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# VAN AKEN BIKEWAY PLAN

## Urban Bike Facilities

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Prepared for the City of Shaker Heights by  
Toole Design, LLC and WSP USA, Inc.

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# CONTENTS

<b>Introduction</b>	<b>3</b>
<b>Existing Conditions</b>	<b>5</b>
City Demographics	5
City Vision Statement and Goals	6
Active Transportation	6
Traffic Counts	7
Parking Utilization	8
Existing Street Cross Sections	13
Existing Bicycle Network Connectivity	14
Existing Transit Routes	15
Summary of Relevant Recommendations from Previous Plans	15
<b>Feasibility Analysis</b>	<b>19</b>
<b>Feasibility Analysis</b>	<b>20</b>
Design Alternatives from Farnsleigh Road to Parkland Drive/Lynnfield Road	20
Design Alternatives from Parkland Drive/Lynnfield Road to Lee Road	30
Screened Out Alternatives	33
<b>Summary</b>	<b>34</b>
<b>Best Practices and Key Recommendations</b>	<b>38</b>
Bikeway Type	38
Wayfinding	39
Amenities	40
Pavement Markings and Signage	40
<b>Community Engagement</b>	<b>44</b>
Virtual Public Meeting (February 1)	44
Market Hall Open House (February 8)	45
Online Survey (February 2 – March 1)	47
St. Dominic Open House (April 13)	50
Walk/Bike Audit (April 18)	51
<b>Concept Design</b>	<b>53</b>
Buffered/Separated Bike Lanes	53
Existing and Proposed Cross Sections	53
Renderings	55
Intersection design	56
<b>Appendix</b>	<b>57</b>

# INTRODUCTION

The Van Aken Bikeway Plan explains the process of creating a concept design for a bicycle facility on Van Aken Boulevard in Shaker Heights, Ohio. The goal of this project is to connect the Lee Road corridor to the Van Aken District with a bicycle facility that is comfortable for people of all ages and abilities. The final recommendation outlined in this plan is a buffered/separated bike lane with vertical elements at intersections. This document explains the existing conditions that were studied, the design alternatives that were considered, the industry best practices that are recommended, and the community feedback that informed the design. The final chapter of this report explains the recommended concept design in greater detail.

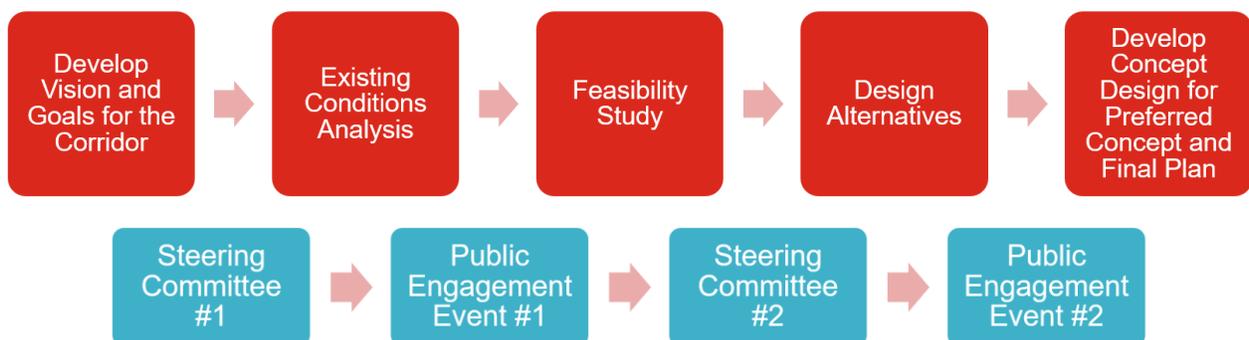
## PROJECT BACKGROUND

The City of Shaker Heights adopted the *Strategic Investment Plan* in 2000, which laid the framework for several of the more recent changes around Shaker Heights, including the development of the Van Aken District. Located in the southeastern region of Shaker Heights, the Van Aken District is a mixed-use and vibrant downtown, with restaurants, shops, and plans for new apartments. The *Strategic Investment Plan* also recommended changes in the Chagrin-Lee area that have resulted in new commercial and residential developments. After its construction, community concerns arose surrounding pedestrian and bicyclist access to the Van Aken District. In 2016, the *Van Aken District Connections Plan* began to study possible routes to the district for people walking and biking. The recommendation from this plan was to construct an off-road walking and bicycling path on Van Aken Boulevard. This Van Aken Bikeway Plan studied the corridor in greater detail to determine the feasibility of an off-road path, as well as the feasibility of other design options, including on-street bicycle facilities.

## PROCESS AND TIMELINE

The planning process for the proposed bicycle facility began in November 2022, and the final plan was completed in May 2023. The project team, which included consultants from Toole Design and WSP as well as City of Shaker Heights staff, began by developing a shared vision and shared goals for the corridor. The project team then assessed the existing conditions and conducted a feasibility study to determine potential design options. Potential design alternatives were evaluated for feasibility, and the feasible designs were evaluated. After this evaluation, a preferred concept design was selected and presented to the community.

This final plan incorporates feedback both from the public and from a steering committee, which was comprised of members selected by the City of Shaker Heights. Both the steering committee and the public were engaged first during the existing conditions analysis and then again during the design alternatives phase. The timeline below shows a summary of the project process.





# **CHAPTER 1**

## **EXISTING CONDITIONS**



# EXISTING CONDITIONS

## CITY DEMOGRAPHICS

In 2021, the City of Shaker Heights, Ohio, located in Cuyahoga County, had a population of roughly 28,970 people<sup>1</sup>. The city is one of Greater Cleveland’s older inner-ring or “first” suburbs, and borders Cleveland, Cleveland Heights, University Heights, Beachwood, Highland Hills, and Warrensville Heights. The city has nine neighborhoods, which were named after the city’s nine original elementary schools<sup>2</sup>. The average median household income is \$88,635<sup>3</sup>. Table 1 below shows the race, ethnicity, and age of Shaker Heights residents as well as household car ownership and commute mode share.

**Table 1. Race, Age, Car Ownership, and Commute Mode Share in Shaker Heights, 2020**

	Category	Percent
<b>Race</b>	White (Not Hispanic or Latino)	<b>53.2%</b>
	Multiracial	<b>4.8%</b>
	Black	<b>33.7%</b>
	Asian	<b>4.4%</b>
	Native American	<b>0.1%</b>
	Native Hawaiian and Other Pacific Islander	<b>0.1%</b>
	Hispanic or Latino	<b>3.2%</b>
<b>Age</b>	< 17	<b>24.8%</b>
	18 - 24	<b>5.7%</b>
	25 - 34	<b>9.2%</b>
	35 - 44	<b>11.9%</b>
	45 - 54	<b>11.7%</b>
	55 - 65	<b>11.5%</b>
	66 and Above	<b>17.8%</b>
<b>Car Ownership by Household</b>	0	<b>4.9%</b>
	1	<b>23.6%</b>
	2	<b>56.6%</b>
	3+	<b>14.8%</b>
<b>Commute Mode Share</b>	Drove alone	<b>75.6%</b>
	Carpooled	<b>4.4%</b>
	Walked	<b>0.4%</b>
	Bicycled	<b>0.4%</b>
	Transit	<b>6.7%</b>
	<b>Other</b>	<b>0.5%</b>

<sup>1</sup> Shaker Heights, Ohio, US Census (2020)

<sup>2</sup> Shaker Neighborhoods, Shaker Online

<sup>3</sup> Shaker Heights, Ohio Profile, Data USA (2020)

## CITY VISION STATEMENT AND GOALS

Shaker Heights prides itself on its natural architectural beauty, superior services, and a dedicated workforce community.

The city vision statement is:

- Shaker Heights is a forward-thinking community defined by its open and welcoming spirit and enlivened by the diversity of its residents, employees and businesses. We are known for unparalleled natural and architectural beauty, superior services, and a dedicated workforce. Shaker Heights is a place of lifelong learning and opportunity for all where new ideas and perspectives keep our community thriving and vital, today and for generations to come.

In order to become a more vibrant city, the city has established the following goals:

- **Superior Response & Service Delivery:** Deliver outstanding services including safety and public works, with targeted modernization of technology, facilities, and infrastructure as Shaker's population, commercial development, and number of residential properties continue to grow.
- **Financial Health & Sustainability:** Responsibly manage and deploy necessary resources to fund strategic priorities and capital budget needs. Increase the tax base by maintaining and increasing high quality housing and commercial development.
- **Greenspaces & Public Spaces:** Maintain the quality of Shaker's beautiful greenspaces and public spaces.
- **Recreation:** Determine the level and type of recreation services and programming based on demand and available resources; deliver quality, accessible programming.
- **Human Capital & Talent:** Attract and retain a diverse resident population and staff who contribute to and benefit from Shaker's welcoming and inclusive culture.
- **Environmental Sustainability:** Educate, advocate for, and support the environmental, economic and social sustainability of the community in partnership with our residents and businesses to meet the needs of our entire community without compromising the resources or well-being of future generations.
- **Quality Housing:** Invest in both new and existing housing to ensure that a diversity of high-quality and well-maintained housing types are available to residents. Encourage both reinvestment in older housing and the growth of additional attractive housing types to meet the needs and desires of current and future residents across a wide spectrum.
- **Economic Development:** Develop and maintain vibrant commercial districts through public/private partnerships and other innovative approaches

## ACTIVE TRANSPORTATION

Toole Design's core belief is designing and building spaces where people can move freely and intuitively. Toole Design prides itself in helping create safe, healthy, and accessible environments for people who walk, bike, and roll and other forms of active transportation.

Active transportation has numerous benefits for people, the community, and the natural and built environment. Shaker Heights believes that in order to ensure the success of the City for future generations, they must evaluate decisions and initiatives through the lens of environmental impact and sustainability. Active transportation can

play a monumental role in creating a successful city that future generations can thrive in. Active transportation can help reduce fuel consumption, thereby reducing vehicle emissions, reduce transport emissions such as local pollution and greenhouse gases, and improve health outcomes for people. By Shaker Heights community members choosing active transportation, such as walking or biking, as their primary form of transportation, future generations will thrive in a healthy, safe, accessible and clean environment.

## TRAFFIC STUDY

Prior to beginning the Van Aken Bikeway Plan and considering repurposing a travel lane, the city hired a traffic engineering consulting firm, GPD Group, to conduct a traffic study to analyze the feasibility of repurposing a lane in either direction of travel on Van Aken Boulevard. GPD Group collected motor vehicle traffic counts on Thursday, December 8, 2022, at the following locations:

- Van Aken Boulevard and Lee Road
- Van Aken Boulevard and Avalon Road / Daleford Road / Dorchester Road
- Van Aken Boulevard / Lynnfield Road / Parkland Drive / Norwood Road
- Van Aken Boulevard / Farnsleigh Road

The traffic counts were used to evaluate whether or not a road diet would be feasible along Van Aken Boulevard (removing one of the two motor vehicle lanes for Van Aken Eastbound and Westbound). Existing (2022) average daily traffic counts were calculated for the street segments from peak hour counts and then estimated for the year 2045 using the Ohio Department of Transportation (ODOT) Traffic Forecast Management System as a reference. This process resulted in an estimated increase of 1.25% per year. The traffic counts by location are shown in Table 2 below for the existing year and estimated for 2045.

**Table 2. Existing 2022 and Estimated 2045 Daily Motor Vehicle Traffic Volumes**

Location	2022 Average Daily Traffic	2045 Estimated Average Daily Traffic
Van Aken Boulevard from Lee Road to Avalon Road	9,400	12,550
Van Aken Boulevard from Avalon Road to Lynnfield Road/Parkland Drive	8,700	11,620
Van Aken Boulevard from Lynnfield Road/Parkland Drive to Farnsleigh Road	10,150	13,550

Using this data, GPD Group conducted intersection capacity analysis using the Highway Capacity Manual (2000) method within *Synchro*, an industry standard program for evaluating traffic operations. The full road diet evaluation document is available in the appendix. Based on this analysis, GPD group provided the following summary of their findings (emphasis added):

“This evaluation of the Van Aken corridor has generally found that **a road diet can be implemented at various intersections along the corridor to accommodate dedicated bike lanes on each side of Van Aken Boulevard**, however, four (4) intersections are anticipated to have certain movements with failing Levels-of-Service if the road diet is implemented. The Van Aken Boulevard / Lee Road intersection is anticipated to operate at a LOS F during the PM peak hour for the WB right movement and the EB left-thru movement once the travel lane is eliminated as part of the road diet. Additionally, the NB, SB and EB movements at the Van Aken Boulevard / Avalon Road / Daleford Road intersection are anticipated to

operate at LOS F during both peak hours. **However, all intersections are anticipated to operate with acceptable overall Levels-of-Service.**<sup>4</sup>

Given this conclusion that bike lanes can be implemented. The Van Aken Bikeway project continued to evaluate the feasibility of removing a motor vehicle travel lane for both directions of travel and including a new bike lane in the remaining space available. It is important to note that the LOS is a measure of delay time at an intersection. A LOS F for certain turning movements can be acceptable when weighed against other operational and safety goals.

## PARKING UTILIZATION

The City of Shaker Heights conducted a parking utilization survey on Van Aken Boulevard between Parkland Drive and Farnsleigh Road for the on-street parking and RTA parking areas. The results indicate there is excess parking capacity in this location both on-street and in the RTA parking areas, with on-street parking usage ranging from 6.5% to 22.6% and RTA parking usage ranging from 27.0% to 52.4%. Detailed results are shown below.

### Parking Survey

Date: 7/29/2022

Time: 9:00am

Westbound:			
	Parked Cars	Capacity	Percent Used
<b>On-Street Parking</b>	12	53	22.6%
<b>RTA Pull-in Parking</b>	51	126	40.5%
<i>Total</i>	63	179	35.2%

Eastbound:			
	Parked Cars	Capacity	Percent Used
<b>On-Street Parking</b>	3	46	6.5%
<b>RTA Pull-in Parking</b>	31	111	27.9%
<i>Total</i>	34	157	21.7%

### Parking Survey

Date: 8/5/2022

Time: 9:00am

Westbound:			
	Parked Cars	Capacity	Percent Used
<b>On-Street Parking</b>	11	53	20.8%
<b>RTA Pull-in Parking</b>	66	126	52.4%
<i>Total</i>	77	179	43.0%

<sup>4</sup> Van Aken Boulevard – Road Diet Evaluation. GPD Group, February 9, 2023.

Eastbound:

	Parked Cars	Capacity	Percent Used
<b>On-Street Parking</b>	5	46	10.9%
<b>RTA Pull-in Parking</b>	35	111	31.5%
<i>Total</i>	40	157	25.5%

### Parking Survey

Date: 8/2/2022

Time: 6:00 pm

Westbound:

	Parked Cars	Capacity	Percent Used
<b>On-Street Parking</b>	13	53	24.5%
<b>RTA Pull-in Parking</b>	54	126	42.9%
<i>Total</i>	67	179	37.4%

Eastbound:

	Parked Cars	Capacity	Percent Used
<b>On-Street Parking</b>	5	46	10.9%
<b>RTA Pull-in Parking</b>	30	111	27.0%
<i>Total</i>	35	157	22.3%

### Parking Survey

Date: 8/9/2022

Time: 6:00 pm

Westbound:

	Parked Cars	Capacity	Percent Used
<b>On-Street Parking</b>	10	53	18.9%
<b>RTA Pull-in Parking</b>	76	126	60.3%
<i>Total</i>	86	179	48.0%

Eastbound:

	Parked Cars	Capacity	Percent Used
<b>On-Street Parking</b>	3	46	6.5%
<b>RTA Pull-in Parking</b>	34	111	30.6%
<i>Total</i>	37	157	23.6%

## RTA Pull-in Parking Counts

	Total Spaces	Breakdown	Head-in Parking	Angled Parking
Westbound	126		78 Regular 5 "72 HR Parking" 4 "Reserved"	50 regular 5 "72 HR Parking" 2 Handicapped 1 Drop Off/Pick Up Only
Eastbound	111		68 Regular 5 "72 HR Parking"	43 regular 5 "72 HR Parking" 3 Handicapped

### Diagram Key

- Reserved Parking
- 72 HR Parking – RTA Riders Only
- Designated Handicapped Parking
- Passenger Pick-Up and Drop-Off Only (Handicapped Accessible)

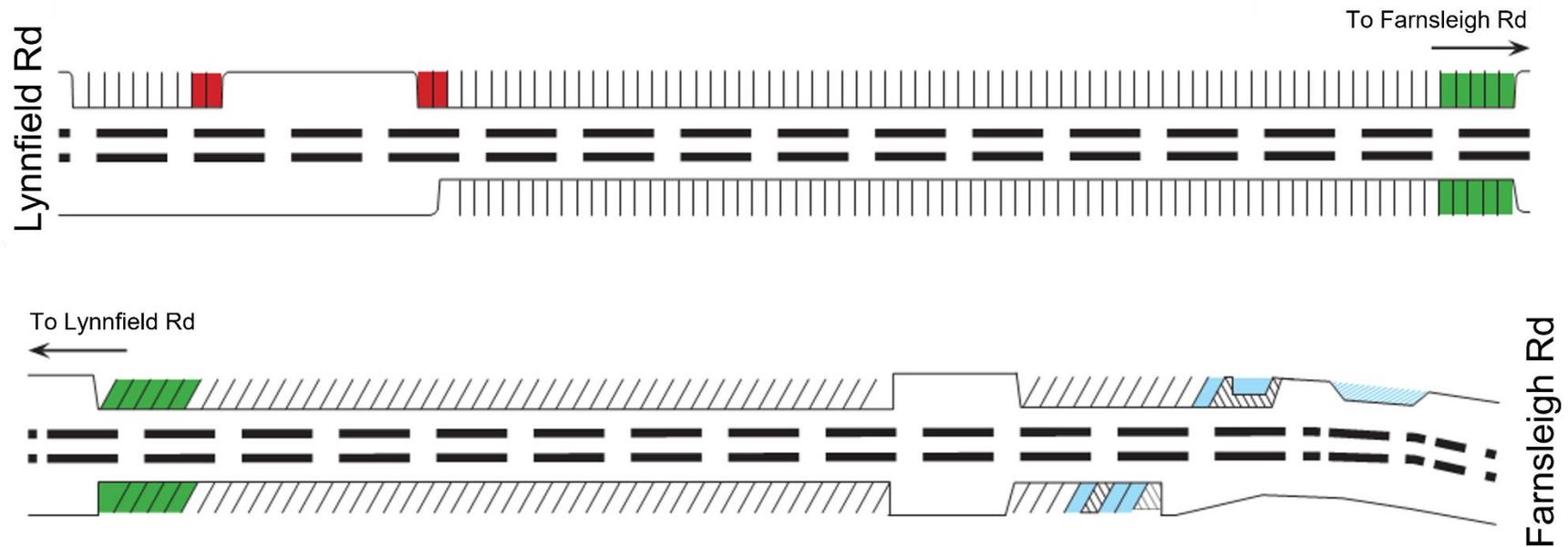
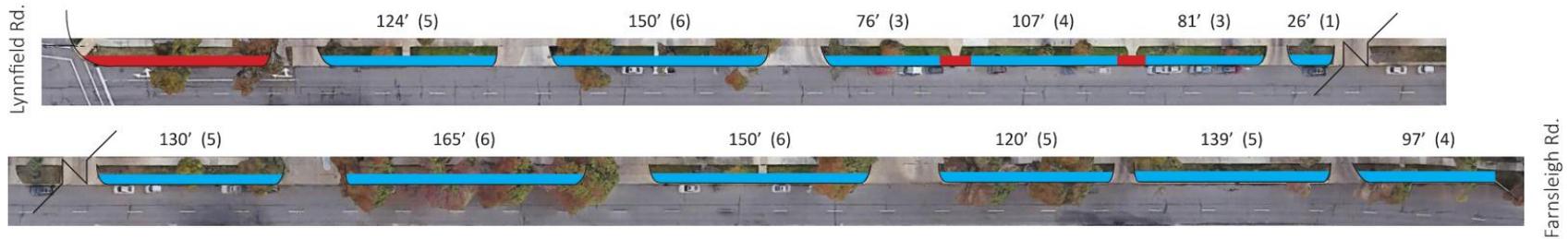


Figure 1: Diagram of RTA On-Street Parking Counts

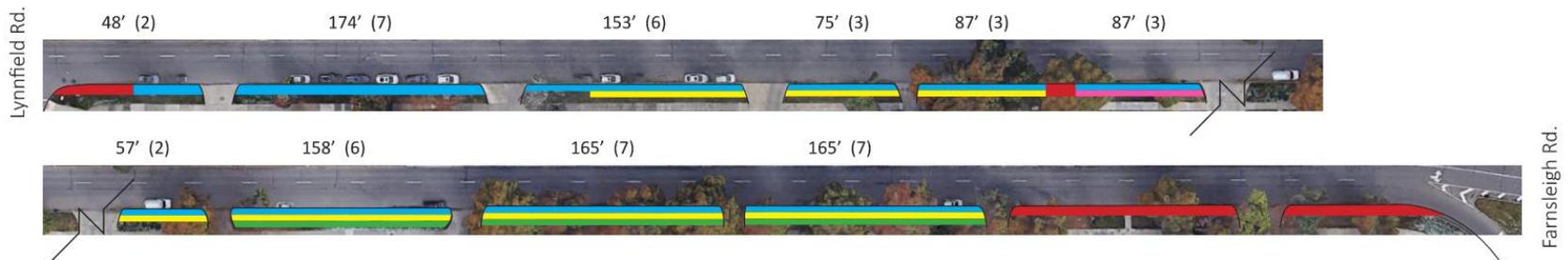
**Diagram Key**

- 2 Hour Parking 9AM- 4PM Weekdays
- No Parking 7AM- 9AM
- No Parking or Stopping 4pm- 6pm Weekdays
- No Parking Any Time
- No Parking or Stopping 7am- 9am & 4pm- 6pm

**Westbound (53)**



**Eastbound (46)**



**Figure 2: Diagrams of On-Street Parking Counts both Westbound and Eastbound**

In addition to the on-street and RTA parking available between Parkland Drive and Farnsleigh Road, there is also on-street parking allowed during off-peak hours in the outside motor vehicle travel lane along Van Aken Boulevard between Lee Road and Parkland Drive. In this location, parking is prohibited on Van Aken Westbound from 7-9 AM on weekdays but is permitted at all other times. On Van Aken Eastbound, parking is prohibited from 4-6 PM on weekdays but permitted all other times.

The past five full years (2017-2021) of bicycle and pedestrian crash data were reviewed to understand existing safety issues. There were crashes at the Lee Road and Farnsleigh Road intersections within the project area. At the Lee Road intersection, there were two pedestrian-involved crashes and one bicyclist-involved crash, both of which did not result in injuries or fatalities. At the Farnsleigh Road intersection there was one bicyclist-involved crash with a minor injury reported for the bicyclist.

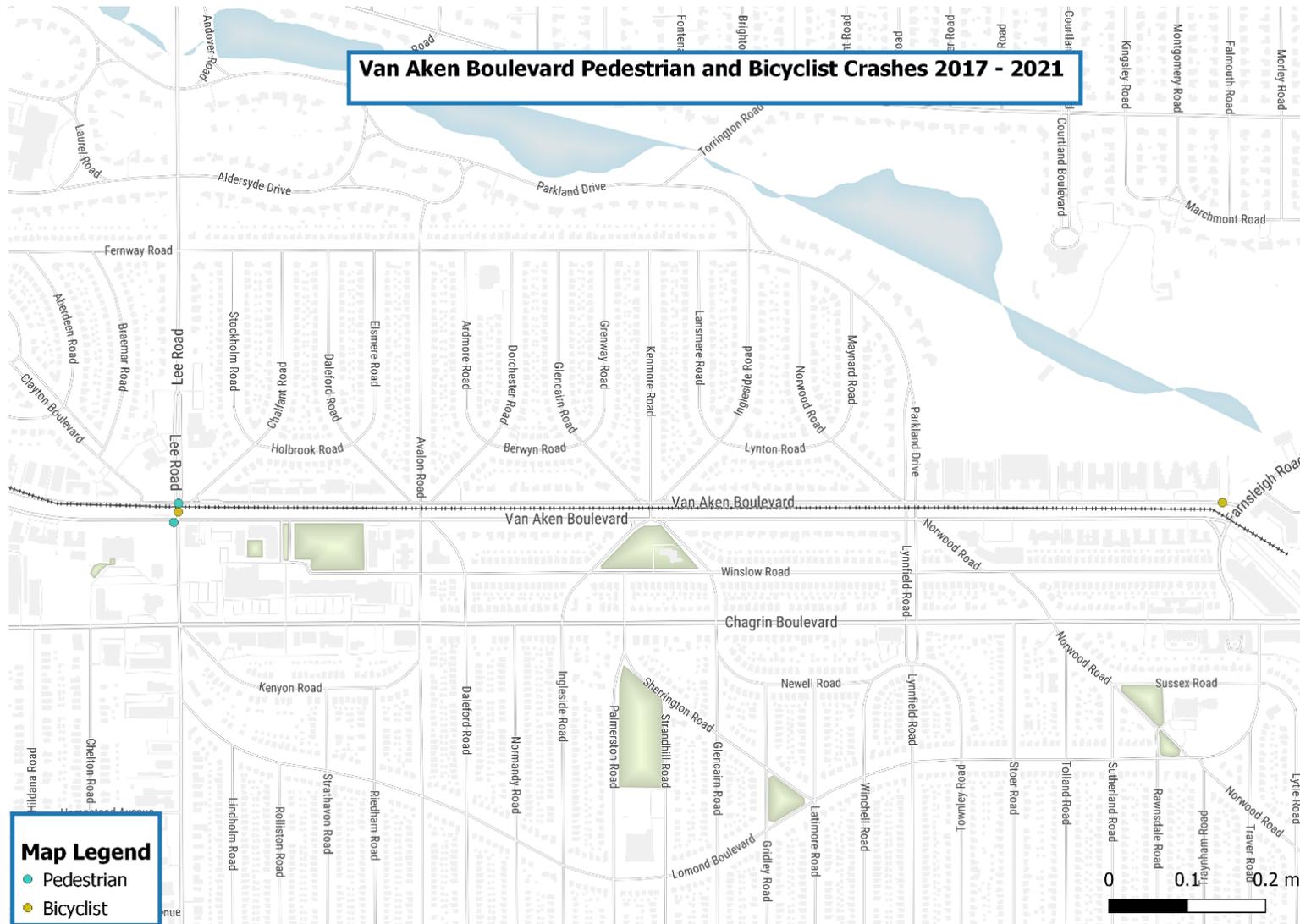
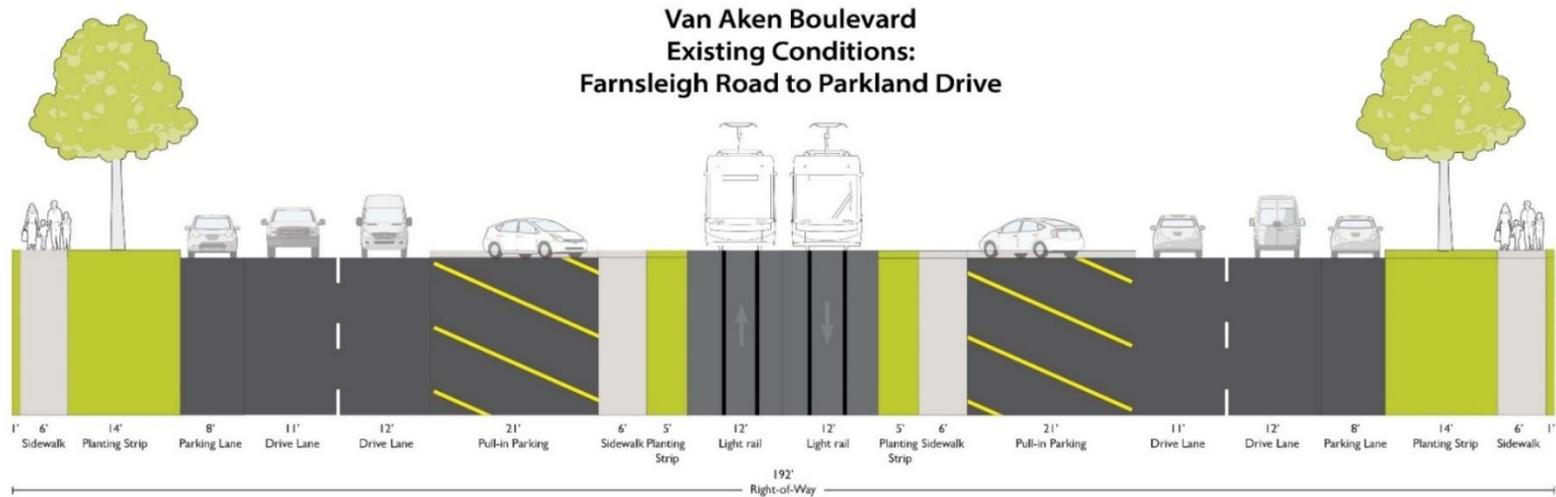


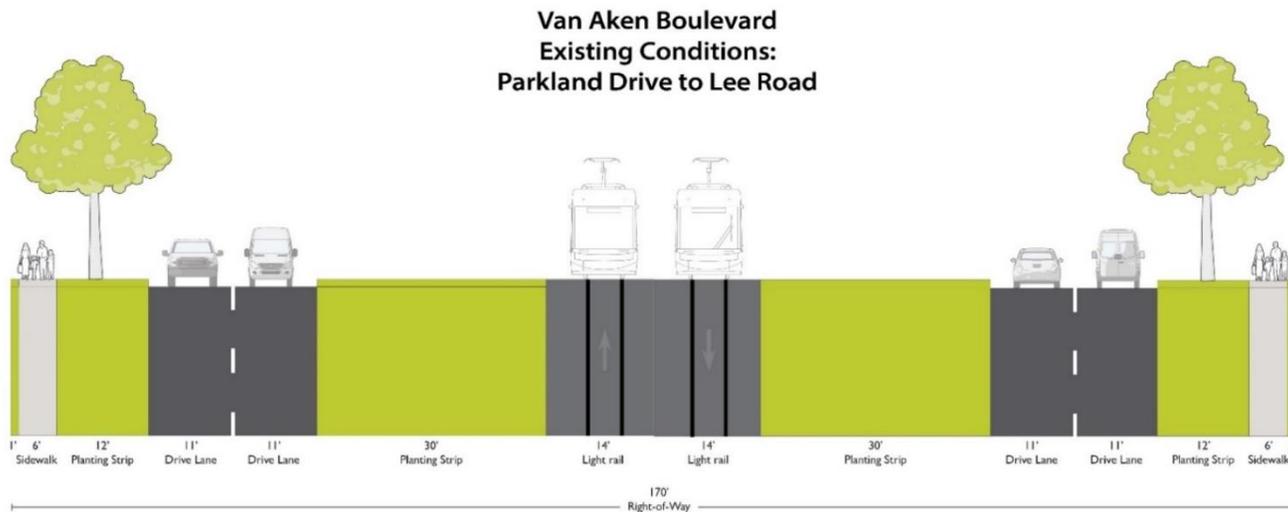
Figure 3: Map of Pedestrian and Bicyclist Crashes between 2017 to 2021

## EXISTING STREET CROSS SECTIONS

The cross-section graphics below show the typical layout and dimensions of travel lanes, parking lanes, sidewalks, and planting areas for the two character areas of Van Aken Boulevard



**Figure 4: From Farnsleigh Road to Parkland Drive, Van Aken Boulevard has two travel lanes and a parking lane in each direction.**



**Figure 5: From Parkland Drive to Lee Road, Van Aken Boulevard has two travel lanes in each direction, with parking allowed in the outer lane.**

# EXISTING BICYCLE NETWORK CONNECTIVITY



Figure 6: Existing bike facilities in the vicinity of Van Aken Boulevard

## EXISTING TRANSIT ROUTES

Three bus routes operate throughout the project corridor. They are the following:

- 14-14A: Kinsman (Downtown Cleveland, south of Shaker Heights, Warrensville Heights, and Beachwood)
  - o Runs along Chagrin Blvd south of Van Aken Blvd
- 41-41F: Warrensville (Northern Cleveland Heights to Glenwillow)
  - o Runs along Warrensville Rd just east of Van Aken Blvd
- 40: Lakeview – Lee (East Cleveland, Cleveland Heights, University Heights, Shaker Heights, Southgate Transit Center)
  - o Runs along Lee Road just west of Van Aken Blvd project area

These bus routes operate from 3:20am to 2:58am. The all-day frequency is generally 30 minutes, with 15-minute frequency in the peak morning and evening periods.

The RTA Blue Line route includes six train stops within in the project corridor along Van Aken Boulevard. The stops are Lee, Avalon, Kenmore, Lynnfield, Farnsleigh and Warrensville. People can travel to and from Cleveland and Beachwood to Shaker Heights via the Blue Line. The train runs from 3:58am to 12:49am with 30-minute frequency at the stops along Van Aken Boulevard all day.

## SUMMARY OF RELEVANT RECOMMENDATIONS FROM PREVIOUS PLANS

This section provides a summary of existing plans, policies, and programs that are relevant to the Shaker Heights Van Aken Boulevard Bike Connection project. This section briefly describes each document and notes each document's relevance to current active transportation efforts in the city. The plans, policies, and programs featured in this section were identified by Shaker Heights. The plans are reviewed in chronological order.

### Strategic Investment Plan (2000)

This plan provided conclusions and recommendations for Shaker Heights regarding the best methods to leverage Shaker Heights' assets to encourage appropriate private investment, and to ensure that Shaker Heights remains one of the premier communities in the country. The goal of the plan was to enhance the quality of life for residents. The plan sought to bring the high-quality residential character to the commercial districts. The plan recommended traffic changes, including reconstructing the Warrensville/Van Aken/Chagrin intersection. The reconstruction supports improving transit connections and transfer points, redeveloping existing strip shopping centers into a mixed-use downtown, improving pedestrian connections between the station and surrounding areas, and recommending improvements to the Chagrin-Lee area, a retail area located one block south of Van Aken Boulevard and Lee Road. Our plan will use the recommendations and conclusions from the Strategic Investment Plan to inform the goals and recommendations for this project. Our plan will also look to review the transit plans and suggested improvements for the Van Aken District and the Chagrin-Lee area as outlined in the Strategic Investment Plan.

### Warrensville/Van Aken Transit Oriented Development Plan (2008)

The Warrensville/Van Aken (WVA) Transit-Oriented Development (TOD) Plan further studied the recommendation to revitalize the Van Aken District that was explored in the Strategic Investment Plan (2000). That plan recommended reconstructing the Warrensville/Van Aken/Chagrin intersection, improving transit connections and transfer points, redeveloping existing strip shopping centers into a mixed-use downtown, and improving pedestrian connections between the station and surrounding areas. An important objective of the Warrensville/Van Aken Transit-Oriented Development Plan was to reinvent this intersection as an important

meeting place and a central node within Shaker Heights. Our plan will look to improve conditions for bicyclists specifically near the Farnsleigh Road and Van Aken Boulevard intersection.

### **Shaker Bike Route Plan** (2008)

This plan proposed new signage and pavement markings for the Shaker Bike on-road bicycle route network. The City of Shaker Heights worked with the Northeast Ohio Areawide Coordinating Agency (NOACA) to create an on-road bicycle route network for Shaker Heights that serves the entire City of Shaker Heights and provides east-west and north-south regional connections to support the larger regional bicycle network. The City of Shaker Heights has had a long history of studying and pursuing bicycle routes and infrastructure in the city to enhance its community appeal and to provide a safe alternative mode of transportation. The plan did not recommend changes to Van Aken Boulevard but did recommend including an on-road bicycle route along Winslow Road from Lee Road to Farnsleigh Rd.

### **Lee Road Traffic Study and Corridor Plan** (2012)

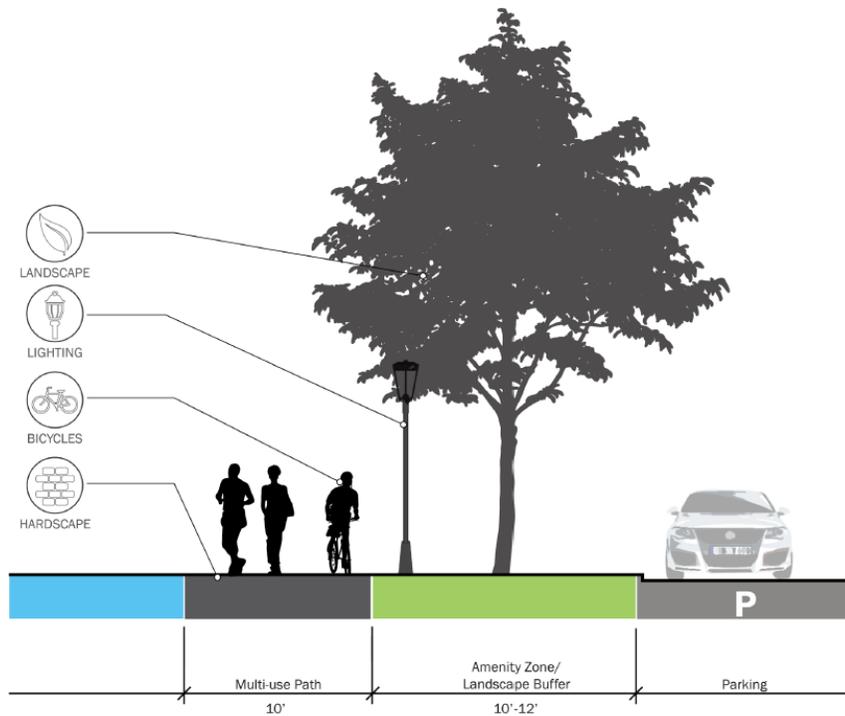
The Lee Road Traffic Study and Corridor Plan looked to improve transportation access and circulation for all modes of transportation along Lee Road and improve the character of the commercial district south of Chagrin Boulevard through streetscape enhancements. The desired outcome of the plan was to develop a planning framework to guide development in the Lee Road commercial district and support bicycle and pedestrian improvements along the corridor. The plan also provided recommendations for traffic and pedestrian improvements along the corridor, intersection transitions, bike lanes and connections to the existing and planned non-motorized network, and streetscape renovations for the section south of Chagrin Boulevard.

The most relevant recommendation to the Van Aken Boulevard project is the goal to establish a safe and accessible non-motorized network.

### **Van Aken District Connections Plan** (2016)

The Van Aken District Connections Plan supported the call to revitalize this district that was explored in the Strategic Investment Plan (2000). This plan was developed based on the City's overall economic development goal of creating a vibrant, mixed-use downtown for Shaker Heights. This includes recommended improvements to bicycle and pedestrian connections to add vibrancy to the Van Aken District.

The Van Aken District Connections Plan recommended building a 10-foot shared use path on Van Aken Boulevard to the west of Farnsleigh Road as shown below.



**Figure 7. Proposed Van Aken Boulevard Cross Section in Van Aken District Connections Plan (2016)**

**Lee Road Action Plan (2023)**

This community-driven plan seeks to improve connections along Lee Road from the northern residential neighborhoods through to the southern civic and commercial areas. The Lee Road Action Plan builds upon the recommendations of the Economic Development Strategy/Strategic Investment Plan Update and Lee Road Traffic Study & Corridor Plan as it also seeks to establish a vision that comprehensively transforms the area south of Chagrin Boulevard into a thriving corridor and commercial district that is attractive, walkable, bikeable, and transit-friendly.

The key recommendation relevant to the Van Aken Boulevard project is the inclusion of a 10-foot-wide two-way cycle track on the west side of Lee Road that will ultimately connect to Van Aken Boulevard.

**Van Aken District Public Realm Plan (2020)**

The City of Shaker Heights partnered with the Greater Cleveland Regional Transit Authority (RTA) and Van Aken District owners, RMS, to enhance the Warrensville Van Aken Transit Station area, creating a high-quality waiting environment with adequate shelter and facilities, attractive and functional pedestrian and bicycle amenities, a plaza, and a strong connection to the adjacent commercial district and neighborhoods. This project will create new pedestrian plaza space where there is existing RTA parking. Design and engineering are now underway, with construction scheduled 2024-2025.

The Van Aken District Public Realm improvements are at the eastern terminus of the Van Aken Bikeway project and when both improvements are complete that will create seamless connections to and from the District for people bicycling.



# **CHAPTER 2**

# **FEASIBILITY ANALYSIS**



# FEASIBILITY ANALYSIS

The purpose of the feasibility analysis was to evaluate several different design alternatives for a bicycle facility on Van Aken Boulevard. Five alternatives were evaluated:

- Shared use path
- Buffered bike lanes
- Separated bike lanes with flex posts (also called protected bike lanes)
- Separated bike lanes with median islands
- Two-way cycle track

There are two additional alternatives for the segment from Farnsleigh Road to Parkland Drive/Lynnfield Road: parking-protected bike lanes and a median with parking cut-outs. This chapter discusses some of the advantages, disadvantages, and considerations for each alternative. Two additional alternatives, a shared use path in the median and left-side bike lanes, were screened out during this feasibility analysis. These alternatives are discussed briefly at the end of this chapter, along with the reasons they were considered infeasible. This chapter also includes a brief preliminary traffic analysis since some of the alternatives include the removal of a travel lane.

This analysis only considers bicycle facility options along Van Aken Boulevard, since this was the preferred route following the network analysis. The network analysis compared Fernway Road/Parkland Drive, Winslow Road, Lomond Boulevard, and Van Aken Boulevard. Of these options, Van Aken Boulevard was the most direct and convenient.



**Figure 8: On-street parking is available along the eastern third of the corridor, from Parkland Drive/Lynnfield Road to Farnsleigh Road (at the edge of the Van Aken District).**

## Preliminary Traffic Analysis

Toole Design conducted a preliminary traffic analysis to determine the possibility of a road diet and found that removing a travel lane in each direction is most likely feasible, although a Synchro model may be useful at the Farnsleigh Road intersection. Between Parkland Drive/Lynnfield Road and Farnsleigh Road, Van Aken Boulevard has an average daily traffic (ADT) of about 10,150 vehicles per day as of late 2022. While road diets are typically

feasible with no further analysis at an ADT under 10,000, key intersection analysis is required for ADTs between 10,000 and 16,000, based on a flow chart developed by the Seattle Department of Transportation and published in the Federal Highway Administration's *Road Diet Informational Guide*. Key intersection analysis determines whether any intersections have more than 200 vehicles turning left within a single hour or more than 700 vehicles traveling in one direction in a single hour. Based on the December 2022 traffic counts collected on Van Aken Boulevard, there were no intersections with more than 700 vehicles traveling in the same direction in a single hour. There was one intersection, at Farnsleigh Road, where there were more than 200 eastbound vehicles turning left in a single hour. The GPD Group road diet evaluation showed that removing one of the left turn lanes in this location would still keep the intersection operating at LOS A. This indicates that a road diet (removal of a travel lane in each direction) can be considered with minimal traffic impact.

## FEASIBILITY ANALYSIS

### DESIGN ALTERNATIVES FROM FARNBLEIGH ROAD TO PARKLAND DRIVE/LYNNFIELD ROAD

#### Existing Condition

Van Aken Boulevard currently has two motor vehicle travel lanes in each direction, and the segment from Farnsleigh Road to Parkland Drive/Lynnfield Road has a dedicated on-street parking lane on both sides. The Regional Transit Authority (RTA) light rail runs along the center of Van Aken Boulevard, with RTA parking (both angled and perpendicular) periodically located along the railroad tracks. The roadway width for each direction (not including RTA parking) is 31 feet. There are currently signs stating, "Bicyclists May Use Full Lane, Change Lanes to Pass." In the current configuration, only highly confident cyclists feel comfortable riding in the roadway, where there is no separation between them and people driving. Because of this lack of separation and the high operating speed (85<sup>th</sup> percentile speed of 41 mph) on Van Aken Boulevard, there is potential for conflicts both throughout the corridor and at intersections. Cyclists today may choose to ride on the sidewalk, potentially creating conflicts for pedestrians. A row of trees separates the sidewalk from the roadway. Van Aken Boulevard is currently snow-plowed with a medium-duty tandem axle truck with an eleven-foot-wide plow.



Figure 9: Van Aken Boulevard Westbound between Farnsleigh Road and Parkland Drive.

### Shared Use Path

Widening the sidewalk to install a shared use path along Van Aken Boulevard would accommodate less confident cyclists, but it would likely require the removal of all the trees currently separating the sidewalk from the roadway.

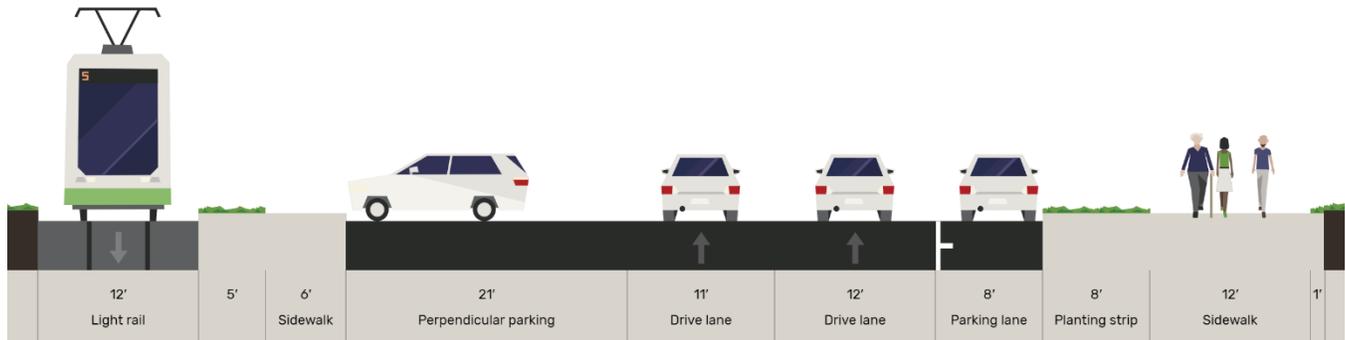


Figure 10: Proposed cross section for a shared use path from Farnsleigh Road to Parkland Drive/Lynnfield Road.



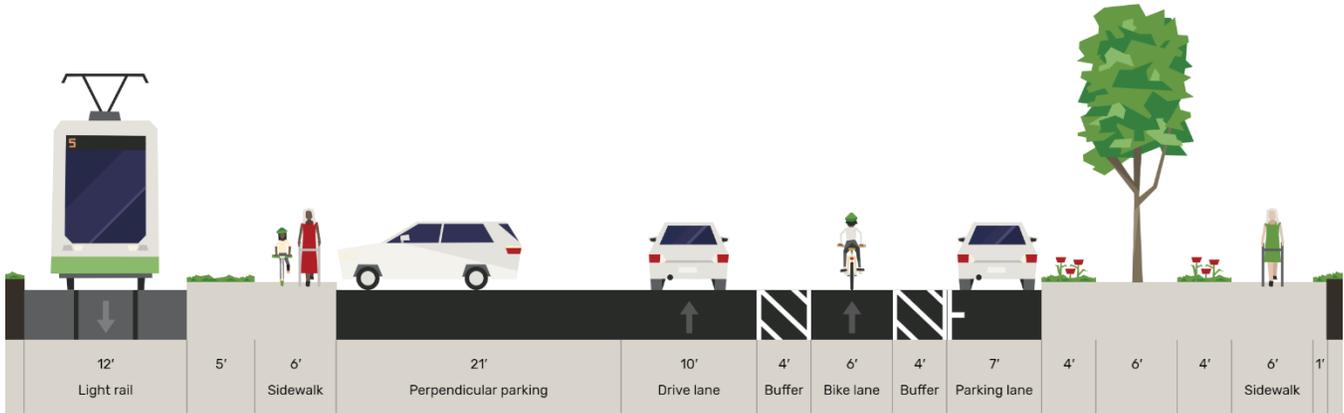
**Figure 11: The Shaker Median Trail, a shared use path in Shaker Heights.**

The preferred position for a shared use path would be on the north side of Van Aken Boulevard so that it can tie into the existing shared use path along Farnsleigh Road (north of Van Aken). Widening the sidewalk to the north would require right-of-way acquisition, while widening the sidewalk to the south would require removing over 20 trees throughout the segment. The existing sidewalk is 6 feet wide, and a shared use path would ideally be 12 feet wide to meet industry standards for a shared walking and bicycling path. The existing space between the north edge of the sidewalk and the right-of-way line is very narrow (approximately 1-3 feet). The space between the south edge of the sidewalk and the centers of the trees is also quite narrow, varying from approximately 3-6 feet.

Shared use paths provide a space for cyclists to ride outside of the roadway, preserving the existing travel lanes and on-street parking. While motor vehicle/bicycle conflicts are confined to the intersections, there may be conflicts between cyclists and people walking, jogging, or using wheelchairs or strollers. The main costs for this design alternative would come from the additional concrete and the tree removal. **This alternative is not recommended**, as the tree removal would not only eliminate some of the separation between the path and the roadway, but it would also worsen the overall appearance of Van Aken Boulevard and reduce levels of shade. Other environmental benefits of the existing trees that would be lost include carbon capture, improved local air quality, and heat reduction.

### **Buffered Bike Lanes**

Buffered bike lanes are bike lanes that are separated from adjacent lanes with a painted buffer. There are no physical elements in the painted buffer. Buffered bike lanes would not be comfortable for most cyclists given the existing traffic volumes and operating speeds on Van Aken Boulevard, but they would maintain curbside parking; this alternative requires the removal of one travel lane in each direction.



**Figure 12: Proposed cross section for buffered bike lanes from Farnsleigh Road to Parkland Drive/Lynnfield Road.**



**Figure 13: A buffered bike lane adjacent to parking in Boston, Massachusetts.**

In this design alternative, bike lanes (on both sides of Van Aken Boulevard) would occupy the current outer travel lane, maintaining curbside parking. Vehicles would need to cross the bike lane to access the parking lane, so no vertical separation (such as flexible delineators, concrete medians, or planters) could be used. The lack of vertical separation and the positioning of the bike lane in between parked and moving vehicles would result in an uncomfortable facility that less confident cyclists, younger or older cyclists, and cyclists with disabilities would be less likely to use. This alternative has the potential for some conflicts between people getting out of their parked cars and people traveling in the bike lane, including “dooring” (someone suddenly opening their car door into the bike lane, causing a bicyclist to run into the door). This conflict can be mitigated by installing a 3-foot buffer between the parking lane and the bicycle lane. Conflicts between people driving and people biking can happen throughout the corridor (as drivers may enter the bike lane to park) as well as at intersections and driveways (where drivers may cross the bike lane to turn). Buffered bike lanes adjacent to curbside parking would be easy to maintain with the existing single or tandem axel truck, and they would present no challenges to street sweepers.

## Separated Bike Lanes with Flex Posts

Separated bike lanes are a cost-effective design alternative that would be comfortable for most cyclists and would maintain two travel lanes, although this alternative would require the removal of on-street parking.

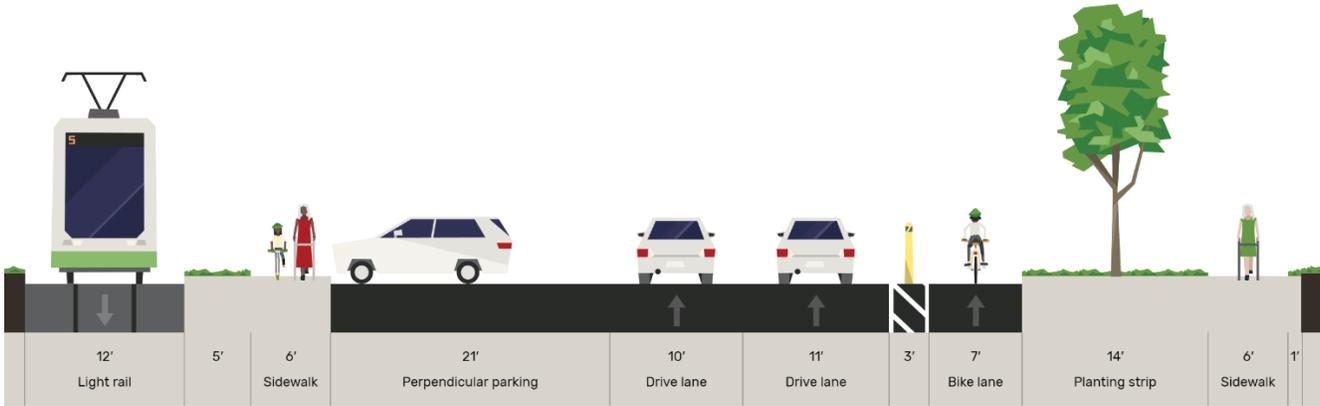


Figure 14: Proposed cross section for separated bike lanes from Farnsleigh Road to Parkland Drive/Lynnfield Road.

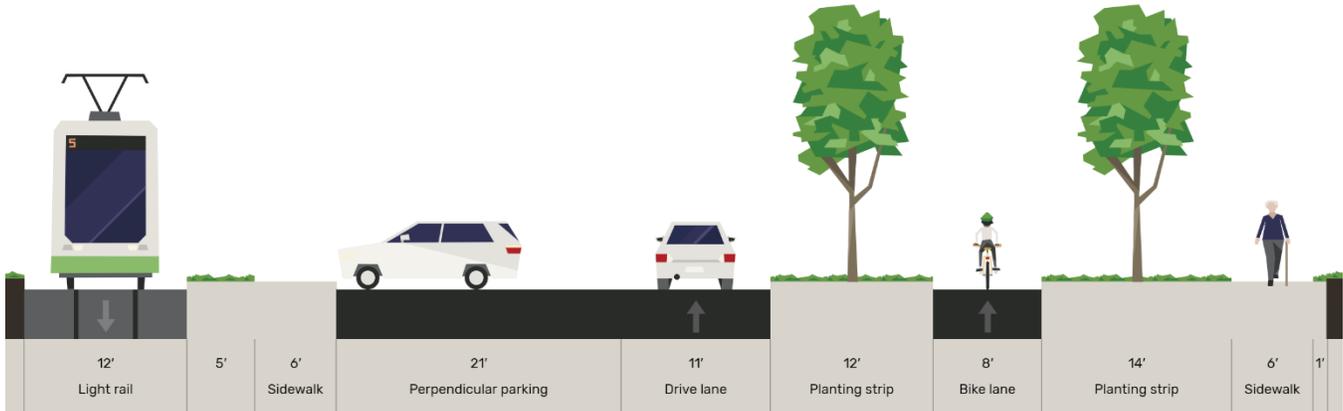


Figure 15: A separated bike lane with flex posts in Cleveland, Ohio.

In this design alternative, bike lanes (on both sides of Van Aken Boulevard) would occupy the current on-street parking lane and be separated from the adjacent motor vehicle lanes by a buffer and vertical separation. Vertical separation elements may include flexible delineators (flex posts), a concrete median, or planters. The separation creates a more comfortable bicycle facility, and by installing an on-road design alternative, the potential for conflicts between pedestrians and cyclists is minimized. The main conflict points (between motorists and cyclists) will be at intersections and driveways. Separated bike lanes can potentially be plowed with the Bombardier (sidewalk plow). An advantage of separated bike lanes is the range of options for vertical separation. Flexible delineators (flex posts) can be used in the interim as a less expensive option, potentially allowing more funds to be allocated towards intersection safety improvements. Alternatively, a concrete median can be used for more robust separation, or planters can be installed to further beautify the facility and create a sense of place along Van Aken Boulevard.

## Separated Bike Lanes with Median Islands

Bike lanes on both sides of Van Aken Boulevard, separated from the travel lane with a wide median, would provide a comfortable bike facility and create opportunities for beautification; this alternative would not include any on-street parking and would remove one travel lane in each direction.



**Figure 16: Proposed cross section for bike lanes with medians from Farnsleigh Road to Parkland Drive/Lynnfield Road.**

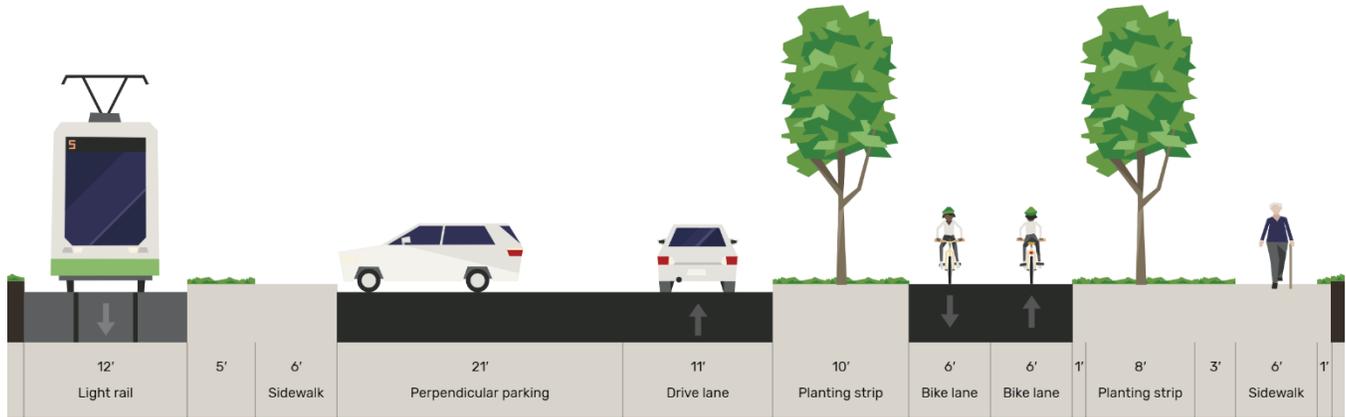


**Figure 17: A separated bike lane with a median island in Victoria, British Columbia (Canada).**

In this design alternative, bike lanes (on both sides of Van Aken Boulevard) would occupy the curbside space (in place of the on-street parking that exists today), and a wide median would be constructed in the current outside vehicle travel lane. Unlike the previous alternative, this median would not include parking cut-outs, so the entire median could be landscaped with native shrubs, grasses, flowers, and trees. These bike lanes would be wide enough to accommodate all cyclists and types of bicycles, and the median would provide ample separation from the lane of vehicle traffic. The potential for conflicts between pedestrians and cyclists is minimized in this alternative, and the main conflict points (between cyclists and motorists) will be at intersections and driveways. These separated bike lanes can potentially be plowed with the sidewalk plow. An advantage of the median is that it allows for a greater buffer space between the bicycle facility and the vehicle travel lane at intersections. This alternative may be a long-term goal, while separated bike lanes with flex posts are implemented in the interim with the budget available.

## Two-Way Cycle Track

A two-way cycle track, separated from vehicle traffic with a median or buffer with flex posts, will comfortably accommodate most cyclists and may provide an opportunity for beautification; this alternative removes on-street parking and one vehicle travel lane from one side of Van Aken Boulevard (likely the north side), while maintaining on-street parking and two travel lanes on the other side.



**Figure 18: Proposed cross section for a two-way cycle track from Farnsleigh Road to Parkland Drive/Lynnfield Road.**



**Figure 19: Two-way cycle tracks with a median (in Spartanburg, South Carolina) and a buffer with flex posts (in Providence, Rhode Island).**

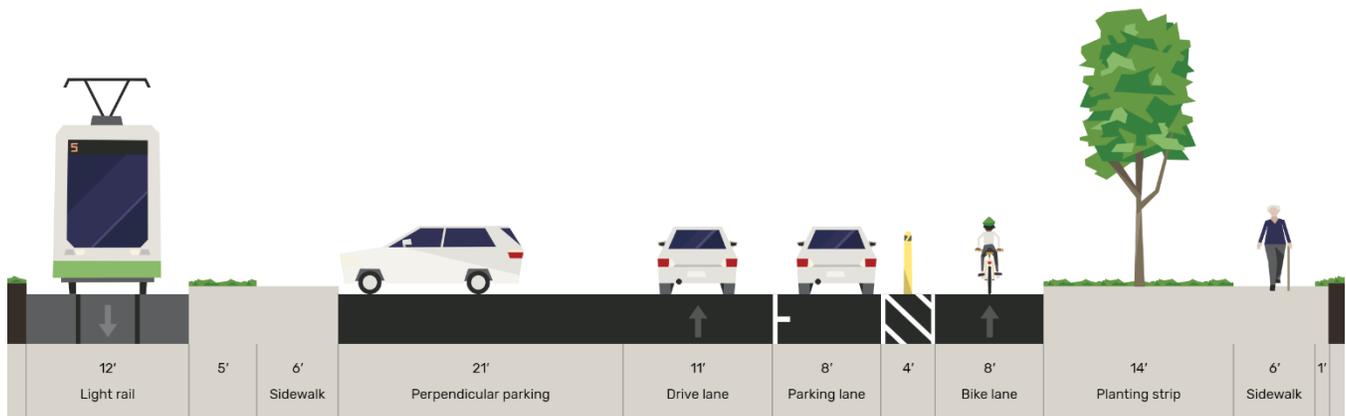
In this design alternative, a two-way cycle track would occupy the existing curbside parking lane and the outer travel lane on one side of Van Aken Boulevard. If a median is constructed, it could be landscaped with native shrubs, grasses, and flowers. A buffer with flex posts could be used instead in the interim. Two-way cycle tracks are comfortable for most bicyclists, and the median or buffer would provide adequate separation from motor vehicles. One disadvantage of a cycle track is that it may not be intuitive to all bicyclists at first. Additionally, drivers will need to grow accustomed to looking for bicyclists coming from both directions before crossing the cycle track. An advantage of this alternative is that there are generally half as many conflict points (at intersections and driveways, along only one side of the street). For example, if the cycle track were installed on the north side of Van Aken Boulevard (Van Aken westbound), there would be no conflict with eastbound right turns or westbound left turns, and only people living on the north side of the street would need to check the cycle

track before exiting their driveways. Although a cycle track can be constructed with a clear width of 12 feet, a sidewalk plow should still be used to avoid blocking the entire bicycle facility width. This alternative would require some signal modifications, specifically for the contraflow bicyclists as they approach intersections.

Based on bicycle network connectivity, the ideal position for a two-way cycle track would be on Van Aken Boulevard Westbound (the north side of the street). This would create an opportunity for bicyclists to easily connect to the existing shared use path on Farnsleigh Road. One challenge with this approach is that Van Aken Boulevard Westbound is more often used for parking than Van Aken Boulevard Eastbound.

### Parking-Protected Bike Lanes

Parking-protected bike lanes are another cost-effective design alternative that would be comfortable for most cyclists; while this design maintains on-street parking, it would require the removal of one vehicle travel lane in each direction.



**Figure 20: Proposed cross section for parking-protected bike lanes from Farnsleigh Road to Parkland Drive/Lynnfield Road.**



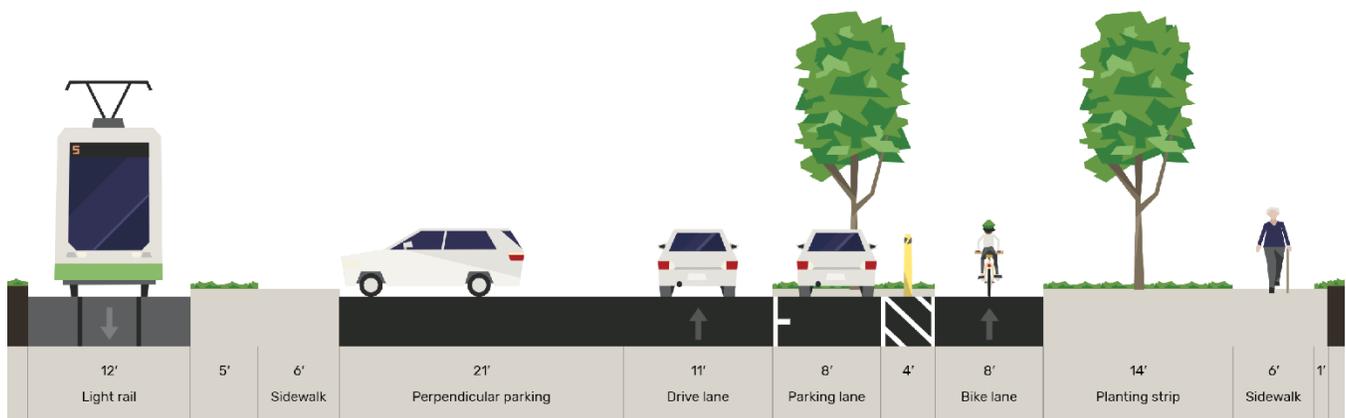
**Figure 21: A parking-protected bike lane in San Francisco, California.**

In this design alternative, bike lanes (on both sides of Van Aken Boulevard) would occupy the curbside space, shifting the on-street parking away from the curb, where it would occupy the current outside vehicle travel lane. Vertical separation such as flexible delineators, rubber curbing, or concrete medians would be installed in between the parking lane and the curbside bike lanes to prevent drivers from parking in the bike lane. Parking-protected bike lanes accommodate most cyclists, and some people may find them to be even more comfortable than separated bike lanes, since there is the added protection of parked cars between cyclists and adjacent moving vehicles. The potential for conflicts between pedestrians and cyclists is minimized in this alternative, and the main conflict points (between cyclists and motorists) will be at intersections and driveways. Parking-protected bike lanes can potentially be plowed with the sidewalk plow. An advantage of parking-protected bike lanes is that they allow for a greater buffer space between the bicycle facility and the vehicle travel lane at intersections. Alternatively, parking can be removed at some intersections if a right turn lane is desired.

People who are accustomed to parking curbside on Van Aken Boulevard may have concerns about the bike lane being located between the parking lane and the curb. There are many treatments that can be implemented to indicate that pedestrians have the right of way when crossing the bike lane. At intersections, the bike lane can be narrowed to encourage slower operating speeds for bicyclists, making them more likely to yield to pedestrians. Additionally, “Bikes Yield to Pedestrians” signs can be installed. Crosswalks can be marked in areas where many pedestrians are likely to cross the bike lane (such as at condominium and apartment building entrances), with yield lines installed in the bike lane in advance of the marked crossing.

### Median with Parking Cut-Outs

A median design alternative with cut-outs for parking combines the comfort and convenience of a parking-protected bicycle facility with the beauty of a median; while parking is maintained in this alternative, one vehicle travel lane is removed in each direction.



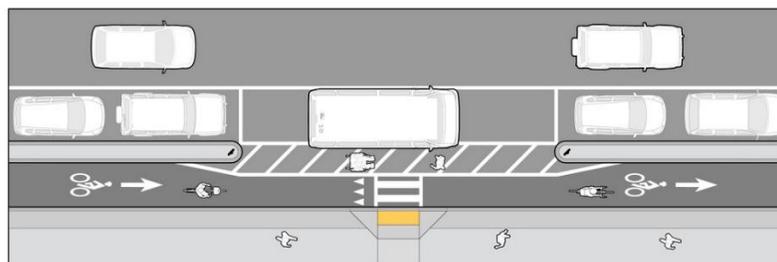
**Figure 22: Proposed cross section for median-separated bike lanes with parking cut-outs from Farnsleigh Road to Parkland Drive/Lynnfield Road.**



**Figure 23: A median-separated bike lane with parking cut-outs in Austin, Texas.**

In this design alternative, bike lanes (on both sides of Van Aken Boulevard) would occupy the curbside space, and a wide median would be constructed in the current outside vehicle travel lane; the median would include cut-outs to create space for on-street parking. In areas with cut-outs, the median would retain a minimum width of 3 feet to prevent motorists from hitting bicyclists with the doors of their cars. In areas without cut-outs, the median becomes an opportunity for landscaping with native plants and trees. Parking-protected bike lanes accommodate most cyclists, and some people may find them to be even more comfortable than separated bike lanes, since there is the added protection of parked cars between cyclists and adjacent moving vehicles. The potential for conflicts between pedestrians and cyclists is minimized in this alternative, and the main conflict points (between cyclists and motorists) will be at intersections and driveways. Parking-protected bike lanes can potentially be plowed with the sidewalk plow. An advantage of parking-protected bike lanes is that they allow for a greater buffer space between the bicycle facility and the vehicle travel lane at intersections. Alternatively, parking can be removed at some intersections if a right turn lane is desired. This alternative may be a long-term goal, while parking-protected bike lanes with flex posts are implemented in the interim with the limited budget available.

People who are accustomed to parking curbside on Van Aken Boulevard may have concerns about the bike lane being located between the parking lane and the curb. There are many treatments that can be implemented to indicate that pedestrians have the right of way when crossing the bike lane. At intersections, the bike lane can be narrowed to encourage slower operating speeds for bicyclists, making them more likely to yield to pedestrians. Additionally, “Bikes Yield to Pedestrians” signs can be installed. There can also be stop bars installed in the bike lane at all signalized intersections. Crosswalks can be marked in areas where many pedestrians are likely to cross the bike lane (such as at condominium and apartment building entrances), with yield lines installed in the bike lane in advance of the marked crossing. If accessible on-street parking stalls are desired, the median may be replaced with marked buffer space (to be used for loading/unloading a wheelchair or other device). Accessible parking spaces would require the installation of new curb ramps.



**Figure 24: Within cut-outs, accessible parking can be created with loading areas, crosswalks, and curb ramps.**

# DESIGN ALTERNATIVES FROM PARKLAND DRIVE/LYNNFIELD ROAD TO LEE ROAD

## Existing Condition

Van Aken Boulevard west of Parkland Drive/Lynnfield Road is very similar to Van Aken Boulevard between Parkland Drive/Lynnfield Road and Farnsleigh Road. The main difference is that there is no dedicated curbside parking lane in this segment. Instead, off-peak parking is permitted in the outer travel lanes on both sides of Van Aken Boulevard. On Van Aken Boulevard Eastbound, there is no parking allowed from 4-6 PM on weekdays, and on Van Aken Boulevard Westbound, there is no parking allowed from 7-9 AM on weekdays. Because there is no dedicated curbside parking lane in this segment, the roadway width is 22 feet for each direction (instead of 31 feet east of Parkland Drive/Lynnfield Road).



Figure 25: Van Aken Boulevard Westbound between Parkland Drive/Lynnfield Road and Lee Road.

## Shared Use Path

Widening the sidewalk to install a shared use path along Van Aken Boulevard would accommodate less confident cyclists, but it would likely require the removal of all the trees currently separating the sidewalk from the roadway.



Figure 26: Proposed cross section for a shared use path from Parkland Drive/Lynnfield Road to Lee Road.

The same considerations for a shared use path from Farnsleigh Road to Parkland Drive/Lynnfield Road apply to this western segment as well. Widening the sidewalk to the north would require right-of-way acquisition, while

widening the sidewalk to the south would require the removal of over 50 trees from Parkland Drive/Lynnfield Road to Lee Road. Additionally, a shared use path on the north side of Van Aken Boulevard in this segment may be inconvenient for people trying to access businesses on the south side of Van Aken Boulevard near Lee Road.

### Separated Bike Lanes

Separated bike lanes are a cost-effective design alternative that would be comfortable for most cyclists and would maintain one travel lane in each direction; this alternative would require the removal of the outer travel lane/off-peak parking lane on both sides of Van Aken Boulevard.

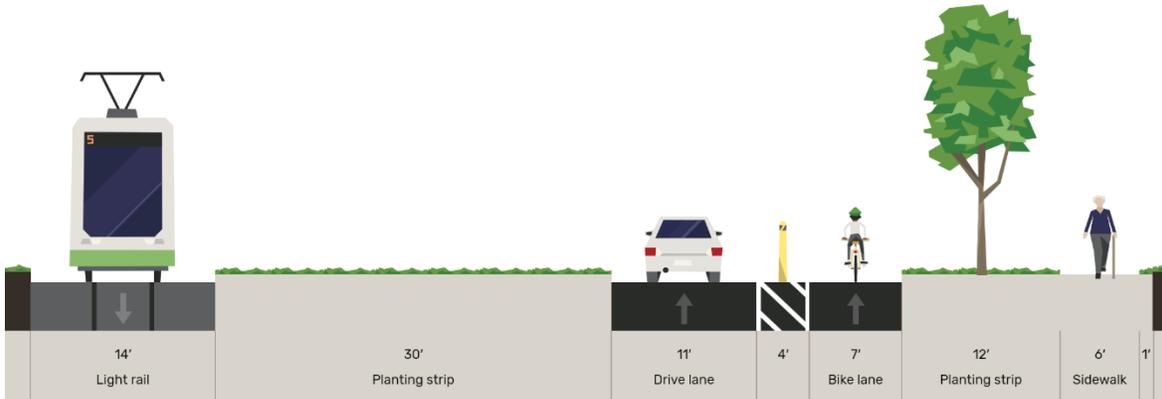


Figure 27: Proposed cross section for separated bike lanes from Parkland Drive/Lynnfield Road to Lee Road.

The same considerations for separated bike lanes from Farnsleigh Road to Parkland Drive/Lynnfield Road apply to this western segment as well. From Parkland Drive/Lynnfield Road to Lee Road, there is slightly more available space for the separated bike lanes since they will occupy the outer travel lane instead of the curbside parking lane.

### Bike Lanes with Median

Bike lanes on both sides of Van Aken Boulevard, separated from the travel lane with a median, would provide a comfortable bike facility and create opportunities for beautification; this alternative would require the removal of the outer travel lane/off-peak parking lane on both sides of Van Aken Boulevard.

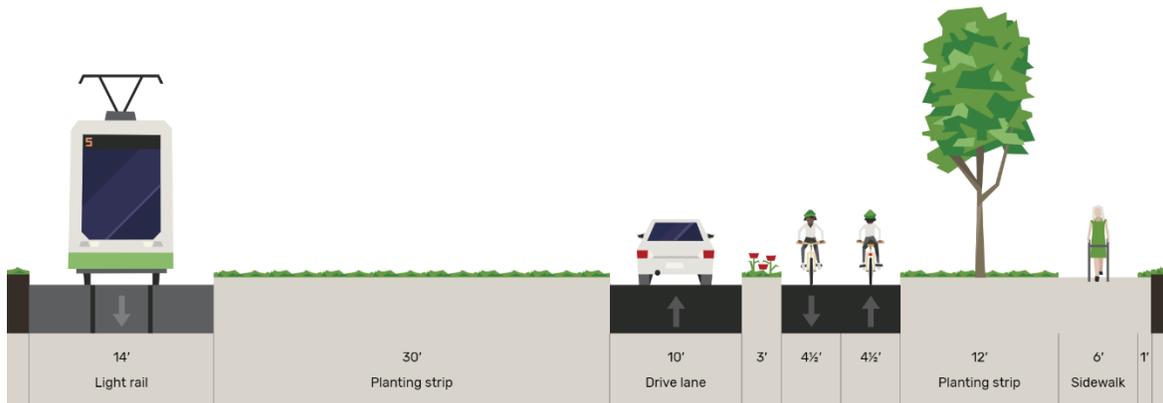


Figure 28: Proposed cross section for bike lanes with medians from Farnsleigh Road to Parkland Drive/Lynnfield Road.

The same considerations for bike lanes with a median from Farnsleigh Road to Parkland Drive/Lynnfield Road apply to this western segment as well. From Parkland Drive/Lynnfield Road to Lee Road, the median would be narrower, so there would not be enough width to create parking cut outs. This alternative may be a long-term goal, while separated bike lanes with flex posts are implemented in the interim with the limited budget available.

### Two-Way Cycle Track

A two-way cycle track, separated from vehicle traffic with a median or buffer with flex posts, will comfortably accommodate most cyclists and may provide an opportunity for beautification; this alternative would require the removal of the outer travel lane/off-peak parking lane on only one side of Van Aken Boulevard, maintaining the two travel lanes/off-peak parking on the other side of Van Aken Boulevard.



**Figure 29: Proposed cross section for a two-way cycle track from Parkland Drive/Lynnfield Road to Lee Road.**

Many of the same considerations for a two-way cycle track from Farnsleigh Road to Parkland Drive/Lynnfield Road apply to this western segment as well. From Parkland Drive/Lynnfield Road to Lee Road, the two-way cycle track would occupy the outer travel lane/off-peak parking lane on either Van Aken Boulevard Eastbound or Westbound. The buffer or median would be limited to only 3 feet wide in this segment and the bike lanes would be 4.5 feet wide, creating a constrained space for bicyclists. One consideration for this alternative is that although a north side cycle track is ideal for connectivity to the existing Farnsleigh Road path, that positioning may be inconvenient in this segment for people trying to access businesses on the south side of Van Aken Boulevard near Lee Road.

## SCREENED OUT ALTERNATIVES

Two additional alternatives were considered, but they were not included in the full feasibility analysis because they were declared infeasible. These alternatives are a shared use path in the RTA median and left-side bike lanes.

### Shared Use Path in the RTA Median

Constructing a shared use path in the RTA median would accommodate cyclists and maintain current vehicle traffic operations, but the construction of the path would conflict with existing trees, light poles, and RTA stations.

A shared use path in the RTA median would ideally be 12 feet wide, with a 14-foot buffer space between the railroad tracks and the path. Situating the path on the south side of the railroad tracks would avoid conflict with the Lynnfield RTA station, but there would be other conflicts with trees and possibly utility poles. In areas with RTA parking, the existing sidewalk would need to be widened, and cyclists using the path would mix with pedestrians waiting to ride the train. One benefit of this design is that conflicts between bicyclists and drivers would be confined to the intersections, where people on the path would have a shorter distance to cross (than if the path was not in the median) and less exposure to motor vehicles.

This alternative would be very challenging to construct because of the existing parking cut-outs in the median, the required offset between the railroad tracks and the path, the trees and utility poles, and the existing RTA stations.

**This alternative is not recommended**, as the various utility, tree, and station conflicts make this design technically infeasible.

### Left-Side Bike Lanes

Left-side bike lanes are a cost-effective design that would be comfortable for most cyclists, but this alternative would mean that service and delivery vehicles block the singular travel lane when stopped at the curb.

In this design alternative, bike lanes (on both sides of Van Aken Boulevard) would occupy the left side of the roadway rather than the right, pushing motor vehicle lanes towards the outside curb. This alternative has several benefits; the design eliminates conflicts between bicycles and motor vehicles at driveways, and the crossing distance at intersections is shorter than if the bike lane were on the right side, reducing bicyclists' exposure to motor vehicles. In areas with RTA parking, however, the bike lane would be in between the RTA parking and the travel lane. The main challenge in implementing left-side bike lanes primarily occurs between Lee Road and Parkland Drive/Lynnfield Road, where the roadway width is limited. In this section, if vehicles stop at the curb (to collect leaves and brush, to make deliveries, or to perform other services), then there will not be enough room for other drivers to pass the stopped vehicle without entering the bike lane. With this design, all drivers would have to wait behind a stopped vehicle, as there would be no room to pass.

This alternative, while it may reduce conflicts at driveways and shorten the intersection crossing distance for bicyclists, would result in Van Aken Boulevard being constantly blocked by vehicles stopped at the curb. There would be no space to maneuver around stopped vehicles. **This alternative is not recommended**, as an inability to maneuver around stopped vehicles will create unnecessary congestion and present a hazard for emergency vehicles.

# SUMMARY

This chapter discussed some of the considerations for four main design alternatives: a shared use path, separated bike lanes, bike lanes with a median, and a two-way cycle track, as well as three additional design alternatives for the wider roadway portion (from Farnsleigh Road to Parkland Drive/Lynnfield Road): buffered bike lanes, parking-protected bike lanes, and a median with parking cut-outs. Several mitigation strategies were discussed for handling the challenges associated with certain design alternatives, such as installing a buffer space to reduce the chance of dooring or installing accessible parking spaces to help people cross bike lanes and walk up to the curb. The two tables on the next pages summarize the design alternatives discussed in this chapter. The alternatives have been scored on motor vehicle conflicts, pedestrian conflicts, comfort, appearance, parking impacts, traffic impacts, and cost. Maintenance was not scored as all the alternatives can be maintained with proper equipment, and maintenance concerns should not be considered more heavily than the user experience when deciding on a design alternative.

Van Aken Boulevard is a beautiful corridor that provides a great foundation for an excellent bicycle facility: there are ample roadway widths, relatively low traffic volumes, good quality sidewalks, and lovely trees. Shaker Heights residents deserve a comfortable bike facility, and the project budget can go a long way towards making that happen. Throughout the corridor, a bike facility will, at a minimum, require the removal of a travel lane or the removal of a parking lane; for this reason, it is crucial to build a high-quality bicycle facility so that residents do not feel like the City is taking away something they value only to build a bicycle lane that no one ends up using due to a lack of comfort and safety.

In the long term, a median separated bike lane with parking cut-outs between Farnsleigh Road and Parkland Drive/Lynnfield Road will likely be the most comfortable facility for bicyclists. This design would preserve on-street parking in front of condominiums and apartments while beautifying the entire corridor.

Given budgetary constraints and service/maintenance concerns along the corridor, Toole Design recommends that the City of Shaker Heights implement a buffered bike lane with flex posts at intersections. The bike lane should be parking-protected between Farnsleigh Road and Parkland Drive/Lynnfield Road. A buffered bike lane may not be comfortable for all bicyclists, but the flex posts at intersections will increase comfort where conflicts with motor vehicles are most likely. This alternative has minor parking impacts between Lynnfield Road and Farnsleigh Road, as it maintains most on-street parking spots while moving them a few feet away from the curb. There are parking impacts to the west between Lee Road and Lynnfield Road where the existing parking that is allowed in the outside travel lane outside of peak travel times is proposed to be removed. These new parking configurations may require some resident education initiatives. This alternative removes one travel lane in each direction, which may have a traffic calming impact on Van Aken Boulevard.

In the long term, Toole Design recommends that the City of Shaker Heights consider a median separated bike lane with parking cut-outs between Farnsleigh Road and Parkland Drive/Lynnfield Road. This option will be comfortable for all bicyclists because it will provide a wide facility that is physically separated from vehicle traffic. A median with parking cut-outs is one of the more expensive alternatives, so implementing a facility with striped buffers and flex posts is a way to save on cost in the interim. When more budget becomes available, the median can be fully built out with concrete curbs and landscaping, adding to the beauty and charm that already exist along Van Aken Boulevard.

Table 3: Design Alternatives Matrix for Van Aken Boulevard from Farnsleigh Road to Parkland Drive

VAN AKEN BOULEVARD: FARNBLEIGH ROAD TO PARKLAND DRIVE																		
Design Alternatives		User Experience				Impact to Existing Conditions			Maintenance and Cost		Total Score (21 possible)							
		Motor Vehicle Conflicts	Pedestrian Conflicts	Comfort	Appearance	Parking Impacts	Traffic Impacts	Maintenance	Cost									
	Existing		Conflicts throughout corridor as well as at intersections; high speeds and no separation contribute to conflicts	1	Possible conflicts between pedestrians and bicyclists on sidewalk	1	Only comfortable for highly confident users	1	Lacks visual appeal	1	On-street (parallel) parking and RTA parking	3	Two lanes of vehicle traffic each side	3	Currently plowed with tandem axel truck	N/A		10
1	12-Foot Path (Off-Road)		All bike/vehicle conflict points are at intersections and driveways	3	Possible conflicts between pedestrians and bicyclists on path	1	Comfortable for all ages/abilities; separates bicycles from vehicles	2	Requires tree removal	0	No impact to number of parking spaces; people parking will cross the path as they walk to their destination; retains RTA parking	3	Maintains two vehicle travel lanes in each direction	3	Can be plowed with existing sidewalk plows	Expensive due to tree removal and additional concrete	1.5	13.5
2	Buffered Bike Lanes (One-Way)		Conflicts throughout corridor as well as at intersections; high speeds and no vertical separation contribute to conflicts	1	Adequate separation between pedestrians and bicycles	3	Only comfortable for highly confident users	1	Lacks visual appeal	1	No impact to number of parking spaces	3	Maintains one vehicle travel lane in each direction	2	Can be plowed and swept with existing equipment	Inexpensive (only includes paint)	3	14
3	Separated Bike Lanes (One-Way)		All bike/vehicle conflict points are at intersections and driveways	2	Adequate separation between pedestrians and bicycles	3	Comfortable for all ages/abilities; some separation between bicycles and vehicles	2	Preserves street trees; opportunity for beautification in buffer (stamped concrete, landscaping)	2	Removes on-street parking on both sides of corridor (EB and WB; approx. 99 spaces); retains RTA parking	0	Maintains two vehicle travel lanes in each direction	3	Potentially plowable with bombardier or sidewalk plow; additional equipment required for sweeping	Inexpensive in short-term (flex posts); more expensive to use nicer separation materials	2	14
4	Parking-Protected Bike Lanes (One-Way)		More buffer space at intersections, potentially reducing conflicts; conflict points at intersections/driveways	2.5	Adequate separation between pedestrians and bicycles	3	Comfortable for all ages/abilities; some separation between bicycles from vehicles	2	Preserves street trees; planters or decorative bollards can enhance appearance	1	No impact to number of parking spaces; people parking will cross the bike lane as they walk to the curb; retains RTA parking	2.5	Maintains one vehicle travel lane in each direction	2	Potentially plowable with bombardier or one ton truck; additional equipment required for sweeping	Inexpensive in short-term (flex posts); more expensive to use nicer separation materials	2	15
4.5	Median with Parking Cut-Outs (One-Way)		More buffer space at intersections, potentially reducing conflicts; conflict points at intersections/driveways	2.5	Adequate separation between pedestrians and bicycles	3	Comfortable for all ages/abilities; better separation between bicycles and vehicles	2.5	Preserves street trees; opportunity for trees and variety of plants in median	3	Some parking loss due to bumpouts; people parking will cross the bike lane as they walk to the curb; retains RTA parking	2.5	Maintains one vehicle travel lane in each direction	2	Potentially plowable with bombardier or sidewalk plow; additional equipment required for sweeping	Expensive due to median and additional trees/landscaping	1.5	17
5	Bike Lanes with Median (One-Way)		More buffer space at intersections, potentially reducing conflicts; conflict points at intersections/driveways	2.5	Adequate separation between pedestrians and bicycles	3	Most comfortable for all ages/abilities; most separation between bicycles and vehicles	3	Preserves street trees; opportunity for trees and variety of plants in median	3	Removes on-street parking on both sides of corridor (EB and WB; approx. 99 spaces); retains RTA parking	1	Maintains one vehicle travel lane in each direction	2	Potentially plowable with bombardier or sidewalk plow; additional equipment required for sweeping	Expensive due to median and additional trees/landscaping	1.5	16
6	Two-Way Cycle Track		May result in intersection/driveway conflicts if drivers do not expect contraflow bicyclists	2	Adequate separation between pedestrians and bicycles	3	Comfortable for all ages/abilities; may not be intuitive to all bicyclists	2.5	Preserves street trees; opportunity for trees and variety of plants in median	3	Removes on-street parking on one side of corridor (approx. 53 spaces WB or 46 spaces EB)	2	Maintains one vehicle travel lane in each direction	2	Plowable using single or tandem axel truck (12' clear space); may be swept with existing equipment	Expensive due to median, additional trees/landscaping, and signal modifications	1	15.5

Table 4: Design Alternatives Matrix for Van Aken Boulevard from Parkland Drive to Lee Road

VAN AKEN BOULEVARD: PARKLAND DRIVE to LEE ROAD																		
Design Alternatives		User Experience				Existing Conditions		Maintenance and Cost		Total Score (21 possible)								
		Motor Vehicle Conflicts	Pedestrian Conflicts	Comfort	Appearance	Parking Impacts	Traffic Impacts	Maintenance	Cost									
	Existing		Conflicts throughout corridor as well as at intersections; high speeds and no separation contribute to conflicts	1	Possible conflicts between pedestrians and bicyclists on sidewalk	1	Only comfortable for highly confident users	1	Lacks visual appeal	1	Off-peak parking on both sides and RTA parking	3	Two lanes of vehicle traffic each side	3	Currently plowed with tandem axel truck	N/A	10	
1	12-Foot Path		All bike/vehicle conflict points are at intersections; potential pedestrian/bike conflicts	3	Possible conflicts between pedestrians and bicyclists on path	1	Comfortable for all ages/abilities; separates bicycles from vehicles	3	Requires tree removal	0	Maintains off-peak parking and RTA parking	3	Maintains two vehicle travel lanes in each direction	3	May need something wider than current sidewalk plows	Expensive due to tree removal and additional concrete	1.5	14.5
2	Buffered Bike Lanes		Conflicts throughout corridor as well as at intersections; high speeds and no vertical separation contribute to conflicts	1	Adequate separation between pedestrians and bicycles	3	Not comfortable for all ages/abilities	2	Preserves street trees	2	Removes off-peak parking; maintains RTA parking	2	Maintains one vehicle travel lanes in each direction	2	Can be plowed with tandem axel truck	Inexpensive (relies on pavement markings)	3	15
3	Separated Bike Lanes		All bike/vehicle conflict points are at intersections and driveways	2.5	Adequate separation between pedestrians and bicycles	3	Comfortable for all ages/abilities; separates bicycles from vehicles	2.5	Preserves street trees; planters or decorative bollards can enhance appearance	2	Removes off-peak parking; maintains RTA parking	2	Maintains one vehicle travel lanes in each direction	2	Potentially plowable with bombardier or sidewalk plow	Inexpensive in short-term (flex posts); more expensive to use nicer separation materials	2	16
4	Bike Lanes with Median		All bike/vehicle conflict points are at intersections and driveways	2.5	Adequate separation between pedestrians and bicycles	3	Most comfortable for all ages/abilities; separates bicycles from vehicles	3	Preserves street trees; opportunity for beautification in buffer (stamped concrete, landscaping)	2.5	Removes off-peak parking; maintains RTA parking	2	Maintains one vehicle travel lane in each direction	2	Potentially plowable with bombardier or sidewalk plow	Expensive due to median and additional landscaping	1.5	16.5
5	Two-Way Cycle Track		May result in intersection conflicts if drivers do not expect contraflow bicyclists	2	Adequate separation between pedestrians and bicycles	3	Comfortable for all ages/abilities; may not be intuitive to all bicyclists. Only enough space for 2-foot buffer	2	Preserves street trees; opportunity for beautification in buffer (stamped concrete, landscaping)	2.5	Removes off-peak parking; maintains RTA parking	2	Maintains one vehicle travel lane in each direction	2	Plowable using single or tandem axel truck (12' clear space curb to curb)	Expensive due to median, additional landscaping, and signal modifications	1	14.5



# **CHAPTER 3**

## **BEST PRACTICES AND KEY RECOMMENDATIONS**



# BEST PRACTICES AND KEY RECOMMENDATIONS

The Van Aken Bikeway project presents an opportunity to connect more residents and visitors to the Van Aken District and to more community destinations along the Van Aken and Lee Road corridors.

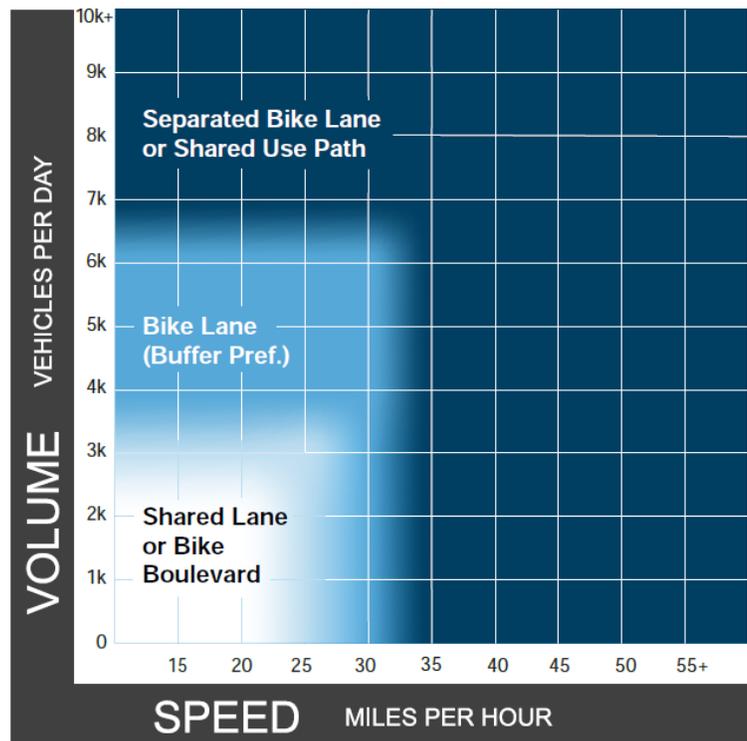
Guidance referenced for this chapter includes:

- FHWA Bikeway Selection Guide
- NACTO Urban Bikeway Design Guide
- NACTO Designing for All Ages and Abilities
- ODOT Multimodal Design Guide
- AASHTO Guide for the Development of Bicycle Facilities (5<sup>th</sup> Edition Draft)
- Manual on Uniform Traffic Control Devices (MUTCD) 2009
- *Universal Principles of Design* (2003) by Lidwell, Holden, and Butler

## BIKEWAY TYPE

Based on community engagement in Shaker Heights, there is a strong desire among residents to build “all ages and abilities” bike facilities, which are a national and international best practice. “All ages and abilities” bike facilities are safe and comfortable for children, the elderly, people with disabilities, and other people who may not be the most experienced or confident cyclists. More people will bike when they have places where they feel safe riding, and more bicyclists mean safer streets. This effect is commonly referred to as “safety in numbers.” Low-stress bike facilities accommodate a broader range of people, attracting traditionally under-represented bicyclists, including women, children, and seniors.

Van Aken Boulevard has a posted speed limit of 35 mph and average daily traffic ranging from 9,000 to 13,000 vehicles per day. Based on these characteristics, NACTO’s *Designing for All Ages and Abilities* guide recommends protected bike lanes (also known as separated bike lanes). Similarly, the FHWA *Bikeway Selection Guide* recommends separated bike lanes or shared use paths based on these characteristics.



**Figure 30: Preferred Bikeway Type for Urban, Urban Core, Suburban, and Rural Town Contexts**

(Source: FHWA Bikeway Selection Guide)

The ODOT Multimodal Design Guide provides minimum widths for one-way and two-way separated bike lanes based on the adjacent curb types and anticipated directional bicyclist volumes. For one-way separated bike lanes, the minimum width is 6 to 8 feet for separated bike lanes adjacent to one vertical curb. Where the separated bike lane is between vertical curbs, the minimum width is 6.5 to 8.5 feet. For two-way separated bike lanes, the minimum width is 9.5 to 11.5 feet for separated bike lanes adjacent to one vertical curb. Where the separated bike lane is between vertical curbs, the minimum width is 10 to 12 feet. See Section 6.3.7 of the ODOT Multimodal Design Guide for more information.

## WAYFINDING

### Purpose of Wayfinding

As Shaker Heights expands upon its bicycle network, wayfinding signs can be used to help bicyclists orient themselves, route plan, and confirm they are on the correct route. The basic process of wayfinding includes four key steps:

**Orientation:** Wayfinding signage should provide context, such as key destinations or landmarks, that will allow users to orient themselves in space.

**Route Decision:** Choosing a route is difficult without signage that provides routes and destinations. Destination signs should be provided at decision points to allow people biking to make key route decisions.

**Route Monitoring:** Confirmation signs allow people to monitor whether they are on the correct route, helping them to not get lost as easily.

**Destination Recognition:** People should be able to recognize when they have made it to their destination or are nearing it, through features such as gateway signage.

### MUTCD Wayfinding Signs

The Manual on Uniform Traffic Control Devices provides guidance for basic bicycle guide signs, which can be used to provide wayfinding guidance. These signs are not required, but they may be provided to inform bicyclists of direction changes, distances, and destinations.

The MUTCD bicycle guide signs consist of white text on a green background. Destinations are listed with horizontal or vertical arrows showing the appropriate direction. There are options to include a bicycle symbol and to include the distance (in miles) to the destination. If used, bicycle symbols should always be on the left of the destination name, and distances should be shown as an integer on the right of the destination name. Bicycle guide signs are smaller than other roadway signs, so they should not be used as a substitute for vehicular destination signs if the message is also intended for people driving.



**Figure 31: Bicycle Guide Signs**

(Source: MUTCD 2009)

## AMENITIES

### Bicycle Parking

Where bike facilities are provided along a corridor, bicycle parking should be considered as well, particularly at major destinations on the corridor. While some bicycle racks are already in place at the Van Aken District, additional bike racks both there and at the commercial and civic area at the corner of Lee Road and Van Aken Boulevard will provide bicycle parking for bicyclists who are shopping or visiting local businesses and institutions. Care should be taken to ensure bike racks are placed outside of the pedestrian access route to allow an unobstructed path of travel for pedestrians. Bike racks should be versatile and intuitive, allowing bicycles of all shapes and sizes to be locked through the frame and at least one wheel. Types of recommended and not recommended bike racks are shown in **Figure 32**.



**Figure 32: Recommended and Not Recommended Bike Racks**

*(Source: ODOT Multimodal Design Guide)*

### Benches, Trash Receptacles, and Lighting

Since both the Lee Road corridor and the Van Aken District house several major destinations, including local shops, restaurants, and the library, people biking will want to socialize in the area, support the businesses, and possibly rest during or after their bike ride. Benches, trash receptacles, and lighting will make the bicycling experience more enjoyable. While these amenities already exist at the ends of the corridor (outside the library and in the Van Aken District), Shaker Heights may consider adding more of these amenities throughout the corridor as bicycling activity is observed.

### Bicycle Repair Stations

As Shaker Heights monitors activity along the new bicycle lanes, bicycle repair stations may be a desirable addition to the corridor. Bike repair stations, located outside the Van Aken District or the library, can enhance the bicycle trip experience and reduce barriers to riding, such as concern over the reliability of equipment. Another benefit of bicycle repair stations is that they allow people to make basic repairs without having to go to a bicycle shop or buy their own tools.

## PAVEMENT MARKINGS AND SIGNAGE

Appropriate signing and pavement markings are essential to delineate the bike facility and communicate right of way priority at intersections.

At intersections, pavement markings are used to highlight conflict areas and aid bicyclist navigation. Recommended markings for Van Aken Boulevard include bicycle crossing markings (also called conflict markings), bike boxes, and two-stage bike turn boxes.

## Bicycle Crossings

Table 6-10 in the ODOT Multimodal Design Guide recommends bicycle crossing markings at intersections. Bicycle crossings consist of dotted extension lines through the intersection. For separated bike lanes, these markings should be supplemented with green-colored pavement to enhance the conspicuity of the bicycle crossing. The green-colored pavement should align with the dotted extension line pattern of the dotted edge lines.

## Bike Boxes

A bike box is an area on the approach to signalized intersections where bicyclists can wait (at a red light) and be seen more easily by people driving. Bike boxes are located in between the crosswalk and the stop bar. These boxes mitigate conflicts between people biking and driving at the start of the green signal phase.

Along Van Aken Boulevard, bike boxes at the end of the bike lane can help increase the visibility of bicyclists and help remind people driving that bicyclists will be merging with general traffic.

Where bike boxes are installed, they must be accompanied by a “No Turn on Red” restriction to prevent drivers from crossing over the bike box where people may be queuing.

## Two-Stage Bike Turn Boxes

Two-stage bike turn boxes help bicyclists in the bike lane (on the right side of the road) make left turns without merging into a lane with motor vehicles. These boxes designate an area at an intersection where bicyclists can safely wait until vehicle traffic has passed before completing their turn. The use of a two-stage turn box is permitted at signalized intersections under FHWA Interim Approval IA-20.12. The Interim Approval provides specific requirements and standards regarding the use and placement of two-stage turn boxes.

Two-stage turn boxes may also be used for right turns (if the bike lane is on the left side of the road). If a two-stage turn box is in the path of vehicles turning right, then a “No Turn on Red” sign must be installed. Two-stage turn boxes are recommended at all signalized intersections on Van Aken Boulevard to assist bicyclists with turning.

## Signage

Since the addition of bicycle lanes changes the existing operation on Van Aken Boulevard, several signs can help people both biking and driving to understand the new street design. This section explains some of the regulatory signs that are recommended as people adjust to the new design of Van Aken Boulevard.

***Bike Lane Signs and Plaques:*** A bike lane sign (R3-17) with a plaque reading “AHEAD” (R3-17aP) should be installed on Van Aken Boulevard eastbound, just before the Lee Road intersection, to alert drivers that the bike lane is starting soon. This sign can also be installed at the eastern end of the corridor. The bike lane sign and the plaque reading “ENDS” (R3-17bP) should be installed at the end of the bicycle lanes: on Van Aken Boulevard eastbound (just before Farnsleigh Road) and on Van Aken Boulevard westbound (just before Lee Road).

***Parking Regulation Signs:*** A “No Parking – Bike Lane” sign (R7-9, R7-9a) alerts drivers not to park in the bicycle lane. These signs are recommended between Lee Road and Parkland Drive/Lynnfield Road, where the bicycle lane occupies the space that people may have grown accustomed to using for parking.

***Bicycle Box Signs:*** A sign reading “Stop Here on Red” (R10-6, R10-6a) should be installed at the intersection of Van Aken Boulevard westbound and Lee Road, where a bicycle box will allow bicyclists to queue ahead of drivers. When bicycle boxes are installed, drivers may get confused about where they should stop for a red light. Signage can help clarify this issue by directing them to stop at the stop line. Additionally, a “No Turn on Red” (R10-11, R10-11a) sign should be installed at the intersection to prevent drivers from turning in the area where bicyclists are queuing.

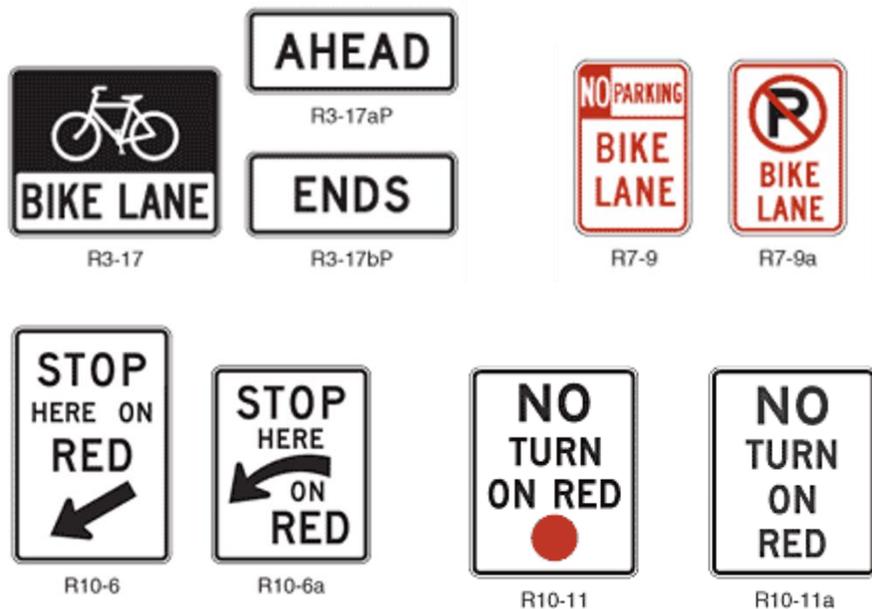


Figure 33: Signage Recommended for Van Aken Boulevard

(Source: MUTCD 2009)



# **CHAPTER 4**

# **COMMUNITY ENGAGEMENT**



# COMMUNITY ENGAGEMENT

Between February 2023 and April 2023, Toole Design and the City began engaging the public regarding the Van Aken Bikeway Plan. The plan was developed over the last six months and included two rounds of community engagement and an online survey. As part of the community engagement process, the project consultant team of Toole Design and WSP, along with Planning staff, facilitated a series of well-attended community meetings. A total of 779 residents participated in the plan development through virtual meetings, in-person meetings, an online survey and a walk & bike audit of the project area. The online survey gathered feedback from over 600 respondents. Before each of the two rounds of community engagement, over 1,000 postcards were mailed to reach every resident living on Van Aken Boulevard between Farnsleigh and Lee Roads. Postcards and fliers were also distributed to local businesses in and around the project area, as well as at the Library, Stephanie Tubbs Jones Community Building, and Thornton Park. The Planning Department also conducted focused outreach by sending letters to the apartment and condominium building owners and management, and to the single-family homes on Van Aken Boulevard to offer individual meetings. Event information for both rounds of engagement was also shared through the City's various social media, website, and ENews channels. Residents of Shaker Heights and the surrounding areas were consulted during two phases of the project: during the existing conditions phase and during the concept development phase. During the existing conditions phase, residents could participate virtually at a public meeting on Zoom, in-person at Van Aken Market Hall, or online through a survey. During the concept development phase, residents could attend an in-person public meeting and/or attend a walk and bike audit to discuss the proposed concept. This chapter discusses the feedback received from each engagement opportunity and provides a general summary with recommendations for ensuring that the community's feedback is reflected in the final design. The overall community engagement schedule is shown below.



## VIRTUAL PUBLIC MEETING (FEBRUARY 1)

According to the Zoom attendance report, 46 members of the public attended the virtual public meeting, held over Zoom on February 1. Participants were asked to respond to four questions in breakout rooms. Below is a summary of the most common responses to the questions.

### Where do you feel there are issues for walking and biking along or across Van Aken Boulevard?

In general, people felt that the whole corridor presented issues for people walking and biking. The Lee Road intersection was called out the most as being uncomfortable and unsafe to cross. People also mentioned the Farnsleigh Road intersection, the Parkland Drive/Lynnfield Road intersection, and the Avalon Road intersection. Specific issues at these intersections included exposure to vehicles and needing to push the button to receive a pedestrian crossing signal. Throughout the corridor, people expressed concerns about the high vehicle speeds and high traffic volumes, both of which combined to create an uncomfortable environment for walking and biking (although there seemed to be a consensus that biking was more difficult than walking). People expressed both curiosity and concern over the idea of removing one motor vehicle travel lane.

### **If you park on Van Aken Boulevard, where do you park?**

Most people attending the meeting did not live directly on Van Aken Boulevard, but they still provided insights into where they usually park. Along Van Aken, several people noted that they use on-street parking near the Lee Road intersection. People noted that while apartment and condominium residents have garage parking, their guests typically utilize the RTA parking. St. Dominic's mass was repeatedly named as an event that increases parking utilization. Several people expressed disapproval of the outside lane of Van Aken Boulevard, which simultaneously functions as both a travel lane and an on-street parking lane during off-peak travel periods. People felt that this was unsafe because people driving in the outside lane may unexpectedly come upon a parked car and need to change lanes to pass the parked car. Additionally, several meeting participants noted that they travel the corridor on foot or on bike and typically do not park a car at all.

### **What type of bicycle facility would you be comfortable using?**

Most meeting attendees preferred separated bike lanes over buffered or painted bike lanes. When considering vertical separation, concrete medians were slightly more popular than flexible delineator posts or a parking-protected bike lane. People were concerned that flexible delineator posts would be easy to knock over and would need consistent replacement. For both types of separation, people had concerns about maintenance and snow clearing. Some people even suggested removable separation (such as retractable bollards or removable barriers) to make maintenance easier. Some people liked the two-way cycle track option, but many people stated they would not feel comfortable biking in the opposite direction of traffic. Most people did not like the buffered or painted bike lanes. Some attendees felt that painted bike lanes would be ignored by drivers, while others felt that sharing a lane with cars was safer than riding in a painted bike lane. The bike lane between curbside parking and a vehicle travel lane was an unpopular option, as most people were concerned about people in parked cars opening driver-side doors into the bike lane (often referred to as "dooring") and cars entering the roadway from the parking lane. Other general concerns included an increase in neighborhood cut-through traffic and turning movements across the bike lane at intersections.

### **It's five years from now, 2028. How are you using the new bicycle facility?**

Meeting attendees want the new bicycle facility to connect them to places around Shaker Heights, to make biking an option for more people, and to make biking safer and more comfortable. Many people stated that they would use the bicycle facility to get to the Van Aken District and to connect to Lee Road. Participants mentioned getting ice cream, going grocery shopping, visiting the pool, and other trips they would like to make by bicycle on a new bicycle facility. In addition, several people mentioned that they would like the new bicycle facility to make it easier for kids, families, grandparents, and inexperienced cyclists to travel by bicycle. Finally, many people simply stated that a new bicycle facility would make them ride their bicycle more. People mentioned that they would feel safer and more comfortable biking, and that even walking may feel more comfortable because of the new facility.

## **MARKET HALL OPEN HOUSE (FEBRUARY 8)**

At the open house at Van Aken District Market Hall, people placed stickers and wrote on sticky notes on three different boards, asking about bike facility types, intersection concerns, and future goals for the bike facility. Sign-in sheets showed that 57 members of the public were in attendance.

### **Bike Facility Types**

Almost everyone at the open house noted that they would feel comfortable using separated bike lanes and uncomfortable using painted or buffered bike lanes. Separated bike lanes with a concrete median received the most green stickers (indicating comfort), followed by separated bike lanes with flexible delineator posts and a two-way cycle track. The painted bike lane next to parking received the most orange stickers (indicating discomfort), followed by buffered bike lanes, and then painted bike lanes. These results are shown in the graph in **Figure 34**.

## Intersection Concerns

While there were safety concerns at every intersection along the corridor, people had the most concerns about the Lee Road intersection. The open house attendees were specifically concerned about fast vehicle speeds, turning movements, and a lack of pedestrian infrastructure. People noted that it was very difficult both on foot and on a bicycle, and their suggestions for improving safety included a bike box and leading pedestrian intervals. There were also numerous concerns about the Farnsleigh Road intersection. People requested better pedestrian crossings for reaching the Van Aken District, and someone noted that they currently bike on the sidewalk to avoid the crossing. The graph in **Figure 35** shows which intersections open house participants believe need the most attention.

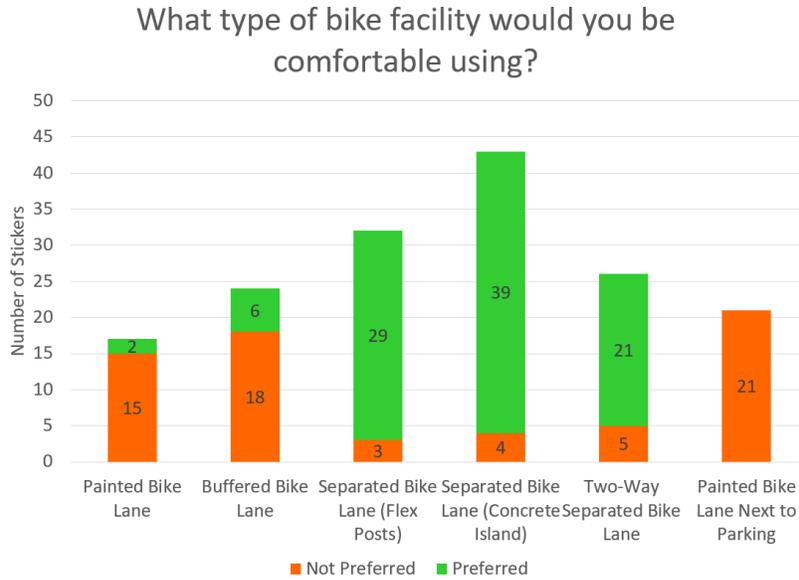


Figure 34: Open house respondents prefer separated bike lanes to painted or buffered lanes.

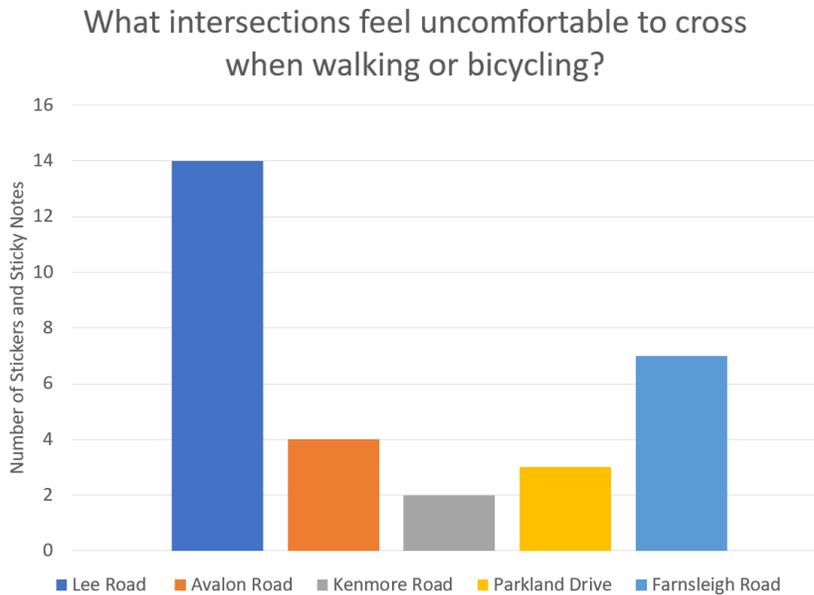


Figure 35: Open house respondents feel most uncomfortable when walking or bicycling across Lee Road.

## Future Uses

Open house attendees want to use the new bicycle facility to connect them to places around Shaker Heights and to spend time with their families. Several people noted that they would like to go on bike rides with their kids or use the bicycle facility to visit family members on or around Van Aken Boulevard. Others said that they would use the bicycle facility for commuting, exercising, and visiting local businesses. Several people also suggested places that the bicycle network could connect to, such as Shaker Boulevard (along Warrensville Center Road), Shaker Square, and Horseshoe Lake Park.

## ONLINE SURVEY (FEBRUARY 1 – MARCH 1)

The project team created an online survey so that people unable to attend either the virtual meeting or the open house would still be able to share their comments on the Van Aken Boulevard bikeway plan. A total of 617 people participated in the survey, although not every response was complete. For the optional question about where respondents lived, about 30% of respondents (136 of 468) live outside of Shaker Heights. Additionally, the demographics of the survey respondents do not reflect the demographics of Shaker Heights residents, as two thirds of respondents identified as male and over 85% of respondents identified as white. The survey questions covered bikeway alignment, facility type, parking habits, and biking habits.

## Bikeway Alignment

Most survey respondents prefer one-way bike facilities on eastbound and westbound Van Aken Boulevard, as seen in **Table 5**.

**Table 5: Bikeway Alignment: Number of Responses by Selection**

<b>Bikeway Alignment</b>	<b>Responses</b>
Two-way bike facility on westbound Van Aken	142
Two-way bike facility on eastbound Van Aken	81
One-way bike facilities on eastbound and westbound Van Aken	360

## Facility Type

Survey respondents were asked to rate several bike facility types on a scale of 1 to 5. Separated bike lanes (with median/plantings) received the highest average score (4.5/5). Parking-protected bike lanes, separated bike lanes with flex posts, and a two-way cycle track all received an average score of over 3/5. Buffered bike lanes received an average score of 2.3/5, while conventional (painted) bike lanes and bike lanes next to curb-adjacent parking both received the lowest scores (below 2/5). These results are shown in **Table 6**.

**Table 6: Bikeway Types: Number of Responses by Selection**

Bikeway Type	1/5	2/5	3/5	4/5	5/5
Conventional bike lane	304	78	50	27	23
Buffered bike lane	117	202	110	51	33
Separated bike lane (flex posts)	25	67	178	184	80
<b>Separated bike lane (median/plantings)</b>	42	7	26	51	<b>417</b>
Parking-protected bike lane	17	63	122	203	115
Two-way cycle track	48	95	133	138	100
Curb-adjacent parking	368	63	24	10	15

## Parking Habits

Most survey respondents did not report regularly parking on Van Aken Boulevard. While most respondents reported not parking at all between Farnsleigh Road and Parkland Drive/Lynnfield Road, most of those who did park in the area reported parking in a garage or in their assigned building parking. People generally did not feel strongly about maintaining on-street parking. These results are shown in **Table 7**.

Table 7: Parking Habits: Number of Responses by Selection

I regularly park my car on eastbound Van Aken.

Yes	No
25	517

I regularly park my car on westbound Van Aken.

Yes	No
23	519

Where do you currently park between Farnsleigh and Lynnfield/Parkland? (check all that apply)

Option	# of Responses
RTA Parking Overnight	20
RTA Parking Daytime	55
On-street along the curb	75
Garage/assigned building parking	111
Other	37
None	309

**On Street Parking on Eastbound Van Aken:** It is important to keep on-street parking between Lynnfield and Farnsleigh in addition to RTA parking areas.

Option	# of Responses
Strongly Agree	31
Agree	60
Neutral	223
Disagree	105
Strongly Disagree	102

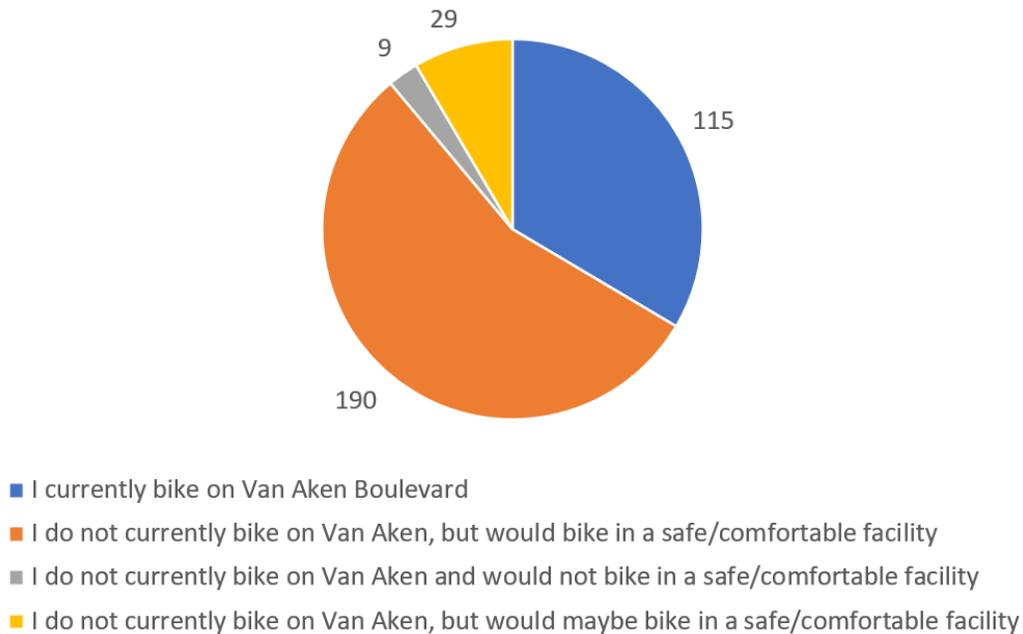
**On-Street Parking on Westbound Van Aken:** It is important to keep on-street parking between Parkland and Farnsleigh in addition to RTA parking areas.

Option	# of Responses
Strongly Agree	35
Agree	53
Neutral	221
Disagree	103
Strongly Disagree	105

## Biking Habits

Most of the survey respondents do not currently bike on Van Aken Boulevard but reported that they would bike if a safe and comfortable facility was added. This is shown in **Figure 36**.

Do you currently bike on Van Aken Boulevard?  
Would you bike if a safe, comfortable bike facility was added?



**Figure 36: Most survey respondents said that they would bike on Van Aken Boulevard if a safe, comfortable bike facility was installed.**

## ST. DOMINIC OPEN HOUSE (APRIL 13)

The project team hosted an open house at St. Dominic School on April 13 from 5:00-7:00 PM. There were 26 attendees. The project team presented a roll plot of the proposed concept design. Based on community feedback, the proposed design includes physical separation at intersections, and to accommodate curbside uses, the physical separation is dropped after intersections. Boards at this open house explained the project timeline, the proposed concept design, and two alternative options for intersection configurations. Attendees provided feedback on the roll plot, the intersection design options, and their comfort level on the proposed facility.

### Concept Design Roll Plot

Open house attendees focused their roll plot comments mostly at Lee Road, Avalon Road, and Farnsleigh Road. At Lee Road, people made note of existing pedestrian/bicycle challenges that they hoped could be addressed, such as signal phasing and poor pavement quality. There was also a suggestion for signage alerting motorists that bicyclists would be merging into traffic. At Avalon Road, people commented on delineators (suggesting both more and less delineators), and someone requested bicycle signals. At the Farnsleigh Road intersection, people

made several suggestions for bicyclist safety/comfort, including more delineators, a bike box, and signage for path users.

### **Intersection Design Options**

In general, most people opposed the suggestion of restricting turning movements from diagonal streets. There were several comments expressing concern over directing more traffic to Fernway Road, including one comment that discussed kids walking along Fernway Road to get to the school bus. Another person was concerned about the inconvenience that turn restrictions would create for drivers. One person who was not in opposition suggested piloting the turning restrictions before making any permanent changes.

### **Proposed Facility Comfort Level**

Sixteen people at the open house placed stickers on one of the boards to indicate their level of comfort with biking on the proposed facility. Twelve people (75%) stated they would feel very comfortable or somewhat comfortable. One person said they would feel neither comfortable nor uncomfortable, while three people (19%) stated they would feel very uncomfortable.

## **WALK/BIKE AUDIT (APRIL 18)**

On Tuesday, April 18 from 6:00-7:30 PM, the project team led a walk/bike audit along Van Aken Boulevard. There were ten attendees. Both groups began at St. Dominic School. The walking group walked between Parkland Drive/Lynnfield Road and Farnsleigh Road along Van Aken eastbound and westbound. The biking group biked the entire project corridor (from Lee Road to Farnsleigh Road) along both Van Aken eastbound and westbound. Five members of the public joined the walk audit, and five members of the public joined the bike audit.

### **Walking Group**

Participants of the walk audit expressed concerns over the removal of a general-purpose lane to add the bike lane. They were worried that reducing Van Aken Boulevard to one lane in each direction would cause congestion, especially given that new apartments are being constructed in the Van Aken District. Additionally, there were concerns about cars parked in the RTA parking spaces. Walk audit participants expressed their worry that these cars would block traffic while trying to park and while trying to back out.

While walking, the walk audit participants remarked that many people do drive over the speed limit (35 mph) on Van Aken Boulevard. The intersections at Parkland Drive/Lynnfield Road and Farnsleigh Road had to be crossed in two stages, as the walk signal did not stay on long enough to allow the group to cross the entire intersection at once.

### **Biking Group**

Participants of the bike audit expressed general support for the proposed bicycle lanes, although they still had several suggestions and concerns. Several people noted that even though they would feel more comfortable riding in the new bicycle lanes, they still had concerns over allowing children to ride in the bicycle lanes. A few people expressed a desire for stronger physical barriers (such as concrete medians) or more frequent physical barriers (such as additional flexible delineators).

While biking, the bike audit participants noticed many people drove at a speed that felt dangerous to people biking. Several people noted that they felt safer and more comfortable while biking in a large group, but that they would not feel as safe or comfortable if they were biking by themselves. Bike audit participants found the Farnsleigh Road intersection very confusing to navigate, and they remarked that a short bike lane segment through the intersection (along Farnsleigh Road) would help simplify the crossing.



**CHAPTER 5**  
**CONCEPT DESIGN**



# CONCEPT DESIGN

The recommended concept design is a combination of buffered and separated bike lanes. From Lee Road to Parkland Drive/Lynnfield Road, the recommended design is buffered bike lanes with flex posts at intersections. This design maintains one general travel lane. From Parkland Drive/Lynnfield Road to Farnsleigh Road, the recommended design is parking-protected bike lanes. This design maintains on-street parking, as well as one general travel lane.

## BUFFERED/SEPARATED BIKE LANES

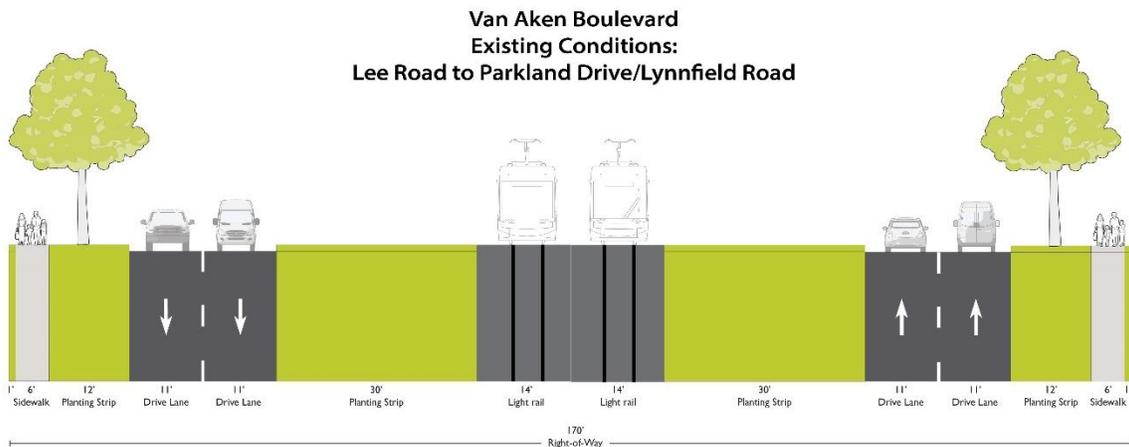
The combination buffered/separated bike lane is the recommended design to give bicyclists a safe and comfortable riding experience while still accommodating curbside access for maintenance and emergency vehicles.

Using best practices, including guidelines from the National Association of City Transportation Officials (NACTO) and the Federal Highway Administration (FHWA), a separated bicycle lane throughout the entire corridor is the appropriate option. This is based on the current speeds (over 35 mph) and traffic volumes (over 6,000 vehicles per day) on Van Aken Boulevard. Separated bicycle lanes may include several types of vertical separation, such as flex posts, parked cars, or concrete medians. Concrete medians were the most popular type of separation among people who came to the open house and took the online survey.

As the design process continued and city staff from the Public Works Department, the Fire Department, and the Police Department were consulted, there were concerns about the ability to access the curb for maintenance, service, and safety operations. These operations include brush collection, leaf collection, sweeping, and snow plowing. To accommodate these concerns, a buffered bike lane is recommended from Lee Road to Parkland/Farnsleigh Road (where most single-family houses are), and vertical separation (flex posts) is recommended at the intersections to increase separation between modes where it is most needed. The bike lane is separated (parking-protected) from Farnsleigh Road to Parkland Drive/Lynnfield Road, which was another popular option in public engagement.

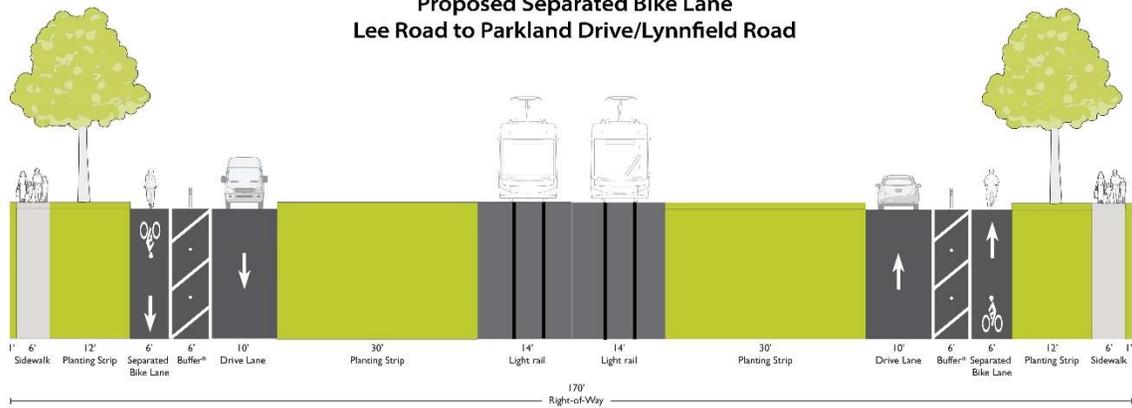
## EXISTING AND PROPOSED CROSS SECTIONS

From Lee Road to Parkland Drive/Lynnfield Road, the existing outside travel lane (with parking allowed off-peak) will become a buffered bicycle lane.



**Figure 37: Existing Conditions from Lee Road to Parkland Drive/Lynnfield Road**

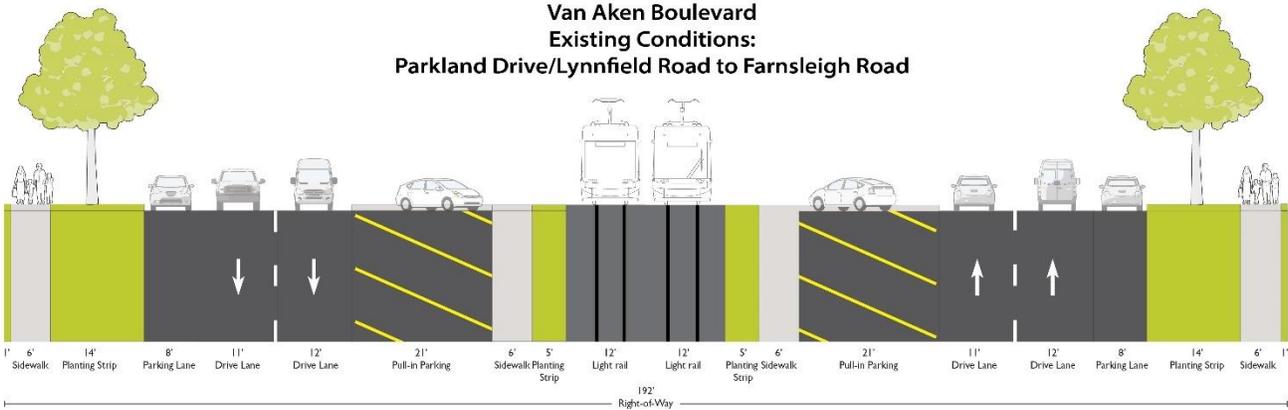
**Van Aken Boulevard  
Proposed Separated Bike Lane  
Lee Road to Parkland Drive/Lynnfield Road**



**Figure 38: Proposed Bicycle Lane from Lee Road to Parkland Drive/Lynnfield Road**

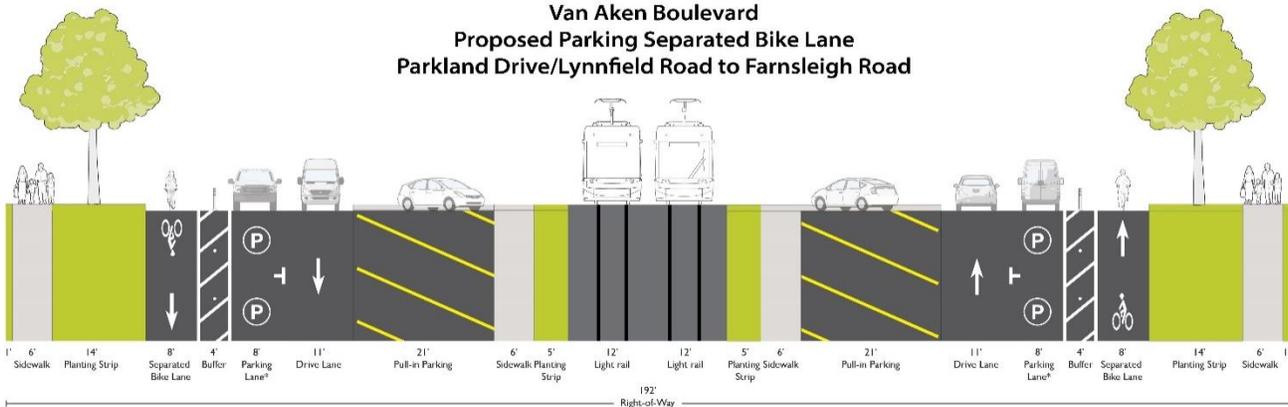
From Parkland Drive/Lynnfield Road to Farnsleigh Road, one general travel lane will be removed to make space for the parking-protected bike lane. On-street parking will be maintained.

**Van Aken Boulevard  
Existing Conditions:  
Parkland Drive/Lynnfield Road to Farnsleigh Road**



**Figure 39: Existing Conditions from Parkland Drive/Lynnfield Road to Farnsleigh Road**

**Van Aken Boulevard  
Proposed Parking Separated Bike Lane  
Parkland Drive/Lynnfield Road to Farnsleigh Road**



**Figure 40: Proposed Bicycle Lane from Parkland Drive/Lynnfield Road to Farnsleigh Road**

## RENDERINGS

The renderings below show the proposed design for the buffered/separated bicycle lanes.



Figure 41: Rendering of Proposed Buffered Bicycle Lanes (Lee Road to Parkland Drive/Lynnfield Road)



Figure 42: Rendering of Proposed Parking-Protected Bicycle Lanes (Parkland Drive/Lynnfield Road to Farnsleigh Road)

# INTERSECTION DESIGN

The figures below illustrate the proposed design at intersections. The proposed design accommodates all turning movements that are currently allowed.

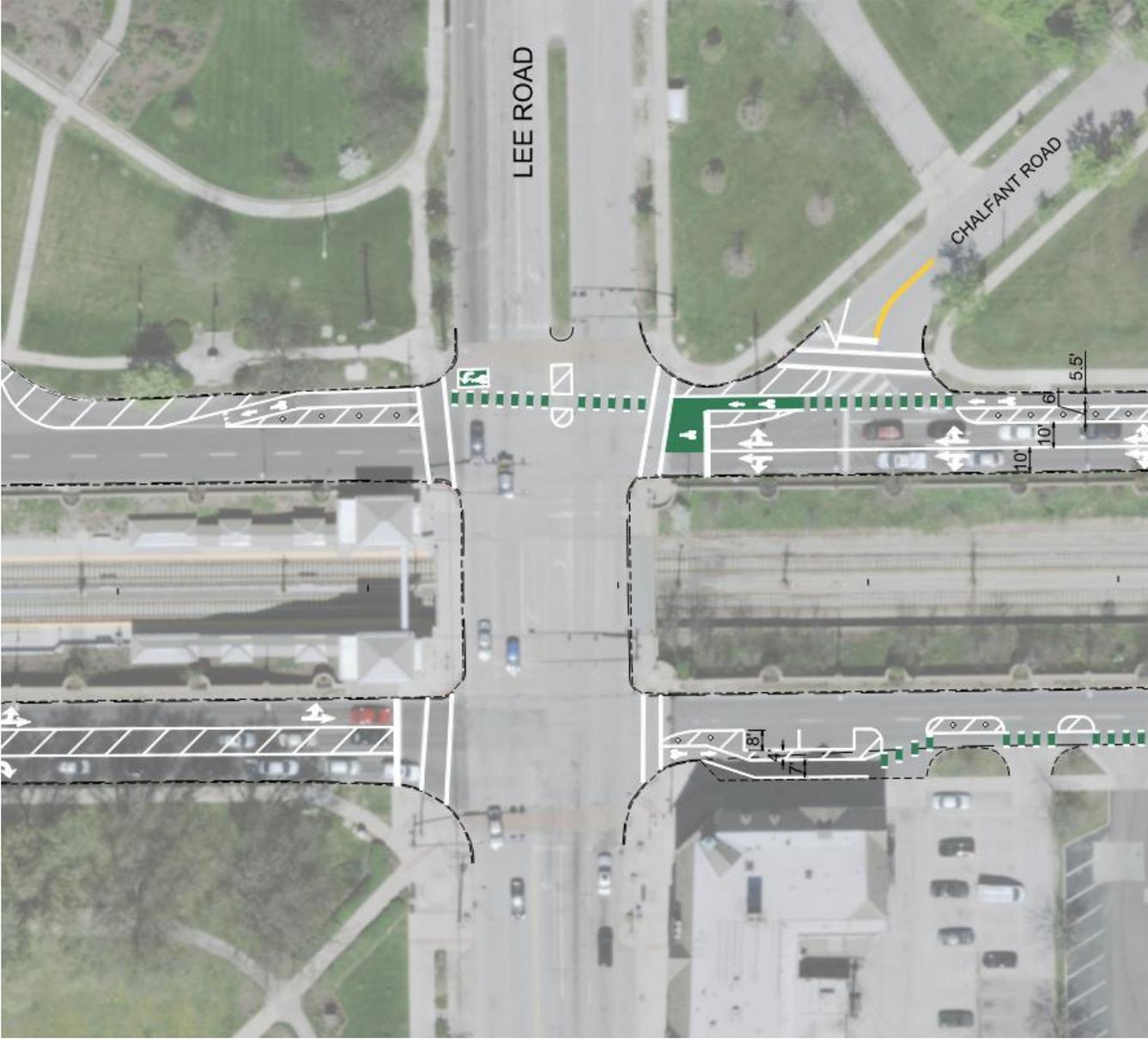


Figure 43: Lee Road Intersection

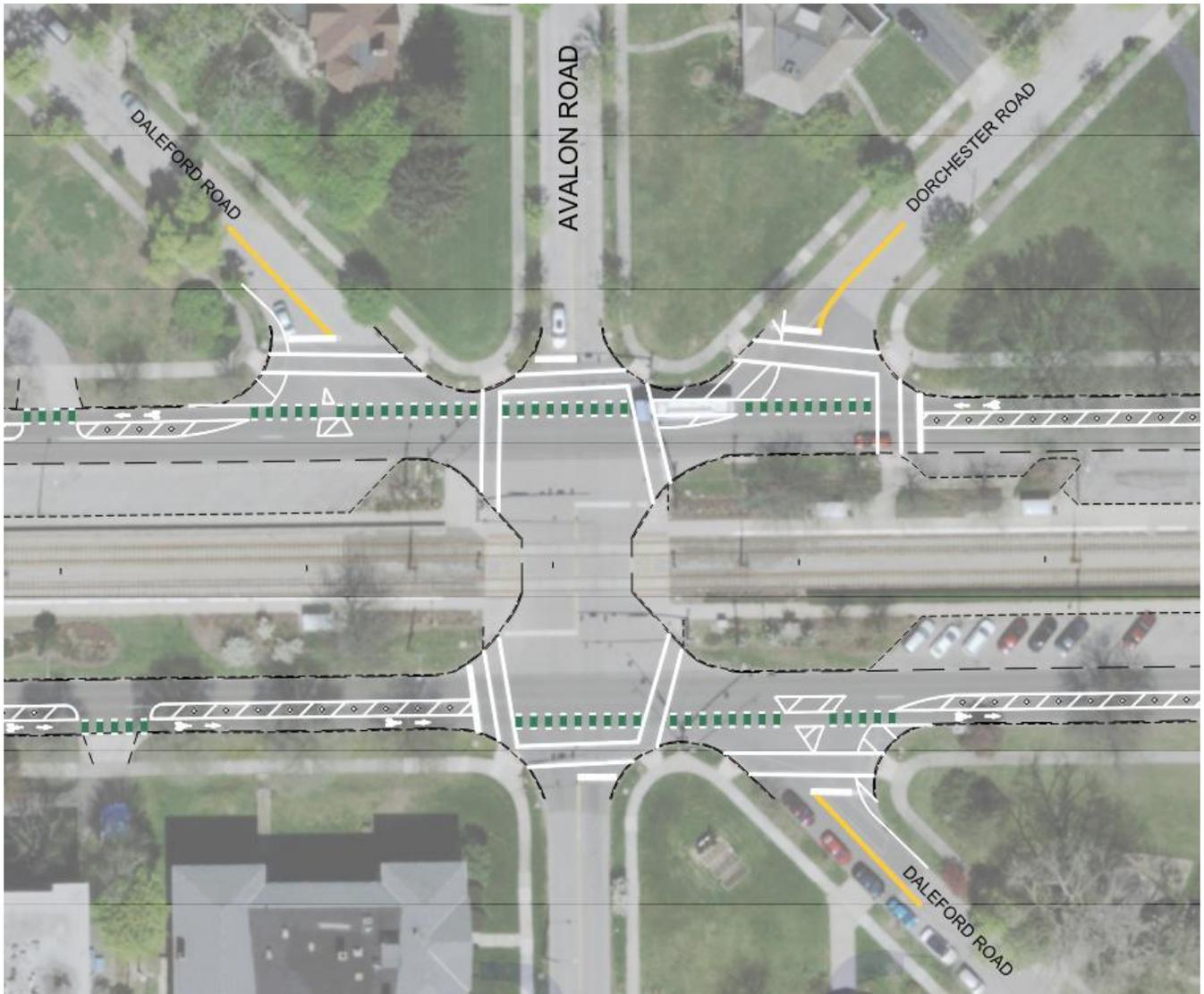


Figure 44: Avalon Road Intersection

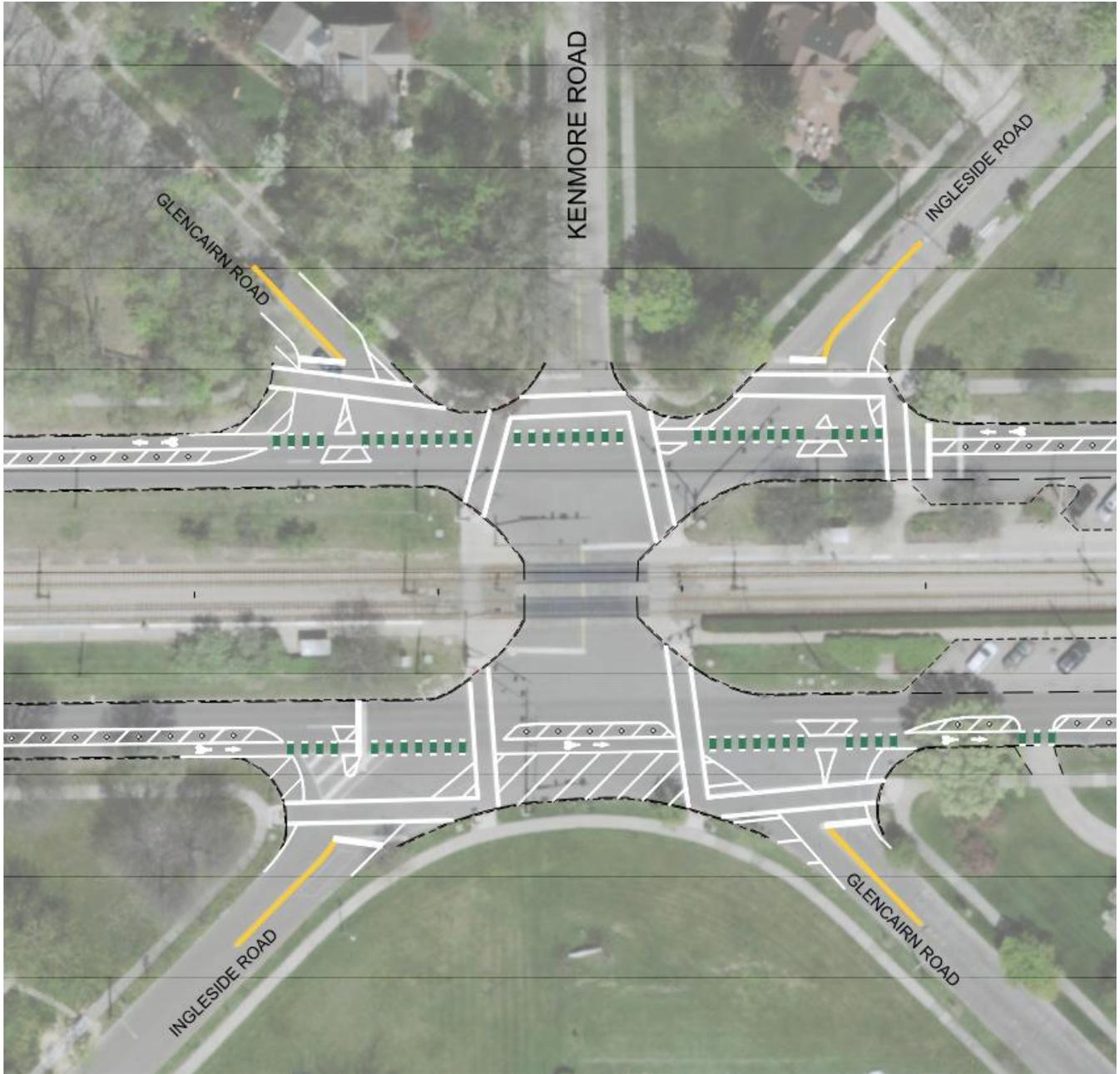


Figure 45: Kenmore Road Intersection

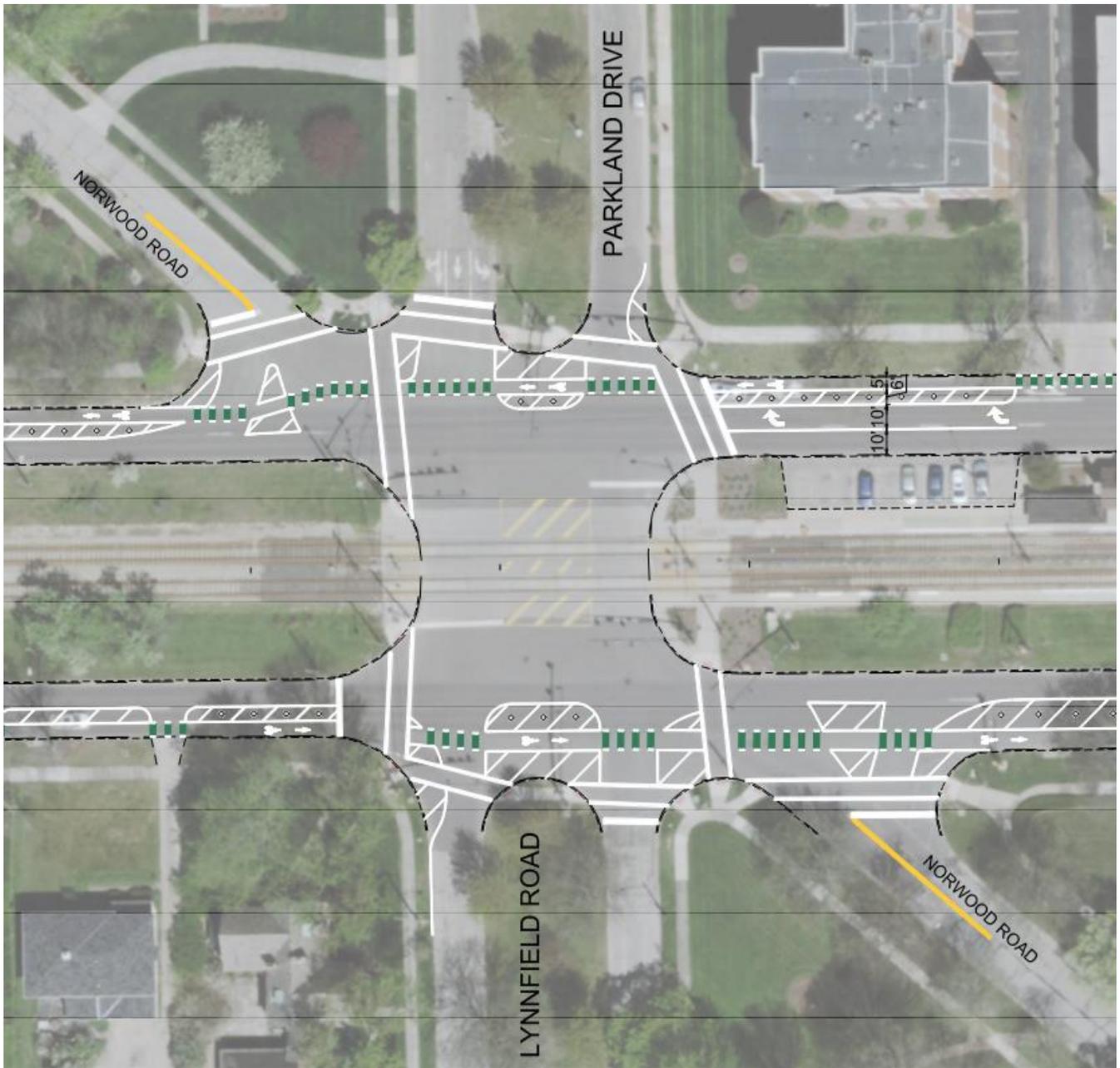
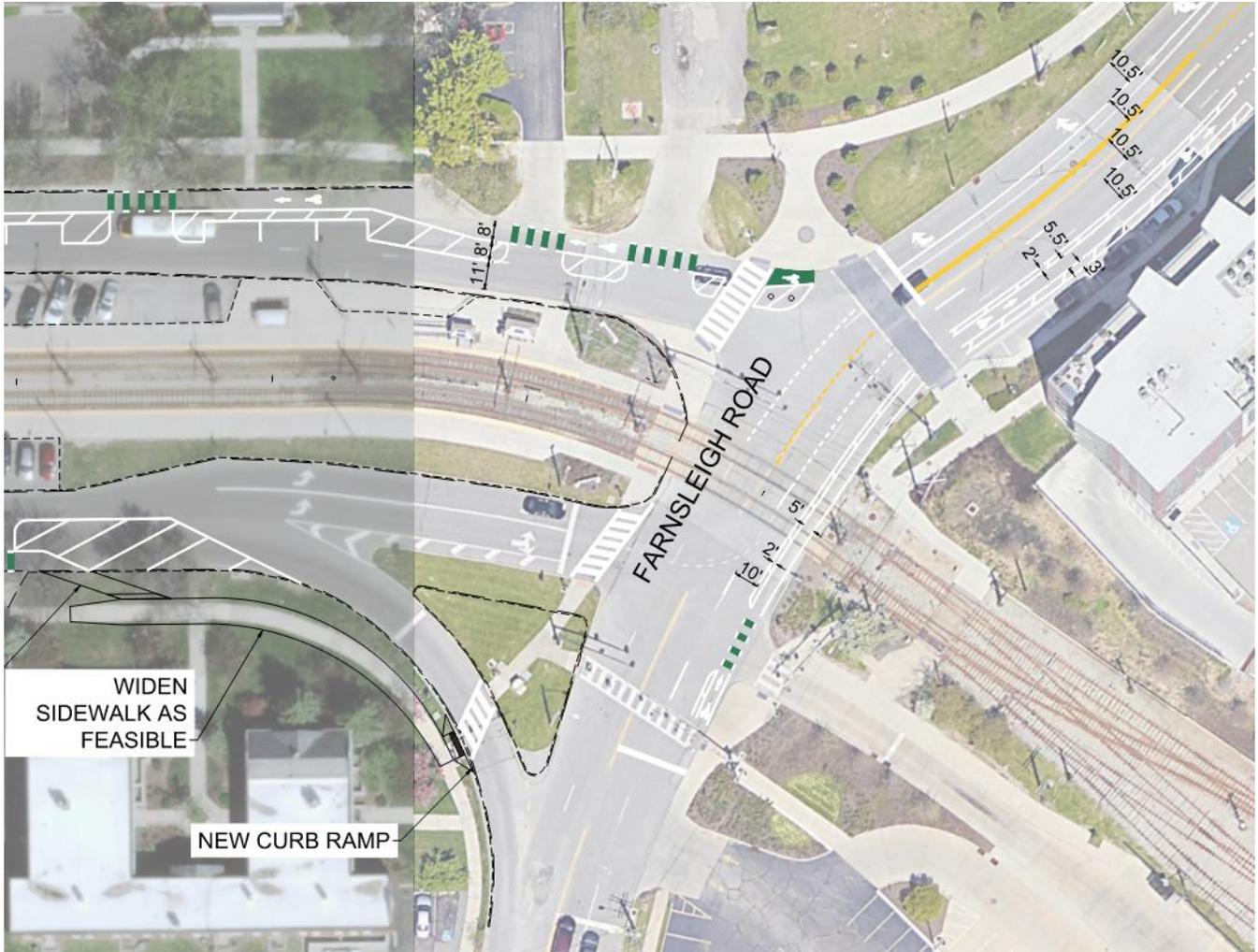


Figure 46: Parkland Drive/Lynnfield Road Intersection



**Figure 47: Farnsleigh Road Intersection**

Information contained in this document is for planning purposes and should not be used for final design of any project. All results, recommendations, concept drawings, cost opinions, and commentary contained herein are based on limited data and information and on existing conditions that are subject to change. Further analysis and engineering design are necessary prior to implementing any of the recommendations contained herein.



# APPENDIX

(Appendices are included as separate files)

