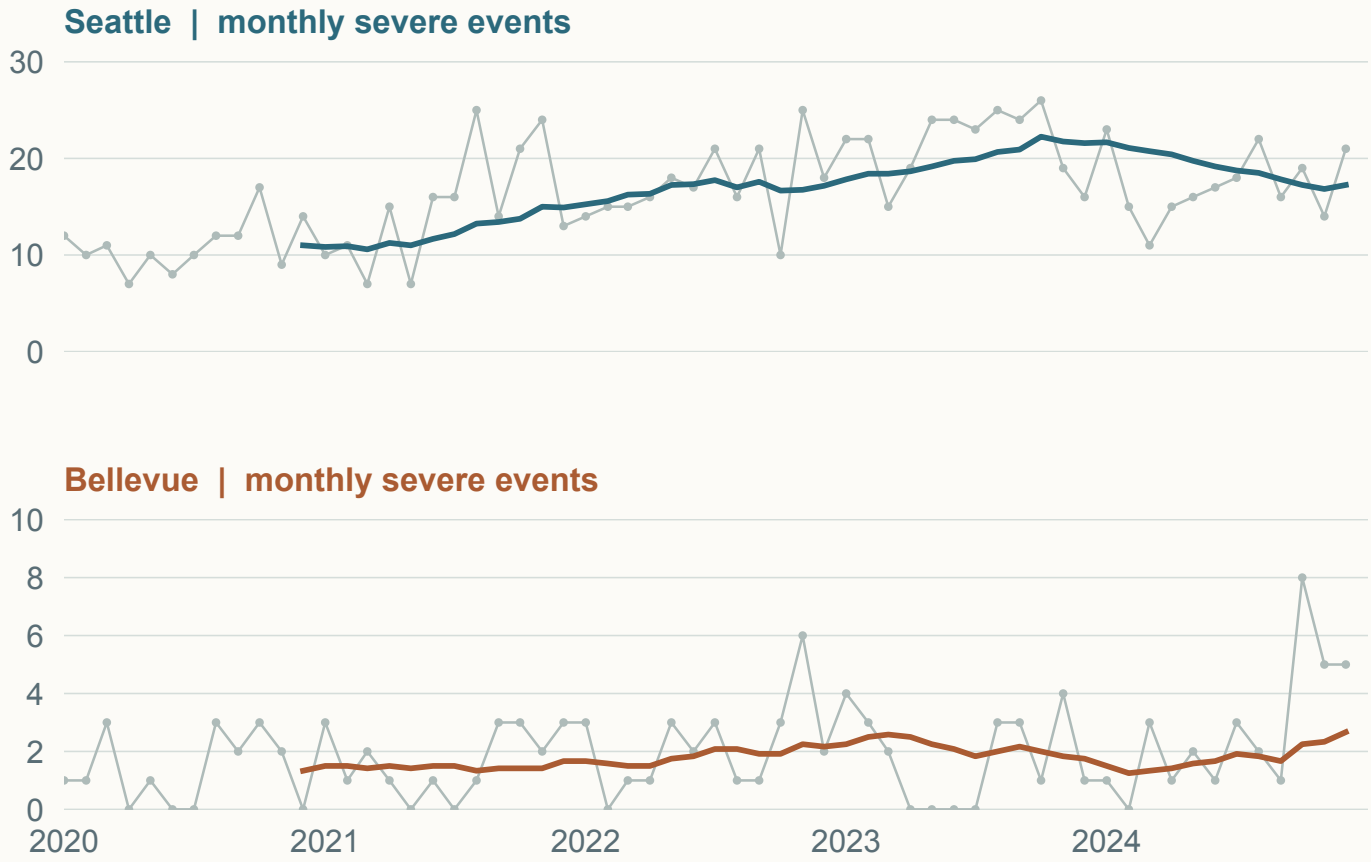
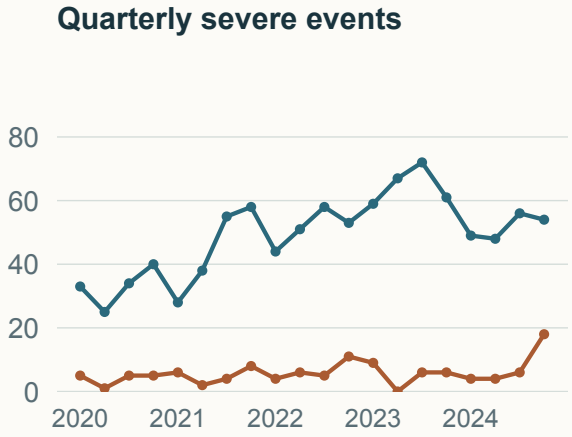
A1 / EXAMINE MULTIPLE TIME SCALES

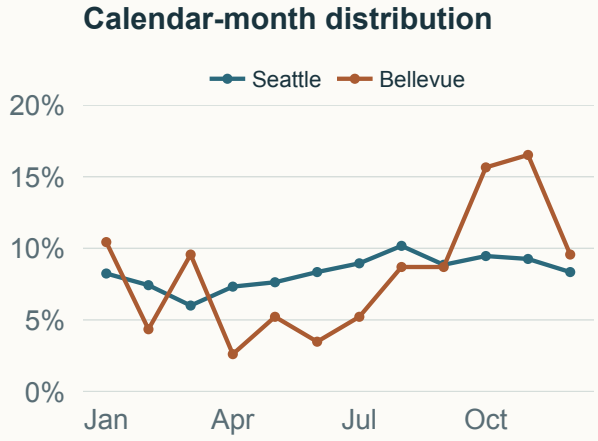
The complete five-year comparison

City Street fatal + suspected serious crash events, 2020-2024. Monthly, quarterly and calendar-month views use the same source-city cohort; all zero-count periods are retained.



Gray: each month. Color: trailing 12-month average. Separate count scales.



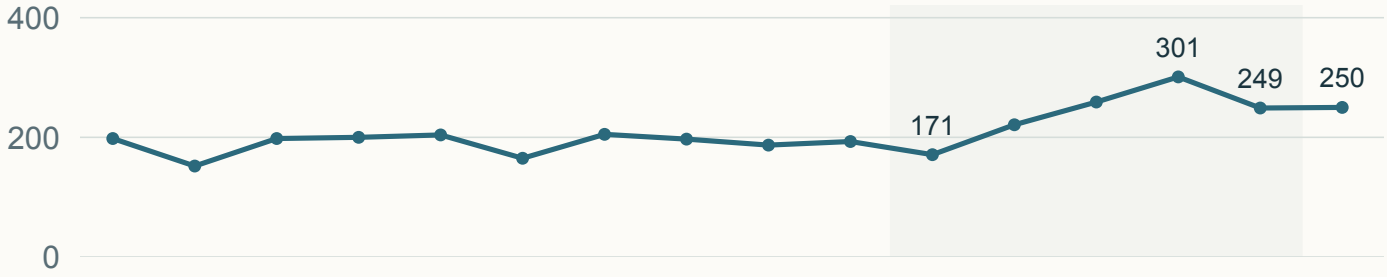


A2 / CHECK LONGER LOCAL HISTORIES

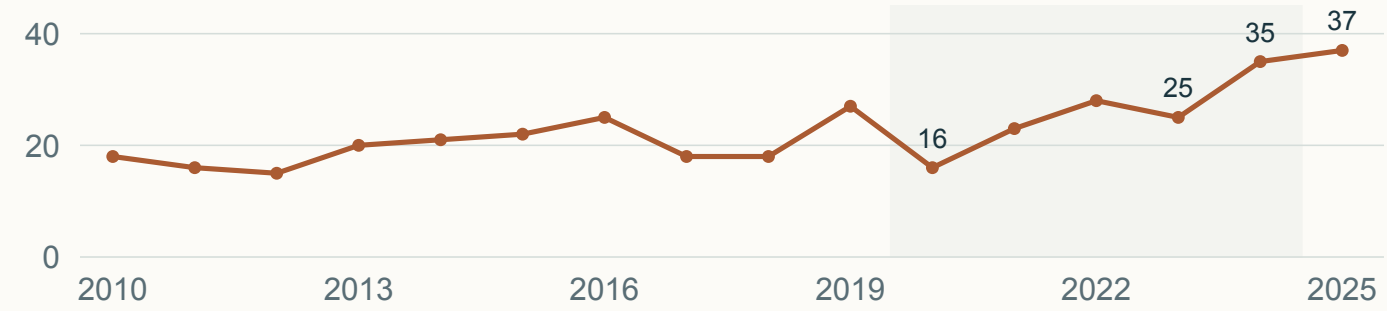
Place the focused study in context

2010-2025 municipal published histories are shown separately. Their coverage differs from the harmonized WSDOT City Street cohort. Gray shading marks the focused 2020-2024 period.

Seattle | city-published severe-collision rows

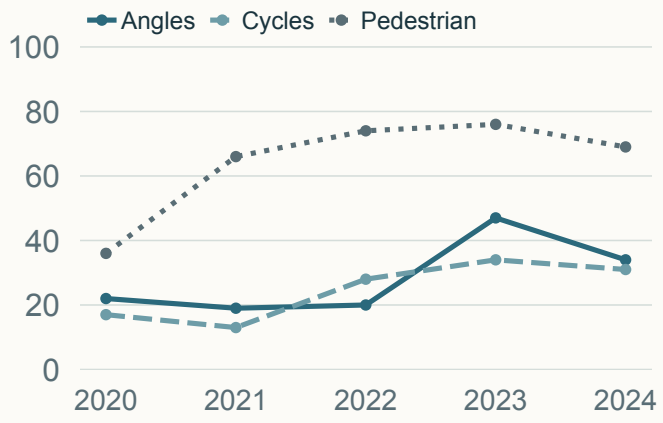


Bellevue | city-published severe-collision rows

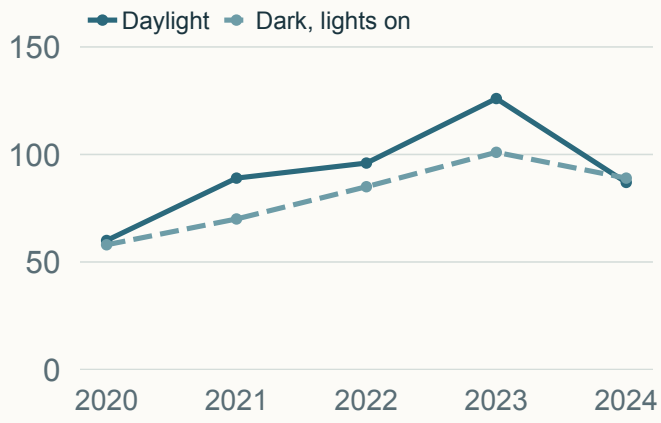


Below: selected SDOT features attached to the frozen Seattle severe-event cohort. They identify movement and condition questions; the full feature table retains all categories and unmatched records.

Published collision type



Recorded lighting

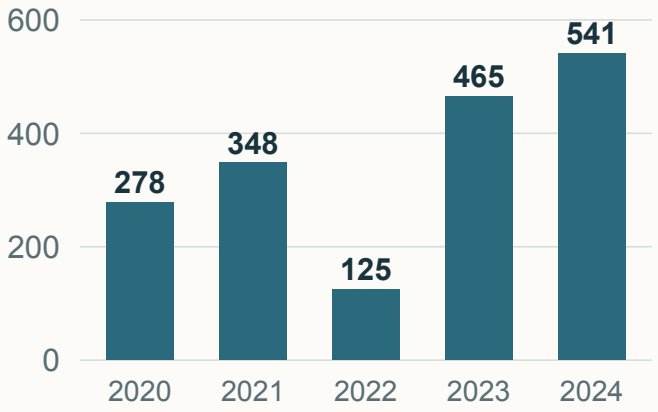


A3 / VERIFY DATES AND REPEATED LOCATIONS

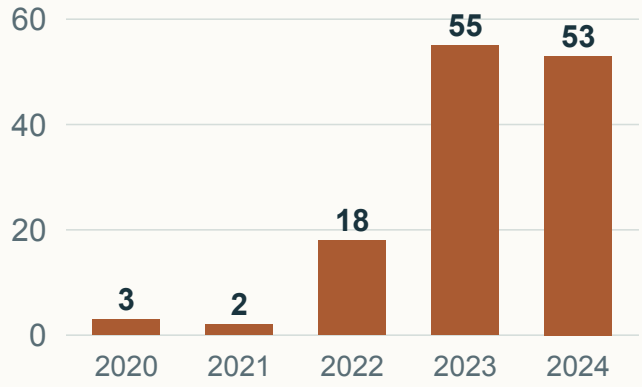
The usable sample depends on the date

Counts below are dated study locations in each target year after selection. An annual layer can also contain older studies and estimates. Separate count scales are shown.

Seattle

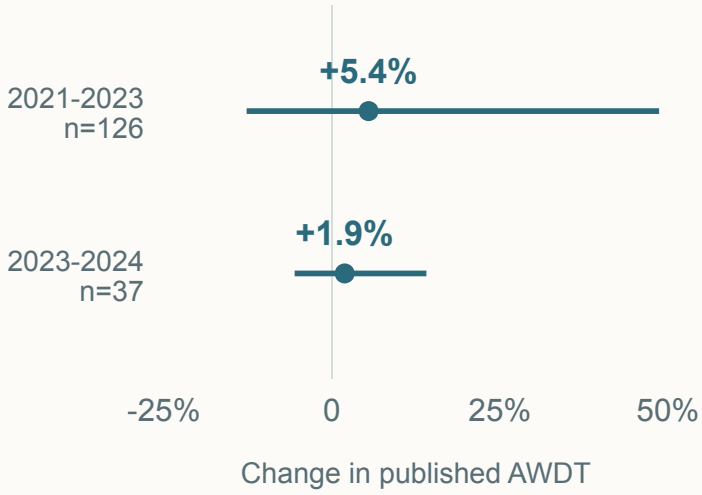


Bellevue



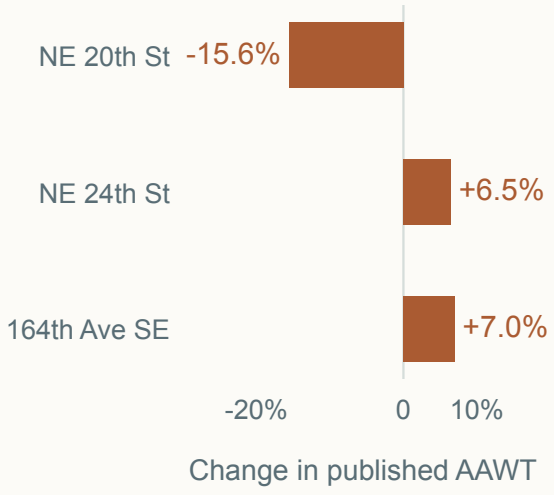
Seattle: paired road studies

Dots: median. Lines: middle 50%.



Bellevue: 3 repeat sites

2023-2024 | individual cases

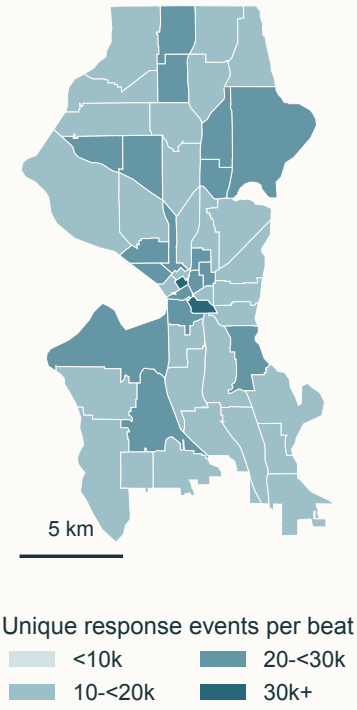


Bellevue repeat-site source values: AAWT	2023	2024	Change
NE 20TH ST E/O BEL-RED RD	18,885	15,936	-15.6%
NE 24TH ST W/O 100TH AV NE	4,873	5,191	+6.5%
164TH AV SE S/O MAIN ST	6,912	7,398	+7.0%

A4 / CONNECT GEOGRAPHY, TIMING AND ACTIVITY

What public policing data can add

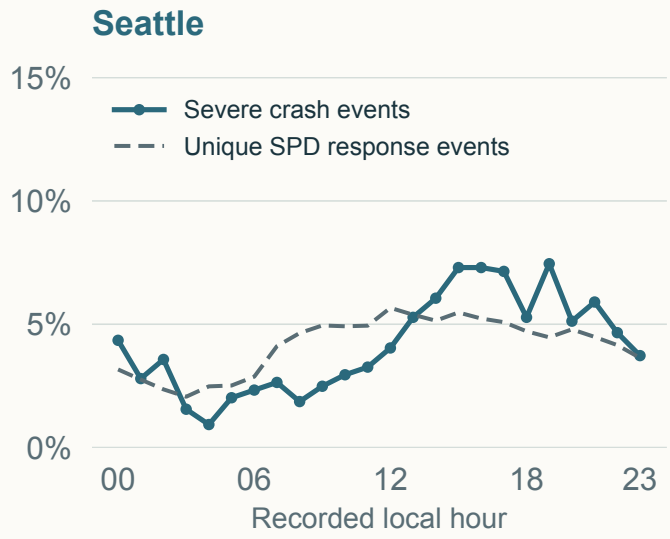
Seattle's response-event map uses 2021-2023 unique CAD events aggregated to published beats. Response activity and on-duty staffing are different measures.

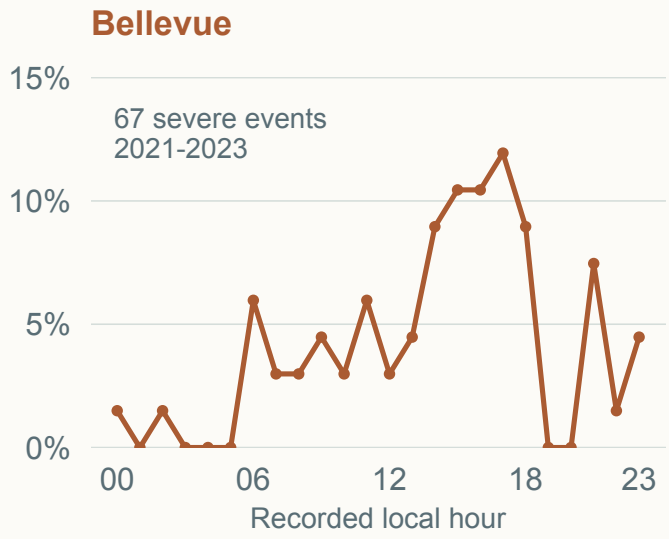


Shared comparison model
Both cities: frozen crash dates/times, severe outcomes, source road category and published local patrol geometry. Use common clock bins and the 1km grid for direct comparison.

Historical schedule context
Seattle documents a 10-hour schedule effective 15 February 2023. Bellevue's official 2023 posting describes 10h40m shifts on a 28-day cycle. Actual historical on-duty hours were not located for either city.

Activity in 2023 and 2024
Seattle: 339,682 to 325,120 unique SPD/co-response events.
Bellevue: 69,767 to 69,028 published calls for service.
These retain separate local reporting definitions.





Next data needed for a patrol hypothesis: date, area and boundary vintage, watch start/end, actual on-duty officer-hours, assignment type and compatible call load. Aggregate to shared clock windows before testing an explanation.

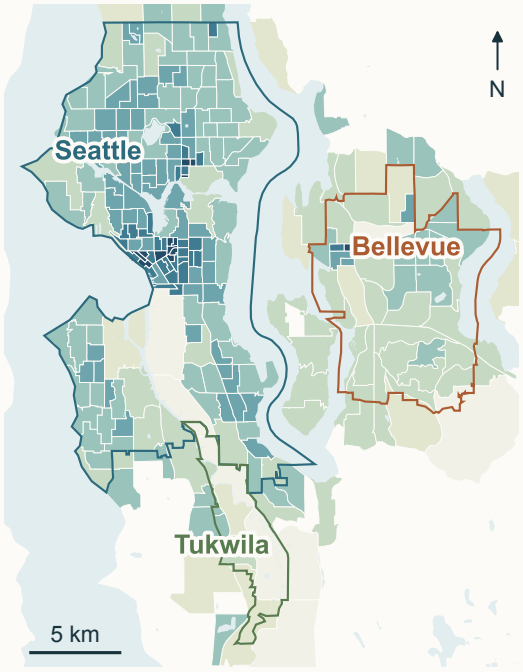
A5 / RESIDENTS, WORKPLACES AND HOME-WORK LINKS

Two activity patterns in the same places

Tukwila has 902 residents and 1,787 workplace primary jobs per land km²; Bellevue has 1,752 and 1,727. City values use whole-place estimates; maps use whole tracts and common density bins.

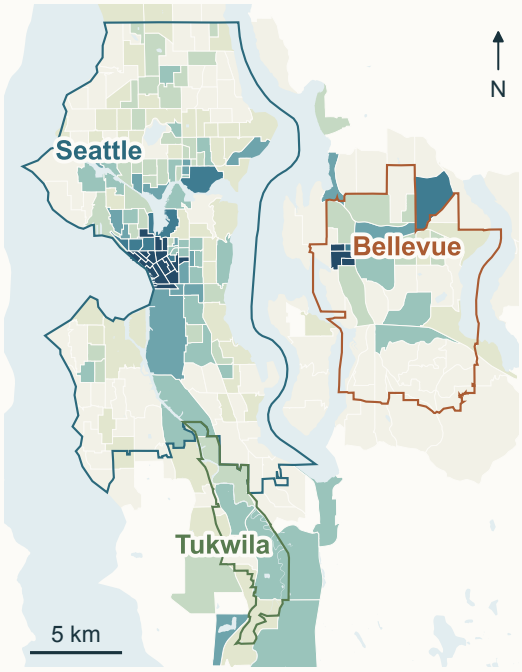
Resident density

ACS 2020-2024 | people / land km²



Workplace job density

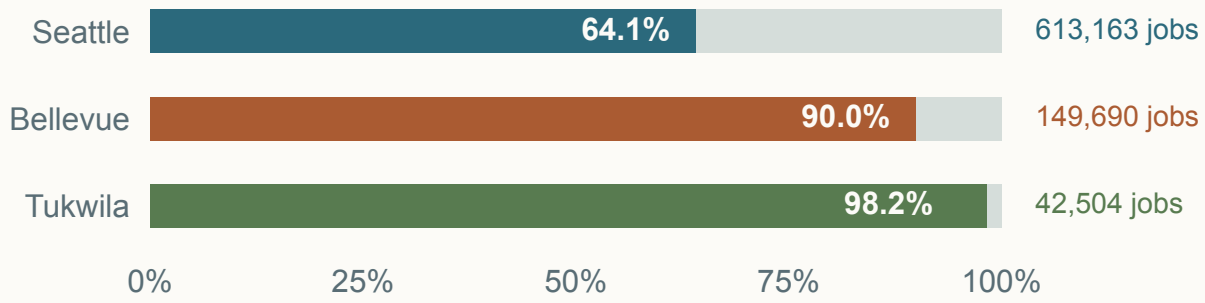
LODES 2023 | primary jobs / land km²





Whole-tract values and land area; 2024 TIGER geometry. City outlines are reference only.

Workplace primary jobs linked to homes outside the city



LODES 2023 JT01 | Home/work links, not measured daily arrivals

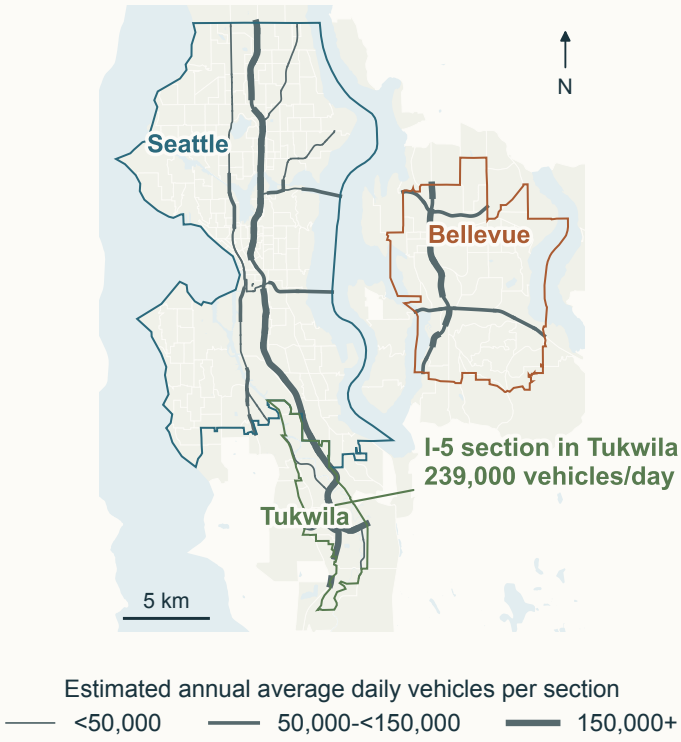
2024 geography reference. ACS: 2020-2024; LODES: 2023 JT01. Gray job-link remainder is same-city residence. Job relationships include disclosure protection and are not observed daily trips.

A6 / ANNUAL ARCHIVES REPLACE THE MOVING CURRENT LAYER

Keep the road and reporting year visible

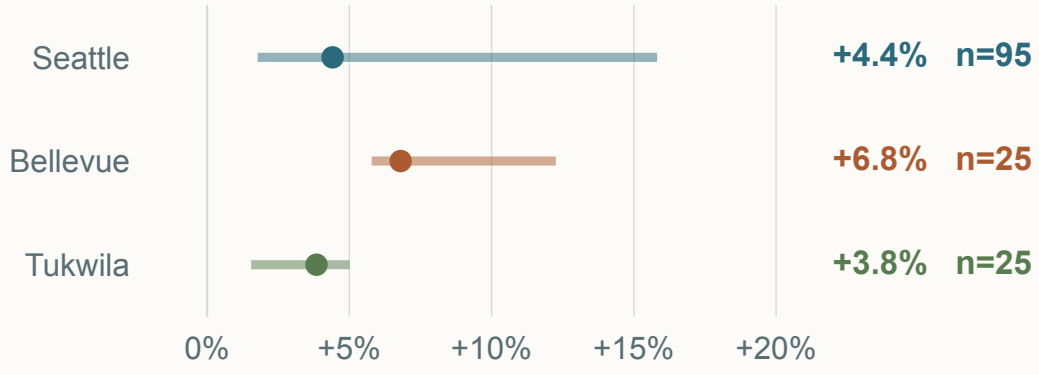
Each 2020-2024 archive's ReportingYear matches its filename. The live current layer returned 2025 records despite a 2023 description. No live-layer volumes enter this study.

State-highway sections | ReportingYear 2023



2021-2023 AADT change at matched mainline sections

Dot: median | Line: middle 50% | n: repeated sections

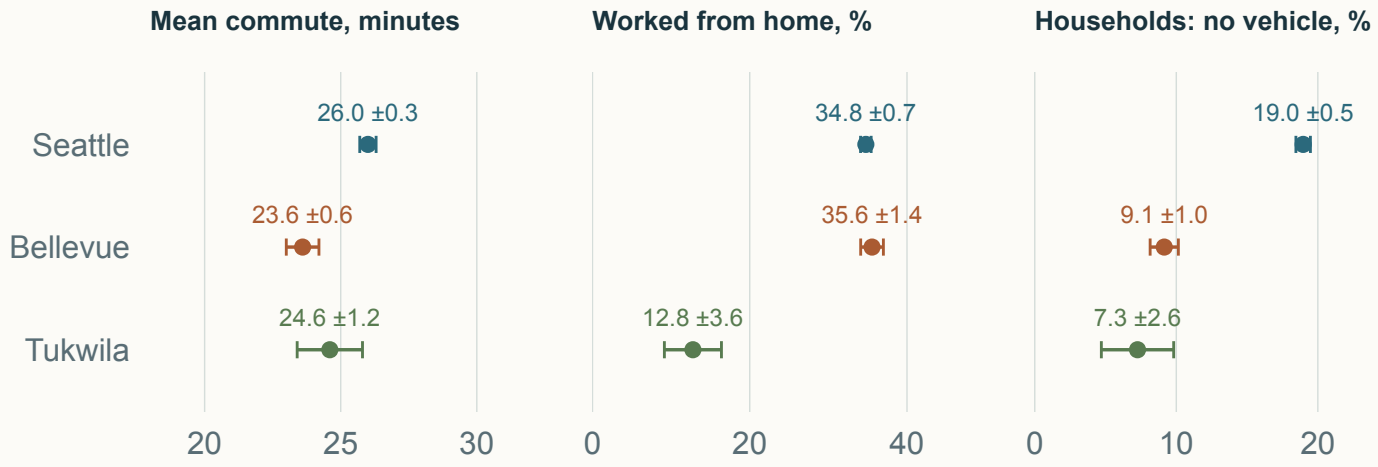


Mainline exact route/qualifier/mile keys; duplicates excluded; geometry Hausdorff distance ≤5m. AADT is never summed into visitors. The 2024 archive's stale 2023 metadata remains documented.

A7 / RESIDENT MOBILITY AND THE JOIN CONTRACT

Keep each feature's population in view

Commute time describes resident workers 16+ who did not work from home; work-from-home shares use all resident workers 16+; vehicle availability describes households. These universes remain separate.



ACS 2020-2024. Bars: 90% MOEs; share MOEs in percentage points. Different universes retained.

Join federal context, state outcomes and local features

FEDERAL

- ACS estimates + 90% MOEs
- LODES primary jobs + links
- TIGER 2024 geography

STATE

- Frozen WSDOT crash events
- 2020-2024 highway AADT
- Road category + local clock

LOCAL

- SDOT junction / light / weather
- Dated municipal traffic studies
- Published policing context

↓

Tract / place GEOIDs
Official block-parent crosswalk

Unique report + exact date
Repeated section + geometry

Date + local time + place
Modeled solar condition

↓

City / tract / time tables → maps, comparisons and next measurements

Audit result: 57,785 crashes and 1,654 severe events retained after the tract join

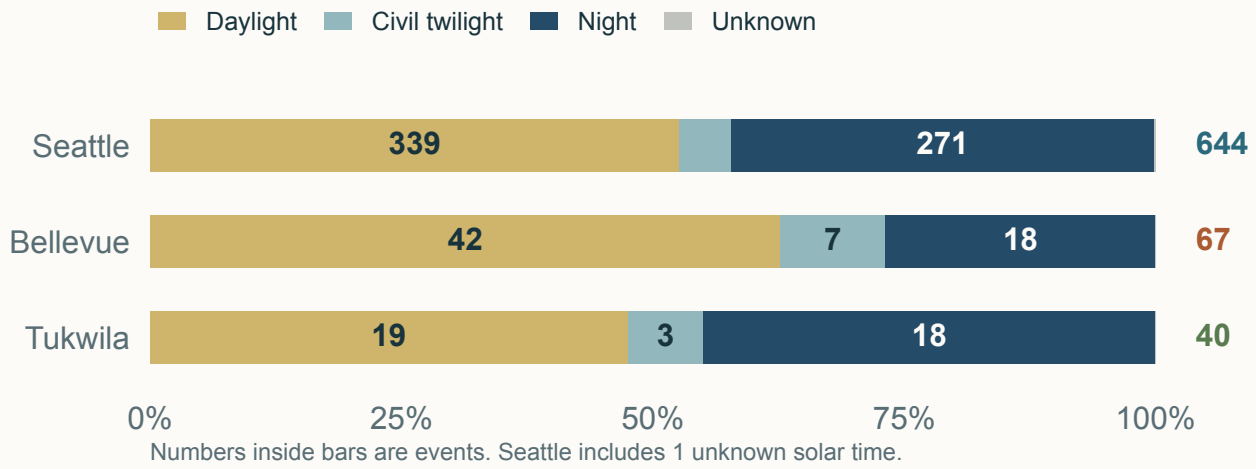
All 495 King tract keys match full 2024 geometry, ACS and LODES parents. The crosswalk resolves a 2020 block-prefix parent change. Estimates, MOEs, annotations, missing values and exact-source receipts travel with the evidence.

A8 / MODEL DAYLIGHT AND RETAIN OBSERVED CONDITIONS

Use the date as well as the clock

2021-2023 City Street severe events. NOAA approximate solar position uses UTC converted from the recorded America/Los_Angeles clock, including daylight-saving rules and each event's location.

Sunlight modeled from each crash's date, local time and location



Numbers inside bars are events. Seattle includes 1 unknown solar time.

SEATTLE / OBSERVED LIGHTING WITHIN MODELED NIGHT

235 of 271

modeled-night severe crashes were reported by SDOT as **Dark - Street Lights On**. That is 86.7% of this cohort, including unmatched records in the denominator.

Model recipe. Daylight: solar elevation ≥-0.833°. Civil twilight: -6° to -0.833°. Night: below -6°. Invalid clocks, daylight-saving ambiguities and missing locations stay unknown. Moving both thresholds ±0.5° is documented in the sensitivity table.

Local observations. Seattle's LIGHTCOND, WEATHER, ROADCOND and JUNCTIONTYPE attach only after a unique report-key/exact-date match. The source snapshot is 2026; WSDOT severity stays frozen. Equivalent observed fields for Bellevue and Tukwila remain a source gap.

Useful next measurements: intersection turning and crossing volumes by hour, lighting quality and sight distance, posted speed and street design, construction history and actual patrol duty hours. The solar model supplies an astronomical condition; weather, terrain, visibility and travel exposure require their own measurements.