TRIMET

# Pedestrian Network Analysis


*A safer, easier, more comfortable walk to transit*

# Acknowledgements

Nathan Banks, Colin Maher, and Jessica Engelmann contributed to this report. Thank you to Technical Advisory Committee members, Transpo Group and ESRI for their software support, and local agency staff who helped collect roadway and intersection information for each of the focus areas.

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Dear Reader:

Why sidewalks? The answer: every transit rider is a pedestrian first. Whether they walk or roll – how they get there matters.

People want to walk to work, shopping, exercise, school, parks or transit centers. This report provides guidance for where to make sidewalk and crossing investments. Let's focus on places that have the greatest need and that present the greatest opportunity.

This Pedestrian Network Analysis is a first. TriMet asked the question: where should investments be made to improve access to transit? We analyzed 7,000 transit stops to see what makes a great environment for pedestrians and what doesn't.

- **Property on walkable streets is worth more.** Real estate agents advertise the Walk Score (walkscore.com) of homes. Businesses choose to locate in walkable areas, and developers see a higher return on their investment in walkable communities.
- **We want to be healthy and walking will help get us there.** A good physical environment promotes walking, which in turn has positive health benefits.
- **Walkable streets and access to transit are vital.** People, particularly our elders, may not feel comfortable driving. That shouldn't mean the loss of their mobility freedom.

It is our hope that counties, cities and towns in our region will find ways to make streets easier and safer to cross, and create better walking environments by adding or widening sidewalks, adding landscaping or planting street trees, calming traffic and/or adding street lighting. Likewise, TriMet will continue to make investments in transit service and transit stops.

Sidewalks and crosswalks make a big impact on our communities. Everyone wins with investments that make it safer, easier and more comfortable to walk.

Regards,

Neil McFarlane
TriMet General Manager

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# Executive summary

Why is TriMet focusing on the safety and quality of places to walk? Because every transit rider is a pedestrian.* Whether walking on foot or rolling in a wheelchair, all transit riders depend on being able to get to and from a stop safely and comfortably. Thus, the quality of the local pedestrian network is often a deciding factor when a person is considering whether to take transit. It can determine whether someone wants, or is able, to take the bus or train.

As the region's primary transit service provider, TriMet is committed to working with local, regional, state, and federal partners to make the region a more livable place. The interplay between walking and taking transit is fundamental to livability. The Pedestrian Network Analysis Project provides TriMet and its partners a way to objectively assess areas of its service district for needs and opportunities, communicate priorities, and eventually work with partners to program investments that provide better pedestrian access to transit stops.

Specifically, the pedestrian network analysis objectives are fivefold:

- Address the needs of seniors, people with disabilities, the economically disadvantaged, and school children;
- make existing transit customers walking trips safer, more direct, and comfortable;
- improve pedestrian safety and comfort through design and operations;
- attract new transit and walking trips;
- leverage other public and private investments.

TriMet anticipates infrastructure investment resulting from this project will serve two purposes: to allow more people to access transit in a safe, comfortable, and attractive environment; and to encourage more localized, short walking trips. To help track progress and measure results once implementation occurs, the project proposes three performance targets:

- increase the number of residents who perceive the Focus Areas to be safe and comfortable by 30%
- increase pedestrian volumes within the Focus Areas by 20%
- increase ridership at transit stops within the Focus Areas by 10%

Tracking performance takes resources. It will be important, as focus area projects move toward implementation, to consider how performance monitoring will be built into the process, including how it will be funded. In the long-run, the performance targets will help TriMet and its partners understand which types of investments are most effective and which types of areas are most responsive to various pedestrian treatments. The performance targets are not intended as a pass/fail evaluation tool, but rather as a structured way for TriMet and its partners to guide expectations, learn from experience, and make informed decisions.

* When the term "walk" and "pedestrian" is used in this report it should be read with an understanding that it encompasses people who are both walking on foot and rolling using mobility devices.

# Chapter Summaries

### Chapter 1: The case for making areas near transit stops walkable

The first chapter provides information on why safe, direct, and comfortable pedestrian access to transit stops is important.

### Chapter 2: Analyzing every transit stop—where to start?

The second chapter walks through the methodology used to identify and prioritize high activity, need, and opportunity areas where TriMet anticipates investment in the pedestrian environment will likely result in the highest economic, social, and health benefits for the community, as well as accessibility and ridership benefits for TriMet.

### Chapter 3: Ten focus areas—pedestrian & transit needs

The third chapter focuses on ten areas in TriMet's service district where field assessments were conducted and existing conditions and needs identified. The chapter provides information about places people can walk to within 15 minutes and access by transit within 15 minutes. It also documents observed behaviors of people traveling in the area and recommends actions to take.

### Chapter 4: Making the walk safer, easier, and more comfortable

The fourth chapter presents introductory information on pedestrian treatments. Pedestrian treatments for roadways, sidewalks, street corners, street crossings, and transit stops are included. For each type of treatment, the treatment's purpose, things to consider, and costs are included.

### Chapter 5: Policy recommendations and where to find more information

The final chapter contains policy recommendations to help implement pedestrian and transit investments. References to additional sources of information are included in this chapter.

Detailed information about the project methodology, analysis results, and focus area audits can be found in three supporting technical memos produced as part of the Pedestrian Network Analysis Project.

Technical Memo #1: Targets, methodology, and data inventory
Technical Memo #2: Analysis results
Technical Memo #3: Existing conditions and needs analysis for ten focus areas

Chapter 1

# The case for making areas near transit stops accessible and walkable

# 1.0 The case for making areas near transit stops accessible and walkable

There are many compelling reasons to make pedestrian accessibility to transit stops a priority. The first is people like and ***want*** to walk.

There are many societal and personal benefits an accessible transit system has to offer:

**Keeping people healthy:** The U.S. Centers for Disease Control and Prevention recommends adults get 150 minutes of moderate-intensity activity every week, such as walking. Walking to transit helps people stay active and healthy.

**Saving families' money:** Transportation costs are often the second biggest expense in a family's budget. According to the American Automobile Association (AAA), the average annual cost of owning a car in 2010 was $9,520. By comparison, a TriMet annual Adult All-Zone Pass costs $968, just over 10 percent of the cost of owning a car.

**Maintaining independence:** Public transportation provides travel options to people who do not want to, cannot afford to, or are unable to drive, like the very young and very old.

In recent scientific polling conducted by Metro, the Portland Metropolitan Planning Organization, 80 percent of people said they wanted to live and work in areas where they could walk, bicycle, and take transit. Investing in infrastructure that makes it safer, easier, and more comfortable for people to walk to places like the store or a transit stop helps communities create the places people want to live and work and helps meet two of the project's objectives:

- To improve pedestrian safety and comfort through design and operations;
- To attract new transit and walking trips;

Likewise, investing comprehensively and strategically in infrastructure that makes places engaging, easy, and desirable to walk helps communities stay vibrant and attract private investment. Metro, with the assistance of a private consultant specializing in real estate development, completed a study in 2010 assessing the impact public investment can have on development feasibility. The consultant's conclusion was that public investment in high quality streetscapes, bicycle facilities, and transit service can "tip the scale in the direction of development feasibility." Figure 1 visually illustrates what might be possible in an area if a package of pedestrian, bicycle, and transit investments are made. Making these types of infrastructure investments can help meet the objective:

- To leverage other public and private investments.

**Figure 1: What might be possible in the City of Portland on SE Foster Rd. Between SE 82nd Ave. & I-205**

Source: Metro's The Impact of Amenities on Development Feasibility


- Minimum width sidewalk
- No marked pedestrian crossings
- Many driveways
- No street trees
- No pedestrian oriented place to walk to
- No people walking

- **Wider sidewalk**
- **Marked pedestrian crossings**
- **Fewer driveways**
- **Added street trees**
- **Added bicycle lane**
- No pedestrian oriented place to walk to
- Few people walking

- Wider sidewalk
- Marked pedestrian crossings
- Fewer driveways
- Added street trees
- Added bicycle lanes
- **Pedestrian oriented places to walk to**
- **Many people walking**

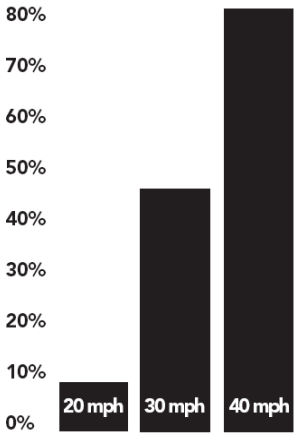
Finally, people are already walking under unsafe, difficult, and/or uncomfortable conditions. There are places around the region where people have to walk on roads without sidewalks, cross at locations without adequate time, or cross streets at unmarked intersections to get anywhere, including to a bus stop. Retrofitting public right-of-ways to be safer and more desirable to walk on is necessary to correct for past oversights in infrastructure designs. Remaining aware of this is important in meeting the remaining two objectives of this project, to:

- Address the needs of seniors, people with disabilities, the economically disadvantaged, and school children;
- Make existing transit customers walking trips safer, more direct, and comfortable.

There are a number of factors impeding the ability of people to safely and easily walk around their community. High motor vehicle speeds are one of the major contributing factors to roads feeling unsafe. Figure 2 shows the chance of pedestrian death if struck by a vehicle moving at 20mph, 30mph, and 40mph. While the difference between 30mph and 40mph may seem small to a driver, in terms of the experience of riding in a car, the difference to a pedestrian is huge. If a person walking is hit by a car moving at 40mph she or he only has a twenty percent chance of survival. The survival rate goes up to fifty-five percent if the car is moving at 30mph and eighty percent if the car is moving at 20mph.

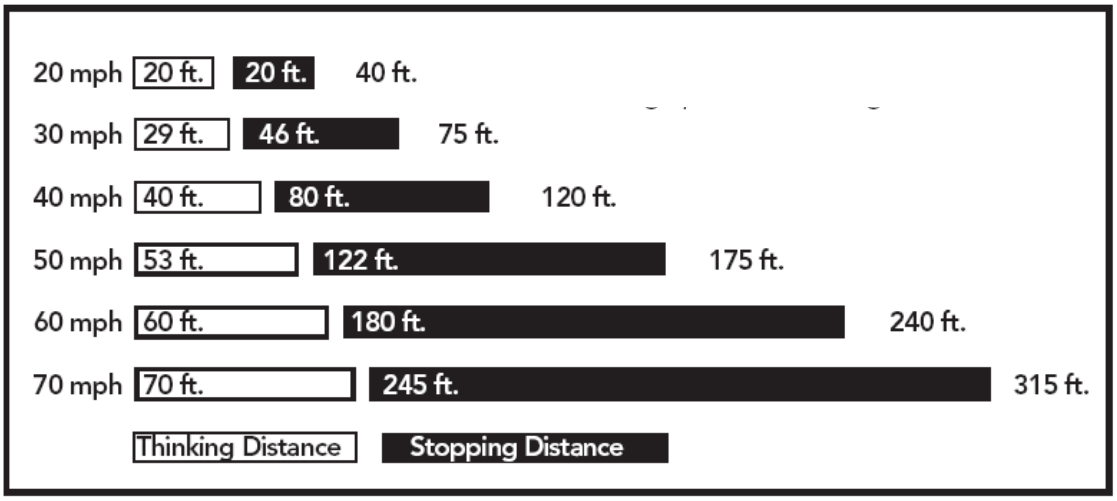
Also important is the amount a driver can see and the distance it takes to stop a moving vehicle. The faster a car or truck is moving, the less a driver can see and the longer it takes to stop. Figures 3 and 4 show, respectively, the distance it takes to stop and the cone of vision of a driver moving at two different speeds.

**Figure 2: Pedestrian's chance of death if hit by motor vehicle**




Source: *Killing Speed and Saving Lives*, UK Department of Transportation

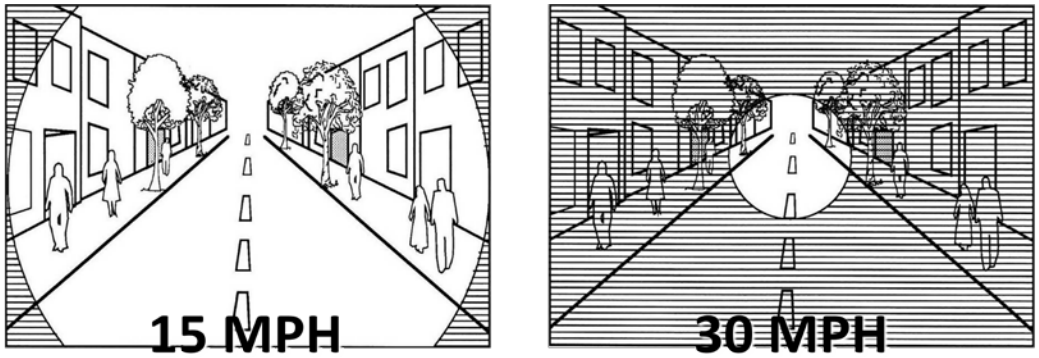
**Figure 3: Motor vehicle stopping distances**




Source: *Killing Speed and Saving Lives*, UK Department of Transportation

TriMet's highest ridership lines are located on arterial roadways. Arterial roadways are often the most suitable type of roadway for transit service, and often the only choice. There are usually many destinations along arterial roadways and they are designed to handle large vehicles, like buses. However, from a pedestrian's perspective arterial roadways can be difficult to cross and uncomfortable, or even dangerous to walk along. In the Portland Metro Region, many of the arterial roadways with transit service on them have posted speed limits in excess of 35mph and are designed for speeds even higher than the posted speed.

**Figure 4: Driver's cone of vision – the area where a driver focuses attention**




As speeds increase, "cone of vision" shrinks and driver pays less attention to surroundings.

Source: Michael Ronkin

Chapter 2

# Analyzing every transit stop
## Where to start?

# 2.0 Analyzing every transit stop—Where to start?

There are a number of factors that make transit feasible and well used in an area, for example ensuring:

- there are people living and working in the area and there is a mix of activities;
- streets are laid out in a manner where connections are easy and frequent;
- the pedestrian environment is inviting (e.g. safe, easy to use, and comfortable);
- buildings are oriented toward the street and designed for pedestrian access; and
- there is not an oversupply of parking, and parking is managed.

Figure 5 provides more details about these factors, including what typically works and does not work. All of the factors need to be present to get the optimum benefit from a transit service investment. It is the pedestrian realm, highlighted in figure 5, that this project hopes to influence. The project is designed to identify places which already exhibit factors that are working well, in terms of number of people and jobs nearby, street layout, and mix of uses, but are not working so well from the standpoint of the pedestrian. Parking and site design are also very important, but were outside the purview of this project.

**Figure 5: What makes transit work**

| Factor | Works | Doesn't Work |
|---|---|---|
| Number of People and Jobs Nearby | • Moderate to High | • Low |
| Street Layout | • Small blocks<br>• Grid system | • Long, winding streets<br>• Dead-end roads, cul de sacs |
| Mix of Uses | • Mix (commercial, residential, and office uses) | • Single use (e.g. all residential or all industrial within walking distance) |
| **Pedestrian Environment** | • **Wide sidewalks buffered by trees and/or on-street parking**<br>• **Low volume streets, slow traffic speeds**<br>• **Good lighting**<br>• **Pedestrian street treatments (benches, tree canopy, etc.)**<br>• **Frequent crossings**<br>• **Well-marked intersections with signalized crossings** | • **Narrow, or no sidewalks**<br>• **High volume streets, fast moving traffic**<br>• **Poor lighting**<br>• **No intersection marking and long pedestrian wait times.** |
| Site Design | • Buildings front the street and entrances are near the sidewalk | • Building set back from street and surrounded by surface parking |
| Parking | • Limited<br>• Managed parking | • Abundant<br>• Free |

## Project methodology

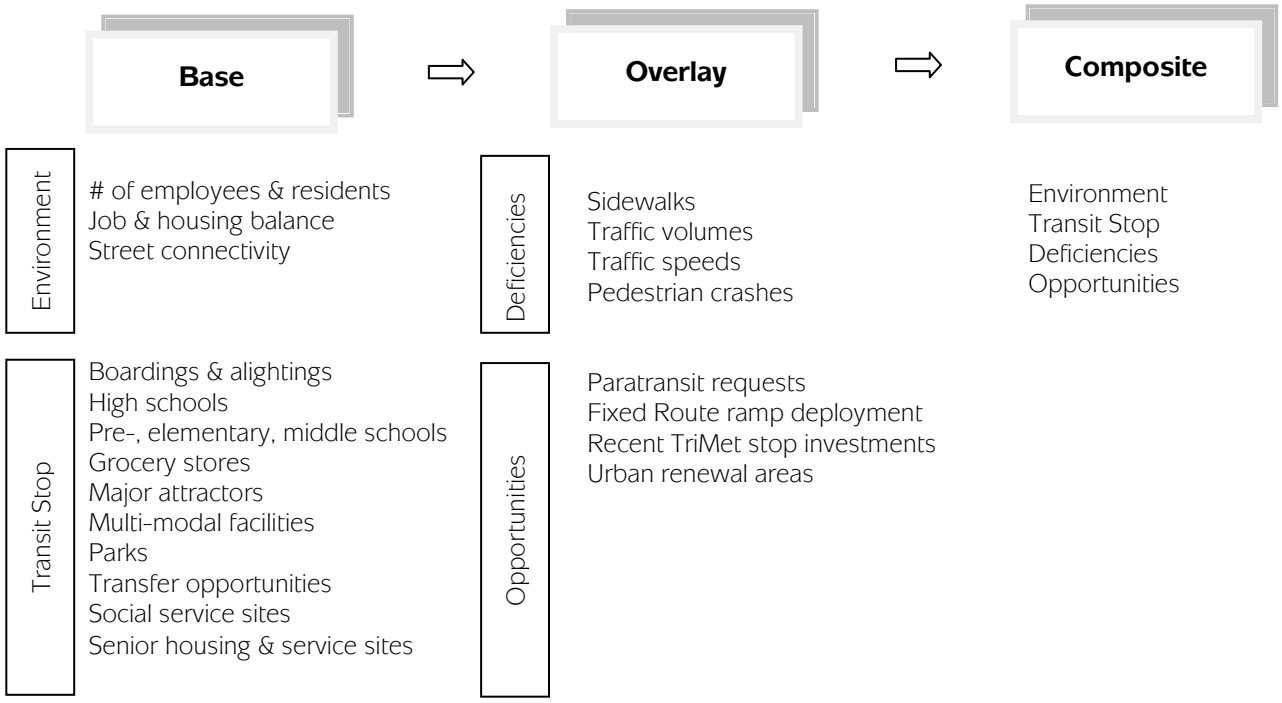
TriMet serves a 570 square mile area and has nearly 7,000 transit stops in its system, many of which could benefit from improved pedestrian access. It is unlikely communities can fix every pedestrian problem at once. Given the size of TriMet's system and the breadth of pedestrian needs in the region, it was imperative the pedestrian network analysis be data-driven, objective as possible, and able to communicate priorities. To accomplish this, the project analyzed each of TriMet's nearly 7,000 transit stops from a variety of perspectives, using Geographic Information Systems (GIS) to understand how transit stops fit into their surroundings and perform relative to each other.

The steps involved in the GIS analysis are shown in Figure 6. Each transit stop received a score of zero, one, or two for every step listed in the base and overlay analysis sections described below. The remainder of this chapter is organized around the analysis process. Each step of the base and overlay analysis is described. A brief explanation of why it is important is included. For more information about findings, key assumptions, and any caveats that might apply, please refer to Technical Memo #2: Analysis Results. This memo is available from TriMet upon request. Please refer to the cover page for contact information.

TriMet strongly encourages cities and counties to use the results of this study and to integrate similar types of information, like transit ridership, public transit transfer points, locations of grocery stores, senior centers, etc. into local planning efforts. TriMet is happy to provide information to assist with these efforts.

Chapter 3 and Appendices A and B provide information on how to do in-field and less computer based analysis. This type of field analysis can be done by anyone, for example by individual community members or by city professionals, like planners, economic development staff, and engineers.

**Figure 6: Pedestrian network analysis methodology**




The methodology consisted of two layers of analysis, combined into a single composite score.

- **Step 1—Base analysis** evaluated the overall transit supportiveness of an area, including density, mix of uses, street connectivity, stop level ridership, transfer opportunities, and the proximity of TriMet's transit stops to a variety of essential destinations like grocery stores, schools, senior housing and services, social services, major employers, colleges, hospitals etc. This step allowed the project to identify areas where pedestrian improvements would likely have the highest impact on the largest number of existing or potential transit users.

- **Step 2—Overlay analysis** identified deficiencies and opportunities near TriMet's transit stops. Deficiencies were defined as characteristics that make a place unpleasant or unsafe to walk like high auto traffic speeds, missing sidewalks, etc. Opportunities included potential resources such as urban renewal and providing more access to fixed route transit service, thereby reducing the need for TriMet's paratransit LIFT service.

- **Step 3—Composite score** Composite scores were calculated for each of TriMet's nearly 7,000 transit stops by combining scores generated in the base and overlay quantitative analysis steps. Based on the composite scores, clusters of high scoring stops were identified and compared to census tract maps that illustrates where there are above average concentrations of low-income households and communities of color. This comparison was done to help identify areas for more in-depth, on-the-ground assessment work, recognizing that areas with a higher percentage of low-income households will also likely be more dependent on public transportation and in need of high quality pedestrian infrastructure to access it.

Figure 7 shows how each step was weighted and scored. The sum of these scores resulted in a composite score for each stop that was used to compare one transit stop to another.

**Figure 7: High scores given to each TriMet stop or Transportation Analysis Zone (TAZ)**

| | |
|---|---|
| **Transit Environment** | |
| **Combined residential and employment density by TAZ** (TAZs with the greatest density = high score) | **2** |
| **Residential/employment ratio** (TAZs with the a ratio closest to 50/50 = high score) | **1** |
| **Average intersection density** (TAZ with the greatest number of intersections = high score) | **1** |
| **Transit Stops** | |
| **boardings and alightings** (stops with the greatest boardings and alightings = high score) | **2** |
| **Distance to nearest high school** (stops closest to a high school = high score) | **1** |
| **Distance to nearest grocery stores** (stops closest to a grocery store = high score) | **1** |
| **Distance to nearest pre-school, middle, or elementary school** (stops closest to a school = high score) | **1** |
| **Distance to nearest major attraction e.g. university, hospital, stadium, major employer** (stops closest to a major attractor = high score) | **1** |
| **Distance to nearest multi-modal facility** (stops closest to a multi-modal facility = high score) | **1** |
| **Distance to nearest park** (stops closest to a park = high score) | **1** |
| **# of connecting transit lines** (stops near the greatest number of connections = high score) | **2** |
| **Distance to nearest social service site** (stops closest to a social service site = high score) | **1** |
| **Distance to nearest senior housing/services site** (stops closest to a senior housing/service site = high score) | **1** |
| **Deficiencies** | |
| **Distance to a street without a sidewalk** (stops closest to a street without a sidewalk = high score) | **2** |
| **Located on a road with high traffic volumes** (stops located on roads with the highest traffic volumes = high score) | **1** |
| **Located on a road with high posted speeds** (stops located on roads with the highest speeds = high score) | **2** |
| **Located near a pedestrian crash site** (stops located closest to pedestrian crash sites = high score) | **2** |
| **Opportunities** | |
| **Located near an address with high paratransit (LIFT) activity** (stops nearest addresses with highest number of LIFT requests = high score) | **2** |
| **Stops with a high number of vehicle ramp deployment** (stops with highest number of ramp deployments = high score) | **1** |
| **Locations with recent TriMet bus stop and sidewalk investments** (stops located closest to stops with recent investment = high score) | **2** |
| **Urban renewal areas** (stops located in identified urban renewal area = high score) | **1** |

## Base analysis—transit supportive environment

Investments made in areas that exhibit transit supportive characteristics like moderate to high density of people, a balance of jobs and housing, and good street connectivity have a better likelihood of achieving positive project outcomes.

### Combined number of people and jobs nearby

The more people living and/or working in an area, the more people there are who need travel options. Likewise, the more people in an area means the more potential transit riders there may be to support greater levels of transit service.

### Jobs/housing balance

The greater the mix of land uses, the more transit service an area can typically support. A mix of uses allows people to move more easily from one activity to another without having to travel great lengths. It also allows creates travel demand throughout the day, which allows TriMet to provide more frequent service, attracting even more riders.

### Street network connectivity

Direct, short paths from one place to another make walking easier and more desirable. The more connected the street system is in an area, the easier it is to access transit.

## Base analysis—Transit stops

Investments made in areas where essential destinations are clustered, ridership is already high, and there are multiple transfer points have a better likelihood of achieving positive project outcomes.

### Boardings and alightings

Ridership is the most important factor TriMet considers when deciding how much to invest in a stop or a transit line. If pedestrian improvements are placed at stops with high ridership, many existing riders will benefit immediately.


### Distance to nearest high school

A large number of high school students are at an age where they are dependent on others for transportation, but mature enough to travel alone. The paths from a transit stop to any school must be safe. Recent "safe-route-to-schools" initiatives are working to prioritize pedestrian improvement near schools.

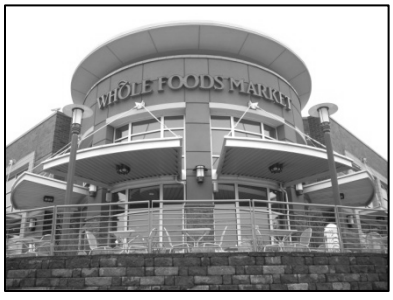
Photo: Portland public schools website

### Distance to nearest pre-school, middle or elementary school

While younger children do not typically travel to and from school alone on transit, it is still important that the paths from a transit stop to any school be safe. Middle school students are often at an age when they are just beginning to gain the autonomy to travel alone. Furthermore, all parents, school employees, and volunteers should have the ability to easily access schools by transit, bicycle, or foot.


### Distance to nearest grocery store

Grocery trips are a necessity for everyone. The proximity of transit stops to the region's grocery stores is important to consider when ensuring that everyone has sufficient and easy access to food in the region. Under the right land use and design circumstances, grocery trips can be short, frequent, and conducted on foot. Furthermore, grocery stores near transit stops provide more opportunities to combine travel trips.



**Distance to nearest major attractor**
Major attractors are important because they tend to be, or have the potential to be, major ridership generators. Major attractors include places like universities, stadiums, major shopping centers, large employment sites, etc.

**Distance to nearest multi-modal facility**
Multi-modal facilities are major transportation hubs like transit centers, intercity rail stations, or the airport. Places where people can switch to a different mode of travel. A smooth and convenient transition from one mode to another is something TriMet wants to facilitate.

**Distance to nearest park**
The proximity of transit stops to the region's parks is important to consider when ensuring everyone has sufficient and easy access to recreational opportunities and open space. Access to open space and parks contribute to a more livable environment for residents. Parks can offer a place to take a walk, relax, play, and exercise.

**Transfer opportunities**
Easy, reliable, safe, and accessible transfers between transit lines allow people greater access to a variety of destinations and more routing options. Transfer points are different than multi-modal facilities. They are not necessarily major transportation hubs, but rather a point where a person can switch from one bus or rail line to another.

**Distance to nearest social service sites**
Social service sites tend to be, or have the potential to be, major ridership generators, often serving people who are dependent on transit for their mobility needs. The proximity of transit stops to social service sites is important to consider when ensuring everyone has sufficient, safe, and easy access to social services in the region.


**Distance to nearest senior housing or service sites**
Seniors may be dependent on transit for their mobility needs. Fixed route transit service to locations serving seniors offers people an inexpensive and flexible way to maintain their mobility as they age. The proximity of transit stops to the region's senior housing and service sites is important when ensuring the region's senior population has sufficient, safe, and easy access to transit service.

## Overlay analysis—deficiencies

Investments made in areas where the walking environment is poor will make access to transit safer and more desirable, thereby increasing the likelihood that the project can achieve its desired results.

### Sidewalk incompleteness

The completeness of the sidewalk network is fundamental to understanding if people can safely walk to and from a transit stop.

### High traffic volumes

Roadways with high traffic volumes are less conducive to a safe and pleasant walking environment than roads with low traffic volumes. These roads tend to act as barriers for people who need to cross them.

### High traffic speeds

Roadways with high traffic speeds are less conducive to a safe and pleasant walking environment than roads with low traffic speeds. These roads tend to act as barriers for people who need to cross them,


### High pedestrian crash rates

Understanding where transit stops are located in relation to pedestrian crashes is important, because it may indicate there is a problem preventing people from safely accessing transit stops.

## Overlay analysis—opportunities

Investments made in areas where there are opportunities to secure funding, save on existing operational costs, or leverage other TriMet investments have the best chance of being implemented and are more likely cost effective.

### Paratransit requests

LIFT is TriMet's paratransit service. LIFT service is available for people who are unable to use regular buses or trains due to disability. At an operating cost of roughly $29/ride, it is an expensive service to operate. Fares only offset a very small portion of the cost. LIFT locations are important to understanding where there may be an opportunity to improve the accessibility of a transit stop that is serving someone who currently is unable to take fixed route transit because of a deficiency in the walking environment.

### Top stops with fixed route ramp deployment

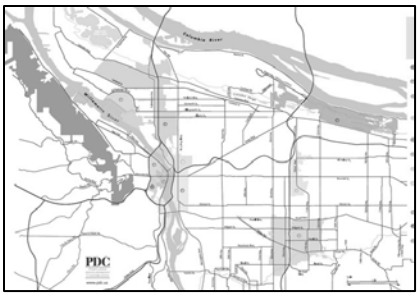
It is important to ensure people with mobility devices, strollers, shopping carts, etc. who choose to take fixed route transit, are able to safely and easily access transit stops. Stops with a number of high vehicle ramp deployments indicate where people are currently taking fixed route transit service and are in need of a walking environment that meets universal access standards.

### Recent TriMet bus stop investments

TriMet continuously makes improvements to select bus stops in the region. While these improvements are useful, they are sometimes limited in the pedestrian access they provide. The purpose of this factor is to capitalize on investments that TriMet already made, or plans to make, e.g. to build a sidewalk to a bus landing pad that TriMet already built.

### Urban renewal areas

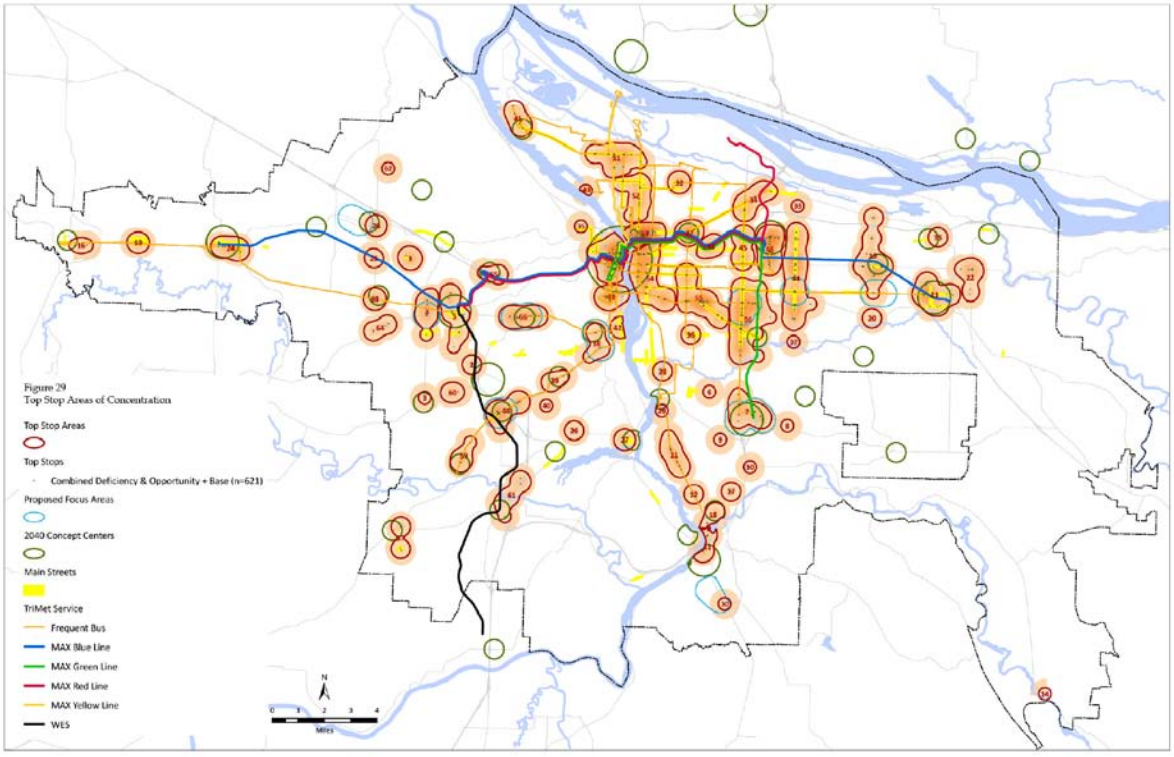
Some pedestrian investments may be eligible for urban renewal funds. Additional sources of funding provide an opportunity for faster implementation.



## Composite score

Transit stops that scored best in all of the analysis sections hold the most potential for achieving the project's desired outcomes: to increase actual and perceived safety, increase local pedestrian activity, and increase transit ridership. Of TriMet's nearly 7,000 transit stops, 621 scored high in terms of activity near the transit stop, deficiencies, and opportunities. The 621 stops fall into 60 clusters. For this analysis, we placed a half mile buffer around them to show the area of interest. Figure 6 depicts the 60 clusters of top scoring stops.

**Figure 8: Clusters of top scoring transit stops in TriMet service area**




Using the clusters, TriMet worked with Technical Advisory Committee members, to select ten sites to focus on first. The focus areas were chosen using the criteria below.

- The Central City and each 2040 Regional Center should be represented within or near at least one of the ten focus area;

- Each type of pedestrian generator included in the analysis should be represented within at least one of the ten focus areas (major attractor, grocery store, high school, pre-, elementary/middle school, senior housing/services, social services, multi-modal facility, parks);

- At least one Oregon Department of Transportation (ODOT) road facility should fall within a focus area;

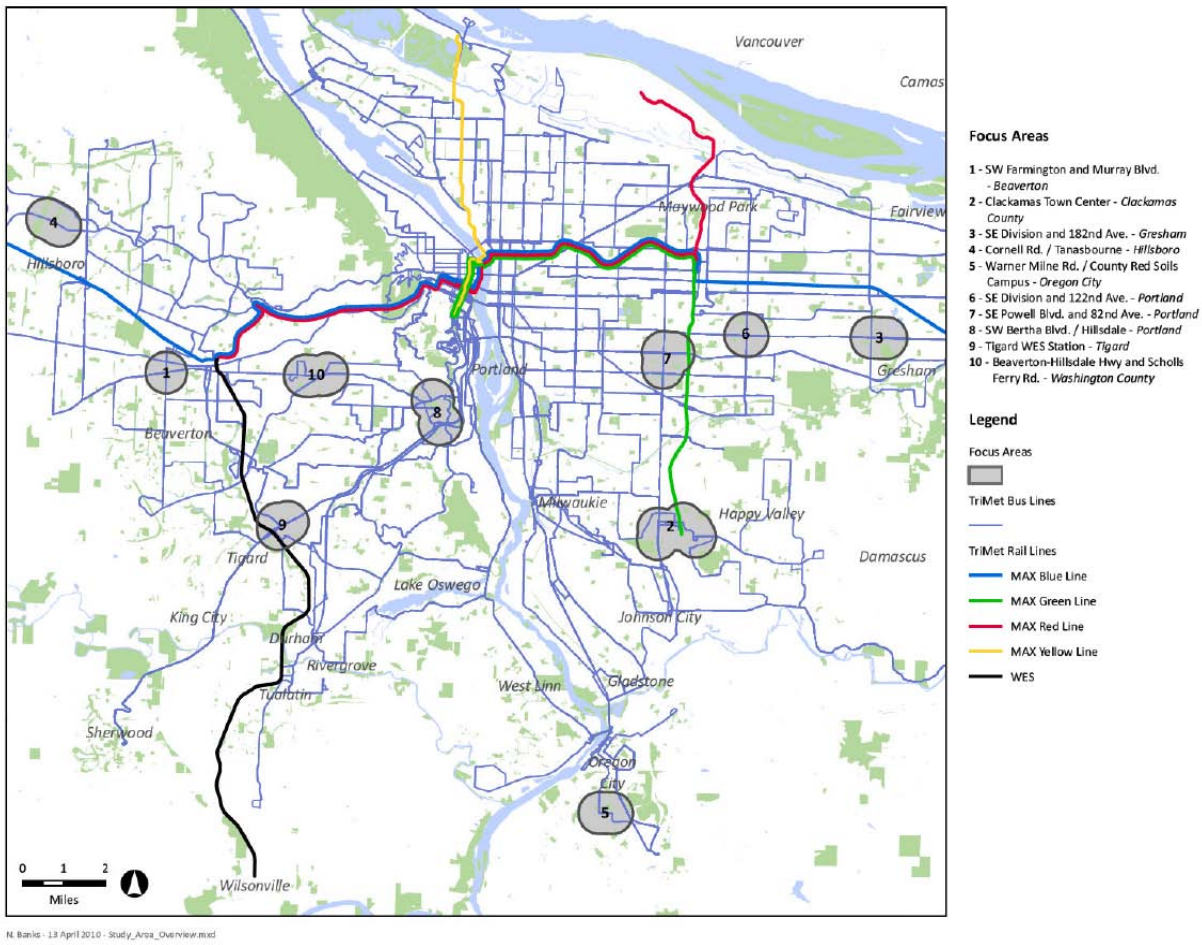
- Each type of fixed route transit service in the region (WES, MAX, Frequent Service Bus, Standard Bus, Peak Service Bus) should be represented within at least one of the ten focus areas;

- Areas with above average low-income and minority populations should be strongly considered;

- Areas recommended as focus areas should be consistent with, and if possible support, local planning initiatives already underway or complete.

The ten focus areas do not encompass all the stops with high scores, but they each have at least one high scoring stop within the area and they provide a strong place to begin. Figure 7 displays the ten focus areas. More information about each is included in Chapter 3.

**Figure 9: Focus areas in TriMet service area**



Chapter 3

# Ten focus areas

## Pedestrian and transit needs

# 3.0 Ten focus areas—pedestrian and transit needs

TriMet staff assessed each of the ten focus areas on foot, documenting existing conditions and assessing pedestrian needs near transit stops, and conducted a parcel-level GIS analysis to understand the degree of overall pedestrian connectivity in the focus area. This chapter provides a snapshot of each of the ten focus areas. For each focus area, information is provided about:

- the places a person can walk or take transit to;
- the distance a person can cover on foot or by transit within 15 minutes;
- intersections, with bus stops that have the most TriMet customer ons and offs in the focus area;
- observed travel behaviors; and
- five recommended actions to take first to make the area safer, easier, and comfortable to walk**.**

When people walk or take transit, they are typically going somewhere (e.g. a store, restaurant, home, work, park, or a transit stop). If there is not someplace people want to walk to within a reasonable distance or time, then they probably will not walk or take transit very often, if at all. For this project, a travel time of 15 minutes was chosen to demonstrate where a person can get to in this amount of time. Fifteen minutes is a moderate amount of time to travel. According to the U.S. Census Bureau, the average time a person takes to travel to work in the United States is 25 minutes. Assuming a person walks at a speed of two mph, which is fairly conservative, he or she could cover one half mile in 15 minutes and get over half his or her recommended daily activity.

To find out where a person could get to within a 15 minute walk, the project used the beta street smart feature on the website *walkscore.com*. Walkscore was used to show the walkshed of an area because it is a widely available tool that can be used by others without a sophisticated technical background. However, it does have limitations. It cannot rate the quality of a walking environment. For example, it does not know whether a sidewalk is missing or an intersection is dangerous to cross. For the purpose of this project, these limitations are compensated for by the on-the-ground observational information.

To find out where a person could get to within 15 minutes on transit, a mapping function on the website *mapnificent.net* was used. Mapnificent is also simple to use and widely available. It calculates a transit travel shed, using actual transit schedule information. For the purpose of this project we represent the area a person can travel to within 15 minutes, at 9 a.m. on a weekday. Maps depicting these areas and the places one can access are provided for each focus area.

Walking is an extremely sensory experience, and it is often the subtle things that make or break the experience. Pedestrians, bicyclists and drivers take in their surroundings differently. An area may feel fine to a driver, but feel hostile to a pedestrian. Furthermore, the behavior we exhibit as pedestrians is not necessarily like the behavior we exhibit when we drive or bicycle. It is impossible to fully understand what the pedestrian or transit customer experience is like in an area without experiencing it firsthand. Observed behaviors in each focus area are provided in this chapter. The observational information helps to broaden our understanding of issues and guide the recommendations in a way numbers and modeling alone cannot.

For every focus area, information is provided about how many people are getting on and off a bus at bus stops located at specific intersections or stop pair locations. This boarding and alighting, or "on and off" information is important to understand in order to get a sense of where existing pedestrian and transit activity is already high. If high activity intersections are not already pedestrian friendly, then these are the intersections we should address first to make them safer, easier, and more comfortable to walk through. Furthermore, intersections with high ridership usually have a number of places people need to travel to or from, so improving pedestrian access to transit stops also improves the environment for people making localized walking trips.

There may be hundreds of pedestrian and transit stop needs in an area and funding is limited, so it is important to know where to start making investments first. For every focus area there is a map showing land uses in the area, sidewalk gaps, areas where there is little to no buffer between the sidewalk and auto traffic, locations where there were bicycle or pedestrian crashes between 2007 and 2009, and intersections where there are many pedestrians and vehicle turning movements occurring. In addition to the map, for each focus area, five observations are made about people's travel behavior. The behaviors are followed by the first five actions TriMet recommends to address these travel behaviors and to make the area safer and more comfortable to walk in.

Full results from the walking audits can be found in Technical Memo #3: Existing Conditions and Needs Analysis for Ten Focus Areas. This memo is available from TriMet upon request. Please refer to the cover page for contact information. Example treatments which could be used to address pedestrian needs in an area are outlined in Chapter 4. More information on how to conduct a full walking audit, along with a sample walking audit template, is located in Appendices A and B.

# Beaverton

## SW Farmington Rd. & SW Murray Blvd.

# SW Farmington Rd. & SW Murray Blvd.—Beaverton

SW Farmington Rd. & SW Murray Blvd. focus area is located in the City of Beaverton. It is situated approximately one mile from the City's downtown, an area of particular interest to the City as it works to revitalize the area. The focus area's close proximity to downtown Beaverton and direct connections to TriMet service make it a prime location for infrastructure investments that will improve a person's ability to walk to transit stops and local destinations safely, directly, and comfortably.

### Places to access locally by foot

If a person walks within this focus area, these are examples of the places he or she could walk to or from:

- Retail (e.g. Kmart, Grocery Outlet, Plaid Pantry, 7-Eleven)
- Housing (senior, multi-family, single-family)
- Sisters of St. Mary Oregon Campus (schools, nursing home, community center)
- Schools (Beaverton High School, Sunshine Montessori Pre-School, German American School of Portland,)
- Eichler Park

### Places to access regionally by transit

If a person boards a TriMet bus in this focus area, these are examples of the places he or she could travel to without making a transfer:

**Beaverton:** Downtown Beaverton, Beaverton High School, Beaverton Library, Beaverton Farmer's Market, The Round
**Aloha:** Aloha High School, retail along Tualatin Valley Hwy
**Hillsboro:** Downtown Hillsboro, Streets of Tanasbourne, Portland Community College (PCC) - Rock Creek Campus and Portland Community College (PCC) – Willow Creek Center
**Tigard:** Washington Square Mall
**Forest Grove and Cornelius:** Pacific University, Downtown Forest Grove and Cornelius

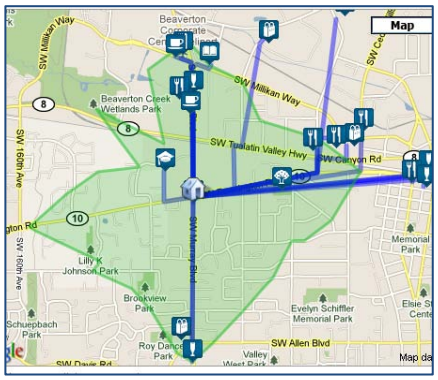
**Transit centers and MAX stations:** Beaverton Transit Center, Sunset Transit Center, Hillsboro Central/SE 3rd Ave Transit Center, Willow Creek/SW 185th Ave Transit Center, Washington Square Transit Center, Millikan Way MAX Station, Beaverton Central MAX station

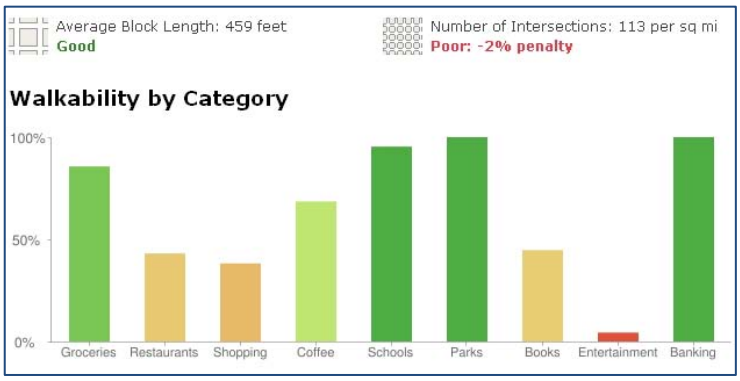
**2040 growth concept centers:** Beaverton Regional Center**,** Washington Square Regional Center, Tanasbourne Regional Center, Aloha Town Center, Murray Hill Town Center, Cedar Mill Town Center

## 15 minutes by walking

The map below displays the area a person can walk to, or from the intersection of SW Murray Blvd. & SW Farmington Rd., within 15 minutes, using the street network. It was created using the website *walkscore.com*. Additional information about Walkscore's beta street smart feature can be found on their website. As noted earlier, Walkscore has limitations. It cannot rate the quality of a walking environment. For example, it does not know whether a sidewalk is missing or an intersection is dangerous to cross. The "observed behavior" section of this report begins to assess the focus area from a more qualitative, user experience perspective.

Walk shed map:  score 61 out of 100—somewhat walkable—some amenities within walking distance

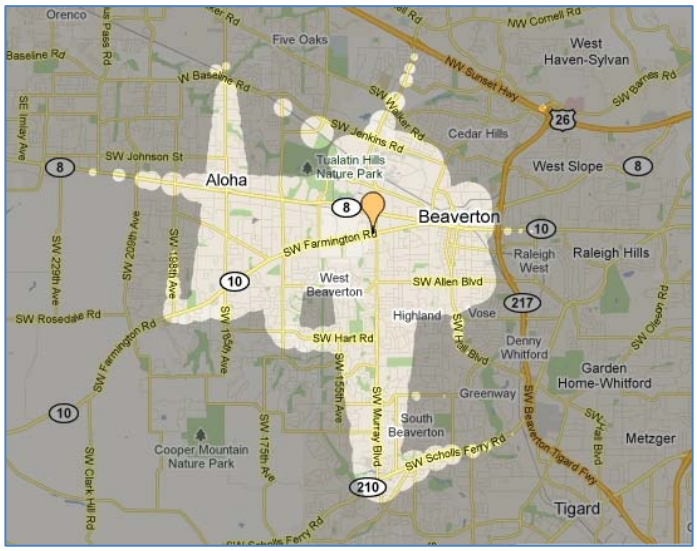



Source: *walkscore.com* (beta street smart feature)

## 15 minutes by transit

The map below displays the area a person can travel to within 15 minutes, using TriMet transit service, from the intersection of SW Murray Blvd. & SW Farmington Rd. It was created using the website *mapnificent.net* and assumes the person is starting travel at 9 a.m. on a weekday.




Source: *mapnificent.net*

The table below shows, during an average week, how many people are getting on and off a bus at the stops located at a particular intersection. We know every person who got on or off the bus had to walk or roll for some part of their trip to the bus stop. Therefore, when no other pedestrian count data is available, the total number of ons and offs can be used as a proxy for the *minimum* number of pedestrians walking around an intersection during an average week. Likewise, the table shows how many times the bus ramp or lift is deployed. The number of ramp/lift deployments is an indicator of the number of people needing an accessible walking environment, often because they are using a mobility device, stroller, or shopping cart.

### Top 5 intersections with TriMet customer ons and offs

| Transit stop locations - intersection | Transit line(s) | Weekly ons and offs at intersection | Monthly vehicle ramp/lift deployment at intersection |
|---|---|---|---|
| Tualatin Valley Hwy. & Murray Blvd. | 57,62 | 2,587 | 22 |
| Farmington Rd. & Murray Blvd. | 52,62 | 1,865 | 22 |
| Farmington Rd. & 153rd/Mueller Dr. | 52 | 468 | 0 |
| Farmington Rd. & 139th | 52 | 410 | 1 |
| Farmington Rd. & 149th/St Mary's Dr. | 52 | 352 | 12 |

### Observed behavior

1. Cars parked in the shoulder of SW Farmington Rd., east of SW Murray Blvd., on the south side of the road, where no sidewalks are present, forcing pedestrians into the motor vehicle travel lane. Pedestrians walking on the south side where no sidewalks are present, even though there are sidewalks on the north side of the road.

2. Transit customers, carrying many items, waiting for the Westbound, Line 52 bus, at SW Farmington Rd. & SW Murray Blvd. without a place to sit.

3. People crossing SW Tualatin Valley Hwy. midblock, in unprotected places, across seven lanes of very fast moving motor vehicle traffic. The posted speed limit is 45 mph.

4. People crossing SW Farmington Rd. midblock, in unprotected places, against four lanes of fast moving motor vehicle traffic. The posted speed limit ranges from 35 to 40 mph.

5. People having to wait a long time before being able to get a walk signal, crossing very long distances, and being on the watch for motor vehicles making permitted right turns on red at the intersections of SW Farmington Rd. & SW Murray Blvd. and SW Murray Blvd. & SW Tualatin Valley Hwy. There are 2,587 people getting on or off a bus at the intersection of SW Murray Blvd. & SW Tualatin Valley Hwy. Most of them likely have to walk across this intersection.

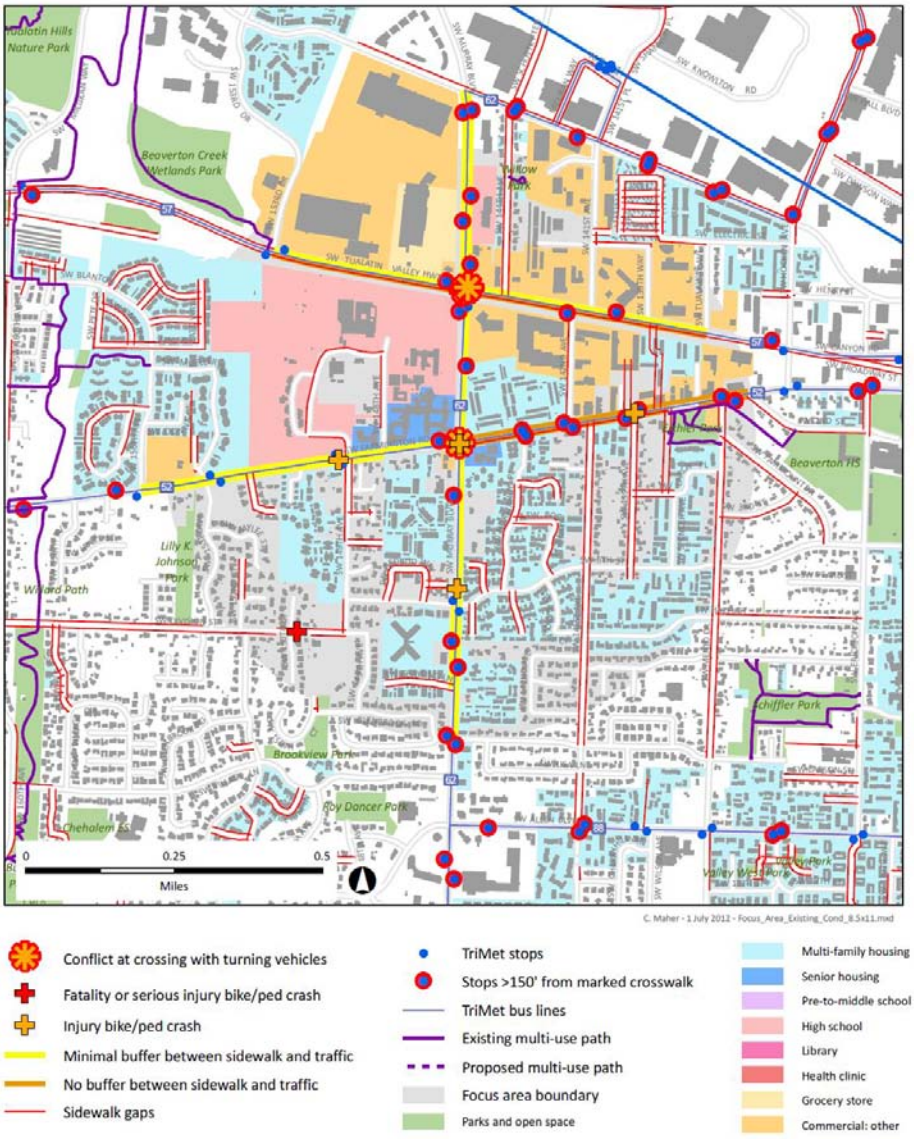
## SW Farmington Rd. & SW Murray Blvd.—pedestrian and transit needs

### Needs help

Near Stop ID 1667, SW Farmington Rd. & 139th Ave.

### Something positive to build from

Stop ID 4064, SW Murray Blvd. & Bonnie Brae St.



**Five actions to take to make the area safer, easier, and comfortable to walk**

1. Build sidewalks that are at least10 ft. wide along the south side of SW Farmington Rd., east of SW Murray Blvd, where there are none, and widen the existing sidewalk corridors all along SW Farmington Rd, east and west of SW Murray Blvd., so there is a landscaped buffer between pedestrians and the motor vehicles. The minimum sidewalk corridor width for a busy road like this should be 10 ft, including a landscaped buffer, but wider is better, preferably 14 ft.

2. Provide a shelter at the Stop ID 1660. It has over 50 average boardings (ons) each weekday.

3. Provide additional, frequent, protected pedestrian crossings along SW Tualatin-Valley Hwy; add sidewalks (minimum 10 ft. with a planted buffer) along the south side of the roadway where there are none, both east and west of where it intersects SW Murray Blvd, parallel to the freight railroad tracks. Work with Portland and Western Railroad to accomplish this. Currently, there are only two protected crossings within one mile. At a minimum, protected pedestrian crossings should be provided at least every 530 ft. Consider treatments like full signalization of intersections, medians with pedestrian refuges, and pedestrian warning signs, like Rectangular Rapid-Flashing Beacons (RRFBs) to assist people with crossing the street.

4. Provide additional, frequent, protected pedestrian crossings along SW Farmington Rd. At a minimum, protected pedestrian crossings should be provided at least every 530 ft. Consider treatments like medians with pedestrian refuges, and pedestrian warning signs, like Rectangular Rapid-Flashing Beacons (RRFBs) to assist people with crossing the street.

5. Shorten crossing distances, make crosswalks more visible, and provide more time for pedestrians to cross at the intersections of SW Farmington Rd. & SW Murray Blvd. & SW Tualatin-Valley Hwy. & SW Murray Blvd. All signals should, at a minimum, be timed so people have one second to walk 3.5 ft. Given the intersections' proximity to senior centers and schools, a more appropriate time would be one second for every 2.5 ft. to allow children and senior citizens, who tend to walk more slowly, to cross comfortably under the protection of the walk phase. Consider other signal treatments like leading pedestrian phases, automatic recall for pedestrian actuated signals, and right turn on red restriction. Curb radius reduction and crossing island treatments should also be considered to shorten crossing distances.

# Clackamas County
## Clackamas Town Center

# Clackamas Town Center Transit Center—Clackamas County

The Clackamas Town Center Transit Center focus area is located in Clackamas County. It is situated approximately four miles from the City of Milwaukie's downtown, 6.5 miles from the City of Oregon City's downtown, and eight miles from Gateway Regional Center. Light rail and bus connections converge at Clackamas Transit Center. A variety of retail outlets are located directly adjacent to the transit center in the Clackamas Town Center Mall. The focus area's abundance of shopping and employment opportunities, located directly adjacent to TriMet's transit service, makes it a prime location for infrastructure investments that will improve a person's ability to walk to transit stops and local destinations safely, directly, and comfortably.

### Places to access locally by foot

If a person walks within this focus area, these are examples of the places he or she could walk to or from:

- Retail (e.g. Clackamas Town Center Mall, Clackamas Promenade Shopping Center)
- Housing (Senior, Multi-Family, Single-Family)
- Kaiser Permanente Sunnyside Medical Center
- Oregon Institute of Technology
- Clackamas Community College Harmony Campus
- Schools (La Salle Catholic High School, Christ the King Catholic High School, Clackamas Middle College)
- Clackamas County Aquatic Center
- Clackamas County Library
- I-205 Trail and Harmony Rd. Neighborhood Park

### Places to access regionally by transit

If a person boards a TriMet bus or train in this focus area, these are examples of the places he or she could travel to without making a transfer:

**Milwaukie:** Downtown Milwaukie
**Oregon City:** Clackamas Community College, Clackamas County Government and Social Services
**Portland:** East Portland, Gateway Town Center, retail and services along 82nd Ave, downtown

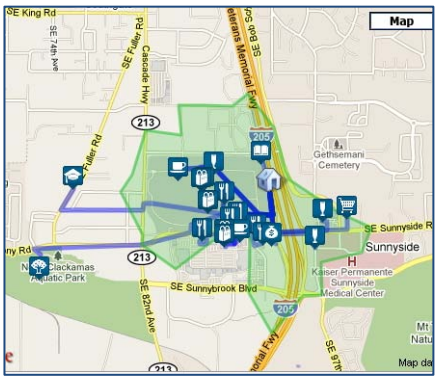
**Transit centers and MAX stations:** Gateway/NE 99th Ave. Transit Center, Hollywood/NE 42nd Ave. Transit Center, Rose Quarter Transit Center, Oregon City Transit Center, new Milwaukie Light Rail line station, all stations along the Green Line MAX.

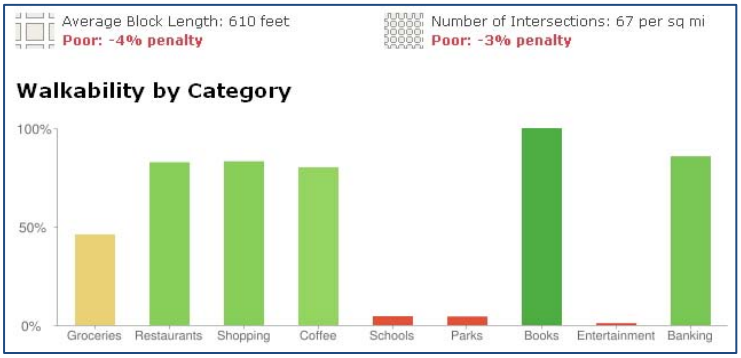
**2040 growth concept centers:** Central City, Clackamas Regional Center, Oregon City Regional Center, Gateway Regional Center, Milwaukie Town Center, Hollywood Town Center

## 15 minutes by walking

The map below displays the area a person can walk to, from the Clackamas Town Center Transit Center, within 15 minutes, using the street network. It was created using the website *walkscore.com*. Additional information about Walkscore's beta street smart feature can be found on their website. As noted earlier, Walkscore has limitations. It cannot rate the quality of a walking environment. For example, it does not know whether a sidewalk is missing or an intersection is dangerous to cross. The "observed behavior" section of this report begins to assess the focus area from a more qualitative, user experience perspective.

Walk shed map: score 58 out of 100—somewhat walkable—some amenities within walking distance

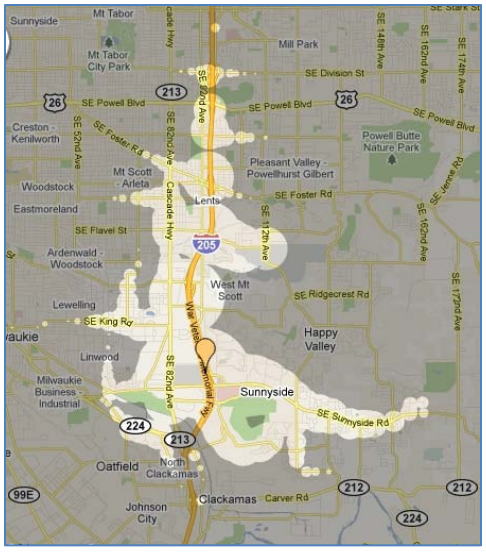



Source: *walkscore.com* (beta street smart feature)

## 15 minutes by transit

The map below displays the area a person can travel to within 15 minutes, using TriMet transit service, from the Clackamas Town Center Transit Center. It was created using the website *mapnificent.net*, and assumes the person is starting travel at 9 a.m. on a weekday.




Source: *mapnificent.net*

The table below shows, during an average week, how many people are getting on and off a bus at stops located at an intersection. We know every person who got on or off the bus had to walk or roll for some part of their trip to the bus stop. Therefore, when no other pedestrian count data is available, the total number of ons and offs can be used as a proxy for the *minimum* number of pedestrians walking around an intersection during an average week. Likewise, the table shows how many times the bus ramp or lift is deployed. The number of ramp/lift deployments is an indicator of the number of people needing an accessible walking environment, often because they are using a mobility device, stroller, or shopping cart.

### Top 5 intersections with TriMet customer ons and offs

| Transit stop locations—intersection or transit center | Transit line(s) | Weekly ons and offs at intersection | Monthly vehicle ramp/lift deployment at intersection |
|---|---|---|---|
| Clackamas Town Center Transit Center | 28,29,31,71,72,79,152, 155,156, Green Line MAX | 46,904 | 389 |
| Clackamas Town Center Mall Stop | 28,29,30,31,71,72,79, 152,155,156 | 21,168 | 599 |
| 82nd & Causey | 31,72,28,71 | 4,212 | 76 |
| 82nd & Sunnyside/Harmony | 29,30,79,152 | 689 | 12 |
| 82nd & McBride | 29,30,79,152 | 291 | 2 |

### Observed behavior

1. Many people cutting through expansive surface parking lots, near the Clackamas Town Center Mall, to reach the transit center. Common routes taken by pedestrians include cutting through the frequently unused parking lot between the transit center and Sunnyside Rd. and walking between points along SE Monterey Ave. to the transit center. Pedestrians were observed making their way through landscaped buffers and down steep slopes.

2. People having to walk out of direction and wait through long signal cycles to cross intersections on SE Sunnyside Rd., where pedestrian crossings are not allowed in all four directions. For example, at the intersections of SE Sunnyside Rd. & 93rd Ave. and the entrance to the Clackamas Town Center mall on SE Sunnyside Rd.

3. People having to wait a long time before being able to get a walk signal, crossing very long distances, and being on the watch for motor vehicles making permitted right turns on red at SE 82nd Ave. & SE Sunnyside Rd.

4. People walking along the west side of SE 82nd Ave. on uneven and sometimes unpaved sections of parking lot, where there are no sidewalks. For example, between SE Causey Ave. & SE Monterey Ave. in front of Clackamas Cycle World.

5. Numerous motor vehicles turning into wide driveways located along SE 82nd Ave.

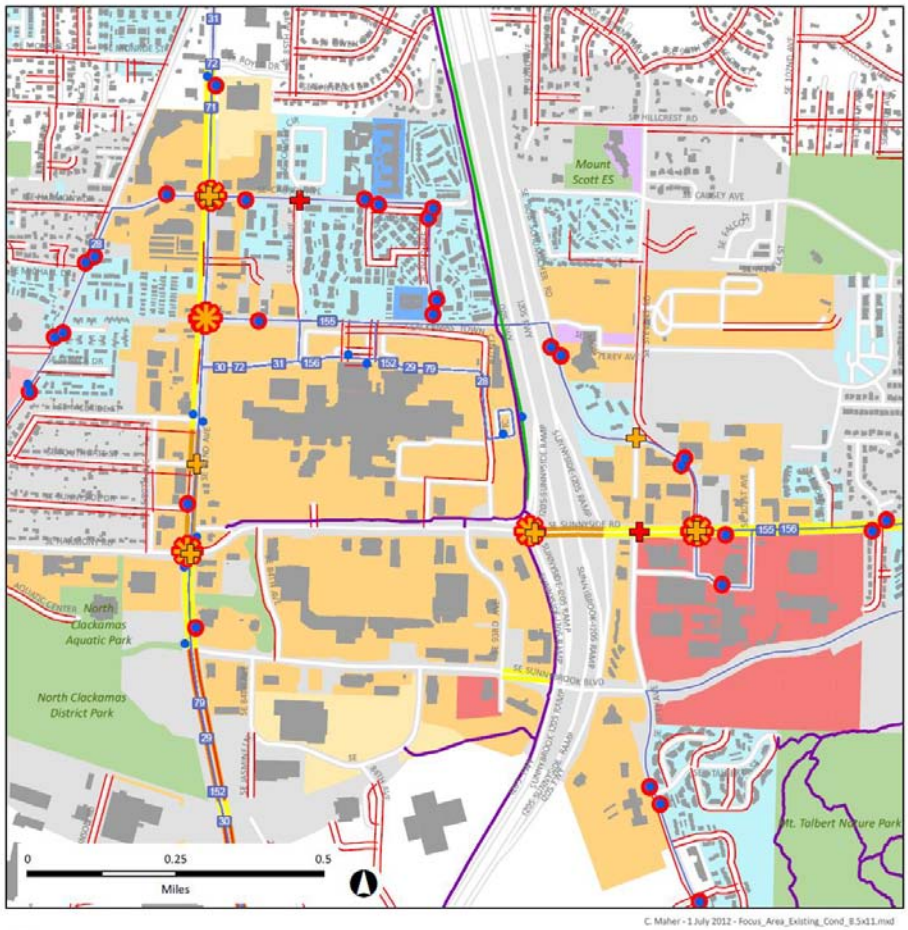
## Clackamas Town Center Transit Center—pedestrian and transit needs

### Needs Help

SE 82nd Ave, between SE Monterey Ave. and SE Causey Ave.

### Something Positive to Build From


I-205 multi-use path, parallel to SE Sunnyside Rd. near SE 93rd Ave.



### Five actions to take to make the area safer, easier, and comfortable to walk

1. Create additional, safe, desirable, pathways from SE Monterey Rd. & SE Sunnyside Rd., through mall parking lot to the transit center. Consider ways to temporarily activate normally unused portions of surface parking lots near the transit center. For example, set up a farmer's market in the space or program it with events to make the space feel more inviting and less auto-dominated. Add wayfinding, including signage that direct people from the MAX station to SE Sunnyside Rd., via the I-205 multi-use path.

2. Re-open closed crosswalks at signals, with the exception of the I-205 ramps. Design intersections, with treatments that shorten the crossing distance, like pedestrian refuges, and provide ample time for slower pedestrians to cross the street.

3. Shorten crossing distances, make crosswalks more visible, and provide more time for pedestrians to cross at the intersection of SE 82nd Ave. & SE Sunnyside Rd. All signals should, at a minimum, be timed so people have one second to make it 3.5 ft. Given the intersections' proximity to the aquatic center and major retail centers, a more appropriate time would be one second for every 2.5 ft, to allow for children and seniors, who tend to walk more slowly, to cross comfortably under the protection of the walk phase. Consider other signal timing treatments like leading pedestrian phases, automatic recall for pedestrian actuated signals, and right turn on red restrictions. Curb radius reduction and crossing island treatments should also be considered to shorten crossing distances.

4. Build sidewalks that are at least10 ft. wide along SE 82nd Ave. where there are none, and widen the existing sidewalk corridors, where it is less than 10 ft, so there is a landscaped buffer between pedestrians and the motor vehicles. The minimum sidewalk corridor width for a busy road like this should be 10 ft., including a landscaped buffer, but wider is better, preferably 14 ft.

5. Consolidate and redesign driveways turning along SE 82nd Ave., reducing width and turning radii of driveways to make turning movements slower and reduce conflict points with pedestrians. Also consider adding a planted median to the roadway to reduce the number of turning movements into driveways and to create a sense of enclosure.

# Gresham

## SE Division St. & SE 182nd Ave.

## SE Division St. & SE 182nd Ave.—Gresham

The SE Division and SE182nd focus area is located in the City of Gresham. It is situated approximately two miles from the City of Gresham's downtown and one mile from the City's Rockwood Neighborhood. Within the focus area a variety of retail and service outlets are located along SE Division St. & SE 182nd Ave. Its concentration of destinations and close proximity to Gresham's Downtown and the Rockwood Neighborhood, a center of attention for reinvestment in Gresham, makes this focus area a prime location for infrastructure investments that will improve a person's ability to walk to transit stops and local destinations safely, directly, and comfortably.

### Places to access locally by foot

If a person walks within this focus area, these are examples of the places he or she could walk to or from:

- Retail (e.g. Dollar Tree, Grocery Outlet, Volunteer of America Resale Outlet, Save-A-Lot, Dairy Queen, Dutch Bros. Coffee)
- Housing (Senior, Multi-Family, Single-Family)
- Multnomah County Rockwood Community Health Center Primary Care Clinic
- Places of Worship (Rockwood Adventist, Ascension Lutheran, Covenant Presbyterian, Church of Jesus Christ of Latter-Day Saints)
- Schools (Centennial High School and Middle School, Lunch Meadows Elementary School)
- Cascade Athletic Club and Vance Park
- United States Social Security Administration Office

### Places to access regionally by transit

If a person boards a TriMet bus or train in this focus area, these are examples of the places he or she could travel to or from without making a transfer:

**Gresham:** Downtown Gresham, Mount Hood Community College
**East Portland:** Shopping and Service along Division St. (e.g. Walmart)
**Portland:** Downtown and Portland State University, Portland Community College (PCC) southeast campus, airport way employment area, cascade station
**North Portland:** Portland Community College, Shopping and Service along Williams, Mississippi and St. Johns.
**Rose Quarter:** Rose Garden Arena and Convention Center
**Troutdale:** Downtown Troutdale

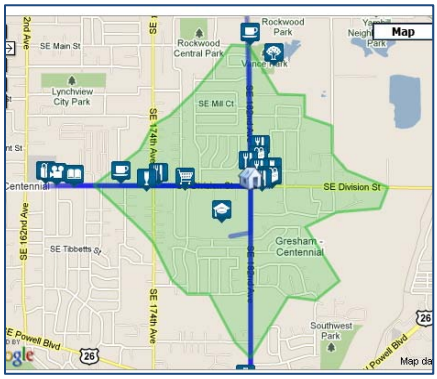
**Transit centers and MAX stations:** Gresham Central Transit Center, 181st MAX Station

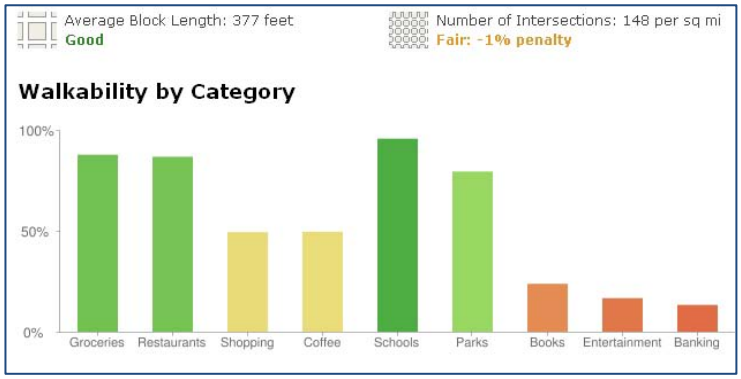
**2040 growth concept centers:** Central City, Gresham Regional Center, Rockwood Town Center

## 15 minutes by walking

The map below displays the area a person can walk to, from the intersection of SE Division St. & SE 182nd Ave., within 15 minutes, using the street network. It was created using the website *walkscore.com*. Additional information about Walkscore's beta street smart feature can be found on their website. As noted earlier, Walkscore has limitations. It cannot rate the quality of a walking environment. For example, it does not know whether a sidewalk is missing or an intersection is dangerous to cross. The "observed behavior" section of this report begins to assess the focus area from a more qualitative, user experience perspective.

Walk score 63 out of 100—somewhat walkable—some amenities within walking distance

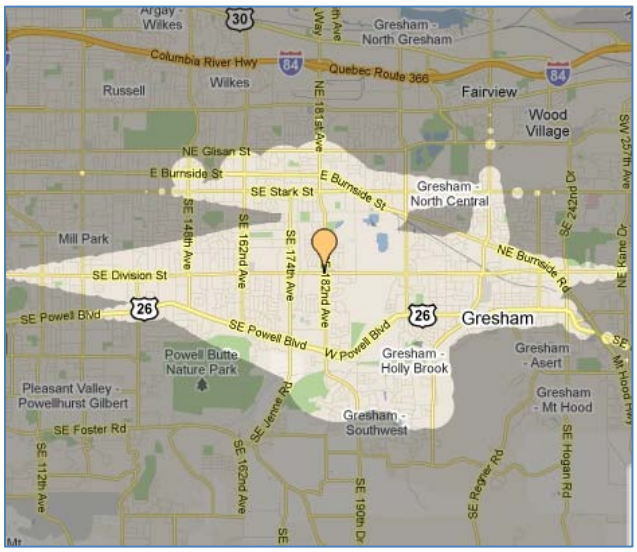



Source: *walkscore.com* (beta street smart feature)

## 15 minutes by transit

The map below displays the area a person can travel to within 15 minutes, using TriMet transit service, from the intersection of SE Division St. & SE 182nd Ave. It was created using the website www.*mapnificent.net*, and assumes the person is starting travel at 9 a.m. on a weekday.




Source: *mapnificent.net*

The table below shows, during an average week, how many people are getting on and off a bus at stops located at an intersection. We know every person who got on or off the bus had to walk or roll for some part of their trip to the bus stop. Therefore, when no other pedestrian count data is available, the total number of ons and offs can be used as a proxy for the *minimum* number of pedestrians walking around an intersection during an average week. Likewise, the table shows how many times the bus ramp or lift is deployed. The number of ramp/lift deployments is an indicator of the number of people needing an accessible walking environment, often because they are using a mobility device, stroller, or shopping cart.

### Top 5 intersections with TriMet customer ons and offs

| Transit stop locations - intersection | Transit line(s) | Weekly ons and offs at intersection | Monthly vehicle ramp/lift deployment at intersection |
|---|---|---|---|
| Division & 182nd | 4,82 | 2,136 | 55 |
| Division & 174th | 4 | 1,769 | 117 |
| Division & 176th | 4 | 757 | 28 |
| Division & 179th | 4 | 480 | 0 |
| Division 3100 Block | 4 | 300 | 1 |

### Observed behavior

1. People walking along the south side of SE Division St., east of SE 190th Ave., on the grass, where there are no sidewalks.

2. Students going to Centennial Middle School and senior citizens accessing the bus stop at SE 182nd Ave. & SE Division St., crossing the intersection, where crossings are long, curb cuts are not available on every corner, and pedestrians must be on the watch for motor vehicles making permitted right turns on red. There are 2,136 people getting on or off a bus at this intersection every week. Most of them likely have to walk across this intersection.

3. People crossing mid-block at unmarked intersections along Division St., particularly in the stretch between SE 174th Ave. and SE 182nd Ave.

4. Many people waiting for the bus, without a place to sit, at the westbound, Line 4 Division bus stop located just east of SE 174th Ave.

5. People stepping off the sidewalk into the roadway, to find a clear pathway, due to overgrown landscaping on the north side of SE Division St., east of SE 190th Ave.

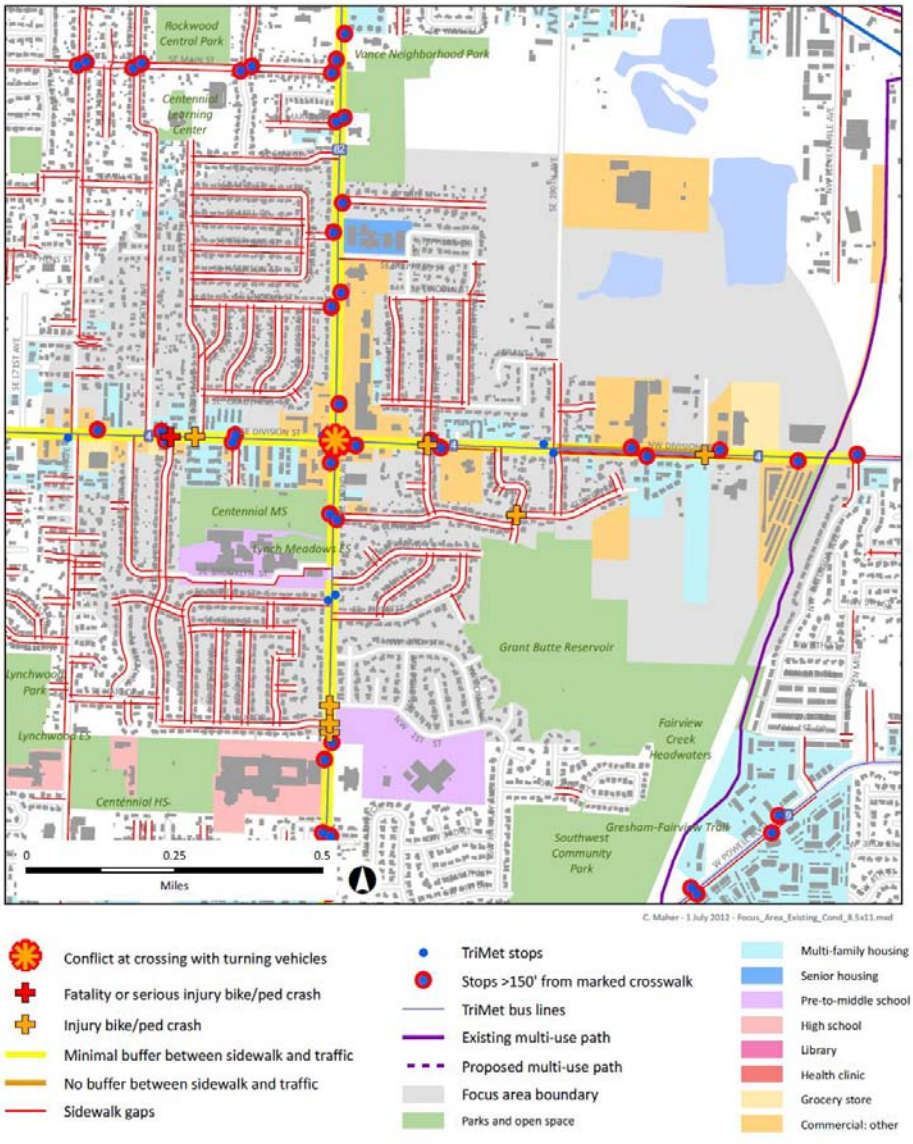
## SE Division St. & SE 182nd Ave.—pedestrian and transit needs

### Needs help

SE Division St & SE 190th Ave., near bus Stop ID 1433

### Something positive to build from

SE Division St, between SE 174th Av and 175th, near bus Stop ID1422



### Five actions to take to make the area safer, easier, and comfortable to walk

1. Build sidewalks that are at least10 ft. wide along the south side of SE Division St., where there are none and widen existing sidewalk corridors all along SE Division St., so there is landscaped buffer between pedestrians and the motor vehicles. The minimum sidewalk corridor width for a busy road like this should be 10 ft., including a landscaped buffer, but wider is better, preferably 14 ft.

2. Install ADA accessible curb cuts on all corners, shorten crossing distances, make crosswalks more visible, and provide more time for pedestrians to cross at the intersection of SE Division St. and SE 182nd Ave. All signals should, at a minimum, be timed so people have one second to walk 3.5 ft. Given the intersection's proximity to a school, a more appropriate time would be one second for every 2.5 ft. to allow for children and senior citizens, who tend to walk more slowly, to cross comfortably under the protection of the walk phase. Consider other signal treatments like leading pedestrian phases, automatic recall for pedestrian actuated signals, and right turn on red restriction. Curb radius reduction and crossing island treatments should also be considered to shorten crossing distances.

3. Provide additional, frequent, and protected pedestrian crossings along SE Division St. At a minimum, protected crossings should be provided every 530 ft. to allow people to cross the street frequently in a safe manner. Consider treatments like medians with pedestrian refuges, and pedestrian warning signs, like Rectangular Rapid-Flashing Beacons (RRFBs) to assist people with crossing the street. In particular consider a mid-block crossing between the two signalized intersections of 174th Ave. & 182nd Ave., near SE 179th Ave. to provide access to Centennial Middle School.

4. Provide a shelter at the bus stop located at the intersection of SE 174th Ave. & SE Division St., serving the westbound Line 4-Division bus route (ID 1422). The stop has 35 average boardings each weekday and 66 lift or ramp deployments at the stop each month.

5. Enforce landscaping codes along SE Division St., where shrubbery is overgrown, preventing a clear 5 ft. pathway along the sidewalk. Re-grade driveways to make the entire length of the sidewalk corridor ADA accessible and provide curb cuts at intersections along SE Division St. where they are missing.

# Hillsboro

## Tanasbourne Town Center

# Tanasbourne Town Center—Hillsboro

The Tanasbourne Town Center focus area is located in the City of Hillsboro. It is situated approximately six miles from the City of Hillsboro's downtown and the City of Beaverton's downtown. Light rail and bus connections converge at three transit centers accessible by bus from the focus area. The closest one is the Willow Creek/SW 185th Ave Transit Center. Within the focus area a variety of retail and service providers are located along NW185th Ave. The mix of uses in the area makes this focus area a prime location for infrastructure investments that will improve a person's ability to walk to transit stops and local destinations safely, directly, and comfortably. It is an area of attention for the City of Hillsboro as it thinks about how to attract new investment.

### Places to access locally by foot

If a person walks within this focus area, these are examples of the places he or she could walk to or from:

- Retail (e.g. Streets of Tanasbourne, Tanasbourne Village, Tanasbourne Center)
- Housing (senior, multi-family, single-family)
- Kaiser Medical Facility (under construction)
- McKinley Elementary School
- Rock Creek Trail, Evergreen Park

### Places to access regionally by transit

If a person boards a TriMet bus or train in this focus area, these are examples of the places he or she could travel to or from without making a transfer:

**Hillsboro:** Downtown Hillsboro, SW Evergreen Pkwy and SW Cornell Rd. Employment Corridors, Hillsboro Airport, Pacific University (Hillsboro Campus)
**Aloha:** Aloha High School
**Beaverton**: Downtown Beaverton, Beaverton High School, Valley Catholic High School

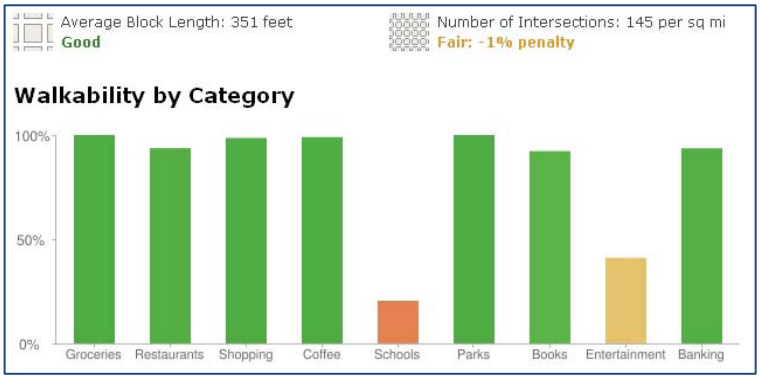
**Transit centers and MAX stations:** Willow Creek/SW 185th Ave Transit Center, Hillsboro Central/SE 3rd Ave Transit Center, Beaverton Transit Center

**2040 growth concept centers:** Tanasbourne Regional Center, Hillsboro Regional Center, Beaverton Regional Center, Aloha Town Center

## 15 minutes by walking

The map below displays the area a person can walk to, from the intersection of NW Cornell Rd. & NW Stucki Ave., within 15 minutes, using the street network. It was created using the website *walkscore.com*. Additional information about Walkscore's beta street smart feature can be found on their website. As noted earlier, Walkscore has limitations. It cannot rate the quality of a walking environment. For example, it does not know whether a sidewalk is missing or an intersection is dangerous to cross. The "observed behavior" section of this report begins to assess the focus area from a more qualitative, user experience perspective.

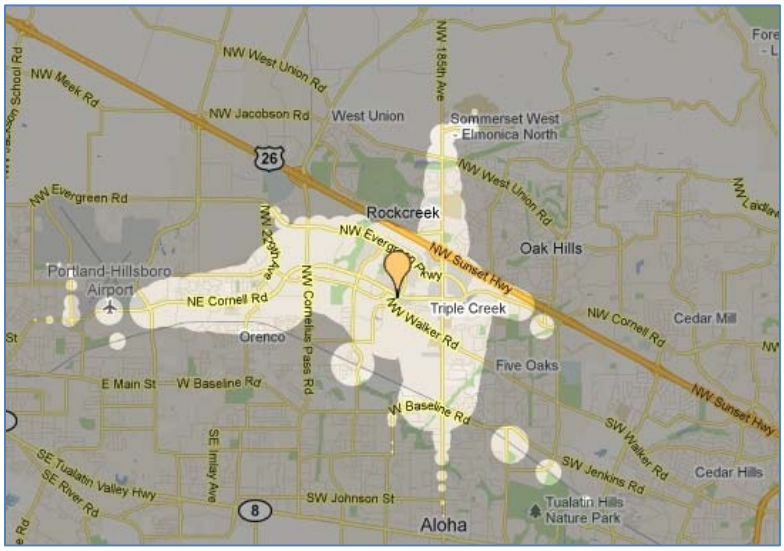
Walk shed map:  score 88 out of 100— very walkable— most errands can be accomplished on foot


Source: *walkscore.com* (beta street smart feature)

## 15 minutes by transit

The map below displays the area a person can travel to within 15 minutes, using TriMet transit service, from the intersection of NW Cornell Rd. & NW Stucki Ave. It was created using the website *mapnificent.net*, and assumes the person is starting travel at 9 a.m. on a weekday.




Source: *mapnificent.net*

The table below shows, during an average week, how many people are getting on and off a bus at stops located at an intersection. We know every person who got on or off the bus had to walk or roll for some part of their trip to the bus stop. Therefore, when no other pedestrian count data is available, the total number of ons and offs can be used as a proxy for the *minimum* number of pedestrians walking around an intersection during an average week. Likewise, the table shows how many times the bus ramp or lift is deployed. The number of ramp/lift deployments is an indicator of the number of people needing an accessible walking environment, often because they are using a mobility device, stroller, or shopping cart.

### Top 5 intersections with TriMet customer ons and offs

| Transit stop locations - intersection | Transit line(s) | Weekly ons and offs at intersection | Monthly vehicle ramp/lift deployment at intersection |
|---|---|---|---|
| 185th & Cornell | 47,48,52 | 2,363 | 47 |
| 185th & Tanasbourne Rd | 52 | 2,011 | 63 |
| 185th & Evergreen | 52 | 717 | 33 |
| 185th & McKinley School/Sunset Square | 47,48,52 | 562 | 16 |
| Cornell & Stucki | 48 | 298 | 7 |

### Observed behavior

1. People having to wait a long time before being able to get a walk signal, crossing very long distances, and being on the watch for motor vehicles making permitted right turns on red at the intersection of NW Cornell Rd. & NW 185th Ave. There are 2,363 people who get on or off a bus at this intersection every week. Most of them likely have to walk across this intersection.

2. People having to wait a long time before being able to get a walk signal, crossing very long distances, and being on the watch for motor vehicles making permitted right turns on red at the intersection of NW Evergreen Pkwy. & NW 185th Ave.

3. Pedestrians crossing NW Stucki Ave., mid-block, at the driveway entrance to Tanasbourne Town Center to get to retail located on the other side of the street.

4. People walking in the roadway on NW Walker Rd., where there are no sidewalks, between NW Amberglen Pkwy. & 185th Ave., near Oregon Health & Science University.

5. People with strollers boarding the bus at the corner of NW Evergreen Pkwy. and NW 188th Ave., where there are no bus landing pads.

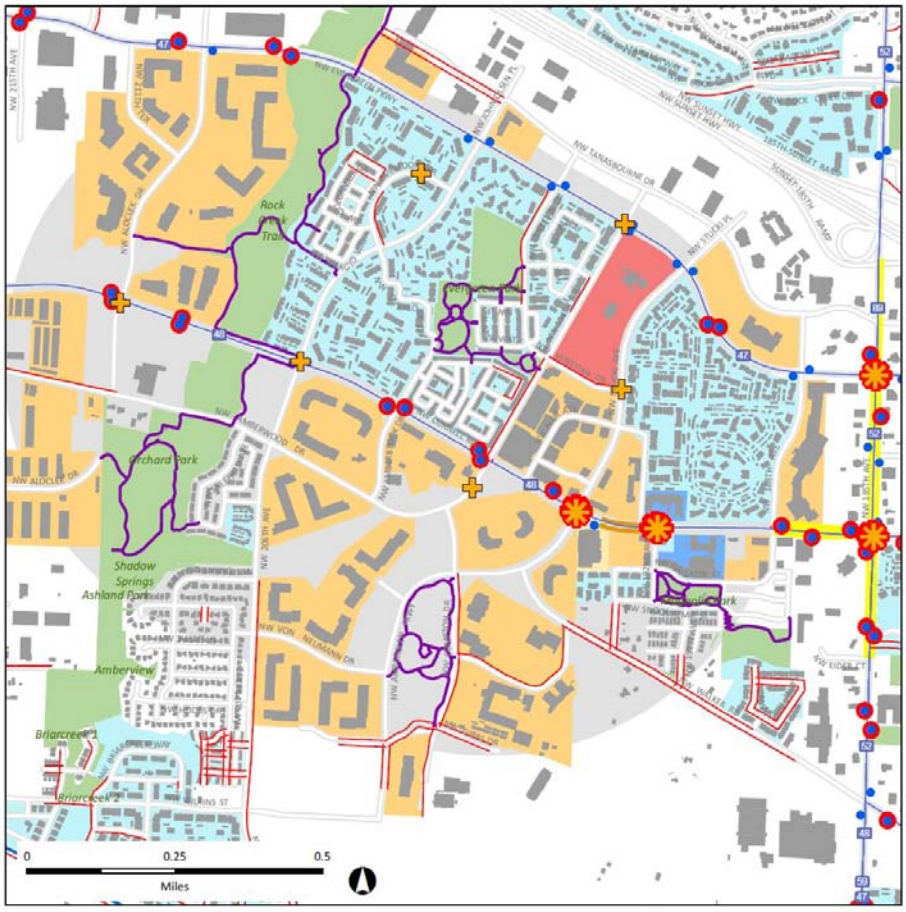
## Tanasbourne Town Center—pedestrian and transit needs

### Needs help

NW Cornell & NW Stucki/Amberglen, near bus Stop ID 10032

### Something positive to build from

NW Evergreen Pkwy. & 188th Ave., near bus Stop ID 1159



### Five actions to take to make the area safer, easier, and comfortable to walk

1. Shorten crossing distances and provide more time for pedestrians to cross at the intersection of NW 185th Ave. & NW Cornell Rd. All signals should, at a minimum, be timed so people have one second to walk 3.5 ft. Given the intersection's proximity to senior centers and a major retail center, a more appropriate time would be one second for every 2.5 ft. to allow children and senior citizens, who tend to walk more slowly, to cross comfortably under the protection of the walk phase. Consider other signal treatments like leading pedestrian phases, automatic recall for pedestrian actuated signals, and right turn on red restrictions. Curb radius reduction and crossing island treatments should also be considered to shorten crossing distances.

2. Shorten crossing distances and provide more time for pedestrians to cross at the intersection NW 185th & NW Evergreen Pkwy. All signals should, at a minimum, be timed so people have one second to walk 3.5 ft. Given the intersection's proximity to senior centers and a major retail center, a more appropriate time would be one second for every 2.5 ft. to allow children and senior citizens, who tend to walk more slowly, to cross comfortably under the protection of the walk phase. Consider other signal treatments like leading pedestrian phases, automatic recall for pedestrian actuated signals, and right turn on red restrictions. Curb radius reduction and crossing island treatments should also be considered to shorten crossing distances.

3. Consider crossing treatments, like medians with pedestrian refuges, and pedestrian warning signs, like Rectangular Rapid-Flashing Beacons (RRFBs) to assist people with crossing the street at the driveway into the Tanasbourne Town Center on NW Stucki Ave.

4. Build sidewalks along NW Walker Rd., between NW Amberglen Pkwy. & 185th Ave. where there are none. Ensure there is a landscaped buffer between pedestrians and motor vehicles.

5. Provide ADA accessible landing pads at bus stops along Evergreen Pkwy. to makes stops accessible to people using mobility devices.

# Oregon City
## Clackamas County Red Soils Campus

# Clackamas County Red Soils Campus—Oregon City

The Clackamas County Red Soils Campus focus area is located in the City of Oregon City. It is situated approximately 1.5 miles from Oregon City's downtown and seven miles from Clackamas Regional Center. There are connections to bus lines at the Oregon City Transit Center, located in downtown Oregon City. Within the focus area there is a variety of retail and services. Nearly all of the County's offices and services are located in this focus area at its Red Soils Campus. The fact the County has all of it services located in the area, combined with the mix of uses makes it a good location for infrastructure investments that will improve a person's ability to walk to transit stops and local destinations safely, directly, and comfortably.

### Places to access locally by foot

If a person walks within this focus area, these are examples of the places he or she could walk to or from:

- Retail (e.g. Hilltop Mall, Fred Meyer, Goodwill)
- Housing (Senior, Multi-family, Single-Family)
- Clackamas County Red Soils Campus
- Schools (Gardiner Middle School, Mt. Pleasant Elementary School)
- Park (Hillendale Park, Singer Creek Park)

### Places to access regionally by transit

If a person boards a TriMet bus or train in this focus area, these are examples of the places he or she could travel to or from without making a transfer:

**Oregon City:** Downtown Oregon City, Clackamas Community College
**Clackamas Town Center:** Clackamas Town Center
**Milwaukie:** Downtown Milwaukie
**Portland:** Downtown Portland, Portland State University

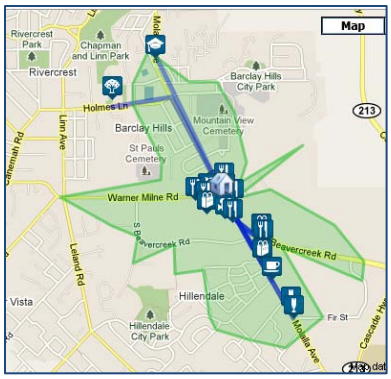
**Transit centers and MAX stations:** Oregon City Transit Center, Clackamas Town Center Transit Center, new Portland to Milwaukie light rail line stations

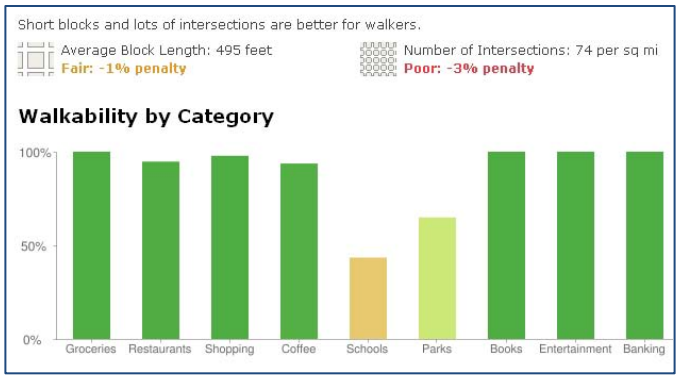
**2040 growth concept centers:** Central City, Oregon City Regional Center, Clackamas Regional Center, Milwaukie Town Center

## 15 minutes by walking

The map below displays the area a person can walk to, from the intersection of Molalla Ave. & Warner Milne Rd., within 15 minutes, using the street network. It was created using the website *walkscore.com*. Additional information about Walkscore's beta street smart feature can be found on their website. As noted earlier, Walkscore has limitations. It cannot rate the quality of a walking environment. For example, it does not know whether a sidewalk is missing or an intersection is dangerous to cross. The "observed behavior" section of this report begins to assess the focus area from a more qualitative, user experience perspective.

Walk shed map:  score 88 out of 100—very walkable—most errands can be accomplished on foot




Source: *walkscore.com* (beta street smart feature)

## 15 minutes by transit

The map below displays the area a person can travel to within 15 minutes, using TriMet transit service, from the intersection of Molalla Ave. & Warner Milne Rd. It was created using the website *mapnificent.net*, and assumes the person is starting travel at 9 a.m. on a weekday.


Source: *mapnificent.net*

The table below shows, during an average week, how many people are getting on and off a bus at stops located at an intersection. We know every person who got on or off the bus had to walk or roll for some part of their trip to the bus stop. Therefore, when no other pedestrian count data is available, the total number of ons and offs can be used as a proxy for the *minimum* number of pedestrians walking around an intersection during an average week. Likewise, the table shows how many times the bus ramp or lift is deployed. The number of ramp/lift deployments is an indicator of the number of people needing an accessible walking environment, often because they are using a mobility device, stroller, or shopping cart.

### Top 5 intersections with TriMet customer ons and offs

| Transit stop locations - intersection | Transit line(s) | Weekly ons and offs at intersection | Monthly vehicle ramp/lift deployment at intersection |
|---|---|---|---|
| Molalla & Clairmont | 33,99 | 1,210 | 22 |
| Beavercreek & Library Ct | 33 | 617 | 8 |
| Beavercreek 400 Block | 33 | 413 | 5 |
| Molalla & Gaffney | 33 | 404 | 23 |
| Molalla & Mountain View | 33 | 387 | 8 |

### Observed behavior

1. People walking in bicycle lanes along Warner Milne Rd. where no sidewalks exist on the south side of the road, between Leland Rd. & Beavercreek Rd.

2. People pushing young children in strollers along neighborhood streets with no sidewalks in the residential neighborhoods located off of Clairmont Way & S. Gaffney La.

3. Motor vehicles inconsistently yielding for pedestrians at mid-block crossings along Molalla Ave.

4. People crossing, just north of Clairmont Way, from apartments on Westside of Molalla Ave. to the shopping center on the east side of the street.

5. People walking through grass, on Beavercreek Rd. where there is no sidewalk, to reach the bus stop located at Library Ct.

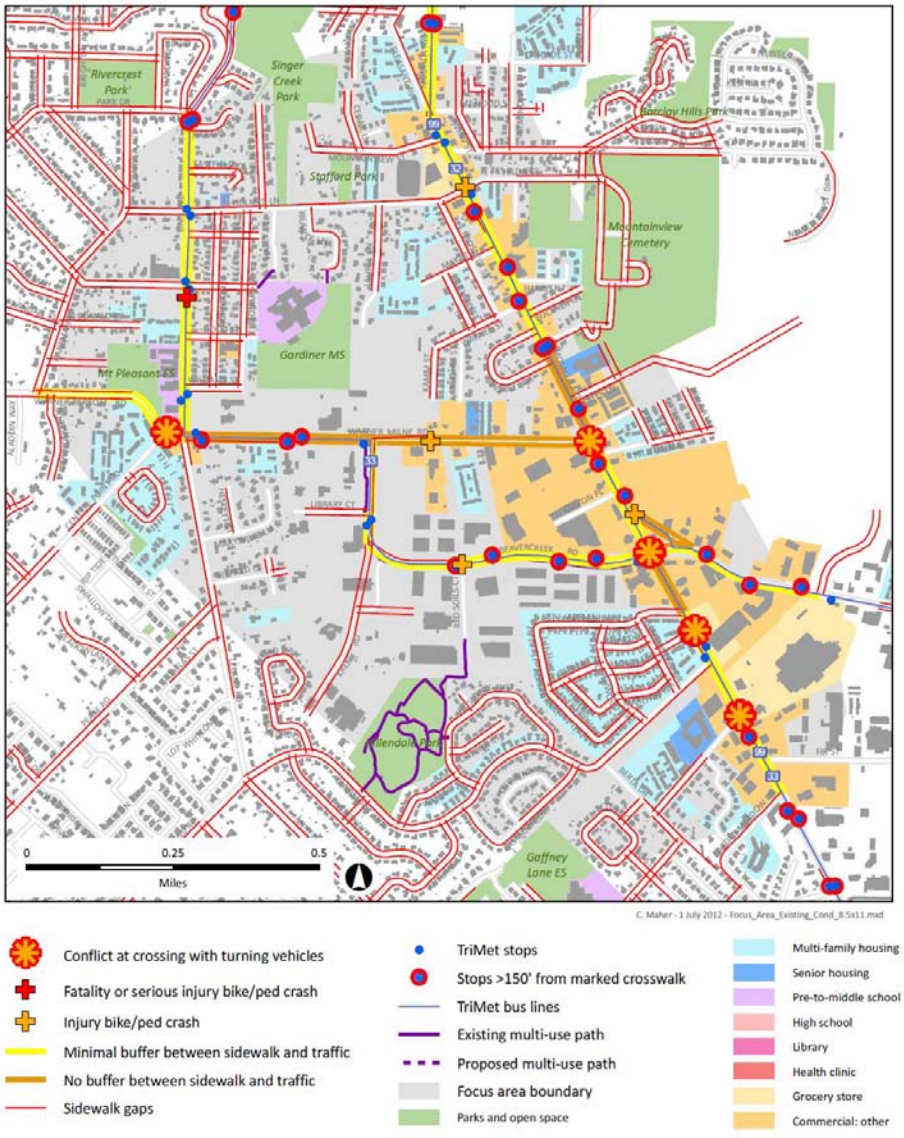
## Clackamas County Red Soils Campus—pedestrian and transit needs

### Needs help

Warner Milne Rd. & Beavercreek Rd., near bus Stop ID 9517

### Something positive to build from

S. Beavercreek Rd. near bus Stop ID 9582



### Five actions to take to make the area safer, easier, and comfortable to walk

1. Build sidewalks that are at least10 ft. wide along Warner Milne Rd., where there are none. Ensure there is a landscaped buffer between pedestrians and the roadway.

2. Build sidewalks on both sides of the street on local, residential streets, particularly those that connect to roadways with transit service, for example on Clairmont Way and on S. Gaffney La.

3. Install additional pedestrian warning systems at mid-block crossings along Molalla Ave. Consider treatments like Rectangular Rapid-Flashing Beacons (RRFBs) to provide more visibility to drivers and assist pedestrians with crossing the street.

4. Provide an additional, protected pedestrian crossing on Molalla Ave, just North of Clairmont Way, to connect the apartments on the west side of Molalla to the shopping center on the east side of the street. Consider treatments like medians with pedestrian refuges, and pedestrian warning signs, like Rectangular Rapid-Flashing Beacons (RRFBs) to assist people with crossing the street.

5. Build sidewalks, where there are none, along the north edge of Beavercreek Rd., west of Molalla Ave. Ensure there is a landscaped buffer between pedestrians and motor vehicles.

# Portland

## SE Division St. & SE 122nd Ave.

# SE Division St. & SE 122nd Ave.—Portland

The SE Division St. & SE 122nd Ave. focus area is located in the City of Portland. It is situated approximately seven miles from the City of Portland's downtown, five miles from City of Gresham's downtown, and three miles from Portland's Gateway Regional Center. Light rail and bus connections converge nearby at the MAX Green Line Division St. Station and the MAX Blue Line E 122nd Ave Station. Within the focus area a variety of retail and service providers are located along SE 122nd Ave. & SE Division St. The high existing transit ridership in this area combined with the mix of land uses makes this focus area a good location for infrastructure investments that will improve a person's ability to walk to transit stops and local destinations safely, directly, and comfortably.

## Places to access locally by foot

If a person walks within this focus area, these are examples of the places he or she could walk to or from:

- Retail (e.g. Albertsons, Safeway, Starbucks, Walgreens)
- Housing (multi-family and single-family)
- Schools (South Powellhurst Middle School, West Powellhurst Elementary, and Mill Park Elementary)
- Parks (West Powellhurst Park and Mill Park)
- Multnomah County Mid County Health Center Primary Care Clinic

## Places to access regionally by transit

If a person boards a TriMet bus or train in this focus area, these are examples of the places he or she could travel to or from without making a transfer:

**Clackamas:** Clackamas Town Center Mall
**Gresham:** Downtown Gresham
**Portland:** Downtown Portland, Rose Quarter, and North Portland,

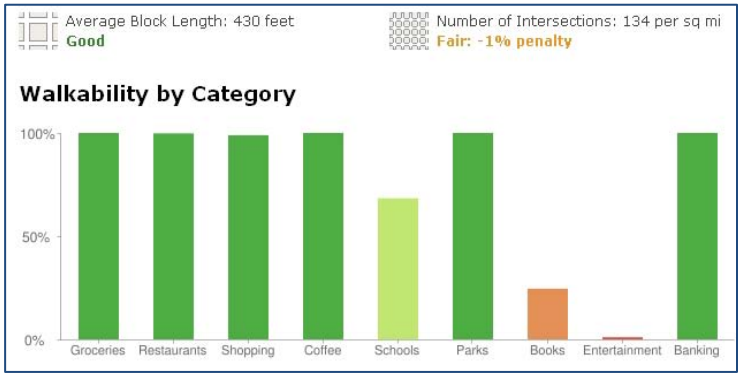
**Transit centers and MAX stations:** Parkrose/Sumner Transit Center, Clackamas Town Center Transit Center, Gresham Central Transit Center, Lents/SE Foster Rd MAX Station, NE 60th Ave MAX Station

**2040 growth concept centers:** Central City, Clackamas Regional Center, Gresham Regional Center, Lents Town Center

## 15 minutes by walking

The map below displays the area a person can walk to, from the intersection of SE Division St. & SE 122nd Ave., within 15 minutes, using the street network. It was created using the website *walkscore.com*. Additional information about Walkscore's beta street smart feature can be found on their website. As noted earlier, Walkscore has limitations. It cannot rate the quality of a walking environment. For example, it does not know whether a sidewalk is missing or an intersection is dangerous to cross. The "observed behavior" section of this report begins to assess the focus area from a more qualitative, user experience perspective.

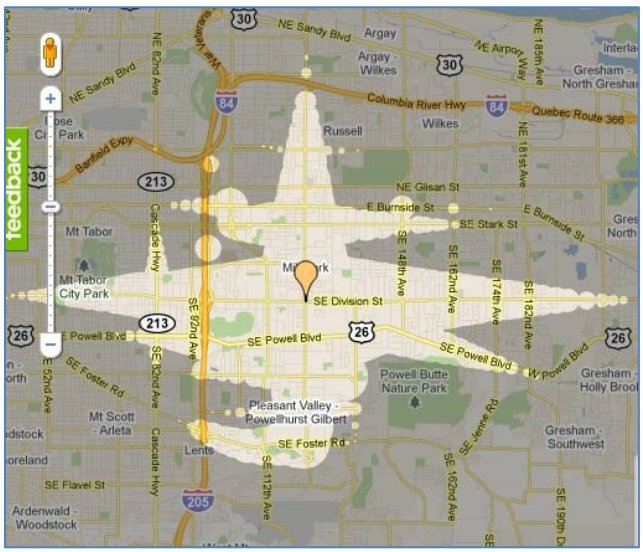
Walk shed map: score 86 out of 100—very walkable—most errands can be accomplished on foot


Source: *walkscore.com* (beta street smart feature)

## 15 minutes by Transit

The map below displays the area a person can travel to within 15 minutes, using TriMet transit service, from the intersection of SE Division St. & SE 122nd Ave. It was created using the website *mapnificent.net*, and assumes the person is starting travel at 9 a.m. on a weekday.




Source: *mapnificent.net*

The table below shows, during an average week, how many people are getting on and off a bus at stops located at an intersection. We know every person who got on or off the bus had to walk or roll for some part of their trip to the bus stop. Therefore, when no other pedestrian count data is available, the total number of ons and offs can be used as a proxy for the *minimum* number of pedestrians walking around an intersection during an average week. Likewise, the table shows how many times the bus ramp or lift is deployed. The number of ramp/lift deployments is an indicator of the number of people needing an accessible walking environment, often because they are using a mobility device, stroller, or shopping cart.

### Top 5 intersections with TriMet customer ons and offs

| Transit stop locations - intersection | Transit line(s) | Weekly ons and offs at intersection | Monthly vehicle ramp/lift deployment at intersection |
|---|---|---|---|
| Division & 122nd | 4,71 | 8,925 | 266 |
| Powell & 122nd | 9,71 | 5,401 | 156 |
| Division & 130th | 4 | 1,681 | 35 |
| Division & 124th | 4 | 1,584 | 18 |
| Division & 119th | 4 | 1,481 | 49 |

### Observed behavior

1. Many people crossing the street on foot and motor vehicles turning at the intersection of SE 122nd Ave. & SE Powell Blvd. There are 5,401 people getting on or off a bus at this intersection every week. Most of them likely have to walk across this intersection.

2. Many people crossing the street on foot and motor vehicles turning at the intersection of SE122nd Ave. & SE Division St. There are 8,925 people getting on or off a bus at this intersection every week. Most of them likely have to walk across this intersection.

3. People walking in the roadway, or on the shoulder of the road, along SE Powell Blvd. where no sidewalks are present. The posted speed limit on SE Powell Blvd. is 35 mph.

4. People crossing mid-block, or at unprotected intersections, along SE Division St. and SE 122nd Ave.

5. People walking on curb tight sidewalks along SE Division St., where there is no landscaped buffer and the on-street parking, which is supposed to provide a buffer between pedestrians and traffic, is going unused.

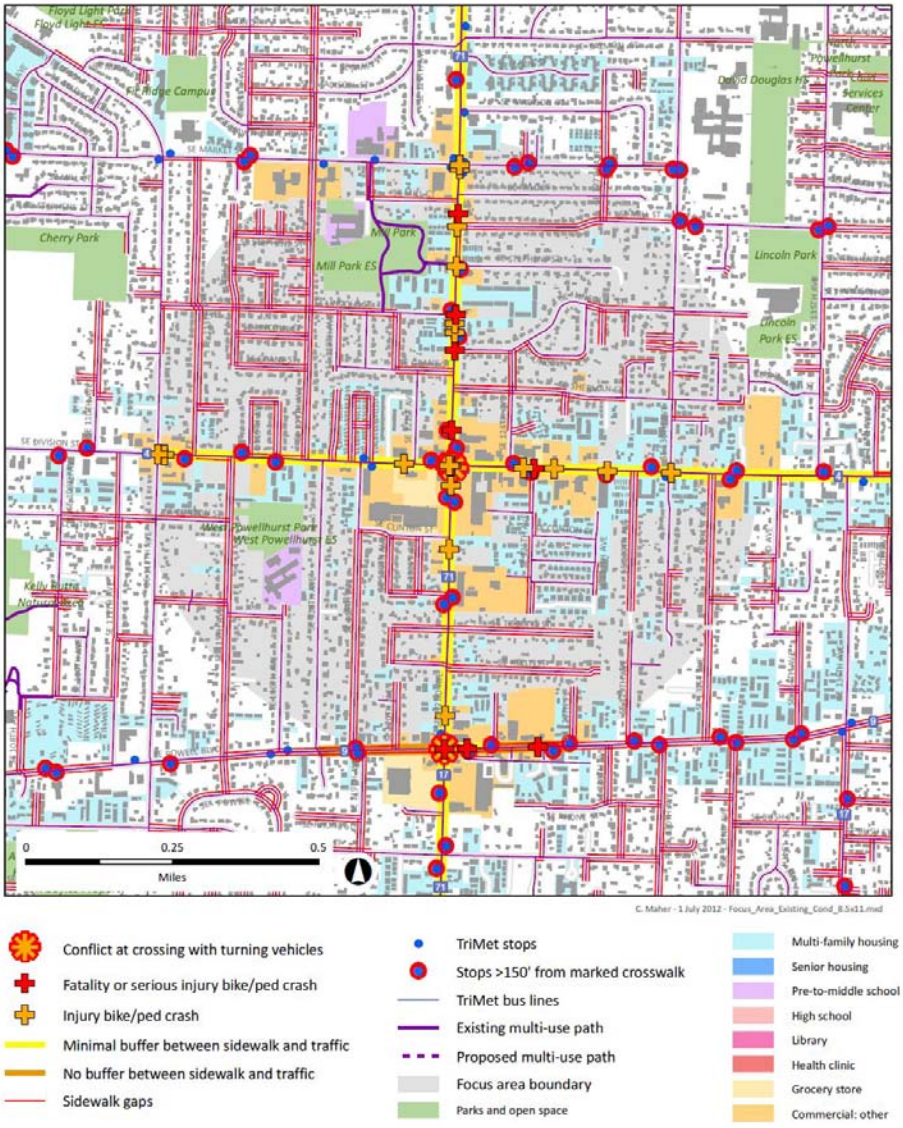
## SE Division St. & SE 122nd Ave.—pedestrian and transit needs

### Needs help

SE Powell Blvd. and SE122nd Ave., near bus Stop ID 4572

### Something positive to build from

SE Division St. & SE129th Ave, near bus Stop ID1308



### Five actions to take to make the area safer, easier, and comfortable to walk

1. Shorten crossing distances, make crosswalks more visible, and provide more time for pedestrians to cross at the intersection SE Division St. & SE 122nd Ave. Consider other signal treatments like leading pedestrian phases, automatic recall for pedestrian actuated signals, and right turn on red restrictions. Curb radius reduction, curb extension, and crossing island treatments should also be considered to shorten crossing distances.

2. Shorten crossing distances, make crosswalks more visible, and provide more time for pedestrians to cross at the intersection SE Powell Blvd. & SE 122nd Ave. Consider other signal treatments like leading pedestrian phases, automatic recall for pedestrian actuated signals, and right turn on red restrictions. Curb radius reduction, curb extension, and crossing island treatments should also be considered to shorten crossing distances.

3. Build sidewalks that are at least10 ft. wide along SE Powell Blvd., where there are none, and widen existing sidewalk corridors all along SE Powell Blvd., so there is landscaped buffer between pedestrians and the motor vehicles. The minimum sidewalk corridor width for a busy road like this should be 10 ft., including a landscaped buffer, but wider is better, preferably 14 ft.

4. Provide additional, frequent, and protected pedestrian crossings along SE Division St. & SE122nd Ave. At a minimum, protected crossings should be provided every 530 ft. Consider treatments like medians with pedestrian refuges, and pedestrian warning signs, like Rectangular Rapid-Flashing Beacons (RRFBs) to assist people with crossing the street.

5. Widen existing sidewalk corridors all along SE Division St. & SE 122nd Ave., so there is landscaped buffer between pedestrians and the motor vehicles. The minimum sidewalk corridor width for a busy road like this should be 10 ft, including a landscaped buffer, but wider is better, preferably 14 ft.

# Portland

## SE Powell Blvd. & SE 82nd Ave.

# SE Powell Blvd. & SE 82nd Ave.—Portland

The SE Powell Blvd. & SE 82nd Ave. focus area is located in the City of Portland. It is situated approximately six miles from the City of Portland's downtown, seven miles from City of Gresham's Downtown, and 2.5 miles from Portland's Gateway Regional Center. Light rail and bus connections converge nearby at the MAX Green Line Powell St. Station and the MAX Red/Blue Line 82nd Ave. Station. Within the focus area a variety of retail and service providers are located along SE 82nd Ave. and SE Powell Blvd. The high existing transit ridership in this area combined with the mix of land uses makes this focus area a good location for infrastructure investments that will improve a person's ability to walk to transit stops and local destinations safely, directly, and comfortably.

### Places to access locally by foot

If a person walks within this focus area, these are examples of the places he or she could walk to or from:

- Retail (e.g. Eastport Plaza, WalMart, Food 4 Less, Goodwill Superstore, Fubonn Supermarket, Columbia Medical Clinic)
- Housing (senior, multi-family, single-family)
- Health Centers (e.g. Rosewood Family Health Center)
- Multnomah County Library—Holgate Branch
- Schools (Marysville Elementary School )
- Parks (Essex Park, Lents Park, Multnomah Park Cemetery)

### Places to access regionally by transit

If a person boards a TriMet bus or train in this focus area, these are examples of the places he or she could travel to or from without making a transfer:

**Portland:** Downtown Portland, North Portland, Southeast Portland,
**Clackamas Regional Center:** Clackamas Town Center Mall
**Gresham:** Downtown Gresham

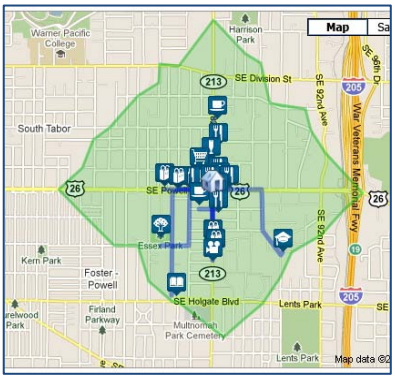
**Transit centers and MAX stations:** Gateway/NE 99th Ave Transit Center, Clackamas Town Center Transit Center, Hollywood/NE 42nd Ave Transit Center, Rose Quarter Transit Center, Gresham Central Transit Center, NE 82nd Ave MAX Station, all stations along the MAX Green Line

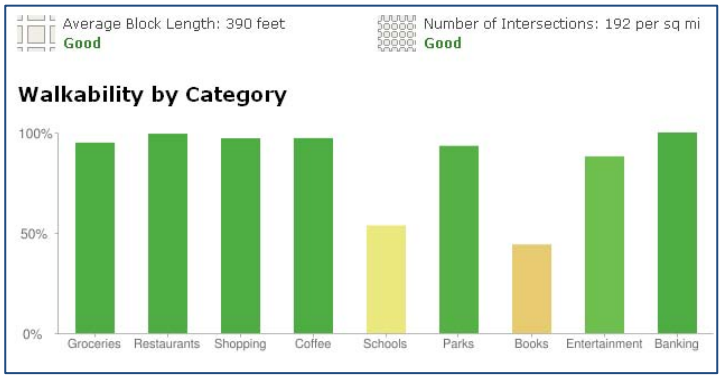
**2040 growth concept centers:** Central City, Gateway Regional Center, Clackamas Regional Center, Gresham Regional Center,

## 15 minutes by walking

The map below displays the area a person can walk to, from the intersection of SE 82nd Ave. & SE Powell Blvd., within 15 minutes, using the street network. It was created using the website *walkscore.com*. Additional information about Walkscore's beta street smart feature can be found on their website. As noted earlier, Walkscore has limitations. It cannot rate the quality of a walking environment. For example, it does not know whether a sidewalk is missing or an intersection is dangerous to cross. The "observed behavior" section of this report begins to assess the focus area from a more qualitative, user experience perspective.

Walk shed map: score 91 out of 100—very walkable—daily errands do not require a car

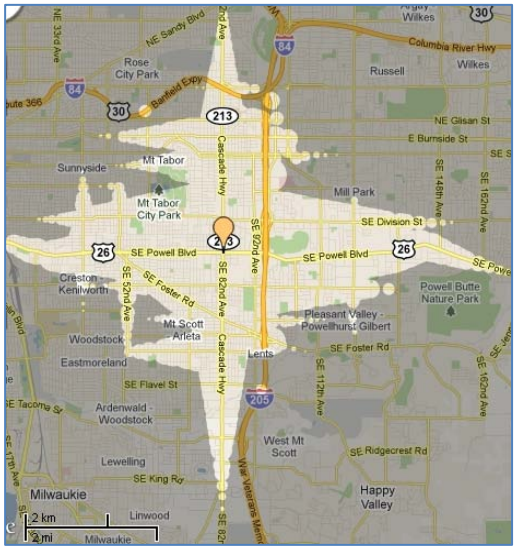



Source: *walkscore.com* (beta street smart feature)

## 15 minutes by transit

The map below displays the area a person can travel to within 15 minutes, using TriMet transit service, from the intersection of SE 82nd Ave. & SE Powell Blvd. It was created using the website *mapnificent.net*, and assumes the person is starting travel at 9 a.m. on a weekday.




Source: *mapnificent.net*

The table below shows, during an average week, how many people are getting on and off a bus at stops located at an intersection. We know every person who got on or off the bus had to walk or roll for some part of their trip to the bus stop. Therefore, when no other pedestrian count data is available, the total number of ons and offs can be used as a proxy for the *minimum* number of pedestrians walking around an intersection during an average week. Likewise, the table shows how many times the bus ramp or lift is deployed. The number of ramp/lift deployments is an indicator of the number of people needing an accessible walking environment, often because they are using a mobility device, stroller, or shopping cart.

### Top 5 intersections with TriMet customer ons and offs

| Transit stop locations - intersection | Transit line(s) | Weekly ons and offs at intersection | Monthly vehicle ramp/lift deployment at intersection |
|---|---|---|---|
| 82nd & Division | 4,72 | 17,953 | 401 |
| 82nd & Powell | 9,72 | 17,782 | 379 |
| 82nd & Holgate | 72,17 | 8,771 | 238 |
| Powell MAX Station | Green Line | 6,326 | Not available |
| 82nd & Boise | 72 | 3,084 | 113 |

### Observed behavior

1. Many people crossing the street on foot and cars turning at the intersection of SE 82nd Ave. & SE Powell Blvd. In addition, motor vehicles were observed running red lights at this intersection, mostly on left turns. There are 17,782 people getting on or off a bus at this intersection every week. Most of them likely have to walk across this intersection.

2. Many people crossing the street on foot and cars turning at the intersections of SE 82nd Ave. & SE Division St. and SE 82nd Ave. & SE Holgate Blvd. There are 17,953 people getting on or off a bus at this intersection every week. Most of them likely have to walk across this intersection.

3. People walking along the side of the road on SE Powell Blvd, east of I-205, where the sidewalk ends. The posted speed limit on SE Powell Blvd is 35 mph.

4. Motor vehicles not stopping for people trying to cross SE Powell Blvd. at mid-block crossings and people crossing outside of marked mid-block crossings. Also, elderly residents crossing SE Powell Blvd. at SE 84th Ave., near Kirkland Manor, to reach Westbound, Line 9 stop. There are no crosswalk or pedestrian facilities at this intersection.

5. People walking on curb tight sidewalks along SE 82nd Ave., where there is no landscaped buffer between pedestrians and traffic.

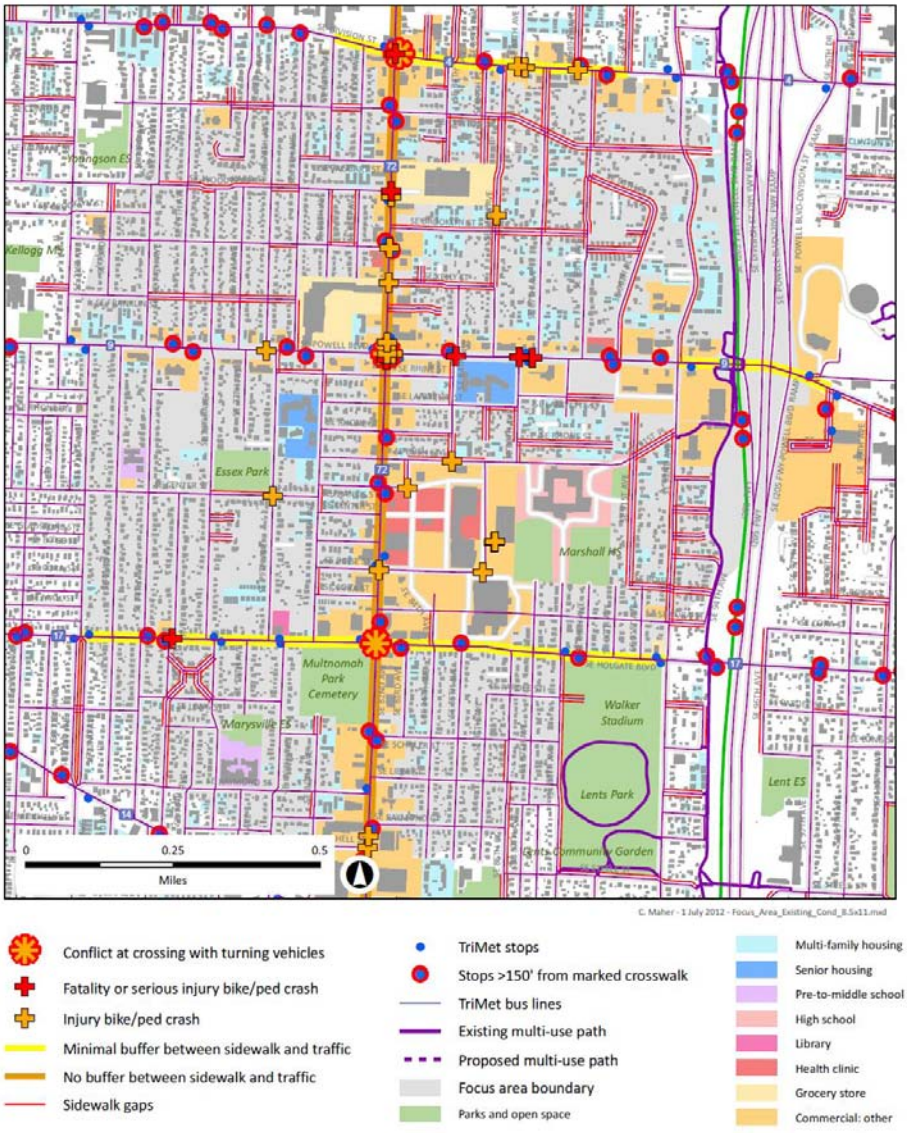
## SE Powell Blvd. & SE 82nd Ave.—pedestrian and transit needs

### Needs help

SE Division St. & SE 82nd Ave, near Stop IDs 1497 and 7957

### Something positive to build from

SE Holgate Blvd. & SE 85th Ave., near WalMart, Stop ID 10593



### Five actions to take to make the area safer, easier, and comfortable to walk

1. Shorten crossing distances, make crosswalks more visible, and provide more time for pedestrians to cross at the intersection of SE Powell Blvd. & SE 82nd Ave. All signals should, at a minimum, be timed so people have one second to walk 3.5 ft. Given the intersection's proximity to senior centers and retail, a more appropriate time would be one second for every 2.5 ft. to allow children and senior citizens, who tend to walk more slowly, more time to cross the street comfortably under the protection of the walk phase. Consider other signal treatments like leading pedestrian phases, automatic recall for pedestrian actuated signals, and right turn on red restrictions. Curb radius reduction, curb extension, and crossing island treatments should also be considered to shorten crossing distances. Red light cameras could help prevent people running red lights.

2. Shorten crossing distances, make crosswalks more visible, and provide more time for pedestrians to cross at the intersections of SE Division St. & SE 82nd Ave. and SE Holgate Blvd. & SE 82nd. All signals should, at a minimum, be timed so people have one second to walk 3.5 ft. Given the intersection's proximity to senior centers and schools, a more appropriate time would be one second for every 2.5 ft. to allow children and senior citizens, who tend to walk more slowly, more time to cross the street comfortably under the protection of the walk phase. Consider other signal treatments like leading pedestrian phases, automatic recall for pedestrian actuated signals, and right turn on red restrictions. Curb radius reduction, curb extension, and crossing island treatments should also be considered to shorten crossing distances.

3. Build sidewalks that are at least10 ft. wide along SE Powell Blvd., where there are none, and widen existing sidewalk corridors all along SE Powell Blvd., so there is landscaped buffer between pedestrians and the motor vehicles. The minimum sidewalk corridor width for a busy road like this should be 10 ft., including a landscaped buffer, but wider is better, preferably 14 ft.

4. Install additional pedestrian warning systems at mid-block crossings along SE Powell Blvd. Consider treatments like Rectangular Rapid-Flashing Beacons (RRFBs) to provide more visibility to drivers and assist pedestrians with crossing the street.

5. Build sidewalks that are at least10 ft. wide along SE 82nd Ave, where there are none, and widen existing sidewalk corridors all along SE 82nd Ave, so there is landscaped buffer between pedestrians and the motor vehicles. The minimum sidewalk corridor width for a busy road like this should be 10 ft., including a landscaped buffer, but wider is better, preferably 14 ft.

# Portland
## Hillsdale

# Hillsdale—Portland

The Hillsdale focus area is located in the City of Portland. It is situated approximately three miles from the City of Portland's downtown, 5.5 miles from the City of Beaverton's Downtown, and five miles from the City of Tigard's Downtown. Light rail and bus connections converge at Portland's Transit Mall and at the Beaverton Transit Center. Connections to WES Commuter Rail can be made at Tigard or Beaverton Transit Centers. Within the focus area a variety of retail and service providers are located along SW Capitol Hwy and SW Barbur Blvd. The mix of land uses and plans for future high capacity transit service makes this focus area a good location for infrastructure investments that will improve a person's ability to walk to transit stops and local destinations safely, directly, and comfortably.

### Places to access locally by foot

If a person walks within this focus area, these are examples of the places he or she could walk to or from:

- Retail (e.g. Hillsdale Plaza, Fred Meyer, Safeway)
- Housing (multi-family and single family)
- Wilson Pool
- Multnomah County Library —Hillsdale Branch
- Schools (Wilson High School, Reike Elementary School, Gray Middle School, Alpha Bet Jewish Day School)
- Parks & Trails (George Himes Park and Trail, Fulton Park & Community Garden, Stephens Creek Natural Area, and Dewitt Park, Fanno Creek Greenway)

### Places to access regionally by transit

If a person boards a TriMet bus or train in this focus area, these are examples of the places he or she could travel to or from without making a transfer:

**Portland:** Downtown Portland, Portland State University, Marquam Hill, Northeast Portland, Lewis and Clark College, Multnomah Village
**Beaverton:** Downtown Beaverton
**Tigard:** Downtown Tigard, retail along SW Pacific Hwy, Washington Square Mall
**Sherwood / King City:** Downtown Sherwood

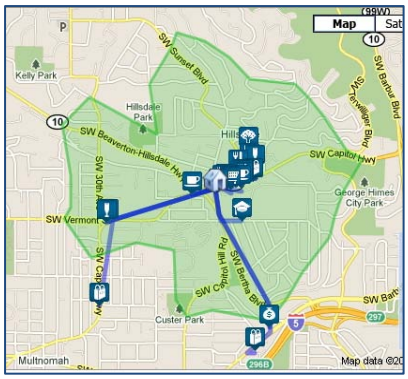
**Transit centers and MAX stations:** Barbur Blvd Transit Center, Beaverton Transit Center, Tigard Transit Center, Washington Square Transit Center

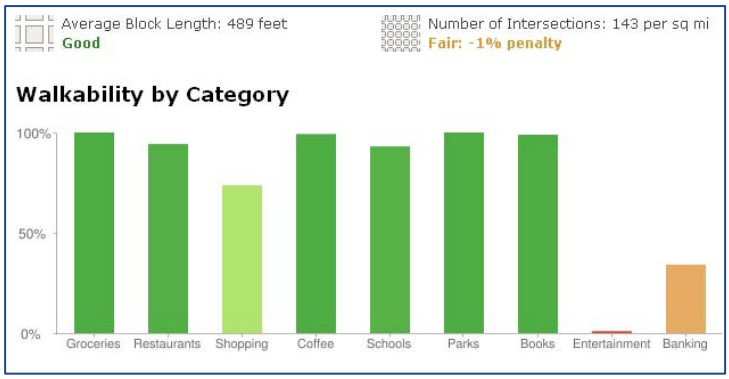
**2040 growth concept centers:** Central City, Beaverton Regional Center, Washington Square Regional Center, Raleigh Hills Town Center, Hillsdale Town Center, West Portland Town Center, Tigard Town Center, King City Town Center, Sherwood Town Center

## 15 minutes by walking

The map below displays the area a person can walk to, from the intersection of SW Vermont St. & SW Bertha Blvd., within 15 minutes, using the street network. It was created using the website *walkscore.com*. Additional information about Walkscore's beta street smart feature can be found on their website. As noted earlier, Walkscore has limitations. It cannot rate the quality of a walking environment. For example, it does not know whether a sidewalk is missing or an intersection is dangerous to cross. The "observed behavior" section of this report begins to assess the focus area from a more qualitative, user experience perspective.

Walk shed map: score 84 out of 100—very walkable—most errands can be accomplished on foot

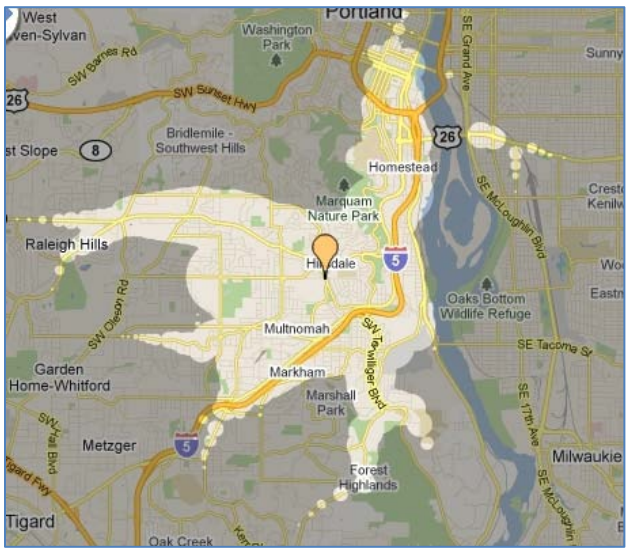



Source: *walkscore.com* (beta street smart feature)

## 15 minutes by transit

The map below displays the area a person can travel to within 15 minutes, using TriMet transit service, from the intersection of SW Vermont St. & SW Bertha Blvd. It was created using the website *mapnificent.net*, and assumes the person is starting travel at 9 a.m. on a weekday.




Source: *mapnificent.net*

The table below shows, during an average week, how many people are getting on and off a bus at stops located at an intersection. We know every person who got on or off the bus had to walk or roll for some part of their trip to the bus stop. Therefore, when no other pedestrian count data is available, the total number of ons and offs can be used as a proxy for the *minimum* number of pedestrians walking around an intersection during an average week. Likewise, the table shows how many times the bus ramp or lift is deployed. The number of ramp/lift deployments is an indicator of the number of people needing an accessible walking environment, often because they are using a mobility device, stroller, or shopping cart.

### Top 5 intersections with TriMet customer ons and offs

| Transit stop locations - intersection | Transit line(s) | Weekly ons and offs at intersection | Monthly vehicle ramp/lift deployment at intersection |
|---|---|---|---|
| Capitol & Sunset | 39,44,45, 54,56,61, 64 | 8,158 | 104 |
| Barbur & Bertha | 1,12,39, 65,94 | 2,863 | 26 |
| Capitol & Bertha Ct | 39,44,45, 54,56 | 1,542 | 23 |
| Barbur & Terwilliger | 1,12,39,65 | 1,409 | 16 |
| Barbur & 3rd | 1,12,38 | 889 | 0 |

#### Observed behavior

1. People walking in the bicycle lane of SW Barbur Blvd., between SW Moss St. and SW Evan St., including people using mobility devices, immediately adjacent to fast moving traffic, where there are no sidewalks present. The posted speed limit is 35 mph.

2. People crossing SW Barbur Blvd. at SW Bertha Blvd., many of them elderly or with children, and not making it across the street within the allowed amount of time to cross.

3. People attempting to cross mid-block on SW Barbur Blvd., including a person in a wheelchair crossing at unmarked midblock point near intersection of SW 17th Ave. & SW Barbur Blvd., to reach an Eastbound, Line 12 bus stop.

4. People having to wait a long time before being able to get a walk signal and crossing long distances at the intersection of SW 19th Ave. & SW Barbur Blvd.

5. People walking in the bike lane on SW Capitol Hwy., east of SW Sunset Blvd., where there are no sidewalks present.

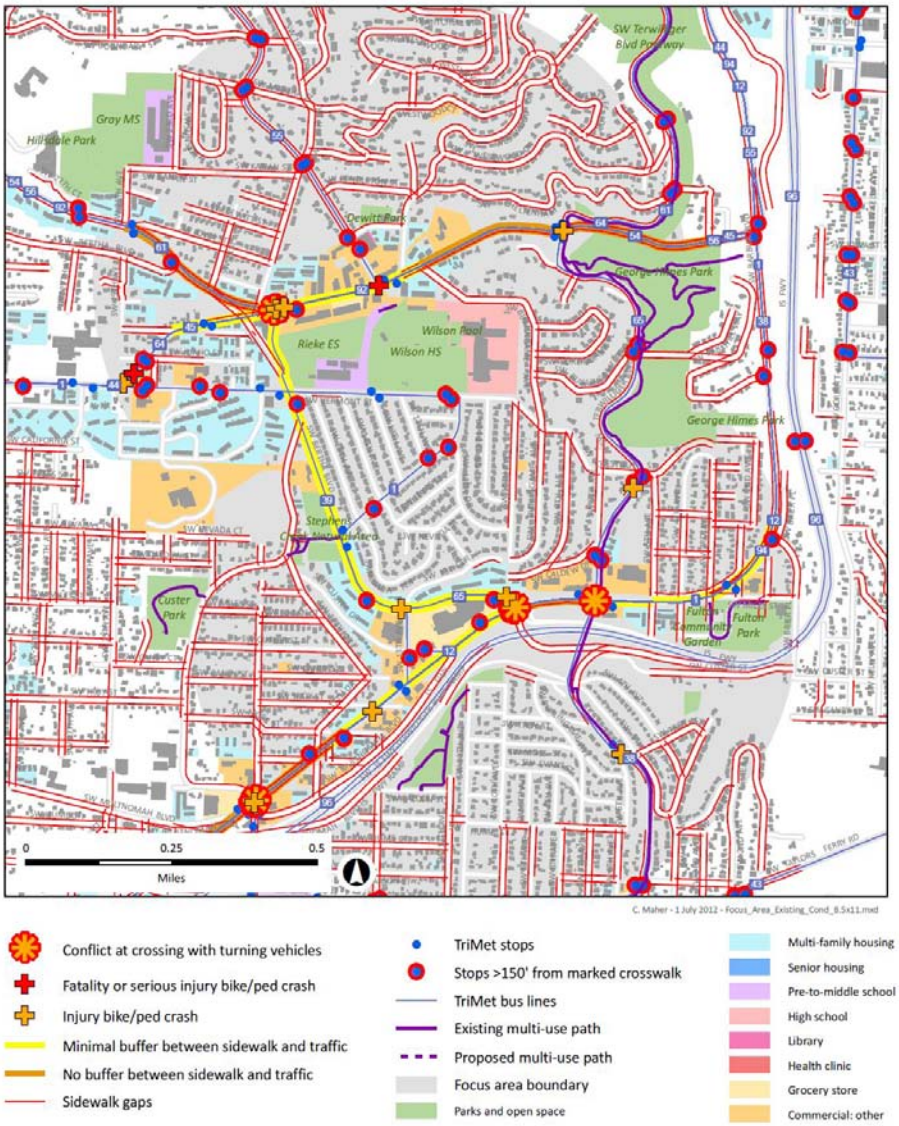
## Hillsdale—pedestrian and transit needs

### Needs help

SW Barbur Blvd. (99W) & SW 17th Dr, near bus Stop ID 180

### Something positive to build from


SW Capitol Hwy. and SW Bertha Ct., bus Stop ID 925



**Five actions to take to make the area safer, easier, and comfortable to walk**

1. Build sidewalks that are at least10 ft. wide along SW Barbur Blvd., where there are none, and widen existing sidewalk corridors all along Blvd, so there is landscaped buffer between pedestrians and the motor vehicles. The minimum sidewalk corridor width for a busy road like this should be 10 ft, including a landscaped buffer, but wider is better, preferably 14 ft.

2. Shorten crossing distances, make crosswalks more visible, and provide more time for pedestrians to cross at the intersection SW Barbur Blvd. and SW Bertha Blvd. All signals should, at a minimum, be timed so people have one second to walk 3.5 ft. Given the intersection's proximity to senior centers and a major retail center, a more appropriate time would be one second for every 2.5 ft. to allow children and senior citizens, who tend to walk more slowly, to cross more comfortably under the protection of the walk phase. Consider other signal treatments like leading pedestrian phases, automatic recall for pedestrian actuated signals, right turn on red restrictions, and automatic pedestrian detection to extend the phase for slower moving pedestrians. Curb radius reduction, curb extension, and crossing island treatments should also be considered to shorten crossing distances.

3. Provide additional, frequent, and protected pedestrian crossings along SW Barbur Blvd. At a minimum, protected crossings should be provided every 530 ft. to allow people to cross the street frequently in a safe manner. Consider treatments like medians with pedestrian refuges, and pedestrian warning signs, like Rectangular Rapid-Flashing Beacons (RRFBs) to assist people with crossing the street. In particular consider adding additional pedestrian warning signage to the crossing island at SW Barbur Blvd. and SW 13th Ave.

4. Shorten crossing distances, make crosswalks more visible, and provide more time for pedestrians to cross at the intersection SW Barbur Blvd. and SW 19th Ave. All signals should, at a minimum, be timed so people have one second to walk 3.5 ft. Given the intersection's proximity to senior centers and a major retail center, a more appropriate time would be one second for every 2.5 ft. to allow children and senior citizens, who tend to walk more slowly, to cross more comfortably under the protection of the walk phase. Consider other signal treatments like leading pedestrian phases, automatic recall for pedestrian actuated signals, and right turn on red restrictions. Curb radius reduction, curb extension, and crossing island treatments should also be considered to shorten crossing distances.

5. Build sidewalks that are at least10 ft. wide along SW Capitol Blvd., where there are none. The minimum sidewalk corridor width for a busy road like this should be 10 ft, including a landscaped buffer, but wider is better, preferably 14 ft.

# Tigard

## Tigard Transit Center

# Tigard Transit Center—Tigard

The Tigard Transit Center focus area is located in the City of Tigard. It is situated in the City of Tigard's downtown and is 4.5 miles from the City of Beaverton's Downtown and 3.5 miles from the City of Tualatin's Downtown. Commuter Rail and bus connections converge at Tigard Transit Center and connections to light rail can be made at Beaverton Transit Center. Within the focus area a variety of neighborhood retail and services are located along Pacific Hwy. The mix of land uses and plans for future light rail service makes this focus area a good location for infrastructure investments that will improve a person's ability to walk to transit stops and local destinations safely, directly, and comfortably.

## Places to access locally by foot

If a person walks within this focus area, these are examples of the places he or she could walk to or from:

- Retail (e.g. Tigard Plaza Shopping Center, neighborhood retail along downtown Tigard's Main St., and retail along SW Pacific Hwy)
- Housing (senior, multi-family, single-family)
- Tigard Public Library
- St. Anthony Catholic School
- Parks & Trails (Fanno Creek Trail & Park, Jim Griffith Memorial Skate Park, Commercial Park, Main Street Park)

## Places to access regionally by transit

If a person boards a TriMet bus or train in this focus area, these are examples of the places he or she could travel to or from without making a transfer:

**Tigard:** Washington Square Mall, Bridgeport Village
**Beaverton:** Downtown Beaverton
**Portland:** Downtown Portland, Multnomah Village, Northeast Portland, Marquam Hill
**Tualatin:** Downtown Tualatin
**Lake Oswego**: Downtown Lake Oswego
**Sherwood/King City:** Downtown Sherwood

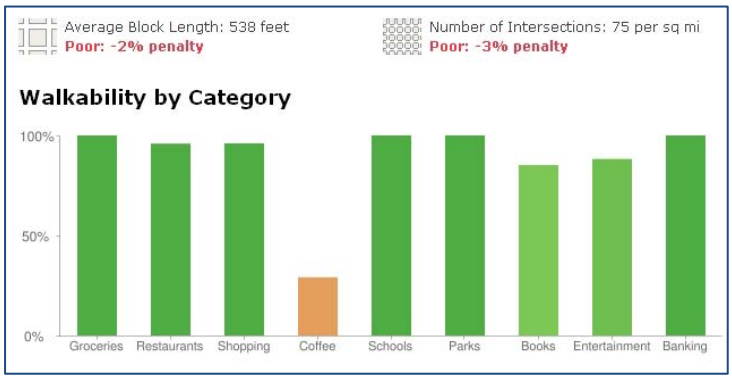
**Transit centers and MAX stations:** Tigard Transit Center**,** Beaverton Transit Center, Washington Square Transit Center, Barbur Blvd Transit Center, Lake Oswego Transit Center

**2040 growth concept centers:** Central City, Beaverton Regional Center, Washington Square Regional Center, Tigard Town Center, Raleigh Hills Town Center, Hillsdale Town Center, West Portland Town Center, King City Town Center, Sherwood Town Center, Tualatin Town Center, Lake Grove Town Center, Lake Oswego Town Center

## 15 minutes by walking

The map below displays the area a person can walk to, from the Tigard Transit Center, within 15 minutes, using the street network. It was created using the website *walkscore.com*. Additional information about Walkscore's beta street smart feature can be found on their website. As noted earlier, Walkscore has limitations. It cannot rate the quality of a walking environment. For example, it does not know whether a sidewalk is missing or an intersection is dangerous to cross. The "observed behavior" section of this report begins to assess the focus area from a more qualitative, user experience perspective.

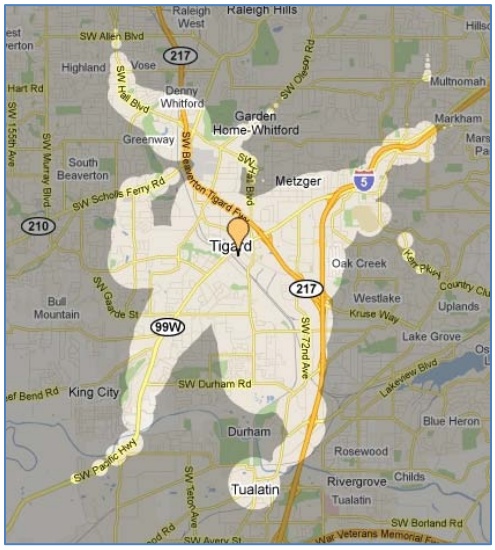
Walk shed map: score 82 out of 100—very walkable—most errands can be accomplished on foot


Source: *walkscore.com* (beta street smart feature)

## 15 minutes by transit

The map below displays the area a person can travel to within 15 minutes, using TriMet transit service, from the Tigard Transit Center. It was created using the website *mapnificent.net*, and assumes the person is starting travel at 9a.m. on a weekday.




Source: *mapnificent.net*

The table below shows, during an average week, how many people are getting on and off a bus at stops located at an intersection. We know every person who got on or off the bus had to walk or roll for some part of their trip to the bus stop. Therefore, when no other pedestrian count data is available, the total number of ons and offs can be used as a proxy for the *minimum* number of pedestrians walking around an intersection during an average week. Likewise, the table shows how many times the bus ramp or lift is deployed. The number of ramp/lift deployments is an indicator of the number of people needing an accessible walking environment, often because they are using a mobility device, stroller, or shopping cart.

### Top 5 intersections with TriMet customer ons and offs

| Transit stop locations - intersection | Transit line(s) | Weekly ons and offs at intersection | Monthly vehicle ramp/lift deployment at intersection |
|---|---|---|---|
| Tigard Transit Center | 12,64,76,78, 45, WES | 18,378 | 194 |
| Main & Scoffins | 12,76,78 | 1,885 | 16 |
| Greenburg & Center | 76,78 | 1,470 | 14 |
| Pacific Hwy & Garden Place/Warner | 12 | 1,254 | 6 |
| Pacific Hwy & Main | 12 | 1,227 | 6 |

### Observed behavior

1. People walking on the south side of SW Pacific Hwy (99W) east of SW Dartmouth St, where there are no sidewalks present.

2. People walking in the street, with children, along SW Scoffins St. where there are no sidewalks. There is also a senior affordable housing complex being constructed nearby at SW Hall Blvd. & SW Scoffins St.

3. People cutting through neighborhood on informal path, from SW Commercial St. to SW Center St., parallel to SW Pacific Hwy. (99W). This provides direct access to SW Greenburg Rd. & SW Hall Blvd., via the Tigard Plaza parking lot.

4. People exiting the trail at the southern end of TriMet's Tigard WES station park and ride lot and continuing through the parking lot, without a designated path, to reach SW Main St.

5. People having to wait a long time before being able to get a walk signal, crossing very long distances, and being on the watch for motor vehicles making permitted right turns on red at the intersections of SW Pacific Hwy. (99W) & SW Greenburg Rd., 99W & SW Hall Blvd, and 99W & SW Dartmouth St.

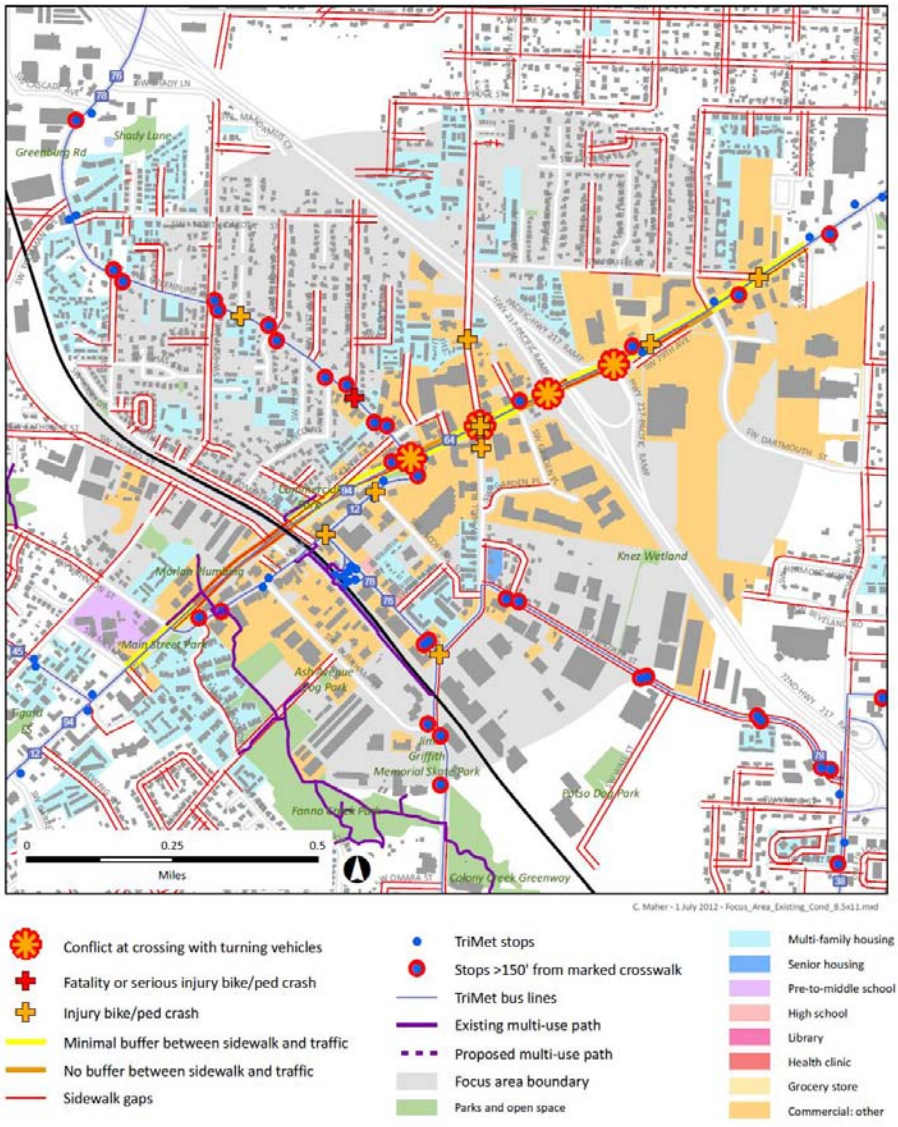
## Tigard Transit Center—pedestrian and transit needs

### Needs Help

SW Pacific Hwy. (99W) & SW Dartmouth St., bus Stop ID 4251

### Something Positive to Build From

SW Pacific Hwy. (99W) & SW Center St, bus Stop ID 10873



### Five actions to take to make the area safer, easier, and comfortable to walk

1. Build sidewalks that are at least10 ft. wide along SW Pacific Hwy (99W), where there are none, and widen existing sidewalk corridors all along 99W, so there is landscaped buffer between pedestrians and the motor vehicles. The minimum sidewalk corridor width for a busy road like this should be 10 ft, including a landscaped buffer, but wider is better, preferably 14 ft.

2. Build sidewalks, where there are none, along SW Scoffins St. & SW Ash St. These streets are near the Tigard Transit Center and provide access to it. Ensure there is a landscaped buffer between pedestrians and motor vehicles.

3. Formalize the informal path running from Center Street Connection from SW Commercial St. to SW Hall Blvd., by paving it, making it ADA accessible, providing lighting, and wayfinding signage.

4. Provide a designated pedestrian path through the transit center park and ride lot, connecting to SW Main St.

5. Shorten crossing distances, make crosswalks more visible, and provide more time for pedestrians to cross at the intersections of 99W and SW Greenburg Rd., 99W & SW Hall Blvd., and 99W & SW Dartmouth St. All signals should, at a minimum, be timed so people have one second to walk 3.5 ft. Given the SW Greenburg Rd. & SW Hall Blvd. intersection's proximity to senior centers and retail, a more appropriate time would be one second for every 2.5 ft. to allow children and senior citizens, who tend to walk more slowly, to cross comfortably under the protection of the walk phase. Consider other signal treatments like leading pedestrian phases, automatic recall for pedestrian actuated signals, and right turn on red restrictions. Curb radius reduction, curb extension, and crossing island treatments should also be considered to shorten crossing distances.

# Washington County

## SW Beaverton-Hillsdale Hwy. & SW Scholls Ferry Rd.

# SW Beaverton-Hillsdale Hwy. & SW Scholls Ferry Rd.—Washington County

The SW Beaverton-Hillsdale Hwy & SW Scholls Ferry Rd. focus area is located in Washington County, on the border of the City of Beaverton and the City of Portland. It is situated 2.5 miles from downtown Beaverton, five miles from downtown Portland, and 4.5 miles from downtown Tigard. Commuter Rail and bus connections converge at Tigard and Beaverton Transit Centers and connections to light rail can be made at Beaverton Transit Center. Within the focus area a variety of neighborhood retail and services are located along SW Beaverton-Hillsdale Hwy. The mix of land uses and abundance of senior housing in this focus area make it a good location for infrastructure investments that will improve a person's ability to walk to transit stops and local destinations safely, directly, and comfortably.

### Places to access locally by foot

If a person walks within this focus area, these are examples of the places he or she could walk to or from:

- Retail (e.g. Raleigh Hills Plaza, Fred Meyer, New Seasons, Safeway, Walgreens)
- Housing (senior, multi-family, single-family)
- Raleigh Hills Elementary School
- Parks (Raleighwood Park and Bauman Park)

### Places to access regionally by transit

If a person boards a TriMet bus or train in this focus area, these are examples of the places he or she could travel to or from without making a transfer:

**Portland:** Downtown Portland, Portland State University, Marquam Hill
**Beaverton:** Downtown Beaverton
**Tigard:** Downtown Tigard, Washington Square Mall

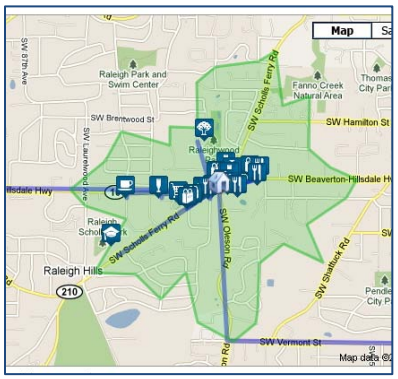
**Transit centers and MAX stations:** Beaverton Transit Center, Tigard Transit Center, Washington Square Transit Center

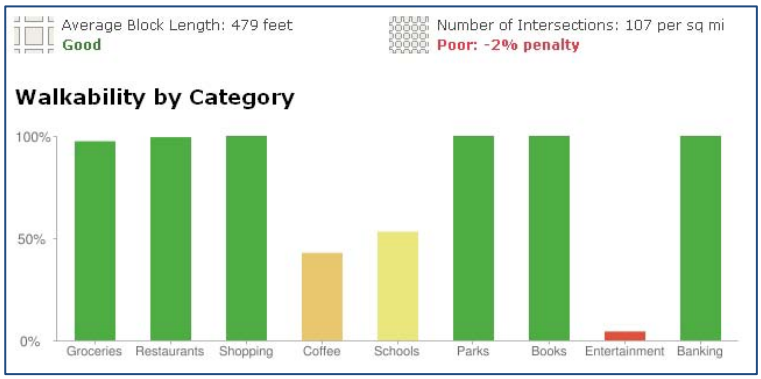
**2040 growth concept centers:** Central City, Beaverton Regional Center, Washington Square Regional Center, Raleigh Hills Town Center, Tigard Town Center, Hillsdale Town Center

## 15 minutes by walking

The map below displays the area a person can walk to, from the intersection of SW Beaverton-Hillsdale Hwy. & SW Oleson Rd., within 15 minutes, using the street network. It was created using the website *walkscore.com*. Additional information about Walkscore's beta street smart feature can be found on their website. As noted earlier, Walkscore has limitations. It cannot rate the quality of a walking environment. For example, it does not know whether a sidewalk is missing or an intersection is dangerous to cross. The "observed behavior" section of this report begins to assess the focus area from a more qualitative, user experience perspective.

Walk shed map: score 81 out of 100—very walkable – most errands can be accomplished on foot

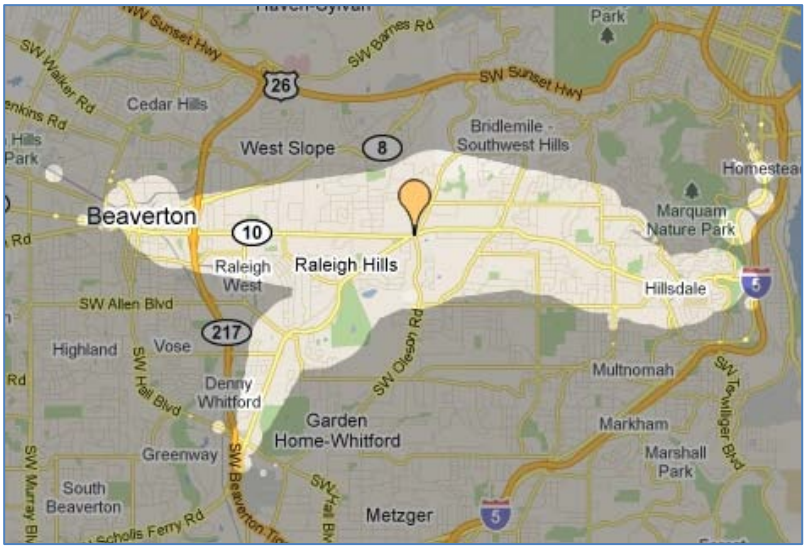



Source: *walkscore.com* (beta street smart feature)

## 15 minutes by transit

The map below displays the area a person can travel to within 15 minutes, using TriMet transit service, from the intersection of SW Beaverton-Hillsdale Hwy. & SW Oleson Rd. It was created using the website *mapnificent.net*, and assumes the person is starting travel at 9 a.m. on a weekday.




Source: *mapnificent.net*

The table below shows, during an average week, how many people are getting on and off a bus at stops located at an intersection. We know every person who got on or off the bus had to walk or roll for some part of their trip to the bus stop. Therefore, when no other pedestrian count data is available, the total number of ons and offs can be used as a proxy for the *minimum* number of pedestrians walking around an intersection during an average week. Likewise, the table shows how many times the bus ramp or lift is deployed. The number of ramp/lift deployments is an indicator of the number of people needing an accessible walking environment, often because they are using a mobility device, stroller, or shopping cart.

### Top 5 intersections with TriMet customer ons and offs

| Transit stop locations - intersection | Transit line(s) | Weekly ons and offs at intersection | Monthly vehicle ramp/lift deployment at intersection |
|---|---|---|---|
| Beaverton-Hillsdale Hwy & Oleson | 54,56,61 | 1,857 | 26 |
| Beaverton-Hillsdale Hwy & 62nd | 54,56 | 1,018 | 35 |
| Beaverton-Hillsdale Hwy & 78th | 54,55 | 762 | 1 |
| Scholls Ferry 5100 Block | 56 | 711 | 2 |
| Beaverton-Hillsdale Hwy & 59th | 54,56 | 631 | 15 |

### Observed behavior

1. People having to wait a long time before being able to get a walk signal, crossing very long distances, being on the watch for motor vehicles making permitted right turns on red, and hurrying or running to cross the intersection of SW Beaverton Hillsdale Hwy & SW Oleson Rd. because they cannot make it across the road in the time allotted to cross. There are 1,857 people getting on or off a bus at this intersection every week. Most of them likely have to walk across this intersection.

2. People having to wait a long time before being able to get a walk signal, crossing very long distances, being on the watch for motor vehicles making permitted right turns on red, and hurrying or running to cross the intersection of SW Beaverton Hillsdale Hwy & SW Oleson Rd. because they cannot make it across the road in the time allotted to cross.

3. People walking on the shoulder or bicycle lane of SW Scholls Ferry Rd. where sidewalks are not present, for example near Raleigh Hills Elementary School.

4. People crossing SW Scholls Ferry Rd. mid-block or at unprotected intersections.

5. People walking on 6 ft. curb tight sidewalks along SW Beaverton-Hillsdale Hwy, where there is no landscaped buffer between pedestrians and traffic. The posted speed limit is 40 mph.

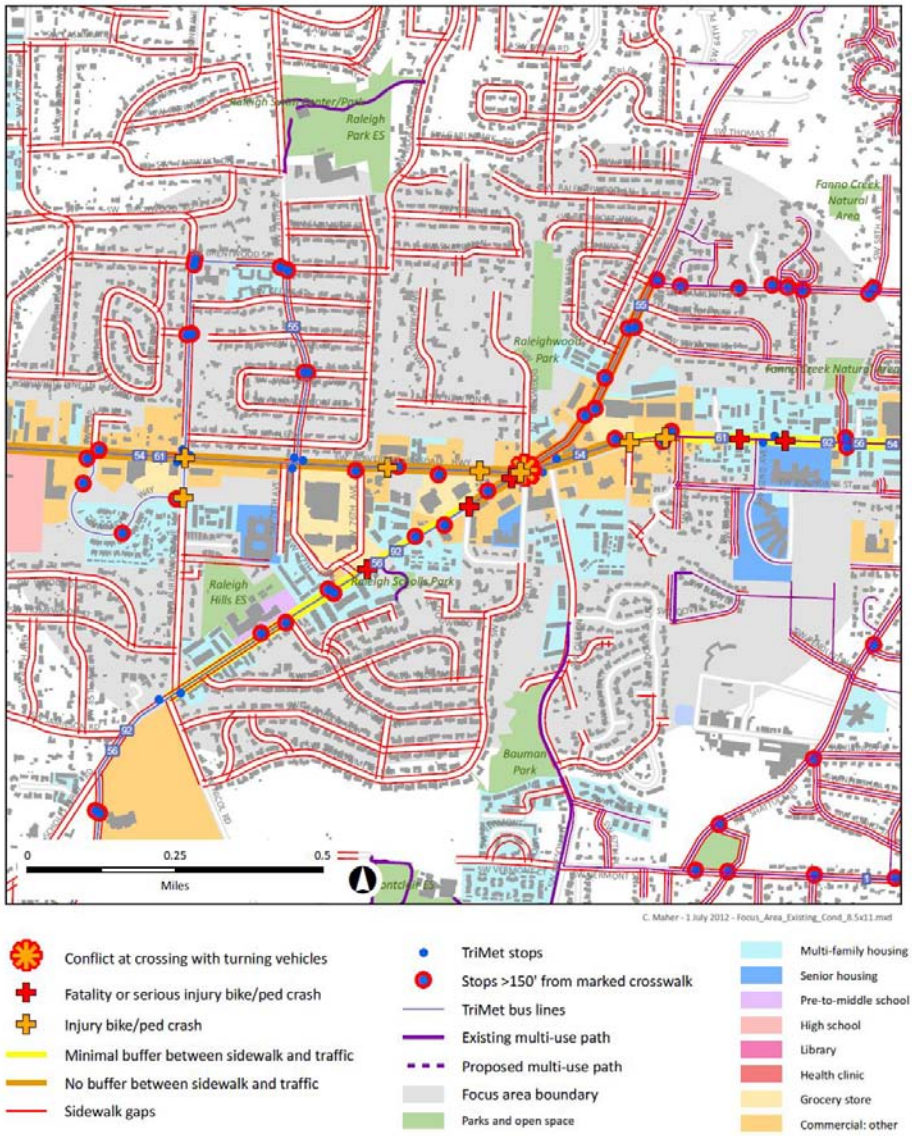
## SW Beaverton-Hillsdale Hwy. & SW Scholls Ferry Rd—Pedestrian and transit needs

### Needs help

SW Beaverton-Hillsdale Hwy & SW Scholls Ferry Rd, near bus Stop ID 350

### Something positive to build from

SW Oleson Rd, near SW Dover St



### Five actions to take to make the area safer, easier, and comfortable to walk

1. Shorten crossing distances, make crosswalks more visible, and provide more time for pedestrians to cross at the intersection of SW Beaverton-Hillsdale Hwy. & SW Oleson Rd. All signals should, at a minimum, be timed so people have one second to walk 3.5 ft. Given the intersection's proximity to senior centers and retail, a more appropriate time would be one second for every 2.5 ft to allow children and senior citizens, who tend to walk more slowly, to cross comfortably under the protection of the walk phase. Consider other signal treatments like leading pedestrian phases, automatic recall for pedestrian actuated signals, and right turn on red restrictions. Curb radius reduction, curb extension, and crossing island treatments should also be considered to shorten crossing distances.

2. Shorten crossing distances, make crosswalks more visible, and provide more time for pedestrians to cross at the intersection of SW Beaverton-Hillsdale Hwy. & SW Scholls Ferry Rd. All signals should, at a minimum, be timed so people have one second to walk 3.5 ft. Given the intersection's proximity to senior centers and retail, a more appropriate time would be one second for every 2.5 ft. to allow children and senior citizens, who tend to walk more slowly, to cross comfortably under the protection of the walk phase. Consider other signal treatments like leading pedestrian phases, automatic recall for pedestrian actuated signals, and right turn on red restrictions. Curb radius reduction, curb extension, and crossing island treatments should also be considered to shorten crossing distances.

3. Build sidewalks that are at least10 ft. wide along SW Scholls Ferry Rd., where there are none, and widen existing sidewalk corridors all along SW Scholls Ferry Rd., so there is landscaped buffer between pedestrians and the motor vehicles. The minimum sidewalk corridor width for a busy road like this should be 10 ft, including a landscaped buffer, but wider is better, preferably 14 ft.

4. Provide additional, frequent, and protected pedestrian crossings along SW Scholls Ferry Rd. At a minimum, protected crossings should be provided every 530 ft. Consider treatments like medians with pedestrian refuges, and pedestrian warning signs, like Rectangular Rapid-Flashing Beacons (RRFBs) to assist people with crossing the street.

5. Widen existing sidewalk corridor along SW Beaverton-Hillsdale Hwy., so there is landscaped buffer between pedestrians and the motor vehicles. The minimum sidewalk corridor width for a busy road like this should be 10 ft, including a landscaped buffer, but wider is better, preferably 14 ft.

Chapter 4

# Making the walk safer, easier and more comfortable

# 4.0 Making the walk safer, easier, and more comfortable

This chapter includes four sections:

1) roadway and sidewalk corridors;
2) roadway corners;
3) roadway crossings; and
4) transit stops.

Each section addresses a part of the public right-of-way pertaining to pedestrians and transit. Attributes of what a pedestrian and transit friendly environment looks like are provided, along with specific treatments that can help make an area more walkable and accessible. The purpose of each treatment, things one should consider when applying the treatment, and rough order-of-magnitude cost estimates are outlined for every treatment.

The attributes, purpose, considerations, and cost estimates are adapted from three primary documents: (1) the Federal Highway Administration's *PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System*, (2) the City of Portland *Pedestrian Design Guide*, and (3) TriMet's *Bus Stops Guidelines.* Cost estimates are adjusted to represent costs in 2011 dollars. The cost estimates are provided to show order of magnitude differences between treatments. They do not include administrative and engineering costs, and if right-of-way is necessary, costs could be significantly higher than what is stated.

Before treatments are considered, the first step in understanding how to make the walk to transit safer, easier, and more comfortable is thinking about who may be using the stop and what types of behaviors they typically exhibit. Figure 8 shows different types of pedestrian groups and their associated characteristics and behaviors. It is excerpted from the Federal Highway Administration's report *Pedestrian Safety Guide for Transit Agencies*. In this report the authors note:

> "Pedestrians traveling to transit stops are frequently preoccupied with reaching the stop before the bus or train arrives. As a result, pedestrians who are running late may take more risks than they typically would under normal circumstances. Pedestrians traveling to the bus or train may exhibit some of the following behaviors:
>
> - Running to catch transit
> - Jaywalking, or crossing at locations that do not have pedestrian crossing facilities or safety enhancements
> - Walking between stopped or parked vehicles, including buses
> - Stepping into street to get around people waiting at a stop."

**Figure 8: Pedestrian characteristics and behaviors**

| Pedestrian group | Characteristics & behaviors |
|---|---|
| **Child pedestrians** | • May have difficulty choosing where and deciding when it is safe to cross the street<br>• May have difficulty seeing (and being seen by) drivers of all types of vehicles, including buses because of less peripheral vision and shorter stature than adults.<br>• May have difficulty judging the speed of approaching vehicles.<br>• May need more time to cross a street than adults. |
| **Older pedestrians** | • May have reduced motor skills that limit their ability to walk at certain speeds or turn their heads.<br>• May need more time to cross a street than younger adults.<br>• May have difficulty with orientation and understanding of traffic signs, so they may need more information about how to access transit and get around safely.<br>• May have difficulty judging the speed of approaching vehicles. |
| **Recent immigrants** | • May have limited understanding of English, traffic laws, or typical roadway behaviors.<br>• May not understand the traffic signals that indicate when to walk.<br>• May not have the experience to know how to interact safely with drivers. |
| **People with disabilities (e.g. people using wheelchairs, crutches, canes, or people with visual or cognitive impairments)** | • May be more affected by surface irregularities in the pavement and changes in slope or grade.<br>• May need more time to cross a street than people without disabilities.<br>• May benefit from pedestrian signal information provided in multiple formats (audible, tactile, and visual).<br>• May have trouble seeing (and being seen) by drivers of all types of vehicles due to seated position (for people using wheelchairs).<br>• Pedestrians who are blind or who have low vision may have trouble detecting yielding vehicles or communicating visually with drivers in crossing at unsignalized crosswalks. |

Source: FHWA Pedestrian Safety Guide for Transit Agencies

At a basic level, community members, decision makers, planners, and engineers should keep in mind fundamental principles for designing pedestrian environments. The City of Portland's *Pedestrian Design Guidelines* does this well. The principals the city adopted are outlined on the following page. They address safety, accessibility, connectivity, functionality, desirability, and cost-effectiveness.

## Principles for pedestrian design

The following design principles represent a set of ideals which should be incorporated, to some degree, into every pedestrian investment.

1. **The pedestrian environment should be safe.** Sidewalks, pathways and crossings should be designed and built to be free of hazards and to minimize conflicts with external factors such as noise, vehicular traffic and protruding architectural elements.

2. **The pedestrian network should be accessible to all.** Sidewalks, pathways and crosswalks should ensure the mobility of all users by accommodating the needs of people regardless of age or ability.

3. **The pedestrian network should connect to places people want to go.** The pedestrian network should provide a continuous direct routes and convenient connections between destinations, including homes, schools, shopping areas, public services, recreational opportunities, and transit.

4. **The pedestrian environment should be easy to use.** Sidewalks, pathways, and crossings should be designed so people can easily find a direct route to a destination and delays are minimized.

5. **The pedestrian environment should provide good places.** Good design should enhance the look and feel of the pedestrian environment. The pedestrian environment includes open spaces such as plazas, courtyards, and squares, as well as the building facades that give shape to the space of the street. Amenities such as street furniture, banners, art, plantings, and special paving, along with historical elements and cultural references, should promote a sense of place.

6. **The pedestrian environment should be used for many things.** The pedestrian environment should be a place where public activities are encouraged. Commercial activities such as dining, vending, and advertising may be permitted when they do not interfere with safety and accessibility.

7. **The pedestrian environment should be economical.** Pedestrian improvements should be designed to achieve the maximum benefit for their cost, including initial cost and maintenance cost as well as reduced reliance on more expensive modes of transportation. Where possible, improvements in the right-of-way should simulate, reinforce and connect with adjacent private improvements.

Source: Portland Pedestrian Design Guidelines

## Roadways and sidewalk corridors

Roadways come in many sizes, function in multiple ways, and are typically classified by the amount of traffic they carry. Many of the roadways where TriMet provides service are classified as arterials. Generally, arterial roadways tend to carry high volumes of traffic at higher speeds and are wider than most other streets. They provide very good motor vehicle access to retail and services located along them, but are often an inhospitable environment for pedestrians and bicyclists. The treatments in this section can help make these wide, fast, auto-dominated streets safer and inviting to pedestrians and bicyclists.

Sidewalk corridors are generally located along the side of roadways, and extend from the edge of the roadway to the edge of the right-of-way. Sidewalk corridors provide space, separated from vehicle movement, for people to walk. A sidewalk corridor should include a frontage zone in front of buildings, a through pedestrian zone of at least 5 ft. for people to walk or roll on, and a furnishing zone or planted buffer separating pedestrians from the roadway traffic. All through pedestrian zones should be American with Disabilities Act (ADA) accessible. On streets where there are high traffic volumes and high speeds, often where there is transit service provided, jurisdictions should make it a priority to have, at a minimum, 10 ft. wide sidewalk corridors, but aim for 14 ft, so pedestrians feel protected from roadway traffic.

### Attributes of good sidewalk corridors

**Safety—**Sidewalk corridors should allow pedestrians to feel a sense of safety and predictability. Sidewalk users should not feel threatened by adjacent traffic.

**Accessibility—**The sidewalk corridor should be easily accessible to all users, whatever their level of ability.

**Continuity—**The walking route along a sidewalk corridor should be obvious and should not require pedestrians to travel out of their way unnecessarily.

**Adequate travel width—**In most areas, two people walking together should be able to pass a third person comfortably, and different walking speeds should be possible. In areas of intense pedestrian use, sidewalks should be wider to accommodate the greater volume of walkers.

**Landscaping—**Plantings and street trees in the sidewalk corridor should create desirable microclimates and should contribute to the psychological and visual comfort of sidewalk users.

**Social space—**Sidewalk corridors should provide places for people to interact. There should be places for standing, visiting, and sitting. The sidewalk corridor should be a place where children can safely participate in public life.

**Quality of place—**Sidewalk corridors should contribute to the character of neighborhoods and business districts, and strengthen their identity.

Source: Portland Pedestrian Design Guidelines

### Sidewalks and walkways

**Purpose:** To allow people of all ages and abilities to walk within the public Right-of-Way (ROW) and be separated from roadway vehicles.

Oregon City: Mollala Ave, between Garden Meadow Dr. and Char Diaz Dr.

**Considerations**

- Sidewalks should be ADA accessible and a through pedestrian zone should be provided, keeping street furniture and utilities outside it. Planted buffers between the through zone and curb should be a high priority for any sidewalk project.
- The pedestrian should not feel unsafe, uncomfortable, or overpowered by vehicles in the corridor.
- When retrofitting streets with sidewalks, locations near places that attract a high number of pedestrian should be the highest priority.

**Estimated cost** The cost for concrete curbs and sidewalks is approximately $15/linear ft. for curbing and $11/square ft. for walkways. Asphalt walkways are less costly, but require more maintenance, and are somewhat more difficult to walk and roll on for pedestrians with mobility impairments. Demolition and reconstruction would cost considerably more. Costs can vary significantly based on right-of-way availability and mitigation.

### Driveway design and consolidation (commercial and residential)

**Purpose:** To reduce pedestrian/motor vehicle conflicts, improve access for people with disabilities, and improve visibility between motor vehicles and pedestrians at driveways.

Beaverton: Driveway to Sisters of St. Mary of Oregon, located near the intersection of SW Tualatin Valley Hwy. and SW Murray Blvd.

**Considerations**

- Driveways should be level and comply with ADA standards.
- Examples of driveway modifications for better pedestrian accessibility include narrowing or closing driveways, tightening turning radii, converting driveways to right-in-only or right-out-only movements, and providing median dividers on wide driveways.
- It is best to properly design and consolidate driveways at the outset.

**Estimated cost**

No additional cost if it is part of the original construction. The cost of re-grading driveways to make them ADA accessible is around $7/square ft.

## Landscaping

**Purpose:** To make the roadway more desirable to walk along, calm traffic by creating a sense of enclosure and a visual narrowing of the roadway, and to physically separate pedestrians from traffic, providing pedestrians more safety and comfort.

**Considerations**

- Landscaping can include a variety of trees, bushes, and/or flowerpots, which can be planted in the buffer area between the sidewalk or walkway and the street.
- Choose appropriate plants for the areas and provide adequate space for maturation.
- Maintenance must be considered and agreed to upfront, whether it's by the municipality or neighborhood residents.
- Shrubs should be low-growing and trees should be trimmed up to at least 8 to 10 ft. to ensure sight distances and head room are maintained.
- Minimum clear widths and heights must be maintained to ensure ADA accessibility.

**Estimated cost**

Opportunities for funding landscaping are often more flexible than for major street changes. Tree boxes can range in prices between $2,000 - $10,000. If additional right-of-way must be purchased, this could significantly add to the cost.

Beaverton: SW Farmington Rd, near Hall Blvd

## Roadway narrowing

**Purpose:** To reduce vehicle speeds, increase safety for all roadway users, and redistribute space to pedestrians and bicyclists.


Oregon City: Molalla Ave. and Barclay Hills Dr.

**Considerations**

- Roadway narrowing can be achieved in several different ways – lane widths can be reduced, travel lanes can be removed, on-street parking can be added, curbs can be moved to narrow cross section and extend the width of sidewalks and landscape areas.
- Provide for bus, emergency vehicle access, and truck needs where appropriate and involve these users in designing the roadway.
- Evaluate whether narrowing may encourage traffic to divert to other local streets in the neighborhood.

**Estimated cost**

Adding striping shoulders or on-street bicycle lanes can cost as little as $1,000/mile if the old paint does not need to be changed. The cost for restriping a mile of street to bicycle lanes or reducing the number of lanes to add on-street parking is $5,000 to $10,000/mile, depending on the number of old lane lines to be removed. Constructing a raised median or widening a sidewalk can cost $100,000 or more per mile.

## Roadway corners

Roadway corners are typically where pedestrians congregate and where transit stops are located. They provide a place for pedestrians to wait safely and comfortably for an opportunity to cross the roadway and they provide intermediary space between the sidewalk corridor and the roadway crossing. All roadway corners should be ADA accessible.

### Attributes of good street corners

**Clear space—**Corners should be clear of obstructions, and have enough space to accommodate the typical number of pedestrians waiting to cross. They should also have enough room for curb ramps, for transit stops where appropriate, and for street conversations.

**Visibility—**It is critical that pedestrians on the corner have a good view of travel lanes and that motorists in the travel lanes can easily see waiting pedestrians.

**Legibility—**Symbols, marks, and signs used at corners should clearly indicate what actions the pedestrian should take.

**Accessibility—**All corner features, such as ramps, landings, call buttons, signs, symbols, marks, textures, etc. must meet accessibility standards.

**Separation from traffic—**Corner designs and construction must be effective in discouraging turning vehicles from driving over the pedestrian area.

Source: Portland Pedestrian Design Guidelines

### Curb radius reduction

**Purpose:** To slow right-turning vehicles, reduce crossing distances for pedestrians, improve visibility between drivers and pedestrians, and provide space for accessible curb ramps.

Hillsboro: NW Cornell Rd & NW185th Ave.

**Considerations**

- Analyze effective radii. Where there is parking and/or bicycle lane, curb radii can be even tighter, because the vehicles will have more room to negotiate the turn.
- Typical turning radius for new construction is 15 ft. to 30 ft. for arterial streets with substantial volume of turning buses and/or trucks. TriMet prefers a 30 ft. effective turning radius (not necessarily the same thing as curb radius) for 40 ft. buses. Paratransit vehicles only require a 20 ft. effective turning radius.
- Ensure large trucks/buses do not ride over the curb at intersections with tight radii, creating a danger for pedestrians.

**Estimated cost**

Construction costs for reconstructing a tighter turning radii are approximately $5,000 to $30,000 per corner depending on site conditions (e.g. drainage and utilities may need to be relocated).

### Curb extensions

**Purpose:** To increase visibility and reduce speed of turning vehicles, encourage pedestrians to cross at designated locations, prevent motor vehicles from parking at corners, shorten crossing distance and reduce pedestrian exposure to traffic.

Tigard: SW Burnham St.

**Considerations**

- For best effect, extensions should be placed along a corridor in series of two or four to an intersection.
- Transit curb extensions have several benefits including:
    - Providing buses with access to the curb from the travel lane without deviation, thereby reducing dwell time and side-to-side sway for passengers.
    - Providing patron waiting and boarding area separated from pedestrian movements on sidewalk.
    - Providing room for stop amenities.
- Curb cuts that incorporate a transit stop have special considerations for size and design. Reference TriMet's Bus Stop Guidelines for more information.
- Curb extensions may be provided midblock.

**Estimated cost**

Curb extensions cost from $5,000 to $30,000 per corner, depending on design and site conditions.

### Curb ramps

**Purpose:** To provide access to street crossings, particularly for people using wheelchairs, strollers, walkers, crutches, handcarts, bicycles, or for those with mobility impairments where stepping up or down is difficult.

Portland: SE Division St. & SE122nd Ave.

**Considerations**

- ADA guidelines should be followed.
- Textured patterns must be detectable to visually impaired pedestrians.
- Where feasible, separate curb ramps for each crosswalk at an intersection should be provided rather than having a single ramp at a corner for both crosswalks. This provides improved orientation for pedestrians.
- All new facilities must include ramps and older facilities that were built without them should be retrofitted, with priority being given to curbs near transit stops, schools, senior centers, public buildings, shopping, and parks.

**Estimated cost**

The cost is approximately $1,000 to $3,000 per curb ramp.

### Advance stop lines

**Purpose:** To improve visibility of pedestrians to motorists and allow pedestrians to advance in crosswalk before motor vehicle turns.


Portland: SE Francis St. & SE 82nd Ave.

**Considerations**

- Can be applied at signalized and midblock intersections.
- Advance stop lines are applicable on multi-lane roads to ensure that drivers in all lanes have a clear view of a crossing pedestrian.
- Effectiveness depends on motorist compliance with the marked stop line.
- If placed too far in advance of the crosswalk motorists may ignore the line.
- In some locations a wider crosswalk may be an effective solution
- Consider adding a "Stop Here for Pedestrians" sign in addition to this treatment.

**Estimated cost**

Stop lines cost $200 to $500.

## Roadway crossings

Most pedestrians need to cross roadways during the course of their trip, and these are the points which tend to be the most dangerous, as they are where roadway traffic and pedestrians share the same space, often at the same time. Surface types, markings, time allowed, distance, and potential conflict times with other traffic are all important things to consider when designing roadway crossings.

It is also necessary to make sure all crossing treatment provide a truly protected environment for the pedestrian to cross. If this is not the case, it can lead to the pedestrian having a false sense of security and some transportation experts believe it could be less safe than having no treatment at all. Protected crossing opportunities should be provided frequently along roadways to avoid pedestrians having to travel out of direction to get to where they are going and to avoid unsafe jaywalking behavior. The street design guidelines, published by Metro, the Portland metro region's metropolitan planning organization, recommend street crossings be located not be more than 530 ft. apart.

### Attributes of good street crossings

**Clarity—**It is obvious where to cross and easy to understand possible conflict points with traffic.

**Visibility—**The location and illumination of the crosswalks allows pedestrians to see and be seen by approaching traffic while crossing.

**Appropriate intervals—**There is a reasonable match between the frequency of good crossing opportunities along a street and the potential demand for crossing.

**Short wait—**The pedestrian does not have to wait unreasonably long for an opportunity to cross.

**Adequate crossing time—**The time available for crossing accommodates users of all abilities.

**Limited exposure—**Conflict points with traffic are few and the distance to cross is short or is divided into shorter segments with refuges.

**Continuous path—**The crosswalk is a direct continuation of the pedestrian's travel path.

**Clear crossing—**The crosswalk is free of barriers, obstacles, and hazards.

Source: Portland Pedestrian Design Guidelines

### Raised medians

**Purpose:** To manage motor vehicle traffic turning movements and provide comfortable left-hand turning pockets with fewer or narrower lanes, provide a refuge for pedestrians crossing the street, and/or provide space for street trees and other landscaping.

Clackamas County: SE Sunnyside Rd. & SE 93rd Ave.

**Considerations**

- Raised medians are most useful on high-volume, high-speed roads.
- Raised medians can provide space for trees and other landscaping that can help change the character of the street and slow speeds.
- Landscaping in medians should not obstruct the visibility between pedestrians and approaching motorists.
- Ensure there is enough room for wider sidewalks, bicycle lanes, and planting strips before proceeding with median.
- Median crossings at midblock and intersection locations must be fully accessible by means of ramps or cut-throughs, with detectable warnings.

**Estimated cost**

The cost for adding a raised median is approximately $15,000 to $35,000 per 100 ft., depending on the design, site conditions, and whether the median can be added as part of a utility improvement or other street construction project.

### Pedestrian warning signs

**Purpose:** To provide more visibility to a pedestrian crossing, indicate to traffic that the pedestrian wants to cross the street, and give the pedestrian a clearance interval to cross.

Tigard: SW Greenburg Rd. & SW Center St.

**Considerations**

- Pedestrian warning signs may include lights or not.
- Lighted, pedestrian activated warning signs are more effective.
- Two kinds of flashing signs include the Rectangular Rapid-Flashing Beacons (RRFB) and pedestrian HAWK crossing
- RRFB pedestrian warning signs have LED flashers, similar to what are on emergency vehicles, with a “stutter-flash” effect. They are effective at getting drivers to yield to pedestrians where they have not in the past.
- Effects do not diminish when a modest number are installed, but it is not clear if effect diminishes at many sites.
- Beacons located on a pedestrian refuge island, in addition to side-mounted beacons, increases yield rates.
- Aiming beacon at vehicles may increase yielding behavior.

**Estimated cost**

RRFB cost $10,000 - $15,000 for purchase and installation of two units, one on each side of the street.

### Pedestrian signals

**Purpose:** To provide a pedestrian clearance interval and indicate the time available for pedestrians to cross the street.

Beaverton: SW Farmington Rd. & SW Murray Blvd.

**Considerations**

- Pedestrian signals are particularly important when vehicle signals are not visible to pedestrians, when timing is complex, at established school zone crossings, and for wide streets, where pedestrian clearance can be difficult.
- Provide a walk interval for every cycle.
- Use exclusive pedestrian intervals and leading pedestrian intervals when possible.
- Ensure the signals are visible to pedestrians.
- Supplement with audible or other messages to make crossing information accessible for all pedestrians, including those with vision impairments.
- Make sure pedestrian push buttons are well positioned and are accessible and within easy reach for all approaching pedestrians.

**Estimated cost**

$20,000 to $40,000 for pedestrian signals on all four legs. Entirely new traffic signals are estimated at $125,000 to $250,000.

### Right turn on red restrictions

**Purpose:** To increase pedestrian safety and prevent crashes, by limiting when pedestrians and right-turning motor vehicles are in conflict.


Portland: SW Broadway & SW Clay St.

**Considerations**

- While the law requires motorists to come to a full stop and yield to pedestrians, many motorists do not fully comply, especially at intersections with wide turning radii.
- Prohibiting right turn on red is a simple, low-cost measure. Together with a leading pedestrian interval, it can benefit pedestrians with minimal impact on traffic flow.
- Prohibiting right turn on red should particularly be considered where there are high pedestrian volumes.
- Part-time right turn on red prohibitions during the busiest times of the day may be sufficient to address the problem.
- Part-time no turn on red signs, work best with a variable-message sign.
- Signs should be clearly visible to right-turning motorists stopped in the curb lane at the crosswalk.

**Estimated cost**

$300 per sign plus installation at $250 per sign. Electronic variable message signs have higher costs.

### Marked crosswalks and enhancements

**Purpose:** To warn motorists to expect pedestrians crossing the street and to indicate preferred crossing locations to pedestrians.

Clackamas County: I-205 multi-use path and I-205 off ramp to SE Sunnyside Rd.

**Considerations**

- Crosswalk locations should be convenient for pedestrians and lead to places they want to go.
- Crosswalk markings alone are unlikely to benefit pedestrian safety. Ideally, crosswalks should be used in conjunction with other measures, such as pedestrian refuges and curb extensions, to improve the safety of a pedestrian crossing, particularly on multi-lane roads with average daily traffic above 10,000.
- Marked crosswalks are particularly important to pedestrians with vision loss. Use materials that are long lasting and do not get slippery.
- Crosswalk markings must be placed to include the ramp so that a wheelchair does not have to leave the crosswalk to access the ramp.

**Estimated cost**

Installation costs are $100 (1 leg) for a regular striped crosswalk, $300 for a ladder crosswalk, and $20,000 for patterned concrete crosswalk. Maintenance must also be considered.

### Crossing islands

**Purpose:** To make pedestrian crossings easier, reduce vehicle speeds approaching pedestrian crossings, and make pedestrian crossings more visible.

Oregon City: Beavercreek Rd. & Library Ct.

**Considerations**

- These islands are also known as center islands, refuge islands, pedestrian islands, or median slow points.
- Center crossing islands allow pedestrians to deal with only one direction of traffic at a time and enable pedestrians to stop part partway across the street and wait for an adequate gap in traffic before crossing the second half of the street.
- Crossing islands help reduce approaching vehicle speeds.
- Crossing islands make pedestrian crossings more visible.
- Crossings islands should be considered a supplement to a crosswalk, and can be combined with curb cuts.
- Crossing islands are particularly helpful at unsignalized intersections, but can be used at signalized intersections.

**Estimated cost**

Costs range from $8,000 to $30,000. The cost for an asphalt island or one without landscaping is less than the cost of installing a raised concrete pedestrian island with landscaping, but they may be less visible and therefore less effective.

## Transit stops and surroundings

The public's first impression of TriMet and its services is often the transit stop. It is important that stops are safe, easily identifiable, accessible, and provide a comfortable place to wait. Transit stops should follow consistent standards for design and provision of amenities, like benches, shelters, bicycle racks, and trash cans to match their use, location and potential for attracting riders. Furthermore, they should make a positive contribution to the community streetscape, providing riders a place where they can obtain transit related information and are encouraged to use the provided services. Every transit stop requires a safe crossing.

### Attributes of good transit stop

**Basic level—**At a basic level, all bus stops should consist of an accessible, paved area with easily identifiable signage.

**Safe & convenient—**Bus stops should be placed to assure safety of pedestrians and vehicles and be convenient for customers.

**Consistent & clear Information—**Bus stops should be clearly and consistently identifiable with up-to-date information for riders about services at the bus stop.

**Community setting—**Bus stops should be sensitive to the community setting and may incorporate features that identify the stop with the community (such as art, bus stop naming, or inclusion of a community bulletin board).

**Accessibility—**Bus stops should be accessible. Americans with Disabilities (ADA) considerations should be given top priority in the siting and design of new and existing bus stops.

**Support institutions—**Bus stops should be located in support of institutions and with clients having special needs, large employers, and community centers.

**Efficiency—**Bus stops should be spaced to maximize the efficient operations of transit service while not requiring riders to walk more than a quarter mile to the stop.

**Well maintained—**Bus stops should be well maintained and free of trash and vandalism. Whenever possible, partnership should be sought, where responsibility for maintaining a stop can be shared.

Source: TriMet's Bus Stop Guidelines

**Stop placement**

**Purpose:** To ensure safety of passengers and vehicles and provide easy access to surrounding neighborhoods, major transit generators, and/or intersecting transit services. Figure 9 outlines TriMet's bus stop placement preferences.

Gresham: SE Division St. & SE 182nd Ave.

**Considerations**

- Placing stops farside of an intersection is preferred in most cases for signalized intersections because it results in fewer traffic delays and better pedestrian safety.
- Generally TriMet expects customer to walk up to a quarter-mile to a stop.
- Midblock bus stops are generally less desirable than stops at intersections, however they must be considered when suitable nearside and farside options are unavailable.
- Every site will present a unique set of issues. TriMet staff considers the following when placing a bus stop: safety, travel time delay, service quality tradeoffs, suitability to bus operations, impacts on other traffic, accessibility for all.
- Reference TriMet's Bus Stop Guidelines for detailed information about how stop placement decisions are made.

**Estimated cost**

A stop should remain in service as designed for at least 5 to 10 years. The cost of moving it is a few hundred dollars, although this could increase to $5,000 or more if new concrete must be installed.

Figure 9– TriMet stop placement preferences

| Situation | Preferred Placement |
|---|---|
| Any signalized intersection where bus can stop out of travel lane | Farside |
| If bus turns at intersection | Farside |
| Intersection with many right turns | Farside |
| Complex intersections with multi-phase signals or dual turn lanes | Farside |
| If nearside curb extension prevents autos from trying to turn right in front of bus | Nearside |
| If two or more consecutive stops have signals | Alternate nearside and farside (starting nearside) to maximize advantage from timed signals |
| If obvious, heavy single-direction transfer activity | One nearside; one farside to eliminate crossing required to transfer. |
| If blocks are too long to have all stops at intersections | Midblock |
| Major transit generators not served by stops at intersections | Midblock |
| Midblock pedestrian-crossing defined by refuge island and/or striping | Midblock |
| Transit Center | Off-Street |
| Major transit generator that cannot be served by on-street stop, or where ridership gain will far outweigh inconvenience to passengers already on-board | Off-Street |

Source: TriMet's Bus Stop Guidelines

## Landing pads

**Purpose:** To allow passengers with mobility devices to use fixed route transit service, ensuring there is adequate room to deploy bus lift and board and alight passengers.

Portland: NE Glisan St. & NE 24th Ave.

**Considerations**

- Bus stops can have two types of landing pads, a front door ADA accessible landing pad and a rear landing pad. Stops will preferably have both, but a rear landing pad must be accompanied by a front door ADA landing pad.
- Front door ADA landing pads preferred at all stops and is actively pursued by TriMet at new and existing stops with moderate or better ridership (minimum 20 daily boardings) and any stop with lift ramp activity.
- TriMet defines an ADA landing pad as a clear, level landing area a minimum of 5'x8', although 10' x 8' is ideal. At new construction sites TriMet requires minimum 8'x8' pads.
- Rear landing pads should be clear of obstacles and be at least 4'x6'. At new construction sites it should always be pursued, but is not required.

**Estimated cost**

5' x 15' landing pad estimated at $5,000

## Seating

**Purpose:** To provide additional level of comfort to passengers waiting to board a vehicle.


Portland: SW Capitol Hwy. & SW Terwilliger Blvd.

**Considerations**

- Seating is considered at any stop where accessibility is provided; placement does not compromise safety (e.g. it is not too close to the street, does not cause a tripping hazard, etc.); and it is allowed.
- Benches should not be placed closer than 3.5 ft. from the curb or 6 ft. from the curb when a travel lane exists adjacent.
- Benches should be oriented to the street or the direction of approaching bus.
- Premium benches (6.5 ft. in length) are considered when there is a min. of 25 daily boardings, usually in business and retail districts where shelters are not appropriate.
- Ad benches (6 ft. in length) are considered at any stop lacking amenities if in a safe location.
- Simme Seats (seats mounted to bus stop pole) will be considered when there is a minimum of 12 daily boardings.

**Estimated cost**

$1,000 for Simme seat or premium bench.

## Lighting

**Purpose:** To improve safety for all roadway users, particularly pedestrians and transit riders, enhance commercial districts, and make the area feel safer at night.

Beaverton: SW Farmington Rd. & SW 153rd Ave.

**Considerations**

- All pedestrian walkways, crossings, and transit waiting areas should be well lit.
- Pedestrians often assume motorists can see them at night; they are deceived by their ability to see oncoming headlights.
- Without adequate lighting motorists may not see the pedestrian in time to stop.
- Install lighting on both sides of the street, particularly on wide streets and in commercial districts.
- Use uniform and consistent lighting levels.
- Crossing used often by pedestrians at night, may be supplemented with brighter or additional lighting.
- Consider using pedestrian scale lighting when possible.
- All crosswalks require lighting.

**Estimated cost**

Varies depending on fixture type and service agreement with local utility. Pedestrian level lights run $3,000-$5,000 each. Standard (cobra head) street lights run $10,000 each.

## Shelter

**Purpose:** To provide additional level of comfort to passengers waiting to board a vehicle.

Beaverton: SW Hall Blvd. & SW 2nd St.

**Considerations**

- Ridership is the primary criteria TriMet uses to determine where to consider placing shelters. TriMet prefers minimum 50 daily boardings and 35 minimum boardings on routes with infrequent service (headways less than 17 minute during weekday peak).
- When ridership does not support it, TriMet also considers Lift usage (minimum 15 weekday boardings and 4% lift usage), proximity to senior housing and minimum of 20 daily boardings, shelters funded/maintained by others, development of large new activity center where ridership is projected to meet criteria, or if stops are consolidated and combined ridership equals criteria.
- All shelters must have 5 ft. of pedestrian clearance, ADA landing pad, clear pathway from ADA waiting area (minimum 2'6" x 4') in shelter to landing pad, and from rear pad to pedestrian path.

**Estimated cost**

$6,000

Chapter 5

# Policy recommendations and where to find more information

# 5.0 Policy recommendations and where to find more information

Policymakers at all levels are placing an emphasis on creating walkable, bikeable, transit-rich, livable environments. The expectation is if more high quality walking, bicycling and transit travel options are available, people will begin shifting their travel behavior toward these more environmentally sustainable, affordable, and healthy modes of travel. Furthermore, there is recognition that walking, bicycling, and taking transit support one another and when planned in tandem can maximize the use of the overall walking biking/transit transportation system. The Pedestrian Network Analysis Project is consistent with this policy direction and is a first step toward building more and better pedestrian infrastructure that provides access to public transportation.

Figure 10 outlines some federal, state, and regional policy initiatives where investments related to pedestrian accessibility to transit stops is relevant. In addition to these policy initiatives, there is great opportunity to make pedestrian accessibility a more prominent part of city and county transportation system plans. Figure 11 provides suggestions on what to include in local transportation system plans.

**Figure 10– Summary of federal, state and regional level policy initiatives**

| Federal | State | Regional |
|---|---|---|
| • Sustainable Communities Partnership (DOT/EPA/HUD)<br>• Transportation For America<br>o Dangerous by Design<br>o Route to Reform: Blue Print for a 21st Century Federal Transportation Program<br>o Aging in Place, Stuck without Options: Fixing the Mobility Crisis Threatening the Baby Boom Generation<br>• FTA New Starts Policy Shift Toward Measuring Livability Benefits<br>• USDOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations, and Recommendations | • Oregon Statewide Planning Goals - Goal 12 - Transportation<br>• House Bill 2001 – Jobs & Transportation Act<br>o GHG reduction<br>o Congestion Pricing<br>o Least Cost Planning | • Active Transportation Partnership<br>• Active Transportation Action Plan<br>• Regional Transportation Plan (RTP) Performance Targets<br>• SB 1059 – Climate Smart Scenarios Planning |

**Figure 11 – Access to transit –TriMet recommendations for transportation system plans**

| | |
|---|---|
| **Word choice** | Avoid calling walking, bicycling, and transit "alternative" modes. They are used by almost everyone and promote health, save money, avoid congestion, and reduce oil dependence. *Instead simply say "walking, bicycling and taking transit."* Walking should also be understood to always include people using mobility devices. |
| **The quality of pedestrian/bicycle facility and transit service matters** | The existence of a 6-foot-wide, curb-tight sidewalk may make a street somewhat safer for a pedestrian, but it is not a place where people want to walk when it is next to traffic. To encourage more trips by walking, bicycling, and taking transit, go beyond minimum design standards (or update those standards) for walking and bicycling facilities, and focus development and investments in key corridors where you want to see more frequent transit service, bicycling, and pedestrian trips. Long-term success requires *complete facilities that feel safe and allow many people to choose walking, bicycling or taking transit*. |
| **Analysis** | Data collection and system analysis for walking, bicycling, and transit require explicit and rigorous methods just as motor vehicles do. GIS tools are available, like ESRI's ArcGIS network analyst, Transpo Group's Viacity tool, Criterion's Index tool, etc. Metro is developing better tools for modeling bicycle use. *Collect data that help identify meaningful and complete pedestrian, bicycle and transit needs.* |
| **Prioritize specific locations and areas where people walk, bicycle, and take transit** | Develop a list of pedestrian and bicycling projects, based on where it is most important for more people to be able to access specific places by walking, cycling or transit. This could be a main street, medical facilities, jobsites or many others. Then identify investments that will increase comfort and safety for walking, bicycling and taking transit to and from those areas. In the long-term, this will be better for travel demand and for livability, saving money and avoiding negative impacts of continually widening roadways and intersections. Pedestrian and bicycle infrastructure costs are very low compared to roadways, but the pedestrian and bicycle network needs are substantial in every jurisdiction. Therefore it is most cost-effective and efficient to *make improvements where they are most needed and most effective at achieving policy goals.* TriMet can supply data on transit ridership and the methodology, data and results of the Pedestrian Network Analysis to assist with this. |
| **Match funding sources with types of projects** | Project lists should recognize jurisdiction and which entities are responsible for making desired improvements. The TSP can be a starting point for determining whether service changes can be made, but TriMet bears the responsibility for funding transit operations. *Plans should be transparent and identify the responsible entity.* They should also identify at a concept level what steps would be necessary to implement the plans. |
| **Match ability with responsibility** | Project lists should recognize jurisdiction and which entities are responsible for making desired improvements. A TSP may envision a new transit line or more service on an existing line, but TriMet bears the ultimate responsibility for funding transit operations. Plans should be transparent and identify the responsible entity and identify at a concept level what steps would be necessary to implement the plans. |

| | |
|---|---|
| **Tie city or county's transit vision to actions, programs, and investments needed to make it feasible** | When transit needs are stated in a TSP, include what is needed to support this type of service, e.g. proximity of X number of households and/or Y number of jobs to transit stops, streetscape and sidewalk investments, managed parking, etc. Include operating and capital costs associated with the type of service desired, so *desires are tied to costs*, especially if it isn't directly in the city/county's control. TriMet will assist in developing service cost estimates as necessary. |
| **Unbundle pedestrian and cycling needs from larger road projects** | Pedestrian or bicycle improvements made now deliver substantial benefits immediately, even if long-term future plans may include roadway widening that could require rebuilding some of the improvements. *Stand-alone pedestrian and bicycling projects are cost-effective and provide substantial benefits in the near term.* |
| **Strongly encourage broad participation** | *Invite a broad base of representatives to help shape the plan*. Jurisdictions and individuals may choose not to accept the invitation, but inviting participation will give your TSP the best chance of meeting many needs and maximizing benefits. Include TriMet (or other transit agencies if applicable), Metro, local land use staff, parks/trail districts, TMAs, public health departments, housing authorities, economic development agencies, school districts and major employers. Ensure there is representation from communities of color and people of all income levels. TriMet will do the best we can to be an active participant. |
| **Conduct field visits and safety audits of select corridors on foot and bicycle** | Computer modeling and GIS analysis can't give a full understanding of the needs of pedestrians and cyclists, particularly of all ages and abilities. Roadways are all generally built to basic quality standards, and therefore engineers and planners can focus on things like capacity and function. But with walking and bicycling, there is not yet consistent basic quality and safety. Assess the facility on foot or bicycle with the engineers and planners who will be helping identify priorities. Include the following: Is it noisy? Do you feel too exposed to traffic? Is the environment attractive? What can I see at night? Do I generally feel safe walking? Can children safely walk here? *Conduct 3-4 pedestrian safety audits and incorporate the results in the analysis*. This will greatly improve the detail and completeness of the needs identification and the scope, as well as the effectiveness, of proposed projects. |

## Funding and programmatic recommendations

In addition to incorporating the recommendations in Figure 11 into transportation system plans, make high-quality pedestrian facilities a part of every transportation project and consider these general policies regarding funding and programming of pedestrian projects

1. Identify how important walking is to your community.

2. Allocate additional funds to pedestrian infrastructure investments, based on how important walking is to your community; ensure the level of investment reflects the level of importance.

3. Concentrate investments in a few key areas to get maximum benefit. A curb cut alone will not make an area a desirable place to walk, but taken together with curb extensions, landscaping, and pedestrian refuges, it can be transformative.

4. Invest money into long-term, before and after evaluation of pedestrian projects so everyone can learn from experience and see what benefit and lessons learned the investments bring.

## Next steps

Through this project TriMet provides strong guidance for where to make sidewalk and crossing investments and hopes to heighten awareness about the need for more and better pedestrian infrastructure in our communities. Moving beyond this study, TriMet will work with cities, counties, and the state to incorporate existing conditions information and findings into community plans, project designs, and funding decisions. Ultimately TriMet wants to find ways, with the help of its city, county, and state partners, to build high quality sidewalks, make street crossings safer and easier, and to generally make the walk to a transit stop a positive and desirable experience for everyone. Public transit customers depend on being able to get to stops safely, easily, and comfortably. This project moves us one step closer to making this possible.

## Additional resources—design treatments

**TriMet Bus Stops Guidelines (2010)**
TriMet
*http://trimet.org/pdfs/publications/bus-stop-guidelines.pdf*

**PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System (2004)**
U.S. Department of Transportation, Federal Highway Administration
*http://www.walkinginfo.org/pedsafe/*

**Safety Benefits of Walkways, Sidewalks, and Paved Shoulders (2011)**
U.S. Department of Transportation, Federal Highway Administration
*http://safety.fhwa.dot.gov/ped_bike/tools_solve/walkways_brochure/walkways_brochure.pdf*

**Safety Benefits of Raised Medians and Pedestrian Refuge Areas (2011)**
U.S. Department of Transportation, Federal Highway Administration
*http://safety.fhwa.dot.gov/ped_bike/tools_solve/medians_brochure/medians_brochure.pdf*

**Pedestrian Safety Guide for Transit Agencies (2008)**
U.S. Department of Transportation, Federal Highway Administration
*http://www.walkinginfo.org/training/collateral/resources/transit_guide.pdf*

**Safer Stops for Vulnerable Customers (2003)**
State of Florida Department of Transportation
*http://www.nctr.usf.edu/pdf/473-13.pdf*

**Evaluation of Pedestrian and Bicycle Engineering Countermeasures: Rectangular Rapid-Flashing Beacons, HAWKs, Sharrows, Crosswalk Markings, and the Development of an Evaluation Methods Report (2011)**
U.S. Department of Transportation, Federal Highway Administration
*http://www.fhwa.dot.gov/publications/research/safety/pedbike/11039/11039.pdf*

**Smart Transportation Guidebook: Planning and Designing Highways and Streets that Support Sustainable and Livable Communities (2008)**
New Jersey and Pennsylvania Departments of Transportation
*http://www.state.nj.us/transportation/community/mobility/pdf/smarttransportationguidebook2008.pdf*

**Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities (2006)**
Institute of Transportation Engineers
*http://www.ite.org/bookstore/RP036.pdf*

**Pedestrian and Bicycle Information Center**
*http://www.pedbikeinfo.org/*

**United States Access Board: A Federal Agency Committed to Accessible Design**
*http://www.access-board.gov/*

**Complete Intersections: A Guide to Reconstructing Intersections and Interchanges for Bicyclists and Pedestrians (2010)**
California Department of Transportation
*http://www.dot.ca.gov/hq/traffops/survey/pedestrian/Complete-Intersections-A-Guide-to-Reconstructing-Intersections-and-Interchanges-for-Bicyclists-and-Pedestirans.pdf*

**Creating Livable Streets: Street Design Guidelines for 2040 (2002)**
Metro Regional Services
*http://www.oregonmetro.gov/index.cfm/go/by.web/id=235*

**Portland Pedestrian Design Guide (1998)**
City of Portland Office of Transportation Engineering and Development
*http://www.portlandonline.com/shared/cfm/image.cfm?id=84048*

## Additional resources—walking audits

**A Resident's Guide for Creating Safe and Walkable Communities (2008)**
U.S. Department of Transportation, Federal Highway Administration
*http://safety.fhwa.dot.gov/ped_bike/ped_cmnity/ped_walkguide/residentsguide.pdf*

**Sidewalks and Streets Survey: Tips, Tools, Resources for Organizers (2010)**
American Association of Retired Persons (AARP)
*http://createthegood.org/sites/default/files/how-to/SidewalksStreets.pdf*

**Active Independent Aging: A community guide for falls prevention and active living. Chapter 16: Walkability Checklist (2004)**
Community Health Research Unit, a partnership between University of Ottawa and the City of Ottawa Department of Public Health Services and Long Term Care.
*http://www.falls-chutes.com/guide/english/resources/handouts/pdf/WalkabilityChecklist.pdf*

**Healthy Development Checklist**
Walkable Communities
*http://www.walkable.org/assets/downloads/healthy_development_checklist.pdf*

**Kansas City Walkability Plan Neighborhood Walking Survey (2003)**
City Planning and Development Department City of Kansas City, Missouri
*http://ww4.kcmo.org/planning/pdf/walkability.pdf*

**Pedestrian Road Safety Audit Guidelines and Prompt Lists (2007)**
U.S. Department of Transportation, Federal Highway Administration
*http://katana.hsrc.unc.edu/cms/downloads/PedRSA.reduced.pdf*

# Appendix A: How to assess an area for pedestrian and transit stop accessibility

Walkability is a measure of how well an area is suited for pedestrians, meaning people getting around on foot or people using a personal mobility device like a wheelchair. It is dependent on a variety of factors, often related to the design of the built environment. These include, but are not limited to how the streets, sidewalks, and crosswalks are designed, where the buildings are located in relation to the street, and what types of destinations are available to walk to and from.

The questions listed below are designed to help people do their own assessment of an area.

## Identify key places to access by foot & transit

**Why?**

When people walk, they are typically going somewhere (e.g. a store, restaurant, home, work, park, or a transit stop). There needs to be a reason for people to walk. If there is not someplace people want to walk to, within a reasonable distance, then they probably will not walk very often.

**Questions to consider:**

- What types of activities are located in the area? For example, are there residences, stores, libraries, schools, banks, medical facilities, restaurants, offices, transit stops located within the area?

- Where are these activities located in relation to one another? Are there areas that, under good walking conditions, seem like they would be logical to walk to and from? For example: a senior center to a grocery store, a residential neighborhood to a restaurant, or an office building to a transit stop.

- Where do the transit lines that serve the area go? For example, will they take you downtown, to a major shopping center, university, or transit center?

- Who is coming to or from the area? For example, are there activities, like a school that draws a lot of young children to the area? Are there senior residences that may result in people living in the area who have limited mobility? Do the people living or working in the area have limited English proficiency? What is the mix of income levels for people living, working, or shopping in the area? For all of these factors, think about what this means for a person walking or taking transit.

# Walk around and take public transit to the site

**Why?**

Walking is an extremely sensory experience, and it is often the subtle things that make or break the experience. Pedestrians, bicyclists and drivers take in their surroundings differently. An area may feel fine to a driver, but feel hostile to a pedestrian. Furthermore, the behavior we exhibit as pedestrians is not necessarily like the behavior we exhibit when we drive or bicycle. We need to understand people's behavior and sensory intakes from a variety of perspectives. It is impossible to fully understand what the pedestrian or transit customer experience is like in an area without experiencing it firsthand. No model or methodology can replace actually experiencing and area as a pedestrian or transit rider.

**Questions to consider:**

- Do walking routes between places feel safe, direct, and comfortable? Humans have a propensity for taking direct routes. Do you feel inclined to want to cross the street at unprotected crossings or cut across parking lots to get to where you want to go?

- How loud is it where you are walking? High levels of noise can be unpleasant. Can you talk to someone next to you without raising your voice? What types of shrubbery are available to absorb the sound?

- How shaded is the place in summer? Is there any place to get a reprieve from the rain or sun? Is there any place to sit? People like places where they can get away from the elements or rest, even if for a short while.

- Does it feel like you are walking through a desert or does it feel you are surrounded by activity that is at the same scale as you? Do you feel vulnerable around faster moving street users like cars or bicycles? Scale and visual appeal influence how safe and comfortable pedestrians feel by their surroundings.

- What type of pedestrian, bicyclist, and driver behavior are you observing? Are people doing what the street design asks of them? Why or why not? Are drivers speeding or taking turns without looking? Are pedestrians crossing at unsafe locations or obeying traffic signals?

- Where are the places you see the most people walking to and from?

- Where are the places you see the most people accessing by car?

- Where are the people getting off at transit stops going to? Where are the people waiting for a bus coming from?

- Where are the places where there are the most conflicts between people walking, bicycling, and driving?

## Collect roadway and pedestrian facility characteristics

**Why?**

Having roadway and pedestrian facility characteristics in hand while walking an area allows a person to begin to relate the behavior they observe and the sensations they feel to tangible design characteristics.

**Questions to consider:**

- What is the posted speed limit? What is the actual speed motor vehicles are traveling (85th percentile speed)? What speed is the roadway designed for (design speed)? The design speed can sometimes be higher than the posted speed. Speed is important to understand because it often determines the severity of a crash. A pedestrian only has a 15 percent chance of survival if they are hit by a car moving at 40 mph. At 30 mph the survival rate is 55percent. At 20 mph it is 95 percent.

- Are sidewalks present on all roadways? If so, how wide is the pavement? Is there a landscaped buffer (planter, trees, etc.) between the sidewalk pavement and the curb? If so, how wide is it? If the scale of the streetscape matches the scale of the roadway, then the pedestrian feels safer and more comfortable near the motor traffic.

- How many driveways are there along the route? The more driveways there are along a walking route, the more opportunities there are for pedestrians and drivers to conflict. Even the mere expectation of having to watch out for turning movements from cars, can cause a pedestrian to feel unsafe.

- Are buildings in the area oriented toward the sidewalk, with direct pedestrian pathways to their entrance? How inviting is the development to a pedestrian?

- What kind of in-street buffer is there between pedestrians and motor vehicle traffic? Is there on-street parking, a paved shoulder or a bike lane? If so, what is its width?

- How lit is the area at night? Are there streetlights present? If so, what kind? Are they designed at a pedestrian scale?

- How wide is the roadway curb-to-curb? Is there a center-two way turn lane? What are the widths of the travel lanes (outer and inner)? This is important to understand in relation to the type of motor vehicle traffic the facility owner would like to facilitate on the roadway.

- Is there a median equal or greater than 6 ft. in the roadway? If so, how wide is it? Medians restrict turning movements, act as a way to provide a sense of enclosure on the street, calm traffic, and provide a space for pedestrians to wait if they are crossing the roadway.

- On average, what how much motor vehicle traffic is there on the roadway? How busy is the road?

# Collect roadway crossing characteristics

**Why?**

Having roadway crossing characteristics in hand while walking an area, allows a person to begin to relate the behavior they observe and the sensations they feel to tangible design characteristics. TriMet can help you gather this data.

**Questions to consider:**

- How many protected crossing opportunities are there along the length of the roadway? For the purpose of this assessment, assume protected means there is at least a flashing light. A painted crosswalk or sign, alone, does not constitute a protected crossing.

- How many unprotected crossings are there along the length of the roadway? In Oregon any intersection is a legal crossing, regardless of how it is marked.

- How many lanes do pedestrians have to cross in order to get across the roadway? What is the total crossing distance? Does it vary at different place along the roadway? The longer the distance to cross, the longer a pedestrian is exposed to motor vehicle traffic and the more opportunities there are for conflicts between the two.

- At signalized crossings, how long does a pedestrian have to wait to get a walk phase?

- Once a walk phase comes up at a signal, how long does a pedestrian have to cross the street? Would the time available be sufficient if you were on crutches, in a wheelchair, or pushing a stroller?

- How many motor vehicles make a permitted right-turn-on-red or left turn while the pedestrian phase of the crosswalk is on? The more motor vehicle turning movements there are while pedestrians are crossing, the more chance there is of the two coming in conflict with one another.

- If there is a right turn channelization lane, is there also a pedestrian refuge island?

- What is overall street connectivity like in the area? Are there a lot of dead ends? Can you get directly from one place to another using the existing pedestrian infrastructure or do you have to go out of direction to get to where you are trying to go?

# Collect transit facility, service, and usage characteristics

**Why?**

Having transit facility, service, and usage characteristics in hand while walking an area, allows a person to begin to understand where there is a lot of public transit and pedestrian activity and why people may be exhibiting certain behaviors.

**Questions to consider:**

- What is the frequency of the transit service on the roadway? Does the bus or train come every 15 minutes, 30 minutes, or 60 minutes? If there are multiple lines operating on the same roadways, what kind of frequency do they provide taken together? For example, two lines serving the same roadway that operate at 30 minute headways, but are staggered can provide 15 minute service.

- Which transit lines operate on the roadways? Where do they connect to?

- How many stops are there on a segment of roadway? The ideal stop spacing, under good walking conditions, is every 800 to 1,000 ft.

- Are there transit stops that do not have a paved front door landing pad? A paved landing pad makes the stop accessible to people using a mobility device.

- Are there sidewalks connections to the stop in all directions? Discontinuous sidewalks can make an area inaccessible to people who use a mobility device.

- What kind of crossing opportunities are there within 150 ft. of the transit stops? Would you consider them protected? To what degree? Is this sufficient?

- How many transit stops with an average of 50 boardings or more a day do not have a shelter present? 50 average boardings a day is TriMet's threshold for placing a shelter at a stop.

- How many ons and offs are there at all of the transit stops in the area? How many times did a bus deploy its lift or ramp to assist a person boarding or debarking? The number of LIFT deployments is an indicator of the number of people needing an accessible walking environment. What are the total ons and offs by intersection? We can assume every person who got on or off the transit vehicle had to walk for some part of their trip. Therefore, the total number of ons and offs can be used as a *minimum* proxy for pedestrian counts.

## Create a prioritized list of needs

**Why?**

There may be hundreds of pedestrian and transit stop needed in an area. It is important to know where to start investigating and making investments to make changes. A prioritized list of needs helps people keep focused and makes what may seem like a daunting task manageable. Furthermore, it allows parties to be transparent about what matters most to them, provides a valuable communication tool, and makes it easier to track progress and work as it goes forward. Remember that needs and solutions are different things. Needs should be identified independent of any pre-existing thoughts about costs or the types of solutions that could be used to address the need.

**Questions to consider:**

- Did you see any parts of the assessment area that are working well from a pedestrian and transit accessibility standpoint? If so, what are its characteristics? How could you replicate those characteristics in other places?

- Think about the pedestrian connections between places. What are the places you would like people to walk to and from? Are they walking there now? If not, why not?

- Are there places where people are walking under suboptimal conditions? If so, where are the most important places to bring up to a higher standard of pedestrian and transit accessibility where people are already walking?

- Where are people taking short cuts, crossing the road where it is currently unprotected, or exhibiting risky or unsafe behavior? Why are they doing what they are doing? Should we try to modify this behavior, or should we embrace it and facilitate it?

- What are the road segments where it is least safe and/or comfortable to walk now? What characteristics make them this way?

- Which are the intersections where it is the least safe and/or comfortable for people to walk? What characteristics make them this way?

- Are facilities in the area compliant with the American with Disabilities Act (ADA)?

- If you could only choose five actions to take first, what would they be? Why?

## Review existing plans and codes

**Why?**

Design codes set standards for roadway designers, property owners, and real estate developers to operate by. If the standards do not give the community the results they want, then it is imperative to review them and consider modification. It is also important to understand what plans other people have developed for the area you are assessing. Plans may have been made with a different perspective in mind or are in sync with your conclusions. Either way, it is good to know what others are recommending for the area.

**Questions to consider:**

- Do the streets and intersections in the area you are assessing meet your jurisdiction's current design code? If not, why not? Were they built in a different era or are the design codes not being followed?

- If the area is meeting the design codes, are the results what you would hope? Should the design codes be revisited to get different results?

- Why are the design codes written the way they are? Which types of travelers/roadway users are they centered around? What types of travel—walking, bicycling, public transit, or driving do they facilitate? Do the standards overemphasize one type of user over another?

- Are there any land use plans for the area?

- Are there any roadway, pedestrian, bicycle, or public transit facilities planned for the area?

- If there are both land use and transportation plans for the area, do they speak to one another? Does the planned transportation system enable the type of travel behavior the land uses expect? Do the planned transportation investments enable the type of development desired in the area?

- Are there opportunities to adjust plans, based on this pedestrian and transit accessibility assessment?

- Are there opportunities to move plans forward, bolster, or reinforce efforts already underway, based on the results of the pedestrian and transit accessibility assessment?

# Appendix B: Template used to assess the ten focus areas

The template outlined below was used for this project. Technical Memo #3 shows it filled out for each of the ten focus areas. The template below is left blank, but general instructions are included to help guide a new person through the process.

## Introduce your assessment area

Describe the characteristics of the area and explain why the area was chosen for the pedestrian and transit accessibility assessment.

### Places to access locally on foot

List places to walk to in the area, for example:

- Grocery Stores
- Community gathering places (civic centers, libraries, senior centers, community centers)
- Places of workshop
- Schools (all grade levels)
- Retail stores and services (banks, salons, gyms)
- Food and drink establishments
- Parks
- Residential developments (senior housing, multi-family housing, single-family housing)

### Places to access regionally by transit

List places people can take the bus or train to without having to make a transfer, for example:

- Nearby neighborhoods
- Adjacent cities
- Major retail areas (malls, downtowns, main streets)
- Transit centers
- Major attractors (stadiums, farmers markets, large employment sites)

### Map places to access on foot

Create a map of the area using *google.com* or *trimet.org* and identify where transit stops and the places you identified above are located, in relation to another.

## Assess the roadways and sidewalks

List the high speed, high volume roads running through the area you are assessing. Look for roads that exhibit these characteristics:

- Posted speed limits of 35mph or greater
- Four or more lanes dedicated to motorized traffic
- Traffic congestion during morning or afternoon rush hours

Describe where the roads listed above connect people to and how they appear to be functioning for all users, including pedestrians, bicyclists, buses, commercial trucks, and private automobiles.

Fill out the table below. You can use Google Maps or Google Earth to measure some things like intersection distance and the number of driveways within an area. For other attributes like, sidewalk width and the width of the landscaped buffer, go into the field, measure, and observe. Finally, for Average Daily Traffic, 85$^{th}$ percentile speed, and design speed, consult your local transportation engineering department.

Based on your field observations and the information you collected, list the most important things you noted about the sidewalks and roadways.

**Roadways and sidewalks table**

| Roadway & sidewalk attributes | Name of road #1 | Name of road #2 | Name of road #3 |
|---|---|---|---|
| Design speed | | | |
| Posted speed limit | | | |
| Midblock 85th percentile traffic speed | | | |
| Presence of sidewalk throughout | | | |
| Width of sidewalk | | | |
| Width of landscaped buffer between walkway & motorized vehicle traffic (planter, trees, etc.) | | | |
| # of driveways within one mile (does not account for size of driveway) | | | |
| Development oriented toward sidewalk | | | |
| Width of paved shoulder, bicycle lane, and/or parking lane | | | |
| On-street parking | | | |
| Presence of streetlights throughout | | | |
| # of travel lanes | | | |
| Presence of two-way center lane | | | |
| Width of outside travel lane | | | |
| Width of inner travel lanes | | | |
| Presence/width of median (must be > 6ft and separate two directions of traffic to be considered median). Is it traffic separating, concrete, raised, planted? | | | |
| Total width of roadway—curt to curb | | | |
| Average daily traffic (ADT) | | | |

## Assess roadway crossings and how often people have to walk out of direction to get to where they are going

Choose two or three signalized intersections to review, based on field observations and transit passenger activity. Look for intersections that exhibit these characteristics:

- High number of turning vehicles
- High number of pedestrians
- High number of transit customers boarding and alighting at stops near the intersection
- At least two bus lines meet at the intersection and customers can transfer between them

Describe how well connected the road system is, e.g. do you often get stuck at dead ends, or find yourself not having any safe place to cross? Describe how the intersections appear to be functioning for all users, including pedestrians (particularly the very young and very old), bicyclists, buses, commercial trucks, and private automobiles.

Fill out the table below. You can use Google Maps or Google Earth to measure some things like the number of marked intersections and unmarked crossings along a stretch of roadway. For other attributes like number of seconds allowed to cross the street, go into the field, measure, and observe. Finally, for turning radiuses and signal cycle length, consult your local transportation engineering department.

Based on your field observations and the information you collected list the most important things you noted about the crossings and intersections.

### Crossings table

| Roadway crossing attributes | name of road #1 | name of road #2 | name of road #3 |
|---|---|---|---|
| Locations of known pedestrian or bicycle crashes that resulted in a fatality or serious injury within the past 5 years | | | |
| # of unmarked crossings in one mile | | | |
| # of marked crossings in one mile | | | |
| # of signalized crossings in one mile | | | |

### Intersection table

| Intersection attributes | Name of intersection #1 | Name of intersection #2 |
|---|---|---|
| # of lanes being crossed by pedestrians at signalized intersections | | |
| Turning radius at intersection | | |
| Total crossing distance | | |
| Signal cycle length | | |
| Pedestrian signal actuated | | |
| Pedestrian crossing time | | |
| # of right-turn-on red motor vehicles and the number of motorists making a permitted left turn in a 15-minute period (right/left) | | |
| Right turn channelization islands on the crossing | | |
| Pedestrian refuge present | | |

## Assess the transit service and stops in the area

List all of the fixed route transit lines operating in the area. Make sure to include:

- Bus lines
- Light rail lines
- Commuter rail lines

Fill out the table below. You can use *trimet.org* to collect most of the transit information. For ridership data contact TriMet directly.

Based on your field observations and the information you collected, list the most important things you noted transit service and transit stops.

**Transit stops table**

| Transit service and stop attributes | Road #1 | Road #2 | Road #3 |
|---|---|---|---|
| Transit lines and weekday frequencies | | | |
| # of transit stops in one mile | | | |
| # of transit stops without a paved front door landing pad | | | |
| # of transit stops without sidewalk connections to it in all directions | | | |
| # of transit stops without a protected crossing within 150 ft. | | | |
| # of transit stops with avg. weekday boardings > 50 without a shelter | | | |

**Transit ridership table**

| Road # 1 | | | | | | |
|---|---|---|---|---|---|---|
| **Stop location** | **Stop ID** | **direction** | **Transit lines** | **Weekly ons and offs** | **Intersection ped count proxy** | **Monthly LIFTs** |
| Stop pair #1 – stop A | | | | | | |
| Stop pair #1 – stop B | | | | | | |
| Stop pair #2 – stop A | | | | | | |
| Stop pair #2 – stop B | | | | | | |
| Intersection #1 – stop A | | | | | | |
| Intersection #1 – stop B | | | | | | |
| Intersection #1 – stop C | | | | | | |
| Intersection #1 – stop D | | | | | | |

## What are the infrastructure needs in the area?

Identify where there are opportunities to make the area safer, more convenient, and/or more comfortable to walk and take public transit. List these pedestrian and transit needs in a table.

### Places to connect

List the key places to connect in an area. For example:

- Senior housing to grocery store
- Multi-family housing to elementary school
- Bus stop to health clinic

### Observed behavior

List the travel behavior you observed, by all people, including drivers, pedestrians, and bicyclists. For example:

- Locations where people are crossing an intersection without any protection from oncoming traffic.
- Locations where drivers are not yielding to pedestrians trying to cross the street.
- Locations where there are people with mobility devices waiting for the bus, but there is not any seating available.
- Locations where people walk along the side of the road when the sidewalk ends.

### Bright spots

To varying degrees, all areas have some bright spots to build from. List these bright spots, so people understand they are not starting from scratch. For example, bright spots may include:

- Basic infrastructure characteristics like, curb cuts to make an intersection ADA accessible and 5 ft. sidewalks.
- Treatments preventing many turning movements along the roadway, like medians.
- Landscaping
- Mid-block crossing treatments
- Traffic calming treatments

### First five actions to take

List the first five actions to take to make the area more pedestrian and transit accessible and create a table outlining a more comprehensive list of needs.

**Priority needs table**

| Facility name | Roadway/sidewalks | Crossings | Transit |
|---|---|---|---|
| **Roadway #1** | | | |
| | | | |
| | | | |
| **Roadway #2** | | | |
| | | | |
| | | | |
| | | | |
| **Roadway #3** | | | |
| | | | |
| | | | |

## Review existing plans and codes for the area

Review existing plans and codes, to see what they call for in regard to:

Sidewalk Widths
Sidewalk Buffers
Curb Radius
Roadway Design Speeds
Intersection & Crossing Spacing
Building Site Location
Parking

For each major roadway and intersection, list which agencies own and maintain it.

Review Transportation System Plans, Comprehensive Plans, and Local Area Plans to understand past, present, and future planning efforts in the area.

**Available in other formats:**

trimet.org

503-238-7433

TTY 503-238-5811

**Para esta información en español, favor llamar al 503-238-7433.**

TRIMET

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