



**Agenda for Gig Harbor Planning Commission
Gig Harbor Civic Center
Thursday, May 2, 2024 5:30 P.M.**

This meeting may also be accessed through Zoom at <https://zoom.us/j/95353411299> or by calling (253) 215- 8782 and entering Meeting ID 953 5341 1299. Please see the Public Comment & Decorum section at the end of this agenda for information on options to make public comment.

This meeting may also be viewed live in the Council Chambers at the Civic Center.

Call to Order/Roll Call:

Approval of Minutes: April 18, 2024

Public Comment:

Agenda Items:

1. Buildable Lands Report and Employment Capacity– Presentation by Staff and Commission Discussion

Other Business: Next meeting Thursday, May 16, 2024

Adjournment:

PUBLIC COMMENT & DECORUM

The city desires to allow a maximum opportunity for public comment. However, the business of the Planning Commission must proceed in an orderly, timely manner. The purpose of a Planning Commission meeting is to advise on subjects prescribed by the City Council; it is not a public forum.

Public comment may be made in-person from the microphone, remotely via Zoom or by phone during designated portions of the meeting. To speak during the meeting via Zoom, press the Raise Hand button near the bottom of your Zoom window or press *9 on your phone. Please refrain from raising your hand until the Chair has announced that the Commission has opened the public comment portion of the meeting. Your

name or the last three digits of your phone number will be called out when it is your turn to speak. When using your phone to call in, you may need to press *6 to unmute yourself. Speakers will be allotted 3 minutes per individual, unless revised by the chair. Comments shall be made, first giving the speaker's name and address. Anyone making "out of order" comments may be subject to removal from the meeting.

Instead of making oral comments, written comments may be submitted to the Planning Commission at MThomas@gjgharborwa.gov.

All remarks shall be addressed to the commission as a body and not to any specific commissioner. All speakers shall be courteous in their language and deportment and shall not engage in or discuss or comment on personalities or indulge in derogatory remarks or insinuations with regard to any commissioner, or any member of the staff or the public.

There will be no demonstrations during or at the conclusion of any public comment. These guidelines are intended to promote an orderly system of holding public meetings, to give every person an opportunity to be heard and to ensure that no individuals are embarrassed by voicing their opinions.

AMERICANS WITH DISABILITIES (ADA) ACCOMMODATIONS

ADA accommodations can be provided upon request. Those requiring special accommodations should contact the city clerk at cityclerk@gjgharborwa.gov or (253) 853-7613 at least 24 hours prior to the meeting.



DRAFT MINUTS

Agenda for Gig Harbor Planning Commission Gig Harbor Civic Center Thursday, April 18, 2024, 5:30 P.M.

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Call to Order/Roll Call: Mark Burcar called the meeting to order at 5:35
Commissioners attending: Loreto Tessicini, Mark Burcar, Julie Martin and Larry Bradbury. John Krawczyk, Jason Jordan and Allison Snodgrass excused absent.

Staff: Robin Bolster-Grant, Principal Planner, Jeremy Hammar, Senior Planner and Cindy Andrews, Planning Technician

Approval of Minutes: March 21, 2024

MOTION: Move to approve the minutes of March 21, 2024 as written.
Bradbury/Tessicini – Motion carried.

Public Comment: Bob Himes: Requesting updates on future meetings.

Agenda Items:

- 1) Trees and Landscape Code Update – Presentation Senior Planner, Jeremy Hammar & Commission discussion.

Senior Planner Hammar provided a summary including a power point presentation of proposed Ordinance 1523, Trees and Landscape code updates to the Gig Harbor Municipal Code. Mr. Hammer provided a chapter-by-chapter review of the draft code. Principal Planner, Robin Bolster-Grant also provided information for the discussion.

Commissioners discussed the proposed ordinance items as presented by staff.

Other Business: Next meeting Thursday, May 2, 2024

Adjournment: 6:59 pm

Cindy Andrews

Cindy Andrews
Planning Technician



Staff Memo

TO: Gig Harbor Planning Commission

FROM: Robin Bolster-Grant, Principal Planner
Planning Division

SUBJECT: Buildable Lands Report and Employment Capacity

DATE: April 24, 2024

At the upcoming meeting on **May 2, 2024** staff will lead a introductory discussion regarding employment capacity included in the Pierce County Buildable Lands Report and how the update to our Economic Development Element can help us meet our growth targets over the next 20 years.

Buildable Lands Report

The Growth Management Act requires counties to adopt and plan for housing and employment targets based on projected population growth. The Buildable Lands Program was developed by Pierce County and its 23 cities and towns in 1997 to establish a coordinated system of collecting and analyzing data regarding development. The program focuses on evaluating available land for housing and employment capacity based on population growth targets over a 20-year period.

The most recent Buildable Lands Report was completed by Pierce County in 2021 and provides an analysis of development data for Gig Harbor, which shows permit data, land use designation, zone district, parcel size and site addresses. Commercial building permit data shows the amount of land used for commercial and industrial activity.

Buildable Lands Inventory

In determining how much land is available to provide additional capacity for employment

over the next 20 years, an inventory is conducted of all buildable lands that can accommodate future or expanded commercial and industrial uses. The inventory of buildable land is broken down into six categories:

- o Vacant
- o Vacant (single unit)
- o Underutilized
- o Pipeline
- o Built out
- o Undevelopable

Vacant Land

Legal parcels without current buildings or uses and which are subdividable based on parcel size. Vacant single units are parcels that are not subdividable, but can accommodate one housing unit.

Underutilized land

Parcels with an existing structure or land use that can accommodate additional housing units or jobs.

Pipeline

This category includes pipeline projects with active development applications and a known number of potential housing units or job estimates. This category will build out during the 20-year time horizon.

Built Out

These parcels have existing uses and cannot be expanded. They are not included in the capacity calculations.

Undevelopable Land

Not counted in the capacity analysis and include uses such as utility, landfill, cemeteries

Capacity Calculation

An estimate of the capacity is based on gross acreage and zoning associated with each of the six categories. Zoning designations determine the capacity for both housing and employment. Employment capacity is limited to land available for either commercial or industrial uses. The calculation is then adjusted to account for market factors and the reality that not every property owner will pursue development within the 20-year planning period.

Parcels with associated pipeline projects are not included in the capacity calculation. Additionally, the Gig Harbor zoning code includes districts that allow for both residential and commercial development – either as true mixed-use development or residential alone. Again, adjustments are made to account for the fact that not all commercial/business zone districts will be developed with commercial uses.

The net developable acreage totals are converted to employment capacity through the application of assumed employees per gross acre. Based on previous analyses, the current calculation assumes 19.37 employees per acre for commercial and services and 8.25 employees per acre for industrial warehousing and manufacturing.

In some cases, existing commercial businesses may be eliminated if redeveloped as another business, resulting in displacement of employees.

Projected Gap and Capacity Results

Based on the population projections, the total 2044 employment needs for the cities and towns* within Pierce County are shown below.

Table 20: Cities and Towns Employment Growth Targets Recommended by GMCC			
Jurisdiction	Estimated 2020 Employment	2020-2044 Employment Growth	2044 Total Employment
Bonney Lake	6,365	1,717	8,082
Buckley	2,241	1,080	3,321
Carbonado	54	6	60
Eatonville	969	152	1,121
Edgewood	2,244	1,962	4,206
Gig Harbor	12,855	2,747	15,602
Milton	2,203	441	2,644
Orting	1,473	196	1,669
Pacific	2,005	638	2,643
Roy	188	92	280
Ruston	532	71	603
South Prairie	80	10	90
Steilacoom	840	10	850
Wilkeson	85	11	96
Total	32,134	9,133	41,267

*“cities and towns” are a discrete sub-category of the cities located within Pierce County

The analysis shows that Gig Harbor will need to provide 2,747 additional jobs by 2044 based on the population target.

The employment capacity for Gig Harbor is shown in the table below.

Zone	Vacant	Underutilized	Pipeline	Total
B-1	12	0	0	12
B-2	333	261	0	594
C-1	171	62	7	240
DB	13	95	0	108
ED	727	142	206	1,075
PCD-BP	242	0	371	613
PCD-C	0	0	0	0
PCD-RMD	0	0	0	0
PI	0	0	0	0
PRD	0	0	0	0
R-1	373	61	0	434
R-2	456	14	0	470
R-3	0	0	0	0
RB-1	3	73	0	76
RB-2	76	231	10	317
WC	1	3	0	4
WM	0	0	0	0
WR	0	0	0	0
Total	2,407	942	594	3,943

The resulting analysis for Gig Harbor indicates that the city has adequate capacity for the employment targets provided by Pierce County (3,943 potential jobs to address a gap of 2,747). While the numbers demonstrate capacity, there are gaps in the analysis that also need to be taken into consideration. For instance, the Buildable Lands Report does not address the need for upgrades to existing infrastructure that may inhibit development. Not all of the commercial acreage identified in the capacity analysis are adequately served by water, sewer, or roads sufficient to be developed. The update to the Economic Development Element must, therefore, be tied to the Capital Facilities Element to ensure that the city has considered infrastructure improvements necessary to support the capacity calculations.

It is also important to consider other barriers that may impede utilizing the capacity that currently exists. Such policies can include permit streamlining and simplification of zoning codes that may be acting as a deterrent to new businesses seeking to open in the city. Another policy to consider may involve active recruitment of new businesses and the retention and expansion of existing businesses to help grow the Gig Harbor economy. Such policies should also help to expand access to opportunity for

economically disconnected communities.

The Puget Sound Regional Council's Vision 2050 focuses on achieving a jobs-housing balance or the ratio of jobs to housing. A better balance provides many benefits such as reducing traffic congestion, air emissions and commute times. The jobs-housing balance also requires an examination of affordable housing so that housing is available to lower-wage workers. As we have discussed over the past year, only 3% of those working in Gig Harbor reside in the city.

While employment capacity is a required and critical indicator of whether Gig Harbor is properly planning for jobs growth over the next 20 years, the goals and policies included in the Economic Development Element must address diversity in economic opportunities, the imbalance between jobs and housing, adequate public services and facilities, preservation of natural resources and the development of a sound fiscal base.



PIERCE COUNTY BUILDABLE LANDS REPORT

A Monitoring and Evaluation Analysis of Urban Growth and
Development Capacity for Pierce County and its Cities and Towns

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EXECUTIVE SUMMARY

The Washington State Growth Management Act (RCW 36.70A), enacted in 1990, requires all counties with a population of 50,000 or more with a high rate of population growth to designate urban growth areas (UGAs). The Act requires that these UGAs be of sufficient size to accommodate the anticipated population growth during the 20-year period following the adoption of the UGA. In accordance with the Growth Management Act (GMA), the Pierce County Council has adopted UGAs for Pierce County and its incorporated cities and towns.

In designating the UGA, the Pierce County Council worked closely with the individual cities and towns to ensure that the UGA was consistent with local comprehensive plans, urban population forecasts, and population capacity analyses. As a policy choice, each jurisdiction conducted its own independent residential capacity analysis through their GMA comprehensive plan. The County's analysis encompassed the unincorporated lands associated with the UGA and the cities' and towns' analyses encompassed the lands within their respective municipal boundaries. At this time, satellite cities' and towns' analyses also included the unincorporated lands within their respective urban growth areas. The methods, definitions, and assumptions incorporated in the analyses differed by jurisdiction and were not uniform or coordinated.

The jurisdictional variations in the capacity analyses and the lack of specificity in the GMA led to state-wide debate. Much of this debate focused on determining whether there were errors in the assumptions used by local governments in sizing their UGAs. This debate resulted in the Washington State legislature amending the GMA in 1997 to require that certain counties and their cities and towns develop local programs aimed at improving confidence and coordination in their capacity analyses. Pierce County was one of the counties required to develop such a program.

Since 1997, Pierce County and its 23 cities and towns have worked collaboratively in a program to collect annual development permitting data, inventory developable land, and enhance information relating to wetlands and steep slopes. Commonly referred to as the Buildable Lands Program, this collaborative program is aimed at satisfying the GMA requirements and improving accuracy in the information used to determine the capacity of Pierce County's UGA. Pierce County published its first consolidated residential/employment capacity analysis in August 2002, second in September 2007, and third in June 2014. This 2021 Report represents the fourth published documentation of Pierce County and its cities' and towns' ability to accommodate future growth and is intended for use in the 2024 GMA Comprehensive Plan periodic update.

The Buildable Lands Report details the methodology, assumptions, and calculations for identifying the housing and employment capacity within the UGA. An important piece of the Buildable Lands Program is using the information in the Report to compare observed densities to the planned densities and growth assumptions, capacity to the growth targets, and housing production rates to the growth targets. This work is completed in a Consistency Evaluation, discussed in Section V of this Report. Due to the timing of the growth target allocation process, the Consistency Evaluation portion of the program will be completed within one year of publication of this Report, as permitted through the Pierce County Countywide Planning Policies.

I.

Overview

- General description and historical perspective of State and County legislation addressing development of the program

II.

Methodology

- Information and data collected through the monitoring procedures.
- Inventory categories and process
- Methodology applied to calculate a residential and employment capacity.
- Factors and assumptions used in the calculations

III.

Summary of Observations

- Countywide data summaries and capacity results
- Individual chapters for each of the 23 cities and towns in Pierce County and urban unincorporated Pierce County
 - Summary of development trends
 - Summary of assumptions used in analysis
 - Capacity results

IV.

Appendices

- Detailed development trend summaries by zone, capacity calculations by zone, and inventory maps for each jurisdiction
- Technical description of inventory model/process
- Employment density survey

SECTION I: OVERVIEW

INTRODUCTION

Pierce County and its 23 cities and towns began developing the Buildable Lands Program in 1997 in response to amendments to the Washington State Growth Management Act (GMA) enacted that same year. The program seeks to establish a coordinated system for collecting and monitoring data regarding growth and development occurring in Pierce County and its cities and towns.

The program primarily focuses on evaluating two aspects of growth management – accommodation of population growth targets during the 20-year planning period and the availability of commercial and industrial land for employment purposes. The program is aimed at ensuring greater consistency between local planning efforts under GMA and the growth and development patterns actually occurring in the urban growth area (UGA).

The Washington State Legislature enacted the GMA in 1990. The GMA required local governments to develop rational policies to manage growth in the State and all urban counties and their cities and towns were required to plan under the GMA. This planning must address issues in land use, transportation, housing, capital facilities, utilities, and rural lands, and must ensure that the forecasted growth in population for the next 20 years can be accommodated in an efficient manner. An essential component of planning under the GMA is the designation of UGAs.

Each county required to plan under the GMA must designate a UGA within which urban growth shall be encouraged and outside of which urban growth shall be prohibited. These UGAs are to be based upon the projected 20-year population growth forecast for the county and its cities and towns as generated by the Washington State Office of Financial Management. To properly size UGAs such that this population could be accommodated, each jurisdiction planning under the GMA conducted a population capacity analysis. These capacity analyses sought to determine how much population could be accommodated in each area based upon availability of developable land.

The jurisdictional variations in capacity analyses and the lack of specificity in the GMA led to statewide debate on the subject, with much of the debate focused on determining whether there were errors in the assumptions used by local governments in sizing their UGAs. In 1997, this debate resulted in the GMA being amended through Senate Bill 6094, commonly referred to as the "Buildable Lands" amendment. The amendment requires certain counties and their cities and towns to monitor development activities and conduct a coordinated housing unit and employment capacity analysis for each of the jurisdictions. Pierce County and its cities and towns are required by state law to participate in this "Buildable Lands" monitoring program.

In July of 2001, the Pierce County Regional Council responded to Senate Bill 6094 by recommending the adoption of proposed amendments to Pierce County's Countywide Planning Policies (CPPs) that incorporated monitoring and evaluation policies related to Buildable Lands. The Buildable Lands legislation was most recently amended in 2017 to include an amended timeframe, a requirement to consider regulations affecting the achieved densities, and a requirement to monitor housing production rates in comparison to adopted growth targets or projections. Pierce County and its cities and towns are

currently in the process of updating the CPPs to align with the updated guidelines and 2017 Buildable Lands legislation.

LOCAL AND REGIONAL FRAMEWORK

While the Growth Management Act (GMA) was silent on the details of urban density, sizing, and analyzing the sufficiency of urban growth areas, local planning policies and decisions by the Central Puget Sound Growth Management Hearings Board (GMHB) have established specific guidance on some of these issues. Additional guidance is provided through a document entitled "Buildable Lands Program Guidelines (2018)," published by the Washington State Department of Commerce. The Pierce County Comprehensive Plan also provides supporting policies specific to Buildable Lands.

Pierce County Countywide Planning Policies

The Pierce County Countywide Planning Policies are written statements that establish a countywide framework for the development of growth management guidelines adopted by the County and its cities and towns. The framework is intended to create consistency among all jurisdictions in addressing certain growth management issues. Pierce County adopted its CPPs on June 30, 1992.

The CPPs are currently being updated and include a section on Buildable Lands based on the original policies currently located in the "Urban Growth Areas, Promotion of Contiguous and Orderly Development and Provision of Urban Services to Such Development" chapter. Other related policies in the draft updated Urban Growth Area and Growth Targets sections address the sizing of the urban growth area, the allocation of targets, and appropriate average density within the UGA.

Per the CPPs and consistent with GMA, urban growth areas must be of sufficient size to accommodate the urban growth projected to occur over the succeeding 20-year planning period. In determining the appropriate size of the urban growth area, various components must be taken into account, such as critical areas, open space, and a market factor (i.e., maintaining a supply of developable land sufficient to allow market forces to operate).

The CPPs direct the County and cities and towns to plan for efficient land use patterns while conserving natural resources. The policies further define efficient land use as development with at least an average net density of four units per acre. Associated policies support the need for infill and compact development in achieving an efficient land use pattern. The CPPs direct the County and cities and towns to adopt plans that encourage concentrated development within the urban growth area which will accommodate the 20-year projected population and employment growth.

Housing and Employment Targets

Evaluating whether sufficient capacity exists in Pierce County's UGAs to accommodate the 20-year population target is one of the central components of the Buildable Lands Program. Adopted housing and employment targets are used in evaluating the success of growth management efforts. It is anticipated that the Pierce County Council will adopt the 2044 housing and employment targets by 2022 and a consistency evaluation will be completed within one year of this Report, per the Pierce County Countywide Planning Policies, once the targets are available. This report provides the 2030 targets as an initial comparison.

SECTION II: METHODOLOGY

DEVELOPMENT DATA

The development data provides information in three key areas:

1. Reveals if the urban growth area is developing at urban densities.
2. Assesses the integrity of assumptions incorporated in the capacity analysis.
3. Guides refinement of the build-out assumptions in the capacity analysis.

While in theory the use of development trend information in future capacity analyses is a valid measure and required by the "Buildable Lands" legislation, there could be some potential problems with doing this. Many jurisdictions have not experienced an amount or range of development necessary to establish a statistically valid trend. Accordingly, use of such data may not truly represent how development will occur in future years. In addition, a certain amount of "new" development being tracked in each jurisdiction is vested under pre-GMA regulations or previous zoning that is no longer in effect. This vested development may be built to standards different than that occurring under the current regulations and may skew the trend information. These, among other potential problems, should be considered in reviewing the development trend information.

Annual Reporting

Jurisdictions are required to submit residential building permits, non-residential building permits, and platting activity. They must submit details of the permit data, including the parcel number, plan designation, zoning district, parcel size, and site address. For residential development they must also include the permitted units or lots, area used to calculate permitted number of units, and, if applicable to density calculations, the number of acres with environmental constraints, roads, and other land uses. For commercial development they must also include the total building size. Data on 100 percent of development activity occurring in each jurisdiction is sought. However, if a jurisdiction does not submit complete information for an individual project, that project is not incorporated in the reported information. It should be noted that the density information should not be compared among different jurisdictions since density calculations from the developments reflect locally adopted regulations.

Residential Building Permits	Residential Platting Activity	Commercial Building Permits
• Multifamily permits show the observed multifamily project density for each zone. • Single-family permit reporting is optional and not used to determine observed density. • Multifamily permits are used in conjunction with the residential platting activity to determine how much land is used for residential development in each zone.	• Used to determine the observed gross and net single-family project density for each zone. • Indicates how much land is used for non-residential purposes, (critical areas, roads, and other uses). • Used in conjunction with the multifamily building permits to determine how much land is used for residential development in each zone.	• Used to determine the amount of land consumed by commercial and industrial activity in each zone. • Indicates how much land is used for non-residential uses in residential zones. • Limitations: disconnect between commercial permits and available employment statistics.

BUILDABLE LANDS INVENTORY

Conducting an inventory of buildable lands, while not a complete representation of the “buildable land” in the county, is essential in the housing and employment capacity analyses and determining how much land is available and suitable for development. Accordingly, the Buildable Lands Program establishes a standard methodology to be used by all jurisdictions, including standard definitions and procedures to ensure reasonable accuracy and consistency. The inventory in this report represents the status of property as of January 2020 to align with Census data. There are six categories of land identified in the Buildable Lands inventory:

- Vacant
- Vacant (Single Unit)
- Underutilized
- Pipeline
- Built Out
- Undevelopable

Vacant and underutilized lands are identified through a Geographic Information System (GIS) model using the assumptions and existing conditions as inputs. The GIS model process is outlined in Appendix B: Buildable Lands Inventory Process and the initial categorization of Assessor-Treasurer (ATR) land use descriptions is shown in Appendix Table 1 in Appendix B: Buildable Lands Inventory Process.

While the model is used to initially sort and categorize the parcels, the results are reviewed and refined by the applicable local jurisdictions to further improve the accuracy of the inventory by taking advantage of local knowledge, field visits, and the review of digital orthographic photography. The inventory provides the underlying basis for the housing and employment capacity analyses but is not a representation of the “buildable land” with capacity for development at a parcel level.

Four of the six inventory categories are identified as having additional employment or housing capacity: Vacant, Vacant (Single Unit), Underutilized, and Pipeline.

Vacant Land

Vacant lands include parcels without an established structure or land use activity, excluding those enrolled in a current use tax program. Vacant properties that are identified as being enrolled in a current use tax program are included in the Underutilized inventory because of the extra difficulties that are associated with developing those lands. Vacant parcels are categorized as either Vacant or Vacant Single Unit. Vacant parcels owned by a government entity or special district are flagged for local review.

- Vacant represents parcels that are assumed can be further subdivided and can accommodate more than one housing unit. These parcels are included in the capacity calculations where further assumptions are applied.



- Vacant Single Unit represents an individual building lot that is assumed to accommodate only one housing unit. These parcels are separated from the “acreage” capacity calculations and added in as one unit per parcel to the final capacity.

Underutilized Land

Underutilized lands include parcels that have an existing structure(s) or land use activity and can accommodate additional housing units or jobs. These lands include parcels in which excess space is available to build a new structure(s), or it is assumed that an existing structure(s) will be demolished and replaced with a larger structure or more structures.

Not all parcels that can theoretically accommodate additional growth are categorized as Underutilized. A specific ratio between the existing housing units or estimated jobs to the calculated assumed future build-out must be met. The ratio is different between housing units and jobs.

Existing Residential Use

Parcels with an existing residential use may be categorized as Underutilized if it meets one of the following:

1. Residential or mixed-use zoning classification:

- The ATR use code is single-family, mobile home, multifamily, or mobile home park.
 - For existing single-family or mobile home units, the improvement value is less than \$500,000.
 - For multifamily and mobile home parks, the improvement value is less than \$1,500,000.
- The ratio of assumed housing build-out to existing housing units is greater than or equal to 2.5.

2. Commercial/industrial zoning classifications that prohibit residential units:

- An existing single-family housing unit, excluding parcels that are within platted subdivisions.

Calculation of Existing-to-Build-Out Housing Density Ratio

1. Determine the existing net housing units per acre for each parcel using ATR data for existing buildings/units.
2. Calculate the assumed housing units per acre using the established density assumptions (listed in the assumptions section for each jurisdiction).
3. Divide the assumed build-out density by the existing density (this is the existing density to build-out ratio).
4. If the existing housing unit to build-out ratio is 2.5 or greater, the property is categorized as Underutilized. If the build-out ratio is less than 2.5, the property is assumed not to have additional housing capacity and is identified as Built Out.

Vacant Single Unit



- No use or buildings
- Not subdividable based on size

Underutilized



- Existing use or building
- Existing development lower than potential build-out

Existing Commercial or Industrial Use

Parcels with an existing commercial or industrial use may be categorized as Underutilized if it meets the following:

Parcels within commercial, industrial, or mixed-use zoning classifications:

- The ATR use code is non-residential.
- The parcel has an improvement value less than \$1,500,000.
- The ratio of assumed future job build-out to estimated existing jobs is greater than or equal to 5.

Calculation of Existing-to-Build-Out Employment Density Ratio

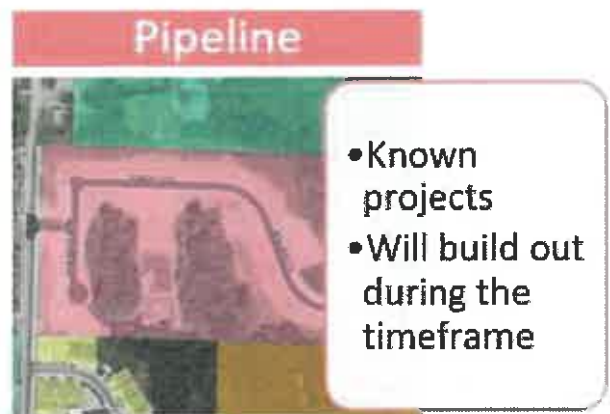
1. Determine the existing employment density for each parcel by dividing the square footage of the existing building(s) by the industry standard square footage assumption to estimate the existing number of employees using ATR data for existing building square footage.
2. Calculate the assumed future employment build-out for the parcel by multiplying the gross acreage of the parcel by the assumed employment density.
3. The assumed future employment build-out figure is divided by the estimated existing number of jobs (this is the existing employment to build-out ratio).
4. If the existing employment to assumed build-out ratio is 5 or greater, the property is categorized as Underutilized. If the build-out ratio is less than 5, the property is assumed not to have additional employment capacity and is counted as Built Out in the inventory.

Pipeline

For ease of use, the inventory categorizes pipeline projects and known development as Pipeline. Single-family residences that have been built or are planned to be built within the timeframe are captured in Vacant Single Unit category, not the Pipeline category.

Pipeline Projects

Projects that are currently in the “pipeline” may be counted separately from the vacant and underutilized land. Pipeline projects are those with an active development application and a known number of units or job estimate. The applicable parcels are identified as Pipeline in the inventory and the number of units applied for are counted toward the capacity to represent a more realistic representation of build-out and units or jobs available during the planning period.



Known Development

The next 20-year period for Growth Management Act periodic updates will span from 2024 to 2044. Since we do not have the ability to know the land available for development in 2024, 2020 is used as the initial baseline for both the Buildable Lands Report and the growth target setting for internal consistency. Using the same baseline data helps jurisdictions accurately track growth targets, and 2020 aligns with a U.S. Census data year, which helps with demographic data comparison in comprehensive planning.

Recognizing that parcels will be developed between 2020 and 2024, the analysis categorizes the parcels associated with these projects as Pipeline since it is known that they will be part of the housing inventory available during this timeframe.

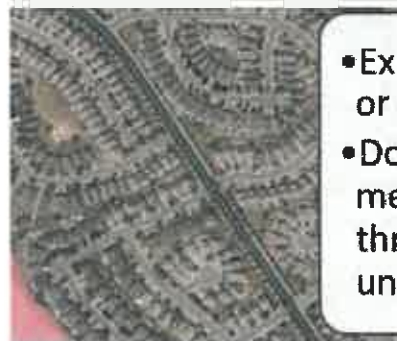
Built Out

Parcels with existing uses that are categorized as Built Out are removed from the capacity calculations outright. Built Out parcels are those that did not meet the definition of Vacant or Underutilized but are not necessarily undevelopable.

Undevelopable

Parcels with existing uses that are categorized as Undevelopable are removed from the capacity calculations outright. It is assumed that certain uses (e.g., utilities, cemeteries, drain fields, landfills, and other protected uses) will not develop further or contribute to housing or employment capacity.

Built Out



- Existing use or building
- Does not meet threshold for underutilized

Undevelopable



Not developable based on use type

CAPACITY CALCULATION METHOD

The methodology used to calculate the residential and employment capacity in this report is similar to the methodology that was utilized in the 2014 analysis.

The methodology employed for the analysis includes various factors and assumptions. Each component directly influences the estimated capacity and needs' statistics. The assumptions reflect a conservative approach; therefore, the reported estimates are not maximum capacity or full build-out estimates. The analysis is based on the total gross acreage associated with each of the buildable land categories (Vacant and Underutilized) by zoning district. The estimated residential capacity is generated through acreage deductions to account for factors identified below and the application of an average residential density.

An explanation of the calculation table process is found in Appendix A: Full Data, Calculation Tables, and Maps with the full capacity calculations.

General Factors and Assumptions

Mixed-Use Zoning

Mixed-use zoning allows residential and commercial activity on the same parcel or on separate parcels within the same zoning classification. To account for this mixture of activity in both the housing and employment capacity analyses, a percentage of zoning classification's acreage is split between the housing and employment capacity calculations. This assumption is referred to as the "residential acreage" and "non-residential acreage" in the calculation tables shown in Appendix A: Full Data, Calculation Tables, and Maps.

In some instances where a vertical mixed-use is anticipated, 100 percent of the land area is assumed as both residential and non-residential. This recognizes buildings where the first floor is commercial and the additional stories are residential. In other cases, it is assumed that a specific mixed-use zone will produce 100 percent commercial on the first floor, but only a percentage of the land in that zone will produce residential on the second and above floors. A 100 percent non-residential and smaller percent residential assumption, depending on the jurisdiction and zone, is applied to accommodate this trend. Conversely, if it is assumed that a zone will develop as 100 percent residential uses, but only a portion will include commercial on the ground or other floor(s), a 100 percent residential and smaller percent non-residential assumption is used.

Future Capital Facilities

The employment capacity for Buildable Lands per RCW 36.70A.215 is limited to land available for commercial or industrial use. While some capital facilities generate jobs, the acreage associated with anticipated/planned public capital facilities is deducted from the total gross residential and commercial/industrial acreage. Any parcels documented as future capital facilities are considered Undevelopable or Built Out in the inventory and are excluded from the capacity calculations. In some instances, local jurisdictions choose to incorporate a specific percentage of future land to deduct from the gross acreage in each zone or specific zones for future public capital facilities if the specific sites are not yet known.

Market Factor

Although individual properties may meet the criteria for Vacant and Underutilized lands, not all properties are assumed available for development during the 20-year planning period. Property owners may not pursue development due to personal use, economic/investment, constraints associated with properties on private roads, or sentimental relationship with their surrounding environment. To account for the market availability and other factors, a percent of the net acreage is deducted from the inventory. A higher percentage is typically deducted for properties categorized as Underutilized to recognize the constraints of additional development or redevelopment of those properties. In previous reports, this market factor was identified as “land unavailable for development.”

Pipeline

Parcels with associated pipeline projects or known development (referred to as Pipeline in the inventory) are not included in the gross acreage shown in the capacity calculations. The associated housing unit or employment build-out total is added to the total capacity at the end of the process.

Residential-Specific Factors and Assumptions

Residential Density

The net buildable acreage is converted to housing unit capacity through the application of assumed density in the form of dwelling units per acre. The assumptions section for each jurisdiction identifies the density for each zoning district. Individual jurisdictions established the density assumptions while considering past trends and recent regulation changes. The assumptions are based on previous reports and refined using the observed development trends.

Plat Deductions

Individual jurisdictions apply different methods to calculate the maximum number of residential lots permitted within a plat. While some calculate units with a project's gross acreage, others employ a net acreage. The plat deductions reflect the type of approach the respective jurisdiction implements. These deductions may include land reserved for roads, critical areas, parks, recreation, open space, or stormwater facilities.

Non-Residential Uses

Zoning codes permit various types of non-residential development within residential districts, such as churches and day-care centers. To account for future non-residential development, a percentage of the net residential acreage is deducted from the residential capacity and moved to the non-residential capacity. The specific percentage differs between each jurisdiction and is only applied to residential-only zones. This process differs from the mixed-use zoning assumption to recognize that it is not truly a mixed-use zone.

Vacant Single Unit

If a parcel is categorized Vacant Single Unit, the parcel acreage is not included in the gross acreage and is incorporated in the analysis as one dwelling unit, which is added to the total capacity at the end of the process.

Displaced Units

In the analysis, existing housing units located on Underutilized parcels are categorized as displaced units. The existing number of units is derived from ATR data. Not all the gross acreage is considered to be developable; accordingly, the total number of displaced units per zone is adjusted down to reflect the same percent of deductions that was applied to the gross acreage. The adjusted displaced units are deducted from the total capacity to avoid double-counting. It is important to note that this calculation process differs from previous reports that added the displaced units back into the housing need, and instead reduces those units and jobs from the capacity itself.

Commercial and Industrial-Specific Factors and Assumptions

Employment Density

The net buildable acreage totals in the calculation tables are converted to employment capacity through the application of assumed employees per gross acre. An assumption for employment density (employees per acre) is necessary to calculate the capacity of the commercial and industrial lands.

Although the Buildable Lands legislation directs the County to use the average employment densities generated through the trending period, this approach is problematic because employment statistics are not readily available and many commercial/industrial buildings/complexes may not be 100 percent occupied within the first year of completion.

The 2014 report set an assumption of 19.37 employees per acre for commercial and services and 8.25 employees per acre for industrial warehousing and manufacturing. The County contracted with ABHL and ECONorthwest using grant funding through the Washington State Department of Commerce to evaluate the employment density assumptions used in the Buildable Lands Report. The findings of their study confirmed that the assumptions were still valid for this report (see Appendix C: Employment

Density Survey). The assumptions have been adjusted to whole numbers for this report and ease of use, updating them to 20 employees per acre for commercial/mixed use zones and 9 employees per acre for industrial zones. Jurisdictions with further analysis and applicable market studies have adjusted their employment assumptions on a case-by-case basis to reflect the market conditions in those areas.

Displaced Employees

The Underutilized land category may include existing businesses that, if redeveloped as another business, are assumed to be displaced. Accordingly, the employment capacity figure is increased to account for the assumed displaced employees. To calculate the displaced employees, the locally observed density of 500 square feet per employee for commercial and 900 square feet per employee for industrial/warehousing is applied to the existing building square footage. Since not all the gross acreage is considered developable, the total number of displaced employees per zone is adjusted down to reflect the same percent of deductions that was applied to the gross acreage. The adjusted displaced job estimates are deducted from the total capacity to avoid double-counting. It is important to note that this calculation process differs from previous reports that added the displaced jobs back into the employment need, and instead reduces those units and jobs from the capacity itself.

SECTION III: SUMMARY OF OBSERVATIONS

GENERAL OVERVIEW

The Pierce County Buildable Lands Report is a milestone project in an on-going monitoring and evaluation program. This section represents a summary of the data and calculations shown in Appendix A: Full Data, Calculation Tables, and Maps, as well as supplemental data.

The development data represents urban development trends between 2013-2020. The development activity generally indicates that urban density housing is being constructed within the urban growth area. As with previous reports, it is impossible to conclude whether there is a trend that indicates an increase or decrease in observed density due to a low number of projects in various zoning districts within the cities, towns, and unincorporated urban areas. The Buildable Lands Report does not calculate capacity for the rural area, but development data is collected to compare to the rate of growth within the urban growth area. The development data summaries are not representative of all development and permitting activity that occurred during the timeframe, rather it is a summary of data that is used to determine or support the assumptions established in the capacity analysis.

The adopted 2030 housing and employment targets and assumptions applied in the housing and employment capacity analyses reflect a redirection of growth through redevelopment and achieving higher density residential projects in cities and towns. When the upcoming 2044 growth targets are available, a supplemental report will be provided to reflect the full conditions for comprehensive plans undergoing the Growth Management Act periodic update due in 2024.

There are 3 factors that the Buildable Lands analysis must analyze for consistency:

1. If the allowed and assumed densities are consistent with the observed densities.
2. If the housing and employment capacity is consistent with the adopted growth targets.
3. If the housing production rates are consistent with the adopted housing growth target (new requirement as of 2017).

The consistency analysis is important to confirm that the assumptions are valid, the allowed zoning is building out within the range allowed, and if there is enough capacity and development occurring to meet the growth targets. If there is an indication that there is an inconsistency between these datapoints, there should be further review into the extent and cause of the inconsistency. A full consistency analysis will be completed in a subsequent report per Countywide Planning Policies UGA-6.1 and UGA-6.2. This section of the report provides the data necessary to complete that analysis.

NEXT STEPS

Since the 2044 growth targets have not been formally adopted, this Report does not contain the full consistency evaluation and findings. Per the Countywide Planning Policies, the County has one year after the Buildable Lands Report is complete to complete and publish the consistency evaluation.

1 COUNTYWIDE



DEVELOPMENT TRENDS

The Buildable Lands Report also tracks the distribution of development between the urban and rural areas. Over time, the platting trend has been shifting toward creating the majority of new lots within the urban growth area, as shown in Table 1-4. However, there are still undeveloped lots within the rural area that can accommodate a housing unit, as shown in Table 1-1 below. The trends for platting and housing production in the rural area do not always match up due to the amount of existing lots of record in the rural area. As those lots develop, it is expected that they will more closely align.

Housing Production

The residential data collected for the Buildable Lands Program tracks the density and other assumptions related to the capacity analysis. The Buildable Lands requirements that were amended in 2017 now require the tracking of housing production to compare to the necessary growth rates to achieve the housing targets. Due to the limitations of the permit data and lack of demolition permit data, Pierce County relies upon the [Washington State Office of Financial Management](#) estimates to track the number of housing units built per year in each jurisdiction for the purposes of this Report.

While capacity is a large factor in determining the ability to accommodate growth in the urban growth area, housing production rates are integral to achieving the housing growth target. Some jurisdictions have already met or exceeded their 20-year growth. Growth targets for 2044 are expected to be set by 2022, and this information should be updated with the 2024 periodic update of comprehensive plans.

Table 1-1: Housing Production in Urban Growth Area vs. Rural and Resource Lands (Includes Incorporated)

		2013	2014	2015	2016	2017	2018	2019	2020	2013-2020
Urban	Units	2,479	3,016	2,801	2,681	3,697	3,233	3,255	4,105	25,267
	Percent	92%	91%	89%	86%	86%	86%	89%	91%	89%
Rural/ Resource	Units	224	285	342	419	580	510	415	404	3,179
	Percent	8%	9%	11%	14%	14%	14%	11%	9%	11%
Total Units		2,703	3,301	3,143	3,100	4,277	3,743	3,661	4,499	28,427

Source: Washington State Office of Financial Management Housing Unit Data (2020).

The following two tables compare the 2010 Census baseline and 2020 OFM estimate for housing units to the adopted 2030 housing unit growth targets for Pierce County in Ordinance Number 2017-84s. The most recent data is used, so it may not align with the data shown in the 2014 Buildable Lands Report.

Table 1-2 shows the number and percent of housing units developed between 2010-2020 in comparison to the 2030 targets, and the remainder of growth needed between 2020-2030 to achieve the target. Table 1-3 shows the observed housing production, average annual rate, average annual rate that was needed to achieve the target, and remainder of the target.

Table 1-2: Countywide Housing Units, Growth, Target, and Remaining Need by Jurisdiction

Jurisdiction	2010 Housing Units ¹	2030 Housing Unit Target ²	2010-2030 Housing Unit Need ³	2020 Housing Unit Estimate ⁴	Total Housing Production 2010-2020 ⁵	2020-2030 Housing Unit Need ⁶	Percent of 2010-2030 Housing Unit Need Developed Between 2010-2020 ⁷
Auburn (part)	3,146	3,634	488	3,954	808	-320	166%
Bonney Lake	6,394	8,604	2,210	7,581	1,187	1,023	54%
Buckley	1,669	2,930	1,261	1,974	305	956	24%
Carbonado	218	298	80	244	26	54	33%
DuPont	3,241	5,291	2,050	3,798	557	1,493	27%
Eatonville	1,059	1,353	294	1,130	71	223	24%
Edgewood	3,801	6,003	2,202	4,858	1,057	1,145	48%
Fife	3,895	4,457	562	4,147	252	310	45%
Fircrest	2,847	3,351	504	2,907	60	444	12%
Gig Harbor	3,560	5,431	1,871	5,302	1,742	129	93%
Lakewood	26,548	34,284	7,736	27,053	505	7,231	7%
Milton (part)	2,724	2,779	55	2,942	218	-163	396%
Orting	2,361	3,121	760	2,925	564	196	74%
Pacific (part)	45	0	-45	15	-30	-15	67%
Puyallup	16,171	22,611	6,440	17,961	1,790	4,650	28%
Roy	326	487	161	331	5	156	3%
Ruston	430	775	345	477	47	298	14%
South Prairie	174	215	41	198	24	17	59%
Steilacoom	2,793	3,385	592	2,917	124	468	21%
Sumner	4,279	5,743	1,464	4,560	281	1,183	19%
Tacoma	85,786	129,030	43,244	91,359	5,573	37,671	13%
University Place	13,573	18,698	5,125	14,264	691	4,434	13%
Wilkeson	175	198	23	182	7	16	30%
Unincorporated Urban Pierce County	70,942	99,563	28,621	83,710	12,768	15,853	45%
Urban Total	256,157	362,241	106,084	284,789	28,632	77,452	27%

¹2010 Census baseline, Source: OFM April 1, 2021 Housing Unit Estimate.²2030 housing target, Source: Ord. No. 2017-24s.³2030 housing target minus 2010 Census housing unit baseline.⁴2020 OFM Estimate, Source: OFM April 1, 2021 Housing Unit Estimate.⁵2020 OFM Estimate minus 2010 Census baseline⁶2030 housing target minus 2010-2020 housing production total.⁷2010-2020 housing production total divided by 2010-2030 housing unit need.

Table 1-3: Countywide Housing Unit Production, Targets, and Remaining Need by Jurisdiction

Jurisdiction	Total Housing Production 2010-2020 ¹	Average Annual Housing Production Rate Observed 2010-2020 ²	Average Annual Housing Production Rate Needed 2010-2030 ³	Average Annual Housing Production Rate Needed 2020-2030 ⁴	Increase in Average Annual Housing Production Rate Needed to Achieve 2030 Target ⁵	
Auburn (part)	808	81	24	-	-	-
Bonney Lake	1,187	119	111	102	-	-
Buckley	305	31	63	96	65	210%
Carbonado	26	3	4	5	2	67%
DuPont	557	56	103	149	93	166%
Eatonville	71	7	15	22	15	214%
Edgewood	1,057	106	110	115	9	8%
Fife	252	25	28	31	6	24%
Fircrest	60	6	25	44	38	633%
Gig Harbor	1,742	174	94	13	-	-
Lakewood	505	51	387	723	672	1,318%
Milton (part)	218	22	3	-	-	-
Orting	564	56	38	20	-	-
Pacific (part)	-30	-	-	-	-	-
Puyallup	1,790	179	322	465	286	160%
Roy	5	1	8	16	15	1,500%
Ruston	47	5	17	30	25	500%
South Prairie	24	2	2	2	0	0%
Steilacoom	124	12	30	47	35	292%
Sumner	281	28	73	118	90	321%
Tacoma	5,573	557	2,162	3,767	3,210	576%
University Place	691	69	256	443	374	542%
Wilkeson	7	1	1	2	1	100%
Unincorporated Urban Pierce County	12,768	1,277	1,431	1,585	308	24%
Urban Total	28,632	2,863	5,304	7,745	4,882	171%

¹2020 OFM Estimate minus 2010 Census Baseline, Source: OFM April 1, 2021 Housing Unit Estimate.²2010-2020 Housing Production divided by 10 (years).³2030 Target minus 2010 Census Baseline divided by 20 (years), Sources: Ord. No. 2017-24s, OFM April 1, 2021 Housing Unit Estimate.⁴2030 Target minus 2020 OFM Estimate divided by 10 (years).⁵2020-2030 needed production rate minus / divided by 2010-2020 observed production rate.

Plat Activity

Table 1-4: Platted Lots in Urban Growth Area vs. Rural and Resource Lands (Includes Incorporated)

		2006- 2012 ¹	2013	2014	2015	2016	2017	2018	2019	2020	2013- 2020
Urban	Lots	7,313	666	880	835	1,043	1,172	768	1,193	622	7,179
	Percent	84%	88%	96%	88%	96%	94%	89%	94%	88%	92%
Rural/ Resource	Lots	1,435	87	36	112	47	73	96	76	85	612
	Percent	16%	12%	4%	12%	4%	6%	11%	6%	12%	8%
Total Lots		8,748	753	916	947	1,090	1,245	864	1,269	707	7,791

¹2014 Pierce County Buildable Lands Report

Sources: County/City/Town Permit Data, Pierce County Auditor Recorded Plats.

Table 1-5: Countywide Plat Activity by Jurisdiction

Jurisdiction	Gross Acres	Net Acres	Lots	Gross Density	Net Density	Percent of Total Lots
Auburn (part)	20.17	19.01	104	5.16	5.47	1.1%
Bonney Lake	149.50	53.91	275	1.84	5.10	2.9%
Buckley	108.66	65.37	321	2.95	4.91	3.3%
Carbonado	16.15	16.15	18	1.11	1.11	0.2%
DuPont	14.98	14.98	67	4.47	4.47	0.7%
Eatonville	14.84	14.84	23	1.55	1.55	0.2%
Edgewood	212.16	152.21	464	2.19	3.05	4.8%
Fife	7.65	4.64	38	4.96	8.18	0.4%
Fircrest	3.03	3.03	22	7.26	7.26	0.2%
Gig Harbor	323.68	213.52	1,043	3.22	4.88	10.8%
Lakewood	93.08	93.08	182	1.96	1.96	1.9%
Milton (part)	13.35	12.06	43	3.22	3.57	0.4%
Orting	106.10	106.10	417	3.93	3.93	4.3%
Pacific (part)	-	-	-	-	-	-
Puyallup	170.64	159.03	639	3.74	4.02	6.6%
Roy	1.60	1.60	5	3.13	3.13	0.1%
Ruston	-	-	-	-	-	-
South Prairie	-	-	-	-	-	-
Steilacoom	31.10	31.10	85	2.73	2.73	0.9%
Sumner	47.74	31.78	157	3.29	4.94	1.6%
Tacoma	97.01	97.01	444	4.58	4.58	4.6%
University Place	76.78	59.63	299	3.89	5.01	3.1%
Wilkeson	-	-	-	-	-	-
Unincorporated Urban Pierce County	1,847.14	1,468.55	4,981	2.70	3.39	51.7%
Urban Total	3,355.35	2,617.59	9,627	2.87	3.68	100.0%

Multifamily Development

Table 1-6: Countywide Multifamily Development by Jurisdiction

Jurisdiction	Gross Acres	Units	Gross Density	Percent of Total Multifamily Units
Auburn (part)	-	-	-	0.0%
Bonney Lake	27.81	615	22.12	6.2%
Buckley	-	-	-	0.0%
Carbonado	-	-	-	0.0%
DuPont	12.29	175	14.24	1.8%
Eatonville	0.28	4	14.37	0.0%
Edgewood	22.21	475	21.38	4.8%
Fife	9.91	150	15.14	1.5%
Fircrest	0.30	2	6.67	0.0%
Gig Harbor	51.68	649	12.56	6.5%
Lakewood	6.93	92	13.28	0.9%
Milton (part)	-	-	-	0.0%
Orting	0.47	3	6.38	0.0%
Pacific (part)	-	-	-	0.0%
Puyallup	27.63	374	13.53	3.8%
Roy	-	-	-	0.0%
Ruston	-	-	-	0.0%
South Prairie	-	-	-	0.0%
Steilacoom	-	-	-	0.0%
Sumner	9.67	188	19.44	1.9%
Tacoma	83.36	4,065	48.76	41.0%
University Place	1.39	270	193.83	2.7%
Wilkeson	-	-	-	0.0%
Unincorporated Urban Pierce County	173.26	2,854	16.47	28.8%
Urban Total	427.19	9,916	23.21	100.0%

Non-Residential Development

Non-residential building permits typically include commercial and industrial development; however, public use is often collected and summarized as well when the use type produces jobs. While the project acreage, building square footage, and floor-to-area ratio information is collected and summarized for the report in order to track non-residential development, the employment density is analyzed in a separate report using data other than building permits. The most recent employment density study to support the assumptions in this Report is provided in Appendix C: Employment Density Survey.

Table 1-7: Countywide Non-Residential Development by Jurisdiction

Jurisdiction	Gross Acres	Building Square Feet (SF)	Floor-to-Area Ratio	Percent of Total Non-Residential Building SF Developed
Auburn (part)	7.07	154,075	0.50	0.7%
Bonney Lake	41.85	546,742	0.30	2.4%
Buckley	7.22	39,577	0.13	0.2%
Carbonado	-	-	-	-
DuPont	214.96	3,955,958	0.42	17.3%
Eatonville	10.10	2,100	0.00	0.0%
Edgewood	9.25	138,010	0.34	0.6%
Fife	200.18	2,369,015	0.27	10.4%
Fircrest	-	-	-	-
Gig Harbor	37.27	317,602	0.20	1.4%
Lakewood	169.58	2,071,492	0.28	9.1%
Milton (part)	1.23	4,888	0.09	0.0%
Orting	-	-	-	-
Pacific (part)	22.62	332,093	0.34	1.5%
Puyallup	77.08	1,142,862	0.34	5.0%
Roy	0.19	168	0.02	0.0%
Ruston	11.37	215,096	0.43	0.9%
South Prairie	1.67	5,640	0.08	0.0%
Steilacoom	-	-	-	-
Sumner	355.59	5,068,779	0.33	22.2%
Tacoma	177.02	1,374,509	0.18	6.0%
University Place	7.97	321,233	0.93	1.4%
Wilkeson	-	-	-	-
Unincorporated Urban Pierce County	560.30	4,757,799	0.19	20.9%
Urban Total	1,912.52	22,817,638	0.27	100.0%

Employment Estimates

Table 1-8: Countywide Employment, Growth, Target, and Remaining Need by Jurisdiction

Jurisdiction	2010 Jobs	2030 Employment Target	2010-2030 Employment Need	2019 Jobs	2010-2019 Employment Growth	2019-2030 Employment Remaining Need
Auburn (part)	590	834	244	1,109	519	0
Bonney Lake	4,505	5,448	943	6,002	1,497	0
Buckley	2,089	3,033	944	2,599	510	434
Carbonado	52	68	16	62	10	6
DuPont	2,937	9,078	6,141	4,650	1,713	4,428
Eatonville	905	2,335	1,430	898	-7	1,437
Edgewood	1,352	3,094	1,742	1,988	636	1,106
Fife	12,504	19,300	6,796	17,190	4,686	2,110
Fircrest	1,369	1,544	175	1,429	60	115
Gig Harbor	9,155	10,189	1,034	12,422	3,267	0
Lakewood	25,259	38,336	13,077	30,982	5,723	7,354
Milton (part)	1,855	2,337	482	2,197	342	140
Orting	1,134	2,370	1,236	1,337	203	1,033
Pacific (part)	2,071	5,156	3,085	2,028	-43	3,128
Puyallup	22,208	34,267	12,059	30,377	8,169	3,890
Roy	158	342	184	248	90	94
Ruston	141	494	353	422	281	72
South Prairie	66	140	74	76	10	64
Steilacoom	659	788	129	701	42	87
Sumner	9,825	21,484	11,659	17,559	7,734	3,925
Tacoma	104,399	176,930	72,531	122,299	17,900	54,631
University Place	6,074	9,593	3,519	7,260	1,186	2,333
Wilkeson	63	85	22	74	11	11
Unincorporated Urban Pierce County	36,336	65,893	29,557	44,760	8,424	21,133
Urban Total	245,706	413,138	167,432	308,669	62,963	107,531

Sources: PSRC Employment Estimates (2019 Estimate), Ord. No. 2017-24s (2030 Targets), 2014 Buildable Lands Report (2010 Estimate).

CAPACITY ANALYSIS

Inventory and Capacity Calculation Characteristics

A portion of the inventory is deducted from the gross acreage based on the assumptions identified in each jurisdiction's sub-section. Table 1-9 shows the characteristics of the initial inventory and Table 1-10 shows the amount of land that was reduced from that initial inventory to be included in the

capacity analysis, as documented in the tables and maps in Appendix A: Full Data, Calculation Tables, and Maps.

Table 1-9: Countywide Summary of Developable Land Characteristics

Characteristics/Category	Vacant	Underutilized	Vacant Single Unit	Pipeline
Total Acreage (Gross)	8,824.89	22,338.83	1,868.99	6,651.23
Average Lot Size (Gross)	2.37	1.12	0.29	9.04
Total Acreage (Net)	6,499.26	18,935.52	1,119.63	5,308.38
Average Lot Size (Net)	1.74	0.95	0.17	7.21
Percent Critical Areas	26%	15%	40%	20%

The parcel inventory is used to categorize land and the capacity calculations are intended to represent the land available for development; thus, the inventory maps alone do not represent the “buildable land” per the Buildable Lands requirements. Table 1-10 shows the overall percentage of land assumed available vs. not available as capacity in the 20-year planning period and the deductions made to account for constraints to the inventory and overall market conditions.

Table 1-10: Countywide Summary of Deductions

Deductions/Category	Vacant	Underutilized
Critical Areas	2,325.63	3,403.31
Infrastructure Gaps	1,663.38	5,342.78
Plat Deductions	470.29	1,553.40
Capital Facilities	29.85	45.57
Market Factor	795.97	5,118.28
Total Percent Reduction in Inventory Land	35%	45%
Percent of Vacant or Underutilized Land Available for Capacity	65%	55%

Housing and Employment Capacity

The housing and employment capacity totals in Table 1-11 and Table 1-12: Countywide Employment Capacity and Need by Jurisdiction

are derived from the calculations shown in Appendix A: Full Data, Calculation Tables, and Maps. To meet the Buildable Lands requirements, the 2020-2044 housing and employment capacities have been compared to the 2030 housing and employment growth targets to determine if they are still within those growth expectations.

The data will be updated in a subsequent report to compare with and further analyze consistency with the 2044 growth targets currently under development. Table 1-13 provides preliminary estimate countywide, comparing the draft 2020-2044 housing and employment needs with the capacity results.

11 CITY OF GIG HARBOR



The City of Gig Harbor's Comprehensive Plan and regulations implement densities using net acreage, subtracting out streets, roads, access easements, wetlands, ravine sidewalls, bluffs, and tideland.

Table 11-1: City of Gig Harbor Zone Classifications

Zone Classification		Zone Type ¹	Total Acres ²
B-1	Neighborhood Commercial District	Commercial	0.6
B-2	General Business District	Commercial	223.6
C-1	Commercial District	Commercial	52.3
DB	Downtown Business District	Commercial	30.2
ED	Employment District	Industrial	241.0
PCD-BP	Planned Community Development Business Park District	Planned	152.0
PCD-C	Planned Community Development Commercial	Planned	75.1
PCD-NB	Planned Community Development Neighborhood Business District	Planned	
PCD-RLD	Planned Community Development Low Density Residential	Planned	
PCD-RMD	Planned Community Development Medium Density Residential	Planned	39.3
PI	Public-Institutional District	Commercial	142.9
PRD	Planned Residential Development	Planned	205.3

Zone Classification		Zone Type ¹	Total Acres ²
R-1	Single-Family Residential	Residential	1,173.0
R-2	Medium-Density Residential	Residential	372.8
R-3	Multiple-Family Residential	Residential	53.7
RB-1	Residential and Business District	Mixed Use	39.1
RB-2	Residential and Business District	Mixed Use	201.3
WC	Waterfront Commercial	Mixed Use	22.5
WM	Waterfront Millville	Mixed Use	12.2
WR	Waterfront Residential	Residential	16.4

¹For purposes of the Buildable Lands inventory and analysis; not a representation of the City zoning code.

²Represents parcel acreage, not zoning coverage.

Sources: City Zoning Code.

DEVELOPMENT TRENDS

This section summarizes permit data observed between January 1, 2013 and December 31, 2020 that is used to monitor observed densities and update the assumptions for future development. The summaries in this section are designed to show the average statistics used to inform the report. Only data pertinent to the Buildable Lands requirements is collected, and incomplete or not-applicable data is omitted; therefore, this Report does not provide a full summary of all development within the jurisdiction. For more detailed summaries by zone/year, see Appendix A: Full Data, Calculation Tables, and Maps.

Table 11-2 shows the average residential density per zone and jurisdiction-wide and is not intended to show the total units/lots created or overall acres consumed. The results reflect the density calculation used by the jurisdiction, and only include a summary of plats and multifamily (3+ attached units) projects. Table 11-3 shows the average floor-to-area ratio (FAR) by zone and the amount of non-residential building square footage developed. The non-residential projects summarized only include new development and omit additions to existing businesses and non-building type improvements.

Table 11-2: City of Gig Harbor 2013-2020 Residential Trends by Zone¹

Zone	Net Acres ²	Lots/Units	Density
B-2	2.51	66	26.29
PCD-RMD	14.58	63	4.32
PRD	235.04	1,007	4.28
R-1	43.31	141	3.26
R-2	51.13	174	3.40
R-3	2.15	10	4.65
RB-1	3.25	11	3.38
RB-2	23.39	220	9.41
Total/Avg.	375.36	1,692	4.51

Table 11-3: City of Gig Harbor 2013-2020 Non-residential Trends by Zone

Zone	Acres	Sq. Ft.	FAR
B-2	9.38	95,187	0.23
C-1	14.00	175,497	0.29
PCD-BP	11.00	10,679	0.02
PRD	17.97	409,491	0.52
R-1	0.09	1,155	0.29
RB-1	1.00	8,952	0.21
RB-2	1.14	20,532	0.41
WM	0.66	5,600	0.19
Total/Avg.	55.24	727,093	0.30

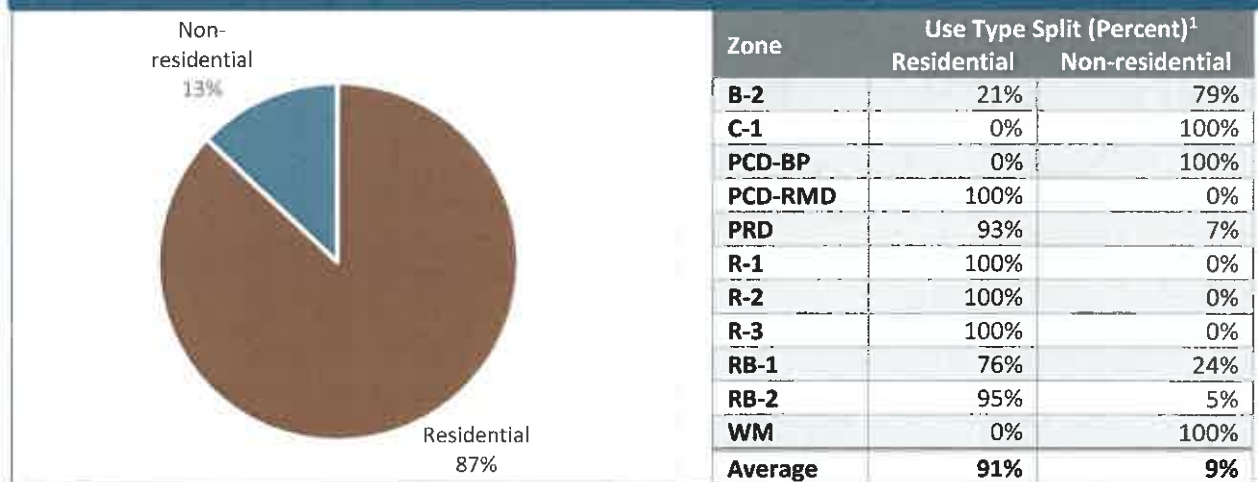
¹Includes multifamily and plat data to represent the overall observed density by zone. Does not include single-family permits in order to accurately represent permitted densities; therefore, does not represent the total number of units developed in the timeframe.

Sources: City Permit Data, Pierce County Assessor-Treasurer Tax Parcels, Puget Sound Regional Council Housing Unit Permit Database.

While the non-residential development trends are informative to show the percent of land consumed for non-residential purposes (as shown in Figure 11-A), the employment densities used in the capacity

assumptions are derived through employment density surveys, as documented in Appendix C: Employment Density Survey. Figure 11-A summarizes the split between residential and non-residential development between 2013-2020 by zone and the jurisdiction average. The percent split is based on the gross acres developed between 2013-2020 using the plat activity and multifamily permits for residential and non-residential permits for non-residential. The information is used to inform the percent split for mixed-use zones, as well as the percent of non-residential uses in residential-only zones.

Figure 11-A: City of Gig Harbor Residential vs. Non-residential Development Split



¹Does not include single-family permits in order to avoid double-counting acreage.

Sources: City Permit Data, Pierce County Assessor-Treasurer Tax Parcels, Puget Sound Regional Council Housing Unit Permit Database.

Housing Production Rate

The residential data collected for the Buildable Lands Program tracks the density and other assumptions related to the capacity analysis. The Buildable Lands requirements that were amended in 2017 now require the tracking of housing production to compare to the necessary growth rates to achieve the housing targets. Due to the limitations of the permit data and lack of demolition permit data, Pierce County relies upon the [Washington State Office of Financial Management](#) estimates to track the number of housing units built per year in each jurisdiction for the purposes of this Report. The comparison of housing production and housing needs is shown in Table 1-2 and Table 1-3 (Countywide).

Figure 11-B: City of Gig Harbor Housing Production Rates (OFM)

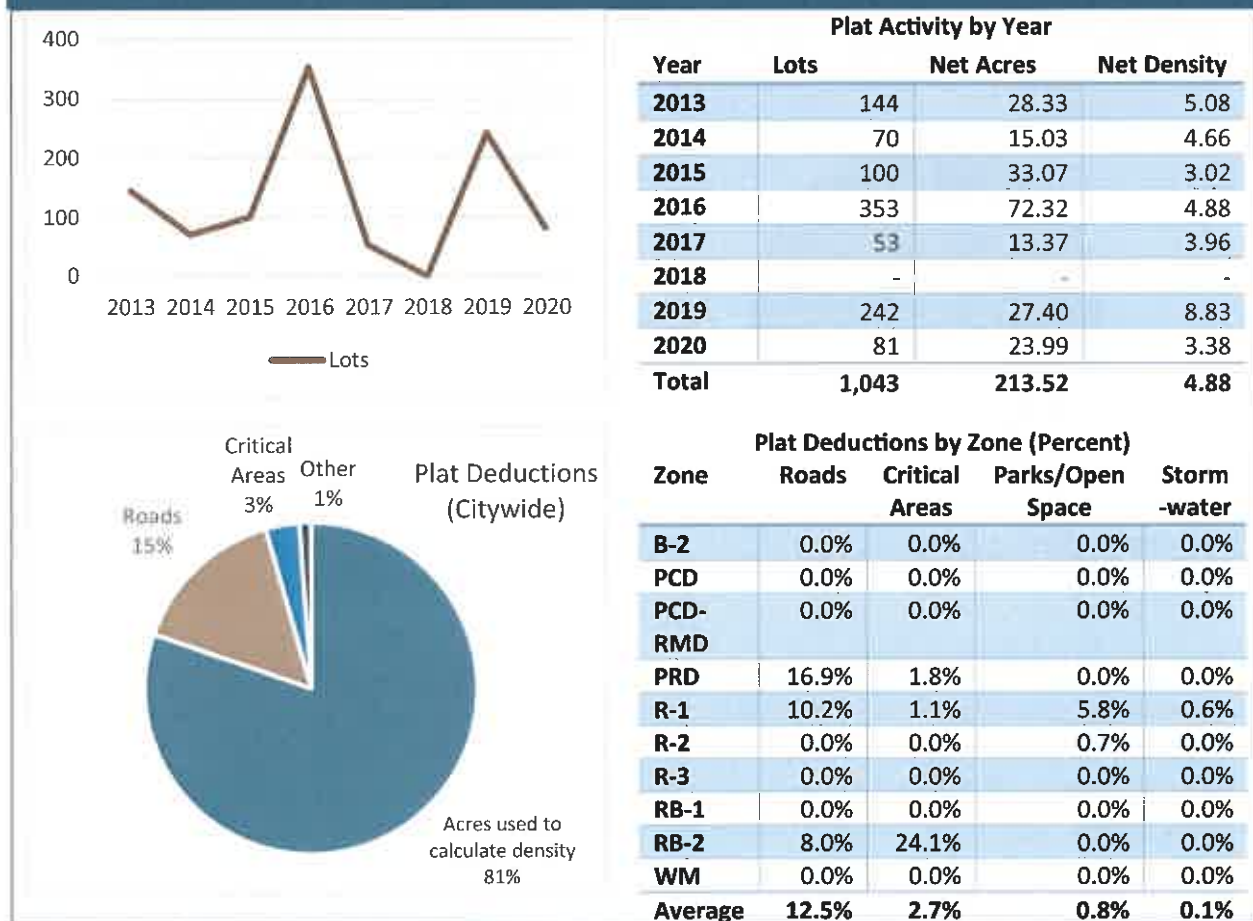


Source: Washington State Office of Financial Management Housing Unit Data (2020).

Platting Activity

Platting activity is used to determine the achieved density for single-family residential zones and to identify the amount of land used for other purposes (whether netted out for density or applied by a regulation and affecting the achieved density). Plat data is used in conjunction with multifamily permits to determine the overall achieved density (as shown in Table 11-2).

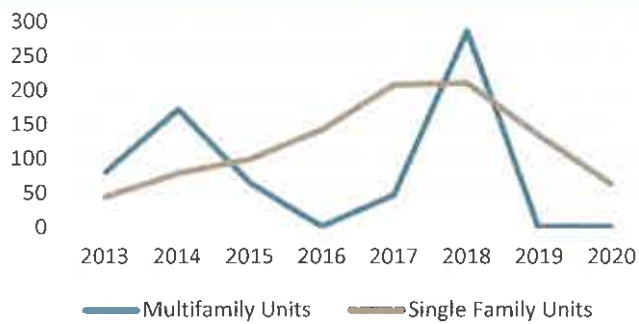
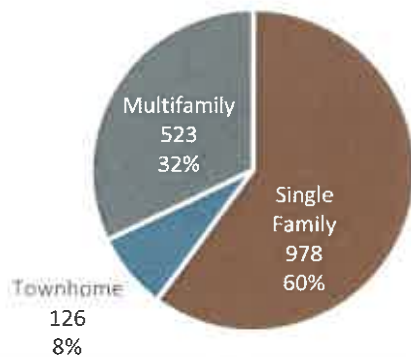
Figure 11-C: City of Gig Harbor Platting Trends



Sources: City Permit Data, Pierce County Auditor Recorded Plats.

Residential Building Trends

Both multifamily and single-family building permits are collected and summarized; however, single-family permit reporting is optional per the Pierce County Countywide Planning Policies and limited in use for tracking factors affecting development. The single-family permit data is useful for identifying the total number of units built and the average lot size per zone and is provided as supplemental information. The multifamily permit data is used to identify the observed density and amount of land used for residential purposes. Please note that this data differs from the data provided in Figure 11-B due to collection limitations and should not be used to represent housing production in the jurisdiction.

Figure 11-D: City of Gig Harbor Residential Building Permit Trends**Housing Unit Types Built 2013-2020****Multifamily Permits by Year**

Year	Units	Net Acres	Net Density
2013	80	15.50	5.16
2014	172	11.52	14.93
2015	64	1.92	33.33
2016	0	0.00	-
2017	46	9.64	9.64
2018	287	17.97	15.97
2019	0	0.00	-
2020	0	0.00	-
Total	649	51.68	12.56

Single-Family Permits by Year (Optional)

Year	Lots	Acres	Avg. Lot Size
2013	43	4.82	0.11
2014	78	9.13	0.12
2015	99	13.88	0.14
2016	142	19.79	0.14
2017	208	29.36	0.14
2018	211	29.11	0.14
2019	134	20.80	0.16
2020	63	11.62	0.18
Total	978	138.51	0.14

Sources: City Permit Data, Pierce County Assessor-Treasurer Tax Parcels, Puget Sound Regional Council Housing Unit Permit Database.

Non-residential Building Trends

Non-residential building permits typically include commercial and industrial development; however, public use is often collected and summarized as well when the use type produces jobs. While the project acreage, building square footage, and floor-to-area ratio information is collected and summarized for the report in order to track non-residential development, the employment density is analyzed in a separate report using data other than building permits. The most recent employment density study to support the assumptions in this Report is provided in Appendix C: Employment Density Survey.

Figure 11-E: City of Gig Harbor Non-residential Permit Trends

Year	Acres	Bldg. SF	FAR
2013	6.95	67,585	0.22
2014	11.37	14,240	0.03
2015	-	-	-
2016	-	-	-
2017	1.76	20,319	0.27
2018	20.16	440,500	0.50
2019	15.00	184,449	0.28
2020	-	-	-
Total	55.24	727,093	0.30

Sources: City Permit Data, Pierce County Assessor-Treasurer Tax Parcels, Puget Sound Regional Council Housing Unit Permit Database.

ASSUMPTIONS

Assumptions vary by jurisdiction and zone. Table 11-4 and Table 11-5 provide a snapshot of the densities, mixed-use split, and deductions used in the inventory development and capacity calculation tables. The assumptions for each zone are shown in the assumptions column of the capacity calculation tables shown in Appendix A: Full Data, Calculation Tables, and Maps.

The PCD and PRD zones have planned development assumptions represented as pipeline development in the capacity calculations, so they are not shown here.

Table 11-4: City of Gig Harbor Assumptions Summary

Zone	Residential		Employment		Residential Market Factor		Non-Residential Market Factor		Land for Capital Facilities
	Percent	Density	Percent	Density	Vacant	Underutilized	Vacant	Underutilized	
B-1	0%	0	100%	20	0%	0%	10%	50%	0%
B-2	20%	6	80%	20	10%	50%	10%	50%	0%
C-1	0%	0	100%	20	0%	0%	10%	50%	0%
DB	20%	8	80%	20	10%	50%	10%	50%	0%
ED	0%	0	100%	9	0%	0%	10%	50%	0%
PCD-BP	0%	0	100%	20	0%	0%	0%	0%	0%
PCD-C	0%	0	100%	20	0%	0%	0%	0%	0%
PCD-RMD	0%	0	0%	0	0%	0%	0%	0%	0%
PI	0%	0	100%	20	0%	0%	10%	50%	0%
PRD	0%	0	0%	0	0%	0%	0%	0%	0%
R-1	100%	4	0%	20	10%	50%	0%	0%	0%
R-2	100%	6	0%	20	10%	50%	0%	0%	0%
R-3	100%	8	0%	20	10%	50%	0%	0%	0%
RB-1	30%	4	70%	20	10%	50%	10%	50%	0%
RB-2	30%	8	70%	20	10%	50%	10%	50%	0%
WC	20%	4	80%	20	10%	0%	0%	50%	0%
WM	20%	4	80%	0	10%	0%	0%	50%	0%
WR	100%	4	0%	0	10%	50%	0%	0%	0%

The Vacant Single Unit size threshold listed below represents the parcel size used to determine if a vacant property is subdividable or only able to accommodate one unit. Parcels smaller than the size listed are considered Vacant Single Units unless otherwise determined by the jurisdiction during the parcel-specific review.

Table 11-5: City of Gig Harbor Plat Deductions for Single-Family Residential Zones

Zone	Roads	Critical Areas	Parks/Open Space	Stormwater	Non-residential	Vacant Single Unit
R-1	15%	GIS	0%	0%	2%	<0.625 acres
R-2	15%	GIS	0%	0%	2%	<0.420 acres
R-3	15%	GIS	0%	0%	2%	N/A

HOUSING AND EMPLOYMENT CAPACITY

Inventory and Capacity Calculation Characteristics

A portion of the inventory is deducted from the gross acreage based on the assumptions identified in the previous section. Table 11-6 shows the characteristics of the initial inventory and Table 11-7 shows the amount of land that was reduced from that initial inventory to be included in the capacity analysis, as documented in the tables and maps in Appendix A: Full Data, Calculation Tables, and Maps.

Table 11-6: City of Gig Harbor Summary of Vacant and Underutilized Land Characteristics

Characteristics/Category	Vacant	Underutilized	Vacant Single Unit	Pipeline
Total Acreage (Gross)	411.92	351.37	50.85	174.18
Average Lot Size (Gross)	2.56	1.36	0.13	7.26
Total Acreage (Net)	397.81	343.88	48.17	171.26
Average Lot Size (Net)	2.47	1.33	0.13	7.14
Percent Critical Areas	3%	2%	5%	2%

The parcel inventory is used to categorize land and the capacity calculations are intended to represent the land available for development; thus, the inventory maps alone do not represent the “buildable land” per the Buildable Lands requirements. Table 11-7 shows the overall percentage of land assumed available as capacity in the 20-year planning period and the deductions made to account for constraints to the inventory and overall market conditions.

Table 11-7: City of Gig Harbor Summary of Deductions

Deductions/Category	Vacant	Underutilized
Critical Areas	14.11	7.49
Plat Deductions	33.93	32.94
Capital Facilities	0.00	0.00
Market Factor	35.46	156.15
Total Percent Reduction in Inventory Land	19%	56%
Percent of Vacant or Underutilized Land Available for Capacity	81%	44%

Capacity Results

The housing and employment capacity totals in Table 11-8 and Table 11-9 are derived from the calculations shown in Appendix A: Full Data, Calculation Tables, and Maps. A summary of the countywide capacity results compared to need is shown in Table 1-11 (2030 Housing Target), Table 1-12 (2030 Employment Target), and Table 1-13 (DRAFT 2044 Targets).

Table 11-8: City of Gig Harbor 2020-2044 Housing Capacity (Dwelling Units)

Zone	Vacant	Underutilized	Vacant Single Unit	Pipeline	Total
B-1	0	0	0	0	0
B-2	25	19	0	0	44
C-1	0	0	0	0	0
DB	1	10	0	0	11
ED	0	0	0	0	0
PCD-BP	0	0	0	20	20
PCD-C	0	0	0	0	0
PCD-RMD	0	0	0	0	0
PI	0	0	0	0	0
PRD	0	0	94	6	100
R-1	373	291	93	89	846
R-2	456	99	16	143	714
R-3	0	3	0	0	3
RB-1	3	6	0	8	17
RB-2	76	38	174	0	288
WC	1	0	0	0	1
WM	0	0	0	0	0
WR	0	0	2	0	2
Total	935	466	379	266	2,046

Table 11-9: City of Gig Harbor 2020-2044 Employment Capacity (Jobs)

Zone	Vacant	Underutilized	Pipeline	Total
B-1	12	0	0	12
B-2	333	261	0	594
C-1	171	62	7	240
DB	13	95	0	108
ED	727	142	206	1,075
PCD-BP	242	0	371	613
PCD-C	0	0	0	0
PCD-RMD	0	0	0	0
PI	0	0	0	0
PRD	0	0	0	0
R-1	373	61	0	434
R-2	456	14	0	470
R-3	0	0	0	0
RB-1	3	73	0	76
RB-2	76	231	10	317
WC	1	3	0	4
WM	0	0	0	0
WR	0	0	0	0
Total	2,007	942	594	3,943

Assumptions and Capacity Calculations		B-1				B-2			
		Vacant		Underutilized		Vacant		Underutilized	
Gross Acres			0.64		0.00		23.12		32.57
Net Acres (minus critical areas)			0.64		0.00		23.12		32.20
Net Acres with Infrastructure Gaps			0.00		0.00		0.00		0.00
Displaced Housing Units					0				1
Displaced Estimated Jobs					0				148
Housing Capacity Calculations		Assumption	Calculation	Assumption	Calculation	Assumption	Calculation	Assumption	Calculation
Residential Acreage		0%	0.00	0%	0.00	20%	4.62	20%	6.44
Infrastructure Gap Residential Deduction		0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Acreage			0.00		0.00		4.62		6.44
Roads Deduction		0%	0.00	0%	0.00	0%	0.00	0%	0.00
Critical Area Deduction (only if %)		0%	0.00	0%	0.00	0%	0.00	0%	0.00
Parks/Open Space Deduction		0%	0.00	0%	0.00	0%	0.00	0%	0.00
Stormwater Deduction		0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Net Acres			0.00		0.00		4.62		6.44
Non-Residential Deduction		0%	0.00	0%	0.00	0%	0.00	0%	0.00
Public Facilities Deduction		0%	0.00	0%	0.00	0%	0.00	0%	0.00
Residential Market Factor Deduction		0%	0.00	0%	0.00	10%	0.46	50%	3.22
Final Residential Net Acres			0.00		0.00		4.16		3.22
Vacant/Underutilized Housing Unit Capacity		0	0	0	0	6	25	6	19
Vacant Single Unit Addition			0				0		
Pipeline Unit Addition			0		0		0		0
Adjusted Displaced Unit Deduction		90%		0%	0	90%		50%	1
Total Housing Capacity		0		0		25		18	
Employment Capacity Calculations									
Non-residential Acreage		100%	0.64	100%	0.00	80%	18.50	80%	26.06
Infrastructure Gap Non-residential Deduction		0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Non-residential Acreage			0.64		0.00		18.50		26.06
Public Facilities Deduction		0%	0.00	0%	0.00	0%	0.00	0%	0.00
Non-residential Market Factor Deduction		10%	0.06	50%	0.00	10%	1.85	50%	13.03
Non-Residential in Residential Addition			0.00		0.00		0.00		0.00
Final Non-residential Net Acres			0.58		0.00		16.65		13.03
Vacant/Underutilized Job Capacity		20	12	20	0	20	333	20	261
Pipeline Job Addition			0		0		0		0
Adjusted Displaced Jobs Deduction		90%		0%	0	90%		50%	74
Total Employment Capacity		12		0		333		187	

Assumptions and Capacity Calculations	C-1				DB			
	Vacant		Underutilized		Vacant		Underutilized	
Gross Acres		9.50		6.25		0.94		11.88
Net Acres (minus critical areas)		9.50		6.25		0.94		11.88
Net Acres with Infrastructure Gaps		0.00		0.00		0.00		0.00
Displaced Housing Units				0				14
Displaced Estimated Jobs				53				41
Housing Capacity Calculations	Assumption	Calculation	Assumption	Calculation	Assumption	Calculation	Assumption	Calculation
Residential Acreage	0%	0.00	0%	0.00	20%	0.19	20%	2.38
Infrastructure Gap Residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Acreage		0.00		0.00		0.19		2.38
Roads Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Critical Area Deduction (only if %)	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Parks/Open Space Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Stormwater Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Net Acres		0.00		0.00		0.19		2.38
Non-Residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Public Facilities Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Residential Market Factor Deduction	0%	0.00	0%	0.00	10%	0.02	50%	1.19
Final Residential Net Acres		0.00		0.00		0.17		1.19
Vacant/Underutilized Housing Unit Capacity	0	0	0	0	8	1	8	10
Vacant Single Unit Addition		0				0		
Pipeline Unit Addition		0		0		0		0
Adjusted Displaced Unit Deduction	90%		50%	0	89%		50%	7
Total Housing Capacity	0		0		1		3	
Employment Capacity Calculations								
Non-residential Acreage	100%	9.50	100%	6.25	80%	0.75	80%	9.51
Infrastructure Gap Non-residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Non-residential Acreage		9.50		6.25		0.75		9.51
Public Facilities Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Non-residential Market Factor Deduction	10%	0.95	50%	3.13	10%	0.08	50%	4.76
Non-Residential in Residential Addition		0.00		0.00		0.00		0.00
Final Non-residential Net Acres		8.55		3.12		0.67		4.75
Vacant/Underutilized Job Capacity	20	171	20	62	20	13	20	95
Pipeline Job Addition		7		0		0		0
Adjusted Displaced Jobs Deduction	90%		50%	27	89%		50%	20
Total Employment Capacity	178		35		13		75	

Assumptions and Capacity Calculations	ED				PCD-BP			
	Vacant		Underutilized		Vacant		Underutilized	
Gross Acres		89.78		31.59		12.10		0.00
Net Acres (minus critical areas)		86.16		31.59		12.10		0.00
Net Acres with Infrastructure Gaps		0.00		0.00		0.00		0.00
Displaced Housing Units				6				0
Displaced Estimated Jobs				24				0
Housing Capacity Calculations	Assumption	Calculation	Assumption	Calculation	Assumption	Calculation	Assumption	Calculation
Residential Acreage	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Infrastructure Gap Residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Acreage		0.00		0.00		0.00		0.00
Roads Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Critical Area Deduction (only if %)	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Parks/Open Space Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Stormwater Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Net Acres		0.00		0.00		0.00		0.00
Non-Residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Public Facilities Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Residential Market Factor Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Final Residential Net Acres		0.00		0.00		0.00		0.00
Vacant/Underutilized Housing Unit Capacity	0	0	0	0	0	0	0	0
Vacant Single Unit Addition		0				0		
Pipeline Unit Addition		0		0		20		0
Adjusted Displaced Unit Deduction	90%		50%	3	100%		0%	0
Total Housing Capacity	0		-3		20		0	
Employment Capacity Calculations								
Non-residential Acreage	100%	89.78	100%	31.59	100%	12.10	100%	0.00
Infrastructure Gap Non-residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Non-residential Acreage		89.78		31.59		12.10		0.00
Public Facilities Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Non-residential Market Factor Deduction	10%	8.98	50%	15.80	0%	0.00	0%	0.00
Non-Residential in Residential Addition		0.00		0.00		0.00		0.00
Final Non-residential Net Acres		80.80		15.79		12.10		0.00
Vacant/Underutilized Job Capacity	9	727	9	142	20	242	20	0
Pipeline Job Addition		206		0		371		0
Adjusted Displaced Jobs Deduction	90%		50%	12	100%		0%	0
Total Employment Capacity	933		130		613		0	

Assumptions and Capacity Calculations	PCD-C				PCD-RMD			
	Vacant		Underutilized		Vacant		Underutilized	
Gross Acres		0.00		0.00		0.00		0.00
Net Acres (minus critical areas)		0.00		0.00		0.00		0.00
Net Acres with Infrastructure Gaps		0.00		0.00		0.00		0.00
Displaced Housing Units				0				0
Displaced Estimated Jobs				0				0
Housing Capacity Calculations	Assumption	Calculation	Assumption	Calculation	Assumption	Calculation	Assumption	Calculation
Residential Acreage	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Infrastructure Gap Residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Acreage		0.00		0.00		0.00		0.00
Roads Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Critical Area Deduction (only if %)	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Parks/Open Space Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Stormwater Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Net Acres		0.00		0.00		0.00		0.00
Non-Residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Public Facilities Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Residential Market Factor Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Final Residential Net Acres		0.00		0.00		0.00		0.00
Vacant/Underutilized Housing Unit Capacity	0	0	0	0	0	0	0	0
Vacant Single Unit Addition		0				0		
Pipeline Unit Addition		0		0		0		0
Adjusted Displaced Unit Deduction	0%		0%	0	0%		0%	0
Total Housing Capacity	0		0		0		0	
Employment Capacity Calculations								
Non-residential Acreage	100%	0.00	100%	0.00	0%	0.00	0%	0.00
Infrastructure Gap Non-residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Non-residential Acreage		0.00		0.00		0.00		0.00
Public Facilities Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Non-residential Market Factor Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Non-Residential in Residential Addition		0.00		0.00		0.00		0.00
Final Non-residential Net Acres		0.00		0.00		0.00		0.00
Vacant/Underutilized Job Capacity	20	0	20	0	0	0	0	0
Pipeline Job Addition		0		0		0		0
Adjusted Displaced Jobs Deduction	0%		0%	0	0%		0%	0
Total Employment Capacity	0		0		0		0	

Assumptions and Capacity Calculations	PI				PRD			
	Vacant		Underutilized		Vacant		Underutilized	
Gross Acres		0.00		0.00		0.00		0.00
Net Acres (minus critical areas)		0.00		0.00		0.00		0.00
Net Acres with Infrastructure Gaps		0.00		0.00		0.00		0.00
Displaced Housing Units				0				0
Displaced Estimated Jobs				0				0
Housing Capacity Calculations	Assumption	Calculation	Assumption	Calculation	Assumption	Calculation	Assumption	Calculation
Residential Acreage	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Infrastructure Gap Residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Acreage		0.00		0.00		0.00		0.00
Roads Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Critical Area Deduction (only if %)	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Parks/Open Space Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Stormwater Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Net Acres		0.00		0.00		0.00		0.00
Non-Residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Public Facilities Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Residential Market Factor Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Final Residential Net Acres		0.00		0.00		0.00		0.00
Vacant/Underutilized Housing Unit Capacity	0	0	0	0	0	0	0	0
Vacant Single Unit Addition		0				94		
Pipeline Unit Addition		0		0		6		0
Adjusted Displaced Unit Deduction	0%		0%	0	0%		0%	0
Total Housing Capacity	0		0		100		0	
Employment Capacity Calculations								
Non-residential Acreage	100%	0.00	100%	0.00	0%	0.00	0%	0.00
Infrastructure Gap Non-residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Non-residential Acreage		0.00		0.00		0.00		0.00
Public Facilities Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Non-residential Market Factor Deduction	10%	0.00	50%	0.00	0%	0.00	0%	0.00
Non-Residential in Residential Addition		0.00		0.00		0.00		0.00
Final Non-residential Net Acres		0.00		0.00		0.00		0.00
Vacant/Underutilized Job Capacity	20	0	20	0	0	0	0	0
Pipeline Job Addition		0		0		0		0
Adjusted Displaced Jobs Deduction	0%		0%	0	0%		0%	0
Total Employment Capacity	0		0		0		0	

Assumptions and Capacity Calculations	R-1				R-2			
	Vacant		Underutilized		Vacant		Underutilized	
Gross Acres		133.87		182.79		102.66		41.64
Net Acres (minus critical areas)		124.66		178.49		101.54		40.36
Net Acres with Infrastructure Gaps		0.00		0.00		0.00		0.00
Displaced Housing Units				106				17
Displaced Estimated Jobs				0				0
Housing Capacity Calculations	Assumption	Calculation	Assumption	Calculation	Assumption	Calculation	Assumption	Calculation
Residential Acreage	100%	124.66	100%	178.49	100%	101.54	100%	40.36
Infrastructure Gap Residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Acreage		124.66		178.49		101.54		40.36
Roads Deduction	15%	18.70	15%	26.77	15%	15.23	15%	6.05
Critical Area Deduction (only if %)	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Parks/Open Space Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Stormwater Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Net Acres		105.96		151.72		86.31		34.31
Non-Residential Deduction	2%	2.12	2%	3.03	2%	1.73	2%	0.69
Public Facilities Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Residential Market Factor Deduction	10%	10.60	50%	75.86	10%	8.63	50%	17.16
Final Residential Net Acres		93.24		72.83		75.95		16.46
Vacant/Underutilized Housing Unit Capacity	4	373	4	291	6	456	6	99
Vacant Single Unit Addition		93				16		
Pipeline Unit Addition		89		0		143		0
Adjusted Displaced Unit Deduction	71%		42%	45	76%		41%	7
Total Housing Capacity		555		246		615		92
Employment Capacity Calculations								
Non-residential Acreage	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Infrastructure Gap Non-residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Non-residential Acreage		0.00		0.00		0.00		0.00
Public Facilities Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Non-residential Market Factor Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Non-Residential in Residential Addition		2.12		3.03		1.73		0.69
Final Non-residential Net Acres		2.12		3.03		1.73		0.69
Vacant/Underutilized Job Capacity	20	42	20	61	20	35	20	14
Pipeline Job Addition		0		0		0		0
Adjusted Displaced Jobs Deduction	71%		42%	0	76%		41%	0
Total Employment Capacity		42		61		35		14

Assumptions and Capacity Calculations	R-3				RB-1			
	Vacant		Underutilized		Vacant		Underutilized	
Gross Acres		0.00		0.80		2.64		10.40
Net Acres (minus critical areas)		0.00		0.80		2.64		10.40
Net Acres with Infrastructure Gaps		0.00		0.00		0.00		0.00
Displaced Housing Units				0				6
Displaced Estimated Jobs				0				28
Housing Capacity Calculations	Assumption	Calculation	Assumption	Calculation	Assumption	Calculation	Assumption	Calculation
Residential Acreage	100%	0.00	100%	0.80	30%	0.79	30%	3.12
Infrastructure Gap Residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Acreage		0.00		0.80		0.79		3.12
Roads Deduction	15%	0.00	15%	0.12	0%	0.00	0%	0.00
Critical Area Deduction (only if %)	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Parks/Open Space Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Stormwater Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Net Acres		0.00		0.68		0.79		3.12
Non-Residential Deduction	2%	0.00	2%	0.01	0%	0.00	0%	0.00
Public Facilities Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Residential Market Factor Deduction	10%	0.00	50%	0.34	10%	0.08	50%	1.56
Final Residential Net Acres		0.00		0.33		0.71		1.56
Vacant/Underutilized Housing Unit Capacity	8	0	8	3	4	3	4	6
Vacant Single Unit Addition		0				0		
Pipeline Unit Addition		0		0		8		0
Adjusted Displaced Unit Deduction	0%		43%	0	90%		50%	3
Total Housing Capacity	0		3		11		3	
Employment Capacity Calculations								
Non-residential Acreage	0%	0.00	0%	0.00	70%	1.85	70%	7.28
Infrastructure Gap Non-residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Non-residential Acreage		0.00		0.00		1.85		7.28
Public Facilities Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Non-residential Market Factor Deduction	0%	0.00	0%	0.00	10%	0.19	50%	3.64
Non-Residential in Residential Addition		0.00		0.01		0.00		0.00
Final Non-residential Net Acres		0.00		0.01		1.66		3.64
Vacant/Underutilized Job Capacity	20	0	20	0	20	33	20	73
Pipeline Job Addition		0		0		0		0
Adjusted Displaced Jobs Deduction	0%		43%	0	90%		50%	14
Total Employment Capacity	0		0		33		59	

Assumptions and Capacity Calculations	RB-2				WC			
	Vacant		Underutilized		Vacant		Underutilized	
Gross Acres		35.46		33.03		1.20		0.42
Net Acres (minus critical areas)		35.30		31.49		1.20		0.42
Net Acres with Infrastructure Gaps		0.00		0.00		0.00		0.00
Displaced Housing Units				9				0
Displaced Estimated Jobs				89				7
Housing Capacity Calculations	Assumption	Calculation	Assumption	Calculation	Assumption	Calculation	Assumption	Calculation
Residential Acreage	30%	10.59	30%	9.45	20%	0.24	20%	0.08
Infrastructure Gap Residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Acreage		10.59		9.45		0.24		0.08
Roads Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Critical Area Deduction (only if %)	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Parks/Open Space Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Stormwater Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Net Acres		10.59		9.45		0.24		0.08
Non-Residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Public Facilities Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Residential Market Factor Deduction	10%	1.06	50%	4.73	10%	0.02	0%	0.00
Final Residential Net Acres		9.53		4.72		0.22		0.08
Vacant/Underutilized Housing Unit Capacity	8	76	8	38	4	1	4	0
Vacant Single Unit Addition		174				0		
Pipeline Unit Addition		0		0		0		0
Adjusted Displaced Unit Deduction	90%		49%	4	99%		60%	0
Total Housing Capacity	250		34		1		0	
Employment Capacity Calculations								
Non-residential Acreage	70%	24.82	70%	23.12	80%	0.96	80%	0.34
Infrastructure Gap Non-residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Non-residential Acreage		24.82		23.12		0.96		0.34
Public Facilities Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Non-residential Market Factor Deduction	10%	2.48	50%	11.56	0%	0.00	50%	0.17
Non-Residential in Residential Addition		0.00		0.00		0.00		0.00
Final Non-residential Net Acres		22.34		11.56		0.96		0.17
Vacant/Underutilized Job Capacity	20	447	20	231	20	19	20	3
Pipeline Job Addition		10		0		0		0
Adjusted Displaced Jobs Deduction	90%		49%	43	99%		60%	4
Total Employment Capacity	457		188		19		-1	

Assumptions and Capacity Calculations	WM				WR			
	Vacant		Underutilized		Vacant		Underutilized	
Gross Acres		0.00		0.00		0.00		0.00
Net Acres (minus critical areas)		0.00		0.00		0.00		0.00
Net Acres with Infrastructure Gaps		0.00		0.00		0.00		0.00
Displaced Housing Units				0				0
Displaced Estimated Jobs				0				0
Housing Capacity Calculations	Assumption	Calculation	Assumption	Calculation	Assumption	Calculation	Assumption	Calculation
Residential Acreage	20%	0.00	20%	0.00	100%	0.00	100%	0.00
Infrastructure Gap Residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Acreage		0.00		0.00		0.00		0.00
Roads Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Critical Area Deduction (only if %)	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Parks/Open Space Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Stormwater Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Residential Net Acres		0.00		0.00		0.00		0.00
Non-Residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Public Facilities Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Residential Market Factor Deduction	10%	0.00	0%	0.00	10%	0.00	50%	0.00
Final Residential Net Acres		0.00		0.00		0.00		0.00
Vacant/Underutilized Housing Unit Capacity	4	0	4	0	4	0	4	0
Vacant Single Unit Addition		0				2		
Pipeline Unit Addition		0		0		0		0
Adjusted Displaced Unit Deduction	0%		0%	0	0%		0%	0
Total Housing Capacity	0		0		2		0	
Employment Capacity Calculations								
Non-residential Acreage	80%	0.00	80%	0.00	0%	0.00	0%	0.00
Infrastructure Gap Non-residential Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Adjusted Non-residential Acreage		0.00		0.00		0.00		0.00
Public Facilities Deduction	0%	0.00	0%	0.00	0%	0.00	0%	0.00
Non-residential Market Factor Deduction	0%	0.00	50%	0.00	0%	0.00	0%	0.00
Non-Residential in Residential Addition		0.00		0.00		0.00		0.00
Final Non-residential Net Acres		0.00		0.00		0.00		0.00
Vacant/Underutilized Job Capacity	0	0	20	0	0	0	0	0
Pipeline Job Addition		0		0		0		0
Adjusted Displaced Jobs Deduction	0%		0%	0	0%		0%	0
Total Employment Capacity	0		0		0		0	

Appendix Figure 12: Lakewood Capacity Tables

See following page.

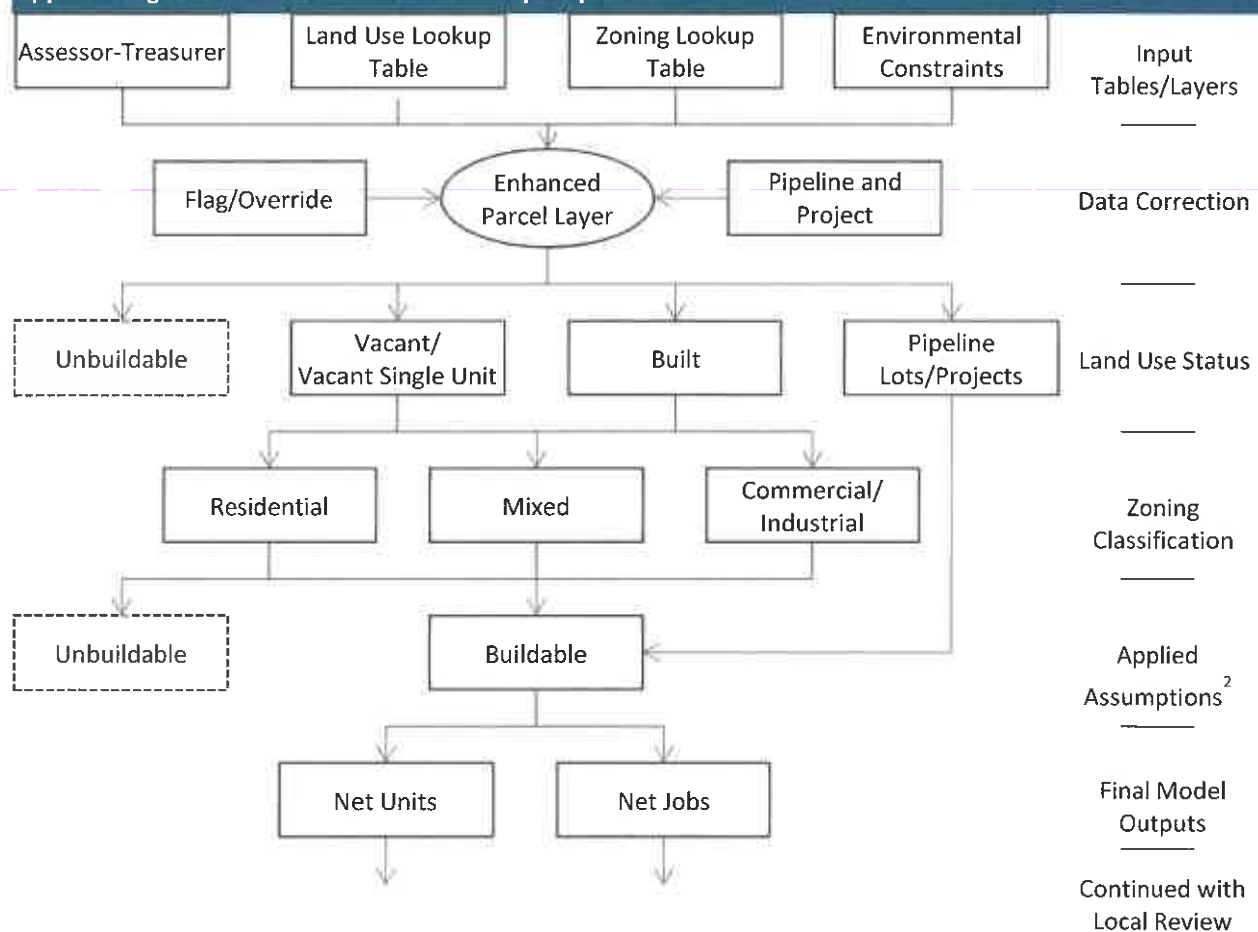
Appendix B: Buildable Lands Inventory Process

DATA INVENTORY

The process of buildable lands begins with assigning designations to parcels based on land use description. Parcels will be coded as vacant, potentially underutilized, unbuildable, or a special code for specific circumstance based on land use description. Certain land use codes that could be vacant will be marked for review by digital orthophoto to determine if they are vacant or not. This process is known as Stage 1A.

While vacant, vacant – single unit, and unbuildable are easily recognizable, underutilized lands require some definition and context. The underutilized category encompasses all parcels that could be further developed given market conditions. Thus, underutilized will capture parcels that have low densities for housing units or jobs that are assumed to have more capacity to accommodate population or employment growth. The following sections outline this process; text bodies contain the contextual information while the technical sequencing is displayed in bullets.

Appendix Figure 26: Buildable Lands Inventory Script Process



ESTIMATED NET UNITS AND JOBS

Net units and jobs are derived from the difference between the future estimated number of units and jobs respectively and the current baseline figures. These estimations are based on observed densities.

- For residential classifications future units equal the housing unit per acre assumption multiplied by the net acreage.
- For commercial and industrial classifications future jobs equal net acreage multiplied by the employees per acre density assumption.
- Residential net units equal the future residential units minus the 2020 inventoried units on the parcel.
- Commercial and industrial present jobs are calculated by parcel square feet divided by 500 for commercial and 900 for industrial.
- The net is then calculated by the present value subtracted from the future value.

INCLUSIONS AND EXCLUSIONS

Utilizing the classifications created in the first stage of this process, it was possible to manually search through selected fields and insert user overrides and special cases that need to be handled by the model separately. All of these classifications will be marked for inclusion or exclusion based on whether or not one could build upon them; hence those included are underutilized or vacant. Some parcels are locked at this stage so that the model ignores their land use type when calculating units and jobs. The model instead relies solely on the inventoried value supplied with the parcel itself. As an example, this occurs with pipeline projects which have a set number of future units.

- Query locks all pipeline parcels.
- Exclude all lots less than 3,000 net square feet, unless otherwise indicated by the jurisdiction.
- Exclude right of ways, narrow polygons, playgrounds, condos, some forms of government-owned lands, and marine areas.
- School sites are identified [this includes universities and colleges] and excluded.
- Vacant government parcels are included.
- Single-family residences on commercial, industrial, or mixed-use lands are included as underutilized.
- Exclude Joint Base Lewis-McChord parcels.
- Include/exclude manually corrected parcels.

REDEVELOPABLE EXCLUSIONS

Redevelopable exclusions provide another parameter which would exclude otherwise included parcels.

- If a single-family residence has an improvement value that is greater than or equal to \$500,000 it is excluded.
- If a mobile home park, multifamily development, or commercial development has a value greater than or equal to \$1,500,000 it is excluded.
- If a residential use has a future unit to base unit ratio less than 2.5 it is excluded.
- If a commercial use has a future job to existing estimated jobs ratio less than 5 it is excluded.

UNIT AND JOB REVISIONS

This section determines the final net units and jobs based on certain market assumptions, presumably that for underutilized units and jobs there must be sufficient additional units or jobs respectively, in order for development to likely occur.

- Housing units are first tested to determine if their acreage meets the minimum size for single-family zones. Those that do not meet this minimum are given a final unit of 1.
- School sites are marked at zero units and jobs while school parcels outside of the school boundary are treated as the parcel provided units and jobs indicate.
- Pipeline projects are marked with recorded units and jobs.
- Pipeline single-family residences are marked as vacant single units.
- Test redevelopable parcels for jobs and units and if they are below the minimum size. The ratio between future and base must be at least 2.5 for units and 5.0 for jobs.

CATEGORIZING POTENTIALLY VACANT, UNDERUTILIZED, AND UNBUILDABLE LAND

Appendix Table 1 shows the Assessor-Treasurer's (ATR) land use descriptions used to categorize land within the Buildable Lands Model.

Appendix Table 1: Inventory Categories for Assessor-Treasurer Tax Parcel Use Codes

	Landuse Description	Use Type	Category	Use Code
1	AG NOT CURRENT USE	OTHERS	REDEVELOPABLE	8100
2	AG RELATED ACTIVITIES	FIRES	REDEVELOPABLE	8200
3	AIRCRAFT TRANSPORTATION	WTCU	AIRCRAFT LAND	4300
4	AMUSEMENTS	FIRES	REDEVELOPABLE	7300
5	APPAREL & FINISH MFG	MANU	REDEVELOPABLE	2300
6	APPAREL ACCSSRS RETAIL	RETAIL	REDEVELOPABLE	5600
7	APT CONDO HIGH RISE	RES CON	REDEVELOPABLE	1410
8	APT/CONDO 3 STOR OR LESS	RES CON	REDEVELOPABLE	1405
9	AUTO ACCESSORIES RETAIL	RETAIL	REDEVELOPABLE	5525
10	AUTO DLR NEW AND USED RETAIL	RETAIL	REDEVELOPABLE	5515
11	AUTO PARKING	OTHERS	REDEVELOPABLE	4600
12	AUTO REPAIR SERVICES	FIRES	REDEVELOPABLE	6410
13	AUTO WRECKING RETAIL	RETAIL	REDEVELOPABLE	5500
14	BANKS	FIRES	REDEVELOPABLE	6110
15	BAYS OR LAGOONS	NA	UNBUILDABLE	9330
16	BIG BOX POWER CTR	WTCU	REDEVELOPABLE	5350
17	BLDG MTRL FARM EQUIP RETAIL	RETAIL	REDEVELOPABLE	5200
18	BUSINESS SERVICES	FIRES	REDEVELOPABLE	6300
19	CAR WASH	FIRES	REDEVELOPABLE	6412
20	CEMETERIES	FIRES	UNBUILDABLE	6242

	Landuse Description	Use Type	Category	Use Code
21	CHEMICAL MFG	MANU	REDEVELOPABLE	2800
22	COMM LND WITH IMPROV LAND VAL ONLY	OTHERS	REDEVELOPABLE	9178
23	COMM LND WITH SFR	MIXED USE	REDEVELOPABLE	1197
24	COMM VAC LAND	VACANT COM	VACANT	9170
25	COMM VAC LND SP ENVIR APPR FILED	VACANT COM	VACANT	9174
26	COMMUNICATION	WTCU	REDEVELOPABLE	4700
27	CONTRACTOR SERVICES	FIRES	REDEVELOPABLE	6600
28	CONVEN STORE MAY HAVE GAS	RETAIL	REDEVELOPABLE	5410
29	CREDIT UNIONS	FIRES	REDEVELOPABLE	6120
30	CU FARM & AGRI RCW 84.34 CURRENT USE	RCW LANDS	UNBUILDABLE	8300
31	CU OPEN SPACE RCW 84.34 CURRENT USE	RCW LANDS	REDEVELOPABLE	9400
32	CU TIMBERLAND RCW 84.34 CURRENT USE	RCW LANDS	REDEVELOPABLE	9500
33	CULTIVATED TIDELANDS	NA	UNBUILDABLE	8491
34	CULTURAL ACTIVITIES	FIRES	REDEVELOPABLE	7100
35	DENTAL SERVICES	FIRES	REDEVELOPABLE	6512
36	DESIG FOREST LND RCW 84.33	RCW LANDS	REDEVELOPABLE	8800
37	DET GARAGE CONDO	RES CON	REDEVELOPABLE	5030
38	DISCOUNT STORES	RETAIL	REDEVELOPABLE	5320
39	DRAINFLDS CATCH BASINS	NA	UNBUILDABLE	4830
40	DUPLEX 2 UNITS	RES MF	REDEVELOPABLE	1202
41	DUPLEX CONDO	RES CON	REDEVELOPABLE	1402
42	EDUCATIONAL SERVICES	EDUC	REDEVELOPABLE	6800
43	ELEM SCHOOLS 1 TO 6	EDUC	SCHOOL LAND	6810
44	ENTERTAINMENT BARS	FIRES	REDEVELOPABLE	5822
45	ESPRESSO SHOP	RETAIL	REDEVELOPABLE	5815
46	FAB METAL PRODUCTS	MANU	REDEVELOPABLE	3400
47	FARMS NOT CURRENT USE	OTHERS	REDEVELOPABLE	8140
48	FAST FOOD	RETAIL	REDEVELOPABLE	5805
49	FIRE STATIONS	GOV	GOV LAND	6720
50	FISHING ACTIVITIES AND SERVICES	FIRES	REDEVELOPABLE	8400
51	FLOOD PLAIN	NA	UNBUILDABLE	9108
52	FLOODWAY	NA	UNBUILDABLE	9109
53	FOOD MFG	MANU	REDEVELOPABLE	2100
54	FOOD RETAIL TRADE	RETAIL	REDEVELOPABLE	5400
55	FOURPLEX 4 UNITS	RES MF	REDEVELOPABLE	1204
56	FOURPLEX OR MORE CONDO	RES CON	REDEVELOPABLE	1404
57	FUELING STATIONS	RETAIL	REDEVELOPABLE	5550
58	FUNERAL CREMATORY SERV	FIRES	REDEVELOPABLE	6241
59	FURNITURE MFG	MANU	REDEVELOPABLE	2500

	Landuse Description	Use Type	Category	Use Code
60	GAS STATION CASHIER BOOTH	RETAIL	REDEVELOPABLE	5560
61	GAS STATION MINI MART	RETAIL	REDEVELOPABLE	5540
62	GAS STATION SERV GAR	RETAIL	REDEVELOPABLE	5530
63	GAS STATION VAC NO PUMPS	RETAIL	REDEVELOPABLE	5570
64	GEN MERCHANDISE RETAIL TRADE	RETAIL	REDEVELOPABLE	5300
65	GEN WAREHOUSING STORAGE	WTCU	REDEVELOPABLE	6310
66	GOLF COURSES	FIRES	GOLF COURSE	7410
67	GOVERNMENTAL SERVICES	GOV	GOV LAND	6700
68	GRNBELT COMMON AREAS	NA	UNBUILDABLE	7630
69	HORTICULTURAL SPECIALTIES	FIRES	REDEVELOPABLE	8150
70	HOSPITAL	FIRES	REDEVELOPABLE	6510
71	HOTELS/MOTELS	FIRES	REDEVELOPABLE	1600
72	IND INDIAN RESERV LND	VACANT IND	VACANT	9186
73	IND LND WITH IMPROV LAND VAL ONLY	VACANT IND	VACANT	9188
74	IND VAC LND SP ENVIR APPR FILED	VACANT IND	VACANT	9184
75	INSTITUTIONAL LODGING	FIRES	REDEVELOPABLE	1700
76	JR COLLEGES	EDUC	SCHOOL LAND	6840
77	LIBRARIES	FIRES	GOV LAND	7110
78	LNDRY & DRY CLEANING SERV	FIRES	REDEVELOPABLE	6210
79	LUMBER & WOOD MFG	MANU	REDEVELOPABLE	2400
80	MARINA SLIP CONDOS	NA	UNBUILDABLE	5050
81	MARINAS	WTCU	UNBUILDABLE	7420
82	MARINE CRAFT TRANSPORTATION	WTCU	REDEVELOPABLE	4400
83	MEDICAL OFFICES SERVICES	FIRES	REDEVELOPABLE	6511
84	MH PARK	RES MH	UNBUILDABLE	1500
85	MH PARK CONDO	RES CON	UNBUILDABLE	1440
86	MH SALES RETAIL	RETAIL	REDEVELOPABLE	5505
87	MH SR/DISABLED EXEMPT ADMIN COMBO	RES MH	REDEVELOPABLE	1154
88	MH TITLE ELIM	RES SFR	REDEVELOPABLE	1155
89	MILITARY BASES	GOV	GOV LAND	6750
90	MINI LUBE SERVICE	RETAIL	REDEVELOPABLE	6420
91	MINI WAREHOUSING	WTCU	REDEVELOPABLE	6380
92	MINING ACTIVITIES	MANU	UNBUILDABLE	8500
93	MISC MFG	MANU	REDEVELOPABLE	3900
94	MISC OFFICE SPACE	FIRES	REDEVELOPABLE	6199
95	MISC SERVICES	FIRES	REDEVELOPABLE	6900
96	MOBILE/MFG HOME	RES MH	REDEVELOPABLE	1152
97	MOTION PICTURE THEATERS	FIRES	REDEVELOPABLE	7210
98	MULTI FAM APTS 5 UNITS OR MORE	RES APT	REDEVELOPABLE	1305
99	MULTI FAM HIGH RISE 5 UNITS OR MORE	RES APT	REDEVELOPABLE	1306

	Landuse Description	Use Type	Category	Use Code
100	NGB COMMUNITY SC	RETAIL	REDEVELOPABLE	5360
101	NON COMM FOREST	VACANT	VACANT	9200
102	NURSERY SCHOOLS	EDUC	REDEVELOPABLE	6860
103	NURSING CONVALESCENT HOSPITALS	FIRES	REDEVELOPABLE	6516
104	OFF INSURANCE REAL ESTATE FINANCE	FIRES	REDEVELOPABLE	6100
105	OFFICE CONDO	FIRES	REDEVELOPABLE	5020
106	OLDER BUSINESS DIST	FIRES	REDEVELOPABLE	5390
107	OP PROP RR RIGHT OF WAY	NA	UNBUILDABLE	4111
108	OTHER CULTURAL ACTIVITIES	FIRES	REDEVELOPABLE	7900
109	OTHER GROUP QTRS	RES GQ	REDEVELOPABLE	1860
110	OTHER PUB ASSEMBLY	FIRES	REDEVELOPABLE	7200
111	OTHER RESIDENTIAL	RES OTHER	REDEVELOPABLE	1800
112	OTHER RESOURCE PROD	FIRES	REDEVELOPABLE	8900
113	OTHER RETAIL TRADE	RETAIL	REDEVELOPABLE	5900
114	OTHER TRANS UTILITIES	WTCU	UNBUILDABLE	4900
115	OTHER UNDEVEL LAND	VACANT	VACANT	9900
116	OTHER WATER AREAS	NA	UNBUILDABLE	9390
117	PAPER PROD MFG	MANU	REDEVELOPABLE	2600
118	PARKS	NA	UNBUILDABLE	7600
119	PERSONAL SERVICES	FIRES	REDEVELOPABLE	6200
120	PETRO INDUSTRIES	MANU	REDEVELOPABLE	2900
121	POSTAL SERVICES	GOV	GOV LAND	6730
122	PRIM METAL INDUSTRIES	MANU	REDEVELOPABLE	3300
123	PRINTING PUBLISHING	FIRES	REDEVELOPABLE	2700
124	PRISONS	GOV	GOV LAND	6740
125	PROFESSIONAL SERVICES	FIRES	REDEVELOPABLE	6500
126	QUARRY SAND ROCK	MANU	UNBUILDABLE	8505
127	REC ACTIVITIES	FIRES	UNBUILDABLE	7400
128	REFRIG WAREHOUSE	WTCU	REDEVELOPABLE	6373
129	REGIONAL SC	RETAIL	REDEVELOPABLE	5380
130	RELIGIOUS SERVICES	FIRES	UNBUILDABLE	6910
131	RENTAL EQUIP AUTO TRUCK	FIRES	REDEVELOPABLE	6390
132	REPAIR SERVICES	FIRES	REDEVELOPABLE	6400
133	RES INDIAN RESERV LND	OTHERS	REDEVELOPABLE	9160
134	RES LND WITH COMM BUILDING	MIXED USE	REDEVELOPABLE	9145
135	RES LND WITH IMPROV LAND VAL ONLY	RES OTHER	REDEVELOPABLE	9140
136	RES NO PERK VAC LND REQ DOC	VACANT	VACANT	9101
137	RESORTS CAMPS	FIRES	UNBUILDABLE	7500
138	RESTAURANT	RETAIL	REDEVELOPABLE	5800
139	RETAIL HOME FURNISHINGS	RETAIL	REDEVELOPABLE	5700

	Landuse Description	Use Type	Category	Use Code
140	RETAIL STAND ALONE	RETAIL	REDEVELOPABLE	5999
141	RETIREMENT HOME	RES GQ	REDEVELOPABLE	1840
142	RM BOARDING HOUSE	RES GQ	REDEVELOPABLE	1300
143	RR EQUIP MAINT	WTCU	UNBUILDABLE	4112
144	RR PASSENGER TERMINALS	WTCU	UNBUILDABLE	4113
145	RV SALES RETAIL	RETAIL	REDEVELOPABLE	5510
146	SALONS SPAS BARBER SHOPS	FIRES	REDEVELOPABLE	6231
147	SALTWATER TIDELANDS	NA	UNBUILDABLE	9391
148	SCI INSTR PHOTO OPTICAL WATCH MFG	MANU	REDEVELOPABLE	3500
149	SEC SCHOOLS 7 TO 12	EDUC	SCHOOL LAND	6820
150	SFR CONDO	RES CON	REDEVELOPABLE	1401
151	SINGLE FAMILY DWELLING	RES SFR	REDEVELOPABLE	1101
152	SPECIAL TRAINING SCHOOLS	EDUC	REDEVELOPABLE	6870
153	SPECIALTY FOOD MKTS	RETAIL	REDEVELOPABLE	5430
154	SPORTS BAR REST LARGER TAV	RETAIL	REDEVELOPABLE	5825
155	STONE/CLAY/GLASS MFG	MANU	REDEVELOPABLE	3200
156	STREET RIGHT OF WAY	NA	UNBUILDABLE	4500
157	SUBSIDIZED HIGH RISE 5 OR MORE	RES APT	REDEVELOPABLE	1308
158	SUBSIDIZED UNITS 5 OR MORE	RES APT	REDEVELOPABLE	1307
159	TAVERNS	RETAIL	REDEVELOPABLE	5820
160	TEXTILE MILL MFG	MANU	REDEVELOPABLE	2200
161	TRANSFERRED DEVELOPMENT RIGHTS	NA	UNBUILDABLE	9190
162	TRANSIT RR RIGHT OF WAY	NA	UNBUILDABLE	4100
163	TRIPLEX 3 UNITS	RES MF	REDEVELOPABLE	1203
164	TRIPLEX CONDO	RES CON	REDEVELOPABLE	1403
165	UNIVERSITY/COLLEGES	EDUC	SCHOOL LAND	6830
166	UNKNOWN	NA	UNBUILDABLE	0
167	USED CAR LOTS ONLY RETAIL	RETAIL	REDEVELOPABLE	5520
168	UTILITIES	WTCU	UNBUILDABLE	4800
169	VAC INDUSTRIAL LAND	VACANT IND	VACANT	9180
170	VAC LND BLDG RESTRICT DOC REQ	VACANT	VACANT	9110
171	VAC LND MAJOR PROBLEM	NA	UNBUILDABLE	9166
172	VACANT LAND UNDEVELOPED	VACANT	VACANT	9100
173	VEHICLE TRANSPORTATION	WTCU	REDEVELOPABLE	4200
174	VETERINARIAN SERVICES	FIRES	REDEVELOPABLE	6520
175	VOC TRADE SCHOOLS	EDUC	REDEVELOPABLE	6850
176	WAREHOUSE CONDO	WTCU	REDEVELOPABLE	5060
177	WATER AREAS	NA	UNBUILDABLE	9300
178	WELL SITES	NA	UNBUILDABLE	4836
179	WETLANDS RECORDED	NA	UNBUILDABLE	9112

	Landuse Description	Use Type	Category	Use Code
180	WHOLESALE TRADE	WTCU	REDEVELOPABLE	5100
181	RV PARK	RES MH	REDEVELOPABLE	1501
182	MARIJUANA GROW OPERATIONS	WTCU	REDEVELOPABLE	
183	VAC LND NOT A BLDG SITE	NA	UNBUILDABLE	

Appendix C: Employment Density Survey

Pierce County contracted with AHBL and ECONorthwest to analyze available employment data and determine if an update to the employment assumptions used in the Buildable Lands analysis is necessary. ECONorthwest provided the following memorandum with findings on the employment density assumptions.

DATE: July 1, 2019
TO: Dan Cardwell and Jessica Gwilt, Pierce County
CC: Wayne Carlson and Brittany Port, AHBL
FROM: Bob Parker, Denise Chin, Sadie DiNatale, Ryan Ulsberger
SUBJECT: PIERCE COUNTY EMPLOYMENT DENSITY SURVEY TECHNICAL MEMORANDUM

1 Summary

An initial step in updating the methodology for Pierce County's buildable lands program is to review the methodology used to complete the 2014 Buildable Lands Report (BLR) and identify methodological changes based on amended state legislation, data availability, and best practices. Task 1.2 of the Buildable Lands Program Support work program includes an evaluation of the past employment density survey methodology, proposed refinements the approach, and conducting a new employment density survey for Pierce County. This memorandum summarizes ECONorthwest's initial research and analysis related to this task.

Several refinements to the 2014 methodology could improve the capacity and land need estimates. Given the amount of variability that exists in broad employment categories, and PSRCs regional plans, we recommend that any methodology employ the principles of simplicity and transparency. More complicated methods do not necessarily improve the results. We recommend the County consider adjustments for employment in residential areas and using the PSRC center framework.

Pierce County's challenge is developing an acceptable methodology that can be applied across many jurisdictions that range from urban centers to suburbs, to rural communities, to rural areas. After a thorough investigation of the methodological options, we make the offer the following recommendations:

- **Continue to use an EPA based method.** Given the countywide scope and the diversity of cities, EPAs are the most accurate and practical method for estimating employment capacity of vacant and under-utilized land as well as land demand.
- **Consider refinements to the methods used in the 2014 BLR.** The County could make refinements to both the capacity and land demand estimates.
 - **Consider allocating some employment to non-employment lands.** Our review of the 2014 BLR suggests that all of the employment growth increment is allocated to employment lands. We suggest considering allocating some employment to non-employment lands.
 - **Consider disaggregating employment forecasts to three or more categories.** A review of the 2014 BLR only identified single value employment figures. The PSRC data ECO used for the employment density analysis in section 3 is available by city disaggregated by sectors or 2-digit NAICS codes. At the

simplest, the models could differentiate between retail, office, and warehouse employment densities.

- **Consider developing a land use typology based on PSRC's Regional Centers Strategy. Typology by PSRC regional centers.**¹ PSRC's VISION 2040 calls for the creation of central places with a mix of uses and activities connected by efficient transportation. PSRC designated 29 regional growth centers which are locations of the region's most significant business, governmental, and cultural facilities and are planning for growth. PSRC also identified nine regional manufacturing/industrial centers, which are locations for more intensive industrial activity. According to PSRC, both regional growth centers and regional manufacturing/industrial centers are focal points for planned growth, economic development and transportation infrastructure investments.

Moreover, the framework identifies three primary geographies: Metropolitan Cities (16 centers), Core Cities (17), and Unincorporated Urban Areas (3). Five regional growth centers and two industrial/manufacturing centers are located in Pierce County.

PSRC's 2013 Monitoring Report presents employment densities for each of the areas based on 2010 data. Exhibit X shows employment densities for Pierce County Centers. The observed densities are lower than the commercial assumptions in all instances, and considerably lower than the 2014 industrial assumptions for the industrial/manufacturing centers.

Given that much of the county's employment is located outside these centers, any method will require assumptions for capacity of those lands. The County could use the 2014 assumptions, or use an approach based on city type.

¹ https://www.psrc.org/sites/default/files/centers_monitoring.pdf

2 Background

An initial step in updating the methodology for Pierce County's buildable lands program is to review the methodology used to complete the 2014 Buildable Lands Report (BLR) and identify methodological changes based on amended state legislation, data availability, and best practices. Task 1.2 of the Buildable Lands Program Support work program includes an evaluation of the past employment density survey methodology, proposed refinements the approach, and conducting a new employment density survey for Pierce County. This memorandum summarizes ECONorthwest's initial research and analysis related to this task.

Pierce County last completed an employment density in 2007. The County is interested in whether the methods and assumptions used in the 2010 Survey are still reasonable, and if there are ways to improve them. AHBL subcontracted to ECONorthwest to provide this analysis. This document details the process of confirming employment density assumptions in Pierce County. The key questions considered in this task are:

- How accurate were the previous methods used?
- How does employment density vary by and within employment sectors?
- How does employment density vary by geography (e.g., cities)?

The 2010 analysis used Employment Security data that allowed matching of specific employers to tax lots. ESD no longer releases parcel-specific employment data. Thus, the updated employment density survey will require a different method to update the employment density assumptions. In addition, the County desires to understand how employment densities may have changed over time based on changing work configuration and technologies.

ECONorthwest conducted the analysis presented in this memorandum using the following approaches:

- (1) Spatial analysis in GIS using PSRC employment data by city and census tract
- (2) A review of studies surrounding buildable land inventories, employment surveys, and other relevant research to observe new employment density methods or consider changing assumptions
- (3) Informational interviews with real estate professionals to gain insight on recent trends in commercial and industrial employment in Pierce County

The 2014 BLR used a relatively simple method that applied standardized average employee per acre assumptions for commercial and industrial uses. The memo concludes with a discussion of the merits of the method used in the 2014 BLR as well as alternative methodological options for estimating demand for employment land.

The following sections provide legal context to buildable land inventories in Pierce County under Washington state's Growth Management Act; and a discussion of past methods and assumptions used in Pierce County's Employment Density Surveys.

2.1 Legal Context

The employment density survey provides data that support assumptions used to determine land needed for employment uses. The statutory guidance from the program is codified in RCW 36.70A.215. Specifically, the following two subsections address density of employment:

- Based on the actual density of development, review commercial, industrial, and housing needs by type and density range to determine the amount of land needed for these uses for the remaining portion of the current 20-year planning period (RCW 36.70A.215(3)(e));
- Determine if there is sufficient employment capacity for the remainder of the planning period based upon planned and achieved densities (RCW 36.70A.215(3)(e));

Section 3 provides further guidance on how the data are used:

- (a) Determine whether there is sufficient suitable land to accommodate the countywide population projection established for the county pursuant to RCW 43.62.035 and the subsequent population allocations within the county and between the county and its cities and the requirements of RCW 36.70A.110;
- (b) Determine the actual density of housing that has been constructed and the actual amount of land developed for commercial and industrial uses within the urban growth area since the adoption of a comprehensive plan under this chapter or since the last periodic evaluation as required by subsection (1) of this section; and
- (c) Based on the actual density of development as determined under (b) of this subsection, review commercial, industrial, and housing needs by type and density range to determine the amount of land needed for commercial, industrial, and housing for the remaining portion of the twenty-year planning period used in the most recently adopted comprehensive plan.

The 2018 *Buildable Lands Guidelines* document provide concise direction on the process and distill the requirements into two questions: How much land was actually developed for commercial and industrial uses within the UGA since the last comprehensive plan was adopted or the last evaluation completed? Based on this and other relevant information, how much land would be needed for commercial and industrial development during the remainder of the 20-year comprehensive planning period?

Thus, while the guidelines provide direction on how to address commercial and industrial development, they are not proscriptive and provide considerable local discretion with respect to methods. Because the focus of this research is on employment density, we do not address other aspects of the methods related to commercial and industrial land.

2.2 Methods and Assumptions Used in Previous Studies

In this section, we discuss past methods and assumptions from Pierce County's 2007 Employment Density Survey and 2014 Buildable Lands Report. As a general observation, the methods used for employment density surveys have not changed much throughout the years.

Definitions: Floor Area Ratios, Employees Per Square Foot, and Employees Per Acre

The Buildable Lands Guidelines and BLR reports use the terms Floor Area Ratio (FAR), Employees Per Square Foot (Emp/sf), and Employees Per Acre (EPA). We start by establishing definitions and the relationship between each of these metrics.

By definition, employment density is the ratio of labor to land. Several measures of employment density exist: FARs, EPAs, and sq. ft. per employee. To understand the relationship between Floor Area Ratios, square feet per employee, and employee per acre ratios, we start with definitions.

- Floor Area Ratio (FAR). The Floor Area Ratio is the total building square footage (building area) divided by the site size square footage (site area)
- Square Feet Per Employee (SFE). The total square feet required for employees. This includes shared spaces such as lobbies, hallways, elevators and stairwells, restrooms, and other built space.
- Employee per acre ratio (EPA). The total number of employees divided by the size of the site. Implicitly, this is a net density figure; it does not include land needed for streets and other public uses.

Given these definitions, there is a simple mathematical relationship between the three measures as expressed below.

FAR can be derived from EPA and SFE as follows:
$$(EPA * 43560) / \text{SF per Emp}$$

SFE can be derived from EPA and FAR:
$$(FAR * 43560) / EPA$$

EPA can be derived from SFE and FAR:
$$(FAR * 43560) / SFE$$

A key issue in estimating EPA ratios is what values are used in the numerator and denominator. The numerator is typically straightforward—reported employment figures. Most analysis we have reviewed do not make distinctions about shifts, or whether employees are full or part time. This is consistent with the way employment data are typically presented.

The issue of the denominator is considerably trickier. The nature of commercial and industrial development is such that it often spans several tax lots. In these instances, calculating density on a tax lot basis can be misleading. Shopping centers, industrial parks, or any employment use

that includes multiple tax lots should be analyzed as combined sites. Parking can also be an issue—is parking part of an employment use or not? If it is in the same ownership and directly related to the use, it should be.

Mixing of employment further complicates matters. In a detailed analysis in Bend, Oregon, we found considerable mixing of employment that would be considered commercial or industrial. The data showed considerable employment in industrial zones that would typically be considered commercial, and the opposite. Zoning codes typically are not proscriptive by NAICS categories.

A final issue is employment that is on lands not zoned for employment. In Oregon cities, we have observed that between 10% and 25% of employment in a city can be on lands that are not zoned for employment. These include typical uses that sometimes locate in residential zones such as schools and churches, as well as home occupations, construction firms, and certain types of retail or service firms that are permitted by zoning.

One of the issues that complicates estimating land capacity is variability. As pointed out in previous Pierce County employment density surveys, employment density in commercial zones can range from more than 100 per acre for restaurants to a few per acre for certain retail uses. Employee per acre ratios implicitly assume...

Pierce County 2007 Employment Density Survey

Pierce County conducted employment density surveys in 2004 and 2007. In those surveys, the method was based on location-specific employment data from the Washington State Employment Security Department (ESD)² and parcel data from the Pierce County Assessor-Treasurer. Businesses included in the survey were randomly selected and categorized based on the sector.

The 2007 Employment Density Survey utilized building permit data, ESD covered employment data, and Pierce County Assessor-Treasurer (ATR) parcel records. Data for Downtown Tacoma was segregated and reported separately due to its unique development intensity—downtown Tacoma reported much higher employment density than elsewhere in the County.

To arrive at the average employee per acre numbers, the sum of the total number of employees and parcel acreage under each category was divided by the total employees by total acreage.

The 2007 Survey identified several data limitations such as unavailable ESD employment data for the entire five-year trending period at the initiation of the project; a large number of commercial/industrial permits in 1999 and 2000 could not be associated with ESD employment data points.

² The ESD data includes firms that report covered employment. The data includes average employment, NAICS codes, and is geolocated. This makes calculating employment densities at the industry or zoning district level relatively straightforward: select a sample of employers, sum the average employment, and then divide it by the number of acres reported in the Assessor-Treasurer tax lot database.

Pierce County 2014 Buildable Lands Report

The 2014 BLR adopted the same methodology as the 2002 and 2007 analyses. The one exception in the 2014 BLR methodology is the consolidation of “underdeveloped” and “redevelopable” categories into one “underutilized” category, as well as the criteria used to identify parcels within this category. The authors note that this step was in effort to achieve inter-departmental consistency between the County’s land use and transportation models.

Exhibit 1 provides a summary of resultant employment densities from past employment surveys and buildable lands reports in Pierce County. The report consistency applies the 8.25 EPA for commercial and the 19.37 EPA for industrial in all geographies but Tacoma.

Exhibit 1. Pierce County Employment Density Comparisons (employees per acre)

Employment sector	1999 Survey	2004 Survey Average	2004 Survey Median	2007 Survey	2014 BLR
Industrial	11.15	13.8	21.32	11.15	8.25
Commercial	34.3	21.92	19.37	19.37	19.37
Government	22.7	7.74	n/a	n/a	n/a
Downtown Tacoma	318	356.77	235.59	235.59	**

Source: ECONorthwest, with data from Pierce County 2007 Employment Density Survey and Pierce County 2014 Buildable Lands Report

** Table 11a of the 2014 Buildable Lands Report (page 225) shows that higher assumptions were used for Tacoma in many zones. The report does not provide an explanation of the source of the assumptions.

2018 Buildable Lands Guidebook

Chapter 3 of the 2018 *Buildable Lands Guidebook* provides guidance on approach and methodologies related to commercial and industrial land capacity. The guidebook indicates that data from the Institute of Transportation Engineers (ITE) presents employees per square footage of buildable area data their trip generation manuals to determine potential trip generation for development and redevelopment sites. Obtaining a copy of the ITE manual was cost prohibitive for this project.

The guidebook suggests that an alternative method that may be used is an employment density calculation based on a ratio of employees per net acre, if employee estimates are available. It suggests that Washington State Employment Sector data can supply jobs per acre estimates. ECO was unable to locate any analysis of employment density based on sector data. The next section presents an analysis of Census tract level, sector data compiled by PSRC.

The Guidebook also suggests that employment densities can be calculated using FAR for buildings constructed during the evaluation period. This approach can be refined by building type or type of employment if data are available. FAR data can then be combined with SF/Emp data from ITE or other sources to arrive at an estimate of employees and employment density in

EPA. This approach would allow for an estimate of achieved employment densities per land use category.

3 Pierce County 2019 Employment Density Analysis

The following sections detail analyses carried out by ECONorthwest to document achieved employment densities and inform methodological options.

3.1 Spatial Analysis of Employment Patterns and Densities

ECO explored alternative methods for estimating employment densities. This analysis intended to assess a methodology for estimating the density of employment throughout Pierce County, Washington using PSRC data at the census tract level combined with parcel data.

Our assessment of this approaches is that available data is not consistent enough to accurately predict employment densities with granularity to enable decision making. However, with directed effort, data maintained by Pierce County and other regional planning agencies could potentially be used for employment density analysis. We are unable to estimate the amount of effort it would take to make the data reasonably reliable for BLR purposes. Two factors are particularly problematic: (1) variability in employment densities within generalized categories; and (2) the quality of the underlying land use/parcel data.

Methodology

Assessors data is some of the most routinely maintained data by counties and represents the smallest geography available from tracking land use. Different properties have different appraisal types; for example, commercial properties are assessed differently than residential properties. Recognizing this advantage, the parcel database was used to identify the different types of land use occurring on properties throughout Pierce County.

As mentioned before, different types of appraisals occur for different types of land uses. Possible appraisal types are summarized in Exhibit 2.

Exhibit 2. Pierce County Appraisal Types

Land Use Categorization	Appraised Property Types
Residential Landuses	Residential
	Residential Leasehold
	Condominium
	Reference
Economic and Other Landuses	
	Commercial
	Commercial Condo
	Commercial Leasehold
	Commercial Multi Unit
	Industrial
	Trended Investment

Source: Pierce County Assessor

Appraisal types do not always correspond to the actual use of a parcel. Housing land uses can incorporate some economic uses which were not captured in this analysis. There is not an accurate way to predict where self-employed or work-from-home employees are based geographically from any available datasets. Furthermore, commercial and industrial appraisal types can also have residential land uses or community and cultural land uses which do not provide any employment. As a result, the Pierce County Assessor also identifies land use descriptions which attempts to clarify what the parcel's current use is. For non-housing appraisal types in Pierce County, there were 179 distinct land use descriptions. This analysis attempted to match land use descriptions to major sectors as designated by the North American Industry Classification System (NAICS). The land use NACIS describes the major sectors of employment as the following:

- Construction and Resources
- Finance, Insurance and Real Estate (FIRE)
- Manufacturing
- Retail
- Services
- Wholesale Trade, Transportation, and Utilities (WTU)
- Government
- Education

The minimum geographical unit available with employment coverage covering all of Pierce County is by census tract. Thus, each parcel was associated with the corresponding census tract.

Employment data was acquired from the Puget Sound Regional Council (PSRC) who has worked with the Washington State Employment Security Department (ESD) to conduct the

Quarterly Census of Employment and Wages (QCEW) and compiled into the Covered Employment Estimate Dataset. This data collects the employment information for all employees covered by the Washington Unemployment Insurance Act and aggregates this data across census tracts. However, out of privacy concerns for employers, any employer who has more than 80% of the employment share for a given census tract has the value withheld.

Finally, the total land area for a given NAICS Major Sector was calculated by parcel area for each census tract. The PSRC employment data was joined to the parcel data using the census tract id, which revealed a total employee count per NAICS Major Sector land area where available. In areas where employment data was obscured, these parcels were removed from the analysis as

The result is an employment density covering the entirety of Pierce County.

Results

The results of the analysis, summarized in Exhibit 3, ranges of employment density range from 49 employees per acre for Finance, Insurance, and Real Estate uses to 2 employees per acre for both Construction and Resource, and Wholesale, Transportation, and Utility land uses in Pierce County. Unsurprisingly, land uses which are concentrated in office environments, or retail and service uses centered in Urban Centers have much higher employment densities than land uses which typically require larger footprints such as warehousing and industrial and manufacturing uses.

Exhibit 3.: Summary of Employment Density for NAICS Major Sectors

Economic Use Category	Total Census Tracts	Total Parcels	Total Acres	Total Employment	Employment Land Use Ratio (Employment/Acre)
CONSTRUCTION/RESOURCE	47	271	4,974	10,097	2
CONSTRUCTION/RESOURCE - EMPLOYMENT DATA REMOVED	3	32	569		
EDUCATION	132	746	5,206	20,494	4
FINANCE/INSURANCE/REAL ESTATE	76	350	241	11,716	49
FINANCE/INSURANCE/REALESTATE - EMPLOYMENT DATA REMOVED	11	14	12		
GOVERNMENT	96	369	2,318	19,013	8
MANUFACTURING	47	919	4,069	11,619	3
MANUFACTURING - EMPLOYMENT DATA REMOVED	28	89	1,034		
RETAIL	109	2,988	3,051	31,124	10
RETAIL - EMPLOYMENT DATA REMOVED	31	238	246		
SERVICES	147	7,566	15,151	113,820	8
SERVICES - EMPLOYMENT DATA REMOVED	2	9	22		
WHOLESALE/TRANSPORTATION/UTILITIES	86	2,054	7,868	16,389	2
WHOLESALE/TRANSPORTATION/UTILITIES - EMPLOYMENT DATA REMOVED	58	285	1,355		
UNCLASSIFIED	151	4,653	12,620		

Source: Pierce County, PSRC, Census, ECONorthwest

However, estimates of employment are likely to be lower than the actual employment because of the withheld employment estimates for those employers which had more than 80% of employment within a census tract. For example, employment in the Frederickson Manufacturing and Industrial Center is anchored by the Boeing Manufacturing Facility. The employment this facility was withheld because Boeing met the 80% threshold to obtain

anonymity in the PSRC employment dataset. Boeing is the 4th largest employer within Pierce County with an estimate employment of 1,550 employees as of 2018³ and would represent an employment ratio of 2.7 employees per acre if all employees were working on the Fredrickson property.⁴

Review and Assessment

After reviewing the results from the employment density analysis for Pierce County, the results were not as conclusive as desired. In short, we do not conclude that this is a viable method that could be incorporated into the BLR.

In particular, two obstacles appeared while using the data available from the Pierce County Assessors Data and the PSRC Employment Dataset.

1. Assessors land use and appraisal types are not consistent across different land uses. Furthermore, land uses descriptions can describe a variety of potential uses that do not relate to economic activities cleanly; if they are classified at all.
2. Employment data is sensitive information and is often obscured to maintain the anonymity of an employer.

If these obstacles were mitigated, the feasibility of using the Pierce County Assessors Data and the PSRC Covered Employment Estimates could become a viable method. In particular, verifying the appraisal types and the land use descriptions of given parcels in Pierce County Assessors database would increase the resolution of the analysis. Furthermore, a partnership with the Washington State Employment Security Department to retrieve the employment data over the 80% employment threshold for a given census tract would allow for more refined results that could better estimate employment density in the county.

3.2 Literature review

EOC conducted an extensive literature review that included academic articles, planning reports conducted in cities and counties within and outside of Washington state, relevant findings from a similar ECONorthwest review conducted in 2015 that was focused on industrial employment densities. We also explored employment density themes throughout the region and the US. One observation we made is that there is little academic research on employment density—a fact we found surprising. Exhibit 4 displays a summary of studies reviewed from Washington state. A more detailed matrix can be found in Appendix 1.

³ Economic Development Board, <https://www.edbtacomapierce.org/area-profile/2018-major-employers/>, Accessed May, 2019

⁴ Manufacturing and industrial land uses exists on an estimated 571 acres for Census tract 731.08.

Exhibit 4. Summary of Methods, Assumptions, and Findings from Washington State Studies

Location	Methodology	Employment Density Assumptions (Emp./acre or SFE)		Findings
		Commercial	Industrial	
Counties				
Clark	Building permits primary source of data from 2006-2016.	9.3	10.9	County has sufficient capacity to accommodate projected employment growth.
Island	- Suppressed data substituted with older available data. - For jobs missing in QCEW data, methodology from PSRC used to estimate total employment from covered employment. - City of Freeland excluded from calculation of employment density average due to lack of amenities (sewer). - Due to County's low industrial employment, rounded average from neighboring counties (Skagit, Clark, Pierce) used for industrial assumptions.	17.0	8.0	Sufficient capacity to accommodate anticipated employment growth.
King (BLR)	- Half of jurisdictions brought forward 2007 BLR density and capacity calculations; remainder cities required new capacity analysis - Location-specific densities reported in final analysis.	250 - 850 SFE*	250 - 851 SFE*	Sufficient capacity to accommodate residential, employment growth.
King (Emp. Capacity Analysis)	- Employment density assumptions from 2007 BLR. - Does not consider future fiscal impacts of redevelopment within Duwamish Industrial Manufacturing Center.	550 SFE	800 SFE	- Total assessed land value for the South Park LID area is \$2,458,285,700. - Total assessed value for the MIC site is \$193,751,000.
Kitsap	- Methods for Land Capacity Analysis adjusted following Remand Order: 1) Using trend-based density factors for each residential zone 2) Increase public facility deduction to 20% 3) Remove discount for environmental purposes in Urban Restricted Zone 4) Platted lots adjustment	969 SFE	500 SFE	Sufficient capacity to meet industrial and commercial development to 2025, 2016-2036.

Location	Methodology	Employment Density Assumptions (Emp./acre or SFE)		Findings
		Commercial	Industrial	
Snohomish	Existing structures (as of April 2011) counted as population or employment base; proposed, built, or occupied structures after April 2011 counted as future capacity.	200 - 700 SFE	300 - 20,000 SFE	Adequate land capacity reported in the County for the 2025 adopted UGA population and employment growth targets.
Thurston		3.3	1.5	Sufficient land supply to support projected growth to 2035.
Whatcom	Based on 2009 Land Capacity Analysis methodology	626 - 900 SFE	775 - 3,500 SFE	Surplus capacity to meet future employment needs
Region				
Puget Sound Regional Council	- Relevant mixed-use zones and land classification included into analysis if related to industrial land. E.g. "Business Park"; "Employment Center" - Parcels considered industrial land if significant industrial development present or permitted to occur. - Four categories of industrial lands: Core industrial; Industrial commercial; Military industrial; Aviation operations areas - Special consideration given to tribal land; natural resource lands; limited areas of more intense rural development; planned developments		0.25 - 14.7*	Employable land capacity variable to area: - Strong demand / limited capacity: Interbay-Ship Canal, Duwamish-North Tukwila, Kent-Renton, and SeaTac-Des Moines subareas - Strong demand/adequate capacity: Frederickson- Lakewood, Southwest Everett and Tacoma-Puyallup subareas - Adequate capacity: I-405 Corridor, Arlington-Marysville, and North-Central Everett subareas - Surplus capacity: DuPont-Gray Field, Puget Sound Industrial Center (PSIC)-Bremerton-Sinclair Inlet, and Auburn-Sumner subareas
City				
Lakewood	- Developed a consolidated employment capacity model - Error in Pierce Co. BLR—one residential zone moved to commercial	12 - 25	15 - 25	Sufficient capacity to meet 2030, 2035 employment targets

Notes: *Location specific numbers reported; ranges provided here. SFE = Square foot per employee.

3.3 Interview findings

ECONorthwest conducted phone interviews with real estate professionals familiar with recent commercial and industrial development in Pierce County (Task 1.2, subtask 4 - Real Estate Professional Interviews). The purpose of the interviews was to better understand local development conditions and emerging employment trends in Pierce County. To the extent possible, ECONorthwest vetted reasonableness of employment density assumptions from the 2014 Buildable Lands study.

ECONorthwest interviewed the following real estate professionals:

1. Rob Allen, Senior Economic Development Specialist with Pierce County, Economic Development Department
2. Kevin Clegg, Special Assistant to the Executive for Business Services with Pierce County, Economic Development Department
3. Patrick Gemma, SVP Investment Officer with Prologis

3.3.1 Interview Key Themes

The interviews consisted of a series of questions (see Appendix B). The following sections describe the key themes from the interviews.

Revisit the 2014 Employment Density Assumptions

Pierce County's 2014 Buildable Lands study used the following employment density assumptions: 19.37 employees per acre for commercial and services (1 employee per 500 sq. ft.) and 8.25 employees per acre for industrial warehousing and manufacturing (1 employee per 900 sq. ft.).

Interviewees suggested that while the commercial employment density assumption seemed reasonable, they are more practical in areas with generally higher densities, such as downtown Tacoma (we note that the BLR indicates much higher EPA assumptions were used in downtown Tacoma). The assumption seemed less practical (too high) for the more suburban areas of the county.

Interviews indicated they thought the industrial employment density assumption seemed inflated (too high). Four to five employees per acre seemed more reasonable, if not a little high. Further, employment capacity needs in industrial / manufacturing facilities will fluctuate depending on the amount of office space that exists in the facility (e.g., a large office component in an industrial / manufacturing facility will accommodate more employees per acre). When taking that factor into consideration, the industrial employment density assumption seemed more reasonable. The following assumption was provided to illustrate typical employment capacity needs: four employees per 1,000 sq. ft. for the office component with one employee per 1,000 sq. ft. for the industrial / manufacturing component.

Vary Average Employment Density Assumptions

Interviewees suggested that varying average employment density assumptions by geographic area and industry sector seemed reasonable.

By geographic area: It is reasonable to assume that downtown or high-density areas will have a higher average employment density assumption. However, lower average employment density assumptions should be assumed in more suburban cities and towns. Accordingly, average density could vary for each incorporated area or between incorporated area versus unincorporated area. An appropriate threshold to help inform varied density assumptions by geographic location was unknown.

By industry sector: Breaking out employment assumptions by sector also seemed reasonable. Large differences in employment densities exist between sector types, such as warehousing versus manufacturing. While an average density works in a general sense, a fair number of anomalies result in observable differences between sites of different sector types. Managing these anomalies may make the study more precise. For example, the manufacturing sector will accommodate more jobs per acre than wholesale trade and transportation; wholesale trade and transportation will accommodate more jobs per acre than warehousing (and big-box warehousing will accommodate fewer jobs per acre than other warehousing types).

Different industrial /manufacturing facilities (with office components) will typically demand different employment capacity needs as well. For example, a distribution center will typically have an office component accounting for 3% - 5% of total building sq. ft. A manufacturing facility will typically have an office component accounting for 10% of total building sq. ft.⁵

Technology and Automation Will Affect Employment Capacity Needs

Looking forward, interviewees suggested that technology and automation will have the biggest impact on employment capacity needs. Other commercial / industrial trends are not expected to drastically affect change. For example, automation of the manufacturing process is a much more significant portion of economic activity than any movement *toward* creative offices or makerspaces or *away* from shopping malls and big box stores. An interviewee compared other trends to an “artsy” community in a downtown area – the trend may be cool (innovation-wise) but does not scale very well and affects only a specific area.

A range of opinions exist about how technology and automation are currently changing employment capacity needs:

⁵ By using the previous example, four employees per 1,000 sq. ft. for an office component in an industrial / manufacturing facility: If both the distribution center and manufacturing facility were 100,000 sq. ft., the manufacturing facility would have about 40 office employees using 10% of the building while the distribution center would have about 12-20 office employees using 3-5% of the building.

- E-Commerce distribution centers (like Amazon) demand more employees per acre than traditional distribution centers because more people are needed to move goods in and around the center (and goods stay in the center for longer).
- Some distribution centers (like IKEA), are experiencing an interesting trend. Technology and automation reduce employment capacity needs, only for employment to increase soon after (although not to the same level). The hypothesis is that companies are “bouncing back” and can hire new employees to serve different roles than before.

Other Considerations

One interviewee provided a suggestion that may help inform employment density assumptions:

- Review the Institute of Transportation Engineers (ITE 10th addition) manual. ITE takes a deep dive into different land uses to determine traffic generation. It is possible that they determine traffic generation by using employment density assumptions. If this is true, the manual could offer a factual basis for Pierce County’s assumptions. A caveat that small sample sizes may present limitations.

We note that this approach is discussed in the 2018 *Buildable Lands Guidebook*.

4 Conclusions and Methodological Options

In general, most employment assumptions have remained the same since each county’s previous employment density and/or buildable land study. This is likely because the relevant underlying data has not evolved much. Notable exceptions include Clark County, where lower employment densities were reported compared to its 2007 study. The City of Lakewood’s study reported higher densities than what was found in Pierce County’s 2014 study—the authors revised a zoning error that adjusted employment densities and showed that Lakewood has substantially more employment capacity than reported. An annotated literature review can be found in Appendix 2.

The following are methodological takeaways to note:

- **Employees per acre (EPA) vs. square feet per employee (SFE)**—some studies used employees per acre as a unit of measurement for employment densities, while others used square feet per employee. Because ESF requires an additional step to get to land estimates, we recommend using EPA as the measurement unit for employment density in Pierce County.
- **Densities seem to cluster around central figures**—while the results vary, employment densities (whether EPA or ESF) seem to cluster around some central figures (5-10 EPA for industrial uses; 15-25 EPA for commercial uses). These figures are not much different than those used in Pierce County’s 2014 Buildable Lands Inventory and 2007 Employment Density Survey.

-
- **Location specific figures**—several studies developed location-specific employment densities (Chamberlain 2015; King County 2014; Gehrke and Srivastava 2012; Watson & Associates Economists Ltd. 2008). This could be an appropriate methodological approach for Pierce County to consider, which will be based on a taxonomy of development or place types. Considering the Cervero/Ewing method of defining place types could also be a useful methodological approach in determining location-specific figures.
 - **Most studies relied on methods from their previous years**, with updates to employment data where possible. Lakewood, however, utilized a **hybrid method in calculating employment densities**, which combined a floor-to-area ratio method with acreage-based calculations using updated employment density factors identified by City staff. This method is worth consideration, given the time and resources available at Pierce County.
 - The Great Recession affected employment in the Puget Sound Region. Most studies noted, however, that the economy is bouncing back and recovering in their respective counties. Job growth in Washington is expected to rise over the next decade—several studies (e.g. Kitsap, Thurston) reported a projected increase in jobs, a majority of which will be in the commercial sector.
 - There is an increasing number of remote workers/home businesses in the region. In Thurston County, for example, 20 percent of future jobs is projected to be in residential zones, which could be taken to mean remote, mobile employment and home-based businesses. The City of Lakewood reduced its total employment allocation by 12 percent to account for remote employees in its Employment Density Survey, consistent with a similar assumption in Pierce County’s 2014 Buildable Lands Report.
 - Accommodating future employment growth scenarios—the City of Reno, Nevada, made note of an impending Tesla factory that would increase employment in the city. The expansion of the University of Nevada in Reno was also a factor in future growth. The City utilized two growth scenarios, Baseline and Recent Trends to project future economic opportunities, where the latter doubled growth rate for manufacturing, wholesale trade, and transportation and warehousing to match Tesla’s projected employment.
 - Several studies (i.e. Reno, Minnesota, Placer County) used methods and assumptions informed by studies from other cities, such as Minneapolis, Washington state, Portland, Southern California, and Rhode Island.

4.1 Methodological Options

The primary objective of this research was to inform BLR methodologies around estimating land needed for employment. Several approaches exist for translating population/employment forecasts into land need. Exhibit 5 summarizes the approaches.

The first method is the easiest: jurisdictions should have current year population estimates as well as population forecasts. Estimates of the amount of developed commercial and industrial land should be developed during the supply analysis. The second method is similar to the first, but uses local employment estimates and forecasts.

The third method requires employee per acre assumptions. Employee-per-acre assumptions allow conversion of employment into acres. Employment density, however, varies considerably by industry—and even within industries. Thus, a small jurisdiction might use an assumption of 8 employees per acre, while a larger one might assume 15-20. Of importance here are whether the assumption is for *net* acres (i.e., land that is available for sale in parcels or lots after roads (right-of-way) has already been deducted, or gross acres (total land before those deductions): one should assume more employees on a net acre than on a gross acre, other things being equal.

Exhibit 5. Basic methods for estimating employment land demand

Method	Description
Population/developed land ratio	Uses the number of developed commercial and industrial acres per 1000 persons and extrapolates it to the planning horizon using the local population forecast.
Employment/developed land ratio	Uses the number of developed commercial and industrial acres per 1000 employees and extrapolates it to the planning horizon using the local population forecast. Requires both a current employment estimate and an employment forecast.
Employee per acre (EPA) ratio	Assumes a specific employment density, expressed in employees per acre. At the simplest level, the method uses an aggregate EPA ratio for all new employment. Requires both a current employment estimate and an employment forecast.
Floor area ratio (FAR) / Employees per sq. ft. (ESF)	Uses zoning to determine floor area ratios and allowable lot coverage. Lot coverage * FAR provides an estimate of built space in square feet. Built space * ESF provides an estimate of land capacity for employment.
Expert consultation	Relies on the expertise of local developers, business leaders and others to estimate land needs.

A variation of the third method is to build up to estimates of employees by using assumptions about floor-to-area ratios (FAR) and about square feet of built space per employee. For example, assumptions of 500 square feet of total (not usable or leasable) office space per employee and of a FAR of 0.3 (built space equals 30% of the buildable area) would yield about 26 employees per net acre, and about 21 employees per gross acre. This method tends to yield greater densities

than those typically assumed for employees per acre, perhaps because the FAR assumes for a single lot are hard to sustain over a larger area.

Each of these methods has limitations.

- **Population and Developed Land Ratio.** This method has two key limitations: (1) use of population forecasts to derive estimates of employment land; and (2) the quality of parcel data. The method is simple: divide developed acres by population to get a ratio of persons per acre (usually expressed as acres per 1,000 persons). A key issue is population is not a good proxy for employment and does not recognize variability of the amount of employment lands in a region. For example, a city that is an industrial center might have half its land in industrial uses; another may be a bedroom community with no industrial land. A second limitation is that assessor's parcel data typically requires considerable effort to identify lands in employment uses that are developed. As a result, this method provides very coarse estimates. We do not recommend considering this approach for the BLR.
- **Employment and Developed Land Ratio.** This is the same as the previous method, with the difference that it uses employment instead of population. ECO used the employment per developed land methodology to estimate EPAs (the analysis is summarized in Section 3 of this memo). The limitations of this method are the same for assessment data. A second limitation is the issue of how to address residential and other lands that might have employment but are not zoned for employment. Due to these limitations we do not recommend using this method for the BLR.
- **Employee Per Acre (EPA) Methods.** The advantage of EPA methods is that they distill the estimate into a very simple formula: net acres * EPA = capacity. EPA assumptions can be developed for broad employment types—the 2014 BLR used commercial (19.37 EPA) and industrial (8.25 EPA). These assumptions are in line with what we see in other studies (for example, Oregon advocates EPAs of 7-12 for heavy industrial uses; 10-15 for light industrial uses; and 12-20 for commercial uses). The limitations of this method are generally related to the source of the EPA assumptions as well as how the assumptions are applied. The EPAs used in the 2014 BLR were derived from a survey of properties using Employment Security data. In our view, this is the best method for developing assumptions using the best data sources.

The biggest limitation of this approach is related to variability in employment densities. As we have discussed, considerable variation exists within zoning districts and within individual industries.

- **FAR/SFE Methods.** Like other methods, this method is limited by the quality of data. One of the biggest problems with this method is that it is difficult to generalize FARs across broad employment types. By definition, FARs are zoning specific. Moreover, variability exists in the amount of built space required by different industries. The amount of effort required to develop accurate estimates for the entire county is

significant given the countywide scope of the BLR. We do not recommend using this approach for future BLRs.

4.2 Recommendations

Pierce County's challenge is developing an acceptable methodology that can be applied across many jurisdictions that range from urban centers to suburbs, to rural communities, to rural areas. After a thorough investigation of the methodological options, we make the offer the following recommendations:

- **Continue to use an EPA based method.** Given the countywide scope and the diversity of cities, EPAs are the most accurate and practical method for estimating employment capacity of vacant and under-utilized land as well as land demand.
- **Consider refinements to the methods used in the 2014 BLR.** The County could make refinements to both the capacity and land demand estimates.
 - **Consider allocating some employment to non-employment lands.** Our review of the 2014 BLR suggests that all of the employment growth increment is allocated to employment lands. Analysis of employment patterns in every Oregon city ECO has worked in shows significant employment exists outside employment zones. Ideally, the amount of employment allocated to non-employment lands would be based on empirical analysis. We suggest exploring if an economist at the Washington Employment Security Department could conduct such an analysis based on zoning data provided by Pierce County.

As an alternative, deductions could be made using ACS commute data. The 2013-17 ACS shows that 4.5% of worked at home. The assumption could be based on a countywide average, or on data for Census places. This refinement is a land demand refinement.

- **Consider disaggregating employment forecasts to three or more categories.** A review of the 2014 BLR only identified single value employment figures. The PSRC data ECO used for the employment density analysis in section 3 is available by city disaggregated by sectors or 2-digit NAICS codes. At the simplest, the models could differentiate between retail, office, and warehouse employment densities. Typically, these would be grouped by NAICS codes. This method is only possible if the employment forecasts/allocations are disaggregated.
- **Consider developing a land use typology based on geography and zoning.** One critique we heard of the 2014 method was that it does not adequately recognize geographic differences. Both ECO's previous work, as well as the literature we reviewed, suggest that geographic variations in employment density exist. In our view, the variations are both due to geography (e.g., one would expect higher

densities in urban cores than in rural areas—a fact that Tacoma’s analysis for the 2014 BLR documents) and zoning. In short, a methodology that recognizes regional differences in land uses could be more robust. The question then is, what options are available?

Following are a few variations for consideration:

- **Typology by city size.** This would be a simple methodology that would develop a typology of city sizes and then associated those with EPA assumptions. The general idea would be that smaller cities and rural areas would be assigned lower EPA assumptions.
- **Typology by PSRC regional centers.**⁶ PSRC’s VISION 2040 calls for the creation of central places with a mix of uses and activities connected by efficient transportation. PSRC designated 29 regional growth centers which are locations of the region’s most significant business, governmental, and cultural facilities and are planning for growth. PSRC also identified nine regional manufacturing/industrial centers, which are locations for more intensive industrial activity. According to PSRC, both regional growth centers and regional manufacturing/industrial centers are focal points for planned growth, economic development and transportation infrastructure investments.

Moreover, the framework identifies three primary geographies: Metropolitan Cities (16 centers), Core Cities (17), and Unincorporated Urban Areas (3). Five regional growth centers and two industrial/manufacturing centers are located in Pierce County.

PSRC’s 2013 Monitoring Report presents employment densities for each of the areas based on 2010 data. Exhibit X shows employment densities for Pierce County Centers. The observed densities are lower than the commercial assumptions in all instances, and considerably lower than the 2014 industrial assumptions for the industrial/manufacturing centers.

Given that much of the county’s employment is located outside these centers, any method will require assumptions for capacity of those lands. The County could use the 2014 assumptions, or use an approach based on city type as described above.

⁶ https://www.psrc.org/sites/default/files/centers_monitoring.pdf

Exhibit 6. Employment Densities in Pierce County Centers, 2010

Type/Center Name	Core Geography	EPA
Regional Growth Centers		
Lakewood	Core City	11.2
Puyallup Downtown	Core City	10.3
Puyallup South Hill	Core City	6.8
Tacoma Downtown	Metropolitan City	22.1
Tacoma Mall	Metropolitan City	14.8
Regional Manufacturing/Industrial Centers		
Fredrickson	Unincorporated UGA	1.2
Port of Tacoma MIC	Metropolitan City	1.8

Source: https://www.psrc.org/sites/default/files/centers_monitoring.pdf, pg 87-88

- **Typology by Zoning.** This is a variation on the previous approach and would be based on local zoning. Effectively, it would require developing a crosswalk between zoning districts and EPAs. This approach has some problems: (1) the number of zoning districts in the county, and (2) data limitations would make it difficult to assign EPAs to zoning districts with any certainty.

In summary, several refinements to the 2014 methodology could improve the capacity and land need estimates. Given the amount of variability that exists in broad employment categories, and PSRCs regional plans, we recommend that any methodology employ the principles of simplicity and transparency. More complicated methods do not necessarily improve the results. We recommend the County consider adjustments for employment in residential areas and using the PSRC center framework.

Appendix 1: Literature Review Matrix

Studies from Washington State

Location	Document Reviewed	Methodology	Employment Density Assumptions (Emp./acre)		Notable Trends	Findings
			Commercial	Industrial		
Counties						
Clark	BLI, 2015	• Building permits primary source of data from 2006-2014 • GIS to link parcels to building permits	9.3	10.9	County has experienced employment gains, however, observed net densities lower than 2007 planning assumptions—could be due to businesses adding employees without requiring new buildings.	County has sufficient capacity to accommodate projected employment growth.
Island	Comp. Plan, 2016	• Suppressed data substituted with older available data • For jobs missing in QCEW data, methodology from PSRC used to estimate total employment from covered employment • City of Freeland excluded from calculation of employment density average due to lack of amenities (sewer) • Due to County's low industrial employment—rounded average from neighboring counties (Skagit, Clark, Pierce) used for industrial assumptions.	17	8	• UGAs resized to accommodate growth in 20 years. • Reduction in size of Freeland and Langley to result in more concentrated growth.	Sufficient capacity to accommodate anticipated employment growth

Location	Document Reviewed	Methodology	Employment Density Assumptions (Emp./acre)		Notable Trends	Findings
			Commercial	Industrial		
King	BLI, 2014	- Half of jurisdictions brought forward 2007 BLR density and capacity calculations; remainder cities required new capacity analysis - Location-specific densities reported in final analysis	250 - 850 SFE*	250 - 851 SFE*	Majority of capacity in Metro and Core cities	Sufficient capacity to accommodate residential, employment growth
King	Emp. Capacity Analysis, 2010	- Employment density assumptions from 2007 BLR - Does not consider future fiscal impacts of redevelopment within Duwamish Industrial Manufacturing Center	550 SFE	800 SFE	South Park has significant portion of employment land capacity	- Total assessed land value for the South Park LID area is \$2,458,285,700. - Total assessed value for the MIC site is \$193,751,000
Kitsap	BLI, 2014	- Methods for Land Capacity Analysis adjusted following Remand Order: - Using trend-based density factors for each residential zone - Increase public facility deduction to 20% - Remove discount for environmental purposes in Urban Restricted Zone - Platted lots adjustment	969 SFE	500 SFE	Majority commercial jobs expected to increase (over 70%) Industrial jobs expected to increase by 6%	Sufficient capacity to meet industrial and commercial development to 2025, 2016-2036
Snohomish	BLI, 2012	Existing structures (as of April 2011) counted as population or employment base; proposed, built, or occupied structures after April 2011 counted as future capacity.	200 - 700 SFE	300 - 20,000 SFE		Adequate land capacity reported in the County for the 2025 adopted UGA population and employment growth targets.

Location	Document Reviewed	Methodology	Employment Density Assumptions (Emp./acre)		Notable Trends	Findings
			Commercial	Industrial		
Thurston	BLI, 2014		3.3	1.5	- Majority employment expected in commercial zones (over 70%) - Industrial jobs expected to increase by 8% - Employment in residential zones (remote jobs / home-based businesses) expected to increase by 20% - Federal endangered species listings anticipated to affect commercial, industrial land supply	Sufficient land supply to support projected growth to 2035.
Whatcom	BLI, 2016	Based on 2009 Land Capacity Analysis methodology	626 - 900 SFE	775 - 3,500 SFE	County-wide surplus employment capacity of almost 13%	Surplus capacity to meet future employment needs
Region						

Location	Document Reviewed	Methodology	Employment Density Assumptions (Emp./acre)		Notable Trends	Findings
			Commercial	Industrial		
PSRC	Industrial Land Analysis, 2015	- Relevant mixed-use zones and land classification included into analysis if related to industrial land. E.g. "Business Park", "Employment Center" - Parcels considered industrial land if significant industrial development present, permitted to occur. - Four categories of industrial lands: - Core industrial - Industrial commercial - Military industrial - Aviation operations areas - Special consideration given to: - Tribal lands - Natural resource lands - Limited Areas of more intense Rural Development - Planned Developments		0.25 - 14.7*	- Revival of manufacturing industry, comparable to the Gulf region, South Carolina, Colorado. - Industrial jobs occurring in non-industrial zoned land. - Non-industrial jobs on industrial lands projected to grow to 45% by 2040.	- Employable land capacity variable to area: Strong demand / limited capacity: Interbay-Ship Canal, Duwamish-North Tukwila, Kent-Renton, and SeaTac-Des Moines subareas. - Strong demand/adequate capacity: Frederickson- Lakewood, Southwest Everett and Tacoma-Puyallup subareas. - Adequate capacity: I-405 Corridor, Arlington-Marysville, and North-Central Everett subareas - Surplus capacity: DuPont-Gray Field, Puget Sound Industrial Center (PSIC)-Bremerton-Sinclair Inlet, and Auburn-Sumner subareas.
City						
Lakewood	Emp. Density Survey, 2017	- Developed a consolidated employment capacity model. - Error in Pierce Co. BLR—one residential zone moved to commercial	12 - 25	15 - 25	City has substantially greater employment capacity than reported in Pierce Co. BLR.	Sufficient capacity to meet 2030, 2035 employment targets

Notes: *Location specific numbers reported; ranges provided here. SFE = Square foot per employee.

Other Studies from Around the US

Location	Document Reviewed	Methodology	Employment Density Assumptions (Emp./acre)		Notable Trends	Findings
			Commercial	Industrial		
Counties						
Placer, CA	Dev. Estimates, 1994	Two development scenarios used to project growth–2010 and 2040. Assumes County captures over 18% regional employment growth for both scenarios.	333 - 550 SFE	700 SFE	• Strong long-term growth rates expected in Sacramento region. • Placer Co. expected to be one of the fastest growing counties due to population and employment increasing from 1990-2010.	Sufficient capacity to meet employment growth needs.
Maricopa, AZ	Emp. Analysis, 2012	• Identified 32 significant regional employment clusters in relation to transit • Employment clusters are assigned sector mix values		5.6 - 14.2	Lowest employment densities in regions characterized by production, distribution, repair	Employment clusters within quarter mile of transit in central and south region have highest densities and employment concentrations–mostly not industrial
Scott, MN	Commercial / Industrial Analysis, 2012	Informed by previous employment density research in other cities		344 - 753 SFE	Buildings with more on-site amenities have higher densities	• Commercial and industrial land expected to expand, but at slower pace than 2006 study. • Sufficient capacity to meet demand but may require land designation changes to meet this change.
Cities						

Location	Document Reviewed	Methodology	Employment Density Assumptions (Emp./acre)		Notable Trends	Findings
			Commercial	Industrial		
Anchorage, AK	BLI, 2009	• Employment density assumptions based on previous studies and trends from other cities. • Employment projections do not account for major construction projects, i.e. Natural Gas Pipeline, the Knik Arm Bridge, the Pebble Mine, Kensington Mine. • Employment density assumptions based on current trend of low density and FARs.		500 - 2000 SFE**	• Major construction projections anticipated to affect industrial sector. • Natural gas pipeline expected to require infrastructure improvements. • Changes in federal spending, expansions in mining or tourism, major infrastructure projects, oil price fluctuations known to have significant impact on local and regional economy. • City is on the lower end of spectrum in regard to industrial employment density.	Sufficient capacity to meet employment growth needs.
Eugene, OR	Emp. Density Analysis, 2006	Employment densities broken down by plan designation and study area	36.3 - 53.9*	8.3 - 20.7*		Provides employment densities by land use designation and study area.
Eugene, OR	Emp. Land Assumptions, 2011	• Government employment growth excluded because typically occurs on public, semi-public lands. • Used "safe harbor" methodology—utilized growth rate for Lane County as calculated by the State.	20 - 90.3	5 - 20	• New employment on non-employment lands: Covered employment occurring in residential and other non-employment land designations. • Increasing number of employment in existing space, making it difficult to predict vacancy rate. Number used in study reflects recession.	Community Advisory Committee agreed that densities would be similar to past.

Location	Document Reviewed	Methodology	Employment Density Assumptions (Emp./acre)		Notable Trends	Findings
			Commercial	Industrial		
Guelph, Canada	Emp. Land Assumptions, 2008	Location-specific densities reported	5 - 106*	2 - 48*	- Competitive industrial land prices. - Employment in Industrial sector expected to increase, followed by commercial and institutional development. - Land-extensive employment trends in warehousing sector.	- Limited supply of employment land, especially for larger sites. - City has adequate land for employment needs to 2031.
Minneapolis, MN	Emp. Pol. Plan, 2006	Introduces Industrial Scorecard to indicate each industry's projected growth, employment demand, and land demand.	7 - 64	14 - 42	Industrial sector significant economic contributor to City.	- Industrial land supply depleting. - City should adopt Employment Districts. - Rezoning for residential use should be reconsidered. - Rezonings should consider job impacts, tax base impacts, viability, transition costs, and adjacency to viable industrial areas.
Reno, NV	Emp. Capacity Analysis, 2016	- Two growth scenarios, Baseline and Recent trends to forecast anticipated employment - Industrial / Commercial buildings categorized by high density and medium/low density	0.15 - 1.25	0.15 - 0.5	Forecasting upcoming employment centers, i.e. Tesla Gigafactory, U of Nevada-Reno	City has capacity to meet employment demands. Growth rate for manufacturing doubled in forecast model to accommodate anticipated employment
San Diego, CA	Industrial Element, n.d.			15.7	Limited industrial land to meet anticipated employment needs.	Rezonings recommended to encourage industrial development.
Region						

Location	Document Reviewed	Methodology	Employment Density Assumptions (Emp./acre)		Notable Trends	Findings
			Commercial	Industrial		
SCAG	Emp. Density Survey, 2001	Over 100 categories consolidated into 10 categories. Employment densities calculated using two methods, median, and weighted averages for employment per acre and FARs.	11.04 - 22.9**	10.63 - 17.05**	Density in Government Offices land use category unusually high—possibly due to small sample size.	Employment density factors derived to be used at region- and county-level.
State						
Oregon	Emp. Density Survey, n.d.	• Employment outside of Central Business District but within city limits referred as Peripheral Employment. • Effects of Great Recession and rise in e-commerce could be reflected in data but difficult to prove at this stage.			• Decreasing jobs in Wholesale, Retail, Transportation, and IT jobs. • Retail trade survived Great Recession.	• Employment densities of downtown central commercial areas have decreased. • Employment densities in city peripheries are more varied.

Notes: *Location specific numbers reported; ranges provided here. **Report also provides weighted averages and/or averages by industry for employee per square foot. SFE = Square foot per employee.

Appendix 2: Annotated Literature Review

Studies from Washington state

Carter, Stephen, and Susan Davis. 2010. South Park Bridge Tiger Grant II Employment Capacity Analysis. ECONorthwest.

This memo includes the technical analysis to be used as background to contribute to the economic competitiveness analysis portion of the Tiger II grant application.

Location: King County, Washington

Relevant Information (2):

- ECONorthwest identified 2007 employment densities from the King County Buildable Lands Report:
 - Commercial: 550 square feet/employee
 - Industrial/warehouse: 800 square feet/employee

Chamberlain, Elizabeth. 2015. Industrial Lands Analysis for the Central Puget Sound Region. Puget Sound Regional Council.

This report assesses economic activity on industrial land in the central Puget Sound region. It is intended to “serve a broad range of land use and economic development planning needs and interests” (E-1).

Location: Puget Sound Region, Washington

Relevant Information (3-8):

- Employment densities for individual Manufacturing/Industrial Centers:
 - Ballard-Interbay (core industrial and industrial commercial): 14.66 EPA
 - Duwamish (core industrial and industrial commercial): 11.61 EPA
 - Frederickson (core industrial and industrial commercial): 1.17 EPA
 - Kent MIC (core industrial): 7.64 EPA
 - North Tukwila (core industrial): 14.05 EPA
 - Paine field/Boeing Everett (core industrial): 10.00 EPA
 - Port of Tacoma (core industrial): 1.79 EPA
 - Puget Sound Industrial Center-Bremerton: 0.25 EPA

Clark County. 2015. Clark County Buildable Lands Plan Monitoring Report.

This report provides updates to the County’s enactment of the Growth Management Act, specifically sprawl reduction and urban growth concentration.

Location: Clark County, WA

Relevant information (4, 20)

- 2007 planning assumptions:
 - Commercial: 20 employees/acre
 - Industrial: 9 employees/acre
- Observed densities are lower than the 2007 planning assumptions:
 - Commercial: 9.3 employees/acre
 - Industrial: 10.9 employees/acre
- “Clark County has seen employment gains from 2006 to 2014. It is likely that some businesses have added employees, which would not require new building permits and may account for the low employment density reported.” (20)

Gifford, Kevin. 2017. *City of Lakewood Employment Capacity Analysis*. BERK Consulting.

This report found that employment densities in Lakewood diverge from Pierce County’s 2014 Buildable Lands Report. BERK’s analysis concludes that the City of Lakewood has substantially greater employment capacity available than is represented in the 2014 Pierce County Buildable Lands Report.

Location: City of Lakewood, Washington

Relevant information:

- BERK developed a consolidated employment capacity model
 - “This blended approach combines the FAR-based method described for the Central Business District with acreage-based calculations using updated employment density factors, as identified by City staff.”
 - “Model assumes a reduction in the market factor for underutilized properties from 50% (assumed by the Pierce County BLR) to 35%, comparable to other commercial hubs in northern Pierce County.”
 - Model provides sufficient employment capacity to meet Lakewood’s 2030 and 2035 employment targets.
- “Per 2014 Pierce County BLR report, total employment allocation is reduced by 12.1% to account for mobile workers and employees working from home.”
- Found error in Pierce Co. BLR
 - ARC zone in residential moved to commercial. This study accounted for ARC zone in employment density
- Lakewood adjusted densities
 - Commercial density: 12-25 employees/acre
 - Industrial density: 15-25 employees/acre

Island County. 2016. "Appendix B: Population Growth Analysis & Accommodations." Island County 2036: 2016 GMA Periodic Review.

This document provides detailed account of Island County's population projections, including buildable lands analysis and employment projections. This document is an appendix to Island County's periodic review of the Growth Management Act.

Location: Island County, WA

Relevant information

- "Suppressed data was substituted for three sectors (Mining, Utilities and Management of Companies and enterprises) using older available data." (16)
- "To compensate for these missing jobs in the QCEW data, a methodology developed by PSRC was used to estimate total employment from covered employment."
- Commercial: 17 employees/acre
- Industrial: 8 employees/acre
- County comparisons
 - Skagit County
 - Commercial: 20 employees/site acre
 - Industrial: 6.5 employees/site acre
 - Clark County (see Clark Co. review—same as 2007 assumptions)
 - Pierce Co. (Unincorporated Pierce County 2014 buildable lands report)
 - Manufacturing/Warehousing: 8.2 employees per acre
 - Commercial/Services: 19.37 employees per site acre

King County. 2014. King County Buildable Lands Report.

This report is an update to the 2007 BLR, in fulfillment of the GMA. The report spans the time period from January 2006 to January 2012, encompassing all 39 cities in King County. The BLR concludes that King County has sufficient capacity to accommodate residential and employment growth.

Location: King County, Washington

Relevant information:

- Employment growth still in transition out of Great Recession (2)
- Minor shortfall in job capacity in unincorporated areas, but majority of King County's capacity to accommodate growth is located in Metro and Core cities. (3)
- Used similar assumptions to 2007 BLR, updated housing and jobs data to 2012
 - "Achieved densities and – for some cities – land capacity data are brought forward from the 2007 BLR into this 2014 BLR. Half of King County's

jurisdictions reported sufficient housing and job capacity in 2007 to absorb even the higher numbers in the new 2006-31 targets. Those cities, including most of the Small Cities, carried forward their 2007 BLR density and capacity calculations into this 2014 BLR... The remaining cities required new analysis of land capacity to overcome a shortfall of capacity with respect to the new targets as part of their process of developing new comprehensive plans.” (2)

- Employment capacity in Table 5.5, 2007 BLR pg V-9

Kitsap County Department of Community Development. 2014. Kitsap County 2014 Buildable Lands Report.

This document provides information on Kitsap County’s update to its growth projections and land capacity for housing and employment. The report found that the County had sufficient land supply to meet the demand for commercial and industrial development to 2025, and the 2016-2036 planning period.

Location: Kitsap County

Relevant information:

- “Kitsap County adopts employment targets to be consistent with the Puget Sound Regional Council’s (PSRC) Regional Growth Strategy.” (53)
- Over 45,000 additional jobs anticipated, majority commercial
 - Industrial jobs expected to increase by 6.4%
- From Appendix:
 - Commercial: 969 sq ft/employee
 - Industrial: 500 sq ft/employee

Snohomish County Council. 2012. Snohomish County Buildable Lands Report.

This report is in accordance with the Growth Management Act. The report evaluates land needs and capacity for residential, commercial, and industrial use anticipated in 20-year planning period, spanning to 2025.

Location: Snohomish County, Washington

Relevant information (3,23):

- Adequate land capacity reported in the County for the 2025 adopted UGA population and employment growth targets.
- No capacity shortfall anticipated in UGAs or cities within the UGAs
- Food Services = 200 sq ft/employee
- Other Services = 400 sq ft/employee
- Finance, Insurance and Real Estate (FIRE) - mini-storage warehouses only = 20,000 sq ft/employee

- Finance, Insurance and Real Estate (FIRE) - other = 350 sq ft/employee
- Retail = 700 sq ft/employee
- Manufacturing = 500 sq ft/employee
- Wholesale, Transportation and Utilities (WTU) = 1,000 sq ft/employee
- Government/Education = 300 sq ft/employee

Thurston Regional Planning Council. 2014. Buildable Lands Inventory for Thurston County.

Thurston County's BLR reports sufficient land supply to support projected growth to 2035. Varying by jurisdiction, Thurston County can sufficiently meet the demand for employment land needs.

Location: Thurston County, Washington

Relevant information:

- Majority of new employment expected to be in commercial zones (72%)
- 8% new jobs expected in industrial zones
- 20% jobs expected in residential zones, i.e. remote workers, home-based businesses
- Employment densities:
 - Commercial: 3.3 employees/1,000 sq ft.
 - Industrial: 1.5 employees/1,000 sq ft.
- "Questions remain as to how much of the commercial and industrial land supply will be available for development due to the pending federal endangered species listings." (65)

Whatcom County Planning and Development Services. 2016. Land Capacity Analysis Report.

This report provides a summary of the land capacity analysis for Whatcom County and its Urban Growth Areas as part of the County's Comprehensive Plan.

Location: Whatcom County, Washington

Relevant information:

- Employment density (found in Appendix C)
 - Commercial: 626-900 sq ft./employee
 - Industrial: 775-3500 sq ft./employee
- "Each UGA has a population growth capacity surplus or deficit within 6% of the allocation, with the exception of the Blaine UGA, which has considerable surplus capacity within its city limits. Figure 2 shows a countywide employment capacity surplus of 12.6%." (1)

Studies outside of Washington state

City of Minneapolis. 2006. Industrial Land Use Study and Employment Policy Plan.

The purpose of this study was to provide information and policy direction for industrial land use and employment in Minneapolis.

Location: Minneapolis, Minnesota

Relevant Information (52-53):

- Minneapolis Assessor/InfoUSA employment per acre:
 - Utilities: 42 EPA
 - Construction: 30 EPA
 - Manufacturing: 27 EPA
 - Wholesale Trade: 20 EPA
 - Transportation & Warehousing: 14 EPA
 - Information: 64 EPA
 - Real Estate, Rental, Leasing: 7 EPA
 - Professional and Technology Services: 64 EPA
 - Other Services: 50 EPA
 - All Industries: 34 EPA

Economic and Planning Systems, Inc. 2009. Anchorage Industrial Land Assessment Final Report. Prepared for the Anchorage Economic Development Corporation.

Chapter 4 of this report, "Industrial Land Demand," estimates the demand for future industrial land in Anchorage by analyzing the relationship between employment and industrial space.

Location: Municipality of Anchorage, Alaska

Relevant Information (29-38):

- Assumptions for employment density in Anchorage by land use category, based on "EPS experience and professional judgment and have been supplemented by significant research of employment density trends specific to the MOA" (31).
 - Industrial Services, Assembly, and Manufacturing: 1000 sq. ft./employee
 - Miscellaneous Industrial (Open storage, processing, heavy manufacturing, utilities, trades, and transportation): 1,800 sq. ft./employee
 - Warehouse/Distribution: 2,800 sq. ft./employee
 - Industrial Flex Space: 500 sq. ft./employee
- EPS conducted a national review of employment density studies with the following results:
 - Pierce County, WA (2006): 13.8 EPA for manufacturing/warehousing
 - Hillsboro, OR (n.d.): 9.0 EPA for industrial

- Silverton, OR (2006): 8.9 EPA for industrial
- Caledon, Ontario, Canada (2007): 17.0 EPA for manufacturing, 9.0 EPA for warehouse/distribution
- Peel Region, Ontario, Canada (2007): 15.8 EPA for industrial
- Grand Traverse County, MI (n.d.): 30.0 EPA for intensive industry, 14.0 EPA for intermediate intensive, 8.0 EPA for extensive
- Portland-Vancouver MSA (2001): 10.0 EPA for warehouse/distribution, 24.5 EPA for general industrial, 24.3 EPA for tech/flex
- Wilsonville, OR (2008): 16.3 EPA for efficient land need, 14.2 EPA for medium land need, 12.3 EPA for high land need
- Minneapolis, MN (2006): 27.0 EPA for manufacturing, 14.0 EPA for transportation and warehousing

Economic & Planning Systems, Inc. 2016. City of Reno: Employment Demand Forecast and Needs Analysis.

This report is a technical analysis to inform the policies and strategies of the City of Reno's Master Plan. It contains a summary of technical analysis, stakeholder feedback, and policy recommendations for the economic components of the Master Plan.

Location: Reno, NV

Relevant information (6-10)

- Used different building types to estimate employment density and land demand. Sub-categories within building types to reflect development density levels and square feet of building space.
- Assumptions based on existing conditions within the Region and national industry standards.
- Building types:
 - Office
 - Type A (Suburban or Campus Office): 300 sq ft./employee, 0.25 FAR
 - Type B (Mid-Rise / High-Rise Office): 250 sq ft./employee, 1.0 FAR
 - Industrial
 - Type A (Large Scale or Heavy Industrial): 1,500 sq ft./employee, 0.15 FAR
 - Type B (Small Scale or Light Industrial): 500 sq ft./employee, 0.50 FAR
 - Retail
 - Type A (Large Format Retail): 400 sq ft./employee, 0.15 FAR
 - Type B (Small Format Retail): 400 sq ft./employee, 0.60 FAR
 - Accommodation and Food Service
 - Type A (Accommodation): 750 sq ft./employee, 1.25 FAR

- Type B (Food Service): 500 sq ft./employee, 0.30 FAR
- Education
 - Type A (General Education): 1,000 sq ft./employee, 0.50 FAR
- Upcoming presence of Tesla's Gigafactory is noted to potentially have impact on employment trends.
- University of Nevada-Reno and its expansion is noted as another economic driver with impact on increased employment.
- Two growth scenarios used to project future economic opportunities, Baseline and Recent Trends. In Recent Trends scenario, growth rate is doubled for manufacturing, wholesale trade, and transportation and warehousing to match trends and include upcoming employment from Tesla.

ECONorthwest. 2006. "Eugene Employment Density Analysis."

This document provides a table of employment density by plan designation and study area in Eugene, Oregon.

Location: Eugene, Oregon.

Relevant information:

- Employment densities were broken down to be more location specific to study area
- Industrial:
 - Campus Industrial: 20.7 EPA
 - Heavy Industrial: 8.3
 - Light Medium Industrial: 15.8
 - Special Heavy Industrial: Not disclosable
- Commercial: 36.3 EPA
 - Commercial Mixed-use: 39.7
 - Major Retail Center: 53.9

Envision Eugene Technical Resource Group. 2011. City of Eugene Employment Land Assumptions Summary.

This document summarizes several assumptions that relate to Eugene's employment land needs. Employment density estimates were based on a 2006 employment density study of 22 areas of Eugene. The Community Advisory Committee agreed that densities would be similar to what they were in the past.

Location: Eugene, Oregon

Relevant Information (4-5)

- Industrial employment density: Ranged from 5 EPA (heavy industrial) to 20 EPA (light or campus industrial); Average industrial EPA: 13
- Commercial employment density: Ranged from 30 EPA (mixed retail and office) to 93 EPA (downtown); Average commercial EPA: 68
- Retail employment density: Ranged from 20 EPA to 37 EPA; Average retail EPA: 23

“Evaluating Employment Density and Land Needs: Floor Area Ratios, Employees Per Square Foot, and Employees Per Acre.” N.d.

This document provides context to the units used when calculating employment densities.

Relevant information:

- Floor-to-Area ratio (FAR), Employees per acre (EPA), square feet per employee (SFA) are three different ways to express employment density
- The document provides the mathematical relationship between FAR, EPA, and SFA
 - “FAR can be derived from EPA and SF/Emp as follows:

$$(EPA * 43560) / SF \text{ per Emp}$$
 - SF/Emp can be derived from EPA and FAR:

$$(FAR * 43560) / EPA$$
 - EPA can be derived from SF and FAR:

$$(FAR * 43560) / SF \text{ per Emp}”$$
- The document also shows the relationship when other variables are held constant:
 - “FAR increasing: When sq. ft. per employee is held constant and FAR increases, EPA also increases (e.g., there is a linear relationship between EPA and FAR)
 - FAR constant/ sf per emp decreasing: When sq. ft. per employee decreases and FAR is held constant, EPA increases at an increasing rate (e.g., a compounding relationship)
 - FAR + SF/Emp Increasing. Under this scenario EPA remains constant.
 - FAR Increasing and SF/Emp decreasing. When both FAR and sf/emp are increased, EPA increases at an increasing rate (e.g., a compounding relationship)”
 - This information is provided in graph form as well

Gehrke, Amanda and Sujata Srivastava. 2012. Final Employment Analysis Memorandum for Maricopa Association of Governments Sustainable Land Use and Transportation Strategy. Strategic Economics.

This updated memo provides information and insight into the relationship between transit (both planned and existing) and employment patterns in Maricopa County. Strategic Economics identified 32 significant regional employment clusters. The Maricopa Association of Governments serves the Phoenix metro area.

Location: Maricopa County, Arizona

Relevant Information (7-15):

- Employment clusters within one-quarter mile of transit in the central and south MAG region have the highest densities and employment concentrations, mainly not industrial
- Regions characterized by PDR (Production, Distribution, and Repair) have lowest employment densities in the region
- Employment clusters are assigned sector mix values. Listed below are employment clusters with over 40% PDR classification, and each cluster's corresponding employment density (jobs per acre)
 - Falcon Field, 58% PDR, 5.6 EPA
 - I-10 West Corridor, 63% PDR, 2.8 EPA
 - West Chandler, 45% PDR, 10.3 EPA
 - West Temple Industrial, 40% PDR, 14.2 EPA

Karr, Peter. N.d. *Employment and Density in Oregon 2004–2012*. University of Oregon.

This study reports employment trends and density changes in Oregon's current downtown and city peripheries from 2004 to 2012. The author focuses on Wholesale and Retail Trade, Transportation, and Information Service Sectors (NAICS Codes 42, 44-45, 48-49, and 51-56), and how much employment from these sectors are in Residential and Mixed-use zones outside of downtown. The study reports findings from Albany, Bend, Corvallis, Eugene, Grants Pass, McMinnville, Medford, Salem, and Springfield.

Location: Oregon (Albany, Bend, Corvallis, Eugene, Grants Pass, McMinnville, Medford, Salem, and Springfield)

Relevant information (10, 23):

- Metrics for evaluation of density included:
 - Count of Businesses per 2-digit NAICS Designation
 - Average Minimum Number of Employees
 - Average Maximum Number of Employees
 - Average Total Number of Employees
 - Standard Deviation
 - Sum of Total Employees working in that Industry
 - Sum of Acreage Totals for Tax Lots Containing Businesses
- Employment in Wholesale and Retail Trade, Transportation, and Information Services has decreased.
- Retail Trade (NAICS Codes 44 and 45) showed increases.
- Employment densities of downtown central commercial areas have decreased, except Salem and Bend showing greater than 5% increase
- Employment densities in city peripheries are more varied

Mullins, Matt, and Amanda Janzen. 2012. "Commercial/Industrial Market Analysis for Scott County, Minnesota." Maxfield Research Inc. Prepared for the Scott County Community Development Agency.

This study analyzed commercial and industrial land supply for Scott County. It is estimated that commercial and industrial land would expand in the county from 2012-2020. To estimate employment density, Maxfield Research, Inc. used previous employment density research in Minneapolis, Washington (state), Portland, Southern California, and Rhode Island.

Location: Scott County, Minnesota

Relevant Information (97-99):

- Estimated EPA using previous studies: Utilities (40), Construction (30), Manufacturing (30), Wholesale Trade (20), Transportation and Warehousing (15), Information (60), Real Estate, Rental, Leasing (20), Professional and Technical Services (60), Other Services (50).
- Square feet per employee has increased in industrial sectors from 2001 to 2010:
 - Light Industrial: 365 sq ft/employee in 2001 to 387 sq ft/employee in 2010
 - General Industrial: 344 sq ft/employee in 2001 to 505 sq ft/employee in 2010
 - General Warehouse: 538 sq feet/employee in 2001 to 753 sq ft/employee in 2010
 - Large Scale/High Bay: 861 sq ft/employee in 2001 and 2010
- Industrial, warehouse, and distribution have experienced increases in EPA since 2001
- Buildings that have more on-site amenities have higher EPAs

Placer County. 1994. Assumptions and Development Estimates. Placer County Countywide General Plan Final EIR.

This chapter is a discussion of assumptions and development estimates in Placer County's Countywide General Plan Final EIR. The document reports estimates for the development scenarios for years 2010 and 2040, which provide the basis for the rest of the impact assessment.

Location: Placer County, CA

Relevant information (2-8)

- Employment density assumptions:
 - Commercial: 550 sq ft/worker
 - Office: 333 sq ft/worker
 - Industrial: 700 sq ft/worker
 - Assumptions based on 1991 County Assessor's database and projections of use over time

San Diego Industrial Element. N.d.

This portion of the general plan examines industrial parcels in Southeastern San Diego.

Location: San Diego County, California

Relevant Information (97):

- SANDAG identified 180 acres of industrial zoned land in Southeastern San Diego, with an employment density of 15.7 jobs per acre.

The Natelson Company. 2001. Employment Density Study Summary Report. Southern California Association of Governments.

This document produces employment density figures based on land use categories from six counties. The consultants consolidated over 100 categories into 10 categories and calculated employment densities using two methods, median and weighted averages for employment per acre and floor-to-area ratios.

Location: Six-county SCAG region (Imperial County, Los Angeles County, Orange County, Riverside County, San Bernardino County, and Ventura County)

Relevant information:

- Land use categories from six counties were aggregated to 10 primary land use categories:
 - Regional Retail
 - Other Retail/Svc.
 - Low-Rise Office
 - High-Rise Office
 - Hotel/Motel
 - R & D/Flex Space
 - Light Manufacturing
 - Heavy Manufacturing
 - Warehouse
 - Government Offices
- Employment density reported in two formats
 - Median employees per acre density and median FAR. Employees per acre:
 - Regional Retail: 14.99
 - Other Retail/Svc.: 13.49
 - Low-Rise Office: 22.91
 - High-Rise Office: 116.32
 - Hotel/Motel: 11.04
 - R & D/Flex Space: 18.13

- Light Manufacturing: 11.63
- Heavy Manufacturing: 17.05
- Warehouse: 10.63
- Government Offices: 16.23
- Weighted average of employees per acre density and weighted average FAR.
Employees per acre:
 - Regional Retail: 19.71
 - Other Retail/Svc.: 21.98
 - Low-Rise Office: 43.95
 - High-Rise Office: 175.49
 - Hotel/Motel: 33.07
 - R & D/Flex Space: 20.53
 - Light Manufacturing: 17.83
 - Heavy Manufacturing: 31.14
 - Warehouse: 11.40
 - Government Offices: 51.67

Watson & Associates Economists Ltd. 2008. City of Guelph Employment Lands Strategy Phase 1.

This Employment Lands Strategy created a vision and plan for future employment lands in the City of Guelph, while maintaining competitiveness in business retention and attraction. The first of two phases, Phase 1: Needs and Opportunities Analysis, identified future employment lands by forecasting demand and evaluating existing vacant and developable land supply.

Location: Guelph, Ontario, Canada

Relevant Information (4-14 – 4-18):

- 2006 Employees per net acre in Hanlon Business Park (287 net acres)
 - Manufacturing: 16 EPA
 - Warehousing & Distribution (including transportation, storage, and wholesale trade): 11 EPA
 - Utilities & Construction: 2 EPA
 - Office: 6 EPA
 - Retail: 5 EPA
 - Other: 24 EPA
- 2006 Employees per net acre in the York-Watson Industrial Area (110 net acres)
 - Manufacturing: 29 EPA
 - Warehousing & Distribution (including transportation, storage, and wholesale trade): 11 EPA

- Utilities & Construction: 30 EPA
- Office: 14 EPA
- Retail: 24 EPA
- Other: 1 EPA
- James Snow Parkway Area, Milton, Industrial EPA: 18
- Harry Walker Parkway Industrial Park, Newmarket, Light Industrial EPA: 23
- Beaver Creek/Commerce Valley Dr. Area, Richmond Hill, Business Commercial/Office EPA: 86; Prestige Industrial EPA: 48
- Brantford, General Industrial EPA: 8
- Mississauga, Limited Outside Storage Industrial EPA: 20, Outside Storage Industrial EPA: 9, Restricted Commercial EPA: 106