APPENDIX D:

Existing Conditions

This document analyzes the existing conditions of the City of Vancouver.

vancouver moves

Existing Conditions

December 2020

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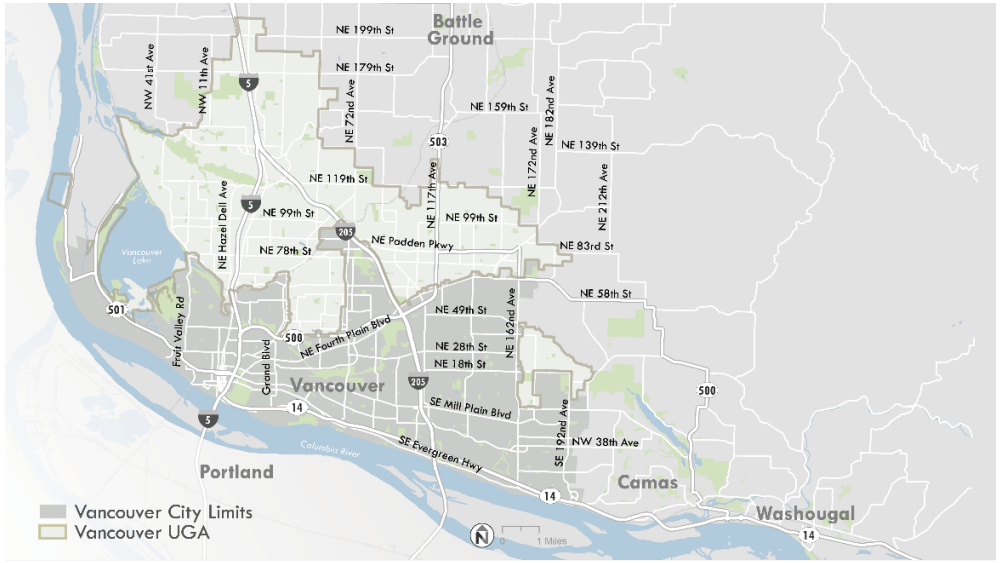
1 THE VANCOUVER COMMUNITY

The City of Vancouver is the largest city in Clark County with a 2018 population of 178,000[1]. Vancouver experienced a 10% increase in population from 2010 to 2018, a rate slightly lower than Clark County. The population has continued growing and diversifying. Twenty percent, or one in five, residents of Vancouver identify as Black, indigenous, or a person of color. This is an increase from 17% in 2010. By April 2020, the city's population reached 189,700[2].

The city is 46.5 square miles[3] with a population density of 3,800 people per square mile in 2018. Vancouver has an urban growth area, known as a UGA, designated for future growth and annexation (Figure 1).

Figure 1 Vancouver City Limits and Urban Growth Area



[1] Source: American Community Survey 2018 5-Year Estimates

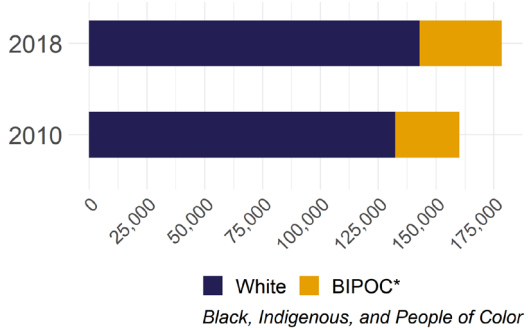
[2] Source: Office of Financial Management, 2020

[3] Vancouver is 49.86 square miles including water areas. The city is 46.5 square miles if water areas are removed.

COMMUNITY STATISTICS

- Median home price: $260,400
- Median household income: $55,593
- Employment grew 14% from 2010 to 2017. Vancouver's 90,000 jobs are concentrated in the health care and social assistance, manufacturing, and retail trade industries.
- 24,000 jobs were associated with port activities in 2018

Figure 2 Population Change

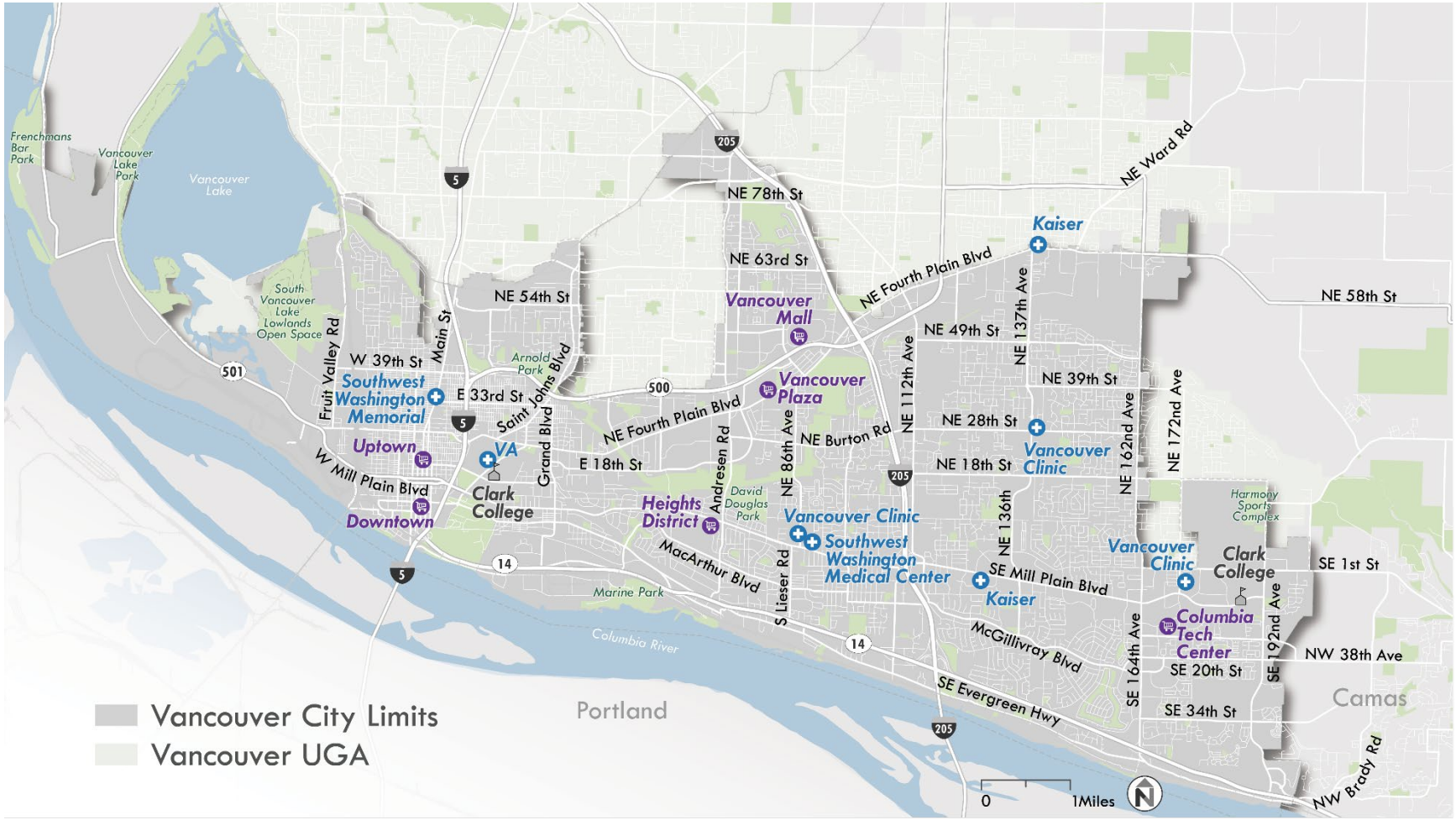


KEY TAKEAWAYS

- Vancouver population is growing and diversifying.
- Employment is growing at a faster rate than population.

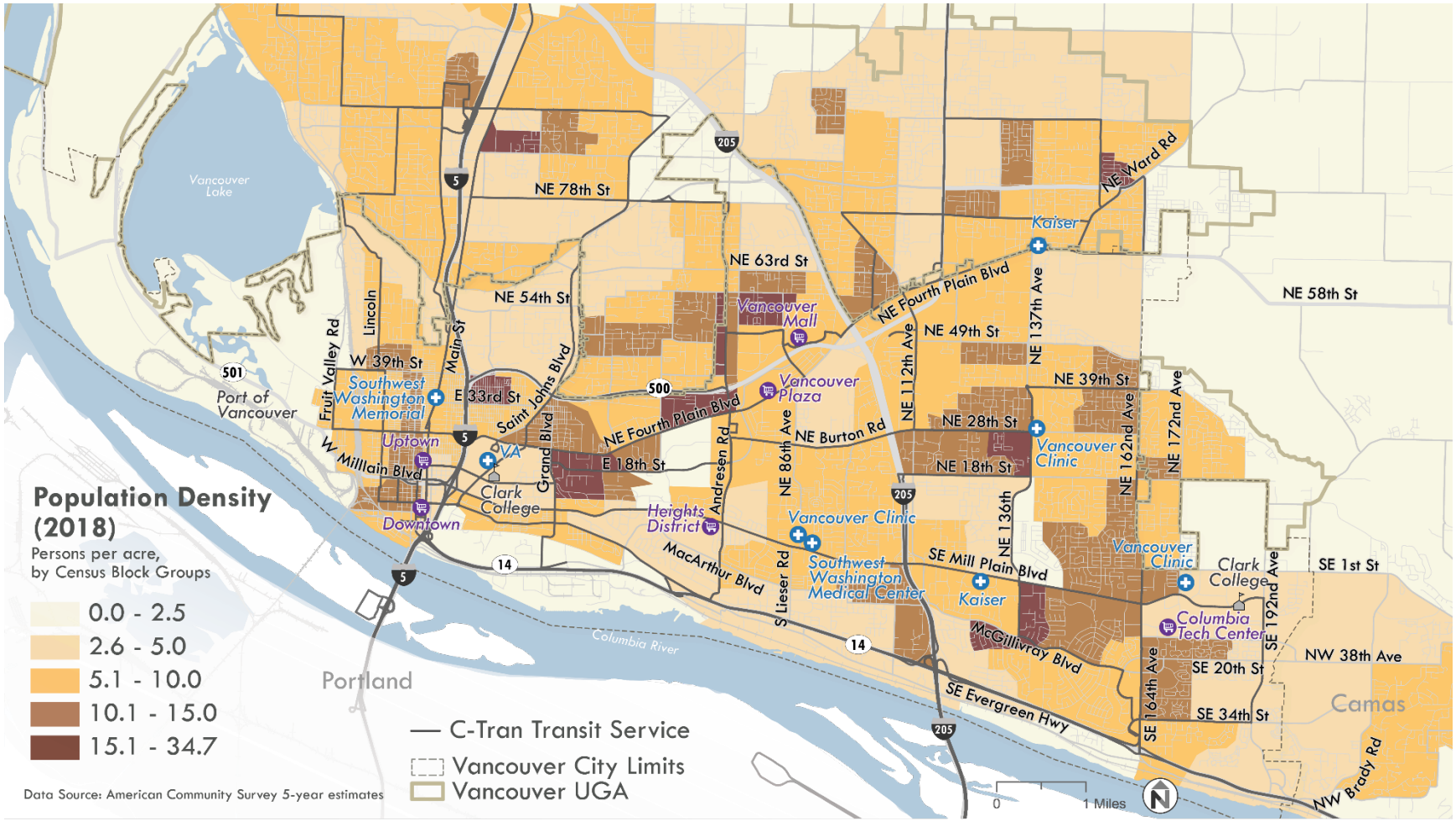
Figure 3 provides an overview of the city. The downtown core is just west of I-5. Popular destinations include Vancouver Mall, Clark College, Vancouver Lake, the Columbia Tech Center, the Waterfront and the Waterfront Renaissance Trail, which begins at Esther Short Park and extends for approximately 1.2 miles along the Columbia River. Vancouver is home to the PeaceHealth Southwest Washington Medical Center as well as several clinics throughout the city. Historic destinations such as the Fort Vancouver National Historic Site and Pearson Air Museum are located just east of downtown. The city has 110 parks and natural areas spread over 1,600 acres.

Figure 3 City of Vancouver Overview



Areas with high densities of population include the neighborhoods of Rose Village, Fourth Plain Village, Maplewood, Harney Heights, and Bagley Downs, located between I-5 and Andresen Road; areas north of the city boundary within Vancouver's UGA; and in the eastern part of the city in the Fisher's Landing East, Hearthwood, East Mill Plain, Mountain View, Cascade Highlands, and Burnt Bridge Creek neighborhoods. Neighborhoods in and near Downtown, near Clark College, and along the SR-500 corridor have seen growing populations as residents have been shifting to the west from the outer eastern ring of the city since 2010 (Figure 4).

Figure 4 City of Vancouver Population Density

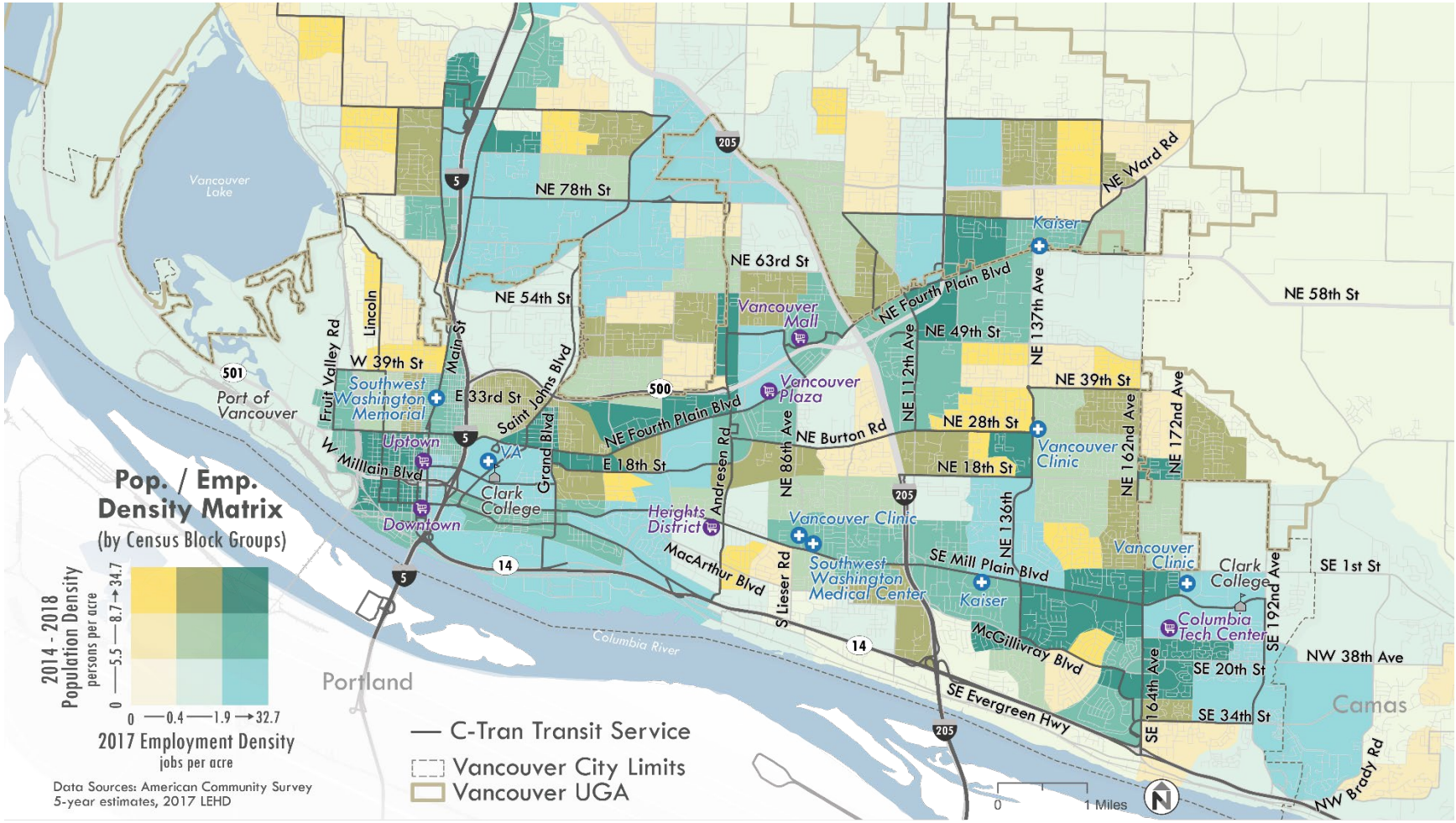


Job centers occur near Uptown, Downtown, along Fourth Plain Boulevard and SE Mill Plain Boulevard, near the Vancouver Clinics and the Columbia Tech Center, and in spots past the north edge of the city (Figure 5). The Port of Vancouver also represents a key employment destination; however, it is in a large block group so its location appears low-density in the map below.

Figure 5 City of Vancouver Employment Density

Places with high concentrations of both jobs and population (teal) are places where many people gather at all times of day, and are opportunities to encourage walking, bicycling, and transit use (Figure 6). These locations include Downtown, the Waterfront, near Clark College, along Fourth Plain Boulevard, and along Mill Plain Boulevard by the Columbia Tech Center.

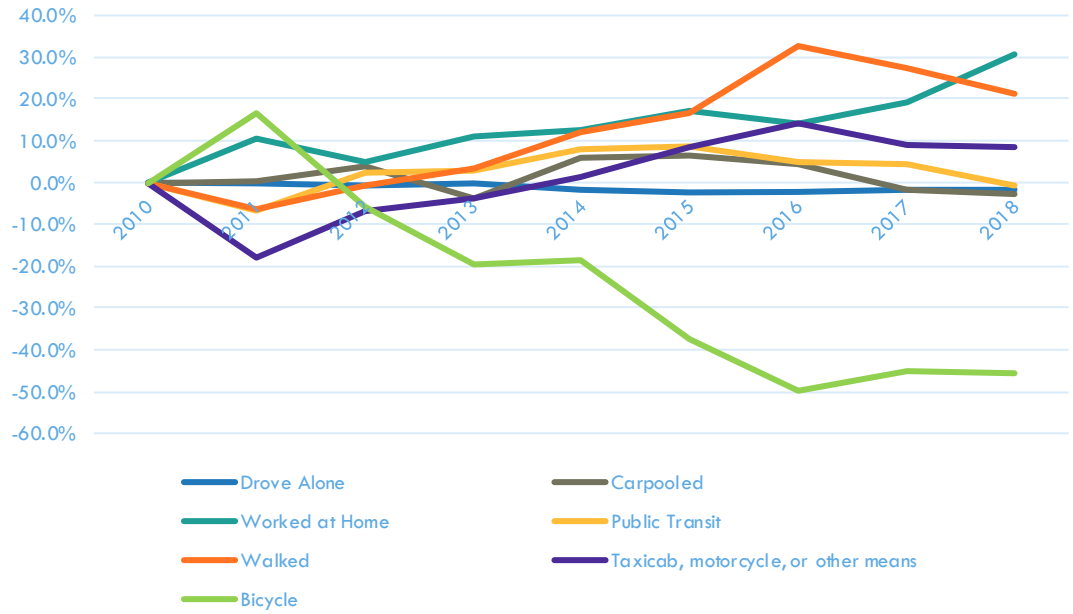
Figure 6 City of Vancouver Population and Employment Densities Combined



COMMUTE TRENDS

How people get to work has changed considerably between 2010 and 2018 (Figure 7). The prevalence of working from home (i.e. telecommuting) increased by 1.5 percentage points between 2010 and 2018 (a 30% relative increase) – the COVID-19 pandemic will further increase this share. Walking commutes increased by 0.5 percentage points (a 20% relative increase). Conversely, bicycling commutes decreased nearly ½ a percentage point, or by nearly 50%.

Figure 7 Change in Commute Mode Share Relative to 2010

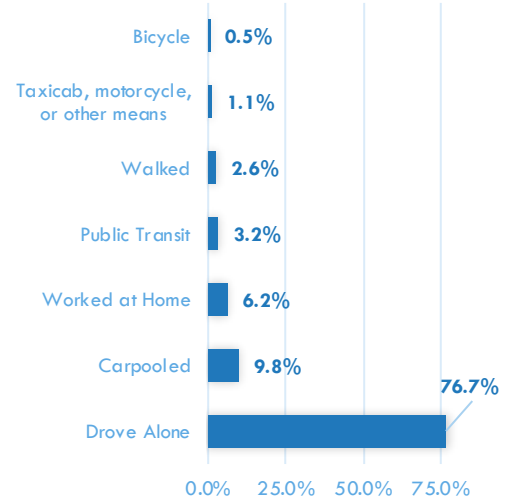


Source: 2010 and 2018 5-Year American Community Survey

Most people drove to work in 2018 (Figure 8).

The Census is a handy source of information regarding how people get to work. But work trips are just one component of a household's total trips. People also go shopping, travel for recreation, etc. This project will gather additional data on travel patterns for non-commute trips to paint a fuller picture of transportation in Vancouver.

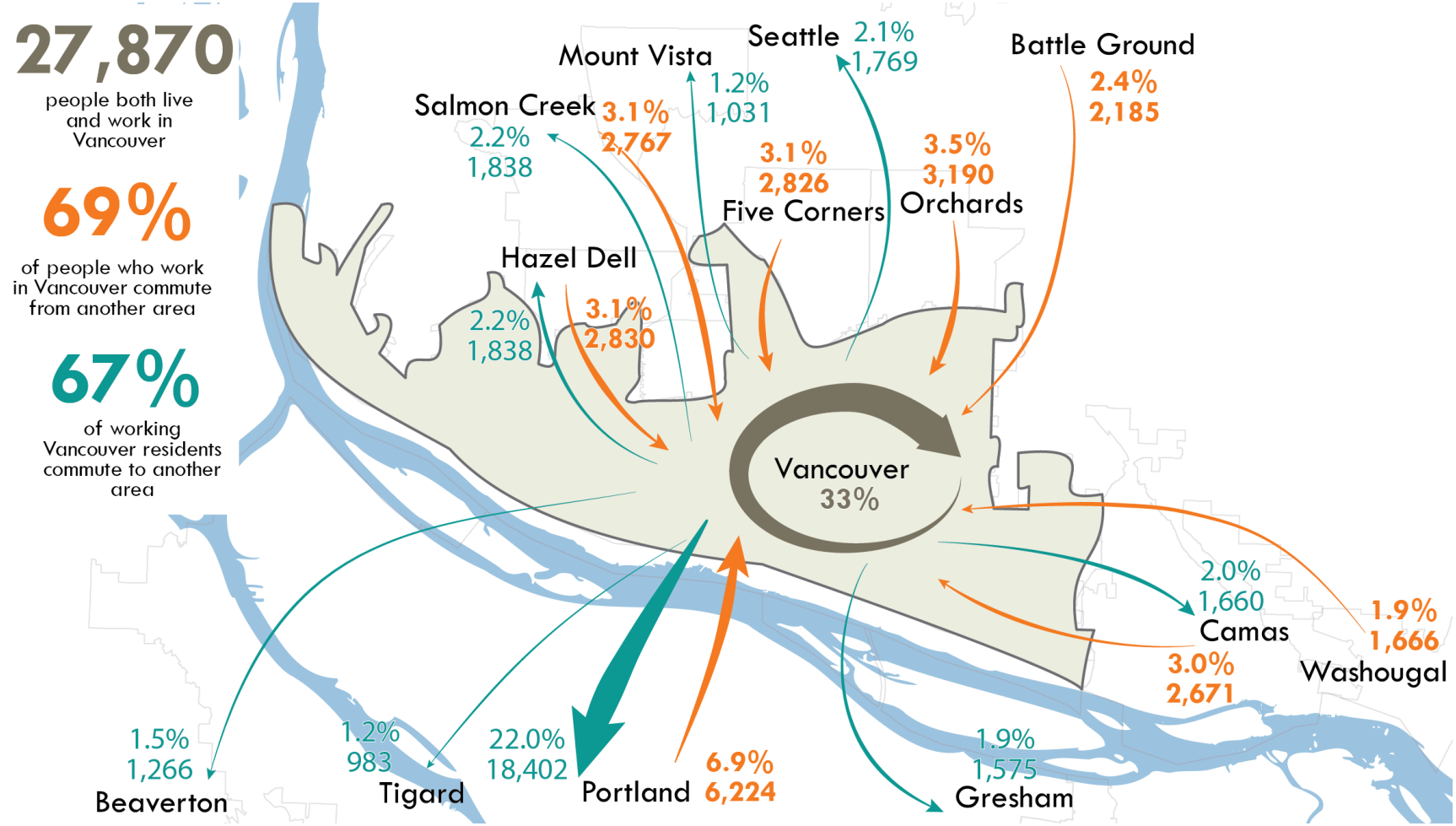
Figure 8 2018 Commute Mode Shares



Source: 2018 5-Year American Community Survey

Prior to COVID-19, Vancouver residents' commutes took them in many directions. One-third of workers travelled to jobs within Vancouver while 22% travelled to Portland (Figure 9). Sixty-four percent of all commutes were less than 10 miles, while 30% of people travelled less than 5 miles. The average commute took 23.8 minutes, which is slightly shorter than the averages for Washington State, Portland, or the United States.

Figure 9 Vancouver Commute Flows, 2018



2 STREET NETWORK

The City's transportation network includes state, county, and city streets, of which the City operates and maintains 1,900 miles of public streets. They make up 20% of Vancouver's land area— compared to the 5% of land devoted to parks. As part of this project, new measures will be applied to assess how streets can best function for everyone. The traditional way of defining and measuring the street network focuses on driving conditions and prioritizes fast movement between places. But this goal is at odds with other desires such as safer walking, bicycling, and transit conditions, as well as environmental responsibility and the reduction of greenhouse gas emissions.

FUNCTIONAL CLASSIFICATION

Functional classification is a way of categorizing streets based on their driving function –mobility versus land access. It does not consider safety, placemaking, pedestrian/bicyclist comfort, equity, or land use context. Yet functional classification remains a common framework for determining street design and operation. Vancouver's existing street classifications are shown in Figure 10. The streets that primarily are used for long-range trips (such as highways and arterials) focus more on efficient driving movement through the city; streets that primarily provide access to local destinations, such as businesses or residences, provide a better balance of all travel modes with a focus on convenience and safety in getting to the user to their destination. This range of street design types are represented in the following classifications:

- **Arterial Streets.** Their primary function is driver mobility, thus they typically carry higher traffic volumes and allow higher travel speeds while providing limited land access.
- **Collector Streets.** Their primary function is to collect traffic from local streets and provide connections to arterial streets. Generally, collectors operate with moderate speeds and provide more access relative to arterials.
- **Neighborhood Circulator Streets.** Their primary function is to distribute traffic from collectors and provide direct access for adjacent properties. In general, these streets connect local streets to collector streets.
- **Local Streets.** Their primary function is property access and connections to collectors. Generally, local streets operate with low speeds and carry low traffic volumes.

Key Corridors

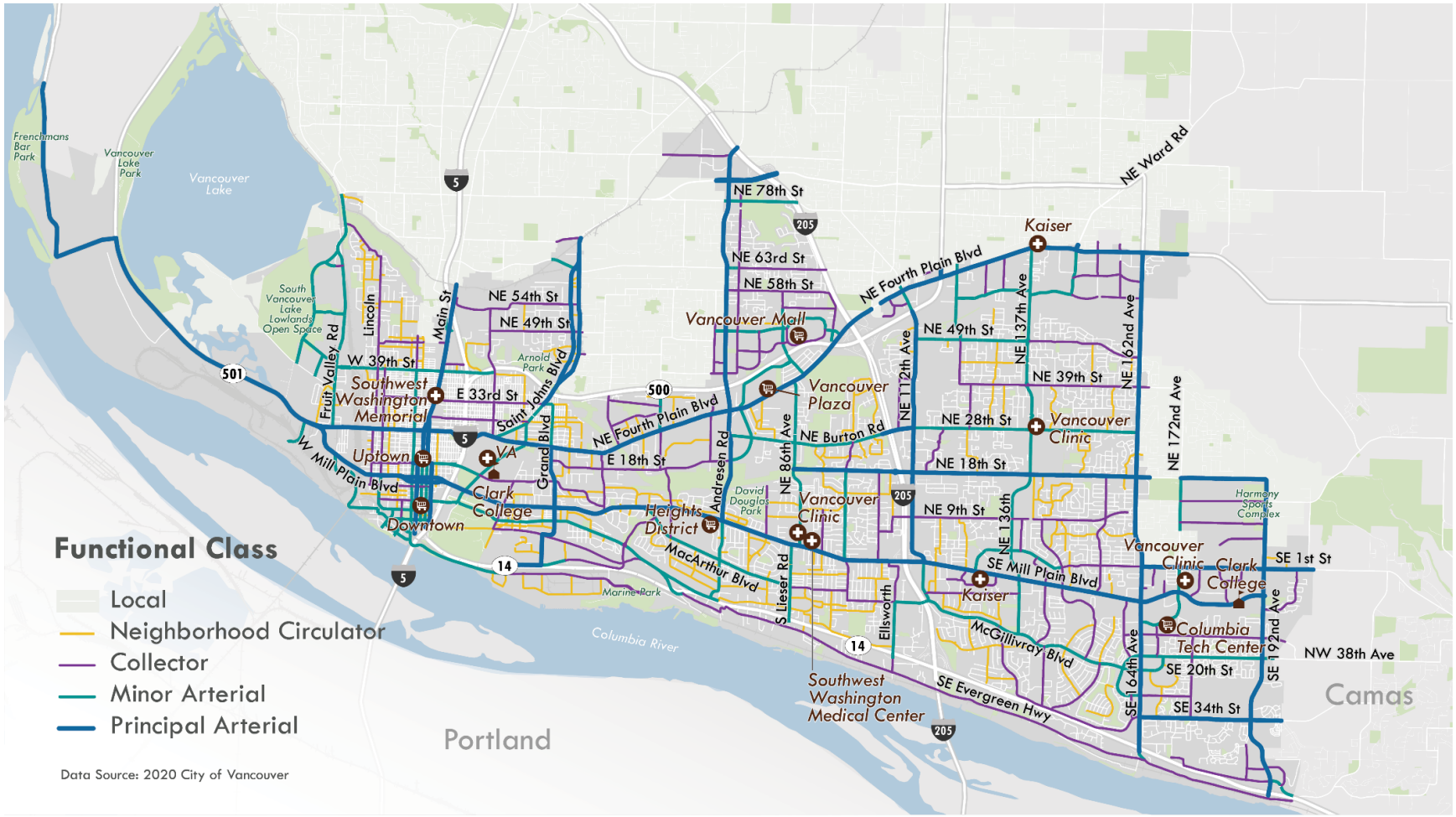
The City tracks performance on a dozen key arterial corridors, and reviews their operations to maintain set driver travel times during peak hours.[1] These key corridors include the following:

- Mill Plain Boulevard
- St Johns/St James Couplet & Ft Vancouver Way
- Fourth Plain Boulevard
- Andresen Road
- 112th Avenue
- 164th Avenue/162nd Avenue
- Burton Road/28th Street
- 18th Street
- 136th Avenue/137th Avenue
- 192nd Avenue
- Main Street

More details on the performance measures and analysis are documented below.

[1] Key corridors were derived from the City's existing Concurrency Corridors and the Southwest Regional Transportation Council's 2018 Congestion Management Process (CMP).

Figure 10 City of Vancouver Functional Classifications



TRAFFIC VOLUMES DURING COVID-19

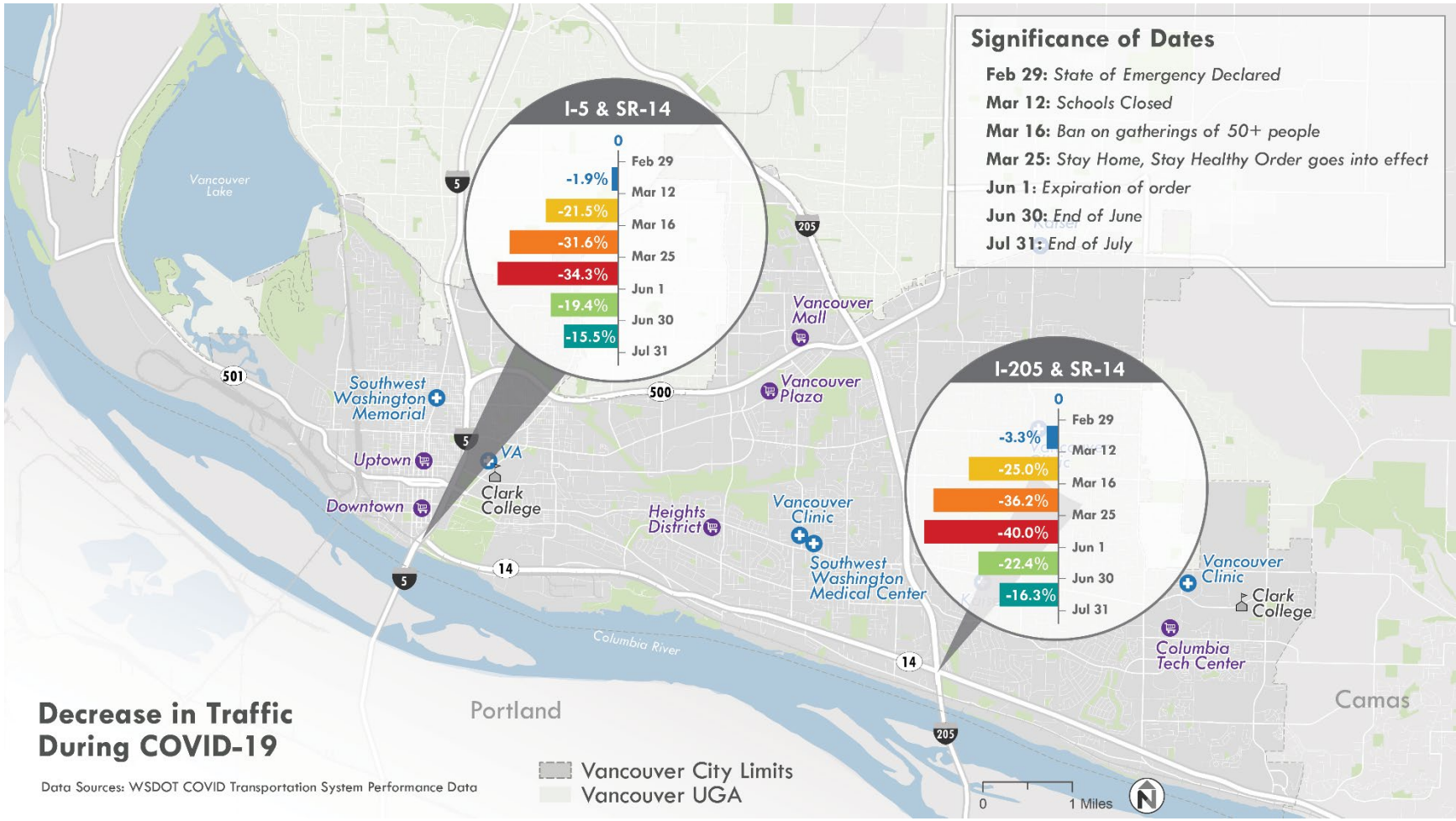
The COVID-19 pandemic has changed travel demands throughout the city as closures have encouraged residents to limit travel beyond their local communities. Figure 11 shows the approximate decrease in traffic volumes at two major locations during the pandemic compared to the same dates in 2019. Percentages are shown during the first 5 months of the pandemic, with key dates shown in the legend.

These traffic volumes are just an example of how travel patterns could change in the future, especially as residents become more comfortable working from home and with using technology-based delivery and mobility services. Concerns over safety aboard public transportation endanger years of efforts to build transit ridership – an equitable, sustainable form of transportation. There is a danger that traffic volumes could become worse in the future, even if commuting levels are down, as people abandon transit for driving.

KEY TAKEAWAYS

- Principal arterials are typically a city's biggest, fastest roads. But in Vancouver, they also encompass two of the City's highest ridership transit corridors – Fourth Plain and Mill Plain Boulevards, meaning bus riders must walk along and cross wide streets with fast traffic.
- High densities of destinations are often located along arterials, but in a well-connected street network, quieter collector streets running parallel to arterials provide a more comfortable alternative for bicycling and walking.

Figure 11 Approximate Decrease in Traffic Volumes during COVID-19 Conditions



NETWORK PERFORMANCE

Each key corridor listed at the start of section 2 was divided into segments to help understand where the critical operational bottlenecks occur during high-demand hours. Arterial performance measures were selected based on readily available data sources – two common metrics used in the region are travel speed as a percent of the posted speed limit and travel time. As noted earlier, through this project additional performance measures will be generated that help balance Vancouver's streets for all users.

Driver Speeds

Slow corridor driver speeds can be an indicator of delay. Driver speed often decreases because of congestion, changes in the number of driveways, traffic signals, and an overall increase of driver trips on the transportation system. The City has established motor vehicle speed standards for arterial streets in its Comprehensive Plan and Concurrency Program. Arterials are expected to maintain average speeds of 10-12 miles per hour. Any street with average speeds below that standard is considered congested. This measure was calculated based on available posted speed limit data and travel time information from the concurrency checkpoint data provided by the City.[4] Slower drivers can actually make streets feel safer for people walking and bicycling. Cities such as Portland and Seattle have lowered speed limits – Seattle arterials are now 25 MPH and Portland residential streets are 20 MPH. While speed will be used as a performance measure for the City's transportation plan, it will be balanced with safety and multimodal performance measures to ensure street improvements benefit all users of the system.

Figure 12 shows the travel speed performance results during the PM peak period (4-6PM) for the city's key street network.

Travel Time Index

Travel time index is the ratio of travel time during the peak period to travel time at free-flow speeds, or during the off peak. This measure points to unreliability or unexpected delays. The City and region have not set a performance target for this metric. Figure 13 shows the travel time index for the city's key corridors.

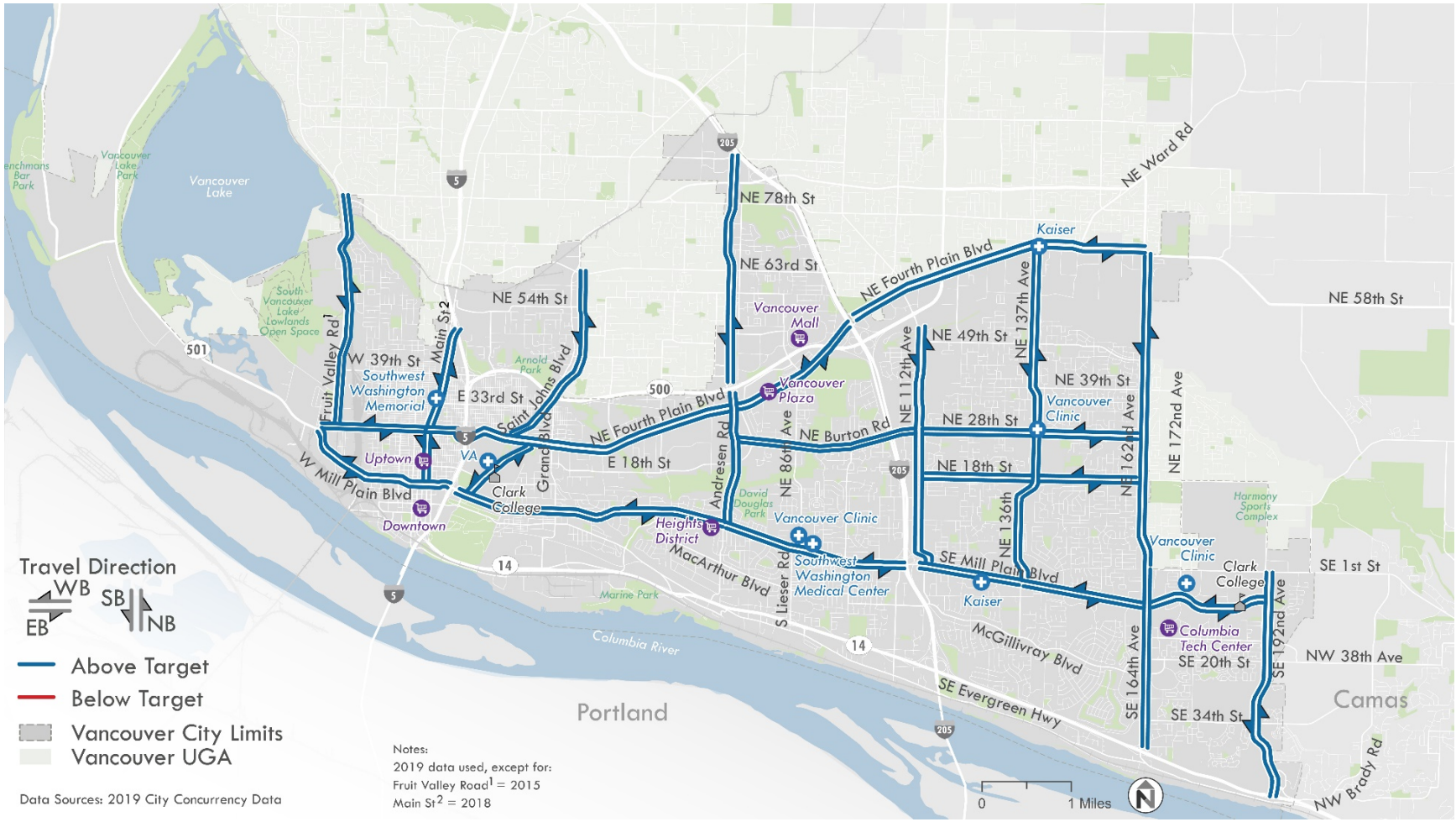
KEY TAKEAWAYS

- All arterial streets are operating at acceptable speeds according to the City's standards.

[4] Speed data used in this analysis is primarily from 2019. Main Street/Highway 99 speed data is from 2018. Fruit Valley Road speed data is from 2015.

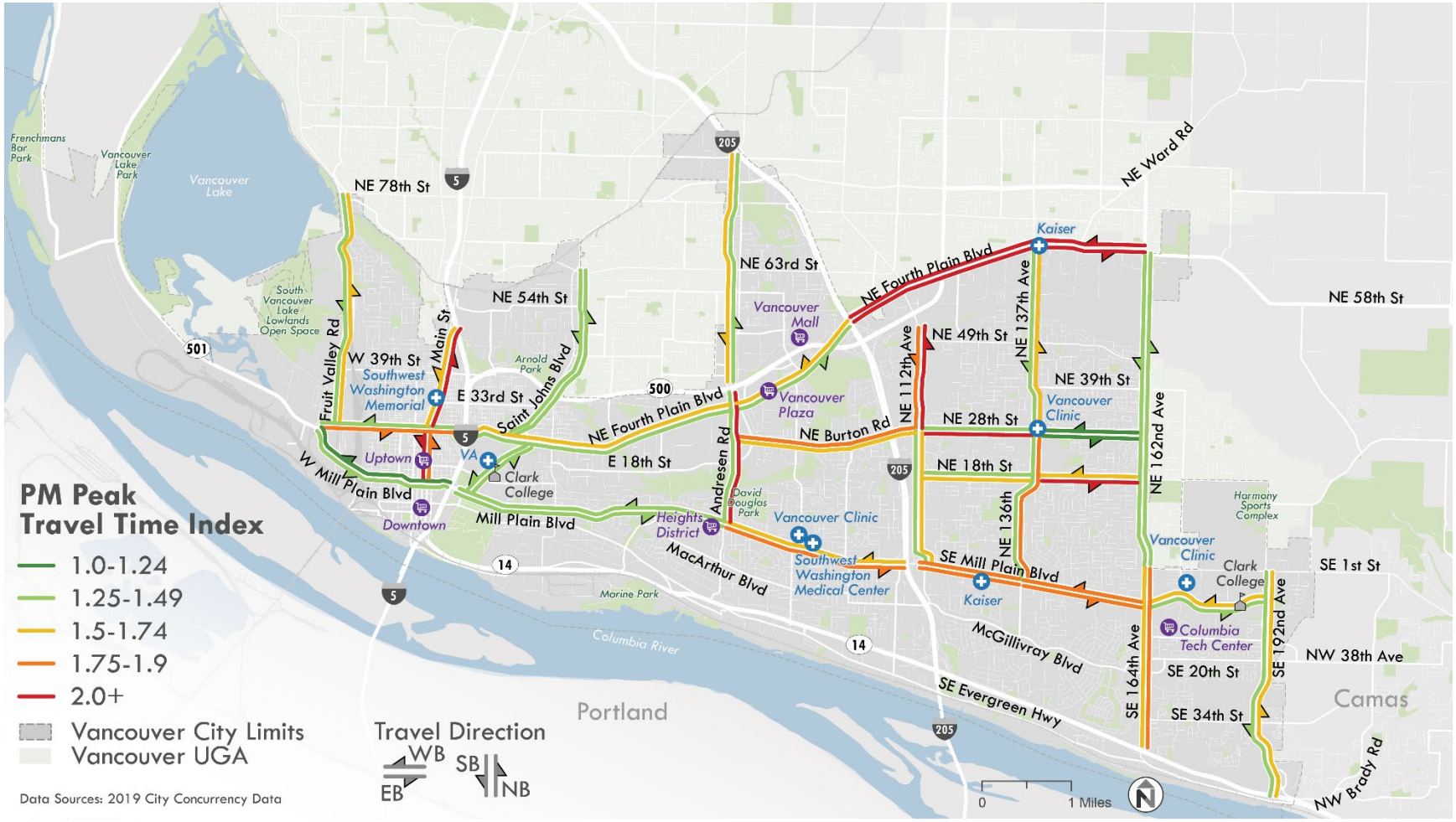
All of the city's key streets are operating above target travel speeds. Higher driver speeds can make streets less safe for walking and bicycling, and can also result in higher severity of injury if crashes occur.

Figure 12 Existing PM Peak Hour Travel Speeds on Key Corridors of the City



Drivers on arterial streets east of I-205 experience more delays in the PM peak hour than arterials west of I-205. Travelers on Main Street into downtown Vancouver also experience delay in the PM peak hour, likely due to its proximity to I-5. Notably, arterials with multiple traffic signals have the potential for higher delays due to queuing from signal to signal that occurs at a higher rate during the PM peak hour.

Figure 13 Existing PM Peak Hour Travel Time Index on Key Corridors of the City

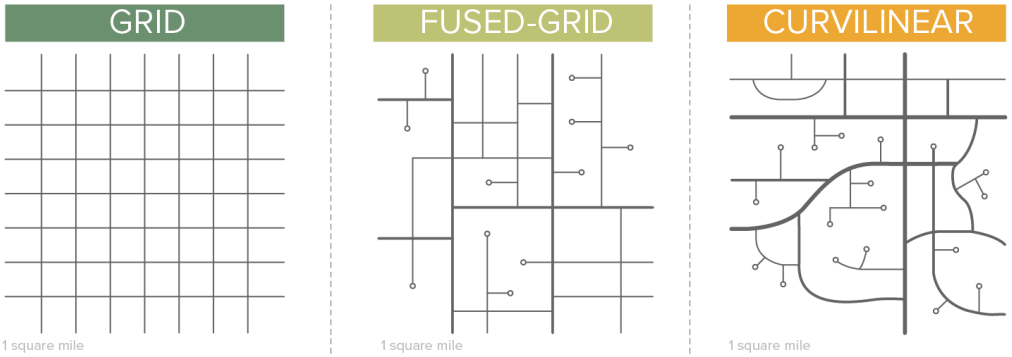


CONNECTIVITY

Vancouver's street network keeps the city connected and goods and people on the move. The strength and balance of this network affects how well the transportation needs of the community are supported. Well-connected networks offer multiple routes between destinations with many parallel streets and few dead ends. Less connected networks concentrate travel demand on a few large streets. This results in challenging design tradeoffs, as many users compete for space on a limited number of connected streets.

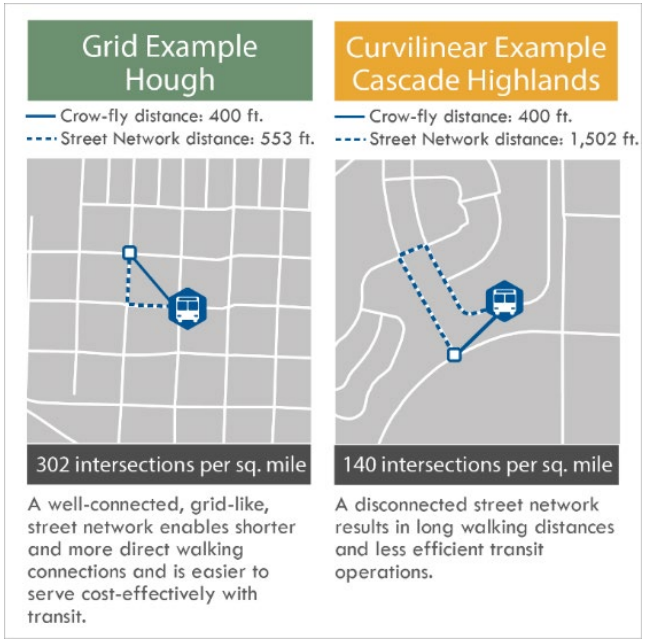
An example of different street networks is shown in Figure 14. These patterns influence travel time and transportation decisions. A well-connected street network, such as a grid, provides people shorter walks to transit operating on major arterials and shorter travel distances for people driving or biking. Walkability increases home and commercial property values and boosts residents' physical activity. Disconnected and curvilinear networks make traveling in a direct path difficult and funnel users into less frequent, larger streets and intersections.

Figure 14 Street Network Connectivity Comparison



Connectivity can be measured by calculating the density of intersections per square mile. The higher the density, the more connected the network. This has direct effects on travel time. Figure 15 compares travel times between destinations in a high-connectivity context (302 intersections per square mile) and a low-connectivity context (140 intersections per square mile). Fourth Plain Boulevard, one of Vancouver's key commercial corridors and home to The Vine, crosses through many neighborhoods with poor connectivity to the corridor.

Figure 15 Straight Line vs. Network Distance in Vancouver

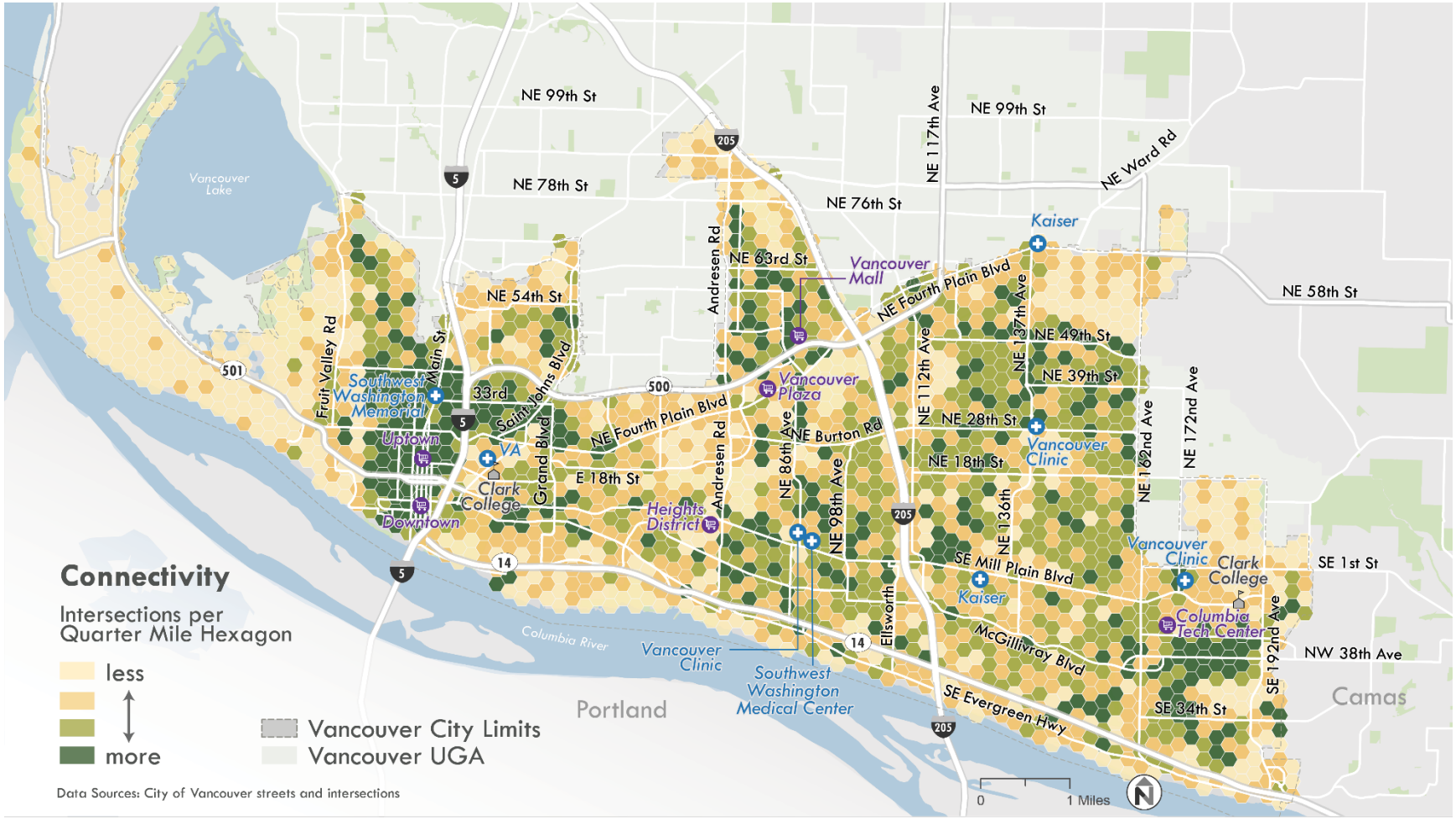


KEY TAKEAWAYS

- Downtown Vancouver has a grid network with high connectivity
- Key corridors like Fourth Plain Blvd that have many destinations are in areas with poor connectivity, making them more difficult to access
- Some neighborhoods have many intersections but do not directly connect to major destinations

Downtown Vancouver is a grid of streets with the highest density of intersections (Figure 16). The central part of the city between Grand Blvd and Andresen Road and neighborhoods between Mill Plain and McGillivray boulevards east of I-205 have low connectivity.

Figure 16 Intersection Density by Quarter Mile Hexagons



3 PARKING

The City of Vancouver's Parking Services Department manages nearly 3,900 on- and off-street parking spaces, including two Park 'n Go Garages. The Vancouver Center Park 'n Go is one of the largest parking garages in the city. On-street paid parking is concentrated in Downtown and Uptown, with a mix of single-space meters and pay stations. Time limits for metered parking spaces range from 30 minutes to three hours. The City also offers on-street and off-street monthly permits. Single-space meters include a 20-minutes free button.

A 2017 Downtown Occupancy Study found that just over half of off-street parking spaces in garages and lots are occupied on the average weekday, while 63% of the on-street spaces are in use (Figure 17). The demand for parking varies throughout the day (Figure 18). In 2020, the COVID-19 pandemic and resulting Stay Home order led to far fewer people parking downtown. The difference in parking revenue between 2019 and 2020 illustrates the drop (Figure 19). It should be noted that the City of Vancouver did not charge for on-street parking from late March through the end of June 2020.

Chapter 19 of the Municipal Code defines parking policy and regulations within the City of Vancouver, including the Downtown Parking Meter District and its regulations, the identification of municipally owned lots, and the Residential Parking Permit (RPP) program. Chapter 19 also defines the parking requirements applicable to new development. For example, the City's minimum off-street parking requirements dictate 1.5 parking spaces per multi-dwelling unit and 2.5 parking spaces per 1,000 square feet of general office.

The City Center Zone (CX) and the Transit Overlay District have reduced minimum parking requirements. The code also allows for reductions of 10-20% of the required off-street parking based on the provision of Transportation Demand Management (TDM) programs, bicycle parking, and transit-supportive design. Finally, the Downtown District also includes parking areas that limit or ban new surface parking lots.

Similar to Vancouver, other cities in Washington and Oregon have created overlay zones where parking minimums are reduced or eliminated, typically including all or part of the Central City. Additionally, Seattle does not require parking for affordable housing units. Both Portland and Seattle have reduced or eliminated parking requirements for multifamily housing projects near frequent transit service.

Figure 17 Average Downtown Parking Occupancy

	On-Street	Off-Street
Thursday	63%	52%
Saturday	69%	29%

Data collected during July and August 2017. Source: City of Vancouver, WA Downtown Occupancy Study, Dixon Resources Unlimited.

KEY TAKEAWAYS

- Nearly half of off-street parking spaces are unoccupied on a typical weekday.
- Over one-third of on-street parking spaces are unoccupied on the average weekday.
- The most convenient on-street spaces tend to fill to capacity, indicating an underpriced resource.
- The City requires new development to provide a minimum number of off-street spaces. These requirements are lower in Downtown and near transit.

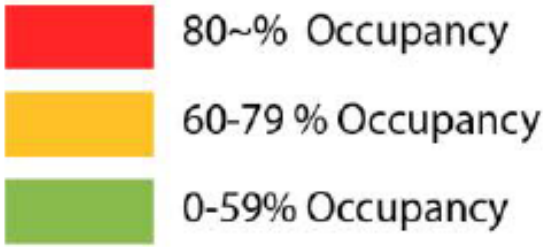
Figure 18 On-Street Parking Occupancy in Downtown Vancouver, July 2017

Thursday Morning

Thursday Afternoon

Thursday Evening

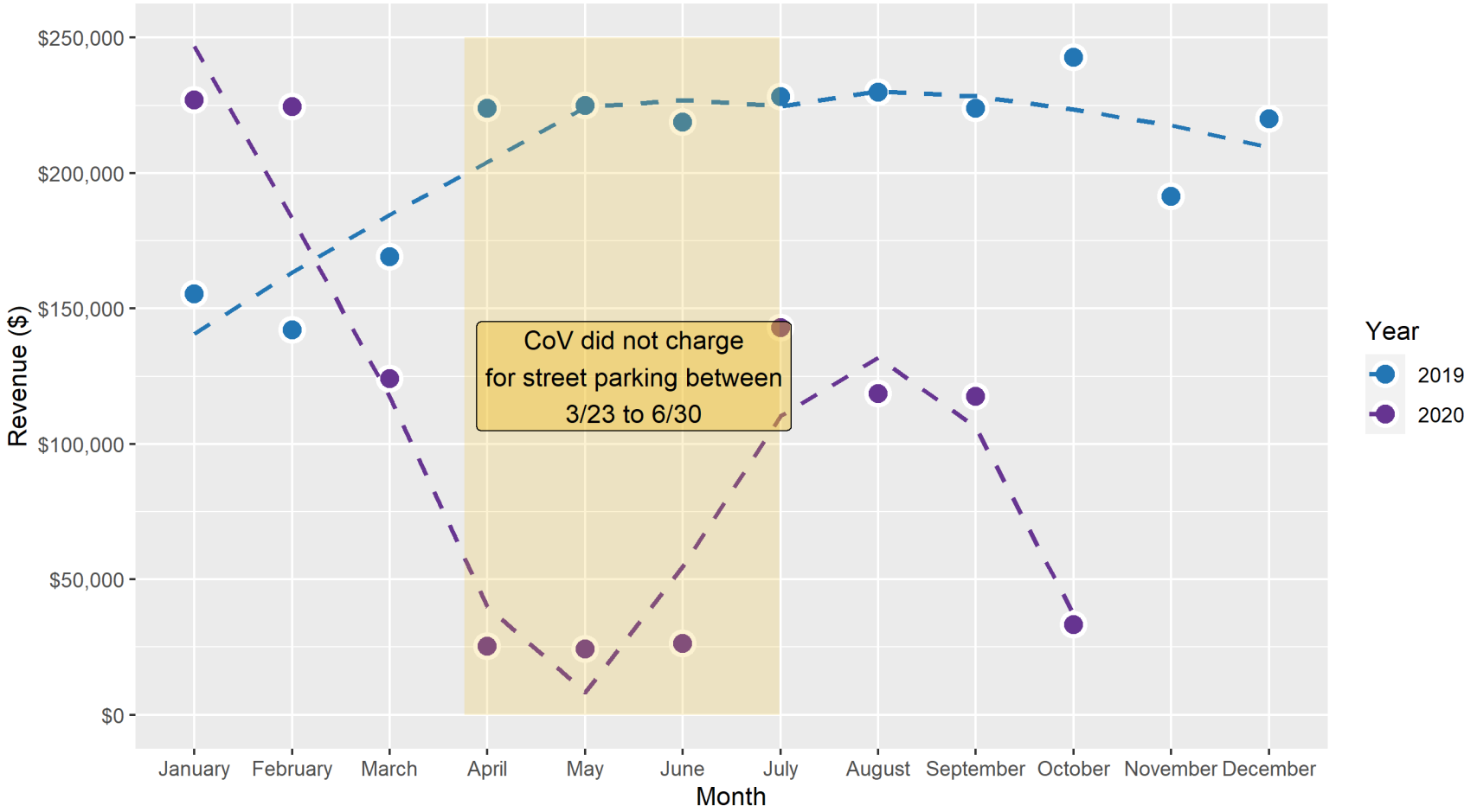
Legend



The 2017 Downtown Occupancy Study found that the demand for hourly on-street parking increases throughout the day, while use of permit parking spaces remains relatively constant. Overall, this means it is harder to find an on-street space as the day goes on. On the Thursday evening in July when the data was collected, about 85% of metered spaces were full. Summer events like the Sunset Concert Series draw many people downtown in addition to the dining and entertainment options that the area offers.

Source: City of Vancouver, WA Downtown Occupancy Study, Dixon Resources Unlimited

Figure 19 City Parking Revenues by Month in 2019 compared to 2020



Note: Dashed lines indicate a smoothed moving average

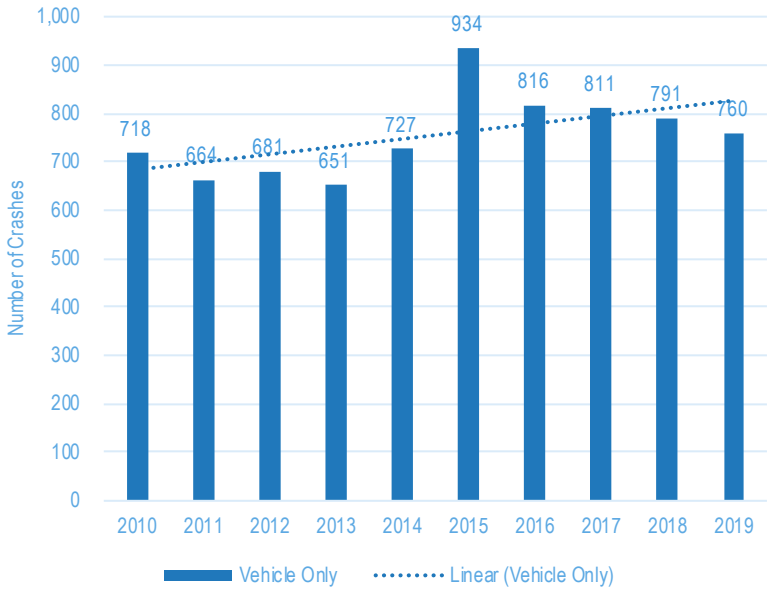
4 SAFETY

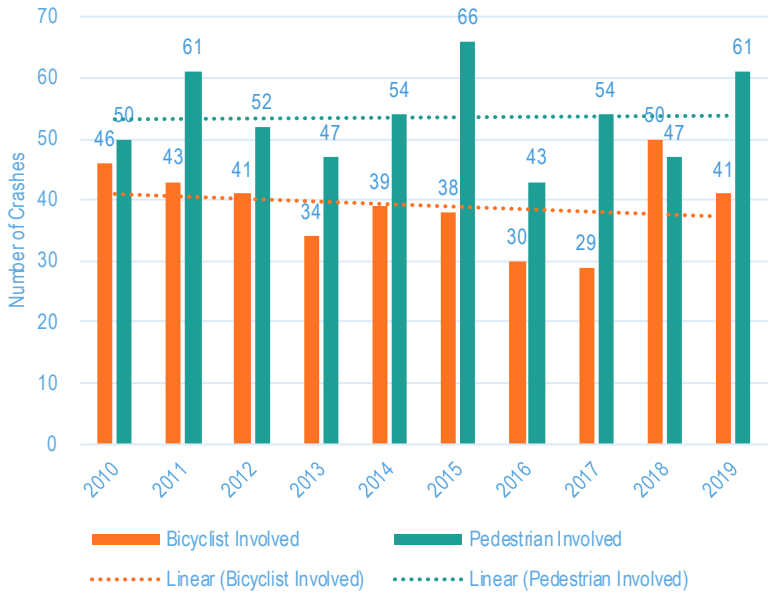
Safety and perceptions of safety influence how often people travel, by which modes, and by which routes. Understanding safety problems often relies upon analyzing crash data; however, the City's goal is to prevent crashes before they happen. This data analysis will be supplemented with community input to help understand near misses and safety issues that are not captured in crash data.

Crash data from WSDOT covering 2010-2019 was analyzed to better understand crash trends over time and by mode. Figure 20 summarizes historical trends in total crashes. In absolute numbers, crashes involving drivers are increasing, crashes involving people on bicycles are decreasing, and crashes involving people walking are flat – although there are spikes in walking and bicycling crashes. But the city is growing and changing, thus absolute numbers must be compared against population change and mode share.

Overall, crashes grew by 29% during the past ten years, while population only grew by 13%. Crashes have been increasing faster than population growth.

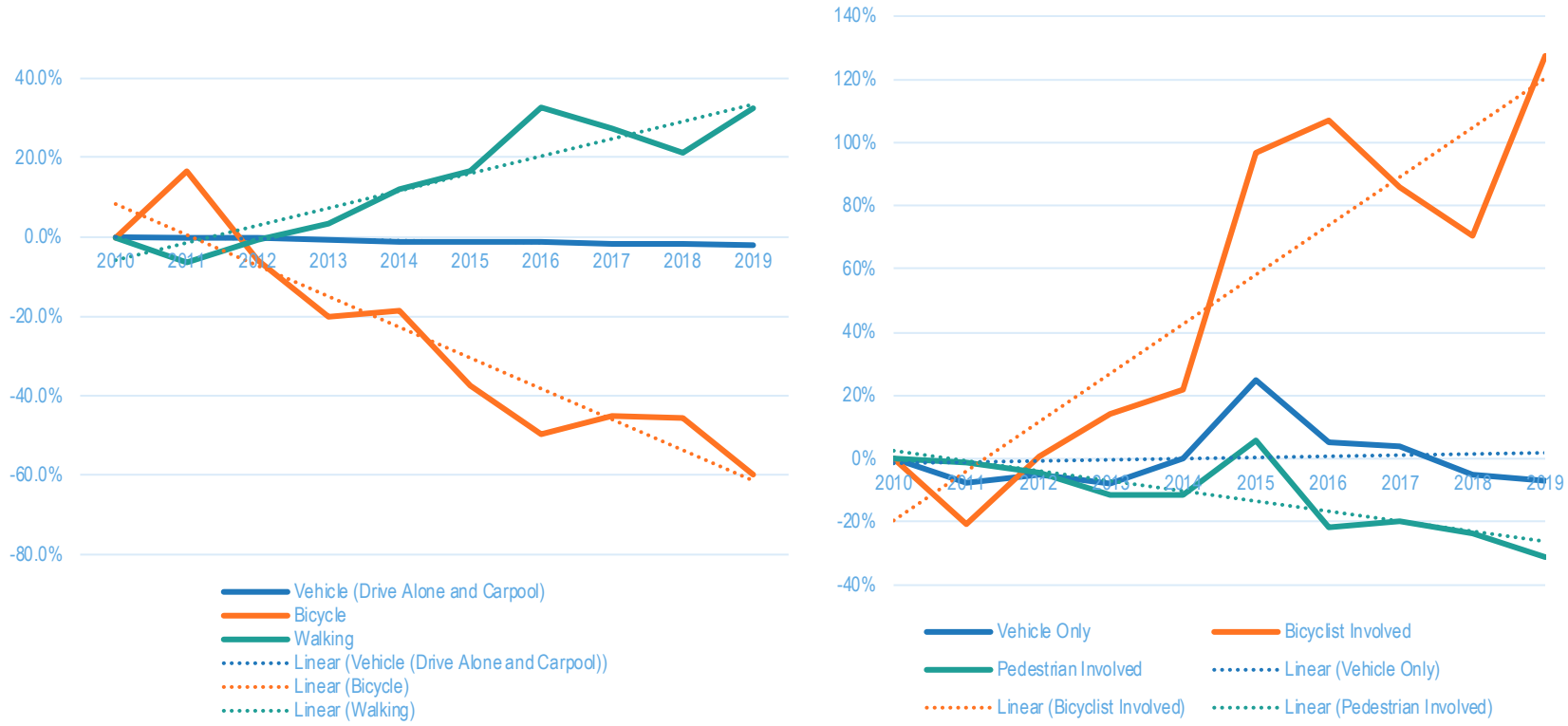
Figure 20 Annual Crashes by Mode (2010-2019) – Driver-Only (left) and Bicyclist and Pedestrian (right)





Crash rates are often normalized by the number of users. Volumes are not readily available citywide; however, the Census's American Community Survey provides data on commuting by mode. Peoples' commute trips are typically only about 20% of their total trips, but commute information is a first step at understanding crash rates normalized by volume. Figure 21 shows the change in commute mode shares on the left – walking has increased but bicycling has declined. These commute percentages were applied to the number of total estimated commuters (per the ACS) to understand number of commuters by mode. The right panel shows crash rate by number of users. This panel shows that because bicycle commuting has been decreasing, the rate of bicyclist crashes per 1,000 bicyclists commuting has greatly increased.

Figure 21 Change in Relative Mode Share, 2010-2018 (left) and Percent Change in Crashes per 1,000 Commuters by Mode (right)



Sources: WSDOT crash data, 2018 5-year American Community Survey data for City of Vancouver (for commute mode share estimates)

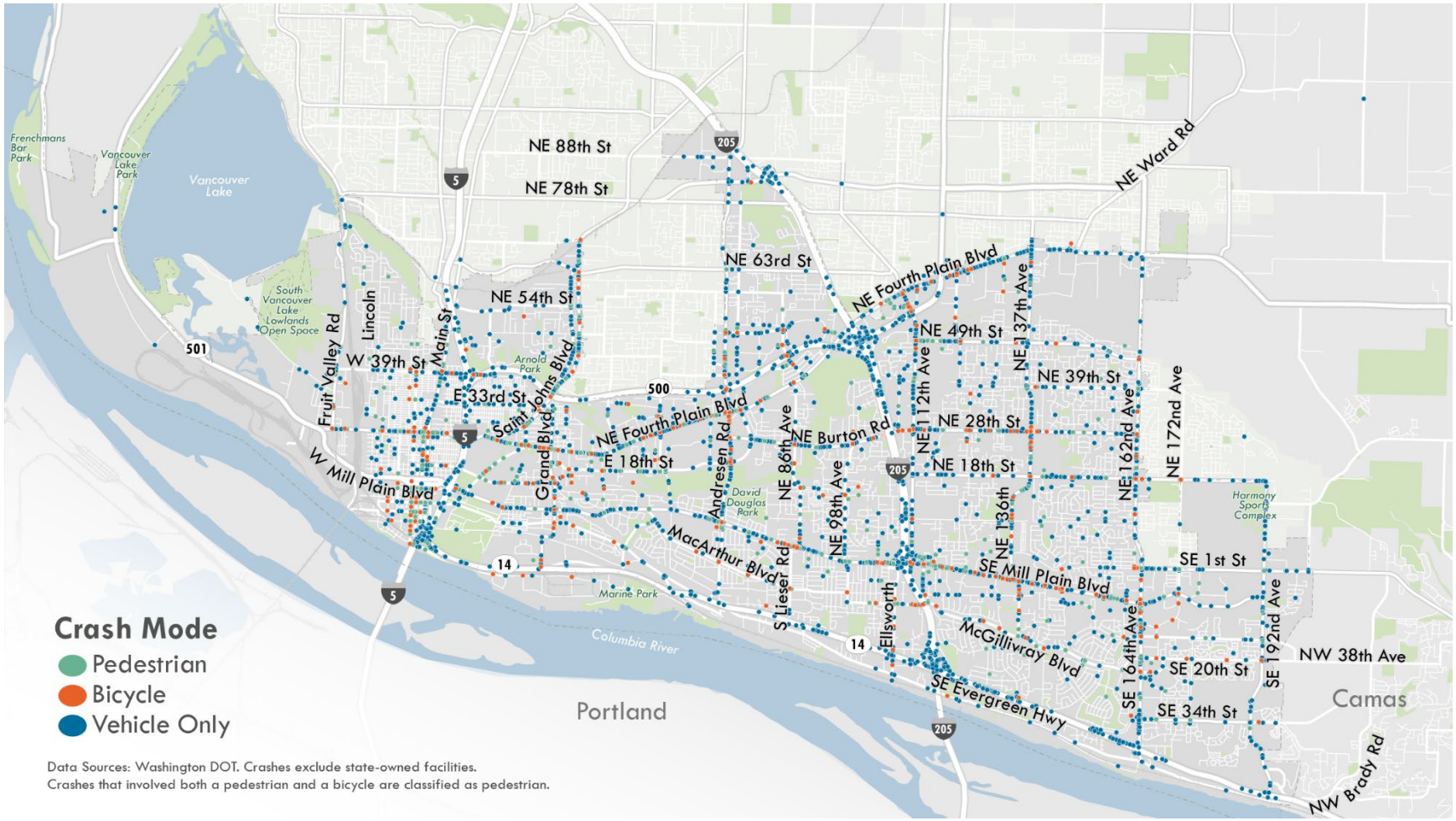
CRASH LOCATIONS

Figure 22 illustrates the location of crashes by mode. Note that crashes on the mainline of state-owned facilities (mostly freeways within the City of Vancouver) have been removed to focus upon crashes occurring either on city streets or on ramps between city streets and state-owned facilities.

Vancouver has a number of streets and corridors, primarily arterials, that have higher volumes of crashes. These include:

- Andresen Road
- Burton Road and NE 28th Street
- Fourth Plain Blvd
- Main Street
- McGillivray Boulevard and SE 10th St
- Mill Plain Boulevard
- Saint James Road
- NE 18th Street
- NE 39th Street
- NE 48th and NE 49th Street
- NE 112th Avenue
- NE 121st Avenue
- NE 136th, NE 137th, and NE 138th Avenue
- NE162nd and SE & NE 164th Avenue
- SE 192nd Avenue

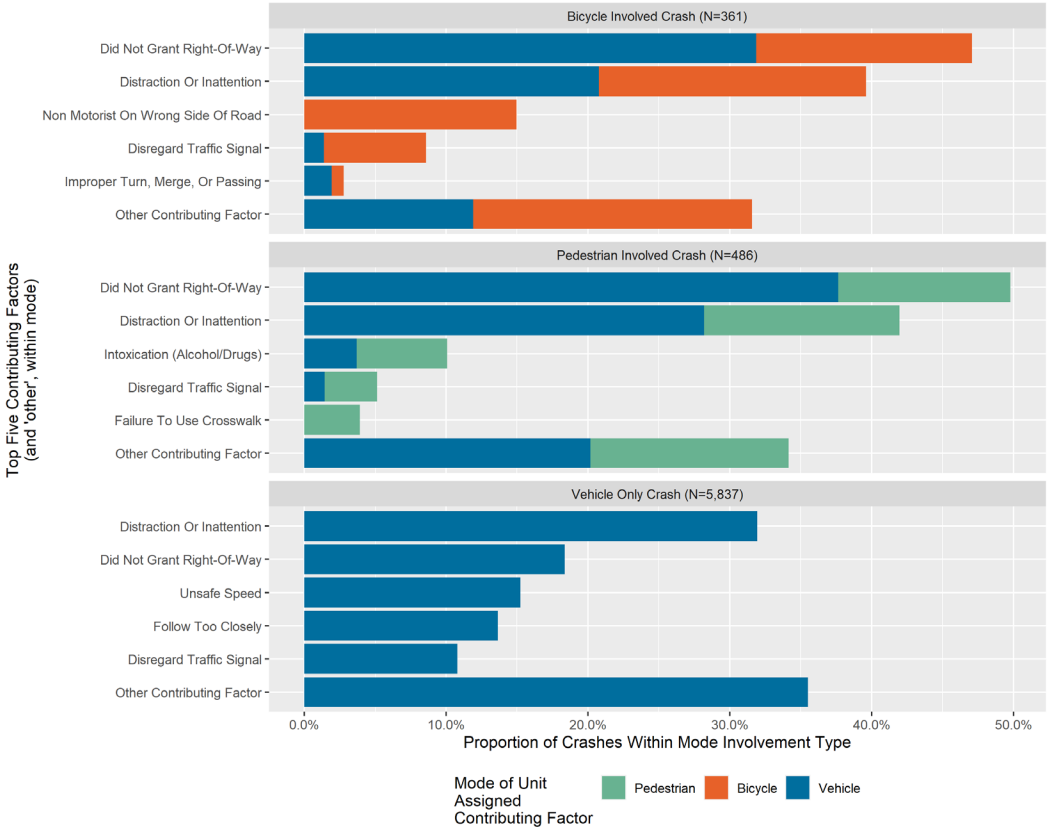
Figure 22 Crashes by Mode, (2010-2019, on City Streets or Ramps), excluding Property Damage Only crashes



CONTRIBUTING FACTORS

Crash reports contain a variety of detailed information that can explain why the crash happened, including behavioral and design factors. Figure 23 illustrates the top 5 street user factors that contributed to crashes as identified by the responding police officer. Crashes assigned 'Other Contributing Factor' include all other crashes not assigned one of the top five contributing factors.

Figure 23 Top Five Contributing Factors by Mode Involvement (2010-2019, on City Streets or Ramps)



Source: WSDOT Crash Report Data, 2004-2019, On City of Vancouver Streets or State Facility Ramps (i.e. mainline state facility crashes excluded). Property damage only crashes excluded.

Top 5 Factors

The top five contributing factors across all modes were:

1. **Distraction or Inattention.** These were among the top two contributing factors across modes, with more drivers being attributed this factor than non-drivers.
2. **Unsafe Speed.** Drivers traveling faster than the speed limit or unsafe for conditions contributed to 15% of vehicle only crashes.
3. **Did not grant right of way.** Failure to grant right of way was among the top three factors across modes, with drivers more likely to be attributed this factor. This factor can indicate a variety of behaviors – failure to obey a traffic signal, failure for a driver to yield to a pedestrian in a crosswalk, failure to obey a stop sign, etc.
4. **Intoxication.** Intoxication was among the top five factors in pedestrian and driver-only crashes. For pedestrian involved crashes, the pedestrian was more likely to be considered intoxicated.
5. **Follow Too Closely.** The fourth most common driver crash type was following too closely, resulting in a rear end crash.

Note: Approximately 20% of crashes were labeled with 'other contributing factor' by the reporting officer, meaning that approximately 2/3 of crashes shown above as 'other contributing factor' were explicitly marked that way (as opposed to being another marked specific factor that was consolidated for brevity – only the top 5 specific factors were enumerated).

CRASH TYPES

Crash data includes information about the design of the location where the crash occurred. This can inform design countermeasures. A preliminary assessment of bicycle and pedestrian crash types is shown in Figure 24. Driver crash types are more complex and will be considered in a following report. Of note:

- Pedestrian crashes occurred almost equally at signalized locations versus unsignalized or midblock locations
- Crashes at driveways made up a significant number of crashes involving bicyclists
- Right turning drivers contributed to 36% of bicyclist crashes

Figure 24 Overview of Preliminary Bicycle and Pedestrian Crash Types

Mode	Intersection Type	Driver Movement					Total
		All Midblock	Driver Going Straight	Right Turning Driver	Left Turning Driver	Other	
Bicycle Involved Crash	Signalized Intersection	0	64	95	36	22	217
	Unsignalized Intersection	0	78	72	47	32	229
	Midblock	82	0	0	0	0	82
	Driveway	0	0	85	27	51	163
	Total	**82**	**142**	**252**	**110**	**105**	**691**
Pedestrian Involved Crash	Signalized Intersection	0	95	91	129	12	327
	Unsignalized Intersection	0	64	31	47	16	158
	Midblock	236	0	0	0	0	236
	Driveway	0	21	33	11	14	79
	Total	**236**	**180**	**155**	**187**	**42**	**800**

Source: WSDOT Crash Report Data, 2004-2019

KEY TAKEAWAYS

- Bicycle collisions increased relative to estimated bicycle volumes. The overall number of bicycle collisions is low, but relative to decreasing bicycle commuting rates (used as a proxy for overall bicycle travel), the crash rate is increasing. Crash rates using this methodology are staying relatively level among pedestrians and drivers.
- Though bicycle and pedestrian collisions occur less frequently than vehicle crashes (partially as a function of mode share), they are significantly more likely to be severe or fatal. Between 2010 and 2019, 1.8% of vehicle crashes were severe/fatal, whereas 10.1% of bicycle crashes and 24.1% of pedestrian crashes were severe/fatal.
- Distraction and Inattention is a top contributing factor to crashes across modes.
- Corridors with high numbers of crashes are also heavy transit user corridors, such as Mill Plain and Fourth Plain Boulevards.

5 FREIGHT

The city's proximity to major ports, the Columbia River, and the Washington-Oregon state line makes transportation network efficiencies vital for freight movement throughout the region. In 2018, approximately 4% to 7% of total traffic volume[5] on WSDOT facilities (I-5, I-205, SR-14, and SR-500) through the city were classified as freight. Notably, freight is not immune to the impacts of the COVID-19 pandemic traffic conditions; as of August 2020 freight volumes were down nearly 20% compared to 2019.[6]

The City of Vancouver has several key freight corridors that provide essential connections between state facilities and major freight destinations in the city:

- Mill Plain Boulevard (Fourth Plain Boulevard to 164th)
- Fourth Plain Boulevard (Mill Plain Boulevard to I-5, Andresen Road to 162nd Avenue)
- Andresen Road (SR-500 to 88th Avenue)
- 112th Avenue (Mill Plain Boulevard to 51st Street)
- 164th Avenue/162nd Avenue (SR-14 to Fourth Plain Boulevard)
- 192nd Avenue (SR-14 to 1st Street)

Performance on freight corridors was assessed by looking at travel speed and the travel time index. Travel time index is the ratio of travel time during the peak period to travel time at free-flow speeds, or during the off peak. This measure points to unreliability or unexpected delays. For example, drivers on Mill Plain Boulevard should expect travel time in the peak period to be approximately 30% longer than it would take them if there were no congestion (outside of the peak hour with free-flow speeds). The City and region have not set a performance target for this metric. See Figure 25 and Figure 26.

Figure 25 Travel Time Index on Freight Corridors

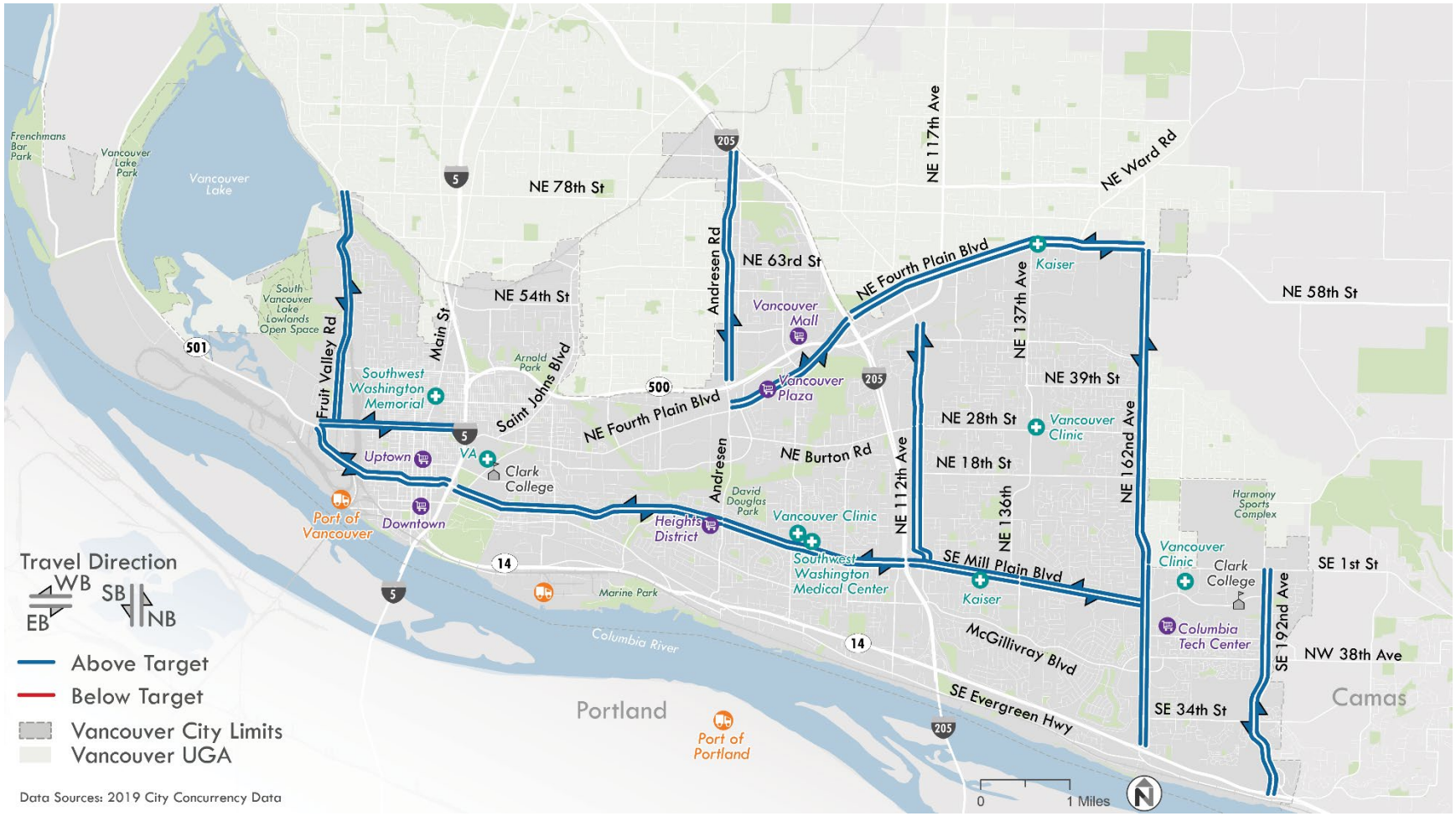
Corridor	Extent	Travel Time Index	% longer than free-flow travel time
Mill Plain Blvd	Fourth Plain – I-5	1.29	29%
	I-5 – Andresen	1.33	33%
	Andresen – I-205	1.67	67%
	I-205 – 136th	1.90	90%
	136th – 164th	1.97	97%
Fourth Plain Blvd	Mill Plain – I-5	1.63	63%
	Andresen – I-205	1.52	52%
	I-205 – 162nd Ave	2.27	127%
Andresen Rd	SR-500 – 88th	1.49	49%
112th Ave	Mill Plain – 28th	1.83	83%
	28th – 51st	2.02	102%
164th Ave / 162nd Ave	SR-14 – 1st St	1.81	81%
	1st St – Fourth Plain	1.42	42%
192nd Ave	SR-14 – 1st	1.81	81%

[5] Approximated from truck percentages of total AADT in 2018, WSDOT Historic Traffic Volumes. Truck percentages in the Vancouver area are generally in line with average truck percentages across the state, but are slightly above average on interstate freeways I-5 and I-205.

[6] Percentage Change for Clark County as of 8/2020, Freight COVID-19 Transportation System Reporting, WSDOT.

All freight corridors are experiencing speeds above targeted travel speeds (Figure 26). In this context, above target travel speeds indicate that freight traffic is not experiencing delays.

Figure 26 Existing PM Peak Hour Travel Speeds on Freight Corridors of the City



6 WALKING

Walking, with or without the aid of a mobility device, is the most basic form of transportation. This plan uses a broad definition of the terms "pedestrian" and "walking." The term "pedestrian" includes people who travel on foot, as well as people who use mobility devices such as wheelchairs. The term "walking" includes people who use wheelchairs and other mobility devices to move around the City of Vancouver.

Vancouver residents and visitors walk to meet their daily needs, to improve their health, and to connect with people, places and natural areas. Even trips by bus and by car begin and end with walking - everyone is a pedestrian at some point in their day. A connected, safe, and comfortable pedestrian transportation network ensures all people have equitable access and opportunity to contribute to a vibrant and healthy city. Pedestrian infrastructure, including sidewalks, signals, and marked crossings, provide access to local destinations and opportunities for exercise and recreation. A high-quality walking network will make routes accessible for people with disabilities per the Americans with Disabilities Act.

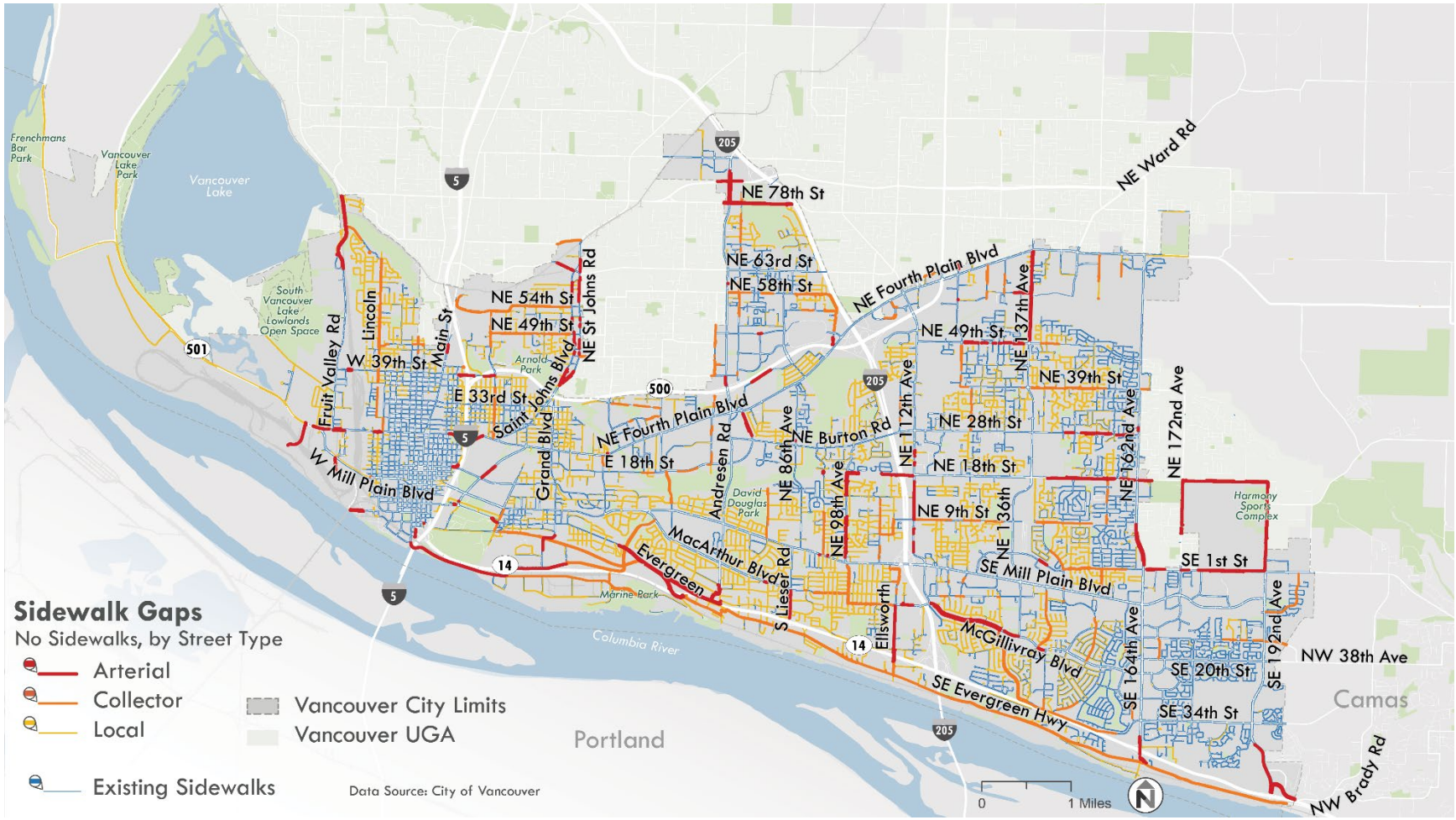
SIDEWALK INVENTORY

The city contains 630 miles of sidewalk and 490 miles of sidewalk gaps. The vast majority (93.5%) of sidewalk gaps are located on local roads outside of downtown. Sidewalk gaps along collector and arterial streets comprise 3.5% and 3%, respectively, of total gaps. Collector and arterial sidewalk gaps present the most significant barrier for people walking because they carry higher volumes of drivers traveling at faster speeds. Local streets are generally less busy and have slower speeds, making them more comfortable places to walk even without sidewalks. Figure 27 shows sidewalk gaps (on one or both sides) by street type.

KEY TAKEAWAYS

- 44% of Vancouver's streets are missing a sidewalk on one or both sides.
- 6.5% of the sidewalk gaps are on collectors and arterials (including 9 miles of arterial streets that are missing sidewalks on both sides).
- Large concentrations of sidewalk gaps are present north and east of downtown, as well as in the southeast neighborhoods of the city.

Figure 27 City of Vancouver Sidewalk Gaps



PEDESTRIAN CROSSINGS

Comfortable and frequent pedestrian crossings are essential for neighborhood connectivity, and for allowing residents and visitors to access their everyday needs without using a car. People walking often find that the most stressful part of their trip is crossing a busy street. The design of crossings plays a big part in how comfortable people feel crossing major streets. Vancouver uses, or plans to install, a variety of treatments to make crossing easier, including crosswalks that are marked with parallel or "zebra" stripes, traffic signals with pedestrian counters, Rectangular Rapid Flashing Beacons (RRFB), and median refuges. These improvements have all been shown to make crossing safer for people walking and can be applied at intersections or midblock.

Another factor that determines how easy it is to cross major streets is the distance between crossings. When people walking have to travel several blocks out of their way to find a designated crossing, they are more likely to take the risk of crossing at an unmarked intersection or midblock location. Regularly spaced crossings allow people to take a direct route to their destination. Improved crossings every block or two, at major destinations, at transit stops, and other trip generators are ideal for a well-connected network. The National Association of City Transportation Officials (NACTO) Urban Street Design Guide also recommends providing mid-block crossings at locations with significant pedestrian desire lines, or demand for crossing.

Marked Crossing Spacing Analysis

The marked crossing spacing analysis illustrates where there are long distances between designated crossing opportunities. Designated crossing opportunities include striped crosswalks, traffic signals, and pedestrian crossing signals. The analysis does not factor in unmarked crossings—legal crossings at intersections that have no crosswalk marking. These type of legal unmarked crossings are typical in denser residential neighborhoods such as the Hough, Carter Park, and Arnada neighborhoods on the Westside, where shorter blocks, narrower streets, and calmer traffic prevail.

Overall, the optimal spacing for marked crosswalks varies based on a number of factors, including the pedestrian network and built environment, typical block lengths, land use, and street character. Some cities have adopted spacing guidelines to help prioritize the installation of new marked crossings. For example, the City of Portland has adopted marked crossing spacing standards that are determined by a street's pedestrian designation in the Transportation System Plan or by the presence of transit stops.

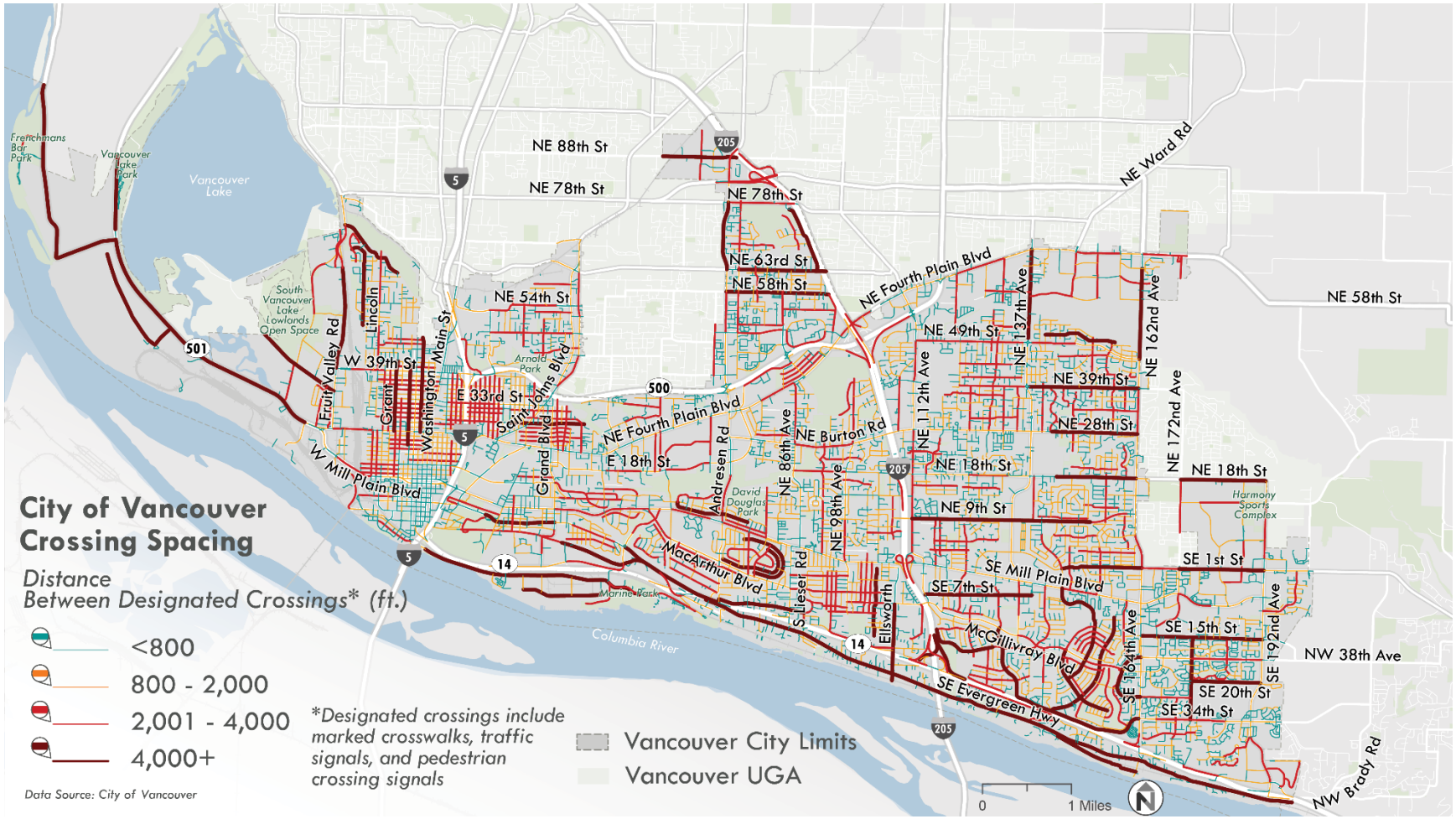
Vancouver does not have any policy on the maximum distance between marked crossings. The analysis uses 800' spacing as a proxy, based on the city's standard for block length (11. 70.070). Most streets where marked crossings are more than 800' apart are local, lower-speed streets, but 35% of designated crossing gaps are on collector and principal and minor arterial streets. Interstates and state highways were not included in the analysis, but they create additional crossing barriers for people between neighborhoods and services.

Outside of downtown, people commonly face crossing spacing greater than 800'. The area north of downtown features a dense network of intersections but lacks consistent designated crossing opportunities. East 33rd Street, for example, features shorter, denser blocks, but functions as an arterial. It offers transit service and an east-west connection across I-5. People walking must travel over a half mile between marked crosswalks (at F Street and P Street) to cross 33rd Street. The lack of traffic signals in the area may contribute to high driver speeds, affecting driver stopping distance and visibility of pedestrians. One or two additional designated crossings across East 33rd Street in this segment would greatly reduce the distance required to access a marked crossing for most pedestrians.

KEY TAKEAWAYS

- Only 38% of Vancouver's street network has designated pedestrian crossings spaced 800' or closer.
- 78% of arterial streets do not have marked crossings spaced every 800'.
- 29% of streets have crossings every 2,000-4,000 feet – meaning a person must walk 10 to 19 minutes to get to a designated crossing.
- Collectors have the most gaps - over 4000' compared to principal and minor arterials and local streets.

Figure 28 City of Vancouver Marked Crossing Spacing



7 BICYCLING

EXISTING BIKE FACILITIES

The City of Vancouver continues to grow, develop, and densify. Prioritizing modes like biking can help mitigate the impacts of growth on streets and parking, congestion, health and safety, and the environment. As more people rely on biking for everyday trips, the benefits are experienced by others as well: people walking, taking transit, and driving. To increase biking in the city and make it more attractive (particularly for short urban trips), people need safe and comfortable bike facilities and amenities. Today there are 197 miles of bikeways, including bike lanes, multi-use paths, and shared streets, to serve people biking in Vancouver. Of these facilities, only bike lanes and multi-use paths provide a dedicated space for biking, for a total of 107 miles. Figure 29 lists existing bike facility miles by type. Additionally, 1.5 miles of new bike facilities are planned within city limits.

In many cases, existing bike facilities end abruptly and people on bikes are forced to merge into travel lanes with busy vehicle traffic. These difficult transitions occur on 33rd Street, Mill Plain Boulevard, Fourth Plain Boulevard, Evergreen Boulevard from east to west; 97th Avenue, 136th Avenue north to south. When this happens, bike riders may not be able to navigate traffic safely and comfortably, and may opt for other unexpected behavior, such as riding on the sidewalk. In other cases, the existing bike lane may not provide sufficient physical space or separation from fast moving traffic or require excessive out-of-direction travel to access safe, comfortable routes. Inadequate bike facilities present a safety hazards for all roadway users, including people walking and driving, who may unexpectedly encounter someone biking. Furthermore, perceived safety and comfort levels are critical factors in a person's decision to bike. Bike facilities that are only comfortable to the most diehard, experienced, and confident riders will not encourage people of all ages and abilities to ride for daily trips. Bike facilities must be continuous, consistent, connected, and comfortable to encourage potential riders who may be interested but concerned.

Figure 30 shows existing bike facilities by type, according to data provided by the City of Vancouver. A visual analysis using aerial imagery was performed to distinguish between bike lanes and wide shoulders, and to record the width of bike lanes. The bike lanes depicted are of varying widths. To illustrate bikeway connections to the wider region, the map includes bicycle connections outside the City of Vancouver boundary.

Figure 29 Bike facility types and mileage

Type of Facility	Miles
Bike Lanes, usually on higher traffic streets	83.5
Bike Lane drops - Mixed Traffic or Wide Shoulders	5.5
Hard Surface Multi-use Paths	24
Soft Surface Trails	1
Shared Street on lower traffic street	38
Shared Street with Wider Outside Lane on moderate and higher traffic street	24
Shared Street/Difficult Connection lower traffic street with sight distance limitations and higher speeds	21

KEY TAKEAWAYS

- There are limited continuous bike facility connections across the city. Many existing facilities end abruptly or do not connect to another facility.
- Many of the critical connections across the city rely on shared facilities, where people on bikes and drivers share the same travel space.

Figure 30 City of Vancouver Bike Facilities

BICYCLING LEVEL OF TRAFFIC STRESS ANALYSIS

Bicycle Level of Traffic Stress (LTS) is a way of measuring how comfortable (or uncomfortable) it is to ride a bike on a given street. Each street is rated on a four-point scale, with LTS 1 being the most comfortable and LTS 4 the most stressful. Data inputs include posted speed limit, number of travel lanes, bicycle facility presence and width, on-street parking, and traffic signals.[7]

Figure 31 presents the LTS analysis results. Across the city, LTS follows a pattern of lower-stress neighborhood networks isolated by higher-stress collector and arterial streets. Lack of safe bicycle intersection crossing conditions along major corridors (Mill Plain Blvd; Fourth Plain Blvd running east to west; and Main St, Andresen Rd, 112th Ave; 136th Ave running north to south) create a stressful cycling environment and limit connectivity for lower-stress streets that cross them. This creates an "island" effect in which people biking can make short trips (within a neighborhood, for example), but have difficulty connecting to destinations outside of that neighborhood to other areas of the city.

Most of the existing designated bikeways in Vancouver received an LTS score of 3 or 4. This suggests the existing bike network is not functioning well for most people; it is primarily only serving bicycle riders with a high stress tolerance. Creating low-stress bikeway network will require improving the bike facilities on existing bikeways and/or designating additional routes on low-traffic streets.

Bicycle LTS Ratings

- LTS 1 represents streets and paths where people of all ages and abilities would feel comfortable riding.
- LTS 2 represents slightly less comfortable streets, where most adults would be comfortable bicycling.
- Streets with LTS 3 or LTS 4 are much more stressful and are typically ridden by only the most experienced and/or confident bike riders.

Bike Facility Data Assumptions

The following analyses were conducted to complement existing data.

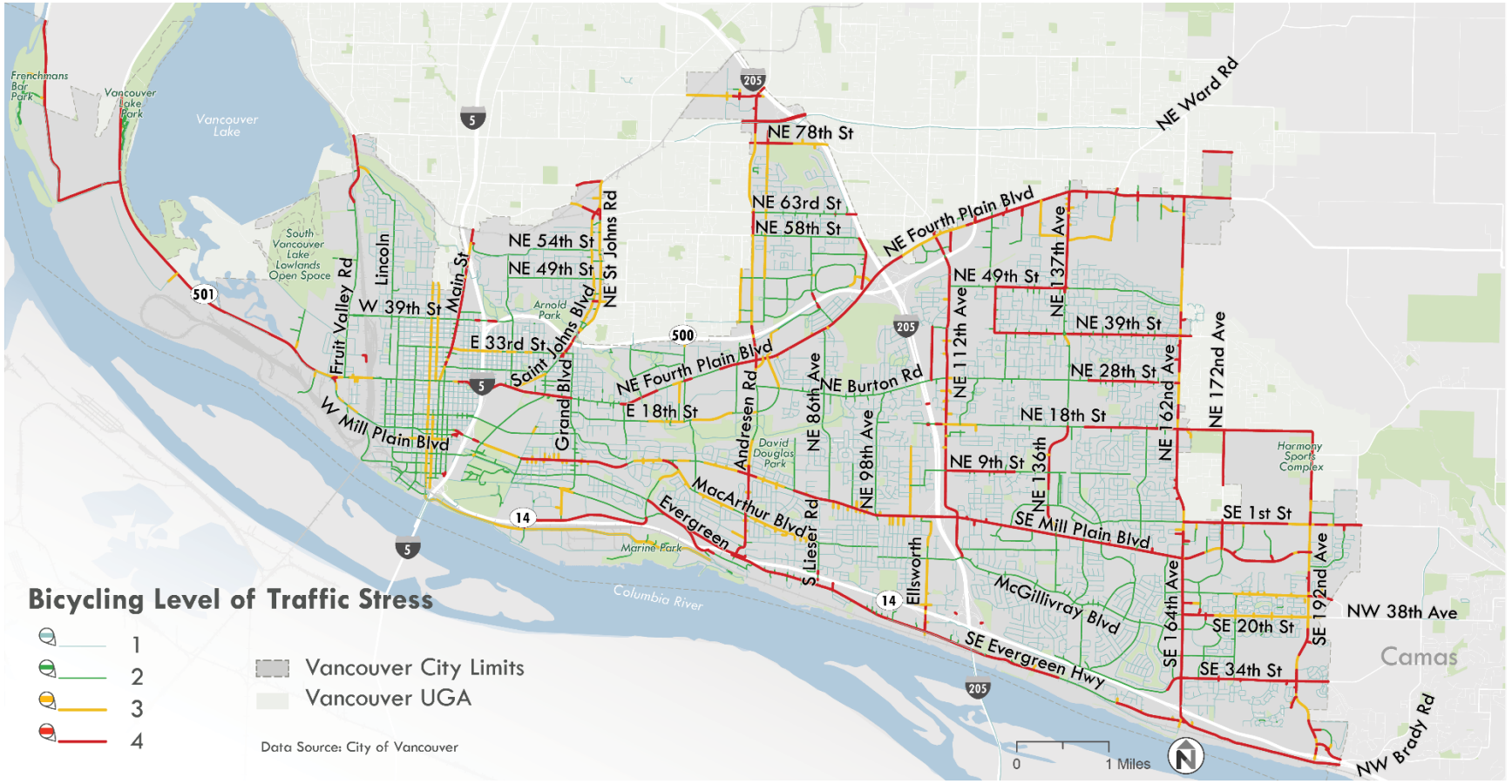
- **Presence and nature of bicycle facilities:** A visual analysis, using aerial imagery, differentiated bike lanes and wide shoulders, and recorded the width of bike lanes. This process captured areas where bike lanes are discontinuous and disrupt comfort and safety for people cycling.
- **Presence and nature of parking lanes adjacent to bicycle facilities:** A visual assessment of existing bike facilities determined the presence of parking adjacent to bike lanes outside downtown.
- Streets classified as Private Roads, Alleys, and Driveways were not assigned an LTS score, but were included for the purposes of analysis to the degree to which they interact with the street network.
- Traffic volume data was not available, and intersection approaches and pedestrian refuge islands were not evaluated.

[7] Methodology is based on the Mineta Transportation Institute Low-Stress Bicycling and Network Connectivity Report (updated June 2017). LTS assesses both travel along a street and through an intersection. A final LTS score is assigned to each street based on the weakest link principle, meaning that the lowest scoring portion of the street (segment, intersection) is assigned to that street link.

KEY TAKEAWAYS

- Neighborhood streets are comfortable for riding but are surrounded by high-stress collectors and arterials, creating an island effect – people can take short trips in their neighborhood but cannot connect to other destinations.
- Of the existing bike facilities, most would be considered deficient when accounting for level of traffic stress (See below). Most of the existing bikeways are not comfortable for people of all ages and abilities. These facilities would need to upgraded with traffic calming, additional separation from traffic, and wayfinding, to serve as viable segments of the bike network.

Figure 31 City of Vancouver Bicycling Level of Traffic Stress



8 TRANSIT

C-TRAN is the area's regional transit service provider that serves Clark County and the City of Vancouver. C-TRAN's services also extend across the Columbia River into Portland, connecting to key destinations. A few connecting providers are also available, including:

- Skamania County Transit – Providing fixed route service from Vancouver's Fisher's Landing Transit Center to Carson, Washington
- Lower Columbia Community Action Program – Providing transportation to older adults in Cowlitz and Wahkiakum Counties that live outside the River Cities Transit service area that need to travel to the Portland-Vancouver area for medical appointments. Service is capped at two round trips per month per person.
- Amtrak –Vancouver Station links riders to Vancouver, British Columbia to the north and Los Angeles to the south.

This analysis focuses on C-TRAN, as the provider with the most relevance for Vancouver residents and employees. Figure 32 shows the existing route network overlaid on top of population and employment densities.

KEY TAKEAWAYS

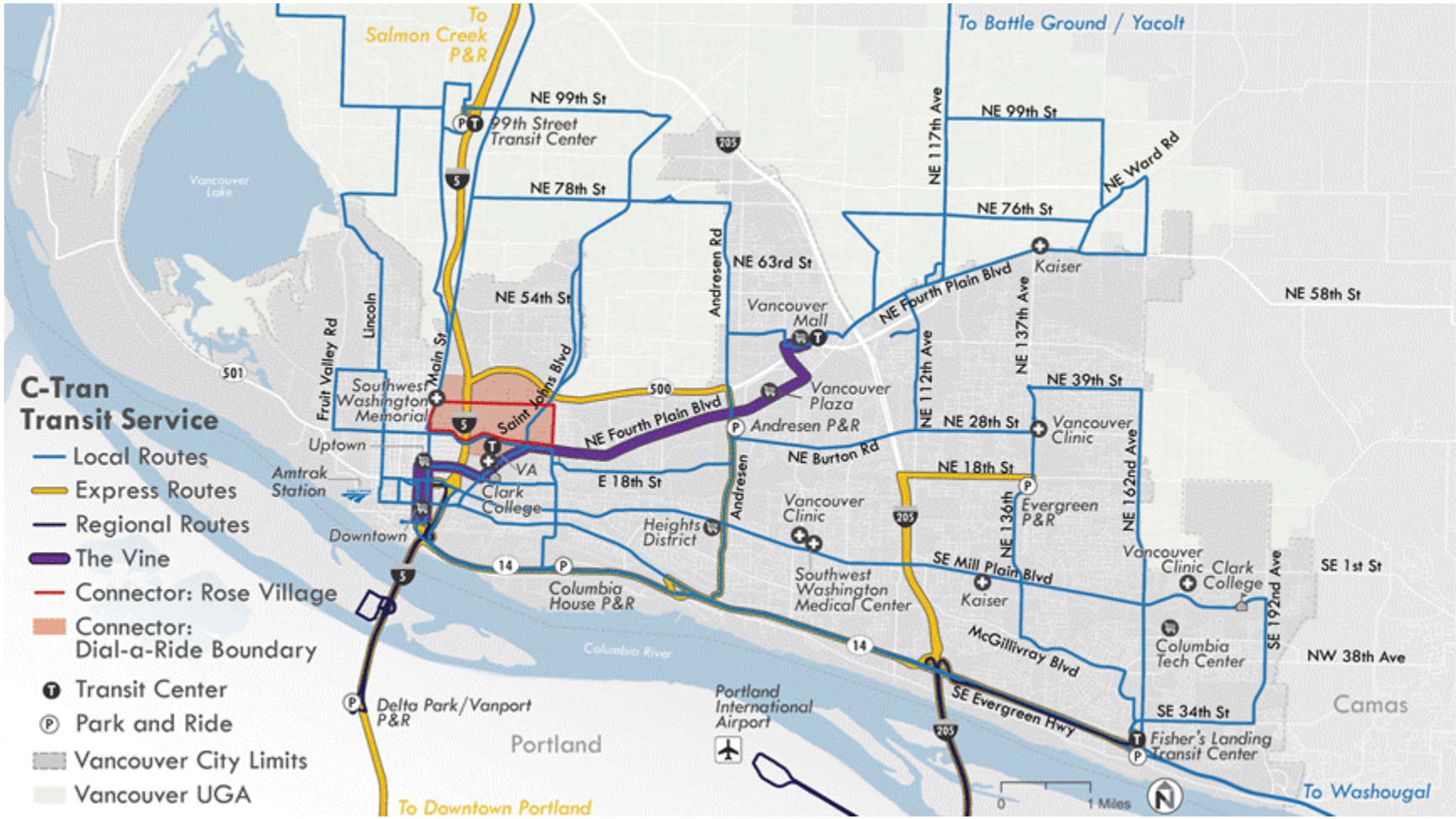
- The Vine is the system's highest-ridership route. Route 37 (Mill Plain/Fisher's), Route 60 (Delta Park), and Route 71 (Highway 99) round out the top 4.
- Mill Plain Boulevard will be the next corridor added to The Vine BRT network. Service on Mill Plain is anticipated to open in 2023. Adding BRT service to Highway 99/Main Street would be the next potential addition to the system.
- In 2019, 70% of fixed route trips operated on-time, lower than the standard of 90%.
- Vanpool ridership has dropped 41% between 2015 and 2019.

OVERVIEW OF C-TRAN

C-TRAN is the public transit provider for Clark County and the City of Vancouver and provides:

- **Local Service:** Regular bus service with frequent stops, typically spaced every few blocks.
- **Regional Service:** Service that crosses into Oregon and connects to TriMet's MAX service and Portland International Airport.
- **Express Service:** Commuter service connecting Vancouver to downtown Portland and Marquam Hill. Service is generally provided only during peak commuting periods.
- **Bus Rapid Transit (BRT):** Branded "The Vine," BRT is more frequent and has longer hours of operation than other routes. Stops are spaced farther apart.
- **Flex:** Branded as "The Connector," flex is an on-demand service. In Vancouver, Connector is offered at Rose Village.
- **Vanpool:** Program that allows groups of 5 to 12 people traveling at least 10 miles in each direction to rent a van from C-TRAN for commuting. Trips must start and/or end in the C-TRAN service area.

Figure 32 Existing Transit Network



PARK AND RIDE/CARPOOL LOTS

C-TRAN operates six park and ride lots, four of which are in Vancouver. All have free parking. Park and ride capacity and utilization are:

- Evergreen Park and Ride: 267 spaces (2019 Utilization: 15%)
- Andresen Park and Ride: 100 spaces (2019 Utilization: 98%)
- Fisher's Landing Transit Center: 761 spaces (2019 Utilization: 65%)
- Columbia House Drive and Park (no transit service): 34 spaces (2019 Utilization: 81%)

PLANNED IMPROVEMENTS

Based on a review of the C-*TRAN 2030* and the C-*TRAN 2019-2024 Transit Development Plan*, the following major improvements were identified for the region:

- New park and ride at I-205 at 18th Street interchange to replace Evergreen Park and Ride (2021-2022)
- New park and ride at I-5 at 219th Street and new Express Route 219 with service to Vancouver (timeframe unknown)
- New Mill Plain BRT line (expected to begin operation in 2023)
- New Highway 99 BRT (would follow after the Mill Plain BRT line)
- Increased frequency on Route 164: Fisher's Landing Express to Portland (2028)

SYSTEM PERFORMANCE AND PRODUCTIVITY

Ridership

Fixed route and demand response ridership have remained steady from 2015 to 2019. Vanpool ridership has fallen 41% from 2015 to 2019.

The Vine is the highest-ridership route. Route 37 (Mill Plain/Fisher's), Route 60 (Delta Park), and Route 71 (Highway 99) round out the top 4. Route 37 and 71 are future Vine routes. May 2019 average weekday boardings by stop is presented in Figure 33.

Ridership on C-TRAN has dropped since the COVID-19 pandemic. Average daily fixed-route ridership in June 2020 was 43% lower than it was in June 2019.

On-Time Performance

C-TRAN defines fixed route trips as being on-time if the bus is 0 minutes early or less than 5 minutes late. In 2019, 70% of fixed route trips operated on-time, lower than the C-TRAN standard of 90%.

Productivity

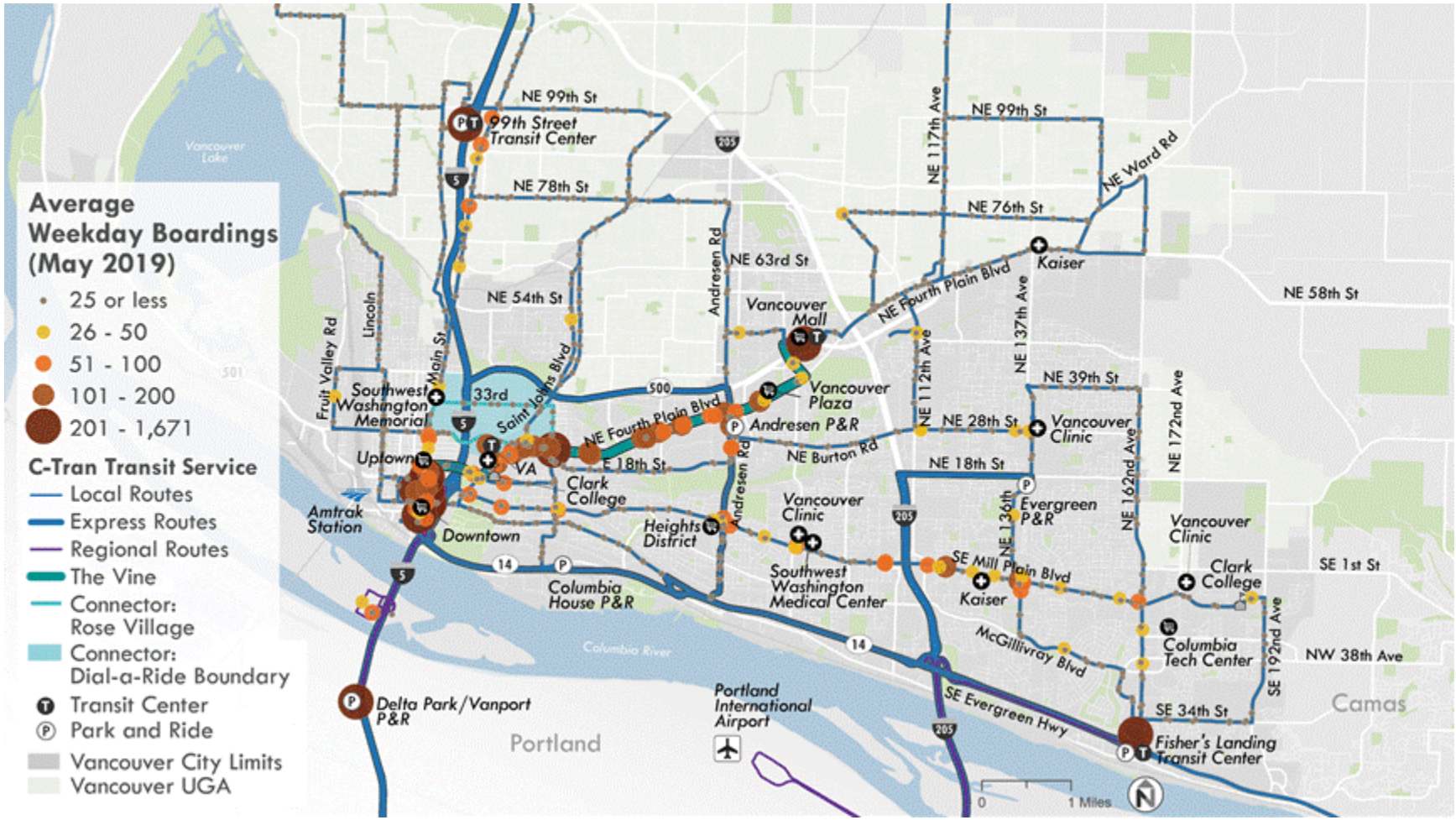
2019 passengers per revenue hour:

- Fixed Route: 21.5 (This is comparable to other similar sized cities)
- The most productive all-day routes are Route 60 (Delta Park) and The Vine, which exceed 35 passengers per revenue hour.
- Demand Response: 2.7

2019 operating cost per passenger trip:

- Fixed Route: $7.32
- Demand Response: $54.33
- Vanpool: $10.96

Figure 33 May 2019 Average Weekday Boardings by Stop



9 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) reduces drive alone trips through policies, programs, and incentives. If the number of drive alone trips can be decreased, there are downstream benefits for many other transportation goals. Trip reduction is especially important on congested routes and/or at congested times of day. The most successful TDM programs have multi-pronged strategies, including but not limited to:

- Encouraging shared commutes in carpools or vanpools.
- Incentivizing the use of transit, such as fully or partially subsidized transit passes.
- Supporting bicycle and pedestrian travel to work and/or for trips during the workday.
- Policies allowing telework and off-peak trips.
- Commute challenges to gamify trip reduction and incentivize non-driving modes through rewards.

TDM programming in Vancouver includes local programming as well as participation in the statewide Commute Trip Reduction program, requiring employee drive-alone trip reduction. The state of Washington adopted the Commute Trip Reduction (CTR) Law in 1991 to reduce air pollution, traffic congestion, and fossil fuel consumption. CTR programs are meant to reduce drive alone trips through a series of strategies and incentives, enacted by the employer, such as offering transit passes, facilitating rideshare, or encouraging telework. More details about Washington's program and employers impacted in Vancouver is in the following section.

LOCAL PROGRAMS

The City of Vancouver, C-TRAN, and the Regional Transportation Council (RTC) fund and administer several TDM programs, including:

- **Get There SW Washington.** A trip planning tool that includes both information regarding alternative modes of travel in Southwest Washington and a localized RideAmigos smartphone application for easier access. This platform offers supplemental data and incentive tools for public agencies and employers.
- **C-TRAN Vanpools.** C-TRAN, the regional transit agency, offers its own vanpool program to facilitate travel for groups of five to twelve commuters who want to share the cost of travel. C-TRAN supplies vans for use that they own and maintain.
- **Destination Downtown**. A program that incentivizes downtown employees to track their commute trips and earn rewards for commuting via transit, carpooling, or active modes.

COMMUTE TRIP REDUCTION (CTR)

Washington's Commute Trip Reduction law applies to employers with more than 100 employees who start work from 6-9 am on weekdays and in counties with a population greater than 1,500,000 (which includes Clark County). WSDOT administers the program.[8] CTR has also been codified into Vancouver's Municipal Code – Chapter 18.12.

CTR-affected employers must create a plan to reduce the number and length of Drive-Alone Trips (DAT). Employers must administer a biennial survey through an employer-designated Employee Transportation Coordinator (ETC).

The City of Vancouver's City Hall is an example of a CTR-affected site, with 231 employees. The City offers subsidized transit passes, bicycle incentives, and carpool/vanpool subsidies. They also provide on-site amenities including lockers, covered bike parking, and showers. Compressed work week schedules are also available.

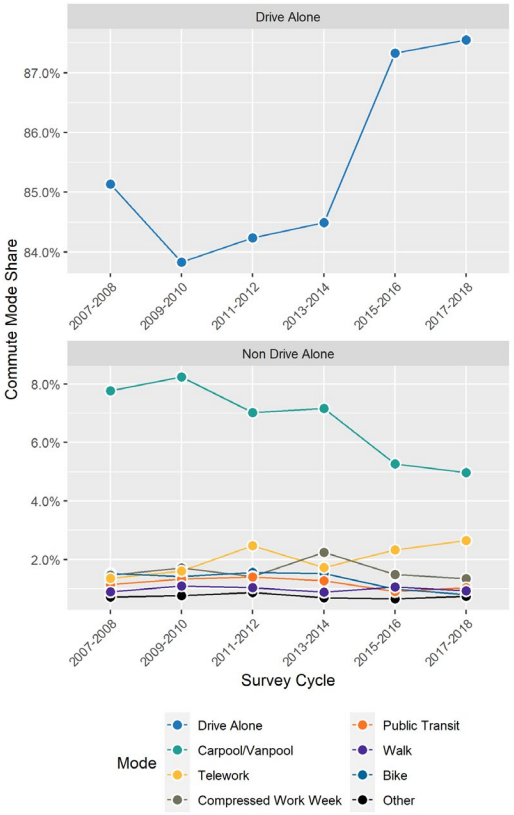
Vancouver's 2006 CTR Plan set a goal of decreasing drive alone trips by 10% and decreasing vehicle miles traveled (VMT) by 13% by 2011. Neither of these goals were met – VMT and DAT have increased. Vancouver and CTR-affected employers overall are not meeting their targets.

CTR Performance

CTR affects 38 employers with 19,000 employees in Vancouver as of the 2017/2018 survey cycle. Figure 34 illustrates the commute mode share for these sites from 2007-2018. A map of Vancouver's CTR effected employers is provided in Figure 35.

The Drive Alone Rate (DAR) increased by approximately 2.5 percentage points between the 07/08 and 17/18 survey cycles. It appears most of this shift can be attributed to a decline in the carpool/vanpool rate. Telework increased over this period and may continue doing so in survey cycles following the COVID-19 pandemic. Other modes comprise less than 2% of trips.

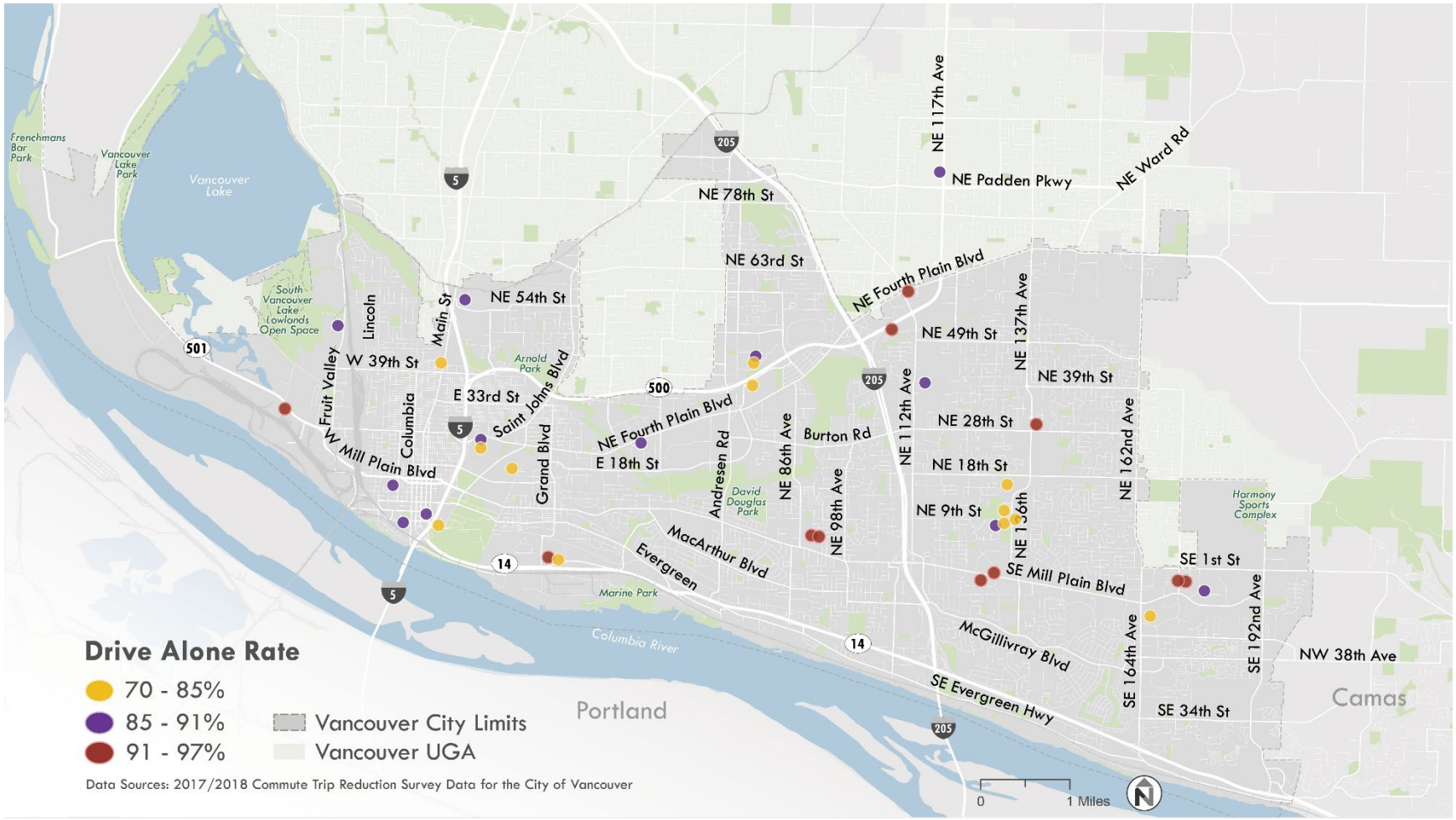
Figure 34 CTR Survey Mode Shares for City of Vancouver Sites (2007/2008 to 2017/2018)



Source: 2007/2008 – 2017/2018 Commute Trip Reduction Biennial Survey Results (for CTR affected sites within the City of Vancouver). Aggregated from Census Tract level data.

[8] RCW 47.04.170 http://apps.leg.wa.gov/RCW/default.aspx?cite=47.04.170

Figure 35 Vancouver's CTR-Affected Employer Locations



10 INTELLIGENT TRANSPORTATION SYSTEMS

Intelligent Transportation Systems, or ITS, are technology-based tools that help manage traffic and improve roadway operations without expanding roadway capacity. The City works with WSDOT, Clark County, C-TRAN, and other local jurisdictions to coordinate, manage, and deploy ITS projects through a regional collaboration with RTC. RTC's Vancouver Area Smart Trek (VAST) Program, established in 2001, has been a successful collaboration opportunity for the City to plan and build ITS infrastructure. The ITS element of the program focuses on identifying regional needs and potential joint funding sources for the communications, and associated infrastructure and technology required to improve operations.

VAST is just one way that the City can implement ITS. Since 2011, the City has developed an asset management plan to track and manage City assets, including any ITS infrastructure already in place. Below is an inventory of ITS infrastructure elements that the City uses and/or maintains.

Fiber Communications Network

A connected fiber network is the physical medium that allows technology in the field to connect to each other and to the communications centers in the region. It includes fiber optic cables owned by individual agencies and joined at hubs and switches. A comprehensive network enables the City to control the flow of traffic with its signals, access ITS devices remotely, and monitor conditions through detection systems and cameras. Corridors with fiber (as of 2016)[9] include:

- Fourth Plain Boulevard
- Mill Plain Boulevard
- Main Street
- St Johns
- Andresen Street
- 28th Street
- 138th Street
- 172nd Street
- 192nd Street

[9] Existing Fiber Optic Network, Figure 2-1, Regional Communications Plan, Vancouver Area Smart Trek, 2016.

Notably, capital projects currently in development include fiber. It is often required or strongly encouraged by funding agencies and broader regional policies.

Figure 36 Example of a Traffic Signal and Traffic Signal Controller

Traffic Signal Technology

A majority of the traffic signals in the region are directly or indirectly connected to the fiber network. It is common for agencies to collaborate on signal timing and operations across jurisdictions to allow for better signal coordination on arterials across agency boundaries. Traffic signal technologies in use by the City of Vancouver include:

- Remote Access for most signals apart from downtown Vancouver
- Emergency Vehicle Preemption at all signals (Opticom Infrared)
- Transit Signal Priority (Opticom GPS)
- Battery Backups on all principal arterials

Detection Systems

The following detection systems are being used by the City to drive the operation of traffic signals, detect bicyclists approaching intersections, monitor congestion levels on the freeways, and provide travel time information to operators and roadway users.

- Video detection at some signals (Miovision for turning movement counts)
- Loop detection (At most signals)
- Radar (Wavetronix)

Other ITS Technology

In addition, through the VAST program, real-time sharing of video, traffic detection, and incident data occurs between WSDOT, Clark County, and the City of Vancouver.

11 SMART MOBILITY

New technologies are expanding mobility options for residents of Vancouver, but are also creating new pressures on Vancouver's streets. Technology-enabled mobility is a rapidly-changing field affecting how people move, how people access transportation information, how goods are delivered, and how transportation services are provided.

Efforts are currently underway to develop a strategy for becoming a smart community. Together with the Regional Transportation Council (RTC), WSDOT, Clark County, and C-TRAN, Vancouver has been working with the International Data Corporation (IDC) to understand current trends in smart communities and to benchmark the region with peer cities.

Based on survey results, IDC found that the Vancouver region has a solid foundation in network/connectivity, data privacy, and cybersecurity, and that innovation is generally encouraged. To build on the region's strengths, IDC noted the importance of standardizing and formalizing tools and processes, sharing data, and continuing to educate stakeholders.

WHAT EXISTS IN VANCOUVER TODAY?

Shared Mobility

Shared mobility enables people to use publicly available transportation services, eliminating the need to own or use a personal vehicle. This reduces the need for car ownership. Shared mobility services include car sharing, micromobility (bike, scooter, moped), on-demand ridesharing (carpooling and vanpooling), ridehailing services, and on-demand transit services (microtransit).

Source: Tysons Partnership, Inc

Ridehailing

Ridehailing companies like Uber and Lyft have enabled Vancouver residents to hail rides since 2015. These services match riders with drivers in real-time through mobile apps that accept payment via credit card. Most people hail a ride for trips within one to three miles long, though longer trips carry people to other regional destinations, like the Portland International Airport.

Despite the many benefits of ridehailing – such as reduced drunk driving and improved first/last mile access to transit – ridehailing services contribute to increased traffic congestion, transit ridership decline, and are often limited to banked customers and able-bodied riders.

Car Share

Car sharing enables people to reserve and rent a car on an hourly, per-minute, or per-mile basis. Peer-to-peer car sharing services like Turo, available in downtown Vancouver, provide a platform for people to rent vehicles from individual car owners.

Station-based car share enables customers to pick up and return a rentable vehicle from a dedicated parking location. At the Green Leaf Uptown Apartments in Vancouver, the Envoy car sharing service allows residents to reserve on-site electric vehicles using an app. While Zipcar no longer operates in Vancouver due to a lack of business, the City is considering the company's return to downtown in response to an increase in residential development along the waterfront.

Source: Ryd

On-Demand Shuttle

An on-demand shuttle, or microtransit, is an app-enabled and dynamically-routed service within a designated zone. Stops are determined by each rider and routes are adjusted in real-time based on rider demand and requested stop locations. In 2018, Ryd debuted in Vancouver as a free on-demand shuttle service. The service runs from 8:30 a.m. and 4:30 p.m. and the service area is roughly bounded by 6th Street, 15th Street, Franklin Street, and Fort Vancouver Way. The vehicles are 100% electric and can accommodate five passengers.[10]

Source: SkedGo

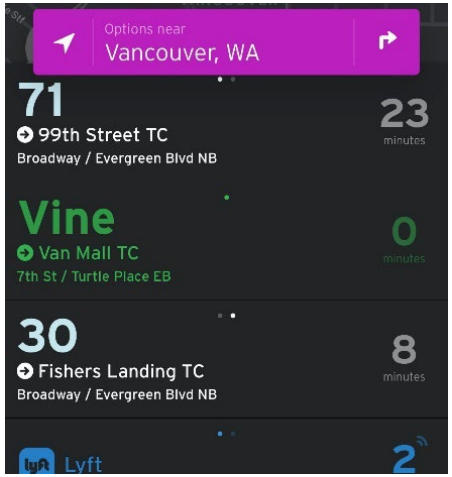
Mobility as a Service

Mobility as a Service (MaaS) enables people to plan, book, and pay for their transportation in a centralized app. The following features are already available in Vancouver and serve as building blocks for MaaS.

[10] It is unclear if the service is still operating during the COVID-19 pandemic.

Map Applications

Map applications such as Google Maps, Apple Maps, Citymapper, and Transit App are forms of MaaS that provide information about transportation options, schedules, and fares. By ensuring that real-time transportation data is accessible to app developers, people can make more informed decisions about how they travel. For example, someone may decide to use transit if the real-time information says it is the cheapest and/or fastest option compared to driving, hailing a ride, biking, or walking.



Source: Transit App

Fare Integration

Fare integration enables simpler and more affordable transfers between systems. Riders can use one mobile application or payment technology to pay for multiple transportation services.

TriMet's Hop Fastpass allows riders to pay for TriMet, C-TRAN, and Portland Streetcar using one fare medium.

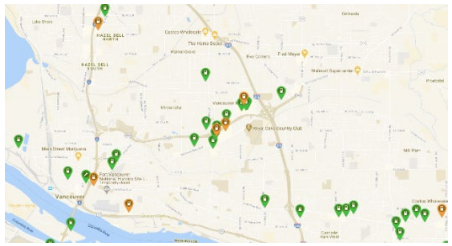
Fare integration can result in increased transit ridership. Given that C-TRAN is the only transit provider in Vancouver, fare integration might take the form of an integrated payment application among C-TRAN and other private car share, ridehail, microtransit, and micromobility service providers.

TriMet's Hop Fastpass (Source: TriMet)

Electric Mobility

Transportation is the greatest contributor to greenhouse gas emissions in the United States. In response, the transportation industry is rapidly manufacturing electric vehicles (EVs). Electric vehicle charging infrastructure is critical to support EVs. Clusters of EV charging stations exist near Clark College, Fisher's Landing Transit Center, the car dealerships along NE Auto Mall Drive, Vancouver Mall, and within the Columbia Tech Center area.

C-TRAN plans to add electric buses to their fleet and invest in public EV charging stations at more Park & Rides.



EV charging stations in Vancouver (Source: PlugShare)

Mobility Hubs

Mobility hubs are places where mobility services converge, facilitating convenient, safe, and accessible connections between modes. Mobility hubs are typically designed around places where multiple transit services intersect and often includes amenities such as package delivery lockers, retail kiosks, and food trucks. Many of C-TRAN's transit centers currently operate as mobility hubs.

Rendering of mobility hub (Source: Nelson\Nygaard)

Urban Delivery Services

On-demand delivery services like Amazon Flex, Instacart, DoorDash, and UberEats will make lasting changes to how people travel, shop, and receive deliveries. Personal trips to the supermarket or a local restaurant may no longer be necessary. But consequences include increased vehicle miles traveled and congestion. In a downtown context, food delivery services also highlight the need to manage curb space for drop-off.