



VILLAGE OF NORTHBROOK MASTER BICYCLE AND PEDESTRIAN PLAN



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Plan Adoption

The Village of Northbrook Master Bicycle and Pedestrian Plan was adopted by the Board of Trustees on July 24, 2018.

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CHAPTER 1: PLAN OVERVIEW

Background & Purpose

The Village of Northbrook is a suburban community in the northern Cook County, Illinois, located minutes away from Lake Michigan and 20 miles north of Downtown Chicago. The Village's 33,170 residents enjoy an enviable mixture of quality housing, exceptional schools and public services, numerous parks and recreational amenities, and access to regional amenities and transit services.

In recent years, community residents have expressed their desire for more opportunities for walking and bicycling and better connections to regional trail facilities. In response, Village of Northbrook staff has begun to systematically plan for and develop infrastructure to support walking and bicycling, both for transportation and recreation. Previous planning efforts have identified improvements to create walkable neighborhoods, safer streets for people of all ages and abilities, and better access to local and regional destinations for people traveling on foot and bike.

In 2017, the Village of Northbrook initiated the planning process for the Master Pedestrian and Bicycle Plan. This Plan synthesizes many of the previous planning efforts and creates a vision and blueprint for building a more walkable and bikeable Northbrook. Recommendations in this plan include both short-range and long-range infrastructure recommendations, like new sidewalks, bike lanes, and trails, as well as policy recommendations and programming opportunities designed to make walking and bicycling, safer, more convenient, and more enjoyable for people of all ages and abilities.



Figure 1. Trails in and around Northbrook are popular community amenities. (Source: Northbrook Park District Facebook Page)

Setting the Stage for Success: Vision and Goals

The Village of Northbrook Master Pedestrian and Bicycle Plan establishes a strategy to support walking and bicycling as viable, accessible, and inclusive modes of transportation. Over the course of the planning process, community residents, businesses, institutions, and other stakeholders have shared their aspirations and ideas for walking and bicycling in Northbrook, and these aspirations and ideas are encapsulated in the plan vision and goals.

The plan vision is aspirational and ambitious, representing the desired future for walking and bicycling. The plan goals are broad, value-based expressions of the community's desires that can guide decision-making and bring the plan vision to life. Goals give direction to the plan as a whole and provide a foundation for the recommendations and implementation strategies outlined later in the plan. The plan vision and goals are firmly rooted in input from community members; guidance from Village staff, the Public Works Committee, the Bicycle Task Force, and detailed analysis of existing conditions.

Plan Vision

The Village of Northbrook is a walkable, bicycle friendly community where:

- » Walking and bicycling are convenient and enjoyable ways to travel
- » The transportation system prioritizes the comfort, safety, and accessibility for everyone
- » Walking and bicycling are a logical, integral, and fun part of living, working, and spending time in Northbrook
- » Residents are connected to parks, schools, neighborhoods, businesses, and regional destinations through a comprehensive network of streets, sidewalks, trails, and intersections
- » People of all ages and abilities are welcome and accommodated in the transportation network

Plan Goals

To achieve this vision, the Village has established the following goals:

- » Create an integrated, connected, and accessible network of transportation infrastructure built to the best practices in bicycle and pedestrian design
- » Design and maintain a transportation system in a good state of repair for all users
- » Be responsive to the needs of people walking, bicycling, driving, and using transit
- » Foster a culture that encourages and embraces walking and bicycling as fun, healthy, and expected ways of getting around
- » Prioritize the safety of transportation network users to protect them from hazardous behaviors or environments, and reduce user risk through design
- » Coordinate with other agencies to reduce crashes through a multidisciplinary approach
- » Develop an ongoing awareness and understanding of travel patterns, traffic levels, and needs of the network for people walking, bicycling, and using transit

Plan Organization

The plan is divided into five chapters. These chapters roughly reflect the general timeline of the planning process.

Chapter 1: Plan Overview

The plan overview chapter provides a brief introduction to the plan and its purpose, introduces the vision and goals that guide plan development, and lists the contents and organization of the plan document.

Chapter 2: Public Engagement

Public input is instrumental to the success of any planning process, and this plan is no different. This chapter documents the public engagement activities through which community residents shared their aspirations, desires, and ideas for a walkable and bikeable Northbrook. This included outreach at community events, public workshops, and an online survey and mapping tool. Community residents expressed the need for more trails and on-street bicycle facilities, safer roadway crossings, and better walking and bicycling access to schools, shopping, parks, and nearby regional trails and amenities.



Figure 2. The Northbrook Park District's annual Youth Duathlon brings kids of all ages to the Ed Rudolph Velodrome. (Source: Northbrook Park District Facebook Page).



Figure 3. Numerous trails in and around the Village will provide the foundation for an interconnected network of safe, comfortable, and accessible walking and bicycling facilities. (Source: Northbrook Park District)

Chapter 3: Existing Conditions Analysis

An understanding of the current environment for walking and bicycling and of related plans and studies is critical to the development of plan recommendations. This chapter of the plan sets the stage for subsequent chapters by providing a detailed inventory and analysis of bicycling and walking conditions, demand for pedestrian and bicycle facilities, opportunities and constraints for future infrastructure development, and review of relevant policy and planning documents.

Chapter 4: Recommendations

The recommendations chapter provides a diverse and comprehensive set of strategies through which the Village of Northbrook can achieve the vision of a walkable and bike-friendly community. The recommendations utilize the Five E's framework of a walkable and bikeable community (engineering, education, encouragement, enforcement, and evaluation), which were first popularized by the National Safe Routes to School Coalition and the League of American Bicyclists as a holistic approach to influencing built, social, and policy environments to better support walking and bicycling.

The infrastructure improvements recommended in this chapter will transform the Village's roads and public spaces and establish a village-wide active transportation network to make bicycling and walking safe, convenient, and enjoyable travel and recreation choices for all.

Supporting policy and program recommendations are also included to further support walking and bicycling. These policies and programs, like safe routes to school programs, organized bicycle rides, education and outreach campaigns, and Complete Streets policies, are as equally important as recommended infrastructure improvements to achieving the overall vision for this plan.

Chapter 5: Implementation

The implementation chapter establishes a strategy for the Village of Northbrook to act on the plan's recommendations. The chapter includes near-term strategies to begin the implementation process, funding sources to leverage Village resources, revisions to the Village's design standards and specifications to better support bicycling and walking, and a prioritization strategy to weigh the value of each recommended infrastructure project.

nders Road at Lake Cook Road
ide, high-speed intersection
sidewalks only on southwest
ner

ringsten Road at Lake Cook Road
ns Spur
Wide, high-speed intersection
No sidewalks on Courtyard by
Marriott side (in Deerfield, outside of
village limits)

Waukegan Road (IL 43) at Edens
r / Somme Woods Forest Preserve
High-speed overpass
No sidewalks on bridge

Skokie Boulevard at Lake Cook

- Wide, high-speed intersection
- Bus stops located on
Road

Dundee Road (IL 68) at Tri-State (I-
94)
- Sidewalk widens to trail west of
the overpass, but is difficult to reach
by bicycle or while walking

Need easier way
to get from River
to location where
businesses located
conveniently
we reach easier
way to get to
businesses near
Lake Cook Spur
it is the scariest part
how to commute
how to work

CUT TREE LIMS
DOWN OVER
SIDEWALKS ALONG
SANDERS ROAD,
ALSO
SIDEWALKS IN THE
NEIGHBORHOOD
DUNDEE RD + SANDERS

WE NEED
SPEED LIMIT
+ CHILDREN
PEDESTRIAN CROSSING
TYPE SIGNS ON
SUNSET LANE
LOTS OF PEOPLE SPEED

~~fixed~~
path
east side of
Waukegan to
Spur overpass

Trail Side walk No 2
needed
East side of
Waukegan at
edens spur
John Paul

CHAPTER 2: PUBLIC ENGAGEMENT

Need better way
to connect w/
Des Plaines River
trail

Thanks to
you all

Public Engagement Overview

Public engagement is a critical component of the planning process. This input complements the analysis of transportation data collected during the existing conditions task of the planning process. Public feedback also helps to inform plan recommendations for infrastructure and non-infrastructure solutions.

This chapter of the plan provides a summary of engagement activities and input shared by community residents and stakeholders during the planning process.



Figure 4. Presentation at the public meeting on December 6th, 2017.

Outreach at Community Events

More than 250 people shared their opinions through in-person events during the existing conditions analysis task to collect input on gaps, barriers, challenges, and to identify where and how people are traveling in and around Northbrook. Village residents were invited to participate in a series of discussions at locations around the Village including:

- » The North Shore YMCA
- » North Shore Senior Center
- » Northbrook Metra Station
- » Farmers Market
- » Autumnfest
- » Northbrook Public Library

Residents discussed streets and intersections in the Village that are challenging or uncomfortable for walking and bicycling. Large format maps were available to mark these comments. In addition to in-person discussion, Village residents were encouraged to engage with the project online.

In April 2018, the Village hosted a final pop-up meeting at the Northbrook Public Library to present the draft plan recommendations. Village staff and the consultant team were on hand to provide an overview of the plan document and field questions from attendees. Twenty-three people attended the event.

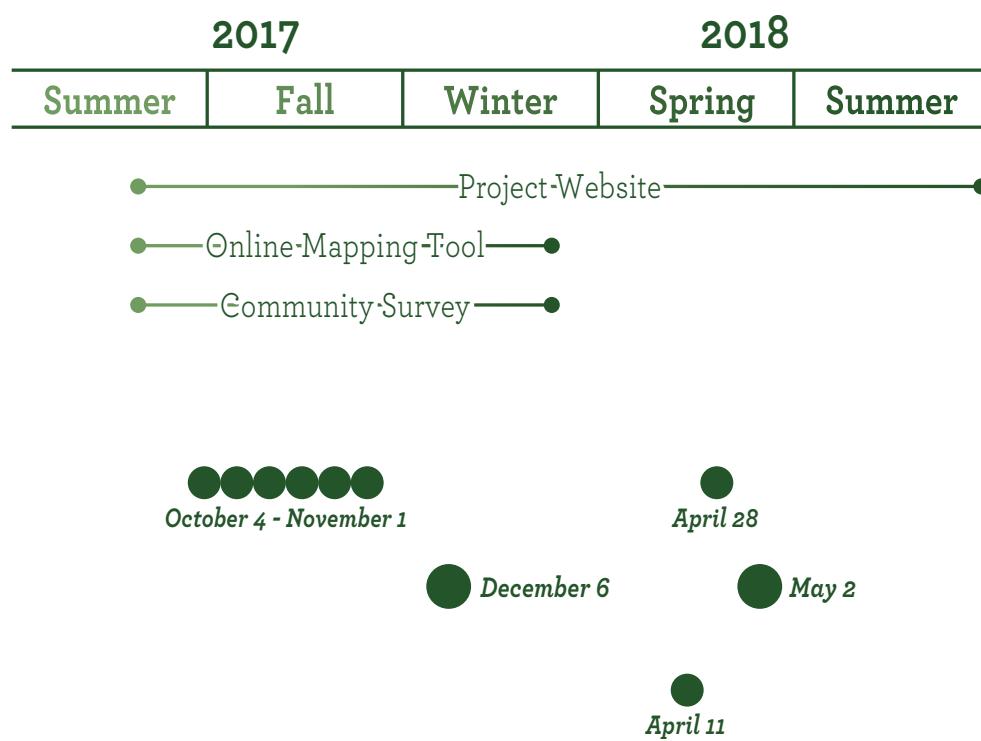


Figure 5. Community engagement process.

Public Meetings

Two public meetings were held during the course of the planning process to provide residents with a summary of work to-date and gather input from the community at key points in the planning process.

Public Meeting 1

On December 6, 2017, the Village of Northbrook hosted a public meeting to share information about the plan purpose and process, and to solicit input during the early stages of the planning process. The consultant team delivered a brief presentation regarding the plan overview and existing conditions for walking and bicycling, then attendees were asked to view the exhibits around the room, provide their input on various maps and meeting boards, and share their ideas for bicycling and walking with Village staff and the consultant team.

The diversity of input provided by community residents reflects the different types of walking and bicycling activity taking place everyday in Northbrook. Attendees expressed the need for safer street crossings for children walking to school, better connectivity to Metra stations and local businesses and employment centers,

increased access to regional trail networks, sidewalk gap closure along major roadways, and increased law enforcement presence to regulate speeding and stop compliance, particularly near local schools.

Public Meeting 2

On May 2, 2018, the Village of Northbrook hosted a second public meeting to share the draft plan recommendations and project prioritization. At the beginning of the meeting, attendees were invited to review exhibits and share their ideas with Village staff and the consultant team. Afterwards, the consultant gave a brief presentation regarding the development of the draft network, the recommended programs and policies, and the draft prioritization of infrastructure projects.

While attendance at the second public meeting was small, the positive input provided by those in attendance validated many of the draft recommendations for infrastructure improvements and for programs and policies.

Existing Walking and Bicycling Gateways to Northbrook

Feelings of comfort and safety of walking and bicycling can vary based on where one enters or exits the Village. Roadways with higher speeds or higher levels of traffic can be uninviting for walking or bicycling.

The number of lanes, the angle of crossings, and the presence and condition of traffic signals, sidewalks, and bike facilities can impact how comfortable a gateway feels.

The map below shows locations where roadways generally cross over the municipal boundary into the Village of Northbrook, or key entry points (e.g. Metra). These are areas where the Village has the potential to influence comfort and safety for people walking and bicycling.

What about these gateways is important to consider? Please add your comments to those shown on the boards.

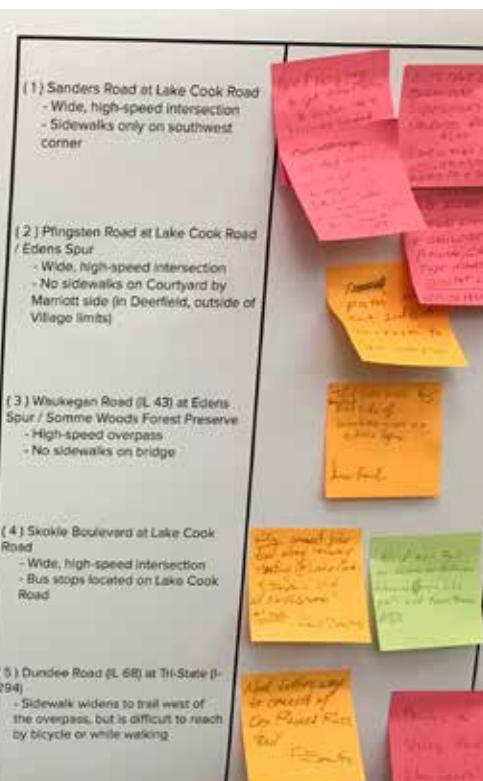


Figure 6. Attendees provided valuable input on these info boards stationed throughout the room at the public meetings.

Project Website & Online Input

Project Website

More and more people access information and interact with their friends, neighbors, and community through websites, social media apps, and other digital media. By creating an online presence for the plan, the Village of Northbrook created new, responsive outlets to build a dialogue with community members around walking and bicycling and encourage participation in the planning process. The project website, northbrook.bikepedplan.com, was launched to share information about the planning process, alert residents of upcoming events, provide access to draft plan materials and previous public meeting presentations, and capture resident feedback through an online survey and interactive map.

The project website banner is shown in Figure 7. More than 300 unique website visitors provided feedback through the survey and map. Summaries of input received through the online survey and the online map are provided in the following sections, and a complete list of comments is provided in the Appendix.

Online Survey

The online survey was designed to gather information from Northbrook residents about their current travel choices, their reasons for walking and bicycling, obstacles that they face when walking and bicycling around the community, and their priorities for investments active transportation. More than 300 individuals completed the online survey.

TRAVELING TO WORK

Two-thirds (66 percent) of survey respondents indicated that they drive alone to and from work. This figure is lower than the 72 percent of commuters who drove alone as identified in the 2016 American Community Survey conducted by the US Census Bureau. Over 30 percent of survey respondents indicated that they regularly walk or bike to work.

TRAVELING AROUND NORTHBROOK

When traveling in and around Northbrook, more survey respondents choose to walk and bike (20 percent and 13 percent, respectively), and fewer respondents travel alone by car (just 56 percent). When traveling specifically to local parks, 24 percent choose to walk, and almost 40 percent choose to bike.

REASONS FOR WALKING AND BICYCLING

When asked to identify their reasons for walking and bicycling, survey respondents pointed to a variety of motivating factors: health and fitness (89 percent), spending time outdoors (80 percent), pleasure and fun (74 percent), environmental impact (39 percent), convenience compared to driving (25 percent), and monetary savings (11 percent).



Figure 7. Plan website homepage

PRIORITIES FOR ACTIVE TRANSPORTATION INVESTMENTS

When asked about which investments in active transportation the Village of Northbrook should pursue, survey respondents pointed to many of the same priorities as public meeting attendees. As shown in Figure 8 below, 71 percent supported more paved paths and trails, 58 percent supported more on-street bikeways, 52 percent supported better crossings of major streets, and 38 percent supported more sidewalks.

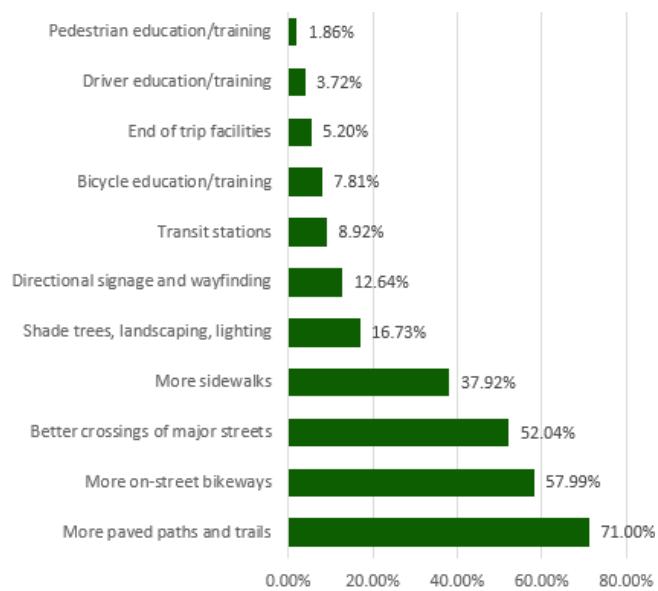


Figure 8. Desired investments to support walking and bicycling.

OBSTACLES TO WALKING AND BICYCLING

Survey respondents pointed to high traffic speeds and volumes (61 percent), difficult major street crossings (58 percent), perception of safety (55 percent), aggressive driving (48 percent), and a lack of convenient routes to local destinations (41 percent) as the most common barriers impacting people's ability to walk and bike.

Online Mapping Tool

The online map served as a valuable input tool during the planning process, allowing visitors to identify their desired improvements for walking and bicycling in Northbrook. The online mapping tool is shown in Figure 9. The red boxes with numbers indicate groups of problem intersections or desired intersection improvements. As a user zooms closer in on the map, those groups separate into individual comments. To better visualize these individual locations, the data from the online mapping tool has been compiled and included in Map 1 on page 10.

Key themes that emerged from the input received through the online mapping tool included a desire for better bicycling and walking facilities along major roadways throughout Northbrook, better connectivity between local and regional trails, improved intersection crossings for bicycling and walking, particularly along major roadways and near commercial destinations. It was also noted by numerous online mapping tool users that connectivity to adjacent communities is limited by major interstates and highways. Crossing locations along these interstates and highways are few and far between, and they often lack comfortable facilities to support walking and bicycling.

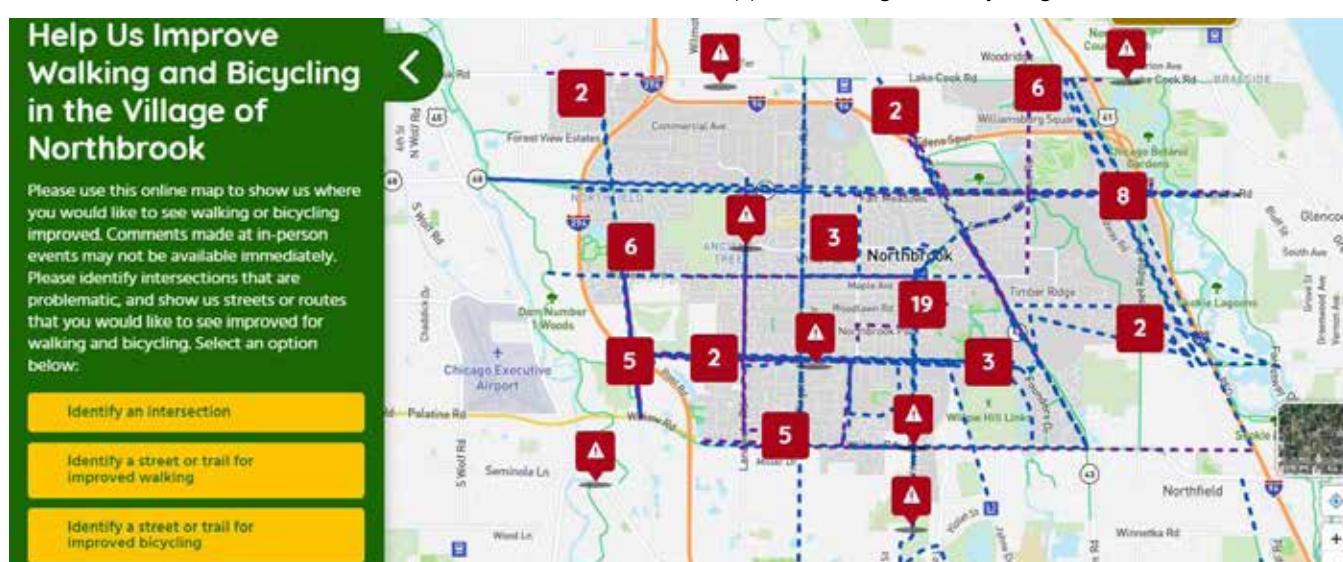
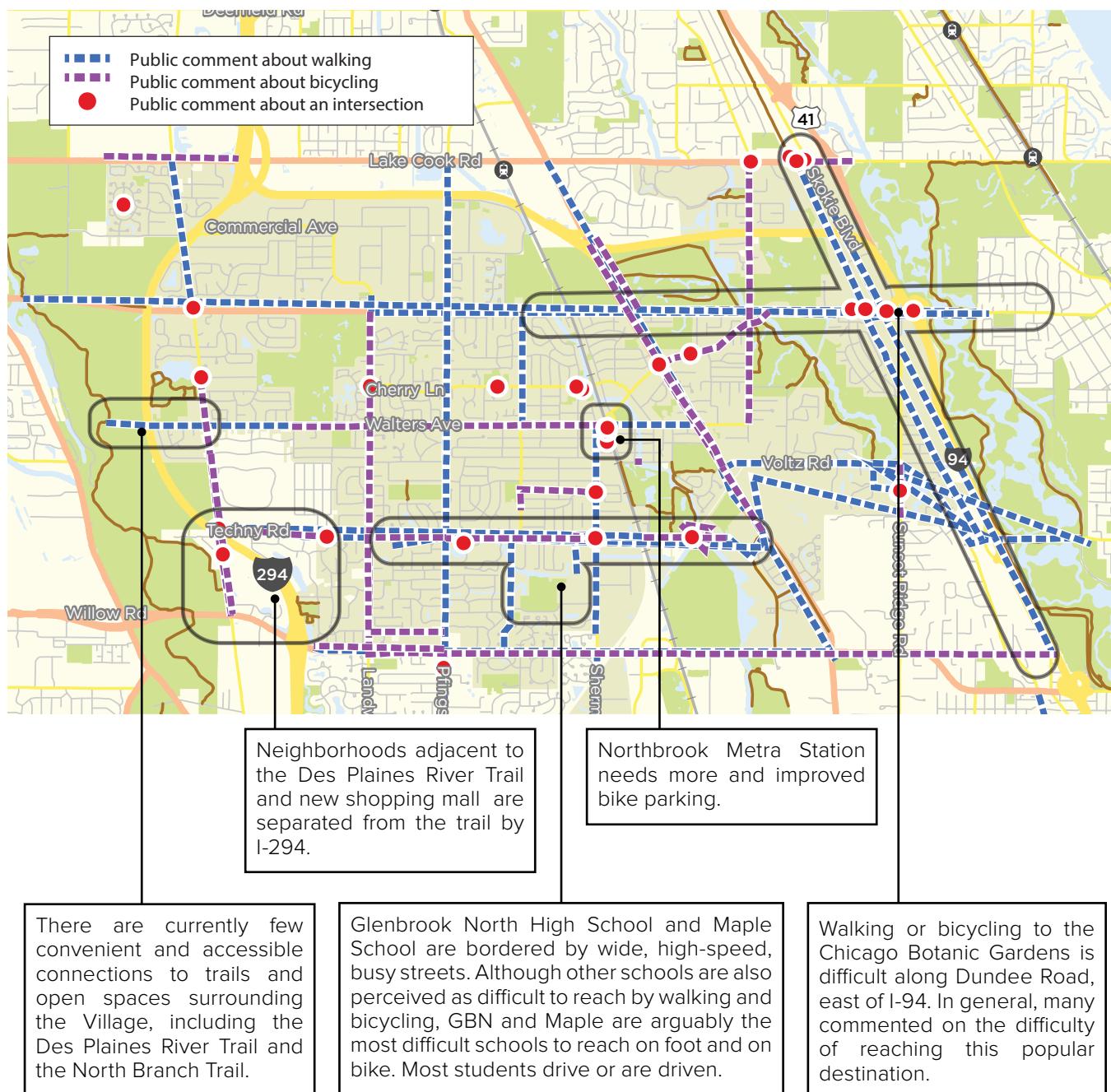


Figure 9. Online Map Interface

Map 1. Public Engagement Summary Map



NOTE: The map shows a geographic summary of common themes from the engagement process and is intended for visualization purposes. A complete list of written comments is provided in Appendix B: Public Comments.



CHAPTER 3: EXISTING CONDITIONS

Existing Conditions Overview

The Village of Northbrook has established the foundation for a complete network of walking and bicycling facilities through both planning and policy efforts that establish the framework for responsible growth and development, and through infrastructure projects that incorporate pedestrian and bicycle infrastructure. The existing conditions chapter documents these efforts to develop the context and setting for this pedestrian and bicycle planning effort and to identify opportunities for active transportation network development. The chapter includes an overview of existing bicycle and pedestrian facilities, an examination of pedestrian- and bicycle-related crash data, an analysis of roadway conditions, documentation of land uses and transit stops that generate and attract walking and bicycling activity, and a summary of related planning efforts and studies. The chapter concludes with a summary of findings that identifies key themes, opportunities, and constraints that will inform the development of plan recommendations.



Figure 10. People of all ages are using Northbrook's network of trails, sidewalks, and on-street bikeways. (Source: Northbrook Parks District)

Existing Bicycling and Walking Facilities

The existing bicycling and walking network in the Village of Northbrook, also referred to as the "active transportation network" was reviewed to document the current state of infrastructure, identify gateways into the Village, and determine network coverage. This includes on-street and off-street facilities.

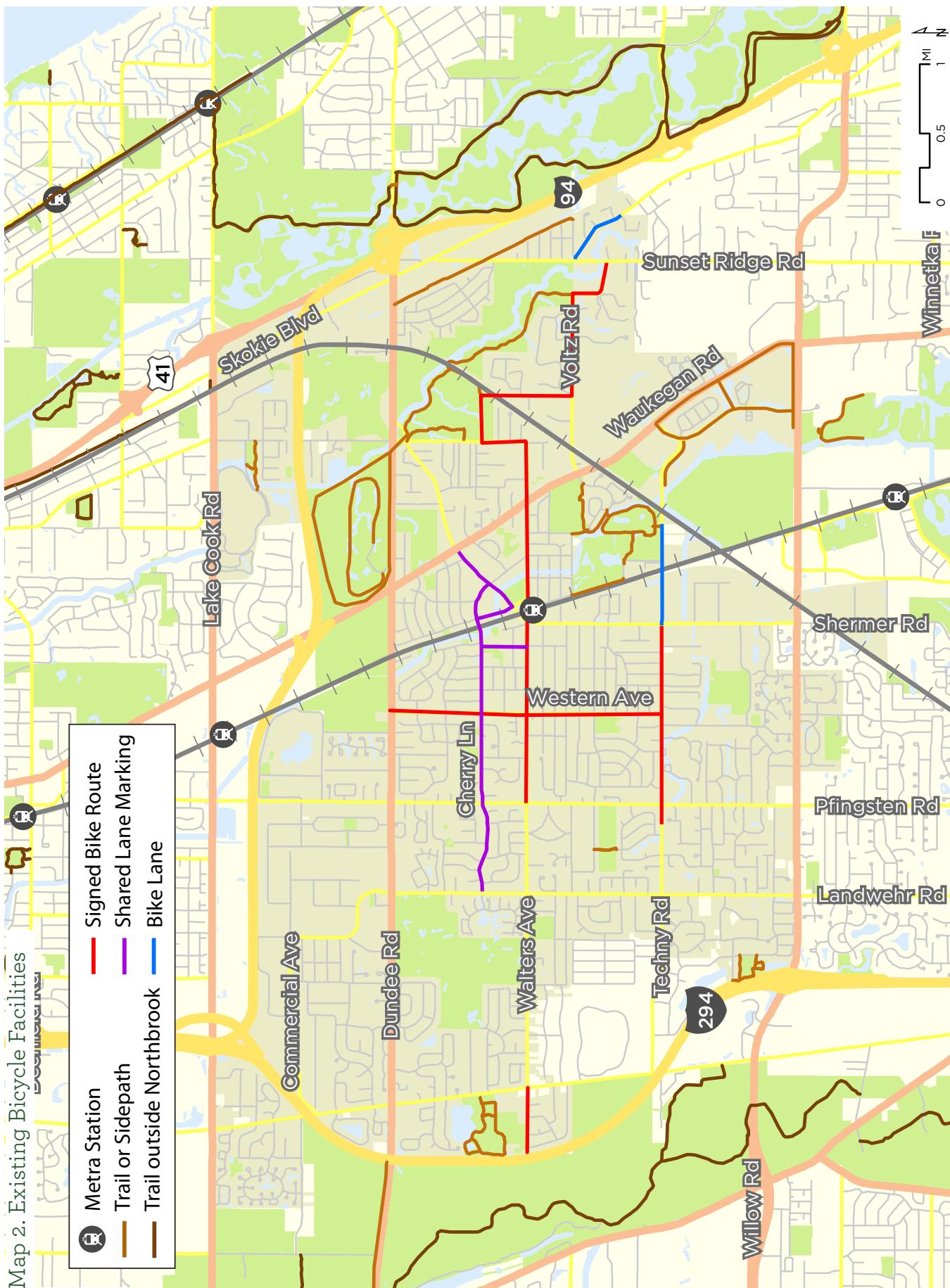
Existing Bicycle Facilities

The Village's network of bicycle facilities is small but growing. There are conventional bike lanes located on Techny Road and Happ Road, totaling only 0.95 miles. These bike lanes provided a dedicated space for bicyclists to travel on the roadway, adjacent to and separate from motor vehicle traffic. There are also an additional 2.68 miles of streets with shared lane markings and 6.76 miles of signed bike routes guiding bicyclists to key destinations throughout the Village. More than 13 miles of walking and bicycling trails connect the Village's parks and recreation areas which include shared use paths, and paths located along roadways. When a shared use path is located along a roadway, it is referred to as a sidepath due to the operational considerations in which a sidepath functions near intersections.

Map 2 shows existing Metra Stations, trails, sidepaths, bike routes, marked shared roadways, and bike lanes.



Figure 11. Northbrook's trails are busy year round with walkers, joggers and bicyclists. (Source: Northbrook Parks District)



Sidepaths in Northbrook are located along Techny Road, Founders Drive, Waukegan Road, and Kamp Drive. Shared use paths, which are located within key recreation areas in Northbrook are located in:

- » Chipilly Woods
- » Northbrook Sports Center
- » Skokie Valley Trail (completed as shown as of 2017; future extension planned between Lake Cook Road and Dundee Road)
- » Somme Woods
- » Sunset Ridge Woods
- » Techny Prairie Park
- » Wood Oaks Green Park

The North Branch Trail and the Des Plaines River Trail are located at the edges of the Village.

Existing Pedestrian Facilities

Map 3 shows existing sidewalks based on available data. While the majority of Village arterial and collector roadways have sidewalks on at least one side of the street, some gaps remain. Per Village standards, sidewalks throughout the community are a minimum of five feet in width.

Sidewalk gaps on major roadways such as Lake Cook Road, Dundee Road, Voltz Road, Skokie Boulevard, Lee Road, and Willow Road may exist due to several factors



Figure 12. Shared lane markings help position bicyclists within the travel lane and alert motor vehicles to the potential for bicycle traffic.

which include right-of-way constraints (e.g. railroad overpass on Willow Road) or cost.

Crossing guards are located primarily at roadway intersections with arterial streets to assist students walking and bicycling to school. Closing gaps in the network for students walking and bicycling to school can improve conditions (for example, constructing a sidewalk on the south side of Techny Road, from Mayapple Lane to Greenview Road).

Sidewalk Installation

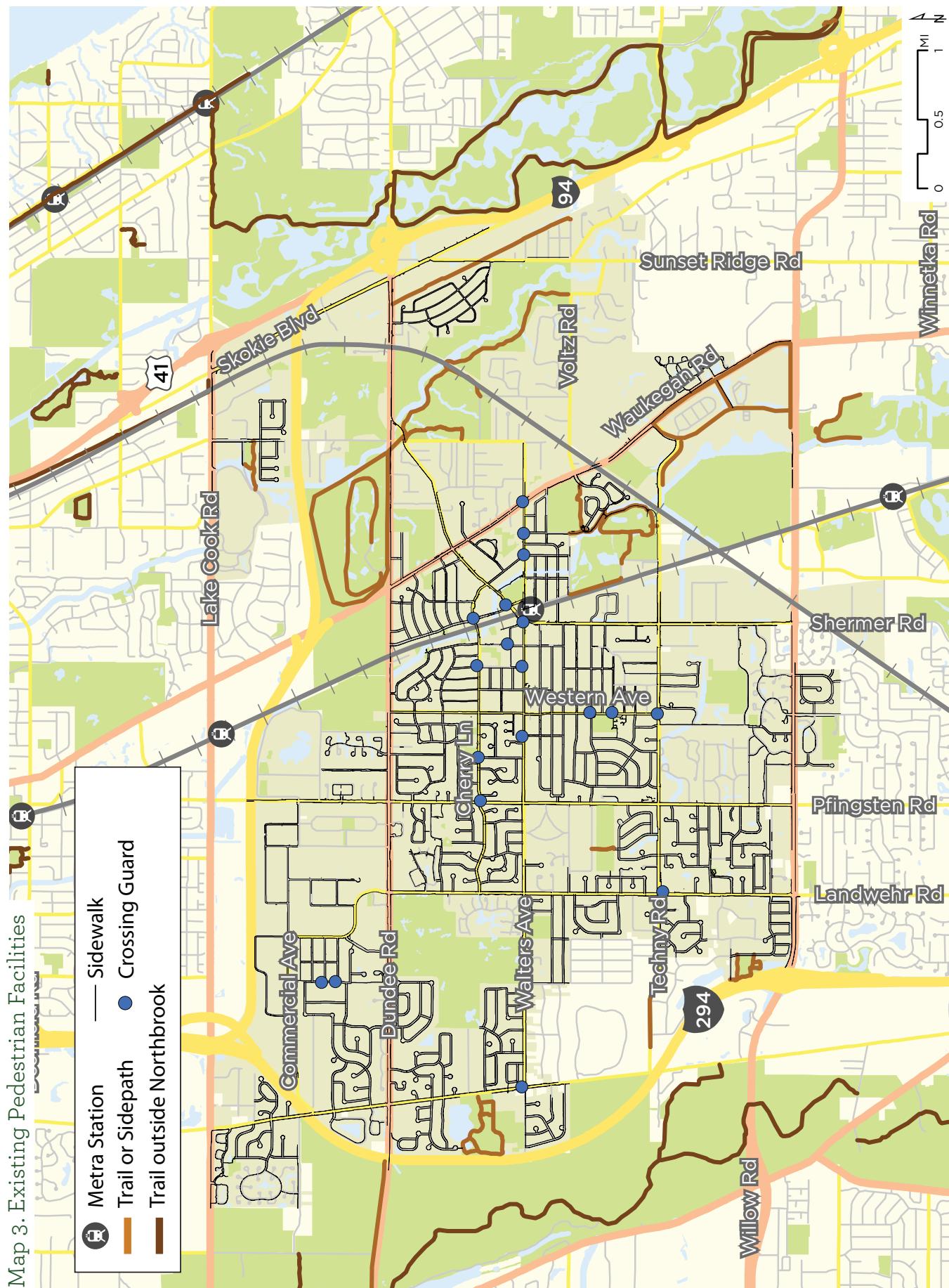
In 2008, the Village of Northbrook passed a policy statement (Resolution No. 08-R-90) detailing its approach to new public sidewalk construction. The policy statement lists specific arterial streets for which new sidewalk construction will be fully funded by the Village, provided that sufficient right-of-way exists for sidewalk construction and that funds have been budgeted or are available for such purposes. The policy also establishes the method by which a residential sidewalk petition may be filed for sidewalks not located along arterial streets.

Maintaining sidewalks in a state of good repair is a key component of network connectivity. Generally, the Village maintains sidewalks, and sidewalk maintenance is 100% funded by the Village. Additional information about sidewalk clearance and maintenance is discussed in the Policies and Practices section.

Northbrook Park District Amenities

The Northbrook Park District has a number of amenities to support bicycling activity throughout the Village. The most prominent of these is the Ed Rudolph Velodrome located in Meadowhill Park. Constructed in 1960, the velodrome is host to multiple programs and events throughout the year, including multiple adult and youth cycling programs offered by the Northbrook Park District, and Northbrook Cycle Committee clinics and weekly races. The velodrome and related programs help reinforce bicycling as a defining characteristic of the Village's recreational amenities and offerings.

The Northbrook Park District also supports bicycling by providing bicycle parking facilities at most parks in the Village. The district is planning to install four bicycle repair stations in Northbrook in 2018. These repair stations will be located in Meadowhill Park, Village Green, Techny Prairie Park and Fields, and Wood Oaks Green Park.



Village Gateways

Village gateways are the entry points for traveling into the Village from neighboring municipalities. These locations were reviewed for their accommodation of walking and bicycling, as well as to identify whether gaps exist at the Village boundary, or where roadways change agency of jurisdiction.

Feelings of comfort and safety of walking and bicycling can vary based on where one enters or exits the Village. Roadways with higher speeds or higher levels of traffic can be uninviting for walking or bicycling. The number of lanes, the angle of crossings, and the presence and condition of traffic signals, sidewalks, and bike facilities can impact how comfortable a gateway feels.

Map 4 shows locations where roadways generally cross over the municipal boundary into the Village of Northbrook, or key entry points (e.g. Metra). These are areas where the Village has the potential to influence comfort and safety for people walking and bicycling.

1) Sanders Road at Lake Cook Road - This intersection is a wide, high speed intersection, and sidewalks are present only on the southwest corner.

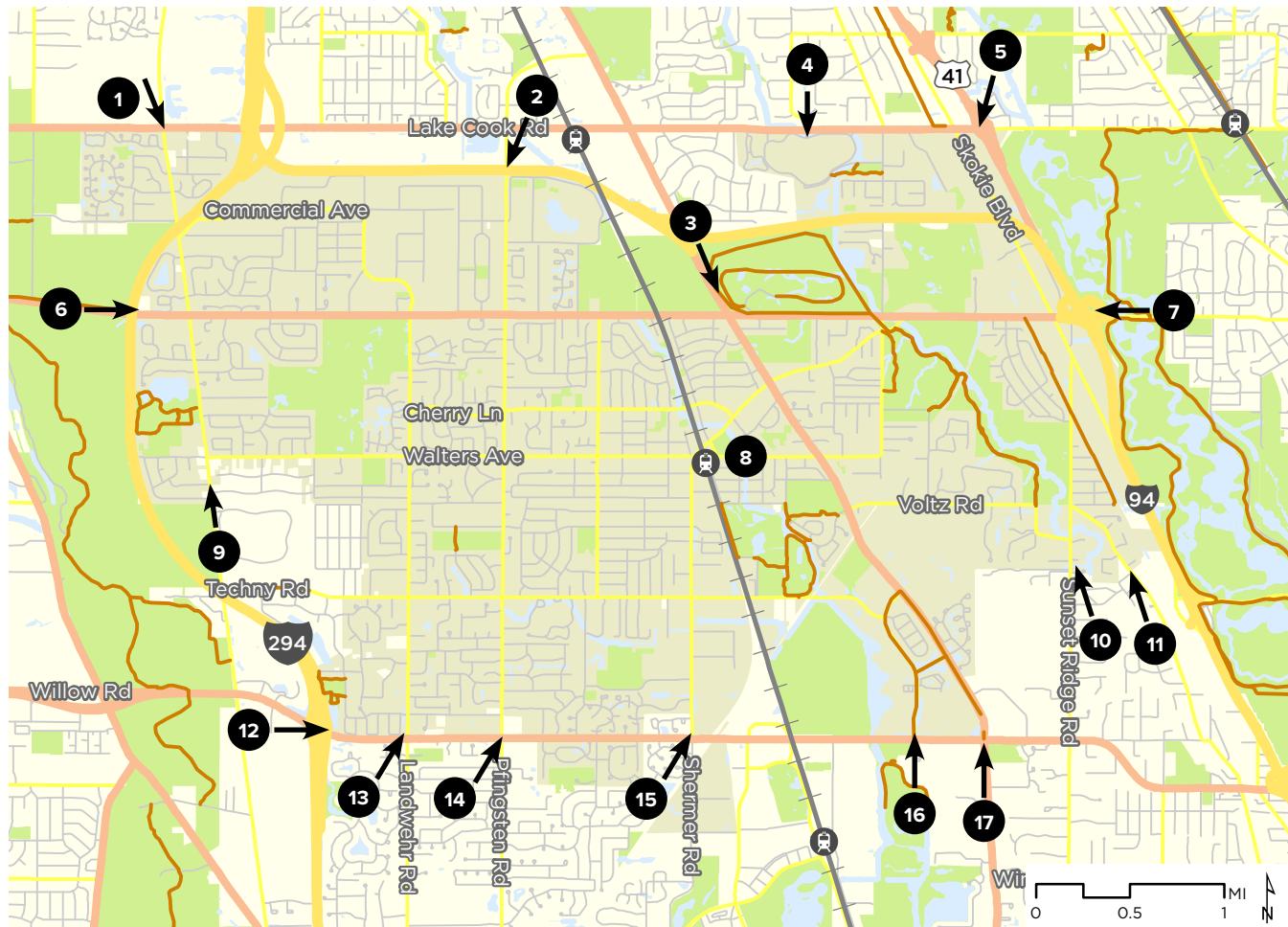
2) Pfingsten Road at Lake Cook Road / Edens Spur - This is a wide, high-speed intersection, and the only sidewalks at this location are located on the Deerfield side of the intersection.

3) Waukegan Road (IL 43) at Edens Spur / Somme Woods Forest Preserve - This gateway is an overpass that was not designed to be accessible to pedestrians, which is why there are no sidewalks on the bridge.

4) Northbrook Court - This regional shopping destination is situated on Lake Cook Road and is accessible from multiple access points.

5) Skokie Boulevard at Lake Cook Road - This is a key gateway to Northbrook and a retail commercial district, but the intersection is wide and high-speed. There are bus stops located along Lake Cook Road, making this a key location for access to transit.

Map 4. Village Gateways



6) Dundee Road (IL 68) at Tri-State (I- 294) - Approaching the Village from the west is challenging due to traffic speeds and volumes on Dundee Road, and the path leading to the Des Plaines River Trail is on the south side of the roadway. People walking and bicycling use the this sidepath as there is no sidewalk on the north side west of Old Dundee Road.

7) Dundee Road (IL 68) at Skokie Boulevard - This is one of the primary Interstate gateways into the Village. It is a key connection to the Skokie Lagoons and the trail network east of I-94, but is high-speed, has interstate ramps, which makes it difficult for people walking and bicycling.

8) Northbrook Metra Station - This is a transit gateway into the Village and generally is comfortable for people walking. However, not all bicyclists are comfortable using shared lanes on Cherry Lane, and the angle of the railroad crossing on Shermer Road is difficult for some bicyclists.

9) Sanders Road at Mission Hills Road - Sanders Road does not have sidewalks south of Terri-Lyn Lane, which is outside of the Village limits. There are no bicycle facilities.

10) Sunset Ridge Road at Old Hunt Road - As far as gateways into the Village, Sunset Ridge Road is a lower speed roadway than other gateways but is narrow, and sidewalks are located only on the east side of the road. While there is some bicycling traffic on Sunset Ridge, the roadway operates in a shared lane condition between motorists and bicyclists, as the shoulders are too narrow to accommodate bicyclists separately.

11) Happ Road near Astor Place (just north of Temple Jeremiah) - Happ Road as a gateway is relatively comfortable for bicycling, and sidewalks are located only on the east side of the road.

12) Willow Road at Tri-State (I-294) - Willow Road is a high-speed roadway. Sidewalks exist on both sides of the road, but free-flow ramps to I-294 make crossings difficult for some pedestrians.

13) Landwehr Road at Willow Road - This intersection has crosswalks on all sides, but the free-flow ramps in the northwest and southwest corners make crossings wide and difficult for some pedestrians to navigate. There is transit service on Willow Road, which indicates that this intersection is key for access to transit.

14) Pfingsten Road at Willow Road - This intersection is similar in nature to the intersection of Landwehr Road and Willow Road, except that there are no free flow ramps.

15) Shermer Road at Willow Road - This intersection is a gateway into Northbrook from the south. All four corners of the intersection have sidewalks, and the intersection is served by transit. However, sidewalks do not continue east of the commercial properties along Willow Road due to the railroad viaduct and Willow Road underpass.

16) Founders Drive at Willow Road - This intersection is wide and high-speed, and the presence of offset left-turn and right-turn lanes make the intersection wide for pedestrian crossings. The sidepath along the north side of Willow Road accommodates walking and bicycling.

17) Waukegan Road at Willow Road - This intersection is difficult for bicyclists and pedestrians due to the offset left-turn and right-turn lanes, which makes for wide crossings. Land uses at this intersection consist of two retention ponds, Fox Meadow Fields, and the Convent of the Holy Spirit, all of which are set back from the roadway, which makes for long walking distances between these destinations.



Figure 13. Facing east on Dundee Road near Shermer Road.

Crash Analysis

Crashes reported that involved bicyclists and pedestrians in Northbrook for the five-year period between 2011 and 2015 are shown in Table 1 and Figure 14 below. During this period, 77 crashes were reported in Northbrook involved people walking or bicycling. A total of 78 injuries and one fatality were reported.

Of the reported bicycle and pedestrian crashes, 71 (92%) occurred on arterial or collector roadways. Six crashes (8%) occurred on lower speed and volume local streets. The majority of crashes occurred at an intersection (69%). For context, a one-year comparison of crashes for area municipalities is shown in Table 2.

The locations of crashes helps identify areas of concern with regard to safety and comfort while walking or bicycling. Map 5 and Map 6 on the following page show crashes by frequency and severity. Intersections with multiple recorded crashes include:

- » Skokie Boulevard and Lake Cook Road (IDOT) (6)
- » Landwehr Road and Dundee Road (IDOT) (4)
- » Shermer Road and Techny Road (IDOT) (4)
- » Pfingsten Road and Walters Avenue (Cook County) (3)

TABLE 1. VILLAGE OF NORTHBROOK FIVE-YEAR CRASH SUMMARY BY TYPE, 2011-2015

| YEAR | 2011 | 2012 | 2013 | 2014 | 2015 | TOTAL |
|--------------------------------|------|------|------|------|------|-------|
| Bicycle and Pedestrian Crashes | 15 | 27 | 13 | 12 | 10 | 77 |
| Bicycle Crashes | 7 | 20 | 8 | 8 | 7 | 50 |
| Pedestrian Crashes | 8 | 7 | 5 | 4 | 3 | 27 |
| Total Injuries | 16* | 28* | 13 | 11 | 10 | 78* |
| Fatalities | 0 | 0 | 0 | 1 | 0 | 1 |

*Reported crashes may include more than one injury or fatality (Source: Illinois Department of Transportation)

Crash data in this table show the most recent five-year period for which municipal data area are available in geocoded format for mapping purposes. (Source: Illinois Department of Transportation)

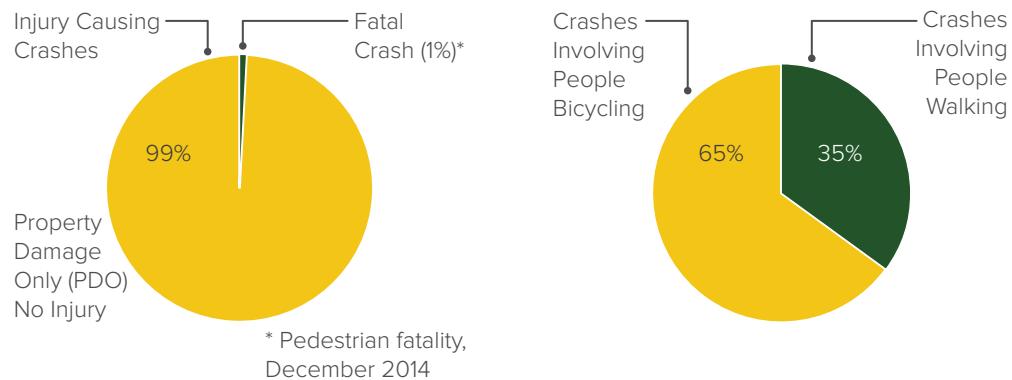


Figure 14. Five-Year Crash Summary by Type, 2011-2015. (Source: Illinois Department of Transportation)

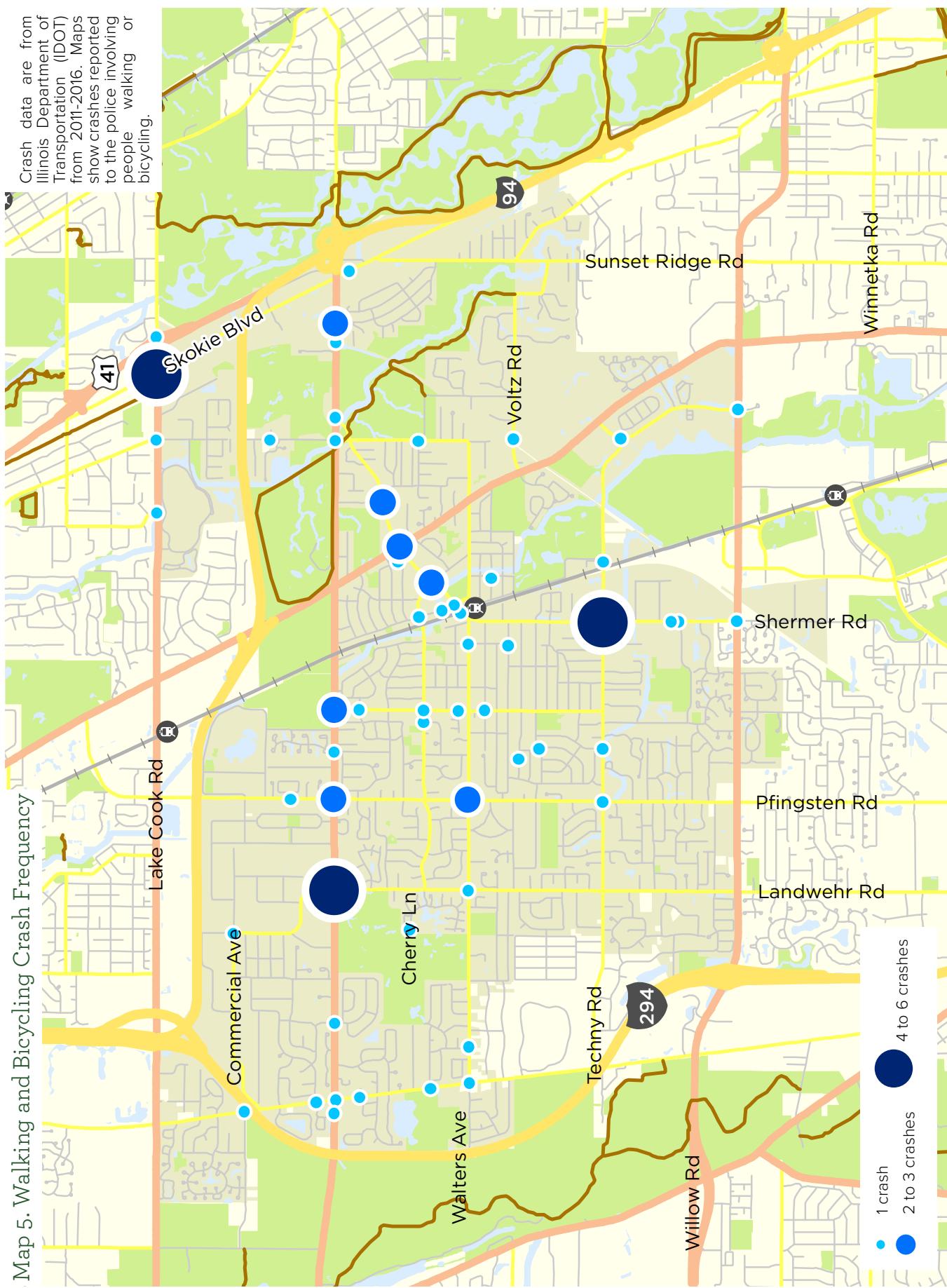
TABLE 2. ALL MUNICIPAL CRASHES BY TYPE FOR AREA MUNICIPALITIES, 2014

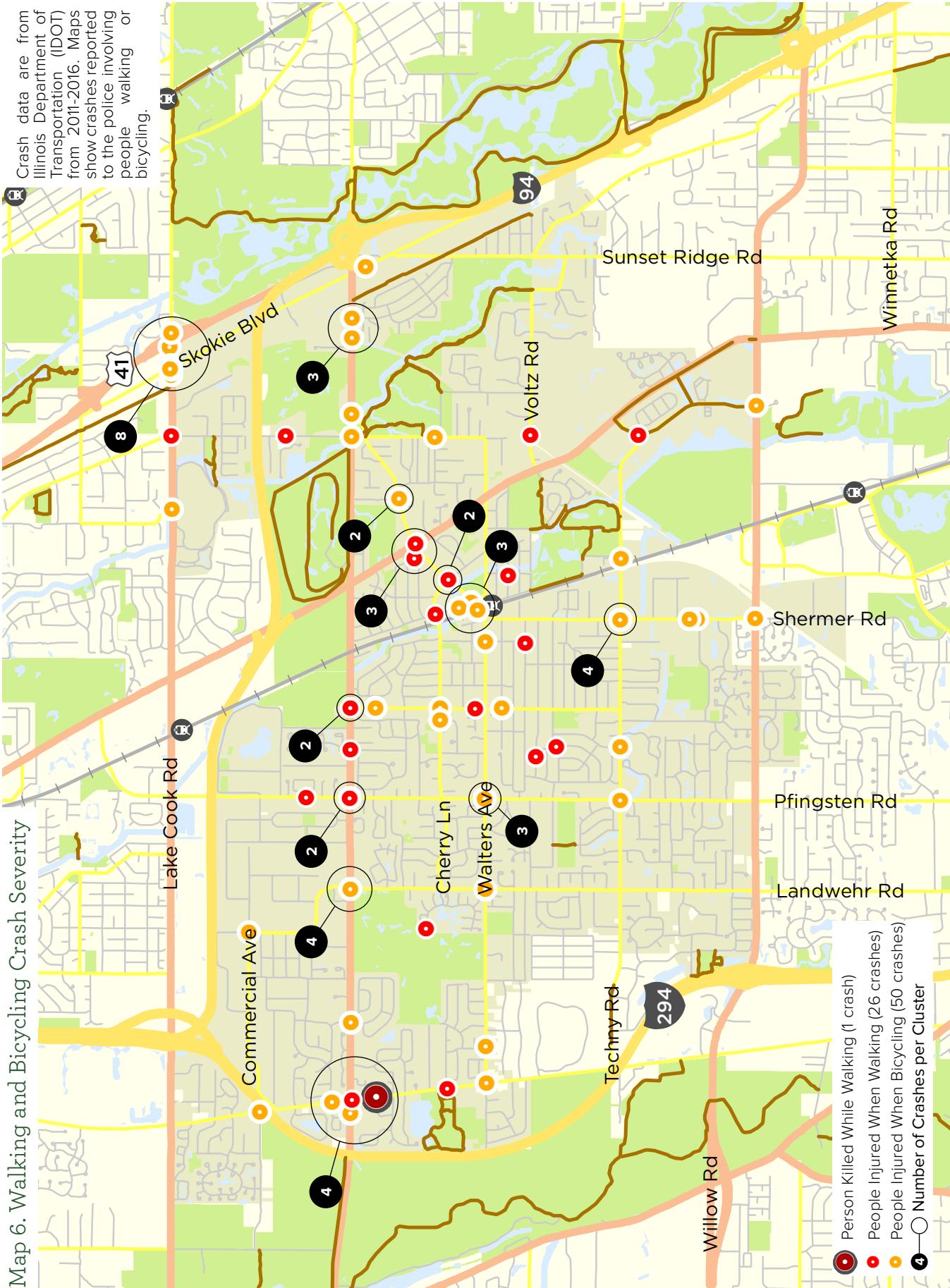
| MUNICIPALITY | NORTHBROOK | DEERFIELD | WHEELING | GLENVIEW | PARK RIDGE |
|----------------------|------------|-----------|----------|----------|------------|
| Population | 33,421 | 19,000 | 38,315 | 47,475 | 37,496 |
| Total Crashes (2014) | 878 | 371 | 659 | 1,098 | 931 |
| All Injury Crashes* | 205 | 77 | 177 | 237 | 149 |
| Bicycle Crashes | 8 | 8 | 9 | 17 | 10 |
| Pedestrian Crashes | 4 | 2 | 5 | 6 | 17 |

*Includes motor vehicle crashes

Crash data in this table show a one-year comparison using published crash reports prepared by the Illinois Department of Transportation

Crash data are from Illinois Department of Transportation (IDOT) from 2011-2016. Maps show crashes reported to the police involving people walking or bicycling.





Level of Traffic Stress for Bicycling

Level of Traffic Stress (LTS) is a qualitative measure that evaluates a roadway from the perspective of a bicyclist. Created by the Mineta Transportation Institute, LTS assigns score of one to four based on roadway width, posted or prevailing speed, number of lanes, and amount of separation between bicyclists and motorists, calculated either as the width of the outside lane or width of a bike lane. Existing LTS is shown in Map 7.

- » LTS 1 roadways are low-stress, low-speed facilities like many neighborhood streets and cul-de-sacs.
- » LTS 2 roadways are shared facilities with posted speeds under 30 miles per hour or roads with bike lanes and posted speeds under 35 miles per hour.
- » LTS 3 roadways are shared roads under 35 miles per hour or roads with bike lanes and posted speeds under 40 miles per hour.
- » LTS 4 roadways are any shared roadway with posted speeds at or above 35 miles per hour and roadways with bike lanes and posted speeds at or above 40 miles per hour.

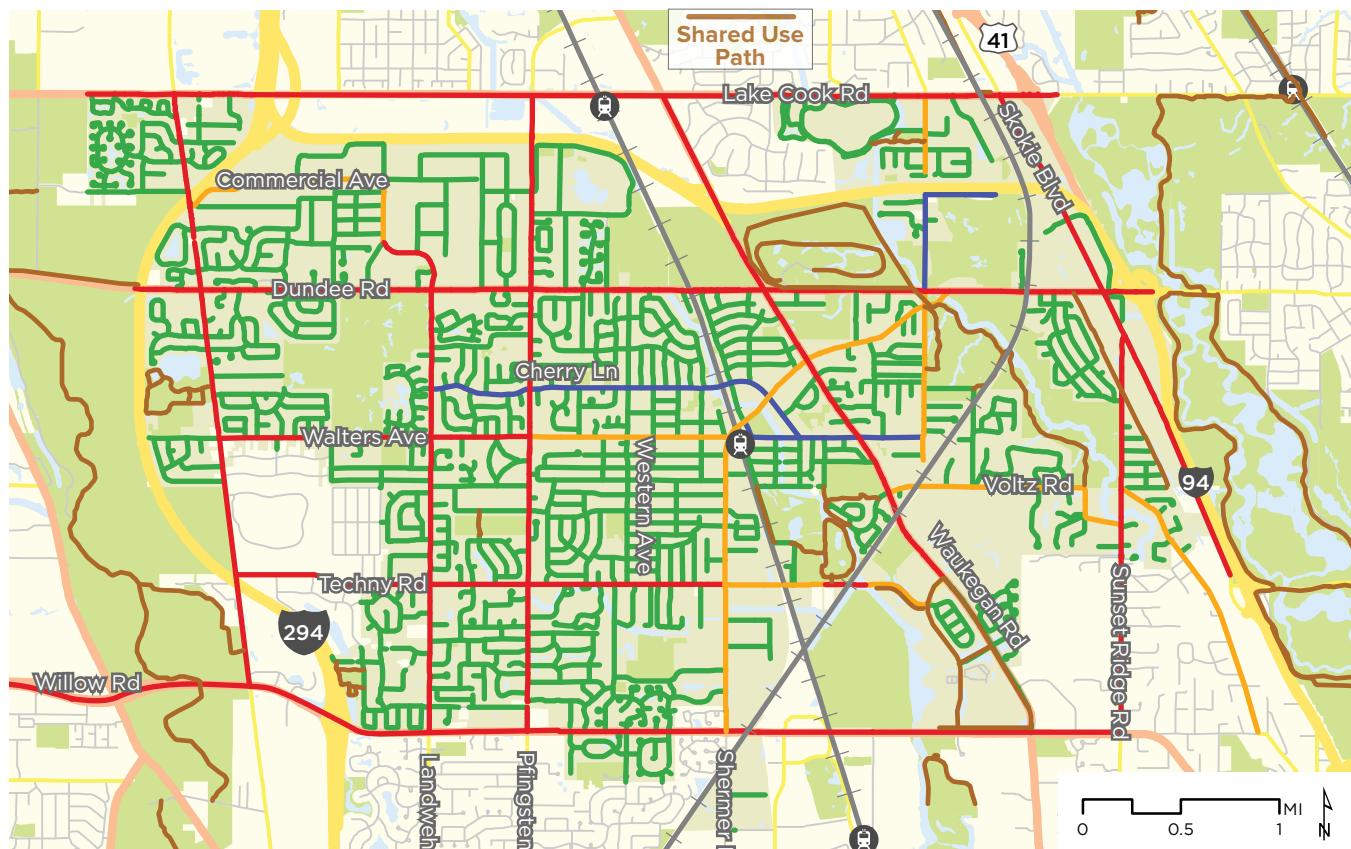
Generally, low stress roadways are comfortable for people of all ages and abilities and high stress roadways are stressful for all but the most confident and experienced adult bicyclists.

LTS rates that roadway from curb to curb (or edge of pavement) and as such, roads like Waukegan Road may still be shown as LTS 4 despite the presence of a sidepath. Additionally, portions of Happ Road and Techny Road are rated LTS 3 even with bike lanes, indicating that these facilities may still be stressful for some. However, many trails connect to low stress roadways, which allows users to avoid high stress roadways where possible.

While not reflected in LTS, residents and stakeholders also stated that roadway surface condition, the presence of debris, and interactions with drivers who are unaware or disregard state laws regarding people walking and bicycling impact perceptions of comfort and safety.

Shared use paths and trails are not rated for LTS because they are completely separated from the roadway. Where possible, the LTS of the adjacent roadway is shown next to the trail to further reiterate the desire to travel on the trail as opposed to the roadway.

Map 7. Stress Level When Bicycling



Demand for Walking and Bicycling

Demand for walking and bicycling is a function on the location and concentration of destinations. Map 8 shows employment by Census tract, Map 9 is the Village of Northbrook Zoning Map showing where residential land uses are located, Map 10 shows parks, trails, open space and schools, and Map 11 shows Pace bus stops and Metra stations.

Based on a review of this information, areas of high demand include the retail commercial area bordered by Sanders Road, I-94, Dundee Road, and Somme Prairie Nature Preserve; shopping areas along Skokie Boulevard, and Dundee Road in the Village's northeast quadrant, the shopping and entertainment area bordered by Founders Drive, Waukegan Road, and Willow Road; Metra Stations; and existing trails that border the Village to the east and to the west.

Regional destinations, located outside the Village boundaries, are also important potential generators of walking and bicycling trips as this is an important factor in regional connectivity and the attraction to living in Northbrook. The Chicago Botanic Gardens and Forest Preserve trails are two examples.

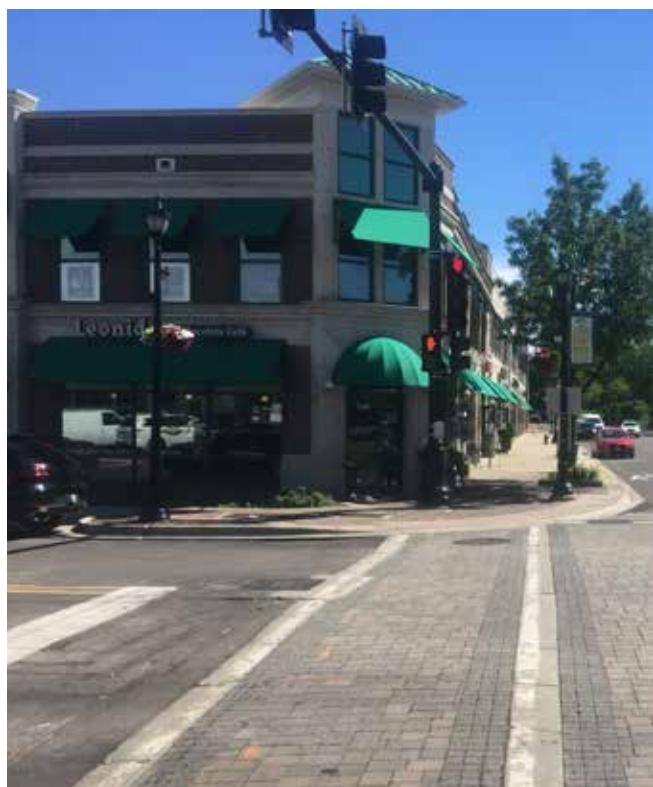
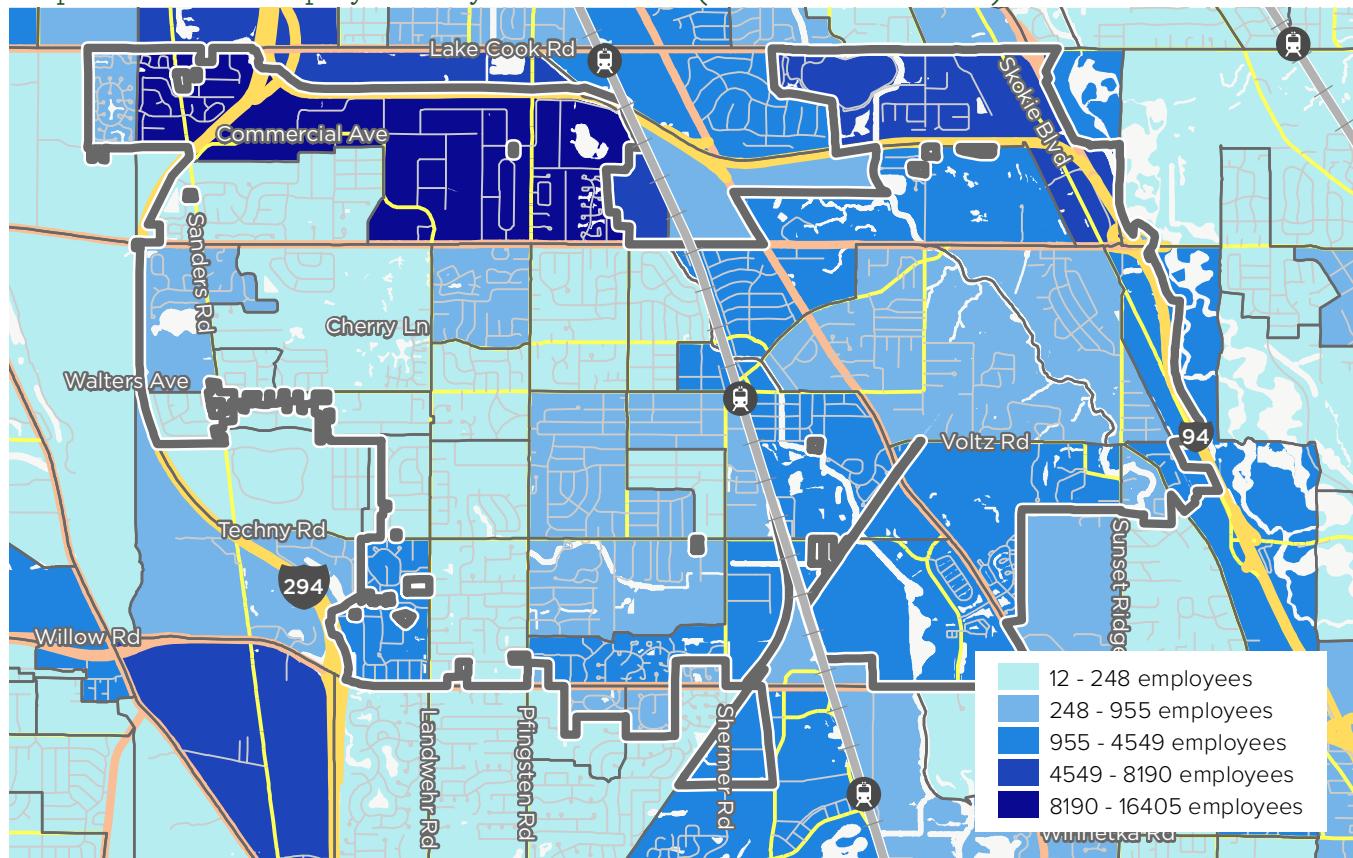
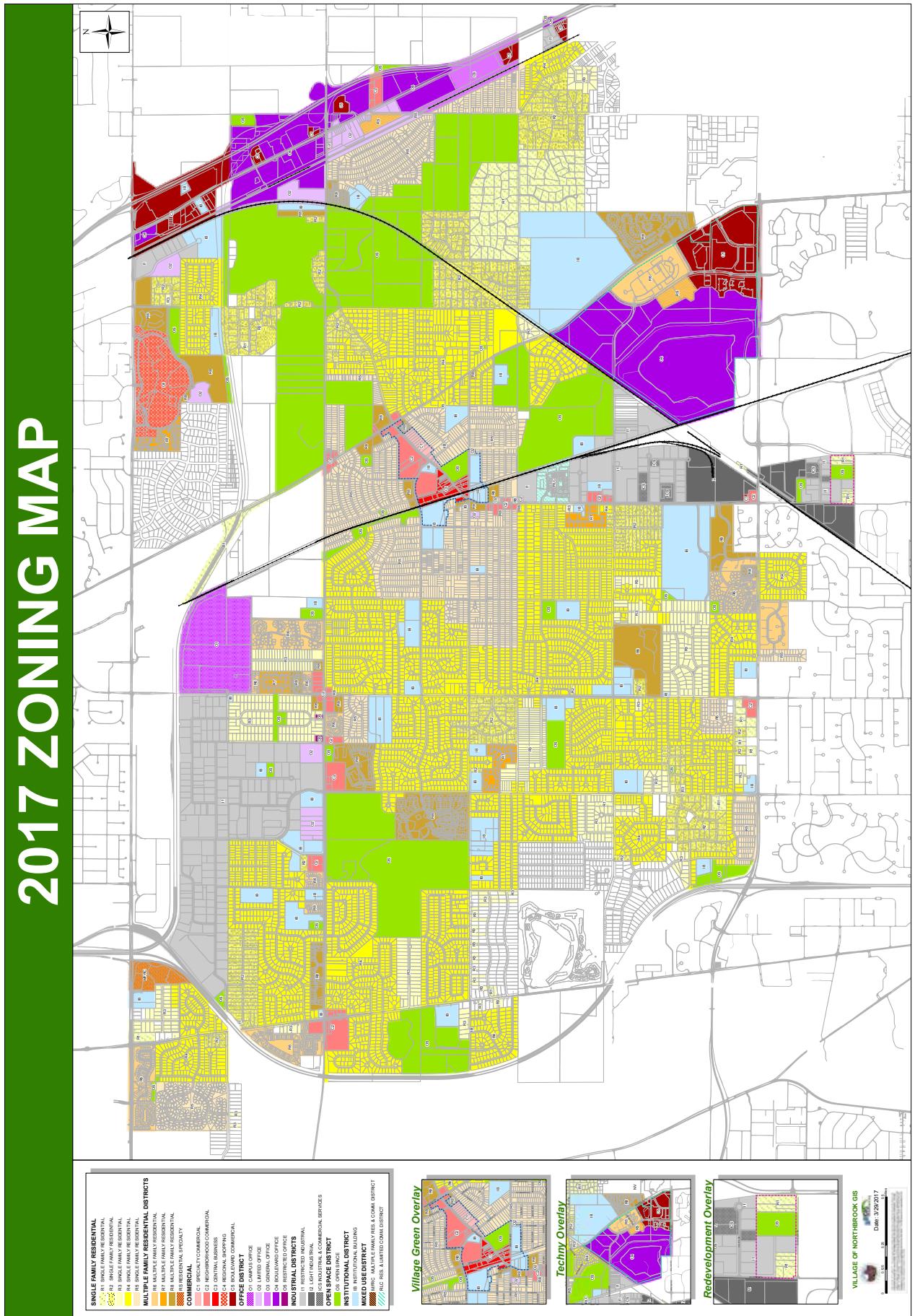


Figure 15. Shermer Road and Meadow Road in Downtown Northbrook.

Map 8. Demand: Employment by Census Tract (Source: U.S. Census)

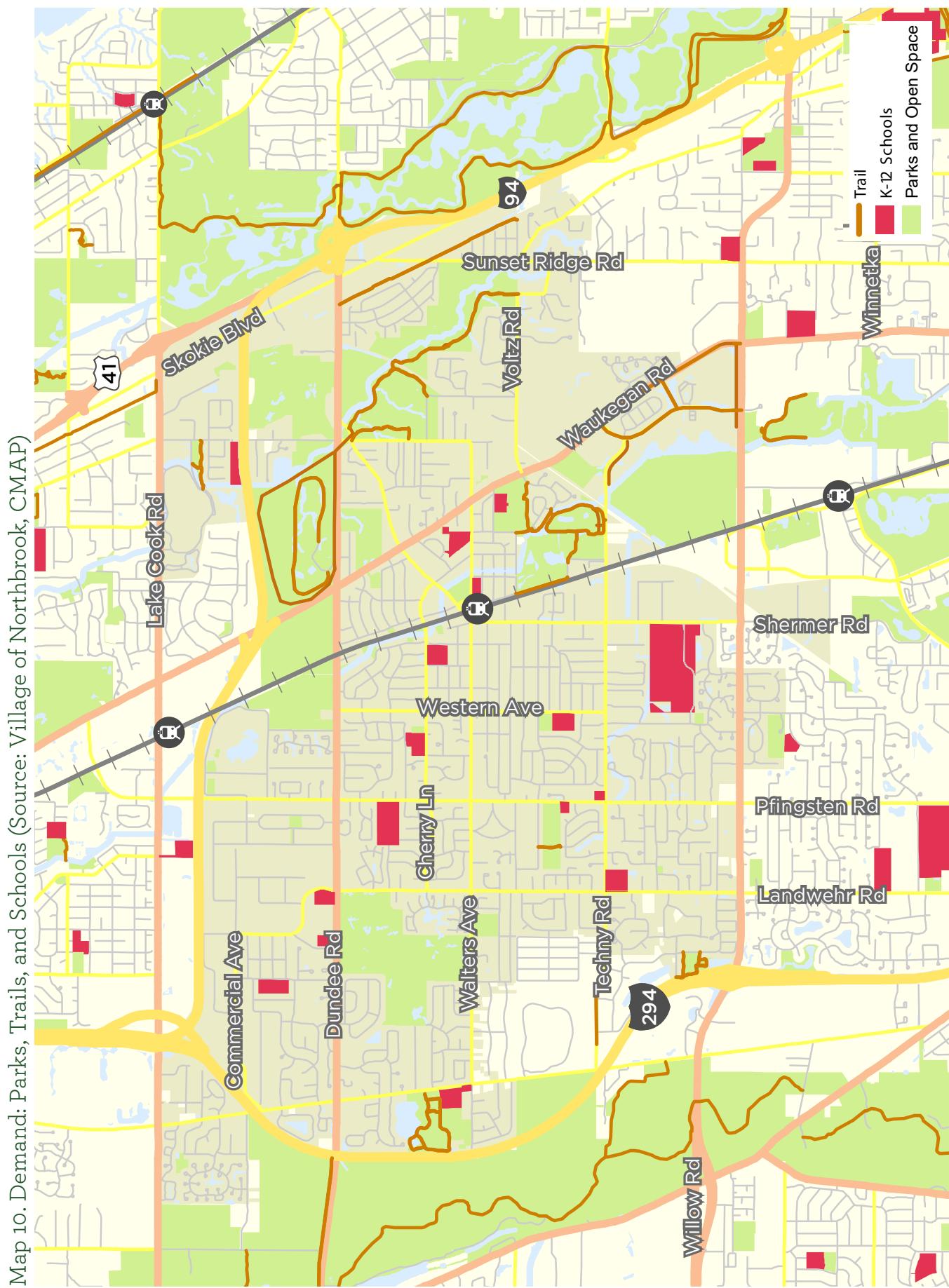


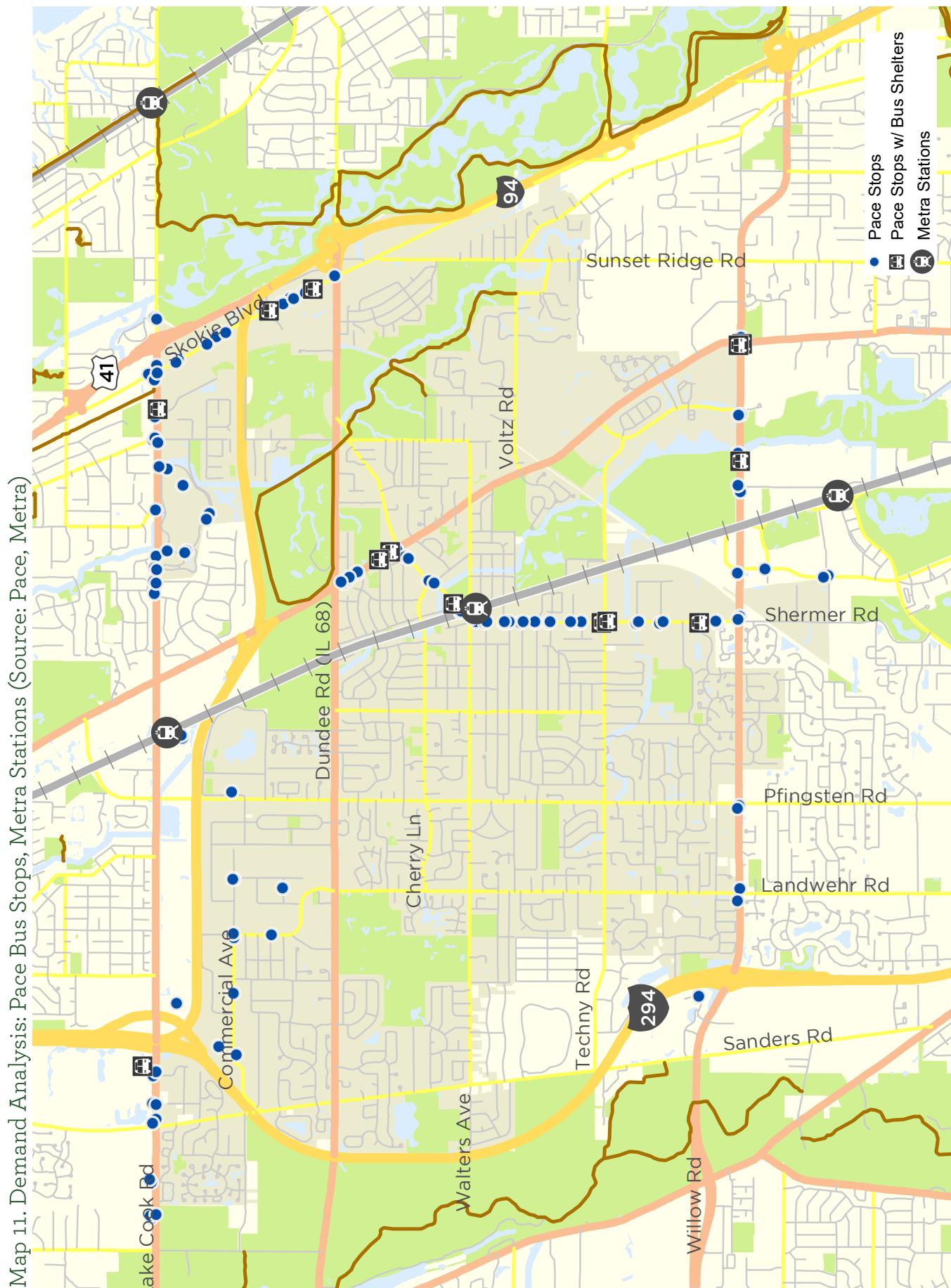
2017 ZONING MAP



Map 9. Northbrook Zoning Map

Village of Zoning Map shown for reference purposes. For a full size map, visit www.northbrook.il.us and search "zoning".





Current Travel Patterns

To identify current travel patterns for people walking and bicycling, trip data from Strava Labs was reviewed. The content is generated by people using Strava, a free, primarily recreational use mobile activity tracking application. Strava Labs assembles this information into “heatmaps” that show concentrations of running and bicycling activity. These heatmaps show hotspots where people walk and bike in Northbrook.

By reviewing the “cooler” areas of the map, the beginnings of gaps appear. Due to the user-created data, Strava users are not representative of the overall population and their trips trend primarily toward recreation. Strava data provide part of the picture, and help identify trends when combined with bicycle and pedestrian count data collected through Village data and other agencies.

RUNNING TRIPS

Strava data are available for jogging trips in Northbrook. Jogging data are used here as a proxy for recreational walking trip data. Although not the same, the data provide a general idea about walking and jogging trends in the Village.

The Strava heatmap in Map 12 shows running activity in subdivisions west and northwest of downtown

Northbrook (Circle 1). Busier north-south streets, such as Shermer Road, Pfingsten Road, and Landwehr Road also appear on the map, along with Dundee Road.

In general, Strava running data show popular corridors for walking and running activity in Northbrook and relatively high traffic levels on regional trails. Connections to and from these trails are less pronounced, which indicates lower traffic levels. This may indicate less preference for walking to and from regional trails.

Strava data show a diagonal running route using neighborhood streets: Grant Road to Voltz Road, Sunset Ridge Road, Happ Road, and Willow Road (Circle 2). However, the route is less traveled on Willow Road, suggesting that not everyone begins or ends their run at Erickson Woods and the North Branch Trail.

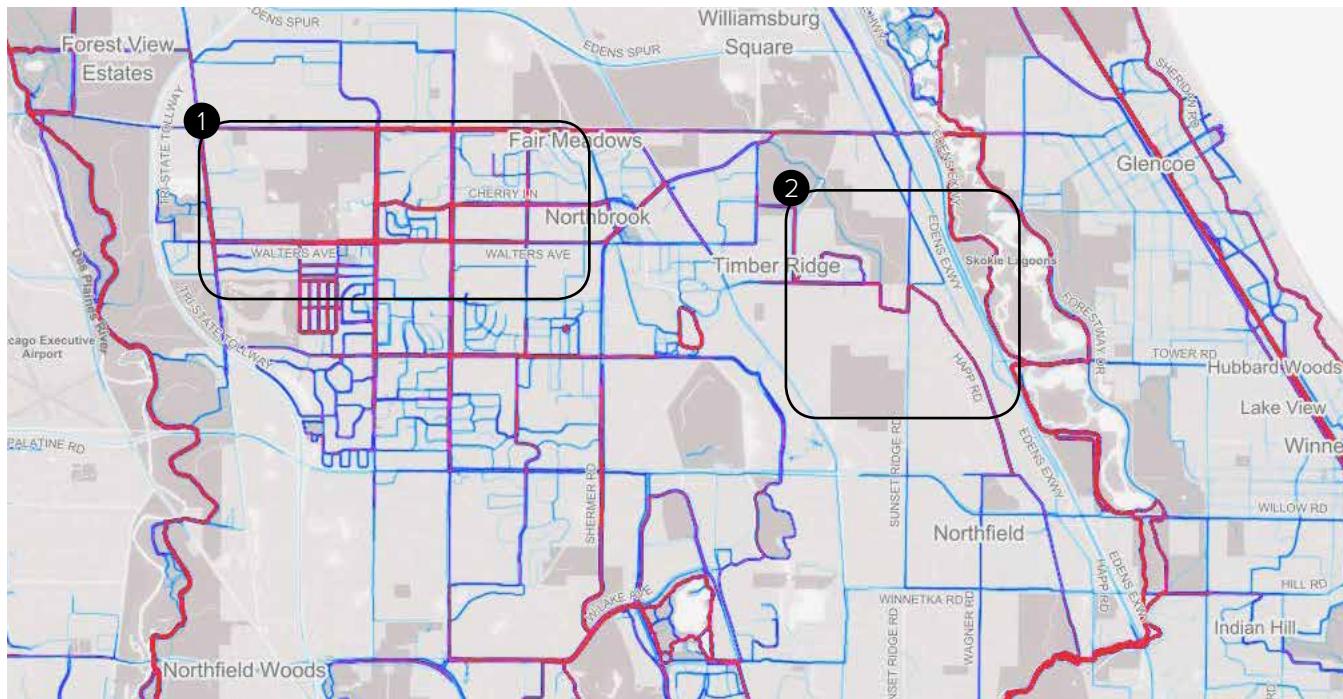
A similar trend is shown in the area east of the Des Plaines River Trail. Although some people run along Dundee Road to use the trail, there is much more activity along the trail itself and in the neighborhoods east of Dam Woods.

BICYCLING TRIPS

Map 13 shows comparatively lower levels of bicycling traffic within residential areas of Northbrook than walking. This suggests that the Strava trips are reported

Map 12. Running Trips in Northbrook

Fewer Map screenshot from
Trips Strava Metro online map



by riders who are trail riding rather than logging their on-street trips. Popular routes include Sanders Road, Pfingsten Road, Shermer Road, and Sunset Ridge Road.

Routes that connect to trails, such as to the Des Plaines River Trail from Dundee Road or Timberlane Drive (by way of Sanders Road and Techny Road), show lower bicycling levels (Circles 1a and 1b) than those on the east side of the Village near the North Branch Trail by Dundee Road, Skokie Boulevard and Tower Road, and Willow Road (Circles 2a, 2b, 2c).

REGIONAL DATA COLLECTION EFFORTS

The Chicago Metropolitan Agency for Planning (CMAP) maintains a Bike and Pedestrian Count Geodatabase which includes street level bicycle and pedestrian counts in the Chicago metropolitan area.

The geodatabase contains a single table for hourly bicycle and pedestrian counts for count collection locations at intersections and street segments within 6 counties of the CMAP region. These counts have been reported by Chicago Metropolitan Agency for Planning.

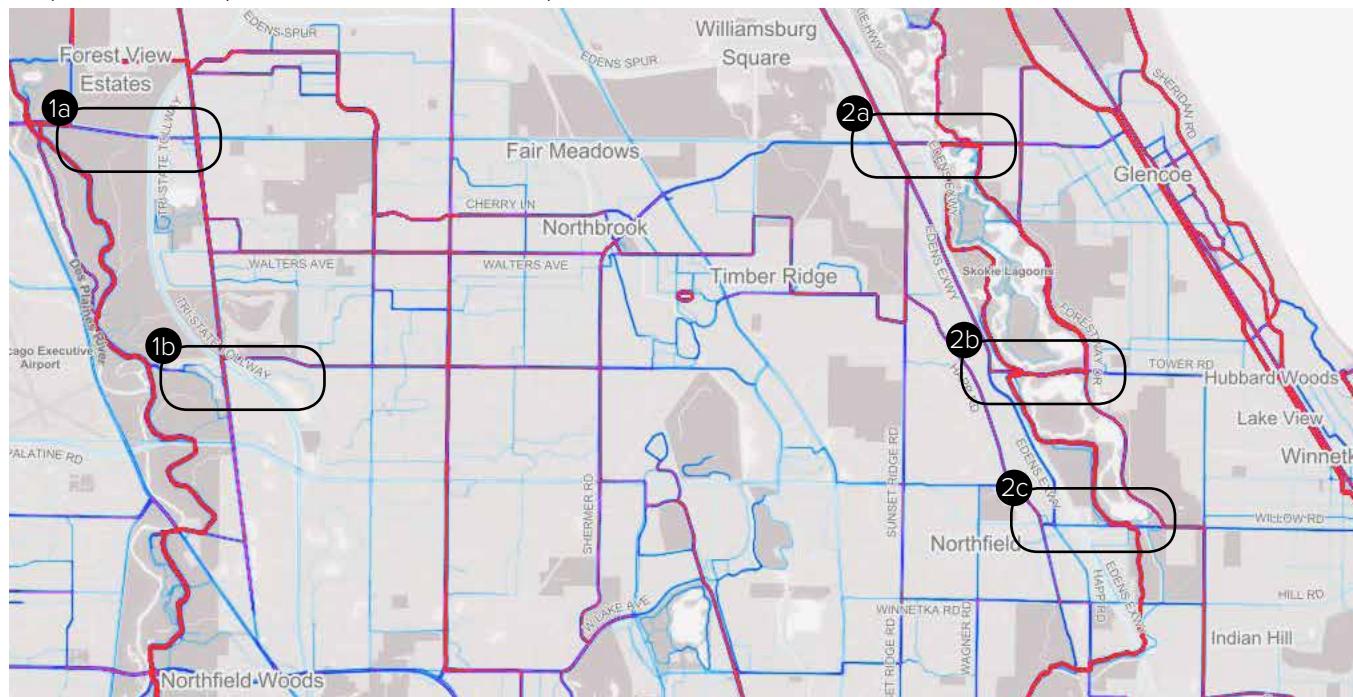
Count data were collected once in 2014 and provide only a preliminary glimpse into data collection efforts in the region. In 2014, count data were collected at two locations near Northbrook: on the Skokie Valley Trail at



Figure 16. Skokie Valley Trail at Sunset Ridge Road.

Map 13. Bicycling Trips in Northbrook

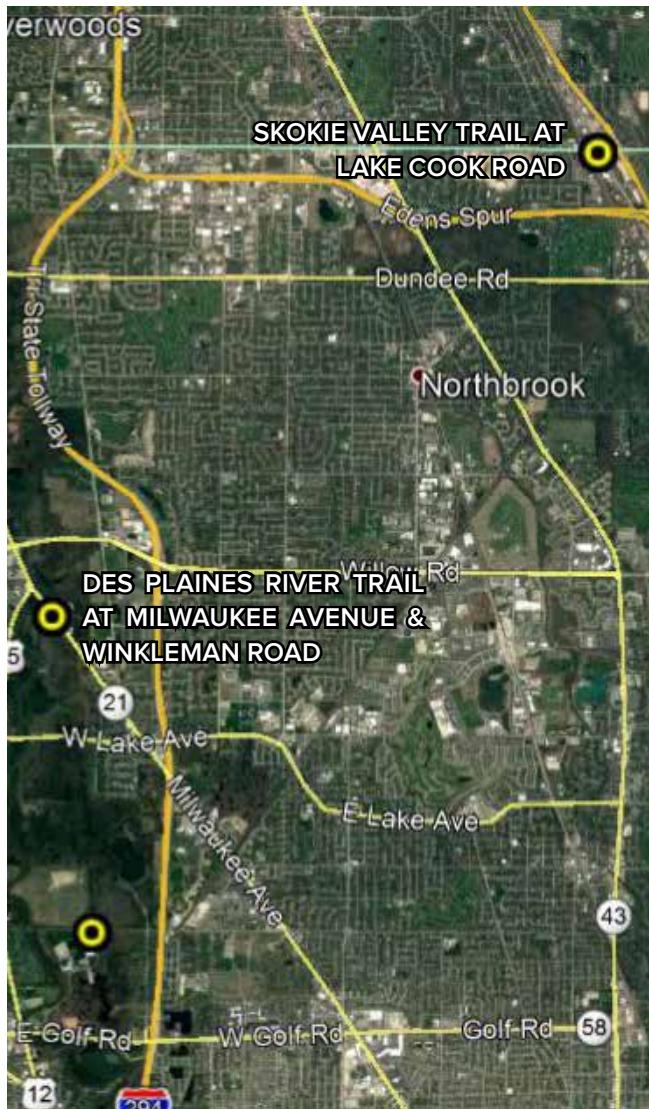
Fewer Trips  More Trips Map screenshot from Strava Metro online map



its current terminus at Lake Cook Road, and on the Des Plaines River Trail at Milwaukee Avenue and Winkleman Road. The Skokie Valley Trail - Lake Cook Road location reported five to seventeen trail users per hour on June 20, 2014. The Des Plaines River Trail - Milwaukee/Winkleman location reported one to five users per hour on July 3, 2014. These count locations are shown below in Map 14.

The Forest Preserve District of Cook County uses automated trail counters to count the number of people walking, bicycling, and driving at various points within Skokie Lagoons. Although outside of Northbrook, the data describe the popularity of this regional destination.

An infrared trail counter positioned just north of the Skokie Lagoons, on the North Branch Trail, counted over 30,000 trail users from June 28 to August 31, 2017. An infrared trail counter south of this location counted over 27,000 people during the same time period.



Map 14. 2014 Count Locations

Regional Planning Context

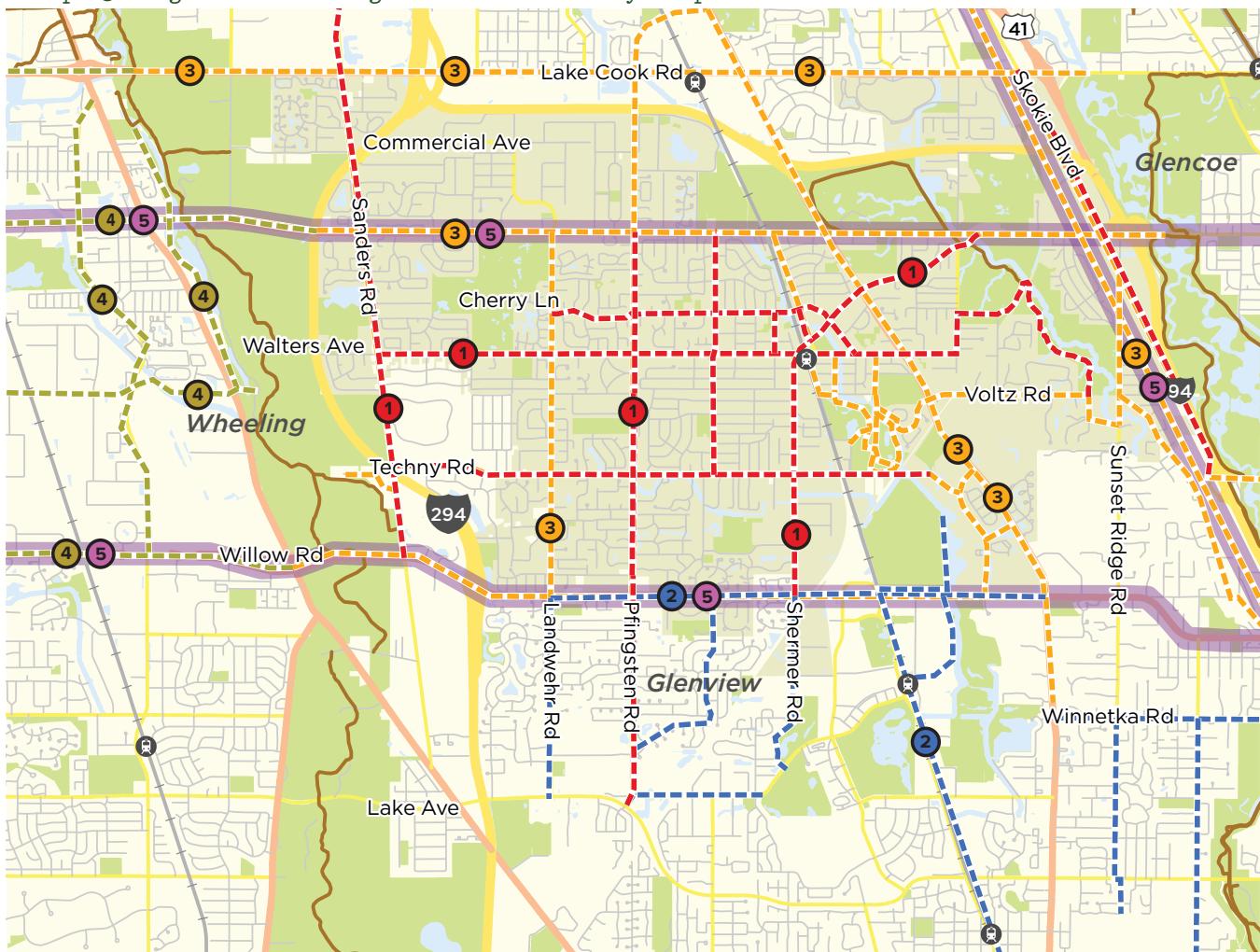
The Village of Northbrook and surrounding communities are constantly preparing and updating plans to improve walking and bicycling. Plans prepared by the Village, neighboring municipalities, and regional agencies were reviewed for context of potential impacts to infrastructure, policies, or programs for walking and bicycling in Northbrook. Plans that were reviewed include:

- » Village of Northbrook Bicycle Plan, 2003
- » Village of Northbrook Comprehensive Plan, 2010
- » Village of Northbrook Policy Statement for the Construction of New Public Sidewalk, 2008
- » Village of Northbrook Capital Improvement Program Executive Summary (2018-2023 program)
- » Village of Northbrook Affordable Housing Plan
- » Village of Deerfield Comprehensive Plan, 2004
- » Des Plaines River Corridor Plan, 2014
- » Village of Glencoe Active Transportation Plan, 2017
- » Village of Glencoe Downtown Plan, 2017
- » Village of Glencoe Strategic Work Plan 2014
- » Village of Glenview Bicycle and Sidewalk Master Plan, 2007
- » Northfield Road Corridor Plan, 2016
- » Northwest Municipal Conference Bicycle Plan, 2010
- » Skokie Valley Bicycle Facility Improvement Plan, 2002
- » Village of Wheeling Active Transportation Plan, 2012

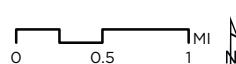
As the field of transportation planning is continuously evolving, some recommendations identified in previous plans have been implemented. Others may remain, and this affords the opportunity to update recommendations to reflect current needs.

Map 15 shows the locations of previously identified infrastructure recommendations from various sources.

Map 15. Regional Planning Context Summary Map



- ① Village of Northbrook Bicycle Plan, 2003
- ② Village of Glenview Bicycle and Sidewalk Master Plan, 2007
- ③ Village of Northbrook Comprehensive Plan, 2010
- ④ Wheeling Active Transportation Plan, 2012
- ⑤ Northwest Municipal Conference Bicycle Plan, 2010



CONNECTIONS TO AND FROM TRAILS

The Des Plaines River Corridor Plan (2014) identified the need for improved trail connections west of Portwine Road, north of Dundee Road, west of Sanders Road, and north of Willow Road. The sidepath proposed in the Wheeling Active Transportation Plan (2012) helped improve pedestrian and bicycling access.

The Northbrook Comprehensive Plan and Northbrook Bike Plan is consistent in this recommendation by proposing bike lanes on streets to connect to the Des Plaines River Trail.

REGIONAL STREET IMPROVEMENTS AND INTERAGENCY COORDINATION

Regional-scale improvements from past plans tend to focus on bicycle improvements, given their proposed distance. The Northwest Municipal Conference (NWMC) Bicycle Plan (2010) is one such regional plan. Future improvements discussed in this plan will focus first on recommendations to improve walking. The NWMC plan identifies Dundee Road, Willow Road, and Skokie Valley Corridor (off-street route parallel to Skokie Boulevard) as priority regional corridors for bicycle improvements. Plans from Northbrook, Wheeling, and Glenview contain recommendations for improving Dundee Road and Willow Road.

Municipal and regional plans discuss the need to coordinate improvements with regional entities, such as County or State Departments of Transportation and neighboring municipalities. Previously completed plans from neighboring villages generally connect to at least one previously proposed improvement from the Northbrook Comprehensive Plan (2010) or Northbrook Bicycle Plan (2003). This indicates a possibility to continue walking and bicycling improvements to neighboring areas.

The Northbrook Comprehensive Plan (2010) and Northbrook Bicycle Plan (2003) include walking and bicycling improvements recommended near the Lake-Cook and Northbrook Metra stations. Additionally, the Northbrook Affordable Housing Plan (2005) identifies multiple affordable housing focus areas within one mile of a Metra station.

Streets recommended as bike routes in the Northbrook Bicycle Plan (2003) included Walters Avenue, Cherry Lane, Techny Road, Western Avenue, Pfingsten Road, Shermer Road, and Sanders Road.

The Village is currently completing several pedestrian projects. Projects include reconfiguring Shermer Road between Church Street and Waukegan Road, which includes midblock pedestrian crossings, sidewalk replacement throughout downtown, and pedestrian island replacement at the northeast corner of Shermer Road and Church Street.

The Northbrook Bicycle Plan identifies streets that have potential for adding wayfinding signage and striping bike lanes. These streets generally offer direct north-south or east-west connections by using low traffic volume and low speed roadways or existing trails. This plan will revisit previously identified improvements for opportunities to identify pedestrian improvements and to upgrade previously proposed improvements based on contemporary best practice facility selection and design guidance.

CAPITAL IMPROVEMENT PLANNING

Municipalities create Capital Improvement Plans (CIP) to schedule expenditures for public improvements. Pairing walking and bicycling transportation improvements--such as adding or improving a sidewalk or striping a bicycle lane--within projects scheduled in the CIP often result in more coordinated and reduced cost ways to install walking and bicycling infrastructure.

While the Village of Northbrook Capital Improvement Program does not have a dedicated funding source solely

for bicycle and pedestrian improvements, it incorporates bicycle and pedestrian accommodations into scheduled projects. The benefit of preparing a master bicycle and pedestrian plan allows for these accommodations to be completed in a more cost effective manner.

Areas where the Village has the potential to incorporate bicycle and pedestrian improvements include:

- » Asphalt Street Reconstruction and Rehabilitation
- » Concrete Street Reconstruction and Rehabilitation
- » Sidewalk Maintenance (repair and replace)
- » Traffic Signal Improvements
- » Roadway Reconstruction
- » Skokie Valley Trail Improvements
- » Central Business District Improvements
- » Bike Parking and Shelter Improvements (e.g. 2018-2023 CIP identifies North Commuter Parking Lot)



Figure 17. An excerpt of a map from the Northbrook Comprehensive Plan (2010). Speed Limit Signs illustrate areas defined as places with cut through traffic concerns.

Review of Village Policies and Practices

As part of the planning process, the Village of Northbrook held a technical training on October 25, 2017 for Village staff which discussed major elements of pedestrian and bicycle planning and design. This included a discussion and review of current Village policies and practices related to walking and bicycling.

JURISDICTIONAL TRANSFERS

Jurisdictional transfers (JT) mean that roadway ownership is transferred from one entity to another. Typically, this means ownership is transferred from the County or State to a local municipality. In Northbrook, this occurs when there is a substantial improvement to a roadway. The Techny Road drain project is one example. The project includes coordinated roadway improvements. A JT also occurs when the Village seeks to maintain control of the roadway for development purposes. Shermer Road, within the downtown area, is an example of this.

CURB RAMPS

The Village Public Works department installs curb ramps through the sidewalk replacement program consistent with accessibility standards and requirements for public rights-of-way established through the Americans With Disabilities Act (ADA). Private property must comply with current code restrictions.

SUBDIVISION DEVELOPMENT

Current policy requires developers to inspect new street and sidewalk construction projects daily. Public Works Department staff inspect projects during specific construction stages. Most public infrastructure improvements are added to a development before the first houses are constructed. Some items, sidewalks included, are developed as homes are constructed. The Village has closed sidewalk gaps during new subdivision construction.

PEDESTRIAN AND BICYCLE IMPROVEMENTS

The Village has used many infrastructure options to improve pedestrian facilities along and across streets. These include sidewalks, pedestrian refuge islands, pedestrian signals and countdown timers, curb extensions, and roadway reallocation (i.e., road diets, which shorten crossing distance). Gaps that remain in the network are due primarily to cost and/or right-of-way constraints.

Currently, the Village pays for all sidewalk repair and replacement. Village funds also paid for the installation of shared lane markings on Shermer Road, Cherry Lane, Cedar Lane, and Meadow Road.

The Village used Illinois Transportation Enhancement Program (ITEP) funding to pay for bike route signage on Walters Avenue, Western Avenue, Techny Road, Lee Road, Grant Road, and Voltz Road. ITEP provided 80% of the project funding. The Village paid the remaining 20%.

STORMWATER MANAGEMENT

The Village of Northbrook works to improve stormwater management for overall system efficiency and to reduce localized flooding. Northbrook's 2018-2023 CIP includes \$5.1 million of stormwater projects.

There is potential for integrating pedestrian and bicycle improvements into stormwater projects. Improvements such as curb extensions (also known as curb bumpouts) or separated bike lanes can be designed with features that capture and filter stormwater.

The National Association of City Transportation Officials (NACTO) Urban Street Stormwater Guide (2017) provides guidance about integrating transportation and stormwater management infrastructure.

WINTER MAINTENANCE

Current village policy is for streets to be cleared in 4 to 6 hours after the snow stops. Sidewalk plowing is subject to staff and equipment availability and is considered a secondary priority to public roadways, municipal facilities, and commuter parking lots. The Village plows a limited number of sidewalks, but it does plow all shared-use paths and trails. While residents are not required to clear snow, it is encouraged. During light snowfall events, the sidewalks that the Village plows are cleared within 8 to 10 hours after the snow stops or by the next day. Online maps are available to view street and sidewalk plow routes. On the Village website search for "Street and Roadway Plowing". Follow the link shown and then turn the sidewalks and roads layers to view your area.

Sidewalk clearance is more challenging to clear in deep snow where snow blower attachments are required. In these instances, the sidewalk may be cleared within a few days. The Village prioritizes sidewalk clearance routes during these moderate to heavy snowfall events.

Summary of Findings

HIGH SPEED, HIGH VOLUME ROADS LIMIT CONNECTIVITY

High speed and higher volume roads are difficult to cross on foot and by bike. Streets such as Shermer Road, Techny Road, Landwehr Road, Pfingsten Road and Sanders Road have crossings spaced 1/4 to 1/2 mile apart. The infrequent crossings make pedestrian travel difficult and residents may be more likely to cross midblock.

Northbrook is situated between two major highways. Traffic passes through the Village on arterial and collector streets such as Dundee Road, Willow Road, Sanders Road and Pfingsten Road. Traffic on these major roadways makes walking and bicycling uncomfortable.

VILLAGE PROGRAMS AND POLICIES ARE SUPPORTIVE OF WALKING AND BICYCLING

A review of policies and programs identified several areas where walking and bicycling are priorities. Documentation of these within the plan can help to improve awareness and communication among Northbrook residents.

RESIDENTS SUPPORT IMPROVED WALKING OPPORTUNITIES WITHIN THE VILLAGE

Residents acknowledged that they walk most often in their own neighborhoods, and that closing key gaps in the sidewalk network could encourage more walking. Residential streets with low posted speed limits and low traffic volumes could support increased biking and walking with additional wayfinding signage or traffic calming. Retrofitting intersections with improved

crossings could help residents travel across streets that would otherwise act as barriers.

Walking and biking to school is encouraged and supported at Northbrook Schools, including schools that serve Northbrook families but are located outside of the Village. Most of the children who walk and bike to school live in adjacent neighborhoods. Prioritizing crossings around major streets leading to schools will help encourage more walking and biking to school.

SIDEWALK GAPS LIMIT WALKABILITY

Sidewalk gaps on at least one side of a street also contribute to more stressful walking environments. Similarly, the level of traffic stress map indicates that high speed, high volume roadways are not perceived as safe and comfortable for the majority of the population.

IMPROVED TRAIL ACCESS IS NEEDED

While the Village is located near three major trails, and will soon have one on its eastern border, access to trails is limited by the major streets and highways that sit between the Village and the trails. Most people who casually use the trails don't ride to them. Instead, they typically drive to a trailhead.

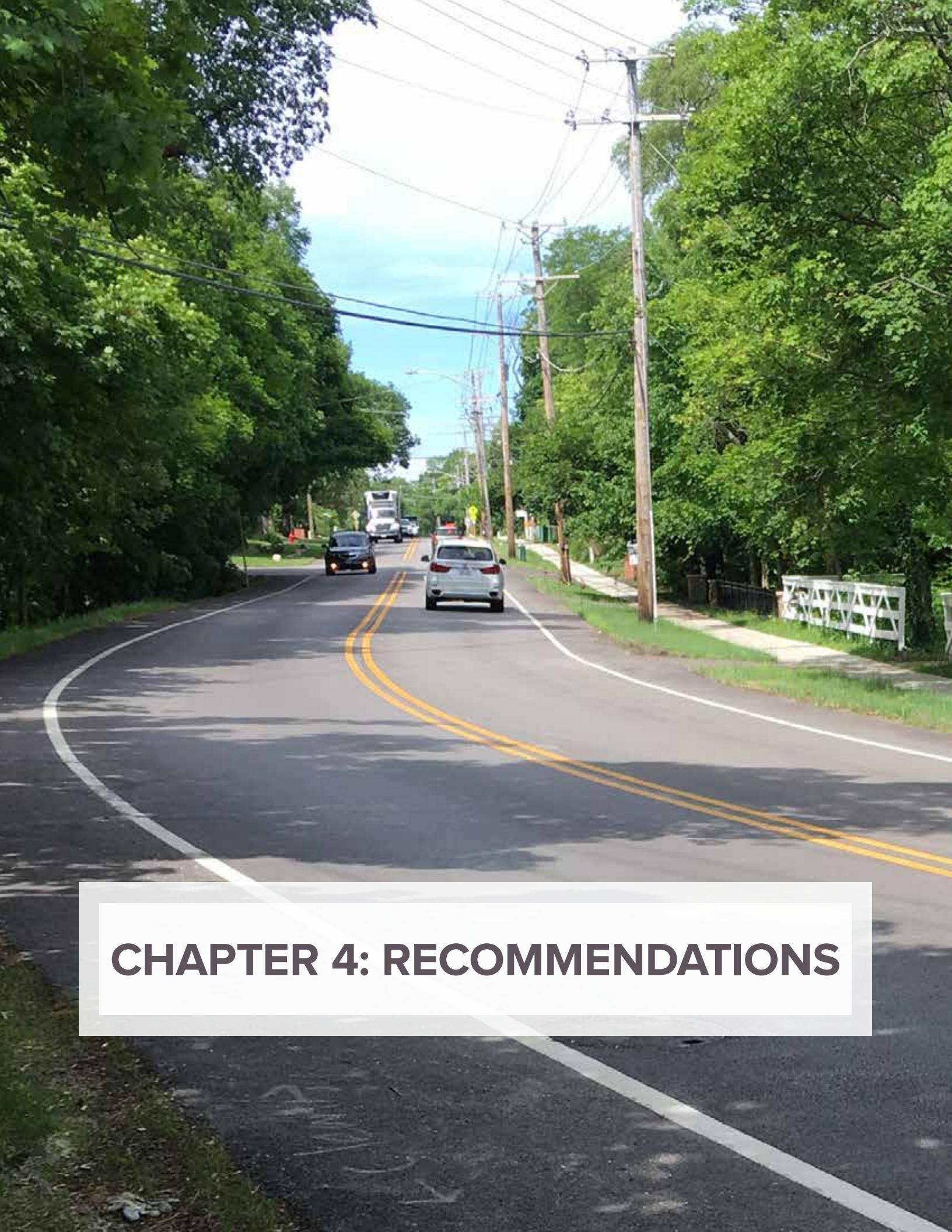
FUTURE TRAILS CREATE OPPORTUNITIES

The proposed extension of Skokie Valley Trail through the eastern portion of Northbrook is a key opportunity. Creating connections to this new trail will encourage increased walking and bicycling in the community. Connections from trails into downtown Northbrook will support the downtown area's economic vitality.



Figure 18. Walters Avenue is a signed bicycle route.

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CHAPTER 4: RECOMMENDATIONS

Recommendations Overview

Bringing the vision of a walkable and bike-friendly Northbrook requires a comprehensive approach, one that employs a variety of strategies to transform not just the physical environment, but also Village policies, community values regarding walking and bicycling, and travel and recreation choices. To this end, the recommendations included in this chapter utilize the “Six E’s” framework of a walkable and bikeable community: Engineering, Education, Encouragement, Enforcement, Evaluation (and planning), and Equity. These Six E’s are described below.

A safe, interconnected, and comfortable network of active transportation facilities is integral to achieving the vision of a walkable, bicycle friendly community.

The recommendations for bicycle and pedestrian infrastructure outlined in this chapter represent a comprehensive active transportation network that builds upon the existing system of streets, sidewalks, and paths and will support people of all ages and abilities who choose walking and bicycling to travel throughout the Village. These recommendations are based on technical and observational analyses of existing conditions, a review of previous planning studies and projects already underway, and input from members of the community gathered through multiple public engagement activities during the course of the planning process.

The Six E’s: Essential Elements of a Bicycle and Pedestrian Friendly Community

Pioneered by the National Safe Routes to School Coalition and the League of American Bicyclists, the Six E’s provide a holistic framework through which people and agencies can plan for and create a bicycle and walk friendly community. The recommendations included in this chapter span the Six E’s and offer Northbrook a wide range of opportunities to impact transportation and recreation choices for Village residents and visitors.



The recommendations chapter consists of four key elements designed to support the Village of Northbrook and its stakeholders in the implementation of the master plan and project development:

» **Program and Policy Recommendations.** These recommendations build on the proposed network by identifying programs and policies that stimulate bicycle and pedestrian activity and foster a transportation culture in Northbrook that respects and values walking and bicycling.

» **Proposed Active Transportation Network.** Proposed infrastructure map presents the ultimate build-out of a complete, interconnected system of walking and bicycling paths. Implementation of this ultimate network of on- and off-street facilities is expected to take place over the next several decades, and will be a combination of Village actions, as well as through actions of partner agencies. This map illustrates the connectivity between proposed infrastructure, the existing transportation system, and key community and regional destinations. The map also includes projects in-progress, like the Skokie Valley Trail Extension and the Shermer Road Project, and highlights first-mile/last-mile connections to transit.

» **Project Cost Estimates.** Cost estimates are an essential tool at both the planning and project

development stages. Cost estimates for proposed infrastructure projects create a shared understanding of the financing needed to implement the full plan, assist with capital improvements planning, and support individual project development.

» **Facilities for Bicycling and Walking.** The character, quality, and integrity of active transportation facilities are critical to the success of the proposed infrastructure projects and to the future of walking and bicycling in Northbrook. The range of facility types for biking and walking reflects the needs and desires of Northbrook residents and indicates the preference for enhancing safety and reducing levels of traffic stress. The facility types are shown in the proposed network, as well as are noted in the recommended listing of projects. The design guidelines included in the appendix expand on these facility types by providing national standards and best practices. These guidelines empower the Village of Northbrook with the tools necessary to build high-quality, state-of-the-art facilities for walking and bicycling.

Together, these four elements of the recommendations chapter embody the Six E's and provide the blueprint for achieving the vision of a walkable and bike-friendly Northbrook.



Figure 19. A student bicycling to school.

Program and Policy Recommendations

Building a walkable and bicycle-friendly Northbrook will require more than just pedestrian and bicycle infrastructure. The Village of Northbrook must employ a holistic, comprehensive approach that utilizes education, encouragement, and enforcement programs, and proactive policies and procedures to create social, institutional, and physical changes envisioned in this Plan. The program and policy recommendations included in this plan complement the proposed infrastructure improvements and create a balanced, well-rounded

approach to increasing walking and bicycling in the community. Coordination with and assistance from local and regional partners will be essential to the successful delivery of these diverse programming opportunities.

These recommended programs and policies follow the Six E's of a walkable and bicycle-friendly community: Engineering, Education, Encouragement, Enforcement, Evaluation (and Planning), and Equity. Table 3 below lists these recommendations and identifies which of the Six E's each program or policy supports.

TABLE 3. RECOMMENDED PROGRAMS AND POLICIES

| RECOMMENDED PROGRAM/ POLICY | EDUCA- TION | ENCOUR- AGEMENT | EN- FORCE- MENT | ENGI- NEERING | EVALUA- TION | EQUITY | STATUS UPDATE |
|---|---|---|---|---|---|---|----------------------|
| Bicycle and Pedestrian Program Branding |  |  | | | | | |
| Bicycle and Pedestrian Coordination - Public Works Lead |  |  |  |  |  |  | |
| Expand Bicycle Task Force Responsibilities |  |  | |  |  |  | See 4/22 Update Memo |
| Bicycle-Friendly Community and Walk-Friendly Community Designations | | | | |  |  | |
| Bicycle and Pedestrian Counts Program |  | | | |  | | |
| Bike Share Feasibility Study |  | | |  | |  | |
| GIS Data Management | | | |  |  |  | See 4/22 Update Memo |
| Updates to Information Collection and Distribution Systems | | | | |  |  | |
| Bicyclist and Driver Education around New Infrastructure |  | | |  | |  | |
| Public Education and Awareness Campaigns |  |  | | | |  | |
| Bicycle Safety and Maintenance Training Workshops |  |  | | | |  | |
| Youth Bicycle Safety Classes |  |  | | | |  | |
| Themed & Targeted Bicycle Rides | |  | | | |  | |
| Specialized Bicycle-Focused Training for Law Enforcement Officers |  | |  | | | | |
| Traffic Ticket Diversion |  | |  | | |  | |

Bicycle and Pedestrian Program Branding

As the Village of Northbrook continues to support and encourage walking and bicycling as legitimate, viable transportation choices for residents and visitors, it will be important to unite individual projects and programs under a single “brand” or identity. Potential branding elements may include:

- » Development of a program logo adapted from the Village logo using the same yellow and green color palette.
- » Logo incorporation into bicycle- and pedestrian-related website content, print materials, and relevant Village of Northbrook and Northbrook Park District events like Autumnfest, and other events co-sponsored or supported by the Village, such as walk- and bike-to-school events.

The Bicycle Task Force should assist the Village in the distribution of branded education, encouragement, and event-related materials to schools, businesses, and other community partners.

Bicycle and Pedestrian Coordination

Successful implementation of the Master Bicycle and Pedestrian Plan relies heavily on a commitment of the Village to implement all facets of the plan, from engineering to evaluation. The determination of whether to hire or appoint a bicycle and pedestrian coordinator will need to be evaluated once the plan is implemented and as it progresses towards accomplishing the Six E's. The level of commitment to the plan may require part or full-time involvement of a Village Staff member(s) depending on the stage of a project or program.

The Village of Northbrook will establish an internal dialog regarding the Bicycle and Pedestrian Coordinator position or shared responsibilities to enhance interdepartmental coordination, support interagency coordination, and streamline communications with community residents, stakeholders, and media. A significant part of the plan involves infrastructure projects; therefore it is envisioned that Public Works will have an important role in coordination of activities; however, other elements of the plan (programs) would be better suited for other departments or other local agencies. Coordination must cross departmental boundaries or allow for several designated persons from key departments to assume a portion of roles needed for successful implementation

of the plan. While coordination may be accomplished by multiple staff members and departments an overall lead for the plan should be established. Responsibilities may include the following activities:

- » Monitor facility planning, design, and construction of bicycle and bicycle-related projects
- » Coordinate the implementation of recommended projects and programs in this Plan with Village staff and external agencies
- » Provide regular updates to the Village Board related to plan implementation and activities
- » Coordinate activities such as annual evaluation programs like bicycle counts, annual reporting, and crash evaluation, as well as before and after studies of the effectiveness of implementation.
- » Identify new infrastructure projects and programs to improve the bicycling environment
- » Identify and pursue funding sources for projects or programs
- » Research and oversee policy updates to enhance a culture of biking and walking in the Village
- » Represent the Village of Northbrook for matters related to bicycle infrastructure projects and supporting programs

Expand Bicycle Task Force Responsibilities

The Village of Northbrook Bicycle Task Force (BTF) meets to coordinate all bicycle-related initiatives within the community, to review the need for access to bicycle transportation on behalf of the Village, to determine existing needs, and to make recommendations to make the Village of Northbrook more ‘bicycle-friendly’. As such, the Bicycle Task Force can also be a valuable resource in implementing the recommendations included in this plan.

The BTF operates differently than other designated groups. This Task Force can add members as it sees fit and adapts to assist the Village regarding bicycling activities in Northbrook. The addition of pedestrian scope and a focus on implementation of the Northbrook Bicycle and Pedestrian Plan will require more diversity in its composition. Additions to the BTF may include representatives from school districts and from walking or running groups. Potential duties and tasks delegated to the BTF could include the following:

- » Explore partnership opportunities for trail development and programs
- » Organize and coordinate education and encouragement programs and events, such as organized walks, bike rides, and bicycle education programs
- » Support the Village's application process for Bicycle-Friendly and Walk-Friendly Community Designations
- » Assist in the Village's review of recommended projects
- » Contribute to project prioritization, phasing, and selection in coordination with Village staff and the Public Works Committee
- » Identify and initiate early action projects from the plan

In coordination with the Public Works Committee, the BTF can provide guidance and input on all matters related to active transportation, including bicycling and walking. This may require a change to the name of the task force to reflect its expanded scope.

Bicycle Friendly Community and Walk Friendly Community Designations

To acknowledge the progress the Village of Northbrook has made to support bicycling and walking, the Village should consider applying for Bicycle Friendly and Walk Friendly Community designations from the League of American Bicyclists and Walk Friendly Communities, respectively. Both of these programs recognize the achievements of local governments to create physical and social environments that weave bicycling and walking into the fabric of the community. Through the detailed application processes and responses from each organization, the Village can gain valuable insight into successful projects and initiatives and identify opportunities for improvement. The application process would likely be led by the Village's bicycle and pedestrian coordinator or Bike Task Force with support from various departments, reflecting the diversity of efforts and cross-departmental coordination required to achieve these designations.

Another advantage of applying for these designations is the valuable feedback that each organization provides to applicants. This feedback can help local agencies pinpoint additional programs, infrastructure improvements, and other focus areas to help them continue on the path to creating a more bicycle- or walk-friendly community.

The awards for Bicycle Friendly and Walk Friendly Communities are designated for a specific period of time and require awardees to complete the application process again to retain the designation or receive a higher award. For example, the Bicycle Friendly Community designation lasts for three years, at which point the awarded agency would apply again for designation.

RESOURCES:

- » League of American Bicyclists' Bicycle Friendly Communities Program: <http://www.bikeleague.org/community>
- » Walk Friendly Communities: <http://walkfriendly.org/>



Figure 20. The Bicycle Friendly Community and Walk Friendly Communities program logos.

Bicycle and Pedestrian Counts Program

The Village of Northbrook collects a variety of traffic count data, but most of this data is limited only to motor vehicle traffic. Without a clear understanding of bicycle and pedestrian activity, it can be difficult to understand active transportation traffic patterns, justify infrastructure improvements, and track changes in bicycle and pedestrian activity before and after an infrastructure project is completed. The Village of Northbrook should consider establishing a bicycle and pedestrian counts program to fill this information gap and better understand non-motorized transportation activity throughout the Village. Additionally, the collection of bicycle and pedestrian count data can prove helpful in the justification of bicycle and pedestrian projects when applying for local, state, or federal funds.

The following elements of a counts program best suited to the Village's current conditions, need, capacity and resources are described below in greater detail:

- » Types of counts
- » Number of count locations
- » Location of count stations



Figure 21. Example of volunteers performing a manual count of bicyclists in Los Angeles, California.

TYPES OF COUNTS

There are two basic types of bicycle and pedestrian count methods: manual and automated:

- » Manual Counts. Manual counts rely on staff or volunteers to physically count the number of people bicycling or walking through an intersection or across a screenline with the support of a chart, clicker, or tablet device. While the manual count method can be deployed easily at many different count locations across the Village, extrapolating the data from these counts can be unreliable, as fluctuations in weather, activity, and other local conditions over the short counting window can result in large differences in extrapolated data.
- » Automated Counts. Automated counts can include counting devices like video counters (such as MioVision), pneumatic tube counters for on-street bicycle counts, or passive infrared sensors for sidewalk and trail counts. Only some automated counter technology can capture intersection movements; however, all types provide numerous advantages for screenline counts, such as around-the-clock data capture and longer count collection duration, both of which result in more accurate extrapolations and a more detailed understanding of activity by time-of-day and day-of-week.



Figure 22. Example of an infrared sensor to count pedestrian and bicycle trips on a trail.

It is recommended that the Village develop a counts program utilizing a combination of automated and manual counts to generate a more accurate and robust dataset from which to analyze bicycle and pedestrian activity. It is also strongly recommend that Public Works performs before-and-after studies as projects take place in order to measure the effectiveness of the infrastructure recommendations in the plan with desired results.

NUMBER OF COUNT LOCATIONS

The Village of Northbrook should establish the count program with five count locations, scaling up the number of count locations as fiscal and staff resources are available. This initial number of count locations is based on four key considerations: community population, factor groups (sites with similar bicycle and pedestrian activity), budget, and coordination with other agencies.

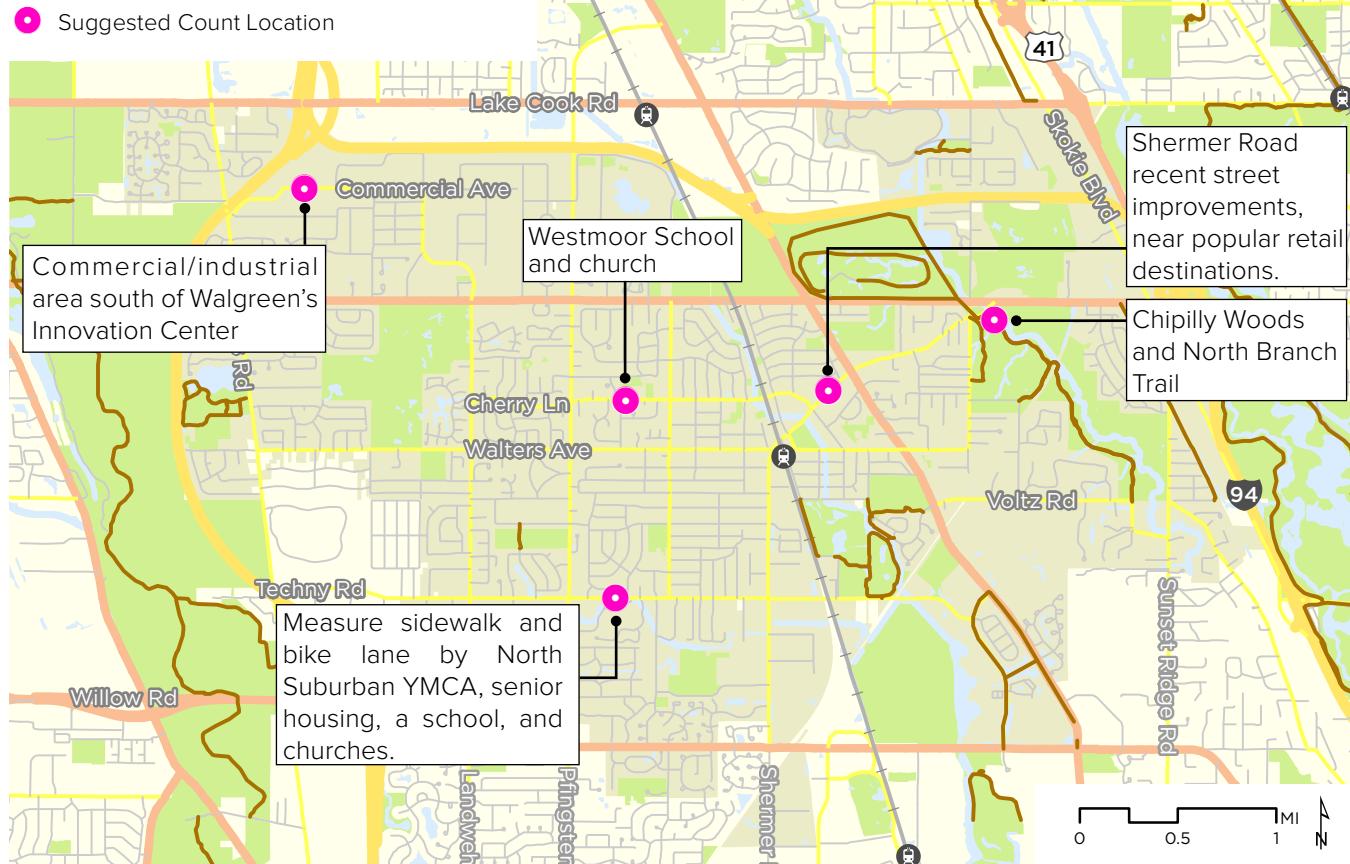
COUNT LOCATION STATIONS

Location selection for counters has two major components: high-level location selection, and site planning. The high-level process involves identifying

locations that are likely to fall within a given factor group, while site planning involves identifying where exactly the site's counters will be installed to accurately represent travel patterns. To begin the count program, five count locations are recommended and are listed below and displayed on Map 16:

- » Cherry Lane, between Crestwood Drive and Partridge Lane
- » Commercial Avenue, between Sunset Lane and Era Drive
- » North Branch Trail, south of Shermer Road (Chipilly Woods)
- » Shermer Road, between Church Street and Waukegan Road
- » Techny Road, between Pfingsten Road and Mayapple Lane

Map 16. Suggested Count Locations



Bike Share

Bike share is a short-term, bicycle rental service where bikes are made available for short trips for a fee. Bike share systems allow for flexible trips, as users can pick up and return bikes at different locations, making bike share a convenient option for one-way trips.

There are currently several bike share systems operating in proximity to Northbrook: Divvy, in the City of Chicago and Evanston; Smoovebike, operated along the North Branch Trail and Dan Ryan Woods; oFo Bikes, operated on Chicago's far South Side; Zagster in Aurora; and JUMP bikes, currently being piloted in Chicago's North Lawndale neighborhood. The Village of Oak Park recently removed its 16 Divvy bike share stations due to low enrollment and usership.

At some point in the future, the Village may wish to consider a bike share program. The relatively short distances between major destinations, convenient and well-used transit stations (Northbrook Metra, Glen of North Glenview Metra), and many low-stress neighborhood streets for short trips can support the development of a bike share program.

Additional information in the plan appendix explains the different types of bike share systems, the pros and cons of each system type, and planning-level cost estimates for future consideration.

GIS Data Management

Geographic Information Systems (GIS) is a data management tool used to map and analyze spatial information. Like many local municipalities, the Village of Northbrook maintains an extensive GIS database to maintain up-to-date information on public utilities, natural resources, aerial imagery, zoning and development projects, land use, parcel information, capital improvements, and other characteristics of the built and natural environments.

The Village also maintains information on trails, sidewalks, and on-street bicycle facilities like bike lanes and signed bike routes. As the Village completes recommended infrastructure projects, it will be important to update the associated GIS files to evaluate implementation efforts, analyze bicycle and pedestrian crash records, and identify patterns of bicycle and pedestrian activity based on data collected through the bicycle and pedestrian count program described above. The Village should continue to digitize walking and bicycling infrastructure as it is completed, and use this information to report annually on tracking progress in implementation of the Plan.

The Village should also update its sidewalk GIS files to a polyline format that includes attributes like sidewalk width, length, material, known deficiencies, and other important information.

Updates to Information Collection and Distribution Systems

The Village of Northbrook has multiple communication channels to receive and distribute information to the community, most notably GONorthbrook and Northbrook Notify. These tools support timely and efficient communication, dialogue, and response-oriented action to help the Village meet the needs of community residents, businesses and other community members.

GONorthbrook, the Village's service request platform, allows residents to request specific services from a wide range of topics, from building permits and construction to sidewalks and street maintenance. The Village should consider incorporating trails, on-street bikeways, and other bicycle-related infrastructure into the topic and sub-topic headings to make it easier for residents to bring attention to deficiencies in the bicycle infrastructure network.



Figure 23. One of Aurora's three bike share stations (source: City of Aurora, Illinois, www.aurora-il.org).

Northbrook Notify, the Village's email, phone, and text notification system, provides timely information to residents based on their preferred topics, such as emergency street closures, local community matters, and weekly meeting notifications. The Village should include an option for residents to receive a seasonal or quarterly newsletter or updates for bicycle- and pedestrian-related programs and projects, as well as contact information or a link to GONorthbrook for residents to submit service requests. This newsletter allows the Village to have a platform to highlight recent and upcoming projects, alert residents to upcoming programs and events, provide valuable tips for bicycle and pedestrian safety, report on bicycle- and pedestrian-related service requests and average response or resolution time, and connect residents with local and regional resources that support active transportation.

Bicycle and Driver Education around New Infrastructure

Many of the bikeways recommended in this plan will be the first of their kind in the Village of Northbrook, new to both community residents and visitors. When roads change, some road users may not be sure what behavior is expected of them. This can lead to mistakes and stress. The Village can help make this transition smoother by proactively educating the public about why roads are changing, and how to use them safely and successfully.

A high-profile media campaign can help to promote the Village's investment in improved transportation infrastructure. These campaign(s) should speak both to bicyclists, drivers, pedestrians, and affected property owners with specific messages about what action/behavior is expected. Outreach methods should target all potential user groups. For example, to reach bicyclists, one might distribute a hang tag distributed with all new bike sales, place temporary chalk stencils in bike paths/lanes, or host a "breakfast in the bike lane" outreach event. To reach drivers, digital outreach on mobile apps Waze and Pandora, radio PSAs, and/or street banners may be more effective. To reach nearby property owners, mailers or door hangers with messages about the coming changes and contact information for Village staff can alleviate concerns and answer questions. The main goals of the campaign will be to increase awareness of road design changes and improving behaviors and compliance around new infrastructure. Campaign elements should use a variety of media types and outlets to ensure coverage, reach, and repetition. All media should be available in both English and Spanish.

The campaign should include the following elements:

- » Website and/or newspaper advertisements
- » Press release to local newspapers and media outlets
- » Social media posts by the Village, other agencies, and partners
- » Outreach to neighborhoods, individuals, and businesses near the infrastructure improvement site
- » Educational information posted online with project updates
- » Educational materials for partners to distribute and to use at local events
- » Posters and banners along the affected corridor
- » Variable reader boards and marquees along the corridor



Figure 24. The Seattle DOT uses door hangers like this to inform community residents about complete streets projects and changes coming to nearby roadways.

Public Education and Awareness Campaigns

A broad public outreach and education campaign can help normalize bicycling as an accepted and welcomed way for people to travel in the Village of Northbrook through compelling graphics and messages targeted to motorists, pedestrians and bicyclists. These campaigns utilize a variety of media to share their messages, from buses and bus stop shelters to websites, online ads, and social media outlets. Common topics for media campaigns include safety and awareness; sharing the road and travel etiquette; light and helmet use; and even humanization of bicyclists as fathers, mothers, sons, and daughters. The Village should identify potential supporting stakeholders (e.g. neighboring municipalities, school districts) to assist in the development and delivery of an education and awareness campaign.

Resources

- » We're All Drivers, Bike Cleveland (Cleveland, OH): <http://www.bikecleveland.org/our-work/bike-safety-awareness/>
- » Drive with Care, Bike PGH (Pittsburgh, OH): <http://www.bikepgh.org/care/>
- » Every Lane Is a Bike Lane, Los Angeles County Metropolitan Transportation Authority (Los Angeles, CA): <http://thesource.metro.net/2013/04/11/every-lane-is-a-bike-lane/>
- » Every Day Is a Bike Day, Los Angeles County Metropolitan Transportation Authority (Los Angeles, CA): <http://thesource.metro.net/2014/04/30/l-a-metro-launches-new-bike-ad-campaign-in-time-for-bike-week-l-a-may-12-18/>



Figure 25. Bike Cleveland's *We're All Drivers* campaign highlighted the diversity of people bicycling to reinforce the idea that everyone bicycles or knows someone that does. Source: bikecleveland.org.



Figure 26. Bike PGH, the bicycle advocacy organization in Pittsburgh, Pennsylvania, launched an effective media campaign to raise awareness for bicycling using these bus stop ads and other media outlets. Source: BikePGH.org.

Adult Bicycle Safety and Maintenance Training Workshops

Classes and workshops provide education and skills training to bicyclists of varying confidence levels. Training classes and workshops offer many benefits: they enhance understanding, confidence, and independence related to bicycling for transportation and provide a supportive learning environment where participants can ask questions or express concerns. Furthermore, classes can be tailored to a variety of topics and demographics, such as:

General Classes:

- » Basic bike maintenance
- » How to change a tire
- » Safe riding and traffic skills training
- » Shopping by bike
- » Commuting 101
- » Bicycle legal clinic
- » No car needed: how to get around without driving

Demographic Specific:

- » Women's maintenance 101
- » Youth safety and skills training
- » Families on bike
- » Bicycling for seniors



Figure 27. Bike maintenance classes can help people learn simple yet valuable repair and maintenance skills.

The Village should partner with local bike shops, advocacy groups, or community members to host workshops and classes. The presenter of the workshop should be confirmed a month or so in advance of the workshop to give adequate preparation time. Workshops should be held at lunch time, or in the evening or weekends to accommodate work and school schedules.

Youth Bicycle Safety Classes

Instilling a love for bicycling in children and young adults can support long-term gains in cultural acceptance and support for bicycling activity. While many children learn bicycling at a young age, it is not a part of physical education curricula in most schools in Northbrook and across the country, partially due to the lack of access to resources. Some school districts, however, have begun to incorporate basic bicycling safety and skills into physical education curricula with great success, often partnering with local police departments, non-profits, and certified bicycling instructors to provide bicycles for students and offer effective instructions to encourage safe riding practices and a basic understanding of rules and responsibilities when riding around motor vehicle traffic. While previous efforts by the Bicycle Task Force to develop and carry out youth bicycle safety classes have achieved limited success, the growth of the Village's bicycle network and increased interest generated during the planning process may be cause to consider re-establishing a similar program. The Village of Northbrook should coordinate with the four elementary school districts that serve the community to explore opportunities to teach basic bicycling skills to younger students.



Figure 28. Bike rodeos and in-school classes can impart valuable skills and knowledge to young children.

Themed & Targeted Bicycle Rides

Organized bicycle rides offer people a comfortable and fun way to explore Northbrook's bicycle routes and trails in a group setting. For many, these types of events build participants' confidence and knowledge of the bicycle network, giving them the tools necessary to choose bicycling for short daily trips. Target audiences for these organized bicycle rides should reflect the diversity of the community and create opportunities for active transportation and recreation, especially children, seniors, and families.

Smaller group rides with capped attendance can capitalize on cultural assets and amenities like historic monuments and buildings, local parks, business districts, and other unique locations. In St. Louis, Missouri, Trailnet's free weekly Community Rides center around the city's history and culture, with themes ranging from museums, breweries, jazz, prohibition, greenways, and the Underground Railroad. Many of these rides are organized and led by local historians and civic enthusiasts.

Larger group rides called cruiser rides that offer family-friendly environment have become mainstays in communities across the country. The Denver Cruiser Ride, the Slow Roll in Detroit, and Freewheel in Memphis attract hundreds to thousands of participants, move at a leisurely pace, and welcome people of all ages and abilities.

The Village should coordinate with local advocacy organizations and other community partners to explore opportunities to diversify and strengthen organized bicycle ride offerings as an essential tool to encourage bicycling activity in Northbrook.

Resources

- » Trailnet (St. Louis, MO) Community Rides: <http://trailnet.org/tag/community-rides/>
- » Slow Roll (Detroit, MI): <http://slowroll.bike/>
- » Denver Cruiser Ride: <http://denvercruiserride.com/>
- » People for Bikes, How to Start a Cruiser Ride: <http://pfb.peopleforbikes.org/take-a-brake/how-to-start-a-cruiser-ride/>

Specialized Bicycle-Focused Training for Law Enforcement Officers

Law enforcement officers receive considerable training annually to effectively enforce local and state laws, including those pertaining to bicycle and pedestrian issues. The Northbrook Police Department should continue to invest training opportunities that focus on bicycle and pedestrian laws, law enforcement, travel behavior, and education tactics to better support active transportation. Funding support from local agencies, state departments of transportation, state highway patrols, and non-profit advocacy organizations have helped to bring valuable training and resources to law enforcement agencies across the country.

Resources

- » Bike Cleveland Enforcement Education (Cleveland, OH): <http://www.bikecleveland.org/enforcement/>
- » Continuum of Training. We Bike, etc: <http://www.webike.org/services/enforcement/continuum-of-training>



Figure 29. Bicyclists stop in an art museum as part of Trailnet's Tour de Museums community bike ride. Source: <https://www.facebook.com/Trailnet/>

Targeted Law Enforcement Activity

Targeted enforcement is an effective way of encouraging lawful travel behavior and instilling respect for other road users. Enforcement activities may include deployment of speed reader boards, police “sting” operations at high crash intersections, wrong-way riding enforcement, bike light enforcement, and even distribution of safety literature along corridors with high volumes of bicycle and pedestrian activity. In the City of Chicago, police officers partner with the City’s Bicycling Ambassadors to educate road users.

The Northbrook Police Department should explore opportunities for regularly-scheduled enforcement activities at strategic locations around the community to support bicycling and walking activity and create safer environments for all road users. Ordinance 24-158 of the Northbrook Municipal Code allows the Village manager to appoint a bicycle safety warden, whose responsibilities include enforcement of bicycle-related ordinances and other duties as assigned. The Village may consider establishing this position to serve as the point person for bicycle and pedestrian safety enforcement.

In addition to strategic locations, the Village should look for opportunities to educate the public as transportation improvements are being planned, designed, during construction, and shortly after a facility is opened to the public to help increase awareness that the transportation network has changed.



Figure 30. Enforcing laws that protect people bicycling and walking creates safer spaces for all road users.

Resources

- » City of Chicago Targeted Enforcement (Chicago, IL): <http://chicagocompletestreets.org/safety/targetedenforcement/>

Traffic Ticket Diversion

Increasing the understanding of and respect for traffic laws, particularly those relating to bicycling and walking, requires a deliberate, multi-faceted approach. A traffic ticket diversion program can support such an approach by offering motorists, bicyclists, and pedestrians who have received traffic violations the opportunity to attend a safety class in lieu of paying fines or receiving points on their driver’s license. As the Village of Northbrook works to increase bicycling and walking activity through an increase in both active transportation infrastructure and supporting programs, a ticket diversion program can increase people’s understanding of the rules and responsibilities of the road and can increase compliance with the Village’s traffic ordinances, creating a safer environment for everyone.

While ticket diversion programs for motorists are common among local agencies in the State of Illinois, ticket diversion programs are relatively new for bicyclists and pedestrians. The Village of Palatine and the Cities of Champaign, Highland Park, Normal, and Urbana are among those in Illinois that have adopted the ticket diversion program for bicyclists that reduces violation fines to only the cost of signing up for the online safety course and exam. For the educational component of the program, these communities have partnered with the League of Illinois Bicyclists to use their Bike Safety Quiz, which can be tailored to different user groups, including bicyclists, motorists, and children. Upon successful completion of the quiz, participants must print and submit their final passing score to the local municipality or ticketing agency in order to complete the diversion process. Because the current League of Illinois Bicyclists’ resources only apply to bicyclist and motorist safety and violations, additional resources would be required to implement a pedestrian ticket diversion program, such as in-person classes taught by Northbrook Police Department officers.

Resources:

- » City of Urbana, IL Ticket Diversion Program: <https://www.urbanaillinois.us/bicycle-violations>
- » City of Normal, IL Ticket Diversion Program: <https://www.normal.org/1070/Bicycle-Violations>

Bicycle Parking

Bicyclists expect a safe, convenient place to secure their bicycle when they reach their destination. This may be short-term parking of two hours or less, or long-term parking for employees, students, residents, and commuters. The Village of Northbrook, the Northbrook Park District, and many community partners and local businesses provide bicycle parking at locations throughout the Village.

Northbrook should continue to expand bicycle parking throughout the Village through three key focus areas: increased parking at Northbrook Parks and Village facilities, a bicycle parking ordinance, and a bicycle parking program.

INCREASING BICYCLE PARKING SUPPLY

A plentiful supply of short- and long-term bicycle parking facilities at municipal destinations is an indicator of the Village's commitment to active transportation. The Village of Northbrook and the Northbrook Park District should continue to expand the supply of bicycle parking at Village and Park District facilities, including the Village Hall and local parks. The Village should also support area school districts and transit agencies to increase the supply of bicycle parking at schools and transit stops in the Village as well.

BICYCLE PARKING ORDINANCE

Zoning regulations dictate the character and quality of development within the village. As future growth and development occur in Northbrook, it is important that the appropriate ordinances are in place to support bicycle transportation. The Village of Northbrook should consider adopting a bicycle parking ordinance to ensure that bicycle parking is integrated into future developments. Such an ordinance would dictate the number of bicycle parking spaces required based on land use and development size. Additional parking design and siting details can be integrated into the bicycle parking ordinance to guarantee both quality and visibility of parking facilities. A sample bicycle parking ordinance is included in the appendix of the plan to serve as a starting point for the development of a local ordinance that best meets the needs and context of the Village. Also included in the appendix is the Association of Pedestrian and Bicycle Professionals'

(APBP) *Essentials of Bicycle Parking: Selecting and Installing Bicycle Parking That Works* (2015), a detailed guide to assist the Village, community partners, and local businesses in choosing the right bicycle parking facilities and placing them in the right location.

BICYCLE PARKING PROGRAM

Many local businesses and community organizations share the Village's desire to make bicycling more convenient, but may not know how to best contribute. The Village of Northbrook should establish a bicycle parking program to encourage local businesses and community organizations to support bicycling by installing bicycle parking racks. There are multiple benefits to a Village-run bicycle parking program. By buying the racks in bulk, the Village can achieve an economy of scale and offer the racks to community partners at a lower cost. The Village can also have control over parking design, siting, and installation, ensuring that high-quality bicycle racks are properly installed in visible, easy-to-reach locations. Like many local agencies with bicycle parking programs, the Village of Northbrook can incorporate Village branding elements into the bicycle rack to increase the visibility of the bicycle parking program.



Figure 31. A copy of the *Essentials of Bicycle Parking* is included in the appendix of the plan.

Proposed Walking and Bicycling Infrastructure Network

Bicycle and pedestrian infrastructure recommendations build on the existing system of roadways, trails, sidewalks, sidepaths, and on-street bikeways to create an interconnected network of facilities to support walking and bicycling. These recommendations will have a significant impact on the transportation network, giving residents and visitors multiple choices for traveling to, from, and within Northbrook, regardless of their age or ability.

The proposed network consists of nearly 70 miles of new facilities for walking and bicycling. Recommended bikeways have been selected based on roadway context and conditions, as well as their ability to support a diverse range of skill and comfort levels. This context-sensitive approach to facility selection takes into account the impacts that posted speed and roadway volume have on selecting a facility. Key factors that determine bicycle facility selection include roadway functional classification, posted speed limit, and motor vehicle traffic volume. For example, a simple, cost-effective combination of wayfinding signage and shared lane markings is most suitable for low-speed, low-

volume local roadways, while separated bike lanes and sidepaths are most suitable for larger roadways.

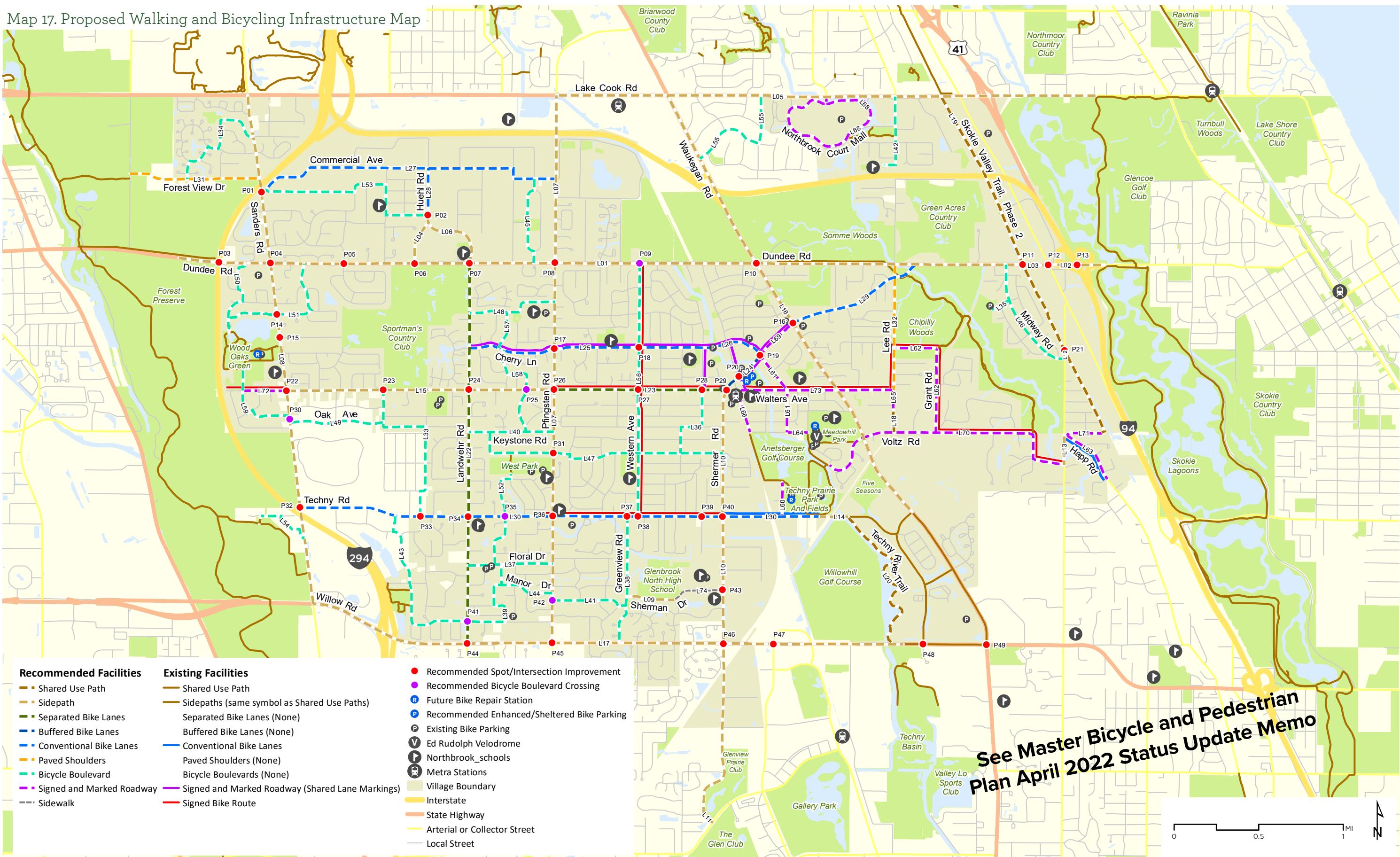
Pedestrian improvements have been recommended to enhance the safety of existing crossings, fill gaps in the existing pedestrian system, calm motor vehicle traffic to create a safer, more comfortable pedestrian experience, and extend the pedestrian network to reach currently inaccessible destinations. These recommendations include sidewalks, sidepaths, high-visibility crosswalks, new midblock crossings with active warning beacons, and minimized turning radii to slow motor vehicles.

Map 17 displays the proposed bicycle and pedestrian infrastructure recommendations. **It is important to note that the recommended network represents the long-term vision of a complete, interconnected system for walking and bicycling. Some of the improvements included in the plan may not be feasible to build until other supporting infrastructure has been completed. As such, construction of the full network will be a long-term endeavor, to be pursued as opportunities arise and as funding is available.**



Figure 32. Sidepaths like this one on Willow Road west of Waukegan Road play a valuable role in creating a safe and comfortable environment for walking and bicycling.

Map 17. Proposed Walking and Bicycling Infrastructure Map



Recommended Infrastructure Project Tables

The bicycle and pedestrian infrastructure recommendations shown in Map 17 are listed in the two following tables. Table 4 provides details for corridor project recommendations, and Table 5 provides details for intersection project recommendations. Descriptions of each project include project location and limits, type of infrastructure recommended, and project length. This information is used to help illustrate the proposed recommendation and to assist in project cost estimates and phasing that are discussed later in the plan. The final design may find a different facility type more appropriate than what is shown on Table 4 when additional details are verified.

TABLE 4. BICYCLE AND PEDESTRIAN INFRASTRUCTURE RECOMMENDATIONS - CORRIDOR PROJECTS

| Segment Number | Project Name | Limits | Length (Miles) | Facility Type | Status Update |
|----------------|--|--|----------------|----------------------|---------------|
| L01 | Dundee Rd. | Des Plaines River Trail to Midway Rd. | 4.89 | Sidepath | 4/22 Memo |
| L02 | Dundee Rd. | Skokie Rd. to North Branch Trail | 0.33 | Sidepath | 4/22 Memo |
| L03 | Dundee Rd. | Midway Rd. to Skokie Rd. | 0.25 | Sidepath | 4/22 Memo |
| L04 | Huehl Rd. | Landwehr Rd. to Dundee Rd. | 0.27 | Sidepath | |
| L05 | Lake Cook Rd. | Pfingsten Rd. to existing Forest Preserve trails | 3.19 | Sidepath | |
| L06 | Landwehr Rd. | Huehl Rd. to Dundee Rd. | 0.47 | Sidepath | |
| L07 | Pfingsten Rd. | Lake Cook Rd. to Willow Rd. | 3.25 | Sidepath | |
| L08 | Sanders Rd. | Lake Cook Rd. to Willow Rd. | 3.04 | Sidepath | |
| L09 | Sherman Dr. | Greenview Rd. to Shermer Rd. | 0.59 | Sidepath | |
| L10 | Shermer Rd. | Walters Ave. to Willow Rd. | 1.50 | Sidepath | 4/22 Memo |
| L11 | Shermer Rd. | Willow Rd. to W Lake Rd. | 1.15 | Sidepath | 4/22 Memo |
| L12 | Sunset Ridge Rd. | Skokie Valley Trail to Midway Rd. | 0.05 | Sidepath | |
| L13 | Sunset Ridge Rd. | Voltz Rd. (west) to Voltz Rd. (east) | 0.18 | Sidepath | |
| L14 | Techny Rd. | Railroad crossing near Techny Prairie Park | 0.17 | Sidepath | |
| L15 | Walters Ave. | Sanders Rd. to Pfingsten Rd. | 1.58 | Sidepath | |
| L16 | Waukegan Rd. | Lake Cook Rd. to Founders Dr. | 2.87 | Sidepath | 4/22 Memo |
| L17 | Willow Rd. | Sanders Rd. to 620' w/o Founders Dr. | 3.54 | Sidepath | |
| L18 | Hillside Park Connector Trail | Lee Rd. to Voltz Rd. | 0.13 | Shared Use Path | |
| L19 | Skokie Valley Trail, Phase 2 | Lake Cook Rd. to Voltz Rd. | 2.23 | Shared Use Path | 4/22 Memo |
| L20 | Techny River Trail | Techny Rd. to Willow Rd. | 1.05 | Shared Use Path | |
| L21 | Timberlane Dr. - Des Plaines Trail Connector | Des Plaines Trail (Unpaved) to Timberlane Dr. | 0.05 | Shared Use Path | |
| L22 | Landwehr Rd. | Dundee Rd. to Willow Rd. | 2.25 | Separated Bike Lanes | |
| L23 | Walters Ave. | Pfingsten Rd. to Shermer Rd. | 1.02 | Separated Bike Lanes | |

TABLE 4. BICYCLE AND PEDESTRIAN INFRASTRUCTURE RECOMMENDATIONS - CORRIDOR PROJECTS, CONTINUED

| SEGMENT NUMBER | PROJECT NAME | LIMITS | LENGTH (MILES) | FACILITY TYPE | STATUS UPDATE |
|----------------|--|---|----------------|-------------------------|---------------|
| L24 | Shermer Rd. | Church St. to Walters Ave. | 0.29 | Buffered Bike Lanes | |
| L25 | Cherry Ln. | Landwehr Rd. to Cedar Ln. (where splits) | 1.40 | Conventional Bike Lanes | |
| L26 | Cherry Ln./Church St. | Cedar Ln. to Schermer Rd. | 0.37 | Conventional Bike Lanes | |
| L27 | Commercial Ave./Anthony Tr./Maria Ave. | Sanders Rd. to Pfingsten Rd. | 1.84 | Conventional Bike Lanes | |
| L28 | Huehl Rd. | Commercial Ave. to Landwehr Rd. | 0.28 | Conventional Bike Lanes | |
| L29 | Shermer Rd. | Dundee Rd. to Waukegan Rd. | 0.83 | Conventional Bike Lanes | |
| L30 | Techny Rd. | Sanders Rd. to trail at Techny Prairie Park | 3.08 | Conventional Bike Lanes | |
| L31 | Forest View Dr. | Portwine Rd. to Sanders Rd. | 0.77 | Paved Shoulder | |
| L32 | Lee Rd. | Dundee Rd. to Walters Ave. | 0.75 | Paved Shoulder | |
| L33 | Arbor Ln./Prestwick Ln./Prairie Ave./Garden St./Highland Ave. | Walters Ave. to Techny Rd. | 1.03 | Bicycle Boulevard | |
| L34 | Basswood Dr./Arrowwood Dr./Lindenwood Dr./Fairview Ln./Phyllis Dr. | Forestview Dr. to Sanders Rd. | 0.74 | Bicycle Boulevard | |
| L35 | Berglund Pl./Whitfield Rd. | Sunset Ridge Woods to Midway Rd. | 0.13 | Bicycle Boulevard | |
| L36 | Cedar Ln./Illinois Rd./Penfold Pl. | Walters Ave. to Farnsworth Ln. | 0.50 | Bicycle Boulevard | |
| L37 | Floral Dr. | Landwehr Rd. to Pfingsten Rd. | 0.50 | Bicycle Boulevard | |
| L38 | Greenview Rd. | Techny Rd. to Willow Rd. | 0.77 | Bicycle Boulevard | |
| L39 | Highland/Vicki/Doriann/Cambridge/Manor/Cedar | Landwehr Rd. to Floral Dr. | 0.66 | Bicycle Boulevard | |
| L40 | Keystone Rd. | Landwehr Rd. to Pfingsten Rd. | 0.50 | Bicycle Boulevard | |
| L41 | Kingston Dr./The Strand | Pfingsten Rd. to Greenview Rd. | 0.45 | Bicycle Boulevard | 4/22 Memo |
| L42 | Lee Rd. | Lake Cook Rd. to Cove School | 0.48 | Bicycle Boulevard | |
| L43 | Longview Rd./Whirlaway Dr./Highland Dr | Techny Rd. to Landwehr Rd. | 1.02 | Bicycle Boulevard | |
| L44 | Manor Dr. | Cedar Ct. to Pfingsten Rd. | 0.36 | Bicycle Boulevard | |
| L45 | Melvin Dr./Helen Dr./Hazelwood Dr. | Maria Ave. to Dundee Rd. | 0.54 | Bicycle Boulevard | |
| L46 | Midway Rd. | Dundee Rd. to Sunset Ridge Rd. | 0.72 | Bicycle Boulevard | |
| L47 | Miller Rd./Koepke Rd./Birch Rd./Farnsworth Ln. | Keystone Rd. to Schermer Rd. | 1.53 | Bicycle Boulevard | 4/22 Memo |
| L48 | Moon Hill Dr./Shabonee Terr. | Landwehr Rd. to Pfingsten Rd. | 0.54 | Bicycle Boulevard | |
| L49 | Oak Ave. | Sanders Rd. to Arbor Ln. | 0.56 | Bicycle Boulevard | |
| L50 | Pinto Ln./Pony Ln./Yorkshire Ln. | Dundee Rd. to Wood Oaks Green Park | 0.51 | Bicycle Boulevard | |
| L51 | Rutgers Ln./Sutton Dr. | Yorkshire Ln. to Dundee Rd. | 0.79 | Bicycle Boulevard | 4/22 Memo |

TABLE 4. BICYCLE AND PEDESTRIAN INFRASTRUCTURE RECOMMENDATIONS - CORRIDOR PROJECTS, CONTINUED

| SEGMENT NUMBER | PROJECT NAME | LIMITS | LENGTH (MILES) | FACILITY TYPE | STATUS UPDATE |
|----------------|---|---|----------------|---------------------------|---------------|
| L52 | Smith Rd./Lilac Ln./Clover Rd. | West Park to Floral Dr. | 0.63 | Bicycle Boulevard | |
| L53 | Sunset Ln./Bernay Dr./Laburnum Dr./Tamarind Dr. | Sanders Rd. to Landwehr Rd. | 1.21 | Bicycle Boulevard | |
| L54 | Timberlane Dr./Evergreen Ln. | Future Des Plaines Trail Connector to Sanders Rd. | 0.34 | Bicycle Boulevard | |
| L55 | Walnut Cir./Cottonwood Rd. | Waukegan Rd. to Lake Cook Rd. | 0.75 | Bicycle Boulevard | |
| L56 | Western Ave. | Dundee Rd. to Techny Rd. | 1.50 | Bicycle Boulevard | |
| L57 | White Mountain Dr. | Moon Hill Dr. to Cherry Ln. | 0.22 | Bicycle Boulevard | |
| L58 | White Mountain Dr./Stonegate Ln./Christina Ln. | Cherry Ln. to Keystone Rd. | 0.62 | Bicycle Boulevard | |
| L59 | Wood Oaks Green Rd./Juli-Lyn Ln./Lori-Lyn Ln./Ridgeland Ln. | Wood Oaks Green Park to Sanders Rd. | 0.56 | Bicycle Boulevard | |
| L60 | Anets Dr. | Techny Prairie Park to Techny Rd. | 0.20 | Signed and Marked Roadway | |
| L61 | Church St. | Schermer Rd. to Illinois Rd. | 0.51 | Signed and Marked Roadway | 4/22 Memo |
| L62 | Grant Rd. | Lee Rd. to Voltz Rd. | 0.75 | Signed and Marked Roadway | 4/22 Memo |
| L63 | Happ Rd. | Voltz Rd. to Tower Rd. | 0.36 | Signed and Marked Roadway | |
| L64 | Illinois Rd. | Church St. to Orchard Ln. | 0.12 | Signed and Marked Roadway | 4/22 Memo |
| L65 | Lee Rd. | Walters Ave. to Hillside Park | 0.12 | Signed and Marked Roadway | 4/22 Memo |
| L66 | Lorenz Dr. | Walters Ave. to Techny Prairie Park | 0.26 | Signed and Marked Roadway | 4/22 Memo |
| L67 | Meadow Rd. | Shermer Rd. to Walters Ave. | 0.09 | Signed and Marked Roadway | |
| L68 | Northbrook Court Mall | internal mall access road | 1.30 | Signed and Marked Roadway | |
| L69 | Shermer Rd. | Waukegan Rd. to Church St. | 0.27 | Signed and Marked Roadway | |
| L70 | Voltz Rd. | Techny Prairie Park Trail to Sunset Ridge Rd. | 1.67 | Signed and Marked Roadway | 4/22 Memo |
| L71 | Voltz Rd. | Happ Rd. to Skokie Valley Trail, Phase 2 | 0.22 | Signed and Marked Roadway | |
| L72 | Walters Ave. | Juli-Lyn Ln. to Sanders Rd. | 0.26 | Signed and Marked Roadway | |
| L73 | Walters Ave. | Anets Dr. to Lee Rd. | 0.92 | Signed and Marked Roadway | 4/22 Memo |
| L74 | Sherman Dr. | School sites | 0.29 | Sidewalk | |



TABLE 5. BICYCLE AND PEDESTRIAN RECOMMENDATIONS - INTERSECTION AND SPOT IMPROVEMENT PROJECTS

| INTER-SECTION NUMBER | PROJECT NAME | LOCATION | PROJECT DESCRIPTION | STATUS UPDATE |
|----------------------|--------------|--------------------------------|---|---------------|
| P01 | Sanders Rd. | at Commercial Ave./ Sunset Ln. | Add active warning beacons, high visibility crosswalk, and other elements as necessary and feasible. | |
| P02 | Landwehr Rd. | at Huehl Rd./ Tamarind Dr. | Bicycle facility transitions and high visibility crosswalks. | |
| P03 | Dundee Rd. | at crossing of I-294 | Widen bike/ped sidepath. Bridge widening likely required. | |
| P04 | Dundee Rd. | at Sanders Rd. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands, and new curbs with minimized radii. If vehicles are allowed free left turns on green, restrict and add left turn signal. | 4/22 Memo |
| P05 | Dundee Rd. | at Torrey Pines Pkwy. | Upgrade all 4 legs of intersection with high visibility crosswalks, add median refuge islands on Dundee; construct new curbs with minimized radii at southern leg of Torrey Pines and Dundee. | |
| P06 | Dundee Rd. | at Huehl Rd. | Upgrade crosswalk on western leg of Dundee to high visibility crosswalk; construct new curbs with minimized curb radii on north side of Dundee at Huehl Rd. | |
| P07 | Dundee Rd. | at Landwehr Rd. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands, and new curbs with minimized radii. If vehicles are allowed free left turns on green, restrict and add left turn signal. Bike path will require barrier at back of curb, | |
| P08 | Dundee Rd. | at Pfingsten Rd. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands, and new curbs with minimized radii. If vehicles are allowed free left turns on green, restrict and add left turn signal. Sidepath will require barrier at back of curb. | |
| P09 | Dundee Rd. | at Western Ave. | Crossing improvement for bicycle boulevard. Necessary if Dundee Rd. sidepath is on north side of roadway. | |
| P10 | Dundee Rd. | at Waukegan Rd. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands, and new curbs with minimized radii. Remove slip lane where sidepath is present. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P11 | Dundee Rd. | at planned Skokie Bike Trail | Construct a high-visibility crossing of Dundee Road; if existing signal is deemed inadequate, overpass will be required. | |
| P12 | Dundee Rd. | at Skokie Blvd. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands, and new curbs with minimized radii. Remove slip lane where sidepath is present. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P13 | Dundee Rd. | at I-94 | Provide safe crossing of I-94 - (Note) It might be possible to reduce eastbound Dundee to one lane AFTER the on-ramp, since ADT decreases after that. | |
| P14 | Sanders Rd. | at Rutgers Ln. | Add active warning beacons, high visibility crosswalk, and other elements as necessary and feasible to support bicycle boulevard and pedestrian crossing. | |
| P15 | Sanders Rd. | at Greenacre Dr. | Upgrade all 4 legs of intersection and add high visibility crosswalks to all 4 legs of intersection. Rebuild curbs with minimized curb radii. | |

TABLE 5: BICYCLE AND PEDESTRIAN RECOMMENDATIONS - INTERSECTION AND SPOT IMPROVEMENT PROJECTS, CONTINUED

| INTER-SECTION NUMBER | PROJECT NAME | LOCATION | PROJECT DESCRIPTION | STATUS UPDATE |
|----------------------|---------------------|----------------------------|---|---------------|
| P16 | Shermer Rd. | at Waukegan Rd. | Upgrade all 4 legs of intersection with high visibility crosswalks and new curbs with minimized radii. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P17 | Pfingsten Rd. | at Cherry Ln. | Upgrade all 4 legs of intersection with high visibility crosswalks and new curbs with minimized radii. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P18 | Western Ave. | at Cherry Ln. | Add volume management/diversion to reduce through traffic. | |
| P19 | Shermer Rd. | at Church St. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands, and new curbs with minimized radii. Remove slip lane where sidepath is present. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P20 | Shermer Rd. | at Meadow Rd. | If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P21 | Skokie Valley Trail | at Sunset Ridge Rd. | Add trail crossing improvements to increase crossing visibility and reduce crossing distance. Part of Skokie Valley Trail Phase 2 project. | |
| P22 | Walters Ave. | at Sanders Rd. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands, and new curbs with minimized radii. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P23 | Walters Ave. | at Arbor Ln. | Upgrade existing crossing with high visibility crosswalk and curb extensions. | |
| P24 | Walters Ave. | at Landwehr Rd. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands, and new curbs with minimized radii. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P25 | Christina Ln. | at Walters Ave. | Crossing improvement for bicycle boulevard. | |
| P26 | Walters Ave. | at Pfingsten Rd. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands (only on Walters), and new curbs with minimized radii. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P27 | Walters Ave. | at Western Ave. | Construct curb extensions with minimized curb radii; add high visibility crosswalks; add traffic calming improvements to reduce vehicle speeds and/or volumes. | |
| P28 | Walters Ave. | at Cedar Ln. | Add high visibility crosswalks. | |
| P29 | Walters Ave. | at Shermer Rd. | Add a protected intersection with appropriate bicycle facility transitions. | |
| P30 | Sanders Rd. | at Ridgeland Ln./ Oak Ave. | Add active warning beacons, high visibility crosswalk, and other elements as necessary and feasible to support bicycle boulevard and pedestrian crossing. | |
| P31 | Pfingsten Rd. | at Koepke Rd. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands (only on Pfingsten Rd), and new curbs with minimized radii. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P32 | Sanders Rd. | at Techny Rd. | Provide access from Techny Rd to Des Planes Trail (just to the west), possibly via Evergreen Ln. Retaining wall and bridge widening required. | |
| P33 | Techny Rd. | at Highland Ave. | Construct curb extensions at existing crosswalk. | |

TABLE 5: BICYCLE AND PEDESTRIAN RECOMMENDATIONS - INTERSECTION AND SPOT IMPROVEMENT PROJECTS, CONTINUED

| INTER-SECTION NUMBER | PROJECT NAME | LOCATION | PROJECT DESCRIPTION | STATUS UPDATE |
|----------------------|---------------|-------------------|---|---------------|
| P34 | Techny Rd. | at Landwehr Rd. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands, and new curbs with minimized radii. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P35 | Clover Rd. | at Techny Rd. | Crossing improvement for bicycle boulevard. | |
| P36 | Techny Rd. | at Pfingsten Rd. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands, and new curbs with minimized radii. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P37 | Techny Rd. | at Greenview Rd. | Finish sidewalks and crossings on all 4 legs of the intersection. | |
| P38 | Techny Rd. | at Western Ave. | Construct curb extensions with minimized curb radii; add high visibility crosswalks. | |
| P39 | Techny Rd. | at 2nd St. | Construct curb extensions at existing crosswalk and add pedestrian-activated flashing beacons. | |
| P40 | Techny Rd. | at Shermer Rd. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands, and new curbs with minimized radii. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P41 | Highland Rd. | at Landwehr Rd. | Crossing improvement for bicycle boulevard. | |
| P42 | Pfingsten Rd. | at Kingston Dr. | Crossing improvement for bicycle boulevard and pedestrian traffic. | |
| P43 | Sherman Dr. | at Shermer Rd. | Add high visibility crossing. | |
| P44 | Willow Rd. | at Landwehr Rd. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands, and new curbs with minimized radii. Remove slip lane where sidepath is present. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P45 | Willow Rd. | at Pfingsten Rd. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands, and new curbs with minimized radii. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P46 | Willow Rd. | at Shermer Rd. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands, and new curbs with minimized radii. Remove slip lane where sidepath is present. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P47 | Willow Rd. | at Old Willow Rd. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands, and new curbs with minimized radii. Remove slip lane where sidepath is present. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P48 | Willow Rd. | at Founders Dr. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands, and new curbs with minimized radii. Remove slip lane where sidepath is present. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |
| P49 | Willow Rd. | at Waukegan Rd. | Upgrade all 4 legs of intersection with high visibility crosswalks, median refuge islands, and new curbs with minimized radii. Remove slip lane where sidepath is present. If vehicles are allowed free left turns on green, restrict and add left turn signal. | |

Project Cost Estimates

Cost estimates are an essential planning tool used for programming capital improvements and drafting applications for external funding sources. Cost estimates were developed for each proposed project based on a review of planning-level estimates of similar constructed projects and pay items from public sector projects completed within the last five years in the State of Illinois, as well as industry averages. These costs were then refined with the assistance of Village staff based on local experience.

All facility designs and associated cost estimates proposed in this plan are conceptual in nature and must undergo final engineering design and review in order to arrive at detailed project costs. These costs are provided in 2018 dollars and include a 20 percent contingency. Inflation should be added to these costs for projects that are programmed for future years.

Depending on the scope and scale of a proposed project, additional costs may be incurred for corridor planning, public engagement, surveying, engineering design, right-of-way acquisition, and other work required to implement a project. Smaller projects, like the addition of shared lane markings and wayfinding signage along a local roadway, may require few additional services, while larger projects like a shared use path may often require many of the services listed above.

With the adoption and implementation of the plan, IDOT and other agencies will be obligated to provide

accommodations for bicycles and pedestrians to which the Village can be a part.

Based on Village experiences, these elements can and should be added as projects are programmed into the capital improvements plan. Depending on the type of improvement, these additional costs can generally be estimated at up to 25 percent of the facility construction cost, in the case of a shared use path design or a two-way separated bike lane.

Construction costs will vary based on the ultimate project scope (i.e., combination with other projects) and economic conditions at the time of construction. When combined with larger roadway projects, the Village can achieve economies of scale and maximize the value of every dollar spent on transportation infrastructure. Some projects will likely require structural improvements to bridges, bridge approaches, or railroad crossings. IDOT is obligated to provide accommodations for bicycle and pedestrian facilities if the Village has an IDOT route shown in a bicycle/pedestrian network plan. The participation from IDOT can offset the costs of a facility to the Village significantly.

Cost estimates (rounded to the nearest thousand dollars) for each type of recommended corridor bicycle and pedestrian facility are listed in Table 6 below. A complete list of cost estimates for each linear project is shown in Table 7. Table 8 displays linear miles and cost estimates of recommended projects for each jurisdiction.

TABLE 6. COST ESTIMATES BY FACILITY TYPE

| FACILITY TYPE | LINEAR MILES | COST PER MILE* | LINEAR COST (ROUNDED UP TO NEAREST \$1,000) | STRUCTURAL COST** | TOTAL COST |
|---------------------------|---------------------|-----------------------|--|--------------------------|-------------------|
| Signed and Marked Roadway | 7.07 | \$ 3,700 | \$ 32,000 | \$ 0 | \$ 32,000 |
| Bicycle Boulevard | 18.19 | \$ 58,100 | \$ 1,072,000 | \$ 0 | \$ 1,072,000 |
| Paved Shoulder | 1.52 | \$ 21,200 | \$ 33,000 | \$ 0 | \$ 33,000 |
| Conventional Bike Lanes | 7.80 | \$ 42,300 | \$ 332,000 | \$ 0 | \$ 332,000 |
| Buffered Bike Lanes | 0.29 | \$ 198,800 | \$ 58,000 | \$ 0 | \$ 58,000 |
| Separated Bike Lanes | 3.28 | \$ 646,000 | \$ 2,117,000 | \$ 0 | \$ 2,117,000 |
| Shared Use Path | 3.47 | \$ 1,237,500 | \$ 4,291,000 | \$ 0 | \$ 4,291,000 |
| Sidepath | 27.32 | \$ 1,202,700 | \$ 32,867,000 | \$ 15,675,000 | \$ 48,542,000 |
| Sidewalk | 0.29 | \$ 211,200 | \$ 62,000 | \$ 0 | \$ 62,000 |
| Total | 69.21 | | \$ 40,864,000 | \$ 15,675,000 | \$ 56,539,000 |

*Cost estimates do not include corridor planning, public engagement, surveying, engineering design, right-of-way acquisition, and similar project development costs, which vary significantly based on the scope and scale of the project.
** Structural costs for bridges, retaining walls, railroad crossings, and other elements.

TABLE 7. COST ESTIMATES FOR LINEAR BICYCLE AND PEDESTRIAN FACILITIES

| Segment Number | Project Name | Project Limits | Facility Type | Length (miles) | Cost | Status Update |
|----------------|--|--|-------------------------|----------------|--------------|---------------|
| L01 | Dundee Rd. | Des Plaines River Trail to Midway Rd. | Sidepath | 4.89 | \$ 8,509,000 | 4/22 Memo |
| L02 | Dundee Rd. | Skokie Rd. to North Branch Trail | Sidepath | 0.33 | \$ 2,152,000 | 4/22 Memo |
| L03 | Dundee Rd. | Midway Rd. to Skokie Rd. | Sidepath | 0.25 | \$ 302,000 | 4/22 Memo |
| L04 | Huehl Rd. | Landwehr Rd. to Dundee Rd. | Sidepath | 0.27 | \$ 322,000 | |
| L05 | Lake Cook Rd. | Pfingsten Rd. to existing Forest Preserve trails | Sidepath | 3.19 | \$ 3,837,000 | |
| L06 | Landwehr Rd. | Huehl Rd. to Dundee Rd. | Sidepath | 0.47 | \$ 563,000 | |
| L07 | Pfingsten Rd. | Lake Cook Rd. to Willow Rd. | Sidepath | 3.25 | \$ 6,105,000 | |
| L08 | Sanders Rd. | Lake Cook Rd. to Willow Rd. | Sidepath | 3.04 | \$ 5,957,000 | |
| L09 | Sherman Dr. | Greenview Rd. to Shermer Rd. | Sidepath | 0.59 | \$ 712,000 | |
| L10 | Shermer Rd. | Walters Ave. to Willow Rd. | Sidepath | 1.50 | \$ 1,803,000 | 4/22 Memo |
| L11 | Shermer Rd. | Willow Rd. to W Lake Rd. | Sidepath | 1.15 | \$ 1,382,000 | 4/22 Memo |
| L12 | Sunset Ridge Rd. | Skokie Valley Trail to Midway Rd. | Sidepath | 0.05 | \$ 61,000 | |
| L13 | Sunset Ridge Rd. | Voltz Rd. (west) to Voltz Rd. (east) | Sidepath | 0.18 | \$ 214,000 | |
| L14 | Techny Rd. | Railroad crossing near Techny Prairie Park | Sidepath | 0.17 | \$ 2,203,000 | |
| L15 | Walters Ave. | Sanders Rd. to Pfingsten Rd. | Sidepath | 1.58 | \$ 1,903,000 | |
| L16 | Waukegan Rd. | Lake Cook Rd. to Founders Dr. | Sidepath | 2.87 | \$ 5,457,000 | 4/22 Memo |
| L17 | Willow Rd. | Sanders Rd. to 620' w/o Founders Dr. | Sidepath | 3.54 | \$ 7,060,000 | |
| L18 | Hillside Park Connector Trail | Lee Rd. to Voltz Rd. | Shared Use Path | 0.13 | \$ 168,000 | |
| L19 | Skokie Valley Trail, Phase 2 | Lake Cook Rd. to Voltz Rd. | Shared Use Path | 2.23 | \$ 2,760,000 | 4/22 Memo |
| L20 | Techny River Trail | Techny Rd. to Willow Rd. | Shared Use Path | 1.05 | \$ 1,304,000 | |
| L21 | Timberlane Dr. - Des Plaines Trail Connector | Des Plaines Trail (Unpaved) to Timberlane Dr. | Shared Use Path | 0.05 | \$ 59,000 | |
| L22 | Landwehr Rd. | Dundee Rd. to Willow Rd. | Separated Bike Lanes | 2.25 | \$ 1,457,000 | |
| L23 | Walters Ave. | Pfingsten Rd. to Shermer Rd. | Separated Bike Lanes | 1.02 | \$ 660,000 | |
| L24 | Shermer Rd. | Church St. to Walters Ave. | Buffered Bike Lanes | 0.29 | \$ 58,000 | |
| L25 | Cherry Ln. | Landwehr Rd. to Cedar Ln. (where splits) | Conventional Bike Lanes | 1.40 | \$ 60,000 | |
| L26 | Cherry Ln./Church St. | Cedar Ln. to Schermer Rd. | Conventional Bike Lanes | 0.37 | \$ 16,000 | |
| L27 | Commercial Ave./Anthony Tr./Maria Ave. | Sanders Rd. to Pfingsten Rd. | Conventional Bike Lanes | 1.84 | \$ 78,000 | |
| L28 | Huehl Rd. | Commercial Ave. to Landwehr Rd. | Conventional Bike Lanes | 0.28 | \$ 12,000 | |
| L29 | Shermer Rd. | Dundee Rd. to Waukegan Rd. | Conventional Bike Lanes | 0.83 | \$ 35,000 | |
| L30 | Techny Rd. | Sanders Rd. to trail at Techny Prairie Park | Conventional Bike Lanes | 3.08 | \$ 131,000 | |
| L31 | Forest View Dr. | Portwine Rd. to Sanders Rd. | Paved Shoulder | 0.77 | \$ 17,000 | |
| L32 | Lee Rd. | Dundee Rd. to Walters Ave. | Paved Shoulder | 0.75 | \$ 16,000 | |

TABLE 7. COST ESTIMATES FOR LINEAR BICYCLE AND PEDESTRIAN FACILITIES, CONTINUED

| Segment Number | Project Name | Project Limits | Facility Type | Length (miles) | Cost | Status Update |
|----------------|--|---|-------------------|----------------|-----------|---------------|
| L33 | Arbor Ln./Prestwick Ln./Prairie Ave./Garden St./Highland Ave. | Walters Ave. to Techny Rd. | Bicycle Boulevard | 1.03 | \$ 60,000 | |
| L34 | Basswood Dr./Arrowwood Dr./Lindenwood Dr./Fairview Ln./Phyllis Dr. | Forestview Dr. to Sanders Rd. | Bicycle Boulevard | 0.74 | \$ 44,000 | |
| L35 | Berglund Pl./Whitfield Rd. | Sunset Ridge Woods to Midway Rd. | Bicycle Boulevard | 0.13 | \$ 8,000 | |
| L36 | Cedar Ln./Illinois Rd./Penfold Pl. | Walters Ave. to Farnsworth Ln. | Bicycle Boulevard | 0.50 | \$ 30,000 | |
| L37 | Floral Dr. | Landwehr Rd. to Pfingsten Rd. | Bicycle Boulevard | 0.50 | \$ 30,000 | |
| L38 | Greenview Rd. | Techny Rd. to Willow Rd. | Bicycle Boulevard | 0.77 | \$ 45,000 | |
| L39 | Highland/Vicki/Doriann/Cambridge/Manor/Cedar | Landwehr Rd. to Floral Dr. | Bicycle Boulevard | 0.66 | \$ 39,000 | |
| L40 | Keystone Rd. | Landwehr Rd. to Pfingsten Rd. | Bicycle Boulevard | 0.50 | \$ 30,000 | |
| L41 | Kingston Dr./The Strand | Pfingsten Rd. to Greenview Rd. | Bicycle Boulevard | 0.45 | \$ 27,000 | 4/22 Memo |
| L42 | Lee Rd. | Lake Cook Rd. to Cove School | Bicycle Boulevard | 0.48 | \$ 28,000 | |
| L43 | Longview Rd./Whirlaway Dr./Highland Dr | Techny Rd. to Landwehr Rd. | Bicycle Boulevard | 1.02 | \$ 60,000 | |
| L44 | Manor Dr. | Cedar Ct. to Pfingsten Rd. | Bicycle Boulevard | 0.36 | \$ 21,000 | |
| L45 | Melvin Dr./Helen Dr./Hazelwood Dr. | Maria Ave. to Dundee Rd. | Bicycle Boulevard | 0.54 | \$ 32,000 | |
| L46 | Midway Rd. | Dundee Rd. to Sunset Ridge Rd. | Bicycle Boulevard | 0.72 | \$ 43,000 | |
| L47 | Miller Rd./Koepke Rd./Birch Rd./Farnsworth Ln. | Keystone Rd. to Schermer Rd. | Bicycle Boulevard | 1.53 | \$ 89,000 | 4/22 Memo |
| L48 | Moon Hill Dr./Shabonee Terr. | Landwehr Rd. to Pfingsten Rd. | Bicycle Boulevard | 0.54 | \$ 32,000 | |
| L49 | Oak Ave. | Sanders Rd. to Arbor Ln. | Bicycle Boulevard | 0.56 | \$ 33,000 | |
| L50 | Pinto Ln./Pony Ln./Yorkshire Ln. | Dundee Rd. to Wood Oaks Green Park | Bicycle Boulevard | 0.51 | \$ 30,000 | |
| L51 | Rutgers Ln./Sutton Dr. | Yorkshire Ln. to Dundee Rd. | Bicycle Boulevard | 0.79 | \$ 47,000 | 4/22 Memo |
| L52 | Smith Rd./Lilac Ln./Clover Rd. | West Park to Floral Dr. | Bicycle Boulevard | 0.63 | \$ 37,000 | |
| L53 | Sunset Ln./Bernay Dr./Laburnum Dr./Tamarind Dr. | Sanders Rd. to Landwehr Rd. | Bicycle Boulevard | 1.21 | \$ 71,000 | |
| L54 | Timberlane Dr./Evergreen Ln. | Future Des Plaines Trail Connector to Sanders Rd. | Bicycle Boulevard | 0.34 | \$ 20,000 | |
| L55 | Walnut Cir./Cottonwood Rd. | Waukegan Rd. to Lake Cook Rd. | Bicycle Boulevard | 0.75 | \$ 44,000 | |
| L56 | Western Ave. | Dundee Rd. to Techny Rd. | Bicycle Boulevard | 1.50 | \$ 88,000 | |
| L57 | White Mountain Dr. | Moon Hill Dr. to Cherry Ln. | Bicycle Boulevard | 0.22 | \$ 14,000 | |

TABLE 7. COST ESTIMATES FOR LINEAR BICYCLE AND PEDESTRIAN FACILITIES, CONTINUED

| SEGMENT NUMBER | PROJECT NAME | PROJECT LIMITS | FACILITY TYPE | LENGTH (MILES) | COST | STATUS UPDATE |
|----------------|---|---|---------------------------|----------------|-----------|---------------|
| L58 | White Mountain Dr./Stonegate Ln./Christina Ln. | Cherry Ln. to Keystone Rd. | Bicycle Boulevard | 0.62 | \$ 37,000 | |
| L59 | Wood Oaks Green Rd./Juli-Lyn Ln./Lori-Lyn Ln./Ridgeland Ln. | Wood Oaks Green Park to Sanders Rd. | Bicycle Boulevard | 0.56 | \$ 33,000 | |
| L60 | Anets Dr. | Techny Prairie Park to Techny Rd. | Signed and Marked Roadway | 0.20 | \$ 1,000 | |
| L61 | Church St. | Schermer Rd. to Illinois Rd. | Signed and Marked Roadway | 0.51 | \$ 2,000 | 4/22 Memo |
| L62 | Grant Rd. | Lee Rd. to Voltz Rd. | Signed and Marked Roadway | 0.75 | \$ 3,000 | 4/22 Memo |
| L63 | Happ Rd. | Voltz Rd. to Tower Rd. | Signed and Marked Roadway | 0.36 | \$ 2,000 | |
| L64 | Illinois Rd. | Church St. to Orchard Ln. | Signed and Marked Roadway | 0.12 | \$ 1,000 | 4/22 Memo |
| L65 | Lee Rd. | Walters Ave. to Hillside Park | Signed and Marked Roadway | 0.12 | \$ 1,000 | 4/22 Memo |
| L66 | Lorenz Dr. | Walters Ave. to Techny Prairie Park | Signed and Marked Roadway | 0.26 | \$ 1,000 | 4/22 Memo |
| L67 | Meadow Rd. | Shermer Rd. to Walters Ave. | Signed and Marked Roadway | 0.09 | \$ 1,000 | |
| L68 | Northbrook Court Mall | Internal mall access road | Signed and Marked Roadway | 1.30 | \$ 5,000 | |
| L69 | Shermer Rd. | Waukegan Rd. to Church St. | Signed and Marked Roadway | 0.27 | \$ 2,000 | |
| L70 | Voltz Rd. | Techny Prairie Park Trail to Sunset Ridge Rd. | Signed and Marked Roadway | 1.67 | \$ 7,000 | 4/22 Memo |
| L71 | Voltz Rd. | Happ Rd. to Skokie Valley Trail, Phase 2 | Signed and Marked Roadway | 0.22 | \$ 1,000 | |
| L72 | Walters Ave. | Juli-Lyn Ln. to Sanders Rd. | Signed and Marked Roadway | 0.26 | \$ 1,000 | |
| L73 | Walters Ave. | Anets Dr. to Lee Rd. | Signed and Marked Roadway | 0.92 | \$ 4,000 | 4/22 Memo |
| L74 | Sherman Dr. | School sites | Sidewalk | 0.29 | \$ 62,000 | |

TABLE 8. FACILITY COSTS BY JURISDICTION

| JURISDICTION | LINEAR MILES | LINEAR COST (ROUNDED UP TO NEAREST \$1,000) | STRUCTURAL COST** | TOTAL COST |
|--------------|--------------|---|-------------------|---------------|
| Northbrook | 41.33 | \$ 11,288,000 | \$ 2,000,000 | \$ 13,288,000 |
| Cook County | 11.80 | \$ 11,193,000 | \$ 2,300,000 | \$ 13,493,000 |
| IDOT | 16.08 | \$ 18,383,000 | \$ 11,375,000 | \$ 29,758,000 |
| Total | 69.21 | \$ 40,864,000 | \$ 15,675,000 | \$ 56,539,000 |

*Cost estimates do not include corridor planning, public engagement, surveying, engineering design, right-of-way acquisition, and similar project development costs, which vary significantly based on the scope and scale of the project.

** Structural costs for bridges, retaining walls, railroad crossings, and other elements.

Cost estimates for spot and intersection improvements can vary significantly based on unique circumstances and context, and are therefore difficult to develop as part of a long-range planning study. These costs are more often generated during the design and engineering stages of project development.

While cost estimates for these spot and intersection recommendations are not included in the plan, Table 9 below provides probable opinions of construction cost per unit for a number of design elements recommended for many of these linear projects. These construction cost estimates, which are shown in Table 9, provide a general understanding of the range of costs for design treatments likely to be included in these recommended spot and intersection improvements.

TABLE 9. COST ESTIMATES FOR SPOT AND INTERSECTION RECOMMENDATION TREATMENTS AND ELEMENTS

| DESIGN ELEMENT | UNIT | COST* |
|--|------|--------------------------|
| Miniature Traffic Circle | Each | \$ 50,000 |
| Speed Hump | Each | \$ 5,000 |
| Median Refuge Islands (2) | Each | \$ 12,000 |
| Divertor | Each | \$ 20,000 |
| Curb Extensions (4) | Each | \$ 120,000 |
| Raised Crosswalk | Each | \$ 12,000 |
| Raised Intersection | Each | \$ 100,000 |
| Signal Modification (Leading Pedestrian Interval/Pedestrian Call-back) | Each | \$ 30,000 |
| Active Flashing Beacons | Each | \$ 22,000 |
| HAWK Signal | Each | \$ 200,000 |
| Retaining Wall Approach, Bridge Widening | Each | \$ 300,000 - 375,000 |
| New Bridge (assumes roadway/bridge reconstruction) | Each | \$ 1,500,000 - 3,000,000 |

*Conceptual planning-level estimates derived from similar projects and industry averages.

Facilities for Bicycling and Walking

Overview

A complete, interconnected active transportation network requires a diverse range of facilities to support bicycling and walking. From busy arterial roadways to quiet neighborhood streets, bicycling and walking can be part of a complete, multimodal transportation system. This section provides a brief description of recommended bicycle and pedestrian facility types shown in the proposed network.

The full design guidelines document, which is located in Appendix A of this plan, provides detailed information regarding typical treatments, design details, discussion of application scenarios, and additional resources to assist the Village of Northbrook with project development and facility design. The design guidelines are organized into themes, which include pedestrian infrastructure, pedestrian crossing treatments, bicycle facility selection, on-street bicycle facility types, bikeway crossing treatments, bikeway amenities, retrofitting streets, off-street facilities, and off-street crossing treatments.

Roadway User Hierarchy

The Northbrook Bicycle and Pedestrian Plan uses a “pedestrian first” modal hierarchy, where the most vulnerable roadway users are given priority (Figure 33). Implementing a modal hierarchy means making project decisions according to the following prioritization:

1. Pedestrians and Transit Users
2. Bicyclists
3. Motorized Vehicles

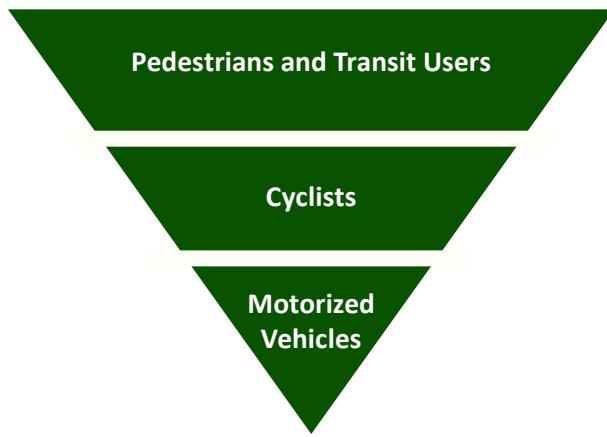


Figure 33. Roadway User Hierarchy

Bicycle Facility Types

Consistent with bicycle facility classifications throughout the nation, the linear bicycle facility types described below represent the building blocks of the proposed Northbrook bicycle network.

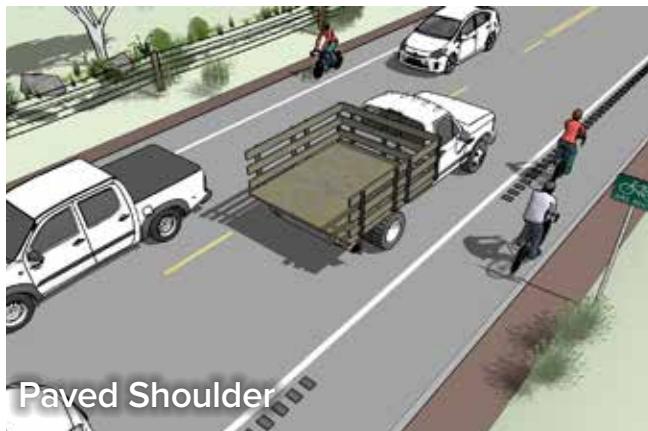
Signed and Marked Roadways are bikeways where bicyclists and cars operate within the same travel lane, either side by side or in single file depending on roadway configuration. For this reason, they are often called shared roadways. Signed and marked roadways provide continuity with other bicycle facilities (usually bike lanes), or designate preferred routes through high-demand corridors. Illinois state law requires that a motorist shall give a minimum three feet of passing distance when overtaking a bicyclist.



Bicycle Boulevards build on the signed and marked roadway facility by incorporating directional signage, traffic diverters, chicanes, chokers and /or other traffic calming devices to reduce motor vehicle speeds or volumes.



Paved Shoulders are striped shoulders wide enough for bicycle travel (minimum of four feet). Shoulder bikeways often, but not always, include signage alerting motorists to expect bicycle travel along the roadway.



Conventional Bicycle Lanes use signage and striping to delineate the right-of-way assigned to bicyclists and motorists. Bicycle lanes encourage predictable movements by both bicyclists and motorists.



Buffered Bicycle Lanes are similar to conventional bicycle lanes but provide additional width between bicyclists and motor vehicle travel or parking lanes with a striped buffer zone.



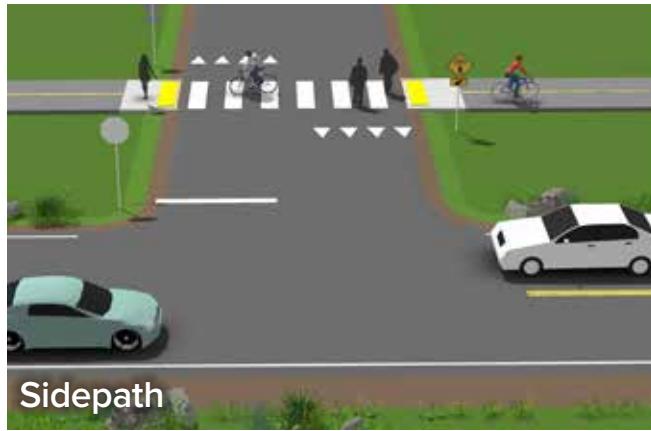
Separated Bicycle Lanes, a variant of on-street bikeways similar to buffered bicycle lanes, are exclusive bike facilities that combine the user experience of a separated path with the on-street infrastructure of conventional bike lanes.



Shared-Use Paths are facilities separated from roadways for use by bicyclists and pedestrians.



Sidepaths are a subset of shared-use paths that are located adjacent to a roadway.



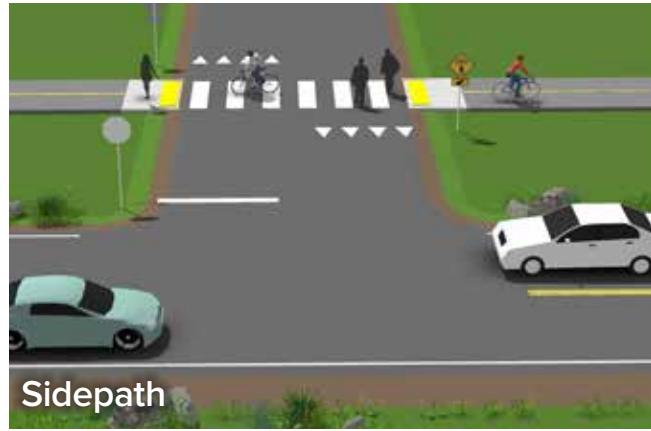
Pedestrian Facility Types

There are three basic types of linear pedestrian facilities that support walking activity in the Village of Northbrook: sidewalks, sidepaths, and shared use paths. Sidewalks are the most common type of infrastructure and can be seen along many streets in Northbrook, from quiet neighborhood streets to busy arterial roadways. Sidepaths, which were described in the previous section, are similar to sidewalks, but their additional width provides enough room for pedestrians to share the space with bicyclists and other wheeled users. Shared use paths, also described in the previous

section, are wider facilities designed for all types of non-motorized traffic and are located in independent rights-of-way (separate from a roadway).

SIDEWALK DEVELOPMENT STRATEGY

It is important to note the nature of pedestrian and bicycle infrastructure development as it relates to the recommendations included in this chapter. Improvements to the pedestrian transportation system in particular must balance larger projects along arterial and collector corridors that focus on system-wide connectivity with spot improvements on local neighborhood streets, that focus on sidewalk infill maintenance. To that end, the Village of Northbrook should employ a multi-pronged strategy consisting of two key elements:



» **Network Development.** The Village should pursue pedestrian projects that support system-wide connectivity and address major gaps along arterial and collector roadways, as well as corridors for shared use path development. These projects are long-term in nature and often require coordination with state and county agencies and adjacent municipalities. These projects related to network development are included in the plan recommendations and should be phased to coordinate with external agencies and best leverage Village resources through the use of external funding.

» **Infill and Maintenance.** The Village should revisit its sidewalk gap infill program to increase its utility as a means through which short sidewalk gaps and maintenance issues can be effectively addressed and remediated. The Village should examine the request and permitting processes associated with this program to better identify, prioritize, construct, and maintain new segments of sidewalk infill. These sidewalk infill and maintenance projects, while important to the overall pedestrian system, can be addressed through a revision of policies and Village services. As a result, these have not been included in the map, but are part of the overall recommended infrastructure strategy.

Intersection & Spot Improvements

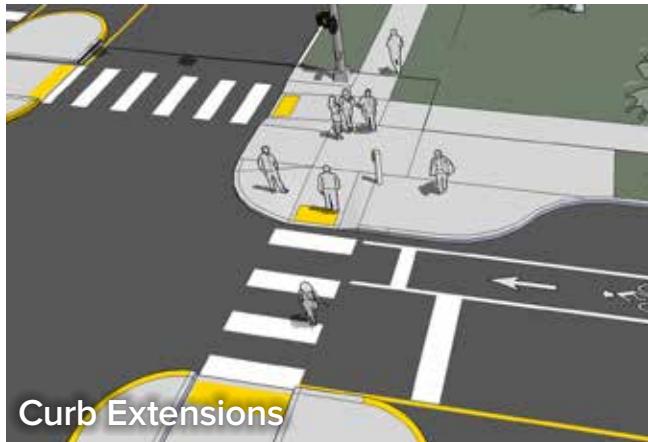
While linear bicycle and pedestrian facilities address a segment or corridor, intersection and spot improvements are intended to enhance bicycling and walking at a specific location, like a roadway intersection or a mid-block crossing. These improvements vary widely in terms of scale, cost, and intent. For example, adding high visibility crosswalks to a stop-controlled neighborhood intersection is a low-cost yet effective treatment for enhancing pedestrian safety. In contrast, enhancements to a multi-lane, signalized intersection may include high-visibility crosswalks, pedestrian push buttons and crossing signals, median refuge islands, or other improvements.

Common intersection and spot improvements are described below and picture to the right. These improvements are also described in greater detail Design Guidelines Appendix.

High Visibility Crosswalks signal to motorists that they must stop for pedestrians and encourage pedestrians to cross at designated locations.



Curb Extensions minimize pedestrian exposure during crossing by shortening crossing distance and giving pedestrians a better chance to see and be seen before committing to crossing.

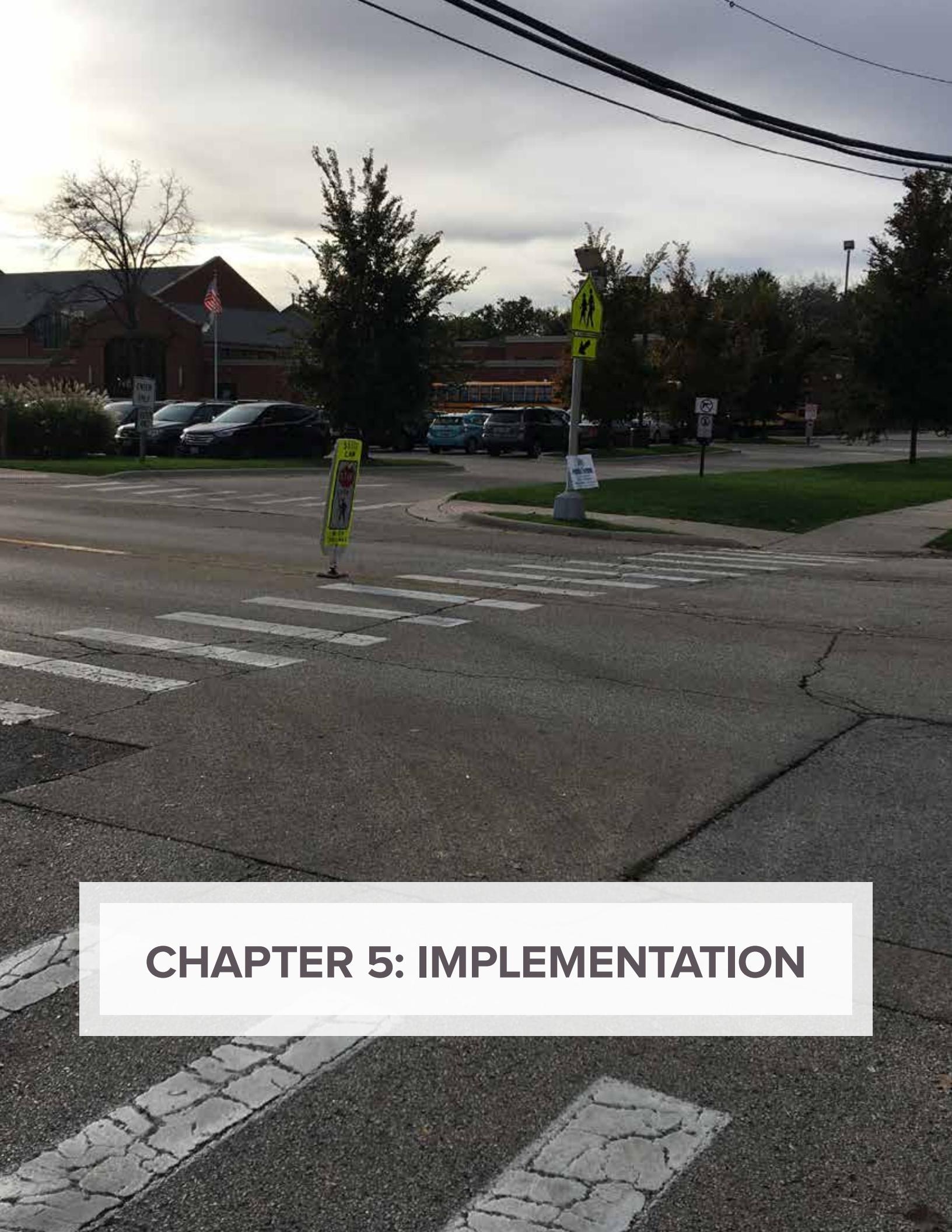


Median Refuge Islands are located at the mid-point of a marked crossing and help improve pedestrian safety by allowing pedestrians to cross one direction of traffic at a time. Refuge islands minimize pedestrian exposure by shortening crossing distance and increasing the number of available gaps for crossing.



Active Warning Beacons are user actuated illuminated devices designed to increase motor vehicle yielding compliance at crossings of multi lane or high volume roadways. Types of active warning beacons include conventional circular yellow flashing beacons, in-roadway warning lights, or pedestrian activated beacons.





The image shows a school crossing with a crosswalk and two signs. One sign is a yellow pedestrian sign with a black arrow pointing left and the text 'SCHOOL CROSSING' and 'STOP FOR CHILDREN'. The other sign is a yellow school bus sign with a black arrow pointing left and the text 'SCHOOL BUS CROSSING' and 'STOP FOR CHILDREN'. In the background, there is a school building, a parking lot with several cars, and a bus. The sky is overcast.

CHAPTER 5: IMPLEMENTATION

Implementation Overview

The Village of Northbrook Master Bicycle and Pedestrian Plan provides a comprehensive set of recommendations and physical improvements intended to increase bicycling and walking as viable and valued forms of transportation and recreation. Implementing the Plan will require commitment and persistence from the Village of Northbrook and its community partners to pursue the opportunities identified in this plan, as well as those that arise in the coming years. Implementation of this plan will occur over several decades; however, there is a significant amount of the network that can be completed by the Village, while other sidpath projects will require coordination with those owners of roadways such as the Illinois Department of Transportation or Cook County.

This chapter of the Plan establishes a multi-pronged strategy to implement the active transportation network, supporting programs, and policy recommendations to ultimately achieve the vision of a walkable, bicycle-friendly Northbrook. The chapter is divided into the following sections, each of which contributes to the implementation of the plan:

» **Funding Strategy and Sources.** Implementing this Plan will require a mixture of local and external funds. The Village should identify or create a consistent local funding stream to directly invest in active transportation projects and to leverage as match for external grants and funding opportunities. This section of the implementation chapter identifies key principles to a successful funding strategy and describes potential funding sources that will bring this Plan to life.

» **Revised Engineering Standards and Specifications.** The Village's engineering standards and specifications dictate the character of public roadways and paths. This section of the implementation chapter focuses on updating these standards and specifications to integrate walking and bicycling into future capital improvements.

» **Implementation Strategy.** The Master Bicycle and Pedestrian Plan is long-term in nature, and will take years to fully implement. As such, it is important that the Village have a clear implementation strategy to invest in projects that can have a significant and lasting impact and contribute towards the achievement of a walkable and bicycle-friendly community. The implementation strategy consists of four components:

- » **Implementation Methods**, which analyzes project cost, jurisdiction, and feasibility;
- » **Project Phasing**, which establishes a process whereby projects can be scheduled for completion;
- » **Near-Term Projects**, which are identified by the Bicycle Task for in coordination with Village staff and the Public Works Committee based on implementation methods, project phasing, and project prioritization; and
- » **Project Prioritization**, which rates the value of each project with regard to accomplishing the goals and objectives of the plan.

Funding Strategy and Sources

Funding bicycle and pedestrian infrastructure projects and supporting programs requires a diversified strategy and a creative approach. Local funding in particular will be critical to the implementation of the plan, whether used as local match for external funding sources or for projects and ongoing maintenance for locally-funded projects. The Village of Northbrook should determine an annual budget commitment to the implementation of active transportation projects based on the needs identified in this plan. When possible, this budget line item should be leveraged as local match for external funding in order to maximize the Village's return on investment. In addition, the Village of Northbrook must be flexible and spontaneous enough to capitalize on partnerships, in-kind matches, and other non-traditional funding opportunities when possible. The following section of this chapter provides an overview of funding sources that can be utilized to make the plan vision a reality.

Local Funding Sources

Because external funding sources for bicycle and pedestrian projects and programs continue to be in short supply and high demand, local funds are often the most reliable funding source for infrastructure projects and encouragement and education programs. In addition, local funding is often required as match for external funding sources. With this in mind, it is imperative that the Village of Northbrook explore, identify, and pursue one or more of these local funding strategies as a means of implementing the plan.

CAPITAL IMPROVEMENT PLAN SET-ASIDE

As with most communities, the Village of Northbrook has limited funds with which to implement active transportation projects and programs. By creating a dedicated set-aside in the Capital Improvement Program, the Village can prioritize and plan for capital expenditures for trails, on-street bikeways, sidewalks, and other projects that improve conditions for walking and bicycling. This set-aside may also be used as a local match for external funding sources, or as contribution towards bicycle and pedestrian elements of larger projects.

LOCAL OPTION SALES TAX

A Local Option Sales Tax is a special-purpose tax implemented and levied at the Village or county level. A local option sales tax is often used as a means of raising funds for specific local or area projects, such as improving area streets and roads, or refurbishing a community's downtown area. Special Improvement Districts are often created to define a sales tax area and administer the collection and expenditures of generated tax.

GENERAL OBLIGATION BOND

General obligation bonds offer local agencies the opportunity to acquire necessary finances for capital improvements and remit payment over time. These general obligation bonds are among the most common form of capital project financing and can cover everything from stormwater and sanitary sewers to streets, sidewalks, and trails. General obligation bonds require majority approval of a popular vote for passage.

INVEST IN COOK

Following the completion of Connecting Cook County, the Cook County long range transportation plan, the Cook County Department of Highways and Transportation established the Invest in Cook grant program to fund local and regional transportation projects consistent with the five priorities of the plan, including prioritizing transit and other transportation alternatives (like walking and bicycling). Eligible activities include planning and feasibility studies, engineering, right-of-way acquisition, and construction.

Projects awarded funding in 2017 included the Village of Glenview's Skokie Valley Trail Improvements (preliminary engineering), Forest Preserve District of Cook County's Des Plaines River Bike Trail at the Union Pacific Railroad project (preliminary engineering), and the Village of Steger Union Avenue Road Diet, Bike Lane and Sidewalk Infill Project (construction). Sixteen of the 30 projects awarded funding directly support walking and bicycling.

<https://www.cookcountylil.gov/investincook>

Federal and State Funding Sources

The federal government has numerous programs and funding mechanisms to support bicycle and pedestrian projects, most of which are allocated by the US Department of Transportation to state, regional, and local entities. In many cases, state and regional entities administer these funds to local agencies through competitive grant programs.

FIXING AMERICA'S SURFACE TRANSPORTATION (FAST) ACT

In 2015, the FAST Act was signed into law, authorizing \$305 billion in transportation infrastructure planning and investment for a five-year period from 2016-2020. Multiple programs have been carried over from the previous transportation bill, Moving Ahead for Progress in the 21st Century, or MAP-21. Funding for FAST Act programs available to the Village of Northbrook is allocated to the Chicago Regional Agency for Planning based on apportionment formulas determined at the federal and state levels. The following four FAST Act programs commonly used to fund bicycle and pedestrian projects are described in this section:

- » Surface Transportation Program
- » Transportation Alternatives Program
- » Congestion Mitigation and Air Quality Program
- » Highway Safety Improvement Program
- » Section 402 Highway Safety Grant Program

Surface Transportation Program (STP)

The STP provides funding that may be used by States and localities for projects to preserve and improve the conditions on any Federal-aid highway, bridge and tunnel projects, public road projects, pedestrian and bicycle infrastructure, and transit capital projects. Bicycle and pedestrian infrastructure projects include ADA sidewalk modification, recreational trails, bicycle transportation, on- and off-road trail facilities for non-motorized transportation, and infrastructure projects and systems that will provide safe routes for non-drivers, including children, older adults and individuals with disabilities to access daily needs.

<http://www.cmap.illinois.gov/committees/advisory/council-of-mayors/stp>

Transportation Alternatives Program (TAP)

The Transportation Alternatives Program (TAP) was authorized by the Moving Ahead for Progress in the 21st Century Act (MAP-21) in 2012 and has been continued by the Fixing America's Surface Transportation (FAST) Act, through federal fiscal year 2020. Eligible project activities for TAP funding include a variety of smaller-scale transportation projects such as pedestrian and bicycle facilities, recreational trails, safe routes to school projects, and community improvements such as historic preservation, vegetation management, and some environmental mitigation related to storm water and habitat connectivity. The TAP program replaced multiple pre-MAP-21 programs, including the Transportation Enhancement Program, the Safe Routes to School Program, and the National Scenic Byways Program.

In the Chicago metropolitan area, the locally programmed TAP funds, known as TAP-L, are generally awarded to bicycle facility projects that help complete the Regional Greenways and Trails Plan. The Village of Northbrook and Cook County have received TAP funding to construct the Skokie Valley Trail Extension from north of Lake Cook Road to the Village of Northbrook southern limit at Volz Road.

<http://www.cmap.illinois.gov/mobility/strategic-investment/transportation-alternatives>

Congestion Mitigation and Air Quality Improvement Program (CMAQ)

The Congestion Mitigation and Air Quality Improvement (CMAQ) Program is a federally-funded program of surface transportation improvements designed to improve air quality and mitigate congestion. Because Northeastern Illinois is a moderate non-attainment zone, CMAP and the CMAQ Project Selection Committee give priority to projects that reduce emissions. Eligible projects include transit improvements, traffic flow improvements, bicycle facility projects, and direct emissions reduction projects.

<http://www.cmap.illinois.gov/mobility/strategic-investment/cmaq>



Highway Safety Improvement Program (HSIP)

The Highway Safety Improvement Program (HSIP) is intended to achieve significant reduction in traffic fatalities and serious injuries on all public roads by funding projects, strategies and activities consistent with a state's Strategic Highway Safety Plan (SHSP).

<http://www.idot.illinois.gov/transportation-system/local-transportation-partners/county-engineers-and-local-public-agencies/funding-opportunities/highway-safety-improvement-program>

Section 402 State and Community Highway Safety Grant Program

Section 402 funds can be used to develop education, enforcement and research programs designed to reduce traffic crashes, deaths, severity of crashes, and property damage. Eligible program areas include reducing impaired driving, reducing speeding, encouraging the use of occupant protection, improving motorcycle safety, and improving bicycle and pedestrian safety. Examples of bicycle and pedestrian safety programs funded by Section 402 are comprehensive school-based pedestrian and bike safety education programs, helmet distribution programs, pedestrian safety programs for older adults, and general community information and awareness programs.

<http://www.idot.illinois.gov/transportation-system/local-transportation-partners/law-enforcement/index>

BUILD TRANSPORTATION GRANTS PROGRAM

The US Department of Transportation's Better Utilizing Investments to Leverage Development (BUILD) Discretionary Grants Program replaces the TIGER Discretionary Grants Program and retains the same purpose of funding road, rail, transit and port projects that achieve critical national objectives, including livability, economic competitiveness, environmental sustainability, and safety. Forty projects were awarded funding in FY2016 for a combined total of nearly \$500M, and fifteen of the forty projects directly benefit bicycling through the provision of dedicated and often protected bicycle facilities. Examples include a \$21M in complete streets projects in Mobile, Alabama, \$22M in bridge reconstruction and rehabilitation in Des Moines, Iowa, and \$40M in roadway reconstruction and multi-modal improvements in Flint, Michigan that will occur in tandem with water transmission line replacement. Given the scale of most successful BUILD projects, this grant

is only likely to fund recommendations in the Master Bicycle and Pedestrian Plan if they are combined with other projects as part of a larger area-wide initiative.

<https://www.transportation.gov/BUILDgrants>

FEDERAL RECREATIONAL TRAILS PROGRAM (FTP)

The Illinois Department of Natural Resources (IDNR) maintains and awards federal funding through the Federal Recreational Trails Program (FTP). The program was originally established as part of the Inter-modal Surface Transportation Efficiency Act (ISTEA) in 1991 and has been incorporated into all subsequent transportation bills, even if under different titles. Trail projects can include hiking and walking, bicycling, cross-country skiing, snowmobiling, horseback riding, canoeing, and off-highway vehicles. IDNR cannot award grants for this program until a state budget is approved. It is, however, accepting applications to continue the review and approval process in order to avoid delays once a budget is in place.

<https://www.dnr.illinois.gov/AEG/Pages/FederalRecreationalTrailsProgram.aspx>

LAND AND WATER CONSERVATION FUND (LWCF)

The goal of the Land and Water Conservation Fund is the creation and maintenance of high quality recreation resources through the acquisition and development of public outdoor recreation areas and facilities. The program, operated by IDNR, requires a 50 percent match from the project sponsor. After the funding is awarded and the project is completed, the local agency receives a reimbursement of 50 percent of the actual project costs.

<https://www.dnr.illinois.gov/AEG/Pages/OpenSpaceLandsAquisitionDevelopment-Grant.aspx>

OPEN SPACE LANDS ACQUISITION AND DEVELOPMENT GRANT (OSLAD)

The Open Space Lands Acquisition and Development Grant (OSLAD) is a state-funded grant program administered by IDNR to provide funding assistance for local governments to acquire and develop land for open space and parks. The program has similar objectives to the LWCF and also requires a minimum 50 percent match from the project sponsor.

<https://www.dnr.illinois.gov/AEG/Pages/OpenSpaceLandsAquisitionDevelopment-Grant.aspx>

BICYCLE PATH PROGRAM

The Illinois Bicycle Path Program was established in 1990 to assist local governments in the land acquisition and construction of bicycle paths and related support facilities. This program is currently suspended until further notice.

<https://www.dnr.illinois.gov/AEG/Pages/BikePathProgram.aspx>

Other Funding

PEOPLE FOR BIKES COMMUNITY GRANTS PROGRAM

People for Bikes, formerly known as Bikes Belong, is a national organization working to make bicycling better throughout the United States through programs and advocacy work. Eligible projects and activities include the following:

- » Bike paths, lanes, trails, and bridges
- » Mountain bike facilities
- » Bike parks and pump tracks
- » BMX facilities
- » Bicycle parking, repair stations, and bike storage
- » Ciclovias and open streets events
- » Campaigns to increase investments in bike infrastructure

People for Bikes has funded hundreds of infrastructure projects and education and encouragement programs since it first launched in 1999, including sixteen projects in the State of Illinois.

<http://www.peopleforbikes.org/get-local#state-IL>

Revised Engineering Standards and Specifications

The Village of Northbrook's Engineering Standards and Specifications dictate the typical geometric design for roadways constructed or reconstructed within the Village limits, as well as for other public infrastructure under the Village's jurisdiction, including sidewalks, bike paths, water distribution systems, sanitary sewers, stormwater drainage systems, and landscaping. These standards and specifications have a significant impact on the presence, character and quality of active transportation infrastructure. Required right-of-way widths, street widths based on functional classification, sidewalk widths, curb ramp dimensions, bicycle facility widths, pavement material, striping and markings and other design elements shape the experience of people bicycling and walking in Northbrook. The Village's current Engineering Standards and Specifications should reference current standards and best practices for bicycle facility design to serve as a tool for implementing this Plan.

The design guidelines included as an appendix to the Plan can serve as a reference to the Engineering Standards and Specifications and for Village staff and contracted parties responsible for planning, engineering, and construction of roadways and active transportation facilities in Northbrook.

The following elements in the Engineering Standards and Specifications should be reviewed for potential updates to provide the Village some flexibility:

- » Pavement Design and Right-of-Way Chart. This section of the document establishes key right-of-way and pavement widths for roadways based on functional classification. The minimum pavement width, in most cases, is not wide enough to accommodate conventional bike lanes or a more protected on-street bicycle facility type. The Village may consider either differentiating between roadways with dedicated on-street bikeways and those without, or providing a note explaining that minimum width may be increased to include space

for dedicated on-street bikeway as determined by the Village Engineer.

- » Sidewalks. Sidewalk width can have a substantial impact on pedestrian mobility, particularly for people with limited mobility or with mobility assistance devices, such as wheelchairs. Rather than a single minimum width of 5 feet, the Village should consider adding language to widen sidewalks where deemed necessary by Village staff to support higher volumes of pedestrian activity.

- » Parking Lots. Many site plans for commercial, office, industrial, and institutional developments require pedestrians, and not just those existing parked motor vehicles, to access buildings and primary uses through the parking lot. While the Village's zoning code requires that pedestrian circulation be included in site plans, the Engineering Standards and Specifications should explicitly reiterate the importance of pedestrian circulation and its inclusion in parking lot design.

- » Bike Path Design and Construction Standards. This section of the document describes the three classes of bicycle facilities as identified in the Village's Comprehensive Plan and the required width and right-of-way for each. This section should be updated to reference standards and best practices established in the design guide appendix and other source materials. The section should also be updated to reference this Plan, pointing to specific proposed bicycle facility types on different roadways.

Implementation Strategy

Introduction

The Village of Northbrook has established a four-pronged strategy established to implement the Master Bicycle and Pedestrian Plan. This process includes implementation strategy, project phasing, near-term projects, and project prioritization. These four components are described in this section.

Implementation Methods

The projects recommended in this vary significantly in terms of scale, cost, and ease of implementation. Some small, low-cost projects can be completed by in-house Village staff. Other projects can be completed as part of routine contractual services for pavement markings and signage. Both of these examples can be achieved through an increase to the Village's normal budget line items. Larger, more expensive projects may require inclusion in the Village's Capital Improvement Plan (CIP) and dedicated revenue streams or grants to be completed. There are also a number of projects recommended in the plan that are located within rights-of-way owned and maintained by the iDOT and Cook County. These projects will require additional coordination with responsible agencies to coordinate, fund, and maintain.

To address these implementation factors, the Village has grouped all recommended projects into three categories based on the appropriate implementation method:

- 1. Non-CIP/Non-Grant Projects.** Smaller projects less than \$50,000.
- 2. Village-controlled CIP Projects.** Larger projects over \$50,000.
- 3. Other Jurisdiction-Controlled CIP Projects.** Projects requiring coordination with IDOT or Cook County.

Project Phasing

The final element of the Implementation Strategy is the phasing of recommended infrastructure projects, which takes into account project prioritization and implementation method described above, as well as annual budget limitations, scheduled capital improvements, and other considerations. The Village of Northbrook should coordinate with the Public Works Committee and the Bicycle Task Force to determine project phasing and identify projects best-suited for near-term completion.

Near-Term Projects

The Village should identify recommended projects for completion within two to three years following the adoption of this plan. The Bicycle Task force should lead this effort, with assistance from Village staff and the Public Works Committee, using prioritization scores, implementation methods, cost, jurisdiction, and other factors as inputs for the selection process.

Project Prioritization

The Village of Northbrook is responsible for the efficient, cost-effective, and value-driven expenditure of taxpayer dollars. Bicycle- and pedestrian-related infrastructure projects and programs must compete with other capital improvements and municipal services, as well as with one another, for limited internal and external resources. In order to maximize investment and provide the greatest benefit, the Village of Northbrook has prioritized bicycle and pedestrian infrastructure based on the value that each project contributes to the overall active transportation system. The draft prioritization will assist the Bike Task Force and Public Works Committee in refining projects for selection and identification of near-term projects.

It is important to note that the prioritization of recommended projects represents a snapshot of the values of the community at the time this plan was developed. These values may change over time as the plan is implemented and new opportunities come to light. The prioritized projects need not be accomplished in any specific order.

Several priority criteria have been established that reflect important plan goals and objectives, from increasing downtown accessibility to creating safe routes to school. These criteria, which are listed in the following column, help to define the purpose and benefits of each project. Each project has been evaluated and scored according to the methodology outlined in Table 10. As the table shows, the maximum possible score for a single project is eight (8) points, and the minimum possible score is zero (0).

1. Downtown Accessibility. These projects focus on increasing connectivity to, from, and within the Village core.

2. Regional Connectivity. These projects increase Village connectivity to adjacent communities and to regional recreation and trail amenities like the Des Plaines River Trail, the Chicago Botanic Garden, and the North Branch Trail.

3. Safe Routes to School. These projects focus on creating safe and comfortable paths from Northbrook neighborhoods to local elementary, middle, and high schools.

4. Safe Routes to Transit. These projects focus on creating safe and comfortable paths to commuter rail stations and bus stops with shelters.

5. Local Comfort and Safety. These projects help to build out the local active transportation network within the Village of Northbrook.

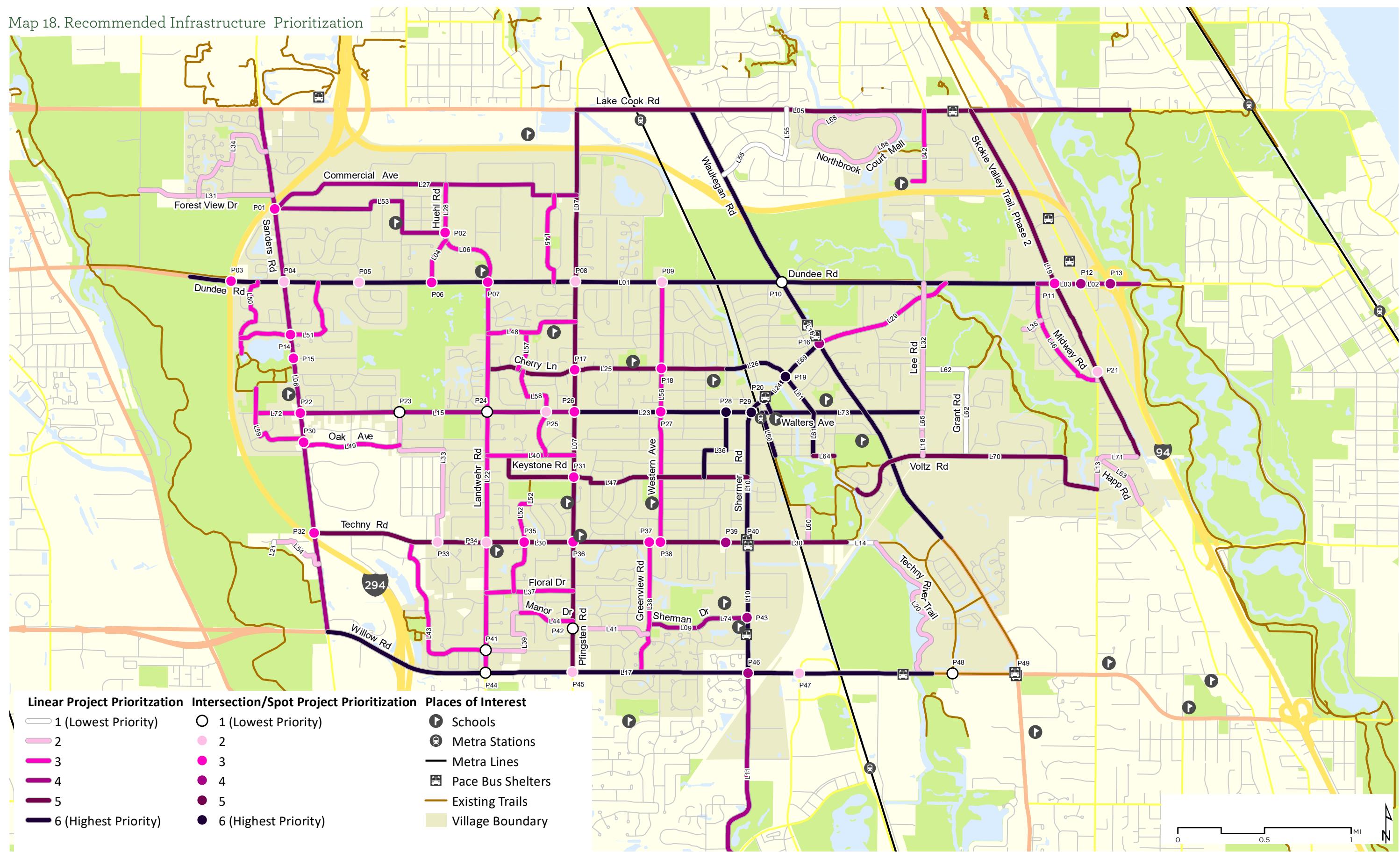
The results of this project prioritization scoring process are displayed in Map 18 on page 75 and shown in Table 11 (linear projects) and Table 12 (spot and intersection projects) beginning on page 76. A color scale is used in the map and in the tables to represent prioritization score. Higher-scoring projects are represented by darker purple colors, while lower-scoring projects are shown in white and light purple. While the highest possible score is eight, no project scored higher than six.

It should be noted that prioritized projects need not be pursued or completed in any specific order. Although low scoring projects may not achieve multiple objectives as defined in the prioritization methodology, these projects are still important to the overall connectivity and functionality of the active transportation network, and should therefore be pursued as opportunities arise.

TABLE 10. INFRASTRUCTURE PRIORITIZATION METHODOLOGY

| CATEGORY NUMBER | CATEGORY | SELECTION METHOD | PROJECT SCORING |
|-----------------|--------------------------|---|---|
| 1 | Downtown Accessibility | Within 1/2 mile of Northbrook Metra Station in downtown Northbrook | Within = 1 Not within = 0 |
| 2 | Regional Connectivity | Within 1 mile of Des Plaines River Trail or North Branch Trail AND Provide a dedicated facility across an interstate highway | Within = 1 Not within = 0 AND Crosses Interstate = 1 Does not cross Interstate = 0 |
| 3 | Safe Routes to School | Within 1/2 mile of any school | Within 1/2 mile of two schools = 2 Within 1/2 mile of one school = 1 Not Within = 0 |
| 4 | Safe Routes to Transit | Within 1/2 mile of any Metra Station or bus shelter | Near Metra station AND bus shelter = 2 Near Metra station OR bus shelter = 1 Neither = 0 |
| 5 | Local Comfort and Safety | Within the Village of Northbrook Limits | Within = 1 Not Within = 0 |
| | | | Total Possible Score = 0-8 |

Map 18. Recommended Infrastructure Prioritization



Prioritization Color Legend

| | |
|-----------------|---|
| Higher Priority | 6 |
| | 5 |
| | 4 |
| | 3 |
| | 2 |
| Lower Priority | 1 |

TABLE 11. LINEAR INFRASTRUCTURE PROJECT PRIORITIZATION

| SEGMENT NUMBER | PROJECT NAME | PROJECT LIMITS / LOCATION | FACILITY TYPE | JURISDICTION* | COST | TOTAL SCORE | STATUS UPDATE |
|----------------|--|--|---------------------------|------------------------|--------------|-------------|---------------|
| L01 | Dundee Rd. | Des Plaines River Trail to Midway Rd. | Sidepath | IDOT | \$ 8,509,000 | 6 | 4/22 Memo |
| L10 | Shermer Rd. | Walters Ave. to Willow Rd. | Sidepath | Northbrook | \$ 1,803,000 | 6 | 4/22 Memo |
| L16 | Waukegan Rd. | Lake Cook Rd. to Founders Dr. | Sidepath | IDOT | \$ 5,457,000 | 6 | 4/22 Memo |
| L17 | Willow Rd. | Sanders Rd. to 620' w/o Founders Dr. | Sidepath | IDOT | \$ 7,060,000 | 6 | |
| L23 | Walters Ave. | Pfingsten Rd. to Shermer Rd. | Separated Bike Lanes | Northbrook | \$ 660,000 | 6 | |
| L24 | Shermer Rd. | Church St. to Walters Ave. | Buffered Bike Lanes | Northbrook | \$ 58,000 | 6 | |
| L26 | Cherry Ln./Church St. | Cedar Ln. to Schermer Rd. | Conventional Bike Lanes | Northbrook | \$ 16,000 | 6 | |
| L36 | Cedar Ln./Illinois Rd./Penfold Pl. | Walters Ave. to Farnsworth Ln. | Bicycle Boulevard | Northbrook | \$ 30,000 | 6 | |
| L61 | Church St. | Schermer Rd. to Illinois Rd. | Signed and Marked Roadway | Northbrook | \$ 2,000 | 6 | 4/22 Memo |
| L66 | Lorenz Dr. | Walters Ave. to Techny Prairie Park | Signed and Marked Roadway | Northbrook | \$ 1,000 | 6 | 4/22 Memo |
| L67 | Meadow Rd. | Shermer Rd. to Walters Ave. | Signed and Marked Roadway | Northbrook | \$ 1,000 | 6 | |
| L69 | Shermer Rd. | Waukegan Rd. to Church St. | Signed and Marked Roadway | Northbrook | \$ 2,000 | 6 | |
| L73 | Walters Ave. | Anets Dr. to Lee Rd. | Signed and Marked Roadway | Northbrook | \$ 4,000 | 6 | 4/22 Memo |
| L05 | Lake Cook Rd. | Pfingsten Rd. to existing Forest Preserve trails | Sidepath | Cook County | \$ 3,837,000 | 5 | |
| L07 | Pfingsten Rd. | Lake Cook Rd. to Willow Rd. | Sidepath | Northbrook/IDOT | \$ 6,105,000 | 5 | |
| L19 | Skokie Valley Trail, Phase 2 | Lake Cook Rd. to Voltz Rd. | Shared Use Path | Northbrook | \$ 2,760,000 | 5 | 4/22 Memo |
| L25 | Cherry Ln. | Landwehr Rd. to Cedar Ln. (where splits) | Conventional Bike Lanes | Northbrook | \$ 60,000 | 5 | |
| L30 | Techny Rd. | Sanders Rd. to trail at Techny Prairie Park | Conventional Bike Lanes | Cook County/Northbrook | \$ 131,000 | 5 | |
| L47 | Miller Rd./Koepke Rd./Birch Rd./Farnsworth Ln. | Keystone Rd. to Schermer Rd. | Bicycle Boulevard | Northbrook | \$ 89,000 | 5 | 4/22 Memo |
| L64 | Illinois Rd. | Church St. to Orchard Ln. | Signed and Marked Roadway | Northbrook | \$ 1,000 | 5 | 4/22 Memo |
| L70 | Voltz Rd. | Techny Prairie Park Trail to Sunset Ridge Rd. | Signed and Marked Roadway | Northbrook | \$ 7,000 | 5 | 4/22 Memo |

* Agency of primary jurisdiction shown in table. The Village of Northbrook should coordinate with agencies as needed for project implementation. Total cost estimates for each jurisdiction are shown in Table 8 on page page 60.

Prioritization Color Legend

| | |
|-----------------|---|
| Higher Priority | 6 |
| | 5 |
| | 4 |
| | 3 |
| | 2 |
| Lower Priority | 1 |

TABLE 11. LINEAR INFRASTRUCTURE PROJECT PRIORITIZATION, CONTINUED

| SEGMENT NUMBER | PROJECT NAME | PROJECT LIMITS / LOCATION | FACILITY TYPE | JURISDICTION* | COST | TOTAL SCORE | STATUS UPDATE |
|----------------|---|----------------------------------|-------------------------|-----------------|--------------|-------------|---------------|
| L02 | Dundee Rd. | Skokie Rd. to North Branch Trail | Sidepath | Northbrook/IDOT | \$ 2,152,000 | 4 | 4/22 Memo |
| L03 | Dundee Rd. | Midway Rd. to Skokie Rd. | Sidepath | Northbrook/IDOT | \$ 302,000 | 4 | 4/22 Memo |
| L08 | Sanders Rd. | Lake Cook Rd. to Willow Rd. | Sidepath | Cook County | \$ 5,957,000 | 4 | |
| L09 | Sherman Dr. | Greenview Rd. to Shermer Rd. | Sidepath | Northbrook | \$ 712,000 | 4 | |
| L11 | Shermer Rd. | Willow Rd. to W Lake Rd. | Sidepath | Northbrook/IDOT | \$ 1,382,000 | 4 | 4/22 Memo |
| L15 | Walters Ave. | Sanders Rd. to Pfingsten Rd. | Sidepath | Cook County | \$ 1,903,000 | 4 | |
| L27 | Commercial Ave./Anthony Tr./Maria Ave. | Sanders Rd. to Pfingsten Rd. | Conventional Bike Lanes | Northbrook | \$ 78,000 | 4 | |
| L53 | Sunset Ln./Bernay Dr./Laburnum Dr./Tamarind Dr. | Sanders Rd. to Landwehr Rd. | Bicycle Boulevard | Northbrook | \$ 71,000 | 4 | |
| L74 | Sherman Dr. | School sites | Sidewalk | Northbrook | \$ 62,000 | 4 | |
| L04 | Huehl Rd. | Landwehr Rd. to Dundee Rd. | Sidepath | Northbrook | \$ 322,000 | 3 | |
| L06 | Landwehr Rd. | Huehl Rd. to Dundee Rd. | Sidepath | Northbrook | \$ 563,000 | 3 | |
| L22 | Landwehr Rd. | Dundee Rd. to Willow Rd. | Separated Bike Lanes | Cook County | \$ 1,457,000 | 3 | |
| L28 | Huehl Rd. | Commercial Ave. to Landwehr Rd. | Conventional Bike Lanes | Northbrook | \$ 12,000 | 3 | |
| L29 | Shermer Rd. | Dundee Rd. to Waukegan Rd. | Conventional Bike Lanes | IDOT | \$ 35,000 | 3 | |
| L37 | Floral Dr. | Landwehr Rd. to Pfingsten Rd. | Bicycle Boulevard | Northbrook | \$ 30,000 | 3 | |
| L38 | Greenview Rd. | Techny Rd. to Willow Rd. | Bicycle Boulevard | Northbrook | \$ 45,000 | 3 | |
| L40 | Keystone Rd. | Landwehr Rd. to Pfingsten Rd. | Bicycle Boulevard | Northbrook | \$ 30,000 | 3 | |
| L42 | Lee Rd. | Lake Cook Rd. to Cove School | Bicycle Boulevard | Northbrook | \$ 28,000 | 3 | |
| L43 | Longview Rd./Whirlaway Dr./Highland Dr | Techny Rd. to Landwehr Rd. | Bicycle Boulevard | Northbrook | \$ 60,000 | 3 | |
| L44 | Manor Dr. | Cedar Ct. to Pfingsten Rd. | Bicycle Boulevard | Northbrook | \$ 21,000 | 3 | |
| L45 | Melvin Dr./Helen Dr./Hazelwood Dr. | Maria Ave. to Dundee Rd. | Bicycle Boulevard | Northbrook | \$ 32,000 | 3 | |
| L46 | Midway Rd. | Dundee Rd. to Sunset Ridge Rd. | Bicycle Boulevard | Northbrook | \$ 43,000 | 3 | |
| L48 | Moon Hill Dr./Shabonee Terr. | Landwehr Rd. to Pfingsten Rd. | Bicycle Boulevard | Northbrook | \$ 32,000 | 3 | |
| L49 | Oak Ave. | Sanders Rd. to Arbor Ln. | Bicycle Boulevard | Northbrook | \$ 33,000 | 3 | |

* Agency of primary jurisdiction shown in table. The Village of Northbrook should coordinate with agencies as needed for project implementation. Total cost estimates for each jurisdiction are shown in Table 8 on page 60.

Prioritization Color Legend

| | |
|-----------------|---|
| Higher Priority | 6 |
| | 5 |
| | 4 |
| | 3 |
| | 2 |
| Lower Priority | 1 |

TABLE 11. LINEAR INFRASTRUCTURE PROJECT PRIORITIZATION, CONTINUED

| SEGMENT NUMBER | PROJECT NAME | PROJECT LIMITS / LOCATION | FACILITY TYPE | JURISDICTION* | COST | TOTAL SCORE | STATUS UPDATE |
|----------------|--|--------------------------------------|---------------------------|---------------|--------------|-------------|---------------|
| L50 | Pinto Ln./Pony Ln./Yorkshire Ln. | Dundee Rd. to Wood Oaks Green Park | Bicycle Boulevard | Northbrook | \$ 30,000 | 3 | |
| L51 | Rutgers Ln./Sutton Dr. | Yorkshire Ln. to Dundee Rd. | Bicycle Boulevard | Northbrook | \$ 47,000 | 3 | 4/22 Memo |
| L52 | Smith Rd./Lilac Ln./Clover Rd. | West Park to Floral Dr. | Bicycle Boulevard | Northbrook | \$ 37,000 | 3 | |
| L56 | Western Ave. | Dundee Rd. to Techny Rd. | Bicycle Boulevard | Northbrook | \$ 88,000 | 3 | |
| L57 | White Mountain Dr. | Moon Hill Dr. to Cherry Ln. | Bicycle Boulevard | Northbrook | \$ 14,000 | 3 | |
| L58 | White Mountain Dr./Stonegate Ln./Christina Ln. | Cherry Ln. to Keystone Rd. | Bicycle Boulevard | Northbrook | \$ 37,000 | 3 | |
| L59 | Wood Oaks Green Rd./Juli-Lyn Ln./Lori-Lyn Ln./Ridgeland Ln. | Wood Oaks Green Park to Sanders Rd. | Bicycle Boulevard | Northbrook | \$ 33,000 | 3 | |
| L72 | Walters Ave. | Juli-Lyn Ln. to Sanders Rd. | Signed and Marked Roadway | Northbrook | \$ 1,000 | 3 | |
| L12 | Sunset Ridge Rd. | Skokie Valley Trail to Midway Rd. | Sidepath | Cook County | \$ 61,000 | 2 | |
| L13 | Sunset Ridge Rd. | Voltz Rd. (west) to Voltz Rd. (east) | Sidepath | Cook County | \$ 214,000 | 2 | |
| L18 | Hillside Park Connector Trail | Lee Rd. to Voltz Rd. | Shared Use Path | Northbrook | \$ 168,000 | 2 | |
| L20 | Techny River Trail | Techny Rd. to Willow Rd. | Shared Use Path | Private | \$ 1,304,000 | 2 | |
| L31 | Forest View Dr. | Portwine Rd. to Sanders Rd. | Paved Shoulder | Northbrook | \$ 17,000 | 2 | |
| L32 | Lee Rd. | Dundee Rd. to Walters Ave. | Paved Shoulder | Northbrook | \$ 16,000 | 2 | |
| L33 | Arbor Ln./Prestwick Ln./Prairie Ave./Garden St./Highland Ave. | Walters Ave. to Techny Rd. | Bicycle Boulevard | Northbrook | \$ 60,000 | 2 | |
| L34 | Basswood Dr./Arrowwood Dr./Lindenwood Dr./Fairview Ln./Phyllis Dr. | Forestview Dr. to Sanders Rd. | Bicycle Boulevard | Northbrook | \$ 44,000 | 2 | |
| L35 | Berglund Pl./Whitfield Rd. | Sunset Ridge Woods to Midway Rd. | Bicycle Boulevard | Northbrook | \$ 8,000 | 2 | |
| L39 | Highland/Vicki/Doriann/Cambridge/Manor/Cedar | Landwehr Rd. to Floral Dr. | Bicycle Boulevard | Northbrook | \$ 39,000 | 2 | |

* Agency of primary jurisdiction shown in table. The Village of Northbrook should coordinate with agencies as needed for project implementation. Total cost estimates for each jurisdiction are shown in Table 8 on page 60.

Prioritization Color Legend

| | |
|-----------------|---|
| Higher Priority | 6 |
| | 5 |
| | 4 |
| | 3 |
| | 2 |
| Lower Priority | 1 |

TABLE 11. LINEAR INFRASTRUCTURE PROJECT PRIORITIZATION, CONTINUED

| SEGMENT NUMBER | PROJECT NAME | PROJECT LIMITS / LOCATION | FACILITY TYPE | JURISDICTION* | COST | TOTAL SCORE | STATUS UPDATE |
|---|--|---|---------------------------|-----------------|--------------|-------------|---------------|
| L41 | Kingston Dr./The Strand | Pfingsten Rd. to Greenview Rd. | Bicycle Boulevard | Northbrook | \$ 27,000 | 2 | 4/22 Memo |
| L54 | Timberlane Dr./Evergreen Ln. | Future Des Plaines Trail Connector to Sanders Rd. | Bicycle Boulevard | Local Agency | \$ 20,000 | 2 | |
| L60 | Anets Dr. | Techny Prairie Park to Techny Rd. | Signed and Marked Roadway | Northbrook | \$ 1,000 | 2 | |
| L63 | Happ Rd. | Voltz Rd. to Tower Rd. | Signed and Marked Roadway | Northbrook | \$ 2,000 | 2 | |
| L65 | Lee Rd. | Walters Ave. to Hillside Park | Signed and Marked Roadway | Northbrook | \$ 1,000 | 2 | 4/22 Memo |
| L68 | Northbrook Court Mall | Internal mall access road | Signed and Marked Roadway | Private | \$ 5,000 | 2 | |
| L71 | Voltz Rd. | Happ Rd. to Skokie Valley Trail, Phase 2 | Signed and Marked Roadway | Northbrook | \$ 1,000 | 2 | |
| L14 | Techny Rd. | Railroad crossing near Techny Prairie Park | Sidepath | Northbrook | \$ 2,203,000 | 1 | |
| L21 | Timberlane Dr. - Des Plaines Trail Connector | Des Plaines Trail (Unpaved) to Timberlane Dr. | Shared Use Path | Forest Preserve | \$ 59,000 | 1 | |
| L55 | Walnut Cir./Cottonwood Rd. | Waukegan Rd. to Lake Cook Rd. | Bicycle Boulevard | Local Agency | \$ 44,000 | 1 | |
| L62 | Grant Rd. | Lee Rd. to Voltz Rd. | Signed and Marked Roadway | Northbrook | \$ 3,000 | 1 | 4/22 Memo |
| * Agency of primary jurisdiction shown in table. The Village of Northbrook should coordinate with agencies as needed for project implementation. Total cost estimates for each jurisdiction are shown in Table 8 on page page 60. | | | | | | | |

TABLE 12. SPOT AND INTERSECTION INFRASTRUCTURE PROJECT PRIORITIZATION

| IMPROVEMENT NUMBER | PROJECT NAME | PROJECT LIMITS / LOCATION | JURISDICTION | TOTAL SCORE | STATUS UPDATE |
|--|--------------|---------------------------|--------------|-------------|---------------|
| P19 | Shermer Rd. | at Church St. | Northbrook | 6 | |
| P20 | Shermer Rd. | at Meadow Rd. | Northbrook | 6 | |
| P28 | Walters Ave. | at Cedar Ln | Northbrook | 6 | |
| P29 | Walters Ave. | at Shermer Rd | Northbrook | 6 | |
| P12 | Dundee Rd. | at Skokie Blvd. | Northbrook | 4 | |
| P13 | Dundee Rd. | at I-94 | IDOT | 4 | |
| P16 | Shermer Rd. | at Waukegan Rd. | IDOT | 4 | |
| P39 | Techny Rd. | at 2nd St. | Northbrook | 4 | |
| * Agency of primary jurisdiction shown in table. The Village of Northbrook should coordinate with agencies as needed for project implementation. | | | | | |

Prioritization Color Legend

| | |
|-----------------|---|
| Higher Priority | 6 |
| | 5 |
| | 4 |
| | 3 |
| | 2 |
| Lower Priority | 1 |

TABLE 12. SPOT AND INTERSECTION INFRASTRUCTURE PROJECT PRIORITIZATION, CONTINUED

| IMPROVE-MENT NUMBER | PROJECT NAME | PROJECT LIMITS / LOCATION | JURISDICTION | TOTAL SCORE | STATUS UPDATE |
|---------------------|---------------------|-------------------------------|--------------|-------------|---------------|
| P40 | Techny Rd. | at Shermer Rd. | Northbrook | 4 | |
| P43 | Sherman Dr. | at Shermer Rd. | Northbrook | 4 | |
| P46 | Willow Rd. | at Shermer Rd. | IDOT | 4 | |
| P01 | Sanders Rd. | at Commercial Ave./Sunset Ln. | Cook County | 3 | |
| P02 | Landwehr Rd. | at Huehl Rd./Tamarind Dr. | Northbrook | 3 | |
| P03 | Dundee Rd. | at crossing of I-294 | IDOT | 3 | |
| P06 | Dundee Rd. | at Huehl Rd. | IDOT | 3 | |
| P07 | Dundee Rd. | at Landwehr Rd. | IDOT | 3 | |
| P11 | Dundee Rd. | at planned Skokie Bike Trail | IDOT | 3 | |
| P14 | Sanders Rd. | at Rutgers Ln. | Cook County | 3 | |
| P15 | Sanders Rd. | at Greenacre Dr. | Cook County | 3 | |
| P17 | Pfingsten Rd. | at Cherry Ln. | IDOT | 3 | |
| P18 | Western Ave. | at Cherry Ln. | Northbrook | 3 | |
| P22 | Walters Ave. | at Sanders Rd. | Cook County | 3 | |
| P26 | Walters Ave. | at Pfingsten Rd. | IDOT | 3 | |
| P27 | Walters Ave. | at Western Ave. | Northbrook | 3 | |
| P30 | Sanders Rd. | at Ridgeland Ln./Oak Ave. | Cook County | 3 | |
| P31 | Pfingsten Rd. | at Koepke Rd. | Northbrook | 3 | |
| P32 | Sanders Rd. | at Techny Rd. | Cook County | 3 | |
| P35 | Clover Rd. | at Techny Rd. | Cook County | 3 | |
| P36 | Techny Rd. | at Pfingsten Rd. | Cook County | 3 | |
| P37 | Techny Rd. | at Greenview Rd. | Northbrook | 3 | |
| P38 | Techny Rd. | at Western Ave. | Northbrook | 3 | |
| P49 | Willow Rd. | at Waukegan Rd. | IDOT | 3 | |
| P04 | Dundee Rd. | at Sanders Rd. | IDOT | 2 | 4/22 Memo |
| P05 | Dundee Rd. | at Torrey Pines Pkwy. | IDOT | 2 | |
| P08 | Dundee Rd. | at Pfingsten Rd. | IDOT | 2 | |
| P09 | Dundee Rd. | at Western Ave. | IDOT | 2 | |
| P21 | Skokie Valley Trail | at Sunset Ridge Rd. | Cook County | 2 | |
| P25 | Christina Ln. | at Walters Ave. | Cook County | 2 | |
| P33 | Techny Rd. | at Highland Ave. | Cook County | 2 | |
| P34 | Techny Rd. | at Landwehr Rd. | Cook County | 2 | |
| P45 | Willow Rd. | at Pfingsten Rd. | IDOT | 2 | |
| P47 | Willow Rd. | at Old Willow Rd. | IDOT | 2 | |

* Agency of primary jurisdiction shown in table. The Village of Northbrook should coordinate with agencies as needed for project implementation.

TABLE 12. SPOT AND INTERSECTION INFRASTRUCTURE PROJECT PRIORITIZATION, CONTINUED

Prioritization Color Legend

| | |
|-----------------|---|
| Higher Priority | 6 |
| | 5 |
| | 4 |
| | 3 |
| | 2 |
| Lower Priority | 1 |

| IMPROVE-MENT NUMBER | PROJECT NAME | PROJECT LIMITS / LOCATION | JURISDICTION | TOTAL SCORE | STATUS UPDATE |
|---------------------|---------------|---------------------------|--------------|-------------|---------------|
| P10 | Dundee Rd. | at Waukegan Rd. | IDOT | 1 | |
| P23 | Walters Ave. | at Arbor Ln | Cook County | 1 | |
| P24 | Walters Ave. | at Landwehr Rd | Cook County | 1 | |
| P41 | Highland Rd. | at Landwehr Rd. | Cook County | 1 | |
| P42 | Pfingsten Rd. | at Kingston Dr. | Northbrook | 1 | |
| P44 | Willow Rd. | at Landwehr Rd. | IDOT | 1 | |
| P48 | Willow Rd. | at Founders Dr. | IDOT | 1 | |

* Agency of primary jurisdiction shown in table. The Village of Northbrook should coordinate with agencies as needed for project implementation.

Conclusion

Creating a bicycle- and walk-friendly community requires planning and goal-setting, partnerships with local stakeholders and public agencies, and the persistence necessary to achieve long-term vision and goals. The Northbrook Master Bicycle and Pedestrian Plan serves as the Village's guiding policy and plan to achieve this vision of a bicycle- and walk-friendly community.

The plan's vision and goals represent the Village's values and aspirations for bicycling and walking as both transportation and recreation choices. They are ambitious, yet achievable.

Existing conditions for bicycling and walking, as well as previous planning efforts, are documented in the plan as a reference point for future investments in bicycle and pedestrian infrastructure and program investments.

The plan recommendations encompass a broad spectrum of programs, policies, and infrastructure improvements that embody the Six E's of a bicycle- and walk-friendly community: Education, Encouragement, Enforcement, Engineering, Evaluation, and Equity. The breadth of these recommendations highlights the importance of continued coordination with adjacent municipalities, Cook County, the State of Illinois, and other

regional agencies. These recommendations also require continued community engagement, Bike Task Force involvement, and cross-departmental involvement. The recommended bicycle and pedestrian network, which includes nearly 70 miles of new facilities, represents the long-term vision to create a full network for bicycling and walking in Northbrook. The plan recommendations are planning-level concepts subject to further evaluation of prioritization, funding, and constructability.

The implementation strategies outlined in the plan provide the Village with direction for phasing projects based on their ability to achieve plan goals, cost, feasibility, and likely funding sources. The Village should regularly revisit and update the plan to re-align the vision, goals, and recommendations to reflect changes throughout the community.

With this plan in hand, the future of bicycling and walking is bright. Northbrook will be a more walkable, bicycle friendly community where people of all ages and abilities can enjoy traveling on a safe, convenient, and accessible network of trails, sidewalks, and on-street bikeways that connects people to the places they value.



Figure 34. The future of Northbrook pedal forward (source: Northbrook Parks District).

