Agenda

Metro
600 NE Grand Ave.
Portland, OR 97232-2736

Meeting:	Metro Technical Advisory Committee (MTAC)
Date:	Wednesday, July 17, 2024
Time:	9:00 a.m. to 12:00 p.m.
Place:	Virtual meeting held via Zoom
	video recording is available online within a week of meeting
	Connect with Zoom Passcode: 982966 Phone: 888-475-4499 (Toll Free)

9:00 a.m.	**Call meeting to order, Declaration of Quorum and Introductions**	Chair Kehe
9:10 a.m.	**Comments from the Chair and Committee Members** • UGB Decision Schedule (Chair Kehe) • Updates from committee members around the Region (all)	
	Public communications on agenda items	
	Consideration of MTAC minutes, June 26, 2024	Chair Kehe
9:20 a.m.	**EPA Climate Pollution Reduction Grant** Purpose:	Eliot Rose, Metro
9:50 a.m.	**Draft Urban Growth Report (UGR)** Purpose: Provide MTAC with a summary of the draft 2024 Urban Growth Report in order that MTAC is prepared to make technical recommendations to the Metro Policy Advisory Committee.	Ted Reid, Metro
11:20 a.m.	**Adjournment**	Chair Kehe

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ការគោរពសិទ្ធិពលរដ្ឋរបស់ ។ សំរាប់ព័ត៌មានអំពីកម្មវិធីសិទ្ធិពលរដ្ឋរបស់ Metro ឬដើម្បីទទួលពាក្យបណ្តឹងរើសអើងសូមចូលទស្សនាគេហទំព័រ www.oregonmetro.gov/civilrights។ បើលោកអ្នកត្រូវការអ្នកបកប្រែភាសានៅពេលអង្គប្រជុំសាធារណៈ សូមទូរស័ព្ទមកលេខ 503-797-1700 (ម៉ោង 8 ព្រឹកដល់ម៉ោង 5 ល្ងាច ថ្ងៃធ្វើការ) ប្រាំពីរថ្ងៃ ថ្ងៃធ្វើការ មុនថ្ងៃប្រជុំដើម្បីអាចឲ្យគេសម្រួលតាមសំណើរបស់លោកអ្នក ។

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January 2021

2024 Metro Technical Advisory Committee (MTAC) Work Program
As of 7/10/2024
***NOTE:** Items in **italics** are tentative; **bold** denotes required items*
All meetings are scheduled from 9am – noon

MTAC meeting, July 17, 2024 Comments from the Chair • UGB Decision Schedule (Chair Kehe) • Committee member updates around the region (Chair Kehe and all) Agenda Items • EPA Climate Pollution Reduction Grant (Eliot Rose, Metro, 30 min) • Draft UGR (Ted Reid, Metro; 90 min)	**MTAC meeting, August 28, 2024** Comments from the Chair • UGB Decision Schedule (Chair Kehe) • Committee member updates around the region (Chair Kehe and all) Agenda Items • Urban Growth Management Decision: Metro Chief Operating Officer recommendation (Ted Reid, Metro, 45 minutes)
MTAC meeting, September 18, 2024 *tentative hybrid mtg* Comments from the Chair • Committee member updates around the region (Chair Kehe and all) Agenda Items • Urban Growth Management Decision: MTAC Recommendations to MPAC (Ted Reid, Metro) FULL MEETING	**MTAC meeting, October 16, 2024** Comments from the Chair • Committee member updates around the region (Chair Kehe and all) Agenda Items • Regional Housing Coordination Strategy: Work Plan (Ted Reid, Metro; 40 min) • EPA Climate Pollution Reduction Grant (Eliot Rose, 20-30 min) • Connecting First and Last Mile Study Introduction (Ally Holmqvist, Metro; 45 min)
MTAC meeting, November 20, 2024 Comments from the Chair • Committee member updates around the region (Chair Kehe and all) Agenda Items • 2040 Vision Update Process (Jess Zdeb, 45 min) • 2023 Regional Transportation Plan Implementation and Local TSP Support Update (Kim Ellis and André Lightsey-Walker, Metro, 45 min.)	**MTAC meeting, December 18, 2024** Comments from the Chair • Committee member updates around the region (Chair Kehe and all) Agenda Items • Urban Growth Management Decision: Follow up on process (Ted Reid, Metro) • Safe Streets for All update (Lake McTighe, 45 min)

Parking Lot/Bike Rack: Future Topics
- Status report on equity goals for land use and transportation planning
- Regional city reports on community engagement work/grants
- Regional development changes reporting on employment/economic and housing as it relates to growth management
- Update report on Travel Behavior Survey
- Updates on grant funded projects such as Metro's 2040 grants and DLCD/ODOT's TGM grants. Recipients of grants.
- Transit-Oriented Development (TOD) annual report/project profiles report

For MTAC agenda and schedule information, e-mail marie.miller@oregonmetro.gov
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Meeting minutes

Meeting: **Metro Technical Advisory Committee (MTAC) meeting**

Date/time: Wednesday, June 26, 2024 | 9:00 a.m. to 12:00 p.m.

Place: Virtual video meeting via Zoom

Metro
600 NE Grand Ave.
Portland, OR 97232-2736

Members Attending	**Affiliate**
Eryn Kehe, Chair	Metro
Joseph Edge	Clackamas County Community Member
Carol Chesarek	Multnomah County Community Member
Victor Saldanha	Washington County Community Member
Tom Armstrong	Largest City in the Region: Portland
Erik Olson	Largest City in Clackamas County: Lake Oswego
Terra Wilcoxson	Largest City in Multnomah County: Gresham
Aquilla Hurd-Ravich	Second Largest City in Clackamas County: Oregon City
Steve Koper	Washington County: Other Cities, City of Tualatin
Katherine Kelly	City of Vancouver
Jamie Stasny	Clackamas County
Adam Barber	Multnomah County
Laura Kelly	Oregon Depart. of Land Conservation & Development
Manuel Contreras, Jr.	Clackamas Water Environmental Services
Gery Keck	Tualatin Hills Park & Recreation District
Nina Carlson	NW Natural
Tom Bouillion	Port of Portland
Bret Marchant	Greater Portland, Inc.
Mary Kyle McCurdy	1000 Friends of Oregon
Nora Apter	Oregon Environmental Council
Rachel Loftin	Community Partners for Affordable Housing
Brendon Haggerty	Multnomah County Public Health & Urban Forum

Alternate Members Attending	**Affiliate**
Laura Weigel	City of Milwaukie
Dakota Meyer	City of Troutdale
Miranda Bateschell	City of Wilsonville
Theresa Cherniak	Washington County
Oliver Orjiako	Clark County
Glen Bolen	Oregon Department of Transportation
Kelly Reid	Oregon Department of Land Conservation & Dev.
Chris Faulkner	Clean Water Services
Cassera Phipps	Clean Water Services
Natasha Garcia	Portland Public Schools
Tom Mills	TriMet
Jerry Johnson	Johnson Economics, LLC
Jeff Hampton	Business Oregon
Kerry Steinmetz	Fidelity National Title Greater Metropolitan Portland
Erin Reome	North Clackamas Parks & Rec. District

Greg Schrock	Portland State University
Ryan Ames	Public Health & Urban Forum, Washington County
Leah Fisher	Public Health & Urban Forum, Clackamas County

Guests Attending	**Affiliate**
Adam Torres	Clackamas County
Cody Meyer	Oregon Dept. of Land Conservation & Development
Justin Sherrill	ECONorthwest
KM	
Kevin Young	OR Department of Land Conservation & Development

Metro Staff Attending

Andrea Celentano, Cindy Pederson, Clint Chiavarini, David Tetrick, Dennis Yee, Eryn Kehe, Glen Hamburg, Jake Lovell, Marie Miller, Matthew Hampton, Miriam Hanes, Serah Breakstone, Ted Reid

Call to Order, Quorum Declaration and Introductions

Chair Eryn Kehe called the meeting to order at 9:00 a.m. A quorum was declared. Introductions were made.

Comments from the Chair and Committee Members

Chair Kehe reviewed the voting procedure. Once a quorum has been announced with one vote per seat on the panel, votes will be taken on action items. The committee follows Democratic Rules of Order which are not as strict as the Roberts Rules of Order. We focus on making sure everyone gets to participate in discussion. Following a motion and second on the motion, we can discuss further before a vote it taken. Amendments to the motion can be proposed, and either accepted or not as part of the motion. After all discussion and amendments are made a final vote will be taken.

Joseph Edge announced that on Saturday June 29 the Oak Grove Festival happens which was formerly known as the Trolley Trail Festival. It's located at the intersection of Trolley Trail and Oak Grove Blvd.

Natasha Garcia announced that last night at the Portland Public Schools Board meeting, the board decided to move our bond vote from this November to March 2025. You can expect to see that on your ballots if you're in Multnomah County.

Glen Bolen announced a four mile stretch of I-5 road closure over SW 26th Ave this weekend. All lanes of I-5 will be closed from Friday at 9:00 p.m. to Monday at 5:00 p.m. This project will improve the I-5 bridge over SW 26th Avenue in Southwest Portland with a new structure and upgrade SW 26th Avenue with better lighting, bike lanes, and sidewalks. This project is necessary to replace a worn-out bridge structure on I-5, bring it up to current seismic standards, and ensure continued reliability for travelers.
https://www.oregon.gov/odot/projects/pages/project-details.aspx?project=20486

Public Communications on Agenda Items – none given.

Consideration of MTAC minutes April 17, 2024 meeting

Motion to accept as written minutes from MTAC April 17, 2024 meeting: Joseph Edge
Seconded: Manny Contreras, Jr.
ACTION: Motion passed unanimously with no abstentions.

<u>Consideration of MTAC minutes May 15, 2024 meeting</u>
Motion to accept as written minutes from MTAC May 15, 2024 meeting: Tom Mills
Seconded: Nina Carlson
ACTION: Motion passed with two abstentions: Brendon Haggerty and Rachel Loftin.

<u>Proposed Amendments to Urban Growth Management Functional Plan (UGMFP) Title 6 Recommendation to MPAC (action item)</u> (Glen Hamburg, Metro) The presentation gave the overview on the Urban Growth Management Functional Plan (UGMFP) amendments required by the state's Climate-Friendly and Equitable Communities (CFEC) program for local adoption of boundaries for 2040 Growth Concept Centers. Back in December 2023, Metro staff presented to MTAC on future amendments to UGMFP Title 6, *Centers, Corridors, Station Communities, and Main Streets*, that would be required by new state regulations as part of state's CFEC program. The state mandates that Metro amend Title 6 by the end of 2024 to require that local jurisdictions adopt by the end of 2025 formal boundaries for the regional and town centers that are shown on the 2040 Growth Concept Map and have been planned for urban land uses.

Draft amendments have not changed since presented in December and would:
1. Apply the Title 6 boundary adoption requirement to all 2040 Growth Concept centers that have been planned for urban land uses, including the Central City
2. Identify a timeframe for cities and counties to report their adopted boundaries to Metro in order for Metro to reflect those adopted boundaries on an updated Title 6 Map
3. Make minor, non-substantive amendments to clarify existing provisions, address formatting discrepancies, update citations, and correct typographic errors.

Metro staff are interested in whether MTAC has any feedback on the draft proposed Title 6 amendments and are seeking a recommendation on the amendments to MPAC. MPAC will consider draft Title 6 amendments later this year and make their own recommendation to the Metro Council. Before consideration by the Metro Council at a public hearing, draft amendments to Title 6 will also be shared with cities and counties in Metro and submitted to the Department of Land Conservation and Development (DLCD).

Comments from the committee:
Joseph Edge had a question about the multi-jurisdictional rule. If a jurisdiction has already adopted boundaries and the boundaries are already set, they've cleared the hurdle, correct? There's no further need for them to take action, correct? Mr. Hamburg agreed. I think we're going to want to check in with all jurisdictions next year and before Feb. 1, 2026, just to make sure that we understand what it is that they consider to have been adopted in making sure that we reflect what they're telling us is the locally adopted boundaries. They don't necessarily need to do anything further in terms of bringing something for example, to their county board or their city council, but they may need to report to us or confirm to us what their adopted boundaries are.

Mr. Edge asked for technical clarification, we have a regional center around the Clackamas Town Center. It goes into the City of Happy Valley boundary on the east side of I-205 and into the City of Milwaukie boundary on the west side of 82nd Avenue. But the Milwaukie part of it is only one or two properties. So technically, wouldn't that fit the bill if only Milwaukie were to adopt that regional center under the text of the amendment. Couldn't Milwaukie be the one jurisdiction to adopt boundaries for that regional center?

Mr. Hamburg noted hypothetically, yes. We don't foresee that situation occurring. I don't anticipate that the City of Milwaukie is going to attempt to adopt boundaries for a regional center in Clackamas that already has one. Also, there is some language in Title 6 consistent with the relevant CFEC rule that says that the adoptive boundaries need to be in the general location of the center as depicted on the 2040 growth concept map, arguably if one jurisdiction were to adopt boundaries for a center that included only one or two properties, that may not be in the realm of just the general location. I don't foresee the situation coming up. We would accept adopted boundaries for the regional center adopted by Clackamas County, and that would mean that of the cities of Milwaukie and Happy Valley don't also need to go about adopting for the same center or some other portion of it connected.

Carol Chesarek asked for clarification that there were text changes in the language, but not changes to the map currently proposed. Mr. Hamburg noted the map that's included in packet is the 2040 growth concept map as it is today. That map identifies what centers there are out there. But in some cases, the pink blobs that are shown are purely conceptual of these locations. Under the CFEC rules and the amendments that we're proposing to Title 6 local jurisdictions we need to adopt, send specific geographies for those areas. And then we're going to update the map that's in your packet after the fact to reflect what they've adopted.

Jerry Johnson noted at some point we should probably revisit referring to this the 2040 Growth Concept. We are 34 years into the 50-year visioning process.

Nina Carlson noted my concern with this whole aspect is have we considered those folks that need jobs, need to be family wage, or living wage jobs. I know the idea of these city centers are to create walkable, bikeable neighborhoods. I'm hoping that there's been some consideration about where we put industrial siting near those city centers or where we have areas for manufacturing other kinds of employment lands around those centers, and that we're being mindful of that because if we're going to create walkable, bikeable communities we're going to need some of those jobs nearly, too.

Mr. Hamburg noted in the centers we foresee employment opportunities in them as well. Another thing is that on the 2040 growth concept map you'll see some sections of the region that are colored blue. These are our Title 4 lands. These are areas that are protected specifically for industrial and other employment land uses. The 2040 growth concept is thinking about both already. There is a long-term vision for the development of these centers but also a long-term vision for the protection of industrial and employment lands in specific areas of the region. Ultimately, the local jurisdictions, the cities and the counties will be the ones defining the boundaries for these areas themselves.

Glen Bolen noted one of the things I'm wondering about is the City of Portland's comp plan, for example, and the work that everyone's doing right now on 82nd Avenue. There are many smaller centers on Portland's comprehensive plan that meet or exceed many of our definitions of what a town center is from a density or mix use thing. Is there any thought to expanding the town center to bring in those kinds of places where jurisdictions have done planning? I'm thinking of 82nd Avenue and Montgomery Ward District as two examples but I'm sure that other cities have them as well. The centers, as per CFEC will also function very similar to Multi-Modal Areas (MMA) in regard to the Transportation Planning Rule.

Mr. Hamburg noted the specific answer to your question is yes, there have been those discussions. What do we do if, for example, a local jurisdiction wants there to be more centers than we necessarily have depicted on the 2040 growth concept map? There's nothing in Metro's program. It's functional plan, for example, that would necessarily prohibit a city or a county from making those local choices to things the essentially create other centers. We've not really answered that for ourselves yet. I'll let others weigh in if they know of what to do about amending the 2040 growth concept map itself to specifically identify what are for those centers that are already on the 2040 growth concept map that need to have adopted boundaries.

Chair Kehe added the 2040 growth concept was developed in the 1990s. There are internal conversations at Metro about scoping a process to update our regional vision as well as the functional plan and our framework plan. The 2040 growth concept is part of that. I hope that we have a presentation from someone in Metro staff later this year giving some updates about a schedule.

Joseph Edge noted it's not part of this amendment but is this foreshadowing some kind of regulatory requirements for centers? Or are we just seeing these as conceptual and there's really no plan to set particular targets because I realize we're already setting targets for what we expect use mixes and density to be, in terms of the residents and workers in the centers. They're not regulatory, correct? Unless maybe it's required if you want a regional investment or is that not really anticipated.

Mr. Hamburg noted the purpose of adopting these boundaries is to define an area where CFEC regulations are going to apply for jurisdictions in the Metro region. I hesitate to be the spokesperson for what the state rules require of local jurisdictions, but they relate to things like motor vehicle parking, improvements of tree canopy, provision of bicycle parking, that sort of thing. CFEC regulations will apply, requirements will apply within and near these defined geographies and Metro steps in to require that there be these defined geographies. But as of right now Metro is not proposing any additional requirements for what occurs in and near those defined areas. That's all going to be requirements that exist right now in the CFEC rules, and we've not received any direction to start talking to local jurisdictions about additional requirements beyond what the state already requires in those spaces. We're just fulfilling the requirements that there be a defined space for the existing state rules to apply locally.

MOTION to approve staff recommendations of amendments to Title 6 as proposed in Attachment C to MPAC for adoption by the Metro Council.
Motion: Carol Chesarek Seconded: Joseph Edge
ACTION: Motion was approved unanimously with no abstentions.

10-minute meeting break taken

<u>Urban Growth Boundary discussion: Employment lands demand analysis</u> (Ted Reid, David Tetrick and Dennis Yee, Metro) Ted Reid began the presentation with a review of the project timeline.

Jamie Stasny asked for clarification that the public comment period on the draft Urban Growth Report is not beginning in June. It's going to wait until the UGR is released on July 9, correct? Mr. Reid confirmed the public comment period will not be July 9 through August 4.

The presentation resumed showing results employment lands capacity analysis. Three capacity types, Vacant, Infill and Redevelopment, were shown on maps. Buildable acres, reviewed by local jurisdiction showed a total of just under 6,000 industrial land, and 481 commercial acres.

Tom Armstrong noted if you go back to the redevelopment slide, there's an awful lot of dots in Portland, and that only equals 124 acres. That visually seems off to me. Mr. Reid noted we do a number of small parcels that are comprising this redevelopment supply. You're pointing out that most of our capacity for industrial is vacant and infill lands that modeling has not identified as a lot of free development potential in total. Mr. Armstrong asked will the Urban Growth Report have the proforma. Will we be able to see what the residual land value of these redevelop able sites is. Just to compare it to actual market activity. Mr. Reid noted I think that it may be a question of level of detail or what we publish versus what we can talk to you about.

Clint Chiavarini noted it's a real issue with mapping because what's happening with this redevelopment a lot of these redevelopment parcels, are very small pieces and that there's that probability that gets apportioned for the redevelopment as well. Each of these dots may represent a very small fraction of an acre. It's difficult to show very small magnitudes without the map looking blank. For redevelopment in particular it's hard because the way that the proforma model works the probability and the net acres are very small numbers.

Bret Marchant noted Mr. Reid had specific maps showing infill and the redevelopment able land. Do you have a similar one showing just the vacant land? This was shown from the presentation. It was suggested if having an appendix detailed maps by acreage, filtering out the small lots to help differentiate this size lots. Mr. Reid added later on in this presentation we will show a map of large industrial sites, 25 plus buildable acres.

Dennis Yee presented information on the employment land demand methodology. Converting jobs to acres was shown in detail:

- Regional (7-county MSA) employment forecast by sector
- Apply historic UGB capture rate by sector
- Deduct shares of work from home/hybrid by sector
- Assign shares of each sector to 6 building types
- Account for current excess office vacancies
- Apply square feet per employee by building type
- Apply floor area ratios by building type
- Acres determined

Manny Contreas asked on that surplus or deficit, when you make your evaluation, if a deficit is going to be a zero or would it be, for example, negative eight? Mr. Yee noted if we're talking about the deficit that just means that presently we're estimating more demand in the 20 year forecast relative to the supply that's been figured out. The deficit just means we're going to have to deal with it in some fashion. Chair Kehe added a negative number demonstrates that there is a need for land in that scenario.

Joseph Edge had a question about the map that showed different kinds of regional groups outside areas. Why are certain portions of land in Clackamas County that are inside the I-205 loop on the east side that are in outer Clackamas versus inner Clackamas? It just seems to be unintuitive with that last map. There are some portions that are west of I-205 adjacent to inner Clackamas and it seems more logical that would be inside the I-205 loop. Could you describe why this decision was made and what the implications would be adjusting this to reflect a more logical inner and outer Clackamas scenario.

Mr. Yee noted part of it is a census tract-based boundary that we're utilizing. Census tracts in Clackamas County tend to be largeish. So either take all of the census tract or none of it, and it creates these funny geographies as you pointed out. Secondly, the geography is based on what we call employment zones that were part of the now defunct land use model, MetroScope. When we were using that model more for analytical purposes that was one of the EA Zones. It is bordered into that outer I-205. If we have a new land use model that we're hoping to stand up in the next year or two and these boundaries are likely to change because the geographies are not as beholden to the large census tracts. This new model is more of a parcel-based approach. It's a hybrid between a parcel-based approach/block based or block group census. We'll have a greater chance of remapping these boundaries and possibly informing this UGB land demand analysis. But for now we're stuck between two of our analytical models.

Glen Bolen referred to a map of the commercial land need and it appeared a couple of ODOT facilities, Highway 99 and Oregon 10 for example, seemed to look very different at the county line. The Washington County side showed a bunch of red dots for commercial development potential. The Portland side of that line showed not dots at all. When I saw that map I assumed that must be because Portland has a mixed use zone rather than a pure commercial zone. I expected to see something fall out of this, the numbers here at the end. Mr. Reid noted my suspicion is that we have county assessor data that are influencing some of the redevelopment potential.

Mr. Bolen noted I was wondering if that was possibly too, if you're using a rate based on one city or county versus another, but it doesn't mesh with the logic. I'm struggling with this one because I fell this is then leading to that deficit that is showing potential commercial space, if Portland's classifications are somehow not showing opportunities that might be there. For consideration - with the "surface" modeling I think one could normalize the assessor data to adjust for high/low assessment based on both the spread within the county data, and via recent sale price per foot.

Clint Chiavarini added there's probably some subtleties in here. There are likely two things going on. One is there's not a lot of purely commercial zoning out there. Particularly in Portland, a lot of it is mixed use. That begs the question why no mixed use is showing up either. That gets into some of the market forces that are driving this proforma model. Mr. Yee agreed that it's mixed use versus commercial and the proforma mixed use cost structures and whatnot are different than the commercial. The other point with across the borderline that goes on with the mixed use is that it tends to be, with the sort of winner take all way that the proforma works, is that those mixed use are going towards residential and not towards commercial. Another point is that mixed use residential with this residential component could go one way or the other.

Tom Armstrong noted that winner take all methodology is probably the flaw here. When we do our local BLI we allocate in our mixed-use areas 20% of the space capacity to commercial because that's what we actually see happen on the ground in actual buildings that get developed. My questions actually had to do with the commercial reconciliation demand supply analysis and showing the deficit for the baseline and the high growth scenarios that in the face of that demand wouldn't you expect the probability in terms of the redevelopment capacity to increase. Will you be reporting some of those gross numbers stuff that is in play before you start slicing it with what's the probability that it will develop in the next 20 years? There's a lot of low value properties that in the face of high demand are going to turn over faster than your forecasting may show. So the capacity, especially on the commercial side, is probably there. It's just not getting captured by your probability rates.

Ted Reid noted we're trying to provide more of that context in our writeup of these numbers. I think the other thing that we could say about this is that we know commercial uses happen on industrial lands, so we would expect that some amount of commercial demand will continue to be met on industrial lands. We've shown we had a surplus on the industrial side. So I think there are a number of contextual pieces that we need to get there along with these numbers.

Mr. Yee noted I think there was a misspeak or a misunderstanding on the mixed use residential supply information or availability. We do have a split rate there and it's by area and I think many of the jurisdictions who reviewed them recall that we did call the question, what's the mixed use residential split rate. Mr. Armstrong used the example of 80/20. We have 5/95, or 10/90, or 50/50. It depends on the area of our mixed use residential. When I think we say all or nothing it's after we've done that split rate. Mr. Chiavarini added that split rate gets applied to the vacant side of things. It gets applied to the vacant land supply. But the MUR side of things is still basically a winner take all proposition for the readout. We could look at ways to correct that.

Greg Schrock had a question to do with the industrial land analysis, and how you account for the heterogeneity of industrial land, both the kind of supply and the demand, both in terms of the size, the characteristics, the location, given especially that industrial land tends to be very peripheral within the urban area. It's different if it's in Washington County versus Airport Way versus Wilsonville. For a perspective industrial user it may make a big difference whether the aggregate supply is all clustered in one end of the region, and the demand is over on another side. How does this overall supply demand picture account for that?

Mr. Reid noted we are tasked with performing a regional analysis of need. In the next slides we're going to talk a little about capacity and demand in aggregate and what the surplus or deficit may be in aggregate. We'll talk about the specific proposal we have from the City of Sherwood for an employment area addition to the urban growth boundary and whether that area has some unique characteristics that are otherwise in short supply.

Mr. Reid noted we did work with a consulting firm to do a quick update of the inventory of large industrial sites. This is 25 plus buildable acres. The consulting firm di this work to support the state semiconductor task force in the last year. We've been doing this inventory since 2011 and updated a few times. Over the years there has been absorption of these large industrial sites. Tier One is likely to be development ready in the next 6 months. Tier Two is likely to be development ready in 7 to 30 months, and the Tier Three likely to take over 30 months to become development ready. The challenge having the land is one question, and then whether appropriate investments and actions have been taken to make that land development ready. Repeatedly over the years as we've done this work, we've seen need for transportation investments, wetland mitigation, site assembly, patient investments in site assembly, those types of things need to happen to make sites development ready.

Steve Koper asked how buildable is defined in this context. The site that is in 12 on the map adjacent to the word Sherwood is likely currently an active rock quarry. I agree that it's Tier Three but am unsure if it's actually buildable as opposed to maybe redevelop able. Curious how those terms are being used. Mr. Reid agreed that is a good point with some of these sites. The development readiness of these is in part actions that need to happen and in part some serious challenges with the sites themselves. Mr. Chiavarini did a little work with what the consulting firm definitions were compared to our and the consulting form came up with higher acreage that we were in our work, generally.

David Tetrick presented the Sherwood West employment analysis. The project question was on an economic benefit to include employment acres above and beyond the regional growth forecast. The project approach included to market supply and site competitiveness.
Market supply: A diverse regional market supply of sites is essential to maintain an equilibrium in market pricing and to support a broad range of industries.
Site competitiveness: The Sherwood West site has characteristics that are suited to accommodate the industries that are likely to grow, which will support regional economic and business growth.

Tom Armstrong asked if there was anything given in the Title VI designation for Industrial Lands when it comes in. Will it be designated as prime industrial to meet these specific market needs that you've identified? Mr. Reid noted if Metro Council does decide to add this area to their growth boundary, they would apply some conditions of approval which would include presumably some Title 4, that's our industrial employment areas map designation. We have three different designations, the regionally significant industrial area, industrial areas, and employment areas. I think that would be a discussion with our Council about their policy objectives along with potentially adding the site, what do they hope to achieve with it and how would they like to protect it.

Mr. Armstrong asked will it be part of the draft. Will it be part of the COOs recommendation? Will it be part of our discussion impact, or is it all the way in December when this discussion takes place? Mr. Reid noted the COO recommendation will address topics like that and will give some substance for MTAC and other groups to react to and help improve.

Bill Marchant appreciated the additional analysis and this kind of next level analysis. This matches up with what we hear anecdotally from at Greater Portland, Inc. For the rest of you here, anecdotally from staff, the economic development staff we work with across the region, commercial realtors, and even site selectors from across the country are saying similar things. Sometimes we worry about just anecdotal data. This additional analysis you've done really helps to confirm what we're hearing as well. Thank you for that.

Chair Kehe reminded the committee we are getting close to the period where we'll make the recommendation to MPAC in September. The Urban Growth Report will be coming out before your next meeting and will provide a lot of data and information, but conclusions will come later with the COOs recommendation in August. Our meeting in July will show all the pieces along the way and talk about how it all comes together. It's a good opportunity for you to delve into that information. We can use that time to think about what technical information MTAC wants to recommend to MPAC.

2040 Planning and Development Grant program changes (Serah Breakstone, Metro) Serah Breakstone presented information on the 2040 Planning and Development Grants Program Updates. A program overview was provided. Following a program refresh with user survey, stakeholder conversation and input for improvement for effectiveness and streamlining the process to focus on expanded opportunities, ease of use and providing more support, program changes were made.

- Rolling cycle with quarterly awards
- Grants available for Tribes
- Grants available for unincorporated areas for annexation planning
- Simplified grant categories, clear criteria
- Up to 20% of grants can be used for local government staff time

Grant categories have been reduced to two: Concept planning and planning inside the UGB. The program will target $4 million each year. The general criteria for the 2040 grants were provided. The 2040 grants timeline was given with full applications due September 6. Asked when the next cycle would occur in 2025, Ms. Breakstone noted this was anticipated happening in late February 2025, then near the end of each quarter for the rest of the year.

Kerry Steinmetz asked how much funding normally goes to those that are outside the UGB versus inside. Or does that fluctuate all the time? Ms. Breakstone agreed it fluctuates. When the program first started a lot of the money was funding concept planning work in urban reserve areas. In more recent years the bulk of the money goes to planning work inside the urban growth boundary.

Glen Bolen noted we had a presentation earlier on Title 6 and CFEC, and I'm wondering if your program is getting interest or thinking about how to work with cities as they're doing CFEC related implementation, which is everything from parking to codes. Ms. Breakstone noted we had some interest last year in our 2023 grant cycle. We had maybe just one parking project that was CFEC related that we funded and is now underway. That was for the City of Gresham. I haven't seen anything this year. None of the letters of interest received are in the realm, but those projects are eligible for funding as long as they can meet our criteria.

Adjournment

There being no further business, meeting was adjourned by Chair Kehe at 11:23 a.m.
Respectfully submitted,
Marie Miller, MTAC Recorder

Attachments to the Public Record, MTAC meeting June 26, 2024

Item	Document Type	Document Date	Document Description	Document No.
1	Agenda	6/26/2024	6/26/2024 MTAC Meeting Agenda	062624M-01
2	MTAC Work Program	6/14/2024	MTAC Work Program as of 6/14/2024	062624M-02
3	Draft minutes	4/17/2024	Draft minutes from MTAC April 17, 2024 meeting	062624M-03
4	Draft minutes	5/15/2024	Draft minutes from MTPAC May 15, 2024 meeting	062624M-04
5	Memo	6/14/2024	TO: MTAC and interested parties From: Glen Hamburg, Associate Regional Planner RE: Proposed Amendments to UGMFP Title 6	062624M-05
6	Attachment A	N/A	Attachment A: CFEC-Required Amendments to UGMFP Title 6 for Regional and Town Centers	062624M-06
7	Attachment B	N/A	Attachment B: 2040 Growth Concept Map	062624M-07
8	Attachment C	N/A	Attachment C: Draft Proposed Title 6 Amendments	062624M-08
9	Presentation	6/26/2024	Proposed Amendments to UGMFP Title 6	062624M-09
10	Presentation	6/26/2024	Urban growth management: Employment land analyses	062624M-10
11	Presentation	6/26/2024	2040 Planning & Development Grants – Program Updates	062624M-11

Draft 2024
Urban Growth Report

July 9, 2024

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LIST OF ACRONYMS

The following is a list of acronyms used throughout this document.

BLI: buildable land inventory

CEDS: Comprehensive Economic Development Strategy

CORE: Committee on Racial Equity

MPAC: Metro Policy Advisory Committee

MSA: Metropolitan Statistical Area (7-county area)

MTAC: Metro Technical Advisory Committee

OEA: Oregon Office of Economic Analysis

UGB: urban growth boundary

UGR: urban growth report

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Appendix 8A: Regional analysis of existing housing needs

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EXECUTIVE SUMMARY

Oregonians have a long tradition of taking a thoughtful approach to growth that protects farms and forests and helps shape vibrant, sustainable urban communities. Tools like the urban growth boundary (UGB) enable us to make the most of the land we have as we work toward achieving our region's shared goals. Over the past four decades the urban growth boundary has helped the Portland metro region minimize our carbon footprint and focus development in town centers and along transportation corridors, providing easier access to destinations where people live, work, play and study.

Under Oregon state land use law, urban growth management decisions focus on whether there is an identified regional need to add land to the UGB for forecasted housing and jobs growth. But a decision about whether to expand the boundary goes beyond that requirement. It also provides a chance to check in on how the region is changing, highlight successes, and draw attention to areas of concern. In the coming months, the Metro Council will make their 2024 growth management decision against a backdrop of new regional challenges and opportunities, informed by a shared desire to improve housing affordability, community stability, downtown revitalization, and equitable economic growth.

Metro and its partners are prepared to confront the challenges faced by our region with policies and investments that extend beyond managing the region's UGB. Examples include investing in supportive housing services, affordable housing, parks and nature. Together we are building regional transit connections along 82nd Avenue in east Portland and Clackamas County and along the Tualatin Valley Highway; and these new connections are leveraged by Comprehensive Economic Development Strategy (CEDS) plans and investments.

We also understand that collectively, we must do more to broaden the availability of affordable housing and economic prosperity. In this context, if a need is identified to provide more land for housing and job creation, Metro's charge is to work with cities seeking proposed UGB expansions that meet certain conditions. For the 2024 growth management decision, only one city – Sherwood – has requested an expansion. The request includes a completed concept plan for a proposed expansion within a designated urban reserve area.

This Urban Growth Report (UGR) sets out data and analysis to inform the Metro Council's decision whether to expand the UGB as proposed by the City of Sherwood.

Planning amid uncertainty

Slower population and employment growth

Several factors shape the context for the decision whether to expand the UGB. Among them, regional population growth is slowing. This reflects a nationwide trend where people are choosing to have fewer children (U.S. Department of Health and Human Services, 2024) - and Oregon's birth rates are among the nation's lowest. This means that in coming years our region is likely to see population growth only from net in-migration. Consequently, regional population growth rates are projected to be lower over the next 20 years.

The relatively high cost of living on the West Coast may be an additional headwind for regional population growth from migration, which historically has been highly variable from year to year.

Slowing population growth also means slower job growth. Sectors expected to grow the most are those that serve the existing population, such as health care and professional services.

Holding our ground in semiconductor manufacturing

Despite long-term declines at the national level, the greater Portland region is expected to maintain its historic strength in high-tech manufacturing thanks in part to assistance from the CHIPS Act. Computer and electronic manufacturing jobs are holding steady with modest gains due to our region's advantages in semiconductor research and development rather than large-scale production, which is more vulnerable to offshoring to countries with lower costs.

Underproduction of housing, particularly for people with the fewest resources

Our nation's housing markets continue to struggle to produce enough housing to match household growth, particularly for households with lower incomes. This backlog of housing production became evident in the aftermath of the 2008 housing bubble and recession – and its effects are still felt today. Those who experience this housing shortage most acutely are people with the fewest resources. Housing instability and houselessness disproportionately impact people of color.

For developers and builders, the cost of labor, materials and lending remain a burden on housing production. Nationwide, access to buildable lots is a challenge in part because of lower numbers of land development companies. In our region, as elsewhere, the cost of serving raw lands with needed infrastructure is a significant barrier to housing development.

On a positive note, jurisdictions around the state have removed regulatory barriers to producing a greater variety of housing types. "Middle housing" options that include townhouses, duplexes, triplexes, quadplexes and cottage clusters hold promise for providing additional housing types for people of varying incomes – particularly ownership options in smaller formats. In fact, in the future middle housing may well be more profitable to build than single unit detached housing.

Pandemic impacts on work

Though many aspects of life have returned to normal after the COVID-19 pandemic in 2020 and 2021, it has had lasting impacts on what that "normal" looks like. After peaking in 2021, the share of employees working from home full time or hybrid remained at 24 percent in 2022 for the greater Portland metropolitan area. While offering more flexibility for office workers and some cost savings for businesses, this persistent trend has led to high office vacancy rates and has long-term implications for demand for office space.

Housing capacity needs

While there is a housing crisis nationally and in our region, it is not clear that shortage is caused by a sheer lack of space for additional housing to be built. Metro's UGB housing need analysis shows that within the Metro area UGB, there is an existing need for approximately 24,000 homes to address historic underproduction and its impacts, including houselessness. Additionally, under the baseline population forecast conducted for this Urban Growth Report, approximately 150,000 additional homes are needed to meet expected population growth over the next 20 years.

Trends projecting more one-person households and an aging population (often on fixed incomes) predict that the need for more affordable, smaller homes will increase. To meet these housing needs, we must continue to focus on public investment and removing barriers to housing production in existing urban locations.

Housing capacity gap analysis

Baseline analysis conducted for this Urban Growth Report reveals that there is likely room to accommodate most, if not all, of the region's existing and future housing needs inside the existing UGB for the next 20 years. Growth projections vary, however - and based on the range of those projections the Metro Council has latitude to determine there is a need to add the Sherwood West urban reserve to the UGB or to take other measures to encourage redevelopment. This latitude derives from several factors described in more detail in this report. Generally, those factors relate to uncertainty around future migration rates, redevelopment potential and middle housing potential. As a result of different growth projections, the UGB capacity deficit, or "gap," for accommodating housing needs can vary within the following ranges:

- For single unit detached and middle housing capacity, the gap ranges from a potential deficit of approximately 2,250 homes to a potential surplus of approximately 32,500 homes.
- For multi-family housing capacity, the gap ranges from a potential deficit of 23,900 homes to a potential surplus of 3,750 homes.

Housing capacity options

If the Metro Council determines that there is a need for additional capacity to address housing needs, it may take measures to increase the likelihood of developing housing on land already inside the UGB and/or expand the UGB to add the Sherwood West urban reserve area as proposed by the City of Sherwood. If the Council elects to expand the UGB, it may wish to consider conditions of approval to help achieve a certain housing mix or number of housing units to best meet the region's housing needs.

Employment land needs

Industrial land needs

Although analysis shows a surplus of industrial land in aggregate throughout the region, individual businesses seeking specific development-ready properties for sale or lease may struggle to find options.

Metro, with review by cities and counties, identified almost 6,000 acres of industrial land inside the UGB that meets the legal definition of being buildable. The Urban Growth Report analysis shows a regional surplus of 4,550 acres of industrial land to accommodate expected industrial job growth under the baseline forecast. There is a surplus even under a high growth employment forecast.

However, the available acres of industrial land may not have the location and site characteristics that will lead to industrial development. The Sherwood West employment area offers the potential for business growth because of unique characteristics that are in short supply on lands already in the UGB, including the potential for assembling larger sites, relatively flat parcels, and relative proximity to existing job clusters.

Industrial land options

Informed by this analysis, the Metro Council has the discretion to do one of the following:

- Based on regional employment forecasts and the aggregate inventory of industrial lands, decide that there is no need for additional land for industrial uses.
- Add the mixed employment portion of the Sherwood West urban reserve to the UGB based on a determination that the area offers unique site characteristics for industrial and flex uses that are in demand and that cannot be found elsewhere in the UGB.

If the Council determines that there is a need to expand the UGB to provide industrial sites with specific characteristics, it may wish to consider conditions of approval to protect those sites from other uses.

Commercial land needs

Depending on the amount of employment growth anticipated, this analysis identifies a potential surplus of 800 buildable acres of commercial land (low growth forecast) to a potential deficit of 1,800 buildable acres (high growth forecast). Under the baseline growth forecast, there is a deficit of 320 buildable acres.

Commercial land options

Informed by this analysis, the Metro Council has the discretion to decide one or more of the following:

- Plan for the low growth forecast and find no need for additional land.
- Plan for the baseline forecast:

  - Assume that 320 acres or more of the region's industrial land surplus is functionally available for commercial employment uses, thereby addressing the commercial capacity gap; or,
  - Assume that additional commercial redevelopment would occur if there is demand for commercial space.
- Plan for the baseline forecast and find a need for a UGB expansion.
  - Add the commercial employment portions of Sherwood West urban reserve to the UGB.
  - Consistent with observed development trends, assume that a small portion of the region's industrial land surplus will be available for commercial employment uses, thereby addressing the remaining commercial capacity gap.
- Plan for the high employment growth forecast and find a need for UGB expansion.
  - Add the 135-net-acre commercial employment portions of the Sherwood West urban reserve to the UGB.
  - Add approximately 1,665 additional net acres of urban reserves that lack a concept plan or city support to the UGB.

Engagement

Metro staff have shared information from this report and explained the methods used to collect and analyze the data during its production. An Urban Growth Report Roundtable started meeting in September 2023 and met eleven times to discuss approaches used to collect data and share early information.

Staff from cities, counties and local experts were invited to review data during the process to ensure accuracy. Thank you to everyone who participated in the production of this plan.

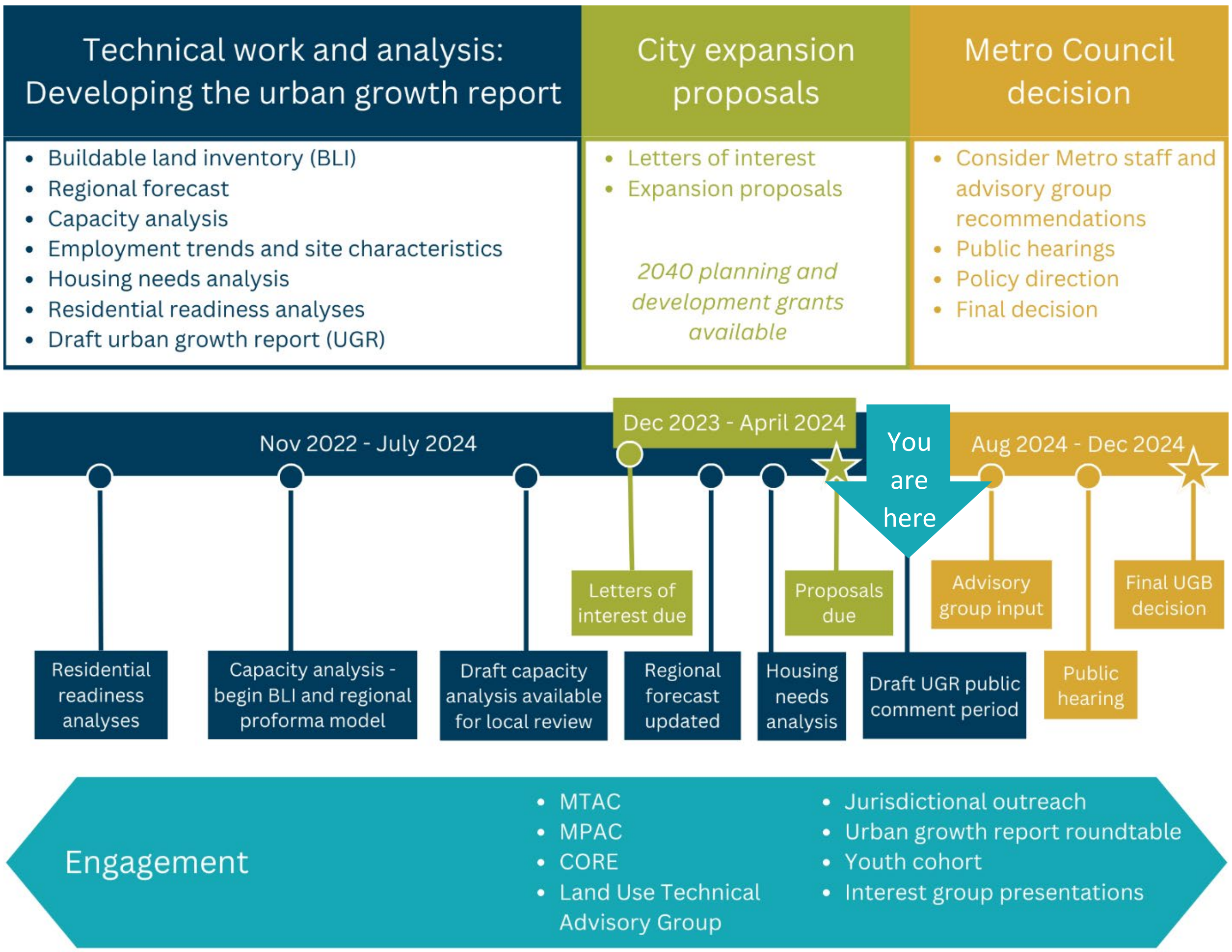
Next steps

The release of this draft 2024 Urban Growth Report kicks off policy discussions, leading to recommendations and a Metro Council decision by the end of 2024. This Urban Growth Report is intended to provide the best available information to support those discussions without implying more precision or certainty than is warranted in a 20-year planning effort.

Tentative milestones:

Now-August 4, 2024	Public comment period on draft UGR and Sherwood expansion proposal
August 14, 2024	Release Chief Operating Officer recommendation
September 18, 2024	Metro Technical Advisory Committee recommendations to MPAC
September 19, 2024	Committee on Racial Equity recommendations to Metro Council
September 25, 2024	Metro Policy Advisory Committee recommendations to Metro Council

September 26, 2024	Metro Council public hearing on Chief Operating Officer recommendation
October 1, 2024	Metro Council direction to staff
November 21, 2024	Metro Council public hearing
December 5, 2024	Metro Council decision



Draft 2024 Urban Growth Report

Urban Growth Report Roundtable and Youth Cohort perspectives

For the 2024 urban growth management decision, Metro's Chief Operating Officer convened an Urban Growth Report Roundtable with the goal of having additional transparency around how Metro conducts its analyses.

Metro also convened a Youth Cohort with the goals of developing future leadership in urban planning and providing avenues for youth to share their perspectives in this decision process.

Youth Cohort and Roundtable perspectives are summarized in sidebars throughout this document.

LAND READINESS, NOT JUST LAND SUPPLY

Our region has learned that growth management decisions need to focus on at least two major factors:

- Whether there is a long-term regional need for more land inside the UGB. State laws establish this expectation to which Metro's analyses respond.
- Whether there is a plan for making UGB expansions ready for development of housing and businesses. Metro, as a matter of adopted policy, orients its decision making around city readiness for UGB expansions.

Before the adoption of urban and rural reserves in 2010, growth management decisions focused solely on the first factor, establishing whether there was a regional need for land. While we continue to strive for objective analyses of land need, we also have learned that we must pay attention to the readiness of potential UGB expansion areas. This was based on multiple instances of expanding the UGB only to see the land sit for years or decades before developing as intended. Figure 1 illustrates this point, showing the slow production of housing in older UGB expansion areas that did not answer the question of readiness before UGB expansion.

UGR Roundtable perspectives: Development barriers

Development barriers and the feasibility of future development was another recurring topic in the group. The discussions included barrier to housing, commercial and industrial development. During an activity where participants identified development barriers, the list included:

- Price of property
- Zoning and market mismatch
- Market conditions outweigh subsidies
- Property owner motivations
- Cost of infrastructure to serve site
- Parcel assembly
- Site constraints
- Environmental challenges – brownfields, floodplains
- Absentee landowner
- Land banking
- Political challenges
- Public ownership
- Easements
- Regulatory requirements – frontage, trees, stormwater, fees
- Transportation infrastructure not well maintained and difficult site access

Members seek creative solutions and collaboration between the development community, local jurisdictions, Metro, and the State of Oregon. Some roundtable members specifically called out the long timeline from the beginning of the concept planning process to the start of construction and suggested reducing the amount of detail and procedures required to complete these steps. Others mentioned that their biggest barriers are expensive infrastructure and cost prohibitive development code requirements, especially on infill sites.

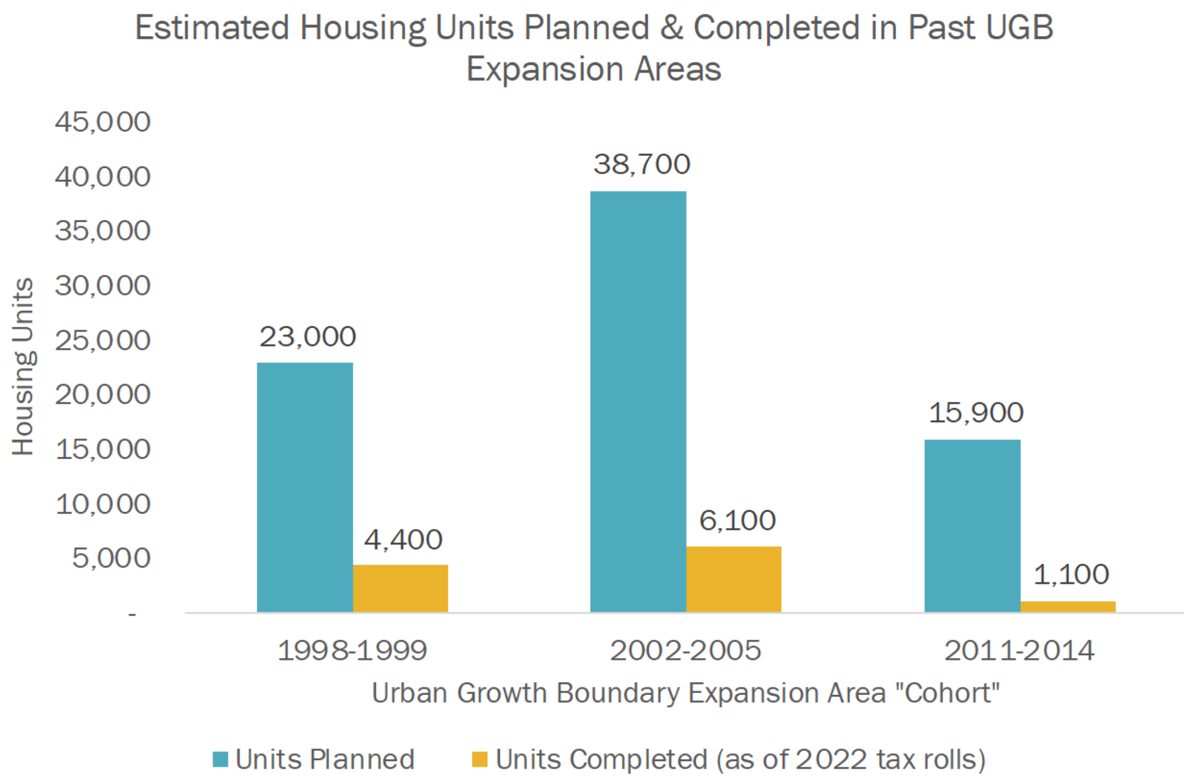


Figure 1: housing units planned and built to date in older UGB expansion areas

Since 2010, it is the Metro Council's policy to only expand the UGB into urban reserves that have been concept planned by a local jurisdiction. Metro provides grant funding for cities seeking to complete concept plans for urban reserves. Title 11 of Metro code lays out concept planning requirements.

In 2017, on advice from the City Readiness Advisory Group, the Metro Technical Advisory Committee (MTAC), and the Metro Policy Advisory Committee (MPAC), the Metro Council adopted additional policies that provide more clarity for cities regarding what needs to be addressed in their UGB expansion proposals. Title 14 of the Metro code describes those factors, including, for example, demonstrating that the city has worked to remove barriers to mixed-use development and has implemented best practices for preserving and increasing the supply and diversity of affordable housing in its existing urban areas.

The 2018 growth management decision was the first full implementation of this readiness-focused approach. In 2018, four cities proposed UGB expansions and the Metro Council approved all four. Today, these cities have completed or are working to complete comprehensive planning for these areas. However, even with a focus on city readiness, development can take time. To date, no housing development has occurred in these four expansion areas.

For the 2024 growth management decision, one city, Sherwood, has proposed a UGB expansion in the Sherwood West urban reserve. The City of Sherwood's concept plan includes a mix of housing and employment uses as well as protection of habitat and open space areas.

UNDERSTANDING THE IMPACT OF THE URBAN GROWTH DECISION

Who benefits and who is burdened?

The UGB helps us make the most of public resources by focusing on development that supports building and maintaining streets, pipes, schools and parks that every community needs. However, not everyone benefits equally from these investments.

The greater Portland area has a history of inequitable and racist land use and development such as redlining, destruction of neighborhoods through the misuse of urban renewal, exclusionary covenants, and zoning codes that only allowed single-unit detached housing on larger lots, which has led to gentrification and displacement.

Displacement has disproportionately affected communities of color, leading to a shift in the racial geography of the region over the last decade. Displacement is a geographic consequence of a series of systemic inequities and racist policies and can have wide-ranging impacts on health and well-being – impacts that can span generations.

Youth Cohort perspectives: Equity and engagement

As the youth cohort learned about the urban growth management decision, a primary focus of their feedback was ensuring that the process centered on **equity and meaningful community engagement.** Many participants wanted the Metro Council to make sure that they were hearing a broad variety of perspectives, especially those that are not always heard in this process. When learning about the Sherwood West proposal, the group wanted to consider how people living in surrounding areas may be affected and wanted the plan to reflect racial equity considerations when discussing access to future homes and job opportunities. The group emphasized the importance of local participation and education, and underlined the role of young people in this process as the primary source for understanding the priorities and challenges that the next generation will face as they will grow up to inherit the outcomes of the plans that are made today.

Understanding the impacts of planning decisions is critical in building a more equitable region where all people have access to the places and resources they need to flourish. Continued work at all levels of government is needed to affirmatively further fair housing and to ensure that affordable housing is available in all communities.

To better understand the wide-ranging impacts of urban growth management decisions, Metro examined previous expansion areas ahead of the 2024 growth decision to determine who has benefited and who has been harmed in expansions of the boundary.

These case studies focus specifically on population demographics, housing type, and home values to measure how the urban growth boundary might impact affordability, housing type, and displacement in greater Portland, and how we can build thriving communities for all in UGB expansion areas and beyond.

A Snapshot of Bethany and Happy Valley

Metro gathered housing and census and housing data for two past expansion areas: Bethany in 2002 and Happy Valley in 1998.

Metro examined this data to understand who has moved to expansion areas as well as how many houses have been built, the types of housing available (townhome, single-unit detached home, etc.), as well as median home value.

These case studies provide a snapshot of two communities that have developed the land within the expanded UGB. Metro focused on assessing these two areas because many other past expansion areas have not yet developed or have been slow to develop.

UGR Roundtable perspectives: Diversity, equity and justice

Diversity, equity, inclusion, and justice topics were woven throughout the UGR roundtable discussions. Staff heard from some members that it is important to center community in our conversation and remember the people that are represented in the technical analysis, elevating qualitative data to the same importance and value as quantitative data. Participants suggested connecting the data related to race, ethnicity with personal stories of lived experiences. This is a way to understand how different demographic groups have different needs and unique positions in the community.

Happy Valley

In 1998, Metro expanded the UGB near Happy Valley to include an additional 660 acres of land. The city has further expanded their city limits into a portion of the 13,000-acre expansion of the Damascus area approved in 2002. Since this time, more than 6,200 housing units (source: RLIS Housing Inventory) have been built or permitted in the expansion areas, and the expanded UGB is now home to more than 20,000 people.

Table 1: Race and ethnicity of people living in Happy Valley (2020 Census)

Race/Ethnicity Census Categories	Happy Valley expansion only	Happy Valley total
White	62%	64%
Black	2%	2%
AIAN (Amer. Indian/Alaskan Native)	0%	0%
Asian	21%	20%
NHPI (Native Hawaiian/Pacific Islander)	0%	0%
Other	0%	0%
Multiple	6%	6%
Hispanic	8%	7%
BIPOC (total non-white)	38%	36%

Analysis: There is no significant difference in the demographics of residents within the expanded UGB area and the total Happy Valley population.

Table 2: Housing types in Happy Valley (Source: RLIS Housing Inventory)

% of homes built that are middle housing	Happy Valley expansion only	Happy Valley total
Middle housing		7%
Multifamily	31%	20%
Other	6%	5%
Single-unit detached housing	58%	68%

Analysis: A higher percentage of middle family and multifamily housing was developed in Happy Valley's UGB expansion areas than in Happy Valley overall.

Implication for affordability: Middle family and multifamily housing types support denser communities where you live closer to places you work, live, play, etc.

Table 3: Affordability & assessed home values in Happy Valley (Source: County Tax Assessor data)

Median home assessed value by home type	Happy Valley expansion only	Happy Valley total
Single-unit detached housing	$695,786	$733,856
Townhouse	$438,329	$431,854

Analysis: Townhouses in the UGB are slightly more affordable than those in the other areas of Happy Valley, in which single-unit detached homes are slightly less expensive. All housing types in Happy Valley are, on average, above the regional average home value. High housing production costs contribute to the overall regional supply shortage and can have a long-term impact on housing costs.

Bethany

In 2002, the Metro Council brought 716 acres into the UGB in Washington County's North Bethany area. More than 5,000 homes are planned for the area.

Since then, 573 homes have been built or approved for construction in the area. As of mid-February, the least expensive home in the area was for sale for $405,995.

Table 4: Race and ethnicity of people living in Bathany (2020 Census)

Race/Ethnicity Census Categories	Bethany expansion	Bethany total
White	27%	40%
Black	3%	2%
AIAN (Amer. Indian/Alaskan Native)	0%	0%
Asian	58%	44%
NHPI (Native Hawaiian/Pacific Islander)	0%	0%
Other	1%	1%
Multiple	4%	5%
Hispanic	6%	7%
BIPOC (total non-white)	73%	60%

Analysis: The Bethany expansion area is home to significantly more residents who identify as Asian than the Bethany population overall.

Table 5: Housing types in Bethany (source: Metro Land Development Monitoring System)

% of homes built that are middle housing	Bethany expansion	Bethany total
Middle housing	11%	8%
Multifamily	20%	20%
Other	0%	2%
Single-unit detached housing	69%	70%

Analysis: A slightly higher percentage of middle family and multifamily housing was developed in the UGB expansion area than in Bethany overall.

Implication for affordability: These housing types are supportive of denser communities where you live closer to places you work, live, play, etc.

Table 6: Affordability & assessed home values in Bethany (source: Metro Land Development Monitoring System)

Median home assessed value by home type	Bethany expansion	Bethany total
Single-unit detached housing	$784,740	$761,170
Townhouse	$474,310	$481,895

Analysis: Townhouses in the UGB are slightly more affordable than those in Bethany overall which Single-unit detached homes were slightly less expensive. All housing in Bethany is above the regional average home value. High housing production costs contribute to the overall regional supply shortage and can have a long-term impact on housing costs.

Limitations of census data and data collection

While the data in this report is accurate and reliable, it relies heavily on census data. Different communities have different levels of comfort engaging with government censuses and surveys. Additionally, smaller demographic segments of the population are harder to count in the census.

These longstanding cultural and statistical issues can result in undercounts, especially for marginalized communities, such as immigrants and refugees, people of color, people who speak limited English, people who are unhoused and people with disabilities. Comparing and making sense of decennial censuses in the United States can be difficult for other reasons, as well.

Additionally, the size and shape of the UGB expansion areas limit the amount of reliable demographic data available. Expansion areas are often small portions of larger geographies used by the census. For example, there is census data about race and ethnicity available at a geographic scale that more closely aligns with expansion areas but the census does not provide data about income for the same geographic scale.

Lessons learned

Metro's analysis of these case studies did not provide conclusive results. This process highlights the need for more and different data to understand equity impacts.

This initial attempt at understanding the impact of UGB expansions paves the way to continue exploring affordability, equity areas, the social consequences, how people move and why, and what it means to benefit from and be impacted by expansion decisions.

Urban growth boundary expansion areas are sparsely populated when added to boundary. The number of people living and working in these areas who are directly affected by UGB expansions is relatively small, but they are important to consider. People with direct connections to expansion areas include property owners (who will likely profit from the sale and development of their land), renters (who are at risk of displacement), as well as farm and forest workers (whose jobs are at risk of displacement). It is worth noting that land that is considered most important for commercial agriculture and forestry use is in rural reserves and not eligible for urban expansion.

It is difficult to draw conclusions about the impact of urban growth decisions on the affordability or livability of existing urban areas because there are many economic and social factors at play. One way of examining the potential impact of the UGB on housing affordability is to compare the greater Portland region to similar metro regions without urban growth boundaries. Austin, Denver and Atlanta have similar housing prices to greater Portland, which could indicate that the UGB does not have a significant impact on affordability in greater Portland.

Looking forward

While it is not possible to predict who will move into newly urbanized areas, there are many ways to help make newly developed areas welcoming to a diversity of community members. These strategies include, but are not limited to, local zoning policies that encourage a diversity of housing types and mixed-use developments, fostering strong communities that include access to nature and community spaces, as well as building affordable housing and transportation infrastructure. Strategies could also include a racial equity assessment and deep community engagement that inform expansion proposals.

Metro can evolve this process to better understand how the urban growth management decision impacts communities and reduces racial disparities in the greater Portland region. Future urban growth management decisions must prioritize community engagement with community members early and often and improve the agency's approach to involving community members in this technical and long-term process.

If community members are not working alongside Metro, there is a risk of perpetuating the inequities in this region. With a commitment to building a more equitable region, Metro will set the tables for continued conversations and collaboration to advance the region's understanding of how urban growth management impacts marginalized communities—particularly people of color.

HOW MUCH POPULATION GROWTH IS EXPECTED?

A core aspect of making growth management decisions is determining the rate of population, household, and job growth in the Metro UGB over the next 20 years. Metro accomplishes this by first conducting a forecast for the seven-county Metropolitan Statistical Area (MSA). As described in appendices 1 and 1A, this forecast is based on the best available data sources and uses accepted practices for forecasting. To ensure the quality of the forecast, external economists and demographers review it for its reasonableness.

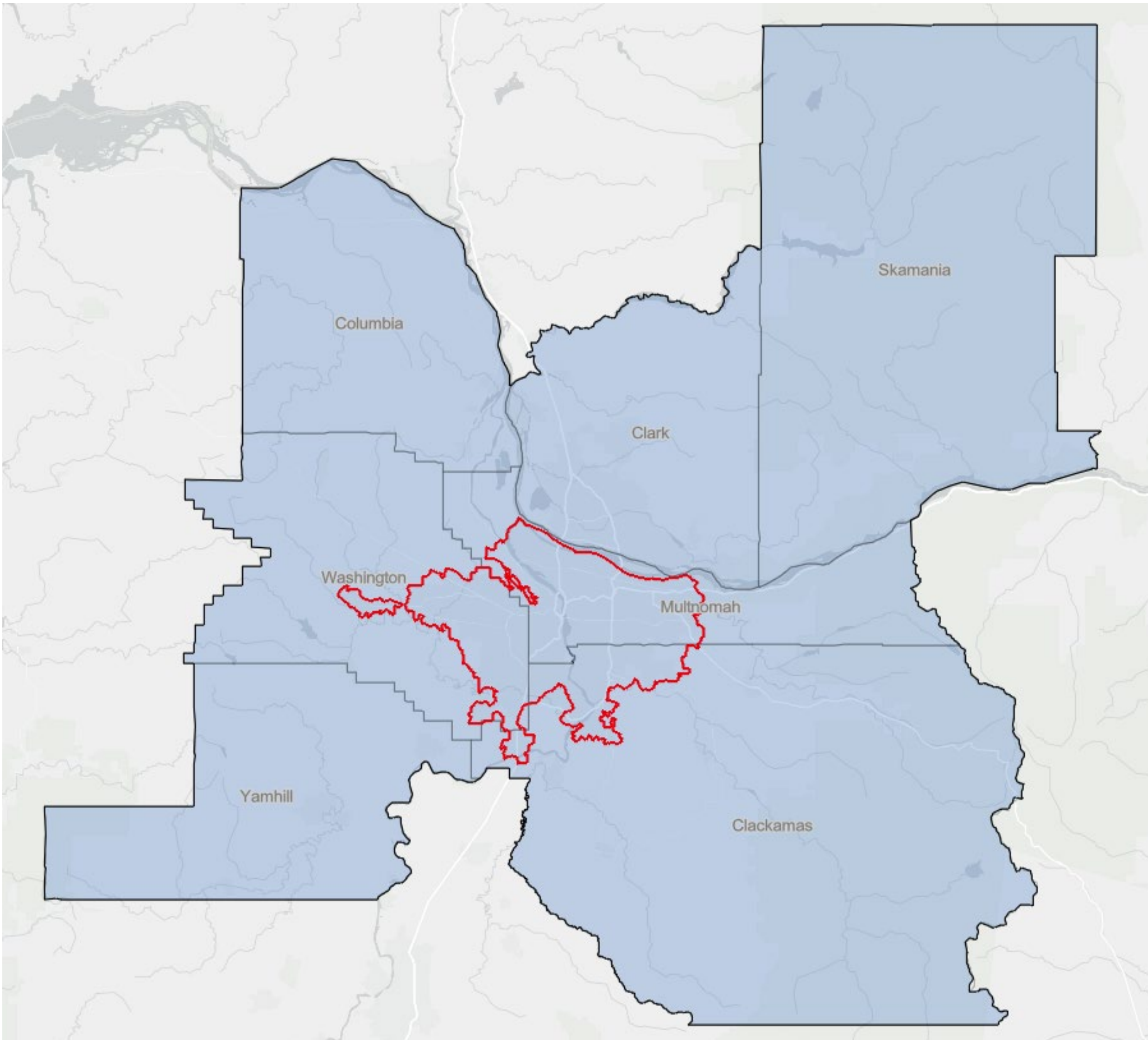


Figure 2: 7-county Metropolitan Statistical Area (MSA) and Metro UGB (shown in red)

People are choosing to have fewer children

In previous population forecasts, the long-term decline in birth rates in the U.S. and the Metro region was expected to plateau. However, birth rates have continued to decline and it is now a widely held view that the population in our nation, state, and region will decline without migration.

Our region is not alone. A recent study published in the British medical journal, The Lancet, estimates that by the year 2100, 97 percent of countries will see population declines without net positive migration.[i] Figure 3 depicts the greater Portland MSA's history and forecast for annual natural change (live births minus deaths). After a near-term increase, natural change is expected to be negative after the year 2033.

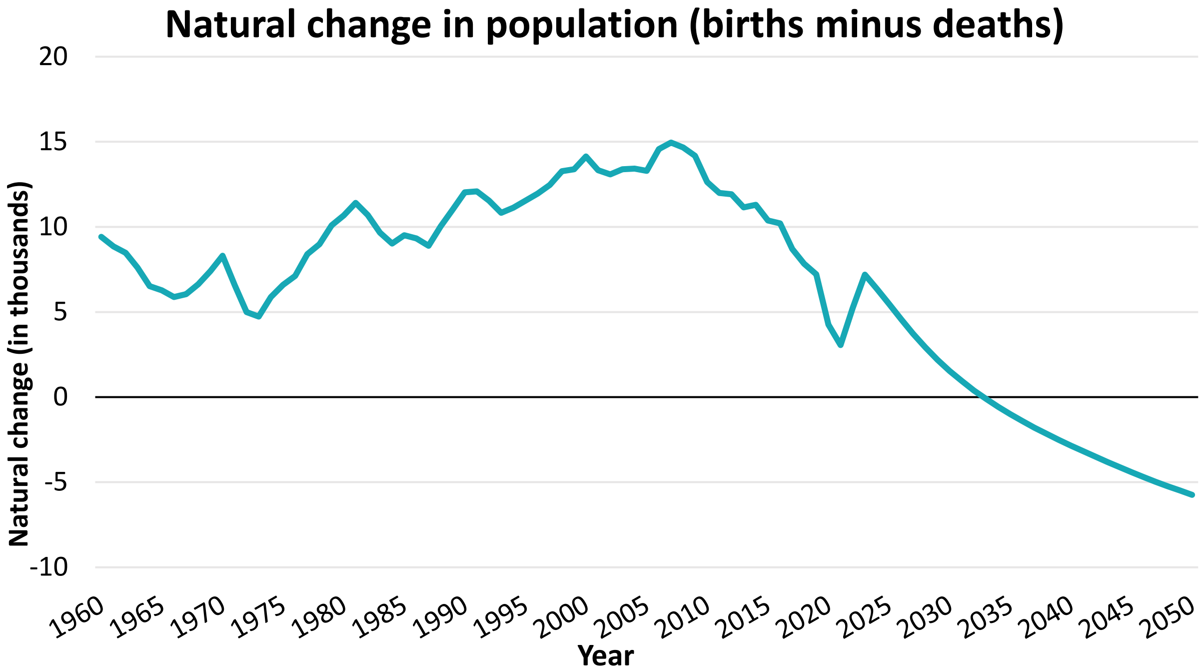


Figure 3: Natural change (live births minus deaths) for the Portland MSA

Future migration levels are a source of uncertainty

The baseline draft regional forecast assumes that net migration will be sustained at the historic average level, which would result in regional population growth, albeit at a slower rate because of negative natural change (deaths will outnumber births). Under the baseline forecast, net migration is expected to add 15,000 people per year to the MSA population.

Expert reviewers of the regional forecast emphasized that, while it is a reasonable assumption, there is uncertainty around maintaining this historic average net migration rate. Reviewers saw potential for lower net migration rates due to affordability issues on the West Coast, including greater Portland.

Reviewers also indicated that, though it makes intuitive sense that the Pacific Northwest will attract migrants from areas with higher climate risk, there is no data to support this assumption. The variation in historic net migration rates illustrates this lack of a trend (see Figure 4). Metropolitan areas that have higher climate risk in the desert, southwest, coastal areas, and the Sunbelt continue to see some of the highest rates of growth in the country. A 2016 symposium on the topic also emphasized these points (Binder, 2016).

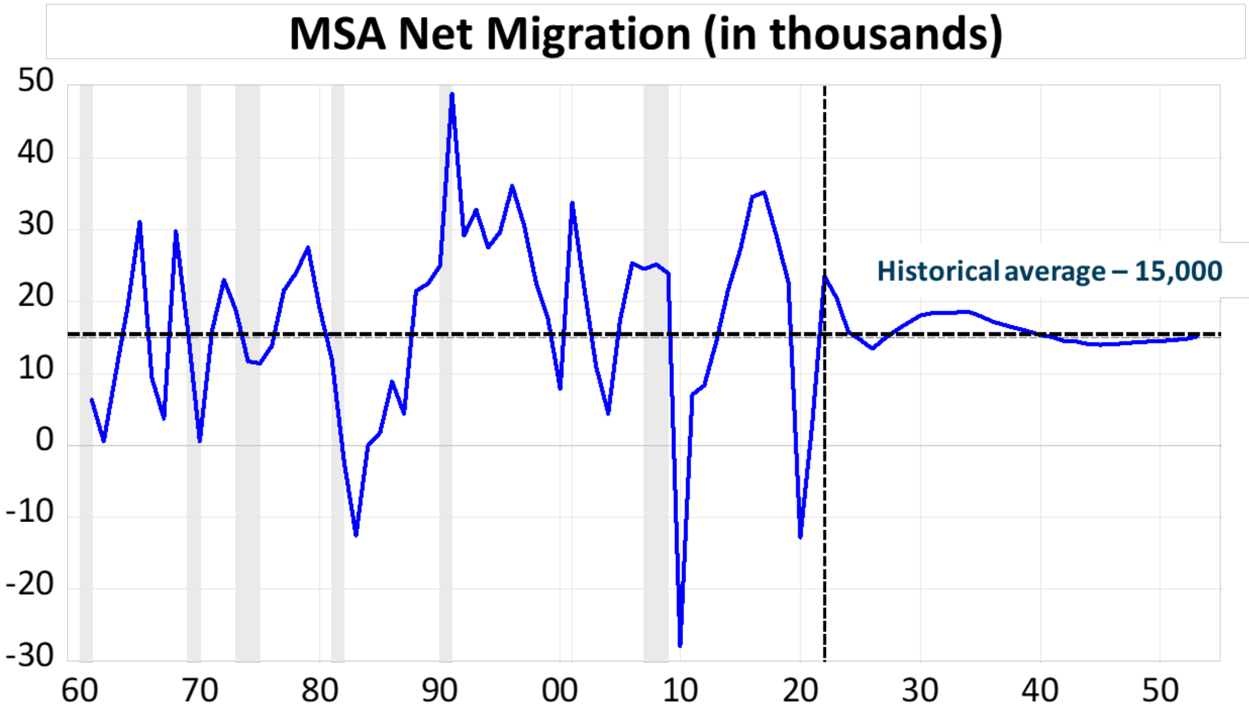


Figure 4: Net migration (in 1000s of people) for the Portland MSA: 1960-2050

Population forecast results

The baseline forecast estimates approximately 315,000 more people in the Portland region between 2024 and 2044 for a total population of 2,901,000 by 2044. The baseline forecast is the most likely forecast. However, as noted, there is uncertainty surrounding population growth, particularly for future migration trends. To recognize that uncertainty, Metro has also completed low and high growth forecasts. While these alternative forecasts are both possible, they are not as likely as they would require sustained and sizable decreases or increases in net migration.

Table 7: Population range forecast for the Portland MSA: 2024-2044

	Low	Baseline	High
2024	2,529,000	2,586,000	2,644,000
2044	2,521,000	2,901,000	3,281,000
Difference	-8,000	315,000	637,000

Note: 2024 population numbers are estimates and therefore vary between low and high forecasts

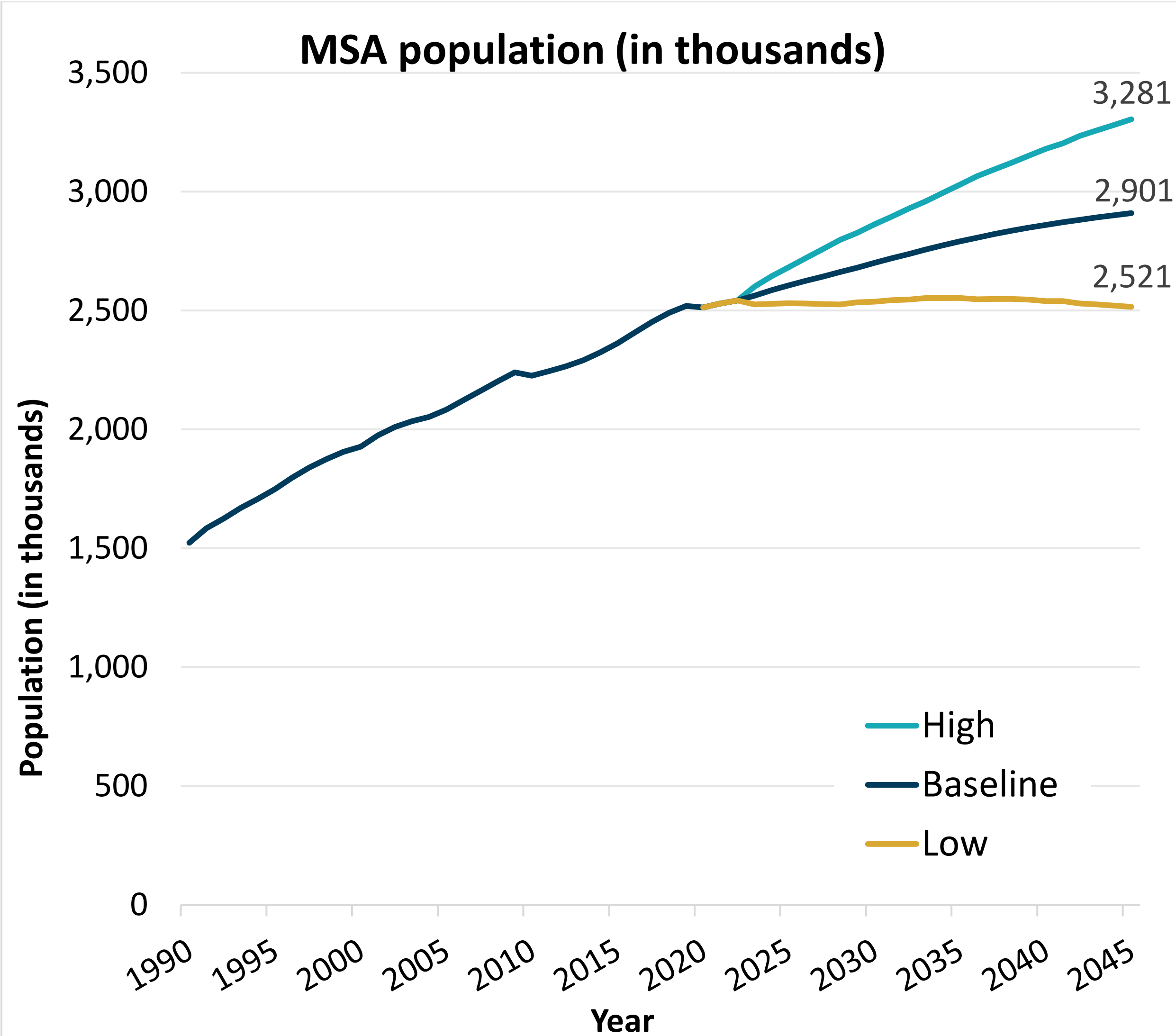


Figure 5: Portland MSA population history and forecast: 2024-2044

REGIONAL HOUSING NEEDS ANALYSIS

Even with a population growing at a slower rate, the region needs to remain focused on people's housing needs. Demographic shifts related to this slower growth rate provide insights into the region's future housing needs for the 2024-2044 period.

Demographic trends

People are choosing to have fewer children:

- In our region, the average household will have fewer people, dropping from 2.41 people today to 2.27 people in 2044.
- Today, approximately two-thirds of households have two or fewer people. That share is expected to increase.

- With fewer people choosing to have children, the median householder age will increase. Households headed by someone over 65 years will constitute the greatest share – almost two-thirds – of the change in households.

As the Millennial generation ages, Gen Z follows in its wake as a smaller generation:

- Compared to today, there will be a slight decrease in the number of families with children with a householder 25-44 years old (instead of Millennials, the smaller Gen Z will be in this age cohort in the year 2044).
- About a quarter of new households will be aged 45 to 64 with children (this will be the Millennial generation in the year 2044).

Smaller, older households mean, on average, fewer wage earners per household:

- With an older population, more people will be retired and on fixed incomes. 41 percent of new households will be seniors with lower (below $60,000) household incomes.
- Over 60 percent of new households will have household incomes less than $60,000, contributing to additional need for housing affordable to households earning 30 to 80 percent of area median income.
- 85 percent of new renter households will have incomes less than $60,000.

Figure 6: 2024-2044 household change (UGB) by life stage (source: ECONorthwest analysis of Metro baseline regional forecast)

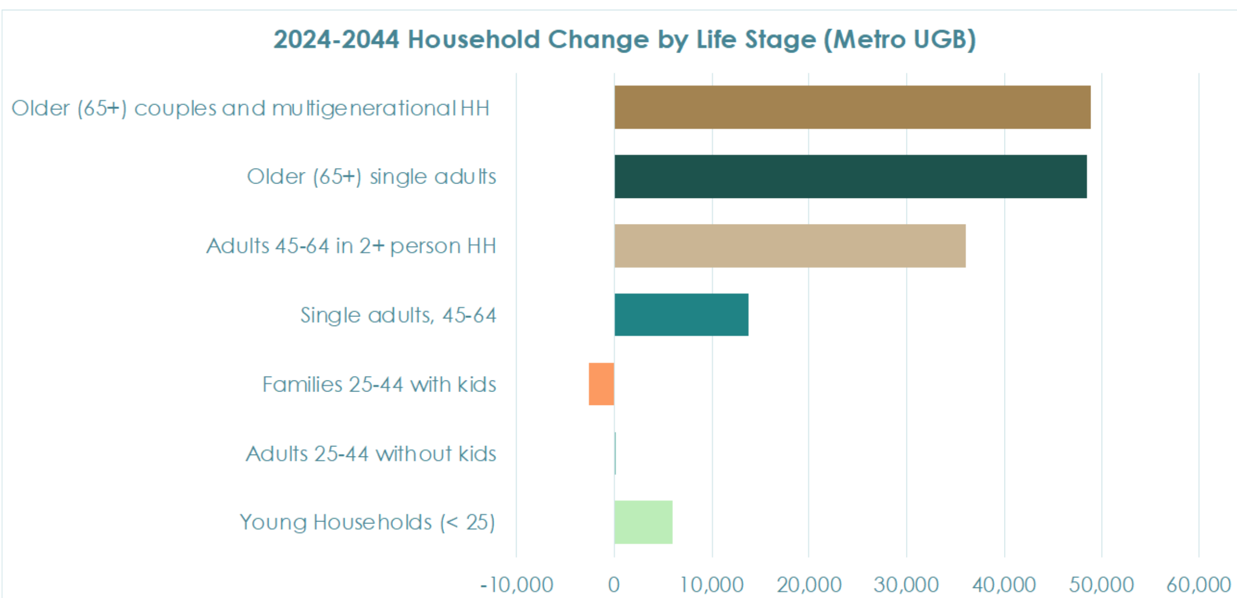
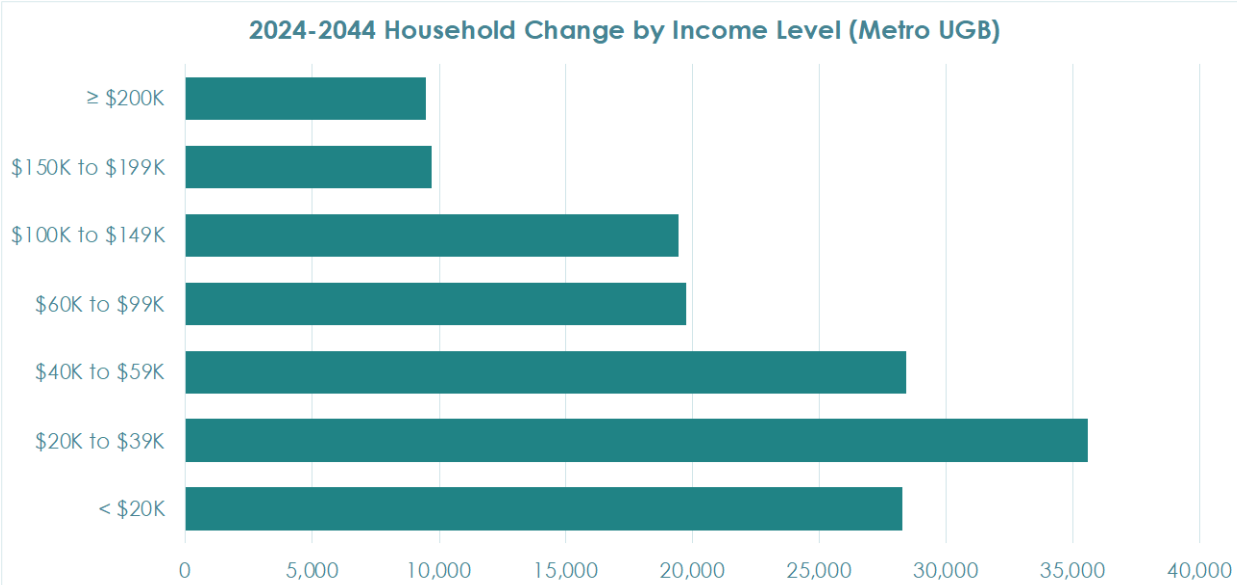


Figure 7: 2024-2044 household change (UGB) by income level (source: ECONorthwest analysis of Metro baseline forecast)



Residential trends

Underproduction of housing

Our nation's housing markets continue to struggle to produce enough housing to match household growth, particularly for people earning lower incomes. This backlog of housing production became clear in the aftermath of the 2008 housing bubble and is still with us today.

More recently, higher interest rates have caused many homeowners who might otherwise move to stay put since they cannot afford to take on a new mortgage at higher rates. This contributes to low inventory of houses for sale. In the end, those that feel the housing shortage most acutely are people with the fewest resources.

For developers and builders, the costs of labor, materials and lending remain a drag on housing production. Nationwide, access to buildable lots is a challenge in part because of lower numbers of land development companies and the costs of serving raw lands with needed infrastructure.

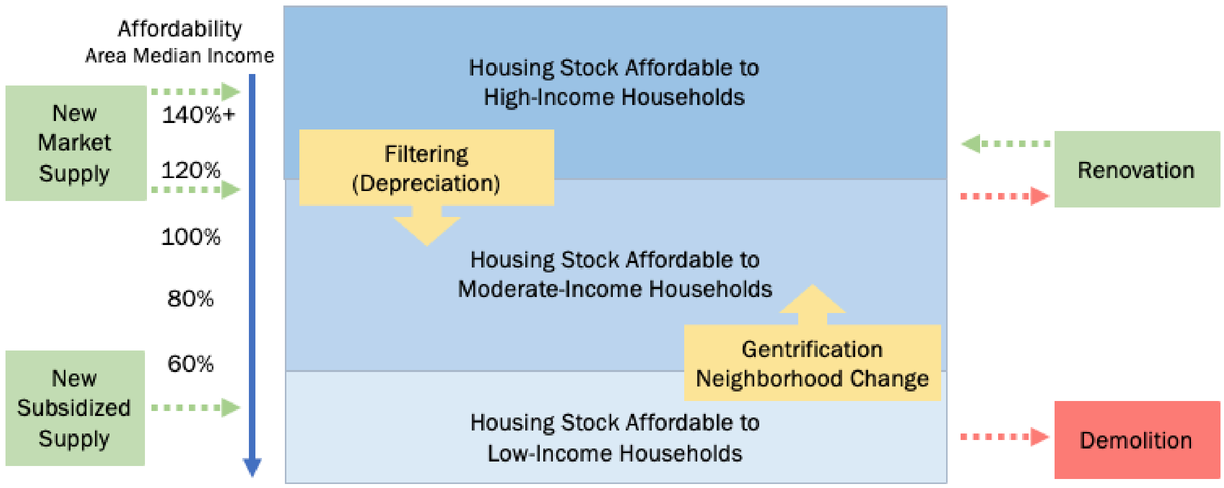
Regional housing production, gentrification, and displacement

The interaction between housing supply and demand influences affordability. While new market rate housing is rarely "affordable," housing production contributes to the overall regional supply and can have a long-term impact on housing costs. Metro, seeking to better understand the role of regional housing supply in affordability, contracted with ECONorthwest to provide an overview of these regional housing market dynamics.

UGR Roundtable perspectives: Housing production and affordability

Housing production and affordability was an important topic to UGR roundtable members. Participants expressed the need for renewing funding sources and establishing clear goals for affordable housing development to meet regional needs at various income levels. This affordable housing production should include units for both rent and ownership. Members mentioned that housing and land are resources for generational wealth building. Other roundtable members working in housing development cited the high infrastructure costs as a substantial barrier to housing affordability and production. This led to conversation about the need for policies to address historic underproduction and advocate for infrastructure funding. Some roundtable members advocated for workforce housing to support job growth in the region. By proactively planning for workforce housing at different income levels, including addressing the specific needs for farmworker housing, cost of living may become less of a barrier for workers here today and those considering moving in the future.

Figure 8: illustration of how new housing supply affects housing markets (source: ECONorthwest)



ECONorthwest's work on this topic can be found in Appendix 10. Takeaways include:

- The supply of new market-rate housing is crucial for moderating price increases.
  - However, depreciation of housing (filtering) alone won't meet the needs of lower-income households.
- Housing displacement risk should inform public policies and investments, but not necessarily inhibit them.
  - Creating affordability in high-opportunity areas with access to services and amenities is as important as maintaining affordability in areas at risk of displacement.
  - Investments in existing communities may increase property values and may need to be paired with investments in stability.
  - Households experiencing economic precarity face displacement risks wherever they live without appropriate support.
- Preventing and mitigating displacement is hard, but not impossible.
  - The UGB is just one policy tool. Many more interventions and partnerships are required to succeed.
- Data alone is not enough to understand gentrification and displacement.
  - Lived experiences and awareness of history can supplement data.

Housing production by location

The 2040 Growth Concept, Greater Portland's long-standing plan for growth, seeks to focus housing development in urban centers, corridors and main streets. This is typically achieved through redevelopment or infill. Approximately 93,000 homes were built inside the UGB from 2013 to 2022. A little more than half of that housing was built through redevelopment rather than vacant land development. Figure 9 depicts the intensity of residential development around the region for the 2009-2023 period. Many 2040 centers and corridors have contributed to this housing production.

Focusing growth in urban areas helps our region to minimize impacts on rural areas outside the UGB. Ongoing efforts are needed to ensure equitable access to nature in urban areas. Climate change brings with it additional urgency to enhance our urban tree canopy to protect people from extreme heat events.

Youth Cohort perspectives: Building communities with access

A recurring theme throughout the youth cohort meetings was the importance of **building communities with access** to opportunities and a variety of community spaces, especially for access that was not car-dependent. This theme included the cohort priority that new neighborhoods should include spaces for everyone and that people should be able to meet their needs without having to rely on a car. Cohort participants emphasized priorities of walkability, public transit access, and accessibility in connections through new neighborhoods. The theme of access also included access to opportunity – jobs with livable wages, and opportunity to meet needs like buying nutritious foods and gathering with other community members.

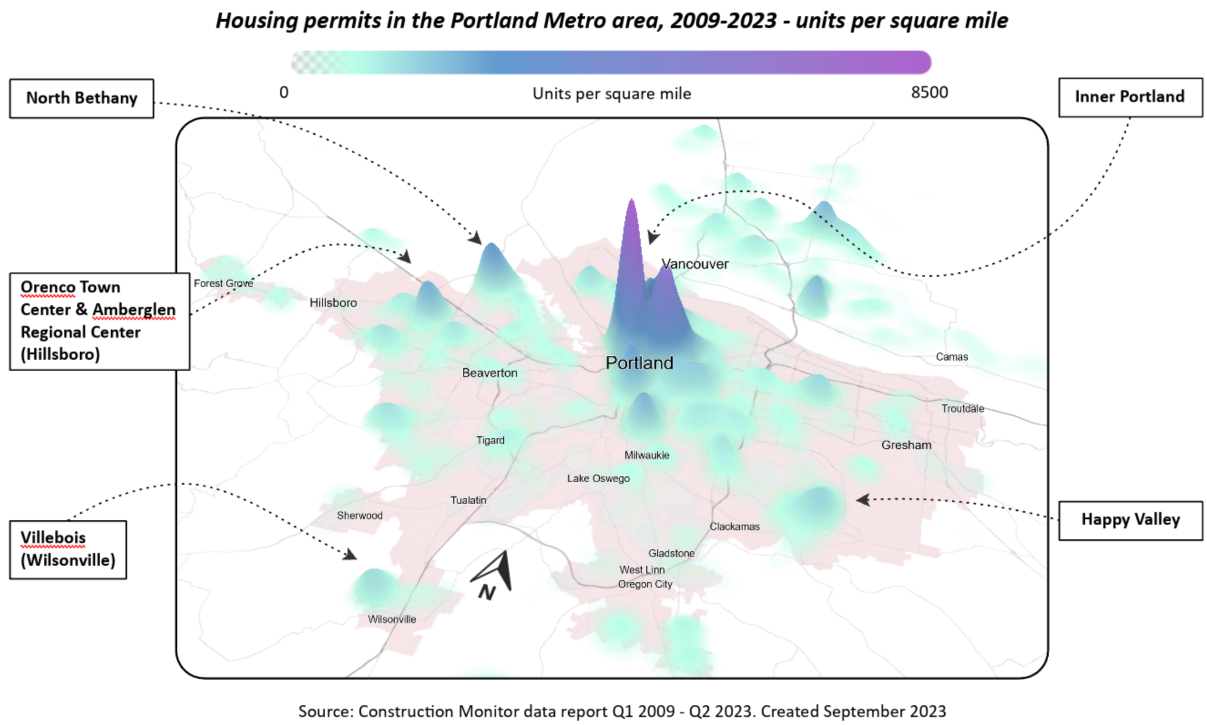


Figure 9: housing units permitted per square mile 2009-2023

Housing type trends

Today's housing mix is the result of decades of change. Though single-unit detached homes are the predominant housing type today (52 percent of housing inside the Metro UGB), as shown in Figure 10 they have represented a smaller share (30 percent) of new housing over the last decade.

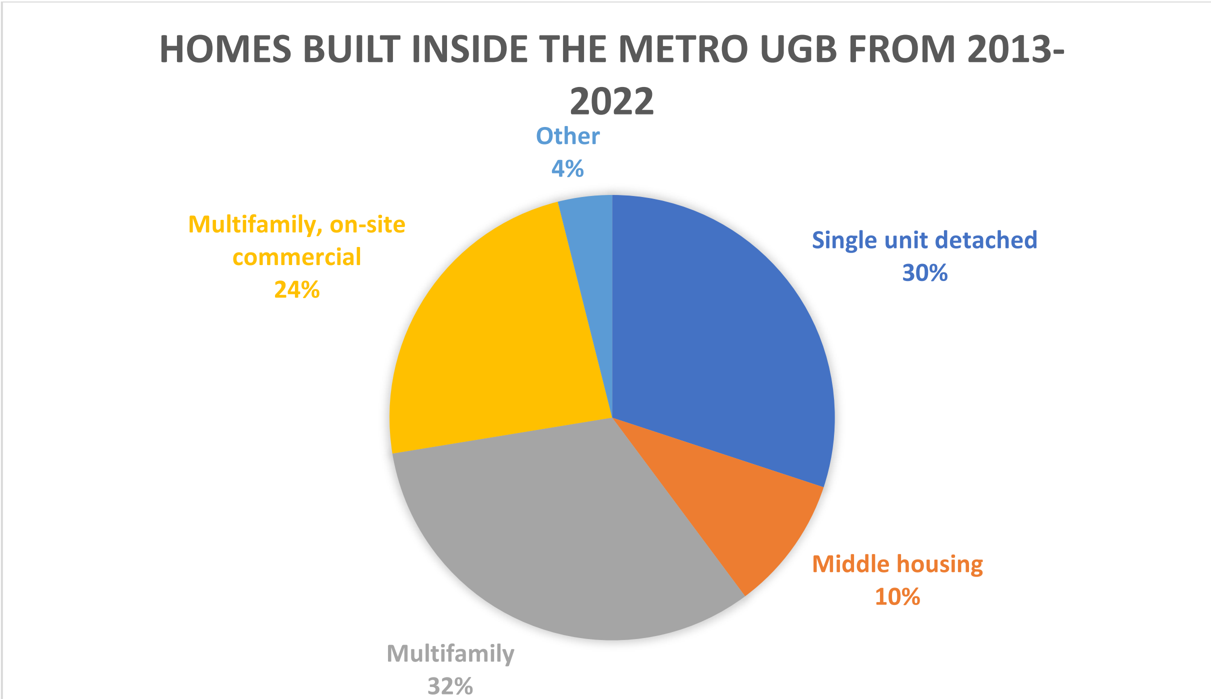


Figure 10: new housing built by type inside the Metro UGB from 2013-2022

Middle housing options such as townhouses, duplexes, triplexes, quadplexes, cottage clusters and accessory dwelling units are now allowed in zones that allow single-unit detached homes. This legalization of middle housing is recent for several of these housing types. Others, such as townhouses, duplexes and accessory dwelling units have a longer history. Over 9,000middle housing units were built inside the UGB from 2013 through 2022 with townhouses and accessory dwelling units making up the majority. See Figure 11.

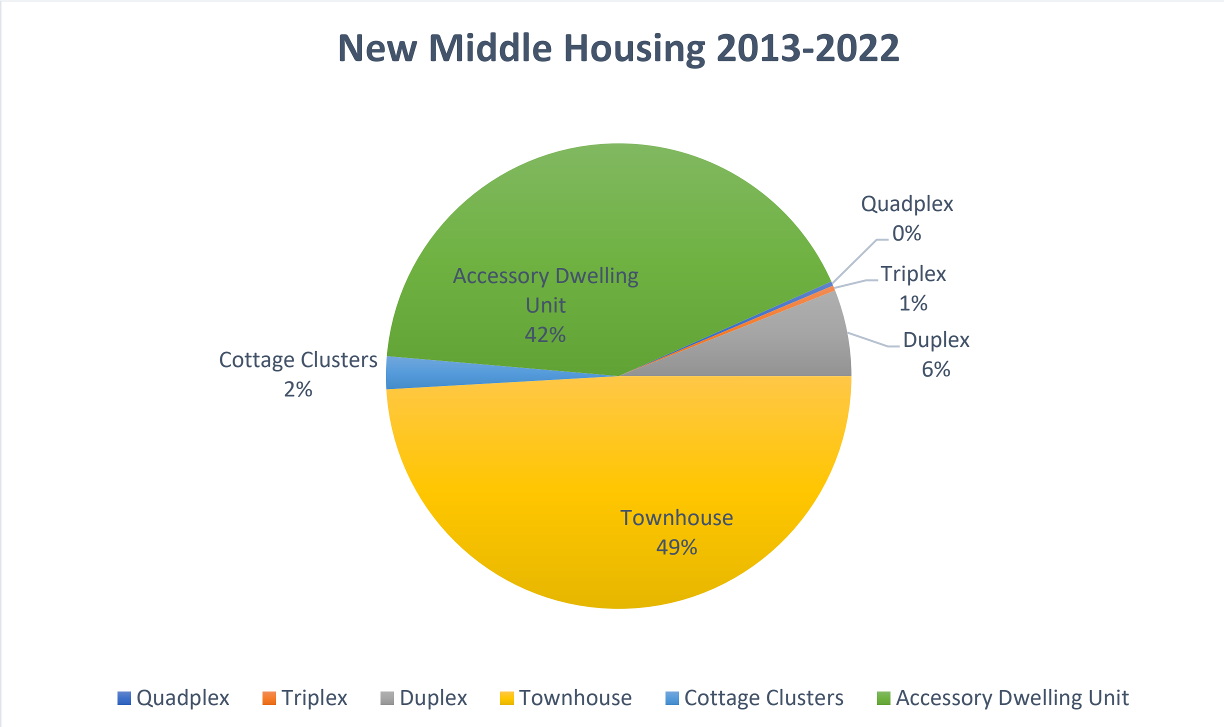


Figure 11: Middle housing developed in the Metro UGB from 2013-2022

Housing density trends

The region has adopted policies to encourage efficient use of land inside the UGB. On average, higher density has been achieved through redevelopment rather than vacant land consumption. However, there are exceptions such as single-unit detached and middle housing, which have achieved higher densities on vacant land.

Table 8: housing density for new housing (units per acre) by housing type and land source (Metro UGB, 2013-2022)

Housing type	Infill/ Redevelopment	Vacant land consumption	Total
Single-unit detached	5.4	7.5	**6.6**
Middle housing	17.1	21.3	**19.8**
Multifamily	71.9	35.1	**49.7**
Multifamily, on-site commercial	148.0	67.4	**101.2**
Other	28.9	26.9	**27.7**
Total	**18.8**	**14.4**	**16.3**

Note: "other" housing includes, for instance, dormitories, retirement facilities, and floating homes

The 2040 Growth Concept seeks to focus housing growth in urban centers and corridors. Figure 12 summarizes where housing has been built in relation to the 2040 Growth Concept over the last decade. The largest shares of housing have been built in non-center areas (neighborhoods) in Multnomah and Washington counties, followed by Multnomah County corridors.

UGR Roundtable perspectives: Regional vision for the future

Many of the topics brought to the roundtable inspired broader conversations about the **regional vision for the future**. As challenges and solutions grew beyond land use interventions, members felt that it was important to be proactive about change rather than reacting. Some participants felt that the reputation of our region is at risk, and that bold, optimistic visions are needed to create a different future for the region. This will might involve a messy process to bring many different voices, perspectives, and priorities to the table. Many of the challenges and concerns mentioned throughout this process go beyond the urban growth management decision itself and require continued leadership and collaboration to find new solutions and commitment to see them through.

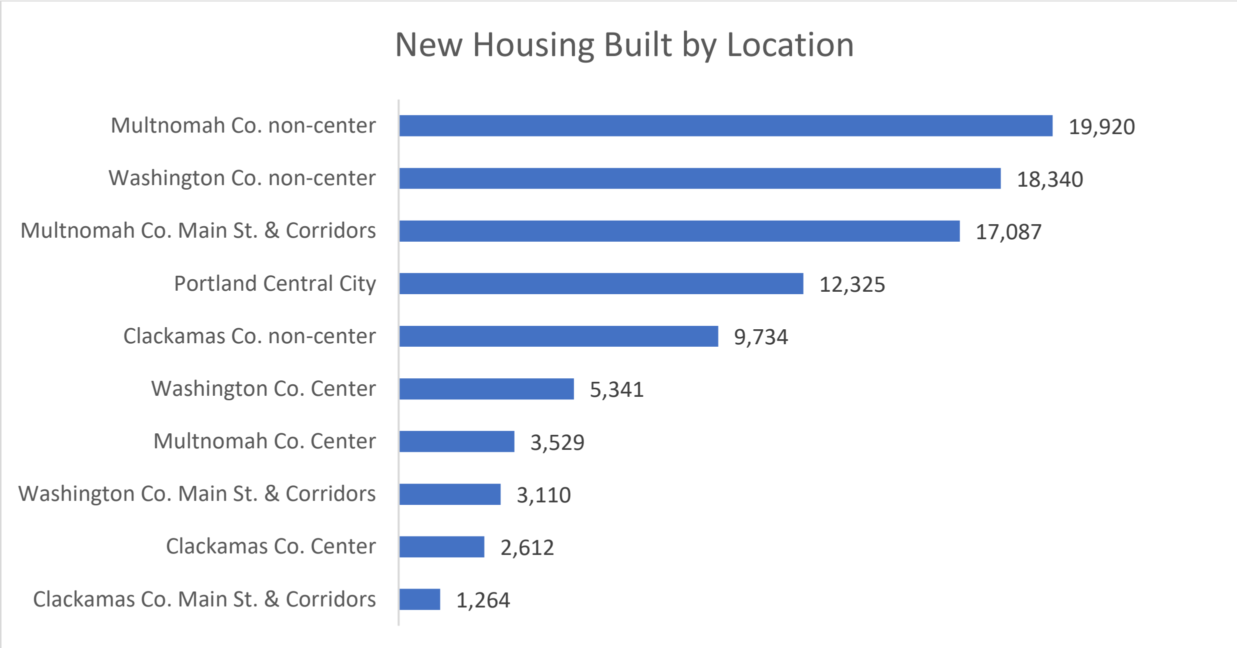


Figure 12: housing units built inside the Metro UGB by location 2013-2022

The highest densities of new housing have been built in the Portland Central City (average 235 units per acre) and Multnomah County corridors and main streets (56 units per acre). The lowest densities of new housing have been built in Clackamas County non-centers (6 units per acre) and Washington County non-centers (10 units per acre).

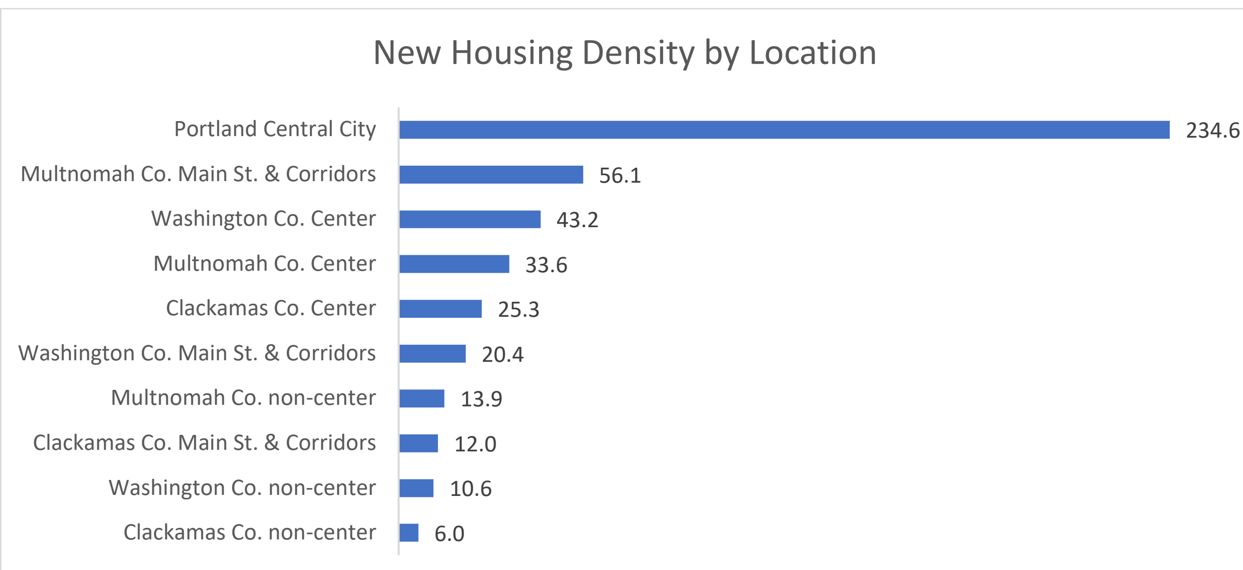


Figure 13: housing densities (units per acre) by location for new housing built from 2013-2022 inside the Metro UGB

Housing growth capacity

In addition to forecasting household growth and reviewing housing development trends, a core aspect of the UGR is determining how much capacity there is inside the current UGB for additional housing growth. Using methods discussed by the Land Use Technical Advisory Group (LUTAG)[1], Metro identifies three main categories of capacity that are described in more detail in Appendix 2:

- Vacant and partially vacant land
- Land that may be usable for redevelopment over the next 20 years
- New urban areas, which are areas that have been added to the UGB in recent years that do not yet have urban level zoning.

Because of long-standing challenges with city governance, planning or infrastructure costs, Metro does not count growth capacity on approximately 3,000 acres in the eastern portion of the former City of Damascus, where Happy Valley has not indicated an intention to annex.

All cities and counties in the region were provided opportunities to review and suggest edits to the buildable land inventory and capacity estimates for those lands.

New methods for estimating potential housing production on existing lands

Because most of the region's housing growth occurs through redevelopment of already-developed lands, Metro has sought to improve how it estimates growth capacity from redevelopment in each UGR. Additionally, recent allowances for middle housing necessitate new methods of estimating potential market responses. While we seek to improve the accuracy of our capacity estimates, we also need to be clear about uncertainty

UGR Roundtable perspectives: Access to nature and climate

Access to nature and climate adaptation was a high priority for some of the roundtable members. More broadly, some participants voiced the need to prioritize environmental conservation during land use decisions and that these decisions should reflect adaptation for climate change. The conversations about infill and redevelopment sparked comments about the need to support a healthy urban tree canopy and to ensure equitable access to parks and publicly accessible green spaces.

As the climate continues to change and result in warmer summers and increased fire seasons, some members urged the group to consider tradeoffs between density, livability, and climate resilience. There was interest in how housing built in different parts of the region will result in different climate impacts based on access to transit, density levels, and reliance on cars.

[1] LUTAG is a special purpose group that is periodically convened by Metro to provide advice on how we estimate growth capacity. The group met six times for the draft 2024 UGR.

when forecasting future market feasibility. This is why Metro expresses capacity estimates as a range.

For the 2024 UGR, Metro worked with Johnson Economics to develop a pro forma model that estimates future development for individual properties, creating a regional estimate of growth capacity. The underlying assumption is that if the value of a property with new development is high relative to the current value of the property, it will be more likely to see development or redevelopment. Essentially, development or redevelopment is more likely if it is profitable. Documentation of the model can be found in Appendix 2.

The model identifies one of 43 possible building prototypes that represents the most profitable use. Even when the model indicates that properties are financially feasible for redevelopment, not all properties are counted as redevelopment capacity. Instead, the model uses backcasting to estimate the smaller share of properties that may actually redevelop. This is intended to make sure that housing production estimates are reliable. Likewise, it addresses the legal requirement that capacity estimates are based on what has historically been built and market factors that may influence future development.

Of note, modeling indicates that middle housing – which has only recently been extensively allowed under zoning codes– will often be more profitable to develop than single-unit detached housing. This housing type presents opportunities to better match the changing needs of smaller households.

Youth Cohort perspectives: Housing crisis and affordability

The youth cohort learned about the statewide housing crisis and the role of local and regional government in helping to address the needs of today's population and future incoming residents and felt strongly that **housing affordability** was a strong value that should guide the UGB process. Cohort members wanted to see plans that included housing options that would work for many different people – including options for different housing types and price points. They group wanted to see that an expansion would help with the housing crisis and also that any expansion would be using the land available wisely to provide the most options to the most amount of people.

The pro forma model and other methods provide the means of estimating a range of potential growth capacity inside the UGB. Capacity is summarized in three categories:

- Single-unit detached housing
- Middle housing
- Multifamily housing

The methods used to establish a range of capacity for these three housing categories include:

- Pro forma scenarios that assume baseline market conditions as well as market erosion and market recovery
- An "expected density" approach that is based on observed development of vacant land
- A range for future accessory dwelling unit production and middle housing conversion/infill. This includes internal conversions of existing homes into multiple units as well as infill development where the original structure is retained and additional housing units are added to the lot.
- A range for possible office-to-residential conversion. See Appendix 2 for more details about how conversion potential was estimated
- Capacity scenarios that include residential zones skewing more towards single-unit detached housing or middle housing.[2]

Table 9: Summary of residential growth capacity inside the UGB by housing type

UGB Residential Capacity			
	Single-unit detached	**Middle housing**	**Multifamily**
Low	25,200	31,400	62,600
Mid	47,700	60,700	73,700
High	60,300	79,800	95,800

Note: these sources of capacity should not be totaled (for instance, adding up high capacity for each housing type) since, for instance, higher middle housing capacity would necessarily mean lower single-unit detached since they rely on the same lands.

Housing needs

State law instructs Metro to estimate existing and future housing needs. Methods for estimating current housing needs are described in more detail in Appendix 8A.

As described in state law, existing housing needs include addressing:

- Historic underproduction of housing, essentially the backlog of homes that ideally would have been built to keep up with household growth. Underproduction of housing has been a nationwide phenomenon since the 2007/2008 Housing Bubble

[2] In their review of capacity estimates, some jurisdictions noted that preliminary estimates skewed more towards middle housing than they would expect. Since middle housing is allowed in zones that allow single-unit detached homes, there is a tradeoff that occurs. Assuming more single-unit detached housing capacity results in lower middle housing capacity. Conversely, assuming more middle housing capacity results in lower single-unit detached housing capacity. Because middle housing develops at higher densities, this is not a one-for-one tradeoff.

- Housing for people experiencing houselessness. Houselessness is caused by underproduction of housing, particularly affordable housing.
- Homes lost to second homes and vacation rentals.

People experiencing houselessness are not counted by the census, so additional data sources are necessary. Methods for estimating current housing needs are described in more detail in Appendix 8A. To estimate the number of homes needed to house people experiencing houselessness, this analysis relies on an April 2024 Portland State University (PSU) report on findings on the 2023 Point in Time Count for the three-county area (Zapata, 2024). As noted in the report, point in time counts have limitations and are an undercount for several reasons:

1. It is impossible to find and count everyone sleeping outside.
2. The count is conducted on a single night so does not capture every experience or episode of houselessness.
3. The U.S. Department of Housing and Urban Development definition of houselessness does not include people who are "doubled up" with other households.

The PSU report attempts to address the second issue by including administrative data about people in need of homeless services, which has been deduplicated with the point in time count. However, the administrative data are uneven across the three counties.

The report attempts to adjust for the third issue by using McKinney-Vinto data on students experiencing houselessness.

Table 10: Existing housing needs by income group (Metro UGB)

Percent area median income	Historic underproduction	For people experiencing homelessness
0-30%	4,200	7,750
30-60%	5,300	700
60-80%	2,700	250
80-120%	2,200	-
120%+	700	-
Total	**15,000**	**8,700**

Note: housing for households earning less than 80 percent area median income is generally understood to require government assistance. Numbers are rounded and may not add exactly to the total shown.

Using methods like those under development for the Oregon Housing Needs Analysis (OHNA) program, ECONorthwest assigned these housing needs by income group to housing types as depicted in Table 11. Multifamily housing is the predominant housing type needed because of the affordability required to match household incomes described in Table 10. Table 11 also summarizes housing "lost" to second and vacation homes. These homes are included because they are not available for housing the region's residents.

Table 11: existing housing needs by housing type (Metro UGB)

	Historic underproduction	For people experiencing homelessness	Second and vacation homes
Single-Unit Detached	700	-	1,100
Middle Housing	2,100	50	1,800
Multifamily	12,200	8,650	400
Total	**15,000**	**8,700**	**3,300**

Note: numbers are rounded to avoid implying too much precision

Future housing needs

Estimating future housing needs entails several steps:

1. Forecast household growth for 7-county MSA (low, baseline, high) for the 2024-2044 period.
2. Apply an assumed UGB capture rate to determine housing need in the Metro UGB (based on history, 70% of MSA household growth captured in Metro UGB).
3. Apply a vacancy rate of 5 percent to allow household moves within the UGB and to convert households into housing units.
4. Express total housing unit needed in the UGB for 2024-2044 for low, baseline, and high growth.

Table 12 depicts these first four steps.

Table 12: Steps for translating 7-county MSA household growth into Metro UGB housing units needed (2024-2044)

	High	Baseline	Low
7-county total HH Growth 2024-2044	244,200	203,500	162,800
UGB capture rate	70%	70%	70%
UGB total household growth 2024-2044	171,000	142,500	114,000
Housing units needed per new household (vacancy rate)	1.05	1.05	1.05
UGB total housing units needed 2024-2044	179,500	149,600	119,700

Note: the low and high forecasts shown here for the 7-county area are a narrowed range (20% less or more than the baseline); to simplify comparisons, a 70% capture rate is assumed here across scenarios. Numbers are rounded and may not total as shown.

The next step is to assign housing types based on household life stage (age, income, size, presence of kids). This step is handled through several different scenarios intended to model different possibilities. These scenarios pair housing choices with forecasts (low, baseline, high) that follow internal logic. For instance, high growth has historically manifested itself as heightened demand for urban development since growth tends to come from younger households migrating to the region. These scenarios are described in more detail in Appendix 8.

a. High growth, strong urban market: high growth forecast; housing trends like development over the last decade with high demand for housing in urban locations; market uptake of middle housing.
b. Baseline growth, new normal: baseline (most likely) growth forecast; as households age, their housing choices shift towards those of older households today, but not to same extent as past generations. More households choose middle housing than have historically.
c. Low growth, following in footsteps: housing choices at each life-stage remain constant – as current households age, their housing choices look the same as those of older households today. This is accompanied by slower household growth, an aging population, and weaker market conditions as these would likely be necessary conditions for households to continue making these housing choices.

Figure 14 depicts the mix of housing in these three scenarios. The share of single-unit detached housing is highest in the “following in footsteps” scenario, followed by “new normal,” and “strong urban market.” The shares of middle housing and multifamily housing are highest in the “strong urban market” scenario, followed by “new normal,” and “following in footsteps.”

Figure 14: 2024-2044 housing mix scenarios (source: ECONorthwest)

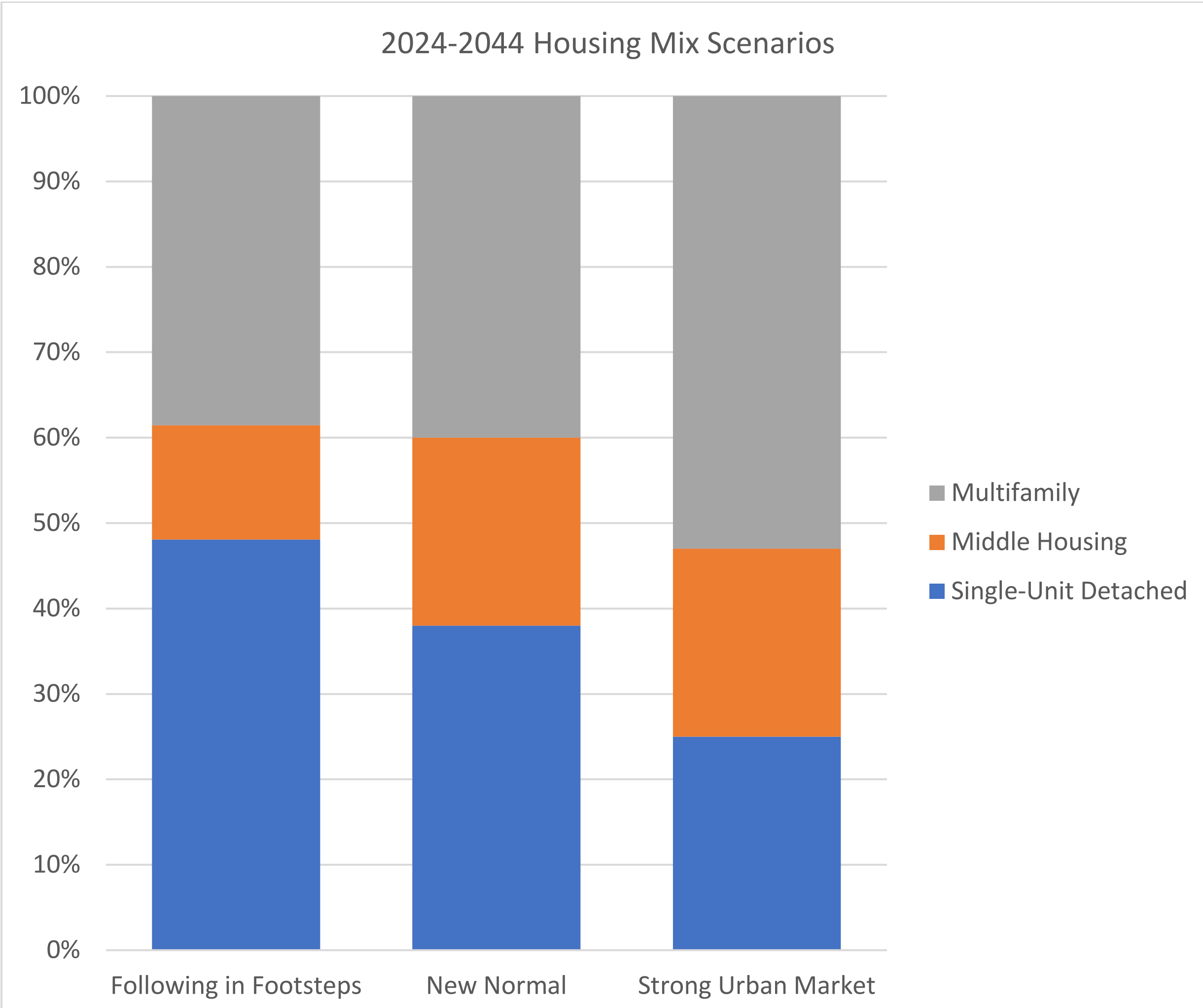


Table 13: Future housing need scenarios (Metro UGB, 2024-2044)

Housing type	High growth, strong urban market	Baseline growth, new normal	Low growth, following in footsteps
Single-Unit Detached	44,900	56,800	57,500
Middle Housing	39,500	32,900	16,000
Multifamily	95,100	59,800	46,100
Total	179,500	149,500	119,600

Total housing needs

Existing and future housing needs by housing type are added together as summarized in Table 14.

Table 14: current and future housing needs for the Metro UGB (2024-2044)

Total Housing Need	High	Baseline	Low
Future Growth Needs	179,500	149,500	119,600
Existing Housing Needs	23,700	23,700	23,700
Total New Units Needed in Metro UGB	**203,200**	**173,200**	**143,300**
Total new units needed in Metro UGB by housing type			
Single-Unit Detached	45,600	57,600	58,300
Middle Housing	41,600	35,000	18,100
Multifamily	116,000	80,700	66,900
Total new units needed in Metro UGB	**203,200**	**173,300**	**143,300**

Note: numbers are rounded to the nearest 100 to avoid implying too much precision

Housing capacity gap analysis

This analysis indicates that the Metro Council has the latitude to determine whether additional housing capacity is needed to accommodate potential household growth. This latitude derives from several factors.

- Uncertainty regarding the amount of future household growth from future migration into and out of the Metro region.
  - Increased migration would likely come from younger households who typically seek multifamily housing.
  - Decreased migration would amplify the trend of an aging population, which will tend to age in place.
- Uncertainty regarding the potential redevelopment of lands inside the UGB, depending on market conditions.
  - Even for properties that are financially feasible for redevelopment, there is uncertainty regarding which ones of them may redevelop over the twenty-year time horizon.
  - Redevelopment capacity is not static. Additional population/household growth would likely increase redevelopment potential as more developers respond to demand. This would increase multi-family and middle housing production (capacity), which corresponds to the housing needs of the younger households that are more likely to migrate to our region.
- The extent to which future housing choices are influenced by smaller household sizes and affordability concerns vs. the persistence of past trends.

- Whether households perceive middle housing as a relatively lower cost ownership alternative to single-unit detached homes or condos.
- The degree to which builders shift from single-unit detached to middle housing to achieve higher profitability.[3]

Depending on the above factors, the UGB capacity gaps for accommodating existing and future housing needs vary. These ranges were developed using several illustrative demand and capacity scenarios that sought to apply consistent economic reasoning in any given scenario. The three demand scenarios are as previously described, now paired with four capacity scenarios. See Appendix 8 for more detail.

Scenario 1: following in footsteps, low growth, lower redevelopment, and less middle housing
Housing choices at each life-stage remain constant – as current households age, their housing choices look the same as those of older households today. This is accompanied by slower household growth, an aging population, and weaker market conditions as these would likely be necessary conditions for households to continue making these housing choices. Redevelopment potential is lower and housing capacity on vacant land skews towards detached single-unit housing.

Scenario 2: new normal with baseline assumptions about growth and capacity
As households age, their housing choices shift towards those of older households today, but not to same extent as past generations. More households choose middle housing than in scenario 1. This is accompanied by baseline (most likely) household growth. Capacity assumptions tend towards baseline with middle housing slightly more likely on vacant lands than detached single-unit housing.

Scenario 3: new normal with baseline assumptions about growth and capacity, except vacant land capacity skews towards single-unit detached
As households age, their housing choices shift towards those of older households today, but not to same extent as past generations. More households choose middle housing than in scenario 1. This is accompanied by baseline (most likely) household growth. Capacity assumptions tend towards baseline with single-unit detached housing more likely on vacant lands than middle housing.[4] This scenario also assumes less accessory dwelling unit production and middle housing conversion as sources of capacity.

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[3] Pro forma modeling shows that middle housing is often more profitable than single-family housing. However, some suburban jurisdictions indicated in their review of capacity estimates that they would expect a bigger share of single-unit detached housing than middle housing. This feedback is reflected in scenario 3 with a heavier mix of single-unit detached housing expected on vacant lands.
[4] This increased mix of single-unit detached housing (as opposed to middle housing) reflects feedback received from some suburban jurisdictions in their review of capacity estimates.

Scenario 4: strong urban market with fast growth, higher redevelopment potential, and more middle housing

Consistent with historic migration dynamics, faster household growth comes from increased in-migration of younger households who are more apt to relocate than older households.[5] This influences the types of housing that are most in demand. Specifically, consistent with their life stage and incomes, these younger households typically will seek multifamily and middle housing. Redevelopment potential increases with stronger market demand for urban residential options. Consistent with development trends over the last decade, multifamily housing makes up a majority share.

Housing capacity gap results

Table 15 summarizes these four scenarios and the resulting housing mix and capacity surpluses or deficits. The above scenarios are not the only ones that could be considered plausible. Instead, these scenarios are intended to provide information to support decision making. Slight changes to assumptions about demand, capacity, or housing mix would produce different results.

At this calculation stage, middle housing and single-unit detached housing capacity surpluses or deficits are combined because both are allowed in the same residential zones. It will be the market, not Metro's UGR calculations, that determine what mix of middle housing and single-unit detached housing gets built on those residentially zoned lands. Importantly, Metro has no recourse for specifically addressing a single-unit detached housing deficit since any UGB expansion area would have to also allow middle housing and multifamily housing in order that the city can remain in compliance with HB 2001 and the Metropolitan Housing Rule. However, the capacity deficit estimated for scenario three is largely attributable to single-detached housing. Scenario three is also the only scenario in which there is a total deficit of housing capacity for all housing types combined.

[5] Per the U.S. Census, a majority of the people that moved to the Portland MSA from 2000-2010 are between the ages of 25 to 34. Using U.S. Census 2022 Current Population Survey data, we calculate that the odds of changing homes in 2022 were highest for the 20-25 age cohort (5.5% odds), followed by those aged 25-44 (3.75% odds), 45-64 (1.75% odds), and 65+ (1% odds).

Table 15: Capacity deficits or surpluses for existing and future housing needs (2024-2044)

	Shares of housing by type			Capacity deficit or surplus	
Scenario	**Single-unit detached**	**Middle housing**	**Multifamily**	**Single-unit detached and middle housing**	**Multifamily housing**
1: follow in footsteps; low growth	40%	14%	46%	+5,300	+3,750
2: new normal; baseline growth; baseline capacity	33%	21%	46%	+13,000	-2,100
3: new normal; baseline growth; heavier use of vacant land for single-unit detached	33%	21%	46%	-2,250	+1,250
4: strong urban market; fast growth	23%	21%	56%	+32,500	-23,900[6]

Note: numbers are rounded to avoid implying too much precision

For comparison, Table 16 depicts the current housing mix as well as the mix of new housing built from 2013 through 2022. See also Figure 8.

Table 16: current housing mix and mix of new housing developed 2013-2022 (Metro UGB)

	Single-unit detached	Middle housing	Multifamily
Current total housing mix	52%	7%	35%
New housing built 2013-2022	30%	10%	57%

Note: housing shares don't total 100% because Metro also tracks "other" housing types that are not listed here, for instance dormitories, floating homes, and retirement facilities.

[6] This multifamily capacity deficit is likely overstated but is included here for transparency. If multifamily demand were as high as contemplated in this scenario, it is likely that rising property values would cause additional redevelopment to occur, thereby eliminating this capacity deficit. However, the pro forma does not include pricing feedback. This capacity deficit assumes that only 20% of the most feasible properties redevelop. If 40% of the most feasible properties redeveloped, this deficit would be eliminated.

Housing capacity options

If the Metro Council determines that there is a need for additional capacity to address housing needs, there are two approaches it may pursue. The Metro Council may take measures to increase the likelihood of housing development on land already inside the UGB and/or expand the UGB to add the Sherwood West urban reserve area as proposed by the City of Sherwood. If the Council elects to expand the UGB, it may wish to consider conditions of approval to help achieve a certain housing mix or number of housing units that will best meet the region's housing needs. Regardless of the Council's growth management decision, there is a need for ongoing work to spur the production of housing, particularly for households with the fewest resources.

> ## UGR Roundtable perspectives: Infrastructure funding
>
> The need for **infrastructure funding** came up frequently in roundtable discussions. It was mentioned as a necessary solution in discussions of housing production and affordability, development barriers and the role of Metro and local governments. This is an area where many roundtable participants advocated for regional partnership in advocating for infrastructure funding at the State and with the Federal government.

REGIONAL EMPLOYMENT ANALYSIS

Employment trends

Much has changed in the economy in recent years and more change appears to be on the way. Drivers of change include:

- Persistence of working from home for many office workers
- High office vacancy rates
- Automation and artificial intelligence
- Slowing population growth
- An aging workforce
- Domestic manufacturing policies such as the CHIPS Act

Pandemic impacts on work

Though many aspects of life have returned to normal after the coronavirus pandemic, it has had lasting effects on what that "normal" looks like. After peaking in 2021, the share of workers working from home either full time or hybrid remained at 24 percent in 2022 for the greater Portland metropolitan area. This persistent trend has led to high office vacancy rates and has long-term implications for demand for office space.

Greater Portland is among the top 10 metro areas in the country for the highest shares of people working from home. As shown in Figure 15, rates increased drastically after 2019 and have persisted as of 2022. For office workers, hybrid and remote work is expected to endure. This has implications for future demand for office space.

In the last few years, there was early enthusiasm about the potential for converting vacant office buildings into housing. That enthusiasm has been tempered by recognition that many office buildings do not lend themselves to these conversions because of issues related to inadequate access to exterior windows and complications related to replumbing buildings for kitchens and bathrooms in individual apartments. Metro worked with ECONorthwest to develop estimates for conversion potential over the 20-year planning period. Those estimates, modest as they are, are included in the residential capacity estimates. ECONorthwest's analysis can be found in Appendix 2.

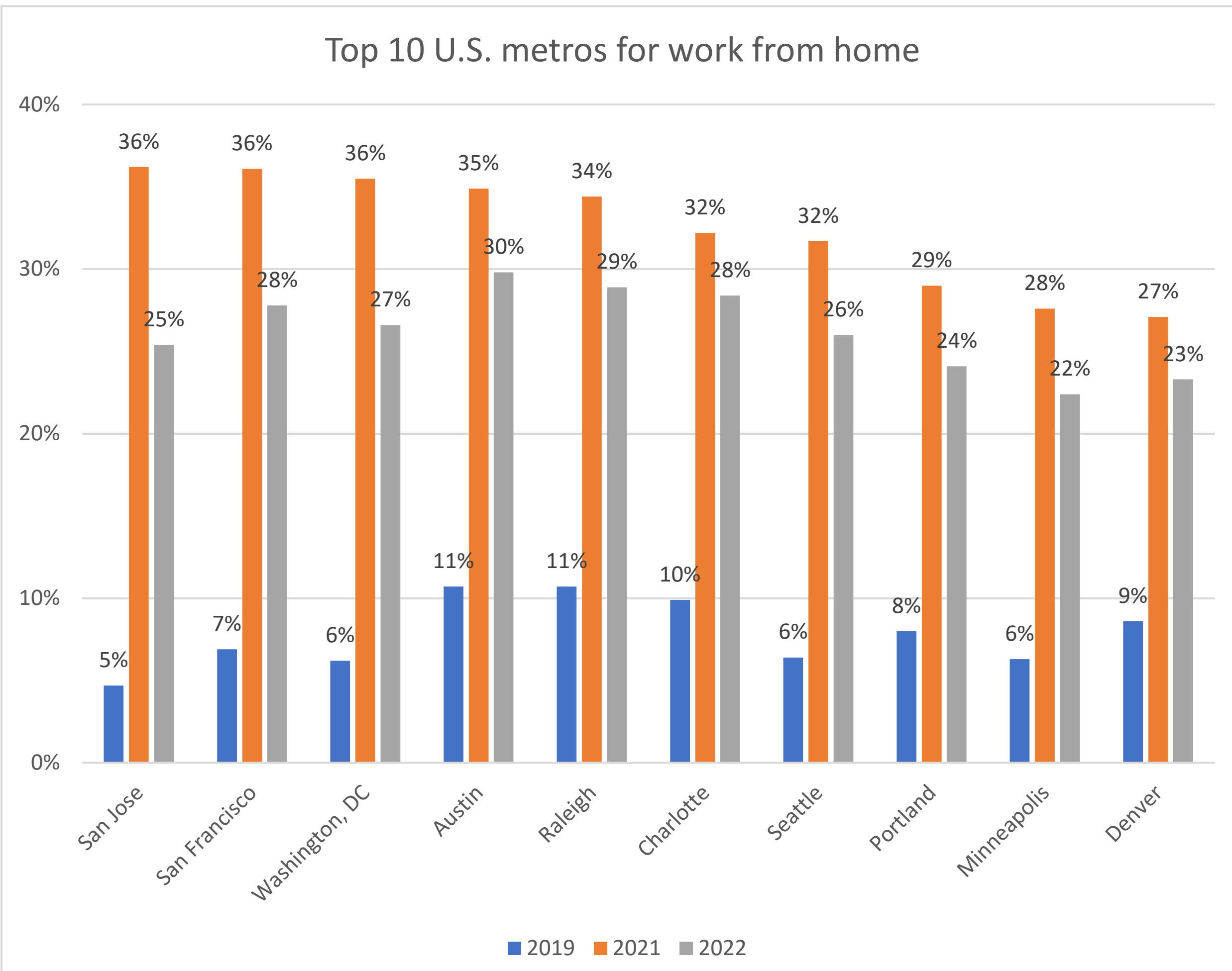


Figure 15: share of all workers that report working from home by MSA (ACS 1-year estimates)

Greater Portland's economy is regional. People's lives span city, county and state boundaries. As shown in Figure 16, many workers live in one county and work in another. This is a product of the complex decisions that people make about where to live and work, including consideration of community and housing preferences, quality of local schools, proximity to friends and family, budget, their career choices, and career choices of a partner or spouse.

This is one reason why Metro is tasked with having a regional perspective in its growth management decisions. Keeping the region compact is the best way to keep commutes as short as possible. The outward growth of metropolitan areas elsewhere in the U.S. has not resulted in their residents living and working in the same community. In fact, their average vehicle miles travelled per capita tend to be higher than those in greater Portland.

More recently, there is evidence that the increased prevalence of working from home has fundamentally shifted these commute patterns, sometimes reducing the share of commuters that live in one county and work in another by half. For instance, in 2021, the share of workers that live in Clark County, but work in Multnomah County and vice versa had been cut roughly in half compared to 2019.

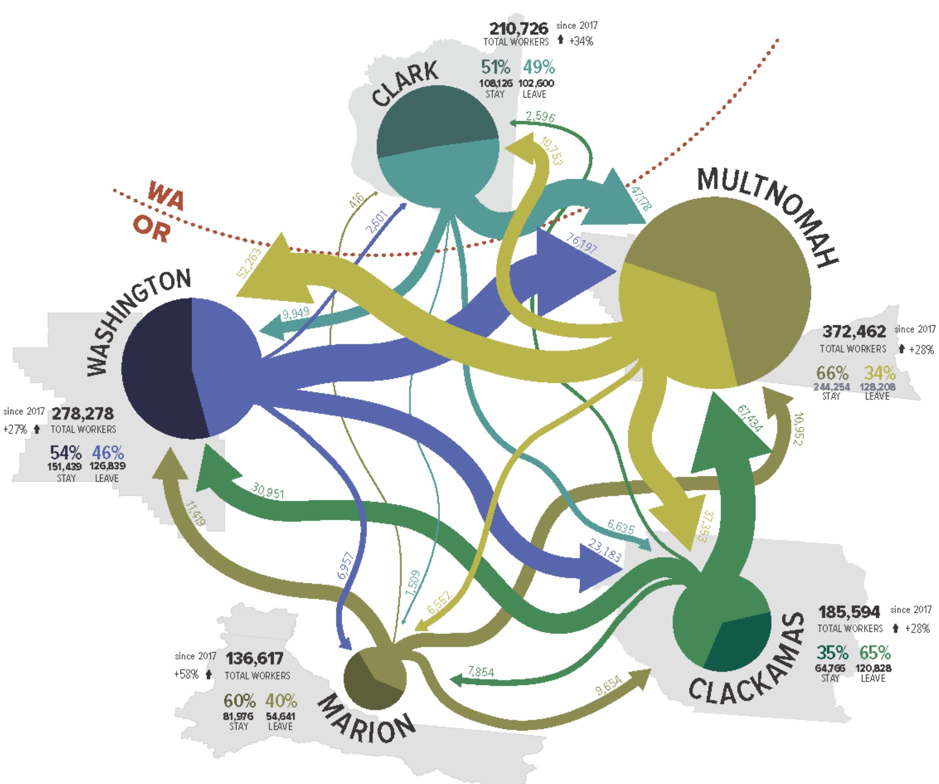


Figure 16: regional commute patterns in 2019 (source U.S. Census, LEHD)

Automation and artificial intelligence

Automation of tasks is typically done with the goal of lowering costs and increasing productivity. Automation can complement human labor, allowing workers to focus on other tasks. For example, voice mail has freed businesses from writing down phone messages. This does not mean that automation will entirely replace occupations, but it may replace repetitive tasks once completed by workers. According to the Brookings Institution, occupations that are most susceptible to having a high share (70-100 percent) of tasks automated include production, food service and transportation. More recently, artificial intelligence has made inroads into tasks like software coding.

Given the mix of occupations in the greater Portland region, 45 percent of tasks are susceptible to automation (Muro, 2019).This study also indicates that younger workers, and Hispanic, American Indian, and Black workers are most likely to be adversely impacted by automation. These trends will be monitored in years to come. For some sectors, automation may result in lower job growth rates or lower employment densities.

Slower population growth means slower workforce growth

Job growth is expected to be closely tied to population growth, both in terms of the degree of growth and the types of sectors that are expected to growth the most. As with the population and household forecast, the employment forecast was reviewed by an external panel of economists and demographers. The panel found the regional employment forecast to be reasonable. A summary of that review is included as Appendix 1A.

With birth rates expected to decline, population growth will slow, and the workforce will age. Figure 17 depicts the current population pyramid for the region. Age cohorts that are younger than 25 are smaller than older age cohorts. This will mean that, without additional migration of young people into the region, there will be fewer people in their prime working years 20 years from now.

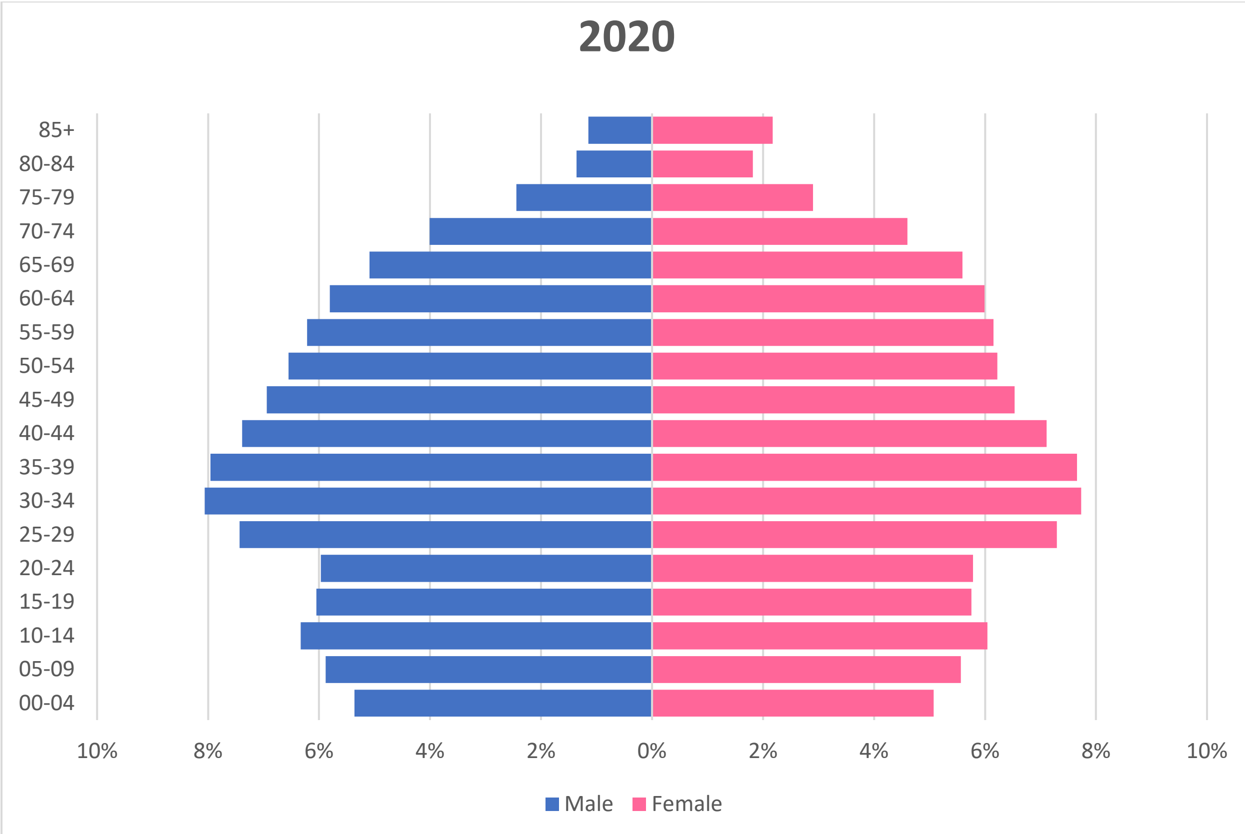


Figure 17: Portland MSA population pyramid in 2020 (source: U.S. Census)

With slower population growth, job growth will also be slower. Under the baseline forecast, 110,400 additional jobs are expected in the 7-county MSA between 2024 and 2044.

Uncertainty in the employment forecast

Even more so than with population growth, there is uncertainty surrounding employment growth. The regional economy is part of a global economy and is subject to current events as well as those that may come, but that cannot be predicted: pandemics, wars, innovations, new trade policies, federal investments, interest rates, recessions and rebounds. For these reasons, Metro uses a range forecast depicting possible growth (see Figure 18). While low and high growth are possible, they are not as likely to materialize as the baseline forecast. Higher job growth would require sustained increases in people moving to the region beyond historic rates of net migration.

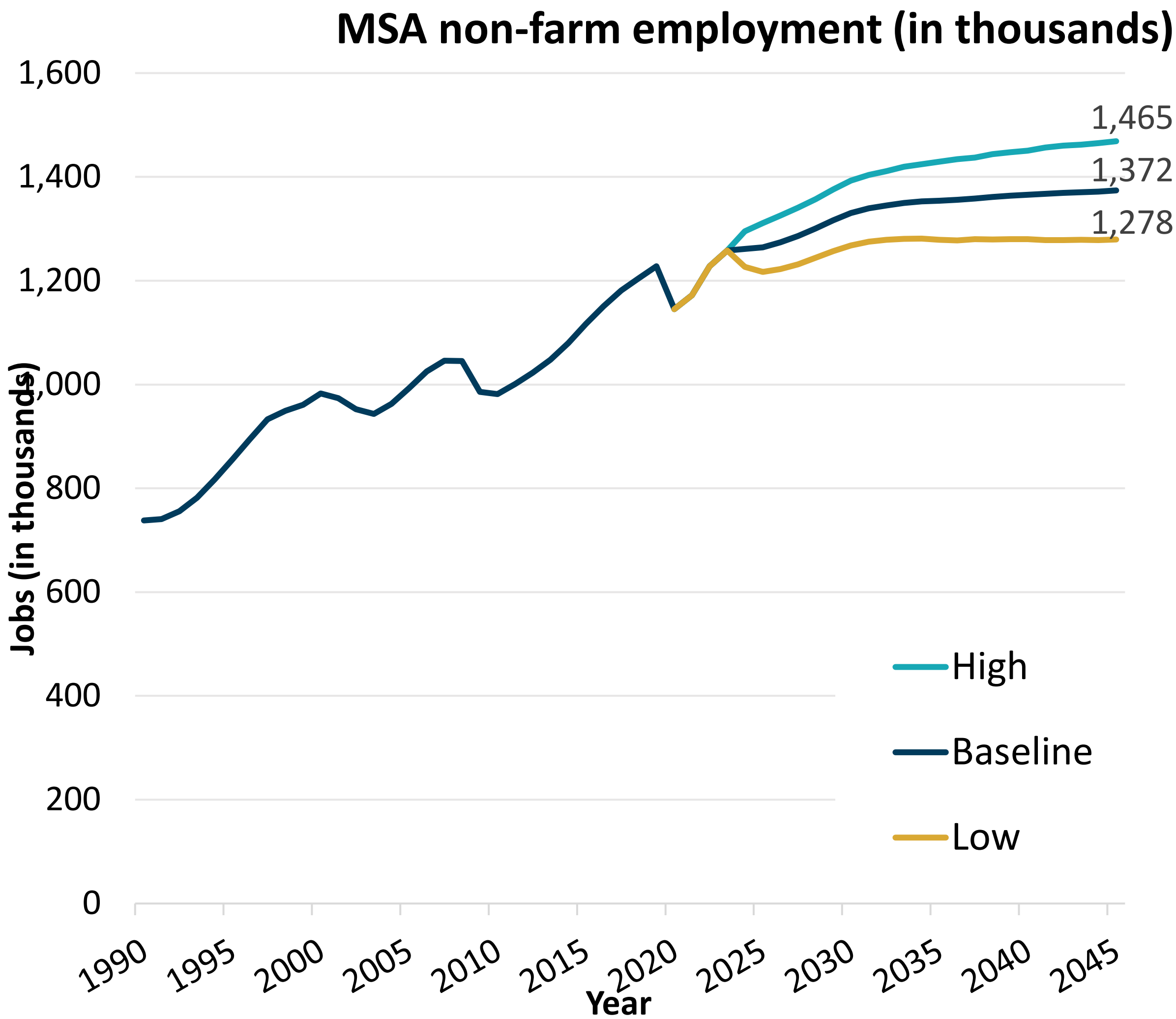


Figure 18: 7-county MSA non-farm employment forecast 2024-2044

Despite this uncertainty, Metro has a strong track record with its employment forecasts. Compared with actual employment numbers from 2019 (pre-pandemic), the three most recent regional forecasts have all been reliable. As shown in Table 17, forecasts for total non-farm employment are all with two percentage points of actuals. In the case of computer and electronic manufacturing – a sector of interest to the region – Metro overestimated jobs in two out of three of the most recent forecasts.

Table 17: Comparison of past Metro forecasts for the 7-county MSA with 2019 actual employment

	Past regional forecasts compared to 2019 actual employment		
	2009 forecast	2014 forecast	2018 forecast
Total non-farm employment	1.3%	-1.8%	-1.1%
Computer and electronics manufacturing employment	-2.3%	5.1%	0.8%

The fastest growing sectors are expected to be those that serve the population. As shown in Figure 19, sectors like professional and business services, healthcare, retail trade, and construction are forecast to have the most job growth. Because this forecast is intended to inform a decision about whether there is a need to expand the UGB for urban uses, it focuses on non-farm employment. However, it is important to note that agriculture continues to play a prominent role in Oregon's economy. In 2022, the value of Oregon's agricultural exports was $2.37 billion (Oregon Department of Agriculture, 2024).

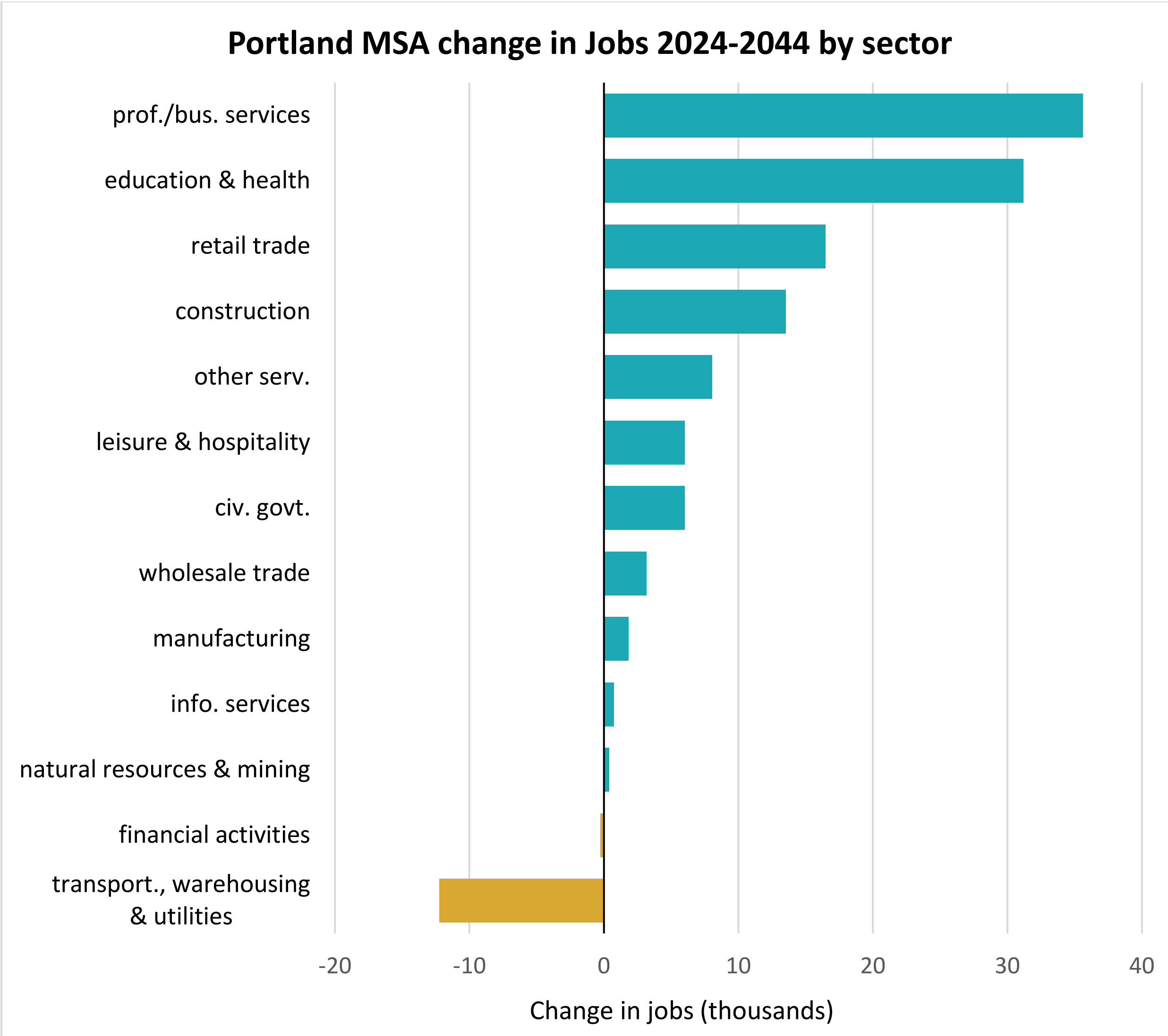


Figure 19: Metro employment forecast by sector (MSA, 2024-2044)

High-tech manufacturing employment in the draft 2024 regional forecast

Because of greater Portland's relative strengths in computer and electronic products manufacturing, there is long-standing interest in this sector. Consequently, Metro often fields questions about its forecast for this sector, including questions about how the CHIPS Act and its investments in semiconductor manufacturing influence Metro's forecast.

Greater Portland has significant strength in engineering and design of semiconductors. CHIPS Act investments help maintain those competitive advantages, which have different implications for land use and land needs than the construction of new semiconductor fabrication facilities.

National context for manufacturing employment

According to the U.S. Bureau of Labor Statistics (BLS), manufacturing employment reached its national peak four decades ago, in 1979. Since then, manufacturing employment has fallen in each of the five recessions and, in each case, never recovered to pre-recession levels. In the Metro region (7-county Metropolitan Statistical Area), the peak was reached in the late 1990s. Going forward, Metro's forecast shows more resilience for manufacturing employment at the regional scale than the S&P Global Insight forecast indicates for the nation. See Figure 20.

UGR Roundtable perspectives

Economic development was a high priority topic for many roundtable participants they encourage Metro to think about how we stay competitive as a region. There were some conversations about the importance of desirable industrial land that will attract manufacturing and industrial businesses to the region to increase the number of high paying jobs for the region's residents. Others raised concern about what barriers are causing businesses to leave. Some participants pointed to zoning code as a barrier for mixed employment and industrial areas where allowed uses can be unclear. Some members mentioned land affordability as a barrier. Overall, many participants support recruitment efforts for high tech manufacturing.

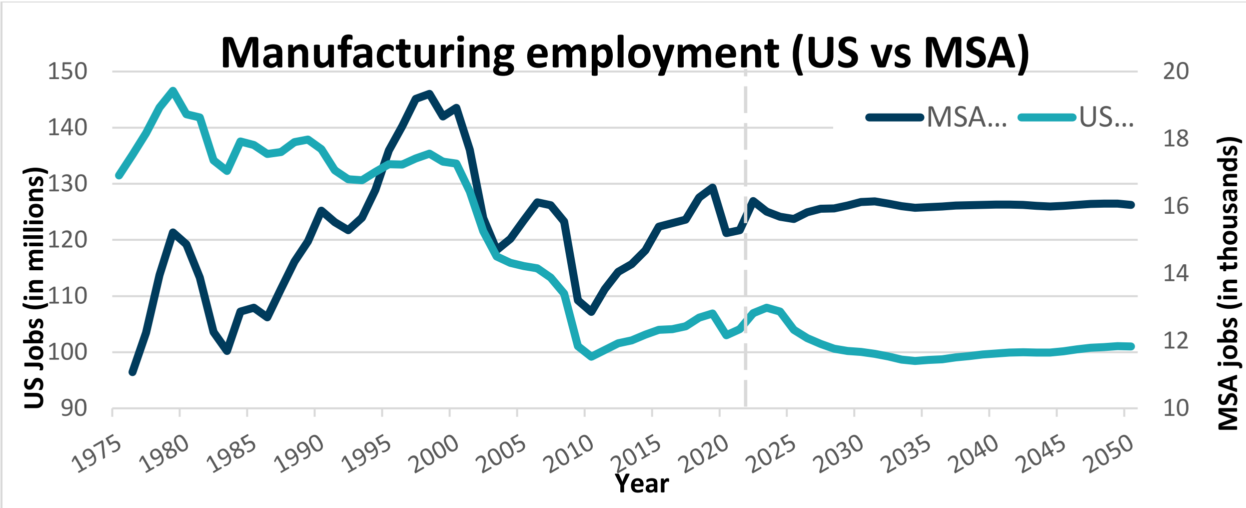


Figure 20: Manufacturing employment in the U.S. and the 7-county Portland Metropolitan Statistical Area (note different y axes)

Sources: Historic data: U.S. Bureau of Labor Statistics; National forecast: S&P Global Insight; MSA forecast: Metro

Nationally, durable goods manufacturing sectors, including the computer and electronics manufacturing sector, are all well below their 1979 job numbers. There are 55 percent the number of jobs in the computer and electronics manufacturing sector today as there were in 1979. The causes are well established and include offshoring and automation.

State context for computer and electronic product manufacturing

For the state of Oregon, early 2001 marks the high point for employment in the computer and electronic manufacturing sector. For this sector, the state is currently at the same employment level as it was 20 years ago.

The Oregon Office of Economic Analysis (OEA) forecasts that the CHIPS Act will result in an additional 3,000 computer and electronic product manufacturing jobs statewide over the next five years (Oregon Office of Economic Analysis, 2023) before flattening for the duration of the 10-year forecast.

Regional forecast for computer and electronic product manufacturing

Metro's draft regional forecast for computer and electronic manufacturing is consistent with the forecast from the OEA. As shown in Figure 20, Metro's forecast indicates short-term impacts of the CHIPS Act. The average annual growth rates for the computer and electronics manufacturing sector are 0.5% (statewide jobs) in the OEA forecast and 0.4% (MSA jobs) in the Metro forecast. Metro's expert forecast review panel indicated that job increases from the CHIPS Act will be in the nearer term, followed by a longer-term slide, resulting in a slight net increase from 2024 to 2044. Panelists indicated that a second or third CHIPS Act or similarly scaled public subsidies would be necessary for computer and electronic product manufacturing job gains persist in the longer term.

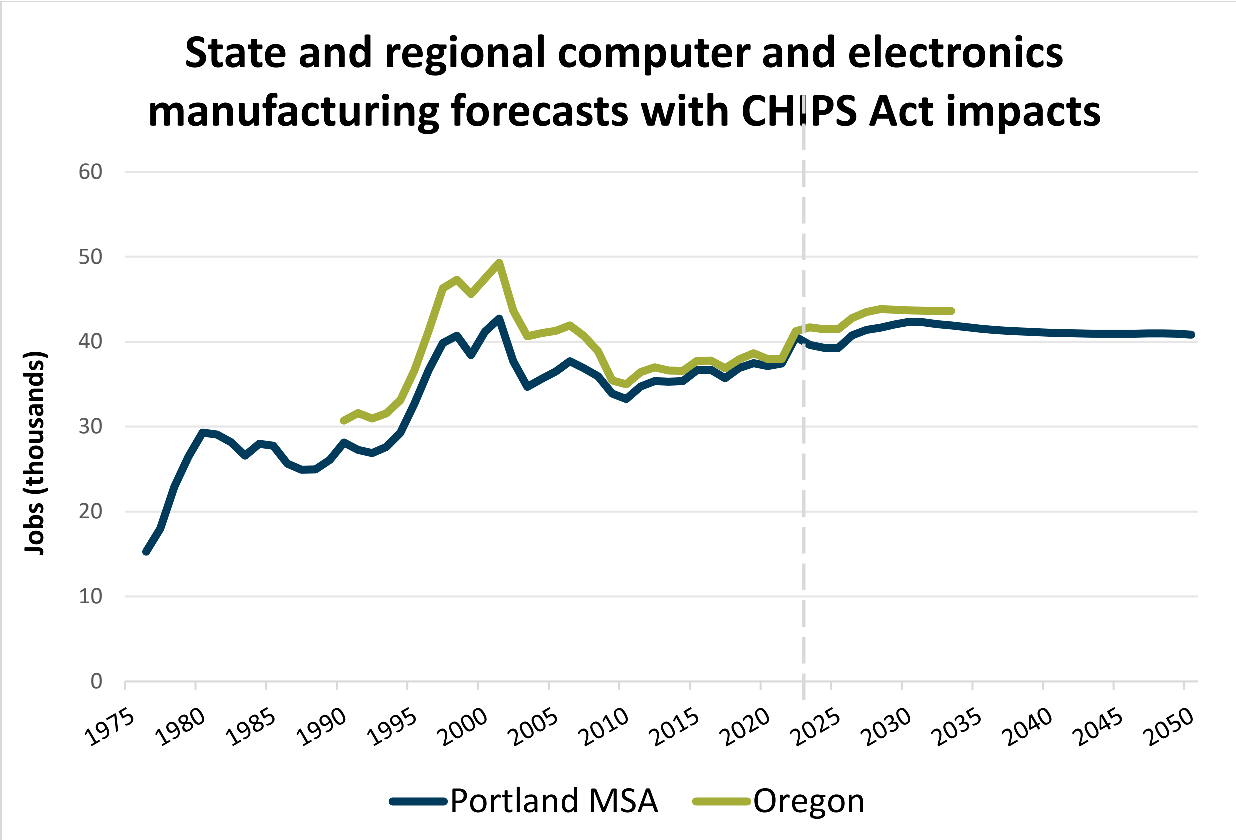


Figure 21: comparison of state and regional forecast for computer and electronics manufacturing with CHIPS Act impacts; State forecast; OEA; MSA forecast: Metro

The positive effects of the CHIPS Act in the computer electronics manufacturing sector are incorporated into the regional forecast model as an exogenous assumption (added from outside the forecast model framework). The model has inter-industry demand variables which estimate indirect and induced effects of computer and electronics manufacturing job increases on other sectors such as the construction or professional and business services sectors.[7] In other words, each new high-tech manufacturing job will have a multiplier effect in other sectors. Those multipliers effects are implicit in the forecast results.

Employment growth capacity

Employment land is sorted into two categories: industrial and commercial. The commercial category includes a portion of lands zoned for mixed uses. Appendix 2 has more details about the methods and results of this capacity analysis. As described earlier in this report, the pro forma model was also used to estimate redevelopment potential on employment lands. Unlike

[7] Metro staff has not specifically calculated these impacts in other sectors with and without the CHIPS Act, but an increase in the manufacturing sector will generally lead to increases in some other sectors. Economic literature indicates that each high-tech manufacturing job has a multiplier effect of 3.5 to 4 jobs in other sectors in regional economies with an existing high-tech cluster.

with residential lands, the model identified minimal redevelopment potential on employment lands. As shown in Table 18, the region's employment growth capacity comes almost entirely from vacant land and infill potential.

Relatively low redevelopment capacity for commercial employment uses can, in part, be explained by the fact that the pro forma model used for estimating redevelopment chooses the most profitable development option. This can produce skewed results in mixed-use zones. In many cases, the model identifies multifamily residential as the most profitable use on lands zoned for mixed-use. In reality, demand for commercial space would lead to more redevelopment for that use, potentially with ground-floor commercial and residential uses above. Consequently, redevelopment capacity for commercial uses as depicted in Table 18 may be an underestimate.

Jurisdiction-level capacity estimates were provided for review by local jurisdictions and reflect suggested edits. Buildable lands are part of the region's long-term land supply but are not necessarily development ready or for sale today. Of note, employment growth capacity is not counted on West Hayden Island and the eastern portion of the former City of Damascus. This is because of long-standing planning, governance, or infrastructure provision challenges.

Table 18: employment capacity in the Metro UGB as reviewed by local jurisdictions

Capacity type	Industrial buildable acres	Commercial buildable acres
Vacant	2,574	288
Infill	3,252	147
Redevelopment	124	46
Total	**5,950**	**481**

Appendix 6 includes a description of the site characteristics of these employment lands.

Employment land needs analysis

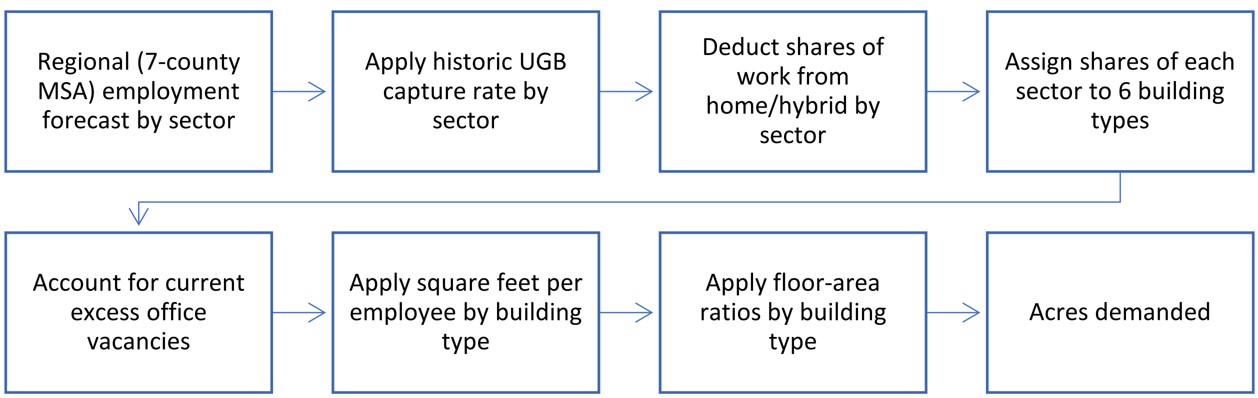
The regional employment forecast is a primary source of information for estimating the region's future employment land needs. Several steps are taken to convert those forecast jobs into demand for land and are summarized in Figure 23. These methods are like those typically used by cities when completing Economic Opportunities Analyses. Additional details about these steps can be found in Appendix 3.

Generally, these steps are intended to address three issues:

- Not all the larger 7-county MSA employment growth will occur inside the Metro UGB. We use a UGB "capture rate" based on historic rates to estimate UGB employment growth.
- There are factors impacting future employment land need that must be accounted for:

    - Work from home and hybrid work have become more widely accepted and reduce demand for commercial office space.
    - Current high office vacancies provide an additional source of commercial office capacity that has not been accounted for in employment capacity estimates because it cannot be characterized as vacant land, redevelopment, or infill.
- Distinct types of jobs have different building and space requirements. For instance, office buildings can be multi-story and have higher employment densities while warehouses tend to be single-story and have lower employment densities because of automation. A group of public and private sector experts was convened on two occasions to provide input on these assumptions.

Figure 22: overview of steps for translating forecast jobs into 20-year demand for land



Applying these steps, results in an estimated baseline regional demand from 2024 to 2044 for the following:

- 1,400 buildable acres needed for industrial employment
- 800 buildable acres needed for commercial employment

Employment lands gap analysis results

Industrial land gap analysis results

Industrial lands support uses like industrial, flex/business parks, and warehousing. This analysis found that, in aggregate, there is a surplus of industrial lands inside the UGB for meeting expected industrial employment growth. This is true even under the high growth forecast.

Table 19: Industrial land capacity gap for Metro UGB 2024-2044

	Capacity (acres)	Demand (acres)	Surplus or deficit (acres)
Low growth forecast	5,950	-1,500	+7,450
Baseline growth forecast	5,950	1,400	+4,550
High growth forecast	5,950	5,200	+750

Though, in aggregate, there is a regional surplus of industrial land, those acres of land may not have the location and site characteristics that will lead to industrial development. Over the years, Metro has partnered on several updates of the Regional Industrial Site Readiness inventory. Those analyses consistently find that many of the region's large industrial sites (25+ buildable acres) are not ready for development and need action or investment to address:

- Transportation improvements
- Wetland mitigation
- Brownfield cleanup
- Site assembly
- City annexation and zoning

The inventory of large industrial sites was updated for the Oregon Semiconductor Taskforce in 2022. The portion of the inventory for the Metro UGB is shown in Figure 24. Tier One sites could be development ready within six months. Tier Two sites would likely take 7 to 30 months to become development ready. Tier Three sites would likely take over 30 months to become development ready.

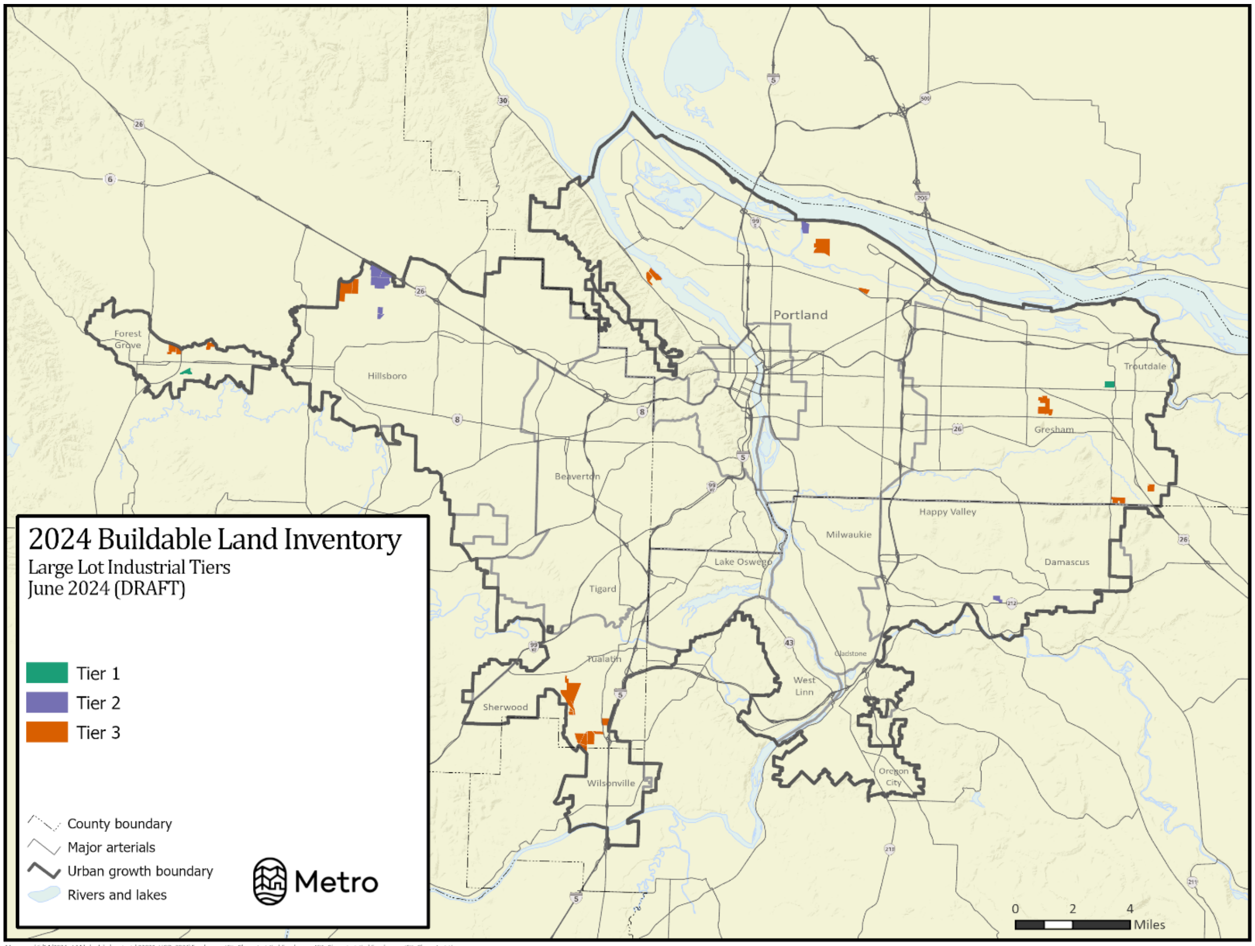


Figure 23: Inventory of large industrial sites (25+ buildable acres) in the Metro UGB

While a site-by-site review of development challenges is not possible for the thousands of acres of smaller industrial sites in the UGB, it is likely that many smaller sites are also held back by similar challenges. A more general assessment of the characteristics of these employment lands is included in Appendix 6. Much of the region's industrial land supply consists of smaller parcels with an average lot size of 3.8 acres and a median lot size of 1.7 acres.[8] Metro's 2023 Small Site Industrial Readiness report found that small industrial spaces are in high demand and have lower vacancy rates than the overall industrial space vacancy rate. These small spaces and parcels that can accommodate them serve an important role for new or smaller businesses, which are often woman or minority owned.

However, smaller industrial spaces and smaller parcels can't serve the entire industrial market. In particular, larger sites are in demand for expansion of existing businesses and recruitment of businesses from outside of the region. For that reason, the Metro Council established the following policy in the Regional Framework Plan:

[8] These statistics are for vacant and infill lands and do not include redevelopment lands.

"1.4.6 Consistent with policies promoting a compact urban form, ensure that the region maintains a sufficient supply of tracts 50 acres and larger to meet demand by traded-sector industries for large sites and protect those sites from conversion to non-industrial uses."

Since the 2017 update of the Regional Industrial Site Readiness inventory of large industrial sites, 15 large industrial sites have developed. Six of the sites that developed are over 50 acres in size. There are ten remaining sites over 50 acres inside the UGB. Of those, two sites have marine or airport use restrictions, leaving eight sites over 50 buildable acres inside the UGB that are available to the general industrial market.

It is not possible to precisely forecast long-term demand for individual sites since development of these sites depends on individual business decisions. Firms have idiosyncratic site needs or preferences such as access to skilled workers, specialized infrastructure, proximity to existing economic clusters, availability of financial incentives, and tax climate.

The August 2022 Oregon Semiconductor Taskforce report identified short term statewide needs for the following:

- Two sites of 500+ acres each to accommodate large-scale semiconductor R&D and/or production fabrication operations.
- Four sites of 50-100 acres suitable for integrated device manufacturers or major semiconductor equipment manufacturers.
- At least eight sites of 15-35 acres to enable key suppliers to the semiconductor cluster to locate and expand.

Analysis of the specific site characteristics in the proposed Sherwood West employment area

The Sherwood West Concept Plan includes land for housing, schools and civic facilities, park space and 265 net acres[9] for employment uses that would support about 4,500 new jobs. Though there is, in aggregate, a surplus of industrial acreage inside the UGB, there are still valid reasons that support adding the Sherwood West urban reserve to the UGB. ECOnorthwest explored regional and local data trends to assess whether the sites identified for future employment growth in Sherwood West have characteristics that make them more suitable for meeting the employment needs of the Metro region.

ECONorthwest's analysis is included in Appendix 9 and finds that the land within the North District Mixed Employment Area of the Sherwood West urban reserve has specific characteristics that meet a regional need for large 40 to 50-acre parcels with minimal need for site aggregation, slopes under seven percent, and proximity to the highway. This assessment indicates that Sherwood West would be more suitable to meet identified needs for industrial growth than other lands inside the existing UGB.

UGR Roundtable perspectives: Agricultural land demand

The discussions around future growth and urbanization prompted some members to express concern about **competing demands on agricultural land**. Participants expressed that agriculture land is employment land pointing out that industrial or commercial zoned uses are not the only way to support job growth in the region. It was important to some roundtable participants that as urban reserves come into the growth boundary and develop, that there is an understanding of the transportation needs for both rural and residential uses – and that those transportation needs are addressed in a compatible way. Other participants noted the link between environmental policy goals and preserving agricultural land, including mentioning that there is an increased cost and carbon footprint of pushing food production outside of Oregon.

Industrial land options

Informed by this analysis, the Metro Council has the discretion to decide one or more of the following:

- Based on regional forecasts, find no need for additional land for industrial uses.
- Add the 130net-acre mixed employment portion of the Sherwood West urban reserve to the UGB based on a determination that the area offers unique site characteristics for

[9] Includes employment lands in the southern "hospitality zone" as well as lands in the northern mixed employment area.

industrial and flex uses that are in demand and that cannot be found elsewhere in the UGB. This decision would be supported in part by the land needs identified by the state Semiconductor Taskforce.

Commercial land gap analysis results

Commercial lands support all other non-industrial employment uses like offices, retail, and medical. To some extent, commercial demand also gets met on industrial lands, for example through retail uses on industrially zoned lands. However, this analysis has not estimated that potential crossover. The binary classification of employment capacity as industrial or commercial may have the effect of overstating the deficit for commercial land. A similar issue may be present for mixed use zones since the pro forma model appears to "choose" residential redevelopment over commercial redevelopment. In reality, demand for commercial space would lead to more redevelopment for that use, potentially in combination with residential uses above.

Table 20: commercial land capacity gap for Metro UGB 2024-2044

	Capacity (acres)	Demand (acres)	Surplus or deficit (acres)
Low growth forecast	480	-300	+780
Baseline growth forecast	480	800	-320
High growth forecast	480	2,300	-1,820

Given the current nationwide challenge of there being excess vacant office buildings, this finding of a potential capacity deficit creates some dissonance. However, it is important to remember that the commercial category includes uses that go beyond office uses (for instance, retail and medical) and this is a long-term demand forecast.

Commercial land options

Informed by this analysis, the Metro Council has the discretion to decide one or more of the following:

- Plan for the low growth forecast and find no need for additional land.
- Plan for the baseline forecast:
    - Assume that 320 acres or more of the region's industrial land surplus is functionally available for commercial employment uses, thereby addressing the commercial capacity gap; or,
    - Assume that additional commercial redevelopment would occur if there is demand for commercial space.
- Plan for the baseline forecast and find a need for a UGB expansion:
    - Add the 135-net-acre commercial employment portions of Sherwood West urban reserve to the UGB; and,
    - Consistent with observed development trends, assume that a small portion (185 acres) of the region's industrial land surplus will be available for commercial employment uses, thereby addressing the remaining commercial capacity gap.
- Plan for the high employment growth forecast and add the 135-net-acre commercial employment portions of the Sherwood West urban reserve to the UGB; and,
    - Add approximately 1,665 additional net acres of urban reserves that lack a city proposal the UGB; or
    - Work with local jurisdictions to rezone industrial lands to allow a greater variety of commercial employment uses.

Youth Cohort perspectives: Sustainability

As we discussed planning for new homes and jobs in the region, youth cohort members felt that **sustainability, environmental preservation, and climate justice**, was a top priority for Metro Council to consider. The group wanted to see natural resource preservation in any proposed expansion area and cautioned against creating urban heat islands. Some members of the group spoke of the importance of a healthy tree canopy and planting native species that would be resilient to changing climates. Overall, the group wanted to see Metro incentivizing a balance within new developments where new housing and jobs could be created while still protecting important natural resources and biodiversity.

CONCLUSION

The 2024 urban growth management decision, like growth management decisions before it, has surfaced people's thoughts on many topics. Some of those topics relate directly to long-term land supply while others relate more generally to land use planning. Others require collaboration across sectors.

The Metro Chief Operating Officer recommendations to be released in mid-August will provide more suggested responses to a number of these topics.

UGR Roundtable perspectives: Summary

Discussing the variety of regional challenges and concerns led to conversations about the **role of Metro and local governments** in finding solutions. Roundtable members highlighted primary roles of Metro as listening to local concerns, partnering with cities to find infrastructure funding, advocating at the state level, and being nimble and flexible to change. Some of the local jurisdiction representatives mentioned the increasing need for fiscal balance in their community to continue to fund their local services.

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[i] (Washington University Institute for Health Metrics and Evaluation, 2024)

APPENDIX 1 – 2024 REGIONAL ECONOMIC FORECAST

Executive Summary

This appendix summarizes Metro's 2024-44 Regional Economic Forecast. The forecast includes projections of future population growth (i.e., age, sex, race, disability status, household size and income bracket), nonfarm payroll employment and employment by industry sector (i.e., NAICS, North American Industry Classification System) for the seven-county Metropolitan Statistical Area (MSA).

Key Findings about the regional forecast

- A panel of experts, economists and demographers found the Metro regional forecast to be reasonably sound (please see Appendix 1A)
- The region (or MSA) has largely rebounded from the pandemic-era induced recession, although sector-level (or industry) employment details differ.
- The baseline regional forecast is consistent with a "soft-landing" with no recession expected in the near term (though a non-negligible risk still exists and is encapsulated in a forecast range).
- Headline nonfarm payroll employment in the MSA rebounded to its pre-pandemic peak in 2023 but has since drifted lower because of the twin burden of higher interest and inflation rates slowing down national growth and weighing down regional trends.
- The pandemic caused some trends to accelerate and likely to persist for the long-run duration of the forecast (e.g., work from home, online purchases of goods, supply-chain dislocations, and other economic scarring).
- Other impacts from the recession aren't likely to persist and their impact on the regional economy are projected to become more muted over time (e.g., elevated inflation, interest rate hikes, high vacancy rates, temporary supply-chain disruptions, and labor market tightness).
- The regional forecast incorporates a boost to regional employment growth due to national legislation to "re-shore" high-tech development (including jobs) to the US; separately, a spending boost on infrastructure has a positive impact on job growth, particularly in construction.
- A notable change in the regional projections (to both population and employment) has been included in this latest release of the regional forecast. The change centers on demographics with stark implications that constrain labor market developments in the long run.
- Total fertility rates (TFR) have declined sharply and were temporarily made worse during the pandemic. Once, a TFR of about 2 children per woman in the 1990's was common. Recently, the rate fell to 1.25 during the pandemic but is expected to edge back up to 1.5 and hold relatively steady through the twenty-year MSA forecast.
- Life expectancy is expected to continue improving, but due to the existing large segment of the "baby boom" generation, the number of total deaths is expected to rise more sharply as "boomers" mature and age out of the population.
- Natural change (live births minus total deaths) in the regional baseline forecast anticipates that the number of deaths will exceed the number of births in the next decade.
- If not for the expectation of positive regional net migration, annual population growth for the MSA would tilt negative, and even so, regional population growth will fall to 0.4% APR (annual percentage rate) in the second half of the twenty-year forecast.

- The significance of the sharp slowdown in population growth is reflected in the tapering of overall nonfarm payroll employment which severely flattens during the second half of the twenty-year forecast. The average annual growth rate projected for nonfarm payroll employment in the MSA is 0.4%.

What's new?

- MSA Population projections from 2024 to 2044
- MSA Population projections by age, sex, and race (white, Hispanic, Asian-Pacific Islander (API), black, and native Americans (AIAN))
- MSA Household projections by age of householder, income bracket, household size (number of persons) – known as the forecast of "HIA distributions"
- MSA Population disability projection
- MSA Nonfarm payroll employment projections from 2024 to 2044

State of the Region

The MSA region has made big strides in overcoming the economic disruptions after the pandemic-induced recession. The downturn in regional employment was swift and sharp, and between February 2020 and April 2020, more than 176,000 workers (source: BLS) had been completely shut down from their workplace and lost their jobs. The unemployment rate in the region jumped to 13.3% in April from 3.0% (source: Census) in two months prior to the economic shutdown. It has taken the region over 2 ½ years to recover from the pandemic induced job losses to bounce back to pre-pandemic employment levels.

At least in the case of headline employment figures, total nonfarm payroll employment has fully recovered. The details for individual sectors are still mixed, although most industry sectors have fully recovered or very nearly so. Leading the recovery in the last several years, and unsurprisingly, were the industry sectors which let go the greatest number of jobs during the pandemic. The leisure and hospitality (NAICS 71 & 72) sector suffered the largest job losses at the onset of the pandemic, but the sector has since made sizeable gains since the re-opening of the economy for business. Service and retail sectors which directly served the public were hit hardest by the government mandates to close or curtail business operations. The majority have rebounded.

The economy continued healing from the pandemic but is now faced with the twin specter of high inflation and higher interest rates. Job growth materially eroded in regional sectors most sensitive to elevated interest rates. Financial activity (NAICS 52 & 53) was one such sector as interest rates made home buying less affordable and cut into company profit margins. Individual industries in manufacturing

(NAICS 31-33) also saw sharp employment declines which lessened overall growth in the region as regional producers didn't want to get stuck with unsold inventory during a possible economic downturn.

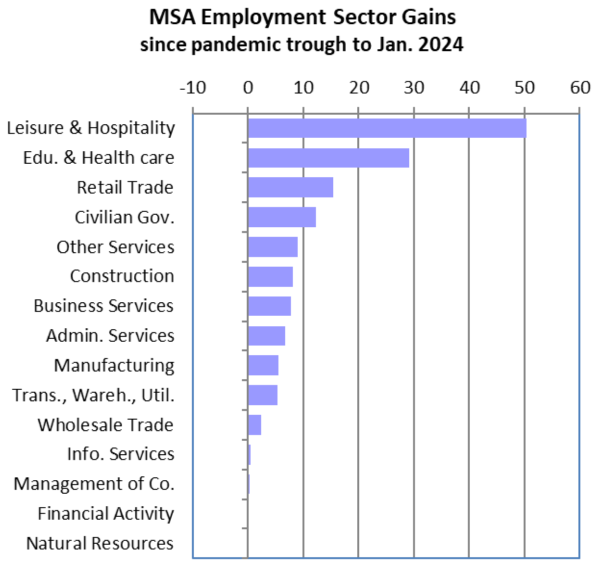


Figure 1: MSA sector growth of major industries

Economic conditions in the region have softened recently and labor market easing has begun appearing in more sectors of the region as inflation has taken its toll on consumers and businesses alike. Headline economic growth has eased with hikes in interest rates. The region's manufacturing sectors along with industries highly sensitive to interest rate fluctuations (e.g., retail trade, especially of stores that sell "big ticket" items and discretionary goods, finance and real estate, and professional services, especially temporary-help jobs) were driven to cut back on hiring and have had forced layoffs in some sectors. With the Federal Reserve still trying to tamp down inflation, the nation's monetary authority has induced a slowdown in manufacturing that has since spread into the service and retail sectors of the economy.

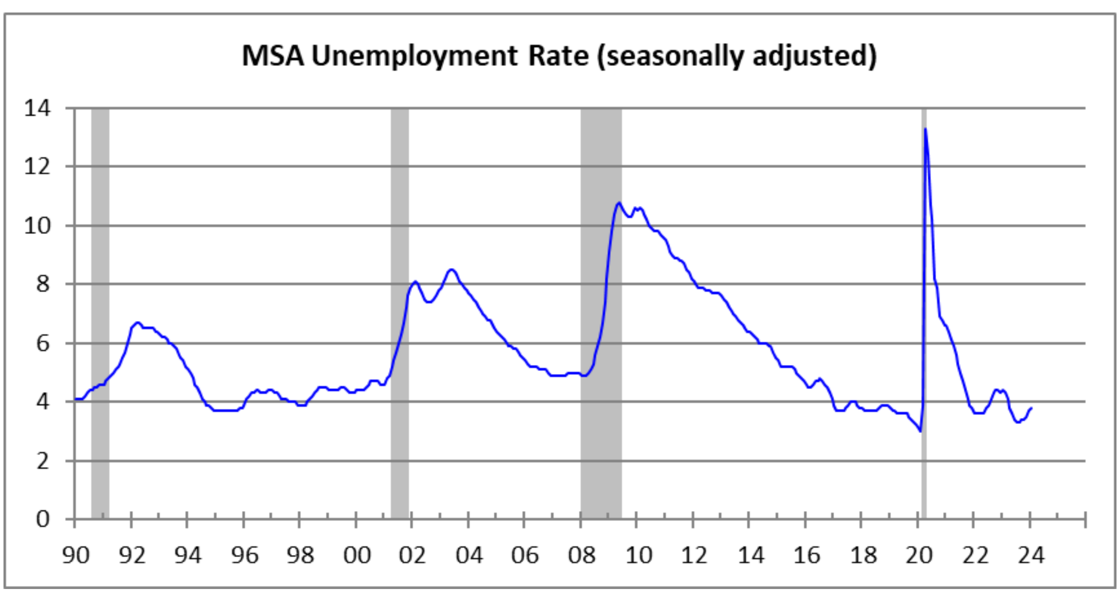


Figure 2: MSA Unemployment rate

Still, the region's overall labor market remains unusually tight for this latter stage of the current business cycle. Before the pandemic, regional unemployment was 3%. The unemployment rate for the entire MSA, though not as low as what it had been pre-pandemic, remains quite low, having recently edged up to 3.8% from a low of 3.3% in the middle of 2023. Labor market conditions remain healthy despite recent economic turbulence.

MSA Long-term Demographic Trends

The MSA has been facing similar demographic pressures that both the state of Oregon and the US have been contending with for many years. Wide fluctuations and a large net inflow of new migrants partly obscured the emergent trend, but now with over a decade of solid natality and mortality trends in place, it is quite evident that natural change (i.e., births minus deaths) in the region is falling and will continue to do so. Most notably, female fertility rates have fallen more sharply than previously anticipated. Life expectancies are projected to continue improving, but the overall crude death rate (i.e., ratio of deaths to total population) is expected to climb as the unusually large segment of the population known colloquially as the "baby boom" generation incrementally ages out during the twenty-year forecast. The result of declining births and a higher crude death rate in the Metro regional forecast means that future regionwide population growth will be much slower on an annual basis.

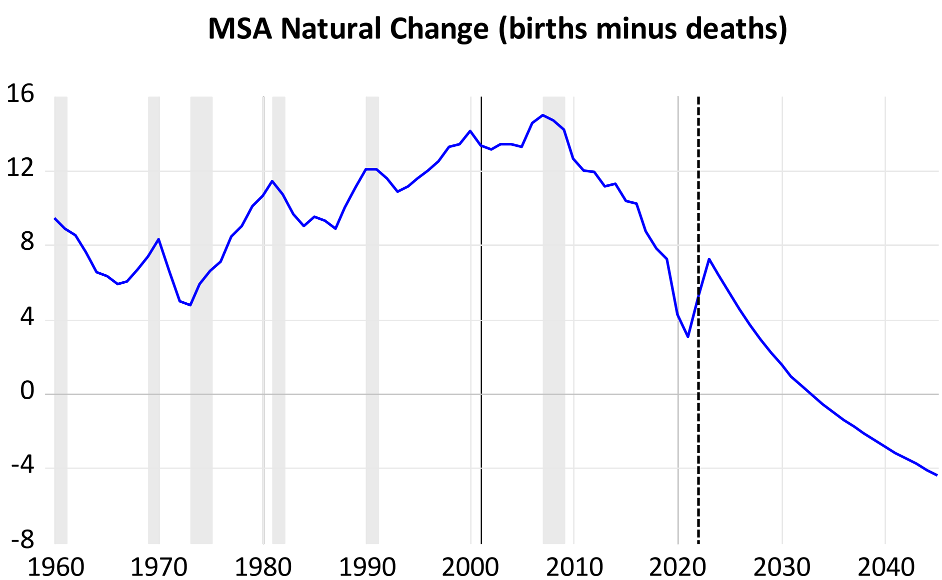


Figure 3: MSA natural change (births minus deaths). Natural change in resident population will turn negative in the next decade and absent positive net migration, the region's total population will start to decline.

MSA Fertility Assumptions

From 1990 to 2000, the MSA region experienced robust population growth of 2.4% (average annual rate). The population growth in that decade was supported by a strong economy that drew in a sizable proportion from migration. The total fertility rate (TFR) in the region was about 2.0, which was near replacement level. The replacement level fertility rate is the level of fertility at which a population exactly replaces itself from one generation to the next. In developed countries, like the US (and the MSA), replacement level fertility can be taken as requiring an average of 2.1 children per woman (source: National Institute of Health (NIH)).

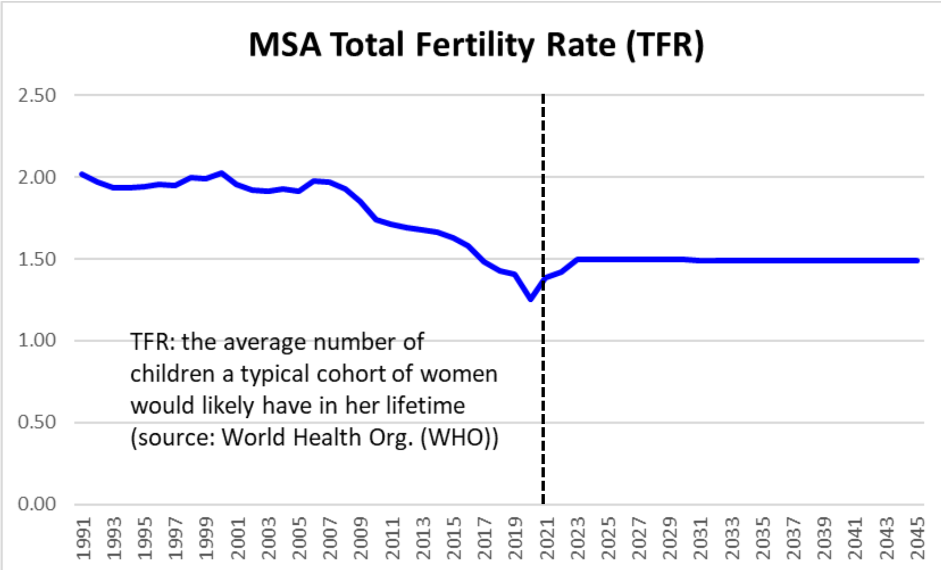


Figure 4: MSA Total Fertility Rate (TFR).

Fertility rates in the MSA clung near replacement level up until the Great Recession (Dec. 2007 to June 2009, source: National Bureau of Economic Research (NBER)). Since then and even after the economy rebounded from the Great Recession, fertility rates did not recover and continued sliding lower in subsequent years. The downward trend briefly accelerated during the pandemic but has since begun to rebound. The rebound will be modest and short-lived in the baseline Metro forecast, returning the region's fertility rate to about 1.5 children, a number just higher than before the onset of the pandemic. The forecast contemplates the total fertility rate holding steady during the twenty-year forecast at roughly 1.5 children per woman residing in the region.

The impact of lower fertility rates and projected decrease in the natural change should (other things being equal) result in a significant slowdown in annual regional population growth. This began happening in the decade between 2000 and 2010 and the trend accelerated into the decade between 2010 and 2020. Regional population in the 2000's fell to 1.4% annual growth and in the decade after 2010 had diminished even more, down to a 1.2% annual growth.

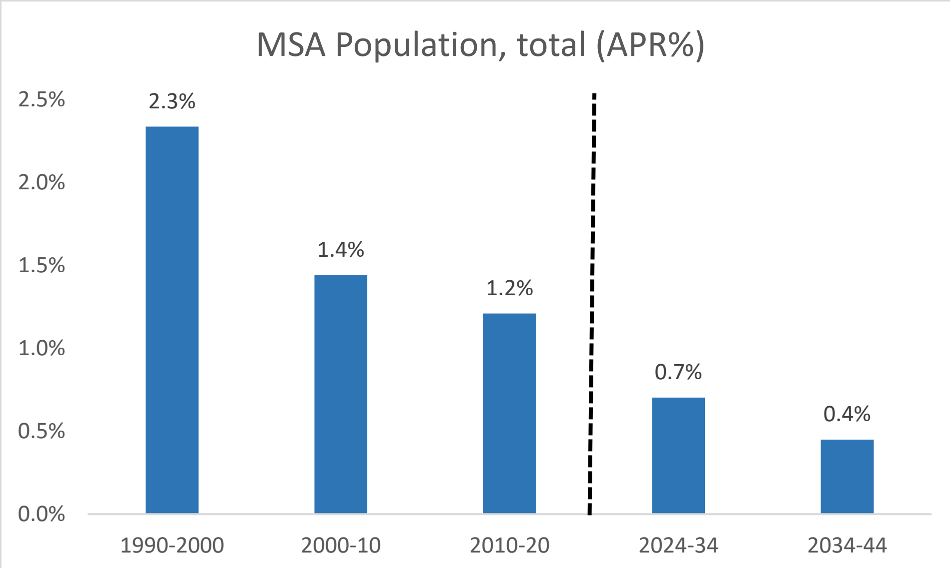


Figure 5: MSA total population, annualized growth rates by decade

MSA Life Expectancy Assumptions

Life expectancies in the US will continue to improve, according to US Census Bureau projections. This is reflected in the baseline MSA forecast, which incorporates an identical set of life expectancies into age-specific death rates for the region. These death rates are then applied to the age cohorts to estimate the number of deaths in the regional outlook.

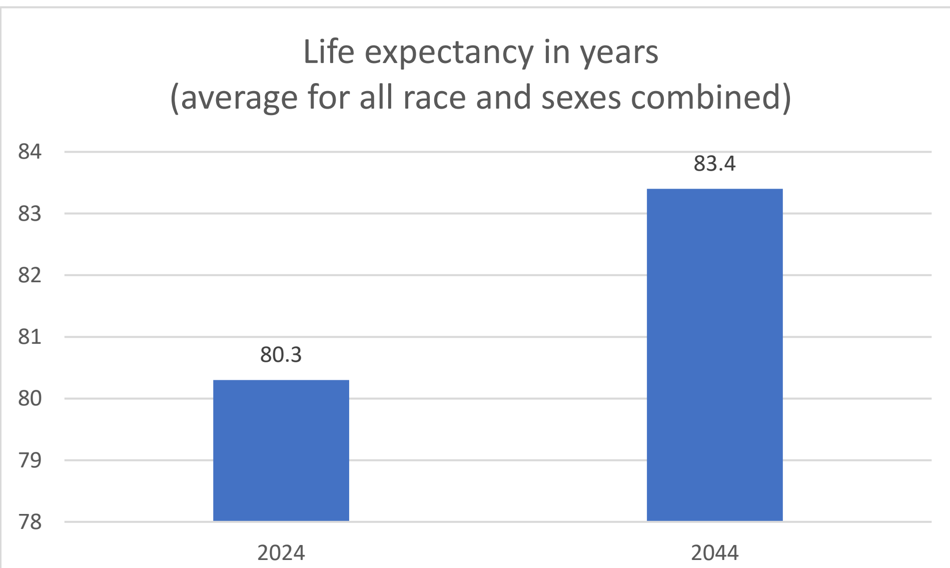


Figure 6: MSA life expectancy is expected to increase in the baseline 20-year Metro forecast.

Life expectancy in general is age specific. For example, a person born in 2024 has an average life expectancy of 80.3 years; and by the forecast horizon, a person born in 2044 will have an average life expectancy of 83.4 years – an increase of more than 3 years. This is why we say that life expectancy is expected to rise in the outlook, but for the population already born (or migrated to the region), their individual average life expectancies remain fixed depending on the person's specific age.

MSA Net Migration

Net migration is the difference between the number of persons who relocate to the MSA from outside the region and the number who leave, generally calculated over a year. Since 1960, annual net flows of MSA migration have tended to swing up and down with movements in economic business cycles, though oftentimes notable lags may exist. Moving carries with it transactional risks and relocation costs that may delay the immediate decision to relocate or stay at home. There are other reasons adults choose to relocate and they aren't always about money and housing, such as moving to be closer with family, going to college, or caregiving responsibilities. Regardless of a migrant's underlying reason, we observe that the annual historical net migration has been mostly positive during recent decades, except in brief periods of economic recessions (marked by gray bars in the figure).

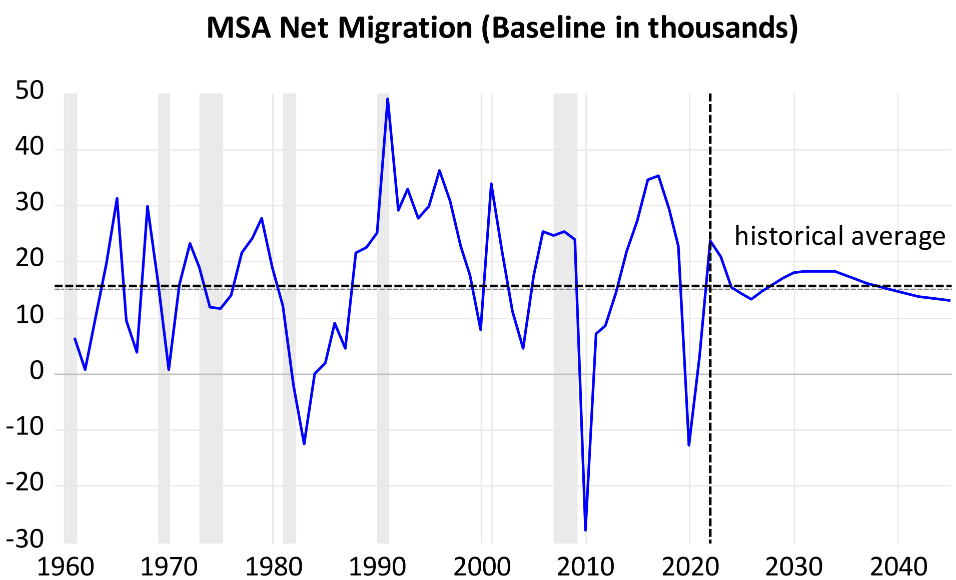


Figure 7: MSA net in-migration

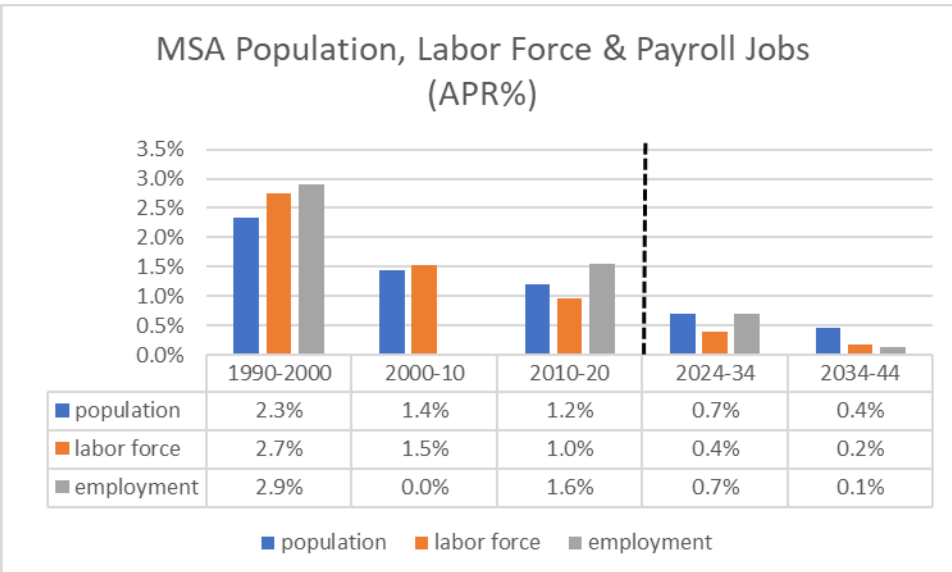
Migration topped out during the decade of the 1990's, with the high technology industries and firms in advanced manufacturing attracting highly skilled workers to computer technology and fabrication plants in the region. In the years leading up to the Great Recession, the region experienced a sharp downturn in migration before rebounding just before the pandemic induced recession in 2020. The economic boom after the Great Recession was beginning to show its age, and the specter of another economic recession loomed over the economy before the economic shutdown finally tipped the US into a sharp economic tailspin.

Over the last 60 years of population data for the region, average annual net migration has been positive and added to the region's demographic growth. Behind this six decades of prosperity in the region, net in-migration has averaged about 15,000 people.

The MSA population projection incorporates fluctuations in the current business cycle. It plays out a "soft landing scenario" in the short run in which the economy is projected to see much slower annual growth (but no recession) going forward. This is reflected in downward drifting of net migration near the outset of the forecast. In the long-run, net migration hews to a steady-state of migration reminiscent of historical trends. Regional migration is expected to continue forward as many of the popular reasons for why people might want to relocate still exist in the future and the relative economic advantages that the region has enjoyed over the rest of the nation and state-level neighbors to the north and south aren't going to materially change in the migration outlook.

MSA Long-term Employment Trends

Employment growth trends in the future are expected to be substantially lower in the current forecast. Compared to prior employment forecasts, the job growth in this forecast vintage reflects substantially slower payroll increases. The projection of job growth will also be considerably more subdued than previous periods of history. The reason behind this slower projected employment growth stems primarily from a significant step down in the projected supply of labor.



	1990-2000	2000-10	2010-20	2024-34	2034-44
population	2.3%	1.4%	1.2%	0.7%	0.4%
labor force	2.7%	1.5%	1.0%	0.4%	0.2%
employment	2.9%	0.0%	1.6%	0.7%	0.1%

Figure 8: MSA annual percentage rates for population, labor force supply, employment demand

In earlier decades, population in the region boomed (at least compared to nowadays). This led to a need to match up the rate of population expansion with jobs people could do. The economy was also in greater transition as women with college degrees continued to enter the labor force in droves. The labor force theoretically doubled, (with sizeable chunks of capable women adding to the labor supply) which meant labor became relatively cheaper, other things being equal. Domestic employers took advantage of this trend in labor supply by hiring more people. On top of this, the advent of computers and improved automation of factory floors also made the economic contributions of each employee proportionally more valuable; we call this increase in productivity and that usually means higher pay. Higher productivity and more hiring meant workers were able to spend more in the economy and thus boost demand for the goods and services that many were providing as employees. This virtuous cycle elevated the growth rate in jobs and industry growth.

Attitudes in family formation (or not) and child rearing had once changed quite slowly, but this trend has taken a sharp turn after the Great Recession and may have accelerated with the pandemic. Going forward, the growth rate in the labor force of the region is projected to be much slower, even slower than the overall rate of population growth. Working age adults and the overall population are impacted in the same way by fewer children being born and an aging labor force that more and more will leave and enter retirement. Labor force participation rates may edge higher when the economy improves in the short run, but this is only a temporary offset to the declining trend in the labor force. The long-term expectation is both labor force and participation rates are on a long-run decline. Final demand for employees is thus scheduled to experience substantially slower growth rates in large part due to the structural transition happening in the population and the labor force.

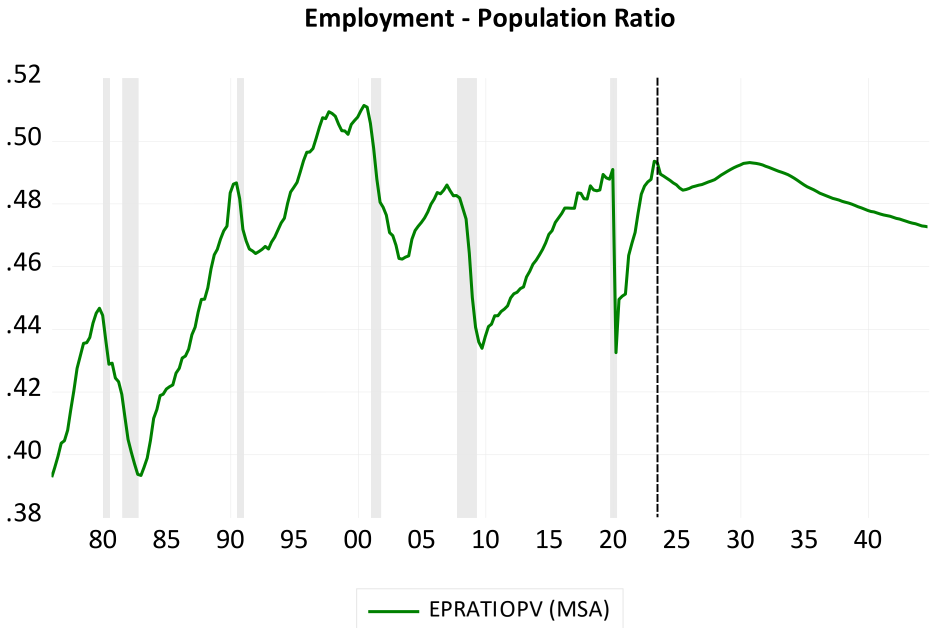


Figure 9: MSA ratio of nonfarm payroll employment and total population

The employment rate, also known as the employment-population ratio, is the percent of individuals who are employed out of the total population (source: US Labor Department). Higher employment rates indicate that more of the population is at work. The ratio tends to fluctuate more near recessions, but since the baseline regional forecast is trend-based (i.e., forecast excludes business cycles), the future year estimate of the employment-population ratio tends to be smoother. Since 1990, the employment-population ratio has been close to 0.5 and to the extent that this relationship holds, the regional nonfarm payroll employment forecast projects similar consistency with the historical ratio.

Manufacturing Sector (private sector)

For the most part, individual industry-sector growth in the MSA is shaped by forecast assumptions contained in the US long-term macroeconomic forecast. Metro relies on a trend US forecast prepared by S&P Global. The regional forecast primarily utilizes the national economic trends of certain macroeconomic variables for its own forecast of regional employment trends. These macroeconomic variables include (but are not limited to) real GDP, US consumer spending trends, inflation, interest and foreign exchange rates, income and wages to employees, productivity, and demographic trend factors. The derivation of the regional forecast is thus hinged to the set of macro-economic forecasts of our national forecast advisor, S&P Global.

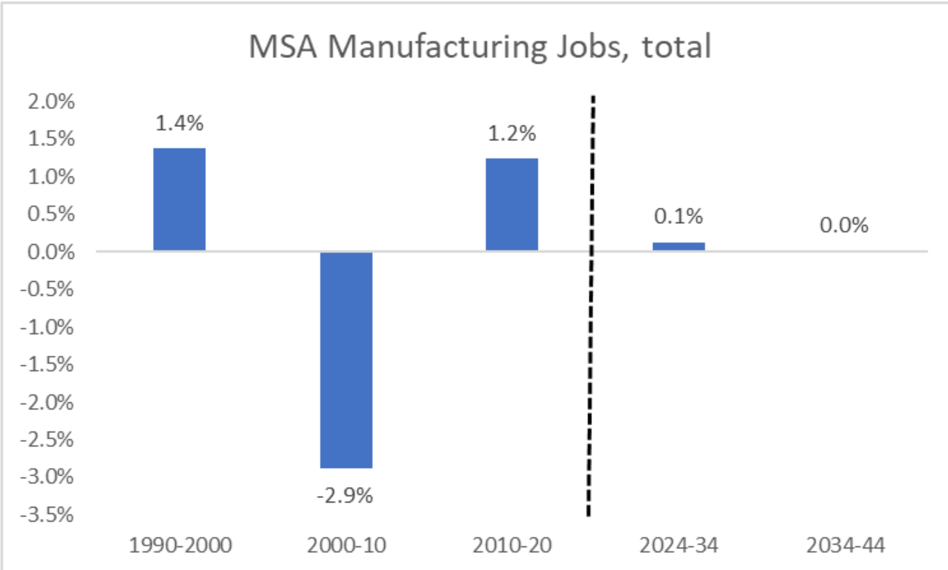


Figure 10: MSA total manufacturing job growth, APR%

The "high-tech sector" (NAICS 334) was a key industry in which the regional forecast implemented an override (called an add factor) which subsequently bolstered short-run job growth in the industry. This override to the region's forecast meant an increase in the number of jobs in the computer and electronics industry instead of an easing in job numbers as would more likely have been the case without the intervention of the CHIPS Act (federal statue enacted by Congress and signed into law on 8/9/2022). The CHIPS Act aims to improve the investment in US semiconductor manufacturing, research and development (R&D), and number of jobs in the workforce. The perception of most, including pundits responding to the review of this forecast, was that the government subsidies would temporarily boost job growth over the next few years, but afterwards continuing efforts to boost sector productivity and improved automation would begin to erode prospects of longer-run job growth in the industry. Job growth tapers in the region as soon as CHIPS Act investments fade.

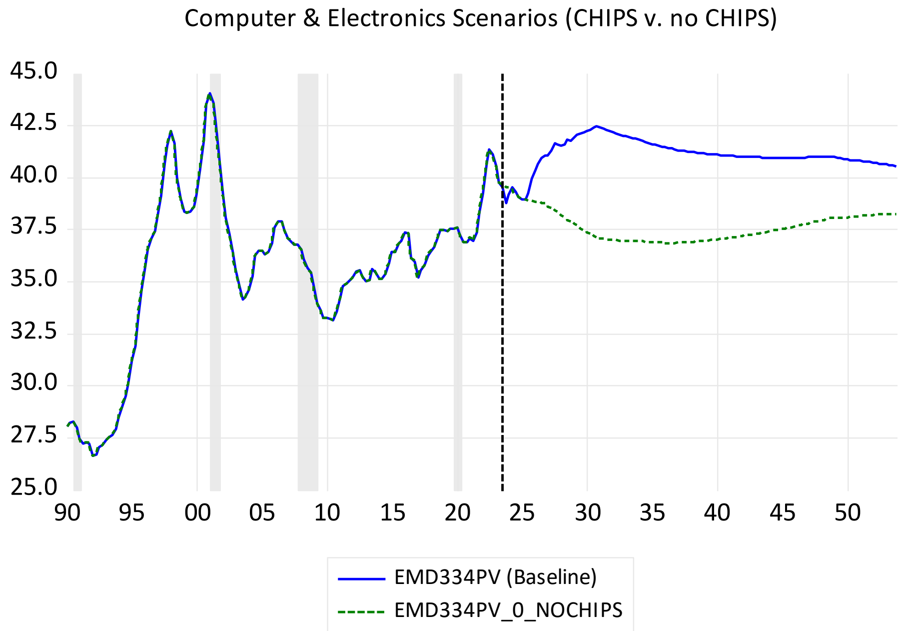


Figure 11: MSA Computer & Electronics industry forecast (with and without CHIPS Act intervention)

Nonmanufacturing Sector (private sector)

The nonmanufacturing sector is comprised of only private sector jobs. Almost half of these are consumer-oriented in such industries like the retail trade sector, health services, and the leisure and hospitality industries; the other half caters more to businesses-to-business relationships which include such sectors of the economy as wholesale trade, the warehousing/ distribution industries and business service sectors. The more business-oriented service sectors have a greater tendency to be impacted by swings in the business cycle while consumer-oriented service sectors may not grow as quickly during economic booms, but they also do not decline as sharply as the business service sectors. At the end of the 2000's, the US and this region suffered one of the steepest declines during the Great Recession and it was most evident in its negative impact to business-oriented industries (and manufacturing too.) It wasn't a great time for consumer-services employment, but the industries that predominantly serviced the public maintained a certain level of job growth commensurate with general population growth.

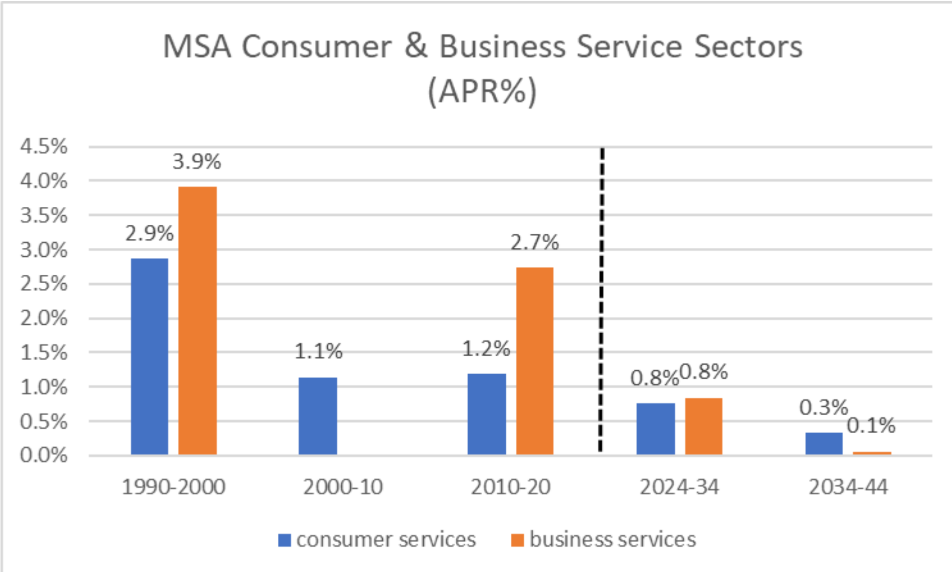


Figure 12: MSA private sector nonmanufacturing employment

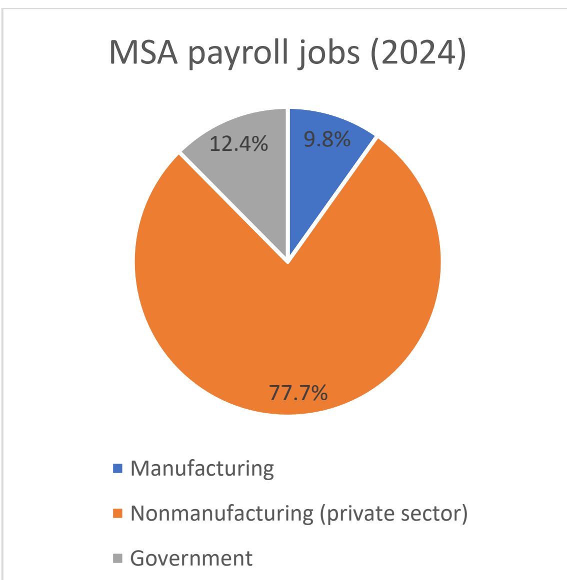
With population growth (as noted before) substantially subdued compared to prior decades, the region experienced much slower nonmanufacturing employment gains between 2010 and 2020, which was particularly evident in the consumer servicing industries. The business service sectors rebounded more sharply in the decade of the 2010's but this was still slower growth than in the 1990's. Going forward, population and domestic job needs are expected to ease even more. Annual population growth is expected to be cut in half in each of the next 10-year periods and is expected to hamper the likelihood of job growth approaching the robust growth rates the region once experienced. The regional forecast reflects a big change in demographics which then impacts prospects for future long-run job growth.

There are two sectors for which the regional forecast projects "outsized" job gains compared to projected population growth rates. One is the health care/ medical services sector. The population in the region is getting older. There will be a larger proportion of retirement age people living in the region in the next two decades than in prior decades. As more of this cohort enters retirement age and beyond, the demand for medical services will rise and the need for professionals in the health care industry will grow faster to meet anticipated need. The second industry anticipated to see job growth outpacing population growth will likely be the arts and entertainment sector. With a proportionally larger population of retirees with more disposable income than previous generations, the demand in this sector will likely be outsized compared to other sectors. Growth will increase as retirees look to find leisure activities other than work. Once again, the "baby boom" generation will dominate demographic and economic headlines until this population cohort ages out entirely, until then, this segment will have a greater influence on select industry job growth.

The construction industry is also anticipated to enjoy growth rates almost twice as fast as population growth during the first half of the twenty-year forecast. A combination of factors lends themselves to this expectation. The first is the Infrastructure Investment and Jobs Act, which looks to strategically invest in industries to bolster ones deemed important to national security. This intervention will likely give a boost to nonresidential construction as firms look to "re-shore" production capability that was once completed overseas. Construction will also receive a leg up from increased investment and construction of residential structures as there is widespread acknowledgement that the US (and this MSA) has under-produced housing after the Great Recession. A period of above average housing development will require a period of more substantial growth in construction jobs to support an increase in needed housing stock.

Government Sector

Government payroll jobs are unlikely to grow very much in the twenty-year forecast. Its job growth is tied mainly to population increases which will be very subdued. Federal employment will remain flat for most of the forecast except in 2030 and 2040 when the Decennial Census is taken. Federal employment will temporarily spike with Census enumerators hired to help count the population in America but will drop back sharply to prior employment levels when enumerators are no longer needed. State and local employment is projected to rise more slowly in the future because of the slowness expected in MSA population growth. Government jobs in education account for half of all nonfederal government jobs in the MSA. The demand for additional education jobs in the future is anticipated to be much less than in the past due to fewer children being born each year. The child population in the MSA is projected to average about 0.2% growth per year in the twenty-year forecast, compared to about 0.6% for the total population. The share of children in the MSA falls to 14.8% in 2044 compared to the 16.1% estimated for 2024.



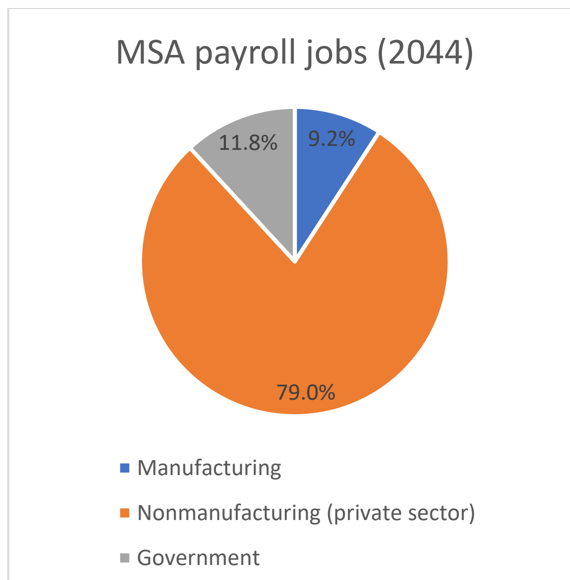


Figure 13: Share of manufacturing, service and retail, and government jobs in the MSA in year 2024 and 2044

US Forecast Outlook (the backbone underlying the MSA forecast)

Last year, the economy outperformed what many pundits and forecasters thought growth would be. Many had believed the US was heading into a recession and doubled down on that prediction when the US Federal Reserve (FED) began sharply raising interest rates to slow the rise of inflation, which topped 9.3% in June 2023. The benchmark federal reserve funds rate went from a range of 0% to ¼% up to a target rate between 5¼% to 5½%, where it now stands as of mid-March 2024. Instead of a recession, the US has had four outstanding quarters of above trend GDP growth, fueled by robust consumer spending, export growth and productivity increases; all of which are leading into this year. Employment gains throughout all twelve months of 2023 were well above expectations and boosted workers take home pay. Wage rates also rose at a healthy pace, supported by a tight labor market and productivity gains. However, inflation eroded much of the nominal increase that payroll workers received, and this was reflected in the plunge in consumer confidence last year.

Inflation has eased considerably since it peaked last year, but the last percentage point or so is usually the toughest to wring out from a vigorous economy. Core inflation did fall below 2% in Q42023, but monthly data since suggests that it won't maintain as producer prices edged higher than expected in the first two months of this year. Higher shelter costs (i.e., rents and mortgages) will likely add to headline CPI inflation and core inflation, or at least make it "stickier" for rates to ease. This suggests more inflation is already in the pipeline and higher prices heading at consumer pocketbooks. Monthly CPI inflation edged up to 3.2% in February 2024, higher than mainstream pundits had expected.

The economy is still operating at a healthy pace. Forecasters view the US operating at near potential already, so there is very little capacity to drive growth higher without inciting greater inflation. The economy will slow more because the FED hasn't yet achieved its goal of price stability. That means driving the US inflation rate down to 2 percent and holding at that rate. It's not quite there, so the FED has said that it needs more economic evidence that the inflation rate will not accelerate before they decide to switch from its current monetary restrictions. So, pundits believe that this gives the FED ample room to maintain its current vigilance against inflation, which means that it is likely that rate cuts will be put off until June 2024 at the earliest. Even then the rate cuts are likely to be gradual, unlike the sharp hikes that the FED engineered at the beginning of the current interest rate cycle.

Metro's national forecast advisor believes real GDP will gradually ease in 2024 and 2025 to about 1.4% growth per year. The belief is that a period of below trend growth is required to achieve the last step down in core inflation (i.e., price of goods and services excluding volatile food and energy prices). The US unemployment rate is currently at 3.9% (Feb. 2024). To facilitate the easing of inflation that is still too uncomfortably high, US unemployment will necessarily inch higher, expected to peak at about 4.7% at the end of 2025.

A "soft-landing" (i.e., the FED able to bring inflation down and cool a hot economy without setting off a significant decline in economic activity, a recession) is assumed in the US outlook, which is reflected in the Metro regional forecast. Consumer confidence has rebounded roughly half of what was lost last year, so there is plenty of room for improvement, but that optimism seems well-founded given near term economic developments.

Long-run projections of GDP and US employment growth have lowered from prior growth outlooks that Metro has used to forecast regional growth. Real GDP in the long-run rebounds from the engineered "soft-landing" by the FED to a peak of 1.8% and eases to roughly 1.7% per year in later years of the US forecast. This is slower growth for the US economy than the annual average of 2.4% real GDP growth in the 10-year span prior to the pandemic. Nonfarm payroll employment grew an average of 1.6% between the Great Recession and the year of the pandemic. Going forward, annual US job growth after recovering from the FED's "soft-landing" is projected to rise 0.5% per year and then drift lower to about 0.3% per year in the forecast outyears.

The US economic forecast is in keeping with national population projections. The US population outlook is anticipated to ease from a near-term peak of 0.5% growth per year after all the confusion from the pandemic settles out. Even so, long-run population growth is expected to drift lower to about 0.3%

growth per year. US population growth continues slowing because of a tapering of total fertility rates at the same time the total number of deaths will creep higher as the median age of the US becomes older. By the end of this forecast, many baby boomers will have aged out of the population so the number of deaths will begin to taper. Meanwhile, immigration rates, which are highly volatile and very much at the whim of political interests and include factors outside of the US economy, could be a greater source of population growth in the long run if immigration exceeds expectations. Bottomline, US (and MSA) population will trend lower mainly because natural change is tapering rapidly.

HIA (Household, Income and Age Bracket) Forecast

Metro's household forecast now includes a joint distribution which projects the change in composition of households in the MSA. These components of the household forecast include a breakdown of households in the MSA by household size (i.e., number of persons in each household), by income brackets and by age brackets (i.e., the age of head of household). Previous forecasts for the UGR broke out the households by just age. New to this forecast is the additional delineation of household income brackets and household size.

We summarize in a nearby table the marginal values of the HIA household forecast distribution, but the reader should understand that cross-dimensions among all three categories/ brackets were estimated for every dimension of the HIA forecast.

Household Size Categories

	1 person	2-person	3-person	4-person	5 or more		(excludes pop in GQ) average HH size
2020	27.2%	36.0%	15.4%	12.9%	8.5%	100.0%	2.52
2030	30.1%	35.8%	16.5%	12.5%	5.1%	100.0%	2.32
2040	31.3%	35.6%	16.9%	12.4%	3.9%	100.0%	2.25
2050	32.0%	35.5%	17.1%	12.2%	3.1%	100.0%	2.21

Household Income Brackets

	under $15,000	$15,000 - $24,999	$25,000 - $34,999	$35,000 - $49,999	$50,000 - $74,999	$75,000 - $99,999	$100,000- $149,999	$150,000 and over	
2020	7.5%	5.9%	6.6%	10.3%	16.8%	13.8%	19.1%	20.0%	100.0%
2030	8.3%	6.9%	7.5%	11.5%	16.1%	12.7%	18.1%	19.0%	100.0%
2040	8.6%	7.4%	7.9%	12.1%	15.9%	12.2%	17.7%	18.4%	100.0%
2050	8.8%	7.6%	8.1%	12.4%	15.7%	11.9%	17.4%	18.1%	100.0%

Household Age Brackets (Head of Household)

	under 25	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75 to 84	85 & over	
2020	3.3%	16.9%	19.9%	17.9%	17.8%	15.0%	6.6%	2.6%	100.0%
2030	3.3%	14.1%	18.5%	18.2%	16.7%	14.8%	10.2%	4.4%	100.0%
2040	3.4%	13.3%	16.6%	17.6%	17.3%	15.0%	10.9%	6.0%	100.0%
2050	3.3%	12.6%	15.5%	16.6%	17.3%	15.8%	11.8%	7.3%	100.0%

Figure 14: Margins of households by size, income and age in the MSA HIA forecast

MSA Population by Race Forecast

The race forecast for the MSA region isn't a different forecast from the regional population forecast. The races add up to be the same on a total regional basis. Here we describe in more detail the added dimensions of the population forecast by race and ethnicity. For purposes of exposition and adequacy in the population by race forecast, the number of categories of race are narrowed to 1) white, 2) black, 3) AIAN – American Indian or Alaskan native, 4) API – Asian or Pacific islander, 5) Hispanic or Latino.

Simplifying assumptions are made in the forecast of population by race. First, people self-identified in the Census as Hispanic or Latino, regardless of their self-identified race, are lumped as one into a 5th category that the forecast treats as its own race. Second, people self-identified in the Census as being of "two-or-more races" are separated into 1 of the 5 main racial categories in the forecast. For example, someone who identified him(er)self as bi-racial of white and Asian descent would be categorized in the Asian population segment for purposes of the forecast; someone identifying as black and Hispanic/ Latino would be categorized in the Hispanic/ Latino population segment. Thus, a person identifying as Hispanic/ Latino regardless of racial self-selection is designated (for purposes of this forecast) into the subpopulation of Hispanics; and someone that has self-identified as multi-racial is designated in one of the "non-white" categories (for purpose of this forecast).

Population segments are assumed to have separate rates of fertility and mortality based on race. These rates are arrived from Census birth and death demographic data and forecasts are based on projections from a Census forecast of these vital rates. Projections of fertility for each race are both age-specific adjusted and further altered to reflect detectable differences between birth rates of women (by age) residing in the MSA versus the national trend. Projections of mortality, age-specific death rates, for residents in the MSA are assumed to reflect the same trends nationally.

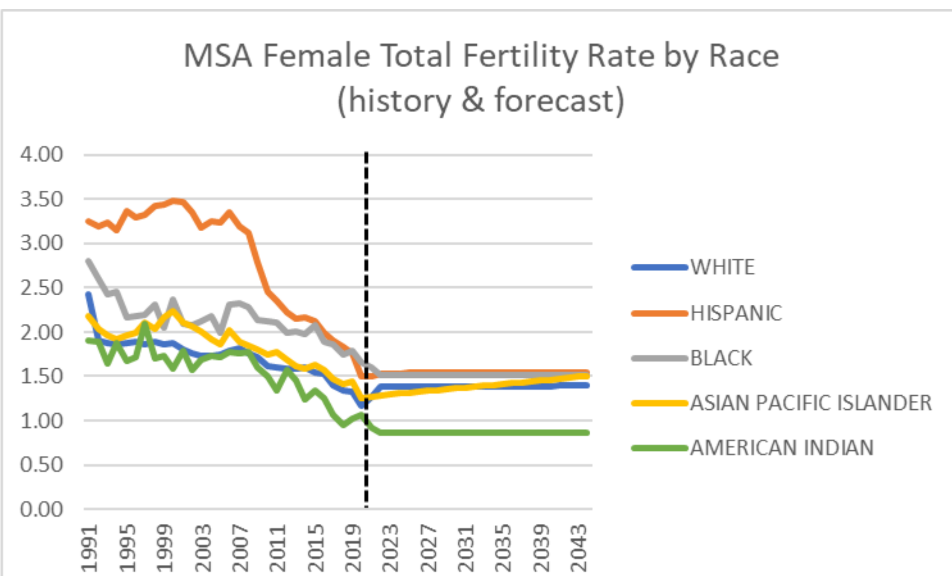


Figure 15: Total Fertility Rate (TFR) by Race (TFR is the average number of children a woman is likely to have in her lifetime)

The total fertility rate is an "aggregation" of age-specific birth rates of women of child bearing ages estimated by each race in the MSA in terms of how the individual birth rates sum to represent an average number of expected children per woman.

The life expectancy (in years) for men and women are so starkly different that the assumption is split between for them. Women generally live longer in the US (and MSA too) and this is reflected in the life expectancy chart (below). There is also a difference among races, with Hispanic subpopulations having the highest life expectancies, followed by white and API, then black and AINA.

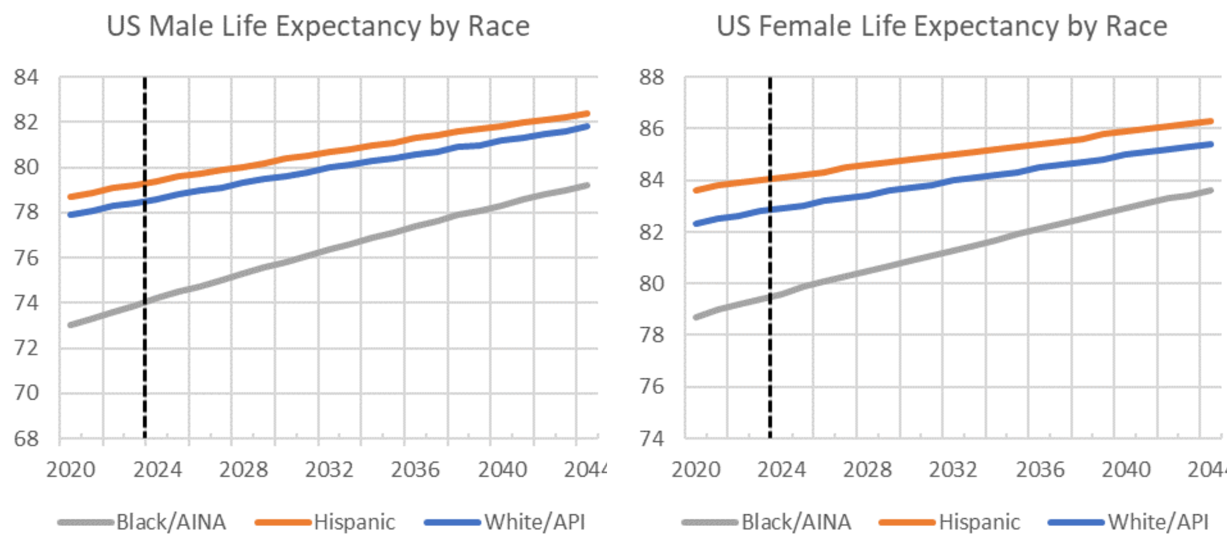


Figure 16: MSA Life expectancies (in years) by race (same as US); (note: Census assumes black & AINA subpopulation have same life expectancies and white & API subpopulations have same)

The region's population is expected to become more racially diverse even as the overall MSA population more slowly expands, and the population grows older. The white population is anticipated to grow the least, at an annualized rate of 0.1%; this is followed by the Native American community at 0.2% growth per year. The fastest growing segment will be the Hispanic/ Latino population, and the Black and Asian community are all expected to exceed average population growth for the entire region.

	MSA Population (2024-44)		
	change	%change	%APR
white	41,918	2.4%	0.1%
black	30,316	27.8%	1.3%
AIAN	1,288	5.0%	0.2%
API	81,350	31.6%	1.4%
Hispanic	159,966	43.1%	1.9%
total pop.	314,837	11.8%	0.6%

Figure 17: MSA population by race: growth, %growth, annualized percentage rate

MSA Disability Forecast

The number of persons with a disability is based on self-identification and that person might identify with multiple incidents of some form of disability according to Census data. The likelihood of a person identifying him(her)self with at least 1 of 6 disability attributes rises with the age of the person. Thus, the MSA disability forecast is produced on an age-adjusted basis to reflect the projected increase in median age of the regional population and the increasing proportion of the population entering retirement age when the incident of one form of disability sharply increases.

The disability forecast is defined by data from a recent Census survey of the MSA region. This survey asks the respondent whether the person has difficulty in 1 or more areas (listed below). The term 'disability' is not specifically used in the survey instrument; however, the Census uses the questions in the survey to glean the number of disabled residents for the region.

- Hearing difficulty, defined as deaf or having serious difficulty hearing.
- Vision difficulty, defined as blind or having serious difficulty seeing, even when wearing glasses.
- Cognitive difficulty, defined as, because of a physical, mental, or emotional problem, having difficulty remembering, concentrating, or making decisions.
- Ambulatory difficulty, defined as having serious difficulty walking or climbing stairs.
- Self-care difficulty, defined as having difficulty bathing or dressing.
- Independent living difficulty, defined as, because of a physical, mental, or emotional problem, having difficulty doing errands alone such as visiting a doctor's office or shopping.

Following the methodology of Portland State University's Population Research Center (PRC), responses to individual disability categories with significant correlation are grouped together into three broader disability categories. The three groupings include 1) hearing and vision difficulties combined, 2) ambulatory and self-care difficulties combined, and 3) cognitive and independent living difficulties combined. The reasoning behind the groupings is individuals who report difficulty(s) in one of the three groupings have a very high incident of having both difficulties; and thus, the groupings reduce the "double counting" of persons with disabilities but do not fully eliminate it.

The six disability categories, and subsequent three groupings, are mutually inclusive. For example, respondents can self-identify as having both hearing and vision difficulties, as well as having self-care and ambulatory difficulties and/ or cognitive and independent living difficulties; in other words, all three, or two of the three, or in just one of the groupings.

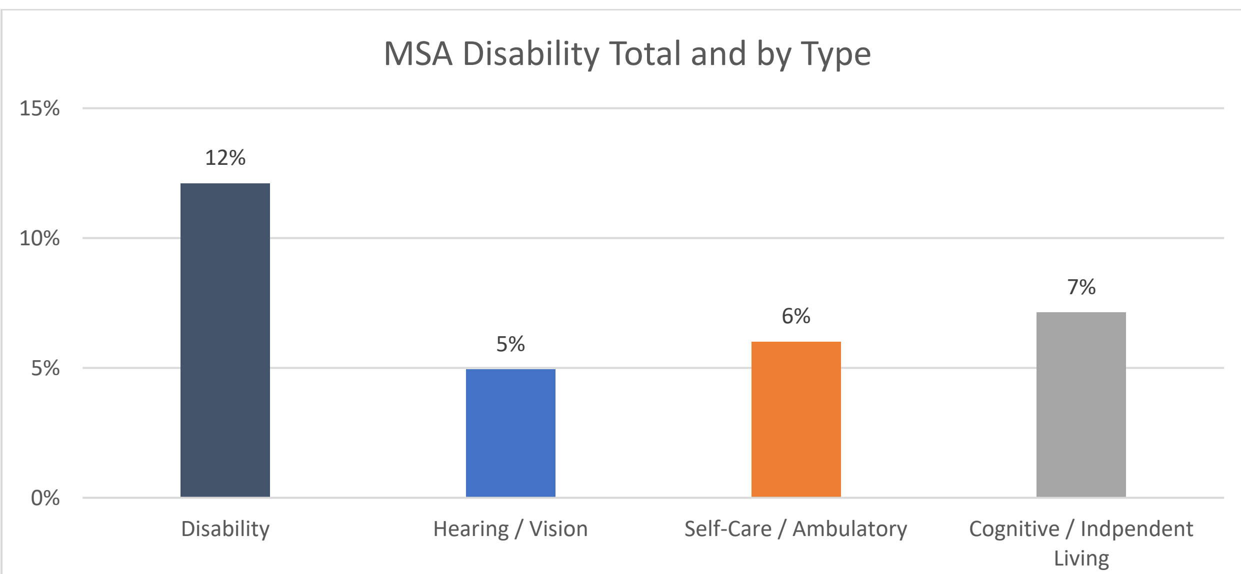


Figure 18: Disability groupings (note: overlap in the disability groupings sum to exceed overall percentage disabled)

Since disability positively correlates with age, the three disability groupings are further disaggregated by age to apply current age-specific disability rates to age-specific forecast brackets.

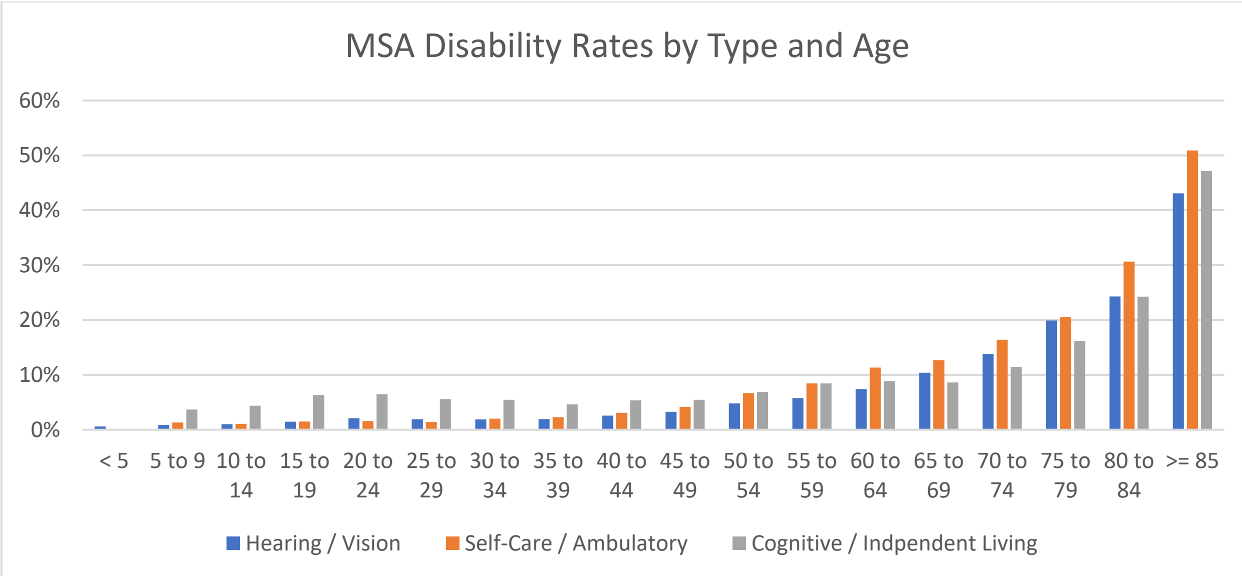


Figure 15: MSA incident rate of disability by groupings by age

MSA Employment Forecast

(Employment figures in thousands)

	2024	2025	2026	2027	2028	2029	2030	2031	2032
Nonfarm Wage & Salary Jobs, TOTAL	1,261.2	1,263.9	1,274.0	1,286.2	1,300.6	1,316.4	1,330.4	1,339.5	1,345.1
Manufacturing, TOTAL	124.2	123.7	124.9	125.5	125.6	126.1	126.7	126.8	126.5
Durables, total	92.7	92.4	93.6	94.1	94.0	94.3	94.8	94.8	94.4
Wood Products	4.0	4.0	4.0	3.9	3.9	3.8	3.8	3.8	3.7
Primary Metals	4.9	5.2	5.1	5.0	4.9	4.7	4.6	4.6	4.5
Fab. Metals	12.7	12.6	12.6	12.6	12.5	12.5	12.5	12.6	12.6
Machinery Mfg.	10.3	9.7	9.5	9.3	9.2	9.2	9.2	9.1	9.1
Computer & Electronics	39.3	39.2	40.7	41.4	41.7	42.0	42.3	42.3	42.1
Transp. Equipment	6.4	6.2	5.8	5.6	5.4	5.3	5.2	5.1	5.0
Other Durable Goods	15.1	15.4	15.8	16.2	16.5	16.8	17.1	17.3	17.4
Nondurables, total	31.5	31.3	31.3	31.5	31.6	31.8	32.0	32.1	32.1
Food Processing	13.7	13.7	13.8	13.9	13.9	14.0	14.0	14.1	14.0
Paper	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2
Other Nondurables	15.5	15.2	15.2	15.3	15.4	15.5	15.7	15.8	15.8
Nonmanufacturing (private), TOTAL	980.5	982.5	990.0	1,000.0	1,012.8	1,026.6	1,038.7	1,047.3	1,053.2
Natural Resources & Mining	1.2	1.2	1.3	1.4	1.4	1.5	1.6	1.7	1.7
Construction	91.4	92.1	93.3	94.9	96.6	98.5	100.3	101.5	102.1
Trade, Transport & Utilities	224.4	222.7	223.8	225.2	226.0	226.5	227.4	228.6	229.3
Wholesale Trade	57.9	58.2	58.4	59.0	59.3	59.4	59.6	59.8	60.0
Retail Trade	115.5	114.3	115.8	117.0	117.8	118.5	119.8	121.1	122.2
TWU	51.0	50.2	49.6	49.2	48.8	48.5	48.1	47.7	47.1
Information Services	28.5	29.5	29.7	29.8	30.2	30.8	31.2	31.5	31.6
Publishing	13.0	13.6	13.9	14.0	14.2	14.5	14.8	14.9	14.9
Internet, etc.	15.5	15.9	15.9	15.8	16.0	16.3	16.4	16.6	16.6
Financial Activities	76.8	78.1	79.0	79.4	79.4	79.5	79.4	79.5	79.8
Finance & Insurance	41.9	43.2	44.2	44.7	44.9	45.0	45.0	45.1	45.5
Real Estate	34.9	34.9	34.8	34.7	34.6	34.6	34.4	34.4	34.3
Pro. Business Services	199.3	195.7	195.2	197.3	203.0	209.0	214.2	217.3	219.7
Pro., Sci., Tech.	87.6	87.5	87.2	87.6	88.1	88.5	89.2	89.9	90.3
Mgmt. of Co.	41.7	41.7	42.0	42.4	42.8	43.3	43.8	44.0	44.1
Admin Sup. + Waste	70.0	66.4	66.0	67.3	72.1	77.1	81.2	83.4	85.3
Education + Health	191.5	194.5	197.0	199.8	202.6	205.3	207.7	209.9	211.9
Education	27.7	28.2	28.4	28.8	29.2	29.5	29.6	29.7	29.6
Health	163.8	166.2	168.6	171.0	173.4	175.8	178.1	180.3	182.2
Leisure + Hospitality	124.3	125.4	126.8	127.7	128.3	129.4	130.0	129.8	129.2
Arts, ent. & rec.	18.9	19.3	19.7	20.1	20.5	21.0	21.4	21.8	22.1
Lodgings & Food	105.4	106.1	107.1	107.6	107.8	108.4	108.6	108.0	107.1
Other Services	43.0	43.4	43.9	44.6	45.3	46.1	46.9	47.5	48.0
Government, Civilian TOTAL	156.5	157.7	159.1	160.6	162.2	163.7	165.0	165.4	165.4
Federal, Civilian	18.3	18.4	18.4	18.4	18.5	18.5	18.7	18.6	18.6
State & Local	138.2	139.3	140.7	142.2	143.7	145.2	146.3	146.8	146.9

MSA Employment Forecast

(Employment figures in thousands)	2033	2034	2035	2036	2037	2038	2039	2040	2041
Nonfarm Wage & Salary Jobs, TOTAL	1,349.9	1,352.7	1,354.0	1,355.9	1,358.5	1,361.5	1,363.6	1,365.4	1,367.5
Manufacturing, TOTAL	126.0	125.7	125.8	125.9	126.1	126.2	126.3	126.3	126.3
Durables, total	93.9	93.7	93.7	93.8	93.9	93.9	93.9	93.9	93.9
Wood Products	3.7	3.6	3.6	3.6	3.5	3.5	3.4	3.4	3.4
Primary Metals	4.4	4.4	4.4	4.3	4.3	4.3	4.2	4.2	4.2
Fab. Metals	12.7	12.7	12.9	13.1	13.3	13.4	13.5	13.6	13.7
Machinery Mfg.	9.0	9.0	9.0	9.1	9.1	9.1	9.1	9.1	9.2
Computer & Electronics	41.9	41.7	41.5	41.4	41.3	41.2	41.1	41.1	41.0
Transp. Equipment	4.9	4.8	4.8	4.8	4.7	4.7	4.7	4.7	4.6
Other Durable Goods	17.4	17.4	17.5	17.6	17.7	17.7	17.8	17.8	17.8
Nondurables, total	32.1	32.1	32.1	32.2	32.2	32.3	32.4	32.4	32.4
Food Processing	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Paper	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9
Other Nondurables	15.9	15.9	16.0	16.1	16.2	16.2	16.3	16.4	16.5
Nonmanufacturing (private), TOTAL	1,058.6	1,062.0	1,063.6	1,065.8	1,068.6	1,071.8	1,074.0	1,075.9	1,078.3
Natural Resources & Mining	1.7	1.7	1.7	1.7	1.6	1.6	1.5	1.5	1.5
Construction	102.9	103.9	104.4	104.6	104.4	104.0	103.8	103.6	103.6
Trade, Transport & Utilities	229.7	229.3	229.2	229.6	230.2	230.7	231.4	231.7	232.0
Wholesale Trade	60.1	60.1	60.1	60.2	60.3	60.5	60.6	60.8	60.9
Retail Trade	123.3	123.6	124.5	125.7	127.0	128.0	129.1	130.0	130.7
TWU	46.3	45.5	44.5	43.7	42.9	42.2	41.6	40.9	40.4
Information Services	31.4	31.1	30.8	30.5	30.3	30.2	30.1	29.9	29.7
Publishing	14.8	14.6	14.3	14.1	13.8	13.6	13.4	13.3	13.2
Internet, etc.	16.6	16.5	16.4	16.4	16.5	16.6	16.6	16.6	16.5
Financial Activities	79.7	79.3	78.8	78.3	77.9	77.6	77.3	77.2	77.0
Finance & Insurance	45.7	45.7	45.5	45.2	45.1	45.0	45.0	45.0	45.0
Real Estate	34.0	33.6	33.3	33.1	32.8	32.6	32.4	32.2	32.0
Pro. Business Services	222.4	224.4	225.3	226.8	228.7	230.9	231.9	233.0	234.0
Pro., Sci., Tech.	90.9	91.6	92.1	92.5	92.7	93.0	93.2	93.5	93.7
Mgmt. of Co.	44.2	44.2	44.1	44.1	44.1	44.1	44.0	44.0	44.0
Admin Sup. + Waste	87.3	88.5	89.1	90.2	91.8	93.9	94.6	95.5	96.3
Education + Health	213.6	215.0	215.7	216.3	216.7	217.3	217.9	218.6	219.5
Education	29.6	29.4	28.8	28.2	27.6	27.0	26.6	26.2	26.1
Health	184.0	185.5	186.9	188.1	189.2	190.2	191.3	192.4	193.5
Leisure + Hospitality	128.9	128.6	128.9	129.1	129.4	129.8	130.2	130.2	130.5
Arts, ent. & rec.	22.5	22.8	23.0	23.3	23.6	23.9	24.2	24.4	24.7
Lodgings & Food	106.4	105.8	105.8	105.8	105.9	105.9	106.0	105.8	105.8
Other Services	48.4	48.7	48.9	49.1	49.4	49.7	50.0	50.2	50.4
Government, Civilian TOTAL	165.3	165.0	164.5	164.1	163.8	163.6	163.3	163.2	162.9
Federal, Civilian	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.7	18.6
State & Local	146.7	146.4	146.0	145.6	145.2	145.0	144.7	144.4	144.3

MSA Employment Forecast

(Employment figures in thousands)

	2042	2043	2044	1990-2000	2000-10	2010-20	2024-34	2034-44
				Average Percent Rate				
Nonfarm Wage & Salary Jobs, TOTAL	1,369.3	1,370.4	1,371.6	2.9%	0.0%	1.6%	0.7%	0.1%
Manufacturing, TOTAL	126.2	126.1	126.0	1.4%	-2.9%	1.2%	0.1%	0.0%
Durables, total	93.7	93.6	93.5	1.9%	-3.0%	1.2%	0.1%	0.0%
Wood Products	3.3	3.3	3.3	-2.9%	-5.0%	0.6%	-1.0%	-1.0%
Primary Metals	4.2	4.1	4.0	-0.9%	-3.4%	-0.6%	-1.2%	-0.8%
Fab. Metals	13.7	13.8	13.8	2.4%	-2.0%	0.9%	0.0%	0.8%
Machinery Mfg.	9.1	9.1	9.2	1.2%	-3.8%	3.0%	-1.4%	0.2%
Computer & Electronics	41.0	41.0	40.9	3.9%	-2.1%	1.1%	0.6%	-0.2%
Transp. Equipment	4.5	4.5	4.4	1.6%	-5.6%	-0.1%	-2.8%	-1.0%
Other Durable Goods	17.9	17.9	17.9	1.5%	-3.0%	1.8%	1.5%	0.3%
Nondurables, total	32.5	32.5	32.5	0.0%	-2.6%	1.4%	0.2%	0.1%
Food Processing	14.0	14.0	14.0	-0.7%	0.7%	3.2%	0.3%	0.0%
Paper	1.9	1.9	1.8	-1.4%	-5.7%	-3.6%	-1.1%	-1.5%
Other Nondurables	16.5	16.6	16.6	0.8%	-3.5%	1.3%	0.3%	0.4%
Nonmanufacturing (private), TOTAL	1,080.3	1,081.7	1,083.1	3.4%	0.3%	1.9%	0.8%	0.2%
Natural Resources & Mining	1.6	1.6	1.6	-0.9%	-5.5%	1.2%	3.8%	-1.0%
Construction	103.8	104.3	104.9	3.7%	-1.7%	5.0%	1.3%	0.1%
Trade, Transport & Utilities	232.0	232.0	231.8	2.5%	-0.8%	1.6%	0.2%	0.1%
Wholesale Trade	61.0	61.0	61.1	2.6%	-1.0%	1.2%	0.4%	0.2%
Retail Trade	131.2	131.7	132.0	2.6%	-0.5%	0.9%	0.7%	0.7%
TWU	39.8	39.3	38.7	2.0%	-1.5%	4.0%	-1.1%	-1.6%
Information Services	29.6	29.4	29.2	4.9%	-1.3%	0.8%	0.9%	-0.6%
Publishing	13.1	12.9	12.8	8.0%	-0.6%	2.1%	1.2%	-1.3%
Internet, etc.	16.5	16.5	16.4	3.5%	-1.7%	-0.2%	0.6%	-0.1%
Financial Activities	76.9	76.7	76.5	2.6%	-0.5%	1.6%	0.3%	-0.4%
Finance & Insurance	45.1	45.1	45.0	3.3%	-0.4%	0.8%	0.9%	-0.2%
Real Estate	31.8	31.7	31.5	1.5%	-0.6%	3.0%	-0.4%	-0.6%
Pro. Business Services	234.8	234.7	234.9	5.4%	0.0%	2.9%	1.2%	0.5%
Pro., Sci., Tech.	94.0	94.2	94.4	2.9%	0.9%	3.7%	0.5%	0.3%
Mgmt. of Co.	43.9	43.9	43.8	8.2%	2.0%	4.0%	0.6%	-0.1%
Admin Sup. + Waste	96.8	96.7	96.7	6.9%	-1.5%	1.6%	2.4%	0.9%
Education + Health	220.5	221.6	222.7	3.4%	3.2%	2.1%	1.2%	0.4%
Education	25.9	25.9	26.0	4.4%	3.3%	-0.3%	0.6%	-1.2%
Health	194.6	195.6	196.7	3.3%	3.2%	2.6%	1.3%	0.6%
Leisure + Hospitality	130.5	130.5	130.3	3.0%	1.0%	-0.4%	0.3%	0.1%
Arts, ent. & rec.	25.0	25.3	25.6	2.8%	0.5%	-1.4%	1.9%	1.2%
Lodgings & Food	105.5	105.2	104.7	3.1%	1.1%	-0.3%	0.0%	-0.1%
Other Services	50.7	50.9	51.1	2.6%	0.4%	0.9%	1.2%	0.5%
Government, Civilian TOTAL	162.7	162.6	162.5	2.3%	1.2%	-0.1%	0.5%	-0.1%
Federal, Civilian	18.6	18.6	18.6	0.0%	-0.2%	0.1%	0.1%	0.0%
State & Local	144.1	144.0	143.9	2.7%	1.4%	-0.2%	0.6%	-0.2%

MSA Employment Forecast

(Annual percent change)	2024	2025	2026	2027	2028	2029	2030	2031	2032
Nonfarm Wage & Salary Jobs, TOTAL	0.2%	0.2%	0.8%	1.0%	1.1%	1.2%	1.1%	0.7%	0.4%
Manufacturing, TOTAL	-0.7%	-0.4%	1.0%	0.5%	0.1%	0.4%	0.5%	0.1%	-0.3%
Durables, total	-0.6%	-0.3%	1.3%	0.5%	0.0%	0.3%	0.4%	0.0%	-0.4%
Wood Products	-4.2%	0.1%	-1.4%	-1.3%	-1.1%	-0.9%	-1.4%	-1.2%	-1.0%
Primary Metals	5.3%	4.4%	-1.1%	-1.7%	-3.1%	-3.1%	-2.0%	-0.5%	-1.2%
Fab. Metals	0.4%	-0.7%	0.2%	-0.2%	-0.8%	-0.2%	0.3%	0.7%	0.4%
Machinery Mfg.	-2.1%	-5.0%	-2.6%	-1.5%	-1.3%	-0.6%	-0.1%	-0.2%	-0.9%
Computer & Electronics	-0.9%	-0.1%	3.8%	1.6%	0.6%	0.9%	0.7%	-0.1%	-0.5%
Transp. Equipment	1.2%	-3.3%	-6.1%	-3.8%	-3.1%	-2.1%	-1.1%	-2.6%	-2.4%
Other Durable Goods	-0.9%	2.3%	2.6%	2.4%	1.9%	1.9%	1.7%	1.0%	0.4%
Nondurables, total	-1.1%	-0.6%	0.1%	0.4%	0.4%	0.6%	0.6%	0.3%	0.0%
Food Processing	-1.3%	0.5%	0.5%	0.6%	0.3%	0.5%	0.4%	0.1%	-0.1%
Paper	-3.4%	-0.6%	-1.1%	-0.9%	-0.9%	-0.9%	-1.1%	-1.1%	-1.2%
Other Nondurables	-0.6%	-1.5%	-0.1%	0.4%	0.6%	1.0%	1.1%	0.7%	0.3%
Nonmanufacturing (private), TOTAL	0.3%	0.2%	0.8%	1.0%	1.3%	1.4%	1.2%	0.8%	0.6%
Natural Resources & Mining	5.4%	-0.4%	7.1%	6.0%	5.3%	6.1%	6.0%	4.7%	3.0%
Construction	4.1%	0.8%	1.3%	1.8%	1.8%	2.0%	1.8%	1.2%	0.6%
Trade, Transport & Utilities	-0.8%	-0.8%	0.5%	0.6%	0.3%	0.2%	0.4%	0.5%	0.3%
Wholesale Trade	3.0%	0.5%	0.3%	1.0%	0.6%	0.2%	0.2%	0.4%	0.4%
Retail Trade	-1.9%	-1.1%	1.3%	1.1%	0.7%	0.6%	1.0%	1.1%	0.9%
TWU	-2.5%	-1.5%	-1.2%	-0.7%	-0.8%	-0.7%	-0.8%	-0.8%	-1.3%
Information Services	1.8%	3.6%	0.8%	0.2%	1.4%	1.9%	1.4%	0.7%	0.3%
Publishing	1.2%	4.6%	2.1%	0.7%	1.8%	2.2%	1.7%	0.8%	0.1%
Internet, etc.	2.3%	2.7%	-0.2%	-0.3%	1.1%	1.6%	1.1%	0.7%	0.5%
Financial Activities	-0.5%	1.7%	1.1%	0.5%	0.1%	0.1%	-0.2%	0.2%	0.4%
Finance & Insurance	-2.0%	3.2%	2.3%	1.1%	0.4%	0.3%	-0.1%	0.3%	0.9%
Real Estate	1.3%	0.0%	-0.4%	-0.3%	-0.2%	-0.1%	-0.3%	-0.1%	-0.3%
Pro. Business Services	-2.4%	-1.8%	-0.2%	1.1%	2.9%	2.9%	2.5%	1.5%	1.1%
Pro., Sci., Tech.	1.0%	-0.1%	-0.4%	0.5%	0.5%	0.5%	0.7%	0.7%	0.5%
Mgmt. of Co.	-1.0%	0.0%	0.7%	0.9%	1.1%	1.2%	1.0%	0.6%	0.2%
Admin Sup. + Waste	-7.0%	-5.1%	-0.6%	1.9%	7.1%	6.9%	5.3%	2.8%	2.2%
Edu. + Health	1.1%	1.5%	1.3%	1.4%	1.4%	1.4%	1.2%	1.1%	0.9%
Education	2.8%	1.9%	0.7%	1.1%	1.5%	1.2%	0.3%	0.2%	-0.1%
Health	0.8%	1.5%	1.4%	1.4%	1.4%	1.4%	1.3%	1.2%	1.1%
Leisure + Hospitality	2.5%	0.9%	1.1%	0.7%	0.4%	0.9%	0.4%	-0.2%	-0.4%
Arts, ent. & rec.	5.3%	2.0%	2.0%	2.0%	2.1%	2.2%	2.1%	1.8%	1.6%
Lodgings & Food	2.0%	0.7%	1.0%	0.5%	0.1%	0.6%	0.1%	-0.5%	-0.8%
Other Services	1.2%	0.8%	1.2%	1.6%	1.7%	1.8%	1.7%	1.3%	0.9%
Government, Civilian TOTAL	0.6%	0.7%	0.9%	1.0%	1.0%	0.9%	0.8%	0.3%	0.0%
Federal, Civilian	0.8%	0.3%	0.2%	0.2%	0.2%	0.2%	1.1%	-0.8%	-0.1%
State & Local	0.6%	0.8%	1.0%	1.1%	1.1%	1.0%	0.8%	0.4%	0.0%

MSA Employment Forecast

(Annual percent change)	2033	2034	2035	2036	2037	2038	2039	2040	2041
Nonfarm Wage & Salary Jobs, TOTAL	0.4%	0.2%	0.1%	0.1%	0.2%	0.2%	0.2%	0.1%	0.2%
Manufacturing, TOTAL	-0.4%	-0.2%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
Durables, total	-0.5%	-0.3%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Wood Products	-0.8%	-1.1%	-1.5%	-0.9%	-1.3%	-1.1%	-1.1%	-0.9%	-1.0%
Primary Metals	-2.4%	-1.5%	-0.5%	-0.4%	-0.5%	-0.9%	-0.6%	-0.3%	-0.7%
Fab. Metals	0.2%	0.1%	1.7%	1.5%	1.4%	1.1%	0.8%	0.8%	0.5%
Machinery Mfg.	-1.1%	-0.1%	0.6%	0.5%	0.5%	0.2%	0.2%	0.1%	0.0%
Computer & Electronics	-0.4%	-0.4%	-0.5%	-0.4%	-0.3%	-0.2%	-0.2%	-0.1%	-0.1%
Transp. Equipment	-1.9%	-1.4%	-0.8%	-0.6%	-0.5%	-0.5%	-0.7%	-0.6%	-0.9%
Other Durable Goods	0.1%	0.4%	0.6%	0.4%	0.4%	0.3%	0.3%	0.2%	0.2%
Nondurables, total	-0.1%	0.0%	0.1%	0.1%	0.2%	0.2%	0.2%	0.1%	0.1%
Food Processing	-0.1%	-0.1%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%
Paper	-1.3%	-1.4%	-1.5%	-1.4%	-1.4%	-1.4%	-1.4%	-1.4%	-1.5%
Other Nondurables	0.1%	0.3%	0.5%	0.4%	0.6%	0.5%	0.5%	0.4%	0.4%
Nonmanufacturing (private), TOTAL	0.5%	0.3%	0.2%	0.2%	0.3%	0.3%	0.2%	0.2%	0.2%
Natural Resources & Mining	0.7%	-0.3%	-0.4%	-4.2%	-3.5%	-2.7%	-0.9%	-1.4%	1.1%
Construction	0.8%	1.0%	0.5%	0.2%	-0.2%	-0.3%	-0.2%	-0.2%	0.0%
Trade, Transport & Utilities	0.2%	-0.2%	0.0%	0.2%	0.3%	0.2%	0.3%	0.1%	0.1%
Wholesale Trade	0.1%	0.0%	-0.1%	0.1%	0.2%	0.3%	0.3%	0.2%	0.2%
Retail Trade	0.9%	0.3%	0.7%	0.9%	1.0%	0.8%	0.9%	0.7%	0.6%
TWU	-1.6%	-1.8%	-2.1%	-1.9%	-1.7%	-1.6%	-1.5%	-1.6%	-1.4%
Information Services	-0.5%	-1.0%	-1.1%	-0.8%	-0.6%	-0.4%	-0.4%	-0.6%	-0.6%
Publishing	-0.9%	-1.4%	-1.8%	-1.8%	-1.7%	-1.5%	-1.3%	-1.1%	-0.9%
Internet, etc.	-0.2%	-0.6%	-0.6%	0.1%	0.3%	0.5%	0.3%	-0.2%	-0.5%
Financial Activities	-0.2%	-0.4%	-0.6%	-0.6%	-0.5%	-0.4%	-0.3%	-0.2%	-0.2%
Finance & Insurance	0.4%	0.0%	-0.4%	-0.6%	-0.4%	-0.1%	-0.1%	0.1%	0.1%
Real Estate	-0.9%	-1.0%	-0.9%	-0.7%	-0.7%	-0.7%	-0.7%	-0.6%	-0.5%
Pro. Business Services	1.2%	0.9%	0.4%	0.7%	0.8%	1.0%	0.4%	0.5%	0.5%
Pro., Sci., Tech.	0.6%	0.8%	0.5%	0.4%	0.3%	0.2%	0.3%	0.3%	0.3%
Mgmt. of Co.	0.2%	0.0%	-0.1%	-0.1%	0.0%	0.0%	-0.1%	-0.1%	-0.1%
Admin Sup. + Waste	2.4%	1.4%	0.6%	1.3%	1.8%	2.2%	0.8%	0.9%	0.9%
Edu. + Health	0.8%	0.7%	0.4%	0.2%	0.2%	0.2%	0.3%	0.3%	0.4%
Education	-0.2%	-0.6%	-1.9%	-2.2%	-2.2%	-2.0%	-1.6%	-1.4%	-0.7%
Health	1.0%	0.9%	0.7%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Leisure + Hospitality	-0.3%	-0.2%	0.2%	0.2%	0.3%	0.3%	0.3%	0.1%	0.2%
Arts, ent. & rec.	1.5%	1.3%	1.1%	1.2%	1.2%	1.2%	1.3%	1.2%	1.1%
Lodgings & Food	-0.6%	-0.5%	0.0%	-0.1%	0.1%	0.1%	0.1%	-0.2%	0.0%
Other Services	0.8%	0.7%	0.5%	0.5%	0.5%	0.6%	0.6%	0.5%	0.5%
Government, Civilian TOTAL	-0.1%	-0.2%	-0.3%	-0.2%	-0.2%	-0.1%	-0.1%	-0.1%	-0.2%
Federal, Civilian	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.8%	-0.7%
State & Local	-0.1%	-0.2%	-0.3%	-0.3%	-0.2%	-0.2%	-0.2%	-0.2%	-0.1%

MSA Employment Forecast

(Annual percent change)	2042	2043	2044
Nonfarm Wage & Salary Jobs, TOTAL	0.1%	0.1%	0.1%
Manufacturing, TOTAL	-0.1%	-0.1%	-0.1%
Durables, total	-0.1%	-0.2%	-0.1%
Wood Products	-1.2%	-0.6%	-0.5%
Primary Metals	-1.2%	-1.6%	-1.4%
Fab. Metals	0.2%	0.2%	0.2%
Machinery Mfg.	0.0%	0.0%	0.2%
Computer & Electronics	-0.1%	-0.1%	0.0%
Transp. Equipment	-1.6%	-1.9%	-2.0%
Other Durable Goods	0.2%	0.1%	0.2%
Nondurables, total	0.1%	0.0%	0.1%
Food Processing	0.0%	0.0%	0.0%
Paper	-1.6%	-1.6%	-1.5%
Other Nondurables	0.4%	0.2%	0.3%
Nonmanufacturing (private), TOTAL	0.2%	0.1%	0.1%
Natural Resources & Mining	2.4%	-0.1%	0.0%
Construction	0.3%	0.5%	0.5%
Trade, Transport & Utilities	0.0%	0.0%	-0.1%
Wholesale Trade	0.1%	0.1%	0.1%
Retail Trade	0.3%	0.4%	0.3%
TWU	-1.3%	-1.4%	-1.4%
Information Services	-0.3%	-0.6%	-0.7%
Publishing	-0.8%	-1.0%	-1.0%
Internet, etc.	0.2%	-0.3%	-0.4%
Financial Activities	-0.2%	-0.2%	-0.2%
Finance & Insurance	0.1%	0.0%	-0.1%
Real Estate	-0.5%	-0.5%	-0.4%
Pro. Business Services	0.3%	0.0%	0.1%
Pro., Sci., Tech.	0.3%	0.2%	0.3%
Mgmt. of Co.	-0.1%	-0.1%	-0.1%
Admin Sup. + Waste	0.5%	-0.2%	0.0%
Edu. + Health	0.4%	0.5%	0.5%
Education	-0.4%	0.0%	0.2%
Health	0.6%	0.6%	0.6%
Leisure + Hospitality	0.0%	0.0%	-0.1%
Arts, ent. & rec.	1.2%	1.2%	1.1%
Lodgings & Food	-0.3%	-0.3%	-0.4%
Other Services	0.5%	0.4%	0.4%
Government, Civilian TOTAL	-0.1%	-0.1%	0.0%
Federal, Civilian	-0.1%	0.0%	0.0%
State & Local	-0.1%	-0.1%	0.0%

MSA Population

by Age (in thousands)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Total Population	2,586.4	2,606.9	2,625.1	2,643.2	2,661.8	2,680.7	2,700.0	2,719.3	2,738.1	2,756.3
under 4 years old	131.0	133.1	134.5	135.6	136.4	137.1	137.7	138.2	138.6	138.9
5 to 9 years old	138.1	138.0	138.1	138.4	139.0	139.7	140.4	141.1	141.8	142.5
10 to 14 years old	147.3	146.4	145.5	144.9	144.5	144.4	144.5	144.7	145.0	145.4
15 to 19 years old	148.8	149.4	149.7	149.8	149.9	150.0	150.1	150.3	150.5	150.7
20 to 24 years old	154.6	155.9	156.8	157.7	158.7	159.8	160.8	161.7	162.5	163.3
25 to 29 years old	176.9	175.0	173.4	172.4	172.0	172.0	172.3	172.9	173.5	174.2
30 to 34 years old	199.9	196.8	193.9	191.3	189.3	187.6	186.4	185.6	185.1	184.7
35 to 39 years old	200.2	200.7	200.5	199.9	199.0	198.0	197.0	196.0	195.1	194.3
40 to 44 years old	194.2	195.8	197.1	198.0	198.8	199.2	199.5	199.5	199.4	199.1
45 to 49 years old	176.4	179.9	183.0	185.7	188.1	190.3	192.1	193.7	195.0	196.0
50 to 54 years old	168.7	170.1	171.9	173.9	176.1	178.3	180.5	182.7	184.7	186.6
55 to 59 years old	153.9	156.2	158.4	160.5	162.6	164.8	167.0	169.3	171.5	173.7
60 to 64 years old	147.5	148.0	148.8	149.8	151.1	152.6	154.3	156.1	158.0	159.9
65 to 69 years old	137.7	138.2	138.6	139.2	140.0	140.9	141.9	143.1	144.4	145.8
70 to 74 years old	118.5	120.1	121.4	122.7	123.8	124.9	125.9	127.0	128.1	129.3
75 to 79 years old	90.2	92.9	95.3	97.5	99.5	101.3	102.9	104.4	105.8	107.2
80 to 84 years old	54.0	58.0	61.5	64.7	67.5	70.1	72.4	74.5	76.4	78.1
85 years or older	48.4	52.5	56.7	61.1	65.5	69.9	74.2	78.5	82.6	86.6

(annualized pct. change)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Total Population	0.9%	0.8%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
under 4 years old	2.3%	1.6%	1.1%	0.8%	0.6%	0.5%	0.4%	0.3%	0.3%	0.2%
5 to 9 years old	-0.5%	-0.1%	0.1%	0.3%	0.4%	0.5%	0.5%	0.5%	0.5%	0.4%
10 to 14 years old	-0.7%	-0.7%	-0.6%	-0.4%	-0.2%	-0.1%	0.1%	0.2%	0.2%	0.3%
15 to 19 years old	0.8%	0.4%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%
20 to 24 years old	1.1%	0.9%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.5%	0.4%
25 to 29 years old	-1.4%	-1.1%	-0.9%	-0.6%	-0.2%	0.0%	0.2%	0.3%	0.4%	0.4%
30 to 34 years old	-1.5%	-1.5%	-1.5%	-1.3%	-1.1%	-0.9%	-0.6%	-0.4%	-0.3%	-0.2%
35 to 39 years old	0.7%	0.3%	-0.1%	-0.3%	-0.4%	-0.5%	-0.5%	-0.5%	-0.5%	-0.4%
40 to 44 years old	0.9%	0.8%	0.6%	0.5%	0.4%	0.2%	0.1%	0.0%	-0.1%	-0.1%
45 to 49 years old	2.3%	2.0%	1.7%	1.5%	1.3%	1.1%	1.0%	0.8%	0.7%	0.5%
50 to 54 years old	0.6%	0.9%	1.0%	1.2%	1.2%	1.3%	1.2%	1.2%	1.1%	1.0%
55 to 59 years old	1.7%	1.5%	1.4%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%
60 to 64 years old	0.0%	0.3%	0.5%	0.7%	0.9%	1.0%	1.1%	1.2%	1.2%	1.2%
65 to 69 years old	0.4%	0.3%	0.4%	0.4%	0.5%	0.6%	0.7%	0.8%	0.9%	1.0%
70 to 74 years old	1.6%	1.3%	1.1%	1.0%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%
75 to 79 years old	3.5%	3.0%	2.6%	2.3%	2.0%	1.8%	1.6%	1.5%	1.4%	1.3%
80 to 84 years old	9.1%	7.4%	6.1%	5.2%	4.4%	3.8%	3.3%	2.9%	2.5%	2.3%
85 years or older	8.3%	8.3%	8.1%	7.7%	7.2%	6.7%	6.2%	5.7%	5.3%	4.8%

MSA Population

by Age	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
(in thousands)										
Total Population	2,774.1	2,791.1	2,806.7	2,821.4	2,835.2	2,848.2	2,860.3	2,871.6	2,882.1	2,892.0
under 4 years old	139.1	139.3	139.4	139.4	139.4	139.4	139.3	139.1	139.0	138.8
5 to 9 years old	143.0	143.5	143.9	144.1	144.3	144.4	144.5	144.4	144.4	144.2
10 to 14 years old	145.9	146.3	146.7	147.0	147.3	147.6	147.8	147.9	148.0	148.0
15 to 19 years old	151.0	151.3	151.5	151.8	152.0	152.2	152.3	152.4	152.5	152.6
20 to 24 years old	163.9	164.4	164.7	164.9	165.1	165.1	165.1	165.1	165.0	164.8
25 to 29 years old	174.9	175.5	175.9	176.3	176.5	176.6	176.6	176.6	176.5	176.3
30 to 34 years old	184.6	184.6	184.6	184.6	184.6	184.6	184.5	184.5	184.3	184.2
35 to 39 years old	193.6	193.0	192.4	192.0	191.5	191.2	190.8	190.5	190.2	189.9
40 to 44 years old	198.8	198.4	197.9	197.4	196.9	196.3	195.8	195.3	194.9	194.4
45 to 49 years old	196.8	197.3	197.7	197.9	197.9	197.8	197.7	197.4	197.2	196.8
50 to 54 years old	188.3	189.8	191.1	192.2	193.2	193.9	194.5	194.9	195.3	195.5
55 to 59 years old	175.8	177.8	179.7	181.5	183.1	184.6	185.9	187.1	188.2	189.1
60 to 64 years old	161.9	163.9	165.9	167.8	169.7	171.6	173.4	175.0	176.6	178.1
65 to 69 years old	147.3	148.9	150.6	152.4	154.1	155.9	157.7	159.5	161.2	163.0
70 to 74 years old	130.5	131.8	133.2	134.6	136.1	137.6	139.2	140.8	142.4	144.1
75 to 79 years old	108.5	109.8	111.1	112.4	113.7	115.0	116.4	117.8	119.2	120.7
80 to 84 years old	79.7	81.3	82.7	84.0	85.3	86.6	87.9	89.1	90.4	91.6
85 years or older	90.4	94.2	97.8	101.2	104.6	107.8	111.0	114.1	117.1	120.0

	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
(annualized pct. change)										
Total Population	0.6%	0.6%	0.6%	0.5%	0.5%	0.5%	0.4%	0.4%	0.4%	0.3%
under 4 years old	0.2%	0.1%	0.1%	0.0%	0.0%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%
5 to 9 years old	0.4%	0.3%	0.3%	0.2%	0.1%	0.1%	0.0%	0.0%	-0.1%	-0.1%
10 to 14 years old	0.3%	0.3%	0.3%	0.2%	0.2%	0.2%	0.1%	0.1%	0.0%	0.0%
15 to 19 years old	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%
20 to 24 years old	0.4%	0.3%	0.2%	0.1%	0.1%	0.0%	0.0%	0.0%	-0.1%	-0.1%
25 to 29 years old	0.4%	0.3%	0.3%	0.2%	0.1%	0.1%	0.0%	0.0%	-0.1%	-0.1%
30 to 34 years old	-0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.1%
35 to 39 years old	-0.4%	-0.3%	-0.3%	-0.3%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%
40 to 44 years old	-0.2%	-0.2%	-0.2%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%	-0.2%	-0.2%
45 to 49 years old	0.4%	0.3%	0.2%	0.1%	0.0%	0.0%	-0.1%	-0.1%	-0.1%	-0.2%
50 to 54 years old	0.9%	0.8%	0.7%	0.6%	0.5%	0.4%	0.3%	0.2%	0.2%	0.1%
55 to 59 years old	1.2%	1.2%	1.1%	1.0%	0.9%	0.8%	0.7%	0.6%	0.6%	0.5%
60 to 64 years old	1.2%	1.2%	1.2%	1.2%	1.1%	1.1%	1.0%	1.0%	0.9%	0.8%
65 to 69 years old	1.0%	1.1%	1.1%	1.2%	1.2%	1.2%	1.1%	1.1%	1.1%	1.1%
70 to 74 years old	0.9%	1.0%	1.0%	1.1%	1.1%	1.1%	1.1%	1.2%	1.2%	1.2%
75 to 79 years old	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
80 to 84 years old	2.1%	1.9%	1.7%	1.6%	1.6%	1.5%	1.5%	1.4%	1.4%	1.4%
85 years or older	4.5%	4.1%	3.8%	3.5%	3.3%	3.1%	2.9%	2.8%	2.6%	2.5%

MSA Population

by Age (in thousands)	2044	Average Percent Rate 1990-2000	2000-10	2010-20	2024-34	2034-44
Total Population	2,901.2	2.3%	1.4%	1.2%	0.7%	0.4%
under 4 years old	138.5	1.5%	0.7%	-1.0%	0.6%	0.0%
5 to 9 years old	144.1	1.8%	0.5%	-0.1%	0.3%	0.1%
10 to 14 years old	148.0	2.2%	0.7%	0.5%	-0.1%	0.1%
15 to 19 years old	152.6	2.8%	0.8%	0.4%	0.1%	0.1%
20 to 24 years old	164.7	2.4%	0.8%	0.6%	0.6%	0.0%
25 to 29 years old	176.1	1.8%	1.3%	1.1%	-0.1%	0.1%
30 to 34 years old	184.0	0.8%	1.1%	1.6%	-0.8%	0.0%
35 to 39 years old	189.6	1.0%	0.4%	1.8%	-0.3%	-0.2%
40 to 44 years old	194.0	2.3%	-0.1%	1.3%	0.2%	-0.2%
45 to 49 years old	196.5	5.3%	0.3%	0.6%	1.1%	0.0%
50 to 54 years old	195.6	6.9%	1.9%	0.1%	1.1%	0.4%
55 to 59 years old	189.8	4.9%	5.0%	0.3%	1.3%	0.8%
60 to 64 years old	179.4	1.1%	7.0%	1.7%	0.9%	1.0%
65 to 69 years old	164.6	-1.2%	5.3%	4.8%	0.7%	1.1%
70 to 74 years old	145.7	0.2%	1.6%	6.9%	1.0%	1.1%
75 to 79 years old	122.2	1.7%	-0.5%	5.0%	1.9%	1.2%
80 to 84 years old	92.9	2.8%	1.0%	1.5%	4.0%	1.5%
85 years or older	122.9	3.4%	3.5%	0.8%	6.4%	3.1%

(annualized pct. change)	2044
Total Population	0.3%
under 4 years old	-0.2%
5 to 9 years old	-0.1%
10 to 14 years old	0.0%
15 to 19 years old	0.0%
20 to 24 years old	-0.1%
25 to 29 years old	-0.1%
30 to 34 years old	-0.1%
35 to 39 years old	-0.2%
40 to 44 years old	-0.2%
45 to 49 years old	-0.2%
50 to 54 years old	0.1%
55 to 59 years old	0.4%
60 to 64 years old	0.8%
65 to 69 years old	1.0%
70 to 74 years old	1.2%
75 to 79 years old	1.2%
80 to 84 years old	1.4%
85 years or older	2.4%

MSA Households

by Age of Head	2024	2025	2026	2027	2028	2029	2030	2031	2032
(in thousands)									
Total Households	1,073.4	1,086.4	1,098.6	1,110.6	1,122.6	1,134.5	1,146.4	1,158.1	1,169.6
15 to 24 years old	34.4	35.0	35.6	36.1	36.7	37.2	37.8	38.4	38.9
25 to 34 years old	166.8	165.0	163.4	162.2	161.5	161.2	161.2	161.5	161.9
35 to 44 years old	210.2	211.3	211.9	212.2	212.1	211.9	211.6	211.2	210.7
45 to 54 years old	192.5	195.3	198.0	200.8	203.4	205.9	208.2	210.3	212.2
55 to 64 years old	178.2	180.0	181.9	184.0	186.2	188.6	191.1	193.6	196.3
65 to 74 years old	162.5	163.7	164.8	165.9	167.0	168.2	169.4	170.8	172.2
75 to 84 years old	95.9	100.4	104.3	107.9	111.1	114.0	116.6	119.0	121.2
85 years and older	32.9	35.7	38.6	41.5	44.5	47.5	50.5	53.4	56.2
Household size (avg.)	2.41	2.40	2.39	2.38	2.37	2.36	2.36	2.35	2.34

	2024	2025	2026	2027	2028	2029	2030	2031	2032
(annualized percent change)									
Total Households	1.3%	1.2%	1.1%	1.1%	1.1%	1.1%	1.0%	1.0%	1.0%
15 to 24 years old	2.2%	1.9%	1.6%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
25 to 34 years old	-1.2%	-1.1%	-1.0%	-0.7%	-0.4%	-0.2%	0.0%	0.2%	0.3%
35 to 44 years old	0.8%	0.6%	0.3%	0.1%	0.0%	-0.1%	-0.2%	-0.2%	-0.2%
45 to 54 years old	1.5%	1.5%	1.4%	1.4%	1.3%	1.2%	1.1%	1.0%	0.9%
55 to 64 years old	1.0%	1.0%	1.1%	1.1%	1.2%	1.3%	1.3%	1.3%	1.4%
65 to 74 years old	0.9%	0.7%	0.7%	0.6%	0.7%	0.7%	0.7%	0.8%	0.9%
75 to 84 years old	5.5%	4.7%	4.0%	3.4%	3.0%	2.6%	2.3%	2.1%	1.9%
85 years and older	8.3%	8.3%	8.1%	7.7%	7.2%	6.7%	6.2%	5.7%	5.3%

MSA Households

by Age of Head	2033	2034	2035	2036	2037	2038	2039	2040	2041
(in thousands)									
Total Households	1,180.8	1,191.8	1,202.5	1,212.7	1,222.5	1,231.9	1,241.0	1,249.4	1,256.7
15 to 24 years old	39.5	40.1	40.6	41.1	41.6	42.1	42.6	42.9	42.9
25 to 34 years old	162.5	163.1	163.8	164.4	164.9	165.4	165.9	166.1	166.1
35 to 44 years old	210.1	209.6	209.1	208.6	208.2	207.7	207.3	206.9	206.4
45 to 54 years old	213.9	215.3	216.6	217.5	218.3	218.9	219.3	219.6	219.7
55 to 64 years old	198.9	201.5	204.1	206.7	209.1	211.4	213.6	215.6	217.3
65 to 74 years old	173.8	175.5	177.2	179.1	181.0	182.9	185.0	187.0	189.2
75 to 84 years old	123.2	125.2	127.1	128.9	130.6	132.4	134.1	135.8	137.6
85 years and older	58.9	61.5	64.0	66.5	68.8	71.1	73.3	75.5	77.6
Household size (avg.)	2.33	2.33	2.32	2.31	2.31	2.30	2.30	2.29	2.29

	2033	2034	2035	2036	2037	2038	2039	2040	2041
(annualized percent chan									
Total Households	1.0%	0.9%	0.9%	0.8%	0.8%	0.8%	0.7%	0.7%	0.6%
15 to 24 years old	1.4%	1.4%	1.3%	1.3%	1.2%	1.2%	1.1%	0.7%	0.0%
25 to 34 years old	0.3%	0.4%	0.4%	0.4%	0.3%	0.3%	0.3%	0.1%	0.0%
35 to 44 years old	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%
45 to 54 years old	0.8%	0.7%	0.6%	0.5%	0.4%	0.3%	0.2%	0.1%	0.1%
55 to 64 years old	1.3%	1.3%	1.3%	1.2%	1.2%	1.1%	1.0%	0.9%	0.8%
65 to 74 years old	0.9%	1.0%	1.0%	1.0%	1.1%	1.1%	1.1%	1.1%	1.1%
75 to 84 years old	1.7%	1.6%	1.5%	1.4%	1.4%	1.3%	1.3%	1.3%	1.3%
85 years and older	4.8%	4.5%	4.1%	3.8%	3.5%	3.3%	3.1%	2.9%	2.8%

MSA Households

by Age of Head	2042	2043	2044	2000-22	2022-32	2032-45
				Average Percent Rate		
(in thousands)						
Total Households	1,263.7	1,270.5	1,276.9	1.5%	1.1%	0.7%
15 to 24 years old	42.9	42.9	42.8	-1.3%	1.7%	0.7%
25 to 34 years old	166.0	165.8	165.6	0.7%	-0.4%	0.2%
35 to 44 years old	206.0	205.6	205.2	0.8%	0.2%	-0.2%
45 to 54 years old	219.7	219.7	219.5	0.6%	1.3%	0.3%
55 to 64 years old	218.9	220.3	221.6	3.0%	1.1%	1.0%
65 to 74 years old	191.3	193.4	195.5	4.5%	0.7%	1.1%
75 to 84 years old	139.4	141.2	143.0	2.4%	3.8%	1.4%
85 years and older	79.6	81.6	83.6	2.6%	6.9%	3.3%
Household size (avg.)	2.28	2.28	2.27			

	2042	2043	2044
(annualized percent chan			
Total Households	0.6%	0.5%	0.5%
15 to 24 years old	0.0%	0.0%	0.0%
25 to 34 years old	-0.1%	-0.1%	-0.1%
35 to 44 years old	-0.2%	-0.2%	-0.2%
45 to 54 years old	0.0%	0.0%	-0.1%
55 to 64 years old	0.7%	0.6%	0.6%
65 to 74 years old	1.1%	1.1%	1.1%
75 to 84 years old	1.3%	1.3%	1.3%
85 years and older	2.6%	2.5%	2.4%

MSA Range Forecast Annual Percentage Rate:			
2024-34	1.3%	0.7%	0.1%
2034-44	0.9%	0.4%	-0.1%
Total %Change:			
2024-34	13.3%	7.3%	1.0%
2034-44	9.5%	4.6%	-1.2%
Difference (in thousands):			
2024-44	637.1	314.8	-7.4

MSA Range Forecast Annual Percentage Rate:			
2024-34	1.5%	1.1%	0.6%
2034-44	1.1%	0.7%	0.2%
Total %Change:			
2022-32	16.2%	11.0%	5.7%
2032-45	11.6%	7.1%	2.1%
Difference (in thousands):			
2024-44	323.2	203.5	83.9

MSA Range Forecast

(in thousands)

	Population				Households		
	High	**Baseline**	**Low**		**High**	**Baseline**	**Low**
2020	2,512.9	2,512.9	2,512.9	**2020**	1,021.5	1,021.5	1,021.5
2021	2,530.4	2,530.4	2,530.4	**2021**	1,033.5	1,033.5	1,033.5
2022	2,542.0	2,542.0	2,542.0	**2022**	1,055.5	1,045.2	1,034.9
2023	2,601.3	2,563.5	2,525.7	**2023**	1,071.0	1,059.4	1,047.8
2024	2,644.2	2,586.4	2,528.6	**2024**	1,090.7	1,073.4	1,056.1
2025	2,683.0	2,606.9	2,530.8	**2025**	1,109.9	1,086.4	1,063.0
2026	2,721.1	2,625.1	2,529.1	**2026**	1,128.7	1,098.6	1,068.6
2027	2,759.7	2,643.2	2,526.7	**2027**	1,147.1	1,110.6	1,074.1
2028	2,797.3	2,661.8	2,526.3	**2028**	1,164.6	1,122.6	1,080.6
2029	2,826.3	2,680.7	2,535.2	**2029**	1,182.3	1,134.5	1,086.6
2030	2,863.2	2,700.0	2,536.9	**2030**	1,199.8	1,146.4	1,092.9
2031	2,895.0	2,719.3	2,543.5	**2031**	1,216.4	1,158.1	1,099.8
2032	2,929.2	2,738.1	2,546.9	**2032**	1,233.5	1,169.6	1,105.7
2033	2,959.9	2,756.3	2,552.7	**2033**	1,248.9	1,180.8	1,112.7
2034	2,995.5	2,774.1	2,552.6	**2034**	1,267.2	1,191.8	1,116.5
2035	3,029.2	2,791.1	2,552.9	**2035**	1,284.7	1,202.5	1,120.4
2036	3,065.9	2,806.7	2,547.6	**2036**	1,300.8	1,212.7	1,124.6
2037	3,093.9	2,821.4	2,549.0	**2037**	1,316.7	1,222.5	1,128.3
2038	3,121.4	2,835.2	2,549.1	**2038**	1,331.6	1,231.9	1,132.3
2039	3,150.4	2,848.2	2,546.0	**2039**	1,347.4	1,241.0	1,134.7
2040	3,180.1	2,860.3	2,540.5	**2040**	1,361.9	1,249.4	1,136.9
2041	3,203.1	2,871.6	2,540.1	**2041**	1,375.4	1,256.7	1,138.1
2042	3,234.5	2,882.1	2,529.7	**2042**	1,390.0	1,263.7	1,137.4
2043	3,258.1	2,892.0	2,525.9	**2043**	1,402.1	1,270.5	1,138.8
2044	3,281.3	2,901.2	2,521.2	**2044**	1,413.8	1,276.9	1,140.0

MSA Range Forecast Annual Percentage Rate:

2024-34	1.0%	0.7%	0.4%
2034-44	0.3%	0.1%	0.0%
Total %Change:			
\	9.9%	7.3%	4.4%
2034-44	2.8%	1.4%	-0.2%
Difference (in thousands):			
2024-44	169.3	110.4	51.5

MSA Range Forecast

(in thousands)

	Nonfarm Payroll Jobs		
	High	**Baseline**	**Low**
2020	1,145.1	1,145.1	1,145.1
2021	1,171.8	1,171.8	1,171.8
2022	1,227.8	1,227.8	1,227.8
2023	1,258.3	1,258.3	1,258.3
2024	1,295.4	1,261.2	1,226.9
2025	1,311.1	1,263.9	1,216.7
2026	1,325.8	1,274.0	1,222.3
2027	1,340.9	1,286.2	1,231.5
2028	1,357.2	1,300.6	1,244.1
2029	1,375.6	1,316.4	1,257.2
2030	1,392.9	1,330.4	1,267.8
2031	1,404.0	1,339.5	1,275.1
2032	1,411.3	1,345.1	1,278.9
2033	1,419.3	1,349.9	1,280.4
2034	1,424.2	1,352.7	1,281.1
2035	1,429.3	1,354.0	1,278.6
2036	1,433.9	1,355.9	1,277.9
2037	1,437.2	1,358.5	1,279.8
2038	1,443.5	1,361.5	1,279.5
2039	1,447.2	1,363.6	1,280.0
2040	1,450.4	1,365.4	1,280.3
2041	1,456.7	1,367.5	1,278.4
2042	1,460.4	1,369.3	1,278.2
2043	1,461.9	1,370.4	1,278.9
2044	1,464.8	1,371.6	1,278.4

MSA Personal Income Accounts

(in millions nominal dollars)	2024	2025	2026	2027	2028
Personal Income	197,546,550	206,127,050	214,328,675	222,214,925	230,429,425
+ Wage & Salary Disbursement	109,126,400	111,830,075	115,489,175	119,531,550	124,030,550
- Social Ins. Contribution	17,096,390	17,366,825	17,850,235	18,243,108	18,814,633
+ Transfer Payments	31,874,183	32,743,055	33,909,540	35,233,960	36,691,628
+ Other Labor Income	22,008,035	22,748,540	23,605,945	24,511,663	25,494,498
+ Farm Proprietors Inc.	35,209	48,476	50,611	46,449	45,911
+ Bus. Proprietors Inc.	12,035,503	12,086,335	12,159,310	12,290,108	12,471,833
+ Div., Interest, & Rent	39,493,825	43,965,780	46,890,420	48,767,813	50,430,355
+ Resident Adjustment	69,812	71,605	73,879	76,471	79,289
Per capital income (dollars)	76,379	79,070	81,646	84,071	86,569

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(annualized percent change)	2024	2025	2026	2027	2028
Personal Income	3.6%	4.3%	4.0%	3.7%	3.7%
+ Wage & Salary Disbursement	2.4%	2.5%	3.3%	3.5%	3.8%
- Social Ins. Contribution	1.8%	1.6%	2.8%	2.2%	3.1%
+ Transfer Payments	1.0%	2.7%	3.6%	3.9%	4.1%
+ Other Labor Income	3.8%	3.4%	3.8%	3.8%	4.0%
+ Farm Proprietors Inc.	3.4%	37.7%	4.4%	-8.2%	-1.2%
+ Bus. Proprietors Inc.	0.7%	0.4%	0.6%	1.1%	1.5%
+ Div., Interest, & Rent	9.2%	11.3%	6.7%	4.0%	3.4%

MSA Personal Income

(in millions nominal dollars)	2029	2030	2031	2032	2033
Personal Income	239,224,500	248,352,500	257,612,350	267,210,025	277,318,225
+ Wage & Salary Disbursement	129,054,325	134,302,450	139,528,900	144,914,100	150,622,650
- Social Ins. Contribution	19,475,090	20,157,573	20,838,823	21,536,188	22,276,393
+ Transfer Payments	38,245,980	39,820,918	41,439,420	43,108,618	44,838,295
+ Other Labor Income	26,553,390	27,653,100	28,789,190	29,986,428	31,256,188
+ Farm Proprietors Inc.	47,975	49,599	50,517	51,623	53,091
+ Bus. Proprietors Inc.	12,691,385	12,935,935	13,179,283	13,430,193	13,684,055
+ Div., Interest, & Rent	52,024,130	53,662,388	55,374,883	57,162,915	59,044,405
+ Resident Adjustment	82,414	85,686	88,967	92,364	95,959
Per capital income (dollars)	89,238	91,981	94,735	97,591	100,612

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(annualized percent change)	2029	2030	2031	2032	2033
Personal Income	3.8%	3.8%	3.7%	3.7%	3.8%
+ Wage & Salary Disbursement	4.1%	4.1%	3.9%	3.9%	3.9%
- Social Ins. Contribution	3.5%	3.5%	3.4%	3.3%	3.4%
+ Transfer Payments	4.2%	4.1%	4.1%	4.0%	4.0%
+ Other Labor Income	4.2%	4.1%	4.1%	4.2%	4.2%
+ Farm Proprietors Inc.	4.5%	3.4%	1.8%	2.2%	2.8%
+ Bus. Proprietors Inc.	1.8%	1.9%	1.9%	1.9%	1.9%
+ Div., Interest, & Rent	3.2%	3.1%	3.2%	3.2%	3.3%

MSA Personal Income

(in millions nominal dollars)	2034	2035	2036	2037	2038
Personal Income	287,380,100	297,525,650	308,426,075	319,838,725	331,717,200
+ Wage & Salary Disbursement	156,487,600	162,316,925	168,476,750	175,027,125	181,942,775
- Social Ins. Contribution	23,059,018	23,844,318	24,657,085	25,522,073	26,441,090
+ Transfer Payments	46,588,845	48,320,063	50,113,073	51,931,370	53,795,538
+ Other Labor Income	32,396,855	33,603,165	34,915,450	36,304,205	37,736,533
+ Farm Proprietors Inc.	53,915	54,645	55,802	57,024	58,287
+ Bus. Proprietors Inc.	13,884,128	14,062,070	14,272,830	14,489,468	14,699,155
+ Div., Interest, & Rent	60,928,270	62,910,045	65,142,365	67,440,658	69,810,858
+ Resident Adjustment	99,515	103,074	106,878	110,914	115,144
Per capital income (dollars)	103,595	106,600	109,887	113,360	116,998

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(annualized percent change)	2034	2035	2036	2037	2038
Personal Income	3.6%	3.5%	3.7%	3.7%	3.7%
+ Wage & Salary Disbursement	3.9%	3.7%	3.8%	3.9%	4.0%
- Social Ins. Contribution	3.5%	3.4%	3.4%	3.5%	3.6%
+ Transfer Payments	3.9%	3.7%	3.7%	3.6%	3.6%
+ Other Labor Income	3.6%	3.7%	3.9%	4.0%	3.9%
+ Farm Proprietors Inc.	1.6%	1.4%	2.1%	2.2%	2.2%
+ Bus. Proprietors Inc.	1.5%	1.3%	1.5%	1.5%	1.4%
+ Div., Interest, & Rent	3.2%	3.3%	3.5%	3.5%	3.5%

MSA Personal Income

(in millions nominal dollars)	2039	2040	2041	2042	2043
Personal Income	343,993,825	356,855,675	370,281,225	384,416,925	399,047,575
+ Wage & Salary Disbursement	189,041,650	196,552,575	204,364,125	212,493,075	220,889,625
- Social Ins. Contribution	27,393,728	28,402,490	29,446,753	30,528,623	31,652,430
+ Transfer Payments	55,765,900	57,844,570	60,041,530	62,396,200	64,874,068
+ Other Labor Income	39,210,953	40,769,268	42,429,205	44,154,448	45,934,700
+ Farm Proprietors Inc.	59,743	61,229	62,628	64,303	66,017
+ Bus. Proprietors Inc.	14,893,153	15,093,065	15,295,703	15,506,750	15,711,018
+ Div., Interest, & Rent	72,296,715	74,813,418	77,405,950	80,197,003	83,085,695
+ Resident Adjustment	119,471	124,044	128,823	133,797	138,922
Per capital income (dollars)	120,775	124,762	128,945	133,381	137,984

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(annualized percent change)	2039	2040	2041	2042	2043
Personal Income	3.7%	3.7%	3.8%	3.8%	3.8%
+ Wage & Salary Disbursement	3.9%	4.0%	4.0%	4.0%	4.0%
- Social Ins. Contribution	3.6%	3.7%	3.7%	3.7%	3.7%
+ Transfer Payments	3.7%	3.7%	3.8%	3.9%	4.0%
+ Other Labor Income	3.9%	4.0%	4.1%	4.1%	4.0%
+ Farm Proprietors Inc.	2.5%	2.5%	2.3%	2.7%	2.7%
+ Bus. Proprietors Inc.	1.3%	1.3%	1.3%	1.4%	1.3%
+ Div., Interest, & Rent	3.6%	3.5%	3.5%	3.6%	3.6%

MSA Personal Income

(in millions nominal dollars)	2044	Average Percent Rate 1990-2022	2024-34	2034-44
Personal Income	414,229,150	5.7%	3.8%	3.7%
+ Wage & Salary Disbursement	229,676,225	5.6%	3.7%	3.9%
- Social Ins. Contribution	32,837,165	5.3%	3.0%	3.6%
+ Transfer Payments	67,486,433	7.4%	3.9%	3.8%
+ Other Labor Income	47,771,200	5.1%	3.9%	4.0%
+ Farm Proprietors Inc.	67,370	-3.0%	4.4%	2.3%
+ Bus. Proprietors Inc.	15,907,738	5.2%	1.4%	1.4%
+ Div., Interest, & Rent	86,013,080	5.3%	4.4%	3.5%
+ Resident Adjustment	144,257	0.4%	3.6%	3.8%
Per capital income (dollars)	142,777	4.0%	3.1%	3.3%

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(annualized percent change)	2044
Personal Income	3.8%
+ Wage & Salary Disbursement	4.0%
- Social Ins. Contribution	3.7%
+ Transfer Payments	4.0%
+ Other Labor Income	4.0%
+ Farm Proprietors Inc.	2.0%
+ Bus. Proprietors Inc.	1.3%
+ Div., Interest, & Rent	3.5%

Total Disabled (categories do not add due to some individuals having multiple forms of disability)

MSA population	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
(count)											
TOTAL DISABLED	335,063	342,137	348,947	355,631	362,224	368,700	375,056	381,261	387,283	393,128	398,808
under 5 years old	767	780	788	794	799	803	807	809	812	813	815
5 to 9 years old	6,345	6,336	6,340	6,357	6,383	6,414	6,448	6,482	6,514	6,543	6,569
10 to 14 years old	7,740	7,689	7,643	7,610	7,591	7,585	7,589	7,601	7,619	7,640	7,662
15 to 19 years old	10,722	10,767	10,785	10,792	10,798	10,805	10,816	10,829	10,844	10,861	10,881
20 to 24 years old	12,838	12,948	13,026	13,103	13,186	13,269	13,354	13,433	13,502	13,561	13,614
25 to 29 years old	12,425	12,288	12,177	12,107	12,077	12,078	12,102	12,141	12,186	12,233	12,280
30 to 34 years old	14,738	14,514	14,297	14,108	13,954	13,834	13,746	13,686	13,645	13,621	13,611
35 to 39 years old	13,492	13,526	13,511	13,467	13,408	13,341	13,274	13,209	13,148	13,093	13,045
40 to 44 years old	15,280	15,402	15,500	15,577	15,634	15,671	15,691	15,695	15,685	15,664	15,637
45 to 49 years old	15,624	15,935	16,208	16,451	16,667	16,857	17,021	17,159	17,272	17,362	17,431
50 to 54 years old	20,282	20,458	20,673	20,916	21,177	21,446	21,713	21,972	22,216	22,441	22,646
55 to 59 years old	23,435	23,786	24,114	24,437	24,764	25,097	25,436	25,776	26,114	26,446	26,768
60 to 64 years old	27,751	27,842	27,993	28,195	28,442	28,724	29,035	29,371	29,723	30,089	30,463
65 to 69 years old	29,116	29,212	29,315	29,440	29,595	29,781	30,000	30,249	30,525	30,826	31,150
70 to 74 years old	32,618	33,052	33,425	33,758	34,066	34,362	34,656	34,954	35,261	35,583	35,921
75 to 79 years old	32,043	33,004	33,864	34,636	35,332	35,965	36,545	37,084	37,590	38,073	38,541
80 to 84 years old	25,610	27,509	29,195	30,700	32,049	33,260	34,353	35,343	36,244	37,071	37,836
85 years or older	34,238	37,088	40,093	43,182	46,301	49,407	52,470	55,467	58,383	61,208	63,939

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
(count)											
Hearing and Vision Disa	140,957	144,816	148,564	152,236	155,835	159,349	162,778	166,111	169,341	172,471	175,509
under 5 years old	767	780	788	794	799	803	807	809	812	813	815
5 to 9 years old	1,201	1,199	1,200	1,203	1,208	1,214	1,220	1,227	1,233	1,238	1,243
10 to 14 years old	1,448	1,439	1,430	1,424	1,420	1,419	1,420	1,422	1,425	1,429	1,434
15 to 19 years old	2,172	2,181	2,185	2,186	2,188	2,189	2,191	2,194	2,197	2,200	2,204
20 to 24 years old	3,193	3,221	3,240	3,259	3,280	3,301	3,322	3,341	3,358	3,373	3,386
25 to 29 years old	3,371	3,334	3,304	3,285	3,277	3,277	3,283	3,294	3,306	3,319	3,332
30 to 34 years old	3,745	3,688	3,633	3,585	3,546	3,515	3,493	3,477	3,467	3,461	3,458
35 to 39 years old	3,842	3,852	3,848	3,835	3,818	3,799	3,780	3,762	3,744	3,729	3,715
40 to 44 years old	4,997	5,038	5,070	5,095	5,113	5,126	5,132	5,133	5,130	5,123	5,114
45 to 49 years old	5,741	5,855	5,955	6,045	6,124	6,194	6,254	6,305	6,346	6,379	6,405
50 to 54 years old	8,056	8,126	8,211	8,308	8,412	8,518	8,624	8,727	8,824	8,914	8,995
55 to 59 years old	8,853	8,985	9,109	9,231	9,355	9,481	9,608	9,737	9,865	9,990	10,112
60 to 64 years old	10,952	10,988	11,048	11,127	11,225	11,336	11,459	11,591	11,730	11,875	12,022
65 to 69 years old	14,299	14,346	14,397	14,458	14,534	14,626	14,733	14,855	14,991	15,139	15,298
70 to 74 years old	16,388	16,605	16,793	16,960	17,115	17,264	17,411	17,561	17,716	17,877	18,047
75 to 79 years old	17,960	18,499	18,981	19,413	19,804	20,158	20,484	20,785	21,069	21,340	21,602
80 to 84 years old	13,110	14,083	14,946	15,716	16,407	17,027	17,586	18,093	18,554	18,978	19,369
85 years or older	20,861	22,598	24,429	26,311	28,211	30,103	31,970	33,796	35,573	37,294	38,958

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
(count)											
Selfcare / Ambulatory D	170,169	174,803	179,320	183,752	188,101	192,352	196,502	200,540	204,454	208,250	211,933
under 5 years old	0	0	0	0	0	0	0	0	0	0	0
5 to 9 years old	1,811	1,809	1,810	1,815	1,822	1,831	1,841	1,850	1,859	1,868	1,875
10 to 14 years old	1,613	1,602	1,592	1,585	1,581	1,580	1,581	1,584	1,587	1,592	1,596
15 to 19 years old	2,196	2,205	2,209	2,210	2,212	2,213	2,215	2,218	2,221	2,224	2,228
20 to 24 years old	2,455	2,476	2,491	2,506	2,522	2,538	2,554	2,569	2,582	2,593	2,603
25 to 29 years old	2,532	2,504	2,481	2,467	2,461	2,461	2,466	2,474	2,483	2,493	2,502
30 to 34 years old	4,000	3,939	3,880	3,829	3,787	3,754	3,731	3,714	3,703	3,697	3,694
35 to 39 years old	4,575	4,587	4,581	4,566	4,546	4,524	4,501	4,479	4,458	4,440	4,424
40 to 44 years old	5,988	6,037	6,075	6,105	6,127	6,142	6,150	6,151	6,147	6,139	6,129
45 to 49 years old	7,360	7,507	7,635	7,750	7,852	7,941	8,018	8,084	8,137	8,179	8,211
50 to 54 years old	11,289	11,387	11,506	11,641	11,787	11,936	12,085	12,229	12,365	12,491	12,605
55 to 59 years old	12,985	13,180	13,361	13,540	13,722	13,906	14,094	14,283	14,470	14,654	14,832
60 to 64 years old	16,718	16,773	16,864	16,986	17,135	17,304	17,492	17,694	17,907	18,127	18,352
65 to 69 years old	17,461	17,519	17,580	17,655	17,748	17,860	17,991	18,140	18,306	18,486	18,681
70 to 74 years old	19,426	19,684	19,906	20,104	20,288	20,464	20,639	20,817	21,000	21,191	21,392
75 to 79 years old	18,564	19,121	19,619	20,066	20,470	20,836	21,173	21,485	21,778	22,057	22,329
80 to 84 years old	16,543	17,770	18,859	19,832	20,703	21,485	22,191	22,831	23,413	23,947	24,441
85 years or older	24,653	26,705	28,869	31,093	33,338	35,575	37,781	39,939	42,038	44,072	46,038

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
(count)											
Cognitive / Independen	194,516	198,485	202,332	206,147	209,941	213,690	217,384	220,996	224,499	227,893	231,183
under 5 years old	0	0	0	0	0	0	0	0	0	0	0
5 to 9 years old	5,066	5,059	5,063	5,076	5,097	5,122	5,149	5,176	5,201	5,224	5,245
10 to 14 years old	6,439	6,397	6,358	6,331	6,315	6,310	6,313	6,324	6,338	6,355	6,374
15 to 19 years old	9,380	9,419	9,434	9,441	9,446	9,452	9,461	9,473	9,486	9,501	9,518
20 to 24 years old	9,978	10,064	10,125	10,184	10,249	10,314	10,379	10,441	10,494	10,541	10,582
25 to 29 years old	9,847	9,739	9,651	9,595	9,572	9,572	9,591	9,622	9,658	9,695	9,733
30 to 34 years old	10,919	10,753	10,592	10,452	10,338	10,249	10,184	10,139	10,109	10,092	10,084
35 to 39 years old	9,218	9,242	9,231	9,201	9,161	9,115	9,069	9,025	8,983	8,946	8,913
40 to 44 years old	10,362	10,445	10,512	10,564	10,603	10,628	10,641	10,644	10,637	10,623	10,605
45 to 49 years old	9,612	9,803	9,971	10,120	10,253	10,370	10,471	10,556	10,626	10,681	10,723
50 to 54 years old	11,631	11,731	11,854	11,994	12,144	12,298	12,451	12,599	12,739	12,869	12,986
55 to 59 years old	12,983	13,178	13,359	13,538	13,720	13,904	14,092	14,280	14,467	14,651	14,830
60 to 64 years old	13,102	13,145	13,216	13,312	13,428	13,561	13,709	13,867	14,033	14,206	14,382
65 to 69 years old	11,850	11,889	11,931	11,982	12,045	12,121	12,210	12,311	12,424	12,546	12,678
70 to 74 years old	13,580	13,760	13,915	14,054	14,183	14,306	14,428	14,552	14,680	14,814	14,954
75 to 79 years old	14,618	15,056	15,448	15,801	16,118	16,407	16,672	16,917	17,148	17,368	17,582
80 to 84 years old	13,095	14,066	14,928	15,698	16,387	17,007	17,565	18,072	18,532	18,955	19,346
85 years or older	22,837	24,738	26,742	28,803	30,883	32,955	34,998	36,997	38,942	40,826	42,647

MSA population

(count)	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
TOTAL DISABLED	404,307	409,597	414,710	419,665	424,477	429,151	433,704	438,138	442,477	446,724
under 5 years old	816	817	817	817	816	816	815	814	813	812
5 to 9 years old	6,590	6,607	6,619	6,628	6,633	6,635	6,634	6,630	6,625	6,618
10 to 14 years old	7,685	7,705	7,724	7,739	7,752	7,762	7,769	7,772	7,774	7,773
15 to 19 years old	10,901	10,918	10,934	10,949	10,963	10,974	10,984	10,990	10,995	10,997
20 to 24 years old	13,656	13,683	13,700	13,710	13,715	13,715	13,711	13,702	13,693	13,681
25 to 29 years old	12,323	12,354	12,376	12,392	12,400	12,402	12,399	12,391	12,379	12,365
30 to 34 years old	13,610	13,609	13,610	13,611	13,610	13,607	13,601	13,592	13,580	13,566
35 to 39 years old	13,004	12,967	12,934	12,905	12,880	12,857	12,835	12,815	12,795	12,775
40 to 44 years old	15,604	15,566	15,526	15,485	15,444	15,404	15,366	15,328	15,293	15,259
45 to 49 years old	17,480	17,511	17,527	17,531	17,525	17,511	17,490	17,465	17,437	17,406
50 to 54 years old	22,828	22,986	23,119	23,231	23,321	23,391	23,444	23,482	23,506	23,518
55 to 59 years old	27,076	27,366	27,636	27,885	28,112	28,315	28,496	28,654	28,791	28,908
60 to 64 years old	30,840	31,214	31,582	31,942	32,290	32,622	32,937	33,234	33,510	33,765
65 to 69 years old	31,492	31,848	32,214	32,589	32,967	33,346	33,722	34,092	34,455	34,806
70 to 74 years old	36,276	36,649	37,038	37,444	37,865	38,299	38,742	39,192	39,647	40,103
75 to 79 years old	39,002	39,460	39,920	40,386	40,861	41,346	41,842	42,350	42,868	43,395
80 to 84 years old	38,550	39,224	39,867	40,487	41,093	41,690	42,282	42,875	43,471	44,073
85 years or older	66,573	69,114	71,566	73,935	76,231	78,461	80,634	82,760	84,847	86,905

(count)	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
Hearing and Vision Disa	178,454	181,299	184,059	186,744	189,361	191,916	194,416	196,864	199,271	201,639
under 5 years old	816	817	817	817	816	816	815	814	813	812
5 to 9 years old	1,247	1,251	1,253	1,254	1,255	1,256	1,256	1,255	1,254	1,253
10 to 14 years old	1,438	1,442	1,445	1,448	1,450	1,452	1,453	1,454	1,454	1,454
15 to 19 years old	2,208	2,212	2,215	2,218	2,221	2,223	2,225	2,226	2,227	2,228
20 to 24 years old	3,397	3,403	3,408	3,410	3,411	3,411	3,410	3,408	3,406	3,403
25 to 29 years old	3,343	3,352	3,358	3,362	3,364	3,365	3,364	3,362	3,359	3,355
30 to 34 years old	3,458	3,458	3,458	3,458	3,458	3,457	3,456	3,453	3,451	3,447
35 to 39 years old	3,703	3,693	3,683	3,675	3,668	3,661	3,655	3,649	3,644	3,638
40 to 44 years old	5,104	5,091	5,078	5,065	5,051	5,038	5,026	5,013	5,002	4,991
45 to 49 years old	6,423	6,434	6,440	6,442	6,439	6,434	6,427	6,417	6,407	6,395
50 to 54 years old	9,067	9,130	9,183	9,227	9,263	9,291	9,312	9,327	9,336	9,341
55 to 59 years old	10,228	10,338	10,440	10,534	10,619	10,696	10,764	10,824	10,876	10,920
60 to 64 years old	12,171	12,319	12,464	12,606	12,743	12,874	12,999	13,116	13,225	13,325
65 to 69 years old	15,466	15,641	15,821	16,004	16,190	16,376	16,561	16,743	16,921	17,093
70 to 74 years old	18,225	18,412	18,608	18,812	19,024	19,241	19,464	19,690	19,919	20,148
75 to 79 years old	21,861	22,117	22,375	22,636	22,902	23,174	23,452	23,737	24,027	24,323
80 to 84 years old	19,735	20,080	20,409	20,727	21,037	21,342	21,646	21,949	22,254	22,562
85 years or older	40,563	42,111	43,605	45,049	46,447	47,806	49,130	50,425	51,697	52,951

(count)	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
Selfcare / Ambulatory D	215,503	218,952	222,296	225,546	228,710	231,795	234,807	237,754	240,644	243,482
under 5 years old	0	0	0	0	0	0	0	0	0	0
5 to 9 years old	1,881	1,886	1,889	1,892	1,893	1,894	1,894	1,893	1,891	1,889
10 to 14 years old	1,601	1,605	1,609	1,612	1,615	1,617	1,619	1,619	1,620	1,619
15 to 19 years old	2,232	2,236	2,239	2,242	2,245	2,248	2,249	2,251	2,252	2,252
20 to 24 years old	2,612	2,617	2,620	2,622	2,623	2,623	2,622	2,620	2,619	2,616
25 to 29 years old	2,511	2,517	2,522	2,525	2,527	2,527	2,527	2,525	2,523	2,520
30 to 34 years old	3,694	3,693	3,694	3,694	3,694	3,693	3,691	3,689	3,686	3,682
35 to 39 years old	4,410	4,397	4,386	4,376	4,367	4,360	4,352	4,345	4,339	4,332
40 to 44 years old	6,116	6,101	6,085	6,069	6,053	6,037	6,022	6,008	5,994	5,980
45 to 49 years old	8,235	8,249	8,257	8,259	8,256	8,249	8,239	8,228	8,214	8,200
50 to 54 years old	12,706	12,793	12,868	12,930	12,980	13,019	13,049	13,070	13,083	13,090
55 to 59 years old	15,003	15,164	15,313	15,451	15,577	15,689	15,790	15,877	15,953	16,018
60 to 64 years old	18,579	18,805	19,027	19,243	19,453	19,653	19,843	20,021	20,188	20,342
65 to 69 years old	18,886	19,099	19,319	19,543	19,770	19,998	20,223	20,445	20,662	20,873
70 to 74 years old	21,604	21,826	22,058	22,300	22,550	22,809	23,072	23,341	23,612	23,883
75 to 79 years old	22,596	22,861	23,127	23,397	23,673	23,954	24,241	24,535	24,835	25,141
80 to 84 years old	24,903	25,338	25,753	26,154	26,545	26,931	27,314	27,697	28,082	28,470
85 years or older	47,935	49,765	51,530	53,237	54,890	56,495	58,060	59,591	61,094	62,575

(count)	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
Cognitive / Independen	234,356	237,389	240,305	243,117	245,833	248,459	251,005	253,475	255,887	258,241
under 5 years old	0	0	0	0	0	0	0	0	0	0
5 to 9 years old	5,262	5,276	5,285	5,292	5,296	5,298	5,297	5,294	5,290	5,284
10 to 14 years old	6,393	6,410	6,425	6,438	6,449	6,457	6,463	6,466	6,467	6,466
15 to 19 years old	9,535	9,551	9,565	9,578	9,590	9,600	9,608	9,614	9,618	9,620
20 to 24 years old	10,615	10,635	10,648	10,656	10,660	10,660	10,657	10,650	10,643	10,634
25 to 29 years old	9,766	9,791	9,809	9,821	9,828	9,829	9,827	9,820	9,811	9,800
30 to 34 years old	10,083	10,083	10,083	10,084	10,083	10,081	10,077	10,070	10,061	10,051
35 to 39 years old	8,885	8,860	8,837	8,817	8,800	8,784	8,770	8,755	8,742	8,729
40 to 44 years old	10,582	10,557	10,529	10,501	10,474	10,447	10,421	10,395	10,371	10,348
45 to 49 years old	10,753	10,772	10,782	10,785	10,781	10,772	10,760	10,744	10,727	10,708
50 to 54 years old	13,091	13,181	13,257	13,321	13,373	13,413	13,444	13,465	13,479	13,486
55 to 59 years old	15,000	15,161	15,311	15,449	15,574	15,687	15,787	15,875	15,951	16,015
60 to 64 years old	14,561	14,737	14,911	15,081	15,245	15,402	15,551	15,691	15,821	15,942
65 to 69 years old	12,817	12,962	13,111	13,264	13,418	13,572	13,725	13,876	14,023	14,166
70 to 74 years old	15,103	15,258	15,420	15,589	15,764	15,945	16,129	16,317	16,506	16,696
75 to 79 years old	17,792	18,001	18,211	18,424	18,640	18,862	19,088	19,320	19,556	19,796
80 to 84 years old	19,712	20,056	20,385	20,702	21,012	21,317	21,620	21,923	22,228	22,535
85 years or older	44,405	46,099	47,735	49,315	50,846	52,334	53,783	55,201	56,594	57,966

US Forecast Flash

	2024	2025	2026	2027	2028	2029
Gross Domestic Product (billions real $)	22,655.5	22,968.4	23,358.1	23,745.9	24,131.6	24,507.0
Nonfarm payroll employment (millions)	157.2	157.3	157.9	158.6	159.4	160.0
Civilian unemployment rate (%)	4.3	4.7	4.6	4.5	4.4	4.3
Population, total (millions)	337.3	339.0	340.7	342.5	344.2	346.0
Federal Reserve funds rate (%)	5.4	4.1	2.9	2.6	2.6	2.6
10-year Treasury bond yield (%)	4.3	3.6	3.3	3.2	3.2	3.2
30-year fixed mortgage interest rate (%)	7.0	5.7	5.1	5.0	4.9	4.9
Price of West-Texas crude oil ($ / bbl)	80.6	70.1	76.8	80.4	83.0	85.2
Consumer Price Index (all items 1982-84=100)	3.1	3.2	3.3	3.3	3.4	3.5
Producer Price Index (all commodities 1982=100)	2.5	2.5	2.6	2.6	2.7	2.7
Housing starts (millions unit)	1.4	1.5	1.5	1.5	1.5	1.5
Cons. Sentiment Index (Univ. of Mich., 1966=100)	79.7	88.2	91.5	91.4	90.1	88.1
S&P 500 Stock Market Index	4,249.5	4,441.4	4,477.3	4,450.1	4,502.9	4,577.8

source: S&P Global, IHS Global Insight | U.S. Macroeconomic Outlook, Baseline Trend, November 2023 (T30112

(annualized percent change)						
Gross Domestic Product (billions real $)	1.4%	1.4%	1.7%	1.7%	1.6%	1.6%
Nonfarm payroll employment (millions)	0.7%	0.0%	0.4%	0.5%	0.5%	0.4%
Population, total (millions)	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Price of West-Texas crude oil ($ / bbl)	2.0%	-13.0%	9.6%	4.6%	3.2%	2.7%
Consumer Price Index (all items 1982-84=100)	2.7%	2.0%	2.5%	2.2%	2.2%	2.2%
Producer Price Index (all commodities 1982=100)	-3.2%	1.1%	2.9%	1.6%	1.3%	1.3%
Housing starts (millions unit)	-3.7%	4.6%	1.8%	-0.5%	-0.2%	-0.1%
Cons. Sentiment Index (Univ. of Mich., 1966=100)	18.2%	10.7%	3.7%	0.0%	-1.5%	-2.3%
S&P 500 Stock Market Index	0.2%	4.5%	0.8%	-0.6%	1.2%	1.7%

US Forecast Flash

	2030	2031	2032	2033	2034	2035
Gross Domestic Product (billions real $)	24,899.4	25,285.3	25,703.9	26,154.7	26,613.5	27,061.6
Nonfarm payroll employment (millions)	160.6	161.1	161.6	162.1	162.7	163.2
Civilian unemployment rate (%)	4.3	4.3	4.3	4.3	4.3	4.3
Population, total (millions)	347.7	349.3	351.0	352.6	354.2	355.7
Federal Reserve funds rate (%)	2.6	2.6	2.6	2.6	2.6	2.6
10-year Treasury bond yield (%)	3.2	3.2	3.2	3.2	3.2	3.2
30-year fixed mortgage interest rate (%)	4.8	4.8	4.8	4.8	4.8	4.8
Price of West-Texas crude oil ($ / bbl)	87.3	89.5	91.7	93.7	95.6	97.4
Consumer Price Index (all items 1982-84=100)	3.6	3.6	3.7	3.8	3.9	4.0
Producer Price Index (all commodities 1982=100)	2.7	2.8	2.8	2.9	2.9	3.0
Housing starts (millions unit)	1.5	1.5	1.5	1.5	1.4	1.4
Cons. Sentiment Index (Univ. of Mich., 1966=100)	87.3	86.2	86.4	86.7	86.4	86.3
S&P 500 Stock Market Index	4,671.0	4,791.0	4,932.2	5,097.7	5,327.1	5,553.8

source: S&P Global, IHS Global Insight | U.S. Macroec3.bnk)

(annualized percent change)						
Gross Domestic Product (billions real $)	1.6%	1.5%	1.7%	1.8%	1.8%	1.7%
Nonfarm payroll employment (millions)	0.4%	0.3%	0.3%	0.3%	0.3%	0.3%
Population, total (millions)	0.5%	0.5%	0.5%	0.5%	0.4%	0.4%
Price of West-Texas crude oil ($ / bbl)	2.5%	2.5%	2.5%	2.2%	2.0%	1.9%
Consumer Price Index (all items 1982-84=100)	2.2%	2.2%	2.2%	2.2%	2.2%	2.1%
Producer Price Index (all commodities 1982=100)	1.4%	1.8%	1.9%	1.8%	1.9%	1.6%
Housing starts (millions unit)	-0.7%	-0.5%	-0.6%	-2.0%	-2.9%	-3.4%
Cons. Sentiment Index (Univ. of Mich., 1966=100)	-0.9%	-1.3%	0.3%	0.3%	-0.3%	0.0%
S&P 500 Stock Market Index	2.0%	2.6%	2.9%	3.4%	4.5%	4.3%

US Forecast Flash

	2036	2037	2038	2039	2040	2041
Gross Domestic Product (billions real $)	27,507.8	27,955.1	28,421.8	28,891.1	29,379.7	29,875.2
Nonfarm payroll employment (millions)	163.7	164.3	165.0	165.6	166.3	166.8
Civilian unemployment rate (%)	4.3	4.3	4.3	4.2	4.2	4.2
Population, total (millions)	357.2	358.6	359.9	361.3	362.5	363.8
Federal Reserve funds rate (%)	2.6	2.6	2.6	2.6	2.6	2.6
10-year Treasury bond yield (%)	3.2	3.2	3.2	3.2	3.2	3.2
30-year fixed mortgage interest rate (%)	4.8	4.8	4.8	4.8	4.8	4.8
Price of West-Texas crude oil ($ / bbl)	99.3	101.1	103.0	105.0	107.0	109.0
Consumer Price Index (all items 1982-84=100)	4.0	4.1	4.2	4.3	4.4	4.5
Producer Price Index (all commodities 1982=100)	3.0	3.1	3.1	3.2	3.2	3.3
Housing starts (millions unit)	1.3	1.3	1.2	1.2	1.2	1.2
Cons. Sentiment Index (Univ. of Mich., 1966=100)	86.7	86.8	87.0	87.1	87.2	87.0
S&P 500 Stock Market Index	5,795.6	6,051.3	6,328.0	6,618.5	6,897.6	7,166.2

source: S&P Global, IHS Global Insight | U.S. Macroec

(annualized percent change)						
Gross Domestic Product (billions real $)	1.6%	1.6%	1.7%	1.7%	1.7%	1.7%
Nonfarm payroll employment (millions)	0.3%	0.4%	0.4%	0.4%	0.4%	0.3%
Population, total (millions)	0.4%	0.4%	0.4%	0.4%	0.4%	0.3%
Price of West-Texas crude oil ($ / bbl)	1.9%	1.9%	1.9%	1.9%	1.9%	1.8%
Consumer Price Index (all items 1982-84=100)	2.1%	2.0%	2.1%	2.1%	2.1%	2.2%
Producer Price Index (all commodities 1982=100)	1.6%	1.7%	1.8%	1.7%	1.9%	1.9%
Housing starts (millions unit)	-4.3%	-3.5%	-2.0%	-2.1%	-0.3%	-0.3%
Cons. Sentiment Index (Univ. of Mich., 1966=100)	0.4%	0.1%	0.1%	0.1%	0.1%	-0.2%
S&P 500 Stock Market Index	4.4%	4.4%	4.6%	4.6%	4.2%	3.9%

US Forecast Flash

	2042	2043	2044
Gross Domestic Product (billions real $)	30,395.5	30,915.2	31,440.0
Nonfarm payroll employment (millions)	167.3	167.8	168.3
Civilian unemployment rate (%)	4.2	4.2	4.2
Population, total (millions)	365.0	366.2	367.3
Federal Reserve funds rate (%)	2.6	2.6	2.6
10-year Treasury bond yield (%)	3.2	3.2	3.2
30-year fixed mortgage interest rate (%)	4.8	4.8	4.8
Price of West-Texas crude oil ($ / bbl)	110.6	112.2	113.9
Consumer Price Index (all items 1982-84=100)	4.6	4.7	4.8
Producer Price Index (all commodities 1982=100)	3.4	3.4	3.5
Housing starts (millions unit)	1.2	1.2	1.2
Cons. Sentiment Index (Univ. of Mich., 1966=100)	87.0	87.0	87.0
S&P 500 Stock Market Index	7,460.8	7,779.8	8,109.4

source: S&P Global, IHS Global Insight | U.S. Macroec

(annualized percent change)			
Gross Domestic Product (billions real $)	1.7%	1.7%	1.7%
Nonfarm payroll employment (millions)	0.3%	0.3%	0.3%
Population, total (millions)	0.3%	0.3%	0.3%
Price of West-Texas crude oil ($ / bbl)	1.5%	1.5%	1.5%
Consumer Price Index (all items 1982-84=100)	2.2%	2.2%	2.2%
Producer Price Index (all commodities 1982=100)	1.7%	1.7%	1.9%
Housing starts (millions unit)	-0.5%	-0.6%	0.1%
Cons. Sentiment Index (Univ. of Mich., 1966=100)	0.0%	0.0%	0.1%
S&P 500 Stock Market Index	4.1%	4.3%	4.2%

US Forecast Keys

	2024	2025	2026	2027	2028	2029
Inflation (index)						
Consumer Price Index (all items 1982-84=100)	312.8	319.0	327.0	334.2	341.6	349.0
Core Consumer Price Index (except food and energ	318.1	326.0	333.2	340.6	348.2	356.2
GDP Price Deflator	125.67	128.50	131.16	133.88	136.79	139.86
Consumer spending Deflator	123.46	125.96	128.63	131.20	133.85	136.55
Employ. cost index (wages & salaries, 2005=1.0)	1.68	1.74	1.79	1.85	1.91	1.97
Employment cost index (benefits)	1.60	1.65	1.71	1.76	1.81	1.87
Interest Rates (percent)						
Effective rate on federal funds	5.38	4.05	2.87	2.63	2.63	2.63
10-year Treasury notes yield	4.32	3.63	3.28	3.21	3.20	3.19
30-year Treasury bonds yield	4.50	3.94	3.65	3.58	3.58	3.57
conventional 30-year fixed rate mortgage	7.01	5.74	5.14	4.96	4.90	4.87
Exchange Rates (index)						
Real US trade-wtd. For. Ex - adv. economies)	1.35	1.30	1.24	1.21	1.18	1.17
Real US trade-wtd. For. Ex. - emerging markets)	1.38	1.33	1.28	1.24	1.22	1.21
Housing & Population						
Total	1.330	1.370	1.390	1.383	1.380	1.379
Single family (1-unit; millions)	0.941	0.970	0.975	0.966	0.964	0.963
Multi-family (2 or more units; millions)	0.389	0.400	0.414	0.417	0.416	0.416
Housing Affordability Index	0.87	1.01	1.11	1.12	1.12	1.12
Population, total (millions)	337.3	339.0	340.7	342.5	344.2	346.0
Households, total (millions)	131.4	132.5	133.6	134.7	135.7	136.7
Household size (persons per household)	2.57	2.56	2.55	2.54	2.54	2.53

source: S&P Global, IHS Global Insight | U.S. Macroeconomic Outlook, Baseline Trend, November 2023 (T3011

	2024	2025	2026	2027	2028	2029
(annualized percent change)						
Inflation variables						
Consumer Price Index (all items 1982-84=100)	2.7%	2.0%	2.5%	2.2%	2.2%	2.2%
Core Cons. Price Index (except food and energy)	3.2%	2.5%	2.2%	2.2%	2.2%	2.3%
GDP Price Deflator	2.7%	2.2%	2.1%	2.1%	2.2%	2.2%
Consumer spending Deflator	2.5%	2.0%	2.1%	2.0%	2.0%	2.0%
Employ. cost index (wages & salaries, 2005=1.0)	3.9%	3.2%	3.3%	3.1%	3.2%	3.2%
Employment cost index (benefits)	3.7%	3.2%	3.2%	3.1%	3.1%	3.2%
Housing & Population						
Population, total (millions)	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Households, total (millions)	0.9%	0.8%	0.8%	0.8%	0.8%	0.8%

US Forecast Keys

	2030	2031	2032	2033	2034	2035
Inflation (index)						
Consumer Price Index (all items 1982-84=100)	356.5	364.3	372.3	380.4	388.6	396.8
Core Consumer Price Index (except food and ener	364.1	372.2	380.4	388.9	397.3	405.8
GDP Price Deflator	143.01	146.30	149.67	153.11	156.56	159.93
Consumer spending Deflator	139.27	142.03	144.86	147.72	150.61	153.50
Employ. cost index (wages & salaries, 2005=1.0)	2.04	2.11	2.18	2.26	2.34	2.42
Employment cost index (benefits)	1.93	2.00	2.07	2.14	2.22	2.29
Interest Rates (percent)						
Effective rate on federal funds	2.63	2.63	2.63	2.63	2.63	2.63
10-year Treasury notes yield	3.18	3.18	3.17	3.17	3.17	3.17
30-year Treasury bonds yield	3.56	3.55	3.55	3.55	3.55	3.55
conventional 30-year fixed rate mortgage	4.85	4.84	4.84	4.84	4.84	4.84
Exchange Rates (index)						
Real US trade-wtd. For. Ex - adv. economies)	1.17	1.17	1.17	1.17	1.18	1.19
Real US trade-wtd. For. Ex. - emerging markets)	1.21	1.22	1.22	1.22	1.22	1.21
Housing & Population						
Total	1.371	1.363	1.353	1.322	1.281	1.235
Single family (1-unit; millions)	0.957	0.952	0.945	0.923	0.898	0.871
Multi-family (2 or more units; millions)	0.413	0.411	0.408	0.399	0.383	0.365
Housing Affordability Index	1.12	1.12	1.12	1.12	1.13	1.14
Population, total (millions)	347.7	349.3	351.0	352.6	354.2	355.7
Households, total (millions)	137.8	138.8	139.8	140.8	141.7	142.6
Household size (persons per household)	2.52	2.52	2.51	2.50	2.50	2.49

source: S&P Global, IHS Global Insight | U.S. Macro(23.bnk)

	2030	2031	2032	2033	2034	2035
(annualized percent change)						
Inflation variables						
Consumer Price Index (all items 1982-84=100)	2.2%	2.2%	2.2%	2.2%	2.2%	2.1%
Core Cons. Price Index (except food and energy)	2.2%	2.2%	2.2%	2.2%	2.2%	2.1%
GDP Price Deflator	2.3%	2.3%	2.3%	2.3%	2.3%	2.2%
Consumer spending Deflator	2.0%	2.0%	2.0%	2.0%	2.0%	1.9%
Employ. cost index (wages & salaries, 2005=1.0)	3.2%	3.4%	3.5%	3.6%	3.6%	3.5%
Employment cost index (benefits)	3.2%	3.4%	3.5%	3.6%	3.6%	3.5%
Housing & Population						
Population, total (millions)	0.5%	0.5%	0.5%	0.5%	0.4%	0.4%
Households, total (millions)	0.7%	0.7%	0.7%	0.7%	0.7%	0.6%

US Forecast Keys

	2036	2037	2038	2039	2040	2041
Inflation (index)						
Consumer Price Index (all items 1982-84=100)	405.0	413.2	421.8	430.5	439.6	449.1
Core Consumer Price Index (except food and ener	414.6	423.5	432.7	442.2	452.0	462.2
GDP Price Deflator	163.31	166.75	170.26	173.81	177.48	181.26
Consumer spending Deflator	156.42	159.41	162.49	165.62	168.86	172.24
Employ. cost index (wages & salaries, 2005=1.0)	2.51	2.59	2.69	2.78	2.88	2.98
Employment cost index (benefits)	2.38	2.46	2.55	2.64	2.73	2.82
Interest Rates (percent)						
Effective rate on federal funds	2.63	2.63	2.63	2.63	2.63	2.63
10-year Treasury notes yield	3.17	3.17	3.17	3.17	3.17	3.17
30-year Treasury bonds yield	3.55	3.55	3.55	3.55	3.55	3.55
conventional 30-year fixed rate mortgage	4.84	4.84	4.84	4.84	4.84	4.84
Exchange Rates (index)						
Real US trade-wtd. For. Ex - adv. economies)	1.19	1.19	1.20	1.20	1.20	1.21
Real US trade-wtd. For. Ex. - emerging markets)	1.20	1.20	1.19	1.18	1.18	1.17
Housing & Population						
Total	1.175	1.131	1.109	1.084	1.079	1.075
Single family (1-unit; millions)	0.837	0.814	0.794	0.773	0.769	0.771
Multi-family (2 or more units; millions)	0.338	0.317	0.315	0.310	0.310	0.304
Housing Affordability Index	1.14	1.15	1.16	1.17	1.17	1.18
Population, total (millions)	357.2	358.6	359.9	361.3	362.5	363.8
Households, total (millions)	143.5	144.4	145.3	146.1	146.9	147.8
Household size (persons per household)	2.49	2.48	2.48	2.47	2.47	2.46

source: S&P Global, IHS Global Insight | U.S. Macro

	2036	2037	2038	2039	2040	2041
(annualized percent change)						
Inflation variables						
Consumer Price Index (all items 1982-84=100)	2.1%	2.0%	2.1%	2.1%	2.1%	2.2%
Core Cons. Price Index (except food and energy)	2.2%	2.2%	2.2%	2.2%	2.2%	2.3%
GDP Price Deflator	2.1%	2.1%	2.1%	2.1%	2.1%	2.1%
Consumer spending Deflator	1.9%	1.9%	1.9%	1.9%	2.0%	2.0%
Employ. cost index (wages & salaries, 2005=1.0)	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Employment cost index (benefits)	3.6%	3.6%	3.5%	3.4%	3.5%	3.5%
Housing & Population						
Population, total (millions)	0.4%	0.4%	0.4%	0.4%	0.4%	0.3%
Households, total (millions)	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%

US Forecast Keys

	2042	2043	2044
Inflation (index)			
Consumer Price Index (all items 1982-84=100)	458.9	468.8	479.2
Core Consumer Price Index (except food and energ	472.7	483.6	494.9
GDP Price Deflator	185.11	189.02	193.03
Consumer spending Deflator	175.70	179.24	182.88
Employ. cost index (wages & salaries, 2005=1.0)	3.09	3.19	3.31
Employment cost index (benefits)	2.92	3.02	3.13
Interest Rates (percent)			
Effective rate on federal funds	2.63	2.63	2.63
10-year Treasury notes yield	3.17	3.17	3.17
30-year Treasury bonds yield	3.55	3.55	3.55
conventional 30-year fixed rate mortgage	4.84	4.84	4.84
Exchange Rates (index)			
Real US trade-wtd. For. Ex - adv. economies)	1.21	1.22	1.22
Real US trade-wtd. For. Ex. - emerging markets)	1.16	1.15	1.15
Housing & Population			
Total	1.070	1.063	1.064
Single family (1-unit; millions)	0.768	0.767	0.767
Multi-family (2 or more units; millions)	0.302	0.296	0.297
Housing Affordability Index	1.19	1.20	1.21
Population, total (millions)	365.0	366.2	367.3
Households, total (millions)	148.6	149.4	150.2
Household size (persons per household)	2.46	2.45	2.45

source: S&P Global, IHS Global Insight | U.S. Macro

	2042	2043	2044
(annualized percent change)			
Inflation variables			
Consumer Price Index (all items 1982-84=100)	2.2%	2.2%	2.2%
Core Cons. Price Index (except food and energy)	2.3%	2.3%	2.3%
GDP Price Deflator	2.1%	2.1%	2.1%
Consumer spending Deflator	2.0%	2.0%	2.0%
Employ. cost index (wages & salaries, 2005=1.0)	3.5%	3.5%	3.5%
Employment cost index (benefits)	3.5%	3.5%	3.5%
Housing & Population			
Population, total (millions)	0.3%	0.3%	0.3%
Households, total (millions)	0.5%	0.5%	0.5%

National Income and Production Accounts

(billions of US dollars, chained-inflation adj.)	2024	2025	2026	2027	2028
Gross Domestic Product	22,655.5	22,968.4	23,358.1	23,745.9	24,131.6
Personal Consumption Expenditures	15,723.7	15,957.5	16,241.3	16,531.8	16,820.3
Durable Goods	2,096.7	2,169.5	2,263.7	2,356.5	2,455.0
Computers	167.7	171.4	177.2	186.3	196.5
Software	336.4	348.6	360.2	377.0	392.3
Info. Processing Equipment	449.0	463.3	478.9	501.8	524.3
Nondurables	3,396.7	3,420.9	3,445.2	3,472.8	3,500.7
Food	2,080.3	2,088.1	2,089.1	2,094.8	2,092.2
Gasoline & other fuels	309.7	307.1	298.4	291.3	284.5
Clothing & footwear	513.3	533.6	546.6	561.7	582.4
Gross Domestic Investments	4,056.7	4,151.7	4,257.1	4,331.5	4,410.0
Nonresidential Fixed Investments	3,308.0	3,350.5	3,407.5	3,468.7	3,530.3
Industrial Equipment	246.2	245.6	251.6	257.7	264.2
Computer Equipment	151.6	161.2	172.5	182.7	192.2
Software	830.5	859.7	882.1	906.0	930.6
Transportation Equip.	265.1	276.9	283.4	290.8	300.6
Structures/Buildings	558.2	554.8	559.1	565.0	570.9
Residential Fixed Investments	718.0	743.3	771.3	785.2	803.8
Equipment	23.1	24.1	25.0	25.7	26.2
Structures/Buildings	561.9	581.6	603.5	614.3	628.8
Exports	2,589.8	2,686.2	2,794.6	2,901.8	3,001.3
Goods	1,944.3	2,020.5	2,101.8	2,184.2	2,259.5
Services	773.8	799.6	832.1	862.6	891.9
Imports	3,589.5	3,726.8	3,855.2	3,945.9	4,029.4
Federal Spending	1,488.8	1,496.7	1,502.8	1,500.3	1,494.6
State & LocalSpending	2,367.0	2,376.3	2,386.2	2,395.1	2,404.8

(annualized percent change)	2024	2025	2026	2027	2028
Gross Domestic Product	1.4%	1.4%	1.7%	1.7%	1.6%
Personal Consumption Expenditures	1.9%	1.5%	1.8%	1.8%	1.7%
Durable Goods	2.6%	3.5%	4.3%	4.1%	4.2%
Computers	6.9%	2.2%	3.4%	5.1%	5.5%
Software	8.5%	3.6%	3.3%	4.7%	4.1%
Info. Processing Equipment	8.0%	3.2%	3.4%	4.8%	4.5%
Nondurables	1.4%	0.7%	0.7%	0.8%	0.8%
Food	1.9%	0.4%	0.0%	0.3%	-0.1%
Gasoline & other fuels	-1.5%	-0.8%	-2.8%	-2.4%	-2.3%
Clothing & footwear	2.8%	3.9%	2.4%	2.8%	3.7%
Gross Domestic Investments	0.5%	2.3%	2.5%	1.7%	1.8%
Nonresidential Fixed Investments	1.4%	1.3%	1.7%	1.8%	1.8%
Industrial Equipment	-2.5%	-0.3%	2.5%	2.4%	2.5%
Computer Equipment	3.7%	6.3%	7.0%	5.9%	5.2%
Software	5.1%	3.5%	2.6%	2.7%	2.7%
Transportation Equip.	7.0%	4.5%	2.3%	2.6%	3.4%

Structures/Buildings	0.5%	-0.6%	0.8%	1.1%	1.0%
Residential Fixed Investments	-1.8%	3.5%	3.8%	1.8%	2.4%
Equipment	4.9%	4.4%	3.5%	2.9%	1.8%
Structures/Buildings	-1.9%	3.5%	3.8%	1.8%	2.4%
Exports	3.2%	3.7%	4.0%	3.8%	3.4%
Goods	3.1%	3.9%	4.0%	3.9%	3.4%
Services	3.5%	3.3%	4.1%	3.7%	3.4%
Imports	4.2%	3.8%	3.4%	2.4%	2.1%
Federal Spending	1.0%	0.5%	0.4%	-0.2%	-0.4%
State & LocalSpending	1.6%	0.4%	0.4%	0.4%	0.4%

National Income and Production A

(billions of US dollars, chained-inflation adj.)	2029	2030	2031	2032	2033
Gross Domestic Product	24,507.0	24,899.4	25,285.3	25,703.9	26,154.7
Personal Consumption Expenditures	17,116.4	17,433.6	17,782.9	18,164.0	18,590.5
Durable Goods	2,565.7	2,688.8	2,822.1	2,965.5	3,123.0
Computers	206.6	217.6	231.0	249.1	270.7
Software	406.8	419.7	432.3	449.6	472.8
Info. Processing Equipment	545.9	566.6	588.9	619.0	657.2
Nondurables	3,529.7	3,561.9	3,599.6	3,643.4	3,696.3
Food	2,094.2	2,104.2	2,116.4	2,126.5	2,142.0
Gasoline & other fuels	278.2	272.5	267.6	263.2	259.7
Clothing & footwear	603.1	622.2	643.1	663.5	689.8
Gross Domestic Investments	4,492.3	4,587.0	4,675.8	4,773.9	4,879.9
Nonresidential Fixed Investments	3,594.3	3,668.3	3,752.0	3,847.3	3,958.8
Industrial Equipment	268.8	274.1	280.8	288.3	296.3
Computer Equipment	201.7	211.4	221.4	232.1	243.7
Software	949.9	968.2	989.9	1,020.0	1,054.4
Transportation Equip.	313.1	327.7	341.3	354.4	366.3
Structures/Buildings	577.2	583.8	590.5	597.4	604.5
Residential Fixed Investments	824.2	844.4	852.5	857.9	856.8
Equipment	26.9	27.6	28.4	29.3	30.3
Structures/Buildings	644.8	660.6	666.7	670.7	669.5
Exports	3,090.5	3,171.1	3,243.9	3,313.8	3,379.1
Goods	2,325.5	2,384.2	2,436.5	2,487.0	2,533.9
Services	919.3	944.7	968.3	990.7	1,011.8
Imports	4,123.8	4,237.9	4,366.4	4,509.2	4,670.7
Federal Spending	1,488.6	1,494.3	1,487.4	1,488.6	1,490.4
State & LocalSpending	2,412.8	2,418.8	2,424.0	2,428.5	2,432.3

(annualized percent change)	2029	2030	2031	2032	2033
Gross Domestic Product	1.6%	1.6%	1.5%	1.7%	1.8%
Personal Consumption Expenditures	1.8%	1.9%	2.0%	2.1%	2.3%
Durable Goods	4.5%	4.8%	5.0%	5.1%	5.3%
Computers	5.1%	5.3%	6.2%	7.9%	8.6%
Software	3.7%	3.2%	3.0%	4.0%	5.2%
Info. Processing Equipment	4.1%	3.8%	3.9%	5.1%	6.2%
Nondurables	0.8%	0.9%	1.1%	1.2%	1.4%
Food	0.1%	0.5%	0.6%	0.5%	0.7%
Gasoline & other fuels	-2.2%	-2.1%	-1.8%	-1.6%	-1.3%
Clothing & footwear	3.5%	3.2%	3.3%	3.2%	4.0%
Gross Domestic Investments	1.9%	2.1%	1.9%	2.1%	2.2%
Nonresidential Fixed Investments	1.8%	2.1%	2.3%	2.5%	2.9%
Industrial Equipment	1.8%	2.0%	2.5%	2.7%	2.8%
Computer Equipment	5.0%	4.8%	4.7%	4.8%	5.0%
Software	2.1%	1.9%	2.2%	3.0%	3.4%
Transportation Equip.	4.2%	4.6%	4.2%	3.8%	3.4%

Structures/Buildings	1.1%	1.1%	1.2%	1.2%	1.2%
Residential Fixed Investments	2.5%	2.5%	1.0%	0.6%	-0.1%
Equipment	2.7%	2.5%	3.0%	3.2%	3.4%
Structures/Buildings	2.5%	2.5%	0.9%	0.6%	-0.2%
Exports	3.0%	2.6%	2.3%	2.2%	2.0%
Goods	2.9%	2.5%	2.2%	2.1%	1.9%
Services	3.1%	2.8%	2.5%	2.3%	2.1%
Imports	2.3%	2.8%	3.0%	3.3%	3.6%
Federal Spending	-0.4%	0.4%	-0.5%	0.1%	0.1%
State & LocalSpending	0.3%	0.2%	0.2%	0.2%	0.2%

National Income and Production A

(billions of US dollars, chained-inflation adj.)	2034	2035	2036	2037	2038
Gross Domestic Product	26,613.5	27,061.6	27,507.8	27,955.1	28,421.8
Personal Consumption Expenditures	19,022.3	19,444.4	19,876.3	20,312.0	20,744.3
Durable Goods	3,281.2	3,440.9	3,606.7	3,777.6	3,952.8
Computers	293.7	318.5	345.4	374.3	405.4
Software	497.1	525.5	557.4	592.9	632.2
Info. Processing Equipment	697.5	742.8	793.1	848.2	908.6
Nondurables	3,755.6	3,820.5	3,890.0	3,958.9	4,025.7
Food	2,156.4	2,168.2	2,181.3	2,194.1	2,206.6
Gasoline & other fuels	257.0	254.4	251.7	248.8	245.7
Clothing & footwear	718.7	744.6	772.9	802.5	833.2
Gross Domestic Investments	4,982.0	5,070.4	5,147.2	5,210.8	5,291.4
Nonresidential Fixed Investments	4,067.6	4,167.0	4,258.1	4,347.1	4,444.6
Industrial Equipment	303.0	312.6	321.1	328.2	334.5
Computer Equipment	256.1	269.3	283.5	298.3	314.0
Software	1,080.3	1,103.7	1,128.3	1,154.2	1,181.4
Transportation Equip.	383.1	396.8	405.5	414.6	427.5
Structures/Buildings	610.9	618.0	624.2	628.4	634.6
Residential Fixed Investments	857.4	860.9	858.0	851.0	848.2
Equipment	31.5	32.6	33.7	34.9	36.1
Structures/Buildings	669.6	672.0	669.4	663.5	661.0
Exports	3,442.0	3,502.4	3,564.7	3,628.5	3,687.1
Goods	2,579.8	2,623.9	2,669.8	2,716.9	2,757.7
Services	1,031.5	1,050.5	1,069.9	1,089.4	1,109.4
Imports	4,835.7	4,993.8	5,159.3	5,314.1	5,450.6
Federal Spending	1,493.5	1,497.6	1,502.5	1,508.1	1,513.6
State & LocalSpending	2,444.5	2,462.5	2,481.4	2,499.3	2,516.5

(annualized percent change)	2034	2035	2036	2037	2038
Gross Domestic Product	1.8%	1.7%	1.6%	1.6%	1.7%
Personal Consumption Expenditures	2.3%	2.2%	2.2%	2.2%	2.1%
Durable Goods	5.1%	4.9%	4.8%	4.7%	4.6%
Computers	8.5%	8.4%	8.4%	8.4%	8.3%
Software	5.1%	5.7%	6.1%	6.4%	6.6%
Info. Processing Equipment	6.1%	6.5%	6.8%	7.0%	7.1%
Nondurables	1.6%	1.7%	1.8%	1.8%	1.7%
Food	0.7%	0.5%	0.6%	0.6%	0.6%
Gasoline & other fuels	-1.0%	-1.0%	-1.1%	-1.1%	-1.3%
Clothing & footwear	4.2%	3.6%	3.8%	3.8%	3.8%
Gross Domestic Investments	2.1%	1.8%	1.5%	1.2%	1.5%
Nonresidential Fixed Investments	2.8%	2.4%	2.2%	2.1%	2.2%
Industrial Equipment	2.3%	3.1%	2.7%	2.2%	1.9%
Computer Equipment	5.1%	5.2%	5.3%	5.2%	5.3%
Software	2.5%	2.2%	2.2%	2.3%	2.4%
Transportation Equip.	4.6%	3.6%	2.2%	2.2%	3.1%

Structures/Buildings	1.1%	1.1%	1.0%	0.7%	1.0%
Residential Fixed Investments	0.1%	0.4%	-0.3%	-0.8%	-0.3%
Equipment	3.7%	3.5%	3.6%	3.5%	3.4%
Structures/Buildings	0.0%	0.4%	-0.4%	-0.9%	-0.4%
Exports	1.9%	1.8%	1.8%	1.8%	1.6%
Goods	1.8%	1.7%	1.7%	1.8%	1.5%
Services	1.9%	1.8%	1.8%	1.8%	1.8%
Imports	3.5%	3.3%	3.3%	3.0%	2.6%
Federal Spending	0.2%	0.3%	0.3%	0.4%	0.4%
State & LocalSpending	0.5%	0.7%	0.8%	0.7%	0.7%

National Income and Production A

(billions of US dollars, chained-inflation adj.)	2039	2040	2041	2042	2043
Gross Domestic Product	28,891.1	29,379.7	29,875.2	30,395.5	30,915.2
Personal Consumption Expenditures	21,172.9	21,597.6	22,025.7	22,464.4	22,919.0
Durable Goods	4,125.6	4,296.2	4,470.0	4,649.5	4,837.3
Computers	438.7	474.0	511.8	551.9	594.5
Software	675.7	723.0	774.6	830.3	890.0
Info. Processing Equipment	974.6	1,045.8	1,123.1	1,205.9	1,294.5
Nondurables	4,091.1	4,155.3	4,219.5	4,286.1	4,356.6
Food	2,218.9	2,230.8	2,242.6	2,254.4	2,266.6
Gasoline & other fuels	242.5	239.2	235.8	232.4	229.0
Clothing & footwear	865.3	898.8	933.6	970.2	1,008.4
Gross Domestic Investments	5,380.8	5,470.8	5,578.5	5,702.7	5,819.2
Nonresidential Fixed Investments	4,546.6	4,650.7	4,761.0	4,876.9	4,996.4
Industrial Equipment	340.8	347.1	354.2	362.6	371.9
Computer Equipment	330.6	348.1	366.5	386.0	406.5
Software	1,209.8	1,238.8	1,268.7	1,299.3	1,331.1
Transportation Equip.	442.5	457.6	474.3	491.9	509.0
Structures/Buildings	640.7	647.5	655.3	663.4	672.3
Residential Fixed Investments	847.9	849.4	855.9	868.0	877.8
Equipment	37.3	38.5	39.8	41.1	42.6
Structures/Buildings	660.5	661.3	666.1	675.3	682.7
Exports	3,747.3	3,812.3	3,876.1	3,943.7	3,996.4
Goods	2,799.3	2,845.9	2,889.7	2,936.4	2,965.0
Services	1,130.0	1,151.1	1,173.2	1,196.3	1,220.1
Imports	5,592.2	5,717.9	5,838.1	5,971.8	6,104.3
Federal Spending	1,519.1	1,531.8	1,529.4	1,534.9	1,540.5
State & LocalSpending	2,534.4	2,552.2	2,570.5	2,588.1	2,608.6

(annualized percent change)	2039	2040	2041	2042	2043
Gross Domestic Product	1.7%	1.7%	1.7%	1.7%	1.7%
Personal Consumption Expenditures	2.1%	2.0%	2.0%	2.0%	2.0%
Durable Goods	4.4%	4.1%	4.0%	4.0%	4.0%
Computers	8.2%	8.1%	8.0%	7.8%	7.7%
Software	6.9%	7.0%	7.1%	7.2%	7.2%
Info. Processing Equipment	7.3%	7.3%	7.4%	7.4%	7.3%
Nondurables	1.6%	1.6%	1.5%	1.6%	1.6%
Food	0.6%	0.5%	0.5%	0.5%	0.5%
Gasoline & other fuels	-1.3%	-1.4%	-1.4%	-1.4%	-1.4%
Clothing & footwear	3.9%	3.9%	3.9%	3.9%	3.9%
Gross Domestic Investments	1.7%	1.7%	2.0%	2.2%	2.0%
Nonresidential Fixed Investments	2.3%	2.3%	2.4%	2.4%	2.5%
Industrial Equipment	1.9%	1.8%	2.0%	2.4%	2.6%
Computer Equipment	5.3%	5.3%	5.3%	5.3%	5.3%
Software	2.4%	2.4%	2.4%	2.4%	2.4%
Transportation Equip.	3.5%	3.4%	3.6%	3.7%	3.5%

Structures/Buildings	1.0%	1.1%	1.2%	1.2%	1.3%
Residential Fixed Investments	0.0%	0.2%	0.8%	1.4%	1.1%
Equipment	3.3%	3.3%	3.3%	3.4%	3.5%
Structures/Buildings	-0.1%	0.1%	0.7%	1.4%	1.1%
Exports	1.6%	1.7%	1.7%	1.7%	1.3%
Goods	1.5%	1.7%	1.5%	1.6%	1.0%
Services	1.9%	1.9%	1.9%	2.0%	2.0%
Imports	2.6%	2.2%	2.1%	2.3%	2.2%
Federal Spending	0.4%	0.8%	-0.2%	0.4%	0.4%
State & LocalSpending	0.7%	0.7%	0.7%	0.7%	0.8%

National Income and Production A

(billions of US dollars, chained-inflation adj.)	2044	Average Percent Rate 2002-22	2024-34	2034-44
Gross Domestic Product	31,440.0	2.1%	1.6%	1.3%
Personal Consumption Expenditures	23,380.9	2.3%	1.9%	1.6%
Durable Goods	5,028.5	5.0%	4.6%	3.3%
Computers	639.2	15.5%	5.8%	6.2%
Software	953.2	21.9%	4.0%	5.1%
Info. Processing Equipment	1,387.9	18.6%	4.5%	5.4%
Nondurables	4,427.2	2.3%	1.0%	1.3%
Food	2,278.5	2.1%	0.4%	0.4%
Gasoline & other fuels	225.4	0.0%	-1.8%	-1.0%
Clothing & footwear	1,048.0	3.0%	3.4%	2.9%
Gross Domestic Investments	5,932.9	3.0%	2.1%	1.4%
Nonresidential Fixed Investments	5,115.5	3.8%	2.1%	1.8%
Industrial Equipment	381.1	1.7%	2.1%	1.8%
Computer Equipment	428.2	7.8%	5.4%	4.0%
Software	1,363.6	9.2%	2.7%	1.8%
Transportation Equip.	525.0	1.3%	3.7%	2.5%
Structures/Buildings	681.4	0.3%	0.9%	0.8%
Residential Fixed Investments	885.6	-0.2%	1.8%	0.2%
Equipment	44.0	5.2%	3.1%	2.6%
Structures/Buildings	688.6	-0.3%	1.8%	0.2%
Exports	4,049.5	3.5%	2.9%	1.3%
Goods	2,994.0	3.7%	2.9%	1.2%
Services	1,243.9	3.3%	2.9%	1.5%
Imports	6,234.1	3.5%	3.0%	2.0%
Federal Spending	1,546.1	1.7%	0.0%	0.3%
State & LocalSpending	2,628.0	0.4%	0.3%	0.6%

(annualized percent change)	2044
Gross Domestic Product	1.7%
Personal Consumption Expenditures	2.0%
Durable Goods	4.0%
Computers	7.5%
Software	7.1%
Info. Processing Equipment	7.2%
Nondurables	1.6%
Food	0.5%
Gasoline & other fuels	-1.6%
Clothing & footwear	3.9%
Gross Domestic Investments	2.0%
Nonresidential Fixed Investments	2.4%
Industrial Equipment	2.5%
Computer Equipment	5.3%
Software	2.4%
Transportation Equip.	3.1%

Structures/Buildings	1.3%
Residential Fixed Investments	0.9%
Equipment	3.4%
Structures/Buildings	0.9%
Exports	1.3%
Goods	1.0%
Services	2.0%
Imports	2.1%
Federal Spending	0.4%
State & LocalSpending	0.7%

US Employment Forecast

(figures in millions)	2024	2025	2026	2027	2028	2029	2030	2031	2032
Nonfarm Wage & Salary Jobs, TOTAL	157.2	157.3	157.9	158.6	159.4	160.0	160.6	161.1	161.6
Manufacturing, TOTAL	12.9	12.3	12.1	11.9	11.8	11.7	11.7	11.6	11.5
Durables, total	8.1	7.7	7.5	7.4	7.2	7.2	7.1	7.1	7.1
Wood Products	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5
Primary Metals	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Fab. Metals	1.5	1.4	1.4	1.4	1.3	1.3	1.3	1.3	1.3
Machinery Mfg.	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Computer & Electronics	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0
Transp. Equipment	1.8	1.7	1.6	1.5	1.5	1.4	1.4	1.4	1.3
Other Durable Goods	1.8	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6
Nondurables, total	4.8	4.6	4.6	4.5	4.5	4.5	4.5	4.5	4.5
Food Processing	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.8
Paper	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Other Nondurables	2.7	2.6	2.6	2.5	2.5	2.5	2.5	2.4	2.4
Nonmanufacturing (private), TOTAL	121.3	121.7	122.5	123.3	124.1	124.7	125.2	125.6	126.1
Natural Resources & Mining	0.6	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7
Construction	8.1	8.2	8.3	8.4	8.6	8.7	8.8	8.9	9.0
Trade, Transport & Utilities	28.5	28.1	28.2	28.2	28.1	28.0	27.9	27.8	27.8
Wholesale Trade	6.1	6.2	6.2	6.2	6.2	6.1	6.0	6.0	6.0
Retail Trade	15.2	14.7	14.7	14.7	14.6	14.6	14.6	14.6	14.7
TWU	7.2	7.3	7.3	7.3	7.3	7.3	7.2	7.2	7.1
Information Services	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Publishing	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
Internet, etc.	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
Financial Activities	9.2	9.3	9.4	9.5	9.5	9.5	9.4	9.4	9.5
Finance & Insurance	6.7	6.9	7.0	7.1	7.1	7.1	7.0	7.1	7.1
Real Estate	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Pro. Business Services	23.0	23.0	23.0	23.3	23.8	24.3	24.8	25.1	25.4
Pro., Sci., Tech.	11.0	11.1	11.0	11.1	11.1	11.1	11.1	11.2	11.3
Mgmt. of Co.	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.3
Admin Sup. + Waste	9.4	9.4	9.5	9.7	10.3	10.8	11.3	11.6	11.8
Edu. + Health	26.1	26.3	26.4	26.6	26.7	26.8	26.9	27.1	27.3
Education	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
Health	22.2	22.4	22.5	22.7	22.8	22.9	23.0	23.2	23.4
Leisure + Hospitality	16.8	17.0	17.3	17.4	17.4	17.3	17.2	17.1	16.9
Arts, ent. & rec.	2.5	2.7	2.7	2.8	3.0	3.1	3.1	3.2	3.2
Lodgings & Food	14.3	14.3	14.5	14.6	14.4	14.3	14.1	13.9	13.6
Other Services	5.9	6.0	6.0	6.1	6.2	6.3	6.3	6.4	6.4
Government, Civilian TOTAL	23.1	23.2	23.3	23.4	23.5	23.6	23.8	23.8	23.9
Federal, Civilian	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
State & Local	20.1	20.3	20.4	20.5	20.6	20.7	20.8	20.9	21.0

US Employment Forecast

(figures in millions)	2033	2034	2035	2036	2037	2038	2039	2040	2041
Nonfarm Wage & Salary Jobs, TOTAL	162.1	162.7	163.2	163.7	164.3	165.0	165.6	166.3	166.8
Manufacturing, TOTAL	11.4	11.4	11.4	11.5	11.5	11.6	11.6	11.6	11.7
Durables, total	7.0	7.0	7.0	7.1	7.1	7.1	7.2	7.2	7.2
Wood Products	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4
Primary Metals	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Fab. Metals	1.3	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.5
Machinery Mfg.	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1
Computer & Electronics	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Transp. Equipment	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Other Durable Goods	1.6	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7
Nondurables, total	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Food Processing	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0
Paper	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Other Nondurables	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1
Nonmanufacturing (private), TOTAL	126.7	127.1	127.5	127.9	128.3	128.8	129.3	129.8	130.2
Natural Resources & Mining	0.7	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7
Construction	9.1	9.1	9.2	9.2	9.2	9.1	9.1	9.1	9.1
Trade, Transport & Utilities	27.7	27.6	27.5	27.5	27.4	27.4	27.4	27.4	27.4
Wholesale Trade	5.9	5.9	5.9	5.8	5.8	5.8	5.8	5.8	5.7
Retail Trade	14.7	14.7	14.8	14.8	14.9	15.0	15.1	15.1	15.2
TWU	7.1	7.0	6.9	6.8	6.7	6.6	6.6	6.5	6.4
Information Services	3.1	3.0	3.0	3.0	3.0	3.1	3.1	3.1	3.1
Publishing	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7
Internet, etc.	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3
Financial Activities	9.5	9.5	9.5	9.5	9.6	9.6	9.6	9.7	9.8
Finance & Insurance	7.2	7.2	7.2	7.3	7.3	7.3	7.4	7.5	7.6
Real Estate	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2
Pro. Business Services	25.8	26.2	26.4	26.7	27.0	27.3	27.5	27.7	28.0
Pro., Sci., Tech.	11.4	11.6	11.8	11.9	12.0	12.1	12.2	12.2	12.3
Mgmt. of Co.	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1
Admin Sup. + Waste	12.1	12.3	12.4	12.6	12.8	13.1	13.3	13.4	13.6
Edu. + Health	27.5	27.7	27.7	27.8	27.8	27.9	27.9	28.0	28.0
Education	3.9	3.9	3.8	3.8	3.7	3.7	3.6	3.6	3.6
Health	23.6	23.8	23.9	24.0	24.1	24.2	24.3	24.4	24.4
Leisure + Hospitality	16.8	16.7	16.8	16.8	16.9	17.0	17.1	17.1	17.2
Arts, ent. & rec.	3.3	3.3	3.3	3.3	3.4	3.4	3.4	3.5	3.5
Lodgings & Food	13.5	13.4	13.5	13.5	13.6	13.6	13.6	13.7	13.7
Other Services	6.4	6.5	6.5	6.6	6.6	6.7	6.8	6.9	6.9
Government, Civilian TOTAL	24.0	24.1	24.2	24.3	24.5	24.6	24.7	24.9	24.9
Federal, Civilian	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
State & Local	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	22.0

US Employment Forecast

(figures in millions)	2042	2043	2044	Average Percent Rate 1990-2022	2024-34	2034-44
Nonfarm Wage & Salary Jobs, TOTAL	167.3	167.8	168.3	1.0%	0.3%	0.3%
Manufacturing, TOTAL	11.7	11.7	11.7	-1.0%	-1.2%	0.2%
Durables, total	7.3	7.2	7.2	-0.9%	-1.4%	0.4%
Wood Products	0.4	0.4	0.4	-0.7%	1.7%	-1.6%
Primary Metals	0.3	0.3	0.3	-2.0%	-2.6%	-1.0%
Fab. Metals	1.5	1.6	1.6	-0.4%	-0.7%	1.4%
Machinery Mfg.	1.1	1.1	1.1	-0.8%	-1.5%	1.1%
Computer & Electronics	1.0	1.0	1.0	-1.7%	-0.8%	0.3%
Transp. Equipment	1.2	1.2	1.2	-0.7%	-3.3%	-1.0%
Other Durable Goods	1.7	1.7	1.7	-0.9%	-1.3%	0.8%
Nondurables, total	4.4	4.4	4.4	-1.1%	-0.8%	0.0%
Food Processing	2.0	2.0	2.1	0.4%	0.4%	1.5%
Paper	0.3	0.3	0.3	-1.8%	-1.2%	0.1%
Other Nondurables	2.1	2.1	2.0	-1.7%	-1.6%	-1.3%
Nonmanufacturing (private), TOTAL	130.6	131.0	131.3	1.5%	0.5%	0.3%
Natural Resources & Mining	0.8	0.8	0.8	-0.7%	1.6%	0.1%
Construction	9.2	9.2	9.3	1.2%	1.2%	0.2%
Trade, Transport & Utilities	27.4	27.3	27.3	0.7%	-0.3%	-0.1%
Wholesale Trade	5.7	5.7	5.7	0.4%	-0.3%	-0.3%
Retail Trade	15.2	15.2	15.3	0.5%	-0.3%	0.4%
TWU	6.4	6.4	6.3	1.7%	-0.4%	-1.0%
Information Services	3.1	3.1	3.1	0.4%	-0.1%	0.2%
Publishing	0.7	0.7	0.7	0.2%	-1.3%	-0.9%
Internet, etc.	2.4	2.4	2.4	0.5%	0.4%	0.5%
Financial Activities	9.9	9.9	10.0	1.0%	0.4%	0.5%
Finance & Insurance	7.6	7.7	7.8	0.9%	0.7%	0.8%
Real Estate	2.2	2.2	2.2	1.2%	-0.5%	-0.5%
Pro. Business Services	28.1	28.3	28.4	2.3%	1.3%	0.8%
Pro., Sci., Tech.	12.4	12.5	12.6	2.6%	0.6%	0.7%
Mgmt. of Co.	2.0	2.0	2.0	1.3%	-1.2%	-1.4%
Admin Sup. + Waste	13.7	13.8	13.9	2.3%	2.7%	1.2%
Edu. + Health	28.0	27.9	27.9	2.5%	0.6%	0.1%
Education	3.6	3.6	3.6	2.6%	-0.1%	-0.7%
Health	24.4	24.3	24.3	2.5%	0.7%	0.2%
Leisure + Hospitality	17.3	17.3	17.4	1.7%	-0.1%	0.4%
Arts, ent. & rec.	3.5	3.6	3.6	2.2%	2.6%	0.9%
Lodgings & Food	13.7	13.7	13.8	1.6%	-0.6%	0.3%
Other Services	7.0	7.1	7.2	0.9%	1.0%	1.0%
Government, Civilian TOTAL	25.0	25.2	25.3	0.6%	0.4%	0.5%
Federal, Civilian	3.0	3.0	3.0	-0.3%	0.0%	0.0%
State & Local	22.1	22.2	22.3	0.7%	0.5%	0.5%

US Employment Forecast

(Annual percent change)	2024	2025	2026	2027	2028	2029	2030	2031	2032
Nonfarm Wage & Salary Jobs, TOTAL	0.7%	0.0%	0.4%	0.5%	0.5%	0.4%	0.4%	0.3%	0.3%
Manufacturing, TOTAL	-0.8%	-4.2%	-2.0%	-1.4%	-1.2%	-0.6%	-0.2%	-0.5%	-0.7%
Durables, total	-0.6%	-4.7%	-2.3%	-1.8%	-1.8%	-1.0%	-0.4%	-0.6%	-0.7%
Wood Products	-4.3%	-2.3%	5.3%	4.3%	3.3%	3.9%	4.3%	1.8%	0.4%
Primary Metals	0.7%	-5.2%	-2.6%	-2.7%	-3.7%	-3.3%	-2.4%	-0.7%	-1.6%
Fab. Metals	0.1%	-3.3%	-1.2%	-1.4%	-1.9%	-1.0%	-0.2%	0.6%	0.4%
Machinery Mfg.	-1.1%	-5.7%	-2.1%	-1.6%	-1.8%	-1.2%	-0.6%	-0.4%	-0.8%
Computer & Electronics	-0.8%	-1.1%	-0.7%	-1.4%	-1.7%	-1.6%	-1.3%	-0.6%	-0.1%
Transp. Equipment	1.1%	-7.7%	-6.0%	-4.3%	-3.5%	-1.7%	-1.7%	-2.9%	-2.1%
Other Durable Goods	-1.5%	-4.8%	-2.3%	-1.6%	-1.4%	-0.7%	0.3%	-0.1%	-0.8%
Nondurables, total	-1.3%	-3.5%	-1.5%	-0.8%	-0.2%	0.2%	0.0%	-0.4%	-0.7%
Food Processing	-0.1%	-3.2%	-0.4%	0.5%	1.3%	1.7%	1.5%	1.0%	0.7%
Paper	-3.4%	-5.8%	-2.0%	-0.8%	-0.2%	0.2%	-0.1%	-0.5%	-0.8%
Other Nondurables	-1.8%	-3.3%	-2.1%	-1.6%	-1.1%	-0.9%	-1.0%	-1.3%	-1.6%
Nonmanufacturing (private), TOTAL	0.6%	0.4%	0.6%	0.7%	0.6%	0.5%	0.4%	0.4%	0.4%
Natural Resources & Mining	0.4%	2.6%	6.8%	5.5%	1.1%	-1.1%	-2.0%	-1.4%	1.3%
Construction	1.6%	0.8%	1.8%	1.5%	1.8%	1.5%	1.4%	0.7%	0.8%
Trade, Transport & Utilities	-1.2%	-1.4%	0.2%	0.2%	-0.4%	-0.5%	-0.4%	0.0%	-0.1%
Wholesale Trade	0.6%	1.0%	0.3%	0.4%	-0.6%	-0.9%	-1.1%	-0.5%	-0.5%
Retail Trade	-2.2%	-3.4%	-0.1%	0.1%	-0.3%	-0.4%	0.1%	0.4%	0.3%
TWU	-0.5%	0.8%	0.5%	0.1%	-0.3%	-0.5%	-0.7%	-0.5%	-0.8%
Information Services	-0.4%	2.7%	-1.2%	-1.2%	0.1%	0.5%	0.1%	0.1%	0.2%
Publishing	-2.7%	-2.0%	-2.0%	-1.1%	-0.8%	-1.0%	-1.1%	-0.9%	-1.2%
Internet, etc.	0.6%	4.6%	-0.9%	-1.3%	0.4%	1.0%	0.6%	0.5%	0.8%
Financial Activities	0.6%	1.7%	1.1%	0.4%	0.0%	-0.1%	-0.4%	0.2%	0.7%
Finance & Insurance	0.6%	2.2%	1.7%	0.7%	0.1%	0.0%	-0.3%	0.3%	1.0%
Real Estate	0.9%	0.3%	-0.5%	-0.6%	-0.4%	-0.4%	-0.7%	-0.1%	-0.3%
Pro. Business Services	0.0%	0.2%	0.0%	1.1%	2.2%	2.1%	2.0%	1.4%	1.3%
Pro., Sci., Tech.	1.3%	0.7%	-0.7%	0.6%	0.2%	-0.1%	0.5%	0.7%	0.8%
Mgmt. of Co.	1.0%	-0.5%	-1.7%	-1.2%	-1.1%	-1.3%	-1.3%	-0.9%	-1.1%
Admin Sup. + Waste	-1.7%	-0.2%	1.3%	2.3%	5.3%	5.3%	4.2%	2.6%	2.2%
Edu. + Health	2.8%	0.9%	0.3%	0.6%	0.6%	0.3%	0.4%	0.7%	0.7%
Education	0.1%	-0.9%	0.0%	0.4%	0.7%	0.1%	-0.6%	-0.2%	-0.1%
Health	3.3%	1.3%	0.3%	0.6%	0.6%	0.3%	0.6%	0.8%	0.9%
Leisure + Hospitality	1.2%	1.2%	1.6%	0.7%	-0.2%	-0.1%	-0.6%	-1.0%	-1.1%
Arts, ent. & rec.	3.4%	4.4%	3.1%	3.4%	4.7%	3.2%	2.5%	1.8%	1.0%
Lodgings & Food	0.8%	0.6%	1.3%	0.2%	-1.2%	-0.8%	-1.2%	-1.6%	-1.5%
Other Services	0.4%	1.2%	1.4%	1.5%	1.6%	1.1%	0.7%	0.7%	0.5%
Government, Civilian TOTAL	1.6%	0.6%	0.5%	0.4%	0.4%	0.4%	0.7%	0.1%	0.4%
Federal, Civilian	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	2.3%	-2.3%	0.0%
State & Local	1.7%	0.7%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%

US Employment Forecast

(Annual percent change)	2033	2034	2035	2036	2037	2038	2039	2040	2041
Nonfarm Wage & Salary Jobs, TOTAL	0.3%	0.3%	0.3%	0.3%	0.4%	0.4%	0.4%	0.4%	0.3%
Manufacturing, TOTAL	-0.8%	-0.3%	0.3%	0.2%	0.5%	0.4%	0.4%	0.3%	0.2%
Durables, total	-0.9%	-0.1%	0.6%	0.4%	0.7%	0.5%	0.5%	0.4%	0.4%
Wood Products	-1.2%	-2.2%	-1.8%	-5.7%	-3.5%	-3.3%	-1.3%	-2.4%	0.8%
Primary Metals	-2.6%	-1.4%	-0.5%	-0.7%	-0.8%	-1.3%	-0.8%	-0.4%	-0.8%
Fab. Metals	0.2%	1.2%	2.3%	2.2%	2.0%	1.7%	1.4%	1.4%	1.1%
Machinery Mfg.	-1.0%	0.2%	1.5%	1.6%	1.7%	1.3%	1.2%	1.2%	0.8%
Computer & Electronics	0.1%	0.0%	0.1%	0.2%	0.3%	0.3%	0.4%	0.4%	0.4%
Transp. Equipment	-1.8%	-0.9%	-0.4%	-0.5%	-0.3%	-0.5%	-0.5%	-0.6%	-1.3%
Other Durable Goods	-1.0%	0.0%	0.8%	1.1%	1.5%	1.1%	0.9%	0.8%	0.7%
Nondurables, total	-0.8%	-0.7%	-0.3%	-0.2%	0.0%	0.2%	0.2%	0.1%	0.0%
Food Processing	0.4%	0.5%	1.0%	1.2%	1.6%	1.7%	1.8%	1.7%	1.4%
Paper	-1.0%	-0.7%	-0.3%	-0.1%	0.3%	0.3%	0.3%	0.2%	0.0%
Other Nondurables	-1.7%	-1.5%	-1.3%	-1.3%	-1.2%	-1.2%	-1.2%	-1.3%	-1.4%
Nonmanufacturing (private), TOTAL	0.4%	0.4%	0.3%	0.3%	0.3%	0.4%	0.3%	0.4%	0.3%
Natural Resources & Mining	2.1%	1.6%	0.3%	-0.5%	-0.8%	-0.5%	-0.1%	0.0%	0.7%
Construction	1.1%	1.0%	0.6%	0.1%	-0.4%	-0.4%	-0.3%	-0.1%	0.2%
Trade, Transport & Utilities	-0.2%	-0.4%	-0.3%	-0.2%	-0.1%	-0.1%	0.0%	-0.1%	-0.1%
Wholesale Trade	-0.7%	-0.5%	-0.6%	-0.5%	-0.5%	-0.3%	-0.3%	-0.3%	-0.3%
Retail Trade	0.4%	-0.1%	0.3%	0.5%	0.6%	0.5%	0.6%	0.4%	0.4%
TWU	-1.1%	-1.0%	-1.3%	-1.4%	-1.3%	-1.1%	-1.1%	-1.0%	-0.9%
Information Services	-0.6%	-1.0%	-0.6%	0.2%	0.6%	0.7%	0.6%	0.1%	-0.4%
Publishing	-1.6%	-1.4%	-1.3%	-1.3%	-1.3%	-1.1%	-0.9%	-0.6%	-0.7%
Internet, etc.	-0.3%	-0.9%	-0.3%	0.8%	1.2%	1.3%	1.1%	0.3%	-0.3%
Financial Activities	0.3%	0.1%	0.0%	0.0%	0.2%	0.4%	0.5%	0.7%	0.7%
Finance & Insurance	0.7%	0.5%	0.3%	0.2%	0.5%	0.7%	0.8%	1.0%	1.1%
Real Estate	-1.2%	-1.2%	-0.9%	-0.6%	-0.7%	-0.6%	-0.7%	-0.4%	-0.4%
Pro. Business Services	1.5%	1.4%	0.9%	1.1%	1.1%	1.1%	0.7%	0.8%	0.8%
Pro., Sci., Tech.	1.3%	1.8%	1.4%	1.0%	0.7%	0.5%	0.6%	0.7%	0.6%
Mgmt. of Co.	-1.5%	-1.4%	-1.5%	-1.5%	-1.5%	-1.3%	-1.3%	-1.2%	-1.3%
Admin Sup. + Waste	2.3%	1.6%	1.0%	1.5%	1.9%	2.2%	1.1%	1.3%	1.3%
Edu. + Health	0.8%	0.7%	0.2%	0.1%	0.1%	0.2%	0.2%	0.3%	0.0%
Education	0.1%	-0.6%	-1.5%	-1.6%	-1.7%	-1.3%	-1.0%	-0.6%	-0.1%
Health	0.9%	0.9%	0.5%	0.4%	0.4%	0.5%	0.3%	0.4%	0.1%
Leisure + Hospitality	-0.7%	-0.5%	0.5%	0.4%	0.5%	0.4%	0.5%	0.4%	0.4%
Arts, ent. & rec.	0.9%	0.6%	0.7%	1.0%	1.0%	1.1%	0.9%	0.9%	0.8%
Lodgings & Food	-1.1%	-0.7%	0.4%	0.3%	0.4%	0.2%	0.4%	0.2%	0.3%
Other Services	0.4%	0.6%	0.5%	0.8%	1.1%	1.2%	1.2%	1.2%	1.1%
Government, Civilian TOTAL	0.4%	0.4%	0.4%	0.5%	0.5%	0.5%	0.5%	0.7%	0.2%
Federal, Civilian	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	1.8%	-1.9%
State & Local	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%

US Employment Forecast

(Annual percent change)	2042	2043	2044
Nonfarm Wage & Salary Jobs, TOTAL	0.3%	0.3%	0.3%
Manufacturing, TOTAL	0.1%	-0.1%	0.0%
Durables, total	0.2%	-0.2%	0.0%
Wood Products	2.3%	-0.8%	-0.2%
Primary Metals	-1.3%	-1.7%	-1.4%
Fab. Metals	0.7%	0.6%	0.7%
Machinery Mfg.	0.5%	0.4%	0.7%
Computer & Electronics	0.4%	0.5%	0.5%
Transp. Equipment	-1.7%	-2.0%	-1.9%
Other Durable Goods	0.5%	0.1%	0.3%
Nondurables, total	0.0%	0.0%	0.0%
Food Processing	1.4%	1.4%	1.4%
Paper	0.0%	0.0%	0.0%
Other Nondurables	-1.3%	-1.4%	-1.4%
Nonmanufacturing (private), TOTAL	0.3%	0.3%	0.3%
Natural Resources & Mining	1.3%	0.8%	-0.2%
Construction	0.6%	0.8%	0.8%
Trade, Transport & Utilities	-0.1%	-0.1%	-0.1%
Wholesale Trade	-0.1%	-0.2%	-0.1%
Retail Trade	0.1%	0.2%	0.1%
TWU	-0.6%	-0.6%	-0.5%
Information Services	0.6%	0.0%	-0.2%
Publishing	-0.7%	-0.8%	-0.7%
Internet, etc.	1.0%	0.2%	0.0%
Financial Activities	0.8%	0.8%	0.8%
Finance & Insurance	1.1%	1.1%	1.1%
Real Estate	-0.4%	-0.4%	-0.2%
Pro. Business Services	0.7%	0.4%	0.5%
Pro., Sci., Tech.	0.7%	0.6%	0.7%
Mgmt. of Co.	-1.3%	-1.4%	-1.3%
Admin Sup. + Waste	1.0%	0.5%	0.6%
Edu. + Health	-0.1%	-0.2%	0.0%
Education	0.1%	0.6%	0.6%
Health	-0.1%	-0.3%	-0.1%
Leisure + Hospitality	0.2%	0.3%	0.2%
Arts, ent. & rec.	0.9%	0.9%	1.1%
Lodgings & Food	0.0%	0.2%	0.0%
Other Services	1.1%	1.0%	1.0%
Government, Civilian TOTAL	0.5%	0.5%	0.5%
Federal, Civilian	0.1%	0.1%	0.1%
State & Local	0.6%	0.6%	0.6%

US Personal Income Accounts

(in billions nominal dollars)	2024	2025	2026	2027	2028	2029	2030	2031
Personal Income	24096.6	25318.7	26465.0	27605.6	28768.2	29957.7	31197.8	32485.7
+ Wage & Salary Disbursement	12327.2	12786.8	13300.1	13847.3	14408.4	14977.9	15572.7	16187.8
- Social Ins. Contribution	1879.7	1938.3	2009.4	2069.8	2148.9	2234.1	2323.4	2416.1
+ Transfer Payments	4230.8	4425.9	4651.1	4902.2	5165.9	5437.9	5710.3	5990.8
+ Other Labor Income	1693.7	1756.9	1827.4	1902.6	1979.7	2058.0	2139.7	2224.2
+ Farm Proprietors Inc.	60.8	83.6	87.3	80.1	79.2	82.8	85.6	87.2
+ Bus. Proprietors Inc.	1843.9	1886.2	1933.5	2002.6	2088.9	2187.3	2298.0	2413.7
+ Div., Interest, & Rent	5003.1	5475.9	5803.0	6042.3	6262.1	6477.5	6705.1	6947.2
Per capita income (dollars)	71,450	74,687	77,668	80,601	83,572	86,594	89,735	92,989

source: S&P Global, IHS Global Insight | U.S. Macroeconomic Outlook, Baseline Trend, November 2023 (T30112

(annualized percent change)	2024	2025	2026	2027	2028	2029	2030	2031
Personal Income	4.9%	5.1%	4.5%	4.3%	4.2%	4.1%	4.1%	4.1%
+ Wage & Salary Disbursement	4.3%	3.7%	4.0%	4.1%	4.1%	4.0%	4.0%	3.9%
- Social Ins. Contribution	3.8%	3.1%	3.7%	3.0%	3.8%	4.0%	4.0%	4.0%
+ Transfer Payments	3.1%	4.6%	5.1%	5.4%	5.4%	5.3%	5.0%	4.9%
+ Other Labor Income	4.6%	3.7%	4.0%	4.1%	4.1%	4.0%	4.0%	3.9%
+ Farm Proprietors Inc.	3.4%	37.7%	4.4%	-8.2%	-1.2%	4.5%	3.4%	1.8%
+ Bus. Proprietors Inc.	3.5%	2.3%	2.5%	3.6%	4.3%	4.7%	5.1%	5.0%
+ Div., Interest, & Rent	8.3%	9.5%	6.0%	4.1%	3.6%	3.4%	3.5%	3.6%

US Personal Income

(in billions nominal dollars)	2032	2033	2034	2035	2036	2037	2038	2039
Personal Income	33851.8	35305.0	36752.6	38258.3	39856.2	41499.4	43203.3	44983.5
+ Wage & Salary Disbursement	16845.7	17552.9	18273.7	19017.5	19793.8	20601.2	21441.7	22317.0
- Social Ins. Contribution	2515.0	2621.2	2728.8	2839.7	2955.5	3075.9	3201.3	3331.8
+ Transfer Payments	6278.9	6577.6	6874.8	7178.1	7493.2	7809.3	8138.2	8487.7
+ Other Labor Income	2314.6	2411.8	2489.0	2574.2	2667.9	2767.4	2870.6	2977.4
+ Farm Proprietors Inc.	89.1	91.6	93.0	94.3	96.3	98.4	100.6	103.1
+ Bus. Proprietors Inc.	2538.4	2669.4	2781.8	2891.0	3016.0	3144.9	3273.4	3399.2
+ Div., Interest, & Rent	7205.2	7480.7	7781.6	8110.2	8464.1	8823.5	9197.0	9593.1
Per capita income (dollars)	96,444	100,123	103,767	107,557	111,590	115,734	120,030	124,521

source: S&P Global, IHS Global Ins23.bnk)

(annualized percent change)	2032	2033	2034	2035	2036	2037	2038	2039
Personal Income	4.2%	4.3%	4.1%	4.1%	4.2%	4.1%	4.1%	4.1%
+ Wage & Salary Disbursement	4.1%	4.2%	4.1%	4.1%	4.1%	4.1%	4.1%	4.1%
- Social Ins. Contribution	4.1%	4.2%	4.1%	4.1%	4.1%	4.1%	4.1%	4.1%
+ Transfer Payments	4.8%	4.8%	4.5%	4.4%	4.4%	4.2%	4.2%	4.3%
+ Other Labor Income	4.1%	4.2%	3.2%	3.4%	3.6%	3.7%	3.7%	3.7%
+ Farm Proprietors Inc.	2.2%	2.8%	1.6%	1.4%	2.1%	2.2%	2.2%	2.5%
+ Bus. Proprietors Inc.	5.2%	5.2%	4.2%	3.9%	4.3%	4.3%	4.1%	3.8%
+ Div., Interest, & Rent	3.7%	3.8%	4.0%	4.2%	4.4%	4.2%	4.2%	4.3%

US Personal Income

(in billions nominal dollars)	2040	2041	2042	2043	2044	Average Percent Rate 1990-2022	2024-34	2034-44
Personal Income	46854.9	48791.2	50858.8	53009.2	55238.1	4.8%	4.3%	3.2%
+ Wage & Salary Disbursement	23245.3	24184.5	25175.4	26207.1	27279.5	4.5%	4.0%	3.1%
- Social Ins. Contribution	3470.2	3610.2	3758.0	3911.8	4071.6	4.5%	3.8%	3.1%
+ Transfer Payments	8854.9	9246.7	9666.6	10106.9	10574.5	6.1%	5.0%	3.4%
+ Other Labor Income	3091.8	3211.7	3335.8	3462.4	3593.2	4.4%	3.9%	2.9%
+ Farm Proprietors Inc.	105.6	108.1	111.0	113.9	116.2	3.0%	4.4%	1.7%
+ Bus. Proprietors Inc.	3531.5	3667.0	3812.3	3958.2	4103.4	5.4%	4.2%	3.0%
+ Div., Interest, & Rent	10000.0	10429.0	10899.3	11391.6	11895.3	4.6%	4.5%	3.3%
Per capita income (dollars)	129,243	134,125	139,343	144,764	150,373	3.8%	3.8%	2.9%

source: S&P Global, IHS Global Insi

(annualized percent change)	2040	2041	2042	2043	2044
Personal Income	4.2%	4.1%	4.2%	4.2%	4.2%
+ Wage & Salary Disbursement	4.2%	4.0%	4.1%	4.1%	4.1%
- Social Ins. Contribution	4.2%	4.0%	4.1%	4.1%	4.1%
+ Transfer Payments	4.3%	4.4%	4.5%	4.6%	4.6%
+ Other Labor Income	3.8%	3.9%	3.9%	3.8%	3.8%
+ Farm Proprietors Inc.	2.5%	2.3%	2.7%	2.7%	2.0%
+ Bus. Proprietors Inc.	3.9%	3.8%	4.0%	3.8%	3.7%
+ Div., Interest, & Rent	4.2%	4.3%	4.5%	4.5%	4.4%

2024-2044 regional population, household, and employment forecast:

Expert panel review summary

Context

On January 30, 2024, Metro staff convened an expert panel of economists and demographers to review the preliminary regional forecast that will be part of the 2024 Urban Growth Report. This review is intended to identify areas of agreement or disagreement among experts in forecasting. The group is advisory to Metro staff. The following summary describes the topics brought forward in the forecast review, staff reasoning, as well as expert panelist views on those topics.

Main takeaways

The long-term trend of declining birth rates will lead to slower population growth rates
Metro's forecast for slower population growth is aligned with other forecasters' assessments. Specifically, panelists agreed that declining birth rates will mean that deaths will begin to outnumber births in the next decade. That negative natural change is expected to continue after that point, and without positive net migration, the region would begin to lose population. This expected slowdown is not because of the pandemic, the ensuing 2020 recession, or because of recent out-migration from the region. It is because of demographic shifts.

Panelists believe there is considerable uncertainty around migration, but that Metro's assumption, based on historic averages is reasonable. Panelists advised Metro to be clear about this uncertainty and that high cost of living on the west coast may lead to lower net in-migration.

Panelists indicated that, while intuition supports the notion that the region may see increased migration from climate refugees drawn to the Pacific Northwest's temperate climate, there is currently no observable evidence that this is happening. Panelists did not recommend building in an add-factor for climate induced migration at this time.

Employment growth will slow because of declining population growth rates
External experts agree that population growth is inextricably tied to employment growth and that slowing population growth would lead to slowing employment growth. Both are expected to grow at 0.4 percent per year over the forecast period. This is less than historic growth rates.

Panelists felt that Metro's preliminary employment forecast looked right in total, but that it was too optimistic about the CHIPS Act and its impacts on computer and electronics manufacturing and metal fabrication. Peer reviewers indicated that the CHIPS Act will primarily prevent manufacturing job losses that would otherwise occur in the next 10 years. Longer term, they expect manufacturing employment to be flat. In response, Metro staff has adjusted the computer and electronics and metal fabrication sectors downward slightly. The result is that manufacturing employment– after an initial increase in the next five to ten years—returns (declines) to pre-pandemic levels by the end of the 20-year forecast period.

NOTE: graphs included in this document are ones that were discussed by the peer review panel. As such, they may differ from the eventual draft or final regional forecast because staff has made adjustments based on expert feedback.

Expert panelists and Metro economics staff

<u>Panelists</u>
Peter Hulseman, City Economist, City of Portland
Neal Marquez, Forecast Program Manager, Portland State University Population Research Center
Ethan Sharygin, Director, Portland State University Population Research Center
Amy Vandervliet, Economist, Oregon Employment Department

<u>Metro economics staff</u>
Josh Harwood, Director of Fiscal and Tax Policy
Katelyn Kelley, Economist
Dennis Yee, Economist

Panel discussion

National macroeconomic conditions
Metro staff presented data on recent national gross domestic product (GDP) as well as GDP projections from S&P Global |IHS Markit. The national outlook shows GDP returning to a slow growth trend after seeing variability during the pandemic. The national outlook does not include another recession, but instead points to a "soft landing" from a period of high inflation.

National population
Metro staff presented national population growth rate forecasts which depict slowing population growth rates. By the end of the forecast period, average annual population growth rates are expected be at 0.4 percent, down from the 0.9 percent rate for the previous 30 years. Panel members suggested comparing this IHS Markit data to 2023 Census data but indicated that those data show a similar trend and forecast.

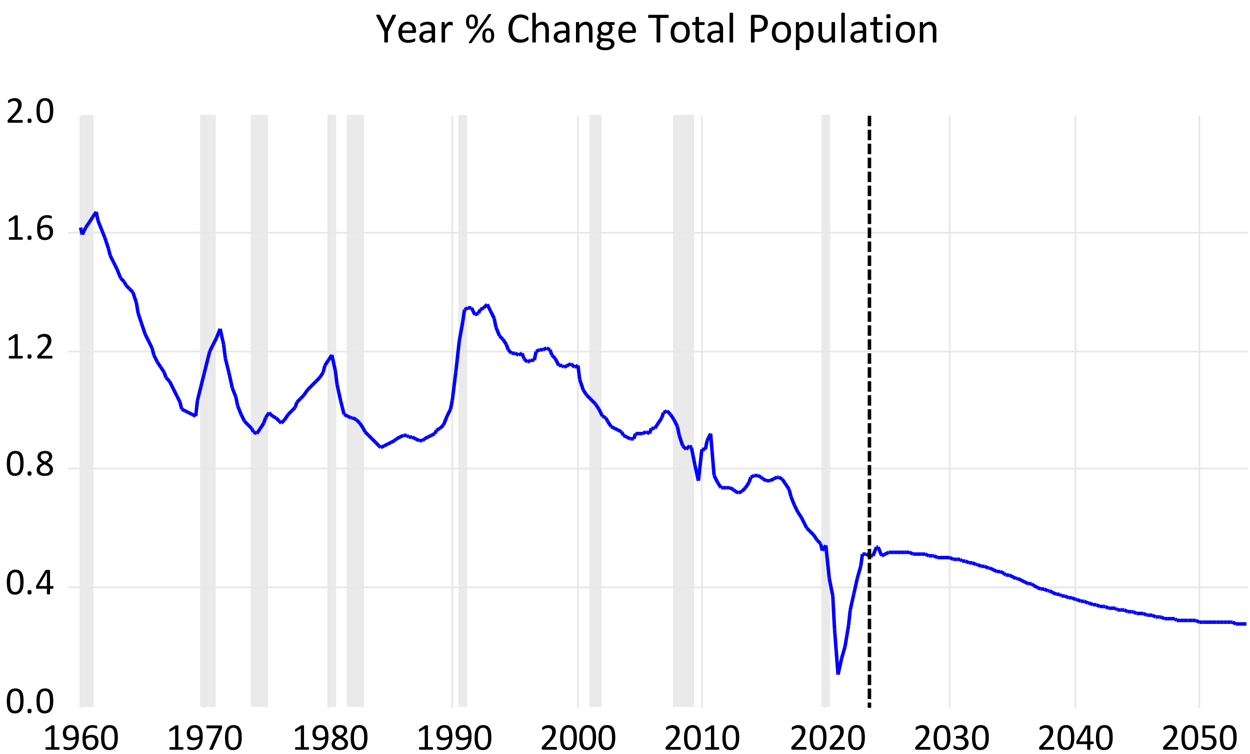


Figure 1: Annual percent change in total U.S. population (source: IHS Markit)

Declining birth rates are a main driver for slowing population growth rates. Though average life expectancy is expected to increase, the continued aging of the Baby Boomer generation will contribute to higher numbers of deaths in the next two decades. At the national level, deaths now outnumber births.

Going forward, national population would decline if it were not for international migration into the U.S. The pandemic is not seen as the cause of slower population growth. Rather, the continuation of the long-term trend of declining birth rates has become clearer since the completion of the 2018 forecast. Panelists did not indicate any disagreement with these overarching trends and their implications for regional population growth.

National Employment
Employment growth depends on population growth and labor force participation among that population. Having presented national data on slowing population growth, staff presented information on labor force participation and employment-to-population ratios.

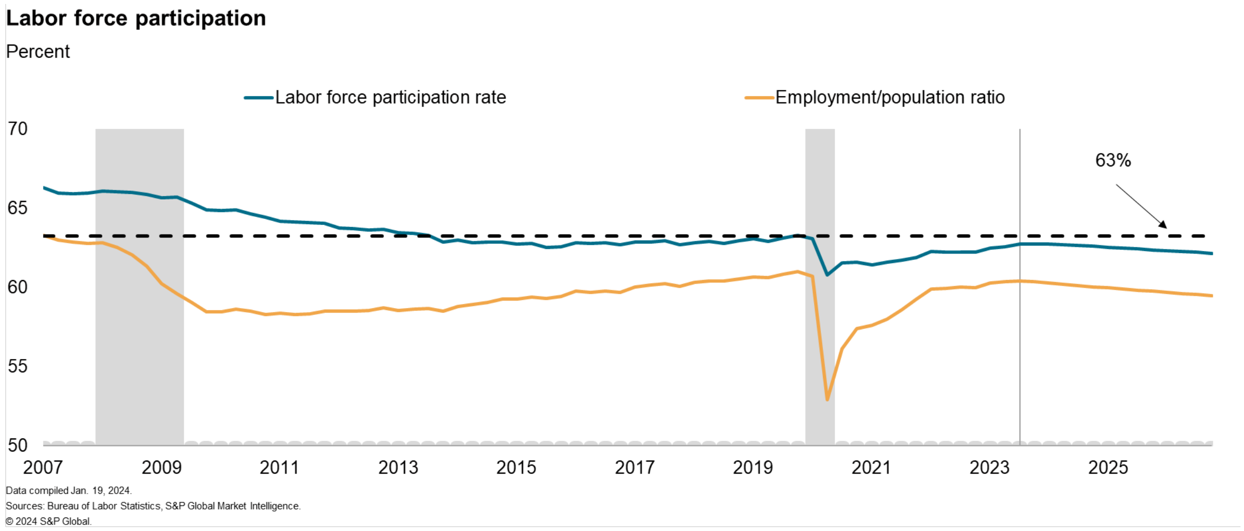


Figure 2: U.S. labor force participation

The national employment forecast shows slowing growth rates in coming decades. IHS Markit's national employment forecast indicates an average of 0.4 percent growth per year through the year 2055. This matches the national forecast for 0.4 percent population growth.

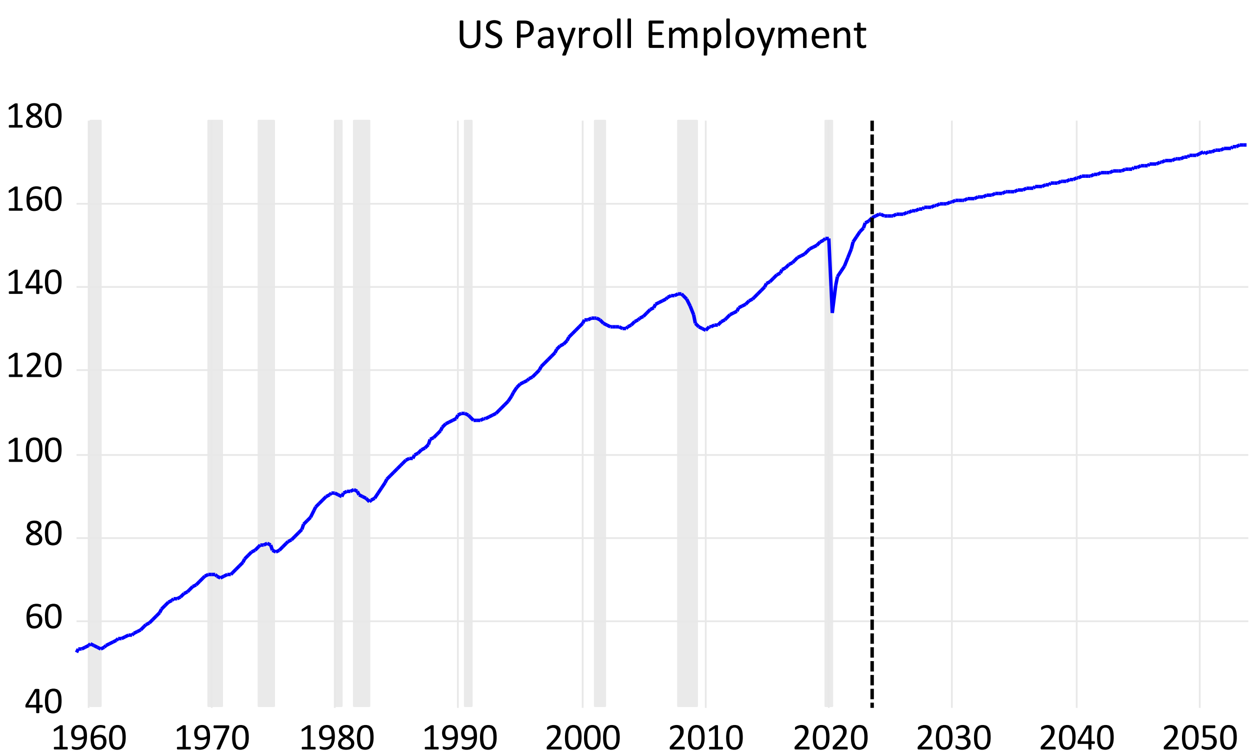


Figure 3: U.S. employment in millions (source: IHS Global Insight)

Regional population

Switching from the national context to the seven-county Portland/Vancouver Metropolitan Statistical Area (MSA), Metro staff presented the current population pyramid for the region.

Current age distribution

Figure 4 depicts an aging population with constricted younger age cohorts. This type of population pyramid indicates that a population will have diminishing natural increase (in which deaths exceed live births) and would shrink over coming decades were it not for net increases from migration.

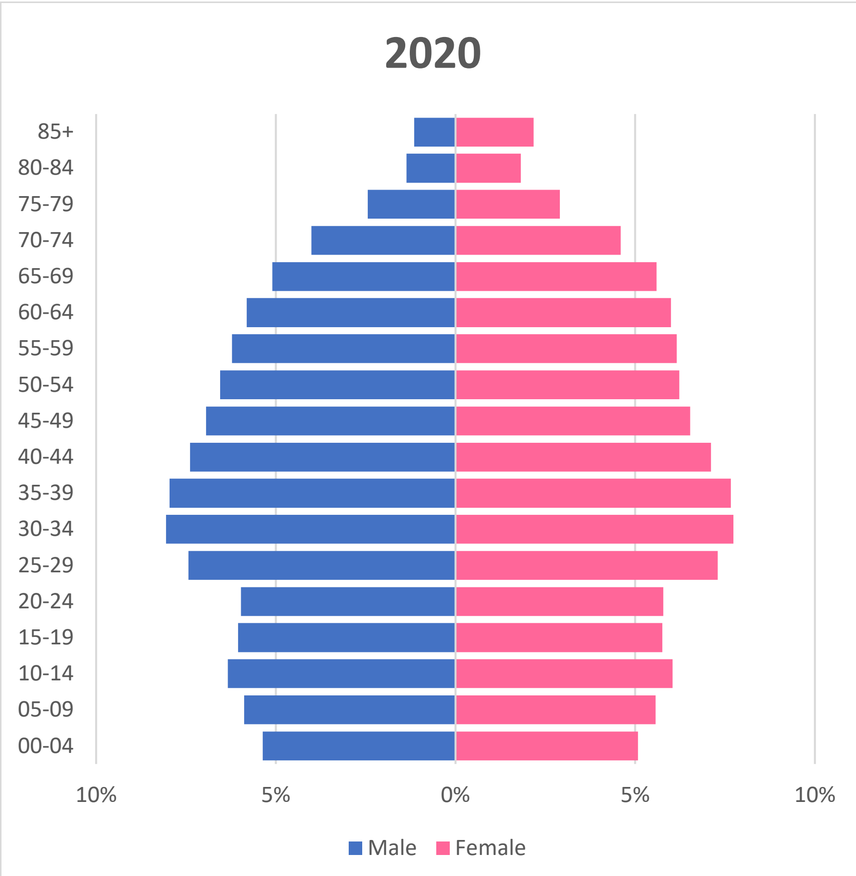


Figure 4: Portland/Vancouver MSA population pyramid in 2020 (source U.S. Census)

Panel members discussed how the regional population pyramid compares with other regions in the U.S.:

- Relative to other states, Oregon has a higher share of population that is 65 and older.
- The region continues to attract young working age migrants (ages 20-39).

Regional birth rates and fertility rates

Metro staff presented data on age-specific birth rates for the region. As depicted in Figure 5, births are being delayed until later in life and the average woman is having fewer children than in previous decades.

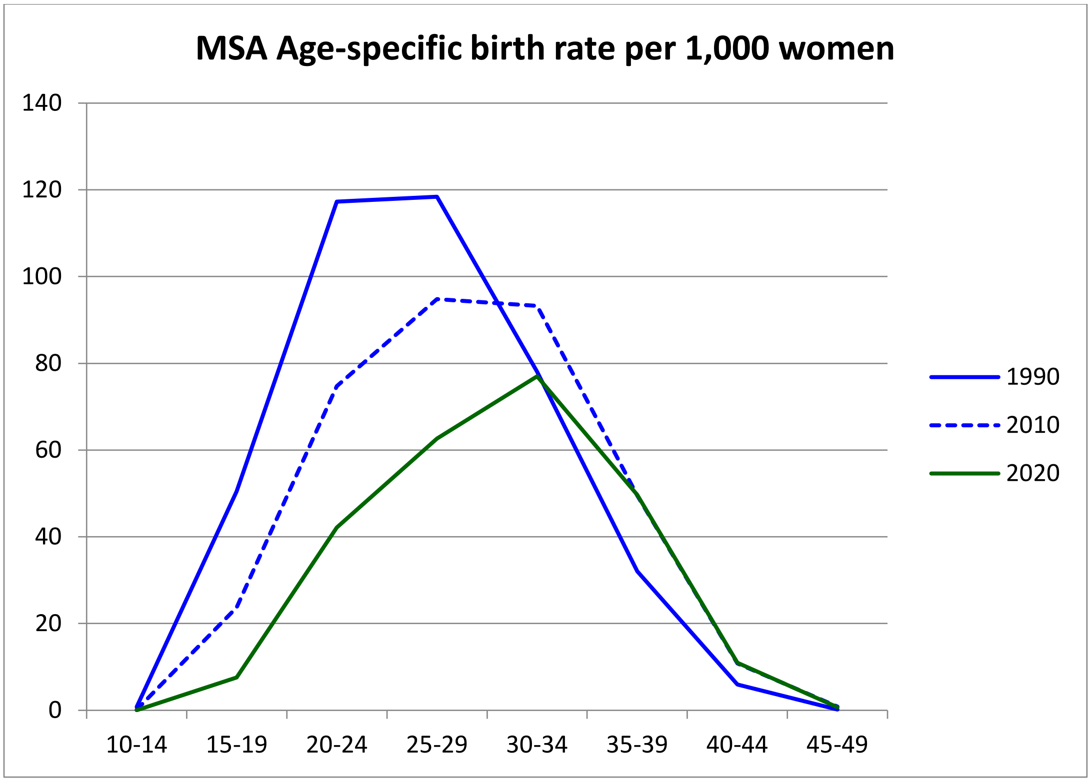


Figure 5: age-specific birth rates for the Portland MSA (source: U.S. Census)

Metro staff also presented total fertility rates for the MSA as depicted in Figure 6.

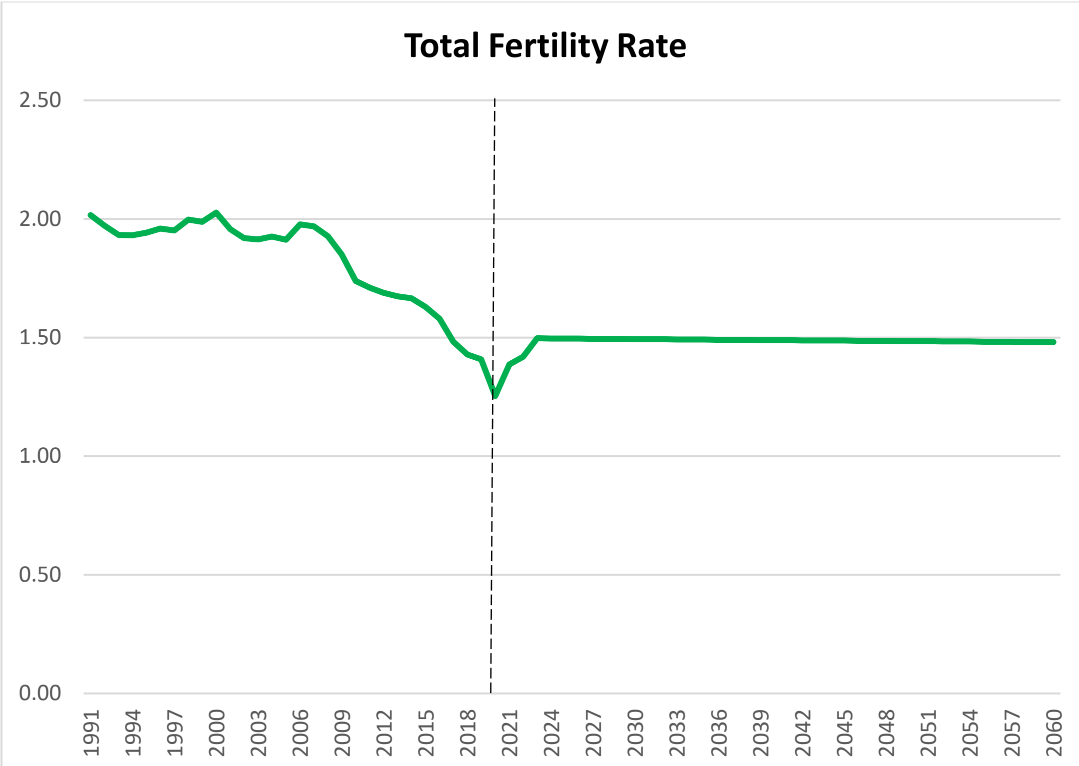


Figure 6: Portland MSA total fertility rate history and forecast (sources: PSU Population Research Center and Metro modeling)

Panelists from PSU's Population Research Center noted that Metro's forecast total fertility rate of 1.5 children per woman is slightly higher than PSU's forecasts for 1.4 children per woman. Metro will retain its assumption of 1.5 for the baseline forecast but will express a low and high forecast range to account for uncertainty around this and other assumptions.

Regional mortality assumptions

Though average life expectancy is expected to rise, the sheer number of people in the Baby Boomer generation will result in rising numbers of deaths in the region in coming years (despite living longer on average). See Figure 7. The peak circa 2020 is because of the pandemic.

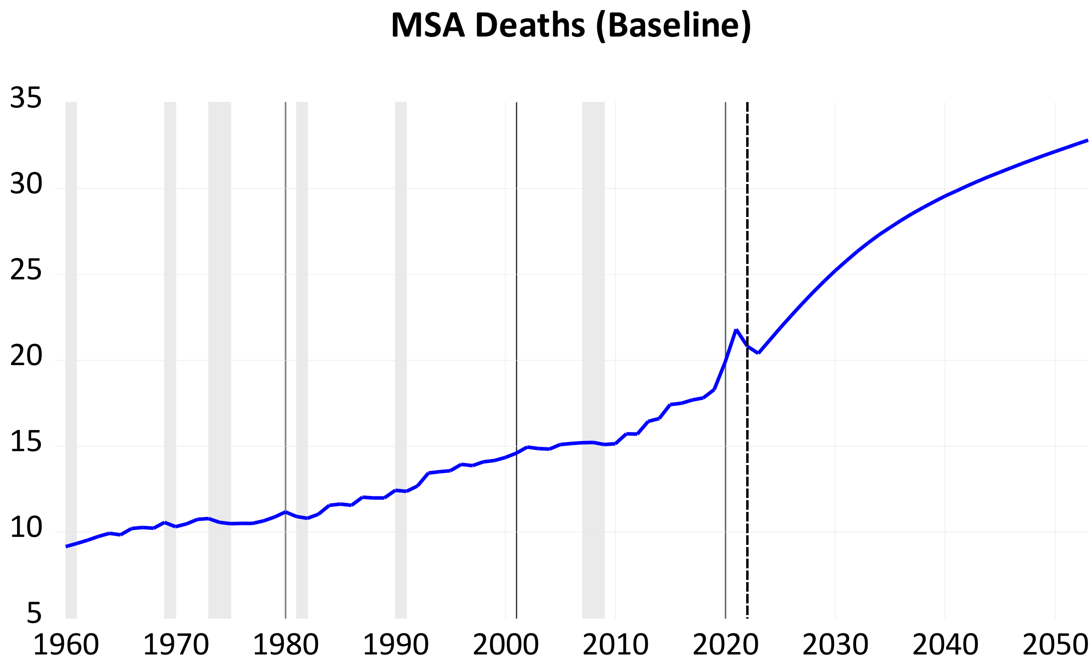


Figure 7: Annual deaths (in 1000s) for Portland MSA (Source: PSU Population Research Center)

Panel members asked whether Metro accounts for the age of people migrating in and out of the region. Metro staff indicated “yes,” that these data come from PSU and include the age of migrants.

Panelists asserted that migrants to the region tend to have better health than people born in the region and inquired whether different life expectancies are assumed for those born here vs. those that migrate here. Metro staff indicated that its forecast does not differentiate.

Panelists inquired whether the forecast includes mortality by race and ethnicity. Metro staff indicated that yes, this is calculated in a post-processor.

Natural change

Natural change is the net change in total population after accounting for births and deaths. As depicted in Figure 8, natural change in the region will be negative in about a decade when deaths outnumber births. The expert panel did not indicate any disagreement with these fundamental demographic trends. Negative natural change will leave net migration as the potential source of regional population growth.

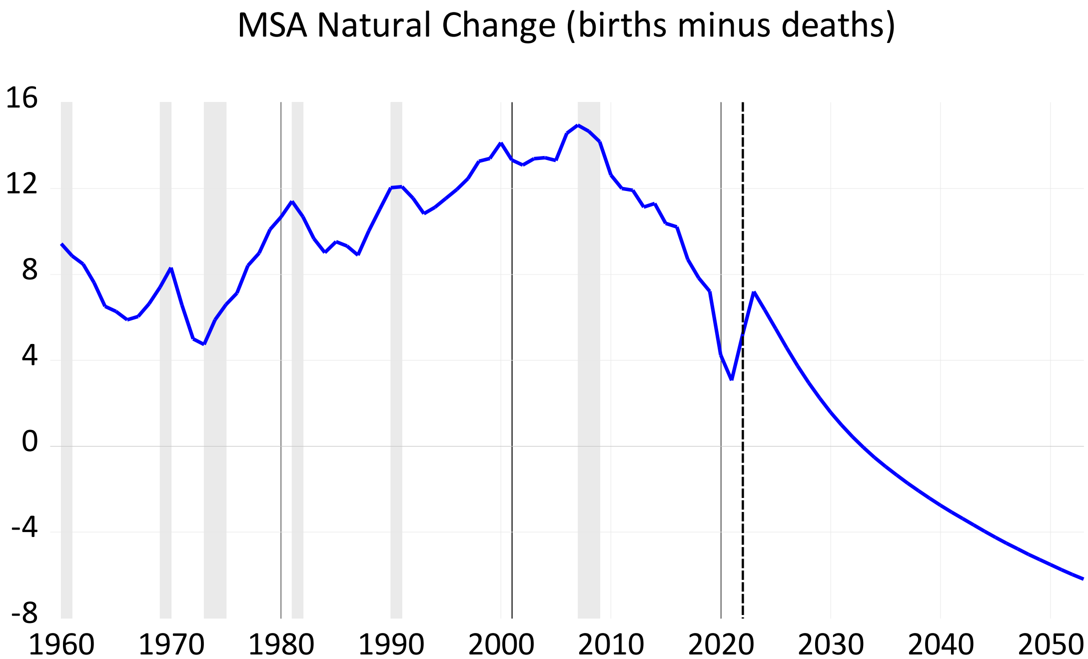


Figure 8: Natural change in the Portland MSA, 1000s of people per year (source: PSU Population Research Center)

Regional migration

Panelists discussed how migration into and out of the region is volatile and difficult to forecast. See Figure 9.

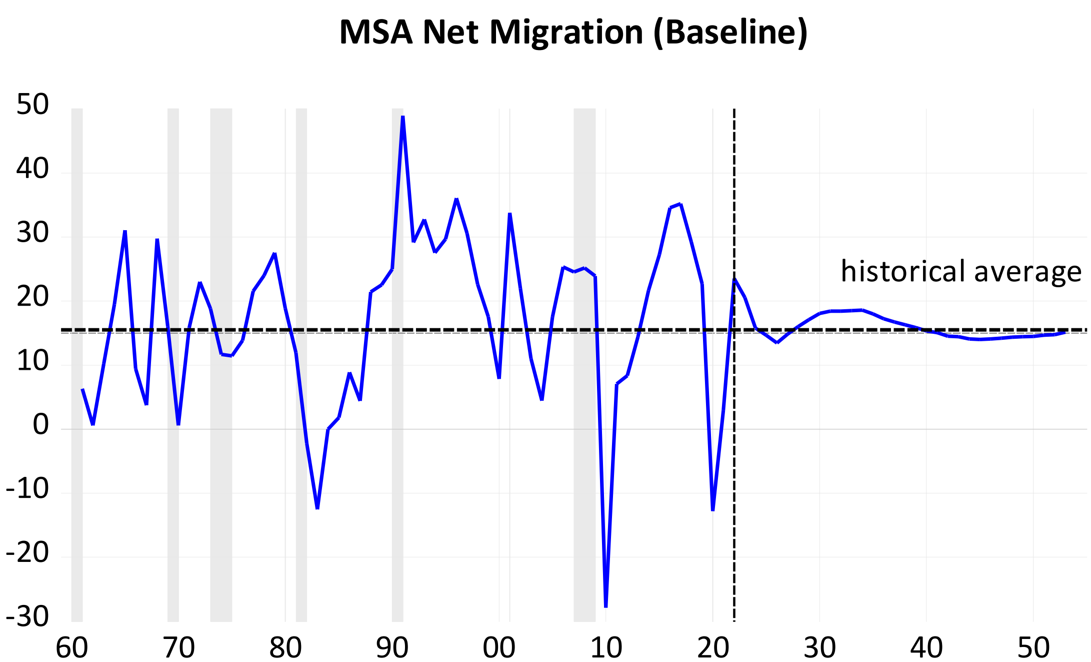


Figure 9: Portland MS net migration, 1000s per year (source: PSU Population Research Center)

Migration rates will determine regional population growth outcomes since natural increase will not be a long-term source of population growth. Panelists indicated that the persistence of remote work, quality of life concerns in downtowns, and cost of living on the West Coast potentially reduce the relative attractiveness of the region for migration, making it more challenging to forecast than before. Panelists indicated general agreement that using the long-term historic average of about 15,000 net migrants per year into the region seemed reasonable, but that staff should be clear about the uncertainty surrounding that assumption. The State of Oregon Office of Economic Analysis has recently published an analysis of a zero-migration scenario to assess the potential impacts of diminished net migration.

Staff indicated that this uncertainty is a reason why we utilize a range forecast. The preliminary, pre-peer-review range forecast is depicted in Figure 10. Negative net migration – as factored into the low forecast – would lead to regional population losses. The baseline forecast assumes a continuation of the historic average of net regional migration. The high forecast assumes increased net migration compared to historic averages (in addition to natural increase in population).

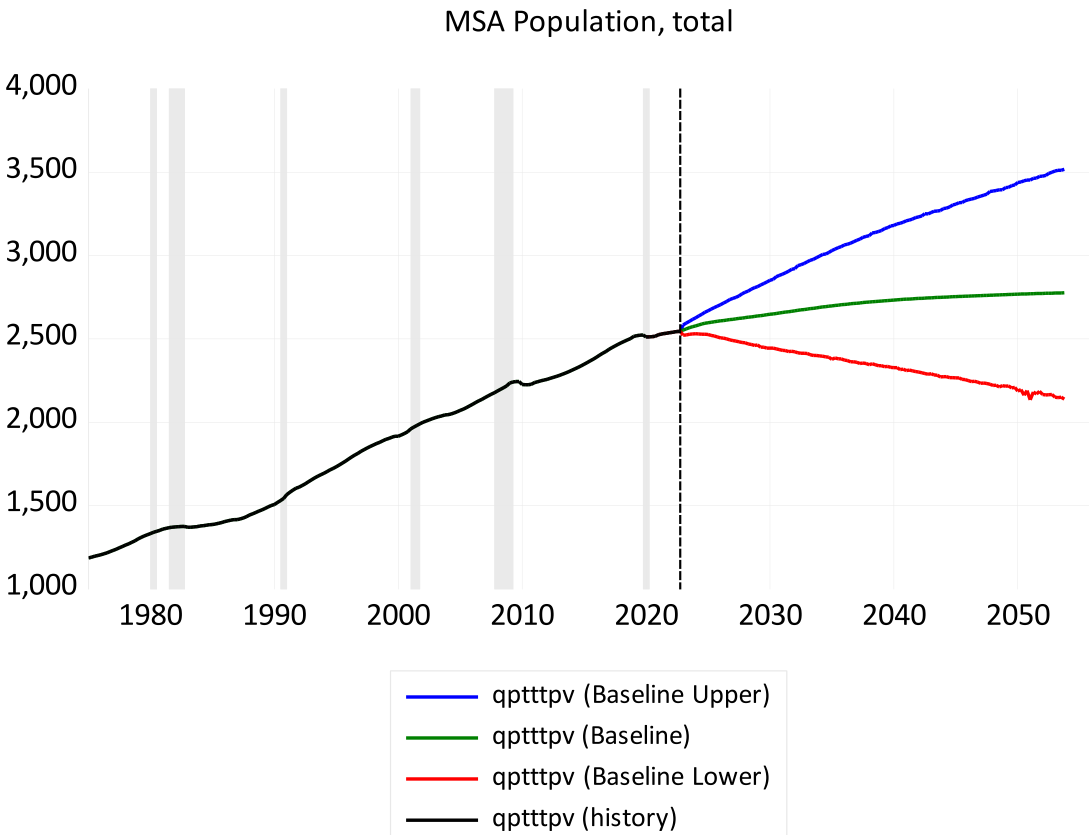


Figure 10: Portland MSA preliminary range forecast for population (in 1000s)

Housing prices and migration

Some have posited that relatively high housing costs on the west coast are one reason why migration to the region may slow down. Metro staff asked panelists a question that has been posed to them in other venues: could migration into the region be maintained by increasing housing production. The reasoning is that an increase in housing supply could moderate price increases, thereby inducing migration.

Staff's sense is that, while increased housing production should remain a goal for the nation, state, and region, it appears unlikely that it could be achieved at a scale that would give our region an affordability advantage relative to other regions. The scale of housing production needed to give our region that advantage would likely require that builders in the region build in a speculative fashion, beyond the point of profitability.

Panelists indicated that, under this theoretical construct of intense housing production, the type of housing that gets built would matter. Specifically, homes with more bedrooms would be needed to attract households with children to bolster population growth. Housing with this many bedrooms can be built as multifamily housing or middle housing, but in our region, it has more typically taken the form of single-family housing.

Related, household formation can happen even without population growth. For instance, a person who once lived with roommates may form their own one-person household. One and two-bedroom units accommodate those newly formed small households.

Climate-induced migration

Staff introduced the topic of climate-induced migration, noting that many believe that our region's temperate climate could attract migrants leaving unfavorable environmental conditions elsewhere (e.g., extreme heat, sea level rise, increased storm intensity). Panelists indicated that this may be true, but that there is no data trend to indicate that this has happened yet. Panelists cited a recent consumer preference survey in which just two percent of respondents indicated that climate change influenced their decision to move. The panel does not recommend explicitly factoring it into the population forecast at this time. This recommendation is consistent with a [2016 symposium on the topic].

Staff suggested that households may become more sensitive to climate risk if insurance companies raise rates for property owners in more vulnerable regions. Staff intends to continue monitoring this issue in future regional forecasts. Countervailing considerations include recent extreme heat in the Pacific Northwest and the increased prevalence of wildfire smoke.

Regional employment

Staff presented information about employment recovery from the 2020 pandemic recession. As shown in Figure 11, non-manufacturing employment in the region has fully recovered, but manufacturing employment has not (see Figure 12).

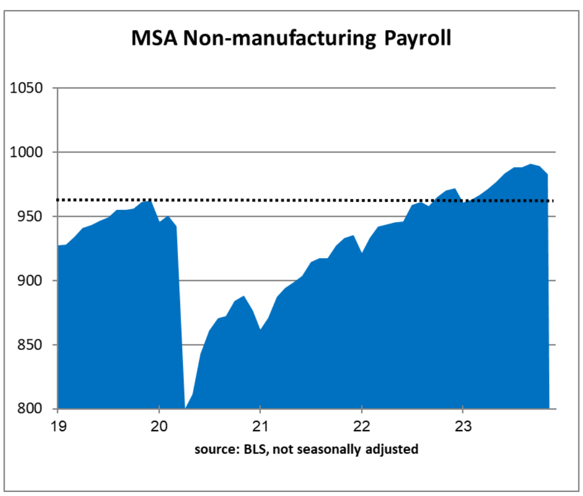


Figure 11: non-manufacturing employment in 1000s of jobs in the Portland MSA, 2019-2024 (source: Bureau of Labor Statistics)

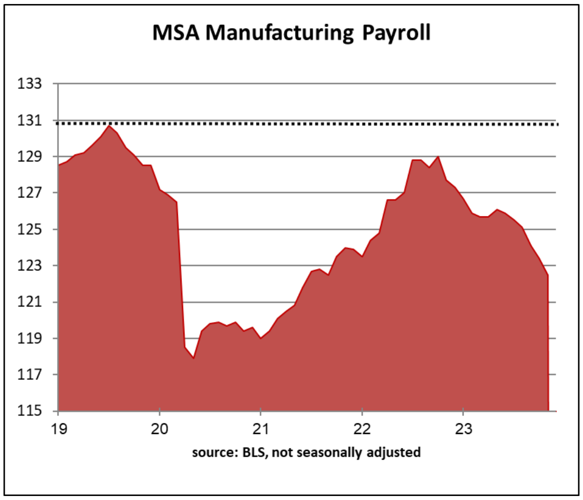


Figure 12: manufacturing employment in 1000s of jobs in the Portland MSA, 2019-2024 (source: Bureau of Labor Statistics)

Moving forward from recent history, Metro staff indicated that they believe that future employment growth rates will track closely with population growth rates, with both at 0.4 percent annual average growth. Staff presented the employment range forecast for the MSA as depicted in Figure 13.

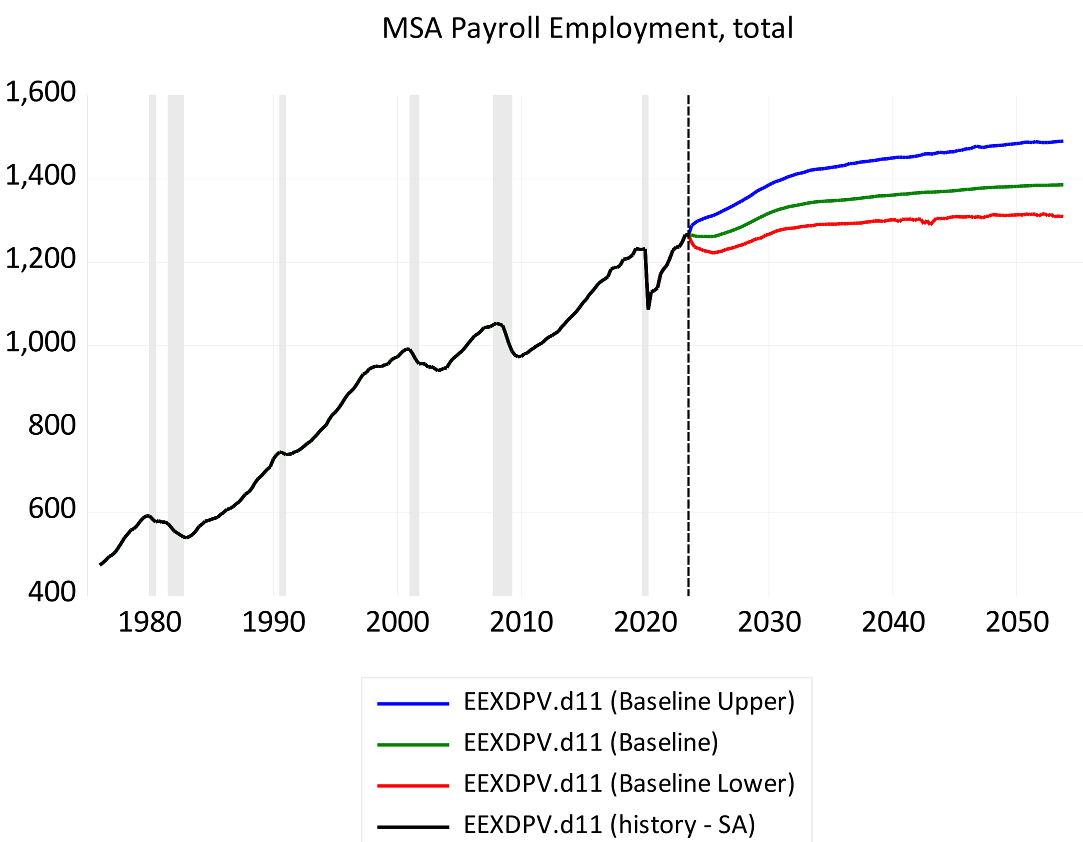


Figure 13: employment history and range forecast for the Portland MSA in 1000s of jobs

Panelists felt that Metro's preliminary employment forecast looked right in total, but that it was too optimistic about manufacturing employment (see Figure 14) and the employment impacts of the CHIPS

Act on computer and electronics manufacturing and fabrication of metal sectors as depicted in Figure 15 and Figure 16.

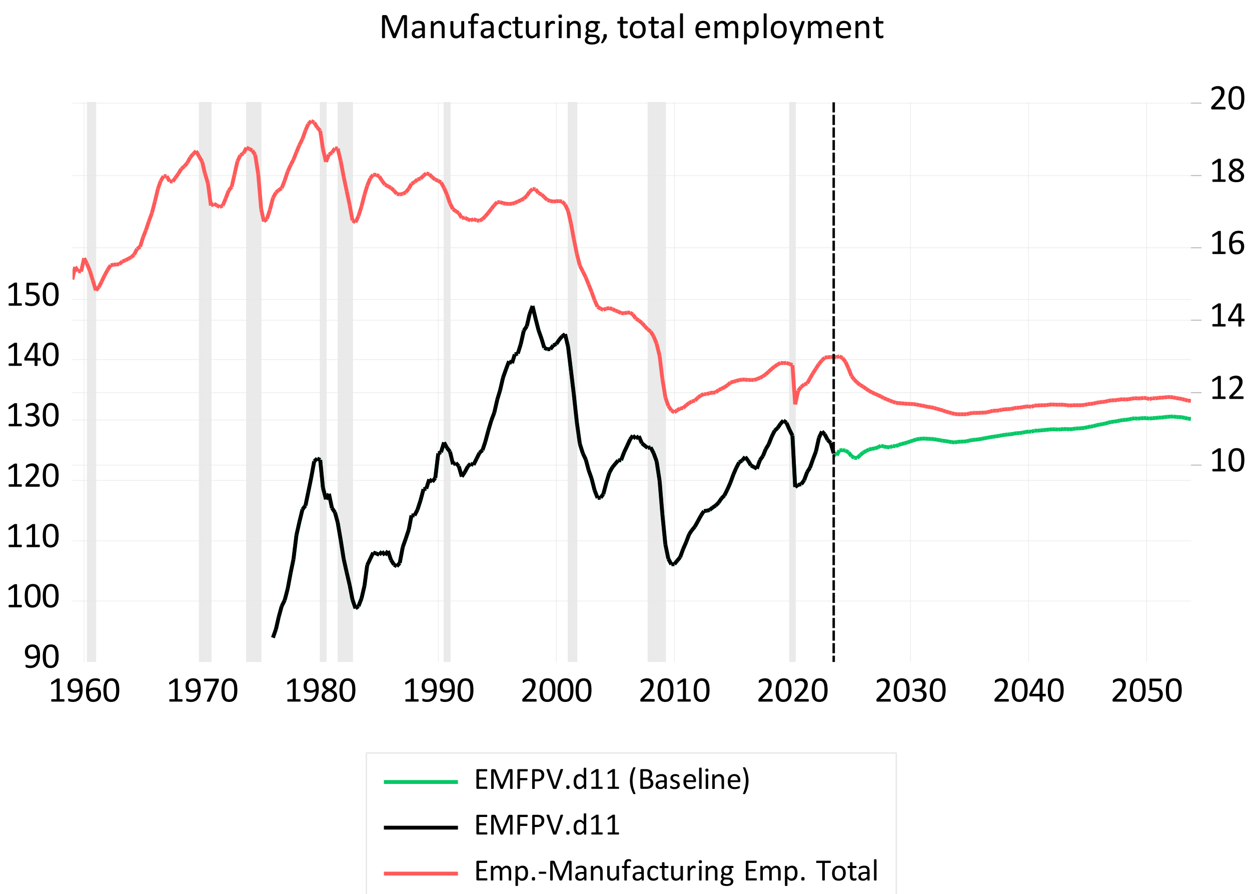


Figure 14: manufacturing employment history and forecast in 1000s of jobs for the Portland MSA (black and green lines) and the U.S. (red line)

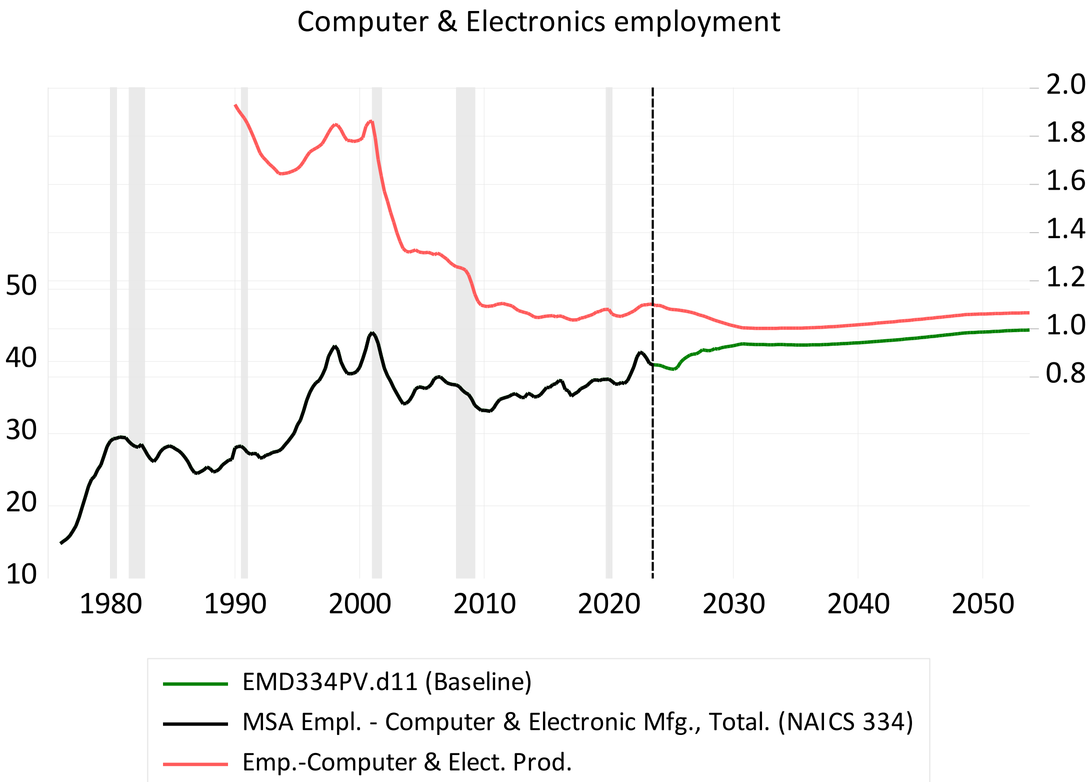


Figure 15: computer and electronics employment; red is U.S.; black is MSA history; green is MSA baseline forecast (in 1000s of jobs)

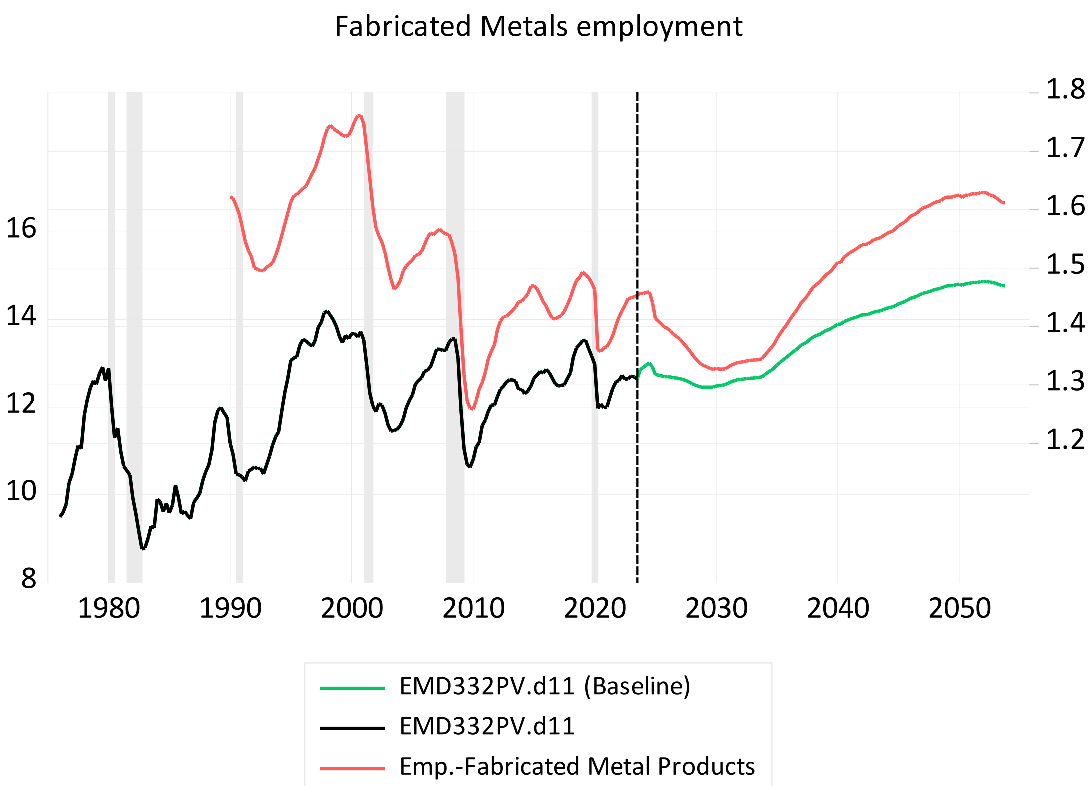


Figure 16: fabricated metals employment; red is U.S.; black is MSA history; green is MSA baseline forecast (in 1000s of jobs)

Panelists noted that Metro "would have to be really confident in the CHIPS Act" to forecast growth as shown in Figure 15 and Figure 16 and that "manufacturing does not seem like the most likely sector for employment growth." Panelists indicated that Metro's forecast for manufacturing carried "too much long-term momentum from the one-time shock of the CHIPS Act" and that, while there may be a short-term bump in high-tech manufacturing, it will be relatively small in the context of overall employment. In summary, panelists indicated that the CHIPS Act is best thought of as preventing manufacturing job losses that would likely otherwise occur over the next decade. Panelists further noted that the statewide forecast show a decline in metal fabrication.

Longer term (past 10 years), panelists believe there is too much uncertainty around technological changes, automation, and productivity to be confident in sustained high-tech manufacturing employment growth when the historic trend would indicate otherwise.[1]

In response, Metro staff will adjust the computer and electronics and metal fabrication sector forecasts downward slightly. The result is that computer and electronics manufacturing employment– after an initial increase—will be at roughly year 2022 levels by the end of the forecast period in 2044. Metal fabrication will be at roughly pre-pandemic levels by 2044.

Panelists inquired whether the first ten years or the end point (year 2044) that matters for the growth management decision. Staff indicated that the land need analysis looks at the 20-year timeframe that

[1] As depicted in Figure 14, today in the Portland MSA, there are about 85 percent the number of manufacturing jobs that there were in 1998.

begins in 2024 and ends in 2044. Panelists reiterated their view that the longer-term outlook for manufacturing employment is flat at best.

Regarding other employment sectors depicted in Figure 17, panelists discussed the following, but did not indicate any disagreement:

- The high growth rate depicted in the natural resources (mining and logging) sector is because of its small size (i.e., small increases in absolute numbers result in big growth rates).
- The computer and electronic manufacturing sector is expected to grow slower (flat growth) than in the past.
- There will be a notable decline in the transportation and warehousing sector (U.S. and Portland MSA) after a decade of steep growth.
- Drivers for state and local government sector growth:
    - Slowing population growth will really impact this sector
    - However, positive tax collections and budget can drive this sector forward too
- Range forecast – in the past, the Metro Council has adopted the baseline (most likely) forecast.

Industry Name by NAICS	APR%: History 1976-2022	ST 2022-32	LT 2022-45
Total Nonfarm Payroll	2.1%	0.9%	0.5%
Manufacturing, total	0.6%	0.0%	0.1%
Durable MF, total	0.7%	0.0%	0.1%
Lumber products	-1.9%	-1.3%	-1.1%
Primary metals	-0.1%	-0.6%	-0.7%
Fabricated metals	0.6%	0.0%	0.6%
Machinery	0.4%	-1.5%	-0.6%
Computer & Electronics	2.1%	0.4%	0.3%
Transportation Equipment	-0.4%	-1.9%	-1.5%
Other Durable MF	0.8%	0.9%	0.5%
Non-durable MF, total	0.2%	0.0%	0.0%
Food processing	1.0%	0.0%	0.0%
Paper products	-2.1%	-1.5%	-1.4%
Other Non-durable MF	0.3%	0.1%	0.3%
Private Non-manufacturing, total	2.5%	1.0%	0.6%
Natural resources	-0.9%	4.8%	1.7%
Construction	2.9%	2.4%	1.2%
Wholesale trade	1.4%	0.5%	0.3%
Retail trade	1.5%	0.5%	0.6%
Transportation, Warehousing & Utilities	2.1%	-1.1%	-1.4%
Info - Publishing	3.5%	1.6%	0.0%
Info - Internet	0.8%	1.2%	0.4%
Finance & Insurance	1.5%	1.3%	1.1%
Real Estate	2.6%	0.4%	-0.2%
Pro., Sci., Tech. services	3.9%	0.6%	0.5%
Mgmt. of Companies	4.2%	0.8%	0.3%
Admin. & Waste Mgmt. Services	3.5%	1.4%	1.2%
Education	3.6%	1.2%	-0.1%
Health care	3.3%	1.4%	0.9%
Leisure	2.3%	3.1%	2.0%
Hospitality	2.5%	0.9%	0.3%
Other services	2.3%	1.5%	1.0%
Government, total	1.4%	1.0%	0.3%
Federal gov.	0.3%	0.4%	0.2%
State & Local gov.	1.5%	1.1%	0.4%

Figure 17: Employment growth rates by sector in the Portland MSA, history and forecast

<u>Work from home and office vacancies</u>

Staff presented a comparison of work from home trends in several metropolitan areas (Figure 18). Staff noted that this topic was somewhat outside of the regional forecast review scope, but that our growth management assessment will need to account for changes in demand for commercial office space. Panelists correctly noted that survey respondents may in fact be working in the office some days but reported that they primarily work remotely. Panelists also noted that work from home shares may decrease somewhat if the labor market loosens (i.e., employers have more bargaining power over working conditions). Staff will strive to account for these considerations as they estimate commercial office demand.

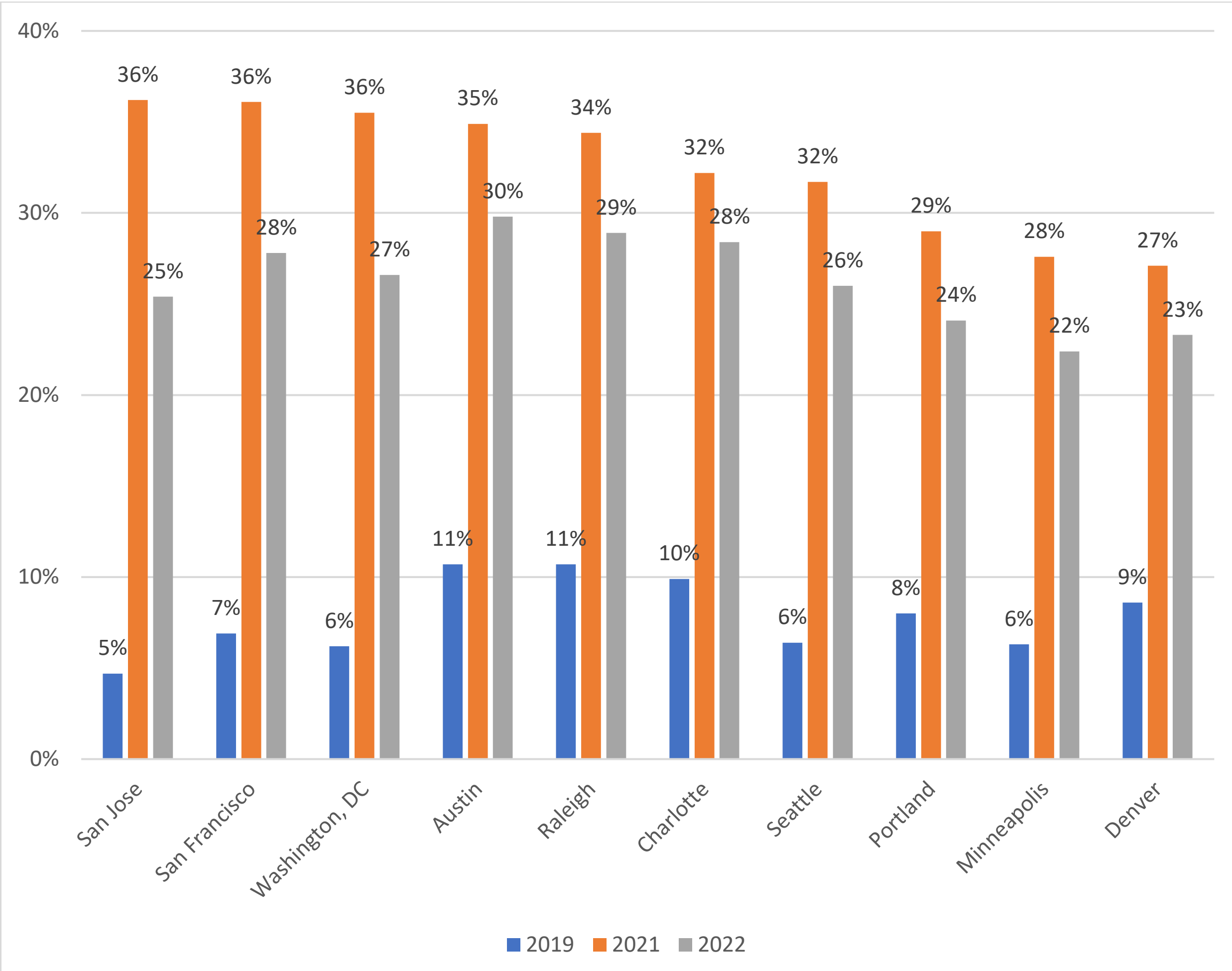


Figure 18: comparison of shares of all workers in different MSAs reporting that they primarily work from home (source ACS)

<u>Office vacancies</u>

As with work from home trends, staff introduced the topic of office vacancies as potentially being outside of the panels' area of expertise. However, staff is interested in whether we need to consider office vacancies as a source of growth capacity (we have not in the past, instead focusing on vacant land or redevelopment of existing structures). Metro staff believes that vacancies will reset in the next couple years or so and will likely not be a long-term capacity consideration.

APPENDIX 2 – 2024 BUILDABLE LAND INVENTORY (BLI) AND CAPACITY ESTIMATES

Introduction

This appendix presents the *draft* data in the 2024 Buildable Land Inventory (BLI). This 2024 BLI draft provides a range of potential future scenarios acknowledging the uncertainty in future markets for development capacity. Indeed, the BLI should be considered a forecast in its own right given that uncertainty. Capacity estimates explore a combination of difference scenarios for both vacant and redevelopable land. Additionally, there are several expansion areas added to the UGB in the last several years that are currently in various stages of being made ready for development. In some cases, (i.e. River Terrace 2.0 and Cooper Mountain) urban level zoning do not exist in these areas, so the BLI relies on anticipated capacity from concept plans submitted when areas were added to the Urban Growth Boundary (UGB). In other areas (Witch Hazell Village, South Hillsboro, Frog Pond) master planning is far enough along as to have solid unit estimates. This category also includes estimates for known development sites which override the model estimates.

Local Review

All cities and counties in the region were given several opportunities to review preliminary versions of this data. This draft incorporates edits submitted by the local jurisdictions as a result of their review. Review opportunities were provided to local jurisdictions:

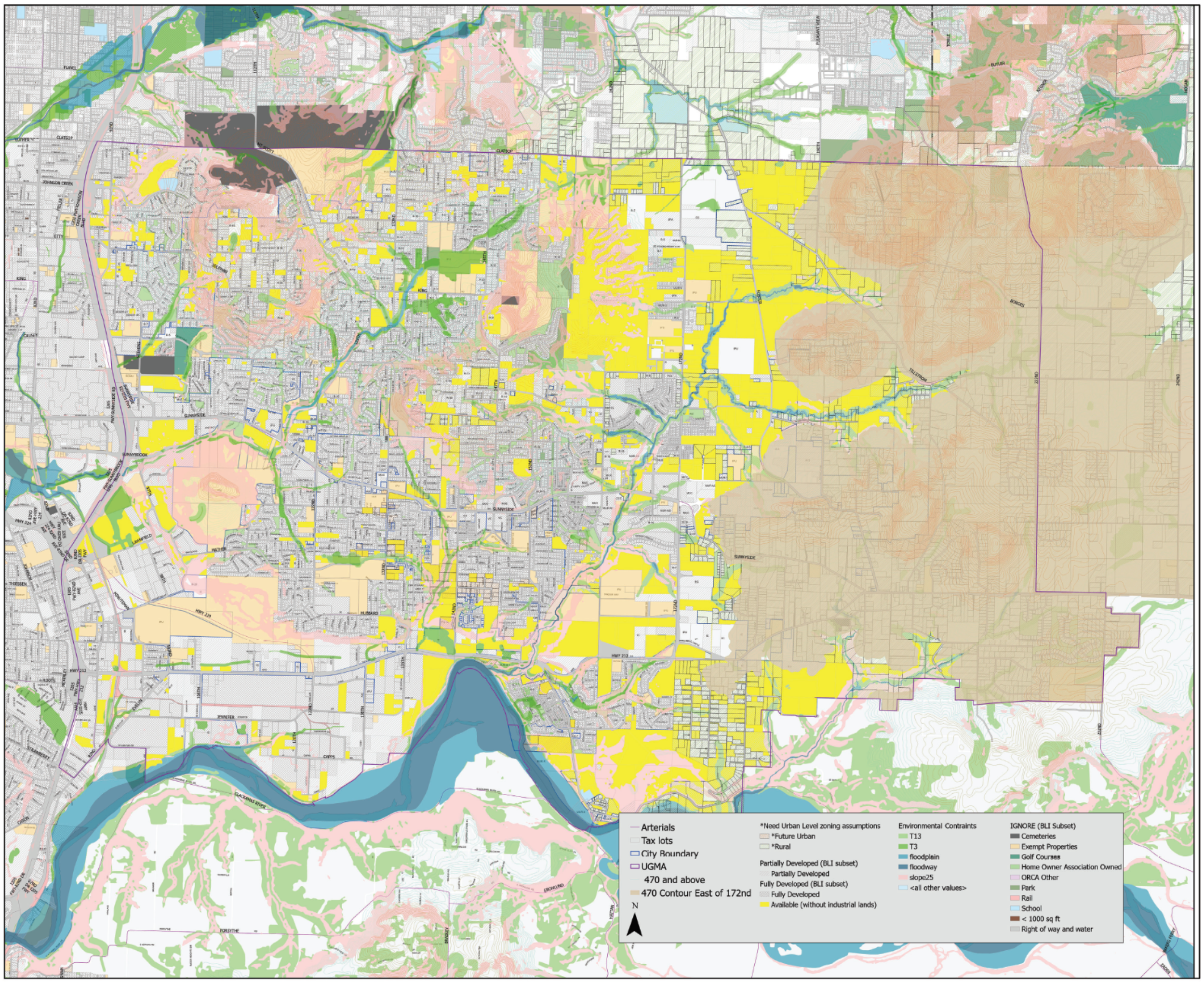
1. After refreshing Metro's regional zoning classifications
2. The taxlot base GIS layer was provided to verify development status, proper zoning assumptions and removal of constraints
3. After the preliminary capacity model runs.
4. After revised model runs.

Damascus BLI Note

Since the last UGR, the City of Happy Valley has committed to eastward expansion into the former City of Damascus. Due to challenges providing urban level utility services, Happy Valley can only commit to developing to the 470-foot elevation contour, a limit set by the Sunrise Water Authority. All other areas to the east are assumed to have rural level zoning in the 20-year timeframe. While those areas contain buildable lands, Metro has not calculated urban growth capacity in those areas to the east.

Map 1, next page, illustrates the foreseeable limits to urban level zoning east of Happy Valley (provided by City of Happy Valley).

Map 1: Limit of development potential in the former City of Damascus area



Tables

- Residential BLI – Vacant land scenarios
- Residential BLI – Redevelopment land scenarios
- Residential BLI – New urban and other planned developments
- Employment BLI

Maps

- Vacant Residential - Expected Density Method, Heavy Middle Housing Mix
- Vacant Residential - Expected Density Method, Heavy Single Family Housing Mix
- Residential Redevelopment – Pro Forma Method, Baseline Scenario
- Residential Redevelopment – Pro Forma Method, Market Recovery Scenario
- Residential Redevelopment – Pro Forma Method, Market Erosion Scenario
- Vacant Employment
- Infill Employment (Land Banked) Map
- Redevelopable Employment Map
- New Urban and Other Planned Development Map

2024 Buildable Lands Inventory Housing Units

Residential Vacant Land Capacity

Expected Density Method - Heavy Middle Housing Mix

Row Labels	Single Family Detached	Middle Housing	Multi-family	Total
BEAVERTON	1,660	2,312	8,283	12,255
CORNELIUS	43	186	557	786
DURHAM	14	20	-	34
FAIRVIEW	101	157	426	683
FOREST GROVE	751	1,460	749	2,959
GLADSTONE	23	30	31	83
GRESHAM	2,050	2,514	881	5,445
HAPPY VALLEY	3,354	5,120	3,378	11,852
HILLSBORO	1,555	2,438	4,077	8,070
JOHNSON CITY	-	-	-	-
KING CITY	5	5	-	9
LAKE OSWEGO	236	365	676	1,277
MAYWOOD PARK	1	1	-	2
MILWAUKIE	442	274	373	1,088
OREGON CITY	2,181	2,348	769	5,298
PORTLAND	3,044	3,496	12,513	19,052
RIVERGROVE	7	11	-	18
SHERWOOD	250	480	187	916
TIGARD	1,823	840	3,413	6,076
TROUTDALE	422	520	62	1,003
TUALATIN	14	82	98	194
UNINCORP CLACKAMAS CO	3,249	4,688	1,538	9,475
UNINCORP MULTNOMAH CO	489	735	24	1,248
UNINCORP WASHINGTON CO	3,785	4,299	772	8,856
WEST LINN	318	543	125	986
WILSONVILLE	359	422	576	1,357
WOOD VILLAGE	24	142	117	282
Grand Total	**26,197**	**33,486**	**39,621**	**99,304**
Percent of Total	26%	34%	40%	100%

Expected Density Method - Heavy SFR Mix

Row Labels	Single Family Detached	Middle Housing	Multi-family	Total
BEAVERTON	1,952	1,818	8,668	12,438
CORNELIUS	50	173	557	779
DURHAM	16	4	-	20
FAIRVIEW	120	47	426	592
FOREST GROVE	931	760	749	2,440
GLADSTONE	26	14	31	71
GRESHAM	2,548	940	881	4,369
HAPPY VALLEY	4,106	1,369	3,378	8,853
HILLSBORO	1,832	1,356	4,077	7,265
JOHNSON CITY	-	-	-	-
KING CITY	6	1	-	7
LAKE OSWEGO	289	96	676	1,061
MAYWOOD PARK	-	-	-	-
MILWAUKIE	516	142	767	1,424
OREGON CITY	2,607	1,056	769	4,432
PORTLAND	3,977	825	14,860	19,662
RIVERGROVE	13	3	-	16
SHERWOOD	312	249	187	748
TIGARD	2,096	292	3,413	5,801
TROUTDALE	533	130	62	725
TUALATIN	16	66	98	180
UNINCORP CLACKAMAS CO	4,276	1,398	1,538	7,212
UNINCORP MULTNOMAH CO	626	162	24	813
UNINCORP WASHINGTON CO	7,128	1,846	995	9,968
WEST LINN	399	214	125	738
WILSONVILLE	540	154	576	1,270
WOOD VILLAGE	28	113	117	258
Grand Total	**34,944**	**13,228**	**42,970**	**91,142**
Percent of Total	35%	13%	43%	92%

2024 Buildable Lands Inventory Housing Units

Redevelopment Scenarios

Baseline Scenario

Jurisdiction	Single Family Detached	Middle Housing	Multi-family	Total
BEAVERTON	2	87	1,504	1,593
CORNELIUS		39	222	261
DURHAM		35	4	39
FAIRVIEW		2	60	62
FOREST GROVE		124	585	709
GLADSTONE		21	2	24
GRESHAM		1,328	2,019	3,346
HAPPY VALLEY	-	1,231	1,578	2,809
HILLSBORO	4	1,596	1,149	2,749
JOHNSON CITY			0	0
KING CITY		0	0	1
LAKE OSWEGO	2,654	61	498	3,213
MAYWOOD PARK		-		-
MILWAUKIE	124	434	516	1,073
OREGON CITY		580	723	1,302
PORTLAND	5,957	812	11,734	18,503
RIVERGROVE	4	8		12
SHERWOOD		782	638	1,420
TIGARD	0	118	872	990
TROUTDALE	3	5	16	23
TUALATIN	7	126	286	418
UNINCORP CLACKAMAS CO	1,027	2,345	1,102	4,474
UNINCORP MULTNOMAH CO	1,489	16	-	1,505
UNINCORP WASHINGTON CO	855	1,291	688	2,835
WEST LINN	2	643	147	792
WILSONVILLE	166	43	19	228
WOOD VILLAGE		0	20	20
Grand Total	**12,292**	**11,727**	**24,382**	**48,400**
Percent of Total	25%	24%	50%	100%

Market Recovery Scenario

Jurisdiction	Single Family Detached	Middle Housing	Multi-family	Total
BEAVERTON	9	202	2,123	2,334
CORNELIUS		88	318	406
DURHAM		59	4	63
FAIRVIEW		9	155	164
FOREST GROVE		314	921	1,236
GLADSTONE		22	22	43
GRESHAM		2,131	2,841	4,972
HAPPY VALLEY	-	2,439	1,766	4,206
HILLSBORO	4	2,398	1,466	3,869
JOHNSON CITY			24	24
KING CITY		1	1	2
LAKE OSWEGO	3,159	61	586	3,807
MAYWOOD PARK		0		0
MILWAUKIE	127	707	609	1,443
OREGON CITY		1,043	928	1,971
PORTLAND	8,112	1,168	20,159	29,439
RIVERGROVE	12	8		20
SHERWOOD		925	739	1,663
TIGARD	26	320	1,151	1,497
TROUTDALE	11	10	45	66
TUALATIN	14	201	370	585
UNINCORP CLACKAMAS CO	1,304	3,593	1,763	6,660
UNINCORP MULTNOMAH CO	1,626	68	-	1,694
UNINCORP WASHINGTON CO	1,531	2,182	1,084	4,796
WEST LINN	7	946	204	1,157
WILSONVILLE	231	56	41	329
WOOD VILLAGE		0	75	75
Grand Total	**16,175**	**18,951**	**37,397**	**72,522**
Percent of Total	22%	26%	52%	100%

Market Erosion Scenario

Jurisdiction	Single Family Detached	Middle Housing	Multi-family	Total
BEAVERTON	-	42	815	858
CORNELIUS		6	135	141
DURHAM		11	1	13
FAIRVIEW		1	0	1
FOREST GROVE		55	276	331
GLADSTONE		-		-
GRESHAM		678	1,144	1,822
HAPPY VALLEY	-	417	1,139	1,556
HILLSBORO	1	892	809	1,702
JOHNSON CITY		-		-
KING CITY		0	-	0
LAKE OSWEGO	2,098	55	328	2,480
MAYWOOD PARK		-		-
MILWAUKIE	120	230	386	736
OREGON CITY		233	395	629
PORTLAND	4,122	453	6,110	10,685
RIVERGROVE	1	5		5
SHERWOOD		653	510	1,163
TIGARD		48	582	630
TROUTDALE	-	0	-	0
TUALATIN	3	73	222	298
UNINCORP CLACKAMAS CO	749	1,506	623	2,877
UNINCORP MULTNOMAH CO	1,358	10	-	1,368
UNINCORP WASHINGTON CO	424	605	357	1,386
WEST LINN	0	375	106	481
WILSONVILLE	102	11	11	125
WOOD VILLAGE		0	-	0
Grand Total	**8,978**	**6,360**	**13,950**	**29,288**
Percent of Total	31%	22%	48%	100%

SCENARIOS	
Market Recovery	ELEVATED PRICING
	- Residential pricing elevated 5% for all parcels
Market Erosion	DEPRESSED PRICING
	- Residential pricing decreased 5% for all parcels

2024 Buildable Lands Inventory Housing Units

New Urban and Other Planned Developments

New Urban Areas

Concept Plan Area	Single Family Detached	Middle Housing	Multi-family	Total	Planning Jurisdiction	Current Jurisdiction
North Cooper Mt	255	45	-	300	Beaverton	WashCo
Cooper Mt.	2,200	1,450	1,350	5,000	Beaverton	WashCo
Kingston Terrace	1,788	572	1,216	3,576	King City	WashCo
River Terrace 2.0a	546	1,775	410	2,731	Tigard	WashCo
River Terrace 2.0b	362	1,177	272	1,810	Tigard	WashCo
Frog Pond South	224	249	25	498	Wilsonville	WashCo
Frog Pond East	436	381	272	1,089	Wilsonville	WashCo
Frog Pond Ridge	63	8	-	71	Wilsonville	Wilsonville
Frog Pond Crossing	29	-	-	29	Wilsonville	Wilsonville
Frog Pond Oaks	41	-	-	41	Wilsonville	Wilsonville
Frog Pond Vista	41	-	-	41	Wilsonville	Wilsonville
Frog Pond Estates	17	-	-	17	Wilsonville	Wilsonville
Frog Pond Other	299	21	-	320	Wilsonville	WashCo
Clermont Wilsonville	89	-	-	89	Wilsonville	Wilsonville
Total	**6,390**	**5,678**	**3,544**	**15,612**		
Percent of Total	41%	37%	23%	100%		

Other Planned Development*

Plan/Area Name	Single Family Detached	Middle Housing	Multi-family	Total	Planning Jurisdiction	Current Jurisdiction
	36			36	Durham	Durham
	300	50		350	Cornelius	Cornelius
	141	80		221	Forest Grove	Forest Grove
	133	32		165	Forest Grove	Forest Grove
	123	62	348	533	Beaverton	WashCo
	118			118	Forest Grove	WashCo
	93			93	Forest Grove	WashCo
Alpenrose	135	172		307	Portland	Portland
Pop Blocks			1,130	1,130	Portland	Portland
Lloyd District			5,000	5,000	Portland	Portland
OMSI District			1,200	1,200	Portland	Portland
Broadway Corridor			2,500	2,500	Portland	Portland
South Hillsboro Area	1,122	578	-	1,700	Hillsboro	WashCo
Witch Hazel Village S	640	182	246	1,068	Hillsboro	WashCo
Total	**2,841**	**1,156**	**10,424**	**14,421**		
Percent of Total	20%	8%	72%	100%		

*Projects in the approval stages that bypassed modeling due to known unit quantities

Total New Urban and Planned

	Single Family Detached	Middle Housing	Multi-family	Total
Total	**9,231**	**6,834**	**13,968**	**30,033**
Percent of Total	31%	23%	47%	100%

Housing type split based on concept plans and/or feedback from local staff

2024 Buildable Lands Inventory

Employment Acres Summary

	Commercial Acres						Industrial Acres					
Jurisdiction	Vacant	MUR Vacant	Infill	Redevelopment	New urban and planned	Total Commercial	Vacant	Infill	Redevelopment	New urban and planned	Total Industrial	Total Employment
BEAVERTON	3.8	2.3	3.4	8.9	-	18.5	9.7	6.5	2.3	-	18.4	36.9
CORNELIUS	6.5	0.1	6.3	-	-	12.9	17.6	4.6	-	-	22.2	35.1
DURHAM	-	-	-	-	-	-	0.8	-	-	-	0.8	0.8
FAIRVIEW	0.4	10.6	-	-	-	11.0	90.3	30.5	2.3	-	123.2	134.1
FOREST GROVE	-	8.5	-	-	-	8.5	77.8	124.2	-	-	202.0	210.5
GLADSTONE	0.5	-	-	0.2	-	0.7	0.6	47.3	-	-	47.9	48.5
GRESHAM	4.9	53.9	1.0	-	-	59.8	197.9	309.6	12.5	-	520.0	579.8
HAPPY VALLEY	0.0	16.3	-	0.0	-	16.4	213.0	102.7	0.6	-	316.3	332.7
HILLSBORO	15.3	5.8	6.7	8.1	-	35.8	310.3	498.8	6.0	-	815.1	850.9
JOHNSON CITY	-	-	-	-	-	-	-	-	-	-	-	-
KING CITY	-	-	3.6	0.5	-	4.1	-	-	-	-	-	4.1
LAKE OSWEGO	-	1.3	-	0.0	-	1.3	-	-	-	-	-	1.3
MAYWOOD PARK	-	-	-	-	-	-	-	-	-	-	-	-
MILWAUKIE	0.1	0.3	-	0.0	-	0.4	0.9	9.7	0.7	-	11.3	11.7
OREGON CITY	0.4	10.3	10.8	0.7	-	22.2	29.1	58.7	1.8	-	89.6	111.8
PORTLAND	1.8	26.9	4.4	1.2	-	34.4	558.9	497.1	1.4	65.0	1,122.4	1,156.7
RIVERGROVE	-	-	-	-	-	-	-	-	-	-	-	-
SHERWOOD	4.2	0.3	8.4	1.0	-	13.9	47.9	50.1	3.8	-	101.9	115.8
TIGARD	2.6	1.5	21.0	13.1	-	38.2	15.3	8.8	5.1	-	29.2	67.4
TROUTDALE	43.9	4.7	9.7	-	-	58.3	161.9	58.5	0.3	-	220.7	279.0
TUALATIN	10.6	0.0	5.9	5.3	-	21.8	124.9	115.3	10.2	-	250.4	272.2
UNINC-CLACK	0.6	6.2	4.5	0.1	4.9	16.3	57.0	163.5	3.5	-	224.0	240.3
UNINC-WASH	7.7	2.0	35.6	-	28.0	73.2	4.3	334.8	(1.5)	-	337.7	410.9
UNINC-MULT	6.7	0.5	25.7	4.7	-	37.5	589.5	718.6	9.2	-	1,317.3	1,354.8
WEST LINN	-	0.4	-	0.1	-	0.5	3.7	1.2	1.0	-	6.0	6.5
WILSONVILLE	4.0	0.5	-	2.1	-	6.6	59.6	99.0	(0.5)	-	158.2	164.8
WOOD VILLAGE	-	21.4	-	-	-	21.4	3.1	5.0	0.0	-	8.2	29.6
Total	**114.0**	**173.9**	**146.8**	**46.0**	**32.9**	**513.6**	**2,574.3**	**3,244.8**	**58.6**	**65.0**	**5,942.8**	**6,456.4**
Percent Total	22%	34%	29%	9%	6%		43%	55%	1%	1%		

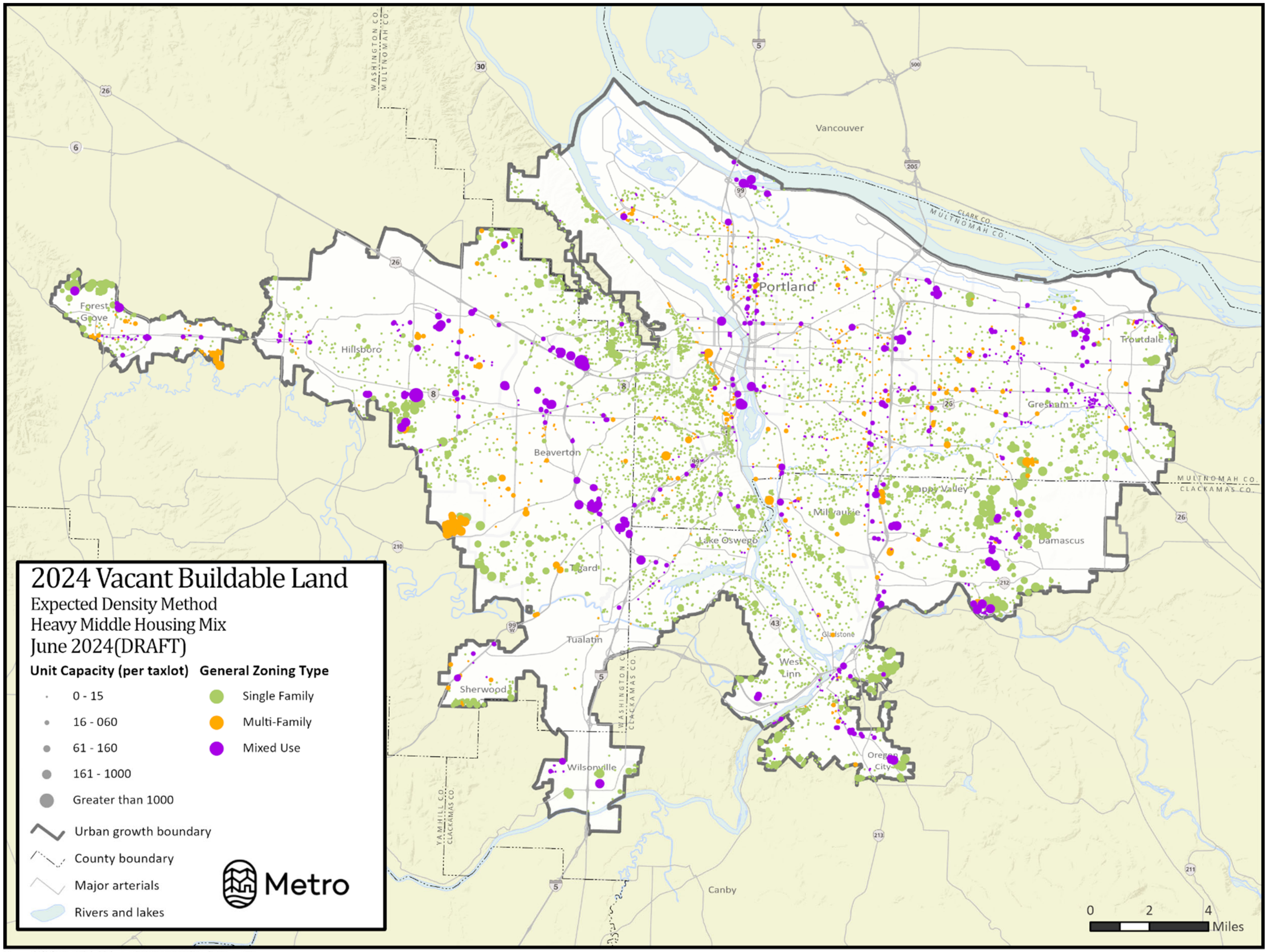
New urban and planned Employment Acres

Development	Acres	Type
Frog Pond East	4.9	Mixed Use (commercial)
River Terrace 2.0	28.0	Mixed Use (commercial)
Riverside Golf	65.0	Industrial

Conversions and accessory dwelling units (ADUs)

	Baseline	Low	High	Housing Type
Office-to-residential conversions	1,000	250	1,500	Multifamily
ADUs and internal conversions	8,692	4,955	11,716	Middle housing

Vacant Residential Map – Expected Density Method, Heavy Middle Housing Mix



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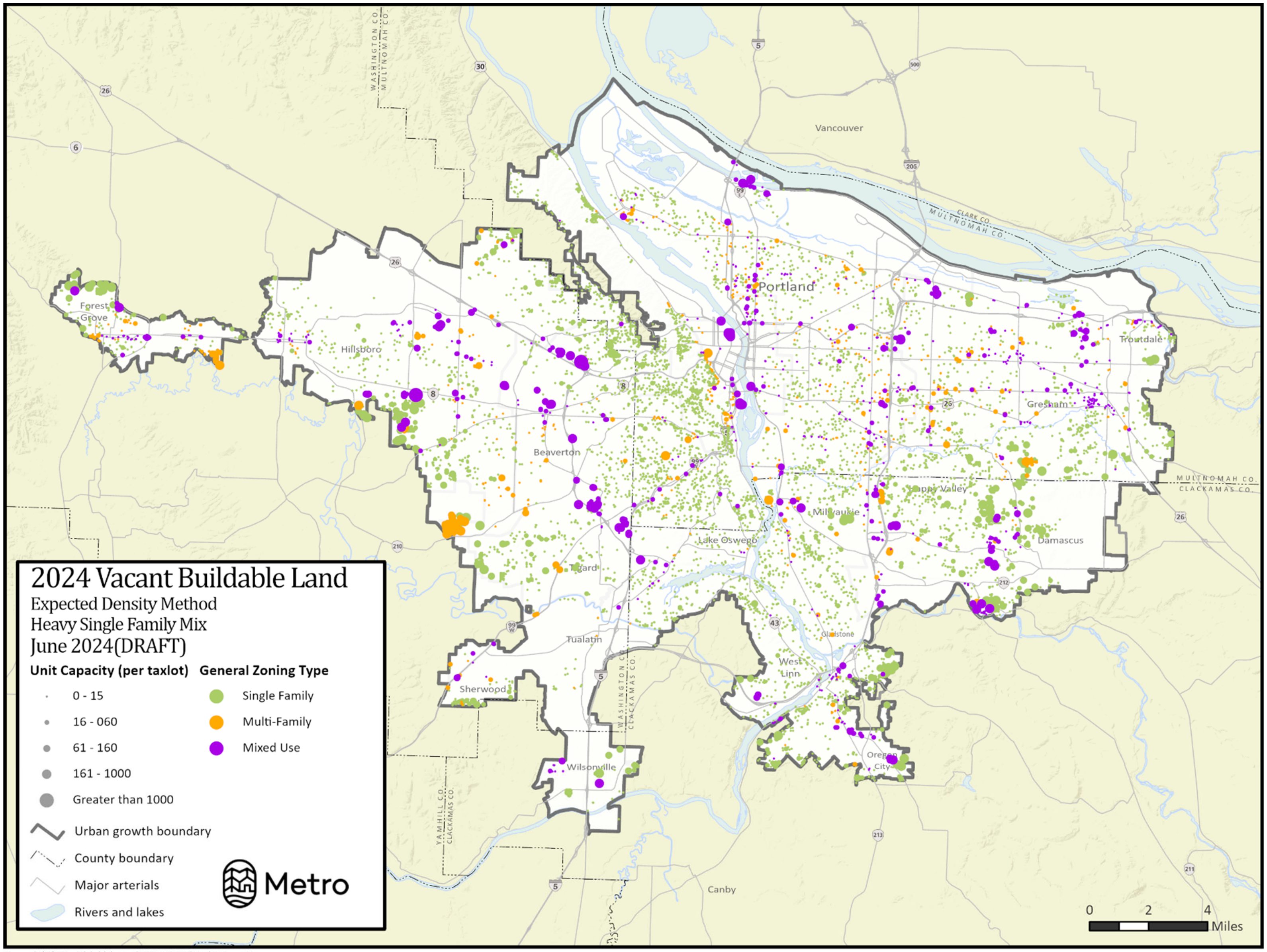
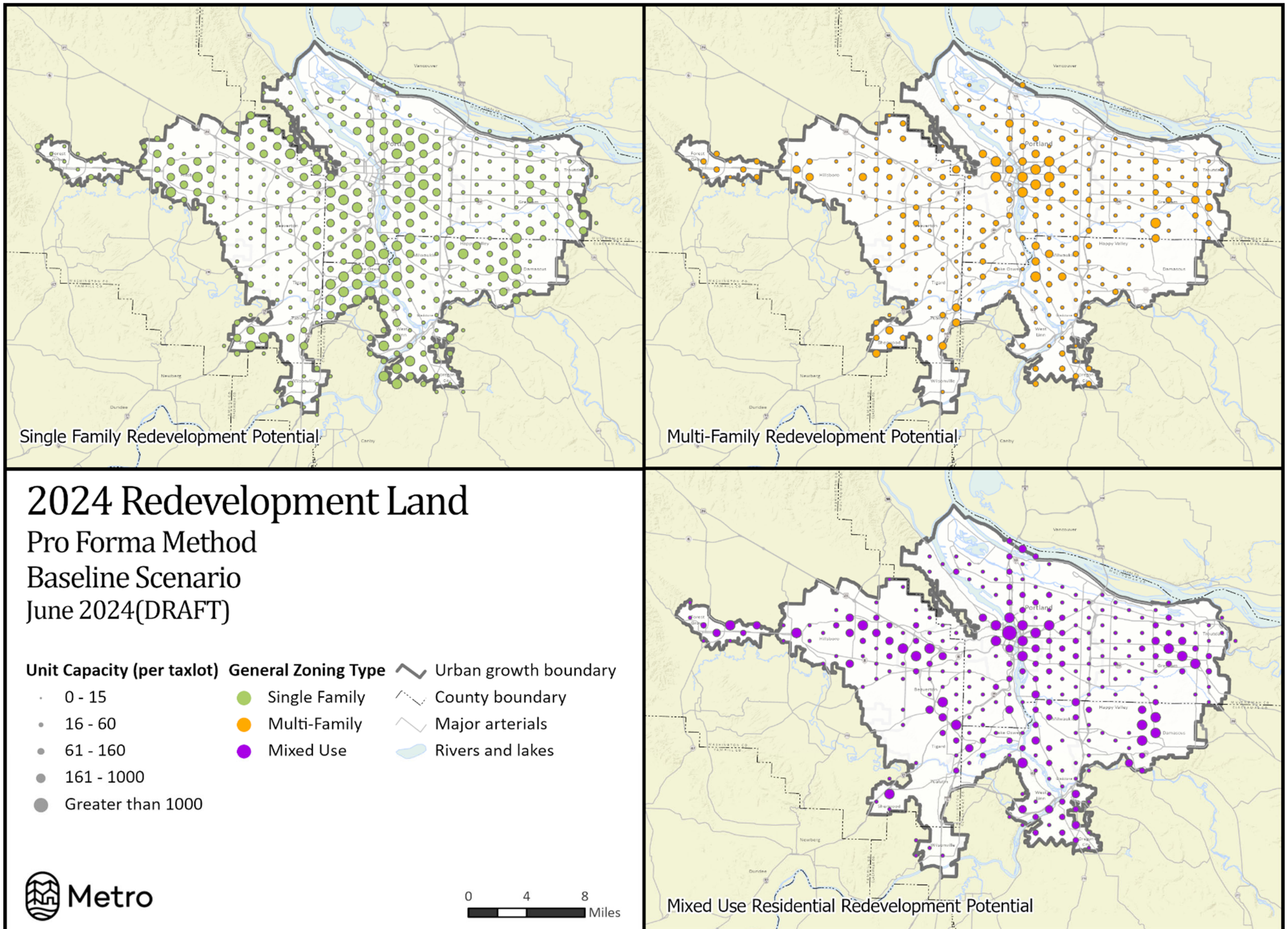
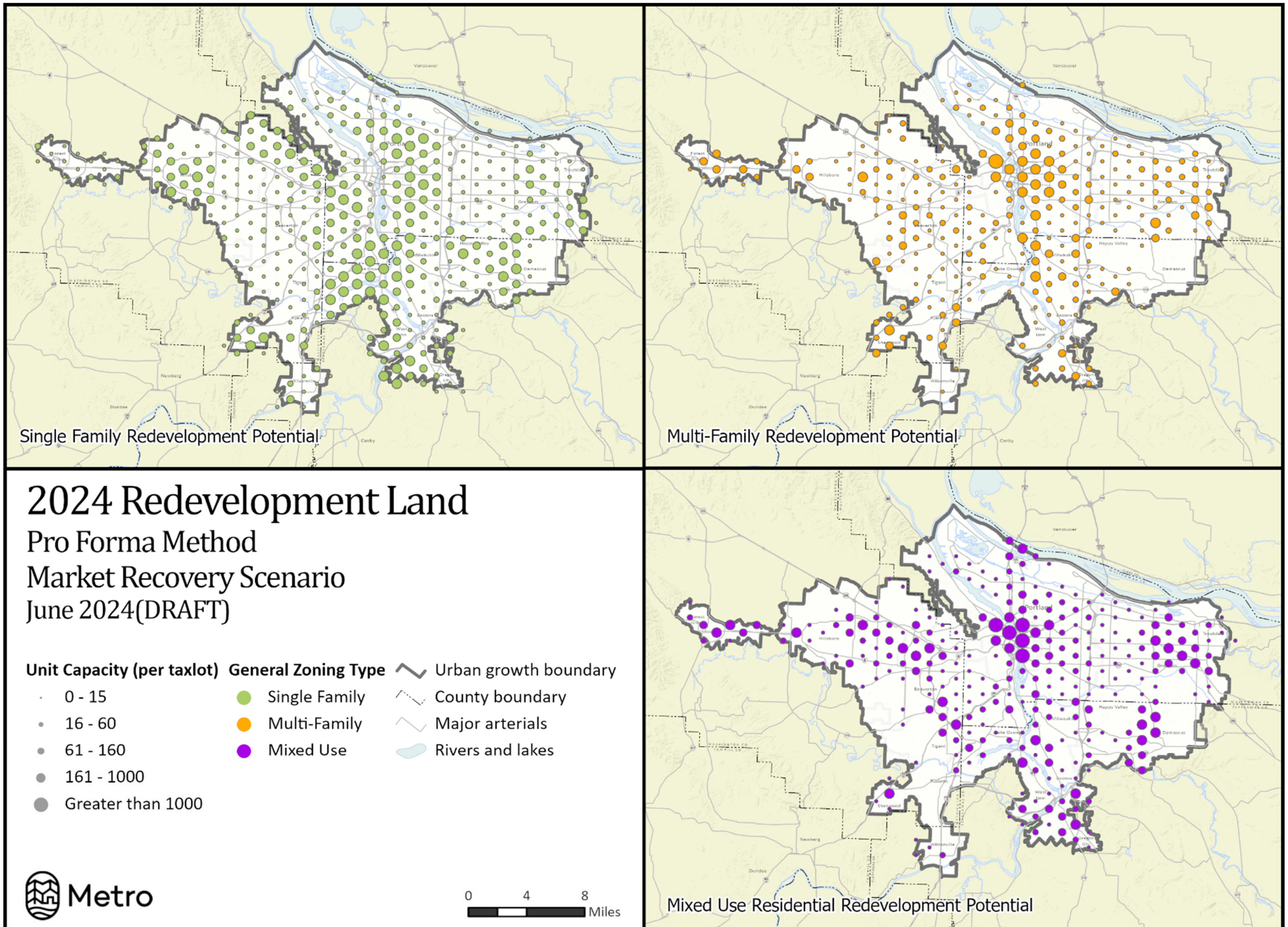
Vacant Residential Map – Expected Density Method, Heavy Single Family Housing Mix



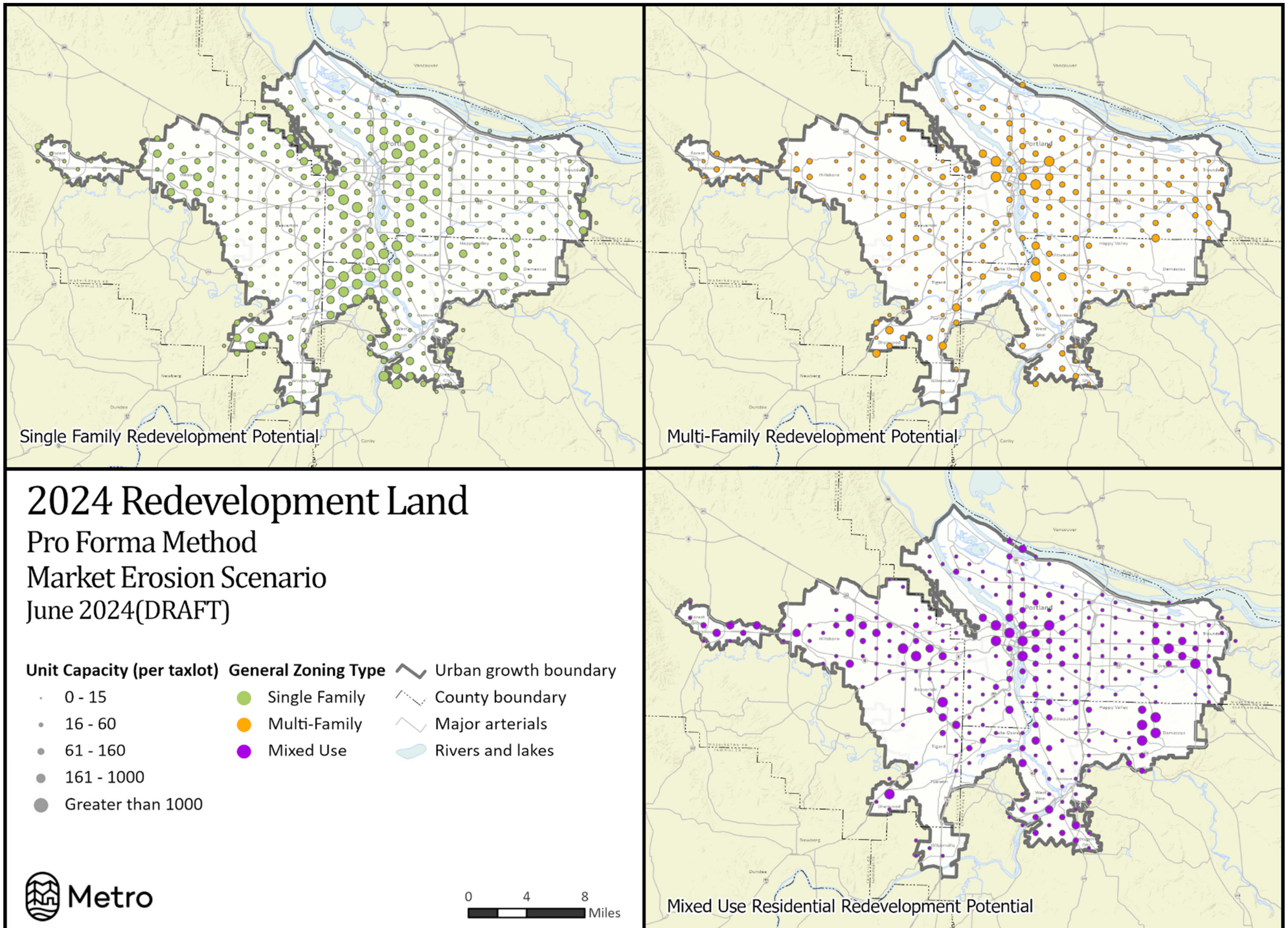
Residential Redevelopment Maps – Baseline Scenario



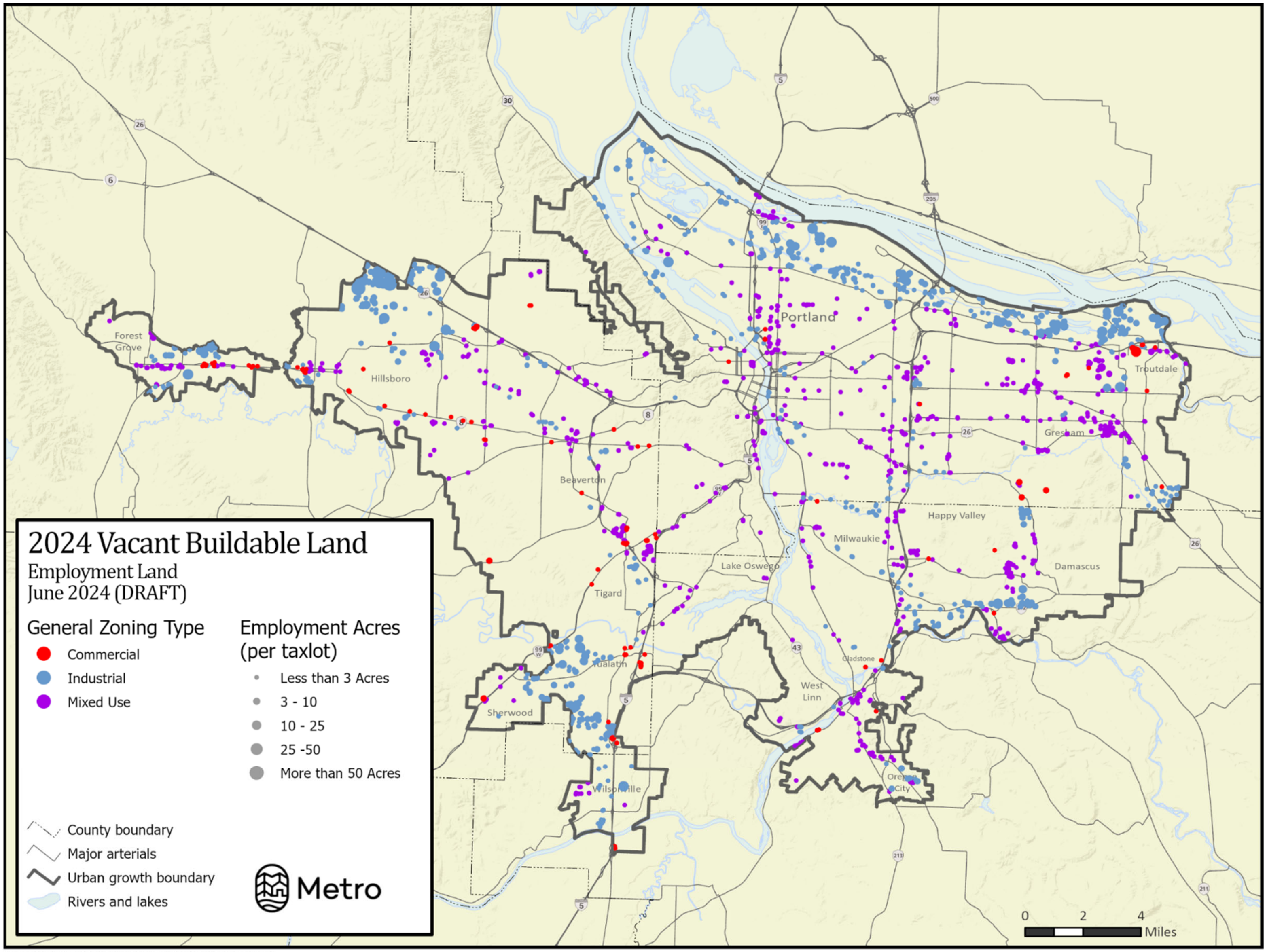
Residential Redevelopment Maps – Market Recovery Scenario



Residential Redevelopment Maps – Market Erosion Scenario



Vacant Employment Map



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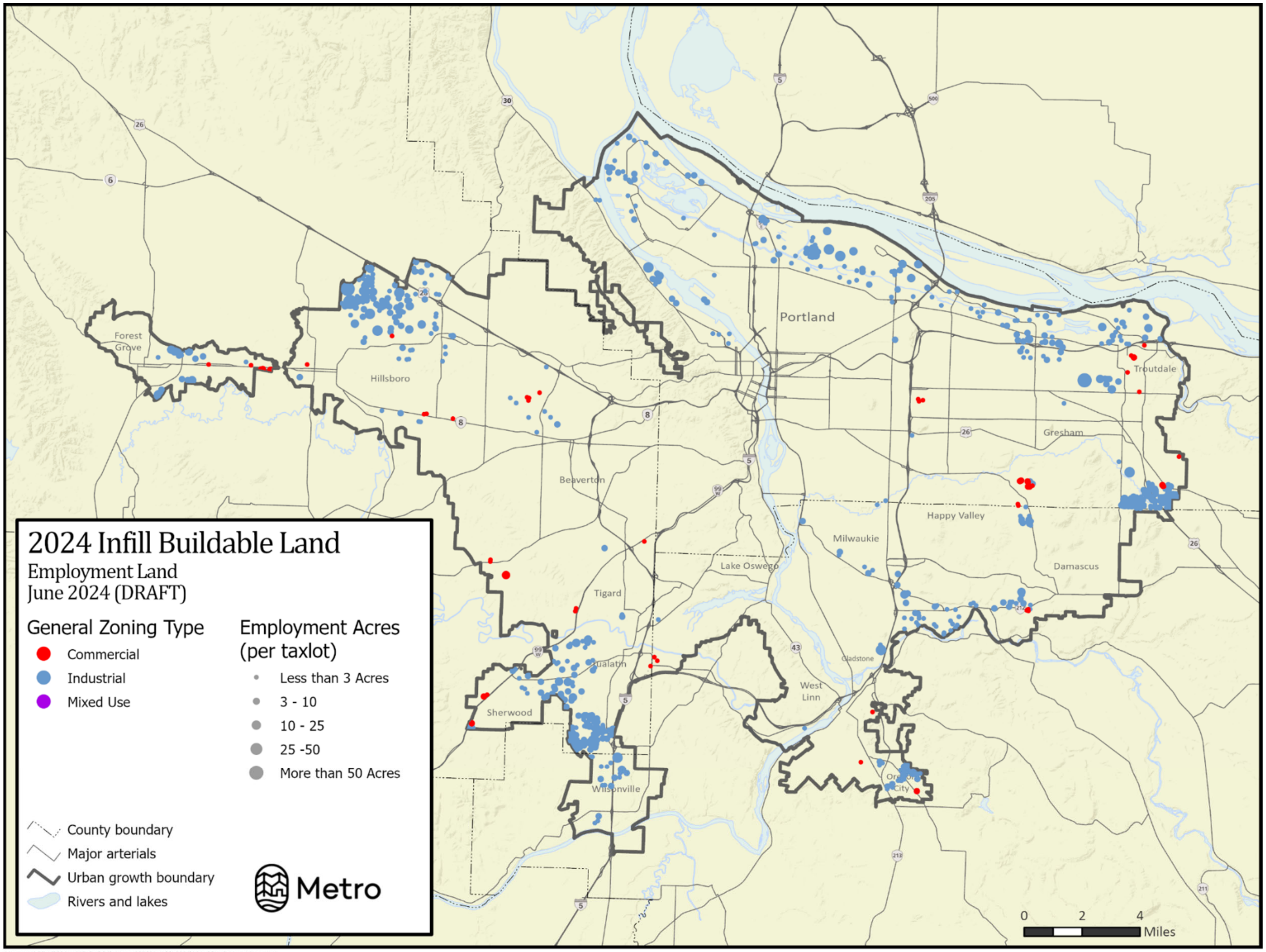
Infill Employment (Land Banked) Map



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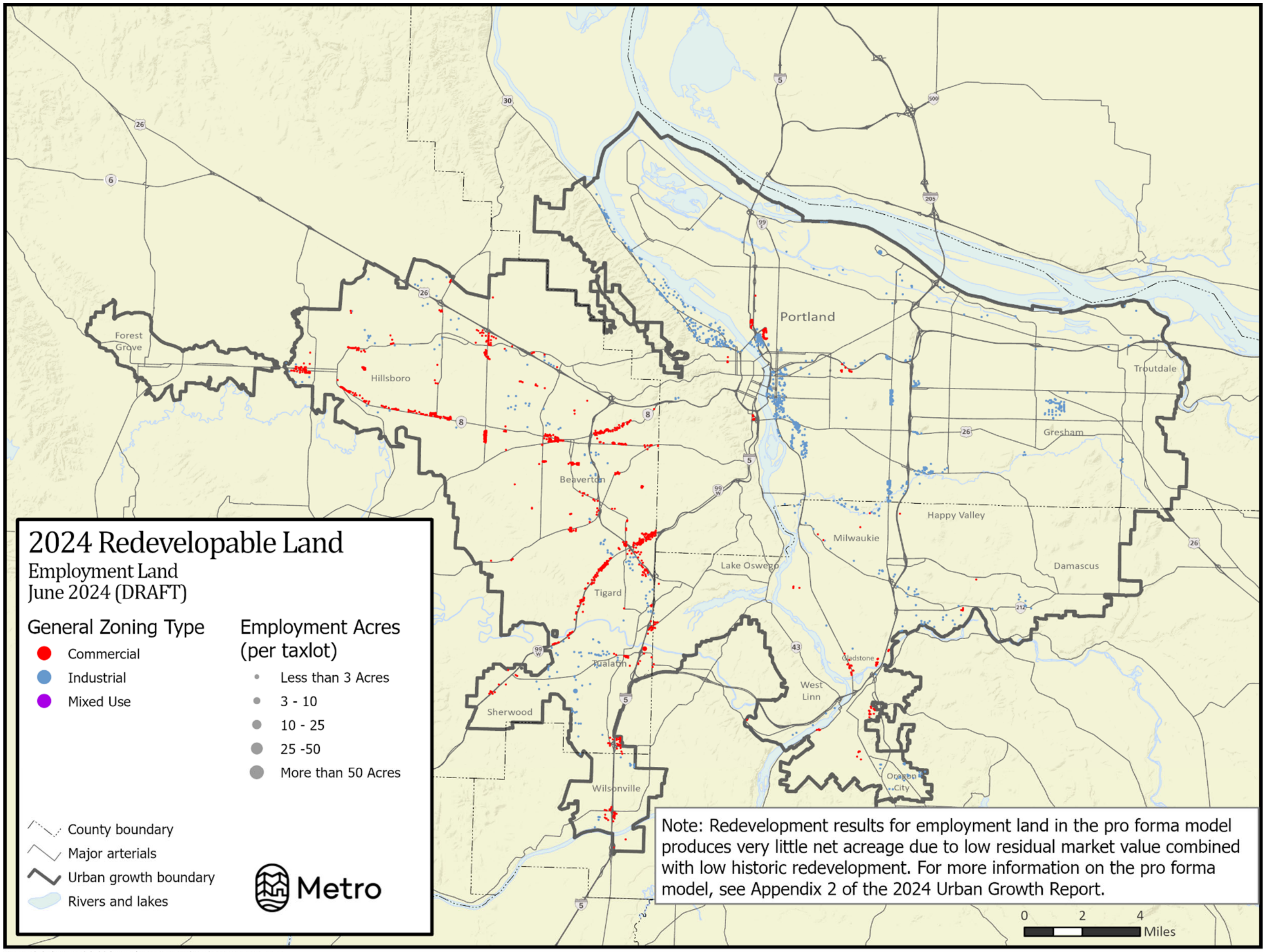
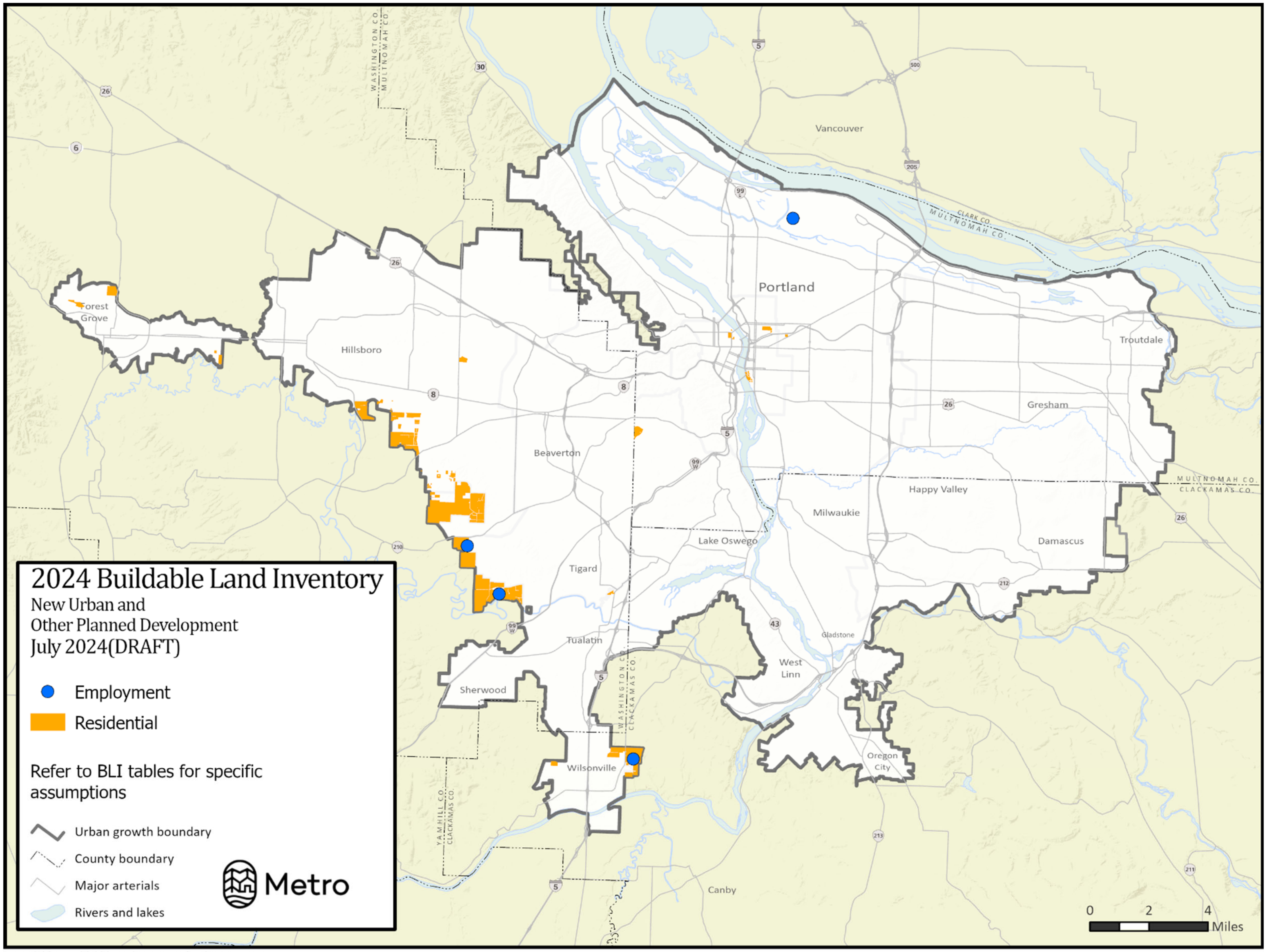
Redevelopable Employment Map



New Urban and Other Planned Development Map



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GENERAL METHODOLOGY FOR DETERMINING THE 2024 URBAN GROWTH REPORT'S BUILDABLE LAND INVENTORY (BLI)

Background

Under state land use regulations, Metro is required to ensure that its regional plan contains sufficient buildable land within the urban growth boundary (UGB) to accommodate estimated housing needs for 20 years. Metro is mandated to conduct this analysis at least every 6 years in its Urban Growth Report (UGR). The UGR is a basis for the Metro Council's urban growth management (UGM) decision. A technical underpinning of the UGR is its buildable land inventory (BLI) which includes vacant and redevelopable land supply estimates. This document provides a summary of the capacity assumptions and a methodology description of how land supplies are estimated.

During the winter of 2023/2024, all local governments in the region were given an opportunity to review the draft BLI and to suggest revisions to the results. These revisions reflect local knowledge about specific tax lots and properties. More detailed information on recent development trends can be found in Appendix 5.

Forecast analytics for the UGR go through additional steps to determine how much of this buildable land inventory may be market feasible in the 20-year planning timeframe. See Appendix 1 for forecast results.

Peer review of methods

Beginning in the summer of 2023, Metro staff worked closely with a land use technical advisory group (LUTAG) that included about 20 planners from jurisdictions around the region as well as other stakeholders to update the regional BLI methodology originally developed in 2018. The 2018 BLI also benefited from that extensive engagement with local jurisdiction planners. The 2018 advisory group discussed the ambiguity inherent in developing 20-year capacity estimates, particularly on a regional scale. On several topics, the group advised Metro that there was not a clear "right" or "wrong" answer, but helped Metro staff to arrive at methods that are, on the whole, reasonably sound for a regional analysis, and that use the best available information. These assumptions were reviewed by LUTAG (2024) and, except as noted below, the assumptions and methods from the 2018 BLI were used in this BLI.

Uncertainty in the BLI

From the Great Recession to the year-over-year double-digit gains in housing prices preceding and during the Covid-19 Global Pandemic to the highest inflation in 40 years, the last two decades remind us that unforeseen economic and societal changes affect our ability to accurately forecast the future.

Therefore, Metro has produced a range of scenarios for the BLI which, taken together present high-end and a low-end estimates. The range of scenarios acknowledges the uncertainty around future market conditions as well as how developers and property owners will respond to those conditions. While this BLI attempts to establish a whether a 20-year supply of land exists within the current UGB, State law requires periodic review specifically to account for potential future changes to underlying conditions.

GENERAL METHODOLOGY

Step 1: Identify vacant and developed tax lots and classify by regional zoning classification

Step 2: Remove tax lots from the BLI that don't have the potential to provide residential or employment growth capacity (e.g., parks)

Step 3: Calculate deductions for environmental resources[1]

Step 4: Calculate deductions for "future streets"[2]

Step 5: Calculate BLI estimates (BLI includes capacity estimates for vacant and redevelopment)

a) Single Family Residential (SFR)
b) Multifamily residential (MFR) and Mixed Use Residential Capacity (MUR)
c) Employment (industrial and commercial)

Identify vacant and developed land by zoning (or comp plan)

Issue:
The BLI methodology treats vacant and redevelopment as separate categories for clarity and to avoid any double counting of capacity on the partially vacant lots. However, Metro's vacant lands inventory (a basis for the BLI) includes some "partially vacant" land.

Solution:
The region's buildable land inventory is sorted into either *vacant* or *developed* tax lots. A categorization as *developed* does not, however preclude the possibility of redevelopment. For the purposes of this analysis, infill and redevelopment are accounted for by subjecting to economic screens (described in this document) to determine whether they should be counted as **potential** redevelopment capacity.

Vacant land definition[3]:

- Any tax lot that is fully vacant (Metro aerial photo)
- Tax lot with less than 2,000 sq. ft. developed AND developed part is under 10% of entire tax lot
- Tax lots that are 95% or more "vacant" from the GIS vacant land inventory[4]

Developed land definition:

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[1] Environmental resources considered include Metro's Title 3, Title 13, FEMA flood way and flood plain, and steep slopes over 25%.

[2] The BLI accounts for future streets on a tax lot-by-tax lot basis. The buildable area of each tax lot is reduced on the basis of individual tax lot size.

[3] Small inconsistencies in the alignment of the tax lot GIS layer and the vacant/developed GIS layer create slivers along property boundaries. In order to deal with this issue, any tax lot that is 95% or more vacant is considered "fully vacant".

[4] GIS tax lot layers change over time as the counties update their parcel base. Because of this, over time, the vacant land layer may develop inconsistencies, resulting in slivers of vacant or developed land that intrude on adjacent tax lots. Setting a 95% threshold prevents full vacant tax lots from being categorized as "developed".

- Part vacant / part developed tax lots are considered developed and will be treated in the redevelopment filter

Rationale:
Categorizing tax lots as vacant or developed (and potentially redevelopable) more closely aligns the inventory approach with that of other local governments and state administrative rules, which refer to vacant and redevelopable land. A lot that might be considered "partially vacant" in older analysis methods are still inventoried but are simply redefined to fit into the vacant or developed categories. Tax lots with fewer than 2,000 sq. ft. developed and a developed part that is less than 10% of the entire tax lot are considered completely vacant with the understanding that tax lots with this condition resemble a fully vacant tax lot. The developed portion would minimally impact new development.

In case of tax lots in employment zones that do not pass through various redevelopment filters, for relatively large tax lots greater than 1 acre, we apply a final screen to include "land banked" parcels into the BLI. These tax lots are categorized as "infill" in the employment summaries of the BLI.

Remove tax-exempt lots, parks.

Issue:
Some vacant tax lots (e.g., parks) should not be recognized as carrying capacity for employment and/or housing going into the future.

Solution:
Remove the following types of tax lots from the residential (and employment) BLI based on Assessor PCA code designations, owner names, assessed values and other data sources:

- Tax exempt with property codes for city, state, federal and Native American designations
- Schools
- Churches and social organizations[5]
- Private[6] "streets"
- Rail properties
- Tax lots under 1,000 sq. ft. (0.023 gross acres)
- Parks, open spaces and where possible private residential common areas

Use the best available GIS data to remove parks, rail yards and railroad properties, major petroleum, natural gas lines and BPA power line right of ways. Parks is a data layer maintained by Metro that includes all parks in the region (e.g., community parks, regional parks, open space areas, golf courses, private common areas, and cemeteries).

EXCEPTIONS:
Included in Residential Capacity Calculations the following list of exemptions:

- Housing Authorities (not just Portland)

Included in Employment Capacity Calculations the following list of exemptions:

[5] Based solely on tax exempt codes.
[6] This was used for SFR, MFR and MUR zoning only. It proved problematic for COM and IND zoning

- Port of Portland
- Portland Development Commission

Rationale:
Tax lots that are not capable of supporting future employment and/or housing because of use restrictions should be removed from the BLI.

Calculate Environmental Constraints

Issue:
Local governments vary in how they implement environmental regulations found in Urban Growth Management Functional Plan Title 3 (Water Quality and Flood Management) and Title 13 (Nature in Neighborhoods). Moreover, estimation of residential housing capacity of tax lots (TL) with environmental impact may vary substantially on a case by case basis. Typically, ***density transfers*** from the environmentally impacted portion of a tax lot to the unconstrained part of the tax lot may vary significantly depending on the environmental impact and city regulations.

The capacity calculations for environmentally constrained tax lots recognize residential density transfers and Title 13's more flexible protections, which are applied on a site-by-site basis during the development review process. Generally, under Title 13, development is to avoid, minimize, or mitigate (in that order) designated habitat areas. Typically, precise delineations of habitat conservation areas are identified during the site development process. Therefore, the data and BLI calculation methods are more appropriate at a higher geographic scale than individual tax lots. The residential capacity computation (though accurate at a regional or subregional scale) may **NOT** accurately portray the precision needed to calculate the environmental deduction for each tax lot. This may also affect the calculation for the transfer of density from the environmentally constrained area to the unconstrained part for individual tax lots, but we believe that on balance, the variance in the calculation of net density and net residential capacity offset each other over the entire region.

For the 2018 BLI, a technical working group was asked to provide advice on how to handle capacity assumptions in Title 13 areas. The group agreed that counting full residential capacity was not appropriate, but that discounting all capacity was not appropriate either. Metro staff then sent an e-mail inquiry out to all local jurisdictions in the region to determine their jurisdictions' historic development experience in Title 13 areas. Metro staff received varied responses with many caveats that preclude meaningful summarization. In the end, this inquiry did not produce a clear answer. Aside from the fact that Title 13 gets interpreted on a site-by-site basis, another challenge is that local implementation of Title 13 is fairly recent, which means that there is not a lot of development experience from which to draw (particularly in light of the Great Recession). Given this ambiguity and the fact that Title 13 areas comprise a relatively small portion of the region's single-family zoned vacant land (approximately 5.5%) and even less of its multi-family zoned vacant land (approximately 0.5%), Metro staff determined that the most reasonable approach was to rely on percentages found in the Title 13 Model Ordinance. This is the best available information and is being used on the advice of the BLI technical working group. These assumptions were reviewed by LUTAG in late 2023, early 2024 and agreed that they were still the best approach for calculating environmental constraints.

Solution:
Most areas that are considered environmentally sensitive fall into multiple categories of overlap including Titles 3 and 13, or are in a floodway or flood prone soils, or include steep slopes or some other ecosystem feature. Metro employs an environmental hierarchy to classify the environmental features to avoid double counting the capacity deduction for the BLI. BLI reductions will reflect the higher assumed protections when environmental features are overlapping.

Methods differ for single-family, multi-family, and employment lands. Generally, using the best available GIS data:

- Remove 100% of the area of floodways
- Recognize environmental constraints such as slopes over 25% and as defined by cities and counties under Title 3 and Title 13. In many instances, the delineation of the environmental buffers are GIS modeled data; where available we utilize environmental buffers from local government GIS data
- By assumption, permit 1 dwelling unit (DU) per residentially-zoned (SFR, MFR, MUR) tax lot if environmental encumbrances would limit development such that by internal calculations no (zero) dwelling units would otherwise be permitted ("essentially avoid takings")

As a result, we define the following land area calculations (used in formulas below):
Vacant buildable = Calculated area of TL – utility easements – parks – railroads – tax exempt sites
Net unconstrained[7] = vacant buildable – environmental constraints

The "calculated area of TL" is the GIS calculation of area (sq. ft.) of the tax lot as defined in Metro's GIS tax lot data layer. (Generally, individual tax lots are not affected by utility easements, parks, railroads or other tax exempt uses, but on a regional scale, these factors add up to be somewhat significant and therefore handled in the regional BLI calculations for the UGR capacity estimates.) Environmental constraints are handled as follows (by land use type):

<u>Single-family residential</u>

1. Floodways: 100% removed
2. Slopes > 25% and Title 3 treated the same way: 100% removed
    a. If tax lot > (or equal to) 50% constrained, follow the "maximum capacity rule" (defined below) to add back units[8]
    b. If tax lot is <50% constrained, assume 90% of unconstrained area is in BLI (i.e., apply 10% discount to vacant buildable acres)[9]
3. Title 13: 50% of Title 13 constrained acres removed from BLI (consistent with Title 13 model Ordinance).
4. Floodplain: 100% removed

[7] This is the calculation for SFR, MFR and MUR. The calculation for COM and IND is a 100% deduction of environmental constraints.

[8] This add back represents Metro's approach for estimating / calculating the density transfer to mitigate the loss of potential development productivity for dwelling units.

[9] Based on feedback from 2018 BLI working group, including local experience.

5. Assume at least one unit per tax lot, even if fully constrained

Multi-family residential

1. Floodways: 100% removed
2. Slopes > 25%: 100% removed
3. Title 3: remove 50% of the constrained land with the other 50% considered buildable
4. Title 13: 15% of Title 13 constrained acres removed from BLI (consistent with Title 13 Model Ordinance)
5. Floodplain: 50% removed
6. Assume at least one unit per tax lot, even if fully constrained

Industrial and commercial

Employment zoned land applies a simple approach of netting out all constrained land. This is based on the input of the BLI technical working group, which indicated that constrained areas are typically avoided altogether by new commercial or industrial employment uses.

1. Floodways: 100% removed
2. Slopes >25%: 100% removed
3. Title 3: 100% removed except for the Portland Harbor Access Land where a 70% discount rate is applied[10]
4. Title 13: 100% removed

Calculate deductions for "future streets"

This BLI methodology sets aside a portion of the vacant land supply (not redevelopment supply) in order to accommodate future streets and sidewalks. This assumption is calculated on a per tax lot basis:

- Tax lots under 3/8 acre assume 0% set aside for future streets
- Tax lots between 3/8 acre and 1 acre assume a 10% set aside for future streets
- Tax lots greater than an acre assume an 18.5% set aside for future streets
- Industrial (IND) zoning assumes a 10% set aside regardless of size.

The basis for these net street deduction ratios derive from previous research completed by the Data Resource Center and local jurisdictions for the 2002 UGR. These assumptions were presented to LUTAG and revalidated for this analysis.

[10] Based on input from City of Portland staff.

Vacant Land Calculations

Calculate single-family and middle housing residential capacity

Issue: In 2019, the Oregon Legislature passed House Bill 2001 which required cities and counties allow duplexes, triplexes, fourplexes/quadplexes, cottage clusters, and townhouses in residential areas by July 2022, essentially doing away with traditional "single family" zoning which previously limited uses to predominantly single unit detached homes. Collectively these housing types are referred to as "middle housing" and can develop at densities significantly higher than traditional detached single-family development. While some homebuilders are starting to make greater use of these types of dwellings in their portfolios in the last 2 years, the overall numbers are relatively small making traditional forecasting difficult. To address this inherent uncertainty, Metro relied on the expertise of ECOnorthwest, a consulting firm of planners and economists with extensive development and planning experience working in and with local jurisdictions in the Metro region to create a range of possible development scenarios resulting from HB2001.

Expected Density Methods

Expected Density Method – Heavy middle housing mix

This scenario anticipates higher use of middle housing within the Metro region as more affordable products. The assumed densities and housing mix in the table below were applied to Vacant SFR land as well as lower density multifamily and mixed-use residential zones (MFR1, MFR2, MUR1, MUR2).

Baseline Expected Density Method Assumptions

	Assumed Housing Mix			Assumed Density by Type			
	SF	MH	MF	SF	MH	MF	Weighted Avg
SFR1	40%	60%	0%	5.4	18.0		13.0
SFR2	50%	50%	0%	9.7	20.0		14.8
SFR3	70%	30%	0%	17.4	26.0		20.0
MFR1	0%	50%	50%		20.0	20.0	20.0
MFR2	0%	25%	75%		25.0	25.0	25.0
MFR3	0%	0%	100%			35.0	35.0
MFR4	0%	0%	100%			45.0	45.0
MFR5	0%	0%	100%			84.0	84.0
MFR6	0%	0%	100%			185.0	185.0
MFR7	0%	0%	100%			338.0	338.0
MFR5	0%	0%	100%			99.0	99.0
MFR6	0%	0%	100%			185.0	185.0
MFR7	0%	0%	100%			338.0	338.0
MUR1	0%	50%	50%		22.0	22.0	22.0
MUR2	0%	25%	75%		28.0	28.0	28.0
MUR3	0%	0%	100%			43.0	43.0
MUR4	0%	0%	100%			58.0	58.0
MUR5	0%	0%	100%			80.0	80.0
MUR6	0%	0%	100%			176.0	176.0
MUR7	0%	0%	100%			321.0	321.0

Heavy single family detached mix
Even with affordability issues in the detached single family housing market, demand for single family detached homes remains high. This scenario anticipates a lower mix of middle housing in SFR zones.

Detached Single Family Emphasis Method Assumptions

	Assumed Housing Mix			Assumed Density by Type			
	SF	**MH**	**MF**	**SF**	**MH**		**Weighted Avg**
SFR1	80%	20%	0%	5.4	18.0		8.0
SFR2	85%	15%	0%	9.7	20.0		11.2
SFR3	90%	10%	0%	17.4	26.0		18.3
MFR1	0%	50%	50%		20.0	20.0	20.0
MFR2	0%	25%	75%		25.0	25.0	25.0
MFR3	0%	0%	100%			35.0	35.0
MFR4	0%	0%	100%			45.0	45.0
MFR5	0%	0%	100%			84.0	84.0
MFR6	0%	0%	100%			185.0	185.0
MFR7	0%	0%	100%			338.0	338.0
MFR5	0%	0%	100%			99.0	99.0
MFR6	0%	0%	100%			185.0	185.0
MFR7	0%	0%	100%			338.0	338.0
MUR1	0%	50%	50%		22.0	22.0	22.0
MUR2	0%	25%	75%		28.0	28.0	28.0
MUR3	0%	0%	100%			43.0	43.0
MUR4	0%	0%	100%			58.0	58.0
MUR5	0%	0%	100%			80.0	80.0
MUR6	0%	0%	100%			176.0	176.0
MUR7	0%	0%	100%			321.0	321.0

Calculate multi-family residential capacity (including mixed-use residential)

If the tax lot is zoned MFR (or MUR) and vacant, the BLI capacity estimate is simply the number of units per acre permitted by the zoning class multiplied by the vacant buildable acres, which in the case of the unconstrained tax lot is the area of the tax lot.

In the case of the lowest density multi-family zoning (MFR1, MFR2, MUR1, MUR2) a portion of the resulting units were allocated to middle housing as described in the previous section.

Formula for calculating density transfers on environmentally constrained tax lots (for MFR and MUR Redevelopment and Vacant tax lots):
If (unconstrained > 50% of total lot) => apply zoning density to entire tax lot.
Else the **buildable** area = unconstrained area * 2: Apply zoning density to **buildable** area.

Note: the deduction for environmental constraints is defined in previous sections of this report.

Density Transfer Rationale:
A tax lot with a majority of it unconstrained, a full density transfer is assumed from the constrained portion to the unconstrained. Therefore, capacity is estimated as the zoned density and the lot size of the entire site.

The capacity estimated for a highly constrained tax lot is calculated differently. In this case, a density transfer is allowed, but the adjusted buildable capacity is based on the unconstrained area and multiplied by a factor of 2 and then applying the zoned density to this adjusted buildable area. For example, if a 10,000 sq. ft lot has a constrained area of 6,000 sq. ft., the method would assume that the zoned density would be applied to 8,000 sq. ft.

Vacant Employment Land Calculations

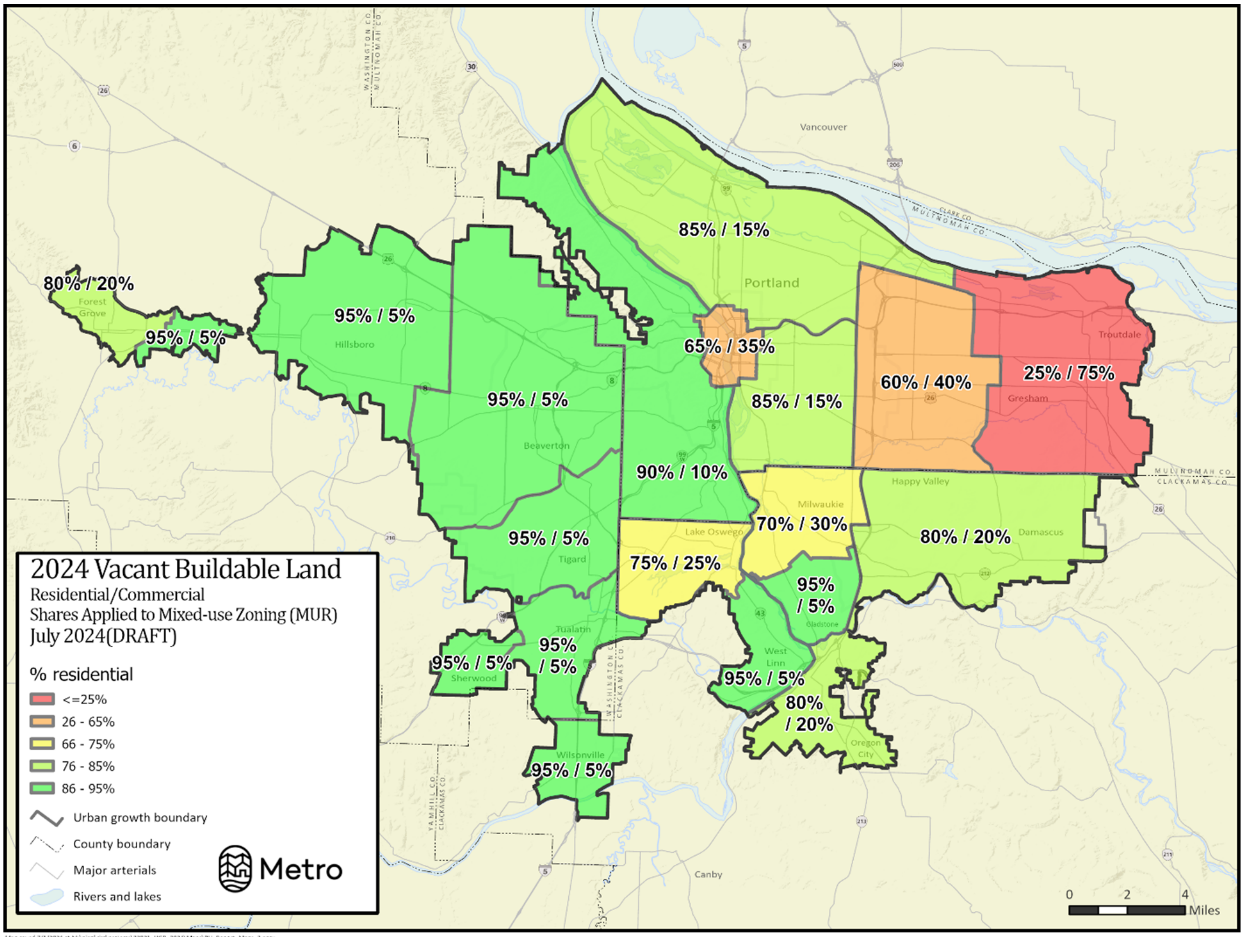
Vacant employment acres are simply the net area of tax lots after removing environmental constraints and right of way as described in previous sections.

Mixed Use capacity estimates (splitting residential and commercial capacity on MUR zoned tax lots)

More and more tax lots in the region are designated in mixed use residential (MUR) zones. Predicting whether MUR-zoned areas throughout the region will be developed as residential or commercial (or what mix of the two) is a challenge. MUR districts in the Metro region can allow *vertical mixed use*, (ground floor retail/service or office uses with housing units above). Horizontal mixed use can also occur, where a mix of retail, service, office and residential apartments occur in the same area, usually on separate tax lots.

MUR residential/non-residential capacity split formula:
Employment capacity in mixed use residential areas, measured in acres, is calculated from the dwelling unit capacity determined in the residential supply.

For the purposes of determining the residential/non-residential split, Metro performed an analysis of observed development from 2013 through 2022 in mixed use zones. Draft findings by sub-regions were developed presented to LUTAG for review and adjustment. The final splits are displayed in Map 2 below.



Map 2: Residential/Commercial Shares Applied to Mixed Use Residential (MUR) zoning in 2018 BLI Draft

These geographically-based residential/non-residential splits were then applied to MUR taxlots with capacity for vacant land. For vacant tax lots with MUR zoning:

- Total effective acres = Total additional units allowed if 100% of lot is used for residential * acres per unit required at maximum zoned density
- Residential effective acres = ResSplit * Total effective acres
- Employment effective acres = EmpSplit * Total effective acres

Mixed-Use-Residential (MUR) proportion assumptions

Metro staff analyzed the observed development data from the Land Development Monitoring System (LDMS) to update the assumed proportion of land zoned mixed-use-residential (MUR) that would develop as housing units. Metro applies this assumption to all vacant MUR lands to estimate the maximum possible residential and employment capacity in those lands for the BLI. Staff generally refer to these assumptions as the “MUR splits.”

Metro first used the 2013-2022 LDMS data to summarize and compute observed average proportions by jurisdiction, then reviewed those results with a Land Use Technical Advisory Group (LUTAG).

Staff summarized the identified tax lots by geography to compute the total acres and units (if applicable) of residential and non-residential properties by geography. Residential properties with on-site commercial space had their area counted only as residential acres. Staff computed the share of commercial and residential land within each geography from total acreage rounded to the nearest 5%. Staff made minor adjustments to some proportions based on input from LUTAG members based on their local knowledge of recent trends and future plans.

These splits were not applied to the redevelopment eligible land and instead deferred to the results of the pro forma model (described below) which evaluates the financial feasibility of both commercial and residential uses in MUR zones.

Redevelopable Residential and Employment Land Calculations

The “pro forma” model (also known in the technical documentation as the “developer supply preprocessor model” or DSP) is designed to predict what tax lots with existing development are likely to redevelop within the 20 year time frame. The model uses the existing real market values (RMV) as derived from tax assessor data against different development prototypes allowable in the underlying zone. The model uses assumptions about construction costs as well as achievable pricing (rental and sales) to determine if redevelopment of the tax lot would be financially feasible. The model then picks the “highest and best use” of the potential redevelopment prototypes that were determined to be financially feasible. Furthermore, the model applies a probability, based on past performance of similar tax lots; the higher the profit potential, the higher the likelihood of redevelopment. Finally, any existing development is subtracted from the achievable to produce a net capacity.

The same method is applied across all zoning types, with different prototypes allowed in each zone. A list of the eligible prototypes by zone can be found at the end of **Attachment A.**

<u>Example</u>: The model determines that a tax lot with an existing single-family home in a MFR zone can support several different prototypes. Of the available options, the most “profitable” are “ 3-story wood townhomes”. Due to the parcel size, the model determines that 5 townhomes (middle housing) could replace the existing single-family home for a net of 4 new dwelling units. The model predicts that there is a 19% chance of the tax lot redeveloping under this scenario, so the tax lot is assigned 0.76 units of middle housing capacity. In other words, approximately 1 in 5 similar tax lots would be expected to develop in this way, however that potential capacity is spread across all similar tax lots.

As demonstrated in the above example, totals from the model results should be aggregated to larger areas and not viewed at the tax lot level.

More detailed explanation of methods and prototypes can be found in **Attachment A**.

Infill employment land

Tax lots that have been identified as part vacant (at least ½ an acre undeveloped) are considered developed and are put through the pro forma model to test market feasibility for redevelopment. (See **Attachment A** for future explanation of the pro forma model.)

However, due in part to the relatively low value per square foot for employment land when compared to improvements, many tax lots that are partially developed still do not meet the threshold for redevelopment. There remain some tax lots with large vacant pieces that do not get through the pro forma model and into the redevelopment supply. The assumed values in the pro forma model which identify which tax lots have potential to be redeveloped are not well suited and calibrated to identify partially developed tax lots with significant amounts of undeveloped real estate.

A final screen for these so called "land banked" parcels was applied by adding back into the redevelopment supply the *net unconstrained* vacant portion of any lot with at least 1 acre of unconstrained vacant land. In the 2018 BLI, these tax lots were included in the redevelopment supply, however, in the 2024 BLI, they have been separated into their own category called "infill" for clarity.

New urban areas and planned development capacity

"New urban areas" are those areas that have been added to the UGB in recent years that do not yet have urban zoning or adopted comprehensive plans. Consequently, planning documents, rather than GIS analysis, are typically the basis for how capacity in new urban areas is handled in the BLI. Possible sources of information include:

- Draft comprehensive plans
- Adopted concept plans
- Draft concept plans
- Conditions of approval that were attached to the UGB expansion.

Additionally, there are several large developments which are currently in the approval and permitting processes with local jurisdictions. While these developments have urban zoning in place, their expected built-out capacity is known due to other planning processes so there is no need to estimate the capacity using various BLI methods. Additionally, while they are already committed to development, full build out will take at least several years, contributing to the 20-year supply.

Overall, this category adds approximately 30,000 units to the UGB land supply.

Office to residential conversion

With the post-pandemic transition to hybrid and remote work and the accompanying housing crisis, the prospect of converting vacant office space to residential units is a possibility. Metro contracted with ECOnorthwest to explore the prospect of office-to-residential conversions and how that might contribute to the future land supply for the region. Due to many market factors in the region, the magnitude of such conversions is likely to be small, with total expected units ranging between 250 and

1,500 total multi-family style units in the next 20 years regionwide. **Attachment B** details the methodology and rationale for these assumptions.

ADUs and internal conversions

Additional capacity in the region is also expected to come from the construction of detached ADUs, as well as conversions of garages, attics, and/or basements into additional units through internal partitions creating multi-unit buildings. Since the pro forma model only looks at complete redevelopment of a tax lot from one types of development to another (i.e.

Metro relied on ECOnorthwest to estimate the capacity potential from these development types. ECOnorthwest estimates a baseline of 8,692 units with a high-low range between 4,955 and 11,716 units possible over the next 20 years through this type of redevelopment. The following assumptions were used:

- **Low:** continue average annual ADU production for 2019-2022
    - This captures the trend since Portland changed its ADU SDC waiver policy to include a restriction on use for short-term rentals
    - Assumes that any additional middle housing conversion that isn't captured by the pro forma analysis would be instead of adding an ADU, so that there is no overall increase in units beyond what was happening with ADUs alone and the redevelopment component from the pro forma model.
- **Baseline:** continue average annual ADU production plus 10% of average annual middle housing from 2013-2022 (all available data years)
    - This assumes that roughly 10% of middle housing production was through conversion, and that longer-range past trends for ADUs and conversion will continue.
- **High:** continue average annual middle housing infill/redevelopment between 2014 and 2023
    - Assumes that as much conversion could take place per year (on top of redevelopment) as all middle housing infill/redevelopment during this period, most of which pre-dates HB2001

GIS Data and Metadata

The final GIS database and accompanying metadata are available upon request from Metro by contacting the Data Resource Center at:

503-797-1742
DRC@oregonmetro.gov
https://www.oregonmetro.gov/tools-partners/data-resource-center
Staff contact: Clint Chiavarini

Attachments

Attachment A: Office-to-Residential Conversion Potential; ECOnorthwest, April 2024
Attachment B: Documentation of Predictive Development/Redevelopment Model; Johnson Economics, June 2024

Documentation of Predictive Development/Redevelopment Model

Prepared for Metro

June 2024

Johnson Economics

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I. Introduction

Metro contracted with Johnson Economics to develop a modeling tool to predict anticipated development and redevelopment activity. The model is designed from the perspective of a developer and is designed to generate a supply side response to key market parameters. At this time, the model is not dynamically matched with a demand side model, but demand limitations and input can be partially addressed with manual limitation functions incorporated into the model.

The following is a general overview of the model, assumptions utilized in the Urban Growth Report work, as well as instructions for use.

II. General Model Overview

The developer supply preprocessor model is designed to predict the magnitude and form of likely development or redevelopment activity over an assumed time frame. The primary metric used to predict likely development patterns is the relationship between the supportable residual land value for prospective entitled uses and the current value of the property (including land as well as improvements, if any). The underlying assumption is that when the value of a property for new development is high relative to the current value of the property, it will be more likely to see development or redevelopment over a defined period.

The model is designed to generate an estimated ratio between the current value of a parcel (land and improvements) and the underlying value of the parcel under potential development scenarios. This ratio is used as the primary indicator of the likelihood of development or redevelopment. Within the model, we use Real Market Value (RMV) from the assessors' office as a proxy for the value of the site. While we understand that this is an imperfect measure, it is readily available at the parcel level and any inherent bias is expected to be largely consistent. The residual land value is determined using a series of simplified pro formas that represent potential prototypical development forms. The resulting ratio between current and residual value has proven to be a strong predictor of the likelihood of development or redevelopment at the parcel level.

The model solves for a development solution that represents the highest and best use at the parcel level under the assumptions used, as well as outputting an associated residual property value. The highest and best use of each parcel is defined as the allowable land use program that yields the greatest return to the existing property, and the residual property value reflects the maximum acquisition value supported by that program under the assumptions used.

The model currently incorporates a total of 43 prototypical programs which cover a range of land use types and development forms. An entitlement screen narrows the allowed use types to reflect development forms entitled under existing zoning. In the model, this is done using a matrix that evaluates whether the theoretical programs are allowable under the range of zoning codes in the study area.

The probability of development/redevelopment activity is predicted by the model at the parcel level based on the ratio generated by dividing the current value (RMV) by the indicated residual land value. A shift in assumptions that increases the value of the property under a new development scenario, such as higher achievable pricing, will increase the denominator in this ratio as well as the likeliness of development or redevelopment. Sites with relatively high current values resulting from significant physical improvements will have a relatively high numerator and will be significantly less likely to redevelop.

The model evaluates the likelihood of development at the parcel level, although the results should be expressed publicly only in aggregated geographies. What the model solves for is probabilities to redevelop as well as anticipated development forms, and the results reflect the expected value of development/redevelopment activity. The model will not indicate that a specific parcel will or will not redevelop, it will change the probability of that occurrence as well as the likely form of development.

The following outline summarizes the data feeding into the model, as well as the general function of the model.

Data

Parcel Database

Assumptions

- Achievable Pricing by use type
    - Residential pricing gradient providing parcel specific solutions for rental and ownership units.
    - Commercial and industrial pricing by submarket, expressed in net annual lease rates per square foot.
- Capitalization Rates
    - Vary by use type.
- Threshold rates of return (targeted returns by development community)
- Construction Cost Estimates
- Assumed conversion rate by RMV/Residual ratio.

Entitlement screening matrix

Geographic screening columns

- Geographic submarkets for office, industrial, and retail markets

Parcel Level Data

- Select parcel from database.
- Populate assumptions.
    - Parcel ID
    - Site size (SF)
        - This should be net developable area, deducting slope and wetland.
    - RMV/SF
    - Pricing
        - Residential Pricing (lookup from gradient)
        - Remaining use types set pricing by market area.
    - Zoning (Metro simplified)
    - Current improvements expressed in residential units and/or square feet of commercial and industrial space.

Prototype Screening

- Determine prospective prototypes to run.
    - Screen by zoning designation and entitlement screen

Residual Land Value Calculations

- Run residual land value calculations for allowed prototypes.
- Determine highest and best use based on prototype supporting the greatest residual land value.
    - Establish preferred, as well as second and third options.

Residual land value represents the maximum supportable value and should not be confused with market clearing prices (which should be inherently lower).

Redevelopment Module

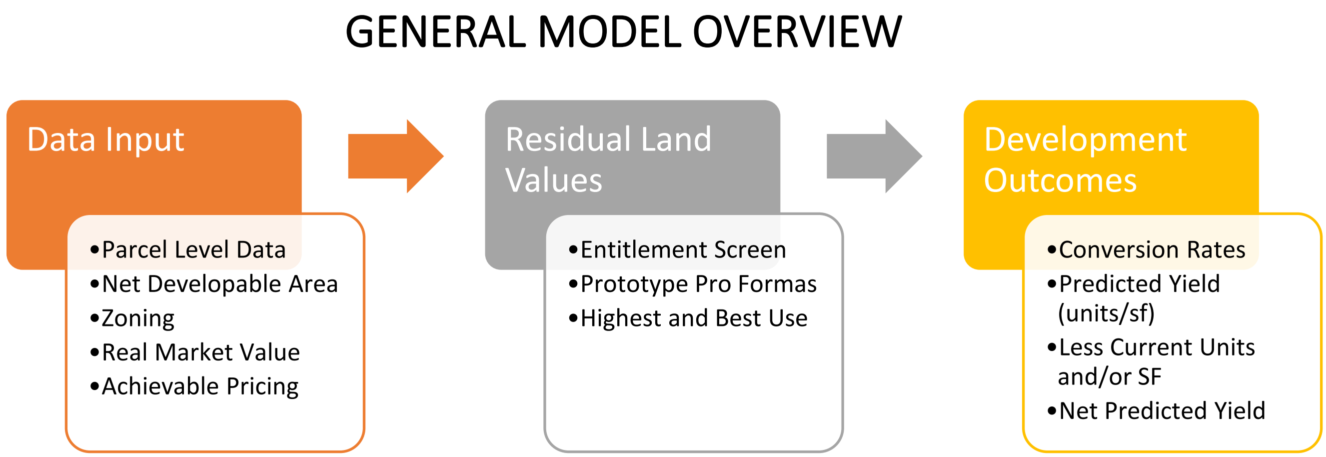
- Categorize parcels into bins based on RMV/Residual ratio and geographic code.
- Apply redevelopment probabilities.
- Predict expected development yield at parcel level.

Market Limit Parameters

- The model allows for demand limits to be placed on output based on a maximum solution for residential units by tenure, office space, retail space, and industrial space.
- The model will sort parcels by likelihood of redevelopment, and when the limit is met will shift the highest and best use determination to the next highest rated use.

Output

- Expected value of predicted development activity and yield within the designated time frame
- Expected value of deduction of current improvements
- Net incremental supportable development capacity
- Output data is printed into a .csv file, which can be imported into a GIS program for further output options.



The model's perspective is intended to mimic that of a developer's, and does not dynamically interact with the demand model. The model will have a tendency to identify a development prototype as highly viable, and this prototype will consistently out-bid alternative uses. The end result is a solution that is highly skewed towards a solution that is immediately viable under current market conditions. If the predicted development output is not consistent with market demand, we would expect the market to respond in ways that reduce the relative return of this product. The market limit parameters component of the model, part of the redevelopment module, is a feedback loop that limits prototype solutions to what can be suported from the demand side.

As an example the model may indicate that rental residential housing is the prevailing development form in most markets where allowed. This output needs to be evaluated in light of market support for this product type. If the model indicates a development output over the next five years of 70,000 new units, while projected demand for rental apartments is only 50,000 units, then the market would be expected to respond with some combination of higher vacancy rates, reduced lease rates, higher capitalization rates, and subsequently lower residual land values. The model in its current form cannot reset these variables dynamically, so we have included the market limit parameters to place demand side limits on the projected development yields. Conversely, if the development is underproducing a product that is demanded we would expect price signals to increase production of that product. A future refinement of this approach would mesh a demand-side model to this model (supply side), allowing for dynamic markt responses to production/demand mismatches.

The model populates a series of fields at the parcel level, which are added to the parcel attributes input from the baseline RLIS/GIS information and input assumptions such as market parameters, financing terms, and construction costs. The highest and best use calculations generate up to three highest and best solutions for each site, as well as the indicated residual land value associatd with each of these uses. The development prediction component of the model sets an assumed conversion rate during the time period based on the RMV/Residual ratio, and well as the predicted yield.

In summary, the model uses the relationship between current value of the property and the indicated value of the property under the highest and best use development prototype as the primary predictive measure of the likelihood of redevelopment.

III. DATA

The model has a series of data requirements in order to run, and this section outlines the sources for this data as well as the processes required to get the data in a format that suports the model.

A. PARCEL DATABASE

The data requirements at the parcel level are relatively simple. This includes physical data such as net developable area, current real market value (RMV), zoning (Metro's simplified zoning), and parcel reference numbers. The parcel database is further refined to include market information. For residential uses, the model uses parcel-specific pricing data, which has been imported to the parcel database to populate the achievable pricing field for these uses. For retail, office, and industrial uses, the parcels are allocated into defined market areas, and assumed achievable pricing is set at the market level and imported into the parcel database for these uses. The parcel database also includes fields to account for current residential units as well as estimated square footage of commerical and industrial space.

The following is a list of the necessary content.

HEADER	CONTENT DESCRIPTION
reference	Tax lot ID
code	Generalized Metro code
code_general	Generalized code category
tract	Census tract
design type	Metro 2040 design type
vac_dev	Current development status
jurisdiction	Jurisdiction
rmv	Total RMV, land and improvements
net_no_row	Net developable area, deducting constraints and ROW
sf	Current sf of improvements
res_rent	Achievable residential rent psf
res_price	Achievable residential price psf
off_rent	Achievable rent psf for office
ret_rent	Achievable rent psf for retail
wd_rent	Achievable rent psf warehouse/distribution
flex_rent	Achievable rent psf industrial flex space
park_rent	Monthly rent for covered and secured parking
park_own	Value of covered and secured parking space
units	Current residential units

The model utilizes a generalized zoning code used by Metro. The codes of individual jurisdictions are converted into this generalized code using a bridge. This approach is required to keep the number of codes manageable at the metropolitan area leve but may not capture specific elements of a jurisdictions's development code. If used for a single jurisdiction or smaller study area, the actual codes could be used. This would require some minor customization.

The model requires an assumption of achievable pricing levels per square foot for residential uses at the parcel level. For the analysis completed in support of the Urban Growth Report these numbers were generated through the development of residential pricing surfaces, which allow for variation in pricing on the parcel level throughout the region. This variable does not require this level of analysis for all applications and can be generated using market areas and or single assumptions for smaller geographic areas.

The following is a summary of the methodology utilized to create the pricing surfaces.

B. Creating Residential Pricing Surfaces

The residential pricing at the site level was generated using the interpolated rental and ownership pricing surface developed in 2016, with the methodology summarized in Appendix A.

The residential pricing surfaces were adjusted upwards based on marginal shifts in rental and ownership residential pricing since the creation of the surfaces in 2016. Rental residential pricing was adjusted based on observed changes in same product pricing from 2016 through 2023 as reported by CoStar, a third-party data provider tracking a significant pool of rental apartment projects. The 2016 gradient was shifted to match the marginal change in rents during that period. The following is a summary of the approach and adjustments.

- Methodological Approach
  - Matched Pair Pricing
    - Observed current quoted pricing for new projects matched against those predicted in the model.
    - Used CoStar quoted rents for new construction and parcel level model predictions.
- Overall Median Market Shift of 111%
- Sharp Split Between Central PDX and Suburban Markets
  - Urban area rents averaged 123% of predicted.
    - Reduced marketability of many areas
    - Elevated vacancy levels in urban areas since 2017
  - Outside of Central PDX the pricing changes were generally consistent at roughly 150% of previously predicted.
    - Some market saw greater increase (Milwaukie)

Ownership pricing was adjusted based on observed sales of new product relative to the predicted achievable pricing in the 2016 gradients. This analysis indicated an overall upward shift in pricing of 11%, with pricing in the suburbs increasing 31% while those in central Portland decreased 10%. The pricing was further adjusted for several specific communities that have seen more significant pricing changes during this period.

Adjustments to Pricing

Overall Metro	
Median	111%
Average	112%
Central PDX	
Median	90%
Average	92%
Suburbs	
Median	131%
Average	127%

- Methodological Approach
  - Matched Pair Pricing
    - Observed last quarter new home sales matched against predicted in model.
    - Used recorded RMLS sales data and parcel level model predictions.
- Overall Median Market Shift of 111%
- Sharp Split Between Central PDX and Eastside/Suburban Markets
  - Likely reflects reduced marketability of urban area as well as interest in condominiums.

  - Outside of Central PDX the pricing changes were largely consistent.
- Final Adjusted Gradient split adjustment

The final pricing gradients were merged with the parcel level data for use in the model.

C. Office, Industrial, and Retail Pricing Analysis

In addition to the normalization of apartment rental data, the model requires lease rate assumptions for office, retail, and industrial properties. These assumptions were created using a submarket approach. Rent levels were adjusted to reflect triple-net (NNN) rents, i.e., rents in which ancillary costs are not factored.

The submarket approach can capture the differences in achievable lease rates throughout the Metro area but is not able to pick up the differences that exist on a more micro level. As residential pricing can differ substantially within a short distance, so, too, can rents for office, industrial, and retail properties, though not, perhaps, to the same extent as their prices are generally more homogenized across broader areas.

The following tables summarize the assumed pricing for the delineated submarkets for office, retail, and industrial uses.

Submarkets and Assumed Achievable Pricing, NNN Lease Rates

	Office	Retail
217 Corridor Beaverton	$28.00	$33.60
CBD	$32.00	$43.20
Close-In NE	$27.00	$33.60
Close-In SE	$29.00	$38.40
Close-in SW	$25.00	$36.00
Columbia Corridor	$23.00	$24.00
Cornelius Forest Grove	$19.00	$22.80
East-Mid	$24.00	$28.80
	$24.00	$28.80
I-5 South Corridor	$23.00	$28.80
Kruse Way	$26.00	$36.00
Milwaukie and Clackamas	$23.00	$26.40
Northwest	$28.00	$36.00
Outer NW	$19.00	$21.60
Outer SE	$20.00	$24.00
Sellwood-Westmoreland-Woodstock	$26.00	$31.20
Sunset Corridor	$22.00	$30.00

WD/Flex	W/D	Flex
217 Corridor Beaverton	$9.80	$19.60
CBD/NW/Guilds Lake	$13.30	$26.60
Milwaukie and Clackamas	$9.80	$19.60
Close-In Eastside	$17.50	$35.00
Cornelius Forest Grove	$6.30	$12.60
Hayden Island	$8.40	$16.80
I-5 South Corridor	$9.10	$18.20
Columbia Corridor	$9.10	$18.20
Outer SE	$10.50	$21.00
Rivergate	$7.00	$14.00
Sunset Corridor	$9.10	$18.20
Close-in SW	$11.90	$23.80
Swan Island	$8.40	$16.80

D. Use of Generated Achievable Pricing Assumptions

The pricing assumptions for residential, commercial, and industrial space were used to populate the parcel database that is fed into the model (parcel.csv file). Each parcel evaluated is assigned an achievable pricing parameter based on the preceding work, which then feeds into the prototype pro formas to generate associated supportable residual land values.

IV. Estimation of Redevelopment Probabilities/Backcasting

A key variable in estimating the likelihood of development/redevelopment activity is the assumed probability of development/redevelopment within a time frame. This factor is expected to vary by region and was established within the modeling framework using a backcasting exercise. This exercise was deemed necessary to calibrate the model by means of predicting development over an extended period and comparing that predicted level of development to *actual* observed rates of development. This approach was used for two time periods. The first of these was 2000 through 2015, with that analysis completed in 2017. A second analysis was completed for activity between 2015 and 2021. The two periods reflect several business cycles with significant recessions.

The approach used the modeling framework previously outlined to determine the RMV/residual value calculations at the parcel level in 2015, and then matched observed development activity at the parcel level through 2022. Market and financial variables used in the model were based on 2015 data provided by Johnson Economics, while construction activity was based on data collected by Metro. The modeling was done on five major zoning designations:

- Multifamily Residential
- Mixed-Use
- Single Family Residential
- Commercial
- Industrial

Parcel and pricing data at the parcel level was available from the 2017 analysis. Sites were aggregated based into five categories of RMV/Residual ratios:

- Less than 0.75
- 0.75 to 1.25
- 1.25 to 2.00
- 2.00 to 4.00
- Greater than 4.00

Over 178,000 parcels were evaluated, of which over 127,000 were single family residential, almost 30,000 multi-family, 16,700 mixed-use, 1,278 commercial, and over 3,400 industrial.

Calculation of Development/Redevelopment Conversion Rates

The observed development activity was matched with the parcels by RMV/Residual ratio, providing for an observed development/redevelopment rate by category. As summarized in the following table, the overall rate of development/redevelopment over the 6-year observation period was 2.58% of parcels, with the rate of redevelopment sharply higher on parcels with a low RMV/Redevelopment ratio. This is consistent with the expectations that parcels with a lower current value relative to the parcel's residual value would be expected to redevelop at a significantly higher rate. It should be noted that this category includes vacant land. The redevelopment rate when adjusted for acreage increases to 7.05%, reflecting a higher likelihood of redevelopment on larger parcels. This likely includes the inclusion of a number of larger vacant sites.

The resulting pattern of observed development relative to the RMV/Residual ratio was largely consistent with expectations. One notable exception was a higher observed rate of redevelopment for industrial properties with a ratio of .75-1.25. A potential explanation for this is shifting needs of industrial tenants necessitating significant investments in already improved properties.

The following figures summarize the observed rate of development/redevelopment, sorted by RMV/Residual ratio and broad land use category.

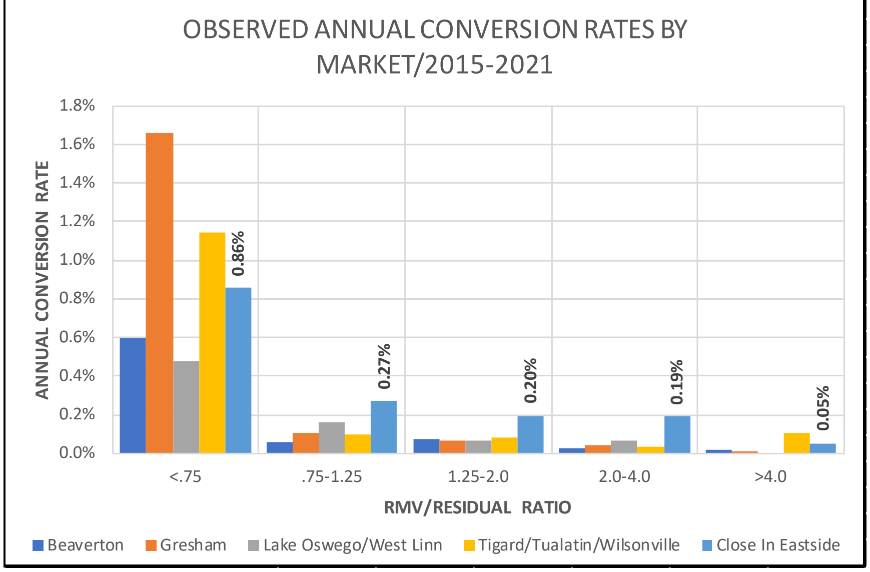
SUMMARY OF OBSERVED DEVELOPMENT RATE BY RMV/RESIDUAL RATIO, 2015-2021

	RMV/Residual Ratio					
	<.75	.75-1.25	1.25-2.0	2.0-4.0	>4.0	Total
TOTAL						
Total Parcels	78,222	50,505	24,751	12,697	12,302	178,477
Developed Parcels	3,879	509	135	48	26	4,597
% Developed	4.96%	1.01%	0.55%	0.38%	0.21%	2.58%
Total Acres	23,600	7,239	4,378	1,944	485	37,647
Developed Acres	2,371	199	47	34	4	2,654
% Developed	10.04%	2.74%	1.08%	1.73%	0.74%	7.05%
MFR						
Total Parcels	9,630	3,349	5,122	5,702	5,877	29,680
Developed Parcels	491	28	13	4	12	548
% Developed	5.10%	0.84%	0.25%	0.07%	0.20%	1.85%
Total Acres	1,484.0	481.6	486.0	195.5	96.4	2,743.5
Developed Acres	153.6	10.8	9.2	3.5	0.1	177.3
% Developed	10.35%	2.24%	1.89%	1.79%	0.12%	6.46%
MUR						
Total Parcels	6,693	2,315	1,509	1,906	4,318	16,741
Developed Parcels	729	117	52	13	10	921
% Developed	10.89%	5.05%	3.45%	0.68%	0.23%	5.50%
Total Acres	2,267.6	597.9	401.1	375.4	181.0	3,823.0
Developed Acres	367.7	29.1	23.9	10.0	0.9	431.5
% Developed	16.21%	4.87%	5.97%	2.65%	0.48%	11.29%
SFR						
Total Parcels	60,470	44,054	17,342	3,881	1,581	127,328
Developed Parcels	2,571	318	50	11	0	2,950
% Developed	4.25%	0.72%	0.29%	0.28%	0.00%	2.32%
Total Acres	16,680.9	5,325.1	2,403.5	423.6	27.8	24,861.0
Developed Acres	1,468.2	72.1	6.3	2.0	0.0	1,548.6
% Developed	8.80%	1.35%	0.26%	0.47%	0.00%	6.23%
COM						
Total Parcels	242	198	271	324	241	1,276
Developed Parcels	11	2	3	5	4	25
% Developed	4.55%	1.01%	1.11%	1.54%	1.66%	1.96%
Total Acres	416.7	128.0	245.2	367.6	97.2	1,254.7
Developed Acres	35.0	0.7	0.8	10.8	2.6	49.9
% Developed	8.40%	0.53%	0.34%	2.93%	2.69%	3.98%
IND						
Total Parcels	1,187	589	507	884	285	3,452
Developed Parcels	77	44	17	15	0	153
% Developed	6.49%	7.47%	3.35%	1.70%	0.00%	4.43%
Total Acres	2,751.1	706.5	842.5	581.9	82.3	4,964.5
Developed Acres	346.0	85.9	7.0	7.4	0.0	446.3
% Developed	12.58%	12.15%	0.83%	1.28%	0.00%	8.99%

The analysis was converted into an average annual conversion rate (% of parcels developed) for the period. The following tables summarize the results by selected jurisdictions and use categories.

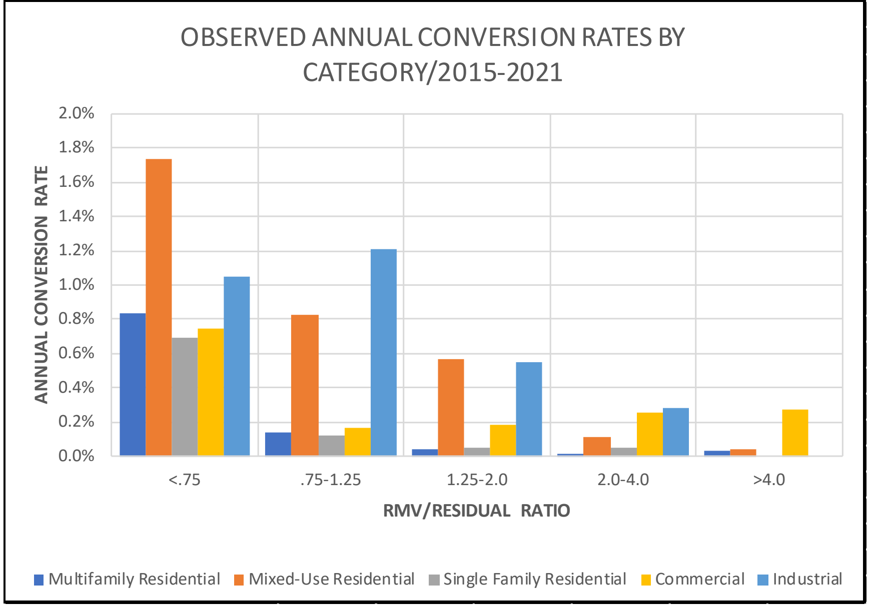
Summary of Annual Conversion Rates by RMV/Residual Ratio and Jurisdiction, 2015-2021

	RMV/Residual Ratio					
	<.75	.75-1.25	1.25-2.0	2.0-4.0	>4.0	Total
Beaverton	0.60%	0.06%	0.07%	0.02%	0.02%	0.14%
Gresham	1.66%	0.11%	0.07%	0.04%	0.01%	0.29%
Lake Oswego/West Linn	0.48%	0.16%	0.07%	0.07%	0.00%	0.33%
Tigard/Tualatin/Wilsonville	1.14%	0.09%	0.08%	0.04%	0.10%	0.40%
Close In Eastside	0.86%	0.27%	0.20%	0.19%	0.05%	0.62%
OVERALL	0.83%	0.17%	0.09%	0.06%	0.04%	0.43%



Summary of Annual Conversion Rates by RMV/Residual Ratio and Land Use Category, 2015-2021

	RMV/Residual Ratio					
	<.75	.75-1.25	1.25-2.0	2.0-4.0	>4.0	Total
Multifamily Residential	0.83%	0.14%	0.04%	0.01%	0.03%	0.31%
Mixed-Use Residential	1.74%	0.83%	0.57%	0.11%	0.04%	0.90%
Single Family Residential	0.70%	0.12%	0.05%	0.05%	0.00%	0.38%
Commercial	0.74%	0.17%	0.18%	0.26%	0.27%	0.32%
Industrial	1.05%	1.21%	0.55%	0.28%	0.00%	0.73%
OVERALL	0.83%	0.17%	0.09%	0.06%	0.04%	0.43%



The results of this analysis were joined with those of the preceding analysis to assess average redevelopment rates from 2000 through 2021. The combined annual conversion rates by RMV/Residual ratio for the period was as follows:

RMV/Residual Ratio	< 0.75	0.75-1.25	1.25-2.00	2.01-4.00	> 4.00
Annual Conversion Rate	0.964%	0.43%	0.16%	0.054%	0.054%

While the preceding methodology provides for a range of assumptions that are empirically derived, ongoing use of the model will ongoing data to update these assumptions in subsequent periods. When the model is run, it generates indicated RMV/Residual ratios at the parcel level for each parcel evaluated. This datafile should be dated and preserved. Metro currently tracks marginal development activity at the parcel level, which can be matched to the parcels evaluated with the model. Over time, an updated conversion ratio can be generated based on observed redevelopment patterns. This should be added to the base layer over time, modifying the results. Ideally the backcasting will include a rolling period of fifteen to twenty years, allowing for multiple business cycles. The rate and pattern of redevelopment varies significantly within a business cycle, and short-term patterns may not be indicative of what should be used for a longer-term forecast.

The model should continue to be refined going forward, and ongoing monitoring and backcasting of the model should increase its reliability.

V. Prototype Screening

The prototypes evaluated on individual parcels were limited based on entitlements. Current simplified zoning designations used by Metro and available for all parcels within the UGB were used. A matrix of allowed prototypes by zoning designation was used, which limits prototypes considered to those that are consistent with current entitlements.

The model is structured to evaluate a total of 43 prototypical development programs, covering a range of land use categories as well as construction types. The general use types evaluated include office, retail, industrial, rental residential, and ownership residential. These are modeled using simplified pro formas, which are designed to yield supportable residual property values associated with the development of each of the programs under the assumptions used.

The following are the basic program parameters of the prototypes used. The prototypical development programs are listed across the top, with assumptions for each listed in the column below:

Summary of Development Prototypes

	FAR	Efficiency Ratio	Parking Per 1,000	% Structured
INDUSTRIAL				
Warehouse / Distribution	0.33	100%	1.00	0%
Fullfillment Center	0.25	100%	3.50	0%
Data Center	0.33	100%	0.40	0%
Manufacturing	0.25	100%	3.00	0%
Multi-Tenant Flex	0.28	100%	1.00	0%
OFFICE				
Office high rise	7.50	90%	1.50	100%
Office mid/struc	3.75	90%	1.50	100%
Office mid / ext. struc	2.00	90%	1.50	85%
Office mid/surf	0.50	90%	1.50	0%
Office high rise - CC	7.50	90%	0.50	100%
Office mid/struc - CC	3.75	90%	0.50	85%
Office mid / ext. struc - CC	2.00	90%	0.50	85%
Office high rise - LP	7.50	90%	1.00	100%
Office mid/struc - LP	3.75	90%	1.00	100%
Office mid / ext. struc - LP	2.00	90%	1.00	85%
Office mid/surf - LP	0.50	90%	1.00	0%
Office low rise	0.30	100%	1.50	0%
RETAIL				
Multi-Story Structured	1.00	90%	3.50	85%
Single Story Structured	0.50	100%	3.50	85%
Single Story Surface	0.30	100%	3.50	0%

	Units/ Acre	Unit Size (SF)	Efficiency Ratio	Parking Ratio	% Structured
RENTAL RESIDENTIAL					
Rental high rise	400.0	725	85%	1.00	100%
Rental Mid Rise w/ Garage	225.0	750	85%	1.00	100%
Rental 5 over 2	225.0	750	85%	1.25	100%
Rental 4 over 1	170.0	750	85%	0.75	100%
Rental high rise-IZ	400.0	725	85%	0.25	100%
Rental Mid Rise w/ Garage - IZ	225.0	750	85%	0.25	100%
Rental 5 over 2 - IZ	225.0	750	85%	1.25	100%
Rental 4 over 1 - IZ	170.0	750	85%	0.75	100%
Rental 5-story wood w/surf	90.0	750	85%	1.25	0%
Rental 4-story wood w/zero	120.0	750	85%	0.00	0%
3-story garden w/surf	35.0	750	100%	1.50	0%
Rental Plexes	16.0	750	100%	1.25	50%
Rental 3-story Townhome	20.0	1,000	100%	1.50	50%
Rental_Middle_TypeV	16.0	750	100%	1.25	50%
OWNERSHIP RESIDENTIAL					
Condo residential high rise	400.0	775	83%	1.50	100%
Condo Mid Rise w/ Garage	250.0	775	83%	1.50	100%
Condo 5 over 2	210.0	775	85%	1.50	100%
Condo 4 over 1	170.0	775	85%	1.00	100%
Condo 3-story wood w/surf	35.0	800	100%	2.00	0%
3-story wood townhome	22.0	1,250	100%	2.00	50%
For-Sale Duplexes	16.0	1,250	100%	2.00	50%
Small Lot Detached	18.0	1,750	100%	2.00	50%
Detached Single Family	8.7	2,800	100%	2.00	50%

The 43 prototypes were cross referenced with Metro's 54 simplified zoning codes, enabling the model to determine which prototypes are entitled at the site level.

The prototype models are reliant upon a series of assumptions, many of which are highly variable over time. One of the key determinants of residual land value is the capitalization rate. This rate is a real estate valuation measure and is calculated as the ratio between the net operating income produced by an asset and the market value. As an example, an asset with an annual net income stream of $100,000 per year would be worth $1,000,000 if the capitalization rate was 10%, or $2,000,000 if the capitalization rate was 5%. The lower the rate, the lower the rate of return an investor will accept to hold that asset. The rate fluctuates based on the perceived risk in the asset class, as well as alternative available returns. Construction costs are also highly variable and are more difficult to establish.

For both capitalization rates and construction costs, we would recommend that periodic updates revise the assumptions based on a survey of local brokers and general contractors. A simple matrix of cost assumptions corresponding to the data included in the model could be circulated to update assumptions. As the model is intended for use in a regional forecasting context, with a forecasts period of decades, there is little input that these groups will likely be able to offer in terms of long-term assumptions. Setting the capitalization rate at a risk premium vis-à-vis a commonly forecasted variable such as treasury rates would allow for setting assumptions in out years.

Additional Comments

- The model does not address brownfield redevelopment, or other unusual site costs and infrastructure requirements to develop properties. While we recognize that these are important considerations, it is not within the scope to generate this specificity of analysis. There is a high level of uncertainty and wide cost variances, and it would require significant effort to refine these assumptions at the regional level. We would suggest that the results of the model be open to the input of jurisdictions and/or interested parties that either have or can generate information pertinent to specific properties.

- The model does not reflect any interaction to influence development outcomes. Market interventions such as active public investment to offset costs, property tax abatements, new market tax credits, and low-income housing tax credits can substantively impact development viability. As with brownfield and unusual site-specific costs, jurisdictions could be allowed the opportunity to provide additional information that can refine the output of the model.

VI. Residual Land Value Calculations

A series of simplified pro forma models are used to calculate supportable residual land values. These models incorporate the assumptions on cost, revenue, operating costs, and return parameters. The models are static and the unleveraged return on cost is used as the measure to establish supportable residual values. For income property types we use the net operating income (NOI) in the first stabilized year of occupancy, while ownership residential uses a return on cost after sales costs.

The model is structured to evaluate the allowed prototypical development programs, based on the market assumptions provided. These are modeled using highly simplified pro formas, which are designed to yield supportable residual property values associated with the development of each of the programs under the assumptions used. The output of the pro formas is evaluated and a highest and best use determination is made for each parcel. The full pro formas using a hypothetical set of assumptions is included in the appendix.

The pro formas for each of the land use types reflects a relationship between achievable pricing, development form, and indicated residual land values. The construction types vary in cost as well as yield, with construction types with high yields in terms of density typically being costlier to construct. In markets in which pricing is adequate to support higher density development forms, these forms will be able to outbid lower intensity development solutions for land. The residual land value in the model is a function of achievable pricing and yield by prototype, with the prototype that supports the highest residual land value representing the "highest and best use" of the property.

A total of up to three highest and best use solutions is derived for every parcel. The second and third alternatives will support lower residual land values, and therefore not represent the highest and best use in an unconstrained situation, there are instances in which the demand side of the equation will preclude the initial indicated use type.

Additional details on the pro forma models are included in Appendix B.

VII. Redevelopment Predictions

The highest and best use determination is reconciled with information specific to the study area to generate a prediction of new development activity. As outlined previously, each parcel is assumed to have a higher probability to develop or redevelop under the indicated highest and best use program when the market value of the property in its current use is close to or below the supportable residual property value.

The ratio generated by dividing the RMV/SF by the residual value per square foot is used as an indicator of a parcel's likelihood of development. The model sets expected values of development at a parcel level, as opposed to specific predictions. The output is best viewed at an aggregated level, as individual parcel information will reflect only a shift in development probability and the resulting expected value of development.

Individual parcels are evaluated based on their RMV/Residual ratio, as well as their indicated highest and best use development prototype. The model applies the development/redevelopment rates derived from the backcasting exercise summarized earlier and produces an expected value of development from these sites.

Market Limit Feedback

The previous steps in the model will solve for a highest and best use solution that is not limited by market demand. To the extent that the highest and best use solution delivers product in a quantity that is above what the market demands, then we would expect that market forces would shift in a way that reduces the yield for that development type. This would then reduce indicated residual land values, as the highest and best use would then shift to a prototype that supports less in terms of value.

The model allows the user to place limits on the predicted development output by major land use type. For each parcel, the model will output the highest and best use determination and associated indicated residual value, as well as a second and third option. These will be determined in the same manner as the initial highest and best use determination but will be restricted to a separate broad land use category. The following are the broad categories that output will be limited at:

- Industrial
- Office
- Residential Ownership
- Residential Rental
- Retail

The model has a cascading function which works as follows if limits are set:

- All the prototypes are calculated per parcel.
- The resulting rows are sorted descending by residual property value per square foot.
- Starting with the prototype that yielded the highest residual property value per square foot and working down, each prototype is compared to the limit if it is set for that prototype class.
  - Residential limits are expressed in number of units.
  - Commercial/Industrial limits are expressed in square feet.
- If the limit has not been reached, the row is preserved, and the counter is incremented.

- If the limit has been reached, the row is not included in the output file, and all remaining highest and best use solutions for that parcel are promoted. I.E the previous #2 use will be the new #1 use.

Conversion to Net

The model is designed to predict anticipated development/redevelopment activity. For the Urban Growth Report (UGR), it is necessary to convert this activity to net gain in capacity. The calculation to do this is a simple deduction of current capacity, expressed in terms of residential units, office, retail, and industrial space. The estimates of current capacity are developed in the baseline data file fed into the model.

An example of a net conversion would be redevelopment of a current single-family home into a tri-plex unit. The new development of three units would replace a single unit, yielding a net gain of two units.

Redevelopment of parcels does not always yield a net increase in capacity, as new development is not always at a higher intensity than previous development. This is primarily true for use types such as industrial space, with new development often having similar or lower floor area ratios (FAR) relative to existing development. As a result, the model may predict redevelopment of industrial property, which would yield development that is more marketable, but not necessarily representing a net increase in industrial space.

APPENDIX A: PRICING GRADIENT METHODOLOGY DETAILS

The following documentation is from a 2017 study[1] prepared for Metro.

A. CREATING AN INTERPOLATED RENTAL SURFACE FROM RAINMAKER AND AXIOMETRICS APARTMENT RENTAL DATA

Purpose

Johnson Economics has set forth to generate a map showcasing existing rents throughout the Metro area. Whereas previous versions of this analysis divided the Metro area into areas with set rental prices based on surveyed properties, this analysis would use interpolation methods in GIS software to set the rental prices at the tax lot level.

Obtain rental data

Before this project started, Johnson Economics had created an interpolated rental grid for use in other projects. To collect data, Johnson Economics surveys rental properties by using apartment complex websites and calling the complexes and talking to leasing agents directly. By obtaining rents, square footage and, most importantly, the number of each type of floor plan (sometimes given actual rental rolls), we can calculate accurate blended per-square-foot rental averages for the complexes. Though the process is more time consuming up front than, say, data obtained by web scraping, the data obtained is of very high quality, which makes interpolation of the rents after this collection very straightforward after normalization.

Metro provided Johnson Economics with two different rental data sets: Rainmaker and Axiometrics. Rainmaker is a web-scraping tool that searches apartment sites and other listing sites such as Craigslist for rents. Axiometrics is a survey-based panel that contains information on just under 400 different properties in the Oregon Metro area.

Cleaning of Rainmaker Data

The Rainmaker data consists of over 1.6 million observations from mid-2011 to mid-2016. Though large in number, the data is chaotic and includes several issues that need to be addressed. Though rents and square footage are included in the data, it is not possible to discern the number of each type of unit in each complex, making the previous method of attaining blended averages moot. Further complicating the issue is that individual properties have a wide range of observations, ranging from 1 to over 1,900. While we could evenly spread surveys geographically in our original interpolation method, this clustering of data presents problems. Using the data as is would mean not using apples-to-apples comparisons.

Johnson Economics and Metro communicated on several occasions to determine how best to move forward with this issue. The first idea was to round rents to the nearest $10 to $50 to see if that would make a difference. It was then suggested to just take averages for each complex, which makes some sense on the surface. However, upon further reflection, this proved to not be the correct way to proceed. In the Rainmaker data, we are presented with one rent per floor plan, not for an individual unit (at least, not in complexes; single family housing units in this data were another matter altogether). As such, we may see rents for one studio plan, two different one bedroom, and two different two bedrooms. Averaging them would, clearly, be better than not. However, it would also be misleading. What if, for instance, the above imagined complex had 40% of its units as studios? If that is the case, then the PSF averages calculated without that knowledge would vastly underestimate the PSF averages for that building.

Johnson Economics thus decided that the best course of action was to aggregate rents into larger areas. Aggregation was first tried at the census block group level, but that quickly proved too small for this analysis. Instead, aggregation by neighborhoods as defined in the Oregon Metro Regional Land Information System (RLIS) was determined to be the best course of action. While not perfect, the resulting numbers better reflect potential unit mixes in the areas and begin to give a better reflection of underlying rents in the Metro area. As will become clear in the following section, the Axiometrics data is much more streamlined and avoids many of these pitfalls.

[1] Johnson Economics, Developer Supply Preprocessor Documentation, Metro, December 2017

Before processing the data in Stata, it is necessary to preprocess the data using GIS. The CSV of the Rainmaker data is loaded into QGIS. The data expands beyond the boundaries of Oregon Metro proper, crossing the Columbia River and including such areas as Vancouver, Washington. These outlying areas are excluded by clipping the data with the Metro area's geographical boundaries. The data is then intersected with the Metro neighborhood and tax lot layers. By using the tax lot layer, we can join Metro's affordable housing layer for use in cleaning the data. The data is then exported into a new csv file.

The Rainmaker data we obtained from Metro had already been cleaned before it was given to Johnson Economics. Metro removed over 80% of the observations, reducing the final count to just over 300,000 from more than 1.6 million. The removed observations were deemed to be duplicates in the data after accounting for address, list year/quarter, bedrooms, and price. Square footage was not considered in this process as many of the Rainmaker observations were missing this variable.

Square footage, however, is an essential piece of this analysis. Because of this, one of the first steps in the cleaning process is to remove any listings without this information. After removing these, the next step in the cleaning process is to look at the rental types. Rainmaker classifies observations into several different categories, including apartments, single family residences, mobile homes, condominiums, and time-depended units such as executive suites. For our purposes, we wanted to whittle these categories down to apartments only.

Upon close inspection of the data, however, there are many instances where categories do not match the notes in the observation. For instance, there are quite a few instances where well known apartment complexes in the Portland Metro area are listed as single-family residences even though that is clearly not the case. As such, code needs to be written to cycle through the observations to search for key words and reclassify the rental types based on names of complexes and certain key words. So, for example, we search the notes column for the word “house” and relabel the rental type as SFR.

Observations listed as duplexes/triplexes, townhomes, time (short-term rentals, such as executive suites), single family residences, mobile homes, and condominiums are all removed from the data in the cleaning process. As this Rainmaker data is to be combined with data from Axiometrics—which has only apartment units—the decision to remove these is made for consistency across the data sets. Future iterations of this work could take advantage of the many different housing categories present in this database. For instance, it may be interesting and useful to compare how rents in single family residences are changing compared to those of condominiums and apartments.

Bedrooms and bathrooms in the Rainmaker data are presented as strings. Additionally—like the rental type variable—there are issues with consistency in the observations. For instance, apartments with 1 bath and a partial bath are listed as having either 1.2, 1.3, 1.5 or 1.7 baths. We call these “1.5” baths. Similarly, 2-bedroom units are listed as “21BR”, “22BR”, or “2BR”. These are all simply renamed “2Bed” for the purposes of this analysis. The renamed strings are then turned into integers for use in hedonic regression analysis.

Given that we almost never see new apartments built with over 4 bedrooms or 3 baths, all observations with either of these are dropped. Similarly, almost all new units that we see are between 350 square feet and 1,600 square feet. As such, units outside of this range are eliminated. There is another reason for this as well. We have recently seen several “micro-apartments” being built in the Metro area. However, as these units are often no bigger than 150 square feet, the per-square-foot values (on which the interpolation is built) become problematic. These units can easily fetch $5-6 PSF or more, which is higher than penthouse units in high-end towers near the central business district.

We next concatenate year and quarter. After sorting it, it becomes clear that there are very few observations before the third quarter of 2011. As such, these, too, are dropped. At this point, we drop all observations that are identified in the data as affordable. As our model predicts market-rate apartment development, these need to be removed. After removing the layer, there are still many observations that fall well below what we observe to be market-rate in 2016. We rarely, regardless of size, see any apartments renting under $1.10 PSF, and certainly not below $1.00 PSF. These are conservative numbers. Still, we need to have a cut-off point and chose $1 for the purposes of this analysis.

This, of course, is just relevant for 2016 data. We assume a 10% gain in PSF per year and go backwards in time dropping anything below adjusted thresholds. Again, we are being very conservative here and are still likely keeping some observations that are not entirely relevant.

At this point, we need to think of the age of a property. If we include anything built before 2000, there is a strong possibility that renovations may have been done to the property. For example, Lumina apartments in Gresham was built in 1994 and just recently finished renovations in their buildings. PSF values shot up dramatically. As the Rainmaker data does not denote which complexes have been renovated, we simply drop any observations built before 2000.

Cleaning of Axiometrics Data

To expand the number of points for use in rent interpolation in GIS software, Metro obtained apartment rental data from Axiometrics. Unlike the web-scraped data from Rainmaker, Axiometrics data is a panel based on monthly surveys. In the Oregon Metro region (including Clark County, Washington), there are 388 properties with a combined 2,999 floor plans and 74,494 units represented in the dataset.

Whereas the Rainmaker dataset was missing a lot of data points, the Axiometrics dataset has complete information for all properties represented. So, for instance, square footage of every property floor plan is listed. More importantly, the Axiometrics data includes the unit count for each type of floor plan, which makes finding weighted per-square-foot rent averages much more straightforward to calculate. Despite the much more complete nature of the data, some cleaning of the data was necessary to keep assumptions like those of the Rainmaker data.

Before doing anything in Stata, the CSV file was imported into QGIS. The data was then clipped with the most recent Metro boundary layer to ensure that no points from Clark County or other outlying areas was included. Additionally, the data points were joined with Metro's RLIS neighborhood layer. After these adjustments, the data was imported into Stata for cleaning.

As the Rainmaker rent data was given as individual points, the Axiometrics data was expanded from floor plans into individual units. For instance, if an apartment's 1B/1b floor plan had 10 units, the data point was expanded into 10 identical data points. This has the benefit of matching the type of data with Rainmaker while simultaneously expanding the number of observations. Note: It is reasonable to assume that there is within floor plan variation of rents. For instance, premiums are often given to units that are on higher levels in a building as they often have a view. However, given that this information was not present, the decision was made to keep all expanded rent levels at the average listed in the Axiometrics data.

Secondly, as in the Rainmaker data, units with square footage of less than 350 or greater than 1,600 were removed. As mentioned previously, beyond a small amount of so-called "micro studios," apartments in these sizes are simply not being built and are not reflective of regular market rate rents that will likely be built in the future. Even if micro-studios are built in the future, we find that they are a much different product than the other market-rate units used for the purposes of this study; they tend to be priced no lower than $5-6 per square foot, well above even the highest levels seen in the Portland central core.

As stated above, we are interested in newer properties for this analysis. As we do not have data on the types of materials used for building the properties and the amenities that they may have, we use year built as a proxy for this. While the Axiometrics data includes whether a property has been rehabbed, we drop observations for apartments built prior to 2000 to keep as much consistency as possible with the Rainmaker dataset.

In the Rainmaker dataset, we removed any properties with per-square-foot rents of less than $1 to weed out potential affordable properties. However, after removing the properties built before 2000, no such observations existed. Consideration was taken to try and remove properties on the high end to try and account for penthouse units. However, given the wide spectrum on which different properties price their units, we did not feel that there was a sufficient foundation to decide on these price cutoffs. Given extra time, future studies could attempt to incorporate this information by doing more detailed surveys of properties. As it is, all remaining units were left in the data.

Normalization Process

Note, please see the appendix for output and a more detailed explanation of results. We also offer suggestions for future iterations of this work using quantile regression as there seems to be clear shifts in effects at difference price levels. Further information can be gleaned from Stata .do files for this project, which will likely be converted into R during future iterations of this work. We will now cover the process that we followed from a broader perspective.

Because of the spatial gaps present in the Rainmaker data, it was necessary to include observations further back than the current quarter. Future iterations should aim to simply include the most recent quarterly information, if possible, but it was our judgment that this was not ideal with the data given. As such, we needed to find a way to deal with the time variables.

The Axiometrics data is a balanced panel. Information is gathered on a set number of properties on a monthly basis by employees making direct calls to property management for the most current information. If a panel regression had been necessary (it was not), it would have been straightforward to implement. The Rainmaker data, on the other hand, is “scraped” from the web from a variety of sources. Whereas you have properties repeated on a consistent basis in Axiometrics, this is not so in the Rainmaker data. Some properties have one observation over several years of data while others have hundreds or—in some more extreme cases—thousands. One could, theoretically, create a panel from this, but it would be overwhelmingly unbalanced. We cannot justify use of panel regression.

Instead, attempt two different analyses with the creation of time indicator variables. The data given is quarterly. We create dummies for year, quarter, and a newly created variable YearQuarter, which is a combination of the two. In the first analysis, we use our intended independent variables plus year and quarter. In the second, we use the same variables and the YearQuarter variable. Both results are, not surprisingly, remarkably similar and included in the appendix. We would hope that future Rainmaker data is more thorough and only has to focus on the most recent quarter, eliminating the need for this process.

In addition to these time dummies, we control for spatial autocorrelation with the inclusion of an indicator variable for neighborhood. Neighborhoods are a catch-all of sorts for many variables that are often included in hedonic regressions, such as distance to schools, walk score, transit score, income levels, education levels, median age, etc. When one chooses a home to rent or own, they may certainly do so because of a single issue such as the strength of a school for their children. One might also simply choose a neighborhood because it is attractive for prospective renters/buyers at the aggregate level. Given time, future iterations could certainly be more detailed and include any number of variables. We do not do so at this stage.

Other than the time indicator variables (not shown below), the variables included in the Rainmaker and Axiometrics regressions are the same and follow the equation specified below:

$$PSF = \alpha+\beta_1*(SquareFeet)+ \beta_2*(Beds)+\beta_3*(Baths)+\beta_4*(YearBuilt)+ \beta_{5+}*(Neighborhood)+\varepsilon$$

Heteroscedasticity is assumed and, upon testing, shown to exist. We adjust for this by using the Huber-White Sandwich Estimator when running the regressions. Using the coefficients resulting from the regression, we normalize the current rent levels to that of a *newly built* 750 square foot, 1-bedroom, 1-bath apartment. This new variable, PSF750, is calculated using the following equation:

$$PSF750 = PSF+(750-sqft)* \beta_{SquareFeet}+(1-Beds)* \beta_{Beds}+(1-Baths)* \beta_{Baths}+(2016-year\_built)* \beta_{YearBuilt}$$

GIS Process

1. **Interpolation of Rents (In QGIS; the steps will be similar, but not exactly the same in ArcGIS)**
    a. Using the RLIS neighborhood layer, create neighborhood centroids.
    b. Join the information just generated in Stata to this centroid layer using the neighborhood name.

    Create Interpolated raster grid in QGIS

    c. Under Vector→Raster tools, click on "Multilevel B-Spline Interpolation"
    d. Choose the point layer (the MF Comp data)
    e. Choose normalized PSF as your Attribute on which to interpolate
    f. Under Method, change to "With B-Spline refinement"
    g. Leave Output Extent blank
    h. Make cell size no less than 100 feet, preferably a bit larger, say, 500 ft. Processing takes a much longer time the smaller the cells are.
2. **Obtain relevant tax lot layer**
    a. Do NOT clip to your final shape until the end.
    b. If you want to make processing quicker, you can create a ¼ mile buffer around your desired study area. However, clipping to the final shape proper will likely mean missing certain important lot centroids.
3. Create a layer for tax lot centroids.
4. Intersect the centroids layer with zoning.
5. Use the QGIS tool "Add Grid Values to Points"
    a. Under Raster→Vector tools
    b. Choose the Tax lot/Zoning points later.
    c. Choose the interpolated grid created in Step 3.
    d. Choose "Inverse Distance Interpolation" [2] as your interpolation method. There are several others if you so choose. The choice matters less the more input points you have.
6. Join the newly created point layer to the original tax lot polygon layer (or the clipped and buffered tax lot layer as explained in Step 4).
7. Save this as its own file, then remove the join.
8. Remove any duplicate columns.
    a. Make sure to leave in the zoning and PSF columns.
9. *Now* you can clip to the final shape.
10. Extract the table as a csv for use in the BLI modeling in Excel.
11. Display the PSF rent gradient with graduated colors. Use the following:
    a. Start with < $1.50 and then increase by $0.25 increments. End with >$3
    b. Alternatively, the map can be broken up with Jenks natural breaks. However, the former method would certainly be more intuitive for a wider audience should the maps be published.

B. Creating an Interpolated Ownership Residential Sales Surface from County Assessor Data

Purpose

Because the implementation of the interpolated multifamily rental surface for the Metro area was successful, Johnson Economics wanted to determine the potential of creating a similar surface for ownership residential sales. Instead of normalizing to a set home size and other characteristics, Johnson Economics thought that it would also be pertinent to normalize the pricing to lot square footage. As with the multi-family normalization, this process aimed to provide Metro with parcel-level detail on single-family home pricing instead of broader regions as seen in the office, industrial, and retail maps below. As home sales (and rents) can vary from neighborhood-to-neighborhood and, even, street to street, it is important to work towards this type of mapping to give a more accurate look at potential future redevelopment.

Obtain Sales Data

There are a limited number of ways to obtain sales data, and each has their plusses and minuses. For the use in these iterations of the interpolated sales surface, Johnson Economics, via Metro, obtained sales data by way of county assessor records. These obtained records went back to 1996 and consisted of sales records in Clackamas, Multnomah, and Washington Counties. However, for future iterations of this work, Johnson Economics recommends that Metro obtain sales data from a different source. The reasons for this will be discussed in the "Limitations and Suggestions for Future Iterations" section below.

Clean Sales Data

As with the multi-family data, the most time-consuming aspect of the interpolated sales map for single-family residential properties is the cleaning of the data. Also like the multi-family data—which came via Rainmaker and Axiometrics, two very differently organized data sources—the SFR sales data came from multiple sources, i.e., Clackamas, Multnomah, and Washington Counties. These three counties organize their data sets in different ways, which makes what could have been a straightforward process follow a more circuitous route.

To calculate sales price per square foot, the two most obvious variables needed are 1) sales price and 2) house square footage. While the former is in all three county assessor data sets, the latter is—somewhat surprisingly—not included in the Washington County records (this was later fixed by joining the assessor data to the RLIS tax lot layer, which does have square footage). Similarly, data on the attributes of single-family residences is sparse. Whereas we could consider variables such as number of bedrooms and number of bathrooms in the MFR properties, this is not possible with the available data. As such, the process of cleaning and normalization had to be done in a different manner.

As the data goes back to 1996, we are also presented with an interesting time issue. Because this map was to create the *current* SFR PSF landscape and because there were thousands of readily available recent data points, Johnson Economics decides to focus solely on sales in the second quarter of 2016, the last such quarter for which we had full data. However, the ultimate purpose of this model is to help determine what tax lots will be developed/redeveloped and the type of development it will serve to fit into a 20-year forecast. As prices will inevitably increase over the course of a two-decade extended period, future work should consider historic price fluctuations to help predict future price increases across different use types. Single-family residential rates and retail rental rates will, almost assuredly, grow at different rates in the future. The rates at which they grow could very well make the highest and best use of a certain property change over time. While this is not included in the scope of this current work, it should be looked at in the future as we work to merge the supply and demand models together.

We aimed to include only sales which were deemed to be arm's-length transactions. That is, we need to make sure that both the seller and buyer in an agreement are both working for their own interests. A transfer of deed from one family member to another, for instance, would not be included as such. Each of the three counties has different way of determining whether a transaction falls under this category. For instance, Clackamas County uses a "screening code" with different letters and symbols. By using guidelines from each of the counties, we could filter the transactions to those deemed to be arm's-length. In the limitations and suggestions section below, we offer a way for a much simpler solution to avoid this filtering process.

Any observations without sales price were dropped out of necessity as that is one of the key components to the analysis. Similarly, observations were—after joining the files to the RLIS tax lot file—dropped if they did not contain house square footage. As we use year built as a variable in the normalization process, observations lacking this information are dropped as well. The final step before the initial steps in GIS is to remove duplicates vis-à-vis multiple sales of the same property. As we limited this data to three months, this was not a big problem for the most part. However, another problem was presented in that some of the assessor data would list a sale multiple times if there were multiple sellers on record. So, for instance, if John and Jane Doe sold a house and were both on the deed, the sale could potentially be listed twice in the data. By collapsing the data on property id, sale date and sale price, we could remove these instances of multiple owners.

GIS Process I

The lack of house square footage in the Washington County assessor data throws a hiccup into an otherwise straightforward, albeit tedious, process. The way we chose to deal with this issue was to wait until after all the cleaning for each of the three counties was done. The one caveat here is that, whereas we could remove observations without house SF in the initial cleaning of the Multnomah and Clackamas County assessor data sets, we had to remove these same observations in Washington County after the join had taken place. This is a minor difference but needs to be pointed out as it just reemphasizes that the three data sets need to be treated differently to get matching variables that can be used in the normalization process.

Assuming the above cleaning has been completed, the next few steps should be followed to obtain lot size (and house size for Washington County), which is needed in the normalization process.

1. Bring the CSVs into ArcGIS.
2. Join the Clackamas and Washington County tax lots to the RLIS tax lot file via tax lot ids. The Multnomah County assessor data lacks tax lot ids, but it does include parcel ids (R numbers) which can be used as a joining mechanism.
    a. This could also be done via address matching. Alternatively, one could geocode all the addresses in the three files and spatially match them to parcels. However, this is likely much more time-consuming than simply joining based on the other columns mentioned.
3. Create a ¼ mile buffer around Metro.
    a. Depending on the future use of this information, we want to be able to clip to either the Metro boundary or the UGB. By using the buffer, we can assure that both are possible in the future.
4. Clip the tax lot layer with the joined variables by using the ¼ mile buffer Metro buffer.
    a. As the assessor data includes areas beyond Metro and the UGB, we can limit the dataset to only relevant observations by doing this.
5. Drop all observations that do not have information joined from the assessor data. This will drop the size of the data set dramatically from the hundreds of thousands in the full RLIS file.
6. Join the remaining file with the RLIS neighborhood layer.
    a. As with the multi-family layer, we need a component to help account for spatial autocorrelation as clustering is sure to be a problem with this type of data.

These are the only steps needed at this point. The file—to be exported in a CSV—now has the lot size and, for Washington County, house size.

Normalization Process

Because of all the joins that took place in the previous steps, some consolidation is necessary. We create a new variable simply named “SF” to represent square footage of a house. This takes in the values of square footage from the three counties and consolidates them into one column. Similarly, we created a “SalePrice” column to aggregate the sales prices from the three different counties. Using these two variables, we create a “PSF” column to detail sales price per square foot. In addition to these, we generate a “LotSF” variable from the acreage we have from the tax lot file. In addition to this we create natural log variables of the sale price, house size, and lot size. Neighborhood indicator variables are generated for use as controls for spatial autocorrelation in the regression analysis.

At this point, we double check arm’s length transactions and look for clear outliers that could end up causing problems in the normalization process. We do this on a county-by-county basis. Removing sales based on different counties’ sales codes was effective, but sorting the new PSF column presented us with quite a few observations with abnormally low values, such as $1 per square foot. While it is possible that this could technically be the case, we surmise that these instances are likely other types of transactions. For instance, there could be a property that has been deemed condemned. A sale may go through with the information on square footage, but the house would in this case be of zero value. Any residual value would be solely due to the land and/or development potential.

The result of this process is the elimination of all observations below the 5th percentile. Similarly, we look at the reverse for outliers. Some houses sell for well more than surrounding houses. However, at the same time many of these sales could be simply due to where they are located. For instance, a 10,000-square foot house adjacent to Lake Oswego may well sell for $15 million, which would indicate a PSF of $1,500. We are wary of removing properties that have added value just because of an area, but still want to be able to remove observations that are abnormally high due to other reasons. We remove all observations at or above the 99th percentile in PSF for each of the three counties. This process is repeated for lot size, which results in observations below 300 SF and above 1.69 acres to be dropped from analysis. Again, we offer a much simpler solution to this cleaning process in the sections below but present these steps as if they were the ones taken with the available data.

We changed our approach to the hedonic analysis from what we did with the multifamily rent data. One of the reasons for this is simply the fact that we do not have many variables to add to the equation. Whereas we had bedroom and bathroom data for the multifamily units, we do not have the luxury of this information from the data given to us. In this type of analysis for single-family residences, we would also generally look at potential variables such as number of fireplaces, view type, finishes, etc., but the assessor data given does not contain this information. The other change we have made is in terms of specification; we opt to use the natural log of price, square feet, and lot size in this model. Year built remains unchanged. We wish to make this analysis more complete in future iterations but are constrained by the data set we have at hand. Please see the limitations section for potential future work on this process. As it is, the regression equation stands as follows:

$$lnPrice = \alpha+\beta_1*(lnSquareFeet)+ \beta_2*(Year\ Built)+\beta_3*(lnLotSquareFeet)+ \beta_{4\text{-}238}*(Neighborhood)+\varepsilon$$

Though, as stated, we are lacking several common variables such as the number of bedrooms and bathrooms, the signs are no doubt significant, and the signs are in the theoretically correct direction. Using the resulting coefficients of square feet, lot size, and year built, we can normalize all house sales to a 1,200 SF home and 5,000 SF lot. We do not normalize for neighborhood as it is merely a control variable. A house is static. It cannot be moved. Normalizing a house in Laurelhurst to be priced as one from Lents could well make sense for a different type of analysis, but it does not make sense in this type of analysis where we need the sales to stay in their representative locations. If we did normalize for this, it would end up masking the spatial patterns that naturally underlie the existing market.

For the normalization, we first create a variable *lnNorm*, representing the natural log of the normalized price:

$$lnNorm = lnPrice + (ln(1200)-lnSF)* \beta_{lnSF}+(ln(5000)-lnLotSF)* \beta_{lnLotSF}+ (2016-YearBuilt)* \beta_{YearBuilt}$$

From there, we create the variable *NormSalePrice* by the straightforward process below:

$$NormSalePrice = exp(lnNorm)$$

The last step in achieving a sale per-square-foot variable is by simply dividing *NormSalePrice* by 1,200 square feet, as that is the size of the property after normalization.

GIS Process II

After normalization, the well-known-text (WKT) variable should still exist for each observation. All that needs to be done at this point is to bring the WKT and newly created normalized PSF variables into GIS software. From there, the interpolation should follow the same process that was used with the multifamily properties. The number of pricing categories should be debated. For the purposes of our early mapping, we have used seven graduated categories created with Jenks natural breaks. This is fine for internal mapping, though more clearly defined prices in, say, $50 or $100 increments may be more appropriate for clearer interpretation by a wider audience.

Appendix B

ENTITLEMENT SCREEN

Metro Regional Zone Class look up table					PROTOTYPES																																										
		Lot Size			OFFICE												RETAIL			INDUSTRIAL					RENTAL RESIDENTIAL														OWNERSHIP RESIDENTIAL								
Standardized Regional Zones	Zone Class	Min	Max	Expected Density	Office high rise	Office mid/struc	Office mid / ext. struc	Office mid/surf	Office high rise - CC	Office mid/struc - CC	Office mid / ext. struc - CC	Office high rise - LP	Office mid/struc - LP	Office mid / ext. struc - LP	Office mid/surf - LP	Office low rise	Multi-Story Structured	Single Story Structured	Single Story Surface	Warehouse / Distribution	Fulfillment Center	Data Center	Manufacturing	Multi-Tenant Flex	Rental high rise	Rental Mid Rise w/ Garage	Rental 5 over 2	Rental 4 over 1	Rental high rise-IZ	Rental Mid Rise w/ Garage - IZ	Rental 5 over 2 - IZ	Rental 4 over 1 - IZ	Rental 5-story wood w/surf	Rental 4-story wood w/zero	3-story garden w/surf	Rental Plexes	Rental 3-story Townhome	Rental_Middle_TypeV	Condo residential high rise	Condo Mid Rise w/ Garage	Condo 5 over 2	Condo 4 over 1	Condo 3-story wood w/surf	3-story wood townhome	For-Sale Duplexes	Skinny Homes	Detached Single Family
Single Family Large Lot /Mid Options	SFR1	6,000	43,560		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	1
Single Family Standard Lot /Mid Optio	SFR2	3,500	6,000		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	1
Single Family Skinny Lot /Mid Options	SFR3	2,000	3,500		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	1
Multi-family-Very Low Density	MFR1	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	0	0
Multi-family-Low Density	MFR2	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	0	0
Multi-family-Moderate Density	MFR3	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	1	1	1	0	0
Multi-family-Medium Density	MFR4	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	1	1	1	0	0	0	1	1	1	1	0	0
Multi-family-Med. High Density	MFR5	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	1	0	0
Multi-family-High Density	MFR6	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	1	0	1	0	1	0	0	1	1	1	1	1	0	0	0
Multi-family-Very High Density	MFR7	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	1	0	1	0	1	1	1	1	1	1	0	0	0
Multi-family-Med. High w/Min	MFR5	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	1	1	0	1	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0
Multi-family-High w/Min	MFR6	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0
Multi-family-Very High w/Min	MFR7	Approx. FA	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1		1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0
Multi-family-Very Low Density	MFR1z	No Parking	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	0	0
Multi-family-Low Density	MFR2z	No Parking	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	0	0
Multi-family-Moderate Density	MFR3z	No Parking	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	1	1	1	0	0
Multi-family-Medium Density	MFR4z	No Parking	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	1	0	0	0	1	1	1	1	0	0
Multi-family-Med. High Density	MFR5z	No Parking	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0
Multi-family-High Density	MFR6z	No Parking	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
Multi-family-Very High Density	MFR7z	No Parking	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1	1	0	0	0	1	1	1	1	1	0	0	0	0
Mixed-Use Comm. & Res.	MUR1	Approx. FA	0		0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
Mixed-Use Comm. & Res.	MUR2	Approx. FA	0		0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
Mixed-Use Comm. & Res.	MUR3	Approx. FA	0		0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0
Mixed-Use Comm. & Res.	MUR4	Approx. FA	0		0	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0
Mixed-Use Comm. & Res.	MUR5	Approx. FA	0		1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	0	0	1	1	0	0	0	0
Mixed-Use Comm. & Res.	MUR6	Approx. FA	0		1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	1	1	1	0	1	1	1	1	0	1	0	0	0	0	1	1	1	1	0	0	0	0
Mixed-Use Comm. & Res.	MUR7	Approx. FA	0		1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	0	0	1	0	0	0	1	1	1	1	1	0	0	0	0
Commercial - Central	CC	FAR < 1.0	0		0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial - General	CG	FAR < 1.0	0		0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial - Neighborhood	CN	FAR < 1.0	0		0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial - Office	CO	FAR < 1.0	0		0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial - Central	CC2	FAR 1.0 +	0		1	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial - General	CG2	FAR 1.0 +	0		1	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial - Neighborhood	CN2	FAR 1.0 +	0		1	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial - Office	CO2	FAR 1.0 +	0		1	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Public & semi-public uses	PF	0	0		1	1	1	0	1	1	1	1	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial Campus	IC	0	0		0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial Office	IO	0	0		0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial - Light	IL	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial - Heavy	IH	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial - Limited Dist.	IND	Distribution Limited			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial - Limited DataCenter	IND	Data Centers Limited			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Parks & Open Space	POS	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exclusive Farm Use	EFU	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rural Residential	RRFU	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rural Commercial	RC	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rural Industrial	RI	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

OFFICE PROTOTYPES

	Office high rise	Office mid/struc	Office mid / ext. struc	Office mid/surf	Office high rise - CC	Office mid/struc - CC	Office mid / ext. struc - CC	Office high rise - LP	Office mid/struc - LP	Office mid / ext. struc - LP	Office mid/surf - LP	Office low rise
PROGRAM												
Property Assumptions												
Site Size (SF)	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000
Stories	10	5	4	4	10	5	4	10	5	4	4	1
FAR	7.50	3.75	2.00	0.50	7.50	3.75	2.00	7.50	3.75	2.00	0.50	0.30
Building Square Feet	300,000	150,000	80,000	20,000	300,000	150,000	80,000	300,000	150,000	80,000	20,000	12,000
Efficiency	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	100%
Leasable Area	270,000	135,000	72,000	18,000	270,000	135,000	72,000	270,000	135,000	72,000	18,000	12,000
Parking Ratio/000 SF	1.50	1.50	1.50	1.50	0.50	0.50	0.50	1.00	1.00	1.00	1.00	1.50
Parking Spaces	405	202	108	27	135	67	36	270	135	72	18	18
Parking Spaces - Surface	-	-	16	27	-	10	5	-	-	11	18	18
Parking Spaces - Structure	405	202	92	-	135	57	31	270	135	61	-	-
Structured Parking %	100%	100%	85%	0%	100%	85%	85%	100%	100%	85%	0%	0%
Cost Assumptions												
Base Construction Cost/SF	$275	$250	$250	$250	$275	$250	$250	$275	$250	$250	$250	$158
Tenant Improvement Allowance	$105	$105	$105	$105	$105	$105	$105	$105	$105	$105	$105	$105
Adjustment Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Construction Cost/SF	$380	$355	$355	$355	$380	$355	$355	$380	$355	$355	$355	$263
Base Parking Costs/Space	$60,000	$45,000	$36,750	$5,500	$60,000	$45,000	$36,750	$60,000	$45,000	$36,750	$5,500	$5,500
Adjustment Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Structured Parking Cost/Space	$60,000	$45,000	$36,750	$5,500	$60,000	$45,000	$36,750	$60,000	$45,000	$36,750	$5,500	$5,500
OPERATING ASSUMPTIONS												
Income Assumptions												
Base Income/Sf/Yr.	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00
Adjustment Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Achievable Pricing	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00	$30.00
Parking Charges/Space/Mo	$120	$120	$120	$120	$270	$270	$270	$120	$120	$120	$120	$120
Expense Assumptions												
Vacancy/Collection Loss	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Base Operating Expenses	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
Adjustment Factor	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Operating Expenses	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
Valuation Assumptions												
Base Capitalization Rate	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%
Adjustment Factor	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Capitalization Rate	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%	7.00%
SUPPORTABLE PROPERTY VALUE												
Cost												
Cost/Construct w/o prkg.	$114,000,000	$53,250,000	$28,400,000	$7,100,000	$114,000,000	$53,250,000	$28,400,000	$114,000,000	$53,250,000	$28,400,000	$7,100,000	$3,156,000
Total Parking Costs	$24,300,000	$9,090,000	$3,373,650	$0	$8,100,000	$2,562,750	$1,124,550	$16,200,000	$6,075,000	$2,249,100	$0	$0
Estimated Project Cost	$138,300,000	$62,340,000	$31,773,650	$7,100,000	$122,100,000	$55,812,750	$29,524,550	$130,200,000	$59,325,000	$30,649,100	$7,100,000	$3,156,000
Income												
Annual Base Income	$8,100,000	$4,050,000	$2,160,000	$540,000	$8,100,000	$4,050,000	$2,160,000	$8,100,000	$4,050,000	$2,160,000	$540,000	$360,000
Annual Parking	$583,200	$290,880	$132,192	$0	$437,400	$184,518	$99,144	$388,800	$194,400	$88,128	$0	$0
Gross Annual Income	$8,683,200	$4,340,880	$2,292,192	$540,000	$8,537,400	$4,234,518	$2,259,144	$8,488,800	$4,244,400	$2,248,128	$540,000	$360,000
Less: Vacancy & CL	$868,320	$434,088	$229,219	$54,000	$853,740	$423,452	$225,914	$848,880	$424,440	$224,813	$54,000	$36,000
Effective Gross Income	$7,814,880	$3,906,792	$2,062,973	$486,000	$7,683,660	$3,811,066	$2,033,230	$7,639,920	$3,819,960	$2,023,315	$486,000	$324,000
Less Expenses:												
Operating Expenses	$234,446	$117,204	$61,889	$14,580	$230,510	$114,332	$60,997	$229,198	$114,599	$60,699	$14,580	$9,720
Annual NOI	$7,580,434	$3,789,588	$2,001,084	$471,420	$7,453,150	$3,696,734	$1,972,233	$7,410,722	$3,705,361	$1,962,616	$471,420	$314,280
Property Valuation												
Return on Cost	5.48%	6.08%	6.30%	6.64%	6.10%	6.62%	6.68%	5.69%	6.25%	6.40%	6.64%	9.96%
Threshold Return on Cost	8.05%	8.05%	8.05%	8.05%	8.05%	8.05%	8.05%	8.05%	8.05%	8.05%	8.05%	8.05%
Residual Property Value	($44,133,123)	($15,264,370)	($6,915,468)	($1,243,851)	($29,514,283)	($9,890,586)	($5,024,765)	($38,141,337)	($13,295,668)	($6,268,780)	($1,243,851)	$748,099
RPV/SF	**($1,103.33)**	**($381.61)**	**($172.89)**	**($31.10)**	**($737.86)**	**($247.26)**	**($125.62)**	**($953.53)**	**($332.39)**	**($156.72)**	**($31.10)**	**$18.70**

RETAIL PROTOTYPES

	Multi-Story Structured	Single Story Structured	Single Story Surface
PROGRAM			
Property Assumptions			
Site Size (SF)	40,000	40,000	40,000
Stories	2	1	1
FAR	1.00	0.50	0.30
Building Square Feet	40,000	20,000	12,000
Efficiency	90%	100%	100%
Leasable Area	36,000	20,000	12,000
Parking Ratio/000 SF	3.5	3.5	3.5
Parking Spaces	126	70	42
Parking Spaces - Surface	19	11	42
Parking Spaces - Structure	107	60	-
Structured Parking %	85%	85%	0%
Cost Assumptions			
Base Construction Cost/SF	$150	$150	$150
Tenant Improvement Allowance	$95	$95	$95
Adjustment Factor	*0.00%*	*0.00%*	*0.00%*
Construction Cost/SF	$245	$245	$245
Base Parking Costs/Space	$36,750	$36,750	$5,500
Adjustment Factor	*0.00%*	*0.00%*	*0.00%*
Structured Parking Cost/Space	*$36,750*	*$36,750*	*$5,500*
OPERATING ASSUMPTIONS			
Income Assumptions			
Base Income/Sf/Yr.	$30.00	$30.00	$30.00
Adjustment Factor	*0.00%*	*0.00%*	*0.00%*
Achievable Pricing	*$30.00*	*$30.00*	*$30.00*
Parking Charges/Space/Mo	$0	$0	$0
Expense Assumptions			
Vacancy/Collection Loss	10.00%	10.00%	10.00%
Base Operating Expenses	3.00%	3.00%	3.00%
Adjustment Factor	*0.00%*	*0.00%*	*0.00%*
Operating Expenses	*3.00%*	*3.00%*	*3.00%*
Valuation Assumptions			
Base Capitalization Rate	7.00%	7.00%	7.00%
Adjustment Factor	*0%*	*0%*	*0%*
Capitalization Rate	7.00%	7.00%	7.00%
SUPPORTABLE PROPERTY VALUE			
Cost			
Cost/Construct w/o prkg.	$9,800,000	$4,900,000	$2,940,000
Total Parking Costs	$4,630,500	$2,572,500	$231,000
Estimated Project Cost	$14,430,500	$7,472,500	$3,171,000
Income			
Annual Base Income	$1,080,000	$600,000	$360,000
Annual Parking	$0	$0	$0
Gross Annual Income	$1,080,000	$600,000	$360,000
Less: Vacancy & CL	$108,000	$60,000	$36,000
Effective Gross Income	$972,000	$540,000	$324,000
Less Expenses:			
Operating Expenses	$29,160	$16,200	$9,720
Annual NOI	$942,840	$523,800	$314,280
Property Valuation			
Return on Cost	6.53%	7.01%	9.91%
Threshold Return on Cost	8.05%	8.05%	8.05%
Residual Property Value	($2,718,202)	($965,668)	$733,099
RPV/SF	**($67.96)**	**($24.14)**	**$18.33**

INDUSTRIAL

	Warehouse / Distribution	Fullfillment Center	Data Center	Manufacturing	Multi-Tenant Flex
PROGRAM					
Property Assumptions					
Site Size (SF)	120,000	120,000	120,000	120,000	40,000
Stories	1	1	1	1	1
FAR	0.40	0.40	0.50	0.45	0.33
Building Square Feet	48,000	60,000	60,000	60,000	13,000
Efficiency	100%	100%	100%	100%	100%
Leasable Area	48,000	60,000	60,000	60,000	13,000
Parking Ratio/000 SF	1.0	3.5	0.4	3.0	1.0
Parking Spaces	48	210	24	180	13
Parking Spaces - Surface	48	210	24	180	13
Parking Spaces - Structure	-	-	-	-	-
Structured Parking %	0%	0%	0%	0%	0%
Cost Assumptions					
Base Construction Cost/SF	$95	$95	$112	$122	$105
Tenant Improvement Allowance	$0	$0	$0	$0	$0
Adjustment Factor	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Construction Cost/SF	$95	$95	$112	$122	$105
Base Parking Costs/Space	$5,500	$5,500	$5,500	$5,500	$5,500
Adjustment Factor	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Structured Parking Cost/Space	*$5,500*	*$5,500*	*$5,500*	*$5,500*	*$5,500*
OPERATING ASSUMPTIONS					
Income Assumptions					
Base Income/Sf/Yr.	$12.00	$12.00		$13.00	$13.00
Adjustment Factor	0.00%	0.00%	0.00%	0.00%	0.00%
Achievable Pricing	*$12.00*	*$12.00*	*$0.00*	*$13.00*	*$13.00*
Parking Charges/Space/Mo	$0	$0	$0	$0	$0
Expense Assumptions					
Vacancy/Collection Loss	10.00%	10.00%	10.00%	10.00%	10.00%
Base Operating Expenses	3.00%	3.00%	3.00%	3.00%	3.00%
Adjustment Factor	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Operating Expenses	*3.00%*	*3.00%*	*3.00%*	*3.00%*	*3.00%*
Valuation Assumptions					
Base Capitalization Rate	6.00%	6.00%	6.00%	6.00%	6.00%
Adjustment Factor	*0%*	*0%*	*0%*	*0%*	*0%*
Capitalization Rate	6.00%	6.00%	6.00%	6.00%	6.00%
SUPPORTABLE PROPERTY VALUE					
Cost					
Cost/Construct w/o prkg.	$4,560,000	$5,700,000	$6,720,000	$7,320,000	$1,365,000
Total Parking Costs	$264,000	$1,155,000	$132,000	$990,000	$71,500
Estimated Project Cost	$4,824,000	$6,855,000	$6,852,000	$8,310,000	$1,436,500
Income					
Annual Base Income	$576,000	$720,000	$0	$780,000	$169,000
Annual Parking	$0	$0	$0	$0	$0
Gross Annual Income	$576,000	$720,000	$0	$780,000	$169,000
Less: Vacancy & CL	$57,600	$72,000	$0	$78,000	$16,900
Effective Gross Income	$518,400	$648,000	$0	$702,000	$152,100
Less Expenses:					
Operating Expenses	$15,552	$19,440	$0	$21,060	$4,563
Annual NOI	$502,848	$628,560	$0	$680,940	$147,537
Property Valuation					
Return on Cost	10.42%	9.17%	0.00%	8.19%	10.27%
Threshold Return on Cost	6.90%	6.90%	6.90%	6.90%	6.90%
Residual Property Value	$2,463,652	$2,254,565	($6,852,000)	$1,558,696	$701,717
RPV/SF	**$20.53**	**$18.79**	**($57.10)**	**$12.99**	**$17.54**

PROTOTYPE RENTAL RESIDENTIAL PROGRAMS

	Rental high rise	Rental Mid Rise w/ Garage	Rental 5 over 2	Rental 4 over 1	Rental high rise-IZ	Rental Mid Rise w/ Garage - IZ	Rental 5 over 2 - IZ	Rental 4 over 1 - IZ	Rental 5-story wood w/surf	Rental 4-story wood w/zero	3-story garden w/surf	Rental Plexes	Rental 3-story Townhome	Rental_Middle_TypeV
Property Assumptions														
Site Size (SF)	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	5,000	40,000	5,000
Density	400	225	225	170	400	225	225	170	90	120	35	30	20	30
Unit Count	367	206	206	156	367	206	206	156	82	110	32	3	18	3
Ave Unit Size	725	750	750	750	725	750	750	750	750	750	750	750	1,000	750
Efficiency Ratio	85%	85%	85%	87%	85%	85%	85%	87%	85%	85%	100%	100%	100%	100%
Building Square Feet	313,029	181,765	181,765	134,483	313,029	181,765	181,765	134,483	72,353	97,059	24,000	2,250	18,000	2,250
FAR	7.83	4.54	4.54	3.36	7.83	4.54	4.54	3.36	1.81	2.43	0.60	0.45	0.45	0.45
Parking Ratio/Unit	1.00	1.00	1.25	0.75	0.25	0.25	1.25	0.25	1.50	1.50	1.50	1.25	1.50	1.25
Total Parking Spaces	367	206	258	117	92	52	258	39	123	165	48	4	27	4
Parking Spaces - Surface	-	-	-	-	-	-	-	-	123	165	48	2	14	2
Parking Spaces - Structure	367	206	258	117	92	52	258	39	-	-	-	2	14	2
Structured Parking %	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	50%	50%	50%
Cost Assumptions														
Base Construction Cost/SF	$450	$325	$300	$300	$450	$325	$300	$300	$300	$220	$220	$230	$230	$230
Adjustment Factor	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Construction Cost/SF	*$450*	*$325*	*$300*	*$300*	*$450*	*$325*	*$300*	*$300*	*$300*	*$220*	*$220*	*$230*	*$230*	*$230*
Base Parking Costs/Space	$60,000	$45,000	$36,750	$36,750	$60,000	$45,000	$36,750	$36,750	$5,500	$5,500	$5,500	$5,500	$21,125	$5,500
Adjustment Factor	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Structured Parking Cost/Space	*$60,000*	*$45,000*	*$36,750*	*$36,750*	*$60,000*	*$45,000*	*$36,750*	*$36,750*	*$5,500*	*$5,500*	*$5,500*	*$5,500*	*$21,125*	*$5,500*
Income Assumptions														
Base Income/Sf/Mo.	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50	$0.00	$2.50	$2.50
Adjustment Factor	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Achievable Pricing	*$2.50*	*$2.50*	*$2.50*	*$2.50*	*$2.50*	*$2.50*	*$2.50*	*$2.50*	*$2.50*	*$2.50*	*$2.50*	*$0.00*	*$2.50*	*$2.50*
Parking Charges/Space/Mo	$135	$135	$135	$70	$70	$70	$135	$135	$135	$135	$135	$0	$135	$135
Expenses														
Vacancy/Collection Loss	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Operating Expenses	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%
Adjustment Factor	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Operating Expenses	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*	*33%*
Valuation														
Capitalization Rate	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%
Adjustment Factor	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Capitalization Rate	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%	5.50%
Cost														
Cost/Construct w/o prkg.	$140,863,235	$59,073,529	$54,529,412	$40,344,828	$140,863,235	$59,073,529	$54,529,412	$40,344,828	$21,705,882	$21,352,941	$5,280,000	$517,500	$4,140,000	$517,500
Total Parking Costs	$22,020,000	$9,270,000	$9,481,500	$4,299,750	$5,520,000	$2,340,000	$9,481,500	$1,433,250	$676,500	$907,500	$264,000	$22,000	$570,375	$22,000
Estimated Project Cost	$162,883,235	$68,343,529	$64,010,912	$44,644,578	$146,383,235	$61,413,529	$64,010,912	$41,778,078	$22,382,382	$22,260,441	$5,544,000	$539,500	$4,710,375	$539,500
Income														
Annual Base Income	$7,982,250	$4,635,000	$4,635,000	$3,510,000	$7,982,250	$4,635,000	$4,635,000	$3,510,000	$1,845,000	$2,475,000	$720,000	$0	$540,000	$67,500
Annual Parking	$594,540	$333,720	$417,960	$98,280	$77,280	$43,680	$417,960	$63,180	$0	$0	$0	$0	$21,870	$3,240
Gross Annual Income	$8,576,790	$4,968,720	$5,052,960	$3,608,280	$8,059,530	$4,678,680	$5,052,960	$3,573,180	$1,845,000	$2,475,000	$720,000	$0	$561,870	$70,740
Less: Vacancy & CL	$428,840	$248,436	$252,648	$180,414	$402,977	$233,934	$252,648	$178,659	$92,250	$123,750	$36,000	$0	$28,094	$3,537
Effective Gross Income	$8,147,951	$4,720,284	$4,800,312	$3,427,866	$7,656,554	$4,444,746	$4,800,312	$3,394,521	$1,752,750	$2,351,250	$684,000	$0	$533,777	$67,203
Less Expenses:														
Operating Expenses	$2,648,084	$1,534,092	$1,560,101	$1,114,056	$2,488,380	$1,444,542	$1,560,101	$1,103,219	$569,644	$764,156	$222,300	$0	$173,477	$21,841
Annual NOI	$5,499,867	$3,186,192	$3,240,211	$2,313,810	$5,168,174	$3,000,204	$3,240,211	$2,291,302	$1,183,106	$1,587,094	$461,700	$0	$360,299	$45,362
Property Valuation														
Return on Cost	3.38%	4.66%	5.06%	5.18%	3.53%	4.89%	5.06%	5.48%	5.29%	7.13%	8.33%	0.00%	7.65%	8.41%
Threshold Return on Cost	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%	6.05%
Residual Property Value	($71,976,350)	($15,679,204)	($10,453,712)	($6,399,792)	($60,958,878)	($11,823,388)	($10,453,712)	($3,905,323)	($2,826,907)	$3,972,513	$2,087,405	($539,500)	$1,244,983	$210,286
RPV/SF	**($1,799.41)**	**($391.98)**	**($261.34)**	**($159.99)**	**($1,523.97)**	**($295.58)**	**($261.34)**	**($97.63)**	**($70.67)**	**$99.31**	**$52.19**	**($107.90)**	**$31.12**	**$42.06**

	Condo residential high rise	Condo Mid Rise w/ Garage	Condo 5 over 2	Condo 4 over 1	Condo 3-story wood w/surf	3-story wood townhome	For-Sale Duplexes	Skinny Homes	Detached Single Family
Property Assumptions									
Site Size (SF)	40,000	40,000	40,000	40,000	40,000	40,000	5,000	40,000	40,000
Density	400	225	225	170	35	30	18	18	9
Unit Count	367	206	206	156	32	27	2	16	8
Ave Unit Size	775	775	775	775	800	1,250	1,250	1,500	1,750
Efficiency Ratio	83%	83%	85%	85%	100%	100%	100%	100%	100%
Building Square Feet	342,681	192,349	187,824	142,235	25,600	33,750	2,500	24,000	14,000
FAR	8.57	4.81	4.70	3.56	0.64	0.84	0.50	0.60	0.35
Parking Ratio/Unit	1.3	1.3	1.50	1.00	2.0	2.0	2.0	2.0	2.0
Total Parking Spaces	459	258	309	156	64	54	4	32	16
Parking Spaces - Surface	-	-	-	-	64	27	2	16	8
Parking Spaces - Structure	459	258	309	156	-	27	2	16	8
Structured Parking %	100%	100%	100%	100%	0%	50%	50%	50%	50%
Cost Assumptions									
Base Construction Cost/SF	$473	$341	$315	$315	$231	$242	$242	$221	$221
Adjustment Factor	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Construction Cost/SF	*$473*	*$341*	*$315*	*$315*	*$231*	*$242*	*$242*	*$221*	*$221*
Base Parking Costs/Space	$60,000	$45,000	$36,750	$36,750	$5,500	$23,875	$5,500	$21,125	$21,125
Adjustment Factor	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Parking Cost/Space	*$60,000*	*$45,000*	*$36,750*	*$36,750*	*$5,500*	*$23,875*	*$5,500*	*$21,125*	*$21,125*
Income Assumptions									
Sales Price/SF	$390	$390	$390	$390	$390	$390	$390	$390	$390
Adjustment Factor	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Achievable Pricing	*$390*	*$390*	*$390*	*$390*	*$390*	*$390*	*$390*	*$390*	*$390*
Parking Charges/Space	$25,000	$25,000	$25,000	$19,500	$19,500	$19,500	$19,500	$19,500	$19,500
Expenses									
Sales Commission	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Cost									
Cost/Construct w/o prkg.	$161,916,642	$65,639,232	$59,164,412	$44,804,118	$5,913,600	$8,150,625	$603,750	$5,292,000	$3,087,000
Total Parking Costs	$27,540,000	$11,610,000	$11,355,750	$5,733,000	$0	$644,625	$11,000	$338,000	$169,000
Estimated Project Cost	$189,456,642	$77,249,232	$70,520,162	$50,537,118	$5,913,600	$8,795,250	$614,750	$5,630,000	$3,256,000
Income									
Gross Income - Units	$133,645,482	$75,016,265	$73,251,176	$55,471,765	$9,984,000	$13,162,500	$975,000	$9,360,000	$5,460,000
Gross Income - Parking	$11,475,000	$6,450,000	$7,725,000	$3,042,000	$0	$526,500	$39,000	$312,000	$156,000
Gross Sales Income	$145,120,482	$81,466,265	$80,976,176	$58,513,765	$9,984,000	$13,689,000	$1,014,000	$9,672,000	$5,616,000
Less: Commission	($5,804,819)	($3,258,651)	($3,239,047)	($2,340,551)	($399,360)	($547,560)	($40,560)	($386,880)	($224,640)
Effective Gross Income	$139,315,663	$78,207,614	$77,737,129	$56,173,214	$9,584,640	$13,141,440	$973,440	$9,285,120	$5,391,360
Property Valuation									
Return on Sales	-26.47%	1.24%	10.23%	11.15%	62.08%	49.42%	58.35%	64.92%	65.58%
Threshold Return	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%
Residual Property Value	($68,312,587)	($9,242,611)	($2,922,658)	($1,690,845)	$2,420,870	$2,632,089	$231,720	$2,444,017	$1,432,139
	($1,707.81)	**($231.07)**	**($73.07)**	**($42.27)**	**$60.52**	**$65.80**	**$46.34**	**$61.10**	**$35.80**

ECONorthwest
ECONOMICS · FINANCE · PLANNING

DATE: April 22, 2024
TO: Metro
FROM: ECONorthwest
SUBJECT: Residential Readiness Task 5: Office-to-Residential Conversion Potential

Overview

The Metro Regional Government (Metro) has contracted with ECONorthwest to evaluate residential readiness in preparation for its 2024 Urban Growth Management decision. ECONorthwest evaluated whether the growing interest in office-to-residential conversions could meaningfully contribute to housing capacity over the next 20 years.

In 2020, the onset of the COVID-19 pandemic accelerated work-from-home trends, raising questions about whether an oversupply of office space in some locations could be converted to residential uses. This memorandum documents opportunities and barriers to office-to-residential conversions in the Portland metropolitan area, including the continuity of work-from-home trends, office vacancy rates, market indicators to understand demand for space in different subareas, and general characteristics of viable residential conversions. It also estimates a range of housing units that could be accommodated through office-to-residential conversions over the next 20 years inside the Metro Urban Growth Boundary (UGB) and their likely price ranges.

This memorandum draws on national studies, articles, and reports; office market data for the Portland region collected in the first quarter of 2023; and findings from a January 2024 study by ECONorthwest for Prosper Portland that evaluated the financial feasibility of office-to-residential conversion for several example office buildings downtown as well as the impact of specific policies and incentives.

Key Findings

- **Lasting remote and hybrid work trends[1] have dramatically increased office vacancy rates**, particularly for older Class B and C office space.[2] This is expected to represent a lasting shift in office real estate. This national trend is present in Portland, where the vacancy rate downtown has exceeded 30%, with lower vacancy rates in the suburbs.[3]
- **Office-to-residential conversions are challenging and require specific building characteristics and market conditions to succeed**. Key factors affecting building conversations include the dimensions and floor plate, the configuration of internal

[1] Caitlin Gilbert et al., "Remote Work Appears to Be Here to Stay, Especially for Women," Washington Post, June 22, 2023, https://www.washingtonpost.com/wellness/2023/06/22/remote-work-family-socialization-time-use/.
[2] Emma Goldberg, "What Would It Take to Turn More Offices into Housing?," The New York Times, December 27, 2022, sec. Business, https://www.nytimes.com/2022/12/27/business/what-would-it-take-to-turn-more-offices-into-housing.html?partner=slack&smid=sl-share.
[3] Samuel Hatcher, Dan Peterson, and Jason Green, "Portland Office Figures Q1 2023" (Portland, OR: CBRE, May 7, 2023), https://www.cbre.com/insights/figures/portland-office-figures-q4-2022, 1.

systems, and window design.[4,5] In Portland, compliance with seismic requirements is another key consideration.[6] In addition, the building must have high office vacancy rates and it, and its surrounding context must be attractive as a place to live.

- **Nationally, some jurisdictions are offering incentives for conversions, sometimes tied to affordability requirements**.[7] Portland offers exemptions on System Development Charges (SDCs) for conversion projects that require seismic upgrades,[8] but does not exempt these projects from the City's Inclusionary Housing (IH) program. Other Metro jurisdictions do not have similar programs.
- **Units resulting from office-to-residential conversion are often high-end, though some have more moderate rents.**[9,10,11] In Portland, in the absence of compelling amenities, rents for conversion projects are expected to be below those of purpose-built new apartments,[12] which is helpful for affordability, but challenging for feasibility.
- **Potential for conversions in Downtown Portland is limited.** Despite challenges with large floorplates and utilities, large, modern office buildings are most likely to be financially feasible because they would avoid the cost of seismic upgrades. However, public subsidies or incentives beyond the City's existing SDC exemption program are likely necessary to support most office-to-residential conversion projects in Downtown Portland.[13]
- **Office-to-residential conversions are unlikely to happen in Portland's suburban markets**. Given the lower office vacancy rates in suburban markets (particularly in Class B and C offices)[14] and the lack of surrounding amenities near most office parks, it would take unique circumstances, a desirable location, and a willing developer to pursue a suburban conversion project. An underperforming suburban office building may be more attractive as a tear-down for new development or for conversion to other nonresidential uses.
- While it is difficult to predict the number of potential successful office-to-residential conversion projects over the next 20-years, it is **unlikely that more than a few downtown office buildings** would convert to residential use over the next 20 years.

[4] Anjali Kolachalam, "Office to Residential Conversions: Scalable Opportunity or Too Unique to a City Block?" (Washington DC: Up for Growth, November 2022).

[5] Jeffrey Havsy, Xiaodi Li, and Kevin Fagan, "Why Office-To-Apartment Conversions Are Likely a Fringe Trend at Best," Moody's Analytics CRE, January 3, 2023.

[6] ECOnorthwest to Prosper Portland: "Office to Residential Conversion Study – Feasibility Results Memo," January 5, 2024.

[7] Abu-Khalaf, Ahmad, and Ray Demers. "What Will It Take to Convert Offices to Housing?" Enterprise Community Partners, April 10, 2023, https://www.enterprisecommunity.org/blog/what-will-it-take-convert-offices-housing.

[8] Alex Zielinski, "Portland City Council approves incentives to help convert office buildings into apartments."

[9] Gensler, "Franklin Tower," n.d., https://www.gensler.com/projects/franklin-tower.

[10] Anita Kramer, Nolan Eyre, and Morgan Maloney, "Behind the Facade."

[11] Ximena Gonzalez, "Calgary's Adventure in Office Conversion," The Globe and Mail, May 5, 2023, https://www.theglobeandmail.com/real-estate/article-calgarys-adventure-in-office-conversion/.

[12] ECOnorthwest to Prosper Portland: "Office to Residential Conversion Study – Feasibility Results Memo," January 5, 2024.

[13] Ibid.

[14] Samuel Hatcher, Dan Peterson, and Jason Green, "Portland Office Figures Q1 2023" (Portland, OR: CBRE, May 7, 2023), https://www.cbre.com/insights/figures/portland-office-figures-q4-2022, 1.

This could result in somewhere between **200 to 1,500 new housing units** depending on the number of successful projects, size of individual buildings, level of efficiency in using interior space, and unit mix. Conversion in the suburban market is even less likely, but one or two suburban conversion projects could result in up to 500 units. This suggests that the region could potentially see **between a few hundred units and roughly 2,000 units of housing resulting from office-to-residential conversion projects**.

Why should Metro consider office-to-residential conversions?

Remote workplace trends are driving office tenants to smaller, higher quality spaces.

Remote and hybrid work trends that increased dramatically during the COVID-19 pandemic have continued to impact business operations and real estate demand, and are likely to persist into the future, albeit at a lower rate than during the peak of the pandemic. These impacts are largely concentrated in certain industries and occupations, including professional services like computer science and technology, business and finance, arts and design, legal services, and architecture and engineering, which have seen the highest rates of working from home in Oregon.[15]

Despite uncertainty about the future of remote work, data show a lasting trend particularly among white-collar workers: in 2022, 34 percent of workers nationwide reported working at least part of the week from home compared to only 24 percent pre-pandemic.[16] While this has declined from the 42 percent of workers doing remote jobs at the onset of the pandemic,[17] it indicates a lasting trend for at least some segments of workers. Trends in remote work are not evenly distributed among the workforce: women and workers with bachelor's degrees or higher work from home more compared to the workforce overall.[18]

In many professional service industries, expectations for locational flexibility have changed. In a survey done in New York for the city's Office Adaptive Reuse Task Force (one of the most comprehensive studies of worker and employer preferences at the city level), 77 percent of office-based employers indicated a hybrid schedule would be their preferred post-pandemic policy.[19] In Oregon, these trends vary across the state and region. In 2021, the Portland metro ranked 11th amongst metro areas nationwide for its high share of remote workers.[20] In the City

[15] Josh Lehner, "Working from Home during the Pandemic," Oregon Office of Economic Analysis, January 18, 2023, https://oregoneconomicanalysis.com/2023/01/18/working-from-home-during-the-pandemic/.
[16] Caitlin Gilbert et al., "Remote Work Appears to Be Here to Stay, Especially for Women," Washington Post, June 22, 2023, https://www.washingtonpost.com/wellness/2023/06/22/remote-work-family-socialization-time-use/.
[17] Ibid.
[18] Caitlin Gilbert et al., "Remote Work Appears to Be Here to Stay, Especially for Women," Washington Post, June 22, 2023, https://www.washingtonpost.com/wellness/2023/06/22/remote-work-family-socialization-time-use/.
[19] New York City Department of City Planning, "New York City Office Adaptive Reuse Study," January 2023, https://www.nyc.gov/site/planning/plans/office-reuse-task-force/office-reuse-task-force.page.
[20] Josh Lehner, "Working from Home during the Pandemic."

of Portland, over 35 percent of workers reported working from home in 2021, compared with about 25 percent of workers in the Portland suburbs, and 12 percent in rural areas.[21]

National level trends indicate that companies are gradually adjusting their space usage and real estate footprints in response to these trends. While many businesses in these industries have long-term leases (e.g., five to ten years), many of those with expiring leases are considering whether to maintain their existing space and footprint (e.g., because of attractive lease rates as property owners try to maintain occupancy), pursue a remote work environment and eliminate their office footprint altogether, or find a space (often smaller) that better fits their hybrid work arrangements.[22] These decisions are often driven by worker preferences so as to attract and retain quality employees, as well as economizing on real estate expenses.

For companies maintaining an office presence, higher quality space, smaller footprints, and flexible configurations are most in demand. Many employers who chose to retain a physical office space in the wake of the pandemic have changing needs for office space, and many are downsizing their total office footprints in exchange for higher-quality spaces as they adjust to new hybrid and flexible schedules. As a result, demand for premium Class A office space is stronger than older, Class B and C office spaces, many of which were constructed before the 1980s and are not seen as 'commute-worthy.' This is translating into higher vacancy rates for Class B and C offices.[23]

Developers and property owners are responding to changes in office tenant decisions.

Redevelopment trends are an indicator of this 'flight to quality,' as developers and property owners seek new opportunities for older Class B and C office space. In some cases, renovations and modern upgrades can transform older offices into more attractive spaces, but converting offices to other uses altogether is a growing trend. In 2021 and 2022, only 12 percent of redeveloped office space remained as office use, a decline from prior years.[24] Local government subsidies and incentives have made it more attractive to pursue residential conversions in some cities, including Chicago, Washington DC, and Los Angeles. However, many building owners have hesitated to sell their office properties or invest in conversion projects until they are more comfortable with hybrid work trends and the desires of companies.[25]

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[21] Ibid.

[22] Patrick J. Kiger, "How to Make Office-To-Residential Conversions Work," Urban Land Magazine (Urban Land Institute, December 1, 2022), https://urbanland.uli.org/planning-design/how-to-make-office-to-residential-conversions-work/?utm_source=realmagnet&utm_medium=email&utm_campaign=HQ%20Urban%20Land%2012%2E05%2E2022.

[23] Emma Goldberg, "What Would It Take to Turn More Offices into Housing?," The New York Times, December 27, 2022, sec. Business, https://www.nytimes.com/2022/12/27/business/what-would-it-take-to-turn-more-offices-into-housing.html?partner=slack&smid=sl-share.

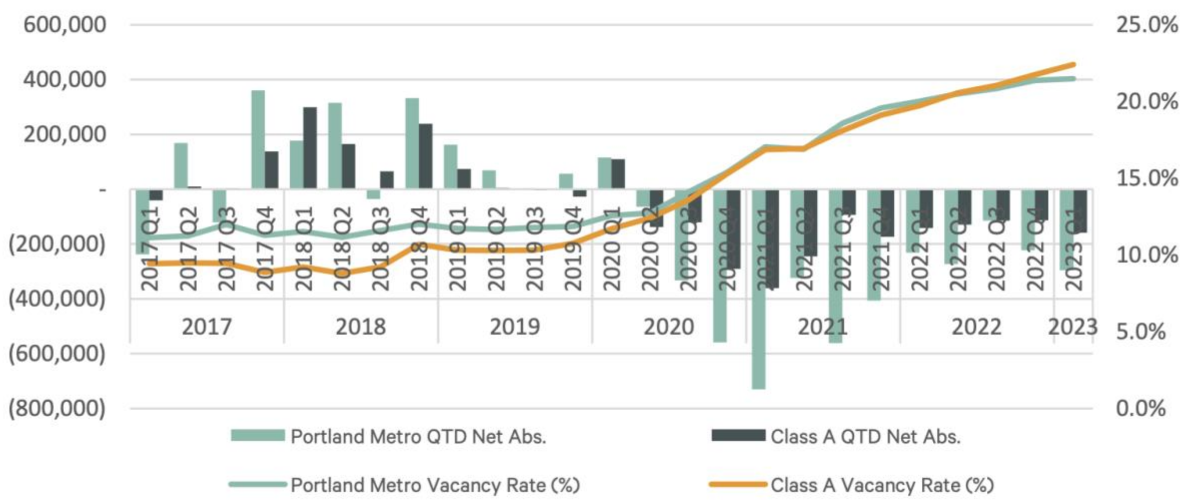
[24] Jacob Rowden and Elena Lanning, "Conversion Activity Gaining Momentum" (JLL Research, October 19, 2022), https://www.us.jll.com/en/trends-and-insights/research/office-research-snapshot-10-19-22.

[25] Richard McGahey, "Converting Offices to Residences Can Help Fight the Housing Shortage," Forbes, December 9, 2022, https://www.forbes.com/sites/richardmcgahey/2022/12/09/converting-offices-to-residences-can-help-fight-the-housing-shortage/?sh=139de24f7eb3.

Office vacancy rates in the Portland area are high and still increasing compared to pre-pandemic rates, especially downtown.

Downtown office vacancy remained high throughout 2022, showing the continued impacts of remote and hybrid work. Even as most workplaces lifted COVID-19 restrictions and pivoted to hybrid and return to in-person work, the Portland MSA ended the fourth quarter of 2022 with an overall office vacancy rate of 21.4 percent.[26] Rather than rebounding, trends in the first quarter of 2023 show continuing high vacancy rates (Exhibit 1), indicating an escalating trend rather than a receding one.

Exhibit 1. Portland MSA Office Absorption (1,000 SF) and Vacancy Rate, 2017-2023
Source: CBRE



Office vacancies are not evenly distributed across the Portland Metro.

The office vacancy rate remains higher in the Portland central business district (CBD) compared with suburban markets, sitting at 32 percent compared to roughly 19 percent in the suburbs.[27] Downtown and suburban offices in the Portland region show different trends in what type of office space is in demand. While downtown offices have lower vacancies in newer Class A space, offices in the suburban markets show the reverse, with higher vacancy in higher-quality spaces (Exhibit 2). Considering that the Portland suburbs have lower rates of remote work, this may indicate that suburban offices are losing fewer tenants in lower cost offices while Downtown businesses are seeking premium space. Nationally, many suburban areas with high quality of life indicators are attracting businesses, including offices.[28] This may be due to desires for shorter commutes and or generational demographic changes as Millennials move out of urban centers.[29]

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[26] Samuel Hatcher, Dan Peterson, and Jason Green, "Portland Office Figures Q1 2023" (Portland, OR: CBRE, May 7, 2023), https://www.cbre.com/insights/figures/portland-office-figures-q4-2022, 1.
[27] Ibid.
[28] Marie Ruff, "What the Urban to Suburban Shift Means for the Office Sector" (National Association for Industrial and Office Parks, August 11, 2022), https://blog.naiop.org/2022/08/what-the-urban-to-suburban-shift-means-for-the-office-sector/.
[29] Ibid.

Exhibit 2. Downtown vs. Suburban Market Statistics in the Portland Metro Area (Q1 2023)
Source: CBRE

	Total SF	Vacant SF	Vacancy Rate	2023 Q1 Net Absorption	Average Direct Asking Rate (PSF)
	Downtown				
Class A	12.0 million	3.7 million	31.0%	(76,486)	$39.99
Class B	8.4 million	2.6 million	31.2%	(24,176)	$32.45
Class C	2.7 million	910,000	33.7%	(23,879)	$28.60
Class D	3.2 million	1.1 million	36.31%	8,025	$26.00
Total	**26.5 million**	8.4 million	**32.0%**	**(116,516)**	**$34.26**
	Suburban				
Class A	10.8 million	2.2 million	20.9%	(82,068)	$34.20
Class B	11.8 million	2.1 million	18.0%	(29,302)	$26.14
Class C	2.0 million	258,000	12.9%	16,399	$19.41
Class D	67,000	-	0.0%	-	-
Total	**24.7 million**	**4.6 million**	**18.8%**	**(94,971)**	**$29.47**

What makes for a successful office-to-residential conversion?

Successful office-to-residential conversion projects are site specific and depend on the existing building's physical configuration.

Converting vacant office space to housing may theoretically make sense given shifting demand trends, but successful office-to-residential conversion projects depend on physical and financial feasibility. Office buildings must have high vacancy rates and be underperforming financially, and they must also have a layout and design that can relatively easily meet residential building requirements, with considerations of the overall building size, configuration, and placement of internal systems.

Several studies use different methodologies to determine eligibility for residential conversion. This analysis references Up for Growth's Office to Residential Conversions Policy Brief which includes an analysis of office conversion viability in Denver[30] and a Moody's Analytics' survey of New York office buildings.[31] Exhibit 3 provides an overview of the parameters used to assess viability in these studies.

[30] Anjali Kolachalam, "Office to Residential Conversions: Scalable Opportunity or Too Unique to a City Block?" (Washington DC: Up for Growth, November 2022).
[31] Jeffrey Havsy, Xiaodi Li, and Kevin Fagan, "Why Office-To-Apartment Conversions Are Likely a Fringe Trend at Best," Moody's Analytics CRE, January 3, 2023.

Exhibit 3. Survey of Successful Office-to-Residential Conversion Metrics
Source: Up for Growth, Moody's Analytics

		Rationale	Metrics
Physical Factors	**Building Size**	Floor plates must be configurable into residential unit sizes.	• Floor plates between 5,000 to 14,000 SF (depending on building shape) • 5+ Stories
	Building Dimensions	Floor plates must be a sufficient depth to hold living area, but not limit access to natural light.	• Floor depth up to 100 feet • Space to hold at least 4 1,000 SF units per floor with a maximum depth of 50 ft for resulting units
	Internal Systems	Features limiting plumbing and electrical lines can make it difficult to reroute utilities to individual units.	• Open floorplans which support rerouting central utility lines
	Year Built	Newer office buildings will be too costly for acquisition and typically come with sealed windows.	• Built before 2010 • Operable windows
Market Factors	**Rent**	Conversions could be viable if they generate more effective revenue as apartments than offices.	• Office rent PSF below median price for apartment rent PSF
	Vacancy Rates	Buildings that are no longer attracting office tenants incentivize owners to convert.	• 25-30%+ office vacancy rate

Generally, existing studies find that **deeper floor plates, limited access to natural light, inoperable windows, and centralized utilities (like plumbing and HVAC systems) make office buildings difficult to redevelop to meet residential building code specifications.** Office building dimensions typically vary by their age:

- Older, turn-of-the century buildings which typically occupy roughly a quarter block are generally more suitable for redevelopment into residential units due to their configuration and scale. In some cases, they may also be eligible for historic tax credits to help with financing projects and provide unique character features which can attract higher rents.[32] In Portland, many turn-of-the century manufacturing spaces have been turned into residential lofts.
- Mid-century offices which may occupy about a half-block of space can have potential for conversion as the flight-to-quality trend continues, but these depend greatly on building shape and layout to be suitable candidates.[33] They may also not have the aesthetic or historical appeal to attract premium rents.
- Class B or C office spaces (many of which were built in the 1970s and 1980s) tend to be more easily converted as they have open floorplans, operable windows, and tall ceilings with smaller total square footage that provide more flexibility for redevelopment.

[32] Anita Kramer, Nolan Eyre, and Morgan Maloney, "Behind the Facade: The Feasibility of Converting Commercial Real Estate to Multifamily" (National Multifamily Housing Council and Urban Land Institute, February 21, 2023), https://www.nmhc.org/research-insight/research-report/behind-the-facade-the-feasibility-of-converting-commercial-real-estate-to-multifamily/.
[33] Miriam Hall, "Far from 'Easy Money': Experts on the Hurdles Facing Office-To-Residential Conversions," Bisnow, October 13, 2022, https://www.bisnow.com/national/news/construction-development/as-distress-comes-to-the-office-market-office-to-residential-conversions-may-prove-elusive-for-some-115846.

- Modern, Class A office buildings tend to occupy full city blocks and present cost and design challenges.[34] Many of the modern offices in Portland's CBD have floor plates that are too large, making it difficult to plan interior space in a way that meets building codes and tenant expectations. Even if building configuration does allow office spaces to meet code standards, many floor plates lead to long, narrow units that can also limit how attractive units may be to tenants. The Up for Growth and Moody's Analytics models capped the depth of floor plates between 80 and 120 ft. These buildings are also often more costly to acquire, even if they are seeing high vacancy rates. However, if these projects are successful, they hold potential to yield a greater number of units.

Office-to-residential conversion projects can be financially risky and depend on local market context and conditions.

Converting office space to residential units has different financial considerations than ground-up construction because it requires the acquisition of a performing asset; in most cases, this involves higher acquisition costs than vacant land or tear-down structures.[35] However, if vacancy rates in a building are higher than the local market and office rents are lower than achievable residential rents, property owners may have enough incentive to pursue conversion projects.

These projects are still risky, given the relatively small field of architectural and engineering experience related to office-to-residential conversion in the Portland region, the potential for unknown challenges with reconfiguring buildings, and the lingering uncertainty around remote and hybrid work trends. All else being equal, it is likely that most property owners and developers would prefer to upgrade existing offices than pursue conversion if it is viable. Building owners who might convert properties to residential uses likely have little to no debt on a building and a long-term hold on office properties in the Portland area market.

Jurisdictions can encourage office-to-residential conversions with regulatory flexibility and financial incentives like tax abatements, tax increment financing dollars, or housing subsidies.[36] In the Metro area, the City of Portland has already begun implementing some incentives, including SDC exemptions for conversions that include seismic retrofits.[37] However, the high cost of seismic retrofitting generally creates substantial additional costs for conversion projects.[38] While these incentives could be applicable for developers in the Downtown market, there are none available yet for developers in other surrounding jurisdictions (but also no seismic retrofit requirements).

[34] Anjali Kolachalam, "Office to Residential Conversions: Scalable Opportunity or Too Unique to a City Block?"
[35] Anjali Kolachalam, "Office to Residential Conversions: Scalable Opportunity or Too Unique to a City Block?"
[36] Abu-Khalaf, Ahmad, and Ray Demers. "What Will It Take to Convert Offices to Housing?" Enterprise Community Partners, April 10, 2023, https://www.enterprisecommunity.org/blog/what-will-it-take-convert-offices-housing.
[37] Ibid.
[38] Alex Zielinski, "Portland City Council approves incentives to help convert office buildings into apartments," OPB, https://www.opb.org/article/2023/03/15/portland-oregon-housing-city-council-apartments-vacant-office-buildings-conversion-incentives/ March 15, 2023.

What is the potential for office-to-residential conversions in the Metro area?

Because the scale and form of office space differs substantially between downtown Portland and suburban locations, the potential for residential conversion must be evaluated separately. As noted previously, office vacancies and remote work trends are generally higher in the CBD compared with suburban areas, though total office square footage is similar (Exhibit 2). This section summarizes the characteristics of office buildings that exist in both markets, and indicators potential of residential conversion projects.

Downtown Office Market

The Downtown Portland market encompasses office buildings in Portland's CBD. This market is generally characterized by taller, denser buildings than the suburban market, and a larger inventory of Class A office space that commands higher rents per square foot (Exhibit 2).

ECONorthwest analyzed the viability of office-to-residential conversion in downtown Portland on behalf of Prosper Portland, in partnership with Gensler Architects and Turner Construction (summary memorandum attached). This analysis considered three different representative types of office buildings in Portland, including a prototypical quarter-block, half-block, and full-block office building that characterize the range of older, mid-century, and modern office buildings found in the CBD. Given the range of office types in Downtown Portland, these are representative of buildings in the market that might be suitable for conversion, ranging from 35,000 to 305,000 square feet.

Suburban Office Market

Other cities in the Metro area also have small downtown districts. The building stock of suburban downtowns like Beaverton and Hillsboro tend to have a small inventory of mid-rise buildings, but none reach the same scale and employment density as the Portland CBD. The suburban office market in Portland is generally characterized by older, low- or mid-rise buildings in office parks with more lot area dedicated to surface parking lots as well as older, smaller standalone office buildings scattered outside of these areas. The suburban office market in the metro area has a greater inventory of Class B office space (Exhibit 2), which can lend itself well to residential conversion in some cases.[39]

However, the suburban market does not currently have the same high vacancy rates as downtown buildings. A greater share of suburban office space overall is still functioning as a performing asset for property owners, providing less incentive to pursue conversions. Class A offices have the highest vacancies in the suburban market (Exhibit 2), but these buildings are generally less feasible to convert to residential because of higher acquisition costs. Because suburban offices have a higher occupancy rate compared with the downtown market, the cost

[39] Jeffrey Havsy, Xiaodi Li, and Kevin Fagan, "Why Office-To-Apartment Conversions Are Likely a Fringe Trend at Best."

of acquisition would generally be higher on a per square foot basis, including the cost of relocating existing tenants.[40]

Suburban office parks developed around 1980's have opportunities for redevelopment or adaptive reuse, as more companies and workers perceive them as obsolete in terms of amenities and design.[41] Many of these buildings are part of sprawling corporate campuses with lower heights/wider footprints than offices in the CBD; many are also occupied by large, single tenants. Some of these buildings can be attractive for residential redevelopment from a physical and financial standpoint if they offer access to operable windows and have floor plates with open floor plans that can be configured into residential units (or low enough height for an atrium lightwell). However, office parks were not designed with residential uses in mind and may lack attractiveness for residential use, particularly if nearby buildings continue to serve corporate functions. Many office parks have large parking lots and few retail options nearby. Research with developers suggests that "the inefficiency of low-density, suburban land use means that they can do better by starting over these days. Compare that to a dense, built-up area, where the existing office footprint is typically maxed out."[42]

What kind of units could office-to-residential conversion produce in the Metro area?

Downtown Portland could see a modest number of office-to-residential conversion units; well-calibrated policy initiatives could increase those opportunities.

Given the physical and financial feasibility challenges associated with office-to-residential conversions, Downtown Portland could see a handful of projects but is unlikely to see a large wave of office-to-residential conversions. The City of Portland's current incentives for SDC exemptions may help to incentivize some property owners to consider conversion projects in Downtown, but the cost of seismic retrofits associated with the program remain prohibitively high (even with the flexibility provided by the City).[43]

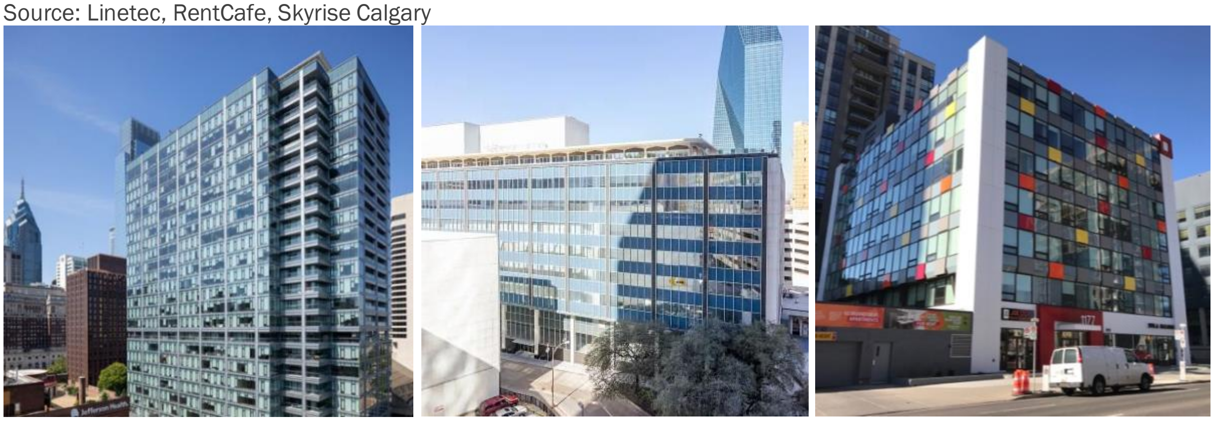
To understand the potential of office-to-residential conversion in the Portland Metro, this analysis uses successful examples in other cities to calculate (1) the average number of units produced by conversion projects and (2) the average gross square footage of building area per unit. Example conversions shown in Exhibit 4 have a wide range in the original building's characteristics, age, and location; all are within the central business district of their respective markets; and all were completed in the past decade.

[40] Anjali Kolachalam, "Office to Residential Conversions: Scalable Opportunity or Too Unique to a City Block?"
[41] Dustin C. Read, "Profiles in the Evolution of Suburban Office Parks" (National Association for Industrial and Office Parks, August 2019).
[42] Anita Kramer, Nolan Eyre, and Morgan Maloney, "Behind the Façade."
[43] Alex Zielinski, "Portland City Council approves incentives to help convert office buildings into apartments."

Exhibit 4. Example CBD Office-to-Residential Conversion Projects
Source: See individual citations

	508 West Apartments[44]	Franklin Tower[45]	Broadway Lofts[46]	Mayflower Apartments[47]	Lofts @ Centennial Yards South[48]	Stephenson Building[49]
Location	Spokane, WA	Philadelphia, PA	Los Angeles, CA	Dallas, TX	Atlanta, GA	Calgary, AB
Year Built	1964	1979	1906	1965	1908	1981
Year Converted	2022	2019	2014	2017	2021	2020
Building Gross SF	91,500	605,000	39,500	253,000	187,000	62,000
Units Produced	112	549	58	215	162	65
Gross Building SF/Unit	817	1,102	681	1,177	1,154	954
Rents	High-End	High-End	High-End	Mixed-Income	Mid-Market	Mid-Market

Exhibit 5. Example Projects (L to R: Franklin Tower, Mayflower Apartments, Stephenson Building)
Source: Linetec, RentCafe, Skyrise Calgary



On average across these examples, conversions yielded roughly one residential unit per 980 square feet of gross floor area in the existing office building, with a range from 681 to 1,177 square feet. Most of these examples include some amenities, including roof decks, lounges, fitness centers, pools, and bicycle rooms. These amenities are one way that the building can be configured to use space that is not suitable for conversion, while adding features that can help attract residents.[50] Given the type and size of office spaces that are most appropriate for conversion in the Portland Metro, variation exists depending on the original building:

[44] Anita Kramer, Nolan Eyre, and Morgan Maloney, "Behind the Facade."
[45] Gensler, "Franklin Tower," n.d., https://www.gensler.com/projects/franklin-tower.
[46] Anita Kramer, Nolan Eyre, and Morgan Maloney, "Behind the Facade."
[47] Ibid.
[48] Ibid.
[49] Ximena Gonzalez, "Calgary's Adventure in Office Conversion," The Globe and Mail, May 5, 2023, https://www.theglobeandmail.com/real-estate/article-calgarys-adventure-in-office-conversion/.
[50] Steven Paytner, "What We've Learned by Assessing More Than 300 Potential Office-to-Residential Conversions," Gensler, June 16, 2022, What We've Learned by Assessing More Than 300 Potential Office-to-Residential Conversions.

- **Quarter-block buildings** are typically older and meet the dimensions criteria described in Exhibit 3. This building type can be suitable for conversion projects on a case-by-case basis, yielding up to approximately 50 units per building depending on the efficiency of the layout, number of floors, and space dedicated to amenities. However, seismic retrofit requirements may make these more financially difficult to upgrade in line with Portland's standards.
- **Half-block buildings** include Downtown's medium-sized, mid-century offices which may be experiencing higher vacancy rates and could have some potential for conversion. Successful projects like these could yield between 100 to 200 units per building if an existing building has a shape that allows for more natural light. However, these buildings typically see challenges with floor plate and depend highly on the building's layout.
- **Large, modern full-block buildings** like those in Downtown Portland are difficult from a physical standpoint because of their large floorplates but are most likely to be financially feasible because they already comply with seismic retrofit requirements. These buildings could yield upwards of 300 units per building but would also likely face challenges with configuration and the location of building utilities.

Exhibit 6. Prototypical Building Configurations
Source: ECONorthwest analysis

	Quarter-Block	Half-Block	Full-Block
Building Square Footage	35,000-60,000 SF	150,000-250,000 SF	300,000-400,000 SF
Estimated Unit Yield (70-80% efficiency)	25-49 units	107-204 units	214-326 units

Suburban offices are less likely to see residential conversions that produce a measurable number of units.

Given the lower vacancy rates in Portland's suburban office parks (particularly in Class B and C office spaces), it is unlikely that many office-to-residential conversion projects will take place in the suburban market. In this context, it may be more feasible to purchase underperforming offices as tear-down projects for new construction. If a suburban building had high vacancy rates, low rents, a physical layout suitable for conversion and it was in a desirable location (like near regional transit lines, a commercial hub, or higher education campus), and or standout historic/architectural character, conversion would be more likely.

Exhibit 7 shows some examples of office-to-residential conversion projects outside of central business districts, but these are primarily from larger east coast markets with different market dynamics and available building stock in suburban areas. The scale and context of these buildings and their surrounding markets do not reflect what is present or possible in most of Portland's suburbs. For example, the D.C./Maryland/Virginia suburban office market is not comparable with Portland's suburbs as it has 12+ story buildings, relatively high walk scores, and a large presence of national and international employers.

Exhibit 7. Example Suburban Office-to-Residential Conversion Projects
Source: National Multifamily Housing Council Research Foundation and Urban Land Institute

	The Foundry	Mission Lofts	Park + Ford
Location	Alexandria, VA	Falls Church, VA	Alexandria, VA
Year Built	1967	1968	1981
Year Converted	2020	2020	2021
Building Gross SF	660,000	178,000	450,000
Units Produced	520	156	435
Building Amenities	Yes	Yes	Yes
Gross Building SF/Unit	1,269	1,141	1,034
Rents	High-End	High-End	Mid-Market

Exhibit 8. Example Suburban Office-to-Residential Projects (L: The Foundry, R: Park + Ford)
Source: Cooper Carry, Landing, Builder

In some cases, conversion of office parking space to residential units has been successful in smaller cities and outside of major downtown areas (see Exhibit 9). However, these are typically either located near new public investments (such as trails/pedestrian improvements connecting to other commercial or mixed-use areas) or included components like ground floor retail.

Exhibit 9. Example Parking Conversion Projects
Source: Retrofit, UBC Sustainability Scholars Program, Urbanism Next

	508 West Apartments	Link Apartments	Broadway Autopark
Location	Spokane, WA	Charlotte, NC	Wichita, KS
Year Built	1964	1969	1949
Year Converted	2022	2020	2016
Parking Type	Structured	Surface	Structured
Building Gross SF	63,500 (building) 28,000 (garage)	555,000	55,000
Units Produced	85	533	44
Building Amenities	Yes	Yes	Yes
Gross Building SF/Unit	1,076	1,003	1,147
Rents	High-End	High-End	High-End

Example: Link Apartments (Charlotte NC)

The Link Apartments are located in Charlotte, North Carolina outside of the city's central business district. At the time of construction, the Little Sugar Creek greenway had recently been extended to the area (providing improved bike access) and another new renovation project nearby created a new anchor for dining and shopping within walking distance. In 2014, Grubb Properties purchased two old mid-century office buildings located in this developing area outside of Charlotte's downtown, including ten acres total of the two buildings and their large surface parking lots. In the following years, the developer first renovated the outdated offices into premium Class A spaces, and then repurposed the parking lots for new construction multifamily housing. The process involved rezoning the land for multifamily use and making a number of public realm improvements to sidewalks surrounding the buildings. The final project includes a shared parking garage to serve office and residential tenants.

Source: Grubb Properties

Without public incentives, most office-to-residential conversions are likely to be slightly below market rate apartments.

Office-to-residential conversions are different from new ground-up construction because their starting point is already a performing asset. Despite nationwide examples, office conversions in Portland are still seen by many property owners and developers a risky investment without many comparable examples or strong local industry expertise.[51] To be feasible and attractive to property owners and developers, these projects usually need to promise close to market rate rents or public incentives.

In some markets (particularly east coast cities), conversion projects can achieve top-of-the-market rents if they adapt historic buildings with distinctive features or offer high-rise units that are otherwise unavailable. Portland has availability of high-end purpose-built apartments with premium amenities and rents which suggests that converted units would face competition. Unless a building in Portland includes special, standout features or premium amenities, it will likely achieve only moderate rents (at or below 100 percent of area median income).

An analysis of office-to-residential conversion projects across the country found the median cost of conversion per unit was $255,000 (accounting for hard and soft costs), but costs vary widely and depend on the complexity of individual buildings.[52] In general, rents for converted units tend to track the market. While some examples show that converted units cost less than newly constructed units, local market factors, public incentives, and site-specific opportunities (such as historic tax credits) can have a large impact.[53]

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[51] Anjali Kolachalam, "Office to Residential Conversions: Scalable Opportunity or Too Unique to a City Block?"

[52] Anita Kramer, Nolan Eyre, and Morgan Maloney, "Behind the Facade," 11.

[53] Macleans, "How this Calgary company is transforming empty offices into housing units" (December 2022) https://www.macleans.ca/society/how-this-calgary-company-is-transforming-empty-offices-into-housing-units/

Some jurisdictions are implementing affordability requirements with office-to-residential conversion incentives.

Within the Metro area, Portland is the only jurisdiction that currently offers incentives for office-to-residential conversions (SDC exemptions for some types of conversion projects).[54] However, the City of Portland's IH ordinance may apply for office-to-residential conversion projects that trigger the requirements (e.g., has at least 20 units). Jurisdictions across the Metro area have different regulations and incentives for affordable and mixed-income housing.

Financial incentives like tax abatements, local contributions, or SDC exemptions could help the financial feasibility of office-to-residential conversion projects that include affordable units. However, if the same incentives are also available for new construction projects that have less complexity and risk, they will likely be used for new buildings.[55]

Some jurisdictions throughout the country that are implementing public incentives for office-to-residential conversions are also including affordability requirements for a share of units (see Exhibit 10). However, this presents an extra financial hurdle. Since these are relatively new initiatives, most have not yet seen a significant number of new conversion projects completed. Chicago and Washington D.C. have begun to see hundreds of planned affordable units, the highest number coming from Chicago's program which proposes to contribute urban renewal funding to projects with affordable units. Public contributions can help to overcome financial feasibility hurdles and ensure that buildings transition to their highest and best use, but they require individual localities to allocate funds.

Exhibit 10. Office-to-Residential Conversion Incentives and Affordability Requirements
Source: Urban Redevelopment Authority of Pittsburgh, Urban Land Institute

Jurisdictions	Incentive	Affordability Requirements	Status/Units Produced or Planned
Pittsburgh, PA[56]	$60-100k/unit (depending on depth of affordability); <40% of total project costs	20% at 50 – 80% AMI	Program currently open for proposals
Washington, DC[57,58]	20-year property tax abatement	15% at 60% AMI in eligible area (min. 10 units in building)	1,100+ before incentive (projects with proposed affordable units upcoming)
Chicago, IL[59]	$188 million from tax increment financing	30% at 60% AMI	Proposals under review; Planned: 1,600+ units (600+ affordable)

[54] Ken Ray, "Portland City Council Adopts Two Ordinances to Assist in Office-To-Residential Conversions" (City of Portland Bureau of Development Services, March 17, 2023), https://www.portland.gov/bds/commercial-permitting/news/2023/3/17/portland-city-council-adopts-two-ordinances-assist-office.

[55] Connor Allen, "From Boardrooms to Bedrooms: The Challenge of Converting Vacant Office Space Into Housing," May 2, 2023, https://camoinassociates.com/resources/converting-vacant-office-space-into-housing/.

[56] Urban Redevelopment Authority of Pittsburgh, "Pittsburgh Downtown Conversion Program," accessed June 23, 2023, https://www.ura.org/pages/pittsburgh-downtown-conversion-program.

[57] Erica Williams, "Downtown Tax Abatement Tailor-Made for Developers at the Expense of DC Residents," DC Fiscal Policy Institute, April 21, 2023, https://www.dcfpi.org/all/downtown-tax-abatement-tailor-made-for-developers-at-the-expense-of-dc-residents/.

[58] Mimi Montgomery, "DC Area Leads the Way in Office-to-Apartment Conversions," *The Washingtonian*, November 14, 2022, https://www.washingtonian.com/2022/11/14/dc-area-leads-the-way-in-office-to-apartment-conversions/.

[59] Alby Gallun, "Converting Chicago Office to Mixed Use on LaSalle Street," Urban Land Institute, April 24, 2023, https://urbanland.uli.org/development-business/team-announced-for-lasalle-street-redesign/.

Partial building conversions could also be a more appealing option for building owners to add residential units to office buildings.

Although it would be less precise to estimate the potential number of units from partial conversions given the case-by-case nature of these projects, building owners and developers could explore partial rather than full building conversions. These projects may require a lower financial commitment than a full-building residential conversion. In downtown Portland, this could also be targeted to upper floors of larger office buildings where step-backs create smaller floorplates more suitable for residential units. In the suburban market, some developers could also pursue adding floors of residential to existing low-rise office buildings that have not yet maximized their allowed height and floor area ratios.

Adaptive reuse can help achieve climate goals.

The built environment is responsible for approximately 40 percent of global CO2 emissions, with new construction generating roughly 11 percent on its own.[60] Demolition is a large part of this equation, which the United States Environmental Protection Agency (EPA) estimates accounts for 90 percent of building debris, compared with only 10 percent from new construction.[61] In Portland, a 2019 report from the Oregon Department of Environmental Quality (DEQ) found that over 85 percent of materials were able to be salvaged from buildings that avoided demolition, significantly reducing carbon emissions, sequestering bioenergetic carbon in wood, and mitigating environmental pollution.[62]

Implications for Residential Capacity

Downtown Office Market

While it is difficult to predict the number of feasible conversion projects given the amount of public support estimated to be needed to make conversion feasible, it is **unlikely that more than a few downtown office buildings** would convert to residential use over the next 20 years. This could result in somewhere between **200 to 1,500 new units** depending on the number of successful projects, size of individual buildings, level of efficiency in using interior space, and unit mix.

Suburban Office Market

If a building in the suburban market with **high vacancy rates and low rents** were located near a **desirable location** (like regional transit lines or shopping centers) or with standout historic/architectural character, conversion could be likely. Likewise, underutilized parking space (either structured garages or surface lots) could have potential with a desirable location or new investments nearby.

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[60] Architecture 2030, "Why the Built Environment?" 2018, https://architecture2030.org/why-the-building-sector/.

[61] US Environmental Protection Agency, "Advancing Sustainable Materials Management: 2018 Fact Sheet," December 2020, https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/advancing-sustainable-materials-management.

[62] Oregon Department of Environmental Quality, "Deconstruction vs. Demolition: An Evaluation of Carbon and Energy Impacts from Deconstructed Homes in the City of Portland" (Portland Bureau of Planning and Sustainability, March 2019), https://www.oregon.gov/deq/FilterDocs/DeconstructionReport.pdf.

If a building conversion were to happen with advantageous circumstances and a willing developer, the number of units produced would be highly dependent on the scale of the building. Based on example suburban office conversion projects in other places (including building and parking space conversions), in a larger building or parking lot, this could yield **up to 500 units** depending on the configuration of an individual property.

Total Potential Housing Capacity

Taken together, **the range of potential housing units that could result from office-to-residential conversion in the region could be between a few hundred units and roughly 2,000 units** over the next 20 years. Units would likely have mid-market rents unless the building had particularly desirable amenities or location that would lead to top-of-market rents.

APPENDIX 3 – 2024 REGIONAL EMPLOYMENT LAND DEMAND METHODOLOGY

Background

This appendix summarizes potential 20-year demand for land based on the regional employment forecast. This forecast-based approach is one source of information that the Council may choose to consider in making its growth management decision. In addition to this forecast-based demand analysis, the Council may wish to consider the potential benefits of adding the Sherwood West employment area to the UGB as proposed by the City of Sherwood, which have been assessed in a separate appendix to this 2024 Urban Growth Report (UGR).

Overview of approach

This appendix summarizes the approach and set of assumptions used in informing the employment land demand projections for this 2024 UGR. The overall methodology is similar to the one used in UGRs dating back to 2009 and is similar to methods commonly used in city Economic Opportunities Analyses. Generally, this analysis goes through several steps, as follows:

1. Estimate how much of the 7-county Metropolitan Statistical Area (MSA) job growth is likely to be "captured" in the Metro UGB over the 20-year planning period.
2. Account for work from home and hybrid work, which reduce future demand for business space (new in this UGR because work from home/hybrid work will likely persist for a sizable share of jobs).
3. Sort shares of jobs in each employment sector into six prototypical building types.
4. Account for current excess office vacancies that are expected to be absorbed over the 20-year planning period (new in this UGR because of historically high office vacancy rates resulting from the pandemic and increased work from home/hybrid work).
5. Translate jobs into building square footage demand by applying square feet per employee assumptions to each of the six building types, recognizing submarket variations.
6. Translate employee square footage to acreage demand by applying floor-area-ratios to each of the six building types, recognizing submarket variations.
7. Summarize acreage demand by building type and then sort into more general commercial and industrial categories for comparison with commercial and industrial growth capacity estimates (capacity estimation methods are summarized in a separate appendix).

Assumptions for the above-listed steps are updated with additional years of data and/ or revised to reflect newer available information to the current methodology. The analysis includes updated projections of employment growth for the Metro UGB (i.e., [1] capture rate assumption); and new data that are deductions to that demand based on negative space need factors (i.e., [2] future job absorption through existing office vacancies in the region and [3] an increased expectation of work from home/ hybrid work (WFH) which is expected to lower on-site job needs). The combination of these three factors we are calling as "Triple Net" and incorporated into this DRAFT UGR non-residential space demand projections.

The MSA forecast includes a range (high, medium, and low growth scenarios) of alternatives and is carried through this UGR jobs demand analysis as three distinct growth options; however, to avoid repetition in explaining the methodology, we use the medium case (or baseline forecast) for purposes of exposition and explanation of our approach.

- An updated Metro UGB employment forecast for 2024 to 2044 serves as the economic trend basis for nonresidential land demand projections of the 2024 Employment UGR. The MSA regional forecast provides the economic foundations for the UGB employment forecast.
- The three growth factors that pare the regional forecast down to the UGB we call collectively "Triple Net" are [1] UGB capture rate, [2] office vacancy rate (based on recent published information from real estate brokers, [3] Census hybrid/ work-from-home data.
    - Factor [1] pares the regional MSA forecast down to the employment growth for just the Metro UGB
    - Factors [2] and [3] do not alter the amount of the UGB employment forecast but rather reduce the impact on brand-new future land demand for office space.
    - Assumes that abnormally high office vacancy rates (today) will stabilize in the long-run and that stabilization will absorb a share of future office demand, partly negating the demand for new/ additional office space.
    - Assumes the WFH trend will persist and continue at current elevated levels during the 20-year forecast, offsetting a portion of demand for new/ additional office employment space.
- The historical capture rate for employment growth in the Metro UGB from 1979 to 2022 is 75%.
- The projection period for the 2024 UGR is 2024 to 2044. For purposes of the DRAFT analytics, future value of the Metro UGB capture rate is assumed to be an average of 75%, same as history, with variation for individual sectors.
- Other key density and growth assumption factors on future land demand:
    - Square foot per job density (updated per advice from public and private sector experts)
    - Floor area ratios (initial consultant input from the 2009 UGR; it appears unlikely that these ratios have changed in recent construction)
    - Employment allocations by 2040 design type & development hubs/ rings (revised with 2019 information)

Data sources

- MSA regional forecast (2024 to 2044) *updated* (w/ peer review)
- UGB employment forecast (2024 to 2044) *updated* – derived from MSA regional forecast
- UGB capture rate *updated* (source: Metro LDMS & BLS)
- Work from home factor *added* to methodology for office demand (source: Census ACS)
- Office vacancy rate *added* to methodology (source: regional real estate brokerage reports)
- Contingency table for UGB jobs to six building types *updated* (source: OED | QCEW & Metro LDMS | RLIS)
- Square foot density per employee *updated* (w/ stakeholder input)

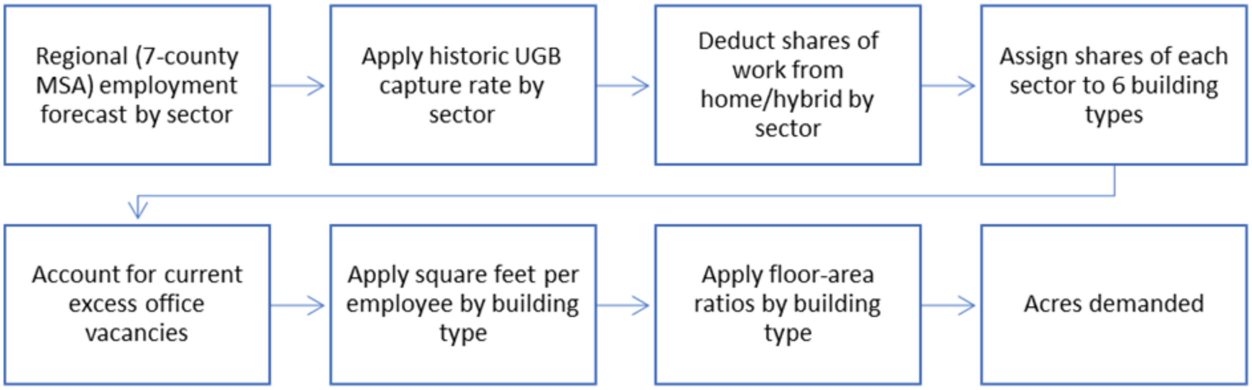


Figure 1: Concept diagram of UGB employment demand calculation.

Methodology details

Metro UGB Employment Capture Rate

The purpose of the Metro UGB employment capture rate is to pare the 7-county MSA regional forecast down to only payroll jobs inside the Metro UGB. The rate excludes projected amounts of employment growth in Clark and Skamania counties in Washington; Columbia and Yamhill counties in Oregon; and the portion of cities and unincorporated county areas in Clackamas, Multnomah and Washington outside the Metro UGB. The rate is used as a forecast allocation tool for splitting the MSA employment forecast between growth assigned to inside the Metro UGB (and to the outside).

The Metro capture rate is both a statistic and an assumption in the UGB forecast. As a statistic, it simply describes the historical share of employment growth (also for example, households or population) within the Metro UGB and the MSA region. When used as an assumption about the future, staff recommends that the capture rate have a basis in historic observations or that there be a clear rationale for why it may be higher or lower than those observations in the future. This analysis assumes a continuation of the historic 1979-2022 UGB capture rate.

The MSA region is delineated by federal data sources to include the counties of Clackamas, Columbia, Multnomah, Washington and Yamhill in Oregon and the counties of Clark and Skamania in Washington State. The Metro UGB is designated by Metro, and its boundaries have increased incrementally over the years with UGB expansions as decided by the Metro Council.

Equation 1: Metro UGB Employment Capture Rate

$$\text{Capture Rate} = \frac{(E_t^{UGB} - E_0^{UGB})}{(E_t^{MSA} - E_0^{MSA})}$$

where,

E	is payroll employment
UGB	is delineation (of employment) in the Metro Urban Growth Boundary
MSA	is delineation (of employment) in the 7-county metropolitan statistical area
t	is a future time
0	is the base year time

The historical value of the Metro capture rate fluctuates over time, depending on business cycle peaks and troughs as well as the span of years included in the capture rate's computation. A nearby table illustrates several examples of different historical periods and the calculations of the capture rate at different points and intervals of business cycles in the region. The table shows that capture rates do indeed vary because of business cycles and these economic impacts may hit organizations differently, depending upon the mix of industries inside vs. outside the UGB and the type of economic driver causing variations in the business cycle.

	Payroll Employment			
	UGB	**MSA (7-county)**		
difference: **1979-2022**	483,400	646,900	75%	capture rate
trough-to-trough: **1983-2010**	337,200	435,800	77%	capture rate
peak-to-peak: **1979-2007**	334,500	464,900	72%	capture rate

Table 1: Historical capture rate estimates of payroll employment in the region (source: Metro and US BLS)

Historic capture rate data suggests that systemic economic change could be underway as the trend in the historic capture rate payroll employment has been trending lower since peaking at 89% in 2014. A nearby chart illustrates the recent downward trajectory in Metro UGB capture rates. The capture rate, more recently in 2022, edged higher. More data will be needed to determine if the uptick is an anomaly or a return to the higher capture rate readings prior to 2015 when the rate hung closer to 80%.

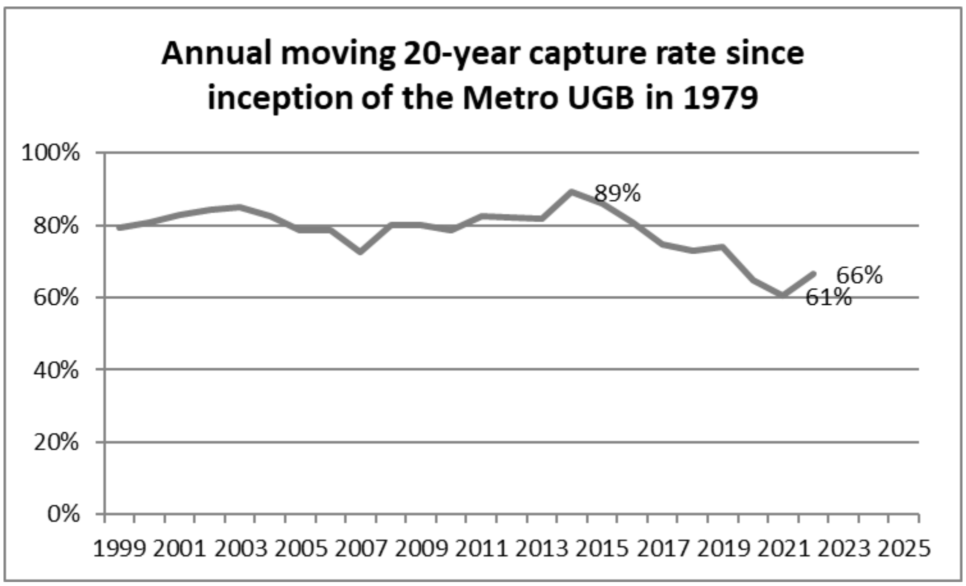


Figure 2: Historic 20-year capture rates of payroll employment in the Metro UGB

For purposes of the DRAFT Employment UGR, staff recommends assuming a 75% capture rate which is the long-term historical rate for the Metro UGB and considers the rate's "average" through several business cycles (i.e., 1980-82 double-dip recession, 1991 recession, 2000 dot-com bust, 2008-2009 Great Recession and 2020 pandemic). The regional economy recently suffered through one of the steepest downturns in history, a pandemic-induced recession which battered growth across many industries. Since then, the recovery suggests the onset of a rebound in the capture rate. A 75% capture rate assumes that the UGB job forecast will stabilize near its long-term "average" and further implies that growth is roughly unchanged from the region's historical long-term growth share.

Hybrid/ Work-from-home Assumption

The purpose of the WFH factor is to calculate a reduced demand for the "housing" of employment growth in non-residential spaces / or buildings. A fairly large fraction of employees now work from home and should be considered going forward in the UGR. Part-time or hybrid employees are assumed to have a smaller workspace footprint than regular on-site employees. Fully home-based employees are assumed to have no workspace footprint in the businesses that employ them.

Most employees continue to be "on-site" workers, about three-fourths, according to a recent Census report for the nation, falling from 84% before the pandemic (see nearby figure). 16% of workers were either hybrid (i.e., a mix of working from home and part-time on-site) or fully home-based employees before the pandemic. After the pandemic, the share of employees working away from home was nearly double, at 27%. The share of employees working from home (full + mixed) held steady during and after the pandemic. Separately, additional Census ACS data (2022) suggests a persistence in work away from home. This is assumed to continue and held steady in the twenty-year forecast of non-residential building demand.

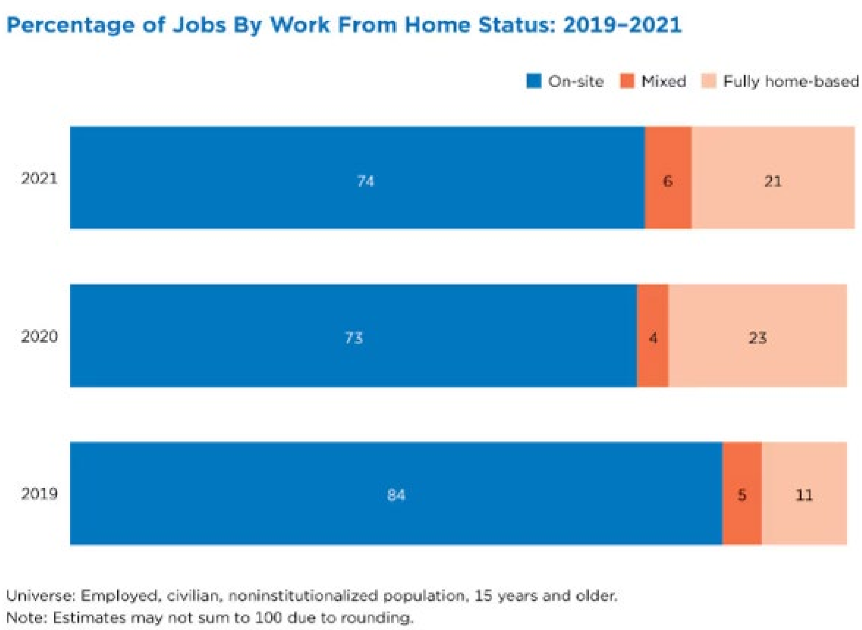


Figure 3: Work from Home Status of Employees (source: US Census, 2020-22 Survey of Income and Program Participation (SIPP))

The Metro and UGB employment forecasts are unchanged by the WFH net reduction. Instead, a hypothetical calculation (much in the manner of a pro forma) is said to reduce the forecast and adjust for a lowering of the number of employees demanding future non-residential building space. This represents a necessary step to avoid over-estimating non-residential land need going forward when roughly one-third of employees are expected to have a status that is work from home. A nearby figure illustrates the work from home assumptions applied to the industry job forecast as a step in calculating the hypothetical employment land need of the Metro region.

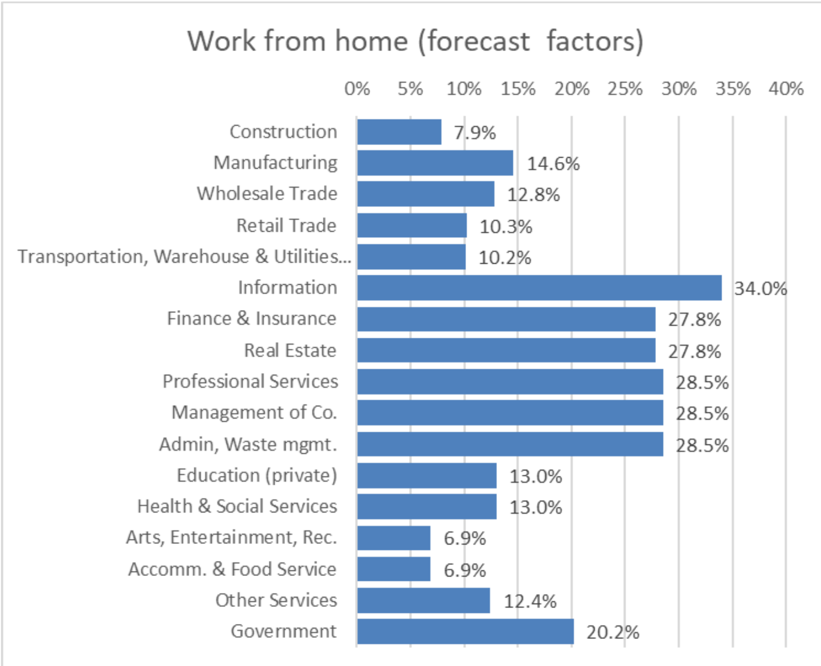


Figure 4: Work from home factors (source: Census ACS, Census SIPP and Metro calculations)

UGB Employment forecast by Building Type

The first level of employment projections was of the MSA (7 counties). The second level, the MSA projections were then trimmed to the Metro UGB, assuming a capture rate for the twenty-year forecast. The third level is the transformation of the UGB employment forecast to the forecast of UGB employment by building space (i.e., the job components for industrial vs. commercial non-residential demand). These employment projections are tallied to jobs by building archetypes. Six types are assumed: (1) general industrial, (2) flex/business park, (3) warehouse/ distribution facilities; (4) office, (5) retail stores, (6) institutional uses (schools, hospitals, medical clinics, etc.).

A contingency table based on Oregon Employment Department (OED) Quarterly Census of Employment and Wages (QCEW) confidential jobs data for the Metro region is used to distribute the UGB payroll employment projections into the 6 building types. The equation below explains the formula for how this was calculated.

Equation 2: Metro UGB Employment Forecast by Building Type

$$E_{j,t} = \sum_{i=1}^{17} (E_{i,t} * \mathbf{B}_{i,j})$$

where,

E is payroll UGB employment (less hypothetical reduction for WFH factors)

$\mathbf{B}$ is a contingency table of job shares by building type, a matrix that displays the bivariate frequency distribution of employment by NAICS and building type.

t is the job growth of 2024 to 2044 (end points for the twenty-year forecast)

i is the list of two-digit NAICS contained by the regional forecast (17 industry categories)

j is the list of building archetypes/ 6 types (i.e., general industrial, flex/business park, warehouse/ distribution facilities; office, retail stores, institutional uses ([schools, hospitals, medical clinics, etc.])

The building archetypes used primarily by the region's businesses vary by industry classification. Some industries have a very distinct "preference" for a certain building archetype, but all industries utilize a mix of all six forms to a higher or lesser degree. This degree is based on current employment data and the figures represent shares of jobs in each NAICS by building type.

- Construction employment mainly utilizes general industrial space, but also office space and warehousing/ distribution facilities.
- Manufacturing mostly uses general industrial buildings and flex/ business parks.
- Wholesale trade job classifications are mostly in warehouse/ distribution facilities but also in flex/ business parks.
- Transportation, warehouse & utilities (TWU) sector employs workers in warehousing/ distribution facilities, office buildings, and flex/ business parks.
- Information services, comprised of print media businesses and internet service-based providers, which include data centers and the like, primarily utilize office spaces followed by warehouse/ distribution building spaces.
- Finance & Real Estate firms employ workers in mostly office settings and retail locations.
- Professional Service providers mainly are in office buildings and some retail locations.
- Management of Companies are employees of big corporations and the holding company that owns or oversees its subsidiaries. The workers are predominantly office workers.
- Administration services are support staff occupations and temporary help workers plus businesses in waste management services, which occupy primarily office buildings and retail formats.
- Private education services are mostly located in institution spaces and office buildings.
- Health care providers mostly utilize institutional space, but some medical clinics are located in retail formats or are in office buildings.
- Arts, entertainment, and recreation jobs are classified into retail formats and larger entertainment activities are assumed in large footprints and classified in warehouse/ distribution.
- Food and accommodation services have workers in largely retail formats.
- Other services sector is more of a "catch-all" category that doesn't have a real dominant footprint
- Government is mostly classified into office spaces. Note: space demand from public schools is excluded here because public school land supply and demand is not fungible across school districts in the region (in other words, a regional calculation of the adequacy of school land supply is not meaningful to individual school districts that must address their site needs within their respective school districts). The UGR analysis also reflects this on the supply side of the ledger by excluding school district lands from the buildable land inventory. Metro has a Major UGB Amendment process that is better suited for addressing the site needs of individual school districts.

NAICS	Sectors Represented	Office	Institution	Flex/BP	Gen Industrial	Ware-house	Retail
23	Construction	27%	2%	1%	40%	20%	10%
31-33	Manufacturing	3%	0%	33%	40%	20%	4%
42	Wholesale Trade	12%	1%	23%	7%	50%	8%
44-45	Retail Trade	5%	1%	0%	2%	50%	42%
22, 48-49	Transportation, Warehouse & Utilities	31%	6%	10%	1%	43%	9%
51	Information	50%	2%	2%	1%	30%	15%
52	Finance	74%	2%	0%	0%	0%	23%
53	Real Estate	73%	3%	1%	2%	1%	21%
54	Professional Services	62%	4%	1%	2%	10%	20%
55	Management	78%	6%	1%	1%	0%	14%
56	Admin, Waste	69%	2%	2%	1%	5%	21%
61	Education (private)	33%	63%	0%	0%	0%	3%
62	Health & Social Services	17%	67%	0%	0%	0%	15%
71	Arts, Entertain, Rec	17%	13%	1%	1%	20%	49%
72	Accomm & Food Service	7%	1%	0%	1%	25%	65%
81	Other Services	34%	8%	1%	2%	35%	18%
92	Government	76%	0%	0%	0%	0%	3%
	TOTAL	36%	16%	6%	8%	5%	29%

Table 2: Metro UGB employment by building type contingency table (source: QCEW 2019 data, Metro tabulation using LDMS information; note: government does not add to 100% because of school employment – please reference the major UGB amendment process for the handling of school uses)

Office Vacancy Rate Assumption

Portland's office vacancy rate in the Central Business District (CBD) has been recently tracked by various professional real estate brokerage reports as somewhere between 25% to 30% (2023Q4 to 2024Q1). The broader Metro region has shown an office vacancy rate of about half that of the Portland CBD. Significant economic dislocations occurred during the pandemic, and difficulties in the office market continue to persist. Many pundits have said that conditions will likely worsen before improving as more leases come up for renewal, and employers who don't need as much office space as before will choose to relocate elsewhere or rent significantly less office square footage. This leaves a "surplus" of existing office space that will take additional time to absorb.

As a result of the current market surplus, most would agree that the current excess supply will get absorbed by market growth and future demand in office space. That trend will indeed resolve existing surpluses, but it will on the flip side reduce the demand for brand new office space going forward. A fraction of projected office need is expected to be absorbed by refilling of today's empty office buildings. Because this refilling of existing vacant office space is not accomplished through redevelopment of buildings, it is not addressed in the UGB capacity analysis. Instead, it is factored in here, as a demand reduction.

The office vacancy rate across the entire Metro area is currently about 15%. Market professionals have noted that a well-functioning market has a vacancy rate between 5 and 10%. This rate accounts for a "friction-less" or the smooth transaction between re-location and rental of new movers and new tenants. For purposes of computation for the UGR employment land need, a friction-less vacancy rate of 7.5% is assumed – a number arrived at from the midpoint between 5 and 10%. With the current office vacancy rate about 15% and subtracting the estimated 7.5% friction-less vacancy rate, the amount of excess office space is assumed to be 7.5% of current office space – regionally. This 7.5% of current excess office space is assumed to then reduce the amount of future office space construction in the twenty-year forecast. This is the third component of the “triple-net” calculation applied to future nonresidential development needs.

Using Square Foot Per Employee (SFE) to Forecast Physical Building Space Needs

At this stage in calculations, we begin to translate “triple-net” job numbers into demand for building space. This is a step towards estimating demand for acres of land for employment growth. This is an approach commonly used in city Economic Opportunities Analyses.

First, we gratefully acknowledge the contributions of experts from local governments, developers, brokers, and knowledgeable individuals in the region’s various real estate markets for their insights on the density and scope of non-residential construction trends. We thank them for their generous aid in reviewing the density assumptions for the 2024 UGR. Final values are Metro assumptions after consideration of external expert opinions.

The density methodology and assumptions attempt to differentiate by business unit types, generally following zoning by industrial or commercial and NAICS code, by building structure type, and by price gradients depending on proximity to the urban core. Generalization is necessary to make a regional scale employment demand analysis feasible and is in keeping with Oregon Administrative Rules such as OAR 660-024-0040(1), which states that “The 20-year [land need] determinations are estimates which, although based on the best available information and methodologies, should not be held to an unreasonably high level of precision.”

Reasons for needing to generalize are at least threefold. First, there are numerous types of businesses doing production, fabrication, assembly, service provision, etc. in a variety of industry fields, and each having quite disparate space need requirements to house their operations and employees, handling and storage of materials, and the usage of large and small-scale machinery. These wide division of activities don’t always lend themselves to a fully representative “average”.

Second, even classifying the activities of industries into a loose organization by building type does not necessarily make the estimate of job density any easier. Building types serve a useful breakdown of the density of different structure uses, but even within this distinction there were many businesses and organizations that did not fit harmoniously into the list of building types.

Third, real estate economic theory and observed price gradients suggest that the “efficient” usage of space for various industries and firms would argue that some variation in job density should exist depending upon location. The simplest formulation imagines that, other things being equal, that closer-in locations would likely fetch a higher price premium than locations out on the edge of a region. In practice, locations aren’t likely to be as fungible (or easily interchangeable) with the particular space usage needs of a business unit. The land supply isn’t necessarily that fungible either because of the wide variability of the land itself, which can have quite unique aspects in its topography (i.e., good or bad for development), historic development patterns (e.g., airports, railroad stations, port facilities, existing infrastructure, etc.), and regulatory barriers. This aside, theory would offer that higher real estate prices ought to influence efficiency in density. Prices near the center of a region are generally more highly prized and therefore price per square footage is generally greater. Other things being equal, theory suggests land supply near the edge of a region might show less density.

Most have agreed that there is wide uncertainty around any job density statistic, or its estimate, and Metro staff would agree. However, external review indicated that the square footage assumptions used in this analysis strike a reasonable balance between observed variability, economic theory, and market trends that may lead to future changes in densities over the 20-year planning period.

Our approach attempts to acknowledge some of the wide variability in space efficiency by considering multiple tiers as we have; however, we acknowledge that there is significant uncertainty in the scope of possible development going forward. Density assumptions in the UGR, generally reflect greater density (i.e., lower square foot per employee) among commercial activities than compared to businesses units that need to operate on industrial sites and zoning districts. Densities between industrial activities vary too, with warehousing and distribution types generally assumed to have greater space usage per employee (i.e., less density per employee). In largely commercial activities, the office archetype is assumed to utilize space most efficiently per employee. Institutional spaces are largely assumed to be medical clinics, hospitals and other medical facilities. Retail is perhaps the most difficult to fathom because so many industry groups can find themselves located in a retail format. These could vary between a small corner grocery store up in size to a "big box" retail footprint with a regional service coverage. Additionally, a wide range of businesses activities are in retail sites, and when these traditional retail outlets change hands, a new "non-retail" establishment could replace the location turnover.

2024 Urban Growth Report – Non-residential employment density assumptions (square-foot per employee)

Building Archetypes	Central Hub	Inner Ring	Outer Ring
General Industrial	850	800	800
Warehousing/ Distribution	950	1,400	2,000
Flex	600	625	1,000
Office	300	300	300
Retail	450	450	475
Institutional	500	500	550

The density assumptions represent a curated "average" after consideration of stakeholder input.

Table 3: Reviewed Square Foot per Employee Density Assumptions

Future square footage demand is calculated by the following generalized formula.

Equation 3: Projected industrial demand (square footage)

$$Sq.ft.(of\ industrial\ demand) = \sum_{i=1}^{3} \sum_{j=1}^{3} (SFE_{i,j} * E_{i,j})$$

where,

SFE is square feet per employee

E is subarea payroll employment by building type

i is building type = {general industrial, warehouse/ distribution, flex}

j is subarea = {central hub, inner ring, outer ring}

Equation 4: Projected commercial demand (square footage)

$$Sq.ft.(of\ commercial\ demand) = \sum_{i=1}^{3}\sum_{j=1}^{3}(SFE_{i,j} * E_{i,j})$$

where,
SFE is square feet per employee
E is subarea payroll employment by building type
i is building type = {office, retail, institutional}
j is subarea = {central hub, inner ring, outer ring}

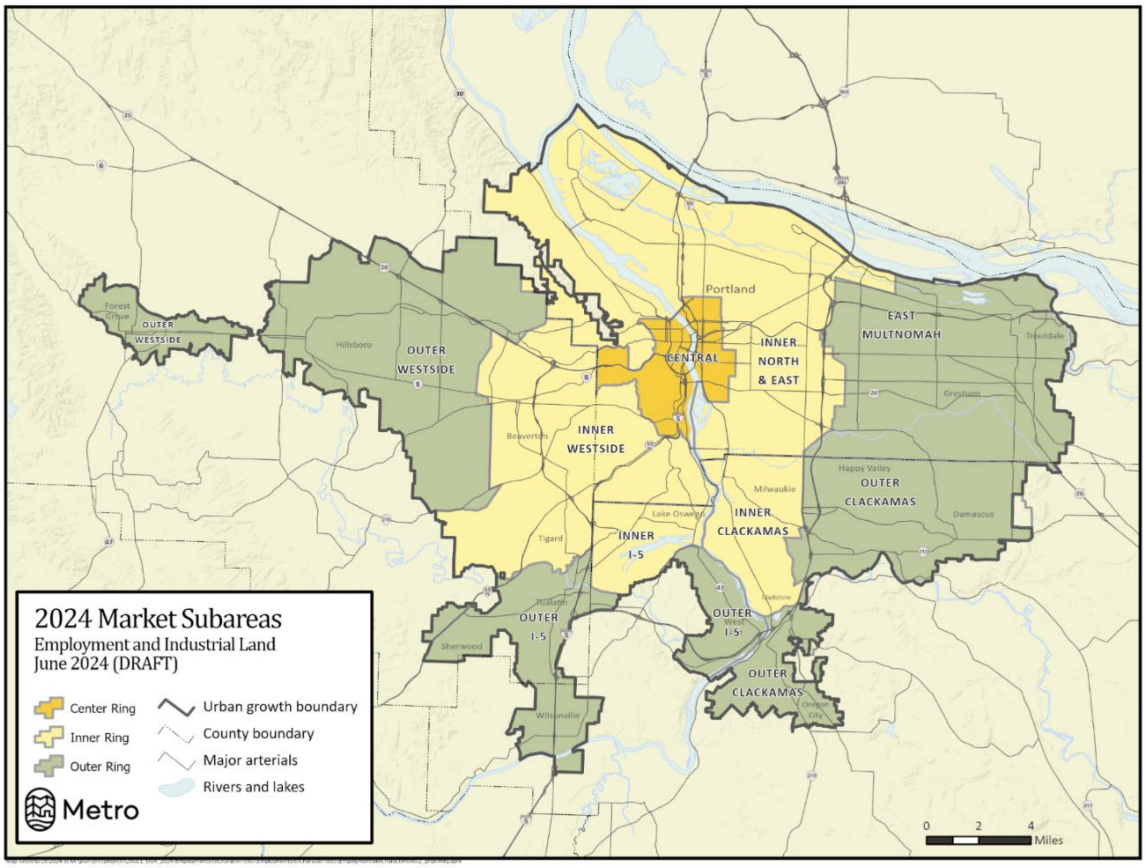


Figure 5: Map of subarea (central, inner & outer rings)

Using Floor-to-Area Ratios (FAR) to Forecast Physical Land Area Need (in net acres)

Floor area ratios convert the square footage space needs of employment and employers from buildings to net acres. The notion is conceptualized in the general equation shown nearby.

Equation 5: Concept formula for estimating net acre land demand from an employment forecast

$$Net\ acre\ land\ demand = \frac{(Employment) * (sq.ft.per\ employee)}{Floor\ area\ ratio}$$

where, the floor area ratio (FAR) is the relationship between a building's total usable floor space and the total area of the lot on which the building stands. FAR may be expressed as a decimal number and is derived by dividing the total area of the building by the total area of the parcel (building area ÷ lot area). Employment is the "triple net" 2024-44 Metro UGB job forecast by building type and distributed to subareas. Subareas employment is based on current employment geographic distributions. Square foot per employee assumptions are noted in Table 3. FAR assumptions are discussed conceptually, next.

The FAR values assumed in the UGR methods have been developed in past UGRs and range from 0.25 to 5.0. Individual FAR contingency tables exist for each of the 6 building types, in other words 6 matrices of FAR. Each table has individual FAR values by subarea and 2040 design type. An illustration of this contingency matrix is shown in a nearby image.

Subareas/ 2040 designs	Central	Corridors	Regional Center	Town Center	RSIA	Industrial	Employment	Other
Central								
Inner Westside								
Inner North & East								
Inner Clackamas								
Inner I-5								
Outer Westside								
East Mult Co								
Outer Clackamas								
Outer I-5/205								

Illustrative table. Actual tables contain FAR values (one table for each building type)

Figure 6: Illustration of the contingency matrix: row and column headings (FAR values populate the cells of the matrix of which there are 6 different arrays – 1 for each building type)

FAR distinction by 2040 design type:

- Central: 1.0 to 5.0
- Corridors: 0.3 to 0.75
- Regional Centers: 0.3 to 0.75
- Town Centers: 0.4 to 0.9
- RSIA (regionally significant areas – Metro Title 4): 0.25 to 0.5
- Industrial: 0.25 to 0.5
- Employment: 0.25 to 0.5
- Other (areas not in a designated 2040 design type): 0.25 to 0.6

FAR distinction by subarea:

- Most notably, FAR's are highest in the central hub and become incrementally less dense (i.e., smaller FAR value) as sites radiate out to the inner ring and then outer ring subareas.
- The names of the subarea denote which of the 3 rings the subarea belongs (also see Map nearby)

Employment land demand results

Applying these steps results in the following estimates of 20-year demand for industrial and commercial land.

	Industrial Demand (acres)
Low growth forecast	-1,500
Baseline growth forecast	1,400
High growth forecast	5,200

	Commercial Demand (acres)
Low growth forecast	-300
Baseline growth forecast	800
High growth forecast	2,300

Negative demand shown in the low growth forecast is a result of job losses under that scenario. The baseline forecast is the most likely outcome.

Additional Notes:

- Redevelopment calculations are handled on the supply-side. The real estate pro forma model is used to estimate the supply of non-residential redevelopment in the twenty-year forecast.
- Public education land demand is handled through the major amendment process, which is outside Metro's 6-year review of the UGB. Experience in past UGR cycles has shown that land for public schools is generally not fungible across different school districts. We exclude from the UGR land demand computation the portion of government employment that can be attributed to demand for future public-schools. Also note that the BLI excludes school owned property from the land available for future development.

APPENDIX 4 – EMPLOYMENT TRENDS

Background

The material presented in this appendix offers additional insight into recent employment trends and a comparison of forecast details for the MSA. The MSA region includes the counties of Clackamas, Columbia, Multnomah, Washington and Yamhill in Oregon plus the counties of Clark and Skamania in Washington. Additional forecast details for the current UGR job forecast can also be found in another appendix. This appendix offers a narrative of regional job trends torqued by the Great Recession and the more recent pandemic-induced downturn and the impact each had on the subsequent job recovery and adaptation of this information on previous forecast vintages. The information herein includes headline employment trends and unemployment information, sector details, and other work force data for the MSA.

Recent employment trends in the MSA

The trend in MSA-level employment began cycling into negative growth beginning this year. The first three months of 2024 saw the rates of year-over-year (y/y) payroll employment growth for the MSA region fall to -1.9% in January, -1.76% in February and settle to -1.75% decrease in March. The number of unemployed workers went up to 60,000-65,000 in the region during this quarter, a number that is roughly 10,000 more unemployed compared to the annual average number of unemployed workers in 2023. During these last 3 months, the seasonally adjusted unemployment rate for the MSA inched up to 4.2%, up from 3.7% at the end of last year – a sure sign that the regional economy is slowing and the labor market in the region is beginning to loosen.

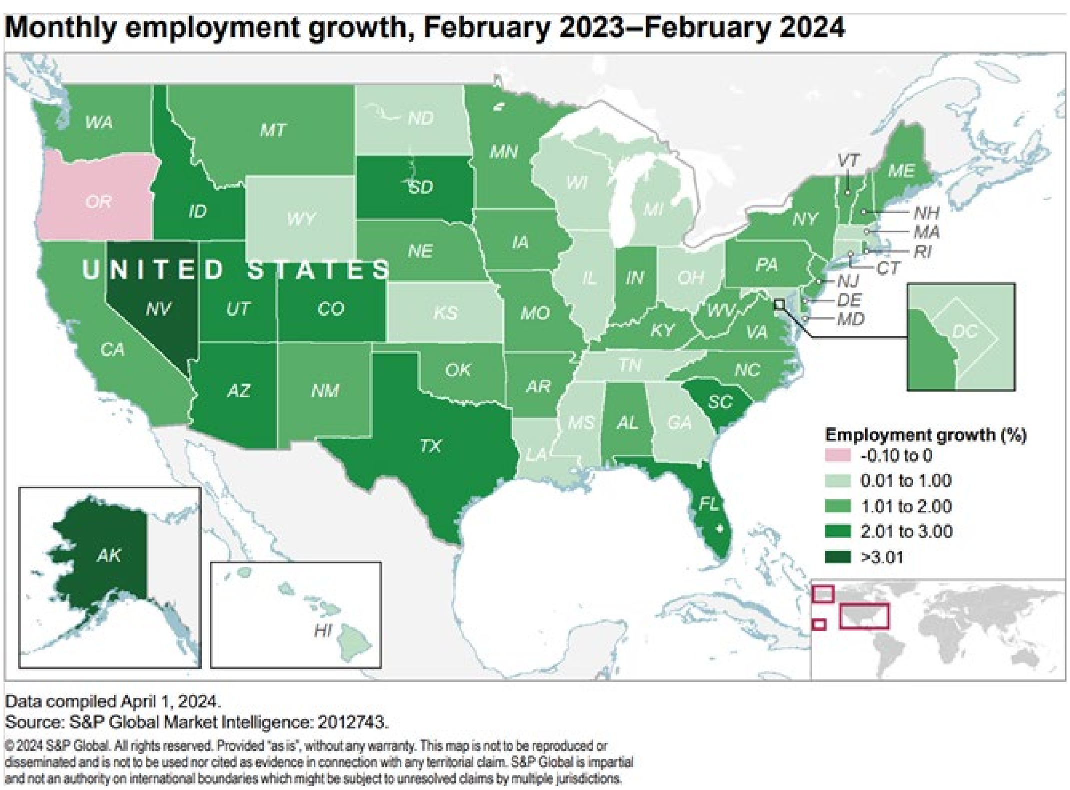
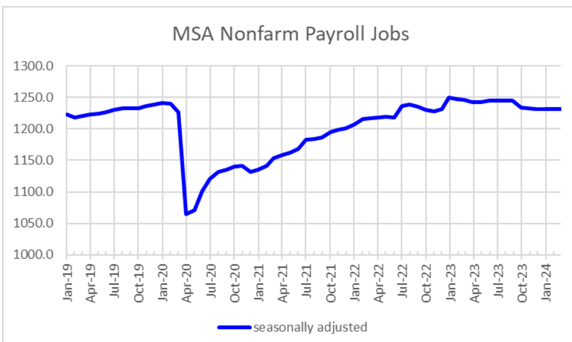


Figure 1: Map of year ago payroll employment growth in each state

The labor market in Oregon and specifically the region has been easing more rapidly than compared to national labor trends. Nowhere else in the US has employment growth been worse than here in Oregon. Consequently, the Oregon economy is dead last in y/y job growth as a nearby map of the annual growth in state-level employment indicates. This information is based on Bureau of Labor Statistics (BLS) payroll employment data and compiled by S&P Global.

A year of restrictive monetary policy has led to the region's slower growth in employment. Factors that contributed to this recent slowdown include: 1) ongoing effects of past FED tightening, 2) tightening bank lending standards on loans to businesses and consumers, 3) diminishing economic tailwinds that had boosted growth rates in 2023, 4) strengthening dollar which weighs down exports. The downshift in regional economic activity is shown in both aggregate payroll employment and the gradual rise in MSA unemployment rates. A nearby chart illustrates this step down in MSA payroll employment and the edge up of MSA unemployment rates, with both indicators indicating the onset of a deterioration in the regionwide labor market.



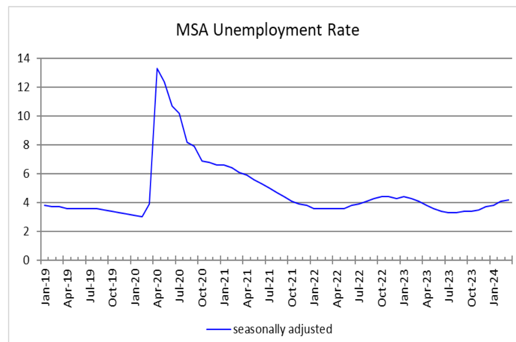


Figure 2: MSA payroll jobs (in thousands) and unemployment rate (in percent) point to a loosening labor market

The nation's central bank engineered an increase to interest rates to slow employment/ economic growth to stem elevated inflation rates. With some lag, signs of labor market weakness in the MSA appeared at the end of 2023, primarily in job sectors most vulnerable to elevated interest rates. Higher rates have made capital expenditure and investments much costlier and riskier to finance. Industries in the region susceptible to the higher cost of obtaining investment funding, such as the information services industry has led the decline in regionwide job growth with jobs in the information sector decreasing -10% (y/y), while the construction industry fell -5.7%, followed closely by the financial services sector declining -5.5%. The manufacturing sector dropped -3.5% from a year ago, led primarily by durable goods producers, which include high-tech and advanced manufacturing industries in this mix.

Interest-sensitive sectors have been leading the dip in regional job growth, but that strain has now carried over into the hiring and employment decisions made in the retail and service sectors. Consumer spending, which centers around service and retail industries, began the year more subdued compared to the second half of 2023. Real consumer purchases in the second half were well over 3% annualized growth. The first quarter of 2024 saw real US consumer spending drift lower to 2.5%, an indication that both high interest rates and elevated inflation rates. The slowdown in US growth has begun to weigh against retailers and service providers and will likely lead to additional erosion in the regional consumer consumption cycle. Hiring and job growth are thus affected by the slower rate of consumer expenditures in the region.

Several counter-cyclical elements of the region's economy remain upbeat, such as in private education, health care, and nonfederal government jobs. However, even these industries are starting to show easing of year-over-year sector growth. There are fewer bright spots that can be pointed to in the region nowadays compared to regional conditions from a year ago.

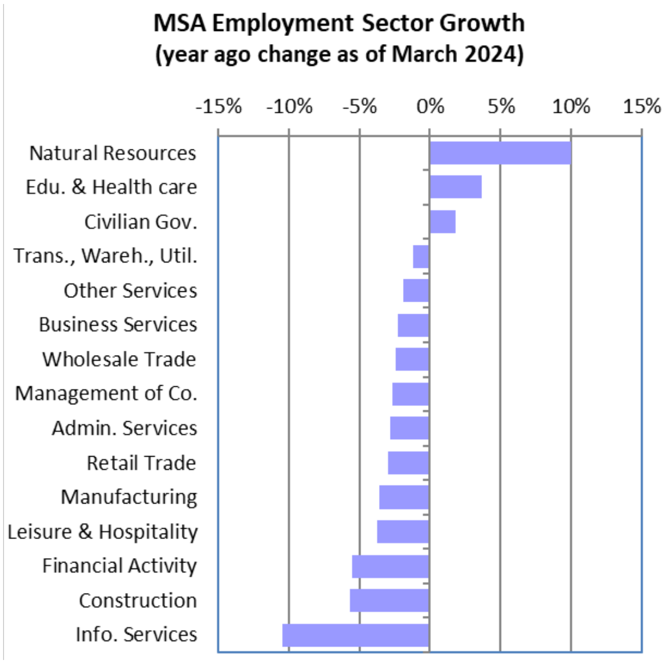


Figure 3: MSA job growth is slowing due to the twin specter of elevated interest and inflation rates of the past year

Pandemic employment recovery

Despite the recent dip in regional employment, the recovery in the MSA since the pandemic's end remains intact. The dip so far is unlikely to be deep nor long lasting if the US can skirt a recession. Most pundits still believe a "soft-landing" is still achievable, one in which the inflation rate declines to about 2% and the labor market loosens without undue hardship, holding unemployment rates below 5%. The macroeconomic advisor (S&P Global | IHS Markit) for the 2024 UGR presents a near-term outlook of slower expansion of real GDP and consumer spending, with macro-economic growth slowing and avoiding an outright recession. Interest rates for the US will remain elevated until later this year to squeeze and force inflation rates to step down to the central bank's preferred target. A period of slower job growth is expected to achieve the price stability sought by the US Federal Reserve (FED). The regional forecast assumes the region will share a similarly muted growth path and an economic outcome consistent with widely held views which incorporate assumptions by the FED and our macro-economic advisor.

The MSA forecast incorporates the assumption of moderate easing in national growth estimates and this is reflected in the downstream economics and demographics assumed of the MSA economy. Slowing growth is not predicated on a recession, anticipating the FED will successfully skirt a downturn while successfully lowering inflation to its long-run expectation of 2% annual growth. Assuming the national economy can ease into a soft-landing, the MSA economy is expected to also settle into a period of easing or slight declines in regional growth.

To date, aggregate employment in the region crested above pre-pandemic employment levels in mid-2022 and has remained above this mark until recently. The leisure and hospitality service industry led all sectors in job growth since the economy was re-opened, but of course this makes sense, since it was the industry that had the sharpest decline overall during the pandemic-induced recession. Medical services buoyed job growth in the health care sector during and after the pandemic. Construction employment also remained highly resilient during and after the pandemic, and only seeing its recent downturn as cost of construction rose sharply with the FED engineering higher interest rates to stem the rise in US inflation. The financial activity sector had largely recovered its modest losses during the pandemic, but recent interest rate hikes have decimated previous recovery gains.

Manufacturing and information services, which depend on capital investments to drive growth, has also slipped in their growth trajectory ever since capital costs rose due to higher interest rates. The cost of building a new home (or apartment building) and the cost of consumer mortgages also rose sharply in the last year, impacting housing affordability (and rents). The steep rise in inflation has lowered consumer purchasing power and made normal household expenditure that much more costly and eating into consumer spending. Higher interest rates have made consumer purchase of "big-ticket" consumer items costlier too. Business investments have been more subdued given higher interest rates. Overall, the economic headwinds have finally begun to drag down demand for payroll employment in the MSA. The recovery in MSA employment peaked about a year ago, and then the FED's shift to a more restrictive monetary stance has had the expected result in easing employment demand.

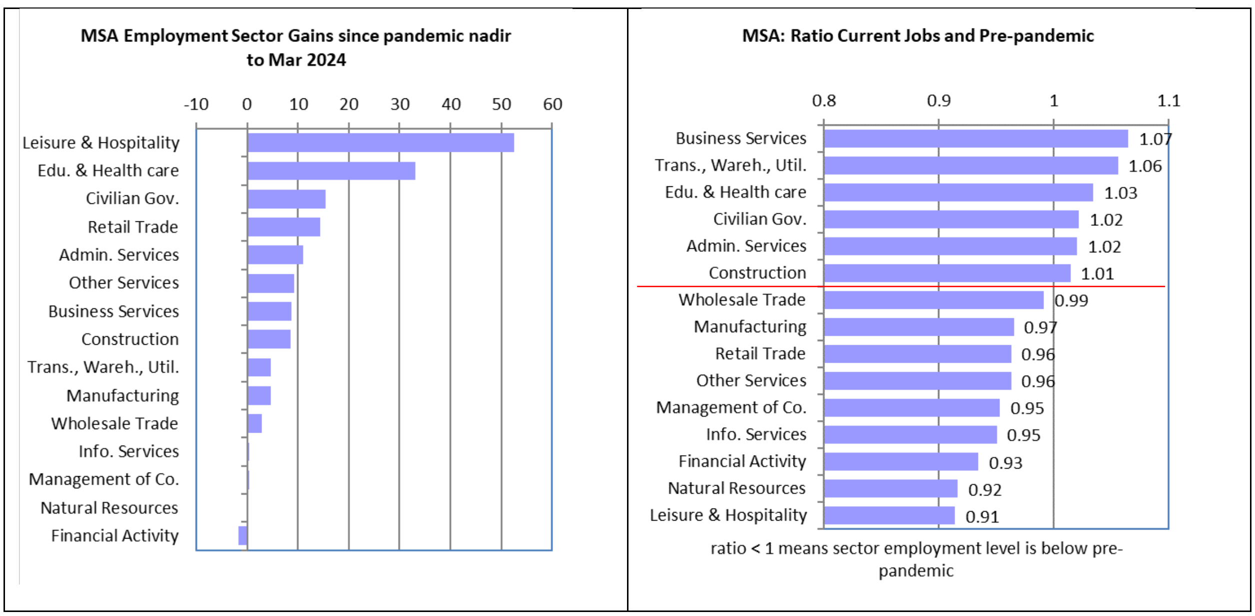


Figure 4

Regional employment growth has slowed and indeed tilted into negative growth. In a nearby chart, industry sectors above the "redline" have current employment levels above what they were before the pandemic, while those below have sagged below employment levels that existed before the onset of the pandemic. Roughly a year ago, all regional sectors had achieved full recovery (i.e., employment above pre-pandemic levels), but that hasn't been the case since the FED shifted its outlook to tightening of monetary policies. There is perhaps greater concern in Oregon for the slowing employment growth because the state ranks dead last in y/y job growth and is either seen as lagging in the recovery or leading the nation into a soft landing that might just be a bit "harder-landing" here in this state compared to elsewhere in the country.

Regional employment declined roughly to the same degree as the US during the depth of the pandemic. The region carried a slight advantage heading into the pandemic recession, experiencing relatively greater job growth before the pandemic. That advantage disappeared with the ensuing recession. Since reopening of the economy to business, the MSA region has lagged the US. More recently, that lag has grown wider (see nearby chart).

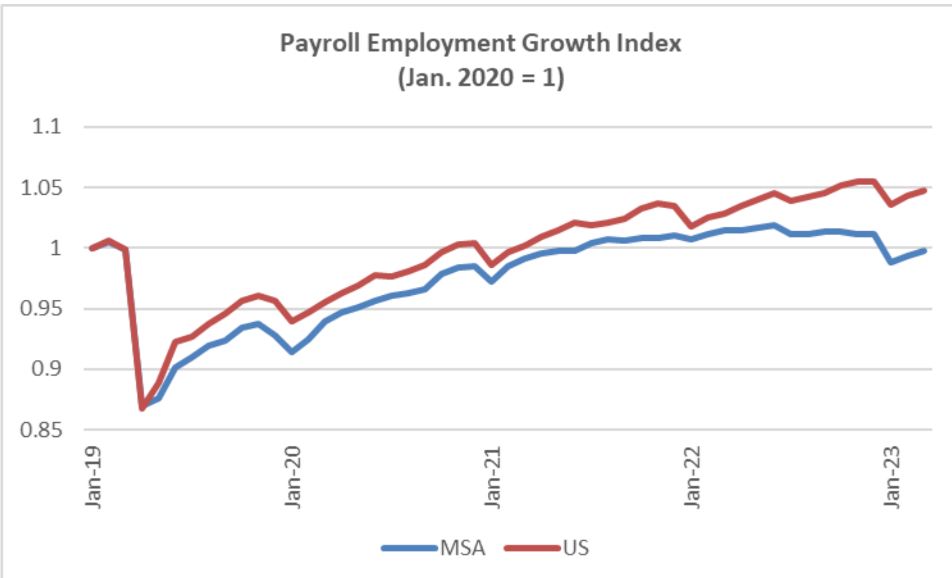


Figure 5: MSA vs. US payroll employment trends since the onset of the COVID pandemic

A brief post-mortem Metro's MSA employment forecasts since the Great Recession

Payroll employment briefly declined more in the region (see nearby chart) than the nation during the Great Recession (2007-09). The regional economy fell sharply after the housing bubble broke. Financial sectors were in turmoil, discombobulated by mountains of bad debt. Major financial institutions went bankrupt while others were forced into merging with more stable and financially stronger firms. While the downturn was less than two years, the initial recovery took 2 to 3 times longer. The recovery was muted by a finance sector unable to respond normally to financial incentives and monetary policies usually capable of elevating a troubled economy. The housing bubble had short circuited many of the financial tools that normally helped heal an ailing economy. As it was, there were moments during the extended recovery period in which the region didn't seem much like one that was rebounding because the pace of growth had been so incrementally slow in materializing. It took almost 5 years for this region to rebound to pre-loss aggregate conditions.

Metro had just completed a regional forecast for the 2010 UGR. It had been near the nadir of the business cycle and was optimistic that regional growth would rebound sharply. However, the reality was that regional growth would be much slower between 2010 and 2015. The 2010 UGR regional employment forecast was in hindsight too optimistic compared to what had actually come to pass.

In 2015, the next UGR cycle, the regional employment forecast partly self-corrected and downshifted future growth in the short-run to reflect the milder growth trend that existed between 2010 and 2015.

Generally, the long-run half of the job forecasted remained moderately optimistic, but the growth trend had been marked down to reflect updated US macro assumptions that pointed to more subdued growth going forward. The reality for the short-run portion for the 2015 UGR forecast was those adjustments over corrected and became too low for the remainder of the decade, compared to the uptick that actually occurred between 2015 and 2019. Regional growth between 2015 and 2019 trended up more quickly than expected (see nearby chart). The long-run portion of the 2015 UGR forecast had been shifted down in part due to the perception that growth in the outyears would be even slower than expected. This less optimistic outlook in the 2015 forecast owed partly to a population forecast that anticipated growth in the future wasn't going to be as fast as what it had been in the prior decade.

In the 2018 mid-cycle periodic UGR, the short-run forecast edged up to compensate for what was by then seen as more robust growth in the latter half of the 2010's, but this adjustment to the new information was itself still shading itself to the lower end of prospective job growth for reasons similar to prior regional forecasts. The 2018 UGR incorporated an even less sanguine national macroeconomic baseline view of economic growth rates in the future. A principal driver was a continuation of demographic factors that began suggesting a lower population trajectory – more baby boomers leaving the work force, fertility rates that were significantly lower than before, and increased recognition of additional economic headwinds. These factors meant more economic turbulence and slower growth, although no pundits back then would have imagined the pandemic-induced shutdown of the global economy. The 2018 UGR employment forecast included near term adjustments that partly lifted the job outlook in the near-term but not to the detriment of drastically lower employment projections in the long run. Consideration of what was then an emerging change in the trend of key demographic components had yet to be fully apparent back then as they are now. Still, the expectation that the labor force supply (i.e., population growth) would be more muted began to influence and tamp down prospects of larger job projections in the outyears of the forecast.

It could be described that each subsequent forecast from the 2010 UGR to the 2018 UGR adapted reasonably well with the data on hand at that juncture in history to help narrow the discrepancy between prior forecasts and actual history. Uncertainty was rising and a directional change in the business cycle was being hinted at by economic data at that time. Growth at the end of the last decade seemed more turbulent as more economic headwinds were perceived which would knock down the longest uninterrupted peace-time expansion in real GDP growth. Economic momentum was already flagging even before the pandemic.

The Great Recession had set in motion a period of that represented significant growth opportunities in the region, but also a greater degree of uncertainty going forward. This is reflected in the gyrations in past employment projections that were at first too high and then subsequent ones in which growth projections in the region were lowered. At these midpoints, the first forecast adjustment was too low and that adjustment was revised up in the last regional forecast before this 2024 UGR employment forecast.

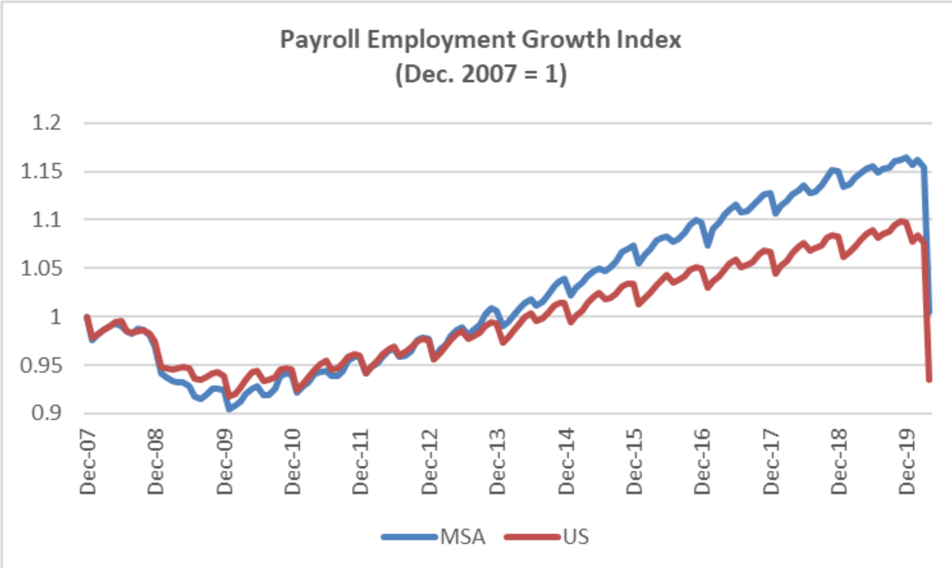


Figure 6: MSA vs. US payroll employment trends since the start of the Great Recession

In now, the current 2024 UGR regional forecast, the projections have the benefit of over a decade of hindsight and incorporates the latest base year course corrections to the regional forecast. However, even so, there is potentially more uncertainty that now exists in the aftermath of the pandemic-induced recession. A great many more post-pandemic questions about what might be the "new normal" and the economic trends that have either accelerated or emerged in the latest aftermath.

Some of the new trends which are visible today include:

- Accelerated and elevated shares of employees working from home or in a hybrid work setting;
- Elevated rates of office vacancy, with some office leases still needing to be renegotiated in the next year or so as longer-term leases continue to expire;
- Artificial intelligence and its implications on future work and industry;
- Rise of mercantilism (and protectionism) in industrial policies.

Forecast table of prior vintages: 2010 UGR, 2015 UGR, 2018 UGR and 2024 UGR

MSA Employment Forecast	*previous regional forecast assumptions*						*current forecast*		year 2019 forecast			comparison of 2040 forecast year		
	circa 2009 US macro		circa 2014 US macro		circa 2017 US macro		circa 2023 US macro		difference from 2019 actual			vs. current 2040 forecast		
	2010 UGR		2015 UGR		2018 UGR		2024 UGR		2010 UGR	2015 UGR	2018 UGR	2010 UGR	2015 UGR	2018 UGR
(Employment figures in thousands)	2019	2040	2019	2040	2019	2040	2019 (actual)	2040						
Nonfarm Wage & Salary Jobs, TOTAL	1,244.2	1,707.4	1,206.4	1,571.3	1,214.3	1,432.3	1,228.0	1,365.4	1.3%	-1.8%	-1.1%	25%	15%	5%
Manufacturing, TOTAL	127.0	133.8	122.5	127.2	127.6	117.7	129.3	126.3	-1.8%	-5.3%	-1.3%	6%	1%	-7%
Durables, total	96.1	102.5	92.9	100.0	94.9	88.7	95.3	93.9	0.8%	-2.5%	-0.4%	9%	6%	-6%
Wood Products	4.9	4.4	4.6	3.8	4.1	4.2	4.0	3.4	22.2%	14.8%	1.4%	30%	11%	24%
Primary Metals	5.7	4.3	5.2	4.4	6.1	4.9	6.2	4.2	-7.1%	-15.4%	-0.9%	2%	3%	16%
Fab. Metals	12.5	11.9	13.3	12.3	13.2	11.1	13.4	13.6	-6.8%	-0.8%	-1.8%	-13%	-9%	-19%
Machinery Mfg.	7.9	7.3	8.7	7.9	9.8	8.6	10.1	9.1	-21.9%	-13.9%	-2.7%	-20%	-14%	-7%
Computer & Electronics	36.6	44.2	39.4	51.1	37.8	40.8	37.5	41.1	-2.3%	5.1%	0.8%	8%	24%	-1%
Transp. Equipment	9.9	10.9	6.5	4.8	6.8	6.2	7.4	4.7	33.3%	-12.0%	-7.6%	133%	4%	32%
Other Durable Goods	18.6	19.5	15.1	15.8	17.1	13.0	16.7	17.8	11.1%	-9.4%	2.2%	9%	-11%	-27%
Nondurables, total	30.9	31.3	29.6	27.2	32.7	28.9	34.0	32.4	-9.1%	-13.1%	-3.8%	-3%	-16%	-11%
Food Processing	9.6	9.4	9.9	9.5	13.9	13.1	13.6	14.0	-29.4%	-27.2%	2.1%	-33%	-32%	-7%
Paper	4.9	4.8	3.1	1.8	2.7	1.9	2.5	2.0	100.2%	26.6%	8.2%	142%	-9%	-2%
Other Nondurables	16.4	17.2	16.6	15.9	16.2	13.9	18.0	16.4	-8.8%	-7.9%	-9.8%	5%	-3%	-15%
Nonmanufacturing (private), TOTAL	959.5	1,362.9	919.6	1,229.7	927.0	1,118.4	946.1	1,075.9	1.4%	-2.8%	-2.0%	27%	14%	4%
Natural Resources & Mining	1.5	1.2	1.8	1.3	1.4	0.9	1.3	1.5	16.9%	35.4%	6.1%	-20%	-18%	-42%
Construction	68.5	93.0	70.8	110.9	74.2	94.0	76.0	103.6	-9.9%	-6.8%	-2.4%	-10%	7%	-9%
Trade, Transport & Utilities	269.9	345.1	254.5	317.7	245.0	262.8	221.8	231.7	21.7%	14.8%	10.5%	49%	37%	13%
Wholesale Trade	69.7	92.0	65.5	82.7	56.7	60.2	57.3	60.8	21.6%	14.3%	-1.1%	51%	36%	-1%
Retail Trade	121.8	144.6	121.9	150.7	118.8	127.4	118.1	130.0	3.1%	3.2%	0.6%	11%	16%	-2%
TWU	49.5	65.4	41.1	46.1	43.2	41.1	46.3	40.9	6.7%	-11.4%	-6.7%	60%	13%	0%
Information Services	29.0	43.1	26.1	38.3	26.3	34.0	26.4	29.9	9.8%	-1.2%	-0.3%	44%	28%	14%
Financial Activities	87.2	119.8	67.8	78.7	73.4	81.6	73.5	77.2	18.6%	-7.8%	-0.2%	55%	2%	6%
Pro. Business Services	178.5	265.0	190.5	270.5	189.9	253.7	190.0	233.0	-6.0%	0.3%	0.0%	14%	16%	9%
Education + Health	185.0	301.2	173.0	240.8	175.9	237.7	188.0	218.6	-1.6%	-8.0%	-6.4%	38%	10%	9%
Leisure + Hospitality	119.6	164.2	120.0	151.0	125.7	140.5	126.4	130.2	-5.4%	-5.1%	-0.6%	26%	16%	8%
Other Services	49.3	73.4	41.4	58.9	41.6	47.2	42.8	50.2	15.4%	-3.3%	-2.8%	46%	17%	-6%
Government, Civilian TOTAL	157.7	210.7	164.3	214.4	159.6	196.3	152.6	163.2	3.3%	7.7%	4.6%	29%	31%	20%
Federal, Civilian	18.1	18.1	16.8	18.6	17.8	19.3	18.4	18.7	-1.6%	-8.6%	-3.5%	-3%	-1%	3%
State & Local	139.5	192.5	147.5	195.8	141.8	177.0	134.2	144.4	4.0%	9.9%	5.7%	33%	36%	23%

2024 UGR Appendix 5A: residential development indicators

Background

To better understand how to plan for future housing needs in the region, it is useful to put in context the type and density of residential development trends in recent years. This report provides residential development data required under ORS 197.296 (the "needed housing" statute) and data specified by ORS 197.301 (metropolitan service district performance measures). Data is provided at the regional level for the Metro Urban Growth Boundary. This appendix addresses most aspects of ORS 197.301; except 197.301 (2)(c) which is reported in the "employment trends" appendix of this UGR, 197.301(2)(e)(h)(i) are dealt with in other reports, and 197.301(f) of which data are incomplete and of limited accuracy.

Data sources:

RLIS Housing Inventory
RLIS Vacant and Developed Land
RLIS Land Development Monitoring System

Terms and definitions:

Vacant land refers to a tax lot (or parcel) which has no detectable structure or any other form of development or building on that site. It can be of any size. Vacant land is determined by administrative records (such as assessors' records) and GIS techniques which can detect the absence of structures on the site. Exceptions: (1) a partially developed tax lot which has less than 5% of the total site area with a development on it is included in the vacant land inventory for purposes of the UGR; (2) a site that was once developed but has become fallow, (abandoned and/or unused), and the structure removed since 1993 is also included in with vacant land.

Infill refers to additional development that occurred on a tax lot (or parcel) that was already deemed developed (i.e., not vacant) in Metro's land inventory, where the original structure has been left intact. Infill is adding more residential units to the tax lot with an already existing development or splitting that "parent" lot into separate "child" lots and adding additional structures or buildings to the parent and/or child lots.

Redevelopment refers to additional development that occurred on a tax lot (or parcel) that was deemed "developed" in Metro's land inventory, in which the original structure was demolished to make room for the new construction. Redevelopment may or may not involve subdividing or reconfiguring the original site to accommodate the new development. Note: additional redevelopment capacity is only counted when the new construction nets more building square footage (in the case of nonresidential development) or net new residential units (typically the new structures are middle housing or apartments/ condos that replace a razed structure with fewer units).

Housing categories:

Single family (SFR) are single housing units, typically one-per-taxlot.

- **Single family detached** have a land use designation of SFR (translated from PCA codes), and do not share walls with other housing units. Some may have condominium-style ownership.
- **Other SFR** units include single residences on designated farm or forest land, and mixed home/businesses with only one residence.

Middle Housing are any housing units that share walls or common area(s), but not stacked vertically. They may include condominium-style ownership, and/or share commonly owned land like a pool, playground or clubhouse.

- **Townhouses** (or rowhouses) are dwelling units constructed in a row of multiple attached units. Townhouses share at least one common wall and may each have their own tax lot.
- **Duplex, Triplex, Quadplex** are residential structures composed of side-by-side units, sharing common floor-to-ceiling wall(s), with no other units above or below.
- **Accessory Dwelling Units (ADU)** is a second dwelling unit created on a lot with at least one SFR unit, attached house or manufactured home. The ADU is created auxiliary to, and is smaller than, the main dwelling. ADUs can be created in a variety of ways, including conversion of a portion of an existing house, addition to an existing house, conversion of an existing garage, or the construction of an entirely new building. The unit count of ADU (and year built) is tabulated separately from the parent house in the residential inventory.
- **Cottage Clusters** are residential structures with four or more individual units. Each unit is 900 square feet or less and built on a shared taxlot or sharing a common space among all units.

Multifamily housing are housing units that are stacked vertically. Some multifamily properties are mixed-use, typically with on-site, ground-floor commercial space.

- **Lowrise** apartments and condominiums, under 5 floors and under 50 feet tall, and often include multiple buildings within a property.
- **Midrise** apartments and condominiums, with 5-12 floors or 50-140 feet tall.
- **Highrise** apartments and condominiums, over 12 floors or greater than 140 feet tall.

Other Housing are any housing units not included in single family, multifamily, or middle housing as defined above.

- **Dormitories** are shared residential units associated with educational institutions.
- **Retirement Facilities** are a planned community or facility associated with retired or senior cohorts.
- **Manufactured homes** are semi-mobile housing units associated with shared common area(s), such as a mobile home park or trailer park.
- **Floating homes** are dwelling units floating on water, typically multiple units on a single dock with a shared shore access point. Unit counts are for residential units, and do not include non-residential slips or other structures.
- **Other MFR** is any other type of multi-unit welling not described above.

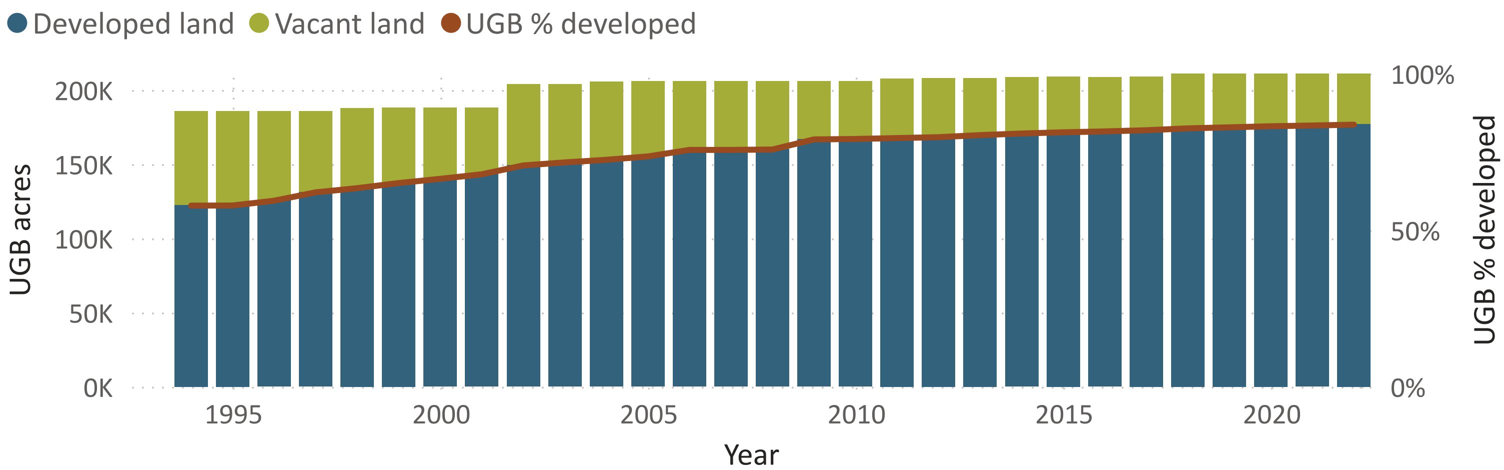
This report generally focuses on gross new units. This differs from total reported building permits, in that it reflects an estimate of what was actually built, rather than all issued permits, some of which don't get built or are later modified to change unit counts. Current totals minus recently built totals may not give the same number as 'before' totals, as unit teardowns are included in 'before' totals.

UGB Land Usage

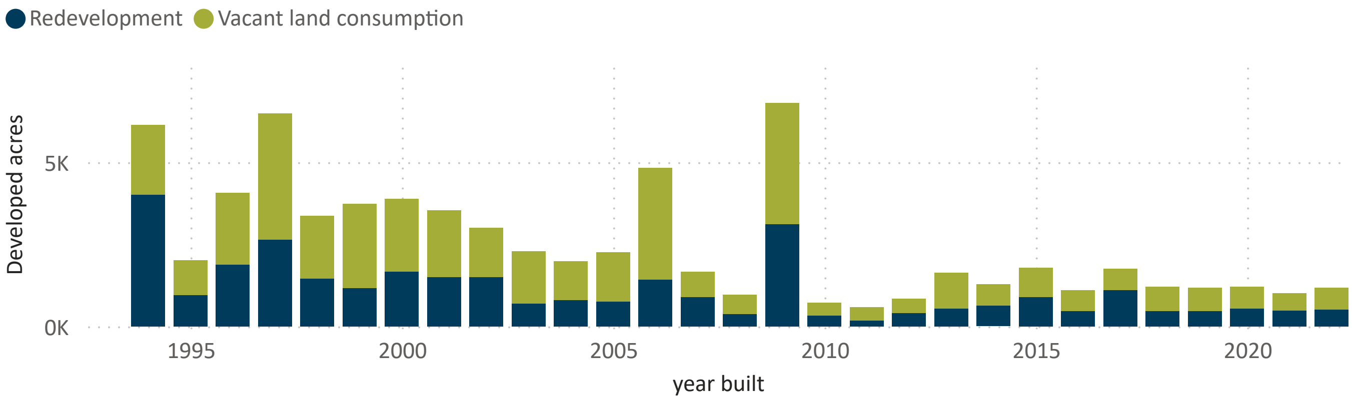
Development type (vacant/infill/redevelopment) is identified as a regional indicator under ORS 197.296 and 197.301

The Urban Growth Boundary was created in 1979 to control urban expansion onto farm and forest lands. The original boundary of 227,000 acres has expanded to 261,000 acres today. The largest expansion was 17,300 acres in 2002. Today, 49,400 acres of the UGB are right-of-way including water, roads, and easements.
In 1993 Metro began mapping vacant and developed land. The chart below shows total acres of vacant vs. developed land inside the UGB over time. Typically, expansions add mostly vacant land to the boundary, which slowly becomes developed over time. The charts below exclude all land that is right-of-way today.
As the UGB has become more developed, we have come to depend more on redevelopment to accommodate future development.

UGB land usage



Acres developed by year



Acres by zoning type as of 2022

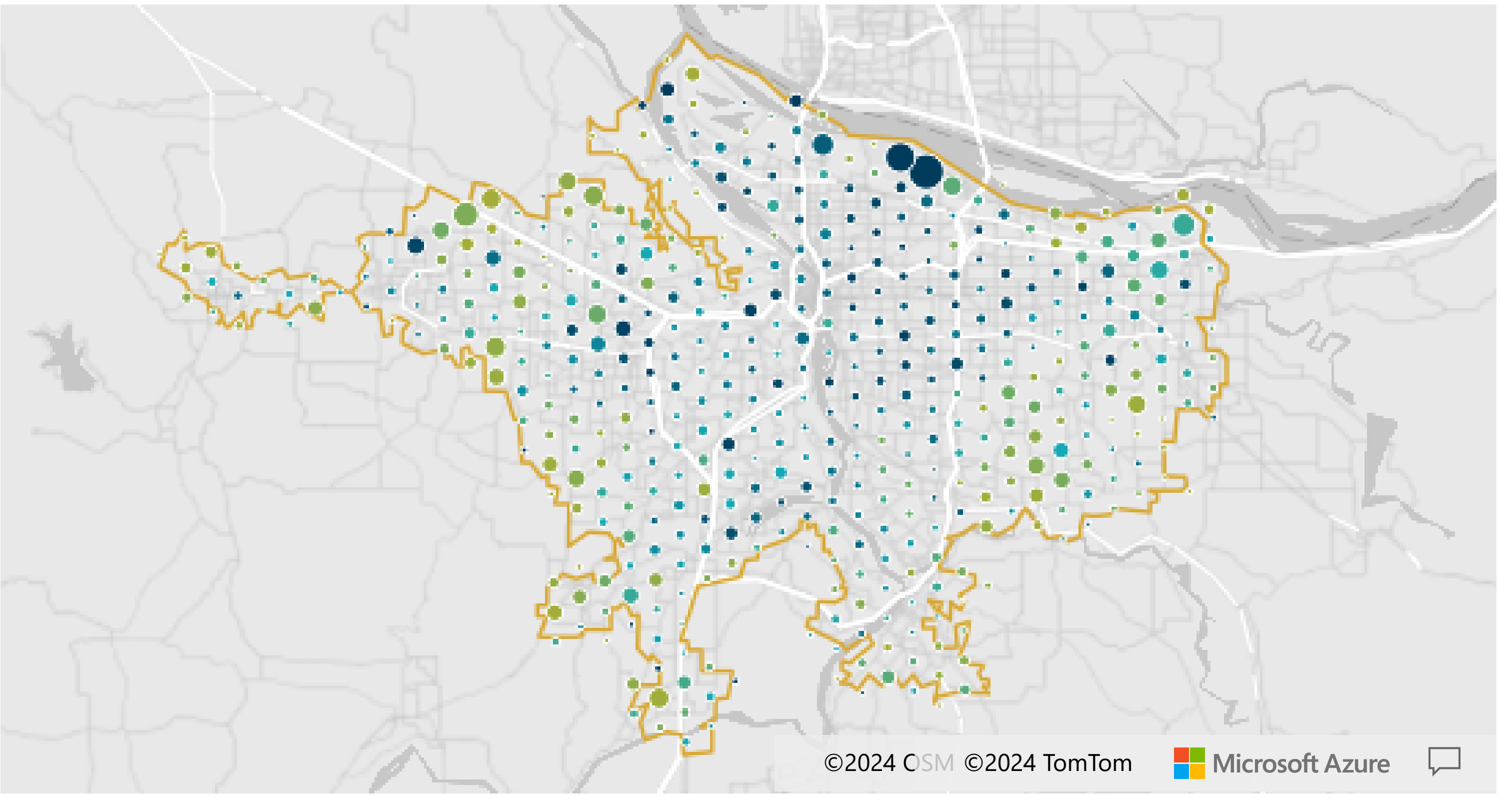
Zoning	Total Acres	Vacant acres	% Developed
Single Family	98,835	10,764	89%
Industrial	34,738	7,596	78%
Parks and Open Spaces, other zoning	23,294	676	97%
Rural or Future Urban Zoning	19,359	11,617	37%
Mixed Use	15,992	1,785	89%
Multifamily	15,603	1,100	93%
Commercial	3,760	368	90%
Total	**211,581**	**33,907**	**84%**

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Development Acres- Where is Development Happening?

Housing trends and land absorption are land use forecast metrics and are identified as a regional indicator under ORS 197.296 and 197.301

Geographic distribution of new construction within the Urban Growth Boundary

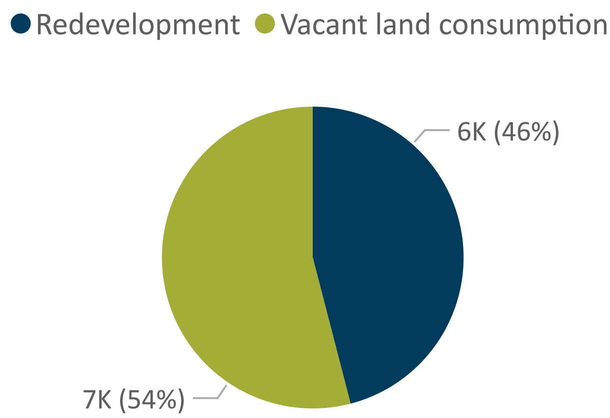


The map above shows relative distribution of acres of new construction within the Urban Growth Boundary (yellow line). The size of the dot represents the total number of acres developed. A green dot represents consumption of vacant land, while a dark blue dot represents more redevelopment, or construction on previously developed land. A light blue dot is a mix of vacant land consumption and redevelopment.

Acres of new development by development type, 2013 to 2022

Zoning	Redevelopment	Vacant land consumption	Total
Single Family	2,019	2,787	**4,806**
Industrial	2,000	1,993	**3,993**
Mixed Use	933	941	**1,874**
Multifamily	416	579	**994**
Parks and Open Spaces, other zoning	452	393	**845**
Rural or Future Urban Zoning	144	368	**512**
Commercial	148	126	**275**

Total acres of new development



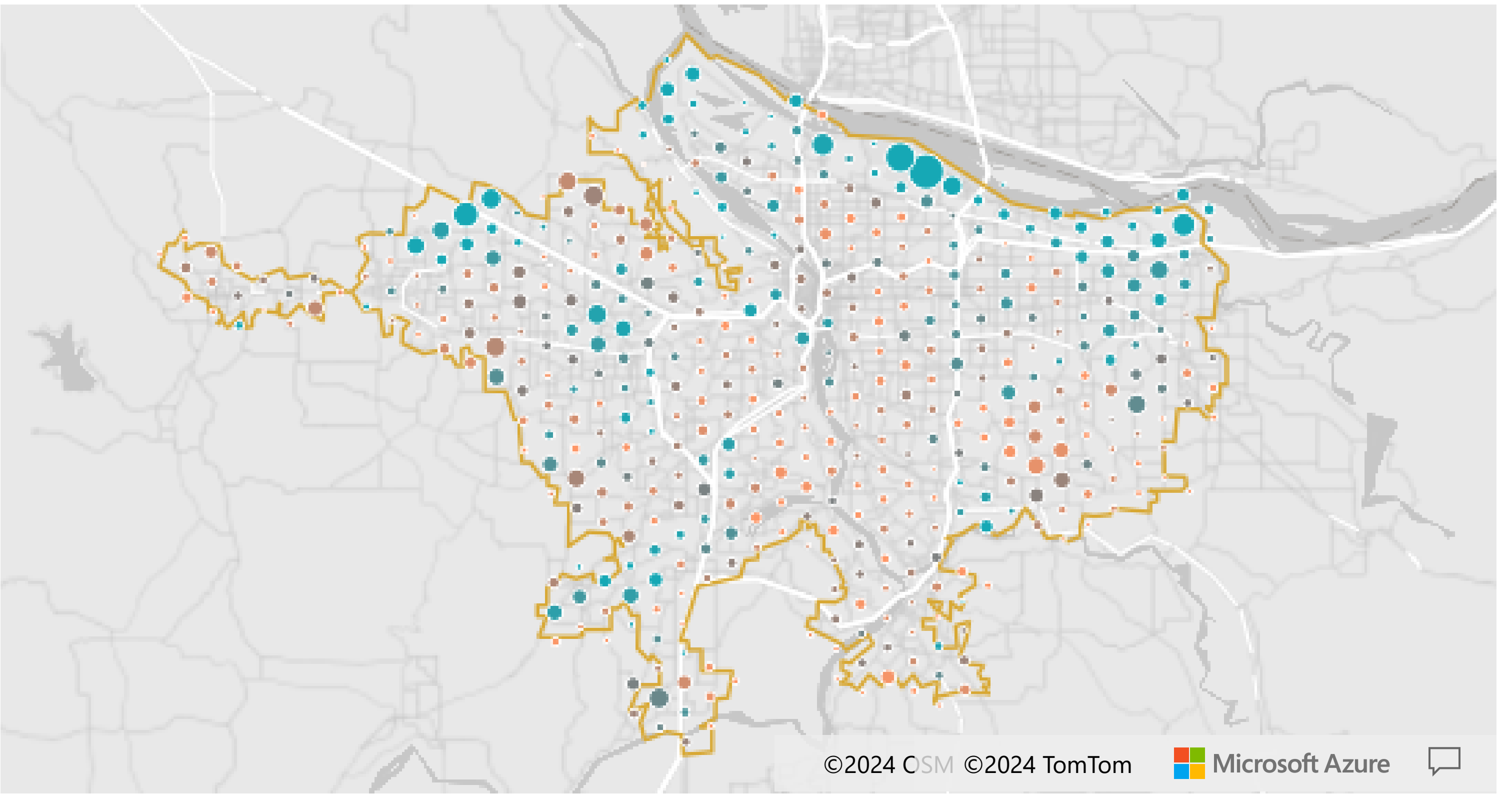
- A total of 13,300 acres were developed between 2013 and 2022. 7,187 acres of that (54 %) were consumption of vacant land.
- Single Family zoning had the most redevelopment, at 2,019 acres (33 % of all redevelopment)
- The zoning type that consumed the most vacant land was Single Family, at 2,787 acres.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Where is Residential vs Non-Residential Development Happening?

Residential and employment land are identified as a regional indicators under ORS 197.296 and 197.301

Geographic distribution of new construction within the Urban Growth Boundary

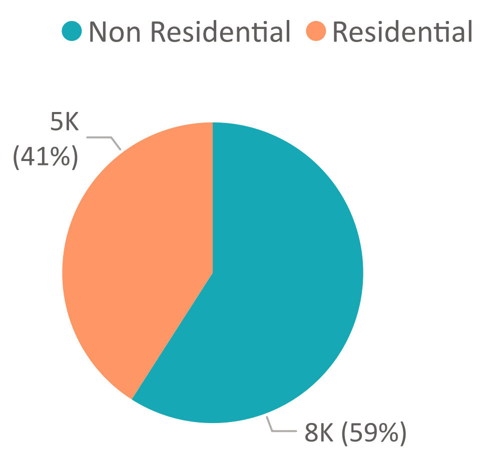


The map above shows relative distribution of acres of new construction within the Urban Growth Boundary (yellow line). The size of the dot represents the total number of acres developed. A light blue dot represents commercial construction, while an orange dot represents residential construction. A grey dot is a mix of residential and commercial.

To 10 areas of development by total acres, 2013 to 2022

Value	Total acres developed	% residential
NE Portland	1,812	18%
Hillsboro	1,431	30%
Beaverton	853	23%
SE Portland	843	57%
Gresham	838	28%
N Portland	797	20%
Happy Valley	633	80%
Tigard	473	57%
Troutdale	455	5%
SW Portland	444	43%

Total acres of new development



- Residential and non-residential development were distributed across the region, but the most acres of development were in NE Portland with 1,812 acres.
- A total of 5,446 residential acres were developed since 2013, 41 % of all development.
- Non-residential development affected 7,854 acres.

- Acres on this page calculated by taxlot, and may differ from per-unit of housing.

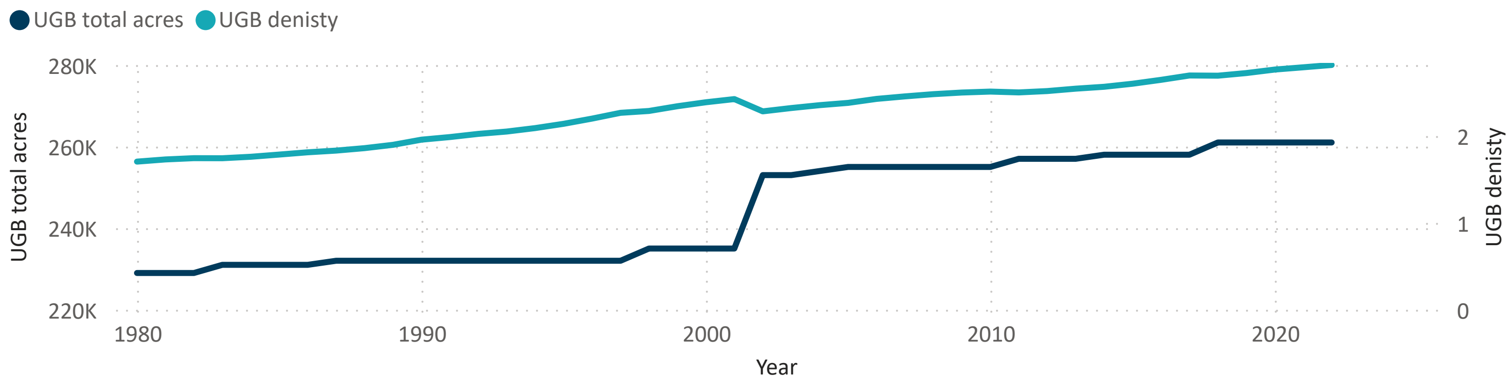
Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

UGB Housing Density

Development density is identified as a regional indicator under ORS 197.296 and 197.301

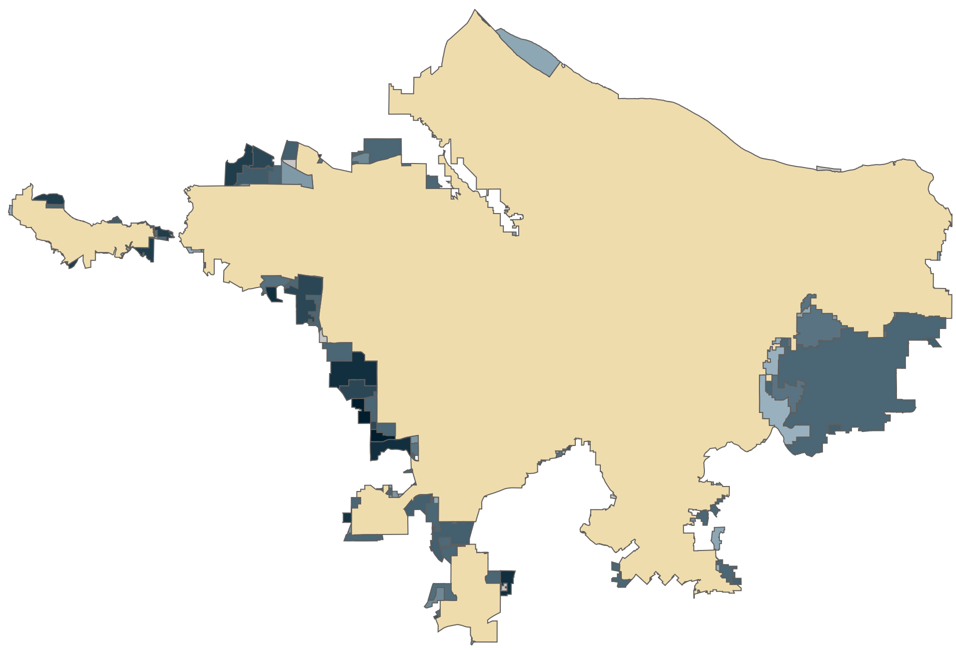
The Urban Growth Boundary was created in 1979 to control urban expansion onto farm and forest lands. The original boundary of 227,000 acres has expanded to 261,000 acres today. The largest expansion was 17,300 acres in 2002.

Total UGB acres



Housing production in the region has continued both on the edges of the UGB in expansions areas, and in the interior of the original UGB. Overall, 83 % of housing built in the last 10 years has been inside of the original 1979 UGB. The total density of the UGB has increased from 1.70 to 2.82 units/acre (calculated as total UGB units / total UGB acres).

Current Metro Urban Growth Boundary, by year added.



The map above shows the Metro Urban Growth Boundary today. The tan area is the original 1979 UGB. Expansion areas are represented in blue tones, with darker blue representing more recent expansions.

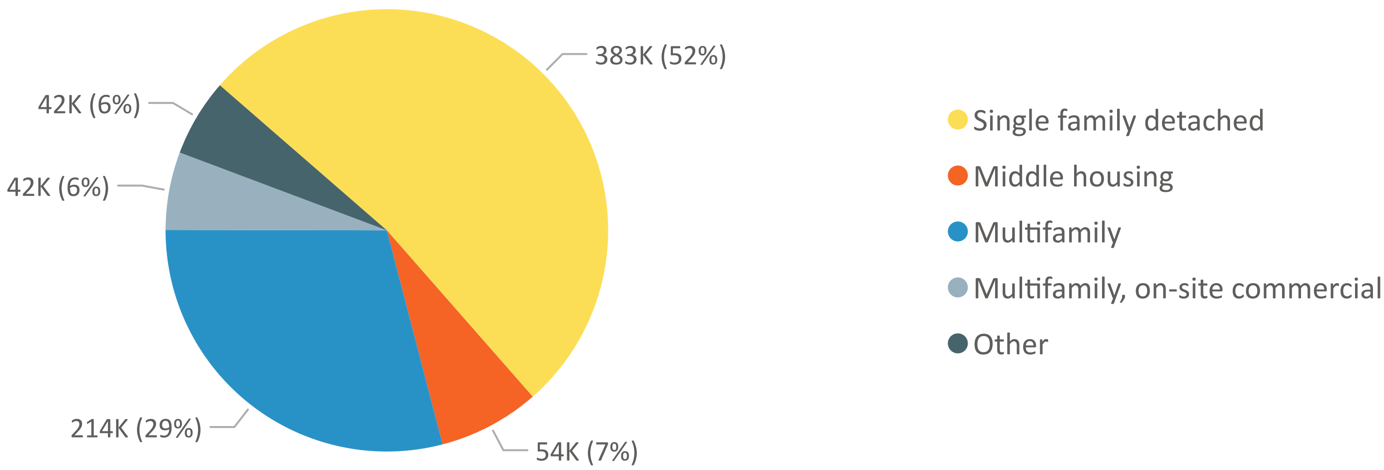
- Unit density on this page calculated as total UGB units / total UGB acres as of 2022

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Housing Today

Type of residential units is a regional indicator required by ORS 197.296 and 197.301. Reporting observed data provides contextual understanding of market trends that is used to “determine the number of units and amount of land needed for each needed housing type for the next 20 years.” ORS 197.296(3)(b).

As of 2022 There were 735,295 total housing units inside the UGB



Housing type	Total units	% of all units	Units/acre average	% growth over range *
Single family detached	383,491	52%	4.1	8%
Middle housing	54,444	7%	13.8	20%
Multifamily	213,875	29%	23.2	17%
Multifamily, on-site commercial	41,819	6%	103.4	112%
Other	41,666	6%	12.3	10%
Total	**735,295**		**6.6**	**14%**

* Range = 2013 to 2022

- As of 2022 there were 735,295 total housing units inside the UGB.
- The number of housing units inside the UGB has grown by 14% since 2013.
- Overall, the most abundant type of housing by total unit count is Single family detached with 383,491 units (52 % of all units).
- Multifamily has grown the most in total units over the past 10 years, adding 30,407 units and growing by 17 %.
- Multifamily, on-site commercial has grown by 112 % since 2013, adding 22,058 units.

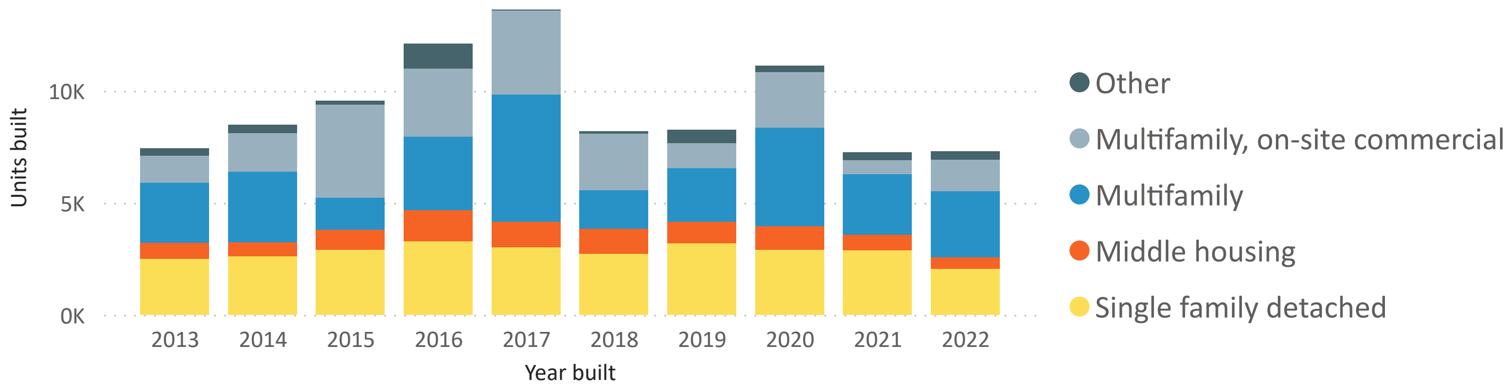
- Units per acre on this page includes all housing inside the UGB as of 2022
- Accessory Dwelling Units excluded from acre calculations on this page

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Housing Production Trends

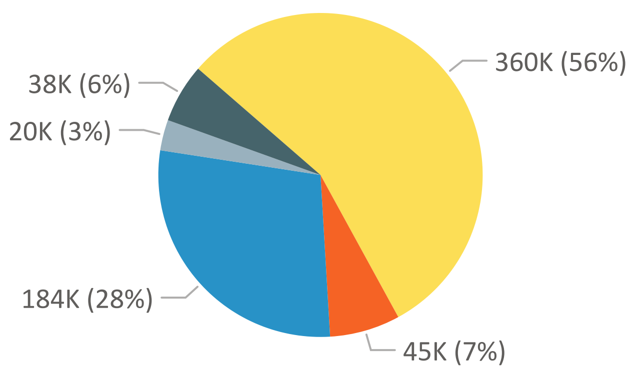
Type of residential units is a regional indicator required by ORS 197.296 and 197.301. Reporting observed data provides contextual understanding of market trends that is used to “determine the number of units and amount of land needed for each needed housing type for the next 20 years.” ORS 197.296(3)(b).

Units built per year by housing type

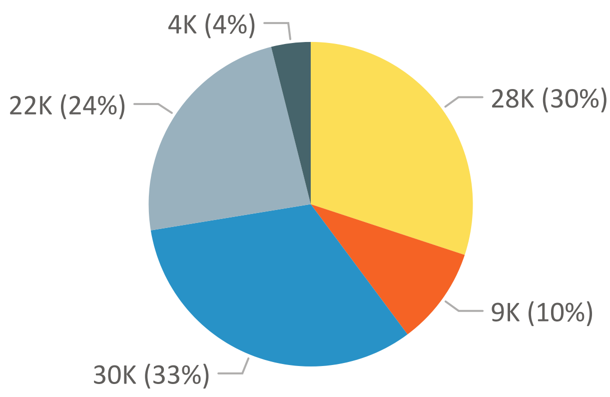


- Total housing units in the region grew by 14 % since 2013, adding 93,262 units.
- The composition of housing in the region is changing. As we build more densely on previously developed land, we have built proportionally less single family homes, and proportionally more multifamily and middle housing.
- Of the housing built since 2013, Multifamily, on-site commercial has been the most dense unit type, adding 22,058 units with an average of 101.2 units/acre.
- The largest housing type by total acres developed was Single family detached, developing 4,264 acres with a density of 6.6 units/acre.

Composition of housing built prior to 2013



Composition of housing built 2013 and after



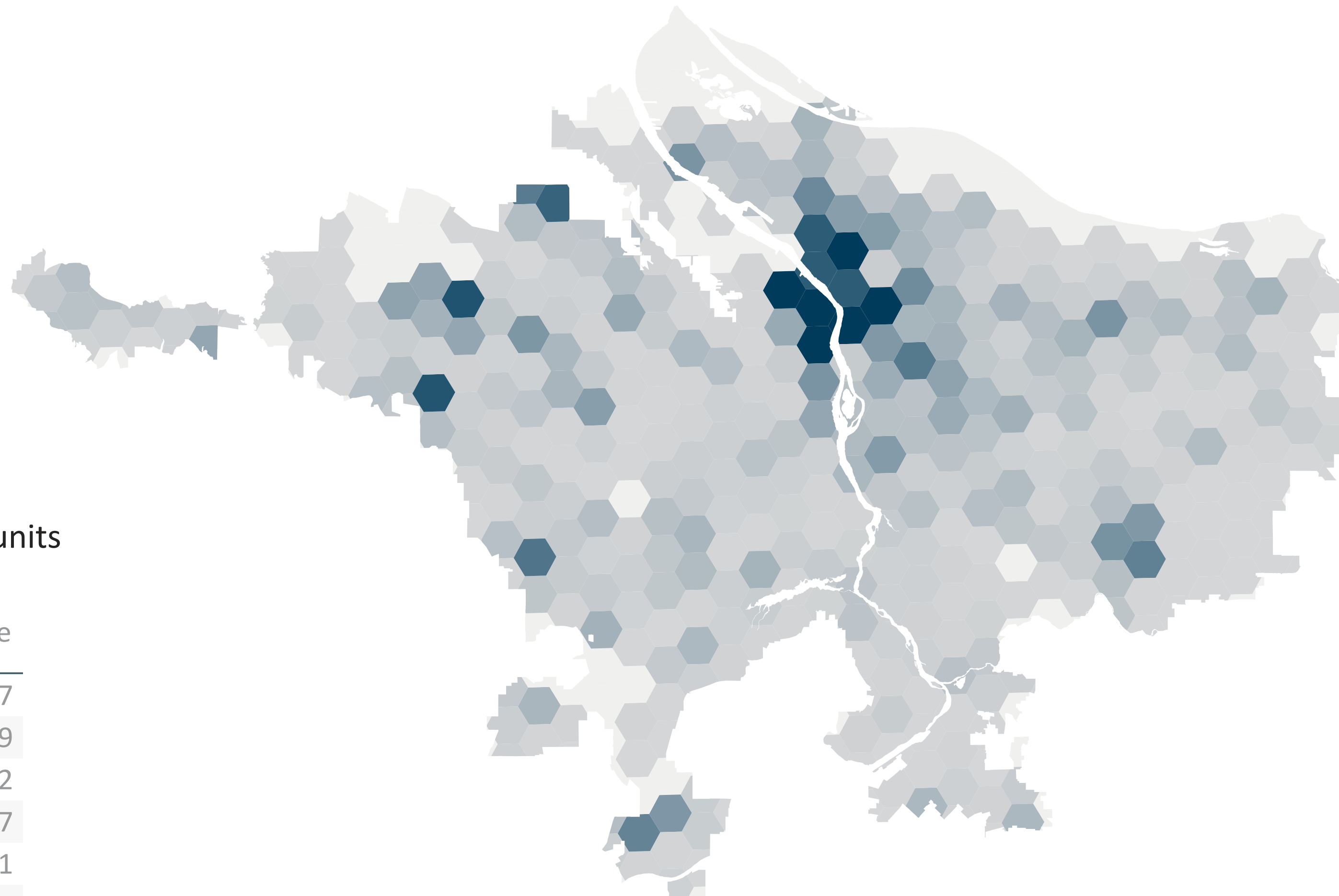
Housing type	New units built	Acres built	density of new units (units/acre)
Single family detached	28,035	4,264.2	6.6
Middle housing	9,098	266.8	19.8
Multifamily	30,407	612.0	49.7
Multifamily, on-site commercial	22,058	217.9	101.2
Other	3,664	132.5	27.7
Total	**93,262**	**5,493.4**	**16.3**

- Unit density on this page includes only new housing inside the UGB built since 2013.
- Accessory Dwelling Units excluded from acre calculations on this page

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

New housing, total new units by area

Housing trends and land absorption are land use forecast metrics and are identified as a regional indicator under ORS 197.296 and 197.301



To 10 areas of new residential units built 2013 to 2022

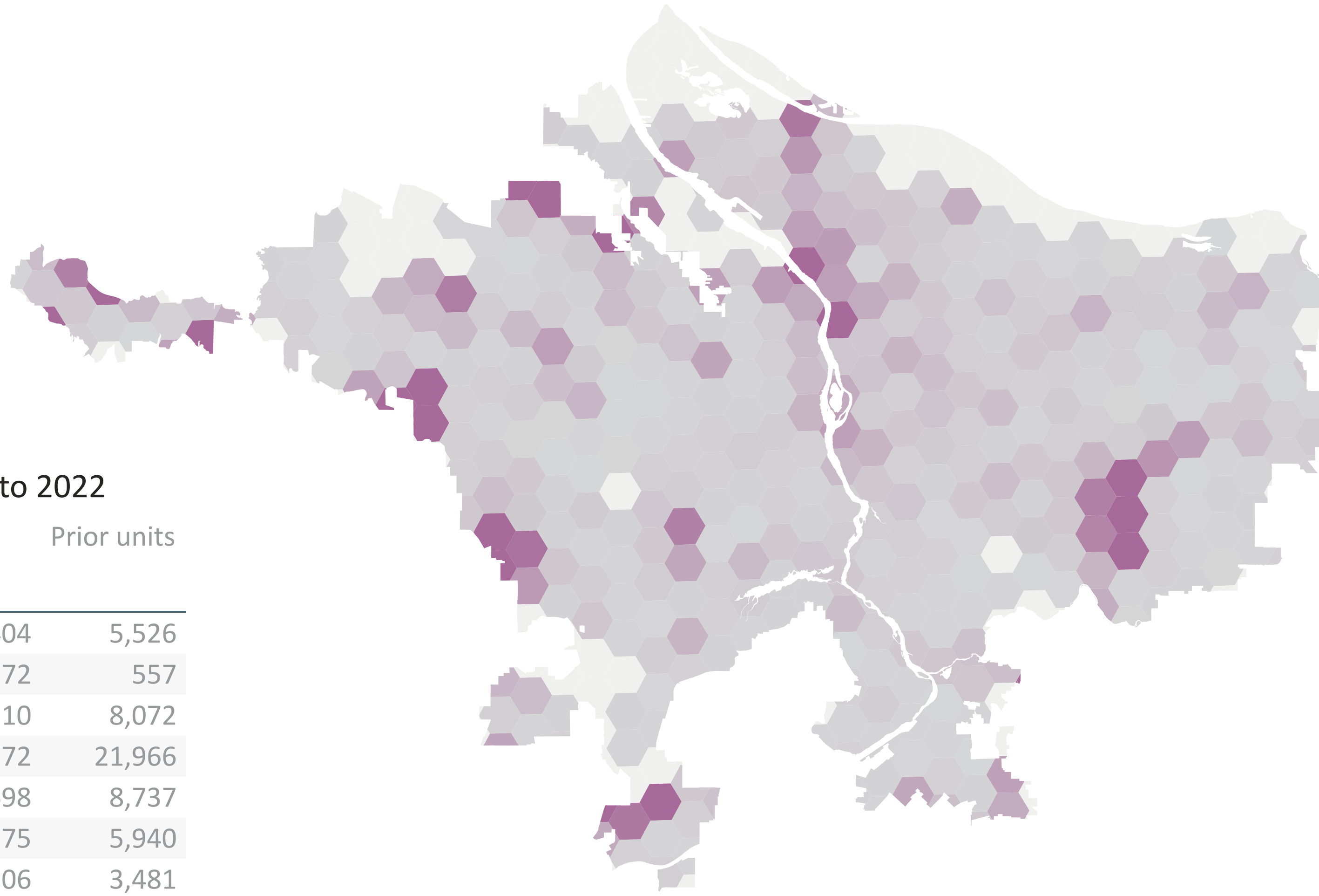
Value	Units built over range
SE Portland	14,387
NE Portland	11,879
NW Portland	8,172
N Portland	7,727
Hillsboro	7,131
SW Portland	5,234
Happy Valley	4,404
Bethany	3,910
Beaverton	3,870
Tigard	3,512

The map above shows where new housing has been built in the region. Dark blue hexagons represent more housing units. The darkest blue represents over 2k new units built in that hexagon.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

New housing, % growth by area

Housing trends and land absorption are land use forecast metrics and are identified as a regional indicator under ORS 197.296 and 197.301



To 10 highest % growth areas 2013 to 2022

Value	% growth over range	Units built over range	Prior units
Happy Valley	80%	4,404	5,526
Durham	67%	372	557
Bethany	48%	3,910	8,072
NW Portland	37%	8,172	21,966
Wilsonville	31%	2,698	8,737
S Portland	30%	1,775	5,940
Cornelius	26%	906	3,481
N Portland	26%	7,727	29,753
Rivergrove	24%	40	169
Forest Grove	19%	1,596	8,240

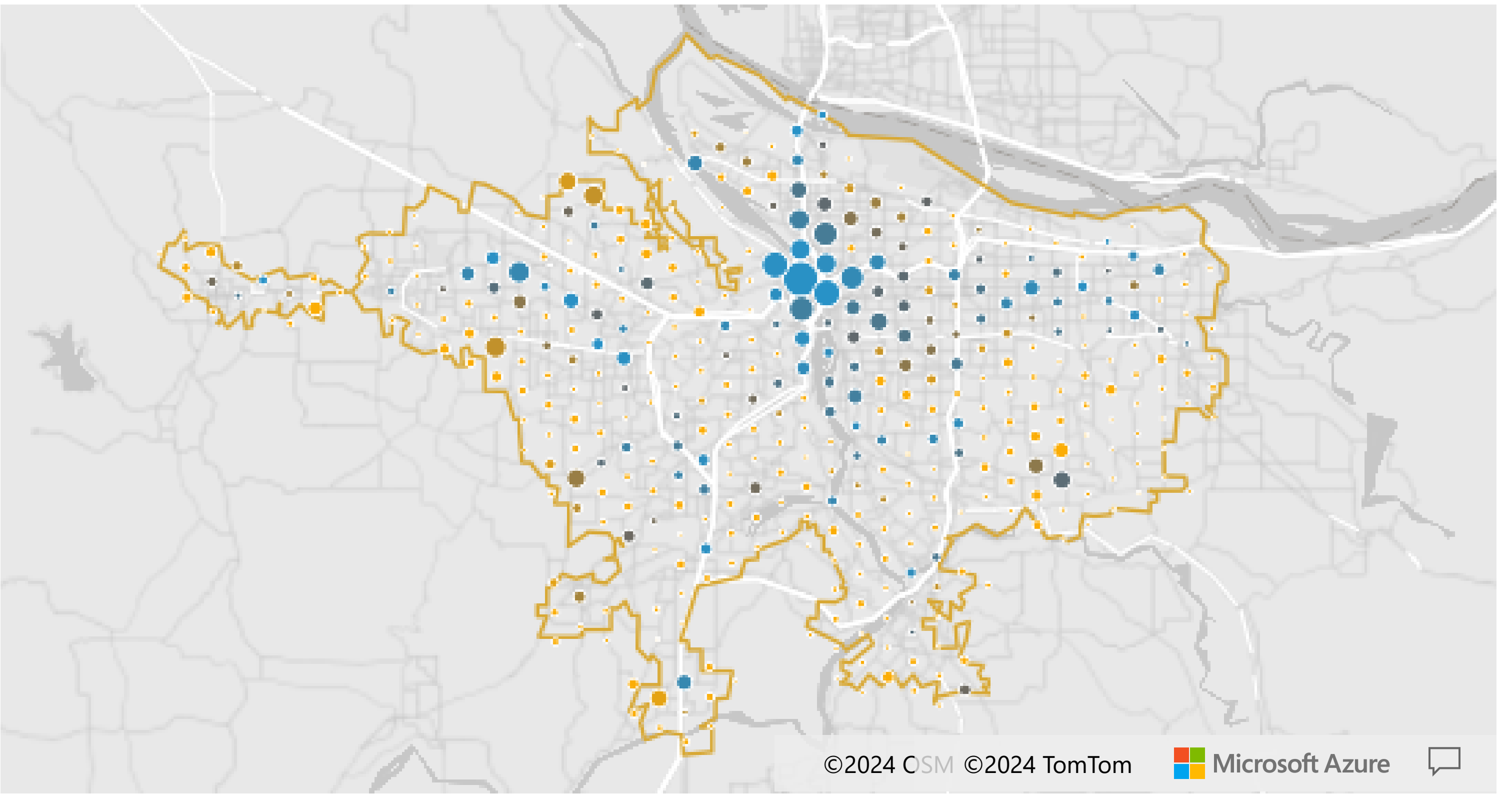
The map above shows areas that are growing quickly relative to the number of previous housing units in that area. Areas that have added more housing units compared to previous units appear dark purple. Newly developing suburbs stand out, like Happy Valley and Bethany, but also former industrial areas like NW Portland.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Location of Recent Residential Construction

Housing trends and land absorption are land use forecast metrics and are identified as a regional indicator under ORS 197.296 and 197.301

Geographic distribution of new housing units built within the Urban Growth Boundary

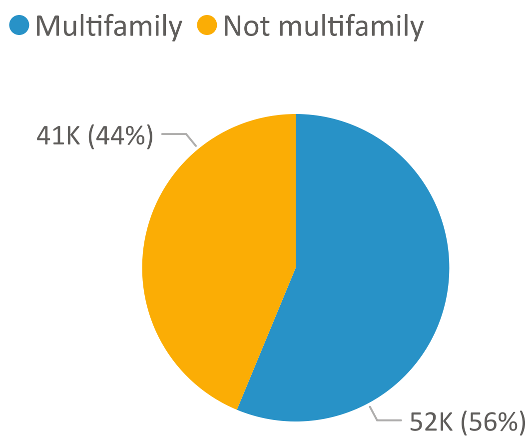


The map above shows relative numbers of new housing units built in the region, and the share of those units that are Multifamily. Multifamily here includes properties with on-site commercial. The largest dot represents 5k new units. A blue dot represents more multifamily units, and a yellow dot represents more other types of units. Generally, Multifamily has been more prominent in the more-dense urban core and interior of the region. Other types of housing like Single-family and Middle Housing have been more prominent on the edges of the region.

To 10 areas of new residential units built 2013 to 2022

Value	Total new units	% MFR
SE Portland	14,387	63%
NE Portland	11,879	68%
NW Portland	8,172	97%
N Portland	7,727	70%
Hillsboro	7,131	51%
SW Portland	5,234	72%
Happy Valley	4,404	25%
Bethany	3,910	18%
Beaverton	3,870	66%
Tigard	3,512	45%

Composition of housing built 2013 and after

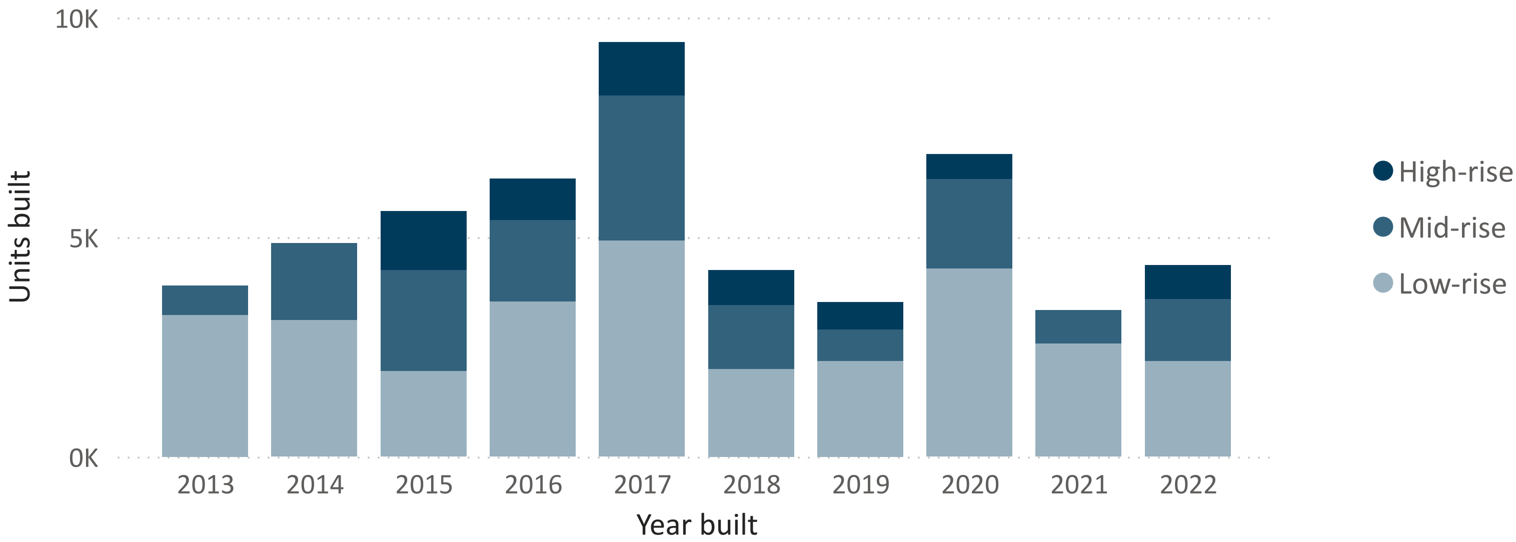


Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Multifamily Construction Trends

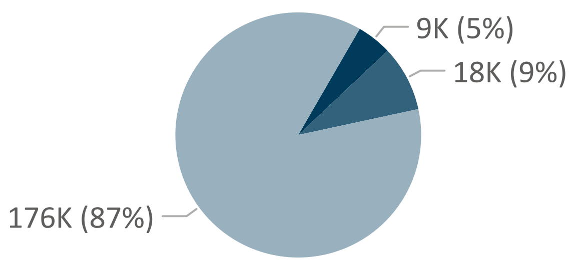
Type of residential units is a regional indicator required by ORS 197.296 and 197.301. Reporting observed data provides contextual understanding of market trends that is used to “determine the number of units and amount of land needed for each needed housing type for the next 20 years.” ORS 197.296(3)(b).

Units of Multifamily housing built per year by housing type

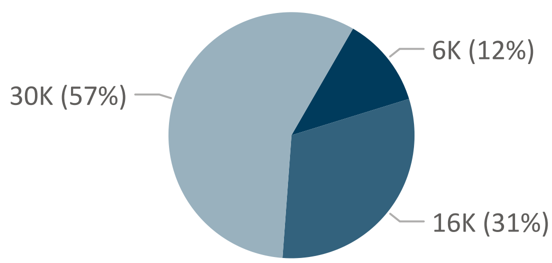


- Multifamily housing in the region grew by 26 % since 2013, adding 52,465 units.
- The most-built type of Multifamily housing was Low-rise, adding 29,993 units (57 % of all Multifamily)
- Of the new units built since 2013, High-rise units have been built at the highest density, adding 6,241 units on only 22 acres- an average of 286.4 units/acre.
- The type of Multifamily housing with the most new total acres was Low-rise, developing 29,993 units on 683 acres.

Composition of multifamily housing built prior to 2013



Composition of new multifamily housing built 2013 and after



ShortDesc	New units built	Total units today	Acres built	density of new units (units/acre)	% growth over range
High-rise	6,241	15,626	21.8	286.4	66%
Mid-rise	16,231	33,821	125.2	129.6	92%
Low-rise	29,993	206,086	682.8	43.9	17%
Total	**52,465**	**255,533**	**829.9**	**63.2**	**26%**

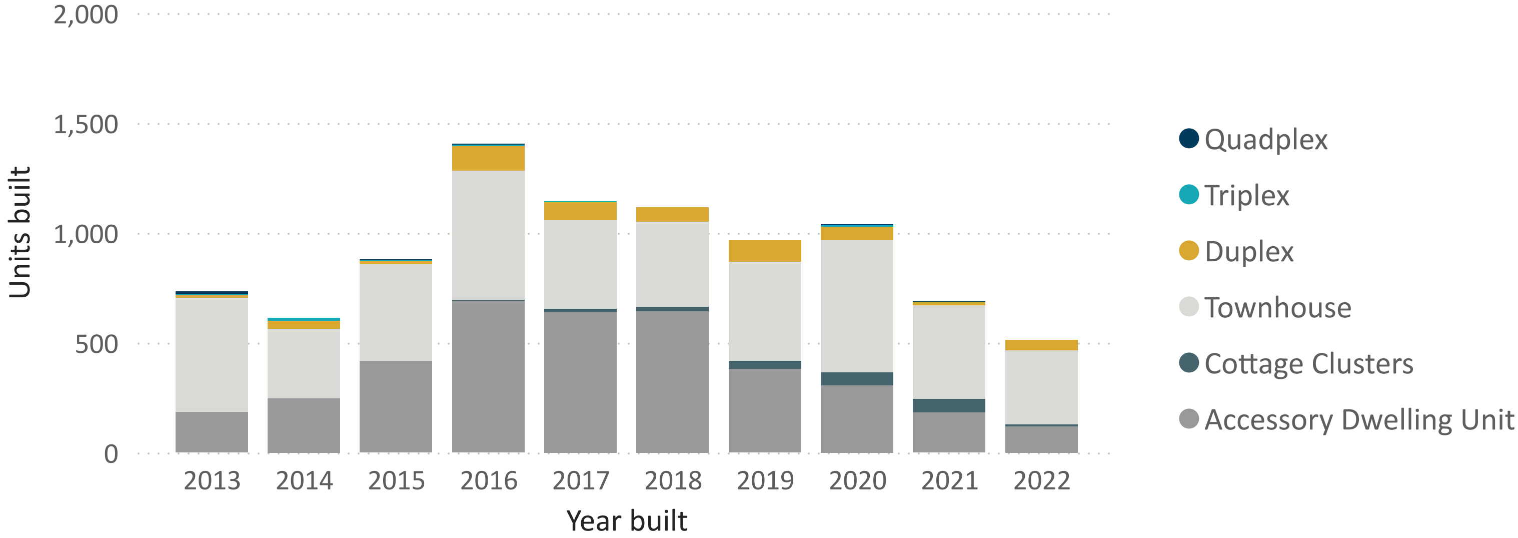
- Multifamily here includes properties with on-site retail/commercial

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Middle Housing Construction Trends

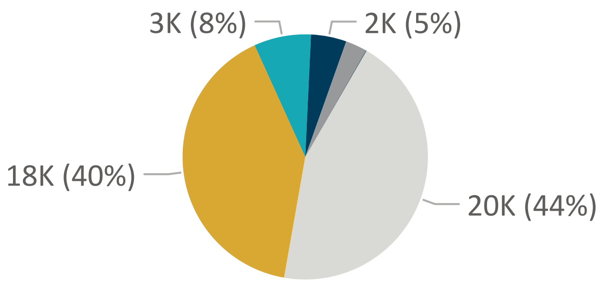
Type of residential units is a regional indicator required by ORS 197.296 and 197.301. Reporting observed data provides contextual understanding of market trends that is used to “determine the number of units and amount of land needed for each needed housing type for the next 20 years.” ORS 197.296(3)(b).

Units of middle housing built per year by housing type

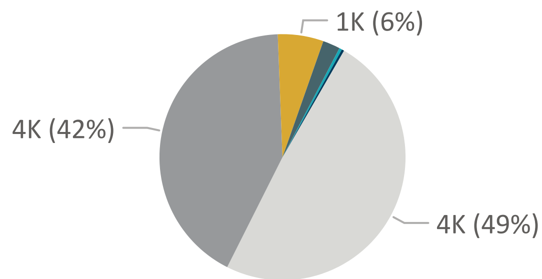


- Middle housing in the region grew by 20 % since 2013, adding 9,098 units.
- The most-built type of Middle housing was Townhouse, adding 4,466 units (49 % of all Middle housing)
- Of the new units built since 2013, Triplex units have been built at the highest density, adding 33 units on only 1 acres- an average of 30.4 units/acre.
- The type of Middle housing with the most new total acres was Townhouse, developing 4,466 units on 219 acres.

Composition of middle housing built prior to 2013



Composition of new middle housing built 2013 and after



ShortDesc	New units built	Total units today	Acres built	density of new units (units/acre)	% growth over range
Quadplex	28	2,160	1.0	27.7	1%
Triplex	33	3,449	1.1	30.4	1%
Duplex	546	18,931	33.5	16.3	3%
Townhouse	4,466	24,720	219.4	20.4	22%
Cottage Clusters	207	250	11.8	17.6	481%
Accessory Dwelling Unit	3,818	5,095			298%
Total	**9,098**	**54,605**	**266.8**	**19.8**	**20%**

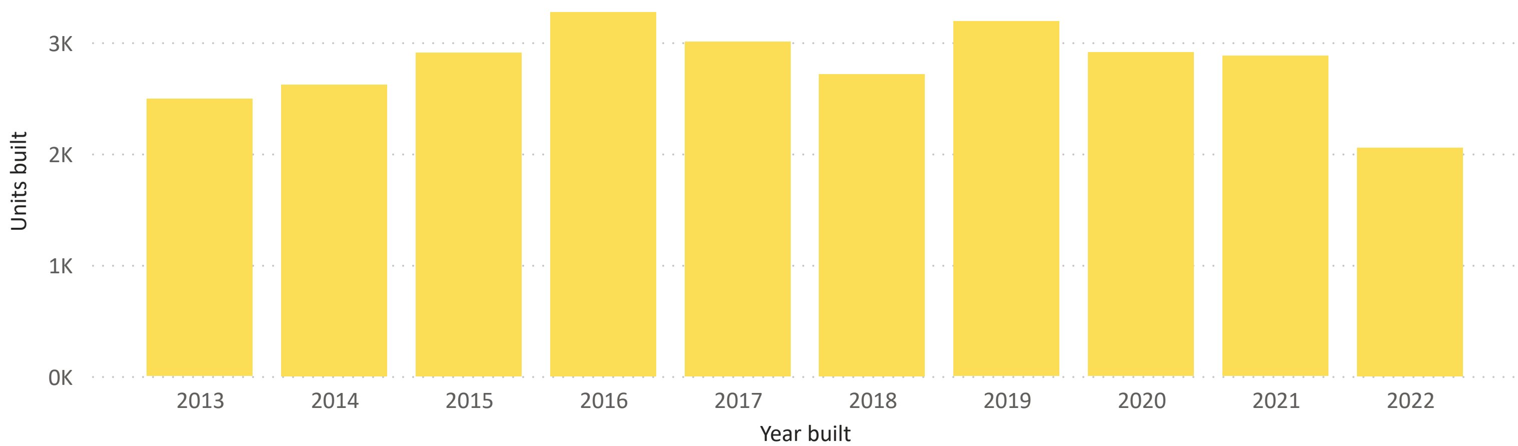
- Acreage of ADUs are not included, as they are accessory to other housing.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

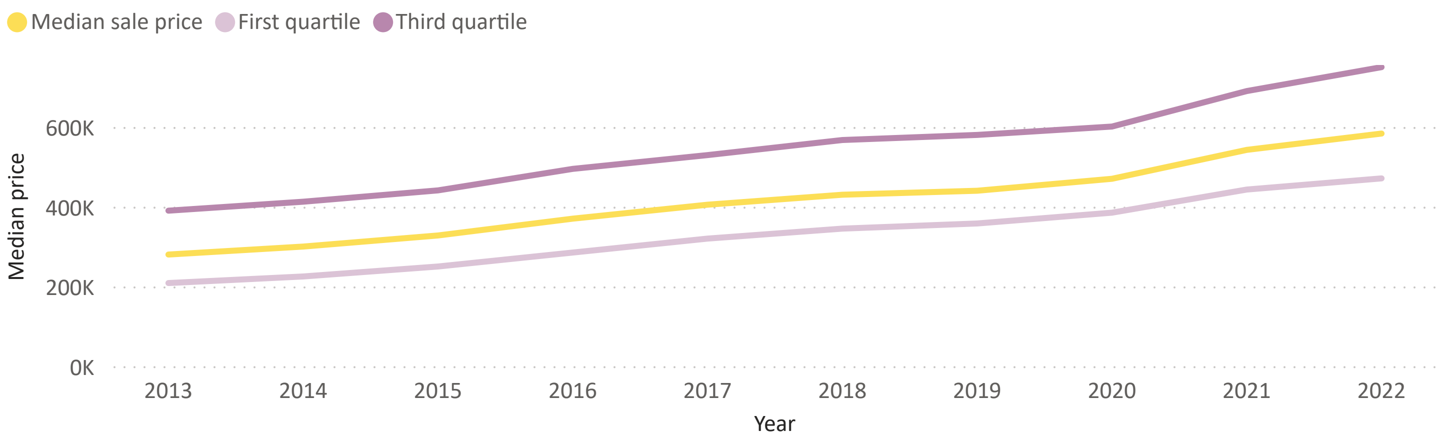
Detached Single family homes

Type of residential units is a regional indicator required by ORS 197.296 and 197.301. Reporting observed data provides contextual understanding of market trends that is used to “determine the number of units and amount of land needed for each needed housing type for the next 20 years.” ORS 197.296(3)(b).

Detached single family homes built per year



Median sale price of single family homes



The bar chart at top shows units of Single family detached homes built each year from 2013 to 2022.
The lower figure shows first, median (second) and third quartiles of single family home sale prices over the past 10 years. This is for all available sales in that year, regardless of when the home was built.

- Single family detached housing in the region grew by 8 % since 2013, adding 28,035 units on 4,264 acres- an average density of 6.6 units/acre.
- Generally, we are building larger houses on smaller lots. This uses land space more efficiently, but does not provide as many new 'starter homes' for first-time home buyers.
- The median building size of new homes since 2013 was 2,363 square feet (sqft), 575 sqft larger than the median building size of 1,788 sqft for all single family homes built prior to 2013.
- The median lot size of new homes was 0.11 acres, 0.06 acres smaller than the median property size of 0.17 acres for all previously existing single family homes.
- The median sale price of Single family homes increased from $279,995 to $583,424 over the past 10 years, an increase of 108 %

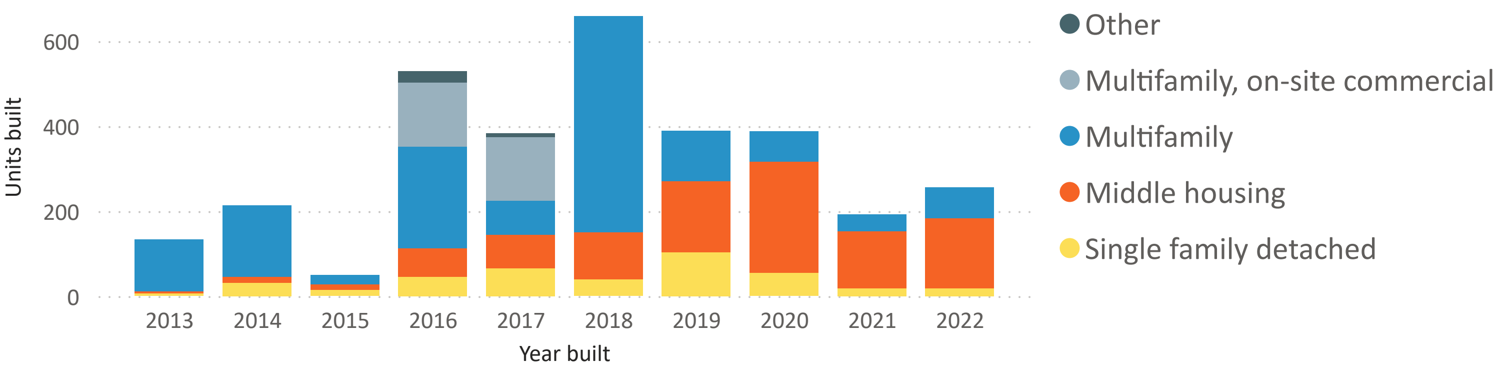
- Home sales from RLIS taxlot sale date/price, published quarterly. This dataset may omit some home sales, specifically 'flipped' houses where the taxlot sells twice in a single quarter. This figure may also omit sales of homes where the taxlot ID has changed over time through property division.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Condominium Ownership

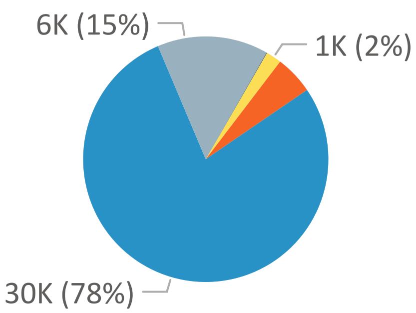
Type of residential units is a regional indicator required by ORS 197.296 and 197.301. Reporting observed data provides contextual understanding of market trends that is used to “determine the number of units and amount of land needed for each needed housing type for the next 20 years.” ORS 197.296(3)(b).
Condominium ownership is where each unit or structure of a property is individually owned, but the land is commonly owned by a condo association representing all owners. Condominium ownership is independent of physical construction, and a taxlot with a single owner could later be sold to the residents and divided into condo units. Ownership for this report is from the most recent available RLIS data, and may not reflect the ownership style during original construction. Senate Bill 458 allowed additional lot divisions for middle housing, including options for condominium ownership.

Units built per year by housing type

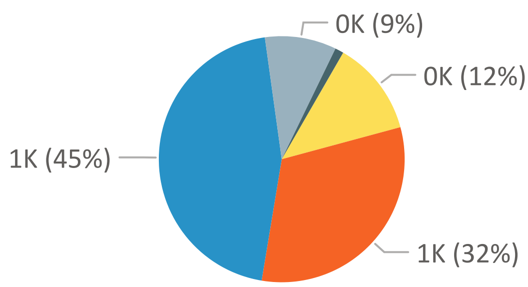


- Condominium units are only 6 % of all regional housing today. A total of 3,191 condo units were built between 2013 and 2022 (3.4 % of all units built in that period).
- The most-built type of housing with condo ownership was Multifamily, adding 1,442 units (45 % of all condo units).
- Of the new units built since 2013, Multifamily, on-site commercial units have been built at the highest density, adding 300 units on only 1.8 acres- an average of 163.3 units/acre.

Composition of condominium units built prior to 2013



Composition of condominium units built 2013 and after



UGR housing type	New units built	Total units today	Acres built	density of new units (units/acre)
Single family detached	398	1,183	31.0	12.8
Middle housing	1,015	2,970	45.5	19.6
Multifamily	1,442	31,511	54.6	26.4
Multifamily, on-site commercial	300	5,930	1.8	163.3
Other	36	64	5.4	6.7
Total	**3,191**	**41,658**	**138.3**	**22.2**

- Accessory dwelling units, by definition for the RLIS Housing dataset, cannot have condo ownership- if they are individually owned 'condo style' units, then they are no longer 'accessory' and are put into another category.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

New Housing by Development Type

Development type (vacant/infill/redevelopment) is identified as a regional indicator under ORS 197.296 and 197.301

Housing type	New units built	Acres built	% of new units built on vacant land
Single family detached	28,035	4,264.2	64%
Middle housing	9,098	266.8	40%
Multifamily	30,407	612.0	43%
Multifamily, on-site commercial	22,058	217.9	39%
Other	3,664	132.5	62%
Total	**93,262**	**5,493.4**	**49%**

New unit denisty (units/acre) by development type

Housing type	Infill/ Redevelopment	Vacant land consumption	Total
Single family detached	5.4	7.5	**6.6**
Middle housing	17.1	21.3	**19.8**
Multifamily	71.9	35.1	**49.7**
Multifamily, on-site commercial	148.0	67.4	**101.2**
Other	28.9	26.9	**27.7**
Total	**18.8**	**14.4**	**16.3**

Unit density of Single family and Middle housing tends to be lower on infill/redevelopment compared to vacant land consumption. One reason for this is optimal use of space on large, greenfield sites compared to working with available space on infill/redevelopment sites.

Multifamily (with and without on-site commercial) tends to be much higher density on redevelopment sites, mainly because redevelopment tends to happen closer to the urban core where zoning requires/allows higher density, compared to greenfield development on the edges of the region where densities are not as high.

- Of the 93,262 units built since 2013, 45,318 (49 %) were on previously vacant land.

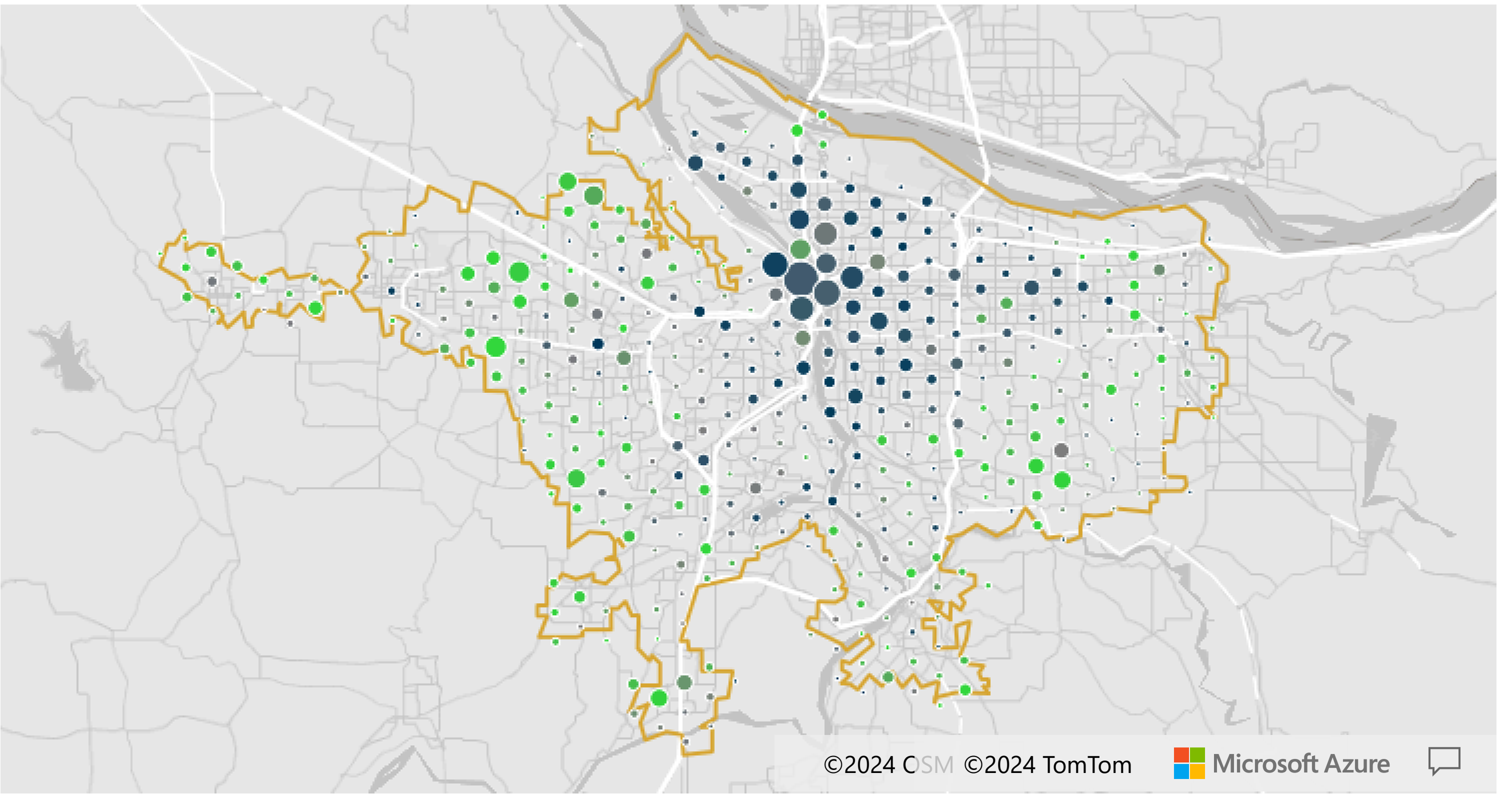
- Unit density on this page includes only new housing inside the UGB built since 2013.
- Acres calculated from total property area from Housing Inventory.
- Accessory Dwelling Units excluded from acre calculations on this page.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Where is Residential vs Non-Residential Development Happening?

Development type (vacant/infill/redevelopment) is identified as a regional indicator under ORS 197.296 and 197.301

Geographic distribution of new housing units built within the Urban Growth Boundary

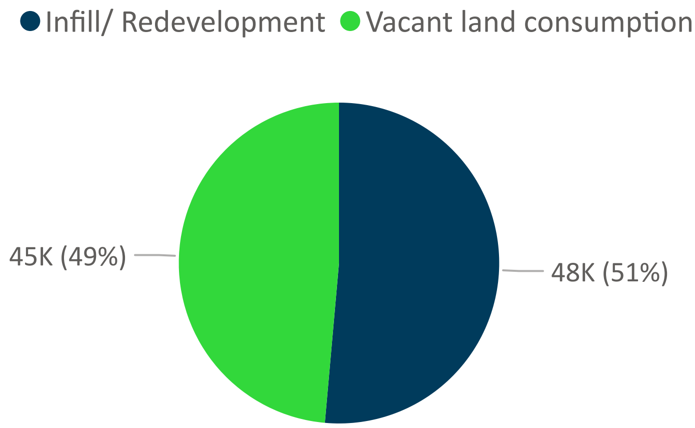


The map above shows relative distribution of new housing units built within the Urban Growth Boundary (yellow line). The size of the dot represents the total number of new units built. A light dark blue dot represents more redevelopment, while an green dot represents vacant land consumption. A grey dot is a mix of both.

To 10 areas of new residential units built 2013 to 2022

Value	Units built over range	% new units on vacant land
SE Portland	14,387	18%
NE Portland	11,879	29%
NW Portland	8,172	26%
N Portland	7,727	24%
Hillsboro	7,131	90%
SW Portland	5,234	19%
Happy Valley	4,404	87%
Bethany	3,910	84%
Beaverton	3,870	72%
Tigard	3,512	69%

Total new units built

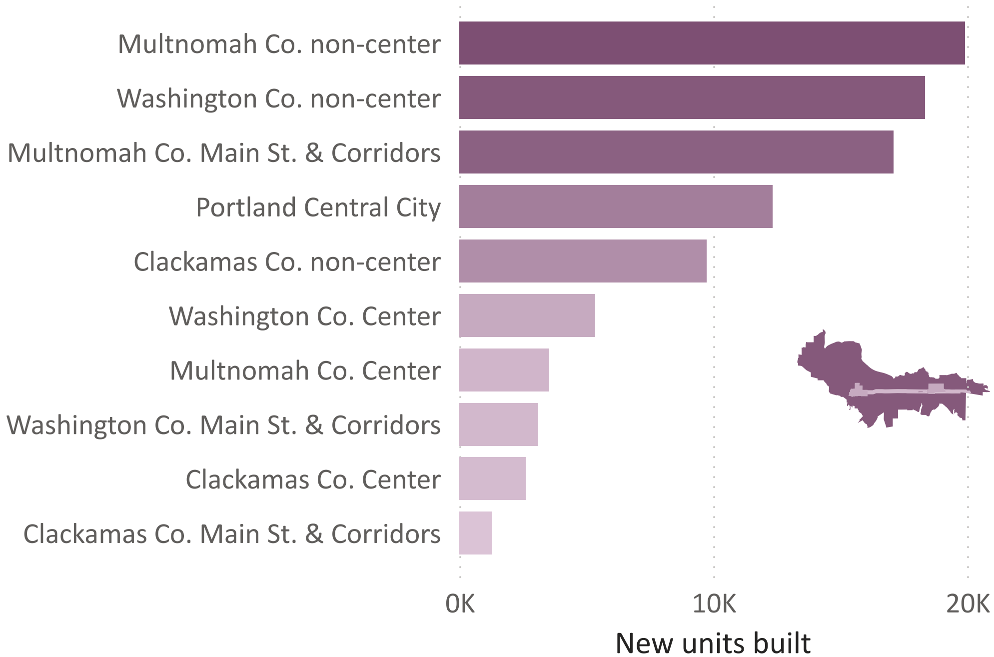


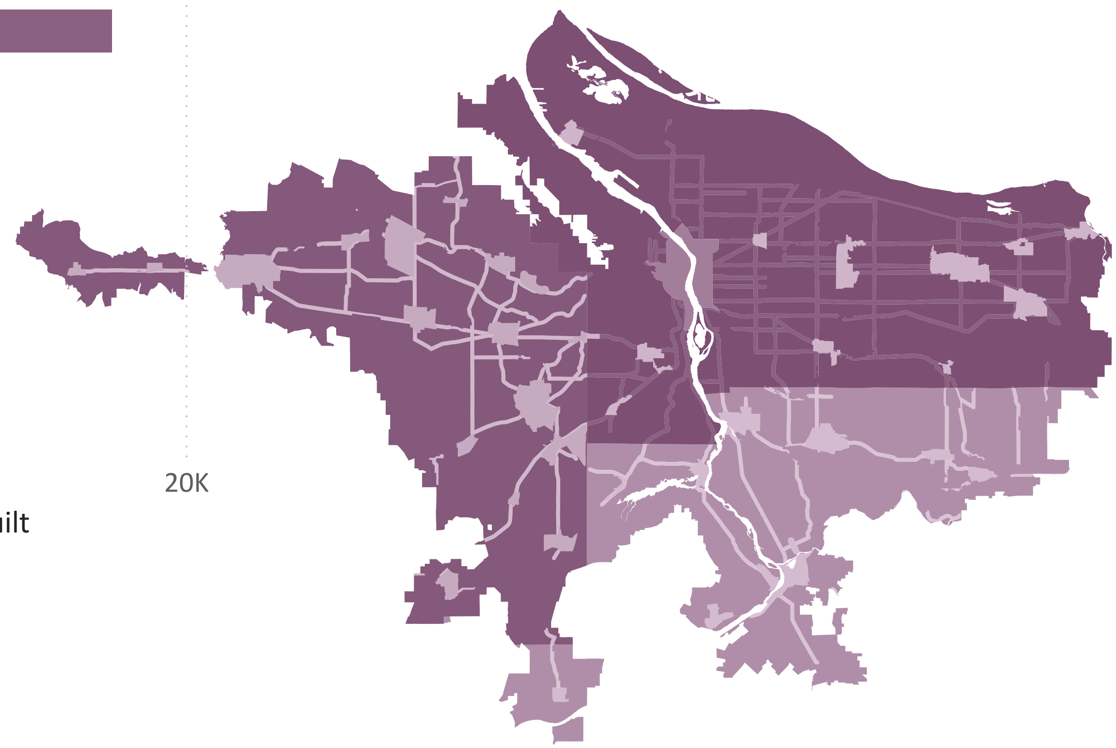
Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

How is housing growth occurring in the 2040 Growth Concept centers?

The type of housing units built is identified as a regional indicator under ORS 197.296 and 197.301. This information provides geographic context as to development types and recent development locations.

Housing production over last 10 years from 2013 to 2022





The map and chart above show new units built by [Metro 2040 Growth Concept]area types. Centers, Main Streets & Corridors tend to be relatively small areas of intentionally dense development. Many of these areas have been developed already, and therefore have less new units than the rest of the larger non-center area.

The most new units were built in Multnomah Co. non-centers, with 19,920 new units (21 % of all new units built).

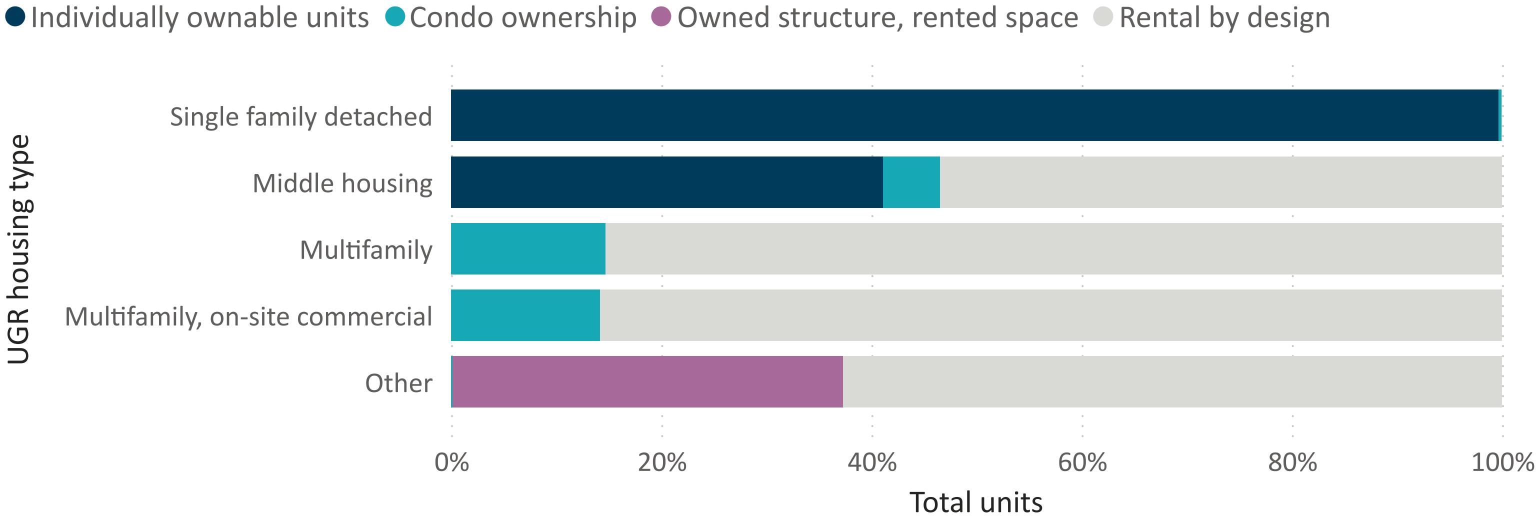
Portland Central City is the smallest of these geographic areas at only 2,972 acres, but grew by 46 %, adding 12,325 new units for a total of 39,000 units.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Housing Production Tenure and Ownership Type

Type of residential units is a regional indicator required by ORS 197.296 and 197.301. Reporting observed data provides contextual understanding of market trends that is used to "determine the number of units and amount of land needed for each needed housing type for the next 20 years." ORS 197.296(3)(b).

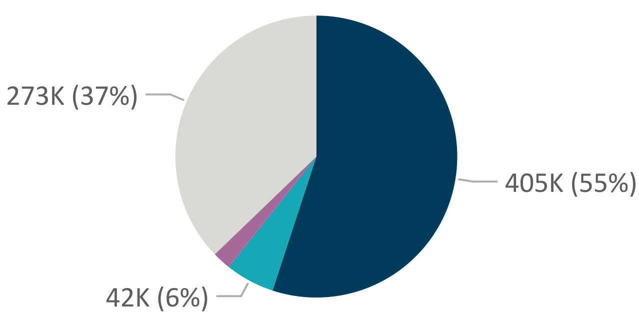
Total units by UGR housing type and owership type



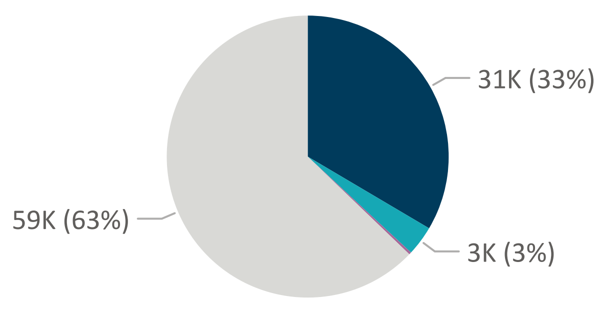
Generally, high-density housing are designed to be rental units, and not owner-occupied or individually owned.

- Large properties (multifamily, with or without on-site retail) can have condominium-style ownership, where each unit is owned by an individual, but this is not common. Multifamily mostly consists of rental units.
- Single family homes are intended for individual ownership. More recently, under SB 458, a small number of single family homes have created condominium associations, similar to homeowner associations but sharing ownership of the overall land while retaining individual ownership of each home.
- Middle housing includes many types of residential units, including townhouses, which are typically individually owned units, and quadplexes, with four units on a taxlot and designed to be rental units. Lot divisions under SB 458 could allow further ownership potential of this type of housing, either through condominium associations or lot divisions.
- manufactured home parks and floating homes are not currently a common development type, but can be individually owned units placed on rented land. Rental housing in the 'other' housing type includes retirement centers, dormitories which are typically rented.

Ownership type of housing built prior to 2013



Ownership type of housing built 2013 and after



Definitions for this page-

- Individually ownable units are defined here as a single unit on a single taxlot.
- Condo ownership is where each unit is individually owned, and the overall property (land) is collectively owned by the condominium association.
- Owned structure, rented space is primarily floating homes and manufactured home parks, where each unit is owned and the space is rented by the owner.
- Rental by design includes all other types of housing. Some of these properties may have an owner-occupied unit, like a duplex where the owner lives in one unit and rents out the 2nd unit.

Data source: Regional Land Information System (LDMS) dataset as of 02/01/2024

Subregional Summary

Summary by

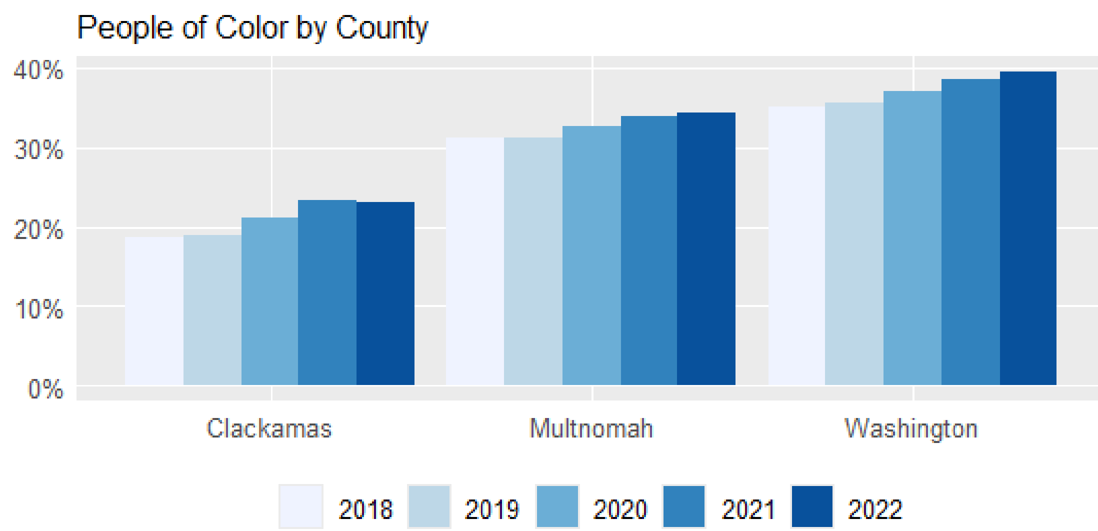
Metro Council district

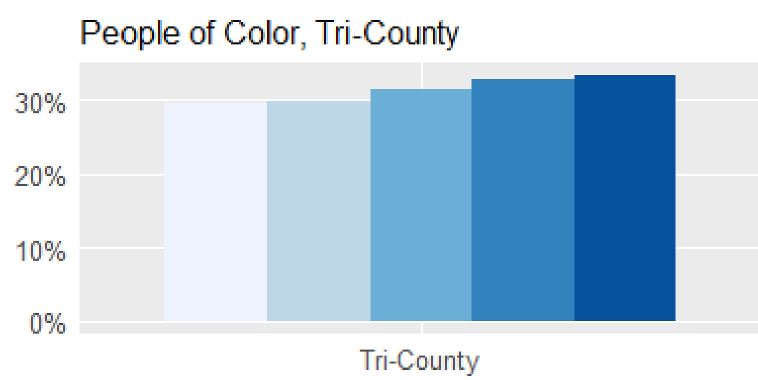
Value	Total acres	% Developed	Acres developed over range	Total units	Total unit density	Units built over range	% growth over range
District 1 (Ashton Simpson)	40,395	71%	2,501	103,071	4.5	8,468	9%
District 2 (Christine Lewis)	40,241	87%	1,851	114,329	4.7	9,327	9%
District 5 (Mary Nolan)	39,606	90%	2,810	150,757	12.2	28,768	23%
District 3 (Gerritt Rosenthal)	36,574	82%	2,445	120,843	5.9	13,178	12%
District 4 (Juan Carlos Gonzalez)	32,673	85%	2,696	114,482	7.0	15,202	15%
District 6 (Duncan Hwang)	19,763	95%	938	130,433	9.7	18,193	16%
Outside Metro jurisdiction	2,549	39%	58	1,380	1.1	126	10%
Total	**211,800**	**84%**	**13,300**	**735,295**	**6.6**	**93,262**	**14%**

Appendix 5B: Demographic indicators

People of color

Diversity, equity and inclusion are cornerstone values in Metro policy. This information helps provide contextual information that informs policy makers.



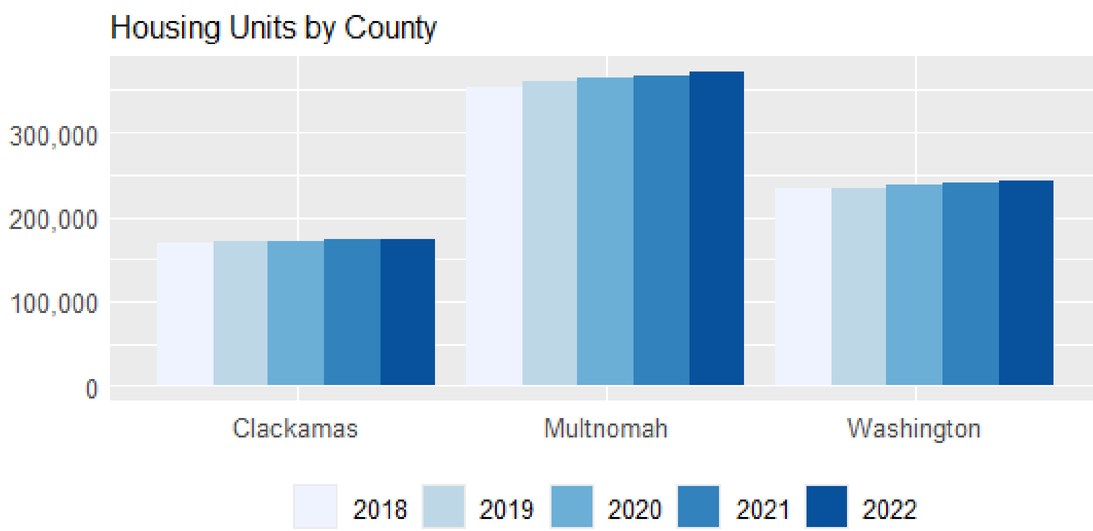


People of color percentages have steadily increased in the tri-county region from 29.6% in 2018 to 33.3% in 2022.

Generally, all three counties have individually followed a similar pattern of small annual increases in the people of color population.

Housing Units

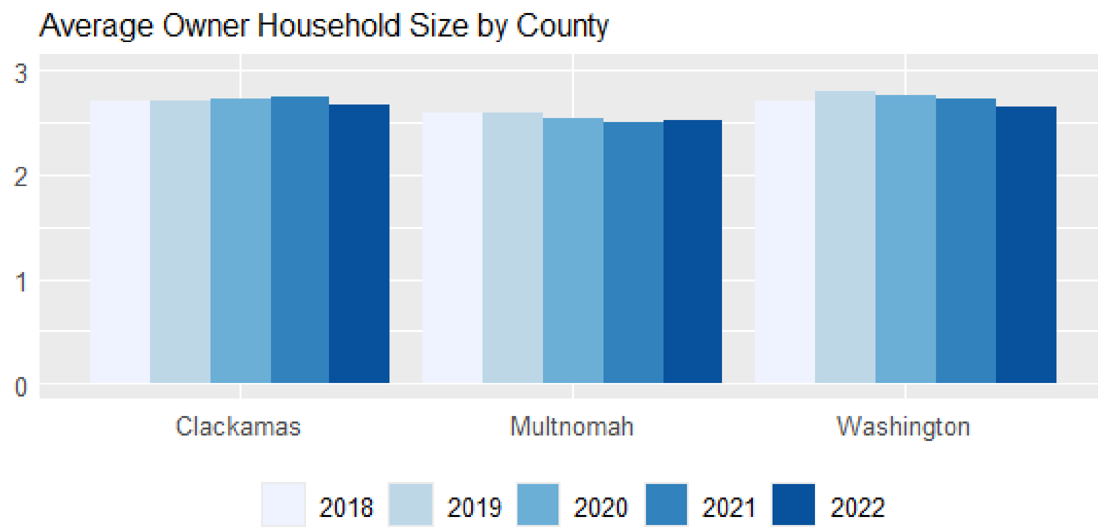
Housing units are identified as a regional indicator under ORS 197.296.



- Clackamas County has seen a small increase in housing units from approximately 170,000 in 2018 to 174,000 in 2022.
- Multnomah County has seen a larger increase in housing units from approximately 354,000 to 371,000.
- Washington County has seen an increase in housing units from approximately 232,000 to 243,000.

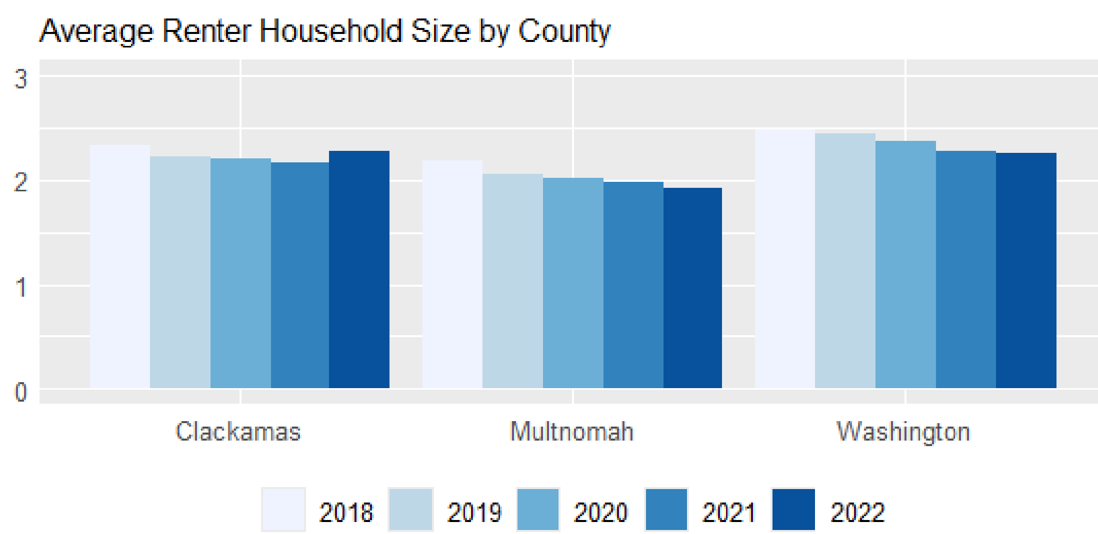
Average Household Size

Tenure choice and household size trends are indicative of economic and demographic trends, housing trends and development policies. ORS 197.296 and 197.301 reference reporting on such trends and performance indicators.



Average owner household sizes have generally slightly increased in Clackamas County over the past five years – except for a decrease in 2022 – and conversely both Multnomah and Washington counties have generally seen annual decreases.

For all counties, average owner household sizes remain above 2.5 persons per household.

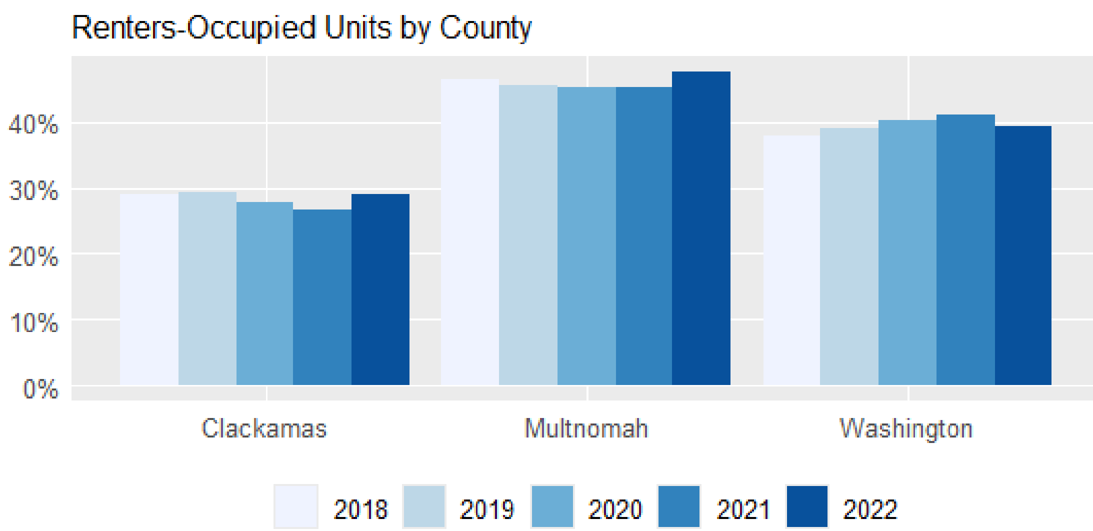


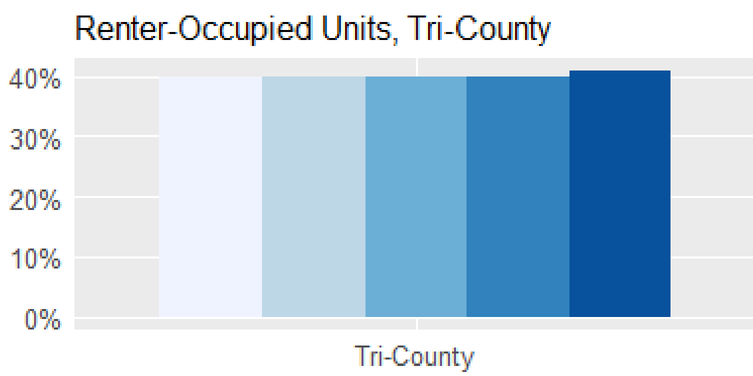
Average renter household sizes have generally decreased across all counties, except for an increase in Clackamas County in 2022.

For all counties, average renter household sizes remain below 2.5 persons per household.

Renter-Occupied Housing Units

Renter-occupied housing units are identified as a regional indicator under ORS 197.296.



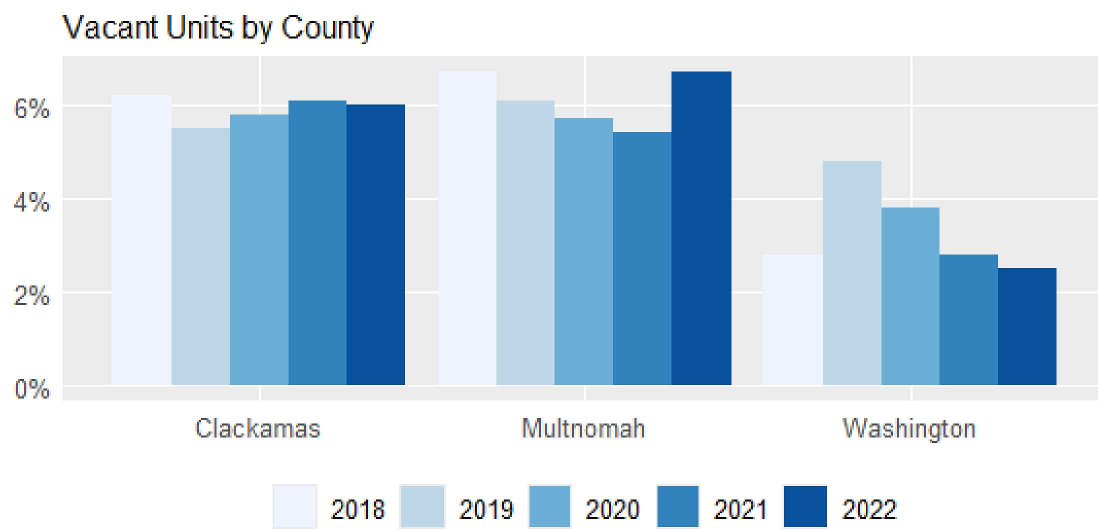


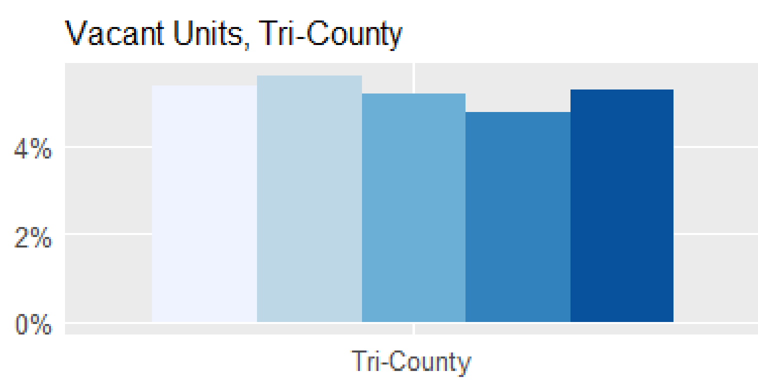
The tri-county region has largely remained steady in terms of the share of renter-occupied housing units, with a slight overall increase in 2022.

The individual counties have varied. Clackamas County has seen fair decreases year-over-year, with an uptick in 2022. Multnomah County, similarly, but to a lesser degree, has seen slight decreases followed by an increase in 2022. Washington County has conversely seen annual increases since 2018, followed by a decrease of renter-occupied housing units in 2022.

Vacant Residential Units

Residential vacancy rates are identified as a regional indicator under ORS 197.301.



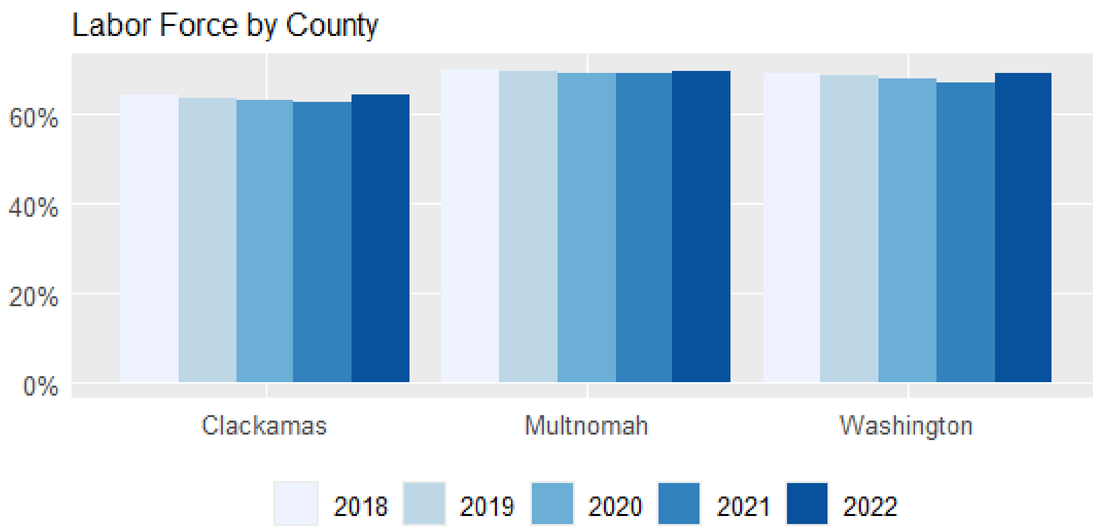


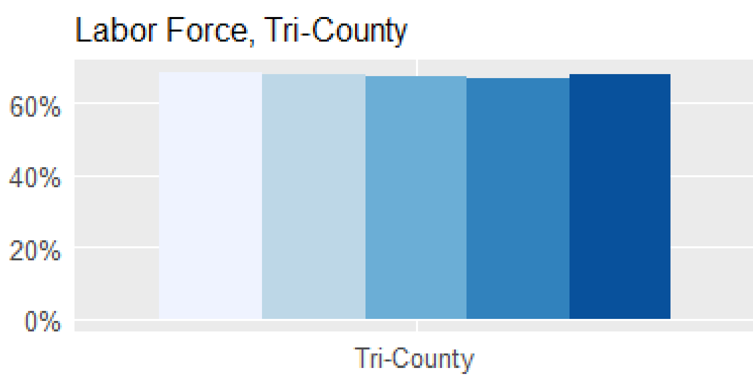
The tri-county region's vacancy rate has oscillated over the past five years, with an increase in 2019 followed by consecutive decreases followed by a fair increase in 2022.

Again, the story is varied across counties. Clackamas County saw a fair decrease in 2019, followed by a general upward trend in vacant housing units. Multnomah County saw general annual decreases in vacancy rates from 2018 to 2021, followed by a sharp increase in 2022. Washington County, conversely, saw a sharp increase in 2019 followed by steady significant decreases since.

Labor Force

Labor force is identified as a regional indicator under ORS 197.296 (economic trends/cycles). Labor force participation rates have been declining for a long time. Arresting this trend would promote greater economic opportunities and raise prosperity in the region. This data provides information about the size of the region's labor supply.





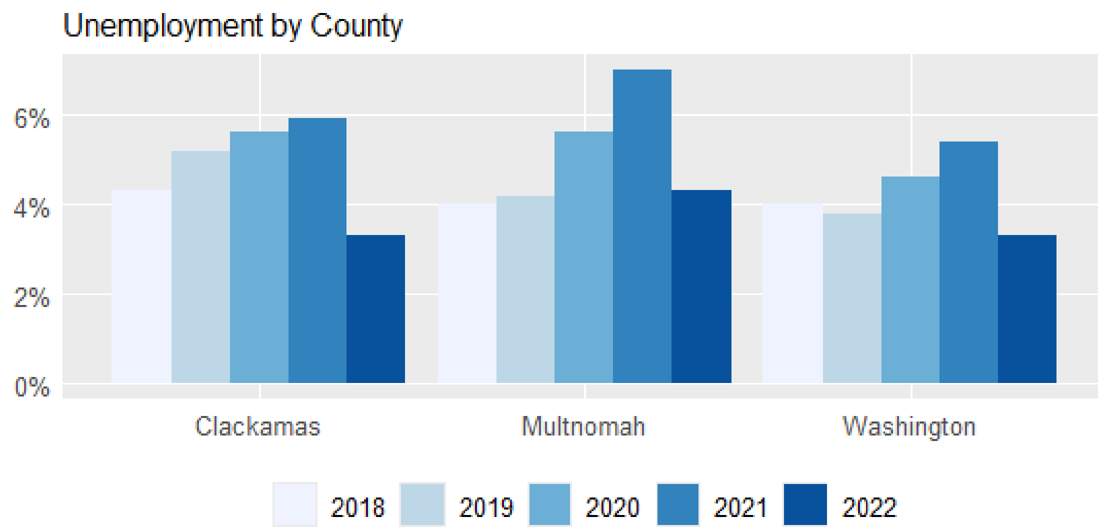
Labor force participation decreased slightly from 68.5% in 2018 to 67.1% in 2021, followed by a rebound to 68.3% in 2022.

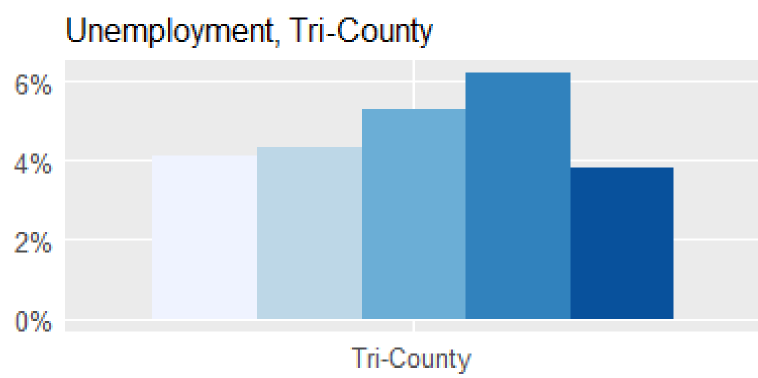
The overall tri-county trend is similar across the individual counties, although Clackamas and Washington counties saw greater decreases and rebounds.

Multnomah County currently has the greatest labor for participation at 69.6%, followed by Washington County at 69.1% and Clackamas County at 64.5%.

Unemployment

Unemployment is identified as a regional indicator under ORS 197.296 and ORS 197.301 (economic trends/cycles and job creation). The unemployment rate is one of the broadest indicators of employment growth and economic vitality of the region.



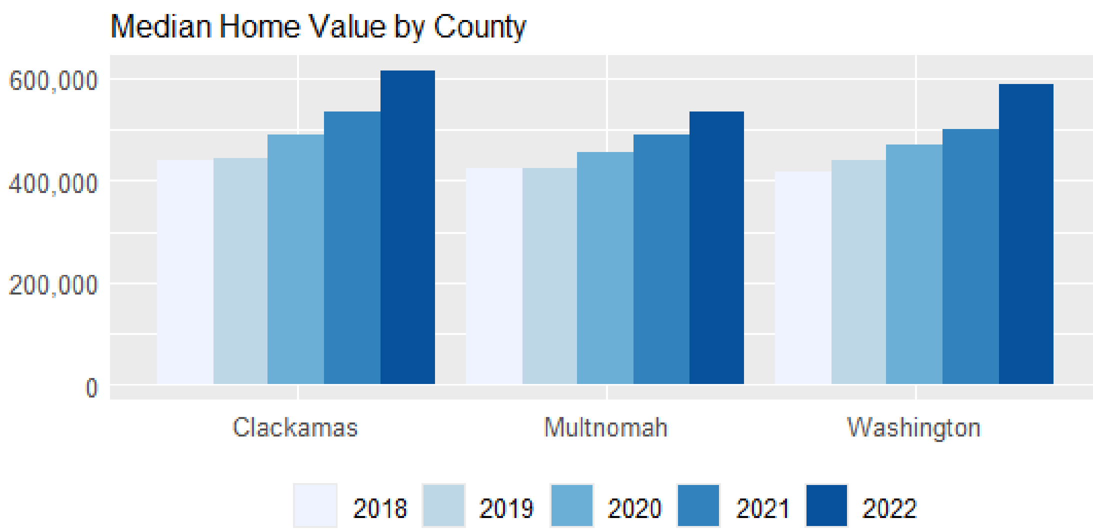


The tri-county region has seen significant increases in unemployment from 2018 to 2021, followed by an equally significant decrease in 2022.

This pandemic-related trend is mirrored across all counties. The sharpest increases of unemployment were in Multnomah and Washington counties. The highest rates of unemployment were in Multnomah and Clackamas counties.

Median Home Value

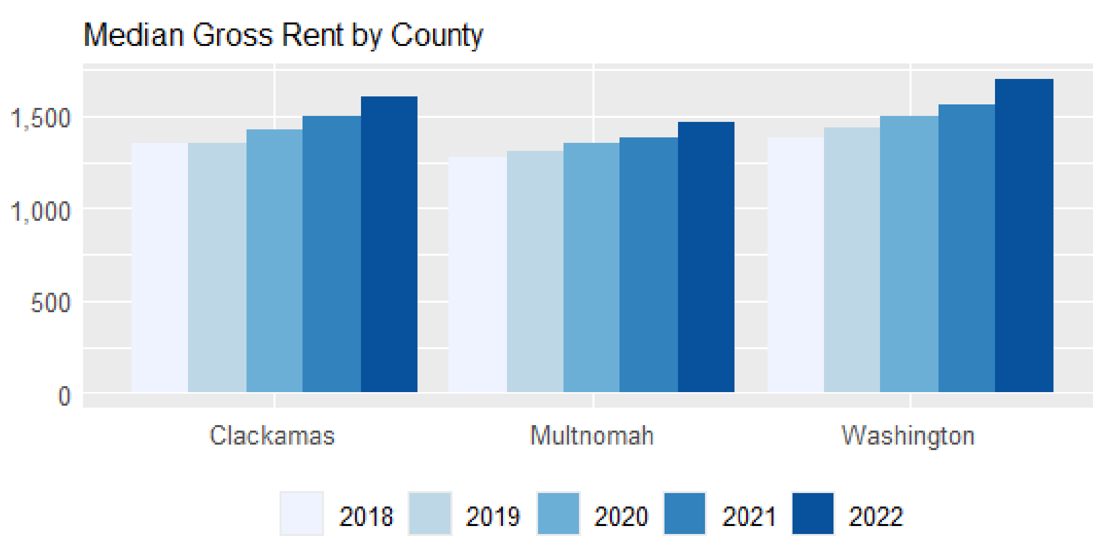
Housing values are indicative of real estate trends. As such they provide a "shadow price" indication of vacant land value (per ORS 197.301).



Housing cost, as approximated by home value, has continued to climb in the tri-county region, with median home values by county hovering above $400,000 in 2018, and steadily increasing to above $500,000 in Multnomah County and around $600,000 in Clackamas and Washington counties.

Median Gross Rent

Apartment rents are indicative of real estate trends. As such they provide a "shadow price" indication of vacant land value (per ORS 197.301).



Like ownership costs, rent prices have steadily increased in the tri-county region, with Multnomah County being slightly more affordable over the past five years than Clackamas or Washington counties.

Currently, Multnomah County median gross rent is around $1,500, and Clackamas and Washington counties are at $1,600 and $1,700 respectively.

Data Sources and Methods

Census Bureau, American Community Survey (ACS), 1-Year County Estimates, 2018-2022.

The ACS was not released in 2020 due to the Covid pandemic. For the purposes of time series analysis, 2020 values are interpolated between 2019 and 2021.

Appendix 6
Employment land site characteristics

Background
Under Division 24 (Urban Growth Boundaries) of the Oregon Administrative Rules, Metro is required to complete an employment land inventory that describes site characteristics of buildable lands inside the urban growth boundary (as described in Division 9, Economic Development). Cities and counties, in the course of their own planning efforts, are responsible for determining whether sites are suitable for particular uses that match their economic development objectives. This is an appropriate approach given the regional scale of this inventory and the desire to not replicate or supplant local efforts.

The approach used for this analysis is also informed by Division 9 (Economic Development) of the Oregon Administrative Rules, that states "The effort necessary to comply… will vary depending on the size of the jurisdiction…" and that "a jurisdiction's planning effort is adequate if it uses the best available or readily collectible information..." This clause acknowledges that a detailed region-wide analysis of employment sites is not feasible either to complete or interpret in any meaningful fashion.

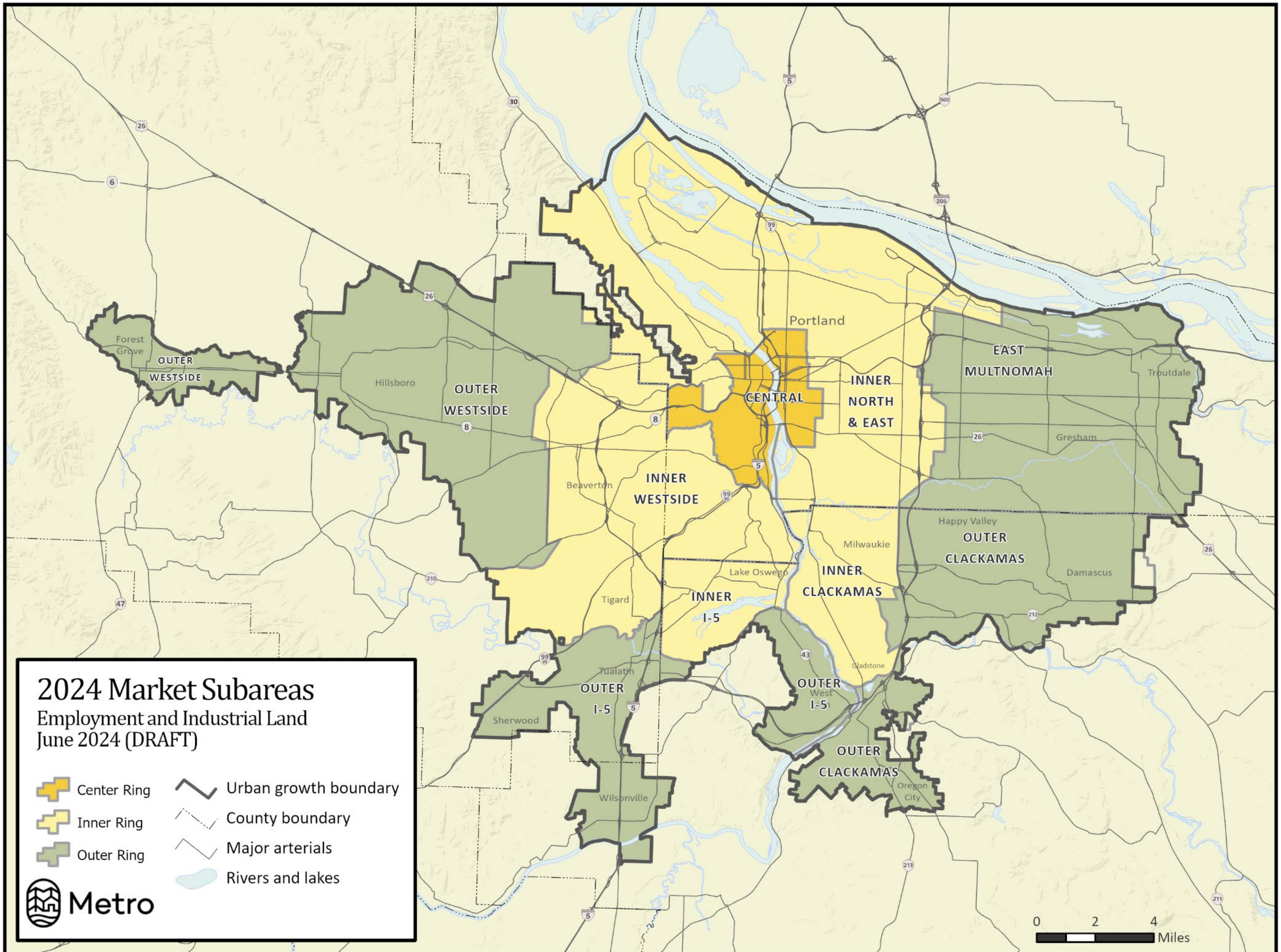
This analysis uses a general approach that was developed in consultation with Oregon Department of Land Conservation and Development staff for the 2014 Urban Growth Report. Table 1 summarizes the site characteristics mentioned in the Administrative Rules and the various data points that have been used to summarize these characteristics. For practical reasons, this report presents regional maps and summary tables. Metro can provide its tax lot level buildable land inventory GIS database on request. Employment land is organized into three categories for this analysis:

- Commercial land
- General industrial land
- Large industrial sites (maps depict dots for each tax lot that comprises a large site; some sites may consist of multiple tax lots)

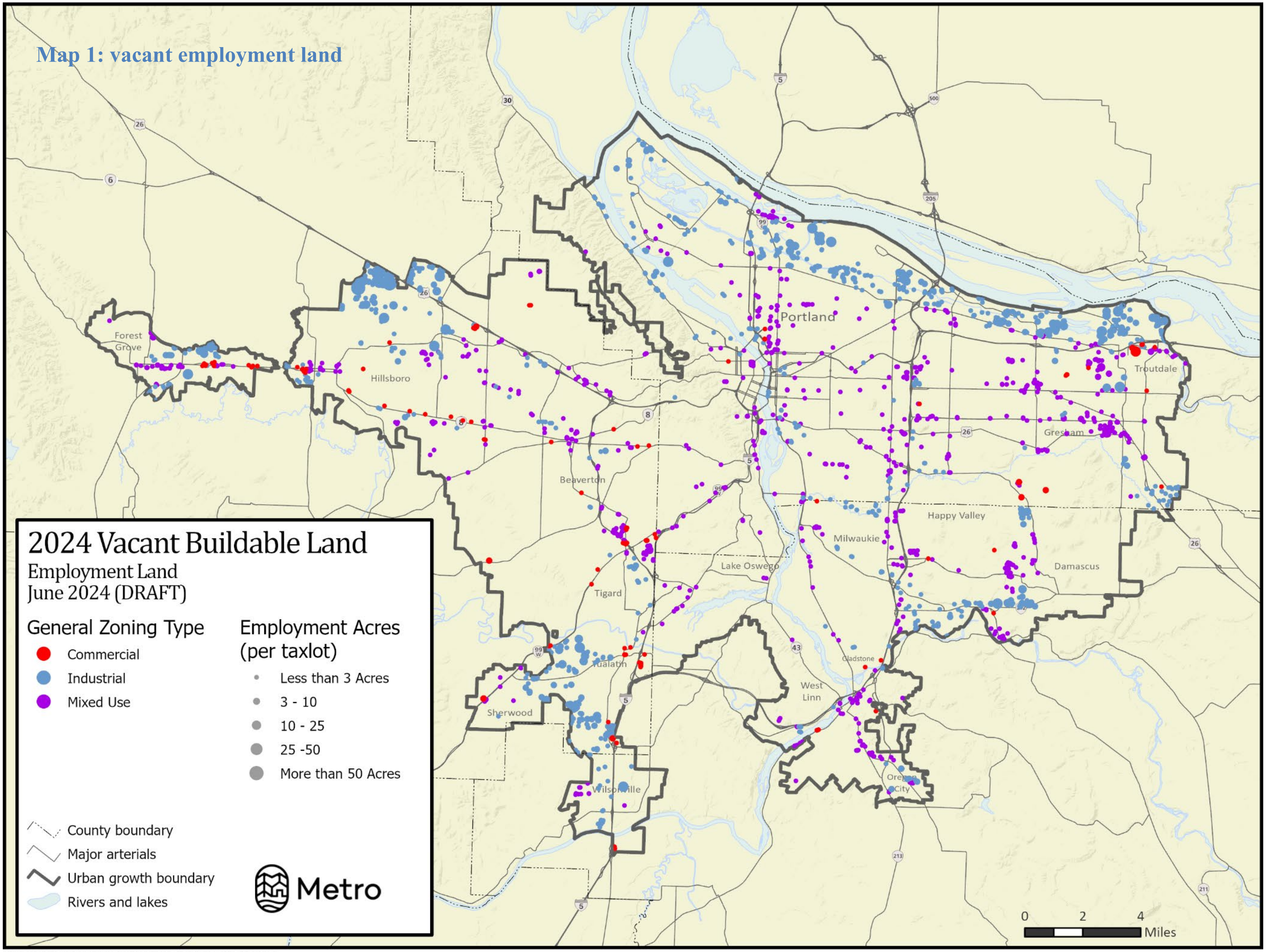
Table 1: summary of approach for describing site characteristics

OR Administrative Rules Division 9 – Economic Development	Metro employment land inventory approach
Description of minimum acreage or site configuration characteristics including shape and topography	Acreage – summary tables of net buildable acreages are provided. Metro can provide its tax-lot-level buildable land inventory GIS database on request. Shape - site shapes cannot be summarized in any meaningful fashion at the regional scale, but the GIS database includes a visual depiction of the shape of each tax lot in the inventory. Metro can provide its tax-lot-level buildable land inventory GIS database on request. Topography - portions of tax lots with slopes over 25% have been removed from the inventory since they are deemed unbuildable. This report describes, as a site characteristic, the portion of each inventoried tax lot that has a slope between 7-25%. This range was chosen because slopes over 7% are often regarded as an impediment to industrial uses with larger development footprints.
Visibility	This characteristic is taken to mean visibility from a public right of way. For each tax lot in the inventory, distance to the nearest major arterial is computed.
Specific types of public facilities, services or energy infrastructure	Region-wide data to address this site characteristic are not readily available. For public security reasons, Metro does not have access to data on where power and gas transmission lines are. Metro also do not have access to data on where water and sewer facilities are located. The inventory depicts the following: -Sewer district name -Water district name -Fire district name -Distance to closest major arterial
Proximity to a particular transportation or freight facility such as rail, marine ports and airports, multimodal freight or transshipment facilities, and major transportation routes.	-Distance to nearest rail terminal -Distance to transhipment facilities -Distance to major arterial -Distance to designated freight route -Distance to airport -Distance to marine terminals
Description of any development constraints or infrastructure needs that affect the buildable area of sites in the inventory	-Number of environmentally constrained acres (note – these acres are removed from buildable land inventory). -Inside or outside marine use restriction area -Inside or outside an aviation overlay zone -Portion of each tax lot that has a slope between 7-25%

OR Administrative Rules Division 9 – Economic Development	Metro employment land inventory approach
	-Owner flagged for tax exempt status (removed from inventory if not available for employment use) -Land value per square foot (county assessor data) -Vacant or redevelopment land category (Metro) -Inside city (yes/no) -Estimate of future streets and sidewalks acreage needs for vacant tax lots. However, we should note that our method uses a regional approach and may not reflect the actual needs of specific sites.

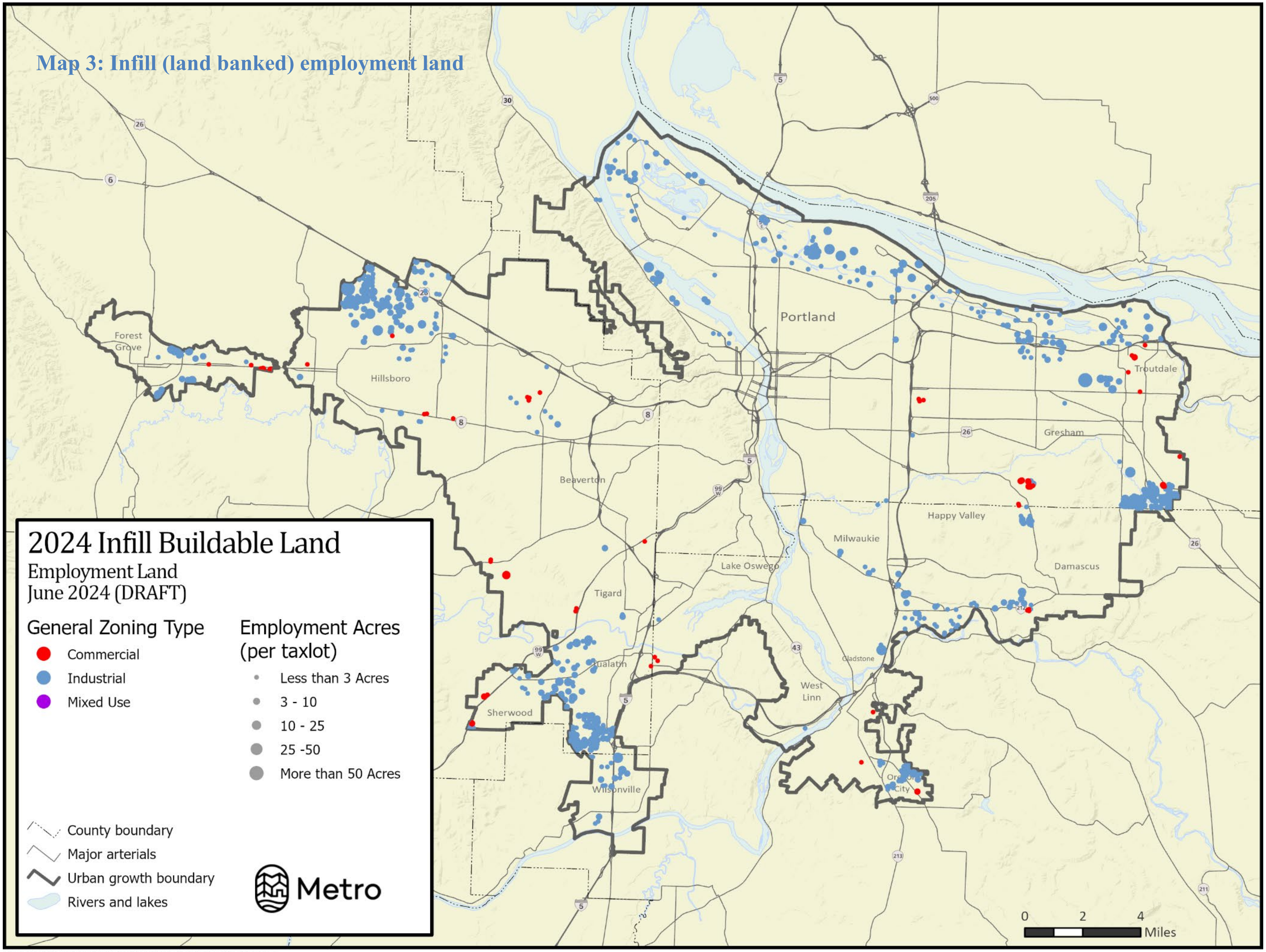

2024 Market Subareas
Employment and Industrial Land
June 2024 (DRAFT)
Center Ring
Inner Ring
Outer Ring
Urban growth boundary
County boundary
Major arterials
Rivers and lakes
Metro
0 2 4 Miles
Portland
CENTRAL
INNER NORTH & EAST
EAST MULTNOMAH
INNER WESTSIDE
OUTER WESTSIDE
OUTER WESTSIDE
INNER I-5
OUTER I-5
OUTER I-5
INNER CLACKAMAS
OUTER CLACKAMAS
OUTER CLACKAMAS
Forest Grove
Hillsboro
Beaverton
Tigard
Lake Oswego
Milwaukie
Happy Valley
Damascus
Gresham
Troutdale
Tualatin
Sherwood
Wilsonville
West Linn
Gladstone
Oregon City

Map 1: vacant employment land



Map saved 6/14/2024 at M:\plan\drc\projects\23021_UGR_2024\Maps\BLI_Report_Maps.aprx

Map 3: Infill (land banked) employment land



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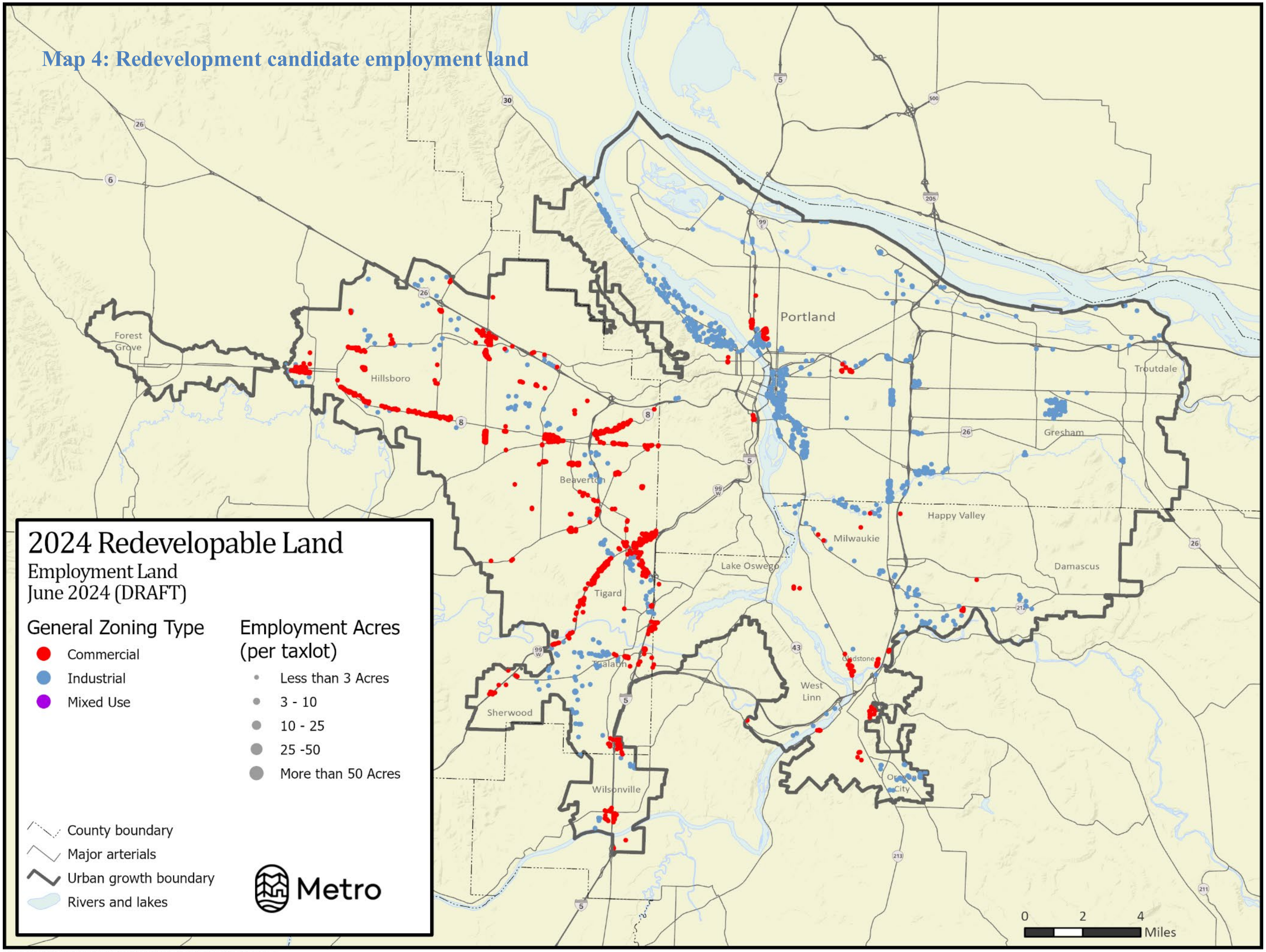
Map 4: Redevelopment candidate employment land



Description of minimum acreage or site configuration characteristics including shape and topography

Table 2: Summary data on acres of buildable employment land inside the Metro urban growth boundary

	Vacant		Infill		Redevelopment		New Urban and Planned		Total	
Market Subarea	Parcels	Acres	Parcels	Acres	Parcels	Acres	Parcels	Acres	Parcels	Acres
Central	**110**	**12.1**			**370**	**4.0**			**480**	**16.1**
Commercial	78	6.7			56	0.8			134	7.5
Industrial	32	5.4			314	3.2			346	8.7
East Multnomah	**348**	**688.5**	**181**	**800.8**	**117**	**17.3**			**646**	**1506.7**
Commercial	226	161.1	18	46.2					244	207.3
Industrial	120	483.8	161	701.6	93	6.3			374	1191.7
Large Lot Industrial	2	43.6	2	53.0	24	11.0			28	107.6
Inner Clackamas	**48**	**9.8**	**9**	**67.6**	**70**	**1.1**			**127**	**78.5**
Commercial	24	1.6			32	0.2			56	1.8
Industrial	24	8.2	9	67.6	38	0.9			71	76.7
Inner I-5	**13**	**1.3**	**1**	**1.3**	**9**	**0.1**			**23**	**2.7**
Commercial	13	1.3			8	0.1			21	1.4
Industrial			1	1.3	1	0.0			2	1.3
Inner North & East	**520**	**493.3**	**105**	**485.4**	**500**	**45.6**	**9**	**65.0**	**1134**	**1089.3**
Commercial	178	9.9	3	4.4	39	0.6			220	14.9
Industrial	336	394.3	96	420.7	458	41.9	9	65.0	899	921.9
Large Lot Industrial	6	89.1	6	60.3	3	3.1			15	152.5
Inner Westside	**149**	**41.4**	**14**	**49.7**	**501**	**29.1**	**1**	**28.0**	**665**	**148.1**
Commercial	126	10.2	5	26.8	446	23.7	1	28.0	578	88.7
Industrial	23	31.2	9	22.8	55	5.4			87	59.4
Outer Clackamas	**271**	**322.2**	**89**	**326.9**	**92**	**6.4**			**452**	**655.4**
Commercial	198	33.2	6	15.2	29	0.8			233	49.2
Industrial	71	275.1	80	295.9	63	5.6			214	576.6
Large Lot Industrial	2	13.9	3	15.7					5	29.7
Outer I-5	**162**	**429.5**	**149**	**682.1**	**183**	**31.2**	**1**	**4.9**	**495**	**1147.6**
Commercial	45	15.8	4	14.6	106	7.9	1	4.9	156	43.2
Industrial	91	325.0	116	526.8	73	18.7			280	870.6
Large Lot Industrial	26	88.6	29	140.6	4	4.6			59	233.8
Outer Westside	**302**	**864.1**	**154**	**985.0**	**398**	**21.5**			**854**	**1870.6**
Commercial	158	48.2	17	39.4	346	12.2			521	99.8
Industrial	126	411.0	131	789.2	51	9.3			308	1209.6
Large Lot Industrial	18	404.8	6	156.3	1	0.0			25	561.1
Grand Total	**1923**	**2862.2**	**702**	**3398.8**	**2240**	**156.3**	**11**	**97.9**	**4876**	**6515.1**

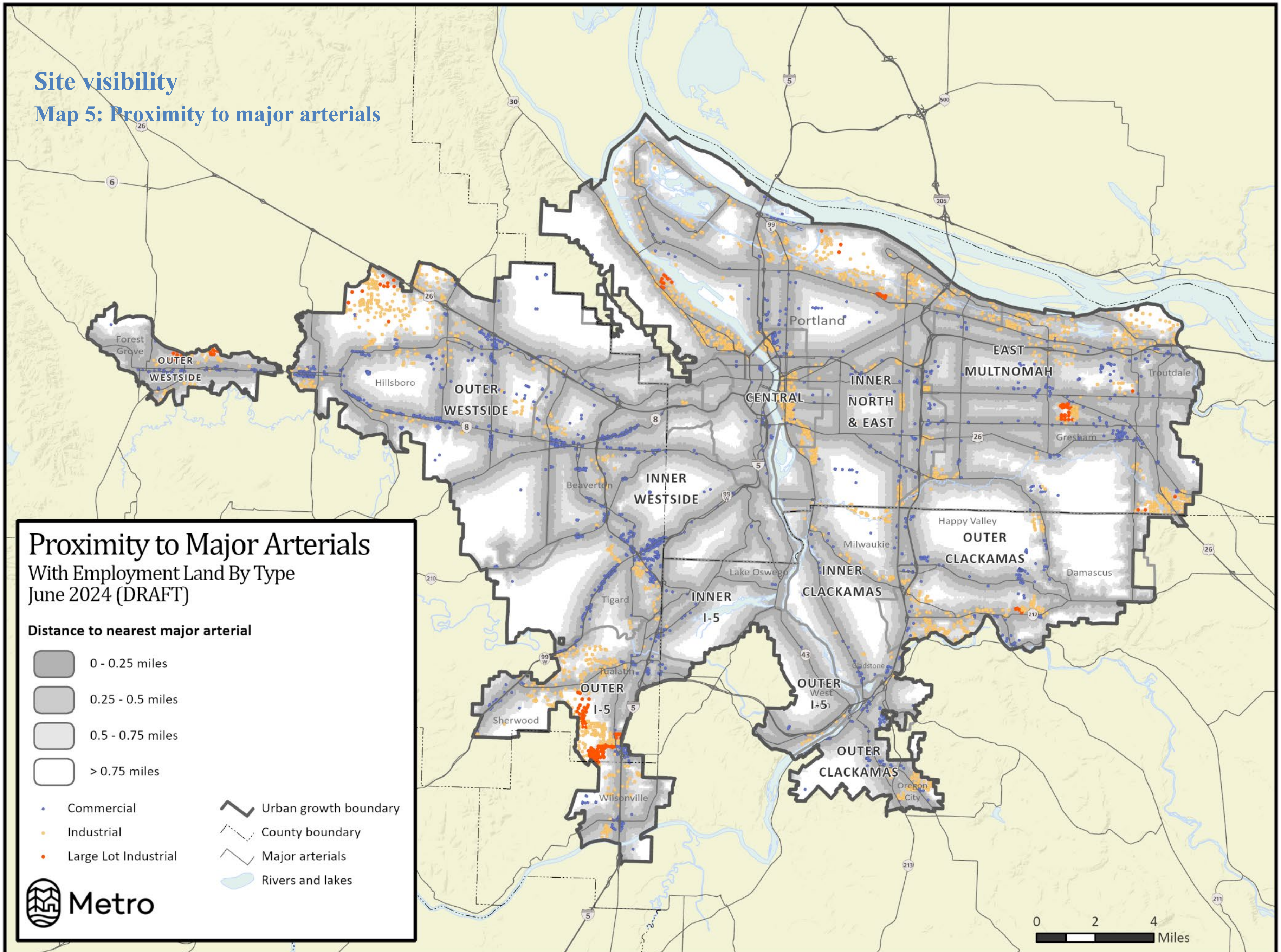
Table 3: average and median parcel sizes for vacant and infill industrial land inside the UGB

	Infill				Vacant				Total			
Row Labels	**Parcels**	**Acres**	**Average Size**	**Median size**	**Parcels**	**Acres**	**Average Size**	**Median size**	**Parcels**	**Acres**	**Average Size**	**Median size**
Industrial	603	2825.9	4.7	2.7	824	1934.2	2.3	0.6	1427	4760.1	3.3	1.6
Large Lot Industrial	46	426.0	9.3	5.0	54	640.1	11.9	3.6	100	1066.1	10.7	4.2
Grand Total	**649**	**3252.0**	**5.0**	**2.8**	**878**	**2574.3**	**2.9**	**0.7**	**1527**	**5826.3**	**3.8**	**1.7**

Note: parcel sizes for large lot industrial lands are for the individual parcels that comprise larger sites

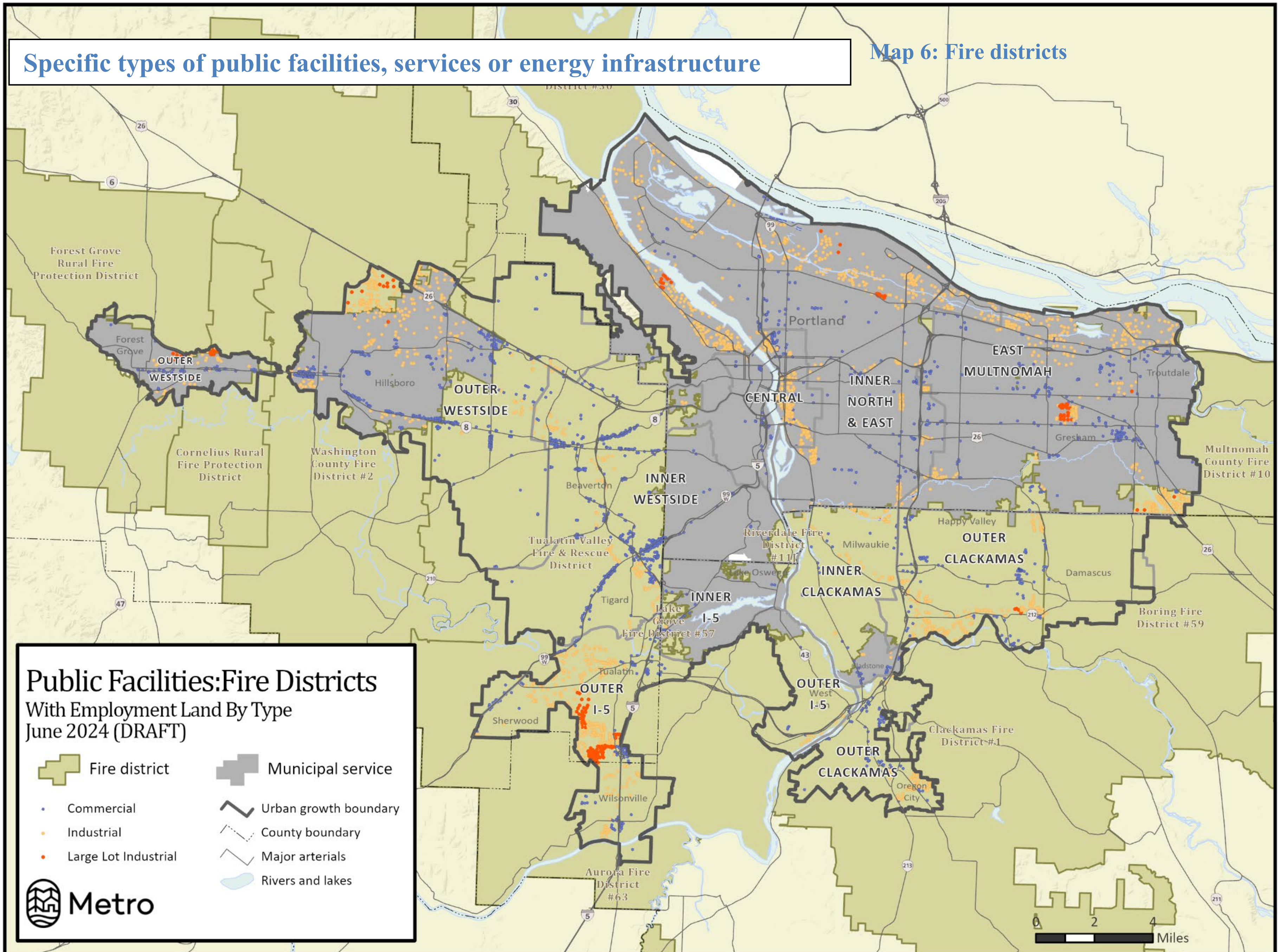
Site visibility

Map 5: Proximity to major arterials

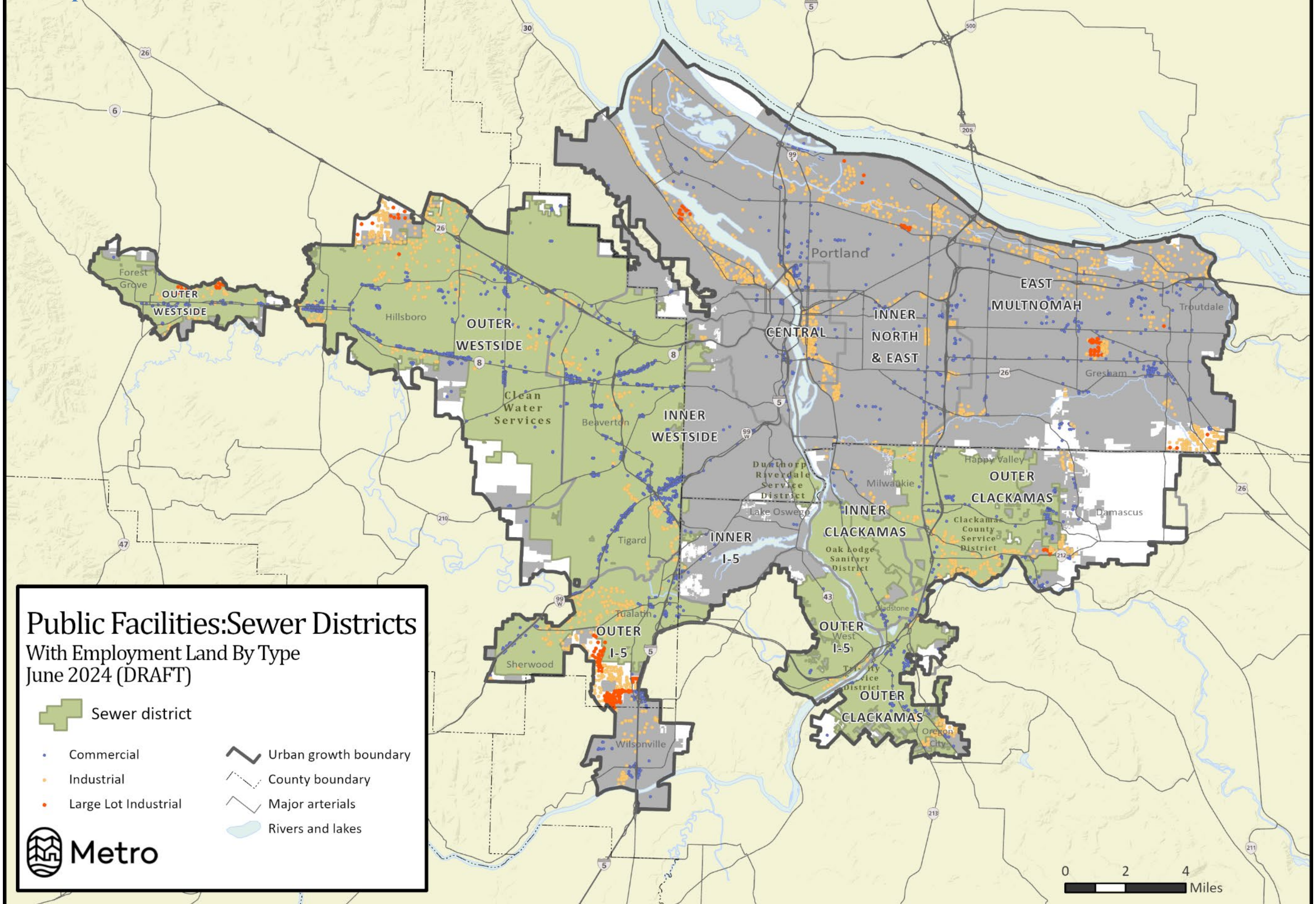


Specific types of public facilities, services or energy infrastructure

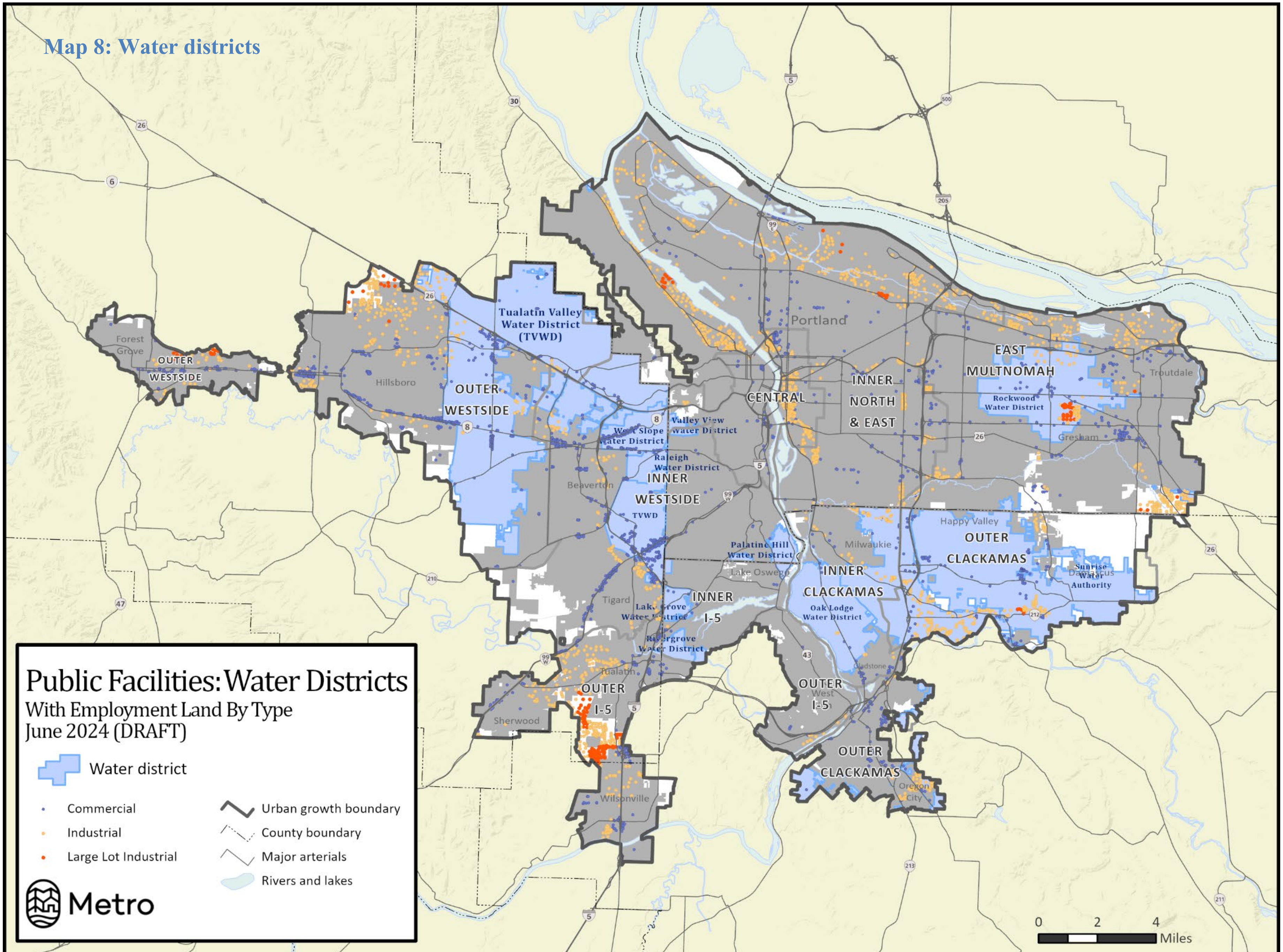
Map 6: Fire districts



Map 7: Sewer districts

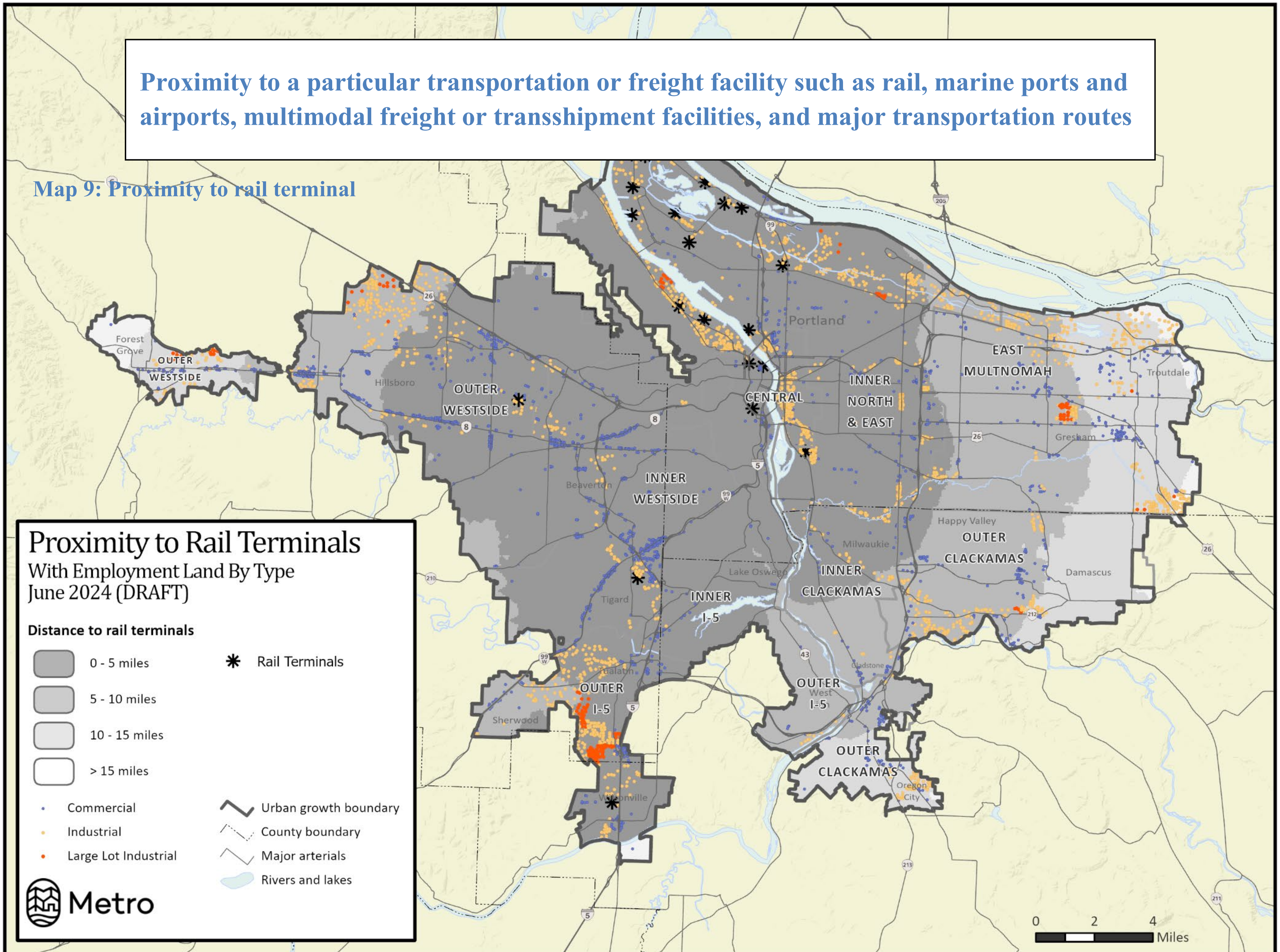


Map 8: Water districts

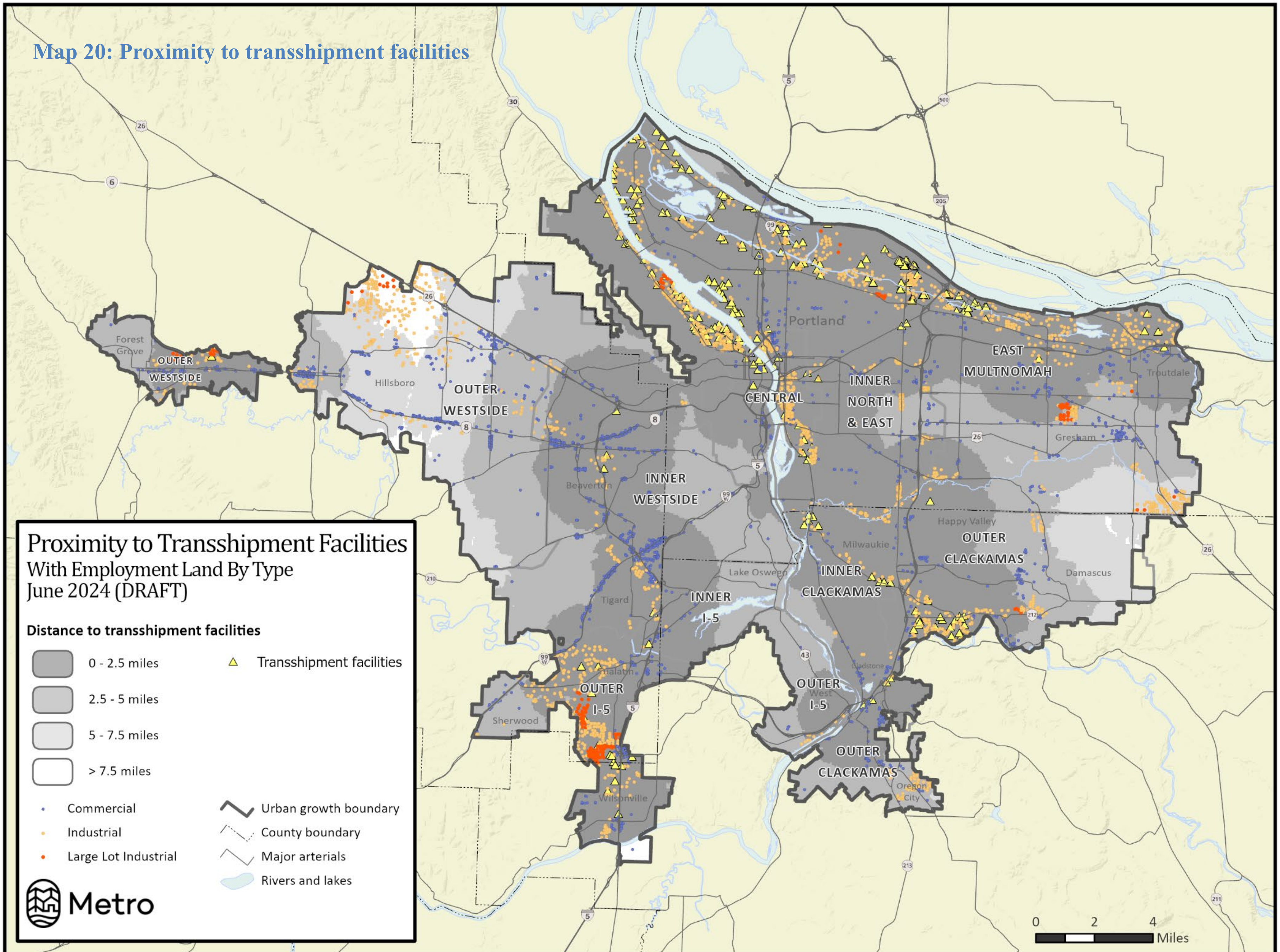


Proximity to a particular transportation or freight facility such as rail, marine ports and airports, multimodal freight or transshipment facilities, and major transportation routes

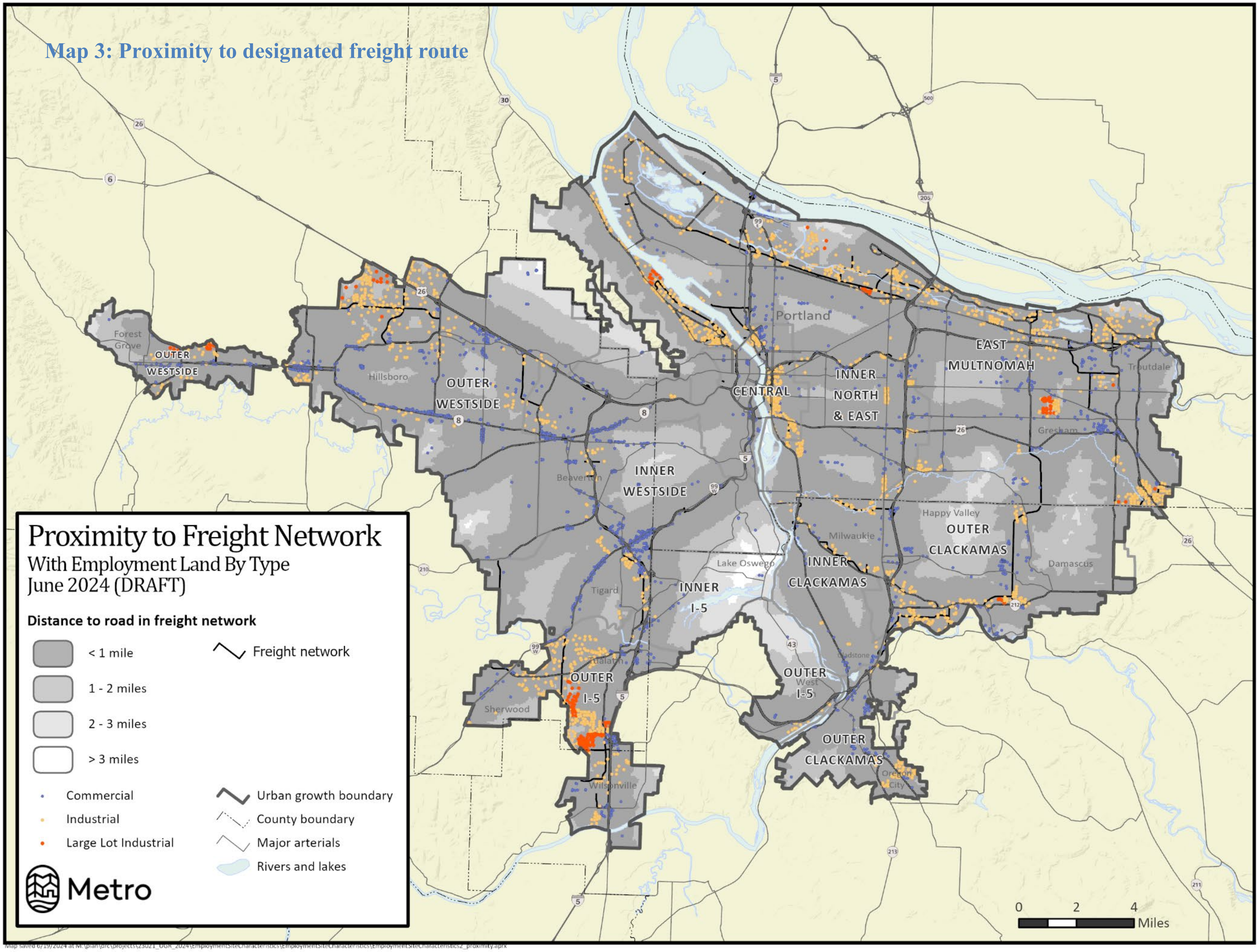
Map 9: Proximity to rail terminal



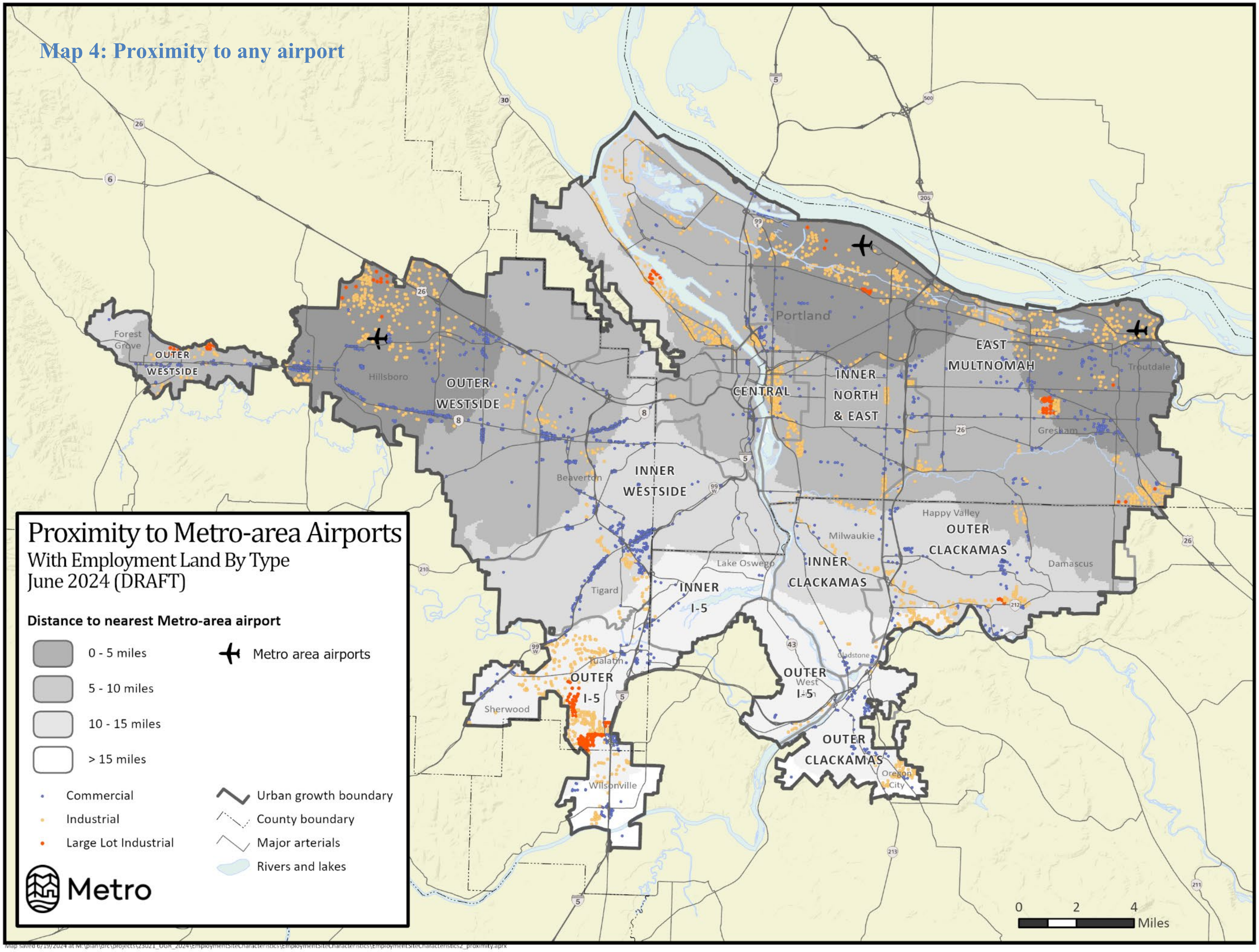
Map 20: Proximity to transshipment facilities



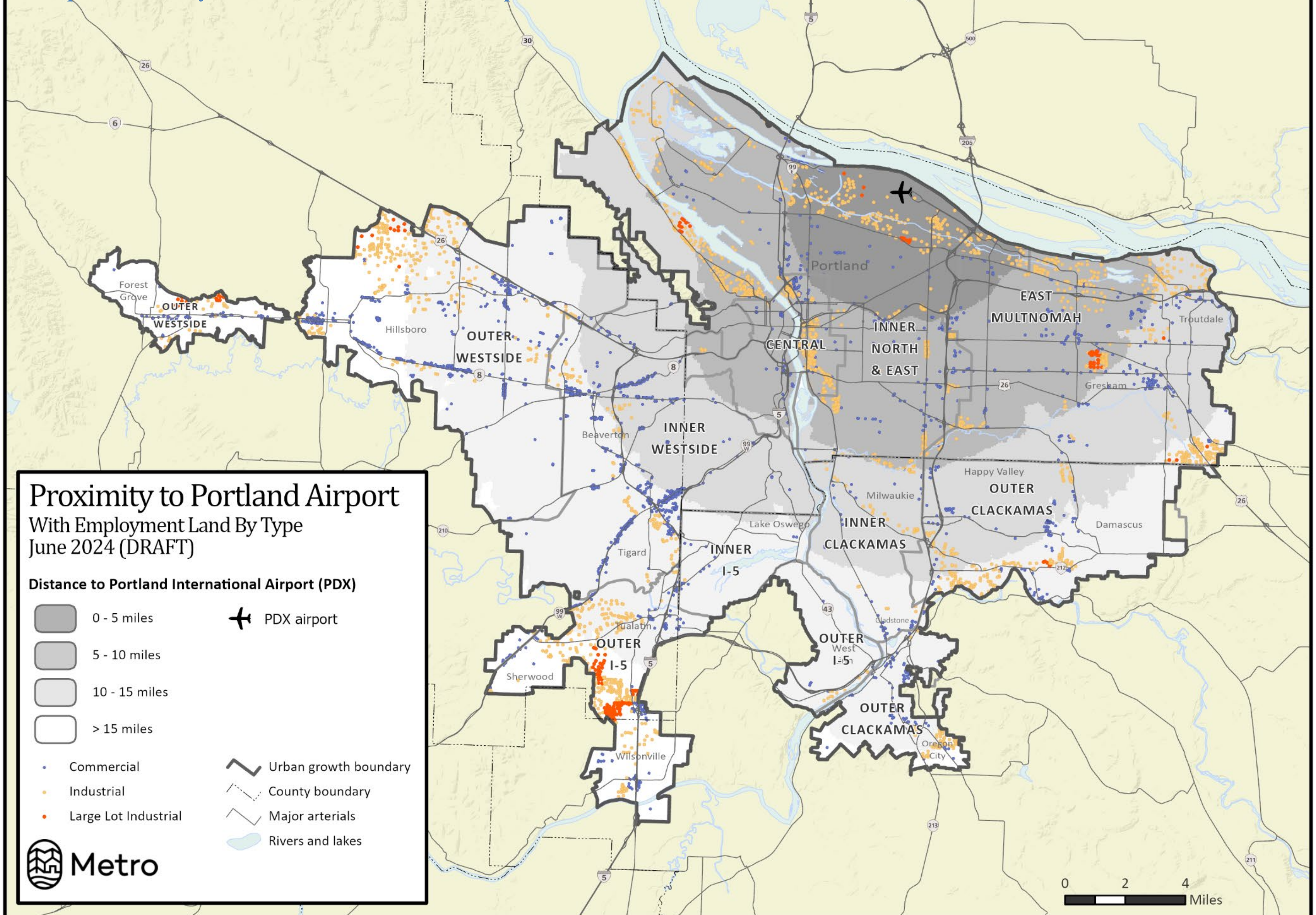
Map 3: Proximity to designated freight route

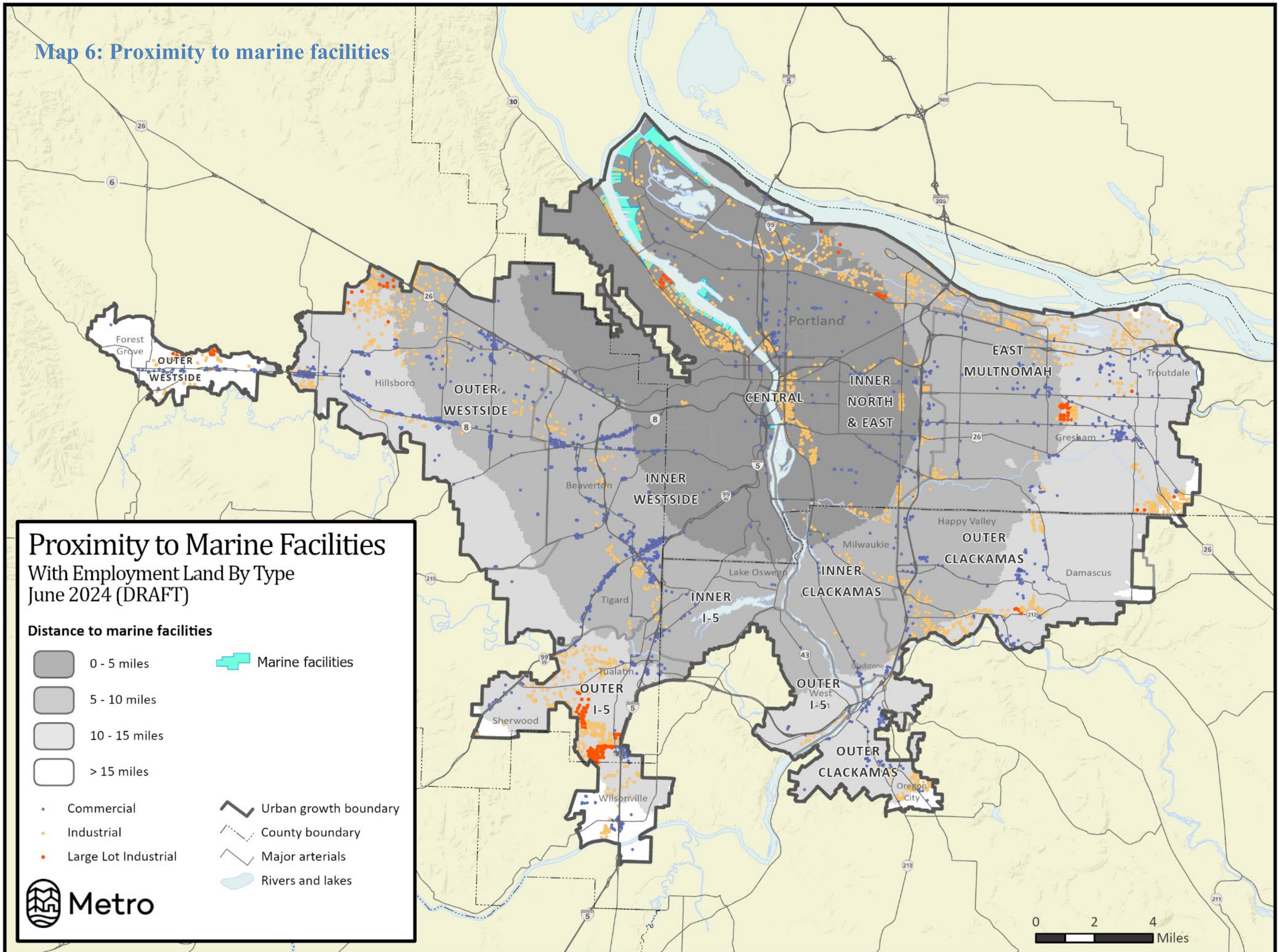


Map 4: Proximity to any airport



Map 5: Proximity to Portland International Airport





Map 6: Proximity to marine facilities
Proximity to Marine Facilities
With Employment Land By Type
June 2024 (DRAFT)
Distance to marine facilities
0 - 5 miles
5 - 10 miles
10 - 15 miles
> 15 miles
Marine facilities
Commercial
Industrial
Large Lot Industrial
Urban growth boundary
County boundary
Major arterials
Rivers and lakes
Metro
Portland
CENTRAL
INNER NORTH & EAST
EAST MULTNOMAH
OUTER WESTSIDE
INNER WESTSIDE
INNER I-5
OUTER I-5
INNER CLACKAMAS
OUTER CLACKAMAS
Forest Grove
Hillsboro
Beaverton
Tigard
Lake Oswego
Milwaukie
Happy Valley
Damascus
Gresham
Troutdale
Tualatin
Sherwood
Wilsonville
West
Oregon City
0 2 4
Miles

Description of any development constraints or infrastructure needs that affect the buildable area of sites in the inventory

The methodology used for the buildable land inventory removes environmentally constrained acres.

Table 4: Environmentally constrained acres removed from buildable land inventory

Market Subarea	Gross Acres	Unconstrained Acres	Constrained Acres
Central	**156.3**	**141.0**	**15.3**
Commercial	44.0	41.2	2.8
Industrial	112.3	99.8	12.5
East Multnomah	**3,103.8**	**2,187.7**	**916.1**
Commercial	386.9	307.4	79.5
Industrial	2,418.7	1,745.4	673.4
Large Lot Industrial	298.1	134.9	163.2
Inner Clackamas	**277.9**	**250.5**	**27.4**
Commercial	18.8	18.2	0.6
Industrial	259.2	232.4	26.8
Inner I-5	**26.6**	**23.2**	**3.3**
Commercial	20.2	18.6	1.6
Industrial	6.3	4.6	1.7
Inner North & East	**4,070.2**	**3,424.1**	**646.1**
Commercial	93.6	80.2	13.4
Industrial	3,638.6	3,077.8	560.8
Large Lot Industrial	338.0	266.1	71.9
Inner Westside	**1,085.6**	**969.3**	**116.4**
Commercial	710.5	625.3	85.2
Industrial	375.1	343.9	31.2
Outer Clackamas	**1,492.2**	**1,201.1**	**291.1**
Commercial	361.0	232.9	128.1
Industrial	1,097.7	934.7	163.0
Large Lot Industrial	33.5	33.5	0.0
Outer I-5	**2,693.9**	**2,263.7**	**430.2**
Commercial	304.8	273.1	31.8
Industrial	1,965.6	1,645.9	319.7
Large Lot Industrial	423.5	344.8	78.8
Outer Westside	**4,635.9**	**4,249.0**	**386.9**
Commercial	793.6	757.4	36.2
Industrial	3,143.2	2,837.3	305.9
Large Lot Industrial	699.1	654.3	44.8
Grand Total	**17,542.4**	**14,709.7**	**2,832.7**

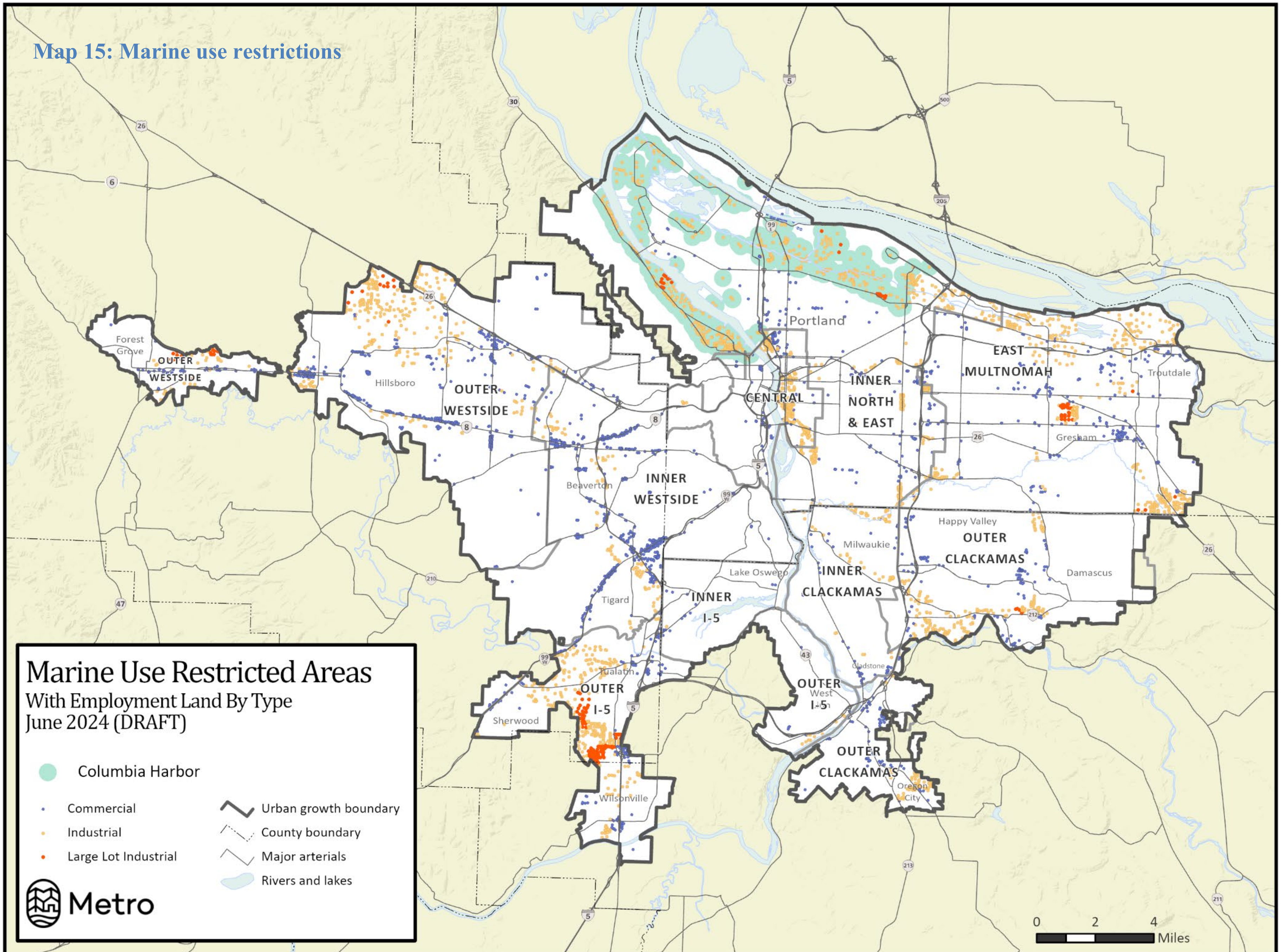
Table 3 describes constraints from slopes. Areas with slopes over 25 percent are removed from the buildable land inventory. For this site characteristics analysis, areas with slopes over 7% are identified.

- Unconstrained: 10% or less of the taxlot has steep slopes
- Partially Constrained: 10.01% to 50% of the taxlot has steep slopes
- Constrained: 50 to 89.99% of the lot has steep slopes
- Heavily Constrained: Greater than 90% of the site has steep slopes

Table 5: Steep (>7%) slope constraints (slopes over 25% are removed from buildable land inventory)

	Unconstrained		Partially Constrained		Constrained		Heavily Constrained		Total	
Market Subarea	Parcels	Acres	Parcels	Acres	Parcels	Acres	Parcels	Acres	Parcels	Acres
Central	**346**	**9.6**	**49**	**2.6**	**52**	**2.3**	**33**	**1.7**	**480**	**16.1**
Commercial	92	5.4	13	1.2	14	0.3	15	0.6	134	7.5
Industrial	254	4.2	36	1.5	38	2.0	18	1.0	346	8.7
East Multnomah	**335**	**481.1**	**180**	**705.6**	**94**	**290.1**	**37**	**29.9**	**646**	**1506.7**
Commercial	163	88.1	37	54.1	23	61.6	21	3.6	244	207.3
Industrial	170	349.4	131	593.2	61	223.7	12	25.4	374	1191.7
Large Lot Industrial	2	43.6	12	58.2	10	4.8	4	1.0	28	107.6
Inner Clackamas	**71**	**4.3**	**30**	**68.7**	**17**	**4.3**	**9**	**1.2**	**127**	**78.5**
Commercial	44	1.2	3	0.0	6	0.5	3	0.0	56	1.8
Industrial	27	3.1	27	68.7	11	3.7	6	1.2	71	76.7
Inner I-5	**13**	**2.0**	**3**	**0.1**	**1**	**0.2**	**6**	**0.4**	**23**	**2.7**
Commercial	12	0.7	3	0.1	1	0.2	5	0.4	21	1.4
Industrial	1	1.3					1	0.0	2	1.3
Inner North & East	**637**	**389.2**	**241**	**605.1**	**124**	**72.6**	**132**	**22.4**	**1134**	**1089.3**
Commercial	146	6.9	26	5.7	17	1.6	31	0.6	220	14.9
Industrial	485	313.7	208	518.3	106	70.2	100	19.7	899	921.9
Large Lot Industrial	6	68.6	7	81.0	1	0.8	1	2.1	15	152.5
Inner Westside	**295**	**52.0**	**196**	**64.6**	**104**	**23.7**	**70**	**7.8**	**665**	**148.1**
Commercial	267	38.7	161	39.5	84	6.2	66	4.3	578	88.7
Industrial	28	13.3	35	25.1	20	17.5	4	3.5	87	59.4
Outer Clackamas	**179**	**232.1**	**133**	**251.9**	**80**	**156.5**	**60**	**14.9**	**452**	**655.4**
Commercial	87	16.1	57	17.5	39	9.9	50	5.7	233	49.2
Industrial	92	216.1	76	234.4	36	117.0	10	9.2	214	576.6
Large Lot Industrial					5	29.7			5	29.7
Outer I-5	**180**	**350.9**	**180**	**504.0**	**95**	**272.5**	**40**	**20.2**	**495**	**1147.6**
Commercial	71	9.0	48	12.5	20	18.2	17	3.4	156	43.2
Industrial	84	244.7	115	437.1	62	177.9	19	10.9	280	870.6
Large Lot Industrial	25	97.2	17	54.4	13	76.3	4	5.9	59	233.8
Outer Westside	**644**	**1318.4**	**158**	**503.5**	**44**	**48.2**	**8**	**0.4**	**854**	**1870.6**
Commercial	428	57.2	68	28.8	20	13.7	5	0.1	521	99.8
Industrial	197	825.2	85	349.8	23	34.3	3	0.3	308	1209.6
Large Lot Industrial	19	436.0	5	124.9	1	0.2			25	561.1
Grand Total	**2700**	**2839.7**	**1170**	**2706.2**	**611**	**870.3**	**395**	**98.9**	**4876**	**6515.1**

Map 15: Marine use restrictions



Map 16: Aviation overlay zones

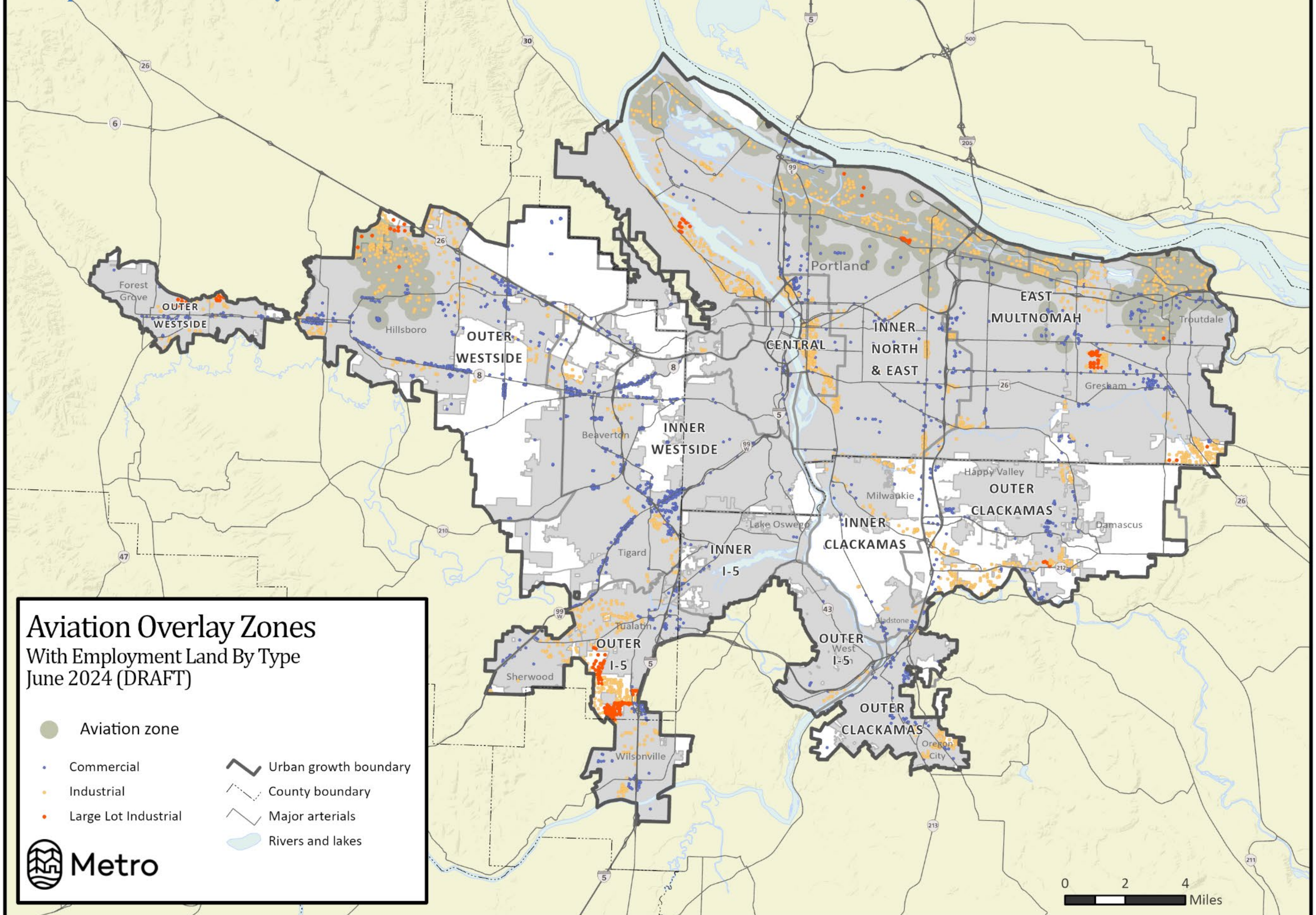
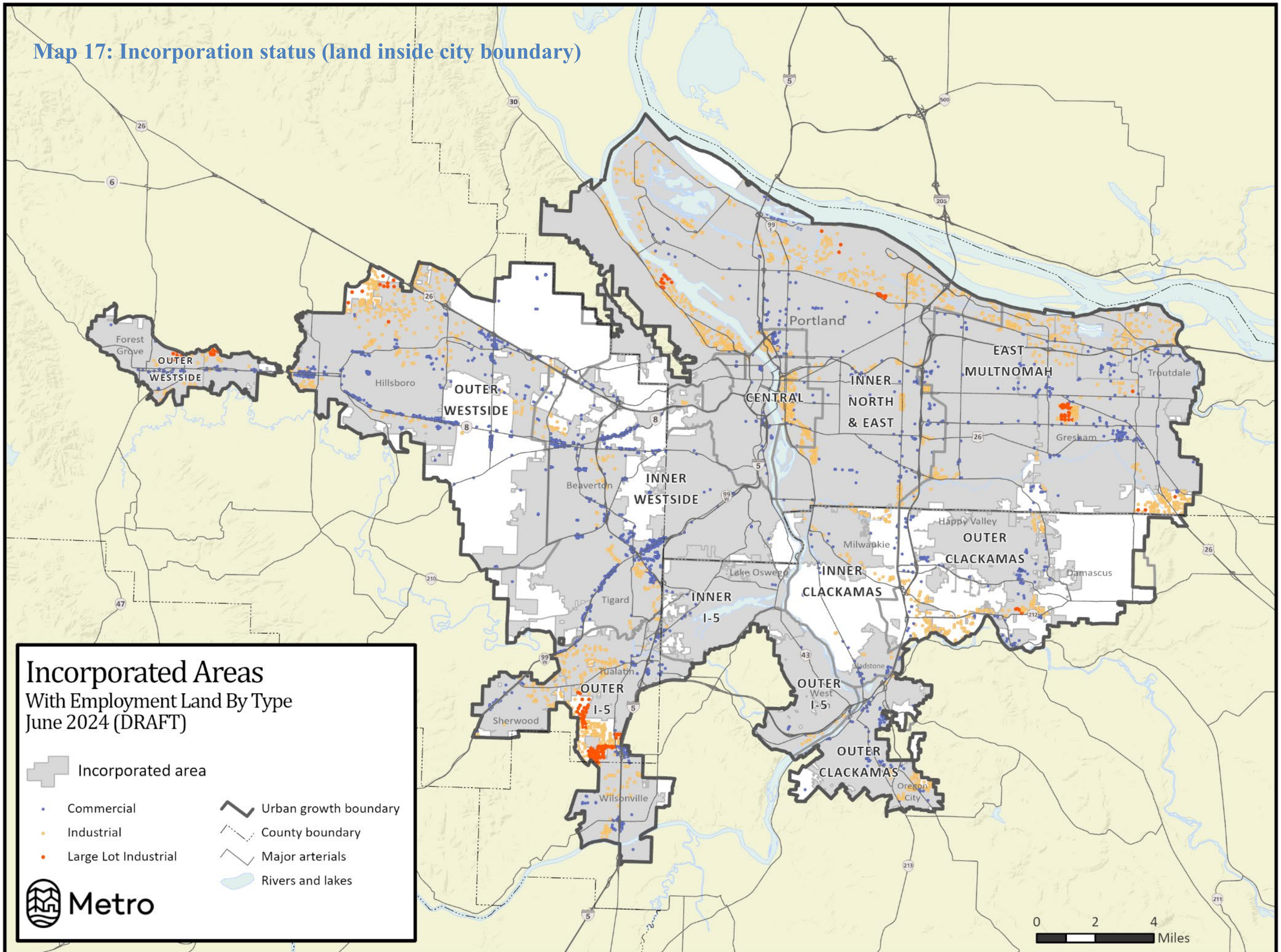


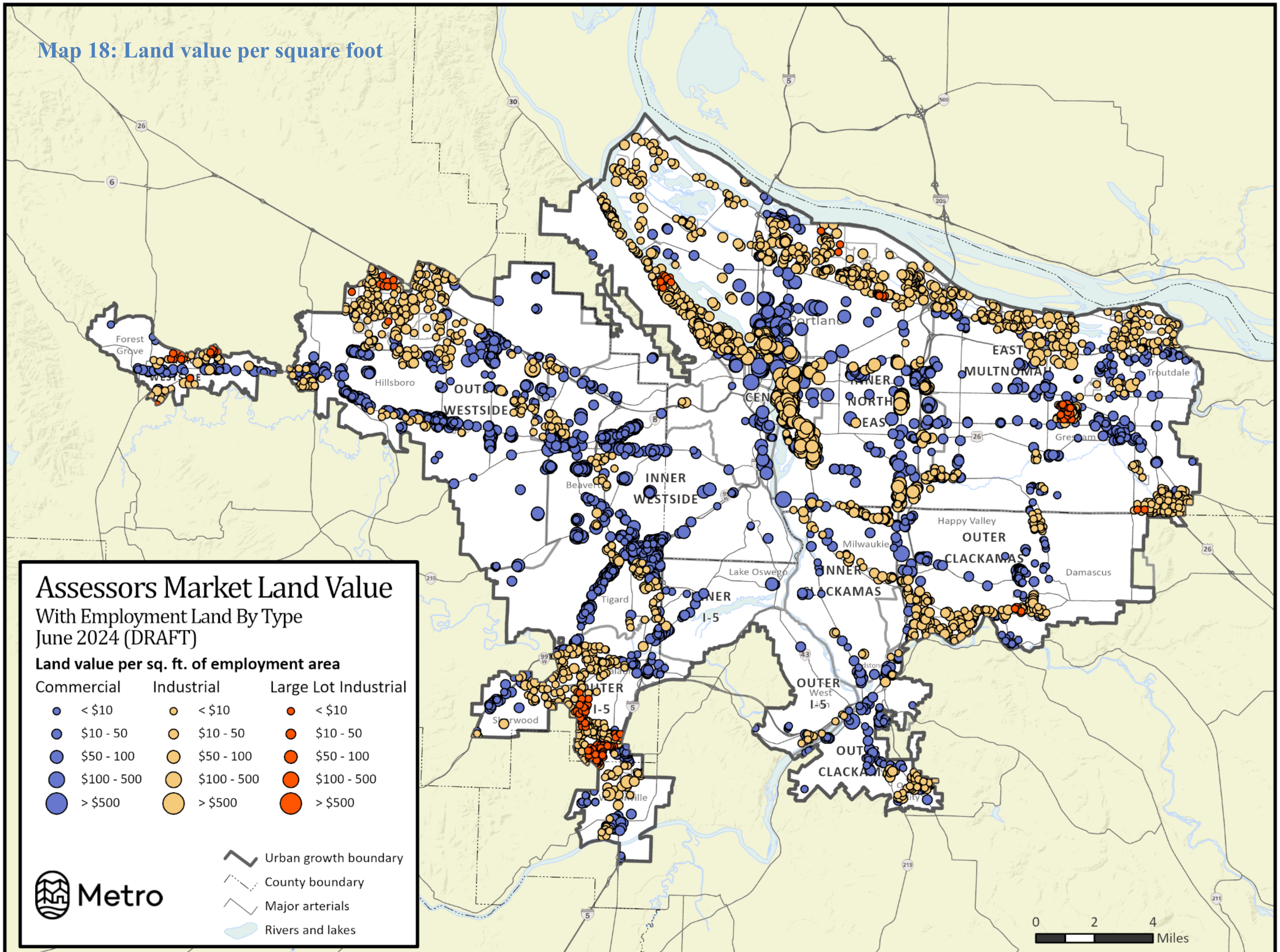
Table 6: Incorporation status (land inside city boundary)

Row Labels	Incorporated Area		Unincorporated Area		Total	
	Parcels	Acres	Parcels	Acres	Parcels	Acres
Central	**480**	**16.1**	**0**	**0.0**	**480**	**16.1**
Commercial	134	7.5			134	7.5
Industrial	346	8.7			346	8.7
East Multnomah	**527**	**1,121.9**	**119**	**384.8**	**646**	**1,506.7**
Commercial	229	162.1	15	45.2	244	207.3
Industrial	273	905.2	101	286.5	374	1,191.7
Large Lot Industrial	25	54.6	3	53.0	28	107.6
Inner Clackamas	**71**	**60.4**	**56**	**18.2**	**127**	**78.5**
Commercial	37	1.0	19	0.8	56	1.8
Industrial	34	59.3	37	17.4	71	76.7
Inner I-5	**22**	**2.7**	**1**	**0.0**	**23**	**2.7**
Commercial	21	1.4			21	1.4
Industrial	1	1.3	1	0.0	2	1.3
Inner North & East	**1,131**	**1,089.3**	**3**	**0.0**	**1,134**	**1,089.3**
Commercial	220	14.9			220	14.9
Industrial	896	921.8	3	0.0	899	921.9
Large Lot Industrial	15	152.5			15	152.5
Inner Westside	**566**	**94.1**	**99**	**54.0**	**665**	**148.1**
Commercial	489	53.4	89	35.3	578	88.7
Industrial	77	40.7	10	18.7	87	59.4
Outer Clackamas	**280**	**444.6**	**172**	**210.8**	**452**	**655.4**
Commercial	182	38.6	51	10.6	233	49.2
Industrial	93	376.4	121	200.2	214	576.6
Large Lot Industrial	5	29.7			5	29.7
Outer I-5	**327**	**551.3**	**168**	**596.3**	**495**	**1,147.6**
Commercial	150	29.4	6	13.8	156	43.2
Industrial	169	495.2	111	375.4	280	870.6
Large Lot Industrial	8	26.7	51	207.1	59	233.8
Outer Westside	**646**	**1,126.6**	**208**	**744.0**	**854**	**1,870.6**
Commercial	409	78.6	112	21.3	521	99.8
Industrial	225	906.6	83	303.0	308	1,209.6
Large Lot Industrial	12	141.4	13	419.8	25	561.1
Grand Total	**4,050**	**4,507.0**	**826**	**2,008.1**	**4,876**	**6,515.1**

Map 17: Incorporation status (land inside city boundary)



Map 18: Land value per square foot



2024 Urban Growth Report

Appendices 7 and 7A: Goal 14 and Metro Code locational factors analysis of urban reserves

The documents are pending and will be released in late August with the Metro Chief Operating Officer recommendations.

APPENDIX 8 – Housing Needs Analysis (HNA)

Background

Detailed household characteristics are needed to forecast housing affordability, the willingness (or ability) of different households to acquire housing, and the tenure and type of housing that each kind of household might consider as a viable housing alternative. The material presented in this appendix offers a high-level overview of the methodology behind the housing needs analysis, including a supportive narrative describing key elements of the regional household forecast. Additional socioeconomic profiles of households are used in this HNA methodology and for the estimation of housing demand required by recent changes in housing statutes. New analytics have been incorporated into the 2024-44 Urban Growth Report (UGR) to meet the new regulatory requirements.

Additional information which specifies the forecasted number of households by household size (i.e., the number of persons in a household); income bracket of the household; and age bracket of the householder (i.e., the age of the head of household as defined by the US Census) are used in formulating the housing demand outlooks for this HNA. Typically, this data is commonly referred to as the Metro HIA forecast, where "H" stands for household size, "I" for income, and "A" for age. The HIA forecast are a series of three-way contingency tables that consist of a cross-classification of the three categorical variables.

We estimate a 2024 base-year of households by HIA, a forecast horizon-year of 2044 and every five years beginning with 2030 through 2050. There are three housing demand outlooks based on the details of the HIA.

The HIA forecast is a product derived from the Metro MSA 2024-44 regional forecast, representing a life-cycle evolution of existing householders as well as the addition of new householders to the region. US Census American Community Survey (ACS) annual regional demographic estimates and ACS Public Use Microsample (PUMS) 2020 5-year estimates of the MSA region are primary sources that inform the details to the socio-economic relationships of members of the households. Metro has been routinely producing the HIA forecast since 1995 for the Regional Transportation Plan (RTP) and travel demand modeling but has only recently in this UGR deployed this information for housing needs analysis.

What's New?

- Oregon HB 2003 (adopted in 2019) – Relevant to Metro's HNA, this bill adds specificity for the household income groups that should be considered when assessing needed housing. It also adds "middle housing" to the list of needed housing types.
- Oregon HB 2001 (adopted in 2019) –This bill fundamentally shifts Oregon's approach to housing planning by requiring cities and counties to allow "missing middle" housing in zones that allow detached single-unit housing.) [This HNA therefore considers an array of possible scenarios that will fundamentally shift the Metro region's mix of future housing.] This bill also requires that Metro estimate existing and future housing. Assessment of existing housing needs (historic underproduction and housing for people experiencing houselessness) is a new provision and is described in more detailed in Appendix 8A.
- The 2024 UGR adds middle housing as another residential archetype in the HNA. The three housing types are 1-unit structures (i.e., single-family detached housing), middle housing (e.g., duplexes, triplexes, quadplexes, townhouses/rowhouses, accessory dwelling units (ADU), and

cottage clusters) (see RLIS meta data for more definitions of each archetypes: https://www.arcgis.com/sharing/rest/content/items/819b261a943b4e5a9a2e60a4be4c19f1/info/metadata/metadata.xml?format=default&output=html)

- Housing Demand: the Metro HIA forecast is used to inform and relate the demand for future housing by rent and price ranges for 5 different household segments based on HUD (Housing and Urban Development) categories of area median income (AMI), i.e., 30% AMI, 30-50% AMI, 50-80% AMI, 80-120% AMI, and over 120% AMI. Demand profiles for affordability and a willingness to pay stem from Metro's HIA forecast by relating selected HIA categories of households by size and income to the 3 housing archetypes in this HNA.
- Housing Supply: the Metro estimate of housing supply (derived from Metro's Buildable Land Inventory – BLI) has been revamped to use a pro forma real estate model to project single family, middle housing, and multifamily housing options (see BLI Appendix for additional details). The pro forma model estimates the highest and best use (HBU) possible for every vacant buildable tax lot and each existing site eligible for redevelopment. Residential types now include middle housing as a development option. Outdated redevelopment assumptions are replaced with the real estate pro forma model and a stabilized set of economic assumptions, evaluating feasible market alternatives and choosing the HBU on only the viable sites. This HNA incorporates this newer data into the capacity estimates to calculate need (i.e., a surplus or deficit).
- Housing Supply Range: this HNA considers alternating development density assumptions and possible end uses in the residential BLI to create a range on the supply-side which can be used in creating a range for the residential gap analysis. A mix of the three housing types is considered which creates a range of housing supply alternatives in addition to other variables.
- New information from Metro's Land Development Monitoring System (LDMS) informs these fundamental shifts in density assumptions from the change in future mixes of shares of housing archetypes. (see Residential Development Indicators Appendix for historical details).
- Housing Demand Range: past UGR's have created a range by assessing the housing demand using roughly 1 (and up to 2) standard deviation(s) from the baseline forecast. The HNA in this 2024 UGR assumes a slightly narrower range – an error band of +/- 20 percent from the baseline forecast of housing demand. Additional forecast range is instilled into the housing demand forecast by varying the housing preferences/choices of future households (i.e., changing the mix/share of single-family detached, middle housing, and multifamily which in itself creates a range of housing need scenarios).

Development of the HIA forecast (methodology overview)

The MSA forecast sets the expectation for the total number of people and households projected in the twenty-year forecast. This is derived as regular output of Metro's regional economic model. More specifically, the derivation of the regional household forecast is a product of a projection of age-specific household headship rates and a population forecast by age cohorts. (For more information about the regional forecast, please see the Regional Economic Forecast appendix.)

Additional information from the Census is folded into the regional MSA forecast to compute the necessary HIA forecast data. There are two main inputs and several key components in each which feed into the generation of the 20-year HIA forecast:

1. Metro MSA forecast:

    a. Population forecast by age
    b. Household forecast by age of householder
    c. Personal income forecast for the region
2. Census ACS data:
    a. H: ACS 1-year, Table B1101 (Households Type by Householder Size)
    b. I: ACS 1-year, Table B19001 (Household Income in the past 12 months, nominal dollars)
    c. A: ACS 1-year, Table B25007 (Tenure by Age of Householder)
    d. IA: ACS 1-year, Table B19037 (Age of Householder by Household Income)
    e. HIA: ACS 2020 PUMS 5-year Table

The HIA forecast is a statistical tabulation which describes future changes in characteristics of households which are key to impacting the taste and preferences of future housing demand. This is shown in a three-variable contingency table or cross-tabulation matrix for the base year (Census year 2020) and future years in 5-year increments. 2024 and 2044 are needed interpolated years for the UGR. These three variables in the contingency table are (H) household size, (I) household income bracket and (A) householder age, hence the name HIA forecast. These variables are known to be highly correlated with housing affordability, willingness/ ability to pay for different forms of shelter, tenure (i.e., own or rent), and structure type size (e.g., single family domiciles or multifamily rental units), as well as other attributes that form individual housing preferences for every subgroup of households.

Current and historical estimates of HIA data can be tabulated from Census PUMS survey data for the Portland MSA, but projections or forecasts are unavailable. However, combining the Metro forecast and current year household characteristics available from the Census allows us to produce the necessary forecast information. The methodology for producing future year HIA contingency tables, i.e. the HIA forecasts, begins with Census HIA data which then extrapolate summary level characteristics of each variable into future years using a statistical technique called "iterative proportional fitting" (IPF) or "matrix scaling." The IPF procedure adjusts (or forecasts) a known distribution from one data set (in our case the HIA base year data given by ACS PUMS) using (sub)totals reported in another data set (in our case it is the Metro regional forecast).

A table nearby illustrates the categories for household size, income and age. The reader should note that these are not the HIA tables. They are merely summary tabulations of the more complex statistical tables.

Household Size Categories (excludes pop in GQ)

	1 person	2-person	3-person	4-person	5 or more		average HH size
2020	27.2%	36.0%	15.4%	12.9%	8.5%	100.0%	2.52
2030	30.1%	35.8%	16.5%	12.5%	5.1%	100.0%	2.32
2040	31.3%	35.6%	16.9%	12.4%	3.9%	100.0%	2.25
2050	32.0%	35.5%	17.1%	12.2%	3.1%	100.0%	2.21

Household Income Brackets

	under $15,000	$15,000 - $24,999	$25,000 - $34,999	$35,000 - $49,999	$50,000 - $74,999	$75,000 - $99,999	$100,000 - $149,999	$150,000 and over	
2020	7.5%	5.9%	6.6%	10.3%	16.8%	13.8%	19.1%	20.0%	100.0%
2030	8.3%	6.9%	7.5%	11.5%	16.1%	12.7%	18.1%	19.0%	100.0%
2040	8.6%	7.4%	7.9%	12.1%	15.9%	12.2%	17.7%	18.4%	100.0%
2050	8.8%	7.6%	8.1%	12.4%	15.7%	11.9%	17.4%	18.1%	100.0%

Household Age Brackets (Head of Household)

	under 25	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75 to 84	85 & over	
2020	3.3%	16.9%	19.9%	17.9%	17.8%	15.0%	6.6%	2.6%	100.0%
2030	3.3%	14.1%	18.5%	18.2%	16.7%	14.8%	10.2%	4.4%	100.0%
2040	3.4%	13.3%	16.6%	17.6%	17.3%	15.0%	10.9%	6.0%	100.0%
2050	3.3%	12.6%	15.5%	16.6%	17.3%	15.8%	11.8%	7.3%	100.0%

Figure 1: Truncated summary tables of the three variables contained in the HIA forecast for the Portland MSA (note: not HIA contingency tables)

The table set, above, tabulate the subtotals reported from the Metro HIA forecast. The standard HIA forecast includes 5-year forecast increments, beginning in 2020. HIA data are interpolated for the base year and the twenty-year forecast (i.e., 2024 and 2044) for this UGR. The tables are expressed as percentages of total households so the reader may see how the marginal distributions of each data concept changes over time. (The figures may be reverted to the original set of numbers by multiplying the share in each by the number of total households in each year.)

A household consists of related or unrelated individuals residing in the same domicile. In general, the average household size in the MSA is expected to lower incrementally each year in the forecast, declining from a regional average of 2.5 persons per household in 2020 to 2.2 persons per household in 2050. This is consistent with our expectation of fewer births and a rising number of families delaying child rearing until they are older. Most households are made up of a single person or a couple, with a plurality being a two-person household. It is also notable that the MSA forecast anticipates a much steeper drop off in larger families (i.e., households of 5 or more people).

The nearby table also shows income brackets of households delineated per US Census categories. The Census data differ from HUD income brackets as HUD (Housing and Urban Development) shows data for family income brackets as percentile of area median income statistics by persons in a family, a somewhat different measurement than what is provided by Census data for the region. The Census household income brackets can be raked up or down to approximate the area median income limits prescribed by HUD. (This is done in a later step in the methodology.) Census delineation fit with our methodology for forecasting households and income brackets. The IPF approach is the chosen method we use to forecast future HIA data for the region.

The HIA forecast of real income (set at year 2020 purchasing power) for households making less than $50,000 shows the number of households in the 4 lowest income brackets, rising in this forecast, with the share of households in 2020 at 30.3% and creeping higher to 36.9% by 2050. The average household income of the richest income bracket (i.e., $150,000 and over) is calculated at $870,300 and rising to $1.3 million by 2050. Please note that this is an average for just the highest Census income bracket and since it is an average is distorted by very high earners; a median value for this bracket would be more representative, but we are unable to calculate that statistic because of the confidential nature imposed on Census information. Without being accused of being too pedantic, we note that since the share of lower income households is on the rise, then the share of higher income households is necessarily on the decline and to the degree to which some in this subset are very high earners it does indeed distort the perception of average wealth for the highest income earners in the highest bracket.

It has been widely noted that population growth is slowing and that the median age of people residing in the MSA is on the rise. Reflective of this aging demographic trend, the share of householders in the MSA in retirement and post-retirement age cohorts is on the rise too. In 2020, fewer than 1 in 4 households were in these two retirement-age cohorts. By 2050, the share of older householders is expected to grow to over 1 in 3, more than a 10-percentage point swing higher.

The full HIA contingency tables are much too large and complex to be shown in a printed appendix. Instead, we offer a stylized illustration of what an HIA forecast might look like. In this illustration, it represents a table of households for 8 income bracket and 5 household sizes and for 5 different household age cohorts.

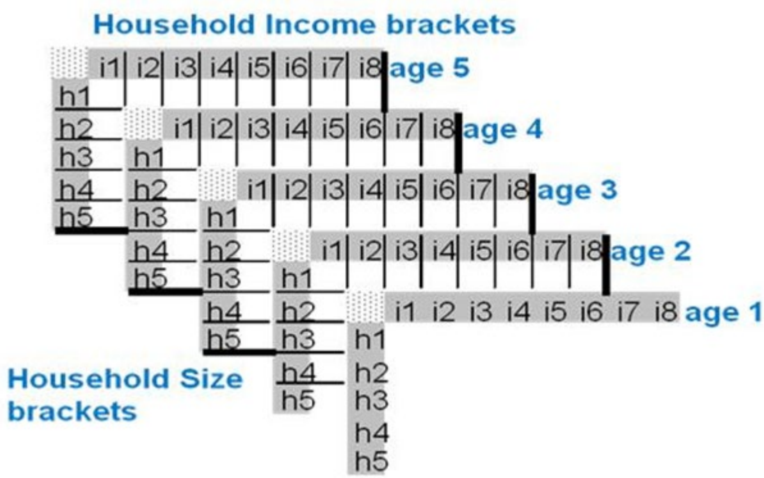


Figure 2: Truncated illustration of the HIA contingency table for a single forecast year.

Projecting Housing Demand from the HIA forecast (methodology overview)

Census data is the foundation by which Metro projects the HIA forecast and housing demand. Some definitional adjustments in the Census data are required to harmonize with state regulations which rely on HUD income limits to prescribe needed housing. Initial projections of housing demand are based on households assumed to spend a certain percent of their income on shelter costs using current trend information. Scenarios or alternative growth projections on housing demand will assume to alter these current trends.

Forecast steps of projecting household HIA brackets into initial housing demand:

1. Collect the HIA brackets of household size and age into household life stages
2. Divide the number of households in the region into the separate life stages (from step 1) and estimate the likely tenure of each (i.e., rent or own)
3. Split and combine the real household income bracket projections (Census definitions) to HUD's AMI limits
4. Reconcile the life stages and household income brackets with HUD AMI limits (from step 2 and 3)
5. Summarize the historical affinity of renters to affordable housing choices (i.e., market rate housing vs. subsidized housing final demand forecast) (from step 4)
6. Summarize the historical affinity of owners to affordable housing choices (i.e., market rate vs. subsidized housing choices final demand forecast) (from step 4)
7. Assign historic structure type preferences by tenure, life cycle and HUD AMI income groups (initial baseline derivation from historic final demand data) (from step 5 and 6)
8. Alter future preferences (create alternate scenarios of housing available) subject to current and expected regulatory production limits (i.e., availability of buildable supply, type of housing entitlements, i.e., zoning codes, and state/ Metro land use regulations). This step alters the historic structure type preferences (in step 7) to meet anticipated entitlement regulations, the state's Metropolitan housing rule (i.e., at least 50% multifamily or attached housing), and state housing regulations requiring allowances for middle housing.

Household Life Stage Assumptions

The HIA forecast underlies the tabulation of households into separate life cycle stages. The HIA data is a tabular array of 5 household size brackets (1-person to 5 or more person households), 8 income brackets (constant 2020 dollar purchasing power), and 5 age brackets. The cross-tabulation of these household characteristics creates a data array of 320 unique household types (320 = 5 x 8 x 5). Each of the 320 household types will have varying degrees of affinity to tenure and structure type, which we call preferences. The majority preference type for each individual housing type, though unique, are not so different that they can't be simplified and summarized by life cycle. The methodology exploits our understanding of the usual aging process of households and the adjacency of HIA categories that share nearly the same degree of and life cycle characteristics in order to streamline both the concept and the actual computational load of estimating and forecasting housing preferences.

HIA household characteristics

household sizes	income brackets	age brackets
1-person	under $15,000	under 25 years old
2-person	$15,000 - $24,999	25 to 44 years old
3-person	$25,000 - $34,999	45 to 54 years old
4-person	$35,000 - $49,999	55 to 64 years old
5 or more	$50,000 - $74,999	65 years or older
	$75,000 - $99,999	
	$100,000 - $149,999	
	$150,000 and over	

Figure 3: Definition of the HIA household and individual attribute levels

The close affinities of some household types and the historic majority preferences of these similar household types are streamlined (i.e., collapsing of categories) by household size, age and other life cycle considerations into just seven life cycle cohorts. Naming of the seven life cycle cohorts are shown in a nearby table. Interpolation of the HIA income brackets is then computed, splitting and rearranging the Census derived income brackets to better match to latter calculation of households by HUD AMI limits. Conceptually, the HIA household forecast reveals the aging of households and the alterations we anticipate happening to them as they age through the various life stages. We show the Metro MSA changes to these life cycles in a nearby table which has households as percentage shares of the entire region.

Base year, 2024 Life Cycle of Households in the MSA

2024: MSA estimate = 1,073,400 total households

Income Category	Young Households, under 25 years old	Adults 25-44 without kids	Families 25-44 with kids	Single adults, 45-64	Adults 45-64 in 2+ person household	Older (65+) single adult household	Older (65+) couples and multigenerational households	Total
< $20K	0.6%	1.5%	1.0%	2.3%	1.2%	3.7%	0.8%	**11.2%**
$20K to $39K	0.7%	1.9%	1.9%	1.8%	1.9%	4.1%	1.9%	**14.2%**
$40K to $59K	0.7%	2.6%	2.2%	1.6%	2.6%	2.1%	2.6%	**14.4%**
$60K to $99K	0.7%	4.8%	4.1%	1.8%	5.2%	1.8%	4.1%	**22.5%**
$100K to $149K	0.3%	3.7%	3.8%	0.9%	6.2%	0.7%	2.9%	**18.4%**
$150K to $199K	0.03%	1.6%	2.0%	0.4%	3.6%	0.2%	1.3%	**9.2%**
≥ $200K	0.05%	1.2%	2.4%	0.3%	4.6%	0.3%	1.2%	**10.1%**
Total	**3.2%**	**17.2%**	**17.4%**	**9.1%**	**25.4%**	**12.8%**	**14.8%**	100%

Figure 4: Tabulation of 2024 MSA HIA estimate by life cycle

Forecast, 2044 Life Cycle of Households in the MSA

2044: MSA forecast = 1,276,900 total households

Income Category	Young Households, under 25 years old	Adults 25-44 without kids	Families 25-44 with kids	Single adults, 45-64	Adults 45-64 in 2+ person household	Older (65+) single adult household	Older (65+) couples and multigenerational households	Total
< $20K	0.7%	1.3%	0.9%	2.5%	1.3%	4.7%	1.0%	**12.4%**
$20K to $39K	0.8%	1.7%	1.7%	1.8%	2.1%	5.2%	2.5%	**15.7%**
$40K to $59K	0.8%	2.3%	1.9%	1.7%	2.7%	2.6%	3.2%	**15.1%**
$60K to $99K	0.7%	3.8%	3.3%	1.7%	5.0%	2.0%	4.6%	**21.0%**
$100K to $149K	0.3%	3.1%	3.1%	0.8%	6.1%	0.8%	3.4%	**17.6%**
$150K to $199K	0.03%	1.3%	1.7%	0.4%	3.6%	0.2%	1.5%	**8.7%**
≥ $200K	0.04%	1.0%	2.0%	0.3%	4.5%	0.3%	1.4%	**9.5%**
Total	**3.3%**	**14.5%**	**14.4%**	**9.1%**	**25.2%**	**15.9%**	**17.5%**	100%

Figure 5: Tabulation of 2044 MSA forecast by HIA households by life cycle.

The two tables succinctly illustrate the distributional changes we anticipate in the composition and types of households between 2024 and 2044. As a household's age, income, and the number of dependents changes for a household, the household moves from one phase into another. The housing affinity, that is the preference to own or rent and the type and size of a structure, is determined by these characteristics and then altered as events in a household adjust to new additions or subtractions within the household. As households age, these changes could be brought about by having more/less income, more/fewer individuals add/subtracted to/from the household, and the inevitable aging of the household. Through different life stages, we can approximate the housing preferences of the region, at least an initial baseline determined by historical data and observed final demand statistics.

Tenure calculations and assumptions

A projected shift in tenure is thus produced by the underlying HIA forecast. The tenure rate assumption for households residing in the MSA in 2024 is estimated at 61% owners and 39% renters. These rates are projected to change in 2044 to be 62% owners and 38% renters. This is a relatively small change in projected tenure and will likely induce only a small shift in future housing preferences, other things being equal. The alteration in tenure splits is due primarily to the underlying shift implied by the demographics and socioeconomic projections embedded in the HIA forecast. However, this mild conclusion is before housing regulations and the availability of housing supplies are considered. The shift in the final demand of housing preference will likely be altered considerably when preferences are balanced against available housing supply and prevailing housing regulations.

Among renters we see a greater proportion that are in the lower income brackets. Those earning below $60,000 dollars in 2024 represent 57% of households that rent. In 2044, that share edges higher to 60.7% of renters. Nearly half of all renters in 2024 are between the ages of 25 and 44, with or without kids. In 2044, the share of renters between the ages of 25 and 44 slips lower to 41.6% from 47.9% of all renters.

Base year (2024) and Forecast (2044): Households by Life Cycle and HUD AMI limits

Renters, 2024

	Renters							
Income Category	**Young Households, under 25 years old**	**Adults 25-44 without kids**	**Families 25-44 with kids**	**Single adults, 45-64**	**Adults 45-64 in 2+ person household**	**Older (65+) single adult household**	**Older (65+) couples & multigenerational households**	**Total, renters in 2024**
< $20K	1.6%	3.2%	2.1%	4.1%	1.7%	5.3%	0.6%	18.6%
$20K to $39K	1.8%	4.0%	4.0%	2.8%	2.3%	4.4%	0.9%	20.3%
$40K to $59K	1.8%	5.4%	3.5%	1.9%	2.5%	1.9%	1.0%	18.0%
$60K to $99K	1.7%	8.6%	4.9%	1.7%	3.9%	1.4%	1.1%	23.3%
$100K to $149K	0.7%	5.0%	3.0%	0.6%	3.0%	0.5%	0.5%	13.3%
$150K to $199K	0.04%	1.9%	0.7%	0.2%	0.7%	0.0%	0.2%	3.8%
≥ $200K	0.1%	1.1%	0.5%	0.2%	0.5%	0.2%	0.2%	2.7%
Total	**7.6%**	**29.2%**	**18.7%**	**11.6%**	**14.7%**	**13.7%**	**4.5%**	**100.0%**
							% all renters in 2024:	39%

Renters, 2044

	Renters							
Income Category	**Young Households, under 25 years old**	**Adults 25-44 without kids**	**Families 25-44 with kids**	**Single adults, 45-64**	**Adults 45-64 in 2+ person household**	**Older (65+) single adult household**	**Older (65+) couples & multigenerational households**	**Total, renters in 2044**
< $20K	1.7%	2.9%	1.9%	4.5%	1.8%	6.9%	0.8%	20.6%
$20K to $39K	2.0%	3.8%	3.6%	2.8%	2.6%	5.8%	1.2%	21.8%
$40K to $59K	1.9%	4.9%	3.1%	2.1%	2.6%	2.4%	1.3%	18.3%
$60K to $99K	1.7%	7.1%	4.0%	1.6%	3.8%	1.6%	1.3%	21.0%
$100K to $149K	0.7%	4.3%	2.6%	0.6%	3.0%	0.5%	0.6%	12.3%
$150K to $199K	0.04%	1.6%	0.6%	0.2%	0.7%	0.0%	0.2%	3.5%
≥ $200K	0.1%	0.9%	0.4%	0.1%	0.5%	0.2%	0.2%	2.5%
Total	**8.1%**	**25.4%**	**16.1%**	**12.0%**	**15.2%**	**17.5%**	**5.6%**	**100.0%**
							% all renters in 2044:	38%

Figure 6: renter households in 2024 and 2044

Owners, 2024

	Owners							
Income Category	**Young Households, under 25 years old**	**Adults 25-44 without kids**	**Families 25-44 with kids**	**Single adults, 45-64**	**Adults 45-64 in 2+ person household**	**Older (65+) single adult household**	**Older (65+) couples & multigenerational households**	**Total, owners in 2024**
< $20K	0.1%	0.4%	0.3%	1.1%	0.9%	2.7%	0.9%	6.4%
$20K to $39K	0.1%	0.5%	0.5%	1.2%	1.6%	3.9%	2.6%	10.3%
$40K to $59K	0.1%	0.7%	1.3%	1.4%	2.6%	2.2%	3.6%	12.0%
$60K to $99K	0.1%	2.3%	3.6%	1.9%	6.1%	2.0%	6.0%	22.0%
$100K to $149K	0.1%	2.9%	4.2%	1.0%	8.3%	0.8%	4.4%	21.7%
$150K to $199K	0.02%	1.4%	2.9%	0.5%	5.5%	0.3%	2.0%	12.6%
≥ $200K	0.04%	1.3%	3.7%	0.5%	7.3%	0.4%	1.8%	14.9%
Total	**0.4%**	**9.5%**	**16.6%**	**7.5%**	**32.4%**	**12.3%**	**21.4%**	**100%**
							% all owners in 2024:	61%

Owners, 2044

	Owners							
Income Category	**Young Households, under 25 years old**	**Adults 25-44 without kids**	**Families 25-44 with kids**	**Single adults, 45-64**	**Adults 45-64 in 2+ person household**	**Older (65+) single adult household**	**Older (65+) couples & multigenerational households**	**Total, owners in 2044**
< $20K	0.1%	0.3%	0.3%	1.2%	0.9%	3.3%	1.1%	7.3%
$20K to $39K	0.1%	0.5%	0.4%	1.1%	1.7%	4.9%	3.3%	12.0%
$40K to $59K	0.1%	0.6%	1.1%	1.4%	2.7%	2.7%	4.4%	13.1%
$60K to $99K	0.1%	1.8%	2.8%	1.7%	5.7%	2.2%	6.7%	21.0%
$100K to $149K	0.1%	2.3%	3.4%	1.0%	8.0%	0.9%	5.1%	20.8%
$150K to $199K	0.02%	1.2%	2.3%	0.4%	5.4%	0.3%	2.3%	12.0%
≥ $200K	0.04%	1.0%	2.9%	0.4%	7.0%	0.4%	2.1%	13.9%
Total	**0.4%**	**7.7%**	**13.3%**	**7.3%**	**31.4%**	**14.9%**	**24.9%**	**100%**
							% all owners in 2044:	62%

Figure 7: owner households in 2024 and 2044

Of the 6 in 10 households that choose to own, those having income below $60,000 represent 28.7% of households that own their own home in 2024. This share in 2044 edges a bit higher to 32.3% of owners in the future. Young adult households (below 45 years of age) have a lower propensity to own, which is understandable because housing prices are very high relative to their generally lower earning potential. As householders exceed 45 years old, the propensity to own is considerably higher. Older households are more likely to include more people in them (i.e., more dependents), have greater earning potential, more accumulated wealth and thus have a greater affinity to own.

Income and Housing Affordability

Housing is essential and everyone should have a place to live, but housing is also a scarce resource. Supply and demand determine the price of housing. Those with more income generally buy more housing than those with less. Households who can't afford to buy tend to rent. This is borne out in Census data which was discussed in a previous section.

There is also a phenomenon that wealthier households generally spend less of their income on housing. This is true with other goods too. The logic behind this becomes clear when one considers that households, despite having more income, will limit their housing expenditure when their need for housing becomes sated. Regardless of wealth, a household can only consume a limited amount of housing before the marginal propensity to consume more housing soon hits its limit and encounters diminishing returns/ benefits.

The percent of income spent on housing varies by tenure, household income, and life cycle (a combination of age and household size). Generally, renters spend proportionally more than owners. Younger households also spend proportionally more than older households. Lower income households generally spend a proportionally more on housing. The Census data finds each data axis highly correlated in some fashion with housing expenditure and housing choice. The tables nearby detail the summary relationships between income spent and household income; note the details of these percentages differ slightly when broken out by life cycle (i.e., household age and family size composition).

Percent Income Spent on Housing, All household tenures

	[0%, 15%)	[15%, 20%)	[20%, 25%)	[25%, 30%)	[30%, 35%)	[35%, 40%)	[40%, 45%)	[45%, 50%)	[50%, 100%]
< $20K	6%	3%	3%	6%	3%	2%	3%	2%	71%
$20K to $39K	16%	4%	3%	4%	6%	7%	8%	9%	43%
$40K to $59K	19%	3%	8%	12%	16%	13%	9%	6%	13%
$60K to $99K	24%	12%	21%	18%	10%	6%	4%	2%	3%
$100K to $149K	32%	28%	22%	11%	4%	2%	1%	1%	0%
$150K to $199K	51%	28%	14%	4%	2%	1%	0%	0%	0%
≥ $200K	77%	15%	5%	2%	1%	0%	0%	0%	0%
Total	**32%**	**14%**	**13%**	**10%**	**6%**	**5%**	**3%**	**3%**	**14%**

Figure 8

Percent Income Spent on Housing, Renter households

	[0%, 15%)	[15%, 20%)	[20%, 25%)	[25%, 30%)	[30%, 35%)	[35%, 40%)	[40%, 45%)	[45%, 50%)	[50%, 100%]
< $20K	1%	2%	3%	7%	2%	2%	2%	2%	80%
$20K to $39K	1%	2%	3%	5%	8%	10%	10%	12%	50%
$40K to $59K	2%	3%	11%	18%	22%	18%	11%	6%	9%
$60K to $99K	6%	18%	32%	23%	11%	5%	3%	1%	2%
$100K to $149K	27%	40%	23%	8%	2%	0%	0%	0%	0%
$150K to $199K	57%	32%	8%	3%	1%	0%	0%	0%	0%
≥ $200K	86%	10%	3%	0%	0%	0%	0%	0%	0%
Total	12%	13%	14%	12%	9%	7%	5%	4%	24%

Figure 9

Percent Income Spent on Housing, Owner households

	[0%, 15%)	[15%, 20%)	[20%, 25%)	[25%, 30%)	[30%, 35%)	[35%, 40%)	[40%, 45%)	[45%, 50%)	[50%, 100%]
< $20K	16%	6%	5%	6%	4%	2%	3%	2%	55%
$20K to $39K	37%	6%	5%	4%	3%	4%	5%	4%	32%
$40K to $59K	38%	4%	5%	6%	9%	8%	7%	6%	17%
$60K to $99K	36%	8%	14%	15%	10%	7%	4%	2%	3%
$100K to $149K	35%	22%	22%	12%	5%	2%	1%	1%	1%
$150K to $199K	50%	27%	15%	5%	2%	1%	0%	0%	0%
≥ $200K	76%	16%	6%	2%	1%	0%	0%	0%	0%
Total	45%	15%	12%	8%	5%	3%	2%	2%	8%

Figure 10

The tables above summarize what economist denote as "willingness to pay". It factors in what is observed in the current trends of real estate markets in the MSA region.

Reconciling HUD income limits, household income and age brackets

Harmonizing Census household income, age and size brackets with HUD income limits required extensive interpolation of various categories. Many of the Census income brackets spanned across the AMI limits for HUD, see nearby table for a brief definition of these limits. The results of interpolating Census income brackets with HUD AMI limits are shown in the body of the following illustration, where extremely low income (ELI) (<30% AMI), very low income (VLI) (30-50% AMI), low income (LI) (50-80% AMI), moderate income (80-120% AMI), and above moderate (>120% AMI).

	1 person	2 person	3 person	4 person	5+ person
Less than $10,000	ELI	ELI	ELI	ELI	ELI
$10,000 to $14,999	ELI	ELI	ELI	ELI	ELI
$15,000 to $19,999	ELI	ELI	ELI	ELI	ELI
$20,000 to $24,999	ELI / V LI	ELI	ELI	ELI	ELI
$25,000 to $29,999	V LI	ELI / V LI	ELI	ELI	ELI
$30,000 to $34,999	V LI	V LI	ELI / V LI	ELI / V LI	ELI
$35,000 to $39,999	V LI / LI	V LI	V LI	V LI	ELI
$40,000 to $44,999	LI	V LI	V LI	V LI	ELI / V LI
$45,000 to $49,999	LI	V LI / LI	V LI	V LI	V LI
$50,000 to $59,999	LI	LI	V LI / LI	V LI / LI	V LI
$60,000 to $74,999	LI/Mod	LI/Mod	LI	LI	V LI / LI
$75,000 to $99,999	Mod / Above Mod	Mod	LI/Mod	LI/Mod	LI
$100,000 to $124,999	Above Mod	Mod / Above Mod	Mod / Above Mod	Mod	LI/Mod
$125,000 to $149,999	Above Mod	Above Mod	Above Mod	Mod / Above Mod	Mod
$150,000 to $199,999	Above Mod	Above Mod	Above Mod	Above Mod	Mod / Above Mod
$200,000 or more	Above Mod	Above Mod	Above Mod	Above Mod	Above Mod

Figure 11

Housing demand and household characteristics from the HIA forecast

Housing demand projections, though computationally sophisticated, are conceptually fairly straight forward as a verbal explanation. Household fall into observable stages in a household life cycle. In each category we understand how old a householder will be, the projected incomes of these households, and include a forecast of future household sizes. Applying what we observe of typical households in each life cycle category, their income and their willingness to pay, it is straight forward to extrapolate housing preferences from current house trends, that is 1) ownership/ rental, 2) percentage afforded – rent levels or home price, and structure type – single family, middle housing or multifamily.

Assume renter households spending historically observed percent of their income

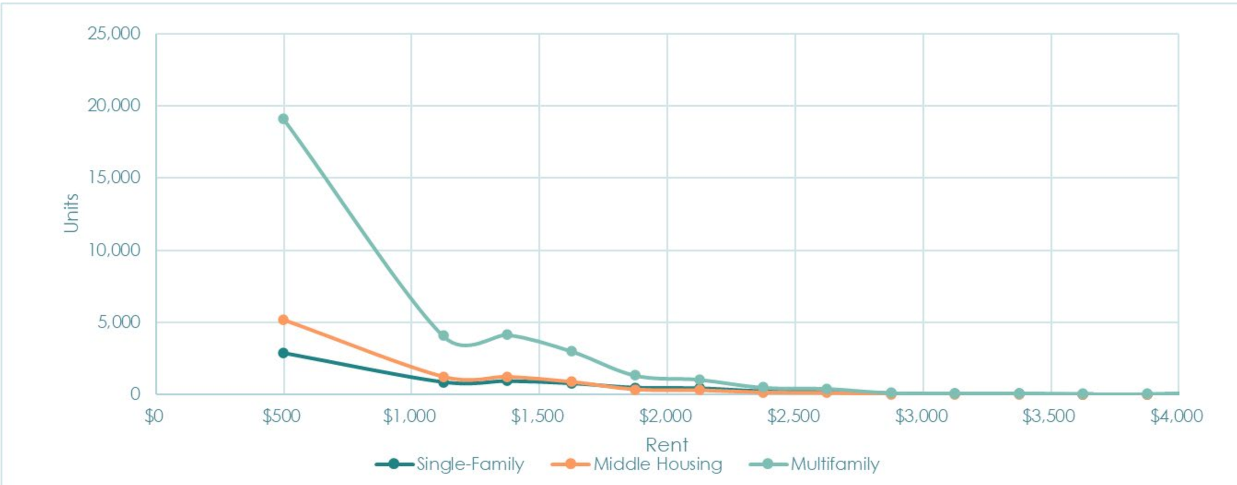


Figure 12

The chart above shows the 2024-44 forecast of renter household's greatest shelter choice is predominantly multifamily – a structure that has 5 or more units. This is followed by a middle housing choice that is a hybrid structure that is seen as generally more affordable than a 1-unit detached structure. The middle housing option is a cross-between a single-family structure and an apartment due to the fact that it is often constructed as a structure with attached units which share walls with another tenant. It said to include duplexes, triplexes, quadplexes, rowhouses and townhouses, and cottage clusters. There are considerably fewer single-family homes for rent as most are generally not purpose-built solely as rental units. The renters forecast has 14% of households in single-family rental choices, 19% in middle housing options, and 67% falling into multi-family units.

An examination of the rental market from a renting cost perspective and taking into account willingness to pay, in particular, reveals a housing market that is likely to yield significant economic dislocations, other things being equal. Over half of this market in the future can only afford housing below $1000 per month based on current conditions. It's unlikely that a future market might improve, so this estimate is likely to look worse.

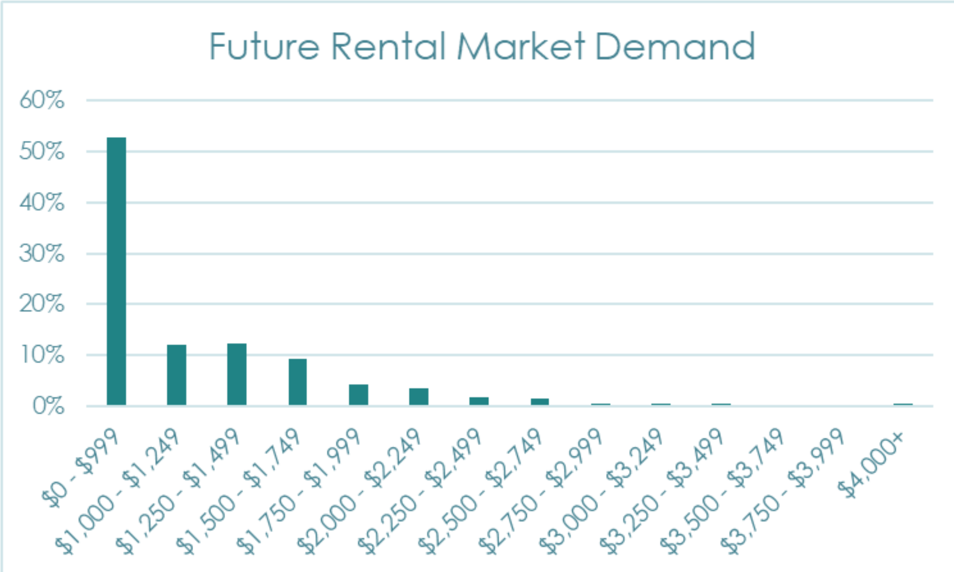


Figure 13

The next chart illustrates the baseline forecast of owner housing choices. In the owner market, 88% of households choose single-family homes, 8% in middle housing alternatives, and 5% in multi-family housing (i.e., condos).

Assume owner households spending historically observed percent of their income

Figure 14

Future households will be financially challenged or unable to purchase homes with current median sales price at roughly today's $550,000. 81% of future households will find it difficult to afford to own such a median house, based on demand calculations seen here. The implication is that future housing tenure choices are not likely to match the past.

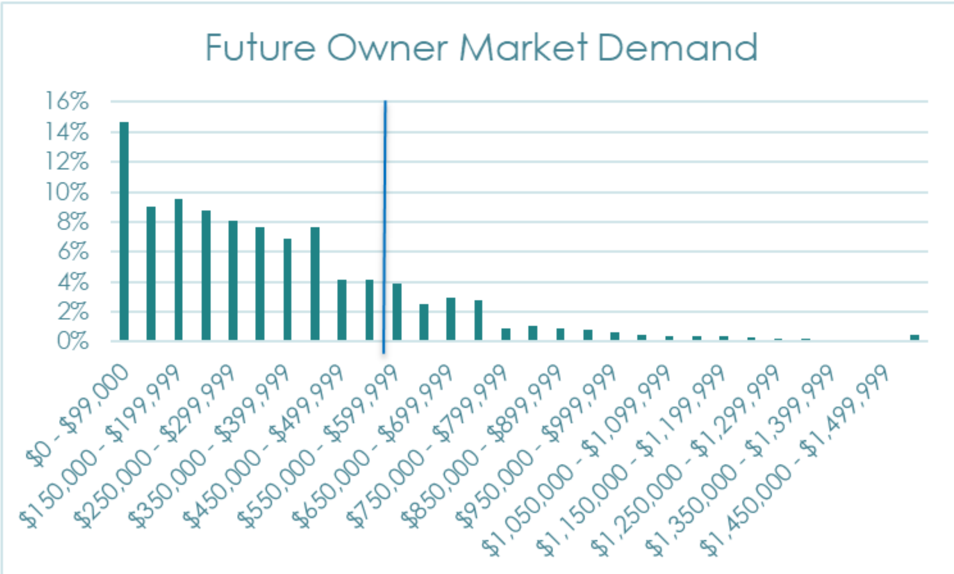


Figure 15

Demand is characterized by tenure and structure type. This is further summarized to only structure type, collapsing renters and owners together because the supply-side housing analytics is unable to reasonably quantify tenure. That's because we don't have sufficient data from zoning or other entitlement information to discern whether construction will lead to rental units or ownership. Residential analysis of a gap in supply and demand is not forthcoming from the limited information on hand for a sound housing supply forecast that includes tenure. The forecast of housing demand is rolled up into three categories: single family housing, middle housing options, and multifamily housing.

HNA Results of Renters and Owners by Life Cycle and rent / home price

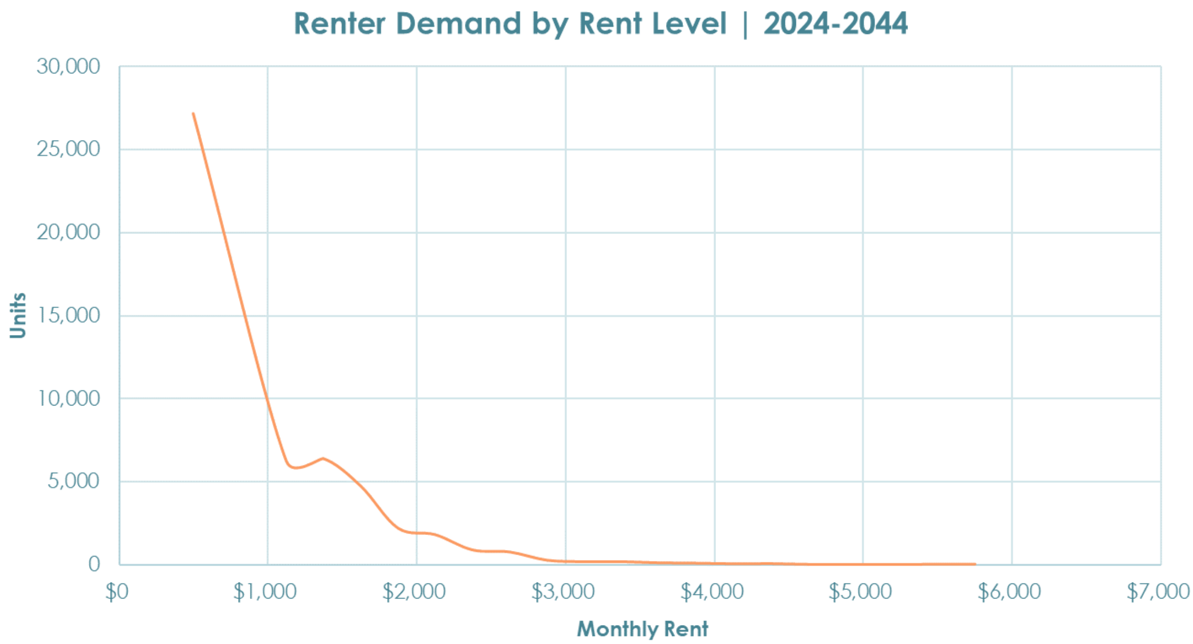


Figure 16: Assumes households spend a percentage of their income on housing based on current trends

The chart above shows the forecast of renters by life cycle and expected rent levels, if households spend a percentage of their income on housing based on current trends. This means that households, particularly lower-income households, will likely spend over the 30% threshold of household income that is commonly used as a metric of affordability. Assuming that this is the case in the future, young householders, single adults and older residents are more likely to be renters and have lower household earning potential and therefore fall into the lower rent need spectrum in which many will need some form of government assisted housing (i.e., rent subsidy). Of renters, the forecast under these assumed conditions is quite stark, projecting fewer than 10% of renters in future years (2024-44) will have the financial ability to afford market-rate rents given their household income. (Note: this analysis may somewhat overstate willingness to pay due to limitations on not being able to account for the accumulation of wealth, particularly retirees who may be on fixed incomes but have amassed a lifetime of savings for their retirement. Affordability in these cases based on annual earnings and income may be supplemented by other assets to pay for monthly shelter expenditures.)

The chart below shows the forecast of owners by life cycle and expected home purchase prices, if households spend a percentage of their income on housing based on current trends. The majority of future market-rate housing demand will likely fall to a generation of more mature residents according to extrapolation of current trends. Older adult households (greater than 45 years old) make up nearly all market-rate home demand between 2024 and 2044, but over half are expected to need some form of housing subsidy unless personal savings or other financial resources are brought or a sizable down payment is made available. Still it makes sense that the vast majority of home buyers in the future are older households that have the financial wherewithal to make up the ownership market for homes.

It's unsurprising that young adult households and households in their "root-setting" years will experience home buying affordability problems. The home demand projections for these younger household life cycle cohorts suggest very few will be in the home buying market. There are several reasons for this: 1) younger households generally earn less; 2) are unable to qualify for mortgages; 3) don't have enough saved up for a down payment; 4) and the demographics in the future lean toward proportionally fewer younger households in the region as there will be fewer due to declining birth rates and thus lower household formation rates.

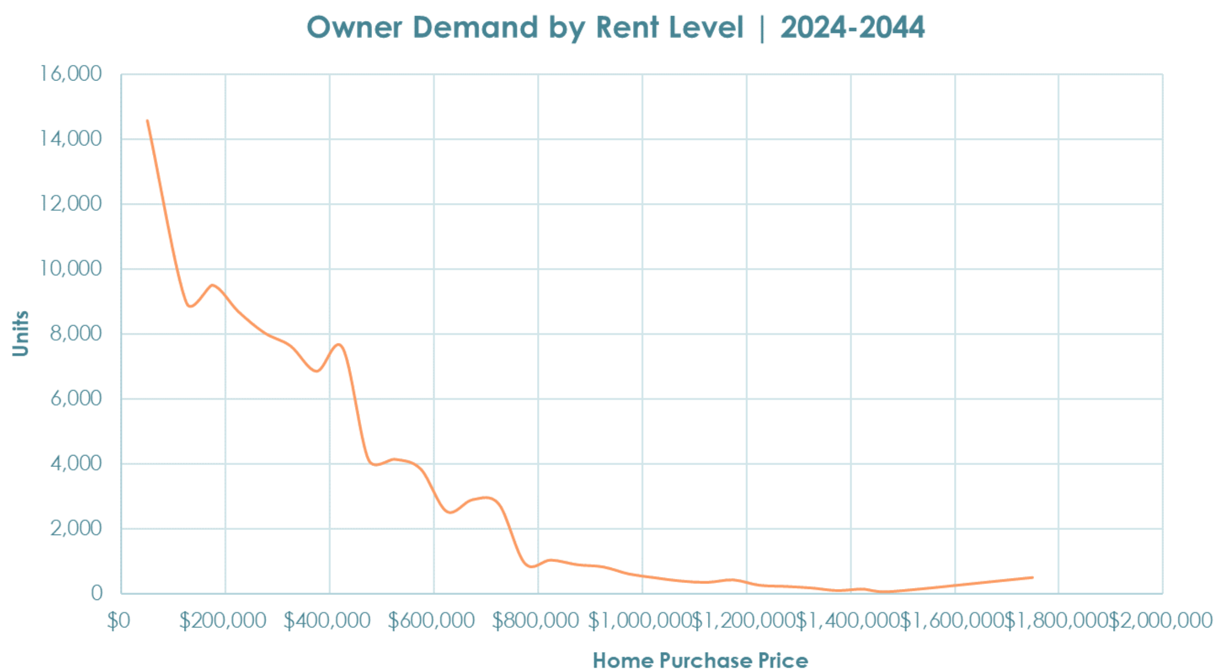


Figure 17: Assumes households spend a percentage of their income on housing based on current trends

In summary, both charts derive from Metro's HIA forecast and rely on further calculations employing HUD's AMI limits and Census housing characteristics are computed into the HIA forecast. Current housing conditions underly the renter and ownership projections in the last two charts. Recent Census ACS data are applied to the tenure splits to modify the HIA forecast into owner and renter projections for the twenty-year forecast. The seven life cycles are tabulated from the more detailed breakdown of HIA households. Then HUD income limits are interpolated from the income brackets to modify the HIA forecast of household by life cycle and tenure. The next to final step is computing the willingness to pay of renters and owners to estimate affordability of the three structure types.

Residential Gap Analysis: Analyzing (3) housing demand scenarios by structure type and (4) housing supply scenarios by structure type

The HNA considers three housing archetypes in this gap analysis: 1) single-family detached housing; 2) middle housing alternatives; 3) multi-family units. This analysis of residential demand includes a range of plausible housing demand scenarios, which are based on the range population forecast for which high, baseline and low growth alternatives are produced. The supply-side includes plausible alternatives to future capacity that are linked to the scenario for demand. Additional assumptions of redevelopment capacity, alternative entitlement assumptions, and the degree to which middle housing is an acceptable substitute for single family housing offers more flexibility in estimating a range for residential capacity going forward.

Final demand, which is the expression of market need after consumers have weighed their supply and demand options, is dependent on the supply of goods (and in this case it is housing) available, relative prices of those goods as well as the income and characteristics of the household to want the good. Supplies of needed housing are thus dependent on demand because producers don't build housing unless there are willing buyers. Price and rent signals tell the supplier how much more/less to build and those same price signals inform households what they can afford to buy or in others how much rents shall be. Determination of final demand or need is thus the market interaction through price signals that inform how much housing of each is consumed and how much supply to build of each archetype.

A housing forecast based on structure type demand assuming current housing trend proportions was completed and subsequently rejected from consideration as a plausible gap scenario. This was because recent statutes enacted by the state are expected to alter the historic production rates of single and multifamily units. Middle housing offers a third archetype. The metropolitan housing rule already regulates the share of single-family entitlement, below the historic proportion to produce single-family units.

Going forward, both real and nominal home prices are expected to outpace growth in household incomes, making home purchases potentially less affordable and less accessible to the median home buyer. Recent state regulations have spurred the market and local entitlements to provide smaller and denser housing alternatives that are nominally less expensive to own. The new state rule thus offers middle housing as a hybrid housing product that might serve as a substitute for traditional detached single-family structures while at the same time meeting higher density requirements of existing and new building regulations closer to multifamily entitlements. Bottom line: the addition of middle housing as an allowedarchetype going forward deters the use and assumption of current housing trends as a useful baseline scenario for forecasting regional housing supply (and demand).

We pivot and consider 4 alternate residential growth scenarios, based on a mix of 3 possible housing demand options and 4 outlooks of what housing supply alternatives are possible. The four residential capacity scenarios are informed by whether growth is slower or faster. In a future of faster demographic growth rates, with the concomitant assumption that more growth will torque prices higher and faster, this demand scenario prompts a supply response to build less expensive, smaller and denser units . In a slower growth scenario, the demand for housing is eased and this outlook assumes tastes and preferences are likely to resemble historic patterns of housing consumption (though not identical because of a rapidly aging population and shifts in demography). The two baseline capacity scenarios bracket an unknown market uptake for middle housing. Although some type of middle housing production (e.g., duplexes and townhouses) has existed for a long while, it is a hybrid housing product that straddles aspects of multifamily housing with its inherent higher carrying capacity while on the consumer end, middle housing offers features in the unit that resemble characteristics inherent of a single-family structure. Because housing costs are expected to continue rising even in real dollar terms, there is uncertainty whether middle housing will become a viable archetype, gaining widespread consumer acceptance. Hence, we have a pair of baseline scenarios that bookend a low vs. a high uptake of middle housing.

The following descriptions provide a brief insight to the four scenarios considered in this HNA.

Residential demand scenarios:

1. (Low growth forecast) – Metro UGB low regional household growth formation & generally following in the footsteps of previous generations' housing preferences and willingness to pay.
2. (Baseline growth forecast) – Metro UGB baseline regional household growth forecast & adjusted for the addition of middle housing entitlements.
3. (High growth forecast) – Metro UGB high regional household growth formation & fundamental shift in housing preferences due to a combination of regulation, entitlements, affordability and demographic shift in market tastes and preferences.

Residential supply scenarios:

1. Weak growth/ weak market conditions
2. Baseline housing supply outlook w/ greater market penetration of middle housing products
3. Baseline housing supply w/ marginally greater detached single-family housing
4. Stronger growth outlook & demand for higher density

Residential components for each residential supply scenario:

Vacant land	Redevelopment	Concept Plans of UGB adds	Other Redevelopment	Office to Residential Conversion	ADU & middle housing conversion
Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
SFR Heavy	Market Recovery			Low	Low
Pro forma	Market Erosion			High	High

Figure 18: Residential gap scenarios.

In total, we analyze 4 scenario combinations. Different combinations of the elements of the mix of 6 supply components make up an individual residential supply scenario. The supply scenario is then matched up against the appropriate demand scenario (low to low, baseline to baseline, high to high). Demand scenarios include estimates of existing housing needs, which are described in more detail in Appendix 8A.

At the final capacity gap calculation stage, middle housing and single-unit detached housing capacity surpluses or deficits are combined because both are allowed in the same residential zones. It will be the market, not Metro's UGR calculations, that determine what mix of middle housing and single-unit detached housing gets build on those residentially zoned lands. Importantly, Metro has no recourse for specifically addressing a single-unit detached housing deficit since any UGB expansion area would have to also allow middle housing and multifamily housing in order that the city can remain in compliance with HB 2001 and the Metropolitan Housing Rule.

Scenario Low: Slow demographic growth / easing residential market

		Supply / Capacity			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Vacant land	SFR Heavy	34,944	13,228	42,970	91,142
Redevelopment	Market erosion	8,978	6,360	13,950	29,288
Concept Plans of UGB adds	Baseline	9,096	6,662	4,138	19,896
Other Redevelopment	Baseline	135	172	9,830	10,137
Office-to-Residential	Low	-	-	250	250
ADUs & middle housing conv.	Low	-	4,955	-	4,955
Total		**53,153**	**31,377**	**71,138**	**155,668**
		34%	20%	46%	100%

		Demand / Housing preferences			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Future growth	Low growth	57,539	16,000	46,136	119,675
Vac. homes		1,072	1,769	443	3,285
Underproduction		726	2,089	12,160	14,975
Homeless		-	40	8,653	8,693
Total		**59,337**	**19,898**	**67,392**	**146,628**
		40%	14%	46%	100%
Surplus/(Deficit)		(6,184)	11,479	3,746	9,041
Surplus/(Deficit) with SFR and MH combined			5,295	3,746	9,041

Scenario Notes:
"Low growth" – a forecast scenario that assumes a lower amount of population than the baseline.
"SFR Heavy" – more SFR detached units are produced than middle housing options. In low growth forecast scenario, there is less pressure to build higher density and the taste and preference of the single-family market is assumed to be more easily met in this scenario.
"Market erosion redevelopment" – assumes a modest erosion of market-rate redevelopment (pro forma) in residential redevelopment estimate; assumes residential pricing is 5% lower across all parcels because of a low population growth scenario (lower demand equates to lower prices)
"Baseline Concept Plans" – density and capacity yield as given by local jurisdictions' concept plans for the vacant tax lots in recent UGB expansions.
"Baseline other redevelopment" – post-BLI override of pro forma real estate redevelopment calculations, approved redevelopment capacity derived from development plans or local input.
"Low office to residential conversion" – assumes fewer units are converted from office buildings.

“Low ADU’s & middle housing conversions” – based on a period of “below average” ADU and middle housing conversions during the last 10 years.

Scenario Baseline "A": Baseline population forecast & higher-end market penetration of middle housing

		Supply / Capacity			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Vacant land	Expected Density	26,197	33,486	39,621	99,304
Redevelopment	Baseline	12,292	11,727	24,382	48,400
Concept Plans of UGB adds	Baseline	9,096	6,662	4,138	19,896
Other Redevelopment	Baseline	135	172	9,830	10,137
Office-to-Residential	Baseline	-	-	1,000	1,000
ADUs & middle housing conv.	Baseline	-	8,692	-	8,692
Total		**47,719**	**60,738**	**78,971**	**187,429**
		25%	32%	42%	100%

		Demand / Housing preferences			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Future growth	Baseline	56,846	32,911	59,838	149,594
Vac. homes		1,072	1,769	443	3,285
Underproduction		726	2,089	12,160	14,975
Homeless		-	40	8,653	8,693
Total		**58,644**	**36,809**	**81,093**	**176,546**
		33%	21%	46%	100%
Surplus/(Deficit)		(10,925)	23,930	(2,122)	10,882
Surplus/(Deficit) with SFR and MH combined			13,005	(2,122)	10,882

Scenario Notes:
"Baseline growth" – most likely population growth trend; a new normal in housing preferences required by new state housing regulations, "shrinkflation" trend in which consumers trade-down in home size for a lower nominal home price.
"Expected Density" – generally asserts a future development density in cities closer to the top-end of what current entitlement regulations permit.
"Baseline redevelopment" – a baseline scenario of market-rate redevelopment (pro forma)
"Baseline Concept Plans" – density and capacity yield as given by local jurisdictions' concept plans for the vacant tax lots in recent UGB expansions.
"Baseline other redevelopment" – post-BLI override of pro forma real estate redevelopment calculations, approved redevelopment capacity derived from development plans or local input.

"Baseline office to residential conversion" – assumes a couple office high-rises or a few mid-rise office buildings convert to residential apartment uses.
"ADU's & middle housing conversions" – based on a period of "average" ADU and middle housing conversions in the last 10 years.

Scenario Baseline "B": Baseline population forecast & lower-end penetration of middle housing

		Supply / Capacity			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Vacant land	SFR heavy	34,944	13,228	42,970	91,142
Redevelopment	Baseline	12,292	11,727	24,382	48,400
Concept Plans of UGB adds	Baseline	9,096	6,662	4,138	19,896
Other Redevelopment	Baseline	135	172	9,830	10,137
Office-to-Residential	Baseline	-	-	1,000	1,000
ADUs & middle housing conv.	Baseline	-	4,955	-	4,955
Total		**56,466**	**36,744**	**82,320**	**175,530**
		32%	21%	47%	100%

		Demand / Housing preferences			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Future growth	Baseline	56,846	32,911	59,838	149,594
Vac. homes		1,072	1,769	443	3,285
Underproduction		726	2,089	12,160	14,975
Homeless		-	40	8,653	8,693
Total		**58,644**	**36,809**	**81,093**	**176,546**
		33%	21%	46%	100%
Surplus/(Deficit)		(2,178)	(65)	1,227	(1,017)
Surplus/(Deficit) with SFR and MH combined			(2,243)	1,227	(1,017)

Scenario Notes:
"Baseline growth" – most likely population growth trend; a new normal in housing preferences required by new state housing regulations, "shrinkflation" trend in which consumers trade-down in home size for a lower nominal home price.
"SFR Heavy" – more SFR detached units are produced than middle housing options. A step-down in market acceptance of middle housing options, w/ SFR still prevailing.
"Baseline redevelopment" – a baseline scenario of market-rate redevelopment (pro forma)
"Baseline Concept Plans" – density and capacity yield as given by local jurisdictions' concept plans for the vacant tax lots in recent UGB expansions.

“Baseline other redevelopment” – post-BLI override of pro forma real estate redevelopment calculations, approved redevelopment capacity derived from development plans or local input.
“Baseline office to residential conversion” – assumes a couple office high-rises or a few mid-rise office buildings are converted to residential apartment uses.
“ADU’s & middle housing conversions” – based on a period of “average” ADU and middle housing conversions in the last 10 years.

Scenario High: Higher growth population forecast

		Supply / Capacity			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Vacant land	Expected Density	26,197	33,486	39,621	99,304
Redevelopment	Market Recovery	16,175	18,951	37,397	72,522
Concept Plans of UGB adds	Baseline	9,096	6,662	4,138	19,896
Other Redevelopment	Baseline	135	172	9,830	10,137
Office-to-Residential	High	-	-	1,500	1,500
ADUs & middle housing conv.	High	-	11,716	-	11,716
Total		**51,602**	**70,986**	**92,487**	**215,075**
		24%	33%	43%	100%

		Demand / Housing preferences			
		Single unit detached (SFR)	Middle housing (MH)	Multifamily (MFR)	Total Units
Future growth	High Growth	44,878	39,493	95,142	179,513
Vac. homes		1,072	1,769	443	3,285
Underproduction		726	2,089	12,160	14,975
Homeless		-	40	8,653	8,693
Total		**46,677**	**43,391**	**116,398**	**206,465**
		23%	21%	56%	100%
Surplus/(Deficit)		4,926	27,595	(23,911)	8,610
Surplus/(Deficit) with SFR and MH combined			32,521	(23,911)	8,610

Scenario Notes:
"High growth" – a forecast scenario that assumes a greater amount of population than the baseline.
"Expected Density" – generally asserts a future development density in cities closer to the top-end of what current entitlement regulations permit.
"Market-recovery Redevelopment" – assumes a modest improvement in market-rate redevelopment (pro forma) in residential redevelopment; assumes residential pricing is 5% higher across all parcels because of higher population growth (higher demand equates to higher prices)
"Baseline Concept Plans" – density and capacity yield as given by local jurisdictions' concept plans for the vacant tax lots in recent UGB expansions.
"Baseline other redevelopment" – post-BLI override of pro forma real estate redevelopment calculations, approved redevelopment capacity derived from development plans or local input.
"High office to residential conversion" – assumes a couple office high-rises or a few mid-rise office buildings convert to residential apartment uses.

"ADU's & middle housing conversions" – based on a period of "above-average" ADU and middle housing conversions in the last 10 years.

Scenario Discussion

Population range forecast – The baseline population forecast represents the most likely growth outlook and population outcome for this region. The population forecast is then translated into households, using headship rates. Headship rates are observed statistical rates at which populations (by age cohort) form into household units. These headship rates are extrapolated for future years, assuming that household sizes on average in the future will see further decreases as birth rates fall and child rearing is delayed to older age cohorts.

A 5% vacancy rate is included in the high, baseline and low growth household scenarios to factor up to a projected demand for housing.

A household range forecast is based on + / - 20% from the baseline household forecast, forming "bookends" that describe the high-end and low-end household growth forecast in the set of HNA scenarios. This equates roughly to a standard z-score of about 0.5 standard deviation from the mean in a range forecast assumed to be normally distributed.

Note: the population range forecast assumed an error range of 2 standard deviations, which encompasses roughly 95% of the probability, chance of that growth will fall between the lines of the high or lower population projections. Staff, with consultant advice, deemed that 2 standard deviations was too wide an error band, encompassing portions of the high-end and low-end of the household forecast range that was too unlikely to consider for reasonable policy evaluations.

Vacant Land Supply / Capacity – For additional information, please see the BLI appendix for methods and additional details.

Note: the HNA scenarios do not utilize the "pro forma" approach of estimating the capacity of vacant land supply inside the UGB.

HNA scenarios contemplate two capacity alternatives for the vacant land supply calculations. Both alternatives rely on the "expected density" method of computing vacant land capacity in the existing UGB. A second version of the expected density approach asserts more of the supply of vacant tax lots will turn to production of detached single family units.

Redevelopment Capacity – For additional information, please see the BLI appendix for methods and additional details.

The HNA scenarios consider 3 residential redevelopment capacity estimates. The baseline redevelopment alternative is derived from the Metro real estate pro forma model. There are two other alternatives to redevelopment capacity – "market erosion" and "market recovery" scenarios. The each pivot from the baseline redevelopment scenario. The main difference in the three scenarios are as follows:

- Baseline redevelopment is derived from a "stabilized" home price surface based on updated home prices and a "stabilized" rent surface for the region, also updated.
- Market erosion assumes a 5% across the region decrease in home and rent price surfaces. The basis for this assumption is linked to the low growth scenario in which there are fewer

consumers chasing market-rate housing and thus price/ rent is shifted lower, other things being equal.

- Market recovery assumes the opposite – 5% increase across the region.

Concept Plan Areas & Other Planned Development (Vacant) – Residential densities and subsequent total yield on capacity is either given by local jurisdictions or available from published concept plans that illustrate the long-term development capability of vacant lands included in recent UGB expansions. Typically, these are areas added to the UGB since 2018.

Other Planned Development (Redevelopment) – These are corrections to the BLI. The capacity changes represent amendments to the existing BLI and pro forma capacity calculations. They generally came about because post-BLI review and further input from local jurisdictions made it clear that development was already substantially underway and/ or the estimated redevelopment rate was incorrectly applied to these tax lots.

Office-to-Residential conversion – see Appendix 2.

ADUs & middle housing conversion – see Appendix 2.

DATE:	July 8, 2024
TO:	Ted Reid, Metro
FROM:	Becky Hewitt, Madeline Miller Baron, and Justin Sherrill, ECOnorthwest
SUBJECT:	METRO RESIDENTIAL READINESS – TASK 8 EXISTING HOUSING NEEDS – REVISED

Introduction

Following recent changes to state law, Metro is required to account for existing housing needs in its 2024 Urban Growth Report (UGR) as part of determining whether there is adequate land for housing within the region's urban growth boundary. This statutory requirement is new since the last UGR.

As part of related legislation referred to as the Oregon Housing Needs Analysis (OHNA), the state is also transforming how housing needs are projected and planned for, and working to incorporate planning for existing housing needs into local housing planning efforts. However, statewide rules and methodology are still being established, and will not be complete in time to provide a basis for the 2024 UGR. The legislative history and relevant bills are summarized at the end of this memo for context.

Metro contracted with ECOnorthwest to help respond to these recent changes in state law, as well as to more deeply integrate market realities, infrastructure, governance needs, and equity into its 2024 Urban Growth Management Decision. ECOnorthwest and Metro staff developed an estimate of existing need based on the most recent, but not yet finalized, methodology that is appropriate for the Metro region and its unique planning context. This memorandum provides an estimate of existing need for the Metro region, describes the methodology behind the estimate, and expands on dome of the differences between this methodology and the OHNA methodology. The first iteration of the OHNA methodology is expected to be released in summer 2024 and will be finalized by December 31, 2024.

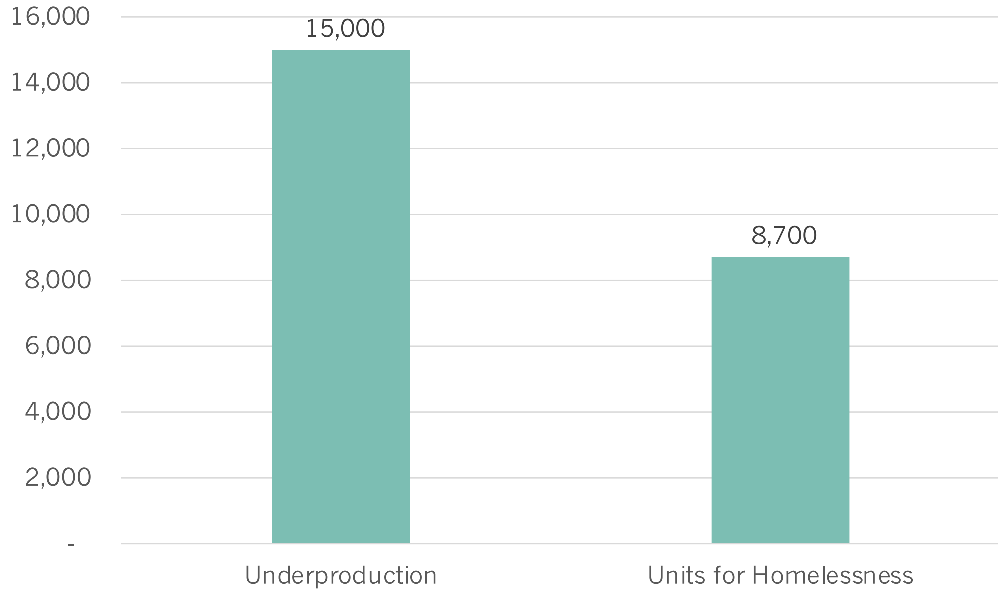
Estimated Existing Housing Needs for Metro's 2024 Urban Growth Report

Metro has a need for **approximately 23,700 housing units to address current unmet housing needs**. This estimate includes approximately:

- **15,000 units needed to address current housing underproduction**
- **8,700 units needed for people experiencing homelessness**

This is illustrated in Figure 1.

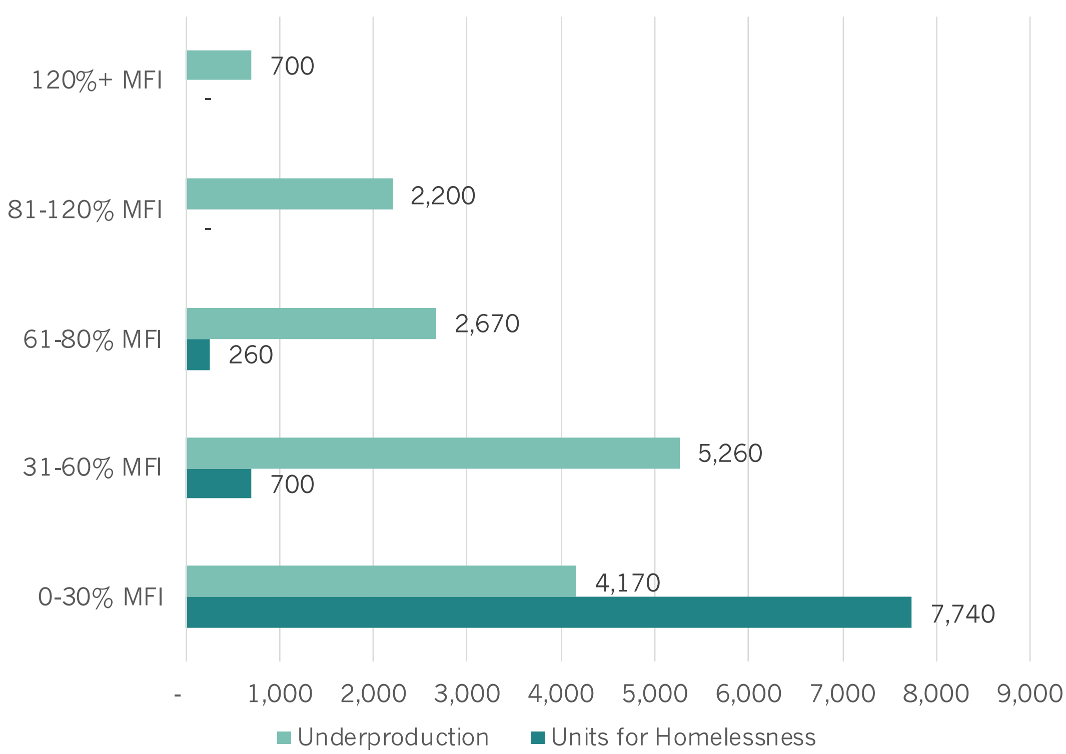
Figure 1. Metro UGB Existing Housing Need by Component (Rounded)



Source: ECOnorthwest analysis

Almost two-thirds of these housing units are needed for households earning the lowest incomes (less than 60% of the area median income), as shown in Figure 2.

Figure 2. Metro Existing Housing Need by Income Level (Rounded)



Source: ECOnorthwest analysis

Accounting for Second and Vacation Homes

Another new component of planning for housing need under the OHNA is accounting for units that will be lost to second and vacation homes during the planning horizon as the stock of those units grows.

Based on long-term (20-year) trends in growth in second and vacation homes, **the Metro region will need to add roughly 3,300 units to make up for units lost to second and vacation homes** over the next 20 years.

Summary of Data Sources and Methods

This section provides a summary of the data sources and methodology used to create these estimates. A more complete description of the Underproduction methodology is provided at the end of the memo.

Data Sources

Figure 3. Data Sources by Component

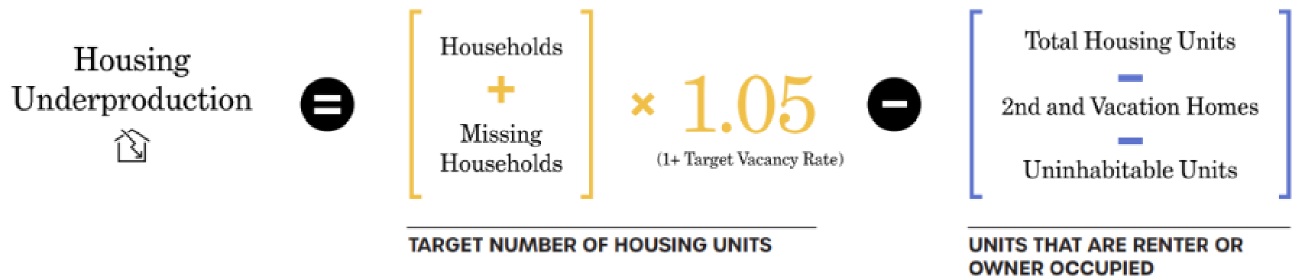
COMPONENT	DATA INPUT	SOURCE
Current Housing Underproduction	Total households, missing households, total housing units, second and vacation homes, uninhabitable units, regional rate of cost burdening (to allocate units to income levels)	Census PUMS
Units for People Experiencing Homelessness	Homeless Point-in-Time Counts	Portland State University[1]
	Estimate of doubled-up homeless population	McKenny-Vento Data from U.S. Department of Education
	Average number of children per household by region	Census PUMS
Second and Vacation Homes	Change second and vacation homes between 2000 and 2020 compared to change in all housing units	Census PUMS
Allocation to income categories	Area Median Income Limits	Census and OHCS

[1] Zapata, et al. 2024. "2023 Point in Time Findings Report: Count of People Experiencing Homelessness in Clackamas, Multnomah, and Washington Counties, Oregon" https://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1047&context=hrac_pub

Underproduction

Underproduction is calculated as the target number of housing units a market should have compared to the actual number of units that market has available for year-round occupancy. While housing underproduction is an important contributor to homelessness, the need for housing specifically related to people experiencing homelessness is addressed separately below. The underproduction estimate methodology is adopted from the Up for Growth Organization.

Figure 4. Up for Growth Housing Underproduction Methodology



As illustrated in Figure 4, the calculation has two main steps:

1. Calculate **target number of housing units**:
    a. Identify total current households based on Census data.
    b. Estimate "missing households"—the number of households that would have formed had housing been more available—using age cohorts and headship rates (the share of the population in a given age cohort that is listed as the "head of household" in the Census survey) to approximate.
    c. Multiply by 1.05 to factor in a healthy amount of market vacancy (5 percent).
2. Calculate the **actual housing stock available for year-round occupancy**:
    a. Identify total existing housing units in the region (based on Census data).
    b. Subtract second and vacation homes (based on Census data).
    c. Subtract uninhabitable units (based on Census data).

Units Needed for People Experiencing Homelessness

As noted above, housing underproduction is interrelated with and contributes to homelessness. However, because the methodology for estimating underproduction does not specifically capture people experiencing homelessness (due to its reliance on Census data), a separate estimate is included based on available data focused on homelessness. The OHNA methodology for estimating housing units needed for people experiencing homelessness is being refined in summer 2024. In the absence of the refined approach, Metro staff provided direction on the desired approach to estimating need for housing for those experiencing homelessness for purposes of the 2024 UGR. The approach includes two main components:

- **Sheltered and unsheltered households based on Point in Time count and county Homeless Management Information Systems (HMIS):** This estimate uses sheltered and unsheltered household counts from an April 2024 Portland State University (PSU) report on findings on the 2023 Point in Time (PIT) Count for the three-county area (Zapata, 2024). The PSU report differs from the PIT Count data collected by Oregon Housing and Community Services (OHCS) and reported to the U.S. Department of Housing and Urban Development (HUD) in that it incorporates administrative data HMIS about people in need of homeless services, which has been deduplicated with the point in time count, to provide a refined estimate. Even with these refinements, the PSU report acknowledges the limitations of the PIT counts and reasons why the PIT often undercounts people experiencing homelessness:
  - It is impossible to find and count everyone sleeping outside.
  - The count is conducted on a single night so does not capture every experience or episode of homelessness.
  - The U.S. Department of Housing and Urban Development definition of homelessness does not include people who are "doubled up" with other households.
- **Doubled-up households based on McKinney-Vento data on students experiencing homelessness:** The McKinney-Vento data comes from the U.S. Department of Education, which works with state coordinators and local liaisons to collect data on students experiencing homelessness. The data records the number of school-aged children who live in shelters or hotels/motels and those who are doubled up, unsheltered, or unaccompanied. Students identified as sheltered, unsheltered, and unaccompanied are assumed to be captured in the PIT count data. However, because the PIT count and HMIS data do not identify households who are doubled-up, the McKinney-Vento data is the best available way to identify such households. This data on doubled-up students is converted to households by dividing by the average number of children per household in the Metro region, which is calculated using 2022 PUMS 1-year data.

These methods result in the following estimates by component for the Tri-County area:

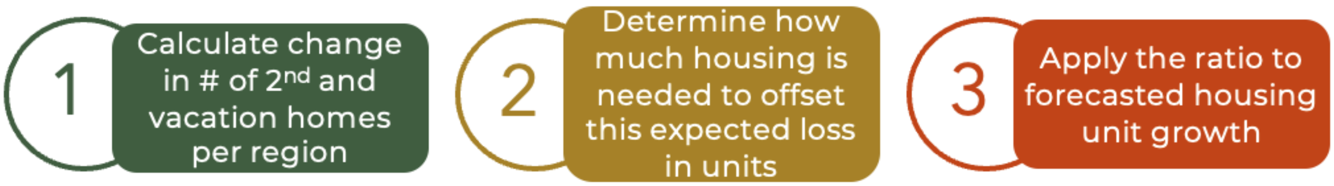
- 5,774 sheltered and unsheltered homeless households based on the PIT count and HMIS data from the 2024 PSU report
- Approximately 3,100 doubled-up households from the McKinney-Vento data

Based on the Metro UGB's share of the tri-county population, 97.5% of the housing for these households (roughly 8,700 units) is assumed to be needed within the Metro UGB.

Second and Vacation Homes

The approach to estimating need for housing due to growth in second and vacation homes is illustrated in Figure 5.

Figure 5. Process of Identifying Second and Vacation Homes



First, the model calculates the change in the number of second and vacation homes for each region between the years 2000 and 2020. The growth in second and vacation homes is then contextualized by the number of all housing units added for each region between 2000 and 2020. The ratio of second and vacation homes added compared to the total housing production is calculated for each region. This ratio is effectively an approximation of how much additional production would be required to offset the loss in units to second and vacation home demand over the 20-year planning period.

Allocation to Income Categories

The methodology uses the same income categories and same methodology as the OHNA to allocate the existing needed housing units to income levels.

Units needed to address underproduction are allocated to income categories based on the rate of cost burdened renter households in each region. Cost burdening is the best proxy available to estimate the current need for housing. Because underproduction in a market leads to cost -burdening by limiting choice and reducing overall affordability, the impacts of underproduction are most acutely felt by lower-income renter households who currently need access to affordable housing. The distribution for the Metro region is shown in Figure 6.

Figure 6: Share of Underproduction Units by Income Category

INCOME CATEGORY	SHARE OF UNITS
0-30% MFI	28%
31-60% MFI	35%
61-80% MFI	18%
81-120% MFI	15%
120%+ MFI	5%

Housing units needed for people experiencing homelessness are distributed by income based on information provided from the Oregon Housing and Community Services Department (OHCS), which comes from administrative data from Community Action Agencies that receive state Emergency Housing Assistance (EHA) and State Housing Assistance Program (SHAP) funds. The data are statewide and from 2020; OHCS plans to update the data going forward. The distribution is shown in Figure 7.

Figure 7: Share of Units for People Experiencing Homelessness by Income Category

INCOME CATEGORY	SHARE OF UNITS
0-30% MFI	89%
31-60% MFI	8%
61-80% MFI	3%
81-120% MFI	-
120%+ MFI	-

Metro Share

The OHNA methodology calculates the Metro Regional housing need based on the three counties. The estimates provided in this memorandum are scaled to the Metro Urban Growth Boundary. The scalar is 97.5% which accounts for the UGB's share of the Tri-County region's underproduction based on the number of jobs and people.

Full Underproduction Methodology

This methodology is based on the OHNA Interim Methodology as of June 2024, which is likely to change before it is finalized and implemented for the first time in January 2025.

TARGET NUMBER OF HOUSING UNITS

The estimate of the target number of housing units starts with the Census Bureau's estimate of total households and then estimates the number of "missing households" that have not formed in a market compared to historical formation rates in 2000.

Household formation is influenced by the housing stock available—when a market does not build sufficient housing, prices rise and vacancy falls, affecting the likelihood of households to form (roommates splitting up, children moving out, etc.). This measure estimates the number of households that would have formed had enough housing been available, and as such, are a component of current demand.

"Missing households" are calculated based on changes in the headship rate (the percentage of persons who are heads of households) for different age cohorts between 18 and 44. The lack of housing availability and affordability is not the only reason that explains reduced household formation rates—other cost increases (e.g., student loans, car ownership and healthcare costs) and societal/demographic trends are also contributors. Therefore, the age cohorts are limited to between 18 and 44 as the most likely ages where this occurs, but also to acknowledge the nature of the estimate as an overcount. Limiting the age cohorts helps compensate for the nature of the overcount–essentially that housing is not the only factor contributing to decreased household formation rates.

The year 2000 is used as a baseline headship rate for all cohorts. This year was chosen because 2000 Decennial Census data affords us the most recent statistically reliable estimate of a housing market that was more in balance. Headship rates were also generally stable between 1980 and 2000, so going back further would not have a large impact on the baseline headship rate. The model compares the most recent headship rate (based on 2022 PUMS data) against the 2000 baseline for each age cohort. If a cohort has a lower headship rate in the most recent year compared to the baseline, it indicates that fewer households formed. The total estimate of "missing households" is the sum of reduced household formation from cohorts aged 44 years and younger. Should there be negative missing households (more households formed compared to the baseline rate), they are netted out to zero.

The estimate of missing households is added to the current total number of households to approximate the total number of households that would be seeking housing in unconstrained market conditions. The model then applies a five percent target vacancy rate to estimate the total number of housing units a region should have to accommodate current need and have a healthy level of vacancy. Five percent vacancy is the 75th percentile of the national vacancy rate between 1980 and 2000 and is meant to represent unconstrained market conditions. It is also backed by industry stakeholder outreach and some research and is used in other methodologies of estimating housing need and underproduction.

ACTUAL UNITS AVAILABLE FOR YEAR-ROUND OCCUPANCY

The estimate of the actual number of units available for year-round occupancy starts with the Census Bureau's estimate of total housing units and removes uninhabitable units and second and vacation homes that are not available for year-round occupancy from the stock. Uninhabitable units are identified in the Census PUMS data as those that lack indoor plumbing and complete kitchens, and that have been vacant for at least a year. Vacation homes are identified in the Census data as those that are used for "seasonal or recreational purposes."

By removing uninhabitable units and second and vacation homes from the estimate of the current housing stock, the methodology attempts to calculate each region's total housing stock available for year-round occupancy as a more accurate reflection of current housing supply.

Legislative History

Legislation related to addressing existing housing needs and changing the state's approach to planning for housing began in 2019, but methodological details are still in flux, and will be the subject of additional rulemaking and potentially additional clarifying legislation through 2025. The relevant legislative history is summarized below.

- In 2019, House Bill 2001 amended state law to require that jurisdictions analyze "existing and projected" housing need.[2] Metro has interpreted this to mean that its 2024 Urban Growth Report and Management Decision must include an estimate of "existing housing need" in addition to future housing need over the 20-year planning period.
- In 2019, House Bill 2003 directed the Oregon Housing and Community Services Department (OHCS) to develop a pilot methodology for an Oregon RHNA (subsequently renamed the OHNA) to estimate statewide housing need under several need categories and incomes. OHCS and the Oregon Department of Land Conservation and Development (DLCD) each produced summary reports[3,4] on the pilot methodology in 2021.
- In 2021, House Bill 5006 directed DLCD and OHCS to revisit the pilot methodology and offer recommendations to the Legislature on how to improve the methodology and implement the OHNA into the existing land use planning system. This work culminated in a Recommendations Report to the Legislature in December 2022.[5]
- In 2023, House Bill 2001 directed DLCD, OHCS, and the Department of Administrative Services (DAS) to implement the OHNA into existing land use planning systems. The bill does not address specific methodology. DAS is responsible for finalizing the methodology, but DLCD's oversight body (the Land Conservation and Development Commission, LCDC) and OHCS must "assist" and "may study and recommend methodological changes to DAS to improve its functions and suitability." When these provisions take effect, Metro will calculate the Metro region's housing need estimates using the principles of the OHNA, but the state will allocate need to cities within the Urban Growth Boundary (UGB). A follow-up bill later in 2023 (House Bill 2889) included several adjustments to the new OHNA laws, including some

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[2] Section 5 of House Bill 2001 (2019) amended ORS 197.296(3)(b) to read: "Conduct an analysis of **existing and projected** housing need by type and density range, in accordance with **all factors under** ORS 197.303 and statewide planning goals and rules relating to housing, to determine the number of units and amount of land needed for each needed housing type for the next 20 years." (Boldface language added.) No further definitions of "existing" housing need were included with this legislation; other sections of the bill describe using population projections to estimate housing need, but do not address existing need.
[3] OHCS Report: https://www.oregon.gov/ohcs/about-us/Documents/RHNA/02-21-2021-ECONW-OHCS.pdf
[4] DLCD Report: https://www.oregon.gov/lcd/UP/Documents/20210301_DLCD_RHNA_Assessment_Report.pdf
[5] OHNA Recommendations Report:
https://www.oregon.gov/lcd/UP/Documents/20221231_OHNA_Legislative_Recommendations_Report.pdf

applicable to Metro, but not to the specific methodology addressed in this memorandum. Both sets of changes have since been codified into statute.[6]

- The OHNA rulemaking process is currently underway along with the process to finalize the methodology. DLCD is responsible for writing the rules and will not be complete until the end of 2025. DAS is responsible for finalizing the methodology and will not be complete until late 2024. Additional legislation in the 2025 regular session could further change the OHNA.

[6] Oregon Revised Statutes (ORS) Chapters 197A and 185 contain most of the new statutory requirements related to the OHNA.

June 2024

Sherwood West UGB Assessment

Oregon Metro

Prepared for: Oregon Metro

ECOnorthwest

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Acknowledgments

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That assistance notwithstanding, ECOnorthwest is responsible for the content of this report. The staff at ECOnorthwest prepared this report based on their general knowledge of the economics of recreation, amenities, and regional economies. ECOnorthwest staff contributing to this study included **Chris Blakney** and **Katherine Buck**. ECOnorthwest also relied on information derived from government agencies, private statistical services, the reports of others, interviews of individuals, or other sources believed to be reliable. ECOnorthwest has not independently verified the accuracy of all such information and makes no representation regarding its accuracy or completeness. Any statements nonfactual in nature constitute the authors' current opinions, which may change as more information becomes available.

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Executive Summary

Project background and understanding

The City of Sherwood has submitted an expansion of the Portland Metro urban growth boundary (UGB) for Sherwood West, which would include annexing 1,291 acres from the Urban Reserve area west of Sherwood. The Sherwood West Concept Plan includes land for housing, schools and civic facilities, park space, and 265 net acres for employment uses that would support about 4,500 new jobs. There could be an economic benefit to including additional large industrial sites in the UGB. ECOnorthwest explored regional and local data trends to assess whether an increase in employment land in Sherwood West would support economic growth for the Metro region.

Market supply as a tool to grow economic benefits for the Metro region

A diverse regional market supply of sites is essential to maintaining an equilibrium in market pricing and to supporting a broad range of industries. Therefore, the first component of the analysis is to understand the regional market supply of industrial and employment sites and to assess if the portfolio of sites has the characteristics necessary to attract the range of industries that are growing in the region. The analysis determined that there is a very low supply of larger industrial sites.

Site competitiveness to retain economic benefits in the Metro region

The second component of the analysis is to assess whether the land in the Sherwood West North District Mixed Employment Area (MEA) has characteristics that can better accommodate the growing industries than other parcels in Sherwood or the Metro region, which will support regional economic and business growth. Scoring higher than other regional land, the land within the MEA has characteristics that would appeal to industrial development, including 40-to-50-acre parcels, minimal site aggregation, slopes under 5 percent, and access to the highway. There have already been regional shifts with industrial companies locating in Sherwood and developers building new industrial space in Sherwood.

Findings

Based on the assessment of the market supply and the evaluation of the MEA, there are low vacancy rates in existing industrial buildings in the region and a lack of suitable land to support industrial uses, while there is a growing demand for industrial space in the region. Sherwood West would be well suited to capture the new and expanding demand for industrial space.

1. Sherwood West Concept Plan

The Sherwood West Concept Plan

The Metro Council reviews the regional 20-year land supply urban growth boundary (UGB) every six years and is currently reviewing the UGB in 2024. The City of Sherwood has requested a UGB expansion to include all or part of Sherwood West in 2024.

The Sherwood West Concept Plan, which was last updated March 2024, designates 265 net acres for employment uses across commercial (seven acres), mixed-use (25 acres), hospitality (63 acres), schools (40 acres), and mixed employment (130 acres), which is projected to create about 4,500 new jobs. The North District of Sherwood West—located south of Scholls-Sherwood Road, north of Chicken Creek, and west of Elwert Road— has the Mixed Employment Area (MEA), which would be the employment center for Sherwood West because it would contain 53 percent of the jobs and 49 percent of the employment acres proposed in the Sherwood West Concept Plan. Based on the Concept Plan, there could be about 18 jobs/ net acre for a total of 2,398 jobs in the MEA. Land in the northeast of this district is mostly flat, has large parcels, and has easy transportation to SW Roy Rogers Road, which is why the plan designated this area to support industry and employment.

The MEA is envisioned to include space for commercial, light industrial, and flex uses. The office space would be a minor component of the development program and would likely support mixed employment, campus, and/or mixed-use developments. The office space would likely be no more than 20,000 square feet with surface parking, and target tenants would be tech, medical, and service-oriented office space, or a “hub and spoke” or satellite office. Most of the employment uses for the MEA would be for light industrial and flex uses. The plan defines flex space as “a building that provides for a combination of uses, typically including a mix of warehouse, light industrial, office, and/or retail space." The MEA has an employment focus, but there would also be a mix of housing north of Chicken Creek and a 13-acre community park.

The approach to the Sherwood West Concept Plan is to create a vision that can be implemented over time, as it is expected that development will happen incrementally. The goal would be to create a zoning system that works both in the short term and long term, and regulations should be designed to be flexible and adaptable to changing conditions. Development is anticipated to take five or six years for development to start occurring in Sherwood West after the site is brought into the UGB, and a full build-out of the region would take several decades.[1]

[1] Sherwood West Concept Plan. March 5, 2024.

2. Regional Industrial Market Supply

To support economic and business growth in the Metro region, it is important to have the supply of sites to foster business growth and expansion. A regional market supply of sites can maintain an equilibrium in market pricing and help to buildout a portfolio of sites with characteristics that attract a broad range of growing industries. The North District Mixed Employment Area (MEA) could expand the supply of suitable sites to support industry growth. The review of industrial space also includes the square footage and trends of flex space in the region.

Metro region industrial square footage

Within the Metro region, industrial buildings were analyzed for the following cities: Forest Grove, Cornelius, Hillsboro, Beaverton, Tigard, King City, Durham, Tualatin, Sherwood, Wilsonville, Rivergrove, Lake Oswego, Portland, Milwaukie, West Linn, Gladstone, Oregon City, Johnson City, Happy Valley, Maywood Park, Gresham, Fairview, Troutdale. The cities of Rivergrove, Johnson City, King City, and Maywood did not have any existing industrial buildings. There are 4,806 industrial buildings in the Metro region and almost two-thirds of the buildings are in the City of Portland. Sherwood currently has 88 industrial buildings and two percent of the industrial buildings in the Metro region (Exhibit 1).

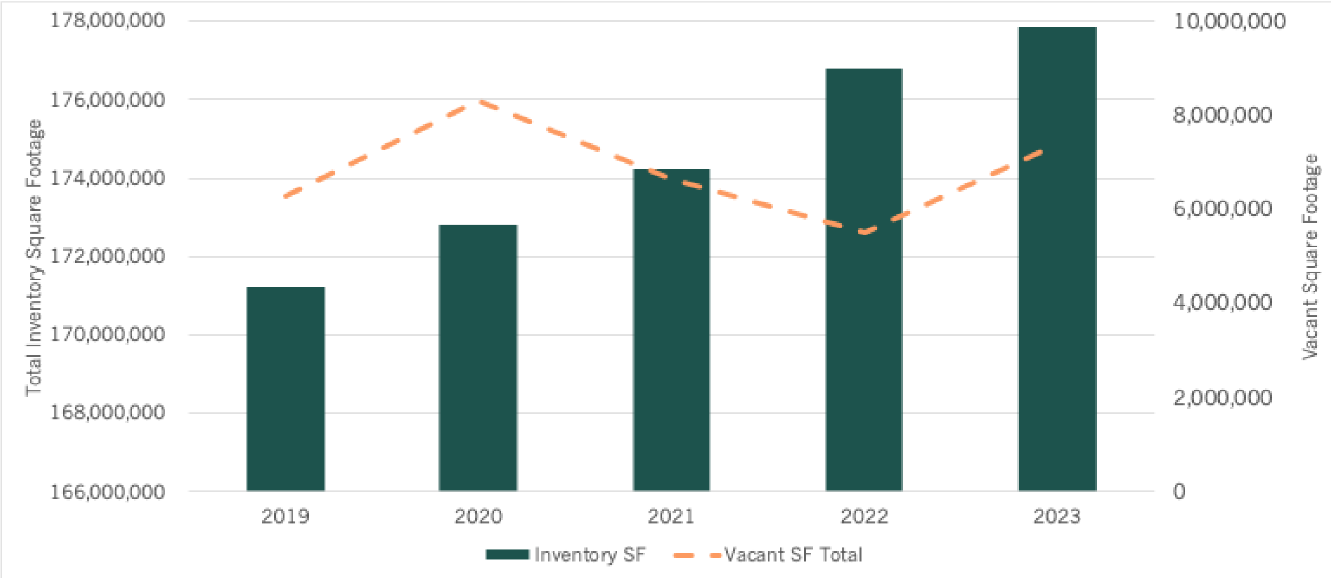
Exhibit 1. Number of Industrial Buildings in the Metro Region by City, 2024

City	Number of Industrial Buildings	Percent of Regional Industrial Buildings
Portland	3,153	65.6%
Hillsboro	318	6.6%
Tualatin	317	6.6%
Beaverton	148	3.1%
Milwaukie	118	2.5%
Wilsonville	107	2.2%
Gresham	102	2.1%
Oregon City	90	1.9%
Tigard	90	1.9%
Sherwood	88	1.8%
Troutdale	77	1.6%
Forest Grove	61	1.3%
Lake Oswego	54	1.1%
Cornelius	32	0.7%
Fairview	23	0.5%
Gladstone	11	0.2%
West Linn	8	0.2%
Happy Valley	7	0.1%
Durham	2	0.0%
Metro Region Total	4,806	100%

Source: CoStar

There has been a four percent increase in the amount of industrial square footage in the region with a total of about 178 million square feet of industrial space in 2023. During this time, the amount of vacant space peaked in 2020 and decreased over time until 2023 (Exhibit 2).

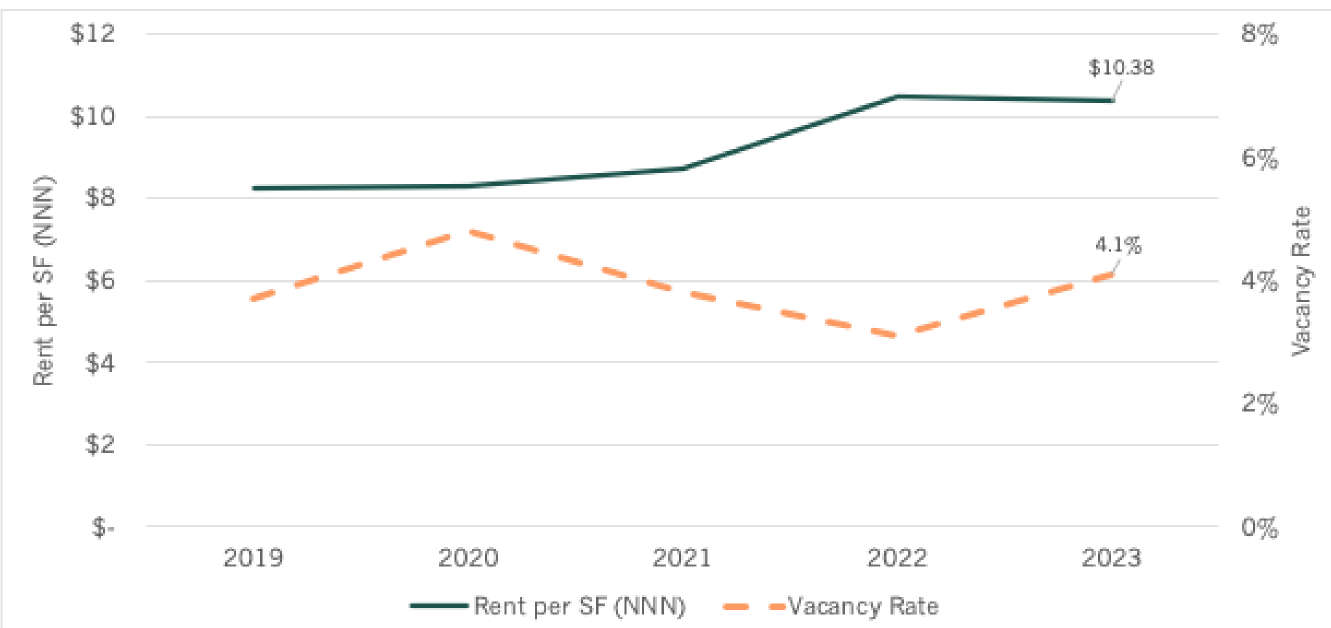
Exhibit 2. Total Industrial Space and Vacant Industrial Space in Metro Region, 2019-2023



Source: CoStar

The Metro region vacancy rate for industrial space has remained consistently under 5 percent since 2019 and was 4.1 percent for 2023. During this time, industrial rents have steadily increased from $8.24 per square foot in 2019 to $10.38 per square foot in 2023 (Exhibit 3).

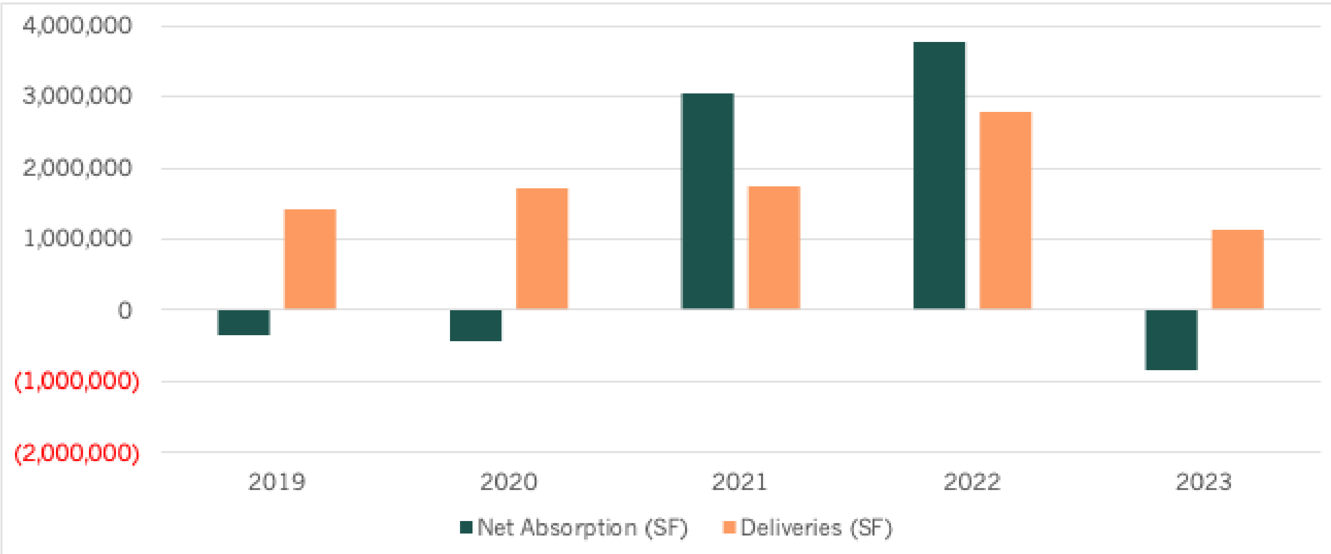
Exhibit 3. Industrial Rent and Vacancy in Portland Metro Region, 2019-2023



Source: CoStar

Since 2019, almost nine million square feet of industrial space has been developed in the Metro region across 84 buildings. In 2022, there was the largest share of industrial deliveries (2.8 million square feet). Net absorption for the Metro region—which is measured by the total square feet occupied minus the total space vacated—has fluctuated between being negative and positive. However, the negative absorption has been less than 500,000 square feet in 2019 and 2020, and less than one million in 2023, which could represent 1 or 2 leases ending. In 2021 and 2022, net absorption was over three million square feet per year, which indicates that three million more industrial square footage was being leased per year than becoming vacant, even as 4.5 million square feet was developed in 2021 and 2022 (Exhibit 4).

Exhibit 4. Industrial Absorption and Deliveries in the Metro Region, 2019-2023



Source: CoStar

When looking specifically at industrial buildings that are 100,000 square feet or larger, there is a much smaller share of these buildings in the Metro Region. Of the 4,806 industrial buildings in the region, only 8 percent of buildings (391) are 100,000 square feet or more. Over half of the larger industrial buildings are in Portland, and Sherwood has 3 percent (11 buildings) that are 100,000 square feet or larger (Exhibit 5).

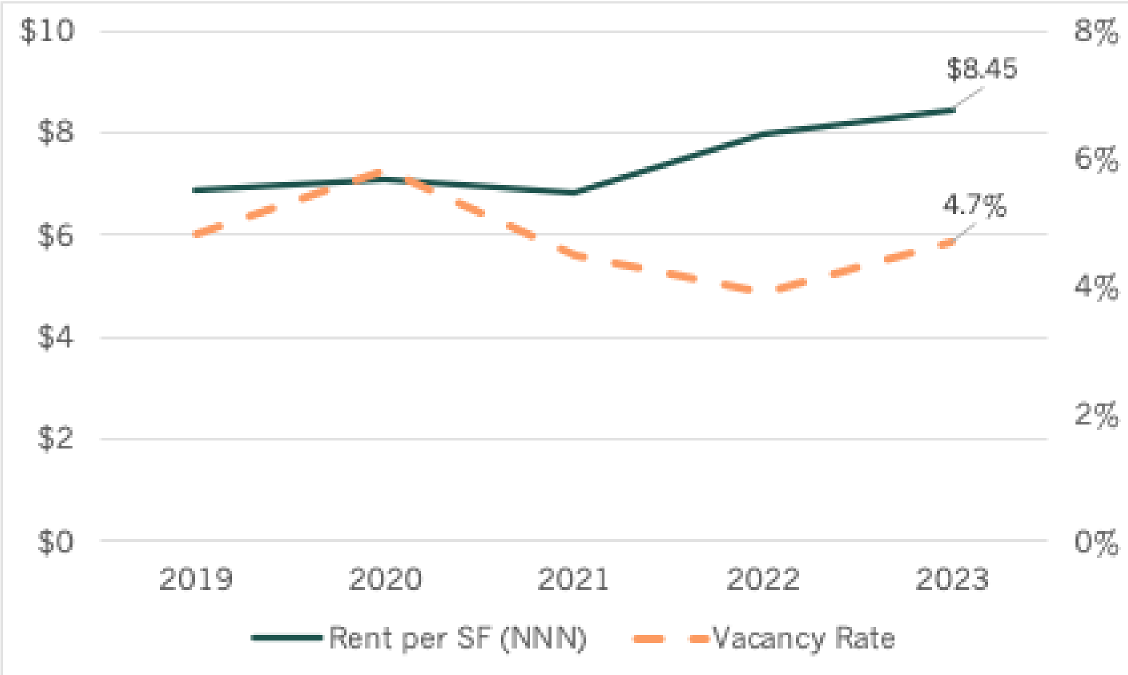
Exhibit 5. Number of Large Industrial Buildings in the Metro Region by City, 2024

City	Number of Industrial Buildings ≥ 100,000 SF	Percent of Regional Large Industrial Buildings
Portland	215	55%
Hillsboro	43	11%
Tualatin	28	7%
Milwaukie	23	6%
Wilsonville	19	5%
Beaverton	17	4%
Sherwood	11	3%
Gresham	10	3%
Fairview	7	2%
Tigard	6	2%
Forest Grove	4	1%
Troutdale	4	1%
Cornelius	2	1%
Lake Oswego	2	1%
Metro Region Total	391	100%

Source: CoStar

The vacancy rate for industrial buildings in the Metro region that are greater than 100,000 square feet has remained under 5 percent since 2021. Since 2019, the average triple net rent for larger industrial buildings have increase by 23 percent ($1.58 per square foot) and were $8.45 per square foot in 2023 (Exhibit 6). While the average rent for larger buildings is less than the average rent for all buildings, this is likely due to economies of scale of leasing a larger building with more square footage.

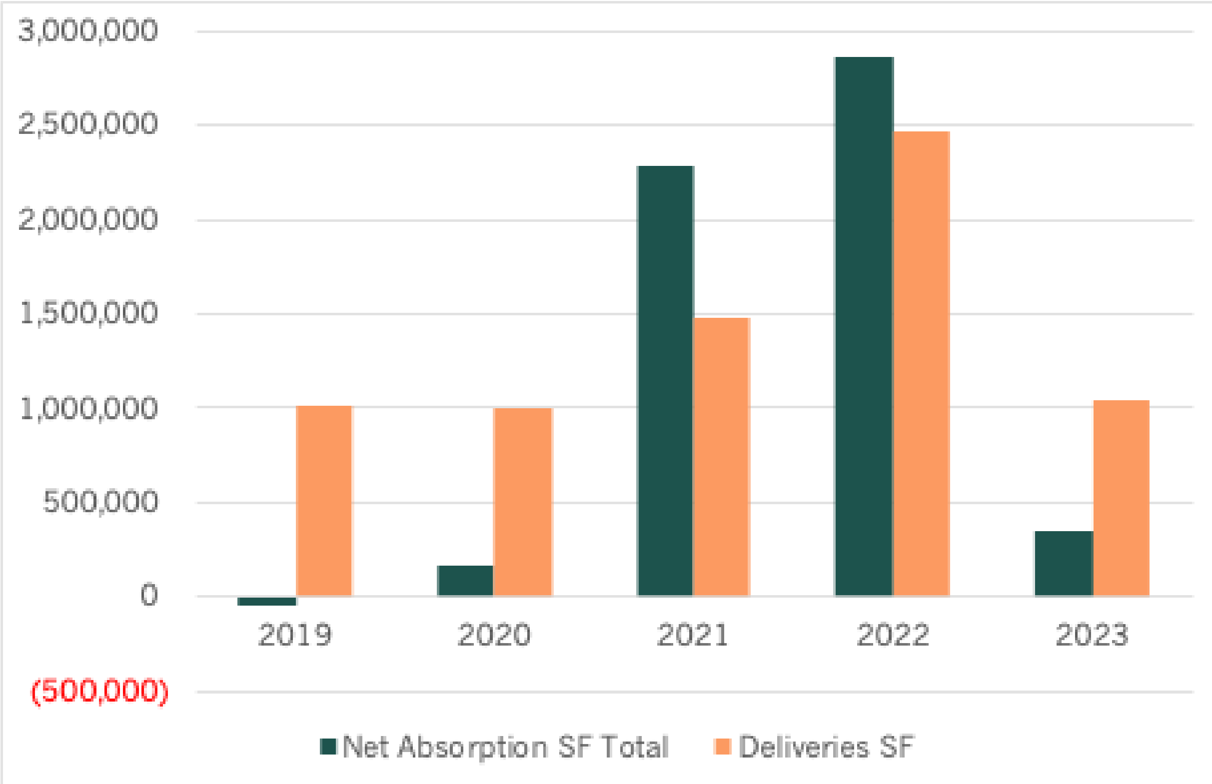
Exhibit 6. Industrial Rent and Vacancy Rates for Large Buildings in the Metro Region, 2019-2023



Source: CoStar

Between 2019 and 2023, 7 million square feet of industrial buildings (sized 100,000 square feet or larger) were developed in the region across 33 buildings. This indicates that 39 percent of the industrial buildings built between 2019 and 2023 equal or are greater to 100,000 square feet, which shows the trend towards new industrial companies needing larger spaces. Absorption for larger buildings was negative in 2019, and positive between 2020 and 2023 even while absorption for all buildings was negative, showing the importance of larger industrial product for the region.

Exhibit 7. Large Building Industrial Absorption and Deliveries in Metro Region, 2019-2023

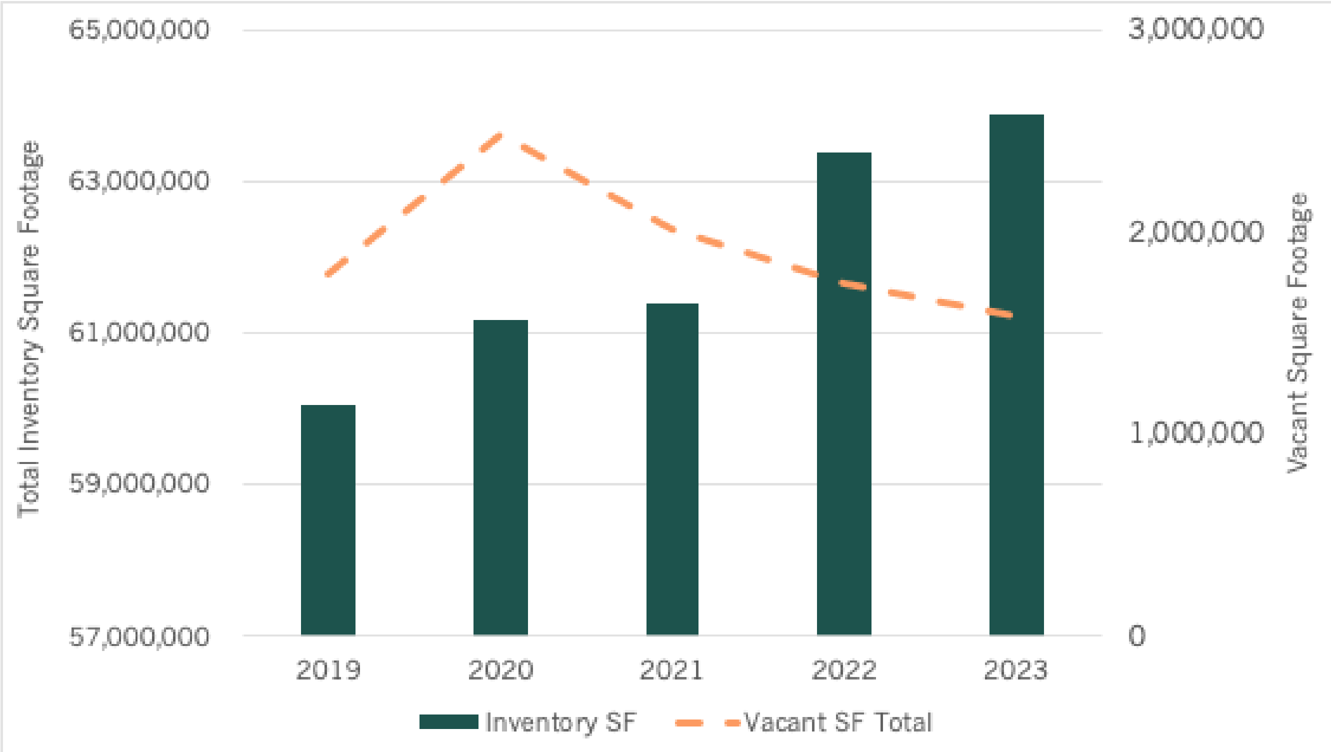


Source: CoStar

Low vacancy for existing industrial space in Washington County

In 2023, Washington County had almost 64 million square feet of industrial space, a 6 percent increase (3.8 million square feet) of total industrial supply since 2019. The amount of vacant square footage of industrial space has peaked in 2020 at just over 2.48 million square feet (Exhibit 8).

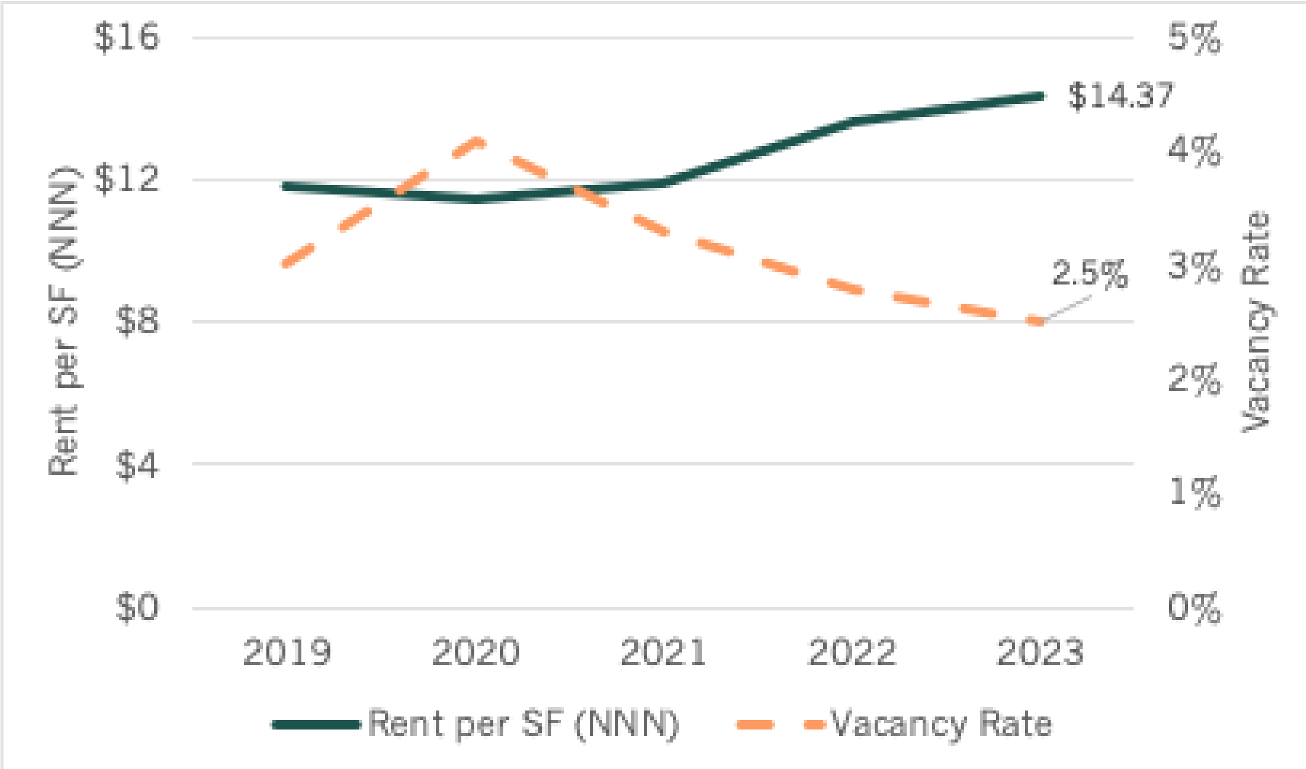
Exhibit 8. Total Industrial Space and Vacant Industrial Space in Washington County, 2019-2023



Source: CoStar

In Washington County, the triple net rent per square foot (a lease agreement in which the tenant is responsible for all expenses) has steadily increased over the last five years while vacancy rates have remained below 5 percent during this time frame, indicating a strong industrial market in the county. Between 2019 and 2023 rents increased by 21 percent ($2.54) per square foot. During the same timeframe, the vacancy rate peaked at 4.1 percent in 2020 and dropped to 2.5 percent for 2023 (Exhibit 9).

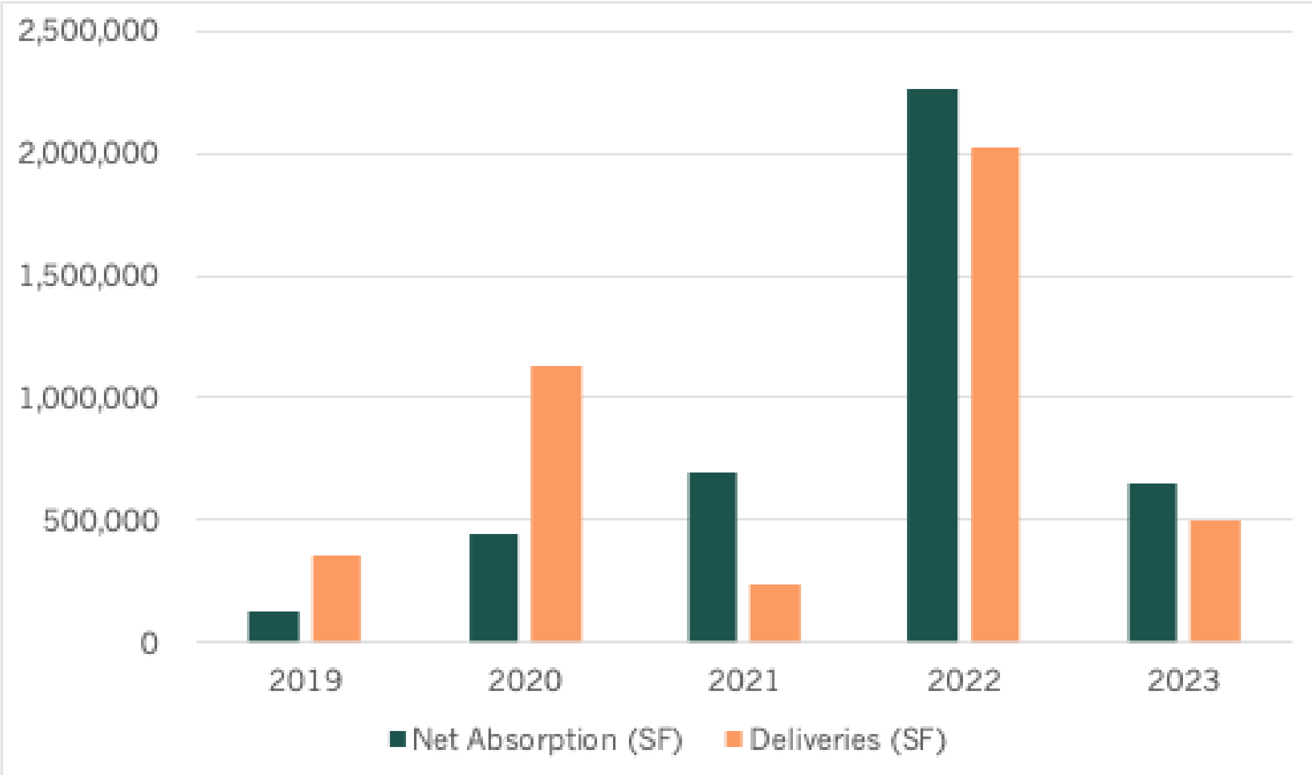
Exhibit 9. Industrial Rent and Vacancy in Washington County, 2019-2023



Source: CoStar

Since 2019, there has been over 4.4 million square feet of new industrial and flex space delivered in Washington County across 43 industrial and flex buildings. Net absorption—which is measured by total square feet occupied minus the total space vacated—was positive between 2019 and 2023 and indicates that more industrial square footage was being leased than becoming vacant even as new industrial developments were built (Exhibit 10). The cool down in the market with space absorption and deliveries is likely a reflection of national development trends.

Exhibit 10. Industrial & Flex Absorption and Deliveries in Washington County, 2019-2023

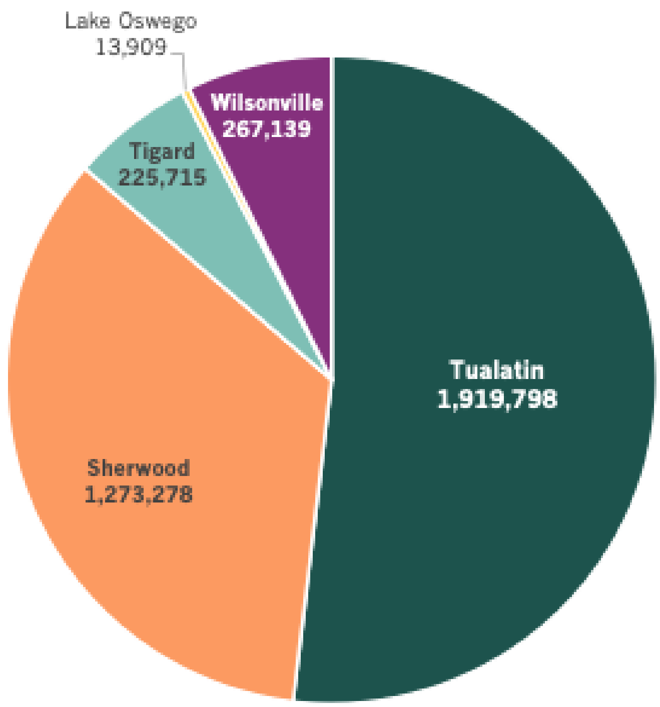


Source: CoStar

Industrial and flex building characteristics in the South Metro Region

Within the South Metro Region, including Sherwood, Tualatin, Tigard, Wilsonville, and Lake Oswego, there is just under 3.7 million square feet of industrial and flex space. About 52 percent of the industrial and flex space is in Tualatin, followed by 34 percent of the space in Sherwood. The remaining industrial and flex square footage in the South Metro Region is in Wilsonville (7 percent), Tigard (6 percent), and Lake Oswego (0.4 percent) (Exhibit 11).

Exhibit 11. Total Industrial & Flex Square Footage in South Metro Region, 2024 YTD

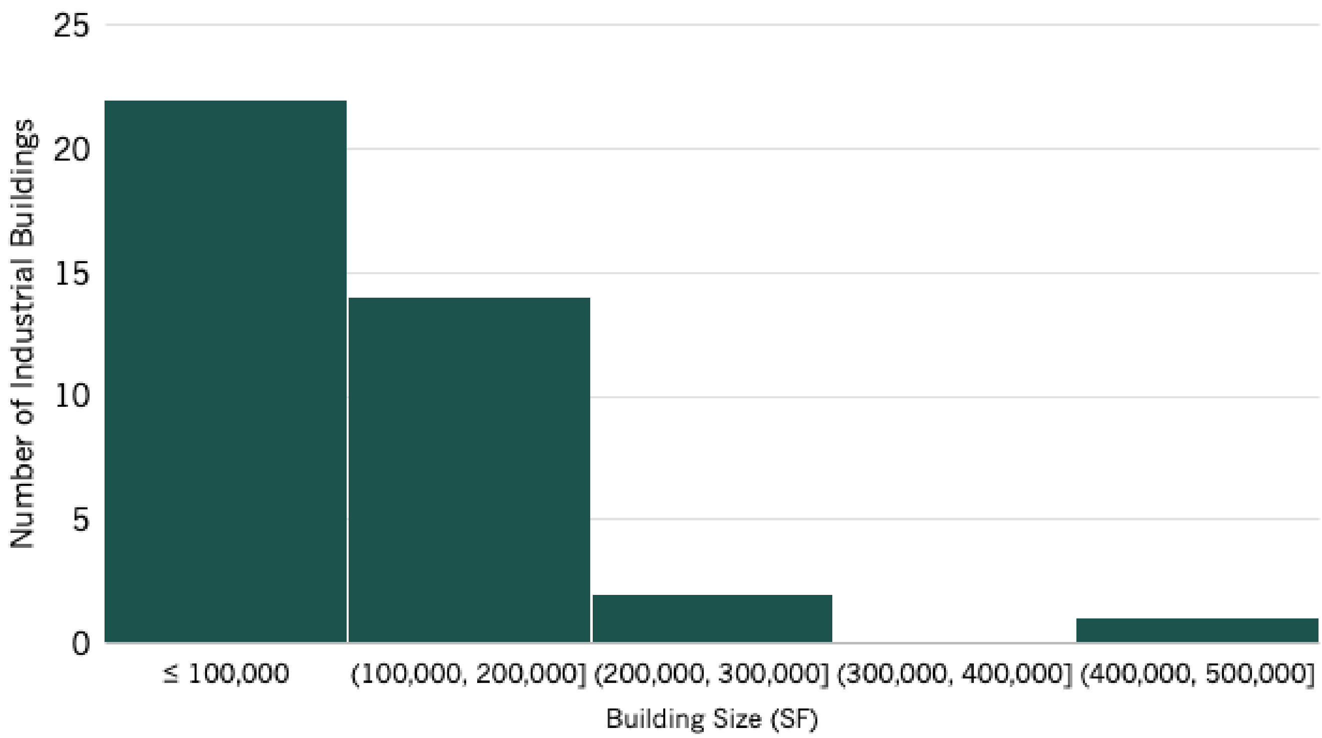


Source: CoStar

Size of industrial product in the South Metro Region

In the past five years, the typical size of industrial buildings constructed in the South Metro Region has been under 100,000 square feet (22 buildings). Fourteen buildings were between 100,000-200,000 square feet, and only three developments in the past five years have exceeded 200,000 square feet (Exhibit 12).

Exhibit 12. Size of Industrial Buildings Built in the South Metro Region, 2019-2024



Source: CoStar

Type of industrial product built since 2019

Within the industrial product type, CoStar delineates the properties into a secondary type based on their use, size, and amenities to industrial users. CoStar utilizes the following definitions for the secondary types of industrial space:

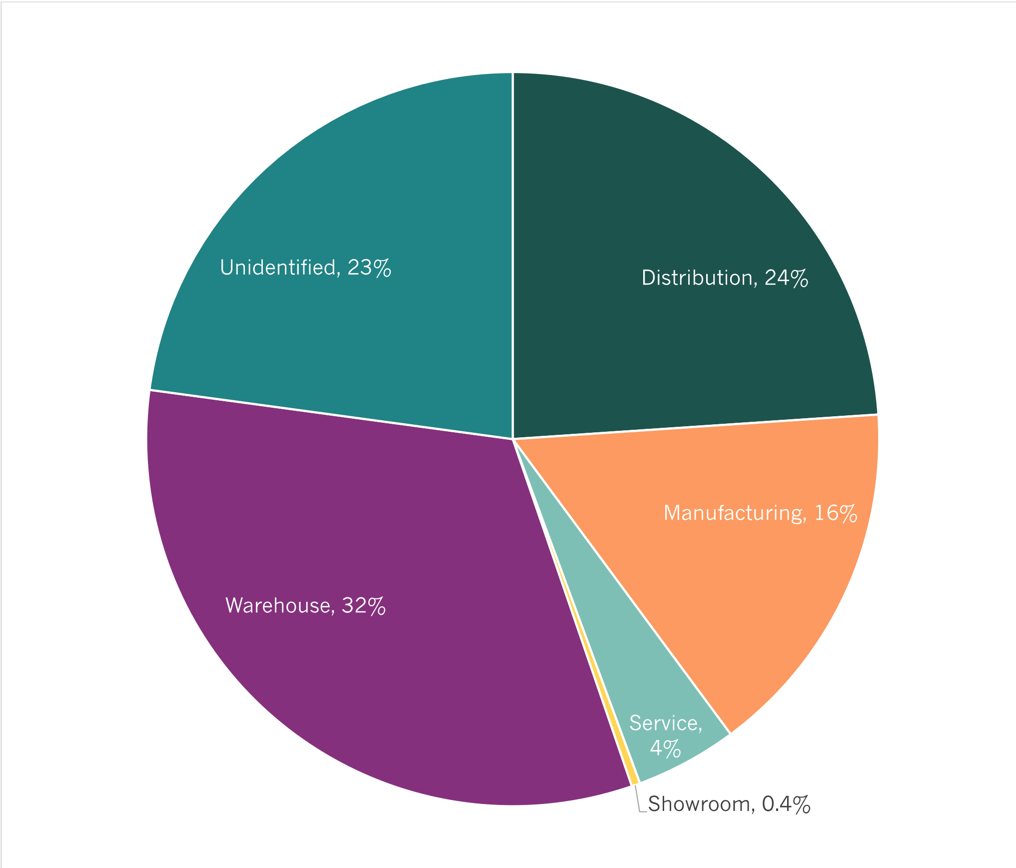
- Distribution–Spaces used for warehousing and distribution of inventory, that are typically 200,000 square feet or more, have clear heights of 28 feet, are less than 5 percent office space, and have site coverage that can be up to 40 percent.
- Warehouse–Buildings that are 25,000 square feet or greater, are up to 20 percent office area, have clear heights of 22 feet or greater, and have site coverage up to 50 percent.
- Manufacturing–Buildings that are typically 300,000 square feet or greater with an office area up to 50 percent.
- Service–Buildings designated for vehicle repair.
- Showroom–Buildings that displays merchandise and can range from 25,000 square feet to 150,000 square feet with office areas up to 30 percent.[2]

In the South Metro Region, 56 percent of the industrial space built since 2019 and proposed through 2026 is distribution and warehouse space. About 23 percent of the space

[2] CoStar Glossary

was not identified by a secondary type and 16 percent of the space supports manufacturing (Exhibit 13).

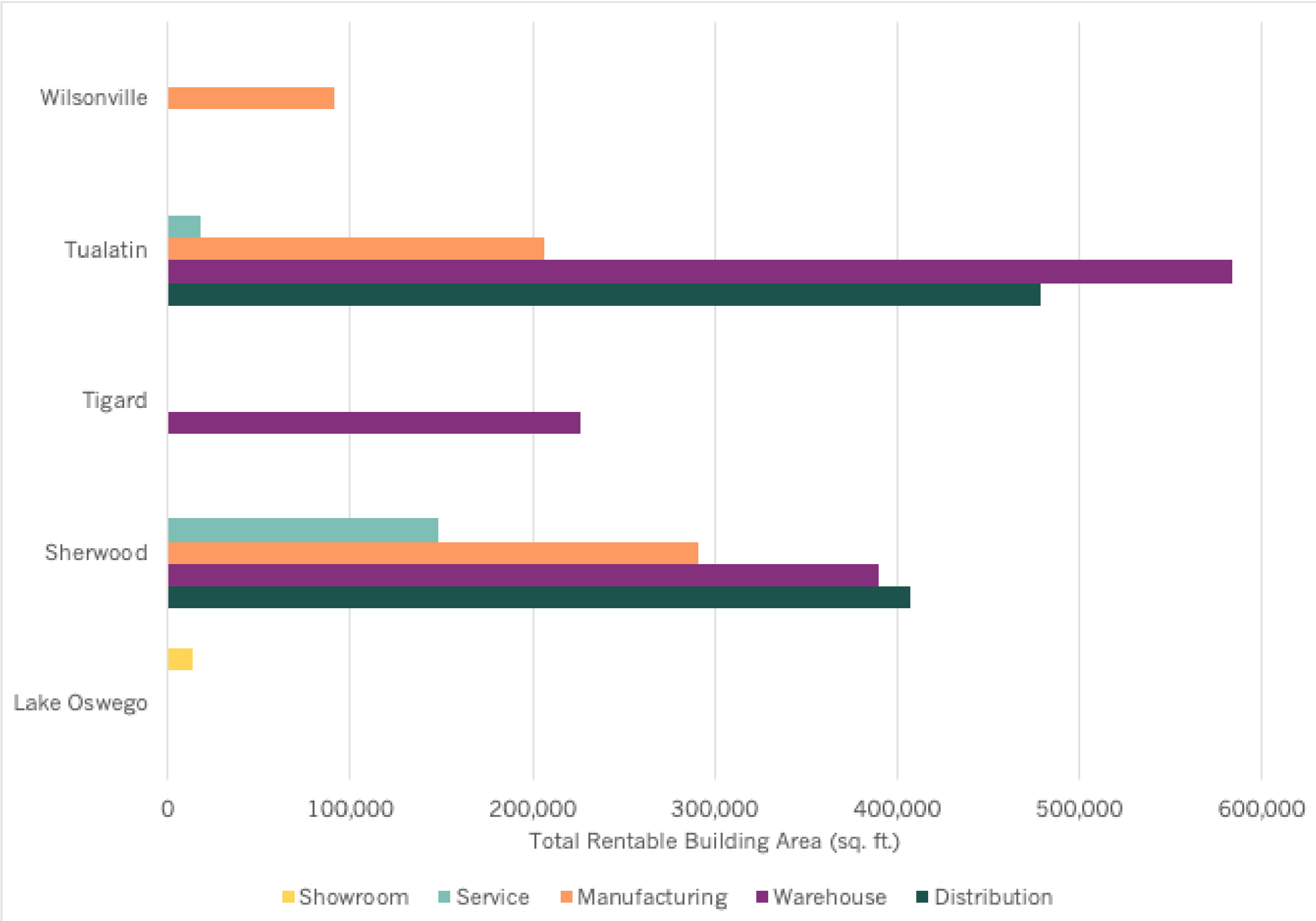
Exhibit 13. Secondary Industrial Space Built in Region, 2019-2026



Source: CoStar

Since 2019, warehouse space (followed by distribution space) was the most common type of industrial space built in this region. Within their city limits, Tualatin and Sherwood have distribution, warehouse, manufacturing, and service industrial space built since 2019 within their city limits. Sherwood had over 291,000 square feet of manufacturing space built since 2019 and proposed through 2026, which is more manufacturing square footage than the other cities during this time frame (Exhibit 14).

Exhibit 14. Secondary Industrial Space Built in Region, 2019-2026



Source: CoStar

Across the South Metro Region, there are eight industrial properties that are identified as manufacturing. These properties are in Sherwood, Tualatin, and Wilsonville; Sherwood has the highest rentable building area (RBA) in square footage and the most acres of land devoted to manufacturing (Exhibit 15). Sherwood has been attracting manufacturing to its city.

Exhibit 15. Size of Manufacturing Properties Built or Proposed in South Metro Region, 2019-2026

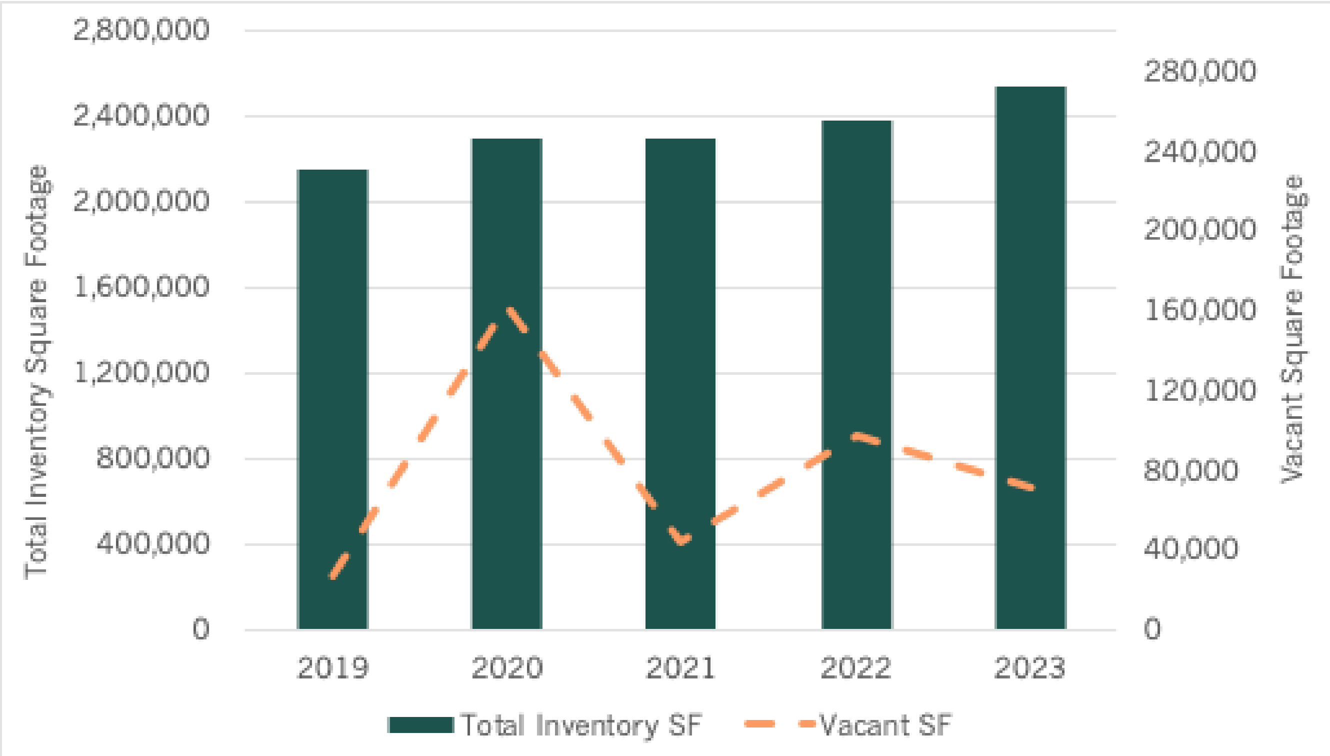
Location	No of Buildings	Total RBA	Average RBA per Building	Total Land Area (AC)	Average Building Lot Size (AC)	Minimum Lot Size (AC)	Maximum Lot Size (AC)
Sherwood	3	291,141	97,047	62	21	1	30
Tualatin	4	206,375	51,594	17	4	2	5
Wilsonville	1	91,773	91,773	6	6	6	6
All Locations	**8**	**589,289**	**73,661**	**85**	**11**	**1**	**30**

Source: CoStar

Sherwood Industrial Supply

Since 2019, the City of Sherwood has seen an 18 percent increase in the amount of industrial and flex space within the city limits, a gain of 393,200 square feet. The amount of vacant square footage peaked in 2020 at about 162,000 square feet and has since declined even as the new space is introduced to the market (Exhibit 16).

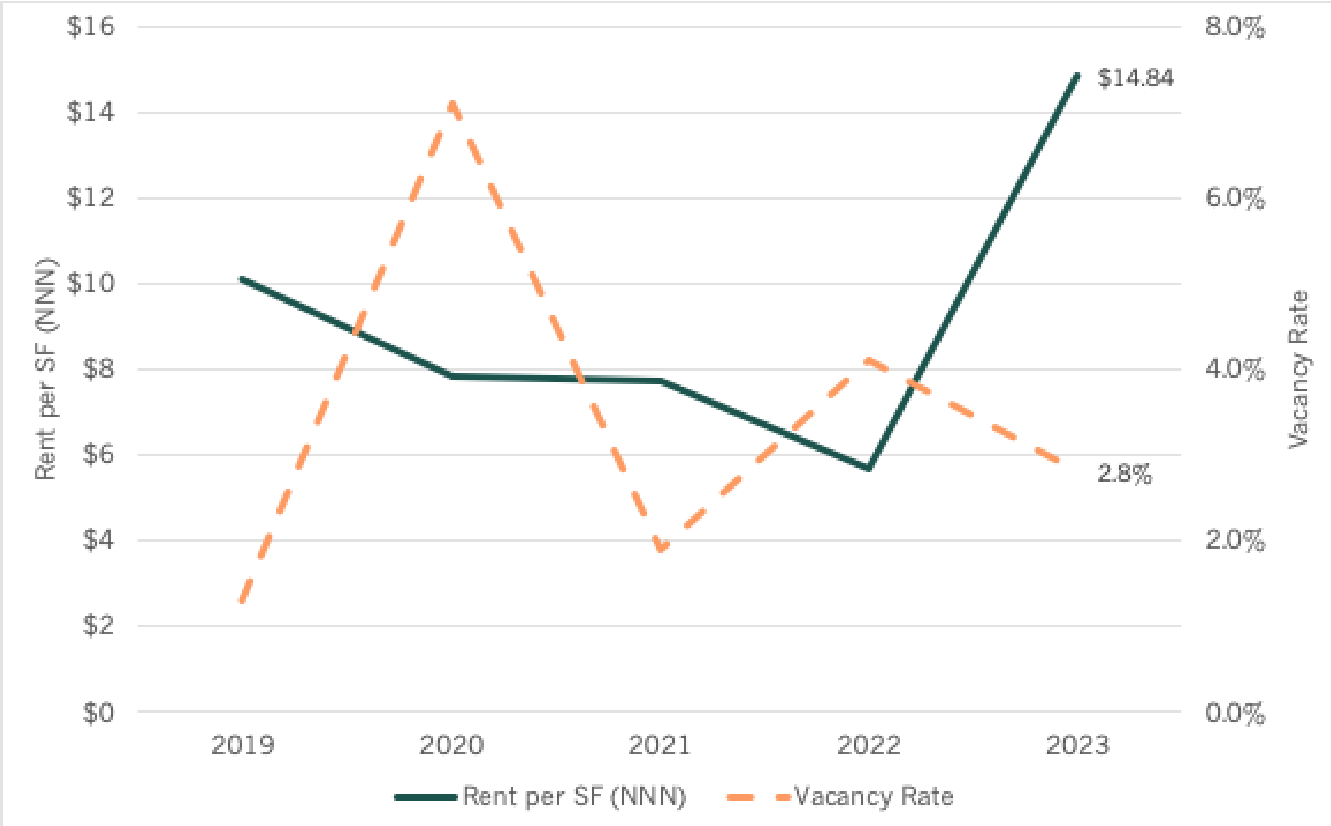
Exhibit 16. Total Industrial Space and Vacant Industrial Space in Sherwood, 2019-2023



Source: CoStar

The triple net industrial and flex rents in Sherwood steadily declined between 2019 and 2022, but they drastically increased by 47 percent (by $4.75 per square foot) between 2019 and 2023. The current triple net lease rates are $14.84 per square feet. During this timeframe, the industrial and flex industrial vacancy rate peaked in 2020 at 7.1 percent but remained under 5 percent between 2021 and 2023. For 2023, the vacancy rate is 2.8 percent (Exhibit 17). The increasing rents and stabilized vacancy under 5 percent indicate a strong industrial market in Sherwood and could attract new industrial development.

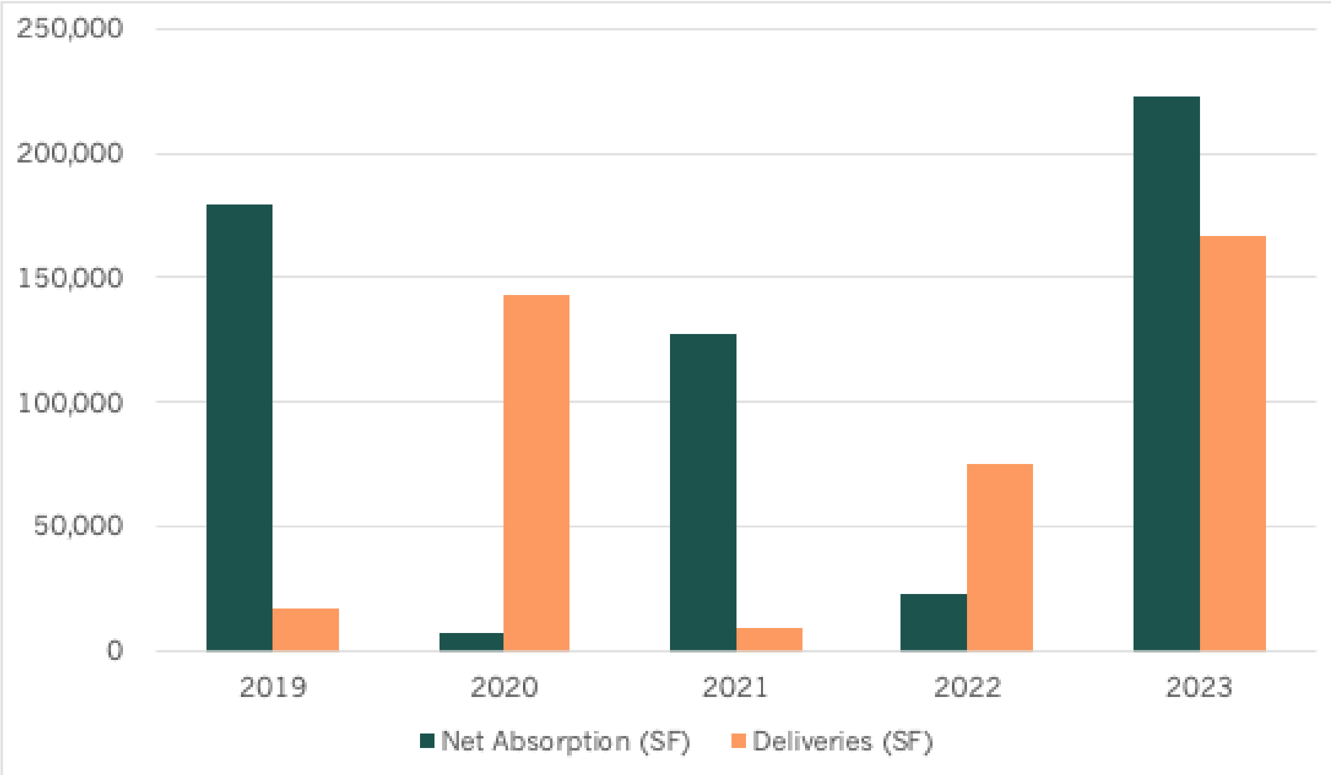
Exhibit 17. Industrial & Flex Rents and Vacancy in Sherwood, 2019-2023



Source: CoStar

Over the past five years, there have been seven new industrial and flex buildings delivered to the Sherwood market, adding 410,000 square feet of new industrial space between 2019 through 2023. Companies are leasing this new space as the net absorption remained positive between 2019 and 2023 (Exhibit 18).

Exhibit 18. Industrial & Flex Absorption and Deliveries in Sherwood, 2019-2023

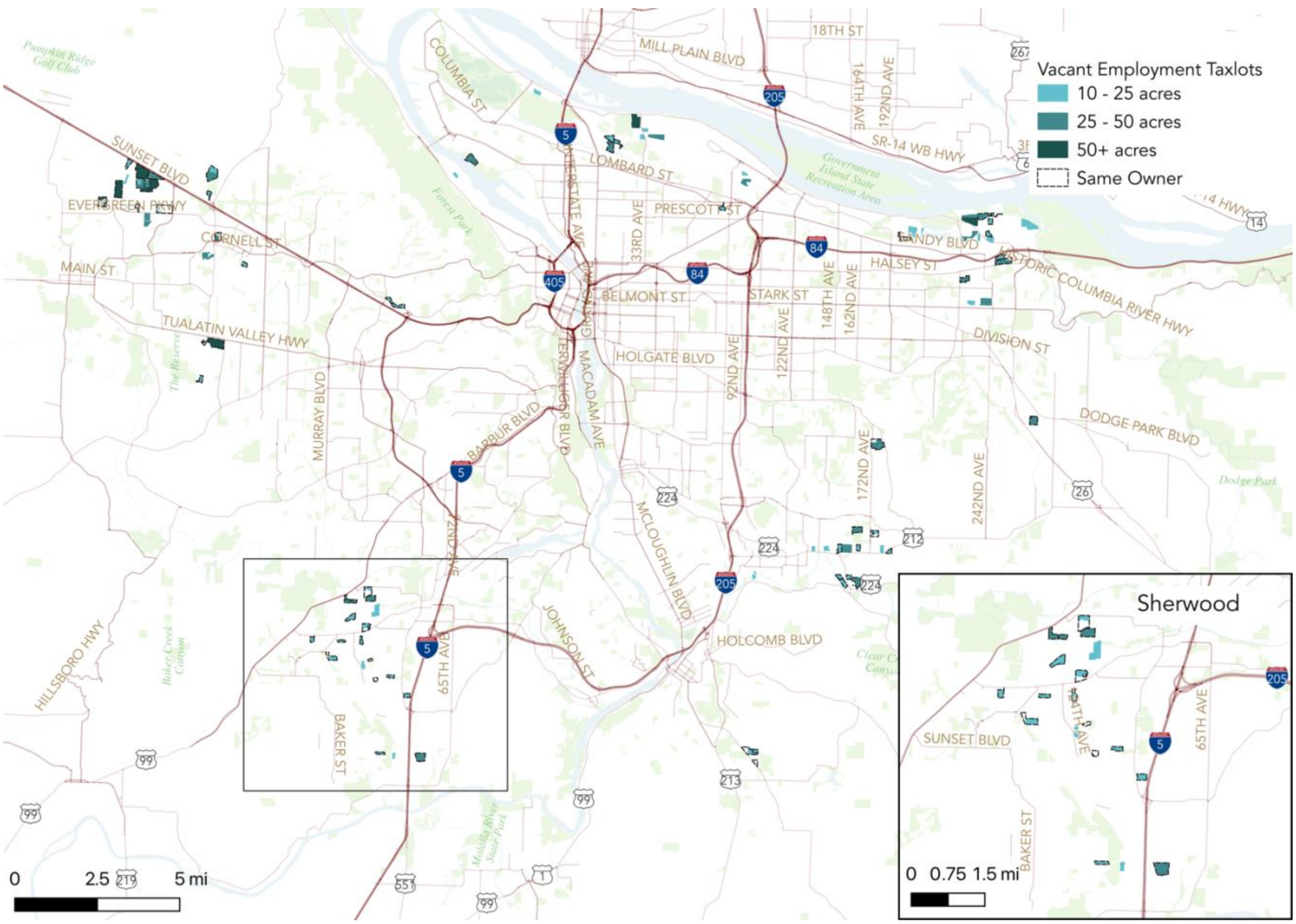


Source: CoStar

3. Regional Land Supply for Industrial Uses

When looking at land that could be suitable for industrial uses in the greater Metro region, Mackenzie created a Large Lot Inventory (LLI) to support the Buildable Lands Inventory (BLI) in 2018. The LLI identified employment capacity from vacant land and potential redevelopment. When looking at the Metro region, there are some scattered vacant taxlots that can accommodate new employment uses. The map below shows there are 104 vacant sites that are larger than 10 acres and are zoned for commercial, industrial, or mixed-use (Exhibit 19). However, ten acres may be too small for some of the industrial users when looking for land and may require assemblage of parcels, and parcels with the dashed box indicate the same owner which could facilitate assembling parcels.

Exhibit 19. Vacant Employment Taxlots Larger than 10 Acres in the Metro Region, 2018

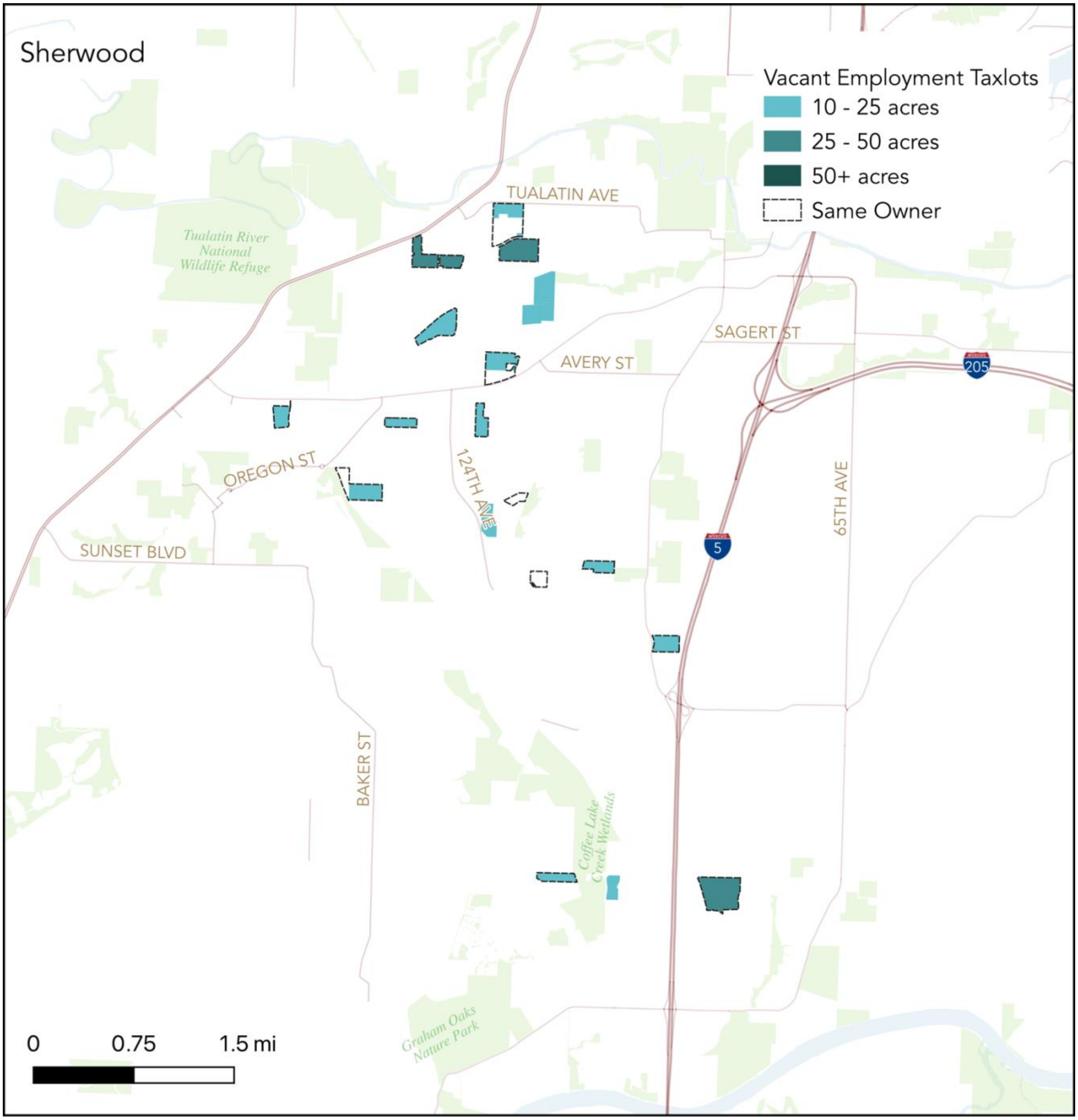


Source: Mackenzie (2018), ECOnorthwest (2024)

Parcel size in Sherwood

When looking at existing vacant taxlots to serve employment uses that were identified in the BLI, there are some taxlots between 10 and 49 acres, however there are no taxlots that are 50 acres or greater. Only three of the taxlots are greater than 25 acres (Exhibit 20).

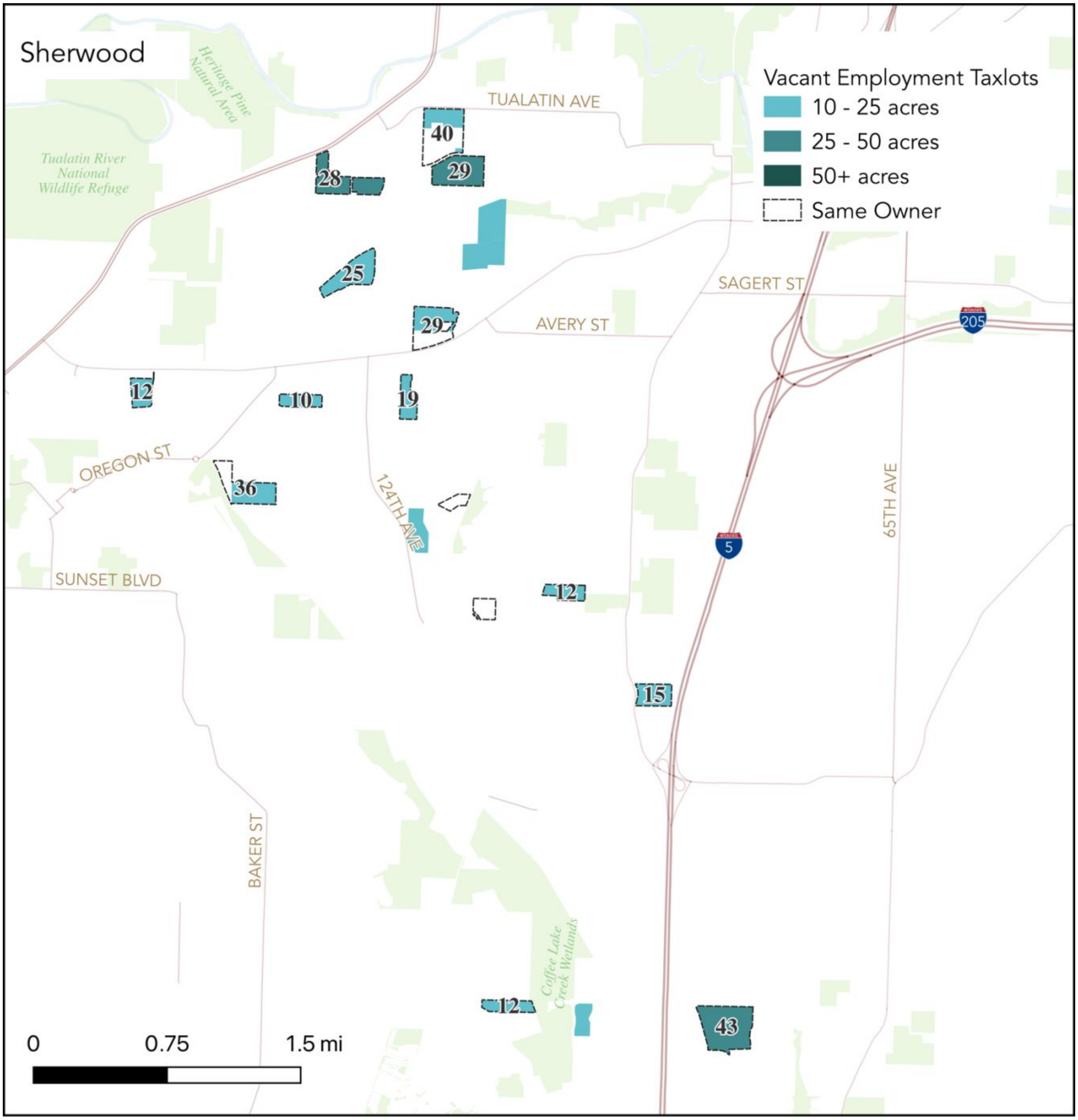
Exhibit 20. Vacant Employment Taxlots in Sherwood by Size, 2018



Source: ECOnorthwest (2024)

While many of the existing sites would be too small to support many industrial users, it is possible that some of the sites could be assembled to create larger lots. Land assemblage is easier when the lots have the same ownership. When reviewing whether any of the sites could be assembled with adjacent sites with the same owner, there are a few opportunities to assemble sites into a larger parcel. However, none of the assembled parcels are greater than 50 acres (Exhibit 21).

Exhibit 21. Vacant Employment Taxlots in Sherwood by Site Aggregation, 2018



Source: ECOnorthwest (2024)

Parcel slope constraints of regional land

When looking at the regional land and its ability to support industrial uses, the slope of the site has an impact of the suitably to support employment uses. The BLI removes sites that have slopes over 25 percent and for this site characteristics analysis, areas with slopes over 7 percent are identified.

- Unconstrained: 10 percent or less of the tax lot has steep slopes
- Partially Constrained: 10.01 percent to 50 percent of the tax lot has steep slopes
- Constrained: 50 to 89.99 percent of the lot has steep slopes
- Heavily Constrained: Greater than 90 percent of the site has steep slopes

Of the BLI sites, about 55 percent of the sites and 44 percent of the acres, fall into the unconstrained slope category, which would be the most feasible sites to develop for industrial uses. About one quarter of the parcels (24 percent) are partially constrained sites that could support some industrial uses. Twenty-one percent of the parcels are constrained or heavily constrained with over half of the lot having a steep slope; these parcels are not suitable for supporting industrial uses (Exhibit 22).

Exhibit 22. BLI Taxlots by Slope Site Constraints, 2018

Market Subarea	Unconstrained		Partially Constrained		Constrained		Heavily Constrained		Total	
	Parcels	Acres	Parcels	Acres	Parcels	Acres	Parcels	Acres	Parcels	Acres
Central	**346**	**10**	**49**	**3**	**52**	**2**	**33**	**2**	**480**	**16**
Commercial	92	5	13	1	14	0	15	1	134	8
Industrial	254	4	36	2	38	2	18	1	346	9
East Multnomah	**335**	**481**	**180**	**706**	**94**	**290**	**37**	**30**	**646**	**1,507**
Commercial	163	88	37	54	23	62	21	4	244	207
Industrial	170	349	131	593	61	224	12	25	374	1,192
Large Lot Industrial	2	44	12	58	10	5	4	1	28	108
Inner Clackamas	**71**	**4**	**30**	**69**	**17**	**4**	**9**	**1**	**127**	**79**
Commercial	44	1	3	-	6	1	3	-	56	2
Industrial	27	3	27	69	11	4	6	1	71	77
Inner I-5	**13**	**2**	**3**	**0**	**1**	**0**	**6**	**0**	**23**	**3**
Commercial	12	1	3	0	1	0	5	0	21	1
Industrial	1	1					1	-	2	1
Inner North & East	**637**	**389**	**241**	**605**	**124**	**73**	**132**	**22**	**1,134**	**1,089**
Commercial	146	7	26	6	17	2	31	1	220	15
Industrial	485	314	208	518	106	70	100	20	899	922
Large Lot Industrial	6	69	7	81	1	1	1	2	15	153
Inner Westside	**295**	**52**	**196**	**65**	**104**	**24**	**70**	**8**	**665**	**148**
Commercial	267	39	161	40	84	6	66	4	578	89
Industrial	28	13	35	25	20	18	4	4	87	59
Outer Clackamas	**179**	**232**	**133**	**252**	**80**	**157**	**60**	**15**	**452**	**655**
Commercial	87	16	57	18	39	10	50	6	233	49
Industrial	92	216	76	234	36	117	10	9	214	577
Large Lot Industrial					5	30			5	30
Outer I-5	**180**	**351**	**180**	**504**	**95**	**273**	**40**	**20**	**495**	**1,148**
Commercial	71	9	48	13	20	18	17	3	156	43
Industrial	84	245	115	437	62	178	19	11	280	871
Large Lot Industrial	25	97	17	54	13	76	4	6	59	234
Outer Westside	**644**	**1,318**	**158**	**504**	**44**	**48**	**8**	**0**	**854**	**1,871**
Commercial	428	57	68	29	20	14	5	0	521	100
Industrial	197	825	85	350	23	34	3	0	308	1,210
Large Lot Industrial	19	436	5	125	1	0			25	561
Grand Total	**2,700** **55%**	**2,840** **44%**	**1,170** **24%**	**2,706** **42%**	**611** **13%**	**870** **13%**	**395** **8%**	**99** **2%**	**4,876** **100%**	**6,515** **100%**

Source: Metro, ECOnorthwest

4. Employment Trends

To understand future demand for space to support employment growth, an analysis of the Quarterly Census of Employment and Wages (QCEW) was conducted for Washington, Clackamas, and Yamhill Counties. The data is analyzed by industries identified by the North American Industry Classification System (NAICS), which federal agencies use as the standard to collect and analyze the business economy.

The analysis includes the employment growth trends between 2017 and 2022 for all sectors and the growth trends for the NAICS codes of sectors that utilize industrial land. Since most of the employment land in the Sherwood West Concept Plan is part of the MEA, which identifies primarily serving flex and light industrial uses, it is important to understand the employment trends for the industrial space users. The typical NAICS codes and industries that utilize industrial space include:

- 22 Utilities: This sector has businesses that provide: electrical power, natural gas, steam supply, water supply, and sewage treatment and disposal.
- 23 Construction: This sector includes construction of buildings or engineering projects.
- 31–33 Manufacturing: This sector comprises establishments engaged in the mechanical, physical, or chemical transformation of materials, substances, or components into new products.
- 42 Wholesale Trade: This sector includes establishments that participate in wholesaling merchandise (typically without transformation) and rendering services incidental to the sale of merchandise. The merchandise includes the outputs of agriculture, mining, and manufacturing, and it can include information industries, such as publishing.
- 48–49 Transportation and Warehousing: This sector includes industries that provide transportation for passengers and cargo, warehousing and storage for goods, scenic and sightseeing transportation, and support activities related to modes of transportation, including transport by air, rail, water, road, and pipeline.[3]

Regional employment growth between 2017 and 2022

Between 2017 and 2022, there has been fluctuations in regional employment by industry with an overall net loss of 2 percent of employees (1,829) for an annual average growth rate (AAGR) of -0.4 percent. The construction industry had the highest AAGR of any industry at 3.4 percent, with a total increase in employment of 18 percent (1,620) between 2017 and 2022. The natural resources sector lost 40 percent of its employees (62) and had the lowest AAGR of -9.7 percent This region is seeing strength in the industrial sectors and a decline in the service sectors.

[3] North American Industry Classification System. US Census Bureau. https://www.census.gov/naics/?99967

When looking at the employment trends for industrial space users, including construction, manufacturing, transportation, warehousing, utilities, and wholesale trade, they all had a positive AAGR, indicating an increase in employees over the past five years. These industries had a 9 percent increase in employment between 2017 and 2022, which shows a positive trajectory for employment in industries that utilize industrial space (Exhibit 23), and the proposed plan for the MEA is to support industrial uses. Within the industrial space users, there is an interest in increasing the number of manufacturing jobs as these jobs typically offer higher wages than other industrial space users.

Exhibit 23. Regional Employment Growth by Industry, 2017-2022

Sector	Number of Employees						Change 2017-2022		
	2017	2018	2019	2020	2021	2022	Number	Percent	AAGR
Construction	8,987	9,378	10,020	9,303	9,485	10,607	1,620	18%	3.4%
Education & Health	12,276	12,081	12,463	12,179	12,448	12,620	344	3%	0.6%
Financial Activities	6,420	6,407	6,367	6,358	5,567	5,031	-1,389	-22%	-4.8%
Information	1,609	1,632	1,780	1,702	1,896	1,758	149	9%	1.8%
Leisure & Hospitality	9,207	9,578	9,665	7,365	7,787	8,407	-800	-9%	-1.8%
Manufacturing	15,623	16,429	16,209	15,353	15,624	16,464	841	5%	1.1%
Natural Resources	155	95	103	94	109	93	-62	-40%	-9.7%
Other Services	3,091	3,246	3,414	2,739	2,734	2,702	-389	-13%	-2.7%
Professional & Business	20,508	18,705	18,057	16,863	17,569	18,572	-1,936	-9%	-2.0%
Public Administration	1,613	1,589	1,600	1,607	1,546	1,576	-37	-2%	-0.5%
Retail Trade	13,761	13,869	13,267	12,337	12,917	12,892	-869	-6%	-1.3%
Transportation, Warehousing, Utilities	3,254	3,232	3,244	3,478	3,702	3,707	453	14%	2.6%
Wholesale Trade	8,417	7,983	8,258	8,452	8,291	8,663	246	3%	0.6%
Total	**104,921**	**104,224**	**104,447**	**97,830**	**99,675**	**103,092**	**-1,829**	**-2%**	**-0.4%**

Source: QCEW

Sherwood employment growth between 2017 and 2022

Between 2017 and 2022, there was an 18 percent increase in employees (1,104) in the City of Sherwood across all sectors. The construction sector saw the largest increase in employment (460) and had an AAGR of 13 percent. Eleven sectors saw net gains in employment. Only two sectors lost a small share of jobs; the financial activities sector lost 64 jobs and had an AAGR of -7 percent, while the leisure and the hospitality sector lost 7 jobs and had an AAGR of -0.1 percent (Exhibit 24). The industrial uses remained strong in Sherwood, while the services sectors had small employment losses.

Exhibit 24. Sherwood Employment Growth by Sector, 2017-2022

Sector	Year						Change 2017-2022		
	2017	2018	2019	2020	2021	2022	Number	Percent	AAGR
Construction	539	615	672	719	781	999	460	85%	13.1%
Education & Health	1,100	1,074	1,110	1,127	1,208	1,218	118	11%	2.1%
Financial Activities	210	193	189	145	145	146	-64	-30%	-7.0%
Information	36	44	42	25	51	53	17	47%	8.0%
Leisure & Hospitality	1,066	1,111	1,147	921	962	1,059	-7	-1%	-0.1%
Manufacturing	691	773	780	734	752	782	91	13%	2.5%
Natural Resources	7	2	4	8	12	12	5	71%	11.4%
Other Services	303	345	395	309	332	336	33	11%	2.1%
Professional & Business	475	506	507	522	537	586	111	23%	4.3%
Public Administration	141	138	145	149	149	155	14	10%	1.9%
Retail Trade	1,074	1,105	1,108	1,207	1,279	1,216	142	13%	2.5%
Transportation, Warehousing, Utilities	222	234	245	220	225	307	85	38%	6.7%
Wholesale Trade	312	319	351	365	423	411	99	32%	5.7%
Total	**6,176**	**6,459**	**6,695**	**6,451**	**6,856**	**7,280**	**1,104**	**18%**	**3.3%**

Source: QCEW

When looking at the sectors that use industrial and flex space, these sectors all had net gains in employment between 2017 and 2022 with a cumulative increase of 525 new jobs and an AAGR of 6 percent. Manufacturing had a 13 percent increase in jobs between 2017 and 2022 in Sherwood (Exhibit 25). These sectors all had double-digit gains in employment, indicating strong job growth.

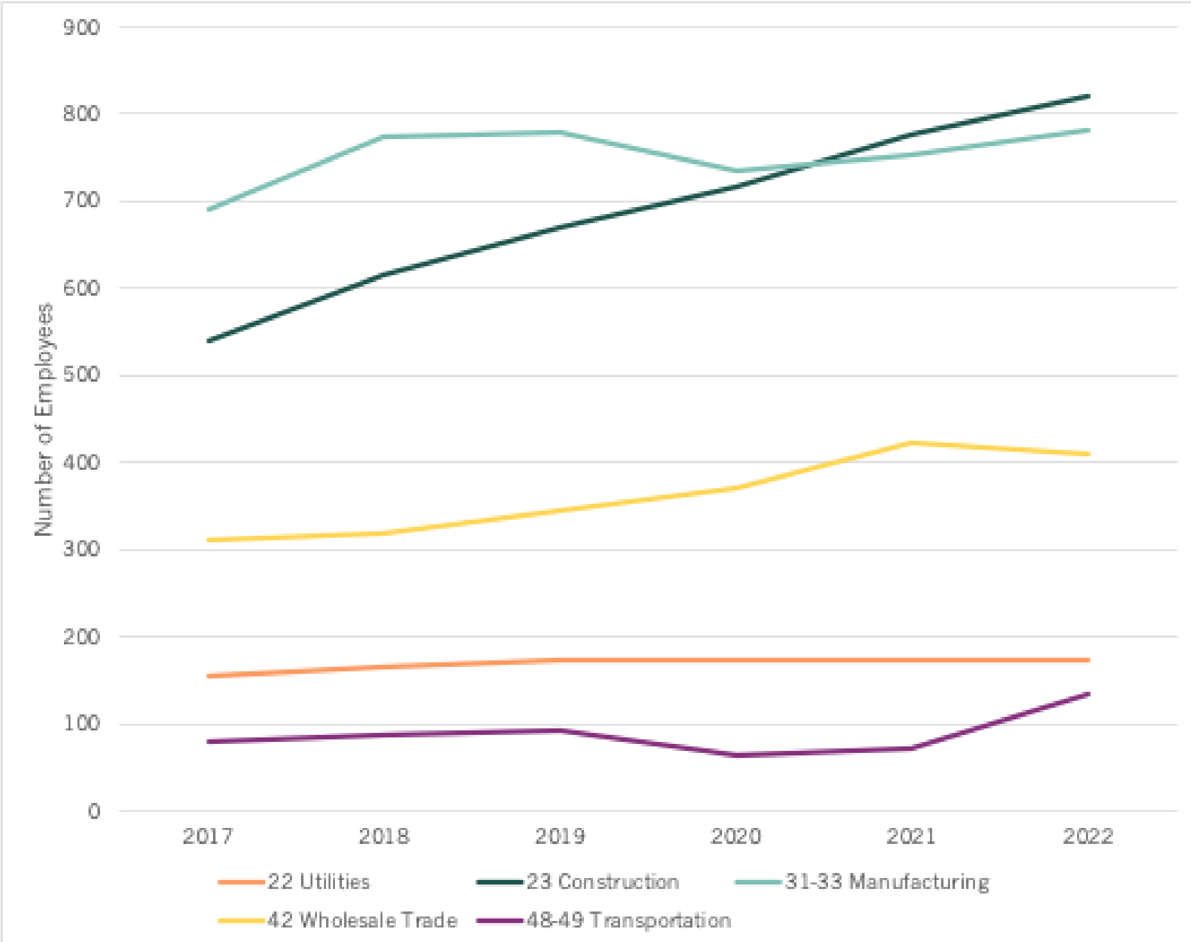
Exhibit 25. Sherwood Employment Growth by Industrial Space Users, 2017-2022

Sector	Number of Employees						Change 2017-2022		
	2017	2018	2019	2020	2021	2022	Number	Percent	AAGR
Construction	539	614	670	716	777	821	282	52%	8.8%
Manufacturing	691	773	780	734	752	782	91	13%	2.5%
Transportation, Warehousing, Utilities	80	87	92	63	71	133	53	66%	10.7%
Wholesale Trade	312	319	344	372	423	411	99	32%	5.7%
Total	**1,622**	**1,793**	**1,886**	**1,885**	**2,023**	**2,147**	**525**	**32%**	**5.8%**

Source: QCEW

Since 2017, the construction sector has seen a steady positive increase in the number of employees. Manufacturing, wholesale trade, and transportation have had minor fluctuations in the number of employees, but all three sectors have seen a net gain in employment over 2017 (Exhibit 26). There are higher numbers of employment in manufacturing and construction than other industrial uses in Sherwood.

Exhibit 26. Sherwood Job Growth in Industrial Sectors, 2017-2022



Source: QCEW

If Sherwood West moves ahead as planned, then the build out of the plan will support construction jobs that have annual wage of $79,200 per year, which is higher than the average wage for 2022 across all sectors, ($63,100). Assuming the Sherwood West site is built out with industrial uses that support manufacturing, the site could provide jobs that pay an average annual salary of $77,900.

Size of industrial employers

When looking at the size and number of firms in Sherwood between 2017 and 2022, the highest growth rate was in firms with fewer than 49 employees. Firms in Sherwood that employ between 10 and 19 employees had the highest annual average growth rate (AAGR) at 17 percent. Firms with 20 to 49 employees had an AAGR of 10 percent (Exhibit 27).

Exhibit 27. Firm Size in Sherwood, 2017-2022

Firm Size by Number of Employees	2017	2018	2019	2020	2021	2022	AAGR
1 to 4	22	24	22	36	30	28	5%
5 to 9	52	38	41	40	64	54	1%
10 to 19	32	75	93	76	80	71	17%
20 to 49	118	145	158	137	212	187	10%
50 to 99	113	120	121	115	57	121	1%
100 to 249	354	119	345	330	309	321	-2%
250 to 499		252					

Source: QCEW

Employment density

The number of employees that work on a parcel of land depends on the industry. Within the manufacturing industry (NAICS 31-33), there is an average of 19 employees per acre of land.[4] If the buildout of the 130 acres of the MEA occurred as planned, this could bring about 2,444 jobs to the region. Additionally, based on the Concept Plan, there could be about 18 jobs/ net acre for a total of 2,398 jobs in the MEA. With a full build out, the MEA could support around 2,400 manufacturing jobs which would pay an annual salary of $79,200.

[4] https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/26252/CRohan_ExitProj_Final.pdf?sequence=1&isAllowed=y

5. Sherwood West Site Competitiveness

The North District Mixed Employment Area (MEA) of the Sherwood West Concept Plan has site characteristics that make the land better suited to accommodate the industries that are growing and expanding in the Portland Metro region. Also, there could also be existing aging industrial and employment centers in the Portland Metro region that do not appeal to the current users or that are more expensive so they do not appeal to many industries.

Site characteristics

The MEA is expected to primarily support light industrial/flex uses while providing a smaller share of space for commercial uses. These types of companies have specific needs when looking at properties. The industrial/flex use needs criteria are derived from Mackenzie's Infrastructure Finance Authority Industrial Development Competitiveness Matrix that the company prepared for the State of Oregon in 2015[5] (Exhibit 28).

Exhibit 28. Evaluation of the Site Characteristics of the MEA

SITE CHARACTERISTIC	INDUSTRIAL/ FLEX USE NEEDS	MEA EVALUATION	SCORE
Site Size	♦ Industrial/flex uses look for large parcels for their operations, which may include the need for the storage/yard space and for truck staging.	♦ The parcel sizes are primarily greater than 10 acres, with 50-acre parcels as well, so the North District parcels could appeal to a wide range of industrial/flex uses (Exhibit 29).	
Ownership	♦ Industrial/flex uses prefer large parcels, rather than needing to assemble many smaller parcels to reach the ideal size.	♦ The parcels are managed by larger ownership, which would require less parcel assemblage and appeal to industrial/flex developers.	
Competitive Slope	♦ Most industrial/flex uses need parcels with slopes under 5% to successfully run their operations.	♦ The MEA sites have slopes less than 3-5%, so these sites would appeal to industrial/flex uses.	
Utilities/ Infrastructure	♦ Industrial and flex requirements for water, sewer, natural gas, electricity, and telecommunications vary by type of industrial use	♦ New infrastructure will be placed as part of the Sherwood West Concept Plan so adequate infrastructure could be included in the North District that meets the requirements of the targeted industries.	

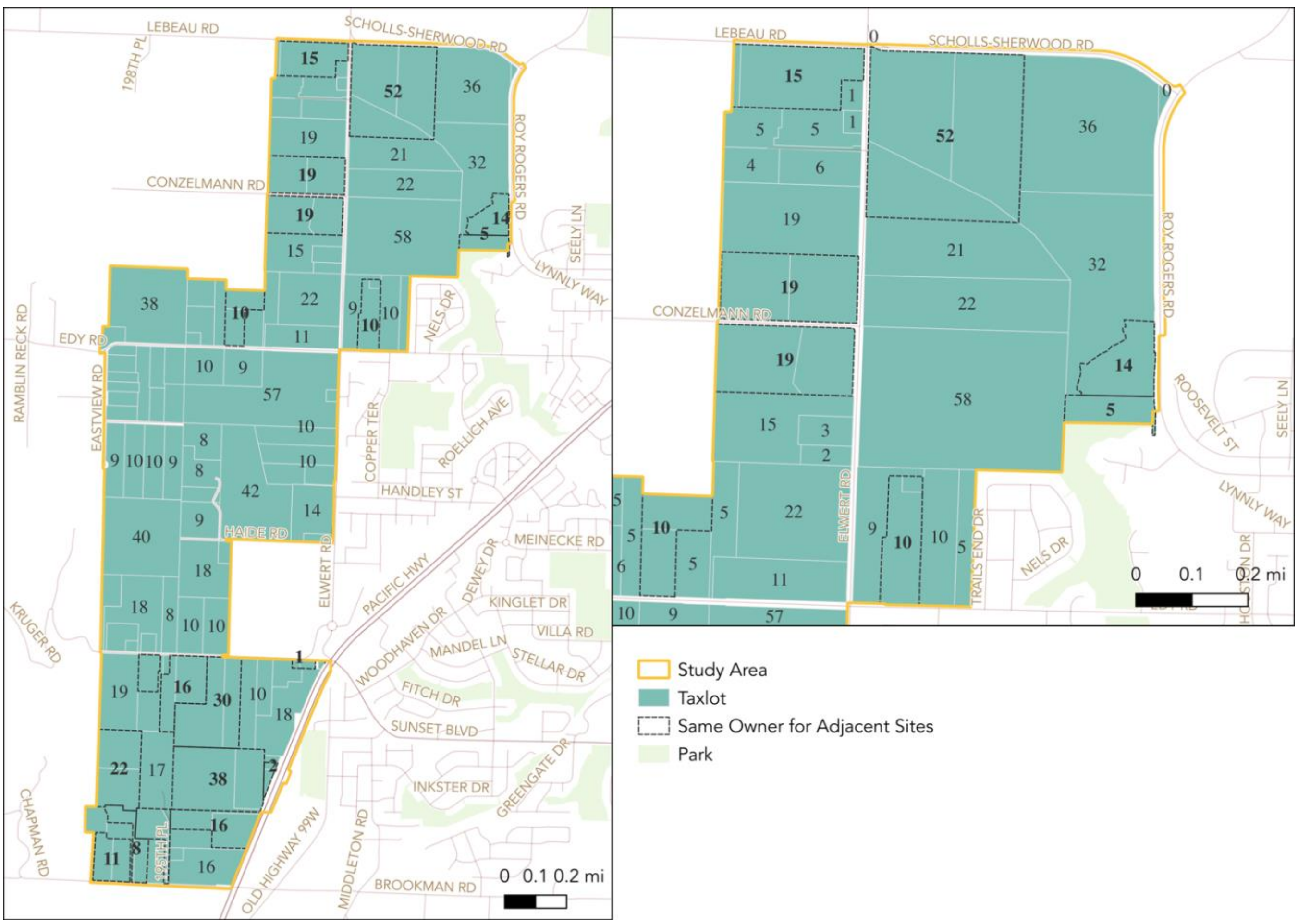
[5] Mackenzie. Infrastructure Finance Authority Industrial Development Competitiveness Matrix. State of Oregon (2015).

	but typically have very high utility demands.	♦ Sherwood West has been included in the current Water System Master Plan (2015). ♦ Sherwood West was neither included in the Sanitary Sewer Master Plan (2016) nor the Stormwater Master Plan (2016).	
Environmental Considerations	♦ Environmental considerations, including wetlands, Habitat Conservation Areas, and floodplains, determine where space can be developed.	♦ The North District is an "Upland Class A Habitat," so it must meet baseline requirements set forth in Metro Title 13 to protect, conserve, and restore the wildlife habitat resources.	

Source: Mackenzie (2015); ECOnorthwest

The parcel map of Sherwood West shows relatively large parcels over 10 acres. Some of the parcels have the same owner, which would facilitate the assembly of parcels to create large sites (Exhibit 29).

Exhibit 29. Parcel Size in Sherwood West and the MEA



Source: RLIS Taxlot Data, ECOnorthwest, 2024

There are site selection criteria regarding the proximate uses and access that industrial and flex users like to see that make a site more competitive for new development. The MEA scores high against the criteria in three categories and scores medium against the criteria in two categories (Exhibit 30).

Exhibit 30. Evaluation of the Site Proximities of the MEA

SITE CHARACTERISTIC	INDUSTRIAL/ FLEX USE NEEDS	MEA EVALUATION	SCORE
Transportation Access to Interstate or Principal Arterial	♦ Industrial/flex users like convenient transportation access to major interstates or principal arteries, and actual distances vary by industry. ♦ Heavy industrial/ manufacturing and high-tech/clean-tech manufacturing prefer to be within 10 miles of the interstate. ♦ Value-added manufacturing and light manufacturing can be within 20 or 30 miles of the interstate.	♦ The North District is not adjacent to I-5 but can access I-5 by SW Roy Rogers Road (about 7 miles). ♦ The site is 2 miles from Highway 99W and about 9 miles from the intersection of 99W and I-5. ♦ The Concept Plan proposes adding a street to connect SW Elwert Road to SW Roy Rogers Road, which would run south of SW Scholls-Sherwood Road. ♦ The plan identifies SW Elwert Road as an "Employment Area Parkway" in the North District, including truck-turning considerations and fewer curb cuts. ♦ The County is planning to expand SW Roy Rogers Road into a five-lane roadway that will have two travel lanes in each direction and a center turn lane between Sherwood and Highway 99W.	
Proximity to Regional Infrastructure Rail/Port/Airport	♦ Industrial and flex uses prefer to locate in reasonable proximity to the railroads, ports, and airports to move their goods for distribution.	♦ The MEA is ~26 miles from Portland International Airport and ~27 miles from the Port of Portland. The site is convenient to the rail lines in the Metro region.	
Proximity to Labor Force	♦ Industrial and flex uses like to locate in proximity to their labor force. Some industries require labor with specialized skills, training, or education. Research & Development uses like to locate in proximity to higher education facilities.	♦ The Concept Plan is planning for thousands of housing units, including multifamily, middle housing, medium-density, and low-density neighborhoods, near the MEA. ♦ It is unclear whether the new residents would have the relevant skills needed for jobs in the MEA.	

Surrounding Uses	♦ Industrial and flex uses like to locate away from residential areas, and these uses can be sensitive to the externalities of the surrounding land uses.	♦ The MEA does not have residential uses nearby, except some planned multifamily, middle housing, and medium-density residential uses on the south end. ♦ There is minimal development to the north, east, and west of the MEA, so there may be minimal externalities from neighboring uses. ♦ There is also a park buffer between the MEA and the Far West District of the Concept Plan.	
Proximity to Goods	♦ For value-added manufacturing, businesses like to be close to the raw materials.	♦ The MEA is in close proximity to the wine region and agricultural land.	

Source: Mackenzie (2015); ECOnorthwest

Site Competitiveness for the Semiconductor Industry

The semiconductor industry provides a key opportunity for the state to promote advanced manufacturing, enhance their traded sector, and support a good jobs pipeline. Since Congress passed the $52 billion CHIPS Act in July 2022, there has been a renewed focus on promoting the national semiconductor industry though manufacturing and research and design. The initiative provides $40 billion in grants for semiconducting manufacturing and $10 billion for investments in research over five years. The Metro Region already has a strong cluster for semiconductors in Hillsboro with Intel's Gordon Moore Park at Ronler Acres Research Campus, which creates 1,000 patents a year. This existing strength in semiconductor manufacturing can position the region to capture other semiconductor activities, and semiconductors are half of the state's annual exports. The semiconductor boom in the 1990s was precipitated by the state having 2000 acres of industrial land, which led to billions of dollars of investment and doubling the industrial employee count.

To prepare for the next influx of semiconductor activity, the region will need to have a supply of industrial land to support business growth and expansion. The Semiconductor Task Force's Industrial Lands Subcommittee found that the key site characteristics that the semiconductor prefers is a location near other semiconductor businesses and labor, parcels of at least 25 acres, and sites that have infrastructure in place to support development that can begin within 6 months to three years. The subcommittee identified a lack of land that met these criteria.

The national focus around semiconductors and regional semiconductor momentum around Hillsboro positions the Metro Region to capture a larger share of semiconductor activities. The Semiconductor Task Force acknowledged losing a major semiconductor investment opportunity because the state did not have a parcel at the needed size with proximity to the labor force and supply chain. In May 2024, Business Oregon was working with Project

Fabrik to identify a location for a semiconductor manufacturing plant that needed between 120 and 140 acres for the semiconductor plant. The project would have included a 1.6 million square foot industrial building and would have created between 400 and 600 jobs. The business could not find the right parcel to locate their semiconductor plan.

The importance of having vacant industrial land, and large parcels are extremely important to supporting the regional semiconductor industry to support economic growth for the region and state. The growth of the semiconductor cluster in Oregon is a priority of the State, and the MEA would be competitive in attracting semiconductor companies. In understanding the site's competitiveness for semiconductors, the Industrial Lands Subcommittee found the following key characteristics for the semiconductor industry. The MEA scores well for large parcels, but scores moderately for clustering and site readiness as the site will take years to build out the infrastructure to support industrial uses (Exhibit 31).

Exhibit 31. Evaluation of the Semiconductor Characteristics of the MEA

SITE CHARACTERISTIC	SEMICONDUCTOR NEEDS	MEA EVALUATION	SCORE
Clustering	♦ The semiconductor industry likes to cluster near talent, other companies in the supply chain. ♦ The semiconductor industry likes to cluster near public and private utilities. ♦ This leads to a cluster of semiconductor industries in one area.	♦ There is a current cluster of semiconductor activities in Hillsboro. ♦ There has already been momentum of semiconductor companies "moving south" of Hillsboro. Lam Research currently operates factories in both Sherwood and Tualatin.	
Large parcels	♦ This industry likes to identify parcels that are 25+ acres.	♦ The MEA has large parcels with the same ownership and could fill the gap for providing large parcels in the Metro Region that could support semiconductor businesses.	
Site Readiness	♦ Companies like properties that are Tier 1 or "development ready", which indicates that they have infrastructure in place and development can begin within six months. ♦ Tier 2 properties may require significant permitting and infrastructure improvements and could	♦ The infrastructure build out of the MEA still needs to happen and will take a few years to build out. ♦ Although the MEA may not support semiconductor industries looking to locate in the next few years, having this site ready could support the project pipeline for the future.	

	be developed within three years.		

Source: Semiconductor Task Force (2022); ECOnorthwest (2024)

The MEA could support the semiconductor industry as these businesses look for new locations and could provide expansion opportunities for the semiconductor industry. Currently, this industry is clustered in Hillsboro, but the Sherwood West site is still proximate to the cluster. The current vacancy rate for industrial properties in Hillsboro is 1.4 percent, lower than the region's vacancy rate (4.1 percent), and industrial space costs $12.70 per square foot which is greater than the average rent for the region ($10.38 per square foot)[6]. The Hillsboro area has low availability of space and buildings rent for higher costs, which could keep out some semiconductor businesses that may be looking for an alternate regional market. There has also been some semiconductor activity south of Hillsboro, including LAM Research in Sherwood and Tualatin. Assuming the semiconductor build out happens for the MEA, these industries could bring jobs that pay an average of $110,000 per year, supporting good jobs for the community.

Site Competitiveness for Key Industries of Growth

The Sherwood West Concept Plan forecasts additional employment land and prioritizes job growth and expansion of the City's tax base, as directed by the Sherwood City Council. A better future jobs-to-housing ratio in the future will provide Sherwood residents the opportunity to work in the city, rather than having to commute elsewhere for work. The City's current jobs-to-housing ratio is 0.9, so there are nine jobs for every 10 households in the city there are 9 jobs. The Concept Plan also states that 92 percent of Sherwood residents work outside of the city limits.

The plan determined that the City may be able to attract tech clusters, as Sherwood is located between existing tech clusters in Wilsonville and the Sunset Corridor. Advanced manufacturing firms are also of interest to the City, and there has been momentum on this front; since 2021, Sherwood has attracted advanced manufacturing companies including Lam Research, NSI Manufacturing, and Olympus Controls.

As part of the 2021 Sherwood Economic Opportunities Analysis (EOA), the City identified the following sectors that are expected to drive economic growth in the current and subsequent cycles based on the economic landscape in Sherwood and Washington County:

- Manufacturing
    - Technology and Advanced Manufacturing
    - Machinery Manufacturing
    - Clean Tech
- Professional and Business Services

[6] CoStar (2024)

- Software and Media
    - Clean Tech
    - Athletics and Outdoors
    - Other Services
- Wholesale
- Services for Visitors
- Services for Residents
    - Medical Services
    - Legal Services
    - Financial Services
    - Retail
    - Personal Services
    - Restaurants[7]

The MEA would be competitive in attracting these uses as they do not require being directly adjacent to the highway, like distribution and warehousing would be. Additionally, these sectors do not have as many community externalities, such as noise, truck traffic, and air pollution, so they would fit well into the Sherwood West Concept Plan which also has residential uses and park land in the North District.

Industrial clustering

Many industrial sectors, including semiconductors, like to cluster or locate near other similar businesses to be near the supply chain and the labor force. When looking where large industrial buildings (100,000 square feet or greater) are locating, Sherwood had the second highest percentage increase in new large industrial buildings after Cornelius that had a modest increase from 1 to 2 industrial buildings (Exhibit 32). This could demonstrate that there is a growing cluster of large industrial buildings in Sherwood, which would likely attract other industrial users to locate near the cluster as well.

[7] https://www.sherwoodoregon.gov/planning/page/2023-economic-opportunities-analysis-update

Exhibit 32. Count of industrial buildings 100,000+ square feet by city, 2010-2024 YTD

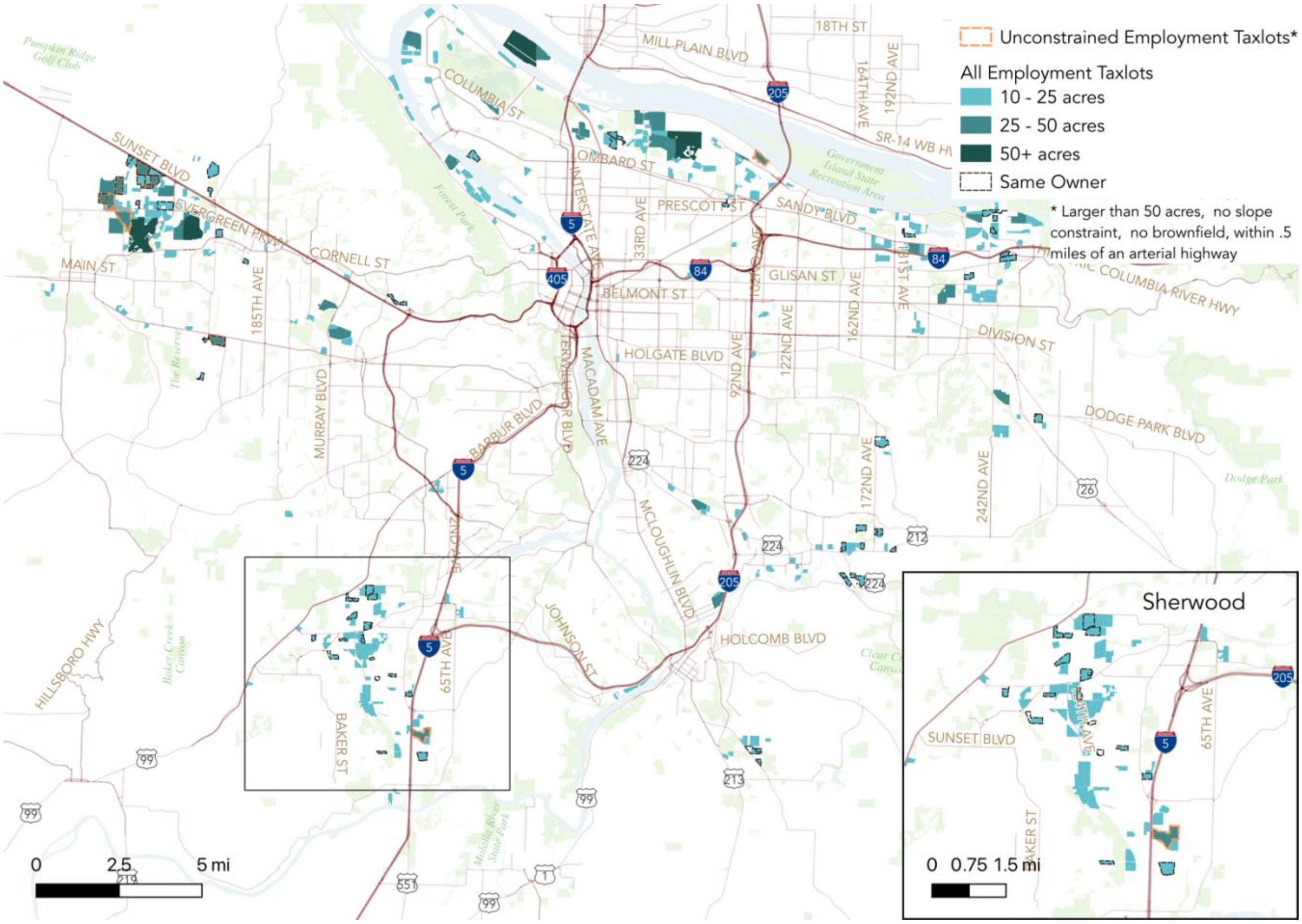
City	2019	2020	2021	2022	2023	2024 YTD
Beaverton	17	17	17	17	17	17
Cornelius	1	1	1	1	1	2
Fairview	6	6	7	7	7	7
Forest Grove	4	4	4	4	4	4
Gresham	9	9	9	10	10	10
Hillsboro	37	38	39	43	43	43
Milwaukie	23	23	23	23	23	23
Portland City	202	205	209	211	213	214
Troutdale	4	4	4	4	4	4
Lake Oswego	2	2	2	2	2	2
Sherwood	6	7	7	7	8	11
Tigard	6	6	6	6	6	6
Tualatin	23	23	23	27	28	28
Wilsonville	18	18	18	19	19	19
TOTAL	**358**	**363**	**369**	**381**	**385**	**390**

Source: CoStar

Site evaluation of regional land

The BLI identifies vacant employment parcels, which are parcels that are vacant, larger than 10 acres, and have a current zoning of commercial, industrial, or mixed use, and the Metro region currently has 104 parcels that meet these criteria. However, not all of the 104 parcels are suitable to support industrial employment, as identified by the site characteristics included in Exhibit 28 and Exhibit 30. To assess the feasibility of industrial development on the vacant employment parcels identified in the BLI, parcels were filtered out to leave behind only the unconstrained parcels that were larger than 50 acres, had no slope constraint (slope >7 percent), were not brownfields, and were within 0.5 miles of an arterial. Only eight parcels in the Metro region met these additional criteria to be considered as unconstrained parcels (Exhibit 33). The eight remaining unconstrained parcels do not provide much opportunity for economic and business growth in the region.

Exhibit 33. Unconstrained Parcels for Industrial Development in the Metro Region, 2018



Source: Mackenzie (2018), ECOnorthwest (2024)

On the 2024 Large Lot Inventory, only 10 lots are 50 acres or greater. Two of the 10 sites have use restrictions on them for marine industrial and airport uses, indicating that only 8 large sites remain for all users. When looking at the large lot inventory between 2017 and 2024, 15 sites have been developed during this time frame. Four of the developed sites were parcels larger than 50 acres and two of these sites were over 70 acres.

Site readiness

In order to understand the site readiness of the MEA, the Concept Plan reviewed the utilities and infrastructure needs required for development to occur in Sherwood West. In the North District, transportation projects are forecasted to be the most expensive infrastructure projects, including the improvement of Elwert Road and Scholls-Sherwood Road. Extending water and storm improvements along Elwert Road in the North District will also be crucial for supporting development.

The concept plan reviewed and provided the following analysis of opportunities and constraints for utilities regarding the MEA:

- **Water:** The 2015 Water System Master Plan considered all areas within Sherwood city limits, UGB, and Sherwood West. Initial anticipated growth in Sherwood West will be served by extending the existing 380 and 455 Zone distribution mains. The North District will be served by an extension of a looped 12-inch system. There is a Preliminary Infrastructure Funding Strategy with cost estimates for extending infrastructure to the North District, and it notes that the water and transportation projects have the highest projected costs for the North District.
- **Sanitary Sewer:** Sherwood West was not considered as part of the 2016 Sanitary Sewer Master Plan. Within Sherwood West, development north of Haide Road is expected to be served by the proposed Chicken Creek Pump Station and Force Main. As part of the Roy Rogers Road widening project in 2025, part of the Chicken Creek Force Main will be installed. It is expected that all of the required sewer upgrades for Sherwood West will be completed by 2028-2029, which would coincide with the completion of Comprehensive Planning of the area.
- **Stormwater:** The 2016 Stormwater Master Plan did not include Sherwood West. Sherwood West is primarily served by the Chicken Creek Drainage Basin that flows north and northeast along Chicken Creek. The Environmental Protection Agency (EPA) has designated the vicinity of Cheick Creek as a riparian corridor, upland wildlife habitat, and aquatic impact area because the creek is a habitat for an anadromous fish that is listed as threatened. There is no stormwater infrastructure planned for Sherwood West, except for the Sherwood High School site, and the area will utilize natural streams, channels, and roadside ditches. The City would prefer the use of regional stormwater facilities to service Sherwood West.

Cost of services

For the MEA to reach its full development capacity, there will need to be a significant investment in infrastructure. Mackenzie completed a North District Concept Plan Refinement and conducted a high-level cost estimate for the North District. The total estimated cost of infrastructure needs for the North District is about $103,990,000 for development of the entire district (Exhibit 34).

Exhibit 34. High-Level Infrastructure Cost Estimate for the North District, 2024

CATEGORY	ESTIMATED COST (2024 $)	KEY PROJECTS
Public Water	$10,745,000	Approximately 11,400 LF of water line installation is necessary to support a water line loop through the North District.
Public Sanitary Sewer	$18,162,500	Pump station, force main, and 15-inch sewer line. Additional improvements will be needed with adjacent site development.

Public Storm Drain	♦ $10,932,500	♦ Storm improvements are likely to be needed alongside initial site development and roadway construction.
Public Roadways	♦ $64,150,000	♦ SW Elwert Road/SW Scholls-Sherwood Road intersection improvements. ♦ Widening of SW Elwert Road, including bike and pedestrian amenities. ♦ Designate roadway connections west of SW Elwert Road. ♦ Designate new Collector roads running east/west in TSP update. ♦ Improve the SW Elwert Road intersections with SW Scholls-Sherwood Road, Conzelmann Road, and East-West Collector with an intersection with signalization or roundabout.

Source: Mackenzie Engineering, 2024

Company relocations in the region

Sherwood has experienced new industrial park development since 2020, and these new larger spaces have attracted regional companies to relocate and expand or consolidate their operations in the city. Many of the projects were fully leased before opening. Some of the industrial developments, and the tenants they attracted, include:

- **Cipole Industrial Park:** 240,000 SF of new speculative industrial park space in three buildings and the project was fully leased prior to completion.
    - **Lam Research:** A leader in semiconductor processes that produces essential products needed by leading chip makers. They leased approximately 45,000 SF in 2021 and created 300 jobs. The company wanted to be close to their base of operations in the Portland Metro region and had difficulties locating larger space in the region.
- **Tualatin-Sherwood Corporate Park (TSCP):** Three speculative industrial buildings consisting of approximately 478,000 SF in the Tonquin Employment Area (TEA). The project was fully leased prior to completion. Current tenants include:
    - **NSI Manufacturing/Nuance Systems:** The company relocated from approximately 13,000 SF in Tigard to 62,000 SF in the TSCP in 2023 to consolidate their footprint and expand their operations.
    - **DWFritz Precision Automation.** The company creates automation solutions for manufacturing industries and they moved from Wilsonville to an 80,000 SF space in the TSCP.
    - **Lam Research:** In 2023-2024, the company leased an additional 271,000 SF in the TSCP to consolidate their logistics operations from various constrained sites in the region.

- **Sherwood Commerce Center (SCC).** Phase I consists of 445,000 SF across 3 multi-tenant buildings in Sherwood's TEA. The developer will be submitting their plans for Phase II for an additional 464,000 SF within 3 new speculative multitenant buildings, and there are plans for a Phase III with an additional 85,800 SF of spec space. Once completed, SCC will provide around 1 million SF of industrial space, which can serve about 30 companies.
    - **Olympus Controls:** This is a robotics/automation engineering company that is currently relocating from a small building in Tualatin to a new 70,000-SF-space in the SCC, allowing the firm to double its employee count.
    - **Gaylord Marine:** This company designs and produces hoods/ventilator control systems for the US Navy and relocated from a home business to a small manufacturing space in Sherwood and is now leasing a larger space in the Sherwood Commerce Center to accommodate their business expansion.
- **Rock Creek Corporate Center.** A new industrial park in the Tonquin Employment Area that will be 400,000+ SF and is expected to start construction in May 2024.

There have also been companies that own their buildings and have been expanding in Sherwood, including:

- **Treske Precision:** A precision machining company which is completing a new 35,000 SF addition to their existing building.
- **AFP Systems.** This company designs, fabricates and installs fire protection systems and recently acquired a 9-acre site in Sherwood, which allows them to expand from a small site in Tualatin.

There have also been regional shifts in where industrial businesses are locating in the Metro region, and manufacturing companies have relocated to Sherwood for larger footprints that allow them to consolidate their operations and expand their businesses.

- **PPM Technologies:** The company produces equipment needed by the food industry, including Quaker Oats and Frito-Lay. They recently expanded their operations into Sherwood from Newberg because they were space constrained, and they are currently working on their second expansion in Sherwood.
- **Greenridge Solar.** This company is moving to Sherwood from a very constrained space in Tualatin.

Sherwood has already been successful in capturing new industrial and manufacturing job growth in the region, and new industrial parks have leased well. These moves could indicate a clustering of industrial development and manufacturing happening in the Sherwood market.

6. Key Findings and Conclusions

Based on the data analysis, there are some key findings to determine whether Sherwood West would support the regional economy.

Regional industrial market supply

- **Industrial vacancy and absorption in the Metro region.** The 2023 vacancy rate for industrial space in the Metro region is 4.1 percent. For industrial buildings over 100,000 square feet, the vacancy rate has remained under 5 percent since 2021 and was 4.7 percent in 2023. Between 2019 and 2023, rents increased for all industrial buildings and for larger industrial buildings. Since 2019, almost 9 million square feet of industrial space has been developed and about 39 percent of this space is in buildings over 100,000 square feet. As new space has entered the market, the net absorption for larger industrial buildings has remained positive.
- **Industrial vacancy and absorption in Washington County.** There are extremely low industrial vacancy rates in Washington County. In 2023, Washington County had almost 64 million square feet of industrial space and just under 1.6 million square feet of vacant industrial space, for a current vacancy rate of 2.5 percent. The vacancy rate has remained under five percent since 2019. Even as new industrial product comes to market, the buildings are leasing. Between 2019 and 2023 net absorption in Washington County was positive, indicating that more industrial square footage was being leased than becoming vacant.
- **Industrial space in the South Metro Region.** There is 3.7 million square feet of industrial and flex space in Sherwood, Tualatin, Tigard, Wilsonville, and Lake Oswego. Tualatin has over half of this space (52 percent) and Sherwood has 34 percent of this space. Industrial and flex space in the South Metro Region has the following characteristics:
  - Under 180,000 square feet
  - Over 50 percent are multitenant buildings
  - 56 percent of the industrial and flex space is for distribution and warehouse, and 16 percent is for manufacturing space.
- **Manufacturing space in the South Metro Region.** Sherwood captured 49 percent of new manufacturing space built in the South Metro region, a greater share than any other city in the region. The average rentable building area for a manufacturing building in Sherwood is about 97,000 square feet on an average lot size of 21 acres, greater than the average industrial building and lot size in the region.
- **Industrial space in Sherwood.** Within Sherwood, the supply of industrial and flex space increased by 18 percent between 2019 and 2024 YTD. Even as new product comes to market, the industrial vacancy rate is low, remaining under 5 percent since 2021.

During this timeframe, triple net rents per square foot have increased by 47 percent, indicating a strong industrial market in Sherwood. Even as new industrial space is delivered, net absorption of new space was positive between 2019 and 2023, indicating the companies are leasing new industrial space.

Regional Land for Industrial Uses

- **Regional large parcels.** As part of the Large Lot Inventory of the BLI, there are 104 vacant sites that are larger than 10 acres and are zoned for commercial, industrial, or mixed-use, although sites 10-49 acres may not be sufficient for some of the industrial users.
- **Regional parcel slopes.** Of the 4,876 parcels included in the BLI sites, about 55 percent of the sites have minimal constraints from steep slopes on the lot and would be especially feasible to support industrial uses. However, 13 percent of the parcels are constrained by steep slopes covering between 51-89 percent of the lot and 8 percent of the parcels have steep slopes over 90 percent of the lot; some of these parcels may not be suitable for supporting industrial uses and feasibility and it would likely depend on the size of the parcel and location of the slopes.
- **Sherwood parcel sizes.** The BLI identifies only three parcels that are greater than 25 acres in Sherwood BLI. There are no parcels 50 acres or greater, and even with assemblage of parcels that have the same ownership, a 50-acre parcel cannot be assembled.

Employment trends

- **Employment growth in the region.** The Quarterly Census of Employment and Wages (QCEW) data for Washington, Clackamas, and Yamhill Counties between 2017 and 2022 shows a loss of 1,829 employees, for an annual average growth rate of -0.4 percent. However, of the industries that use industrial space, there has been a regional AAGR of 1.7 percent and a net gain of 9 percent of employees (3,160).
- **Employment growth in Sherwood.** Within the City of Sherwood, there has been an 18 percent increase in employees between 2016 and 2022 (1,104), for an AAGR of 3.3 percent. Of sectors that uses industrial spaces, there was an AAGR of 5.8 percent with a total increase of 32 percent of employees (525).
- **Manufacturing job growth.** Manufacturing had an AAGR of 1.1 percent in the region and 2.5 percent in Sherwood between 2017 and 2022. Sherwood is capturing manufacturing jobs which will provide an economic benefit to the region as the average annual wage of a manufacturing job was $77,900, higher than the average wage for 2022 across all sectors ($63,100).

MEA competitiveness for new industrial uses

- **Industrial site criteria.** Based on Mackenzie's site criteria for industrial use, the MEA scores:

- **High:** Site Size, Ownership, and Competitive Slope
- **Medium**: Utilities/infrastructure, Environmental considerations

- **Industrial proximity criteria.** Based on the proximity considerations for industrial use, the MEA scores:
  - **High:** Proximity to Regional Infrastructure Rail/Port/ Airport, Surrounding Uses, Proximity to Goods
  - **Medium**: Transportation Access to Interstate or Principal Arterial, Proximity to Labor Force
- **Semiconductors.** The semiconductor industry likes to locate in proximity to other semiconductor businesses and their employees and needs sites of 25+ acres, so the MEA could provide this critical land. While there is an existing semiconductor cluster is Hillsboro, the 2023 vacancy rate for industrial properties was 1.4 percent and average triple net rents were $12.70 per square foot, which could be barriers for new semiconductor businesses wanting to locate in the region. If the MEA does support semiconductor uses, then these businesses will add new jobs to the region that pay an average of $110,000 per year.
- **2021 EOA identified sectors.** The 2021 Sherwood Economic Opportunities Analysis includes advanced manufacturing goals. The MEA would be competitive in attracting these uses as they do not require being directly adjacent to the highway like distribution and warehousing would be. Additionally, these sectors do not have as many community externalities, such as noise, truck traffic, and air pollution, so they would fit well into the Sherwood West Concept Plan which also has residential uses and park land in the North District.
- **Sherwood's capture of regional industrial business shifts.** Sherwood has captured industrial shifts from users in the region who are looking for more space to consolidate or expand their operations. Since 2020, the Cipole Industrial Park, Tualatin-Sherwood Corporate Park (TSCP), and Sherwood Commerce Center (SCC) opened in Sherwood, bringing brand new industrial space to the market. Since opening, there have been 6 companies who previously operated in the region that have relocated to these buildings to expand or consolidate their operations.
- **Site evaluation of BLI land.** Of the 104 vacant parcels over 10 acres included in the BLI, many of the parcels have further constraints for industrial employment uses. When filtering out parcels with a slope greater than 7 percent and parcels under 50 acres, there are eight parcels in the region.

Conclusions

- **Market Supply:** There is a lack of industrial space:
  - Over the past 5 years, industrial vacancy rates for Sherwood, Washington County, and the Metro region have been below 5 percent. Even though new

industrial buildings have been developed during this time, net absorption has remained positive indicating that the supply of buildings is leasing.

- Very low industrial vacancy rates in the region could be a barrier to attracting new companies or supporting company expansion.
- There is a small share of vacant land in the region that would be suitable for industrial uses, indicating a developer would have to assemble parcels which could be a barrier to new development.
- Job growth in the region has been in the industrial sectors. Between 2017 and 2022, there has been a net loss of employees across all sectors in the Washington-Clackamas-Yamhill region; however, the sectors that use industrial space have had positive gains in employment.

- **Site Competitiveness –** Sherwood West would be well suited to capture the new and expanding demand for industrial space.
  - The MEA would be competitive for new industrial development because of its favorable parcel size, ownership, and low slopes; however, access to I-5 may be a concern for some users. There are few parcels in the BLI that have as many favorable conditions, which could hinder businesses from locating in the region.
  - Sherwood has seen growth in the amount of industrial and flex space since 2019. It has seen the largest amount of manufacturing space in the South Metro region. Even as new space comes to market, the product is being leased and vacancy rates remain low. The MEA provides opportunities to attract the semiconductor industry.
  - There may be an insufficient supply of larger industrial sites to support goals for growing the semiconductor industry, however the MEA provides an opportunity to add to the supply of land suitable. If the site is successful in attracting semiconductor uses, then these businesses will add new jobs to the region that pay an average of $110,000 per year. The MEA could provide an alternate location with large parcels outside of Hillsboro.
  - Sherwood has also captured industrial shifts from users in the region who are looking for more space to consolidate or expand their operations. The space in Sherwood allows them to stay in the Metro region. Industrial users, including manufacturing, have been locating in Sherwood. Sherwood is capturing excess capacity in the region that this site could accommodate.
  - The typical in-demand size for industrial space would be around 50 acres, so these properties are not likely to appeal to new industrial users without lot assemblage, which brings its own set of challenges by trying to get neighboring landowners to sell their land.

DATE: December 22, 2022
TO: Ted Reid, Dennis Yee, Metro
FROM: Mike Wilkerson, Becky Hewitt, Madeline Baron, James Kim, Jolie Brownell, ECONorthwest
SUBJECT: METRO RESIDENTIAL READINESS PROJECT – TASK 4: HOUSING MARKET FILTERING MEMORANDUM - REVISED

Background and Purpose

The Metro Regional Government (Metro) has contracted with ECONorthwest to assist in revising some of its regional housing planning and growth management approaches, data, and processes. This project will set the stage for upcoming growth management decisions (particularly the 2024 urban growth management decision) and help Metro more deeply integrate market realities, infrastructure, governance needs, and equity into those decisions.

The outcomes of this effort will help provide a fuller accounting of trade-offs of growth management alternatives and recognize the factors beyond land availability that influence the region's ability to accommodate growth in ways that meet a full spectrum of needs. It will also help Metro implement upcoming changes to statewide requirements related to housing needs and equitable regional housing allocations.

As Metro considers how the anticipated prices and rents of new housing stock that could be built across the region align (or do not align) with the region's overall housing needs by income, it is important to consider all the ways in which new housing supply relates to housing affordability, and how that can change over time. This includes, but is not limited to, "filtering" and depreciation of older housing stock, how new supply impacts the rate of filtering, impacts on price escalation due to the balance between supply and demand (elasticity), and the potential for localized increases in market demand that could cause gentrification and displacement.

This memorandum describes these concepts and market functions, summarizes relevant literature evaluating these impacts, and incorporates local data and examples to illustrate how these factors are playing out in the Metro region. It draws on published literature; a recent, relevant housing market primer prepared by ECONorthwest; and local market data. It is beyond the scope of this effort to conduct a full regression analysis or detailed longitudinal study of home prices and rents regionwide, but ECONorthwest did analyze available rent and home sales data from the Metro region for patterns that suggest whether and to what extent these impacts are occurring in the region. The memorandum also includes several examples of housing in the region to illustrate how these trends and patterns can play out for a specific property.

Introduction

What Drives Housing Markets and Property Value?

Housing markets are subject to the laws of supply and demand, though they are greatly influenced by government interventions. Price reflects buyers' and sellers' willingness to pay and the amount of housing that is demanded and supplied at a given time.[1]

Property values are driven by the balance between supply and demand. Prices tend to rise when demand exceeds supply. The pace of price changes depends on the availability of alternatives (e.g., prices rise faster when there are few desirable units to choose from) and changes in demand preferences (e.g., unit types or locations).

To understand how new housing supply affects the value of existing housing and how property values and affordability change over time, it is important to understand that the value of real estate is a combination of the value of the structure (which tends to depreciate over time and requires maintenance and repair) and the value of the land/location (which can change over time with localized and regional/national trends). The value and desirability of a given residential property at any given time will depend on how old the structure is and how it has been maintained or modified since it was built, how well the structure meets current household needs and preferences, and how desirable the location is, among other factors.

What is Filtering?

Filtering is "the process by which housing ages and depreciates in value relative to newer housing so that it becomes affordable to moderate- and low-income households over time."[2] New construction starts the process of filtering through a "migration chain" where newly constructed units "create vacancies in the existing housing stock and expand housing options for those looking to relocate."[3] When subsequent households relocate, they create new vacancies for other households, thus creating a chain of vacancy and migration. The longer the migration chain continues, the more likely it is for the older housing supply to filter down and become available to lower-income occupants.

The filtering process "is critically important to a functional housing market that meets the needs of a range of households and allows for some housing choice for current and new residents of a community."[4] The addition of new housing in a regional housing market allows the migration chain to continue and creates opportunities for households with moderate-incomes or low-incomes to live in units that were once new and priced at the top end of the market. In contrast, when there are no new housing units built in a region, filtering often does not occur and fewer units become more affordable through the filtering process. When demand exceeds supply,

[1] HDR and ECONorthwest, *Oregon Transportation and Housing Study* (Oregon: Oregon.gov, 2020), https://www.oregon.gov/odot/Planning/documents/TransitHousing_PrimerWithGlossary.pdf

[2] *Ibid*.

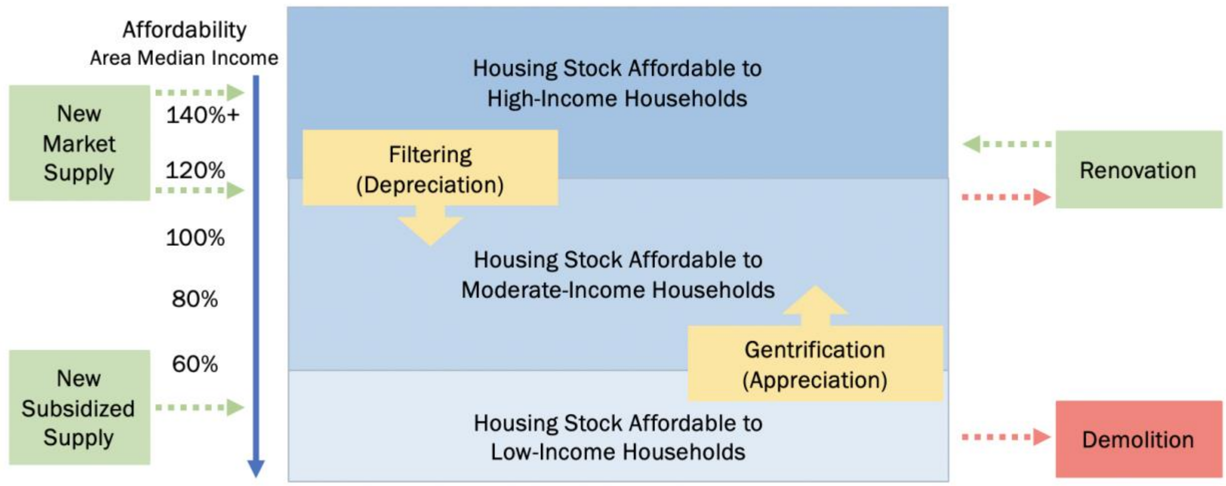
[3] *Ibid*.

[4] *Ibid*.

filtering can also occur in reverse. Reverse filtering or upward filtering occurs when "low-cost housing occupied by lower-income households is bought and renovated to meet the demand from higher-income households."[5] This is illustrated in Figure 1.

Figure 1. Filtering vs. Reverse Filtering

Source: ECONorthwest



Notes: Filtering is when new, more expensive housing becomes relatively more affordable over time. Gentrification is when older, less expensive housing becomes relatively less affordable due to increased demand from higher-income households.

Literature Summary

Effects of Filtering on Affordability

The main debate within the filtering literature is broader than filtering itself; the key question is whether filtering is enough to achieve better affordability overall, particularly for lower-income households.[6] Recent studies [7, 8] and the larger research literature, including ECONorthwest's previous work, demonstrate that "**the filtering process is insufficient to create an adequate supply of stable, safe, affordable housing for low-income households** – this part of the housing stock requires ongoing, meaningful investments in subsidized or regulated[9] affordable housing as well as public-private-partnerships with mission-oriented housing developers."[10]

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[5] HDR and ECONorthwest, 2020.

[6] Josh Lehner, "Housing Does Filter," *Oregon Office of Economic Analysis*, May 25, 2016, https://oregoneconomicanalysis.com/2016/05/25/housing-does-filter/

[7] Miriam Zuk and Karen Chapple, "Housing Production, Filtering and Displacement: Untangling Relationships," (Urban Displacement Project, University of California, Berkeley, 2016), https://escholarship.org/uc/item/7bx938fx

[8] Chapple et al., 2022.

[9] 'Subsidized or regulated affordable housing' refers to housing that has deed or other financial requirements to restrict the rents or sales prices at the property, or to restrict the incomes of residents who live at the property, so that the unit is affordable to households with incomes in a specified range of the area median income.

[10] HDR and ECONorthwest, 2020.

This is because filtering takes time, as discussed in the next section, does not reach the lowest levels of affordability in a housing market, and can be reversed when demand exceeds supply. Also, the filtering migration chain can break or end due to increases in demand from "household formation, a unit being used as a second home, out-of-metro migration," or from "landlords not reducing rents enough to fully fill vacancies."[11]

In addition, "when a market is undersupplied and demand outpaces supply (marked by rapidly rising prices), filtering can operate in reverse, resulting in the gentrification of places and displacement of low-income residents. In this case, low-cost housing occupied by lower-income households is bought and renovated to meet the demand from higher-income households."[12] Filtering does not guarantee protection from gentrification (or upward filtering) and displacement.[13]

Because the effects of filtering are not easily observable until decades or generations later, many people question the effectiveness of filtering in ensuring the availability of housing that is affordable.[14, 15] Additionally, some worry that the housing that does filter down may have deteriorated too much to be habitable.

Filtering Rates and the Impact of Supply at a Regional Scale

To understand how filtering works and contributes to housing market dynamics, many researchers have studied how quickly housing units filter down or depreciate relative to real incomes. To do so, they measured the percentage difference in the incomes between previous and new occupants after controlling for differences in housing quality, local amenities, and inflation.

While some studies[16,17] show that filtering can begin to occur within five years of new housing construction, "**the filtering process can take decades, or even generations**" due to the long lifespan of residential construction.[18]

The most well-documented study of filtering showed that housing in the U.S. depreciates (relative to new units) at a rate of 0.49 percent to 0.58 percent per year for ownership units and

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[11] Mast, 2019.

[12] HDR and ECONorthwest, 2020.

[13] Chapple et al., 2022.

[14] *Ibid*.

[15] Josh Lehner, "Construction, Housing Supply, and Affordability," *Oregon Office of Economic Analysis*, February 15, 2022, https://oregoneconomicanalysis.com/2022/02/15/construction-housing-supply-and-affordability/

[16] Evan Mast, "The Effect of New Market-Rate Housing Construction on the Low-Income Housing Market" (Upjohn Institute Working Paper No. 19-307, Upjohn Institute, Kalamazoo, MI, 2019), http://dx.doi.org/10.2139/ssrn.3426103

[17] Karen Chapple et al., "Housing Market Interventions and Residential Mobility in the San Francisco Bay Area" (Federal Reserve Bank of San Francisco Community Development Working Paper No. 2022-1, San Francisco, CA 2022), https://www.frbsf.org/community-development/wp-content/uploads/sites/3/housing-market-interventions-and-residential-mobility-in-the-san-francisco-bay-area.pdf

[18] HDR and ECONorthwest, 2020.

2.37 percent to 2.71 percent per year for rental units.[19] The study evaluated national panel data from the American Housing Survey (AHS) between 1985 and 2011, including properties built before 1985, and concluded that most of filtering occurs within the first 40 years of construction. The filtering rates are lower in New England, the Middle Atlantic, and the Pacific regions, and the author explains "the regional differences in house price inflation contributes to differences in filtering rates."[20] In other words, **filtering rates are lower in places where housing prices have grown faster and housing underproduction or supply challenges persist**.

Another study confirmed that fast-growing regions like California with higher housing prices have lower filtering rates. Researchers found that **a median-income housing unit in California could take roughly 15 years to filter down to occupants at 80 percent of the median income and almost 50 years to filter down to occupants at 50 percent of the median income**. The same fundamentals are at play affecting high prices and lower filtering rates: a lack of new supply. [21]

An international study based in Finland also concluded that filtering could occur in the near-term.[22] The researchers found greater filtering rates in Finland and explained that the difference in filtering rates between Finland and the U.S. is likely related to greater socioeconomic gaps, income inequality, and residential segregation.

Filtering (and Reverse Filtering) at a Neighborhood Scale

While most research (as summarized above) shows that adding housing moderates price increases at a regional scale, there is some question as to how new housing supply affects filtering and reverse filtering (with potential for gentrification and displacement) in the area immediately surrounding the new housing. This is described in the introduction to a recent study:

> *There's a growing debate among housing advocates over the neighborhood-level impacts of market-rate housing development. On one side are those who think new market-rate units — unsubsidized homes whose price often places them beyond the reach of lower- and middle-income households — make nearby housing more affordable by increasing availability and relieving pressure on the existing housing stock. This is known as the "supply effect." An opposing view, however, is that new housing only attracts more wealthy households, brings new amenities to the neighborhood (including the housing*

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[19] Stuart S. Rosenthal, "Are Private Markets and Filtering a Viable Source of Low-Income Housing? Estimates from a 'Repeat Income' Model," *American Economic Review* 104, no. 2 (2014): 687-706, https://www.aeaweb.org/articles?id=10.1257/aer.104.2.687

[20] *Ibid*.

[21] Zuk and Chapple, 2016.

[22] Cristina Bratu et al., "City-wide effects of new housing supply: Evidence from moving chains" (VATT Institute for Economic Research Working Paper No. 146, VATT Institute for Economic Research, Helsinki, Finland, 2021), https://www.doria.fi/handle/10024/181666

itself), and sends a signal to existing landlords that they should raise their rents. This "amenity effect" or "demand effect" thus makes housing less affordable.[23]

This study, a synthesis of other recent papers, notes that five of six recent relevant studies find evidence that new market-rate housing makes nearby rental housing more affordable across the income distribution, with one study finding mixed results.[24]

One study found that new market-rate buildings in large cities[25] decreased rents of nearby units by 5 to 7 percent relative to units slightly farther away.[26, 27] Filtering began the same year the construction was completed and continued for at least another three years.

Another recent study shows the potential for both filtering and reverse filtering to occur across and within smaller geographical spheres. The study estimated the filtering rates across and within six metropolitan statistical areas (MSAs)[28] and found great variation in filtering rates, including "rapid downward filtering in Chicago and Detroit to upward filtering in Washington, D.C. and Los Angeles." [29] Moreover, the researchers found that the filtering rates *within* MSAs vary substantially more than the filtering rates across MSAs. Thus, even within MSAs that, on average, are experiencing upward filtering, some neighborhoods are seeing downward filtering creating more affordable housing options. The study, using data from 1993 to 2018, found that upward filtering occurred in areas closest to city centers and that neighborhoods seeing downward filtering were outside of city centers.[30] Given the timing, this likely reflects a trend of increasing demand for urban living during this period.

[23] Shane Phillips, et al. (2021). "Research Roundup: The Effect of Market-Rate Development on Neighborhood Rents." UCLA: The Ralph and Goldy Lewis Center for Regional Policy Studies. Retrieved from https://escholarship.org/uc/item/5d00z61m

[24] Phillips, et al., 2021

[25] The study included a sample of 1,483 buildings constructed between 2010-2019 in 11 cities: Atlanta, Austin, Chicago, Denver, Los Angeles, New York City, Philadelphia, Portland, San Francisco, Seattle, and Washington, D.C.

[26] Brian J. Asquith et al., "Supply Shock Versus Demand Shock: The Local Effects of New Housing in Low-Income Areas," (Upjohn Institute Working Paper No. 19-316, Upjohn Institute, Kalamazoo, MI, 2019), https://doi.org/10.17848/wp19-316

[27] Nearby units are defined in the study as units within 250 meters (roughly one or two city blocks) and units further away are defined as those within 600 meters (slightly over a third of a mile and 8 to 10 minutes by walking).

[28] Atlanta, Chicago, Detroit, Los Angeles, Minneapolis, and Washington, D.C.

[29] Liyi Liu and Doug McManus and Elias Yannopoulos, "Geographic and Temporal Variation in Housing Filtering Rates," *Regional Science and Urban Economics 93*, no. C (2020), https://www.aeaweb.org/conference/2021/preliminary/paper/GebsZrYS

[30] *Ibid*.

Local Data: Filtering in the Metro Region

Filtering of Rental Units in the Portland Metro Area

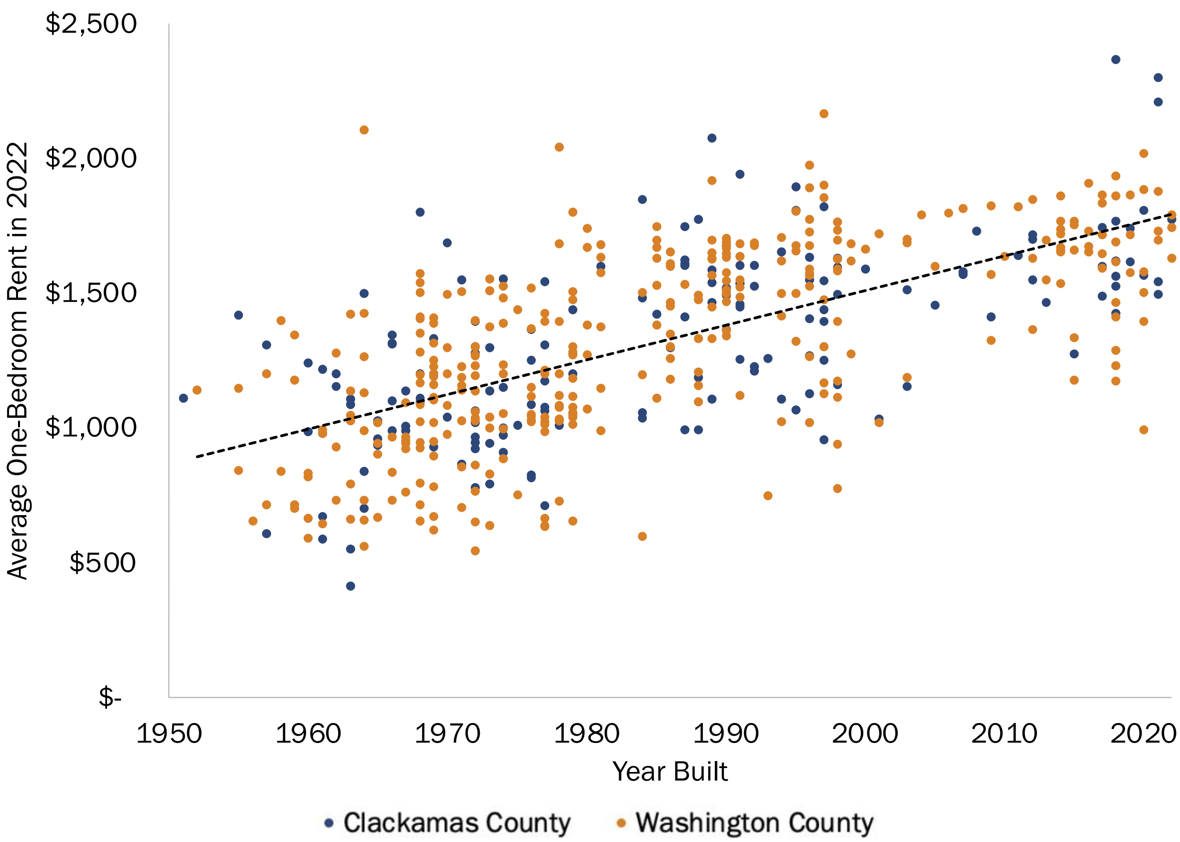
Regional Patterns

To identify long-term price effects of filtering in the Portland metropolitan area, ECONorthwest compared the relative affordability of housing built in different years using building-level rent data and recent sales transactions. If filtering is occurring, older units should have lower rents (and sales prices) on average. The lower rents/sales prices, in turn, would be more affordable to households in the region. However, this approach does not control for changes in building quality for housing built during different time periods due to shifts in the demand for onsite amenities and more stringent building codes. The analysis separates suburban areas (using Clackamas and Washington Counties as a proxy) from more urban areas (using Portland's Central City Plan District as a proxy) to test for differences in different parts of the region.

ECONorthwest's analysis shows a general downward trend in rents relative to building age in Clackamas County and Washington County: one-bedroom units have higher average monthly rents in newly built multifamily buildings than in older buildings (see Figure 2).

Figure 2. Average Multifamily One-Bedroom Monthly Rents by Year Built in Clackamas County and Washington County, Year Built Since 1951

Source: ECONorthwest, CoStar

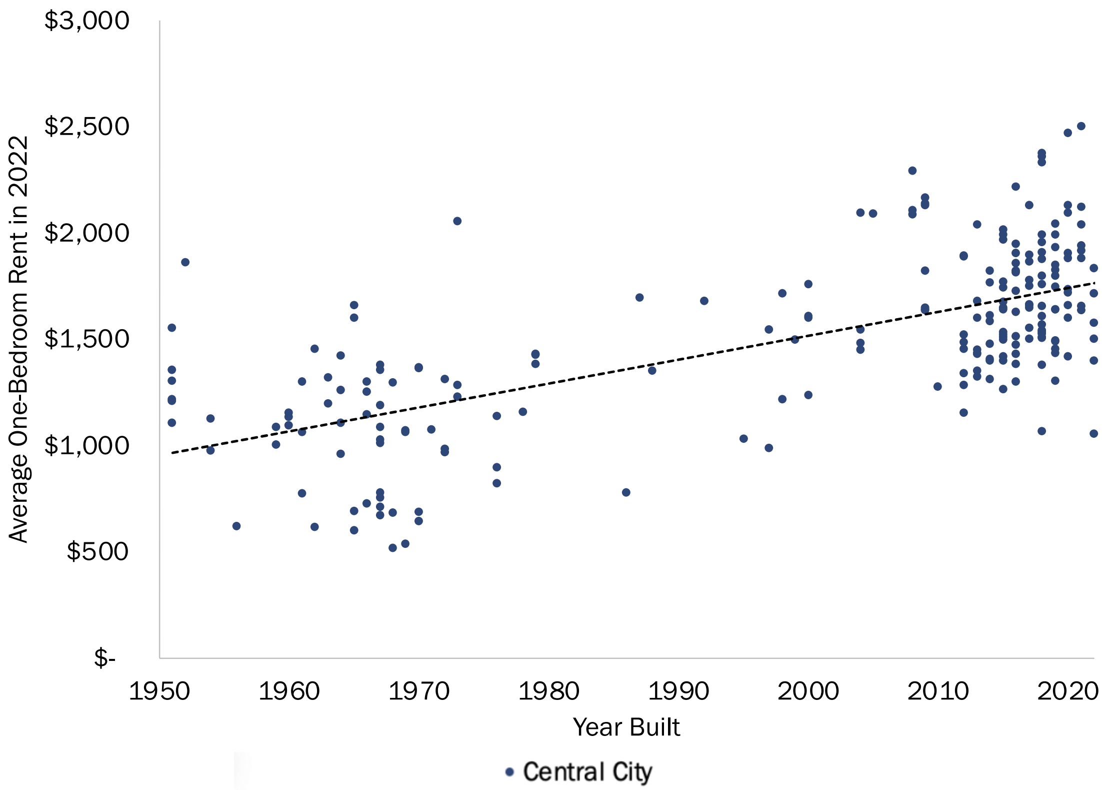


As the figure demonstrates, each decade of a building's age is associated with about $125 lower one-bedroom monthly rents, without controlling for other factors.[31] It also shows that rents vary across building ages as some older buildings have higher rents than newer buildings. Building age is just one of many factors influencing the price of rent, along with other considerations like location, amenities, size, or accessibility to employment and locational amenities.

In Portland's Central City Plan District (Figure 3), the data shows each decade of a building's age is associated with about $106 lower one-bedroom monthly rents,[32] when looking only at buildings constructed since 1951 (for consistency with the Washington County and Clackamas County analysis).

Figure 3. Average Multifamily One-Bedroom Monthly Rents by Year Built in Portland Central City Plan District, Year Built Since 1951

Source: ECONorthwest, CoStar



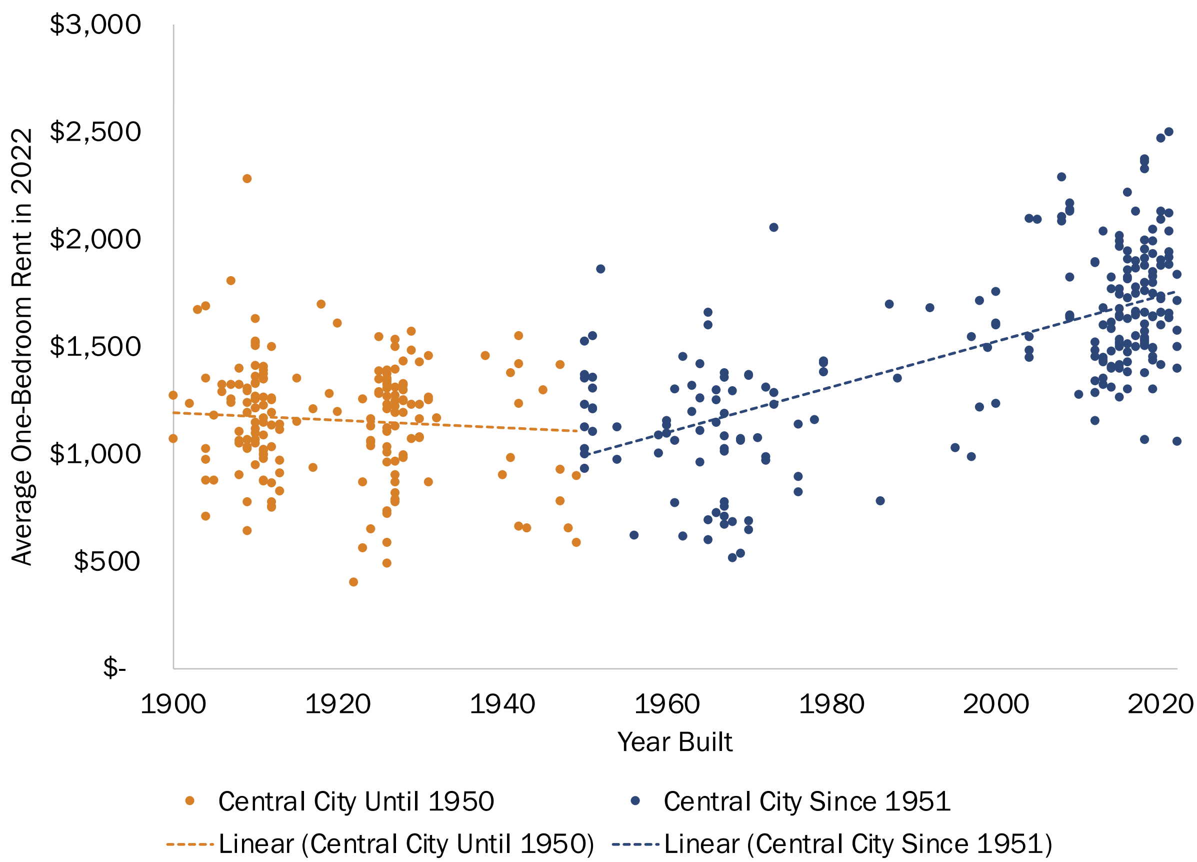
[31] The analysis does not account for variation in construction types across the observed sample; trends in finish qualities and expectations, which can impact rent levels; neighborhood amenities such as transit access; school districts; difference in local property tax rates; and many other factors that could be accounted for in a multivariate regression. The regression analysis in the figure shows that building age explains about 42 percent of the variation in one-bedroom rents.

[32] The analysis does not account for variation in construction types across the observed sample; trends in finish qualities and expectations, which can impact rent levels; neighborhood amenities such as transit access; school districts; difference in local property tax rates; and many other factors that could be accounted for in a multivariate regression. The bivariate regression analysis in the figure shows that building age explains about 43 percent of the variation in one-bedroom rents.

The pattern observed in the data above applies only to apartments that were built since the 1950s and have not been demolished. Looking at older buildings in the Central City Plan District (built in 1950 or earlier), there is almost no difference in average one-bedroom rents across building age, as shown in Figure 4. (The same analysis is not repeated for Clackamas County and Washington County because there were too few properties built earlier than 1950.) There are several possible explanations for this. First, older properties that had depreciated are more likely to have been demolished because building upkeep and renovation costs were too high, leaving only the most desirable properties that are worth reinvestment and can attract reasonable rents. Second, older properties can remain in the market at relatively competitive rent levels due to architectural or historical significance. The demand from a narrow segment of renters and investors and efforts to retain such buildings may outweigh the effects of building age and deterioration on rent levels.

Figure 4. Average Multifamily One-Bedroom Monthly Rents by Year Built in Portland Central City Plan District

Source: ECONorthwest, CoStar

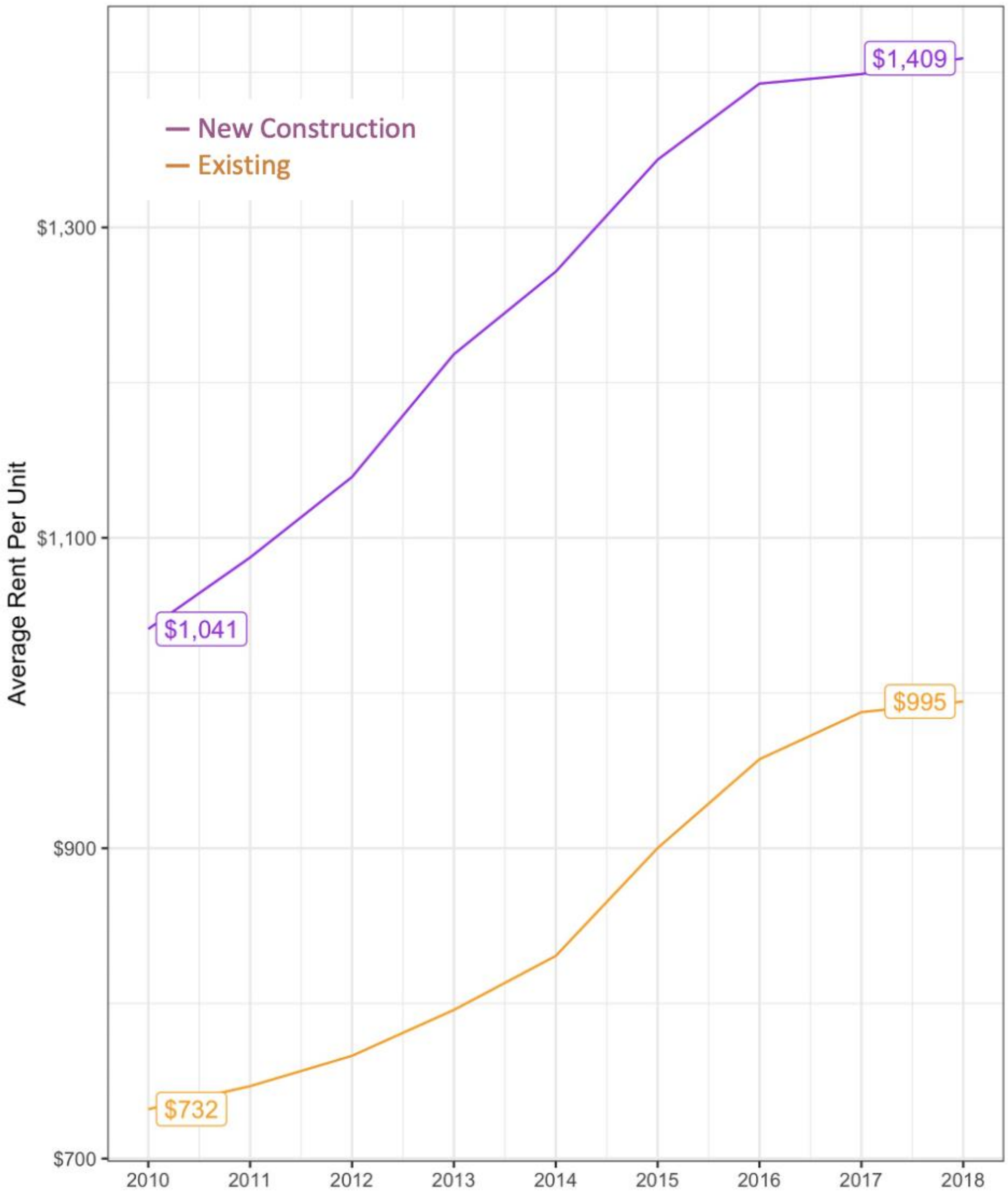


Rent Premium Over Time

Due to data limitations, it is more difficult to track rents for particular buildings longitudinally (over time) at a regional scale. However, an analysis by ECONorthwest for the City of Beaverton in 2018 looked at rent trends over time for apartments in the Metro region, separating new construction from older housing stock. The analysis showed that rents for both new construction and older housing stock grew at about 4 percent per year and showed a relatively consistent rent premium of about 42 percent for new construction between 2010 and 2018 (see Figure 5).[33]

Figure 5. Multifamily Rent Premium and Trends for New Construction vs. Existing Apartments, 2010-2018

Source: ECONorthwest using data from CoStar[34]



Note: Rent amounts are reported in nominal dollar values and are not adjusted for inflation.

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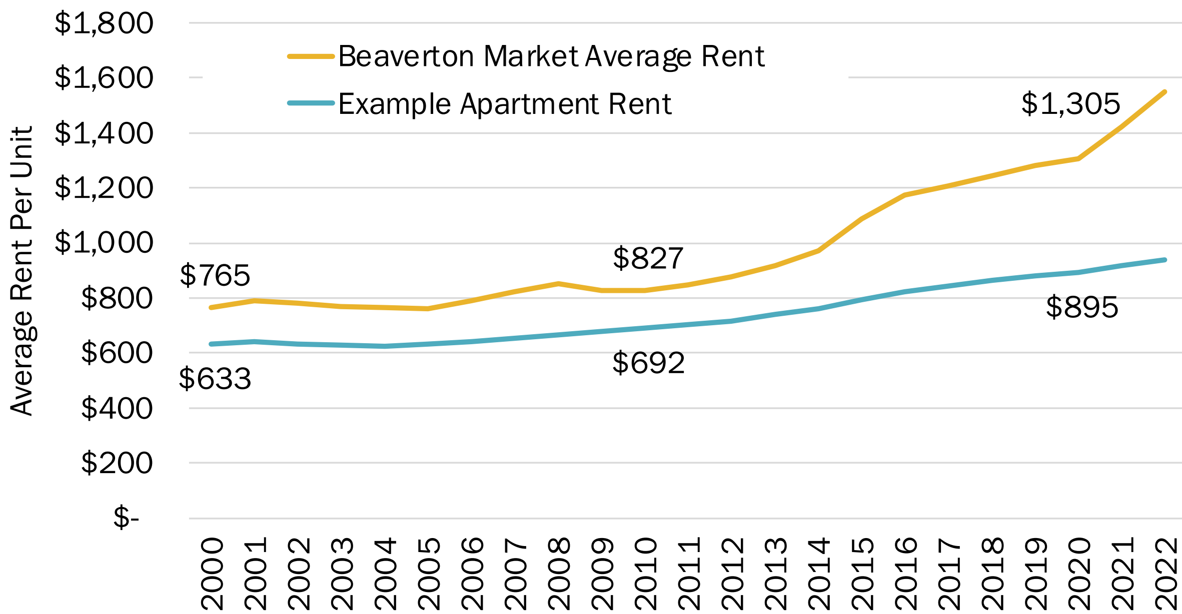
[33] ECONorthwest memorandum to City of Beaverton: "Beaverton Vertical Housing Development Zone Displacement Analysis," June 15, 2018

[34] *Ibid*.

Illustrative Examples of Filtering for Rental Housing

Looking at an example apartment built in 1998 illustrates how rents can change over time relative to the market. The example property in Beaverton was relatively affordable even when it was new, with a rent circa 2000 that was 18 percent below the Beaverton market average rent[35]. This gap was sustained through 2010. However, the difference between the example property and the market average grew during the 2010s. The addition of new apartments with higher rent premiums into the existing housing stock pushed the market average rent 58 percent higher between 2020 and 2010. Meanwhile, the average rent for the example property grew only 29 percent. By 2020, the average rent for the example property was 31 percent below the market average rent in Beaverton.

Figure 6. Average Rents at Example Apartment Property Over Time Compared to Beaverton Market, 2000 to 2022
Source: CoStar



[35] The market average rent for Beaverton apartments is for a subset of apartments that CoStar categorizes as having 2, 3, or 4 stars on its 5-star rating system to indicate building quality. It captures the price of typical apartments (including new construction) while excluding extremely high-quality or extremely low-quality ones.

Filtering Observed in Single-Family Home Sales Prices

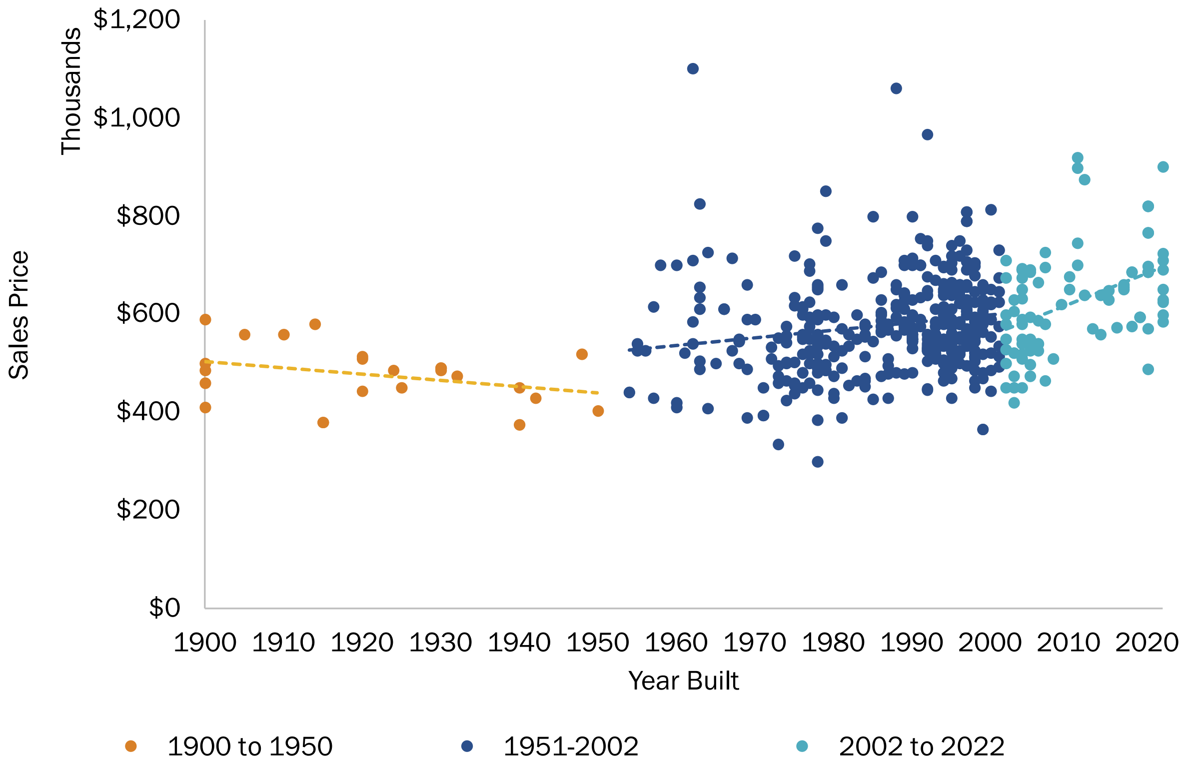
ECONorthwest analyzed relative prices across single-family homes built in different years and identified illustrative examples comparing pairs of similar homes built at different times. If filtering is occurring, sales prices should be lower in older units on average than in newly built units. Lower-priced units are more likely to be purchased by lower-income households.

Regional Patterns

Outside the City of Portland, the relationship between single-family home sales prices and the year built depends on the decades the units were built in, as shown in Figure 7. For units built in 1950 or earlier, there is a very weak but slightly negative relationship (i.e., the sales prices are *lower* for new units on average). For units built between 1951 and 2002, there is a very weak but slightly positive relationship (i.e., the sales prices are *higher* for newer units on average). Finally, for units built in the last 20 years, there is a stronger and positive relationship: each decade of building age is associated with about $63,000 lower sales price.[36]

Figure 7. Recent Sales Prices of Single-Family Homes Outside of Portland*

Sources: ECONorthwest, Metro Regional Land Information System (RLIS)



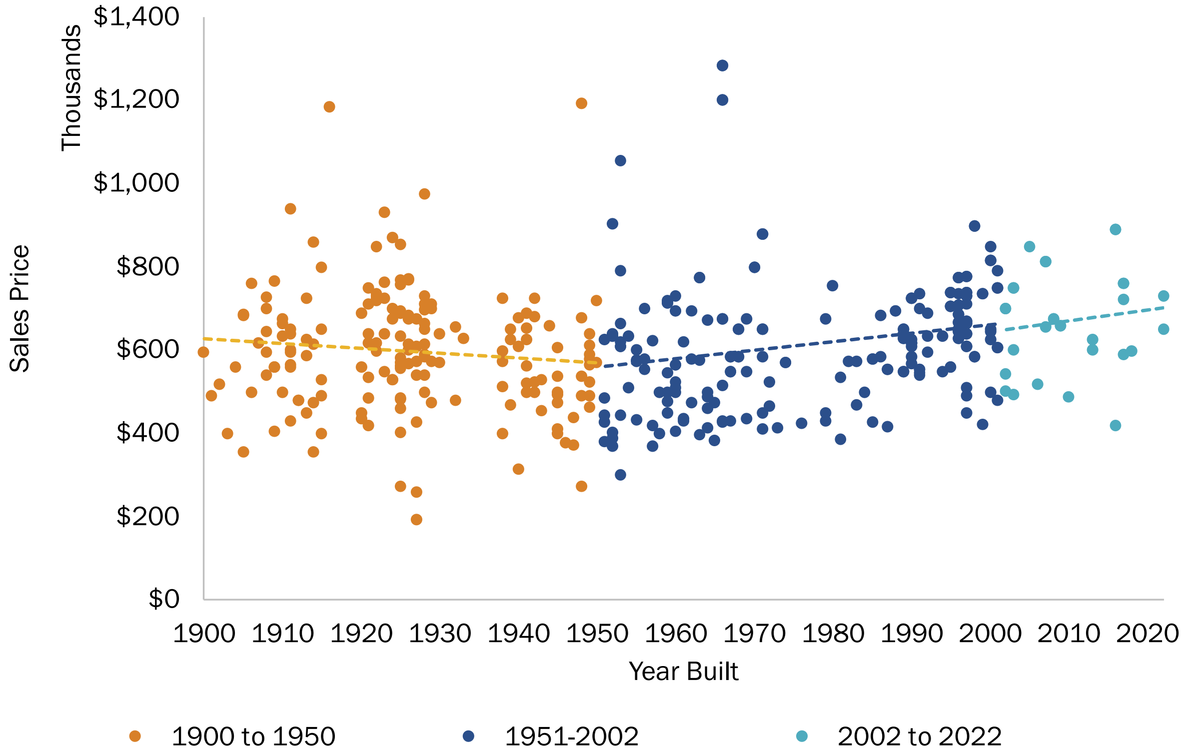
* Notes: The data is a subset of sales prices recorded in RLIS. Filters are 3 or 4 bedrooms, unit size of 1,500 to 2,500 sq. ft., lot size of 4,500 to 9,000 sq. ft., and sales transaction in September, October, or November of 2022.

The findings diverge for Portland, as shown in Figure 8. Similar to outside of Portland, there is a very weak but slightly negative relationship for units built in 1950 or earlier and there is a very

[36] The building age in the most recent two decades explains about 19 percent of the variation in sales prices.

weak but slightly positive relationship for units built between 1951 and 2002; the relationship between sales price and year built is not noticeably different for units built in the last 20 years.

Figure 8. Recent Sales Prices of Single-Family Homes in Portland*
Sources: ECONorthwest, Metro Regional Land Information System (RLIS)



* Notes: The data is a subset of sales prices recorded in RLIS. Filters are 3 or 4 bedrooms, unit size of 1,500 to 2,500 sq. ft., lot size of 4,500 to 9,000 sq. ft., and sales transaction in September, October, or November of 2022.

The data suggests that single-family sales prices decline (on average) over time relative to overall market prices, but the effect is limited (without controlling for other factors) and disappears for housing that is more than 70 years old.

Illustrative Examples of Filtering in Single-Family Homes

To find illustrative examples of filtering, ECONorthwest used a matched-pairs approach using data from Zillow on the prices of detached single-family units that were constructed and sold in 2022 and prices of older homes that sold in the past 12 months and at least once before. To attempt to mitigate some of the differences in neighborhood characteristics, ECONorthwest considered the distance between the comparison units, primary school district boundaries, and major roadways that could divide a part of a neighborhood from another. To mitigate some of the differences in building characteristics, ECONorthwest considered unit size, building height, façade, heating and cooling features, and garage size (i.e., number of vehicles that a garage can accommodate).[37] ECONorthwest also excluded renovated units based on information available

[37] A more robust analysis that requires a level of effort beyond the amount needed for the illustrative examples in this section could involve a statistical method (such as a multiple linear regression analysis) that controls for a variety of building and neighborhood characteristics.

from unit images and descriptions. Still, the illustrative examples are not perfect comparisons. Examples include both units in Urban Growth Boundary (UGB) expansion areas and units in infill areas.

For each example unit, ECONorthwest calculated the ratio between the sales price and average market price to gauge *relative affordability*. The average market prices are from Zillow Home Value Index (ZHVI) Single-Family Homes Time Series, which are available monthly and by ZIP Code. Calculating this affordability metric allows a comparison of housing prices in different years. If the metric is above 1.0, then the sales price is above the market average. If the metric is below 1.0, then the sales price is below the market average. This metric does not indicate a unit's affordability to a household because it does not compare the sales prices to a measurement of household income such as the area median income, and because the affordability of ownership units depends not only on the housing price and household income but also on mortgage payment terms and interest rate, which vary over time.

Example 1: Aloha

The two comparison units in Aloha on the next page are similarly sized, detached single-family units located within a mile of one another. In this example, the newer unit carries a price premium relative to the older unit (relative affordability of 1.21 for the newer unit vs. 0.97 for the older unit compared to the zip code overall as of the most recent sale), despite having much higher Homeowners Association (HOA) dues, which would tend to constrain how much a buyer would be willing and able to pay. Although the older unit appreciated about 63 percent from 2006 to late 2021, it became relatively affordable compared to other housing prices in the same area (relative affordability of 1.06 in 2006 vs. 0.97 in 2021).

Figure 9. Aloha Units
Source: Zillow

Newer Unit
Built Year: 2020
Unit Size: 1,825 sq. ft. (4 beds, 3 baths)
Parcel Size: 2,613 sq. ft.
Garage Spaces: 2
HOA Dues: $667 per year

Last Sales Date: March 21, 2022
Last Sales Price: $622,000 ($341 per sq. ft.)
Last Sales Price Relative Affordability: 1.21

Older Unit
Built Year: 2005
Unit Size: 1,815 sq. ft. (3 beds, 3 baths)
Parcel Size: 2,613 sq. ft.
Garage Spaces: 2
HOA Dues: $0 or no data

Last Sales Date: December 30, 2021
Last Sales Price: $475,000 ($262 per sq. ft.)
Last Sales Price Relative Affordability: 0.97

Previous Sales Date: July 3, 2006
Previous Sales Price: $292,000 ($161 per sq. ft.)
Previous Sales Price Relative Affordability: 1.06

Example 2: Tigard

The two comparison units in Tigard are located in residential neighborhoods, about 1.5 miles from each other. They are about equally close to the local elementary and middle schools. The newer unit carries a price premium relative to the older unit (relative affordability of 1.22 for the newer unit vs. 1.02 for the older unit compared to the zip code overall as of the most recent sale). The older unit did not start more affordable (relative affordability of 1.27 in 2005) but became more affordable over time (relative affordability of 1.01 in 2021).

Figure 10. Tigard Units

Source: Zillow

Newer Unit
Built Year: 2022
Unit Size: 2,153 sq. ft. (4 beds, 2 baths)
Parcel Size: 6,528 sq. ft.
Garage Spaces: 2
HOA Dues: $1,008 per year

Last Sales Date: March 15, 2022
Last Sales Price: $788,582 ($366/sq. ft.)
Last Sales Price Relative Affordability: 1.22

Older Unit
Built Year: 2004
Unit Size: 2,295 sq. ft. (3 beds, 3 baths)
Parcel Size: 7,405 sq. ft.
Garage Spaces: 2
HOA Dues: $175 per year

Last Sales Date: July 14, 2022
Last Sales Price: $675,000 ($294/sq. ft.)
Last Sales Price Relative Affordability: 1.01

Previous Sales Date: February 25, 2005
Previous Sales Price: $365,000 ($159/sq. ft.)
Previous Sales Price Relative Affordability: 1.27

Example 3: Oregon City

The two example properties are less than 1 mile from each other. In this example, the newer unit is more expensive than the older unit (relative affordability of 1.28 vs. 1.06), despite the fact that the older unit is slightly larger and on a slightly larger parcel. However, the older unit became relatively less affordable over time (relative affordability of 1.06 in 2022 compared to 0.88 in 2006).

Figure 11. Oregon City Units

Source: Zillow

Newer Unit
Built Year: 2022
Unit Size: 2,583 sq. ft. (4 beds, 3 baths)
Parcel Size: 6,534 sq. ft.
Garage Spaces: 2
HOA Dues: $0 or no data

Last Sales Date: October 14, 2022
Last Sales Price: $769,950 ($298/sq. ft.)
Last Sales Price Relative Affordability: 1.28

Older Unit
Built Year: 2006
Unit Size: 2,819 sq. ft. (4 beds, 3 baths)
Parcel Size: 7,405 sq. ft.
Garage Spaces: 2
HOA Dues: $0 or no data

Last Sales Date: June 3, 2022
Last Sales Price: $660,000 ($234/sq. ft.)
Last Sales Price Relative Affordability: 1.06

Previous Sales Date: June 26, 2006
Previous Sales Price: $295,330 ($105/sq. ft.)
Previous Sales Price Relative Affordability: 0.88

Example 4: Roseway Neighborhood in NE Portland

The two example properties in northeast Portland are located just under 1 mile from each other. The older property is closer to NE Sandy Boulevard and thus has slightly better access to commercial uses, though the two properties are about equal distance from a grocery store. In this example, both units are more affordable than the average market price for the area, and the older unit is more affordable than the newer unit at the most recent sale (relative affordability of 0.83 for the older unit vs. 0.90 for the newer unit). However, the older unit appreciated significantly from 2007 to 2021 (about an 87 percent increase in value) and became relatively less affordable than it had been (relative affordability of 0.83 vs. 0.76 when built).

Figure 12. Roseway Units

Source: Zillow

Newer Unit
Built Year: 2022
Unit Size: 1,520 sq. ft. (3 beds, 3 baths)
Parcel Size: 2,500 sq. ft.
Garage Spaces: 1
HOA Dues: $0 or no data

Last Sales Date: August 30, 2022
Last Sales Price: $550,000 ($362/sq. ft.)
Last Sales Price Relative Affordability: 0.90

Older Unit
Built Year: 2008
Unit Size: 1,502 sq. ft. (3 beds, 3 baths)
Parcel Size: 2,613 sq. ft.
Garage Spaces: 1
HOA Dues: $0 or no data

Last Sales Date: June 28, 2021
Last Sales Price: $471,000 ($314/sq. ft.)
Last Sales Price Relative Affordability: 0.83

Previous Sales Date: November 16, 2007
Previous Sales Price: $252,500 ($168/sq. ft.)
Previous Sales Price Relative Affordability: 0.76

Example 5: Southwest Neighborhood in Gresham

The two example properties in Gresham's Southwest Neighborhood (south of Powell Boulevard / Route 26) are about 0.6 miles from each other. The older home is more affordable than the newer home (relative affordability of 1.22 for the older home vs. 1.29 for the newer home). Although the price of the older unit more than doubled since 2000, it became relatively affordable over time when compared to other housing prices in the same area (relative affordability of 1.32 when new vs. 1.22 after 20 years).

Figure 13. Southwest Gresham Units

Source: Zillow

<u>Newer Unit</u>
Built Year: 2022
Unit Size: 2,214 sq. ft. (4 beds, 3 baths)
Parcel Size: 7,840 sq. ft.
Garage Spaces: 3
HOA Dues: $0 or no data

Last Sales Date: April 8, 2022
Last Sales Price: $673,000 ($304/sq. ft.)
Last Sales Price Relative Affordability: 1.29

<u>Older Unit</u>
Built Year: 2000
Unit Size: 2,205 sq. ft. (4 beds, 3 baths)
Parcel Size: about 10,000 sq. ft.
Garage Spaces: 3
HOA Dues: $0 or no data

Last Sales Date: September 22, 2022
Last Sales Price: $630,000 ($286/sq. ft.)
Last Sales Price Relative Affordability: 1.22

Previous Sales Date: September 25, 2002
Previous Sales Price: $295,500 ($118/sq. ft.)
Previous Sales Price Relative Affordability: 1.32

Conclusion

There is relatively strong evidence that filtering does occur in housing markets, though it varies based on local conditions and can sometimes occur in reverse, potentially resulting in gentrification, when older properties become more valuable. Adding new housing to a regional housing market creates opportunities for higher-income households to move into newer units while older units "filter" down to households with lower incomes. This process occurs over a long period of time, though there are studies suggesting short-term effects as well. Filtering occurs more slowly in places where housing markets are undersupplied, and strong demand has pushed prices upward. Filtering through deterioration and age reverses when there are renovations and other significant upgrades to older properties.

Many recent studies also conclude that new housing supply does more to alleviate upward pressure on rents in the vicinity of the new development than to increase that pressure. However, filtering alone is not enough to provide housing affordable to the lowest-income households, and does not protect from future market pressures.

Housing market patterns and trends within the Metro region show potential evidence of filtering (older units have lower rents and sales prices on average, at least over the first 70 years after construction) and of premiums for new construction. However, construction quality has also increased over time, which could account for some of this effect. As the literature would suggest, filtering appears to be slower where housing prices are higher and housing price/rent growth has been greater (e.g., Portland's central city). Moreover, the effects of filtering appear to disappear after a certain building age, possibly due to significant reinvestments in more desirable properties, demolition of less desirable properties, or a value premium associated with architectural or historical significance of an aged building.

Taken together, this suggests that new construction helps mitigate price and rent increases at a regional and neighborhood level and can allow older units to become relatively more affordable, but filtering provides only modest increases in relative affordability (at best) for new housing over the course of a 20-year planning horizon.

Materials following this page were distributed at the meeting.

Comprehensive Climate Action Plan Kickoff

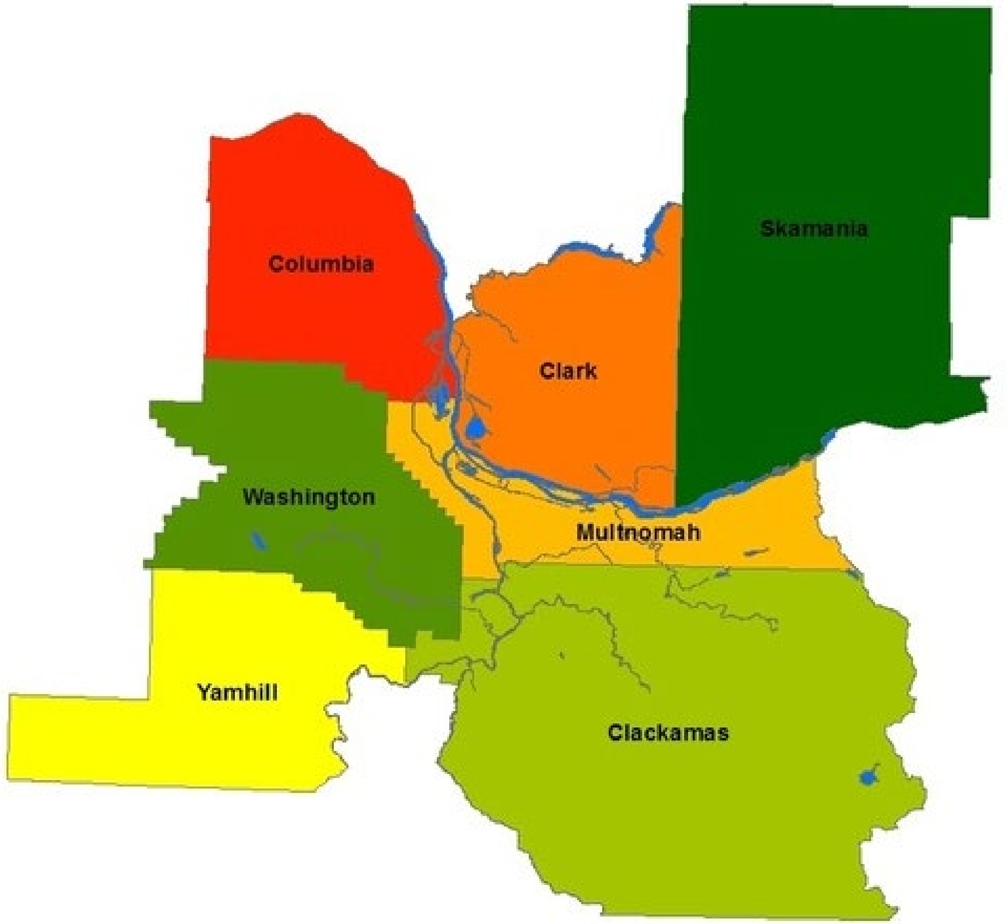
Metro Technical Advisory Committee

July 17th, 2024

What are the EPA Climate Pollution Reduction planning grants?

4-year planning grants to create state and **metropolitan area** climate plans that focus on:

- Reducing greenhouse gases (GHGs)
- Implementation-ready actions
- Alignment with federal and state climate funding sources



Metro is leading a grant for the 7-county Portland-Vancouver metropolitan statistical area.

Two rounds of planning, possibly two rounds of funding

$4.3B
CPRG grants (applications submitted 4/1/24)

$TBD
Other federal climate funding

Priority CAP (Sep ‘23-Mar ‘24)

- Focus on GHG emissions and actions that public agencies are poised to achieve significant GHG reductions

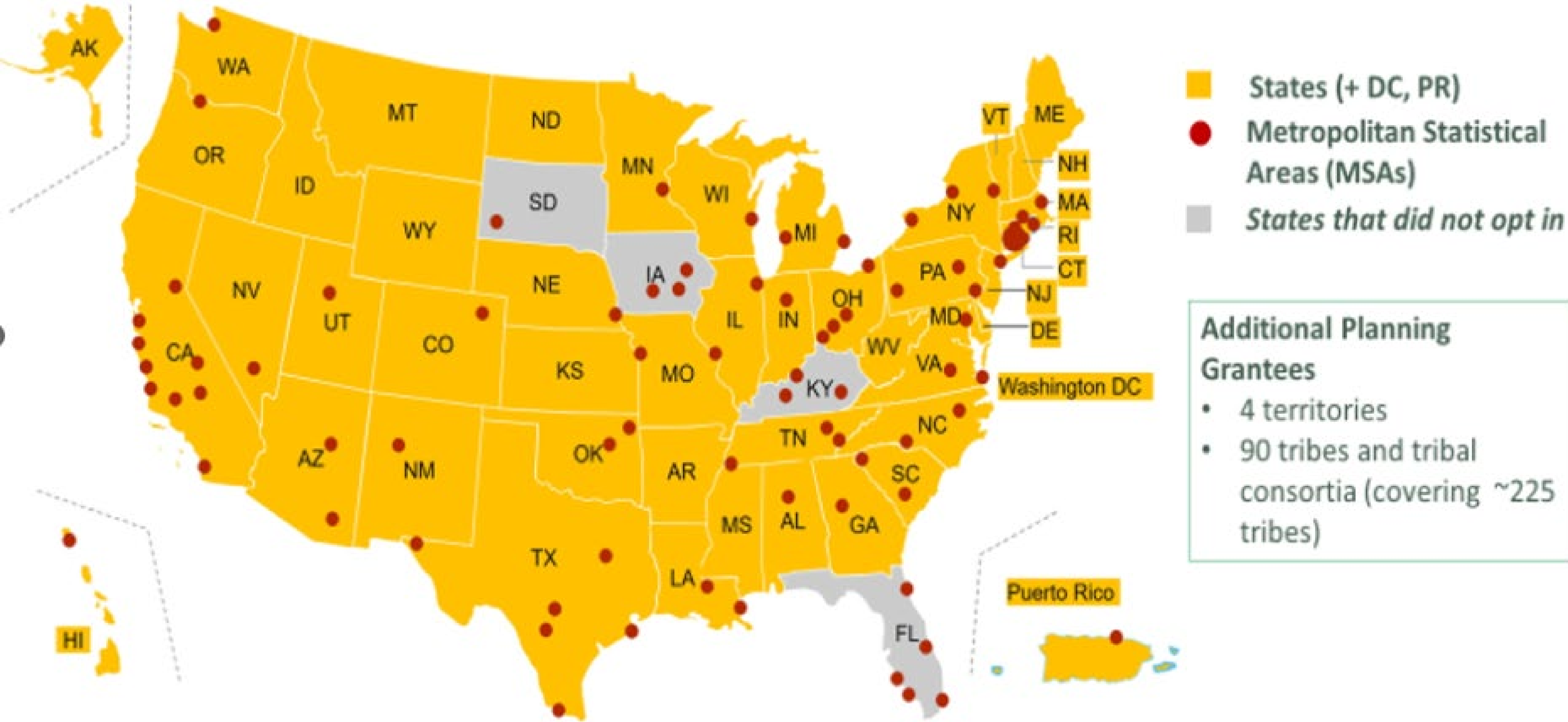
Comprehensive CAP (Apr ‘24-Dec ’25)

- Cover all relevant GHG emissions and actions

Status report (Sep ‘25 – Aug ’27)

- Provide updates on GHG emissions and PCAP/CCAP implementation actions

Coordination is critical



In addition to the Portland-Vancouver area, the states of Oregon and Washington have received planning grants. Metro coordinates with both states so that the resulting plans reflect state, regional, and local agency roles and responsibilities.

The Climate Partners' Forum is our steering group

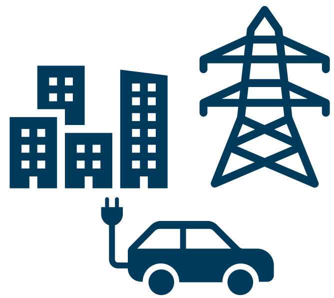
City of Beaverton
Clackamas County
Clark County
Clark County DPH
Columbia County
City of Gresham
City of Hillsboro
City of Lake Oswego
City of Milwaukie
Metro
Multnomah County
ODOT
Oregon DEQ
Oregon DOE
Port of Columbia County
Port of Vancouver
Portland (BPS, PWB, PBOT, BES)
Portland Public Schools
SW Washington Regional Transportation Council
Skamania County
SW Clean Air
Tualatin Hills Parks & Recreation District
City of Tigard
TriMet
City of Tualatin
City of Vancouver
Washington County
…and potentially other agency and non-agency partners for this next phase of the grant.

Current climate planning landscape

There is a lot of existing climate work going on in our metro area, including agency and community plans that reflect many different…

perspectives & approaches

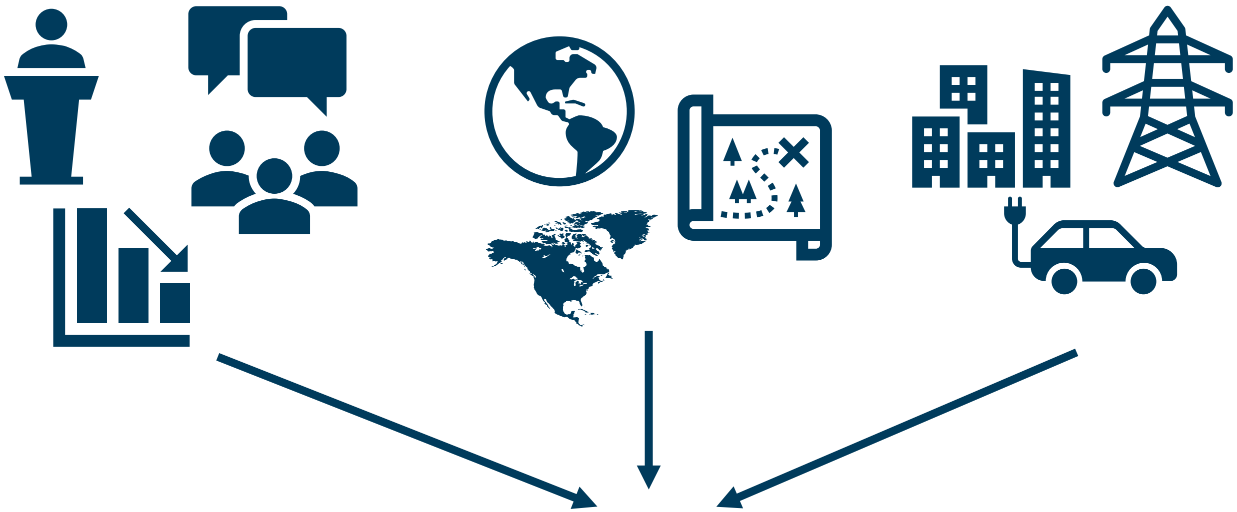
communities & scales



types of GHG emissions

There are also many communities that have not adopted climate plans of their own.

Why is CPRG important?



CPRG is an opportunity to…

- Plan across all communities and emissions sectors in the metro area
- Identify specific, collaborative, actionable, and effective GHG reduction measures
- Further develop these opportunities so that they are ready to seek funds and align with likely implementation opportunities

What implementation opportunities?

Priority Climate Action Plan (PCAP; submitted March '24)

Comprehensive Climate Action Plan (CCAP; due December '25)

CPRG Implementation Grants (submitted April '24)

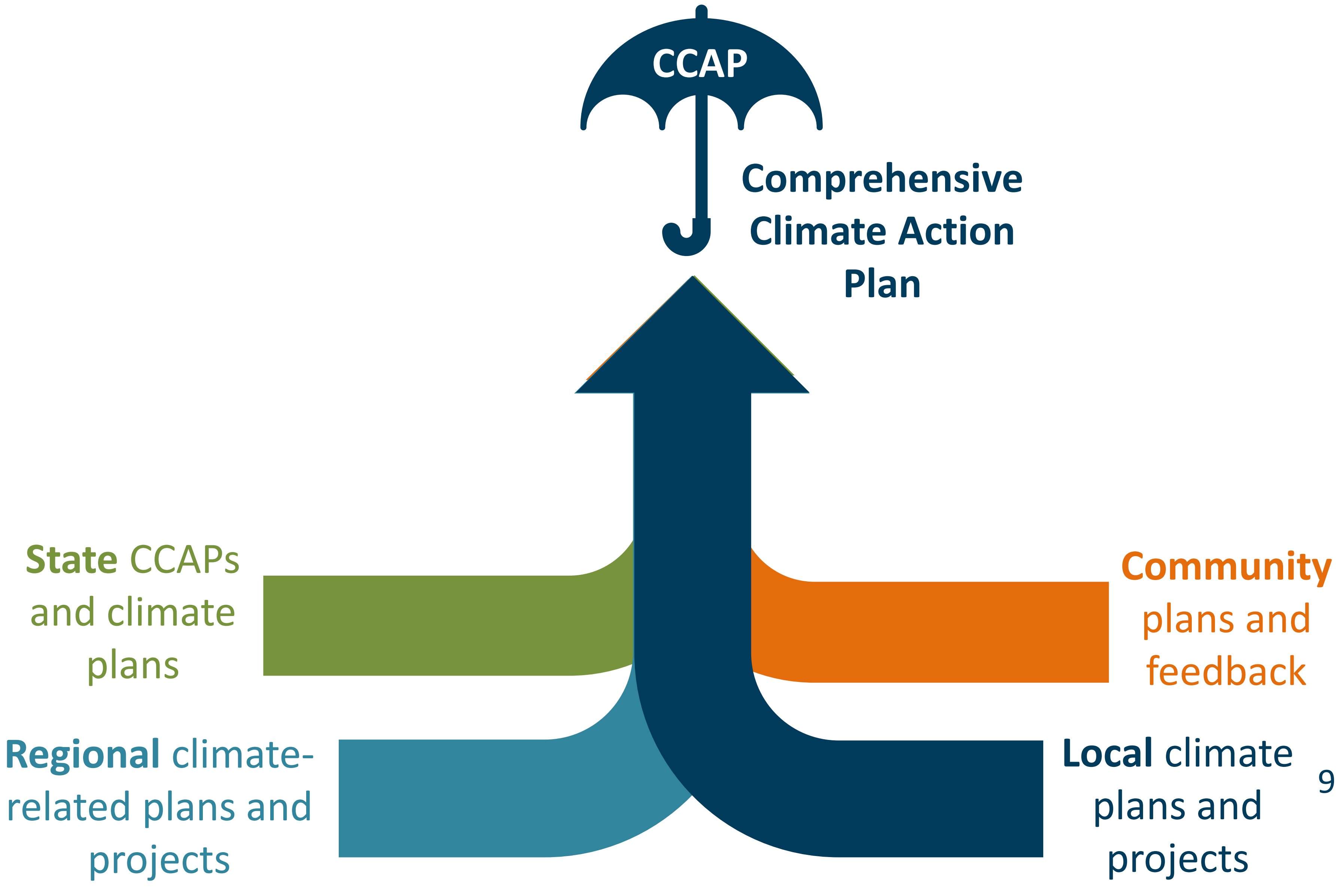
Federal BIL/IRA* funding opportunities

Other funding opportunities (state, local, foundation, etc.)

Modifying/ coordinating with current projects and programs

*BIL = Bipartisan Infrastructure Law, IRA = Inflation Reduction Act

Existing climate planning efforts provide the foundation for the CCAP



Submitted CPRG implementation grant applications

- TriMet: $24m for transit electrification
- TriMet and Metro: $9m for transit signal priority
- Gresham: $26m to add composting capacity
- Washington County, Vancouver Housing Authority, and Clackamas County: $49m to provide energy-efficiency retrofits to existing affordable housing units
- Metro: $5m to fund energy efficiency measures in new affordable housing located near transit

…Plus $100m+ applications from both Oregon and Washington, which include funding for local climate efforts.

EPA plans to announce awards this summer. They received 10x as many requests as they can fund.

Submitted CPRG implementation grant applications

Oregon: $197M, including funding for local/regional agencies to:

- Purchase EVs for public fleets
- Build public EV charging
- Make homes more energy efficient

Portland-Vancouver metro area: $113M

- $33M for efficient and clean transit
- $54M for energy-efficient affordable housing
- $26M to reduce emissions from waste

Washington: $200M+, including funding for local/regional agencies to:

- Upgrade organic waste processing
- Purchase electric transit vehicles
- Purchase EVs for public fleets

CCAP vs. PCAP: key differences

	PCAP	CCAP
Scope of emissions	Sectors with significant emissions / reduction potential	All GHG emission sectors and sinks
Implementation funding sources	EPA CPRG implementation grants	Federal, state and local climate-related funding sources
Implementation project leads	Public agencies	Varies by source
Time we have to create the plan	6 months	18 months
Required plan elements	• GHG inventory • GHG reduction measures • Equity analysis • Review of authority to implement	All required PCAP elements plus: • GHG projections and targets • Workforce planning analysis • Review of other funding availability* • Co-benefits analysis*

The PCAP included preliminary versions of these elements.

Draft CCAP development timeline

Introduction and work plan *(summer-fall ‘24)*

↓

Review background information / analysis *(fall-winter ’24-25)*

↓

Screen, select, and analyze GHG reduction measures *(winter-summer ‘25)*

↓

Finalize plan *(due end of ‘25)*

We are here.

This chart shows the approximate phases of developing the CCAP, assuming we follow a similar process as we did during the PCAP.

We will continue to develop this timeline based on the input we hear at the **next Climate Partners’ Forum meeting on July 23 from 1:00-2:30 PM**.

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oregonmetro.gov

http://oregonmetro.gov/climategrant

What kind of measures do CPRG plans focus on?

CPRG focuses on measures that…	✓	X
Produce significant and quantifiable GHG reductions	Divert food waste from landfills	Create cooling centers for extreme heat events
Reduce community emissions	Offer incentives for property owners to reduce energy use in offices	Install more efficient heating systems in City Hall
Are specific	Conduct energy efficiency retrofits in agency-owned affordable housing	Reduce residential energy use by 10%
Are scalable	Increase high-capacity transit service across the metro area	Increase service on TriMet line 72
Align with local / regional authority	Require that agency-funded housing projects meet energy efficiency standards	Require industrial businesses to reduce emissions

Who will benefit from participating in the CCAP?

You'll likely get more value out of participating in this process if you meet many of the following criteria:

- You are **interested in advancing a GHG reduction measure** that is significant, specific, and scalable.
- You have **already conducted some outreach, analysis or planning** to develop this measure.
- You are **interested in collaborating** with other organizations to implement this measure at scale.
- Your measure is well aligned with **available funding sources**.
- You have the capacity to **engage in these meetings every 3 months** through the end of 2025.
- You have the capacity to **support follow-up applications for implementation funding**.

Even if these don't apply to you, this is an opportunity to **learn about all the ongoing climate work** in our metro area!

Urban growth management: Draft Urban Growth Report

MTAC
July 17, 2024

Metro

Project timeline

Technical work and analysis: Developing the urban growth report

- Buildable land inventory (BLI)
- Regional forecast
- Capacity analysis
- Employment trends and site characteristics
- Housing needs analysis
- Residential readiness analyses
- Draft urban growth report (UGR)

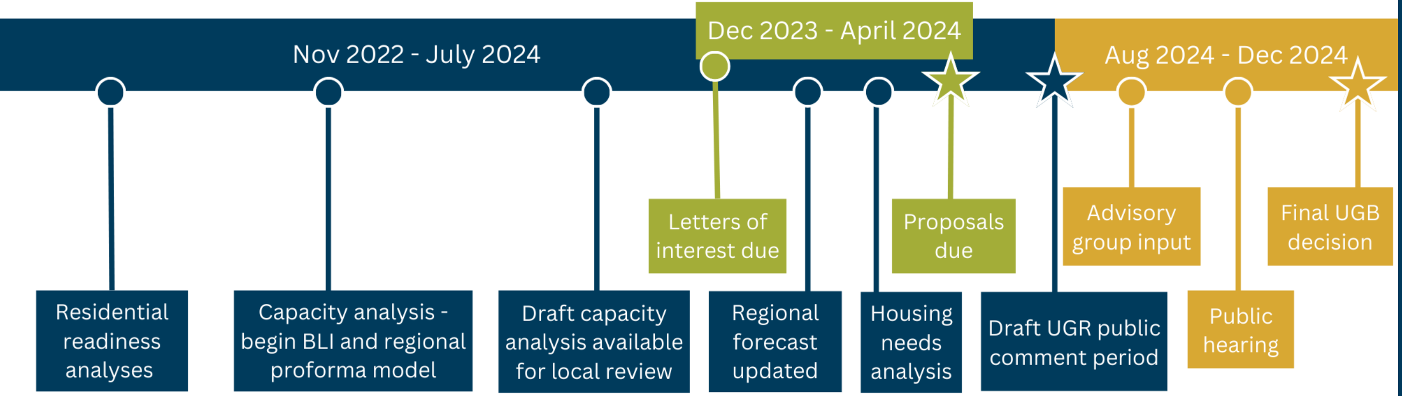
City expansion proposals

- Letters of interest
- Expansion proposals

2040 planning and development grants available

Metro Council decision

- Consider Metro staff and advisory group recommendations
- Public hearings
- Policy direction
- Final decision



Engagement

- MTAC
- MPAC
- CORE
- Land Use Technical Advisory Group
- Jurisdictional outreach
- Urban growth report roundtable
- Youth cohort
- Interest group presentations

	July	August	September	October	November	December
Council	Discussion of draft Urban Growth Report *released July 9*	Public comment survey available until August 22 COO recommendation released August 26	**Public hearing** on COO recommendation	Council direction on intended decision	Council first reading; **public hearing**	**Council second reading; final decision**
MPAC			Discuss COO recommendation; *Recommendation to Council*			
MTAC			Discuss COO recommendation; *Recommendation to MPAC*			
CORE	Discussion with Sherwood staff		Discuss COO recommendation; *Recommendation to Council*			

Engagement

Committee engagement

- MTAC
- MPAC
- CORE
- UGR Roundtable
- Youth cohort

Where have we been?

- Washington County Coordinating Committee
- Clackamas County Coordinating Committee
- Greater Portland Inc
- Westside Economic Alliance
- Portland Metropolitan Association of Realtors
- Home Building Association
- NAIOP

Economic and demographic trends

Draft regional forecast

Preliminary residential capacity

Preliminary housing needs analysis

Project and process overview

Sherwood West Concept Plan

Technical review

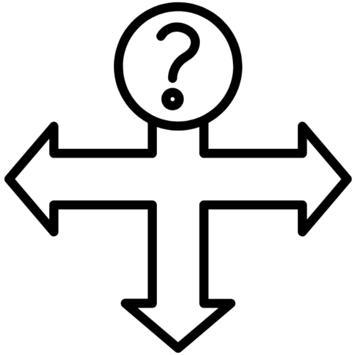
- Land Use Technical Advisory Group (LUTAG)
- Regional forecast review panel of economists and demographers
- Metro Technical Advisory Committee (MTAC)

Housing

Results – demand scenarios

More single-unit detached housing *More middle housing and multifamily*

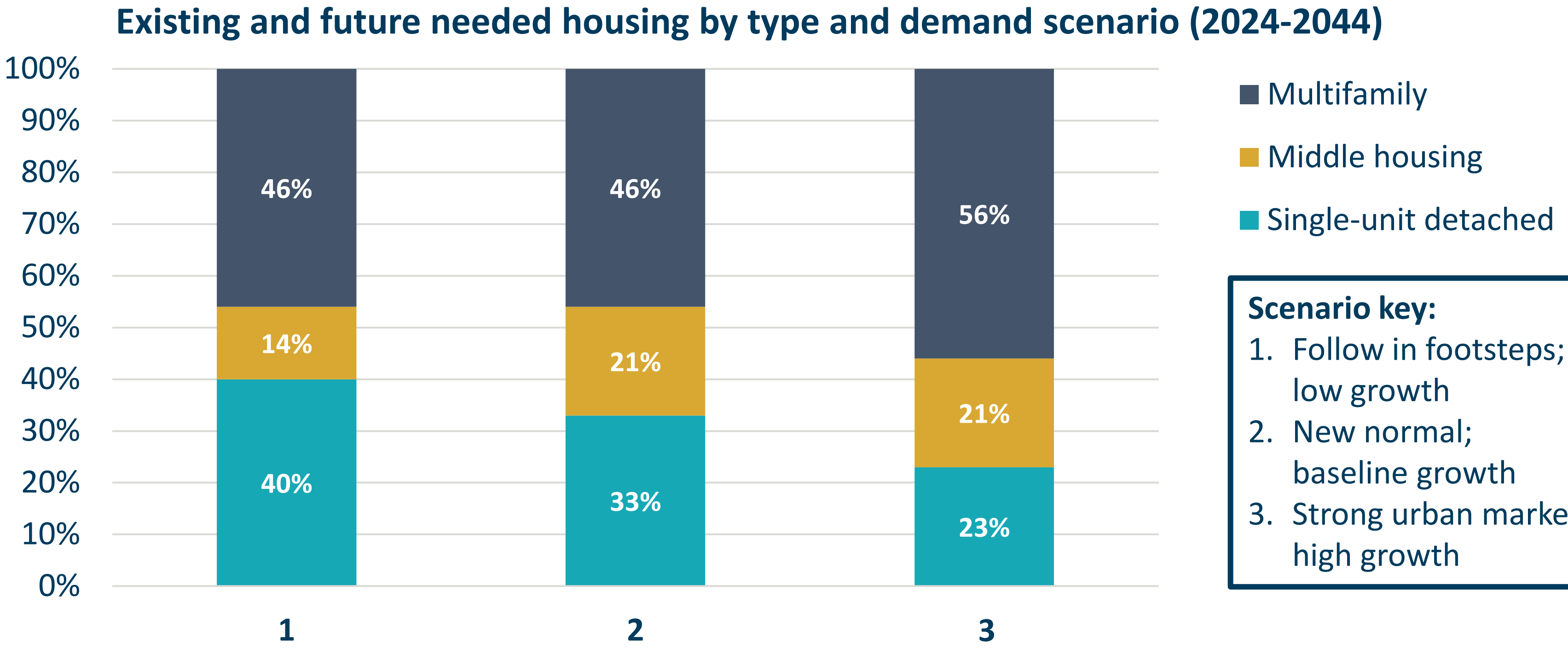
Following in footsteps: Housing choices at each life-stage remain constant – as current households age, their housing choices look the same as those of older households today.



Strong urban markets: Housing trends like development of last decade; housing choices shift to attached housing based on affordability

New normal: As households age, their housing choices shift towards those of older households today, but not to same extent.

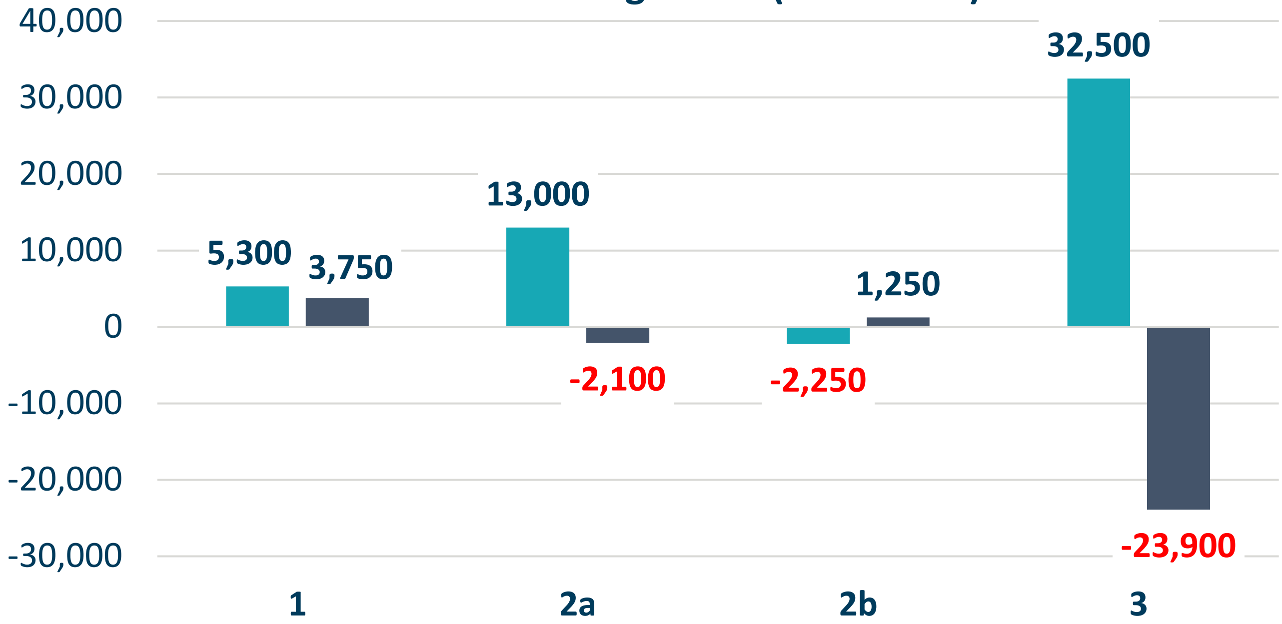
Results



Scenario key:
1. Follow in footsteps; low growth
2. New normal; baseline growth
3. Strong urban market; high growth

Results

Capacity deficits or surpluses for existing and future housing needs (2024-2044)



Scenario key:

1. Follow in footsteps; low growth

2a. New normal; baseline growth; baseline capacity

2b. New normal; baseline growth; heavier use of vacant land for single-unit detached housing

3. Strong urban market; high growth

Employment land

Converting jobs to acres

Regional (7-county MSA) employment forecast by sector

Apply historic UGB capture rate by sector

Deduct shares of work from home/hybrid by sector

Assign shares of each sector to 6 building types

Account for current excess office vacancies

Apply square feet per employee by building type

Apply floor-area ratios by building type

Acres demanded

Summarize two categories for results

Industrial	Commercial
Gen. Industrial	Office
Warehouse/Distribution	Retail
Flex/Business Park	Medical/Institution

Results: Commercial land gap analysis

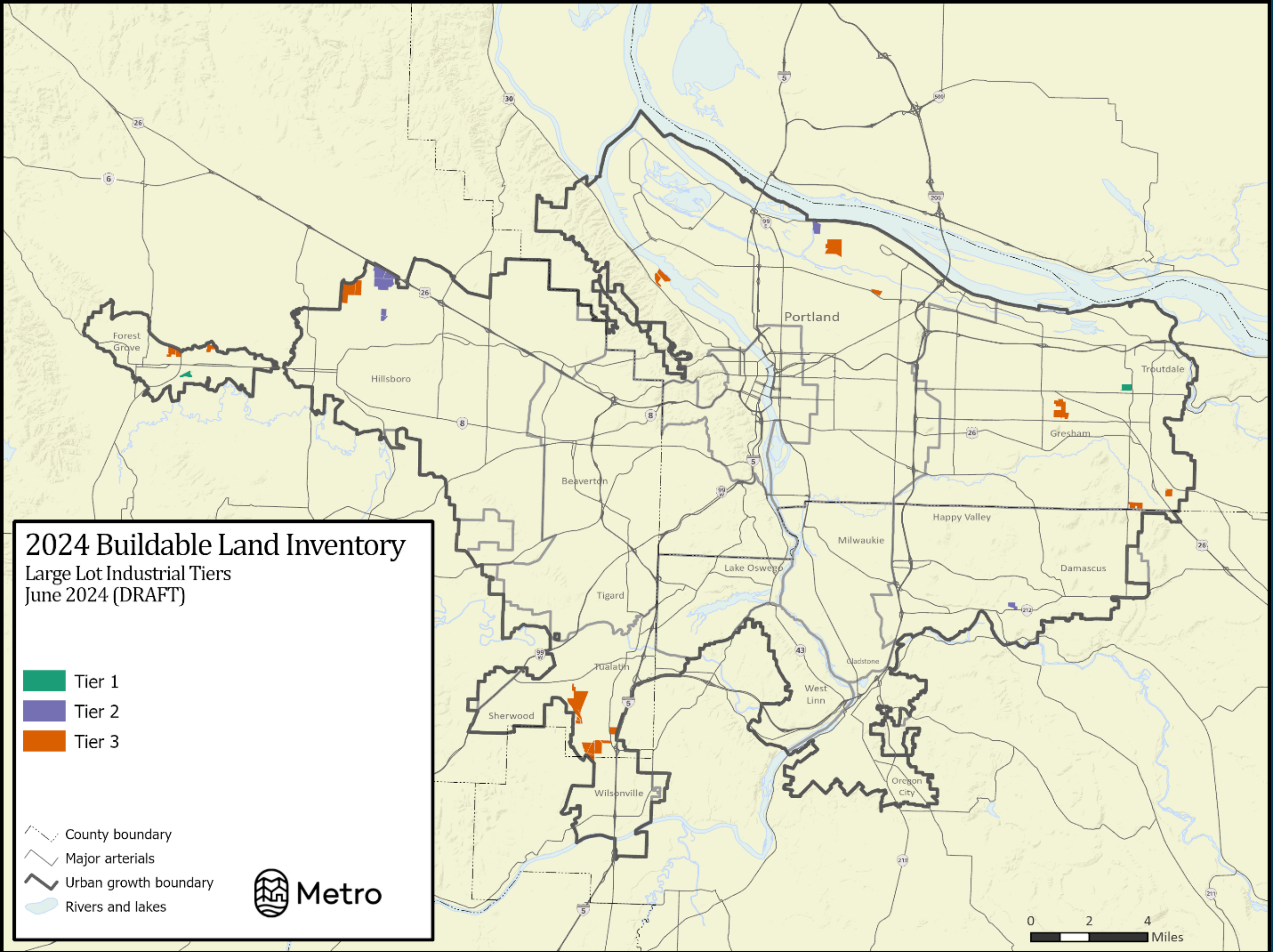
Commercial land capacity gap for Metro UGB, 2024 – 2044

	Capacity (acres)	Demand (acres)	Surplus or deficit (acres)
Low growth forecast	480	-300	+780
Baseline growth forecast	480	800	-320
High growth forecast	480	2,300	-1,820

Results: Industrial land gap analysis

Industrial land capacity gap for Metro UGB, 2024 – 2044

	Capacity (acres)	Demand (acres)	Surplus or deficit (acres)
Low growth forecast	5,950	-1,500	+7,450
Baseline growth forecast	5,950	1,400	+4,550
High growth forecast	5,950	5,200	+750



Large site industrial needs

Statewide Semiconductor Taskforce

- **Two sites of 500+ acres** each to accommodate large-scale semiconductor R&D and/or production fabrication operations.
- **Four sites of 50-100 acres** suitable for integrated device manufacturers or major semiconductor equipment manufacturers.
- At least **eight sites of 15-35 acres** to enable key suppliers to the semiconductor cluster to locate and expand.

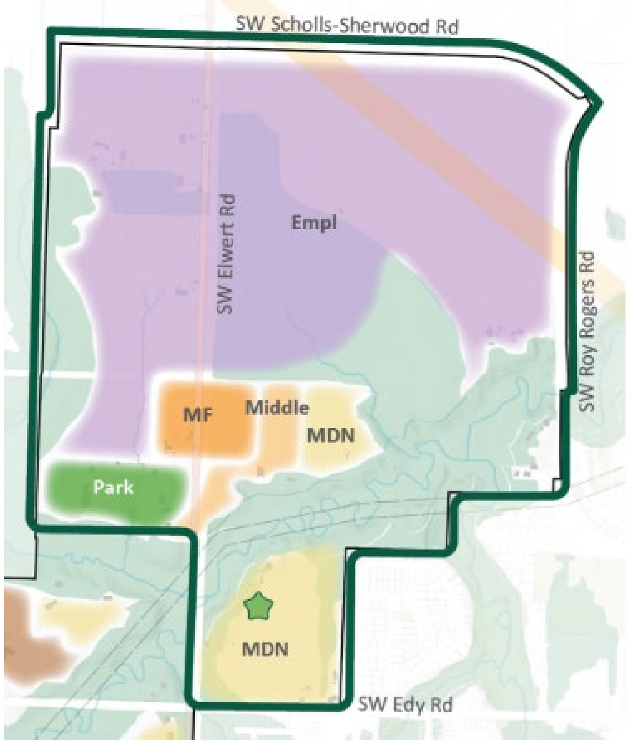
Sherwood West employment land analysis

Sherwood West has specific site characteristics that may meet a regional need.

50+ acre site options

Relative proximity to existing high-tech cluster

Flat sites



Policy options

Policy options

1. No expansion	2. Expansion
Sufficient capacity inside the UGB	**Insufficient capacity inside the UGB**
Conclude that there is adequate capacity inside the UGB for housing and jobs	Expand the UGB to add the Sherwood West urban reserve area as proposed by the City of Sherwood Consider conditions of approval: • to help achieve a certain housing mix or number of housing units • to preserve employment land with unique site characteristics for industrial and flex uses that cannot be found elsewhere in the UGB

Next steps

<table>
<tr><th></th><th>July</th><th>August</th><th>September</th><th>October</th><th>November</th><th>December</th></tr>
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Questions?

oregonmetro.gov