



UNIVERSITY *of* WASHINGTON

eScience Institute

DATA SCIENCE FOR SOCIAL GOOD

# Mission

The eScience Institute empowers researchers and students in all fields to answer fundamental questions through the use of large, complex, and/or noisy data.

## Data Science for Social Good Program



### Team composition

- DSSG Student Fellows (4-5)
- eScience Data Scientist Leads (1-2)
- Project Leads (1-2)

### Goals

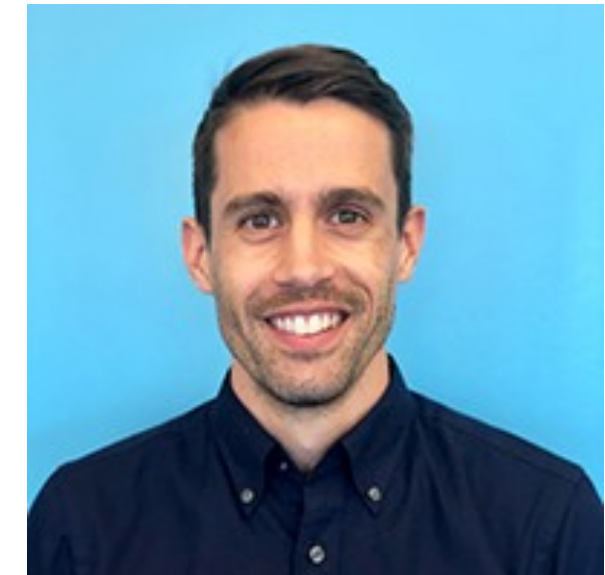
- Train students in data science methods
- Increase data science capacity across fields and organizations
- Positively impact society

# 2019 UW Data Science for Social Good

## Affordable Accessory Dwelling Units



Rick Mohler  
 Project Lead  
 University of Washington  
 Department of  
 Architecture



Nick Welch  
 Project Lead  
 Seattle Office of  
 Planning and Community  
 Development



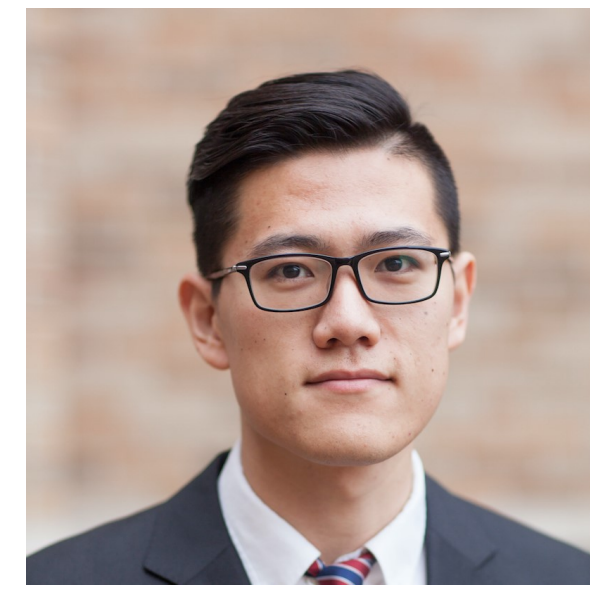
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 Student Fellow  
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Emily Finchum  
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Yuanhao Niu  
 Student Fellow  
 University of Notre Dame

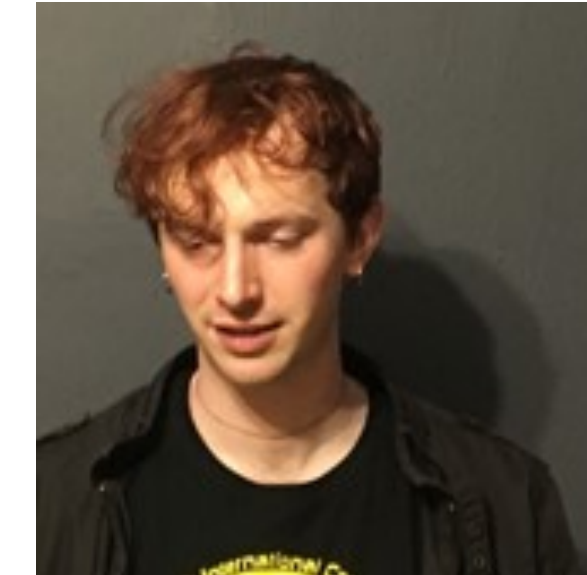


Adrian Tullock  
 Student Fellow  
 University of Washington

## Algorithmic Equity



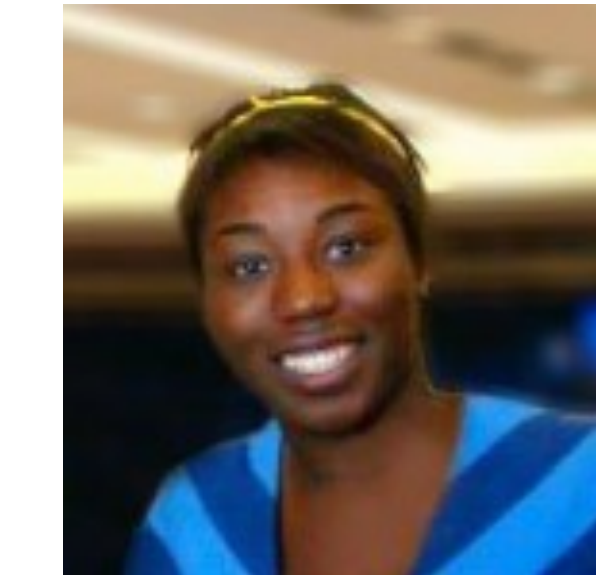
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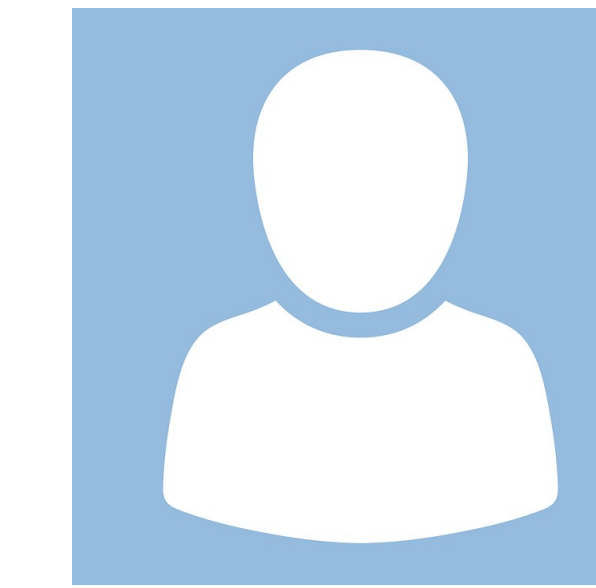
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## Congestion Pricing



Mark Hallenbeck  
 Project Lead  
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Vaughn Iverson  
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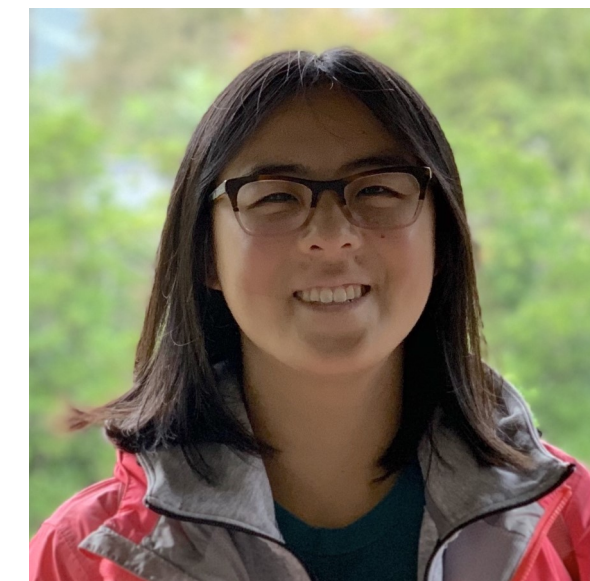
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Christopher Robinson  
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Kiana Roshan Zamir  
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Shirley Leung  
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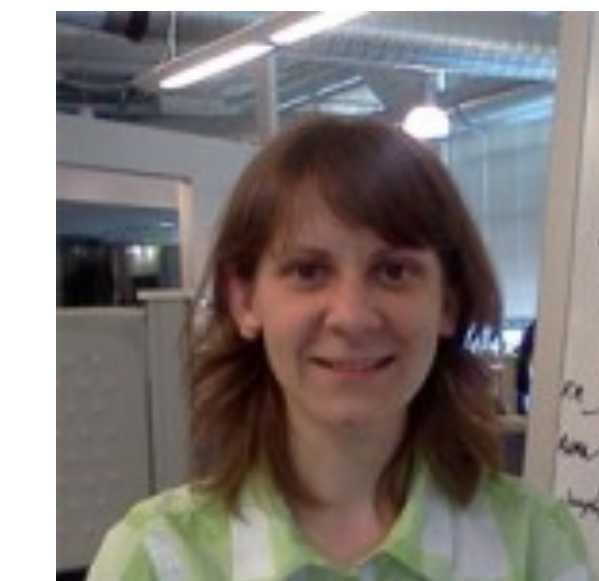
## Peer Support



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David Lang  
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## Program Staff



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Anissa Tanweer  
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Emily Keller  
 DSSG Program Coordi-  
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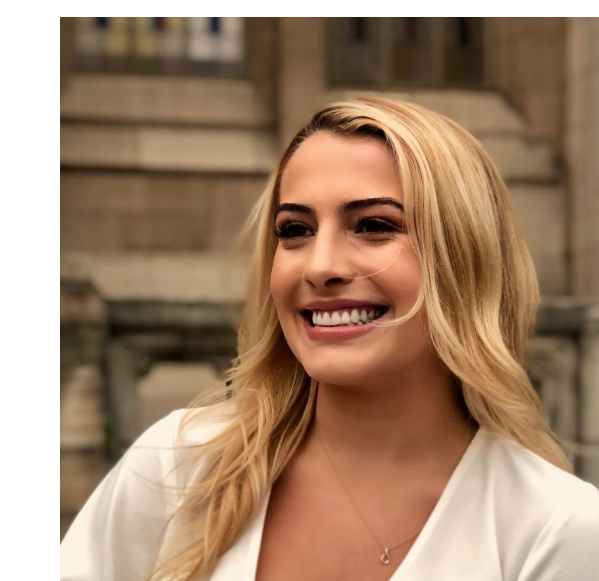
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Bryna Hazelton  
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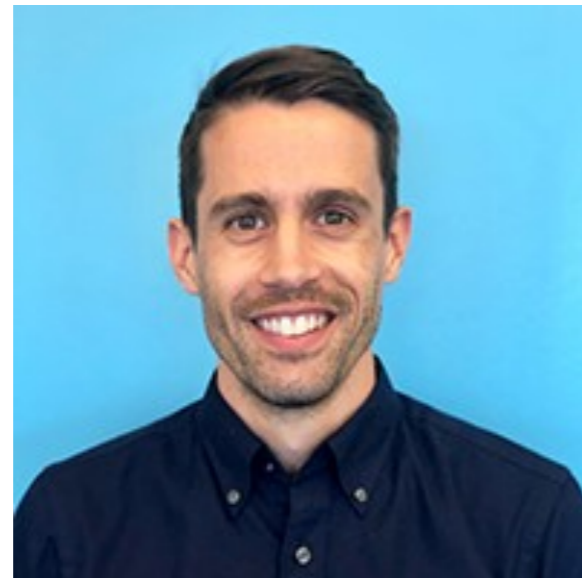


Nikki Reyes  
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 eScience Institute

# Affordable Accessory Dwelling Units



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Project Lead  
University of Washington  
Department of  
Architecture



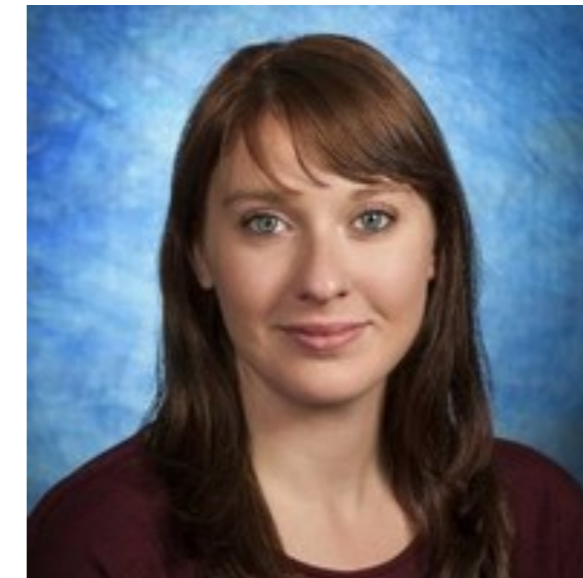
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University of Washington



Visualization  
addresses  
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bi numerical  
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state  
numerical  
feasibility

Today

WRF

CROSSING

# ADUniverse

Evaluating the feasibility of  
(affordable) ADUs in Seattle

**Nick Welch**

**Senior Planner**

Seattle Office of Planning and  
Community Development

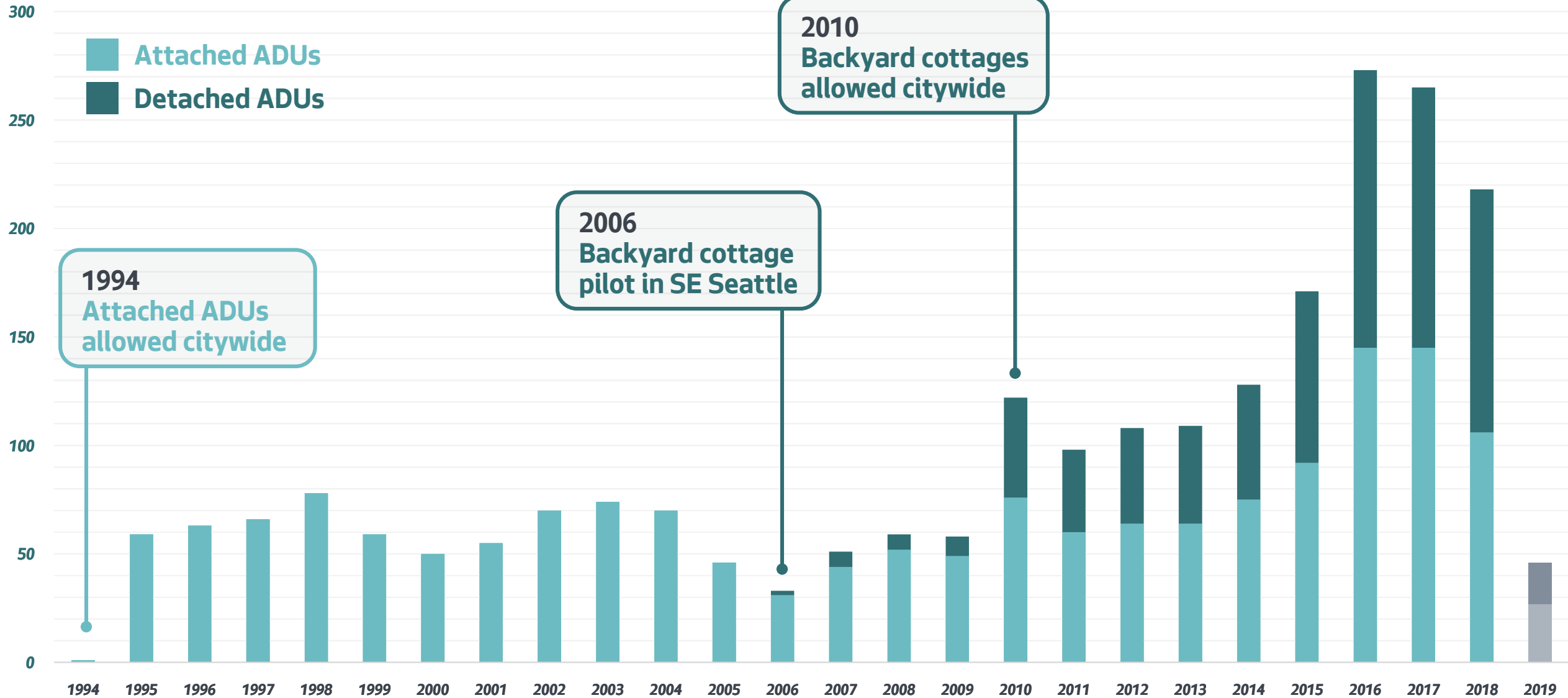
**Rick Mohler**

**Associate Professor of Architecture**

University of Washington  
Seattle Planning Commission

# ADU production in Seattle

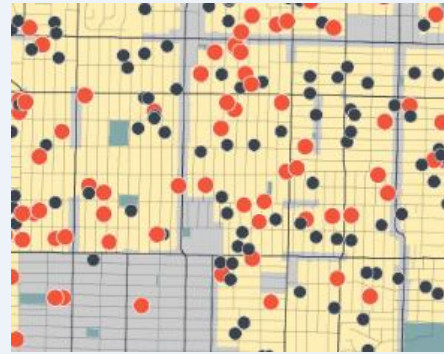
per year since 1994



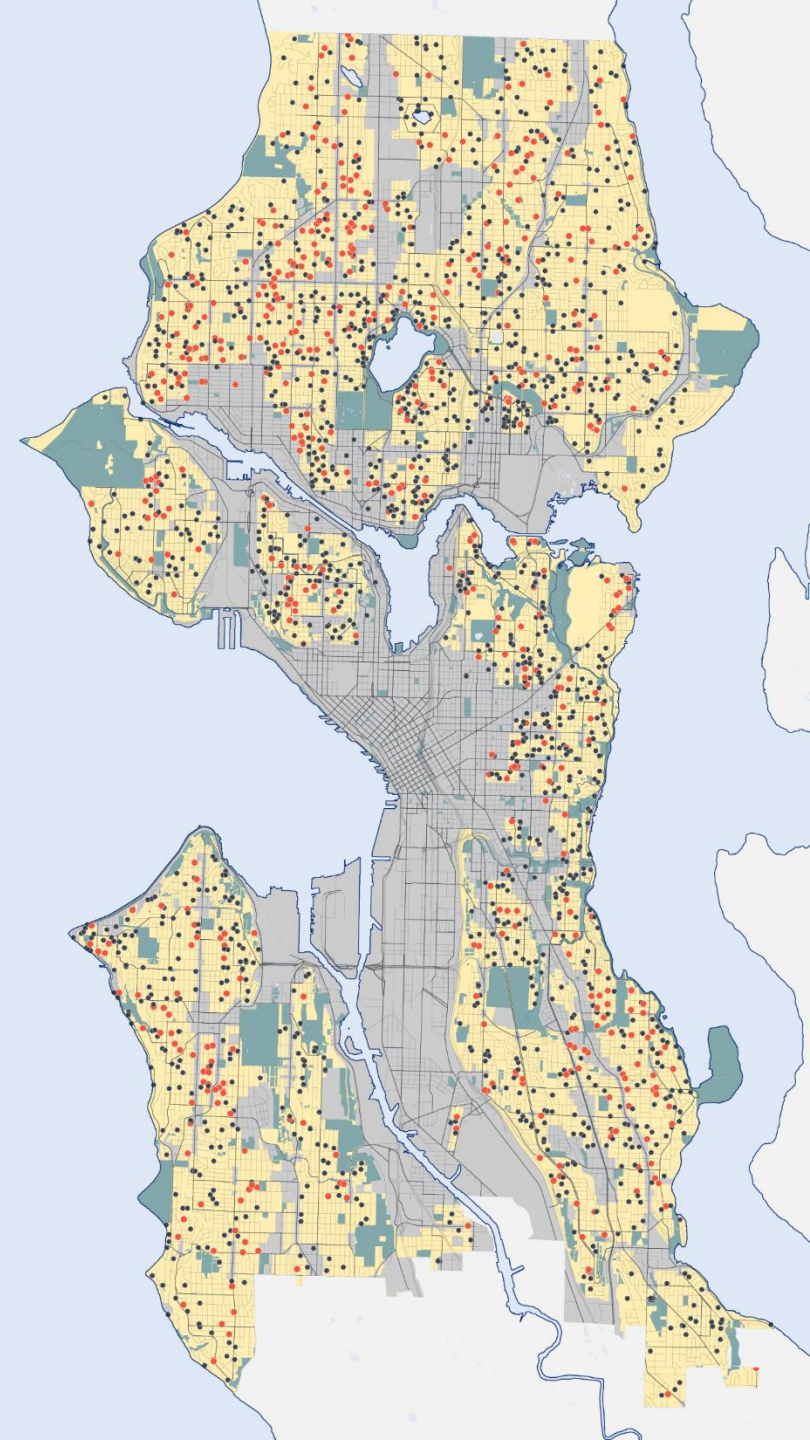


# ADU production in Seattle

- ▶ Historically distributed throughout single-family neighborhoods
- ▶ DADUs present in central neighborhoods with smaller lots, and in areas with larger lots



- Attached ADU
- Detached ADU
- Single-family zone
- Other zone



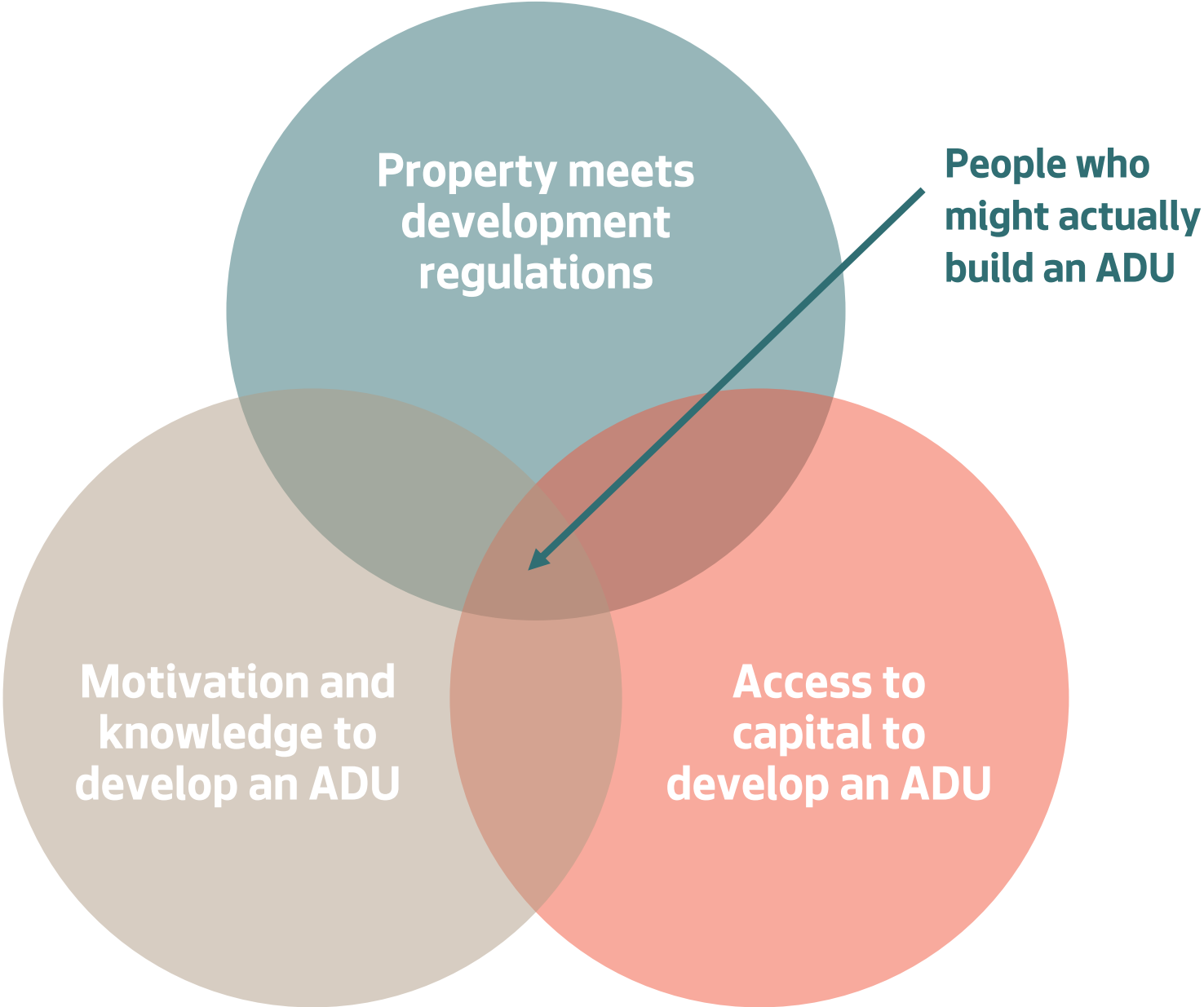
# Yet few are built.

Less than two percent of Seattle properties have an ADU.

**709 backyard cottages**  
and **1,721 in-law units.**



125,000 single-family lots



# What hampers ADU production?

## Code barriers

discourage or prevent creating an ADU.



## Construction costs

are high, especially for DADUs.



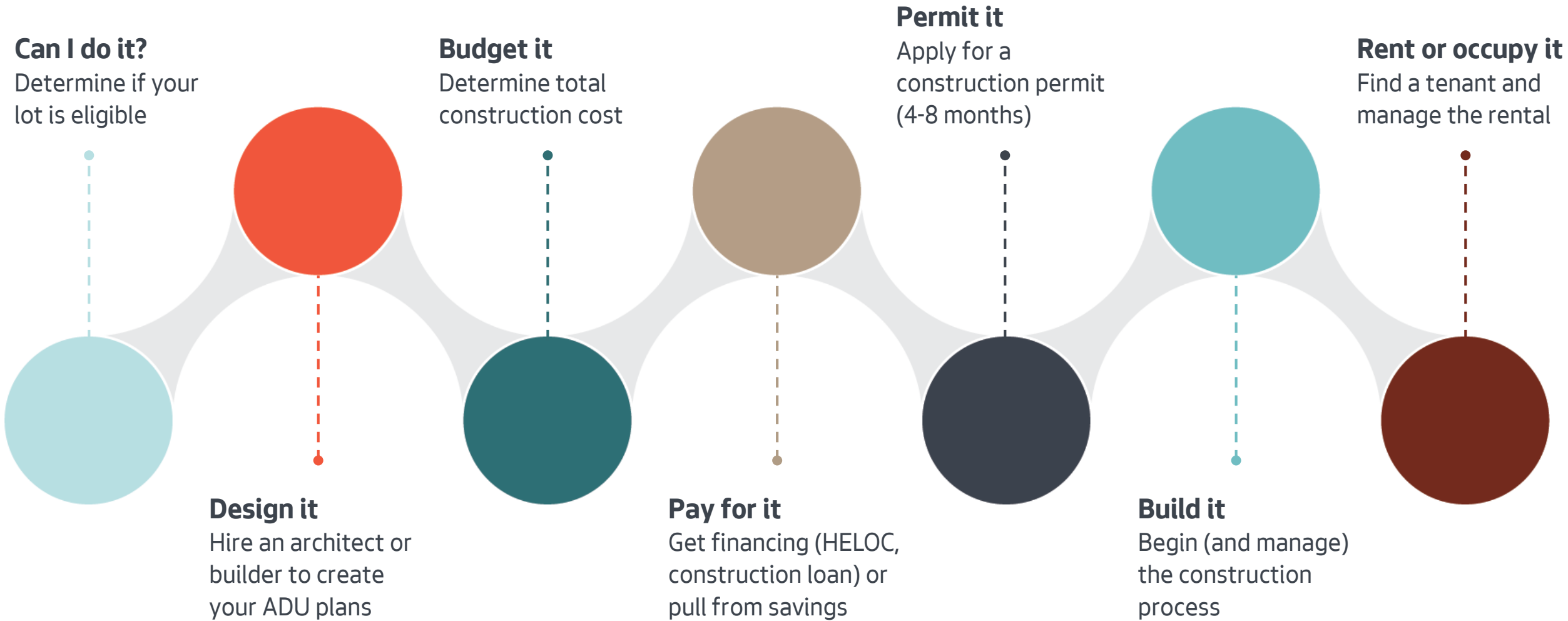
**Permitting** is a complex and lengthy process.



**Financing** is scarce and unavailable for some homeowners.



# The ADU process



# "Can I build an ADU?"

## Is it allowed?

- ▶ Is my lot big enough?
- ▶ Do I have enough yard space?
- ▶ Do I have a basement?
- ▶ Do I meet code requirements?

## Is it a good site?

- ▶ Do I have an alley?
- ▶ Is my lot flat or sloping?

## How will I use it?

- ▶ Long-term rental
- ▶ House family or caregiver
- ▶ Downsize and rent house
- ▶ Guests + short-term rental

## Is it financially feasible?

- ▶ What's my local housing market?
- ▶ What rent can I expect?
- ▶ How much is construction and do rents cover debt payment?
- ▶ What happens to my property taxes?

## Can the City help me?

- ▶ Can I use a pre-approved design?
- ▶ Is financing available?
- ▶ How do I start the permitting process?

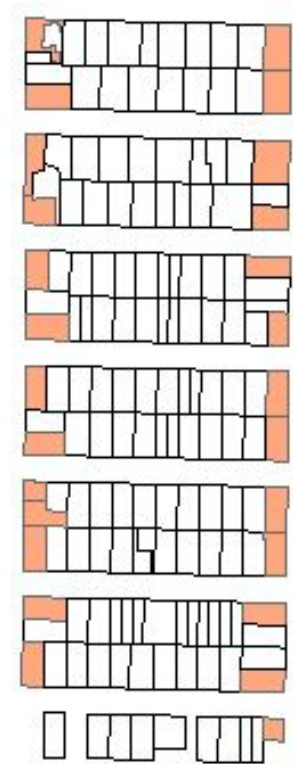
## Where should support or interventions focus?

- ▶ What areas are most viable for financing support?
- ▶ Where are ADUs most likely to address displacement pressure?

# Leveraging Open Source Data to Understand ADU Feasibility

# Value Adds & Challenges in Data

- Novel indicators
  - Corner, through-lot, and alley indicators
  - Estimating tree canopy coverage
  - Building on existing evaluative methods for ADUs
    - Using similar King County Assessor and City of Seattle GIS data
- Challenges
  - Time horizon on variable construction given spatial data
  - Strategy and innovation in indicators for lot and tree canopy coverage.

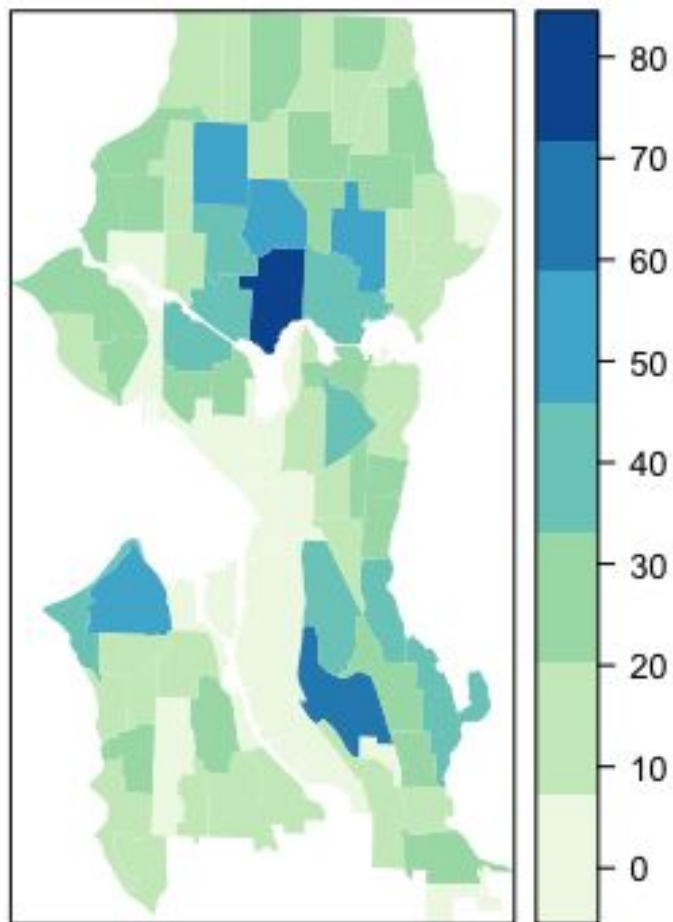




**What does existing  
ADU data tell us?**

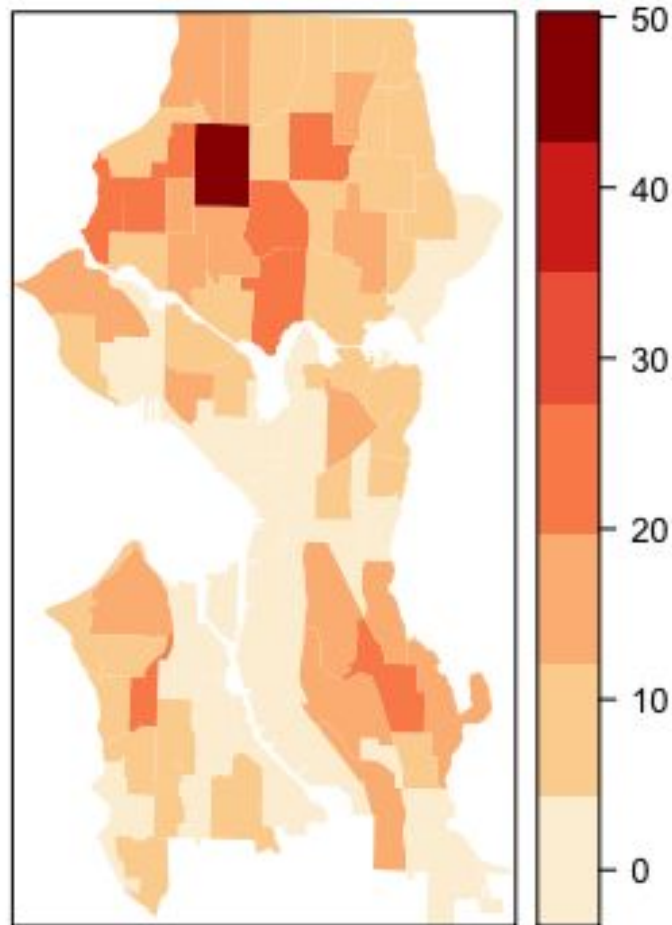
Where do we see  
AADU density?

Attached ADUs in Seattle



Where do we see DADU density?

Detached ADUs in Seattle

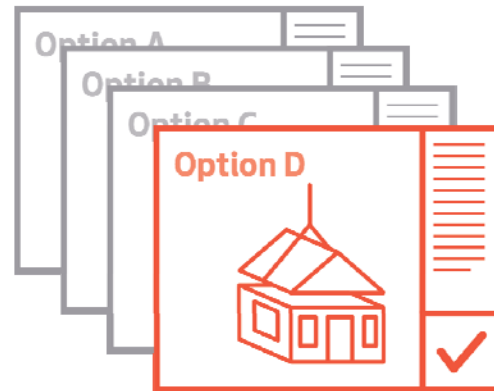


<b>Parcel characteristics of existing permitted ADUs/DADUs</b>	<b>AADU</b>	<b>DADU</b>
	<b>1763 Units</b>	<b>808 Units</b>
Mean lot size (in square feet)	6172.6	6582.4
Average lot coverage (percent of area covered by existing structures)	22.68%	15.54%
Percent located on peat settlement	1.53%	2.23%
Percent located on potential slide areas	0.40%	0.25%
Percent located on properties with some steep slope area	10.49%	2.72%
Percent located on shoreline parcels	0.51%	0.00%
Percent located on alley lots	34.60%	49.38%
Percent located on corner lots	22.52%	21.66%

# "Is an ADU for me?" How we help more owners and renters say "yes"

## Can I build it?

**Permissive rules** allows new homes in more places and lets owners achieve their ADU vision.



## What does it cost?

**Innovation** yields new low-cost designs, which pre-approved plans help to spur.

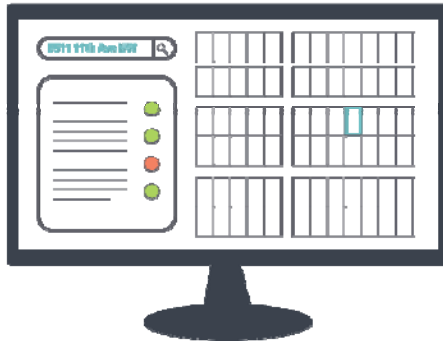


## How do I pay for it?

**New financing options** make an ADU possible for new families, delivering affordable rentals in more places.

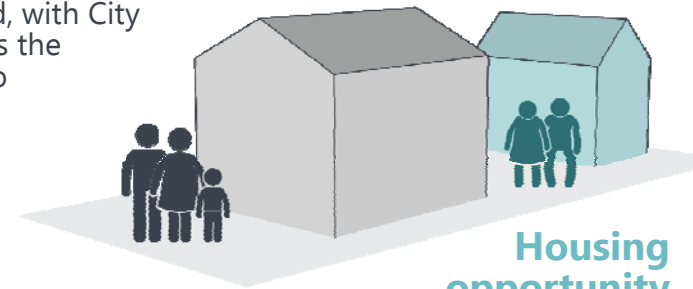
## On my lot?

**A one-stop website** tells homeowners what's feasible, shows them how, and connects to City programs.



## What's the process?

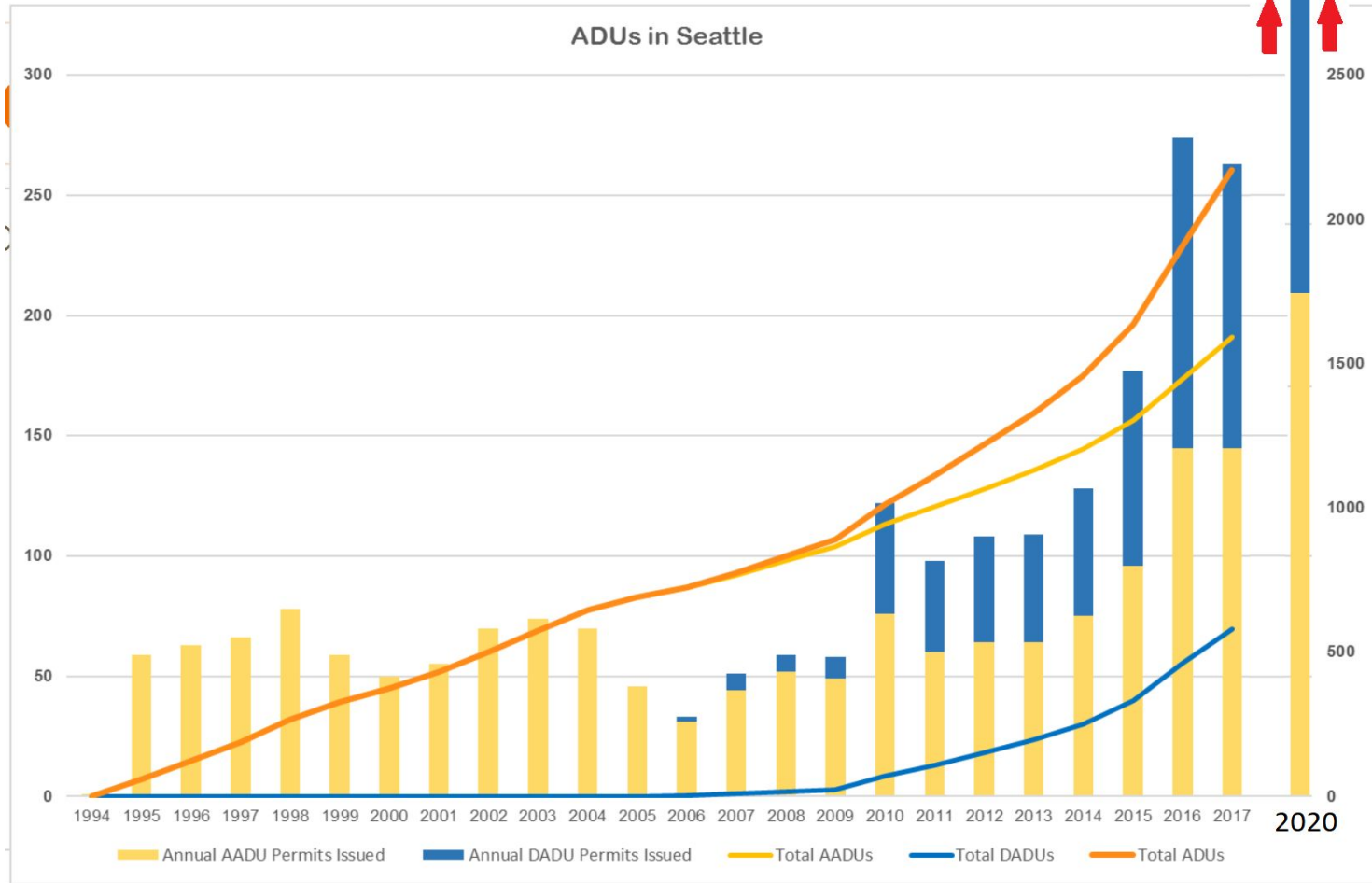
**Permitting** is more efficient and straightforward, with City info that makes the process easy to understand.



**Housing opportunity**  
Stability and access to all neighborhoods

# ADUiverse

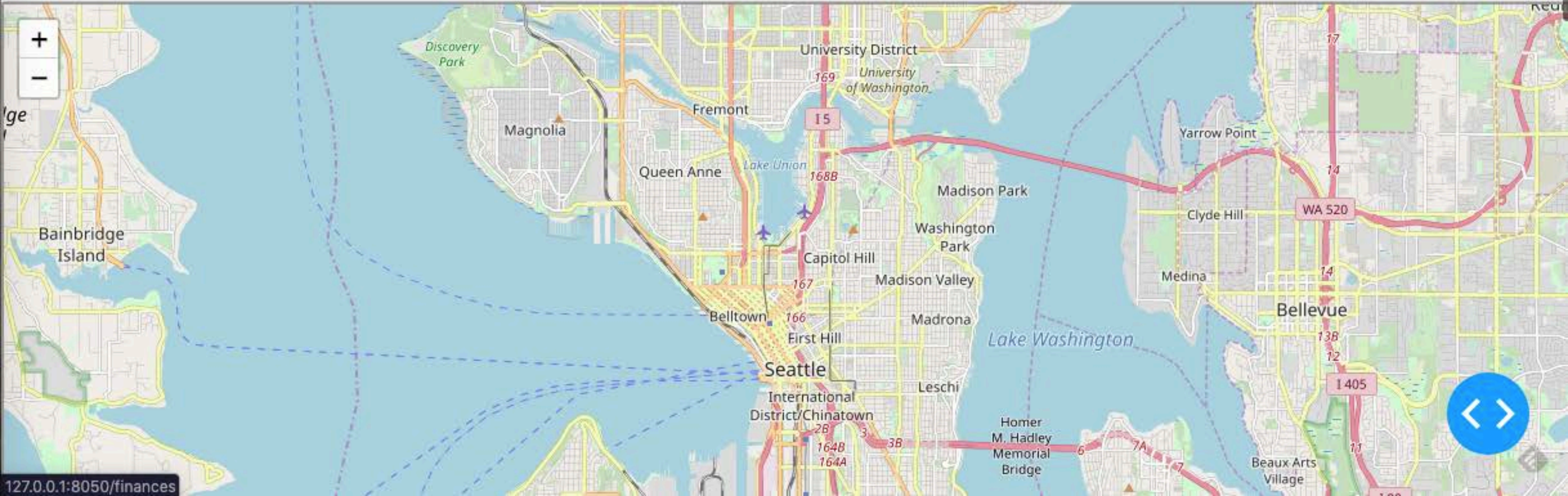
ADUs in Seattle



# Seattle ADU Feasibility

Find your home

Type your house address here...



# Seattle ADU Feasibility

Find your home

48|

3648 W LAWTON ST 98199

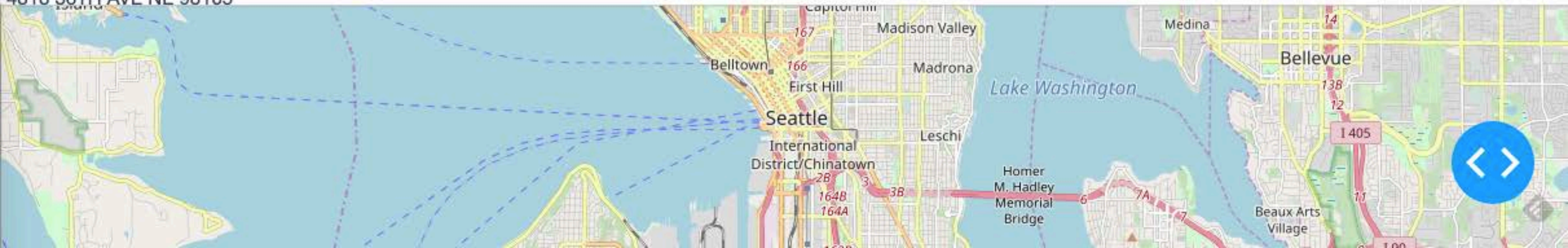
4548 W SHERIDAN ST 98199

4820 40TH AVE W 98199

4812 40TH AVE W 98199

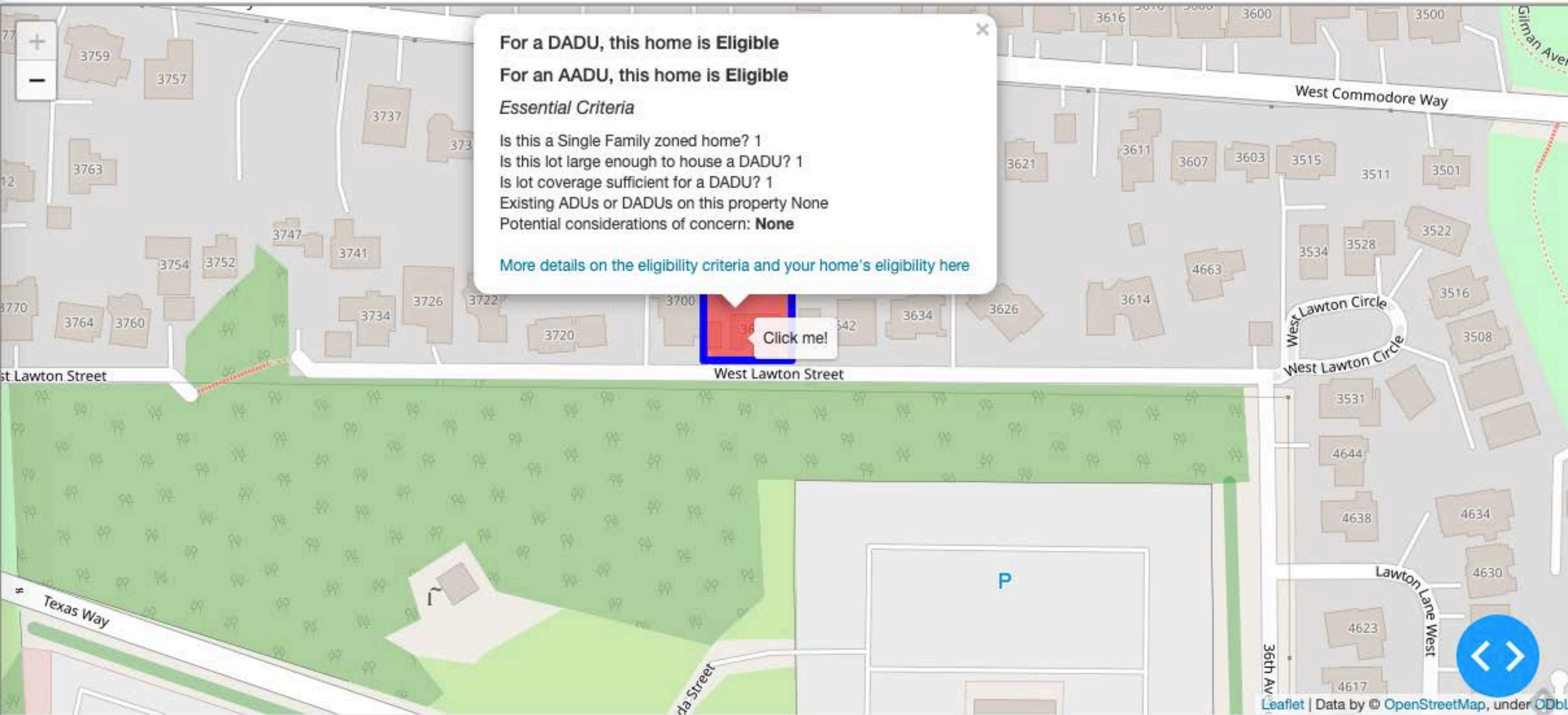
4548 W CRAMER ST 98199

4818 36TH AVE NE 98105









For a DADU, this home is **Eligible**

For an AADU, this home is **Eligible**

*Essential Criteria*

- Is this a Single Family zoned home? 1
- Is this lot large enough to house a DADU? 1
- Is lot coverage sufficient for a DADU? 1
- Existing ADUs or DADUs on this property None
- Potential considerations of concern: **None**

[More details on the eligibility criteria and your home's eligibility here](#)

Click me!

# Let's do the numbers!

## Cost Breakdown

Attached ADU



Detached ADU

### What ADU will you build?

250 SF (Studio)

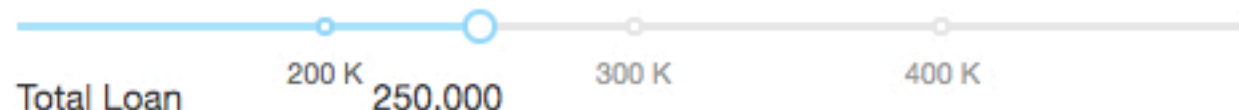
500 SF (1 Bed)

750 SF (2 Bed)

Your Future ADU Size: "500" Square Feet

Construction Cost	187,500
+ Sewer Capacity Charge	11,268
+ Permit Fee	4,000
+ Architecture Fee	11,250
= Estimated Cost	214,018

## How much will you borrow?



Monthly Payment 2,233

Assumptions: APR 6.9% for a 15-year fixed-rate home equity loan. Bank typical requires debt-to-income ratio < 40%.

## Where do you live?

Capitol Hill



Expected Monthly Rental (Zillow Estimate) 1,613

Be part of the SOLUTION! check out [Seattle Housing Authority](#)