of all partially vacant parcels by dividing the parcel area by the minimum lot size allowed in the zone, rounding down, and subtracting one in order to account for the existing dwelling unit. As a further step identify all parcels that are between 2 and 3 times the minimum lot size allowed in the zone; discount a portion of these based on the sliding scale below to account for parcels which are physically large enough to be divided, but which are not likely to be divided for practical reasons such as the configuration of the lot or the placement of the existing dwelling unit.

Criteria	Discount Factor
2 – 2.5 times the minimum lot size	75%
> 2.5 – 3 times the minimum lot size	50%
> 3 times the minimum lot size	0%

5. For each single-family zoning designation determine the total net capacity by adding the results of steps three and four together. The total net capacity of each zoning designation should be expressed by the number of dwelling units that could, potentially, be constructed based on current zoning regulations.
6. In order to determine the number of people that can be accommodated in each of the single-family zones multiply the number of dwelling units permitted in each zone by the average household size for the City of Burlington (2.63).

2.6.3.3 - Duplex

1. Sort duplex parcels into two categories; (a) vacant and (b) partially vacant, based on the definitions provided in section one.
2. Deduct 15 percent from the lot area of each vacant and partially vacant parcel that is larger than 15,200 square feet in order to account for the land needed for public purposes.
3. For the R-2 zoning designation calculate the development potential of all vacant parcels. The development potential of vacant parcels is determined by dividing the parcel area by 7,600 square feet, rounding down and multiplying the result by two. The result of this step is the development capacity of the R-2 zone, in dwelling units.
4. For the R-2 zoning designation calculate the development potential of all partially vacant parcels. For purposes of this analysis, a partially vacant parcel is a parcel that is at least twice as large as the minimum lot size allowed by the zone (7,600 square feet) but already has a dwelling on it. Calculate the development potential of all partially vacant parcels by dividing the parcel area by 7,600 square feet, rounding down, and subtracting one in order to account for the existing dwelling unit.
5. Determine the total net capacity of the R-2 zone by adding the results of steps three and four together. The total net capacity should be expressed as the number of dwelling units that could, potentially, be constructed based on current zoning regulations.
6. In order to determine the number of people that can be accommodated in the R-2 zone multiply the total net capacity by the average household size for the City of Burlington (2.63).

2.6.3.4 - Multifamily

1. Identify all vacant parcels zoned for multifamily residential development (R-3 and R-S). Determine the development potential of these parcels by dividing the parcel area by 3,000 square feet. The result of this step is the total net capacity of all vacant multifamily parcels, in dwelling units.
2. Identify all re-developable multifamily parcels. Determine the development potential of these parcels by dividing the parcel size by 3,000 square feet and rounding down. As an additional step deduct 25 percent from the result to account for existing dwelling units and physical and market factors which may prevent redevelopment. The result in the total net capacity of the multifamily zones.

3. In order to determine the number of people that can be accommodated in the multifamily zones, add the results from steps one and two together and multiply by the average household size for the City of Burlington (2.63).

2.6.3.5 – Mixed-Use Residential

1. Identify all of the vacant parcels available for mixed use residential development and calculate their total combined acreage.
2. Identify all of the re-developable parcels available for mixed use residential development. A parcel should be considered re-developable if the parcel data indicates that it has an improvement to land value ratio of less than 1:2. Once all of the re-developable parcels have been identified calculate their total combined acreage.
3. Combine the total acreage figures from steps one and two and subtract 25 percent in order to account for land which may not be available for redevelopment due to market conditions, parcel configuration, access, or existing development. Divide the result into a residential component and a commercial component. The residential component should represent 20 percent of the total acreage and the commercial component should represent 80 percent of the total acreage.
4. Determine the residential capacity of the mixed use residential areas by converting the acreage of the residential component to square feet, dividing by 3,000, and rounding down. The result represents the total number of dwelling units that can be constructed in the mixed use residential zones. As a final step determine the total population capacity by multiplying the number of dwelling units by the average household size for the City of Burlington (2.63).
5. Determine the employment capacity of the mixed use residential areas by multiplying acreage of the commercial component by 17. The result represents the total employment capacity of the mixed use residential zones.

2.6.3.6 – Mixed-Use Commercial

1. Identify all vacant parcels available for mixed use commercial development and calculate their total combined acreage.
2. Identify all of the re-developable parcels available for mixed use commercial development. A parcel should be considered re-developable if the parcel data indicates that it has an improvement to land value ratio of less than 1:2. Once all of the re-developable parcels have been identified calculate their total combined acreage.
3. Combine the total acreage figures from steps one and two and subtract 25 percent in order to account for land which may not be available for redevelopment due to market

conditions, parcel configuration, access, or existing development. Divide the result into a residential component and a commercial component. The residential component should represent 10 percent of the total acreage and the commercial component should represent 90 percent of the total acreage.

4. Determine the residential capacity of the mixed use commercial areas by converting the acreage of the residential component to square feet, dividing by 3,000, and rounding down. The result represents the total number of dwelling units that can be constructed in the mixed use commercial zones. As a final step determine the total population capacity by multiplying the number of dwelling units by the average household size for the City of Burlington (2.63).
5. Determine the employment capacity of the mixed use commercial areas by multiplying acreage of the commercial component by 17. The result represents the total employment capacity of the mixed use commercial zones.

2.6.3.7 - Commercial

1. Identify all vacant parcels zoned for commercial development and calculate their total combined acreage.
2. Identify all of the re-developable parcels available for mixed use residential development. A parcel should be considered re-developable if the parcel data indicates that it has an improvement to land value ratio of less than 1:2. Once all of the re-developable parcels have been identified calculate their total combined acreage.
3. Combine the total acreage figures from steps one and two and subtract 25 percent in order to account for land which may not be available for redevelopment due to market conditions, parcel configuration, access, or existing development.
4. Determine the employment capacity of the commercial zones by multiplying the results of step three by 17. The result represents the total employment capacity of the commercial zones.

2.6.3.8 - Industrial

1. Identify all vacant parcels zoned for industrial development and calculate their total combined acreage.
2. Identify all of the re-developable parcels available for mixed use residential development. A parcel should be considered re-developable if the parcel data indicates that it has an improvement to land value ratio of less than 1:2. Once all of the re-developable parcels have been identified calculate their total combined acreage.

3. Combine the total acreage figures from steps one and two and subtract 25 percent in order to account for land which may not be available for redevelopment due to market conditions, parcel configuration, access, or existing development.
4. Determine the employment capacity of the industrial zones by multiplying the results of step three by 8. The result represents the total employment capacity of the industrial zones.

2.6.4 Limitations

1. Commercial, multifamily, and mixed-use redevelopment potential does not account for existing employment or population capacity that may be replaced during the redevelopment process. Because the City lacks adequate information regarding the number of dwelling units in multi-family buildings, or the quantity of commercial floor space in existing buildings, all such capacity has been excluded from this analysis. It is recommended that improvements be made to the City's permit tracking data-base and annual multifamily/commercial safety inspection program so that capacity can be more accurately tracked during subsequent periodic update cycles.
2. The assumptions and calculations related to partially vacant duplex parcels may be less accurate than the same assumptions and calculations for single-family parcels. The process outlined in this report assumes that the existing structure on a parcel zoned R-2 is a single-family home when in reality it may be either a duplex or a single-family home. However, only a small quantity of land is zoned for duplexes so the overall effect of this assumption is limited. In the future the City should consider eliminating the "R-2" zone and replacing it with an "attached SFR" or "town-house" zone. By doing so the development potential could be easily calculated using permitted density assumptions similar to those applied in the multifamily zones.
3. The mixed-use "use ratio" assumptions presented in this document are untested. The City's current regulations tightly limit density and require commercial uses on the ground floor of all mixed use projects. This analysis assumes changes are made to the zoning code to promote additional housing development. The use ratios identified in section two should be added to the land use element of the comprehensive plan as goals, and progress towards these goals should be monitored on an ongoing basis. If necessary, changes should be made during subsequent periodic update cycles to ensure the use ratio goals are achieved.
4. This analysis method is intended to estimate the aggregate capacity of developable land within the City of Burlington. This method is *not* intended to identify the ability or likelihood of an individual parcel being developed or redeveloped.

3 Housing

3.1 Introduction

The City's Comprehensive Plan must identify the type and quantity of housing needed for a period of 20 years. The Comprehensive Plan must show where this housing can be built, and demonstrate that the City's land use policies and development regulations allow for the construction of the needed housing. This report summarizes what the Growth Management Act (GMA) requires with respect to housing, explains how housing markets work, and analyzes the City's future housing needs. A list of recommended changes to address the City's housing needs is also included.

A housing problem can be said to exist when housing is simply unavailable, or when the price of housing increases dramatically in relation to incomes, resulting in housing that is unaffordable for even relatively well-off households (Glaeser 2008). Housing problems tend to be isolated and are most prevalent in fast growing cities with restrictive land use policies (Glaeser and Gyourko 2018). More commonly, poor households struggle to obtain housing because their incomes are too low to afford it regardless of how cheaply the market provides it. In such cases the problem is poverty, not a shortage of housing (Glaeser 2008). This distinction is important because the two problems require very different approaches. Local governments are arguably better equipped to address the issue of housing availability, while poverty problems may require resources and policy measures that fall within the purview of the state and federal governments.

Over the next 20 years Burlington will need to add over 1,448 housing units, an increasing percentage of which will need to meet the needs of single adults, couples without children, multigenerational households, and the elderly. Changing economic conditions, demographic trends, and shifting consumer preferences have altered the demand for housing and created a need for a more diverse range of housing options. Importantly, no single housing type will meet these needs. Instead, the City will need to accommodate a variety of housing types including detached houses, accessory dwelling units, small apartment buildings, townhouses, and larger multi-unit buildings. While more detailed recommendations are provided later in this report, the most significant points can be summarized as follows:

- **More attached housing is needed.** Attached housing, such as apartments, townhomes, and condominiums, currently accounts for 48 percent of the housing in Burlington. By 2036 more than 60 percent of the City's housing will be attached, creating a need for at least 869 additional multi-unit and attached dwellings. Based on the City's current regulations, only 375 such dwellings can be constructed.

- **Allow housing to be used more flexibly.** Nearly half of the City’s households are “non-family households” and the number of non-family households has steadily increased over the past three decades. Accessory dwelling units (ADUs) can meet the housing needs of many non-family households. ADUs are essentially a small apartment built on the same lot as a single-family home. ADUs can either be located inside an existing home, or in an accessory building. Current zoning regulations allow ADUs citywide but make obtaining a permit for one time consuming, expensive, and difficult.
- **Infill and redevelopment will be increasingly important.** GMA requirements aimed at reducing sprawl, Skagit County’s rigorous farmland protection policies, and the presence of flood hazards make expanding the City and incorporating undeveloped land difficult. In order to allow otherwise unbuildable sites to be developed, the setback, parking, and design standards for multifamily development should be reviewed. Regulations concerning residential development in commercial zones should also be revised to make it easier to develop mixed use and residential projects.
- **Townhomes and row-houses should be permitted.** Townhomes are modest homes suitable for families who may not be able to afford, or who may not want or need a detached single-family home. The City’s R-2 (duplex) zone should be amended to allow townhomes, row-houses, and small apartment buildings. These areas are already characterized by a mix of housing types and could easily accommodate more development with little impact.
- **Housing, economic development, and transportation are related.** In order to reduce transportation costs, increase access to jobs and economic opportunity, and to support continued growth in the City’s retail and service trades, changes should be made to the City’s commercial zoning regulations to encourage an increase in residential and mixed use development in commercial areas. These changes could accommodate a significant share of the City’s needed multi-unit housing without impacting existing residential areas.

3.2 Requirements

The City is required by the GMA to demonstrate, based on its zoning regulations, that sufficient capacity exists to accommodate 20 years of population growth (RCW 36.70A.110(2)). The Housing Element must provide an inventory of existing housing and analyze the projected supply and demand for housing. Specifically the Housing Element must show how, and where, a variety of housing types and densities will be accommodated, including multi-unit buildings, detached houses, accessory dwelling units, group homes, manufactured housing, foster care facilities, and subsidized housing for low income households.

One of the goals of the GMA is to encourage the availability of affordable housing for all economic segments of the community, promote a variety of housing types and densities, and to encourage the preservation of existing housing (RCW 36.70A.020(4)). Importantly the GMA does not require that housing be provided, or guarantee a specific outcome; instead, local governments are required to ensure planning policies and regulations do not prevent private, non-profit, or public housing developers from constructing needed housing.

The City's housing element must be based on an "inventory and analysis". The purpose of this analysis is to identify the number of units required for each type of housing, show where this housing can be developed, and demonstrate the City's regulations do not prevent this housing from being constructed. The inventory and analysis should also identify methods of monitoring annual housing production and identify potential corrective actions that will be taken in the event of a shortfall (WAC 365-196-410(2)(d)). The City's current housing element is based on a report prepared in 1993. This analysis is no longer relevant and up-to-date information on housing is required.

The most important GMA requirements related to housing can be summarized as follows:

- The City must accommodate 20 years of population growth
- The number and type of housing units required to accommodate this growth must be identified
- The housing element must show how the City's zoning regulations will accommodate these housing units
- Housing for all economic and demographic segments of the population must be permitted

3.3 Theory and Best Practices

The market for housing, like the market for other consumer goods, is largely driven by supply and demand. However, unlike other consumer goods, housing is unique in ways that can frustrate normal market functions. Government intervention in housing markets through regulations, tax policy, financial support, incentives, and infrastructure spending have had profound impacts on how housing markets function. This section describes how housing markets work, identifies the factors affecting the cost of housing, and explains what local governments, such as Burlington, can do to alleviate housing problems.

3.3.1 Demand

Housing markets respond to supply and demand. If the demand for housing is constant, an increase in supply will reduce prices. Conversely, rising demand in the face of a fixed supply will cause prices to increase. Demand for housing is induced by changes in the demographic and economic composition of a housing market. Specifically, the demand for housing is driven by the rate of household formation (Smith 1984 and Perlich 2015). Households tend to form in response to immigration, children leaving home, divorce, births, and rising incomes. Similarly, the rate of household formation will be suppressed by marriage, death, or adult children living with their parents in response to low wages or unemployment (Dunne 2012 and Haurin & Rosenthal 2004).

3.3.2 Supply

The supply of housing consists of both a “stock” of existing housing units, and a “flow” of new units resulting from construction and redevelopment (Schuetz and Murray 2018). While discussions involving housing tend to focus on the flow, or construction of new units, the vast majority of the supply in a housing market is comprised of existing stock. Nationally existing home sales account for 80 to 90 percent of the homes sold in a given year (Mildner). Given the long lead time associated with bringing new housing units to the market, and the fact that new units comprise a relatively small share of the overall supply, changes which limit, or increase, the production of housing will take many years to affect the price of housing.

A fundamental tenant of housing economics is that existing housing is generally more affordable than new housing. While land tends to increase in value over time, structures tend to depreciate, both because they wear out and become structurally deficient, and because consumers tend to value up-to-date features and amenities. As new homes are built, they are purchased or rented by relatively well-off households who then vacate older units, which in turn become available to households with comparatively lower incomes. This process is known as “filtering”. In theory, filtering will reduce the cost of existing homes, in relation to the cost of new homes, each time they changes hands (Mildner 2015).

3.3.3 Production Costs

The cost of constructing new housing is driven by the costs of the inputs required to produce it, principally land, finance, and construction costs, including labor, materials, and infrastructure (Green and Malpezzi 2003). Regulations imposed by local governments can also add to the cost of housing by limiting the supply of land available for development, restricting the amount of development that can occur in a given location, and by requiring buildings to be constructed to a certain standard, or by requiring developers to provide amenities, such as parking, landscaping, and open space.

Land is one of the most significant (although not generally the largest) factor in the cost of producing housing. The price of land is subject to dramatic changes, both from place to place and across time. Importantly land has little value in and of itself; rather, its value is derived from the uses it can be put to. All other factors being equal, land is most expensive near the center of cities and employment centers and generally decreases in value as the distance to the city or employment center increases (Kivell 1993). As a result, land nearest the center will be used more intensively, while less intensive, and profitable, uses will be located further from town (Oxley 2004). This concept is known as the “land rent gradient” and is a factor in all markets to varying degrees.

Considerable attention is often given to reducing construction costs through prefabrication, modular construction, smaller dwellings, or relaxed building standards. While construction costs are a significant factor in the total cost of housing (perhaps the largest), the cost of new housing varies significantly from one place to another, and this variation cannot be explained on the basis of construction costs alone. Instead, it is thought that the cost of land contributes to this variation (Glaeser and Gyourko 2018). This is a particularly relevant consideration for Burlington. Burlington, like most cities in the State of Washington, is surrounded by an urban growth area (UGA) which limits the City’s outward expansion and the supply of land available for development.

Urban growth areas are intended to preserve farmland and prevent sprawling development by ensuring that development is compact and contiguous to areas of existing development. In order to achieve these objectives, growth must be accommodated through infill and redevelopment when possible. Because expensive land tends to be used more intensively, and efficiently, than less expensive land, the success of an urban growth area depends, at least to some extent, on increasing the cost of land within the UGA. In fact, Burlington’s recently completed buildable lands analysis is predicated on this very assumption. Within certain limits however, high land costs need not necessarily increase the cost of housing.

In an otherwise unrestricted market, housing developers respond to high land costs by either producing more expensive homes, targeted at higher income buyers, or by building housing at higher densities, thereby using land more efficiently. In practice however, most cities, including Burlington, restrict the amount of development that can occur on a given site through

minimum lot size requirements, building height limitations, and density limits. As a result of these limitations developers often find the only viable way of recovering the cost of expensive land is to build expensive homes for the relatively well off (HART 2017). If the dual goals of restraining sprawl and maintaining housing affordability are to be achieved, the amount of housing that can be constructed within the UGA must be increased through higher residential densities.

While UGAs may increase the cost of land, they can also reduce other development costs. The infrastructure necessary to support new development, such as roads, sewer systems, storm-water infrastructure, and public water supplies are expensive. Even when these costs are paid by developers they are invariably passed on to consumers in the form of higher housing prices. Numerous studies have shown that public services can be provided more efficiently at higher residential densities (Halifax Regional Municipality 2005, Ford 2009, and Smart Growth America 2015). By making use of existing infrastructure through infill and redevelopment the total cost of new development can be minimized (HART 2017).

While not a “housing cost” transportation costs are a significant household expense. For most families transportation costs constitute the second largest household expense after housing (Litman 2018). Although housing costs are generally lower further away from cities and employment centers, the cost of transportation is also highest in these locations (Haas, Makareicz, Benedict, Sanchez, and Dawkins 2006). As a result, households make decisions about where to live by balancing transportation and housing costs (Litman 2018). If transportation costs increase significantly due to rising energy prices or congestion, the demand for housing near employment centers will also increase. Transportation costs can be reduced by adopting zoning regulations that allow housing to be developed in commercial areas or near employment centers.

In order to maintain housing affordability and manage growth effectively the following principles should guide the City’s planning efforts:

- Land within the UGA must be used efficiently and higher housing densities should be permitted
- Development should be concentrated in areas where roads, utilities and other infrastructure already exist
- More housing should be permitted in commercial areas and future UGA expansions should be limited to reduce transportation expenses

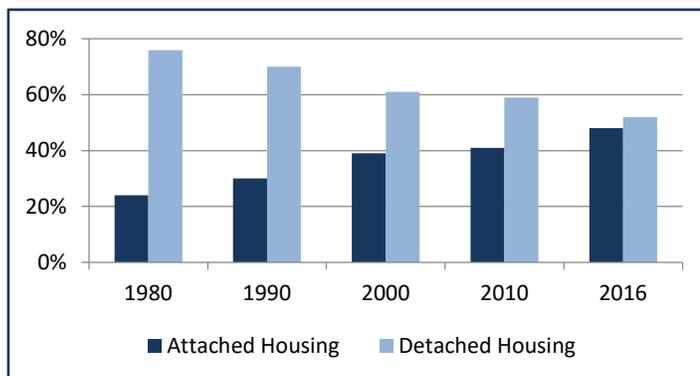
3.4 Existing Conditions and Projected Needs

The previous sections of this report addressed the requirements of the GMA and summarized the fundamentals of housing economics. This section documents the characteristics of the City’s existing housing stock, identifies important demographic and economic conditions, and estimates the type and quantity of housing required over the next 20 years. This information

will be used to ensure the City’s zoning regulations guide growth effectively and are consistent with future housing needs.

3.4.1 Current Conditions

Burlington is a relatively small community and has experienced slow, but steady, population growth throughout its history. With respect to housing, the City is unique in several important ways. The city has a large and growing number of small households, households without children, and non-family households. Nearly half of the city’s housing is multifamily or attached housing. These factors have important implications for the City’s future housing needs.



Between 1989 and 2016, 1,632 housing units were constructed in Burlington. Of these, 775 were multifamily units and 857 were single-family homes. The percentage of attached housing has steadily increased over the past three decades, rising from 24 percent of the total housing stock in 1980 to 48 percent in 2016. This ratio is significantly higher than in any other Skagit County city. The ratio of attached housing to detached housing ranges from 21 percent in Anacortes to 35 percent in Mount Vernon. The nearest comparable city is Bellingham, where 48 percent of housing units are attached. Despite this stock of multifamily housing, production has fallen in recent years and vacancy rates are extremely low, near one percent, resulting in shortage of available units (SCOG 2017).

	1980 ⁽¹⁾	1990 ⁽²⁾	2000 ⁽³⁾	2010 ⁽⁴⁾	2016 ⁽⁵⁾
Attached*	24%	30%	39%	41%	48%
Detached*	76%	70%	61%	59%	52%

Sources: (1) Office of Financial Management (OFM) post-censal estimates of April 1st housing units, 1980 and 1990 to present; (2) US Census, 1990; (3) US Census, 2000; (4) 2010 American Community Survey (ACS) 5-year estimates; (5) Skagit Council of Governments (SCOG) 2017 Housing Inventory and Transportation Analysis – based on Skagit County Assessor’s data
 Note: Housing data by unit type not available from consistent sources across years. SCOG data from 2017 is assumed to be the most accurate because it is based on building permits and a physical inventory as opposed to survey or occupant reported data.

	Burlington ⁽¹⁾	Mount Vernon ⁽¹⁾	Sedro Woolley ⁽¹⁾	Anacortes ⁽¹⁾⁽²⁾	Ferndale ⁽²⁾	Bellingham ⁽²⁾	Arlington ⁽²⁾
Attached*	48%	35%	26%	21%	27%	48%	30%
Detached*	52%	65%	74%	79%	73%	52%	42%

*Attached housing includes any building that contains two or more dwelling units. Detached housing includes single family homes, manufactured homes, and trailers. (1) Source: Skagit Council of Governments (SCOG) 2017 Housing Inventory and Transportation Analysis – based on Skagit County Assessor’s data. (2) 2016 American Community Survey (ACS) 5-year estimates.
 Note: A significant divergence exists between SCOG and ACS data for Anacortes so data from both sources was included.

Burlington also has the highest concentration of “non-family” households in Skagit County. Non-family households include households comprised of singles, unmarried couples, and unrelated individuals living together. The percentage of non-family households increased from 34 percent in 2000 to 45 percent in 2016. Over the same period, the number of “family households”, defined as a household comprised of two or more people who are either married or related, declined from 66 percent to 55 percent (U.S. Census Bureau, 2016). In Burlington, most non-family households appear to be singles living alone. In fact, singles represent 36 percent of the City’s households.

Age and family structure are also important considerations when assessing housing needs. In Burlington, 74 percent of households have no children. This percentage is significantly higher than in most other cities in Skagit County. For example, in Mount Vernon, 53 percent of households are childless. Only Anacortes, where 75 percent of households are childless, is comparable. In Anacortes this number can be explained by a comparatively large proportion of retirees. In Anacortes approximately 25 percent of the population is 65 or older, while in Burlington only 16 percent of the population falls into this category. A large percentage of Burlington’s childless households are comprised of working age adults (25 to 44 years old).

Table 3.3 Household Size							
	Burlington	Mount Vernon	Sedro Woolley	Anacortes	Ferndale	Bellingham	Arlington
1 person	36%	23%	26%	29%	34%	35%	28%
2 people	34%	34%	33%	42%	38%	35%	30%
3 people	10%	14%	15%	12%	12%	14%	15%
4+ people	20%	29%	26%	17%	16%	16%	27%

Source: U.S. Census Bureau. American Community Survey (ACS) 5-year estimates, 2016.

Table 3.4 Household with Children							
	Burlington	Mount Vernon	Sedro Woolley	Anacortes	Ferndale	Bellingham	Arlington
Children	26%	47%	32%	25%	36%	22%	35%
No Children	74%	53%	68%	75%	64%	78%	65%

Source: U.S. Census Bureau. American Community Survey (ACS) 5-year estimates, 2016.

Approximately 48 percent of the Burlington households are renters and this percentage has fluctuated only slightly since 1990 (U.S. Census). For purposes of comparison it’s worth noting that Burlington has a larger share of renter households than most other cities in Skagit County. Only Sedro Woolley had a larger share of renters (52 percent). Commonly housing that consumes more than 30 percent of a household’s monthly budget is said to be unaffordable. While arguably overly simplistic, this measure can be used to compare the relative “affordability” of Burlington’s housing to other nearby cities.

Approximately 59 percent of the City’s renters pay more than 30 percent of their monthly incomes for housing. This is comparable to other cities in Skagit and Whatcom counties. Only Anacortes has a significantly smaller number of renter households that can be considered “cost

burdened”. Nationally it is thought that approximately 50 percent of renter households are cost burdened (JCHS 2017). It does not appear that Burlington has a significantly higher percentage of cost burdened renters than other Cities in Skagit County.

3.4.2 Future Needs

In general, communities with a large number of small or childless households, high land costs, lower incomes, dense concentrations of employment, increasing transportation costs or congestion, and rigorously enforced urban growth boundaries will have strong demand for infill development and attached housing. Conversely, large households, dispersed employment patterns, low commuting costs, and weak growth management laws tend to increase demand for larger detached homes (City of Portland 1994).

As demonstrated in the previous section, Burlington differs from other Skagit County cities in important ways. A large and growing percentage of the City’s housing is attached. Singles, childless couples, and other non-family households represent an increasingly large share of the population. At the same time transportation costs have increased, rural development has become more difficult, and significant legal and environmental barriers exist to expanding urban growth areas. Consumer preferences have also changed. Increasingly buyers prefer central locations with convenient access to work, shopping, and entertainment. In the future the City should expect strong, and growing, demand for attached housing.

In previous decades the demand for detached houses was driven by rising incomes, cheap transportation, and easy access to home buying credit (Nelson 2012). In addition, large family sizes and single income households meant that many households were willing, and able, to trade the convenience of a central location for a larger, but less centrally located house. Today these circumstances are less relevant. Household sizes and family compositions have changed. Home buying credit is harder to obtain, and transportation and housing costs have increased (Nelson 2012). Consumer preferences have also shifted. Increasingly it now appears people are willing to trade the amenities of a larger house for the convenience of a smaller, but more centrally located one. These changes have increased the number of renters and the demand for attached housing.

While renting, and by extension multifamily housing, was once considered an option of last resort for poor households, or at best a transitional step towards home ownership, renting is becoming increasingly common. People now rent for longer periods of time or never become homeowners at all. Some former homeowners move back into rental housing as a result of changing life circumstances, such as children leaving home, divorce, or retirement. Much of the recent increase in renting can be attributed to higher income households who could afford to buy, but choose not to (JCHS 2017). Due to strong demand for multifamily rental units and limited supply, nationally, higher income households are thought to occupy 43 percent of the units affordable to low income households (HUD 2017). Therefore, increasing the stock of multifamily housing has important implications for housing affordability in general.

Consumer preferences have also changed over time. A 2017 study conducted by the National Association of Realtors shows that among young home buyers, 60 percent prefer to live near work or in an area where they can walk to shopping, parks, and other amenities, even if doing so means living in an attached home, such as a townhouse or apartment. A significant share of these buyers also stated they would be willing to pay “a lot more” for such a location (NAR 2017). Living near work and shopping has significant economic benefits as well, particularly for lower income households. On average it costs approximately \$5,000 a year to own a car. Eliminating one car can save a household \$417 a month (Litman 2018). This is a significant savings given that the average apartment rent in Skagit County is only \$950 a month (SCOG 2017).

Although the Burlington does not have a large population of retirees or older adults, the needs of this demographic cannot be overlooked. More than 21 percent of the City’s population will reach retirement age over the next 20 years. In response to the rising cost of assisted living and long term care, a growing number of retirees are moving in with their adult children. Unfortunately, most homes are poorly suited to the needs of multigenerational households (Macht 2015). Accessory dwelling units (ADUs) are one way of addressing the needs of these households. An ADU is essentially a small apartment located on the same property as a larger home. Also for younger homeowners, the rental income from ADUs also can offset the financial burdens of homeownership.

Even though the demand for detached homes may be declining, the needs of larger households and families with children cannot be overlooked. Currently the City’s housing stock is bifurcated between large detached homes and small apartment units. This presents a problem for families with children and modest incomes. While few median income families in Skagit County can afford a detached home (SCOG 2017), apartments are frequently unsuitable for families with children. Duplexes and townhomes can meet the needs of these households. This type of housing provides family friendly amenities, such as yards and garages, but can cost significantly less than a comparable detached home. In order to meet the needs of families with children, Burlington should take steps to increase the number of duplexes and townhomes.

Multifamily housing comprises 48 percent of the City’s housing stock and this percentage has increased by 10 percent each decade since 1980. If this trend continues, by 2036 more than 60 percent of the City’s housing will be attached. As a result of the demographic and economic trends discussed above, this outcome is not only realistic, but perhaps conservative. Given the increasingly prohibitive costs of detached homes, a significant number of townhomes, duplexes and other common-wall dwellings will be required. The City has historically permitted an average of eight duplex units each year. Duplexes have similar characteristics to townhomes and serve as logical proxy for estimating future demand for townhomes. If the current rate of duplex production is carried forward, approximately 170 townhome units will be needed in the next 20 years.

Future demand for ADUs is difficult to predict. ADUs are currently permitted in all single family zones. However, they are subject to complex, expensive, and restrictive permitting

requirements which may discourage their construction. Small lot homes are also permitted in all of the City’s detached residential zones and represent a housing type similar to ADUs. The City’s small lot regulations allow lots as small as 3,000 square feet to be created, regardless of the otherwise applicable lot size requirements. Assuming a modest annual construction rate of two units per year, it’s reasonable to assume that as many as 40 ADUs and small lot homes could be built by 2036.

Table 3.5 Future Housing Needs*			
Attached Housing	869 dwelling units (60%)	Multunit Buildings	652 (75%)
		Townhouses/Duplexes	174 (20%)
		ADU/Small Lot Housing	43 (5%)
Detached Housing	579 dwelling units (40%)		
Total:	1,448 dwelling units (100%)		

**Housing unit needs are calculated by dividing the City’s population allocation by an average household size of 2.63. See Land Use Chapter for more information and data citations.*

The GMA requires the City to address the demand for other types of housing, including group homes, manufactured housing, foster care facilities, and subsidized housing for low income households. Group homes, boarding houses, and foster care facilities are permitted in all of the City’s residential zones. Manufactured housing is treated no differently from site built housing and is permitted in all residential zones. The City does not regulate housing based on whether or not it is subsidized. Subsidized housing is permitted in all residential and mixed uses zones. Because housing in Burlington is regulated solely on the basis of density and building type, and not on the basis of who lives in it or how they pay for it, it’s not necessary to separately analyze the need for housing types listed above.

Table 3.6 Existing Housing Capacity			
	Future Needs	Existing Capacity	Surplus/(Deficit)
Attached	869 dwelling units	375 dwelling units*	(494)
Detached	579 dwelling units	1,148 dwelling units	569
Total;	1,448	1,523	75

**Note this figure does not include ADUs. While ADUs are permitted in the detached residential zones very few have been built, suggesting changes must be made in order to include this as “capacity”.*

As demonstrated in Table 3.6, the City has sufficient capacity to accommodate 20 years of population growth. There is however, a significant discrepancy between the type of housing that will be needed and the amount of land that can be constructed under the City’s current regulations. For example, while the City is projected to need a minimum of 869 detached dwellings, under regulations in effect at the time of this analysis, only 375 can be built. Alternatively, while the City is only projected to need 579 detached dwellings, 1,148 can be built. Finally, although in raw numbers the City’s population growth can be accommodated, a significant surplus of housing capacity should be provided to contain cost increases and ensure adequate flexibility and choice for the City’s households.

3.5 Recommendations

3.5.1 Summary

The future demand for various types of housing was estimated in the previous section. Under the GMA, the City must show how its projected housing needs can be met based on current zoning regulations. If not, changes must be made to the City's zoning regulations to bring the potential supply in line with the projected demand. To address this requirement, the results of the Development Capacity Analysis described in Chapter 2 (Land Use) were compared to the housing needs identified in this chapter. A number of significant capacity shortfalls were identified. Most notably, although attached housing represents 60 percent of the City's future housing needs, only 25 percent of the available capacity is allocated to this type of housing. In order to address this imbalance changes must be made to increase the amount of attached housing permitted by the City's zoning regulations.

Residential development is permitted in seven of the City's zoning designations. For the purposes of this analysis these zoning designations were combined into three broad categories including, detached residential, attached residential, and mixed use. The names of the City's comprehensive plan and zoning designations were completely revised after this chapter was drafted. Table 2.11 in Chapter 2 (Land Use) can be used to compare the old names to the new names.

The detached residential category includes the R-1 zoning designation. The primary uses permitted in this zone include detached homes and related accessory uses, such as ADUs. A number of other housing types are also included in this zone, such as boarding houses, foster care facilities, and manufactured housing. Small lot housing is permitted throughout the R-1 zone. Small lot housing allows lots as small as 3,000 square feet to be created through a short plat or subdivision, provided the size the resulting homes is proportionally limited through plat restrictions. An estimated 1,148 housing units can be constructed in the detached residential category. This represents 75 percent of the City's available capacity and greatly exceeds the projected demand for such housing.

The attached residential category includes three multifamily zoning designations (R-2, R-3, and R-S). The R-3 and R-S zoning designations allow multifamily development subject to a maximum density of approximately 14 dwelling units per acre. The R-S zone differs from the R-3 zone by allowing offices and professional services. Duplexes are the only use permitted in the R-2 zone. New lots created in the R-2 zone must be a least 7,600 feet resulting in an effective maximum density of approximately 11 dwelling units per acre. Attached dwellings can also be constructed in the mixed use zoning designations. The MR-NB and B-1 zones both allow residential development up to a maximum density of 14 dwelling units per acre. Stand-alone residential development is permitted in the C-1 zone and is subject to the same density limit. "Mixed use"

developments in the C-1 zone, that include both commercial and residential uses, are exempt from this limit.

A significant shortage of development capacity exists in the City's multifamily and mixed use zones. While 60 percent of the City's future housing is expected to be attached, only 25 percent of the available capacity is located in zones that allow multifamily development. Conversely, while only 40 percent of the City's future housing will be detached, the detached zones contain 75 percent of the City's available capacity. Over the next 20 years there will be demand for approximately 869 attached dwelling units while capacity exists for only 375. Changes must be made to accommodate at least 494 additional attached dwellings.

3.5.2 Proposed Changes

The City must make changes to accommodate a minimum of 494 additional attached housing units. Although this may seem like a large number, by making a number of subtle changes to the City's zoning and development regulations this development can be accommodated without significantly altering the City's historic pattern of development. By allowing townhomes and small apartment buildings in the R-2 zone the capacity of this designation can be almost doubled. Density in the attached zoning designations (R-3, MRNB, and RS) is currently limited to 14 dwelling units per acre. Two and three story walk-up apartments are frequently developed at densities ranging from 20 to 30 dwelling units per acre. Changing the way development is regulated in these zones and achieving an average density of 25 dwelling units per acre would accommodate over 154 additional units of housing.

Significantly larger gains can be achieved by permitting more development in the City's mixed-use zones. These zones are located near jobs, shopping, and entertainment and are physically separated from existing residential neighborhoods. Developing these areas would minimize future transportation expenditures and support the City's retail and service industries by increasing the customer base. Stand-alone residential development in the C-1 zone is limited to 14 dwelling units per acre while mixed use development is exempt from density limits. Many sites in the C-1 zone can't be used effectively for commercial or mixed use development due to access constraints, poor visibility, or lack of traffic. Standards should be adopted for determining when stand-alone residential development is allowed and the current density limit should be eliminated.

Based on the City's experience with mixed use development in the C-1 zone during the Comprehensive Plan update, the changes above can be expected to increase the amount of vacant and re-developable land available for residential development from 20 percent (9.16 acres) to 50 percent (45.78 acres) and increase the average density of new development in the C-1 zone from 14.5 dwellings per acre to 32 dwellings per acre. The combined effect of these changes will allow the City's mixed-use commercial zones to accommodate at least 1,465 attached dwelling units.

A summary of the City's housing needs and how the Comprehensive Plan will be amended to address them has been provided below.

1. There is a need for more townhomes, row-houses, common wall buildings, and small apartments. The R-2 zone currently allows duplexes, but does not allow townhomes or other structures that share a common wall if they include more than two dwelling units. As documented in the Land Use Chapter, a new system of zoning and comprehensive plan designations will be created. The R-2 will be renamed RA-1 and the corresponding regulations will be amended to allow a wide variety of lower density attached housing types.
2. There is a shortage of land available for attached housing development and surplus of land available for detached housing. The proposed zoning and comprehensive plan maps will increase the amount of land available for attached housing by approximately seven acres and reduce the amount of land available for detached housing by a corresponding amount. By increasing the amount of land available for attached housing an additional 175 dwelling units can be accommodated.
3. Increase the development capacity of the R-3, R-S, and MR-NB zones (renamed RA-2, MUR-1, and MUR-2) by revising the setback, parking, design, and density requirements. The current regulations impose unnecessary restrictions, which in some cases do not appear to be related to any legitimate public purpose. New regulations should be developed for multifamily development focused on the size, mass, and street orientation of buildings. In addition, the current parking requirements, particularly the guest parking requirements, should be audited for consistency with other jurisdictions. By increasing the average density of new developments to a relatively modest 25 units per acre, these changes have the potential to add 154 units of capacity to the City's attached residential zones.
4. Develop specific standards allowing stand-alone residential development in the C-1 zone (renamed MUC-2) and regulate it the same as mixed-used development. The parking regulations for mixed-use and stand-alone residential development in the C-1 zone should be reviewed to increase the use of shared parking. The Development Capacity Analysis in Chapter 2 (Land Use) shows that, as of 2018, a total of 91.55 acres of land is available for development/redevelopment in the C-1 zone, but assumed that only 20 percent of this land (9.16 acres) would be used for residential development. By allowing stand-alone residential development in the C-1 zone as much as 50 percent (45.78 acres) of the available land supply in the C-1 can be used for residential development. Changes to development regulations could increase density of new development to 32 dwellings per acre. The combined effect of these changes would increase the residential capacity of the City's MUC zones from 133 attached units to 1,465 attached units.

5. Add approximately 10 acres of land to the mixed use zone. The City should identify undeveloped areas, or areas characterized by an existing mix of uses, and rezone them to allow a combination of commercial and residential development. These changes would address both the housing needs identified in this report, and the shortage of commercial land identified in the land capacity analysis. Adding additional land to the mixed use zones would increase the City’s capacity for attached housing by 35 units.

6. Reduce barriers to ADU construction. Current ADU regulations are very restrictive and require a time consuming permit process. The City issues less than one ADU permit each year. Studies have shown that ADU regulations do little to limit their construction (DEQ 2014). Instead many units are constructed illegally, often without proper safety features, such as adequate exits, smoke alarms etc. ADUs should be permitted with a simple building permit, subject to a straight-forward size limit, and detached ADUs should be permitted. Assuming an average production of two ADUs, or small lot units, per year, 40 units of additional capacity could be added with these changes.

7. Provide opportunities to construct duplexes, townhomes, and small multi-unit buildings throughout the City, particularly near schools, parks, employment areas, and services.

Table 3.7 Housing Capacity with Proposed Changes				
	Future Needs	Existing Capacity	Revised Capacity	Surplus/(Deficit)
Attached	869 dwelling units	375 dwelling units	2,032 dwelling units	1,163
Detached	579 dwelling units	579 dwelling units	1,188 dwelling units	609
Total:	1,448	1,523	3,220	1,772

3.5.3 Monitoring

While the projections and estimates in this report are based on the best information currently available, they are nonetheless only projections and estimates. In order to account for future uncertainty, housing production and capacity should be tracked on an annual basis. During the periodic review periods required by the GMA, demographic, economic, and market conditions should be reassessed and compared to this analysis. The Housing Element of the comprehensive plan should include policies and procedures to guide the monitoring process, and identify steps that will be taken in the event housing production or capacity deviates substantially from the estimates in this report.

3.6 Citations

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4 Natural Resources

4.1 Introduction

4.1.1 Summary

Local governments in the State of Washington are required by the Growth Management Act (GMA) to regulate development in hazardous or environmentally sensitive areas (RCW 36.70A.060). These areas are known as “critical areas”. Critical areas include the following natural features or areas:

- Wetlands
- Critical Aquifer Recharge Areas
- Fish and Wildlife Habitat
- Floodplains
- Geologic Hazards

In developing policies and regulations for the protection of critical areas local governments are required utilize scientifically valid and up-to-date information. The GMA refers to such information as “best available science” (BAS). Local governments are also required to give special consideration to the protection and conservation of anadromous fish species, principally salmon and steelhead (RCW 36.70A.172).

While the City has adopted regulations addressing development in critical areas, these regulations must be periodically reviewed, and if necessary, updated to ensure compliance with current laws and regulations. This review process is also intended to ensure consistency with current scientific and technical information. The purpose of this report is to summarize the City of Burlington’s current policies and regulations for the protection of critical areas, demonstrate whether or not these policies and regulations are consistent with BAS, and identify recommended changes.

4.1.2 Organization

This report is divided into a number of sections addressing each of the five critical areas identified by the GMA. Each section begins by describing the presence and importance of the critical area in the City of Burlington. A summary of applicable regulations is provided followed by several sections which describe how the particular critical area should be identified and protected. Each section includes a description of how the City’s current regulations address the critical area and a summary of the relevant BAS. Finally, a summary of recommended changes is included at the end of each section.

4.1.3 Key Findings

The City's current critical area protection standards were adopted in 2002. At that time the City chose to adopt a slightly modified version of Skagit County's critical areas ordinance (Planning Department memo, March 28, 2002) rather than conducting an independent review of BAS. While the Washington State Department of Commerce may have supported this approach at the time (March 27, 2002 memo from Department of Commerce), subsequent court decisions and Growth Management Hearings Board (GMHB) cases have held that local governments have an independent duty to include BAS in the adoption of critical areas regulations.

To address the lack of BAS in the City's record, the Planning Department compiled BAS for each of the five critical areas identified by the GMA and compared this information to the City's current critical areas regulations. The City's current regulations are generally consistent with statutory requirements and BAS; however, a number of changes are required and improvements can be made throughout the code to enhance its clarity and effectiveness.

A brief summary of the Planning Department's most important findings has been provided below. More detailed recommendations are included at the end of each section and a complete list of the recommended changes is attached to this report (see appendix "A").

- The City's current critical areas code was developed for Skagit County. Changes should be made to reflect the needs of an urban, as opposed to rural, environment.
- The City does not have the same level of in-house environmental expertise as Skagit County. References to reviews by Skagit County officials should be deleted and provisions should be included to allow third party reviews of critical area applications.
- Regulations for floodplain development should be revised to reflect current FEMA requirements
- Most urban land uses are by default "high intensity". Wetland buffers should be based only on the characteristics of the wetland and not on the intensity of adjoining land uses.
- The location of known geologic hazards in the City should be identified
- Several area with limited existing development, numerous overlapping critical area designations, and important natural resource functions (such as Gages Slough) should be assigned unique designations and managed as distinct units as opposed to a collection of unrelated critical areas
- The current critical area regulations should be reformatted for consistency with the recently completed code update using model ordinance language developed by the Department of Commerce and FEMA as templates.
- The stream classification system currently used by DNR should be adopted and riparian buffer widths should be revised for consistency with WDFW guidance.

4.2 Wetlands

4.2.1 Local Conditions

Given its small size and well drained soils Burlington has a limited number of wetlands. However, the City is bisected by a Gages Slough, a large linear wetland complex. Gages Slough is thought to be the remnant of a historic meander channel of Skagit River (Otak 2007). Wetlands are also known to exist around the base of Burlington Hill and near the south end of Walnut Street. Other small, unmapped wetlands may also exist. These wetlands provide important habitat, flood storage capacity, and storm-water management functions (Sheldon et al. 2005).

4.2.2 Regulations

While wetlands are directly regulated by the Washington State Department of Ecology and the U.S. Army Corps of Engineers, the City is also required to protect wetlands by the GMA (RCW 36.70A.060). While these requirements are common to all local governments, the City's extensive floodplain areas pose an additional challenge. Washington State floodplain regulations require that wetlands be protected to preserve flood storage capacity and maintain natural hydrologic processes (WAC 173-158-020). In addition the National Marine Fisheries Service recently issued a decision concerning the effects of floodplain development on endangered salmon populations (NMFS 2008). Because modifying wetlands in floodplains can indirectly affect salmon habitat (FFEMA 2007) the City is required to protect wetlands in the floodplain as a condition of participating in the National Flood Insurance Program (NFIP).

4.2.3 Identification

When identifying and delineating the boundaries of wetlands, the City is required by Washington State law to use the current wetland identification manual published by the U.S. Army Corps of Engineers (RCW 36.70A.030(21) and WAC 173-22-035). This manual is commonly referred to as the "Federal Manual". The City's critical areas regulations require that the Federal Manual be used but additional clarity could be provided by citing WAC 173-22-035 in the text of the code.

The Washington State Department of Ecology (DOE) recommends local governments develop a complete inventory of wetlands if possible (DOE 2016). For large jurisdictions, such an approach may be impractical or prohibitively expensive. However, by compiling and mapping wetland studies conducted for individual development projects, a small city such as Burlington can, over time, develop a relatively comprehensive wetlands inventory. The City's code contemplates such an effort by requiring that critical areas be mapped whenever possible. This code section could be improved by requiring that mapping and delineation data be submitted whenever a

critical areas report is prepared. The code should also specify the format of the required mapping and delineation data.

A comprehensive study was conducted of Gages Slough by Sheldon and Associates in 1998. This study broke the slough into a number of assessment units and analyzed the characteristics, functions, and approximate boundaries of the wetlands in each assessment unit. This study was subsequently updated by the consulting firm Otak in 2007. While neither of these studies delineated the exact boundaries of the wetlands forming Gages Slough, they are useful as a screening tool for determining when additional analysis should be required.

Another wetland study was conducted by ProSource Technologies in 2016 for a natural gas pipeline project. The Prosource study identified a significant number of wetlands along the west side of Burlington Hill. These wetlands extend from the from the City limits near Gear Road to the terminus of County Shop Lane (ProSource Technologies 2016). This study rated, delineated, and assigned buffers to each wetland in accordance with the City's code requirements.

While the studies referenced above are useful for identifying the location of wetlands in certain areas of the City, they are far from comprehensive. Unmapped wetlands are likely to exist within the City. The City's code addresses such gaps in mapping information by requiring applicants for development permits to submit a critical areas checklist and field indicators form (BMC 15.15.080.C). While such an approach is consistent with scientific findings (Commerce 2003), in practice it creates confusion for permit applicants and City staff. In order to account for unmapped wetlands the code should be revised to require an inspection of all development sites. The inspection should be conducted in accordance with Department of Ecology guidance.

4.2.4 Protection Standards

The common approach to protecting wetlands involves the use of a system of protective buffers. The width of buffers is generally determined by the quality of the wetland. The Department of Ecology has established a uniform wetland rating system for assessing the relative quality of wetlands and recommends that local governments adopt this system (Commerce 2003). The Burlington Municipal Code currently references the DOE rating system and the City's protective buffers vary depending on the wetland rating assigned by the system.

4.2.4.1 Buffers

The size of a wetland buffer is generally determined by three factors (DOE 2016):

- Wetland rating (based on the DOE system)
- Intensity of adjoining land uses (urban vs. rural)
- Characteristics of the buffer (slope, vegetation, soil type etc.)

Buffer systems are a balance between flexibility and certainty. Currently there are three systems supported by BAS, including a system based only on the wetland rating, a system which considers both the characteristics of the wetland and the intensity of adjoining land uses, and a system which includes special habitat considerations (DOE 2006). The first system has the advantage of being clear and predictable; however, in some cases the size of the required buffers will be larger than necessary. For example a category IV wetland will always require a buffer 50 feet in width. The other systems allow more flexibility, and may in some cases, allow smaller buffers to be used, but have disadvantage of requiring additional analysis before the required buffer size can be determined.

The range of buffer widths prescribed by the City's wetland regulations are consistent with BAS (DOE 2006) and do not need to be changed. However, the regulations employ a variable buffer width system which considers both the wetland rating and the intensity of adjoining land uses. The variable buffers system is one of several options identified in Department of Ecology guidance documents. In rural areas, where the relative intensities of land uses vary greatly, this system can provide additional flexibility; however, this advantage is lost in urban environments where almost all land uses are considered "high intensity". The City's variable buffer system provides very little flexibility and adds unnecessary complexity to the code (DOE 2016).

4.2.4.2 Mitigation.

In situations where wetland and wetland buffer impacts can't be avoided mitigation is required (DOE 2016). In general terms the purpose of mitigation is to reduce the overall impact of a project to an acceptable level. When assessing the severity of impacts and identifying appropriate mitigation measures state and federal agencies require the use of "mitigation sequencing" (DOE 2003). Mitigation sequencing establishes a preferential order of actions that should be evaluated whenever wetland, or wetland buffer, impacts are possible. The sequencing steps include:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology or by taking affirmative steps to avoid or reduce impacts.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time through preservation and maintenance.
- Compensating for the impact by replacing, enhancing, or creating new wetland or wetland buffer areas.

"Compensatory mitigation" is a particular type of mitigation which involves replacing lost wetland functions and values (DOE 2006). Compensatory mitigation is required for any unavoidable wetland or wetland buffer impact, but should only be considered an option if the other mitigation measures listed above are determined to be infeasible (DOE 2016). Four basic types of compensatory mitigation measures are supported by BAS. These measures include, in order of preference, restoration, creation, enhancement, and preservation (DOE 2006).

Because not all mitigation efforts are successful, and because there's typically a delay between the impacts of a development and the completion of mitigation work, the area of the mitigation typically exceeds the area of the impact (DOE 2006). The Washington State Department of Ecology has prepared a guidance document that identifies appropriate mitigation ratios based on the category of the affected wetland and the type of proposed mitigation. These ratios are considered a minimum requirement and may be increased based on the functional characteristics of the wetland and the likelihood of the proposed mitigation succeeding (DOE 2006). The wetland mitigation ratios discussed above apply only to direct wetland impacts and not buffer impacts. Buffer impacts should be mitigated at a one to one ratio (DOE 2016).

The City's wetland regulations permit off-site mitigation in limited circumstances. Specifically, mitigation within the same "drainage basin" is permitted through the use of wetland bank credits or an "in-lieu" fee program. Wetland mitigation banks are artificially created or restored wetlands established for the purpose of offsetting future wetland impacts. Mitigation banks are licensed by State and federal regulatory agencies. An "in-lieu" fee program is similar, except that it would allow the City to collect money from project proponents to construct suitable mitigation projects locally. The City does not currently have an in-lieu fee program so this reference should be eliminated. For reasons unique to Burlington, the use of mitigation banks is also problematic and is discussed in more detail below.

While the use of mitigation banks is supported by BAS (DOE 2016), most of the City's known wetland areas are located in Gages Slough. Gages Slough is an important part of the City's storm-water conveyance system. In addition to attenuating storm-water flows, removing contaminants, and conveying water to the Skagit River, Gages Slough also provides important flood storage capacity (Sheldon and Associates 1998). The City is unaware of any authorized mitigation banks located in the basin which drains to Gages Slough; as a result, the functions and values of these wetlands cannot be entirely replaced by off-site mitigation banks.

Wetlands in Burlington reduce flood risks and provide important habitat functions. Floodplain development has been shown to negatively impact endangered species, including several species of salmon (NMFS 2008). Because wetlands provide important, and localized, water quality functions and flood storage capacity, and because these same factors are important to preserving and enhancing salmon populations, the City must give special weight to preserving wetlands (RCW 36.70A.172.1 and WAC 365-195-925).

For the reasons discussed above, the use of wetland mitigation banks should be strictly limited to unavoidable impacts associated with essential public facilities, utilities, and transportation projects. In addition, mitigation must be provided for any storm-water, water quality, and flood storage impacts associated with such projects.

4.2.5 Recommendations

In general the City's wetland regulations are consistent with current agency guidance and BAS. However, the following changes are recommended to simplify the City's wetland regulations, ensure compliance with state and federal regulations, and to fully incorporate BAS.

- The size of wetland buffers should be based only on the rating of the wetland and not on the intensity of adjoining land uses.
- Buffer averaging should not be permitted unless necessary to grant reasonable use.
- Mitigation banks should only be used when unavoidable impacts associated with large scale public projects cannot be mitigated locally.
- Directly cite the state law governing the use of the federal wetland delineation manual.
- Replace the complex procedures for identifying potential wetland areas with a field verification process.
- Require that the flood storage, storm-water, and floodplain habitat functions associated with wetlands be addressed consistent with National Marine Fisheries Service Biological Opinion and FEMA guidance.
- Include wetland goals and policies in the comprehensive plan.

4.3 Water Quality

4.3.1 Local Conditions

Burlington is characterized by flat terrain, flood hazards, and shallow groundwater. Given these constraints, effectively managing surface and groundwater has been a significant issue throughout the City's history. The development of much of the City would not have been possible without the construction of drainage and flood control improvements. While the City does have the advantage generally flat topography and permeable soils, historic development patterns and storm-water management techniques have led to water quality problems.

The City is bisected by Gages Slough which is a system of interconnected wetland areas. The majority of the City drains into the slough which discharges directly the Skagit River. The water flowing to the slough carries pollutants from roads, parking lots, industrial uses and other developments resulting in surface water contamination (City of Burlington 2005).

A large concentration of potential sources of water contamination exist in the City, including underground storage tanks, industrial uses, and sites that handle or generate hazardous waste. The City's shallow ground water and generally permeable soils mean that contaminants could easily enter the groundwater. Surface water contamination could also occur through inadequately treated storm-water runoff or flood conditions. While there are few, if any, residences in Burlington that rely on well water, the City of Anacortes operates a water system that withdraws water directly from Skagit River immediately downriver from Burlington (City of Anacortes and Skagit PUD 2004). Spills, flooding, and the interaction between contaminated groundwater and surface water could degrade the quality of water used by Anacortes. In addition numerous homes located outside the City's borders rely on wells for drinking water.

4.3.2 Regulations

The protection of water resources is a central component of the GMA. In addition the City is subject to numerous state and federal laws related to water quality. Goal ten of the GMA requires local governments to "protect and enhance the state's high quality of life, including air, and water quality, and the availability of water" (RCW 36.70A.020(20)). Also, the land use element of a local government's comprehensive plan must "review drainage, flooding, storm-water run-off in the area and nearby jurisdictions and provide guidance for corrective actions to mitigate or cleanse those discharges that pollute waters of the state, including Puget Sound or waters entering Puget Sound (RCW 36.70A.070(1)).

The GMA requires that local governments "provide for the protection of the quality and quantity of groundwater used for public water supplies" (RCW 36.70A.070(1)). Groundwater is not generally used as source of water in the City of Burlington; however, a number of wells do exist immediately outside the City. The presence of shallow groundwater and permeable soils

means the City's groundwater is susceptible to contamination (Commerce 2003). Such contamination could, in theory, affect well water outside the City or result in surface water contamination through surface/groundwater interaction. Given these risks the City is obligated to address potential sources of groundwater contamination.

The City's storm-water discharges are regulated by a "National Pollutant Discharge Elimination System (NPDES) permit issued by the Washington State Department of Ecology (DOE). NPDES permits are intended to implement, and ensure compliance with, state and federal water quality laws. DOE last updated the City's NPDES permit on August 1, 2013. The conditions of the updated NPDES permit required the City to change the way it manages storm-water and regulates development.

To implement the updated the NPDES permit the City's storm-water and development regulations were amended on December 8, 2016. Specifically the City adopted the current version of DOE's "Storm-water Manual for Western Washington". All new development in the City is subject to the requirements outlined in the DOE manual. In addition the City updated its zoning and development regulations to require the use of "Low Impact Development" (LID) techniques. LID describes a form of development, or a system of development techniques, that minimize storm-water runoff by reducing impervious surface coverage and increase the amount of water that is infiltrated on-site. The overall objective of LID is to more closely mimic natural drainage conditions and reduce the amount of storm-water generated by new development.

4.3.3 Identification

Water quality degradation is caused by numerous factors. While other critical areas such as wetlands, streams, and steep slopes can be identified and mapped, this section focuses on identifying land uses and development activities that have the potential to contaminate water resources and the areas of the City susceptible to contamination.

4.3.3.1 Groundwater

Critical aquifer recharge areas should be identified and regulated on the basis of three factors, hydrologic susceptibility, contamination potential, and vulnerability (Commerce 2003). Hydrologic susceptibility refers to natural conditions that increase or decrease the likelihood of contaminants entering the groundwater. Factors such as shallow groundwater or permeable soils tend to increase susceptibility. The second factor, contamination potential, is based on land uses and activities that involve storing, handling, or producing potential contaminants. Examples of such uses include landfills, storage tanks, and septic systems (DOH 2010). The final factor, vulnerability represents the combined effect of hydrologic susceptibility and contamination potential (Commerce 2003).

No comprehensive evaluation of groundwater or subsurface geology has been conducted for the City of Burlington but a variety of information sources are available to help identify

potential hazards. DOE well logs, soil and subsurface geologic information from the USGS, and CARA maps prepared by Skagit County were used to assess the vulnerability of the City's groundwater resources. When there is a lack of scientific information regarding critical areas local governments are directed to exercise a precautionary, or no risk, approach (WAC 365-195-920(1)). Accordingly, the findings in this section are based on available information and have been construed to afford the highest level of protection to groundwater resources.

Based on available geologic information, DOE well logs, and previous studies the City's groundwater is vulnerable to contamination. Burlington has a dense concentration of potential contamination sources including underground storage tanks and sites that handle or generate hazardous waste (City of Anacortes and Skagit PUD 2004) and the shallow water table and permeable soils present throughout the City make it easy for contamination to enter the groundwater (DOE 2005).

There are few, if any, individual wells and no public water systems using groundwater as a source of potable water in the City of Burlington. Therefore, despite the presence of factor which may make the City's groundwater susceptible to contamination, it could be argued that there are no areas in the City meeting the strict definition of a critical aquifer recharge area provided in WAC 365-190-030. There are however homes outside the City which use wells as a source of potable water. The City's shallow groundwater discharges to wetlands and other surface waters such as Gages Slough and the Skagit River (Otak 2007). Water from the Skagit River is ultimately used as a source of drinking water by the City of Anacortes.

Groundwater is considered a "water of the State" (RCW 90.48.020) and sustains the functions and values of other critical areas including wetlands and fish and wildlife habitat areas (DOE 2005). Groundwater also falls within the definition of "waters of the state". Waters of the State are subject to designation and protection through a local government's critical area regulations (WAC 365-190-130(2)(f)). It is recommended that the City's groundwater be designated as a critical area and protected regardless of whether or not it is used directly as a source of potable water.

4.3.3.2 Surface Water

There are two major bodies of surface water in Burlington, Gages Slough and the Skagit River. The Skagit River is the largest river flowing into the Puget Sound. The river accounts for 30 percent of the Puget Sound's freshwater input, supports six species of Pacific Salmon and steelhead (Swinomish Indian Tribal Community 2016), and serves as an important source of drinking water. The City of Anacortes operates a large water system which, not only serves the City of Anacortes, but also provides drinking water to the cities of La Conner and Oak Harbor, the Swinomish Indian Reservation, and a number of other water users (City of Anacortes and Skagit PUD 2004).

Most of the City of Burlington drains, either directly, or indirectly, into Gages Slough. A small area of the City, mostly north and west of Burlington Hill, drains to Joe Leary Slough, which in

turn discharges into Padilla Bay. Both the Skagit River and Gages slough have a history of water quality impairments (City of Burlington 2005; Skagit County 2017) and the Washington State Department of Ecology Water Quality Atlas indicates that Joe Leary Slough does not meet several water quality standards. While some of the pollution issues affecting these water bodies can be attributed to rural land uses such a poor agricultural practices and septic systems, runoff from urban development also a contributing factor (City of Burlington 2005; DOE 2000).

4.3.4 Protection Standards

Burlington’s code includes provisions to protect both surface and groundwater. The City’s surface water regulations were recently updated, are consistent with BAS, and provide an adequate level of protection. The City’s groundwater protection standards were adapted from the Skagit County Code, do not adequately address local conditions, and may not be consistent with BAS. Changes should be made to the City’s groundwater protection standards to address these issues.

4.3.4.1 Groundwater

Several strategies are recommended to protect groundwater. Generally these strategies can be sorted into two categories; strategies that maintain natural hydrologic processes and strategies that protect groundwater from contamination.

To protect groundwater from contamination, a list should be developed of land uses and activities that produce, store, or handle potential contaminants. Regulations should then be developed that minimize the risk associated with these activities or prohibit certain highly hazardous uses (DOE 2005). The Washington Department of Health has produced a list of potential contamination sources sorted by common land use activities (DOH 2010). Some of these uses, such as septic systems and animal feed lots, are not associated with urban development and can, with limited exceptions, be prohibited. Other uses, such as underground storage tanks and facilities that handle chemicals and other potential contaminants, are a normal and expected urban land use. For these uses, regulations should be adopted that minimize the risk of contaminants entering the groundwater (DOE 2005).

Many of the activities listed in the Department of Health Guidance are already subject to other regulatory programs and protection standards. These standards should be reviewed to identify gaps in regulatory protection. In cases where a given use or activity is already subject to regulation, it may be sufficient to simply ensure compliance with exiting standards. However, in instances where a gap exists, regulations should be adopted to ensure adequate protection (DOE 2005).

In some cases it may be difficult to adequately anticipate potential impacts and develop effective regulations. The City’s current groundwater protection standards require the preparation of an assessment report in certain circumstances. Although no BAS was found

which describes the circumstances under which an assessment report should be prepared, or what should be included in an assessment report, standards do exist for the preparation of assessment reports associated with waste discharge permits regulated by the Washington State Department of Ecology (Kimsey 2005). These standards are very similar to those included in the City's current regulations, but are more specific. The City's regulations should be updated for consistency with these requirements.

Development activities including paving, soil compaction, vegetation removal, grading, and filling or modifying wetlands and other water courses can have significant effects on natural hydrologic processes (DOE 2005). Groundwater protection standards should include measures which maintain or increase groundwater recharge. The City recently updated its storm-water and development regulations to implement current Washington State Department of Ecology regulations. The changes made through this update effort include regulations limiting impervious surface coverage and requiring that development plans include low impact development (LID) measures. These updates are consistent with BAS and no additional changes are required.

4.3.5 Recommendations

The City recently updated its storm-water and development regulations to protect surface water resources. These changes are consistent with BAS and no substantive changes are needed to protect surface water resources. The City's current groundwater protection standards were adapted from Skagit County's regulations. These regulations rely on the expertise of the County's hydrogeologist to evaluate potential groundwater threats on a case by case basis. The City does not employ a hydrogeologist so this approach is not appropriate. The City also has a high concentration of potential contamination sources, shallow groundwater, and permeable soils. The current groundwater protection standards do not adequately consider these unique local conditions and the following changes should be considered:

- Develop a list of exempt, permitted, and prohibited uses based on Washington State Department of Health guidance.
- Amend the "aquifer recharge site assessment" standards in chapter 14.15 BMC for consistency with the hydrologic study standards outlined in the Department of Ecology's guidance manual.
- Include policies on groundwater and surface water protection in the comprehensive plan. These goals and policies should address the high degree of connectivity between the City's surface, groundwater, and wetland areas.
- Clarify that new development may not be served by individual wells and require that existing wells be decommissioned properly when they are abandoned.
- Clarify that new development must be connected to the City's sanitary sewer system and require that existing septic systems be properly decommissioned when they are abandoned.

- Consider policy or regulatory changes to permit additional impervious surface coverage within the City's UGA in exchange for purchasing development rights outside the UGA, either as part of the City's existing agricultural heritage program or through a new program.

4.4 Fish and Wildlife Habitat

4.4.1 Local Conditions

Most of Burlington is extensively developed and very few areas of native vegetation or habitat exist. Many of the city's remaining open space areas are used for parks or recreation and have been heavily modified by historic agricultural uses and flood control projects. The City does have several notable habitat features, and development within the City has the potential to indirectly impact threatened, endangered, and sensitive species.

The City's southern limit is defined by the Skagit River. The Skagit River supports all six species of Pacific Salmon and Steelhead (Swinomish Indian Tribal Community 2016), several of which are listed as endangered (WDFW Salmonscape). Other water bodies also exist which are either modeled as potential salmon habitat or have documented salmon occurrences including Joe Leary Slough and Gages Slough (WDFW Salmonscape).

In addition to the riparian areas described above, the City has two other notable areas which provide locally important habitat features. Gages Slough provides a continuous band of habitat for waterfowl and other birds and connects undeveloped areas to the east and west of the City. Burlington Hill also provides locally important habitat functions. It is the largest remaining stand of forest in the City and contains rocky outcrops, downed trees, snags, and unique geologic conditions.

4.4.2 Regulations

The GMA mandate to protect fish and wildlife habitat is broad. Specifically, WAC 365-190-130(2) requires the city to designate and protect any of the following species and habitat features as Fish and Wildlife Habitat Conservation Areas (FWHCAs):

- Areas with which an endangered, threatened, or sensitive species has a primary association
- Locally important or significant habitats and species
- Commercial and recreational shellfish areas
- Kelp and eelgrass beds, herring smelt, and forage fish spawning areas
- Ponds that provide fish or wildlife habitat
- Waters of the State, including lakes, rivers, ponds, streams, groundwater, salt water bodies, and all other surface water and water courses in Washington
- Any body of water planted with game fish by a governmental or tribal entity
- State Natural area preserves, natural resource conservation areas, and state wildlife areas

4.4.3 Identification

This section addresses the extent to which the habitat features and species listed above are either present in, or impacted by, development in Burlington. Species and habitats that are not present in Skagit County have been omitted from this analysis. Habitats and species which, due to their geographic distribution, could not possibly be impacted by development in the City have also been omitted. For example, species exclusively associated with alpine or upland forests (such as Grizzly Bears) have been excluded from this list along with marine species (such as Grey Whales).

The GMA requires that two distinct groups of habits and species be identified and protected. First the GMA requires that all threatened, endangered, and sensitive species be designated. Two primary sources of information were used to identify the presence of endangered, threatened, or sensitive species in the City of Burlington and to assess the extent to which development in Burlington may impact them. The Washington State Department of Fish and Wildlife (WDFW) “Salmonscape” mapping tool was used to identify streams that either have documented fish presence, or which provide potential habitat or important habitat functions such as water quality and quantity. The WDFW Priority Habitats and Species (PHS) and Department of Natural Resources (DNR) Natural Heritage Program (NHP) databases were used to identify other vulnerable species and ecosystems.

The GMA also requires that local governments identify, designate, and protect “habitats and species of local importance”. This category of FWHCAs includes species that are not listed as endangered, threatened, or sensitive, that may have locally significant aggregations or which may have recreational, commercial, or tribal importance. This category also includes unique landscape features that may provide important habitat functions (WDFW 2008).

For purposes of this report, two primary sources of information were used to identify locally significant species and habitat features, including the Priority Habitats and Species List and Landscape Planning for Washington’s Wildlife. Attention has also been given to areas which have multiple overlapping critical area designations, large areas of relatively intact native vegetation, and continuous corridors since these features are locally important to maintaining habitat functions and connectivity (WDFW 2009).

For purposes of organizing this report individual species and habitat types have been organized into a number of broad categories including:

- Aquatic Species
- Birds
- Amphibians
- Mammals
- Plants and Habitat Areas
- Waters of the State

4.4.3.1 Aquatic Species

In total ten species of anadromous fish exist in the Skagit Basin, including six distinct populations of Chinook salmon, Pink, Chum, Coho, and Sockeye salmon, summer and winter run Steelhead, sea run Cutthroat Trout, Dolly Varden, and Bull Trout. Of these, Chinook salmon, Bull Trout, and Steelhead (WDFW 2008) are currently listed as threatened by the federal government. A number of watercourses in the City are used by, or modeled as potential habitat for Chinook salmon (SalmonScape). These watercourses include the Skagit River, Joe Leary Slough, Gages Slough, and two other unnamed watercourses located to the north and west of Burlington Hill.

While some of the water courses mapped as salmon habitat have physical blockages which prevent fish passage, they flow directly into, and thereby have the potential to directly impact, other water courses that are used by salmon. The City is obligated to consider designating not only those streams presently used by salmon, but also the potential for restoring lost or impaired salmon habitat (WAC 365-190-130(3)(b)). Salmon habitat can be negatively impacted by altering stream flows, hydrology, changing sediment inputs, and impairing water quality (NMFS 2007). Development in, or near these water courses can impair salmon habitat even if fish are not physically present (Knight 2009). Therefore all of the water course mapped by WDFW as salmon habitat should be designated as FWHCAs.

In addition to those species of salmon listed as endangered, a number of other locally important salmon species are also associated with habitat found in the City of Burlington. Chum, Coho, and Pink Salmon are all known to be present in the Skagit River and its tributaries (NatureServe 2017). In addition, Pacific and River Lamprey and White Sturgeon may all be present. The habitat and management needs of these species are similar to those listed above.

While shellfish in Skagit County are almost exclusively associated with marine shorelines, shellfish are sensitive to water quality problems, the sources of which may be located anywhere in a contributing watershed. In Skagit County, failing septic systems, agricultural practices, and storm-water runoff from urban development all have the potential to negatively impact water quality and shellfish areas (DOH, online shellfish protection district information).

Kelp and Eelgrass are both exclusively associated with marine environments are not discussed in this report. Forage fish are small schooling fish that serve as food source for larger predatory fish, such as salmon and birds. Of the forage fish species present in Washington State (Pacific Herring, Northern Anchovy, Surf Smelt, Pacific Sand Lance, and Longfin Smelt) only Longfin Smelt are anadromous. Longfin Smelt occur locally only in the Nooksack River (Penttila 2007). While the species is present in the marine waters of Skagit County, no Longfin Smelt habitat exists in the City of Burlington.

4.4.3.2 Birds

Common Loon is listed as a sensitive species by WDFW. Common Loon habitat consists primarily of rivers, lakes, and wetlands. WDFW recommends protecting nesting and nursery locations. The Marbled Murrelet is listed as threatened by both the State and federal government. It is typically associated with nearshore and marine environments, but can be found along lakes and rivers up to 46 miles from the marine shoreline (WDFW 2005; WDFW 2008; Nature Serve 2017). If present in the City of Burlington, the Common Loon is likely to be found along the Skagit River or Gages Slough.

Peregrine Falcons are listed as sensitive species by the State of Washington and can be associated with habitat features found in urban areas (NatureServe 2017). Commonly, Peregrine Falcons are associated with large trees and snags and forage near wetlands (WDFW 2005). Areas with cliffs, rocky outcrops, wetlands, riparian areas, and large tracts of forest should all be considered as potential Peregrine Falcon habitat. In the City of Burlington two areas exist that may provide suitable habitat for Peregrine Falcons; Burlington Hill and Gages Slough.

A number of PHS listed species of aquatic birds and waterfowl have are associated with habitat types found in Burlington. Most of these species are associated with wetlands, ponds, streams, and rivers (Larsen et al. 2004; NatureServe 2017). These areas should be designated as FWHCAs as they provide suitable habitat for several species of waterfowl and shorebirds including cavity nesting ducks, Great Blue Herons, Trumpeter Swans, and the Snow Goose.

While most of the waterfowl identified above have similar habitat needs, cavity nesting ducks, including Wood Ducks, Barrow's Goldeneye, Common Goldeneye, Bufflehead, and Hooded Merganser nest in snags and dead trees adjacent to wetlands and riparian areas (Larsen et al. 2004). In addition to the wetland and riparian buffers large stands of trees adjacent to significant wetland complexes and rivers should be designated as FWHCAs including areas such as Gages Slough and Burlington Hill. In additional, individual nesting sites or nesting habitat should be designated.

The Trumpeter Swan and Snow Goose are both associated with wetlands, ponds, streams, and areas of shallow standing water; however, locally both are known to forage in cultivated fields (WDFW, Priority Habitats and Species [PHS] online mapping tool). The Washington State Department of Fish and Wildlife has documented several significant concentrations of Trumpeter Swan near the City of Burlington, including agricultural fields to the north and east of Burlington Hill and also east of the City between Highway 20 and the Skagit River. Although these areas are outside the City of Burlington, they should be identified and designated to assist in long range planning decisions such as Urban Growth Area expansions (WDFW 2009).

The Great Blue Heron is commonly found in coastal areas and along rivers flowing into the Puget Sound. Typically Heron nesting and breeding sites are located near water bodies, but are also associated with a variety of upland habitat types (Larsen, Azerrad, & Nordstrom 2004).

Given these diverse habitat needs, the Washington State Department of Fish and Wildlife has developed special management guidelines for Heron nesting and breeding sites. All wetlands, streams, and rivers should be designated as Great Blue Heron habitat along with individual nesting sites. Individual nesting sites should be identified using the WDFW guidance (WDFW 2012).

Other PHS listed birds species which could be present in the City of Burlington include, the Pileated Woodpecker, Purple Martin, and Vaux's Swift. The Band Tailed Pigeon is typically associated with mineral springs and seeps and is primarily concentrated along Washington's southern coast and on the Olympic Peninsula. Each of these species nests in cavities in snags and decaying trees. The Pileated Woodpecker is important because it excavates cavities while foraging for insects. The resulting cavities are then used by other birds for nesting (Larsen, Azerrad, & Nordstrom 2004).

Both the Pileated Woodpecker and Vaux's Swift are known to inhabit developing areas. The Vaux's Swift is more tolerant of development and frequently inhabits artificial cavities and abandoned smoke stacks while the Pileated Woodpecker's urban habitat is limited to remnant forest track, parks, and green-belt areas. To protect cavity nesting bird species large tracts of remaining forest should be protected along with riparian corridors and snags, decaying trees, logs, and stumps should be retained in these areas (Larsen, Azerrad, & Nordstrom 2004; WDFW 2005).

4.4.3.3 Amphibians

The only endangered amphibian in Skagit County is the Oregon Spotted Frog (WDFW 2008). The Oregon Spotted Frog is typically associated with quiet waters such as ponds, wetlands, and streams (NatureServe 2017). This species could be associated with many of the water courses and wetlands in the City, such as Gages Slough. As such habitat features associated with the Oregon Spotted Frog should be designated as FWHCs.

The Western Toad is the only species of amphibian is identified in the Priority Habitats and Species list as potentially being present in the City of Burlington. The Western Toad was once common throughout Western Washington but has suffered significant declines, which are primarily attributed to habitat loss. Western Toads breed in standing water including wetlands, ponds, and the backwaters of larger rivers. Western Toads also inhabit a variety of upland habitats such as meadows and forests but are most commonly associated with damp conditions (British Columbia Ministry of Water, Land, and Air Protection; Nature Mapping Foundation). Ponds, wetlands, and riparian areas should all be designated as FWHCAs to protect vulnerable amphibian habitat.

4.4.3.4 Mammals

Three species of bats may be present in the Skagit Valley, including Townsend's Big-eared Bat, Big Brown Bat, and Keen's Myotis. Keen's Myotis occurs primarily on the Olympic Peninsula and

in the San Juan Islands but may also occur in the Skagit Valley. The Big Brown Bat and Townsend's Big-eared Bat are common throughout the State of Washington (Hayes and Wiles 2013).

The Big Brown Bat occupies a wide variety of forest and habitat types, including urban areas. Habitat types common to all three bat species including large trees, snags, caves, rock crevices, and buildings). Bats depend on riparian areas such as streams and wetlands for foraging and drinking water. The Townsend's Big-eared Bat is particularly sensitive to drinking water access. Large tracts of existing forest, forested areas near riparian areas, riparian corridors, and areas with cliffs and rock crevices should be designated as FWHCAs (Hayes and Wiles 2013; WDFW interim priority species guidance for mammals). Suitable bat habitat exists on Burlington Hill and along the Gages Slough corridor and these areas should be considered for designation.

4.4.3.5 Plants and Habitat Areas

No rare plants or plant communities are known to exist in the City but regulations should be adopted in the event isolated occurrences are discovered. DNR publishes a survey guide for identifying rare plants and ecosystems and this guide should be incorporated into the City's critical area report requirements.

4.4.3.6 Waters of the State

Waters of the State include lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and water courses in the State of Washington (RCW 90.48.020). The City's critical area protection standards should explicitly designate lakes, rivers, ponds, streams, and other water courses that connect these features or flow into them. Groundwater protection is addressed in section three of this report but the City's critical area regulation should address the potential for groundwater contamination and hydrologic changes to impact fish and wildlife habitat.

The GMA requires that any body of water stocked with game fish by a tribal or governmental entity be considered for designation. A number of hatchery programs operate in the Skagit River watershed. These hatcheries release Chinook, Coho, Chum, and Sockeye Salmon and Winter Steelhead (Skagit River Systems Cooperative and WDFW 2005). These hatchery fish are presumed to be present in any habitat suitable for the native stocks. The Skagit River, and all streams or watercourses mapped or modeled as providing, or potentially providing, salmon habitat should be designated as a FWHCA.

Naturally occurring ponds under twenty acres and their submerged aquatic beds should be designated as a FWHCA if they are present and provide habitat for fish and wildlife (WAC 365-190-130(2)(e)). Lakes twenty acres or larger are subject to regulation under the Shoreline Management Act (RCW 90.58.030(2)(e)) and are not addressed in this report. For the purposes of this report, any naturally occurring body of standing water less than twenty acres shall be

classified as a pond. Ponds may also be classified as, or contains areas which can be classified as, wetlands (Hruby 2014). Riparian areas, wetlands, lakes, and ponds have the potential to support wildlife including waterfowl and amphibians (Knutson and Naef 1997; Larsen 1997; Larsen, Azerrad, & Nordstrom 2004) and ponds should be designated as a FWHCA. It is recommended that the terms “pond”, “lake”, and “wetland” be defined in the City’s Critical area regulations in such a way that there is no gap in regulatory coverage.

4.4.4 Landscape Planning and Priority Habitat

Protecting fish and wildlife habitat in an urban area requires a broad landscape based approach. Focusing exclusively specific species or habitat features can result in fragmented, ineffective patches of habitat. The Washington State Growth Management Hearings Board has found that local governments are required to protect “areas and ecosystems” and not just individual species and habitat features¹. This approach is consistent best available science and guidance from the Washington State Department of Fish and Wildlife.

Land use and development patterns can significantly affect fish and wildlife habitat. The Washington State Department of Fish and Wildlife has documented a direct correlation between the intensity of development and the abundance and diversity of wildlife and wildlife habitat. The ability of wildlife to coexist with humans drops significantly as residential densities exceed one unit per acre. Obviously such densities are not appropriate in urban areas or consistent with GMA directives regarding containing sprawl and promoting urban development. The City should instead focus on preserving habitat blocks and corridors, promoting the use of clustered development techniques near habitat features, and limiting urban growth area expansions (Theobald, Miller, & Thompson 1997; WDFW 2009).

The Washington State Department of Fish and Wildlife recommends that local governments designate bio-diversity areas and habitat corridors. Bio-diversity areas are described as areas that, in comparison to the rest of the City, have relatively intact vegetation, a varied tree canopy, and decaying logs or snags. Corridors are similar bio-diversity areas except that they focus on linear features, such as streams, or are used to connect a number of individual habitat components which may, collectively, have a significant value. WDFW recommends that a number of landscape and habitat features be considered when identifying and designating corridors and bio-diversity areas (WDFW 2008) including:

- Riparian Areas – Upland areas adjacent to Streams, rivers, ponds, and lakes, and other water courses
- Freshwater Wetlands and Deep Water Habitat – Wetland and areas of standing water which may be too deep to support wetland vegetation

¹ Whidbey Environmental Action Network v. Island County, 14-2-0009. Final Decision and Order, June 26, 2015 and Ann Aagaard, Judy Fisher, Bob Fisher, Glen Conley, and Save a Valuable Environment (SAVE) v. City of Bothell, 15-3-0001, Final Decision and Order, July, 2015.

- Instream Habitat – Rivers, streams, and other watercourses mapped by WDFW as providing, or being capable of providing fish habitat
- Cliffs and Talus – Rocky outcrops and other similar geologic formations more than 25 feet high and slopes comprised of rock rubble, riprap slides, or mine tailings
- Snags and Decaying Logs – Areas with concentrations of snags, dead or dying trees, and decaying logs

Identifying and designating significant habitat patches and corridors is also important for satisfying GMA requirements related to greenbelts and opens space areas². In addition the GMA requires that local governments give “special consideration” to preserving and enhancing anadromous fish resources. Based on the habitat and landscape features identified above, the City should consider designating the following areas as habitat patches or corridors.

4.4.4.1 Gages Slough

Gages Slough is linear system of interconnected wetlands and deep-water habitat areas that bisects the City. The slough is connected to, and directly influenced by, the Skagit River and connects undeveloped agricultural areas to the east and west of the City. While the slough has been extensively modified in places it retains significant patches of native vegetation in comparison to other areas of the City and provides important habitat for amphibians, shorebirds, waterfowl (such as cavity nesting ducks), other birds, and bats. The slough is mapped as fish habitat by WDFW (SalmonScape) and provides important floodplain, water quality, and storm-water management functions. Gages Slough and all associated wetlands, deep-water habitat areas, wetland buffers, and special flood risk areas should be included within the corridor designation.

4.4.4.2 Burlington Hill

Burlington Hill contains the single largest stand of forest remaining in the City and includes snags, decaying trees, rocky outcrops, talus, and cliffs. The entire hill is mapped as a geologically hazardous area and is predominantly comprised of slopes between 15 and 40 degrees. Limited areas of Burlington Hill have slopes in excess of 40 degrees (Skagit County 2014). The hill possesses the largest relatively intact patch of habitat in the City of Burlington and may provide suitable habitat for bats, the Pileated Woodpecker, Bald Eagle, Purple Marin, Vaux’s Swift, Peregrine Falcon and other birds such as cavity nesting ducks.

Burlington Hill has been identified as an erosion hazard area (Skagit County 2014) and wetlands have been identified at the base of the hill. The rocky soil conditions and steep topography of the hill suggest that at least some of these wetland areas are fed by groundwater moving down the hill during the wet season (ProSource 2016). These wetland areas appear to be linked by a series of ditches and drainage features which flow to Joe Leary Slough, which is mapped as

² RCW 36.70A.110(2) and RCW 36.70A.160

providing salmon habitat (SalmonScape). Given these unique landscape features, development on the hill could impact wetlands and water courses located at the base of the hill.

4.4.4.3 Skagit River

A large swath of land owned by the City and the Dike District parallels the Skagit River. This corridor is largely developed for low intensity uses such as parks, sports fields, and flood control structures. The shoreline areas between the dike and the Skagit River are within the Skagit River floodway and a strip of land 300 feet inland from the toe of the dike has been designated by the City of Burlington as a special flood risk area. The Skagit River corridor connects undeveloped agricultural and floodplain areas to the east and west of the City. Combined, this area provides important riparian functions. Development, including fill, new impervious surfaces, and vegetation clearing, could negatively impact water quality, hydrologic functions and present significant risks in the event of a flood.

4.4.5 Protection Standards

Three common approaches are used to protect fish and wildlife habitat conservation areas. These approaches may include protecting individual wildlife occurrences (such as nesting sites), establishing buffers around habitat features (such as streams), or more general protective measures (such as regulating storm-water runoff or limiting development densities in sensitive areas).

4.4.5.1 Fish Habitat

Fish and other aquatic species are both directly impacted by development in streams and riparian areas and indirectly impacted by other factors such as storm-water runoff, water quality, and the loss of wetlands. With respect to direct impacts, the Washington State Department of Fish and Wildlife recommends that streams be classified using the stream typing system developed by the Department of Natural Resources (DNR), and that the riparian areas adjacent to stream be protected by buffers.

Stream buffers should correspond to the DNR stream classification system and should be consistent with WDFW recommendations (Knight 2009). The City's current FWHCA regulations contain a stream classification system and a range of protective buffers. While this general approach is consistent with WDFW's guidance, the stream classification system and buffer widths prescribed by Burlington's code should be updated. The City's uses an outdated DNR classification system which can't be directly compared to the current one. WDFW guidance recommends applying four separate riparian buffers, ranging in width from 150 feet to 250 feet. Also, in cases of overlapping riparian and wetland buffers, the larger should apply Knight 2009; Knutson and Naef 1997). In contrast, the City's code prescribes three buffer widths, which range in width from 50 feet to 200 feet, and does not address the issue of overlapping buffers.

Within riparian buffers most development activities such as clearing, grading, tree cutting, filling, and construction should be prohibited. Some low impact uses, such as trails and underground utilities may be appropriate when it can be shown that existing buffer functions will not be significantly degraded or altered (Knutson and Naef 1997). The City's fish and wildlife regulations contain a list of permitted and exempt uses and this list is generally consistent with WDFW's guidance. The performance based buffer requirements in the City's code should be eliminated. These standards pertain only to timber harvest operations and are not applicable in the City. Also, additional standards should be added to regulate utility stream crossings, recreational uses, and the application of chemical treatments (Knutson and Naef 1997).

Development indirectly impacts salmon habitat by increasing the amount of storm-water runoff during rainy periods, reducing the amount of water available for fish and other aquatic species in the summer, and contributing pollutants to local streams and rivers. In areas that rely on individual wells for drinking water, groundwater withdrawals can also reduce stream flows (Skagit River Systems Cooperative and WDFW 2005). The Puget Sound Partnership has identified nonpoint pollution including, storm-water, and hydrologic changes as one of the greatest threats to water quality in the Puget Sound (Puget Sound Partnership [PSP] 2016). In order to protect salmon habitat policies and regulations must be adopted to address the indirect impacts associated with development.

Not all surface water flows directly to streams and rivers. Under natural conditions a significant quantity of rainfall becomes groundwater which, through interaction with stream channels and depressions, such as Gages Slough, contributes to stream flows during the dry season (Knight 2009). This process also removes pollutants and reduces stream temperatures. Excessive impervious surface coverage from new development decreases groundwater recharge rates, limits the interaction between surface water and groundwater, and ultimately contributes to lower summer flows, warmer water temperatures, and may cause localized flooding problems during periods of heavy rain. Studies have shown that when the amount of impervious surface coverage in a basin exceeds ten percent, salmon habitat can be compromised (Knight 2009). Therefore, limiting the amount of impervious surface coverage and effectively managing storm-water runoff are crucial to maintaining salmon habitat.

Recently concerns over the effects of development within floodplains have been highlighted. In 2008 the National Marine Fisheries Service issued a "Biological Opinion" documenting the effects of floodplain development on endangered species, including salmon. Floodplain development can physically disconnect side channels, sloughs, and other areas that provide spawning and rearing habitat for salmon and can also isolate or degrade wetlands associated with streams and river systems. These wetlands are critical to maintaining natural hydrologic processes (such as groundwater recharge and discharge), storing sediment from runoff, and contributing insects and other macroinvertebrates which are an important food source for salmon (WRIA 3 and 4 Technical Advisory Group).

In order to protect salmon habitat from indirect development impacts the City should adopt policies and regulations to limit impervious surface coverage, manage storm-water runoff with low impact development (LID) measures, mitigate for loss of floodplain habitat functions and flood storage capacity, limit UGA expansion into undeveloped areas, and encourage redevelopment within existing UGA boundaries.

4.4.5.2 Other Species

Birds, bats, and amphibians are often associated with wetlands, riparian areas and large tracts of forest. To protect these species, all wetlands, ponds, and riparian areas should be designated as locally important habitat areas. Specific regulations should be adopted to require that snags, dying trees and rotting logs be retained when possible. Isolated occurrences (such as nesting sites) of birds and mammals such as, cavity nesting ducks, Pileated Woodpeckers, and bats, should be protected through the preparation of a habitat management plan consistent with WDFW guidance.

In order to address wildlife habitat on a landscape scale a system of corridors and special management areas should be established and should include Gages Slough, Burlington Hill, and the Skagit River. With the Burlington Hill special management area clustered development patterns should be required in order to maintain large tracts of vegetation and protect unique features such cliffs and talus slopes. Policies and regulations should be adopted to limit development along the Skagit River and Gages Slough to protect water quality, floodplain habitat functions, amphibians, birds, and bats.

4.4.6 Recommendations

Generally the City's existing fish and wildlife habitat protection standards are consistent with technical guidance from State agencies and "best available science". The following changes should be made to improve the code and ensure compliance with the GMA.

- Explicitly designate the Loon, Peregrine Falcon, and Bald Eagle as protected species
- Designate naturally occurring ponds and deep-water habitat as habitat of local significance and limit filling, modifications, and development in these areas without mitigation.
- Designate all streams and watercourses as fish and wildlife habitat and protect these areas with riparian buffers consistent with WDFW guidance and the current DNR stream typing system.
- All wetland areas should also be designated as FWHCAs to protect bird, bat, and amphibian habitat and regulations should be adopted which specifically address the removal of snags and rotting logs.
- Designate a special management corridor along Gages Slough and adopt policies which encourage land acquisition, habitat restoration, and passive recreation (such as trails) where appropriate.

- Designate a special management area encompassing Burlington Hill and adopt policies and regulations which require the use clustered development patterns, the retention of large patches of vegetation, the retention of snags and rotting logs and the protection of cliffs and talus fields.
- Designate a special management corridor along the Skagit River consisting of the river, its riparian buffer areas and the special flood hazard area extending inland from the toe of the dike. Limit development in this area to flood control structures, agriculture, and recreation. Adopt policies encouraging land acquisitions and conservation projects.
- Adopt policies and regulations to ensure that, basin-wide, impervious surface coverage does not exceed ten percent and manage storm-water runoff by using low impact development (LID) measures.
- Adopt policies and regulations to ensure that, basin-wide, there is no net loss of floodplain habitat functions and that no new isolated floodplain areas are created.
- Encourage redevelopment and increase land use intensities within the City's existing UGA.

4.5 Flood Hazards

4.5.1 Local Conditions

Flooding has historically played a major role in the development of Burlington and much of the Skagit Valley. With the exception of a few isolated areas the entire city is located in a floodplain. While flooding poses significant risks, historically it has been responsible for the Skagit Valley's unique pattern of development and strong agricultural industry.

Under natural conditions floodplains are frequently inundated and the receding low velocity floodwaters leave behind sediment and nutrients (WRIA 3 and 4 Technical Advisory Group). This naturally occurring cycle is responsible for the incredibly productive soils found in the Skagit Valley which are thought to be among the best in the State of Washington. The local agricultural industry is responsible for over \$300 million in annual economic output (Swinomish Indian Tribal Community 2016). This development and concentration of economic activities is not without risks however.

The Skagit River is one of the largest and most flood-prone rivers in the State (DOE 2007). The floodplain of the lower Skagit River encompasses over 100 square miles and includes the County's largest and fastest growing cities. The City of Burlington, and much of the lower Skagit River floodplain, is protected by an extensive system of dikes and levees (U.S. Army Corps of Engineers [USACE] 2014). While dikes, levees, and other structural flood protection measures tend to reduce the frequency of flooding and minimize the damage associated with minor flooding events, these measures also tend to increase the risks associated with major, but less frequent floods (Lee and Hamlet 2011).

Despite the significant efforts made to control flooding in the Skagit River watershed, the possibility of major flooding in the City of Burlington is not remote and the risks will likely increase, rather than decrease, over time. Over the past century the Skagit River has flooded more than 60 times (DOE 2007). Floods occurred recently in 1990, 1995, and again in 2003. While each of these floods breached dikes and caused significant property damage, they were each small compared to the largest floods on record (USACE 2014). The frequency and magnitude of flooding in the Skagit Valley has been increasing (NMFS 2007) and this trend is expected to continue with more significant and frequent winter storms (Lee and Hamlet 2011).

The threat of flooding is particularly challenging for the City of Burlington given the dense concentration of people, economic activity and infrastructure in the floodplain. Critical transportation routes including I-5, SR-20, and interstate rail lines pass through the city and are vulnerable to damage or disruption in the event of a major flood (Washington State Department of Transportation [WSDOT] 2015). Schools, municipal buildings, numerous utilities, and the City's sewage treatment plant are also located in the floodplain. It is estimated that a major flood could endanger over 2,554 structures and cause more than \$374 million in damage (USACE 2014).

Despite the significant risk of flooding, the City of Burlington is expected to grow by 3,808 people and add 3,516 jobs over the next 20 years. In the past, the challenge of accommodating this growth, and mitigating the associated flood risks, would have been met by physically expanding the City and constructing new dikes or levees. However, the financial implications and environmental consequences of this pattern of development have become untenable.

Major new flood control projects were proposed in the 1930s and the 1960s. None of these projects moved forward due to a lack of funding (USACE 2014). More recently, in 2014, the U.S Army Corps of Engineers proposed a more limited set of levee and dike improvements near the City of Burlington at a projected cost in excess of \$201,413,000. This project also lacks funding and faces an uncertain future. In addition to these substantial, and as yet unmet, financial costs, significant environmental consequences have also been attributed to structural flood protection measures and floodplain development.

In their natural state floodplains contain extensive wetlands, side channels, calm backwater sloughs, and other areas that provide important water quality and habitat functions that support native salmon stocks and other wildlife. Since 1850 the lower Skagit has been extensively developed and over 60 percent of the natural riparian areas have been lost. The Chinook Recovery Plan places a significant emphasis on protecting undeveloped floodplain areas and restoring natural functions whenever possible (NMFS 2007).

While the ecological functions of floodplains have long been recognized, in 2008 the National Marine Fisheries Services (NMFS) issued a Biological Opinion specifically documenting the effects of floodplain development on a number of endangered species, including several stocks of native salmon. As a result, cities such as Burlington are required to take actions to avoid, or mitigate, the habitat impacts associated with new development in the floodplain (NMFS 2008).

4.5.2 Regulations

Floodplain development in the City of Burlington is subject to a number of federal and state requirements, including the National Flood Insurance Program (NFIP), Washington State floodplain management laws (RCW 86.16), the Growth Management Act (GMA), and the Shoreline Management Act (SMA). These regulatory programs address where development can occur in the floodplain, what type of floodplain development is appropriate, and specify construction techniques and building design standards. Broadly, these regulations are intended to minimize flood damage and property loss, protect lives, and maintain the natural functions of the floodplain.

In 1968 the U.S federal government enacted a number of laws intended to address a lack of affordable flood insurance options, alleviate flood damage, and reduce the expense of disaster recovery efforts. These laws created the national flood insurance program (NFIP) and empowered the Federal Emergency Management Agency (FEMA) to oversee floodplain development programs administered by state and local governments.

To access federally insured mortgages home buyers are required to purchase and maintain a flood insurance policy. Normal home owner insurance policies don't cover flood damage, and with few exceptions, flood insurance is only available through the NFIP. In exchange for access to federally backed flood insurance policies, the NFIP requires that participating governments adopt development regulations to prevent new buildings from being damaged by floods, prohibit forms of development that intensify flood risks, and protect the natural ecological and hydrological functions of the floodplain (FEMA 2009).

While nationally participation in the NFIP is voluntary, the State of Washington has adopted, and imposed, floodplain development standards statewide (RCW 86.16.020 and WAC 173-158-050). This requirement makes compliance with NFIP standards mandatory for local governments throughout the state and imposes additional, more rigorous development standards. Washington State floodplain laws are administered by the Department of Ecology (DOE). DOE has authority to review, and approve, floodplain regulation adopted by local governments (RCW 86.14.041). In addition to ensuring compliance with the minimum standards of the NFIP, DOE generally prohibits development in floodways and discourages filling or modifying wetlands.

The Growth Management Act (GMA) requires that local governments designate "frequently flooded areas" as a critical area. The GMA definition of a frequently flooded area is broader than the definition used by the NFIP. Under the GMA frequently flooded areas included not only mapped floodplains, but also unmapped areas that may be at risk of localized flooding due to high ground water, wetlands, streams, and urban storm-water runoff. The GMA requires that local governments take actions to minimize public health and safety risks, reduce economic losses, and protect natural floodplain functions. The State's platting and land division laws also

require that flood hazards be considered in approving new subdivisions and short plats (RCW 58.17.120).

4.5.3 Identification

In designating frequently flooded areas the City must consider the periodic flood cycle of the Skagit River, the effects of changing natural conditions, the cumulative effects of floodplain development, and the potential for catastrophic failures involving the dams and levees. Under the GMA, frequently flood areas are defined as areas with at least a one percent chance of flooding in any given year or areas subject to flooding due to high groundwater, including, but not limited to, streams, lakes, wetlands, and other areas where groundwater ponds on the surface (WAC 365-190-030(8)). Because the City is required to give special consideration to anadromous fish species the ecological functions of the floodplain must also be considered when designating frequently flooded areas.

4.5.3.1 Reoccurring Flood Risks

A floodplain is a relatively flat area adjacent to a river that, under natural conditions, is periodically inundated when the river spills over its banks during periods of high flow (DOE 2007). Floodplains consist of two distinct parts; a “floodway” and a “flood fringe” (DLCD 2000). The floodway carries the bulk of floodwaters and is typically where the greatest velocities and destructive forces occur. The flood fringe constitutes the bulk of the floodplain. While this area is subject to inundation, floodwaters in the fringe travel and very low velocities and have little destructive force (FEMA 2009). In the City of Burlington the floodway has, for regulatory purposes, been physically disconnected from the rest of the floodplain by a series of dikes and levees (WAC 173-26-221(3)(b)).

Flood hazard studies and maps typically identify and classify flood risks using an “occurrence interval”. An occurrence interval is an assessment of the likelihood that a flood will occur in a given year. Occurrence intervals are frequently expressed as ratio using the number of years between occurrences (10 year, 50 year, 100 year etc.) but can also be expressed as a percentage (USACE 2014). While helpful for assessing the probability of flooding, the use of occurrence intervals can lead the public to erroneously believe that a 100 year flood will only occur once in a 100 year period. Alternatively, some may question the accuracy of flood maps because they are not aware of any floods having occurred in the past 100 years. This phenomenon is commonly referred to as the “100 year flood myth” (DLCD 2000).

In reality the possibility of a flood occurring is both greater and more difficult to predict than most people assume. For example, in any given year there a one percent chance that a 100 year will occur. While this may seem like a remote possibility, there is a 26 percent chance that such a flood will occur over a period of 30 years, or the term of a typical home mortgage (FEMA 2009).

The most common source of flood information are the “flood insurance rate maps” (FIRMs) provided by the Federal Emergency Management Agency (FEMA). FIRMs delineate the boundaries of the 100 year (one percent) floodplain. FEMA refers to this area as the “special flood hazard area”. FIRMS also commonly have information on the predicted height of floodwaters (base flood elevations). Each FIRM is associated with a flood insurance study that contains additional information on local flood characteristics and the methods used to map the boundaries of the floodplain (DOE 2007). Because of annexations the City of Burlington is covered by three separate FIRMs. These maps were produced in the 1970s and the most recent revision occurred in 1989. At a minimum the City of Burlington must designate the entire extent of the 100 year flood plan depicted on these FIRMs as a critical area (WAC 365-190-110(1)).

While riverine flooding is commonly understood and reflected on FEMA maps, less well understood is the fact that naturally occurring topographic and manmade features may also be prone to flooding or affect the course and velocity of floodwaters (Schwab 2016). The City of Burlington has a number of areas that could be prone to elevated flood risks including significant topographic depressions, sloughs, streams, and manmade watercourses. While Gages Slough and areas near that are more than three feet below the base flood elevation have been designated as “special flood risk zones” by the Burlington Municipal Code (BMC 14.01.060), other areas that could store or direct significant quantities of floodwater should also be designated.

Wetlands also provide important hydrologic functions in floodplains. They store large amounts of floodwater, reduce sediment and pollutant flows, and reduce downstream flooding by intercepting surface runoff and attenuating its flows through groundwater recharge (FEMA 2009). The City’s critical area regulations address wetlands separately from floodplains. In order to ensure that the floodplain management functions of wetlands are adequately considered they should be specifically designated in the City’s floodplain regulations.

4.5.3.2 Ecological Functions

Existing FIRMs do not adequately address the natural ecological functions of floodplains. Floodplains provide important riparian and aquatic habitat. In designating frequently flooded areas the City must consider these functions and take actions to support anadromous fish populations (Schwab 2016). Under natural conditions floodplains are frequently inundated. This periodic flooding and horizontal movement of floodwater across the floodplain deposits sediment, and moderates flow velocities by providing temporary floodwater storage. Additionally the reoccurring movement of floodwaters produces a complex network of wetlands, ponds, sloughs, side channels, and other calm backwater areas that support salmonids at various life stages (WRIA 3 and 4 Technical Advisory Group).

The hydrologic and ecological functions of floodplains are particularly pronounced in the area immediately adjacent to a stream or river. This area, which is known as the hyporheic zone, extends beneath a river’s banks and is characterized by a significant interaction between surface and groundwater (WDFW 2001). Burlington has designated an area parallel to the

Skagit River dike system as special flood risk zone. Significant limits on development between the Skagit River and the landward edge of this area. While this area may protect the functions of hyporheic zone these functions are not identified and the City's development code should be amended accordingly.

4.5.3.3 Future Conditions

One important characteristic of floodplains is that they are not static. The boundaries of a floodplain and the risks associated with floodplain development can, and do, change as a result of natural processes and human activities. Development and watershed modifications including dredging, channelization, and the construction of dams, dikes, and levees can significantly alter river flows by retaining water or forcing greater volumes of water downstream (Schwab 2016). Altering or filling wetlands can adversely affect their ability to reduce flood damages (WAC 173-158-080). Normal building and construction activities can also alter flood patterns. Urban development creates hard surfaces that increase runoff and reduce the ability of soil to absorb rainfall. Building and fill can displace floodwaters and alter flow paths. Cumulatively, these actions can raise base flood elevations and expand the boundaries of a floodplain (Schwab 2016).

Naturally occurring changes can also alter the characteristics of a floodplain. River channel migration, long term climate change, cyclical weather patterns, sea level rise, and earth movement can all effect flooding. These changes must be considered when designated frequently flooded areas under the GMA (WAC 365-190-110(2)(d)).

Although FIRMs are the most commonly available source of flood information they suffer from a number of problems. It is thought that in many cases these maps significantly underestimate the true extent of the floodplain and the height of potential floodwaters (Wing et al. 2018). Most of the available FIRMs, including those covering the City of Burlington, were produced in the 1970s and 1980s using methods and technology that are now considered outdated (DOE 2007). In addition, these maps reflect a fixed point in time and do not account for changes that have occurred since the maps were completed. Development and changes in natural conditions, vegetation, and land cover can all affect the characteristics of a floodplain (DLCD 2000).

When buildings, structures, and fill are placed in the floodplain water is displaced increasing the base flood elevation and expanding the spatial extent of the floodplain. Clearing vegetation and paving can also affect flood conditions. For example, in forested area up to 50 percent of rainfall is intercepted by trees and evaporates without contacting the ground. Impervious surfaces, such as pavement, can increase the volume and velocity of storm-water runoff, causing localized flooding and increasing downstream flows (DLCD 2000).

The GMA requires that the City consider the vertical and spatial extent of the floodplain at "full buildout" and the effect of increasing impervious surface coverage (WAC 365-190-110(2)). In the City of Burlington it is estimated that since 1985 (the date the City's FIRM was last updated)

almost 56 million cubic feet of fill has been placed in the floodplain, effectively raising the base flood elevation by almost six inches (City of Burlington 2016). The City should consider addressing this change by expanding the scope of the floodplain regulations to include areas of the 500 year flood plain (B zones) and raising the minimum floor height for new buildings.

Rivers in western Washington are fed by a combination of surface water runoff from precipitation, groundwater inflow, and snowmelt. During winter months when the northwest experiences heavy precipitation, much of the precipitation falling at higher elevations falls as snow reducing stream flows and minimizing flooding. During the spring and summer the snowpack at higher elevations gradually melts augmenting stream flows during dry periods. Major floods in the Skagit River watershed typically occur during the winter and are associated with periods of rapidly warming temperatures. The resulting combination of snowmelt and heavy precipitation can produce very heavy river flows and flooding conditions (USACE 2014).

In the future, western Washington is expected to experience warmer winters and dryer summers (Lee and Hamlet 2011) and the frequency and magnitude of flooding is expected to increase, particularly between October and March as a result of increasing snow levels and more rainfall at higher elevations. Earlier and more rapid snowmelt may also increase the risk of flooding in early spring months (DOE June 2007). Many of these changes are already apparent; since 1983 snowpack in the North Cascades has declined by 73 percent and glaciers have lost 18 -32 percent of their volume (DOE April 2007).

The Army Corps of Engineers estimates that peak flows in the Skagit River basin could increase 23 percent by 2040 and 40 percent by 2080. As result, in any given year, the risk of a flood occurring that exceeds the capacity of Burlington's levee system could increase from four percent to ten percent (USACE 2014). To account for future conditions the City should consider expanding the scope of the City's flood protection ordinance to include additional areas currently outside the regulatory floodplain.

Under natural conditions the alignment of a river's channel can change frequently. This channel movement is called "channel migration" (DOE June 2007) and the area along the river which may be impacted by this movement is called the "channel migration zone" (WAC 173-26-020(7)). The City is required to consider channel migration zones when designating frequently flooded areas and assessing flood risks (WAC 365-190-110(2)(c)). The City of Burlington is separated from the Skagit River by an extensive system of dikes and levees. These structures have interrupted the river's normal movement. As a result, areas landward of the levees do not fall within the Skagit River's channel migration zone (WAC 173-26-221(3)(b)).

4.5.3.4 Catastrophic Events

In addition to naturally occurring periodic flood events, the potential impacts of catastrophic events, such as the failure of dams and dikes, and natural disasters, such as tsunamis, should be considered.

While flood control structures, such as the dikes that surround Burlington, offer protection from small regularly occurring flood and reduce the frequency of flooding, they also magnify the risk of less frequent, but more severe, floods (Lee and Hamlet 2011). When levees fail or are overtopped development can be exposed to high velocity floodwaters. In addition, the levees may act as a dam and prevent floodwater from receding prolonging the period of inundation. It is estimated that the levees system protecting Burlington is capable of containing a four to five percent (20 to 25 year) flood event (USACE 2014). The level of protection provided by the City's current levee system is not sufficient to protect the City from a one percent (100 year) flood event and is not capable of protecting the City from the largest known flood events that have occurred on the Skagit River.

The floods that occurred most recently in 1995 and 2003 were both four percent (25 year) floods. The 1995 and 2003 floods were both damaging and severely tested the City's flood control measures. If a flood comparable to those that occurred in 1917 or 1921 were to occur again, it is estimated that the dike breach could occur in the vicinity of Burlington and the resulting flood could cause \$1.3 billion in damages. In such a scenario flood depths could reach eight feet and many areas would remain inundated for two to three days.

Communities located downstream of dams are subject to flood risks that are not reflected on FIRMs. Such communities can be impacted by releases necessary to alleviate upstream flooding and the structural failure of the dams themselves. Dam failures create a sudden rush of high velocity floodwater that exceeds the capacity of downstream flood control structures (Schwab 2016). The Washington State Department of Ecology (DOE) maintains a list of "high hazard" dams. A high hazard dam is a dam that would result in the loss of seven or more lives in the event of a failure (DOE 2017). Many of the dams listed in the DOE inventory are relatively small, located a significant distance from the City, and pose little risk to Burlington.

Larger dams, including those operated by Seattle City Light in the upper Skagit are regulated by the Federal Energy Regulatory Commission (FERC) and are not included in the DOE inventory. If one, or more, of these dams were to fail the results for downstream communities would be catastrophic. Seattle City Light estimates that in a worst case scenario the City of Burlington would be impacted by a surge of floodwater and would experience significant inundation. The resulting flood would cover areas of the City not identified on FIRMs and would exceed normal flood depths. It is estimated that the City would have approximately 12 hours to prepare and organize evacuation before the flood surge reached the City (Seattle City Light 2009).

4.5.3.5 Tsunamis

Tsunamis are caused by offshore earth movement and consist of a series of extremely long high energy waves. Tsunamis are typically associated with earthquakes but can also be caused by underwater volcanic eruptions and landslides occurring beneath the surface of the ocean. Tsunamis can move at speeds in excess of 500 miles per hour. When traveling offshore they have very little height but as the waves approach shallow coastal waters or enter a confined

waterway (such as the Puget Sound) the waves can reach great heights and carry immense destructive force (UNESCO 2014).

The Cascadia Subduction Zone of Washington's coast could produce a significant tsunami. Researchers have uncovered evidence of historic tsunamis at a number of locations stretching from northern California to southern Vancouver Island and stories from native peoples, including the Makah tribe on the Olympic Peninsula indicate that a major tsunami has occurred in the past (Walsh, Titov, Venturato, Mofjeld, & Gonzalez 2005). Earthquakes involving the Cascadia Subduction Zone are thought to occur at intervals of 500 – 540 years. While a tsunami caused by a Cascadia Subduction Zone earthquake would impact numerous coastal communities in Washington State, inundation modeling prepared by the Washington State Department of Natural Resources (DNR) indicates that the City of Burlington would not be directly impacted.

4.5.4 Protections Standards

As demonstrated in the proceeding sections, floodplain development has both human and ecological impacts. Developing flood prone areas can put lives at risks and lead to significant economic losses in the event of a major flood. By removing vegetation, covering land with impervious surfaces, filling wetlands, and channelizing natural watercourses, floodplain development can negatively impact fish and wildlife habitat. The City's policies and regulations must address both the human and ecological impacts of floodplain development.

There are essentially three ways of minimizing flood damage, including:

- Prohibiting, or limiting, development in flood prone areas
- Constructing levees and dikes to reduce the magnitude and frequency of flooding
- Requiring that new buildings be elevated and constructed to minimize damage from flooding

Because much of Burlington is located in a floodplain, completely avoiding all flood prone areas is not viable option; however, opportunities do exist to minimize floodplain development in some areas. For example, the City currently imposes significant restrictions on development in the most hazardous areas. These areas include the Gages Slough corridor and the areas along the Skagit River dike. These regulations should be retained and updated mapping and designation criteria should be adopted.

Although much of the undeveloped land surrounding the City is located in unincorporated Skagit County, and is therefore not directly regulated by the City, Burlington's land use plans and policies do play in how this land is used and under what conditions it may be developed. By limiting the City's outward expansion the amount of land exposed to flooding can be reduced, the expense of constructing new flood protection structures can be minimized, and the ecological impacts associated with new development can be limited. Burlington's

comprehensive plan should contain explicit policies promoting development within the existing municipal boundaries, limiting future UGA expansions, and ensuring that the annexation, and development, of new undeveloped land includes adequate mitigation measures.

Currently the City's policies and regulations do not address "critical facilities". Critical facilities are generally considered to be facilities, such as a fire station or hospital that must remain functional in the event of an emergency or natural disaster. While some critical facilities can be located outside of the floodplain, the operational needs or response areas of others dictate their location (such as the City's sewage treatment plant which must be located near the river). In such cases, more rigorous elevation and construction standards should be applied. The capital facilities element of the comprehensive plan should be amended to address critical facilities and the floodplain development regulations should be amended to require higher standards for critical facilities located in the floodplain.

Historically vast sums of money were spent on flood protection structures, such as dikes and levees. While these structures have succeeded in reducing the frequency of flood events, they have also encouraged development in flood prone areas, increased the risk associated with major flood events, and have proven to be financially infeasible in many cases. More recently focus has shifted to "keeping people away from the water" as opposed to "keeping the water away from people".

While avoiding flood risks rather than fighting them is a logical strategy, Burlington is already protected by a significant diking and flood control system and large percentage of the City was constructed prior to the adoption of modern flood protection standards. As a result, existing flood control structures will need to be maintained, improved, and in some cases, expanded to address the effects of previous floodplain development and changing natural conditions. The City should ensure that existing regulations allow dikes and flood control structures to be improved and expanded. Also, by limiting the physical size of the City through appropriate land use policies, the amount of land which must be protected can be reduced, thereby minimizing the cost of constructing flood protection measures.

Consistent with National Flood Insurance Program (NFIP) requirements, the bulk of the City's floodplain regulations are directed at ensuring that new buildings are designed and constructed to minimize damage in the event of a flood. Nationally these types of requirements have been shown to be highly effective (FEMA 2009). The City's current regulations generally meet or exceed NFIP standards; however, a number of minor changes could be made. For example, the City currently requires that the first floor of all new buildings be elevated at least one foot above the base flood elevation but this requirement only applies within the 100 year flood plain (A zone). Buildings constructed in areas where the natural grade is slightly higher than the base flood elevation (B zone) are exempt from this requirement, meaning that it is actually possible from some buildings in the B zone to be lower than comparable structures in the A zone. This regulatory gap should be addressed by requiring that all structures meet or exceed the minimum flood protection elevation.

In addition to protecting people from floods, the City must also protect floodplains from people. Floodplain development has been shown to impair natural hydrologic and ecological processes. As a result of past floodplain development significant fish and wildlife habitat has been lost. While much of the City is already developed, the ecological impacts of floodplain development can still be minimized. FEMA has developed a model code and specific criteria for evaluating the ecological impacts of floodplain development (FEMA 2012 and FEMA 2013). The City should use the applicable provisions of FEMA's model code and require individual biological site assessments for projects that don't fit a listed exemption. As a long term goal the City should work to achieve "programmatic" compliance through FEMA's approval process.

The City owns or controls large tracts of land along the Skagit River and adjacent to Gages Slough. The existing regulations which restrict development in these areas should be clarified and policies should be adopted which prioritize property acquisition and ecological restoration projects in these areas. To further minimize ecological impacts the Land Use Element of the comprehensive plan should prioritize development and reuse of existing site within the City's current municipal limits. UGA expansions should be discouraged and any annexation of undeveloped land should be accompanied by appropriate mitigation measures. For instance, the City's agricultural heritage program could be expanded to offset the impacts associated with annexing and developing undeveloped properties.

Burlington's storm-water regulations were recently updated. The updates were broadly intended to require that new development mimic natural processes by reducing impervious surface coverage, retaining natural vegetation, and infiltrating storm-water whenever possible. These regulations should be retained and clarified and corresponding policies should be added to the natural resources and capital facilities elements.

4.5.5 Recommendations

The following changes should be made to the City's policies and regulations:

- Utilize the current FEMA model ordinance as a template for the City's flood development regulations and require biological site assessments for any project not specifically listed as exempt.
- Adopt a long term goal of achieving programmatic (door two) compliance with FEMA's floodplain habitat protection standards.
- Clarify mapping and designation criteria for special flood risk zones.
- Wetland regulations should be amended to require that flood storage and groundwater recharge impacts be addressed.
- Adopt policies explicitly favoring storm-water and development practices that mimic natural hydrologic and ecological processes.
- Ensure that all buildings, including those in the "B zone" are constructed to the City's minimum flood protection elevation.

- Adopt regulations and policies governing the location and construction of “critical facilities”.
- Adopt policies that limit UGA expansion in flood prone areas and encourage infill and redevelopment within the City’s current municipal boundaries.
- Adopt policies and regulations to offset the impacts of developing vacant land annexed to the City.
- Consider increasing the minimum flood protection elevation to account for past development and changing natural conditions
- Adopt policies that prioritize the acquisition and restoration of land along Gages Slough and the Skagit River.
- Ensure planning policies and regulations allow for the construction of dikes and other flood control measures.

4.6 Geologic Hazards

4.6.1 Local Conditions

The City of Burlington, and much of the Skagit Valley, is characterized by extremely flat terrain formed by historic floodplain deposits (ProSource 2016). One notable exception is Burlington Hill, a steep rocky landform rising more than 400 feet above the surrounding land and marking the City’s northwest corner. The soils on Burlington Hill are extremely prone to erosion, and rock formations present numerous design and construction challenges. The City is also at risk from seismic activity and volcanic eruptions. Soils found throughout the City are prone to liquefaction, earth spreading and subsidence. The City could also be impacted by debris flows in the event of an eruption of Mount Baker or Glacier Peak.

4.6.2 Regulations

Under the GMA the City must address geologically hazardous areas through its critical area regulations (RCW 36.70A.030(5)). Geologically hazardous areas include areas susceptible to erosion, landslides, seismic activity, and volcanic eruptions. Manmade hazards, such as abandoned mines, must also be addressed (WAC 365-190-120(3)).

4.6.3 Identification

GMA regulations prescribe specific criteria for identifying geologically hazardous areas and identify recommended sources of information. In addition to identifying potentially hazardous areas, the City is also required to utilize three categories for assessing potential risks, including:

- Areas with known or suspected risks
- Areas with no known risks

- Areas of unknown risks

For purposes of identifying critical areas, the City primarily relied on the maps prepared by Skagit County, the Washington State Department of Natural Resources (DNR), and the U.S. Geological Survey (USGS). Each of the four categories of geologically hazardous areas identified in WAC 365-190-120(3) is discussed below and an assessment has been made regarding the relative risk posed by each.

4.6.3.1 Erosion Hazards

Erosion hazard areas are areas likely to become unstable, such as bluffs, steep slopes, and areas with unconsolidated soils. Burlington Hill generally consists of slopes in the range of 15 – 40 degrees, with slopes in some limited areas exceeding 40 degrees. The Natural Resource Conservation Service soils survey for Skagit County indicates that the dominate soil group present on the hill is “Andic Xerochrepts”. This soil unit characterized by extremely rapid surface runoff and is prone to severe erosion. Mapping prepared by Skagit County also indicates that all of Burlington Hill should be classified as an erosion hazard area due to the presence of erodible soils and steep slopes (Skagit County 2014). No other erosion hazard risks are known to exist within the City of Burlington.

4.6.3.2 Landslide Hazards

There are no mapped landslide areas in the vicinity of Burlington Hill (Skagit County 2014). Several areas with vertical rock faces exist on Burlington Hill and these areas may be susceptible to rock fall and toppling events (Highland and Bobrowsky 2008). Any slope with a gradient steeper than 40 percent and a vertical relief exceeding ten feet should be classified as a potential landslide area in accordance with GMA regulations (WAC 365-190-120(6)(i)). Vertical rock faces and slopes exceeding 40 percent on Burlington Hill should be identified as areas of known landslide hazards. Given the predominately flat terrain found throughout the rest of the City, there are no other known landslide risks present.

4.6.3.3 Seismic Hazards

Seismic hazards include areas that would be extremely prone to damage in the event of an earthquake. Seismically hazardous areas include areas subject to slope failure, settlement or subsidence, soil liquefaction, faulting, and tsunamis (WAC 365-190-120(7)). The Washington State Department of Natural Resources (DNR) has prepared detailed seismic hazard assessments and mapping for the State and each county. The ratings shown on these maps generally correspond to the design criteria used in the International Building Code to regulate the design of buildings and structures. DNR has also prepared maps showing location of fault lines and easily liquefied (potentially unstable) soils.

Based on DNR’s maps, much of the City of Burlington has been assigned a seismic site classification rating of “D” which is consistent with many areas of western Washington (DNR

2007). DNR's maps show an inactive, pre-Quaternary fault bisecting Burlington Hill and document evidence of several small earthquakes (DNR 2014). These factors are not significant enough to distinguish Burlington as an area of significant risk. Of more concern however, is that much of the City is comprised of liquefiable soils which can become extremely unstable in an earthquake. DNR has classified much of the City as moderate to highly susceptible to liquefaction (Palmer et al. 2004).

Liquefaction is a phenomenon that occurs during an earthquake when the shaking of the ground changes the structure of granular soils from a solid state to a liquid state. Once altered, such soils may be unable to support the weight of buildings and structures (DLCD 2000). Liquefaction may also trigger lateral spreading and subsidence of the ground (Highland and Bobrowsky 2008). Granular soils, those comprised of gravel, sand, or silt, are the most prone to liquefaction. The presence of shallow groundwater also increases the risk of liquefaction in the event of an earthquake (). Most of Burlington, with the exception of Burlington Hill, is characterized by granular soils (alluvium), and a shallow water table. These characteristics are particularly notable south of Gages Slough and east of I-5 (Palmer et al. 2004). As such all areas except Burlington Hill should be considered known areas of liquefaction risk.

4.6.3.4 Volcanic Hazards

The GMA also requires the City to designate other geologic hazards, including abandoned mines, and volcanic risks. DNR maintains an inventory of abandoned mines. This inventory does not identify any abandoned mines in, or near, the City of Burlington. Volcanic hazards include areas subject to pyroclastic flows, lava flows, debris avalanches, lahars, and flooding associated with volcanic activity. Glacier Peak and Mount Baker are both volcanos and have the potential to impact Burlington. The U.S. Geological Survey has produced maps and studies analyzing the risks posed by these volcanos. Based on this information the City of Burlington is not at risk of pyroclastic flows, lava, or debris avalanches. However, lahars and flooding induced by volcanic activity are significant risks (Wait and Mastin 1995; Wait, Mastin, & Beget 1995; USGS 1995).

A lahar is essentially a fast moving flood comprised of a slurry of water, mud, debris (such as trees rocks), and volcanic sediment. Lahars primarily affect low lying areas along rivers, similar to conventional floods; however, unlike a conventional flood, lahars tend to carry large quantities of solid debris and therefore have far more destructive force (Wait, Mastin, & Beget 1995). The USGS estimates that in a worst case scenario a lahar originating at Glacier Peak could travel down the Sauk and Skagit rivers and inundate the entire floodplain of the Skagit Valley in a matter of hours. An eruption of Mount Baker could produce a similar result by overtopping or destroying the Baker Dam. Such an event would result in catastrophic flooding and debris inundation (USGS 1995). Given these well documented hazards the entire City of Burlington should be considered an area of known lahar risk.

4.6.4 Protection Standards

The City's critical area protection standards do address geologically hazardous areas but were adapted from Skagit County regulations and suffer from a lack of specificity and rely on the role of a staff geologist, a position which the City does not have. The City's current regulations should be updated to include more specific standards for the preparation of geologic site assessments and policies should be adopted to ensure urban growth area expansions and annexations do facilitate new development in hazardous areas.

4.6.4.1 Erosion Hazards

Erosion occurs when soil is removed from its original location and is generally caused by rainfall or surface water runoff. Erosion can also be caused by wind. Four factors determine an area's susceptibility to erosion, including soil characteristics, vegetation cover, topography, and climate (Commerce 2005). Climate is a naturally occurring phenomenon and is not altered by site specific development activities. While difficult to alter a site's topography can be altered by filling, excavation, and grading. The length of a slope, its relative steepness, and surface texture all play a role in the volume and velocity of runoff. Regulations aimed at preventing erosion must consider these factors.

To prevent erosion it is particularly important to maintain the structure and organic content of the naturally occurring soils on a site. Organic matter enhances the stability and permeability of soil. When soil is compacted its porosity is reduced limiting its infiltration capabilities and increasing the volume of surface water runoff (Commerce 2005). Vegetation cover contributes organic matter to the soil and protects soil from compaction. Vegetation also prevents erosion by absorbing the energy of falling rain and the root structures of plants, trees, and shrubs stabilize soils, entrap sediment, and slow the movement of surface water. In areas prone to erosion regulations should be adopted which limit clearing, vegetation removal, and soil disturbing activities.

Burlington Hill is mapped as an erosion hazard area and the soils present on the hill are distinct from those found elsewhere in the City. Notably the NRCS considers these soils to be poorly drained and highly erodible. Burlington Hill is also characterized by uniformly steep slopes. Extremely steep slopes and vertical rock faces also exist in some areas and these features could be prone to rock fall and toppling. Because these conditions exist only on Burlington Hill it is possible to map the potentially hazardous area and designate a special management area to regulate development. This strategy may be particularly appropriate on Burlington Hill due to the numerous overlapping critical areas and habitat features, particularly those documented in the fish and wildlife section of this report.

While the City's critical area regulations address geologic hazards on a general level, they should be revised to focus on the hazards unique to the City of Burlington, specifically those confined to Burlington Hill. Regulations should be adopted limiting densities, requiring the use

of clustered development patterns, and ensuring the most hazardous or erosion prone areas are set aside as open space tracts (DLCD 2000). All development applications on Burlington Hill should be accompanied by a geotechnical evaluation addressing erosion hazards, site layout, storm-water management, and the preservation of existing vegetation and natural soils.

4.6.4.2 Seismic Hazards

The primary seismic hazard present in the City of Burlington is the risk of liquefaction. Because liquefiable soils are found throughout the City avoidance is not a viable strategy in all situations. However regulations and policies should be adopted to limit the siting of critical facilities in the most hazard prone areas. Policies should also be adopted which limit or restrict urban growth area expansion in areas most susceptible to liquefaction. The city's building code currently addresses soil movement but does not specify a threshold at which the standards apply. Also, no seismic design standards or site evaluation criteria exist for structures and improvements, such as roads and utilities, that not covered by the building code. The code should be amended to require the same level of analysis for these types of improvements that is required by the building code. Finally, the risks associated with rock-fall are not addressed in the City's critical area regulations. Development proposals adjacent to vertical rock faces should include a geotechnical evaluation addressing rock-fall potential and prescribing appropriate setbacks.

4.6.4.3 Volcanic Hazards

The U.S. Geologic Survey notes that there are no known mitigation measures to prevent damage from lahars, except avoidance (Highland and Bobrowsky 2008). Because the entire city is located in a floodplain and is at risk of lahar inundation and damage an effective evacuation plan should be developed.

Lahars and debris flows tend to follow existing drainages and river courses and therefore behave similarly to floods. Unlike floods though, lahars can carry large quantities of solids which can erode river channels and cause a river's banks to collapse (USGS 1995). Given the forces involved it is not known how much protection the City's existing flood control structures might provide. However, it is logical to assume that areas protected by dikes and levees would be less effected than unprotected areas. It is also logical to assume that taller and more robust levees would offer more protection. As such, development outside the City's current boundaries should be limited and policies should be adopted supporting the existing efforts to strengthen and expand flood control structures.

4.6.5 Recommendations

The following changes should be made to the City's policies and regulations:

- Create a special management area encompassing Burlington Hill in recognition of the multiple overlapping critical areas and natural hazards.
- Development densities should be limited on Burlington Hill and regulations should be adopted requiring the use of clustered development patterns.
- Limit clearing, vegetation removal, and soil disturbing activities in erosion prone areas.
- Require the preparation of a geotechnical report as early in the development process as possible. Such reports should be used to develop a site plan which avoids the steepest or most slide prone portions of the site.
- Geotechnical studies should be prepared for substantial structures, critical facilities, and public improvements such as roads and utilities. These studies should address the potential for liquefaction, settlement, and earth spreading and should prescribe appropriate design and mitigation measures.
- Critical facilities should not be located in areas susceptible to liquefaction unless absolutely necessary.
- Consider allowing reduced street widths and deviations from street connectivity standards on Burlington Hill if doing so would reduce the amount of soils clearing and vegetation removal.
- Limit UGA expansions to existing developed areas or areas with limited natural hazards.
- Develop an effective emergency response and evacuation plan for the City to address lahar and debris flow hazards.
- Consider developing a section of code focused on grading and site development.
- Adopt policies supporting efforts to improve, enlarge, and expand the City's existing flood control improvements.

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5 Economic Development

5.1 Introduction

Note: This chapter was adapted from a report prepared by Center for Economic and Business Research at Western Washington University. It has been revised and edited for consistency with other sections of the Comprehensive Plan and to incorporate research conducted after the preparation of the report.

The City of Burlington has experienced a period of economic change stemming in part from the rapid shift in consumer behavior throughout the Covid-19 pandemic. This economic shock has followed a longer economic trend in consumer behavior towards e-commerce or hybrid format retail. These factors have proven to be significant to Burlington's economy, this is due to the city's industrial composition being heavily concentrated within retail. In Burlington, this decline in retail is evident through the recent closure of the Cascade Mall in 2020. This is due to challenges to retail shopping during the COVID-19 pandemic as well as a decline in retailers in the mall itself over the past decade.

Despite these challenges, the City of Burlington has seen recent growth in other sectors. Namely transportation and warehousing, which has experienced 10 percent annual growth over the past five years. This growth holds promise for the future of economic conditions as climate factors in Burlington are advantageous for investment in expanding transportation, warehousing, and logistics. The City of Burlington has a number of unique advantages including local tax rates, geographic location, real estate, available workforce and workforce composition.

The first section of this chapter (5.2) summarizes the economic environment of the City of Burlington and provides comparison of these conditions to peer cities. The next section (5.3) analyzes how the City of Burlington has changed over time. This section contains forecasts and projections for several economic variables, including a population infill model to help the city plan for future growth in accordance with the Growth Management Act. The final section (5.4) provides policy recommendations for the City of Burlington based on current economic conditions, projected trends, and the unique characteristics of the City of Burlington.

5.2 Current Conditions

This section presents an overview of current economic conditions of the City of Burlington. It also discusses the impacts of the COVID-19 pandemic on the various aspects of Burlington's economy. This section also provides comparisons of economic data to three other peer cities: Fredericksburg, Texas; Sedro-Woolley, Washington; and Union Gap, Washington.

Although Fredericksburg is not geographically close to Burlington, this city was selected as a peer city because of similarities in its economy. Fredericksburg presents an example of a city which transitioned from a highly retail-dependent economy towards one which diversified into other industries such as manufacturing and tourism.

Sedro-Woolley was selected as a peer city as it shares similar characteristics, such as county policies, geography and economic conditions that allow the two cities to be compared while controlling for other factors. Union Gap was selected because it has been previously used by Burlington as a peer city for comparison purposes. Union Gap shares Burlington’s low tax rate and strong retail economy. However, Union Gap faces unique challenges because it is located within the Yakama Reservation and therefore has significantly more economic barriers due to federal jurisdiction.

5.2.1 Population

Population data comes from the US Census Bureau’s American Community survey for 2015-2019. Data from the 2020 Census will become available soon. However, 2020 Census data may not be especially accurate due to sampling issues related to the COVID-19 pandemic.

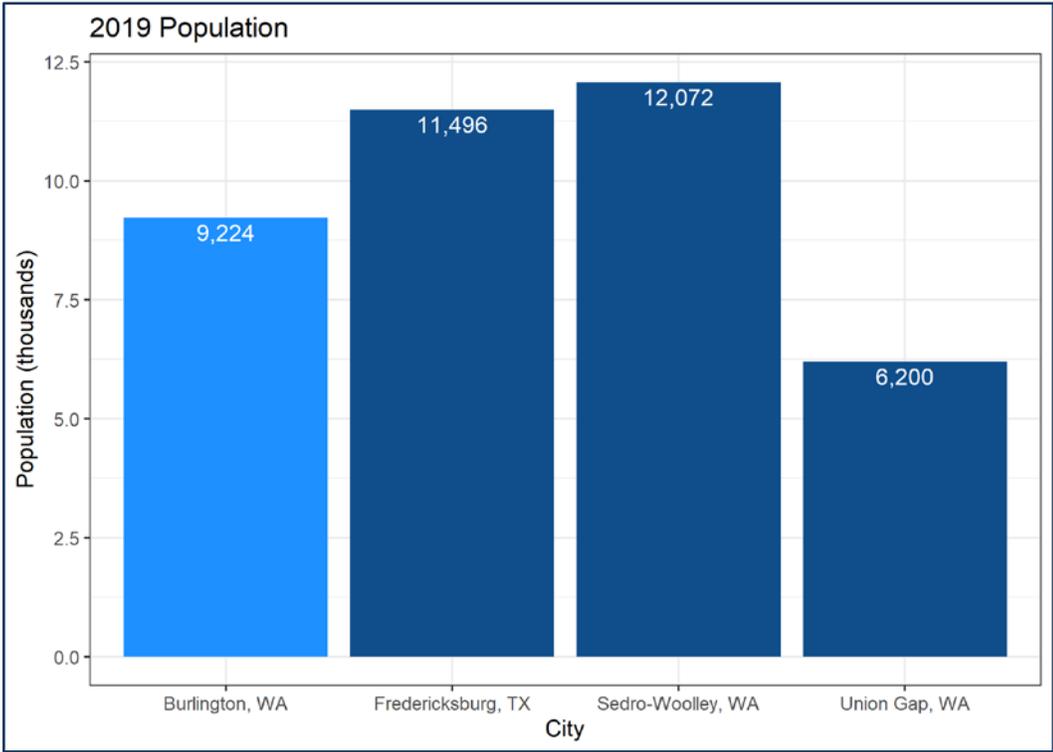


Figure 5.1: Population

As of 2019, Burlington’s population 9,224. Comparing to the peer cities, Burlington has the second lowest population, with Fredericksburg’s population at 11,496; neighboring Sedro-Woolley’s population is 12,072; and Union Gap’s population is lowest at 6,200. The Covid-19 pandemic may have impacted where people live, so it’s reasonable to assume that the population today is not exactly what it was when the data was collected.

5.2.2 Labor Force

Labor force data comes from the US Census Bureau’s American Community survey for 2015-2019. The data in Table 5.2 is an estimate of the labor force for each peer city in 2019. The labor force is defined as the population of adults (16+) who are either employed or looking for work. This figure does not count people who are retired, perform unpaid work at home, are incarcerated, or those who are otherwise able to work but choose not to.

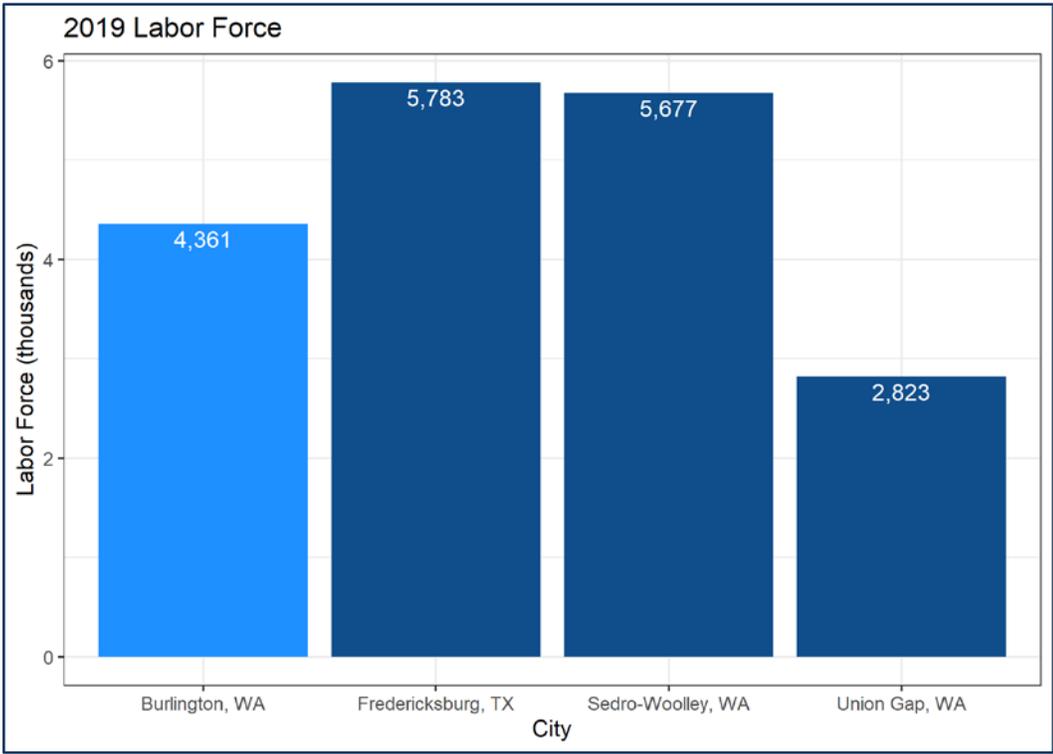


Figure 5.2: Labor Force

Burlington’s labor force was 4,361 as of 2019. Compared to the peer cities, Burlington has the second lowest labor force, which is to be expected because Burlington also has the second lowest population. Above Burlington, Fredericksburg’s labor force is 5,783; neighboring Sedro-Woolley’s labor force is 5,677; and Union Gap’s labor force is the smallest at 2,823.

To better understand the labor force metric, the labor force participation rate (LFPR) was considered. This LFPR measures the percentage of the population that is in the labor force. Burlington's LFPR is 47.3 percent, well below the US LFPR, which was 63.1 percent in 2019. For comparison, Fredericksburg's LFPR is 50.3 percent, Sedro-Woolley's LFPR is 47.0 percent; and Union Gap's LFPR is 45.5 percent. While Burlington's LFPR is relatively low, it is similar to peer cities. A low LFPR is common in rural regions and may be caused by a number of factors. A low LFPR can indicate a higher population of retired people, or that the cost of living is low enough that only one income is needed to support a household. However, all things being equal, a household with two or more incomes will have a higher household income than a household with only one income, will have more money available for discretionary spending, and will be able to spend more in the local economy.

The COVID-19 pandemic has had a significant impact on the labor force, and we should expect big changes to this data in the 2020 census. The pandemic caused many people to leave the labor force for a variety of reasons, especially women who had to leave work to care for children or elders. Many have not sought new employment due to challenges finding child or elder care, fears about contracting the virus, or choosing to seek work in a new field or further their education. The loss in the labor force has hit low-wage sectors especially hard, which can be expected to have a significant impact on Burlington's economy.

Many companies who have lost their labor force have turned to offering higher wages or accepting applicants with less experience in order to fill positions. This is beneficial to a strong economy as wages increase, boosting spending in the region. However, this can also force companies out of business if their margins were too small or encourage companies to get by on a smaller staff. Overall, higher wages for low earners are typically positive for the economy, leading to better upward mobility and reducing income inequality.

5.2.3 Cost of Living

Cost of living data comes from the Council for Community and Economic Research (C2ER) and is an average of the first three months of 2021. When C2ER data was not available cost of living data proxy inputs were imputed from Chmura.

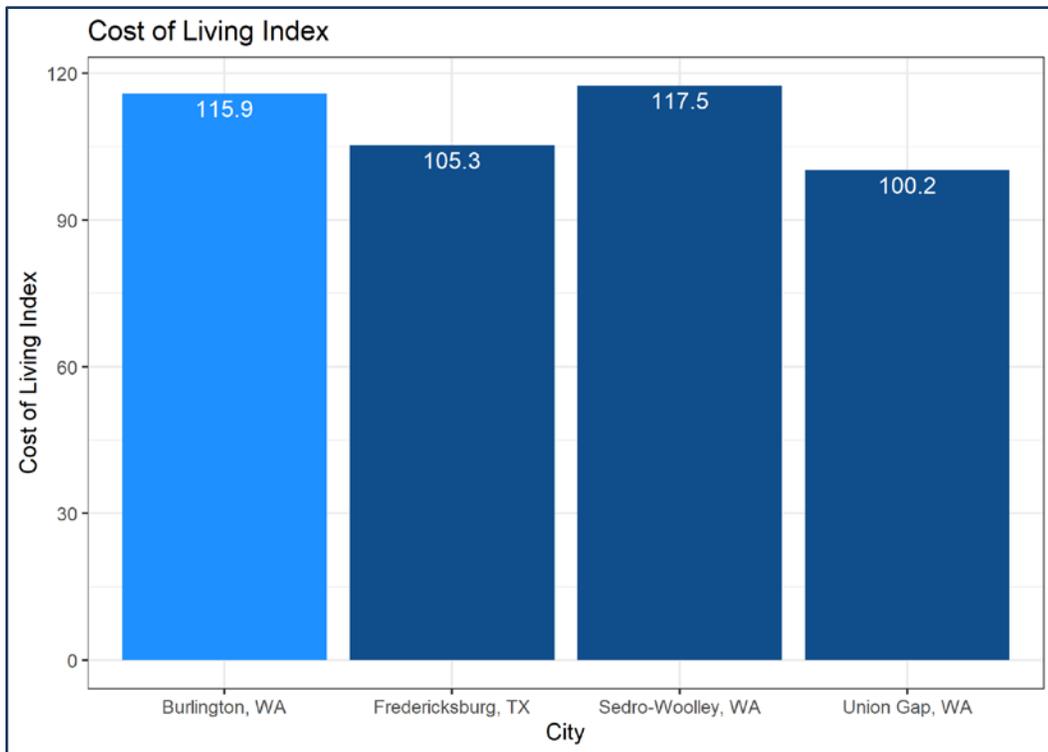


Figure 5.3

C2ER cost of living data is organized into six categories: food, housing, utilities, transportation, healthcare, and miscellaneous goods and services. Items that are relatively more important to consumers are weighed more heavily towards the composite index number. Figure 5.3 shows estimates of the relative price levels for consumer goods and services for people in locations compared to the national average. When applied to wages and salaries, the result is a measure of relative purchasing power of a consumer. The national average equals 100 and each location's index is read as a percentage of the average for all places. For example, this means that in Burlington the cost of living is 15.9 percent higher than the U.S. average.

The median house value in Burlington costs \$240,800 whereas the value for the U.S. is \$217,500 and for Washington State is \$339,000 according to American Community Survey from 2015-2019. In 2020, the median mortgage payment on a home in Skagit County was approximately \$1,678 per month. In this case, a household would need an annual income of at least \$60,408 to afford a home if a living wage is defined as an income at which one-third of a household's gross income is allocated to housing expenses. The median household income in Burlington is \$49,641 (see next section), so a household with the median income would not be able to afford to purchase the median home in Burlington.

According to data from Zumper, the median price of a two bedroom apartment in Burlington is \$1,700, so a median income household would not be able to afford to rent a median priced two-bedroom apartment. As documented in the Chapter 3 (Housing), 36 percent of Burlington's

households are comprised of singles living alone and a further 34 percent are comprised of two people, many of whom are couples without children, so many residents do not need a two-bedroom apartment. A more relevant metric may be the median rent for a one bedroom apartment. The median rent payment in Burlington is \$1,092 according to census data, and the median rent for a one-bedroom apartment is \$1,100 per month. In order to be able to afford the median rent for a one bedroom apartment, a household would need an annual income of about \$40,000. According to U.S Census data (see figure), the median household income for the City of Burlington was \$49,641 in 2019, so a household with a median income could afford to rent a one-bedroom apartment at the median price.

5.2.4 Income and Wages

The figure 5.4 shows average wages by occupation for the City of Burlington. This data is provided by JobsEQ as an average for 2020, so there may be some discrepancies because of the COVID-19 pandemic. In March 2020, higher earners were kept on staff while lower earners were laid off resulting in an increase in median wages. Because the data is reported by occupation, this effect is less significant, but may still bias the data.

Burlington's occupation group with the highest wage is for "Management," followed by "Computer and Mathematical" and then "Healthcare Practitioners and Technical." Burlington's lowest earning occupations were "Healthcare Support," "Fishing, Farming, and Forestry," with workers in "Food Preparation and Service Related" earning the least.

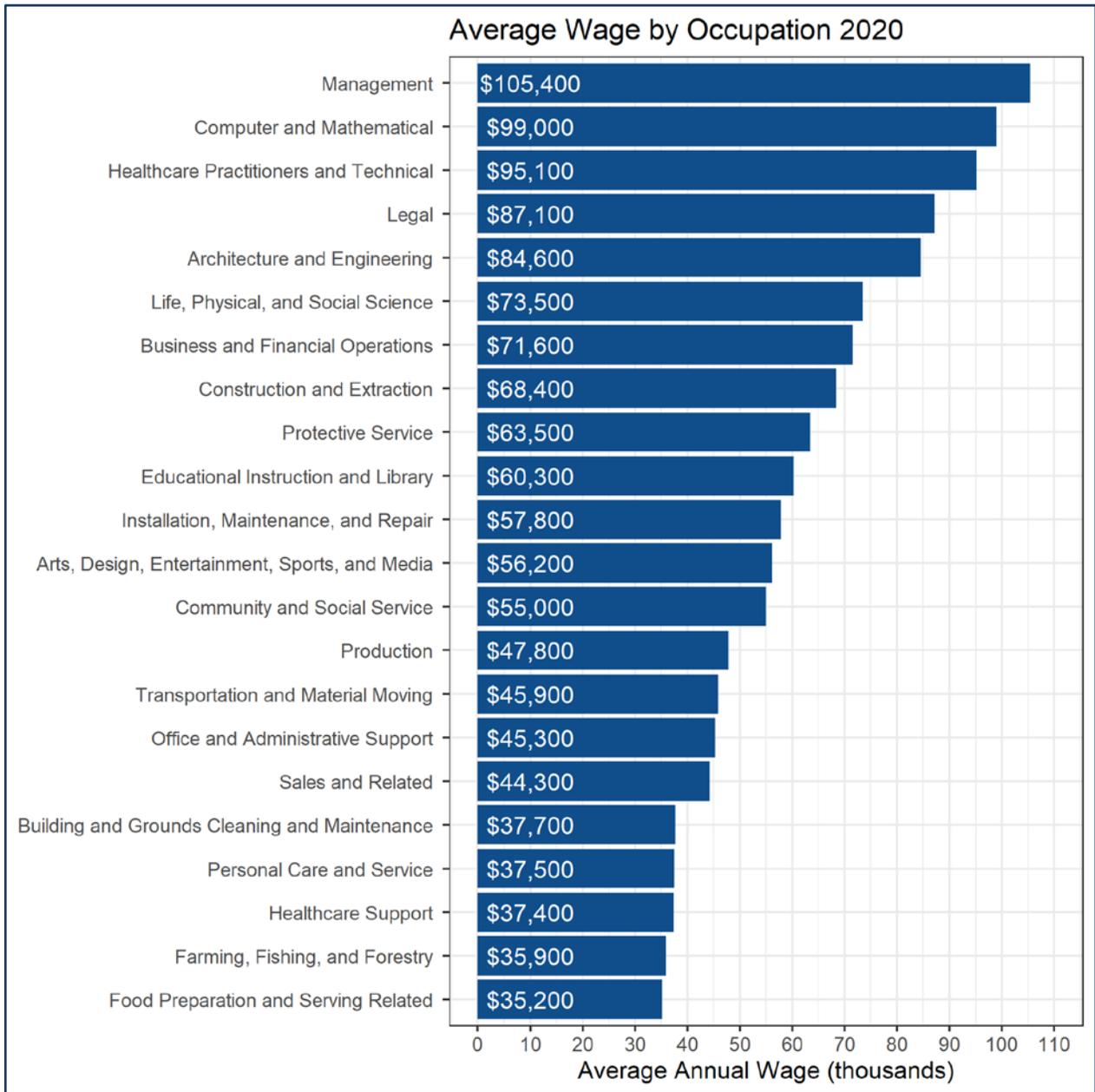


Figure 5.4

Average wage by occupation in the City of Burlington is mostly proportional to the U.S Bureau of Labor statistics’ 2020 estimates for annual mean wage in Washington State. However, Burlington’s average wage by occupation falls behind the state averages across all occupations. And in contrast to the statewide average, “Sales and Related Occupations” underperform “Office and Administrative Support” as well as “Transportation and Material Moving Occupations”. Similarly, “Healthcare Practitioners and Technical Occupations” disproportionately outperform “Legal Occupations” in comparison to the State average.

Median household income comes from the US Census Bureau’s American Community Survey from 2015-2019. The data was then calculated by weighted averages of the median values from the composing counties that make up the location.

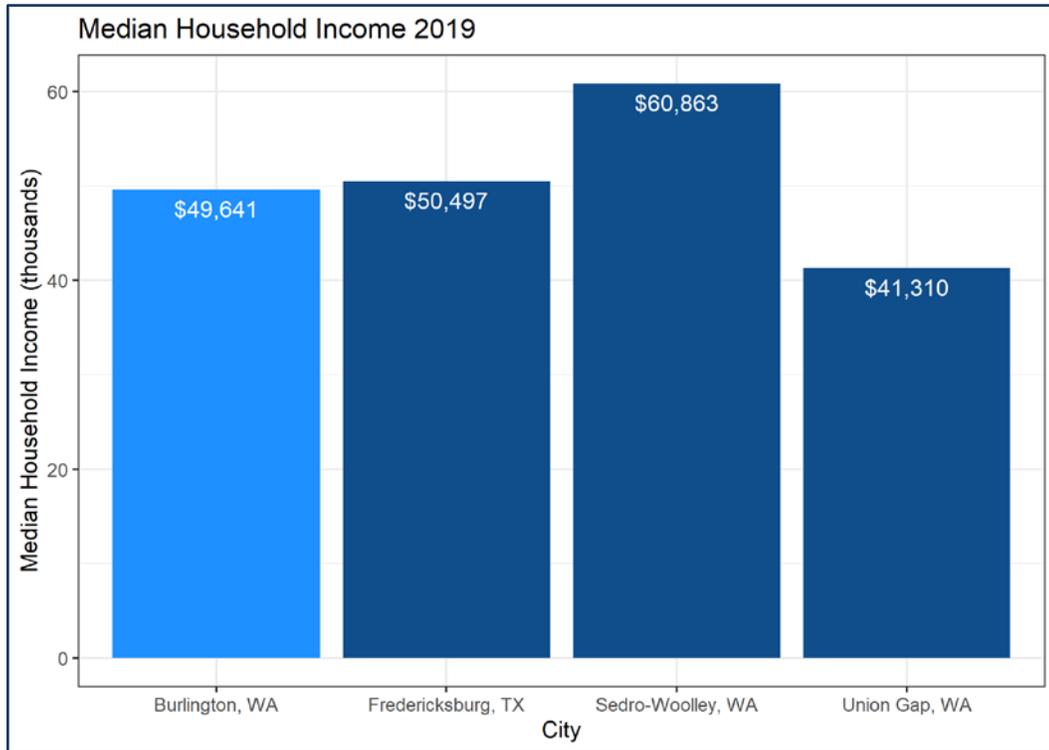


Figure 5.5

As of 2019, the median income of a household in Burlington was \$49,641. Comparing to the peer cities, Burlington has the third lowest median household income, with Fredericksburg’s median household income as \$50,497, neighboring Sedro-Woolley’s median household income is \$60,863, and Union Gap’s median household income is \$41,310. The Covid-19 pandemic and the resulting government programs have had a significant impact on the incomes of people, so it’s reasonable to expect that incomes are likely *higher* today than they were when they were calculated in 2019.

Although Burlington and Sedro-Woolley are close geographically, there is a significant difference in median incomes. Part of the difference is due to the small sample size. Even one multi-millionaire in either city could significantly skew the data. One reason that Sedro-Woolley’s median income is higher may be that a few CEOs and business owners (for example, Janicki Industries) live in Sedro-Woolley.

Data on poverty rates also comes from the US Census Bureau’s American Community Survey from 2015-2019. The poverty rate is the percentage of individuals or households who earn less income than the poverty threshold. The poverty threshold is dependent on the household size

and number of children. For example, the 2020 poverty threshold for a family of two adults and two children is \$26,246. The poverty threshold is defined for the US overall and does not account for differences in cost of living. Because Burlington’s cost of living is 15.9 percent higher than the national average, it’s reasonable to infer that more people are living in poverty conditions than the statistics suggest.

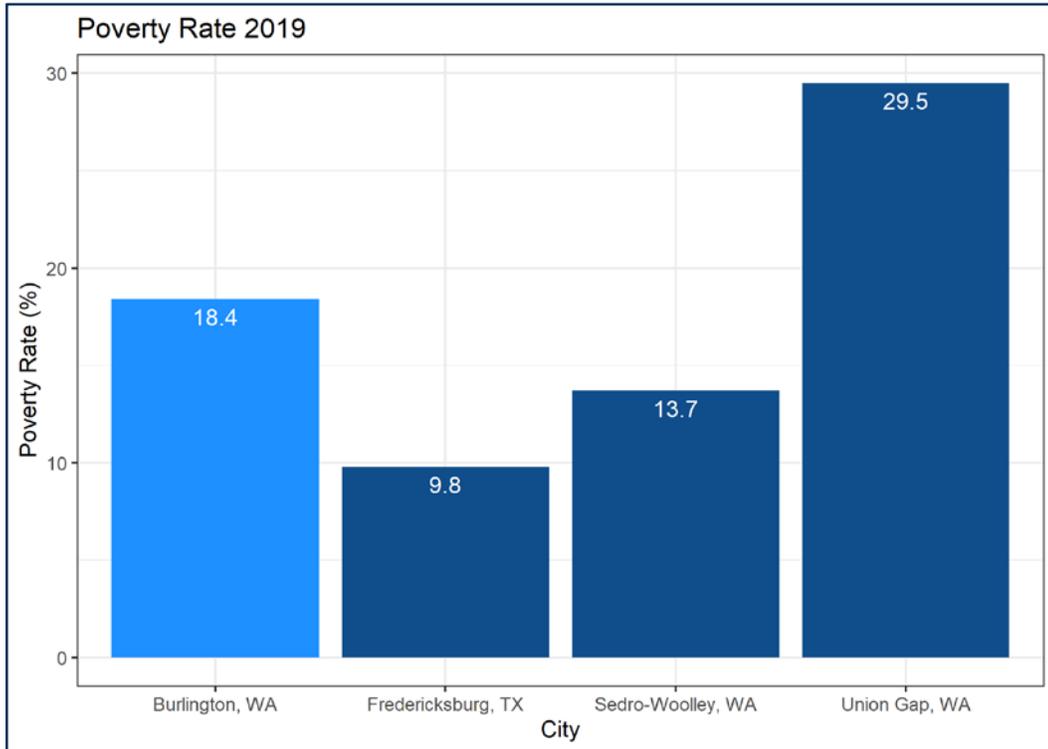


Figure 5.6

As of 2019, Burlington’s poverty rate was 18.4 percent. This is significantly higher than peer cities Fredericksburg and Sedro-Woolley which had poverty rates of 9.8 percent and 13.7 percent, respectively. Union Gap had the highest poverty rate of 29.5 percent in 2019. Because Union Gap is located within a reservation, the city faces significantly more barriers to economic development and has a poverty rate similar to the national average for reservations (28.4 percent).

The COVID-19 pandemic significantly impacted the number of individuals and households facing poverty. While stimulus payments, unemployment benefits, and the child income tax credit have lifted many households out of poverty, other households have entered poverty as a result of the pandemic. Overall, the poverty rate is likely lower today than it was in 2019.

5.2.5 Employment

The largest employers of Burlington residents are displayed in Table 5.1. The information in Table 5.1 was sourced from the Economic Development Alliance of Skagit County and data collected by CEBR in 2018. Data was supplemented during fall 2021. The human resources department for each business below was called to obtain the total number of employees (which includes non-full-time employees) per company as displayed below. Note that companies with an asterisk are not physically located within Burlington but are close enough to be a source of employment for Burlington residents.

Table 5.1: Burlington Top Seven Employers

Company	Number of Employees
Burlington-Edison School District	700
Fred Meyer	380
Costco Wholesale	359
KarMART Chrysler-Jeep-Dodge	104
*PeaceHealth United General Medical Center	2,500
*Hexcel	200
*Walmart Supercenter	150

Employment numbers by sector comes from quarter two in 2021 data for JobsEQ. Employment numbers are expected to increase as the region recovers from the COVID-19 pandemic.

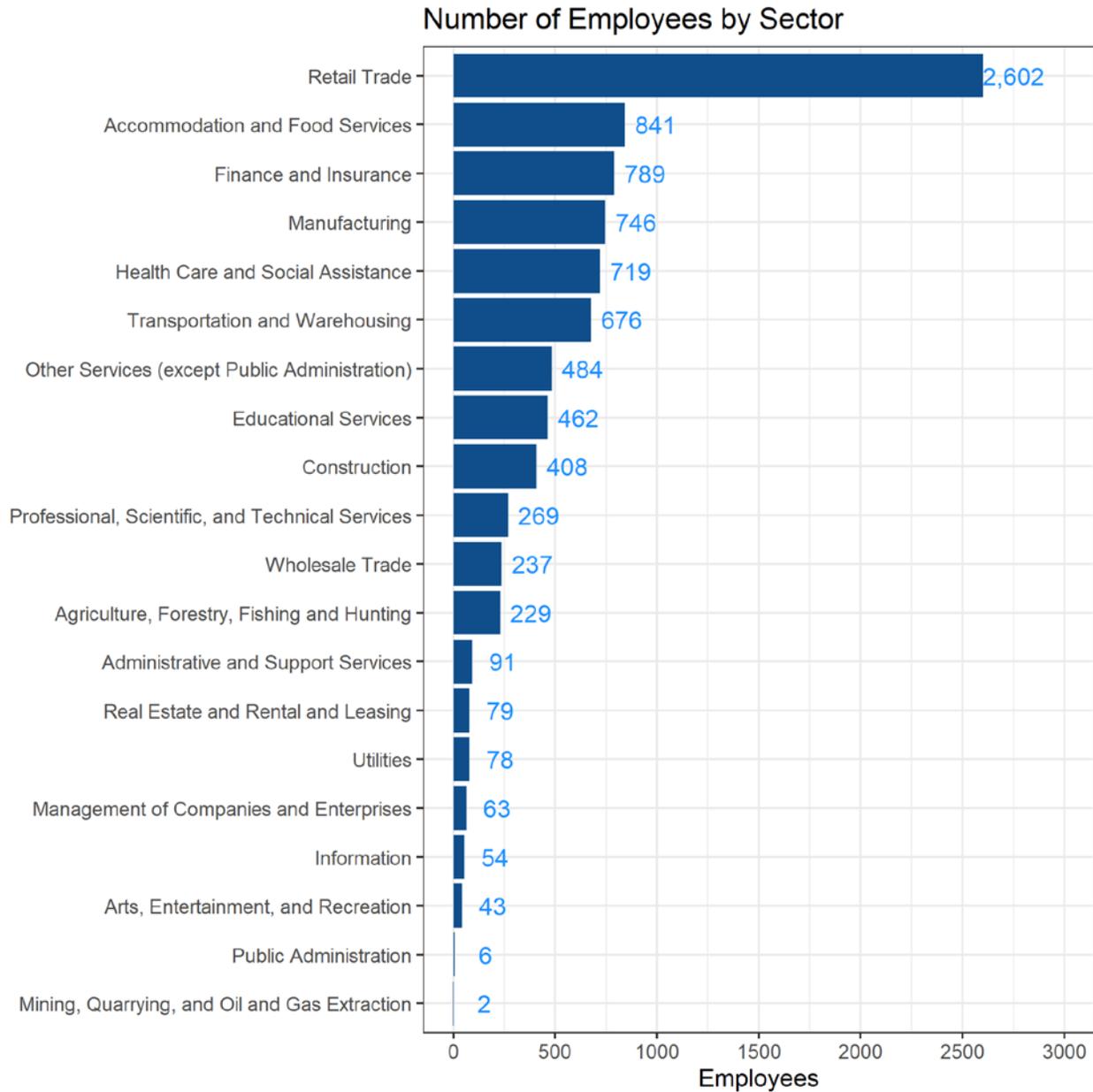


Figure 5.7: Burlington Employees by Sector (2021Q2)

Some of the top sectors include retail which is by far the largest employer by sector employing 2,602 people, followed by accommodation and food services which employs 841 people, finance and insurance with 789 people, manufacturing with 746 people, 719 health care and social assistance, and transportation and warehousing with 676 people. As mentioned above, the COVID-19 pandemic continues to force retail stores to close so we can expect that the number of employees today is not exactly what it was when the data was collected. Unemployment data at the County level comes from the Bureau of Labor Statistics for August 2021, the most recent data available. Unemployment rate data is not available at a municipality level.

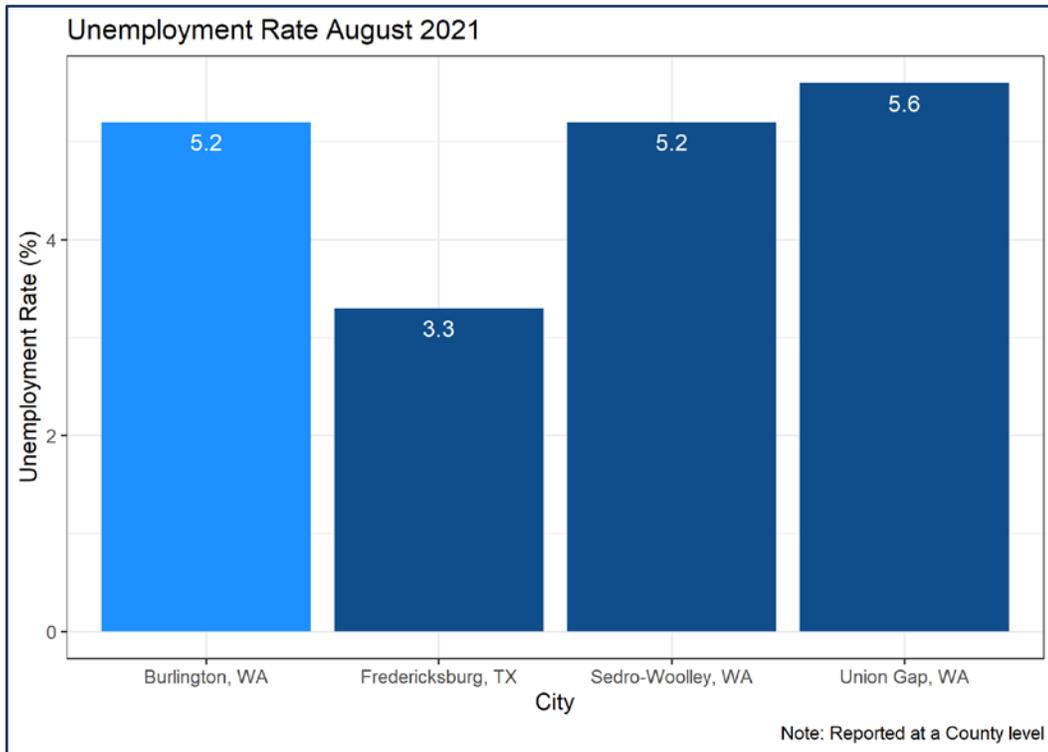


Figure 5.8

As of August 2021, Burlington’s unemployment rate was 5.2 percent. Comparing to the peer cities, Burlington is tied for the second highest rate with Sedro-Wooley because all data is reported at a county level, with Fredericksburg’s unemployment rate at 3.3 percent, and Union Gap’s unemployment slightly higher at 5.6 percent.

The Covid-19 pandemic has had a significant impact on how many people are employed with many people still having still not returned to the labor force, so the unemployment rate appears more optimistic than is truly the case.

5.2.6 Workforce Qualifications

To measure the qualifications of Burlington’s workforce, one useful metric is the skill gap. The skill gap evaluates the number of job listings versus candidates from the region who applied for the job. Data comes from JobsEQ and was only available at the county level, so the graph below shows the skill gap for Skagit County. Data was collected in January 2021, so this represents a snapshot of the skill gap while the local economy was still heavily affected by the pandemic.

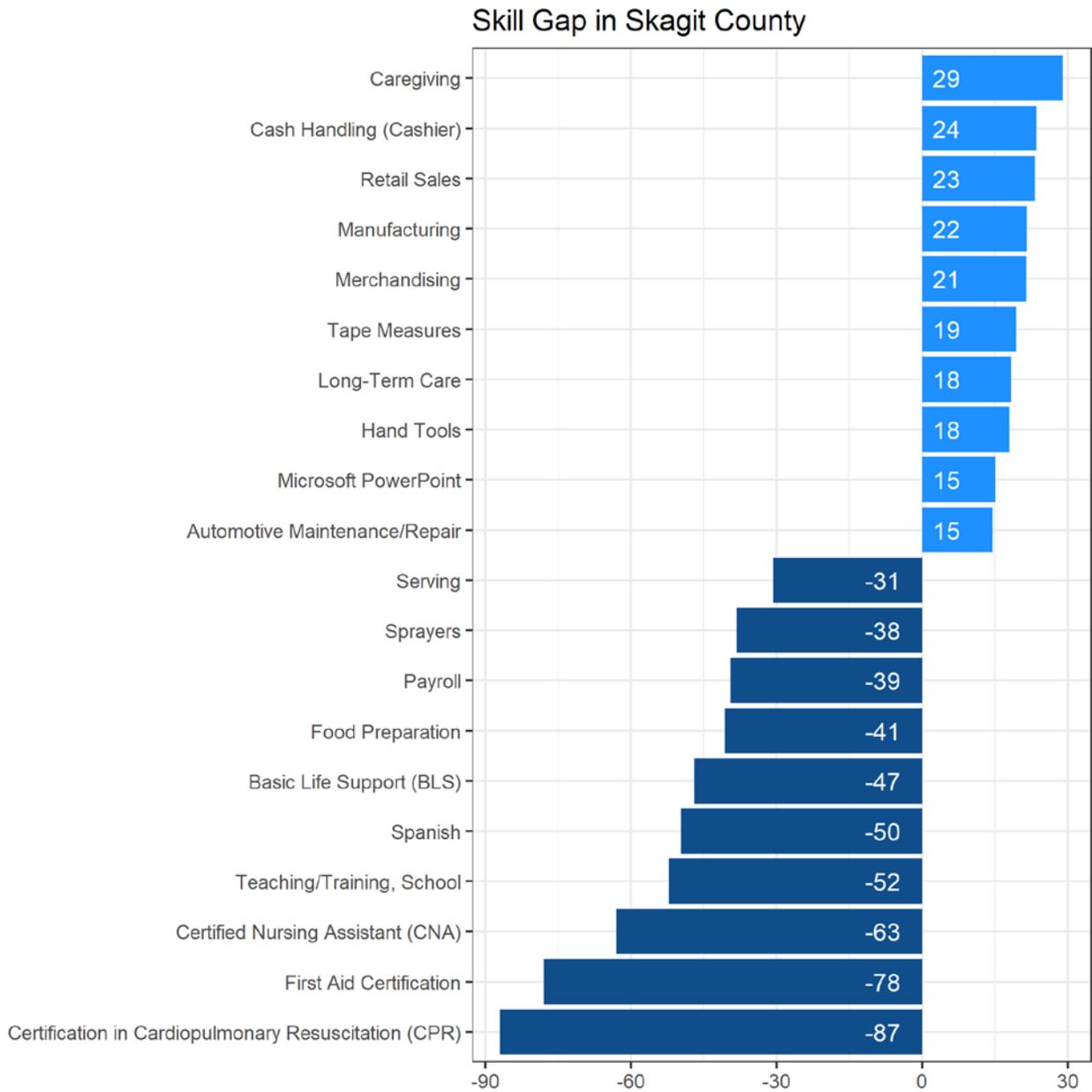


Figure 5.9

The skills where there was the greatest gap were primarily in the healthcare fields. Counterintuitively, the COVID-19 pandemic had a negative impact on the healthcare sector because many elective services and procedures were postponed. According to the data, workers in Skagit County are most lacking in entry-level healthcare certifications including CPR, first-aid, CNA, and BLS. Workers could also benefit from teaching certifications and learning Spanish.

Surprisingly, there were too many workers with caregiving skills, despite the gap for other healthcare-related skills. There was also an abundance of workers with retail skills such as cash-

handling and merchandising. Due to the timing of data collection, the skill gap should be used with discretion.

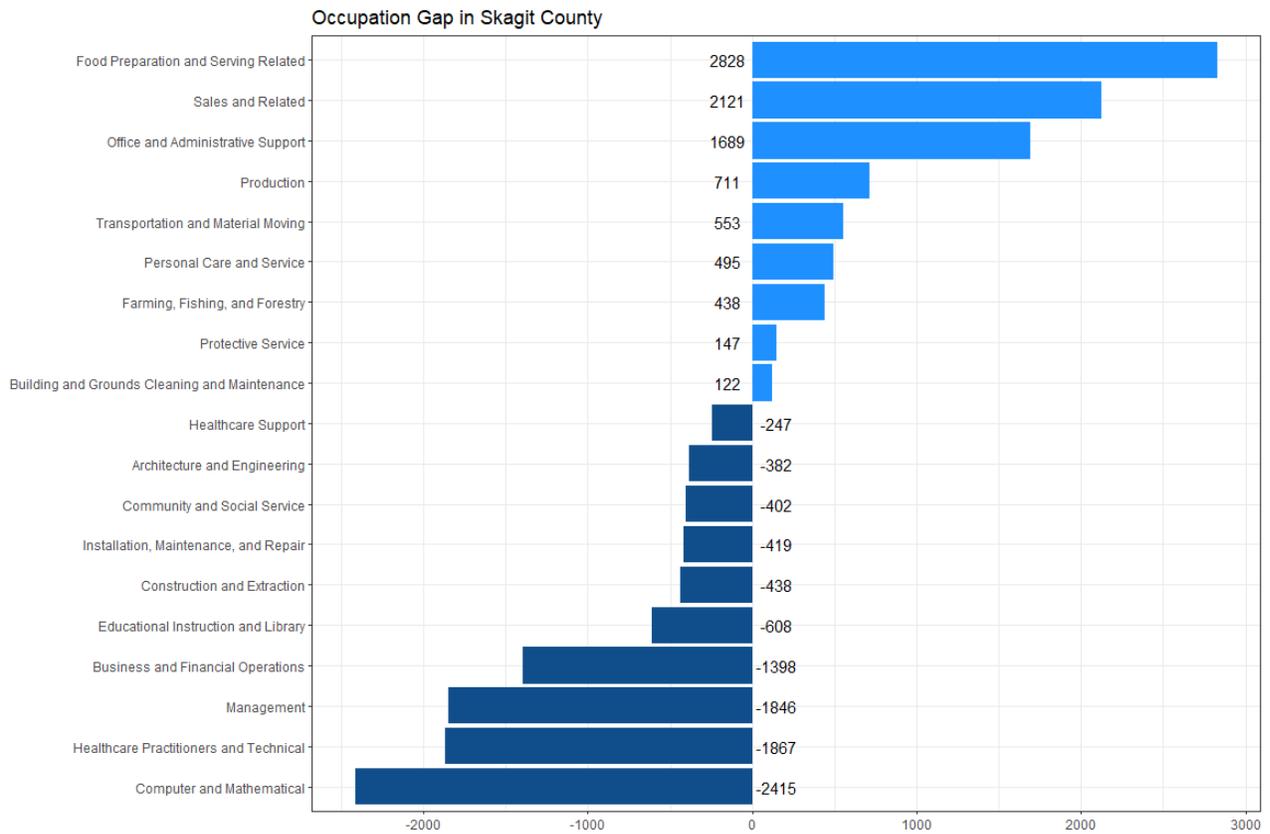


Figure 5.10

5.2.7 Current Retail Locations

The map on the following page shows current commercial vacancies as of September 2021. Much of the vacant commercial space is located within the Cascade Mall and other shopping centers in the area. From this pattern, we can see that vacancy tends to spread as an area becomes undesirable due to an increase in vacancies. The success of businesses in a shopping center often depends on the success of nearby businesses which draw in shoppers for a variety of retailers. Later in this chapter, a retail suitability index is provided that identifies areas of the City most likely to be successful for retailers.

Note that much of Burlington’s commercial space is also zoned to allow residential uses. This is especially apparent on the north side of the city where many commercially zoned plots are used for residential purposes.

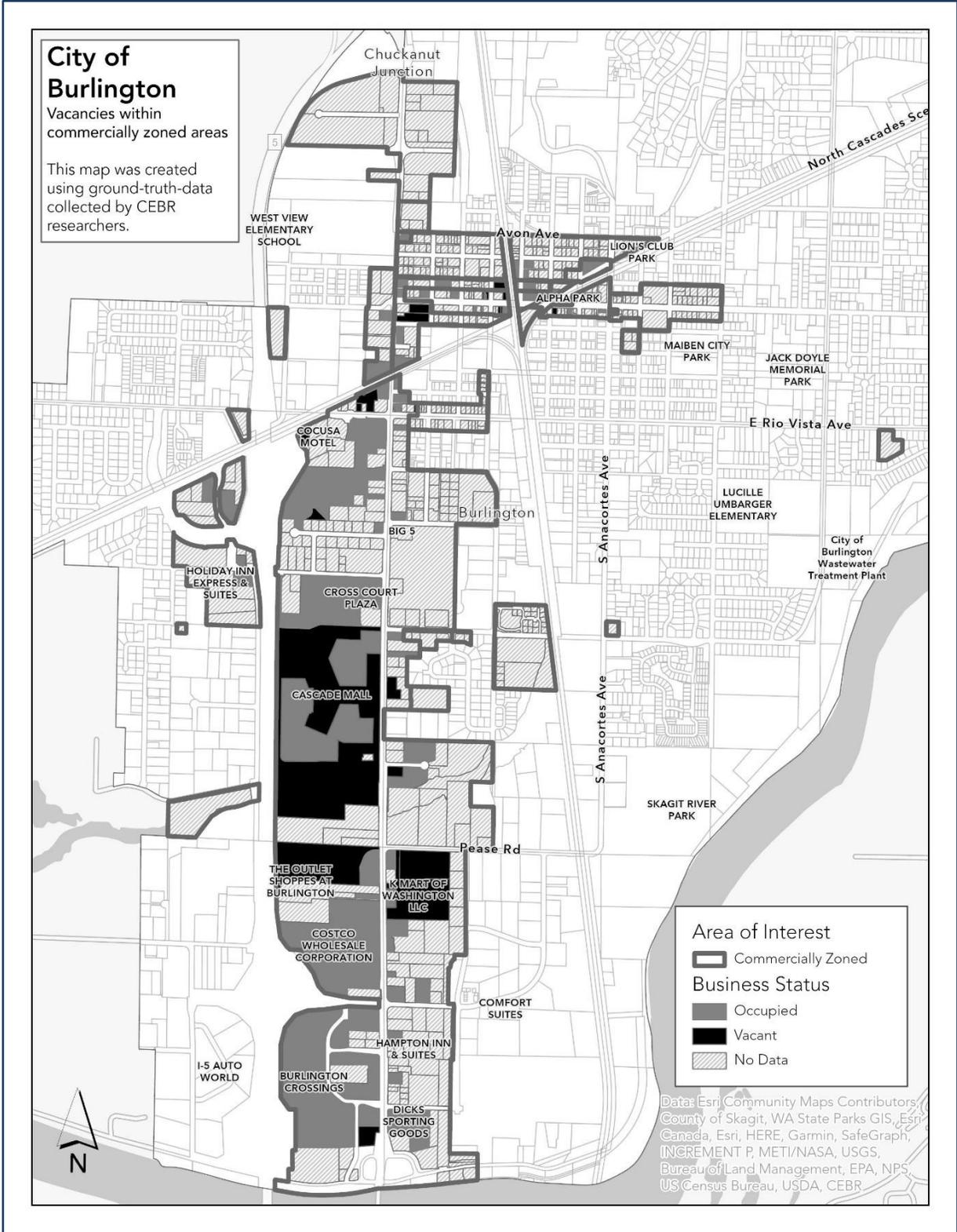


Figure 5.12

5.2.8 Walkability Index

The map below shows the City of Burlington by “walkability.” The walkability index is defined by variables such as intersection density, proximity to transit stops, and diversity of land uses. The walkability of a city is considered an important amenity for many Americans and can have a substantial impact on how people make transportation choices. According to the EPA, walkable communities help encourage healthy behaviors, reduce air pollution, and improve a sense of community¹. The figure below shows that Burlington’s walkability ranges from 4.83 to 12. A score of 1 to 5.75 is considered least walkable and a score of 15.26 to 20 is considered most walkable. So, Burlington’s neighborhoods range from least walkable to above average, but no area is considered most walkable.

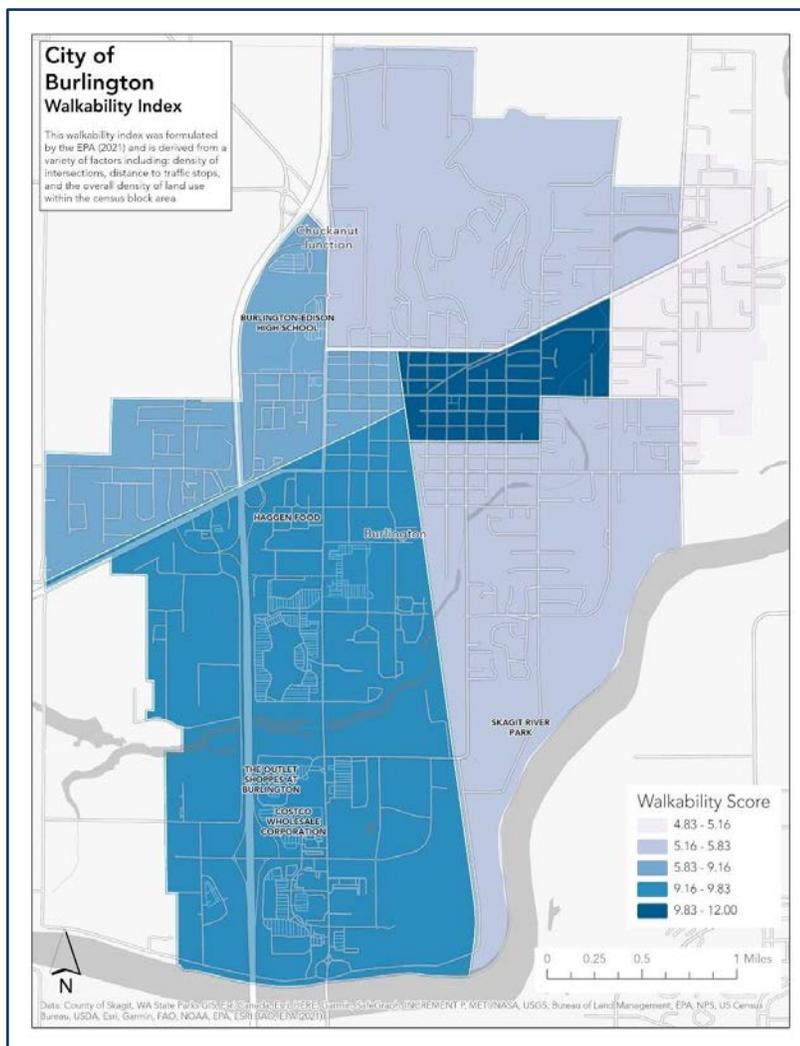


Figure 5.12

¹ <https://www.epa.gov/smartgrowth/smart-location-mapping#walkability>

5.3 Future Conditions and Employment Projections

In this section, time series data is provided for the City of Burlington which allows trends in data to be analyzed. For several economic variables, forecasts of future economic conditions are provided. The forecast period depends on the volatility of the variable. Some measures, for example population, are relatively stable over time and can be forecasted reliably for many years in the future. Other measures, such as income, are more volatile and can only be reliably forecasted a few quarters or years into the future.

5.3.1 Population

Burlington's population forecast comes from the City's existing estimates developed by the Skagit Council of Governments (SCOG). SCOG's numbers are based on forecasts developed by the Washington State Office of Financial Management (OFM). Based on this forecast, Burlington's population is expected to grow at an average rate of 2.12 percent per year through 2036. This places Burlington's 2036 population at 14,272 individuals.

Population forecasts are fairly reliable because with the exception of catastrophic events, population growth rates are relatively stable. However, with smaller populations, more variability can be expected. Burlington's population most recently shrunk as a result of the Great Recession. Because many of Burlington's residents are dependent on retail jobs, economic recessions are likely to have a notable, negative impact on the City's population.

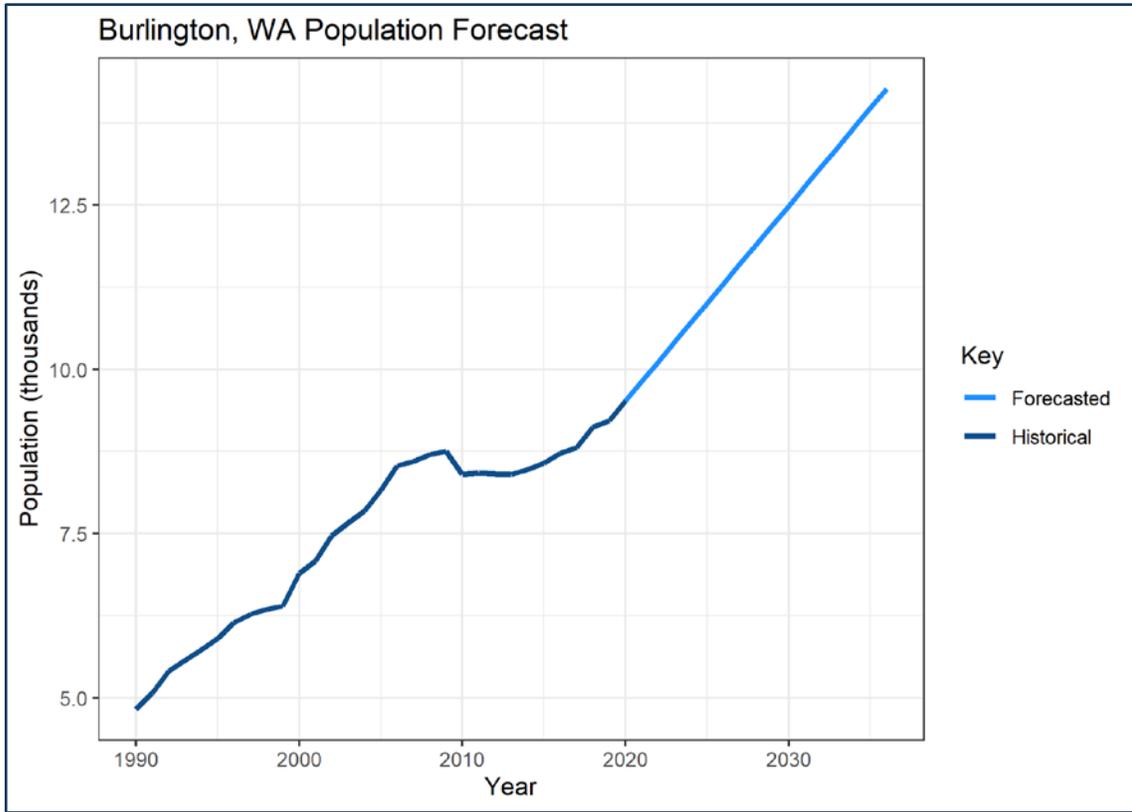


Figure 5.13

Figure 5.4 shows a map of household trends in Burlington by census block. The map shows the areas of Burlington that have experienced growth recently and may continue to grow in the future.

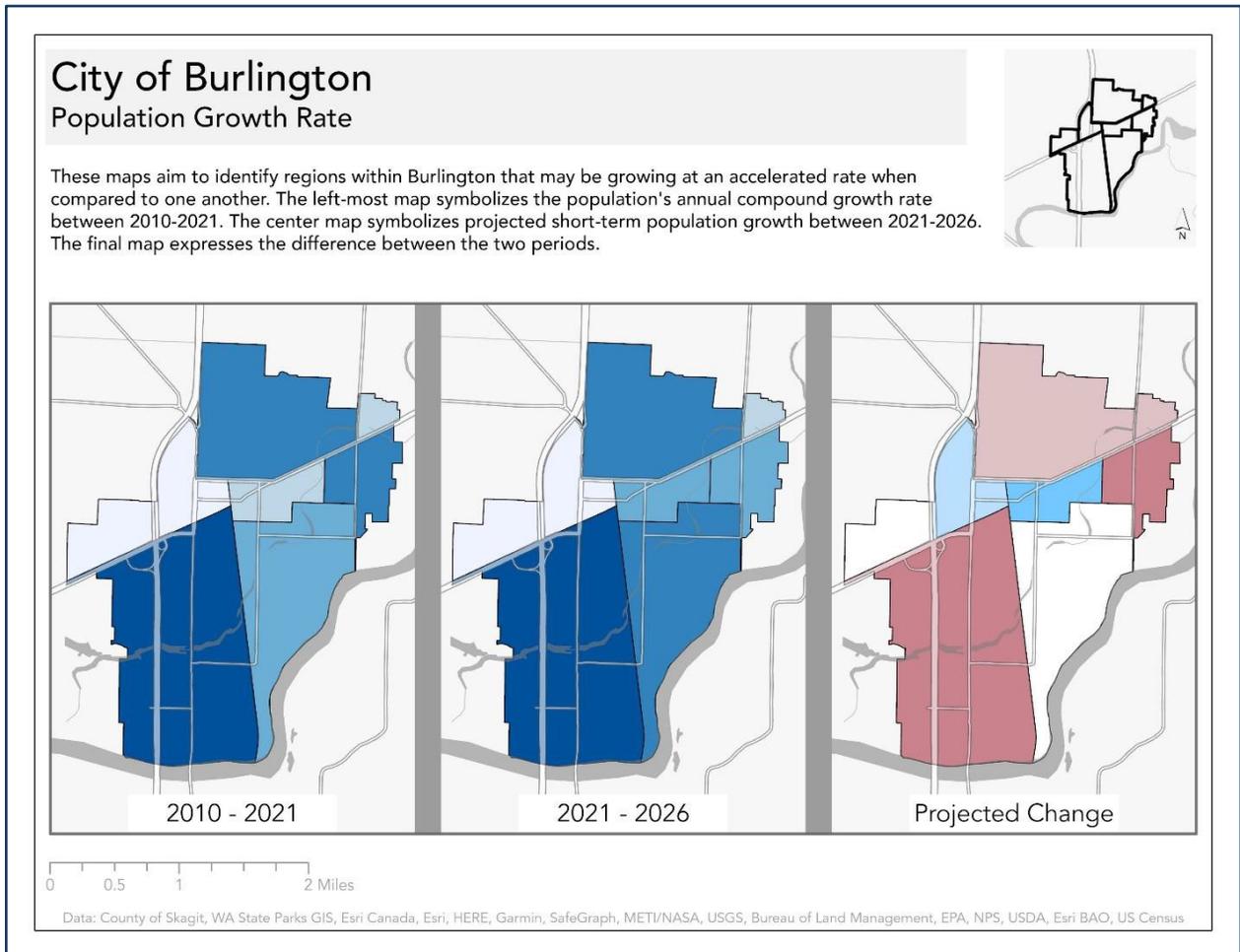


Figure 5.14: Population Growth by Census Block

Population growth is most rapid in the southwest area of the city and slowest just north of the SR-20 corridor. Annual population growth is not especially high in any one area, and as documented in Chapter 2 (Land Use), the City has the capacity to facilitate this level of growth through the year 2036 without annexing additional land or expanding the City's Urban Growth Area (UGA). Burlington's population is expected to grow in similar geographic pattern over the next five years as it has in the past ten years with significant growth occurring along the Burlington Boulevard Corridor.

5.3.2 Employment

Forecasts for employment trends come from JobsEQ. These forecasts are based on a combination of recent trends, expected trends, and regional impacts. While this forecast is specific to the City of Burlington, it is based on a forecast for Skagit County extrapolated to the city-level using industry characteristics. Data is updated as of Q2 2021.

Table 5.2: Employment Trends by Industry

Industry	Current Employment	5-Year Past Employment Change	Annual %	5-Year Future Employment Growth	Annual %
Retail Trade	2,602	-403	-2.8%	34	0.3%
Accommodation and Food Services	841	-198	-4.1%	47	1.1%
Finance and Insurance	789	15	0.4%	39	1.0%
Manufacturing	746	103	3.0%	9	0.3%
Health Care and Social Assistance	719	66	2.0%	94	2.5%
Transportation and Warehousing	676	256	10.0%	27	0.8%
Other Services (except Public Administration)	484	205	11.6%	22	0.9%
Educational Services	462	-37	-1.5%	26	1.1%
Construction	408	76	4.2%	17	0.8%
Professional, Scientific, and Technical Services	269	29	2.3%	12	0.9%
Wholesale Trade	237	-56	-4.1%	2	0.2%
Agriculture, Forestry, Fishing and Hunting	229	-44	-3.5%	9	0.8%
Administrative and Support and Waste Management and Remediation Services	91	-55	-9.0%	5	1.0%
Real Estate and Rental and Leasing	79	-4	-1.0%	1	0.3%
Utilities	78	11	3.0%	-1	-0.3%
Management of Companies and Enterprises	63	-15	-4.3%	3	1.0%
Information	54	-21	-6.3%	-2	-0.8%
Arts, Entertainment, and Recreation	43	-16	-6.3%	3	1.4%
Public Administration	6	-111	-45.6%	0	0.1%
Mining, Quarrying, and Oil and Gas Extraction	2	-1	-6.2%	0	0.8%
Total - All Industries	8,879	-200	-0.4%	352	0.8%

The forecasted figures in Table 5.2 uses baseline assumptions that do not consider the impacts of the COVID-19 pandemic. Table 3 applies a COVID-19 scenario for growth rates in Skagit County to the employment levels in Burlington. Table 3 should be considered the more likely model.

Table 5.3: Employment Forecast by Industry (COVID Model)

Industry	Current Employment	5-Year Future Employment Growth	Annual %
Retail Trade	2,602	114	1.1%
Accommodation and Food Services	841	141	4.2%
Finance and Insurance	789	32	1.0%
Manufacturing	746	30	1.0%
Health Care and Social Assistance	719	60	2.1%
Transportation and Warehousing	676	35	1.3%
Other Services (except Public Administration)	484	48	2.5%
Educational Services	462	46	2.5%
Construction	408	20	1.2%
Professional, Scientific, and Technical Services	269	14	1.3%
Wholesale Trade	237	10	1.1%
Agriculture, Forestry, Fishing and Hunting	229	7	0.8%
Administrative and Support and Waste Management and Remediation Services	91	6	1.6%
Real Estate and Rental and Leasing	79	4	1.3%
Utilities	78	0	0.0%
Management of Companies and Enterprises	63	4	1.7%
Information	54	2	1.0%
Arts, Entertainment, and Recreation	43	8	4.6%
Public Administration	6	0	0.6%
Mining, Quarrying, and Oil and Gas Extraction	2	0	1.1%
Total - All Industries	8,879	581 ⁽¹⁾	1.7%

Note: (1) Table produced by CEBR appeared to contain an error. The total for this column was originally stated as 604. The actual total appears to be 581. Table was corrected to reflect this adjustment.

The primary difference between the two models is that the COVID-19 scenario appears more optimistic due to the higher growth rates. However, growth rates are especially high because they are comparing to a baseline that is especially low. This makes growth rate appear optimistic although the levels of growth are not as remarkable. While the first model utilizes recent growth rates, the COVID model considers that recent trends are not normal trends and makes adjustments based on the assumption that employment levels return to pre-pandemic levels by Q1 2022.

Neither model predicts future decline of any industry. It appears that the retail sector has settled into a new, lower equilibrium. The models show very modest growth in almost all sectors over the next five years. The higher growth rates shown in the COVID model (Table 5.3) are due to increases from especially low numbers during the pandemic. Overall, many of these industries may show a decline since pre-pandemic levels depending on how significantly they have been impacted by COVID-related, economic changes.

Due to Burlington’s strong retail presence, a breakdown of retail sector trends by subsector has been provided in Table 5.4. The data in Table 5.4 is based on the non-COVID model, reflects only a five-year period, and has not been adjusted to conform to the employment allocations generated by the Skagit Council of Governments (SCOG).

Table 5.4

Industry	Current Employment	5-Year Past Employment Change	Annual %	5-Year Future Employment Growth	Annual %
General Merchandise Stores	964	-36	-0.7%	5	0.1%
Motor Vehicle and Parts Dealers	504	-168	-5.6%	15	0.6%
Clothing and Clothing Accessories Stores	234	-167	-10.2%	9	0.7%
Building Material and Garden Equipment and Supplies Dealers	197	23	2.6%	4	0.4%
Miscellaneous Store Retailers	130	20	3.5%	-1	-0.2%
Food and Beverage Stores	118	-30	-4.5%	1	0.2%
Sporting Goods, Hobby, Musical Instrument, and Book Stores	117	11	1.9%	3	0.5%
Electronics and Appliance Stores	85	-60	-10.1%	-3	-0.8%
Health and Personal Care Stores	80	4	1.0%	-1	-0.1%
Gasoline Stations	70	-3	-0.7%	0	0.1%
Furniture and Home Furnishings Stores	56	-7	-2.3%	1	0.5%
Non-store Retailers	49	8	3.7%	1	0.3%
Retail Trade	2,602	-403	-2.8%	34	0.3%
Total - All Industries	8,879	-200	-0.4%	352	0.8%

Over the last five years, the retail sectors that showed the greatest decline were “Electronics and Appliance Stores” and “Clothing and Clothing Accessories Stores.” The sectors that grew the most were “Miscellaneous Store Retailers” and “Non-store Retailers.” Over the next five years, nearly all retail sectors are expected to experience modest changes whether growth or decline, indicating that Burlington’s retail economy will settle into a lower equilibrium in the coming years.

5.3.3 SCOG Forecast

The Skagit Council of Governments (SCOG) also provides estimates of employment levels for the City of Burlington based on forecasts developed by the Washington State Office of Financial Management (OFM). According to these estimates, Burlington can expect to add 3,516 jobs by 2036. This is a job growth rate of approximately 1.7 percent annually from 2015 to 2036. SCOG estimates place baseline employment levels at 9,986 as of 2015, bringing total expected employment to 13,412 by 2036.

In order to comply with the consistency requirements of the Growth Management Act (GMA) and the City’s obligations under regional planning agreements, it is important that all employment forecasts be related to the official SCOG forecasts and allocations. As previously noted, the employment forecasts in tables 5.2, 5.3, and 5.4 reflect only five-year periods and are not based on the employment allocations issued by SCOG. To account for these differences the COVID model forecast produced by CEBR was used to identify a growth *rate* for each employment sector. These rates were then applied to the total 20-year employment forecast issued by SCOG. The results, illustrated in Table 5.5, identify the total number of jobs that can be expected in each employment sector.

The baseline employment forecast produced by CEBR (Table 5.2) projects an annual employment growth rate of 0.8 percent over the next five years. Whereas the COVID model forecast from CEBR projects employment to grow at a rate of 1.7 percent annually over the next five years, which is identical to the overall growth rate in the SCOG allocation.

Employment figures experience frequent and pronounced fluctuations, particularly when comparing numbers from individual employment sectors. These fluctuations, and the attendant difficulties in producing accurate long term forecasts, have been further complicated by the effects of the COVID-19 pandemic on the labor market during the study period. Longer-term forecasts may be helpful for some planning activities, but are often unreliable far into the future. For these reasons, the forecasts in this report should be used with caution. While short term employment forecasts are generally quite reliable, long-term forecasts, for periods exceeding five years, should be considered less reliable and used to approximate future conditions.

Table 5.5 – Population and Employment Growth			
Industry	2021 Employment⁽¹⁾	5-Year Growth Forecast⁽¹⁾	21-Year Growth Forecast⁽²⁾
Retail	2,602	114	689.89
Accommodation & Food Service	841	141	853.28
Finance & Insurance	789	32	193.65
Manufacturing	746	30	181.55
Healthcare and Social Assistance	719	60	363.10
Transportation and Warehousing	676	35	211.81
Other Services (Private Sector)	484	48	290.48
Educational Services	462	46	278.38
Construction	408	20	121.03
Professional, Scientific, and Technical Services	269	14	84.72
Wholesale Trade	237	10	60.52
Agriculture, Forestry, Fishing and Hunting	229	7	42.36
Administrative and Support and Waste Management Services	91	6	36.31
Real Estate and Rental and Leasing	79	4	24.21
Utilities	78	0	0
Management of Companies	63	4	24.21
Information	54	2	12.10
Arts, Entertainment, and Recreation	43	8	48.41
Public Administration	6	0	0
Mining, Quarrying, and Oil and Gas Extraction	2	0	0
Total:	8,879	581	3,516

Notes: (1) Five-year employment forecasts taken from CEBR "COVID Model" in Table 5.3. (2) Five-year CEBR forecast was related to the 21-year SCOG forecast of total employment by identifying components of change for each sector in the CEBR forecast then applying them to 21 year SCOG forecast of total employment growth. For example, in the CEBR forecast retail employment is expected to growth by 114 jobs over a five year period. This represents 19.62 percent of the total employment change for the same five-year period (581). By applying the same percentage to the total growth employment growth forecasted by SCOG through the year 2036, it is possible to estimate the total growth in retail employment for the 21-year period ending in 2036 ($0.1962 \times 3,516 = 689.89$).

5.3.4 Retail Suitability

To determine the most suitable locations for commercial investment, a variety of socio-spatial factors were combined into comparable relative scales (0-5) in raster format for the purpose of aggregation. These scores were weighted and added together; the mean score of the cells within each parcel is calculated and assigned as the parcel's suitability score. Commercial parcels were first identified using data directly from Burlington city planners as well as parcel data from the county. These are considered zones of interest for this suitability index.

The first variable created is for Cost Accumulation (35 percent weight), which aims to consider multiple factors (road type, amount of intersections passed through, and slope) when determining distance from major highways. Cells closer to major transit routes received a five while cells further away received a lower score. The second variable, the Vacancy Variable (15 percent weight) is determined by whether the property is currently vacant or occupied. This ground-truth data was acquired by CEBR researchers driving around Burlington to visually identify businesses within the commercially zoned districts that were vacant or occupied. Vacant properties received a max score of five, while occupied businesses received a one. Many parcels in that dataset were omitted due to some seemingly being a place of residence rather than a business and were left null for this attribute.

The next variable is the Walkability Index (20 percent weight) created by the EPA and distributed by census block. The data was broken into five separate classes and ranked one through five; areas with higher walkability received a five, while areas with lower walkability receive a one.

The fourth variable is the Population Growth Rate Variable (10 percent weight) broken up by census block. This data is obtained from ESRI's Business Analyst online tool, which derives much of its data from the US Census as well as other surveys. This aims to identify census blocks that may be growing at a faster rate when compared to surrounding areas. Like the others, this data was also aggregated into a scale of one through five to allow for relative comparison.

The final variable, Empty Lot Variable (20 percent weight), was obtained from Landsat-8 data using ArcGIS software to identify bare land parcels within the commercial zoned areas. Bare land was given a score of five, grass a score of four, urban areas a score of two, and dense vegetation a score of one. This would create a break between open lots and occupied or forested lots.

After these scores were all added together in a raster format, zonal statistics were run using the commercially zoned parcels to find the average score of the cells within each parcel. The result is the suitability score for each parcel. Figure 5.5 shows the retail suitability index for the City of Burlington.

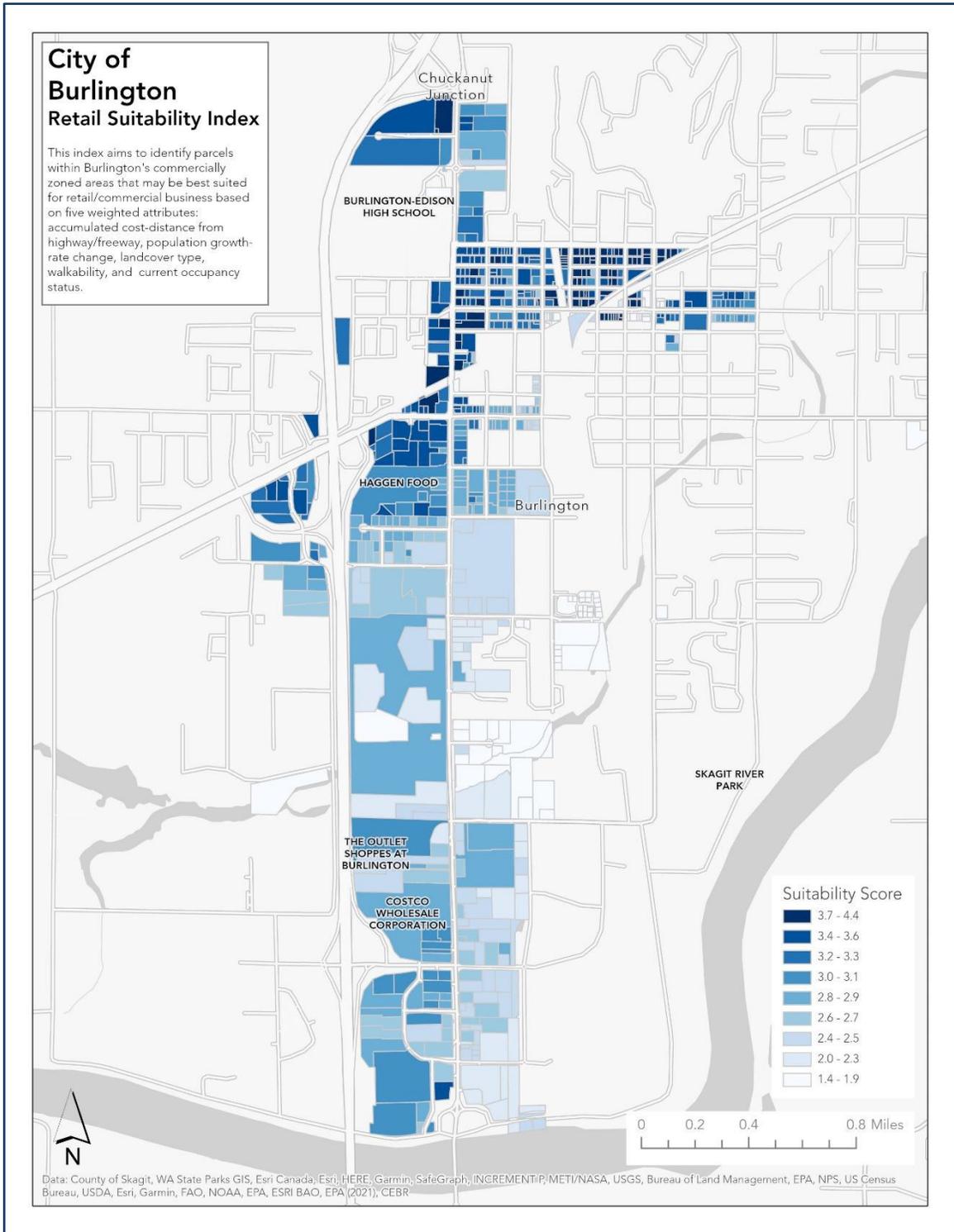


Figure 5.15: Retail Suitability Map

5.3.5 Land Use and Development

By applying the land utilization and employment densities from the Land Use chapter to the employment forecasts in Table 5.5 it is possible to estimate future non-residential development by economic sector. Since each of City’s Comprehensive Plan and zoning designations allows a different range of uses, knowing the amount of development that can be expected for each economic sector is important for monitoring the supply of land available for economic development needs. This information is also important for other long-range planning purposes, such as forecasting potential impact fee revenue, and identifying transportation and public facility needs.

The estimates in this section should be used with caution since employment numbers fluctuate rapidly and long-term forecasts frequently unreliable. Additionally, as noted in Chapter 2 (Land Use), the City may attempt to increase employment densities and maximize the utilization of its existing land supply. If these objectives are achieved, less development and less land will be required to support each job. It is recommended that the City continuously monitor employment growth and non-residential development activity throughout the planning period and make appropriate adjustments to these forecasts.

Table 5.6 – Development Impacts Associated with Job Growth				
Industry⁽¹⁾	Employment Growth (2015 – 2036)⁽²⁾	Comprehensive Plan Designation	Square Feet/Employee⁽³⁾	Total Projected Space Needs (square feet)
Retail	1,591.58	MUC & MUR-1	700	1,114,106
FIRES ⁽⁴⁾	629.37		350	220,280
Healthcare	363.10		350	127,085
Manufacturing	181.55	CI & MUR-2	500	90,775
WTCU ⁽⁵⁾	472.03		1,000	472,030
Government	0	PFT	300	0
Education	278.38		300	83,514
Total:	3,516	N/A	N/A	2,107,790 sq. ft.

Notes:

(1) Estimates of space needs by employment category are derived from studies prepared for other jurisdictions using data from the Washington State Employment Security Department (ESD). Because ESD requires employers to report the number of people they employ and their address it is possible to estimate the average number of employees in relation to land area and building square footage. See the Public Services and Facilities Chapter for more information. Industrial sectors presented here are coarse and group the more detailed categories from the previous tables into broad categories.

(2) Total employment growth for the 21-year period between 2015 and 2036 derived from Table 5.4.

(3) Employment space needs derived from Snohomish County study (Snohomish County, 2007 Employment Density Study).

(4) FIRES: Finance, Insurance, Real Estate and Services

(5) WTCU: Warehousing, Transportation, Communication, and Utilities

5.4 Recommendations

The primary issue facing the City of Burlington is the declining retail sector. The COVID-19 pandemic has worsened the existing issue, and may have precipitated the closure of the Cascade Mall. However, the causes of the decline are largely external. For example, the Seattle Premium Outlets near Marysville attract shoppers from Seattle while shopping in Bellingham stops Canadians short of Burlington.

Many economic development strategies are based on ideas or narratives that have little theoretical or empirical foundation. The following thoughts about economic development are offered to provide context for the recommendations in this chapter and to help avoid strategies that offer little chance for success.

- Economies are not confined to defined political boundaries; they interact with other regions. As such, it is important to consider the effects of larger, external forces when pursuing economic development.
- Economic development is organic in the sense that it has a life of its own. Community leaders can set the stage for development but cannot say which companies should expand or select the entrepreneurs they want to be successful.
- Economic development takes decades and often development initiatives take years before communities see a return on the investment.

In general, economies benefit from identifying the characteristics that give them an advantage and then capitalizing on industries that benefit from those characteristics. Burlington possesses the following assets:

- Proximity to I-5
- Low sales tax rate
- Relatively affordable real estate
- Abundant workforce

The City of Burlington may, and should, identify additional strongpoints to take advantage of. As a general recommendation, Burlington should focus on what it is already good at, and work to develop around those characteristics. More specifically, the following policy recommendations should be considered:

- Work to retain what retailers remain, do not emphasize attracting new retailers
- Identify and support lacking industries, such as transportation and warehousing
- Support quality of life for low-income workers

The following sections provide additional detail on these policy recommendations.

5.4.1 Retaining Existing Retailers

Research indicates that less than one percent of US companies are able to relocate for a variety of reasons. The takeaway message is that business attraction can be a low return endeavor. Of course, businesses do periodically move, and businesses can expand into a new area. The trick is to recognize that all businesses need many of the same things. Focus on making an area appealing for business in general and to work with existing business owners to be your champions; doing so will make your area more appealing to businesses looking to relocate or expand.

This report provides some analysis of which locations are best suited for retailers. The City of Burlington should continue to identify which retail locations have had the most success and which locations may need revitalization or re-zoning. Identifying ideal retail locations may include studying factors such as traffic and accessibility.

Keep in mind that the forecasts in this chapter do not anticipate significant growth in the retail sector. However, it is expected that Burlington will continue to maintain a higher number of retailers compared to cities of the same population.

5.4.2 Identifying and Supporting Lacking Industries

Burlington has long had a strong retail economy; however, this has created gaps in other sectors. By identifying which sectors are lacking, the City of Burlington can support the industries which are most likely to thrive.

At the end of this report, two graphs are provided which show historical and forecasted labor quotients, respectively. A labor quotient is an index which represents the concentration of jobs in that sector. A labor quotient (LQ) of one is average for the US. A lower LQ means that the industry is under-represented in the economy and a higher LQ means that the industry is overrepresented. According to this analysis, the health care sector has been historically severely underrepresented (LQ=.55) and is forecasted to continue to be underrepresented. Education (LQ=.79) and Construction (LQ=.82) are also underrepresented in Burlington's economy.

In this analysis, warehousing and transportation was identified as a sector that has been a historically lacking industry that has begun to thrive in Burlington. The City is uniquely suited to the warehousing, distribution, and transportation industry because of its proximity to major highways, rail lines, affordable land, and abundant workforce.

The City of Cheyenne has had success in supporting the warehousing and distribution industry by developing land to suit these industries, and then providing the locations at a subsidized cost to major retailers such as Walmart. The City's development entity, Cheyenne LEADS, has been able to fund this project by membership dues from local businesses. The program has had a strong return on investment as Cheyenne has become a hub for distribution centers.

5.4.3 Quality of Life

Research shows that investing in locals' quality of life can have a significant impact on economic development. The City of Burlington should work to identify which amenities their residents value so that the City can make the most effective investments.

Generally, supporting education goes a long way in improving quality of life. Investments in afterschool programs and childcare can help parents in their own career development. For children, these programs create lifelong skills and help children become successful adults. Trade school programs for high school students can help them build careers without the expense of a university education. Education is considered a primary driver of economic class mobility and should be considered a top priority.

Residents of Burlington benefit from the City's relatively low cost of living compared to surrounding areas. This is a key benefit to living in Burlington that should be maintained as much as possible. Despite this, many of Burlington's residents are below the poverty line or otherwise still face high housing costs compared to their incomes. Therefore, when considering potential revenue sources, the City should carefully evaluate options to avoid disproportionately burdening those who are already struggling.

We also recommend investments in affordable housing development. Burlington can be an excellent place to live, not only for those who work in Burlington, but also for those who work in more expensive cities such as Bellingham or Everett. Because of Burlington's proximity to I-5, the City could be an affordable commuter town if low housing prices are maintained.

² See Cheyenne LEADS

³ Environmental Protection Agency. (2015, May). How small towns and cities can use local assets to rebuild their economies: Lessons from successful places (EPA231-R-15 002) https://www.epa.gov/sites/default/files/2015-05/documents/competitive_advantage_051215_508_final.pdf

6 Public Facilities and Services

6.1 Introduction

This chapter includes information used to inform the Public Facilities and Services Element of the Comprehensive Plan, including information on the City's impact fee revenue projections and the City's six-year Capital Improvement Plan (CIP). This chapter also includes a list of capital plans adopted by reference and incorporated into the City's Comprehensive Plan, including plans generated by special service districts such as Skagit Area Transit (SKAT) and the Burlington Edison School District (BESD).

6.2 Future Work

The Public Facilities and Services Element of the Burlington Comprehensive Plan was developed to address the minimum requirements of the Growth Management Act (GMA) and to ensure consistency between the various public agencies providing services in the City of Burlington. However, more work is needed on this topic. Specifically, the City should conduct a comprehensive inventory of its existing facilities, properties, and equipment, and further examine its future needs. Work is also needed to ensure greater consistency between the public agencies operating in Burlington. Finally, the City's impact fee program should be revised to properly capture growth related development impacts. Work recommended for future years includes the following:

- Prepare a comprehensive inventory of the City's existing buildings, facilities, vehicles and equipment and develop a long term strategy and financial plan for maintenance, repair, and replacement, and for responding to growth related pressures.
- Work with other agencies to achieve greater consistency. For example, the BESD is not planning for any growth related enrollment changes despite the forecasted growth of 3,808 people and 1,448 households through the year 2036. The City should also work to identify opportunities for shared facilities and services.
- Develop a system for assessing impact fees using zones or tiers that reflect the comparatively low cost of servicing development in areas with good access to existing facilities and services vs. the cost of servicing development on green-field sites where no facilities exist.
- Consider developing an impact fee revenue sharing program with Skagit County to offset the impacts of development in unincorporated Skagit County.

6.3 Funding and Impact Fee Projections

6.3.1 Summary

The purpose of this section is to forecast the amount of impact fee revenue which may be available to fund future capital projects, and to document the methods used to produce the forecast. The impact fee forecast provided in this memo is intended to serve as a basis for the development of the Capital Facilities Element of the City’s Comprehensive Plan and to assist with the City’s ongoing Capital Improvement Plan (CIP) update.

6.3.2 Results

The following table provides estimates of future revenue available from park, fire, and transportation impact fees. These estimates are provided in annual, six-year, and 20-year increments.

Table 6.1 – Impact Fee Revenue Forecast			
Impact Fee	Annual	6 Years	2015-2036
Park	\$95,349	\$572,094	\$2,002,335
Fire	\$39,476	\$236,859	\$829,006
Transportation	\$895,896	\$5,375,378	\$18,813,822

6.3.3 Legal Requirements

The Washington State Growth Management Act (GMA) requires most cities and counties in the State to adopt comprehensive plans (RCW 36.70A.040). The GMA further requires that comprehensive plans include a number of “elements”, including a capital facilities element (RCW 36.70A.070(3)). This element must cover a twenty year period and include a forecast of future capital facilities needs based on projected population and employment growth (RCW 36.70A.070(3)(b) & WAC 365-196-415(b)). The capital facilities element should, conceptually, identify potential funding sources for the entire twenty year planning period and must also include a detailed financing plan identifying specific costs and sources of revenue for the first six years of the plan. This six year financing plan is often known as a Capital Improvement Plan (CIP).

In order to finance the projects identified in the capital facilities element, the GMA authorizes local governments to collect “impact fees” (RCW 82.02.050(4)). Impact fees are intended to offset the cost of providing new facilities necessitated by population and employment growth (RCW 82.02.050(3)(a)). Importantly impact fees may only be used to pay for a portion of the cost of the providing new facilities and must be balanced with other sources of revenue (RCW 82.02.050(3)(b)). Currently the City of Burlington collects impact fees for parks, fire service, and transportation improvements. These impact fees are collected whenever a building permit is issued for new construction. Impacts fees for residential construction are based on the number of housing units created, while commercial impact fees vary depending on the number of square feet constructed.

One of the core requirements of the GMA is that comprehensive plans be “internally consistent”. For purposes of developing a capital facilities element and updating the CIP, this means the same set of assumptions must be used throughout the plan. Impact fee revenue is directly dependent upon the amount of construction taking place in the City, and construction is a product of population and employment growth. Therefore, in order to forecast the need for future capital facilities, and potential impact fee revenue, it is necessary to forecast population and employment growth.

Counties are responsible for developing population and employment forecasts and allocating growth to cities. In Skagit County, growth forecasts are periodically developed by a Growth Management Steering Committee managed by the Skagit Council of Governments (SCOG). Through this process SCOG has determined that between 2015 and 2036, the City of Burlington will grow by 3,808 people and 3,516 jobs. These forecasts are referenced extensively in this memo and serve as the basis for all of the City’s long range planning work.

6.3.4 Forecasting Residential Impact Fee Revenue

Impact fees are collected for each new housing unit constructed in the City. In order to forecast the amount of impact fee revenue resulting from future residential construction, the number of projected housing units was multiplied by the applicable impact fee. The number of housing units was determined by applying the average household size from the 2010 census (2.63) to the SCOG population forecast, resulting in a total projected growth of 1,448 housing units ($3,808/2.63 = 1,448$).

Because transportation impact fees are assessed at different rates for attached and detached units, the housing unit projection was broken into attached and detached components based on housing needs assessment data from the Housing chapter. For Burlington this means that a minimum of 60 percent, or 869, of the projected housing units will be attached units, and the remaining 40 percent, or 579, will be detached units.

Table 6.2 – Residential Forecast			
Fee Type	Fee Amount	Housing Units	Revenue (2015-2036)
Park	\$655/unit	1,448	\$948,440
Fire	\$253.73/unit	1,448	\$367,401
Transportation (attached)	\$1,652	869	\$1,435,588
Transportation (detached)	\$2,665	579	\$1,543,035

6.3.5 Forecasting Nonresidential Impact Fee Revenue

Impact fees from commercial development are more difficult to project than residential impact fees because non-residential impact fees are based on the number of square feet constructed. As a result, in order to forecast impact fee revenue from non-residential construction, it is necessary to forecast the amount of non-residential building space that will be constructed over a 20 year period. In order to satisfy the GMA’s internal consistency requirement, this forecast should be consistent with, and incorporate the 20 year employment projections provided by SCOG.

Because new non-residential construction is closely linked to employment growth it is possible to estimate the amount of future construction based on the number of square feet typically attributable to each new employee. For purposes of this analysis, a study prepared by Snohomish County was used to estimate the number of square feet associated with each employee across a variety of employment categories (Snohomish County, 2007 Employment Density Study).

As described in the Economic Development Chapter, the employment forecast and allocations issued by SCOG do not include a detailed breakdown of employment growth by sector. However, by comparing the sector level forecasts prepared for the City by the Western Washington Center for Business and Economic Research (CEBR), the City has been able to estimate sector level employment growth through the year 2036. The process by which the sector level forecast was developed is described in more detail in Chapter 5 (Economic Development). The employment categories identified in these detailed employment forecasts are directly comparable to the employment categories identified in the Snohomish County study cited above. Specifically, both studies divide employment into following economic sectors:

- Manufacturing
- Retail
- Finance, Insurance, Real Estate, and Services (FIRES)
- Wholesale, Transportation, Communication, and Utilities (WTCU)
- Government
- Education
- Health

By comparing the detailed, industry level, job forecasts from Chapter 5 (Economic Development), and the employment densities identified in the Snohomish County study it's possible to produce an estimate of future non-residential construction based on employment growth (Table 6.3). Non-residential impact fee revenue for parks and fire service can then be identified by multiplying the non-residential construction total by the applicable impact fees as shown in Table 6.4.

Table 6.3 – Employment and Non-Residential Construction			
Employment Type	Employment Projection (employees)	Square Feet per Employee	Projected Nonresidential Construction (sq. ft.)
Retail	1,591.58	700	1,114,106
FIRES	629.37	350	220,280
Health	363.10	350	127,085
Manufacturing	181.55	500	90,775
WTCU	472.03	1,000	472,030
Government	0	300	0
Education	278.38	300	83,514
Total	3,516	N/A	2,107,790

Table 6.4 – Non-Residential Revenue Forecast for Park and Fire Impact Fees

Fee Type	Fee Amount	Projected Construction	Total Revenue (2015 -2036)
Park	\$0.50/sq. ft.	2,107,790	\$1,053,895
Fire	\$0.219/sq. ft.	2,107,790	\$461,605 ⁽¹⁾

Note: (1) As discussed in this chapter, no growth related fire impacts were identified through the City's initial capital planning efforts. As a result it is recommended that the City suspend collecting fire impact fees pending a more detailed analysis of future growth related impacts on fire/EMS services.

Transportation impact fee revenue is more difficult to estimate than park and fire impact fees. Unlike park and fire impact fees, transportation impact fees are based on the number of “peak hour trips” a given type of development is projected to generate. Therefore, in order to produce an estimate of future transportation impact fee revenue it is necessary relate the City's adopted trip generation schedule to the non-residential construction projections identified in the table above.

The trip generation schedule used by the City to assess transportation impact fees includes a lengthy and very specific list of land uses, as opposed to the broad employment categories used in the Snohomish County study and SCOG regional transportation analysis. In an attempt to arrive at a reasonable impact fee for each employment category, a use was selected from the impact fee schedule which is typical, or most representative, of each employment category. For example, the “general office” fee type was assumed to be representative of the “FIRES” category. A complete list of the impact fee categories selected is shown in the Table 6.5. Impact fees from government buildings were not included in the total because the City of Burlington does not collect impact fees from itself.

Table 6.5 – Non-Residential Revenue Forecast for Transportation Impact Fees

Employment Type	Impact Fee Category	Fee Amount (\$/1,000 sq. ft.)	Projected Square Feet of Construction	Total Revenue (2015-2036)
Retail	Discount Store	\$11,006	1,114,106	\$12,261,851
FIRES	General Office	\$3,971	220,280	\$874,730
Government ⁽¹⁾	N/A	N/A	N/A	N/A
Education ⁽²⁾	Government Office	\$3,225	83,514	\$269,333
WTCU	Light Industrial	\$2,585	472,030	\$1,220,198
Manufacturing	Manufacturing	\$1,945	90,775	\$176,557
Health	Medical/Dental Clinic	\$9,514	127,085	\$1,624,991
Total:	N/A	N/A	2,107,790	\$15,835,199

Notes: (1) No fees assigned for government office category because no increase in government employment is forecasted and because the City does not charge itself impact fees. (2) Since BESD has stated no student growth is projected for 20 years the employment numbers cannot be reconciled. For purpose of calculating impact fees education employment was assessed at government office rate identified in the ITE manual.

6.3.6 Limitations and Conclusion

The impact fee projections provided in this section are based on reasonable assumptions and are consistent with the population and employment forecasts developed by the Skagit Council of Governments. However, as with all forecasts, these projections are based on a number of assumptions, each of which may affect their long term accuracy; specifically:

- *Population and employment projections* – Because the projections provided in this memo are directly tied to new development and construction, and because new development and construction is dependent on growth in population and employment, the accuracy of the projections will largely in hinge on the accuracy of the population and employment projections developed by SCOG.
- *Household size* – Residential impact fees are collected for each new dwelling unit permitted by the City. This study uses the average household size from the 2010 census to estimate the number of housing units required based on the City’s projected population growth. Household size tends to change over time in response to local and national demographic trends. Significant changes to household size will affect the number of housing units constructed, and in turn, the amount of impact fee revenue collected. In future years the City should closely monitor household size statistics for different housing types and use this data to refine its revenue forecasts.
- *Square feet per employee* – While the Snohomish County study used to inform the impact fee projections was thorough and well documented, its findings are untested locally. Also, in applying the findings of the Snohomish County study to the impact fee projections, estimates of industry level employment from analysis prepared by CEBR were used. These projections may or may not prove to be reliable, as employment levels tend to fluctuate rapidly and sector level employment is difficult to predict. Also, as cautioned by CEBR, employment forecasts covering long periods of time are considerably less reliable than short-term projections. In addition, as a matter of policy the City is working to increase employment densities and use land more efficiently. If the City is successful, the projections in this section may be effected. To address these vulnerabilities, the City should continuously monitor employment and non-residential construction and adjust its impact fee projections accordingly.

In order to control for the variables and assumptions listed above it is recommended that impact fee revenue, development trends, and population growth be continuously monitored, and the CIP should be adjusted to accommodate changing economic conditions on an annual basis. Also, it is worth noting that while the projections in this memo are likely to be reasonably accurate over a long period of time, development, and by extension, impact fee revenue, is highly cyclical; therefore, the annual projections are likely to be less accurate than the 20 year projections.

6.5 Capital Plans Adopted by Reference

In addition to the public facilities and services addressed in detail in the Burlington Comprehensive Plan, the City also relies on a number of other planning documents for capital planning purposes. These documents include plans prepared by the City of Burlington, such as sewer and storm-water plans, but also include documents prepared by other agencies, such as Skagit Area Transit (SKAT), the Skagit Public Utility District (PUD), and Skagit County.

Because the City relies on services provided by other agencies, ensuring a high level of coordination between the plans prepared by independent agencies and the City’s Comprehensive Plan is essential. In preparing the Comprehensive Plan, the City requested that all agencies that own land, operate facilities, or provides services in the City of Burlington provides capital planning documents covering a period of at least six-years.

The City received plans for most of the agencies it contacted, and most of the planning documents it received were consistent with the Comprehensive Plan. However, a number of agencies did not submit capital plans or submitted capital plans that were not consistent with the City’s Comprehensive Plan. Notably, Dike District 12 and the Housing Authority of Skagit County did not submit capital plans. The Burlington Edison School District did submit a capital plan, but it does not sufficiently address the impact of the City’s adopted population forecasts on student enrollment and facility needs.

Table 6.6 identifies capital planning documents used by the City but prepared by outside agencies. Table 6.7 identifies detailed capital plans prepared by City departments for specific services. Planning documents marked as “conforming” are formally adopted and considered to be a part of the Burlington Comprehensive Plan. Those marked as “not conforming” are considered deficient and have not been adopted by the City. Only agencies with conforming capital plans are eligible to receive permits and approvals from the City of Burlington.

Table 6.6 – Outside Agency Capital Plans			
Service	Agency	Document Title	Conforming (Yes/No)
Drinking Water	Skagit PUD	2013 Water System Plan and 2023 Limited Water System Plan Update	Yes
Flood Control	Diking District 12	(no plan provided)	No
County Services	Skagit County	2023 Skagit County CIP	Yes
K-12 Education	Burlington Edison School District	2021 Six-Year Capital Facilities Plan	No
Public Housing	Skagit County Housing Authority	(no plan provided)	No
Transit	Skagit Area Transit	Six-Year Transit Development Plan	Yes

Table 6.7 – City Capital Plans Adopted by Reference			
Service	Department	Document Title	Conforming (Yes/No)
Stormwater	Public Works	2023 Surface Water Management Plan	Yes
Sewer Service	Public Works	2023 Wastewater Comprehensive Plan	Yes
General Facilities	Administration	2023 Capital Improvement Plan (CIP)	Yes
Transportation	Public Works	2023 Transportation Improvement Plan (TIP)	Yes

7 Parks and Recreation

7.1 Parks Recreation and Open Space (PROS) Plan

The 2020 Parks Recreation and Open Space (PROS) Plan developed by the City's Parks and Recreation Department was used to develop the Parks and Recreation Element of the Burlington Comprehensive Plan. The PROS plan is adopted as part of the Comprehensive Plan. In the event of a conflict between the PROS Plan and the Comprehensive Plan the Comprehensive Plan shall control.

8 Transportation

8.1 Introduction

Burlington's Comprehensive Plan must include a Transportation Element (RCW 36.70A.070). The Transportation Element shows how the city's future transportation needs will be met. This report summarizes what the Growth Management Act (GMA) requires with respect to transportation, describes transportation planning techniques, and addresses the crucial connection between transportation and land use. A list of recommended changes is also provided at the end of the report.

Over the next 20 years the city will experience significant growth, including 1,448 dwelling and 3,516 jobs. Fiscal constraints coupled with fundamental shifts in development patterns, housing characteristics, and economic conditions demand that Burlington reimagine its transportation system. While more detailed recommendations are presented later in this chapter, the most significant points can be summarized as follows:

- **Coordinate land use and transportation.** The transportation system must be consistent with, and support, the types of growth described in the land use element. Over the next 20 Burlington's population and employment base will experience significant growth, and most of this growth will be accommodated through infill and redevelopment. A large percentage of future growth will be directed to the Burlington Boulevard corridor and the City's downtown. The City should build invest in transportation improvements that facilitate the type of development it wants to see.
- **Build a better connected transportation system.** Traditionally cities were developed with an orderly grid of streets with frequent intersections and short blocks. Later transportation systems became more hierarchical with less frequent intersections, wide streets, and numerous dead-ends. As a result large volumes of traffic were routed to a small number of arterial streets increasing travel distances and causing traffic problems. Today the City suffers from a lack of continuous routes in many places. As a result the city's transportation system lacks redundancy and travel distances are much greater than they need to be, even between points that are geographically close to one another. These deficiencies increase emergency response times and make it difficult for people to get around.
- **Make it possible for more people to get where they're going without a car.** While most of City' residents get where they're going by car, many others including children, seniors, people with disabilities, and those who cannot afford to drive do not. Often, a lack of convenient routes, or suitable sidewalks means that people are forced to drive even when making short trips. Finally, as the percentage of growth occurring in, or near,

commercial areas increases, the demand for sidewalks, bike lanes, paths, and other similar improvements will increase.

- **Transportation choices must be financially sustainable.** For Burlington residents, transportation costs often represent the second largest household expense after housing. At the same time, the amount of revenue available to the City to expand the transportation system has been declining. In order to minimize monthly household expenses and ensure scarce public resources are used efficiently the City should focus on maintaining existing facilities and upgrading existing structurally deficient roads. Investments in new capacity should focus on improving connections.

8.2 Requirements

The transportation element must show how the transportation infrastructure and services needed to support projected growth and development will be provided. Importantly, the transportation element must be consistent with, and implement the land use element (RCW 36.70A.070 (6)). The transportation element must include an inventory of existing transportation system components, a projection of future demand, and a list of improvements needed to support future population and employment growth. Importantly, the City's transportation element must be consistent with state and regional plans.

The City is required to identify "level of service standards" (LOS) for arterials and transit routes. The purpose of identifying level of services standards is to evaluate the performance of transportation facilities and systematically analyze the need for future improvements. If transportation system components fall below adopted LOS standards, improvements must be identified that will bring the system into compliance. Essentially, LOS standards are used describe how well a community expects their transportation system to function and represent an opportunity to balance cost and performance considerations. Importantly, the GMA only requires that the City adopt level of services standards. It does not however, specify the level of service that must be provided.

In addition to identifying the improvements needed to support future growth, the transportation element must also show how the improvements will be paid for. Specifically, the GMA requires the City to pay for the required improvements. If the funding available is insufficient to meet future needs, the City must either identify new sources of funding or reassess the Land Use Element to minimize transportation impacts. The City may also mitigate traffic impacts by using "transportation demand management techniques" to reduce traffic and travel, or to shift travel from expensive modes (such as single occupant cars) to lower cost modes (such as walking). This means there's no free lunch when it comes to transportation planning.

The most important GMA requirements related to transportation can be summarized as follows:

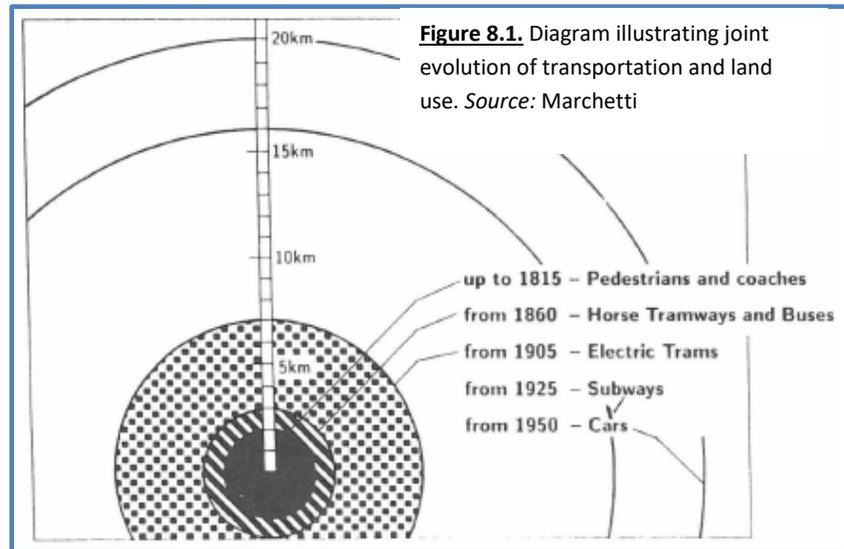
- The City's transportation plan must be consistent with, and support, the land use element
- An inventory of existing transportation facilities and services must be provided
- A forecast of future transportation demand, based on the growth projection included in the land use element, must be prepared
- By comparing the existing inventory to the projected future travel, the City must prepare a list of projects needed to support planned growth, and identify the funding sources that will be used to pay for them.
- The transportation element must be consistent with the plans adopted by neighboring jurisdictions, regional planning agencies, and the State of Washington
- The City's six year transportation improvement plan (TIP) must be based on, and fully consistent with, the transportation element of the comprehensive plan

8.3 Theory and Best Practices

Approaches to transportation planning tend to fall into one of two categories. As will be shown, neither approach has produced satisfactory results. On one end of the spectrum, seemingly obvious solutions are applied to isolated problems without giving much thought to the big picture (addressing a congested spot by adding an additional lane for example). By ignoring important underlying concepts and broad considerations this approach frequently results in unintended consequences. Often the "solutions" simply create more problems or move problems somewhere else. For example widening a road in one spot may simply move the congestion to the next intersection.

At the other end of the spectrum are techniques that rely heavily on complex computer programs and sophisticated mathematical models. These techniques often hide flawed or poorly supported assumptions behind a veil of mathematical complexity. This approach often produces results that, while exceedingly detailed and precise, are inaccurate or misleading nonetheless. While mathematical models can be extremely helpful, the quality of the model outputs is tied directly to the quality of the inputs. Faulty assumptions simply lead to faulty results.

The pitfalls associated with the two approaches described above can be avoided with a better understanding of how transportation systems work, and how transportation relates to development. The recommendations in this chapter draw a direct connection between how a city is developed and how its transportation system functions. Two important concepts guide this relationship, the “constant travel time theory” and “induced demand”.



The first concept, known as the “constant travel time theory”, argues that throughout history, regardless of the dominant mode of transportation, or available technology, people tend to spend about an hour a day traveling (Marchetti). When transportation modes are slow, people simply travel shorter distances and, in the absence of constraints, the intensity with which land is used and developed increases. With the introduction of transportation improvements that allow travel speeds to increase, the distance people travel each day also increases. Essentially, people use the time they save from transportation improvements to travel further (Fleischer & Tir). The constant travel time theory explains why cities have gradually become more spread out as transportation has become faster. As Figure 8.1 illustrates, early cities were limited by the distance a person could reasonably walk. Then, as travel speeds increased the distances people could travel grew, allowing cities to become more spread out.

The second concept, which is closely related to the first, is known as “induced demand”. Because travel time savings result in longer trips, or more travel, reducing travel times by speeding up traffic creates a self-defeating cycle. All things being equal, widening roads rarely relieves congestion (Duranton, Gilles & Turner, Matthew). Instead wider roads simply enable greater travel distances and lead to more dispersed development patterns. While somewhat counter intuitive, transportation problems can often be addressed more cost effectively by changing the way land is used and developed.

8.3.1 Transportation and Land Use

Two terms are frequently used when discussing land use and transportation; mobility and accessibility. While similar, and related, these terms differ in important ways. While mobility is nothing more than a simple measure of travel speed, accessibility describes how easy it is for people to get where they’re going (Zhang, Zu, & Li, 2009; Litman, 2019). At first glance these

terms may seem to be the same. Most people assume, not unreasonably, that moving faster will allow them to get where they want to go more quickly. However, by focusing exclusively on speed, this assumption ignores the important role of proximity (how close things are to one another).

Accessibility is frequently measured in terms of the number of jobs or businesses that can be reached within a given amount of time and tends to be highest in central areas and lowest in remote or peripheral locations (Ewing, Bartholomew, Winkelman, Walters & Chen, 2007). As a result, the most accessible locations tend to be those with the greatest concentration of jobs, housing, and services. However, in such places travel speeds also tend to be slow (Levine, Grengs, Qinggyun, & Shen, 2012).

Whether they realize it or not, most people intuitively understand this relationship. For example, a freeway running through an empty desert will allow for very high travel speeds, but this does not mean that living in the middle of an empty desert is convenient since things are separated by great distances. Alternatively, while it may be impossible to travel quickly through the center of a large city, like New York, this does not mean that such places are inconvenient since a large number of jobs, services, dwellings, and stores are concentrated in a small area. The purpose of this example is not to suggest that everyone solve their transportation problems by becoming more like New York, but rather to illustrate the two-way relationship between land use and transportation, and to show that increasing travel speeds does not necessarily make it easier to get around.

Given the importance of accessibility, the relationship between land use and transportation is both circular and self-reinforcing. Because centrally located areas tend to be the most accessible, they also tend to be the most highly valued. All other factors being equal, land will be most expensive near the center of cities and employment centers and gradually decrease in value as the distance to the center increases (Kivell, 1993). This concept is known as the “land use gradient” and is a factor in all land markets to varying degrees. Essentially, the land use gradient is an economic measure of the relative accessibility of land.

In an otherwise unrestricted market, developers respond to expensive land by using it more efficiently and developing at higher levels of intensity. All things being equal, the most accessible locations will have the greatest development potential (Hansen, 1959). More intensive development invariably leads to more traffic congestion, making long distance travel increasingly difficult and time consuming. However, increasing the intensity of development also improves accessibility (Olds, 2014). As a result, proximity and accessibility become even more important, causing land values to increase still further, thereby perpetuating the cycle until the costs imposed by congestion begin to outweigh the access benefits of higher density development (Zhang, Zu, & Li, 2009). Despite the effects of congestion, the accessibility improvements associated with density increases are ten times greater than the associated congestion effects. (Levine, Grengs, Qinggyun & Shen, 2012).

No city however, can be described as an unrestricted market. Instead, zoning and development regulations influence the development process described above. In most places zoning regulations tend to limit development intensities near the center of the city and rigidly separate commercial and residential areas. Overall, these restrictions tend to reduce proximity and accessibility.

Transportation and land use are closely related. The most important elements of this relationship can be summarized as follows:

- Places where lots of things are close together have high levels of accessibility and slow travel speeds. Accessibility is better measure of how efficient a city is than travel speeds.
- Transportation improvements that increase travel speeds result in longer travel distances and more dispersed development patterns.
- Limiting development intensities or rigidly separating different land uses has a negative effect on accessibility
- Increasing development intensities and permitting a greater mix of land uses increases congestion but also improves accessibility. Importantly the accessibility improvements significantly outweigh the congestion impacts.

8.3.2 Designing a Better Transportation System

Changing the way land is used and developed can affect how far people travel, the way they travel, and how easily they can reach their destination. Broadly speaking, land use changes that reduce travel distances, make it possible to make more trips without a car, or make it easier to use public transit can be referred to as “demand management techniques”. In many cases demand management represents a more efficient and cost effective way of addressing transportation needs than simply adding road capacity (Couture, Duanton & Turner, 2016). Studies have repeatedly shown that that a number of land-use and urban design factors, such as street connectivity, mixed land uses, density, and the availability of transit service all affect transportation demand (Ewing & Cervero, 2017).

As will be shown in this section, the cumulative effect of incrementally increasing street connectivity, providing more opportunities for mixed use development, and increasing residential densities in areas with a good access to jobs and transit service, can significantly reduce the demand for road capacity (Nelson, 2017; Arizona Department of Transportation Research Center, 2012).

Cities in the United State were historically developed with a dense grid of streets intersecting and regular intervals. By maximizing the number of intersections, property developers were able to maximize the number of accessible lots and leasable street frontage. However, following World War II this system began to change. In the 1950’s engineers and city planners began to promote the use of disconnected, hierarchical street systems (Marshal & Garrick, 2009). Instead of an orderly grid of equally sized streets, these new street layouts relied on a

system of local streets terminating in dead-ends, feeding into increasingly larger collectors and arterials.

While intended to reduce accidents and minimize “through traffic” in residential areas the evidence supporting the use of hierarchical street systems has always been scant. While hierarchical networks devote less land to streets (Rifaat, Tay, & De Barros, 2012) they are also less reliable, carry less traffic, discourage walking, and significantly increase the distances people must travel (Cortright, 2017). In recent decades mounting evidence has shown that far from improving traffic conditions, disconnected street networks actually force people to travel longer distances and cause traffic congestion on arterials (Marshall & Garrick, 2009). Simply put, disconnected street networks concentrate too much traffic on a small number of streets and force people to travel longer than necessary.

One measure of a transportation system’s efficiency is “circuitry”. Circuitry essentially measures how direct real world trips are by comparing straight-line distances to street distances. The closer the two measures are to one another, the less circuitous, and more efficient, the transportation system is. Importantly, traditional street grids, especially those with closely spaced intersections, are considerably less circuitous than modern hierarchical street networks (Boeing, 2018). In addition to shorter travel distances, traditional street grids also reduce traffic congestion by balancing traffic across multiple streets and providing a more robust and redundant street network (Commerce, 2007). Also, because gridded street patterns offer multiple ways of reaching a destination they are considerably more reliable, and less prone to disruption, than modern street networks (Rifaat, Tay, & De Barros, 2012; Cortright, 2017).

Ultimately making it easier for people get around isn’t just about street networks. Mixed use development has been shown to shorten trip lengths, improve access, and is associated with higher levels of pedestrian activity (Cervero & Duncan, 2006; Pivo, Hess & Thatté, 1995). Importantly, households in mixed use areas travel significantly less than those in single use areas (Arizona Department of Transportation Research Center, 2012). This isn’t just about commuting to work, non-work trips, such as shopping, entertainment, and personal business, account for 70 – 80 percent of all household travel and non-work travel also represents the fastest growing segment of transportation demand (Arizona Department of Transportation Research Center, 2012). On a basic level, mixing land uses, such as stores and apartments, is about shortening the distance between where people live and where they need to go.

Changing the way a city’s street network is designed, and the way land use is regulated, can significantly improve transportation outcomes. Specifically:

- A transportation system comprised of a dense network of interconnected streets with intersections at regular intervals is more efficient than a hierarchical system with widely spaced streets and frequent dead ends.
- Allowing a greater mix of land uses and higher development intensities reduces travel distances and make it easier for people to get around.

- The majority of travel is not work related. By focusing on non-work travel significant transportation improvements can be realized.

8.3.3 Forecasting Future Needs

A city's comprehensive plan must describe how well the system is expected to perform (commonly referred to as "level of service") and include a list of improvements necessary to achieve this level of performance. Typically these requirements are addressed by producing a transportation demand forecast and comparing the forecast results to the capacity of existing services and facilities. While a useful tool for identifying future transportation needs, traditional transportation forecasting models suffer from a number of fundamental problems. This section explains how common transportation models work, describes their shortcomings, and explains how model outputs can be adjusted or supplemented to improve the utility of transportation planning work.

Identifying future transportation needs typically involves a five step process. First levels of service are established. Next the condition of existing services and facilities are evaluated and a forecast of future traffic, or travel, volumes is produced. By comparing this forecast to current levels of service standards, deficiencies can be identified. Finally, a list of improvements necessary to address the deficiencies is compiled. While seemingly simple, the details of the process are considerably more complex.

Transportation models begin with an estimate of population and employment growth. In Washington, population forecasts are produced for each county by the Office of Financial Management (OFM). These forecasts are then used by local government to develop individual population and employment forecasts. Local governments then estimate the amount of development that will result from the projected population and employment growth. Each new development is assumed to "generate" a certain number of vehicle trips each day.

To assess the amount, and location, of future traffic, the city is typically divided into a number of small geographic areas called "transportation analysis zones" (TAZs). TAZs vary in size depending on the density of population or jobs they contain. The city's projected development, and the resulting vehicle trips are then assigned to each TAZ. Finally, a mathematical model is used estimate the amount of travel that will occur between each TAZ. By comparing existing traffic volumes and the anticipated growth in the trips to the capacity of existing facilities, cities can identify where future improvements will be needed.

While a helpful tool for estimating future vehicle traffic, traditional transportation modeling suffers from some crucial defects. Notably many transportation models are based on flawed assumptions and inaccurate data. By focusing only on vehicle traffic, transportation models ignore other forms of transportation. Also, by using level of service standards that are based on delay and slowdowns, transportation models can produce perverse outcomes that are contrary to GMA planning goals.

Like all models, the quality of transportation demand forecasts depend on the quality and validity of the assumptions and data on which they are based. Because transportation demand forecasts are predicated on assumptions about how many vehicle trips each new land use will generate, trip generation rates are a critical model input. Most models use trip generation rates provided by Institute of Transportation Engineers (ITE). However, ITE trip generation rates have been shown to be inaccurate. In fact, studies have shown that the ITE may overestimate trip generation rates by 53 percent. It has also been shown that ITE trip generation rates are based on faulty methods, statistically invalid samples sizes, and information sources that cannot be verified or peer reviewed (Millard-Ball, 2015).

Another significant problem is that most, but not all, transportation models fail to account for the relationship between land use and transportation. For example, transportation models commonly treat each new household or job the same regardless of where it is located. A home near the edge of town is expected to generate the same transportation impact as one built near the center of the city. However, all things are not equal. In fact, traffic impacts vary widely depending on location and development type. Households in more accessible areas make fewer trips by car and travel fewer miles when they do (Krizek, 2003; Larco, 2013; Arizona Department of Transportation Research Center, 2012).

Although traffic forecasting models have their shortcomings, they remain a useful starting point for gauging future travel conditions provided steps are taken to account for their inherent weaknesses, such as:

- In centrally located areas where a mix of commercial and high density residential uses are expected, lower trip generation rates and VMT estimates should be used.
- Transportation plans should separately account for non-motorized transportation and transit needs.
- Design standards should be adopted for streets and intersections that identify a “fully improved condition”, such as a maximum number of lanes, beyond which demand management techniques or parallel connections should be used to address deficiencies.
- Instead of continually rerunning forecast models, other important level of service indicators, such as per capita VMT, non-motorized transportation use, transit ridership, and average commute times, should be monitored.

8.3.4 Bicycle and Pedestrian Travel

Walking is one of the simplest and cheapest ways to get around. For local governments, the cost of accommodating pedestrians and bicyclists is significantly lower than the cost of building new roads or expanding transit systems. For households, more walking or bicycling means less money spent on gas, insurance, and cars. There are other benefits too. Lack of physical activity has been linked to numerous health problems including diabetes, high blood pressure, and heart disease (Commerce, 1998). Increasing the number of trips people make by walking or bicycling has been shown to improve both physical and mental health (California Air Resources

Board, 2016). These factors suggest that while planning for non-motorized transportation is required by law, it is not without good reason.

Planning for non-motorized transportation is neither fundamentally complex, nor particularly expensive. In fact, simple common sense measures can significantly impact the number of trips made on foot or by bike. These measures include a combination of land use, urban design, and infrastructure factors. First, in order for walking or bicycling to be viable options, it must be physically possible for a person to make the trip, meaning a sidewalk, path, or other reasonably safe route is available, and their intended destination is close by. Second, there needs to be destination nearby that are worth walking to, such as schools, parks, stores, and services. Finally, while some people are forced to walk or ride a bike due to age, income, or disability, for many others it is a choice. For such people walking or riding must be safe comfortable and pleasant (Stampe, 2018; Arizona Department of Transportation Research Center, 2012).

In areas with busy streets, sidewalks, bicycle lanes, paths, and improved pedestrian crossings are essential in order for people to get where they're going. As previously discussed, the directness, or circuitry, of available routes is a measure of a transportation system's relative efficiency (Boeing, 2018; Rifaat, Tay, & De Barros 2012). This concept is particularly relevant to non-motorized transportation planning since pedestrians and bicyclists are much more sensitive to small changes in travel distance than drivers. Generally speaking, pedestrians can be expected to travel up to one-half mile (Commerce, 2007). Riding a bicycle expands this range to three miles (PSRC, 2015). By providing a connected grid of streets with short blocks and frequent crossings the number of trips made on foot or by bicycle can be significantly increased (Berrigan, Pickle, & Dill, 2010 and Commerce, 2005).

So what sort of changes can be made to accommodate pedestrians and bicyclists? Research has shown that non-motorized travel can be increased by limiting block lengths to 200 – 600 feet in residential areas (Oregon Department of Transportation) and 1,000 feet in commercial areas (Commerce, 2005). Other physical impediments to pedestrian and bicycle travel, such as dead end streets and cul-de-sacs should be prohibited or removed (ODOT). It has also been shown that households that live within one-quarter mile of bicycle lane ride more frequently than those who don't (Krizek & Johnson 2006), suggesting that creating a grid of bicycle lanes and dedicated paths at intervals of one-half mile, would bring most of the City's residents within this range.

The way land is used and developed also influences how people travel. While it may seem obvious, it's worth stating that people aren't inclined to walk unless there's somewhere nearby worth walking to. When surveyed, people identify parks, stores and restaurants, transit service, and schools as the places they'd most like to walk to. Changing land use policies and regulations to allow higher residential densities and a wider range of uses allows more people to live near, and walk to, these popular destinations. Even small changes in residential densities and the mix of allowed uses can increase walking and biking (Pivo, Hess & Thatte, 1995).

In fact people who live in areas with higher residential densities and a mix of commercial and residential uses drive 40 percent less than those who don't (Ewing, Bartholomew, Winkelman, Walters & Chen, 2007) and also walk or ride bikes much more frequently (Arizona Department of Transportation Research Center, 2012). Studies in Washington have documented significant reductions in driving, and corresponding increases in non-motorized travel, when employment densities reach 20 employees per acre and residential densities exceed 13 dwellings per acre (Lawrence & Pivo). Importantly, these relationships are causal and not the product of mere correlation or self-selection (Boarnet, Raphael, & Williams 2017).

The vast majority of travel is unrelated to commuting and instead involves non-work trips. One significant source of non-work travel involves parents dropping their kids off at school (US Department of Transportation, 2007). Over the past 50 years the catchment area, or area served by local schools, has increased in size. Unsurprisingly, over the same time the number of students walking to school has also steadily decreased. While some parents drive their kids to school because it's convenient, or because of bad weather, more commonly they do so because of a lack of safe, convenient routes bicycling or walking routes (Schlossberg, Greene, Phillips, Johnson & Parker, 2006).

Aside from physical improvements such sidewalks, bike lanes, and crosswalks, distance is a crucial factor in determining the number of students who walk to school. A study of middle school students in Oregon showed that 52 percent of students who lived within one mile of their school walked or bicycled. For students who lived up to 1.5 miles from school, 36 percent walked or bicycled. However, the percentage of students who walked or bicycled declined to 4 percent when the distance between their home and school exceeded 1.5 miles (Schlossberg, Greene, Phillips, Johnson & Parker, 2006). These are significant numbers and demonstrate that students will walk or ride to school when it is safe and convenient. The numbers also suggest that significant travel efficiencies can be realized by increasing residential densities near schools and by providing adequate infrastructure.

Burlington Boulevard has one of the densest concentrations of shopping, services, and high density housing in Skagit County. Over the next 20 years the number of people living, and working, along the Burlington Boulevard corridor is expected to increase significantly. These factors are particularly relevant to non-motorized transportation. Although people don't commonly associated commercial strips with pedestrian activity, commercial strips are frequently bordered by areas of higher density housing, making short trips to stores and services possible. In fact studies have shown that people who live near commercial strips make a large number of trips on foot or by bike. One study of commercial strips located in places as diverse as Oregon and Georgia, showed people living near strips made a third of their trips on foot or by bike (Larco, 2013), suggesting the City could increase pedestrian and bicycle trips by directing growth to the Burlington Boulevard corridor.

In addition to land use changes, that encourage the construction of places for people to walk to, and physical changes, that make walking and bicycling trips possible, it's also necessary to consider factors that make non-motorized trips safe and enjoyable. These factors are

sometimes classified as qualitative, rather than quantitative, and are nearly as important as physical improvements and land use changes. Whether because of age, disability, or income, a certain percentage of the population will always have few alternatives to walking. As a result, increasing the number of non-motorized trips necessarily involves convincing those who could drive that walking or riding a bike are better options. For those who might otherwise drive, safety, comfort, and enjoyment are important considerations (Litman, 2017).

Subtle urban design changes can have a tremendous impact on people's perception of safety and comfort. For example, generally people do not like walking along busy arterials because they feel dangerously close to traffic (Larco, 2013); however, this perception can be mitigated with wider sidewalks, street trees, and on-street parking. It is also important to provide a visually interesting environment in which to walk. This can be accomplished by providing high quality landscaping, locating buildings near the sidewalk ensuring that parking areas are not located between the building entrance and the street, and limiting the width and frequency of driveway curb cuts (PSRC, 2015; Mukhija & Shoup, 2006; Commerce, 1998). In residential areas traffic calming measures such as traffic circles and narrow travel lanes can also be effective (Commerce, 2005).

The most important pedestrian and bicycle planning concepts are summarized below:

- Provide continuous sidewalks
- Small blocks and frequent intersections reduce travel distances and make it easier to get around without a car
- Land use policies and regulations can influence the number of trips made on foot or by bike. Allowing higher residential densities in areas that are close to shops, services, parks, and schools will result in more pedestrian and bicycle trips.
- A significant amount of vehicle traffic is created when people feel it is unsafe or impractical for their children to walk to school. Connecting schools to surrounding residential areas with sidewalks and bike lanes can reduce unnecessary vehicle trips
- Pedestrians are heavily influenced by the perception of safety and comfort. Urban design changes such as street trees, wider sidewalks, and the presence of on-street parking can significantly increase pedestrian travel.
- Commercial corridors, such as Burlington Boulevard, have been shown to generate surprising amounts of pedestrian travel.

8.3.5 Public Transportation

Transit is not generally regarded as a viable mode of transportation in small towns or rural areas. However, in cities with a large concentrated employment base, compact geography, and convenient access to other regional destinations, it represents a cost effective and efficient way of moving large numbers of people. A functional public transportation system also serves important economic functions by lowering monthly household expenses and providing access to jobs and services (Godavarthy, Mattson & Ndembe, 2014). As this section will show, Burlington has the necessary characteristics to support public transportation service, and by making targeted investments and smart decisions about future growth, the number of people who use public transit can be increased while simultaneously reducing the per-capita cost of providing transit service (PSRC, 2015).

Transit ridership is influenced by a variety of factors, including development patterns, street connectivity, and the speed and reliability of transit vehicles (King County METRO, 2012). In terms transit operations, frequency, average routes speed, and service hours are all important (Commerce, 2012). Because the City has little control over these operational characteristics, land use factors are also important. The Puget Sound Regional Council (PSRC) has identified four land use conditions that are necessary to support a viable public transportation system, including a critical mass of patrons (dense concentration of intensive commercial and residential development), all day travel demand resulting from a concentration of activities such as stores restaurants, services and entertainment, convenient pedestrian access to transit stops, and regional connections (PSRC, 2015).

The Burlington Boulevard corridor addresses all of these conditions. It is served by a reasonably frequent transit route, with connections to regional service in both Mount Vernon and Burlington. It contains a regionally significant concentration of employment, stores, restaurants, and services, and much of the City's future multifamily housing is projected to be located along this strip. Finally, the corridor is approximately one-half mile wide, meaning all of the development on either side of the Boulevard is within walking distance of transit service. Surveys of residents in areas with similar characteristics similar to Burlington Boulevard indicate they drive less (Boarnet, Raphel, Bostic & Williams, 2017) and use transit frequently (Larco, 2013).

The most important planning concepts related to transit service are summarized below:

- Transit service plays a crucial economic role by allowing those who are unable, or who cannot afford, to drive to get to work or go shopping.
- Since much of Burlington's planned growth will occur within walking distance of Burlington Boulevard, a major bus route, there is significant potential for ridership growth.

- Transit ridership can be supported by increasing residential and employment densities near transit routes and by providing convenient pedestrian connections between residential areas, businesses, and bus routes.
- Frequency, hours of operation and average route speeds are all important operational characteristics that affect transit ridership. Focusing resources on a small number of high quality routes is the best way to improve ridership.

8.3.6 Public Health and Safety

The characteristics of a city's transportation system can have profound impacts on the health and safety of its residents and visitors. Motor vehicles accidents and pedestrian collisions are a leading cause of death for Americans (Ewing, Schieber & Zegeer, 2003). Conventional transportation planning has been linked to a host of physical and mental ailments associated with sedentary lifestyles (Lawrence, Sallis, Conway, Chapman, Saelens & Bachman, 2006). Finally, motorized transportation is a significant source of air pollution which can affect people's health (California Air Resources Board, 2016). Fortunately, by making smart planning decisions and changing the way the City's transportation system is used and developed many of these negative impacts can be minimized.

Motor vehicle deaths are the number one cause of death for Americans under 34 years of age and a significant risk for all age groups. The most vulnerable road users are pedestrians. Despite that fact that pedestrian trips account for only 5 percent of all trips, pedestrian deaths represent 12 percent of all traffic fatalities (Ewing, Schieber & Zegeer, 2003). This represents a pressing public safety issue, particularly for those who are unable to drive, including the young, the poor, the elderly, and the disabled. A large percentage of traffic deaths can be attributed to street designs that encourage excessive speeds and inadequately protect vulnerable road users, such as pedestrians and cyclists.

Paradoxically, reducing traffic fatalities may not necessarily involve a corresponding reduction in traffic accidents. Cities with the lowest fatality rates are not those with the lowest accident rates, but rather those with the fewest *severe* accidents (Marshal & Garrick, 2009). The key determinant in the severity of accidents appears to be speed. While a pedestrian struck by a vehicle traveling at 40 miles per hour has an 85 percent chance of being killed, a pedestrian struck by a vehicle traveling at 20 miles per hour has only a five percent chance of being killed (Ewing, Schieber & Zegeer, 2003). Accordingly, reducing deaths necessarily entails reducing vehicle speeds and providing safe infrastructure for pedestrians and cyclists.

Development patterns and street design can have a significant impact on vehicle speeds and accident rates (Ewing, Schieber & Zegeer, 2003). Areas with well-connected streets and frequent intersections are not only more efficient, they are also safer. As the frequency of intersections increase the rate of fatal accidents declines (Marshal & Garrick, 2009). By creating a more traditional grid system with frequent intersections, adding bike lanes and improved

sidewalks, and constructing traffic calming improvements the City can significantly enhance the safety of its transportation system.

More than 30 percent of Americans are obese and fewer than half have a healthy body weight. One of the leading contributors to obesity and related illnesses, such as diabetes, heart disease, high blood pressure, and osteoporosis is a lack of daily exercise (Commerce, 2007; 2005; Frank, Sallis, Conway, Chapman, Saelens & Bachman, 2006). Health experts recommend that adults engage in at least 30 minutes of moderate physical activity (such as walking) each day, yet only 5 percent of adults meet this recommendation (Berrigan, Pickle, & Dill, 2010). The connection between physical activity and transportation is not difficult to grasp. A larger share of the population could easily incorporate the recommend physical activity into their daily lives if they simply spent 15 minutes each day walking to and from a store, restaurant, or bus stop each day. Unfortunately, the design of many modern cities makes such casual physical activity difficult.

Fortunately, there are a number of simple land use and urban design strategies that can improve public health by allowing people to incorporate physical activity into their daily lives (Commerce, 2007). Specifically, people who live in neighborhoods characterized by higher residential densities, well-connected streets, and nearby commercial activities drive less, walk or bicycle more, and have lower rates of obesity than those who live in areas with more suburban patterns of development (Frank, Sallis, Conway, Chapman, Saelens & Bachman, 2006; Larco, 2013). Aside from reducing obesity, populations that live in walkable neighborhoods suffer from lower rates of hypertension, diabetes, stroke, heart disease, and cancer. Importantly, these health benefits are not due to self-selection and have been shown to be independent of other health factors such as age, sex, diet, or smoking (Institute of Cardiovascular and Medical Sciences, University of Glasgow, 2017).

Transportation also impacts public health by contributing to air pollution. Motorized transportation is responsible for more than 50 percent of air pollution in urban areas (CDC) and represents the single largest source of greenhouse gas emissions in Washington State (Olds, 2014). Pollution from transportation sources includes fine particulate matter, ground level ozone, carbon monoxide, nitrogen dioxide, and methane. These forms of pollution are responsible a variety of repertory ailments and other illnesses including cancer (World Health Organization and Union of Concerned Scientists, 2014). Because cities lack direct control over vehicle emissions, the only viable method of minimizing air quality impacts is through strategies that reduce the number of miles traveled by car and by promoting active transportation and transit use (CDC).

Important planning concepts related to public health and safety:

- Many common health problems can be attributed to a lack of physical activity. Transportation planning that allows people to incorporate more walking or bicycling into their daily routines can significantly improve public health.
- Motor vehicle accidents are the leading cause of death for Americans under 34 and a significant risk for all age groups. Pedestrians account for disproportionate percentage

of traffic deaths, and many of these deaths can be attributed to street designs that encourage excessive speed or fail to protect vulnerable road users

- Development patterns have a significant impact on vehicle speeds and accident rates. Areas with a network of streets with frequent intersections have lower accident rates and less serious collisions.

8.3.7 Parking

Although parking is often considered a separate issue it is an important component of the transportation system. Parking affects the way people get around and can influence how cities look and function (The Economist, 2017). Parking can also affect the cost of housing and the feasibility of development. Parking policies and regulations must be carefully crafted to avoid unintended consequences and ensure consistency with broader land use, housing, and transportation goals.

Typically parking is provided either privately, in parking lots associated with individual developments, or publicly, in the form of shared lots and on-street parking. While private developments would undoubtedly provide some parking in an otherwise unregulated market, most private parking is provided in response to regulatory requirements. Alternatively, public parking is generally provided by local governments as a way to manage excess right-of-way or to accomplish specific economic development goals, such as improving access to a downtown business district.

How parking is provided also affects how it is used. With few exceptions private parking is restricted to a single use, or user. As a result private parking is frequently underutilized during much of the day. For example, office parking lots are generally full during daytime hours but empty at night. Alternatively, restaurants and apartment buildings have little demand for parking during the day, but have the greatest need for parking on nights and weekends. As a result private parking is frequently oversupplied due to inefficiencies in the way it is managed. These inefficiencies can be traced back to local regulations which require each development, or business, to provide parking in a stand-alone fashion.

Parking requirements can impact the intensity, cost, and feasibility of development. The availability of parking also affects the number of pedestrian, bicycle, and transit trips (Commerce, 2007). For example, studies have shown that the number of miles people must travel by car increases as the amount of available parking increases (Pivo, Hess & Thatte, 1995; Salon, 2014). In addition to quantity, the way parking areas are designed also impacts these relationships. For example, large single use parking lots located in front of buildings increase the distance between buildings and the street, effectively increasing trip lengths and discouraging walking, even between neighboring businesses, thereby creating a need for still more parking. Alternatively, parking lots that are small, dispersed, and located behind buildings are more efficient and increase foot traffic by encouraging people to visit multiple destinations from a single parking space (Mukhija & Shoup 2006).

Except in older cities and traditional downtowns most parking is provided privately in response to government regulations that require new development to provide free on-site parking. However, as with most things, this “free” parking is not really free, but rather paid for by property owners or developers who pass the cost on to their customers and renters (Millard-Ball, 2015). Excessive parking requirements can also affect the financial feasibility of development projects, reducing the supply of affordable housing (Gabbe, 2017).

Parking requirements might work well if they were closely related to demand. In practice however, parking requirements generally exceed the actual demand for parking (The Economist, 2017). While some might imagine parking requirements are established using a rigorous technical process; in actuality, the methods used to set minimum parking requirements have been shown to unscientific and highly inaccurate (Shoup, 1999; Weinberger & Karlin-Resnick, 2014). Most commonly parking standards are simply copied from other jurisdictions; thereby overlooking local conditions, repeating errors, and making it impossible to analyze or verify the methods used to establish the original requirements.

In those instances where parking requirements aren’t copied from other jurisdictions, they are typically established using a manual published by the ITE. However, far from being a reliable source of accurate information, it has been demonstrated that the estimates in the ITE manual are based on poor quality data, overly broad assumptions, and statistically invalid methods. Notably, most of the parking estimates in the ITE manual are based on surveys with extremely small sample sizes. For example, over 50 percent of the entries in the ITE manual are based on sample sizes of 4 or less, and remarkably, 22 percent are based on a single sample (Shoup, 1999). Obviously, such small sample sizes are inadequate for developing a national database and are prone to serious errors. In fact, studies have shown that parking requirements often exceed demand by a margin of 45 -65 percent (Weinberger & Karlin-Resnick, 2014).

So what’s the problem with excessive parking requirements? In many situations parking is unquestionably a necessity, but it is also expensive to construct and consumes valuable land. A single parking space, together with its share of the required access and circulation space typically requires 300 – 400 square feet, about the same amount of space required for a cubicle in an office building or nearly as much as a small apartment. Simply put, parking spaces requires almost as much space as the uses they serve (Litman, 2017).

Ideally, private parking requirements should be set at a level that more accurately reflects the demand for parking, taking into consideration factors such as vehicle ownership rates, proximity to transit, and the diversity of surrounding land uses. Parking requirements should also be crafted to achieve the City’s broader land use, transportation, and economic development goals (Willson & Roberts, 2011). Public parking, such as on-street spaces, should be managed to maximize the value of a scarce resource and valuable public resource. Turn-over should be encouraged to benefit short term customer parking and discourage long term parking.

Important planning concepts related to parking:

- Parking is an important component of a city's transportation system and influences how cities look and function and also affects how people get around.
- Parking requirements are frequently based on flawed, incomplete, or inaccurate information.
- Excessive or overly rigid parking requirements can increase the cost of housing and make development infeasible
- The way parking lots are designed and located can influence how people get around. Parking lots that are small, dispersed, shared with multiple businesses, and located alongside or behind buildings make it easier to travel between businesses in the same area on foot.
- Free parking is not actually free, instead the cost is paid by consumers and renters.

8.3.8 Economic Development and Financial Implications

Transportation decisions have important economic and financial implications for households, businesses, and municipalities. Through effective long range planning, a city's transportation system can improve business conditions, make it easier and less expensive for residents and visitors to get around, and maximize the value of tax dollar investments. Unfortunately the reverse is also true. Short sighted decision making can create an inflexible transportation system that's unable to adapt to changing business needs and development trends, saddle local governments with untenable financial obligations, and make transportation expensive and inconvenient.

Though frequently overlooked, transportation costs are a significant household expense. In fact, after housing, transportation constitutes the second largest monthly expense for American households. Household transportation expenses are directly impacted by urban design factors and land use factors. All things being equal, households that live in areas with a large concentration of jobs, shopping opportunities, and services will have lower transportation costs than those who don't (Stampe, 2018). In order to minimize household transportation costs, it's important to ensure transportation planning decisions incorporate land use and housing considerations.

Transportation costs vary by location. Though it may seem obvious, to a large extent transportation costs are driven by the number of cars a household must own and how many miles each member of the household must drive each day. The American Automobile Association (AAA) reports that it costs between \$625 - \$851 per month to own and operate a car (Godavarthy, Mattson & Ndembe, 2014), and studies have shown the average American household spends 18 percent of its income on transportation (Couture, Duanton, & Turner 2016). For purposes of comparison, this is a significant portion of what a one bedroom apartment costs in Burlington. While some people choose to travel long distances each day,

others do not. Instead many are forced into long commutes by a lack of housing options or local job opportunities.

Unemployment levels, income, and financial mobility are tied to job access. Research has shown that people who live closer to areas of concentrated employment find employment more easily and are less likely to be unemployed (Kneebone, & Holmes, 2015). Studies have also tied upward financial mobility to job access. In places where jobs are highly concentrated, people find it easier to locate suitable employment, travel shorter distances to work, and are more likely to be able to get to work without a car. The reverse is also true, low employment densities result in longer commutes and fewer employment options. In such areas, few, if any jobs, will be accessible to person without a car. This relationship is particularly significant for low income households because they own fewer cars and are less able to afford the cost of driving. By permitting a dense concentration of housing and by creating a transportation system that addresses the needs of those who are unable to drive, cities can reduce unemployment and foster upward financial mobility.

Constructing and maintaining transportation infrastructure and funding public transportation are significant expenses for local governments. Expenses can be minimized and transportation services can be provided more efficiently by ensuring land use and transportation plans are coordinated, prioritizing maintenance, and by focusing on simple low cost solutions.

Transportation costs include both direct costs paid by drivers and transit riders, such as gas, insurance, registration taxes, tolls, and fares, and indirect costs which are shared equally by all tax payers regardless of how they get around. Indirect costs include things that are widely recognized, like general fund expenditures financed by sales and property taxes, and less well acknowledged things, such as the financial and economic impacts of accidents, congestion, and pollution. Because so many transportation costs are indirect, and because transportation funding comes from many sources, the total cost of providing transportation services is difficult to determine. Also, since roads and parking are often provided without a direct cost, they tend to appear cheaper than they really are (Olson, Berkaw, Charland, Patton & Bilmes, 2019). Making smart transportation planning decisions requires a complete analysis of costs and benefits.

One way of minimizing transportation costs is by ensuring land use and transportation plans are coordinated. Ideally a city's land use plan should be crafted in a way that makes getting around convenient and cost effective. Generally, transportation infrastructure can be provided more efficiently in areas with higher population and employment densities. While the relative effectiveness of land use strategies vary, scenario planning exercises have shown significant cost savings and efficiencies can be realized by changing the way land is used and developed (Sweeney, 2013; Nelson, 2017), with some studies showing that more compact development patterns are 12 – 15 percent more cost effective than alternative development scenarios (TRB 1998).

Another frequently overlooked aspect of transportation planning is the cost of maintenance. While it's easy to focus on the more obvious costs and benefits associated with new projects, each new project creates an ongoing need for repair and maintenance. Deferring or ignoring maintenance compounds these expenses because when roads and other transportation infrastructure deteriorate beyond a certain point they must be replaced or reconstructed (Transportation for America, 2019). Optimum paving and maintenance schedules can be determined using a "life cycle cost analysis". Generally the objective of these studies is to determine the minimum level of periodic repair and maintenance required to avoid costly reconstruction work (Babashamsi, Yusoff, Ceylan, Nor & Jenatabadi, 2016). When considering new transportation projects, ongoing maintenance costs should also be considered and periodic maintenance schedules should be established for existing infrastructure using a lowest life cycle cost analysis.

With the rise of internet shopping and changing demographic and economic conditions, shopping has become more of an activity and less of a necessity. Because of this shift, consumers have increasingly come to value short trips and high quality amenities (Buliung & Hernandez, 2009). Increasingly, many experts believe that small scale retailers will outperform large scale big-box stores because of they provide a more personalized experience and flexible product assortment than large format retailers and traditional shopping centers (Gray, 2017). To remain economically relevant cities must change their transportation plans to adapt to these trends.

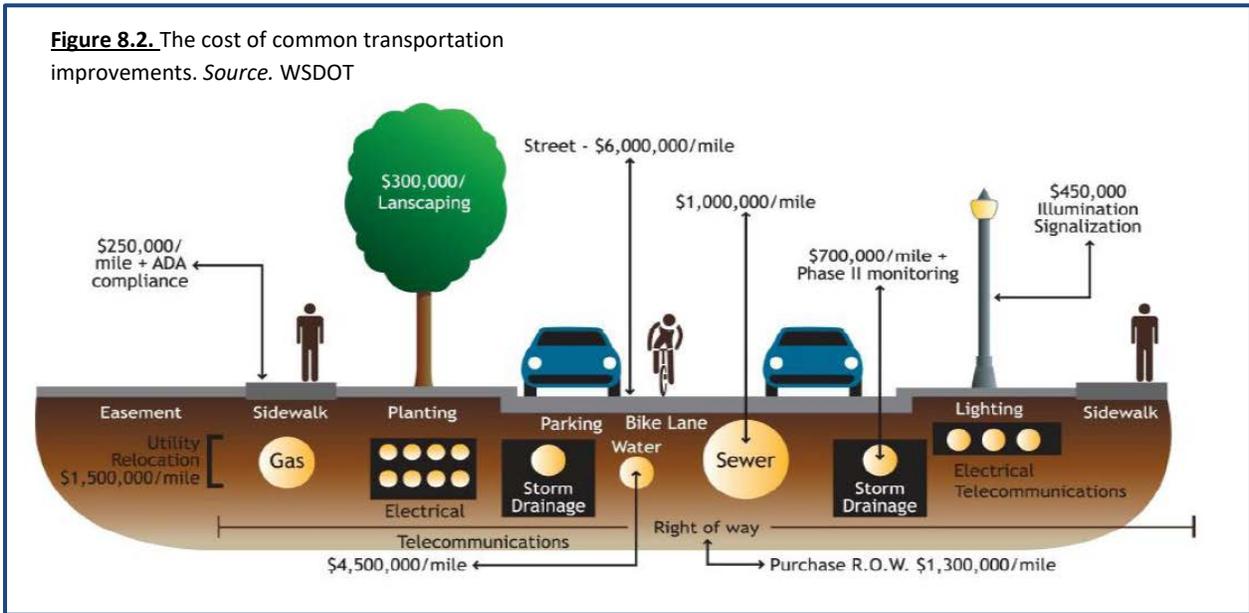
Small scale retail businesses are dependent on casual shoppers and foot traffic. They also require street networks, buildings, and parcel configurations that can be easily adapted to accommodate different uses. Importantly, these types of businesses are most successful when they are surrounded by a dense concentration of complementary businesses and connected together by a network of streets and sidewalks that allow shoppers a number of shops, restaurants, and other businesses in the same trip (Cortright, 2018). Economic development experts suggest that aging commercial strips, such as Burlington Boulevard, can be improved by providing pedestrian amenities, such as wider sidewalks that can be used for outdoor dining, and breaking up large parcels with new streets and smaller blocks (EPA).

Important financial and economic considerations:

- Building new roads to serve low density uses in peripheral areas is not cost effective.
- Ongoing repair and maintenance costs are frequently overlooked when new transportation projects are being considered.
- Transportation investments generate larger returns when they are focused on improving access rather than increasing capacity. Capacity investments have been shown to have little economic value and seldom result in long term transportation improvements.
- Online shopping has fundamentally changed the nature of retail development. Retail developments are now smaller and more focused on providing an experience for

shoppers. Small blocks, frequent intersections, flexible parking arrangements, and high quality pedestrian amenities are needed to adapt to changing market conditions.

Figure 8.2. The cost of common transportation improvements. *Source.* WSDOT



8.4 Current Conditions and Future Needs

Burlington’s compact geography, small population, and balance of jobs and housing means it’s generally an easy place to get around. Residents have short commutes and shops and services close at hand. Despite these advantages, the City faces many of the same transportation issues as other communities. The future poses additional challenges. Much of the infrastructure built over the past two decades is aging and needs to be repaired or upgraded, but little funding exists for this work. At the same time evolving economic and demographic conditions will result in new challenges and different needs. Over the next 20 years population and employment densities are expected to increase significantly, the bulk to the City’s growth will shift from peripheral areas to existing developed areas. These changes will require a more balanced and interconnected transportation system.

The average commute time for a Burlington resident is approximately 19 minutes, which is less than average for Washington as a whole (27 minutes) and other nearby cities. While average commute times are useful for illustrating general traffic conditions and commuting patterns, only 28 percent of household travel is associated with commuting (AASHTO, 2013). Accordingly, by focusing solely on commute time and travel modes important trends can be masked with respect to the 72 percent of travel that is not work related.

	Burlington	Mount Vernon	Sedro Wooley	Anacortes	Ferndale	Bellingham	Washington
2010	22.9	22.8	25.7	21.8	21.8	17.4	25.4
2012	22.5	22.8	23.4	21.8	21.3	17.6	25.5
2014	20.7	23.2	21.8	22.2	19.8	17.6	25.9
2016	19.2	23.9	23.9	22	19.9	17.9	26.7
Change	-3.7%	+1.1%	-1.8%	+0.2%	-1.9%	+0.5%	+1.3%

**Source: American Community Survey/US Census Bureau – All times in minutes*

While most of Burlington’s residents and workers commute by car, a significant and growing number, 7.8 percent, use transit or commute by walking or riding a bike. This is slightly lower than the average for Washington State, which is 10.7 percent, but higher than other surrounding cities. Only Bellingham has a higher percentage of commuters who use alternative forms of transportation. Notably, Burlington is the only city in the area to record a net increase in alternative transportation since 2010.

	Burlington	Mount Vernon	Sedro Wooley	Anacortes	Ferndale	Bellingham	Washington
2010	3%	5.3%	1.4%	7.9%	3.8%	17.2%	9.9%
2012	2.7%	5.7%	1.8%	8.8%	5.4%	18%	10.1%
2014	5.7%	6%	0.6%	7.4%	3.1%	16.7%	10.3%
2016	7.8%	4%	1.3%	7.5%	2.4%	17.1%	10.7%
Change	+4.8%	-0.5%	-0.1%	-0.4%	-1.4%	-0.1%	+0.8%

**Source: American Community Survey/US Census Bureau – “Alternative Transportation” includes walking, biking, and transit*

The numbers presented above have been used because they were the only available data source unique to Burlington; however, caution should be exercised when interpreting these numbers for three reasons. First, the information was obtained from the US Census Bureau’s American Community Survey (ACS) program. ACS data is based on statistical sampling. Because of Burlington’s small population size, it represents a comparably small, and less reliable, sample group. Second, this data covers a narrow timespan of only six years, making it difficult to gauge long term trends. Finally, this data only addresses work related travel. Non-work related travel now accounts for the majority of household travel. In order to address these deficiencies, over the next 20 years the City should seek more accurate sources of information and continually monitor changes in travel behavior.

8.4.1 Land Use Assumptions

While over the next 20 years the City’s rate of growth is not expected to change dramatically, the form, and location, of development are expected to change. Between 2015 and 2036 the City’s population is expected to grow by 3,808 people and 3,516 jobs will be added to the economy. Most, if not all, of this growth will occur within the City’s existing municipal boundaries through infill and redevelopment. The land use element calls for directing the bulk of this growth to three “primary growth areas” centered along the Burlington Boulevard and Fairhaven Avenue corridors.

Future development will not only shift from peripheral areas to centrally located areas, but the form of development will also change. Importantly the percentage of the City's housing stock comprised of higher density attached housing, such as duplexes, townhomes, and apartments is projected to increase from 48 percent to 60 percent. The nature of commercial development is also expected to change. In the past job growth was associated with large format, "big box", retailers resulting in relatively low employment densities. Future job growth is expected to be comprised of a larger share of office, health care, food service, and smaller specialty retailers, all of which tend to have higher employment densities.

From a regional perspective, it is assumed that residentially growth will be largely confined to existing City's and urban growth areas. Skagit County's long range plan for the region is predicated on directing at least 80 percent of future growth to cities and urban growth areas (Skagit County, 2016) and the location and size of these urban growth areas is expected to remain relatively constant.

8.4.2 Streets and Sidewalks

The City's primary transportation system is comprised of a network of streets and sidewalks. This network includes approximately 47.8 miles of street within the City's municipal boundaries. An additional 8 miles of streets are located in the unincorporated urban growth area. This total includes approximately 4.6 mile of State highway, 35 miles of city streets, and 8.2 miles of private streets and roads. The City's streets are classified into four groups depending on their characteristics and intended purposes. These groups include:

- Major arterials
- Secondary arterials
- Collector arterials
- Local access streets (including private roads)

Currently only 36 percent of the City's street network consists of streets with fully improved right-of-way, including curbs, gutters, sidewalks on both sides, and storm-water infrastructure. Approximately one third of Burlington's streets have only limited improvements and 32 percent have no curbs, sidewalks, or formal storm-water infrastructure. There are no streets in the unincorporated UGA that are improved to urban standards; however, Lafayette Road is currently being improved from Monroe Street to the Skagit County Housing Authority's property at Farmview Lane.

In order to provide adequate pedestrian access, improve safety, and properly manage storm-water the City's substandard streets should be gradually over the next 20 years. While some projects will be completed in conjunction with private development, projects near schools, parks, and high density housing should be prioritized.

Table 8.3 Existing Road and Sidewalk Conditions		
	Municipal Boundaries	Unincorporated UGA
Fully Improved	17.38 miles (36%)	0.0 miles
Limited Improvements	14.9 miles (31%)	1.36 miles (16%)
Pavement Only	15.27 miles (32%)	6.54 miles (79%)
Unimproved (dirt or gravel)	0.20 miles (1%)	0.38 miles (5%)
Total:	47.75 miles	8.28 miles

Burlington’s historic downtown area has the highest level of connectivity in the City and is characterized by a uniform pattern of small blocks measuring 330’ X 220’. The level of street connectivity in the Commercial Core and Northern Gateway Priority Development Areas varies dramatically. Importantly Burlington Boulevard is the only continuous corridor in this area making transportation in the most intensively developed portion of the City prone to disruption. Also, the Burlington Northern right-of-way is a significant barrier to east-west travel, resulting in poor connectivity between the residential areas east of the rail line and the commercial areas along Burlington Boulevard. The outlying areas of the City and the unincorporated UGA have the lowest levels of connectivity.

A separate, yet related, connectivity issue concerns the distance people must walk along high volume, higher speed arterials before reaching a signalized, or controlled intersection where they can cross safely. Commercial strips, such as Burlington Boulevard, have the potential to generate comparatively large volumes of pedestrian traffic, particularly with the addition of mixed use or high density residential development (Larco, 2013). Unfortunately, because of the distance between safe crossing and higher vehicle speeds, streets such as Burlington Boulevard, also associated with more serious pedestrian injuries and deaths (Marshal & Garrick, 2009; Ewing, Schieber, & Zegeer, 2003).

Burlington has two principle arterials where higher vehicle speeds are permitted, Burlington Boulevard and Highway 20/Avon Avenue. However, Highway 20 is controlled by the State and does not contain the same concentration of commercial, mixed use, and higher density residential uses and Burlington Boulevard. In order to both facilitate pedestrian traffic and minimize safety risks, the distance between crossings should not exceed 1,000 feet and should ideally be closer to 600 feet (Litman, 2017).

Currently there are 12 controlled intersections along Burlington Boulevard with an average spacing of 977 feet. However, as shown below there are three street segments where the spacing exceeds 1,000 feet and five segments where the intersection spacing is less than 1,000 feet but more than 600 feet. There are three segments of Burlington Boulevard where the gap between intersections is less than 600 feet. In order to accommodate the City’s anticipated growth in pedestrian traffic and constrain the growth in vehicle travel, additional signalized intersections should be added along Burlington Boulevard, beginning with the street segments where the largest gaps exist. The City should consider establishing a minimum level of service for intersection spacing of 1,000 feet and a more ambitious goal of 600 feet.

While the City’s transportation system functions relatively well, limited areas of heavy traffic exist. Currently level of service (LOS) “C” is used for all City streets, except Burlington Boulevard, where LOS D is used. LOS “C” is not commonly used in urban areas and maintaining LOS “C” would be prohibitively expensive. Accordingly, this report is based on a citywide LOS standard of “D”. State Highways are managed by the Washington State Department of Transportation and are subject to a LOS standard of “D”. The City is required to assess traffic conditions on State Highways but is not responsible for ensuring that LOS standards are maintained.

There are four intersections that do not meet current LOS standards, three of which are located along Highway 20 and are controlled by the Washington State Department of Transportation (WSDOT). The intersection of South Spruce Street and Rio Vista Avenue is controlled by the City and currently operates a LOS “D”. This plan envisions lowering the LOS standard city-wide from “C” to “D”, which will eliminate this deficiency. Traffic forecasting conducted by Transportation Solutions Incorporated (TSI) shows that over the next 20 years traffic conditions will steadily worsen. By 2036 a total of nine intersections in the City will fall below LOS D, six of which are managed by WSDOT. The remaining three are the City’s responsibility and changes must be made to ensure an acceptable level of service.

Status	Distance	Street Segment
Meets Goal	579 feet	Rio Vista – Sharon
Meets Goal	592 feet	Pump Drive – Cascade Place
Meets Goal	587 feet	Costco Drive – George Hopper
Acceptable	903 feet	I-5 - Kirkby
Acceptable	849 feet	Kirkby – Avon
Acceptable	830 feet	Avon – Fairhaven
Acceptable	901 feet	Gilkey – Pump Drive
Acceptable	950 feet	Cascade Place – Pease Road
Poor	1,300 feet	Fairhaven – Rio Vista
Poor	1,850 feet	Sharon – Gilkey
Poor	1,215 feet	Pease Road – Costco Drive
Poor	1,166 feet	George Hopper – Market Place Drive
Average Distance:		977 feet

Location	2016 Level of Service	2036 Level of Service	Status
George Hopper Rd & Bouslog Rd	C	D	Pass
Spruce Street & Rio Vista Ave	D	D	Pass
Anacortes St & Rio Vista Ave	B	D	Pass
Whitmarsh Rd & Pease Rd	C	D	Pass
Skagit St & Fairhaven Ave	B	D	Pass
Burlington Blvd & George Hopper Rd	C	E	Fail (2036)
Burlington Blvd & Pease Rd	D	E	Fail (2036)
Spruce St & Greenleaf Ave	C	F	Fail (2036)

*Citywide level of service standard “D” - Source Transportation Solutions Inc. (TSI), 2017

Table 8.6 WSDOT Intersection Conditions			
Location	2016 Level of Service	2036 Level of Service	Status
SR-20 & Spruce St	D	E	Fail (2036)
SR-20 & Avon Ave	E	F	Fail (2016)
SR-20 & Skagit St	F	F	Fail (2016)
SR-20 & Section St	F	F	Fail (2016)
SR-20 & Cherry St	D	F	Fail (2036)
SR-20 & Regent St	C	E	Fail (2036)

**WSDOT level of service standard "D" – Source Transportation Solutions Inc. (TSI), 2017*

8.4.3 Bicycle and Pedestrian Facilities

Currently the transportation element of the City’s comprehensive plan does not address pedestrian and bicycle facilities and the City does not have a formally adopted non-motorized transportation plan. While several non-motorized transportation maps were produced for previous transportation element updates, most recently in 2010, these maps suffer from a number of shortcomings which must be addressed in order to plan effectively for non-motorized transportation; specifically:

- Information should be provided on the location, extent, or condition of sidewalks
- Maps should specify what, specifically is proposed by differentiating between different bike lanes, multi-use paths, etc.
- Non-motorized transportation improvements should create a complete circulation system, provide safe routes to schools, and create logical connections between parks, high density housing, and commercial services

While only partially complete the City’s non-motorized transportation system includes a number of important routes. A paved multi-use path parallels the Old Highway 99/Burlington Boulevard corridor and extends from the Burlington Edison High School to the municipal boundary at Gear Road. This path connects the Burlington Edison High School to the Chuckanut Transit Station and may ultimately connect to regional path along State Route 20. The Tami Wilson Trail provides the only non-motorized crossing of I-5. It begins near the Cascade mall and follows Gages Slough a short distance before terminating at Steven Road. Another important non-motorized route is the SR-20 path which begins in Lions Park near Anacortes Street and extends past the municipal boundary, ending at District Line Road.

A significant share of the City’s future growth will be accommodated by increasing residential densities in, or near, commercial areas, particularly along Burlington Boulevard. While this pattern of growth has been shown to reduce the demand for automobile travel (Pivo, Hess & Thatte, 1995), studies have also shown this is only possible when adequate infrastructure is present (Stampe, 2018). In order to achieve the objectives outlined in the land use element of the comprehensive plan, it will be necessary to make a greater investment in the City’s non-motorized infrastructure, including sidewalks, multi-use paths, and bike lanes.

The non-motorized transportation provisions in the transportation element should focus on improving conditions in areas that are likely to experience the highest demand, or have the greatest impact on the number of trips made on foot or by bike. It has been consistently demonstrated that areas, such as the Burlington Boulevard corridor, with a mix of intensive commercial and residential development, generate the highest volumes of non-motorized trips (ODOT; TRAC, 1995; Lawrence & Pivo; Ewing, Bartholomew, Winkelman, Walters & Chen, 2007; DOE, 2008; Salon, 2014; Litman 2017). Therefore, the provision of pedestrian and bicycle amenities should be prioritized along, or near these corridors. Schools and parks have also been shown to create a high demand for non-motorized transportation (Schlossberg, Greene, Phillips, Johnson & Parker, 2006; Commerce, 2007; Larco, 2013) and attention should be given to improving connections between these facilities.

Table 8.7 Non-Motorized Facilities			
Name/Location	Type	Length	Comments
Highway 99/ North Burlington Boulevard Path	Multi-Use Path	1.07 miles	<ul style="list-style-type: none"> • Paved surface • Connects to transit station and high school
Burlington Edison High School Trail	Multi-Use Path	0.7 miles	<ul style="list-style-type: none"> • Connects to Hwy 99/Burlington Blvd Path • Owned by School District
Tammi Wilson/Gages Slough	Multi-Use Path	0.4 miles	<ul style="list-style-type: none"> • Paved surface • Crosses I-5
SR-20 Trail	Multi-Use Path	0.83/1.7 miles (city/total)	<ul style="list-style-type: none"> • Paved surface • Extends from Anacortes Street past City limits to District Line Road • Connects to Dike Trail
Dike Trail	Multi-Use Path	2.27 miles	<ul style="list-style-type: none"> • Gravel Surface • Connects to Skagit River park • Owned by Dike District
Rivers Edge Trail	Multi-Use Path	0.33 miles	<ul style="list-style-type: none"> • Gravel/grass surface • Mixed ownership • Connects school, Rotary Park, Skagit River Boat Launch, and Dike Trail
Sharon Street Path	Multi-Use Path	0.05 miles/254 feet	<ul style="list-style-type: none"> • Gravel surface • Unopened right-of-way • Connects to Anacortes Street • Provide route to School
Section Street Bike Lane	Bike Lane	0.25 miles	<ul style="list-style-type: none"> • Connects to Rio Vista Bike Lane
Rio Vista Bike Lane	Bike Lane	0.25 miles	<ul style="list-style-type: none"> • Connects to Section Street Bike Lane
Garrett Road Bike Lane	Bike Lane	0.20 miles	
Walnut Pond Trail	Park Trail	0.2 miles	

8.4.4 Transit Service

The Skagit Area Transit (SKAT) operates 19 bus routes, including six local routes, three commuter routes, and six primarily rural routes. Four routes originate in, or pass through, the City of Burlington, including route 80X which provides express commuter service from Bellingham to Mount Vernon, route 208 which connects Burlington and Mount Vernon and provides service along the Burlington Boulevard/Riverside Drive corridor, and routes serving the Anacortes and Sedro Woolley. Chuckanut Station, which includes a park and ride facility is a major hub for transit service in the City and provides convenient access to downtown Burlington and the Burlington Edison High School. SKAT route 208, which serves the Burlington Boulevard corridor, is the most productive bus route in county and accounts for nearly 24 percent of SKAT’s total ridership (SKAT, 2018).

Daily transit use is quite low in Skagit County but 8.3 percent of County residents report using transit occasionally (Whatcom Council of Governments & SCOG, 2009). Generally, households that have low incomes or limited access to cars use transit most frequently (PSRC, 2015); however, the case of Skagit County, more than half of transit users have access to a car, suggesting that many SKAT users are riders by choice, a positive indication of good quality transit service. Still, when surveyed SKAT users identified a number of improvements which might encourage greater levels of ridership including, more frequent service, better bus stops and shelters, and extending service hours later into the evening (SKAT, 2018).

Route	Hours	Frequency	Serves
80X	6:45 AM – 7:20 PM (weekday) 8:00 AM – 6:00 PM (weekends)	Hourly (weekdays) two hours (weekends)	Bellingham - Mount Vernon
208	6:20 AM – 8:15 PM (weekday) 8:15 AM – 5:45 PM (weekends)	30 minutes (weekdays/weekends)	Burlington – Mount Vernon
513	7:10 AM – 7:10 PM	Three hours (weekdays only)	Burlington - Anacortes
300	7:15 AM – 8:15 PM (weekdays) 8:15 AM – 5:15 PM (weekends)	Hourly (weekdays/weekends)	Burlington – Sedro Woolley

8.4.5 Other Transportation Services and Facilities

Two rail lines pass through the City of Burlington, including the BNSF mainline and a spur between Sedro Woolley and Anacortes. Currently BNSF provides freight service to a number of Burlington businesses and the Washington State Department of Transportation (WSDOT) operates the Amtrak Cascades service between Eugene Oregon and Vancouver BC. While convenient access to rail service is an important asset. The presence of the rail lines, and numerous at grade crossing pose significant safety risks and create traffic problems. The BNSF

bridge across the Skagit River is also aging and in need for replacement for safety, flood control, and capacity reasons.

Other regional transportation options include ferry service and privately operated bus lines. Bellair Airporter bus line provides service between Bellingham and the SeaTac Airport with a stop in Burlington. WSDOT provides ferry Service between Anacortes, the San Juan Islands and Sydney BC, and Skagit County operates a ferry between Anacortes and Guemes Island.

8.5 Recommendations

This section includes recommended changes intended to meet the City's current and future transportation needs. These recommendations are also intended to ensure a high level of coordination between the Transportation Element and the other sections of the comprehensive plan. The recommended changes include both capital projects, and revisions to the City's comprehensive plan policies and development regulations. In some cases, the recommended changes should be implemented immediately, while other projects are less essential and may be deferred until they are needed and resources become available.

8.5.1 Comprehensive Plan Changes

The following changes should be incorporated into the Comprehensive Plan:

- Require that all arterial intersections perform at Level of Service (LOS) "D" or better
- Adopt "build-out" standards for each arterial street in the City. These standards would prevent perverse outcomes from the application of LOS standards and avoid the possibility of the City investing money in projects beyond the point of diminishing returns. Build-out standard would essentially define a completed state for each arterial street section. Once the completed state was reached, LOS requirement would be addressed through general network improvements, demand management, or investments in alternative transportation.
- Establish maximum intersection and pedestrian crossing standards for major arterials such as Burlington Boulevard.
- Establish minimum street connectivity goals, and develop a GIS model for evaluating circuitry and monitoring changes over time.
- Adopt policies to encourage Skagit Transit to prioritize investment in their most productive routes and the routes with the greatest potential for ridership growth. Specifically the City should insist that SKAT maintain peak hour headways of 30 minutes or better and off peak headways of one hour or better along Burlington Boulevard. The City should also insist that regional intercity routes maintain all day service with peak hour headways of one hour or better. The City should strongly discourage the use of scarce resources to serve areas outside of Urban Growth Areas.

- Include policies specifying that the Planning Commission review and approve annual revisions to the Transportation Improvement Plan (TIP), and that all capital spending decision be consistent with the TIP and comprehensive plan.

8.5.2 Development Regulations

The following changes should be made to the Burlington's development regulations:

- Adopt detailed street standards and requirements that specify when they apply
- Develop and adopt maximum block size and street connectivity requirements for subdivisions and site plan reviews
- Revised development regulations to clearly specify that sidewalks are required along all road segments
- Recognize that development will impact the transportation system differently depending on where it occurs by adopting a tiered impact fee schedule. A tiered impact fee schedule would create a financial incentive for development in centrally located areas and a disincentive for development in expensive outlying areas
- Conduct a review of completed developments to determine parking occupancy rates. Parking requirements should then be adjusted to reflect actual occupancy rates, as well as other factors that influence parking demand locally.
- Require that new developments provide connections to all surrounding streets and undeveloped parcels
- Require that new public projects that generate large volumes of pedestrian traffic, such as schools, parks, and transit centers, contribute to the city's non-motorized transportation plan.

8.5.3 Streets and Sidewalks

The City's most pressing transportation needs are unrelated to roadway capacity. Instead the City's street system suffers from low levels of circuitry, inadequate intersection controls, and substandard street segments. Investments will be required to enhance the connectivity of the street system, fix failing intersections, and upgrade substandard streets. Figure 8.3 shows the location of major street and intersection improvements that should be constructed over the next 20 years.

Table 8.9 Local Arterial Intersection Improvements			
Location of Deficiency	2036 LOS Without Changes	Proposed Changes	2036 With Changes
Burlington Blvd & George Hopper Rd	E	Interchange Improvements	D
		Signal Timing Improvements	
Burlington Blvd & Pease Rd	E	Gilkey Railroad Overpass	C
		McCorquedale Road Extension to Costco Drive	
		Signal Timing Improvements	
Spruce St & Greenleaf Ave	E	Install Signal or Roundabout	A

**Citywide level of service standard "D" - Source Transportation Solutions Inc. (TSI), 2017*

The following street and sidewalk improvements should be made:

- Reduce block lengths along Burlington Boulevard to 1,000 feet or less by constructing at least four new signalized intersections.
- Prevent the City’s arterial intersections from falling below LOS E by making the improvements identified in the table above.
- Create a new east-west route by constructing a new grade separated railroad crossing
- Establish a new north-south route parallel to Burlington Boulevard.
- Improve connectivity and balance traffic flows by extending East McCorquedale Road to Costco Drive.
- Incrementally upgrade substandard streets.

8.5.4 Bicycle and Pedestrian Facilities

As illustrated by Figure 8.4 existing bike lane and trails segments should be connected together. Particular attention should be given to connecting parks and schools. Also, connections should be provided between residential areas and the commercial core. Ultimately the City should strive to create a fully connected network of bike lanes and multi-use paths located at quarter-mile intervals. Bike lanes should be constructed incrementally in conjunction with repaving/restriping projects. Multi-use paths should create overlapping park and transportation benefits. In order to accommodate the changing nature of retail business, the City should create high quality pedestrian amenities, such as wider sidewalks, planting strips, lighting, and streetscape improvements along Burlington Boulevard and Fairhaven Avenue. These improvements should be constructed incrementally in conjunction with development.

- Reduce block lengths and increasing the number of intersections
- Eliminate dead end streets and cul-de-sacs
- Provide clear and direct pedestrian paths within, and between, developments
- Increase residential densities and the mix of allowable land uses along commercial strips such as Burlington Boulevard
- Connect parks together and provide connections between parks and schools, residential areas and public services
- Allow increased residential densities within one mile of schools and connect schools to surrounding residential areas with marked crossings, improved sidewalks, dedicated paths, and bike lanes
- Create a network of bike lanes at one-half mile intervals so most of the City's residents and commercial areas area within one-quarter mile of a bike lane
- Enhance pedestrian comfort and safety with landscaping, pedestrian scaled lighting and signage, and by providing a buffer between traffic and pedestrians with street trees or on-street parking

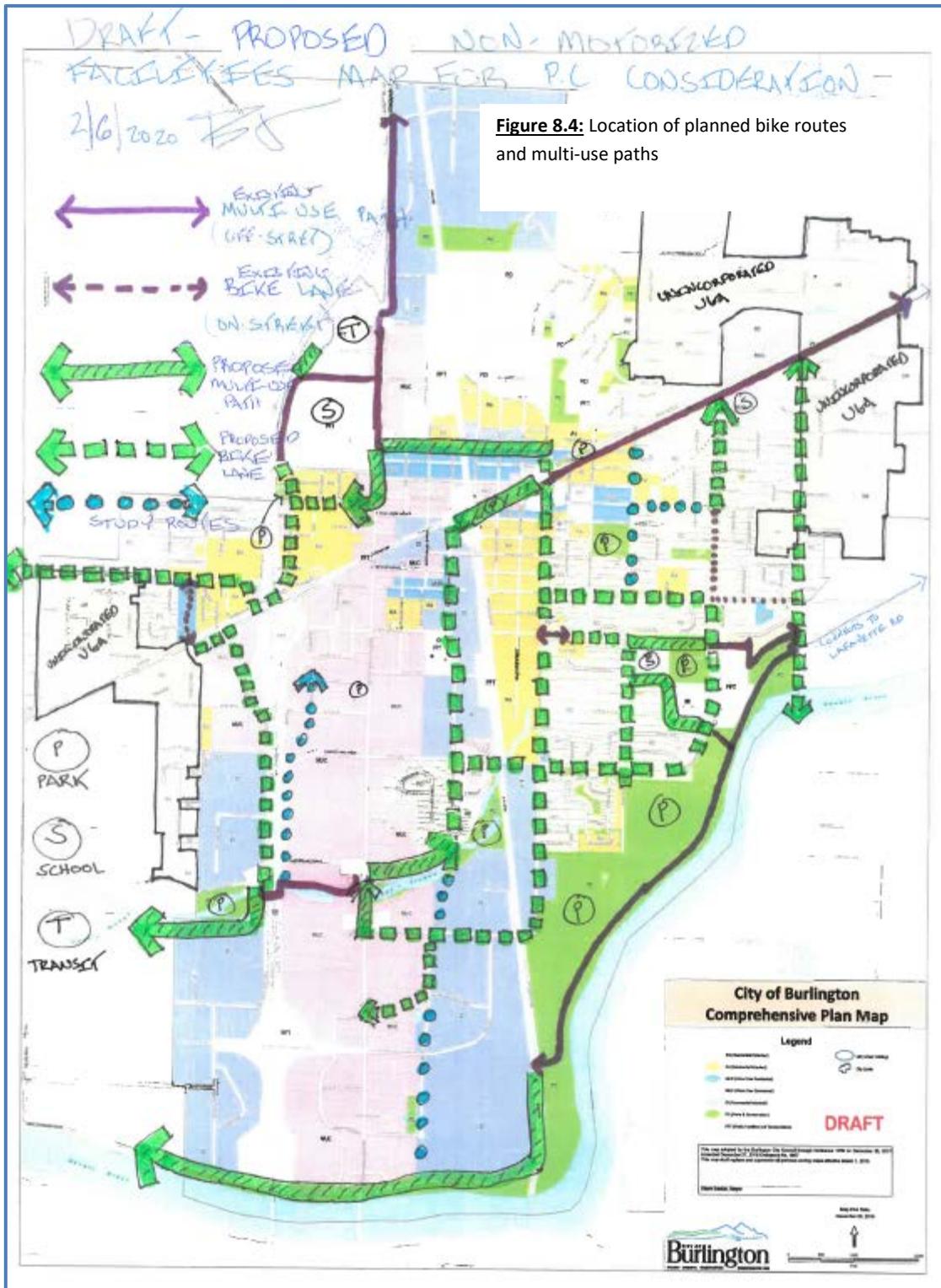


Figure 8.4: Location of planned bike routes and multi-use paths

Figure 8.4: Non-Motorized Improvement Plan

8.5.5 Transit Service

Transit service in the City of Burlington is provided by Skagit Area Transit (SKAT). While the City has little direct control over SKAT's operations, the City can take actions to improve the efficiency and effectiveness of transit service, by concentrating development near bus routes, providing continuous sidewalks between residential areas and arterial bus routes, and by ensuring that uses that generate significant demand for transit service are located near transit routes and provided with good quality pedestrian access improvements.

- Direct the majority of the City's future commercial and residential growth to the Burlington Boulevard corridor
- Provide high quality pedestrian amenities along the Boulevard
- Encourage SKAT to prioritize investments in high volume corridors and regional express service
- Establish levels of service for transit based on frequency, headways, average route speed, service hours and the number of residents and employees within walking distance of a transit route

8.5.6 Other Transportation Services and Facilities

Replacing the rail bridge over the Skagit River has been identified as a priority. This project would have multiple benefits, including increased rail capacity, improved safety, and reducing flood risks by increasing the amount of water that can pass between the bridge abutments. The City should actively encourage the State of Washington and BNSF to prioritize this project and, if possible, incorporate a pedestrian bicycle crossing into the final design.

8.6 Conclusion

The changes recommend in this report are intended to accommodate the City's changing transportation needs over the next 20 years. The overall objective of these changes is to better coordinate land use and transportation, build a more connected transportation system, make it easier for residents and visitor to get around without a car, and to ensure the City's transportation system is financially sustainable. The changes should be incorporated into the City's comprehensive plan and steps should be taken to ensure all subsequent Capital Improvement Plans and Transportation Improvement Plans are consistent with these recommendations.

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10 Definitions

The definitions in this section shall be used for the purpose of interpreting the Comprehensive Plan.

Best Available Science (BAS): Means scientific or technical information that is consistent with the criteria in WAC 365-195-905 for determining which information is the “best available science”.

Comprehensive Plan: Means the City of Burlington’s Comprehensive Plan adopted pursuant to Growth Management Act. The Burlington Comprehensive Plan includes the plan document and associated maps, tables, and supporting information. The Burlington Comprehensive Plan also includes related plans adopted by reference, such as the Sewer Comprehensive Plan, and the Surface-Water Management Plan.

Comprehensive Plan Map: Means one or more maps adopted by the City to implement the Comprehensive Plan. Comprehensive plan maps are considered part of the comprehensive plan and have the same regulatory weight, and are subject to the same amendment process, as other components of the Comprehensive Plan. Examples of comprehensive plan maps adopted by Burlington include maps showing future land use designations, priority development areas, special development areas, special management areas, and the location of future transportation improvements or public facilities.

Cottage Housing: A form of higher density detached housing where two or more small detached homes are located on a single lot. Cottage housing developments typically have common open space areas and shared amenities.

Countywide Planning Policies (CWPP): Means the policies adopted by Skagit County pursuant to RCW 36.70A.210 and the “Framework Agreement” between Skagit County and the cities and towns within Skagit County.

Craft Industries: Means uses where arts or crafts are manufactured in a small scale facility using skilled labor. Craft industries include art studios, woodworking and cabinet shops, bakeries, kitchens, breweries, distilleries, wine making, and other similar activities. Craft industries are owners operated enterprises where the owner staffs, directly participates in, and manages the day-to-day operations of the business. Craft industries may employ a small number of employees in addition to the owner and members of the owner’s immediate family. Craft industries have a floor area of 5,000 square feet or less and primarily operate during normal business hours.

Critical Areas: Means areas and ecosystems as defined in RCW 36.70A.030 or otherwise defined as such by the Burlington Municipal Code.

Density: Means a measure of how intensively land is used or developed. Density includes both residential density and employment density. Residential density describes the number of dwelling units located an area of land. Employment density describes the number of employees who work on a given unit of land.

Development Capacity Analysis (DCA): Means an analytical model used by the City of Burlington to determine development capacity.

Development Regulations: Means the controls placed on development or land use by the City. Examples of development regulations include the zoning code, land division regulations, critical areas regulations, and the engineering standards for streets, storm-water management, and sewer infrastructure included in the Burlington Municipal Code.

Dwelling: means a building, or a portion of a building, providing complete housekeeping facilities for one family or housekeeping unit. Dwellings are differentiated from transient accommodations, such as hotels, by providing a permanent, non-transient, residence or place of habitation.

Dwelling, Attached: Means a dwelling unit located in a building that contains other dwelling units or any structure where multiple dwellings share common walls or are located on top of, or below, one another.

Dwelling, Duplex or Duplex: Means a building, or a portion of a building, containing two dwelling units.

Dwelling, Horizontally Attached: Means a buildings containing two or more dwelling units where the individual dwelling units are separated by common walls and where no unit is located above or below another unit.

Dwelling, Detached: Means a detached building, surrounded on all sides by open space, containing a single dwelling unit.

Dwelling, Accessory or Accessory Dwelling Unit (ADU): Means a building, or a portion of a building, used as a self-contained dwelling that is secondary and subordinate to a primary dwelling.

Essential Public Facility (EPF): Means any public facility or facilities owned or operated by a unit of local or state government, public or private utility, transportation company, or any other entity that provides services as its primary mission, and is difficult to site. EPFs include those facilities listed in RCW 36.70A.200.

Growth Management Act (GMA): Means the Washington State Growth Management Act (Chapter 36.70A RCW) and related statutes and agency rules.

Income Qualified Housing: Means housing available to tenants below a certain income threshold.

Multiunit Building: Means a building, or a portion of a building, containing three or more dwelling units. Example of multiunit buildings include apartments, condominiums, and multifamily buildings.

Multiunit Building, Small: A multiunit building containing up to four dwellings.

Multiunit Building, Medium: A multiunit building containing five to eight dwellings.

Multiunit Building, Large: A multiunit building containing more than eight dwellings.

Natural Hazards: Natural hazards are a particular type of critical area that pose a danger to human life, safety, and property. Examples of natural hazards include floodplains and geologically hazardous areas.

Public Services and Public Facilities: Means services or facilities that are owned, operated by, or provided under contract for a government agency.

Shelter Housing, “Emergency Housing” or “Emergency Shelter”: Means temporary housing or shelter provided by a government entity, or private organization sanctioned by a government agency, to house persons who would otherwise be without housing or suitable shelter due to natural disaster, personal circumstances, fire, economic calamity, disability, addiction, health issues, or other similar circumstances. Shelter housing is generally limited to stays of 30 days or less.

Shelter Housing, Permanent: Means shelter housing that is provided at a permanent facility that is open on a year-round basis.

Shelter Housing, Emergency: Means shelter housing that is provided on a temporary or seasonal basis.

Small Lot Housing: A higher density form of detached housing with small housing units located on individual lots.

Walking Distance: Means the travel distance for pedestrians is one-third of a mile (1,584 feet) or less.