

**Appendix F**  
**Bel-Red Corridor Project**  
**Nonmotorized Transportation Facilities**

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# Bel-Red Corridor Project

## Nonmotorized Transportation Facilities

### No-Action Alternative

The No-Action Alternative nonmotorized facilities are those identified in the *1999 Pedestrian and Bicycle Transportation Plan*. These facilities feature on-street, off-street, and regional trail connections.

### Action Alternatives

Nonmotorized transportation facilities shown for each Action Alternative support the intended land use. These facilities feature on-street, off-street, and regional trail connections.

Each Action Alternative offers the potential to develop walkable and bikeable neighborhoods around higher density, transit-rich areas. These are areas where specific facilities can't be called out at this time—due to unknown locations of potential streets—but where certain levels of service, or degree of quality, with regard to nonmotorized facilities are intended. Those levels of service are described as follows:

### ***Level of Service Standards***

There are many ways to calculate Level of Service (LOS) for both pedestrians and bicyclists. This report subscribes a degree of quality which planned facilities must meet in the perceptions of pedestrians and bicyclists using them. It also presents a toolkit of features that can be used to achieve the intended Level of Service of the facility.

The pedestrian measures characterized in the *Highway Capacity Manual*—detailing flow rates—are unacceptable for this purpose. This led to the exploration and adaptation of other measures (Balloffet & Associates, N.D.; FHWA, 1998; FHWA 1998; League of Illinois Bicyclists, 2001; SCI, N.D.).

Table 1 contains a description of each LOS category. Generally, Level of Service for pedestrians and bicyclists measures the degree of safety, comfort, and visually welcoming environment the users experience. LOS of A depicts a facility in which the pedestrian or bicyclist feels the most safe, comfortable, and welcome. Conversely, LOS of F depicts a facility in which pedestrian or bicycle travel is unsafe, uncomfortable, and perceived as unwelcome.

**Table 1: LOS Category Descriptions**

| <b>LOS Categories</b> | <b>Description (Subjective Impression of User)</b>   |
|-----------------------|--|
| A                     | Highest degree of safety and comfort for pedestrians and bicyclists. Visually welcoming environment.   |
| B                     | High level of pedestrian and bicyclist comfort and safety. Many amenities to signal a welcome queue to pedestrians and bicyclists.   |
| C                     | Acceptable degree of safety. Average level of pedestrian and bicyclist comfort. Amenities are present to signal a welcome queue to pedestrians and bicyclists, though not in abundance.                              |
| D                     | Less than acceptable degree of safety for pedestrian and bicycle travel. Less than average level of pedestrian and bicyclist comfort. Few amenities to display a welcome environment for pedestrians and bicyclists. |
| E                     | Low degree of safety for pedestrian and bicycle travel. Low pedestrian and bicycle comfort. Amenities to display a welcome environment for pedestrians and bicyclists are severely lacking.                          |
| F                     | Unsafe for pedestrian and bicyclist travel. Pedestrians and bicyclists are very uncomfortable. Visually unwelcoming environment.   |

Table 2 is a toolkit of roadway features and building/roadway relationship characteristics that can be interpreted to an LOS category in relation to pedestrian perception of safety, comfort, and a visually welcoming environment for roadways. The table only details Level of Service A through C because the vision for the Bel-Red Corridor is to achieve a high level of pedestrian and bicycle activity. It is important to note that individual streets may not feature all of these characteristics, rather, many characteristics involve trade-offs with another—i.e. installing bike lanes and landscape buffers on 5 lane, heavily trafficked arterials. Some features would weigh stronger in individuals’ perception of the Level of Service, though those weights have not been established for the purposes of this report.

Table 3 is a similar toolkit for bicycle facility LOS. In many cases both pedestrian and bicyclist perceptions will reflect a similar Level of Service dependent on a certain combination of features and characteristics. However, there are a few features/characteristics that conflict between the two—increasing pedestrian Level of Service while lowering bicycle LOS or vice versa—or have an affect on one but not another. For that reason, it is necessary to have a separate tool kit for bicycle facility Level of Service.

**Table 2: Pedestrian LOS Category Achievement Toolkit**

| Facility Feature                       | LOS A   | LOS B  | LOS C  |
|--|---|--|--|
| Directness (Actual/Min) <sup>1</sup>   | Low A/M   |  | Medium A/M   |
| Continuity                             | Complete sidewalk provision with pockets of open space  | Continuous sidewalk separated from road by landscape       | Continuous sidewalks, varying widths, with or without landscape buffer |
| Traffic Lanes                          | 3 or fewer  | 4 to 5   | 6 or more  |
| Turn lanes                             | 0   | 1 to 2   | 2 or more  |
| Traffic Volume                         | Less than 10k/day   | 10 to 20k/day  | 20k/day or more  |
| Traffic speeds                         | 20 to 25 mph  | 25 to 35 mph   | 35 or more mph   |
| Lateral separation                     | 10' or more of sidewalk   | 6 to 10' of sidewalk                                       | Less than 6' of sidewalk   |
|  | 5' or more of landscape buffer  | Less than 5' of landscape buffer                           | No landscape buffer  |
|  | Parking lane  | Parking lane   | No parking lane  |
|  | Bike lane   | Bike lane  | No bike lane   |
| Percentage of heavy vehicles and buses | Less than 2%  | 2 to 4%  | 5% or more   |
| Driveway access                        | Seldom  | Intermittent   | Frequent   |
| Intersections                          | Clear indication of proper action to take by motorist and pedestrian (signals, signs, infrastructure) | Some of the amenities listed for LOS A intersections       | Few of the amenities listed for LOS A intersections                    |
|  | Well marked crosswalks or special paving  |  |  |
|  | Good lighting   |  |  |
|  | ADA standard curb ramps   |  |  |
|  | Automatic pedestrian crossing phase   |  |  |
|  | Strong indication of a pedestrian crossing at each crossing location                                  |  |  |
|  | Unobstructed views for both motorists and pedestrians   |  |  |
| Visual interest and amenity            | Aesthetically pleasing roadway design details   | Some of the amenities listed for LOS A visual interest     | Few of the amenities listed for LOS A visual interest                  |
|  | Varying building design, shape, texture, and color  |  |  |
|  | Active street frontage  |  |  |
|  | Pedestrian scale lighting   |  |  |
|  | Street trees and landscaping  |  |  |
|  | Quality street furniture  |  |  |
| Safety and security                    | Prominence and safety enhancements (improved crossings, traffic calming, etc)                         | Some of the amenities listed for LOS A safety and security | Few of the amenities listed for LOS A safety and security              |
|  | Visibility from adjacent buildings  |  |  |
|  | Good lighting   |  |  |
|  | Presence of other people using sidewalks  |  |  |

<sup>1</sup>Ratio of the actual distance from an origin to destination divided by the minimum distance (straight line between the two), trips chosen at random.

**Table 3: Bicycle LOS Grade Achievement Toolkit**

| Facility Feature  | LOS A  | LOS B  | LOS C   |
|---|--|--|---|
| Through lanes   | 3 or fewer   | 4 to 5   | 6 or more   |
| Turn lanes  | 0  | 1 to 2   | 2 or more   |
| Width of outside travel lane                                | 14' +  | 14'+   | <14'  |
| Presence of outside lane marking                            | Yes  | Yes  | No  |
| Width of bike lane or paved shoulder                        | 5' +   | 4'   | 0   |
| Traffic volume  | Low  | Medium   | High  |
| Traffic speeds  | 20 to 25 mph   | 25 to 35 mph   | 35 or more mph  |
| Percentage of heavy vehicles and buses                      | Low  | Medium   | High  |
| FHWA 5-point roadway pavement condition rating <sup>2</sup> | 5  | 4  | <4  |
| On-street parking with 50%+ occupation                      | No   | No   | Yes   |
| Driveway and/or parking access                              | Seldom   | Intermittent   | Frequent  |
| Intersections   | Clear indication of proper action to take by motorist and bicyclist (signals, signs, infrastructure) | Some of the amenities listed for LOS A intersections   | Few of the amenities listed for LOS intersections     |
|   | Clear instruction of proper bicyclist placement  |  |   |
|   | Good lighting  |  |   |
|   | Sensitive loop detector and indication of how-to trigger detector                                    |  |   |
|   | Strong indication of bicyclist crossing at each crossing location                                    |  |   |
|   | Unobstructed views for both motorists and bicyclists   |  |   |
| Visual interest and amenity                                 | Aesthetically pleasing roadway design details  | Some of the amenities listed for LOS A visual interest | Few of the amenities listed for LOS A visual interest |
|   | Varying building design, shape, texture, and color   |  |   |
|   | Active street frontage   |  |   |
|   | Pedestrian scale lighting  |  |   |
|   | Street trees and landscaping   |  |   |
| Safety and security   | Prominence and safety enhancements (improved crossings, traffic calming, etc)                        |  |   |

<sup>2</sup>5 representing the best score, 1 representing the worst.

## **PB-1**

The pedestrian and bicycle overlay zone 1 (PB-1) is characterized by high density housing and mixed use areas. Because of the density of persons and destinations expected, these areas hold the most potential for pedestrian and bicycle travel—whether for commuting, errand running, or recreation—and should be facilitated by having the features and characteristics in tables 2 and 3 to achieve pedestrian and bicycle Level of Service A.

Further, this zone is generally within close proximity to planned future High Capacity Transit stations, meeting the main components associated with the term *Transit-Oriented Development* (TOD)—medium to high density mixed-use residential within walking distance to significant transit services.

Short blocks and frequent cross streets should be planned into any new development in the PB-1 zone to facilitate easy and convenient access by both the pedestrian and bicyclist (see Figure 1 for a comparison of differing densities of streets). In the example, Portland and Savannah represent system densities that should be emulated in Bel-Red. The street network in Irvine provides less than the intended level of connectivity if pedestrian and bicycle activity is to be encouraged.

Where it is necessary or desirable to supplement full functioning streets in order to achieve the appropriate system densities, pedestrian connections may be provided by using mid-block crossings and mid-block connections (see Figure 2 for examples of mid-block crossings and mid-block connections).

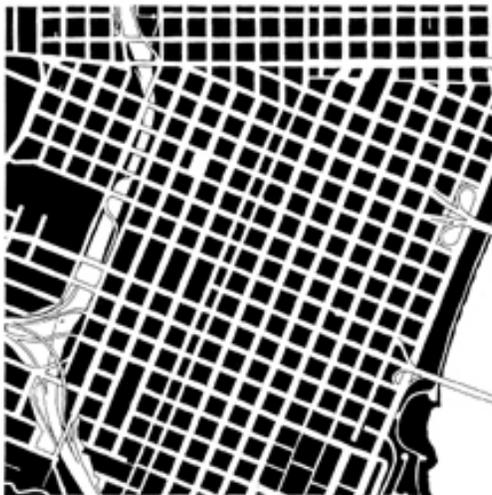
Issues affecting accessibility, such as pedestrian crossing distances, signal timing, and frequent driveways across sidewalks, shall be minimized. Safe and convenient pedestrian access to and around the transit stations is crucial, since poor station accessibility at the starting or ending point of a trip will reduce ridership and decrease the viability of nonmotorized transportation in the area.

All newly constructed and renovated streets in the Bel-Red Corridor will feature sidewalks reasonably sized to meet the intended character and use of the street. Streets in this overlay zone should be designed to impart a vibrant, diverse, human scaled urban landscape to enhance the perception of a safe and pleasant environment, promote physically active lifestyles, and increase walking to transit trips



### **Irvine, California**

Minimal connection.  
Large uninviting  
right-of-way on the  
few through-streets.



### **Portland, Oregon**

Extensive  
connection provided.  
Regular right-of-way  
width on all streets.



### **Savannah, Georgia**

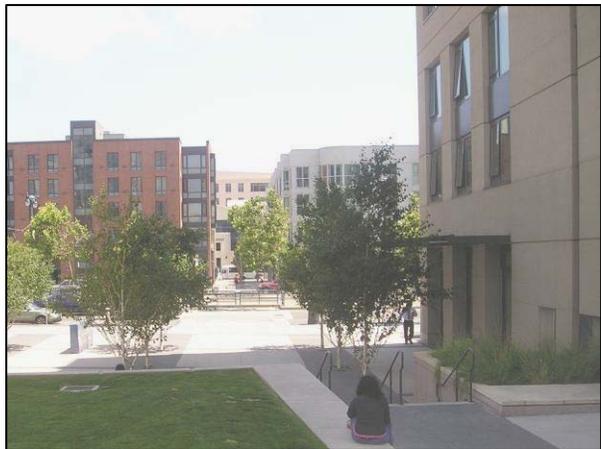
Extensive  
connection provided.  
Right-of-way widths  
matched to purpose  
of roadway.



**Figure 1: Comparisons of connectivity provision**

Scale is the same for each image.

Source: Adapted from Allen Jacobs' *Great Streets*.



**Figure 2: Mid-block crossings and connections**

Source: Photos provided by PBIC Image Library [<http://www.pedbikeimages.org>], Kevin McDonald, and Wesley Kirkman

This overlay zone should also feature a dense network of bicycle facilities that are clearly designated with on-street lanes along busier arterials and shared lanes on lower traffic streets. Cyclists on heavily traveled arterials require separate space allocation for safety and comfort reasons. On lightly traveled streets bicycle lanes would provide little benefit and will add 10 feet to the roadway width, which may increase vehicle travel speeds. On these types of roadways bicyclists and motorists can safely share the outside lane. Incorporation of a visually welcoming queue to the bicyclist and advisory to the motorist—through the use of pavement markings and signs—will encourage a respect between the two users on these roadways.

Providing bicycle parking facilities along the sidewalks and incorporated into buildings in this zone will further maximize the convenience of bicycle use.

The regional trails that would border or pass-through this overlay area—including the proposed BNSF rail-trail, the existing 520 trail, and potential trails along stream corridors—should have a high level of connections to make these features as convenient and accessible as possible.

## ***PB-2***

The Pedestrian and Bicycle Overlay Zone 2 (PB-2) is characterized by medium density office use in transit rich areas and, thus, should provide pedestrians and bicyclists a Level of Service B or greater (see Tables 2 and 3).

The density of employees expected in this zone can be expected to spur higher levels of pedestrian and bicycle activity, especially during the commute and lunch times. Further, pedestrian and bicycle activity can be greater and extend to other times of day if housing and mixed use activity is nearby and/or if the zone is along a continuous nonmotorized corridor.

Thus, this overlay zone should also see significant nonmotorized facility provision and pedestrian friendly environments. At the least, features and characteristics should equate to a Level of Service B for both pedestrians and bicyclists.

# Proposed Facilities

## Pedestrian Facilities

### No-Action Alternative

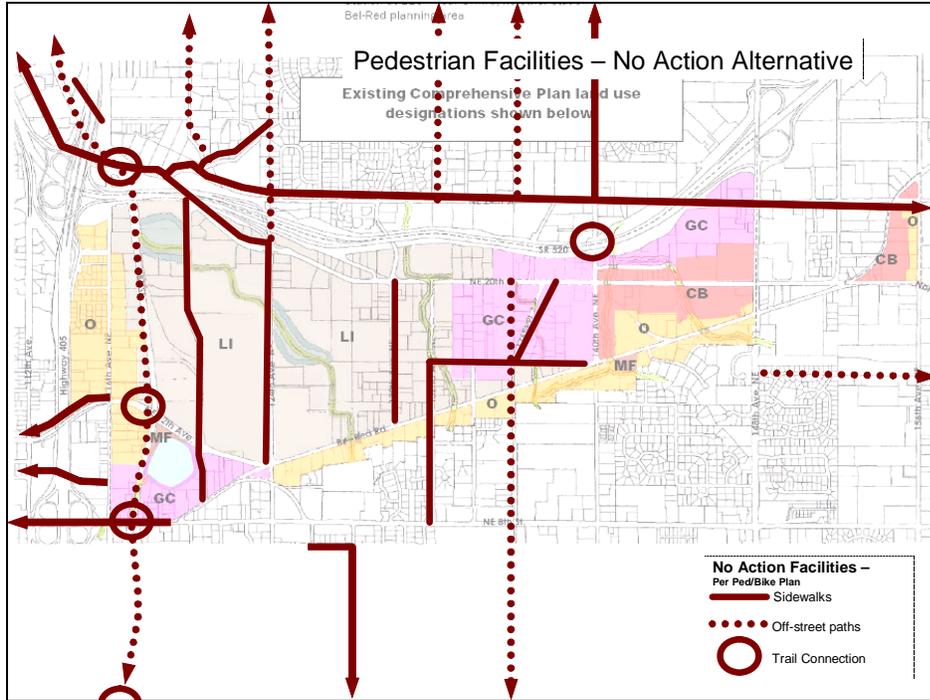


Figure 3: No Action Alternative Proposed Pedestrian Facilities with Current Zoning

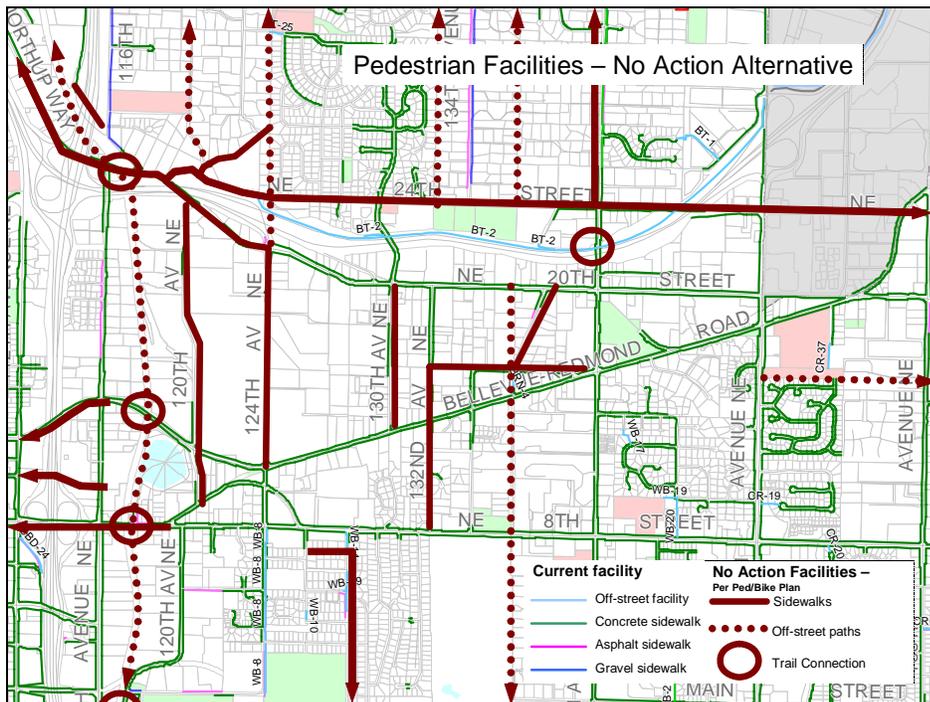


Figure 4: No Action Alternative Proposed Pedestrian Facilities with Current Facilities

# Action Alternative 1

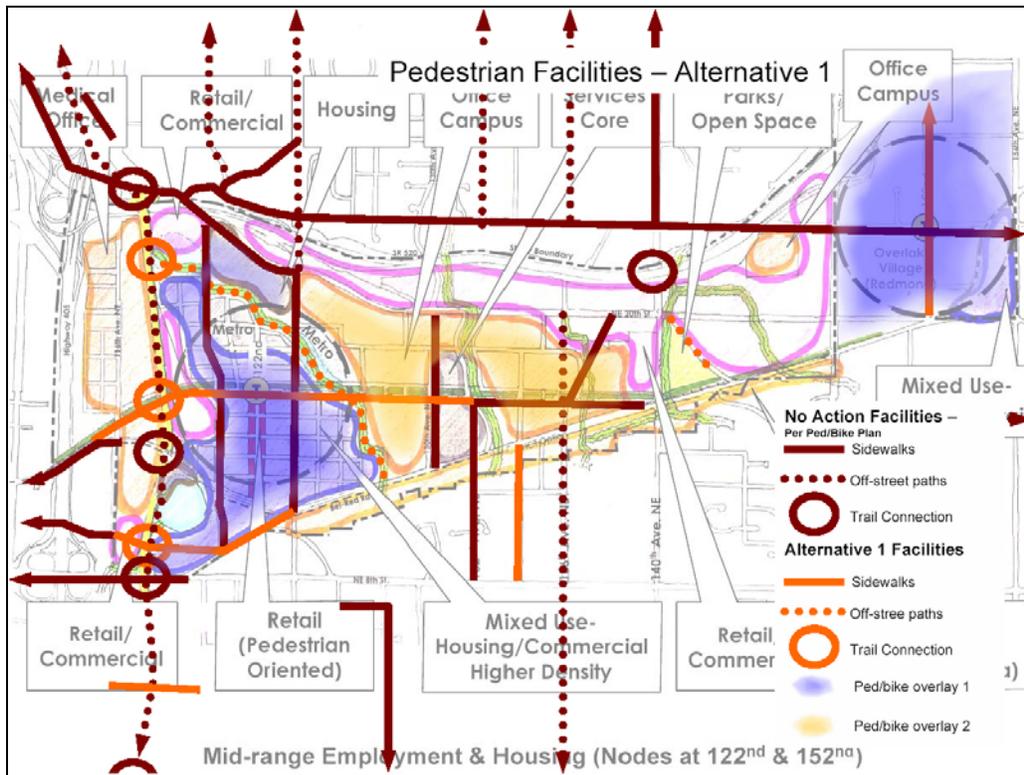


Figure 5: Action Alternative 1 Proposed Pedestrian Facilities with Zoning Alternative

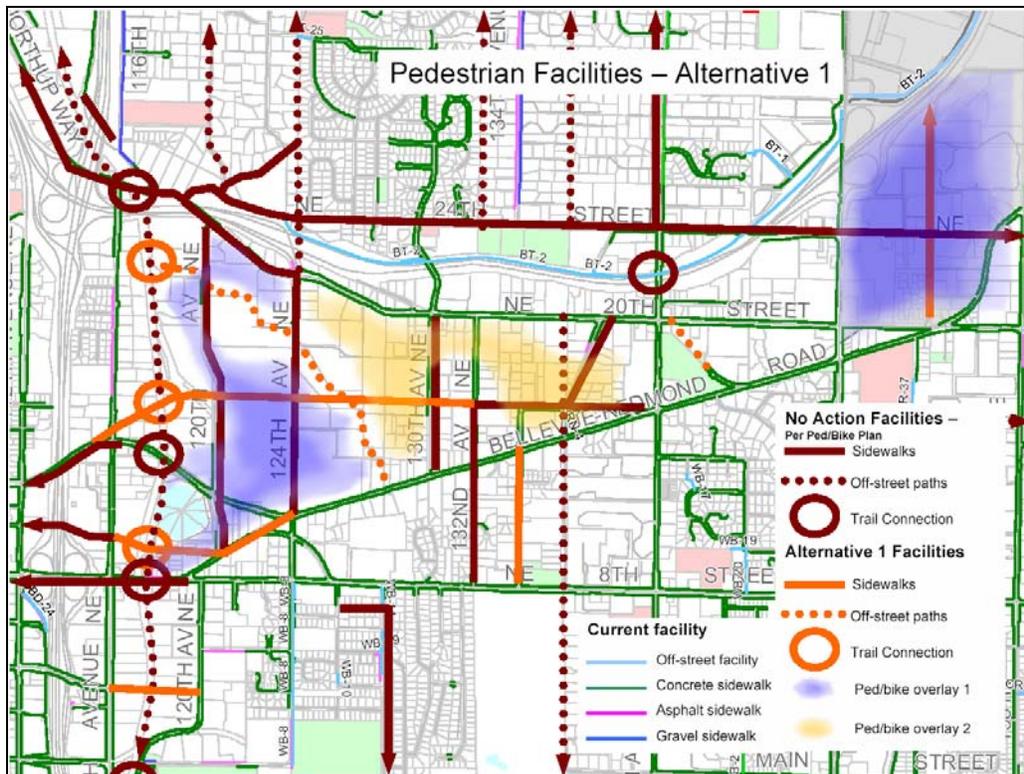


Figure 6: Action Alternative 1 Proposed Pedestrian Facilities with Current Facilities

## Action Alternative 2

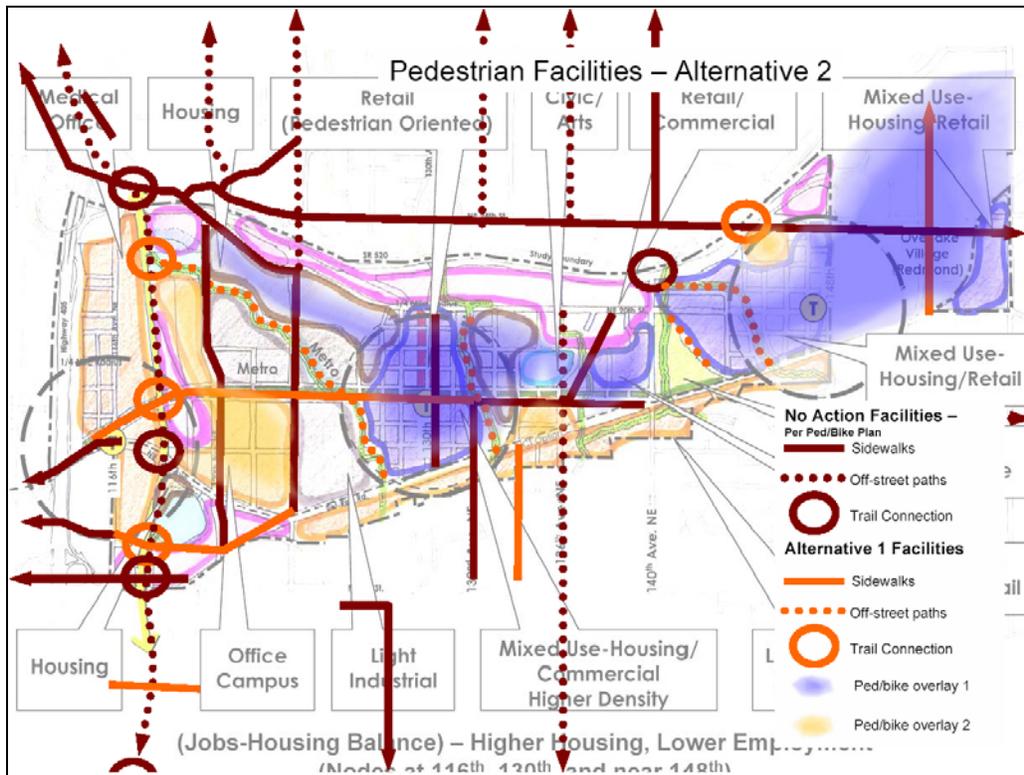


Figure 7: Action Alternative 2 Proposed Pedestrian Facilities with Zoning Alternative

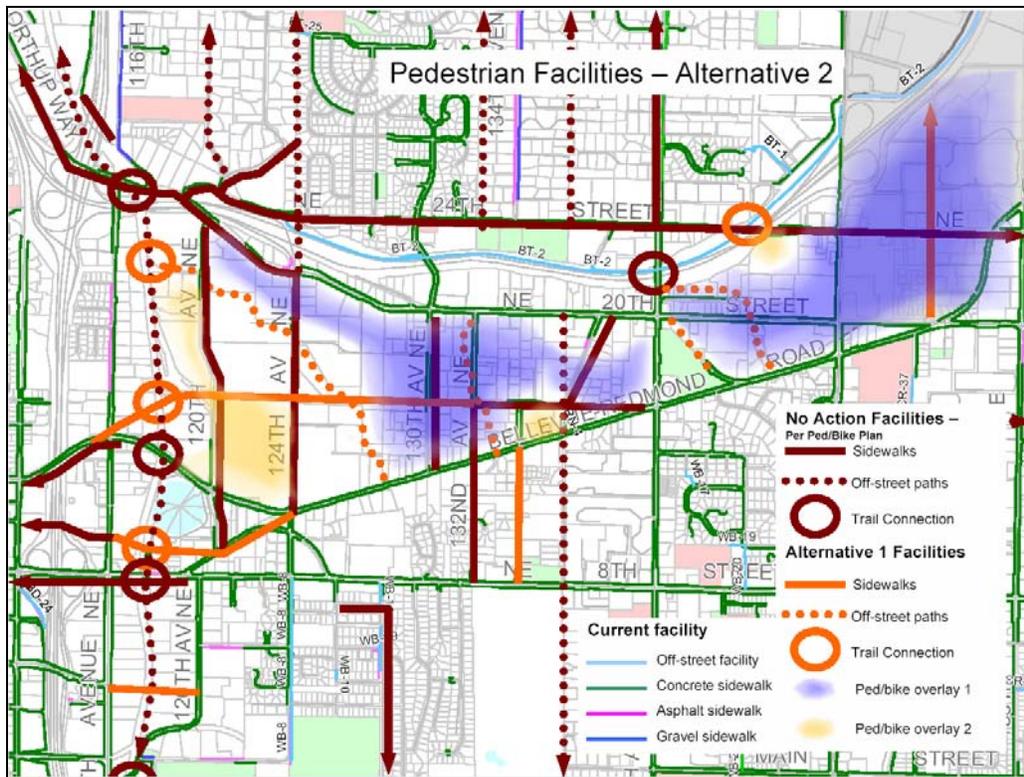


Figure 8: Action Alternative 2 Proposed Pedestrian Facilities with Current Facilities

### Action Alternative 3

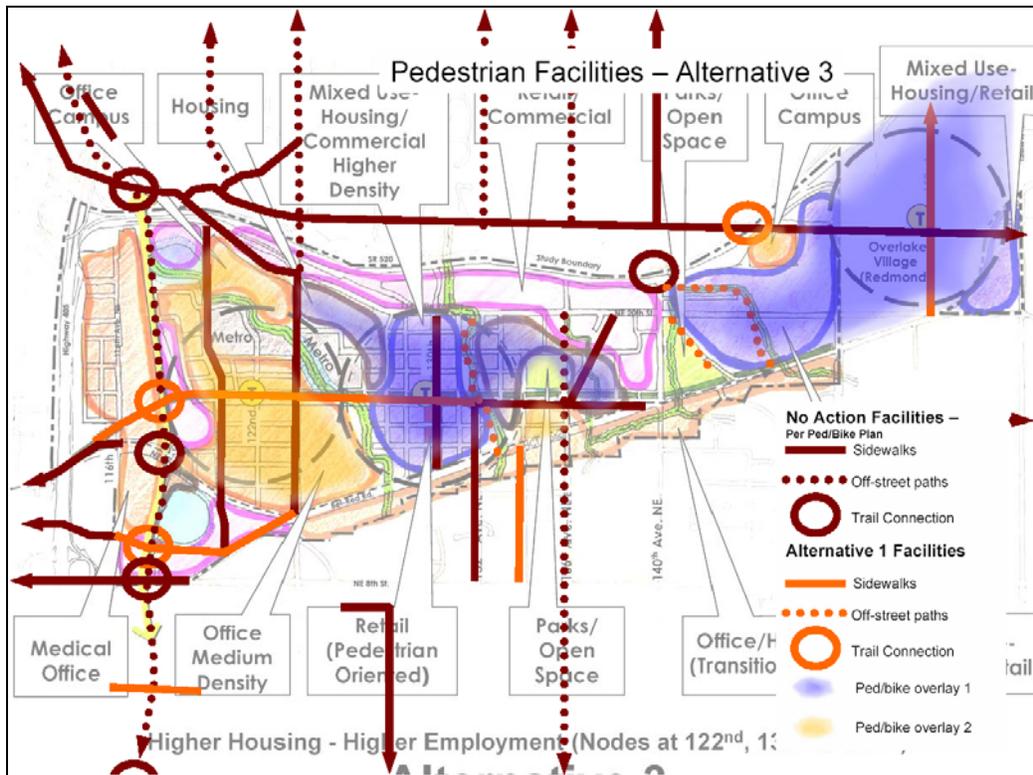


Figure 9: Action Alternative 3 Proposed Pedestrian Facilities with Zoning Alternative

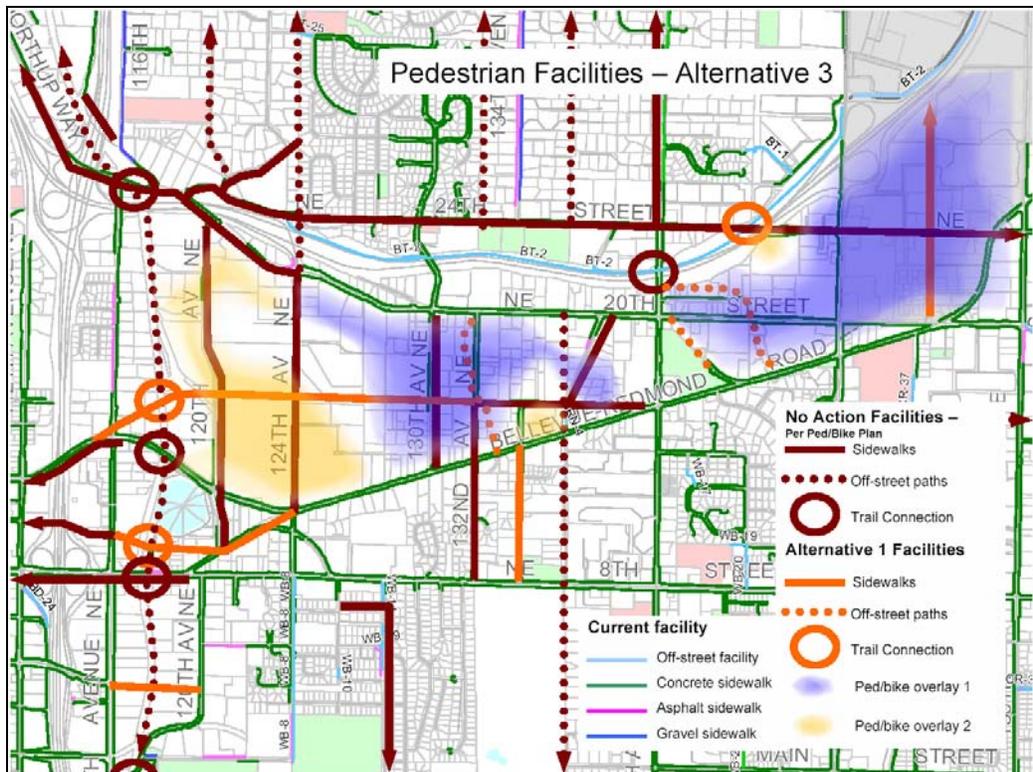


Figure 10: Action Alternative 3 Proposed Pedestrian Facilities with Current Facilities

# Bicycle Facilities

## No-Action Alternative

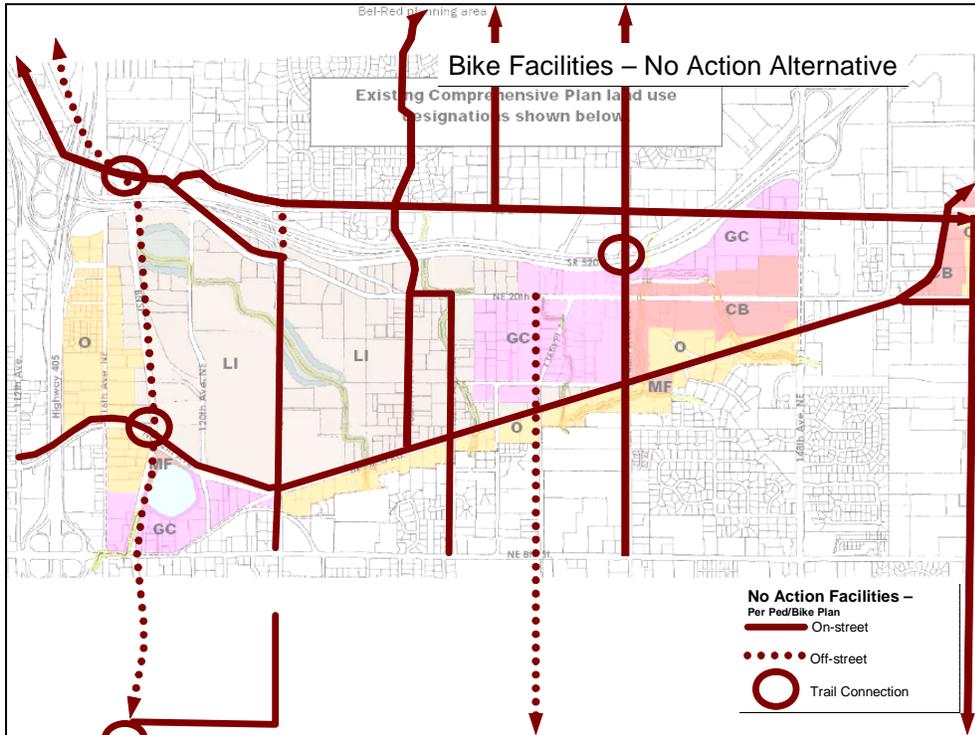


Figure 11: No Action Alternative Proposed Bicycle Facilities with Current Zoning

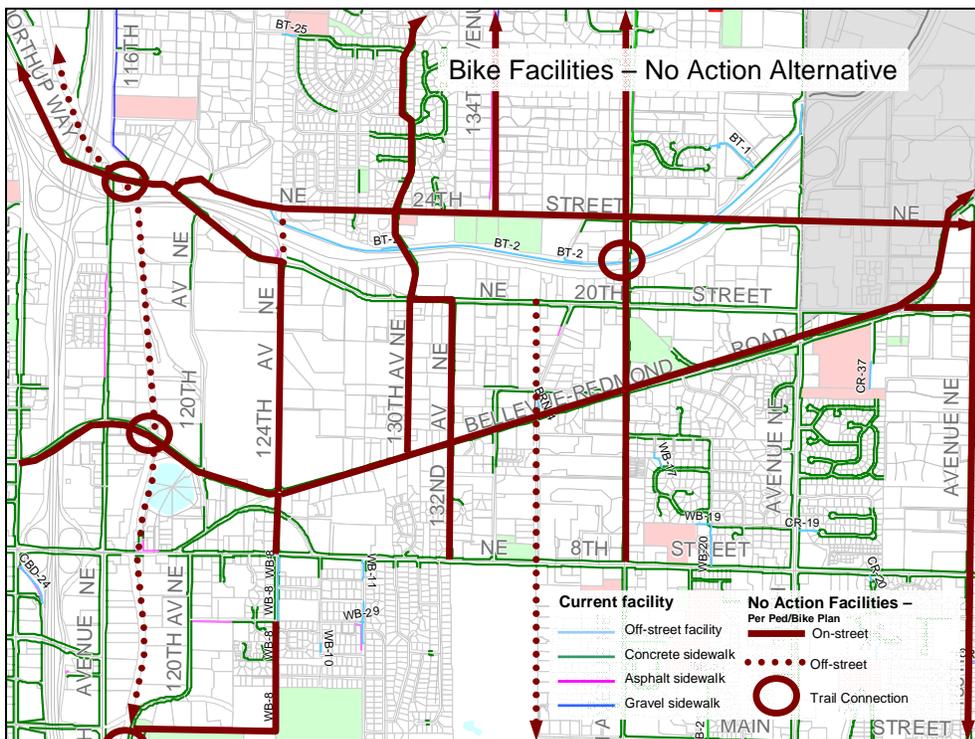


Figure 12: No Action Alternative Proposed Bicycle Facilities with Current Facilities

# Action Alternative 1

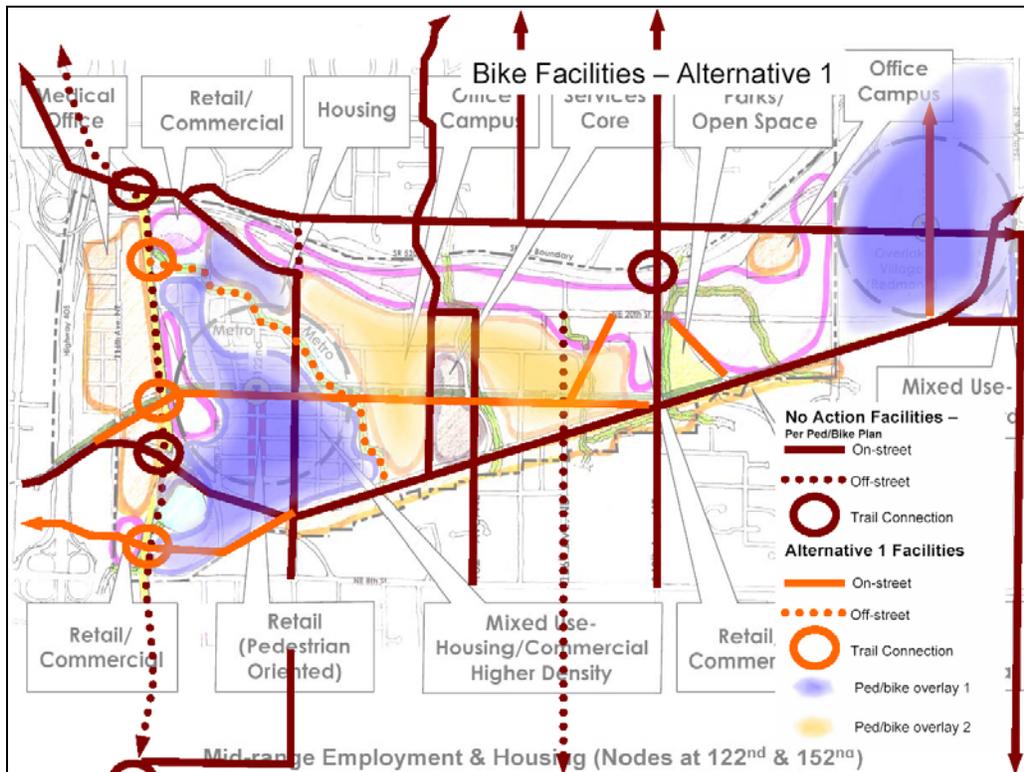


Figure 13: Action Alternative 1 Proposed Bicycle Facilities with Zoning Alternative

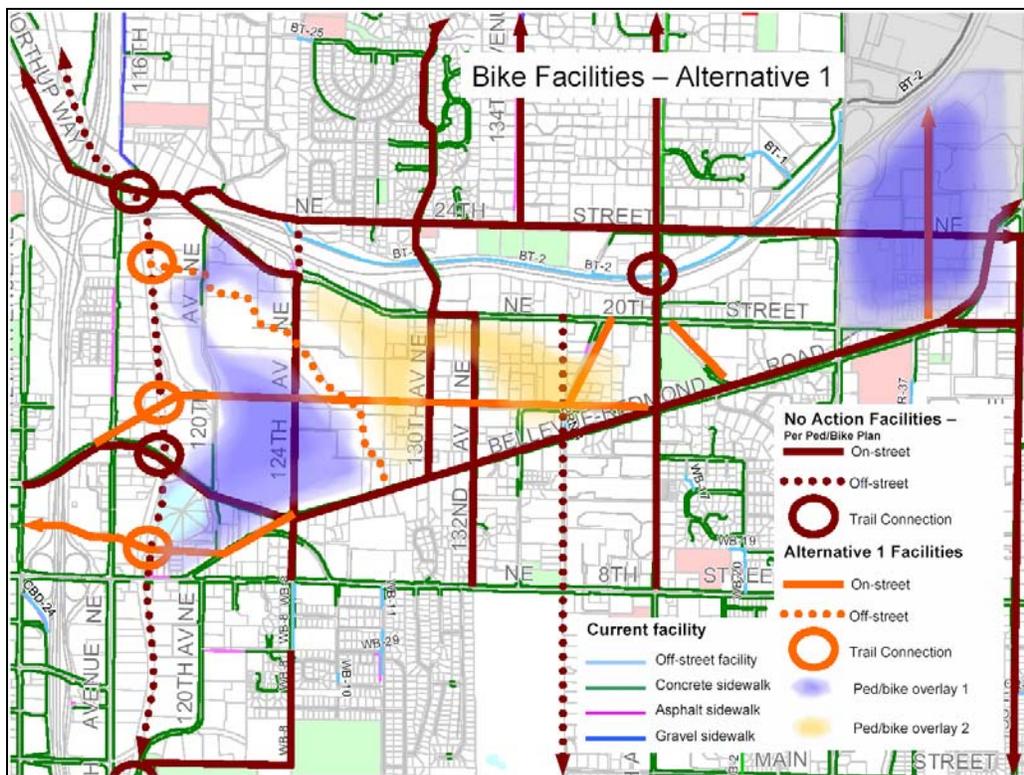


Figure 14: Action Alternative 1 Proposed Bicycle Facilities with Current Facilities

## Action Alternative 2

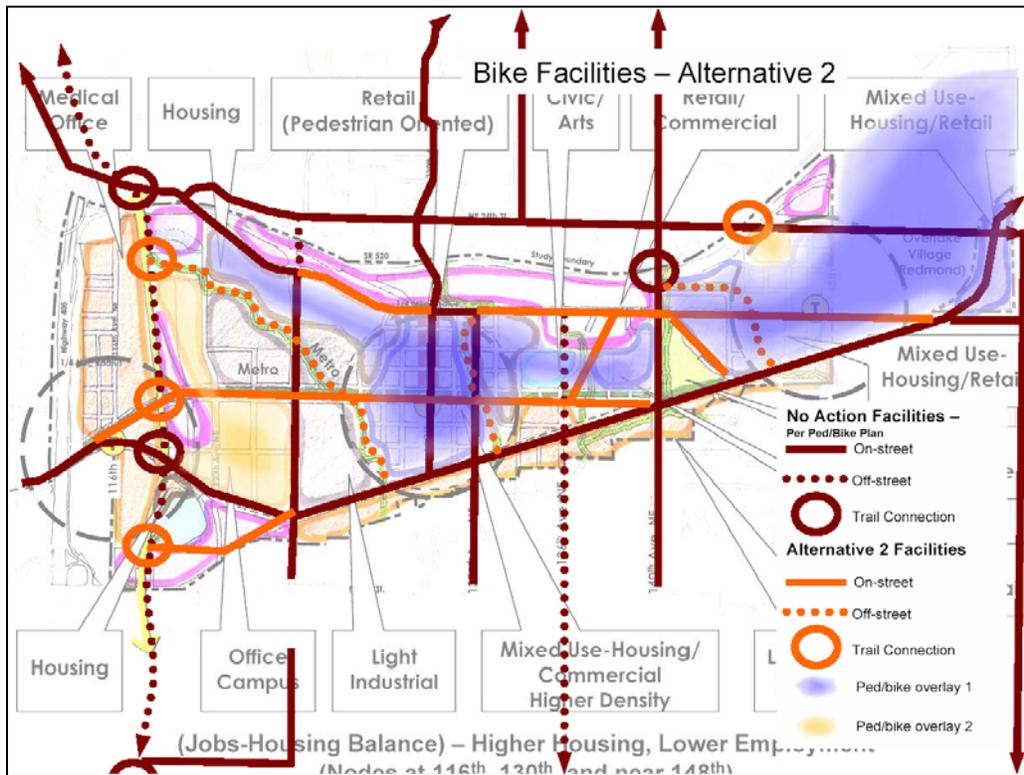


Figure 15: Action Alternative 2 Proposed Bicycle Facilities with Zoning Alternative

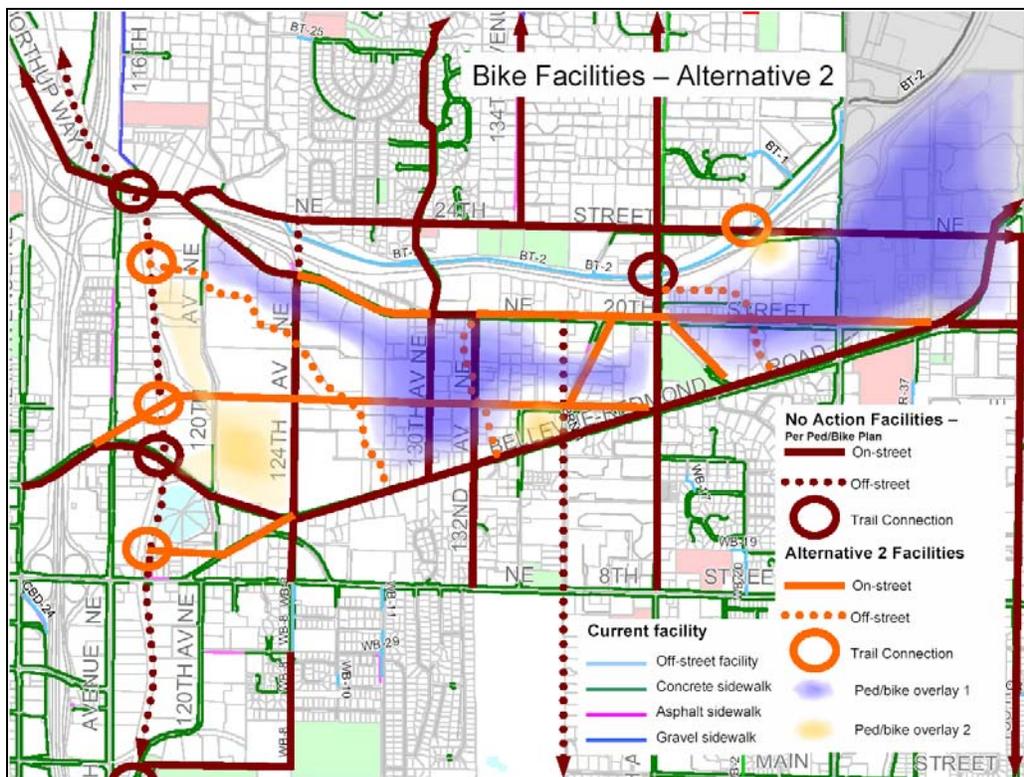


Figure 16: Action Alternative 2 Proposed Bicycle Facilities with Current Facilities

### Action Alternative 3

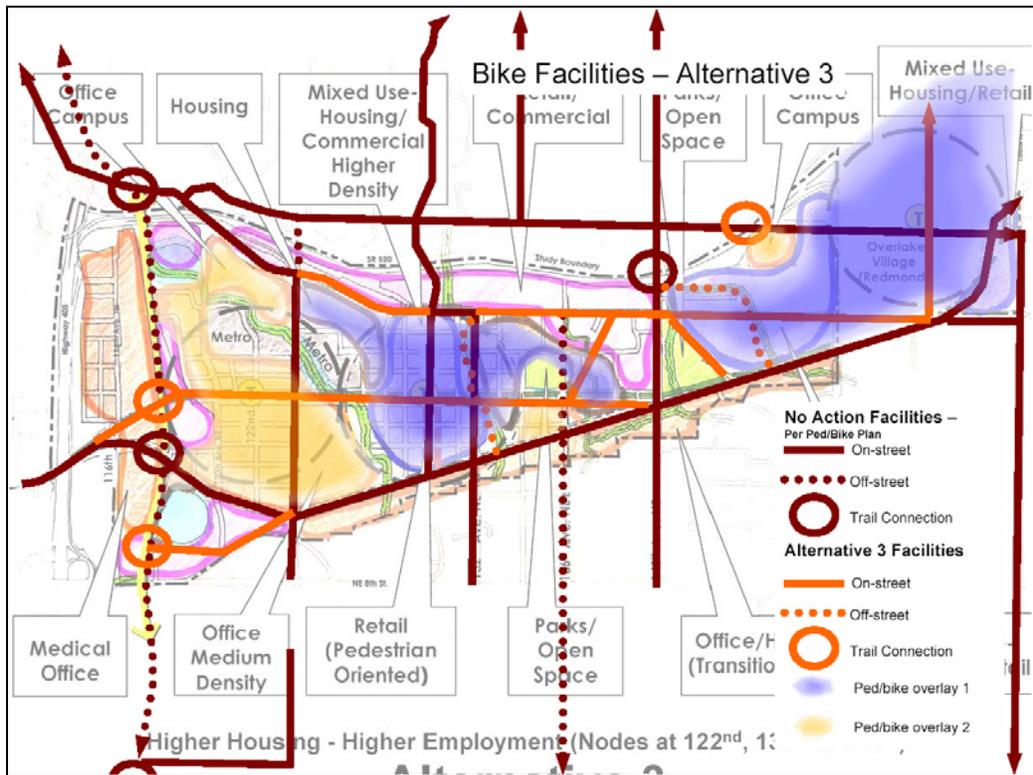


Figure 17: Action Alternative 3 Proposed Bicycle Facilities with Zoning Alternative

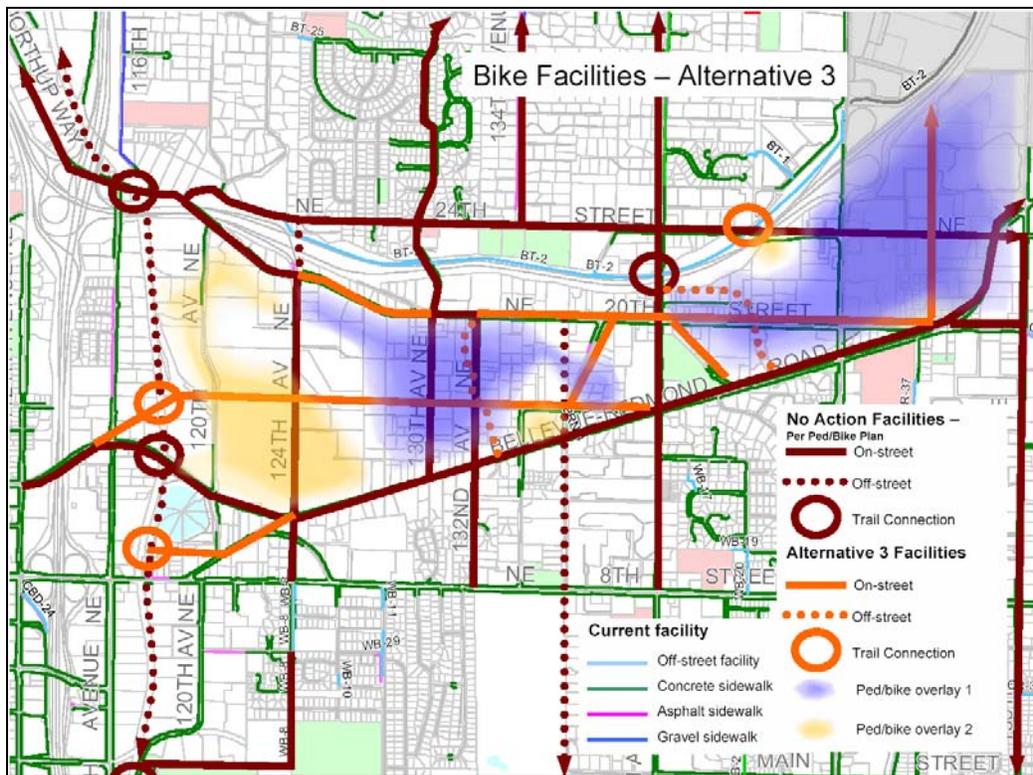


Figure 18: Action Alternative 3 Proposed Bicycle Facilities with Current Facilities