

September 2026

Technical Summary and Appendices: Overview of Hypothetical Futures Modeling & Land Use Translation Assumptions

Overview of the technical methodology and assumptions for the transportation modeling and land use translation for the three hypothetical futures, as well as the transportation themes implied by all three



**A PLAN FOR TOMORROW,
CRAFTED TODAY.**

Introduction

The following summary provides an overview of:

- **State Policy Context:** Summary of new state requirements that Bend's growth plan and next transportation plan must address
- **VMT Overview**
 - What is vehicle miles traveled (VMT),
 - How VMT is calculated,
 - Why VMT is relevant to current planning efforts in Bend, and
 - The process used for evaluating hypothetical futures
- **Hypothetical Future Summary:** Overview of the modeling assumptions and model inputs for each hypothetical future (True Trend, High Urbanization, Edge Rebalancing)
 - **Appendix A** - Modeling results for three hypothetical futures that reflect a range of potential VMT outcomes, transportation network sensitivity tests, and transportation themes implied by travel demand model results
 - **Appendix B** - Assumptions for the land use translation and visualization process for the three hypothetical futures including district and street level visualizations of each future at three locations in the City

Table of Contents

Topic	Page Number
Hypothetical Futures Modeling Technical Summary	
State Policy Context	4
Vehicle Miles Traveled (VMT) Overview	11
Hypothetical Future Evaluation Process	19
Hypothetical Futures Overview and Assumptions	29
Appendix B: Transportation Modeling Results	53
VMT Modeling Results	54
Network Sensitivity Testing	62
Transportation Themes	67
Appendix B: Land Use Translation	80
Hypothetical Futures Floor Area Ratio Heat Maps	116
Hypothetical Future Visualizations	132

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State Policy Context

New State rules require Bend to plan for growth and transportation differently



Climate-Friendly Area (CFA) Requirements

CFAs are intended to help achieve the State's climate goals by addressing both transportation and land use. Bend must:

- Designate at least 1 primary CFA of at least 25 acres
- CFAs must accommodate at least 30% of a jurisdiction's 20-year housing need and:
 - Allow for a mix of uses
 - Be accessible via existing or planned high-quality bicycle and pedestrian networks
 - Be within ½ mile of existing or planned high frequency transit corridors
- Implement strategies to help people avoid having to move elsewhere due to rising rents and/or home prices



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Key Features of CFAs



Housing:

Compact, higher-density housing near jobs, services, and transit



Transportation:

Walkable, bike-friendly, and transit-served areas designed to reduce driving



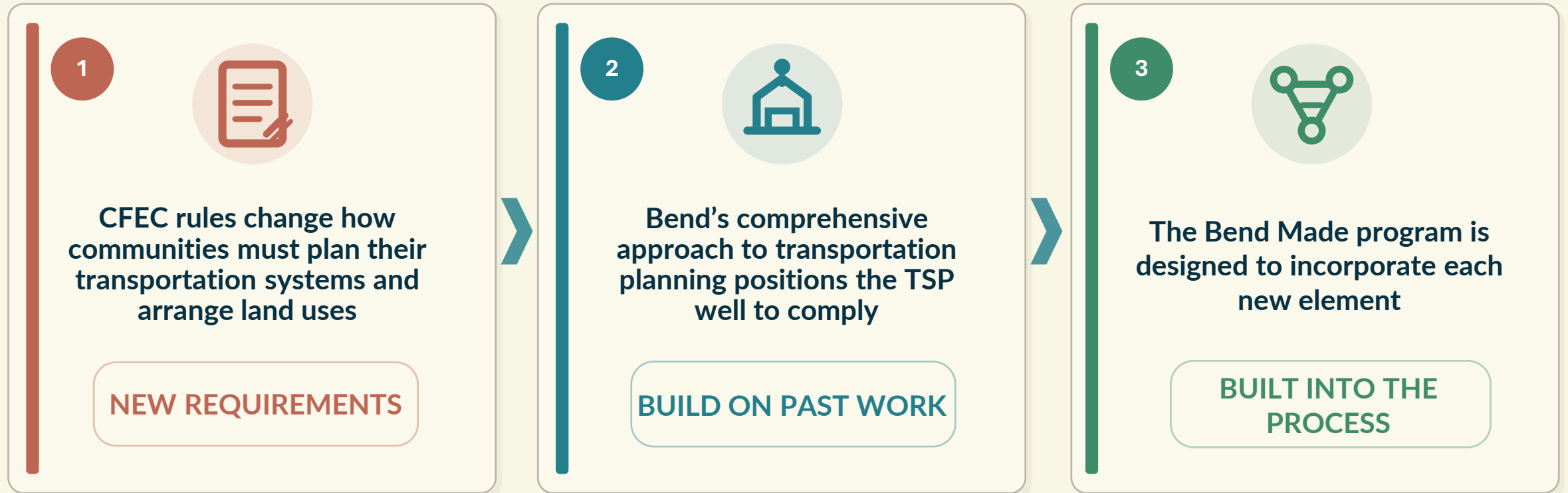
Amenities:

Access to parks, retail, public services, and community spaces

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Bend's TSP Must Incorporate Recent Changes to State Transportation Planning Rule

Bend can build on its existing planning foundation while integrating the new Climate Friendly & Equitable Community (CFEC) requirements into the Bend Made workflow.



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State Requirements & Bend's VMT Target



VMT Per-Capita Reduction

OAR 660-012-0160(4)-(5)

NEW REQUIREMENT

No increase in VMT/capita (2019 base year to 2050 TSP horizon year), including meaningful progress to the initial target of -11% reduction

CURRENT PLAN

2020 Transportation Plan limited VMT/capita growth to <5% above 2003 levels

NEXT STEPS

Compare VMT scenarios through the Growth Plan

Finding: Adopted transportation plan meets prior target — new targets need evaluation

VMT = Vehicle Miles Traveled

0%

*No VMT increase with next
Transportation Plan adoption*

▼ -11%

*State-established initial VMT per
capita reduction target by 2050*

*Bend Major Report, October 30, 2025, Department
of Land Conservation and Development*

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Requirements + Bend's Next Transportation Plan



Equity Analysis OAR 660-012-0135

NEW REQUIREMENT

Identify benefits & burdens for underserved populations

CURRENT PLAN

Equity definition + policies already in place

NEXT STEPS

Refine policy using analysis & outreach findings

Finding: Large gap, in process



Climate Friendly Areas OAR 660-012-0315

NEW REQUIREMENT

ID areas for density, mixed use, multimodal access

CURRENT PLAN

UGB Opportunity Areas already modeled in prior TSP

NEXT STEPS

Formalize CFAs; update HNA and model

Finding: Gap filled via Bend Made Work Program



Bike/Ped Inventories OAR 660-012-0505 / -0605

NEW REQUIREMENT

Complete pedestrian & bicycle inventories; ID gaps

CURRENT PLAN

Low-stress bike data + arterial / collector ped data used

NEXT STEPS

Use state data, verify gaps, expand inventory detail

Finding: Gap filled via Bend Made Work Program

Requirements + Bend's Next Transportation Plan



Parking Management

OAR 660-012-0400 to -0450

NEW REQUIREMENT

Reduce parking mandates near CFAs & transit

CURRENT PLAN

Policies 36-38 + 2017
Downtown Parking Plan

NEXT STEPS

Document completed code changes; link to CFAs as part of CFA Designation

Finding: Mostly complete, part of Bend Made work program



Performance Measures

OAR 660-012-0905 to -0915

NEW REQUIREMENT

Adopt measures + at least 2 objectives to monitor

CURRENT PLAN

Chapter 7 monitoring already tied to TSP goals

NEXT STEPS

Update 2020 measures to match TPR standards

Finding: Will be part of Bend Made work program



Enhanced Project Review

OAR 660-012-0830

NEW REQUIREMENT

Enhanced review for major arterial/interchange projects

CURRENT PLAN

Policy 17 offers a similar local review process

NEXT STEPS

Screen project list; formalize review process

Finding: Existing policy partly supports enhanced review intent

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VMT Overview



Household VMT per Capita Definition

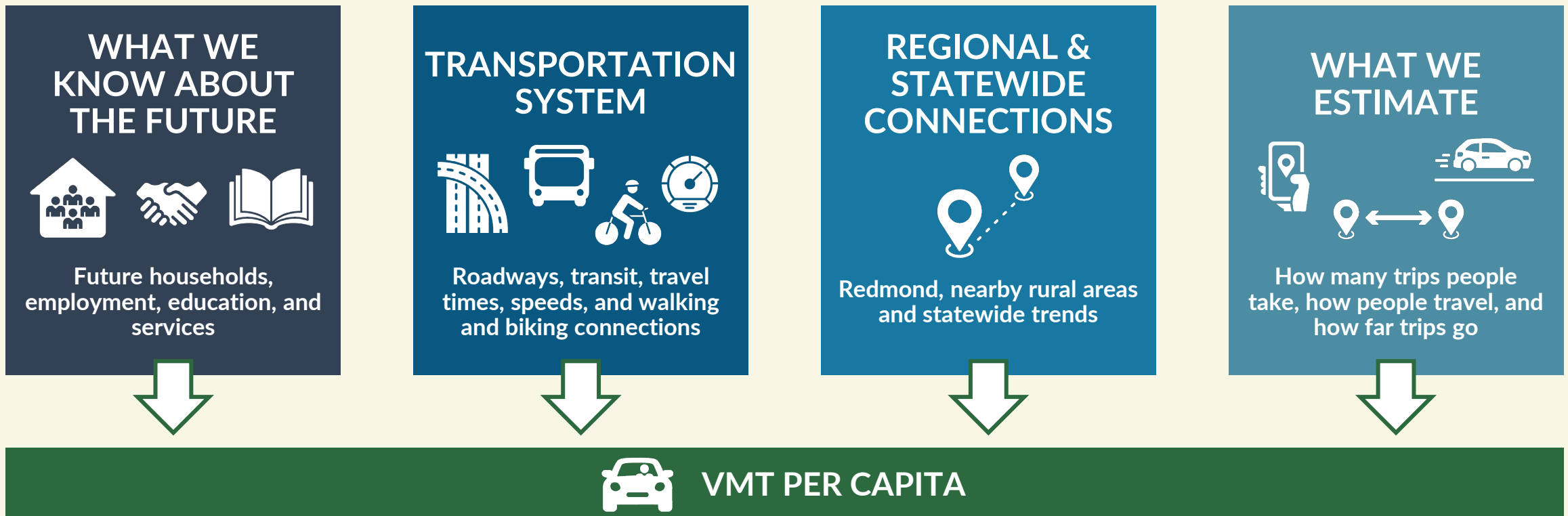
Vehicle Miles Traveled (VMT) per Capita: The measure Bend uses to track progress toward the state-mandated climate goal over time.



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How is VMT per Capita Modeled?

Bend uses the **Bend-Redmond Travel Demand Model (BRM)** to estimate how people travel today and how they are likely to travel in the future.



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VMT Modeling Overview



HOW BEND CAN INFLUENCE VMT MOST

Resident household travel is the part of VMT most responsive to local planning and policy.

LAND USE



- Where housing and destinations are located
- Mix and density of uses



TRANSPORTATION SYSTEM

- Quality and availability of walking, biking, transit, and shared mobility
- Connected streets and trails



POLICIES & PROGRAMS

- Parking pricing and management
- Employer Travel Demand Management
- Other programs that influence travel choices

Visitor and external travel also contribute to VMT, but are generally less responsive to local policy.



HOW VMT CHANGES

VMT changes through two primary pathways:



MODE CHOICE

Whether people travel by car, transit, walk, bike, or other modes.



TRIP LENGTH

How far trips go based on destination choices and route options.

Vehicle Trips x Distance Traveled =
Household-associated VMT

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Key Model Factors That Influence VMT



Land Use

The location, mix, and density of homes, jobs, schools, and services shape how far people need to travel



- Location
- Mix of Uses
- Density
- School Location



Households

Who lives in Bend and what resources they have influence how often they travel and by what mode



- Household Size & Type
- Income
- Age
- Auto Ownership



Transportation

The design and performance of our streets, transit, and active transportation network affect travel choices and trip lengths



- Connectivity
- Travel Time & Speed
- Transit Access
- Walking & Biking Network



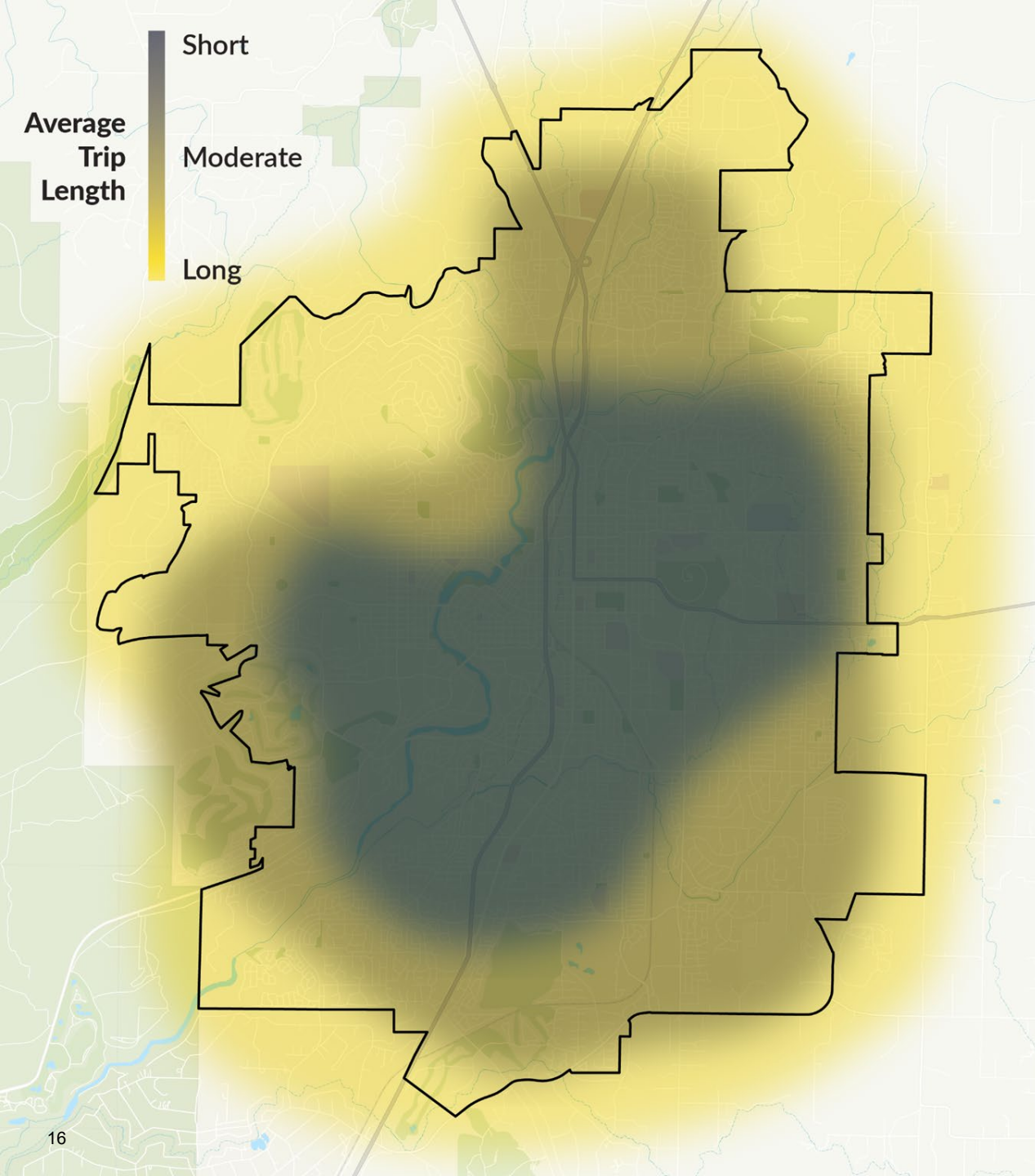
Travel Costs & Programs

Cost and programs can encourage people to drive less and choose other travel options



- Parking Pricing
- Fuel & Operating Costs
- Work Patterns
- TDM Programs

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VMT Drivers

Location sets the VMT starting point.

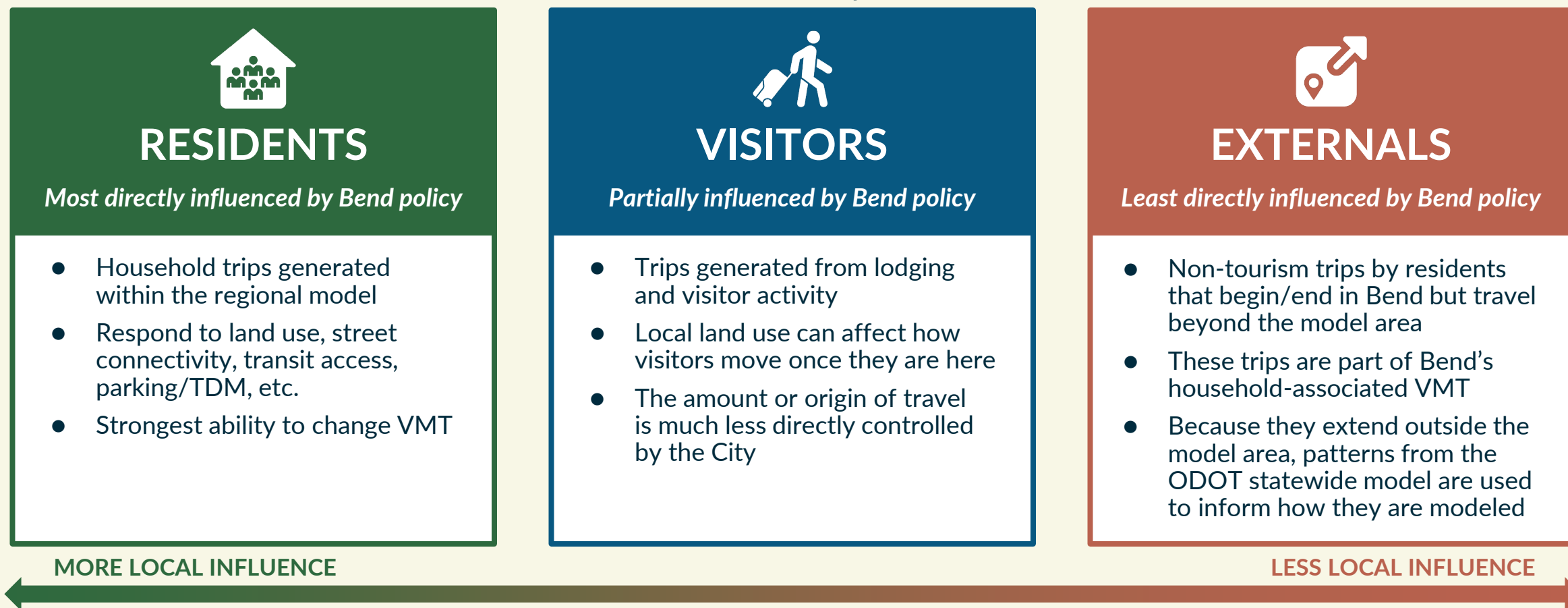
Higher densities of housing and jobs in central areas generally support shorter trips and more non-auto travel.

Farther from the center, balanced land use with higher concentrations of housing near goods and services jobs, along with strong transportation choices, become increasingly important to improve VMT outcomes.

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Different Travel Markets Respond Differently to Local Policy

The model includes three travel markets. Bend's ability to influence each varies.

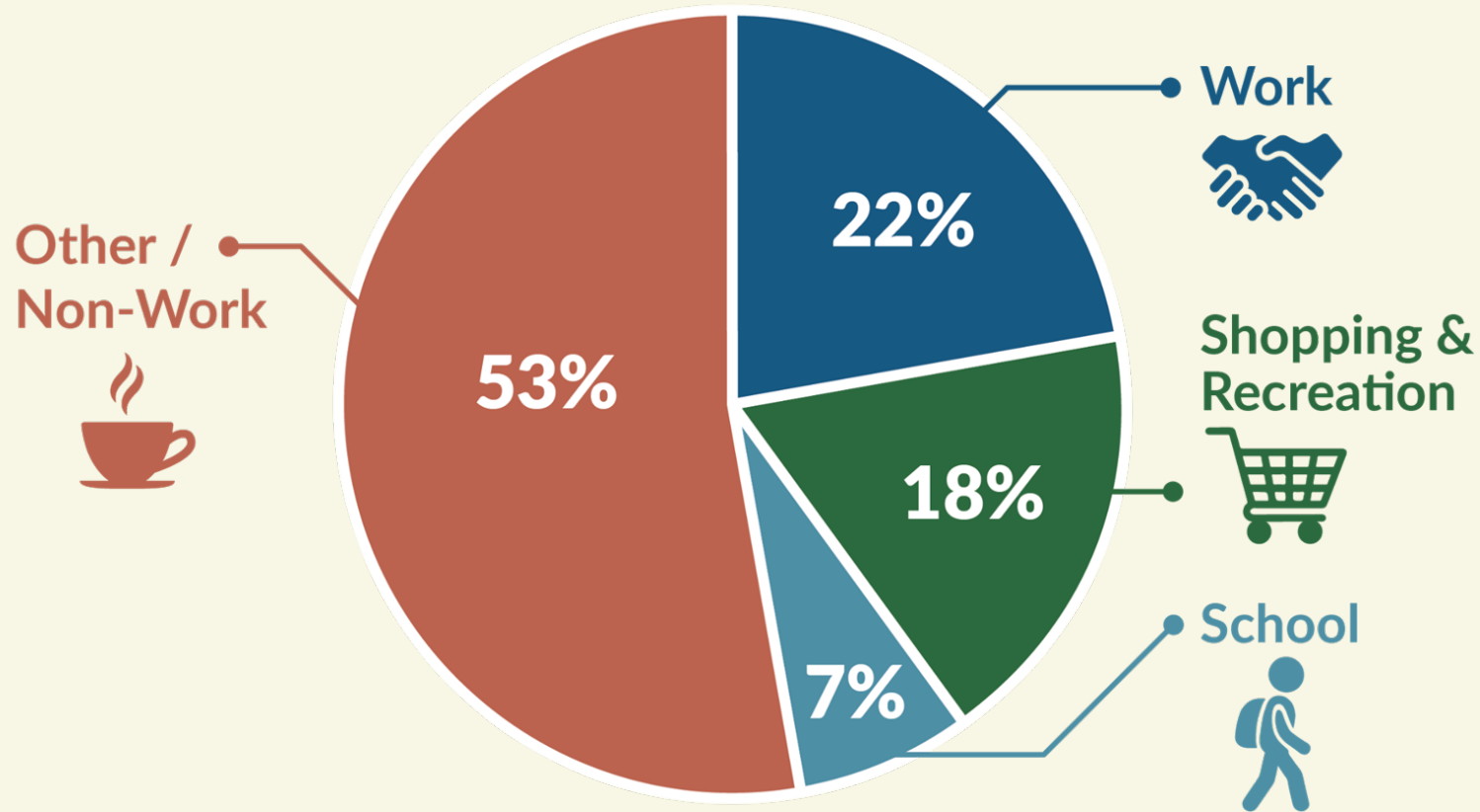


Note: Lodging-heavy areas can show elevated VMT because visitor travel contributes to modeled VMT, even though visitors are not part of Bend's population.

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Key Model Factors that Influence VMT

Different trip purposes influence VMT differently.



Work trips only represent 1 in 5 trips.



Different destinations affect VMT differently so where someone is going matters.



The model uses trip types to estimate the number of trips, how they were made, and how far they travel.



Key Point: Locating housing close to higher numbers and concentration of retail and other commercial uses is the most significant combination for reducing VMT.

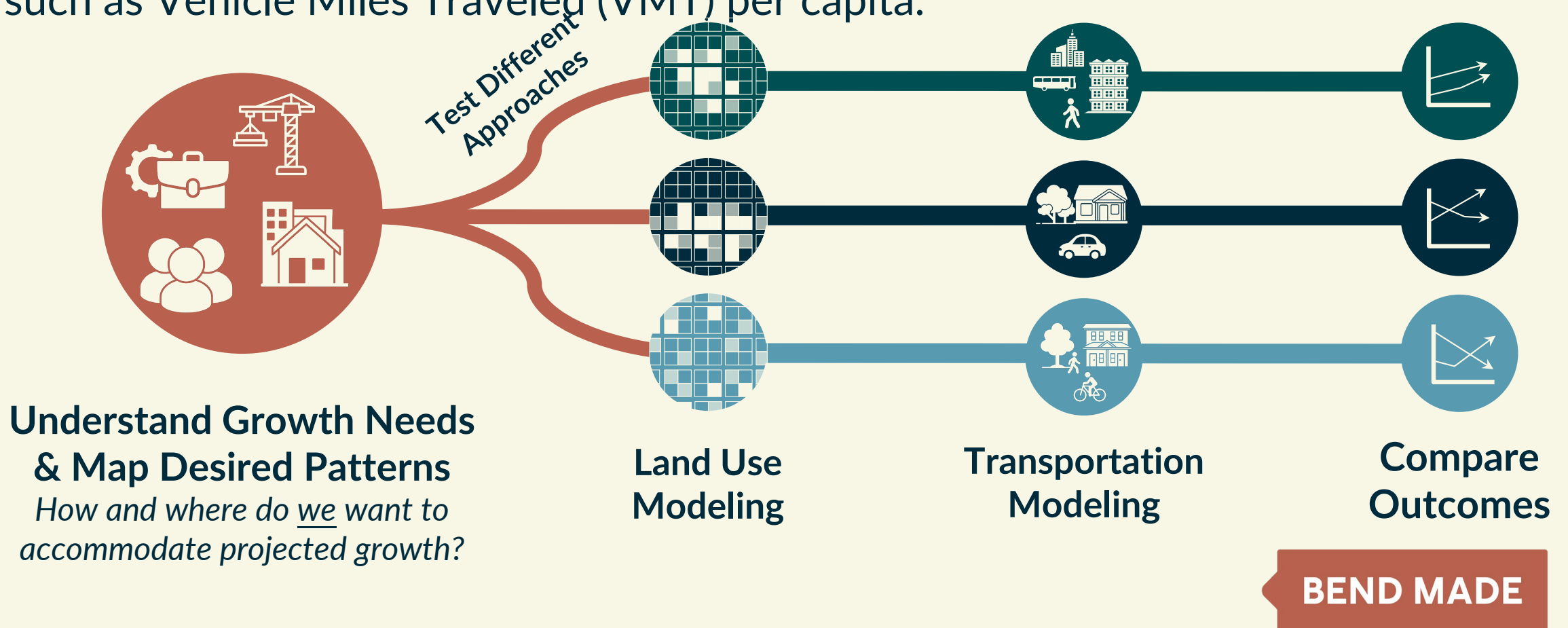
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Hypothetical Future Evaluation Process



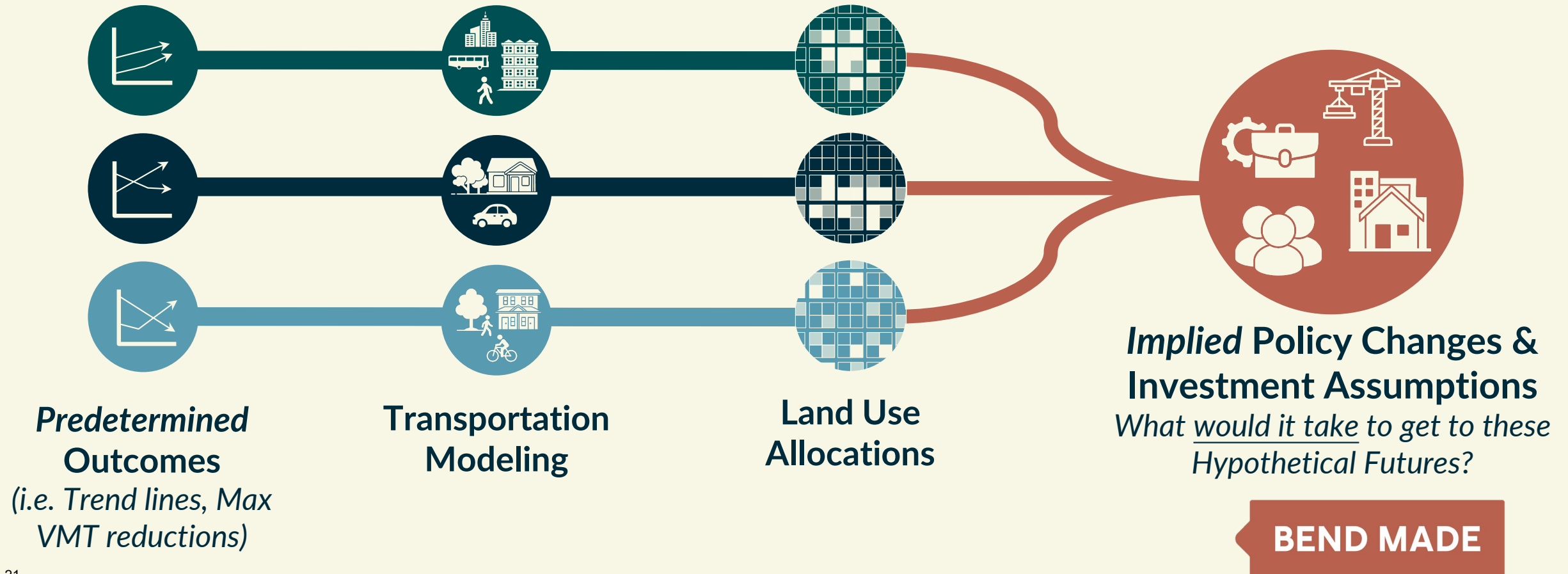
Typical Scenario Planning Process

Scenario planning takes future needs (housing and jobs), models different land use and transportation growth scenarios, then explores how that impacts elements such as Vehicle Miles Traveled (VMT) per capita.



We Analyzed Futures in Reverse

Because we know the State VMT per capita requirements, we worked backwards to explore how different approaches to VMT come with different land use patterns



Detailed Modeling Process

1. Define Hypothetical Futures (HFs)

Establish three distinct HFs, based on past planning and VMT modeling work in Bend

2. Develop HFs Inputs

Incorporate HF-specific changes to land use, transportation network, and other travel demand model inputs

Run trip-based travel demand model

3. Evaluate Outcomes

Calculate VMT per capita or other performance measurements to compare futures

Translate model inputs to visualizations (discussed in Appendix B)

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1. Define Hypothetical Futures

Land Use

Test alternative patterns for accommodating future growth

- True Trend
- High Urbanization
- Edge Rebalancing

Discussed in more detail in next section.

Network Sensitivity

Test how major changes to the transportation network may affect VMT

- Lower roadway speeds citywide
- Added river crossing capacity (new crossing and widened crossings)

Additional network strategies will be evaluated later in the process concurrent with the Transportation System Plan work program

1. Define Hypothetical Futures

Note that Hypothetical Futures use different, but similar, population forecasts than future phases of the project will use.



Hypothetical Futures

Analyzed using the current Bend Redmond trip-based travel demand model.



Future Project Phases

ODOT is developing an Activity-Based Model that may enable more detailed testing of household and individual travel behavior when available.

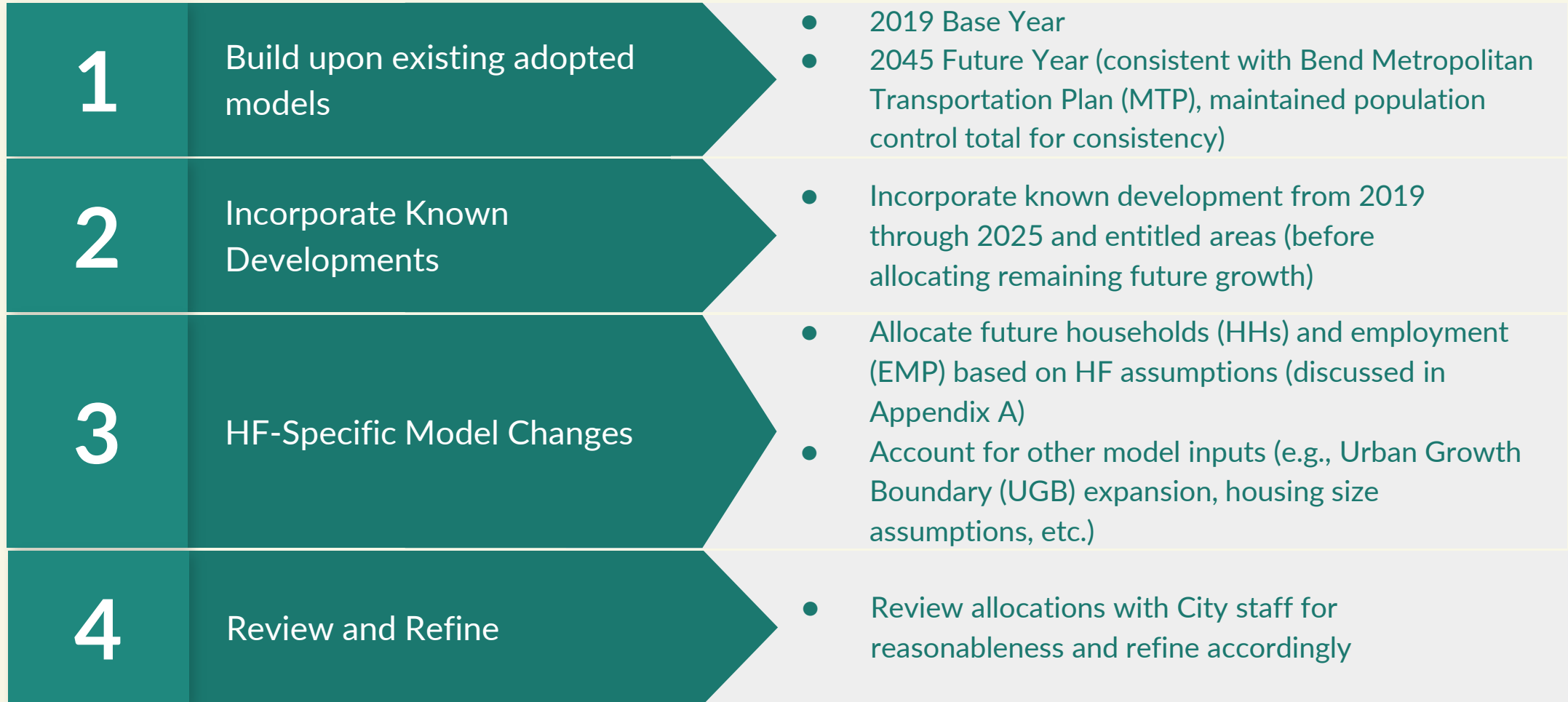
Year	Bend Population Estimate or Forecast	
	2022 PSU Forecast	2026 PSU Forecast
2025 (Today)	111,062	107,501
2045	155,806	146,689
2050	167,332	154,493

The forecast Bend Made will use in future project phases.

Forecast used to model the hypothetical futures.

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2. Develop HF Inputs



3. Evaluation

While this was not a holistic scenario evaluation process, the project team considered the following transportation metrics to identify key findings to share with Council.

Metrics (continued on next slide)	Description	Current (2020) TSP Goal
VMT*	Where VMT is generated across the model area and differences between scenarios, at the Citywide level and by zone	Steward the Environment
Mode Split	How trips are distributed among different travel modes, focused on reductions in single occupancy vehicle (drive alone) trips	System Capacity, Quality & Connectivity for all users; Steward the Environment
Demand /Capacity Ratio	The relationship between roadway demand and available capacity	System Capacity, Quality & Connectivity for all users

* All metrics were analyzed using methodology consistent with the adopted 2020 TSP, with the exception of VMT, which was provided by ODOT from the travel demand model based on a methodology consistent with the new state household-based VMT definition.

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3. Evaluation

Metrics	Description	Current (2020) TSP Goal
Ped/Bike Considerations	Qualitative consideration of potential pedestrian and bike opportunities and impacts	System Capacity, Quality & Connectivity for all users
Housing & Employment	Consideration of how scenarios serve areas identified for future housing and employment	Facilitate Housing Supply, Job Creation, and Economic Development to Meet Demand/Growth
Regional Considerations	Consideration of regional connectivity and coordination with other planned infrastructure	Have a Regional Outlook and Future Focus
Diversion Potential	Differences in traffic volumes to identify where traffic may shift between routes	Protect Livability and Ensure Equity and Access

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Future VMT Scenario Refinements

Future tasks will help develop and model formal scenarios for this work program. Additional VMT modeling refinements during those future tasks will include:

- **Land Use:** Based on feedback from council, the community and other work tasks, additional land use scenarios will be formally modeled as part of the planning process. This may include a refinement of population assumptions to align with the most recent Portland State University population forecasts.
- **Transportation Network:** As part of the TSP update process, additional transportation network changes will be modeled and evaluated for inclusion in the TSP. This could include refinements to transit, travel demand management strategies, citywide speed limits, etc. which could influence VMT outcomes.
- **Model Inputs:** There are additional model inputs that can influence VMT outcomes that were not modified with these futures but could be incorporated into the formal scenario evaluation process. These include inputs such as school boundaries, transit coverage factors and hotel/lodging rates. Refinements will also be considered for other demographic distributions (age of head of household, income and size) to align with the land use refinements.

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Hypothetical Futures Overview



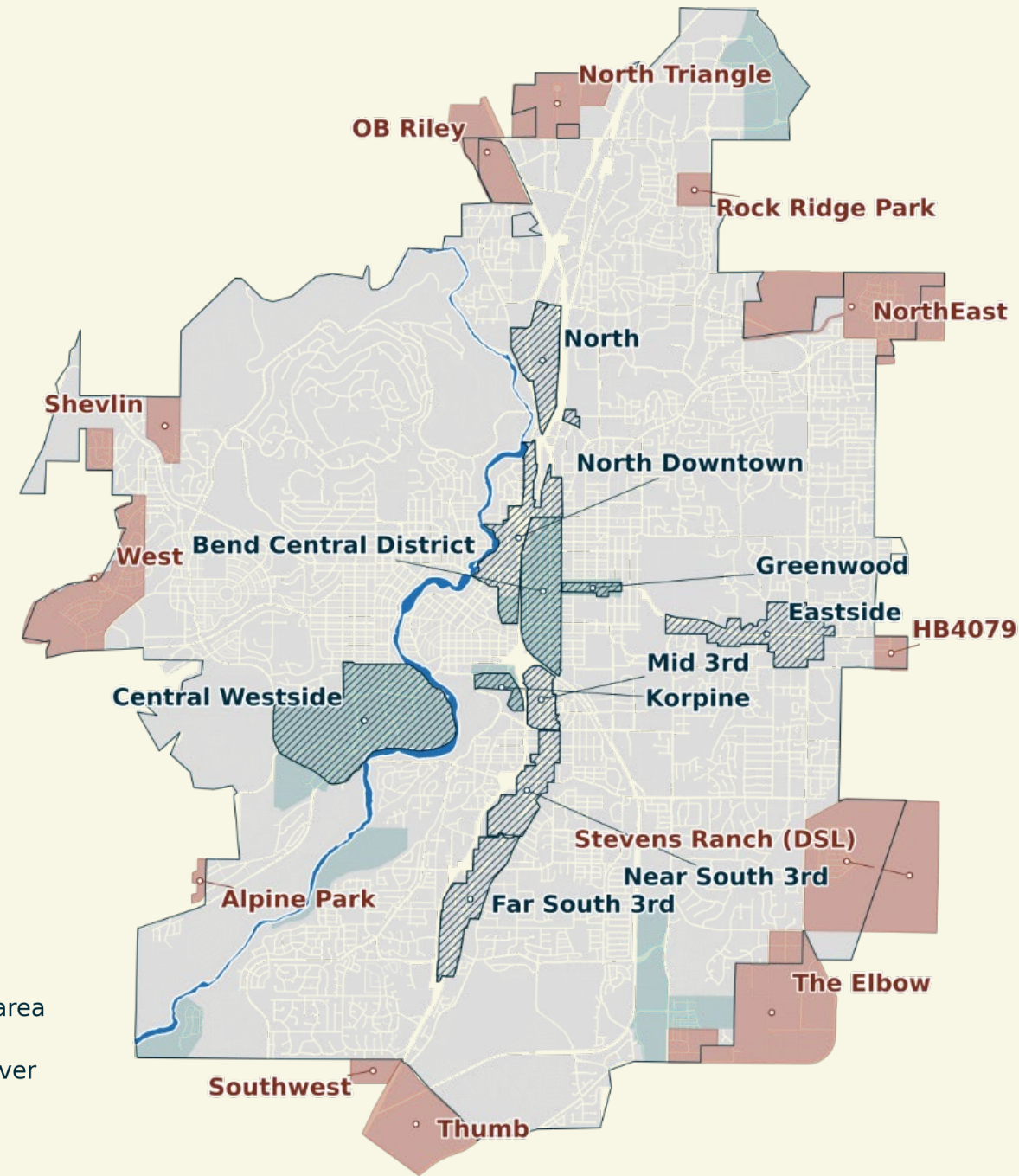
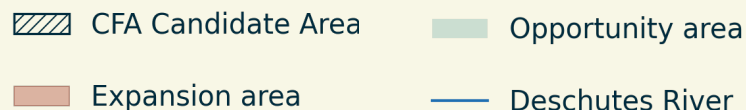
Detailed Travel Demand Model Methodology for VMT Evaluation of Hypothetical Futures

Defining Bend's Areas

Locations referred to across hypothetical futures:

Climate Friendly Area (CFA) Candidate areas (notably Bend Central District (BCD), Eastside, Central Westside)

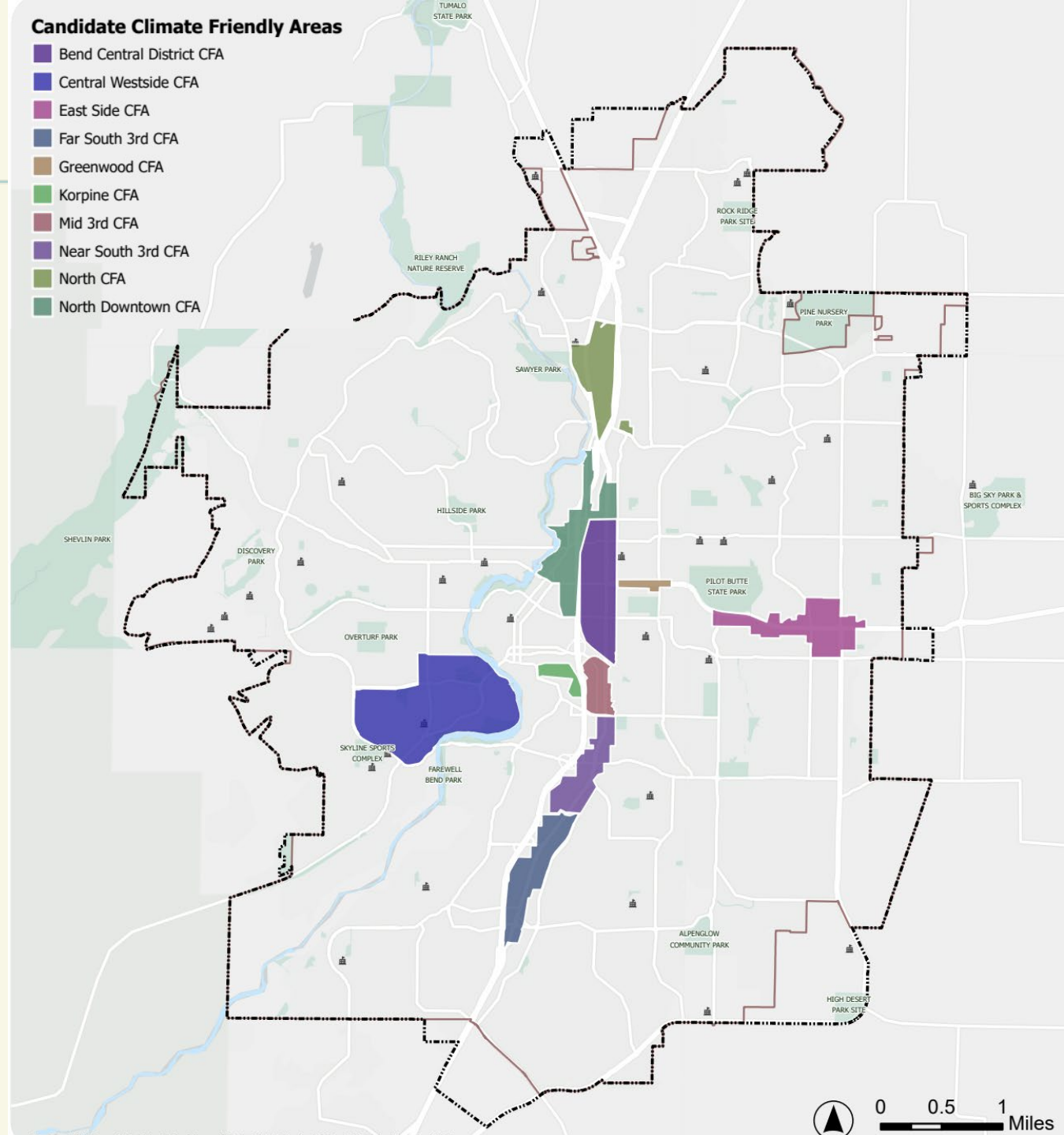
Expansion areas (Thumb, North Triangle, Juniper Ridge, Stevens Ranch and DSL)



Bend's CFA Study

City identified **ten potential CFA candidate areas** in 2023 to help support future designation of CFAs through the Bend Made process.

There was notable public support for the **Central Westside, Bend Central District, and Eastside** areas to be prioritized for as primary CFAs.



Three Hypothetical Futures

HF1: True Trend

- "Business-as-usual" extrapolation of 2019-2025 development patterns
- No major policy intervention beyond what is already in place

HF2: High Urbanization

- *More* mixed-use communities in the center of Bend (in three preferred CFAs/around major job centers)
- Remaining housing increment concentrated in CFA Traffic Analysis Zones (TAZs)

HF3: Edge Rebalancing

- *More* Mixed-Use Communities at the Edge
- Balanced jobs-housing districts at UGB edge

Common Ground Assumption

- All three apply the same locked baseline of entitlements and 2019 base year (see Locked Assumptions)

Locked Assumptions (applied to all three futures)

Baseline

- **Base:** 2019 base year, with permitted and entitled development locked in (assumed 100% absorption by 2045)
- **Built:** Residential permits reflect 2019 through 2025 growth
- **"Stable Growth" or Entitlements:** Growth already in the pipeline, which includes master plans approved since 2016 (including expansion areas and non-expansion areas), multi-unit site plan applications and approximately 2,500 units assumed to be locked in Stevens Road tract/DSL/Legacy Village (master plans for these areas were pending at time of analysis).

"Movable Growth":

- Approx. 10-11k households (HH), varies depending on household size assumptions with population held constant throughout all futures (consistent with 2045 MTP assumptions)

Other Methodology constants

- Vacancy rate: 10%
- Hotel occupancy: 50%
- Commercial condos assumed not re-developable

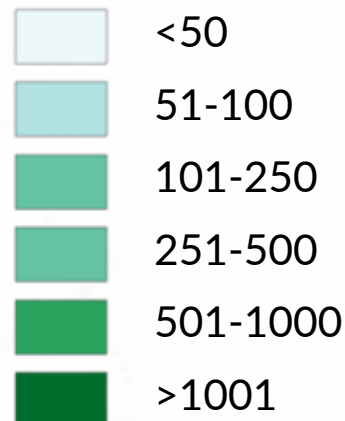
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Locked Assumptions Households Map

Locked assumptions are the shared baseline that all three hypothetical futures are built upon.

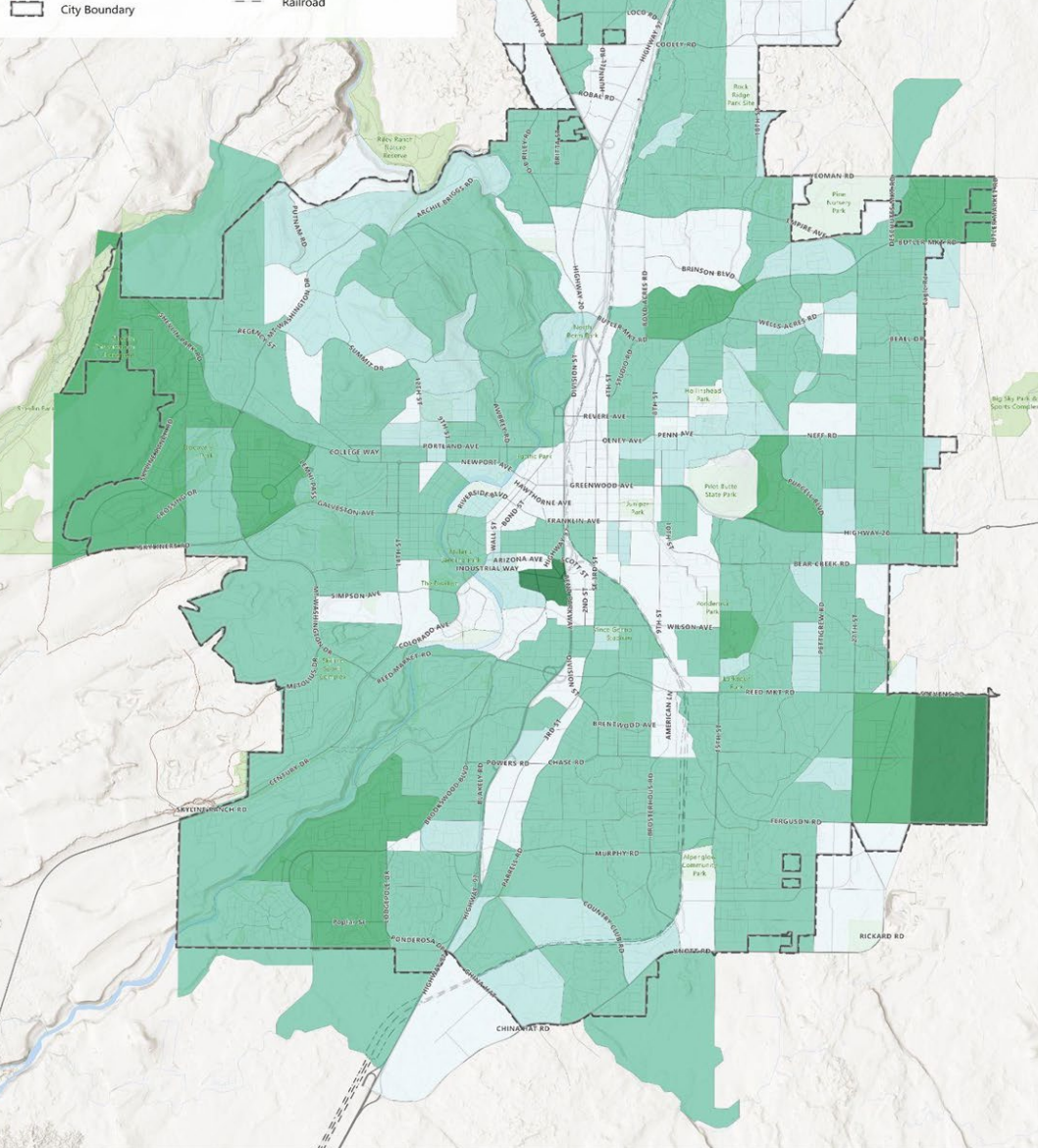
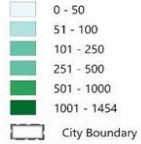
Locked Assumptions include existing households and employment from a 2019 land use base, built residential units (2019-2025), and approved major entitlements or projects that are "in the pipeline".

Locked Household Growth (e.g., permitted, entitled) to 2045 (households)



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Locked Household Growth (e.g., permitted, entitled) (2019-2045)



Hypothetical Future 1: True Trend



HF1: True Trend

Concept

- **Trend-based extrapolation of 2019-2025 development trends through 2045**
- No new policy intervention; mostly reflects outcome of 2016 UGB remand project planning choices (e.g. Opportunity Areas), recent state housing changes (HB2001, etc) and future UGB expansions

Growth Allocations

- Continued expansion-area growth on vacant lands (e.g., near OB Riley, Thumb)
- Future small UGB expansions to accommodate population growth
- Development of vacant lots and infill/redevelopment assumed inside existing UGB

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HF1: True Trend Key Assumptions

Housing Allocation

- Zone-specific assumptions for large vacant parcels provided by City
- Assumed development of vacant parcels within existing Urban Growth Boundary (UGB)
- Infill/redevelopment based on past permit trends, City identification of where redevelopment potential still remains (low/med/high) and assumed redevelopment of partially vacant large lots
- Caldera Ranch UGB and future conceptual UGB expansion based on City-identified sites

Employment Allocation

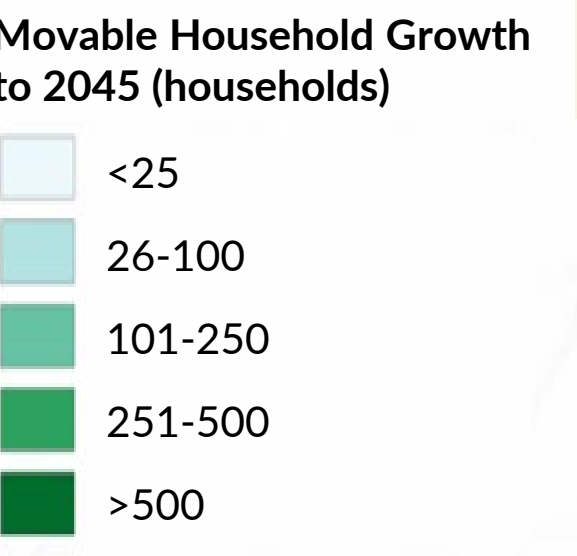
- Vacant employment parcel data and employment density assumptions provided by Cascadia
- Targeted adjustments for major employment centers (e.g., St. Charles, Central Oregon Community College, Oregon State University (OSU) Cascades, and Downtown Bend) to reflect higher employment densities in the future
- Scaled employments allocations in all other zones to match MTP employment control totals by employment category

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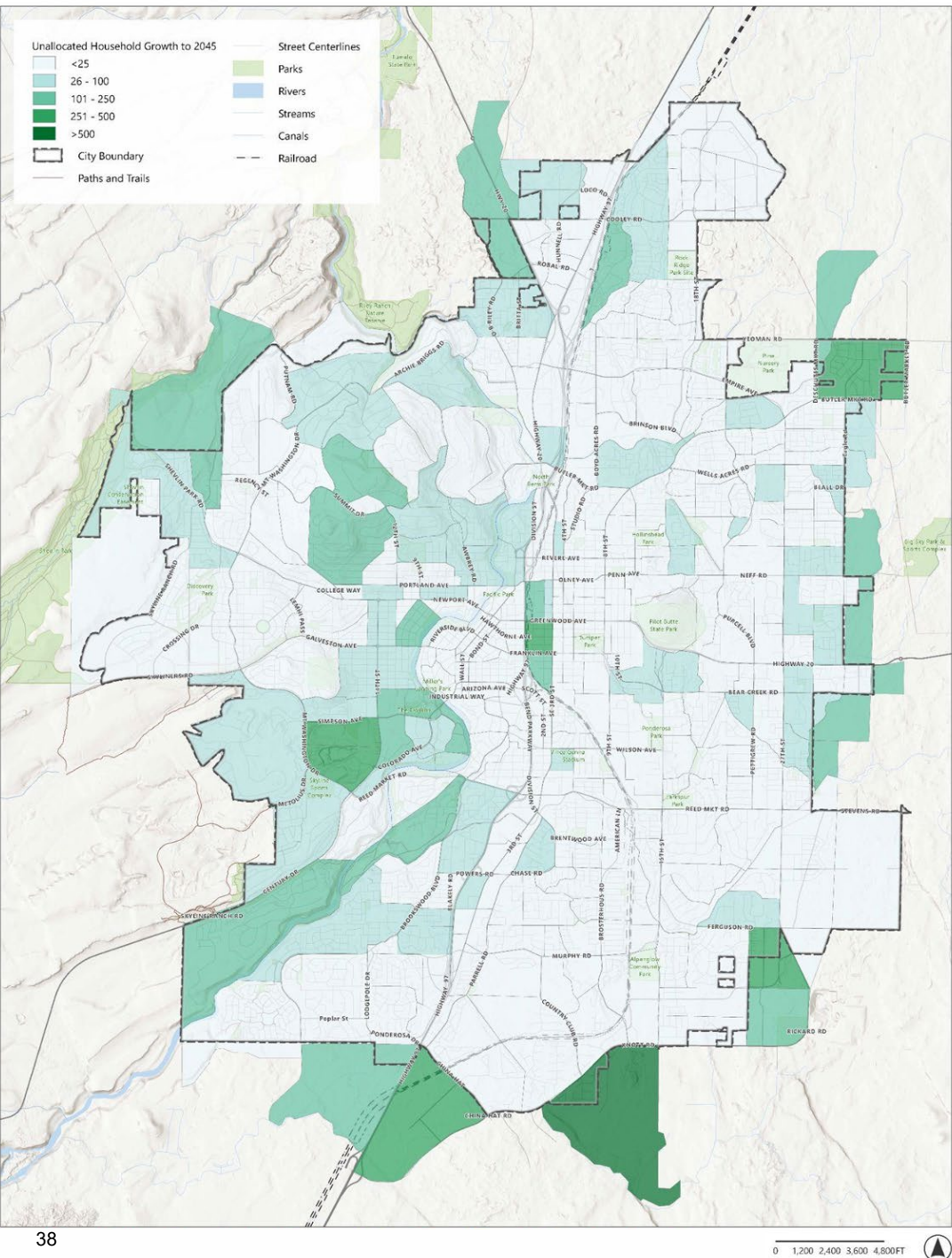
HF1: True Trend Movable Household Growth

Movable household growth shows locations where assumed movable growth was allocated at the TAZ-level.

Growth was allocated to model observed 2019-2026 development patterns and is further discussed in the land use translation appendix.



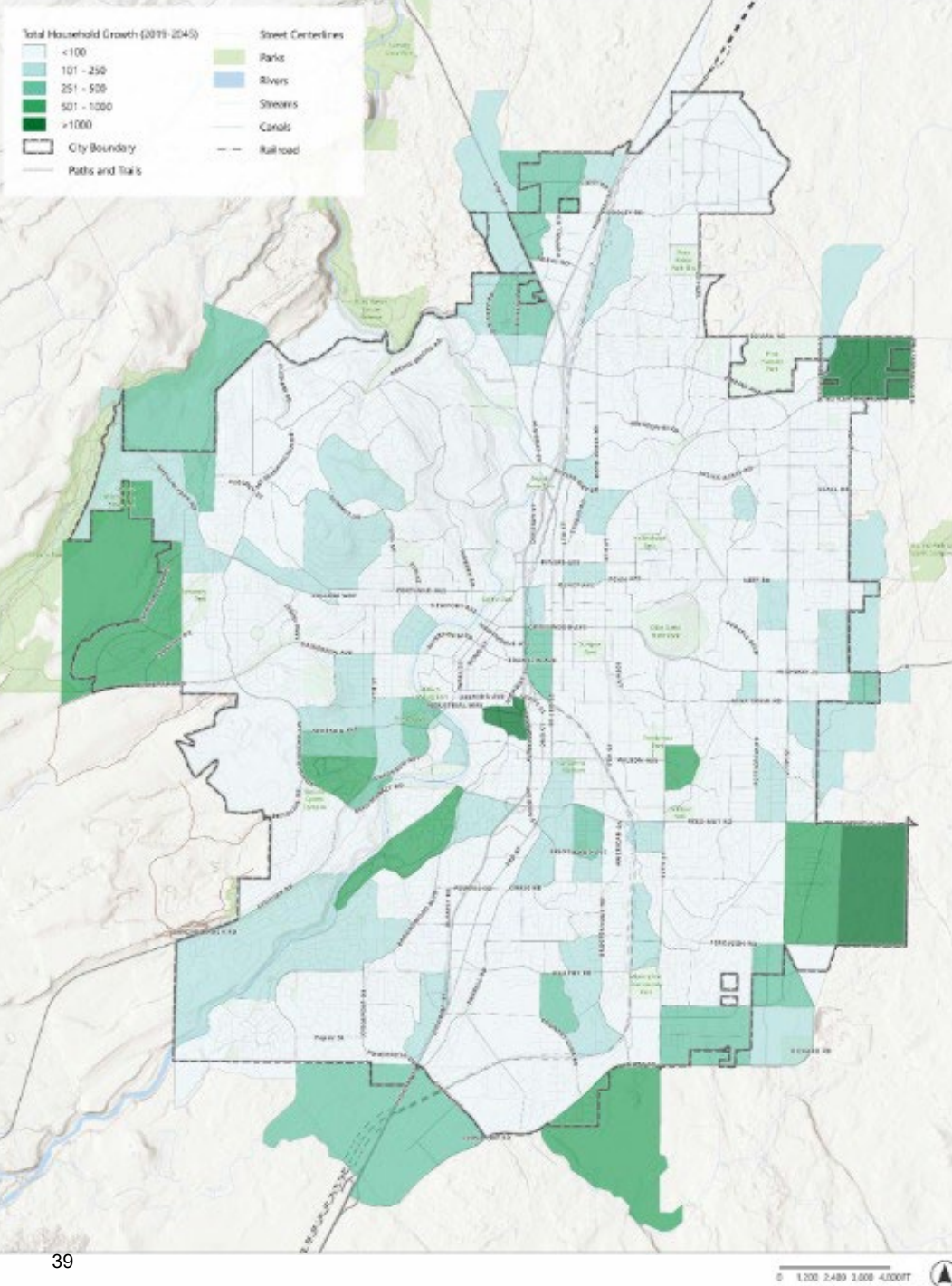
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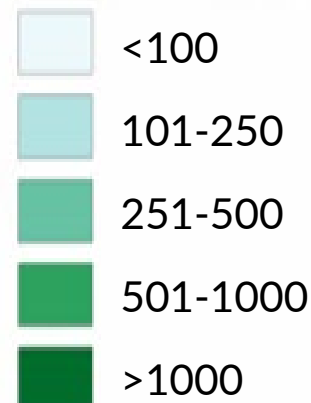
HF1: True Trend

Total Household Growth Map

Total household growth is the total household growth assumed from 2019 to 2045 in the True Trend future, including the built and stable growth assumptions, and the movable growth allocation for True Trend.



Total Household Growth from 2019 to 2045 (households)

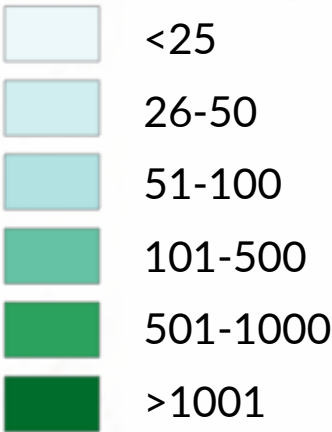


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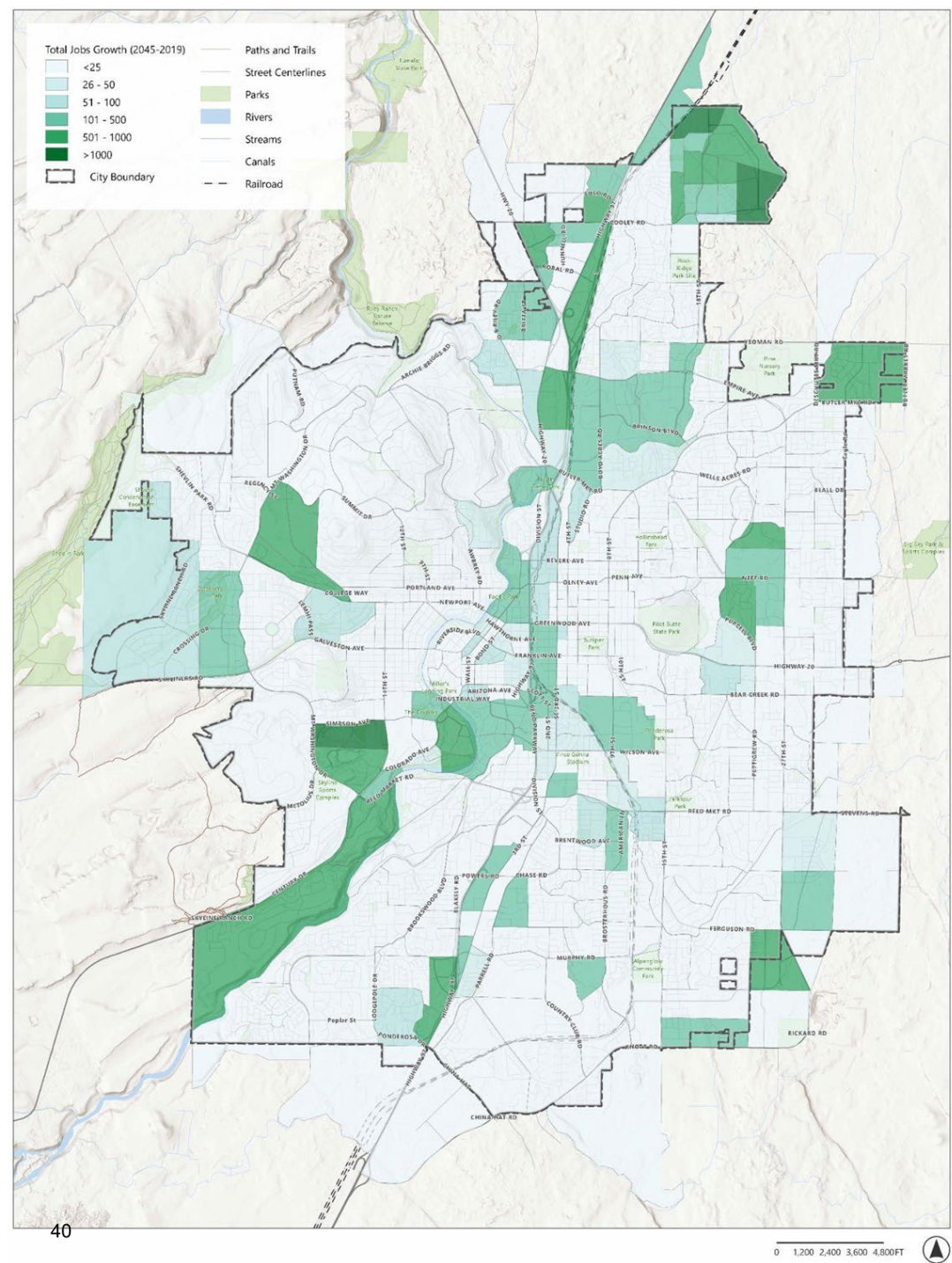
HF1: True Trend Employment Growth Map

Total employment growth assumed for True Trend from 2019 base through 2045.

Total Jobs Growth (2045-2019)



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Hypothetical Future 2: High Urbanization



HF2: High Urbanization

Concept

- ***More Mixed-Use Communities in the Center***
- All unlocked housing growth increment allocated to TAZs that overlap with three priority Climate-Friendly Areas (CFAs) (Bend Central District, Eastside, Central Westside, and North Downtown)
- Employment increment also shifted toward CFAs

Growth Allocations

- Potential primary CFA candidate areas plus additional growth adjacent to Bend Central District to result in reasonable density assumptions
- Excludes Korpine (which is accounted for as a “locked” entitlement or stable growth)

HF2: High Urbanization Key Assumptions

Housing allocation

- 100% of unlocked housing increment to CFA TAZs
- Within each CFA, growth allocated by TAZ size to achieve roughly 40 units per net acre
- North Downtown limited to TAZs 306, 307, 308, 261, 301 (closest to downtown, west of Parkway)

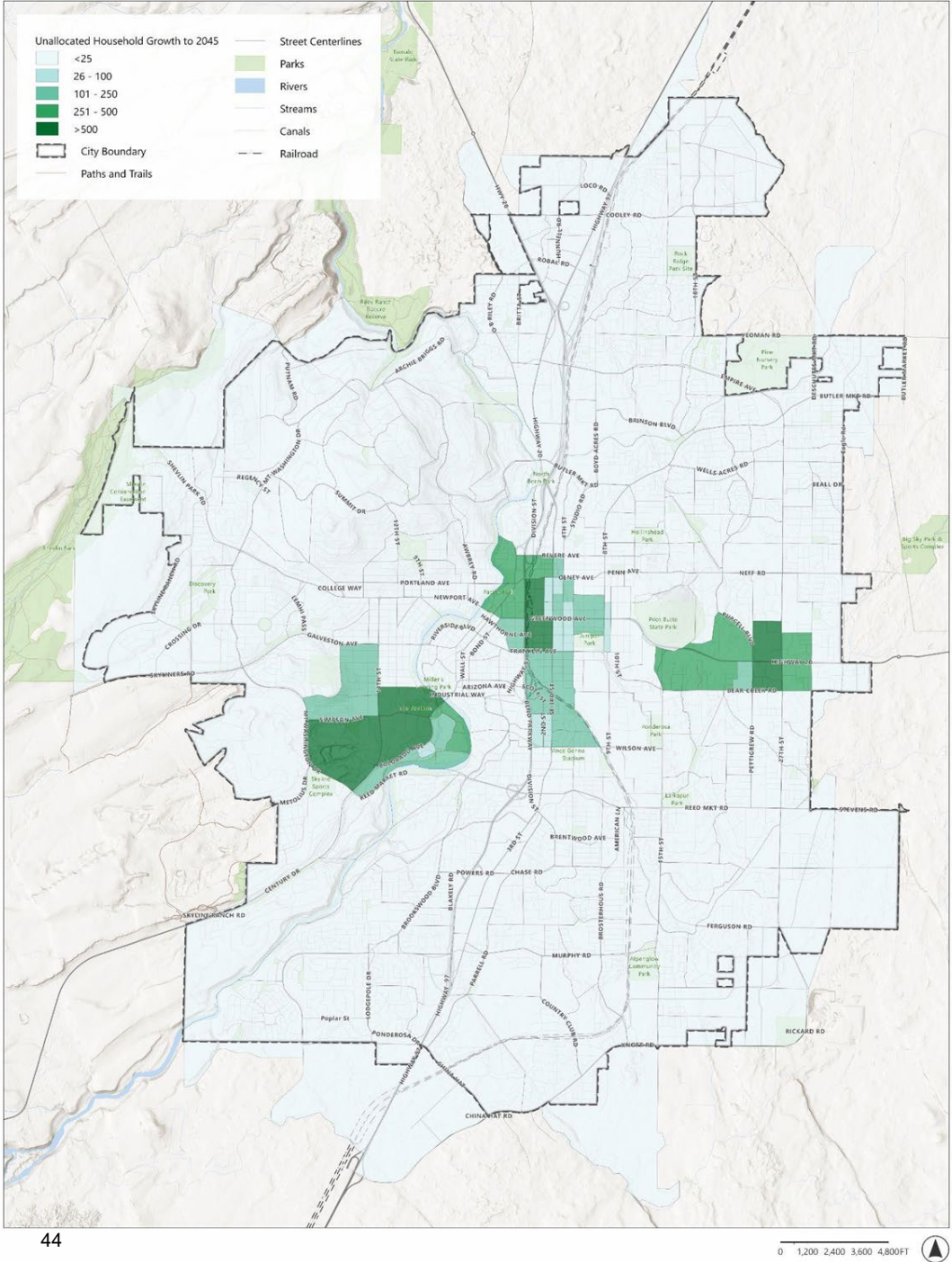
Employment allocation

- Targeted maximum HH/EMP ratio of 0.80 (based on avg. ratio within Bend UGB from MTP) in primary CFAs and 3 additional CFAs (based on staff direction): Greenwood, North Downtown, Mid 3rd
- Zeroed out OB Riley and Thumb employment (assuming limited additional expansion in this HF)
- Detuned employment growth from all other areas of the City.

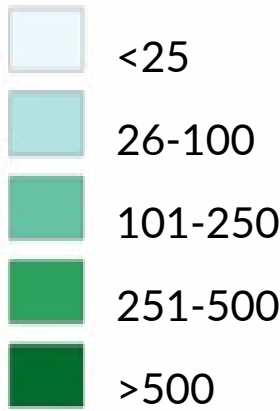
HF2: High Urbanization Movable Household Growth

Movable household growth shows locations where assumed movable growth was allocated at the TAZ-level.

Growth was allocated to three primary CFAs.



Movable Household Growth
to 2045 (units)



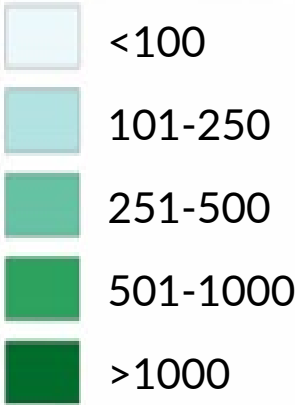
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HF2: High Urbanization

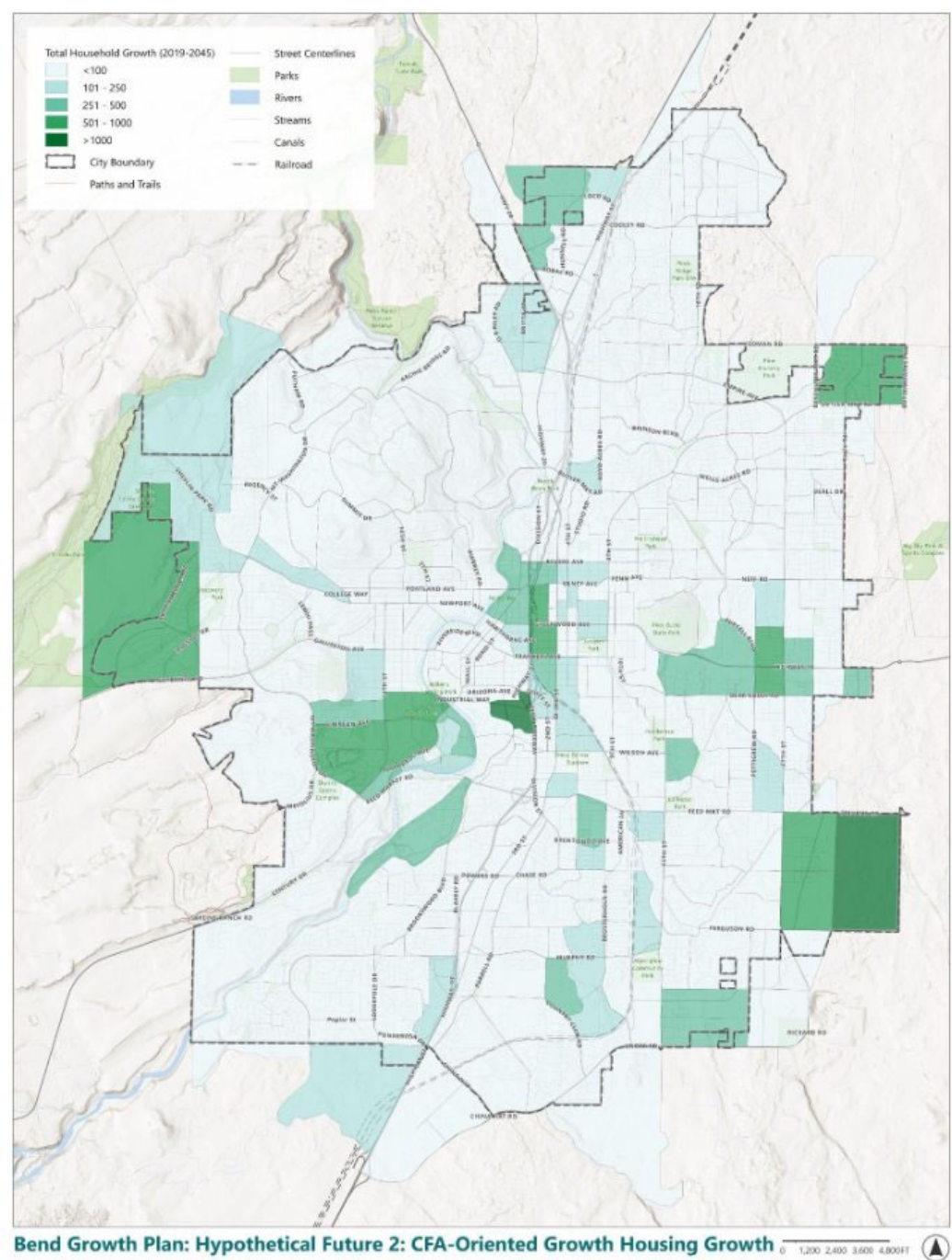
Total Household Growth

Total household growth is the total household growth assumed from 2019 to 2045 in the High Urbanization future, including the built and stable growth assumptions, and the movable growth allocation for High Urbanization.

Total Household Growth from 2019 to 2045 (households)



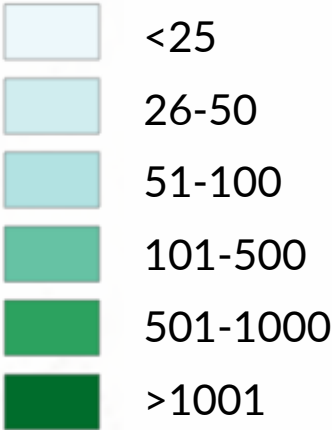
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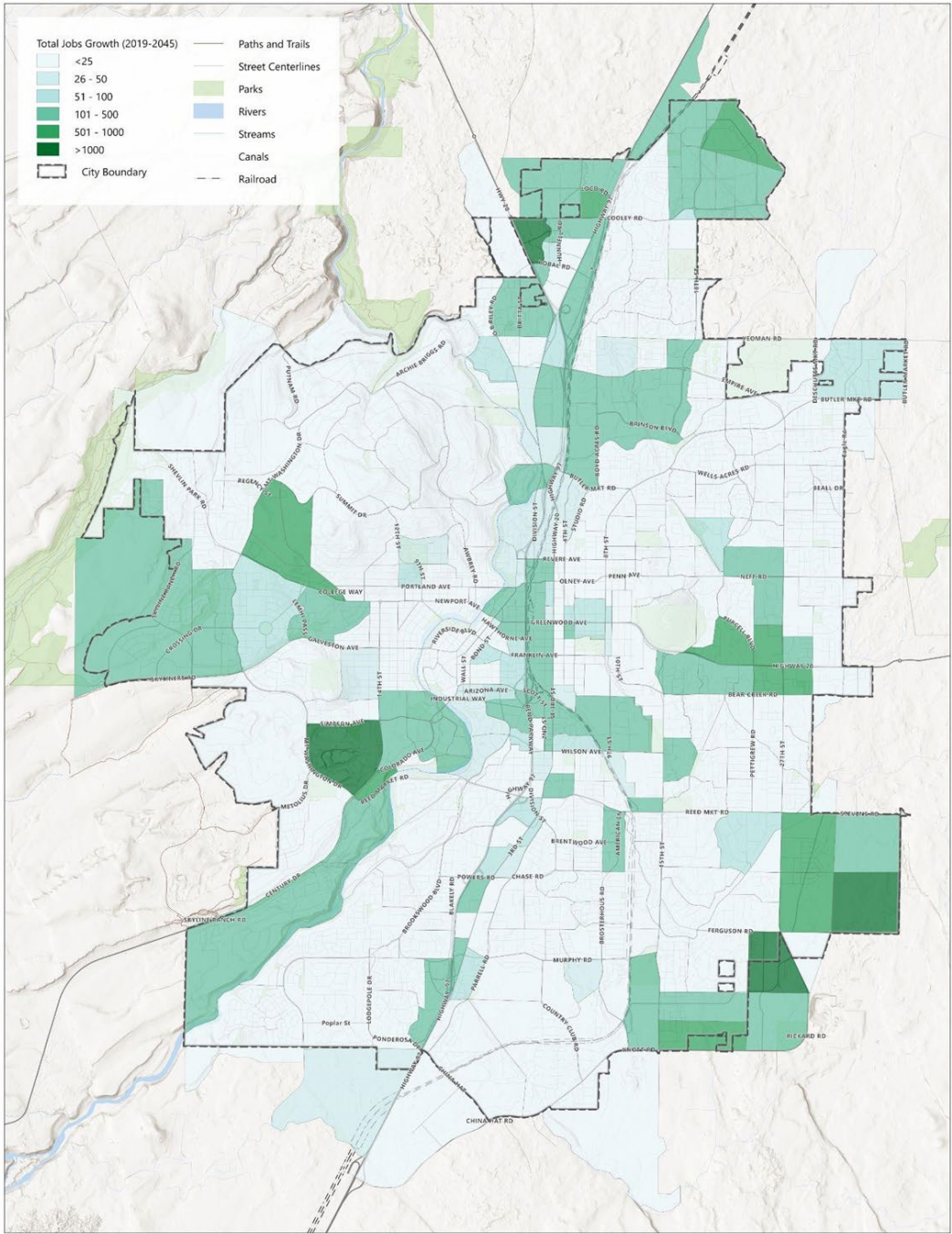
HF2: High Urbanization Employment Growth Map

Total employment growth assumed for High Urbanization from 2019 base through 2045.

Total Jobs Growth (2045-2019)



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Bend Growth Plan: Hypothetical Future 2: CFA-Oriented Growth Employment Growth



Hypothetical Future 3: Edge Rebalancing



HF3: Edge Rebalancing

Concept

- ***More Mixed-Use Communities at the Edge***
- 3-4 balanced jobs-housing districts at UGB edge, intentionally avoiding CFAs for a more distinct future comparison

Growth Allocations

- Targeted employment-to-household ratio of 0.5-1.0 (based on high performing edge zones near Stevens)
- Targeted districts on the edges that were approximately 0.75 sq. mi to 1.5 sq. mi. in size. Results in approx. 2,500-5,000 households per district
- Primary Growth Areas
 - Juniper Ridge (roughly 160 unentitled acres, allocated based on information provided by the City)
 - OB Riley / North Triangle
 - The Thumb (south)
 - SE Area (Elbow)

HF3: Edge Rebalancing Key Assumptions

Housing Allocation:

- For Juniper Ridge, targeted approximately 20-25 units per acre
- For other areas, targeted 2,500 households or EMP/HH ratio 0.5-1.0, whichever came second

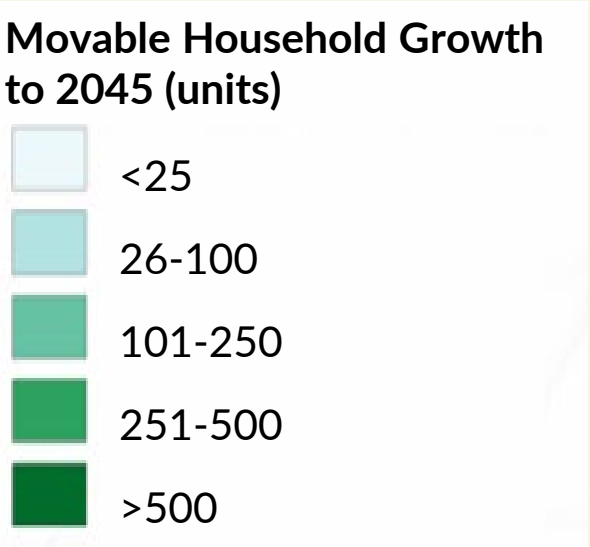
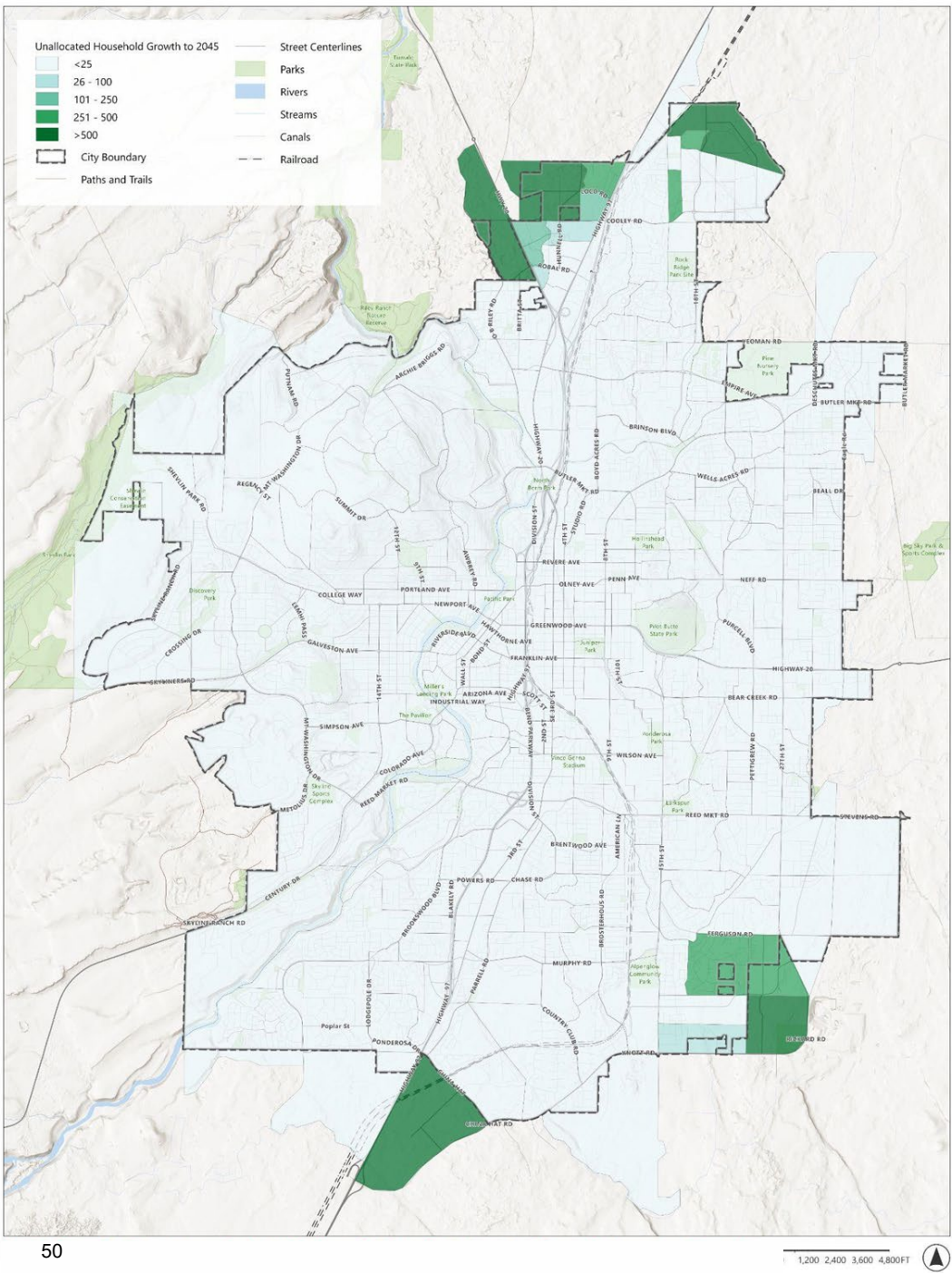
Employment Allocation:

- Increased EMP in growth areas to target approx. 0.23 retail jobs (RET)/HH and approx. 0.69 service jobs (SVC)/HH employment (consistent with Bend UGB average)
- Iterative loop to meet housing allocation targets and EMP/HH ratios
- Decreased SVC EMP growth globally in other areas to account for increase in edge districts

HF3: Edge Rebalancing Movable Household Growth

Movable household growth shows locations where assumed movable growth was allocated at the TAZ-level.

Growth was allocated to districts on the edge of Bend.



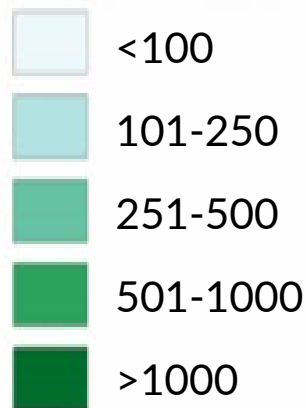
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HF3: Edge Rebalancing

Total Household Growth

Total household growth is the total household growth assumed from 2019 to 2045 in the Edge Rebalancing future, including the built and stable growth assumptions, and the movable growth allocation for Edge Rebalancing.

Total Household Growth from 2019 to 2045 (households)

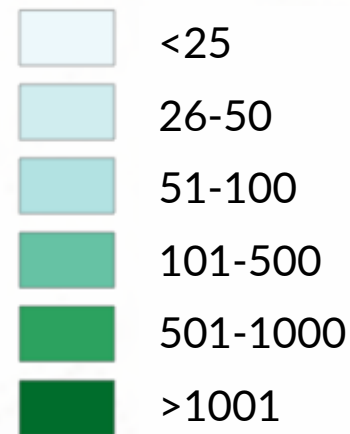


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HF3: Edge Rebalancing Employment Growth Map

Total employment growth assumed for Edge Rebalancing from 2019 base through 2045.

Total Jobs Growth (2045-2019)



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Total Jobs Growth (2019-2045)

<25

26 - 50

51 - 100

101 - 500

501 - 1000

>1000

City Boundary

Paths and Trails

Street Centerlines

Parks

Rivers

Streams

Canals

Railroad



August 2026

Appendix B: Transportation Modeling Results

Detailed Travel Demand Model Results and Evaluation of
Hypothetical Futures

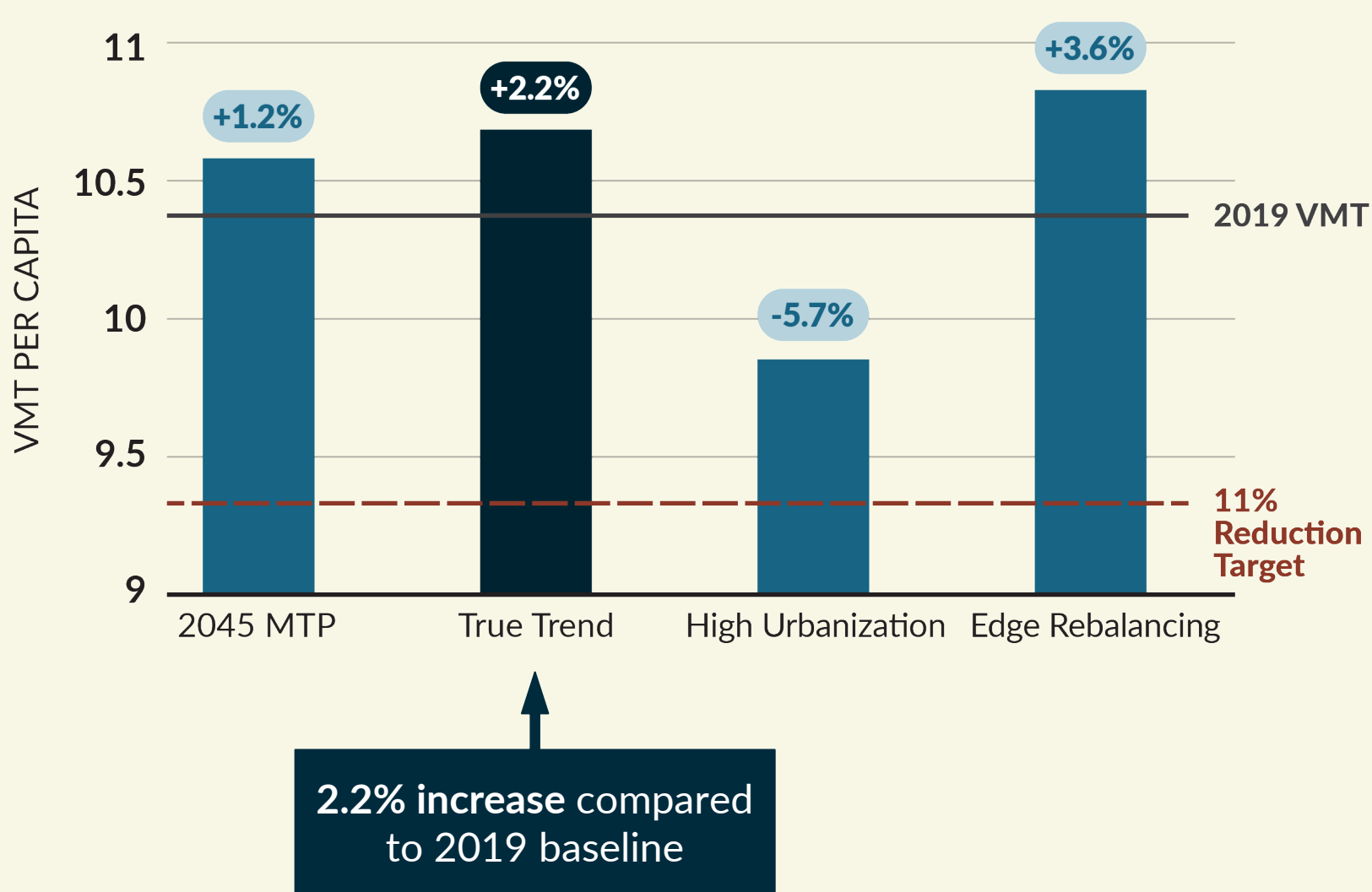


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VMT Modeling Results



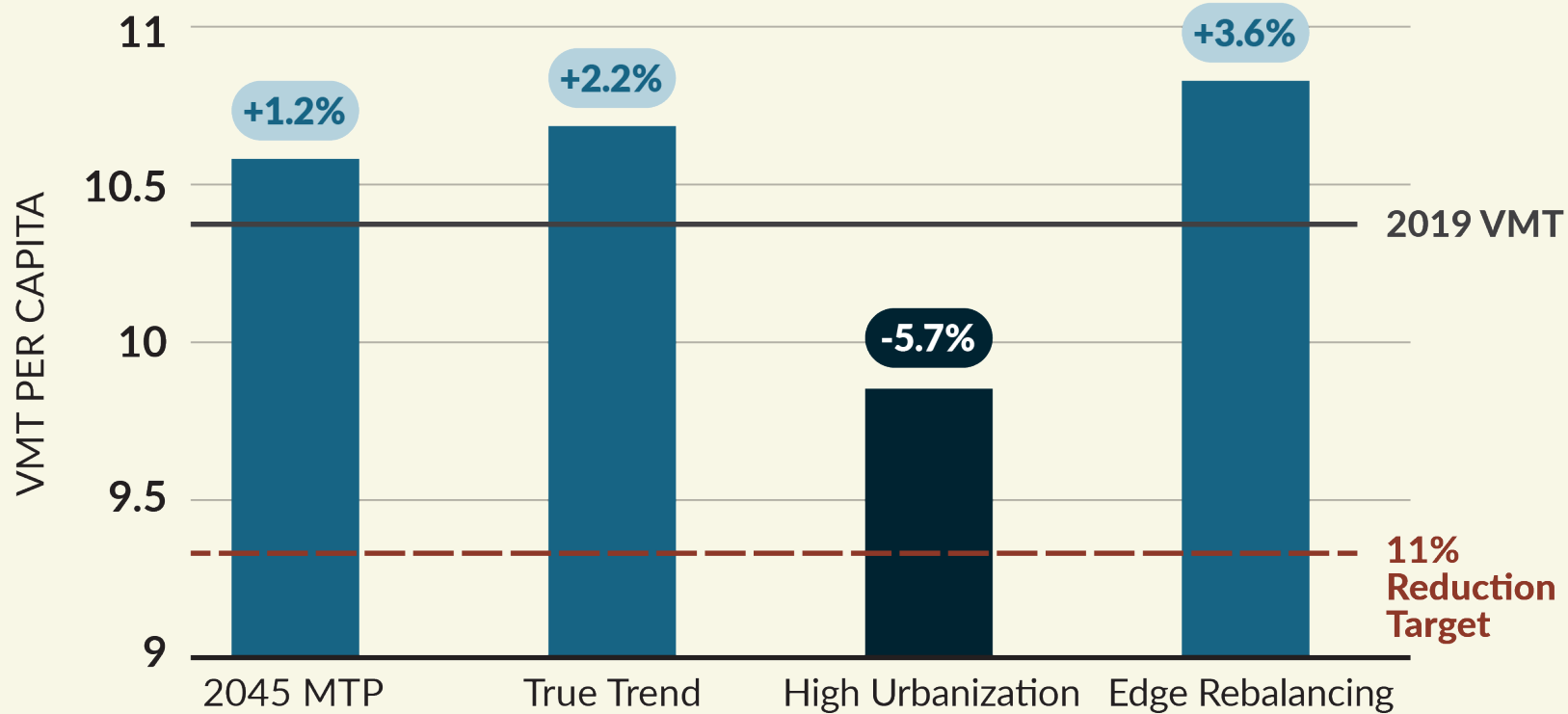
True Trend results in increased VMT



If Bend development trends remain unchanged, **VMT is expected to increase** due to less employment and commercial on edges to balance residential growth areas.

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High Urbanization can substantially narrow the VMT gap

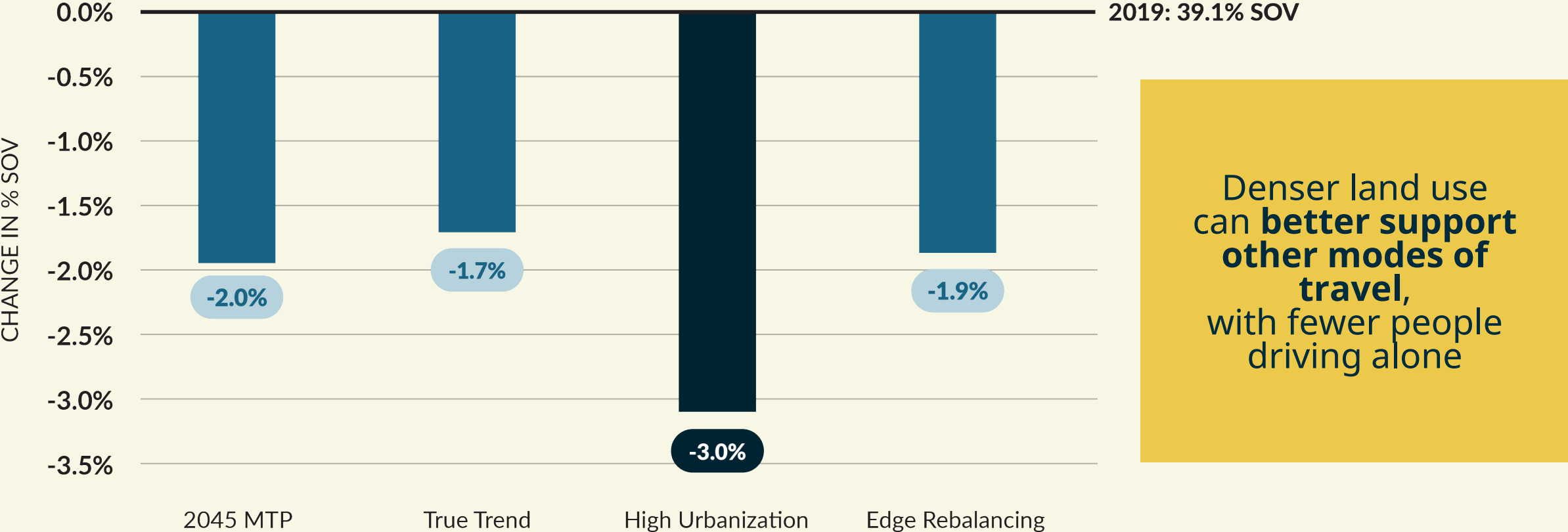


Increasing household and job density in the core of Bend can significantly reduce VMT, narrowing the gap between the future and the target.

5.7% decrease compared to 2019 baseline

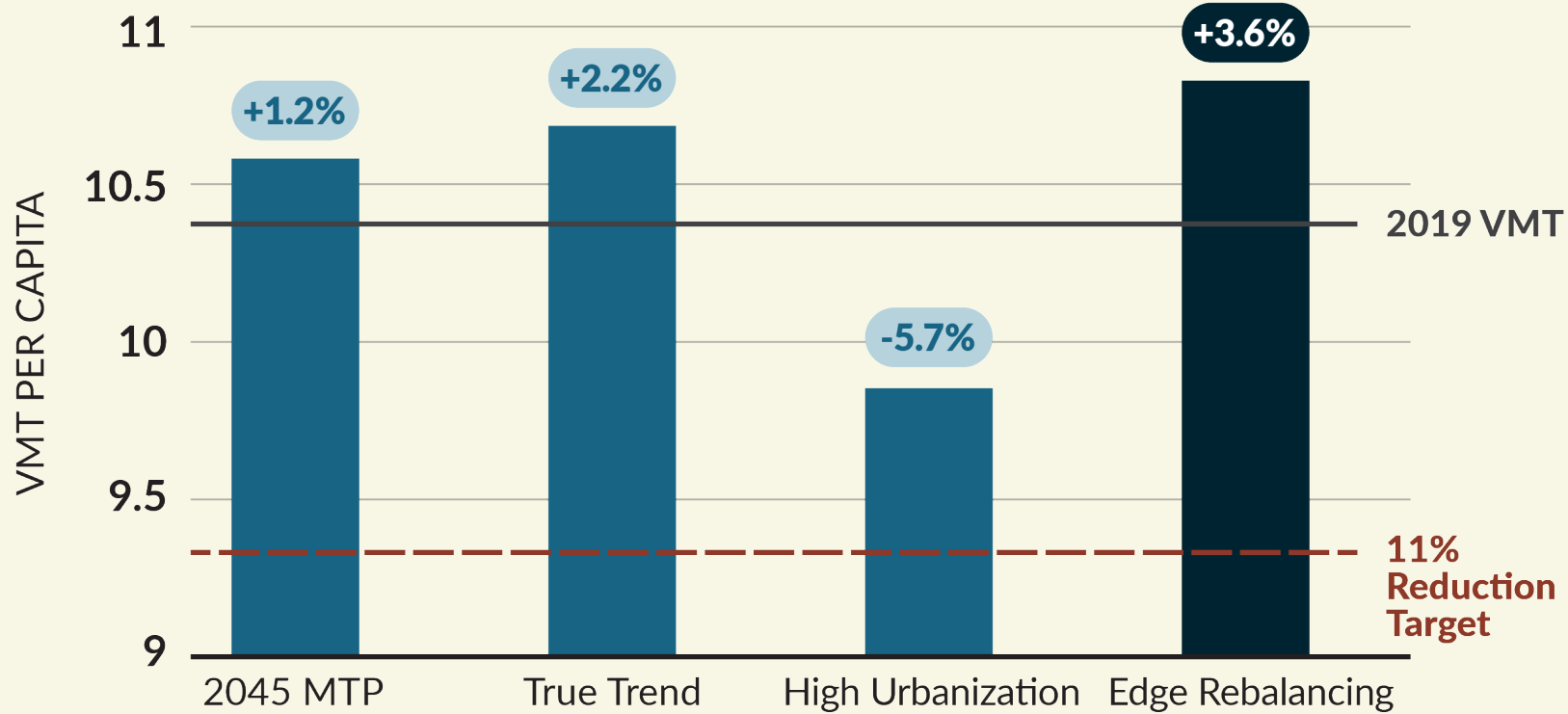
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High Urbanization reduces Single Occupancy Vehicle (SOV) trips the most



BEND MADE

Edge-focused growth results in the largest VMT increase, but...

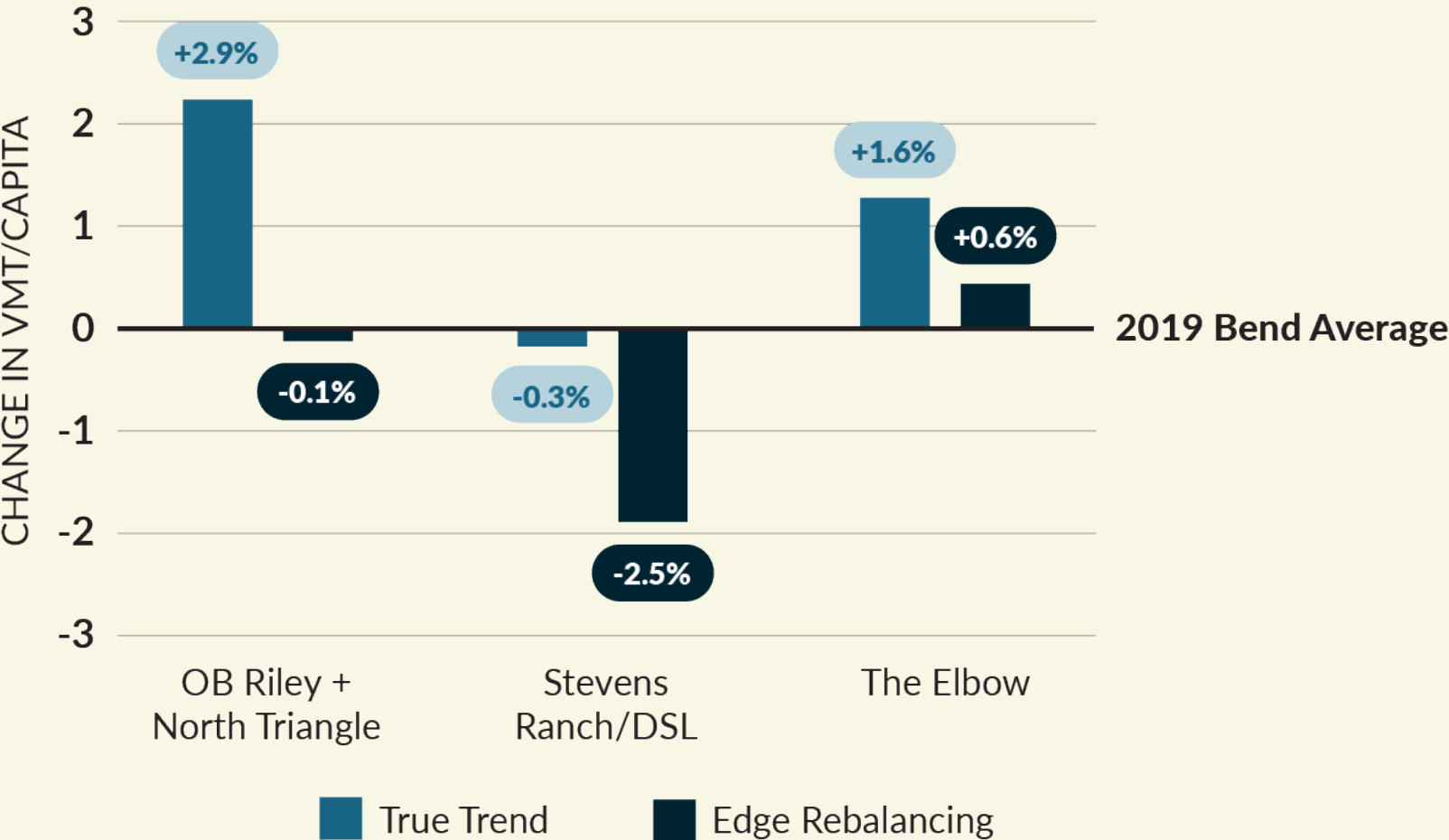


Growth focused on the edges of Bend **further increases overall VMT**, but...

3.6% increase compared to 2019 baseline

BEND MADE

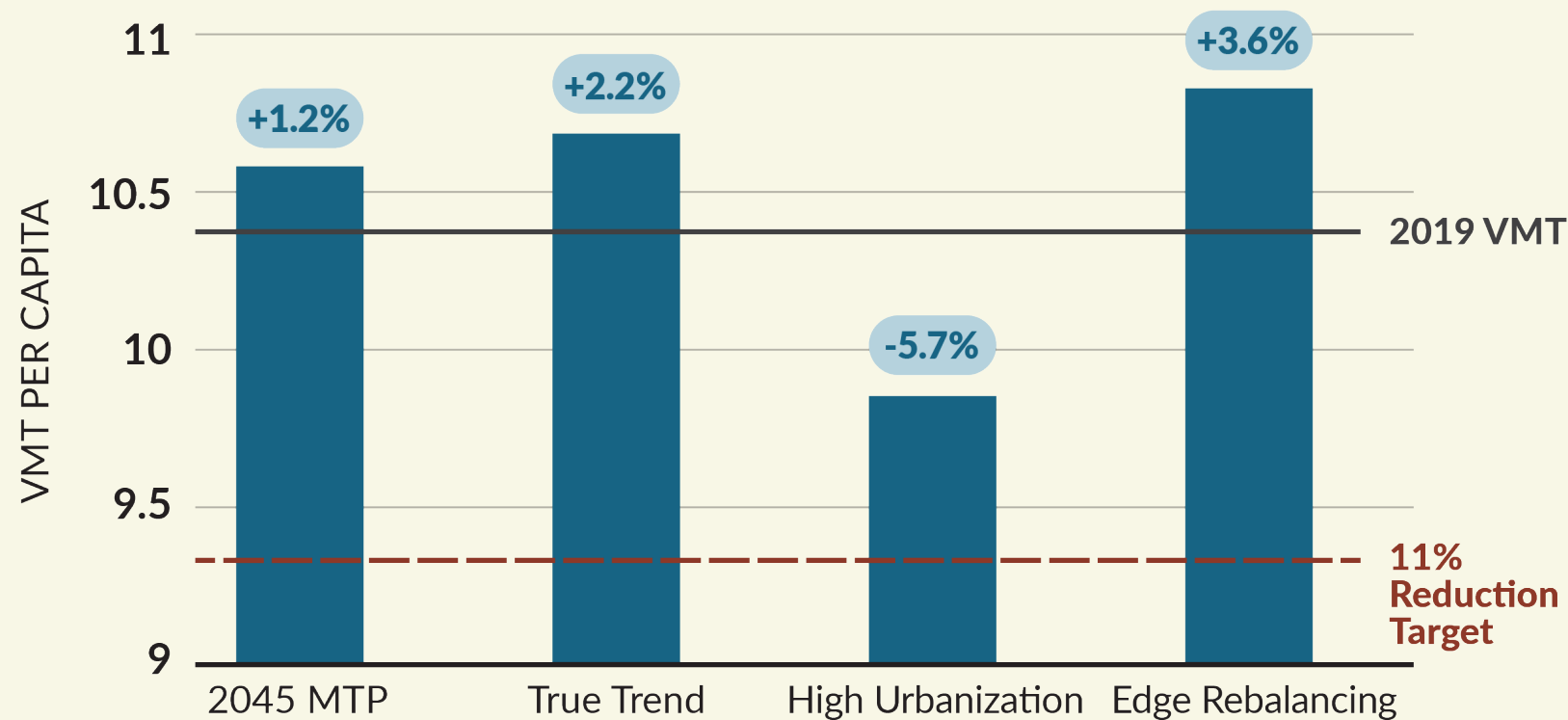
Improved household/jobs balance can support VMT reduction compared to True Trend patterns, even in edge areas



... improving household/jobs balance in those areas can **help offset the VMT impact** and may provide a method for edge growth that reduces citywide VMT.

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VMT reduction appears to be possible, but there is a gap projected towards meeting the -11% target



High Urbanization performs best, but Bend is still not projected to meet initial VMT reduction targets

Additional transportation and demand management strategies can be supportive to further improve VMT performance

BEND MADE

A combination of strategies can improve VMT outcomes

VMT – What Can We Carry Forward?

LAND USE



- Concentrate growth, as feasible, in centralized, mixed-use centers
- Improve housing/jobs balance on the edges, particularly with retail/service anchors
- Refine demographics, development mix, and school locations in later scenarios

TRANSPORTATION



- Prioritize high-quality multimodal facilities and transit in higher-density and mixed-use areas
- Evaluate network speed management as a potential VMT-reduction and safety strategy
- Improve connectivity where it can shorten travel distances, expand multimodal options, address congestion, and improve resiliency

TRAVEL DEMAND MANAGEMENT



- Evaluate parking pricing and management
- Expand employer Transportation Demand Management (TDM) programs
- Test complementary TDM measures alongside land use and transportation strategies



Past Bend TSP modeling found the greatest mode shift benefits when compact/mixed land use, enhanced transit service, and TDM strategies were implemented together.

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Network Sensitivity Testing



Network Sensitivity Tests

Purpose

- Evaluate the sensitivity of the BRM VMT results to large-scale transportation network modifications
- Focused on changes to roadway operating characteristics and network connectivity that would likely have the largest global impact on VMT
- Additional transportation network strategies will be tested during the Transportation System Plan update process

Test Scenarios

- 1.Reduce roadway speeds city wide (based on guidance from City staff)
- 2.Add one new southern river crossing (following locations tested):
 - a. Near Powers Rd, without direct connection to US 97
 - b. Near Powers Rd, with direction connection to US 97
 - c. Near Powers Rd, with direction connection to US 97 and Chase extension
 - d. Near Buck Canyon Rd
- 3.Widen existing river crossings
 - a. Widen Reed Market Rd to two lanes each direction from Century Dr to US 97
 - b. Widen Colorado Ave to two lanes each direction from Simpson Ave to Wall St

BEND MADE

Network Sensitivity VMT Testing



RIVER CROSSING CAPACITY

Tested whether increased river capacity (a new connection or a widened connection) would:



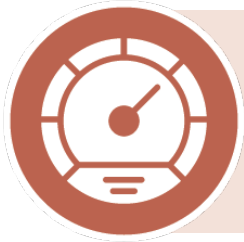
Improve connectivity and shorten some trips (reducing VMT)?



Relieve congested crossings and increase driving through changed travel patterns (increasing VMT)?

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Network Sensitivity VMT Testing



CITYWIDE SPEED REDUCTION

Tested a 5–10 mph reduction on most City roadways.

Originally raised as a safety concept, but travel time affects destination choice, route choices, and mode choice, so it could also affect VMT

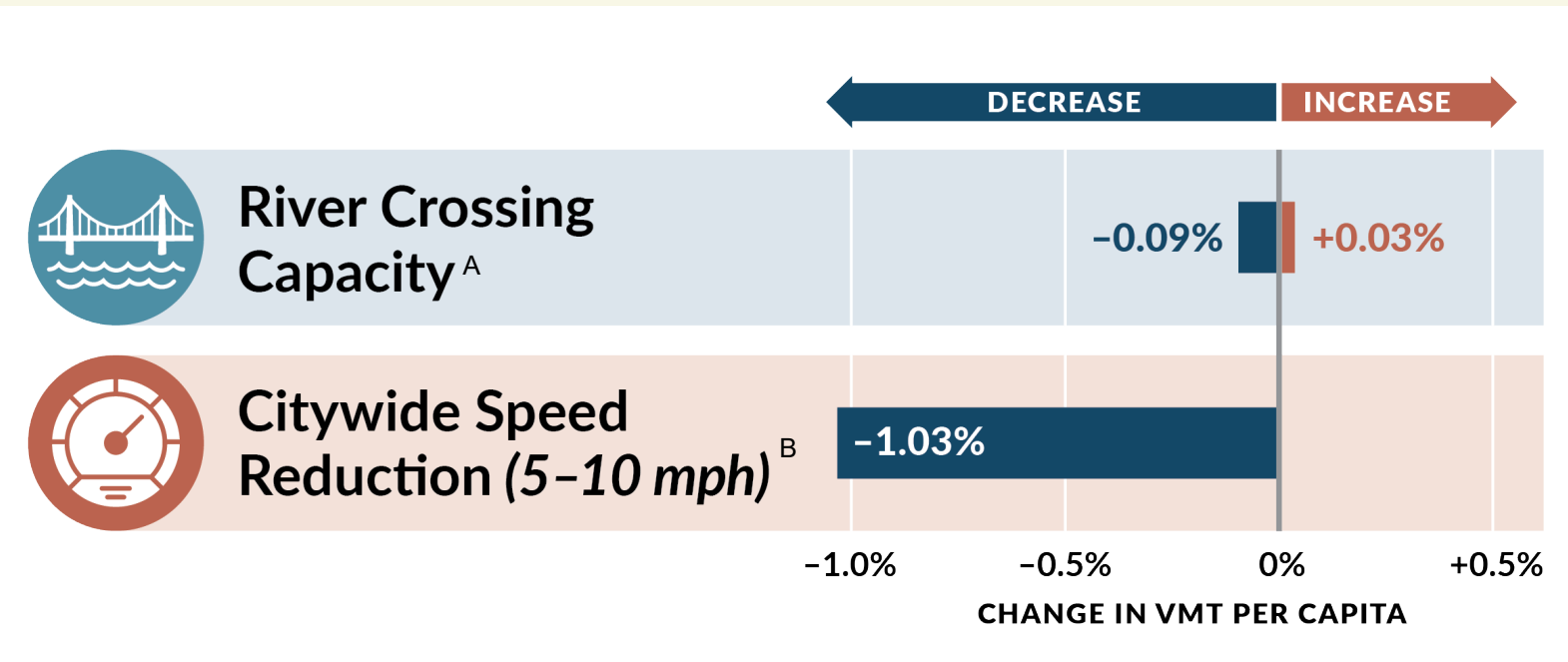


Note that Oregon law limits a city's ability to implement a citywide speed limit reduction. Speed limit reductions must follow ODOT's speed zone setting process and typically require an engineering investigation.

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Network Options: System-Wide Speed Reductions Show Potential to Reduce VMT

Results show how each network sensitivity test affects citywide household VMT per capita compared to the 2045 MTP baseline



^A Evaluated increased river crossing capacity via options for widening an existing connection or adding a new connection.

^B Oregon law limits a city's ability to implement a citywide speed limit reduction. Speed limit reductions must follow ODOT's speed zone setting process and typically require an engineering investigation.

KEY TAKEAWAYS



River crossing capacity has a minimal effect on citywide VMT (-0.09 to +0.03%)



Speed reductions can move the VMT needle more (-1.03%)

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Transportation Themes

Transportation Themes implied by each Hypothetical Future based on transportation modeling results



Key Transportation Similarities Between Futures

Transportation need		Condition consistent across futures
	East-West Corridors	These corridors remain limited and congested <i>(Reed Market, Wilson, US 20 / Greenwood / Newport, Portland, and Neff)</i>
	River Crossings	All crossings are expected to exceed capacity in all futures
	North-South Corridors in East Bend	These corridors remain important as east-side development grows
	Parkway	Safety and capacity needs continue across futures
	Active Transportation Network	A low-stress network remains a shared need
	Investment in VMT Reduction Strategies	High investment in active transportation, mobility hub network, TDM programs, etc.

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Transportation Differentiators Between Futures

The team has used these indicators to compare how transportation investments may change by type, timing, or magnitude across futures

Investment indicator		Geographic focus	How the indicator may vary across futures
	Capital Investments	● North Bend ● South Bend ● Core (Central areas)	New infrastructure could be needed sooner or later based on changes in development intensity
	Multimodal Infrastructure	● Walking and biking network	Walking and biking facilities may become more or less supportive of mode choices depending on future development patterns
	Transit Compatibility	● Transit network and service areas	Transit service may become more or less compatible with future development patterns

The question: How does each future shift the location, timing, or scale of investment?

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True Trend Transportation Summary

Capital Investment Areas

	North Bend	Higher demand Earlier capacity needs	Employment growth raises demand and may accelerate the need for the North Interchange
	South Bend	Lower demand Reduced priority	Lower employment may limit need for added investment beyond projects already underway
	Core	Stable Similar needs	Demand and infrastructure expectations remain broadly similar
	Multimodal infrastructure	North/south split Mode shift moves north	Mode-shift potential increases in north Bend and decreases in south Bend
	Transit compatibility	More challenging Harder to serve south	Lower density and a weaker land use mix may make south Bend transit harder to serve

True Trend Shifts Demand North

Demand shifts away from some planned growth areas: Lower demand near Thumb / Stevens Ranch and the Stevens Road tract area may reduce near-term pressure for major capacity expansion in southeast and southwest Bend.

Planning question	True Trend Observation	Potential TSP response
Where is demand lower?	Thumb / Stevens Ranch and the Stevens Road tract area.	Recognize lower growth pressure in portions of southeast and southwest Bend
What does recent investment mean?	Recent 15th Street and 27th Street projects may support future growth longer.	Reassess whether additional capacity investments are needed as early as previously assumed
Which investments may change?	Lower demand may alter the timing or scale of major projects.	Consider deferring, resizing, or reevaluating Murphy Interchange; China Hat / Ponderosa Overcrossing; and Knott Road intersection and frontage projects



True Trend Demands more on Key Corridors

Demand shifts toward key corridors: Higher demand in north Bend, westside areas, and the eastern US 20 corridor may increase pressure for significant transportation investment.

Planning question	True Trend Observation	Potential TSP response
Where is demand higher?	North Corridor and Juniper Ridge show the highest changes. Westside areas and the eastern US 20 corridor also have higher demand.	Confirm corridor needs and identify where added demand changes project timing or priority
Where could major investment be needed?	Higher demand is concentrated in north Bend and along key connecting corridors.	Evaluate the North Interchange and North Corridor Phase 2 connection from US 20 to US 97
Which additional corridors may be affected?	Demand increases may extend to supporting north-south and east-west connections.	Evaluate the Empire Corridor and 27th Street Corridor north of US 20 for project need, timing, and scale



High Urbanization Transportation Summary

Capital Investment Areas

↓	North Bend	Lower demand Investment may be delayed	Less housing and employment may delay new infrastructure needs
↓	South Bend	Lower demand Investment may be delayed	Less housing and employment may delay new infrastructure needs
↑	Core	Higher density Core needs increase	Growth raises needs along US 20 and Colorado Avenue
↑	Multimodal infrastructure	Stronger mode choice Network need rises	Higher density strengthens the case for core walking and biking networks
↑	Transit compatibility	Greater viability Core transit improves	Core growth supports mobility hubs and transit-oriented development

Key Finding: High Urbanization Reduces Parkway Demand

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High Urbanization Centralizes Demand

Demand shifts away from some planned growth areas: Lower demand near Thumb / Stevens Ranch and the Stevens Road tract area may reduce near-term pressure for major capacity expansion in southeast and southwest Bend.

Planning question	High Urbanization Observation	Potential TSP response
Where is demand lower?	North Bend and South Bend.	Reassess the timing and scale of capacity investments in both areas
Which north-area or system investments may change?	Lower north-area demand and reduced Parkway demand may change network priorities.	Consider deferring, resizing, or reevaluating the North Interchange; US 97 / US 20 connection; and Empire Corridor, while accounting for lower Parkway demand
Which south-area investments may change?	Lower demand may reduce pressure for major south-area expansion.	Consider deferring, resizing, or reevaluating Murphy Interchange; China Hat / Ponderosa Overcrossing; and Knott Road intersection and frontage projects



High Urbanization Increases Need for Multimodal Investments

Demand shifts toward the core area: Higher core-area demand may increase the need for multimodal, transit, mobility hub, and key corridor infrastructure.

Planning question	High Urbanization Observation	Potential TSP response
Where is demand higher?	The core area.	Confirm how concentrated growth changes travel patterns and infrastructure needs in the core
Where could major investment be needed?	The core area has a heavier need for multimodal infrastructure and higher investment in transit and mobility hubs.	Evaluate walking, biking, transit, and mobility hub investments needed to support higher core-area activity
Which additional corridors may be affected?	Vehicular demand increases along Colorado Avenue, including at US 97, and along the US 20 corridor in east Bend.	Evaluate whether higher demand increases the need, timing, or scale of infrastructure investment along Colorado Avenue and US 20



Edge Rebalancing Transportation Summary

Capital Investment Areas



North Bend

Higher demand
Priority corridors

Higher demand raises investment priority along US 97 and US 20



South Bend

Higher demand
Earlier major needs

Growth may accelerate Murphy, China Hat, and Baker investments needs



Core

Lower demand
Less corridor pressure

Demand decreases along Colorado Avenue, US 20, and 15th Street



Multimodal infrastructure

Lower effectiveness
Longer trips limit mode choice

Longer trips reduce walking and biking effectiveness and may increase grade-separation needs



Transit compatibility

Similar to today
Broadly similar

Transit remains similar, with possible city-edge hubs

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Edge Rebalancing Increases Need for High Cost Infrastructure

Demand shifts toward the edges of Bend: Higher demand in north and south Bend may require earlier, and potentially higher, investment in major corridors, interchanges, and supporting infrastructure.

Planning question	Edge Rebalancing Observation	Potential TSP response
Where is demand higher?	North Bend and south Bend.	Reassess project timing and scale of investments that may be needed in these areas
Which north-area investments may change?	Higher demand creates earlier pressure in north Bend.	Consider advancing the North Interchange; US 97 / US 20 connection; Empire Corridor; Juniper Ridge infrastructure; O.B. Riley Road; and 18th Street corridor
Which south-area investments may change?	Higher demand creates earlier pressure in south Bend and along the Parkway.	Consider advancing Murphy Interchange; China Hat / Ponderosa Overcrossing; Knott Road intersection and frontage projects; and Powers Road Interchange



Edge Rebalancing May Limit Effectiveness of Multimodal Investments

Demand shifts away from the core and Central Westside: A more dispersed land use pattern from the core may reduce demand on central corridors and make mobility hubs, walking, and biking less supportive of mode choice.

Planning question	Edge Rebalancing Observation	Potential TSP response
Where is demand lower?	The core area and Central Westside.	Reassess investment timing and scale in these areas
Which additional corridors may be affected?	Lower demand on Century Drive, Colorado Avenue, Newport Avenue, and Franklin Avenue.	Evaluate whether project timing, scope, or scale should be revised along these corridors
How does travel behavior change?	More dispersed growth makes mobility hubs harder to implement and walking and biking less supportive of mode choice.	Reevaluate mobility hub assumptions and target multimodal investments where they can remain most effective



What the Possible Futures Tell Us About Demand & Investment Needs

- **True Trend** *increases* travel demand (i.e., investment needs) to the North, *decreases* it to the South, and is *stable* for the Core
- **High Urbanization** *decreases* demand to the North and South, while *increasing* it in the Core (especially for multi-modal infrastructure); Parkway demand *decreases*
- **Edge Rebalancing** *increases* demand to the North and South, while *decreasing* demand in the Core

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September 2026

Appendix B: Land Use Translation Methodology & Visualizations

Technical methodology to allocate transportation modeling inputs into growth allocations for all three Hypothetical Futures and visualize them



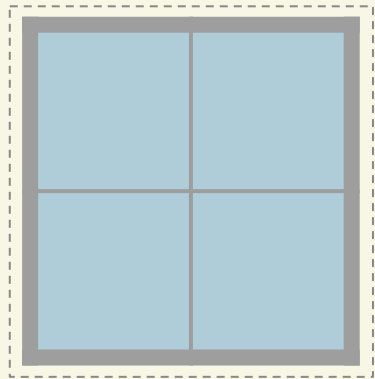
**A PLAN FOR TOMORROW,
CRAFTED TODAY.**

Introduction

- This methodology documents:
 - How Traffic Analysis Zone (TAZ)-level growth from the three Hypothetical Futures (HFs) is translated down to individual parcels
 - How parcel-level growth is expressed as building floor area and building form for visualizations
 - The working assumptions embedded in that translation
 - Methods implemented in the Parcel Allocation Tool (internal Cascadia analyst tool developed for the translation)
 - Parcel Allocation Tool inputs and outputs

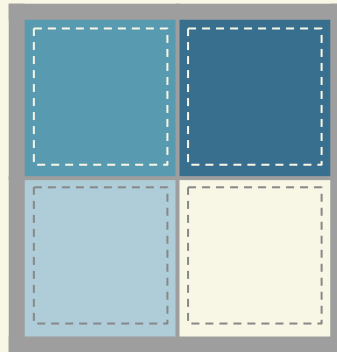
Purpose

A technical methodology for translating TAZ-level growth forecasts onto parcels and representing that growth into a rational building form.



TAZ-Level Growth Forecast

Use current City parcel data (Bend Land Information System or BLIS/Assessor data) to understand existing land use and relative redevelopment potential within each TAZ.



Parcel-Level Growth Forecast

Produce a plausible, ground-level reflection of how each hypothetical future could be accommodated; the magnitude and character of growth each future implies.



Projected Building Form

Output feeds the hypothetical future visualizations (citywide heat maps, subarea 3D, street-level photomorphs) and growth outcomes.

Approach

The Land Use Translation consisted of four steps:

1. **Step 1 TRANSLATE:** convert each TAZ's movable household and job growth (see Stable vs. Movable Growth slides) into building floor area
2. **Step 2 ISOLATE:** identify which parcels in each TAZ can plausibly redevelop
 1. Locked development is subtracted from parcel capacity before allocation, so modeled growth is not placed on land that already has a committed project
3. **Step 3 APPLY:** distribute each TAZ's floor-area increment across its eligible parcels, capped by capacity
 1. Growth a TAZ cannot absorb spills to neighboring TAZs through a defined waterfall, so no growth is lost
4. **Step 4 MATCH:** express the resulting parcel Floor Area Ratio (FAR) as a building type and 3D massing

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Step 1: Translate



Step 1: Translate

Households (HH) to Housing Units (HU)

Translating People-based Growth Increment into Building Space-based Growth.

Floor area is computed from units, not households. But the travel model forecasts households, not units.

Since about 10% of all housing units in Bend sit vacant (for sale, between tenants, second homes), to translate household count to housing unit count in a 1:1 ratio would undercount the housing supply.

Instead we apply a vacancy factor to inflate households (HH) to Housing Units (HU).


$$1.10 \times \text{Households} = \text{Housing Units}$$

Vacancy Rate Factor*

Example: 1,000 new households = 1,100 units

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Step 1: Translate

Households (HH) to Housing Units (HU)

Translating People-based Growth Increment into Building Space-based Growth.

Assign a standard gross square foot (sq.ft.) per unit based on unit mix.*

HUs by HH SIZE	SQFT/UNIT**
1 Person HH	499
2 Person HH	998
3 Person HH	1497
4 Person HH	1996

Population, not households, is the control total across the three futures; each future carries its own household-size assumptions, so household counts differ between futures by design.

A future with smaller households, such as High Urbanization, yields more households but less floor area per household by design.

*Unit mix per TAZ derived from Oregon Department of Transportation (ODOT) Transportation Planning & Analysis Unit (TPAU) Model Outputs for 2019, held constant over time.

**Source: Derived from City of Bend Envision Tomorrow 2040 Transportation System Plan (2015) Scenario Assumptions of 499 square feet (sq.ft.) per person.



Step 1: Translate

Jobs to Employment Space

Convert jobs by different employment types into floor area per employee by type.

EMPLOYMENT CATEGORY	SQFT/JOB*
AFREMP - Agriculture & Forestry employment	2212
MINEMP - Mining employment	2212
CONEMP - Construction employment	2212
MFGEMP - Manufacturing employment	1627
TCPEMP - Transportation, Communication & Public Utilities employment	542
WSTEMP - Wholesale employment	2310
RETEMP - Retail employment	1632
FINEMP - Financial, Insurance & Real Estate employment	464
SVCEMP - Service employment	1317
GVTEMP - Government employment	542

*Publicly available data on sf-per-job values sector-by-sector is extremely limited. The assumptions here are a hybrid of mean square feet (sqft)/ per worker by building activity from Commercial Building Energy Consumption (CBECS) 2018 Table B15 (EIA Form EIA-871A) and average space per employee from the COB Envision Tomorrow prototype buildings.

Source: U.S. Energy Information Administration, Form EIA-871A of the 2018 Commercial Buildings Energy Consumption Survey;
City of Bend Envision Tomorrow Preferred Scenario Assumptions & Documentation

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Step 1: Translate

Delta sq.ft. of
Housing Per
TAZ

Floor Area per HH by HH size

+

Delta sq.ft. of
Employment Space
Per TAZ

Floor Area per Employee by Type

=

Total Delta
Floor Area per
TAZ

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Step 1 Result: Movable Floor-Area Increment per TAZ

Measure (Bend UGB, 2019 to 2045)	True Trend	High Urbanization	Edge Rebalancing
Total household growth	28,284	31,162	27,688
Distance from Oregon Housing Needs Analysis (OHNA) Target	5,834	2,956	6,430
	20.63%	9.49%	23.22%
Locked households (permitted and entitled, same TAZ in all three futures)	17,531	17,531	17,531
Movable households (location differs by future)	10,753	13,631	10,157
Total employment growth	33,817	33,808	33,817
Stable employment (same TAZ in all three futures)	18,137	18,137	18,137
Shifted employment (location differs by future)	15,680	15,671	15,680

The OHNA 20-year production target is 34,118 HHs

Notes:

Household counts differ across futures by design because population, not households, is the control total. Smaller household types (e.g. multi-unit) yield more households but less total floor area.

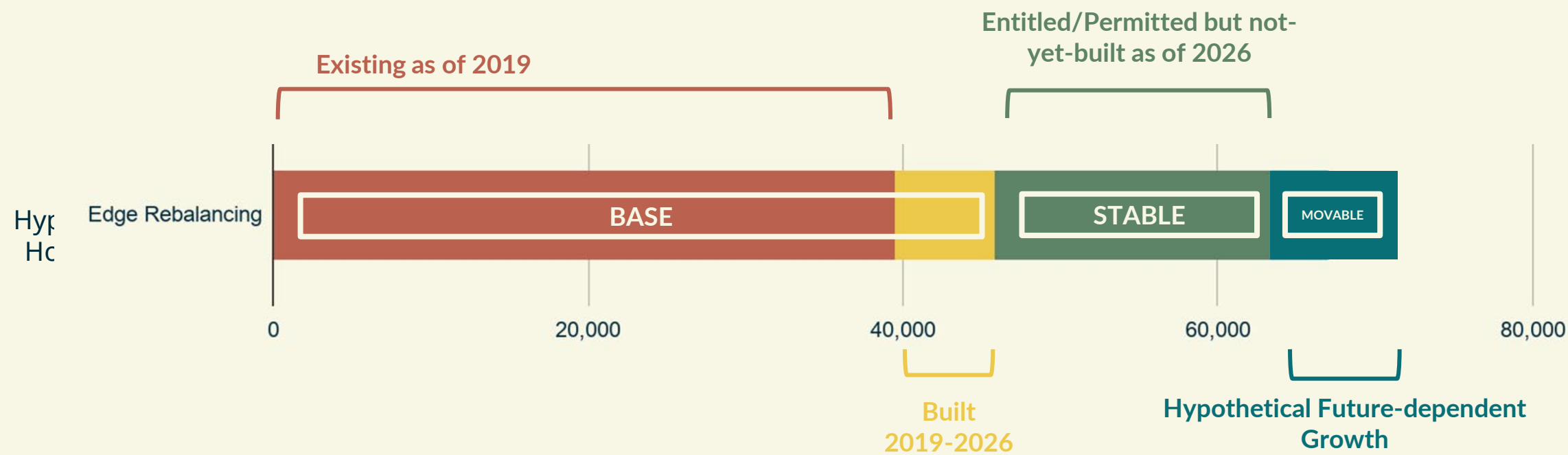
Movable households = total household growth minus locked households. Locked households come from permit and entitlement data.

Employment has no permitted or entitled component in the data; the allocator treats all employment growth as movable. "Stable employment" is instead a cross-future comparison: for each TAZ, the smallest employment increment across the three futures, summed citywide. These jobs land in the same TAZ in every future; the shifted remainder is what each future places differently.

BEND MADE

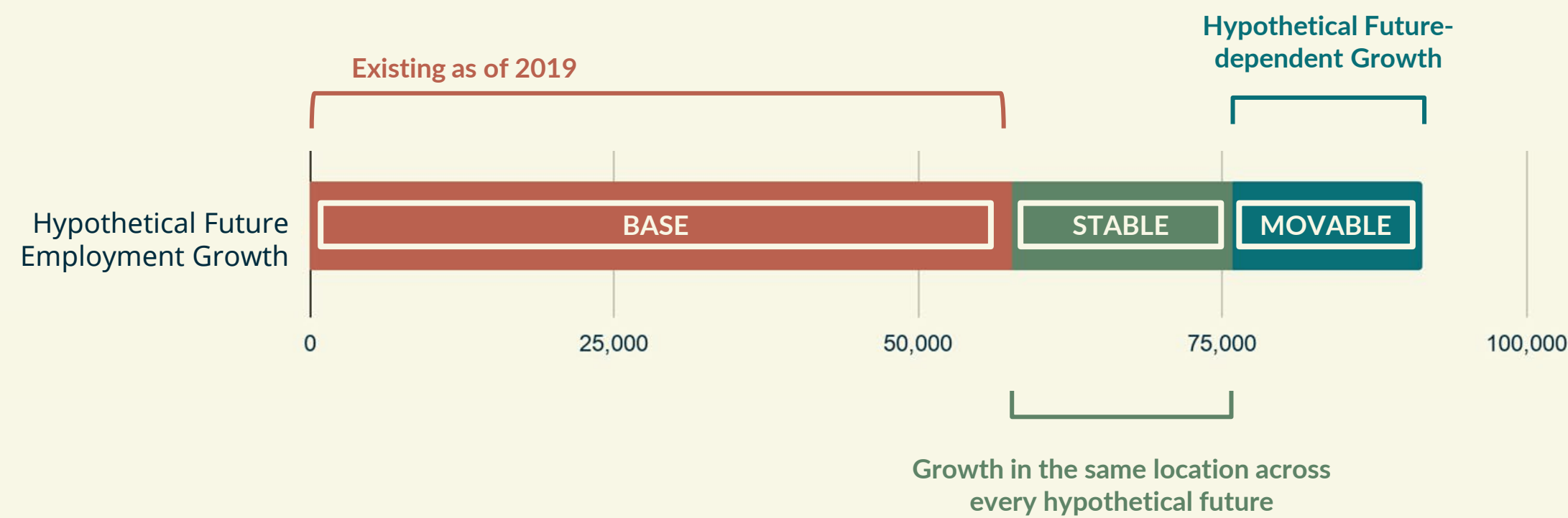
Stable vs. Movable Growth

Households



Stable vs. Movable Growth

Employment



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Step 2: Isolate



Step 2: Isolate

Redevelopability Test

A parcel is redevelopable only if it passes all of these tests:

1. Improvement-to-land value ratio below 1.00 (improvement value divided by land value; a low ratio signals redevelopment potential)
 2. Zoning carries redevelopment capacity (FAR increment cap above 0; see next slide)
 3. Property class is on the redevelopable list (see next slide)
 4. Bend Land Information System (BLIS) data use type is on the redevelopable list (see next slide)
- Note: parcels missing class or use-type descriptions are considered eligible for redevelopment

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Step 2: Isolate

Isolating (Re)developable Parcels within each TAZ

Assigning redevelopment likelihood by zoning and land use designation.

ZONING			PROPERTY CLASS		BLIS LAND USE	
CP_zoning	Model Trigger	Key	PROPERTY_CLASS_DESC	Model Trigger	BLIS_USE_TYPE	Model Trigger
UAR10	Excluded	0.0	NULL	N	Automotive	Y
RL	Excluded	0.0	BENEVOLENT, FRATERNAL OWNERSHIP - IMPROVED	N	Cemetery	N
RS	Limited	0.5	CHURCH - IMPROVED	N	Church	N
RM	Limited	0.5	CITY - IMPROVED	N	Commercial	Y
RH	Unlimited	999.0	CITY - TAXABLE LEASED	N	Commercial Condos	N
CC	Unlimited	999.0	CITY - VACANT	N	Cottage Cluster Developments	N
CL	Unlimited	999.0	COMMERCIAL CELL TOWERS	N	Cottage Housing Development	N
CG	Unlimited	999.0	COMMERCIAL CONDOMINIUMS	N	Duplex	Y
CB	Unlimited	999.0	COMMERCIAL IMPROVED	Y	Entertainment	Y
ME	Unlimited	999.0	COMMERCIAL IMPROVED - INDUSTRIAL ZONING	Y	Fourplex	Y
MR	Unlimited	999.0	COMMERCIAL IMPROVED - RESIDENTIAL ZONING	Y	Fraternal	Y
PO	Unlimited	999.0	COMMERCIAL PARTIALLY EMEMPT	N	Group Quarters	Y
IG	Limited	0.5	CONDO/WAREHOUSE BLDG - ZONED INDUSTRIAL	Y	Hospital/Medical Center	N
IL	Limited	0.5	CONDOMINIUMS - MULTI FAMILY ZONING	N	Industrial	Y
PF	Excluded	0.0	COUNTY - IMPROVED	N	Industrial Condos	Y
UA	Excluded	0.0	COUNTY - TAXABLE LEASED	N	Industrial Manufacturing	Y
MN	Unlimited	999.0	COUNTY - VACANT	N	Institutional	N
MU	Unlimited	999.0	EXEMPT ACCOUNTS - NO TREND	N	Lodging	Y
CN	Unlimited	999.0	FEDERALLY OWNED - IMPROVED	N	Mixed-Use	Y
PO/RM/RS	Limited	0.5	GOVERNMENT RESTRICTED LIH	N	Mobile Home Park	Y
Source			H & B USE RESIDENTIAL DUPLEX THROUGH FOURPLEX	Y	Multifamily	Y
			H & BEST USE RESIDENTIAL CONDOMINIUM	Y	NA	N
			IMPROVED - MULTI-FAMILY ZONING	Y	Non-Residential Structure	Y
			IMPROVED FOREST LAND - DESIG FOREST ZONED & UN	N	Office	Y
			IMPROVED GOLF COURSE	N	Office - Medical	Y
			IMPROVED LAND RECEIVING FUV - EFU ZONING	N	Other Improvements	Y
			IMPROVED LAND RECEIVING FUV - EFU ZONING	N		

Step 2: Isolate

Zoning FAR Increment Caps

How much additional FAR can a parcel absorb under its zoning?

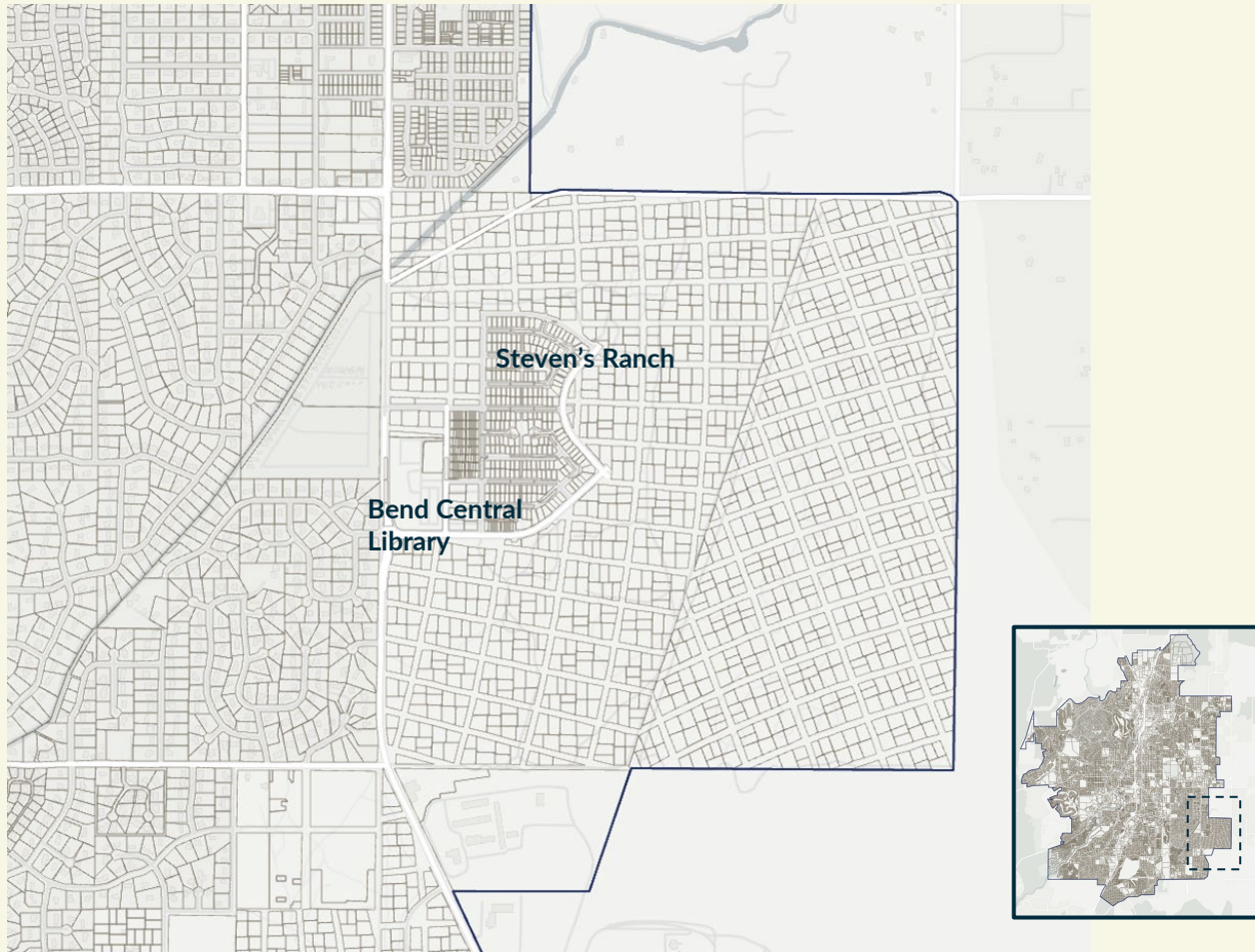
FAR Cap	Applicable Land Use District
Excluded (0.0)	Low Density Residential (RL)
Limited (0.5)	Urban Area Reserve (UAR-10), Public Facilities (PF), and Urbanizable Area (UA), revised 2026-07-02 from excluded; Standard Density Residential (RS); Medium Density Residential (RM); General Industrial (IG); Light Industrial (IL)
Unlimited* (999)	High Density Residential (RH); commercial districts (CC, CL, CG, CBD); Mixed Employment (ME); Mixed-Use Riverfront (MR); Professional Office (PO); Mixed-Use Neighborhood (MN); Mixed-Use Urban (MU); Commercial Neighborhood (CN)
Synthetic Parcel Zones (See Step 2 Handling Southeast Expansion Areas slide)	Urban Reserve (UR) 0.3; Urban Reserve High (URH) unlimited

*“Unlimited” is bounded in practice by the citywide FAR cap (see the Citywide FAR Cap slide).



Step 2: Isolate

Handling Southeast Expansion Areas



- The Southeast UGB expansion areas largely had no platted parcel fabric, but did have approved plans for development
- The tool grids that land into synthetic parcels of about 1 acre each (named "UGBX" cells) to give the allocator something to place growth on
- The grid is clipped around any real platted parcels
- Synthetic UGBX cells below 0.5 acres are not considered developable. This removes remnant cells and stray right-of-way parcels

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Step 3: Apply



Step 3: Apply

Parcel Capacity

Maximum additional floor area per parcel =

**Min(zoning FAR cap, global FAR cap) × net acres × 43,560 – existing building sf
– locked development sf**

- Net acres = assessor acreage. No slope or easement deduction is observable in the data
- Minimum allocation floor: a parcel receives at least 1,000 sf or nothing. This prevents small scattered increments

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Step 3: Apply

Locked Development

- Committed but not-yet-built development reserves parcel capacity before any allocation:
 - Pending permits (662 units, about 408,000 sf), issued permits not yet in the assessor's building data (297 units, about 374,000 sf), and entitled units are area-weighted* onto parcels (13,861 units)
 - Total: 14,820 units, about 12.1 million sf, reserved on about 4,760 parcels
 - Entitled units carry no floor area in the source data. The tool assumes 815 sf per entitled unit, the observed average across the permit layers (781,727 sf across 959 units)
- The allocator cannot place movable growth on land that already has a permitted or entitled project

*Area-weighting is used to split the unit count portion from larger entitlement areas to a parcel's share of the entitlement polygon's total area. This is because entitlement polygon data layers often cover large master plan and site plan areas that are larger than individual parcels or lots.

BEND MADE

Step 3: Apply

Development Suitability Rank

Within each TAZ, developable parcels are ordered in three tiers, most to least suitable:

- **Tier A:** improvement value under \$50,000 (vacant or minimal structures). First to absorb growth
- **Tier B:** improvement value \$50,000 or more, built before 1990 (aging structures)
- **Tier C:** improvement value \$50,000 or more, built 1990 or later (recent, higher-value structures)
Last to absorb growth

Within each tier, parcels are ordered by improvement value (lowest first), then acreage (largest first).

Step 3: Apply

Citywide FAR Cap

- The TAZ model allocates without regard to parcel count, so small TAZs can otherwise produce isolated towers where zoning is uncapped. That is a tool limitation, not a realistic growth story
- To solve for this, a global 3.0 FAR citywide cap on total parcel FAR (existing plus locked plus allocated)
 - Effective parcel cap = $\min(\text{zoning cap}, \text{global cap})$. The global cap only tightens: RL stays excluded and 0.5 zones stay 0.5. It binds in the unlimited zones
- Capacity removed by the cap re-routes through spillover into neighboring TAZs, producing a smoother growth surface (see Step 3 Spillover slide)

BEND MADE

Step 3: Apply

Development Amplitude

Base method: growth is divided among a TAZ's eligible parcels in proportion to each parcel's acreage times its suitability tier. Higher-tier and larger parcels receive larger shares of allocated growth.

- No parcel receives more than its remaining capacity; growth that hits a capacity cap is redistributed to the other parcels in additional passes until it is placed
- Every receiving parcel must receive at least 1,000 sf. If a parcel's share would fall below that, the share is reassigned to higher-ranked parcels instead

Market-rent amplitude adjustment: the TAZ layer carries market rents

- In TAZs with above-median rents, growth is directed to the higher-ranked parcels first, and the share of parcels in that first group shrinks as rents rise: in the highest-rent TAZ, about half of the eligible parcels are in the first group. In TAZs at or below median rent, all eligible parcels receive growth. The reasoning: stronger markets support concentrated, higher-intensity development; softer markets see more diffuse, incremental change

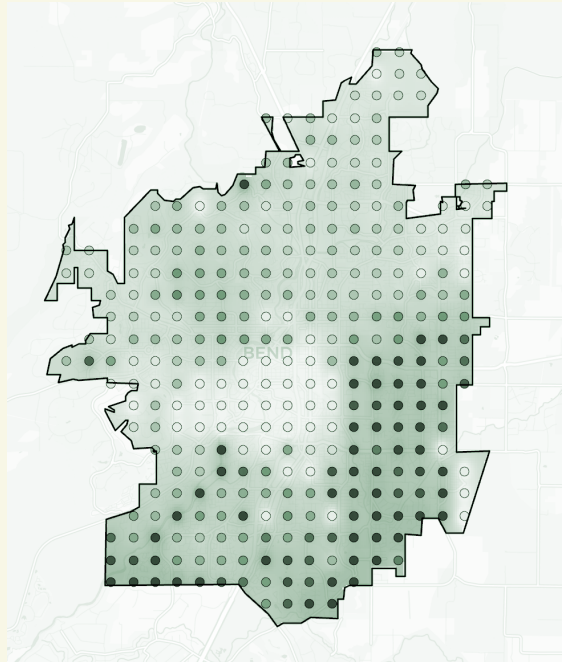
This ordering never excludes a parcel. Parcels outside the first group still receive growth when the first group's capacity fills, and growth a TAZ cannot absorb moves to neighboring TAZs (see spillover).

BEND MADE

Step 3: Apply

Development Amplitude

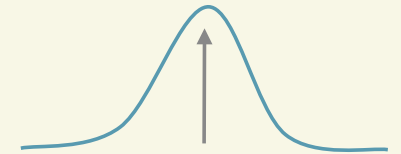
Adjusts for market growth potential, using market rent as a proxy for development pressure.



Higher-rent TAZ - concentrated
Stronger markets enable developers to densify with higher construction cost techniques.

Lower-rent TAZ - spread
Softer markets see more diffuse, incremental change.

High Development Amplitude



A few parcels absorb most of the growth.

Low Development Amplitude - “peanut butter” approach



Most parcels absorb some growth.

Rent data: Rentometer QuickView Application Programming Interface (API), 1BR apartment 75th percentile, 36-month look-back, Inverse Distance Weighted (IDW)-interpolated to TAZ averages, August 2026. Cascadia Partners spatial analysis, August 2026. Rent Surface Map generated by Claude AI; edited and reviewed by Cascadia Partners.

BEND MADE

Step 3: Apply

Spillover

Growth a TAZ cannot absorb is never dropped.

Growth Allocation fills using the following order:

- 1. Own TAZ: amplitude receiver set
- 2. Own TAZ: remaining eligible parcels
- 3. Adjacent TAZs (ring 1), then ring 2, and so on
 - Within each ring, destination TAZs fill one at a time in order of remaining capacity, largest first. Within each destination TAZ, in-amplitude parcels fill before beyond-amplitude parcels.
- 4. Citywide pool of remaining eligible capacity (backstop)

Spill respects every redevelopability test, remaining capacity, and the minimum-allocation floor.

BEND MADE

Prepared Parcel Dataset

Output attributes for every parcel in Bend...

TAZ ID

INCREMENTAL
FLOOR AREA

This will be 0 if the parcel is
not suitable or a low priority
for redevelopment

TOTAL FLOOR
AREA

Base + Locked +
Incremental Growth

TOTAL FAR

Gross Floor Area

Total Lot Area

Step 4: Match



Step 4: Match

Building Type

Total FAR (existing plus locked plus allocated) maps to a building-type band.

Total FAR	Building type	Local example
under 0.5	Low-rise detached	
0.5 to 1	Low-rise attached / stacked	Hiatus Homes
1 to 2	Two- to three-story	Galveston Supply; Powder House Base Camp
2 to 3	Mid-rise (wood-frame)	Solis at Petrosa
3 to 5	Mid-rise (podium)	Terava; The Current
5 to 10	High-rise	Jackstraw; Hixon

Note: with the citywide FAR cap at 3.0, allocated growth alone reaches at most the mid-rise (wood-frame) band. Podium and taller bands appear only where existing or locked floor area already exceeds FAR 3 (see Step 3 Citywide FAR Cap)



Step 4: Match

Building Massing

For 3D visualization, each parcel's allocated floor area becomes a simple building massing:

- Floors = $\text{allocated sf} \div (\text{max lot coverage} \times \text{parcel sf})$, rounded up.
- Footprint = $\text{floor area} \div \text{floors}$, capped at $\text{coverage} \times \text{parcel area}$. Minimum floor plate is 400 sf.
- Max lot coverage by zone: 0.6 in residential zones; 0.8 in commercial, mixed-use, industrial, public, and urbanizable zones.



Sample Massing in True Trend Hypothetical Future
Bend Central West Side View

BEND MADE

Step 4: Match

Zoning-Fit Diagnostics (Post-Allocation)

There are a few places where modeled growth exceeds current zoning entitlements, where zoning would need to change to absorb a given future.

- **FAR exceedance flag:** total FAR (built plus locked plus allocated) > than entitled FAR
 - *Note: A parcel is flagged only when its total FAR exceeds its zoning entitlement by more than 5 percent plus 0.05 FAR. This buffer exists because the tool and the zoning matrix measure parcel area from different sources, and small area differences would otherwise create false flags*
- **Floors exceedance flag:** the allocated growth implies more floors than the parcel's zoning allows
 - *Note: FAR cannot see height. A parcel can pass every FAR check and still imply a taller building than the zone allows. The tool compares the floors implied by each parcel's allocated growth (allocated sf divided by maximum footprint, rounded up) against the floors the zoning allows*

Step 4: Match

Zoning-Fit Diagnostics (Post-Allocation)

Parcels where movable growth exceeds current zoning	True Trend	High Urbanization	Edge Rebalancing
FAR exceedance (total FAR exceeds entitled FAR)	21	41	17
Floors exceedance (total floors exceed allowed floors)	37	53	20

Both rows count only parcels pushed over their zoning limit by the movable growth this method allocates. The two checks are independent and partially overlapping.

FAR exceedance: total FAR (built plus locked plus allocated) exceeds entitled FAR by more than 5 percent plus 0.05 FAR to allow for a margin of error; all flagged parcels are in commercial and mixed-use districts filled to the citywide cap of 3.0 against entitled FAR of 1.2 to 2.55.

Floors exceedance: the allocated growth implies more floors than the zoning allows (implied floors = allocated sf divided by lot coverage times parcel sf, rounded up, versus the zoning-based allowed floors); overages are 1 to 2 floors, and 17 (TT), 15 (HU), and 3 (ER) of these parcels pass every FAR test.

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Input Datasets



Inputs

TAZ hypothetical-future files (DKS): Defines the growth to be allocated for each future. Each file contains 2045 household and employment totals by TAZ for one hypothetical future developed using a 2019 base year and a 2045 future year (consistent with the Bend Metropolitan Transportation Plan). The tool computes the movable growth increment from these totals.

Base file (01A_Base_TAZ_260803): Establishes the baseline: 2019 households plus permitted and entitled households per TAZ. Movable growth equals the future total minus this base.

City parcel data (BLIS/assessor): Provides the parcel-level inputs for allocation. Parcel geometry, acreage, zoning, existing building area, improvement and land value, year built, property class, and use type determine redevelopability, suitability ranking, and development capacity.

Locked development parcels (COB entitlements geodatabase): Identifies permitted and entitled projects at the parcel level. Their floor area is subtracted from parcel capacity before allocation, so modeled growth is not placed on land with a committed project.

FAR-Gap zoning matrix: Used for post-allocation diagnostics only. Supplies each parcel's entitled FAR and allowed floors, which are compared against modeled outcomes to flag where growth would exceed current zoning. It does not affect the allocation.

Climate Friendly Area (CFA) Candidate Area Boundaries: Identify which TAZs and parcels fall within candidate CFAs identified in the City's 2023 CFA Study, supporting CFA-based review, mapping, and reporting of allocation results.

Urban Growth Boundary (UGB): Defines the analysis extent. Allocation runs only on TAZs and parcels within the Bend UGB. The boundary is also displayed on all maps.

TAZ layer with rent attributes (Rentometer): Provides per-TAZ market rents used to adjust the development amplitude setting. In above-median-rent TAZs, growth is assigned to higher-ranked parcels first rather than spread across all eligible parcels; at and below the median, growth spreads across all eligible parcels at the current default setting.

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Data Sources

TAZ hypothetical-future files (True Trend / High Urbanization / Edge Rebalancing, 2045 HH and EMP by TAZ)

DKS Associates. (2026). *Bend Growth Plan hypothetical future TAZ allocations: True Trend, High Urbanization, and Edge Rebalancing (2045 households and employment by transportation analysis zone)* [Unpublished data set]. Prepared for the City of Bend Growth Plan. (File vintages: True Trend, July 7, 2026; High Urbanization, June 2026; Edge Rebalancing, June 25, 2026.)

DKS-authoritative base file (01A_Base_TAZ_260803)

DKS Associates. (2026). *HH_EMP_Tracking_Scenarios Combined* (August 3, 2026, version) [Unpublished data set]. Prepared for the City of Bend Growth Plan.

City parcel data (BLIS/assessor)

City of Bend. (2026). *Bend Land Information System* [Data set]. ArcGIS REST Services.

https://services5.arcgis.com/JisFYcK2mIVg9ueP/arcgis/rest/services/Bend_Land_Information_System/FeatureServer/0 (Extract of May 12, 2026; taxlot geometry and assessor attributes: Deschutes County Assessor's Office.)

Locked development parcels (COB_Entitlements_v2_20260528.gdb)

City of Bend. (2026). *Issued residential permits (January 1, 2020–December 31, 2025) and residential entitlements (multifamily site plans, master plans, and large vacant lots)* [Unpublished geodatabase, COB_Entitlements_v2_20260528; layers prepared April 9, 2026; provided to the consultant team April 2026]. (Permit points are a residential subset of City of Bend, *Permit applications – point* [Data set], https://services5.arcgis.com/JisFYcK2mIVg9ueP/arcgis/rest/services/Permit_Applications_Point/FeatureServer/0; entitlement polygons are unpublished.)

FAR-Gap zoning matrix v3

Cascadia Partners. (2026). *BGP parcels FAR-Gap zoning analysis* (Version 3, July 16, 2026) [Unpublished data set].

CFA study-area boundaries

City of Bend. (2026). *Climate-Friendly Area candidate area boundaries* [Unpublished geodatabase; boundaries identified 2024, provided to the consultant team February 2026].

UGB boundary

Deschutes County Community Development Department. (2026). *Urban growth boundary* [Data set]. ArcGIS REST Services.

https://services1.arcgis.com/znO8Hz1SuVVohYhZ/arcgis/rest/services/Urban_Growth_Boundary/FeatureServer/0 (Bend polygon extracted.)

TAZ layer with rent attributes (amplitude baseline)

Cascadia Partners. (2026, May). *Bend TAZ rent surface: 1-bedroom 75th-percentile rents, 36-month lookback, IDW-interpolated to TAZ* [Unpublished data set]. Derived from Rentometer QuickView API rent data; TAZ geometry from the DKS Associates Bend–Redmond travel demand model.

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Consolidated Default Assumptions



Consolidated Default Assumptions

Vacancy Factor	1.10
Residential floor area	499 sf per person, multiplied by household size
Employment sf per job	Sector table on the Jobs slide
Improvement-to-land ratio threshold	below 1.00
Suitability tier breaks	\$50,000 improvement value; 1990 year built
Zoning FAR increment caps	Table on the Zoning Caps slide
Global FAR cap (total FAR)	3.0 (see Step 3 Citywide FAR Cap)
Development amplitude	1.0; rent-based per-TAZ baseline applies (see the Development Amplitude slide)
Minimum allocation per parcel	1,000 sf
Locked-capacity	815 sf per entitled unit
Cross-TAZ spillover	Waterfall; Capacity-priority ring fill
UGB Expansion sliver floor	0.5 acres
Max lot coverage (3D massing only)	0.6 residential; 0.8 all other zones
Exceedance tolerance	entitled FAR times 1.05, plus 0.05
Scope	Bend UGB TAZs and parcels only

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Hypothetical Future Heat Maps



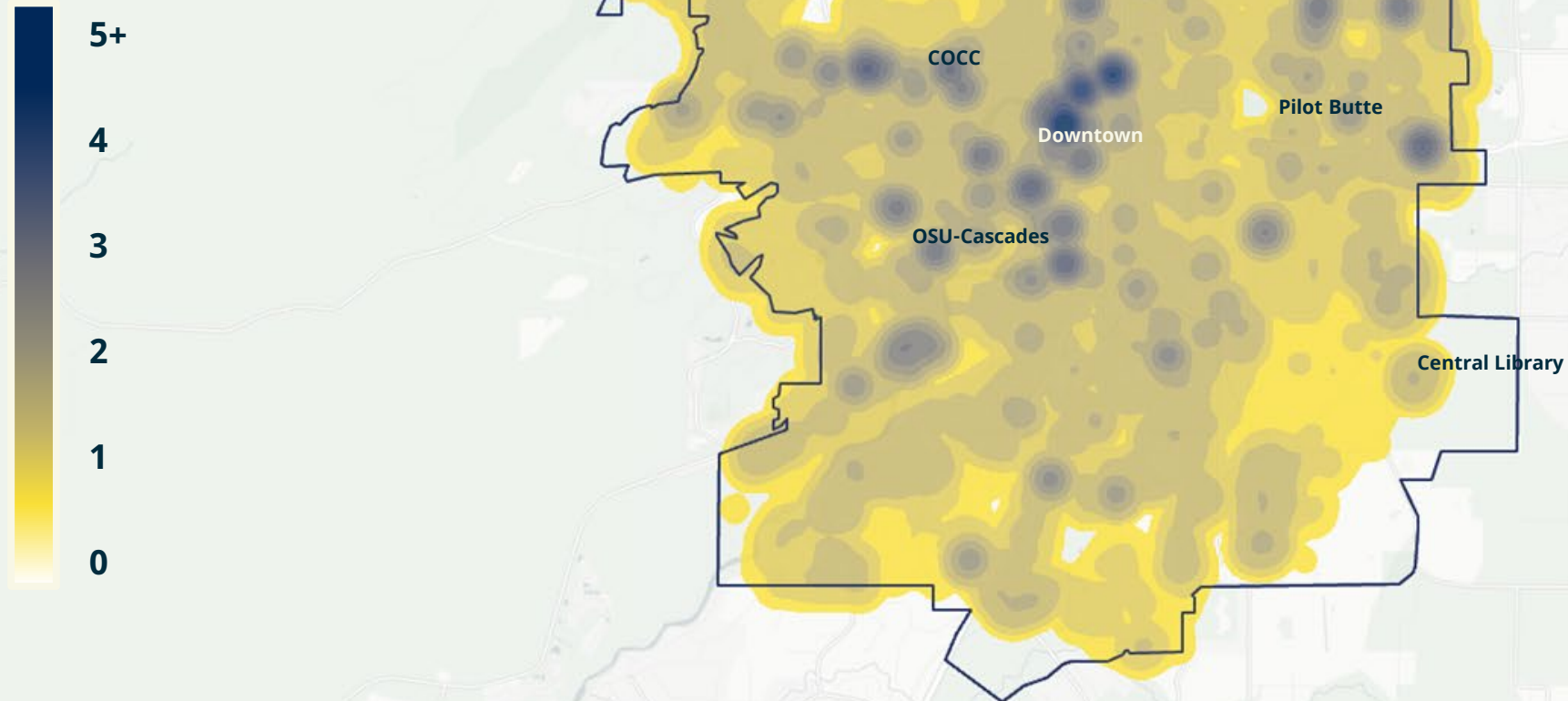
Floor Area Ratio Heat Maps

The Floor Area Ratio (FAR) heat surfaces are smoothed value surfaces, not kernel density maps and not inverse distance weighted (IDW) interpolation. They serve the same purpose as inverse distance weighted (IDW), turning parcel values into a continuous surface, but blend overlapping values by soft maximum instead of by average.

- **Method:** each parcel's FAR value, taken at its centroid, is spread over a search radius (default 30 pixels) with a smoothstep distance falloff: full value at the centroid, zero at the radius. Where influences overlap, values combine as a p-norm soft maximum, $(\sum v_i^6)^{1/6}$, with $p = 6$.
- **Soft maximum approach:** a sum (kernel density) would let clusters of low-FAR parcels read as high intensity, and an average (IDW) would dilute an isolated high-FAR parcel toward its low neighbors. The soft maximum preserves the FAR level: similar neighbors fuse into one region at roughly their shared value, and a single high-FAR parcel still stands out. The surface reads as an envelope of parcel values.

Built Density

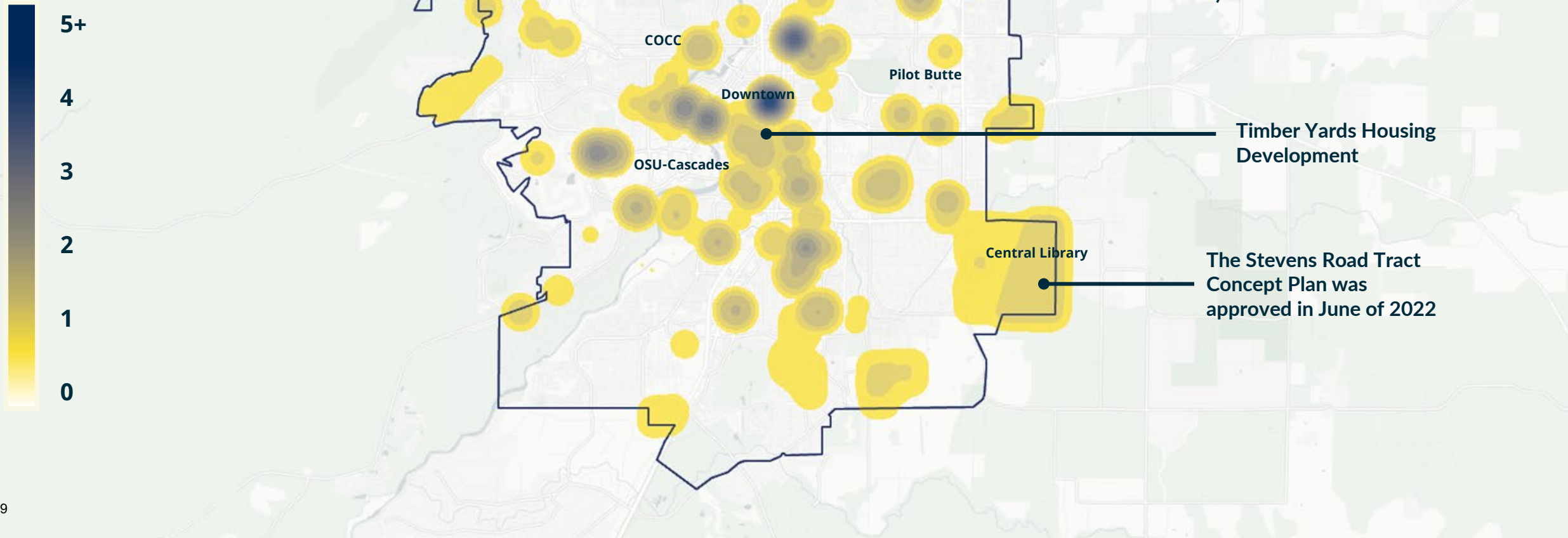
Housing & Employment
built as of 2026



“Stable” Residential Growth

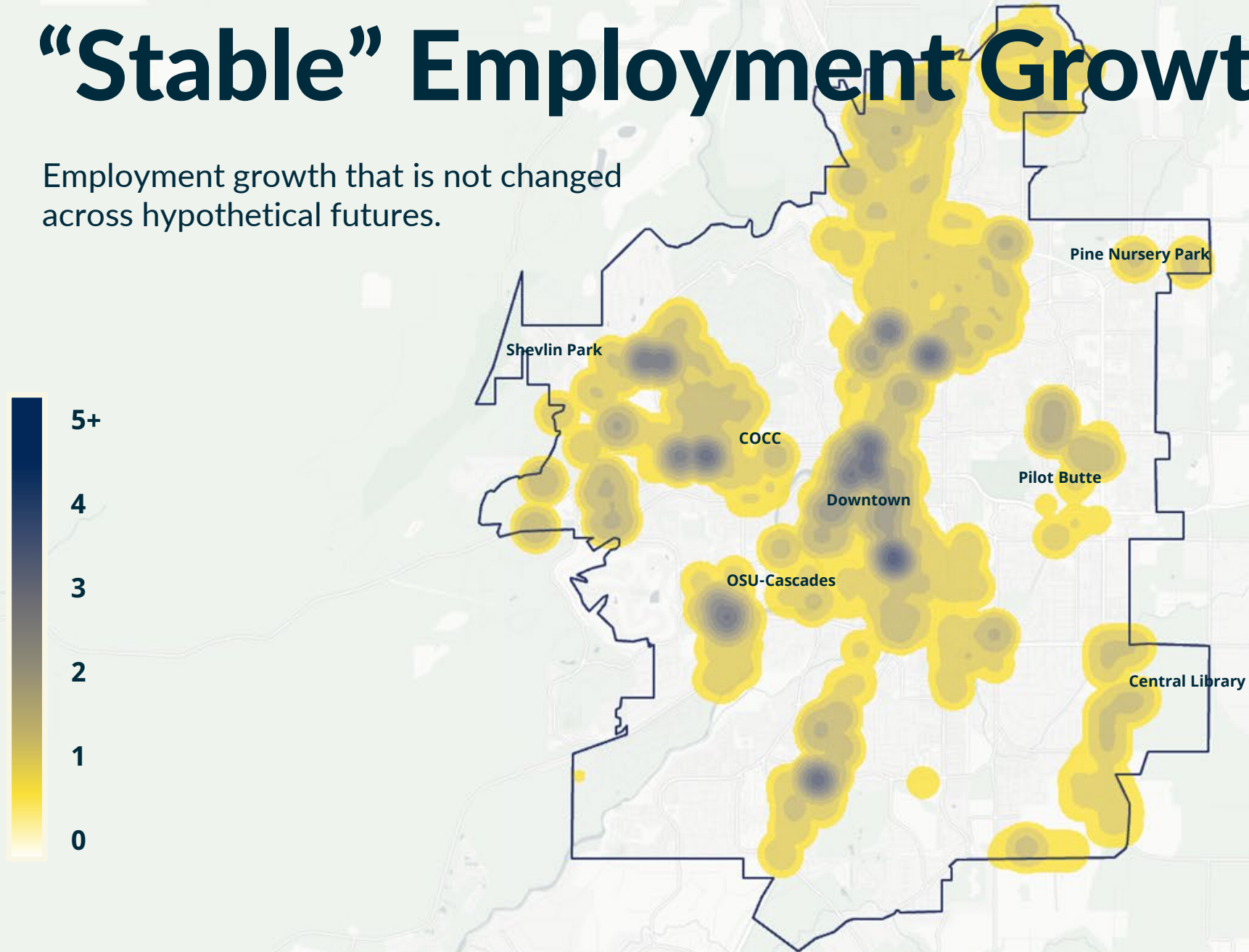
Residential growth that is not changed across hypothetical futures including projects “in the pipeline”.

“In the pipeline” includes permitted and entitled development (master plans, subdivisions, site plans >50 units).



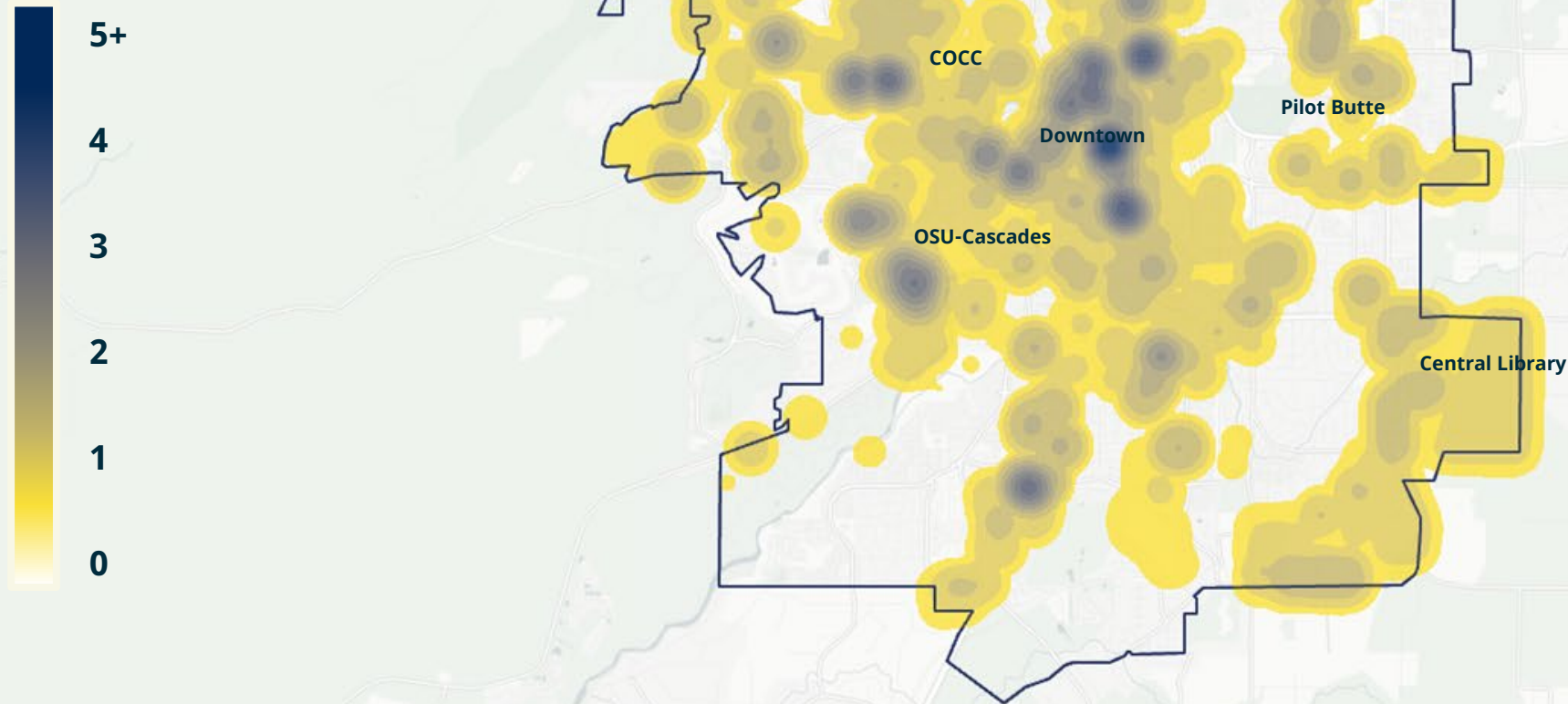
“Stable” Employment Growth

Employment growth that is not changed across hypothetical futures.



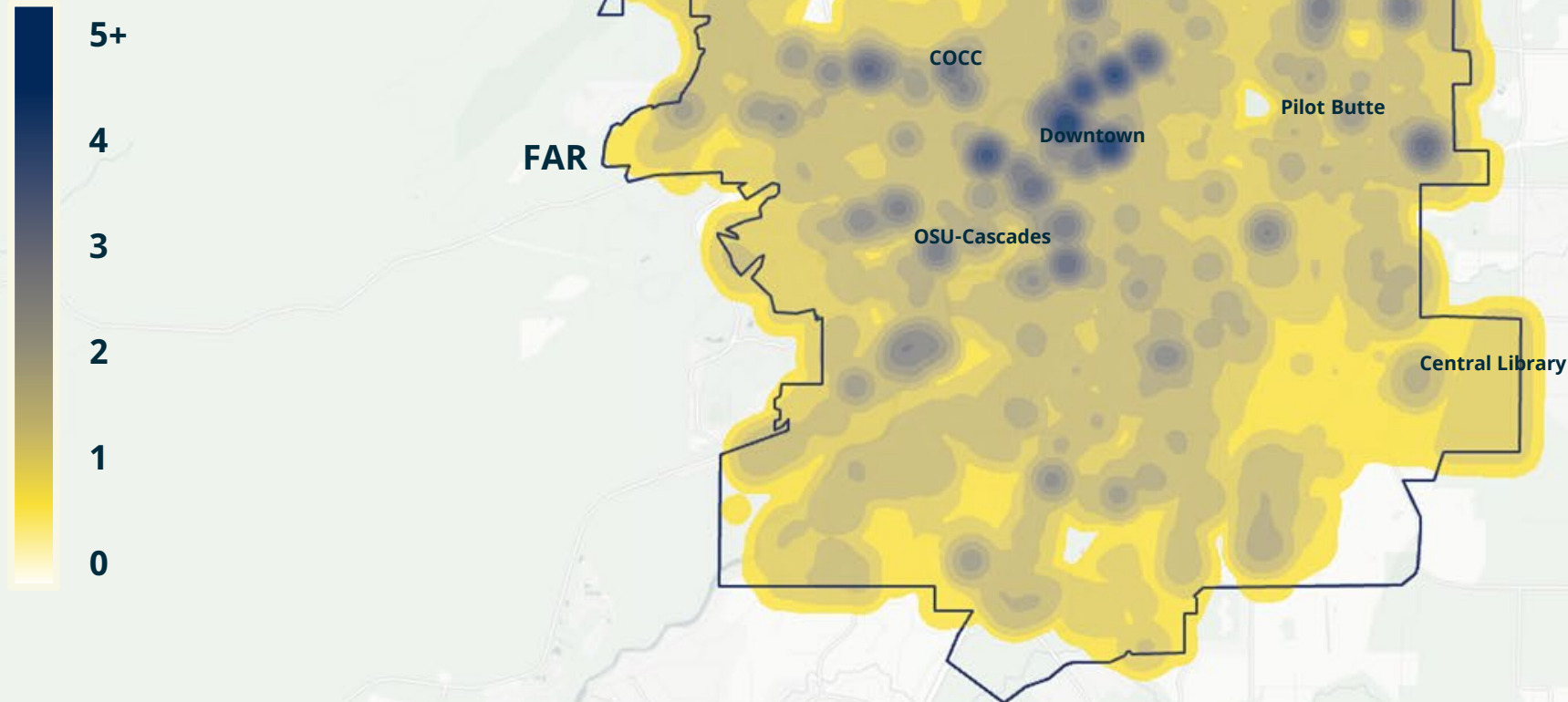
“Stable” Growth Combined

Housing and employment growth anticipated or planned in Bend that is not changed across hypothetical futures.



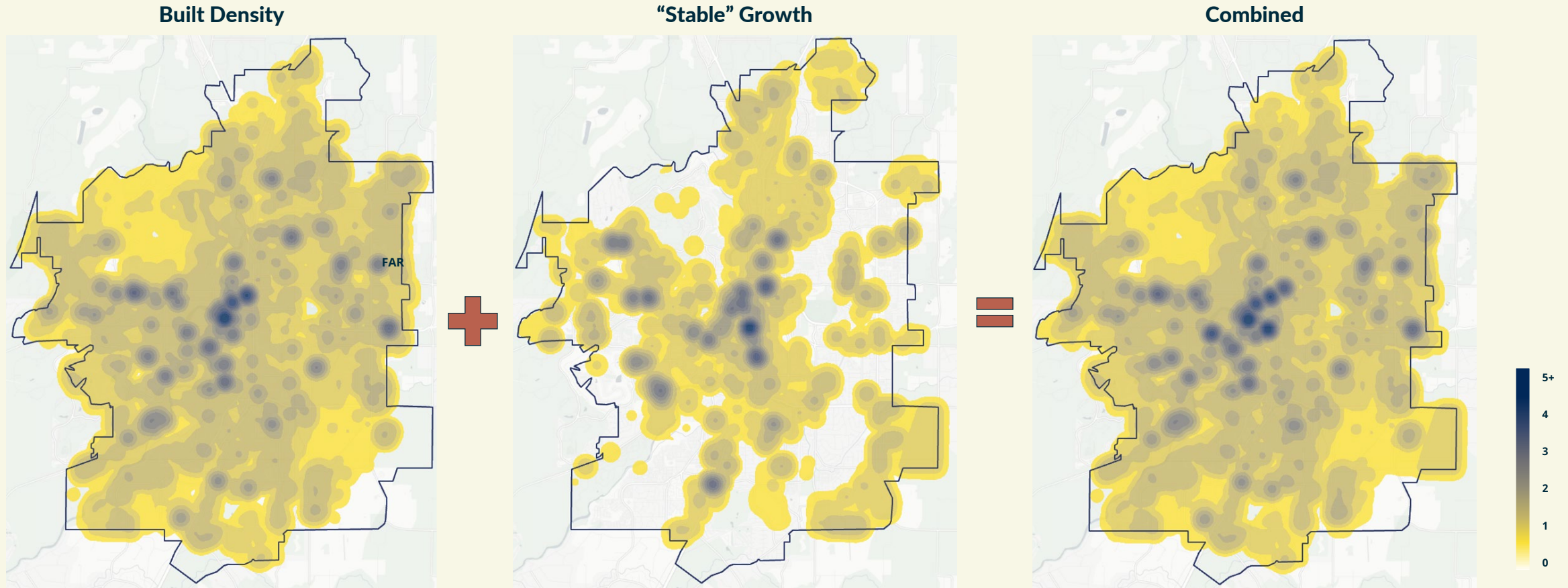
Built + Stable Density

Built and committed (“in the pipeline”) employment and housing development. The conditions on which each hypothetical future is built.



The Baseline Assumptions

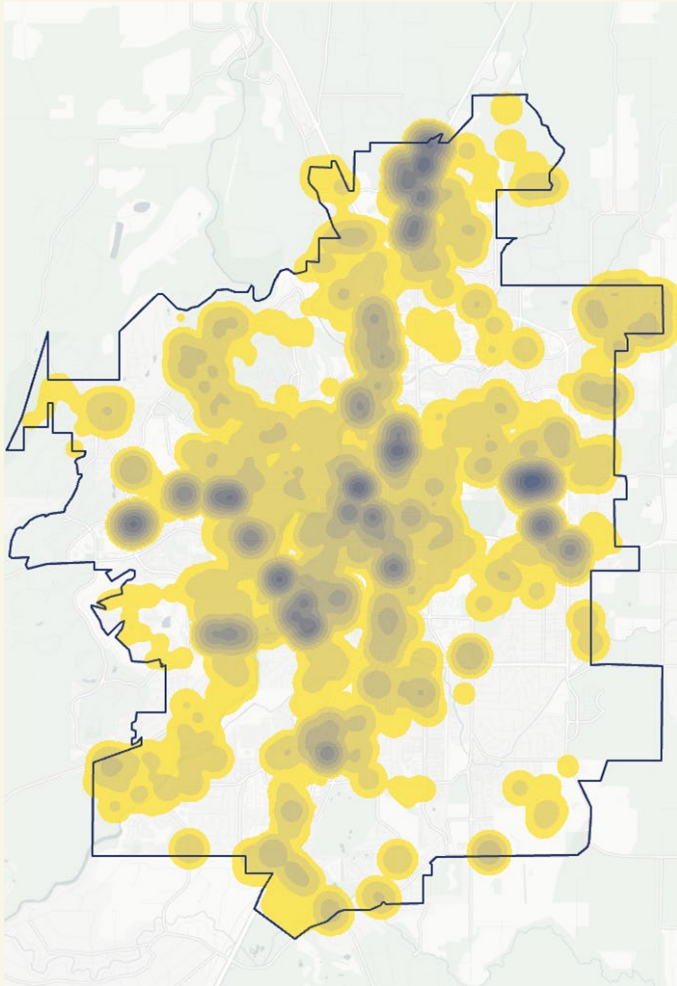
Built + Stable FAR: Existing FAR and committed FAR combined. The conditions on which each hypothetical future is built.



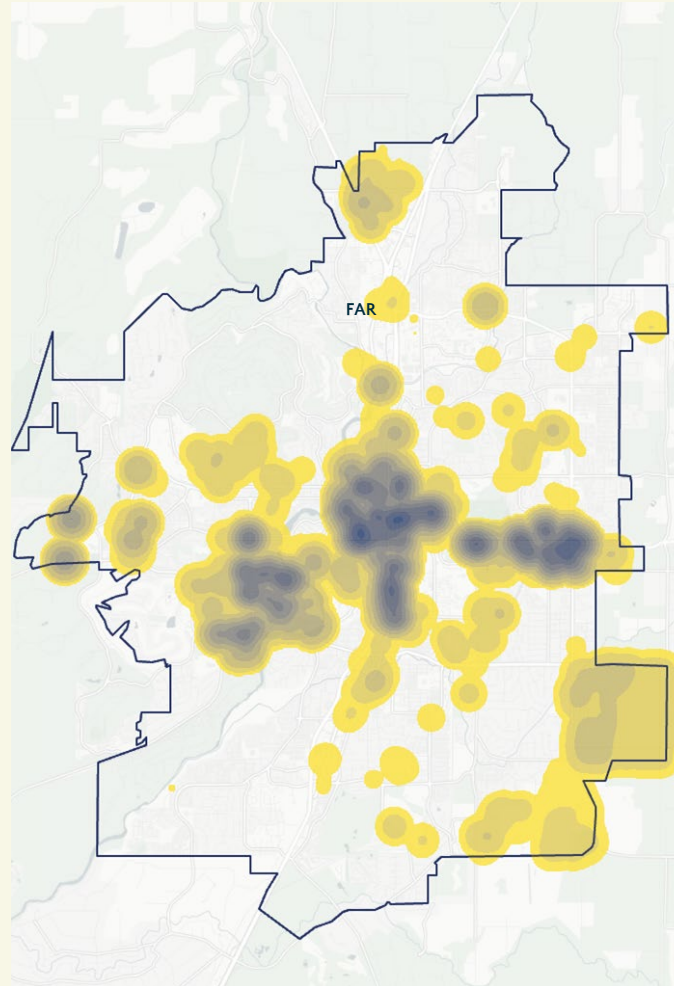
BEND MADE

Movable Growth Allocations

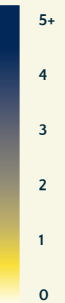
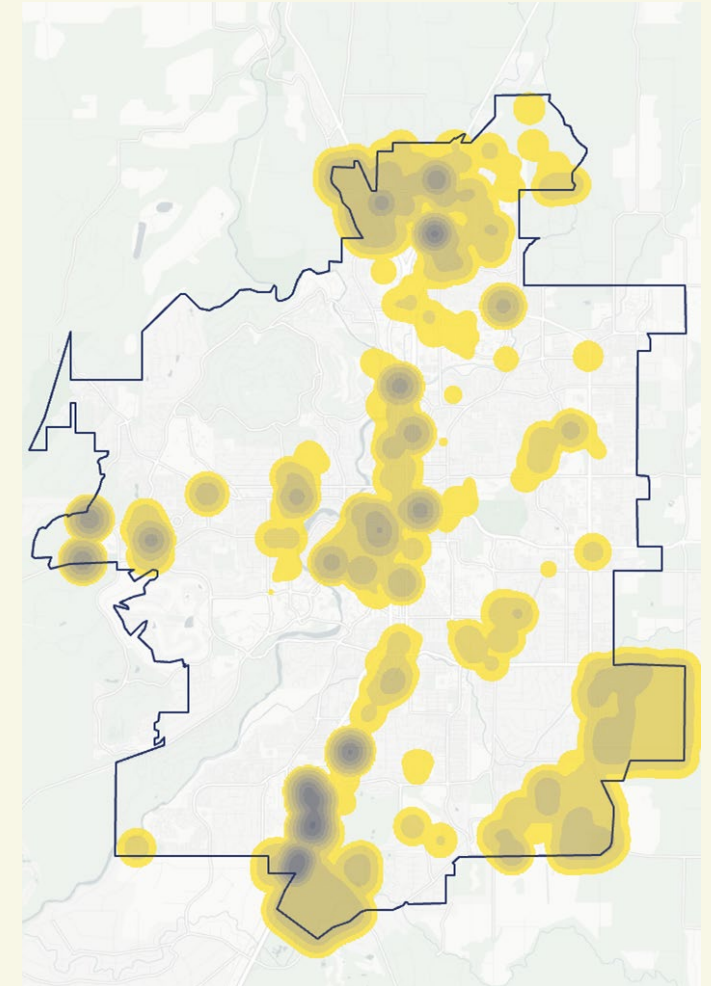
True Trend



High Urbanization

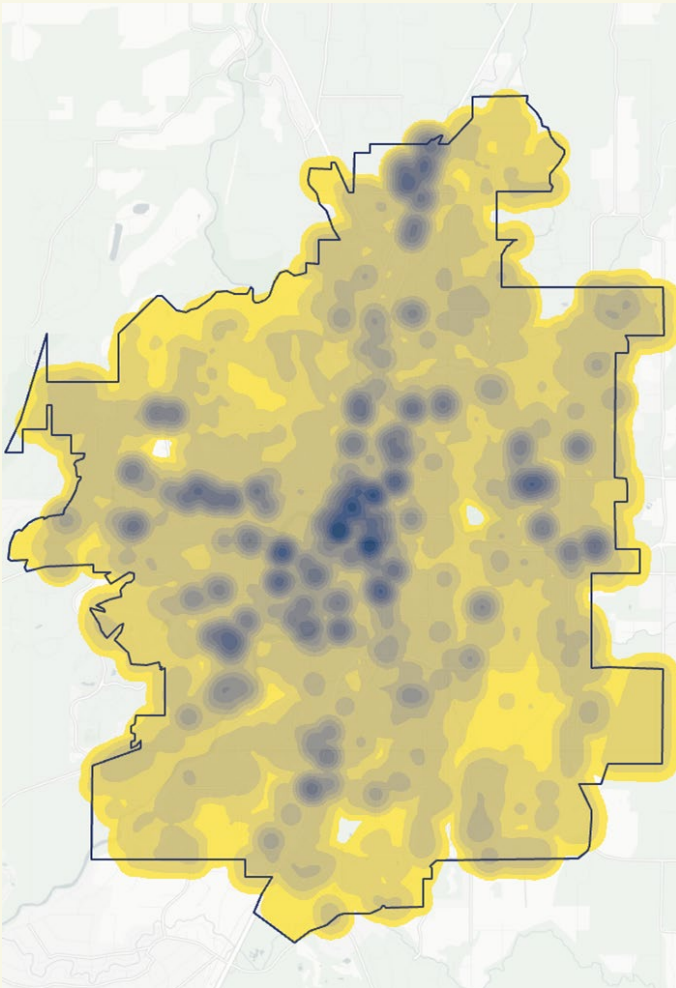


Edge Rebalancing

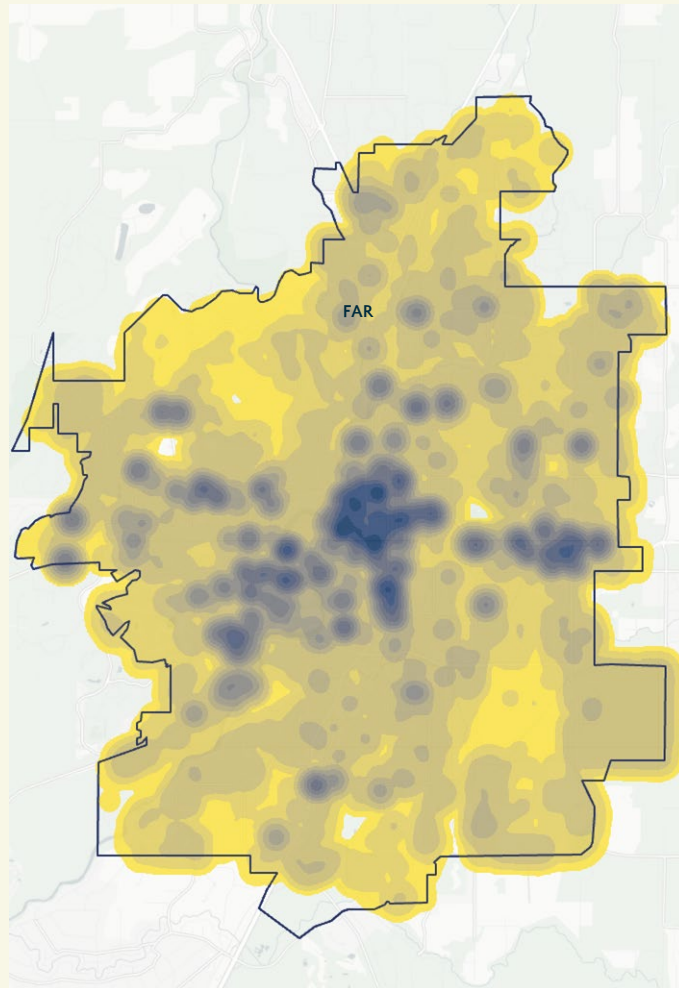


Projected Density (total FAR) in 2045

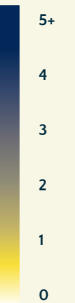
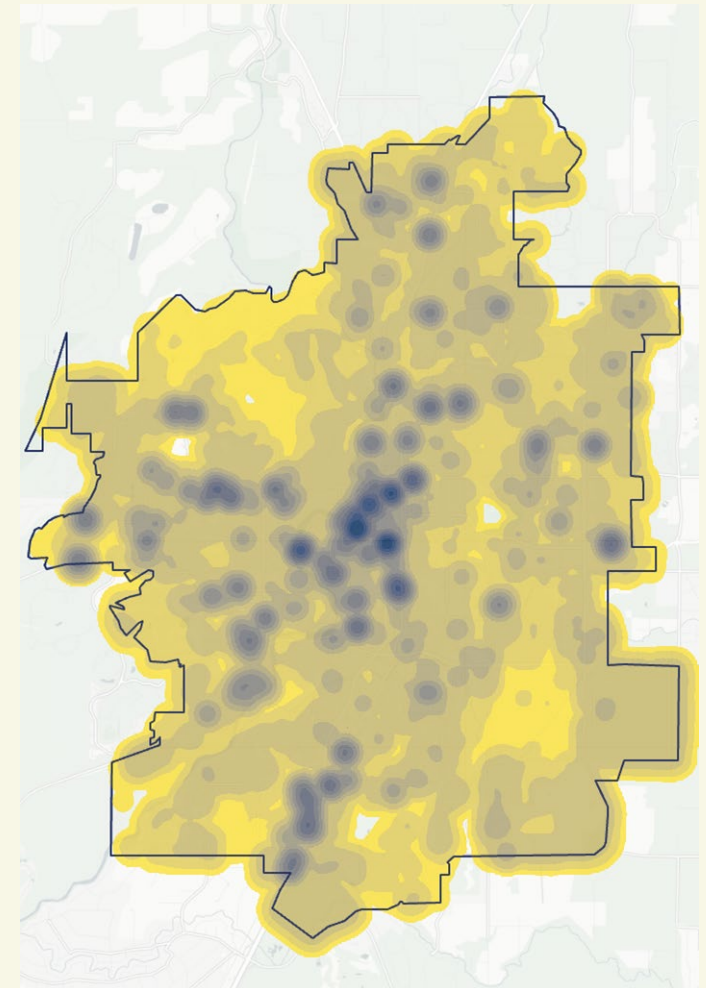
True Trend



High Urbanization

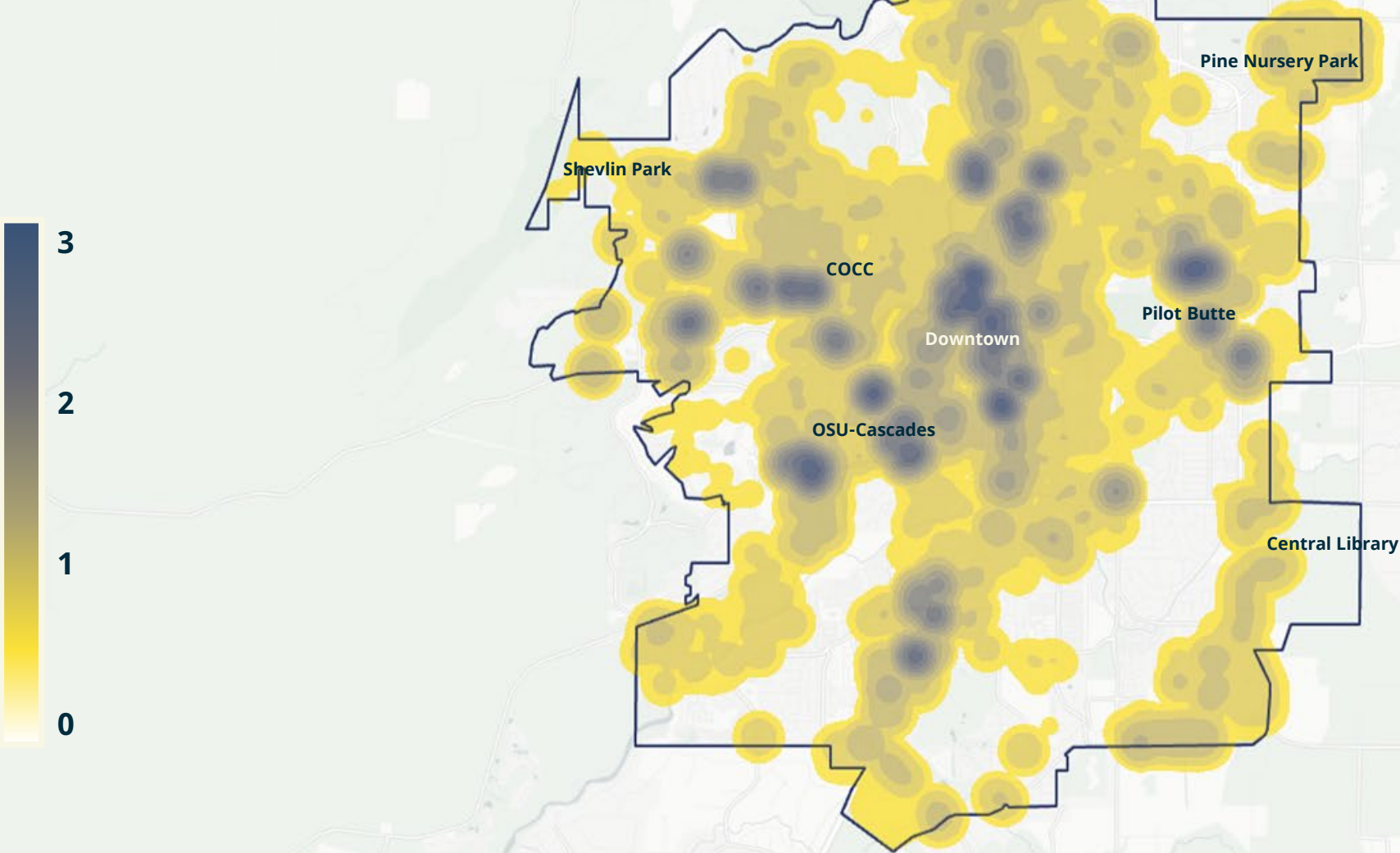


Edge Rebalancing



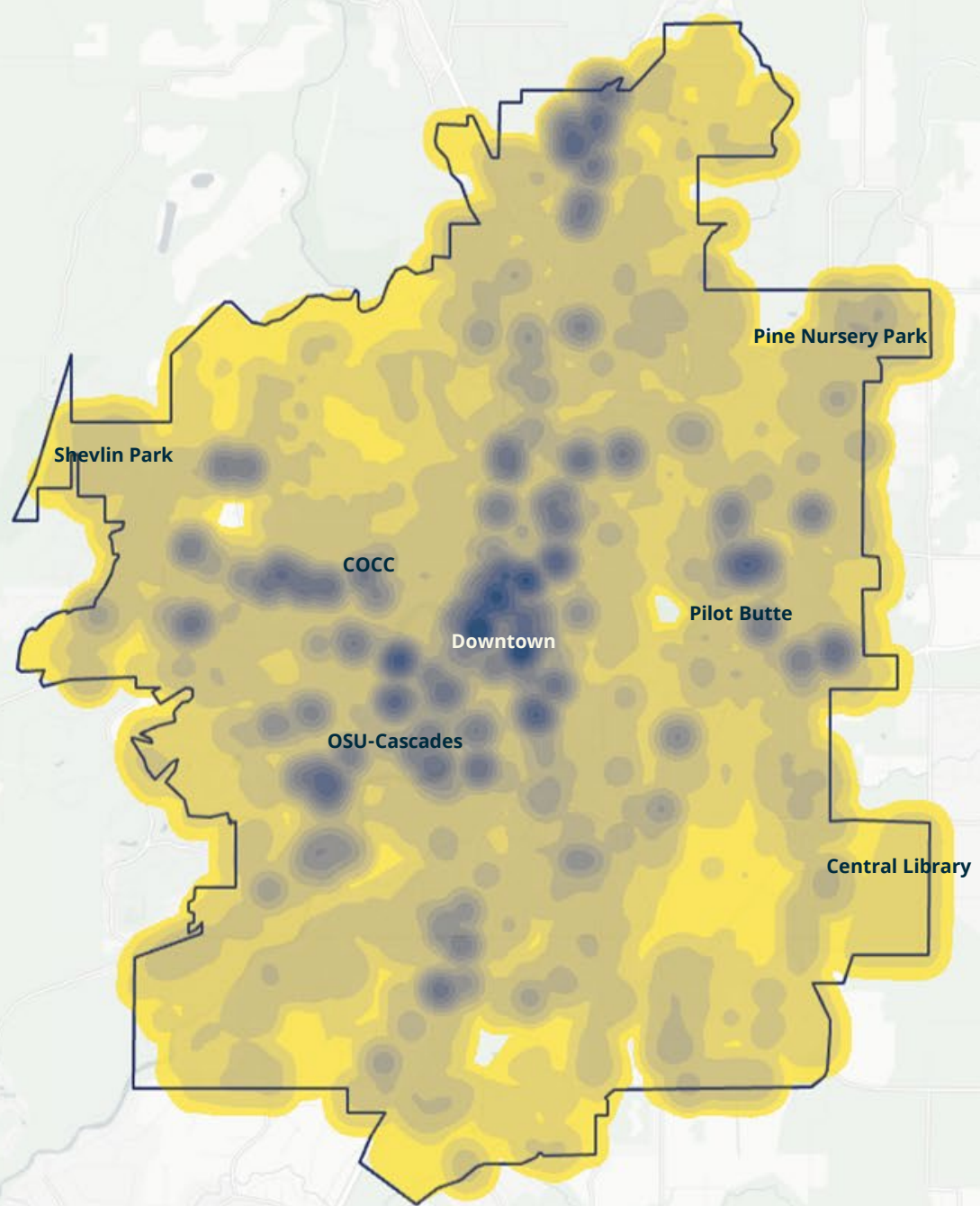
HF: True Trend

Assigned Movable Household & Employment Growth (FAR)



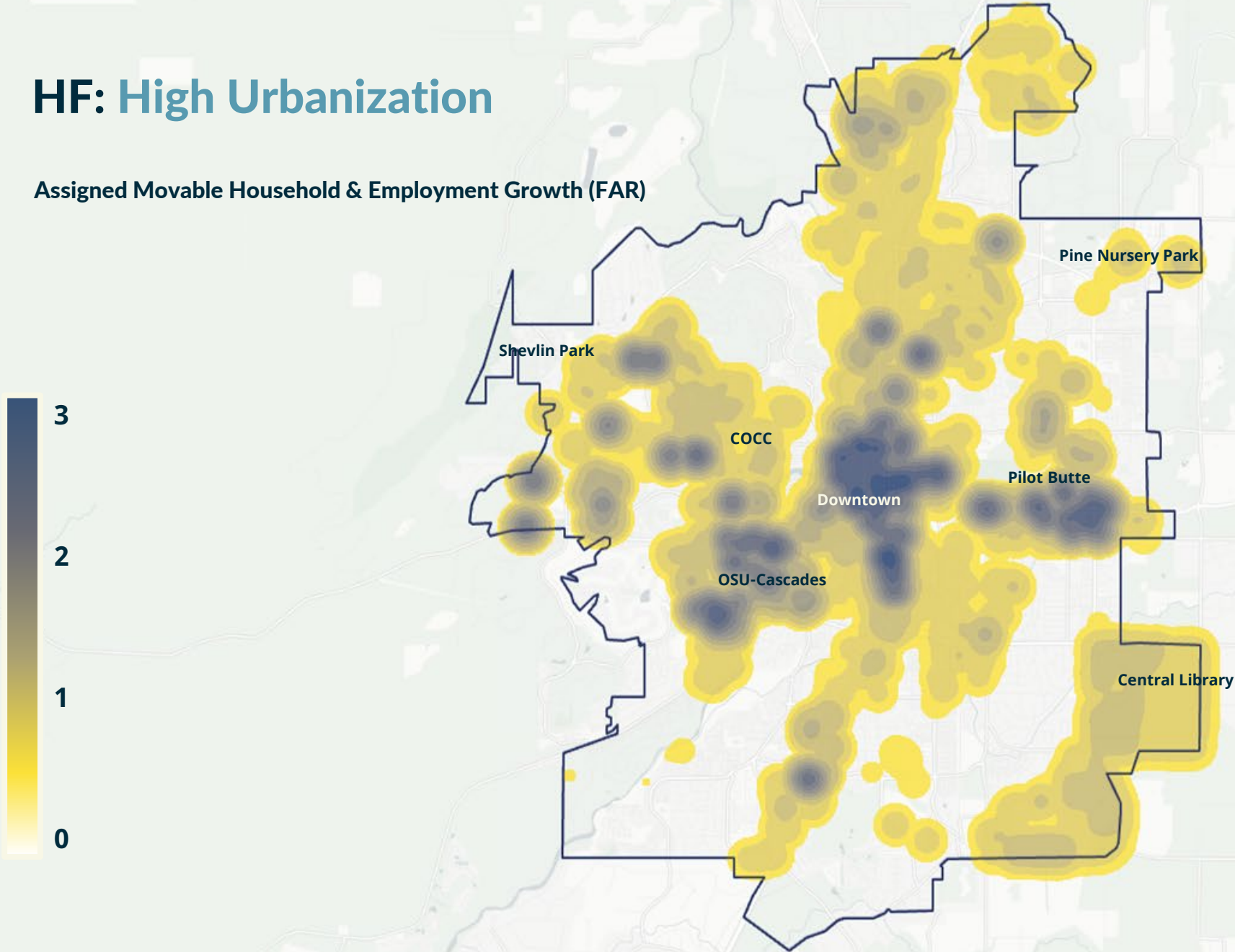
HF: True Trend

2045 Future Projected Total Growth
(Total FAR)



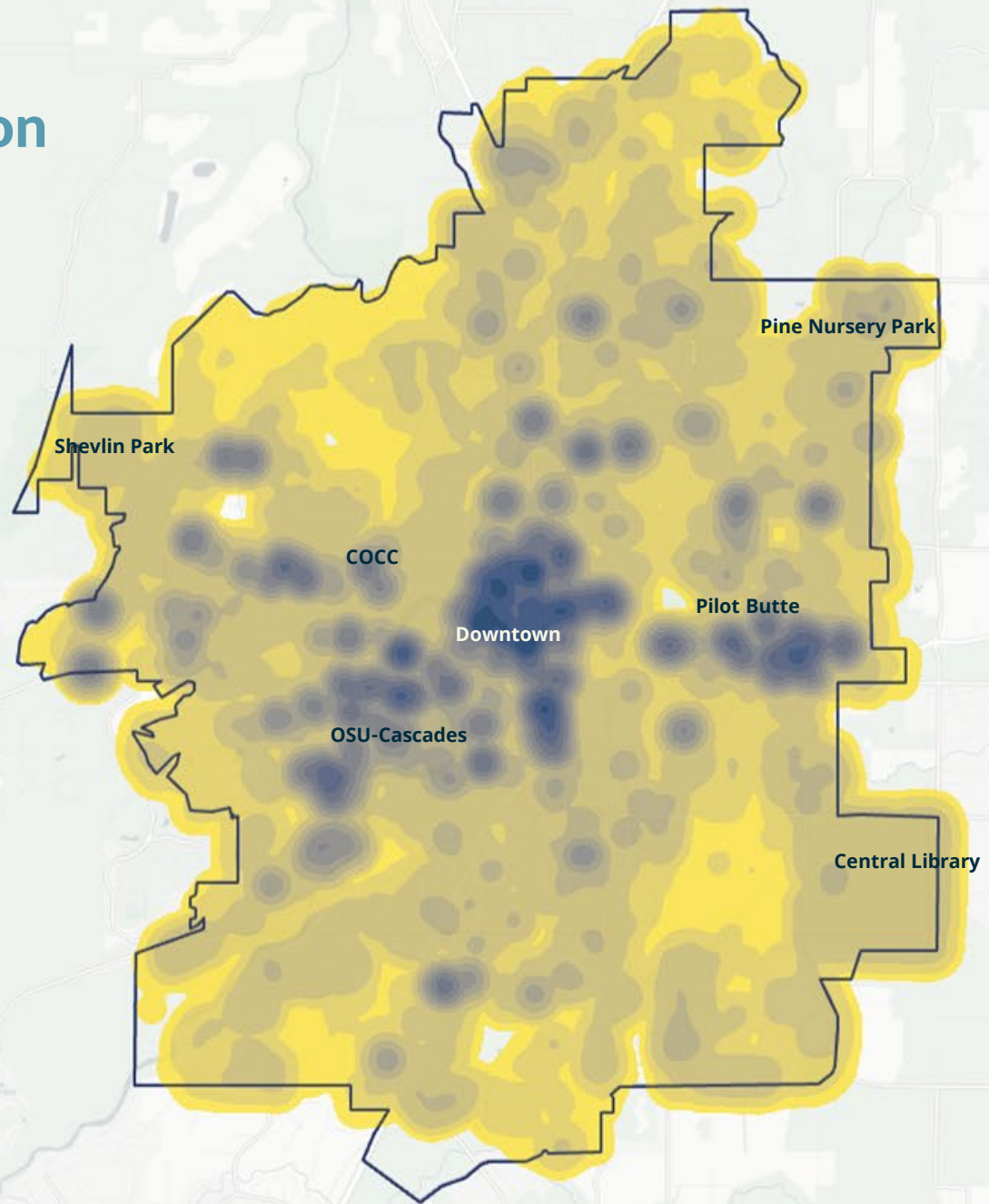
HF: High Urbanization

Assigned Movable Household & Employment Growth (FAR)



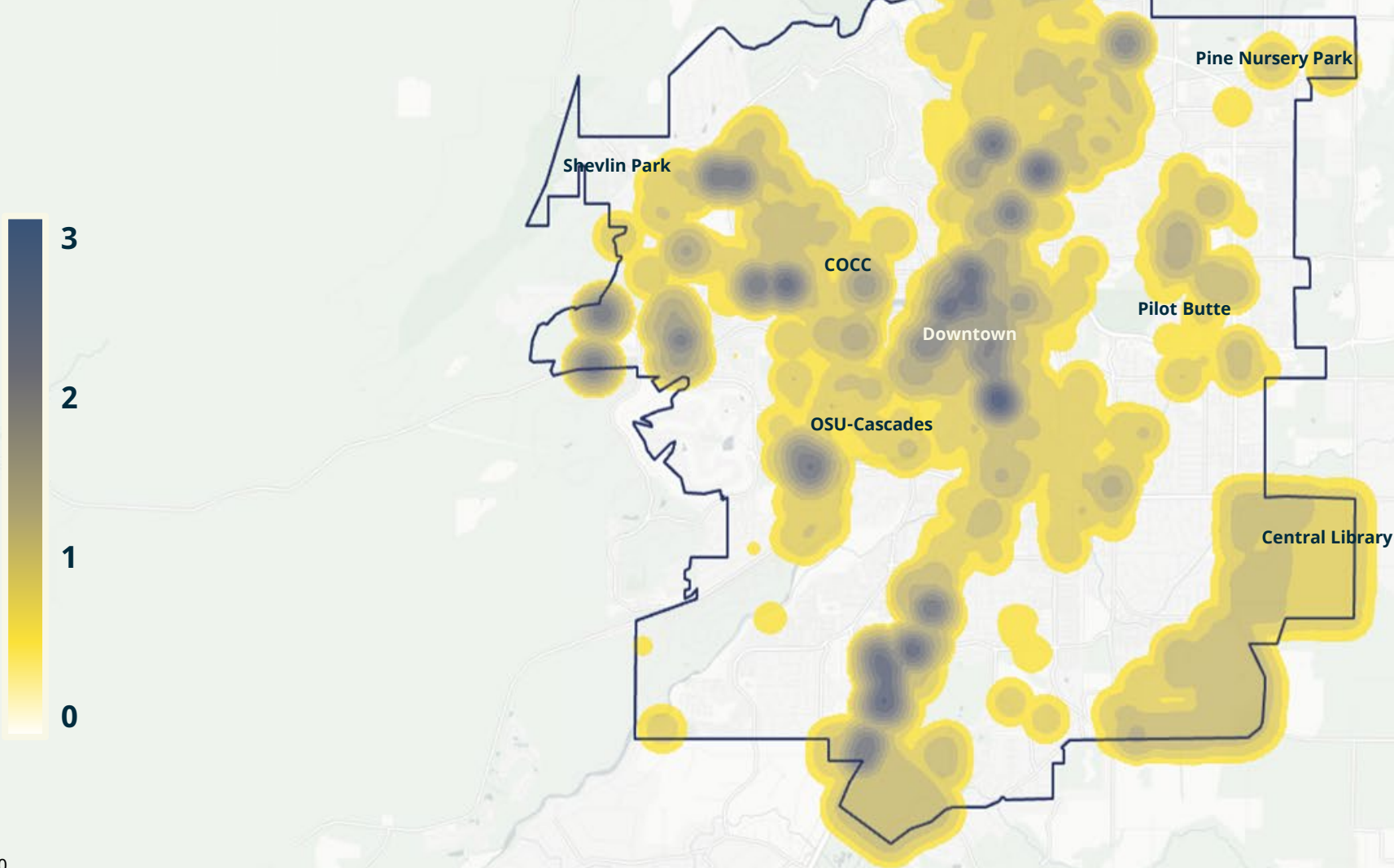
HF: High Urbanization

2045 Future Projected Total Growth
(Total FAR)



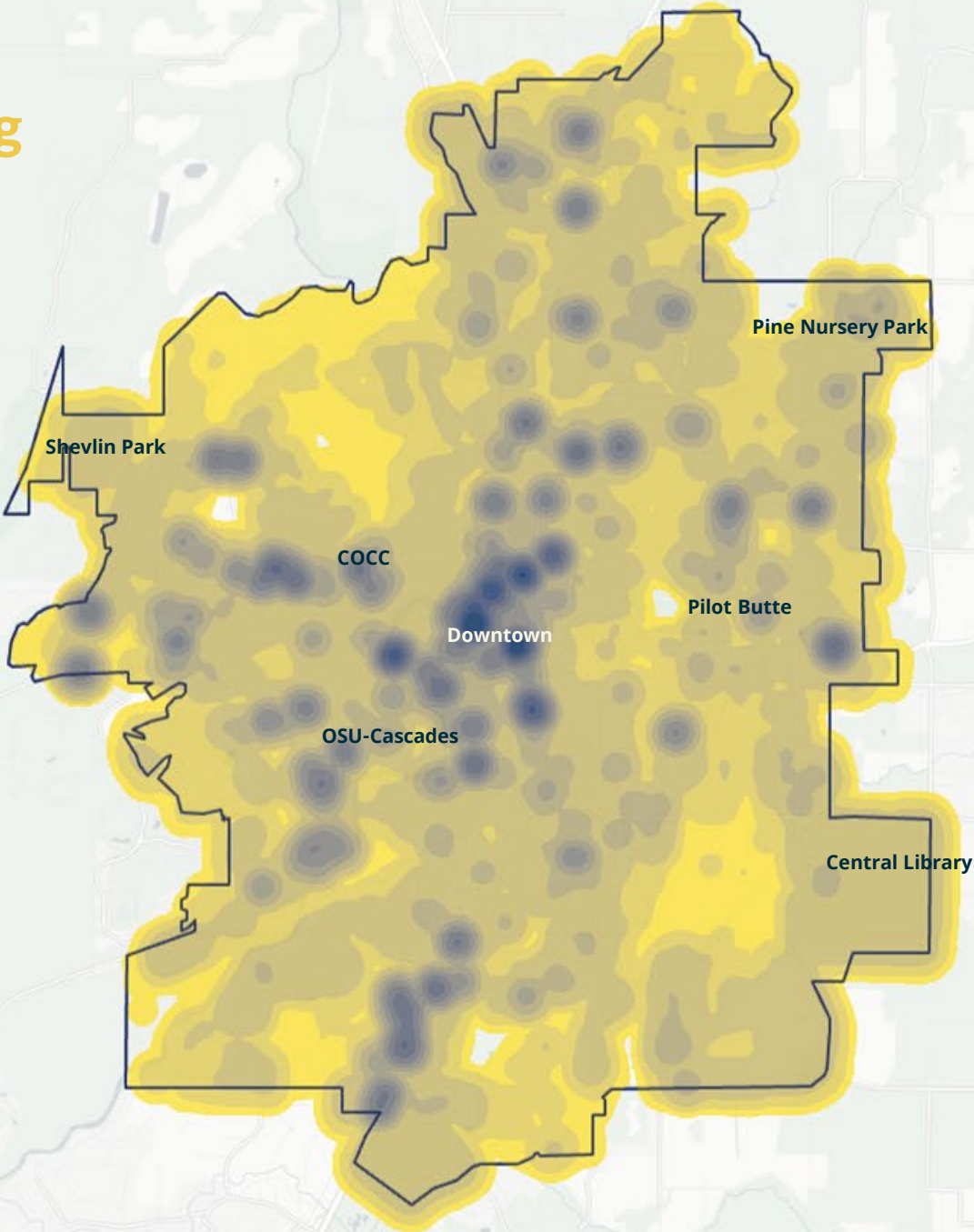
HF: Edge Rebalancing

Assigned Movable Household & Employment Growth (FAR)



HF: Edge Rebalancing

2045 Future Projected Total Growth
(Total FAR)



Hypothetical Future Visualizations

Illustrative renderings of the three hypothetical futures



Bend Central District - Existing



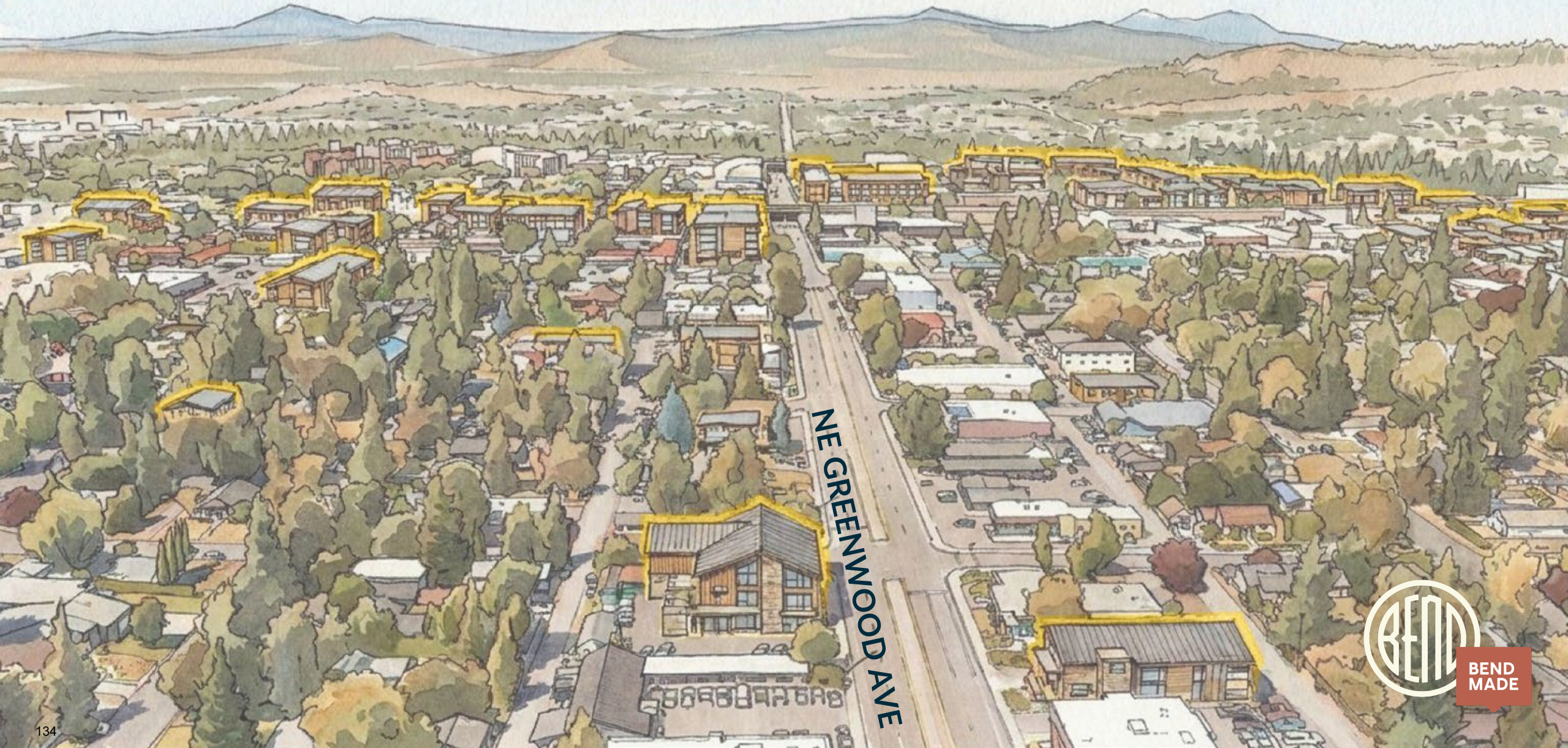
NE GREENWOOD AVE



BEND
MADE

Bend Central District – HF1: True Trend

Mixed density infill development closer to downtown



Bend Central District – HF2: High Urbanization

Significant higher density infill development throughout Central District

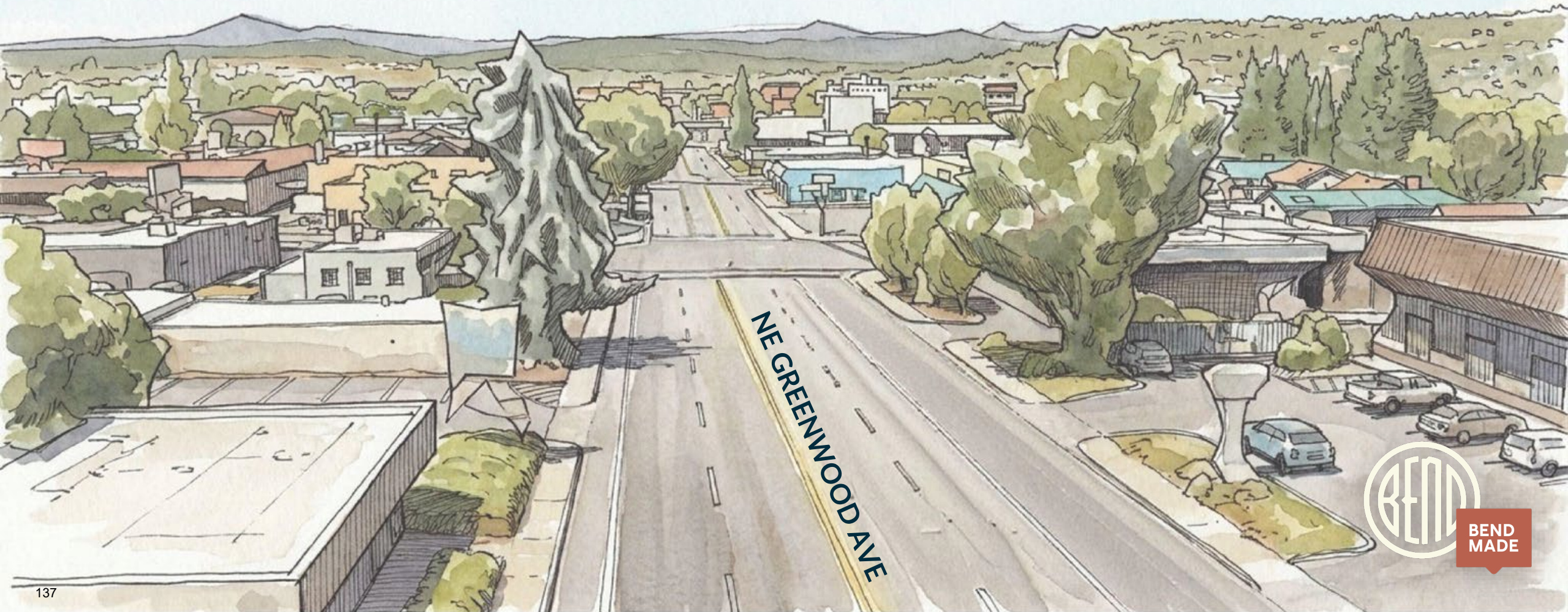


Bend Central District – HF3: Edge Rebalancing

Dispersed lower density infill development throughout Central District



Bend Central District - Existing



**BEND
MADE**

Bend Central District – HF1: True Trend

Mixed density infill development



BEND
MADE

Bend Central District – HF2: High Urbanization

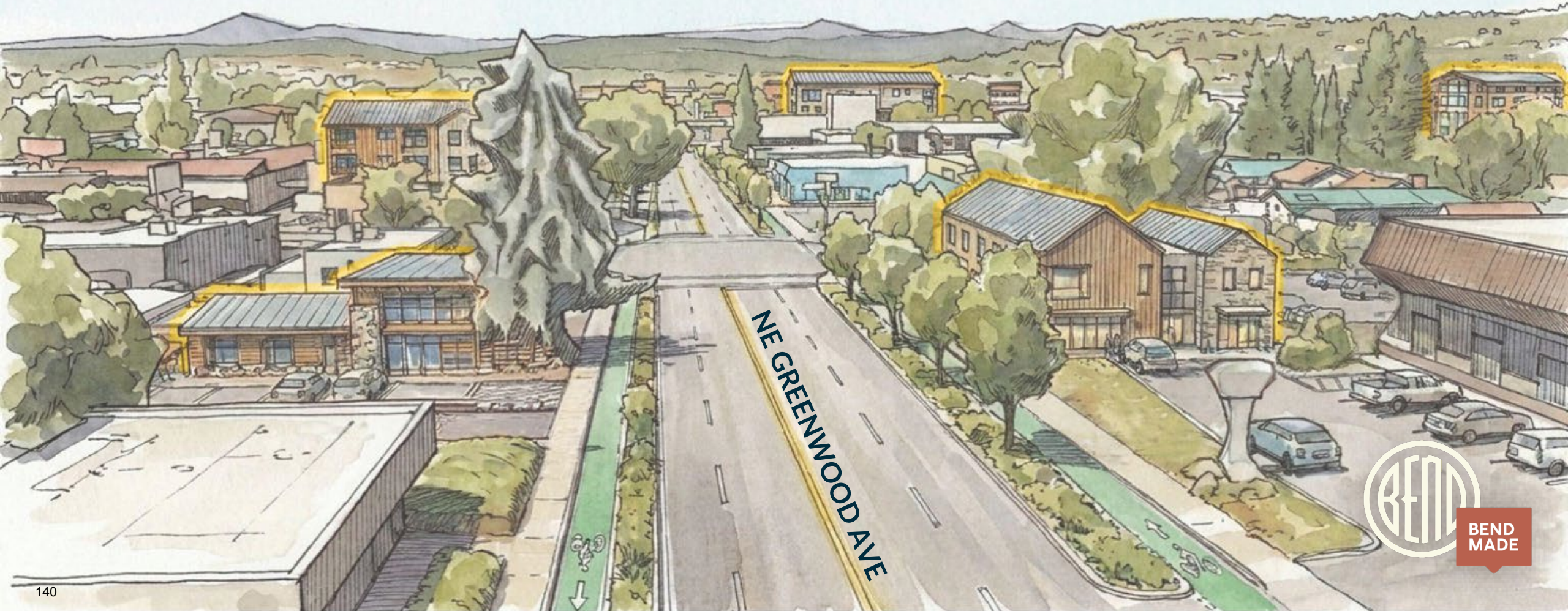
Higher density infill development



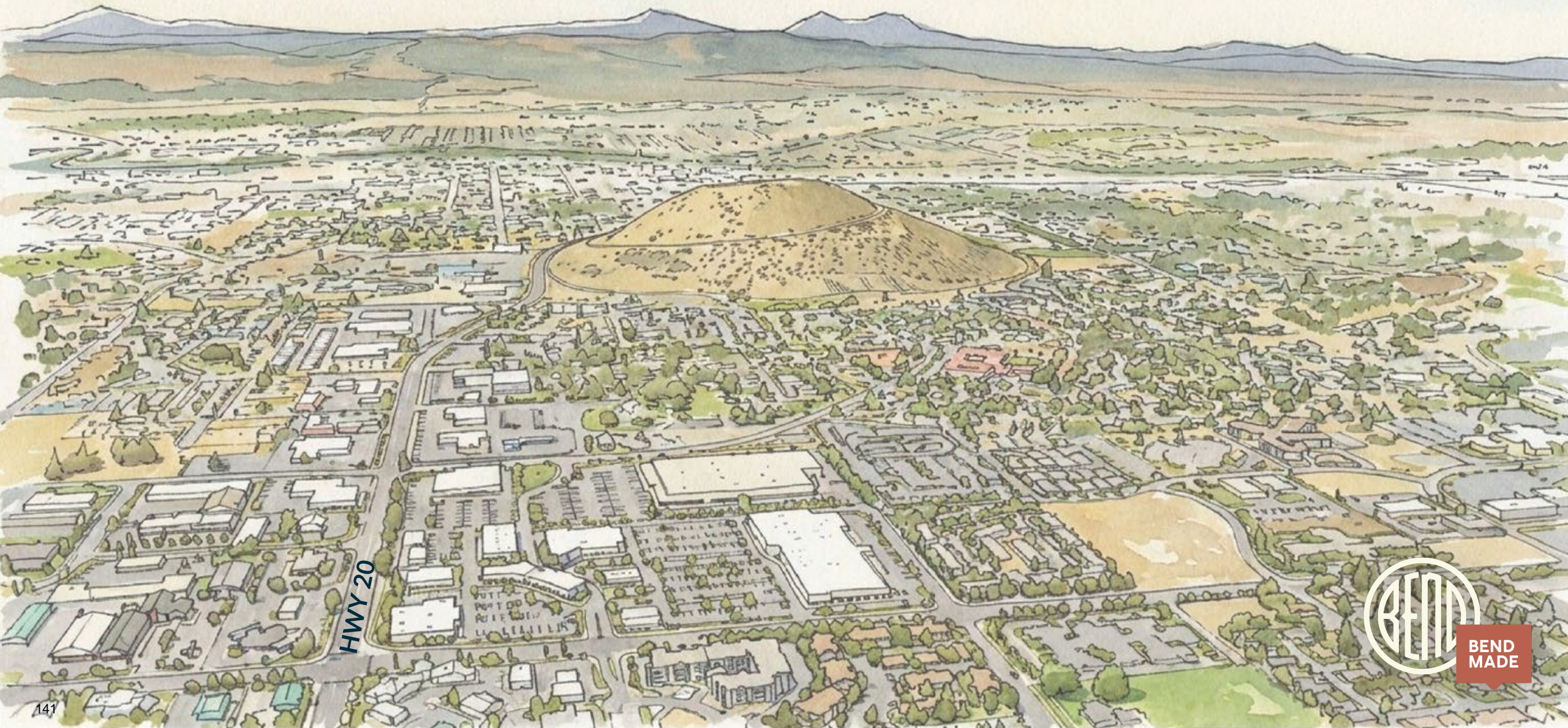
BEND
MADE

Bend Central District – HF3: Edge Rebalancing

Dispersed lower density infill development



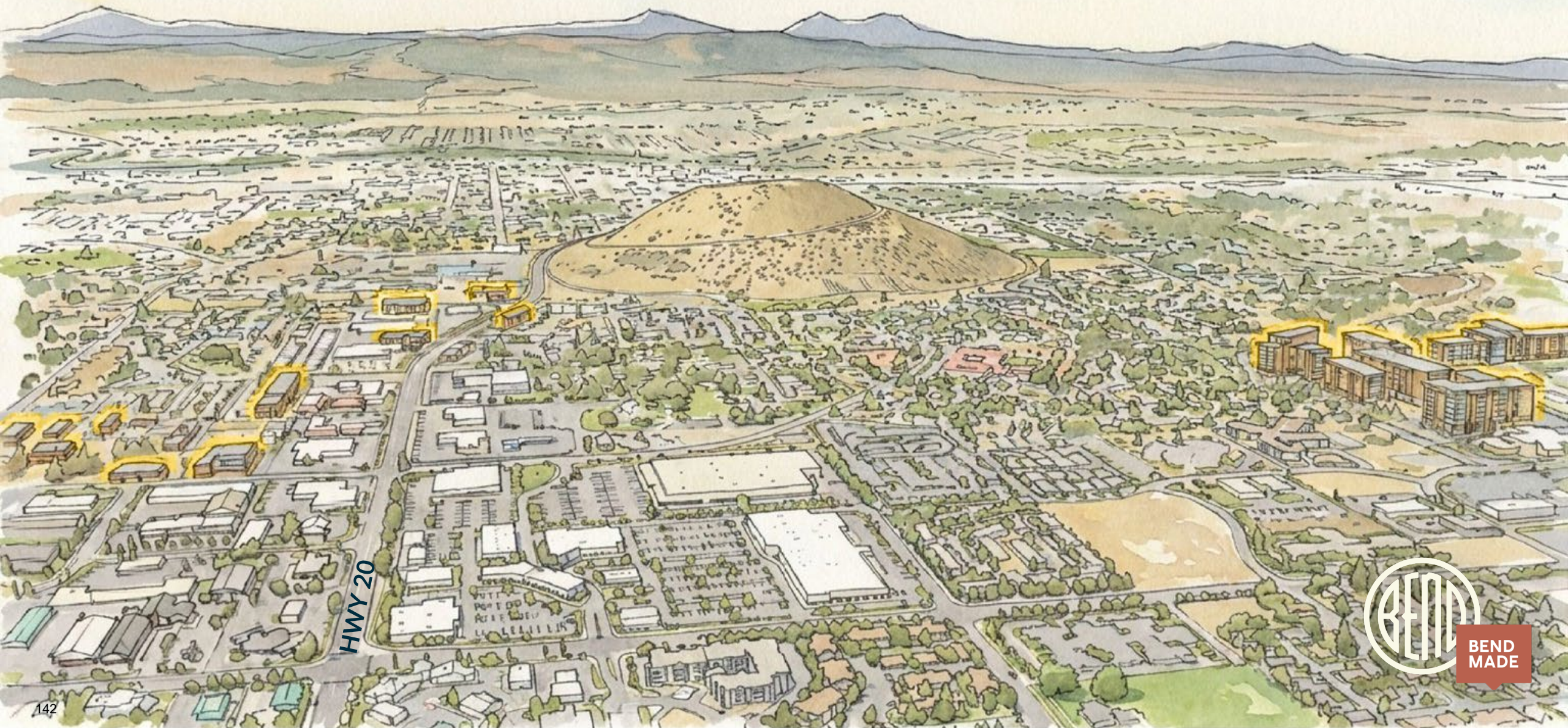
Eastside - Existing



BEND
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Eastside – HF1: True Trend

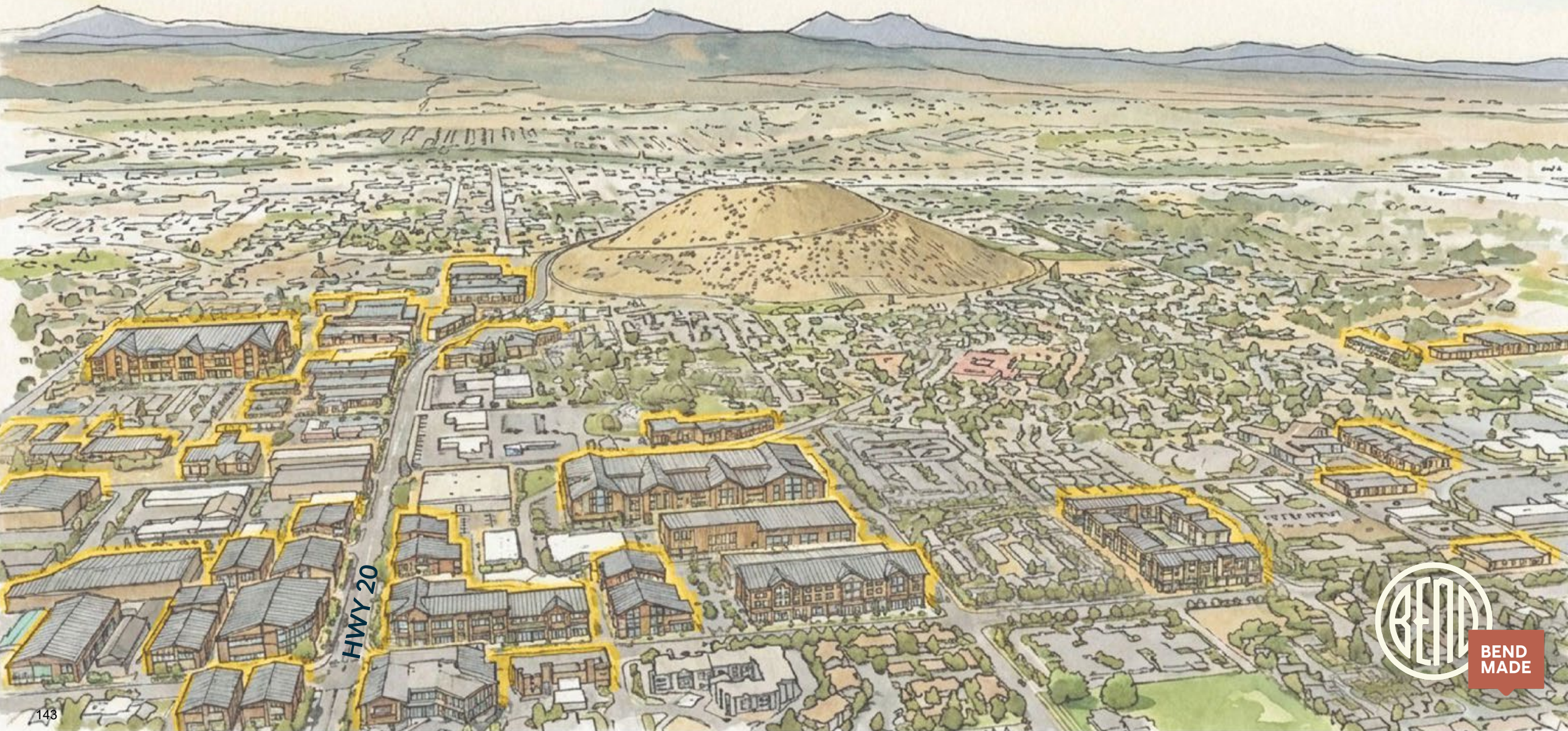
Limited middle housing infill south of Hwy 20, higher density infill to the north



BEND
MADE

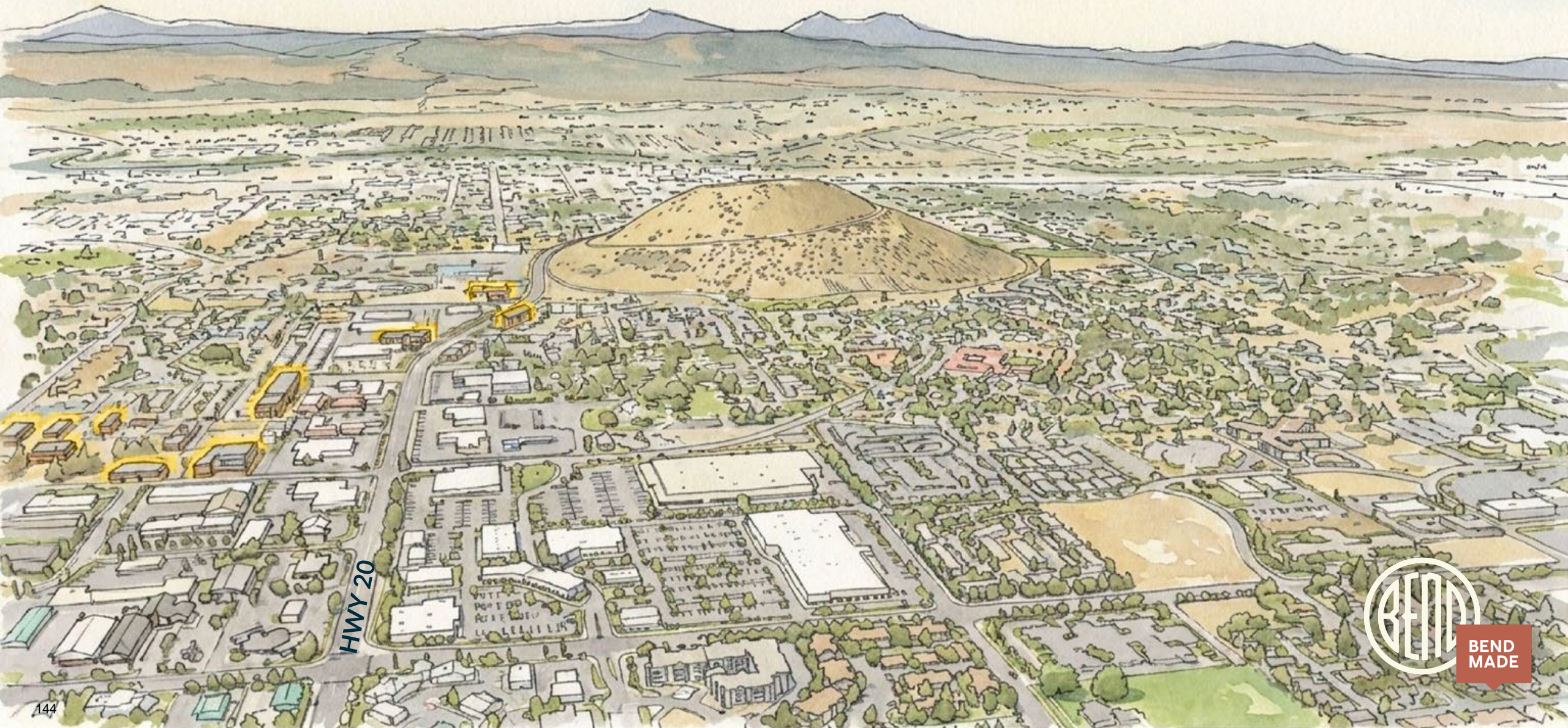
Eastside – HF2: High Urbanization

High density development throughout Eastside Candidate CFA



Eastside – HF3: Edge Rebalancing

Little middle housing infill south of Hwy 20



Eastside - Existing



HWY 20



BEND
MADE

Eastside – HF1: True Trend

Limited middle housing infill development



BEND
MADE

Eastside – HF2: High Urbanization

Significant higher-density development



BEND
MADE

Eastside – HF3: Edge Rebalancing

Limited middle housing infill development



BEND
MADE

Westside - Existing



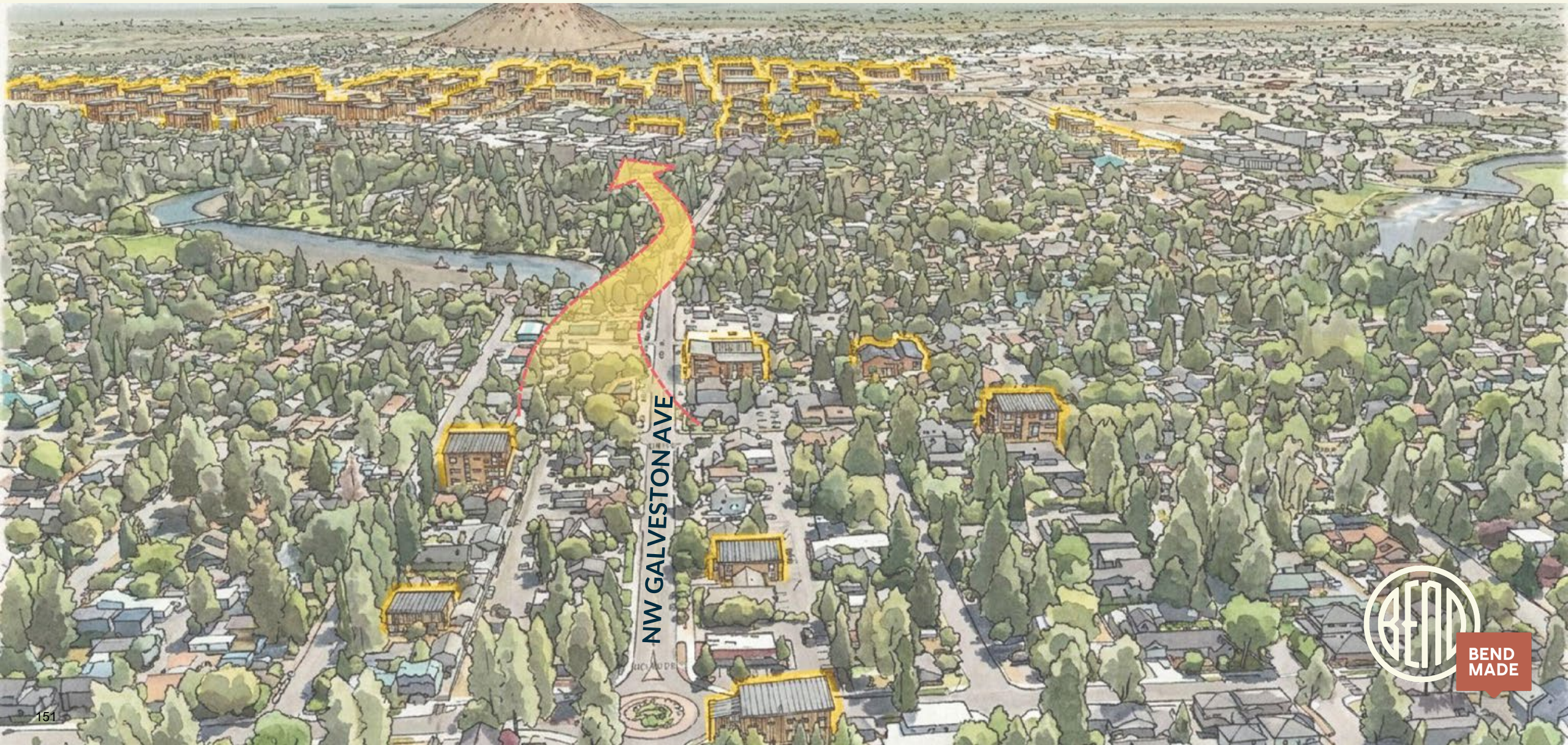
Westside – HF1: True Trend

Significant incremental infill development throughout neighborhoods



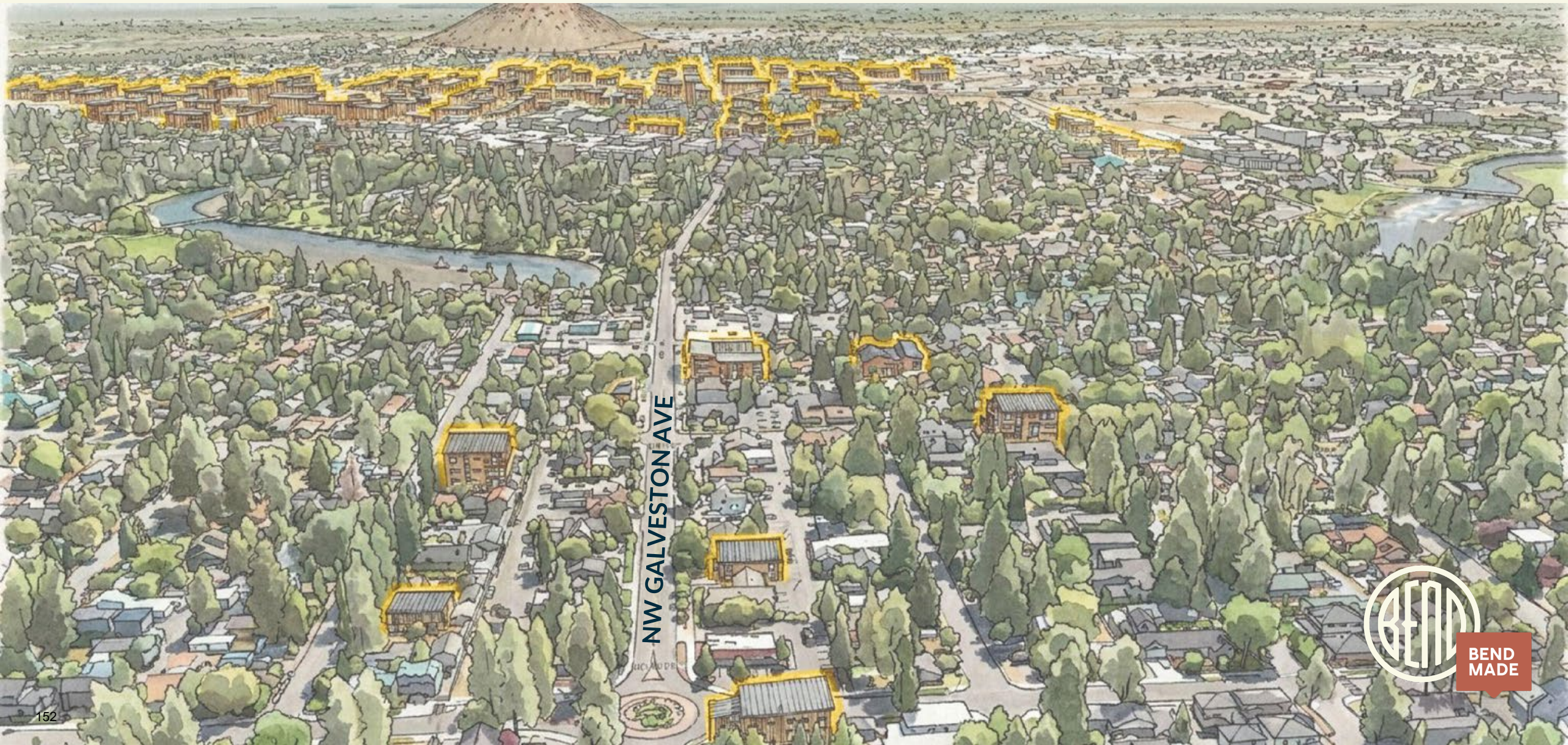
Westside – HF2: High Urbanization

Density focused within the central core



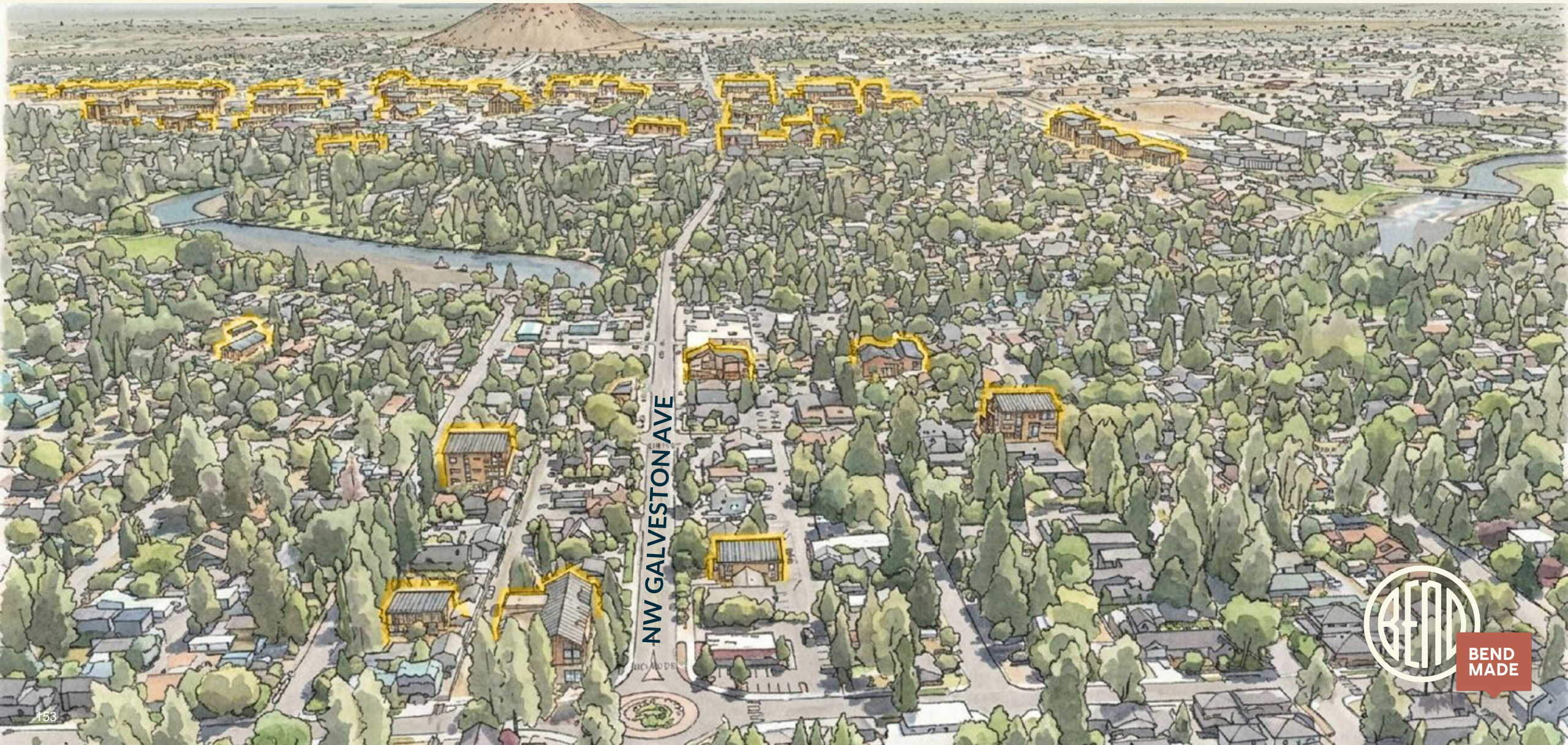
Westside – HF2: High Urbanization

Density focused within the central core



Westside – HF3: Edge Rebalancing

Limited incremental infill development throughout neighborhoods



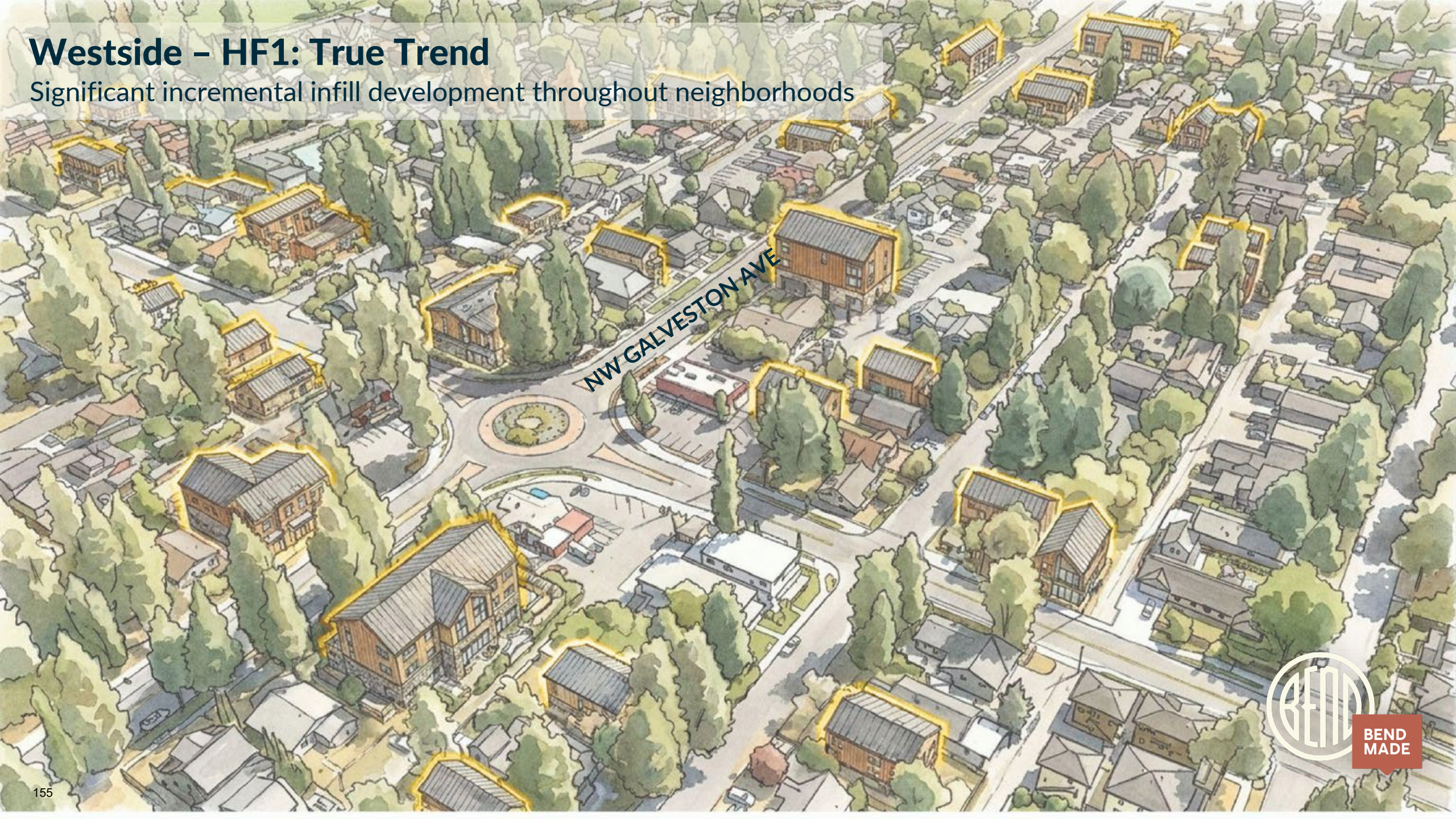
Westside - Existing



**BEND
MADE**

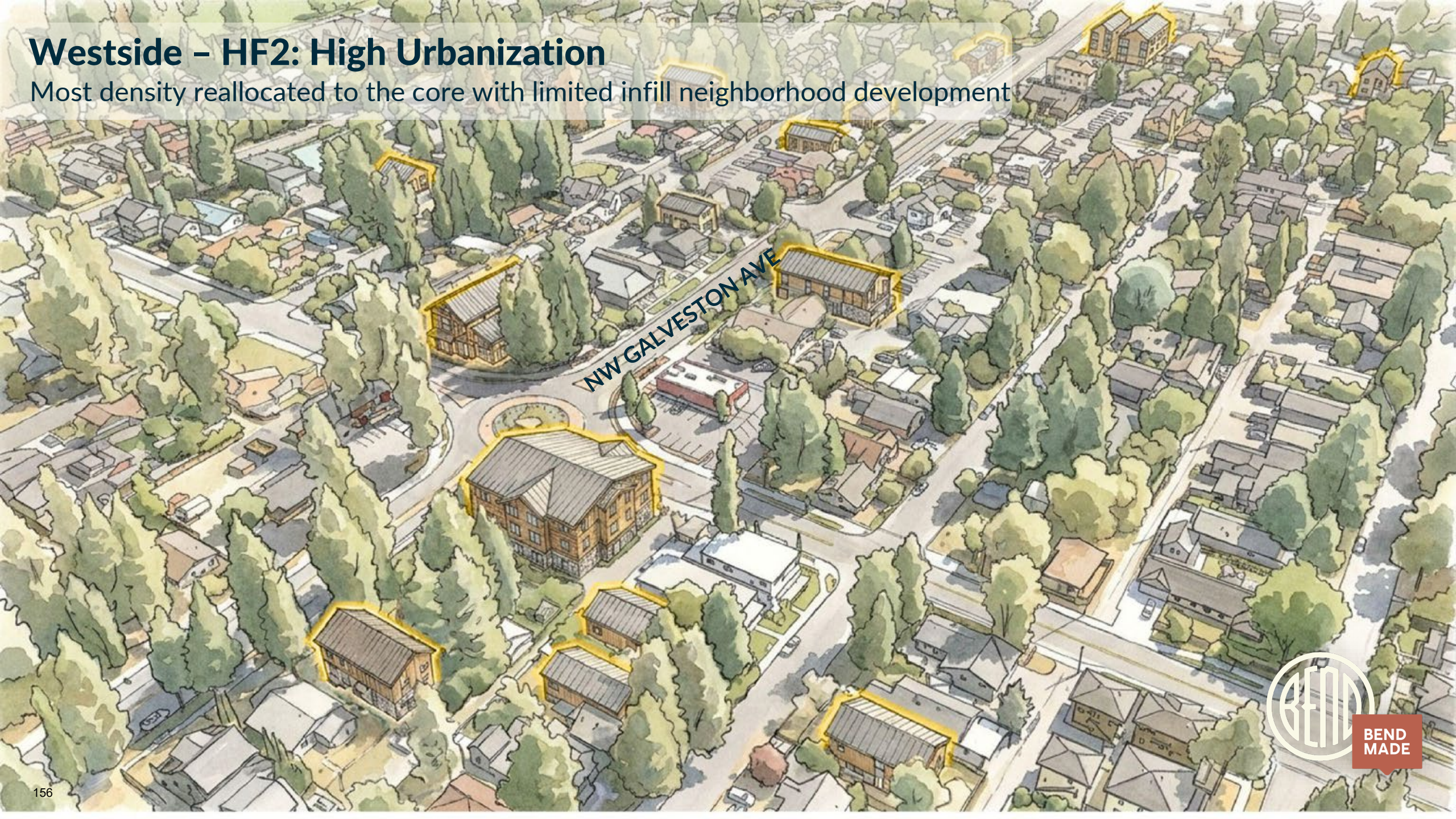
Westside – HF1: True Trend

Significant incremental infill development throughout neighborhoods



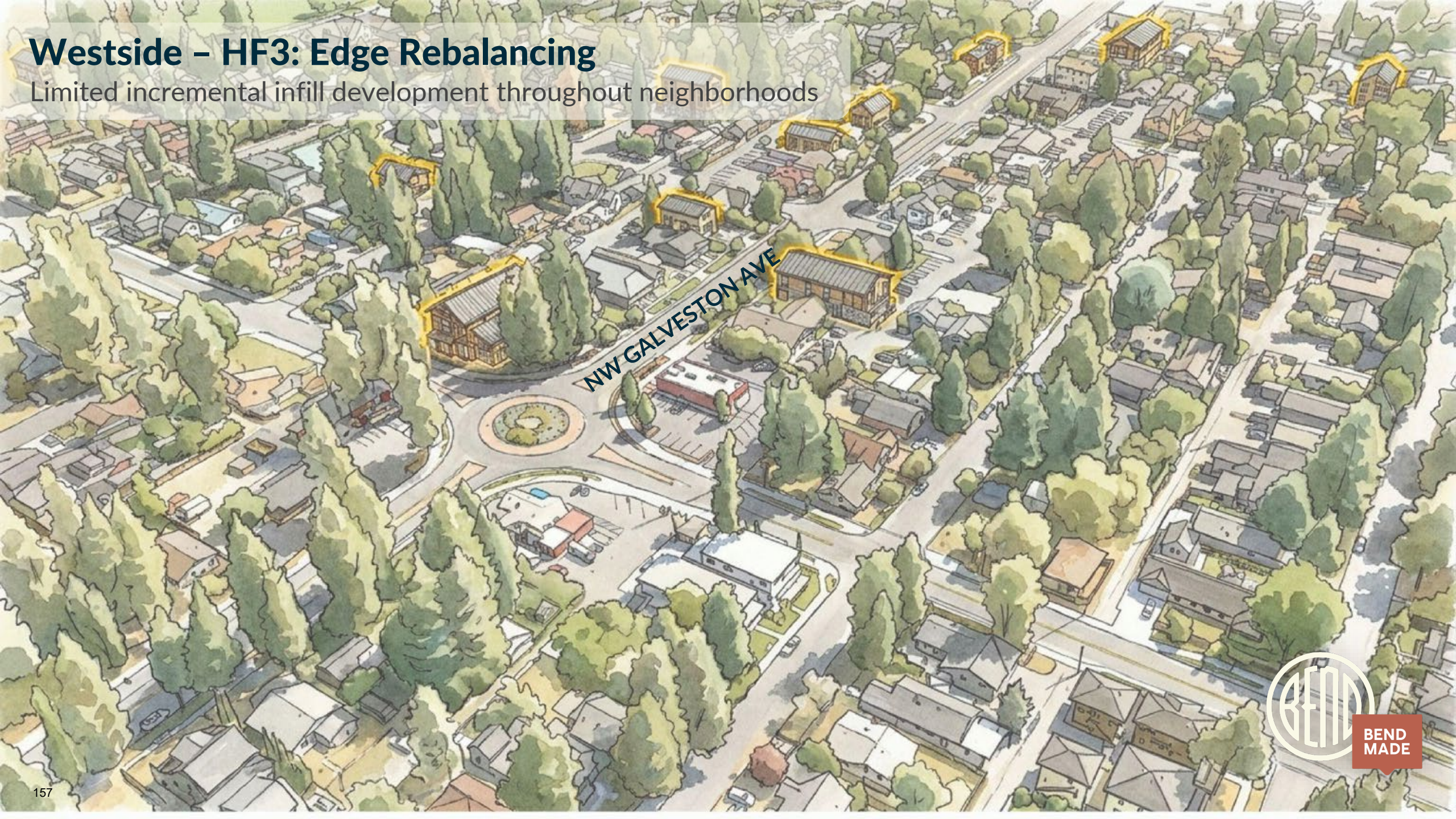
Westside – HF2: High Urbanization

Most density reallocated to the core with limited infill neighborhood development



Westside – HF3: Edge Rebalancing

Limited incremental infill development throughout neighborhoods



BEND
MADE

**A PLAN FOR TOMORROW,
CRAFTED TODAY.**

BEND MADE



CITY OF BEND

BEND MADE