BEFORE THE METRO COUNCIL

FOR THE PURPOSE OF ADOPTING THE 1997 BUILDABLE LANDS AND CAPACITY ANALYSIS, REGIONAL FORECAST OF POPULATION, HOUSEHOLDS AND EMPLOYMENT, ACTUAL DENSITY ANALYSIS, AND 1997 HOUSING NEEDS ANALYSIS	)))))))	RESOLUTION NO 97-2559B Introduced by Presiding Officer Kvistad

WHEREAS, Periodic Review of Metro's acknowledged regional Urban Growth Boundary (UGB) was completed in December 1992 and the date for the next Periodic Review of the boundary has not been established; and

WHEREAS, Metro Code 3.01 "Urban Growth Boundary Amendment Procedures" were acknowledged for compliance with statewide planning goals in that 1992 Periodic Review; and

WHEREAS, ORS 197.296(3) and (1997) HB 2493 require Metro to complete (a) an inventory of the supply of buildable lands within the urban growth boundary, (b) a calculation of actual density and average housing mix during the past five years, and (c) an analysis of 20-year housing need by type and range by January 1, 1998; and

WHEREAS, preliminary 1997 Urban Growth Report tables, policy variables estimating trends and the estimated number of needed housing units were adopted in Resolution No. 97-2550A; and

WHEREAS, the Metro Council has held public hearings providing the opportunity to comment on the comparison of the buildable lands inventory and the population and employment forecast, the analysis of whether there is any significant surplus in any land use categories to address the unmet forecasted need, and the Housing Needs Analysis; and

WHEREAS, the acknowledged Metro Code Chapter 3.01 process for 5-year review of the regional urban growth boundary (UGB) shall continue as locations are reviewed for the scheduled consideration of a first legislative UGB amendment in 1998; now therefore,

BE IT RESOLVED:

1. That the 1997 Buildable Lands and Capacity Analysis and the Regional Forecast of Population, Households and Employment in the 1997 Urban Growth Report, attached and incorporated herein as Exhibit A are hereby adopted as part of the analysis in Metro's 5 year review of the regional UGB. These analyses reaffirm and apply the same policy variables adopted in Resolution No. 97-2550A and adjust the UGB capacity deficit in that resolution from 29,350 to 32,370 dwelling units based on those same policy variables.

2. That the determination of the actual density and the average mix of housing types of residential development within the regional UGB over the past 5 years, attached and incorporated herein as Exhibit B, is hereby adopted as part of the analysis in Metro's 5 year review of the regional UGB.

3. That the 1997 Housing Needs Analysis, attached and incorporated herein as Exhibit C, which contains an analysis of 20-year housing need by type and range, is hereby adopted as part of the analysis in Metro's 5 year review of the regional UGB.

ADOPTED by the Metro Council this 18th day of December 1997.

Jon Kvistad, Presiding Officer

APPROVED AS TO FORM:

Daniel B. Cooper, General Counsel

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BEFORE THE METRO COUNCIL

FOR THE PURPOSE OF ADOPTING THE 1997 BUILDABLE LANDS AND CAPACITY ANALYSIS, REGIONAL FORECAST OF POPULATION, HOUSEHOLDS AND EMPLOYMENT, ACTUAL DENSITY ANALYSIS, AND 1997 HOUSING NEEDS ANALYSIS	))))))	RESOLUTION NO 97-2559A Introduced by Presiding Officer Kvistad

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WHEREAS, Metro Code 3.01 "Urban Growth Boundary Amendment Procedures" were acknowledged for compliance with statewide planning goals in that 1992 Periodic Review; and

WHEREAS, ORS 197.296(3) and (1997) HB 2493 require Metro to complete (a) an inventory of the supply of buildable lands within the urban growth boundary, (b) a calculation of actual density and average housing mix during~~, at least,~~ the past five years, and (c) an analysis of 20-year housing need by type and range by January 1, 1998; and

WHEREAS, ~~the~~preliminary 1997 Urban Growth Report tables, policy variables estimating trends and the estimated number of needed housing units were ~~has been~~ adopted in Resolution No. 97-2550A; and

WHEREAS, the Metro Council has held public hearings providing the opportunity to comment on the comparison of the buildable lands inventory and the ~~2017~~ population and employment forecast, the analysis of whether there is any significant surplus in any land use categories to address the unmet forecasted need, and the Housing Needs Analysis; and

WHEREAS, the acknowledged Metro Code Chapter 3.01 process for 5-year review of the regional urban growth boundary (UGB) shall continue as locations are reviewed for the scheduled consideration of a first legislative UGB amendment in ~~July,~~ 1998; now therefore,

BE IT RESOLVED:

1. That the 1997 Buildable Lands and Capacity Analysis and the Regional Forecast of Population, Households and Employment in the 1997 Urban Growth Report, attached and incorporated herein as Exhibit A are hereby adopted as part of the analysis in Metro's 5 year review of the regional UGB. These analyses reaffirm and apply the same policy variables adopted in Resolution No. 97-2550A and adjust the UGB capacity deficit in that resolution from 29,350 to 32,370 dwelling units based on those same policy variables.

2. That the determination of the actual density and the average mix of housing types of residential development within the regional UGB over the past 5 years, attached and incorporated herein as Exhibit B, is hereby adopted as part of the analysis in Metro's 5 year review of the regional UGB.

3. That the 1997 Housing Needs Analysis, attached and incorporated herein as Exhibit ~~A~~C, which contains ~~the 2017 housing needs analysis including calculation of actual density and average housing mix during the last five years and~~ an analysis of 20-year housing need by type and range, is hereby adopted~~.~~ as part of the analysis in Metro's 5 year review of the regional UGB.

ADOPTED by the Metro Council this _____ day of _____ 1997.

_____
Jon Kvistad, Presiding Officer

APPROVED AS TO FORM:

_____

Daniel B. Cooper, General Counsel

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Exhibit A

Urban Growth Report

Final
Draft

December 18, 1997

Growth Management Services
Department

METRO

Metro
Metro is the directly elected regional government that serves approximately 1.2 million residents in portions of Clackamas, Multnomah, and Washington counties as well as those in the 24 cities in the region: Beaverton, Cornelius, Durham, Fairview, Forest Grove, Gladstone, Gresham, Happy Valley, Hillsboro, Johnson City, King City, Lake Oswego, Maywood Park, Milwaukie, Oregon City, Portland, Rivergrove, Sherwood, Tigard, Troutdale, Tualatin, West Linn, Wilsonville, and Wood Village.

Metro is responsible for the regional aspects of transportation, land use planning, and the urban growth boundary; regional parks and greenspaces; solid waste management; operation of the Metro Washington Park Zoo; and technical services to local governments of the region. Through the Metropolitan Exposition-Recreation Commission (MERC), Metro manages the Oregon Convention Center, Civic Stadium, Portland Center for the Performing Arts, and the Expo Center.

Metro is authorized by Chapter 268 of the Oregon Revised Statutes (OAR) and has operated as an elected regional government since 1978. With the adoption of the Metro Charter by vote of the citizens of the region in November of 1992, additional responsibilities were mandated to Metro. Metro is governed by a seven-member council, an executive officer, and auditor. Councilors are elected from districts, and the executive officer and auditor are elected region-wide.

Executive Officer
Mike Burton

Metro Councilors
Presiding Officer
District 3 John Kvistad

Deputy Presiding Officer
District 1 Ruth McFarland

District 2 Don Morissette
District 4 Susan McLain
District 5 Ed Washington
District 6 Lisa Naito
District 7 Patricia McCaig

Auditor
Alexis Dow, CPA

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Urban Growth Report

Executive Summary

Urban Growth Report
Adopted by the Metro Council December 1997

BACKGROUND - Metro Code and State Land Use statutes require that the elected Metro Council review the estimated capacity of the existing Metro Urban Growth Boundary (UGB) at least every 5 years for each new 20-year period. The Metro Council adopted the Metro UGB in 1979 and over the years about 2,800 acres have been added. The last review of the Metro UGB was completed in 1992 for the year 2012. In 1997, when the most recent review of the Metro UGB was initiated, 232,670 acres were in the UGB.

CALCULATIONS - The *Urban Growth Report, December 1997*, is comprised of two main parts: 1) a Buildable Land and Capacity Analysis for the Metro Urban Growth Boundary, and 2) a Regional Forecast of Population, Households and Employment. These data allow a comparison of the estimated need (the forecast) for the next twenty years with the current capacity for residential and employment growth within the current Metro UGB.

The 2017 Regional Forecast is a computer model of a five-county area (Clackamas, Clark, Multnomah, Washington and Yamhill) and is based on estimates of economic sector growth (manufacturing, transportation, construction, services, etc.) and demographic trends. The forecast estimates were peer-reviewed by public and private economists from the area.

The geographic study area of the regional forecast was then reduced to a four-county forecast of population and employment (Clackamas, Clark, Multnomah and Washington). From the four-county population and job estimates for future years, forecasts of households and dwelling unit demand were derived. The four-county regional forecast of population, households and employment was subsequently disaggregated to 1,260 Traffic Analysis Zones (TAZ) using Metro's growth allocation process for use in planning at the local level consistent with regionwide totals.

The four-county estimates of total jobs, population and households and dwelling units for the year 2017 are as follows:

Portland-Vancouver Region
(Multnomah, Clackamas, Washington and Clark Counties)

	1994	2017	1994-2017
Employment, nonfarm (BEA)	956,000	1,536,500	580,500
Population	1,565,800	2,271,100	705,300
Households	604,400	947,900	343,500
Dwelling Units *	633,600	990,500	356,900

*assumes 3.9% vacancy rate for future years
Source: 1994 data - Metro Regional Data Book; September 1997
2017 data – 2015 Regional Forecast, January 1996

For purposes of administering the Metro urban growth boundary, the study area of the four-county regional forecast was further reduced to only the population, households, dwelling units

and employment contained currently inside the Metro urban growth boundary. The estimates of total jobs, population, households and dwelling units for the year 2017 are as follows:

Metro Urban Growth Boundary

	1994	2017	1994-2017 Net Change
Employment, nonfarm (BEA)	788,500	1,264,500	476,000
Population	1,134,900	1,628,600	493,700
Households	451,300	691,700	240,400
Dwelling Units *	472,800	722,600	249,800

*assumes 3.9% vacancy rate for future years
Source: 1994 data - Metro Regional Data Book; September 1997
2017 data – 2015 Regional Forecast, January 1996

In order to produce more detailed transportation and growth management analyses, the 2017 Regional Forecast (population, households and employment) was allocated to TAZ. This was a collaborative process between Metro planners and local city and county planners who jointly determined the future growth allocations of households and employment in their respective jurisdictions.

There are six variables or assumptions that were identified in the buildable lands analysis which played a key role in determining buildable land capacity. These variables, along with the Metro Council conclusions, are as follows:

Summary Buildable Lands Analysis Variables

Variable 1: Environmentally Constrained Lands	Assume 16,000 acres of floodplains, steep slopes & wetlands
Variable 2: Gross-to-Net	Assume 15,080 acres assumed for future roads, parks, schools
Variable 3: Underbuild Factor	Assume a rate of 21% reduction from 2040 Growth Concept densities on dwelling units
Variable 4: Ramp-Up	Assume a 5-year timeframe for implementation of the Urban Growth Management Functional Plan (1994-1999)
Variable 5: Redevelopment and Infill	Assume 28.5 percent of all needed housing will be supplied by redevelopment and infill
Variable 6: Farm Use Assessment	Assume all farm use assessed land within the UGB is available for urban development

CONCLUSION - During the latest 5-year review of the Metro UGB, the Metro Council considered the above variables. In addition, they considered the "capture rate" or amount of growth that will likely occur within the Metro UGB. This rate is assumed to be 70 percent of the four-county dwelling unit growth and 82 percent of job growth. With these policy assumptions determined by the Metro Council, the Metro UGB has a deficit of approximately 32,370 dwelling units and 2,900 jobs to the year 2017. This translates to an approximate expansion of the Metro UGB of between 4,100 and 4,800 acres depending on the efficiency of the urban reserve areas added to the UGB.

Analysis Summary

1. Determine the Regional Forecast, i.e. projected growth in employment (or jobs), population and the resulting number of households and dwelling units for the year 2017

2. Calculate the amount of capacity in the current Metro urban growth boundary for accommodating the future increases in jobs and dwelling units.

3. Compare the Need (or Demand) with the calculated Capacity (or Supply).

Summary Table

	Dwelling Units	Employment
Demand Calculations:		
1994 4-County Estimate	633,600	956,000
2017 4-County Forecast	990,500	1,536,500
4-County Need (1994 – 2017)	356,900	580,500
Metro UGB Need (1994 – 2017)	**249,800**	**476,000**
	(70% of Region)	(82% of Region)
Supply Calculations:		
Capacity using 2040 Growth Concept densities (22,420 net buildable vacant acres)	175,430	291,870
- Underbuild	(36,850)	(22,330)
- Ramp-up (1994 to 1999)	(6,430)	(2,650)
+ Net Redevelopment	46,990	162,510
+ Infill Development	24,200	43,700
+ Capacity on existing platted lots	10,900	0
+ Development rights on environmentally constrained land	3,190	0
Metro UGB Capacity	**217,430**	**473,100**
Result: Supply minus Demand	**(32,370)**	**(2,900)**
	(deficit)	(deficit)

INTRODUCTION

LEGISLATIVE REQUIREMENTS

Oregon Revised Statutes (ORS) and Oregon Administrative Rules (OAR) direct local city and county planning authorities in Oregon and Metro to analyze and to provide sufficient quantities of buildable land for housing in the future. In addition, Metro Code, Chapter 3.01, was established to provide procedures to be used by Metro in making amendments to the Metro Urban Growth Boundary (UGB) adopted Statewide Planning Goals, especially goals 2 and 14, and Metro's Regional Urban Growth Goals and Objectives (RUGGO's).

State laws were recently revised to add the following:

1. Redefine the definition of buildable lands.
2. Require coordination of population projections.
3. Set the criteria for prioritizing land for Urban Growth Boundary expansions.
4. Prescribe specific requirements regarding buildable lands for needed housing.

The combination of these legal regulations means that Metro, as the lead growth management planning agency for urban portions of Multnomah, Clackamas and Washington county, is responsible for compliance with all Oregon statutes and rules governing growth planning. As part of this legal obligation, Metro's Department of Growth Management Services and Data Resource Center have been directed to study and analyze the impact of future urban development and document these findings in a report to Metro Council.

A first draft report, *Urban Growth Report, March 1996*, was presented to the Metro Council for review and subsequent public hearings and debates ensued. As a result of the public hearings and further discussions, Metro Council directed the Executive Officer and Staff to conduct further research on the matter of urban growth demand and supply calculations. The research findings were reported to the Metro Council in an interim, second draft report, *Urban Growth Report, June 1997.*

This report, *Urban Growth Report, December 1997*, is the final reflecting the Metro Council's decision about all information and public testimony given. This document contains an overview of the key results and analysis, and explains the technical steps involved in meeting the requirements of state law and Metro Code. This document only addresses the issues of buildable lands analysis, population forecast and urban development allocations. Other Metro reports explain the housing needs analysis[1]. The *Baseline Urban Growth Data Report* also contains additional information regarding future urban development patterns.

DEFINING BUILDABLE LAND, ORS 197.295(1)

As required by state law, the definition of buildable lands focuses on lands "available and necessary for residential uses." The definition of what may constitute buildable lands now

[1] See *Housing Needs Analysis*, Final Draft, November 1997, Growth Management Services Department, Metro; also see the Technical Appendix 1 and 2.

includes "developed land likely to be redeveloped." Prior to HB 2709, local jurisdictions had the option to include or not include the computation of redevelopable lands into the capacity calculation of buildable land. The definition of buildable lands is contained in ORS 197.295(1).

COORDINATION OF POPULATION FORECASTS, ORS 195.036

This statute requires Metro, as the coordinating entity for the Metro Regional Services District, to establish and maintain a population forecast for the region as a whole and to coordinate this forecast with the other local government entities. A population forecast to meet this statutory requirement will be adopted by ordinance.

THE CONNECTION BETWEEN THE BUILDABLE LAND AND CAPACITY ANALYSIS AND THE REGIONAL FORECAST.

The preparation of the regional forecast and determination of buildable land are two sides of the same puzzle. The buildable lands analysis represents a methodical determination of the supply or inventory of land inside the current Metro UGB sufficient to meet future development, whether for residential or employment (includes industrial, retail and commercial) consumption. It explains step-by-step the technical methods performed, the assumptions used at each step, and the results of this complicated multi-step study.

The other side of the problem of estimating future land need is a quantification of urban land demand, i.e. a forecast of employment and population growth converted into an estimate of land consumption to accommodate the projected amount of urban Metro-wide growth. Future population and employment growth is converted into an estimate of dwelling units and jobs. The regional forecast of population and employment is derived from a sophisticated econometric model for estimating population, households and employment trends. These regional trends are then disaggregated or allocated to smaller geographic units, known as TAZ's, (Transportation Analysis Zones) in order to understand better the internal patterns of urban growth development within the Metro region. The forecasting process was peer reviewed by a panel of economists and demographers from around the region. The Economic Peer Review Council was comprised of representatives from business, government, and academia. The disaggregated data were peer reviewed by city and county planning officials from throughout the Metro region.

FINAL DETERMINATION CONTAINED IN THE URBAN GROWTH REPORT

The conclusion drawn from the buildable lands capacity analysis and the regional forecast suggests that the region does not have a 20-year land supply inside the current Metro UGB. The buildable lands capacity analysis estimates the supply of buildable land; the regional forecast gives us the 20-year demand for residential and employment development needs.

The estimated capacity or supply of land in the current Metro UGB is for 217,430 dwelling units and 473,100 jobs. The regional forecast estimates the housing need to be approximately 249,800 dwelling units and the employment need to be approximately 476,000 jobs by the year 2017. When supply and demand are compared, the result is a deficit of 32,370 dwelling units and 2,900 jobs. At an estimated average of ten dwelling units per net buildable acres in the urban reserves, about 3,240 net acres are needed, requiring about 4,100 to 4,800 gross acres of urban reserves. The small regionwide job deficit must be accommodated as part of this addition of urban reserves consistent with 2040 Growth Concept design types.

THE ORGANIZATION OF THIS REPORT

This report contains three major parts:

Part 1: *Buildable Lands and Capacity Analysis* describes the technical analysis that determines the buildable acres inside the UGB and calculates the dwelling unit and employment capacity for the Metro urban growth boundary.

Part 2: *2017 Regional Forecast and Urban Development Patterns* describes the methodology and includes projections of population, households, and employment growth for the four-county region. The companion to the regional forecast is the *Urban Development Patterns,* which is a spatial allocation of the 2017 forecast of population, household and employment within the four counties to small geographic areas.

This part of the report is intended provide the reader an overview of the regionwide growth trends for the Portland-Vancouver metropolitan area. It summarizes regional growth projections for employment, population and households. The section discusses major factors that might influence regional growth and describes emerging trends that may impact the region's future.

Part 3: The Appendix provides the detailed technical results for all interested parties, especially city and county planners of the region.

BUILDABLE LANDS AND CAPACITY ANALYSIS

PART 1

INTRODUCTION

Part 1 of this report considers buildable land inside the existing Metro Urban Growth Boundary (UGB) and the corresponding dwelling unit and job capacity. Metro Code and state land use statutes require an analysis of the buildable land supply inside UGB. State law (ORS 197.295-298) requires that Metro projects the 20-year land needs based on actual densities inside the UGB. If the UGB has insufficient capacity to meet the 20-year need, then measures must be taken to address the deficit either through by amending the UGB or by allowing greater densities.

This is the final report to Metro Council. Earlier drafts were released in March 1996 and June 1997. These earlier drafts were reviewed extensively by Metro Council, various advisory councils, local jurisdictions and other interested parties. In addition, public hearings were held to solicit public comment. Assumptions made for six of the variables used in this report were debated among various groups. After extensive deliberation, Metro Council made policy decisions in October 1996 and October 1997[2] addressing these variables. Their decisions are incorporated into this report and are summarized below.

Variable 1: Environmentally Constrained Lands - total acreage removed from vacant lands – approximately 16,000; adjust capacity to account for existing development rights on environmentally constrained lands – 3,190 dwelling units (10/96);

Variable 2: Gross-to-Net Reductions – assume approximately 15,080 acre reduction for future streets, parks, schools, etc.; includes additional acreage set aside by Council for schools and parks – 940 acres (10/96) and 1,000 acres for parks (10/97)

Variable 3: Underbuild – assume a rate of 21 percent on dwelling units

Variable 4: Ramp-up – assume a five-year time frame (1994-1999) for implementation of the Urban Growth Management Functional Plan (10/96)

Variable 5: Redevelopment and Infill - assume 28.5 percent of housing need (10/97)

Variable 6: Farm Use Assessed Land - assume 100 percent development over planning period (10/96)

In addition, the Council considered the "capture rate" or amount of growth that will likely occur with the Metro URG. This rate is assumed to be 70 percent of the four-county household growth and 82 percent of job growth.

The *Buildable Lands and Capacity Analysis* is a series of 14 steps organized in two sections. The first section begins by determining the number of net buildable vacant acres inside the UGB (Steps 1-5). It starts with total acreage inside the UGB, determines the gross vacant acres, then subtracts environmentally constrained acres and land for future needs. The result - net buildable vacant acres – is then arrayed by current comprehensive plan categories and capacity is calculated using current plan densities (Steps 6-8).

[2] Resolution 96-2392B (10/4/96), Resolution 97-2550A (10/23/97)

The second section of this analysis applies 2040 Growth Concept assumptions to calculate capacity. The analysis begins by arraying net buildable vacant acres calculated in the first section (Step 5) by the 2040 Growth Concept planning categories. Capacity is then calculated using 2040 Growth Concept densities. From there, capacity is adjusted downward to account for underbuild and ramp up (the time it takes local jurisdictions to implement the 2040 Growth Concept). Redevelopment and infill capacity are then added in the final steps.

SECTION 1

Section 1 of this analysis uses a traditional approach to inventory the supply of buildable lands within the Metro urban growth boundary (UGB). This complies with ORS 197.296(3)(a) for vacant buildable lands. First, the total acreage inside the UGB is determined and categorized by type: developed land, vacant land, existing streets and parks, and water. Reductions are then made to gross vacant acres to account for environmentally constrained lands and land needed for future facilities. The result is net buildable vacant acres inside the UGB. Dwelling units and employment capacity are then calculated using density assumptions for existing comprehensive plans.

This methodology is similar to the original CRAG (Columbia Region Association of Governments) analysis for estimating the needed UGB size in the late 1970's. Although the CRAG work did assume slight changes to comprehensive plans over time, it only worked with gross vacant acres (which were considered accurate within a +/- 10 percent margin), and the details on environmental constraints and public facility needs were very general.[3]

This section involves eight steps to determine net buildable vacant acres and the associated dwelling unit and job capacity under current comprehensive plans. The first step begins by calculating the total number of acres inside the current UGB.

Step 1: *Calculate the total number of acres inside the Metro Urban Growth Boundary.*

The approximate total area inside the Metro urban growth boundary is:

232,670 acres or 364 square miles

Step 2: Subtract acres of developed and committed land to arrive at total gross vacant acres.

Table 1 shows the categories of acreage subtracted from total UGB acres to arrive at **total gross vacant acres**. The acreage subtracted from total UGB acres consists of developed or improved acres, existing streets and roads, existing parks[4] (as shown on current comprehensive plans), and unbuildable areas - bodies of water (rivers and lakes). Total gross vacant acres - 55,040 - include partially vacant parcels (see Appendix A for definition).

[3] Metropolitan Service District, Urban Growth Boundary Findings, Part I, 1979.

[4] The park coverage in Metro's Regional Land Information System (RLIS) database includes nine items: public parks, private parks, open space, cemeteries, miscellaneous public uses, public golf courses, private golf courses, school district park/field, and publicly owned parcels not yet maintained as parks.

Table 1: Vacant Land inside Metro UGB (1994)

Land Supply	Acres
Total UGB Acres	232,670
Developed[1]	(114,880)
Existing Streets	(34,570)
Existing Parks	(20,690)
Water (rivers and lakes)	(7,490)
Total Vacant Acres	**55,040**

Source: Metro's Vacant Lands Inventory (1994); Metro Regional Land Information System (RLIS) database

[1]See Appendix D for a breakdown of developed acres by current comprehensive plan categories.

Step 3: Subtract acres of platted, vacant single-family residential land.

Platted single-family lots, 16,300 square feet or less (3/8ths of an acre),[5] are shown in Table 2. These existing development plats, totaling 1,590 acres (or 10,900 lots), are subtracted from gross vacant acres. Development on this acreage will presumably be only one house per lot – 10,900 units. Redevelopment is not likely to occur within the planning horizon (1994-2017). Table 2 shows the acreage and number of units associated with the single-family residential planning categories. These units are added to the dwelling unit capacity calculations in Step 8.

Table 2: Existing Development Plats (1994)

Development Plats	Acres	# of Units
Single-family1 (10,000 sq. ft.+)	30	130
Single-family2 (7-10,000 sq. ft.)	700	4,110
Single-family3 (5-7,000 sq. ft.)	860	6,660
Total	1,590	10,900

Source: Metro Vacant Lands Inventory (1994); Metro RLIS database

Vacant Acres	55,040
Less existing platted lots	(1,590)
Adjusted Gross Vacant Acres	**53,450**

[5]This assumption is based on the size of existing vacant platted lots, on which development is likely to occur now rather than subdivide or re-plat.

Step 4: Subtract vacant environmentally constrained acres to arrive at gross buildable vacant acres.

Land identified as environmentally constrained - approximately 15,950 acres - is summarized in Table 3A. These lands include areas with slopes over 25 percent; 100-year floodplain (except in areas currently developed or committed as noted by local jurisdictions); floodprone soils (also subject to the same local jurisdiction exceptions as floodplains); wetlands as identified by the National Wetlands Inventory and local wetland inventories; and riparian corridors, a width of 200 feet along rivers and streams. Some of these areas are either difficult or hazardous to develop, while other areas are important natural resources that should be protected. As shown in the Table 3A, developed land, street and parks, as well as vacant land, include environmentally constrained lands. For the purpose of this report, the focus is the environmentally constrained portions of vacant land, which are removed from the gross vacant acres to arrive at gross buildable vacant acres.

Table 3A: Environmentally Constrained Land (1994)

Constraint	Developed	Streets	Parks	Vacant	Total
Slope > 25%	2,230	780	4,680	**4,270**	11,960
Floodplain	4,030	600	2,570	**3,420**	10,610
Floodprone	2,990	890	440	**1,910**	6,230
Wetlands	500	60	1,140	**1,410**	3,110
Riparian - 200' buffer	2,180	410	1,200	**4,940**	8,720
Total Acres	11,930	2,740	10,030	**15,950**	40,650

Source: Metro RLIS database

Table 3B shows gross vacant acres and environmentally constrained vacant acres by current comprehensive plan categories. The environmentally constrained vacant acres are subtracted from total gross vacant acres to arrive at **gross buildable vacant acres** - 37,500.

The current comprehensive plan categories shown in Table 3B are "regional" plan categories and are used throughout this report. Each jurisdiction has separate and distinct zoning/plan categories. Regional categories group similar local plan categories, such as single family (listed regionally as "SFR-1," "SFR-2," and "SFR-3" depending on average lot size allowed), multi-family, commercial neighborhood, light industrial, public facilities, etc. A complete description of the regional plan categories can be found in Appendix B. A geographic coverage of regional zoning/plan categories is part of Metro's Regional Land Information System (RLIS) database.

Table 3B: Gross Buildable Vacant Acres (1994)

Current (Regional) Plan Category	Total Gross Vacant Acres	Constrained Acres	Gross Buildable Vacant Acres
Agricultural or Forestry (FF)	40	(30)	10
Rural or Future Urban (RRFU)	2,480	(830)	1,650
Single-family 1 (SFR1) (10,000 sq ft +)	2,370	(1,020)	1,350
Single-family 2 (SFR2) (7-10,000 sq ft)	12,430	(4,020)	8,410
Single-family 3 (SFR3) (5-7,000 sq ft)	9,770	(2,760)	7,010
Multi-family 1 (MFR1) (8-25 du/acre)	5,190	(1,320)	3,870
Multi-family 2 (MFR2) (25+du/acre)	460	(140)	320
Planned Unit Devel./Mixed Use (PUD)	170	(10)	160
Neighborhood Commercial (CN)	100	(10)	90
General Commercial (CG)	1,320	(280)	1,040
Central Commercial (CC)	820	(140)	680
Office Commercial (CO)	610	(100)	510
Light Industrial (IL)	6,780	(1,380)	5,400
Heavy Industrial (IH)	6,200	(2,180)	4,020
Mixed Use Industrial (IMU)	1,880	(430)	1,450
Park and Open Space (POS)	1,690	(1,110)	580
Public Facilities (PF)	1,140	(190)	950
Total	53,450	(15,950)	37,500

Source: Metro RLIS database

Adjusted Gross Vacant Acres	53,450
Environmentally Constrained Lands	(15,950)
Gross Buildable Vacant Acres	**37,500**

Step 5: Subtract land for future facilities to arrive at net buildable vacant acres (gross-to-net reduction).

Net buildable vacant acres are calculated by subtracting future land requirements for streets, schools, local parks, regional parks, churches and fraternal organizations. Land held in public ownership, which includes an existing inventory for federal, state, county and city uses, is also subtracted. These publicly owned lands are not considered buildable for general housing or employment.[6] The gross-to-net reduction that is calculated in this step is necessary to represent the actual vacant land available for private development. Table 4A lists the future estimated land need (1994-2017) - approximately 15,080 acres. An explanation of each category follows the table.

[6] The acres are distributed as follows by government level (1994): Federal - 303 acres; State - 360 acres; County - 170 acres; City - 295 acres. (Metro did not own any vacant land in 1994.) These acres are part of the gross-to-net reduction shown in Table 4A as "other public facilities."

Table 4A: Land for Future Facilities (1994-2017)

Current Plan Category	Streets 1 acre +	Streets < 1 acre	Schools	Local Parks	Regional Parks	Churches/ Fraternal Org.	Other Public Facilities	Total Reduction
FF	0	0	0	0	0	0	0	0
RRFU	890	10	40	210	100	0	10	1,260
SFR1	450	20	120	200	100	20	20	930
SFR2	1,000	70	400	400	310	180	190	2,550
SFR3	1,950	110	440	200	160	290	70	3,220
MFR1	430	30	130	200	110	70	50	1,020
MFR2	120	10	0	0	0	20	0	150
PUD	50	0	0	0	0	0	0	50
CN	20	0	0	0	0	0	0	20
CG	190	20	80	200	0	0	30	520
CC	60	10	80	200	0	40	20	410
CO	120	10	10	0	0	0	20	160
IL	960	10	50	200	110	0	190	1,520
IH	1,030	20	50	0	160	0	40	1,300
IMU	540	10	150	0	0	30	220	950
POS	0	0	80	0	0	20	100	200
PF	60	0	360	200	0	30	170	820
Total	7,870	330	1,990	2,010	1,050	700	1,130	15,080

Source: Metro RLIS database

Streets. The most substantial reduction to gross buildable vacant acreage is for streets needed for future development (1994-2017) - estimated to account for approximately 8,200 acres.[7] Gross-to-net percentage used for streets is dependent on parcel size.[8] Parcels one acre and larger are reduced by 22 percent, whereas parcels less than one acre are reduced by 10 percent. Recent subdivisions (in Metro Data Resource Center inventory) were examined and areas allotted to streets were calculated to arrive at the estimates used here. The lower percentage applied to parcels less than an acre assumes that many of these smaller parcels have street frontage.

Schools. Future school need is determined by dividing the estimated additional school- age population (ages 5-18) of 75,000 students (from Metro's *2015 Regional Forecast, January 1996*) by the existing ratio of 50 students per acre.[9] This ratio is consistent with plans for school acreage allowances of between 45 students/acre (high school) and 60 students/acre (elementary and middle school).[10] The calculation yields a need for about 1,500 additional acres for schools.

[7] These are for future streets. Existing streets (34,570 acres) are subtracted from the total UGB acres in Table 1.

[8] Parcel size is available at the polygon level in the RLIS database. The actual parcel size distribution over and under one acre was calculated without consideration of environmental constraints.

[9] The ratio is derived by dividing the current estimated school-age population (197,350) attending school inside the UGB by the total number of developed public and private school acres (3,940 acres) inside the UGB – 50.1. The number of school-age children is taken from the four-county school-age population total and multiplied by 72 percent (the approximate Metro share in 1994). It is then multiplied by 90 percent, which assumes that 10 percent of the school-age population is not at traditional school sites.

[10] North Natomas Community Plan 5/3/94, City of Sacramento, a new community plan for 66,000 residents.

The Metro Council, in its review of the variables in the first draft *Urban Growth Report* (March, 1996), determined that an additional 490 acres should be set aside to meet future demand for schools, changing the total need to 1,990 acres. School districts currently own about 920 acres inside the UGB, which means that an additional 1,070 acres are needed to meet the population demand of the next twenty years. This change results in a future ratio of approximately 38 students per acre (75,000 student/1,990 acres) or about 40 acres for a high school with 1,500 students. The 920 school-owned acres are arrayed by current plan categories in Table 4A with the additional 1,070 acres. This acreage is split 60 percent single-family residential, 10 percent multi-family and 30 percent commercially zoned land.

Parks. A methodology similar to estimating school need is used to derive local park need. Existing parks inside the UGB comprise about 16,240 acres.[11] A current ratio of 14.4 acres per 1,000 residents is used to estimate future demand for parks.[12] Additional demand based on this ratio is approximately 7,110[13] acres in both local and regional parks (for the planning period 1994-2017). Regional parks such as Forest Park, Mt. Tabor and Smith and Bybee Lakes currently make up the vast majority of the existing acreage. Similarly, the future demand is assumed to be addressed in large part by the Metro Greenspaces Bond Measure No. 26-26 (May, 1995). With the bond measure acquisition target of 6,100 acres of regional parks (6,000 acres regional, and 100 acres of linear trails), the local park need will be approximately 1,010 acres to maintain the current ratio. Metro Council, in its review of the second draft of the *Urban Growth Report* (June, 1997), determined that an additional 1,000 acres should be set aside for future local park demand. The reasoning for this additional acreage is that with higher densities in the region, a greater demand for parks will occur. This additional acreage increases the future parks per capita ratio to 15.2 acres per 1,000 residents.

Two-thirds of the proposed 6,000-acre acquisition is estimated to be purchased outside the UGB[14] and one-third inside the UGB, mostly at the periphery. A rough estimate, and the assumption used in this report, is that of the 2,000 acre (6,000 x 1/3) proposed acquisition inside the UGB, about 50 percent, or 1,000 acres, overlap with the environmentally constrained land - floodplain, floodprone soils, wetlands, steep slopes and riparian corridor. (These are deducted from the vacant lands inventory in Step 4.) The linear trail component also assumes a 50 percent overlap. The remaining 2,060 acres (1,000 for regional parks, 50 for linear trails, and 1,010 for local parks) plus the additional 1,000 acres set by Metro Council are deducted from the gross buildable vacant acreage in Table 4A (3,060 acres). The regional park acreage is spread among plan categories as follows: 65 percent single-family residential, 10 percent multi-family and 25 percent industrial. Local park need is deducted from plan categories using the split of 50 percent single-family, 10 percent for multi-family and 40 percent for commercial, industrial and public facilities.

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[11] Parks included here are public and private parks and open space (RLIS database items 1, 2 & 3).

[12] The ratio is derived by the following calculation: 16,240 acres/(1.1 million, the estimated 1994 population inside UGB/1,000) = 14.4 acres per 1,000 residents.

[13] Population forecast for 1994-2017 inside the UGB (494,000 more persons) divided by 1,000 x 14.4 (the existing ratio per 1,000 residents) = 7,113.

[14] Regional parks located at the edge but outside the UGB are still regarded as serving the function of providing the urban population with parks. They are seen as acquisitions on the edge of the urban area.

Churches and Fraternal Organizations. The demand for churches and fraternal organizations will presumably increase as the population grows. The current ratio of land owned by churches and fraternal organizations per 1,000 residents is 1.4.[15] Additional demand (1994-2017) based on this ratio is approximately 700 acres[16]. Churches and fraternal organizations currently own 430 acres of vacant land inside the UGB, which means that an additional 270 acres are needed to meet the population demand. The total 700 acres is subtracted in the gross-to-net calculation in Table 4A.

Other Public Facilities. Government owned land for public facilities, approximately 1,130 vacant acres, is assumed to be adequate for future needs for federal, state, city and county government, and service providers. The presumption is that services would utilize these existing publicly owned vacant lands and redevelop existing lands and intensify uses. This would presumably satisfy the need for city halls, fire or police stations, hospitals, water, sewer, etc.

The 15,080-acre gross-to-net reduction from Table 4A is subtracted from the gross buildable vacant acres in Table 4B below to arrive at net buildable vacant acres of 22,420.

Table 4B: Net Buildable Vacant Acres (1994)

Current Plan Category	Gross Buildable Vacant Acres	Gross-to-Net Reduction	Net Buildable Vacant Acres
Agricultural or Forestry (FF)	10	0	10
Rural or Future Urban (RRFU)	1,650	(1,260)	390
Single-family 1 (SFR1)	1,350	(930)	420
Single-family 2 (SFR2)	8,410	(2,550)	5,860
Single-family 3 (SFR3)	7,010	(3,220)	3,790
Multi-family 1 (MFR1)	3,870	(1,020)	2,850
Multi-family 2 (MFR2)	320	(150)	170
Planned Unit Devel./Mixed Use (PUD)	160	(50)	110
Neighborhood Commercial (CN)	90	(20)	70
General Commercial (CG)	1,040	(520)	520
Central Commercial (CC)	680	(410)	270
Office Commercial (CO)	510	(160)	350
Light Industrial (IL)	5,400	(1,520)	3,880
Heavy Industrial (IH)	4,020	(1,300)	2,720
Mixed Use Industrial (IMU)	1,450	(950)	500
Park and Open Space (POS)	580	(200)	380
Public Facilities (PF)	950	(820)	130
Total	**37,500**	**(15,080)**	**22,420**

Gross Buildable Vacant Acres	37,500
Gross-to-net Reduction	(15,080)
Net Buildable Vacant Acres	**22,420**

[15] The ratio is derived by dividing developed acres owned by churches and fraternal organizations (1,566 acres) by 1,100 (1.1 million, the estimated 1994 population inside UGB/1,000) = 1.42 acres per 1,000 residents.

[16] Population forecast for 1994-2017 inside the UGB (494,000 more persons) divided by 1,000 x 1.42 (the existing ratio per 1,000 residents) = 702 acres.

Step 6: Calculate dwelling unit and employment capacity of net buildable vacant acres under current comprehensive plans.

This step calculates the dwelling unit and job capacity on the 22,420 net buildable vacant acres using current comprehensive plan densities. The vacant land is split between residential and employment categories in Table 5. Capacity is determined by multiplying the vacant acres in each category by the corresponding density (in column three). As shown in Table 5, net buildable acres yield approximately 117,600 dwelling units and 192,510 jobs, assuming build out of current comprehensive plans.

Table 5: Vacant Capacity by Current Plan Categories (1994)

Current Plan Category	Residential Net Acres	Dwelling Unit Density	Dwelling Unit Capacity	Employment Net Acres	Employee Density	Employee Capacity
FF	10	0.1	0	0	0.1	0
RRFU	270	0.2	50	120	0.02	0
SFR1	420	3.0	1,260	0	0.8	0
SFR2	5,860	5.1	29,890	0	1	0
SFR3	3,790	7.3	27,670	0	2	0
MFR1	2,850	18.0	51,300	0	3	0
MFR2	170	35.0	5,950	0	6	0
PUD	110	10.0	1,100	0	2	0
CN	10	2.0	20	60	16	960
CG	0	0	0	520	17	8,840
CC	0	0	0	270	105	28,350
CO	40	9.0	360	310	88	27,280
IL	0	0	0	3,880	16	62,080
IH	0	0	0	2,720	20	54,400
IMU	0	0	0	500	15	7,500
POS	0	0	0	380	2	760
PF	0	0	0	130	18	2,340
Total	13,530		117,600	8,890		192,510

Step 7: Adjust current comprehensive plan capacity for single-family underbuild.

Underbuild is defined as development that is built at less than the density allowed by comprehensive plans. It occurs for several reasons: development limitations (e.g., steep slope, poor access), lack of market support for the density, or local government response to neighborhood concerns. Metro has calculated 21 percent as the regional average underbuild for single-family residential development.[17] This underbuild factor is applied only to single-family zones; it is not applied to multi-family and employment zones. Data on multi-family underbuild was not available at the time of this report. Employment space is more adaptable to absorbing additional employees by adding work shifts or by reconfiguring or adding on to existing buildings, or a combination of these strategies. Table 6 shows the dwelling units associated with

[17] This underbuild figure is based on a selected sample of single-family subdivisions, most built in the last five years, examined by the Metro Data Resource Center, 1995.

the single-family residential categories and the units lost due to the 21 percent underbuild factor. The estimated reduction is 12,350 units; the adjusted capacity is 105,250 dwelling units.

Table 6: Adjusted Housing Capacity for Underbuild (1994)

Current Plan Category	Dwelling Unit Capacity	Underbuild Factor	Dwelling Units Lost
Single family 1	1,260	21%	260
Single family 2	29,890	21%	6,280
Single family 3	27,670	21%	5,810
Total	58,820		12,350

Dwelling Unit Capacity Calculated in Step 6:	117,600
Less Dwelling Units Lost from Underbuild:	(12,350)
Adjusted Dwelling Unit Capacity	**105,250**

Step 8: Adjust dwelling unit and employment capacity for existing platted lots and for development rights on unbuildable land.

Platted single-family lots, 16,300 square feet or less (3/8ths of an acre), were subtracted from gross vacant acres in Step 3. In this step the 10,900 dwelling units associated with the 1,590 acres are added to the total dwelling unit capacity calculated in Step 7.

An adjustment is also made in this step for development rights on unbuildable land. Metro Council's review of the draft *Urban Growth Report* (March, 1996) resulted in a change to environmentally constrained lands. The Council recognized that although environmentally constrained lands are removed from gross vacant acres, some development does occur in these areas. For example, development is allowed in floodplains if foundations are elevated one foot or more above flood level. In recognition of development rights on unbuildable land, the Council directed that dwelling unit capacity be increased at a rate of one unit for every five acres of constrained land, or 3,190 units (15,950/5).

Table 7: Adjustments to Capacity

Adjustment	Dwelling Units	Jobs
Adjusted capacity from Step 7 (no change for employment)	105,250	192,510
Add in capacity for existing platted lots	10,900	0
Add in capacity for development rights on environmentally constrained lands	3,190	0
Total Dwelling Units and Jobs	**119,340**	**192,510**

Steps 1 through 8 are the traditional capacity calculation. As shown in Table 7, total capacity using this method is approximately 119,340 dwelling units and 192,510 jobs (from Table 5). In Section 2, net buildable vacant acres are reconsidered using 2040 Growth Concept densities, as well as variable estimating underbuild, ramp up, redevelopment and infill.

SECTION 2

Section 2 uses a different approach to determine capacity. It includes plan changes expected in the region as a result of the Metro 2040 Growth Concept as implemented by the 1996 Urban Growth Management Functional Plan, redevelopable land, and residential infill and employment absorption on developed land. This analysis also goes beyond the initial modeling that was completed for the Metro 2040 Growth Concept. Ramp up, which is the phase-in or implementation time estimated to achieve the comprehensive plan changes required by the 1996 Urban Growth Management Functional Plan. A more complete assessment of underbuild is also addressed, which is applied to all residential zoning.

The Metro 2040 Growth Concept, adopted by the Metro Council in December 1994 and added to Metro's Regional Urban Growth Goals and Objectives (RUGGO) in 1995, established a design for a compact urban form in the region. This regional design, represented by the Growth Concept map, includes a number of "design types": Central City, Regional Centers, Town Centers, Station Areas, Main Streets, Corridors, Inner Neighborhood, Outer Neighborhood, Employment Areas, Industrial Areas, and others.

The section starts with the same net buildable vacant land as in Section 1 - approximately 22,420 acres. For this analysis, the region is assumed to develop consistent with the design types of the Metro 2040 Growth Concept. These are estimated changes to local comprehensive plans required by the Urban Growth Management Functional Plan. The centers, station areas, main streets and corridors adopt mixed-use characteristics. Neighborhoods are assumed to develop with smaller lots, and commercial and industrial areas are strategically located (for the most part following today's locations). Transportation improvements allow for better travel mode choice to common destinations, and greenspaces are intertwined to maintain the regional accessibility to parks.

This analysis includes six steps to arrive at dwelling unit and employment capacity using the 2040 Growth Concept. It begins by calculating dwelling unit and job capacity on net buildable acres (from Step 5 in Section 1) using the 2040 Growth Concept densities required by the Urban Growth Management Functional Plan. It then considers the effects of underbuild and ramp up. Next, redevelopment and infill are estimated and finally, the capacity is adjusted for existing platted lots and development rights.

Step 9: Rezone for 2040 Growth Concept and calculate dwelling unit and employment capacity.

Table 8 shows the distribution of the net buildable vacant acres by planning category under the 2040 Growth Concept analysis. This was accomplished using Metro's regional land information

system (RLIS) database, where each parcel of vacant land was changed as necessary to meet the Metro 2040 Growth Concept.[18] A matrix was established (see Appendix C) that translates current zoning to zone types that approximate the kind of land use regulation ensured by the Urban Growth Management Functional Plan. From this matrix, total acreage by zoning type was obtained, which accounts for implementation of the Functional Plan in the future.

Some of the changes from current plan categories to 2040 Growth Concept categories are quite broad. For example, the 2040 Growth Concept does not attribute any future single-family land to the SFR-1 category (greater than 10,000 square feet), and much of the single-use commercial designations of current plans (such as CC, CO, CG) is replaced by the Mixed-Use Center designation (MUC-1, -2, -3) in the process. Total net buildable vacant acres - 22,420 acres - remain the same. They are simply aligned with the different set of planning and zoning requirements of the Urban Growth Management Functional Plan.

Using this planning and zoning, dwelling unit capacity increases from approximately 117,600 on vacant acres (under current plans before adjustments, Table 5) to 175,430 under the 2040 Growth Concept method; job capacity increases from approximately 192,510 (Table 5) to 291,870.

Table 8: Housing and Employment Capacity of Metro 2040 Growth Concept

2040 Growth Concept Plan Categories	Net Buildable Vacant Acres	Dwelling Unit Density	*Dwelling Unit Capacity*	Job Density	*Job Capacity*
Agricultural or Forestry (FF)	0	0	0	0	0
Rural or Future Urban (RRFU)	0	0	0	0	0
Single family 1 (SFR1)	0	0	0	0	0
Single family 2 (SFR2) Outer Neighborhood	3,620	7.3	26,430	1.8	6,520
Single family 3 (SFR3) Inner Neighborhood	5,110	9.6	49,060	2.4	12,260
Multi-family 1 (MFR1)	1,330	21.2	28,200	4.0	5,320
Multi-family 2 (MFR2)	30	47.1	1,410	7.0	210
Planned Unit Devel./Mixed Use (PUD)	1,970	12.8	25,220	5.0	9,850
Neighborhood Commercial (CN)	1,810	9.4	17,010	20.0	36,200
General Commercial (CG)	0	0	0	0	0
Central Commercial (CC)	0	0	0	0	0
Office Commercial (CO)	30	18.8	560	60.0	1,800
Light Industrial (IL)	0	0	0	0	0
Heavy Industrial (IH)	0	0	0	0	0
Mixed Use Industrial (IMU)	390	7.1	2,770	11.0	4,290
Park and Open Space (POS)	270	0	0	0	0
Public Facilities (PF)	460	0	0	17.0	7,820
Mixed Use Center 1 (MUC1) Town Centers	590	14.1	8,320	35.0	20,650
Mixed Use Center 2 (MUC2) Regional Ctr.	290	25.9	7,510	95.0	27,550
Mixed Use Center 3 (MUC3) Central City	50	58.8	2,940	350.0	17,500
Employment Areas (MUEA)	2,500	2.4	6,000	25.0	62,500
Industrial Areas (IS)	3,970	0	0	20.0	79,400
Total	22,420		175,430		291,870

Source: Metro's vacant land inventory, RLIS database

[18] The RLIS process for reconfiguring the acres to match the 2040 Growth Concept is done in grid, rather than at the polygon level. As a result, the gross-to-net reduction, which is based on polygon data, had to be approximated for the Growth Concept plan categories. The gross-to-net reduction of 13,650 acres is applied here according to the percentages in the existing plan categories (see Table 4A). Additional work was necessary in some instances to approximate the acreage shift so that gross-to-net reductions placed in the appropriate new plan category.

Step 10: Adjust the Metro 2040 Growth Concept capacity for residential and employment underbuild.

In this step dwelling unit capacity is reduced by 21 percent to account for underbuild. The definition of "underbuild" is development built at less than the density allowed by local government comprehensive plans. As discussed in Step 7, it occurs for a number of reasons. Development limitations (such as poor access, steep slopes, or small size), neighborhood objections or a lack of market support for density all may contribute to underbuild.

The first draft of the *Urban Growth Report* (March, 1996) included a variable known as the "Zell" discount factor. This factor addressed development barriers or limitations of some parcels due to small size, poor access, steeps slopes, or partially developed status. The Metro Council voted to address this variable by combining it with the underbuild factor and to apply the factor (21 percent) to all residential zones (rather than single-family zones only as in Step 7). The Council did, however, retain the discounted employment figure from the Zell calculation (22,330 jobs, based on a parcel by parcel analysis), recognizing that some underbuild does occur in employment zones due to development limitations. The Council established 21 percent as the discount factor to apply to dwelling unit capacity based on Metro's study of single-family subdivision density (1995).

Underbuild is reflected in Table 9 below. Dwelling unit capacity is reduced by 36,850 units; the adjusted capacity is 138,580. Job capacity is also reduced approximately 7.5 percent (22,330 jobs) in this step to account for development barriers. The adjusted job capacity is 269,540.

Table 9: Adjusted Dwelling Unit Capacity for Underbuild

2040 Plan Category	Dwelling Unit Capacity (from Table 8)	Underbuild Factor %	Dwelling Units Lost	*Adjusted Dwelling Unit Capacity*	Job Capacity (from Table 8)	Job Capacity Lost	*Adjusted Job Capacity*
FF	0	0	0	0	0	0	0
RRFU	0	0	0	0	0	0	0
SFR1	0	0	0	0	0	0	0
SFR2	26,430	21%	(5,550)	20,880	6,520	(1,520)	5,000
SFR3	49,060	21%	(10,300)	38,760	12,260	(2,910)	9,350
MFR1	28,200	21%	(5,920)	22,280	5,320	(640)	4,680
MFR2	1,410	21%	(300)	1,110	210	(30)	180
PUD	25,220	21%	(5,300)	19,920	9,850	(540)	9,310
CN	17,010	21%	(3,570)	13,440	36,200	(3,010)	33,190
CG	0	0%	0	0	0	0	0
CC	0	0%	0	0	0	0	0
CO	560	21%	(120)	440	1,800	(160)	1,640
IL	0	0%	0	0	0	0	0
IH	0	0%	0	0	0	0	0
IMU	2,770	21%	(580)	2,190	4,290	(120)	4,170
POS	0	0%	0	0	0	0	0
PF	0	0%	0	0	7,820	(290)	7,530
MUC1	8,320	21%	(1,750)	6,570	20,650	(2,250)	18,400
MUC2	7,510	21%	(1,580)	5,930	27,550	(2,810)	24,740
MUC3	2,940	21%	(620)	2,320	17,500	(1,800)	15,700
MUEA	6,000	21%	(1,260)	4,740	62,500	(3,370)	59,130
IS	0	0	0	0	79,400	(2,880)	76,520
Total	175,430		(36,850)	138,580	291,870	(22,330)	269,540

Step 11: Adjust density assumptions to allow cities and counties time to implement zone changes required by the Urban Growth Management Functional Plan.

A ramp-up or phase-in period for implementation of the Urban Growth Management Functional Plan is assumed to span the first five years (1994-1999) of the plan period. That is, cities and counties will need time to change comprehensive plans and zoning ordinances in order to implement the changes required by the Urban Growth Management Functional Plan (deadline for compliance is February 1999).

Ramp-up primarily affects residential zones, taking into account the difference between current densities and 2040 Growth Concept densities. Employment densities are assumed to be more flexible and less likely to be affected by ramp-up issues. In the past, employment densities have been shown to be highly adaptive to market conditions (businesses employing more or less people in the same space). No reduction is made to employment densities, except in mixed-use center zones (MUC-1, -2, -3).

Two adjustments to employment densities have been made as a result of Metro's 2017 household and employment allocation process (from 2017 data – *2015 Regional Forecast, January 1996*). First, a higher density is applied to Industrial Areas – 20 employees per acre. This change was made in response to local government (the city of Hillsboro and Washington County) input regarding average densities in industrial areas. They indicate that a level of about 27 employees per acre is more likely, which far exceeds Metro's earlier assumption of 10. Secondly, the mixed-use component of Employment Areas is reduced by about two-thirds, from 6 to 2.4 residential units an acre (or 2.2 units an acre when adjusted by the ramp-up factor). Consistent local government comment indicates that the location of residential near light industry would be difficult. As a result, the employment assumption for these lands is increased by the offset in residential reduction, up from 17 employees to 25 employees an acre (MUEA plan type).

Calculation of the five-year ramp-up period[19] results in an estimated loss of 6,430 dwelling units and 2,650 jobs (see Table 10). The adjusted 2040 Growth Concept capacity is 132,150 dwelling units and 266,890 jobs.

[19] The formula to estimate the ramp-up effect on densities measures the impact of a five-year ramp-up from current to future densities. The density reduction is .1087 (accounting for 5 of the 23-year planning period developing at a lower average density) times the difference between 2040 densities with underbuild and current plan densities with underbuild. This difference is deducted from 2040 densities (shown in Table 8) and applied to the acreage figures to calculate capacity overall in the period 1994 to 2017. In new plan types, unique to 2040, a comparable current plan type was used as reference. In the case of MUC-1 current household densities were assumed at 5 units an acre, in MUC-2 10 units/ac., MUC-3 35 units/ac., and MUEA at .1 units/ac.

Table 10: Capacity Adjustment to Allow for 5-Year Ramp-up

2040 Plan Category	DU Capacity (from Table 9)	DU Capacity Loss from Ramp-up	*Adjusted DU Capacity*	Job Capacity (from Table 9)	Job Capacity Loss from Ramp-up	*Adjusted Job Capacity*
FF	0	0	0	0	0	0
RRFU	0	0	0	0	0	0
SFR1	0	0	0	0	0	0
SFR2	20,880	(740)	20,140	5,000	0	5,000
SFR3	38,760	(1,600)	37,160	9,350	0	9,350
MFR1	22,280	(360)	21,920	4,680	0	4,680
MFR2	1,110	(30)	1,080	180	0	180
PUD	19,920	(480)	19,440	9,310	0	9,310
CN	13,440	(1,150)	12,290	33,190	0	33,190
CG	0	0	0	0	0	0
CC	0	0	0	0	0	0
CO	440	(30)	410	1,640	0	1,640
IL	0	0	0	0	0	0
IH	0	0	0	0	0	0
IMU	2,190	(780)	1,410	4,170	0	4,170
POS	0	0	0	0	0	0
PF	0	0	0	7,530	0	7,530
MUC1	6,570	(390)	6,180	18,400	(960)	17,440
MUC2	5,930	(330)	5,600	24,740	(1,420)	23,320
MUC3	2,320	(60)	2,260	15,700	(270)	15,430
MUEA	4,740	(480)	4,260	59,130	0	59,130
IS	0	0	0	76,520	0	76,520
Totals	138,580	(6,430)	132,150	269,540	(2,650)	266,890

Note: DU = Dwelling Units

Step 12: Estimate redevelopment potential and adjust capacity calculation for dwelling units and employment.

Net redevelopable acres are identified in this step and dwelling units and job capacity are adjusted to account for potential redevelopment opportunities. This complies with ORS 197.296(3)(a) for redeveloped land. Redevelopment occurs when an existing building is converted to, or demolished and replaced with, a higher density use.

During the preparation of the 2040 Growth Concept, Metro went through several iterations of criteria to identify redevelopable tax lots in the region. The method used in this report allowed for differentiation of improvement values (building values) by location, compared to land values. Two sets of criteria were used. One applied to tax lots one acre or less in mixed-use zones (centers, corridors, etc.) and industrial areas. The other set applied to tax lots larger than one acre, including all Metro 2040 design types. (This includes centers, neighborhoods, industrial areas, etc., with the exception of greenspaces – parks and open space.)

In the case of tax lots one acre or less, the mean surrounding value of parcels within 500 feet was used for comparison. Tax lots were identified as likely to redevelop over the planning period (1994-2017) if the improvement value was between 50 percent and 70 percent[20] of the mean

[20] 50% for Town Centers, Corridors, Employment Areas and Industrial Areas, 60% for Regional Centers and Station Areas, 70% for Central City and Main Streets.

surrounding value. For tax lots larger than an acre, a comparison of building value to land value was used. Tax lots were identified as likely to redevelop over the planning period if the building value was less than the land value.

A slightly different gross-to-net reduction was applied to parcels identified as redevelopable. A reduction was made for streets only. (The vacant land supply already was reduced for needed schools, parks and other public facilities.) Here, because of the likely existing road infrastructure, streets were netted out in single-family zones at 20 percent and in all other zones at 15 percent.

Table 11A presents net redevelopable acres by 2040 Growth Concept planning categories and estimated dwelling unit capacity. Dwelling unit capacity is not assigned to SFR2, SFR3 or PUD categories; even though there are redevelopable acres in these categories that meet the criteria outlined above. Most residential redevelopment is expected to be multi-family units; whereas, single-family residential will be captured with infill development (discussed in Step 13).

Existing 1994 dwelling units, which are considered displaced by redevelopment, are subtracted from the redevelopment capacity (column four) in Table 11A to arrive at the potential redevelopment capacity - 56,160. The Metro Council established the redevelopment and infill rate for dwelling unit capacity at 28.5 percent (18.8 percent redevelopment, 9.7 percent infill) of the housing need[21] in the region (1994-2017). Column 6 of Table 11A shows the potential redevelopment capacity, whereas column 7 reflects the dwelling unit capacity adjusted downward for the established rate (18.8 percent). The net redevelopment capacity is 46,990, which is added to the capacity from Table 10 to yield an adjusted capacity of 179,140.

[21] Housing need is 249,800 dwelling units. See Part 2 of this report.

Table 11A: Dwelling Unit Capacity Adjustment for Redevelopment

2040 Plan Category	DU Capacity (from Table 10)	Net Redevel. Acres	Redevel. DU Capacity[1]	Less Existing DU 1994[2]	Potential Redevel. DU Capacity	Net Redevel. DU Capacity[3]	*Adjusted DU Capacity*
FF	0	0	0	0	0	0	0
RRFU	0	0	0	0	0	0	0
SFR1	0	0	0	0	0	0	0
SFR2	20,140	430	0	0	0	0	20,140
SFR3	37,160	960	0	0	0	0	37,160
MFR1	21,920	400	8,360	(1,700)	6,660	5,580	27,500
MFR2	1,080	40	1,840	(330)	1,510	1,260	2,340
PUD	19,440	850	0	0	0	0	19,440
CN	12,290	990	8,690	(2,510)	6,180	5,170	17,460
CG	0	0	0	0	0	0	0
CC	0	0	0	0	0	0	0
CO	410	10	180	(20)	160	140	550
IL	0	0	0	0	0	0	0
IH	0	0	0	0	0	0	0
IMU	1,410	80	160	(150)	10	10	1,420
POS	0	0	0	0	0	0	0
PF	0	20	0	0	0	0	0
MUC1	6,180	1,020	13,720	(4,710)	9,010	7,550	13,730
MUC2	5,600	690	17,080	(1,820)	15,260	12,750	18,350
MUC3	2,260	300	17,270	(1,490)	15,780	13,190	15,450
MUEA	4,260	1,050	2,270	(680)	1,590	1,340	5,600
IS	0	1,970	0	0	0	0	0
Total	132,150	8,810	69,570	(13,410)	56,160	46,990	179,140

Source: Metro RLIS database (1994)
Note: DU = Dwelling Unit; Redevel. = Redevelopment
[1] Net redevelopable acres x density (adjusted for ramp-up); data does not support including SFR2, SFR3 & PUD units in capacity calculation.
[2] Dwelling units displaced by redevelopment.
[3] Reflects Metro Council's decision to use a rate of 28.5% of housing need for redevelopment and infill (18.8% redevelopment, 9.7% infill).

Redevelopable acres for employment are determined using the same methodology and criteria described above. Table 11B presents potential job capacity on redevelopable acres. Existing 1994 jobs (133,540), considered displaced by redevelopment, are subtracted to arrive at net job capacity of 162,510. This number is added to the capacity from Table 10 for an adjusted capacity of 429,400.

Table 11B: Employment Capacity Adjustment for Redevelopment

2040 Plan Category	EMP Capacity (from Table 10)	Net Redevel. Acres	Redevel. Job Capacity	Less Existing Jobs 1994	Net Redevel. Job Capacity	*Adjusted Job Capacity*
FF	0	0	0	0	0	0
RRFU	0	0	0	0	0	0
SFR1	0	0	0	0	0	0
SFR2	5,000	430	770	(240)	530	5,530
SFR3	9,350	960	2,300	(1,300)	1,000	10,350
MFR1	4,680	400	1,600	(670)	930	5,610
MFR2	180	40	280	(380)	(100)	80
PUD	9,310	850	4,250	(1,200)	3,050	12,360
CN	33,190	990	19,800	(17,540)	2,260	35,450
CG	0	0	0	0	0	0
CC	0	0	0	0	0	0
CO	1,640	10	600	(1,270)	(670)	970
IL	0	0	0	0	0	0
IH	0	0	0	0	0	0
IMU	4,170	80	880	(660)	220	4,390
POS	0	0	0	0	0	0
PF	7,530	20	340	(140)	200	7,730
MUC1	17,440	1,020	34,040	(20,510)	13,530	30,970
MUC2	23,320	690	62,170	(25,330)	36,840	60,160
MUC3	15,430	300	103,370	(31,450)	71,920	87,350
MUEA	59,130	1,050	26,250	(14,700)	11,550	70,680
IS	76,520	1,970	39,400	(18,150)	21,250	97,770
Total	**266,890**	**8,810**	**296,050**	**(133,540)**	**162,510**	**429,400**

Source: Metro RLIS database (1994)

Step 13: Estimate infill housing and employment absorption and adjust capacity.

Estimated residential infill and employment absorption is considered in this step and presented in Table 12B. Infill development occurs on underutilized lands – lands that Metro considers developed (114,880 acres listed in Step 3).[22] Employment absorption is the addition of jobs on developed land (in existing buildings).

Residential Infill

Potential infill development is calculated first by assessing the stock of oversized lots (within the current Metro UGB) and then by estimating the rate of infill development occurring in the region. Potential infill sites were identified by comparing current zoning to lot size, highlighting lots three to ten times the allowed minimum lot size. For example, a 15,000 square foot lot zoned R5 (residential, 5,000 sq. ft. minimum lot size) would be selected for this analysis because it is three times the allowed minimum lot size. These lots are considered either developed or partially developed in Metro's developed lands inventory. Table 12A shows there are approximately 26,350 lots inside the current Metro UGB that are three to ten times the allowed

[22] Developed acres in RLIS can be fully developed or partially developed/partially vacant. A lot is considered partially developed/partially vacant if it has a structure and there is a vacant component (no structures, outbuildings, driveways or roads) of one-half acre or more. The vacant portion is added to the vacant lands inventory; the developed portion is added to the developed lands inventory.

minimum lot size. The future potential of these sites varies depending on the assumption used. (Table 12B shows various assumptions.) If the allowed zoning is employed, the yield is approximately 90,000 lots (116,440 potential lots minus 26,350 existing lots). If the number of partitions is limited by presuming the existing unit remains on a double lot (or double the minimum allowed) and the additional partition is capped at three units a lot (on those lots five to ten times the allowed zoning), the number of potential lots drops to 51,680. If a further screen is employed, taking out high value parcels (expensive homes where property is valued at over $300,000), the number drops further to 47,700 potential lots. This is still almost 24,000 more lots than the assumed rate (see Table 12C).

The sample included all single-family zoning types including townhouse zoning (1,000 square-foot zones). This acreage, or stock, was screened first for overlaps with environmental constraints, public ownership, commercial and industrial zones, and redevelopable acres. However, the sample excluded lots equal to two times allowed zoning or approximately 37,000 lots. These represent the normal flexibility of allowed zoning (underbuild factors and other issues creating larger lots than the minimum). The sample also excluded lots over 10 times allowed zoning, around 6,000 lots. Even though these lots are residentially zoned, there appears to be commercial or other uses occurring.

Table 12A: Potential Stock of Oversized Lots

Existing Lots 3 to 10 Times Current Zoning by Potential Lot Size Category	
Zoning allows lot size:	Number of Existing Oversized Lots
1,000 - 2,500	12,660
2,500 - 5,000	5,740
5,000 - 7,500	4,360
7,500 - 10,000	3,430
10,000 - 20,000	140
20,000 - 1 acre	20
Total	26,350

Table 12B: Potential Infill Lots

% of allowable zoning:	Existing Lots	Potential Future Lots	Limited Partitions	Value Limited to $300 K	
				Lots	Potential
300%	10,680	32,040	10,680	10,000	10,000
400%	5,980	23,920	11,960	5,620	11,240
500%	4,760	23,810	14,280	4,500	13,510
600%	1,680	10,100	5,050	1,530	4,600
700%	1,140	7,980	3,420	1,020	3,060
800%	880	7,040	2,640	770	2,310
900%	620	5,490	1,830	510	1,530
1000%	610	6,070	1,820	500	1,490
Totals	26,350	116,450	51,680	24,450	47,740

Source: Metro RLIS database (1994)

The potential stock identified in Tables 12A and 12B shows the number of lots under current zoning that have additional area to support multiple units and could, when conditions prevail,

partition or subdivide.[23] Metro Council established the combined infill and redevelopment rate for the planning horizon (1994-2017) at 28.5 percent of the housing need, based on the average of the 1995 and 1996 measured rate (27.5 percent in 1995, 29 percent in 1996). Table 12C below shows the additional dwelling unit capacity from infill development – 24,200. This number is added to the capacity from Table 11A for an adjusted dwelling unit capacity of 203,340.

Table 12C: Estimated Residential Infill and Employment Absorption on Developed Acres

2040 Plan Category	DU Capacity (from Table 11A)	Est. Infill for DU	*Adjusted DU Capacity*	Job Capacity (from Table 11B)	Est. Job Absorption	*Adjusted Job Capacity*
FF	0	0	0	0	0	0
RRFU	0	0	0	0	0	0
SFR1	0	0	0	0	0	0
SFR2	20,140	7,030	27,170	5,530	0	5,530
SFR3	37,160	9,930	47,090	10,350	0	10,350
MFR1	27,500	0	27,500	5,610	0	5,610
MFR2	2,340	0	2,340	80	0	80
PUD	19,440	0	19,440	12,360	0	12,360
CN	17,460	4,840	22,300	35,450	4,370	39,820
CG	0	0	0	0	0	0
CC	0	0	0	0	0	0
CO	550	0	550	970	0	970
IL	0	0	0	0	0	0
IH	0	0	0	0	0	0
IMU	1,420	0	1,420	4,390	870	5,260
POS	0	0	0	0	0	0
PF	0	0	0	7,730	0	7,730
MUC1	13,730	2,400	16,130	30,970	4,370	35,340
MUC2	18,350	0	18,350	60,160	8,740	68,900
MUC3	15,450	0	15,450	87,350	8,740	96,090
MUEA	5,600	0	5,600	70,680	7,870	78,550
IS	0	0	0	97,770	8,740	106,510
Totals	179,140	24,200	203,340	429,400	43,700	473,100

Note: DU = Dwelling Units

Employment Absorption

Employment absorption occurs in existing structures (on developed land) without using additional land. The absorption occurs a number of ways. For instance, it can occur by adding shifts, or by altering an existing building, or by adding onto an existing building. This "absorption" is a significant factor to consider in estimating job capacity inside the UGB. A Metro Data Resource Center report[24] indicates that the dollar investment noted through building

[23] The conditions likely to produce conversion are high land prices, similar to those existing today, low improvement values, individual investment and life cycle decisions by homeowners, and neighborhood development or redevelopment changes. They are speculative conditions, but all are affecting the infill seen today.

[24] *Regional Development Trends, Non-Residential Building Permits,* (Metro Data Resource Center, June 1995, p.9), a statistical analysis relating dollar investment to job creation.

permit data for alterations and additions is roughly equivalent to 35 percent of the investment in new structures. This can be statistically equated with about one-third of the new job locations between 1974 and 1993, which means that roughly 35 percent of the new job creation is located in existing structures or improvements to those structures. This absorption is in part represented by the redevelopment component of this report (see Step 12); however, redevelopment does not consider absorption in high value buildings. (Redevelopment is largely weighted towards lower value buildings.)

Employment absorption is shown in Table 12C - 43,700 or about 7.5 percent of the four-county employment.[25] This employment distribution is approximated by plan categories and is added to job capacity from Table 11B for an adjusted total of 473,100.

Step 14: Adjust dwelling unit and employment capacity for existing platted lots and development rights on unbuildable land.

Dwelling unit and employment capacity is adjusted in this step just as it is using the traditional approach in Section 1 (Step 8), only this time to the Metro 2040 Growth Concept capacity from Step 13. To summarize the adjustments, capacity for existing platted single-family lots and development rights on unbuildable land is added. (See Step 8 for explanation of capacity regarding development rights on unbuildable lands.) Table 13 shows the adjusted capacity under the 2040 Growth Concept as 217,430 dwelling units and 473,100 employees.

Table 13: Final Adjustment to Capacity

Adjustment	Dwelling Units	Jobs
Capacity from Table 12A	203,340	473,100
Add in capacity for existing platted lots:	10,900	0
Add in capacity for development rights on environmentally constrained lands:	3,190	0
Estimated dwelling unit and employment capacity of the current UGB:	**217,430**	**473,100**

[25] The employment absorption is calculated as 7.52% of the difference between the 1994 and 2017 four-county employment, or (1,536,500 - 955,600) x .075.

Summary

In summary, the UGB capacity under a 2040 Growth Concept scenario is 217,430 dwelling units and 473,100 jobs as shown in the summary table below. The 2040 Growth Concept method yields almost 100,000 more dwelling units and over 280,000 more jobs than the capacity under current plans calculated in Section 1 of the report.

Table 14: Summary of Capacity Under 2040 Growth Concept

Part 2, Steps 9-14	Dwelling Units	Employees
Step 9: Capacity using 2040 Growth Concept densities	175,430	291,870
Step 10: Subtract dwelling units for underbuild and development limitations	(36,850)	(22,330)
Step 11: Subtract dwelling units and jobs to account for 5-year ramp up	(6,430)	(2,650)
Step 12: Add dwelling units and employment to account for redevelopment	46,990	162,510
Step 13: Add dwelling units and employment to account for infill	24,200	43,700
Step 14: Add in dwelling units for existing platted lots (10,900) and development rights on environmentally constrained lands (3,190)	14,090	0
TOTAL	**217,430**	**473,100**

Part 2 of this report examines the demand for housing and employment. The demand and supply can be compared to reach a conclusion about whether sufficient capacity exists in the current Metro urban growth boundary to meet the 20-year housing need.

REGIONAL FORECAST AND URBAN DEVELOPMENT PATTERNS

PART 2

INTRODUCTION

Since 1988, the Portland-Vancouver metropolitan economy has received much faster growth than anticipated. In comparison with actual estimates, prior forecasts of population and employment show widening deviations between what was forecasted and today's actual performance. The 2017 Regional Forecast updates these current trends and reflects the emerging trends we believe will persist into the future of this forecast.

Today's 2017 regional forecast and its companion the urban development patterns represent a minor adjustment to the previous year's 2015 regional forecast and urban development patterns[1]. The urban development patterns analysis is an allocation of the geographically broader regional forecast into smaller geographic estimates. The 2017 forecast updates the 2015 forecast by extending the forecast horizon an additional two more years. Additionally, the new 2017 growth allocation correctly reallocates the amount of growth and the assumption behind where that growth is expected to occur in the designated urban reserve sites[2].

The forecast methodology for the 2017 regional forecast represents a significant advance in technical achievement. The regional forecast was derived from a sophisticated regional economic forecasting model. The model projections was the basis for Metro's dwelling unit (or household and population) and employment demand forecast for the year 2017. The 2017 growth projections serve as the regionwide control totals for allocating future growth into smaller geographic units. In other words, a sum of all the subarea estimates in the region must add up to the original regional total for households, population and employment.

The organization of this part of the report begins with a summary of the regional forecast and results, description of the regional model, a discussion of the major economic and demographic trends of the region, and ending with a summary of the regional allocation methods and its results.

[1] We characterize the regional forecast to represent the larger four or five county economic region, whereas, the urban development patterns represents an urban growth allocation to smaller geographic units, typically TAZ's. TAZ's or transportation analysis zones are small transportation areas that show potential concentrations of commuters.

[2] It was only this October 1997 that the Council formally declared the first tiers of the Urban Reserve (UR) sites. First tier UR are designated to be included into the Metro UGB before any other potential sites. Prior to this announcement, the Council had designated over 18,000 acres of land outside the UGB as UR. The Council declared about 5,500 acres

2017 Regional Forecast Summary

Recent growth in this region has exceeded forecast expectations. In particular, figures released by the Census Bureau in 1994 indicate population to be about 39,000 ahead of the Metro *2040 Regional Forecast*. A number of economic factors have helped boost regional growth rates:

- higher migration rates, particularly because of slow job growth in California
- above average employment growth in the Portland area economy
- tax incentives that have lured a large number of high-tech firms.

Silicon Forest. The region's emergence as a center for high-tech development has spurred new growth. Nearly $12 billion in high-tech plant and equipment are expected to be invested in the region during the next few years. In addition, we anticipate more growth from suppliers, other retailers and merchants who sell goods and services to the companies and their employees who have moved into the area. The region is fast becoming a major player in the world of high-tech manufacture and research.

International Trade. Portland offers an ideal backdrop for international trade, particularly with the Far East. Good air, sea, and rail connections make Portland an ideal distribution point. The region's closer proximity to Pacific Rim nations gives this area a competitive edge over other inland regions of the U.S. Presently, agricultural and timber products still represent a major part of exports, but in terms of value of shipments, high-tech products make up a faster growing segment.

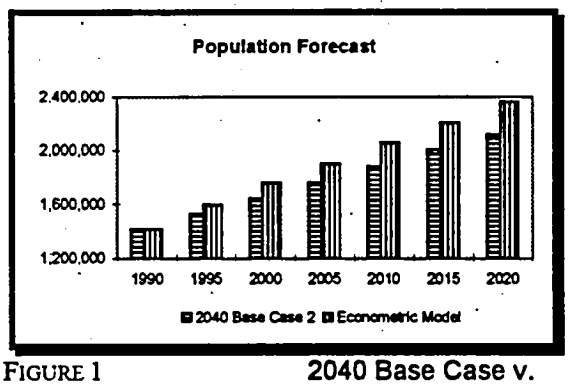

FIGURE 1 2040 Base Case v. Econometric Model Forecast

FORECAST ASSUMPTIONS

Nationally, many observers feel that the U.S. Federal Reserve has successfully engineered a "soft-landing" for the U.S. economy. In the very short-run, the implication for the Portland economy suggests that the regionwide growth rate will tend to moderate along with the a slowdown in the U.S.

Because of the area's relatively stronger economic condition, a slowdown in regional employment and population growth will be less pronounced than for the nation as a whole. Favorable economic conditions will continue to fuel in-migration and sustain population and economic growth, but a rebounding California economy will tend to decrease migration flows into this state. High-tech growth will bolster manufacturing activity in this area – directly in the semi-conductor industry and supporting suppliers.

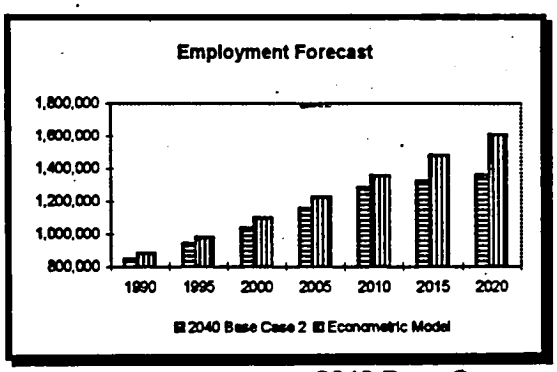

FIGURE 2 2040 Base Case v. Econometric Model Forecast

Retail merchants and other service providers are expected to enjoy continued strong growth because of demographic trends. By 2000, population is expected to reach 1.75 million – an increase of 150,000 people in six years. By 2017, the area is expected to reach approximately 2.3 million inhabitants – an increase of 705,000 people (1994 to 2017).

FIGURE 3
REGIONAL FORECAST SCENARIOS
POPULATION*

	2040	Econometric Model		
	Base Case	HIGH	MEDIUM	LOW
1990	1,412,344		1,412,344	
1995	1,526,500	1,598,700	1,597,100	1,597,100
2000	1,640,000	1,824,700	1,756,700	1,695,300
2005	1,756,200	2,065,700	1,903,600	1,803,900
2010	1,877,700	2,333,500	2,055,900	1,925,400
2015	2,001,730	2,631,500	2,210,800	2,037,100
2017	2,249,300	2,703,300	2,271,100	2,092,600
2020	2,121,900	2,951,800	2,363,600	2,128,600

Over the length of the forecast, we emphasize both short-run and long-run growth determinants. The region's potential output in the future is conditional upon increases in its population and labor force, improvement in productivity, long-term investments, and the region's comparative economic advantage over other regional economies.

The regional economy is expected to outperform national growth trends predicted of the future. Faster population and in-migration rates are expected to bolster retail growth and the broader service sectors.

Technology advancements will continue to boost productivity. Capital investments in recent years will enhance competitive advantages in the future. Investments in high-tech companies now are likely to start the region growing more in later years through increased agglomeration.

Alternative Forecast Scenarios. The econometric model employs three different U.S. macroeconomic scenarios to produce three separate and independent regional forecasts:

- Moderate/Trend Scenario
- High Growth Scenario
- Low Growth Scenario

The WEFA U.S. macroeconomic scenarios provide the underlying growth assumptions for our future regional growth projections. In a comparison of forecasts, the *2040 Base Case Forecast* is projected to increase an average of 1.4 percent a year. In contrast, computations based on the Metro econometric model show the region is more likely to grow an average of 1.6 percent per year. Also, depending upon growth scenarios and future assumptions, the high growth scenario predicts an average 2.5 percent and the low growth scenario 1.2 percent growth per year (see figure 5).

FIGURE 4
REGIONAL FORECAST SCENARIOS
EMPLOYMENT*

	2040	Econometric Model		
	Base Case	HIGH	MEDIUM	LOW
1990	847,671		856,000	
1995	938,862	985,100	979,700	966,700
2000	1,040,955	1,150,600	1,104,000	1,041,400
2005	1,154,148	1,321,800	1,228,500	1,135,000
2010	1,279,651	1,518,000	1,356,100	1,233,400
2015	1,321,160	1,723,300	1,486,600	1,319,400
2017	1,338,200	1,805,000	1,536,500	1,352,400
2020	1,364,016	1,937,000	1,615,100	1,403,500

Population growth varies from year-to-year depending upon net migration rates. In the short-run, we anticipate faster population growth due to relatively favorable economic

conditions. As conditions in the long-run moderate, we expect population and employment growth to slow together.

The number of households projected for the four-county area is expected to increase with population. Household formation is expected to increase slightly faster, just as the trend in household size (i.e. the number of persons per household) continues to fall across the nation.

Each of the alternative growth scenarios shares one common theme and that is an absence of explicit business cycles[3]. The Medium Growth scenario represents a trend or base case growth by which the actual economy in the future is most likely to cycle around.

FIGURE 5
THE REGIONAL FORECAST
(1994 TO 2017)

	Annual Average Growth Rates		
	High	Med.	Low
Population	2.5%	1.6%	1.2%
Households	2.7%	1.9%	1.4%
Employment	2.8%	2.0%	1.5%
Per Capita Inc.	1.2%	1.0%	0.7%

FIGURE 6
REGIONAL FORECAST SCENARIOS
HOUSEHOLD*

	2040	Econometric Model		
	Base Case	HIGH	MEDIUM	LOW
1990	553,107		553,107	
1995	608,328	634,400	636,000	633,800
2000	665,112	729,900	705,900	678,100
2005	724,711	843,100	777,300	736,300
2010	786,608	968,300	852,000	798,900
2015	849,235	1,105,600	917,000	855,900
2017	872,715	1,163,100	947,300	880,000
2020	909,157	1,256,100	992,100	917,500

The long-run factors that determine real growth will impact the region's potential aggregate supply. We therefore construct high (and low) growth scenario(s) which are consistent with simulating changes in the region's future aggregate supply, such as:

- regional productivity
- population and its determinants
- labor force
- investment activity.

The high (and low) growth scenario(s) do not represent absolute growth bounds, but rather frame a "probable" high (or low) growth path(s) that the regional economy may take if alternative conditions assumed actually materialize.

[3] The current business cycle is "played-out" in the short-run before the forecast is blended into an expected long-run forecast. The long-run embodies the historical average growth of the regional economy with its many business cycle swings.

* Population, households and employment projections in the sets of econometric model projections have been re-calibrated to compare with the 2040 Base Case projections which include only the 4-county, bi-state area.

Regional Economic Model Described

SECTION 1

INTRODUCTION

The economic and demographic outlook summarized in the *2015 Regional Forecast* actually represents three separate 25-year growth scenarios: a Medium Growth forecast, a High Growth, and a Low Growth scenario. (The regional forecast has extensions through to the year 2020 and we are able to consistently use this forecast to meet year 2017 requirements.) The Medium Growth forecast scenario represents our most likely (highest probability) long-term growth trend. That is to say the Medium Growth forecast is a medium-case forecast which embodies our best estimate of what future growth will be in this region. It incorporates the expectations and predicted outcomes we feel have the highest likelihood of being realized.

The Medium Growth forecast is a trend scenario; by this we mean that significant business cycles in the long run are not represented in the outlook. It is not our belief that business cycles in the future will never occur, instead cyclical turning points far in the future are extremely difficult to predict. So, we construct a trend scenario that allows the regional economy to grow along historical averages in relation to regional population growth and subject to national economic conditions as they develop in the future.

Economists often differ in their opinions regarding future economic growth. That's because monetary and fiscal policies are always in a state of flux. In addition, global developments also add to the confusion and uncertainty about how growth will occur. Economists and forecasters' ability to predict the future are limited to the degree in which the economic models being used are able to predict the behavior of people and industry to various unknown economic stimulus in the future.

It is these unanticipated event(s) that can materially throw a particular forecast "off track." In order to mitigate the risk inherent with a single forecast, we have developed a range of alternative growth scenarios. Each forecast can be interpreted as a range of possible outcomes given different sets of assumptions regarding economic and population growth in the future.

With a forecast range, we can be reasonably confident of where future growth might be headed. Therefore we construct high and low growth scenarios. Within the bounds of the high and low forecasts, the two projections represent an interval of growth around which future economic and demographic conditions are likely to occur given changes in long-run economic and demographic assumptions.

The high and low scenarios attempt to predict with a reasonable degree of confidence the probable range in which the regional economy could grow in the future. These projections demonstrate that under a range of plausible economic and demographic assumptions, regional growth can shift up in some years or swing down in other years.

All three scenarios are developed with the assumption that there will not be any unusual shock(s) to the region or the U.S., such as a large war or a major natural disaster (an

earthquake, tidal wave, or other act of God). The high and low scenarios focus on plausible shifts in fundamental trends of the economy and the population.

THE ECONOMIC MODEL

The regional forecast was prepared using a Metro developed econometric model using national growth assumptions obtained from the WEFA Group, Inc. For more information about the Metro Regional Economic Model, please refer to the Model Reference Guide [4], or for additional details please reference the *2015 Regional Forecast*[5].

The Metro Regional Model is a quarterly-data, econometric model of the Portland-Vancouver economy. It was developed in-house by METRO staff and is maintained and operated in-house. This econometric model is Metro's first integrated economic and demographic model of the region and covers all of Clackamas, Multnomah, Washington, and Yamhill counties in Oregon plus Clark county, Washington. The model treats the region as a single economic entity; that is inter-county transactions and inter-industry impacts among the counties are ignored. Also, it is not a "shift-share" model and does not "share-down" from any existing state model. The Metro Model is a stand-alone economic model that features U.S. and international drivers combined with regional assumptions to forecast employment, income, population and household trends (see figure 3).

The regional economic model is basically a top-down structural model. Its primary inputs are exogenous variables or drivers taken from the national economy. The model is essentially block recursive and can be conceptually divided into three major blocks: a pre-determined block for computing productivity, population, and households; a simultaneous block comprised of the main endogenous variables such as net migration, employment, income and wage rates; and a third block for post-determinant variables, which do not feed back up to the simultaneous block.

The Metro model is a long-run econometric model that forecasts expected values for which alternative assumptions and scenarios can be constructed to test for the outcome of future economic trends or economic realizations.

For more information about the WEFA Group, Inc., its U.S. macroeconomic models, or forecasting methodology, please consult them directly or refer to any of their published U.S. Economic Outlook publications.

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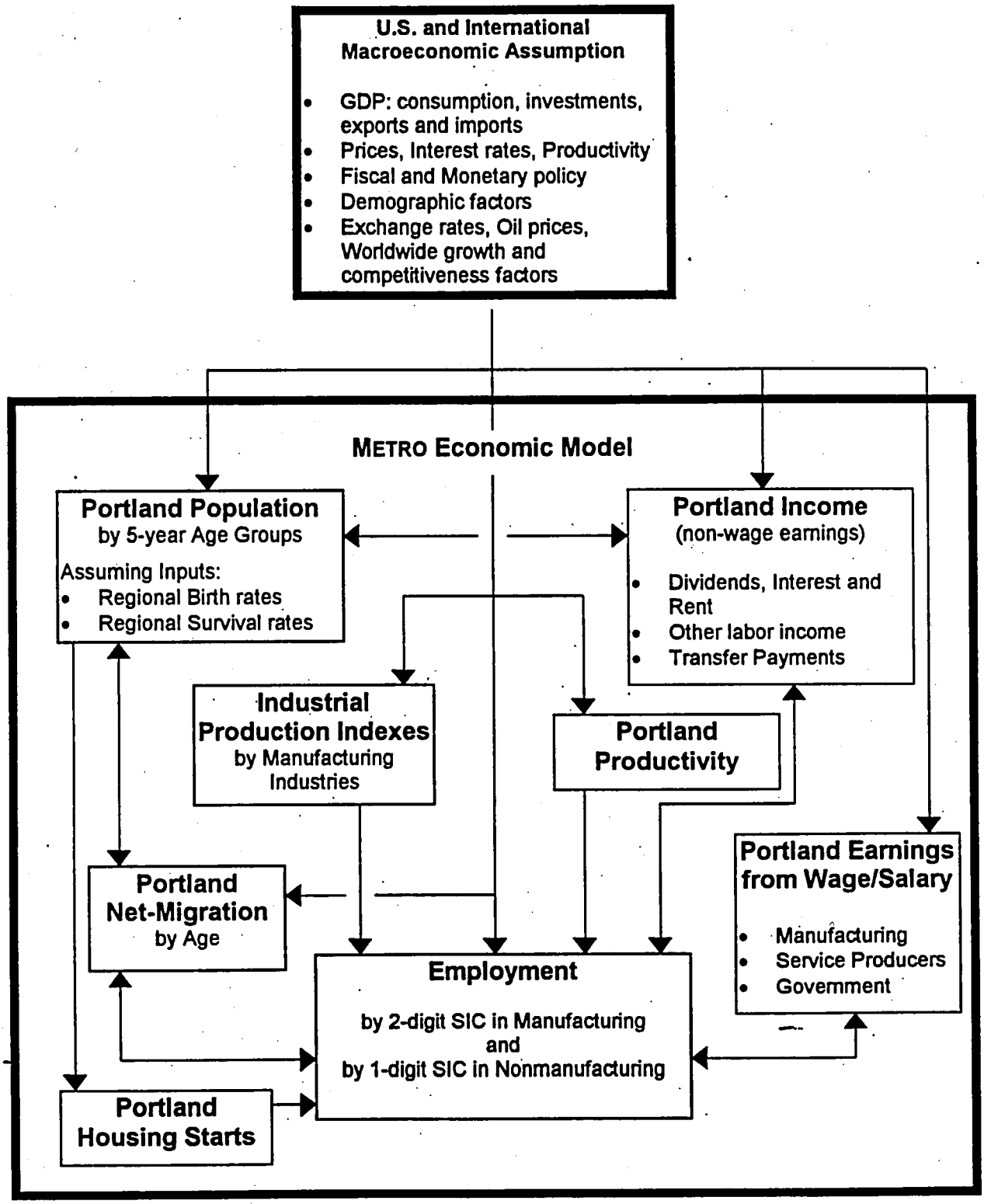
[4] Metro Regional Economic Model (Portland-Vancouver Area), Model Reference Guide, METRO Data Resource Center, July 1994, (unpublished report).

[5] Portland-Vancouver Area, 2015 Regional Forecast, January 1996.

FIGURE 7
METRO REGIONAL ECONOMIC MODEL



The Regional Model is comprised of the bi-state area that includes Clackamas, Multnomah, Washington, Yamhill counties in Oregon and Clark county, Washington.

SECTION 2

To clarify the discussion, we distinguish the regional forecast as different from the urban growth allocation or so called urban development patterns forecast. A regional forecast is the projection of how much growth the entire region is anticipated to grow during the duration of the forecast. The regional forecast serves as a control total for how much employment, population or household growth the whole region is expected to experience in future years.

The urban growth allocation is a product derived from the regional forecast. An urban growth allocation distributes (or reduces down) the forecasted regionwide growth totals to smaller geographic units, such as cities, counties and other urban areas throughout the forecast area.

THE LONG-RUN OUTLOOK

The Portland economic region is growing and expanding in geographic influence and business diversity. It is highly export oriented, with a focus to the Pacific Rim. Traditionally, the regional economy has relied on resource-based industries, which still remain a cornerstone of the region. Increasingly however, other sectors have been providing greater growth and employment opportunities.

These industries include value-added manufacturers in aerospace technology, transportation equipment producers, computer software makers, silicon wafer and microprocessor manufacturers. Throughout the region, there is a complex network of trade relationships and associations; some are long-standing, in sectors such as energy and forest product industries, while others in the technology and service sectors are more recent and still evolving.

The regional forecast calls for continued growth in many of the region's major industries. There are plenty of reasons to support such optimism. The Portland region has always been an extremely attractive place to live because of its sense of community and quality of life. Businesses will locate where they can find a motivated and skilled workforce.

The regional forecast of employment and population reflects the belief that the region will continue to prosper and attract new growth. Portland's location as a crossroads and port city for merchandise trade is expected to help bolster future regional growth.

The area's emergence as a major manufacturing center of high-technology products and research is expected to give the region a competitive edge in the future too. The opening of new semi-conductor plants and silicon wafer manufacturers places Portland economic region at the forefront of the highly competitive high-tech industry.

EMERGING TRENDS

Population and Migration. In the past few years, a weak economy in California and in the U.S. in general has helped boost net in-migration flows and fueled population growth in the Portland area. The region's faster growth has both attracted a higher number of in-migrants as well as kept more people from migrating out than has been the historical average. During the last five years, the number of people living in the four-county area rose by an estimated 186,000 residents, or an average of 2.5 percent growth per year. By some estimates, migration has accounted for nearly two-thirds of this growth. People move for many reasons, but one principal reason is to seek a better life and greater economic opportunity. The Portland economy provides that opportunity for many.

Population growth as evidenced in recent years has been much faster than for the entire U.S. due to this region's economic strength and its more attractive quality of life. These two reasons help drive the migration flow into the area; and in turn it helps increase the potential for economic growth. As new residents arrive, they shop and consume more goods and services.

While growth in the U.S. economy as a whole has grown anemic, the economy of this region has showed little signs of a let down. Employment here continues to surge ahead and unemployment rates in the region remain well below national figures.

Economic Growth. The region's high-tech industry is diversifying as new companies enter the Portland market. Several multi-billion dollar corporations that produce a wide-range of microprocessors and memory chips, fabricate silicon wafers, and manufacture various computers and related office equipment have led this growth. Portland's manufacturing sector has created over 6,200 jobs in the last two years. During the next several years, up to 10,000 additional jobs could be added in the high-technology fields if additional plant expansions are carried forward as planned. Economic projections suggest that the regional economy will be able to sustain and exceed projected growth as compared to the U.S. Not only are high-tech manufacturers and suppliers benefiting from current growth trends, but Portland's other industries are growing too.

Portland's nonmanufacturing industries sustained about 3.0 percent employment growth per year over the past several years. Business and software services are growing quickly too – sustained in part by the rise of Portland's *Silicon Forest*. Some segments of services will receive an above-average boost in growth due to its relationship with high-tech manufacturers.

The health care industry is another key segment of this region's future and is expected to sustain its trend for the foreseeable future. Migration data suggests that Oregon may receive an above-average share of retiring migrants moving into the state, this in turn should bolster growth in regional health services.

The confluence of the Willamette and Columbia rivers and the connections it affords to the Pacific Rim has made this region an ideal location for international commerce. Portland's proximity as a go-between for trade with fast-growing Pacific Rim countries has contributed to the economic vitality that this region has enjoyed over the past several years. The Port of Portland reports that the value of marine shipments passing through Portland has steadily increased at a rate of about 13 percent a year. The air cargo freight similarly rose an average of 13 percent a year. This has helped maintain a strong and healthy transport and warehousing industry in the region.

The recent merger of Union Pacific and Southern Pacific will certainly strengthen Portland's position as a transport hub for moving goods, services and people. Portland becomes a major point in the crossroads between north-south and east-west freight transport. The merger combines the strength of Southern Pacific's north-south rail lines which pass through Portland from the southwest U.S. up to Canada, and Union Pacific's strong east-west rail lines which begin in Portland and extends east.

KEY TRENDS AFFECTING GROWTH IN THE REGION'S FUTURE

International Trade. The regional economy will grow and add new jobs from rising trade activity with fast growing Pacific Rim nations. China and other southeast Asian countries represent the next wave of newly industrialized nations. Export of goods and raw material will spur investment and greater production capacity by Oregon firms. Also, foreign capital investments from already industrialized countries in Asia (Japan and Taiwan) will flow more easily into this region because of declining dollar denominated exchange rates and other global competitiveness factors.

The economic prospects are promising in terms of investment and production facilities in the region. This is likely to result in greater employment opportunities. The region is strategically well positioned between east and west in terms of communication (time zone differences) and travel/cargo routes. Some regional industries have forged vital links with other Pacific Rim nations; these links are expected to grow even stronger with the maturation of the newly industrialized nations in the Far East.

Technology. Technological innovations and other improvements will continue to raise the productivity of industries in the region. Traditionally, the manufacturing sector has exhibited the greatest average productivity gains from year-to-year. Productivity is expected to continue rising in manufacturing. Nonmanufacturing sectors will see faster productivity growth too.

With the introduction of computers and new inventory management systems, the different service sectors are expected to improve their rate of productivity. Recent innovations in retailing and better information databases have helped retail merchants and improved marketing efforts.

We anticipate that productivity will increase the standard of living of all individuals in the region, but that the path in the short range may be bumpy. Presently, productivity is helping the economy grow, but job growth has not been where it has in previous business cycles. Job growth has been offset in the U.S. by big companies downsizing in the name of increasing productivity, competitiveness, and corporate profits.

Eventually, increased productivity will help grow the economy and allow it to absorb the unemployed and new entrants to the labor force. The economy should be larger than it otherwise would without the productivity we are undergoing now. Meanwhile, job growth may be constrained in the short-run but the economy will be larger and better for it in the long run.

Technology in the form of computers, silicon wafers and semiconductors, office equipment and software development will be a driving force in employment growth in the region. A worldwide shortage of semi-conductors and memory chips is currently spurring major plant and equipment investments throughout the region. Collectively, these investments are expected to have a long-run positive impact on employment and economic growth in this region.

Demographics. Continued population growth will be a major determinant of regional growth in the future. If population growth continues to grow at similar rates as in the last five years, the region will look much different than it would otherwise. However, it is unlikely that recent trends will persist over the long-run. Population rates tend to ebb and flow depending on regional economic growth and business cycles in the U.S.

Historically, population growth is weighted by changes in net migration, which has accounted for about two-thirds of population growth from year-to-year in this region. When migration rates were high, the regional economy was usually doing very well, when rates plummeted, the economic conditions in the region were generally well below the national average. Through the peaks and troughs, the population cycle tends to an average rate of growth that is less than the current experience.

What we know about population in the long-run is the age structure, that is to say, the population of the U.S. and this region is expected to grow older. As the baby boom generation ages, the median age of the population increases. Eventually the baby boomers will enter retirement.

The aging of the population will cause the economy to shift to accommodate this change. First, it is clear that the consumption pattern of the elderly will be much different. There will be greater emphasis on health and medical services, personal, financial and so forth.

On the other hand, there will be fewer young workers, proportionately. This is likely to pose a greater burden on the economy. The spending power of this demographic segment could be lessened. Combined with the fact that this generation (Generation X) is smaller than its predecessor (the Baby-boom Generation), the industries which produce consumer

durables, products and services may feel less demand. Overall, this demographic shift could constrain growth in some of the traditional industries, while benefiting some industries that provide services to the elderly.

Agglomerative Forces. The technology revolution that is spreading throughout the world is helping to boost plant and equipment investments in this region. The region has emerged as an area that is extremely attractive to high-tech companies in search of locating new sites to operate. The growing concentration of high-tech firms helps to draw in other establishments wanting to do business with them. New suppliers and other retailers will emerge to satisfy the growing demand from households drawn to jobs in high-tech fields.

Industries in the region have had a successful tradition of spinning off new companies from larger firms in the area. These smaller firms have proven to be highly successful in their own right.

In high-tech, there tends to an agglomerative trend because the principal manufacturers tend to influence key suppliers to relocate closer to where the manufacturing activity takes place.

Education and Business Partnerships. An educated and skilled labor force can be a competitive advantage for a region seeking to attract new businesses. Companies in the future will be seeking employees who can operate sophisticated technical equipment, diagnose problems and repair them. Employees in the future will need to have computer skills, mathematics and scientific aptitudes above what is presently required. A regional economy that can provide a plentiful supply of workers with these aptitudes will help attract new firms and retain existing growth.

Unlike other cities, Portland is presently at a disadvantage – in terms of having an institution devoted to high-technology research and development. Until a facility or educational institution can be developed at this level comparable to other competing regions (e.g. Austin, Texas), the Portland-Vancouver region will not be seen as being as attractive.

In the past, Tektronix has filled a limited leadership role, but with recent downsizing their role has diminished. It is possible that Intel or another manufacturers might take the lead in this area by perhaps assisting local colleges in implementing cooperative education programs that emphasize math and science.

Another aspect of education is retraining dislocated workers. In the short-run, we foresee many jobs being replaced by new technology. Institutions of learning must step forward and help mitigate the losses created by an economy undergoing change.

The economy in Portland and the state of Oregon is not as well positioned to meet the future education challenges as other states which have universities that foster research and development. Other states seem more focused on training tomorrow's workforce in

terms of science and math. In order to compete with other cities, Portland and Oregon will have to improve the knowledge base of future workers, to provide a better educated workforce.

Public and private business partnerships and other linkages between the two will have to expand in importance as the demands on the education system increase. Business will have to play a larger role in helping public schools educate tomorrow's workforce. The public school system will have to change too; it must learn to accept a greater role from businesses. Schools must understand that it can not afford to provide all the necessary education and training without help from others.

Urban Development Patterns

2017 Regional Growth Allocation

SECTION 3

A final population, household and employment allocation based on the 2017 Regional Forecast is detailed in this section of the report. We describe the methodology behind the 2017 urban growth allocation process. This includes the development and derivation of basic control totals on regional households, population, employment, income and age. It contains as well the assumptions we made regarding land supply, household size and dwelling demand. We describe the methodology used to derive small area forecast and how the *Growth Allocation Workshop* reviewed and evaluated the data to arrive at an "expert allocation" consistent with *Region 2040* growth concepts.

At the end of this report, we present the allocation results and compare at several geographic levels these results, ranging from the Metro 20-district geography to jurisdiction-level boundaries and TAZ's. These data are available in several socio-economic categories:

- Nonfarm Employment
- Number of Households
- Population (by age)
- Household Size
- Age of Head of Householders
- Income

BACKGROUND

This report continues a Metro practice first started in 1968[6] and continued periodically ever since. Besides that initial report, Metro has published a series of population, households and employment reports in 1978, 1981, 1984, 1985, 1989.[7] In all cases, Metro has used roughly the same method and approach for regional forecasting and growth allocation. The fundamental methodology follows these procedures:

1. Start with a regional forecast of population and employment to use as control totals prior to allocating population and employment to smaller units of geography.
2. Produce a "technically-based" spatial allocation of the projected population and employment considering historical trends and land availability for particular subareas.

[6] CRAG, Economic Profile with Interim Projections to 1990, Portland-Vancouver METROpolitan Area, 1968. 26 pages.

[7] There may have been other regional forecast and allocation works between 1968 and 1978, but we retain no records of them.

3. Use an expert panel comprised of representatives (usually planning staff) from local jurisdictions to evaluate and revise the technical allocations of population and employment.
4. Publish the forecast results after completing the expert panel review. The forecast and subarea growth allocations have usually been published for several levels of geography, ranging from county-level to Metro 20 district subareas or census tracts.

While Metro or its predecessor CRAG[8] has essentially retained the same regional forecast and growth allocation methods and procedures over the past three decades, details of the forecasts have varied considerably. For instance, forecast years have moved from 1990 out to 2010. Some types of data that have been the subject of forecasts have changed. Most forecasts, though, contain a projection of population, households and employment, but some forecasts have contained additional detail. These forecasts have often times included projections of dwelling type (the number of single family and multi-family dwelling units) and employment by land-use configuration (i.e., jobs in office, retail, or industrial).

Especially during the last several years, Metro has continued to improve the technical aspects of the forecasting and growth allocation elements. Metro has used increasingly rigorous methods to estimate regional control totals. By the same token, the database on land capacity and the level of spatial and socio-economic information has increased many fold. Full implementation of the Metro GIS - RLIS allows a robust examination of the interplay between land supply, land-use regulation and forces of market demand with a high degree of spatial resolution.

Though there have been technical variations, Metro forecasts including the present effort retain four basic elements. The first element is the use of regionwide control totals of population, households and employment to constrain the spatial allocation. The second element is to allocate growth from the regional forecast into smaller geographic subareas. This technical allocation represents the market demand for particular geographic subareas by using time series data on population and employment. The third element is to use land availability and comprehensive plan designations to measure the supply/capacity of each subarea, to use this data to constrain the technical allocations. The fourth element is the use of expert panels to review and revise the technical allocations.

[8] Columbia Regional Council of Governments

Growth Allocation
Methodology and Policy Assumptions

SECTION 4

The current growth allocation of the regional forecast both continues and extends the Metro forecast methods. Like previous Metro growth allocations, it contains four basic procedural elements of using regional control totals, trend estimates of market demand, land supply/capacity constraints, and review and revision by an expert panel. Of significance, the current forecast also adds much that is new to regional forecasting and growth allocation.

MAJOR ALLOCATION ASSUMPTIONS.

The greatest change from earlier forecast methods and allocation practice has been the explicit adoption of a regionwide planning policy, namely the *Region 2040* urban growth plan. Previous Metro forecasts were essentially trend forecasts based upon the assumption that investments and land use policies of the past would continue on into the future. The premise behind *Region 2040* is a set of land-use goals and targets that when implemented layout general growth concepts and guidelines that try to promote compact urban form.

Policy Assumptions:

1. Over the next 50 years the Metro region will grow into a denser and somewhat more compact form than has been the trend over the last 50 years. Densities will increase from approximately four DU[9] per acre (gross) now to about five DU per acre by the year 2017.

2. The Urban Growth Boundary (UGB) is assumed to expand in order to maintain a 20-year land supply for residential purposes – in accordance with Oregon HB 2709 and based on implementation of 2040 land-use policies. For purposes of the 2017 Regional Forecast, Metro **assumed** that a UGB expansion between 4,000 to 9,000 acres[10] would accord with regulatory requirements.

3. The level and type of transportation investment will affect the density and pattern of growth.

4. Metro and local governments will actively encourage infill and redevelopment within the existing UGB. Government regulation, investment and subsidies will support infill and redevelopment as well as increased densities.

[9] Dwelling Units

[10] Under alternative assumptions, namely the so-called "Zero Option", expansion of the UGB may not be necessary.

5. Local governments outside of Metro will be subject to many of the same growth pressures, legislative restrictions, and fiscal constraints. Therefore they will manage their growth in a similar fashion.

Technical Assumptions:

In addition to the general policy level assumptions described on the previous page, Metro staff have made a number of *technical assumptions* based on research conducted in addition to the growth allocation workshops. These technical assumptions establish the 2017 levels for the following data[11]:

- Projected **population** in the 4-county region will be 2,271,100 in the year 2017.
- The number of **households** in the 4-county region will be 947,900 and the average household size will be 2.40 in 2017.
- Regional **nonfarm employment** (includes proprietors, part- and full-time jobs, supervisors and managers, etc.) in 2017 will total 1,536,500.
- Real per household **income** will increase at an average rate of 0.85 percent per year in the future.
- The **vacancy rate** regionwide is assumed to be 3.9 percent.
- The **capture rate** (or percentage of households, dwelling units, or jobs inside the UGB as compared to the net change in the four-county regional forecast) is assumed to be 70 percent for dwelling units[12] and 82 percent for employment.

[11] Source: *2015 Regional Forecast*, METRO Data Resource Center, January 1996

[12] Actual percentage dwelling units from recent capture rate data for Metro UGB.

Year	Percent of 4-county residential growth occurring within Metro UGB
1990	70.6%
1991	67.1%
1992	61.6%
1993	62.5%
1994	64.7%
1995	72.1%
1996	71.3%

Source: Metro, Marginal Rate of Households in the UGB (July 18, 1997)

In addition to accepting these assumptions and figures as 2017 regional control totals, we also assume the following characteristics about what type of households we expect in the future and how many of each type we project. Households are classified based on the following HIA[13] characteristics:

- size of the household (number of people in the household),
- household income,
- and the age of the head of household.

The figures arrived by these assumptions are necessary inputs for the travel demand model, for calculating small area population by age cohort, and estimating future housing needs[14].

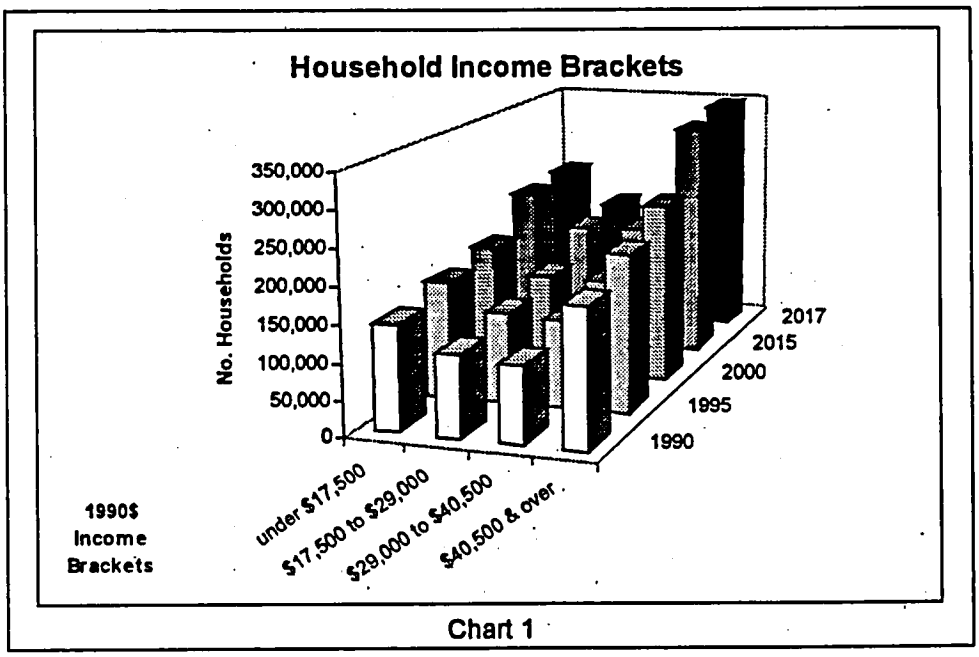


Chart 1

The *distributional assumptions* we make in regard to household size, income and age (HIA) play a very significant role in the estimation of dwelling choice[15] and travel demand. In general, we assume very little change in the distribution of these variables through the forecast period. We essentially take the 1990 Census distribution of households by the HIA categories and gradually modify them during the forecast period based on acknowledged demographic and economic trend assumptions.

[13] Household Size, Income in the household, Age of the head of household

[14] Collectively, the distribution assumptions make up what we call the HIA's. Household size range from 1, 2, 3, 4 or more. There are four household income ranges, under $17,500, $17,500 to $28, 999, $29,000 to $40,499, and $40,500 or over. The ranges for the age of the head of household are under 25 years, 25 to 54, 55 to 64, and 65 years or older.

[15] For example, tenure - own or rent; single family or multi-family dwelling.

The shape of the HIA distribution shifts slightly between now and the future. In looking at the distribution of households by income brackets, the number of households distributed by income continues to rise, but the proportion of households in each income bracket shifts. The proportion of households belonging in the two lower income brackets actually declines relative to the two higher income brackets.

With moderate growth projected of the region, the number of households allocated to the four income classes increases to 947,900 total households in 2017 from 553,107 in 1990, or an average growth rate of 2.0 percent a year. We expect that the two highest income classes will add almost 239,000 households while the lower half adds only about 155,800 new households by the year 2017.

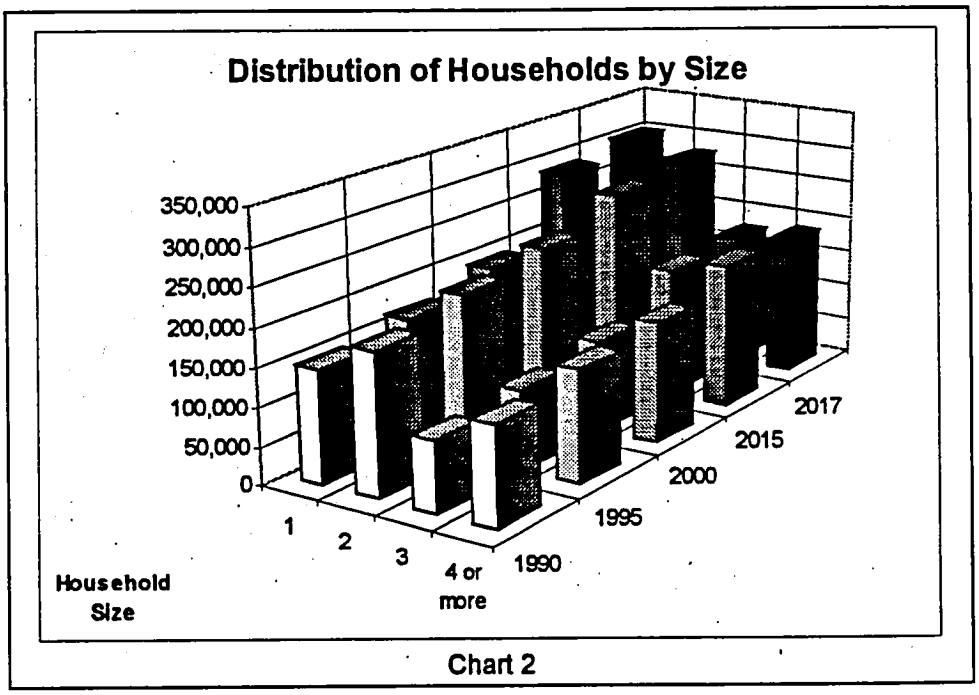


Chart 2

In terms of household size, we expect a more dramatic shift in the distribution of households by size. As shown by chart 2, proportionally fewer larger households are projected in the future as compared to smaller households. We anticipate the share of households in the "4 persons or more" category to decline from 23.7 percent to 18.7 percent of all households in the region, while household size two increased to 39.2 percent from 33.6 percent. Correspondingly, the average household size falls to about 2.4 persons per household by 2017 from about 2.6 persons per household now.

The decline in household size coincides with the increasing median age of households and the population. We expect a consistent increase in the age of the average head of household. The demographic structure overall is expected to shift up as the dominant baby boom generation grows during the forecast period. Households headed by someone 55 years or older are expected to *increase* to a 40 percent share from a base share of 31 percent in 1990. Conversely, the share of households headed by someone between the ages of 25 and 54 years will *decrease* to 54 percent from an existing 63 percent.

Unlike the assumption concerning the distribution of household income, the set of assumptions about future household sizes and the age of the head of household distribution are well grounded by established demographics, which consensus demographers believe to have a high probability of coming true.[16] We feel that the HIA distributions for household size and household age are more predictable and reliable.

Like income, household size and household age substantively impact the choices in travel demand and housing preference. Given our assumptions, we would expect a slowing growth rate in travel demand, and a proportional increase in demand for *non-traditional* owner occupied dwellings.

By the same token, increasing household age also means an increase in total household assets. Traditionally, increases in household wealth generate an increase in auto and housing assets. Generally, wealthier households own or purchase larger dwelling units and produce greater auto ownership.

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[16] Our income assumptions merit a far more lengthy technical discussion than the format of this report allows. The question of the income distribution makes a substantial difference in the demand for housing by tenure, type and size. The income distribution assumption also makes a significant difference in the travel demand model in terms of auto ownership, mode choice and number of trips. In short, the future income distribution can significantly affect the outcome of METRO's 2040 planning and transportation investment strategies. Moreover, assumptions about the income distribution may in part determine which METRO planning and investment strategies appear successful and which do not.

Unfortunately, even assuming the 0.85% per year real household income forecast is perfectly accurate, it is still possible to arrive at numerous, if not infinite income distributions, which incorporate a household income increase of 0.85% per year. Suffice to say that estimation approaches that incorporate the present household income distribution and the 0.85% real increase rate, result in an intuitively implausible concentration of households in the two highest brackets. After calculating numerous distributions, we chose a distribution that produces little change from the present distribution, retains the 0.85% per year increase in real household income and does not require an unbelievably large increase in the average income of the highest income category. (In other words, the average income of households making more than $40,500 per year does not exceed $100,000.)

Up until the time of retirement, households tend to *trade-up* to increasingly larger owner occupied homes, raising the demand for new construction of larger houses. In turn, this leaves behind a stock of more affordable vintage housing which becomes available to younger households that generally have fewer assets and are relatively less wealthy. The changes projected in the HIA distribution also have impacts other than housing demand. The projected changes in the allocation of households by HIA will also impact the demand for other services, such as schools and health services.

Growth Allocation Method:

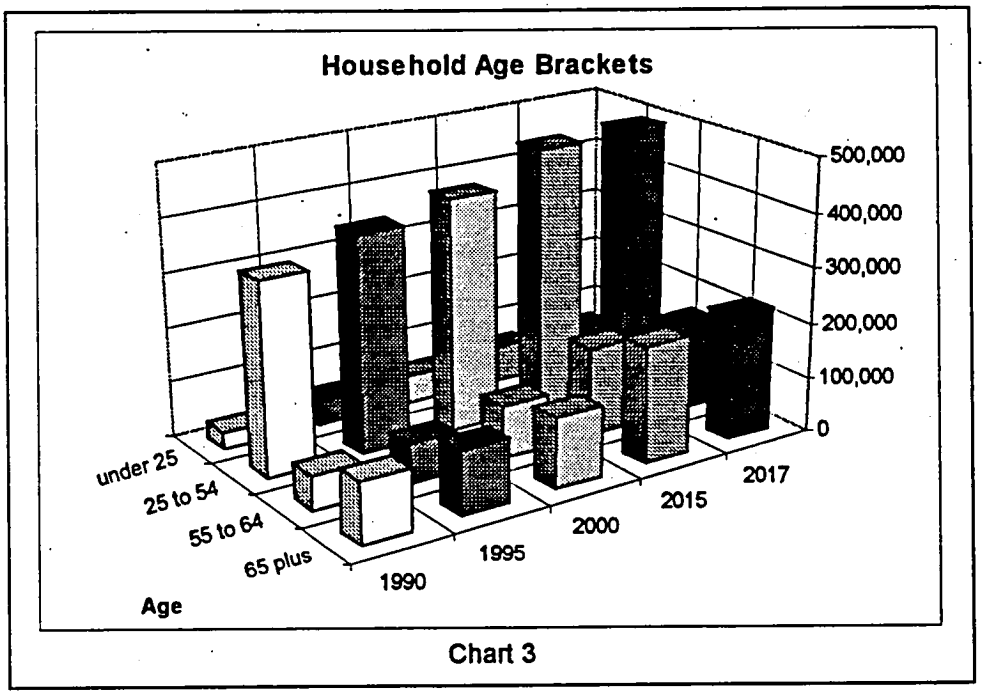

Chart 3

Combining the aforementioned policy and technical assumptions with the control totals found in the 2017 Regional Forecast, growth allocations of the region are derived. Consider the growth allocation a continuation that blends policy and technical assumptions and expert review in an iterative process to obtain a spatial allocation of households, population and employment across the region. The final result is a regional forecast of households, population and employment by Traffic Analysis Zones.

The 2017 growth allocation is a derivative of the 2015 growth allocation as detailed in the *Urban Growth Report, March 1996*. State law and Metro Code require a 20-year regional forecast (including a spatial growth allocation). Therefore, the reporting of a 2015 regional forecast and allocation is updated to the year 2017 in this final report to the Metro Council and the people of Oregon. The 2017 regional forecast and its spatial allocation is merely a two-year extension with but minor corrections to the urban reserves.

The following points summarize the principal details of the spatial allocation:

1. The four-county regional forecast (household and employment) was divided into six major market areas (see map nearby). These six land market areas were assumed not to be significantly impacted by Region 2040 growth policy(s) other than land availability (supply). These six major market areas are 1) the Central Business District (including the Lloyd Center and Central East Side), 2) the remainder of Multnomah county, 3) Clackamas County east of the Willamette River, 4) Clackamas county east of the Willamette and southeastern part of Washington county, 5) remainder of Washington county, and 6) Clark county.

2. Using available dwelling unit data from 1970 to 1994, linear trend regression estimates[17] were made for each land market area representing the future demand in each area. Projections for single family dwelling units, multi-family dwelling units, and total nonfarm employment were made of each land market area.

3. Capacity (or supply) estimates for housing units and employment were made for each land market area and compared. Capacity calculations were based in terms of jurisdiction comprehensive plans and the *Region 2040* capacity assumptions.

4. The results in step 3 were presented to the *Growth Allocation Workshop*. The participants reviewed the data and adjusted the estimates for market areas in which the trend forecast exceeded 95% of the calculated capacity (accordingly for jobs or housing). The adjustments were made in one of two ways. The forecast was adjusted by shifting any excess projected growth to an adjacent market area(s) where sufficient capacity exists in the forecast period or by implicitly agreeing that future regulatory changes in zoning and land-use would reflect greater capacity than currently recognized in the capacity estimates in step 3 (above).

5. Using the revised market area employment and housing trends as control totals, a second set of subarea growth forecasts were produced for Metro's traditional 20 district planning subareas (see map nearby). Linear trend regression models were estimated using the same methodology as before to forecast the demand in each 20 subareas. By definition, groupings of planning subareas nested into land market areas. As before, capacity estimates were calculated for each subarea.

6. In a second round of peer review, the results in step 5 were presented to the same Growth Allocation Workshop participants as before. Again the growth projections were analyzed against projected capacity estimates that were based on comprehensive zoning and Region 2040 growth concepts. In the planning subareas in which projected demand exceeded the calculated capacity limits, growth was shifted to other

[17] The projection method we used was a linear least squares model of a time trend constrained to the sum of the regional forecast control total of dwelling units or employment for any given future year. We chose a constrained linear time trend after testing various exponential, log linear and logistic models. While other models occasionally provided a statistically better fit, the linear model in general produced the most consistent and robust results for the most market areas.

subareas that still contained additional capacity in the future and belonging to the same land market area.

7. The adjusted 20 district subarea forecasts (of housing and employment) were then disaggregated and distributed to 1/16 acre grid cells in each subarea. The grid allocation method was specified in terms of the land designation and its status in the 2040 Growth Concept.

8. For the third round of review by the Growth Allocation Workshop, the gridded allocation of the forecast was retabulated to TAZ's for employment and housing. Each jurisdiction was assigned to review the TAZ's belonging to them.

9. The fourth represented the final round of reviews by jurisdictions involved in the growth allocation. Jurisdictions were afforded a high degree of discretion to adjust TAZ level growth projections insofar as each jurisdiction maintained its own control total allocation. Metro staff reviewed the recommended changes and discussed with each jurisdiction any differences in the data interpretation and policy intent. Jurisdictions were asked to submit their final TAZ allocations.

10. Submitted TAZ allocations were re-gridded to bring the Grids in conformity with the TAZ allocations.

The ten growth allocation steps outline a lengthy and detailed peer review process for producing a regional forecast and growth allocation at the TAZ level. The availability of detailed land use information in the RLIS database and sophisticated GIS technology made it possible for policy and technical assumptions to be blended together with a Regional Forecast.

As previously noted, the 2015 growth allocations are updated and extended an additional two-year period to meet State law and Metro Code. A new 20 year regional forecast and growth allocation for 2017 was needed. The following is a brief discussion of how that extension was made.

The 2017 regional forecast and growth allocation is merely a technical revision which heaps two more years of employment and household growth in addition to what was determined for the year 2015. **The 2017 growth allocation attempts to change as little as possible the distribution patterns of employment and household** (except to re-allocate a part of future growth into Urban Reserve Areas recently identified by the Metro Council)[18]. In extending to the year 2017, Metro staff employed a series of deterministic decision rules to distribute the two-year's growth. These rules take into account future growth into:

[18] The 2015 Urban Growth Allocation distributed a part of future household and employment to what were then known *as urban reserve study areas (URSA).* Selected URSA sites were adopted by Metro Council and some URSA sites have been identified and selected by Council to be included in a first Tier to be brought inside the Urban Growth Boundary (UGB) to accommodate future development.

- new urban reserve areas determined by Metro Council ordinance which replace previous urban reserve study areas.
- declaration by Metro Council of Tier 1 urban reserve sites
- vacancies in existing unincorporated land inside the current urban growth boundary,
- vacant and redevelopable properties inside existing city limits (including infill and redevelopment),
- assumptions about how much additional capacity exists in neighboring cities and Clark county,
- and finally, make no changes to the jobs housing balance between Portland and Clark county.

The 2017 allocation does not materially alter the allocation of households or employment in 2015. In TAZ's which showed steady upward growth through 2015, the 2017 Allocation in these TAZ's showed an increase. In TAZ's that declined through 2015, this downward trend was continued for 2017.

Instead of starting all over, the 2017 regional forecast and its growth allocation left off at the point where the 2015 regional forecast and allocation ended with a final TAZ level allocation as described in step 10 (as noted above). Before beginning the re-allocation of the two-years of additional growth, growth that had been allocated to urban reserve study areas were pulled out of the 2015 allocation. The reason for this was new information coming from the Metro Council directing where additional urban growth capacity would come from in the future. This net change is added to the two-year amount of growth that is to be allocated to the 2017 TAZ growth allocation.

1. 2017 Regional Forecast control totals for the four-county area were extrapolated from the 2015 Regional Forecast. Divide out Clark county's share of the regional forecast (for employment and households). The remaining Tri-county totals will be re-distributed to TAZ's in Metro.

2. Determine the amount of growth to pull out of previous urban reserve study areas and add this amount to the two-year growth extension.

3. Compute the capacity limits for each city and county in Metro.

4. Cities with surplus capacity were then distributed additional growth up to 95% of the city's estimated capacity.

5. Similarly, surplus capacity in the unincorporated parts of each county inside the Metro UGB was computed and the additional two-year period of growth was added to them as well.

6. Allocate additional growth to urban reserve sites according to the Metro Council. The number of households that were allocated into each Urban Reserve site was based on Metro staff capacity findings for each urban reserve. The basic assumption was a 75% gross-to-net and 10 households (or dwelling units) per net acre.

7. A total of one thousand households were allocated to the neighboring cities of Canby (300), Estacada (100), Mollala (150), North Plains (150), and Sandy (300). These amounts were based on forecast trends in the data.

8. Allocate an additional 4,570 households to the city of Portland for the two-year growth period.

9. Steps 1 through 9 represent a series of calculations to derive jurisdiction-level control totals. This step assigns each TAZ in the region to a specific jurisdiction or urban reserve site. The jurisdiction control totals are then distributed to each TAZ bounded by the jurisdiction based on forecasted growth trends to get the final 2017 regional forecast and growth allocations.

10. The last step is to re-Grid the new TAZ-level forecasts.

The 2017 allocations to TAZ represent a definitive description of the growth allocation. Depending upon assumptions in Grid, variations in zonal tabulations may appear that may seem incongruent with the TAZ representations. Some of this variation is because TAZ's do not evenly nest into the boundaries of cities and urban reserves. This leakage or spillover in the TAZ from the exact jurisdictional boundaries will create some deviation. In addition, gridding the TAZ data is subject to variations in vacant land, redevelopment and infill assumptions, water, existing development intensity with respect to the grid cells assignment of these parameters and the TAZ data. These GIS-level variations create a degree of "grid-chatter," which is a function of the gridding algorithm.

At larger geographic scales or study areas, the grid-chatter and the rough edges around the TAZ allocations become less distinct. However, at small areas less than the TAZ, any GIS analysis using this data may be skewed. The user of this small area data is encouraged to adjust the data to fit already known parameters or more reliable previous data in existence.

APPENDIX A

Vacant and Developed Lands Inventory and Methodology

Vacant acres: unimproved land; a fully vacant tax lot has no improvements; a partially vacant parcel has improvements on the property but also has a vacant component (no structures, outbuildings, driveways, roads, etc.) of one-half acre or more. The vacant portion is added to the vacant lands inventory; the developed portion is added to the developed lands inventory.

Developed acres: improved property; a partially developed tax lot has a vacant component of one-half acre or more.

Metro's Regional Land Information System (RLIS) database is one of the best available in the country at this time. It is a compilation of coordinate geographic information that has been carefully input and assembled since 1987. Metro dedicates staff to maintaining and updating the information as it becomes available, including aerial photography, assessor's data, local plans, building permits, wetlands inventories, slopes, soils, and more. The entire database is described in the RLIS Data Dictionary, (DRC, 1995).

Metro's Data Resource Center (DRC) uses digitized aerial photographs rectified to match parcel maps in their update of the basic vacant lands coverage. Vacant land inventories have been updated every other year to this point, recently in 1990-1992-1994, and currently an annual update (for September 1994 to September 1995) is underway.[1] The updates are based on aerial photographs of the region and the tax lot base maps that are derived from county assessors' records (scale varies by location from one inch : 100 feet, to one inch : 400 feet). The photographs are compared to the previous existing inventory maps for vacant land. A manual check of each fully or partially vacant parcel is made to determine its status. With each tax lot update, the parcels are coded partially or fully vacant, developed or under site construction

Developed land is not explicitly checked once it has been categorized as developed (which started with the 1990 assessors' designation and the original parcel review of the entire three county coverage area). However, as the vacant lands are checked, any note of developed parcels becoming vacant is entered as a change to the database.

[1] The 1994 vacant lands coverage was chosen for this report as the most up to date at the time the work began, and because the 2040 forecasts and modeling, and the 2015 allocation work with local jurisdictions uses 1994 as a base year.

APPENDIX B

BUILDABLE LANDS AND CAPACITY ANALYSIS

Regional Zoning and Plan Categories:

Each jurisdiction has separate and distinct zoning/plan designations. A bridge table has been developed to produce a common set of zoning/plan categories. The common zoning/plan classifications are listed below. The RLIS database contains look-up tables that correlate each jurisdiction's zoning designations to the common set.

Farm and Forest

FF — Agricultural or forestry - activities suited to commercial scale production, typically with lot sizes of 30 acres or more.

Residential

RRFU — Rural or future urban - residential uses permitted in rural or areas designated for future urban development with minimum lot sizes of one acre or more.

SFR1 — Single-family - detached housing with minimum lot sizes ranging from 10,001 to 40,000 square feet (one to four dwelling units per net acre).

SFR2 — Single-family - detached housing with minimum lot sizes ranging from 7,001 to 10,000 square feet (four to six dwelling units per net acre).

SFR3 — Single-family - detached housing with minimum lot sizes usually ranging from 5,000 to 7,000 square feet (six to nine dwelling units per net acre).

MFR1 — Multi-family - housing and/or duplex, townhouse and attached single-family structures allowed outright. Maximum net allowable densities range from 8 to 25 units per acre, with height limits usually set at 2 1/2 or 3 stories.

MFR2 — Multi-family - housing accommodating densities in excess of 25 units per acre. Buildings higher than three stories are usually permitted and often include high rise structures.

PUD — Planned unit development/mixed use - applies where planned developments are mapped as a separate zone; some commercial uses may be encompassed within individual residential developments. Also applies to special mixed-use zones with residential emphasis (altered - allows 5 employees/acre and 11 dwelling units - 4,000 sq. ft.)

Commercial

CN Neighborhood commercial - small-scale commercial districts permitting retail and service activities such as grocery stores and laundromats supporting local residential community; commercial floor space usually limited to 5,000 to 10,000 square feet (altered - allows 8 dwelling units/acre; mixed use 2,000 sq. ft. townhouses).

CG General commercial - larger scale commercial districts, often with a more regional orientation. Businesses offering a wide variety of goods and services are permitted and include highway and strip commercial zones.

CC Central commercial - allows a full range of commercial activities typically associated with central business districts. More restrictive than general commercial in the case of large lot and highway-oriented uses, but usually allows for multi-story development.

CO Office commercial - districts accommodating a range of business, professional and medical office facilities, typically as a buffer between residential areas and more intensive uses. Mixed-use structures incorporating higher density residential and limited commercial uses are often allowed.

Industrial

IL Light industrial - districts permitting warehousing and light processing and fabrication activities. May allow some commercial activities.

IH Heavy industrial - districts permitting light industrial and more intensive industrial activity such as bottling, limited chemical processing, heavy manufacturing and similar uses.

IMU Mixed use industrial - districts accommodating a mix of light manufacturing, office and retail uses.

Comprehensive Plan Designations (where different than zoning)

POS Parks and open space

PF Public facilities - such as schools, hospitals or government buildings.

Mixed Use Plan Types, and Designations Unique to the 2040 Growth Concept Analysis

MUC-1 Mixed Use Center 1, a designation adopted in the 2040 Growth Concept analysis work for town centers and station cores, which combines residential and employment uses at a ratio of about 2:3, two residents for every three jobs. The floor area ratios here could be expected to be between .5 and 1.

MUC-2 Mixed Use Center 2, a designation adopted in the 2040 Growth Concept analysis for regional centers, a moderate mixed-use environment, which combines residential and employment uses at a ratio of about 1:2, one resident for every two jobs. The floor area ratios here could be expected to be between 1 and 3.

MUC-3 Mixed Use Center 3, a designation adopted in the 2040 Growth Concept analysis for the Central City or downtown Portland, it is the most intense mixed-use designation, with a ratio of about 1:4, one resident for every four jobs. The floor area ratios here could be expected to be over three and likely to be between 3 and 10.

MUEA This is a mixed-use employment designation intended to allow residential in these areas along with light industry, research and development, warehousing, trade, and local retail. The designation is specific to the 2040 Growth Concept analysis work, and is subject to revision. The residential component has dropped from the original 25 percent of the land area to about 8 percent as a placeholder.

IS This is a revised industrial plan designation, originally called Industrial Sanctuary but now referred to as Industrial Areas, and has been used in the 2040 Growth Concept analysis. It was intended to be a lower density, heavy industrial designation similar to traditional port facilities or manufacturing uses. However, this also is being reexamined because the densities associated with the locations are regarded as being too low when compared to current practice.

Plan Codes and Design Type Reference Sheet

Plan Codes (RLIS and modeling designation)
FF - Farm and Forest, Agricultural commercial uses
RRFU - Rural or Future Urban, 1 acre or larger
SFR-1 - Single Family (10,000 to 40,000 square feet)
SFR-2 - Single Family (7,000 to 10,000 square feet)
SFR-3 - Single Family (5,000 to 7,000 square feet)
MFR-1 - Multi-family 8 to 25 units per acre
MFR-2 - Multi-family 25 or more units per acre
PUD - Planned unit development/mixed use (used as an intermediate residential zone in the 2040 Growth Concept - neo-traditional design averaging 4,000 square foot lots, with some allowance for employment)
CN - Neighborhood Commercial, floor space 5,000 to 10,000 (used in the 2040 Growth Concept as a mixed use zone, with the residential component averaging 2,000 square foot townhouse lots, representing about 35% of the land area coverage.)
CG - General Commercial - large scale commercial districts
CC - Central Commercial, central business districts
CO - Office Commercial - Office uses and mixed uses
IL - Light Industrial (warehousing and light processing/fabrication)
IH - Heavy Industrial (light processing and heavy manufacturing)
IMU - Mixed Use Industrial (mix of light manufacturing, office and retail uses)
POS - Parks and Open Space
PF - Public Facilities
MUC-1 - Mixed Use Center 1 (least intense center - Floor Area Ratio of .5 to 1) - small town centers
MUC-2 - Mixed Use Center 2 (moderate intensity center FAR 1 to 3) - regional centers
MUC-3 - Mixed Use Center 3 (highest intensity center FAR 3+) - Portland Central City
MUEA - Mixed Use Employment Area (mix of light industrial, warehousing, back office and some residential)
IS - Industrial Sanctuary (low intensity industrial employment areas) or Industrial Area
Design Types (2040 Growth Concept design elements)
Central City - Downtown Portland, Central City Plan area
Regional Center - Major suburban downtown centers, such as Gresham and Beaverton, also includes Clackamas Town Center and Washington Square
Town Center and Station Core (within 1/4 mile of station) - these are treated the same, they are smaller urban and suburban town centers - Lake Oswego, Tualatin, Hollywood and St. Johns in Portland, Cedar Mill and Troutdale are examples; plus the core light rail station areas
Outer Station Areas - the area between 1/4 and 1/2 mi. of the station. Moderate density mixed use.
Main Street - 200-foot deep coverage along main streets, mixed-use density similar to town centers.
Transit Corridors - 360-foot deep coverage off streets with 10 min. peak headways, moderate density, mixed use allowed
Inner Neighborhood - neighborhoods near centers/corridors, primarily single family, with some multi-family and commercial.
Outer Neighborhood - further away neighborhoods, slightly larger average lot size, similar to Inner Neighborhood.
Mixed Use Employment Area - light industry and warehousing, research, trade, local retail, some peripheral residential
Industrial Area - lower density traditional industrial zones, with strategic access such as port facilities.
Greenspaces - regional open space, including overlap with environmentally constrained lands - steep slopes, streams, etc.

APPENDIX C

BUILDABLE LANDS AND CAPACITY ANALYSIS

2040 Growth Concept Upzoning Matrix:

The attached matrix has been used in the 2040 Growth Concept modeling, in different versions since the modeling work began over two years ago. The matrix is called inaccurately an "up-zone" as a means of communicating the concept of making zone changes. It is in fact changing plan designations, not actual zoning. The Metro Regional Land Information System (RLIS) has a geographic coverage of local plans in the region. These various local plan designations have been consolidated by Metro into 17 plan categories. The Region 2040 work added five additional plan categories to allow more flexibility in modeling the 2040 Growth Concept and the various alternatives studied. (See Appendix B for a description of the plan designations, and a design type reference.)

The matrix is separated into two components: the upper larger matrix of plan or, as they are listed, zoning changes; and the lower portion, which describes the densities assumed for any plan or "zone" category.

This matrix is a tool to represent the assumed changes to local plans from their current designations. The upper section has the 2040 Growth Concept design types listed in the left column and the current zoning or plan designations across the top. The current zoning has a reference to the 2040 zoning category below that represents it under the 2040 Growth Concept. For example, FF changes to MUC-3 if it falls within the central city; SFR-1 changes to SFR-3 if it is located in an Inner Neighborhood; and IL changes to MUC-2 if located in a Regional Center, and so on.

The lower portion of the chart shows two different zoning assumptions. The first chart shows maximum densities required to achieve the 2040 Growth Concept, whereas the second chart presents the 2040 expected yield densities with underbuild factored in.

An example of how to interpret this chart is as follows. To determine the density assumption for SFR-1 (current plan category) located in a Transit Corridor, refer to the upper portion of the chart to find the new zone under the 2040 Growth Concept. In this case, SFR-1 changes to SFR-3. Look below at the density assumptions and locate SFR-3. SFR-3 allows for 9.6 dwelling units and 2.4 employees, which should yield 8.2 dwelling units (considering underbuild). Employee density remains the same.

2040 Growth Concept Matrix

CURRENT Regional Zoning Category: → / Regional Zoning Categories under 2040 Growth Concept Design Types: ↓	*FF*	*RRFU*	*SFR-1*	*SFR-2*	*SFR-3*	*MFR-1*	*MFR-2*	*PUD*	*CN*	*CG*	*CC*	*CO*	*IL*	*IH*	*IMU*	*POS*	*PF*
Central City	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	POS	PF
Regional Centers	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	POS	PF
Town Centers & Station Cores	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-2	MUC-2	MUC-1	MUC-1	MUC-1	POS	PF
Outer Station Areas	SFR-3	SFR-3	SFR-3	PUD	PUD	MFR-1	MFR-2	PUD	CN	MUC-1	MUC-1	CO	CN	CN	CN	POS	PF
Transit Corridors	SFR-3	SFR-3	SFR-3	PUD	PUD	MFR-1	MFR-2	PUD	CN	CN	MUC-1	MUC-1	CN	CN	CN	POS	PF
Main Streets	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-2	MUC-2	MUC-1	MUC-1	MUC-1	POS	PF
Mixed Use Employment Areas	MUEA	MUEA	MUEA	MUEA	MUEA	MFR-1	MFR-2	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	POS	PF
Industrial Areas	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IMU	POS	IS
Neighborhood I (Inner Neighborhood)	SFR-3	SFR-3	SFR-3	SFR-3	SFR-3	PUD	MFR-1	CN	CN	CN	CN	CN	MUEA	MUEA	MUEA	POS	PF
Neighborhood II (Outer Neighborhood)	SFR-2	SFR-2	SFR-2	SFR-2	SFR-3	MFR-1	MFR-1	CN	CN	CN	CN	CN	MUEA	MUEA	MUEA	POS	PF
Urban Reserve (UR) Town Centers	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	POS	MUC-1
UR Corridors	PUD	PUD	MFR-1	MFR-1	MFR-1	MFR-1	MFR-2	CN	CN	CN	CN	CN	MFR-1	MFR-1	MFR-1	POS	PF
UR Main Streets	CN	CN	CN	CN	CN	MFR-1	MFR-2	CN	CN	CN	CN	CN	CN	CN	MFR-1	POS	CN
UR Mixed Use Employment Areas	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	POS	PF
UR Industrial Area	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	POS	PF
UR Neighborhood I	SFR-3	MFR-1	SFR-3	SFR-3	SFR-3	PUD	PUD	CN	CN	CG	CN	CN	MUEA	MUEA	MUEA	POS	PF
UR Neighborhood II	SFR-2	SFR-2	SFR-2	SFR-2	SFR-3	PUD	PUD	PUD	CN	CG	CN	CN	MUEA	MUEA	MUEA	POS	PF
Greenspaces	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF

Plan Codes & Descriptions:

FF - Farm and Forest, agricultural commercial uses
RRFU - Rural or Future Urban, 1 acre or larger
SFR-1 - Single-family residential (10,000 to 40,000 sq. ft.)
SFR-2 - Single-family residential (7,000 to 10,000 sq. ft.)
SFR-3 - Single-family residential (5,000 to 7,000 sq. ft.)
MFR-1 - Multi-family 8 to 25 units per acre
MFR-2 - Multi-family 25 or more units per acre
PUD - Planned Unit Development/Mixed Use
CN - Neighborhood Commercial, floor space 5,000 to 10,000 sq. ft.
CG - General Commercial, large scale commercial districts
CC - Central Commercial, central business districts
CO - Office Commercial, office uses and mixed uses
IL - Light Industrial (warehousing and light processing/fabrication)
IH - Heavy Industrial (light processing and heavy manufacturing)
IMU - Mixed use Industrial (mix of light manufacturing, office and retail uses)
POS - Parks and Open Space
PF - Public Facilities
MUC-1 - Mixed Use Center 1 (least intense center - Floor Area Ratio of .5 to 1)
MUC-2 - Mixed Use Center 2 (moderate intensity center - Floor Area Ratio 1 to 3)
MUC-3 - Mixed Use Center 3 (highest intensity center - Floor Area Ratio 3+)
MUEA - Mixed Use Employment Area (light industrial, warehousing, office, some residential)
IS - Industrial Sanctuary (low intensity industrial employment area)

Maximum Zoning Capacity

ZONE	*DU*	*EMP*
FF	0	0
RRFU	0	0
SFR-1	0	0
SFR-2	7.3	1.8
SFR-3	9.6	2.4
MFR-1	21.2	4.0
MFR-2	47.1	7.0
PUD	12.8	5.0
CN	9.4	20.0
CG	0	0
CC	0	0
CO	18.8	60.0
IL	0	0
IH	0	0
IMU	7.1	11.0
POS	0	0
PF	0	17.0
MUC-1	14.1	35.0
MUC-2	25.9	95.0
MUC-3	58.8	350.0
MUEA	2.4	25.0
IS	0	20.0

2040 Expected Yield

ZONE	*DU*	*EMP*
FF	0	0
RRFU	0.2	0
SFR-1	4	0.9
SFR-2	6.2	1.8
SFR-3	8.2	2.4
MFR-1	18.0	4.0
MFR-2	40.0	7.0
PUD	10.9	5.0
CN	8.0	20.0
CG	0	22.0
CC	0	100.0
CO	16.0	60.0
IL	0	15.0
IH	0	20.0
IMU	6.0	11.0
POS	0	0
PF	0	10
MUC-1	12.0	35.0
MUC-2	22.0	95.0
MUC-3	50.0	350.0
MUEA	6.0	17.0
IS	0	10.0

APPENDIX D

BUILDABLE LANDS AND CAPACITY ANALYSIS

Developed Acres
by Current Comprehensive Plan Categories

Current Plan	Developed Acres
Agricultural or Forestry (FF)	20
Rural or Future Urban (RRFU)	1,140
Single-family 1 (SFR1)	2,010
Single-family 2 (SFR2)	24,600
Single-family 3 (SFR3)	39,820
Multi-family 1 (MFR1)	10,950
Multi-family 2 (MFR2)	1,890
Planned Unit Devel./Mixed Use (PUD)	120
Neighborhood Commercial (CN)	540
General Commercial (CG)	5,330
Central Commercial (CC)	1,200
Office Commercial (CO)	2,420
Light Industrial (IL)	12,040
Heavy Industrial (IH)	2,430
Mixed Use Industrial (IMU)	6,500
Park and Open Space (POS)	1,110
Public Facilities (PF)	2,760
Total Developed Acres	**114,880**

Appendix E

Population, Households & Employment
(1994-2017)

Population, Households and Employment
Cities, Unincorporated Areas, Counties and Region

	Population			Household			Nonfarm Employment		
Cities	**1994**	**2017**	**Change**	**1994**	**2017**	**Change**	**1994**	**2017**	**Change**
Banks	570	597	27	522	534	11	1,276	1,314	39
Barlow	130	193	63	66	94	27	13	19	6
Battleground	4,720	13,188	8,468	1804	4796	2993	3,026	4,534	1,508
Beaverton	61,085	85,478	24,393	24269	38267	13998	50,496	75,322	24,825
Camas	7,430	34,575	27,145	3013	13647	10634	7,240	19,754	12,514
Canby	10,405	14,355	3,950	4435	6140	1705	4,430	7,813	3,383
Cornelius	6,550	8,642	2,092	2622	3494	872	2,388	5,339	2,951
Durham	1,270	1,737	467	281	521	240	1,261	1,726	466
Estacada	2,045	2,598	553	1486	1732	247	1,371	1,843	471
Fairview	3,740	9,462	5,722	1337	3973	2635	2,190	7,341	5,151
Forest Grove	14,295	18,750	4,455	5466	7305	1839	7,743	12,217	4,475
Gaston	610	548	-62	210	209	-2	238	246	8
Gladstone	11,325	11,510	185	4006	4397	392	2,849	4,469	1,619
Gresham	74,625	100,748	26,123	29136	42729	13593	32,699	55,942	23,243
Happy Valley	2,365	8,539	6,174	633	3193	2560	656	2,556	1,900
Hillsboro	44,045	80,673	36,628	13677	29101	15424	32,612	90,736	58,124
Johnson City	620	688	68	592	646	53	302	385	83
King City	2,155	3,023	868	243	436	194	369	563	193
La Center	759	1,028	269	674	771	97	219	411	192
Lake Oswego	32,940	38,484	5,544	13230	17108	3878	18,930	28,298	9,368
Maywood Park	780	790	10	96	114	18	158	166	8
Milwaukie	19,930	25,784	5,854	8332	11321	2989	13,558	21,292	7,734
Molalla	3,915	4,251	336	3810	3960	150	3,501	3,839	339
North Plains	1,160	1,643	483	886	1090	204	609	763	154
Oregon City	17,545	29,003	11,458	6980	12313	5334	15,098	23,407	8,309
Portland	495,090	589,090	94,000	212581	266252	53671	430,138	590,516	160,378
Ridgefield	1,605	2,320	715	468	780	312	654	802	147
Rivergrove	300	144	-156	137	111	-26	35	74	39
Sandy	4,520	12,652	8,132	2553	5903	3350	5,350	10,062	4,712
Sherwood	4,615	18,566	13,951	1580	7002	5422	2,309	11,851	9,542
Tigard	33,730	42,789	9,059	13343	18764	5421	40,181	55,717	15,536
Troutdale	10,495	15,625	5,130	3455	6193	2738	2,938	9,285	6,347
Tualatin	17,450	23,957	6,507	7059	10514	3456	17,657	27,574	9,917
Vancouver	59,225	125,741	66,516	46840	58477	11637	80,341	108,317	27,976
Washougal	5,290	10,095	4,805	2603	4655	2052	2,916	5,641	2,725
West Linn	18,860	22,800	3,940	6420	8730	2309	2,985	5,366	2,381
Wilsonville	9,680	24,589	14,909	4589	11083	6494	16,540	31,782	15,242
Wood Village	2,950	3,618	668	1142	1518	376	1,591	2,508	918
Woodland	130	132	2	1	2	1	0	0	0
Yacolt	813	1,000	187	646	717	71	185	225	39
Unincorporated									
Multnomah	35,140	45,254	10,114	5,793	19,037	13,244	6,977	-66,550	-73,527
Clackamas	170,920	248,011	77,091	58,730	100,070	41,340	63,783	141,896	78,113
Washington	171,965	321,495	149,530	63,842	119,862	56,020	52,462	125,531	73,070
Clark	198,008	266,834	68,826	44,811	100,439	55,628	25,227	105,508	80,280
County and Region									
Multnomah	620,000	761,100	141,100	252,400	338,300	85,900	475,100	596,700	121,600
Clackamas	305,500	443,600	138,100	116,000	186,800	70,800	149,400	283,100	133,700
Washington	359,500	607,900	248,400	134,000	237,100	103,100	209,600	408,900	199,300
Clark	280,800	458,400	177,600	102,000	185,800	83,800	121,400	247,700	126,300
Region	1,565,800	2,271,000	705,200	604,400	948,000	343,600	955,600	1,536,500	580,900

Population, Households and Employment
Metro Urban Reserves, 1997

Urban Reserve Site	Population		Household		Employment	
	1994	2017	1994	2017	1994	2017
1	115	309	39	123	3	11
2	143	245	49	93	0	4
3	0	0	0	0	0	0
4	137	1,861	43	659	6	156
5	324	12,366	101	4,337	28	5,121
6	1,453	24,195	467	8,822	913	4,973
7	641	3,473	185	1,247	162	346
8	718	8,956	205	3,336	385	2,919
9	1,072	4,228	299	1,515	253	1,826
10	147	896	47	327	7	79
11	379	2,954	134	1,075	519	1,393
13	10	228	4	83	355	613
14	120	1,259	38	505	27	351
15	59	433	19	166	7	52
17	462	1,603	161	608	151	338
18	137	406	43	154	3	26
19	2	2	1	1	0	0
22	108	483	36	179	1	36
23	7	13	2	4	3	6
24	17	173	6	64	0	8
25	857	3,896	271	1,396	23	834
26	1,480	5,549	472	2,065	370	906
29	19	132	6	54	0	18
30	7	23	2	11	0	2
31	92	78	30	32	29	33
32	1	0	0	0	0	0
33	35	175	11	66	5	15
34	50	256	18	112	14	56
35	35	93	12	32	12	13
36	1	6	0	2	0	0
37	15	148	6	63	0	15
39	0	1	0	0	0	0
41	115	1,671	43	695	8	1,162
42	109	3,512	36	1,236	215	466
43	0	5	0	2	0	0
44	77	497	24	177	33	39
45	236	1,703	92	685	4	353
47	6	167	3	80	0	9
48	135	123	52	59	8	18
49	38	92	14	44	7	23
51	65	86	22	32	4	43
52	64	61	22	22	1	1
53	7	225	3	82	0	54
54	41	3,376	14	1,226	22	903
55	94	2,126	32	775	4	659
61	7	8	2	3	0	0
62	60	61	18	19	2	2
63	6	6	2	2	0	0
64	242	213	86	79	53	2
65	16	78	6	28	3	21
67	97	109	37	44	1	1
68	21	560	8	233	0	37
69	6	6	2	2	0	0
70	1	1	0	0	0	0
	12,077	91,143	5,219	34,675	5,636	25,962

source: 2017 GRIDS, 11/97
parent geography: TAZ

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
1	594	1,329	735	545	1,128	583	28,657	38,271	9,614
2	17	356	339	12	302	290	8,578	11,554	2,976
3	16	128	111	14	116	102	1,207	2,764	1,557
4	324	810	486	302	810	507	1,490	5,109	3,619
5	6	161	155	5	161	156	459	1,406	946
6	232	417	185	195	378	183	8	349	341
7	0	1,075	1,075	0	429	429	760	3,869	3,110
8	206	1,025	818	141	853	712	3,721	5,295	1,575
9	19	1,393	1,374	18	1,058	1,041	3,884	4,061	176
10	1,164	2,328	1,164	1,021	1,847	826	11,790	16,303	4,513
11	2,035	2,684	649	1,576	2,062	486	2,444	3,080	636
12	543	1,138	595	410	966	555	23,359	30,143	6,784
13	179	316	137	126	268	142	3,919	6,612	2,693
14	266	323	57	188	261	73	97	1,294	1,197
15	1,815	3,636	1,821	1,310	2,750	1,440	10,138	14,316	4,178
16	1,310	1,488	178	951	1,104	153	2,813	3,912	1,099
17	893	1,531	638	677	1,129	451	8,653	11,374	2,720
18	3,064	2,811	-254	1,644	1,699	55	6,153	6,324	171
19	211	312	101	103	157	54	9,345	10,282	937
20	84	111	27	33	46	13	24	26	2
21	441	2,156	1,715	170	891	721	28	179	151
22	179	605	426	72	250	178	25	71	46
23	1,024	3,792	2,768	412	1,567	1,155	42	299	256
24	407	286	-122	159	121	-38	22	22	0
25	80	102	23	32	50	18	2,049	2,626	577
26	603	1,195	592	256	578	322	602	1,290	688
27	837	2,645	1,808	301	1,140	839	110	278	168
28	837	661	-176	351	372	21	79	85	6
29	6,921	7,358	437	4,997	5,228	231	9,502	10,181	679
30	1,858	1,741	-118	855	937	82	167	212	45
31	924	1,379	454	367	622	255	1,133	1,208	74
32	310	539	229	123	244	122	815	838	23
33	109	211	102	44	100	56	497	507	9
34	4,120	3,687	-433	1,977	2,051	75	959	971	13
35	768	999	231	298	441	143	59	92	32
36	254	523	269	101	237	136	11	41	30
37	1,169	1,166	-4	446	497	51	89	101	12
38	1,066	1,646	580	436	712	276	61	122	61
39	917	1,505	588	383	689	306	487	863	375
40	3,377	3,782	405	1,366	1,634	268	1,708	1,870	162
41	1,561	1,536	-25	597	654	57	97	118	20
42	2,812	2,697	-116	1,168	1,346	178	248	287	39
43	1,398	1,465	67	828	842	14	9,584	10,046	463
44	592	485	-107	316	357	41	4,876	4,990	114
45	0	764	764	0	305	305	327	4,867	4,541
46	59	1,574	1,516	34	993	959	1,572	4,926	3,353
47	1,212	1,226	14	662	745	84	1,453	1,499	46
48	412	451	39	241	259	18	426	437	11
49	804	801	-3	427	487	60	1,510	1,593	83
50	471	535	64	281	322	41	3	22	19
51	1,257	1,200	-57	523	614	91	373	486	113
52	2,479	2,155	-324	1,015	1,037	23	373	383	10
53	2,029	2,129	100	778	889	111	69	94	25

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
54	3,257	3,879	622	1,308	1,669	361	490	598	108
55	4,124	4,195	71	1,874	2,016	142	1,184	1,320	136
56	1,728	1,705	-23	730	780	50	787	873	87
57	92	102	10	39	47	7	23	26	3
58	421	434	13	180	199	18	26	36	10
59	416	395	-20	174	195	20	13	21	8
60	503	470	-33	206	217	11	19	22	3
61	65	70	5	28	30	2	35	39	4
62	2,740	2,999	258	1,100	1,317	217	344	412	68
63	1,576	1,786	210	676	813	137	135	165	31
64	602	668	66	268	315	47	536	589	53
65	1,116	1,276	160	536	637	102	2,502	2,744	242
66	1,265	1,372	107	476	570	94	41	216	175
67	2,366	2,285	-81	888	950	62	64	80	15
68	1,587	1,821	234	698	929	231	466	644	178
69	1,467	1,468	1	586	749	163	2,065	2,521	457
70	1,735	1,578	-157	634	689	55	13	66	53
71	725	940	215	257	390	133	18	48	30
72	706	1,172	466	266	502	237	156	208	53
73	866	1,436	570	297	615	319	1,190	1,254	65
74	2,292	5,112	2,820	869	2,137	1,268	294	762	468
75	2,620	3,261	641	1,110	1,462	352	62	145	83
76	4,476	4,182	-294	1,922	2,128	206	2,043	2,288	246
77	1,663	1,415	-249	705	719	15	81	125	44
78	907	827	-80	317	364	47	50	266	215
79	2,327	3,122	795	1,015	1,518	504	123	239	117
80	1,435	1,982	547	626	964	338	4,229	5,531	1,302
81	2,037	2,237	200	888	1,060	173	655	871	216
82	1,943	1,902	-41	784	901	117	148	224	76
83	1,339	1,632	293	624	774	150	287	533	245
84	559	1,215	656	315	550	234	1,980	2,841	861
85	1,283	1,344	61	594	676	82	662	933	271
86	1,952	2,032	80	800	935	135	969	1,326	358
87	2,239	2,621	382	1,028	1,318	290	138	336	199
88	3,148	3,344	196	1,210	1,579	369	375	732	357
89	1,419	1,726	306	555	733	178	56	118	62
90	2,377	3,645	1,268	1,130	1,693	563	1,130	1,660	530
91	1,996	2,193	197	783	965	182	127	242	115
92	469	823	354	218	402	183	10,790	15,876	5,085
93	991	1,356	365	421	597	176	320	744	425
94	2,215	2,453	238	935	1,085	151	1,134	1,531	397
95	361	830	469	144	375	231	3,044	4,123	1,078
96	1,300	1,866	566	579	875	297	5,851	6,763	912
97	858	947	89	384	450	66	1,987	2,233	245
98	1,122	1,555	433	510	749	239	1,355	1,931	575
99	2,185	2,179	-6	937	1,038	101	469	600	131
100	98	2,176	2,078	43	1,058	1,016	240	3,542	3,301
101	2,313	3,153	840	933	1,533	601	155	1,204	1,049
102	675	1,570	896	230	764	533	76	145	68
103	2,181	4,258	2,077	722	1,746	1,025	49	220	170
104	1,817	2,444	627	630	1,002	372	269	510	241
105	472	1,151	679	182	560	378	15	135	120
106	83	3,038	2,955	36	1,477	1,441	481	2,071	1,590

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
107	483	966	483	207	458	251	989	2,258	1,270
108	1,319	1,677	358	564	795	231	259	631	372
109	522	492	-30	232	239	7	5	50	45
110	595	1,747	1,152	260	849	589	566	1,482	917
111	1,533	2,368	835	715	1,151	436	3,010	5,175	2,165
112	787	912	124	365	443	78	1,661	2,740	1,079
113	1,974	6,530	4,556	884	3,120	2,236	3,823	4,739	916
114	2,266	2,308	41	924	997	73	1,257	1,678	421
115	1,161	1,105	-55	480	478	-2	2,315	2,508	193
116	14	13	-2	6	6	0	5,384	6,422	1,038
117	3,852	3,466	-387	1,555	1,578	23	904	1,095	191
118	2,504	2,586	82	1,037	1,215	177	90	194	104
119	1,163	1,194	32	437	486	49	70	143	73
120	3,560	3,162	-399	1,175	1,277	102	120	228	108
121	2,518	2,380	-137	867	948	82	171	250	79
122	5,564	5,791	226	2,352	2,482	130	941	1,273	332
123	596	599	2	291	300	9	64	89	25
124	218	516	298	108	259	151	165	541	376
125	273	395	123	132	198	66	1,622	3,528	1,906
126	492	447	-46	219	217	-2	2,518	2,892	374
127	3,902	3,642	-260	1,531	1,555	24	344	486	143
128	2,461	3,688	1,227	1,082	1,666	584	619	1,172	553
129	348	3,712	3,364	101	1,312	1,212	41	176	134
130	883	1,528	645	339	654	316	18	83	65
131	2,340	3,999	1,660	864	1,711	847	1,140	1,856	715
132	407	758	352	168	325	157	2,188	2,295	106
133	4,357	4,601	244	1,733	1,965	232	874	1,194	320
134	1,906	1,742	-163	738	744	7	33	3,784	3,751
135	206	185	-21	79	91	12	788	3,918	3,131
136	100	102	3	41	52	11	2,586	3,667	1,081
137	66	2,740	2,674	25	1,345	1,319	4,416	5,180	764
138	0	582	582	0	233	233	42	886	844
139	11	10	0	5	5	0	644	1,354	710
140	64	1,600	1,537	31	841	810	838	1,140	302
141	841	1,833	992	406	900	494	394	553	160
142	310	585	276	150	284	134	614	704	90
143	605	1,428	823	285	659	374	406	722	316
144	885	988	104	429	496	66	74	142	67
145	1,468	1,689	222	681	778	96	417	493	76
146	3,410	3,329	-81	1,391	1,439	48	1,190	1,599	410
147	1,596	1,587	-9	573	646	72	27	83	56
148	2,844	4,226	1,382	980	1,744	765	165	546	381
149	1,303	1,442	139	489	587	98	62	125	63
150	1,664	3,654	1,991	685	1,632	947	965	1,425	460
151	2,377	4,078	1,701	922	1,821	899	145	299	154
152	2,417	2,072	-344	775	908	133	172	273	101
153	2,313	2,349	36	784	994	210	79	190	111
154	2,585	2,983	398	1,017	1,262	245	58	193	135
155	900	1,465	565	289	576	287	8	94	86
156	1,062	1,394	332	342	548	206	5	116	111
157	206	285	78	125	124	-1	0	681	681
158	0	93	93	0	37	37	0	651	651
159	351	266	-85	117	116	-1	2,305	2,895	590

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
160	59	550	492	29	240	211	1,154	3,007	1,852
161	706	972	266	289	440	150	2,662	2,898	236
162	842	1,990	1,149	345	900	555	2,096	3,625	1,529
163	1,284	1,984	701	495	798	303	112	418	306
164	1,738	1,587	-151	614	638	24	87	152	65
165	273	1,499	1,226	85	530	445	36	85	49
166	804	6,021	5,217	237	2,129	1,892	31	1,441	1,410
167	426	1,816	1,390	151	642	492	724	1,489	765
168	751	3,657	2,906	226	1,290	1,065	24	380	356
169	1,527	2,891	1,364	446	1,015	569	70	233	163
170	1,550	3,068	1,518	470	1,125	654	52	251	198
171	1,532	1,481	-51	445	517	72	24	80	56
172	695	1,474	779	285	667	382	1,616	2,584	968
173	464	1,204	740	181	544	363	3	53	50
174	416	1,619	1,203	168	732	564	16	166	150
175	1,169	4,069	2,899	426	1,812	1,386	245	1,265	1,020
176	544	1,640	1,095	218	715	498	10	148	138
177	821	1,359	538	427	593	166	429	1,432	1,003
178	1,040	1,217	176	349	479	129	314	449	135
179	1,293	1,720	427	443	692	249	40	225	185
180	2,779	2,646	-133	791	986	196	342	493	151
181	4,001	7,162	3,162	1,261	2,767	1,506	179	437	259
182	4,997	6,992	1,995	1,733	2,435	702	463	1,103	640
183	1,794	2,423	629	681	921	240	149	798	649
184	1,048	1,317	270	382	518	136	30	207	177
185	1,053	1,089	35	325	373	48	200	238	38
186	429	564	135	149	202	53	147	240	94
187	265	246	-19	90	105	15	607	833	226
188	668	975	306	229	425	196	117	200	84
189	391	1,072	681	129	371	243	201	321	120
190	2,149	3,913	1,764	694	1,497	804	134	506	372
191	824	1,569	744	255	610	355	112	2,065	1,953
192	939	1,930	991	380	872	492	50	174	124
193	537	729	192	193	330	136	50	76	25
194	657	560	-97	252	253	2	20	42	22
195	1	2	1	1	1	0	204	554	350
196	932	968	36	357	394	38	65	150	85
197	2	2	0	1	1	0	63	1,405	1,342
198	551	1,456	904	209	658	449	576	2,227	1,652
199	209	492	283	86	222	137	0	43	43
200	355	965	611	142	436	294	47	86	39
201	1,116	931	-185	398	421	23	53	122	69
202	821	787	-34	359	356	-3	17	61	44
203	5	5	0	2	2	0	748	2,088	1,340
204	4,302	5,081	780	1,724	2,029	304	231	428	197
205	2,058	2,873	815	655	1,073	418	113	328	216
206	800	806	6	287	285	-3	281	74	-208
207	1,187	1,217	31	377	529	152	45	268	222
208	2,688	2,426	-262	870	1,055	185	100	215	115
209	56	51	-6	27	27	0	1,460	4,407	2,947
210	308	277	-31	148	146	-1	354	2,476	2,123
211	344	3,305	2,960	165	1,746	1,581	1,170	3,372	2,202
212	47	2,579	2,532	22	946	925	422	4,233	3,811

Population, Households and Employment

Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
213	53	827	774	25	437	412	1,966	5,632	3,666
214	3	665	663	1	312	310	0	1,590	1,590
215	704	8,333	7,629	334	4,403	4,068	34	1,243	1,209
216	2,944	5,200	2,256	897	1,783	886	82	340	258
217	3,308	3,589	281	1,018	1,228	210	553	830	277
218	3,210	3,476	266	1,025	1,196	171	533	763	231
219	2,200	2,436	236	670	834	165	2,647	2,888	241
220	5,443	9,420	3,977	1,657	3,231	1,574	211	653	442
221	1,189	929	-260	377	396	20	151	99	-52
222	120	153	33	36	53	17	1	16	15
223	21	23	2	8	7	0	0	4,711	4,711
224	0	0	0	0	0	0	1,220	3,673	2,454
225	11	11	0	4	4	0	22	5,005	4,983
226	418	5,632	5,214	150	2,066	1,917	169	288	119
227	422	5,913	5,491	132	2,259	2,126	389	3,484	3,095
228	536	3,294	2,758	167	1,258	1,091	121	390	269
229	2,311	4,968	2,656	788	1,897	1,109	636	1,451	815
230	2,985	3,808	822	1,067	1,454	387	329	478	150
231	389	3,761	3,372	121	1,436	1,315	50	1,126	1,075
232	72	59	-13	23	22	0	5,629	7,058	1,430
233	1,005	971	-34	359	356	-3	118	985	868
234	32	35	4	11	12	1	50	1,153	1,103
235	23	1,012	989	8	371	363	335	4,985	4,651
236	639	666	27	191	245	55	72	111	38
237	59	54	-5	20	20	0	1,005	2,175	1,170
238	2	2	0	1	1	0	181	640	459
239	1,224	1,818	594	426	630	204	31	119	87
240	3,115	4,206	1,091	959	1,457	498	100	291	190
241	1,904	2,424	520	595	840	244	46	67	21
242	2,969	3,788	818	989	1,327	338	1,651	2,212	561
243	3,052	3,297	245	1,027	1,243	217	389	788	400
244	968	628	-339	333	228	-105	680	1,381	701
245	34	3,384	3,350	12	1,232	1,220	0	1,089	1,089
246	34	3,380	3,346	12	1,225	1,214	26	1,247	1,220
247	30	33	4	10	12	2	0	3	3
248	109	103	-6	38	37	0	3	7	4
249	1,551	3,552	2,000	562	1,340	777	764	2,255	1,491
250	73	84	11	31	31	0	658	1,239	581
251	420	495	74	184	187	2	1,717	2,048	330
252	908	1,521	613	358	574	216	2,935	3,400	465
253	1,684	2,852	1,168	609	1,011	403	1,348	1,934	586
254	1,959	2,280	320	673	797	124	40	150	110
255	326	436	110	121	153	31	28	32	4
256	1,639	1,930	291	608	708	100	269	413	144
257	3,529	3,823	294	1,252	1,403	151	529	767	239
258	2,421	3,725	1,304	675	1,367	691	94	5,284	5,189
259	2,743	3,232	489	866	1,191	326	57	68	11
260	560	691	132	206	255	49	87	123	35
261	564	840	276	212	309	98	702	751	49
262	1,694	2,446	751	575	901	327	69	151	82
263	159	301	142	48	111	63	96	189	92
264	1,164	2,336	1,173	392	861	469	2,846	3,010	165
265	746	1,521	775	327	561	234	1,372	1,653	281

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
266	1,033	1,553	521	436	571	135	64	298	234
267	24	23	-1	8	8	0	213	6,157	5,944
268	921	787	-134	323	288	-35	200	187	-13
269	452	446	-6	158	163	4	183	1,245	1,062
270	2,841	4,301	1,460	958	1,571	613	623	736	113
271	2,396	2,377	-19	791	843	52	154	206	52
272	2,660	3,160	500	890	1,100	210	1,423	1,504	82
273	3,794	3,982	187	1,341	1,389	48	1,287	1,422	135
274	447	493	46	159	162	4	812	814	2
275	71	85	14	25	28	3	9	13	4
276	475	437	-38	138	144	6	73	108	35
277	124	142	18	44	47	3	81	88	7
278	299	294	-6	90	97	7	12	18	6
279	100	104	4	31	34	4	17	18	1
280	2,025	3,636	1,610	773	1,281	508	941	2,710	1,769
281	4,252	6,290	2,038	1,836	2,643	807	3,554	5,878	2,324
282	4,852	8,644	3,793	1,680	3,255	1,575	1,251	1,743	492
283	4,412	5,701	1,290	1,655	2,180	526	2,747	4,877	2,130
284	797	1,104	307	293	422	129	226	927	701
285	3,648	3,765	118	1,096	1,327	231	377	824	447
286	2,563	3,149	586	877	1,109	232	1,168	2,291	1,123
287	482	648	167	165	235	70	255	356	101
288	257	296	39	88	107	19	60	66	5
289	627	601	-26	208	226	18	97	106	8
290	44	160	115	18	60	42	31	32	1
291	190	219	30	63	82	19	35	38	3
292	691	369	-322	259	138	-121	403	313	-90
293	668	750	82	244	281	37	93	106	13
294	1,506	1,644	138	490	604	115	176	193	17
295	1,153	1,153	0	357	400	43	372	383	11
296	288	339	51	99	123	24	303	308	4
297	510	497	-13	171	174	3	195	201	6
298	154	150	-4	53	54	2	18	23	4
299	353	341	-12	114	118	4	238	240	2
300	371	422	51	144	147	3	22	29	7
301	420	454	34	149	158	9	452	466	14
302	204	195	-9	65	68	2	9	14	5
303	93	97	4	29	34	5	30	31	1
304	684	609	-75	213	211	-2	240	239	-1
305	1,041	1,121	80	323	389	66	144	203	60
306	1,178	1,300	122	415	451	36	72	96	24
307	376	418	42	116	145	29	15	22	7
308	1,553	1,879	326	584	794	210	1,679	2,292	613
309	1,135	1,112	-23	428	472	44	47	99	52
310	364	509	145	166	249	82	92	416	324
311	411	633	222	141	257	116	969	1,695	726
312	519	848	329	221	344	123	4,372	5,224	852
313	101	271	170	35	110	75	2,528	2,736	208
314	2,233	2,521	288	924	1,141	217	2,760	3,808	1,048
315	1,950	2,369	420	885	1,155	270	944	1,678	733
316	292	218	-73	105	104	-1	750	1,362	613
317	4,054	3,787	-267	1,512	1,617	105	2,128	2,345	217
318	3,733	4,539	806	1,357	1,872	516	119	278	159

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
319	602	620	19	220	248	28	291	356	64
320	1,827	1,872	45	705	751	47	2,566	2,676	109
321	424	628	204	152	265	113	434	522	87
322	2,466	3,158	692	836	1,384	547	581	1,089	508
323	2,039	3,407	1,368	829	1,611	783	4,407	5,972	1,565
324	1,137	1,130	-6	469	574	105	170	374	204
325	2,989	2,462	-528	1,150	1,243	93	748	1,072	324
326	1,706	1,564	-142	631	703	72	931	1,204	273
327	4,328	5,187	860	2,060	2,562	501	3,126	4,616	1,490
328	987	918	-69	423	471	49	253	345	92
329	2,390	2,276	-114	1,021	1,142	121	4,574	6,784	2,211
330	1,009	1,100	91	381	482	101	1,083	2,491	1,408
331	1,444	1,432	-12	547	636	88	1,544	1,783	238
332	29	170	141	11	76	65	5,380	6,198	818
333	1,738	2,044	306	635	973	339	194	492	298
334	3,813	4,882	1,069	1,921	2,324	403	277	727	450
335	1,678	2,263	585	671	978	307	64	147	83
336	1,829	2,276	447	767	951	184	724	951	227
337	889	1,383	495	271	520	249	103	146	43
338	572	1,644	1,072	208	744	536	10	75	65
339	2,624	3,337	713	971	1,465	494	107	231	124
340	1,529	3,815	2,286	620	1,703	1,084	43	1,257	1,214
341	1,987	3,730	1,743	741	1,688	947	108	250	142
342	781	1,817	1,037	304	822	518	64	128	63
343	459	1,389	930	181	629	447	18	292	274
344	4,160	6,188	2,028	2,353	2,801	447	601	1,278	677
345	1,837	2,111	274	745	1,005	259	536	697	162
346	1,178	2,180	1,002	506	970	463	58	577	519
347	828	814	-14	334	362	28	1,205	1,198	-6
348	647	1,041	394	258	463	205	999	1,351	353
349	220	474	253	88	211	123	1,352	1,505	153
350	23	55	32	9	26	17	1,209	1,395	186
351	864	1,002	138	323	398	75	1,871	2,428	557
352	2,607	2,527	-80	960	1,003	44	263	426	162
353	6,250	5,798	-453	2,012	2,072	59	512	722	209
354	1,355	1,289	-66	484	508	23	249	425	176
355	1,888	4,337	2,449	692	1,736	1,044	110	1,498	1,389
356	1,555	2,002	448	586	802	216	355	352	-2
357	2,045	2,372	327	668	950	282	115	114	-1
358	243	209	-34	80	79	-1	78	78	0
359	1,766	5,373	3,607	533	1,920	1,387	96	918	822
360	1,778	1,253	-525	612	497	-115	168	279	111
361	2,552	3,766	1,214	938	1,532	594	474	811	337
362	3,503	4,139	635	1,391	1,840	449	1,156	1,557	401
363	2,140	5,012	2,872	854	2,229	1,375	5,136	7,359	2,223
364	454	403	-50	181	179	-2	3,036	4,257	1,221
365	45	42	-3	19	19	0	1,525	4,937	3,412
366	347	1,124	777	154	500	346	206	823	617
367	73	282	209	30	107	78	38	145	107
368	354	4,593	4,239	150	1,723	1,573	93	2,347	2,254
369	1,395	6,437	5,042	513	2,490	1,977	1,120	5,182	4,062
370	41	39	-1	15	14	0	619	3,655	3,036
371	24	42	19	9	17	8	377	1,236	860

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
372	569	2,260	1,691	180	794	615	889	1,507	618
373	7,940	8,213	273	2,582	2,961	379	583	864	281
374	448	429	-19	142	151	9	116	128	12
375	624	546	-78	205	203	-2	55	55	0
376	282	281	-2	93	104	12	13	23	9
377	3,577	3,649	71	1,170	1,459	289	474	551	77
378	2,291	4,440	2,149	787	1,736	948	291	563	272
379	2,192	935	-1,257	779	363	-416	974	1,641	667
380	2,545	2,929	384	901	1,138	237	249	571	322
381	1,910	4,306	2,395	628	1,604	976	187	1,201	1,014
382	3,227	4,029	803	1,134	1,540	405	406	741	335
383	3,322	4,846	1,524	1,127	1,971	844	2,321	2,310	-11
384	159	1,816	1,657	53	638	585	2,695	4,158	1,463
385	24	1,192	1,168	10	496	486	1,452	3,445	1,993
386	2,837	6,559	3,722	1,129	2,728	1,599	2,038	3,710	1,672
387	1,485	3,767	2,283	591	1,567	976	1,975	7,339	5,364
388	3,396	5,176	1,780	1,265	2,152	888	3,213	5,246	2,033
389	174	1,195	1,021	77	497	421	2,194	4,003	1,809
390	3	445	441	1	185	184	553	1,076	524
391	142	134	-9	47	47	0	1,985	2,358	373
392	142	290	148	47	102	55	6	38	32
393	131	3,868	3,737	44	1,360	1,316	353	707	355
394	280	246	-34	108	111	3	59	68	9
395	157	657	499	50	231	181	192	239	47
396	2,621	6,309	3,688	963	2,440	1,477	311	1,036	725
397	49	2,095	2,046	18	810	792	2	265	263
398	370	2,516	2,147	153	1,047	893	14	416	402
399	693	3,499	2,806	256	1,353	1,098	45	649	604
400	406	6,238	5,832	151	2,594	2,443	33	1,433	1,400
401	604	1,219	615	210	507	298	89	312	222
402	48	57	9	18	25	7	21	37	16
403	675	1,534	859	249	694	445	51	213	162
404	1,034	1,020	-14	352	392	40	29	98	69
405	1,775	1,753	-22	673	704	31	69	229	160
406	1,076	1,538	462	490	613	123	922	2,212	1,289
407	455	1,235	780	237	667	430	543	1,317	774
408	1,199	2,517	1,319	584	1,360	776	886	2,713	1,827
409	1,125	1,485	359	605	665	60	57	172	115
410	1,330	1,360	31	665	735	70	111	745	634
411	55	125	69	21	49	28	3,966	4,159	193
412	1,002	1,020	18	369	395	26	318	574	257
413	1,963	4,219	2,256	764	1,635	871	394	1,046	652
414	1,668	1,667	-1	628	646	18	427	457	30
415	1,835	1,817	-18	713	717	4	280	287	6
416	886	957	71	342	369	27	647	797	150
417	310	308	-2	118	118	0	18	19	1
418	1,362	1,427	65	481	559	78	413	621	208
419	644	701	57	243	270	27	77	138	61
420	475	537	62	200	212	12	1	22	21
421	865	1,021	156	344	400	56	191	457	266
422	1,848	2,196	348	681	858	177	155	422	267
423	1,552	1,810	258	558	705	148	24	67	43
424	106	252	146	40	106	66	427	820	393

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
425	1,109	1,302	192	414	547	132	1,573	1,693	119
426	2,321	2,022	-299	817	901	84	109	161	52
427	1,543	1,525	-18	683	730	47	673	1,091	418
428	2,637	2,656	19	1,410	1,547	136	1,190	1,234	45
429	2,496	2,320	-176	973	1,023	50	215	319	104
430	1,626	1,706	80	657	752	95	1,542	1,857	314
431	522	519	-3	217	231	15	167	193	26
432	819	745	-74	293	318	25	51	158	107
433	207	394	188	77	166	88	1,165	1,509	345
434	17	50	33	6	23	17	1,013	1,365	352
435	345	1,475	1,130	130	625	494	114	2,420	2,307
436	1,682	1,898	215	645	813	168	472	680	208
437	1,385	1,958	573	555	846	291	25	123	98
438	993	1,228	235	410	531	120	452	820	368
439	624	938	315	259	405	146	877	1,225	348
440	461	555	94	199	239	39	717	913	196
441	747	933	186	362	576	214	398	1,477	1,079
442	1,096	1,531	434	625	946	320	437	1,420	983
443	905	1,220	315	491	737	246	6,755	11,471	4,716
444	14	462	448	7	215	208	966	4,221	3,256
445	15	225	211	7	105	98	162	1,042	880
446	354	364	10	130	137	8	164	166	2
447	2,511	2,941	430	937	1,235	298	1,204	1,723	519
448	2,925	2,818	-107	998	1,212	214	188	309	121
449	750	695	-54	279	300	21	26	41	15
450	1,613	1,555	-58	621	667	45	389	417	28
451	1,868	1,856	-12	746	816	70	1,000	1,512	512
452	1,904	1,827	-77	735	808	72	107	122	15
453	1,246	1,404	157	503	622	119	293	323	30
454	1,157	1,220	63	475	523	48	1,034	1,292	258
455	1,840	1,792	-48	768	794	26	159	191	32
456	1,025	927	-97	363	386	23	263	342	78
457	3,859	3,515	-343	1,339	1,382	43	237	277	39
458	874	1,180	306	298	506	208	54	154	99
459	3,525	3,840	315	1,257	1,448	190	318	634	317
460	3,758	3,830	72	1,250	1,454	205	412	494	82
461	389	618	228	162	287	125	1,737	2,159	421
462	284	500	217	128	233	105	1,106	1,433	327
463	852	1,037	186	355	482	128	1,091	1,399	308
464	82	91	9	34	42	8	5,628	6,641	1,013
465	1,233	2,104	871	424	803	378	7	2,122	2,115
466	1,533	2,335	801	550	891	341	52	327	275
467	575	1,170	595	181	446	265	56	274	218
468	677	1,554	877	237	591	354	45	267	222
469	595	1,425	829	189	544	355	412	708	296
470	1,010	3,728	2,718	321	1,422	1,102	187	905	718
471	1,183	1,850	667	379	723	344	94	760	666
472	1,486	2,064	578	618	960	341	482	637	155
473	1,475	1,609	133	450	748	298	90	215	124
474	407	3,220	2,813	129	1,229	1,099	45	666	621
475	1,631	3,297	1,666	518	1,258	740	352	829	478
476	885	1,151	266	281	439	158	184	222	38
477	331	2,585	2,255	105	988	882	58	516	458

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
478	1,146	2,507	1,361	353	1,166	813	83	523	440
479	538	2,811	2,272	180	1,307	1,127	55	1,451	1,396
480	94	2,607	2,513	31	1,211	1,180	35	1,121	1,085
481	860	5,589	4,729	290	2,025	1,735	1,513	3,059	1,546
482	541	8,472	7,931	224	3,070	2,845	441	2,227	1,786
483	414	1,154	740	172	418	246	61	506	444
484	299	401	103	138	187	48	70	792	722
485	1,964	1,760	-204	592	818	226	39	432	393
486	398	632	234	132	294	162	0	46	46
487	225	207	-18	94	96	2	893	1,362	469
488	396	259	-137	120	121	1	1,290	1,595	305
489	1,261	995	-266	382	462	80	1,066	1,322	256
490	110	94	-16	44	44	0	689	3,079	2,389
491	48	33	-15	17	17	0	1,188	1,371	183
492	2,615	2,569	-46	1,090	1,126	36	1,077	1,253	176
493	2,188	2,254	66	894	906	12	435	532	97
494	1,156	1,509	353	383	583	200	686	1,739	1,053
495	99	160	61	51	74	24	267	341	73
496	493	629	135	262	292	30	24	306	282
497	321	325	4	161	160	-1	1,931	2,714	782
498	308	351	44	156	163	7	356	2,566	2,210
499	11	181	170	4	67	63	344	707	363
500	35	304	269	12	115	103	239	872	633
501	1,175	1,834	659	398	694	296	499	1,101	602
502	716	2,743	2,027	250	1,038	788	155	344	190
503	763	671	-93	256	254	-2	125	124	-1
504	786	1,014	228	247	380	134	35	35	0
505	1,746	5,169	3,423	549	1,957	1,407	123	613	490
506	987	981	-6	320	371	51	34	51	17
507	1,151	6,630	5,479	387	2,509	2,122	2	607	605
508	403	655	253	141	248	107	46	94	48
509	2,162	2,179	17	899	1,047	149	2,085	2,264	179
510	10	147	137	4	71	67	2,893	3,254	361
511	4,213	3,742	-471	1,453	1,519	66	559	631	72
512	1,992	3,634	1,643	675	1,400	725	118	436	318
513	1,510	4,434	2,924	508	1,708	1,200	78	493	415
514	2,702	2,852	150	968	1,137	169	763	1,129	366
515	1,321	1,863	542	531	732	201	529	749	220
516	286	1,107	822	112	431	319	1,567	2,369	801
517	3,816	4,275	460	1,290	1,647	356	2,277	2,918	641
518	833	3,223	2,390	271	1,241	971	30	506	476
519	555	1,118	562	184	431	246	19	82	63
520	3,409	3,152	-257	1,535	1,601	65	389	424	35
521	13,847	23,213	9,366	4,864	8,906	4,043	4,608	9,813	5,205
522	1,365	1,559	194	449	560	112	129	128	-1
523	1,299	5,794	4,495	433	2,232	1,799	218	2,422	2,204
524	777	3,821	3,044	245	1,373	1,128	27	600	573
525	1,373	1,521	148	444	546	103	129	128	-1
526	1,449	4,999	3,550	471	1,808	1,337	2,245	4,001	1,757
527	665	4,343	3,678	207	1,561	1,354	51	938	887
528	2,193	3,730	1,537	696	1,341	644	351	382	31
529	1,181	1,568	388	373	588	215	115	114	0
530	1,211	1,704	493	408	639	231	152	151	-1

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
531	805	1,172	367	270	440	170	91	91	-1
532	1,688	1,479	-209	545	569	25	54	201	147
533	1,041	1,584	543	356	594	239	61	61	0
534	1,135	1,267	132	371	475	104	60	60	0
535	24,694	31,571	6,877	8,168	11,234	3,066	5,042	5,674	632
536	2,250	2,710	460	790	1,041	251	133	290	157
537	5,086	8,412	3,327	1,797	3,282	1,485	1,386	1,834	448
538	6,199	7,254	1,054	2,200	2,802	602	553	634	82
539	923	23,484	22,561	294	8,509	8,215	87	4,344	4,257
540	861	980	120	275	355	80	374	382	8
541	906	1,023	118	298	371	72	341	343	2
542	1,857	2,422	565	634	880	246	280	313	33
543	2,539	15,861	13,322	690	5,747	5,057	574	4,749	4,175
544	503	578	76	166	210	44	45	45	0
545	834	976	141	281	354	73	63	63	0
546	951	2,472	1,521	279	896	617	37	349	312
547	654	2,262	1,609	200	820	619	51	220	169
548	1,759	1,915	156	541	694	153	949	943	-5
549	387	469	82	131	170	39	249	248	-1
550	1,167	1,903	736	396	691	295	390	432	42
551	2,621	3,547	925	915	1,286	371	1,156	1,162	6
552	1,117	1,504	387	371	545	174	578	574	-3
553	6,113	16,137	10,024	2,147	6,268	4,121	2,383	6,775	4,392
554	986	1,173	187	301	425	124	306	305	-2
555	883	970	86	475	568	93	107	180	74
556	67	115	49	31	58	28	935	1,131	196
557	59	72	14	28	41	13	1,484	1,566	82
558	766	1,249	483	277	471	194	85	203	118
559	841	1,412	570	299	535	236	267	341	74
560	1,303	7,221	5,918	419	2,735	2,316	70	427	357
561	594	1,854	1,259	207	694	487	28	100	72
562	782	1,225	443	280	459	179	109	131	22
563	3,267	4,057	790	1,203	1,519	317	94	151	56
564	363	2,070	1,707	122	785	663	44	191	146
565	507	7,630	7,123	158	2,806	2,648	77	5,913	5,836
566	2,052	2,511	459	746	941	195	83	115	32
567	194	318	124	74	119	45	549	573	25
568	386	571	185	148	214	66	15	63	48
569	982	1,298	316	375	486	111	174	226	52
570	1,193	1,353	159	450	525	75	233	282	49
571	2,524	2,729	205	938	1,072	134	171	179	8
572	1,771	2,232	461	699	889	190	237	381	144
573	2,563	3,225	661	989	1,349	359	245	581	336
574	1,471	1,744	272	586	686	100	286	396	110
575	910	841	-70	297	333	35	110	153	44
576	2,527	2,863	336	861	1,097	235	232	322	90
577	722	661	-61	250	262	11	78	91	13
578	194	207	13	69	82	12	147	169	22
579	564	868	304	209	343	134	247	387	140
580	140	2,359	2,219	44	829	786	3	248	245
581	1,130	2,295	1,165	348	793	445	68	185	117
582	196	9,046	8,850	59	3,006	2,946	25	3,286	3,261
583	2,778	3,073	294	851	1,075	224	62	133	70

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
584	4,073	4,128	55	1,195	1,481	286	204	282	78
585	3,778	3,905	127	1,349	1,502	153	159	512	353
586	1,968	2,064	96	729	817	87	457	584	127
587	688	659	-29	240	261	21	68	101	32
588	637	769	132	229	303	74	64	105	40
589	1,356	1,298	-58	501	514	12	1,387	1,397	11
590	1,232	1,276	45	428	508	80	248	392	144
591	505	486	-18	189	192	3	4	5	1
592	572	554	-18	206	220	14	56	61	5
593	928	1,044	117	364	424	60	139	267	128
594	983	1,036	54	391	425	34	365	494	129
595	253	267	14	93	115	22	15	74	59
596	1,150	1,255	105	437	550	114	463	878	415
597	864	883	19	355	389	34	496	575	79
598	514	528	14	213	228	16	19	25	6
599	1,040	919	-121	406	410	4	10	12	2
600	1,556	1,511	-45	608	674	66	137	368	232
601	20	162	142	8	72	64	550	782	233
602	1,058	1,233	175	400	501	100	501	634	132
603	500	989	489	188	402	213	803	1,290	487
604	417	496	79	154	196	42	8	86	78
605	322	812	490	117	349	232	71	293	222
606	1,421	1,545	125	602	684	82	651	664	13
607	1,655	2,390	735	696	1,059	362	603	815	212
608	796	875	79	306	387	81	77	129	51
609	1,493	1,392	-101	560	565	5	104	106	1
610	1,542	1,693	151	638	688	50	1,004	1,064	61
611	1,875	2,219	344	851	958	107	1,968	2,108	139
612	678	803	125	274	329	55	321	398	78
613	715	770	55	283	319	36	126	132	7
614	983	957	-26	393	403	10	85	87	2
615	766	761	-5	320	320	0	286	286	-1
616	1,410	1,346	-64	583	597	14	59	63	4
617	1,520	1,523	2	615	675	60	236	261	25
618	1,279	2,381	1,102	518	1,056	539	28	151	122
619	1,725	2,074	350	698	920	222	62	110	47
620	2,914	3,129	215	1,197	1,314	117	132	164	33
621	3,100	3,495	395	1,299	1,487	188	232	385	153
622	1,134	1,743	609	461	775	315	116	440	324
623	2	4	2	1	2	1	575	1,038	463
624	10	782	772	4	358	354	46	1,534	1,488
625	70	977	907	28	442	414	2,528	3,837	1,309
626	129	369	239	54	158	104	577	905	328
627	765	924	159	322	399	77	1,425	1,491	66
628	1,173	1,255	82	490	556	66	764	847	83
629	738	758	20	288	338	50	288	407	119
630	107	98	-9	38	40	2	1,052	1,114	62
631	1,197	1,988	791	541	900	360	525	1,141	615
632	200	798	598	80	364	283	32	1,376	1,343
633	362	2,038	1,675	146	923	777	130	1,301	1,172
634	468	1,799	1,331	215	815	600	1,008	1,976	969
635	966	1,170	204	341	497	156	1,491	1,713	222
636	366	987	620	127	386	259	22	454	432

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
637	2,379	2,752	374	847	1,126	279	485	1,145	660
638	613	576	-37	220	253	33	16	54	38
639	1,653	1,809	156	599	774	175	839	1,070	231
640	1,435	1,505	70	522	647	125	311	500	189
641	534	540	6	217	232	15	52	69	17
642	964	1,970	1,007	382	847	465	62	1,950	1,887
643	275	1,164	888	102	500	398	1,215	2,681	1,467
644	1,234	1,115	-119	427	436	9	27	31	4
645	1,062	1,262	201	368	494	126	673	759	86
646	126	730	604	44	285	242	0	610	610
647	24	1,389	1,366	8	560	552	0	2,328	2,328
648	41	55	14	18	23	6	712	730	18
649	20	122	102	7	48	41	115	191	77
650	40	563	523	14	239	225	29	591	562
651	2,274	2,687	413	751	1,100	350	521	1,270	748
652	2,076	1,863	-214	618	774	157	980	1,489	510
653	23	125	102	10	54	43	41	210	169
654	276	333	57	118	143	25	441	541	100
655	77	256	180	27	110	83	335	650	315
656	828	1,100	272	369	473	103	742	1,150	409
657	356	574	218	143	247	104	1,184	1,584	401
658	213	294	80	83	126	43	346	516	171
659	126	231	105	47	90	43	423	588	165
660	692	971	279	282	353	71	520	768	248
661	1,152	1,168	16	365	424	59	41	58	17
662	1,761	4,800	3,039	545	1,744	1,199	162	501	339
663	1,082	2,805	1,724	388	1,086	698	101	695	594
664	1,152	1,268	115	391	460	69	507	571	64
665	651	825	175	233	319	86	18	69	51
666	1,242	1,547	305	452	571	119	635	972	337
667	399	668	269	171	287	116	240	708	468
668	246	472	226	87	203	115	234	690	456
669	365	779	415	157	330	172	1,243	1,872	629
670	696	727	31	297	306	10	93	126	32
671	645	682	37	275	288	13	73	98	24
672	378	434	56	160	183	23	106	132	26
673	497	935	438	163	396	233	70	678	608
674	14	635	621	5	269	264	0	602	602
675	2,216	2,348	132	846	994	148	243	430	187
676	118	284	166	40	89	49	104	223	118
677	0	200	200	0	77	77	18	916	898
678	1	200	199	1	91	90	219	1,312	1,093
679	18	55	38	7	25	18	501	1,395	894
680	0	1	1	0	0	0	0	0	0
681	245	1,577	1,332	88	668	580	334	1,208	875
682	835	1,655	820	277	701	424	38	748	709
683	574	894	320	188	379	191	51	285	234
684	897	1,113	216	406	541	134	1,023	1,063	40
685	967	986	19	441	479	38	286	368	82
686	163	354	191	71	172	101	167	447	280
687	272	336	64	108	163	56	924	1,047	122
688	145	203	59	52	79	27	3	18	15
689	1,661	2,029	368	550	785	235	89	213	124

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
690	509	811	302	194	314	120	57	69	12
691	1,140	2,210	1,070	361	855	494	79	238	158
692	312	882	570	97	342	245	195	272	77
693	569	745	176	174	290	117	35	66	31
694	5,637	5,649	13	2,182	2,484	302	464	629	165
695	732	769	37	331	374	42	132	189	57
696	109	134	25	47	52	5	1,442	1,434	-8
697	710	864	154	221	318	97	77	184	106
698	605	1,237	631	187	447	260	15	81	66
699	1,226	1,026	-200	370	371	1	224	224	0
700	596	1,114	519	191	412	220	214	379	165
701	1,254	1,537	284	377	556	179	12	143	131
702	144	862	718	52	365	314	510	1,007	497
703	417	566	149	138	205	67	233	404	170
704	3,284	3,501	216	967	1,273	306	238	406	168
705	457	982	526	144	364	220	136	196	61
706	328	1,044	716	111	380	270	64	159	95
707	1,478	1,326	-152	487	483	-4	609	605	-4
708	373	335	-38	123	122	-1	43	43	0
709	2,094	1,902	-191	699	798	99	594	647	54
710	919	1,785	866	309	676	367	72	162	90
711	953	1,635	682	341	618	277	222	354	132
712	635	1,666	1,031	229	631	402	58	122	63
713	293	352	59	110	143	33	7	101	94
714	2,730	3,119	389	1,680	2,128	449	1,686	3,066	1,380
715	3,864	3,708	-156	2,032	2,214	182	2,780	3,047	267
716	2,004	1,653	-351	741	737	-3	193	192	-1
717	760	1,424	664	324	634	310	1,412	1,583	171
718	3,143	3,252	110	1,608	1,730	122	2,156	2,358	201
719	722	851	128	364	385	21	1,995	2,003	7
720	4,293	4,225	-68	1,841	1,884	44	788	847	59
721	1,070	1,273	203	439	528	89	268	355	87
722	1,857	2,255	398	704	876	172	390	651	261
723	1,838	1,834	-4	733	751	18	368	374	6
724	2,122	1,979	-143	877	897	19	171	175	4
725	647	977	331	320	442	122	2,295	2,592	297
726	1,054	1,601	546	492	720	228	715	1,347	631
727	742	1,711	969	323	737	414	1,665	2,340	675
728	415	3,479	3,064	186	1,359	1,174	2,982	4,882	1,900
729	664	700	36	249	275	26	4,854	4,871	17
730	1,052	1,437	385	403	557	154	696	908	212
731	631	980	349	241	375	134	338	426	88
732	2,061	2,052	-9	739	769	30	165	167	2
733	1,651	1,543	-108	568	572	4	119	118	-1
734	1,317	1,424	107	465	528	64	261	332	71
735	1,417	1,635	218	506	590	84	205	233	28
736	2,180	2,638	457	808	983	176	204	325	121
737	2,182	2,532	350	857	998	142	421	486	65
738	1,532	1,895	363	582	709	126	200	321	121
739	2,285	2,931	646	924	1,146	222	851	1,113	261
740	1,714	2,067	353	652	799	147	774	925	151
741	1,361	1,316	-45	533	558	24	1,150	1,178	27
742	591	1,041	450	259	441	182	538	786	248

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population 1994	Population 2017	Population Change	Households 1994	Households 2017	Households Change	Nonfarm Employment 1994	Nonfarm Employment 2017	Nonfarm Employment Change
743	1,576	1,771	195	577	683	106	574	670	96
744	593	996	402	246	417	171	258	460	202
745	1,286	1,521	236	543	638	95	389	501	112
746	738	954	216	296	387	91	531	708	177
747	1,753	1,688	-65	749	759	11	784	804	21
748	498	509	12	196	206	11	206	207	1
749	1,266	1,402	136	500	567	68	36	62	26
750	1,150	1,565	414	447	629	182	433	577	144
751	353	349	-4	145	148	3	97	98	0
752	583	565	-18	212	213	1	13	14	1
753	544	557	13	224	236	12	184	185	1
754	535	519	-16	202	200	-2	19	19	0
755	1,234	1,624	389	487	667	180	68	193	125
756	1,558	1,911	352	595	715	121	173	298	125
757	707	677	-30	260	262	2	2	3	1
758	645	768	122	236	296	59	4	15	11
759	1,282	1,407	124	481	550	68	366	464	98
760	797	1,423	626	309	562	253	116	357	241
761	799	885	86	319	359	39	44	51	7
762	1,762	1,781	18	707	747	40	272	293	20
763	426	717	291	269	425	157	4,832	5,514	682
764	593	571	-22	311	339	27	2,550	3,741	1,191
765	2,287	2,487	200	1,359	1,489	130	4,646	6,243	1,597
766	4,517	4,279	-238	2,259	2,452	193	2,613	2,915	302
767	2,404	2,214	-189	919	946	27	558	583	25
768	1,987	1,707	-280	704	729	25	334	337	3
769	2,276	2,145	-130	1,070	1,093	23	5,216	5,196	-20
770	3,448	3,551	103	1,510	1,629	119	1,337	1,428	91
771	2,007	2,202	196	835	924	89	996	1,070	74
772	3,647	3,994	347	1,467	1,624	157	1,286	1,424	137
773	3,181	3,618	437	1,249	1,458	208	986	1,274	288
774	6,632	6,374	-258	2,814	2,914	101	1,307	1,331	24
775	2,231	3,033	802	912	1,227	315	621	967	346
776	4,113	4,062	-51	1,620	1,749	129	709	755	46
777	1,447	1,479	32	651	710	59	643	692	49
778	2,117	2,110	-6	868	925	57	362	449	87
779	2,271	2,568	297	1,114	1,242	127	650	795	145
780	2,824	2,869	46	1,206	1,320	113	1,581	1,732	151
781	400	509	109	305	349	43	2,992	3,930	937
782	0	0	0	0	0	0	1,718	2,044	326
783	1,978	1,688	-290	1,132	1,110	-23	2,819	3,661	841
784	1,589	1,435	-154	789	836	46	1,098	1,172	74
785	2,224	2,141	-83	1,133	1,171	38	740	806	67
786	2,158	2,325	167	1,216	1,270	53	966	1,050	84
787	2,217	2,157	-60	1,043	1,122	79	1,067	1,194	127
788	0	0	0	0	0	0	613	953	340
789	408	1,257	849	168	577	409	2,107	2,563	456
790	865	862	-2	406	443	37	1,852	2,351	500
791	2,324	2,181	-144	1,006	1,048	42	453	516	63
792	567	731	163	236	335	100	4,500	4,620	119
793	890	884	-6	372	406	34	1,335	1,603	267
794	1,513	1,703	190	678	785	107	911	1,116	205
795	684	1,368	683	325	638	314	3,557	4,440	883

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
796	1,976	1,989	13	925	1,018	93	1,581	1,699	119
797	1,766	1,687	-79	720	776	57	663	730	67
798	2,674	2,584	-91	1,129	1,210	81	598	709	112
799	3,374	3,481	107	1,426	1,544	117	762	918	157
800	2,803	2,919	116	1,134	1,242	108	282	444	162
801	1,784	1,956	172	752	840	89	995	1,090	95
802	3,150	3,476	326	1,398	1,571	172	1,310	1,443	133
803	3,595	3,777	182	1,660	1,780	120	198	249	51
804	2,163	2,255	92	895	956	61	147	165	18
805	2,018	2,140	122	770	841	71	703	749	46
806	1,949	1,965	16	744	781	36	209	227	18
807	1,290	1,368	78	553	570	17	36	43	7
808	1,723	1,758	35	707	730	23	317	324	7
809	1,939	2,150	211	794	852	58	629	637	8
810	1,643	1,680	37	650	655	6	116	124	9
811	1,449	1,722	274	595	712	118	383	555	172
812	952	1,435	484	382	552	171	949	1,178	229
813	943	1,969	1,026	398	758	361	628	1,135	507
814	1,008	1,534	526	513	644	131	718	829	111
815	757	986	229	302	418	116	961	1,077	116
816	248	383	135	97	166	69	40	71	30
817	323	717	393	157	312	154	562	660	98
818	507	576	69	236	238	2	40	40	0
819	1,652	1,964	311	617	724	107	276	448	172
820	1,872	2,272	400	701	860	159	147	278	132
821	3,448	3,531	83	1,334	1,405	71	96	183	86
822	1,316	1,484	168	562	593	32	255	296	40
823	1,502	1,492	-10	578	582	4	57	58	1
824	2,214	2,385	171	859	936	77	37	93	55
825	2,339	2,654	315	945	1,077	132	578	704	126
826	1,058	1,161	104	462	479	17	146	147	1
827	1,422	1,378	-44	624	671	47	181	187	6
828	1,999	2,170	171	812	909	97	731	828	97
829	1,168	922	-247	445	443	-2	617	613	-4
830	1,211	1,248	37	632	697	65	1,268	1,355	87
831	1,268	1,571	302	637	783	147	330	457	127
832	2,437	2,596	159	1,219	1,299	80	553	646	93
833	1,281	1,324	42	550	639	89	479	535	56
834	1,075	1,228	152	500	593	93	607	738	131
835	2,880	2,797	-83	1,240	1,350	110	1,067	1,170	103
836	2,044	1,981	-63	901	991	90	392	608	216
837	129	200	71	47	81	34	393	418	25
838	1,781	1,587	-194	635	645	10	117	118	1
839	2,098	1,901	-197	767	772	5	112	111	-1
840	167	174	6	61	71	9	79	79	0
841	1,881	2,368	488	716	899	183	2,585	2,612	27
842	2,208	2,402	194	852	910	58	103	111	8
843	2,310	2,584	274	870	987	117	114	141	28
844	1,895	2,822	927	713	1,062	350	369	624	256
845	1,850	1,949	99	694	720	26	182	199	17
846	0	0	0	0	0	0	690	2,147	1,456
847	215	1,447	1,233	205	864	660	10,154	17,438	7,284
848	618	935	316	326	558	232	1,511	3,095	1,583

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
849	16	337	320	13	253	241	6,379	9,164	2,785
850	1,310	2,005	695	506	784	278	910	1,144	234
851	607	973	366	234	357	123	1,553	1,881	328
852	100	99	-2	40	40	-1	9,868	11,055	1,187
853	1,419	1,860	442	623	768	145	205	307	102
854	1,565	1,369	-196	575	572	-3	143	142	-1
855	2,045	1,702	-344	722	719	-3	205	205	0
856	2,188	1,818	-371	780	824	44	524	600	76
857	3,753	3,461	-292	1,451	1,500	48	617	665	48
858	1,854	1,600	-254	653	677	24	70	75	5
859	2,021	1,855	-166	744	754	9	416	419	3
860	1,703	1,678	-25	650	660	11	140	142	2
861	1,280	1,663	382	472	604	132	190	306	116
862	940	1,113	174	357	369	12	291	294	2
863	552	701	149	188	234	46	102	145	43
864	627	608	-19	225	240	15	2,862	1,987	-874
865	532	803	271	241	315	74	220	303	83
866	781	900	120	281	303	22	32	37	5
867	1,456	1,734	277	521	593	72	289	320	31
868	1,466	1,777	311	487	593	106	500	608	108
869	2,217	2,310	93	769	811	42	177	232	56
870	4,593	4,210	-383	1,643	1,685	42	156	233	77
871	2,735	2,823	88	1,095	1,210	115	377	446	69
872	2,506	2,889	383	990	1,160	170	463	493	30
873	3,863	4,077	215	1,455	1,582	126	239	389	150
874	2,331	2,779	447	847	963	116	131	274	144
875	1,279	1,713	434	459	580	120	709	842	133
876	1,619	1,898	280	657	698	40	266	315	49
877	626	788	162	290	292	2	820	820	0
878	667	769	103	260	296	36	49	92	43
879	1,706	1,685	-21	679	684	5	212	215	3
880	2,293	2,229	-64	914	922	8	114	118	5
881	511	719	209	198	288	89	86	178	92
882	382	414	33	154	156	2	126	125	-1
883	1,475	1,502	27	569	571	2	73	74	1
884	1,441	1,715	273	530	646	116	310	506	196
885	2,940	2,972	32	1,025	1,084	58	138	146	9
886	3,013	3,040	27	1,116	1,126	10	298	299	0
887	1,172	1,331	159	464	503	39	11	22	11
888	1,806	3,007	1,201	660	1,121	461	319	744	426
889	3,580	4,261	680	1,397	1,688	292	691	852	160
890	3,032	2,777	-255	1,166	1,221	56	384	442	58
891	4,369	4,137	-232	1,692	1,759	67	583	690	107
892	5,959	7,310	1,351	2,434	2,940	506	2,750	3,258	508
893	722	1,403	682	331	573	242	757	1,164	408
894	211	208	-3	79	95	16	1,171	1,671	500
895	14	172	157	6	79	73	2,334	2,447	113
896	21	17	-4	8	8	0	1,327	1,505	178
897	1	1	0	1	1	0	265	459	194
898	30	22	-8	11	11	0	454	693	239
899	23	19	-4	9	9	0	682	901	218
900	14	12	-2	5	5	0	1,893	2,060	167
901	19	117	98	7	50	42	706	1,251	545

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
902	5	0	-5	2	0	-2	3,197	8,328	5,131
903	1	82	81	0	34	34	590	836	246
904	34	0	-34	16	0	-16	4,233	6,088	1,855
905	29	25	-4	13	13	0	3,406	3,703	297
906	2,691	3,115	424	969	1,147	178	1,517	1,869	351
907	36	245	209	18	133	114	931	1,258	326
908	677	1,535	858	340	831	491	3,332	4,774	1,443
909	1,070	1,372	302	574	840	266	961	1,311	350
910	515	567	52	261	307	46	1,920	3,537	1,617
911	632	1,244	612	362	761	399	445	975	530
912	1	1	0	1	1	0	824	878	54
913	1,270	1,716	445	514	667	153	239	369	130
914	457	1,108	650	200	462	262	596	869	273
915	762	1,544	782	317	642	325	1,137	1,511	373
916	2,843	3,290	447	1,190	1,295	105	435	566	131
917	1,939	2,107	168	724	769	46	579	666	88
918	2,279	2,167	-113	780	788	9	380	495	115
919	2,158	2,402	244	879	938	59	92	122	30
920	5,201	6,338	1,137	2,054	2,510	456	1,907	2,315	408
921	4,330	4,654	325	1,526	1,632	106	399	446	47
922	5,153	6,331	1,179	2,155	2,536	381	3,259	3,683	424
923	4,778	5,341	563	1,758	1,951	193	346	555	209
924	2,979	3,507	528	1,142	1,344	201	917	1,546	629
925	29	0	-29	11	0	-11	4,591	9,912	5,321
926	48	43	-5	26	25	-1	1,913	4,618	2,705
927	17	1	-16	9	0	-9	0	837	837
928	271	296	25	124	123	-1	1,755	2,753	998
929	797	2,033	1,236	349	901	552	5,530	5,869	339
930	2,820	5,413	2,593	1,108	2,263	1,155	598	565	-33
931	588	997	409	204	448	244	65	65	0
932	53	230	176	22	100	78	1,872	2,140	268
933	84	110	26	30	51	21	630	955	325
934	143	174	31	56	78	22	223	337	114
935	535	470	-66	207	226	19	515	602	86
936	8	83	75	3	31	28	168	335	167
937	21	254	233	8	92	84	41	575	534
938	1,167	1,235	68	457	527	69	661	811	150
939	466	460	-6	174	193	19	172	251	79
940	125	163	38	54	96	41	616	1,091	475
941	1,203	1,092	-111	428	457	29	246	274	28
942	264	353	89	91	135	44	1,859	2,064	205
943	1,915	1,848	-67	667	759	92	162	210	48
944	527	476	-51	237	254	17	592	619	28
945	4,807	4,991	184	2,280	2,568	288	960	1,466	506
946	648	634	-15	362	406	44	1,611	1,720	109
947	449	528	80	256	339	83	2,029	2,303	274
948	87	276	189	51	177	126	1,162	2,624	1,462
949	54	84	30	21	56	34	2,981	3,594	613
950	0	0	0	0	0	0	220	265	45
951	330	750	420	118	286	167	194	351	157
952	448	824	376	164	320	155	208	303	95
953	1,026	959	-67	368	377	9	385	388	3
954	775	1,546	771	306	613	307	286	505	218

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
955	994	1,098	103	424	432	9	134	151	17
956	710	701	-8	275	282	7	11	21	9
957	1,180	1,295	115	472	510	38	156	172	16
958	905	900	-5	351	376	25	536	553	18
959	1	1	0	1	1	0	121	189	69
960	7	7	-1	4	4	0	57	61	4
961	337	356	19	193	244	51	1,828	1,885	58
962	4,330	4,775	445	3,012	3,679	667	5,169	6,185	1,016
963	57	0	-57	26	0	-26	505	6,883	6,378
964	154	352	198	70	148	78	1,771	2,019	248
965	6	7	1	3	3	0	2,639	2,869	230
966	454	485	32	168	174	5	192	215	23
967	1,298	1,466	168	483	554	71	91	113	21
968	126	122	-3	58	57	-1	1,270	1,514	244
969	43	43	-1	20	20	0	1,387	1,514	127
970	255	193	-62	99	91	-8	1,534	2,541	1,007
971	0	0	0	9	0	-9	3,732	2,886	-846
972	374	342	-32	319	285	-34	2,645	2,786	141
973	73	212	139	36	178	142	1,721	1,006	-715
974	180	172	-9	103	144	41	2,378	1,445	-933
975	374	299	-75	181	251	70	2,269	2,155	-114
976	94	220	126	81	183	102	3,058	2,287	-771
977	641	476	-166	255	229	-26	863	885	22
978	1,073	769	-304	421	371	-51	137	450	314
979	845	933	88	412	450	38	605	874	269
980	474	238	-236	231	133	-98	2,115	2,253	138
981	712	516	-196	355	302	-52	271	566	295
982	1,834	1,556	-278	762	732	-31	2,335	4,031	1,696
983	596	933	337	237	447	210	354	901	548
984	633	485	-148	251	233	-19	125	151	26
985	662	566	-96	308	273	-35	272	525	253
986	586	430	-155	239	241	2	506	614	109
987	520	340	-181	204	190	-14	2	35	32
988	811	698	-113	342	336	-6	319	344	25
989	490	179	-311	267	100	-166	1,938	1,787	-151
990	305	306	1	201	171	-29	41	64	23
991	1,056	901	-156	412	394	-17	52	805	754
992	1,189	1,169	-20	504	573	69	1,095	1,107	12
993	195	215	20	127	120	-6	711	738	28
994	767	742	-24	274	325	51	93	136	43
995	433	487	54	158	216	57	48	76	29
996	944	758	-185	339	334	-6	120	184	64
997	774	773	0	292	345	53	43	93	50
998	301	469	167	108	205	98	23	52	29
999	40	25	-15	27	12	-15	2,158	5,341	3,183
1000	7	5	-2	3	3	0	2,377	3,337	960
1001	253	349	96	107	163	57	14	39	24
1002	1,037	1,630	593	372	751	379	43	154	111
1003	317	1	-316	173	1	-172	2,884	2,635	-249
1004	492	1,285	793	261	668	407	61	155	94
1005	114	28	-87	62	18	-44	1,146	1,050	-96
1006	1,143	1,085	-58	635	652	17	1,474	1,591	117
1007	721	676	-44	283	309	26	340	358	18

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
1008	1,210	1,150	-60	517	548	31	464	513	49
1009	928	1,012	84	384	465	81	111	177	66
1010	750	678	-72	283	314	31	266	318	52
1011	1,335	2,420	1,086	448	1,090	642	34	197	163
1012	839	684	-156	341	312	-29	224	306	82
1013	339	298	-42	150	148	-2	1,520	1,488	-32
1014	2,133	1,864	-268	803	801	-2	422	522	100
1015	1,684	1,384	-300	693	650	-44	126	271	145
1016	1,715	1,762	47	678	793	116	292	1,008	716
1017	2	0	-2	1	0	-1	1,141	1,074	-67
1018	12	0	-12	6	0	-6	971	895	-76
1019	787	646	-141	379	389	10	87	146	59
1020	638	607	-31	264	290	26	81	130	49
1021	1,372	1,168	-204	677	648	-29	16	121	106
1022	1,424	1,366	-58	709	725	16	174	274	100
1023	570	488	-82	252	244	-8	449	493	44
1024	1,821	1,661	-160	833	741	-92	1,466	1,459	-7
1025	1,528	1,782	254	577	818	241	2,259	2,296	37
1026	2,308	2,255	-53	809	1,035	225	227	1,267	1,041
1027	821	685	-136	394	412	18	242	275	33
1028	1,089	1,232	143	550	688	138	600	717	116
1029	1,615	1,079	-536	741	575	-166	348	421	73
1030	58	6	-51	27	3	-23	1,587	1,450	-137
1031	74	0	-74	25	0	-25	1,847	1,983	136
1032	1,120	1,118	-2	357	513	156	87	160	72
1033	815	589	-226	259	270	10	8	68	60
1034	1,476	1,180	-296	465	542	76	72	151	79
1035	1,655	1,189	-466	572	535	-37	243	403	160
1036	512	1,280	768	186	575	389	147	1,122	975
1037	1,869	1,555	-314	696	698	2	24	137	113
1038	669	570	-99	273	286	13	107	148	41
1039	1,099	884	-215	467	428	-39	168	242	74
1040	1,495	1,439	-56	695	704	9	372	490	119
1041	1,217	913	-304	477	447	-30	181	238	57
1042	1,228	1,342	113	458	662	204	83	291	209
1043	1,102	1,388	286	474	695	222	653	806	153
1044	1,480	1,706	225	633	766	133	209	521	312
1045	432	303	-129	185	136	-48	400	585	185
1046	518	20	-498	206	10	-196	1,088	1,952	864
1047	596	609	14	237	299	62	140	768	627
1048	954	2,117	1,163	355	1,010	655	2,131	2,595	464
1049	659	1,145	486	262	561	300	3,455	3,237	-218
1050	673	546	-127	276	270	-6	26	72	46
1051	727	756	29	306	366	60	19	75	56
1052	510	355	-155	225	172	-53	122	165	43
1053	292	475	183	104	228	124	0	19	19
1054	1,091	1,023	-69	391	491	101	270	416	147
1055	652	1,127	474	225	506	281	139	202	63
1056	514	1,205	691	179	541	362	16	95	80
1057	1,386	1,327	-59	449	596	147	361	757	396
1058	129	314	185	47	151	103	1,363	1,279	-84
1059	1,538	1,293	-245	548	621	73	297	849	552
1060	1,389	1,461	71	543	650	107	179	293	114

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
1061	1,419	2,245	827	562	1,008	446	139	279	140
1062	980	3,458	2,477	342	1,525	1,183	195	397	201
1063	1,481	2,868	1,387	568	1,354	785	319	715	396
1064	671	1,070	399	266	525	258	2	156	153
1065	573	870	297	219	371	152	107	459	352
1066	820	1,363	543	307	581	275	1,272	1,260	-12
1067	1,024	1,429	405	354	610	255	92	178	86
1068	1,379	1,834	454	523	853	330	362	467	105
1069	1,028	1,328	300	405	579	174	437	815	377
1070	212	154	-58	81	67	-13	261	1,659	1,398
1071	789	1,326	538	361	637	276	985	1,019	34
1072	491	1,227	736	225	589	364	406	728	322
1073	1,204	1,334	130	555	641	86	1,590	1,607	16
1074	287	549	261	132	264	131	122	1,629	1,506
1075	318	227	-91	144	97	-47	1,306	1,584	278
1076	733	3,080	2,347	265	1,353	1,088	906	1,258	352
1077	1,026	1,295	269	369	569	200	209	984	775
1078	1,876	2,494	618	671	1,095	424	757	874	117
1079	1,033	2,927	1,894	369	1,286	917	43	366	322
1080	121	183	62	43	87	44	260	401	141
1081	1,380	1,924	544	517	845	329	343	511	168
1082	2,730	3,255	525	879	1,428	549	125	340	216
1083	473	769	296	167	364	198	272	605	333
1084	397	799	402	171	320	149	698	1,312	615
1085	1,079	853	-226	395	404	9	71	154	83
1086	894	675	-219	314	320	6	34	82	48
1087	774	1,080	306	371	510	138	424	552	127
1088	294	547	254	129	260	131	606	673	67
1089	1,016	968	-49	325	414	89	125	177	53
1090	1,138	1,057	-81	469	453	-17	95	158	64
1091	25	32	8	11	14	3	978	902	-76
1092	1,056	1,342	286	366	573	206	155	229	74
1093	1,761	1,328	-432	562	569	7	18	109	91
1094	1,106	1,406	300	375	602	227	103	185	82
1095	863	559	-304	386	239	-146	261	496	235
1096	2,759	5,971	3,213	914	2,321	1,408	68	509	440
1097	2,198	3,141	944	666	1,222	557	195	384	188
1098	1,676	1,668	-8	556	789	233	4	139	135
1099	660	668	8	275	316	41	442	571	128
1100	1,610	1,355	-255	679	641	-38	60	157	97
1101	357	331	-26	126	157	30	2	28	25
1102	1,324	3,281	1,957	416	1,276	859	40	349	309
1103	1,342	3,856	2,514	421	1,499	1,078	135	350	214
1104	516	1,266	751	172	599	427	16	103	88
1105	1,720	2,625	904	691	1,143	452	159	719	560
1106	2,096	2,446	349	845	1,065	220	629	973	344
1107	1,156	3,648	2,492	466	1,589	1,123	477	1,379	902
1108	783	1,306	523	316	569	253	24	110	86
1109	279	635	355	113	276	164	116	1,136	1,020
1110	408	455	47	136	198	62	11	41	31
1111	360	399	38	120	174	54	43	66	23
1112	410	377	-33	136	164	28	28	65	38
1113	294	341	47	98	148	50	138	148	10

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
1114	228	430	202	75	156	81	35	55	20
1115	330	1,079	750	109	392	283	54	105	51
1116	423	3,821	3,398	139	1,386	1,247	641	1,646	1,004
1117	1,342	1,710	368	436	620	185	650	751	101
1118	356	4,097	3,741	121	1,487	1,366	29	965	936
1119	690	1,200	510	240	435	195	24	89	65
1120	748	1,012	264	325	533	209	36	116	80
1121	2,086	1,519	-567	708	782	74	151	261	110
1122	2,364	2,006	-358	998	1,033	35	96	252	156
1123	2,013	1,041	-973	636	559	-78	38	125	87
1124	2,406	2,200	-206	1,147	1,183	36	180	1,086	906
1125	685	156	-529	275	76	-200	1,246	1,100	-147
1126	1,715	1,352	-363	678	656	-22	1,677	1,409	-268
1127	2,646	2,644	-2	961	1,283	322	563	788	225
1128	2,545	1,790	-755	948	872	-76	102	1,374	1,272
1129	1,270	2,185	916	455	955	500	1,425	1,628	203
1130	1,442	1,149	-294	469	502	33	393	811	418
1131	1,409	1,662	253	468	702	234	169	959	790
1132	2,853	2,857	4	948	1,206	259	151	522	371
1133	873	1,128	254	283	493	210	62	132	70
1134	456	308	-148	147	135	-12	41	544	503
1135	2,068	2,530	462	687	1,068	381	28	237	210
1136	537	2,151	1,614	199	940	742	129	421	291
1137	1,390	2,111	721	515	923	408	13	210	197
1138	1,893	1,681	-213	564	709	145	484	680	196
1139	1,484	1,559	75	509	675	165	1,238	1,646	408
1140	825	875	50	278	379	101	412	981	569
1141	1,991	1,345	-646	590	582	-7	35	146	111
1142	3,443	3,453	10	1,008	1,166	158	58	284	226
1143	1,525	2,001	476	607	866	259	2,266	1,168	-1,098
1144	1,702	2,390	688	625	1,034	409	67	260	193
1145	3,804	4,349	545	1,174	1,466	292	217	1,305	1,088
1146	181	167	-14	82	72	-10	79	1,225	1,145
1147	308	1,141	833	139	506	366	261	922	660
1148	677	497	-180	213	167	-46	95	3,585	3,490
1149	416	676	259	189	297	108	1,826	2,012	186
1150	100	2	-98	36	1	-35	476	1,384	908
1151	539	531	-8	173	234	60	56	346	290
1152	1,364	1,370	6	476	601	124	52	235	183
1153	979	1,380	402	314	462	148	76	142	66
1154	987	850	-137	317	286	-31	490	1,008	518
1155	820	618	-202	273	210	-63	418	1,202	784
1156	1,348	1,406	59	451	478	27	334	461	126
1157	1,312	2,611	1,299	452	938	485	218	768	550
1158	548	1,769	1,221	163	670	507	153	813	659
1159	3,104	3,935	831	916	1,319	404	1,033	2,378	1,345
1160	2,208	1,803	-405	653	619	-33	872	1,841	968
1161	5,153	7,097	1,944	1,571	2,426	855	70	659	589
1162	1,523	2,481	957	467	942	475	227	1,253	1,026
1163	1,825	2,359	533	513	871	358	303	408	105
1164	717	1,581	864	245	576	332	104	233	128
1165	321	919	598	109	335	226	52	95	44
1166	1,438	2,537	1,100	497	964	467	356	586	230

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
1167	1,240	3,159	1,918	432	1,198	766	174	338	165
1168	780	763	-18	277	289	12	54	95	41
1169	726	735	9	228	269	40	17	52	36
1170	601	432	-169	206	157	-48	10	35	25
1171	371	664	293	122	235	113	70	111	42
1172	713	781	69	211	284	74	222	293	71
1173	855	611	-244	318	223	-96	120	188	69
1174	703	1,778	1,075	246	633	386	152	231	79
1175	1,714	1,921	207	463	651	188	128	217	88
1176	1,386	1,677	291	412	576	164	87	202	115
1177	2,523	4,008	1,485	795	1,398	603	143	342	200
1178	872	2,113	1,241	292	764	471	165	262	96
1179	214	2,023	1,810	61	684	623	16	107	91
1180	841	1,169	328	299	423	123	73	131	58
1181	1,594	2,362	768	495	854	359	71	199	128
1182	1,113	2,050	937	356	759	403	46	157	112
1183	825	3,994	3,169	234	1,424	1,190	227	533	306
1184	1,194	2,811	1,616	456	1,186	730	268	1,573	1,305
1185	457	2,142	1,685	157	803	646	23	1,117	1,094
1186	183	473	290	59	221	162	55	2,727	2,672
1187	340	4,925	4,585	116	1,788	1,672	7	3,556	3,548
1188	321	2,888	2,567	107	1,048	941	8	157	149
1189	1,126	1,640	514	351	596	245	43	122	79
1190	527	2,554	2,027	188	927	740	77	200	123
1191	1,269	1,786	517	437	658	221	34	129	96
1192	2,041	7,017	4,976	720	2,698	1,978	171	548	376
1193	1,137	5,901	4,764	415	2,300	1,885	198	741	543
1194	755	2,665	1,909	288	1,160	872	73	455	382
1195	1,582	1,663	80	584	659	76	310	509	199
1196	1,103	10,205	9,102	367	3,866	3,499	65	1,504	1,439
1197	123	3,548	3,425	40	1,289	1,249	8	2,077	2,069
1198	97	1,806	1,708	32	842	810	520	6,131	5,611
1199	1,732	1,966	234	623	919	295	1,625	1,719	94
1200	781	2,434	1,654	297	1,137	841	35	944	909
1201	345	2,050	1,706	130	958	828	13	1,087	1,074
1202	185	766	581	70	346	276	153	250	97
1203	451	4,087	3,636	166	1,566	1,400	41	189	148
1204	313	388	75	121	152	30	5	1,706	1,701
1205	1,112	2,398	1,286	420	937	517	3,435	3,129	-306
1206	767	582	-186	333	264	-69	2,048	1,209	-839
1207	1,055	948	-106	432	431	-2	887	2,347	1,460
1208	2,115	2,480	365	885	1,024	139	340	831	490
1209	1,487	1,531	44	559	620	61	2,127	3,405	1,278
1210	992	1,735	743	346	702	356	86	184	97
1211	1,364	1,771	407	454	657	203	97	2,150	2,053
1212	2,407	4,288	1,881	812	1,595	783	434	1,693	1,260
1213	333	3,227	2,895	107	1,200	1,093	70	1,067	998
1214	345	3,163	2,818	110	1,176	1,066	23	182	159
1215	1,314	2,275	961	421	846	425	87	345	257
1216	156	290	134	50	108	58	5	28	23
1217	507	429	-78	163	160	-3	113	129	16
1218	326	464	137	111	161	50	23	45	23
1219	651	827	175	221	287	66	123	156	33

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
1220	353	1,207	854	120	432	312	23	84	61
1221	418	2,349	1,931	142	814	672	515	631	115
1222	470	363	-107	160	139	-21	23	97	74
1223	274	306	32	94	114	20	20	36	15
1224	935	1,123	189	315	398	83	219	263	43
1225	819	3,775	2,956	274	1,308	1,034	167	392	225
1226	2,135	2,879	743	727	997	271	928	1,487	560
1227	286	419	133	94	153	59	29	1,052	1,024
1228	553	637	84	190	237	47	53	85	32
1229	652	1,008	356	225	375	150	55	92	37
1230	1,096	1,590	494	371	566	195	143	216	73
1231	438	4,675	4,237	145	1,620	1,475	161	727	566
1232	1,881	3,579	1,698	625	1,240	615	1,238	1,201	-37
1233	455	1,974	1,519	151	684	533	29	145	116
1234	458	1,238	780	152	429	277	64	120	57
1235	1,220	1,659	439	372	575	203	70	137	67
1236	1,121	1,981	859	406	672	265	23	127	104
1237	1,467	2,000	532	393	678	285	5	108	103
1238	1,543	2,052	509	465	695	231	43	148	104
1239	366	531	165	138	180	42	107	125	18
1240	812	1,596	783	281	580	299	159	254	94
1241	4,009	6,250	2,240	1,171	2,228	1,057	119	451	333
1242	1,826	3,228	1,401	601	1,133	531	54	207	153
1243	3,394	6,633	3,239	1,097	2,327	1,230	326	765	439
1244	5,419	10,047	4,628	1,911	3,582	1,671	230	620	389
9999	13,129	14,359	1,230	4,660	5,864	1,204	3,435	4,084	648
Region	**1,565,800**	**2,271,100**	**705,300**	**604,400**	**947,300**	**342,900**	**955,600**	**1,536,500**	**580,900**

Exhibit B

Mix of Housing Types and Actual Density
1992-1996

Mix of Housing Types				
Year[1]	Single family Units[2]	Manufactured Homes	Multi-family Units	Total Units 1992-1996
1992	4,421	128	2,153	6,702
1993	4,361	413	1,415	6,189
1994	5,042	396	2,672	8,110
1995	5,687	589	5,200	11,476
1996	5,388	363	4,085	9,836
Total	24,899	1,889	15,525	42,313
Housing Mix % of Total[3]	58.8%	4.5%	36.7%	100%

Actual Density per Gross Acre[4]			
Gross Residential Land Developed 1992-1997[5]	Single-family residential units[6] **8,215** acres	Multi-family units **1,386** acres	Total Residential Land Developed **9,601** acres
Average Gross Density by Housing Type[7]	Single family **3.3** units per gross acre	Multi-family **11.2** units per gross acre	
Average Gross Density of All Housing Types[8]	**4.4** units per gross acre		

Actual Density per Net Acre[9]			
Net Residential Land Developed 1992-1997	Single-family residential units **4,246** acres	Multi-family units **768** acres	Total Residential Land Developed **5,015** acres
Average Net Density by Housing Type	Single family **6.6** units per net acre	Multi-family **17.3** units per net acre	
Average Net Density of All Housing Types	**8.6** units per net acre		

Source: Residential Building Permit Data from *Baseline Urban Growth Data*, (Metro), April 1997, p. 16.; RLIS Database, Metro 12/2/97

[1]Calendar year

[2]Includes detached and attached (rowhouses, townhouses, etc.) single-family units.

[3]Calculated by dividing units (by type) by the total number of units (41,339).

[4]Gross Acres do not include an allowance for environmentally constrained land, streets, parks, schools and other public facilities.

[5]Vacant land (9/92) minus vacant land (9/97). The building permit data leads land consumption data by 6 months, consistent with procedures that remove land from vacant land inventory only when building construction occurs.

[6]Includes land used for both attached & detached single-family units, and manufactured homes.

[7]Calculated by dividing total number of units in each category by total developed acres in each category.

[8]Calculated by dividing total number of units by total residential land developed.

[9]Net acres have environmentally constrained land removed and reduction for streets, parks, schools, churches and other public facilities (using assumption from the Urban Growth Report, Dec. 1997, p.15).

Exhibit B
Building Permit Data
1992-1996

Housing Types: 1992-1996
by Jurisdiction and by Region

	Number of Units															Total # of Units 1992-1996			'92-'96
	1992			*1993*			*1994*			*1995*			*1996*						
Jurisdiction	SF	MF	MH	SF	MF	MH	SF	MF	MH	SF	MF	MH	SF	MF	MH	SF	MF	MH	TOTAL
Uninc.Clackamas Co.	314	546	125	312	55	103	355	247	77	364	452	84	206	330	1	1,551	1,630	390	3,571
Uninc. Multnomah Co.	18	0	0	15	0	0	16	0	3	53	0	2	0	0	0	102	0	5	107
Uninc. Washington Co.	1,011	245	0	946	10	75	1,099	14	69	1,249	491	69	295	44	4	4,600	804	217	5,621
Beaverton	429	47	0	195	18	32	210	0	0	289	431	22	390	609	37	1,513	1,105	91	2,709
Cornelius	33	0	0	50	0	1	107	2	4	86	7	3	42	0	40	318	9	48	375
Durham	0	0	0	0	3	0	24	0	0	16	0	0	0	0	0	40	3	0	43
Fairfiew	21	0	0	2	0	1	0	126	0	86	0	0	48	313	0	157	439	1	597
Forest Grove	41	9	3	20	2	10	24	36	18	66	57	2	169	72	14	320	176	47	543
Gladstone	11	0	0	18	4	4	21	14	2	11	0	0	26	15	2	87	33	8	128
Gresham	274	234	0	277	367	29	355	481	68	259	442	93	252	94	52	1,417	1,618	242	3,277
Happy Valley	63	0	0	42	0	0	94	0	0	45	0	0	98	0	0	342	0	0	342
Hillsboro	314	16	0	430	44	18	451	155	3	611	1,482	41	536	591	54	2,342	2,288	116	4,746
Johnson City	0	0	0	0	0	2	0	0	5	0	0	0	0	0	0	0	0	7	7
King City	32	0	0	79	0	0	5	0	0	0	0	0	0	0	0	116	0	0	116
Lake Oswego	196	14	0	183	0	0	197	0	0	89	373	0	84	47	0	749	434	0	1,183
Maywood Park	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Milwaukie	90	0	0	38	0	1	39	0	4	36	0	4	32	6	2	235	6	11	252
Oregon City	46	152	0	119	0	10	160	398	19	283	169	11	284	229	9	892	948	49	1,889
Portland	556	854	0	675	657	104	735	336	108	893	602	195	1,384	1,368	80	4,243	3,817	487	8,547
Rivergrove	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	0	0	3
Sherwood	124	24	0	59	0	5	230	4	3	366	164	19	517	36	34	1,296	228	61	1,585
Tigard	282	6	0	353	238	0	315	0	0	319	166	2	380	196	3	1,649	606	5	2,260
Troutdale	143	6	0	162	17	4	186	48	8	111	153	36	207	96	26	809	320	74	1,203
Tualatin	172	0	0	115	0	0	154	545	0	233	0	1	140	14	1	814	559	2	1,375
West Linn	111	0	0	148	0	7	140	20	3	178	116	2	158	20	2	735	156	14	905
Wilsonville	138	0	0	123	0	4	124	246	2	42	95	2	139	5	2	566	346	10	922
Wood Village	0	0	0	0	0	3	0	0	0	2	0	1	1	0	0	3	0	4	7
Regional Total	**4,421**	**2,153**	**128**	**4,361**	**1,415**	**413**	**5,042**	**2,672**	**396**	**5,687**	**5,200**	**589**	**5,388**	**4,085**	**383**	**24,899**	**15,525**	**1,889**	**42,313**

Source: Associated Marketing Resources (1/1/96 to 9/30/96); Perpetual Data Solutions (10/1/96 to 10/1/97); Metro Data Resource Center, Metro's RLIS database

Note: SF = Single Family; MF = Multi-family; MH = Mobile Home & Manufactured Homes

Note: The building permit data covers the calendar year. Nongeocoded records were allocated to the issuing jurisdiction and assigned to inside or outside the UGB based on the issuing jurisdiction. Nongeocoded permits issued for unincorporated areas were tabulated as being outside the UGB.

Gross Vacant Land Inside the UGB by Metro Planning Designation*

Land Use Category	1992	1994	1995	1996
Farm and Forest	88	45	794	785
Rural Residential	2,400	2,483	2,349	2,289
Single Family 10,000 - 40,000 sq. ft.	1,870	2,391	955	929
Single Family 7,000 - 10,000 sq. ft.	15,185	13,128	12,991	12,440
Single Family 5,000 - 7,000 sq. ft.	14,092	10,627	11,499	10,619
Multi-family 8-25 units	3,973	5,194	3,193	2,981
Multi-family over 25 units	522	455	439	405
Planned Unit Development	5	168	5	4
Neighborhood Commercial	121	102	99	103
General Commercial	1,446	1,317	1,272	1,195
Office Commercial	676	610	604	583
Central Commercial	720	823	501	483
Light Industrial	7,352	6,202	6,536	6,098
Heavy Industrial	7,061	1,878	6,241	5,954
Mixed Use Industrial	2,123	6,783	1,886	1,824
Parks & Open Space	1,934	1,692	1,711	1,862
Public Facilities	1,247	1,139	1,077	1,069
Multi-use Commercial 1			189	133
Multi-use Commercial 2			21	17
Total:	60,815	55,037	52,362	49,773

Source: RLIS Data Base, Metro 12/2/97

*Aerial photography flight dates: September '92, July '94, September '95, July '96, September '97

Gross Vacant Land Summary:

	1992	1994	1995	1996	*Estimated* 1997	Land Developed 1992-1997
Vacant Single-family Residential Land*	33,635	28,674	28,588	27,062	25,420	8,215
Vacant Multi-family Residential Land	4,495	5,649	3,632	3,386	3,109	1,386
Total	38,130	34,323	32,220	30,448	28,529	9,601

*Includes Farm and Forest, Rural Residential, Single-family 1,2,3

Gross density calculation:

	1992-1996
Single-family units	26,788
Multi-family units	15,525
Total Units	42,313
SFR land used (9/92-9/97)	8,215
MFR land used (9/92-9/97)	1,386
Total residential land consumed	9,601
SF density per gross acre	3.26
MF density per gross acre	11.2
Total density per gross acre	4.4

Net Buildable Vacant Land Inside the UGB by Metro Planning Designation*

Land Use Category	1992	1994	1995	1996
Farm and Forest	14	10	292	285
Rural Residential	1,583	1,649	1,493	1,421
Single Family 10,000 - 40,000 sq. ft.	1,027	1,374	620	599
Single Family 7,000 - 10,000 sq. ft.	10,703	9,110	8,833	8,352
Single Family 5,000 - 7,000 sq. ft.	10,479	7,865	8,241	7,492
Multi-family 8-25 units	3,164	3,879	2,448	2,249
Multi-family over 25 units	367	317	296	259
Planned Unit Development	3	158	3	2
Neighborhood Commercial	110	94	86	89
General Commercial	1,163	1,037	993	936
Office Commercial	570	512	488	480
Central Commercial	615	684	428	405
Light Industrial	5,794	5,404	5,158	4,811
Heavy Industrial	4,593	4,024	4,027	3,864
Mixed Use Industrial	1,614	1,452	1,433	1,377
Parks & Open Space	668	578	588	641
Public Facilities	1,046	949	884	873
Multi-use Commercial 1	172		170	116
Multi-use Commercial 2	1		21	16
Total	43,687	39,095	36,501	34,266

Source: RLIS Data Base, Metro 12/2/97

*Aerial photography flight dates: September '92, July '94, September '95, July '96, September '97

Net Vacant Land Summary:

	1992	1994	1995	1996	1997	Land Developed 1992-1997
Single Family Residential Land*	23,807	20,008	19,478	18,148	16,730	7,077
Multi-family Residential Land	3,531	4,196	2,744	2,508	2,251	1,280
Total	27,339	24,204	22,222	20,656	18,981	8,358

*Includes Farm and Forest, Rural Residential, Single-family 1,2,3

Net density calculation:	1992-1996
Single-family units	26,788
Multi-family units	15,525
Total Units	42,313
SFR land used (9/92-9/97)	4,034
MFR land used	896
Total residential land consumed	4,930
SF density per gross acre	6.6
MF density per gross acre	17.3
Total density per gross acre	8.6

*Gross to Net Reduction**

SFR	4,034
MFR	896
Total	4,930

*Assumptions used to estimate future lands needs for schools, parks, streets, churchs, other public facilities.
43% for SF, 30% for MF
Source: Urban Growth Report Dec. 97, Tables 3B & 4A, page 14-15

M E M O R A N D U M

METRO

TO: John Fregonese, Director, Growth Management Services

FROM: Carol Krigger and Carol Hall

DATE: December 16, 1997

SUBJECT: ***Exhibit B: Mix of Housing Types and Actual Density (1992-1996)***

HB 2709 requires that Metro inventory the supply of buildable lands inside the urban growth boundary, conduct a housing needs analysis, and determine the actual density and mix of housing. The purpose of this memo is to describe the process and data source used to determine the actual density and mix of housing summarized in "Exhibit B" attached.

The table – Mix of Housing Types and Actual Density (1992-1996) - in Exhibit B has three sections:

1) Mix of Housing Types
2) Actual Density per Gross Acre
3) Actual Density per Net Acre

Mix of Housing Types

Determining housing mix requires an analysis of building permits issued inside the urban growth boundary. Metro's Data Resource Center contracts with a data collection firm to gather building permit data from the local jurisdictions. The Data Resource Center then geocodes the building permits into Metro's Regional Land Information System (RLIS) database. The process of geocoding matches the permits to specific geographic coordinates in RLIS.

The first section of the table in Exhibit B summarizes building permit data for the calendar years 1992 through 1996 (see page 2, Exhibit B), categorized by single-family units, manufactured homes (which include mobile homes) and multi-family units. The total units in each category (1992-1996) are compared to the total overall number of units (1992-1996) to arrive at the percentage of housing represented by each category. As shown in the table, single-family units are 58.8 percent of the total, manufactured homes are 4.5 percent of the total, and multi-family units are 36.7 percent of the total.

Actual Density per Gross Acre

Density per gross acre is calculated by dividing the number of units (1992-1996) by the number of gross acres developed from September 1992 to September 1997. (Gross acres are minus streets, water and parks.) Building permit data is accounted for by calendar year, whereas the vacant lands inventory is a snapshot in time, usually in the months of July or September when aerial photos are taken of the region. Therefore, units developed during calendar years 1992 through 1996 are matched with land developed from September 1992 through September 1997. However, the 1997 vacant lands inventory based on aerial photos taken in September 1997 is not complete at this time and an estimate is made from July 1996 through September 1997. The estimate is based on the average gross residential acreage consumption between September 1992 and July 1996 and is subtracted from the 1996 vacant residential acres.

The number of residential acres developed (inside the urban growth boundary) is calculated by comparing residential vacant land remaining in September 1992 (38,130 acres) with estimated residential vacant land remaining in September 1997 (28,529 acres). The difference between the two is the number of acres developed during that time period (9,601 acres). The overall density is calculated by dividing the total number of housing units by the total number of gross acres developed to arrive at 4.4 units per gross acre. Likewise, single-family and multi-family density is calculated by dividing the total number of units in each category by the appropriate residential land category (single-family or multi-family residential). In the case of single-family density, both single-family units and manufactured homes are used in the calculation. Page 3 of Exhibit B shows the vacant land remaining in 1992, 1994, 1995 and 1996. It also shows the calculation for single-family, multi-family and overall density.

Actual Density per Net Acre

Net density is calculated in the bottom section of the Exhibit B table (page 1). The calculation is similar to the calculation of gross density per acre described above. The only difference is that net acres developed, rather than gross acres developed, are used. Net acres have environmentally constrained lands removed as well as an estimate of land for future needs (for schools, parks, streets, churches, etc.). Page 4 of Exhibit B presents vacant land by year and the calculation of single-family, multi-family and overall density per net acre.

Also attached to Exhibit B is the 1992 and 1996 snapshot of vacant buildable lands from RLIS. Additional information regarding vacant lands and building permits is provided on a CD, which will be part of the record. The CD contains the supporting data and procedures used for determining housing mix and density (Exhibit B).

Exhibit C

Housing Needs Analysis

Final Draft

December 18, 1997

Growth Management Services Department

METRO

Metro
Metro is the directly elected regional government that serves approximately 1.2 million residents in portions of Clackamas, Multnomah, and Washington counties as well as those in the 24 cities in the region: Beaverton, Cornelius, Durham, Fairview, Forest Grove, Gladstone, Gresham, Happy Valley, Hillsboro, Johnson City, King City, Lake Oswego, Maywood Park, Milwaukie, Oregon City, Portland, Rivergrove, Sherwood, Tigard, Troutdale, Tualatin, West Linn, Wilsonville, and Wood Village.

Metro is responsible for the regional aspects of transportation, land use planning, and the urban growth boundary; regional parks and greenspaces; solid waste management; operation of the Metro Washington Park Zoo; and technical services to local governments of the region. Through the Metropolitan Exposition-Recreation Commission (MERC), Metro manages the Oregon Convention Center, Civic Stadium, Portland Center for the Performing Arts, and the Expo Center.

Metro is authorized by Chapter 268 of the Oregon Revised Statutes (OAR) and has operated as an elected regional government since 1978. With the adoption of the Metro Charter by vote of the citizens of the region in November of 1992, additional responsibilities were mandated to Metro. Metro is governed by a seven-member council, an executive officer, and auditor. Councilors are elected from districts, and the executive officer and auditor are elected region-wide.

Executive Officer
Mike Burton

Metro Councilors
Presiding Officer
District 3 John Kvistad

Deputy Presiding Officer
District 1 Ruth McFarland

District 2 Don Morissette
District 4 Susan McLain
District 5 Ed Washington
District 6 Lisa Naito
District 7 Patricia McCaig

Auditor
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Contents

Housing Needs Analysis – Technical Appendix 1
Available in the Data Resource Center
(contact Sonny Conder)

Housing Needs Analysis Summary

Purpose

This report is required by Metro Code (Resolution 96-2392B). The intent is to revise the March, 1996 *Housing Needs Analysis* which estimates the types and quantities of housing needed in the region over a 20-year period. It also addresses affordable housing and projected land prices.

Because part of the focus of this report is on addressing affordable housing on a regional level, it is intended for a diverse group of readers this including: elected officials, area agencies, non-profit organizations and affordable housing advocates; developers, realtors, land interests; banks and lending institutions.

This document is also required and guided by the following mandates:

Oregon Administrative Rules (OAR) Chapter 660, Division 7

The purpose of this rule is to assure opportunity for the provision of adequate numbers of needed housing units and the efficient use of land within the Metropolitan Portland (Metro) urban growth boundary, to provide greater certainty in the development process so as to reduce housing costs. *Needed Housing* means housing types determined to meet the need shown for housing within an urban growth boundary at particular price ranges and rent levels. Needed Housing also includes but is not limited to attached and detached single-family housing and multiple-family housing for both owner and renter occupancy and manufactured homes.

Department of Land Conservation and Development: Goal 10

Goal 10 indicates the State of Oregon's mandate to provide housing needs of its citizens. Buildable lands--lands in urban and urbanizable areas that are suitable, available, and necessary for residential use--shall be inventoried. Plans shall encourage adequate numbers of housing units at price ranges and rent levels which are commensurate with the financial capabilities of Oregon households and allow for flexibility of housing location, type, and density.

Regional Urban Growth Goals and Objectives (RUGGOs)

RUGGOs Objective 17 requires that Metro adopt a *fair share* strategy for meeting the housing needs of the urban population in cities and counties based on a subregional analysis. A *fair share* strategy will include (1) a diverse range of housing types available within cities and counties inside the UGB; (2) specific goals for low and moderate rate housing to ensure that sufficient and affordable housing is available to households of all income levels that live or have a member working in each jurisdiction; (3) housing densities and costs supportive of adopted public policy for the development of the regional transportation system and designated centers and corridors; and (4) a balance of jobs and housing within the region and subregion.

Metro Code 3.03

The Metro Housing Goals and Objectives are for the purpose of adopting and implementing region-wide land use planning goals and objectives related to housing. The Metro Housing Goals and Objectives shall be subject to regular review and amendment where appropriate, every four years from the date of adoption.

How This Report is Organized

This report is organized with the following section headings: Background, Regional Housing Data - A Brief Description and Assessment, Costs and Attributes of Single-Family Housing, Factors and Barriers to Affordable Housing, Overview and Assessment of Affordable Housing Needs, Tools and Strategies, and Legal Requirements and Conclusions.

Background

This section assesses the growing concern of housing affordability in the region. It addresses what is affordable housing and the criteria set by United States Department of Housing and Urban Development to determine what is affordable based on income. This section also discusses the following: the correlation between population growth and increases in housing prices; subsidy programs in the region; and affordable housing efforts--national and local.

Section 1: Regional Housing Data - A Brief Description and Assessment

This is a three-part section of pertinent housing data. The first part, *Description and Assessment of the Current Housing Stock*, is an analysis of data that addresses the following: single and multi-family housing growth by county; residential land value of single and multi-family housing in the region; growth in the region as related to building permit activity; and the impact of the urban growth boundary on land values. The second part, *Description and Assessment of Demand Characteristics of Housing in the Region*, is an analysis of all recorded, single-family residential sales for Clackamas, Multnomah, and Washington counties (between 7/1/95 and 6/30/96). This data has been evaluated to determine the attributes in market-demand for housing. The third part, *Overview of Assisted Housing in the Region*, is secondary data on assisted housing programs reported in the Consolidated Plans for Multnomah, Clackamas, Clark, and Washington counties.

Section 2: Costs and Attributes of Single-Family Housing

This section contains brief statistical analyses which address housing sales price and its relation to: lot size, house size and type, access, neighborhood location, and depreciation. This is the type of information that developers use to configure their housing developments to yield a maximum profit given the current price of land, development fees, zoning, and housing construction costs.

Section 3: Factors and Barriers to Affordable Housing

This section presents a number of barriers to affordable housing that are both quantitative and qualitative. Discussion topics include: demographic changes, regulatory constraints, infrastructure costs, lending barriers, and access to public goods and services.

Section 4: Overview and Assessment of Affordable Housing Needs, Tools and Strategies

This section assesses the affordable housing tools that are consistent with Metro's Charter authority which include: expansion of the urban growth boundary, inclusionary zoning, density bonuses, replacement ordinance, master planning urban reserves, community land trusts, and linkage of Metro approved transportation funds to affordable housing.

Section 5: Legal Requirements and Conclusions

This section contains a brief overview of the mandates that address the housing needs of this region. These mandates include: Goal 10 of the State Planning Goals; sections of the Oregon Revised Statutes (ORS); portions of the Oregon Administrative Rules (OAR); and Objective 17 within RUGGOs. This section also addresses the requirements of the State of Oregon or Metro, findings, and conclusions demonstrating compliance.

Background

Since 1990, there has been a growing concern on the issue of housing affordability in the Portland metropolitan region. This concern continues to be precipitated by a number of reasons which include: a widening gap between household income and the cost of housing; an increase in population and homelessness; rising land costs; and the lack of available land.

The vast number of reasons behind this growing concern has encouraged housing advocates; local, regional, and state government; and financial institutions to discuss, examine, and implement methods to sustaining and increasing affordable housing in the region. To date, there have been some significant efforts to address affordable housing which include: community development corporations; provisions that allow accessory units to be built in single-family residential zones; community development block grants; and density increases. Despite these approaches, housing affordability continues to be a concern for many in the Portland region.

What is Affordable* Housing?

The inherent problem in dealing with most affordable housing issues is two-fold: one, defining the phrase *affordable housing*; and two, establishing consensus on a definition. This has been perhaps the most debated question in the region; however, a definition does exist. The United States Department of Housing and Urban Development (HUD) defines housing as affordable when:

> *All housing costs (rent or mortgage, utilities, property taxes, and insurance) do not exceed 30% of total household income.*

The HUD 30% of income standard represents a social criterion which embodies a specific value judgment about the level of income that should go to housing. Therefore, affordability applies to any person or household regardless of their income (Table 1).

* For further discussion on *affordability* see also pages 68 – 71.

Table 1

Housing Affordable to Various Household Sizes and Occupations

Single Person			2 Person Hsehold			3 Person Hsehold			4 Person Hsehold		
Annual Income [1] 30% of Median	Likely wage per hour*	What is Affordable	Annual Income [1] 30% of Median	Likely wage per hour*	What is affordable	Annual Income [1] 30% of Median	Likely wage per hour*	What is affordable	Annual Income [1] 30% of Median	Likely wage per hour*	What is affordable
$9,700	$5.27	$224	$11,100	$6.00	$278	$12,500	$6.73	$288	$13,900	$7.46	$348
3/4 time fast food worker, child monitor or service, station attendant* **(Very Low Income)**			Full-time fast food worker, child monitor or service, station attendant w/ a child, or 2 elderly adults on SSI			Full-time parking enforcement officer, housekeeper, or taxi driver w/ 2 children			Full-time preschool teacher, or janitor and laborer w/2 children		
$16,200 **50%** of Median	$8.56	$405	$18,500 **50%** of Median	$9.76	$463	$19,200 **50%** of Median	$10.96	$521	$23,150 **50%** of Median	$12.16	$579
Full-time data entree, home health aide, nurse's aide, hairdresser or receptionist **(Low Income)**			Full-time teacher's aid, bank teller, cook, legal secretary, assembler, waitperson or messenger w/ a child			Full-time medical asst., bus driver, librarian, elem. school teacher, or bookkeeper w/2 children			Full-time dental asst., maintenance worker, or pharmacy asst. w/ 3 children or a fast food wkr. and service station attendant w/2 children		
$24,850 **80%** of Median	$13.81	$621	$28,400 **80%** of Median	$15.66	$710	$31,950 **80%** of Median	$17.51	$799	$35,500 **80%** of Median	$19.36	$888
Full-time broadcast technician, computer operator, emergency med. tech, or licensed pract. nurse **(Low – Moderate)**			Full-time postal carrier, secondary teacher, recreation coordinator, or librarian w/ a child			Full-time computer programmer, vocational counselor, or drafter w/ 2 children or a nurse's aide and a data entree w/ 1 child			Full-time registered nurse or social worker w/ 3 children or a teacher's aide and a bank teller w/ 2 children		
$32,400 **100%** of Median	$17.89	$810	$37,000 **100%** of Median	$20.29	$925	$41,700 **100%** of Median	$22.69	$1043	$46,300 **100%** of Median	$25.09	$1158
Full-time comp programmer, corrections officer, junior college professor **(Moderate Income)**			Full-time accountant, real estate appraiser, auto mechanic, chef, or police officer w/ a child			Full-time dental hygienist, educ administrator, or fire fighter w/ 2 children or a private investigator and a elem. school teacher w/ 1 child			Full-time electrical engineer or health serves manager w/ 3 children or a dental asst. and a maintenance worker w/ 2 children		

"Affordability" is based on 30 percent of monthly household income allocated to housing expenses. 40-hr workweek.

1 Median income levels (Fiscal Year 1996/97) determine by the Dept. of Housing and Urban Development

* Average wages based on 1995 data compiled by the Oregon Employment Department and Metro

Table 2

Median Income Percentages FY 1996/97

Household Size	30%	50%	80%	100%
1	9,700	16,200	24,850	32,400
2	11,100	18,500	28,400	37,000
3	12,500	20,850	31,950	41,700
4	13,900	23,150	35,500	46,300
5	15,000	25,000	38,350	50,000
6	16,100	26,850	41,200	53,700

Source: City of Portland Bureau of Housing and Community Development

(Based on the HUD Portland Area Median Income (Fiscal Year 1996/97): $46,300 for a family of four. Figures are rounded to the nearest $50.00).

Assessing the 30 Percent Affordable Housing Standard

The *American Housing Survey* reports data for various regions throughout the United States. Figures 1 and 2 reflect data from the *Survey* which indicate several regions have substantial proportions of their households spending more than 30% of their income on housing. In Portland for example, data shows that 25% of mortgage holders spent over 30% of their income on housing and 37% of renters spent over 30% of their income on housing.

Figure 1

Percent Owner-Occupied Households Above HUD Guidelines: 1990

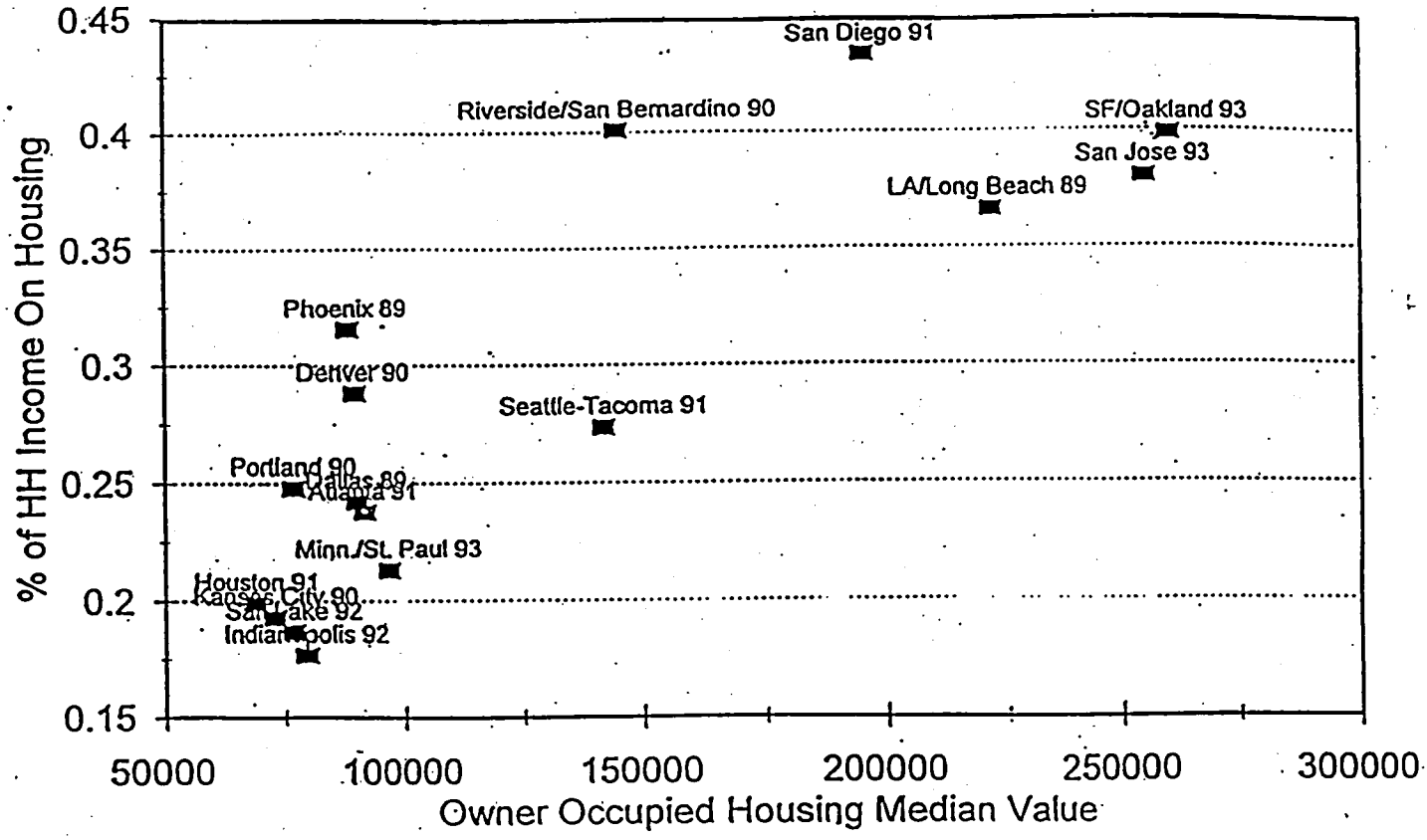
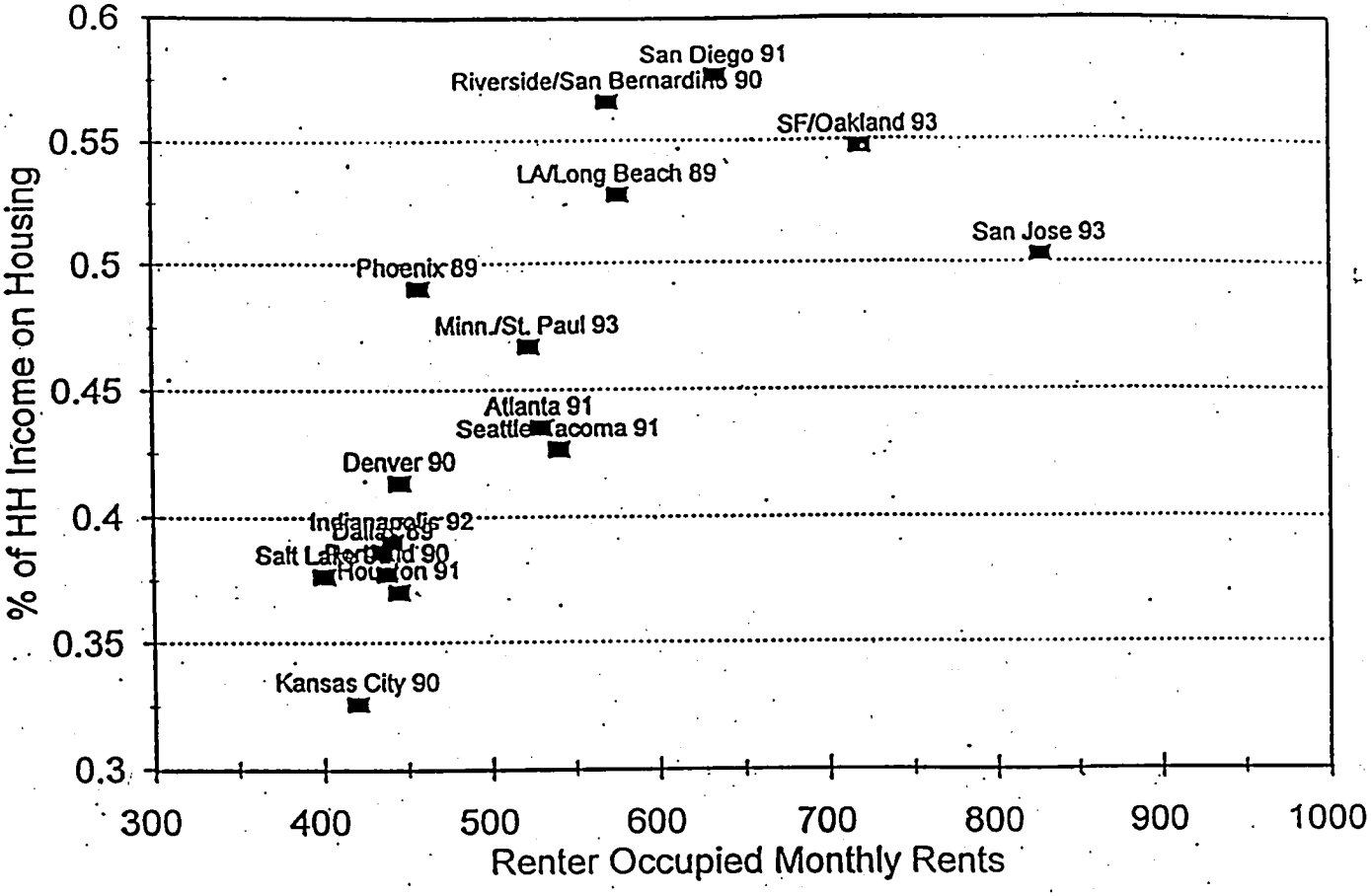


Figure 2

Percent Renter Households Above HUD Guidelines: 1990



The above information suggests the 30% of income standard is not applicable in most regions. Research indicates that part of the affordable housing problem is the median price of housing has increased well above real wages since the 1970s.

Historically, housing in the Portland metropolitan region has been relatively affordable. From 1979 to 1984, average home prices rose by 9% while incomes rose by 34%.[1] It was not until 1990 when the state of housing affordability significantly changed in the region. Average home prices rose by 33% while median household incomes rose by 24%.[2] By 1995, the availability of affordable housing was compounded by a 2.5% annual increase in population. During the period from 1990 to 1995, the region experienced an annual increase in real housing prices close to 10% per year.

Figure 3 demonstrates a 0% annual change in population is correlated with a 4.0% decrease in housing prices. The graphic also shows that a 0.75% population increase per year correlates with a 0% real price change for housing. The correlation between population growth and increased housing prices is also true for the middle to late 1970s.

During this late 70s period, population growth in the region increased by 38% while the price of housing increased by 40% (Figure 4). It was during this time frame in which a number of changes were happening in the region. Suburban communities were growing at a considerable rate while policy and planning actions were being implemented to preserve and enhance inner Portland neighborhoods such as Eliot, Lair Hill, and Goose Hollow.

[1] City of Portland, City of Gresham, and Multnomah County. *CHAS 1993*. p.28
[2] A change of 33%; 1985 average house price was $70,600 and 1990 average house price was $93,950.

Figure 3

Annual Population Change as Related to House Price Change

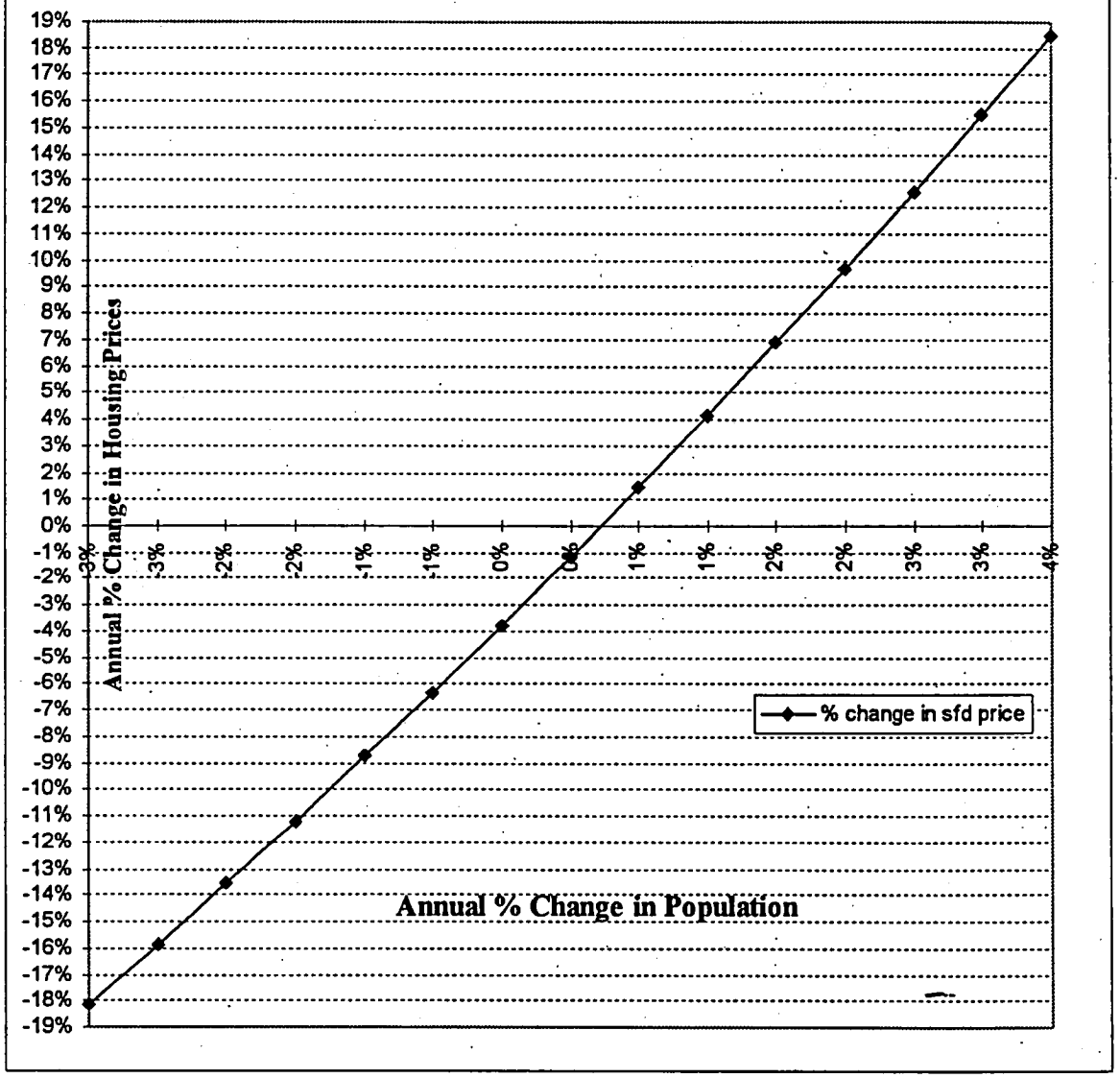
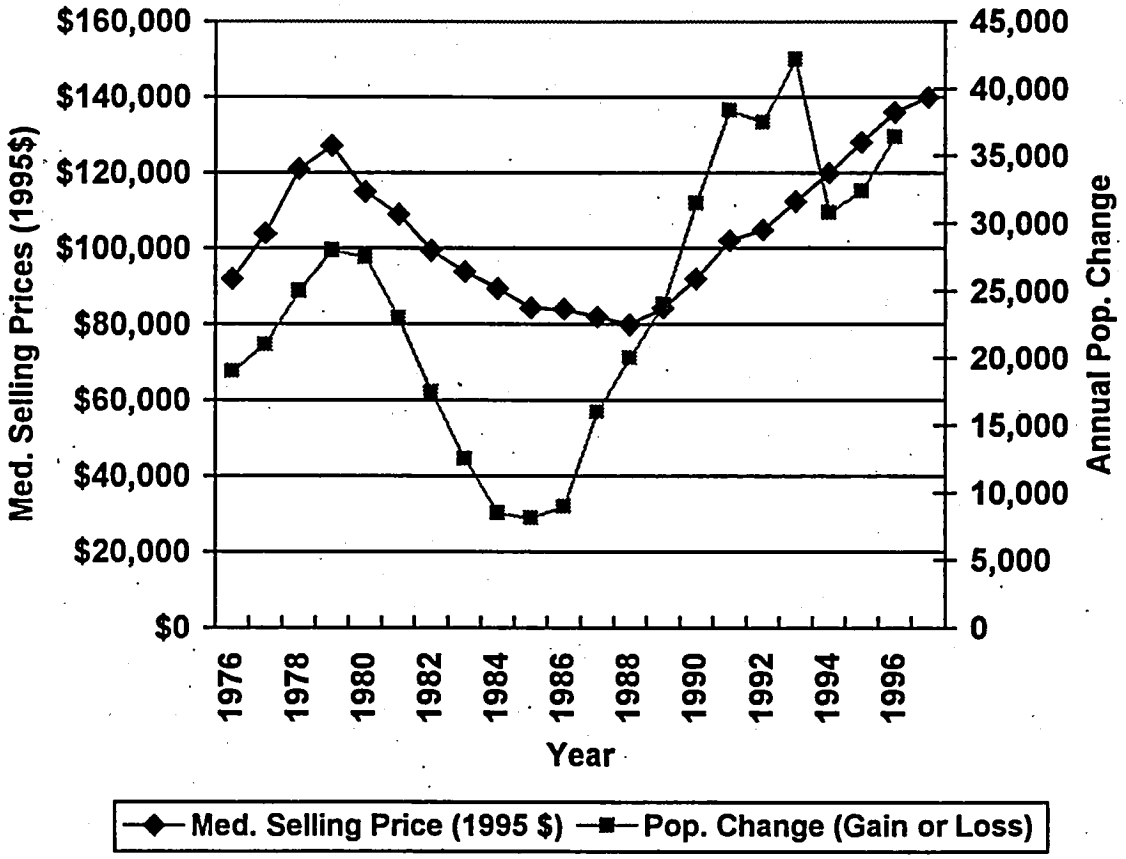


Figure 4

Median Selling Prices* for New and Existing Single-Family Dwellings and Population Growth in the Portland Metropolitan Area 1976-1996



* Prices are adjusted for inflation (1995 $).

As demonstrated in Figures 1 and 2, several regions have substantial proportions of their households spending more than 30% of their income on housing. However, additional data by the *Survey* notes that Portland subsidizes the largest share of total housing stock when compared to other cities in the west and selected cities elsewhere in the United States (Table 3). In Portland, 13.9% of owner mortgages are subsidized and 9.8% of rental stock are subsidized. The high percentage of subsidized mortgages is due in part to the Veteran Home Loan programs--not a means-tested subsidy.

Subsidy programs are generally supported by federal dollars which are allocated proportionally with population. Table 3 shows that subsidy rates among the reported regions are fairly similar, varying between 8% to 12%. However, San Jose and Kansas City present a different case. San Jose has one of the highest rent levels and the lowest subsidy levels while Kansas City has the lowest rent level and the highest subsidy level.

The Housing Authority of Portland, for example, reports that it subsidizes about 12,000 units in Portland. However, 3,000 units are *at-risk* of becoming unaffordable. That is, the contracts on these particular units will expire by the end of 1997 and possibly be converted to market-rate housing unless additional federal support (i.e., tax credits, bond financing) is used to extend the term of the contract.

Table 3
Estimates of Subsidized Dwelling Units By Region

Region/Year	Subsidized Rentals	% of Rental Stock	Subsidized Mortgages	% of Owner Stock	% Total Stock Subsidized
Portland (1990)	22,000	9.8	49,200	13.9	12.3
Kansas City (1990)	25,400	12.6	18,400	4.6	7.2
Seattle/Tacoma (1991)	33,900	8.9	24,000	3.7	5.7
Phoenix (1989)	23,500	8.4	15,400	3.0	4.9
San Fran./Oak. (1993)	70,300	10.7	19,500	2.5	6.2
Houston (1991)	61,500	11.3	35,600	4.9	7.7
Atlanta (1991)	46,100	11.9	27,600	4.0	6.8
Los Ang./Long B. (1989)	160,100	11.0	72,700	5.0	7.8
San Jose (1993)	17,400	8.0	10,100	3.2	5.1
San Diego (1991)	33,100	8.3	21,100	4.4	6.2
Salt Lake City (1992)	13,000	11.0	18,500	7.4	8.6

Source: U.S. Bureau of Census & HUD. *American Housing Survey.* (various regions & years)

Historical Overview of Affordable Housing Efforts: National and Local

The issue of housing affordability is not a recent problem or phenomenon. The United States Congress attempted to address the issue as early as 1949 in the National Housing Act. The primary goal of the Act was to encourage private activity in building low and moderate-income housing through the use of federal credit. Additional legislation was also presented in the National Housing Act of 1959. According to the University of Miami Law Review:

> ...Housing Act of 1959...provided below-market interest-rate loans to private non-profit sponsors of housing for the elderly. Soon thereafter, a series of laws gave subsidies to for-profit developers as well.

Since the passage of the Housing Act, there have been a myriad of other forms of federal legislation that have a connection to housing affordability which include the following: Affordable Housing Act, Fair Housing Act, Community Reinvestment Acts, and Americans with Disabilities Act. Many of these efforts were also made part of the political agenda of presidents like Lydon B. Johnson and his *War On Poverty* initiatives (1964-1968). Subsequently, many federal programs became part of the goals and objectives of state legislation and were implemented by designated housing agencies.

The State of Oregon Housing and Community Services has a number of programs which are funded by federal dollars and/or provided by federal tax credits. Examples include: Low Income Tax Credit Program, Home Investment Partnership, Emergency Shelter Grant, and Low Income Rental Assistance. The State's role is to provide technical and financial assistance to public and private organizations that develop housing for the elderly, first-time homebuyers, and special needs populations in urban and rural parts of Oregon.

On the local level, there have been a number of policies and strategies that address housing affordability in the region. The Comprehensive Housing Affordability Strategy (CHAS) was one of the earlier efforts towards addressing affordable housing in the region. The CHAS (replaced by the Consolidated Plan) is a combined five year plan and application to the United States Department of Housing and Urban Development (HUD) for funds available to cities and counties under the following grant programs: Community Development Block Grant (CDBG) Programs; Home Investment Partnership; Emergency Shelter Grant (ESG); and Housing Opportunities for Persons With AIDS (HOPWA).

Local jurisdictions receiving funds from HUD are required to develop a Five Year Consolidated Plan. For example, Washington and Clackamas counties are required to develop a separate plan. The statutes for the grant programs have three basic goals which primarily benefit low-income households (earning between 51% and 80% of median income) and very low-income households (earning less than 50% of median income):

- To provide decent housing;
- To provide a suitable living environment; and
- To expand economic opportunities.[3]

The creation of the Housing Authority of Portland (HAP) was another earlier, affordable housing effort. HAP is perhaps the oldest and most recognized organization involved in low-income housing. Created by the Portland City Council on December 11, 1941, HAP is a public non-profit municipal corporation. HAP is responsible for the administration of Low Rent Public Housing and Section 8 programs in Multnomah County. In addition, HAP is responsible for the development of affordable rental housing and the insurance of mortgage revenue bonds for non-profit housing developers. Currently, HAP programs provide housing for 14,755 low-income persons in public housing or rent assisted units.

[3] City of Portland Bureau of Housing and Community Development. *Housing and Community Development Plan Fiscal Years 1995-1999.* p.1

Assessing the Historic and Current Issue of Affordable Housing in the Region

As previously indicated, efforts to address housing affordability have existed since 1949 on the federal level. In the Portland metropolitan area, however, issues related to housing affordability have been increasing since 1990. This alludes to the question--is there really an affordable problem? If based primarily on the median selling price of single-family homes, housing in the Portland region would be expensive compared to the national average. However, when compared to 12 other western regions of 1 million or more in population, single-family home prices in the Portland area are relatively affordable.

Table 4
Single-Family Home Selling Prices*

Second Quarter 1997 Region (a)	Median Selling Price (b)	Median Income ($000s)	Price/ Income Ratio	Price/ Income Ratio % of National
Riverside, CA	111,000	44.8	2.48	88
Phoenix, AZ	111,000	47.5	2.34	83
Denver, CO	135,000	54.9	2.46	87
Sacramento, CA	138,000	48.4	2.85	101
Portland, OR	**150,000**	**46.3**	**3.24**	**115**
Salt Lake City, UT	150,000	47.7	3.14	111
Los Angeles, CA	164,000	47.8	3.43	121
Seattle, WA	166,000	55.1	3.01	107
San Diego, CA	170,000	48.6	3.50	124
Orange County, CA	199,000	63.2	3.15	111
Oakland, CA	216,000	60.1	3.59	127
San Jose, CA	272,000	70.2	3.87	137
San Francisco, CA	305,000	64.4	4.74	167
National	123,000	43.5	2.83	—

Source: National Association of Homebuilders. *Housing Economics*. September 1997

(a) Regions of 1,000,000 or more in population.
(b) Data are not adjusted for housing quality, size, or proportion of new home sales.
* Includes existing and new construction that sold on the market.

Still, the data is clear to the extent that if there is an affordable housing problem in the region, those facing severe cost burdens are low-income groups.* Perhaps local jurisdictions should target their efforts as well as coordinate with Metro in creating strategies to maintain long-term affordability in the region for all income levels. Accordingly, the intent of this report is to examine ways in which affordable housing issues can be addressed on a regional level and *tools* jurisdictions can use to achieve their respective housing goals.

* Households that are at or below 50 percent of the area median (household income).

Background Summary

- Affordability applies to any person or household regardless of their income and household size.

- The Portland area median income for a family of four is $46,300 (F/Y1996-97).

- Several regions have substantial proportions of their households--renter and owner occupied--spending more than 30% of their income on housing regardless of their income level.

- Increases in real housing prices are correlated with population growth. During the period from 1990 to 1995, the region experienced a 2.5% annual increase in population and a 10% per year increase in real housing prices.

- There is relationship between housing affordability and population growth. From 1973 to 1979, the regional population increased by 13% while single-family housing prices increased by 56% (before the establishment of the urban growth boundary). From 1979 to 1984, the population increased by 6% while housing prices increased by 9%. From 1989 to 1995, the population increased by 16% while housing prices increased by 51%.

- The median sales price of single family housing in the Portland area is 22% above the national average; however, single-family houses in the Portland area are more affordable when compared to most California markets and less affordable than other western cities with populations of 1 million or more.

- According to the *American Housing Survey*, 13.9% of owner mortgages are subsidized and 9.8% of rental stock are subsidized in the Portland area. The high percentage of subsidized mortgages is due in part to the Veteran Home Loan programs--not a means tested subsidy.

Section 1:

Regional Housing Data - A Brief Description and Assessment

This is a three-part section of pertinent housing data in the region. The first part, *Description and Assessment of the Current Housing Stock*, is an analysis of 1995-1996 data that addresses the following: single and multi-family housing growth by county; residential land value of single and multi-family housing in the region; growth in the region as related to building permit activity; and the impact of the urban growth boundary on land values.

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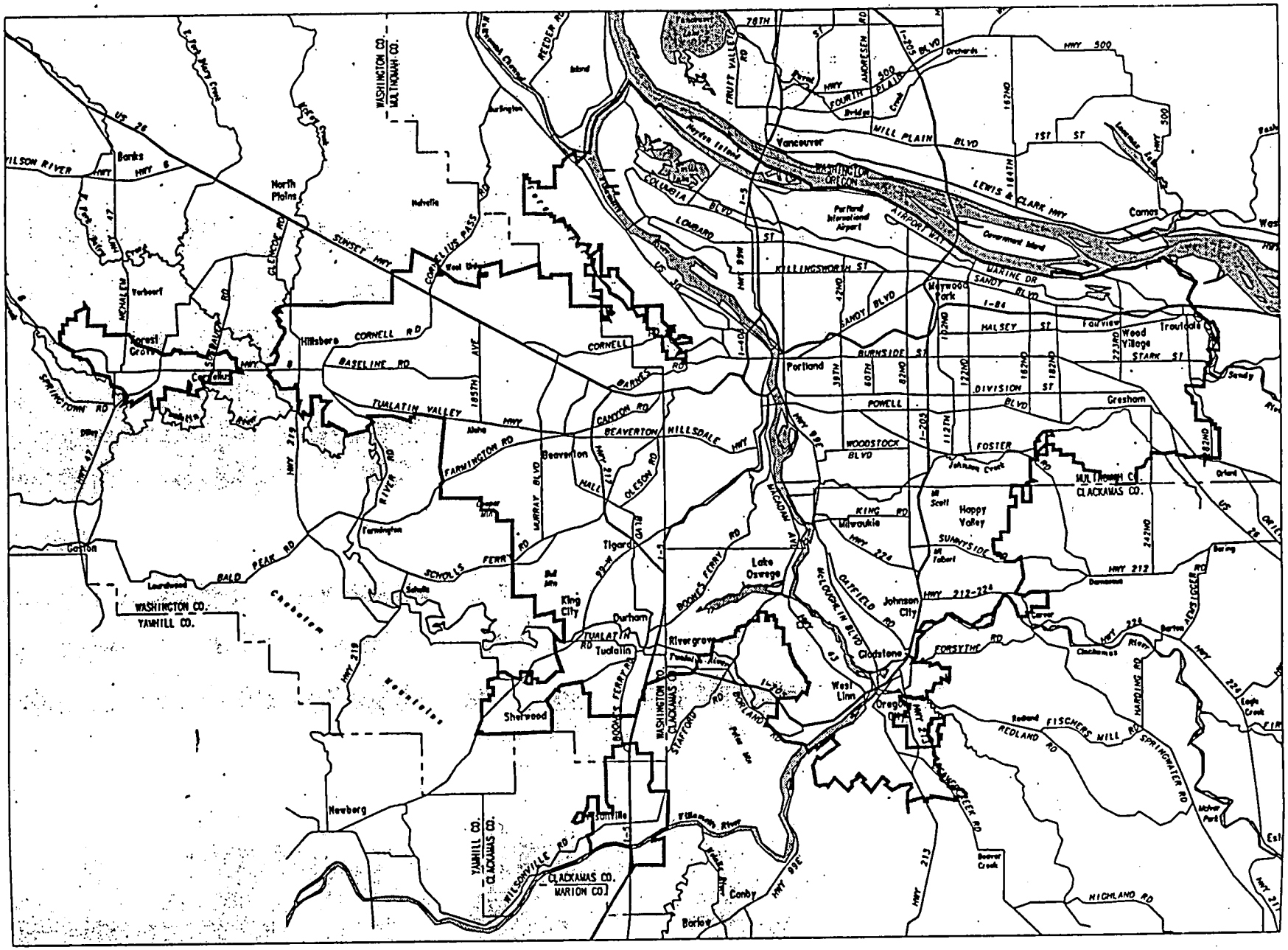


Urban Growth Boundary

September 21, 1995

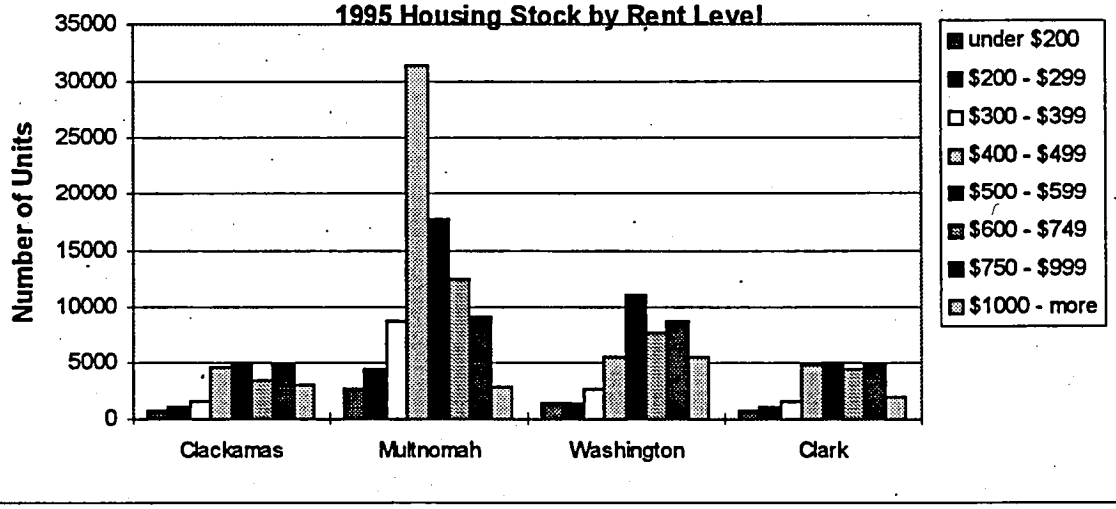
Metro
600 NE Grand Ave.
Portland, OR 97232-2736
(503) 797-1742

Part 1: Description and Assessment of the Current Housing Stock

Housing Data by County

In 1995, Multnomah County had almost half of the region's multi-family housing stock and 39% of the region's single-family stock. Washington County had the second highest concentration of both single and multi-family housing stock followed by Clackamas County and then Clark County. For 1995, 72% of the dwelling units in the combined four county area (649,000) were classed single-family and 28% were classed multi-family (Table 5).

Figure 5: Multi-family Dwellings in the Four County Area



Value Distribution by County

In the four county region,* residential land uses accounted for $50 to $60 billion in assessed value for 1995. Residential values comprised roughly 70% to 80% of the total private, taxable asset value of the area. For multi-family, 41% of the total number of units rented at or below $500 per month; less than 8% rented at or below $300 per month.

For single-family dwellings, 43% of the housing stock was assessed at or below $100,000 in 1995. Approximately 100,000 single-family dwelling were assessed at or below $75,000 in 1995. Multnomah County had the highest concentrations of multi-family housing renting at or below $500 per month and single-family dwellings assessed for $100,000 or less. In Clackamas, Clark, and Washington counties, 70% or more of single-family dwellings were priced at or above $100,000.

Table 5: 1995 Single Family Dwellings by County

House Price	Clackamas		Washington		Multnomah		Clark		Region	
under $50,000	4,607	4.6%	3,985	3.9%	20,556	11.4%	3,987	4.6%	33,136	7.1%
$50,000 - 74,999	9,353	9.4%	6,959	6.9%	42,755	23.7%	8,095	9.4%	67,163	14.3%
$75,000 - 99,999	15,929	16.0%	21,711	21.4%	44,353	24.6%	13,787	16.0%	95,780	20.5%
$100,000 - 124,999	20,061	20.1%	25,573	25.2%	30,281	16.8%	17,362	20.1%	93,277	19.9%
$125,000 - 149,999	15,756	15.8%	18,302	18.0%	17,155	9.5%	13,637	15.8%	64,850	13.9%
$150,000 - 174,999	9,719	9.7%	9,750	9.6%	8,755	4.9%	8,412	9.7%	36,636	7.8%
$175,000 - 199,999	6,776	6.8%	5,448	5.4%	4,914	2.7%	5,865	6.8%	23,004	4.9%
$200,000 or more	17,544	17.6%	9,765	9.6%	11,704	6.5%	15,184	17.6%	54,196	11.6%
Total	**99,746**	**100.0%**	**101,493**	**100.0%**	**180,474**	**100.0%**	**86,329**	**100.0%**	**468,042**	**100.0%**
% of Total	**21.3%**		**21.7%**		**38.6%**		**18.4%**		**100.0%**	

* The four county area is defined as Clackamas, Multnomah, and Washington counties in the state of Oregon and Clark County in the state of Washington.

Growth By Area

In 1995, approximately 15,000 building permits (includes single-family, multi-family, manufactured housing) were issued in the four county area.[4] This was the largest amount over the recorded 5 year period (1990-1995) and the largest since the 1970s. During this period, 35% of the permits issued were multi-family. While not necessarily apparent in Table 6, every jurisdiction experienced consistent and significant growth levels. This is due to increased levels of infill and redevelopment which allows some growth to be accommodated in built-out areas. In 1995, approximately 29% of residential units were from infill and redevelopment.

[4] There have been a number of reported inconsistencies with building permit data in the region. To date, there is no one systematic method used by each jurisdiction in recording building permit activity.

Table 6: Housing Development 1992-1995 by Region and Jurisdiction

Jurisdiction	Number of Units												Total # of Units 1992-1995			'92-'95 TOTAL UNITS	% of Regional Total	1994-2015 Forecast %
	1992			*1993*			*1994*			*1995*								
	SF	MF	MH	SF	MF	MH	SF	MF	MH	SF	MF	MH	SF	MF	MH			
Uninc.Clackamas Co.	314	546	125	312	55	103	355	247	77	364	452	84	1,345	1,300	389	3,034	9.3%	8.4%
Uninc. Multnomah Co.	18	0	0	15	0	0	16	0	3	53	0	2	102	0	5	107	0.3%	1.4%
Uninc. Washington Co.	1,011	245	0	946	10	75	1,099	14	69	1,249	491	69	4,305	760	213	5,278	16.3%	22.2%
Beaverton	429	47	0	195	18	32	210	0	0	289	431	22	1,123	496	54	1,673	5.2%	7.1%
Cornelius	33	0	0	50	0	1	107	2	4	86	7	3	276	9	8	293	0.9%	0.5%
Durham	0	0	0	0	3	0	24	0	0	16	0	0	40	3	0	43	0.1%	0.1%
Fairview	21	0	0	2	0	1	0	126	0	86	0	0	109	126	1	236	0.7%	1.4%
Forest Grove	41	9	3	20	2	10	24	36	18	66	57	2	151	104	33	288	0.9%	0.7%
Gladstone	11	0	0	18	4	4	21	14	2	11	0	0	61	18	6	85	0.3%	0.2%
Gresham	274	234	0	277	367	29	355	481	68	259	442	93	1,165	1,524	190	2,879	8.9%	6.1%
Happy Valley	63	0	0	42	0	0	94	0	0	45	0	0	244	0	0	244	0.8%	1.0%
Hillsboro	314	16	0	430	44	18	451	155	3	611	1,482	41	1,806	1,697	62	3,565	11.0%	7.4%
Johnson City	0	0	0	0	0	2	0	0	5	0	0	0	0	0	7	7	0.0%	0.1%
King City	32	0	0	79	0	0	5	0	0	0	0	0	116	0	0	116	0.4%	0.0%
Lake Oswego	196	14	0	183	0	0	197	0	0	89	373	0	665	387	0	1,052	3.2%	1.3%
Maywood Park	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	0.0%
Milwaukie	90	0	0	38	0	1	39	0	4	36	0	4	203	0	9	212	0.7%	1.5%
Oregon City	46	152	0	119	0	10	160	398	19	283	169	11	608	719	40	1,367	4.2%	1.7%
Portland	556	854	0	675	657	104	735	336	108	893	602	195	2,859	2,449	407	5,715	17.6%	27.3%
Rivergrove	2	0	0	0	0	0	1	0	0	0	0	0	3	0	0	3	0.0%	0.0%
Sherwood	124	24	0	59	0	5	230	4	3	366	164	19	779	192	27	998	3.1%	2.7%
Tigard	282	6	0	353	238	0	315	0	0	319	166	2	1,269	410	2	1,681	5.2%	2.6%
Troutdale	143	6	0	162	17	4	186	48	8	111	153	36	602	224	48	874	2.7%	1.2%
Tualatin	172	0	0	115	0	0	154	545	0	233	0	1	674	545	1	1,220	3.8%	1.8%
West Linn	111	0	0	148	0	7	140	20	3	178	116	2	577	136	12	725	2.2%	1.1%
Wilsonville	138	0	0	123	0	4	124	246	2	42	95	2	427	341	8	776	2.4%	2.0%
Wood Village	0	0	0	0	0	3	0	0	0	2	0	1	2	0	4	6	0.0%	0.2%
Regional Total	**4,421**	**2,153**	**128**	**4,361**	**1,415**	**413**	**5,042**	**2,672**	**396**	**5,687**	**5,200**	**589**	**19,511**	**11,440**	**1,526**	**32,477**	**100%**	**100%**

Source: Associated Marketing Resources; Metro Data Resource Center

Note: SF = Single Family; MF = Multi-family; MH = Mobile Home

Impact of Urban Growth Boundary on Land Values

Figure 6 is a statistical generalization of how 1995 and 1996 raw land values are affected by the urban growth boundary (UGB) after being in place for 18 years. It is important to note, however, development has already moved up to the edge of the UGB and is often seen as an effective determinant of when and where urban land uses will occur. Figure 6 shows raw land value per acre for single-family residential areas (with 5,000-7,000 square foot lot size minimum) as a function of distance from the central business district (CBD) and location inside or outside the UGB.

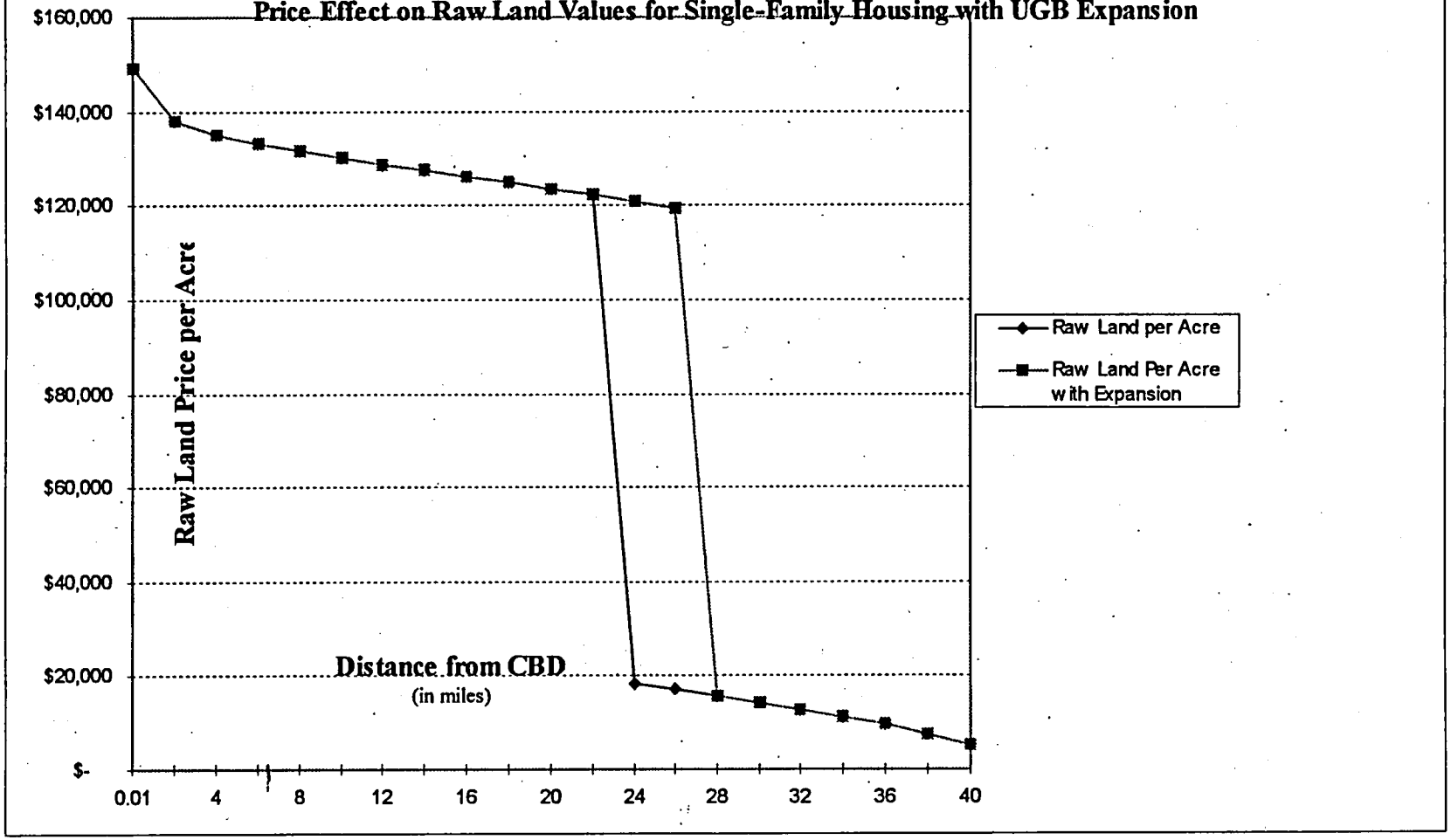
Holding neighborhood characteristics, zoning, and development fees constant, price per acre for single-family residential areas declines steadily from about $150,000 per acre to $120,000 per acre at the edge of the UGB. Beyond the UGB, price per acre falls dramatically to $18,000 per acre which is a combination of the value of land for rural uses and a speculative premium value based on the presumption that it will eventually be used for some urban purpose.

Included in Figure 6 is an alternative line showing raw land prices per acre with an expansion of the boundary. There is a dramatic difference in land prices for the new areas included in the boundary.[5] This substantial increase in value provides a unique opportunity for a capture of value sufficient to pay for infrastructure and fund meaningful affordable housing programs. If such programs are enacted before a UGB expansion, costs could be shifted back to the price of raw land.

[5] In theory, an expansion would result in a larger than proportional reduction in land price throughout the urban area given that the expansion produced a proportional increase in housing output.

Figure 6

Price Effect on Raw Land Values for Single-Family Housing with UGB Expansion



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Part 2: Description and Assessment of Demand Characteristics of Housing

Lot Size Distribution of New Single-Family Dwelling (SFD)

Table 7 displays the distribution of lot sizes of newly constructed homes for 1995 to 1996. 13% of the homes were constructed on lots of 5,000 square feet (sq.ft.) or less; 57% of the total were on lots of 7,000 sq.ft. or less. The median lot size was 6,700 sq.ft.

Table 7
Lot Size Distribution of New SFD Construction: 1995-1996
Portland Metro Area

Lot Size in Square Feet	Frequency	Cumulative %
0 to 2,499	132	3.35
2,500 to 4,999	371	12.76
5,000 to 6,999	1727	56.58
7,000 to 9,999	1181	86.55
10,000 to 14,999	463	98.30
15,000 to 19,999	31	99.09
20,000 to 24,999	17	99.52
25,000 to 43,499	9	99.75
1 acre or more	10	100.00

Median Lot Size 6,700 sq.ft.

House Size Distribution

Table 8 displays the size distribution of newly constructed single-family dwellings for 1995 to 1996. The table shows that no significant construction occurred below 1,000 sq.ft; however, 60% of all construction was 2,000 sq.ft. or less. The median house size was 1,850 sq.ft. and the average house size was approximately 2,000 sq.ft.

Table 8
House Size Distribution of New SFD Construction: 1995-1996
Portland Metro Area

House Size in Square Feet	Frequency	Cumulative %
999	9	0.23
1,249	286	7.48
1,499	660	24.23
1,749	724	42.59
1,999	680	59.84
2,249	535	73.41
2,499	359	82.52
2,749	195	87.47
2,999	203	92.62
3,249	114	95.51
3,499	68	97.23
3,500 or more	109	100.00

Median House Size 1,856 sq.ft.

Sales Price Distribution of Newly Constructed Houses*

Table 9 displays the sales price distribution of newly constructed houses for 1995 to 1996. It also shows that 3.5% of newly built single-family houses sold for less than $110,000 and 10% sold for under $125,000. The median sales price of newly constructed single-family homes was approximately $169,000 and the average sales price was roughly $185,000. This analysis was limited to newly constructed (stick built) homes that sold on the market.

Manufactured homes on single-family lots and exclusive custom built homes are not represented in this coverage. Manufactured housing will only be recorded in the county assessor's database if it is placed on a tax-lot, which does not necessarily include all mobile home and manufactured housing parks. Custom built homes do not initially show as homes that sold on the market because the land is purchased first and then the house is built.

Table 9
House Sales Price Distribution of New SFD Construction: 1995-1996
Portland Metro Area

House Sales Price	Frequency	Cumulative %
$74,999	2	0.05
$89,999	31	0.84
$109,999	105	3.50
$124,999	273	10.43
$149,999	958	34.73
$174,999	811	55.30
$199,999	626	71.18
$224,999	397	81.25
$249,999	240	87.34
$274,999	147	91.07
$299,999	127	94.29
$349,999	95	96.70
$350,000 or more	130	100.00
Median Sales Price $168,556		

* We over emphasize that the median sales price of $168,556 is for *newly* constructed single-family houses only and not *existing* houses. The median sales price of existing houses and new houses is $150,000.

Table 10
Single-Family House Sales Price Distribution by County, 1995-1996
(New and Existing Houses That Sold)

Clackamas County

Sales Price	# of Home Sales	Cumulative Percentage
$74999	366	10.5%
75,000-99,999	408	22.2%
100,000-114,999	261	29.7%
115,000-124,999	227	36.2%
125,000-139,999	408	47.9%
140,000-149,999	212	54.0%
150,000-174,999	478	67.7%
175,000-199,999	306	76.5%
200,000-224,999	215	82.6%
225,000-249,999	167	87.4%
over $250,000	439	100.0%
Total	3,487	

Median Sales Price: **$143,467**

Multnomah County

Sales Price	# of Home Sales	Cumulative Percentage
$74999	1,444	14.2%
75,000-99,999	2,384	37.6%
100,000-114,999	1,240	49.8%
115,000-124,999	917	58.8%
125,000-139,999	1,099	69.6%
140,000-149,999	511	74.7%
150,000-174,999	878	83.3%
175,000-199,999	475	88.0%
200,000-224,999	258	90.5%
225,000-249,999	188	92.4%
over $250,000	778	100.0%
Total	10,172	

Median Sales Price: **$115,196**

Washington County

Sales Price	# of Home Sales	Cumulative Percentage
$74999	415	4.5%
75,000-99,999	559	10.6%
100,000-114,999	686	18.1%
115,000-124,999	832	27.2%
125,000-139,999	1,577	44.4%
140,000-149,999	829	53.4%
150,000-174,999	1,579	70.6%
175,000-199,999	981	81.3%
200,000-224,999	524	87.1%
225,000-249,999	384	91.2%
over $250,000	803	100.0%
Total	9,169	

Median Sales Price: **$146,218**

Source: County assessor sales ratios

Table 11
Multi-Family Rents 1994-1996

	1994	1995	1996	% Change 1994 - 1995	% Change 1995 - 1996	% Change 1994 - 1996
Regional Median Rent	$528	$543	$591	2.8%	8.9%	11.9%

Source: Metro Data Resource Center and County Assessor data

Part 3: Overview of Assisted Housing in the Region

As previously indicated in the *Background* section, one of the inherent problems in dealing with most affordable housing issues is defining housing affordability. If based solely upon the HUD definition, housing affordability would apply to any person or household regardless of their income. The definition or perhaps the notion of affordability also applies to persons living in *assisted* housing. The distinguishing factor is the need for assistance (i.e., rent subsidy) to ensure that housing costs will not exceed 30% of the household income. Households in this region that are often in need of assisted housing tend to be at or below 80% of median household income.

According to the *American Housing Survey* (1990), about 10 percent of rental housing in the Portland area is subsidized. Still, this data above does not provide a clear picture with regard to the types of people that may need housing assistance. Many of these low - and moderate households include the following: teachers, fast food workers, preschool aides, gas station attendants, bookkeepers, nurses, bank tellers and librarians.

Current Housing Deficit

The issue of assisted housing in the context of how this region will address housing unaffordability has increased concerns regarding the current need or deficit of affordable housing primarily because Metro's forecasts involve future demand. This has been a difficult challenge for Metro and local jurisdictions due to a lack of understanding on exactly what should constitute the *unmet* housing need of the region. Some of the variables that can be used to describe the unmet need include:

- Homeless estimate (annual).
- Special needs group (i.e.; frail elderly, persons with HIV, victims of domestic violence).
- Renter and Owner households at or below 50% of the regional median income.
- Renter and Owner households between 51% and 80% of regional median income.
- Those on "waiting lists" for housing.

According to the State of Oregon Department of Housing and Community Development, the unmet need in the three county area is close to 47,000 dwelling units (Table 14, page 33).

Table 12 (a)
Assisted Housing Programs by County

Assisted Housing Programs (1994)	Washington (# of units)	Clackamas (# of units)	Multnomah (# of units)	Clark (# of units)
Public Housing	279	569	2, 690	575
Section 8 (Certificates & Vouchers)	2,221*	1,150	4,853	1,924
Other HUD programs; Section 202 and 811 and Farmers Admin.	480	203	5,230	688
Total	2,980	1,922	12,773	3,187

Source: (1995) Consolidated Plans for Washington, Clackamas and Multnomah counties.
(1997) Consolidated Plan for Clark County.

*Some are privately owned

(a) Does not include persons with "special needs" (e.g.; frail elderly, persons with HIV, victims of domestic violence); Rentals only. Does not include state programs.

Table 13
Assisted Households by County (1994)*

County	Assisted HH	Total HH	% of Total
Washington County	2,808	134,014	2.1
Clackamas County	2,231	115,953	1.9
Multnomah County	11,783	252,376	4.7
Clark County	3,187 (b)	111,827	2.8

Source: State of Oregon Department of Housing and Community Development, Consolidated Plan (1996) and Metro, Regional Databook (1997)

*Does include persons with "special needs."

(b) Based on total from the Consolidated Plan.

Table 14
Current Deficit of Assisted Housing (1994)*

County	*Unmet* Need	Total Households	% of Total
Washington County	9,364	134,014	7.0
Clackamas County	7,596	115,953	6.6
Multnomah County	30,014	252,376	11.9
Total	46,974	502,343	9.4

Source: State of Oregon Department of Housing and Community Development, Consolidated Plan (1996) and Metro, Regional Databook

*Does include persons with special needs. Does not include homeless estimates.

Table 15
Homeless Estimates by County*

	Washington	Clackamas	Multnomah
Annual Estimate	3,000 - 6,000	2,800 - 4,600	13,000 - 16,000

Source: (1995) Consolidated Plans for Washington, Clackamas and Multnomah counties.

*Each source notes the difficulty of ascertaining reliable census on homelessness; specifically as it relates to "one-time snap-shots" in which surveys are conducted. However, the data is noted to be a fair representation of the current conditions.

Section One Summary

- At the edge of the urban growth boundary (UGB), price per acre for single-family housing declines steadily from about $150,000 to $120,000 when holding the affects of neighborhood change, zoning, and development fees constant.

- From 1995 to 1996, 57% of single-family houses built in the region were on lots of 7,000 square feet (sq.ft) or less. The median lot size was 6,700 sq.ft..

- From 1995 to 1996, 60% of all single-family home construction was 2,000 sq.ft. or less. The median house size was 1,850 sq.ft.

- From 1995 to 1996, the median sales price of newly constructed single-family homes was $168,556 and the average sales price was roughly $185,000. The median sales price of new and existing houses was $150,000 (second quarter 1997).

- In 1995, every jurisdiction experienced consistent and significant growth levels. This is due to increased levels of infill and redevelopment which allows some growth to be accommodated in built-out areas. Approximately 29% of residential units were from redevelopment and infill in 1996.

- Those who are often in need of assisted housing in the region are identified as households with incomes less than 80 percent the area median household income and paying 30 percent or more for housing expenses (i.e.; rent or mortgage, utilities, property taxes, and insurance).

- About 12% of the housing stock in the four county area is subsidized. Multnomah County currently has more assisted households (in relation to its total households) than Clackamas, Clark, and Washington counties.

- The following is a list of low and moderate-income people that are often in need of affordable housing or assistance guaranteeing that housing costs will not exceed 30% of their income: teachers, fast food workers, preschool aides, gas station attendants, bookkeepers, nurses, bank tellers, and librarians.

- In Clackamas, Clark, and Washington counties, 70% or more of single-family dwellings were priced at or above $100,000. In the three county area, only a total of 70 single-family dwellings built in 1996 were priced at $100,000 or less.

Section 2:

Costs and Attributes of Single Family Housing Production

To fully understand the factors and barriers to producing affordable housing--as discussed in Section 3, this section contains brief statistical analyses which address housing sales price and its relation to: lot size, house size and type, access, neighborhood location, and depreciation.*

This is the type of information that developers intuitively, and through experience apply in their housing developments to yield a maximum profit given the current price of land, development fees, zoning, and housing construction costs.

* The word *effect* is used throughout Section 2 because our analyses (models) produce specific results that support a general design or intention.

Lot Size

Table 16 displays the lot size effect on home sales price for five different home sizes ranging from 1,000 to 3,000 square feet (sq.ft.).* Sales price for each size house is displayed for lot sizes ranging from 1,500 to 25,000 sq.ft. For instance, a 1,500 sq.ft. house on a 2,500 sq.ft. lot sells for $134,000. The same house on a 25,000 sq.ft. lot sells for $168,000. This ten fold increase in lot size (22,500 sq.ft.), increases the selling price of a house by $34,000.

From an economic perspective, if raw land plus lot development costs exceed $1.51 per sq.ft., a developer would lose money offering 1,500 sq.ft. homes on 25,000 sq.ft. lots. In the case for 3,000 sq.ft. homes to regularly appear on 25,000 sq.ft. lots, lot development costs would have to be under $2.53 per sq.ft. In jurisdictions with responsive zoning to reflect changes in the housing market, we would expect most 1,500 sq.ft. houses to be on lots of 5,000 sq.ft. or less, and 3,000 sq.ft. houses to be on lots ranging from 5,000 sq.ft. to 10,000 sq.ft.

* Variables of neighborhood character, sale month, and access are held constant.

Table 16

Lot Size Effect

Access Utility	Sale Month	House Size (sq.ft.)	House Size (sq.ft.)	House Size (sq.ft.)	House Size (sq.ft.)	Lot Size	Est. Price 1000 Sq.ft. hse	Est. Price 1500 Sq.ft. hse	Est. Price 2000 Sq.ft. hse	Est. Price 2500 Sq.ft. hse	Est. Price 3000 Sq.ft. hse
279.34	13	1000	2000	2500	3000	1500	$93,602	$127,126	$157,966	$186,952	$214,542
279.34	13	1000	2000	2500	3000	2500	$98,457	$133,720	$166,160	$196,650	$225,671
279.34	13	1000	2000	2500	3000	5000	$105,451	$143,219	$177,962	$210,618	$241,700
279.34	13	1000	2000	2500	3000	7500	$109,770	$149,085	$185,251	$219,244	$251,600
279.34	13	1000	2000	2500	3000	10000	$112,941	$153,392	$190,603	$225,578	$258,868
279.34	13	1000	2000	2500	3000	12500	$115,464	$156,818	$194,861	$230,617	$264,651
279.34	13	1000	2000	2500	3000	15000	$117,567	$159,674	$198,410	$234,817	$269,471
279.34	13	1000	2000	2500	3000	17500	$119,375	$162,130	$201,461	$238,428	$273,615
279.34	13	1000	2000	2500	3000	20000	$120,964	$164,287	$204,142	$241,601	$277,256
279.34	13	1000	2000	2500	3000	22500	$122,382	$166,214	$206,536	$244,435	$280,508
279.34	13	1000	2000	2500	3000	25000	$123,666	$167,957	$208,702	$246,998	$283,449

Housing Size and Price

Table 17 shows the effect of house size on selling price, holding all other variables constant. Moreover, it indicates that house size is perhaps the most important attribute when it comes to the sales price of a home. For example, a 1,000 sq.ft. house sells for $109,000 and a 3,000 sq.ft. house sells for $250,000--an increase of $141,000. A study by the National Association of Home Builders indicates the average house size grew to 1,920 sq.ft. in 1996 from 1,385 sq.ft. in 1970--an increase of 39%.

Table 17
House Size Effect

Access Utility*	Lot Size	Sale Month	House Size	Est. Price
279.34	7,000 sq.ft.	13	1,000 sq.ft.	$109,023
279.34	7,000 sq.ft.	13	1,250 sq.ft.	$129,028
279.34	7,000 sq.ft.	13	1,500 sq.ft.	$148,070
279.34	7,000 sq.ft.	13	1,750 sq.ft.	$166,345
279.34	7,000 sq.ft.	13	2,000 sq.ft.	$183,990
279.34	7,000 sq.ft.	13	2,250 sq.ft.	$201,101
279.34	7,000 sq.ft.	13	2,500 sq.ft.	$217,752
279.34	7,000 sq.ft.	13	2,750 sq.ft.	$233,999
279.34	7,000 sq.ft.	13	3,000 sq.ft.	$249,887
279.34	7,000 sq.ft.	13	3,250 sq.ft.	$265,454
279.34	7,000 sq.ft.	13	3,500 sq.ft.	$280,730

* The cost of travel and the amount of travel time from a given origin to all destinations within the region by all modes of travel.

Neighborhood Location

Tables 18 and 19 show the effects of neighborhood location on home selling price, holding the variables house size and lot size constant.* In the Portland area, the price of new houses with the same size house vary by $100,000 or more. For example, a new home selling for $158,000 in rural Sandy would sell for $227,000 in Forest Park. In another example, a house of attached design (i.e., townhouse, row house) in the West Hills on a smaller lot (2,500 sq.ft.) sells for even more--$243,000. Conversely, new housing in Portland's older and prestigious neighborhoods such as Irvington and Alameda command a $30,000 premium in value over new, suburban subdivisions.

* In this analysis, neighborhood effects are measured in terms of city and county jurisdiction and then a set of additional attributes such as view, prestige, housing occupancy, and design mix, infill area, rural, subsidy area, etc. Neighborhoods were not measured specifically by their nomenclature (i.e., Irvington, Raleigh Hills, Portland Heights).

Table 18

CBD distance	lot size	house size	sale month	Jurisdiction	estimated price	view?	prestige?	mixed?	infill?	attached?	subsidized?	rural?
21.5	5000	2000	13	Forest Grove	$ 173,966	0	0	0	0	0	0	0
19.0	5000	2000	13	Cornelius	$ 155,045	0	0	0	0	0	0	0
15.5	5000	2000	13	Hillsboro	$ 170,664	0	0	0	0	0	0	0
10.0	5000	2000	13	Aloha, infill	$ 170,379	0	0	0	1	0	0	0
7.5	5000	2000	13	Beaverton, infill	$ 166,287	0	0	1	1	0	0	0
7.5	5000	2000	13	Forest Park	$ 226,912	1	1	0	0	0	0	0
1.0	2500	2000	13	West Hills, attached	$ 243,009	1	1	0	1	1	0	0
3.0	5000	2000	13	Boise, subsidized	$ 122,674	0	0	1	1	0	1	0
3.0	5000	2000	13	Irvington	$ 207,755	0	1	0	1	0	0	0
5.5	5000	2000	13	East Portland, infill	$ 170,097	0	0	1	1	0	0	0
6.5	5000	2000	13	Mid County,infill	$ 171,709	0	0	0	1	0	0	0
8.0	5000	2000	13	Mid County, new	$ 175,554	0	0	0	0	0	0	0
12	5000	2000	13	Gresham,new	$ 185,192	1	0	0	0	0	0	0
22	5000	2000	13	Sandy,rural	$ 157,963	0	0	0	0	0	0	1

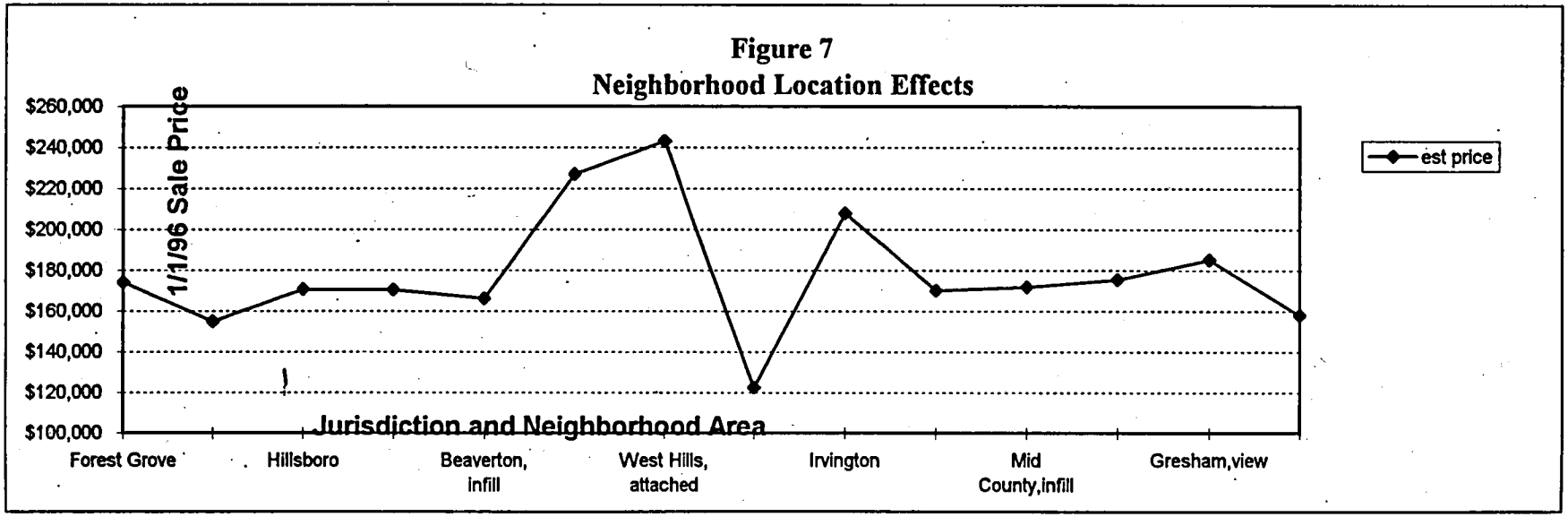

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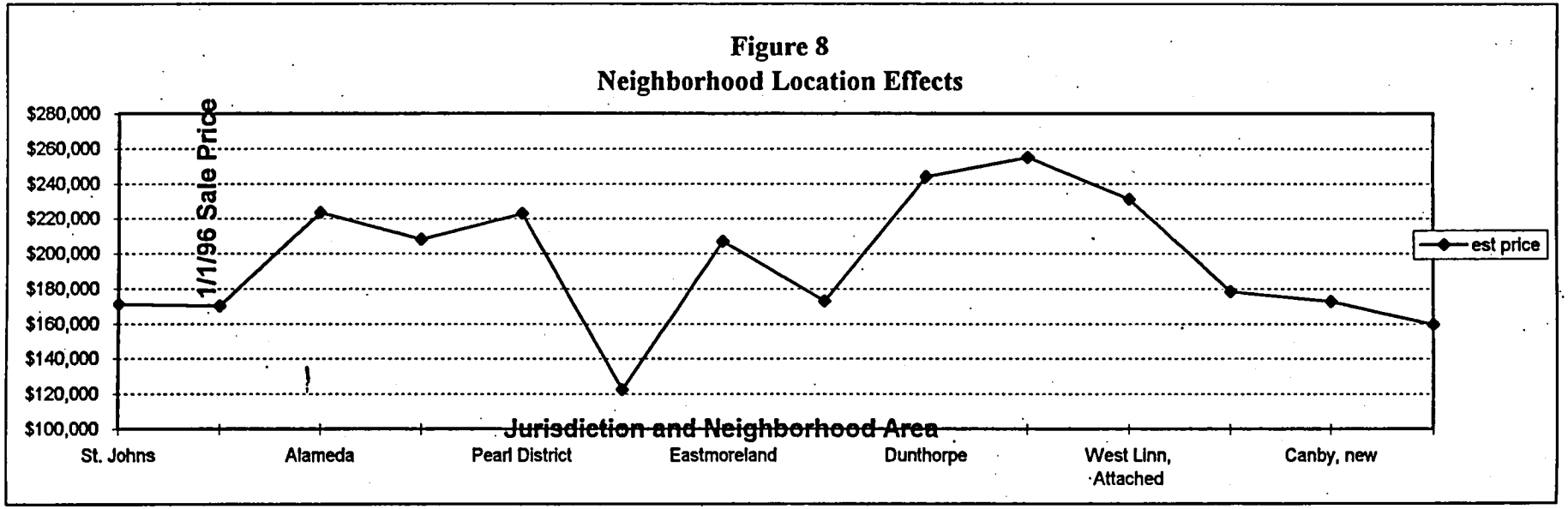
Table 19

CBD distance	lot size	house size	sale month month	Jurisdiction	estimated price	view?	prestige?	mixed?	infill?	attached?	subsidized?	rural?
8.0	5000	2000	13	St. Johns	$ 171,163	0	0	0	1	0	0	0
5.0	5000	2000	13	N.E. Portland	$ 170,307	0	0	1	1	0	0	0
3.5	5000	2000	13	Alameda	$ 223,433	1	1	0	1	0	0	0
2.5	5000	2000	13	Laurelhurst	$ 208,129	0	1	0	1	0	0	0
0.05	1000	2000	13	Pearl District	$ 222,848	1	1	1	1	1	0	0
1.0	4500	2000	13	Belmont,subsidy	$ 122,544	0	0	1	1	0	1	0
4.5	5000	2000	13	Eastmoreland	$ 206,823	0	1	0	1	0	0	0
5.5	5000	2000	13	Milwaukie	$ 172,940	0	0	1	1	0	0	0
6.0	10000	2000	13	Dunthorpe	$ 243,829	1	1	0	0	0	0	0
7.0	5000	2000	13	Lake Oswego	$ 254,986	1	1	0	0	0	0	0
10.5	5000	2000	13	West Linn	$ 231,159	1	1	0	0	0	0	0
15.0	5000	2000	13	Oregon City, new	$ 178,247	0	0	0	0	0	0	0
20.0	5000	2000	13	Canby, new	$ 172,652	0	0	0	0	0	0	0
25.0	5000	2000	13	Estacada, rural	$ 159,573	0	0	0	0	0	0	1



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Housing Depreciation

To this point, data in this section of the report has been limited to houses constructed in 1995 and 1996.[6] The rationale behind this approach was to focus on how the housing market is responding to current prices and regulations--not those of 25 or 60 years ago. However, this section does focus on the factors that affect the vintage housing stock such as depreciation.[7]

This section describes an analysis of 17,000 valid sales records in the region with complete data that contained the following: year built, sales price, lot price, building size, and location. Essentially, the analysis provided results for vintage housing that were similar to newly constructed housing in terms of lot size and building size. However, depreciation results are quite surprising. Instead of depreciating at 1% to 1.5 % a year like most housing throughout the U. S. with appropriate zoning ordinances designed to maintain the character of residential areas, depreciation in this region has been less than 0.5% per year since 1991.

[6] Data was collected for the purpose of evaluating the elasticity of capital-land substitution. Literature indicates this technical parameter is unambiguously measured using sales price data for newly constructed housing. See J. Jackson, R. Johnson, D. Kaserman. "The Measurement of Land Prices and the Elasticity of Substitution in Housing Production." *Journal of Urban Economics.* 16: (1984), pp. 1-12. Also, J. McDonald. "Capital-Land Substitution in Urban Housing: A Survey of Empirical Estimates." *Journal of Urban Economics.* 9:(1981), pp. 190-211.

[7] Depreciation is defined as a reduction or loss in the value of a good because of age, wear, or other cause; and Vintage Housing is defined as housing that is available (in any jurisdiction) after demolition, and new construction in a given time period.

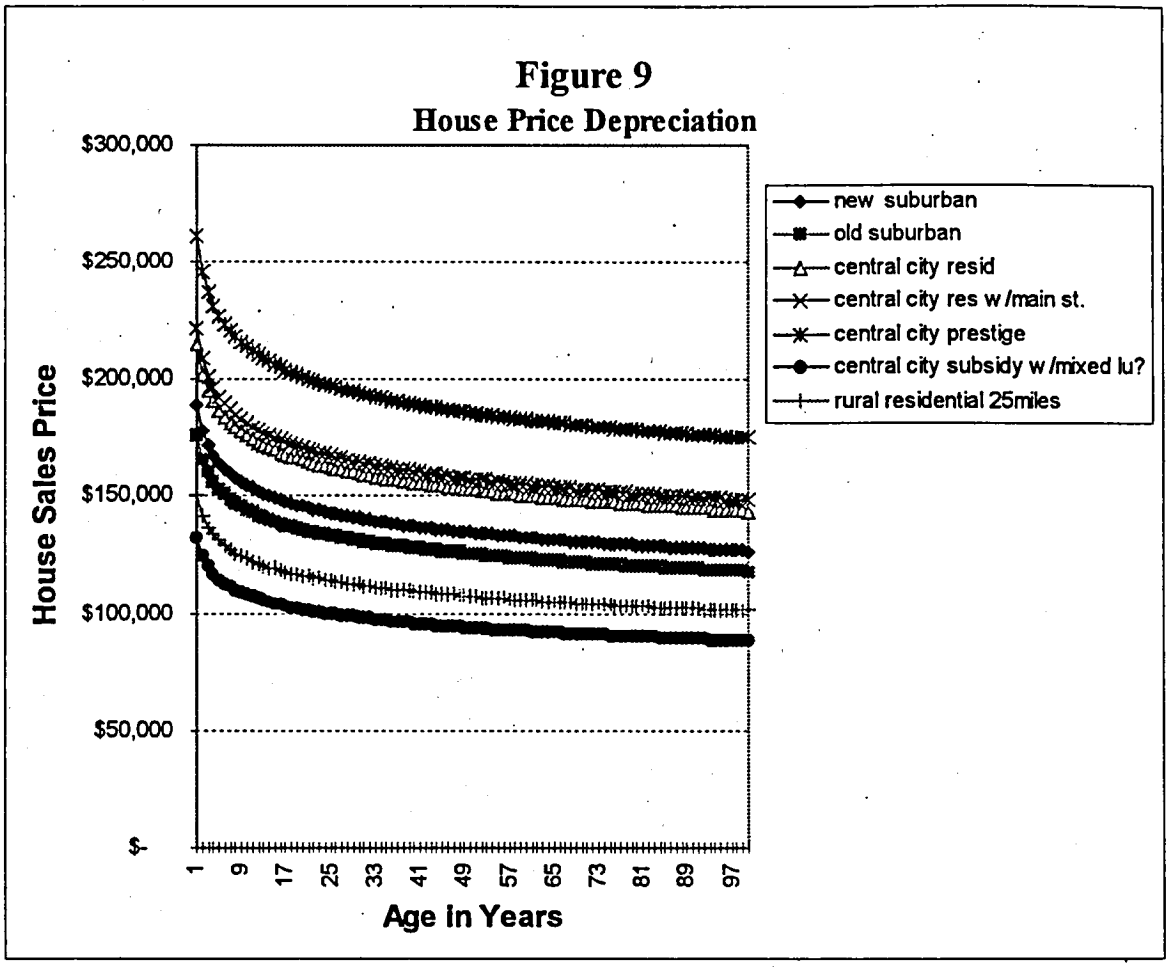


Figure 9
House Price Depreciation
$300,000
$250,000
$200,000
$150,000
$100,000
$50,000
$-
House Sales Price
1
9
17
25
33
41
49
57
65
73
81
89
97
Age in Years
new suburban
old suburban
central city resid
central city res w/main st.
central city prestige
central city subsidy w/mixed lu?
rural residential 25miles

Section Two Summary

- Compared to the sales price of a home, lot size is not as valued by most consumers. However, when land is cheap, consumers express a preference for larger lot sizes.

- An affordable house is essentially a smaller house. A 1,000 square feet (sq.ft.) house may sell for $109,000 while a 3,000 sq.ft. house may sell for $250,000.

- Small, single-family affordable houses can only be built on small lots; typically 5,000 sq.ft. or less.

- Unlike most eastern cities, older neighborhoods such as Alameda and Irvington in the city of Portland are not sources of affordable housing in terms of vintage stock. Throughout the region, housing prices in suburban areas are quite similar to housing prices in urban areas.

- The average house size grew to 1,920 sq.ft. in 1996 from 1,385 sq.ft. in 1970--an increase of 39%.

Section 3:

Factors and Barriers to Affordable Housing

The previous section on costs and attributes associated with the selling price of a house is important and must be considered when addressing issues related to housing affordability.

However, the previous section also implies that affordable housing is essentially a quantitative problem--which may or may not be the case. Accordingly, this section presents a number of barriers that indicate affordable housing has both quantitative and qualitative aspects.

Demographic Changes

Over the past 10 years, the Portland metropolitan area has experienced a rapid increase in population growth. In 1980, the population was estimated at 1,050,418 people living in the tri-county area. By 1995, the population grew to an estimated 1,205,100. Factors that have contributed to this growth include:

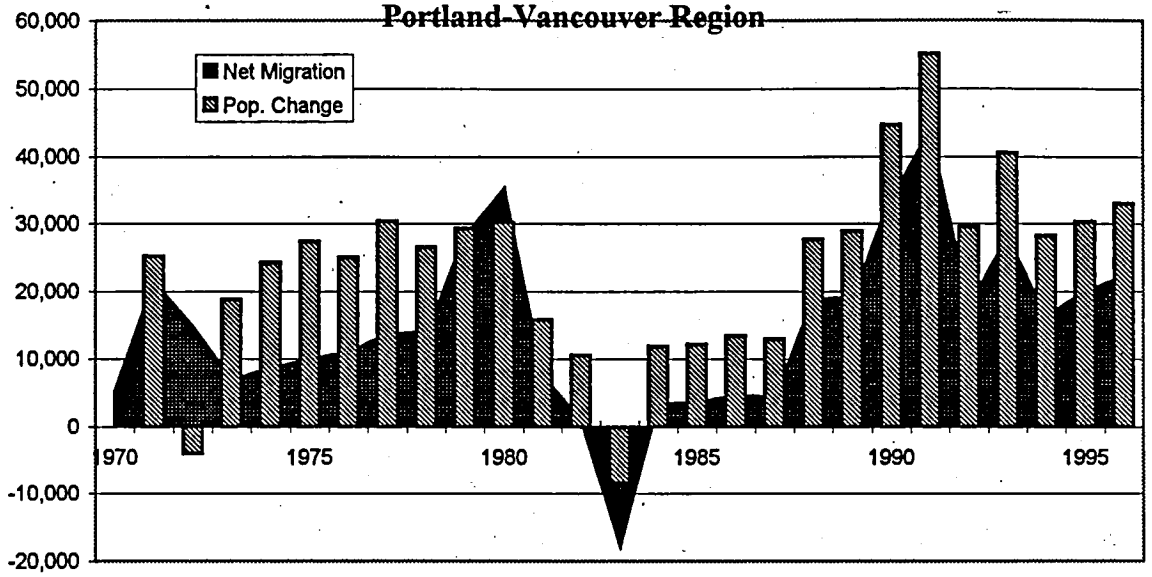
- High migration rates, particularly because of slow job growth in California;
- Above average employment growth in the Portland area economy; and
- Tax incentives that have lured a large number of high-tech firms.[8]

In-migration has been the main source of population growth in the Portland metropolitan region. Many of the in-migrants come from places such as California (43.3%), Washington (11.6%), and states east of the Mississippi River (12.9%).[9] Due to migration, the region is expected to grow an average of 1.6% per year through 2015 while the U.S. is expected to grow an average of 0.9% per year through 2015. During this 18 year period, the share of elderly (65 years and older) will rise to 14.9% from 11.9% in 1990; individuals 45 years and over increases to 25.5% from 18.7%.[10]

Forecasts indicate the region will be on average older and have fewer people per household. Also, the economy is likely to remain strong, particularly in the high-tech sector, and continued population growth will make this possible. However, most of the job growth will be in the relatively low paid retail and service sectors. As a result, there will likely be an increase in the demand for many low and moderate-income households seeking decent housing they can afford.

[8] Metro. *Urban Growth Report.* p.5
[9] The Institute of Portland Metropolitan Studies. *Metropolitan Briefing Book.* p.14
[10] Metro. *The 2015 Regional Forecast.* p.27

Figure 10:
Migration Trends of the
Portland-Vancouver Region

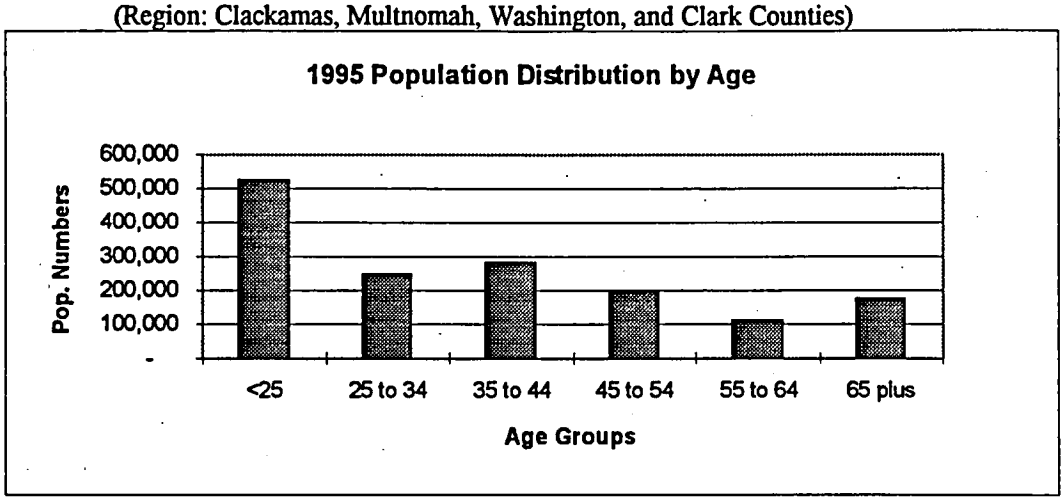


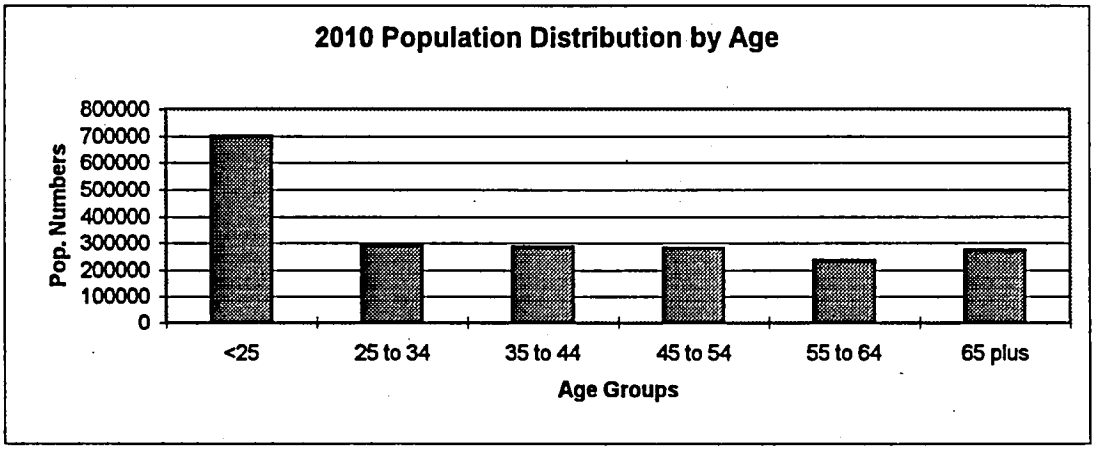
source: CPRC, Portland State University
OFM, State of Washington

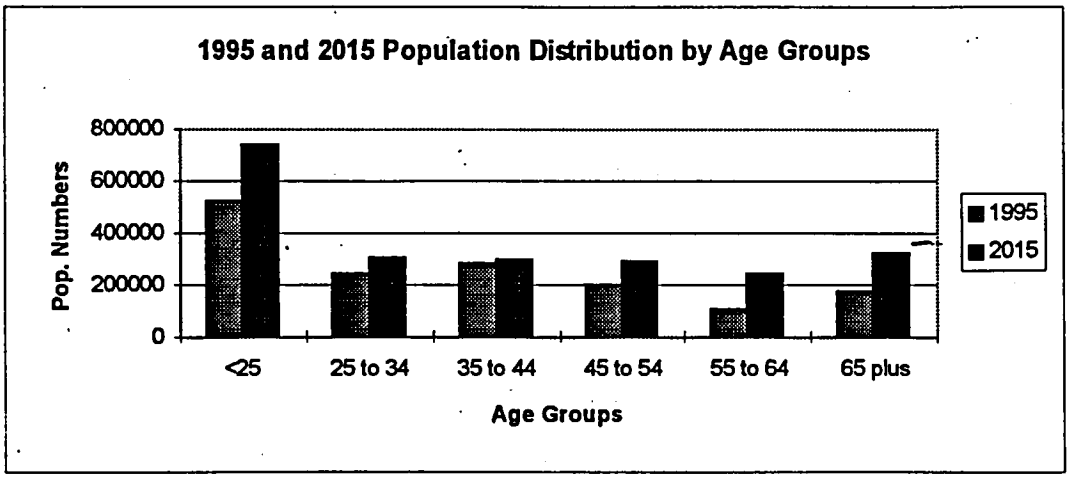
Figure 11

Population Age Distributions: 1995, 2010, and 2015

(Region: Clackamas, Multnomah, Washington, and Clark Counties)







Regulatory Constraints

There are a number of regulatory constraints that affect the development of affordable housing such as building codes, seismic standards, zoning, and land use regulations. Additional elements that are often combined with the list above which can affect the cost of housing include: system development charges for services and utilities like water, electricity, and garbage disposal; building permits fees; and review procedures for development proposals.

A study by the Victoria Transport Policy Institute notes how zoning requirements for parking can have an impact on housing affordability.

> Parking requirements reduce the maximum potential density of development, increasing overall housing costs. This increases average housing costs and reduces developers' incentive to build affordable housing. Based on typical development costs, requiring one parking space per housing unit to a multi-family development increase total development by over 10%, and two parking spaces increase housing costs by over 25%. Since parking costs increase as a percentage of rent for lower priced housing, and housing represents a larger portion of household expenditures for poorer households, parking costs are highly regressive.

Another regulatory barrier that affects the development of affordable housing is zoning that requires a minimum lot size for detached, single-family dwellings to be set above 5,000 sq.ft. Our analysis shows that lot sizes over 5,000 sq.ft. increases the price and size of the house on the land that it is built. Over half of the land currently inside the UGB is zoned for 7,000 sq.ft. to 10,000 sq.ft. lots. Rezoning or perhaps reducing minimum lot sizes will encourage smaller, more affordable homes.

Many of the above regulations have a purpose in terms of maintaining property values and protecting public health, safety, and welfare; however, this often presents a three-fold problem. One, developers will often regain funds from regulatory exaction by increasing the selling price or rental price of the proposed dwelling units. Two, local government accountability to charge fees when there is no public benefit gained or maintained by a project; and three, the general public may pick up increased costs through services.

Regulatory constraints are quite complex and would require local governments to make a considerable amount of adjustments to lessen costs to the developer. However, benefits are gained when costs are not passed on to the consumer. A study by the Montgomery County Inter-Agency Task Force on Affordable Housing indicate changes to development regulations, zoning, and the review process can save as much as 15% to 20% of the purchase price for a house.

Infrastructure Costs

Major off-site needs and capital improvement for roads, stormwater management, schools, utility systems, and so forth have an impact on housing affordability. However, understanding the type of growth--planned or trend--in a particular region can provide more insight to possible impacts. Planned growth is a method which maximizes development resources and limits costs by containing most growth within locations that are more efficient to service; and trend or traditional development includes subdivision residential style developments particularly in the form of 0.33 to 1.0 acre lots and strip "big box" commercial and retail uses.

In a study published by the Lincoln Institute of Land Policy Research, authors Robert W. Bruchell and David Listokin investigate the impact of infrastructure costs with respect to planned and trend development. They note the following for the city of New Jersey (Table 20):

> Planned development relative to trend development requires 76% of the capital costs for roads, 97% of the costs for schools, and 92% of the costs for utilities.

> When the overall picture is examined with respect to housing affordability under managed growth--taking into account both instances of rising and lowered costs, as was done in the New Jersey impact assessment--the finding is that managed growth can moderate rather than increase the cost of housing.

In regard to the above information, there is limited research as to how growth management has impacted infrastructure costs in the Portland metropolitan region. However, such a study by authors Robert W. Bruchell and David Listokin would provide a base for demonstrating that infrastructure costs would not significantly affect housing affordability in this region.

Table 20

New Jersey Impact Assessment: Summary of Infrastructure Impacts for Trend Versus Planned Development

Growth/Development Impacts		Trend Development	Planned Development	Trend Versus Planned	
				Difference	*%*
Population Growth	(persons)	520,012	520,012	0	0
Household Growth	(households)	431,000	431,000	0	0
Employment Growth	(employees)	653,600	653,600	0	0
Infrastructure					
A. Roads	($ millions)[a]				
Local		$2,197	$1,630	$567	25.8
State		$ 727	$ 595	$132	18.2
Total Roads		$2,924	$2,225	$699	23.9
B. Utilities--Water	($ millions)	$ 634	$ 550	$ 84	13.2
C. Utilities--Sewer	($ millions)	$6,790	$6,313	$477	7.0
Total Utilities		$7,424	$6,863	$561	7.6
D. Schools	($ millions)	$5,296	$5,123	$173	3.3
E. All Infrastructure	(sum of A-D)	**$15,644**	**$14,211**	**$1,433**	**9.2**
Land Consumption					
A. Overall Land	(acres)	292,079	117,607	174,472	59.7
B. Frail Lands	(acres)	36,482	6,139	30,343	83.2
C. Agricultural Lands	(acres)	108,000	66,000	42,000	38.9
House Price					
A. Median Cost per unit	($ 1990)	$172,567	$162,162	$10,495	6.1
B. Housing Index (higher # is more affordable)		118	126	8	6.7

[a] in 1990 dollars

Source: Lincoln Institute of Land Policy. *Land, Infrastructure, Housing Costs and Fiscal Impacts Associated with Growth.* 1995

Lending Environment

There are lending barriers for first-time homebuyers as well as developers. This should be considered in the context of housing affordability issues. However, this section will focus primarily on the barriers which affect the renter/potential homeowner since the previous sections on regulations and infrastructure costs applied to the developer and local government, while noting how costs are passed on to the consumer in most cases.

The ability to obtain home financing is a central piece to the issue of housing affordability because owning a home is the greatest single investment for most people. It is quite clear that all housing is affordable to someone, and most banks are willing to assist homebuyers based around how much of their monthly income should be devoted to a house payment; however, those with incomes 30% to 50% of median income normally face a number of problems that relate directly to barriers in the lending environment.

Cost Burden

61% (13,870) of rental households and 51% of owner households in Multnomah County with incomes at 30% of median or less experience severe cost burdens. That is, they pay more than 50% of their monthly income for expenditures such as property taxes, mortgage payments or rent, utilities, maintenance costs, and mortgage insurance. As a result, the above monthly expenditures can have an affect on the ability of low-income borrowers to become homeowners. Still, very few moderate-income households are experiencing a severe cost burden.

Cost burden is also a concern for many households in Washington County--one of the most affluent areas in the state of Oregon. In 1990, the U.S. Census identified 70% of renters (3,533) with incomes at or below 30% of the area median income paid more than half of their income on rent and utilities. The 1990 Census also found 8,977 low-income households and 13,593 moderate-income households living in unaffordable housing in Washington County.[11]

Up-Front Cash Costs

For many potential low and moderate-income homebuyers, putting a significant down payment on a home without causing additional burdens on their borrowing ability continues to be a problem as home prices appreciate in the region. Most banks require a 20% or more down payment. Therefore, if we consider the median price of a home in the region ($150,000) a borrower would need to put a down payment of at least $30,000.*

In this example, the down payment can be adjusted depending upon the length of the mortgage (15 or 30 year) or perhaps additional collateral a borrower could use as a substitute for a cash payment such a car, boat, farm equipment, and other major property investments. Still, many low and moderate-income borrowers do not have substantial collateral, nor are they able to put 20% down on a home without some assistance.

If a lending institution allows a borrower to put less than 20% down, the borrower is then required to pay a private mortgage insurance (PMI). This is essentially a premium that has to be paid to off-set the lender's risk of accepting less than 20% down. The negative side of PMI is two-fold: One, it is not tax deductible; and two, it can be very expensive depending upon what a borrower puts down--potentially increasing monthly mortgage payments by 5% to 10%. Moreover, PMI has to be paid until a borrower accumulates 20% equity into the home. This could also result in a significant cost burden for many low and moderate-income borrowers.

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[11] Washington County, Oregon and City of Beaverton. *Housing and Community Development Plan.* p.9

* A less expensive house for $100,000 would require a borrower to put $20,000 down.

Rising Interest Rates

During periods of low to moderate interest rates, home purchasing often increases. This condition is also stimulated when housing prices remain stable. It is during this time when most low and moderate-income groups find housing that is affordable. Still, there are a lot of considerations individuals make when purchasing a home such as location, neighborhood crime rates, and proximity to retail centers that could affect the price of the home itself; yet interest rates fluctuate based on changes in the market which a homebuyer does not have direct control of. The uncertainty of interest rates can have an affect on any home purchaser; however, when interest rates increase, it begins to force many low and moderate-income groups out of the housing market.

In contrast to the above, the affordability problems associated with rising interest rates and up-front cash costs may not be applicable to long-time mortgage holders. This group of homeowners generally have a fixed (or adjustable) mortgage which does not change much over a 15 to 30 year period. Therefore, established homeowners are not necessarily affected by increases in home prices and can potentially reduce their cost burden over time provided property taxes and insurance rates do not greatly increase.

Scenario: Tax Savings for the Homebuyer

Loan Amount	80,000
Term	30 Year
Interest	9%
Monthly Payment	$644
Taxes	$200 p/mo.
Insurance	$40 p/mo.
Total Monthly Payment	**$884**

First Month's Interest: (9% x 80,000)/ 12 =	$600
Property Tax per Month:	$200
Total Tax Deduction p/mo.	**$800**

Monthly Tax Savings @ Owners Tax Bracket of 28%: 800 x 28% =	$224
Effective Monthly Costs: 884 - 224 =	**$660**
Monthly Equity Build-up: ($80,000 x 0.683%)/ 12	$ 46
Actual Monthly Cost: 660 - 46 =	**$614**

source: 1987 Realty BlueBook

Access to Public Goods and Services

Providing and promoting access to goods and services continues to be a key mechanism to achieving Metro's 2040 Growth Concept design types (i.e., Regional Centers, Main Streets, Employment Areas). However, residential areas with improved access to transit services, retail and employment centers, and so forth can have an affect on housing costs. Gerrit Knaap notes this in a study.

> ...property values higher near public parks, light rail stations, sewer interceptors and other public investments...also...property values higher in communities with centralized sewer systems.

A example can be identified with Census Tract 23.01, which encompasses portions of the Eliot and Irvington neighborhoods in Northeast Portland. These neighborhoods are adjacent to Martin Luther King, Jr. Boulevard, a 3 mile main street that has experienced a number of new commercial/retail and residential development over the past 5 years. 1990 Census data shows the median value of owner-occupied homes in the area as $39,500. 1996 data estimates the median value of owner-occupied homes as $67,300. This is an increase in value of 70%.

In regard to access to public goods and services, Metro's growth management efforts can create amenities that are beneficial to the entire region. On the neighborhood level, however, the creation of amenities can have an impact on housing costs.

Section Three Summary

- Since 1990, increases in housing prices are driven in part by the region's rapid rate of population growth and inability to produce a sufficient number of buildable lots to satisfy demand. This same pattern was exhibited in the 1970s before the region established the urban growth boundary in 1979.

- The regional economy is likely to remain strong, particularly in the high-tech sector and continued migration will make this possible. This will increase the demand for many low and moderate-income households seeking decent housing they can afford.

- Regulatory constraints such as building codes, seismic standards, zoning, and land use regulations can have an affect on the cost of housing. A study by the Montgomery County Interagency Task Force on Affordable Housing indicates streamlining development regulations, zoning, and the review process can save as much as 15% to 20% of the purchase price for a house.

- A study by published by the Lincoln Institute of Land Policy notes that housing affordability under managed growth can moderate rather than increase, and infrastructure costs for roads, stormwater management, schools, and utility systems would not significantly increase the price of housing.

- Households with incomes at or below 50% of median income generally face the greatest challenge of obtaining affordable housing in the region. Moreover, potential first-time homebuyers face problems such as rising interest rates and insufficient funds for closing costs which prevent them from becoming homeowners.

- Demand for affordable senior housing will likely increase as the region's share of elderly (65 years and older) grows.

Section 4:

Overview and Assessment of Affordable Housing Needs, Tools and Strategies

This section includes an estimate of affordable housing need for the next 20 years. In additional, there are a number of tools or mechanisms Metro and local jurisdictions can use to address affordable housing issues. This section contains a list of examples that have been used in this region and other metropolitan areas to address affordable housing. This section also describes the affordable housing *tools* that are consistent with Metro's Charter authority.

Metro's Charter Authority

Metro is authorized to ". . . identify aspects of metropolitan development . . . and adopt functional plans which . . . recommend or require cities and counties, as it considers necessary, to make changes in any plan to assure that the plan and any actions under it conform . . ." to the functional plan (ORS 268.390).

Further definition of this broad planning authority in state law has been established in the Metro Charter. First, Section 4 of the Metro Charter defines Metro's jurisdiction to include "matters of metropolitan concern." Section 5 (2)(b) of the Metro Charter identifies "matters" that must be addressed in the Regional Framework Plan to include "housing densities . . . and other growth management and land use matters which the council, with the consultation and advice of the Metropolitan Planning Advisory Committee (MPAC)* determines are of metropolitan concern and will benefit from regional planning."

Therefore, Metro clearly has authority to determine that affordable housing is of metropolitan concern and (1) include affordable housing policies in the Regional Framework Plan, and (2) adopt functional plan provisions that require cities and counties to amend their land use plans to enhance affordable housing.

Limits of Land Use Authority

In the 25 years of the Oregon land use program, the issue of how far a land use regulation may go has come up, but there has been little litigation of the issue. The principle has long been established that "local taxation, budget and fiscal policy " decisions of cities, counties and special districts are not subject to the statewide land use program.

* MPAC is a 21 member committee consisting of representatives of local government and citizens to provide advice and consultation to the Metro Council.

"All of these decisions would affect land use interests like transportation, recreation and efficient provision of public services. All of these decisions could result in higher or lower fees and taxes, thereby increasing or decreasing the cost of housing. Yet, if the legislature contemplated that all of these decisions are exercises of land use planning responsibility that must comply with the goals, there is little or no local government action that is not land use planning." (Emphasis added.) Housing Council v. City of Lake Oswego, 48 Or. App. 525, 617 P.2d 655 (1980), petition for review dismissed, 291 Or. 878, 635 P.2d 647 (1981), quoted in Westside Neighbors. v. School Dist. 4J, 58 Or. App. 154, 647 P.2d 962 (1982), rev. denied 294 Or. 75 (1982).

The kinds of regulatory policies that clearly are within Metro's land use authority are zoning policies that regulate the use of land. Examples of two such policies to enhance affordable housing were adopted in the Urban Growth Management Functional Plan. All cities and counties must use minimum densities in their zoning which encourages smaller lots and multi-family housing. Also, cities and counties may not prohibit accessory dwellings which are likely to be additional, affordable housing units in neighborhoods.

Depending on specific provisions, inclusionary zoning, density bonuses, and generally speaking land use tools to increase the supply of affordable housing are the kind of regulations within Metro's land use authority. Therefore, Metro has broad land use regulatory authority to establish regional housing policies in the Regional Framework Plan and affordable housing requirements for city and county plans in functional plans. However, Metro does not have authority in matters of direct local taxation, budget and fiscal policy decisions, therefore any housing tools that include these matters can only be encouraged by Metro.

Affordable Housing Tools

There are many ways that affordable housing has been encouraged throughout the United States and locally. Some of these tools, and their pros and cons, are included in the following list. While the list is not all inclusive, it does represent a summary of the most frequently used and discussed tools to encourage lower cost housing.

Housing Tool	Definition and/or Description	Pros/ Advantages	Cons/ Disadvantages	Additional Considerations
Inclusionary Zoning	Inclusionary zoning/ inclusionary housing are essentially programs that deal with residential development which require a certain percentage of dwelling units to be provided at an affordable rate or require an in lieu fee for the development of affordable units. Inclusionary zoning programs can be done by incentive (voluntary) and/or by requirement (mandatory) to get residential developers to include a percentage of low and moderate income housing in their proposed development.	According to a study by the Florida Atlantic University and Florida International University, inclusionary zoning programs can be effective in states and localities that are experiencing rapid growth and development pressure. According to a study by the Local Housing Assistance Project, it indicates the following as benefits of inclusionary zoning programs: * Does not depend on state or federal subsidies or direct involvement of outside agencies. * Affordable requirements are known with certainty at the earliest stages of project formation. Over time this may result in lower land costs. * It expands the supply of affordable housing. Works better with design guidelines. More credible as a housing requirement when linked to fair housing and preventing *exclusionary* zoning.	May conflict with CDBG funding and other federal programs that are essentially geared to households at or below 80 percent of the area median income. Developers are not always interested in taking risks to do lower income development. Voluntary programs are rarely used by for-profit developers unless incentives are provided (e.g., reduced impact fees, building permit fee waivers, priority permitting, density bonuses). Housing specialists in Boulder, Colorado indicate strict building guidelines are needed to prevent developers from building the market-rate units first, then selling the land before building the below market rate units; and to prevent developers from building sub-standard below market rate dwellings. May not work inside the present urban growth boundary area where the price of land is already high and often used as a source for profit making.	Inclusionary zoning is not just an ordinance - it is a program that has to be developed, managed and monitored in order to be effective. Authors Gareth Jones and Peter Ward indicate..."the nature of price setting, which may take account of *social factors* as against purely market forces, have also assisted in making land at affordable rates." (see *Methodology for Land and Housing Market Analysis*) When the housing market is sluggish, in a local with (mandatory) inclusionary zoning, builder "relief" options are often warranted (e.g., reduced system development charges, building permit fee waivers). Heavy reliance on the private sector to produce affordable dwelling units will result in **unachieved** fair share targets. Projects should be designed to create mixed-income communities. Must be applied region-wide to mitigate development issues of compliance and exemption.
Accessory Unit (by right in single-family zones) This is a Functional Plan requirement as of November 21, 1996	A self contained dwelling unit with a separate entrance and kitchen that functions independently from the primary dwelling. Attached Unit: This conversion method involves the creation of one or more accessory units within the structure of an existing home. This may include the remodeling of a basement, attic or garage that is attached structurally to a home.	Deemed as a source of affordable housing. Rental income from the accessory unit can be used to offset mortgage costs for the primary dwelling. A way to get additional use out of under-used space. A way to broaden the housing market. Space in the home can be used to care for disabled or elderly relatives.	There is often a lack of familiarity or understanding about accessory units. It is difficult to track illegal units. Jurisdictions with owner-occupancy requirements present problems for owners attempting to obtain financing. Banks often evaluate the accessory unit as commercial property because it is "income generating space."	Some jurisdictions in their codes only acknowledge detached units as *accessory*. A design review process is often warranted as a way to mitigate issues concerning adverse affects on neighborhood character. Virtually all the jurisdictions in the Portland region that allow accessory units are by-right. (see *Accessory Rental Units in the Portland Area: A Guide for Design, Development & Management*)

Housing Tool	Definition and/or Description	Pros/ Advantages	Cons/ Disadvantages	Additional Considerations
Accessory Units cont.	Detached Unit: This conversion method involves the addition of an accessory unit to the residential property in a way that does not fundamentally change the internal layout or floor plan of the primary dwelling. This may include the conversion of a garage that is (physically) separate from the primary dwelling.	A way to increase home security. An "invisible" way to add density.	There are often public perceptions that accessory units will negatively affect the character of a neighborhood, decrease residential property values and cause additional burden on infrastructure.	Neighborhoods with accessory units should be monitored over time. Conceivably, every single-family detached home could have an accessory unit in this region. AUs work best in transit-oriented areas; reduces demand for neighborhood parking. Accessory unit occupants are considered a household by Metro's definition.
Condominium Conversion Ordinance	This type of ordinance is designed to prevent affordable rental housing (multi-family) from being converted to condominiums and provide protection to tenants in buildings undergoing conversion.	Preserves the stock of rental housing. Mitigates tenant dislocation.	A new ordinance will not affect the current stock of converted structures. A conversion ordinance will not affect monthly rents from increasing over time. Does not prevent condominiums from from being rented out by owners. May have an affect on the supply of lower-priced owner-occupied units; the average price of condominiums in the region is $119,000	A substantial number of condominium conversions occurred during the period 1994 to 1995; primarily in Multnomah County (476 units) and Washington County (178 units). Guidelines may be considered that prevent condominiums from being converted back to rental property.
Replacement Ordinance	The purpose of a replacement ordinance is to prevent and/or minimize the displacement of residents from their homes (low/moderate-income households) as a result of conversion or demolition. A replacement ordinance can also include an impact fee. The fees can be placed in a housing trust fund for low and moderate income housing projects.	Mitigates tenant dislocation. Provides the opportunity to maintain the supply of housing for low and moderate income households.	It is often difficult for replacement projects to occur immediately after demolition or conversion. Implications for site acquisition, financing the new project and construction costs. Project sponsors applying for CDBG funding to help assist with relocation costs may face difficulty complying with HUD guidelines. May discourage redevelopment and reduce infill rates.	Shortages in affordable (assisted) housing also occur when Section 8 vouchers and certificates are no longer accepted by property management firms. This often occurs as a result of tenants remaining delinquent on payments not covered by the vouchers or certificates. Shortages in affordable housing also occur when contracts on subsidized units expire and are converted to market-rate housing. A replacement ordinance may affect infill and redevelopment rates. As a result, a method for tracking replacement housing needs to be established.

Housing Tool	Definition and/or Description	Pros/ Advantages	Cons/ Disadvantages	Additional Considerations
Replacement Ordinance cont.	HUD has a residential anti-displacement and relocation assistance program tied to the Housing and Community Development Act of 1974.			Requiring builders to replace a certain stock of housing will not ensure that new development will occur; particularly if developers cannot make some profit and/or be provided with an incentive (e.g.; tax break, building permit fee waiver, reduced system development charge).
Community Land Trusts This section is a general overview. CLT's cover a wide range of land ownership and acquisition. Other forms include land banking and cooperatives.	This method removes land from the speculative market. There are a myriad of reasons why CLTs are often considered. Examples include: * To control development. * Maintain open space. * Preserve land for affordable housing. * A combination of the above. CLTs are often purchased by the the following: * Grant(s). * Tax-exempt (zero-coupon) revenue bonds.	CLTs have the potential to lower both state and county taxes. CLTs can have both developed and undeveloped parcels of land. The trust agreements can include a variety of amenities (e.g.; daycare center, gardens, senior housing). The leasing of land for short to long term construction -as for housing, is effective where land values are high and where savings in site acquisition costs can be translated into lower apartment or floor area rents. *(see Garden Cities 21: Creating a Livable Urban Environment)*	CLTs that have group loans, may require owners to pay an additional share of the group mortgage, insurance and taxes to cover the costs of the unsold shares. There may be certain legal restrictions in the trust agreement which prevent development from occurring in a certain period of time. Land developed during this period may be charged a penalty fee.	If a bank owns the land, there may be a clause in the lease agreement which allows a foreclosure to be sold at market rate inside the CLT. The selling price of house in a CLT will likely remain much less than the price of a house outside the CLT. This may be a benefit if one is deciding to remain in a CLT; however, this would be a disadvantage to a person attempting to purchase a home outside the CLT. Redevelopment and infill may be difficult to achieve.
Linkage of Metro **Approved** Transportation Funds to Affordable Housing	In the Metro 2040 Transportation Program, selection criteria are used to evaluate a project's multi-modal benefits, safety, usage potential and support of 2040 land use goals. The provision of affordable housing could be added to the evaluation criteria of specific projects or linked to a jurisdiction's eligibility to apply for Surface Transportation (ST) funds.	Land acquired by Metro for transit-oriented developments (TOD) may be reduced in value. TOD projects are designed for the "highest and best transit use" to increase ridership on light rail. In a study by Robert Cervero and Roger Gorham, they note that neighborhoods with transit showed higher walking and biking and lower single occupancy trip generation providing the opportunity to forgo auto-ownership.	Land purchased by Metro for TOD projects may have covenants or zoning restrictions which preclude the construction of housing. Affordable housing projects in the ST program will not meet the demand for housing at or below 60 percent of the area median income unless there is an additional component(s) such as a property tax abatement and building fee and plan review waivers. Proximity to transit, retail and employment centers can increase the the market value of housing. (see *The Determinants of Metropolitan Property Values: Implications for Regional Planning*)	The City of Portland has a similar model (Ordinance 170667) which provides tax breaks for housing near transit. Developers have the opportunity to obtain assistance from the state of Oregon through grants and tax credits which can help them meet an affordable housing component in the ST Program. The public may be better served if ST Program funds were used for urban infrastructure. Public-private partnerships can fully capitalize opportunities for transit-based housing.

Housing Tool	Definition and/or Description	Pros/ Advantages	Cons/ Disadvantages	Additional Considerations
Linkage of Metro Approved Transportation Funds cont.			A TOD project that supports the "highest and best transit use" may be one that does not include housing (e.g.; park-n-ride, employment center). Federal transportation funds may only be used for those streets that are designated "collector" or greater, not for local streets to help support a specific housing project.	There is a statutory prohibition from using transportation funds for the construction of revenue producing (i.e., rent) buildings. Exemptions to the limits on the use of federal funds require approval of the Oregon Transportation Commission and federal agencies.
Master Planning to Include Affordable Housing	In this strategy, tracts of land are carefully designed to include affordable and market priced homes; including senior housing, rental housing and housing for special needs groups. Metro Code Section 3.01.012 (e) requires a conceptual land use plan and concept map to be developed for urban reserves that demonstrate compliance with RUGGOs and the 2040 Growth design types and any applicable functional plan provisions..	There is significant opportunity for value - capture on land brought inside the urban growth boundary. A certain percentage of funds gained from the selling of land brought into the UGB can be used toward affordable housing projects and programs. Affordable requirements are known with certainty at the earliest stages of project formation.	Does not often include "worst case" scenarios or contingency plans. The term "master planning" often alludes to the notion that "flexibility" will not be incorporated in future development efforts. Difficulty in determining the bases for decision-making for future development (e.g.; trend development, forecasts, market analyses, census data).	Jurisdictions are often concerned about the fiscal aspects of master planning.
Density Bonuses	Zoning regulations that allow a higher density than is normally permitted. As it applies to housing, regulations are often developed to grant a certain percent of density bonus (or provide other incentives of equal value) to a developer in exchange for an agreement that the additional units be affordable.	According to a study by the Local Housing Assistance Project, it indicates the following as benefits of density bonus programs: * It makes residential development more economical, especially where land costs are high. * Allows local government to create greater land value in a project which can then be used to subsidized affordable housing. * Density bonuses can make the conversion of higher-cost non-residential land for new housing economically feasible.	Residents may perceive increased density as a negative impact on the character of an of existing neighborhood. Developers often perceive that density bonus programs will reduce the marketability of their development. According to a study by the Florida Atlantic University and Florida International University, it indicates voluntary density bonus programs are ineffective.	Density bonuses in exchange for affordability can also be negotiated on a project-by-project basis. More effective when combined with other land use concessions and/or subsidies. The percentage of units required by a developer to built will have an affect on the investor(s) rate of return. *(see analyses by E.D. Hovee and Company for the Portland Development Commission - Preliminary Financial Evaluation for Alternative Hoyt Street Project Developments)*

Housing Tool	Definition and/or Description	Pros/ Advantages	Cons/ Disadvantages	Additional Considerations
Expansion of the Urban Growth Boundary	The UGB marks the separation between rural and urban land. It is intended to encompass an adequate supply of buildable land which can be efficiently provided with urban services (e.g.; as roads, sewers, streets) to accommodate growth during a 20 year planning period. Metro manages the regional urban growth boundary which was established in 1979.	An expansion will increase land supply for future housing development. Obtaining loans for new development will increase. Less pressure to develop open space in the current UGB. More land may attract employers.	Increased costs to build new services (e.g.; roads, sewer, schools, stormwater management and utility systems) Reduction in rural land. Less potential for redevelopment and infill to occur.	There is no guarantee that housing prices will decrease with an expansion of the UGB. This rationale is based upon the relationship between increased housing prices and population growth. From 1973 to 1979, the population increase by 13 percent while housing prices increased by 56 percent (before the UGB). From 1989 to 1995, the population increased by 16 percent while housing prices increased by 51 percent. Bidding for land will continue with or without an urban growth boundary as long as there is opportunity for development to occur. The price of land is not the only factor that contributes to housing costs. Other examples include: demographic changes; zoning; the quality and type of building materials used; and accessibility to jobs and shopping. Farmers may decide to sell their land. This could be both positive and negative. Effective monitoring will have to take place regarding housing prices after an expansion of the UGB.

Determining the Amount of Affordable Housing Needed

Determining the amount of affordable housing is required by the Oregon Department of Land Conservation and Development's *Housing Goal 10* and other state law; but as with many parts of the planning process, it is a forecast – dependent on variables that are assumed. To determine the need for *affordable* housing (described below), Metro has constructed a model that uses several variables to estimate the costs of future housing. The model essentially holds the population forecast constant, and compares the expected income level of the future population with the cost of housing. This results in an estimate of needed affordable housing – in other words, housing that the market will most likely not provide at price levels that are affordable to the entire regional population.

Variables that Affect the Estimate of Needed Affordable Housing

The key variables that affect the estimate of future housing demand are as follows:

1. "Construction cut-off" or the minimum price or rent that new housing can be produced by the private sector or by non-profit agencies. (*HNA Technical Appendix 1*, page 19 cites five subvariables to this which include raw land costs, transaction costs, local government regulations, lot and housing production costs and time.)

We estimated construction cutoff to be $120,000 for new single family housing and $550 for new rental units. This results in a need for 94,000 units in the four county area using the HUD 30% of income standard for affordable housing. As an example of the effect of this factor, changing the Metro housing model for construction cut-off values of $100,000 for new housing and $450 per month for rental housing reduced the amount of new affordable housing need to 30,000 units for the four county area.

2. Definition and Analysis of Affordable Housing. There are three standards that we tested. The first test was based upon the HUD standard - ensuring that households would not spend more than 30% of their income on housing costs. This standard resulted in an estimate of 94,000 affordable housing units needed in the four county area. The second was using the 1994 level that people actually paid for housing. This level, averaging 33%, is higher than the HUD standard. It reflects both poor households paying too much for housing and people with low income but who have some wealth, most commonly, retired persons who own their home and have no mortgage. This variable requires 48,000 units of assisted housing. Finally, we tested the assumption that people could pay as much of their income for housing as people do in the San Francisco Bay area. This results in a need for 25,000 households potentially needing assistance (see also definition applied to 2017 forecast – Table 22, page 80).

3. Changes in Housing Expenditure Patterns. People in this region are used to paying less of their income for housing than other parts of the country. As people change the amount of income that they are willing to spend on housing this will affect demand in various price levels, and affect the average price of housing produced. This is closely interrelated with the definition of affordable housing (which also includes households needing assistance to ensure their housing costs do not exceed 30% of income). We do not assume any change in our final estimate.

4. Changes in Income. Clearly, if there is more income available in the long run there will be more ability to afford more expensive housing. The result is that housing prices rise as incomes rise. We assume an increase in real per capita income of 0.75% per year, which is distributed unevenly -- more to persons above the median income than persons below the median income.

5. The Depreciation Rate of Housing. Over time, housing can decrease in value. This is fundamentally based on the consideration that roofs, siding etc., wear out. These components can be repaired or replaced and so the actual useful lifetime of housing can be extended indefinitely. As reported (page 42), we use a very low depreciation rate based on the observation that housing in the Metro area depreciates very little. This is different than many parts of the U.S. Most metropolitan areas that have lower housing costs have large developed areas that are losing population and a much higher rate of home depreciation. We assume 0.5% per year depreciation of existing housing stock in real dollars.

6. Public Expenditures. In housing forecast model, this includes the amount of money spent from general tax bases or rate bases on streets, sanitary sewers, stormwater systems, etc. versus the amount spent by a developer or builder for the specific housing project, or the amount constructed by system development charges. Lowering infrastructure costs that are charged directly to the home, can lower production costs. We assume no change to the current level of infrastructure charges.

Types of Affordable Housing Need

Based on the above assumptions, and using the 30% HUD standard of defining affordable housing, the four county region has a forecast need of 94,000 units of affordable housing (2017 Forecast). Assuming that the area inside the UGB should receives 70% of the housing need* (the overall percentage of new housing built in the UGB) our need for affordable and assisted housing is 66,000 units. However, this is not a uniform need. In further examining the need in terms of ages, and household size, there could be further targets with the types of affordable housing. For example, there appears to be at least four distinct types of affordable housing needed:

* For the purposes of this analysis, "demand" is substituted with the word "need." Note: Demand is a term with an operable definition in the economic and regional science literature when computing the output of and consumption of housing stock.

Senior Housing
This category constitutes 30% of the affordable housing need. It includes seniors that need affordable rental housing and seniors who have some capital to buy, but who have low incomes.

Owner Occupied Family Homes
This need is for housing for purchase that is below the level set by assumption in the estimating model. This housing - $80,000 to $120,000, can be met by small lot detached and attached housing and manufactured housing. This need is about 28% of the total estimated affordable housing need.

Moderate Income Rental
These are rental units that are needed for moderate-income households – just below the level that the market is producing. These units have rents between $400 to $500 a month. A variety of ages and household sizes are included in this group. This amounts to 20% of the affordable housing need.

Assisted* Rental and Special Needs Housing
These are housing units for households whose incomes are so low that their needs cannot be met without a direct subsidy. This amounts to 22% of the affordable housing need.

As noted above, the need for affordable housing is not uniform and neither are the solutions. Family homes, Moderate Income Rental, and some Senior Homes may be achieved through various kinds of incentives (i.e., density bonuses, building permit fee waivers, priority permitting) rather than government subsidies. On the other hand, some of the Senior Housing need and all of the Assisted Housing need will require some subsidy which include both project and tenant-based programs.

* Assisted housing can also include living facilities that have income and eligibility requirements. The tenant or owner-occupant may not have a direct subsidy (e.g., Section 8 Certificate or Voucher); however, the eligibility requirements are designed to keep housing costs below 30 percent of the household income.

Fair Share Strategy

Solving the current and future housing needs of the region will be a major undertaking for Metro, local governments, citizens, the business community and other interests. This effort links to the challenge on how the region will create a fair share housing strategy. The RUGGOs defines fair share as follows:

> Each city and county within the region working with Metro to establish local and regional policies that will provide the opportunity within each jurisdiction for accommodating a portion of the region's need for affordable housing.

Currently, Multnomah County has more assisted households (in relation to its total households) when compared to the remaining three counties. In this regard, Multnomah County has a greater share of the region's assisted housing stock. However, the demographics and physical landscape of each county have a lot to do with the issues surrounding fair share. For example, there is a greater concentration of ethnic minorities and more employers in Multnomah County. These circumstances might support the position that Multnomah County should have more affordable housing or that other jurisdictions should increase their share of providing more affordable housing.

We queried certain conditions in the housing market to determine how the forecast need for assisted housing (1994 - 2017) might be reduced in the four county area. The query suggests that if the minimum price at which single-family dwellings could enter the market at $120,000 and drop to $81,000, and new rental units rented for a minimum of $550 and dropped to $361, the forecast need of assisted housing would be close to 10,000 units.

The problem with this query, in terms of the present conditions, is simply based upon that fact that the market is not producing a substantial number of dwelling units at or below the above prices even though there is an increasing demand for below market-rate housing. Moreover, it is not likely that the present stock of vintage or existing dwellings will help satisfy this demand. This is based upon Metro's analysis that shows housing in this region is depreciating at less than 0.5% percent per year unlike housing in most cities which normally depreciates at 1% to 1.5% a year.

Choosing a Fair Share Alternative

This section has provided an estimate of needed affordable and assisted housing and the variables that go into developing an estimate. Also, this section details the kinds of housing that make up the affordable housing need, and ways to distribute the need in the region. Accordingly, once a fair share strategy is established for the region, Metro Council, local governments, citizens, the business community and other interests can further determine the types of tools needed to build and encourage the development of affordable housing throughout the region.

Section Four Summary

- The Regional Urban Growth Goals and Objectives (RUGGOs) defines fair share as each city and county within the region working with Metro to establish local and regional policies that will provide the opportunity within each jurisdiction for accommodating a portion of the region's need for affordable housing.

- Currently, Multnomah County has more assisted households (in relation to its total households) when compared to Clackamas, Clark, and Washington counties. In this regard, Multnomah County has a greater share of the region's assisted housing stock.

- If more single-family housing construction were priced at a minimum of $120,000 and new rental units rented for a minimum of $550, with the assumption that the price of single-family housing would eventually be $81,000 and rentals would rent for $361, this would decrease the forecast need of assisted housing in the four county area.

- There are various ways of estimating need for affordable housing in the region. Using the variables that appear most likely, housing need is estimated at 66,000 units in the three county area inside the urban growth boundary.

- The forecast of affordable housing need (94,000 units) in the four county area is not uniform, and can be further divided into the following: Senior Housing (30%) Family Owner Occupied Housing (28%) Moderate Income Rental (20%) and Assisted Rental and Special Needs Housing (22%).

- The State of Oregon Department of Housing and Community Development's estimate of *unmet* housing need for the three county region is approximately 47,000 dwelling units.

- Households with tenant-based subsidies (i.e., Section 8 Certificate or Voucher) can live in the private sector, provided the property owner or landlord accepts these types of rent subsidy payments.

Section 5:

Legal Requirements and Conclusions

This section contains a brief overview of the mandates that address the housing needs of this region. These mandates include: Goal 10 of the State Planning Goals; sections of the Oregon Revised Statutes (ORS); portions of the Oregon Administrative Rules (OAR); and Objective 17 within RUGGOs. This section also addresses the requirements of the State of Oregon or Metro, findings, and conclusions demonstrating compliance.

Overview of State and Regional Housing Mandates

Metro has several housing mandates, including those required by state law as well as some self-imposed, to address the needs of this region. These mandates include Goal 10 of the State Planning Goals, sections of the Oregon Revised Statutes (ORS), portions of the Oregon Administrative Rules, and an objective within Metro's Regional Urban Growth Goals and Objectives (RUGGOs). The broadest statement, Goal 10 (Housing), specifies that each community must plan for and accommodate needed housing types (typically, multifamily and manufactured housing). It requires each community to inventory its buildable residential lands, project future needs for such lands, and plan and zone enough buildable land to meet those needs. It also prohibits local plans from discriminating against needed housing types.

The ORS Chapter 197 provides more detailed requirements for assuring sufficient housing including the requirement that a 20 year residential land capacity be shown and that capacity for *needed housing* be demonstrated. It also includes consideration of the density of residential development, so that to be counted, densities must be at rates that the market is likely to demand and developers build. It also requires cities and counties to set reasonable standards for siting manufactured housing. Cities and counties must permit such housing both on individual lots as well as in manufactured housing parks. In addition, it requires that provision for government-assisted housing be provided.

Without direction from the mandates mentioned above, there would be a need for 27 separate analyses (one each for the 24 cities and the urban, unincorporated portion of the 3 counties), while Metro would still be responsible for maintaining an urban growth boundary with sufficient residential capacity. Accordingly, a special division of the OAR recognizes this challenge and make provision for how the region and the communities within it are to demonstrate compliance with this goal. In the Metropolitan Housing Rule, a State administrative rule that only applies to the metropolitan area, two fundamental requirements are included. The first requirement (50/50 rule) states:

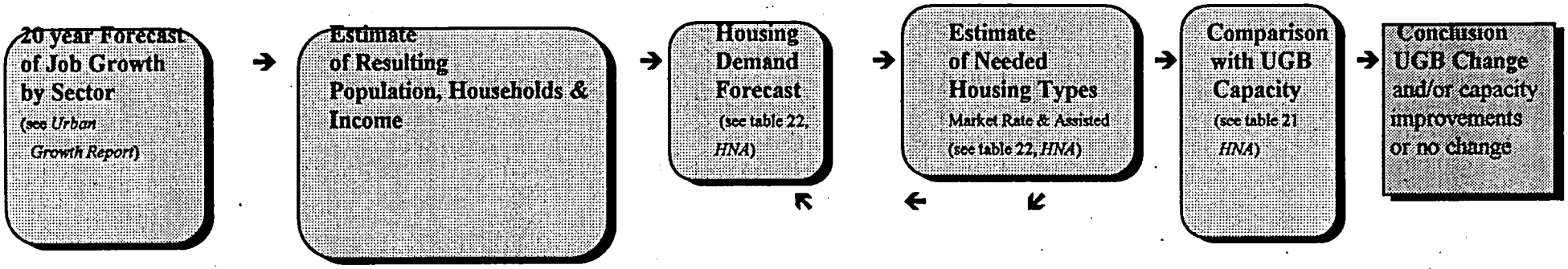
> "Jurisdictions other than small developed cities must either designate sufficient buildable land to provide the opportunity for at least 50 percent of new residential units to be attached single family housing or multiple family housing or justify an alternative percentage based on changing circumstances"

The second state requirement is that the communities in the region must provide an overall density of either six, eight or ten dwelling units per net buildable acre of residential land (6/8/10 rule).

Lastly, the Metro Council adopted the RUGGOs, which include Objective 17, Housing. This objective calls for a fair share housing strategy including specific goals for low and moderate income and market rate housing.

Overall Description

The following is a summary depiction of the method used by Metro to determine housing demand and capacity within the region:



The analysis begins by looking at types of employment - manufacturing, retail sales, services, etc. and estimating their growth rates to the year 2017. A panel of private and public economists from the region reviewed the Metro forecast and adjustments were made. See the *Urban Growth Report* for specifics.

Based on the number of new jobs forecast to be located in the region, estimates of the resulting number of households, their income and the population expected to be in the region is estimated. (This model accounts for aging of the population, expected changes in household size, labor participation rates and other factors.) Incomes are estimated in constant 1995 dollars.

Given the prediction of the number of households, the number of additional housing units needed is projected.

The housing demand forecast is then allocated to varying housing types, based on current patterns of housing consumption. That is, the current rate of income devoted to renting or buying housing is assumed, even if it is over the generally accepted target of no more than 30 percent of income devoted to housing. Some of the projected housing will require assistance – project and tenant-based subsidies.

Once the housing need, both total and by type is known, comparison with the estimated capacity within the existing Urban Growth Boundary (UGB), is completed. See *Urban Growth Report (Buildable Lands and Capacity Analysis*

If a deficit for any type of housing estimated out twenty years (to the year 2017) is found by the Metro Council, they must determine how to resolve this issue. Expansion of the UGB is the most direct, but changes to the capacity within the UGB may be feasible that would reduce the need for UGB expansion.

As noted above, in order to determine whether there is sufficient capacity for housing, there must be an inventory of buildable land. Metro begins by determining the amount of vacant land, and then, as described in the *Urban Growth Report; Part 3, Buildable Lands and Capacity Analysis for the Current Urban Growth Boundary*, adjustments are made to raw vacant land figures.

Subtractions for unbuildable lands (floodplains, wetlands, riparian areas and slopes over 25 percent) as well as adjustments for vacant buildable lands with some obstacles to development (slopes from 8 to 24 percent, small parcels less than 5 acres in size which may be more difficult to design development for than larger parcels) were made. Other adjustments included assumptions about reductions of capacity to account for parks, schools, streets, and non-profit association land needs.

In addition, the analysis accounts for rates of infill and redevelopment as well as city and county zone changes within the urban growth boundary to implement Metro's 2040 Growth Concept, as required by the Urban Growth Management Functional Plan. Metro Council, on October 23, 1997, concluded that there is a deficit of 29,350 dwelling units inside the current UGB. This would require an expansion of the UGB within the range of 4,100 to 4,800 acres. Further refinement and analysis of the *Buildable Lands and Capacity Analysis* show that the deficit of dwelling units is 32,370 (Table 21). This difference will not affect the range of UGB expansion.

Forecasting the housing need for the next 20 years is dependent on variables that are assumed. Accordingly, ranges of housing need by housing type have been indicated. When compared with estimated dwelling unit capacity, if the demand for housing is at the low end of the range, there is little or no deficit when compared with the existing capacity for single family or townhouse housing types. However, under any circumstance, there is a forecast deficit for multi-family housing when compared with the existing housing capacity. Depending on the strength of single family or townhouse demand, there could be deficits in these areas.

Refinement of Housing Forecast Calculations

Initial Household Forecast	240,400
Adjusted Dwelling Unit Forecast (using 3.9% vacancy rate)	249,800

Calculations rounded to nearest hundred

Table 21

Current UGB Capacity Compared with Forecast Need to the Year 2017[1]

Housing Type	Dwelling Unit Capacity[2]	Dwelling Unit (DU) Forecasted Need[3]	Deficit
Single Family			
Outer Neighborhood[4]	34,600		
Inner Neighborhood[5]	53,750		
Planned Unit Development[6]	19,440		
Total Single Family	107,790	105,077 - 137,993	0 – 28,620
Townhouses			
Neighborhood Commercial[7]	22,300		
Mixed Use[8]	18,100		
Total Townhouse	40,400	20,787 - 53,732	0 – 12,855
Multi-family			
Multi-family Moderate Density[9]	27,500		
Multi-family High Density[10]	41,740		
Total Multi-family	69,240	86,887 - 97,526	16,794 – 27,434
TOTAL	**217,430**	**249,800**	**-32,370**

[1] Table 21 concerns residential supply and demand (S & D) only. Comparisons of employment S & D are in the *Urban Growth Report* (there is sufficient job capacity within the current UGB). Numbers for DU capacity include infill.

[2] Data from *Urban Growth Report* (Part 1, Buildable Lands and Capacity Analysis).

[3] Table 22, *Housing Needs Analysis*, November 1997, includes vacancy rate.

[4] Source: *Urban Growth Report*, November 1997 (Part 1, Buildable Lands and Capacity Analysis). Includes DU capacity estimates for SFR2 zone (Table 12C – 27,170), development rights on unbuildable land (Table 13 - 3,190), and existing platted lots for SFR1 and SFR2 (Table 2 – 4,240).

[5] Ibid. Includes DU capacity estimates for SFR3 (Table 12C – 47,090), plus existing platted lots for SFR3 (6,660).

[6] Ibid. PUD estimate from Table 12C.

[7] Ibid. Neighborhood Commercial estimate from Table 12C.

[8] Includes capacity estimates in Table 12C for CO (office commercial - 550 dwelling units), IMU (Mixed Use Industrial - 1,420), and MUC1 (town centers – 16,130).

[9] Includes MFR1 from Table 12C.

[10] Includes MFR2 (2,340) as well as MUC2 (regional centers – 18,350), MUC3 (central city 15,450) and MUEA (mixed use employment areas – 5,600) from Table 12C.

Table 22: Regional Housing Need (1994 – 2017) Based on the Metro 2040 Growth Concept (Urban Metro Area Only - Includes Vacancy Rate)

Monthly Rental Cost	Approximate Equivalent Ownership Price	Number of New Housing Units Needed [5]	Housing Type Distribution					
			Detached Homes		Attached Homes			
			Detached Single Family & Manufactured Homes on Individual Lots	Detached Small Lot Single Family & Mobile Homes and Manufactured Housing in Parks	Attached Single Family & Rowhouses	Multiple Family Low Rise	Multiple Family Mid Rise	Multiple Family High Rise
0-299	< 49,999	2,381	n/a [1]	n/a	n/a	A,R	A,R	A,R
300-399	50-59,999	10,340	n/a	n/a	n/a	A,R	A,R	A,R
400-499	60-74,999	25,859	n/a	n/a	A,R	A,R	A,R	A,R
500-599	75-89,999	32,993	O [3]	O	A,R	A,O,R	A,O,R	A,O,R
600-749	90-114,999	38,823	O	O	O,R	O,R	O,R	O,R
750-999	115-149,999	51,823	O	O	O,R	O,R	O,R	O,R
1,000-1,165	150-174,999	39,082	O	O	O,R	O,R	O,R	O,R
1,166-1,330	175-199,999	12,693	O	O	O,R	O,R	O,R	O,R
1,331+	200,000 +	35,806	O	O	O,R	O,R	O,R	O,R
Total Units [9]:		249,800 [6]	SF Units Range: 105,077 - 137,993 [4]		Rowhouse Units:20,787-53,732	Multi-Family Units: 86,887 -97,526		
Single Family/Rowhouse/Multi-Family Split [8]: 42/19/39 - 5/10/35					Assisted Housing Units [2] : 48,000 [7] - 66,000 [10]			

1. n/a means not available in the cost/price range. Ownership tenancy within the lower range of prices is a rough estimate.
2. Assisted Housing means housing provided through Government Assisted Housing programs, non-profit organizations or households paying more than 30 percent of income for housing. Additional assisted housing for larger households also may be provided on a limited basis in other categories than those listed above.
3. O means that the new housing is expected to be owner occupied; "R" means that the housing is expected to be renter occupied. "A" means assisted housing.
4. Between 5,750 and 25,062 manufactured homes would be needed.
5. To calculate the total number of housing units needed, you must add the high end of the detached single family range to the low end of the attached home range, or vice-versa. Total demand for housing units is not assumed to change, but actual housing preferences could range within the estimates of the ranges cited.
6. Housing needs projected in this chart are cited to the level of individual units in order to be consistent with model results. However, these are forecasts and should be considered to be accurate to the nearest 1,000 units.
7. Estimate for UGB. Low estimate preserves current % of income spent on housing. High estimate derived from separate analysis where share of household income spent on housing was 30%. Low estimate is calculated consistently with the other data used in the table to calculate housing needs.
8. Assumes 35 % to 50 % of assisted housing will be multifamily. Conversely, we assume 65% or 50% will be single family of which ½ will be detached and ½ will be attached.
9. Housing demand and supply analysis is based on a "baseline projection" assuming that no new single family dwelling units are produced on the private market below $110,000 and no new multifamily rental units are produced below $550 per month rent. $ estimates are in 1995 $.
10. Based on UGB receiving 70% of the 4 county regional total (94,000 affordable units) of housing demand and supply; model run on 8/20/97.

It should be pointed out that additional housing capacity is available outside the present UGB. The Urban Reserve decision of the Metro Council (Ordinance 96-655E) adopted March 6, 1997 provides for 18,579 acres of land for urban growth boundary expansion as needed to accommodate future growth. Of the total acreage, 10,472 acres are estimated to be buildable acres. Ordinance 96-655E specifies that the minimum density for residential development within the Urban Reserves is 10 dwelling units per acre. This would forecast a capacity of 104,720 dwelling units within the Urban Reserves if were all used for residential purposes. An additional required analysis is a comparison of housing need by rent or price with expected income. Table 5 of this report summarizes the existing housing stock. In addition, this report includes estimates of future incomes as well as future housing costs. The results of the forecasts are shown in the following table showing the relationship between levels of income and home prices/rents.

Table 23

Price/Rent Compared with Estimated Future Income

Income Level 1 (Median '95 household income $13,400)	Income Level 2 (Median '95 household income $29,700)	Income Level 3 (Median '95 household income $44,400)	Income Level 4 (Median '95 household income $70,300)	Total Number of New Housing Units Needed by Cost Category	Percent of Needed Housing	Cumulative Percentage	Monthly Rental Cost Categories	Ownership Price Categories
1,677	641	54	-	2,381	0.9%	.09%	$0-299	Less than $49,999
7,497	2,573	116	117	10,340	4.1%	5.0%	300-399	50-59,999
18,926	6,014	684	142	25,859	10.5%	15.5%	400-499	60-74,999
14,572	8,865	9,123	314	32,993	13.2%	28.7%	500-599	75-89,999
9,574	9,203	18,644	1,262	38,823	15.5%	44.2%	600-749	90-114,999
-	19,228	12,002	20,407	51,823	20.7%	64.9%	750-999	115-149,999
-	-	13,543	25,398	39,082	15.6%		1,000-1,165	150-174,999
-	-	3,158	9,489	12,693	5.1%		1,166-1,330	175-199,999
-	-	-	35,677	35,806	14.4%		1,331+	200,000 +
Total				249,800	100%			

Table 23 illustrates that in order to meet the future forecast of household income levels, 44 percent of the housing must be at prices/rents below $115,000 for sale or $750 per month rental rate (expressed in constant 1995 dollars).

Another requirement that has to be measured is vacancy rates. On page 44 of the *Baseline Urban Growth Data* report dated April 30, 1997, the most current (September, 1996) vacancy rates are reported for the region, by five subregions (Beaverton/Washington Square, Gresham, Hillsboro, Milwaukie/Clackamas Town Center and Portland. In addition, 35 smaller divisions of the region are reported. These data are from readings of electric power meters from the service area of Portland General Electric. Other sources, private and public are also available, but not included in the report as they are not available for auditing of methods.

In addition, consideration of "units capable of rehabilitation" are required. With rising home and land prices, reinvestment in many older portions of the region is coming to pass. As noted in the sections on neighborhood location and housing depreciation, trends are towards appreciation and reinvestment. Few areas of the region are experiencing further deterioration or dilapidation.

For example, the City of Portland up to a few years ago kept an inventory of abandoned buildings (primarily single family homes) that they hoped to have renovated and inhabited. This list, with over 1,000 properties, is no longer kept as very few properties now default on taxes and are foreclosed. The *Baseline Urban Growth Data* report also has information on infill and redevelopment, which provides an estimate of the number of additional units that could be made available to the housing market. The data show that 34 percent of new single-family residential building permits and 50 percent of new multi-family permits are on lands categorized by Metro as being wholly developed lands. The Metro Council has concluded in Resolution 97-2550A that an overall rate of 28.5 percent should be considered when calculating available future capacity.

It should be noted that inherent in the capacity calculations are several assumptions and data. First, work completed by KCM Consultants and the water, sewer and storm water providers of the region assessed the cost to serve the increased densities within the current UGB as well as those areas in the Urban Reserves. Their conclusions were that all areas were able to be served at rates consistent with most already urbanized portions of the region. However, more detailed plans for extending these services are not available in most cases, but are required as a part of the urban reserve plans prior to expansion of the UGB into urban reserves.

In addition, the Future Vision document completed an extensive analysis of the carrying capacity of the region (see *Carrying Capacity and its Application to the Portland Metropolitan Area*, Metro, April 1994). Considering these data, the Future Vision Commission came to the following conclusion regarding carrying capacity:

> "This metropolitan area, like all others, exceeded its ability to meet the physical needs of its people long ago. Our style of life depends on the importation of energy, materials, capital and brain power from all over the world. We have also found that traditional biological models of population carrying capacity are simply too narrowly drawn to be of much use in a metropolitan setting. Determining the sustainability of even current population levels at our existing quality of life is greatly complicated by uncertainties due to future technological and global economic changes. In addition, there are difficult questions of value which must be addressed first, since values can be the basis for an analysis of carrying capacity but cannot be derived from such a study. For these reasons, it may not be possible to choose a single sustainable population level for the region."

Further on, the report states:

> "Consequently, we have chosen to approach carrying capacity as an issue requiring ongoing discussion and monitoring. We believe that the relevant question is not <u>when</u> carrying capacity will be exceeded, but <u>how</u> we will collectively restore, maintain and/or enhance the qualities of the region central to sustaining our health, the quality of the natural environment and the ability of future generations to take action to meet the needs of their time.
>
> Sustainable communities will come about through the skillful blending of factual data, our values and new ideas in a public discussion occupying a place of honor in this region, not through blind adherence to numerical thresholds that cannot be specified, much less met. Hence, carrying capacity is not a one-time issue, a single number, a simple answer, but an ongoing question for us all."

Metro has responsibility for managing the UGB. Implementation, in the form of expansion of the UGB has occurred during the past 16 years when the Metro Council added a little less than 3,000 acres of land to the UGB. However, for direct implementation of most other policies, Metro, almost without exception, relies on local jurisdictions. Regardless, there are aspects relating to implementation that Metro does address. For example, the adopted Metro Code (Chapter 3.01) requires that Metro:

> "...shall develop 20 year Regional Forecasts of Population and Employment, which shall include a forecast of net developable land need, providing for review and comment by cities, counties, special districts and other interested parties. After deliberation upon all relevant facts the district shall adopt a forecast. This forecast shall be completed at least every five years or at the time of periodic review, whichever is sooner. Concurrent with the district's growth forecast, the district shall complete an inventory of net developable land, providing the opportunity for review and comment by all cities and counties in the district. The forecast and inventory, along with all other appropriate data shall be considered by the district in determining the need for urban developable land."

Inherent in these requirements are estimates for the regional demand for all types of land, including residential land. In addition, with the adoption of the Urban Growth Management Functional Plan in November, 1996, Metro committed to the production of "Performance Measures". These measures were intended to provide the region with detailed information about what was actually happening in the region every two years. The *Baseline Urban Growth Data* report illustrates the type of data being gathered and analyzed.

The Functional Plan also mandates that cities and counties within the Metro boundary are required to demonstrate how they are allowing increased housing densities. Among the requirements are a minimum density requirement, allowing accessory units in single family zones, and assessing the effect of standards which may in effect lower densities. Concurrent with these requirements, local jurisdictions also must demonstrate that they have reviewed their public facility capabilities and plans to assure that planned public facilities can be provided and accommodate the calculated capacities. The Functional Plan also includes a title which contains a list of recommendations to increase affordable housing.

CONCLUSIONS

From the data available, it is concluded that:

1. There is insufficient capacity to accommodate all housing needed to the year 2017 within the current urban growth boundary. The combined capacity of that area within the current UGB plus Urban Reserves is more than adequate to accommodate forecast need.

2. There is a clear need for additional capacity for multiple family housing. This could be accommodated within Urban Reserve areas, although to the extent that it can be located in highly accessible locations within the current urban growth boundary, transportation issues may also be addressed more effectively.

3. Depending on the strength of market demand, there may be lesser or greater demand for single family housing which may need to be accommodated within Urban Reserves as well as areas within the current UGB.

4. A substantial portion of the new housing that is built should be at affordable rates of prices or rents. As noted earlier in the report, affordable housing can be encouraged through one or more of the following: a) building more densely, b) building less square feet per dwelling unit, c) using manufactured housing which can be sited on small lots either in manufactured home parks or on individual lots and d) using existing or creating public or private housing subsidies.

5. While low residential vacancy rates indicate additional demand for housing, the housing market is dynamic and cyclical and by the time vacancy data is available, it is not useful for public policy-making purposes.

6. Rehabilitation is occurring primarily through private sector actions and a combination of these actions plus redevelopment and infill are providing more livable housing stock, additional housing capacity and making for a more efficient urban form.

7. Sufficient public facilities can be provided to urban areas within the current UGB and within the Urban Reserves, consistent with Metro policies, especially the Metro 2040 Growth Concept. However, additional efforts will need to be made to ensure timely and cost-effective services are provided.

8. Carrying capacity is not a practical tool for public policy-making. However, the goal of protection and even enhancement of our region's air, water and land resources must continue to be considered and addressed in public and private decision-making. The Metro 2040 Growth Concept and implementing ordinances and actions begin to address this overarching goal.

9. The Metro Code (Chapter 3.01) and the Urban Growth Management Functional Plan provides timely methods for updating housing need projections.

10. By passage of the Urban Growth Management Functional Plan, Metro has taken effective action to allow the market to build higher density units on transit corridors and main streets.

FINDINGS - Oregon Revised Statutes

Much of the requirements cited above are restatements of the State goal and will not further be addressed here. However, there are several additional requirements which do need to be addressed. These include the requirement to "demonstrably increase the likelihood that residential development will occur at densities a sufficient to accommodate housing needs ..." and that land "....is zoned at density ranges that are likely to be achieved by the housing market ..."

Analysis contained within the *Baseline Urban Growth Data* report (see pages 11- 24) indicate that in the single family residential market, average actual development is less than average permitted zoning. If regulations are not changed, the market demand will not be able to be accommodated. There are many signs, however, that cities and counties of the region are beginning or have completed substantial changes.

The following is a summary of the activities in the various jurisdictions of the region:

Hillsboro: Adopted most Station Area Planning changes. Several innovative changes in place, such as in the Orenco town center. Pending: Hillsboro Main Streets study, and the Tanasbourne town center study.

Washington County: Nearing completion of Station Area Planning changes. Pending: Cedar Mills Main Street study, Storm Water management study.

Beaverton: Multiple Use districts adopted in code. Now applying districts to station areas. Pending: Murray Hill Town Center study.

Portland: The Central City, Albina, and Outer Southeast plans are adopted. The South-west Community Plan is to be adopted this summer (1998). The Hillsdale Town Center plan is complete and the West Portland Town Center is pending. Planning for the Hollywood Town has begun. These plans are done to comply with the Urban Growth Management Functional Plan. The City also plans to complete code changes required by the Functional Plan. Code changes for accessory dwelling units are pending at City Council.

Gresham: Civic Neighborhood Plan, regional center planning completed. Adopted new parking standards. Recently adopted low density residential zone permits lot sizes of 5,000.to 6,200 average lot sizes. Rockwood town center plan underway.

Lake Oswego: Undergoing code rewrite - working on minimum densities and parking standards.

Troutdale: Completing Troutdale town center plan.

Wood Village: Changed Industrial zoning in the Multnomah Kennel Club area to mixed use, increasing the capacity for housing and employment. Currently undergoing periodic review and amending code and plan to comply with the functional plan.

Clackamas County: Completing the Clackamas County regional center plan, examining alternatives and drafting a code rewrite.

Oregon City: Completing a regional center plan.

Milwaukie: Completing a regional center plan - already finished the Riverfront plan, which is part of the regional center plan.

Tigard: Current code rewrite may include functional plan compliance. Tigard triangle plan complied with functional plan requirements, and may exceed density requirements.

Forest Grove: Recent changes in single-family [residential] standards allow small lots, lot size averaging, zero lot-line development, accessory dwellings, duplexes, townhouses, and (by conditional use) neighborhood stores. New standards also require minimum density, street visibility, and lot size variety.

Wilsonville: Plans for a mixed use village in the Dammasch area on hold because of State plans to build a prison at that site.

Cornelius: Completing main street plan, reviewing city codes.

In addition, nine jurisdictions have requested compliance plans from Metro, which allows Metro to suggest detailed changes to the current codes and plans which comply with the regional functional plan. The cities are: Tualatin, Wood Village, Oregon City, Happy Valley, West Linn, Wilsonville, Forest Grove, Cornelius, and Troutdale.

The smaller jurisdictions, which are Rivergrove, King City, Durham, Maywood Park, and Johnson City do not have any planning activities underway, to our knowledge. Gladstone and Sherwood do not have any planning activities underway implementing the Functional Plan to our knowledge. Other upcoming projects that have requested state funding through the Transportation Growth Management (TGM) program are; Sherwood town center, Tigard regional center (Washington Square), Raleigh Hills town center plan, Gateway regional center plan, and Murray Hill town center.

CONCLUSIONS

11. The market is developing in patterns compatible with the Metro 2040 Growth Concept and local jurisdictions are moving toward implementation.

FINDINGS - Oregon Administrative Rules

This section will address three considerations which were not addressed earlier. These are: clear and objective standards, regional coordination and restrictions on housing tenure.

Metro does not directly regulate land through zoning. (It does determine UGB expansions which has a major impact on land uses.) The Urban Growth Management Functional Plan as mentioned earlier, does attempt to address the effects of local zoning requirements which may inadvertently or otherwise have the effect of reducing densities (see Title 1, Section 5C). Model codes are also being produced by Metro with the intent of providing clear, objective language for implementing the Urban Growth Management Functional Plan and as required by the Metro Charter for the Regional Framework Plan.

With regard to regional coordination, each new growth forecast and subsequent allocation are coordinated with the cities and counties within the region. These processes are described in Parts 1 and 2 of the *Urban Growth Report*. Metro does not directly regulate development or construction, nor do any of its functional plans address housing tenure.

CONCLUSIONS

12. The requirements listed above either do not apply to Metro or are already addressed.

FINDINGS - Metropolitan Housing Rule

This section will address conformance with Division 8 of the Oregon Administrative Rules, particularly the 6/8/10 rule and the 50/50 single family /multiple family unit split. It should be noted that over and above region compliance, the cities and counties of the region are individually responsible to the state for meeting several rules of this chapter of the Oregon Administrative Rules.

As indicated on Table 21, the region is estimated to have 50 percent of the dwelling unit capacity (107,790 units) to be single family, with 18 percent townhouse (to be counted as multi-family in the Metropolitan Housing Rule) and 32 percent multi-family. In calculating average density, the Metro Housing Rule does not provide for mixed use developments, and we have no data about the lot sizes of infill projects. Accordingly, if infill dwelling units are excluded from the total of 217,430 dwelling units, the result is a regional average residential density of 11.2 dwelling units per acre.

As the estimate of capacity within the current UGB is not enough to address estimated demand, additional housing will need to be made available. Should this occur through expansion of the UGB, adherence to these rules would have to be demonstrated in any Urban Reserves brought into the UGB. These requirements include the minimum average residential density of 10 dwelling units per acre, preparation of urban reserve plans and compliance with the Metro Housing Rule.

CONCLUSIONS

13. On a region-wide basis, conformance with the 6/8/10 and 50/50 rules have been demonstrated.

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Statutes and Mandates

Goal 10: Housing

definitions

Buildable lands for residential use shall be inventoried and plans shall encourage the availability of adequate numbers of needed housing units at price ranges and rent levels which are commensurate with the financial capabilities of Oregon households and allow for flexibility of housing location, type and density.

Buildable Lands -- refers to lands in urban and urbanizable areas that are suitable, available and necessary for residential use.

Government-Assisted Housing -- means housing that is financed in whole or part by either a federal or state housing agency or a local housing authority as defined in ORS 456.005 to 456.720, or housing that is occupied by a tenant or tenants who benefit from rent supplements or housing vouchers provided by either a federal or state housing agency or a local housing authority.

Household -- refers to one or more persons occupying a single housing unit.

Manufactured Homes -- means structures with a Department of Housing and Urban Development (HUD) label certifying that the structure is constructed in accordance with the National Manufactured Housing Construction and Safety Standards Act of 1974 (42 USC 5401 et seq.), as amended on August 22, 1981.

Needed Housing Units -- means housing types determined to meet the need shown for housing within an urban growth boundary at particular price ranges and rent levels. On and after the beginning of the first periodic review of a local government's acknowledged comprehensive plan, "needed housing units" also includes government-assisted housing. For cities having populations larger than 2,500 people and counties having populations larger than 15,000 people, "needed housing units" also includes (but is not limited to) attached and detached single-family housing, multiple-family housing, and manufactured homes, whether occupied by owners or renters.

A. Planning

1. In addition to inventories of buildable lands, housing elements of a comprehensive plan should, at a minimum, include: (1) a comparison of the distribution of the existing population by income with the distribution of available housing units by cost; (2) a determination of vacancy rates, both overall and at varying rent ranges and cost levels; (3) a determination of expected housing demand at varying rent ranges and cost levels; (4) allowance for a variety of densities and types of residences in each community; and (5) an inventory of sound housing in urban areas including units capable of being rehabilitated.

2. Plans should be developed in a manner that insures the provision of appropriate types and amounts of land within urban growth boundaries. Such land should be necessary and suitable for housing that meets the housing needs of households of all income levels.

3. Plans should provide for the appropriate type, location and phasing of public facilities and services sufficient to support housing development in areas presently developed or undergoing development or redevelopment.

4. Plans providing for housing needs should consider as a major determinant the carrying capacity of the air, land and water resources of the planning area. The land conservation and development actions provided for by such plans should not exceed the carrying capacity of such resources.

B. Implementation

1. Plans should provide for a continuing review of housing need projections and should establish a process for accommodating needed revisions.

2. Plans should take into account the effects of utilizing financial incentives and resources to (a) stimulate the rehabilitation of substandard housing without regard to the financial capacity of the owner so long as benefits accrue to the occupants; and (b) bring into compliance with codes adopted to assure safe and sanitary housing the dwellings of individuals who cannot on their own afford to meet such codes.

3. Decisions on housing development proposals should be expedited when such proposals are in accordance with zoning ordinances and with provisions of comprehensive plans.

4. Ordinances and incentives should be used to increase population densities in urban areas taking into consideration (1) key facilities, (2) the economic, environmental, social and energy consequences of the proposed densities and (3) the optimal use of existing urban land particularly in sections containing significant amounts of unsound substandard structures.

5. Additional methods and devices for achieving this goal should, after consideration of the impact on lower income households, include, but not be limited to: (1) tax incentives and disincentives; (2) building and construction code revision; (3) zoning and land use controls; (4) subsidies and loans; (5) fee and less-than-fee acquisition techniques; (6) enforcement of local health and safety codes; and (7) coordination of the development of urban facilities and services to disperse low income housing throughout the planning area.

6. Plans should provide for a detailed management program to assign respective implementation roles and responsibilities to those governmental bodies operating in the planning area and having interests in carrying out the goal.

Oregon Revised Statutes, portions of Chapter 197.

197.295. *Definitions for ORS 197.295 to 197.314 and 197.475 to 197.490.*

As used in ORS 197.295 to 197.314 and 197.475 to 197.490:

(1) "Buildable lands" means lands in urban and urbanizable areas that are suitable, available and necessary for residential uses. "Buildable lands" includes both vacant land and developed land likely to be redeveloped.

(2) "Manufactured dwelling park" has the meaning given that term in ORS 446.003.

(3) "Government assisted housing" means housing that is financed in whole or part by either a federal or state housing agency or a housing authority as defined in ORS 456.005, or housing that is occupied by a tenant or tenants who benefit from rent supplements or housing vouchers provided by either a federal or state housing agency or a local housing authority.

(4) "Manufactured homes" has the meaning given that term in ORS 446.003.

(5) "Mobile home park" has the meaning given that term in ORS 446.003.

(6) "Periodic review" means the process and procedures as set forth in ORS 197.628 to 197.646.

(7) "Urban growth boundary" means an urban growth boundary included or referenced in a comprehensive plan.

197.296. *Amendment of comprehensive plan to include sufficient buildable lands within urban growth boundary; analysis and determination of residential housing patterns.*

(1)(a) The provisions of this section apply to local government comprehensive plans for lands:

(A) Within any urban growth boundary for a city with a population of 25,000 or more;

(B) Within any urban growth boundary for a city with a population of less than 25,000 with a rate of growth that exceeded the average rate of growth for the state for three of the last five years; and

(C) For which a functional plan is prepared by a metropolitan service district under ORS 268.390(2).

(b) Notwithstanding paragraph (a) of this subsection, the Land Conservation and Development Commission may waive the requirements of that paragraph.

(2) At periodic review or any other legislative review of the urban growth boundary, comprehensive plans or functional plans shall provide sufficient buildable lands within urban growth boundaries established pursuant to statewide planning goals to accommodate estimated housing needs for 20 years.

(3) As part of its next periodic review pursuant to ORS 197.628 to 197.650 following September 9, 1995, or any other legislative review of the urban growth boundary, a local government shall:

(a) Inventory the supply of buildable lands within the urban growth boundary;

(b) Determine the actual density and the actual average mix of housing types of residential development that have occurred within the urban growth boundary since the last periodic review or five years, whichever is greater; and

(c) Conduct an analysis of housing need by type and density range, in accordance with ORS 197.303 and statewide planning goals and rules relating to housing, to determine the amount of land needed for each needed housing type for the next 20 years.

(4) If the determination required by subsection (3) of this section indicates that the urban growth boundary does not contain sufficient buildable lands to accommodate housing needs for 20 years at the actual developed density that has occurred since the last periodic review, the local government shall take one of the following actions:

(a) Amend its urban growth boundary to include sufficient buildable lands to accommodate housing needs for 20 years at the actual developed density during the period since the last periodic review or within the last five years, whichever is greater. As part of this process, the amendment shall include sufficient land reasonably necessary to accommodate the siting of new public school facilities. The need and inclusion of lands for new public school facilities shall be a coordinated process between the affected public school districts and the local government that has the authority to approve the urban growth boundary;

(b) Amend its comprehensive plan, functional plan or land use regulations to include new measures that demonstrably increase the likelihood that residential development will occur at densities sufficient to accommodate housing needs for 20 years without expansion of the urban growth boundary. A local government or metropolitan service district that takes this action shall monitor and record the level of development activity and development density by housing type following the date of the adoption of the new measures; or

(c) Adopt a combination of the actions described in paragraphs (a) and (b) of this subsection.

(5) Using the analysis conducted under subsection (3)(c) of this section, the local government shall determine the overall average density and overall mix of housing types at which residential development of needed housing types must occur in order to meet housing needs over the next 20 years. If that density is greater than the actual density of development determined under subsection (3)(b) of this section, or if that mix is different from the actual mix of housing types determined under subsection (3)(b) of this section, the local government, as part of its periodic review, shall adopt measures that demonstrably increase the likelihood that residential development will occur at the housing types and density and at the mix of housing types required to meet housing needs over the next 20 years.

(6) A local government that takes any actions under subsection (4) or (5) of this section shall demonstrate that the comprehensive plan and land use regulations comply with goals and rules adopted by the commission and implement ORS 197.295 to 197.314.

(7) In establishing that actions and measures adopted under subsections (4) and (5) of this section demonstrably increase the likelihood of higher density residential development, the local government shall at a minimum ensure that land zoned for needed housing is in locations appropriate for the housing types identified under subsection (3) of this section and is zoned at density ranges that are likely to be achieved by the housing market using the analysis in subsection (3) of this section. Actions or measures, or both, may include but are not limited to:

(a) Increases in the permitted density on existing residential land;

(b) Financial incentives for higher density housing;

(c) Provisions permitting additional density beyond that generally allowed in the zoning district in exchange for amenities and features provided by the developer;

(d) Removal or easing of approval standards or procedures;

(e) Minimum density ranges;

(f) Redevelopment and infill strategies;

(g) Authorization of housing types not previously allowed by the plan or regulations; and

(h) Adoption of an average residential density standard.

197.298. *Priority of land to be included in urban growth boundary.*

(1) In addition to any requirements established by rule addressing urbanization, land may not be included within an urban growth boundary except under the following priorities:

(a) First priority is land that is designated urban reserve land under ORS 195.145, rule or metropolitan service district action plan.

(b) If land under paragraph (a) of this subsection is inadequate to accommodate the amount of land needed, second priority is land adjacent to an urban growth boundary that is identified in an acknowledged comprehensive plan as an exception area or nonresource land. Second priority may include resource land that is completely surrounded by exception areas unless such resource land is high-value farmland as described in ORS 215.710.

(c) If land under paragraphs (a) and (b) of this subsection is inadequate to accommodate the amount of land needed, third priority is land designated as marginal land pursuant to ORS 197.247 (1991 Edition).

(d) If land under paragraphs (a) to (c) of this subsection is inadequate to accommodate the amount of land needed, fourth priority is land designated in an acknowledged comprehensive plan for agriculture or forestry, or both.

(2) Higher priority shall be given to land of lower capability as measured by the capability classification system or by cubic foot site class, whichever is appropriate for the current use.

(3) Land of lower priority under subsection (1) of this section may be included in an urban growth boundary if land of higher priority is found to be inadequate to accommodate the amount of land estimated in subsection (1) of this section for one or more of the following reasons:

(a) Specific types of identified land needs cannot be reasonably accommodated on higher priority lands;

(b) Future urban services could not reasonably be provided to the higher priority due to topographical or other physical constraints; or

(c) Maximum efficiency of land uses within a proposed urban growth boundary requires inclusion of lower priority lands in order to include or to provide services to higher priority lands.

197.303 "Needed housing" defined.

(1) As used in ORS 197.307, until the beginning of the first periodic review of a local government's acknowledged comprehensive plan, "needed housing" means housing types determined to meet the need shown for housing within an urban growth boundary at particular price ranges and rent levels. On and after the beginning of the first periodic review of a local government's acknowledged comprehensive plan, "needed housing" also means:

(a) Housing that includes, but is not limited to, attached and detached single-family housing and multiple family housing for both owner and renter occupancy;

(b) Government assisted housing;

(c) Mobile home or manufactured dwelling parks as provided in ORS 197.475 to 197.490; and

(d) Manufactured homes on individual lots planned and zoned for single-family residential use that are in addition to lots within designated manufactured dwelling subdivisions.

(2) Subsection (1)(a) and (d) of this section shall not apply to:

(a) A city with a population of less than 2,500.

(b) A county with a population of less than 15,000.

(3) A local government may take an exception to subsection (1) of this section in the same manner that an exception may be taken under the goals.

197.307. Effect of need for certain housing in urban growth areas; placement standards for approval of manufactured dwellings.

(1) The availability of affordable, decent, safe and sanitary housing opportunities for persons of lower, middle and fixed income, including housing for seasonal and year-round farmworkers, is a matter of statewide concern.

(2) Many persons of lower, middle and fixed income depend on government assisted housing as a source of affordable decent, safe and sanitary housing.

(3) When a need has been shown for housing within an urban growth boundary at particular price ranges and rent levels, needed housing, including housing for seasonal and year-round farmworkers, shall be permitted in one or more zoning districts or in zones described by some comprehensive plans as overlay zones with sufficient buildable land to satisfy that need.

(4) Subsection (3) of this section shall not be construed as an infringement on a local government's prerogative to:

(a) Set approval standards under which a particular housing type is permitted outright;

(b) Impose special conditions upon approval of a specific development proposal; or

(c) Establish approval procedures.

(5) A jurisdiction may adopt any or all of the following placement standards, or any less restrictive standard, for the approval of manufactured homes located outside mobile home parks:

(a) The manufactured home shall be multisectional and enclose a space of not less than 1,000 square feet.

(b) The manufactured home shall be placed on an excavated and back-filled foundation and enclosed at the perimeter such that the manufactured home is located not more than 12 inches above grade.

(c) The manufactured home shall have a pitched roof, except that no standard shall require a slope of greater than a nominal three feet in height for each 12 feet in width.

(d) The manufactured home shall have exterior siding and roofing which in color, material and appearance is similar to the exterior siding and roofing material commonly used on residential dwellings

within the community or which is comparable to the predominant materials used on surrounding dwellings as determined by the local permit approval authority.

(e) The manufactured home shall be certified by the manufacturer to have an exterior thermal envelope meeting performance standards which reduce levels equivalent to the performance standards required of single-family dwellings constructed under the state building code as defined in ORS 455.010.

(f) The manufactured home shall have a garage or carport constructed of like materials. A jurisdiction may require an attached or detached garage in lieu of a carport where such is consistent with the predominant construction of immediately surrounding dwellings.

(g) In addition to the provisions in paragraphs (a) to (f) of this subsection, a city or county may subject a manufactured home and the lot upon which it is sited to any development standard, architectural requirement and minimum size requirement to which a conventional single-family residential dwelling on the same lot would be subject.

(6) Any approval standards, special conditions and the procedures for approval adopted by a local government shall be clear and objective and shall not have the effect, either in themselves or cumulatively, of discouraging needed housing through unreasonable cost or delay.

197.312. *Limitation on city and county authority to prohibit certain kinds of housing.*

(1) No city or county may by charter prohibit from all residential zones attached or detached single-family housing, multiple-family housing for both owner and renter occupancy or manufactured homes. No city or county may by charter prohibit government assisted housing or impose additional approval standards on government assisted housing that are not applied to similar but unassisted housing.

(2) No city or county may impose any approval standards, special conditions or procedures on seasonal and year-round farm-worker housing that are not clear and objective or have the effect, either in themselves or cumulatively, of discouraging seasonal and year-round farmworker housing through unreasonable cost or delay or by discriminating against such housing.

197.313. *Interpretation of ORS 197.312.*

Nothing in ORS 197.312 or in the amendments to ORS 197.295, 197.303, 197.307 by sections 1, 2 and 3, chapter 795, Oregon Laws 1983, shall be construed to require a city or county to contribute to the financing, administration or sponsorship of government assisted housing.

197.314. *Required siting of manufactured homes.*

(1) Notwithstanding ORS 197.295 to 197.313, within urban growth boundaries each city and county shall amend its comprehensive plan and land use regulations for all land zoned for single-family residential uses to allow for siting of manufactured homes as defined in ORS 446.003 (26)(a)(C). A local government may only subject the siting of a manufactured home allowed under this section to regulation as set forth in ORS 197.307 (5).

(2) Cities and counties shall adopt and amend comprehensive plans and land use regulations under subsection (1) of this section according to the provisions of ORS 197.610 to 197.650.

(3) Subsection (1) of this section does not apply to any area designated in an acknowledged comprehensive plan or land use regulation as a historic district or residential land immediately adjacent to a historic landmark.

(4) Manufactured homes on individual lots zoned for single-family residential use in subsection (1) of this section shall be in addition to manufactured homes on lots within designated manufactured dwelling subdivisions.

(5) This section shall not be construed as abrogating a recorded restrictive covenant.

Oregon Administrative Rules

INTERPRETATION OF GOAL 10 HOUSING

660-008-0000

Purpose

(1) The purpose of this rule is to assure opportunity for the provision of adequate numbers of needed housing units, the efficient use of buildable land within urban growth boundaries, and to provide greater certainty in the development process so as to reduce housing costs. This rule is intended to define standards for compliance with Goal 10"Housing" and to implement ORS 197.303 through 197.307.

(2) OAR 660-007-0000 et seq., Metropolitan Housing, are intended to complement and be consistent with OAR 660-008-0000 et seq., Goal 10 Housing. Public facilities and services are planned for buildable land as defined in OAR 660-007-0140 within the Metropolitan Portland urban growth boundary. Should differences in interpretation between OAR 660-008-0000 and OAR 660-007-0000 arise, the provisions of OAR 660-007-0000 shall prevail for cities and counties within the Metro urban growth boundary.

660-008-0005

Definitions

For the purpose of this rule, the definitions in ORS 197.015, 197.295, and 197.303 shall apply. In addition, the following definitions shall apply:

(1) "Attached Single Family Housing" means common-wall dwellings or rowhouses where each dwelling unit occupies a separate lot.

(2) "Buildable Land" means residentially designated vacant and, at the option of the local jurisdiction, redevelopable land within the Metro urban growth boundary that is not severely constrained by natural hazards (Statewide Planning Goal 7) or subject to natural resource protection measures (Statewide Planning Goals 5 and 15). Publicly owned land is generally not considered available for residential use. Land with slopes of 25 percent or greater unless otherwise provided for at the time of acknowledgment and land within the 100-year floodplain is generally considered unbuildable for purposes of density calculations.

(3) "Detached Single Family Housing" means a housing unit that is free standing and separate from other housing units.

(4) "Government Assisted Housing" means housing that is financed in whole or part by either a federal or state housing agency or a local housing authority as defined in ORS 456.005 to 456.720, or housing that is occupied by a tenant or tenants who benefit from rent supplements or housing vouchers provided by either a federal or state housing agency or a local housing authority.

(5) "Housing Needs Projection" refers to a local determination, justified in the plan, of the mix of housing types and densities that will be:

(a) Commensurate with the financial capabilities of present and future area residents of all income levels during the planning period;

(b) Consistent with any adopted regional housing standards, state statutes and Land Conservation and Development Commission administrative rules; and

(c) Consistent with Goal 14 requirements.

(6) "Manufactured Dwelling" means:
(a) Residential trailer, a structure constructed for movement on the public highways that has sleeping, cooking and plumbing facilities, that is intended for human occupancy, that is being used for residential purposes and that was constructed before January 1, 1962;

(b) Mobile home, a structure constructed for movement on the public highways that has sleeping, cooking and plumbing facilities, that is intended for human occupancy, that is being used for residential purposes and that was constructed between January 1, 1962, and June 15, 1976, and met the construction requirements of Oregon mobile home law in effect at the time of construction;

(c) Manufactured home, a structure constructed for movement on the public highways that has sleeping, cooking and plumbing facilities, that is intended for human occupancy, that is being used for residential purposes and that was constructed in accordance with federal manufactured housing construction and safety standards regulations in effect at the time of construction;
(d) Does not mean any building or structure subject to the structural specialty code adopted pursuant to ORS 455.100 to 455.450 or any unit identified as a recreational vehicle by the manufacturer.

(7) "Manufactured Dwelling Park" means any place where four or more manufactured dwellings as defined in ORS 446.003 are located within 500 feet of one another on a lot, tract or parcel of land under the same ownership, the primary purpose of which is to rent space or keep space for rent to any person for a charge or fee paid or to be paid for the rental or use of facilities or to offer space free in connection with securing the trade or patronage of such person. "Manufactured dwelling park" does not include a lot or lots located within a subdivision being rented or leased for occupancy by no more than one manufactured dwelling per lot if the subdivision was approved by the local government unit having jurisdiction under an ordinance adopted pursuant to ORS 92.010 to 92.190.

(8) "Manufactured Homes" means structures with a Department of Housing and Urban Development (HUD) label certifying that the structure is constructed in accordance with National Manufactured Housing Construction and Safety Standards Act of 1974 (42 U.S.C. Sections 5401 et seq.), as amended on August 22, 1981.

(9) "Mobile Home Park" means any place where four or more manufactured dwellings as defined in ORS 446.003 are located within 500 feet of one another on a lot, tract or parcel of land under the same ownership, the primary purpose of which is to rent space or keep space for rent to any person for a charge or fee paid or to be paid for the rental or use of facilities or to offer space free in connection with securing the trade or patronage of such person. "Mobile home park" does not include a lot or lots located within a subdivision being rented or leased for occupancy by no more than one manufactured dwelling per lot if the subdivision was approved by the local government unit having jurisdiction under an ordinance adopted pursuant to ORS 92.010 to 92.190.

(10) "Multiple Family Housing" means attached housing where each dwelling unit is not located on a separate lot.

(11) "Needed Housing" defined. Until the beginning of the first periodic review of a local government's acknowledged comprehensive plan, "needed housing" means housing types determined to meet the need shown for housing within an urban growth boundary at particular price ranges and rent levels. On and after the beginning of the first periodic review of a local government's acknowledged comprehensive plan, "needed housing" also means:

(a) Housing that includes, but is not limited to, attached and detached single-family housing and multiple family housing for both owner and renter occupancy;

(b) Government assisted housing;

(c) Mobile home or manufactured dwelling parks as provided in ORS 197.475 to 197.490;
(d) Manufactured homes on individual lots planned and zoned for single-family residential use that are in addition to lots within designated manufactured dwelling subdivisions; and

(e) Subsections (12)(a) and (d) of this rule shall not apply to:

(A) A city with a population of less than 2,500;

(B) A county with a population of less than 15,000.

(12) "Redevelopable Land" means land zoned for residential use on which development has already occurred but on which, due to present or expected market forces, there exists the strong likelihood that existing development will be converted to more intensive residential uses during the planning period.

(13) "Suitable and Available Land" means residentially designated vacant and redevelopable land within an urban growth boundary that is not constrained by natural hazards, or subject to natural resource protection measures, and for which public facilities are planned or to which public facilities can be made available. Publicly owned land generally is not considered available for residential use.

660-008-0010
Allocation of Buildable Land

The mix and density of needed housing is determined in the housing needs projection. Sufficient buildable land shall be designated on the comprehensive plan map to satisfy housing needs by type and density range as determined in the housing needs projection. The local buildable lands inventory must document the amount of buildable land in each residential plan designation.

660-008-0015
Clear and Objective Approval Standards Required

Local approval standards, special conditions and procedures regulating the development of needed housing must be clear and objective, and must not have the effect, either of themselves or cumulatively, of discouraging needed housing through unreasonable cost or delay.

660-008-0020
Specific Plan Designations Required

(1) Residential plan designations shall be assigned to all buildable land, and shall be specific so as to accommodate the varying housing types and densities identified in the local housing needs projection.

(2) A local government may defer the assignment of specific residential plan designations only when the following conditions have been met:

(a) Uncertainties concerning the funding, location and timing of public facilities have been identified in the local comprehensive plan;

(b) The decision not to assign specific residential plan designations is specifically related to identified public facilities constraints and is so justified in the plan; and

(c) The plan includes a time-specific strategy for resolution of identified public facilities uncertainties and a policy commitment to assign specific residential plan designations when identified public facilities uncertainties are resolved.

660-008-0025
The Rezoning Process

A local government may defer rezoning of land within an urban growth boundary to maximum planned residential density provided that the process for future rezoning is reasonably justified. If such is the case, then:

(1) The plan shall contain a justification for the rezoning process and policies which explain how this process will be used to provide for needed housing.

(2) Standards and procedures governing the process for future rezoning shall be based on the rezoning justification and policy statement, and must be clear and objective.

660-008-0030
Regional Coordination

(1) Each local government shall consider the needs of the relevant region in arriving at a fair allocation of housing types and densities.

(2) The local coordination body shall be responsible for ensuring that the regional housing impacts of restrictive or expansive local government programs are considered. The local coordination body shall ensure that needed housing is provided for on a regional basis through coordinated comprehensive plans.

660-008-0035
Substantive Standards for Taking a Goal 2, Part II Exception Pursuant to ORS 197.303(3)

(1) A local government may satisfy the substantive standards for exceptions contained in Goal 2, Part II, upon a demonstration in the local housing needs projection, supported by compelling reasons and facts, that:

(a) The needed housing type is being provided for elsewhere in the region in sufficient numbers to meet regional needs;

(b) Sufficient buildable land has been allocated within the local jurisdiction for other types of housing which can meet the need for shelter at the particular price ranges and rent levels that would have been met by the excluded housing type; and

(c) The decision to substitute other housing types for the excluded needed housing type furthers the policies and objectives of the local comprehensive plan, and has been coordinated with other affected units of government.

(2) The substantive standards listed in section (1) of this rule shall apply to the ORS 197.303(3) exceptions process in lieu of the substantive standards in Goal 2, Part II. The standards listed in section (1) of this rule shall not apply to the exceptions process authorized by OAR 660-007-0360.

660-008-0040
Restrictions on Housing Tenure

Any local government that restricts the construction of either rental or owner occupied housing on or after its first periodic review shall include a determination of housing need according to tenure as part of the local housing needs projection.

(Oregon Administrative Rules continued)
METROPOLITAN HOUSING

660-007-0000

Statement of Purpose

The purpose of this rule is to assure opportunity for the provision of adequate numbers of needed housing units and the efficient use of land within the Metropolitan Portland (Metro) urban growth boundary, to provide greater certainty in the development process and so to reduce housing costs. OAR 660-007-0030 through 660-007-0037 are intended to establish by rule regional residential density and mix standards to measure Goal 10 Housing compliance for cities and counties within the Metro urban growth boundary, and to ensure the efficient use of residential land within the regional UGB consistent with Goal 14 Urbanization. OAR 660-007-0035 implements the Commission's determination in the Metro UGB acknowledgment proceedings that region wide, planned residential densities must be considerably in excess of the residential density assumed in Metro's "UGB Findings". The new construction density and mix standards and the criteria for varying from them in this rule take into consideration and also satisfy the price range and rent level criteria for needed housing as set forth in ORS 197.303.

(The Metropolitan Housing Rule repeats definitions listed earlier and so are not reproduced here.)

660-007-0030
New Construction Mix

(1) Jurisdictions other than small developed cities must either designate sufficient buildable land to provide the opportunity for at least 50 percent of new residential units to be attached single family housing or multiple family housing or justify an alternative percentage based on changing circumstances. Factors to be considered in justifying an alternate percentage shall include, but need not be limited to:

(a) Metro forecasts of dwelling units by type;

(b) Changes in household structure, size, or composition by age;

(c) Changes in economic factors impacting demand for single family versus multiple family units; and

(d) Changes in price ranges and rent levels relative to income levels.

(2) The considerations listed in section (1) of this rule refer to county-level data within the UGB and data on the specific jurisdiction.

660-007-0033
Consideration of Other Housing Types

Each local government shall consider the needs for manufactured housing and government assisted housing within the Portland Metropolitan UGB in arriving at an allocation of housing types.

660-007-0035
Minimum Residential Density Allocation for New Construction

The following standards shall apply to those jurisdictions which provide the opportunity for at least 50 percent of new residential units to be attached single family housing or multiple family housing:

(1) The Cities of Cornelius, Durham, Fairview, Happy Valley and Sherwood must provide for an overall density of six or more dwelling units per net buildable acre. These are relatively small cities with some growth potential (i.e. with a regionally coordinated population projection of less than 8,000 persons for the active planning area).

(2) Clackamas and Washington Counties, and the cities of Forest Grove, Gladstone, Milwaukie, Oregon City, Troutdale, Tualatin, West Linn and Wilsonville must provide for an overall density of eight or more dwelling units per net buildable acre.

(3) Multnomah County and the cities of Portland, Gresham, Beaverton, Hillsboro, Lake Oswego and Tigard must provide for an overall density of ten or more dwelling units per net buildable acre. These are larger urbanized jurisdictions with regionally coordinated population projections of 50,000 or more for their active planning areas, which encompass or are near major employment centers, and which are situated along regional transportation corridors.

(4) Regional housing density and mix standards as stated in OAR 660-007-0030 and sections (1), (2), and (3) of this rule do not apply to small developed cities which had less than 50 acres of buildable land in 1977 as determined by criteria used in Metro's UGB Findings. These cities include King City, Rivergrove, Maywood Park, Johnson City and Wood Village.

660-007-0037
Alternate Minimum Residential Density Allocation for New Construction

The density standards in OAR 660-007-0035 shall not apply to a jurisdiction which justifies an alternative new construction mix under the provisions of OAR 660-007-0030. The following standards shall apply to these jurisdictions:

(1) The jurisdiction must provide for the average density of detached single family housing to be equal to or greater than the density of detached single family housing provided for in the plan at the time of original LCDC acknowledgment.

(2) The jurisdiction must provide for the average density of multiple family housing to be equal to or greater than the density of multiple family housing provided for in the plan at the time of original LCDC acknowledgment.

(3) A jurisdiction which justifies an alternative new construction mix must also evaluate whether the factors in OAR 660-007-0030 support increases in the density of either detached single family or multiple family housing or both. If the evaluation supports increases in density, then necessary amendments to residential plan and zone designations must be made.

660-007-0045
Computation of Buildable Lands

(1) The local buildable lands inventory must document the amount of buildable land in each residential plan designation.

(2) The Buildable Land Inventory (BLI): The mix and density standards of OAR 660-007-0030, 660-007-0035 and 660-007-0037 apply to land in a buildable land inventory required by OAR 660-007-0010, as modified herein. Except as provided below, the buildable land inventory at each jurisdiction's choice shall either be based on land in a residential plan/zone designation within the jurisdiction at the time of periodic review or based on the jurisdiction BLI at the time of acknowledgment as updated. Each jurisdiction must include in its computations all plan and/or zone changes involving residential land which that jurisdiction made since acknowledgment. A jurisdiction need not include plan and/or zone changes made by another jurisdiction before annexation to a city. The adjustment of the BLI at the time of acknowledgment shall:

(a) Include changes in zoning ordinances or zoning designations on residential planned land if allowed densities are changed;

(b) Include changes in planning or zoning designations either to or from residential use. A city shall include changes to annexed or incorporated land if the city changed type or density or the plan/zone designation after annexation or incorporation;

(c) The county and one or more city(ies) affected by annexations or incorporations may consolidate buildable land inventories. A single calculation of mix and density may be prepared. Jurisdictions which consolidate their buildable lands inventories shall conduct their periodic review simultaneously;

(d) A new density standard shall be calculated when annexation, incorporation or consolidation results in mixing two or more density standards (OAR 660-007-0035). The calculation shall be made as follows:

(A)(i) BLI Acres x 6 Units/Acre = Num. of Units;

(ii) BLI Acres x 8 Units/Acre = Num. of Units;

(iii) BLI Acres x 10 Units/Acre = Num. of Units;

(iv) Total Acres (TA) xxxxxxxxxxTotal Units (TU).

(B) Total units divided by Total Acres = New Density Standard;

(C) Example:

(i)(I) Cities A and B have 100 acres and a 6-unit-per-acre standard: (100 x 6 = 600 units);

(II) City B has 300 acres and a 10-unit-per-acre standard: (300 x 10 = 3000 units);

(III) County has 200 acres and an 8-unit-per-acre standard: (200 x 08 = 1600 units);

(IV) Total acres= 600. . . . . .Total Units = 5200.

(ii) 5200 units divided by 600 acres = 8.66 units per acre standard.

(3) Mix and Density Calculation: The housing units allowed by the plan/zone designations at periodic review, except as modified by section (2) of this rule, shall be used to calculate the mix and density. The number of units allowed by the plan/zone designations at the time of development shall be used for developed residential land.

660-007-0050
Regional Coordination

(1) At each periodic review of the Metro UGB, Metro shall review the findings for the UGB. They shall determine whether the buildable land within the UGB satisfies housing needs by type and density for the region's long-range population and housing projections.

(2) Metro shall ensure that needed housing is provided for on a regional basis through coordinated comprehensive plans.

660-007-0060
Applicability

(1) The new construction mix and minimum residential density standards of OAR 660-007-0030 through 660-007-0037 shall be applicable at each periodic review. During each periodic review local government shall prepare findings regarding the cumulative effects of all plan and zone changes affecting residential use. The jurisdiction's buildable lands inventory (updated pursuant to OAR 660-007-0045) shall be a supporting document to the local jurisdiction's periodic review order.

(2) For plan and land use regulation amendments which are subject to OAR 660, Division 18, the local jurisdiction shall either:

(a) Demonstrate through findings that the mix and density standards in this Division are met by the amendment; or

(b) Make a commitment through the findings associated with the amendment that the jurisdiction will comply with provisions of this Division for mix or density through subsequent plan amendments.

Metro's Regional Urban Growth Goals and Objectives (RUGGOs)

Objective 17. Housing

The Metro Council shall adopt a fair share strategy for meeting the housing needs of the urban population in cities and counties based on a subregional analysis which provides for:

a diverse range of housing types available within cities and counties inside the UGB;

specific goals for low and moderate income and market rate housing to ensure that sufficient and affordable housing is available to households of all income levels that live or have a member working in each jurisdiction;

housing densities and costs supportive of adopted public policy for the development of the regional transportation system and designated centers and corridors;

a balance of jobs and housing within the region and subregions.

121897C-17

Exhibit A

Urban Growth Report

Revised Draft

December 1997

Growth Management Services Department

METRO

Metro
Metro is the directly elected regional government that serves approximately 1.2 million residents in portions of Clackamas, Multnomah, and Washington counties as well as those in the 24 cities in the region: Beaverton, Cornelius, Durham, Fairview, Forest Grove, Gladstone, Gresham, Happy Valley, Hillsboro, Johnson City, King City, Lake Oswego, Maywood Park, Milwaukie, Oregon City, Portland, Rivergrove, Sherwood, Tigard, Troutdale, Tualatin, West Linn, Wilsonville, and Wood Village.

Metro is responsible for the regional aspects of transportation, land use planning, and the urban growth boundary; regional parks and greenspaces; solid waste management; operation of the Metro Washington Park Zoo; and technical services to local governments of the region. Through the Metropolitan Exposition-Recreation Commission (MERC), Metro manages the Oregon Convention Center, Civic Stadium, Portland Center for the Performing Arts, and the Expo Center.

Metro is authorized by Chapter 268 of the Oregon Revised Statutes (OAR) and has operated as an elected regional government since 1978. With the adoption of the Metro Charter by vote of the citizens of the region in November of 1992, additional responsibilities were mandated to Metro. Metro is governed by a seven-member council, an executive officer, and auditor. Councilors are elected from districts, and the executive officer and auditor are elected region-wide.

Executive Officer
Mike Burton

Metro Councilors
Presiding Officer
District 3 John Kvistad

Deputy Presiding Officer
District 1 Ruth McFarland

District 2 Don Morissette
District 4 Susan McLain
District 5 Ed Washington
District 6 Lisa Naito
District 7 Patricia McCaig

Auditor
Alexis Dow, CPA

Table of Contents

Urban Growth Report

Executive Summary

Urban Growth Report
Adopted by the Metro Council December 1997

BACKGROUND - Metro Code and State Land Use statutes require that the elected Metro Council review the estimated capacity of the existing Metro Urban Growth Boundary (UGB) at least every 5 years for each new 20-year period. The Metro Council adopted the Metro UGB in 1979 and over the years about 2,800 acres have been added. The last review of the Metro UGB was completed in 1992 for the year 2012. In 1997, when the most recent review of the Metro UGB was initiated, 232,670 acres were in the UGB.

CALCULATIONS - The *Urban Growth Report, December 1997*, is comprised of two main parts: 1) a Buildable Land and Capacity Analysis for the Metro Urban Growth Boundary, and 2) a Regional Forecast of Population, Households and Employment. These data allow a comparison of the estimated need (the forecast) for the next twenty years with the current capacity for residential and employment growth within the current Metro UGB.

The 2017 Regional Forecast is a computer model of a five-county area (Clackamas, Clark, Multnomah, Washington and Yamhill) and is based on estimates of economic sector growth (manufacturing, transportation, construction, services, etc.) and demographic trends. The forecast estimates were peer-reviewed by public and private economists from the area.

The geographic study area of the regional forecast was then reduced to a four-county forecast of population and employment (Clackamas, Clark, Multnomah and Washington). From the four-county population and job estimates for future years, forecasts of households and dwelling unit demand were derived. The four-county regional forecast of population, households and employment was subsequently disaggregated to 1,260 Traffic Analysis Zones (TAZ) using Metro's growth allocation process for use in planning at the local level consistent with regionwide totals.

The four-county estimates of total jobs, population and households and dwelling units for the year 2017 are as follows:

Portland-Vancouver Region
(Multnomah, Clackamas, Washington and Clark Counties)

	1994	2017	1994-2017
Employment, nonfarm (BEA)	956,000	1,536,500	580,500
Population	1,565,800	2,271,100	705,300
Households	604,400	947,900	343,500
Dwelling Units *	633,600	990,500	356,900

*assumes 3.9% vacancy rate for future years
Source: 1994 data - Metro Regional Data Book; September 1997
2017 data – 2015 Regional Forecast, January 1996

For purposes of administering the Metro urban growth boundary, the study area of the four-county regional forecast was further reduced to only the population, households, dwelling units

and employment contained currently inside the Metro urban growth boundary. The estimates of total jobs, population, households and dwelling units for the year 2017 are as follows:

Metro Urban Growth Boundary

	1994	2017	1994-2017 Net Change
Employment, nonfarm (BEA)	788,500	1,264,500	476,000
Population	1,134,900	1,628,600	493,700
Households	451,300	691,700	240,400
Dwelling Units *	472,800	722,600	249,800

*assumes 3.9% vacancy rate for future years
Source: 1994 data - Metro Regional Data Book; September 1997
2017 data – 2015 Regional Forecast, January 1996

In order to produce more detailed transportation and growth management analyses, the 2017 Regional Forecast (population, households and employment) was allocated to TAZ. This was a collaborative process between Metro planners and local city and county planners who jointly determined the future growth allocations of households and employment in their respective jurisdictions.

There are six variables or assumptions that were identified in the buildable lands analysis which played a key role in determining buildable land capacity. These variables, along with the Metro Council conclusions, are as follows:

Summary Buildable Lands Analysis Variables

Variable 1: Environmentally Constrained Lands	Assume 16,000 acres of floodplains, steep slopes & wetlands
Variable 2: Gross-to-Net	Assume 15,080 acres assumed for future roads, parks, schools
Variable 3: Underbuild Factor	Assume a rate of 21% reduction from 2040 Growth Concept densities on dwelling units
Variable 4: Ramp-Up	Assume a 5-year timeframe for implementation of the Urban Growth Management Functional Plan (1994-1999)
Variable 5: Redevelopment and Infill	Assume 28.5 percent of all needed housing will be supplied by redevelopment and infill
Variable 6: Farm Use Assessment	Assume all farm use assessed land within the UGB is available for urban development

CONCLUSION - During the latest 5-year review of the Metro UGB, the Metro Council considered the above variables. In addition, they considered the "capture rate" or amount of growth that will likely occur within the Metro UGB. This rate is assumed to be 70 percent of the four-county dwelling unit growth and 82 percent of job growth. With these policy assumptions determined by the Metro Council, the Metro UGB has a deficit of approximately 32,370 dwelling units and 2,900 jobs to the year 2017. This translates to an approximate expansion of the Metro UGB of between 4,100 and 4,800 acres depending on the efficiency of the urban reserve areas added to the UGB.

Analysis Summary

1. Determine the Regional Forecast, i.e. projected growth in employment (or jobs), population and the resulting number of households and dwelling units for the year 2017

2. Calculate the amount of capacity in the current Metro urban growth boundary for accommodating the future increases in jobs and dwelling units.

3. Compare the Need (or Demand) with the calculated Capacity (or Supply).

Summary Table

	Dwelling Units	Employment
Demand Calculations:		
1994 4-County Estimate	633,600	956,000
2017 4-County Forecast	990,500	1,536,500
4-County Need (1994 – 2017)	356,900	580,500
Metro UGB Need (1994 – 2017)	**249,800**	**476,000**
	(70% of Region)	(82% of Region)
Supply Calculations:		
Capacity using 2040 Growth Concept densities (22,420 net buildable vacant acres)	175,430	291,870
- Underbuild	(36,850)	(22,330)
- Ramp-up (1994 to 1999)	(6,430)	(2,650)
+ Net Redevelopment	46,990	162,510
+ Infill Development	24,200	43,700
+ Capacity on existing platted lots	10,900	0
+ Development rights on environmentally constrained land	3,190	0
Metro UGB Capacity	**217,430**	**473,100**
Result: Supply minus Demand	**(32,370)**	**(2,900)**
	(deficit)	(deficit)

INTRODUCTION

LEGISLATIVE REQUIREMENTS

Oregon Revised Statutes (ORS) and Oregon Administrative Rules (OAR) direct local city and county planning authorities in Oregon and Metro to analyze and to provide sufficient quantities of buildable land for housing in the future. In addition, Metro Code, Chapter 3.01, was established to provide procedures to be used by Metro in making amendments to the Metro Urban Growth Boundary (UGB) adopted Statewide Planning Goals, especially goals 2 and 14, and Metro's Regional Urban Growth Goals and Objectives (RUGGO's).

State laws were recently revised to add the following:

1. Redefine the definition of buildable lands.
2. Require coordination of population projections.
3. Set the criteria for prioritizing land for Urban Growth Boundary expansions.
4. Prescribe specific requirements regarding buildable lands for needed housing.

The combination of these legal regulations means that Metro, as the lead growth management planning agency for urban portions of Multnomah, Clackamas and Washington county, is responsible for compliance with all Oregon statutes and rules governing growth planning. As part of this legal obligation, Metro's Department of Growth Management Services and Data Resource Center have been directed to study and analyze the impact of future urban development and document these findings in a report to Metro Council.

A first draft report, *Urban Growth Report, March 1996*, was presented to the Metro Council for review and subsequent public hearings and debates ensued. As a result of the public hearings and further discussions, Metro Council directed the Executive Officer and Staff to conduct further research on the matter of urban growth demand and supply calculations. The research findings were reported to the Metro Council in an interim, second draft report, *Urban Growth Report, June 1997.*

This report, *Urban Growth Report, December 1997*, is the final reflecting the Metro Council's decision about all information and public testimony given. This document contains an overview of the key results and analysis, and explains the technical steps involved in meeting the requirements of state law and Metro Code. This document only addresses the issues of buildable lands analysis, population forecast and urban development allocations. Other Metro reports explain the housing needs analysis[1]. The *Baseline Urban Growth Data Report* also contains additional information regarding future urban development patterns.

DEFINING BUILDABLE LAND, ORS 197.295(1)

As required by state law, the definition of buildable lands focuses on lands "available and necessary for residential uses." The definition of what may constitute buildable lands now

[1] See *Housing Needs Analysis*, Final Draft, November 1997, Growth Management Services Department, Metro; also see the Technical Appendix 1 and 2.

includes "developed land likely to be redeveloped." Prior to HB 2709, local jurisdictions had the option to include or not include the computation of redevelopable lands into the capacity calculation of buildable land. The definition of buildable lands is contained in ORS 197.295(1).

COORDINATION OF POPULATION FORECASTS, ORS 195.036

This statute requires Metro, as the coordinating entity for the Metro Regional Services District, to establish and maintain a population forecast for the region as a whole and to coordinate this forecast with the other local government entities. A population forecast to meet this statutory requirement will be adopted by ordinance.

THE CONNECTION BETWEEN THE BUILDABLE LAND AND CAPACITY ANALYSIS AND THE REGIONAL FORECAST.

The preparation of the regional forecast and determination of buildable land are two sides of the same puzzle. The buildable lands analysis represents a methodical determination of the supply or inventory of land inside the current Metro UGB sufficient to meet future development, whether for residential or employment (includes industrial, retail and commercial) consumption. It explains step-by-step the technical methods performed, the assumptions used at each step, and the results of this complicated multi-step study.

The other side of the problem of estimating future land need is a quantification of urban land demand, i.e. a forecast of employment and population growth converted into an estimate of land consumption to accommodate the projected amount of urban Metro-wide growth. Future population and employment growth is converted into an estimate of dwelling units and jobs. The regional forecast of population and employment is derived from a sophisticated econometric model for estimating population, households and employment trends. These regional trends are then disaggregated or allocated to smaller geographic units, known as TAZ's, (Transportation Analysis Zones) in order to understand better the internal patterns of urban growth development within the Metro region. The forecasting process was peer reviewed by a panel of economists and demographers from around the region. The Economic Peer Review Council was comprised of representatives from business, government, and academia. The disaggregated data were peer reviewed by city and county planning officials from throughout the Metro region.

FINAL DETERMINATION CONTAINED IN THE URBAN GROWTH REPORT

The conclusion drawn from the buildable lands capacity analysis and the regional forecast suggests that the region does not have a 20-year land supply inside the current Metro UGB. The buildable lands capacity analysis estimates the supply of buildable land; the regional forecast gives us the 20-year demand for residential and employment development needs.

The estimated capacity or supply of land in the current Metro UGB is for 217,430 dwelling units and 473,100 jobs. The regional forecast estimates the housing need to be approximately 249,800 dwelling units and the employment need to be approximately 476,000 jobs by the year 2017. When supply and demand are compared, the result is a deficit of 32,370 dwelling units and 2,900 jobs. At an estimated average of ten dwelling units per net buildable acres in the urban reserves, about 3,240 net acres are needed, requiring about 4,100 to 4,800 gross acres of urban reserves. The small regionwide job deficit must be accommodated as part of this addition of urban reserves consistent with 2040 Growth Concept design types.

THE ORGANIZATION OF THIS REPORT

This report contains three major parts:

Part 1: *Buildable Lands and Capacity Analysis* describes the technical analysis that determines the buildable acres inside the UGB and calculates the dwelling unit and employment capacity for the Metro urban growth boundary.

Part 2: *2017 Regional Forecast and Urban Development Patterns* describes the methodology and includes projections of population, households, and employment growth for the four-county region. The companion to the regional forecast is the *Urban Development Patterns,* which is a spatial allocation of the 2017 forecast of population, household and employment within the four counties to small geographic areas.

This part of the report is intended provide the reader an overview of the regionwide growth trends for the Portland-Vancouver metropolitan area. It summarizes regional growth projections for employment, population and households. The section discusses major factors that might influence regional growth and describes emerging trends that may impact the region's future.

Part 3: The Appendix provides the detailed technical results for all interested parties, especially city and county planners of the region.

BUILDABLE LANDS AND CAPACITY ANALYSIS

PART 1

INTRODUCTION

Part 1 of this report considers buildable land inside the existing Metro Urban Growth Boundary (UGB) and the corresponding dwelling unit and job capacity. Metro Code and state land use statutes require an analysis of the buildable land supply inside UGB. State law (ORS 197.295-298) requires that Metro projects the 20-year land needs based on actual densities inside the UGB. If the UGB has insufficient capacity to meet the 20-year need, then measures must be taken to address the deficit either through by amending the UGB or by allowing greater densities.

This is the final report to Metro Council. Earlier drafts were released in March 1996 and June 1997. These earlier drafts were reviewed extensively by Metro Council, various advisory councils, local jurisdictions and other interested parties. In addition, public hearings were held to solicit public comment. Assumptions made for six of the variables used in this report were debated among various groups. After extensive deliberation, Metro Council made policy decisions in October 1996 and October 1997[2] addressing these variables. Their decisions are incorporated into this report and are summarized below.

Variable 1: Environmentally Constrained Lands - total acreage removed from vacant lands – approximately 16,000; adjust capacity to account for existing development rights on environmentally constrained lands – 3,190 dwelling units (10/96);

Variable 2: Gross-to-Net Reductions – assume approximately 15,080 acre reduction for future streets, parks, schools, etc.; includes additional acreage set aside by Council for schools and parks – 940 acres (10/96) and 1,000 acres for parks (10/97)

Variable 3: Underbuild – assume a rate of 21 percent on dwelling units

Variable 4: Ramp-up – assume a five-year time frame (1994-1999) for implementation of the Urban Growth Management Functional Plan (10/96)

Variable 5: Redevelopment and Infill - assume 28.5 percent of housing need (10/97)

Variable 6: Farm Use Assessed Land - assume 100 percent development over planning period (10/96)

In addition, the Council considered the "capture rate" or amount of growth that will likely occur with the Metro URG. This rate is assumed to be 70 percent of the four-county household growth and 82 percent of job growth.

The *Buildable Lands and Capacity Analysis* is a series of 14 steps organized in two sections. The first section begins by determining the number of net buildable vacant acres inside the UGB (Steps 1-5). It starts with total acreage inside the UGB, determines the gross vacant acres, then subtracts environmentally constrained acres and land for future needs. The result - net buildable vacant acres – is then arrayed by current comprehensive plan categories and capacity is calculated using current plan densities (Steps 6-8).

[2] Resolution 96-2392B (10/4/96), Resolution 97-2550A (10/23/97)

The second section of this analysis applies 2040 Growth Concept assumptions to calculate capacity. The analysis begins by arraying net buildable vacant acres calculated in the first section (Step 5) by the 2040 Growth Concept planning categories. Capacity is then calculated using 2040 Growth Concept densities. From there, capacity is adjusted downward to account for underbuild and ramp up (the time it takes local jurisdictions to implement the 2040 Growth Concept). Redevelopment and infill capacity are then added in the final steps.

SECTION 1

Section 1 of this analysis uses a traditional approach to inventory the supply of buildable lands within the Metro urban growth boundary (UGB). This complies with ORS 197.296(3)(a) for vacant buildable lands. First, the total acreage inside the UGB is determined and categorized by type: developed land, vacant land, existing streets and parks, and water. Reductions are then made to gross vacant acres to account for environmentally constrained lands and land needed for future facilities. The result is net buildable vacant acres inside the UGB. Dwelling units and employment capacity are then calculated using density assumptions for existing comprehensive plans.

This methodology is similar to the original CRAG (Columbia Region Association of Governments) analysis for estimating the needed UGB size in the late 1970's. Although the CRAG work did assume slight changes to comprehensive plans over time, it only worked with gross vacant acres (which were considered accurate within a +/- 10 percent margin), and the details on environmental constraints and public facility needs were very general.[3]

This section involves eight steps to determine net buildable vacant acres and the associated dwelling unit and job capacity under current comprehensive plans. The first step begins by calculating the total number of acres inside the current UGB.

Step 1: *Calculate the total number of acres inside the Metro Urban Growth Boundary.*

The approximate total area inside the Metro urban growth boundary is:

232,670 acres or 364 square miles

Step 2: Subtract acres of developed and committed land to arrive at total gross vacant acres.

Table 1 shows the categories of acreage subtracted from total UGB acres to arrive at **total gross vacant acres**. The acreage subtracted from total UGB acres consists of developed or improved acres, existing streets and roads, existing parks[4] (as shown on current comprehensive plans), and unbuildable areas - bodies of water (rivers and lakes). Total gross vacant acres - 55,040 - include partially vacant parcels (see Appendix A for definition).

[3] Metropolitan Service District, Urban Growth Boundary Findings, Part I, 1979.

[4] The park coverage in Metro's Regional Land Information System (RLIS) database includes nine items: public parks, private parks, open space, cemeteries, miscellaneous public uses, public golf courses, private golf courses, school district park/field, and publicly owned parcels not yet maintained as parks.

Table 1: Vacant Land inside Metro UGB (1994)

Land Supply	Acres
Total UGB Acres	232,670
Developed[1]	(114,880)
Existing Streets	(34,570)
Existing Parks	(20,690)
Water (rivers and lakes)	(7,490)
Total Vacant Acres	**55,040**

Source: Metro's Vacant Lands Inventory (1994); Metro Regional Land Information System (RLIS) database

[1]See Appendix D for a breakdown of developed acres by current comprehensive plan categories.

Step 3: Subtract acres of platted, vacant single-family residential land.

Platted single-family lots, 16,300 square feet or less (3/8ths of an acre),[5] are shown in Table 2. These existing development plats, totaling 1,590 acres (or 10,900 lots), are subtracted from gross vacant acres. Development on this acreage will presumably be only one house per lot – 10,900 units. Redevelopment is not likely to occur within the planning horizon (1994-2017). Table 2 shows the acreage and number of units associated with the single-family residential planning categories. These units are added to the dwelling unit capacity calculations in Step 8.

Table 2: Existing Development Plats (1994)

Development Plats	Acres	# of Units
Single-family1 (10,000 sq. ft.+)	30	130
Single-family2 (7-10,000 sq. ft.)	700	4,110
Single-family3 (5-7,000 sq. ft.)	860	6,660
Total	1,590	10,900

Source: Metro Vacant Lands Inventory (1994); Metro RLIS database

Vacant Acres	55,040
Less existing platted lots	(1,590)
Adjusted Gross Vacant Acres	**53,450**

[5]This assumption is based on the size of existing vacant platted lots, on which development is likely to occur now rather than subdivide or re-plat.

Step 4: Subtract vacant environmentally constrained acres to arrive at gross buildable vacant acres.

Land identified as environmentally constrained - approximately 15,950 acres - is summarized in Table 3A. These lands include areas with slopes over 25 percent; 100-year floodplain (except in areas currently developed or committed as noted by local jurisdictions); floodprone soils (also subject to the same local jurisdiction exceptions as floodplains); wetlands as identified by the National Wetlands Inventory and local wetland inventories; and riparian corridors, a width of 200 feet along rivers and streams. Some of these areas are either difficult or hazardous to develop, while other areas are important natural resources that should be protected. As shown in the Table 3A, developed land, street and parks, as well as vacant land, include environmentally constrained lands. For the purpose of this report, the focus is the environmentally constrained portions of vacant land, which are removed from the gross vacant acres to arrive at gross buildable vacant acres.

Table 3A: Environmentally Constrained Land (1994).

Constraint	Developed	Streets	Parks	Vacant	Total
Slope > 25%	2,230	780	4,680	4,270	11,960
Floodplain	4,030	600	2,570	3,420	10,610
Floodprone	2,990	890	440	1,910	6,230
Wetlands	500	60	1,140	1,410	3,110
Riparian - 200' buffer	2,180	410	1,200	4,940	8,720
Total Acres	11,930	2,740	10,030	15,950	40,650

Source: Metro RLIS database

Table 3B shows gross vacant acres and environmentally constrained vacant acres by current comprehensive plan categories. The environmentally constrained vacant acres are subtracted from total gross vacant acres to arrive at **gross buildable vacant acres** - 37,500.

The current comprehensive plan categories shown in Table 3B are "regional" plan categories and are used throughout this report. Each jurisdiction has separate and distinct zoning/plan categories. Regional categories group similar local plan categories, such as single family (listed regionally as "SFR-1," "SFR-2," and "SFR-3" depending on average lot size allowed), multi-family, commercial neighborhood, light industrial, public facilities, etc. A complete description of the regional plan categories can be found in Appendix B. A geographic coverage of regional zoning/plan categories is part of Metro's Regional Land Information System (RLIS) database.

Table 3B: Gross Buildable Vacant Acres (1994)

Current (Regional) Plan Category	Total Gross Vacant Acres	Constrained Acres	Gross Buildable Vacant Acres
Agricultural or Forestry (FF)	40	(30)	10
Rural or Future Urban (RRFU)	2,480	(830)	1,650
Single-family 1 (SFR1) (10,000 sq ft +)	2,370	(1,020)	1,350
Single-family 2 (SFR2) (7-10,000 sq ft)	12,430	(4,020)	8,410
Single-family 3 (SFR3) (5-7,000 sq ft)	9,770	(2,760)	7,010
Multi-family 1 (MFR1) (8-25 du/acre)	5,190	(1,320)	3,870
Multi-family 2 (MFR2) (25+du/acre)	460	(140)	320
Planned Unit Devel./Mixed Use (PUD)	170	(10)	160
Neighborhood Commercial (CN)	100	(10)	90
General Commercial (CG)	1,320	(280)	1,040
Central Commercial (CC)	820	(140)	680
Office Commercial (CO)	610	(100)	510
Light Industrial (IL)	6,780	(1,380)	5,400
Heavy Industrial (IH)	6,200	(2,180)	4,020
Mixed Use Industrial (IMU)	1,880	(430)	1,450
Park and Open Space (POS)	1,690	(1,110)	580
Public Facilities (PF)	1,140	(190)	950
Total	53,450	(15,950)	37,500

Source: Metro RLIS database

Adjusted Gross Vacant Acres	53,450
Environmentally Constrained Lands	(15,950)
Gross Buildable Vacant Acres	37,500

Step 5: ***Subtract land for future facilities to arrive at net buildable vacant acres (gross-to-net reduction).***

Net buildable vacant acres are calculated by subtracting future land requirements for streets, schools, local parks, regional parks, churches and fraternal organizations. Land held in public ownership, which includes an existing inventory for federal, state, county and city uses, is also subtracted. These publicly owned lands are not considered buildable for general housing or employment.[6] The gross-to-net reduction that is calculated in this step is necessary to represent the actual vacant land available for private development. Table 4A lists the future estimated land need (1994-2017) - approximately 15,080 acres. An explanation of each category follows the table.

[6] The acres are distributed as follows by government level (1994): Federal - 303 acres; State - 360 acres; County - 170 acres; City - 295 acres. (Metro did not own any vacant land in 1994.) These acres are part of the gross-to-net reduction shown in Table 4A as "other public facilities."

Table 4A: Land for Future Facilities (1994-2017)

Current Plan Category	Streets 1 acre +	Streets < 1 acre	Schools	Local Parks	Regional Parks	Churches/ Fraternal Org.	Other Public Facilities	Total Reduction
FF	0	0	0	0	0	0	0	0
RRFU	890	10	40	210	100	0	10	1,260
SFR1	450	20	120	200	100	20	20	930
SFR2	1,000	70	400	400	310	180	190	2,550
SFR3	1,950	110	440	200	160	290	70	3,220
MFR1	430	30	130	200	110	70	50	1,020
MFR2	120	10	0	0	0	20	0	150
PUD	50	0	0	0	0	0	0	50
CN	20	0	0	0	0	0	0	20
CG	190	20	80	200	0	0	30	520
CC	60	10	80	200	0	40	20	410
CO	120	10	10	0	0	0	20	160
IL	960	10	50	200	110	0	190	1,520
IH	1,030	20	50	0	160	0	40	1,300
IMU	540	10	150	0	0	30	220	950
POS	0	0	80	0	0	20	100	200
PF	60	0	360	200	0	30	170	820
Total	7,870	330	1,990	2,010	1,050	700	1,130	15,080

Source: Metro RLIS database

Streets. The most substantial reduction to gross buildable vacant acreage is for streets needed for future development (1994-2017) - estimated to account for approximately 8,200 acres.[7] Gross-to-net percentage used for streets is dependent on parcel size.[8] Parcels one acre and larger are reduced by 22 percent, whereas parcels less than one acre are reduced by 10 percent. Recent subdivisions (in Metro Data Resource Center inventory) were examined and areas allotted to streets were calculated to arrive at the estimates used here. The lower percentage applied to parcels less than an acre assumes that many of these smaller parcels have street frontage.

Schools. Future school need is determined by dividing the estimated additional school- age population (ages 5-18) of 75,000 students (from Metro's *2015 Regional Forecast, January 1996*) by the existing ratio of 50 students per acre.[9] This ratio is consistent with plans for school acreage allowances of between 45 students/acre (high school) and 60 students/acre (elementary and middle school).[10] The calculation yields a need for about 1,500 additional acres for schools.

[7] These are for future streets. Existing streets (34,570 acres) are subtracted from the total UGB acres in Table 1.

[8] Parcel size is available at the polygon level in the RLIS database. The actual parcel size distribution over and under one acre was calculated without consideration of environmental constraints.

[9] The ratio is derived by dividing the current estimated school-age population (197,350) attending school inside the UGB by the total number of developed public and private school acres (3,940 acres) inside the UGB – 50.1. The number of school-age children is taken from the four-county school-age population total and multiplied by 72 percent (the approximate Metro share in 1994). It is then multiplied by 90 percent, which assumes that 10 percent of the school-age population is not at traditional school sites.

[10] North Natomas Community Plan 5/3/94, City of Sacramento, a new community plan for 66,000 residents.

The Metro Council, in its review of the variables in the first draft *Urban Growth Report* (March, 1996), determined that an additional 490 acres should be set aside to meet future demand for schools, changing the total need to 1,990 acres. School districts currently own about 920 acres inside the UGB, which means that an additional 1,070 acres are needed to meet the population demand of the next twenty years. This change results in a future ratio of approximately 38 students per acre (75,000 student/1,990 acres) or about 40 acres for a high school with 1,500 students. The 920 school-owned acres are arrayed by current plan categories in Table 4A with the additional 1,070 acres. This acreage is split 60 percent single-family residential, 10 percent multi-family and 30 percent commercially zoned land.

Parks. A methodology similar to estimating school need is used to derive local park need. Existing parks inside the UGB comprise about 16,240 acres.[11] A current ratio of 14.4 acres per 1,000 residents is used to estimate future demand for parks.[12] Additional demand based on this ratio is approximately 7,110[13] acres in both local and regional parks (for the planning period 1994-2017). Regional parks such as Forest Park, Mt. Tabor and Smith and Bybee Lakes currently make up the vast majority of the existing acreage. Similarly, the future demand is assumed to be addressed in large part by the Metro Greenspaces Bond Measure No. 26-26 (May, 1995). With the bond measure acquisition target of 6,100 acres of regional parks (6,000 acres regional, and 100 acres of linear trails), the local park need will be approximately 1,010 acres to maintain the current ratio. Metro Council, in its review of the second draft of the *Urban Growth Report* (June, 1997), determined that an additional 1,000 acres should be set aside for future local park demand. The reasoning for this additional acreage is that with higher densities in the region, a greater demand for parks will occur. This additional acreage increases the future parks per capita ratio to 15.2 acres per 1,000 residents.

Two-thirds of the proposed 6,000-acre acquisition is estimated to be purchased outside the UGB[14] and one-third inside the UGB, mostly at the periphery. A rough estimate, and the assumption used in this report, is that of the 2,000 acre (6,000 x 1/3) proposed acquisition inside the UGB, about 50 percent, or 1,000 acres, overlap with the environmentally constrained land - floodplain, floodprone soils, wetlands, steep slopes and riparian corridor. (These are deducted from the vacant lands inventory in Step 4.) The linear trail component also assumes a 50 percent overlap. The remaining 2,060 acres (1,000 for regional parks, 50 for linear trails, and 1,010 for local parks) plus the additional 1,000 acres set by Metro Council are deducted from the gross buildable vacant acreage in Table 4A (3,060 acres). The regional park acreage is spread among plan categories as follows: 65 percent single-family residential, 10 percent multi-family and 25 percent industrial. Local park need is deducted from plan categories using the split of 50 percent single-family, 10 percent for multi-family and 40 percent for commercial, industrial and public facilities.

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[11] Parks included here are public and private parks and open space (RLIS database items 1, 2 & 3).

[12] The ratio is derived by the following calculation: 16,240 acres/(1.1 million, the estimated 1994 population inside UGB/1,000) = 14.4 acres per 1,000 residents.

[13] Population forecast for 1994-2017 inside the UGB (494,000 more persons) divided by 1,000 x 14.4 (the existing ratio per 1,000 residents) = 7,113.

[14] Regional parks located at the edge but outside the UGB are still regarded as serving the function of providing the urban population with parks. They are seen as acquisitions on the edge of the urban area.

Churches and Fraternal Organizations. The demand for churches and fraternal organizations will presumably increase as the population grows. The current ratio of land owned by churches and fraternal organizations per 1,000 residents is 1.4.[15] Additional demand (1994-2017) based on this ratio is approximately 700 acres[16]. Churches and fraternal organizations currently own 430 acres of vacant land inside the UGB, which means that an additional 270 acres are needed to meet the population demand. The total 700 acres is subtracted in the gross-to-net calculation in Table 4A.

Other Public Facilities. Government owned land for public facilities, approximately 1,130 vacant acres, is assumed to be adequate for future needs for federal, state, city and county government, and service providers. The presumption is that services would utilize these existing publicly owned vacant lands and redevelop existing lands and intensify uses. This would presumably satisfy the need for city halls, fire or police stations, hospitals, water, sewer, etc.

The 15,080-acre gross-to-net reduction from Table 4A is subtracted from the gross buildable vacant acres in Table 4B below to arrive at net buildable vacant acres of 22,420.

Table 4B: Net Buildable Vacant Acres (1994)

Current Plan Category	Gross Buildable Vacant Acres	Gross-to-Net Reduction	Net Buildable Vacant Acres
Agricultural or Forestry (FF)	10	0	10
Rural or Future Urban (RRFU)	1,650	(1,260)	390
Single-family 1 (SFR1)	1,350	(930)	420
Single-family 2 (SFR2)	8,410	(2,550)	5,860
Single-family 3 (SFR3)	7,010	(3,220)	3,790
Multi-family 1 (MFR1)	3,870	(1,020)	2,850
Multi-family 2 (MFR2)	320	(150)	170
Planned Unit Devel./Mixed Use (PUD)	160	(50)	110
Neighborhood Commercial (CN)	90	(20)	70
General Commercial (CG)	1,040	(520)	520
Central Commercial (CC)	680	(410)	270
Office Commercial (CO)	510	(160)	350
Light Industrial (IL)	5,400	(1,520)	3,880
Heavy Industrial (IH)	4,020	(1,300)	2,720
Mixed Use Industrial (IMU)	1,450	(950)	500
Park and Open Space (POS)	580	(200)	380
Public Facilities (PF)	950	(820)	130
Total	37,500	(15,080)	**22,420**

Gross Buildable Vacant Acres	37,500
Gross-to-net Reduction	(15,080)
Net Buildable Vacant Acres	22,420

[15] The ratio is derived by dividing developed acres owned by churches and fraternal organizations (1,566 acres) by 1,100 (1.1 million, the estimated 1994 population inside UGB/1,000) = 1.42 acres per 1,000 residents.

[16] Population forecast for 1994-2017 inside the UGB (494,000 more persons) divided by 1,000 x 1.42 (the existing ratio per 1,000 residents) = 702 acres.

Step 6: Calculate dwelling unit and employment capacity of net buildable vacant acres under current comprehensive plans.

This step calculates the dwelling unit and job capacity on the 22,420 net buildable vacant acres using current comprehensive plan densities. The vacant land is split between residential and employment categories in Table 5. Capacity is determined by multiplying the vacant acres in each category by the corresponding density (in column three). As shown in Table 5, net buildable acres yield approximately 117,600 dwelling units and 192,510 jobs, assuming build out of current comprehensive plans.

Table 5: Vacant Capacity by Current Plan Categories (1994)

Current Plan Category	Residential Net Acres	Dwelling Unit Density	Dwelling Unit Capacity	Employment Net Acres	Employee Density	Employee Capacity
FF	10	0.1	0	0	0.1	0
RRFU	270	0.2	50	120	0.02	0
SFR1	420	3.0	1,260	0	0.8	0
SFR2	5,860	5.1	29,890	0	1	0
SFR3	3,790	7.3	27,670	0	2	0
MFR1	2,850	18.0	51,300	0	3	0
MFR2	170	35.0	5,950	0	6	0
PUD	110	10.0	1,100	0	2	0
CN	10	2.0	20	60	16	960
CG	0	0	0	520	17	8,840
CC	0	0	0	270	105	28,350
CO	40	9.0	360	310	88	27,280
IL	0	0	0	3,880	16	62,080
IH	0	0	0	2,720	20	54,400
IMU	0	0	0	500	15	7,500
POS	0	0	0	380	2	760
PF	0	0	0	130	18	2,340
Total	13,530		117,600	8,890		192,510

Step 7: Adjust current comprehensive plan capacity for single-family underbuild.

Underbuild is defined as development that is built at less than the density allowed by comprehensive plans. It occurs for several reasons: development limitations (e.g., steep slope, poor access), lack of market support for the density, or local government response to neighborhood concerns. Metro has calculated 21 percent as the regional average underbuild for single-family residential development.[17] This underbuild factor is applied only to single-family zones; it is not applied to multi-family and employment zones. Data on multi-family underbuild was not available at the time of this report. Employment space is more adaptable to absorbing additional employees by adding work shifts or by reconfiguring or adding on to existing buildings, or a combination of these strategies. Table 6 shows the dwelling units associated with

[17] This underbuild figure is based on a selected sample of single-family subdivisions, most built in the last five years, examined by the Metro Data Resource Center, 1995.

the single-family residential categories and the units lost due to the 21 percent underbuild factor. The estimated reduction is 12,350 units; the adjusted capacity is 105,250 dwelling units.

Table 6: Adjusted Housing Capacity for Underbuild (1994)

Current Plan Category	Dwelling Unit Capacity	Underbuild Factor	Dwelling Units Lost
Single family 1	1,260	21%	260
Single family 2	29,890	21%	6,280
Single family 3	27,670	21%	5,810
Total	58,820		12,350

Dwelling Unit Capacity Calculated in Step 6:	117,600
Less Dwelling Units Lost from Underbuild:	(12,350)
Adjusted Dwelling Unit Capacity	105,250

Step 8: ***Adjust dwelling unit and employment capacity for existing platted lots and for development rights on unbuildable land.***

Platted single-family lots, 16,300 square feet or less (3/8ths of an acre), were subtracted from gross vacant acres in Step 3. In this step the 10,900 dwelling units associated with the 1,590 acres are added to the total dwelling unit capacity calculated in Step 7.

An adjustment is also made in this step for development rights on unbuildable land. Metro Council's review of the draft *Urban Growth Report* (March, 1996) resulted in a change to environmentally constrained lands. The Council recognized that although environmentally constrained lands are removed from gross vacant acres, some development does occur in these areas. For example, development is allowed in floodplains if foundations are elevated one foot or more above flood level. In recognition of development rights on unbuildable land, the Council directed that dwelling unit capacity be increased at a rate of one unit for every five acres of constrained land, or 3,190 units (15,950/5).

Table 7: Adjustments to Capacity

Adjustment	Dwelling Units	Jobs
Adjusted capacity from Step 7 (no change for employment)	105,250	192,510
Add in capacity for existing platted lots	10,900	0
Add in capacity for development rights on environmentally constrained lands	3,190	0
Total Dwelling Units and Jobs	119,340	192,510

Steps 1 through 8 are the traditional capacity calculation. As shown in Table 7, total capacity using this method is approximately 119,340 dwelling units and 192,510 jobs (from Table 5). In Section 2, net buildable vacant acres are reconsidered using 2040 Growth Concept densities, as well as variable estimating underbuild, ramp up, redevelopment and infill.

SECTION 2

Section 2 uses a different approach to determine capacity. It includes plan changes expected in the region as a result of the Metro 2040 Growth Concept as implemented by the 1996 Urban Growth Management Functional Plan, redevelopable land, and residential infill and employment absorption on developed land. This analysis also goes beyond the initial modeling that was completed for the Metro 2040 Growth Concept. Ramp up, which is the phase-in or implementation time estimated to achieve the comprehensive plan changes required by the 1996 Urban Growth Management Functional Plan. A more complete assessment of underbuild is also addressed, which is applied to all residential zoning.

The Metro 2040 Growth Concept, adopted by the Metro Council in December 1994 and added to Metro's Regional Urban Growth Goals and Objectives (RUGGO) in 1995, established a design for a compact urban form in the region. This regional design, represented by the Growth Concept map, includes a number of "design types": Central City, Regional Centers, Town Centers, Station Areas, Main Streets, Corridors, Inner Neighborhood, Outer Neighborhood, Employment Areas, Industrial Areas, and others.

The section starts with the same net buildable vacant land as in Section 1 - approximately 22,420 acres. For this analysis, the region is assumed to develop consistent with the design types of the Metro 2040 Growth Concept. These are estimated changes to local comprehensive plans required by the Urban Growth Management Functional Plan. The centers, station areas, main streets and corridors adopt mixed-use characteristics. Neighborhoods are assumed to develop with smaller lots, and commercial and industrial areas are strategically located (for the most part following today's locations). Transportation improvements allow for better travel mode choice to common destinations, and greenspaces are intertwined to maintain the regional accessibility to parks.

This analysis includes six steps to arrive at dwelling unit and employment capacity using the 2040 Growth Concept. It begins by calculating dwelling unit and job capacity on net buildable acres (from Step 5 in Section 1) using the 2040 Growth Concept densities required by the Urban Growth Management Functional Plan. It then considers the effects of underbuild and ramp up. Next, redevelopment and infill are estimated and finally, the capacity is adjusted for existing platted lots and development rights.

Step 9: Rezone for 2040 Growth Concept and calculate dwelling unit and employment capacity.

Table 8 shows the distribution of the net buildable vacant acres by planning category under the 2040 Growth Concept analysis. This was accomplished using Metro's regional land information

system (RLIS) database, where each parcel of vacant land was changed as necessary to meet the Metro 2040 Growth Concept.[18] A matrix was established (see Appendix C) that translates current zoning to zone types that approximate the kind of land use regulation ensured by the Urban Growth Management Functional Plan. From this matrix, total acreage by zoning type was obtained, which accounts for implementation of the Functional Plan in the future.

Some of the changes from current plan categories to 2040 Growth Concept categories are quite broad. For example, the 2040 Growth Concept does not attribute any future single-family land to the SFR-1 category (greater than 10,000 square feet), and much of the single-use commercial designations of current plans (such as CC, CO, CG) is replaced by the Mixed-Use Center designation (MUC-1, -2, -3) in the process. Total net buildable vacant acres - 22,420 acres - remain the same. They are simply aligned with the different set of planning and zoning requirements of the Urban Growth Management Functional Plan.

Using this planning and zoning, dwelling unit capacity increases from approximately 117,600 on vacant acres (under current plans before adjustments, Table 5) to 175,430 under the 2040 Growth Concept method; job capacity increases from approximately 192,510 (Table 5) to 291,870.

Table 8: Housing and Employment Capacity of Metro 2040 Growth Concept

2040 Growth Concept Plan Categories	Net Buildable Vacant Acres	Dwelling Unit Density	*Dwelling Unit Capacity*	Job Density	*Job Capacity*
Agricultural or Forestry (FF)	0	0	0	0	0
Rural or Future Urban (RRFU)	0	0	0	0	0
Single family 1 (SFR1)	0	0	0	0	0
Single family 2 (SFR2) Outer Neighborhood	3,620	7.3	26,430	1.8	6,520
Single family 3 (SFR3) Inner Neighborhood	5,110	9.6	49,060	2.4	12,260
Multi-family 1 (MFR1)	1,330	21.2	28,200	4.0	5,320
Multi-family 2 (MFR2)	30	47.1	1,410	7.0	210
Planned Unit Devel./Mixed Use (PUD)	1,970	12.8	25,220	5.0	9,850
Neighborhood Commercial (CN)	1,810	9.4	17,010	20.0	36,200
General Commercial (CG)	0	0	0	0	0
Central Commercial (CC)	0	0	0	0	0
Office Commercial (CO)	30	18.8	560	60.0	1,800
Light Industrial (IL)	0	0	0	0	0
Heavy Industrial (IH)	0	0	0	0	0
Mixed Use Industrial (IMU)	390	7.1	2,770	11.0	4,290
Park and Open Space (POS)	270	0	0	0	0
Public Facilities (PF)	460	0	0	17.0	7,820
Mixed Use Center 1 (MUC1) Town Centers	590	14.1	8,320	35.0	20,650
Mixed Use Center 2 (MUC2) Regional Ctr.	290	25.9	7,510	95.0	27,550
Mixed Use Center 3 (MUC3) Central City	50	58.8	2,940	350.0	17,500
Employment Areas (MUEA)	2,500	2.4	6,000	25.0	62,500
Industrial Areas (IS)	3,970	0	0	20.0	79,400
Total	22,420		175,430		291,870

Source: Metro's vacant land inventory, RLIS database

[18] The RLIS process for reconfiguring the acres to match the 2040 Growth Concept is done in grid, rather than at the polygon level. As a result, the gross-to-net reduction, which is based on polygon data, had to be approximated for the Growth Concept plan categories. The gross-to-net reduction of 13,650 acres is applied here according to the percentages in the existing plan categories (see Table 4A). Additional work was necessary in some instances to approximate the acreage shift so that gross-to-net reductions placed in the appropriate new plan category.

Step 10: Adjust the Metro 2040 Growth Concept capacity for residential and employment underbuild.

In this step dwelling unit capacity is reduced by 21 percent to account for underbuild. The definition of "underbuild" is development built at less than the density allowed by local government comprehensive plans. As discussed in Step 7, it occurs for a number of reasons. Development limitations (such as poor access, steep slopes, or small size), neighborhood objections or a lack of market support for density all may contribute to underbuild.

The first draft of the *Urban Growth Report* (March, 1996) included a variable known as the "Zell" discount factor. This factor addressed development barriers or limitations of some parcels due to small size, poor access, steeps slopes, or partially developed status. The Metro Council voted to address this variable by combining it with the underbuild factor and to apply the factor (21 percent) to all residential zones (rather than single-family zones only as in Step 7). The Council did, however, Council retain the discounted employment figure from the Zell calculation (22,330 jobs, based on a parcel by parcel analysis), recognizing that some underbuild does occur in employment zones due to development limitations. The Council established 21 percent as the discount factor to apply to dwelling unit capacity based on Metro's study of single-family subdivision density (1995).

Underbuild is reflected in Table 9 below. Dwelling unit capacity is reduced by 36,850 units; the adjusted capacity is 138,580. Job capacity is also reduced approximately 7.5 percent (22,330 jobs) in this step to account for development barriers. The adjusted job capacity is 269,540.

Table 9: Adjusted Dwelling Unit Capacity for Underbuild

2040 Plan Category	Dwelling Unit Capacity (from Table 8)	Underbuild Factor %	Dwelling Units Lost	*Adjusted Dwelling Unit Capacity*	Job Capacity (from Table 8)	Job Capacity Lost	*Adjusted Job Capacity*
FF	0	0	0	0	0	0	0
RRFU	0	0	0	0	0	0	0
SFR1	0	0	0	0	0	0	0
SFR2	26,430	21%	(5,550)	20,880	6,520	(1,520)	5,000
SFR3	49,060	21%	(10,300)	38,760	12,260	(2,910)	9,350
MFR1	28,200	21%	(5,920)	22,280	5,320	(640)	4,680
MFR2	1,410	21%	(300)	1,110	210	(30)	180
PUD	25,220	21%	(5,300)	19,920	9,850	(540)	9,310
CN	17,010	21%	(3,570)	13,440	36,200	(3,010)	33,190
CG	0	0%	0	0	0	0	0
CC	0	0%	0	0	0	0	0
CO	560	21%	(120)	440	1,800	(160)	1,640
IL	0	0%	0	0	0	0	0
IH	0	0%	0	0	0	0	0
IMU	2,770	21%	(580)	2,190	4,290	(120)	4,170
POS	0	0%	0	0	0	0	0
PF	0	0%	0	0	7,820	(290)	7,530
MUC1	8,320	21%	(1,750)	6,570	20,650	(2,250)	18,400
MUC2	7,510	21%	(1,580)	5,930	27,550	(2,810)	24,740
MUC3	2,940	21%	(620)	2,320	17,500	(1,800)	15,700
MUEA	6,000	21%	(1,260)	4,740	62,500	(3,370)	59,130
IS	0	0	0	0	79,400	(2,880)	76,520
Total	175,430		(36,850)	138,580	291,870	(22,330)	269,540

Step 11: Adjust density assumptions to allow cities and counties time to implement zone changes required by the Urban Growth Management Functional Plan.

A ramp-up or phase-in period for implementation of the Urban Growth Management Functional Plan is assumed to span the first five years (1994-1999) of the plan period. That is, cities and counties will need time to change comprehensive plans and zoning ordinances in order to implement the changes required by the Urban Growth Management Functional Plan (deadline for compliance is February 1999).

Ramp-up primarily affects residential zones, taking into account the difference between current densities and 2040 Growth Concept densities. Employment densities are assumed to be more flexible and less likely to be affected by ramp-up issues. In the past, employment densities have been shown to be highly adaptive to market conditions (businesses employing more or less people in the same space). No reduction is made to employment densities, except in mixed-use center zones (MUC-1, -2, -3).

Two adjustments to employment densities have been made as a result of Metro's 2017 household and employment allocation process (from 2017 data – *2015 Regional Forecast, January 1996*). First, a higher density is applied to Industrial Areas – 20 employees per acre. This change was made in response to local government (the city of Hillsboro and Washington County) input regarding average densities in industrial areas. They indicate that a level of about 27 employees per acre is more likely, which far exceeds Metro's earlier assumption of 10. Secondly, the mixed-use component of Employment Areas is reduced by about two-thirds, from 6 to 2.4 residential units an acre (or 2.2 units an acre when adjusted by the ramp-up factor). Consistent local government comment indicates that the location of residential near light industry would be difficult. As a result, the employment assumption for these lands is increased by the offset in residential reduction, up from 17 employees to 25 employees an acre (MUEA plan type).

Calculation of the five-year ramp-up period[19] results in an estimated loss of 6,430 dwelling units and 2,650 jobs (see Table 10). The adjusted 2040 Growth Concept capacity is 132,150 dwelling units and 266,890 jobs.

[19] The formula to estimate the ramp-up effect on densities measures the impact of a five-year ramp-up from current to future densities. The density reduction is .1087 (accounting for 5 of the 23-year planning period developing at a lower average density) times the difference between 2040 densities with underbuild and current plan densities with underbuild. This difference is deducted from 2040 densities (shown in Table 8) and applied to the acreage figures to calculate capacity overall in the period 1994 to 2017. In new plan types, unique to 2040, a comparable current plan type was used as reference. In the case of MUC-1 current household densities were assumed at 5 units an acre, in MUC-2 10 units/ac., MUC-3 35 units/ac., and MUEA at .1 units/ac.

Table 10: Capacity Adjustment to Allow for 5-Year Ramp-up

2040 Plan Category	DU Capacity (from Table 9)	DU Capacity Loss from Ramp-up	*Adjusted DU Capacity*	Job Capacity (from Table 9)	Job Capacity Loss from Ramp-up	*Adjusted Job Capacity*
FF	0	0	0	0	0	0
RRFU	0	0	0	0	0	0
SFR1	0	0	0	0	0	0
SFR2	20,880	(740)	20,140	5,000	0	5,000
SFR3	38,760	(1,600)	37,160	9,350	0	9,350
MFR1	22,280	(360)	21,920	4,680	0	4,680
MFR2	1,110	(30)	1,080	180	0	180
PUD	19,920	(480)	19,440	9,310	0	9,310
CN	13,440	(1,150)	12,290	33,190	0	33,190
CG	0	0	0	0	0	0
CC	0	0	0	0	0	0
CO	440	(30)	410	1,640	0	1,640
IL	0	0	0	0	0	0
IH	0	0	0	0	0	0
IMU	2,190	(780)	1,410	4,170	0	4,170
POS	0	0	0	0	0	0
PF	0	0	0	7,530	0	7,530
MUC1	6,570	(390)	6,180	18,400	(960)	17,440
MUC2	5,930	(330)	5,600	24,740	(1,420)	23,320
MUC3	2,320	(60)	2,260	15,700	(270)	15,430
MUEA	4,740	(480)	4,260	59,130	0	59,130
IS	0	0	0	76,520	0	76,520
Totals	138,580	(6,430)	132,150	269,540	(2,650)	266,890

Note: DU = Dwelling Units

Step 12: Estimate redevelopment potential and adjust capacity calculation for dwelling units and employment.

Net redevelopable acres are identified in this step and dwelling units and job capacity are adjusted to account for potential redevelopment opportunities. This complies with ORS 197.296(3)(a) for redeveloped land. Redevelopment occurs when an existing building is converted to, or demolished and replaced with, a higher density use.

During the preparation of the 2040 Growth Concept, Metro went through several iterations of criteria to identify redevelopable tax lots in the region. The method used in this report allowed for differentiation of improvement values (building values) by location, compared to land values. Two sets of criteria were used. One applied to tax lots one acre or less in mixed-use zones (centers, corridors, etc.) and industrial areas. The other set applied to tax lots larger than one acre, including all Metro 2040 design types. (This includes centers, neighborhoods, industrial areas, etc., with the exception of greenspaces – parks and open space.)

In the case of tax lots one acre or less, the mean surrounding value of parcels within 500 feet was used for comparison. Tax lots were identified as likely to redevelop over the planning period (1994-2017) if the improvement value was between 50 percent and 70 percent[20] of the mean

[20] 50% for Town Centers, Corridors, Employment Areas and Industrial Areas, 60% for Regional Centers and Station Areas, 70% for Central City and Main Streets.

surrounding value. For tax lots larger than an acre, a comparison of building value to land value was used. Tax lots were identified as likely to redevelop over the planning period if the building value was less than the land value.

A slightly different gross-to-net reduction was applied to parcels identified as redevelopable. A reduction was made for streets only. (The vacant land supply already was reduced for needed schools, parks and other public facilities.) Here, because of the likely existing road infrastructure, streets were netted out in single-family zones at 20 percent and in all other zones at 15 percent.

Table 11A presents net redevelopable acres by 2040 Growth Concept planning categories and estimated dwelling unit capacity. Dwelling unit capacity is not assigned to SFR2, SFR3 or PUD categories, even though there are redevelopable acres in these categories that meet the criteria outlined above. Most residential redevelopment is expected to be multi-family units; whereas, single-family residential will be captured with infill development (discussed in Step 13).

Existing 1994 dwelling units, which are considered displaced by redevelopment, are subtracted from the redevelopment capacity (column four) in Table 11A to arrive at the potential redevelopment capacity - 56,160. The Metro Council established the redevelopment and infill rate for dwelling unit capacity at 28.5 percent (18.8 percent redevelopment, 9.7 percent infill) of the housing need[21] in the region (1994-2017). Column 6 of Table 11A shows the potential redevelopment capacity, whereas column 7 reflects the dwelling unit capacity adjusted downward for the established rate (18.8 percent). The net redevelopment capacity is 46,990, which is added to the capacity from Table 10 to yield an adjusted capacity of 179,140.

[21] Housing need is 249,800 dwelling units. See Part 2 of this report.

Table 11A: Dwelling Unit Capacity Adjustment for Redevelopment

2040 Plan Category	DU Capacity (from Table 10)	Net Redevel. Acres	Redevel. DU Capacity[1]	Less Existing DU 1994[2]	Potential Redevel. DU Capacity	Net Redevel. DU Capacity[3]	*Adjusted DU Capacity*
FF	0	0	0	0	0	0	0
RRFU	0	0	0	0	0	0	0
SFR1	0	0	0	0	0	0	0
SFR2	20,140	430	0	0	0	0	20,140
SFR3	37,160	960	0	0	0	0	37,160
MFR1	21,920	400	8,360	(1,700)	6,660	5,580	27,500
MFR2	1,080	40	1,840	(330)	1,510	1,260	2,340
PUD	19,440	850	0	0	0	0	19,440
CN	12,290	990	8,690	(2,510)	6,180	5,170	17,460
CG	0	0	0	0	0	0	0
CC	0	0	0	0	0	0	0
CO	410	10	180	(20)	160	140	550
IL	0	0	0	0	0	0	0
IH	0	0	0	0	0	0	0
IMU	1,410	80	160	(150)	10	10	1,420
POS	0	0	0	0	0	0	0
PF	0	20	0	0	0	0	0
MUC1	6,180	1,020	13,720	(4,710)	9,010	7,550	13,730
MUC2	5,600	690	17,080	(1,820)	15,260	12,750	18,350
MUC3	2,260	300	17,270	(1,490)	15,780	13,190	15,450
MUEA	4,260	1,050	2,270	(680)	1,590	1,340	5,600
IS	0	1,970	0	0	0	0	0
Total	**132,150**	8,810	69,570	(13,410)	56,160	46,990	179,140

Source: Metro RLIS database (1994)
Note: DU = Dwelling Unit; Redevel. = Redevelopment
[1] Net redevelopable acres x density (adjusted for ramp-up); data does not support including SFR2, SFR3 & PUD units in capacity calculation.
[2] Dwelling units displaced by redevelopment.
[3] Reflects Metro Council's decision to use a rate of 28.5% of housing need for redevelopment and infill (18.8% redevelopment, 9.7% infill).

Redevelopable acres for employment are determined using the same methodology and criteria described above. Table 11B presents potential job capacity on redevelopable acres. Existing 1994 jobs (133,540), considered displaced by redevelopment, are subtracted to arrive at net job capacity of 162,510. This number is added to the capacity from Table 10 for an adjusted capacity of 429,400.

Table 11B: Employment Capacity Adjustment for Redevelopment

2040 Plan Category	EMP Capacity (from Table 10)	Net Redevel. Acres	Redevel. Job Capacity	Less Existing Jobs 1994	Net Redevel. Job Capacity	*Adjusted Job Capacity*
FF	0	0	0	0	0	0
RRFU	0	0	0	0	0	0
SFR1	0	0	0	0	0	0
SFR2	5,000	430	770	(240)	530	5,530
SFR3	9,350	960	2,300	(1,300)	1,000	10,350
MFR1	4,680	400	1,600	(670)	930	5,610
MFR2	180	40	280	(380)	(100)	80
PUD	9,310	850	4,250	(1,200)	3,050	12,360
CN	33,190	990	19,800	(17,540)	2,260	35,450
CG	0	0	0	0	0	0
CC	0	0	0	0	0	0
CO	1,640	10	600	(1,270)	(670)	970
IL	0	0	0	0	0	0
IH	0	0	0	0	0	0
IMU	4,170	80	880	(660)	220	4,390
POS	0	0	0	0	0	0
PF	7,530	20	340	(140)	200	7,730
MUC1	17,440	1,020	34,040	(20,510)	13,530	30,970
MUC2	23,320	690	62,170	(25,330)	36,840	60,160
MUC3	15,430	300	103,370	(31,450)	71,920	87,350
MUEA	59,130	1,050	26,250	(14,700)	11,550	70,680
IS	76,520	1,970	39,400	(18,150)	21,250	97,770
Total	**266,890**	8,810	296,050	(133,540)	**162,510**	**429,400**

Source: Metro RLIS database (1994)

Step 13: Estimate infill housing and employment absorption and adjust capacity.

Estimated residential infill and employment absorption is considered in this step and presented in Table 12B. Infill development occurs on underutilized lands – lands that Metro considers developed (114,880 acres listed in Step 3).[22] Employment absorption is the addition of jobs on developed land (in existing buildings).

Residential Infill

Potential infill development is calculated first by assessing the stock of oversized lots (within the current Metro UGB) and then by estimating the rate of infill development occurring in the region. Potential infill sites were identified by comparing current zoning to lot size, highlighting lots three to ten times the allowed minimum lot size. For example, a 15,000 square foot lot zoned R5 (residential, 5,000 sq. ft. minimum lot size) would be selected for this analysis because it is three times the allowed minimum lot size. These lots are considered either developed or partially developed in Metro's developed lands inventory. Table 12A shows there are approximately 26,350 lots inside the current Metro UGB that are three to ten times the allowed

[22] Developed acres in RLIS can be fully developed or partially developed/partially vacant. A lot is considered partially developed/partially vacant if it has a structure and there is a vacant component (no structures, outbuildings, driveways or roads) of one-half acre or more. The vacant portion is added to the vacant lands inventory; the developed portion is added to the developed lands inventory.

minimum lot size. The future potential of these sites varies depending on the assumption used. (Table 12B shows various assumptions.) If the allowed zoning is employed, the yield is approximately 90,000 lots (116,440 potential lots minus 26,350 existing lots). If the number of partitions is limited by presuming the existing unit remains on a double lot (or double the minimum allowed) and the additional partition is capped at three units a lot (on those lots five to ten times the allowed zoning), the number of potential lots drops to 51,680. If a further screen is employed, taking out high value parcels (expensive homes where property is valued at over $300,000), the number drops further to 47,700 potential lots. This is still almost 24,000 more lots than the assumed rate (see Table 12C).

The sample included all single-family zoning types including townhouse zoning (1,000 square-foot zones). This acreage, or stock, was screened first for overlaps with environmental constraints, public ownership, commercial and industrial zones, and redevelopable acres. However, the sample excluded lots equal to two times allowed zoning or approximately 37,000 lots. These represent the normal flexibility of allowed zoning (underbuild factors and other issues creating larger lots than the minimum). The sample also excluded lots over 10 times allowed zoning, around 6,000 lots. Even though these lots are residentially zoned, there appears to be commercial or other uses occurring.

Table 12A: Potential Stock of Oversized Lots

Existing Lots 3 to 10 Times Current Zoning by Potential Lot Size Category	
Zoning allows lot size:	Number of Existing Oversized Lots
1,000 - 2,500	12,660
2,500 - 5,000	5,740
5,000 - 7,500	4,360
7,500 - 10,000	3,430
10,000 - 20,000	140
20,000 - 1 acre	20
Total	26,350

Table 12B: Potential Infill Lots

% of allowable zoning:	Existing Lots	Potential Future Lots	Limited Partitions	Value Limited to $300 K	
				Lots	Potential
300%	10,680	32,040	10,680	10,000	10,000
400%	5,980	23,920	11,960	5,620	11,240
500%	4,760	23,810	14,280	4,500	13,510
600%	1,680	10,100	5,050	1,530	4,600
700%	1,140	7,980	3,420	1,020	3,060
800%	880	7,040	2,640	770	2,310
900%	620	5,490	1,830	510	1,530
1000%	610	6,070	1,820	500	1,490
Totals	26,350	116,450	51,680	24,450	47,740

Source: Metro RLIS database (1994)

The potential stock identified in Tables 12A and 12B shows the number of lots under current zoning that have additional area to support multiple units and could, when conditions prevail,

partition or subdivide.[23] Metro Council established the combined infill and redevelopment rate for the planning horizon (1994-2017) at 28.5 percent of the housing need, based on the average of the 1995 and 1996 measured rate (27.5 percent in 1995, 29 percent in 1996). Table 12C below shows the additional dwelling unit capacity from infill development – 24,200. This number is added to the capacity from Table 11A for an adjusted dwelling unit capacity of 203,340.

Table 12C: Estimated Residential Infill and Employment Absorption on Developed Acres

2040 Plan Category	DU Capacity (from Table 11A)	Est. Infill for DU	*Adjusted DU Capacity*	Job Capacity (from Table 11B)	Est. Job Absorption	*Adjusted Job Capacity*
FF	0	0	0	0	0	0
RRFU	0	0	0	0	0	0
SFR1	0	0	0	0	0	0
SFR2	20,140	7,030	27,170	5,530	0	5,530
SFR3	37,160	9,930	47,090	10,350	0	10,350
MFR1	27,500	0	27,500	5,610	0	5,610
MFR2	2,340	0	2,340	80	0	80
PUD	19,440	0	19,440	12,360	0	12,360
CN	17,460	4,840	22,300	35,450	4,370	39,820
CG	0	0	0	0	0	0
CC	0	0	0	0	0	0
CO	550	0	550	970	0	970
IL	0	0	0	0	0	0
IH	0	0	0	0	0	0
IMU	1,420	0	1,420	4,390	870	5,260
POS	0	0	0	0	0	0
PF	0	0	0	7,730	0	7,730
MUC1	13,730	2,400	16,130	30,970	4,370	35,340
MUC2	18,350	0	18,350	60,160	8,740	68,900
MUC3	15,450	0	15,450	87,350	8,740	96,090
MUEA	5,600	0	5,600	70,680	7,870	78,550
IS	0	0	0	97,770	8,740	106,510
Totals	179,140	24,200	203,340	429,400	43,700	473,100

Note: DU = Dwelling Units

Employment Absorption

Employment absorption occurs in existing structures (on developed land) without using additional land. The absorption occurs a number of ways. For instance, it can occur by adding shifts, or by altering an existing building, or by adding onto an existing building. This "absorption" is a significant factor to consider in estimating job capacity inside the UGB. A Metro Data Resource Center report[24] indicates that the dollar investment noted through building

[23] The conditions likely to produce conversion are high land prices, similar to those existing today, low improvement values, individual investment and life-cycle decisions by homeowners, and neighborhood development or redevelopment changes. They are speculative conditions, but all are affecting the infill seen today.

[24] *Regional Development Trends, Non-Residential Building Permits,* (Metro Data Resource Center, June 1995, p.9), a statistical analysis relating dollar investment to job creation.

permit data for alterations and additions is roughly equivalent to 35 percent of the investment in new structures. This can be statistically equated with about one-third of the new job locations between 1974 and 1993, which means that roughly 35 percent of the new job creation is located in existing structures or improvements to those structures. This absorption is in part represented by the redevelopment component of this report (see Step 12); however, redevelopment does not consider absorption in high value buildings. (Redevelopment is largely weighted towards lower value buildings.)

Employment absorption is shown in Table 12C - 43,700 or about 7.5 percent of the four-county employment.[25] This employment distribution is approximated by plan categories and is added to job capacity from Table 11B for an adjusted total of 473,100.

Step 14: Adjust dwelling unit and employment capacity for existing platted lots and development rights on unbuildable land.

Dwelling unit and employment capacity is adjusted in this step just as it is using the traditional approach in Section 1 (Step 8), only this time to the Metro 2040 Growth Concept capacity from Step 13. To summarize the adjustments, capacity for existing platted single-family lots and development rights on unbuildable land is added. (See Step 8 for explanation of capacity regarding development rights on unbuildable lands.) Table 13 shows the adjusted capacity under the 2040 Growth Concept as 217,430 dwelling units and 473,100 employees.

Table 13: Final Adjustment to Capacity

Adjustment	Dwelling Units	Jobs
Capacity from Table 12A	203,340	473,100
Add in capacity for existing platted lots:	10,900	0
Add in capacity for development rights on environmentally constrained lands:	3,190	0
Estimated dwelling unit and employment capacity of the current UGB:	**217,430**	**473,100**

[25] The employment absorption is calculated as 7.52% of the difference between the 1994 and 2017 four-county employment, or (1,536,500 - 955,600) x .075.

Summary

In summary, the UGB capacity under a 2040 Growth Concept scenario is 217,430 dwelling units and 473,100 jobs as shown in the summary table below. The 2040 Growth Concept method yields almost 100,000 more dwelling units and over 280,000 more jobs than the capacity under current plans calculated in Section 1 of the report.

Table 14: Summary of Capacity Under 2040 Growth Concept

Part 2, Steps 9-14	Dwelling Units	Employees
Step 9: Capacity using 2040 Growth Concept densities	175,430	291,870
Step 10: Subtract dwelling units for underbuild and development limitations	(36,850)	(22,330)
Step 11: Subtract dwelling units and jobs to account for 5-year ramp up	(6,430)	(2,650)
Step 12: Add dwelling units and employment to account for redevelopment	46,990	162,510
Step 13: Add dwelling units and employment to account for infill	24,200	43,700
Step 14: Add in dwelling units for existing platted lots (10,900) and development rights on environmentally constrained lands (3,190)	14,090	0
TOTAL	217,430	473,100

Part 2 of this report examines the demand for housing and employment. The demand and supply can be compared to reach a conclusion about whether sufficient capacity exists in the current Metro urban growth boundary to meet the 20-year housing need.

REGIONAL FORECAST AND URBAN DEVELOPMENT PATTERNS

PART 2

INTRODUCTION

Since 1988, the Portland-Vancouver metropolitan economy has received much faster growth than anticipated. In comparison with actual estimates, prior forecasts of population and employment show widening deviations between what was forecasted and today's actual performance. The 2017 Regional Forecast updates these current trends and reflects the emerging trends we believe will persist into the future of this forecast.

Today's 2017 regional forecast and its companion the urban development patterns represent a minor adjustment to the previous year's 2015 regional forecast and urban development patterns[1]. The urban development patterns analysis is an allocation of the geographically broader regional forecast into smaller geographic estimates. The 2017 forecast updates the 2015 forecast by extending the forecast horizon an additional two more years. Additionally, the new 2017 growth allocation correctly reallocates the amount of growth and the assumption behind where that growth is expected to occur in the designated urban reserve sites[2].

The forecast methodology for the 2017 regional forecast represents a significant advance in technical achievement. The regional forecast was derived from a sophisticated regional economic forecasting model. The model projections was the basis for Metro's dwelling unit (or household and population) and employment demand forecast for the year 2017. The 2017 growth projections serve as the regionwide control totals for allocating future growth into smaller geographic units. In other words, a sum of all the subarea estimates in the region must add up to the original regional total for households, population and employment.

The organization of this part of the report begins with a summary of the regional forecast and results, description of the regional model, a discussion of the major economic and demographic trends of the region, and ending with a summary of the regional allocation methods and its results.

[1] We characterize the regional forecast to represent the larger four or five county economic region, whereas, the urban development patterns represents an urban growth allocation to smaller geographic units, typically TAZ's. TAZ's or transportation analysis zones are small transportation areas that show potential concentrations of commuters.

[2] It was only this October 1997 that the Council formally declared the first tiers of the Urban Reserve (UR) sites. First tier UR are designated to be included into the Metro UGB before any other potential sites. Prior to this announcement, the Council had designated over 18,000 acres of land outside the UGB as UR. The Council declared about 5,500 acres

2017 Regional Forecast Summary

Recent growth in this region has exceeded forecast expectations. In particular, figures released by the Census Bureau in 1994 indicate population to be about 39,000 ahead of the Metro *2040 Regional Forecast*. A number of economic factors have helped boost regional growth rates:

- higher migration rates, particularly because of slow job growth in California
- above average employment growth in the Portland area economy
- tax incentives that have lured a large number of high-tech firms.

Silicon Forest. The region's emergence as a center for high-tech development has spurred new growth. Nearly $12 billion in high-tech plant and equipment are expected to be invested in the region during the next few years. In addition, we anticipate more growth from suppliers, other retailers and merchants who sell goods and services to the companies and their employees who have moved into the area. The region is fast becoming a major player in the world of high-tech manufacture and research.

International Trade. Portland offers an ideal backdrop for international trade, particularly with the Far East. Good air, sea, and rail connections make Portland an ideal distribution point. The region's closer proximity to Pacific Rim nations gives this area a competitive edge over other inland regions of the U.S. Presently, agricultural and timber products still represent a major part of exports, but in terms of value of shipments, high-tech products make up a faster growing segment.

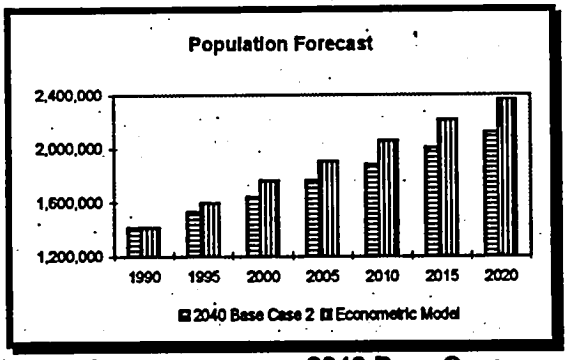

FIGURE 1 2040 Base Case v. Econometric Model Forecast

FORECAST ASSUMPTIONS

Nationally, many observers feel that the U.S. Federal Reserve has successfully engineered a "soft-landing" for the U.S. economy. In the very short-run, the implication for the Portland economy suggests that the regionwide growth rate will tend to moderate along with the a slowdown in the U.S.

Because of the area's relatively stronger economic condition, a slowdown in regional employment and population growth will be less pronounced than for the nation as a whole. Favorable economic conditions will continue to fuel in-migration and sustain population and economic growth, but a rebounding California economy will tend to decrease migration flows into this state. High-tech growth will bolster manufacturing activity in this area – directly in the semi-conductor industry and supporting suppliers.

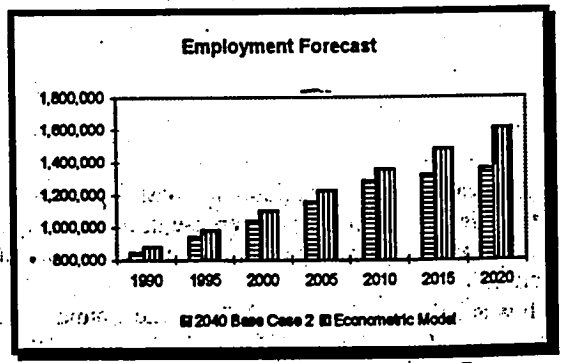

FIGURE 2 2040 Base Case v. Econometric Model Forecast

Retail merchants and other service providers are expected to enjoy continued strong growth because of demographic trends. By 2000, population is expected to reach 1.75 million – an increase of 150,000 people in six years. By 2017, the area is expected to reach approximately 2.3 million inhabitants – an increase of 705,000 people (1994 to 2017).

FIGURE 3
REGIONAL FORECAST SCENARIOS
POPULATION*

	2040	Econometric Model		
	Base Case	HIGH	MEDIUM	LOW
1990	1,412,344		1,412,344	
1995	1,526,500	1,598,700	1,597,100	1,597,100
2000	1,640,000	1,824,700	1,756,700	1,695,300
2005	1,756,200	2,065,700	1,903,600	1,803,900
2010	1,877,700	2,333,500	2,055,900	1,925,400
2015	2,001,730	2,631,500	2,210,800	2,037,100
2017	2,249,300	2,703,300	2,271,100	2,092,600
2020	2,121,900	2,951,800	2,363,600	2,128,600

Over the length of the forecast, we emphasize both short-run and long-run growth determinants. The region's potential output in the future is conditional upon increases in its population and labor force, improvement in productivity, long-term investments, and the region's comparative economic advantage over other regional economies.

The regional economy is expected to outperform national growth trends predicted of the future. Faster population and in-migration rates are expected to bolster retail growth and the broader service sectors.

Technology advancements will continue to boost productivity. Capital investments in recent years will enhance competitive advantages in the future. Investments in high-tech companies now are likely to start the region growing more in later years through increased agglomeration.

Alternative Forecast Scenarios. The econometric model employs three different U.S. macroeconomic scenarios to produce three separate and independent regional forecasts:

- Moderate/Trend Scenario
- High Growth Scenario
- Low Growth Scenario

The WEFA U.S. macroeconomic scenarios provide the underlying growth assumptions for our future regional growth projections. In a comparison of forecasts, the *2040 Base Case Forecast* is projected to increase an average of 1.4 percent a year. In contrast, computations based on the Metro econometric model show the region is more likely to grow an average of 1.6 percent per year. Also, depending upon growth scenarios and future assumptions, the high growth scenario predicts an average 2.5 percent and the low growth scenario 1.2 percent growth per year (see figure 5).

FIGURE 4
REGIONAL FORECAST SCENARIOS
EMPLOYMENT*

	2040	Econometric Model		
	Base Case	HIGH	MEDIUM	LOW
1990	847,671		856,000	
1995	938,862	985,100	979,700	966,700
2000	1,040,955	1,150,600	1,104,000	1,041,400
2005	1,154,148	1,321,800	1,228,500	1,135,000
2010	1,279,651	1,518,000	1,356,100	1,233,400
2015	1,321,160	1,723,300	1,486,600	1,319,400
2017	1,338,200	1,805,000	1,536,500	1,352,400
2020	1,364,016	1,937,000	1,615,100	1,403,500

Population growth varies from year-to-year depending upon net migration rates. In the short-run, we anticipate faster population growth due to relatively favorable economic

conditions. As conditions in the long-run moderate, we expect population and employment growth to slow together.

The number of households projected for the four-county area is expected to increase with population. Household formation is expected to increase slightly faster, just as the trend in household size (i.e. the number of persons per household) continues to fall across the nation.

Each of the alternative growth scenarios shares one common theme and that is an absence of explicit business cycles[3]. The Medium Growth scenario represents a trend or base case growth by which the actual economy in the future is most likely to cycle around.

FIGURE 5
THE REGIONAL FORECAST
(1994 TO 2017)

	Annual Average Growth Rates		
	High	Med.	Low
Population	2.5%	1.6%	1.2%
Households	2.7%	1.9%	1.4%
Employment	2.8%	2.0%	1.5%
Per Capita Inc.	1.2%	1.0%	0.7%

FIGURE 6
REGIONAL FORECAST SCENARIOS
HOUSEHOLD*

	2040	Econometric Model		
	Base Case	HIGH	MEDIUM	LOW
1990	553,107		553,107	
1995	608,328	634,400	636,000	633,800
2000	665,112	729,900	705,900	678,100
2005	724,711	843,100	777,300	736,300
2010	786,608	968,300	852,000	798,900
2015	849,235	1,105,600	917,000	855,900
2017	872,715	1,163,100	947,300	880,000
2020	909,157	1,256,100	992,100	917,500

The long-run factors that determine real growth will impact the region's potential aggregate supply. We therefore construct high (and low) growth scenario(s) which are consistent with simulating changes in the region's future aggregate supply, such as:

- regional productivity
- population and its determinants
- labor force
- investment activity.

The high (and low) growth scenario(s) do not represent absolute growth bounds, but rather frame a "probable" high (or low) growth path(s) that the regional economy may take if alternative conditions assumed actually materialize.

[3] The current business cycle is "played-out" in the short-run before the forecast is blended into an expected long-run forecast. The long-run embodies the historical average growth of the regional economy with its many business cycle swings.

* Population, households and employment projections in the sets of econometric model projections have been re-calibrated to compare with the 2040 Base Case projections which include only the 4-county, bi-state area.

Regional Economic Model Described

SECTION 1

INTRODUCTION

The economic and demographic outlook summarized in the *2015 Regional Forecast* actually represents three separate 25-year growth scenarios: a Medium Growth forecast, a High Growth, and a Low Growth scenario. (The regional forecast has extensions through to the year 2020 and we are able to consistently use this forecast to meet year 2017 requirements.) The Medium Growth forecast scenario represents our most likely (highest probability) long-term growth trend. That is to say the Medium Growth forecast is a medium-case forecast which embodies our best estimate of what future growth will be in this region. It incorporates the expectations and predicted outcomes we feel have the highest likelihood of being realized.

The Medium Growth forecast is a trend scenario; by this we mean that significant business cycles in the long run are not represented in the outlook. It is not our belief that business cycles in the future will never occur, instead cyclical turning points far in the future are extremely difficult to predict. So, we construct a trend scenario that allows the regional economy to grow along historical averages in relation to regional population growth and subject to national economic conditions as they develop in the future.

Economists often differ in their opinions regarding future economic growth. That's because monetary and fiscal policies are always in a state of flux. In addition, global developments also add to the confusion and uncertainty about how growth will occur. Economists and forecasters' ability to predict the future are limited to the degree in which the economic models being used are able to predict the behavior of people and industry to various unknown economic stimulus in the future.

It is these unanticipated event(s) that can materially throw a particular forecast "off track." In order to mitigate the risk inherent with a single forecast, we have developed a range of alternative growth scenarios. Each forecast can be interpreted as a range of possible outcomes given different sets of assumptions regarding economic and population growth in the future.

With a forecast range, we can be reasonably confident of where future growth might be headed. Therefore we construct high and low growth scenarios. Within the bounds of the high and low forecasts, the two projections represent an interval of growth around which future economic and demographic conditions are likely to occur given changes in long-run economic and demographic assumptions.

The high and low scenarios attempt to predict with a reasonable degree of confidence the probable range in which the regional economy could grow in the future. These projections demonstrate that under a range of plausible economic and demographic assumptions, regional growth can shift up in some years or swing down in other years.

All three scenarios are developed with the assumption that there will not be any unusual shock(s) to the region or the U.S., such as a large war or a major natural disaster (an

earthquake, tidal wave, or other act of God). The high and low scenarios focus on plausible shifts in fundamental trends of the economy and the population.

THE ECONOMIC MODEL

The regional forecast was prepared using a Metro developed econometric model using national growth assumptions obtained from the WEFA Group, Inc. For more information about the Metro Regional Economic Model, please refer to the Model Reference Guide [4], or for additional details please reference the *2015 Regional Forecast*[5].

The Metro Regional Model is a quarterly-data, econometric model of the Portland-Vancouver economy. It was developed in-house by METRO staff and is maintained and operated in-house. This econometric model is Metro's first integrated economic and demographic model of the region and covers all of Clackamas, Multnomah, Washington, and Yamhill counties in Oregon plus Clark county, Washington. The model treats the region as a single economic entity; that is inter-county transactions and inter-industry impacts among the counties are ignored. Also, it is not a "shift-share" model and does not "share-down" from any existing state model. The Metro Model is a stand-alone economic model that features U.S. and international drivers combined with regional assumptions to forecast employment, income, population and household trends (see figure 3).

The regional economic model is basically a top-down structural model. Its primary inputs are exogenous variables or drivers taken from the national economy. The model is essentially block recursive and can be conceptually divided into three major blocks: a pre-determined block for computing productivity, population, and households; a simultaneous block comprised of the main endogenous variables such as net migration, employment, income and wage rates; and a third block for post-determinant variables, which do not feed back up to the simultaneous block.

The Metro model is a long-run econometric model that forecasts expected values for which alternative assumptions and scenarios can be constructed to test for the outcome of future economic trends or economic realizations.

For more information about the WEFA Group, Inc., its U.S. macroeconomic models, or forecasting methodology, please consult them directly or refer to any of their published U.S. Economic Outlook publications.

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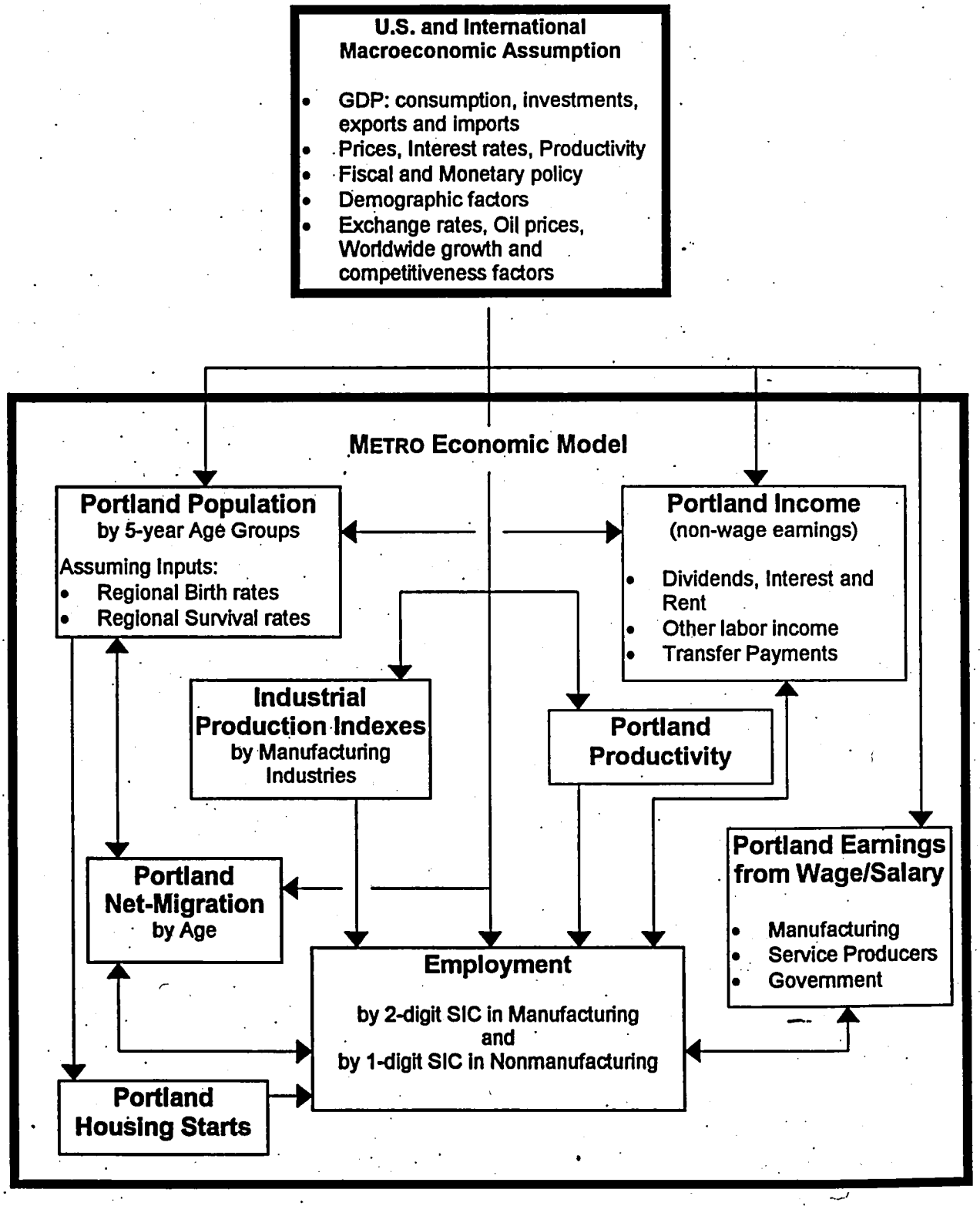
[4] Metro Regional Economic Model (Portland-Vancouver Area), Model Reference Guide, METRO Data Resource Center, July 1994, (unpublished report).
[5] Portland-Vancouver Area, 2015 Regional Forecast, January 1996.

FIGURE 7
METRO REGIONAL ECONOMIC MODEL



The Regional Model is comprised of the bi-state area that includes Clackamas, Multnomah, Washington, Yamhill counties in Oregon and Clark county, Washington.

SECTION 2

To clarify the discussion, we distinguish the regional forecast as different from the urban growth allocation or so called urban development patterns forecast. A regional forecast is the projection of how much growth the entire region is anticipated to grow during the duration of the forecast. The regional forecast serves as a control total for how much employment, population or household growth the whole region is expected to experience in future years.

The urban growth allocation is a product derived from the regional forecast. An urban growth allocation distributes (or reduces down) the forecasted regionwide growth totals to smaller geographic units, such as cities, counties and other urban areas throughout the forecast area.

THE LONG-RUN OUTLOOK

The Portland economic region is growing and expanding in geographic influence and business diversity. It is highly export oriented, with a focus to the Pacific Rim. Traditionally, the regional economy has relied on resource-based industries, which still remain a cornerstone of the region. Increasingly however, other sectors have been providing greater growth and employment opportunities.

These industries include value-added manufacturers in aerospace technology, transportation equipment producers, computer software makers, silicon wafer and microprocessor manufacturers. Throughout the region, there is a complex network of trade relationships and associations; some are long-standing, in sectors such as energy and forest product industries, while others in the technology and service sectors are more recent and still evolving.

The regional forecast calls for continued growth in many of the region's major industries. There are plenty of reasons to support such optimism. The Portland region has always been an extremely attractive place to live because of its sense of community and quality of life. Businesses will locate where they can find a motivated and skilled workforce.

The regional forecast of employment and population reflects the belief that the region will continue to prosper and attract new growth. Portland's location as a crossroads and port city for merchandise trade is expected to help bolster future regional growth.

The area's emergence as a major manufacturing center of high-technology products and research is expected to give the region a competitive edge in the future too. The opening of new semi-conductor plants and silicon wafer manufacturers places Portland economic region at the forefront of the highly competitive high-tech industry.

EMERGING TRENDS

Population and Migration. In the past few years, a weak economy in California and in the U.S. in general has helped boost net in-migration flows and fueled population growth in the Portland area. The region's faster growth has both attracted a higher number of in-migrants as well as kept more people from migrating out than has been the historical average. During the last five years, the number of people living in the four-county area rose by an estimated 186,000 residents, or an average of 2.5 percent growth per year. By some estimates, migration has accounted for nearly two-thirds of this growth. People move for many reasons, but one principal reason is to seek a better life and greater economic opportunity. The Portland economy provides that opportunity for many.

Population growth as evidenced in recent years has been much faster than for the entire U.S. due to this region's economic strength and its more attractive quality of life. These two reasons help drive the migration flow into the area; and in turn it helps increase the potential for economic growth. As new residents arrive, they shop and consume more goods and services.

While growth in the U.S. economy as a whole has grown anemic, the economy of this region has showed little signs of a let down. Employment here continues to surge ahead and unemployment rates in the region remain well below national figures.

Economic Growth. The region's high-tech industry is diversifying as new companies enter the Portland market. Several multi-billion dollar corporations that produce a wide-range of microprocessors and memory chips, fabricate silicon wafers, and manufacture various computers and related office equipment have led this growth. Portland's manufacturing sector has created over 6,200 jobs in the last two years. During the next several years, up to 10,000 additional jobs could be added in the high-technology fields if additional plant expansions are carried forward as planned. Economic projections suggest that the regional economy will be able to sustain and exceed projected growth as compared to the U.S. Not only are high-tech manufacturers and suppliers benefiting from current growth trends, but Portland's other industries are growing too.

Portland's nonmanufacturing industries sustained about 3.0 percent employment growth per year over the past several years. Business and software services are growing quickly too – sustained in part by the rise of Portland's *Silicon Forest.* Some segments of services will receive an above-average boost in growth due to its relationship with high-tech manufacturers.

The health care industry is another key segment of this region's future and is expected to sustain its trend for the foreseeable future. Migration data suggests that Oregon may receive an above-average share of retiring migrants moving into the state, this in turn should bolster growth in regional health services.

The confluence of the Willamette and Columbia rivers and the connections it affords to the Pacific Rim has made this region an ideal location for international commerce. Portland's proximity as a go-between for trade with fast-growing Pacific Rim countries has contributed to the economic vitality that this region has enjoyed over the past several years. The Port of Portland reports that the value of marine shipments passing through Portland has steadily increased at a rate of about 13 percent a year. The air cargo freight similarly rose an average of 13 percent a year. This has helped maintain a strong and healthy transport and warehousing industry in the region.

The recent merger of Union Pacific and Southern Pacific will certainly strengthen Portland's position as a transport hub for moving goods, services and people. Portland becomes a major point in the crossroads between north-south and east-west freight transport. The merger combines the strength of Southern Pacific's north-south rail lines which pass through Portland from the southwest U.S. up to Canada, and Union Pacific's strong east-west rail lines which begin in Portland and extends east.

KEY TRENDS AFFECTING GROWTH IN THE REGION'S FUTURE

International Trade. The regional economy will grow and add new jobs from rising trade activity with fast growing Pacific Rim nations. China and other southeast Asian countries represent the next wave of newly industrialized nations. Export of goods and raw material will spur investment and greater production capacity by Oregon firms. Also, foreign capital investments from already industrialized countries in Asia (Japan and Taiwan) will flow more easily into this region because of declining dollar denominated exchange rates and other global competitiveness factors.

The economic prospects are promising in terms of investment and production facilities in the region. This is likely to result in greater employment opportunities. The region is strategically well positioned between east and west in terms of communication (time zone differences) and travel/cargo routes. Some regional industries have forged vital links with other Pacific Rim nations; these links are expected to grow even stronger with the maturation of the newly industrialized nations in the Far East.

Technology. Technological innovations and other improvements will continue to raise the productivity of industries in the region. Traditionally, the manufacturing sector has exhibited the greatest average productivity gains from year-to-year. Productivity is expected to continue rising in manufacturing. Nonmanufacturing sectors will see faster productivity growth too.

With the introduction of computers and new inventory management systems, the different service sectors are expected to improve their rate of productivity. Recent innovations in retailing and better information databases have helped retail merchants and improved marketing efforts.

We anticipate that productivity will increase the standard of living of all individuals in the region, but that the path in the short range may be bumpy. Presently, productivity is helping the economy grow, but job growth has not been where it has in previous business cycles. Job growth has been offset in the U.S. by big companies downsizing in the name of increasing productivity, competitiveness, and corporate profits.

Eventually, increased productivity will help grow the economy and allow it to absorb the unemployed and new entrants to the labor force. The economy should be larger than it otherwise would without the productivity we are undergoing now. Meanwhile, job growth may be constrained in the short-run but the economy will be larger and better for it in the long run.

Technology in the form of computers, silicon wafers and semiconductors, office equipment and software development will be a driving force in employment growth in the region. A worldwide shortage of semi-conductors and memory chips is currently spurring major plant and equipment investments throughout the region. Collectively, these investments are expected to have a long-run positive impact on employment and economic growth in this region.

Demographics. Continued population growth will be a major determinant of regional growth in the future. If population growth continues to grow at similar rates as in the last five years, the region will look much different than it would otherwise. However, it is unlikely that recent trends will persist over the long-run. Population rates tend to ebb and flow depending on regional economic growth and business cycles in the U.S.

Historically, population growth is weighted by changes in net migration, which has accounted for about two-thirds of population growth from year-to-year in this region. When migration rates were high, the regional economy was usually doing very well, when rates plummeted, the economic conditions in the region were generally well below the national average. Through the peaks and troughs, the population cycle tends to an average rate of growth that is less than the current experience.

What we know about population in the long-run is the age structure, that is to say, the population of the U.S. and this region is expected to grow older. As the baby boom generation ages, the median age of the population increases. Eventually the baby boomers will enter retirement.

The aging of the population will cause the economy to shift to accommodate this change. First, it is clear that the consumption pattern of the elderly will be much different. There will be greater emphasis on health and medical services, personal, financial and so forth. On the other hand, there will be fewer young workers, proportionately. This is likely to pose a greater burden on the economy. The spending power of this demographic segment could be lessened. Combined with the fact that this generation (Generation X) is smaller than its predecessor (the Baby-boom Generation), the industries which produce consumer

durables, products and services may feel less demand. Overall, this demographic shift could constrain growth in some of the traditional industries, while benefiting some industries that provide services to the elderly.

Agglomerative Forces. The technology revolution that is spreading throughout the world is helping to boost plant and equipment investments in this region. The region has emerged as an area that is extremely attractive to high-tech companies in search of locating new sites to operate. The growing concentration of high-tech firms helps to draw in other establishments wanting to do business with them. New suppliers and other retailers will emerge to satisfy the growing demand from households drawn to jobs in high-tech fields.

Industries in the region have had a successful tradition of spinning off new companies from larger firms in the area. These smaller firms have proven to be highly successful in their own right.

In high-tech, there tends to an agglomerative trend because the principal manufacturers tend to influence key suppliers to relocate closer to where the manufacturing activity takes place.

Education and Business Partnerships. An educated and skilled labor force can be a competitive advantage for a region seeking to attract new businesses. Companies in the future will be seeking employees who can operate sophisticated technical equipment, diagnose problems and repair them. Employees in the future will need to have computer skills, mathematics and scientific aptitudes above what is presently required. A regional economy that can provide a plentiful supply of workers with these aptitudes will help attract new firms and retain existing growth.

Unlike other cities, Portland is presently at a disadvantage – in terms of having an institution devoted to high-technology research and development. Until a facility or educational institution can be developed at this level comparable to other competing regions (e.g. Austin, Texas), the Portland-Vancouver region will not be seen as being as attractive.

In the past, Tektronix has filled a limited leadership role, but with recent downsizing their role has diminished. It is possible that Intel or another manufacturers might take the lead in this area by perhaps assisting local colleges in implementing cooperative education programs that emphasize math and science.

Another aspect of education is retraining dislocated workers. In the short-run, we foresee many jobs being replaced by new technology. Institutions of learning must step forward and help mitigate the losses created by an economy undergoing change.

The economy in Portland and the state of Oregon is not as well positioned to meet the future education challenges as other states which have universities that foster research and development. Other states seem more focused on training tomorrow's workforce in

terms of science and math. In order to compete with other cities, Portland and Oregon will have to improve the knowledge base of future workers, to provide a better educated workforce.

Public and private business partnerships and other linkages between the two will have to expand in importance as the demands on the education system increase. Business will have to play a larger role in helping public schools educate tomorrow's workforce. The public school system will have to change too; it must learn to accept a greater role from businesses. Schools must understand that it can not afford to provide all the necessary education and training without help from others.

SECTION 3

A final population, household and employment allocation based on the 2017 Regional Forecast is detailed in this section of the report. We describe the methodology behind the 2017 urban growth allocation process. This includes the development and derivation of basic control totals on regional households, population, employment, income and age. It contains as well the assumptions we made regarding land supply, household size and dwelling demand. We describe the methodology used to derive small area forecast and how the *Growth Allocation Workshop* reviewed and evaluated the data to arrive at an "expert allocation" consistent with *Region 2040* growth concepts.

At the end of this report, we present the allocation results and compare at several geographic levels these results, ranging from the Metro 20-district geography to jurisdiction-level boundaries and TAZ's. These data are available in several socio-economic categories:

- Nonfarm Employment
- Number of Households
- Population (by age)
- Household Size
- Age of Head of Householders
- Income

BACKGROUND

This report continues a Metro practice first started in 1968[6] and continued periodically ever since. Besides that initial report, Metro has published a series of population, households and employment reports in 1978, 1981, 1984, 1985, 1989.[7] In all cases, Metro has used roughly the same method and approach for regional forecasting and growth allocation. The fundamental methodology follows these procedures:

1. Start with a regional forecast of population and employment to use as control totals prior to allocating population and employment to smaller units of geography.
2. Produce a "technically-based" spatial allocation of the projected population and employment considering historical trends and land availability for particular subareas.

[6] CRAG, Economic Profile with Interim Projections to 1990, Portland-Vancouver METROpolitan Area, 1968, 26 pages.
[7] There may have been other regional forecast and allocation works between 1968 and 1978, but we retain no records of them.

3. Use an expert panel comprised of representatives (usually planning staff) from local jurisdictions to evaluate and revise the technical allocations of population and employment.
4. Publish the forecast results after completing the expert panel review. The forecast and subarea growth allocations have usually been published for several levels of geography, ranging from county-level to Metro 20 district subareas or census tracts.

While Metro or its predecessor CRAG[8] has essentially retained the same regional forecast and growth allocation methods and procedures over the past three decades, details of the forecasts have varied considerably. For instance, forecast years have moved from 1990 out to 2010. Some types of data that have been the subject of forecasts have changed. Most forecasts, though, contain a projection of population, households and employment, but some forecasts have contained additional detail. These forecasts have often times included projections of dwelling type (the number of single family and multi-family dwelling units) and employment by land-use configuration (i.e., jobs in office, retail, or industrial).

Especially during the last several years, Metro has continued to improve the technical aspects of the forecasting and growth allocation elements. Metro has used increasingly rigorous methods to estimate regional control totals. By the same token, the database on land capacity and the level of spatial and socio-economic information has increased many fold. Full implementation of the Metro GIS - RLIS allows a robust examination of the interplay between land supply, land-use regulation and forces of market demand with a high degree of spatial resolution.

Though there have been technical variations, Metro forecasts including the present effort retain four basic elements. The first element is the use of regionwide control totals of population, households and employment to constrain the spatial allocation. The second element is to allocate growth from the regional forecast into smaller geographic subareas. This technical allocation represents the market demand for particular geographic subareas by using time series data on population and employment. The third element is to use land availability and comprehensive plan designations to measure the supply/capacity of each subarea, to use this data to constrain the technical allocations. The fourth element is the use of expert panels to review and revise the technical allocations.

[8] Columbia Regional Council of Governments

Growth Allocation
Methodology and Policy Assumptions

SECTION 4

The current growth allocation of the regional forecast both continues and extends the Metro forecast methods. Like previous Metro growth allocations, it contains four basic procedural elements of using regional control totals, trend estimates of market demand, land supply/capacity constraints, and review and revision by an expert panel. Of significance, the current forecast also adds much that is new to regional forecasting and growth allocation.

MAJOR ALLOCATION ASSUMPTIONS.

The greatest change from earlier forecast methods and allocation practice has been the explicit adoption of a regionwide planning policy, namely the *Region 2040* urban growth plan. Previous Metro forecasts were essentially trend forecasts based upon the assumption that investments and land use policies of the past would continue on into the future. The premise behind *Region 2040* is a set of land-use goals and targets that when implemented layout general growth concepts and guidelines that try to promote compact urban form.

Policy Assumptions:

1. Over the next 50 years the Metro region will grow into a denser and somewhat more compact form than has been the trend over the last 50 years. Densities will increase from approximately four DU[9] per acre (gross) now to about five DU per acre by the year 2017.

2. The Urban Growth Boundary (UGB) is assumed to expand in order to maintain a 20-year land supply for residential purposes – in accordance with Oregon HB 2709 and based on implementation of 2040 land-use policies. For purposes of the 2017 Regional Forecast, Metro **assumed** that a UGB expansion between 4,000 to 9,000 acres[10] would accord with regulatory requirements.

3. The level and type of transportation investment will affect the density and pattern of growth.

4. Metro and local governments will actively encourage infill and redevelopment within the existing UGB. Government regulation, investment and subsidies will support infill and redevelopment as well as increased densities.

[9] Dwelling Units

[10] Under alternative assumptions, namely the so-called "Zero Option", expansion of the UGB may not be necessary.

5. Local governments outside of Metro will be subject to many of the same growth pressures, legislative restrictions, and fiscal constraints. Therefore they will manage their growth in a similar fashion.

Technical Assumptions:

In addition to the general policy level assumptions described on the previous page, Metro staff have made a number of *technical assumptions* based on research conducted in addition to the growth allocation workshops. These technical assumptions establish the 2017 levels for the following data[11]:

- Projected **population** in the 4-county region will be 2,271,100 in the year 2017.
- The number of **households** in the 4-county region will be 947,900 and the average household size will be 2.40 in 2017.
- Regional **nonfarm employment** (includes proprietors, part- and full-time jobs, supervisors and managers, etc.) in 2017 will total 1,536,500.
- Real per household **income** will increase at an average rate of 0.85 percent per year in the future.
- The **vacancy rate** regionwide is assumed to be 3.9 percent.
- The **capture rate** (or percentage of households, dwelling units, or jobs inside the UGB as compared to the net change in the four-county regional forecast) is assumed to be 70 percent for dwelling units[12] and 82 percent for employment.

[11] Source: *2015 Regional Forecast*, METRO Data Resource Center, January 1996

[12] Actual percentage dwelling units from recent capture rate data for Metro UGB.

Year	Percent of 4-county residential growth occurring within Metro UGB
1990	70.6%
1991	67.1%
1992	61.6%
1993	62.5%
1994	64.7%
1995	72.1%
1996	71.3%

Source: Metro, Marginal Rate of Households in the UGB (July 18, 1997)

In addition to accepting these assumptions and figures as 2017 regional control totals, we also assume the following characteristics about what type of households we expect in the future and how many of each type we project. Households are classified based on the following HIA[13] characteristics:

- size of the household (number of people in the household),
- household income,
- and the age of the head of household.

The figures arrived by these assumptions are necessary inputs for the travel demand model, for calculating small area population by age cohort, and estimating future housing needs[14].

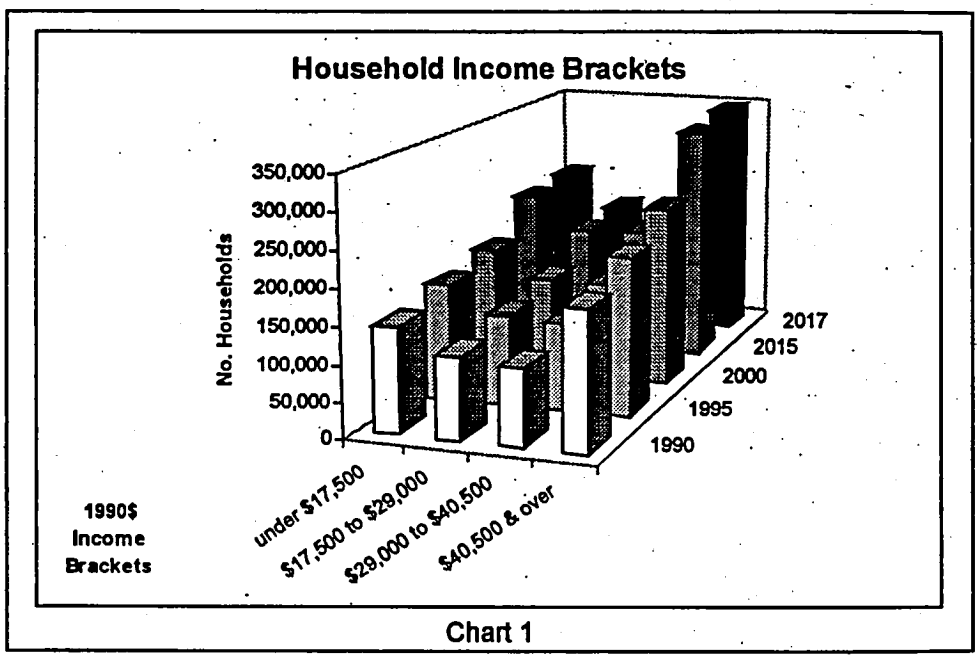


Chart 1

The *distributional assumptions* we make in regard to household size, income and age (HIA) play a very significant role in the estimation of dwelling choice[15] and travel demand. In general, we assume very little change in the distribution of these variables through the forecast period. We essentially take the 1990 Census distribution of households by the HIA categories and gradually modify them during the forecast period based on acknowledged demographic and economic trend assumptions.

[13] Household Size, Income in the household, Age of the head of household

[14] Collectively, the distribution assumptions make up what we call the HIA's. Household size range from 1, 2, 3, 4 or more. There are four household income ranges, under $17,500, $17,500 to $28, 999, $29,000 to $40,499, and $40,500 or over. The ranges for the age of the head of household are under 25 years, 25 to 54, 55 to 64, and 65 years or older.

[15] For example, tenure - own or rent; single family or multi-family dwelling.

The shape of the HIA distribution shifts slightly between now and the future. In looking at the distribution of households by income brackets, the number of households distributed by income continues to rise, but the proportion of households in each income bracket shifts. The proportion of households belonging in the two lower income brackets actually declines relative to the two higher income brackets.

With moderate growth projected of the region, the number of households allocated to the four income classes increases to 947,900 total households in 2017 from 553,107 in 1990, or an average growth rate of 2.0 percent a year. We expect that the two highest income classes will add almost 239,000 households while the lower half adds only about 155,800 new households by the year 2017.

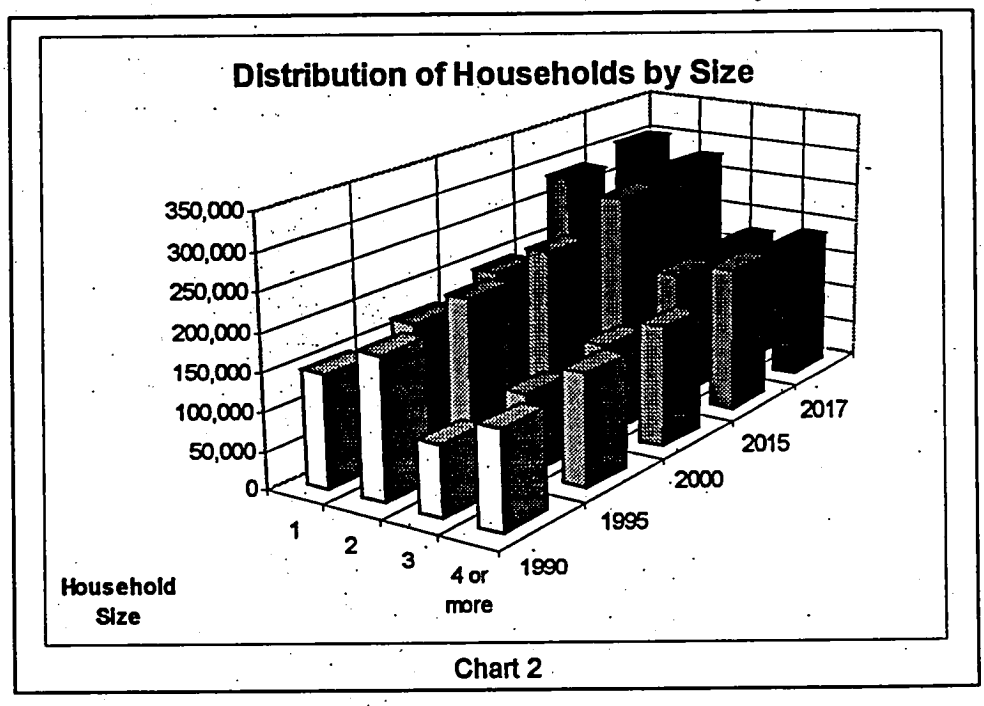


Chart 2

In terms of household size, we expect a more dramatic shift in the distribution of households by size. As shown by chart 2, proportionally fewer larger households are projected in the future as compared to smaller households. We anticipate the share of households in the "4 persons or more" category to decline from 23.7 percent to 18.7 percent of all households in the region, while household size two increased to 39.2 percent from 33.6 percent. Correspondingly, the average household size falls to about 2.4 persons per household by 2017 from about 2.6 persons per household now.

The decline in household size coincides with the increasing median age of households and the population. We expect a consistent increase in the age of the average head of household. The demographic structure overall is expected to shift up as the dominant baby boom generation grows during the forecast period. Households headed by someone 55 years or older are expected to *increase* to a 40 percent share from a base share of 31 percent in 1990. Conversely, the share of households headed by someone between the ages of 25 and 54 years will *decrease* to 54 percent from an existing 63 percent.

Unlike the assumption concerning the distribution of household income, the set of assumptions about future household sizes and the age of the head of household distribution are well grounded by established demographics, which consensus demographers believe to have a high probability of coming true.[16] We feel that the HIA distributions for household size and household age are more predictable and reliable.

Like income, household size and household age substantively impact the choices in travel demand and housing preference. Given our assumptions, we would expect a slowing growth rate in travel demand, and a proportional increase in demand for *non-traditional* owner occupied dwellings.

By the same token, increasing household age also means an increase in total household assets. Traditionally, increases in household wealth generate an increase in auto and housing assets. Generally, wealthier households own or purchase larger dwelling units and produce greater auto ownership.

[16] Our income assumptions merit a far more lengthy technical discussion than the format of this report allows. The question of the income distribution makes a substantial difference in the demand for housing by tenure, type and size. The income distribution assumption also makes a significant difference in the travel demand model in terms of auto ownership, mode choice and number of trips. In short, the future income distribution can significantly affect the outcome of METRO's 2040 planning and transportation investment strategies. Moreover, assumptions about the income distribution may in part determine which METRO planning and investment strategies appear successful and which do not.

Unfortunately, even assuming the 0.85% per year real household income forecast is perfectly accurate, it is still possible to arrive at numerous, if not infinite income distributions, which incorporate a household income increase of 0.85% per year. Suffice to say that estimation approaches that incorporate the present household income distribution and the 0.85% real increase rate, result in an intuitively implausible concentration of households in the two highest brackets. After calculating numerous distributions, we chose a distribution that produces little change from the present distribution, retains the 0.85% per year increase in real household income and does not require an unbelievably large increase in the average income of the highest income category. (In other words, the average income of households making more than $40,500 per year does not exceed $100,000.)

Up until the time of retirement, households tend to *trade-up* to increasingly larger owner occupied homes, raising the demand for new construction of larger houses. In turn, this leaves behind a stock of more affordable vintage housing which becomes available to younger households that generally have fewer assets and are relatively less wealthy. The changes projected in the HIA distribution also have impacts other than housing demand. The projected changes in the allocation of households by HIA will also impact the demand for other services, such as schools and health services.

Growth Allocation Method:

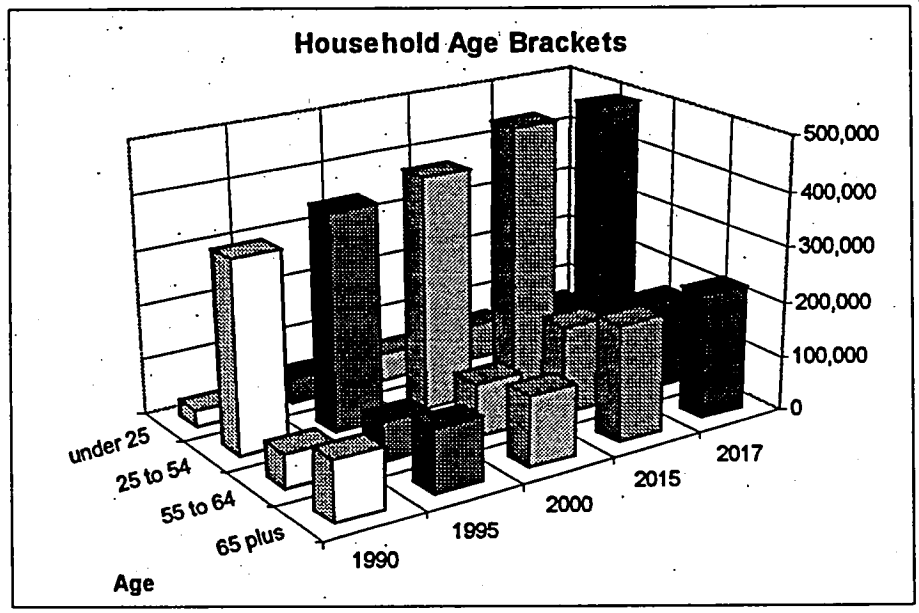


Chart 3

Combining the aforementioned policy and technical assumptions with the control totals found in the 2017 Regional Forecast, growth allocations of the region are derived. Consider the growth allocation a continuation that blends policy and technical assumptions and expert review in an iterative process to obtain a spatial allocation of households, population and employment across the region. The final result is a regional forecast of households, population and employment by Traffic Analysis Zones.

The 2017 growth allocation is a derivative of the 2015 growth allocation as detailed in the *Urban Growth Report, March 1996*. State law and Metro Code require a 20-year regional forecast (including a spatial growth allocation). Therefore, the reporting of a 2015 regional forecast and allocation is updated to the year 2017 in this final report to the Metro Council and the people of Oregon. The 2017 regional forecast and its spatial allocation is merely a two-year extension with but minor corrections to the urban reserves.

The following points summarize the principal details of the spatial allocation:

1. The four-county regional forecast (household and employment) was divided into six major market areas (see map nearby). These six land market areas were assumed not to be significantly impacted by Region 2040 growth policy(s) other than land availability (supply). These six major market areas are 1) the Central Business District (including the Lloyd Center and Central East Side), 2) the remainder of Multnomah county, 3) Clackamas County east of the Willamette River, 4) Clackamas county east of the Willamette and southeastern part of Washington county, 5) remainder of Washington county, and 6) Clark county.

2. Using available dwelling unit data from 1970 to 1994, linear trend regression estimates[17] were made for each land market area representing the future demand in each area. Projections for single family dwelling units, multi-family dwelling units, and total nonfarm employment were made of each land market area.

3. Capacity (or supply) estimates for housing units and employment were made for each land market area and compared. Capacity calculations were based in terms of jurisdiction comprehensive plans and the *Region 2040* capacity assumptions.

4. The results in step 3 were presented to the *Growth Allocation Workshop*. The participants reviewed the data and adjusted the estimates for market areas in which the trend forecast exceeded 95% of the calculated capacity (accordingly for jobs or housing). The adjustments were made in one of two ways. The forecast was adjusted by shifting any excess projected growth to an adjacent market area(s) where sufficient capacity exists in the forecast period or by implicitly agreeing that future regulatory changes in zoning and land-use would reflect greater capacity than currently recognized in the capacity estimates in step 3 (above).

5. Using the revised market area employment and housing trends as control totals, a second set of subarea growth forecasts were produced for Metro's traditional 20 district planning subareas (see map nearby). Linear trend regression models were estimated using the same methodology as before to forecast the demand in each 20 subareas. By definition, groupings of planning subareas nested into land market areas. As before, capacity estimates were calculated for each subarea.

6. In a second round of peer review, the results in step 5 were presented to the same Growth Allocation Workshop participants as before. Again the growth projections were analyzed against projected capacity estimates that were based on comprehensive zoning and Region 2040 growth concepts. In the planning subareas in which projected demand exceeded the calculated capacity limits, growth was shifted to other

[17] The projection method we used was a linear least squares model of a time trend constrained to the sum of the regional forecast control total of dwelling units or employment for any given future year. We chose a constrained linear time trend after testing various exponential, log linear and logistic models. While other models occasionally provided a statistically better fit, the linear model in general produced the most consistent and robust results for the most market areas.

subareas that still contained additional capacity in the future and belonging to the same land market area.

7. The adjusted 20 district subarea forecasts (of housing and employment) were then disaggregated and distributed to 1/16 acre grid cells in each subarea. The grid allocation method was specified in terms of the land designation and its status in the 2040 Growth Concept.

8. For the third round of review by the Growth Allocation Workshop, the gridded allocation of the forecast was retabulated to TAZ's for employment and housing. Each jurisdiction was assigned to review the TAZ's belonging to them.

9. The fourth represented the final round of reviews by jurisdictions involved in the growth allocation. Jurisdictions were afforded a high degree of discretion to adjust TAZ level growth projections insofar as each jurisdiction maintained its own control total allocation. Metro staff reviewed the recommended changes and discussed with each jurisdiction any differences in the data interpretation and policy intent. Jurisdictions were asked to submit their final TAZ allocations.

10. Submitted TAZ allocations were re-gridded to bring the Grids in conformity with the TAZ allocations.

The ten growth allocation steps outline a lengthy and detailed peer review process for producing a regional forecast and growth allocation at the TAZ level. The availability of detailed land use information in the RLIS database and sophisticated GIS technology made it possible for policy and technical assumptions to be blended together with a Regional Forecast.

As previously noted, the 2015 growth allocations are updated and extended an additional two-year period to meet State law and Metro Code. A new 20 year regional forecast and growth allocation for 2017 was needed. The following is a brief discussion of how that extension was made.

The 2017 regional forecast and growth allocation is merely a technical revision which heaps two more years of employment and household growth in addition to what was determined for the year 2015. **The 2017 growth allocation attempts to change as <u>little</u> as possible the distribution patterns of employment and household** (except to re-allocate a part of future growth into Urban Reserve Areas recently identified by the Metro Council)[18]. In extending to the year 2017, Metro staff employed a series of deterministic decision rules to distribute the two-year's growth. These rules take into account future growth into:

[18] The 2015 Urban Growth Allocation distributed a part of future household and employment to what were then known *as urban reserve study areas (URSA)*. Selected URSA sites were adopted by Metro Council and some URSA sites have been identified and selected by Council to be included in a first Tier to be brought inside the Urban Growth Boundary (UGB) to accommodate future development.

- new urban reserve areas determined by Metro Council ordinance which replace previous urban reserve study areas.
- declaration by Metro Council of Tier 1 urban reserve sites
- vacancies in existing unincorporated land inside the current urban growth boundary,
- vacant and redevelopable properties inside existing city limits (including infill and redevelopment),
- assumptions about how much additional capacity exists in neighboring cities and Clark county,
- and finally, make no changes to the jobs housing balance between Portland and Clark county.

The 2017 allocation does not materially alter the allocation of households or employment in 2015. In TAZ's which showed steady upward growth through 2015, the 2017 Allocation in these TAZ's showed an increase. In TAZ's that declined through 2015, this downward trend was continued for 2017.

Instead of starting all over, the 2017 regional forecast and its growth allocation left off at the point where the 2015 regional forecast and allocation ended with a final TAZ level allocation as described in step 10 (as noted above). Before beginning the re-allocation of the two-years of additional growth, growth that had been allocated to urban reserve study areas were pulled out of the 2015 allocation. The reason for this was new information coming from the Metro Council directing where additional urban growth capacity would come from in the future. This net change is added to the two-year amount of growth that is to be allocated to the 2017 TAZ growth allocation.

1. 2017 Regional Forecast control totals for the four-county area were extrapolated from the 2015 Regional Forecast. Divide out Clark county's share of the regional forecast (for employment and households). The remaining Tri-county totals will be re-distributed to TAZ's in Metro.

2. Determine the amount of growth to pull out of previous urban reserve study areas and add this amount to the two-year growth extension.

3. Compute the capacity limits for each city and county in Metro.

4. Cities with surplus capacity were then distributed additional growth up to 95% of the city's estimated capacity.

5. Similarly, surplus capacity in the unincorporated parts of each county inside the Metro UGB was computed and the additional two-year period of growth was added to them as well.

6. Allocate additional growth to urban reserve sites according to the Metro Council. The number of households that were allocated into each Urban Reserve site was based on Metro staff capacity findings for each urban reserve. The basic assumption was a 75% gross-to-net and 10 households (or dwelling units) per net acre.

7. A total of one thousand households were allocated to the neighboring cities of Canby (300), Estacada (100), Mollala (150), North Plains (150), and Sandy (300). These amounts were based on forecast trends in the data.

8. Allocate an additional 4,570 households to the city of Portland for the two-year growth period.

9. Steps 1 through 9 represent a series of calculations to derive jurisdiction-level control totals. This step assigns each TAZ in the region to a specific jurisdiction or urban reserve site. The jurisdiction control totals are then distributed to each TAZ bounded by the jurisdiction based on forecasted growth trends to get the final 2017 regional forecast and growth allocations.

10. The last step is to re-Grid the new TAZ-level forecasts.

The 2017 allocations to TAZ represent a definitive description of the growth allocation. Depending upon assumptions in Grid, variations in zonal tabulations may appear that may seem incongruent with the TAZ representations. Some of this variation is because TAZ's do not evenly nest into the boundaries of cities and urban reserves. This leakage or spillover in the TAZ from the exact jurisdictional boundaries will create some deviation. In addition, gridding the TAZ data is subject to variations in vacant land, redevelopment and infill assumptions, water, existing development intensity with respect to the grid cells assignment of these parameters and the TAZ data. These GIS-level variations create a degree of "grid-chatter," which is a function of the gridding algorithm.

At larger geographic scales or study areas, the grid-chatter and the rough edges around the TAZ allocations become less distinct. However, at small areas less than the TAZ, any GIS analysis using this data may be skewed. The user of this small area data is encouraged to adjust the data to fit already known parameters or more reliable previous data in existence.

APPENDIX A

Vacant and Developed Lands Inventory and Methodology

Vacant acres: unimproved land; a fully vacant tax lot has no improvements; a partially vacant parcel has improvements on the property but also has a vacant component (no structures, outbuildings, driveways, roads, etc.) of one-half acre or more. The vacant portion is added to the vacant lands inventory; the developed portion is added to the developed lands inventory.

Developed acres: improved property; a partially developed tax lot has a vacant component of one-half acre or more.

Metro's Regional Land Information System (RLIS) database is one of the best available in the country at this time. It is a compilation of coordinate geographic information that has been carefully input and assembled since 1987. Metro dedicates staff to maintaining and updating the information as it becomes available, including aerial photography, assessor's data, local plans, building permits, wetlands inventories, slopes, soils, and more. The entire database is described in the RLIS Data Dictionary, (DRC, 1995).

Metro's Data Resource Center (DRC) uses digitized aerial photographs rectified to match parcel maps in their update of the basic vacant lands coverage. Vacant land inventories have been updated every other year to this point, recently in 1990-1992-1994, and currently an annual update (for September 1994 to September 1995) is underway.[1] The updates are based on aerial photographs of the region and the tax lot base maps that are derived from county assessors' records (scale varies by location from one inch : 100 feet, to one inch : 400 feet). The photographs are compared to the previous existing inventory maps for vacant land. A manual check of each fully or partially vacant parcel is made to determine its status. With each tax lot update, the parcels are coded partially or fully vacant, developed or under site construction

Developed land is not explicitly checked once it has been categorized as developed (which started with the 1990 assessors' designation and the original parcel review of the entire three county coverage area). However, as the vacant lands are checked, any note of developed parcels becoming vacant is entered as a change to the database.

[1] The 1994 vacant lands coverage was chosen for this report as the most up to date at the time the work began, and because the 2040 forecasts and modeling, and the 2015 allocation work with local jurisdictions uses 1994 as a base year.

APPENDIX B

BUILDABLE LANDS AND CAPACITY ANALYSIS

Regional Zoning and Plan Categories:

Each jurisdiction has separate and distinct zoning/plan designations. A bridge table has been developed to produce a common set of zoning/plan categories. The common zoning/plan classifications are listed below. The RLIS database contains look-up tables that correlate each jurisdiction's zoning designations to the common set.

Farm and Forest

FF — Agricultural or forestry - activities suited to commercial scale production, typically with lot sizes of 30 acres or more.

Residential

RRFU — Rural or future urban - residential uses permitted in rural or areas designated for future urban development with minimum lot sizes of one acre or more.

SFR1 — Single-family - detached housing with minimum lot sizes ranging from 10,001 to 40,000 square feet (one to four dwelling units per net acre).

SFR2 — Single-family - detached housing with minimum lot sizes ranging from 7,001 to 10,000 square feet (four to six dwelling units per net acre).

SFR3 — Single-family - detached housing with minimum lot sizes usually ranging from 5,000 to 7,000 square feet (six to nine dwelling units per net acre).

MFR1 — Multi-family - housing and/or duplex, townhouse and attached single-family structures allowed outright. Maximum net allowable densities range from 8 to 25 units per acre, with height limits usually set at 2 1/2 or 3 stories.

MFR2 — Multi-family - housing accommodating densities in excess of 25 units per acre. Buildings higher than three stories are usually permitted and often include high rise structures.

PUD — Planned unit development/mixed use - applies where planned developments are mapped as a separate zone; some commercial uses may be encompassed within individual residential developments. Also applies to special mixed-use zones with residential emphasis (altered - allows 5 employees/acre and 11 dwelling units - 4,000 sq. ft.)

Commercial

CN Neighborhood commercial - small-scale commercial districts permitting retail and service activities such as grocery stores and laundromats supporting local residential community; commercial floor space usually limited to 5,000 to 10,000 square feet (altered - allows 8 dwelling units/acre; mixed use 2,000 sq. ft. townhouses).

CG General commercial - larger scale commercial districts, often with a more regional orientation. Businesses offering a wide variety of goods and services are permitted and include highway and strip commercial zones.

CC Central commercial - allows a full range of commercial activities typically associated with central business districts. More restrictive than general commercial in the case of large lot and highway-oriented uses, but usually allows for multi-story development.

CO Office commercial - districts accommodating a range of business, professional and medical office facilities, typically as a buffer between residential areas and more intensive uses. Mixed-use structures incorporating higher density residential and limited commercial uses are often allowed.

Industrial

IL Light industrial - districts permitting warehousing and light processing and fabrication activities. May allow some commercial activities.

IH Heavy industrial - districts permitting light industrial and more intensive industrial activity such as bottling, limited chemical processing, heavy manufacturing and similar uses.

IMU Mixed use industrial - districts accommodating a mix of light manufacturing, office and retail uses.

Comprehensive Plan Designations (where different than zoning)

POS Parks and open space

PF Public facilities - such as schools, hospitals or government buildings.

Mixed Use Plan Types, and Designations Unique to the 2040 Growth Concept Analysis

MUC-1 Mixed Use Center 1, a designation adopted in the 2040 Growth Concept analysis work for town centers and station cores, which combines residential and employment uses at a ratio of about 2:3, two residents for every three jobs. The floor area ratios here could be expected to be between .5 and 1.

MUC-2 Mixed Use Center 2, a designation adopted in the 2040 Growth Concept analysis for regional centers, a moderate mixed-use environment, which combines residential and employment uses at a ratio of about 1:2, one resident for every two jobs. The floor area ratios here could be expected to be between 1 and 3.

MUC-3 Mixed Use Center 3, a designation adopted in the 2040 Growth Concept analysis for the Central City or downtown Portland, it is the most intense mixed-use designation, with a ratio of about 1:4, one resident for every four jobs. The floor area ratios here could be expected to be over three and likely to be between 3 and 10.

MUEA This is a mixed-use employment designation intended to allow residential in these areas along with light industry, research and development, warehousing, trade, and local retail. The designation is specific to the 2040 Growth Concept analysis work, and is subject to revision. The residential component has dropped from the original 25 percent of the land area to about 8 percent as a placeholder.

IS This is a revised industrial plan designation, originally called Industrial Sanctuary but now referred to as Industrial Areas, and has been used in the 2040 Growth Concept analysis. It was intended to be a lower density, heavy industrial designation similar to traditional port facilities or manufacturing uses. However, this also is being reexamined because the densities associated with the locations are regarded as being too low when compared to current practice.

Plan Codes and Design Type Reference Sheet

Plan Codes (RLIS and modeling designation)
FF - Farm and Forest, Agricultural commercial uses
RRFU - Rural or Future Urban, 1 acre or larger
SFR-1 - Single Family (10,000 to 40,000 square feet)
SFR-2 - Single Family (7,000 to 10,000 square feet)
SFR-3 - Single Family (5,000 to 7,000 square feet)
MFR-1 - Multi-family 8 to 25 units per acre
MFR-2 - Multi-family 25 or more units per acre
PUD - Planned unit development/mixed use (used as an intermediate residential zone in the 2040 Growth Concept - neo-traditional design averaging 4,000 square foot lots, with some allowance for employment)
CN - Neighborhood Commercial, floor space 5,000 to 10,000 (used in the 2040 Growth Concept as a mixed use zone, with the residential component averaging 2,000 square foot townhouse lots, representing about 35% of the land area coverage.)
CG - General Commercial - large scale commercial districts
CC - Central Commercial, central business districts
CO - Office Commercial - Office uses and mixed uses
IL - Light Industrial (warehousing and light processing/fabrication)
IH - Heavy Industrial (light processing and heavy manufacturing)
IMU - Mixed Use Industrial (mix of light manufacturing, office and retail uses)
POS - Parks and Open Space
PF - Public Facilities
MUC-1 - Mixed Use Center 1 (least intense center - Floor Area Ratio of .5 to 1) - small town centers
MUC-2 - Mixed Use Center 2 (moderate intensity center FAR 1 to 3) - regional centers
MUC-3 - Mixed Use Center 3 (highest intensity center FAR 3+) - Portland Central City
MUEA - Mixed Use Employment Area (mix of light industrial, warehousing, back office and some residential)
IS - Industrial Sanctuary (low intensity industrial employment areas) or Industrial Area
Design Types (2040 Growth Concept design elements)
Central City - Downtown Portland, Central City Plan area
Regional Center - Major suburban downtown centers, such as Gresham and Beaverton, also includes Clackamas Town Center and Washington Square
Town Center and Station Core (within 1/4 mile of station) - these are treated the same, they are smaller urban and suburban town centers - Lake Oswego, Tualatin, Hollywood and St. Johns in Portland, Cedar Mill and Troutdale are examples; plus the core light rail station areas
Outer Station Areas - the area between 1/4 and 1/2 mi. of the station. Moderate density mixed use.
Main Street - 200-foot deep coverage along main streets, mixed-use density similar to town centers.
Transit Corridors - 360-foot deep coverage off streets with 10 min. peak headways, moderate density, mixed use allowed
Inner Neighborhood - neighborhoods near centers/corridors, primarily single family, with some multi-family and commercial.
Outer Neighborhood - further away neighborhoods, slightly larger average lot size, similar to Inner Neighborhood.
Mixed Use Employment Area - light industry and warehousing, research, trade, local retail, some peripheral residential
Industrial Area - lower density traditional industrial zones, with strategic access such as port facilities.
Greenspaces - regional open space, including overlap with environmentally constrained lands - steep slopes, streams, etc.

APPENDIX C

BUILDABLE LANDS AND CAPACITY ANALYSIS

2040 Growth Concept Upzoning Matrix:

The attached matrix has been used in the 2040 Growth Concept modeling, in different versions since the modeling work began over two years ago. The matrix is called inaccurately an "up-zone" as a means of communicating the concept of making zone changes. It is in fact changing plan designations, not actual zoning. The Metro Regional Land Information System (RLIS) has a geographic coverage of local plans in the region. These various local plan designations have been consolidated by Metro into 17 plan categories. The Region 2040 work added five additional plan categories to allow more flexibility in modeling the 2040 Growth Concept and the various alternatives studied. (See Appendix B for a description of the plan designations, and a design type reference.)

The matrix is separated into two components: the upper larger matrix of plan or, as they are listed, zoning changes; and the lower portion, which describes the densities assumed for any plan or "zone" category.

This matrix is a tool to represent the assumed changes to local plans from their current designations. The upper section has the 2040 Growth Concept design types listed in the left column and the current zoning or plan designations across the top. The current zoning has a reference to the 2040 zoning category below that represents it under the 2040 Growth Concept. For example, FF changes to MUC-3 if it falls within the central city; SFR-1 changes to SFR-3 if it is located in an Inner Neighborhood; and IL changes to MUC-2 if located in a Regional Center, and so on.

The lower portion of the chart shows two different zoning assumptions. The first chart shows maximum densities required to achieve the 2040 Growth Concept, whereas the second chart presents the 2040 expected yield densities with underbuild factored in.

An example of how to interpret this chart is as follows. To determine the density assumption for SFR-1 (current plan category) located in a Transit Corridor, refer to the upper portion of the chart to find the new zone under the 2040 Growth Concept. In this case, SFR-1 changes to SFR-3. Look below at the density assumptions and locate SFR-3. SFR-3 allows for 9.6 dwelling units and 2.4 employees, which should yield 8.2 dwelling units (considering underbuild). Employee density remains the same.

2040 Growth Concept Matrix

CURRENT Regional Zoning Category: → / Regional Zoning Categories under 2040 Growth Concept Design Types:	*FF*	*RRFU*	*SFR-1*	*SFR-2*	*SFR-3*	*MFR-1*	*MFR-2*	*PUD*	*CN*	*CG*	*CC*	*CO*	*IL*	*IH*	*IMU*	*POS*	*PF*
Central City	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	MUC-3	POS	PF
Regional Centers	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	MUC-2	POS	PF
Town Centers & Station Cores	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-2	MUC-2	MUC-1	MUC-1	MUC-1	POS	PF
Outer Station Areas	SFR-3	SFR-3	SFR-3	PUD	PUD	MFR-1	MFR-2	PUD	CN	MUC-1	MUC-1	CO	CN	CN	CN	POS	PF
Transit Corridors	SFR-3	SFR-3	SFR-3	PUD	PUD	MFR-1	MFR-2	PUD	CN	CN	MUC-1	MUC-1	CN	CN	CN	POS	PF
Main Streets	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-2	MUC-2	MUC-1	MUC-1	MUC-1	POS	PF
Mixed Use Employment Areas	MUEA	MUEA	MUEA	MUEA	MUEA	MFR-1	MFR-2	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	POS	PF
Industrial Areas	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IMU	POS	IS
Neighborhood I (Inner Neighborhood)	SFR-3	SFR-3	SFR-3	SFR-3	SFR-3	PUD	MFR-1	CN	CN	CN	CN	CN	MUEA	MUEA	MUEA	POS	PF
Neighborhood II (Outer Neighborhood)	SFR-2	SFR-2	SFR-2	SFR-2	SFR-3	MFR-1	MFR-1	CN	CN	CN	CN	CN	MUEA	MUEA	MUEA	POS	PF
Urban Reserve (UR) Town Centers	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	MUC-1	POS	MUC-1
UR Corridors	PUD	PUD	MFR-1	MFR-1	MFR-1	MFR-1	MFR-2	CN	CN	CN	CN	CN	MFR-1	MFR-1	MFR-1	POS	PF
UR Main Streets	CN	CN	CN	CN	CN	MFR-1	MFR-2	CN	CN	CN	CN	CN	CN	CN	MFR-1	POS	CN
UR Mixed Use Employment Areas	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	MUEA	POS	PF
UR Industrial Area	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	POS	PF
UR Neighborhood I	SFR-3	MFR-1	SFR-3	SFR-3	SFR-3	PUD	PUD	CN	CN	CG	CN	CN	MUEA	MUEA	MUEA	POS	PF
UR Neighborhood II	SFR-2	SFR-2	SFR-2	SFR-2	SFR-3	PUD	PUD	PUD	CN	CG	CN	CN	MUEA	MUEA	MUEA	POS	PF
Greenspaces	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF

Plan Codes & Descriptions:

FF - Farm and Forest, agricultural commercial uses
RRFU - Rural or Future Urban, 1 acre or larger
SFR-1 - Single-family residential (10,000 to 40,000 sq. ft.)
SFR-2 - Single-family residential (7,000 to 10,000 sq. ft.)
SFR-3 - Single-family residential (5,000 to 7,000 sq. ft.)
MFR-1 - Multi-family 8 to 25 units per acre
MFR-2 - Multi-family 25 or more units per acre
PUD - Planned Unit Development/Mixed Use
CN - Neighborhood Commercial, floor space 5,000 to 10,000 sq. ft.
CG - General Commercial, large scale commercial districts
CC - Central Commercial, central business districts
CO - Office Commercial, office uses and mixed uses
IL - Light Industrial (warehousing and light processing/fabrication)
IH - Heavy Industrial (light processing and heavy manufacturing)
IMU - Mixed use Industrial (mix of light manufacturing, office and retail uses)
POS - Parks and Open Space
PF - Public Facilities
MUC-1 - Mixed Use Center 1 (least intense center - Floor Area Ratio of .5 to 1)
MUC-2 - Mixed Use Center 2 (moderate intensity center - Floor Area Ratio 1 to 3)
MUC-3 - Mixed Use Center 3 (highest intensity center - Floor Area Ratio 3+)
MUEA - Mixed Use Employment Area (light industrial, warehousing, office, some residential)
IS - Industrial Sanctuary (low intensity industrial employment area)

Maximum Zoning Capacity

ZONE	DU	EMP
FF	0	0
RRFU	0	0
SFR-1	0	0
SFR-2	7.3	1.8
SFR-3	9.6	2.4
MFR-1	21.2	4.0
MFR-2	47.1	7.0
PUD	12.8	5.0
CN	9.4	20.0
CG	0	0
CC	0	0
CO	18.8	60.0
IL	0	0
IH	0	0
IMU	7.1	11.0
POS	0	0
PF	0	17.0
MUC-1	14.1	35.0
MUC-2	25.9	95.0
MUC-3	58.8	350.0
MUEA	2.4	25.0
IS	0	20.0

2040 Expected Yield

ZONE	DU	EMP
FF	0	0
RRFU	0.2	0
SFR-1	4	0.9
SFR-2	6.2	1.8
SFR-3	8.2	2.4
MFR-1	18.0	4.0
MFR-2	40.0	7.0
PUD	10.9	5.0
CN	8.0	20.0
CG	0	22.0
CC	0	100.0
CO	16.0	60.0
IL	0	15.0
IH	0	20.0
IMU	6.0	11.0
POS	0	0
PF	0	10
MUC-1	12.0	35.0
MUC-2	22.0	95.0
MUC-3	50.0	350.0
MUEA	6.0	17.0
IS	0	10.0

APPENDIX D

BUILDABLE LANDS AND CAPACITY ANALYSIS

Developed Acres
by Current Comprehensive Plan Categories

Current Plan	Developed Acres
Agricultural or Forestry (FF)	20
Rural or Future Urban (RRFU)	1,140
Single-family 1 (SFR1)	2,010
Single-family 2 (SFR2)	24,600
Single-family 3 (SFR3)	39,820
Multi-family 1 (MFR1)	10,950
Multi-family 2 (MFR2)	1,890
Planned Unit Devel./Mixed Use (PUD)	120
Neighborhood Commercial (CN)	540
General Commercial (CG)	5,330
Central Commercial (CC)	1,200
Office Commercial (CO)	2,420
Light Industrial (IL)	12,040
Heavy Industrial (IH)	2,430
Mixed Use Industrial (IMU)	6,500
Park and Open Space (POS)	1,110
Public Facilities (PF)	2,760
Total Developed Acres	**114,880**

Appendix E

Population, Households & Employment (1994-2017)

Population, Households and Employment
Cities, Unincorporated Areas, Counties and Region

	Population			Household			Nonfarm Employment		
Cities	**1994**	**2017**	**Change**	**1994**	**2017**	**Change**	**1994**	**2017**	**Change**
Banks	570	597	27	522	534	11	1,276	1,314	39
Barlow	130	193	63	66	94	27	13	19	6
Battleground	4,720	13,188	8,468	1804	4796	2993	3,026	4,534	1,508
Beaverton	61,085	85,478	24,393	24269	38267	13998	50,496	75,322	24,825
Camas	7,430	34,575	27,145	3013	13647	10634	7,240	19,754	12,514
Canby	10,405	14,355	3,950	4435	6140	1705	4,430	7,813	3,383
Cornelius	6,550	8,642	2,092	2622	3494	872	2,388	5,339	2,951
Durham	1,270	1,737	467	281	521	240	1,261	1,726	466
Estacada	2,045	2,598	553	1486	1732	247	1,371	1,843	471
Fairview	3,740	9,462	5,722	1337	3973	2635	2,190	7,341	5,151
Forest Grove	14,295	18,750	4,455	5466	7305	1839	7,743	12,217	4,475
Gaston	610	548	-62	210	209	-2	238	246	8
Gladstone	11,325	11,510	185	4006	4397	392	2,849	4,469	1,619
Gresham	74,625	100,748	26,123	29136	42729	13593	32,699	55,942	23,243
Happy Valley	2,365	8,539	6,174	633	3193	2560	656	2,556	1,900
Hillsboro	44,045	80,673	36,628	13677	29101	15424	32,612	90,736	58,124
Johnson City	620	688	68	592	646	53	302	385	83
King City	2,155	3,023	868	243	436	194	369	563	193
La Center	759	1,028	269	674	771	97	219	411	192
Lake Oswego	32,940	38,484	5,544	13230	17108	3878	18,930	28,298	9,368
Maywood Park	780	790	10	96	114	18	158	166	8
Milwaukie	19,930	25,784	5,854	8332	11321	2989	13,558	21,292	7,734
Molalla	3,915	4,251	336	3810	3960	150	3,501	3,839	339
North Plains	1,160	1,643	483	886	1090	204	609	763	154
Oregon City	17,545	29,003	11,458	6980	12313	5334	15,098	23,407	8,309
Portland	495,090	589,090	94,000	212581	266252	53671	430,138	590,516	160,378
Ridgefield	1,605	2,320	715	468	780	312	654	802	147
Rivergrove	300	144	-156	137	111	-26	35	74	39
Sandy	4,520	12,652	8,132	2553	5903	3350	5,350	10,062	4,712
Sherwood	4,615	18,566	13,951	1580	7002	5422	2,309	11,851	9,542
Tigard	33,730	42,789	9,059	13343	18764	5421	40,181	55,717	15,536
Troutdale	10,495	15,625	5,130	3455	6193	2738	2,938	9,285	6,347
Tualatin	17,450	23,957	6,507	7059	10514	3456	17,657	27,574	9,917
Vancouver	59,225	125,741	66,516	46840	58477	11637	80,341	108,317	27,976
Washougal	5,290	10,095	4,805	2603	4655	2052	2,916	5,641	2,725
West Linn	18,860	22,800	3,940	6420	8730	2309	2,985	5,366	2,381
Wilsonville	9,680	24,589	14,909	4589	11083	6494	16,540	31,782	15,242
Wood Village	2,950	3,618	668	1142	1518	376	1,591	2,508	918
Woodland	130	132	2	1	2	1	0	0	0
Yacolt	813	1,000	187	646	717	71	185	225	39
Unincorporated									
Multnomah	35,140	45,254	10,114	5,793	19,037	13,244	6,977	-66,550	-73,527
Clackamas	170,920	248,011	77,091	58,730	100,070	41,340	63,783	141,896	78,113
Washington	171,965	321,495	149,530	63,842	119,862	56,020	52,462	125,531	73,070
Clark	198,008	266,834	68,826	44,811	100,439	55,628	25,227	105,508	80,280
County and Region									
Multnomah	620,000	761,100	141,100	252,400	338,300	85,900	475,100	596,700	121,600
Clackamas	305,500	443,600	138,100	116,000	186,800	70,800	149,400	283,100	133,700
Washington	359,500	607,900	248,400	134,000	237,100	103,100	209,600	408,900	199,300
Clark	280,800	458,400	177,600	102,000	185,800	83,800	121,400	247,700	126,300
Region	1,565,800	2,271,000	705,200	604,400	948,000	343,600	955,600	1,536,500	580,900

Population, Households and Employment
Metro Urban Reserves, 1997

Urban Reserve Site	Population		Household		Employment	
	1994	2017	1994	2017	1994	2017
1	115	309	39	123	3	11
2	143	245	49	93	0	4
3	0	0	0	0	0	0
4	137	1,861	43	659	6	156
5	324	12,366	101	4,337	28	5,121
6	1,453	24,195	467	8,822	913	4,973
7	641	3,473	185	1,247	162	346
8	718	8,956	205	3,336	385	2,919
9	1,072	4,228	299	1,515	253	1,826
10	147	896	47	327	7	79
11	379	2,954	134	1,075	519	1,393
13	10	228	4	83	355	613
14	120	1,259	38	505	27	351
15	59	433	19	166	7	52
17	462	1,603	161	608	151	338
18	137	406	43	154	3	26
19	2	2	1	1	0	0
22	108	483	36	179	1	36
23	7	13	2	4	3	6
24	17	173	6	64	0	8
25	857	3,896	271	1,396	23	834
26	1,480	5,549	472	2,065	370	906
29	19	132	6	54	0	18
30	7	23	2	11	0	2
31	92	78	30	32	29	33
32	1	0	0	0	0	0
33	35	175	11	66	5	15
34	50	256	18	112	14	56
35	35	93	12	32	12	13
36	1	6	0	2	0	0
37	15	148	6	63	0	15
39	0	1	0	0	0	0
41	115	1,671	43	695	8	1,162
42	109	3,512	36	1,236	215	466
43	0	5	0	2	0	0
44	77	497	24	177	33	39
45	236	1,703	92	685	4	353
47	6	167	3	80	0	9
48	135	123	52	59	8	18
49	38	92	14	44	7	23
51	65	86	22	32	4	43
52	64	61	22	22	1	1
53	7	225	3	82	0	54
54	41	3,376	14	1,226	22	903
55	94	2,126	32	775	4	659
61	7	8	2	3	0	0
62	60	61	18	19	2	2
63	6	6	2	2	0	0
64	242	213	86	79	53	2
65	16	78	6	28	3	21
67	97	109	37	44	1	1
68	21	560	8	233	0	37
69	6	6	2	2	0	0
70	1	1	0	0	0	0
	12,077	91,143	5,219	34,675	5,636	25,962

source: 2017 GRIDS, 11/97
parent geography: TAZ

Population, Households and Employment

Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
1	594	1,329	735	545	1,128	583	28,657	38,271	9,614
2	17	356	339	12	302	290	8,578	11,554	2,976
3	16	128	111	14	116	102	1,207	2,764	1,557
4	324	810	486	302	810	507	1,490	5,109	3,619
5	6	161	155	5	161	156	459	1,406	946
6	232	417	185	195	378	183	8	349	341
7	0	1,075	1,075	0	429	429	760	3,869	3,110
8	206	1,025	818	141	853	712	3,721	5,295	1,575
9	19	1,393	1,374	18	1,058	1,041	3,884	4,061	176
10	1,164	2,328	1,164	1,021	1,847	826	11,790	16,303	4,513
11	2,035	2,684	649	1,576	2,062	486	2,444	3,080	636
12	543	1,138	595	410	966	555	23,359	30,143	6,784
13	179	316	137	126	268	142	3,919	6,612	2,693
14	266	323	57	188	261	73	97	1,294	1,197
15	1,815	3,636	1,821	1,310	2,750	1,440	10,138	14,316	4,178
16	1,310	1,488	178	951	1,104	153	2,813	3,912	1,099
17	893	1,531	638	677	1,129	451	8,653	11,374	2,720
18	3,064	2,811	-254	1,644	1,699	55	6,153	6,324	171
19	211	312	101	103	157	54	9,345	10,282	937
20	84	111	27	33	46	13	24	26	2
21	441	2,156	1,715	170	891	721	28	179	151
22	179	605	426	72	250	178	25	71	46
23	1,024	3,792	2,768	412	1,567	1,155	42	299	256
24	407	286	-122	159	121	-38	22	22	0
25	80	102	23	32	50	18	2,049	2,626	577
26	603	1,195	592	256	578	322	602	1,290	688
27	837	2,645	1,808	301	1,140	839	110	278	168
28	837	661	-176	351	372	21	79	85	6
29	6,921	7,358	437	4,997	5,228	231	9,502	10,181	679
30	1,858	1,741	-118	855	937	82	167	212	45
31	924	1,379	454	367	622	255	1,133	1,208	74
32	310	539	229	123	244	122	815	838	23
33	109	211	102	44	100	56	497	507	9
34	4,120	3,687	-433	1,977	2,051	75	959	971	13
35	768	999	231	298	441	143	59	92	32
36	254	523	269	101	237	136	11	41	30
37	1,169	1,166	-4	446	497	51	89	101	12
38	1,066	1,646	580	436	712	276	61	122	61
39	917	1,505	588	383	689	306	487	863	375
40	3,377	3,782	405	1,366	1,634	268	1,708	1,870	162
41	1,561	1,536	-25	597	654	57	97	118	20
42	2,812	2,697	-116	1,168	1,346	178	248	287	39
43	1,398	1,465	67	828	842	14	9,584	10,046	463
44	592	485	-107	316	357	41	4,876	4,990	114
45	0	764	764	0	305	305	327	4,867	4,541
46	59	1,574	1,516	34	993	959	1,572	4,926	3,353
47	1,212	1,226	14	662	745	84	1,453	1,499	46
48	412	451	39	241	259	18	426	437	11
49	804	801	-3	427	487	60	1,510	1,593	83
50	471	535	64	281	322	41	3	22	19
51	1,257	1,200	-57	523	614	91	373	486	113
52	2,479	2,155	-324	1,015	1,037	23	373	383	10
53	2,029	2,129	100	778	889	111	69	94	25

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
54	3,257	3,879	622	1,308	1,669	361	490	598	108
55	4,124	4,195	71	1,874	2,016	142	1,184	1,320	136
56	1,728	1,705	-23	730	780	50	787	873	87
57	92	102	10	39	47	7	23	26	3
58	421	434	13	180	199	18	26	36	10
59	416	395	-20	174	195	20	13	21	8
60	503	470	-33	206	217	11	19	22	3
61	65	70	5	28	30	2	35	39	4
62	2,740	2,999	258	1,100	1,317	217	344	412	68
63	1,576	1,786	210	676	813	137	135	165	31
64	602	668	66	268	315	47	536	589	53
65	1,116	1,276	160	536	637	102	2,502	2,744	242
66	1,265	1,372	107	476	570	94	41	216	175
67	2,366	2,285	-81	888	950	62	64	80	15
68	1,587	1,821	234	698	929	231	466	644	178
69	1,467	1,468	1	586	749	163	2,065	2,521	457
70	1,735	1,578	-157	634	689	55	13	66	53
71	725	940	215	257	390	133	18	48	30
72	706	1,172	466	266	502	237	156	208	53
73	866	1,436	570	297	615	319	1,190	1,254	65
74	2,292	5,112	2,820	869	2,137	1,268	294	762	468
75	2,620	3,261	641	1,110	1,462	352	62	145	83
76	4,476	4,182	-294	1,922	2,128	206	2,043	2,288	246
77	1,663	1,415	-249	705	719	15	81	125	44
78	907	827	-80	317	364	47	50	266	215
79	2,327	3,122	795	1,015	1,518	504	123	239	117
80	1,435	1,982	547	626	964	338	4,229	5,531	1,302
81	2,037	2,237	200	888	1,060	173	655	871	216
82	1,943	1,902	-41	784	901	117	148	224	76
83	1,339	1,632	293	624	774	150	287	533	245
84	559	1,215	656	315	550	234	1,980	2,841	861
85	1,283	1,344	61	594	676	82	662	933	271
86	1,952	2,032	80	800	935	135	969	1,326	358
87	2,239	2,621	382	1,028	1,318	290	138	336	199
88	3,148	3,344	196	1,210	1,579	369	375	732	357
89	1,419	1,726	306	555	733	178	56	118	62
90	2,377	3,645	1,268	1,130	1,693	563	1,130	1,660	530
91	1,996	2,193	197	783	965	182	127	242	115
92	469	823	354	218	402	183	10,790	15,876	5,085
93	991	1,356	365	421	597	176	320	744	425
94	2,215	2,453	238	935	1,085	151	1,134	1,531	397
95	361	830	469	144	375	231	3,044	4,123	1,078
96	1,300	1,866	566	579	875	297	5,851	6,763	912
97	858	947	89	384	450	66	1,987	2,233	245
98	1,122	1,555	433	510	749	239	1,355	1,931	575
99	2,185	2,179	-6	937	1,038	101	469	600	131
100	98	2,176	2,078	43	1,058	1,016	240	3,542	3,301
101	2,313	3,153	840	933	1,533	601	155	1,204	1,049
102	675	1,570	896	230	764	533	76	145	68
103	2,181	4,258	2,077	722	1,746	1,025	49	220	170
104	1,817	2,444	627	630	1,002	372	269	510	241
105	472	1,151	679	182	560	378	15	135	120
106	83	3,038	2,955	36	1,477	1,441	481	2,071	1,590

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
107	483	966	483	207	458	251	989	2,258	1,270
108	1,319	1,677	358	564	795	231	259	631	372
109	522	492	-30	232	239	7	5	50	45
110	595	1,747	1,152	260	849	589	566	1,482	917
111	1,533	2,368	835	715	1,151	436	3,010	5,175	2,165
112	787	912	124	365	443	78	1,661	2,740	1,079
113	1,974	6,530	4,556	884	3,120	2,236	3,823	4,739	916
114	2,266	2,308	41	924	997	73	1,257	1,678	421
115	1,161	1,105	-55	480	478	-2	2,315	2,508	193
116	14	13	-2	6	6	0	5,384	6,422	1,038
117	3,852	3,466	-387	1,555	1,578	23	904	1,095	191
118	2,504	2,586	82	1,037	1,215	177	90	194	104
119	1,163	1,194	32	437	486	49	70	143	73
120	3,560	3,162	-399	1,175	1,277	102	120	228	108
121	2,518	2,380	-137	867	948	82	171	250	79
122	5,564	5,791	226	2,352	2,482	130	941	1,273	332
123	596	599	2	291	300	9	64	89	25
124	218	516	298	108	259	151	165	541	376
125	273	395	123	132	198	66	1,622	3,528	1,906
126	492	447	-46	219	217	-2	2,518	2,892	374
127	3,902	3,642	-260	1,531	1,555	24	344	486	143
128	2,461	3,688	1,227	1,082	1,666	584	619	1,172	553
129	348	3,712	3,364	101	1,312	1,212	41	176	134
130	883	1,528	645	339	654	316	18	83	65
131	2,340	3,999	1,660	864	1,711	847	1,140	1,856	715
132	407	758	352	168	325	157	2,188	2,295	106
133	4,357	4,601	244	1,733	1,965	232	874	1,194	320
134	1,906	1,742	-163	738	744	7	33	3,784	3,751
135	206	185	-21	79	91	12	788	3,918	3,131
136	100	102	3	41	52	11	2,586	3,667	1,081
137	66	2,740	2,674	25	1,345	1,319	4,416	5,180	764
138	0	582	582	0	233	233	42	886	844
139	11	10	0	5	5	0	644	1,354	710
140	64	1,600	1,537	31	841	810	838	1,140	302
141	841	1,833	992	406	900	494	394	553	160
142	310	585	276	150	284	134	614	704	90
143	605	1,428	823	285	659	374	406	722	316
144	885	988	104	429	496	66	74	142	67
145	1,468	1,689	222	681	778	96	417	493	76
146	3,410	3,329	-81	1,391	1,439	48	1,190	1,599	410
147	1,596	1,587	-9	573	646	72	27	83	56
148	2,844	4,226	1,382	980	1,744	765	165	546	381
149	1,303	1,442	139	489	587	98	62	125	63
150	1,664	3,654	1,991	685	1,632	947	965	1,425	460
151	2,377	4,078	1,701	922	1,821	899	145	299	154
152	2,417	2,072	-344	775	908	133	172	273	101
153	2,313	2,349	36	784	994	210	79	190	111
154	2,585	2,983	398	1,017	1,262	245	58	193	135
155	900	1,465	565	289	576	287	8	94	86
156	1,062	1,394	332	342	548	206	5	116	111
157	206	285	78	125	124	-1	0	681	681
158	0	93	93	0	37	37	0	651	651
159	351	266	-85	117	116	-1	2,305	2,895	590

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
160	59	550	492	29	240	211	1,154	3,007	1,852
161	706	972	266	289	440	150	2,662	2,898	236
162	842	1,990	1,149	345	900	555	2,096	3,625	1,529
163	1,284	1,984	701	495	798	303	112	418	306
164	1,738	1,587	-151	614	638	24	87	152	65
165	273	1,499	1,226	85	530	445	36	85	49
166	804	6,021	5,217	237	2,129	1,892	31	1,441	1,410
167	426	1,816	1,390	151	642	492	724	1,489	765
168	751	3,657	2,906	226	1,290	1,065	24	380	356
169	1,527	2,891	1,364	446	1,015	569	70	233	163
170	1,550	3,068	1,518	470	1,125	654	52	251	198
171	1,532	1,481	-51	445	517	72	24	80	56
172	695	1,474	779	285	667	382	1,616	2,584	968
173	464	1,204	740	181	544	363	3	53	50
174	416	1,619	1,203	168	732	564	16	166	150
175	1,169	4,069	2,899	426	1,812	1,386	245	1,265	1,020
176	544	1,640	1,095	218	715	498	10	148	138
177	821	1,359	538	427	593	166	429	1,432	1,003
178	1,040	1,217	176	349	479	129	314	449	135
179	1,293	1,720	427	443	692	249	40	225	185
180	2,779	2,646	-133	791	986	196	342	493	151
181	4,001	7,162	3,162	1,261	2,767	1,506	179	437	259
182	4,997	6,992	1,995	1,733	2,435	702	463	1,103	640
183	1,794	2,423	629	681	921	240	149	798	649
184	1,048	1,317	270	382	518	136	30	207	177
185	1,053	1,089	35	325	373	48	200	238	38
186	429	564	135	149	202	53	147	240	94
187	265	246	-19	90	105	15	607	833	226
188	668	975	306	229	425	196	117	200	84
189	391	1,072	681	129	371	243	201	321	120
190	2,149	3,913	1,764	694	1,497	804	134	506	372
191	824	1,569	744	255	610	355	112	2,065	1,953
192	939	1,930	991	380	872	492	50	174	124
193	537	729	192	193	330	136	50	76	25
194	657	560	-97	252	253	2	20	42	22
195	1	2	1	1	1	0	204	554	350
196	932	968	36	357	394	38	65	150	85
197	2	2	0	1	1	0	63	1,405	1,342
198	551	1,456	904	209	658	449	576	2,227	1,652
199	209	492	283	86	222	137	0	43	43
200	355	965	611	142	436	294	47	86	39
201	1,116	931	-185	398	421	23	53	122	69
202	821	787	-34	359	356	-3	17	61	44
203	5	5	0	2	2	0	748	2,088	1,340
204	4,302	5,081	780	1,724	2,029	304	231	428	197
205	2,058	2,873	815	655	1,073	418	113	328	216
206	800	806	6	287	285	-3	281	74	-208
207	1,187	1,217	31	377	529	152	45	268	222
208	2,688	2,426	-262	870	1,055	185	100	215	115
209	56	51	-6	27	27	0	1,460	4,407	2,947
210	308	277	-31	148	146	-1	354	2,476	2,123
211	344	3,305	2,960	165	1,746	1,581	1,170	3,372	2,202
212	47	2,579	2,532	22	946	925	422	4,233	3,811

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
213	53	827	774	25	437	412	1,966	5,632	3,666
214	3	665	663	1	312	310	0	1,590	1,590
215	704	8,333	7,629	334	4,403	4,068	34	1,243	1,209
216	2,944	5,200	2,256	897	1,783	886	82	340	258
217	3,308	3,589	281	1,018	1,228	210	553	830	277
218	3,210	3,476	266	1,025	1,196	171	533	763	231
219	2,200	2,436	236	670	834	165	2,647	2,888	241
220	5,443	9,420	3,977	1,657	3,231	1,574	211	653	442
221	1,189	929	-260	377	396	20	151	99	-52
222	120	153	33	36	53	17	1	16	15
223	21	23	2	8	7	0	0	4,711	4,711
224	0	0	0	0	0	0	1,220	3,673	2,454
225	11	11	0	4	4	0	22	5,005	4,983
226	418	5,632	5,214	150	2,066	1,917	169	288	119
227	422	5,913	5,491	132	2,259	2,126	389	3,484	3,095
228	536	3,294	2,758	167	1,258	1,091	121	390	269
229	2,311	4,968	2,656	788	1,897	1,109	636	1,451	815
230	2,985	3,808	822	1,067	1,454	387	329	478	150
231	389	3,761	3,372	121	1,436	1,315	50	1,126	1,075
232	72	59	-13	23	22	0	5,629	7,058	1,430
233	1,005	971	-34	359	356	-3	118	985	868
234	32	35	4	11	12	1	50	1,153	1,103
235	23	1,012	989	8	371	363	335	4,985	4,651
236	639	666	27	191	245	55	72	111	38
237	59	54	-5	20	20	0	1,005	2,175	1,170
238	2	2	0	1	1	0	181	640	459
239	1,224	1,818	594	426	630	204	31	119	87
240	3,115	4,206	1,091	959	1,457	498	100	291	190
241	1,904	2,424	520	595	840	244	46	67	21
242	2,969	3,788	818	989	1,327	338	1,651	2,212	561
243	3,052	3,297	245	1,027	1,243	217	389	788	400
244	968	628	-339	333	228	-105	680	1,381	701
245	34	3,384	3,350	12	1,232	1,220	0	1,089	1,089
246	34	3,380	3,346	12	1,225	1,214	26	1,247	1,220
247	30	33	4	10	12	2	0	3	3
248	109	103	-6	38	37	0	3	7	4
249	1,551	3,552	2,000	562	1,340	777	764	2,255	1,491
250	73	84	11	31	31	0	658	1,239	581
251	420	495	74	184	187	2	1,717	2,048	330
252	908	1,521	613	358	574	216	2,935	3,400	465
253	1,684	2,852	1,168	609	1,011	403	1,348	1,934	586
254	1,959	2,280	320	673	797	124	40	150	110
255	326	436	110	121	153	31	28	32	4
256	1,639	1,930	291	608	708	100	269	413	144
257	3,529	3,823	294	1,252	1,403	151	529	767	239
258	2,421	3,725	1,304	675	1,367	691	94	5,284	5,189
259	2,743	3,232	489	866	1,191	326	57	68	11
260	560	691	132	206	255	49	87	123	35
261	564	840	276	212	309	98	702	751	49
262	1,694	2,446	751	575	901	327	69	151	82
263	159	301	142	48	111	63	96	189	92
264	1,164	2,336	1,173	392	861	469	2,846	3,010	165
265	746	1,521	775	327	561	234	1,372	1,653	281

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
266	1,033	1,553	521	436	571	135	64	298	234
267	24	23	-1	8	8	0	213	6,157	5,944
268	921	787	-134	323	288	-35	200	187	-13
269	452	446	-6	158	163	4	183	1,245	1,062
270	2,841	4,301	1,460	958	1,571	613	623	736	113
271	2,396	2,377	-19	791	843	52	154	206	52
272	2,660	3,160	500	890	1,100	210	1,423	1,504	82
273	3,794	3,982	187	1,341	1,389	48	1,287	1,422	135
274	447	493	46	159	162	4	812	814	2
275	71	85	14	25	28	3	9	13	4
276	475	437	-38	138	144	6	73	108	35
277	124	142	18	44	47	3	81	88	7
278	299	294	-6	90	97	7	12	18	6
279	100	104	4	31	34	4	17	18	1
280	2,025	3,636	1,610	773	1,281	508	941	2,710	1,769
281	4,252	6,290	2,038	1,836	2,643	807	3,554	5,878	2,324
282	4,852	8,644	3,793	1,680	3,255	1,575	1,251	1,743	492
283	4,412	5,701	1,290	1,655	2,180	526	2,747	4,877	2,130
284	797	1,104	307	293	422	129	226	927	701
285	3,648	3,765	118	1,096	1,327	231	377	824	447
286	2,563	3,149	586	877	1,109	232	1,168	2,291	1,123
287	482	648	167	165	235	70	255	356	101
288	257	296	39	88	107	19	60	66	5
289	627	601	-26	208	226	18	97	106	8
290	44	160	115	18	60	42	31	32	1
291	190	219	30	63	82	19	35	38	3
292	691	369	-322	259	138	-121	403	313	-90
293	668	750	82	244	281	37	93	106	13
294	1,506	1,644	138	490	604	115	176	193	17
295	1,153	1,153	0	357	400	43	372	383	11
296	288	339	51	99	123	24	303	308	4
297	510	497	-13	171	174	3	195	201	6
298	154	150	-4	53	54	2	18	23	4
299	353	341	-12	114	118	4	238	240	2
300	371	422	51	144	147	3	22	29	7
301	420	454	34	149	158	9	452	466	14
302	204	195	-9	65	68	2	9	14	5
303	93	97	4	29	34	5	30	31	1
304	684	609	-75	213	211	-2	240	239	-1
305	1,041	1,121	80	323	389	66	144	203	60
306	1,178	1,300	122	415	451	36	72	96	24
307	376	418	42	116	145	29	15	22	7
308	1,553	1,879	326	584	794	210	1,679	2,292	613
309	1,135	1,112	-23	428	472	44	47	99	52
310	364	509	145	166	249	82	92	416	324
311	411	633	222	141	257	116	969	1,695	726
312	519	848	329	221	344	123	4,372	5,224	852
313	101	271	170	35	110	75	2,528	2,736	208
314	2,233	2,521	288	924	1,141	217	2,760	3,808	1,048
315	1,950	2,369	420	885	1,155	270	944	1,678	733
316	292	218	-73	105	104	-1	750	1,362	613
317	4,054	3,787	-267	1,512	1,617	105	2,128	2,345	217
318	3,733	4,539	806	1,357	1,872	516	119	278	159

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
319	602	620	19	220	248	28	291	356	64
320	1,827	1,872	45	705	751	47	2,566	2,676	109
321	424	628	204	152	265	113	434	522	87
322	2,466	3,158	692	836	1,384	547	581	1,089	508
323	2,039	3,407	1,368	829	1,611	783	4,407	5,972	1,565
324	1,137	1,130	-6	469	574	105	170	374	204
325	2,989	2,462	-528	1,150	1,243	93	748	1,072	324
326	1,706	1,564	-142	631	703	72	931	1,204	273
327	4,328	5,187	860	2,060	2,562	501	3,126	4,616	1,490
328	987	918	-69	423	471	49	253	345	92
329	2,390	2,276	-114	1,021	1,142	121	4,574	6,784	2,211
330	1,009	1,100	91	381	482	101	1,083	2,491	1,408
331	1,444	1,432	-12	547	636	88	1,544	1,783	238
332	29	170	141	11	76	65	5,380	6,198	818
333	1,738	2,044	306	635	973	339	194	492	298
334	3,813	4,882	1,069	1,921	2,324	403	277	727	450
335	1,678	2,263	585	671	978	307	64	147	83
336	1,829	2,276	447	767	951	184	724	951	227
337	889	1,383	495	271	520	249	103	146	43
338	572	1,644	1,072	208	744	536	10	75	65
339	2,624	3,337	713	971	1,465	494	107	231	124
340	1,529	3,815	2,286	620	1,703	1,084	43	1,257	1,214
341	1,987	3,730	1,743	741	1,688	947	108	250	142
342	781	1,817	1,037	304	822	518	64	128	63
343	459	1,389	930	181	629	447	18	292	274
344	4,160	6,188	2,028	2,353	2,801	447	601	1,278	677
345	1,837	2,111	274	745	1,005	259	536	697	162
346	1,178	2,180	1,002	506	970	463	58	577	519
347	828	814	-14	334	362	28	1,205	1,198	-6
348	647	1,041	394	258	463	205	999	1,351	353
349	220	474	253	88	211	123	1,352	1,505	153
350	23	55	32	9	26	17	1,209	1,395	186
351	864	1,002	138	323	398	75	1,871	2,428	557
352	2,607	2,527	-80	960	1,003	44	263	426	162
353	6,250	5,798	-453	2,012	2,072	59	512	722	209
354	1,355	1,289	-66	484	508	23	249	425	176
355	1,888	4,337	2,449	692	1,736	1,044	110	1,498	1,389
356	1,555	2,002	448	586	802	216	355	352	-2
357	2,045	2,372	327	668	950	282	115	114	-1
358	243	209	-34	80	79	-1	78	78	0
359	1,766	5,373	3,607	533	1,920	1,387	96	918	822
360	1,778	1,253	-525	612	497	-115	168	279	111
361	2,552	3,766	1,214	938	1,532	594	474	811	337
362	3,503	4,139	635	1,391	1,840	449	1,156	1,557	401
363	2,140	5,012	2,872	854	2,229	1,375	5,136	7,359	2,223
364	454	403	-50	181	179	-2	3,036	4,257	1,221
365	45	42	-3	19	19	0	1,525	4,937	3,412
366	347	1,124	777	154	500	346	206	823	617
367	73	282	209	30	107	78	38	145	107
368	354	4,593	4,239	150	1,723	1,573	93	2,347	2,254
369	1,395	6,437	5,042	513	2,490	1,977	1,120	5,182	4,062
370	41	39	-1	15	14	0	619	3,655	3,036
371	24	42	19	9	17	8	377	1,236	860

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
372	569	2,260	1,691	180	794	615	889	1,507	618
373	7,940	8,213	273	2,582	2,961	379	583	864	281
374	448	429	-19	142	151	9	116	128	12
375	624	546	-78	205	203	-2	55	55	0
376	282	281	-2	93	104	12	13	23	9
377	3,577	3,649	71	1,170	1,459	289	474	551	77
378	2,291	4,440	2,149	787	1,736	948	291	563	272
379	2,192	935	-1,257	779	363	-416	974	1,641	667
380	2,545	2,929	384	901	1,138	237	249	571	322
381	1,910	4,306	2,395	628	1,604	976	187	1,201	1,014
382	3,227	4,029	803	1,134	1,540	405	406	741	335
383	3,322	4,846	1,524	1,127	1,971	844	2,321	2,310	-11
384	159	1,816	1,657	53	638	585	2,695	4,158	1,463
385	24	1,192	1,168	10	496	486	1,452	3,445	1,993
386	2,837	6,559	3,722	1,129	2,728	1,599	2,038	3,710	1,672
387	1,485	3,767	2,283	591	1,567	976	1,975	7,339	5,364
388	3,396	5,176	1,780	1,265	2,152	888	3,213	5,246	2,033
389	174	1,195	1,021	77	497	421	2,194	4,003	1,809
390	3	445	441	1	185	184	553	1,076	524
391	142	134	-9	47	47	0	1,985	2,358	373
392	142	290	148	47	102	55	6	38	32
393	131	3,868	3,737	44	1,360	1,316	353	707	355
394	280	246	-34	108	111	3	59	68	9
395	157	657	499	50	231	181	192	239	47
396	2,621	6,309	3,688	963	2,440	1,477	311	1,036	725
397	49	2,095	2,046	18	810	792	2	265	263
398	370	2,516	2,147	153	1,047	893	14	416	402
399	693	3,499	2,806	256	1,353	1,098	45	649	604
400	406	6,238	5,832	151	2,594	2,443	33	1,433	1,400
401	604	1,219	615	210	507	298	89	312	222
402	48	57	9	18	25	7	21	37	16
403	675	1,534	859	249	694	445	51	213	162
404	1,034	1,020	-14	352	392	40	29	98	69
405	1,775	1,753	-22	673	704	31	69	229	160
406	1,076	1,538	462	490	613	123	922	2,212	1,289
407	455	1,235	780	237	667	430	543	1,317	774
408	1,199	2,517	1,319	584	1,360	776	886	2,713	1,827
409	1,125	1,485	359	605	665	60	57	172	115
410	1,330	1,360	31	665	735	70	111	745	634
411	55	125	69	21	49	28	3,966	4,159	193
412	1,002	1,020	18	369	395	26	318	574	257
413	1,963	4,219	2,256	764	1,635	871	394	1,046	652
414	1,668	1,667	-1	628	646	18	427	457	30
415	1,835	1,817	-18	713	717	4	280	287	6
416	886	957	71	342	369	27	647	797	150
417	310	308	-2	118	118	0	18	19	1
418	1,362	1,427	65	481	559	78	413	621	208
419	644	701	57	243	270	27	77	138	61
420	475	537	62	200	212	12	1	22	21
421	865	1,021	156	344	400	56	191	457	266
422	1,848	2,196	348	681	858	177	155	422	267
423	1,552	1,810	258	558	705	148	24	67	43
424	106	252	146	40	106	66	427	820	393

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
425	1,109	1,302	192	414	547	132	1,573	1,693	119
426	2,321	2,022	-299	817	901	84	109	161	52
427	1,543	1,525	-18	683	730	47	673	1,091	418
428	2,637	2,656	19	1,410	1,547	136	1,190	1,234	45
429	2,496	2,320	-176	973	1,023	50	215	319	104
430	1,626	1,706	80	657	752	95	1,542	1,857	314
431	522	519	-3	217	231	15	167	193	26
432	819	745	-74	293	318	25	51	158	107
433	207	394	188	77	166	88	1,165	1,509	345
434	17	50	33	6	23	17	1,013	1,365	352
435	345	1,475	1,130	130	625	494	114	2,420	2,307
436	1,682	1,898	215	645	813	168	472	680	208
437	1,385	1,958	573	555	846	291	25	123	98
438	993	1,228	235	410	531	120	452	820	368
439	624	938	315	259	405	146	877	1,225	348
440	461	555	94	199	239	39	717	913	196
441	747	933	186	362	576	214	398	1,477	1,079
442	1,096	1,531	434	625	946	320	437	1,420	983
443	905	1,220	315	491	737	246	6,755	11,471	4,716
444	14	462	448	7	215	208	966	4,221	3,256
445	15	225	211	7	105	98	162	1,042	880
446	354	364	10	130	137	8	164	166	2
447	2,511	2,941	430	937	1,235	298	1,204	1,723	519
448	2,925	2,818	-107	998	1,212	214	188	309	121
449	750	695	-54	279	300	21	26	41	15
450	1,613	1,555	-58	621	667	45	389	417	28
451	1,868	1,856	-12	746	816	70	1,000	1,512	512
452	1,904	1,827	-77	735	808	72	107	122	15
453	1,246	1,404	157	503	622	119	293	323	30
454	1,157	1,220	63	475	523	48	1,034	1,292	258
455	1,840	1,792	-48	768	794	26	159	191	32
456	1,025	927	-97	363	386	23	263	342	78
457	3,859	3,515	-343	1,339	1,382	43	237	277	39
458	874	1,180	306	298	506	208	54	154	99
459	3,525	3,840	315	1,257	1,448	190	318	634	317
460	3,758	3,830	72	1,250	1,454	205	412	494	82
461	389	618	228	162	287	125	1,737	2,159	421
462	284	500	217	128	233	105	1,106	1,433	327
463	852	1,037	186	355	482	128	1,091	1,399	308
464	82	91	9	34	42	8	5,628	6,641	1,013
465	1,233	2,104	871	424	803	378	7	2,122	2,115
466	1,533	2,335	801	550	891	341	52	327	275
467	575	1,170	595	181	446	265	56	274	218
468	677	1,554	877	237	591	354	45	267	222
469	595	1,425	829	189	544	355	412	708	296
470	1,010	3,728	2,718	321	1,422	1,102	187	905	718
471	1,183	1,850	667	379	723	344	94	760	666
472	1,486	2,064	578	618	960	341	482	637	155
473	1,475	1,609	133	450	748	298	90	215	124
474	407	3,220	2,813	129	1,229	1,099	45	666	621
475	1,631	3,297	1,666	518	1,258	740	352	829	478
476	885	1,151	266	281	439	158	184	222	38
477	331	2,585	2,255	105	988	882	58	516	458

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
478	1,146	2,507	1,361	353	1,166	813	83	523	440
479	538	2,811	2,272	180	1,307	1,127	55	1,451	1,396
480	94	2,607	2,513	31	1,211	1,180	35	1,121	1,085
481	860	5,589	4,729	290	2,025	1,735	1,513	3,059	1,546
482	541	8,472	7,931	224	3,070	2,845	441	2,227	1,786
483	414	1,154	740	172	418	246	61	506	444
484	299	401	103	138	187	48	70	792	722
485	1,964	1,760	-204	592	818	226	39	432	393
486	398	632	234	132	294	162	0	46	46
487	225	207	-18	94	96	2	893	1,362	469
488	396	259	-137	120	121	1	1,290	1,595	305
489	1,261	995	-266	382	462	80	1,066	1,322	256
490	110	94	-16	44	44	0	689	3,079	2,389
491	48	33	-15	17	17	0	1,188	1,371	183
492	2,615	2,569	-46	1,090	1,126	36	1,077	1,253	176
493	2,188	2,254	66	894	906	12	435	532	97
494	1,156	1,509	353	383	583	200	686	1,739	1,053
495	99	160	61	51	74	24	267	341	73
496	493	629	135	262	292	30	24	306	282
497	321	325	4	161	160	-1	1,931	2,714	782
498	308	351	44	156	163	7	356	2,566	2,210
499	11	181	170	4	67	63	344	707	363
500	35	304	269	12	115	103	239	872	633
501	1,175	1,834	659	398	694	296	499	1,101	602
502	716	2,743	2,027	250	1,038	788	155	344	190
503	763	671	-93	256	254	-2	125	124	-1
504	786	1,014	228	247	380	134	35	35	0
505	1,746	5,169	3,423	549	1,957	1,407	123	613	490
506	987	981	-6	320	371	51	34	51	17
507	1,151	6,630	5,479	387	2,509	2,122	2	607	605
508	403	655	253	141	248	107	46	94	48
509	2,162	2,179	17	899	1,047	149	2,085	2,264	179
510	10	147	137	4	71	67	2,893	3,254	361
511	4,213	3,742	-471	1,453	1,519	66	559	631	72
512	1,992	3,634	1,643	675	1,400	725	118	436	318
513	1,510	4,434	2,924	508	1,708	1,200	78	493	415
514	2,702	2,852	150	968	1,137	169	763	1,129	366
515	1,321	1,863	542	531	732	201	529	749	220
516	286	1,107	822	112	431	319	1,567	2,369	801
517	3,816	4,275	460	1,290	1,647	356	2,277	2,918	641
518	833	3,223	2,390	271	1,241	971	30	506	476
519	555	1,118	562	184	431	246	19	82	63
520	3,409	3,152	-257	1,535	1,601	65	389	424	35
521	13,847	23,213	9,366	4,864	8,906	4,043	4,608	9,813	5,205
522	1,365	1,559	194	449	560	112	129	128	-1
523	1,299	5,794	4,495	433	2,232	1,799	218	2,422	2,204
524	777	3,821	3,044	245	1,373	1,128	27	600	573
525	1,373	1,521	148	444	546	103	129	128	-1
526	1,449	4,999	3,550	471	1,808	1,337	2,245	4,001	1,757
527	665	4,343	3,678	207	1,561	1,354	51	938	887
528	2,193	3,730	1,537	696	1,341	644	351	382	31
529	1,181	1,568	388	373	588	215	115	114	0
530	1,211	1,704	493	408	639	231	152	151	-1

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
531	805	1,172	367	270	440	170	91	91	-1
532	1,688	1,479	-209	545	569	25	54	201	147
533	1,041	1,584	543	356	594	239	61	61	0
534	1,135	1,267	132	371	475	104	60	60	0
535	24,694	31,571	6,877	8,168	11,234	3,066	5,042	5,674	632
536	2,250	2,710	460	790	1,041	251	133	290	157
537	5,086	8,412	3,327	1,797	3,282	1,485	1,386	1,834	448
538	6,199	7,254	1,054	2,200	2,802	602	553	634	82
539	923	23,484	22,561	294	8,509	8,215	87	4,344	4,257
540	861	980	120	275	355	80	374	382	8
541	906	1,023	118	298	371	72	341	343	2
542	1,857	2,422	565	634	880	246	280	313	33
543	2,539	15,861	13,322	690	5,747	5,057	574	4,749	4,175
544	503	578	76	166	210	44	45	45	0
545	834	976	141	281	354	73	63	63	0
546	951	2,472	1,521	279	896	617	37	349	312
547	654	2,262	1,609	200	820	619	51	220	169
548	1,759	1,915	156	541	694	153	949	943	-5
549	387	469	82	131	170	39	249	248	-1
550	1,167	1,903	736	396	691	295	390	432	42
551	2,621	3,547	925	915	1,286	371	1,156	1,162	6
552	1,117	1,504	387	371	545	174	578	574	-3
553	6,113	16,137	10,024	2,147	6,268	4,121	2,383	6,775	4,392
554	986	1,173	187	301	425	124	306	305	-2
555	883	970	86	475	568	93	107	180	74
556	67	115	49	31	58	28	935	1,131	196
557	59	72	14	28	41	13	1,484	1,566	82
558	766	1,249	483	277	471	194	85	203	118
559	841	1,412	570	299	535	236	267	341	74
560	1,303	7,221	5,918	419	2,735	2,316	70	427	357
561	594	1,854	1,259	207	694	487	28	100	72
562	782	1,225	443	280	459	179	109	131	22
563	3,267	4,057	790	1,203	1,519	317	94	151	56
564	363	2,070	1,707	122	785	663	44	191	146
565	507	7,630	7,123	158	2,806	2,648	77	5,913	5,836
566	2,052	2,511	459	746	941	195	83	115	32
567	194	318	124	74	119	45	549	573	25
568	386	571	185	148	214	66	15	63	48
569	982	1,298	316	375	486	111	174	226	52
570	1,193	1,353	159	450	525	75	233	282	49
571	2,524	2,729	205	938	1,072	134	171	179	8
572	1,771	2,232	461	699	889	190	237	381	144
573	2,563	3,225	661	989	1,349	359	245	581	336
574	1,471	1,744	272	586	686	100	286	396	110
575	910	841	-70	297	333	35	110	153	44
576	2,527	2,863	336	861	1,097	235	232	322	90
577	722	661	-61	250	262	11	78	91	13
578	194	207	13	69	82	12	147	169	22
579	564	868	304	209	343	134	247	387	140
580	140	2,359	2,219	44	829	786	3	248	245
581	1,130	2,295	1,165	348	793	445	68	185	117
582	196	9,046	8,850	59	3,006	2,946	25	3,286	3,261
583	2,778	3,073	294	851	1,075	224	62	133	70

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
584	4,073	4,128	55	1,195	1,481	286	204	282	78
585	3,778	3,905	127	1,349	1,502	153	159	512	353
586	1,968	2,064	96	729	817	87	457	584	127
587	688	659	-29	240	261	21	68	101	32
588	637	769	132	229	303	74	64	105	40
589	1,356	1,298	-58	501	514	12	1,387	1,397	11
590	1,232	1,276	45	428	508	80	248	392	144
591	505	486	-18	189	192	3	4	5	1
592	572	554	-18	206	220	14	56	61	5
593	928	1,044	117	364	424	60	139	267	128
594	983	1,036	54	391	425	34	365	494	129
595	253	267	14	93	115	22	15	74	59
596	1,150	1,255	105	437	550	114	463	878	415
597	864	883	19	355	389	34	496	575	79
598	514	528	14	213	228	16	19	25	6
599	1,040	919	-121	406	410	4	10	12	2
600	1,556	1,511	-45	608	674	66	137	368	232
601	20	162	142	8	72	64	550	782	233
602	1,058	1,233	175	400	501	100	501	634	132
603	500	989	489	188	402	213	803	1,290	487
604	417	496	79	154	196	42	8	86	78
605	322	812	490	117	349	232	71	293	222
606	1,421	1,545	125	602	684	82	651	664	13
607	1,655	2,390	735	696	1,059	362	603	815	212
608	796	875	79	306	387	81	77	129	51
609	1,493	1,392	-101	560	565	5	104	106	1
610	1,542	1,693	151	638	688	50	1,004	1,064	61
611	1,875	2,219	344	851	958	107	1,968	2,108	139
612	678	803	125	274	329	55	321	398	78
613	715	770	55	283	319	36	126	132	7
614	983	957	-26	393	403	10	85	87	2
615	766	761	-5	320	320	0	286	286	-1
616	1,410	1,346	-64	583	597	14	59	63	4
617	1,520	1,523	2	615	675	60	236	261	25
618	1,279	2,381	1,102	518	1,056	539	28	151	122
619	1,725	2,074	350	698	920	222	62	110	47
620	2,914	3,129	215	1,197	1,314	117	132	164	33
621	3,100	3,495	395	1,299	1,487	188	232	385	153
622	1,134	1,743	609	461	775	315	116	440	324
623	2	4	2	1	2	1	575	1,038	463
624	10	782	772	4	358	354	46	1,534	1,488
625	70	977	907	28	442	414	2,528	3,837	1,309
626	129	369	239	54	158	104	577	905	328
627	765	924	159	322	399	77	1,425	1,491	66
628	1,173	1,255	82	490	556	66	764	847	83
629	738	758	20	288	338	50	288	407	119
630	107	98	-9	38	40	2	1,052	1,114	62
631	1,197	1,988	791	541	900	360	525	1,141	615
632	200	798	598	80	364	283	32	1,376	1,343
633	362	2,038	1,675	146	923	777	130	1,301	1,172
634	468	1,799	1,331	215	815	600	1,008	1,976	969
635	966	1,170	204	341	497	156	1,491	1,713	222
636	366	987	620	127	386	259	22	454	432

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
637	2,379	2,752	374	847	1,126	279	485	1,145	660
638	613	576	-37	220	253	33	16	54	38
639	1,653	1,809	156	599	774	175	839	1,070	231
640	1,435	1,505	70	522	647	125	311	500	189
641	534	540	6	217	232	15	52	69	17
642	964	1,970	1,007	382	847	465	62	1,950	1,887
643	275	1,164	888	102	500	398	1,215	2,681	1,467
644	1,234	1,115	-119	427	436	9	27	31	4
645	1,062	1,262	201	368	494	126	673	759	86
646	126	730	604	44	285	242	0	610	610
647	24	1,389	1,366	8	560	552	0	2,328	2,328
648	41	55	14	18	23	6	712	730	18
649	20	122	102	7	48	41	115	191	77
650	40	563	523	14	239	225	29	591	562
651	2,274	2,687	413	751	1,100	350	521	1,270	748
652	2,076	1,863	-214	618	774	157	980	1,489	510
653	23	125	102	10	54	43	-41	210	169
654	276	333	57	118	143	25	441	541	100
655	77	256	180	27	110	83	335	650	315
656	828	1,100	272	369	473	103	742	1,150	409
657	356	574	218	143	247	104	1,184	1,584	401
658	213	294	80	83	126	43	346	516	171
659	126	231	105	47	90	43	423	588	165
660	692	971	279	282	353	71	520	768	248
661	1,152	1,168	16	365	424	59	41	58	17
662	1,761	4,800	3,039	545	1,744	1,199	162	501	339
663	1,082	2,805	1,724	388	1,086	698	101	695	594
664	1,152	1,268	115	391	460	69	507	571	64
665	651	825	175	233	319	86	18	69	51
666	1,242	1,547	305	452	571	119	635	972	337
667	399	668	269	171	287	116	240	708	468
668	246	472	226	87	203	115	234	690	456
669	365	779	415	157	330	172	1,243	1,872	629
670	696	727	31	297	306	10	93	126	32
671	645	682	37	275	288	13	73	98	24
672	378	434	56	160	183	23	106	132	26
673	497	935	438	163	396	233	70	678	608
674	14	635	621	5	269	264	0	602	602
675	2,216	2,348	132	846	994	148	243	430	187
676	118	284	166	40	89	49	104	223	118
677	0	200	200	0	77	77	18	916	898
678	1	200	199	1	91	90	219	1,312	1,093
679	18	55	38	7	25	18	501	1,395	894
680	0	1	1	0	0	0	0	0	0
681	245	1,577	1,332	88	668	580	334	1,208	875
682	835	1,655	820	277	701	424	38	748	709
683	574	894	320	188	379	191	51	285	234
684	897	1,113	216	406	541	134	1,023	1,063	40
685	967	986	19	441	479	38	286	368	82
686	163	354	191	71	172	101	167	447	280
687	272	336	64	108	163	56	924	1,047	122
688	145	203	59	52	79	27	3	18	15
689	1,661	2,029	368	550	785	235	89	213	124

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
690	509	811	302	194	314	120	57	69	12
691	1,140	2,210	1,070	361	855	494	79	238	158
692	312	882	570	97	342	245	195	272	77
693	569	745	176	174	290	117	35	66	31
694	5,637	5,649	13	2,182	2,484	302	464	629	165
695	732	769	37	331	374	42	132	189	57
696	109	134	25	47	52	5	1,442	1,434	-8
697	710	864	154	221	318	97	77	184	106
698	605	1,237	631	187	447	260	15	81	66
699	1,226	1,026	-200	370	371	1	224	224	0
700	596	1,114	519	191	412	220	214	379	165
701	1,254	1,537	284	377	556	179	12	143	131
702	144	862	718	52	365	314	510	1,007	497
703	417	566	149	138	205	67	233	404	170
704	3,284	3,501	216	967	1,273	306	238	406	168
705	457	982	526	144	364	220	136	196	61
706	328	1,044	716	111	380	270	64	159	95
707	1,478	1,326	-152	487	483	-4	609	605	-4
708	373	335	-38	123	122	-1	43	43	0
709	2,094	1,902	-191	699	798	99	594	647	54
710	919	1,785	866	309	676	367	72	162	90
711	953	1,635	682	341	618	277	222	354	132
712	635	1,666	1,031	229	631	402	58	122	63
713	293	352	59	110	143	33	7	101	94
714	2,730	3,119	389	1,680	2,128	449	1,686	3,066	1,380
715	3,864	3,708	-156	2,032	2,214	182	2,780	3,047	267
716	2,004	1,653	-351	741	737	-3	193	192	-1
717	760	1,424	664	324	634	310	1,412	1,583	171
718	3,143	3,252	110	1,608	1,730	122	2,156	2,358	201
719	722	851	128	364	385	21	1,995	2,003	7
720	4,293	4,225	-68	1,841	1,884	44	788	847	59
721	1,070	1,273	203	439	528	89	268	355	87
722	1,857	2,255	398	704	876	172	390	651	261
723	1,838	1,834	-4	733	751	18	368	374	6
724	2,122	1,979	-143	877	897	19	171	175	4
725	647	977	331	320	442	122	2,295	2,592	297
726	1,054	1,601	546	492	720	228	715	1,347	631
727	742	1,711	969	323	737	414	1,665	2,340	675
728	415	3,479	3,064	186	1,359	1,174	2,982	4,882	1,900
729	664	700	36	249	275	26	4,854	4,871	17
730	1,052	1,437	385	403	557	154	696	908	212
731	631	980	349	241	375	134	338	426	88
732	2,061	2,052	-9	739	769	30	165	167	2
733	1,651	1,543	-108	568	572	4	119	118	-1
734	1,317	1,424	107	465	528	64	261	332	71
735	1,417	1,635	218	506	590	84	205	233	28
736	2,180	2,638	457	808	983	176	204	325	121
737	2,182	2,532	350	857	998	142	421	486	65
738	1,532	1,895	363	582	709	126	200	321	121
739	2,285	2,931	646	924	1,146	222	851	1,113	261
740	1,714	2,067	353	652	799	147	774	925	151
741	1,361	1,316	-45	533	558	24	1,150	1,178	27
742	591	1,041	450	259	441	182	538	786	248

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
743	1,576	1,771	195	577	683	106	574	670	96
744	593	996	402	246	417	171	258	460	202
745	1,286	1,521	236	543	638	95	389	501	112
746	738	954	216	296	387	91	531	708	177
747	1,753	1,688	-65	749	759	11	784	804	21
748	498	509	12	196	206	11	206	207	1
749	1,266	1,402	136	500	567	68	36	62	26
750	1,150	1,565	414	447	629	182	433	577	144
751	353	349	-4	145	148	3	97	98	0
752	583	565	-18	212	213	1	13	14	1
753	544	557	13	224	236	12	184	185	1
754	535	519	-16	202	200	-2	19	19	0
755	1,234	1,624	389	487	667	180	68	193	125
756	1,558	1,911	352	595	715	121	173	298	125
757	707	677	-30	260	262	2	2	3	1
758	645	768	122	236	296	59	4	15	11
759	1,282	1,407	124	481	550	68	366	464	98
760	797	1,423	626	309	562	253	116	357	241
761	799	885	86	319	359	39	44	51	7
762	1,762	1,781	18	707	747	40	272	293	20
763	426	717	291	269	425	157	4,832	5,514	682
764	593	571	-22	311	339	27	2,550	3,741	1,191
765	2,287	2,487	200	1,359	1,489	130	4,646	6,243	1,597
766	4,517	4,279	-238	2,259	2,452	193	2,613	2,915	302
767	2,404	2,214	-189	919	946	27	558	583	25
768	1,987	1,707	-280	704	729	25	334	337	3
769	2,276	2,145	-130	1,070	1,093	23	5,216	5,196	-20
770	3,448	3,551	103	1,510	1,629	119	1,337	1,428	91
771	2,007	2,202	196	835	924	89	996	1,070	74
772	3,647	3,994	347	1,467	1,624	157	1,286	1,424	137
773	3,181	3,618	437	1,249	1,458	208	986	1,274	288
774	6,632	6,374	-258	2,814	2,914	101	1,307	1,331	24
775	2,231	3,033	802	912	1,227	315	621	967	346
776	4,113	4,062	-51	1,620	1,749	129	709	755	46
777	1,447	1,479	32	651	710	59	643	692	49
778	2,117	2,110	-6	868	925	57	362	449	87
779	2,271	2,568	297	1,114	1,242	127	650	795	145
780	2,824	2,869	46	1,206	1,320	113	1,581	1,732	151
781	400	509	109	305	349	43	2,992	3,930	937
782	0	0	0	0	0	0	1,718	2,044	326
783	1,978	1,688	-290	1,132	1,110	-23	2,819	3,661	841
784	1,589	1,435	-154	789	836	46	1,098	1,172	74
785	2,224	2,141	-83	1,133	1,171	38	740	806	67
786	2,158	2,325	167	1,216	1,270	53	966	1,050	84
787	2,217	2,157	-60	1,043	1,122	79	1,067	1,194	127
788	0	0	0	0	0	0	613	953	340
789	408	1,257	849	168	577	409	2,107	2,563	456
790	865	862	-2	406	443	37	1,852	2,351	500
791	2,324	2,181	-144	1,006	1,048	42	453	516	63
792	567	731	163	236	335	100	4,500	4,620	119
793	890	884	-6	372	406	34	1,335	1,603	267
794	1,513	1,703	190	678	785	107	911	1,116	205
795	684	1,368	683	325	638	314	3,557	4,440	883

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
796	1,976	1,989	13	925	1,018	93	1,581	1,699	119
797	1,766	1,687	-79	720	776	57	663	730	67
798	2,674	2,584	-91	1,129	1,210	81	598	709	112
799	3,374	3,481	107	1,426	1,544	117	762	918	157
800	2,803	2,919	116	1,134	1,242	108	282	444	162
801	1,784	1,956	172	752	840	89	995	1,090	95
802	3,150	3,476	326	1,398	1,571	172	1,310	1,443	133
803	3,595	3,777	182	1,660	1,780	120	198	249	51
804	2,163	2,255	92	895	956	61	147	165	18
805	2,018	2,140	122	770	841	71	703	749	46
806	1,949	1,965	16	744	781	36	209	227	18
807	1,290	1,368	78	553	570	17	36	43	7
808	1,723	1,758	35	707	730	23	317	324	7
809	1,939	2,150	211	794	852	58	629	637	8
810	1,643	1,680	37	650	655	6	116	124	9
811	1,449	1,722	274	595	712	118	383	555	172
812	952	1,435	484	382	552	171	949	1,178	229
813	943	1,969	1,026	398	758	361	628	1,135	507
814	1,008	1,534	526	513	644	131	718	829	111
815	757	986	229	302	418	116	961	1,077	116
816	248	383	135	97	166	69	40	71	30
817	323	717	393	157	312	154	562	660	98
818	507	576	69	236	238	2	40	40	0
819	1,652	1,964	311	617	724	107	276	448	172
820	1,872	2,272	400	701	860	159	147	278	132
821	3,448	3,531	83	1,334	1,405	71	96	183	86
822	1,316	1,484	168	562	593	32	255	296	40
823	1,502	1,492	-10	578	582	4	57	58	1
824	2,214	2,385	171	859	936	77	37	93	55
825	2,339	2,654	315	945	1,077	132	578	704	126
826	1,058	1,161	104	462	479	17	146	147	1
827	1,422	1,378	-44	624	671	47	181	187	6
828	1,999	2,170	171	812	909	97	731	828	97
829	1,168	922	-247	445	443	-2	617	613	-4
830	1,211	1,248	37	632	697	65	1,268	1,355	87
831	1,268	1,571	302	637	783	147	330	457	127
832	2,437	2,596	159	1,219	1,299	80	553	646	93
833	1,281	1,324	42	550	639	89	479	535	56
834	1,075	1,228	152	500	593	93	607	738	131
835	2,880	2,797	-83	1,240	1,350	110	1,067	1,170	103
836	2,044	1,981	-63	901	991	90	392	608	216
837	129	200	71	47	81	34	393	418	25
838	1,781	1,587	-194	635	645	10	117	118	1
839	2,098	1,901	-197	767	772	5	112	111	-1
840	167	174	6	61	71	9	79	79	0
841	1,881	2,368	488	716	899	183	2,585	2,612	27
842	2,208	2,402	194	852	910	58	103	111	8
843	2,310	2,584	274	870	987	117	114	141	28
844	1,895	2,822	927	713	1,062	350	369	624	256
845	1,850	1,949	99	694	720	26	182	199	17
846	0	0	0	0	0	0	690	2,147	1,456
847	215	1,447	1,233	205	864	660	10,154	17,438	7,284
848	618	935	316	326	558	232	1,511	3,095	1,583

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
849	16	337	320	13	253	241	6,379	9,164	2,785
850	1,310	2,005	695	506	784	278	910	1,144	234
851	607	973	366	234	357	123	1,553	1,881	328
852	100	99	-2	40	40	-1	9,868	11,055	1,187
853	1,419	1,860	442	623	768	145	205	307	102
854	1,565	1,369	-196	575	572	-3	143	142	-1
855	2,045	1,702	-344	722	719	-3	205	205	0
856	2,188	1,818	-371	780	824	44	524	600	76
857	3,753	3,461	-292	1,451	1,500	48	617	665	48
858	1,854	1,600	-254	653	677	24	70	75	5
859	2,021	1,855	-166	744	754	9	416	419	3
860	1,703	1,678	-25	650	660	11	140	142	2
861	1,280	1,663	382	472	604	132	190	306	116
862	940	1,113	174	357	369	12	291	294	2
863	552	701	149	188	234	46	102	145	43
864	627	608	-19	225	240	15	2,862	1,987	-874
865	532	803	271	241	315	74	220	303	83
866	781	900	120	281	303	22	32	37	5
867	1,456	1,734	277	521	593	72	289	320	31
868	1,466	1,777	311	487	593	106	500	608	108
869	2,217	2,310	93	769	811	42	177	232	56
870	4,593	4,210	-383	1,643	1,685	42	156	233	77
871	2,735	2,823	88	1,095	1,210	115	377	446	69
872	2,506	2,889	383	990	1,160	170	463	493	30
873	3,863	4,077	215	1,455	1,582	126	239	389	150
874	2,331	2,779	447	847	963	116	131	274	144
875	1,279	1,713	434	459	580	120	709	842	133
876	1,619	1,898	280	657	698	40	266	315	49
877	626	788	162	290	292	2	820	820	0
878	667	769	103	260	296	36	49	92	43
879	1,706	1,685	-21	679	684	5	212	215	3
880	2,293	2,229	-64	914	922	8	114	118	5
881	511	719	209	198	288	89	86	178	92
882	382	414	33	154	156	2	126	125	-1
883	1,475	1,502	27	569	571	2	73	74	1
884	1,441	1,715	273	530	646	116	310	506	196
885	2,940	2,972	32	1,025	1,084	58	138	146	9
886	3,013	3,040	27	1,116	1,126	10	298	299	0
887	1,172	1,331	159	464	503	39	11	22	11
888	1,806	3,007	1,201	660	1,121	461	319	744	426
889	3,580	4,261	680	1,397	1,688	292	691	852	160
890	3,032	2,777	-255	1,166	1,221	56	384	442	58
891	4,369	4,137	-232	1,692	1,759	67	583	690	107
892	5,959	7,310	1,351	2,434	2,940	506	2,750	3,258	508
893	722	1,403	682	331	573	242	757	1,164	408
894	211	208	-3	79	95	16	1,171	1,671	500
895	14	172	157	6	79	73	2,334	2,447	113
896	21	17	-4	8	8	0	1,327	1,505	178
897	1	1	0	1	1	0	265	459	194
898	30	22	-8	11	11	0	454	693	239
899	23	19	-4	9	9	0	682	901	218
900	14	12	-2	5	5	0	1,893	2,060	167
901	19	117	98	7	50	42	706	1,251	545

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
902	5	0	-5	2	0	-2	3,197	8,328	5,131
903	1	82	81	0	34	34	590	836	246
904	34	0	-34	16	0	-16	4,233	6,088	1,855
905	29	25	-4	13	13	0	3,406	3,703	297
906	2,691	3,115	424	969	1,147	178	1,517	1,869	351
907	36	245	209	18	133	114	931	1,258	326
908	677	1,535	858	340	831	491	3,332	4,774	1,443
909	1,070	1,372	302	574	840	266	961	1,311	350
910	515	567	52	261	307	46	1,920	3,537	1,617
911	632	1,244	612	362	761	399	445	975	530
912	1	1	0	1	1	0	824	878	54
913	1,270	1,716	445	514	667	153	239	369	130
914	457	1,108	650	200	462	262	596	869	273
915	762	1,544	782	317	642	325	1,137	1,511	373
916	2,843	3,290	447	1,190	1,295	105	435	566	131
917	1,939	2,107	168	724	769	46	579	666	88
918	2,279	2,167	-113	780	788	9	380	495	115
919	2,158	2,402	244	879	938	59	92	122	30
920	5,201	6,338	1,137	2,054	2,510	456	1,907	2,315	408
921	4,330	4,654	325	1,526	1,632	106	399	446	47
922	5,153	6,331	1,179	2,155	2,536	381	3,259	3,683	424
923	4,778	5,341	563	1,758	1,951	193	346	555	209
924	2,979	3,507	528	1,142	1,344	201	917	1,546	629
925	29	0	-29	11	0	-11	4,591	9,912	5,321
926	48	43	-5	26	25	-1	1,913	4,618	2,705
927	17	1	-16	9	0	-9	0	837	837
928	271	296	25	124	123	-1	1,755	2,753	998
929	797	2,033	1,236	349	901	552	5,530	5,869	339
930	2,820	5,413	2,593	1,108	2,263	1,155	598	565	-33
931	588	997	409	204	448	244	65	65	0
932	53	230	176	22	100	78	1,872	2,140	268
933	84	110	26	30	51	21	630	955	325
934	143	174	31	56	78	22	223	337	114
935	535	470	-66	207	226	19	515	602	86
936	8	83	75	3	31	28	168	335	167
937	21	254	233	8	92	84	41	575	534
938	1,167	1,235	68	457	527	69	661	811	150
939	466	460	-6	174	193	19	172	251	79
940	125	163	38	54	96	41	616	1,091	475
941	1,203	1,092	-111	428	457	29	246	274	28
942	264	353	89	91	135	44	1,859	2,064	205
943	1,915	1,848	-67	667	759	92	162	210	48
944	527	476	-51	237	254	17	592	619	28
945	4,807	4,991	184	2,280	2,568	288	960	1,466	506
946	648	634	-15	362	406	44	1,611	1,720	109
947	449	528	80	256	339	83	2,029	2,303	274
948	87	276	189	51	177	126	1,162	2,624	1,462
949	54	84	30	21	56	34	2,981	3,594	613
950	0	0	0	0	0	0	220	265	45
951	330	750	420	118	286	167	194	351	157
952	448	824	376	164	320	155	208	303	95
953	1,026	959	-67	368	377	9	385	388	3
954	775	1,546	771	306	613	307	286	505	218

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
955	994	1,098	103	424	432	9	134	151	17
956	710	701	-8	275	282	7	11	21	9
957	1,180	1,295	115	472	510	38	156	172	16
958	905	900	-5	351	376	25	536	553	18
959	1	1	0	1	1	0	121	189	69
960	7	7	-1	4	4	0	57	61	4
961	337	356	19	193	244	51	1,828	1,885	58
962	4,330	4,775	445	3,012	3,679	667	5,169	6,185	1,016
963	57	0	-57	26	0	-26	505	6,883	6,378
964	154	352	198	70	148	78	1,771	2,019	248
965	6	7	1	3	3	0	2,639	2,869	230
966	454	485	32	168	174	5	192	215	23
967	1,298	1,466	168	483	554	71	91	113	21
968	126	122	-3	58	57	-1	1,270	1,514	244
969	43	43	-1	20	20	0	1,387	1,514	127
970	255	193	-62	99	91	-8	1,534	2,541	1,007
971	0	0	0	9	0	-9	3,732	2,886	-846
972	374	342	-32	319	285	-34	2,645	2,786	141
973	73	212	139	36	178	142	1,721	1,006	-715
974	180	172	-9	103	144	41	2,378	1,445	-933
975	374	299	-75	181	251	70	2,269	2,155	-114
976	94	220	126	81	183	102	3,058	2,287	-771
977	641	476	-166	255	229	-26	863	885	22
978	1,073	769	-304	421	371	-51	137	450	314
979	845	933	88	412	450	38	605	874	269
980	474	238	-236	231	133	-98	2,115	2,253	138
981	712	516	-196	355	302	-52	271	566	295
982	1,834	1,556	-278	762	732	-31	2,335	4,031	1,696
983	596	933	337	237	447	210	354	901	548
984	633	485	-148	251	233	-19	125	151	26
985	662	566	-96	308	273	-35	272	525	253
986	586	430	-155	239	241	2	506	614	109
987	520	340	-181	204	190	-14	2	35	32
988	811	698	-113	342	336	-6	319	344	25
989	490	179	-311	267	100	-166	1,938	1,787	-151
990	305	306	1	201	171	-29	41	64	23
991	1,056	901	-156	412	394	-17	52	805	754
992	1,189	1,169	-20	504	573	69	1,095	1,107	12
993	195	215	20	127	120	-6	711	738	28
994	767	742	-24	274	325	51	93	136	43
995	433	487	54	158	216	57	48	76	29
996	944	758	-185	339	334	-6	120	184	64
997	774	773	0	292	345	53	43	93	50
998	301	469	167	108	205	98	23	52	29
999	40	25	-15	27	12	-15	2,158	5,341	3,183
1000	7	5	-2	3	3	0	2,377	3,337	960
1001	253	349	96	107	163	57	14	39	24
1002	1,037	1,630	593	372	751	379	43	154	111
1003	317	1	-316	173	1	-172	2,884	2,635	-249
1004	492	1,285	793	261	668	407	61	155	94
1005	114	28	-87	62	18	-44	1,146	1,050	-96
1006	1,143	1,085	-58	635	652	17	1,474	1,591	117
1007	721	676	-44	283	309	26	340	358	18

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
1008	1,210	1,150	-60	517	548	31	464	513	49
1009	928	1,012	84	384	465	81	111	177	66
1010	750	678	-72	283	314	31	266	318	52
1011	1,335	2,420	1,086	448	1,090	642	34	197	163
1012	839	684	-156	341	312	-29	224	306	82
1013	339	298	-42	150	148	-2	1,520	1,488	-32
1014	2,133	1,864	-268	803	801	-2	422	522	100
1015	1,684	1,384	-300	693	650	-44	126	271	145
1016	1,715	1,762	47	678	793	116	292	1,008	716
1017	2	0	-2	1	0	-1	1,141	1,074	-67
1018	12	0	-12	6	0	-6	971	895	-76
1019	787	646	-141	379	389	10	87	146	59
1020	638	607	-31	264	290	26	81	130	49
1021	1,372	1,168	-204	677	648	-29	16	121	106
1022	1,424	1,366	-58	709	725	16	174	274	100
1023	570	488	-82	252	244	-8	449	493	44
1024	1,821	1,661	-160	833	741	-92	1,466	1,459	-7
1025	1,528	1,782	254	577	818	241	2,259	2,296	37
1026	2,308	2,255	-53	809	1,035	225	227	1,267	1,041
1027	821	685	-136	394	412	18	242	275	33
1028	1,089	1,232	143	550	688	138	600	717	116
1029	1,615	1,079	-536	741	575	-166	348	421	73
1030	58	6	-51	27	3	-23	1,587	1,450	-137
1031	74	0	-74	25	0	-25	1,847	1,983	136
1032	1,120	1,118	-2	357	513	156	87	160	72
1033	815	589	-226	259	270	10	8	68	60
1034	1,476	1,180	-296	465	542	76	72	151	79
1035	1,655	1,189	-466	572	535	-37	243	403	160
1036	512	1,280	768	186	575	389	147	1,122	975
1037	1,869	1,555	-314	696	698	2	24	137	113
1038	669	570	-99	273	286	13	107	148	41
1039	1,099	884	-215	467	428	-39	168	242	74
1040	1,495	1,439	-56	695	704	9	372	490	119
1041	1,217	913	-304	477	447	-30	181	238	57
1042	1,228	1,342	113	458	662	204	83	291	209
1043	1,102	1,388	286	474	695	222	653	806	153
1044	1,480	1,706	225	633	766	133	209	521	312
1045	432	303	-129	185	136	-48	400	585	185
1046	518	20	-498	206	10	-196	1,088	1,952	864
1047	596	609	14	237	299	62	140	768	627
1048	954	2,117	1,163	355	1,010	655	2,131	2,595	464
1049	659	1,145	486	262	561	300	3,455	3,237	-218
1050	673	546	-127	276	270	-6	26	72	46
1051	727	756	29	306	366	60	19	75	56
1052	510	355	-155	225	172	-53	122	165	43
1053	292	475	183	104	228	124	0	19	19
1054	1,091	1,023	-69	391	491	101	270	416	147
1055	652	1,127	474	225	506	281	139	202	63
1056	514	1,205	691	179	541	362	16	95	80
1057	1,386	1,327	-59	449	596	147	361	757	396
1058	129	314	185	47	151	103	1,363	1,279	-84
1059	1,538	1,293	-245	548	621	73	297	849	552
1060	1,389	1,461	71	543	650	107	179	293	114

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
1061	1,419	2,245	827	562	1,008	446	139	279	140
1062	980	3,458	2,477	342	1,525	1,183	195	397	201
1063	1,481	2,868	1,387	568	1,354	785	319	715	396
1064	671	1,070	399	266	525	258	2	156	153
1065	573	870	297	219	371	152	107	459	352
1066	820	1,363	543	307	581	275	1,272	1,260	-12
1067	1,024	1,429	405	354	610	255	92	178	86
1068	1,379	1,834	454	523	853	330	362	467	105
1069	1,028	1,328	300	405	579	174	437	815	377
1070	212	154	-58	81	67	-13	261	1,659	1,398
1071	789	1,326	538	361	637	276	985	1,019	34
1072	491	1,227	736	225	589	364	406	728	322
1073	1,204	1,334	130	555	641	86	1,590	1,607	16
1074	287	549	261	132	264	131	122	1,629	1,506
1075	318	227	-91	144	97	-47	1,306	1,584	278
1076	733	3,080	2,347	265	1,353	1,088	906	1,258	352
1077	1,026	1,295	269	369	569	200	209	984	775
1078	1,876	2,494	618	671	1,095	424	757	874	117
1079	1,033	2,927	1,894	369	1,286	917	43	366	322
1080	121	183	62	43	87	44	260	401	141
1081	1,380	1,924	544	517	845	329	343	511	168
1082	2,730	3,255	525	879	1,428	549	125	340	216
1083	473	769	296	167	364	198	272	605	333
1084	397	799	402	171	320	149	698	1,312	615
1085	1,079	853	-226	395	404	9	71	154	83
1086	894	675	-219	314	320	6	34	82	48
1087	774	1,080	306	371	510	138	424	552	127
1088	294	547	254	129	260	131	606	673	67
1089	1,016	968	-49	325	414	89	125	177	53
1090	1,138	1,057	-81	469	453	-17	95	158	64
1091	25	32	8	11	14	3	978	902	-76
1092	1,056	1,342	286	366	573	206	155	229	74
1093	1,761	1,328	-432	562	569	7	18	109	91
1094	1,106	1,406	300	375	602	227	103	185	82
1095	863	559	-304	386	239	-146	261	496	235
1096	2,759	5,971	3,213	914	2,321	1,408	68	509	440
1097	2,198	3,141	944	666	1,222	557	195	384	188
1098	1,676	1,668	-8	556	789	233	4	139	135
1099	660	668	8	275	316	41	442	571	128
1100	1,610	1,355	-255	679	641	-38	60	157	97
1101	357	331	-26	126	157	30	2	28	25
1102	1,324	3,281	1,957	416	1,276	859	40	349	309
1103	1,342	3,856	2,514	421	1,499	1,078	135	350	214
1104	516	1,266	751	172	599	427	16	103	88
1105	1,720	2,625	904	691	1,143	452	159	719	560
1106	2,096	2,446	349	845	1,065	220	629	973	344
1107	1,156	3,648	2,492	466	1,589	1,123	477	1,379	902
1108	783	1,306	523	316	569	253	24	110	86
1109	279	635	355	113	276	164	116	1,136	1,020
1110	408	455	47	136	198	62	11	41	31
1111	360	399	38	120	174	54	43	66	23
1112	410	377	-33	136	164	28	28	65	38
1113	294	341	47	98	148	50	138	148	10

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
1114	228	430	202	75	156	81	35	55	20
1115	330	1,079	750	109	392	283	54	105	51
1116	423	3,821	3,398	139	1,386	1,247	641	1,646	1,004
1117	1,342	1,710	368	436	620	185	650	751	101
1118	356	4,097	3,741	121	1,487	1,366	29	965	936
1119	690	1,200	510	240	435	195	24	89	65
1120	748	1,012	264	325	533	209	36	116	80
1121	2,086	1,519	-567	708	782	74	151	261	110
1122	2,364	2,006	-358	998	1,033	35	96	252	156
1123	2,013	1,041	-973	636	559	-78	38	125	87
1124	2,406	2,200	-206	1,147	1,183	36	180	1,086	906
1125	685	156	-529	275	76	-200	1,246	1,100	-147
1126	1,715	1,352	-363	678	656	-22	1,677	1,409	-268
1127	2,646	2,644	-2	961	1,283	322	563	788	225
1128	2,545	1,790	-755	948	872	-76	102	1,374	1,272
1129	1,270	2,185	916	455	955	500	1,425	1,628	203
1130	1,442	1,149	-294	469	502	33	393	811	418
1131	1,409	1,662	253	468	702	234	169	959	790
1132	2,853	2,857	4	948	1,206	259	151	522	371
1133	873	1,128	254	283	493	210	62	132	70
1134	456	308	-148	147	135	-12	41	544	503
1135	2,068	2,530	462	687	1,068	381	28	237	210
1136	537	2,151	1,614	199	940	742	129	421	291
1137	1,390	2,111	721	515	923	408	13	210	197
1138	1,893	1,681	-213	564	709	145	484	680	196
1139	1,484	1,559	75	509	675	165	1,238	1,646	408
1140	825	875	50	278	379	101	412	981	569
1141	1,991	1,345	-646	590	582	-7	35	146	111
1142	3,443	3,453	10	1,008	1,166	158	58	284	226
1143	1,525	2,001	476	607	866	259	2,266	1,168	-1,098
1144	1,702	2,390	688	625	1,034	409	67	260	193
1145	3,804	4,349	545	1,174	1,466	292	217	1,305	1,088
1146	181	167	-14	82	72	-10	79	1,225	1,145
1147	308	1,141	833	139	506	366	261	922	660
1148	677	497	-180	213	167	-46	95	3,585	3,490
1149	416	676	259	189	297	108	1,826	2,012	186
1150	100	2	-98	36	1	-35	476	1,384	908
1151	539	531	-8	173	234	60	56	346	290
1152	1,364	1,370	6	476	601	124	52	235	183
1153	979	1,380	402	314	462	148	76	142	66
1154	987	850	-137	317	286	-31	490	1,008	518
1155	820	618	-202	273	210	-63	418	1,202	784
1156	1,348	1,406	59	451	478	27	334	461	126
1157	1,312	2,611	1,299	452	938	485	218	768	550
1158	548	1,769	1,221	163	670	507	153	813	659
1159	3,104	3,935	831	916	1,319	404	1,033	2,378	1,345
1160	2,208	1,803	-405	653	619	-33	872	1,841	968
1161	5,153	7,097	1,944	1,571	2,426	855	70	659	589
1162	1,523	2,481	957	467	942	475	227	1,253	1,026
1163	1,825	2,359	533	513	871	358	303	408	105
1164	717	1,581	864	245	576	332	104	233	128
1165	321	919	598	109	335	226	52	95	44
1166	1,438	2,537	1,100	497	964	467	356	586	230

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
1167	1,240	3,159	1,918	432	1,198	766	174	338	165
1168	780	763	-18	277	289	12	54	95	41
1169	726	735	9	228	269	40	17	52	36
1170	601	432	-169	206	157	-48	10	35	25
1171	371	664	293	122	235	113	70	111	42
1172	713	781	69	211	284	74	222	293	71
1173	855	611	-244	318	223	-96	120	188	69
1174	703	1,778	1,075	246	633	386	152	231	79
1175	1,714	1,921	207	463	651	188	128	217	88
1176	1,386	1,677	291	412	576	164	87	202	115
1177	2,523	4,008	1,485	795	1,398	603	143	342	200
1178	872	2,113	1,241	292	764	471	165	262	96
1179	214	2,023	1,810	61	684	623	16	107	91
1180	841	1,169	328	299	423	123	73	131	58
1181	1,594	2,362	768	495	854	359	71	199	128
1182	1,113	2,050	937	356	759	403	46	157	112
1183	825	3,994	3,169	234	1,424	1,190	227	533	306
1184	1,194	2,811	1,616	456	1,186	730	268	1,573	1,305
1185	457	2,142	1,685	157	803	646	23	1,117	1,094
1186	183	473	290	59	221	162	55	2,727	2,672
1187	340	4,925	4,585	116	1,788	1,672	7	3,556	3,548
1188	321	2,888	2,567	107	1,048	941	8	157	149
1189	1,126	1,640	514	351	596	245	43	122	79
1190	527	2,554	2,027	188	927	740	77	200	123
1191	1,269	1,786	517	437	658	221	34	129	96
1192	2,041	7,017	4,976	720	2,698	1,978	171	548	376
1193	1,137	5,901	4,764	415	2,300	1,885	198	741	543
1194	755	2,665	1,909	288	1,160	872	73	455	382
1195	1,582	1,663	80	584	659	76	310	509	199
1196	1,103	10,205	9,102	367	3,866	3,499	65	1,504	1,439
1197	123	3,548	3,425	40	1,289	1,249	8	2,077	2,069
1198	97	1,806	1,708	32	842	810	520	6,131	5,611
1199	1,732	1,966	234	623	919	295	1,625	1,719	94
1200	781	2,434	1,654	297	1,137	841	35	944	909
1201	345	2,050	1,706	130	958	828	13	1,087	1,074
1202	185	766	581	70	346	276	153	250	97
1203	451	4,087	3,636	166	1,566	1,400	41	189	148
1204	313	388	75	121	152	30	5	1,706	1,701
1205	1,112	2,398	1,286	420	937	517	3,435	3,129	-306
1206	767	582	-186	333	264	-69	2,048	1,209	-839
1207	1,055	948	-106	432	431	-2	887	2,347	1,460
1208	2,115	2,480	365	885	1,024	139	340	831	490
1209	1,487	1,531	44	559	620	61	2,127	3,405	1,278
1210	992	1,735	743	346	702	356	86	184	97
1211	1,364	1,771	407	454	657	203	97	2,150	2,053
1212	2,407	4,288	1,881	812	1,595	783	434	1,693	1,260
1213	333	3,227	2,895	107	1,200	1,093	70	1,067	998
1214	345	3,163	2,818	110	1,176	1,066	23	182	159
1215	1,314	2,275	961	421	846	425	87	345	257
1216	156	290	134	50	108	58	5	28	23
1217	507	429	-78	163	160	-3	113	129	16
1218	326	464	137	111	161	50	23	45	23
1219	651	827	175	221	287	66	123	156	33

Population, Households and Employment
Metro Traffic Analysis Zones

TAZ	Population			Households			Nonfarm Employment		
	1994	2017	Change	1994	2017	Change	1994	2017	Change
1220	353	1,207	854	120	432	312	23	84	61
1221	418	2,349	1,931	142	814	672	515	631	115
1222	470	363	-107	160	139	-21	23	97	74
1223	274	306	32	94	114	20	20	36	15
1224	935	1,123	189	315	398	83	219	263	43
1225	819	3,775	2,956	274	1,308	1,034	167	392	225
1226	2,135	2,879	743	727	997	271	928	1,487	560
1227	286	419	133	94	153	59	29	1,052	1,024
1228	553	637	84	190	237	47	53	85	32
1229	652	1,008	356	225	375	150	55	92	37
1230	1,096	1,590	494	371	566	195	143	216	73
1231	438	4,675	4,237	145	1,620	1,475	161	727	566
1232	1,881	3,579	1,698	625	1,240	615	1,238	1,201	-37
1233	455	1,974	1,519	151	684	533	29	145	116
1234	458	1,238	780	152	429	277	64	120	57
1235	1,220	1,659	439	372	575	203	70	137	67
1236	1,121	1,981	859	406	672	265	23	127	104
1237	1,467	2,000	532	393	678	285	5	108	103
1238	1,543	2,052	509	465	695	231	43	148	104
1239	366	531	165	138	180	42	107	125	18
1240	812	1,596	783	281	580	299	159	254	94
1241	4,009	6,250	2,240	1,171	2,228	1,057	119	451	333
1242	1,826	3,228	1,401	601	1,133	531	54	207	153
1243	3,394	6,633	3,239	1,097	2,327	1,230	326	765	439
1244	5,419	10,047	4,628	1,911	3,582	1,671	230	620	389
9999	13,129	14,359	1,230	4,660	5,864	1,204	3,435	4,084	648
Region	**1,565,800**	**2,271,100**	**705,300**	**604,400**	**947,300**	**342,900**	**955,600**	**1,536,500**	**580,900**