



To: Brett Kelter, City of Milwaukie, Stacey Goldstein, DLCD
From: Derek Abe, Grace Stainback, Philip Longenecker, Alta Planning + Design
Date: February 26, 2021
Re: Central Milwaukie Bikeway Connections Conceptual Design Report REFINED DRAFT

Executive Summary

The purpose of the Central Milwaukie Bikeway Connection (CMBC) project is to identify a safe and comfortable bicycle connection through Central Milwaukie, linking the 29th Ave Neighborhood Greenway at the north end of the area with the planned Monroe St Neighborhood Greenway to the south and east.

There is a strong need for a safe bicycle connection through Central Milwaukie. The project area serves as a commercial hub, a crossroads for several neighborhoods, and the gateway to transit hubs located downtown. Additionally, there are four large parcels in the project area that are in various stages of active development, which will increase demand for multimodal connections: The Hillside Manor Redevelopment site, Murphy Opportunity site, MacFarland Opportunity site, and Providence Hospital Development site. The City's 2018 Transportation System Plan (TSP) proposed a bicycle connection from 29th Ave through the Hillside Manor and Murphy development sites, crossing Harrison St at the south end of the Murphy site at a location adjacent to the railroad, and continuing along Railroad Ave through the McFarland development site. However, implementing this concept is proving to be much more challenging than originally thought, due to the close proximity of the railroad crossing and intersection of Harrison St and 32nd Ave. The intention of the CMBC project is to identify a feasible, near-term solution that considers all of the potential route options through this area and aligns with the ongoing development initiatives in Central Milwaukie.

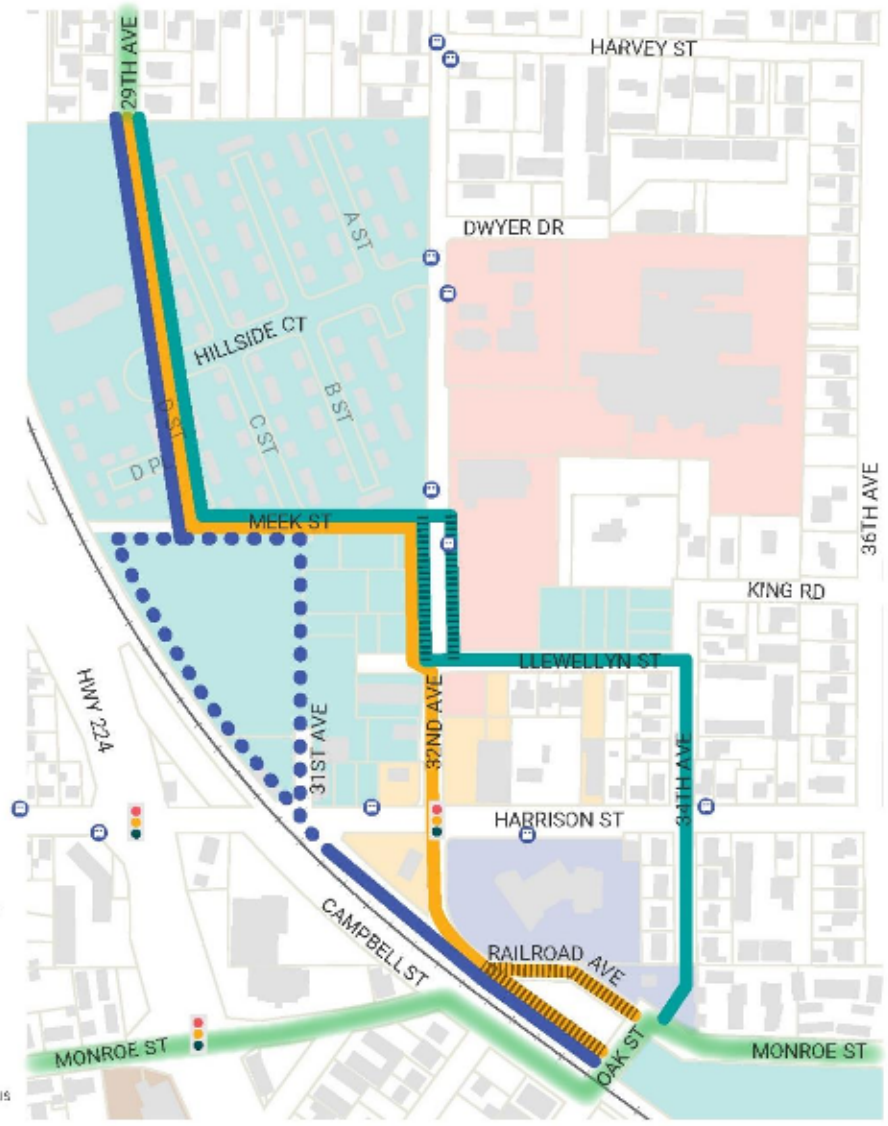
The CMBC Concept Design Report presents three potential route options for the bicycle connection (Figure 1).

Figure 1: All Route Options Map

ALL ROUTE OPTIONS

CENTRAL MILWAUKIE BIKEWAY CONNECTIONS

- Railroad
 - Development Site
 - Providence Hospital
 - School
 - Key Businesses
 - City Property
 - Building
 - Property Lines
 - Traffic Signal
 - Base Case Option*
 - Route Option 1**
 - Route Option 2**
 - Neighborhood Greenway connection
 - Bus Stop
- *Dotted line indicates route location still to be determined or unknown
- **Hash marks indicate multiple options exist in these locations



To evaluate each option, the project team considered factors including access within and connectivity across the project area, safety and comfort for people biking, the relationship between the route options and patterns of development in the project area, feasibility, and cost. The Route Options Matrix (Table 1) illustrates the factors considered and overall scores. Each option was assigned a score based on how much it aligned with each criterion, resulting in a cumulative score (assuming all factors are weighted equally). The development and evaluation of the alternatives were guided by prior planning efforts; existing conditions; and input from the community at large, key stakeholders, and the City of Milwaukie.

Evaluation Key:

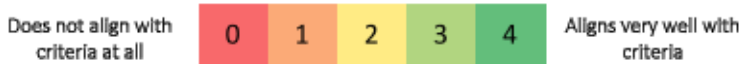


Table 1. Route Options Matrix

Criteria	Traffic Safety (Exposure to vehicle traffic and potential conflicts)	Route Comfort (How stressful is the route and crossings)	Route Directness (through the area)	Access to Destinations in Project Area	Alignment with Development Plans of Key Properties (Property Impacts)	Feasibility (Related to Approvals Process, and/or Regulatory Constraints)	Cost	Overall Score
Base Case	4	4	4	1	0	0	1	2.0
Option 1	2	2	3	4	1	1	0	1.9
Option 2	3	4	2	3	3	4	3	3.1

Route Option 2 emerged as the recommended route option with the highest-ranking score.

Introduction

The purpose of this Concept Design Report is to present conceptual designs for three potential bike routes for the Central Milwaukie Bikeway Connection (CMBC) project.

The purpose of the CMBC project is to identify a safe and comfortable bicycle connection through Central Milwaukie that is both feasible in the near-term and cost-effective. The bikeway will link the 29th Ave Neighborhood Greenway at the north end of the area with the planned Monroe St Neighborhood Greenway to the south and east. This project builds on the City's previous efforts to identify multimodal connections in the project area, as presented in the Transportation System Plan (TSP, last updated in 2018), Central Milwaukie Land Use and Transportation Plan (2016), and Monroe Street Neighborhood Greenway Concept Plan (2015).

There is a strong need for a safe bicycle connection through Central Milwaukie. The project area serves as a commercial hub and is a crossroads for several neighborhoods. Furthermore, Central Milwaukie is the gateway between surrounding neighborhoods and the transit hubs located Downtown, including the Milwaukie Transit Center and the Milwaukie/Main St MAX Station, as well as other regional connections such as the future North Clackamas Greenway.

The Central Milwaukie District is separated from Historic Downtown Milwaukie by Hwy 224 and the rail line along its western edge, which pose barriers to bicycle travel. Currently, connections for people riding bikes through the project area are limited. Figure 1: Active Transportation Network Map illustrates the existing active transportation network in Central Milwaukie.

There are four parcels in the project area that are in various stages of active development: The Hillside Manor Redevelopment site, the Murphy Opportunity site, the MacFarland Opportunity site, and the Providence Hospital Development site (Figure 2: Key Properties Map). The projected rapid increase in housing density and mixed-use development in the project area as a result of these initiatives will greatly increase the number of people traveling in the area, making the need for safe walking and biking routes all the more urgent. People are more likely to choose to walk and bike when they can use low-stress facilities. Encouraging more people to travel without a car will offset demand on vehicle trips and parking, and will help to reduce the impact of development on vehicle traffic and congestion in the project area. The CMBC project is focused on identifying a bicycle route that aligns with these ongoing development initiatives.

The City's TSP proposed a bicycle connection from 29th Ave through the Hillside Manor and Murphy development sites, crossing Harrison St at the south end of the Murphy site at a location adjacent to the railroad, and continuing along Railroad Ave through the McFarland development site. However, this concept is much more challenging than originally thought, due to the close proximity of the railroad crossing and the intersection of Harrison St and 32nd Ave. The intention of the CMBC project is to identify alternative solutions to the route identified in the TSP.

Figure 1: Active Transportation Network Map

ACTIVE TRANSPORTATION NETWORK

CENTRAL MILWAUKIE BIKEWAY CONNECTIONS

DESTINATIONS

- Affordable Housing
- Community Center
- Hospital
- MAX Station

BIKE ROUTES

- Bike Lane
- Shared Roadway
- Planned Bikeways

TRANSIT

- MAX Light Rail
- Bus Route

FEATURES AND BOUNDARIES

- Railroad
- Schools
- Building Footprints
- Parks
- Wetlands
- Development Site
- Vacate

Data Source:
City of Milwaukie, Metro KLIS
Map Created:
September 2020

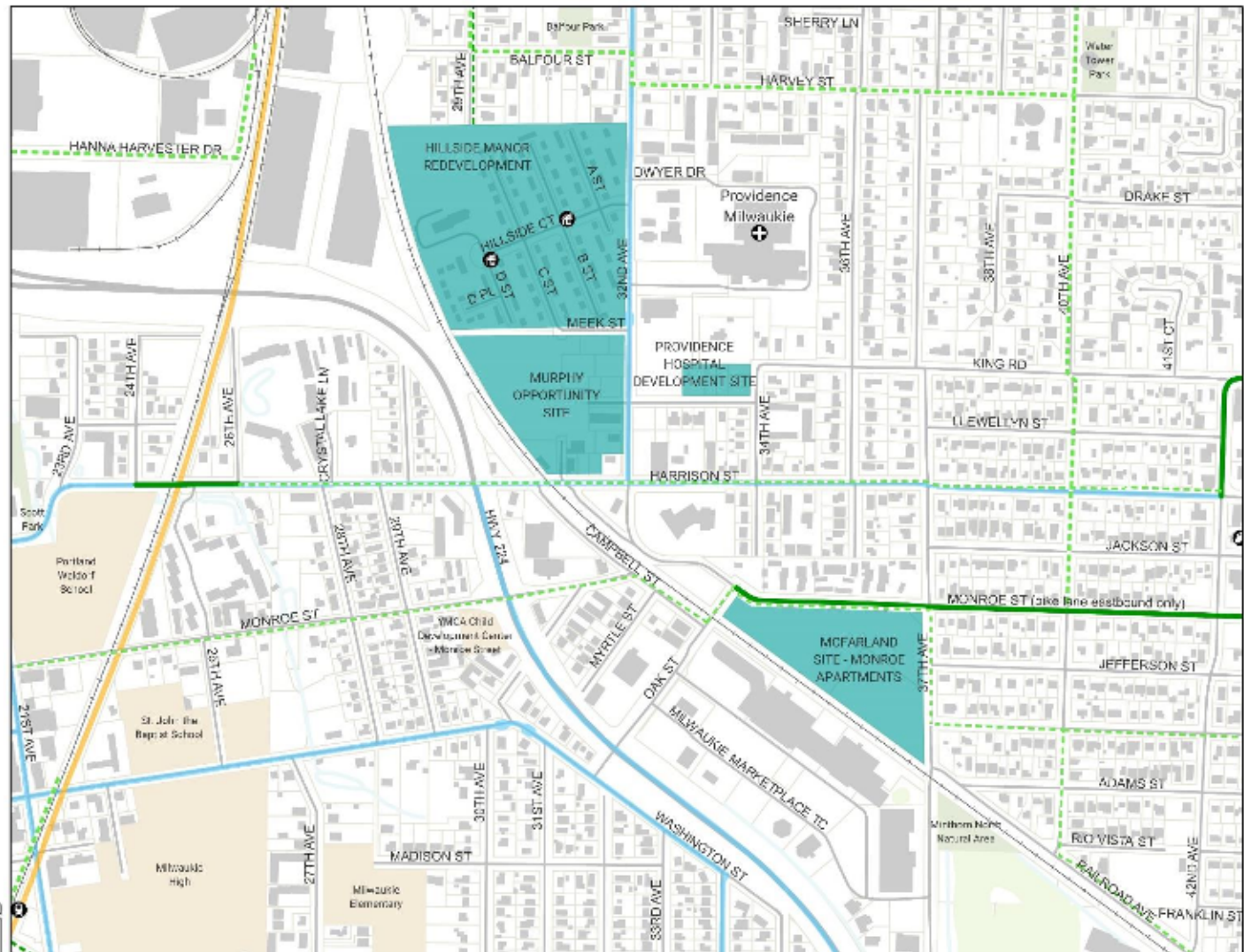


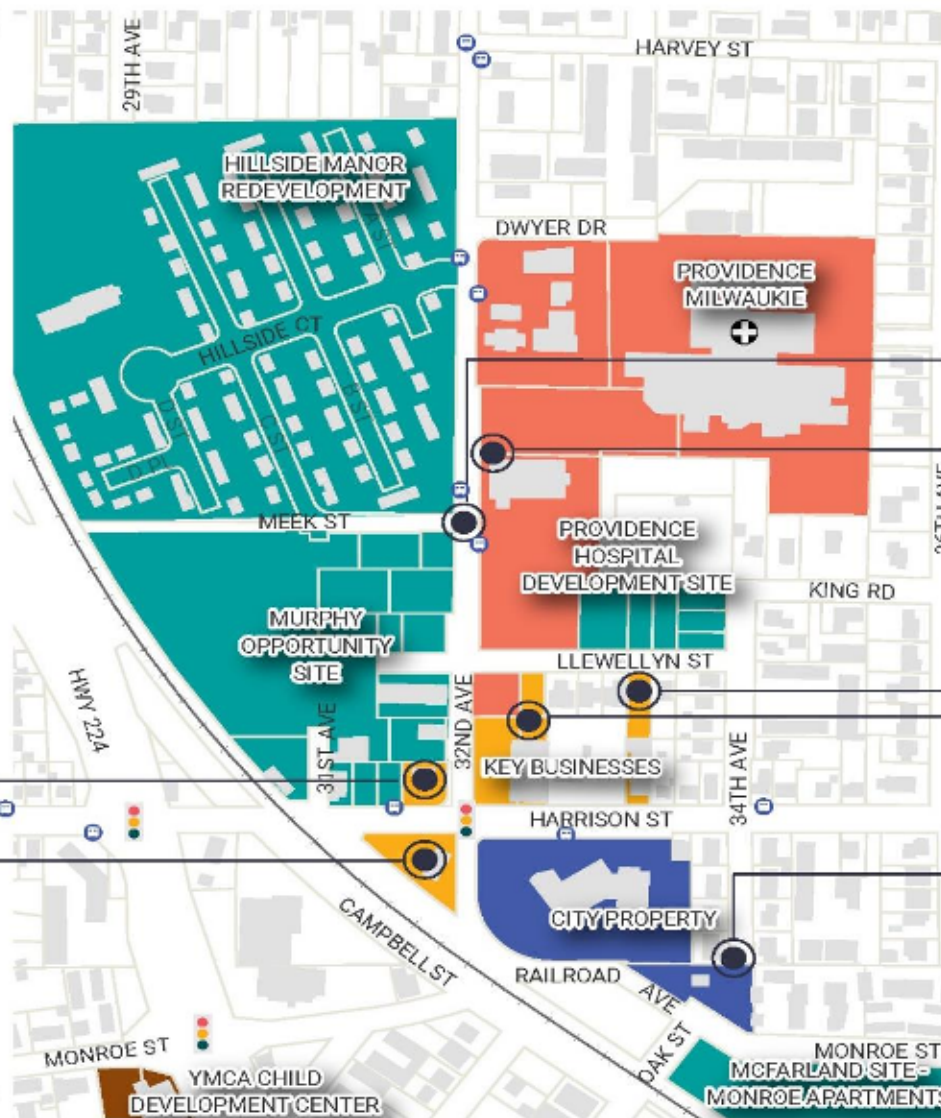
Figure 2: Key Properties Map

KEY PROPERTIES

CENTRAL MILWAUKIE
BIKEWAY CONNECTIONS

FEATURES AND BOUNDARIES

- Railroad
- Development Site
- Providence Hospital
- School
- Key Businesses
- City Property
- Building
- Property Lines



Kimmy's Market
Property not included in Murphy development site

The Pit Stop and Purdy's Car Wash & Detail
Drive through circulation on Railroad Ave and 32nd Ave

32nd Ave/Meek St
Future main entrance to Hillside and Murphy Development Sites

Providence Hospital
Main entrance to Providence Hospital Campus

JSE Labs Inc.
Parking lot access on Harrison St and Llewellyn St

Harrison Plaza
Parking lot access on Harrison St, 32nd Ave and Llewellyn St

Water Treatment Facility
City owned property with driveway access on both 34th Ave and Railroad Ave

Data Source: City of Milwaukie, Metro RLIS Map (Created November 2022)



Process and Engagement

The CMBC Concept Design Report presents three route options for a bicycle connection through Central Milwaukie. Prior planning efforts, existing conditions, and input from agencies, stakeholders, and the community all guided the formation of the alternatives and the recommended concept design. The engagement process for the CMBC project included several conversations with key stakeholders as well as opportunities for general public input (Table 2). Development of three conceptual route options followed the initial round of stakeholder interviews in October 2020 (Figure 3). The three route options considered existing conditions as well as opportunities and challenges presented by the key development sites in the project area. The project team gathered feedback on the route options during the second round of stakeholder interviews, Community Meeting 1, and the first update to the City of Milwaukie Planning Commission and City Council. This feedback allowed the project team to further evaluate the route options and develop a route recommendation. The final round of stakeholder conversations, Community Meeting 2, and the second update to the Planning Commission and City Council focused on vetting the recommended route option. This section summarizes key takeaways from the engagement process, while the following section discusses the three concept design alternatives in detail.

Table 2. Engagement Process

Engagement Tool	Timing
Project Website	Duration of project
Stakeholder Interviews	October 2020, December 2020, and February 2021
Community Meetings	January 2021 and February 2021
Updates to City of Milwaukie Planning Commission and City Council	December 2020 and February 2021

Stakeholder Interviews

The project team engaged key stakeholders early and often to identify opportunities and constraints associated with key development sites in the project area, and incorporated feedback on draft concept design alternatives. Representatives from the following six stakeholder groups each participated in recurring one-on-one conversations with the project team:

- Hillside Manor
- Murphy Company
- Providence Hospital
- Harrison Plaza
- Kimmy’s Market
- Bike Milwaukie

Key takeaways from the stakeholder interviews include:

- Overall, major priorities for stakeholders included designing a route that aligns with the development plans and timelines of adjacent properties, does not interrupt traffic circulation and business practices at and around the intersection of 32nd Ave and Harrison St, and provides a safe, comfortable, and practical route for cyclists.
- The majority of stakeholders indicated a preference for Route Option 2. Reasons for this preference included the fact that Route Option 2 aligns well with adjacent development plans, minimizes traffic circulation impacts and modal conflict, and provides ease of access to destinations in the project area. Preference for this option also stemmed from the likelihood of it having the lowest overall cost, and that it can be implemented in the near term without being subject to the development schedules of the Murphy development site.

- The majority of stakeholders expressed a strong desire to be closely involved as the City moves forward with design and implementation of the route, to ensure alignment with development plans as they evolve.

Community Meetings

The project team hosted two community meetings to collect feedback on the draft concept designs and discuss the preferred concept design, respectively. Due to limitations on in-person gatherings in response to the COVID-19 pandemic, the City hosted both community meetings online.

Community Meeting 1 was held in January 2021 and consisted of a survey hosted on the Engage Milwaukie platform on the City’s website, as well as a live public meeting hosted on Zoom on January 13th, 2021. A total of 105 community members completed the survey (100 respondents participated online, and 5 respondents completed paper versions of the survey delivered to the Hillside Manor resident complex). A total of 12 participants joined the Zoom meeting.

Key takeaways from Community Meeting 1 include:

- The Base Case option was the most popular route option among survey respondents. Explanations for this preference included the directness of this route, as well as its separation from 32nd Ave and street traffic in general. Concerns over the Base Case included the infeasibility of the option due to its location at the railroad tracks, traffic circulation and congestion impacts with a new at-grade crossing of Harrison at 31st Ave, and the high potential cost of constructing an elevated structure or tunnel.
- Route Option 1 was slightly more favored than Route Option 2 in the survey. Those who preferred this option liked the directness of the route. Concerns over Route Option 1 included safety concerns for cyclists traveling along 32nd Ave and at the intersection of 32nd Ave and Harrison St.
- Those who preferred Route Option 2 liked the design of the route as a relatively calmer neighborhood greenway along low-traffic streets. Concerns over Route Option 2 included the higher prevalence of street crossings compared to the other two options, as well as the impact of slope on the overall accessibility of the route.
- During the Zoom meeting, the participants asked questions regarding the design and feasibility of the three alternatives. While several indicated an initial preference for the Base Case, they acknowledged the barriers that potentially make this option less feasible in the short-term.

Appendix 1 includes the full Survey Summary Report for Community Meeting 1.

Community Meeting 2 was held in February 2021 (forthcoming).

Updates to City of Milwaukie Planning Commission and City Council

The project team provided two updates to the City of Milwaukie Planning Commission and City Council. The first update took place in December 2020. Key takeaways from the first update include:

- Commission and Council members considered all three route options and shared their initial reactions to some of the trade offs presented.
- There was general interest in further exploring the feasibility of the Base Case in the long-term, despite the potential costs, development complications, and traffic circulation impacts associated with the route.

The second update took place in February 2021 (forthcoming).

Bikeway Option Concepts

Figure 3. All Route Options Map

ALL ROUTE OPTIONS CENTRAL MILWAUKIE BIKEWAY CONNECTIONS

- Railroad
- Development Site
- Providence Hospital
- School
- Key Businesses
- City Property
- Building
- Property Lines
- Traffic Signal
- Base Case Option*
- Route Option 1**
- Route Option 2**
- Neighborhood Greenway connection
- Bus Stop

*Dotted line indicates route location still to be determined or unknown

**Hash marks indicate multiple options exist in these locations



Data Source: City of Milwaukie, Metro RUS Map Created November 2020

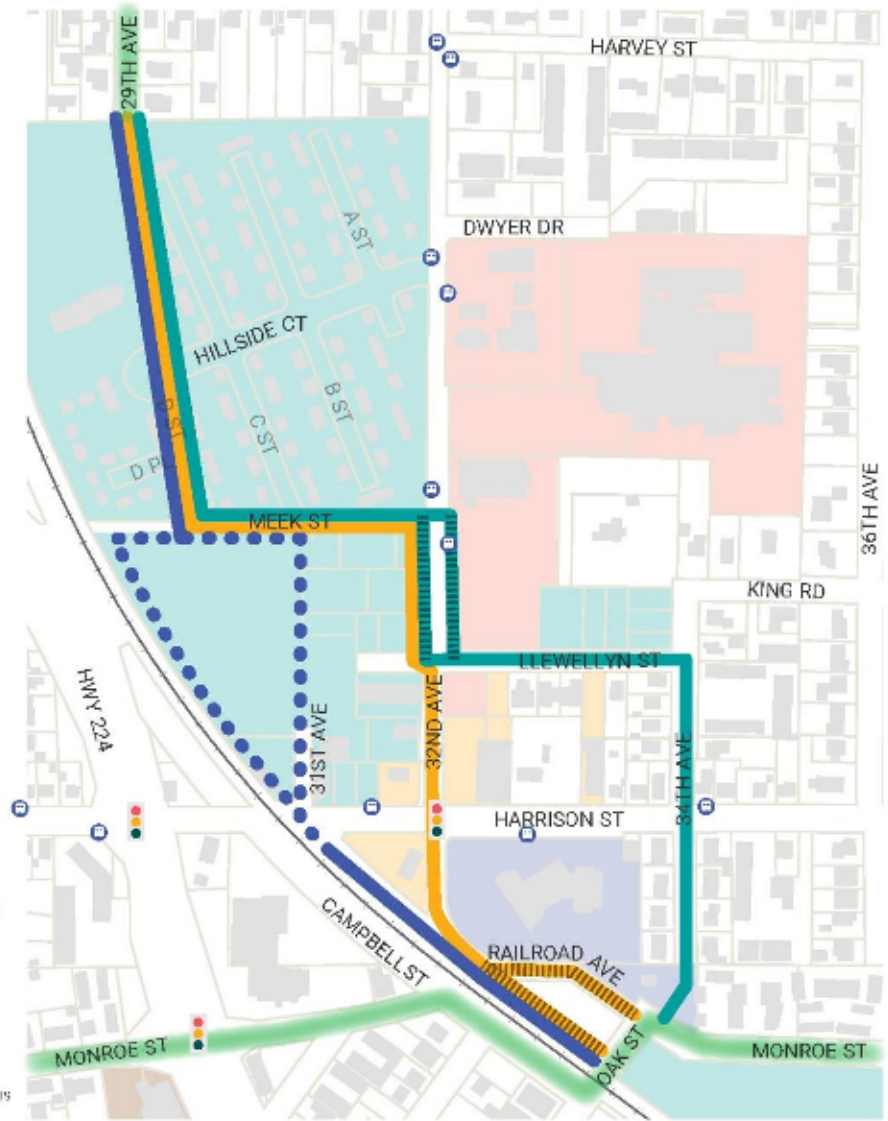


Figure 4: Base Case Option Map

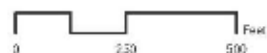
**BIKEWAY ROUTE
BASE CASE
OPTION**
CENTRAL MILWAUKIE
BIKEWAY CONNECTIONS

- Railroad
- Development Site
- Providence Hospital
- School
- Key Businesses
- City Property
- Building
- Property Lines
- Traffic Signal
- Base Case Option*
- Neighborhood Greenway connection
- Bus Stop

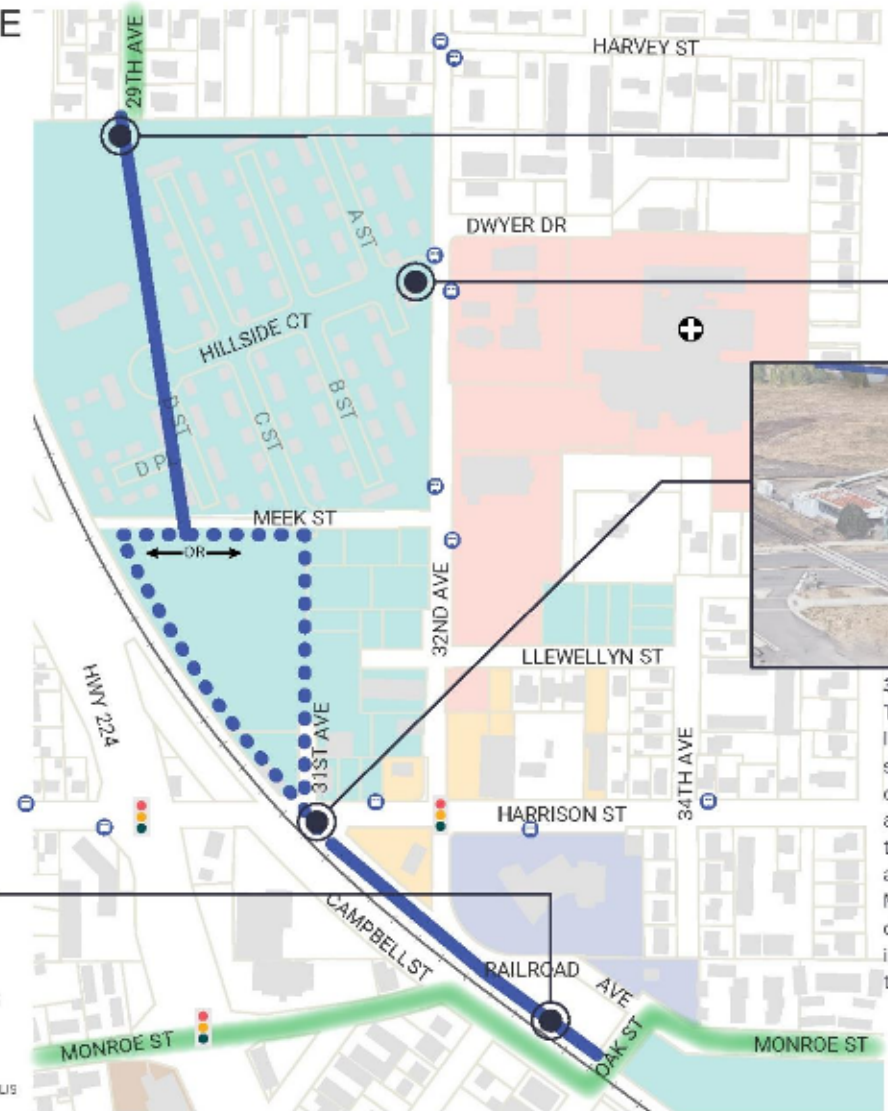
*Dotted line indicates route location still to be determined or unknown

Railroad Ave

The south side of Railroad Ave presents an opportunity for a shared-use path.



Data Source: City of Milwaukie, Metro RLS Map Created: November 2020



29th Ave/Hillside Site

29th Ave does not connect to the Hillside Site but will likely be accessible to pedestrians and bikes when redeveloped. The 29th Ave route will likely be extended south to Meek St.

Hillside Ct/Dwyer Drive

This entrance to the Hillside site will be realigned to Dwyer Dr upon redevelopment.



31st Ave/Harrison St

This route option and crossing location would require a new traffic signal or overcrossing/undercrossing of Harrison St. An at-grade crossing and signal would require a new traffic signal with ODOT and UPRR approval. Development plans on the Murphy site have yet to be determined. Collectively, these issues present a significant barrier to the feasibility of this route.



Bikeway Base Case Option

The Bikeway Base Case Option (Figure 4) is presented as an expansion on the original bikeway alignment option shown in the 2018 TSP. The bikeway would serve as a direct north/south connection from the 29th Ave Neighborhood Greenway to the future Monroe St Neighborhood Greenway.

Description

In this concept, the route crosses through both the Hillside and Murphy Development sites. The Hillside site redevelopment is in final stages of planning and would provide a low-stress shared street bike connection from 29th Ave to Meek St, when 29th Ave is extended/realigned as a part of the site redevelopment. In contrast, the Murphy site's development plans are on a more extended timeline, with future accessways, streets, and buildings yet to be determined. Thus, this bikeway route option could connect to Harrison St either by following Meek St to the west and then south alongside the railroad tracks, or by following Meek St to the east and then directly south parallel to 32nd Ave to where 31st Ave intersects with Harrison St (illustrated by dotted lines). Each of these options would need to be explored further to determine impacts and feasibility with the Murphy property owners and development team.

There are three options for crossing Harrison St at this location:

1. An at-grade (street-level) crossing requiring a new traffic signal, subject to approval from UPRR and ODOT.
2. An elevated structure or bridge, where people ramp up and over and back down on either side, requiring ADA compliant ramps, stairs, and/or elevators.
3. A below-grade tunnel path, where people ramp down and back up on either side, requiring ADA compliant ramps, excavation, and retaining walls.

Each of these options have significant trade-offs in terms of feasibility, cost, and implementation timelines discussed below.

South of this location, where 32nd Ave transitions into Railroad Ave, there may be room within the public ROW to implement a shared-use path on the south side of the street, continuing along the railroad tracks (off-street) to connect to Oak St. A barrier between the path and the tracks would block people from crossing the railroad tracks. The path would connect with Oak St, where users could access Monroe St.

Feasibility Considerations

The feasibility of the route through the Murphy site following the proposed alignment in the TSP would be subject to agreement with the developers, and involve coordination and approval with Union Pacific Railroad (UPRR) and ODOT. The project planning team noted that this option would likely result in the construction of a barrier separating the shared-use path from the railroad tracks and potentially from the future buildings to the east as well. This could cause a "canyon effect" that might be uncomfortable for some users due to safety concerns. Lighting and other security concerns would likely need to be addressed for this stretch. While it may serve as a direct route through the area, this option would function as a by-pass and would not serve well the goal of routing people walking and rolling to the destinations and commercial activity along 32nd Ave and Harrison St.

The route option directly through the Murphy site would depend on a new, yet to be confirmed, extension of 31st Ave from Meek St to Harrison St. This option would have the heaviest impact on the redevelopment options for the site, an aspect that concerns the property owners.

With either of these routes through the Murphy site, the Base Case's most significant challenge is crossing Harrison St near the UPRR line. An improved at-grade (street-level) crossing here would require UPRR approval, due to the proximity of the railroad tracks. The typical path crossing setback requirement is for the crossing to be 100 ft from the railroad track. However, the proposed crossing location here is approximately only 50 ft from the track. This would trigger the need for a "crossing order" with ODOT for further evaluation to ensure safe stopping distances from the track. Based on the ODOT/UPRR standards for crossing approvals and precedent throughout Oregon, the project planning team anticipates that UPRR approval would be unlikely and that ODOT would object to a crossing at this location due to the proximity of the traffic signals at Hwy 224 and 32nd Ave. Additionally, the City, ODOT, and UPRR all prefer to eventually close 31st Ave to vehicle access. An intersection with crossings at this location presents safety and congestion issues on and around the tracks, and future development utilizing 31st Ave would further complicate traffic signal operations at the adjacent intersections at 32nd Ave and Hwy 224. Adding a new crossing between the two signalized intersections and the railroad tracks could generate vehicle queues that could create unsafe crossing conditions for people driving, walking, and biking. For example, vehicles might have to stop on the railroad tracks to let a cyclist cross, or impatient drivers might cut around vehicles queued in front of them while a pedestrian or cyclist is still crossing the street. A new enhanced crossing at this location would require new traffic signal infrastructure, which would significantly increase the cost of implementing this option (roughly \$500,000- \$1 million). Preliminary investigations by the City have concluded that securing approval of a new at-grade street-level crossing at this location would be very unlikely for these reasons.

As a much longer-term TSP project, routing Harrison St itself under the railroad tracks may provide a future opportunity to keep the bike and pedestrian path crossing at the current street-level. However, this is a much more costly project proposal, with a much more distant timeline in terms of funding and implementation, and it is considered beyond the scope and objective of this project.

As mentioned above, potential alternatives to an at-grade crossing include a bike and pedestrian overcrossing (bridge) or undercrossing (tunnel) to connect across Harrison St. With an overcrossing, the approaches need to be accessible, meaning the ramps leading to either approach of the elevated structure would need to be ADA-compliant, requiring gradual slopes and landings, and/or elevators. Depending on the right-of-way space available on either side, private property acquisition may be needed to fit the necessary ramp running distances. The feasibility and costs of an overcrossing here would need to be explored further, but in general this would likely increase the cost of this option by a few orders of magnitude. As a similar example, a recent bike and pedestrian overcrossing constructed in Portland, the Gideon Overcrossing, cost approximately \$15 million including elevators.

The same accessibility provisions would be necessary for a below-grade tunnel option under 32nd Ave. Ramps and/or elevators would be needed to ensure accessibility on both approaches. This alternative has significant feasibility and cost considerations as well. In particular, a tunnel option requires excavation, retaining walls, relocation of underground utilities, and drainage improvements, all of which add considerable construction complexity and also impact the cost and project implementation timeline. Like the overcrossing option, the tunnel option would also be very expensive; orders of magnitude greater than the street-level intersection improvements.

With an overcrossing or undercrossing there are also important public safety and security considerations that need to be addressed related to lighting, graffiti, loitering, camping, and access/egress points.

Figure 5: Option 1 Map

BIKEWAY ROUTE OPTION 1

CENTRAL MILWAUKIE
BIKEWAY CONNECTIONS

- Railroad
- Development Site
- Providence Hospital
- School
- Key Businesses
- City Property
- Building
- Property Lines
- Traffic Signal
- Route Option 1**
- Neighborhood Greenway connection
- Bus Stop

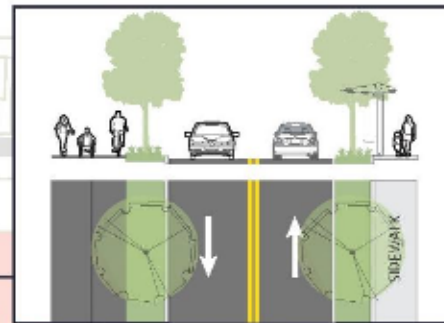
**Hash marks indicate multiple options exist in these locations

Harrison St/32nd Ave

Complex intersection with many physical constraints. May require significant reconstruction to accommodate bike facilities. Bike facility may need to change to a 2-way facility south of Harrison St.



Data Source: City of Milwaukie, Metro RLIS
Map Created: November 2020



Meek St/32nd Ave

Neighborhood greenway on Meek St would transition to a shared-use path on west side of 32nd Ave. ROW frontage along Kimmy's Market features severe constraints, and will not be redeveloped with the rest of the Murphy Development Site.

Railroad Ave/Oak St

South side of Railroad Ave presents opportunity for off-street path connection to Oak St/Monroe St.

Oak St/Campbell

Bike facilities connect to future Monroe Greenway (two-way protected bike lane on south side of Monroe St).



Bikeway Route Option 1

Bikeway Route Option 1 (Figure 5) is an alignment that emerged in response to the challenge of adding a crossing next to the railroad tracks, while maintaining a relatively direct north/south connection from the 29th Ave Neighborhood Greenway to the future Monroe St Neighborhood Greenway. The concept design alternative utilizes 32nd Ave to accomplish this.

Description

Like the Base Case Option, this concept design alternative crosses through the Hillside site. The Hillside site redevelopment is in the final stages of planning and would be able to accommodate a bicycle facility connection from 29th Ave to Meek St. In contrast, the Murphy site has no plans to redevelop in the near term, and thus this bikeway route option directs users east along Meek St and then south along 32nd Ave in order to minimize impacts on the Murphy site. Due to the anticipated increase in vehicle traffic with the Hillside and Murphy developments, a physically separated bike facility would likely be needed on Meek St to ensure safe and comfortable transitions between the Hillside site and 32nd Avenue. This could either be separated bike facilities in each direction on both sides of the street, or a single two-way bike facility on one side of the street. In either case, careful consideration should be paid to address transitions into and out of these bikeways at 29th Ave and 32nd Ave.

Along 32nd Ave, a shared-use path on the west side of 32nd Ave would require widening the public right-of-way (ROW) on that side to fit an off-street bikeway. As part of the redevelopment of the Hillside site, this segment of roadway on 32nd Ave will be widened, to incorporate a northbound left-turn lane at Meek St. This means that the bike and pedestrian facilities along this stretch of 32nd Ave would also have to factor the additional space needed for the turn lane. Fortunately, an agreement is in place with the Murphy site development to provide an easement for a future pathway along this edge of the property when the site develops.

If the bike facilities were instead in the street, the bike lanes would need to be protected – physically separated from interaction with moving vehicles to make this a comfortable route for anyone beyond the “Strong and Fearless” bike riders who are already riding on 32nd Ave today. Because of the narrower width of the roadway, this would also require widening the roadway to fit the bike lanes, vehicle travel lanes, and turn lanes.

At the intersection of 32nd Ave and Harrison, a range of solutions could be considered depending on design standards and available funding. However, the physical space constraints would necessitate some degree of roadway widening, and expansion of the intersection to fit protected bike lanes or a shared use path. In particular, property impacts on the west side of the street would be likely along the Kimmy’s Market property. The City plans to thoroughly research the potential for intersection improvements at this location as a part of the next TSP update process.

On the west side of 32nd Ave south of Harrison St, one of the Purdy’s Auto Detailing and Service Center buildings is situated on the edge of the property, limiting potential for a wider bike facility behind the curb without impacting the Purdy property. As with Kimmy’s Market, the Purdy’s property would also be impacted to fit a bike facility.

Feasibility Considerations

Between Llewellyn St and Railroad Ave, the public ROW on 32nd Ave is fairly narrow so there are more constraints and potential for impacts to existing businesses and adjacent properties.

The intersection of 32nd Ave and Harrison St is complex due to the turning movements, existing driveways, vehicle queues, and physical constraints of the intersection itself. Adding bike facilities through this intersection would likely require a significant redesign of the intersection, including acquisition/easement of ROW from adjacent properties including Kimmy's Market, Purdy's Service Center, and the Pit Stop. Not only would property acquisition add to the expense of the project, but it could also include the consolidation of key driveways for each of these properties. Closing driveways would help to reduce the likelihood of vehicle-bike conflicts when vehicles turn into or out of the driveways on 32nd Ave. However, it would limit access to these properties, and could result in longer vehicle traffic back-ups, or "queuing," along 32nd Ave and Harrison St.

Even with all of these changes, the bikeway would not qualify as a neighborhood greenway facility, given the speed and volume of traffic through the intersection. The large size and busy nature of the intersection make it inherently uncomfortable for many people on bikes, even if physical separation from traffic is achieved.

The intersection of Harrison St poses unique challenges for the bikeway, whether it continues as a two-way bike facility (shared use path) on one side of the street north and south of the intersection, or transitions from two-way to one-way bike facilities on either side of the street north and south of the intersection. With a two-way bike facility, a bike signal (a traffic signal specifically for bikes) would be recommended at the intersection to provide a way for bikes to cross exclusive of conflicting vehicle turning movements. A restriction on right turns on red would also be necessary for the southbound-to-westbound vehicle turning movement. Expanding the intersection and subsequent traffic signal modifications would have significant impacts on the operations of the intersection, limiting the amount of green light time for all modes.

These bikeway transitions would need to be designed in a way that minimizes complex transitions for bikes, minimizes impacts on traffic operations for all modes, and capitalizes on the route opportunities with respect to amount of physical space available. For example, it may be possible to instead route bikes exclusively on the east side of 32nd Ave south of Harrison St, but transitions to and from that bike facility complicate the intersection operations, require additional storage space at the intersection, reduce parking capacity on the City property at the southeast corner of the intersection, and add an additional crossing when connecting to Monroe St and Oak St further south.

While the segment of the bikeway route on 32nd Ave south of Llewellyn St presents many major implementation challenges, a bikeway on 32nd Ave would be very beneficial for connecting people directly to businesses and transit. In an area that will include many more people in the future, this option would be the most intuitive and visible.

Figure 6: Option 2 Map

BIKEWAY ROUTE OPTION 2

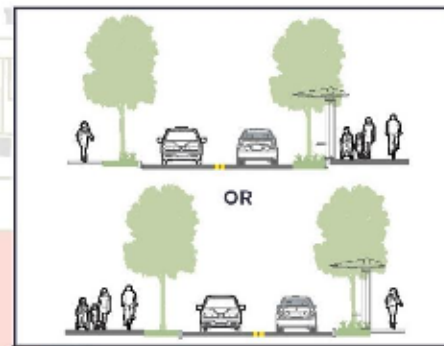
CENTRAL MILWAUKIE
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 - Bus Stop
- **Hash marks indicate multiple options exist in these locations

32nd Ave/Llewellyn
Shared-use path transitions to neighborhood greenway or shared-use path on the north side of Llewellyn. Enhanced crossing(s) needed at Meek/32nd and/or Llewellyn/32nd.



Data Source: City of Milwaukie, Metro IR 15
Map Created: November 2023



Meek St/32nd Ave
Neighborhood greenway on Meek St transitions to shared-use path on east or west side of 32nd Ave.

Llewellyn St
Bike facility to be determined by projected vehicle volumes. Additional options include driveway access and/or vehicle circulation improvements.

34th Ave/Harrison St
Neighborhood greenway on 34th Ave continues through Harrison St with enhanced crossing. Westbound bus stop relocated to far side of 34th Ave for increased visibility.

Water Treatment Facility
City owned property with driveway access on both 34th Ave and Railroad Ave



Bikeway Route Option 2

Bikeway Route Option 2 (Figure 6) emerged as an alternative to the Base Case Option and Option 1 to avoid the physical constraints of the crossing of Harrison St at either the railroad tracks or 32nd Ave. The intent is to utilize less stressful streets to carry people on bikes between 29th Ave and Oak St/Monroe St. This idea is based on the principles of a “Neighborhood Greenway” or “Bike Boulevard,” where routes can be more indirect but avoid major intersections and roadways with higher vehicle travel speeds and volumes. These types of bike facilities are especially attractive to families as well as to bike riders of all ages and abilities. Interestingly, the difference in out-of-direction travel distance between Option 2 and Option 1 could be about 250ft, making the travel distance of Option 2 about one city block further than Option 1.

Description:

From the North, Route Option 2 picks up at Meek St after passing through the Hillside development site. Similar to Option 1, the likely bike facility along Meek St would be a shared use path, or physically separated bike lane. This could be either be one-way bike lanes on both sides of Meek St or a combined two-way separated bike lane on one side of the street (the north side of the street is more advantageous in this option).

The bikeway then transitions to 32nd Ave. As noted in Option 1, the segment along 32nd Ave is most complicated, due to the higher volumes of vehicles on the roadway and constrained curb-to-curb space. 32nd Ave is currently too wide to encourage slower driving speeds, but too narrow to fit a protected bike lane with physical separation. Even for the one-block stretch between Meek St and Llewellyn St, the design will need to consider existing and expected behaviors for people walking, biking, taking transit, and driving. In addition, vehicle turning movements, crossing locations and treatments, and the bus stop location will all need to be taken into account. Lastly, the design will need to respond to the actual physical space available to construct bike facilities. Many of these factors are inter-related.

In this route option, a shared-use path is proposed on either the west or east side of 32nd Ave. The project team considered these choices as mutually exclusive because of the need to minimize the number of locations where a crossing of this busy street would be enhanced with a Rectangular Rapid Flashing Beacon (RRFB).

West Path Option:

- **Path location:** A shared use path on the west side of the street would be a viable option if the ROW is expanded during the redevelopment of the Murphy site. The Murphy site development team has agreed to provide a west-side pathway when the property develops. With a stormwater or utility easement along the street frontage, for example, a wide path could be constructed.
- **Crossing location:** The northern leg of the intersection at Llewellyn Street would be a viable crossing location, as the southern leg of the intersection would be too close to the traffic signal at Harrison St to install an RRFB and would not be allowed per Clackamas County policy. This crossing would provide a safe transition from two-way bike operations on the path to one- or two-way bike facilities on Llewellyn street. The same is true for the two-way operations transitioning to and from Meek St.

East Path Option:

- **Path location:** A shared-use path on the east side of the street would be possible by removing some trees and plantings in the buffered areas on both sides of the existing sidewalk. This would require an easement on the Providence Hospital property, since the ROW line ends at the back of the sidewalk; the existing buffer between the sidewalk and adjacent parking lot is on Providence Hospital property. The existing bus stop on this side of the street would also likely need to be relocated a bit further to the north to create space for bus passenger access. The transition from a two-way shared-use path to one- or two-way bike facilities on Meek and Llewellyn will be important.

- Crossing location:** The enhanced RRFB crossing of 32nd Ave would be at the northern leg of the intersection with Meek St. There are two reasons for this: 1) to avoid conflicting with the high levels of northbound left turns from 32nd Ave to Meek St that are anticipated at the main entrance to the Hillside development site and 2) to align closer to the location of the existing median refuge island, bus stop, and Providence Hospital Healing Place building entrance.

Along Llewellyn St, the bikeway on 32nd Ave would be dealing with lower traffic volumes than on 32nd Ave. Today, Llewellyn is a relatively calm, quiet residential street, with some traffic entering the Providence Hospital campus via the southern parking lot entrance. However, Providence Hospital has near-term plans to redevelop another parcel on Llewellyn St as a senior care facility. This property will increase traffic, and early indications suggest that there will also be a passenger pick and drop off area along the building frontage. This expected increase in traffic on Llewellyn St would warrant a more protected physically separated bikeway, such as a shared use path to reduce potential conflicts with vehicles. There may be an opportunity to require improvements for bikes along the north side of the street as a part of this development proposal.

From Llewellyn St, the bikeway would then turn down 34th Ave, which would remain a fairly calm residential street. Shared lane markings in both directions would be the most likely bikeway treatment along this block. A new enhanced marked crossing would be provided across Harrison St at 34th Ave. The enhancements could include an RRFB and median refuge island to help people crossing the street. Speed humps and parking restrictions could slow vehicles approaching the crossing. Although this location only features one travel lane in each direction of traffic, the street is wide enough that it shares some of the same challenges associated with multiple lane roadways, namely, the multiple-lane threat. A multiple-lane threat occurs when vehicles in an adjacent lane continue around a bus or other vehicle that has stopped for pedestrians crossing the street. Due to restricted visibility, the pedestrian cannot see oncoming cars in the adjacent lane, nor can vehicle drivers see the pedestrians in the crossing. This often results in vehicle-pedestrian collisions. Relocation of the westbound bus stop to the far side of the intersection (on the NW corner) would eliminate the multiple-lane threat and ensure that pedestrians crossing the street are visible to oncoming traffic, and vice versa.

The shared bikeway would continue south of Harrison along this block of 34th Ave until it reaches the end of the existing cul-de-sac, at the driveway to the City's water treatment plant property. At this location there is potential for a pathway connection through the City's water treatment facility site at the south end of 34th Ave. There is enough space for a pathway through the site to connect 34th Ave directly to the existing marked crossing at Monroe St/Oak St. This improvement would require relocating fencing and driveway access. At this point, the pathway would utilize the existing crossing to connect to the southside of Railroad Ave/Monroe St where the two-way bikeway will be developed as a part of the future Monroe St Greenway.

Feasibility Considerations

The West Path option (crossing 32nd Ave at Llewellyn St) would take advantage of an agreement with the Murphy site developers but would not work well for transit users, due to the current location of the northbound bus stop on the east side of the street. People coming or going to/from the bus stop and other locations farther north on the east side of the street are not likely to walk down to the crossing at Llewellyn to cross the street and then back up 32nd Ave. They will likely cross at the most direct line of sight, whether there is a crossing there or not.

The challenge with the East Path option is that there is less available ROW on the east side of the street requiring coordination with Providence Hospital and TriMet. When a dedicated northbound turn lane is added on 32nd Ave at Meek St for the Hillside property, the available ROW space will be further reduced. A property easement with Providence Hospital would likely be needed to acquire enough space between the back of sidewalk sidewalk and the parking lot to widen the pathway. The existing bus stop will likely need to be relocated a bit further north of its current location to provide sufficient clearances in and around the bus stop area.

The crossing at Harrison St and 34th Ave would need to address existing speeding by vehicles on this section of Harrison St. The westbound direction of travel is characterized by a slight downhill approach to this intersection where vehicles are known to exceed the speed limit, so traffic calming in this area will be important. Fortunately, sight lines and visibility at this location are fairly good. Additional crossing enhancement such as curb extensions or a center median refuge, could help to narrow the roadway, enhance visibility of people walking and biking, and reduce vehicle speeds.

Key Issues and Considerations

Route Safety and Comfort

- Route safety and comfort are critical considerations in the design of the facilities as well as in whether people will use them as intended, and whether this will result in increased ridership over time.
- Physical separation is key along higher volume, higher speed roadways, and the more that can be done to separate people walking and rolling from vehicle traffic, the more they are likely to feel safe and comfortable.
- Physical separation in the case of an overcrossing/tunnel (Base Case) can also have a negative effect on the access to certain locations such as businesses, and can create a sense of isolation or security in enclosed spaces with limited access/egress.
- Despite being a bit less direct, neighborhood greenways (Option 2) utilizing lower volume, lower speed roadways can provide a comfortable alternative to protected bikeways on busier streets, despite being a bit less direct, if crossings and transitions are designed correctly.
- Despite all efforts to slow traffic and separate vehicles, the degree of congestion and exposure at intersections can still feel uncomfortable to some users. Certain bike riders and pedestrians may still feel reluctant to cross at the intersection of 32nd Ave and Harrison St, even with the intersection improvements assumed as a part of Option 1.

Route Directness (Connectivity *through* the area)

- People on bikes are likely to want to make connections to points beyond the immediate project area, so it is important to consider the directness of the route. This measure of distance allows us to estimate how much faster or how much more convenient the route would be for people that may not be beginning and/or ending their trip in the area.
- It is also important to consider travel time, since distance alone may not be the most reliable measure of convenience. A more direct, shorter-distance route may often involve longer waiting times at traffic signals, rail crossings, and unsignalized intersections.
- The Base Case Option and Option 1 are slightly shorter travel distances than Option 2, however, the difference in distance may be less important than the difference in travel time. The Base Case Option and Option 1 would involve a crossing of Harrison St at a traffic signal, whereas Option 2 would utilize a Rectangular Rapid Flashing Beacon (RRFB), which is a user-activated beacon that is triggered when there is a person waiting to cross.

Access to Destinations (Connectivity *to* the area)

- As the key properties develop and more people live, work, and visit the destinations in the area, the need for safe and comfortable access in and around the intersection of 32nd Ave and Harrison St will only continue to grow. Option 1 provides the best, most direct access to the businesses and properties in this area but would require significant improvements along 32nd Ave at the 32nd Ave and Harrison St intersection (perhaps including property acquisition) and would also likely impact traffic operations (vehicle delay).
- Option 2 takes people on bikes along 32nd Ave for one block, within one block of the main intersection and key businesses.
- The Base Case Option along the railroad would more or less serve to bypass the district entirely, especially if an overcrossing or undercrossing were constructed.

Alignment with Development Plans (Uncertainty of development patterns and intersection/roadway improvements)

- Various development projects are underway in the Central Milwaukie area; however, they are all at various stages of development. The Hillside property north of Meek St is the furthest along, with clear plans for streets and buildings. The Providence Hospital development at Llewellyn St and 34th Ave has shared a proposed site plan and a

concept for vehicle access and circulation. The Murphy development site plan is the most uncertain, with no specific plan for streets, buildings, or vehicle parking/circulation. The timeline for development is likely to follow that order (Hillside, Providence, Murphy).

- The Murphy and Hillside developments are both likely to impact traffic demand and operations along 32nd Ave and at the intersection of 32nd Ave and Harrison St. These impacts cannot be fully understood until more traffic impact studies are conducted.
- This means that sections of the project relying on/impacting the Murphy site (Base Case Option) have quite a bit more uncertainty with regard to feasibility, and are more likely to take a longer time to construct.
- Sections of the project along 32nd Ave may be subject to opportunities and/or constraints with the roadway, depending on what capacity and safety improvements are needed as a result of development impacts, such as induced traffic demand.
- Projects along Meek St and Llewellyn St will need to consider the expected increase in vehicle traffic and congestion along these streets.

Feasibility

- Project Phasing
 - The intent of this project is to identify a preferred route option that can be constructed in the nearer-term future to resolve a connectivity issue that has been identified previously in several past city-wide planning efforts. When the Hillside site redevelops, the need to route bicycles safely through Central Milwaukie will immediately become more urgent. Therefore, the City needs to identify a safe route that can somehow be developed and publicized quickly.
 - It is probable that the route options that are not selected as a part of this process may be further investigated, designed, and constructed as new opportunities arise in the further in the future. The project team is considering how various stages of implementation may factor into the project being built over time.
- Developer requirements – With new development, the City can require improvements along property lines and frontages where a sidewalk, path, or bike facility could benefit building residents, visitors, and the general public.
 - In all route options, there is the opportunity to provide a shared use path on the west side of 32nd Ave along the Murphy property frontage.
 - In the Base Case Option, requirements to provide bike and pedestrian connections along the northern side of Llewellyn St when the Providence Hospital site develops can ensure that the bikeway provides a comfortable and consistent facility as traffic increases.

Project Cost

The costs of improvements needed across the three route options vary by orders of magnitude. For example, for the crossing of Harrison St, one of the most complex and potentially costly route connections, the costs for adding new marked crosswalks, curb ramps, RRFBs, and a median refuge (Option 2, around \$170,000) will be substantially less expensive than installing a new full traffic signal (Base Case Option at-grade crossing, +\$300,000), which is in turn dramatically less expensive than constructing overcrossings or undercrossings (Base Case Option grade-separated crossing, +\$10 million), which is potentially less expensive than reconstructing the intersection of 32nd Ave and Harrison St and acquiring private property (Option 1). That said, Options 1 and 2 may also have substantial costs associated with shared use path construction due to the need to separate bikes and pedestrians from vehicle traffic along busier streets.

- Property acquisition, and/or property easements – It will likely be necessary to negotiate an easement for paths proposed in all three options (where improvements are not required as a condition of new development). Acquiring ROW through property acquisition is a significantly more expensive and time-intensive proposition than an easement to achieve the same means, but property acquisition may be necessary if an easement is not possible.

Alternatives Analysis and Results

In this section, the three route concepts are presented alongside an assessment of their respective advantages and disadvantages. Each concept design was shown above on a map with select design considerations highlighted for the reader. The accompanying descriptions expand on these considerations in greater detail. The project planning team evaluated these opportunities and constraints, issues, considerations, and trade-offs between route options in a Route Evaluation Matrix to develop a recommendation for a preferred route below.

Base Case Option Opportunities

- The most direct route *through* the area.
- Potential separation of modes through the Murphy site (i.e., dedicated path).
- Avoids potential traffic conflicts on 32nd Ave.

Constraints

- Does not provide direct access to commercial services in the project area.
- It will be very difficult (costly, slow, and/or possibly infeasible) to gain approval from UPRR and ODOT to establish an at-grade crossing adjacent to the rail and so close to the state highway.
- It will be extremely expensive, and slow to construct an overcrossing or undercrossing at this location.
- Without a plan for development of the Murphy site, it is hard to prioritize this over other options.
- While it may be an ideal solution in the long term, the Base Case Option does not appear to be feasible as a near-term solution due to likely permitting difficulties and uncertainty surrounding the nature and timeline of the Murphy site development, the Base Case Option does not appear to be feasible as a near-term solution.
- It would not be possible to both phase this project in a way that would align with development plans for the Murphy site *and* provide a near-term solution. Project timelines would be contingent on developer agreement, development schedules, and funding. Near-term alternatives would be to direct bike riders along the routes proposed in Options 1 or 2.

Option 1

Opportunities

- Offers the most direct route *through* the area.
- Provides direct access *to* destinations and commercial services in the project area.
- There is potential to align a phased bicycle facility with the development of the Murphy site, to include improvements to the west side of 32nd Ave between Meek St and Llewellyn St. Additionally, there is an opportunity to underground the existing utility poles along the west side of 32nd Ave in conjunction with the development of the Murphy site.

Constraints

- Major traffic conflicts and safety concerns along 32nd Ave and at the 32nd Ave/Harrison St intersection.
- Waiting time at the signal at 32nd Ave and Harrison St adds to travel time.

- Narrow ROW along 32nd Ave between Llewellyn St and Harrison St precludes a separated bicycle facility within existing curb-to-curb space.
- This option would impact adjacent properties along 32nd Ave. The available ROW along the frontage of Kimmy's Market and Purdy's Service Center is severely constrained; roadway improvements would likely impact existing structures. These properties are not a part of the Murphy site redevelopment.
- Lacking more information about the Murphy development plan, it is hard to anticipate traffic impacts in this immediate area and the corresponding need for roadway expansion and intersection improvements/reconstruction.
- Bike facility design details would need to consider transitions across the intersection from one-way to two-way operations or vice versa. This will require more physical space and will impact traffic signal operations and increase delay for all modes.
- It would not be difficult to phase this project in a way that would provide a safe and comfortable bike facility on 32nd Ave, minimize impacts to adjacent businesses, *and* provide a near-term solution. Full project build out would be contingent on property acquisition, developer agreement, and traffic impact studies for the Murphy development site. A near-term alternative would be to direct bike riders along the routes proposed in Option 2.
-

Option 2

Opportunities

- Takes advantage of calmer lower-speed, lower-volume streets (e.g., "Neighborhood Greenway" or Bike Boulevard streets) *through* the area.
- Location of the route's southern terminus at Oak St makes it close in actual distance to the other route options. Although Option 2 would be longer than Option 1 by about 250 feet (about the length of an average city block), waiting time at the signal at 32nd Ave and Harrison St may actually make the travel time for Option 2 shorter.
- Provides access close to destinations and commercial services in the project area.
- Opportunity to improve safety and access around TriMet bus stops.
- Opportunity to improve site circulation on existing lower volume streets.
- Opportunity to require bike and pedestrian improvements with Providence Hospital site development
- Add another safe crossing of Harrison St at 34th Ave.
- Takes advantage of City property and public ROW at water treatment facility to create a new walking and biking connection to Oak St.
- Overall, this route option presents the lowest cost, and nearest term low-stress bike solution for full build out of a functional route. Phasing individual segments of this route would be simpler than the phasing potentials for the Base Case Option and Option 1. The Providence Hospital development along Llewellyn St does introduce some specific longer-term design considerations, but a shared-lane facility could be implemented along Llewellyn St in the near term.

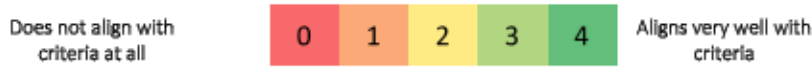
Constraints

- Slightly more circuitous route *through* the area. This route is approximately 250 ft longer in travel distance than Option 1 (Note that travel times may still be faster than other options depending on intersection delay in Option 1, or overcrossing/tunnel ramp lengths in the Base Case Option).
- Transition between Llewellyn St and Meek St along 32nd Ave will require careful design for shared use path, crossing locations, on- and off-street transitions, and bus stop access.
- Constrained ROW on the east side of 32nd Ave may require property acquisition or an easement to fit a shared-use path to meet demand.
- Llewellyn St and Meek St are likely to become busier due to property development, necessitating some degree of physical separation for bikes on these streets.
- Bus stop relocation will be necessary at Harrison St and 34th Ave.

- Traffic calming is needed near the intersection of Harrison St and 34th Ave, specifically with the westbound approach due to its location near the bottom of the hill and subsequent vehicle speeds.

Table 3. Route Options Matrix

Evaluation Key:



Criteria	Traffic Safety (Exposure to vehicle traffic and potential conflicts)	Route Comfort (How stressful is the route and crossings)	Route Directness (through the area)	Access to Destinations in Project Area	Alignment with Development Plans of Key Properties (Property Impacts)	Feasibility (Related to Approvals Process, and/or Regulatory Constraints)	Cost	Overall Score
Base Case	4	4	4	1	0	0	1	2.0
Option 1	2	2	3	4	1	1	0	1.9
Option 2	3	4	2	3	3	4	3	3.1

Explanation of Scoring and Route Assumptions

The Base Case Option assumes a grade-separated overcrossing or undercrossing due to the low likelihood of approval from UPRR and ODOT for an at-grade street-level crossing improvement so close to the railroad tracks.

Option 1 assumes a full intersection reconstruction at the intersection of 32nd Ave and Harrison St as well as ROW acquisition at adjacent properties to accommodate protected bike facilities at the intersection and along 32nd Ave/Railroad Ave.

Option 2 assumes development of an off-street connection across the City-owned water treatment facility between 34th Ave and Oak St.

Quantitative scores assigned to each criterion are intended as ranked measures of each route option relative to the other route options. Scores do not reflect the actual magnitude of the criterion for each route.

Traffic Safety

The Base Case Option would provide the most protection of users from vehicle traffic when crossing Harrison. By virtue of using some lower-traffic neighborhood streets, Option 2 provides the next best level of comfort users in a calmer, less busy shared street environment. Option 1 is centered on 32nd Ave, where even physical separation from vehicle traffic may still be stressful for some people riding bikes due to the large and complicated intersection with Harrison St,

Route Comfort

The Base Case Option and Option 2 are both low-stress routes with more comfortable crossings of Harrison St than Option 1.

Route Directness

The Base Case Option provides perhaps the shortest path of travel of the option. Route 1 provides a slightly longer path of travel. Route 2 provides the longest path of travel. The difference in travel distance between Route 1 and Route 2 is about 250 ft, or one city block. Travel times may vary depending on the delay at the intersection of 32nd Ave/Harrison St in Option 1, the need for switchback ramps, or elevator wait times in the Base Case Option, and driver stop compliance at the RRFB at 34th Ave and Harrison St in Option 2.

Access to Destinations

The Base Case Option does not provide direct access to most of the properties along the commercial core at 32nd Ave and Harrison St. Option 1 provides the most direct access to the businesses at the intersection. Option 2 provides a moderate degree of access to businesses north of Harrison St.

Alignment with Development Plans

The Base Case Option and Option 1 are much more difficult due to the high degree of uncertainty with the Murphy site development plans, including future traffic impacts at the 32nd Ave/Harrison St intersection. Option 2 is subject to the Providence Hospital development along Llewellyn St but unlike the Base Case Option and Option 1, Option 2 can be implemented in a phased approach that would provide for a complete, functional route in the near term without sacrificing safety and comfort.

Feasibility

Feasibility relates to constructability and cost, regulatory steps and approvals, development and property impacts, and project readiness (phasing potential) as described above. All options involve some development and property impacts, but the Base Case Option and Option 1 involve significantly more feasibility considerations with regard to construction complexity, UPRR and ODOT approvals, and project timelines and funding.

Cost

Project costs among the route options vary widely, with Option 2 having significantly lower costs than the high impact designs of the Base Case Option and Option 1. Again, this consideration factored in a minimum facility design standard for safety and comfort.

Preferred Route

The Route Evaluation Matrix resulted in Route Option 2 showing the highest overall score. All routes were assessed for potential bike facility types that would result in the highest and best levels of safety and comfort. This established a basis for comparison of the routes across the other evaluation criteria, including project feasibility and cost. In addition to being significantly more feasible in the near term, more cost-effective, and more conducive to development realities when compared to the Base Case Option and Option 1, Option 2 also ranked fairly well across the other evaluation criteria.

One of the biggest drawbacks and criticisms of Option 2 is that it requires more out-of-direction travel than the other options. While this is technically true, the actual difference in distance between Options 1 and 2 amounts to only about a typical city block length. Wayfinding signage and markings will be important to ensure that the route is clear and intuitive. Furthermore, the other important aspect of directness that is often overlooked is travel time. When delay at the traffic signal at 32nd Ave and Harrison (Option 1) is factored in, or the time, distance, and effort it takes to climb ramps for an overcrossing or undercrossing (Base Case Option) is considered, Option 2 may actually be just as fast, if not faster than these other options when considering the entire route.

Given the complexity and uncertainty of development patterns in the area, Option 2 offers the most confidence in implementing a near-term solution that is also adaptable to future changes. Facilities along Llewellyn St where Providence Hospital has near-term development plans can be upgraded with relatively little constraint on construction programs or disruption to traffic operations. Furthermore, investing in Option 2 would not preclude the development of the Base Case Option or Option 1 if opportunities to fund and construct them arise in the future. Indeed, the City should continue to assess opportunities to advance the Base Case Option or Option 1 as development in the area unfolds.

Preferred Route Cost Estimate

A planning-level cost estimate was prepared for Option 2 as the preferred option with the most certainty in terms of feasibility and project phasing. The estimate assumes the following major design elements with Option 2:

- Enhanced bike and pedestrian crossing treatments including: marked crosswalks, curb ramps, RRFBs and median refuge islands at crossings of 32nd Ave and Harrison St
- a shared use path on the east side of 32nd Ave between Meek St and Llewellyn St pending an easement agreement with Providence Hospital
- 2-way shared use paths on the north side of Meek St and Llewellyn St, and
- a shared use path on the City water treatment facility site

Table 3 below summarizes the planning level costs associated with the concept design elements of Option 2.

Table 3. Route Option 2 Planning-level Cost Estimate

DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST	NOTES
29th Ave - Redevelopment Area (Hillside site)	900	LF	\$0	\$0	Costs paid by developer
Meek St - Shared Use Path	500	LF	\$190	\$95,000	Shared-use path, landscaping, demo
32nd Ave - East Side	325	LF	\$268	\$87,000	Shared-use path, landscaping, grading, demo (does not include any easement costs)
32nd Ave Crossing at Meek	1	LS	\$95,000	\$95,000	RRFB, median refuge, ADA ramps, signage, pavement markings, demo
Llewellyn St – Shared-Use Path along existing parking lot of Providence Hospital	200	LF	\$250	\$50,000	Path, landscaping, grading, demo (does not include any easement costs)
Llewellyn St – Shared-Use Path at Providence Hospital Redevelopment Site	300	LF	\$0	\$0	Costs paid by developer
34th Ave - Neighborhood Greenway	500	LF	\$20	\$10,000	Signage, pavement markings
Harrison St Crossing at 34th Ave	1	LS	\$95,000	\$95,000	RRFB, ADA ramps, signage, pavement markings, demo
Connection at City Water Treatment Facility	325	LF	\$180	\$59,000	Shared use path, landscaping, demo
Total Construction Cost				\$491,000	
40% Soft Costs (Design, Construction Management, etc)				\$196,000	
40% Contingency:				\$196,000	
Total Project Cost				\$883,000	

Key: LF = lineal foot; LS = lump sum; demo = demolition of existing features as needed