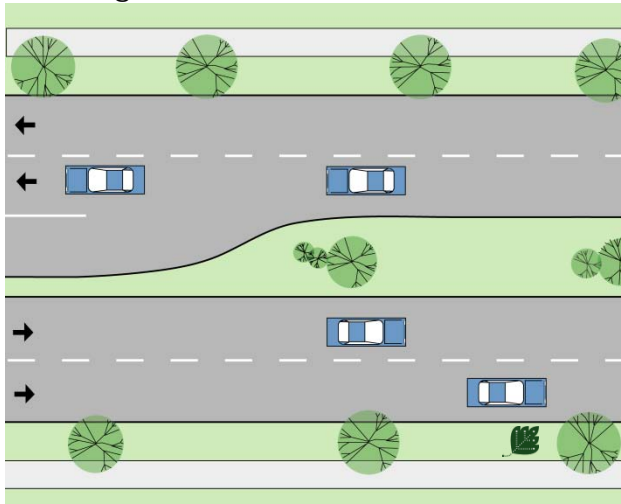


Fig. 5.6E. Four to Two-Lane Boulevard Conversions Design Guidelines

Existing Conditions



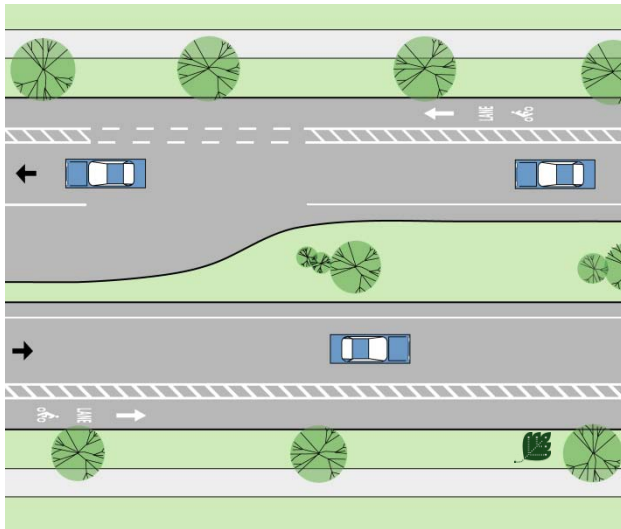
Description

The existing condition is a four-lane boulevard with designated turn lanes. These roads have tremendous traffic volume capacity. There are some situations where this road design exceeds the needs of the roadway.

In the proposed condition, two lanes of through traffic are eliminated and bicycle lanes are added. As bicycle lanes are considerably more narrow than travel lanes, a striped buffer is added between the vehicular travel lane and the bike lane and an edge line is placed a few feet from the inside curb. This allows emergency vehicles to pass.

This striped buffer is replaced with a dashed line where bicycle-merging movements are expected.

Proposed Conditions

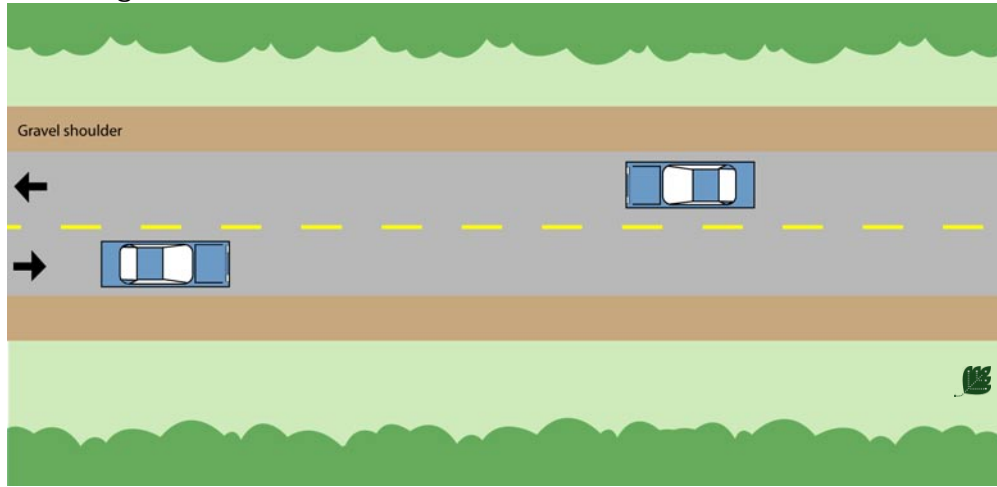


Application

Where the existing and expected traffic volumes do not warrant four lanes of traffic with extended designated turn lanes.

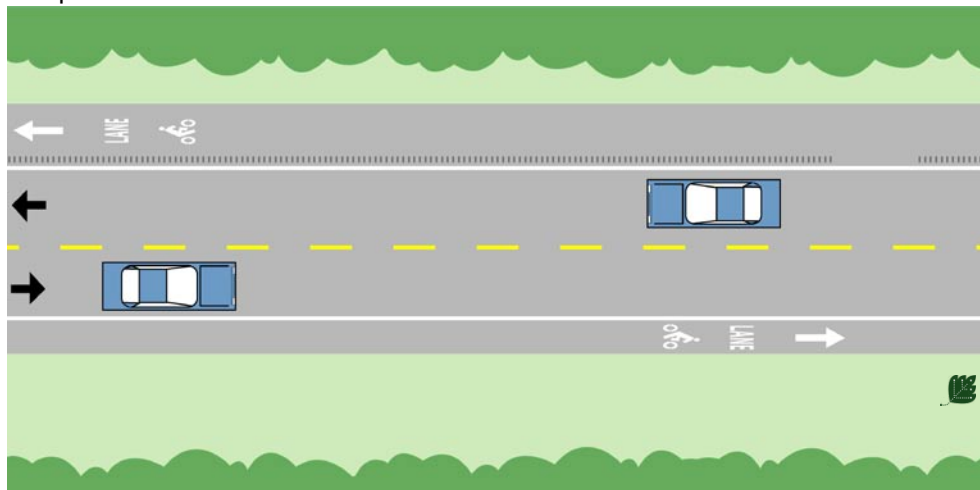
Fig. 5.6F. Paving Shoulders

Existing Conditions



A rural cross-section (no curbs) with gravel or grass shoulder. The existing roadway travel lanes are not of a sufficient width to accommodate bicycle lanes by lane narrowing.

Proposed Conditions



Description

Paving the shoulder provides a separate bicycle facility and improves roadway conditions from a motor vehicle and maintenance standpoint. The use of rumble strips is discouraged as they may cause a bicyclist to lose control when they leave the bicycle lane to make a turn or to avoid an obstacle. If extenuating circumstances call for the use of rumble strips, breaks should be provided where appropriate to allow for a bicycle to safely leave the bike lane.

Application

Paved shoulders should be provided on all rural cross section roadways within the City. Where appropriate, bicycle lane pavement markings may be applied.

5.7 Travel Across The Road Corridor

Despite the dangers or inconveniences that exist, at some point in a pedestrian's or bicyclist's journey they will be required to cross a road. Crossing roadways pose challenges to safe navigation for pedestrians and bicyclists on their journeys. Ways to get across a road (including railroads) include intersections, mid-block crosswalks, bridges and tunnels. All pose unique challenges to pedestrians and bicyclists.

Bicyclists and pedestrians in many cases, cross the road in very different fashions. Bicyclists in the roadway most likely will make left turns just like a vehicle, merging across lanes as necessary. Their restrictions to crossing the road are primarily based on their comfort level of riding with traffic and the volumes, speed and gaps that exist. Some bicyclists, depending on the traffic conditions, choose to make left turns as pedestrians. They leave the roadway and cross the road at a crosswalk.

For pedestrians and bicyclists who choose to cross the road as a pedestrian, crossing a road can be an intimidating experience. There are often limited safe and legal crossing options. Pedestrians are directed to cross roads at either intersections or at mid-block crosswalks. Each of those options has their own set of issues.

Intersection Issues

While generally, intersections are the safest place for pedestrians and bicyclists to cross the road, there are a number of issues to consider. Intersections are the most common places of conflict for automobiles, bikes and pedestrians. Even at a simple four way stop, there can be up to twelve different possible movements from the cars alone. Add in more lanes of traffic, and it can quickly get overwhelming. In 2009, 52% of non-motorized crashes in Southeast Michigan were intersection related¹. However, if designed correctly, intersections can facilitate convenient and safe interactions for all users.

Signalized intersections are the hubs of activity on the roadway. It is a place with conflicting demands from many different users. For the most part, a roadway's vehicular capacity is determined at signalized intersections. From a pedestrian's standpoint, they often face a sea of left turning vehicles, right turning vehicles, and through traffic from four directions. When crosswalk signals require activation by a push button, pedestrians often ignore them because of their inconvenience. Even when pedestrians push the button, in most cases there is no feedback to the pedestrian that they have indeed activated the signal. Often when the signal phases are long, they will assume that the button is broken and cross the road at an inappropriate time.

Vehicles turning right-on-red also pose dangers to pedestrians. The driver of a vehicle is focused on the traffic to the left, looking for a gap. Frequently drivers do not look right for pedestrians beginning to cross the street before beginning their turn. Another problem occurs in situations where the view of the oncoming traffic is obstructed if the vehicle is behind the stop bar. Often times the driver of the vehicle will advance over the crosswalk to improve their sightline. If they are unable to proceed they completely block the crosswalk with their vehicle. This is a common occurrence especially in the downtown area where right-on-red is permitted even when clear sight lines do not exist from behind the stop bar.

Vehicles turning left at busy intersections with few gaps in traffic can also be problematic to pedestrians. The driver of a left turning vehicle in such cases is often focused primarily on finding a suitable gap in oncoming traffic and may commit to turning left before noticing a pedestrian in the crosswalk.

¹ Michigan Traffic Crash Facts, 2009.

Unsignalized intersections are also key points where pedestrians and bicyclists want to cross the road corridor. When the crosswalks are left unmarked, pedestrian travel is often discouraged.

The aforementioned issues are addressed throughout the following guidelines and in *Section 4 – Proposed Policies and Programs*. In addition, special attention has been paid to addressing crossings at points other than signalized intersections.

General Crosswalk Design

Marking a crosswalk serves two purposes: (1) it clarifies that a legal crosswalk exists at that location and (2) it tells the pedestrian the best place to cross.¹ Several issues should be considered when designing safe crosswalks, including visibility, communicating the pedestrian's intent, minimizing crossing distance, snow obscuring the road surface, and accommodating persons with special needs.

Visibility

Increasing the visibility of all users crossing the road is a key issue for pedestrian safety. The ability of pedestrians to see motorists is equally as important as their own visibility in the roadway. Marked crosswalks should be included only where sight distance is adequate for both pedestrians and motorists. Obstructions in sight lines should be minimized. Visibility can be improved with the following design treatments:

- Wide white ladder crosswalks.
- Stop lines or yield lines that are set back from the crosswalk a sufficient distance to increase visibility from all lanes of traffic.
- Signage directing motorists to yield to the pedestrians.
- Placement of signage that does not obstruct the visibility of the pedestrians.
- Curb extensions (bulb outs), extending the curb out at intersections, also minimizes the pedestrian crossing distance.
- Removal of low hanging branches and minimal planting between the oncoming vehicles and the sidewalk approaches to the crosswalk such that sight distances are in accordance with AASHTO guidelines.
- Lighting of the crosswalk and the sidewalk approaches.

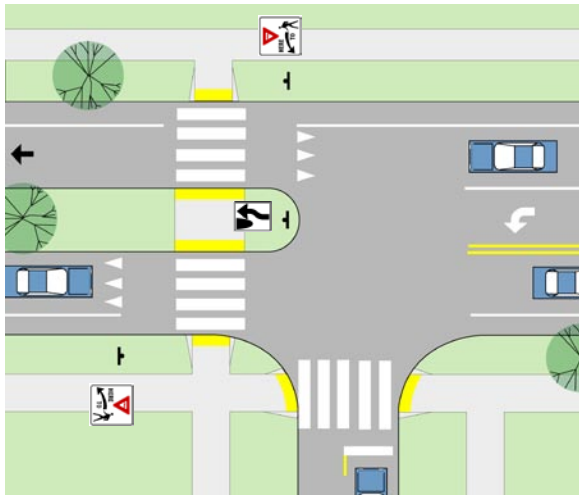
¹ AASHTO. *Guide for the Planning, Design, and Operation of Pedestrian Facilities (Draft)*. August 2001.

Understanding the Pedestrian's Intent

Road users should be able to discern if a pedestrian is planning to cross the road so that they may take appropriate measures. If a crosswalk is located where a sidewalk directly abuts the roadway, the road users cannot tell if someone is simply going to walk by the crosswalk or abruptly turn and attempt to cross the street. Also, places where pedestrians may typically congregate, such as bus stops, may cause road users to needlessly stop. To help clarify the pedestrian's intent to cross the road, intersections should incorporate the following features:

- A short stretch of sidewalk perpendicular to the roadway where only pedestrians planning to cross the street would typically stand.
- Placing bus stops past the crosswalk to avoid blocking the crosswalk.
- Distancing the crosswalk from places where pedestrians may congregate adjacent to the roadway without the intent to cross the road.
- Installing curb extensions to reduce the crossing distance for pedestrians and to slow traffic, (see Fig. 5.4B)

Figure 5.7A. Pedestrian Crossing Island



Crossing islands

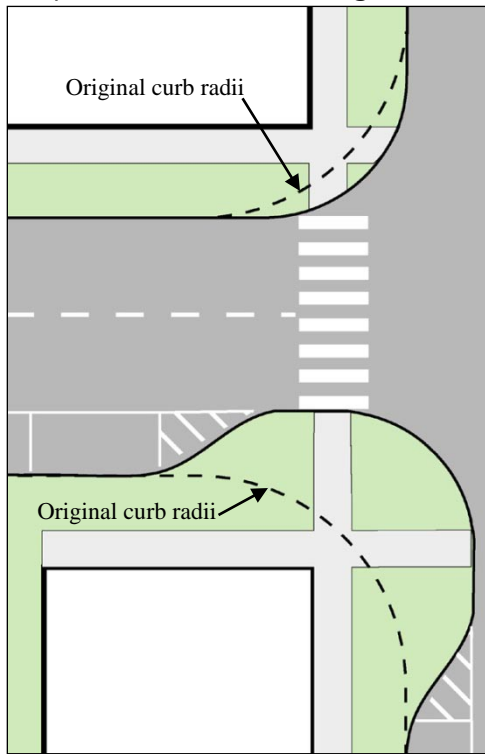
Crossing islands are raised areas that separate lanes of opposing traffic and eliminate the need for pedestrians to cross more than one direction of traffic at a time (see Figure 5.4A to the left).

Crossing islands allow the pedestrian to undertake the crossing in two separate stages. This increases their comfort level and opens up many more opportunities to safely cross the road.

Crossing islands increase the visibility of the crosswalk to motorists and reduce pedestrian crossing distances.

Crossing islands should be considered for all unsignalized marked crosswalks that traverse three or more lanes.

Fig. 5.7B. Effect of curb extensions and smaller curb radii on pedestrian crossing distances



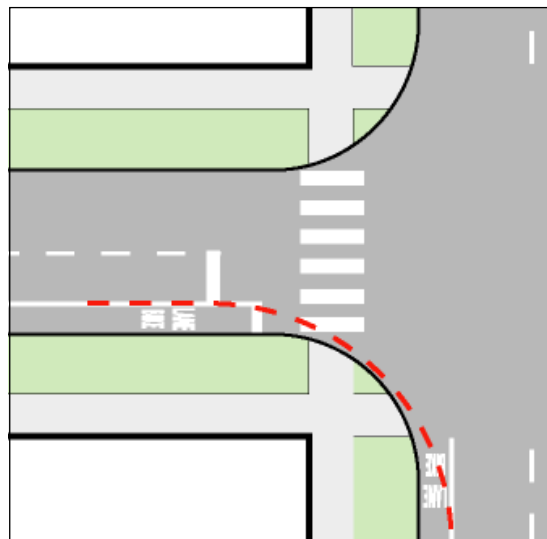
Minimizing Crossing Distances

Minimizing the distance that pedestrians need to cross the street is another critical safety solution. As crossing distances increase, the comfort and safety of a pedestrian decreases. Simple design solutions such as reducing curb radii, and adding curb extensions, shorten crosswalk distances. As well, they reduce the potential for pedestrian-vehicle conflict. Larger corner radii promote higher turning speeds and increase pedestrian crossing distances. See the figure to the left.

In addition to increasing visibility and shortening crossing distances for pedestrians, curb extensions increase the space available for directional curb ramps and prevent parked cars from encroaching on the crosswalk. Curb extensions also serve to make a pedestrian’s intent to cross the road known to motorists before they have to step into the roadway.

For signalized intersections, shorter crosswalks mean more time for the pedestrian “Walk” phase and a shorter clearance interval “Flashing Don’t Walk” phase.

Fig 5.7C. Effect of Bike Lanes on Turning Radius



Minimizing Turning Radius When Bike Lanes are Present

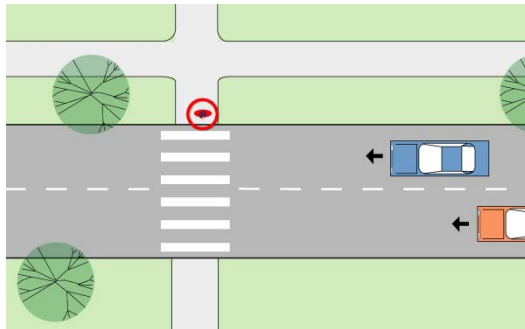
Bicycle lanes provide an added advantage of effectively increasing the turning radius for motor vehicles. This is especially the case where both intersecting roads have bike lanes as shown in the figure to the left.

This also applies to driveways. When a sidewalk is close to the road, the curb radius of an intersecting driveway is typically quite small. In these cases, a bicycle lane can significantly improve the ease of entering and exiting the driveway. For example a 5’ curb radius adjacent to a 3.5’ bike lane has an effective turning radius of 10’ (including the gutter).

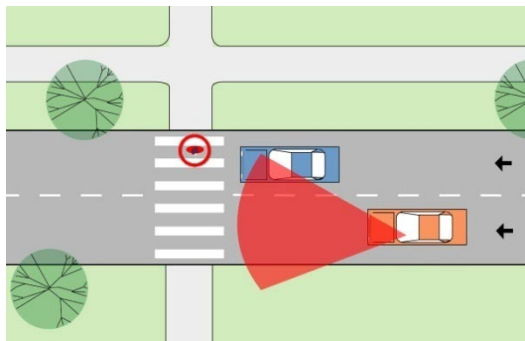
The increased effective turning radius means that motorists are less likely to encroach on adjacent motor vehicle lanes during the turning movements.

Fig. 5.7D. Multiple Threat Crashes Issues

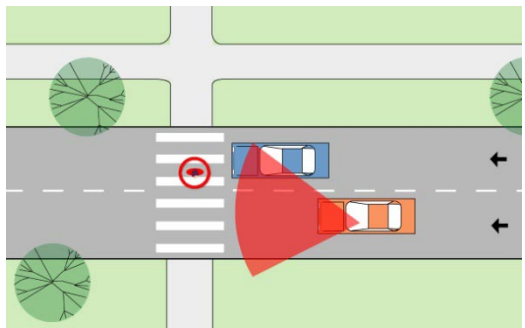
Whenever a crosswalk traverses multiple lanes of traffic traveling in the same direction, there is a potential for what is known as a multiple-threat crash. The crash unfolds as follows:



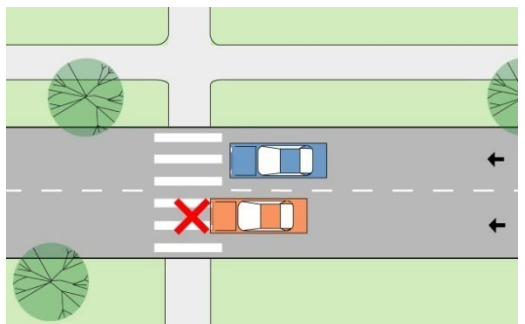
1. The driver in the lane closest to the pedestrian sees the pedestrian approaching the ramp or just entering the roadway and begins to slow down



2. The driver closest to the pedestrian lane stops, yielding the right-of-way to the pedestrian. The car is stopped immediately adjacent to the crosswalk, therefore blocking the sightlines between the pedestrian and the driver of the other car.



3. The driver of the other car fails to see the pedestrian and continues towards the crosswalks without slowing down.



4. The driver of the second car does not see the pedestrian until it is too late to come to a complete stop and hits the pedestrian.

A combination of high visibility crosswalks, yield lines set back from the crosswalk, and crosswalk signage on both sides of the street can help provide better visibility of pedestrians in the crosswalk. See Fig. 5.4T for recommended countermeasures.

Fig. 5.7E. Countdown Signals



“Walk” Phase



Clearance Interval



“Don’t Walk” Phase

Description

These operate in the same manner as typical pedestrian signals, with one addition. At the onset of the Clearance Interval (flashing “Don’t walk” or red hand), the signal counts down the remaining time until the “Don’t Walk” phase (solid “Don’t Walk” or red hand).

Pedestrians find these very intuitive to use and they can help clear up many misunderstandings as to the purpose of the Clearance Interval. Studies have shown that fewer pedestrians remain in the street at the end of the Clearance Interval with countdown signals than with standard pedestrian signals. These signals have been very well received by pedestrians and have reduced complaints in some communities regarding pedestrian signal timing.

Application

The City should consider using the pedestrian signals with an integrated countdown clock for all new and replacement pedestrian signals. The City should consider adding countdown clocks to existing signals at high pedestrian volume signalized crosswalks and locations where the crosswalk is longer than 50’.

Fig. 5.7F. Portable Speed and Traffic Detectors



Description

These portable detectors have the ability to perform traffic counts, speed studies and indicate a driver's speed on a LED display. Some models have a strobe light that may be activated when the speed limit is exceeded. They have been shown to reduce speed in before and after studies.

Application

These may be moved into an area where speeding is of concern to residents. The device may be used without displaying the speed to get a baseline speed study and traffic count in an unobtrusive manner. It may then be set to display the speed. Numerous inexpensive mounting plates may be put in place around the City and the detector can be easily and economically moved from place to place. These would be ideal for school zones where speed is a concern like on Burcham Road.

Fig. 5.7G. Active Crosswalk Warning Systems



Description

A flashing beacon and/or in-pavement flashing LEDs are activated when a pedestrian is present. The signals may be passively activated through a number of methods or activated via a standard push button. The pedestrian approach can also be set to flash a red light with a sign indicating to cross after traffic clears. Various manufacturers have solar powered models with radio controls to activate flashers on advance warning signs and on signs on the opposite side of the street. This significantly reduces the cost of installation and operation.

Application

These systems are best located at pathway and major road intersections, or mid-block crosswalks on major roadways where pedestrian traffic is sporadic. Passive activation works best when there is a long pedestrian approach such as a pathway.

Fig. 5.7H. Rectangular Rapid Flash Beacon



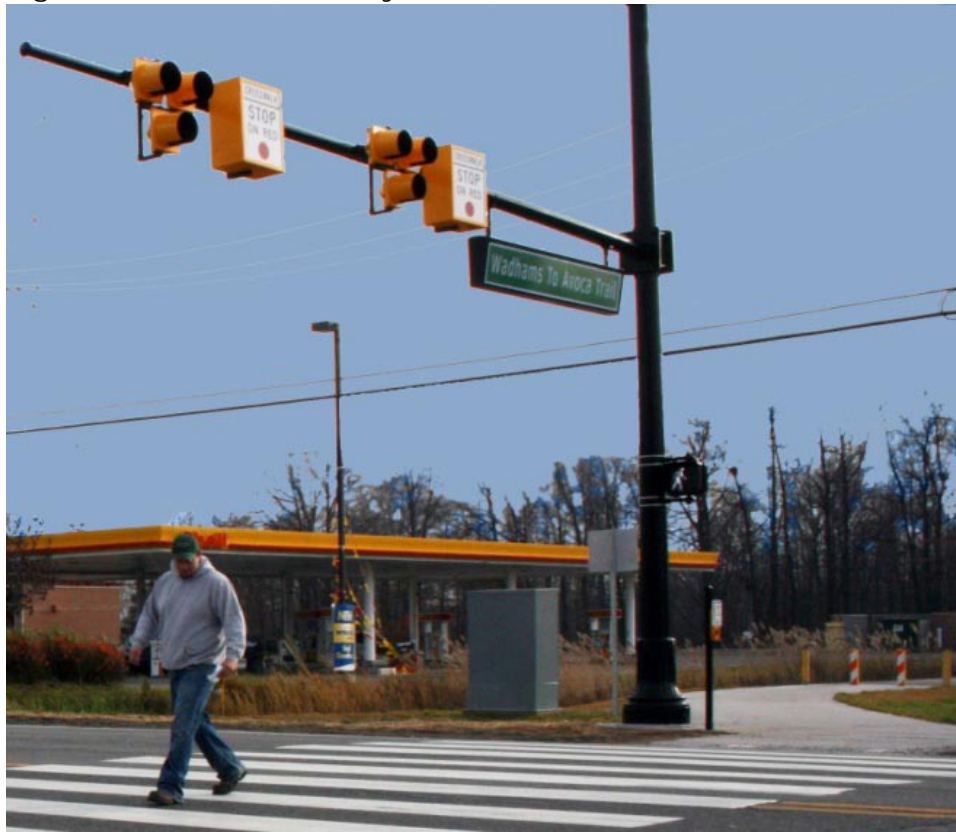
Description

Actuated Rectangular Rapid Flash Beacons are high intensity LED flashers that are paired with crosswalk signs. The LED flashers alternate and get motorists attention when activated. They can be passively or push-button activated and are sometimes linked to advanced warning signs. Various manufacturers have solar powered models that significantly reduce the cost of installation and operation.

Application

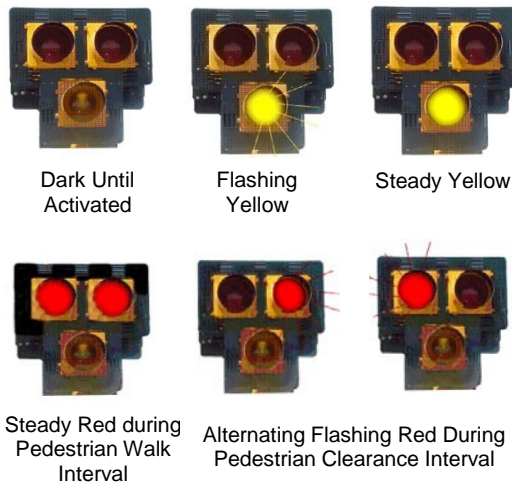
These systems are best located at pathway and major road intersections, or mid-block crosswalks on major roadways where pedestrian traffic is sporadic. Passive activation works best when there is a long pedestrian approach such as pathway.

Fig. 5.71. Pedestrian Hybrid Beacon



Description

The Pedestrian Hybrid Beacon, also known as a HAWK signal, is a beacon used to help pedestrians cross mid-block where a traditional pedestrian crosswalk signal would be inappropriate. The pedestrian hybrid beacon is similar to an emergency beacon in that the signal’s purpose is clearly signed adjacent to the signal.

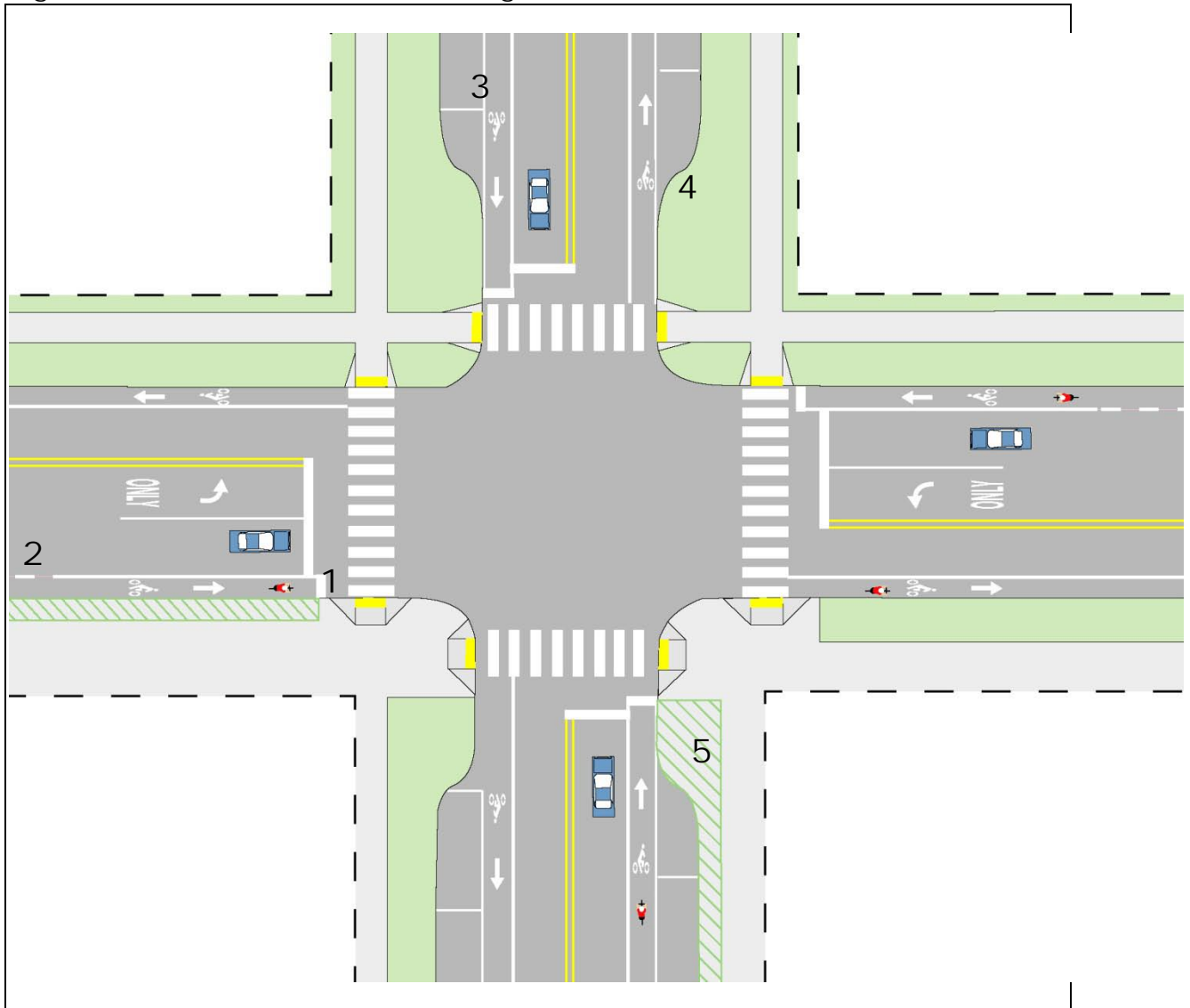


The signal is kept dark at its resting state. When a pedestrian activates the crossing button, a flashing yellow signal is displayed to motorists. This is followed by a steady yellow then a solid red at which time the pedestrian is displayed a walk signal. During the clearance interval, the motorists are displayed an alternating flashing red signal. Motorists may then move forward if the pedestrian or bicyclist has already crossed the road.

Application

These system work best at mid-block crosswalk locations where poor sight lines, infrequent usable gaps and/or inability to install a crossing island make an unsignalized crossing unsafe. They should not be installed at or within 100 feet of an intersection.

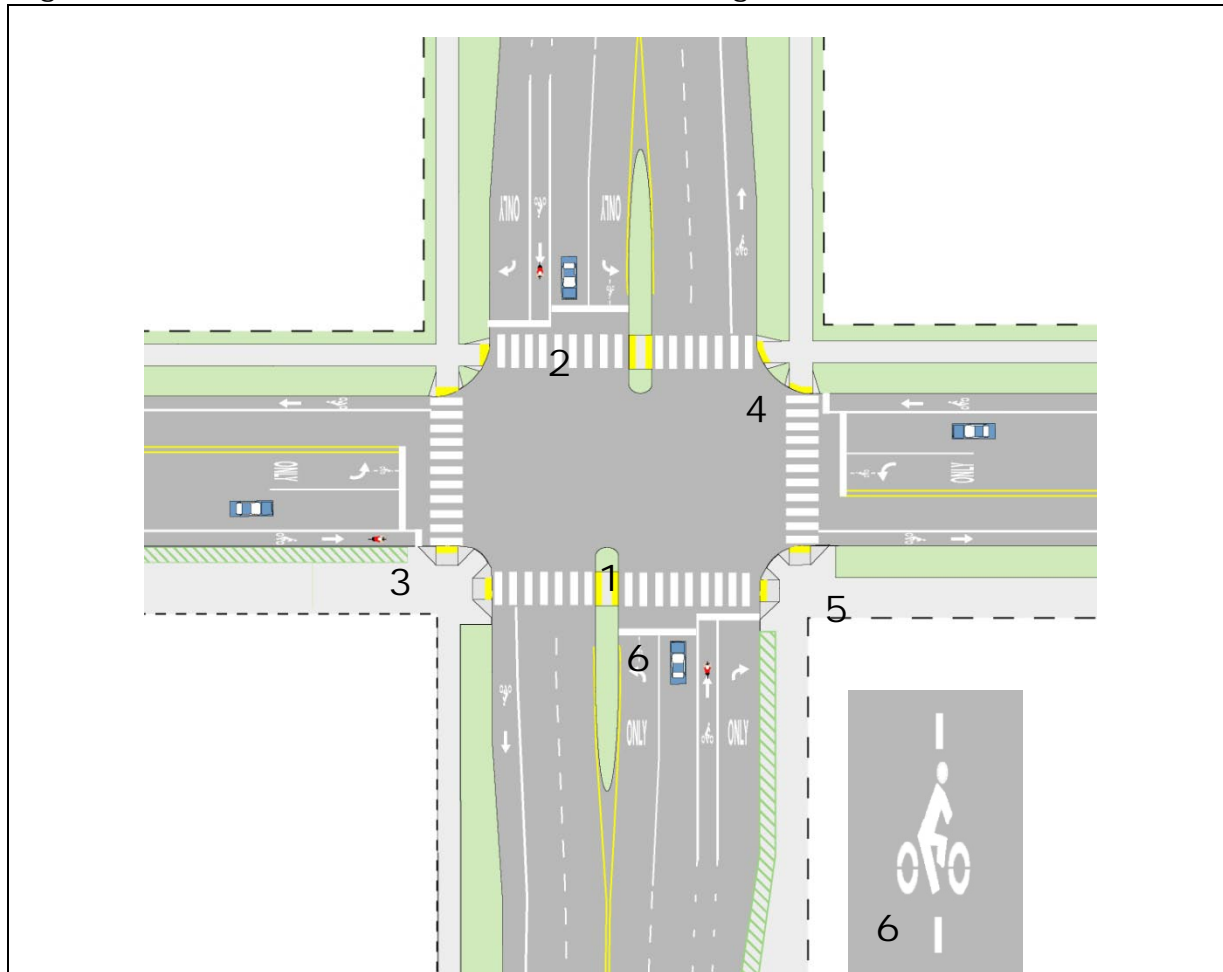
Fig. 5.7J Urban Intersection Design Guidelines



Key Elements

1. Bike lane striping should stop at the pedestrian crosswalks and resume on the far side of the intersection. Unusual alignments may be aided by extending dashed guidelines through the intersection.
2. Bike lane striping is dashed at the intersection approach to indicate that bikers may be merging with traffic to make a turn.
3. Striping between the parking lane and bike lane encourages motorists to park closer to the curb and discourages motorists from using the bike lane in combination with an unused parking bay as a travel lane.
4. Curb extensions reduce the crossing distance of pedestrians and improve sight distance for both motorists and pedestrians. Curb extensions should be used wherever there is on-street parking.
5. In urban areas, a furniture and street tree zone provides a buffer from the street and improves the pedestrian level of service rating. A sufficiently wide travel way should be clear of any obstructions.

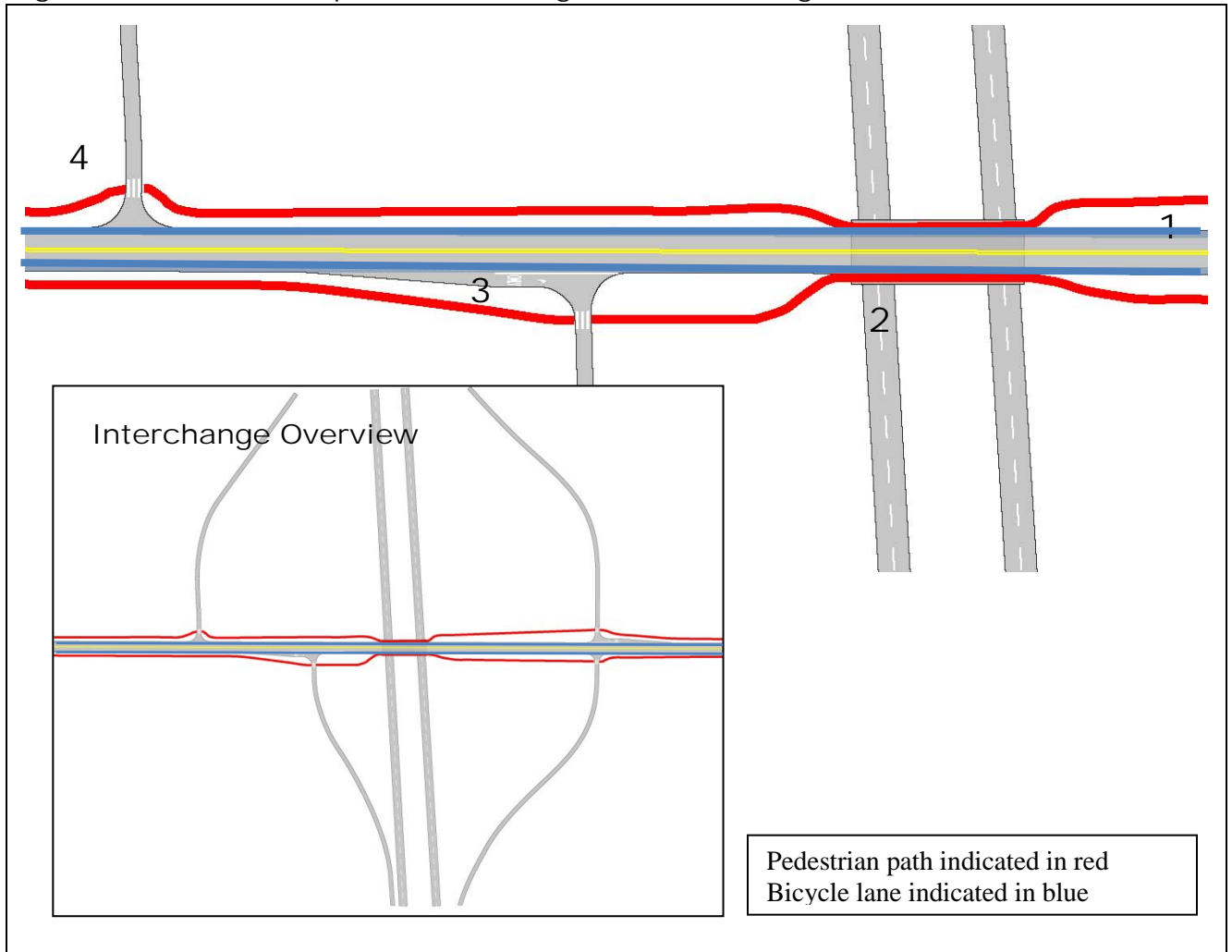
Fig. 5.7K. Multi-lane Urban Intersection Design Guidelines



Key Elements

1. Pedestrian crossing islands should be installed at wide, multi-lane streets with high traffic volumes. Curbs, signs, and street hazard markings should delineate the islands.
 2. Crosswalks should be a minimum of 10' wide and clearly marked with a white ladder design to increase visibility and resist tire wear.
 3. Bike stop bar is advanced several feet ahead of vehicle stop bar to minimize conflicts of right turning cars with through bike traffic.
 4. A small curb radius shortens the pedestrian's crossing distance and controls traffic speed around corners. Bike lanes provide a significantly larger effective turning radius than the actual curb radius and should be considered in turning radius calculations.
 5. Perpendicular ramps should be built 90 degrees to the curb face and should include a detectable warning strip for visually impaired people.
 6. Traffic detectors in left turn lanes should be designed to detect bicycles. Detectors should include pavement markings that indicate where bikes can best be detected.
 7. Timing of the traffic signal should allow adequate all red phases to provide sufficient clearance time for bikes to clear an intersection.
- Other intersection features may include Right-On-Red turning restrictions, leading pedestrian interval signal phases, and audible signals for visually impaired users where appropriate.

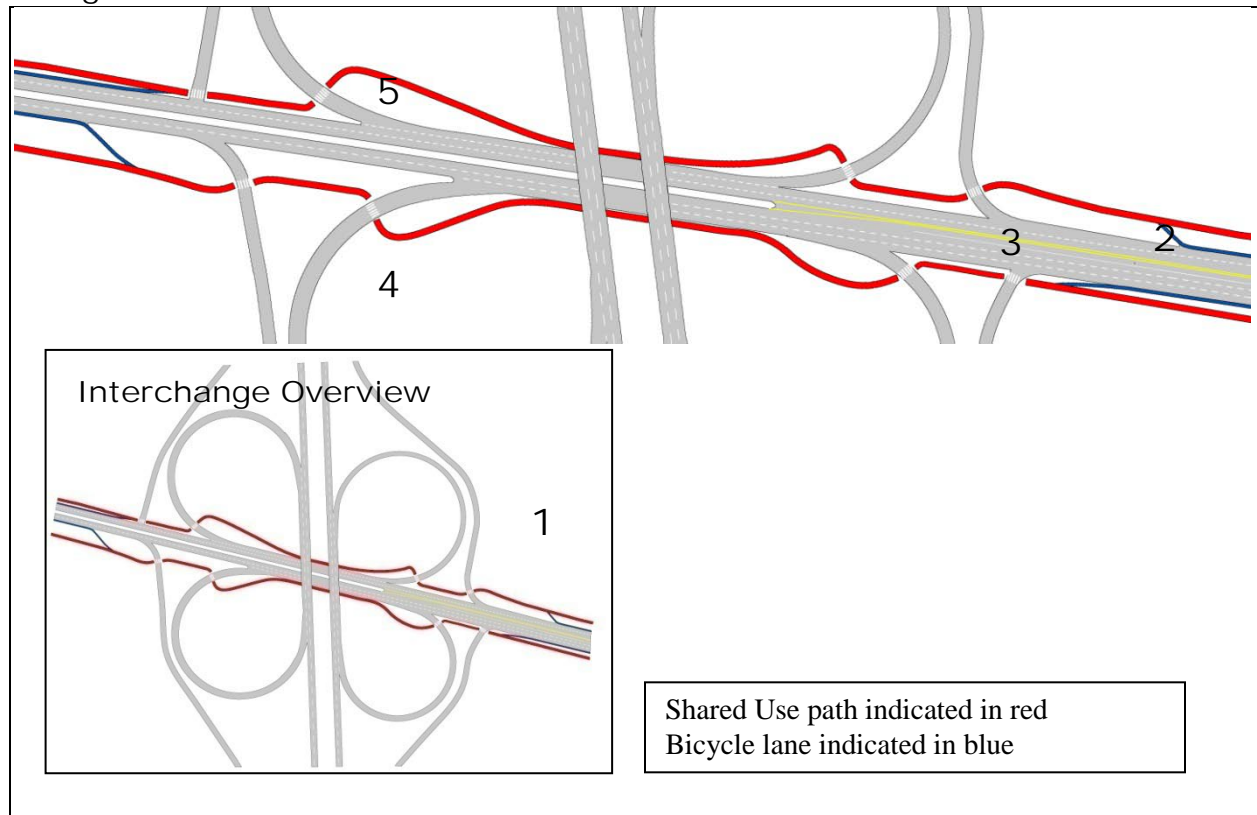
Fig. 5.7L. Urban Overpass Interchange Retro-fit Design Guidelines



Key Elements

1. Bike lanes must be on both sides of the road to allow cyclists to ride with traffic.
2. Sidewalks with barriers between the sidewalk and the roadway should be provided at the bridge. If retrofitting an existing bridge, consider cantilevering a sidewalk.
3. The through bike lane should be to the left of the right turn lane onto the approach ramp.
4. Curb radii of ramps are tightened to narrow pedestrian crossing distances and crosswalks are clearly marked.

Fig. 5.7M. Urban Free-flow Underpass Interchange Retro-fit Design Guidelines



Description

Free-flow ramps pose many dangers to bicyclists and pedestrians. Motor vehicle speeds are high and a lot of merging movements occur in different lanes. When interchanges are reconstructed, all ramps should be brought perpendicular to the roadway to reduce speeds at crosswalk locations.

Key Elements

1. A Shared-Use Path circumnavigating the interchange reduces the conflicts between non-motorized traffic and merging vehicles.
2. Approaching the intersection, bike lanes leave the roadway and merge with the sidewalk to form a Shared-Use Path.
3. On-ramp radii are tightened to slow right-turning traffic.
4. Shared- Use Path meets all roadways at right angles. The distance that pedestrians and bicyclists must cross at the ramps is minimized. Path crosses ramps in a location with good visibility, where speeds are low and where the driver is not entirely focused on merging with traffic.
5. Shared-use Path should be at least 10' wide.

Signal Timing and Turn Restrictions

The length of pedestrian signals are generally determined primarily by the motor vehicle flow with the exception of a few cases where the motor vehicle phase is lengthened to accommodate a long pedestrian clearance interval. Where there is heavy pedestrian flow, such as in the campus area, the flow of pedestrians should be given the same consideration as motor vehicles in setting signal timing.

Where intersection geometry is such that the intersection is wider than typical, motor vehicle clearances should be evaluated to make sure that the pedestrian Walk phase is not started when motor vehicles would be moving through the crosswalk. Also, the motor vehicle clearance time should be set to account for bicycle traffic.

Motorists are prohibited from blocking crosswalks by law. The City should evaluate restricting right turns where a vehicle cannot see cross street traffic without entering a crosswalk. Where there is significant pedestrian traffic in a crosswalk that conflicts with motor vehicles making right turns, the City should evaluate the feasibility of using a leading pedestrian interval of approximately 5 seconds. A leading pedestrian interval providing pedestrians with the “Walk” phase prior to motor vehicles given the green light has been shown to help prevent right turning vehicles from cutting off pedestrians trying to leave the curb.

Unsignalized Mid-block Crosswalks

The majority of pedestrian trips are ¼ mile or less, or a five to ten minute walk at a comfortable pace²³. Any small forced detour in a pedestrian's path has the potential to cause significant time delays if not shift the trip to another mode (most likely motorized). Pedestrians will seek the most direct route possible and are not willing to go far out of their way. Thus, they will often cross the road whether there are crosswalks or not. This results in the increased likelihood of pedestrians unexpectedly dashing out mid-block. This is the second most common type of pedestrian/vehicle collision after intersection related crashes.²⁴

A concern with any mid-block crosswalk is providing the pedestrian with a false sense of security. This concern must be weighed against accommodating and encouraging pedestrian travel. If we are to encourage safe and legal pedestrian travel, well designed, high visibility mid-block crosswalks should be provided at appropriate locations. The use of a sign oriented toward pedestrians that states "Cross Road When Traffic Clears" has been used in other communities to underscore the pedestrian's responsibilities at unsignalized crosswalks.

Understanding pedestrian routes and common pedestrian destinations will guide the placement of mid-block crosswalks at needed locations. According to AASHTO's *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, there are numerous attributes to consider when determining whether placement of a mid-block crosswalk is appropriate. These include:

- The location is already a source of a substantial number of mid-block crossings.
- A new development is anticipated to generate mid-block crossings.
- The land use is such that pedestrians are highly unlikely to cross the street at the next intersection.
- The safety and capacity of adjacent intersections or large turning volumes create a situation where it is difficult to cross the street at the intersection.
- Spacing between adjacent intersections exceeds 200 m (660 ft or an 1/8 of a mile).
- The vehicular capacity of the roadway may not be substantially reduced by the midblock crossing.
- Adequate sight distance is available for both pedestrians and motorists.

The 2009 MUTCD revised guidance for provision of marked crosswalks states:

New marked crosswalks alone, without other measures designed to reduce traffic speeds, shorten crossing distances, enhance driver awareness of the crossing, and/or provide active warning of pedestrian presence, should not be installed across uncontrolled roadways where the speed limit exceeds 40 mph and either:

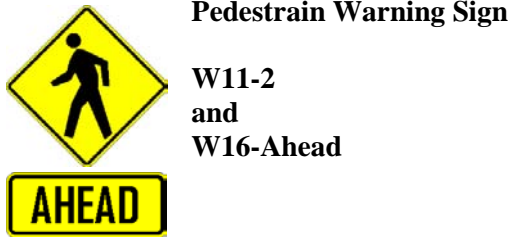
- A. *The roadway has four or more lanes of travel without a raised median or pedestrian refuge island and an ADT of 12,000 vehicles per day or greater; or*
- B. *The roadway has four or more lanes of travel with a raised median or pedestrian refuge island and an ADT of 15,000 vehicles per day or greater*

²³ AASHTO. *Guide for the Planning, Design, and Operation of Pedestrian Facilities*. July 2004.

²⁴ FHWA, *Pedestrian and Bicycle Crash Types of the Early 1990's*, Publication No. FHWA-RD-95-163, June 1996

Unsignalized Marked Mid-block Crosswalk Signage

Fig. 5.7N. Crosswalk Signage



The current version of the Michigan Manual of Uniform Traffic Control Devices illustrates numerous ways to sign a crosswalk. When an advanced warning sign is desired, the W11-2 and W16-Ahead should be used. At the crosswalk itself there are a number of options. One option is to use a W11-2 (pedestrian warning sign) with a W16-7P (arrow pointing at the crosswalk). Another option uses one of the new Yield Here to Pedestrian Signs either the R1-5 (shown) or the R1-5a (where the word pedestrian is used rather than the icon). It is recommended in most cases to use the R1-5 in conjunction with a yield line consisting of a row of isosceles triangle pavement markings across approach lanes and pointed towards approaching vehicles. This helps to get vehicles to yield to pedestrians at a safe distance back from the crosswalk.

Fig. 5.7O. In-Road Signs



R1-6

Many communities use Yield to Pedestrian signs placed within the crosswalk that alert motorists of pedestrian crossings and calm traffic in the vicinity of the crosswalk. These in-street crossing signs cannot be used at signalized locations. If the In-Street Pedestrian Crossing sign is placed in the roadway, the sign should comply with the breakaway requirements of AASHTO’s guidelines. The in-street sign may be used seasonally to prevent damage in winter from plowing operations.



In-Road Removable Yield to Pedestrian signs may be used temporarily as part of an education and/or enforcement program in a targeted area or on a semi-permanent basis for critical crosswalks.

Fig. 5.7P. Yellow vs. Fluorescent Green Signs



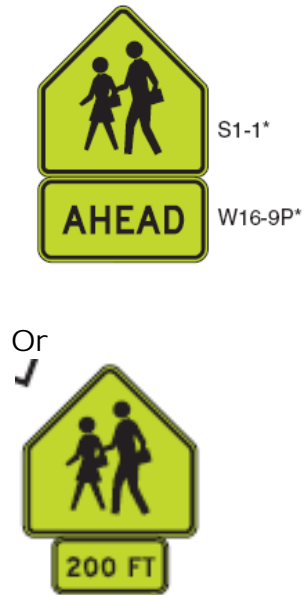
W11-2



The 2009 MUTCD requires fluorescent yellow-green colored signs be used for school and school bus signs. MDOT has until the end of 2011 to adopt these changes. Fluorescent yellow-green colored signs are optional for pedestrian, bike and playground signs, however, if they should be used consistently throughout the city.

Fig. 5.7Q. School Crossing Sign Options

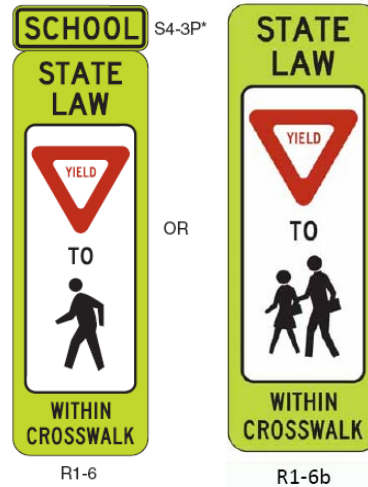
Advanced Warning



Crosswalk Warning



In-Street Pedestrian Crossing Sign Alternative to Crosswalk Warning Sign



The use of the STATE LAW legend is optional on the R1-6 series signs

Overhead Pedestrian Crossing Signs



The Overhead Pedestrian Crossing (R1-9 or R1-9a) may be modified to replace the standard pedestrian with schoolchildren symbols and may be used at unsignalized school crossings. The STATE LAW legend may be omitted on the R1-9 signs.

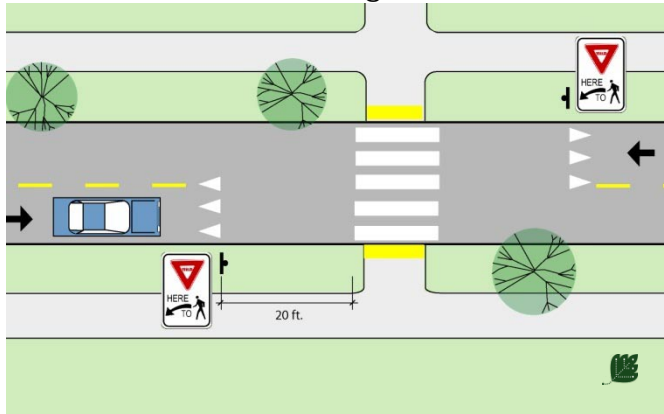
The School Crossing signs are intended to be placed at established crossings that are used by students going to and from school. However, if the crossing is controlled by stop signs, S1-1 should be omitted at the crosswalk location. Only crossings adjacent to schools or on designated routes to school should be signed with S1-1.

The In-street Pedestrian Crossing (R1-b or R1-6a) sign may be used at unsignalized school crossings. If used at a school crossing a SCHOOL (S4-3P) sign may be mounted above the sign.

The signs in Fig. 5.4Q are required in the 2009 MUTCD. MDOT has until the end of 2011 to adopt these changes.

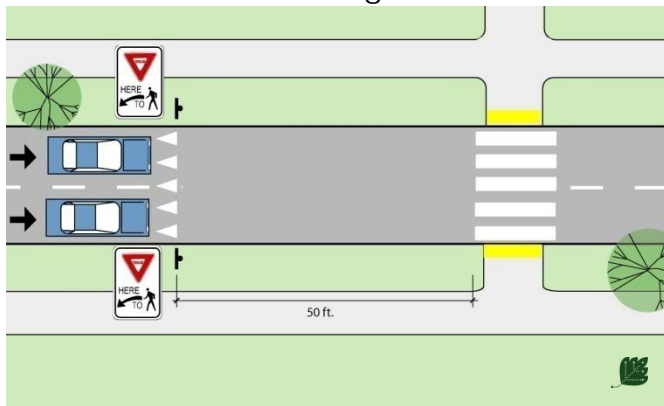
.Fig. 5.7R. Crosswalk Sign and Yield Line Placement

“Yield to Pedestrian Sign” on a One or Two-Lane Road



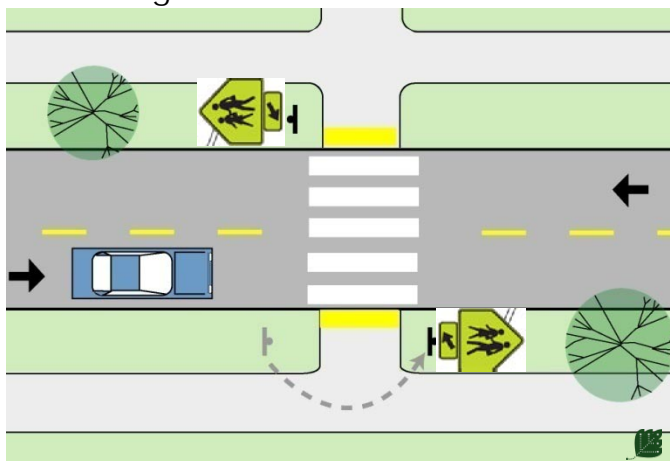
“Yield Here to Pedestrians” signs and yield line pavement markings should be placed a minimum of 20 ft. in advance of a crosswalk to encourage drivers to stop a greater distance from the crosswalk.

“Yield to Pedestrian Sign” on a Multi-Lane Road



“Yield Here to Pedestrians” signs and yield line pavement markings should be placed further in advance of a crosswalk on multi-lane roads to minimize the risk of a multiple-threat crash (see illustration in this section) and provide improved visibility for motorists in adjacent lanes.

School Sign Placement



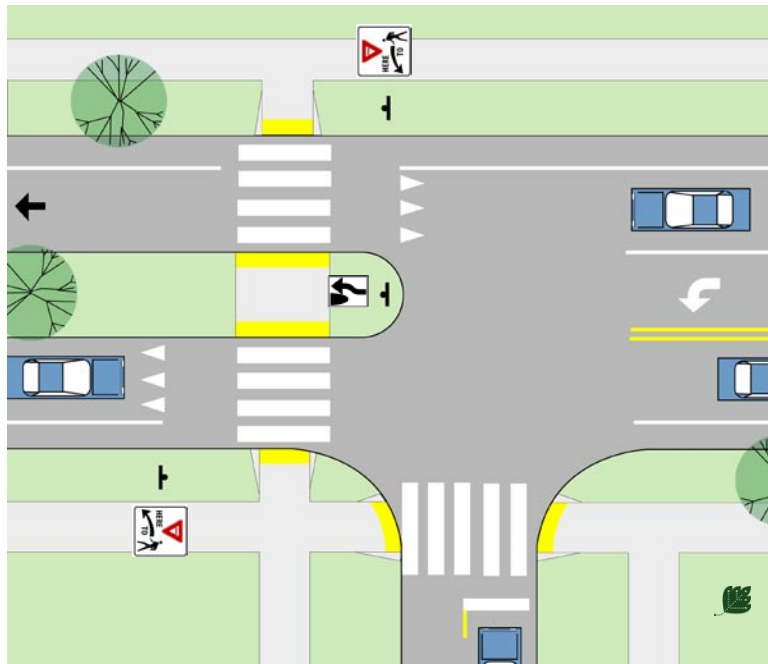
“Yield Here to Pedestrians” signs should be placed on either side of the road to ensure visibility for motorists in both lanes.

School Crossing Signs should be placed behind the crosswalk to improve visibility of crossing pedestrians rather than in front of the crosswalk where the large signs may obstruct motorists’ views.

Selected Placement of Crosswalks at Tee Intersections Design Guidelines

On some roads it may be desirable to mark only one of the crosswalks at a Tee intersection in order to channel pedestrians to a safer crossing point and to maximize the effectiveness of the crosswalk by not overusing high visibility crosswalks.

Fig. 5.7S. Unsignalized Tee Intersection with Turn Lane Guidelines



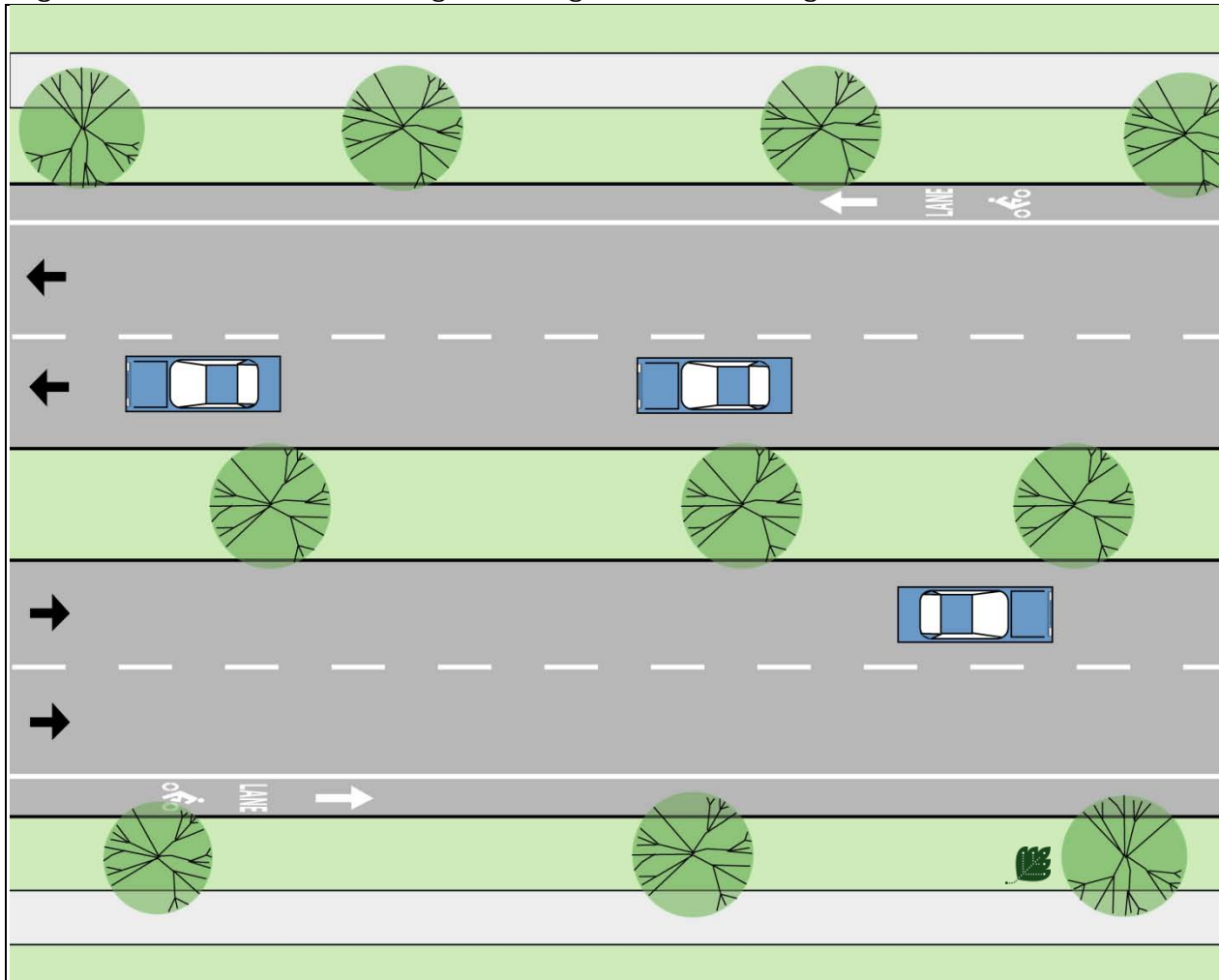
Description

At unsignalized Tee intersections with center turn lanes, the marked crosswalk is located to the left of the intersecting street and the turn lane is converted to a pedestrian crossing island. The crossing island should be located such that it requires left turns from the intersecting street to have a fairly tight turning radius, therefore reducing their travel speed.

Curb ramps should be provided at all legal crosswalks, regardless of whether the crosswalk is marked. Driveways should be prohibited in the vicinity of the intersection.

The treatment shown should be used in conjunction with advance warning signs (not shown).

Fig. 5.7T. Informal Crossing Utilizing Medians Design Guidelines



Description

Raised medians may somewhat accommodate dispersed informal crossings by able-bodied adults during periods of no or low snowfall.

Key Elements

A median with plantings that permits traversing by foot and allows good visibility between the driver and the pedestrian.

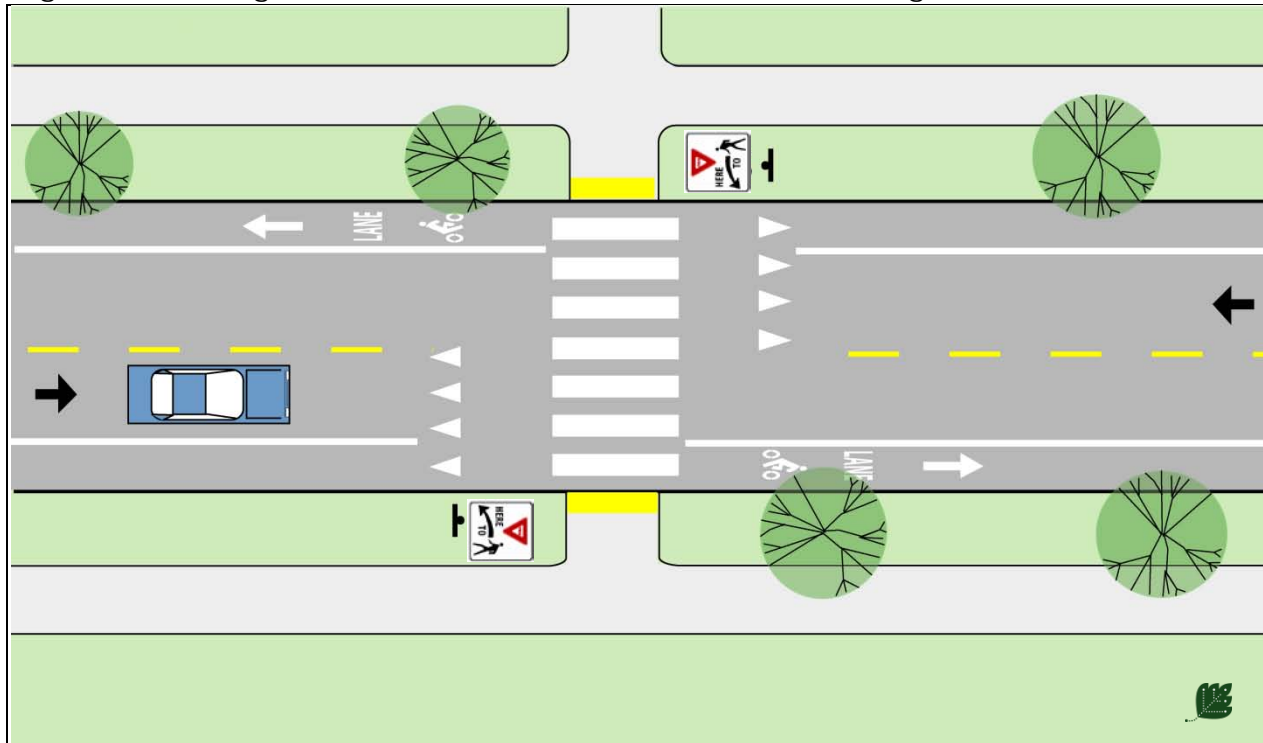
Applications

On roads of four or more lanes where dispersed crossings are anticipated, where center left-turn lanes are unused, where minimum pavement is desired, and where traffic calming is desired. They may be used where a marked crosswalk is being considered as a Near-term Opportunities measure.

Example



Fig. 5.7U. Unsignalized Basic Mid-block Crosswalk Design Guidelines



Description

A mid-block crosswalk for a two-lane road at an unsignalized location without parking. The treatments shown should be used in conjunction with advance warning signs (not shown).

Key Elements:

- The yield markings are set back from the ladder crosswalk to minimize the potential for a multiple threat crash.
- Where crossing signs other than the R1-5/ R1-5a “Yield Here to Pedestrians” are used, yield lines should be omitted.
- Sightlines are kept clear of vegetation.
- A 2’ wide detectable warning strip is used at the base of the ramps.

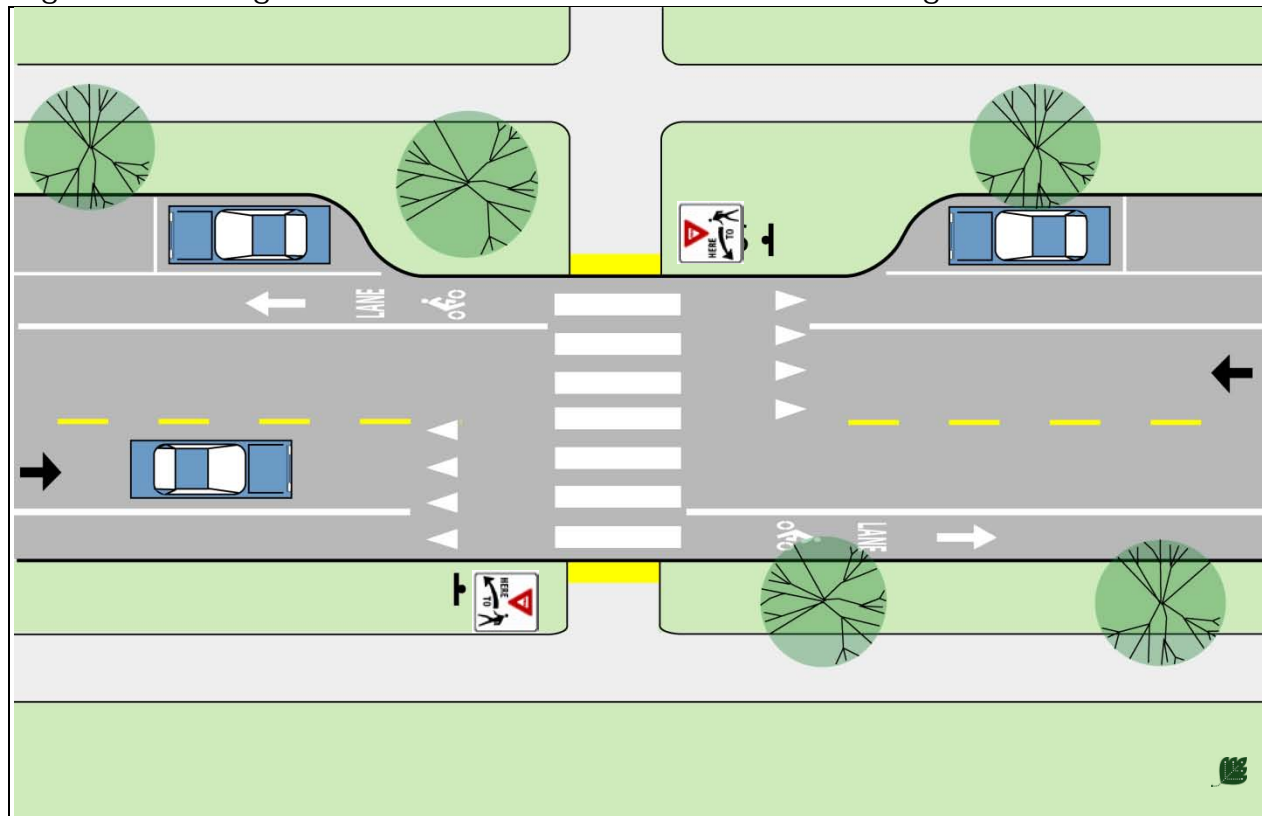
Applications

Generally used on relatively low volume, low speed roads where sufficient gaps in the motorized traffic exist. This crosswalk design should not be used in any situations where there are greater than two travel lanes or when there is on street parking.

Example



Fig. 5.7V. Unsignalized Mid-block Crosswalk With Parking Guidelines



Description

A mid-block crosswalk for a two-lane road at an unsignalized location with parking. The treatments shown should be used in conjunction with advance warning signs (not shown).

Key Elements:

- See elements listed under Unsignalized Basic Mid-block Crosswalk.
- A bulb-out extends the pedestrian ramp into the sightlines of oncoming vehicles, reducing the potential for a “dart-out” type crash.

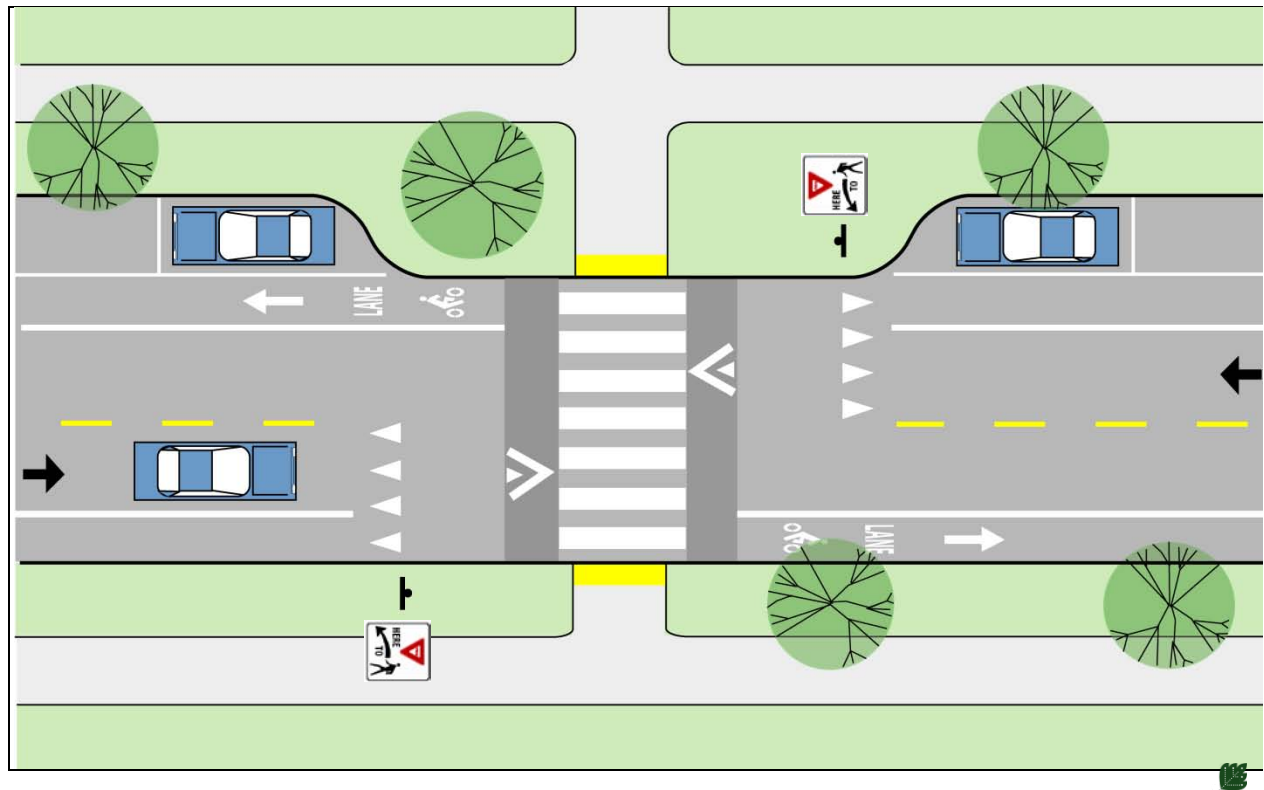
Applications

Generally used on relatively low volume, low speed roads where sufficient gaps in the motorized traffic exist. This crosswalk design should not be used in any situations where there are greater than two travel lanes.

Example



Fig. 5.7W. Unsignalized Speed Table Mid-block Crosswalk Design Guidelines



Description

A mid-block crosswalk for a two-lane road at an unsignalized location with parking. The treatments shown should be used in conjunction with advance warning signs (not shown).

Applications

Generally used on relatively low volume, low speed roads where sufficient gaps in the motorized traffic exist. This crosswalk design should be used in areas where traffic speeds typically exceed posted speeds. May only be used as a part of a traffic calming program.

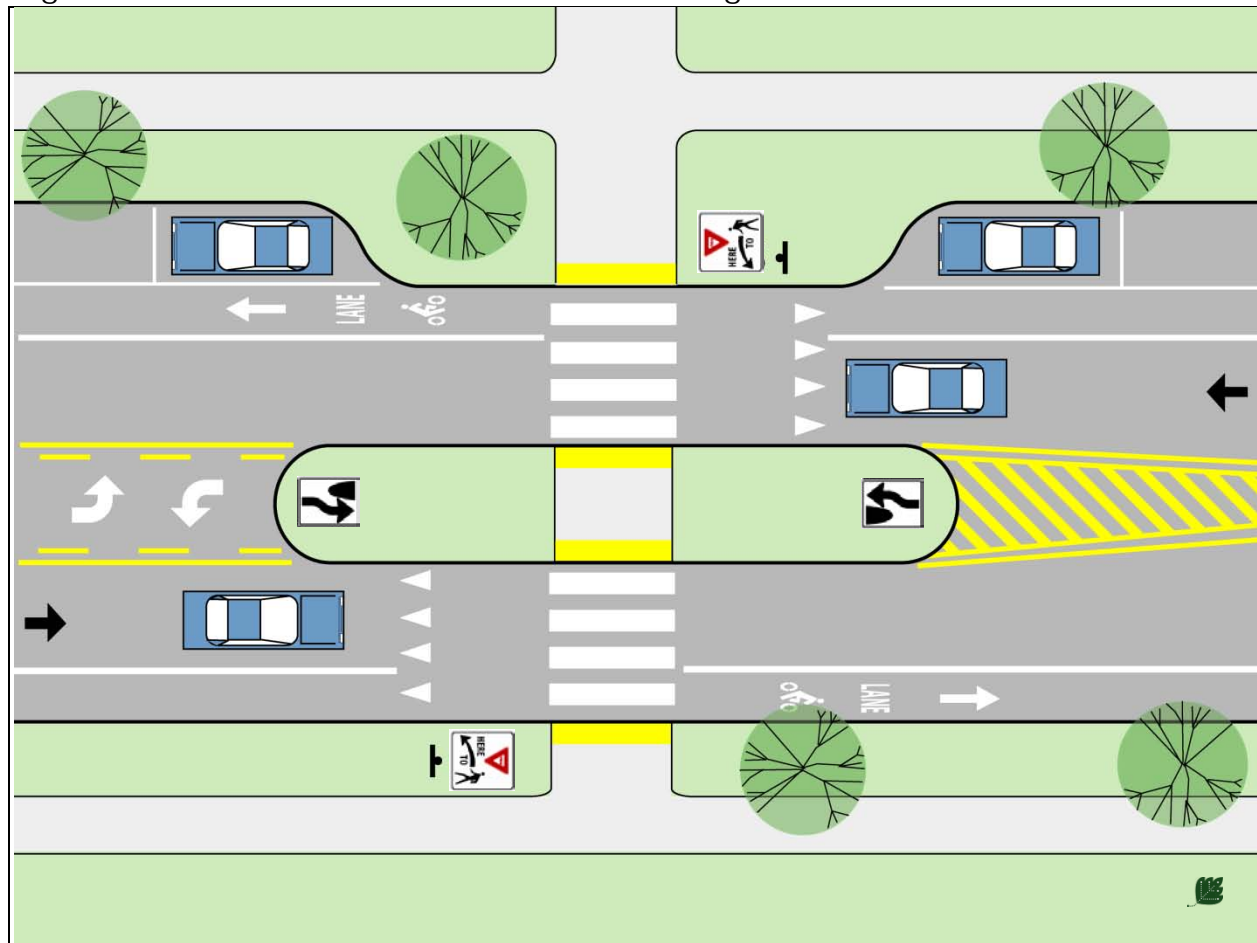
Key Elements:

- See elements listed under Unsignalized Basic Mid-block Crosswalk and Unsignalized Mid-block Crosswalk with Parking.
- A speed table with 6’ long approach ramps and a 4” high table is placed under the crosswalk to bring travel speeds to approximately 25 MPH.
- When retrofitting existing roadways, maintaining drainage along the curb may present challenges in meeting ADA ramp requirements.

Example



Fig. 5.7X. Mid-block Crosswalk with Crossing island Guidelines



Description

A mid-block crosswalk for a two-lane or three-lane road at an unsignalized location with or without parking. The treatments shown should be used in conjunction with advance warning signs (not shown).

Applications

Generally used on a higher volume and higher speed road where suitable gaps to cross both directions of traffic in one movement are infrequent.

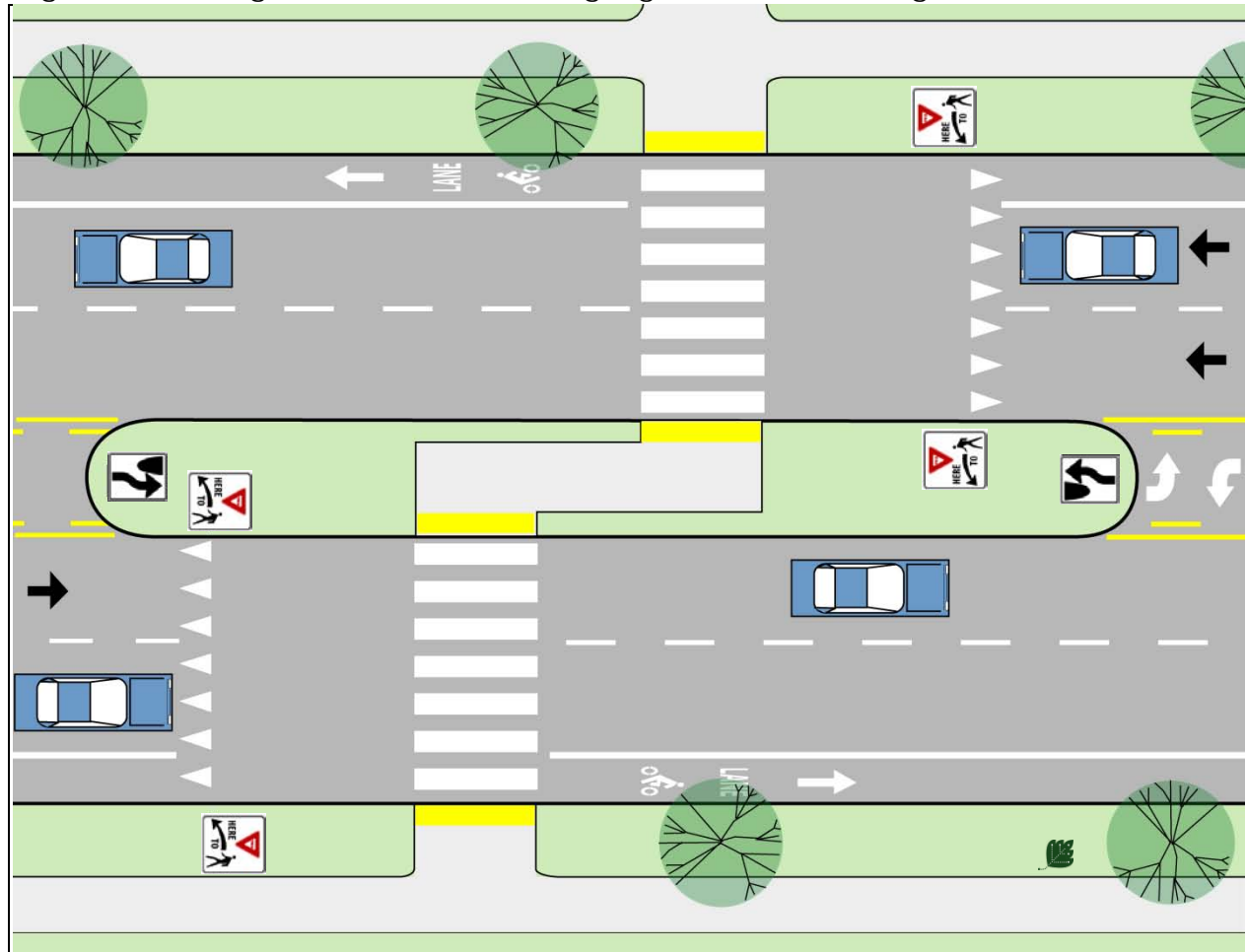
Key Elements:

- See elements listed under Unsignalized Basic Mid-block Crosswalk and Unsignalized Mid-block Crosswalk with Parking.
- A crossing island is provided to break the crossing into two separate legs. The island has a minimum width of 6’ with 11’ or wider preferred.
- Planting on crossing islands should be kept low so as not to obstruct visibility.

Example



Fig. 5.7Y. Unsignalized Mid-block Zigzag Crosswalk Design Guidelines



Description

A mid-block crosswalk for a four or more lane road at an unsignalized location without parking.

Key Elements:

- See elements listed under Unsignalized Basic Mid-block Crosswalk and Unsignalized Mid-block Crosswalk with Crossing island.
- The crosswalks are staggered to direct the pedestrian view towards oncoming traffic.
- Yield markings are set further back to improve pedestrian visibility from both lanes and minimize multiple-threat crashes.
- Median signs are placed higher than typical so as not to impede sightlines.

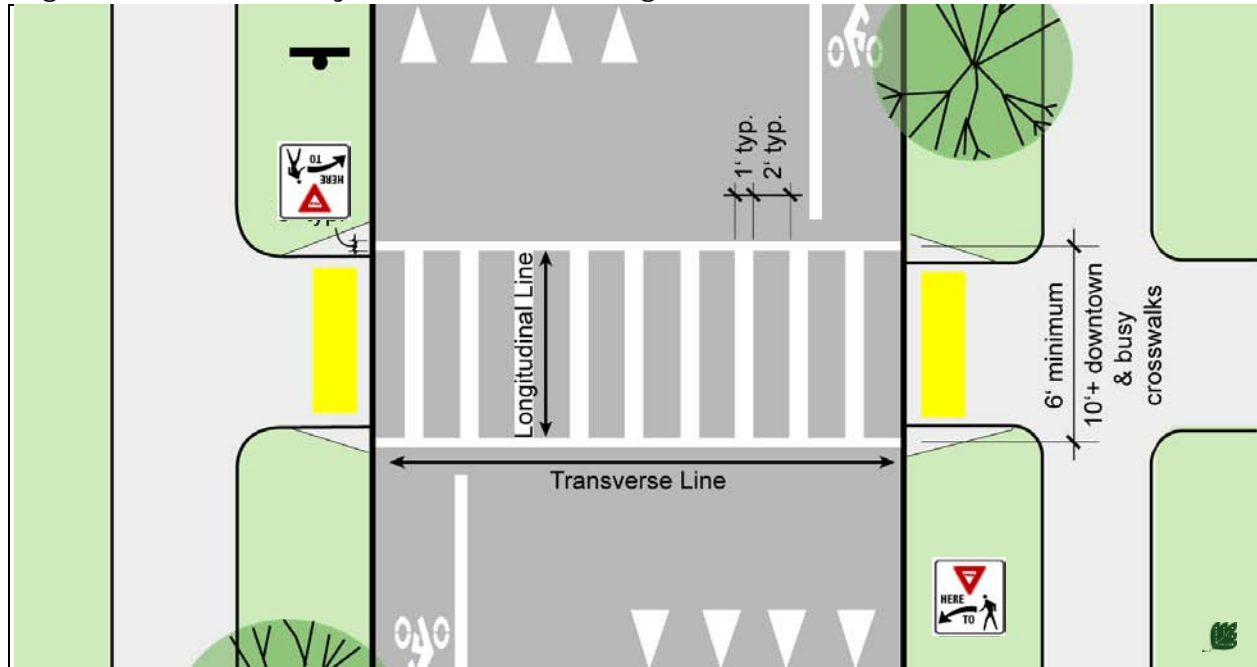
Application

Generally used on high volume / high-speed multi-lane roads.

Example



Fig. 5.7Z. Ladder Style Crosswalk Design Guidelines



Description

A combination of Transverse and Longitudinal style crosswalks to improve visibility for motorists and usability for pedestrians with sight impairments.

Key Elements:

- All crosswalk markings are highly skid-resistant and strongly contrast pavement.
- Longitudinal lines are no more than 1’ wide to minimize areas of thermoplastic markings.
- The clear spacing between the longitudinal lines is no more than 2’ to improve the visibility of the crosswalk to motorists.
- Transverse lines are used to aid pedestrians with sight impairments in finding the edge of the crosswalks (this can be difficult with longitudinal lines alone, especially when spaced far apart).
- The width of the crosswalk is set such that it can easily accommodate all pedestrians crossing the road.

Application

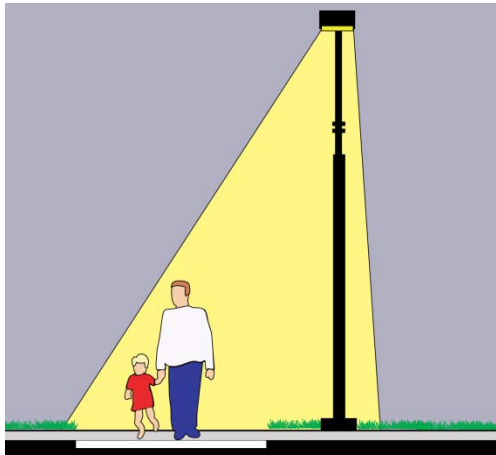
For all marked mid-block crosswalks across Arterial and Collector streets and signalized crosswalks downtown. Also, on local streets where there is a high potential for conflict between motorists and pedestrians such as crosswalks that serve schools. Locations where pedestrian crossing is sporadic require high visibility as the motorist’s expectation for the presence of pedestrians is low.

Example



Lighting of Crosswalks

Lighting is a key element for a pedestrian's safety and comfort. It is most important to provide lighting where a pedestrian crosses a roadway to make the pedestrian visible to motorists. All marked crosswalks, including intersections and midblock crossings, should be well lit with overhead lighting. The lighting should be such that it illuminates the side of the pedestrian facing traffic. Lighting along sidewalks and roadside pathways increases the comfort level for pedestrians at night and in the early morning, especially for school age children. However, the cost of lighting an entire pathway could be prohibitive; therefore lighting should be administered where there are safety issues first and foremost.



Marking of Crossing Islands

Crossing islands can present an obstruction in the roadway for motorists. The presence of this obstacle is key to the visibility of the crosswalk even more so than the signage or pavement markings and flush crossing islands have not been shown to have the same safety benefits as raised crossing islands. When the crosswalk is located in a left-turn lane it is located outside of the typically traveled roadway and is a minimum obstruction. When the road flairs around a crossing island it is more of an obstruction for a motorist. To draw attention to the obstruction, typical pavement markings as called for in MUTCD should be utilized. In addition, reflective material may be added to the sign posts, and reflective flexible bollards may be placed on the ends of the islands to increase the island's visibility at night and during inclement weather.

Subdivision Entrances

Subdivision entrances pose many challenges for bicyclists and pedestrians using the roadside pathways and sidewalks as well as trying to cross the primary road. In most cases when a local roadway intersects with an arterial or collector road, by-pass /de-acceleration lanes are added to the road turning a two lane road into a four lane road right at the point where most non-motorized traffic want to cross the road. Not only does this make crossing the road twice as long, at many of the entrances there are signs and landscaping that block visibility creating safety hazards for bicycles and pedestrians. Minimizing the number of lanes that a pedestrian has to cross, pulling vegetation and signs back to improve visibility and providing refuge islands at road crossings are ways to mitigate some of the safety concerns.

The City of Novi has the potential to implement many subdivision intersection improvements which could greatly improve the quality and safety of the road corridor for bicyclists and pedestrians. As it will take many years to construct a complete bike lane system, bicycles will continue using the roadside pathways for many years and thus it is imperative that a safe intersection be constructed.

Fig. 5.7AA. Existing Subdivision Example

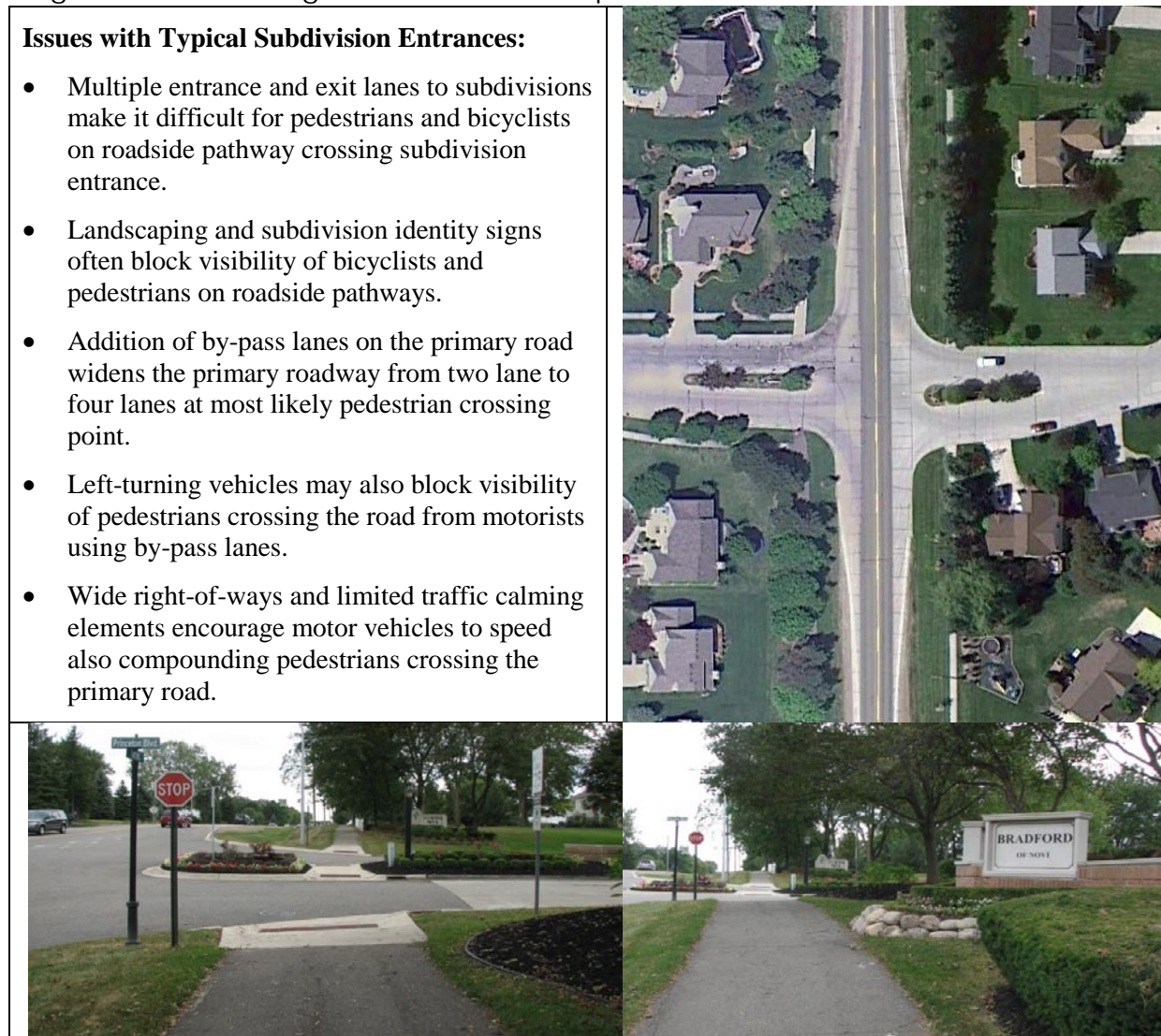
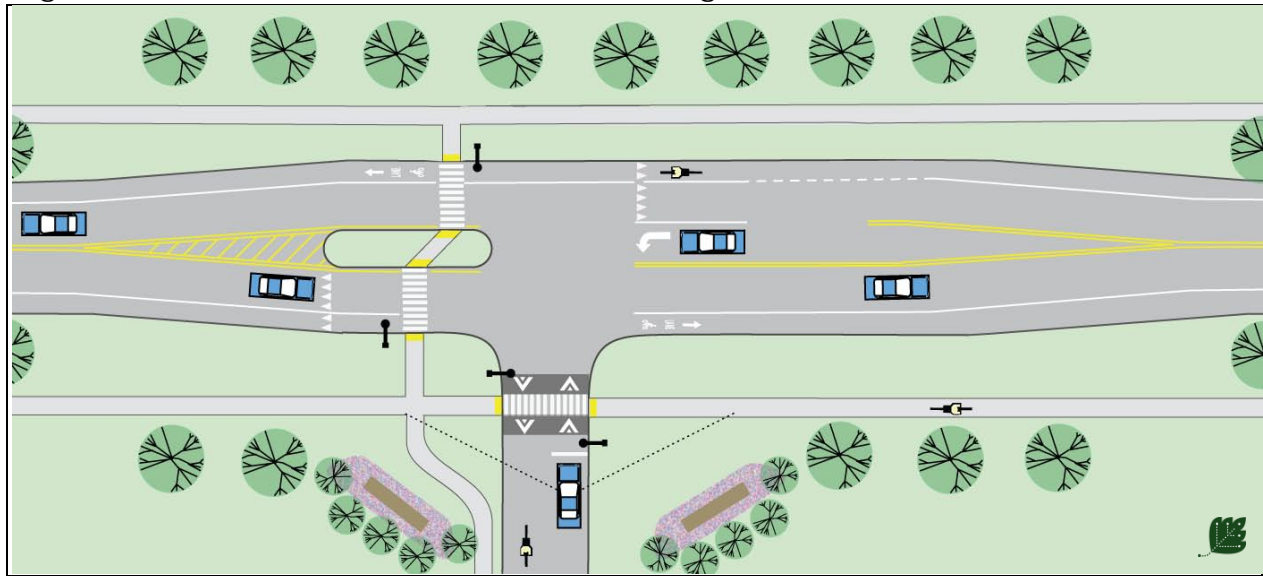


Fig. 5.47B. Subdivision T-Intersection Design Guidelines



Description

This type of intersection treatment is used to provide a pedestrian crossing where a subdivision intersects with a major.

Key Elements:

- Restrict subdivision entrance and exit lanes to one 11' wide lane in each directions
- Where visibility is restricted, provide speed table crosswalks on subdivision entrances
- Construct sidewalk and pathway ramps such that they provide a smooth transition for bicyclists
- Provide lighting at crosswalks that illuminates the side of the pedestrian or bicyclist facing on-coming traffic

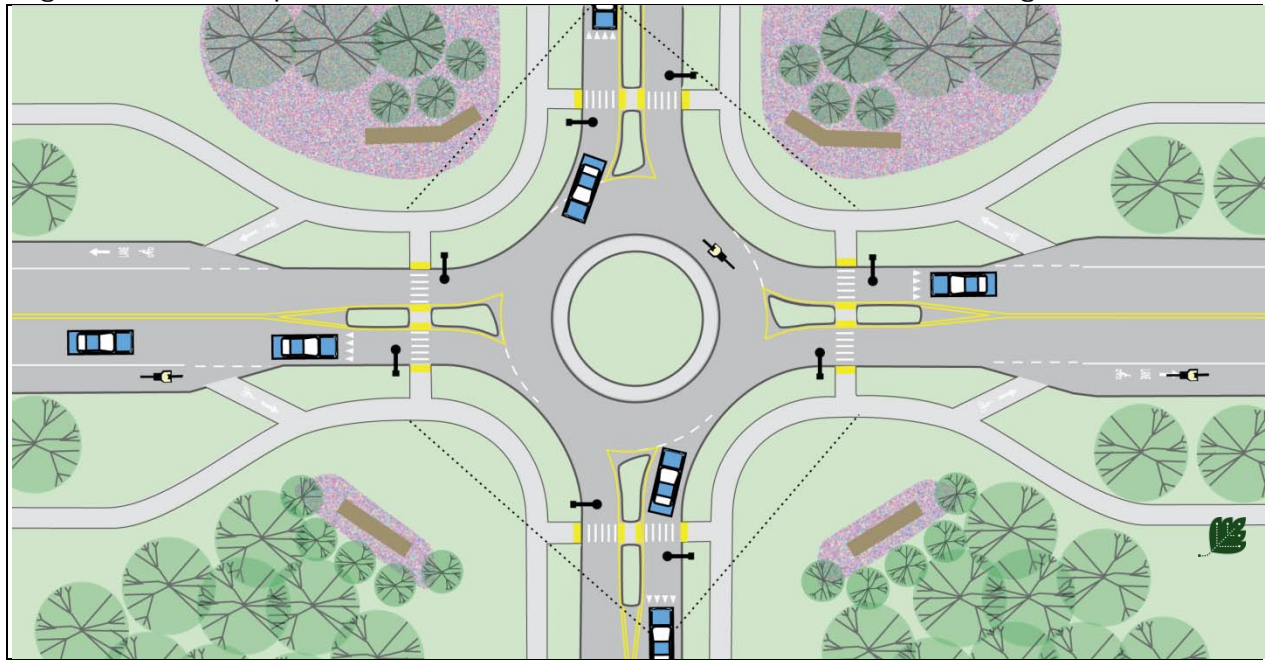
Applications

Where a local road or subdivision entrance intersect with a collector or arterial road.

Example



Fig. 5.7AC. Compact Roundabout at Subdivision Entrance Design Guidelines



Description

A compact roundabout is used to provide pedestrian crossings between two subdivisions as well as provide traffic calming on long-stretches of roadways between signals.

Key Elements:

- Provide vegetated buffer between sidewalk and circular.
- Restrict entrance and exit lanes to one 11’ wide lane
- Set back crosswalk one car length from circular
- Construct sidewalk and pathway ramps such that they provide a smooth transition for bicyclists
- Provide lighting at crosswalks that illuminates the side of the pedestrian or bicyclist facing on-coming traffic

Applications

Where two subdivision entrances intersect with arterial and collector roads on opposite side and there are significant turning movements from the subdivision entrance. Generally implemented as a four to three lane conversion, in instances such as Fig.5.4AA.

Example



Roundabouts

In many situations, roundabouts have several advantages over typical intersection design: vehicles move at slower speeds, traffic flows more smoothly, and reduced pavement enhances aesthetics and offers the opportunity for landscaping in the central and splitter islands. There are however, serious drawbacks to roundabouts for those with vision impairments, and two-lane roundabouts are problematic for bicycles in particular. Roundabouts, especially larger ones, can present significant out-of-direction travel for pedestrians. Depending on the nature of the surrounding land uses and the design of the roundabouts, pedestrians may attempt to walk directly across the center of the roundabout.

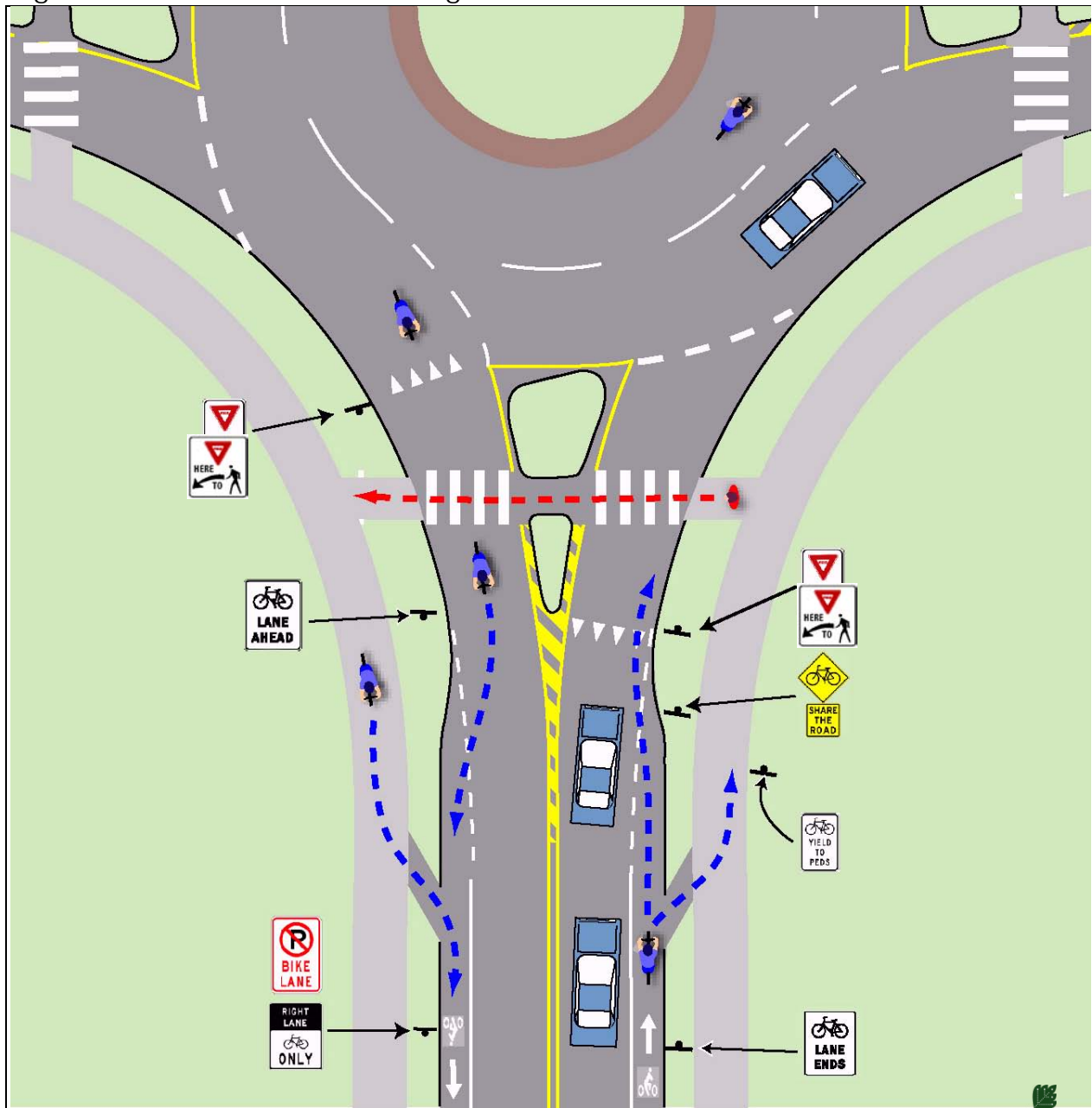
Because there are no traffic control signals to provide a pedestrian “walk” signal, pedestrians wait for an appropriate gap in traffic and cross. The splitter or diversion islands provide a crossing island for the pedestrian, breaking the road crossing into two stages so that they are only dealing with one direction of traffic at a time. This system works quite well for pedestrians without vision difficulties. Studies have shown a reduction in pedestrian crashes for single lane roundabouts and about the same number for multiple lane roundabouts as compared to a traditional signalized intersection. Pedestrians with vision impairments often find roundabouts very intimidating as the audible queues are sometimes insufficient to judge a suitable gap in traffic. Research is currently underway to determine the most appropriate way to accommodate blind and vision impaired pedestrians in roundabouts.

Multi-lane roundabouts are especially problematic for bicyclists. Studies have shown that while single lane roundabouts have about the same number of bicycle crashes when compared to traditional signalized intersections, multi-lane roundabouts have significantly more. Because of this, design guidelines recommend allowing bicyclists who are traveling in the roadway approaching the roundabout to exit the roadway prior to the roundabout and navigate the roundabout as a pedestrian would. More confident bicyclists may remain in the roadway and merge with the motor vehicles. Bike lanes should not be placed within the roundabout itself because a bicyclist close to the edge of the roadway is not the usual position where an entering motorist expects to look for circulating traffic.

Design Guidelines:

- Roundabout approaches should include bicycle entrance and exit ramps to give bicyclists the option of biking on a sidewalk bikeway as well as the roadway.
- Roundabouts should include pedestrian crossing islands on all entering roadways.
- The use of roundabouts should be accompanied by an education campaign regarding the issues with blind pedestrians and a motorist responsibly when they see a pedestrian using a white cane.
- The bicycle and pedestrian safety issues should be carefully evaluated for any multiple lane roundabouts.
- The latest research on accommodating blind and vision impaired pedestrians in roundabouts should be consulted before designing and constructing a roundabout.
- Bicycle and pedestrian pavement markings and signs should be regularly evaluated for every roundabout.

Fig. 5.7AD. Non-motorized Design Considerations for Roundabouts



5.8 Neighborhood Connectors

The local roadways that serve residential and mixed use areas are critical to the success of the City's non-motorized system. Local roads that serve neighborhoods are typically attractive non-motorized links due to the lower vehicle volumes and speeds.

Bicycle Travel in Neighborhoods

Bicycles typically do not need any special accommodations on local residential streets as they can comfortably share the road with the limited motor vehicle traffic. Some local residential streets, by themselves or in combination with off-road paths, provide excellent and attractive alternatives to the primary road system. In some cases, it may be desirable to sign bicycle routes that provide access to destinations such as schools and parks where the route may not be obvious to a cyclist unfamiliar with the area. See Section 5.6 Bike Route Signs and Wayfinding for more information.

Public vs. Private Roads

It is just as important to provide safe and comfortable pedestrian facilities on private streets as on public streets. Regardless of ownership, neighborhood roads should include concrete sidewalks a minimum of 5' wide and compliant with ADA standards, on both sides of the street with a landscaped buffer between the sidewalk and the road.

An issue with private roads is the perception that they may not be open for use by the general public. For this reason public roads should always be the preference for new developments. In crafting development agreements that incorporate private roads it should be clear that the roads are open to all pedestrians and bicyclists and that there should be no signage or physical structures that imply that non-motorized access is limited to the residents of that neighborhood.

Both public and private neighborhood streets should be designed to incorporate the same pedestrian safety enhancing measures as those previously noted for primary public roadways. These include reduced curb radii, narrower street widths, curb extensions, and traffic calming measures such as speed tables.

Connectivity Between Neighborhoods and to the Primary Road System

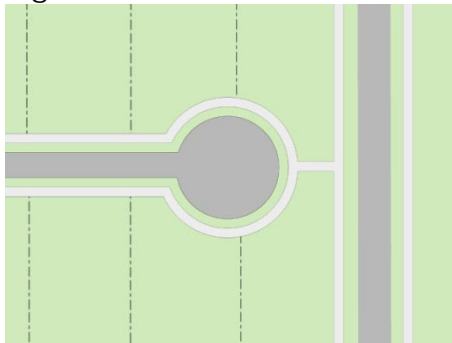
If a new development has limited road access to surrounding arterial streets, special access points for pedestrians and bikes should be incorporated between property lines or along utility rights-of-way. Non-motorized connectivity between adjacent residential, commercial and institutional developments should be provided. The City can regulate the form and shape of new neighborhoods to support and promote pedestrian and bike mobility by modifying master plans and development standards. Careful site design encourages walking by making non-motorized travel more direct than motorized transportation modes.

Neighborhood Roadways Design

Public and private street standards should clearly require sidewalks on both sides of the street, subject to City review. Neighborhood streets should have the following amenities to encourage pedestrian and bicycle access in neighborhoods:

- Design the road to slow vehicular speeds.
- Small block sizes.
- Interconnected streets.
- Sidewalks on both sides of the streets.
- Landscaped buffer between the street and the sidewalk with street trees that will provide shade.
- Connections to adjoining neighborhoods.
- Direct walkway connections between residential areas and commercial and institutional areas when not afforded by the street system

Fig. 5.8A. Cul-de-sac connector



Grid patterned streets with sidewalks and small block sizes are preferred for pedestrian use. They allow pedestrians to have multiple options in route choices and follow the most direct route possible. It is desirable for street networks and pedestrian facilities to correspond wherever possible. However, even if grid streets are not desired or feasible, pedestrian and bike links should still be provided even where the road does not connect. If cul-de-sacs and dead end streets are used, pedestrian and bike cut-throughs meeting AASHTO guidelines should be created to link to adjacent streets (Figure 5.5A).

Neighborhood Connector Routes

Introduced in Section 3 Proposed Facilities, neighborhood connector routes can be as simple as implementing signage or they can provide the opportunity to change the complete character of the street. Generally, neighborhood connector routes begin as guided routes and as their popularity grows and opportunities arise they can be developed to incorporate additional amenities, such as traffic calming measures, rain gardens and public art. Figure 5.5B illustrates the different types of elements that can be developed into a neighborhood connector route.

Fig. 5.8B. Neighborhood Connectors Overview

GUIDED ROUTES:		
 Lakeshore Park 3.5 →	<ul style="list-style-type: none"> • Located primarily on low speed, low traffic volume local roads and connecting pathways • Signs provide wayfinding by noting direction and distance to key destination such as schools, parks and the downtown • Identify routes that may not be obvious to someone who is unfamiliar to the area • Along the route signs are used periodically to reassure users they are still along the route 	
 Novi Town Center 1.5 →		
<p>At each decision point signs, about the size of a typical street sign, indicate the route direction, destination and distance</p>		
NAMED ROUTES:		
	<ul style="list-style-type: none"> • Incorporates the elements of the Guided Routes • Provides trail system branding and specific route identification • Are helpful in providing consistency where a long-distance route is comprised of a number of different facility types • Generally used on routes that provide key connections between major destinations – something worthy of a name or number 	
BICYCLE AND PEDESTRIAN BOULEVARDS:		
 	<ul style="list-style-type: none"> • Generally Incorporates the elements in Guided Routes, and Named Routes • Route is optimized for bicycle travel while discouraging through motor vehicle traffic via tools such as motor vehicle diverter islands that are permeable to bicycles and pedestrians • Motor vehicle speeds reduced through calming measures • Stop signs and yield sign are oriented to provide 	
NEIGHBORHOOD GREENWAYS:		
	<ul style="list-style-type: none"> • Incorporates elements of the Guided Bike Routes, Named Bike Routes, and Bicycle Boulevards • Designed for pedestrian and bicycle use • Contains elements that reflect the character of the surrounding community such as natural areas, local art, community gardens and historic features. • Has sustainable design elements such as rain gardens and permeable pavement 	

5.9 Bike Route Signs and Wayfinding

Route Characteristics

Routes signed as a Bike Route should be roads that have a relatively high Quality/Level of Service for bicyclists. The route should not have any known hazards to bicyclists and should be maintained in a manner that is appropriate for bicycle use. While many local roads may meet these criteria, the key is that the road is part of a specific route to a particular place. Obvious routes need not be marked. Bike Routes should be used judiciously to identify obscure routes to key destinations that avoid travel along major roadways.

Where a bicycle route on a local road intersects a busy multi-lane primary road and continues on the other side of the road, a traffic signal or appropriately designed mid-block crossing should be provided.

Bike Routes generally do not include specific bicycle improvements such as Bike Lanes. Bike Lane pavement markings and signs already indicate that a road segment is designed to specifically accommodate bicycles. Bike Route signs are to be used where no obvious bicycle facility exists yet the route is advantageous to bicyclists. Thus road segments with Bike Lanes should generally not be marked as a Bike Route, except where the bike route uses these facilities as short connectors to continue the route.



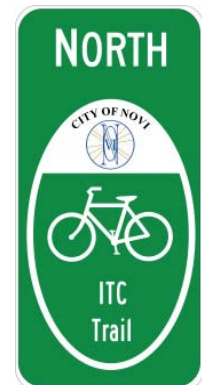
D1-1c
MUTCD 2009

Bike Route Guide Signs

The most basic bike route signs are Bike Route Guide Signs (shown to the left). These are used on designated bike routes to inform bicyclist of changes in direction and the distance to the next destination. Bike Route Guide Signs are placed at changes in direction of designated bike routes. Not every bicycle facility will necessarily be designated a bike route. Bike routes should be used where the signage would help direct a bicyclist to a key destination that may not be obvious.

Bike Route Identification Signs

Some bike routes are significant enough to warrant a name or numerical designation. Typically these are key connectors between off-road trails or used to help delineate a trail that incorporates many different facility types. Bike Route Identification Signs (shown to the right) establish a unique identification for a bike route. These signs are typically used with auxiliary plaques that indicate the direction of travel and any changes in direction of the route.



M1-8a
MUTCD 2009

5.10 Bicycle and Pedestrian Boulevards and Neighborhood Greenways

Bicycle and Pedestrian Boulevards and Neighborhood Greenways are Neighborhood Connectors that function as premium bicycle and pedestrian routes. They create an attractive, convenient and comfortable environment that is welcoming to all cyclists and pedestrians. Bicycle and Pedestrian Boulevards and Neighborhood Greenways are a great way to navigate through a city, where arterial and collector roads may be undesirable to bicyclist and pedestrians. They can also function as an extension of an off-road trail, creating a smooth transition between two trail systems.

Bicycle and Pedestrian Boulevard Design Elements

Bicycle and Pedestrian Boulevards are located on low-volume and low-speed streets that have been optimized for bicycle and pedestrian travel through special treatments that allow through movement for bicyclist and pedestrians while discouraging similar through trips by non-local motorized traffic. Bicycle and Pedestrian Boulevards can take many forms. Special treatments such as traffic calming and traffic reduction, signage and pavement markings and intersection crossing treatments all help to optimize these routes for cyclists.

The following are some example of treatments that can be used to develop a Bicycle and Pedestrian Boulevard:



Pavement Markings

Identifies this route as a Bicycle Boulevard



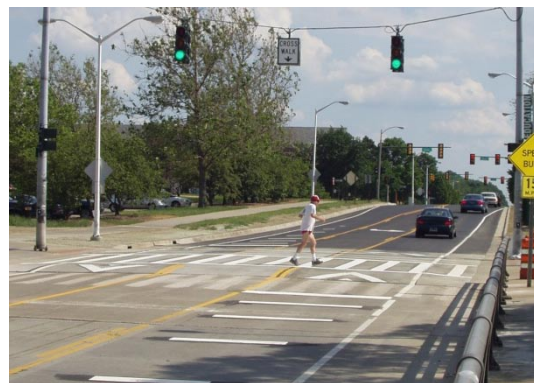
Traffic Reduction

Restricts motorized vehicles while allowing bicycle traffic



Traffic Calming

Mini Traffic Circles help reduce speed at intersection without stopping

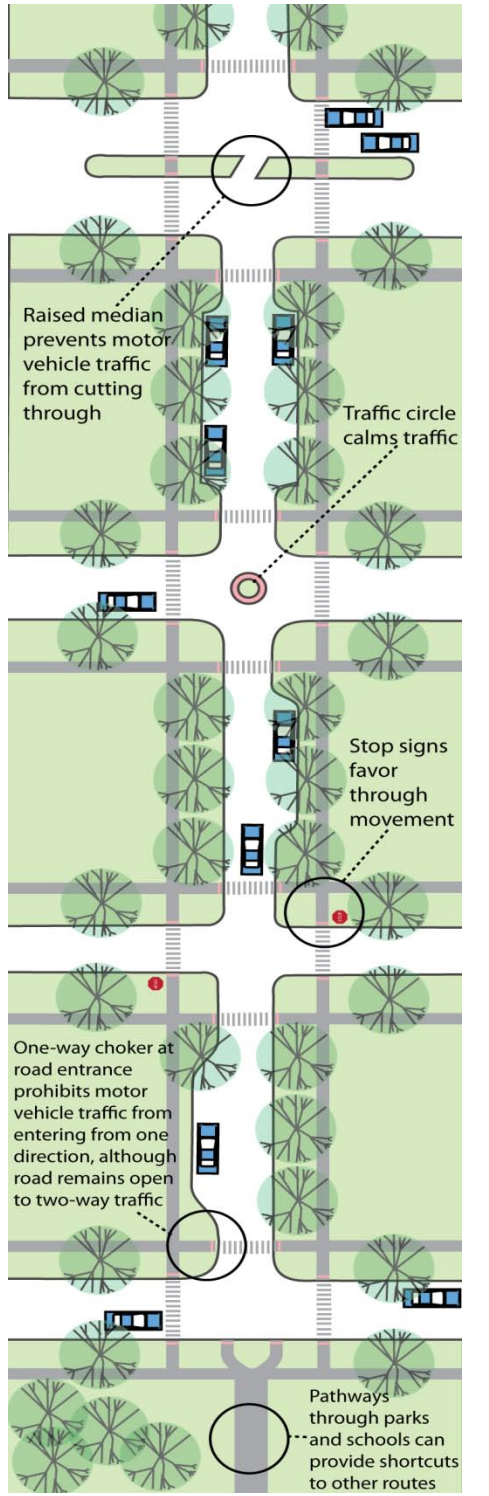


Traffic Calming

Speed Tables help to reduce speed and enhance the crosswalk

Fig. 5.10A.

Each corridor needs to be specifically tailored to its needs by selecting the appropriate mix of design elements.



Some local streets may already have traffic conditions optimal for a bicycle boulevard and may require minimal improvements to become a new bicycle boulevard.

The following are examples of these types of treatments that are already in Novi:



Non-motorized Pathway Connections through Landings Park



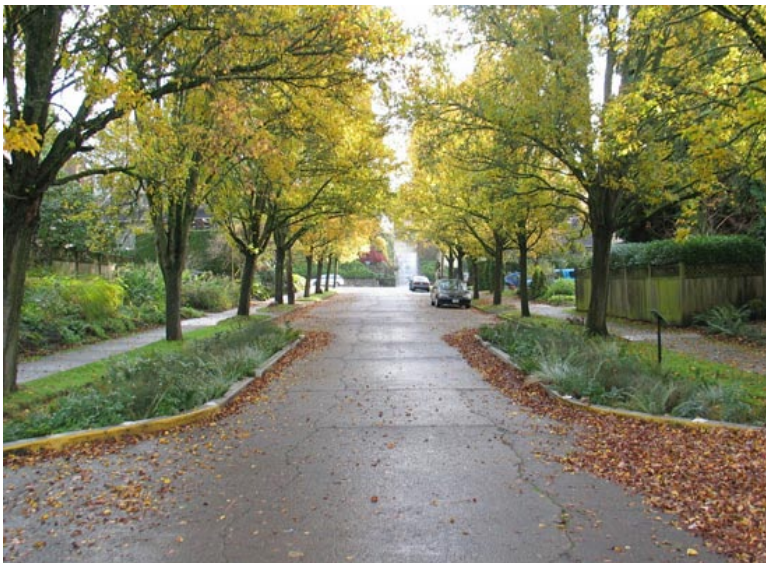
Sidewalk Extension at the end of Russet Street into Ella Mae Power Park



Raised Median at Glenwood Dr Entrance

Neighborhood Greenway Design Elements

Neighborhood Greenways incorporate all the elements of bicycle boulevards but take the concept to the next level. They typically incorporate sustainable design elements such as rain gardens, bio-swales, native plantings, etc. They should incorporate pedestrian amenities such as art installations; benches; interpretive sign; and community vegetable and ornamental gardens. They may take on many different looks from avant-garde to traditional.



5.11 Off-Road Trails

There are many types of Off-road Trails, each with unique issues. One type of Off-road Trail is the independent pathway that is separate from the road system. Independent pathways include rail-to-trail corridors, paths through parks and other trail systems. Independent pathways can be important and beneficial links to the non-motorized transportation system provided they have direct connections to the existing network of bike lanes and sidewalks. If designed and maintained properly, they can be the “jewels” of a City’s non-motorized transportation system.

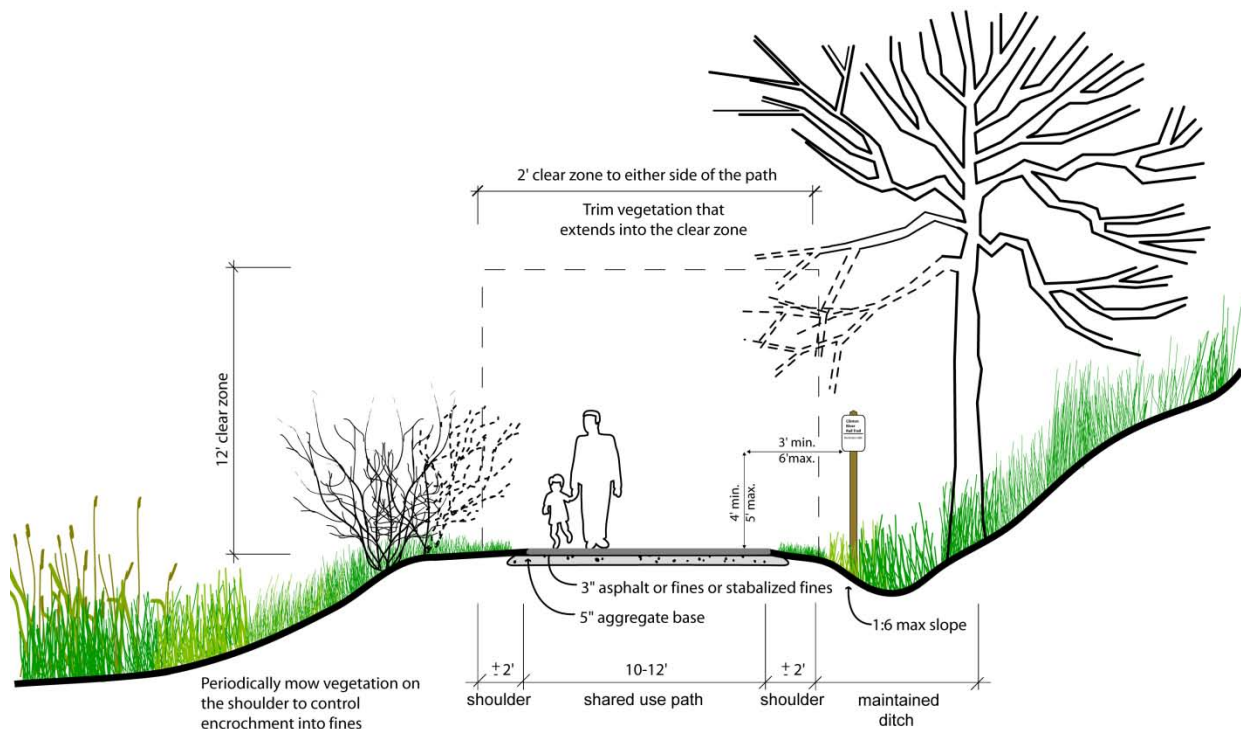
Independent pathways should be designed to accommodate shared uses including cyclists, walkers, strollers, in-line skaters, and people in wheelchairs. For the safety of all users, the pathway should be built wide enough to accommodate these shared uses. AASHTO guidelines indicate that a 10’ wide path is the minimum width for a Shared-Use path. The preferred minimum width is 12’ in most cases in urban areas with 14’ to 16’ being common widths.

Studies done by the Rails-to-Trails Conservancy have shown that off-road pathways in general are quite safe from a personal safety standpoint. But in urban areas it is important that pathways follow the principles of Crime Prevention Through Environmental Design (CPTED).

Trail Cross Section Design Guidelines

Figure 5.8A below illustrates several key points about the design and maintenance of Shared-Use paths. Whether the surface of the path is asphalt, fines or other material, it should have a solid base and positive drainage as the path may have maintenance vehicles on it at all times of the year. The vegetation along the trail should be regularly trimmed and mowed to maintain a clear zone around the trail.

Fig. 5.11A. Typical Path Cross Section



Independent Pathway / Road Intersection Design Guidelines

Independent pathways often intersect roadways at unsignalized mid-block crossings. Many of the design guidelines for a typical mid-block crosswalk apply but because of the unique nature of independent pathways, several additional safety points must be considered. The following plan illustrates the key points needed for a safe design of the intersection of an independent pathway with a roadway:

- Clear signage that identifies user rights-of-way and notifies both the users of the pathway and the motorists that an intersection is approaching.
- Pavement markings at the beginning of the trail intersection notify users of direction of travel and rights-of-way. Pavement markings further along the trail should be minimized to avoid visual clutter.
- The pathway should meet the roadway at as close to a 90-degree angle as possible for maximum visibility of users.
- Supplemental trail signage is often set back outside the road right-of-way.
- Regardless of the surfacing material of the trail, asphalt or concrete should be used for the portion of the trail that intersects the road. The hard surface increases traction for bicycle users and cuts down on debris from the shoulder of the road accumulating in the pathway. The change in materials can also help to notify users of the upcoming intersection. At rural intersections, gravel shoulders should also be paved adjacent to the trail to minimize debris in the stopping zone.

Fig. 5.11B. Typical Pathway/Roadway Intersection

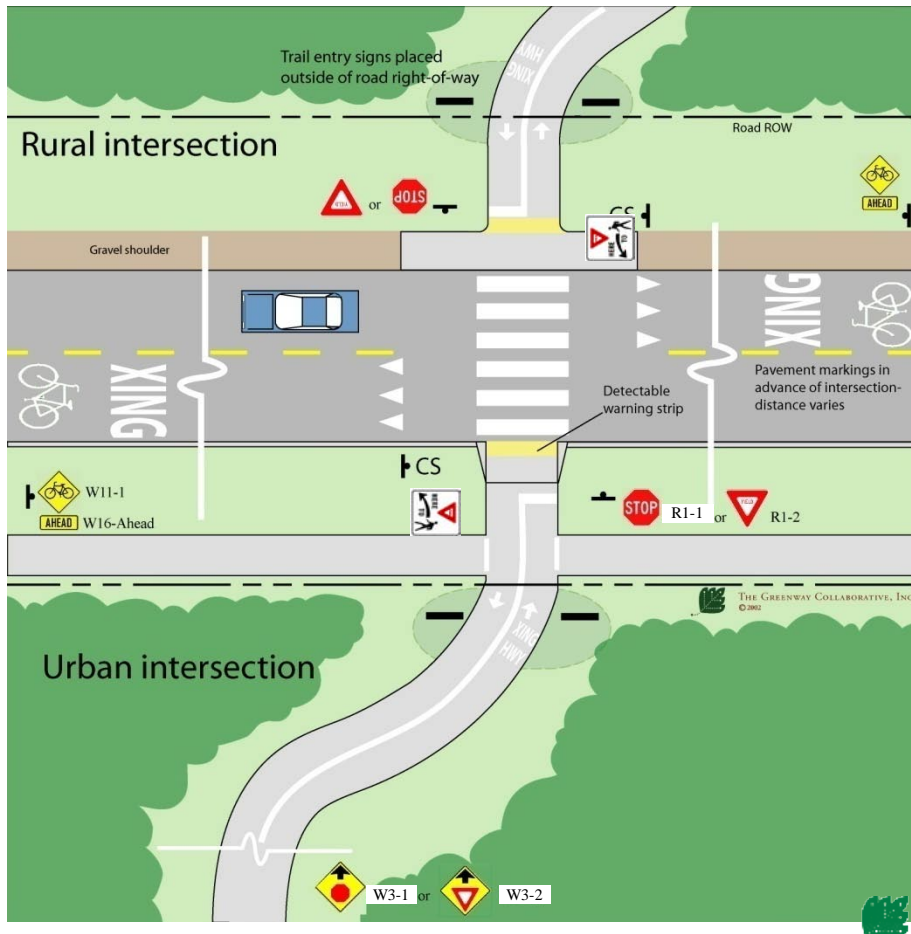


Fig. 5.11C. Trail Signs at Road Intersections
Trail View



Key Recommendations:

- Two sign posts form a gateway to the trail at road intersections.
- On the right above a Stop or Yield sign, a standard street name sign is used to identify the cross street.
- All parts of the signs should be set back 3' from the trail.
- On the left side, an optional plaque identifies the local agency in charge of the trail, trail rules, and emergency and maintenance contact numbers.

Road View



Key Recommendations:

- On the right side, a No-Motor-Vehicle Sign and a Bicycle Yield-to-Pedestrian Sign should be posted to address the key rules of the trail.
- On the left side, a Bike Route Destination sign listing the direction and distance to the next major destination may be placed.
- On the left side, the Bike Route Identification Sign with a custom logo, direction of travel and route name may be used to identify the route.
- A detectable warning strip should be placed across the entire trail.
- Pavement markings should be used for the first 100' to 150' of trail.

5.12 Commercial Centers

Many new commercial, office, institutional and mixed use developments being built today are designed for easy access by motor vehicles and do not take into adequate consideration the patrons arriving by other means of travel. Aspects of site design can discourage non-motorized traffic when designed solely for automobile use. New developments today often have poorly placed bike-parking facilities, large setbacks with parking lots that lack direct access for pedestrians or bicyclists and face large arterial roadways with little or no direct access to neighborhoods and residential areas that may be surrounding them. These problems can be remedied by improving site design and enhancing connections to the external transportation system.



Most commercial developments are oriented to motor vehicles, resulting in an often oppressive environment for pedestrians and bicyclists.

Circulation within the Site

Buildings with frontages located near the street create a streetscape that is comfortable and accommodating to pedestrians, and help keep traffic moving at slower speeds. Parking to the side or the rear of the building keeps the streetscape intact, allows easy access for pedestrians from adjacent sidewalks and minimizes automobile and pedestrian conflicts. As the building frontages are moved back from the streetscape to accommodate parking, the pedestrian's sense of exposure to traffic, the distance they must walk to access the store, and their resulting discomfort substantially increases.

Setback of the building frontages from adjacent intersections also complicates pedestrian travel across the roadways. Typical development patterns are "L" shaped with the majority of buildings set back from the intersection and one or two isolated buildings near the intersection. This pattern places the majority of the buildings away from the primary pedestrian crossing point and puts a large expanse of parking between the isolated buildings on the corner and the majority of the buildings. Depending on the development across the street, "L" shaped developments can set up strong pedestrian desired lines across mid-block locations. Because of the large scale of most of these developments, the distance between the desired lines and the signal is significant.

If orienting proposed development projects to improve non-motorized uses is not a feasible option in designing the layout of the buildings, then providing clear, direct and safe pedestrian access at mid-block locations is necessary to minimize out of direction travel through or around the parking lot by pedestrians. Parking lots can be dangerous areas for pedestrians and present many challenges for safe navigation. Older adult pedestrians have a high incidence of accidents involving vehicles backing up, a common maneuver in parking lots.²⁵ Site plans should be required to include the following design measures:

- Reduce building setbacks as much as possible and provide walkways to the entrances that are clearly marked, accessible and buffered from the surrounding parking lot.
- Use raised crosswalks and striping to clearly differentiate the walkways from driveways. Speed tables and raised crosswalks can calm traffic and increase visibility.

²⁵ National Highway Traffic Safety Administration. *Pedestrian Safety for the Older Adult*.

Fig. 5.12A. Typical Commercial Center at Intersection of Main Roads

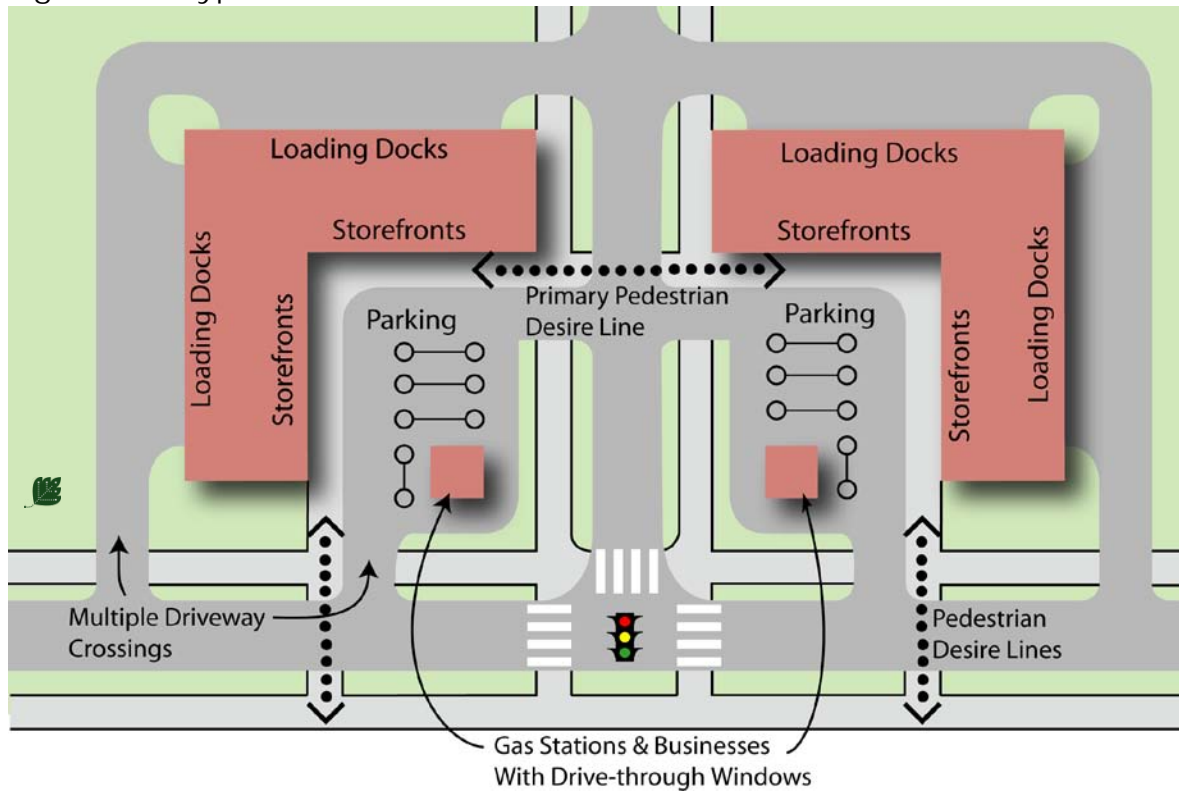
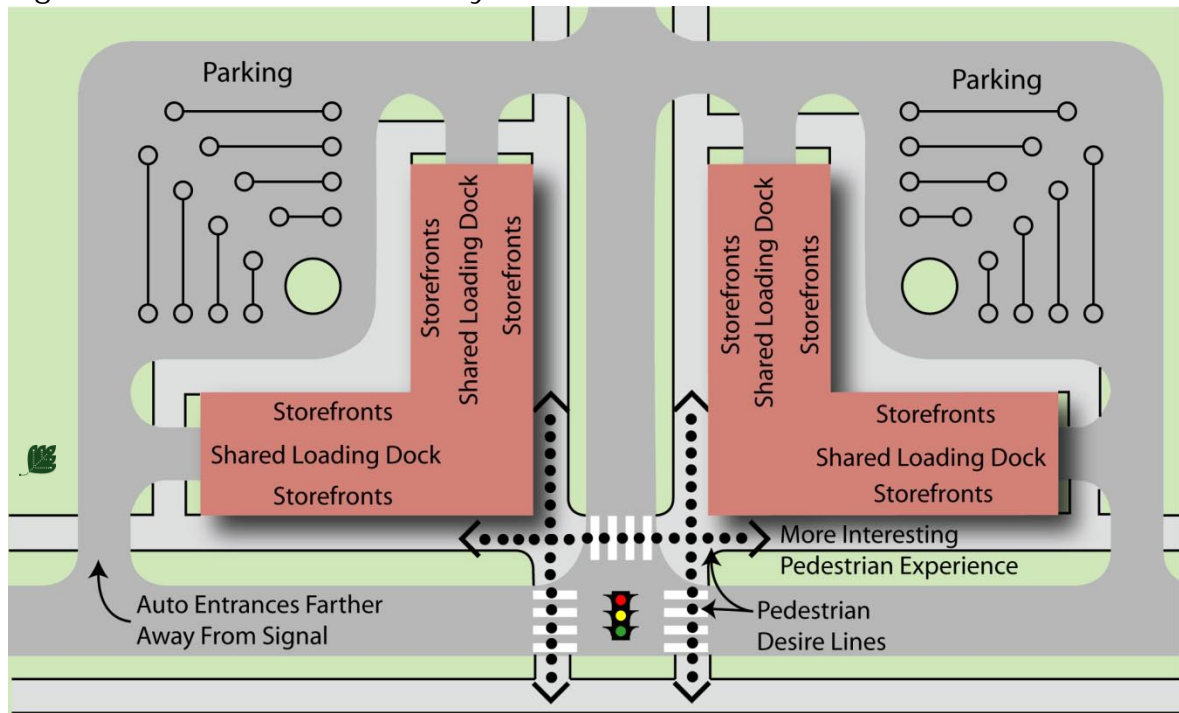


Fig. 5.12B. Pedestrian Friendly Commercial Center Alternative



- Provide trees and other plantings to buffer pedestrians from parking areas, enhance parking lot aesthetics, and minimize the pedestrian's exposure to the elements while crossing the vast expanse of pavement.
- Walkways should have direct and clear access to building entrances and be designed to safely go through the parking lot, or circumnavigate it if necessary.
- Walkways along the buildings should be wide enough to accommodate several people abreast and have frequent curb cuts and ramps for accessibility, as well as tactile and audible pedestrian information.

Just as pedestrians need direct and clear access through the parking lots to the buildings, bikes should also be safely directed through the parking lot. Bike parking should be provided in a visible and convenient location. Many cyclists are reluctant to lock their bikes in an area that is out of the way and unfrequented because of the greater likelihood of theft. This leads to situations where bikes are locked to anything available such as signposts or railings. These bikes can cause hazards for pedestrians and obstacles to accessibility. Providing bike parking facilities in convenient and well-lit locations will minimize these problems.

The site plan review process will allow the City to ensure that these design measures are followed. The City should require that developers include these specific pedestrian and bike accommodations early in the site planning.

Connections to the External System

The site must have convenient and safe access to pedestrian, bicycle and transit facilities outside the development. Frequently, large new developments are located on the edge of town along major arterials with limited non-motorized facilities. New developments should always connect to an existing non-motorized transportation network. Commercial developments should include specific plans for connecting to existing facilities and neighborhoods in surrounding areas.

Motor vehicle access to commercial development should be constructed as a conventional driveway with small turning radii and a ramp up to the sidewalk level, rather than a typical public intersection where the roadbed continues at the same level and there are curbs on either side. Use of driveway entrances rather than typical intersections enhance pedestrian safety and comfort because motorists must drive slowly when entering and exiting the development. When a typical intersection-style entrance is used, the sidewalk should continue across the entrance, preferably at sidewalk height, so the right-of-way is clearly established and motorists understand they are entering a pedestrian area. Supplemental signage and crosswalk pavement markings should be used to indicate a crosswalk and the pedestrian right-of-way.

Plantings should be pulled back away from the entrance crossings to allow maximum visibility for both pedestrians crossing the entrance and the cars entering the commercial development. The radius of the intersection curb should be kept as small as possible, and the width of the driveway should be the minimum needed. Just as roads are updated to accommodate vehicular access at new developments with turning lanes or signals, so should non-motorized facilities be updated with new crosswalks, signage and pedestrian signals.

New roadway designs often favor access control for businesses along the road. In this scenario, several businesses share access through one driveway instead of each business having its own entrance and exit onto the main street. In addition to the advantages for vehicles, this is an advantage for the lateral movement of pedestrians along the street because they do not have to cross as many driveways.

However, more direct pedestrian access points from the sidewalk to the individual building entrances should be incorporated. The spacing of crosswalks along the primary road to developments across the road should also be considered.

The design and placement of the buildings should allow direct and clear access from surrounding neighborhoods and residential areas. Too often, what could be a short walk to a nearby store from a residential street becomes dangerous and un-navigable because the store does not have public access on the side facing the residential streets. Both pedestrian and bicycle access should be unimpeded from these areas. During site plan evaluation, development access and travel distances from surrounding residential areas should be a prime consideration.

Encouraging Mixed Use

While tying commercial developments to surrounding residential areas is a good practice, a better practice is to eliminate the segregation of commercial and housing areas. Incorporating higher density housing into commercial developments can dramatically alter the character of commercial development making the project more similar in feel to a small downtown rather than a strip development. For more information see the Land Use Considerations in the next section. Mixed land uses can significantly increase the number of non-motorized trips.

Site Design Checklist

A site design checklist or similar tool should be provided to developers and used by the City in their review of site plans to make sure that bicycle and pedestrian issues are being adequately addressed. The following checklist was adapted with minor modifications from *The Canadian Guide to Promoting Sustainable Transportation through Site Design* by the Canadian Institute of Traffic Engineers. It is a part of a larger publication that looks at site design issues more fully.

Land Use & Urban Form Checklist:

- Densities are sufficient to support transit (3 to 7 households an acre / 4 to 7 jobs an acre)
- Highest density land uses are located close to activity nodes such as transit corridors and intersections.
- Proposed use provides or adds to a diversity of land uses in the surrounding area and does not result in large tracts of similar uses.
- Proposed use is compatible with adjacent land uses and with long term land use plans for the area.
- Adjacent street network provides for connectivity of transit, cycling and pedestrian routes.
- Mixed uses help support non-motorized transportation.

Safety & Security Checklist:

- Overall site design attempts to minimize conflict points between vehicles, pedestrians and cyclists.
- Sight distances have been considered in overall site design and in the placement of entry signs and landscaping.
- Consideration has been given to personal security for pedestrians, cyclists and transit users.
- Buildings are located close to the street, but provide adequate clearance for pedestrian activities along street frontage.
- Where appropriate, retail, restaurants and other pedestrian oriented uses animate the street frontage.

Building Entrances Checklist:

- Building entrances are located close to the street, with direct pedestrian access.
- Potential conflict points between users arriving by different modes are minimized.

Internal Transportation Network Checklist:

- Roads and paths match up with surrounding networks and ensure direct connections through the site for cyclists and pedestrians.
- Block lengths are limited and mid-block crosswalks are provided where appropriate.
- Traffic-calming principles are applied, where appropriate (proper site design should avoid the need to apply extensive traffic calming).
- Appropriate measures have been taken to ensure easy progress of transit through the site.

Desired Pedestrian & Cyclist Routes Checklist:

- Safe, continuous and clearly defined routes for pedestrians and cyclists are provided along desire lines including links to surrounding residential areas.
- Weather protection and amenities such as trees are provided.
- Intersections are designated to facilitate pedestrian and cyclist crossings.

Transit Stops Checklist:

- Walking distances to stops do not exceed 1300 feet, and pathways to stops are safe and direct.
- Waiting areas are well lit and attractive.

Site Grading Checklist:

- Terrain along pathways is kept reasonably level, and ramps are also provided wherever stairs are necessary.
- Slopes along pathways are designed to avoid the ponding of slush and water.

Motor Vehicle Parking Configuration & Treatment Checklist:

- Off-street parking is located away from the street, preferably behind buildings or underground.
- Vehicle access is separate from pedestrian access, and access and egress controls are designed so vehicles do not block pedestrian ways.
- Parking lots are kept small and designed to prevent speeding.
- Pedestrians have protected walkways through the lots.

Motor Vehicle Parking Supply & Management Checklist:

- Off-street parking should be provided, where necessary, at the sides and rear of buildings.

Bicycle Parking Checklist:

- Bicycle parking is located near entrance for short term users in a high visibility location.
- Weather protected bicycle parking for longer term users is provided in a secure area. Storage possibilities for gear are considered.
- Showers, changing rooms and lockers are provided within employment centers.

Passenger Pick-up & Drop-off Areas Checklist:

- Passenger pick-up and drop-off areas are located to the side or rear of buildings, downstream from the entrance, but no more than 100 feet away from it.

Loading Areas Checklist:

- Loading areas are located off the street, and are screened from public view.
- Loading area access is designed so that pedestrian, cyclist, and transit routes are never severed.

Internal Road Design Checklist:

- Appropriate traffic signals and compact geometry of intersections control speeds and allow for safe passage of cyclists. Roads are designed to cross at right angles. Sight lines are respected.
- Lanes are designed to accommodate motor vehicles and cyclists, and remind users of the other networks on the site.
- Facilities for cyclists and sustainable modes are provided and continued across the site.

Pedestrian Facilities Checklist:

- Sidewalks are provided along all roads, and follow pedestrian desire lines where possible.
- Properly signed crossings are provided wherever a path or sidewalk crosses a road.
- Pathways are clearly defined, delineated, and are of a sufficient unobstructed width. Appropriate amenities such as lighting and weather protection are provided and safety along path is addressed.

Transit Facilities Checklist:

- Stops are located close to the main entrances of activity generators. Crosswalks are provided at all stops.
- Stops and waiting areas are properly illuminated, visible from a distance, and have warranted amenities such as shelters and benches.
- Spacing between stops is minimized.
- Shelters and rest areas are provided at transit stops and locations where there is a high number of users, the elderly or the disabled.
- Shelters and rest areas are identifiable, accessible, placed appropriately, and are comfortable.

Wayfinding Checklist:

- Appropriate signage and physical features are provided for users of all networks to determine their location, identify their destination, and progress towards it.

Street Furniture & Amenities Checklist:

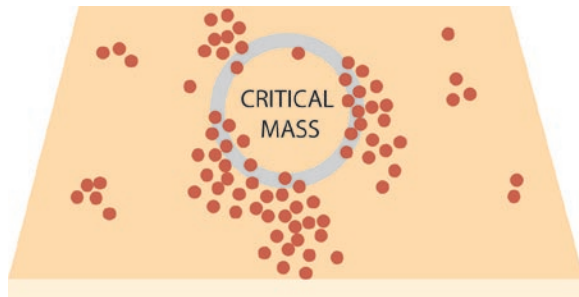
- Amenities are provided to create a comfortable and appealing environment, pre-empting litter and responding to user needs.

Landscaping Checklist:

- Landscaping does not compromise user security and safety.

5.13 Land Use Planning

Land use patterns greatly affect the viability of non-motorized transportation. There is a general consensus based on a significant body of research that three key issues determine how supportive an environment is to walking, bicycling and transit.



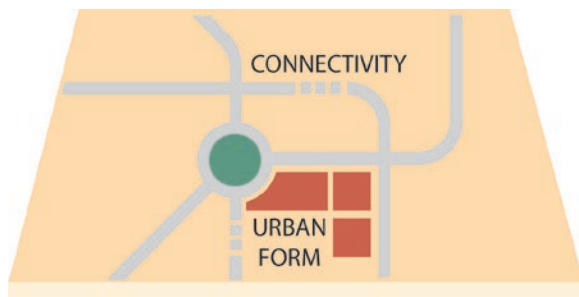
Density

The density of the residential population determines if an area is capable of supporting a transit system, both economically and efficiently. The Southeast Michigan Council of Governments generally considers that at least 3 to 7 households an acre and 4 to 7 jobs an acre are necessary to support a transit system. Higher density encourages retail services needed to maintain a healthy urban environment. Increased population density introduces a critical mass of pedestrians who provide comfort and security to each other with their combined presence. Higher density uses support a non-motorized transportation system more than low density land uses. It has been noted that the key indicator of the vitality of a place is the presence of pedestrians.



Diversity

The diversity of land uses refers to the proximity of trip origins and destinations. If the distances are comfortable for bicyclists and/or pedestrians they will be more likely to use non-motorized means, thus reducing the number of motor vehicle trips. A diversity of services at key public transportation stops allows transit users to minimize their travel and combine many errands at one place.



Design

The design of the non-motorized system and the support facilities determine if a pedestrian or bicyclist trip will be safe, comfortable and convenient. The design is also key in determining how accessible transit stops are and how large an area each transit stop draws from. Design is important on both a macro and micro scale. On a macro scale the directness and interconnectedness of the network is critical for permitting quick access to adjacent diverse land uses. On a micro scale an environment that rewards non-motorized users with safe and pleasant surroundings encourages use.

Density, diversity and design must all work in concert to make an environment that supports alternative transportation. The absence of one element has the ability to reduce the positive impact of the presence of the other two. Municipal planning can guide land use plans and zoning plans to encourage dense, mixed-use development and design considerations that support a variety of transportation choices. Ordinances may be used to permit mixed-use developments with higher densities, as well as promote increased densities around major destination points and transit lines.



A community's transit, bicycle and pedestrian friendliness has as much to do with a community's population density, land-use diversity and the layout of the street network as it does with providing specific facilities for bicyclists and pedestrians.

6. *Outreach and Education*

The education and marketing is critical for the establishment of a successful non-motorized environment in the City of Novi. This section outlines recommendations and strategies on how the City can develop a program for public outreach and education for the non-motorized system.

Topics:

- 6.1 – Existing Promotional and Marketing Activities
- 6.2 – Opportunities and assets
- 6.3 – Public Outreach and Educational Strategies that Promote the use of Sustainable Transportation
- 6.4 – Recommendations
- 6.5 – Resources

Imagine walking into a new sandwich shop. In front of you is a menu 6 feet high and 8 feet wide filled with an overwhelming array of sandwich choices. Many of the sandwiches listed have ingredients you've never tried before. So you decide to go with what you know: a ham and cheese sandwich on white bread. The next day you walk into the shop and order the same thing. And again the day after that. Even though some of the other sandwiches might be cheaper, or better for you, you are hesitant to break out of your routine.

Many people experience their transportation choices in the same way. They think "I could walk to the grocery store or bike downtown, but will it be safe? Will I get dirty? Will I look silly?" So many people stick to what they know and lose out on the great benefits non-motorized transportation can offer. So how do we break people out of their routine and encourage them to try non-motorized transportation? A public education and outreach program can provide the encouragement many people need to move them from considering using non-motorized transportation to actually using it.

The following recommendations outline the strategies the City can use to develop a public outreach and education program for the non-motorized system. It is important that the recommendations outlined in this section are done in tandem with the infrastructure changes so that what is being sold by the outreach program is truly a good product. If people are told that a particular bike route is safe and then have a fearful experience when they try it out, the result will be counterproductive.

6.1 Existing Promotional and Marketing Activities

The following is a list of activities that are already being done to promote non-motorized transportation in the Novi area.

Southeast Michigan Council of Governments (SEMCOG) (www.semco.org)
SEMCOG offers limited information on bicycling and walking programs at <http://www.semco.org/WalkableBikeableCommunities.aspx>. Their information includes biking maps for Oakland County and the surrounding area.

Safe Routes to School (<http://www.saferoutesmichigan.org>)
City of Novi has an active Safe Routes to School Committee with three schools having Safe Route Action plans to make it safe for kids to walk and bike to schools.

League of Michigan Bicyclists (www.lmb.org)
The League of Michigan Bicyclists provides advocacy, events, and resources for cycling in Michigan. Their website contains information on bike rides, Smart Commute events throughout the state, and ways to get involved in advocacy efforts around cycling. LMB has regional representatives for each part of the state. Rory Neuner of the Michigan Environmental Council is the current representative for the Lansing/Novi area.

Michigan Trails & Greenways Alliance (www.michigantrails.org/)
Michigan Trails and Greenways Alliance fosters and facilitates the creation of an interconnected statewide system of trails and greenways for environmental/cultural preservation purposes, and includes an extensive database of Michigan's trails. The organization has been very active in the Detroit metro area. Their website currently includes information on the I-275 Metro Trail.

City of Novi (cityofnovi.org)

Parks and Recreation

The City of Novi Parks and Recreation department provides information on its website about current biking facilities, including Lakeshore Park mountain biking.

6.2 Opportunities and Assets

When developing a public outreach and education program for the City's non-motorized plan, it is important to survey the opportunities and assets for promoting and encouraging non-motorized transportation.

Partnerships

There are many opportunities for the City of Novi to partner with other groups to promote non-motorized transportation and collaborate on programming educational opportunities and events.

Novi Police Department: Novi's Police Department is highly regarded throughout Michigan for its professionalism, public programming, and in particular for its work to improve traffic safety; it has been awarded the state's Excellence in Traffic Safety award four consecutive times. It already participates in a wellness event, the Run! It's an Emergency! 5K run, in partnership with other emergency response agencies and Providence Park Hospital.

Providence Park Hospital: Novi's primary wellness provider, Providence Park may be a powerful partner in programs and events that promote healthy, active lifestyles, reduce traffic-related crashes, and reduce the incidences and severity of injuries through traffic safety campaigns and classes, such as youth and adult cycling education.

Safe Routes to School: Parents in the Novi Public Schools have been working on the Safe Routes to School Program, already exposing them to the benefits of non-motorized transportation for their children. They may be willing participants in exploring Safe Routes opportunities for other trips within their community for their children and for themselves, such as Safe Routes to summer park programs, to shopping, or to work.

The merchant community: Novi's newest merchant developments, such as City Center, were developed with the pedestrian and bicycling environment in mind. Merchants may be enthusiastic participants in programs and events that leverage their "lifestyle" image to encourage residents to bike or walk to their businesses.

Corporations: Effective company wellness programs send cost savings in health insurance and lost productivity straight to a company's bottom line. Many major employers are located near Novi's existing trails, the I-275 Metro Trail and the M-5 Metro Trail, presenting an opportunity to engage companies from an employee wellness perspective as partners in bicycling and walking programs and events. There may also be opportunities to partner with the Novi Technology Innovation Center since it is based downtown and houses innovative small businesses.

Walled Lake residents: The Lake Area Homeowners Association (LAHA) is a powerful stakeholder in the quality of life for Novi's lakeside residents, and works to promote active, outdoor recreation as a component of lakeside living. The LAHA may be willing partners in recreational cycling and walking events that showcase the lake lifestyle, and in programs that provide safer, more convenient, and enjoyable cycling and walking routes around the lake and to Novi's services, restaurants and shopping.

Community Groups: It was noted that the City of Novi has active Neighborhood Associations, civic groups and environmental groups and volunteer associations, many interested in promoting a higher quality of life for Novi residents. These groups may represent a good avenue for promoting non-motorized transportation and creating a movement around walking and biking as a Novi way of life.

Oakland County: Many other Oakland County communities, such as as Royal Oak, are also pursuing improvements to their walking and biking environments to improve sustainability, economic activity and quality of life. These communities may make powerful allies for Novi as a coalition of bicycling and walking-friendly communities on regional issues, programs, and infrastructure improvements.

Communications

City of Novi: The City of Novi distributes *Engage*, a recreation program and events guide, to residents three times a year, and publishes a monthly e-newsletter, *Novi in a Nutshell*. The City produces a variety of programs on its public access channel, Novi Television, including an environmentally themed program, the Green Zone.

Social networks: The City has a robust social networking presence with well over 1200 followers on Facebook and Twitter.

Periodicals: The *Novi News* is the City's local daily, with a circulation of 4000. Other important publications include the *Detroit Free Press* and *Crain's Detroit Business*.

Events

Community Events: Novi hosts many events that could be opportunities for promoting biking and walking and providing traffic safety education. These events include the city's summer festival, Novi Palooza, its summer athletic programs, and events hosted by the Recreation Department, such as 2010's National Take Your Child Outside Day. Bicycling and walking programming and education also will likely fit well with Novi's Farmer's Market, which is open May through October.

5K runs and mountain biking: Novi has a strong community of runners and mountain bikers, thanks to excellent accommodations at its parks such as Lakeshore Park, whose trails include nine miles of "primitive" trails for mountain bike use. These populations may be a rich opportunity to find programming and event participants, but also perhaps to find volunteers interested in supporting the City's efforts to create a community friendlier to walking and biking.

6.3 Public Outreach and Educational Strategies

A non-motorized transportation system isn't of much use if people do not use the system. Too often there is a reliance on a "build it and they will come" approach. This ignores the fact that Novi and many other communities have been designed around automobile use for the last 50 years. Thus, many residents won't naturally feel comfortable using a non-motorized system and will benefit from some encouragement.

To address this issue a public outreach and education strategy has been developed to engage a community to:

- Improve attitudes towards biking and walking
- Teach residents to be safer walkers, bikers and drivers
- Find partners and volunteers in creating better biking and walking conditions and producing events
- Maintain momentum for the often long and frustrating effort to improve the built environment
- Grow a movement

The great thing about public outreach and education is that it can start immediately, before the City of Novi lays one more mile of sidewalk or completes another trail connection. Novi, like most communities, has enough infrastructure and the programs, partners, and community pride to begin adding to the numbers of residents willing to try biking and walking right now. Efforts now will prime the City for success as it begins the hard, tedious work of improving its infrastructure for non-motorized transportation.

This section breaks out a Year One and a Year Two for outreach and encouragement to help the City set a direction and build momentum towards a sustainable, rich and varied outreach and education program. While the programs were selected as suitable for Novi, it's likely that a diverse and committed Task Force of local experts will discover new programs or tweaks to those listed that will work even better.

Year One: Establish the Program

In the first year, Novi can expect to:

- Make the Recreation Department the home of the city's biking and walking outreach and education program
- Establish a Bicycling and Walking Task Force to help shape, produce and guide the outreach and education efforts.
- Establish a brand for the bicycling and walking outreach and education program
- Create a Facebook and Twitter presence for the outreach and education effort
- Establish partnerships with experienced bicycling and walking organizations such as Michigan Trails and Greenways Alliance and League of Michigan Bicyclists
- Apply for grants to fund a part-time coordinator for the outreach and education program and related tools and materials like website development, printed materials, and events promotion

- Begin tying active transportation messages and information into existing events such as organized runs, mountain bike events at Lakeshore Park, summer athletic leagues, the Farmers Market, and Novipalooza.
- Produce one stand-alone bicycling event

Establish the Encouragement and Outreach program within the City's Recreation Department

The City's Recreation Department represents the most expertise and best fit among the City's departments for many of the program and outreach components of this program. Already experienced in producing events large and small that leverage existing facilities, educate participants, and promote messages, the Recreation Department should make a capable home for many of the recommendations in this section of the plan.

Establish a Bicycling and Walking Task Force to help shape and direct the Education & Outreach program

If the outreach and education program is going to be successful, its development, direction and oversight needs to include key stakeholders, including interested residents. Forming a Bicycling and Walking Task Force that engages stakeholders helps provide buy-in from important groups as they are involved in the process of creating this program. They'll also be important channels for promoting efforts and programs to their constituencies, enabling the program to tap a much larger pool of potential volunteers, resources, energy and enthusiasm.

The primary responsibility of the Task Force will be to establish the needs of the community for non-motorized transportation education, information, promotion and events, and to provide the expertise, partnerships, resources and coordination to fulfill them.

This plan recommends that the Task Force have up to 12 members. Suggested stakeholders for this Advisory Board include the following:

- Staff member from the City of Novi's Recreation Department who will serve as the administrator for the program
- Staff members from the City of Novi that represents transportation, public relations
- A representative of the Novi Chamber of Commerce
- A representative from the Novi Police Department
- An interested employee of a Novi-headquartered major company
- A representative of Providence Park Hospital
- A representative from Michigan Trails and Greenways Alliance
- Up to three residents interested in bicycling and walking, including a Walled Lake resident
- Representative of Novi Public Schools working on Safe Routes to School issues

This Task Force should meet on a monthly basis to provide input on the direction of the program and help find ways to partner with the program once it is created.

Define a brand for biking and walking programming and education in Novi

A city's non-motorized transportation education and outreach efforts are best delivered through a branded program that gives the city a tool for promoting, communicating and creating buy-in for its events and

initiatives. Novi has done this before, with its Go Green environmental sustainability brand and its associated programs.

There is not one correct way to create a public outreach and education campaign. Some, like Ann Arbor's getDowntown Program, focus on a particular target audience (employers and employees in the downtown), some, like CATA's Clean Commute Options Program, repackage a portion of an organization to promote the use of existing services (CATA's buses, rideshare program, etc) among a certain audience (commuters and students). No matter how a Public Outreach and Education program is organized, it is extremely important that the program is packaged in some way.

While biking and walking safety demonstrations, encouragement programs, and events may seem to fit well under the Go Green brand, consider that people come to bicycling from diverse preferences and backgrounds. A brand that directly communicates biking and walking separate from Go Green will give the Task Force and the City more flexibility in marketing programs and messages. Brands that evoke motion and active living also may appeal more to current state, federal and private interests issuing grants and assistance for improving wellness.

Establish a web presence for the program at cityofnovi.org and social networking sites

The branded program should have its own page at cityofnovi.org, similar to the Go Green program. The page should offer a calendar of biking and walking-related events in the area, information available through the program, an explanation of the Task Force and meeting minutes, and updates regarding grant awards and efforts to improve the built environment. The page should be complimented by links to follow the non-motorized transportation plan on Facebook and Twitter.

It's important that the social networking feeds, Facebook and Twitter, post not just the City's progress towards bicycling and walking improvements but ANY information about walking or biking in Novi or neighboring communities, including mountain biking events and races such as Run, It's an Emergency! The Facebook page should be open to all notes, commentary and encouragement regarding the current cycling and walking experience, good and bad. Novi has no identified group of cyclists or walkers, which communities typically build upon to create a movement around sustainable transportation. Both Facebook and Twitter can build community but only if communication is two-way and open.

A great strategy would be to make two or more of the Task Force members administrators for these pages, allowing posts to reflect a variety of opinions and perspectives about walking and biking in Novi. The goal is to start and grow a conversation around the shared vision of a walking and biking-friendly community. The payoff is community buy-in, a rich source of viewpoints, a ready company of potential volunteers, and a qualified audience for programming and events.

Establish partnerships with experienced bicycling and walking organizations

The Recreation Department's programming at Lakeshore Park has produced at least a basic knowledge of mountain biking across a wide base of residents. But Novi lacks an analogue for street cycling and pedestrian issues, and has no local cycling club or pedestrian rights group to provide ideas and expertise for outreach and education.

Michigan, however, has excellent non-motorized transportation organizations, including Michigan Trails and Greenways Alliance and the League of Michigan Bicyclists. Both organizations have active volunteers and/or staff working in the Detroit Metro region. These resources should be tapped through the Bicycling & Walking Task Force to supplement the Task Force's local knowledge with bicycling and walking program expertise, and to help identify opportunities for grant proposals and partnerships. As Novi begins to implement changes to build environment as well as education and outreach initiatives, these contacts become important promotional channels as well to a regional, state and national audience.

Apply for grants to fund a part-time coordinator for the outreach and education program and related tools and materials such as website development, printed materials, and events promotion

Taking a look at successful non-motorized programs throughout the country, from Ann Arbor to Boulder, it's clear that if a community wants to transition from a car-centered culture to one that makes biking and walking a safe and attractive option, that community must make a commitment to provide some staffing for this effort.

The Recreation Department already has clear expertise in program development, event production, instructional services, and promotion. It's possible that an existing staff position could be in part recast to spend up to half of its time on coordinating the outreach and education objectives set by the Task Force.

Whether it's a new hire or an internal job description change, the Task Force should pursue grants available through private and public agencies that fund wellness, recreation and non-motorized transportation initiatives. The Kellogg Foundation, the Meier Foundation, and the Kresge Foundation all have funded wellness and active lifestyle staff and programming in the Detroit Metro region and around the state. The state's own Highway Safety program may also provide funding for traffic safety education materials and programs.

Begin tying active transportation messages and promotions into existing events such as organized runs, mountain bike events at Lakeshore Park, summer athletic leagues, the Farmers Market, and Novipalooza

While creating bicycling and walking programming and information from scratch is considerable work, relying on existing materials produced elsewhere and incorporating sustainable transportation messaging and instruction into planned and existing events and publications is simple, effective and inexpensive.

The Task Force can help the Recreation Department determine the City's top three messages for encouraging safe bicycling and walking to be incorporated into the materials developed for *Engage*, into the City's Go Green materials and communications, and into the community's mountain biking and running/walking events. The Task Force should look to Michigan's bicycling advocacy groups, MDOT, and national advocacy groups for materials suitable for distribution at the farmers market and at events. These materials should become part of the table-top kit for the Recreation Department.

Produce one small-scale stand alone bicycling event

In a city like Novi, which hasn't had an organized cycling community hosting rides and cycling-related events, even a small, well-publicized cycling event can generate interest and excitement community-wide with modest resources.

An event such as Bike & Dine is small enough to be produced wholly within the Recreation Department, whether or not the department is successful in hiring an outreach and education coordinator. A Bike & Dine is simply a progressive dinner by bicycle. The Task Force identifies 3-5 Novi restaurants to visit by bicycle, and asks each restaurant to offer one course of a meal to all participants. Following a pre-selected route, with police escort if desired, participants ride to each establishment, enjoy the restaurant's offerings, and continue on to the next. Bike & Dines typically are limited to less than 35 participants, and involve a fee to cover the restaurants' costs.

While characterized by the Twelve Oaks regional mall and its busy Mile roads and arterials, Novi's clusters of retail and restaurants still offers a selection of high quality dining and drinking within easy riding distances of one another. A select bicycle tour of these establishments can garner media attention to local businesses and raise the profile of cycling as a way to encourage and enjoy local patronage.

The City of Royal Oak hosted its first Bike & Dine in fall 2010 with no city staff time or resources involved; volunteers organized through Facebook produced the event themselves, and more than 35 people spent an enjoyable evening exploring their community by bicycle. It's easy to imagine that a Bike & Dine in Novi would be similarly successful.

Year Two: Build a culture of biking and walking

Year one recommendations provide a structure and process for establishing outreach and education objectives, helps the City identify partners and supporters in the community, and begins a dialogue with the community about biking and walking in Novi. Year two recommendations leverage these efforts to begin initiatives in Education, Enforcement, and Encouragement that can grow biking and walking modeshare and consideration for other transportation system users going forward.

In year two, the City of Novi can expect to:

Educate

- Establish a biking and walking ambassador program within the Youth Police Academy
- Establish third grade bicycling and walking education programs as a prerequisite for riding to school in 4th grade

Enforce

- Deploy crosswalk stings at targeted pedestrian crossings
- “Ticket” children who are wearing bicycling helmets

Encourage

- Produce a community bicycle map
- Host Bike to Work Week
- Produce a larger bicycling event

Evaluate

- Survey residents' attitudes towards biking and walking efforts
- Apply for the League of American Bicyclists' Bicycle Friendly Community status and the state's Promoting Active Communities award

The following pages provide more details to the proposals listed above.

Education

Bicycling and Walking Ambassadors

The issue

Training children and adults in basic non-motorized traffic safety, developing awareness of all road and trail users, and raising the profile of cycling and walking as a healthy, smart, and valid choice of transportation within the community.

The idea

Junior Bicycle Ambassadors—teenage youth trained in traffic cycling and safe cycling and walking issues in order to deliver bicycle and pedestrian safety demonstrations for all ages, educate motorists and non-motorists, and assist with the development of local cycling activities and events.

Why it works in Novi

The award-winning Novi police force currently offers a popular one-week program that immerses youth in a broad-based, hands-on survey of police department operations, including traffic safety. This existing program provides an administrative structure for training youth and allows additional capacity for further training to be added incrementally. Federal Highway Administration safety funds, administered through MDOT, may provide funding.

How it works

The police department agrees to add an additional week of training for youth interested in serving a summer internship as a Bicycling and Walking Ambassador. The youth receive hands on training in bicycling and walking law and practicable skills, basic bicycle maintenance, and public outreach and presentation. Organizations such as Michigan Trails & Greenways Alliance or the Chicago-area Active Transportation Alliance can train police academy instructors to teach youth bicycle and pedestrian safety education and outreach skills and tactics. International Police Mountain Bike Association-certified instructors or League of American Bicyclist-certified instructors may be contracted to train police academy instructors to teach youth traffic cycling and bicycle handling.

Once trained, the Ambassadors would be programmed out of the Recreation Department to:

- Be deployed as instructors to Novi Parks & Recreation bicycle safety classes and local Safe Routes to School programs where they can provide helmet fitting, basic bicycle safety checks, and basic bicycle and crosswalk skills instruction.
- At motorized/non-motorized conflict points, distribute “Share the Road” and awareness literature to drivers as well as bicyclists and pedestrians (along with a supervising bicycle-mounted officer)
- Capitalize on local walking, running and bicycling events by providing safety demonstrations for participants and spectators, and they can be a safety/support resource for events as ride marshals or course marshals.

Related opportunities:

- Youth may design their own literature for cyclists, walkers and driver tips & awareness, and even their own presentations
- Youth may write a guest column for local news, maintain a Facebook page or blog, produce biking, walking & driving awareness videos
- Trading cards for each of the Jr. Ambassadors with “stats” could spread excitement about the program among pre-teen and younger youth

In Ann Arbor, Ambassadors are used during the month-long Commuter Challenge and are an invaluable resource, encouraging potential walkers and cyclists in the workplace to try sustainable transportation. In Chicago, Ambassadors help officers with targeted pedestrian crossing enforcement, deliver bicycling and walking instruction in the classroom and park programs, provide riding support during city cycling events, and distribute maps, information, and assistance on Chicago's busy Lakefront Trail. The Ambassadors become a high-profile home of community cycling expertise.

Third Grade Bicycle Academy

The issue

Begin normalizing the broad-based delivery of safe cycling education to children and their parents in a fun, engaging way. Mitigate growing school traffic aggravated by the elimination of bus routes for financial savings.

The idea

Make completion of a safe cycling course at the end of third grade, taught by the Ambassadors, a prerequisite for the privilege of cycling to school

Why it works in Novi

Children—and their parents—would begin seeing cycling as a right of passage rewarded with a new privilege, which is a powerful motivator for most people, especially children paying close attention to older kids. A culture of responsible cycling to school would follow the children into middle school.

Also, having to teach is often the greatest teacher: The Biking & Walking Ambassadors, supplemented by a bicycle-mounted supervising officer, could be this program's instructors while encouraging their own training to sink in for life-long behavior and attitude change towards cycling and walking. Novi's involved parents could be engaged by asking them to test their children at home; send-home evaluation materials to be filled out and signed by parents can deliver safe walking and biking education to the adults.

How it works

Elementary school districts adopt school travel policies that limit cycling to school to fourth grade and above, and establish a week-long, end-of-year "bicycle academy" integrated into third grade physical education. Using Ambassadors as instructors, children learn cycling skill basics, basic bicycle safety check, helmet fit, and appropriate traffic cycling skills such as crossing roads, driveway dangers, and negotiating sidewalks. Children completing the academy receive a free helmet and a certificate permitting them to bicycle to school in fourth grade.

This program, obviously, requires that children have a bicycle to use during the program. Not all children wishing to participate will have their own bike to use. The Recreation Department or the police department could quickly establish a small fleet of bicycles for the program by repurposing unclaimed bicycles recovered by the police department.

Enforcement

Police Crosswalk Stings

The issue

Improve the safety and comfort level of street crossings by changing the behavior of motorists to comply with state law requiring motorized traffic to fully stop before right on red, and to yield to the pedestrian or cyclist in the crosswalk.

The idea

Police stings at marked crosswalks and trail crossings that provide a warning period before hard enforcement. Any revenue beyond cost of enforcement can be used to fund the Ambassadors program explained above.

Why it works in Novi

Surveys show that crossing streets is a top safety priority for the Novi walking and biking community. The award-winning police department can leverage MDOT highway safety funding for sting operations at targeted high risk, high pedestrian or trail use crosswalks.

How it works: Crosswalk stings involve a public information campaign, a week of educating and issuing warnings, a week of hard enforcement, a video camera, and a chicken suit:

- **Week one** – A public information week promoting the stings as a response to Novi’s residents demanding a safer bicycling and walking community and how yielding to users in the crosswalk is an essential component. Promotion includes specifying the locations of the stings to begin the following week, and that a chicken will be trying to cross the road at these locations.
- **Week two** – at the selected high risk/high use crossings, an officer dressed as a chicken crosses within a marked crosswalk (during the WALK cycle if signalized) while another officer (or Ambassador) films driver behavior. Turning or crossing traffic failing to yield/stop for the chicken are pulled aside by another officer/officers for a warning and education. At the end of the week, news outlets are provided video clips and a press release that includes a reminder of hard enforcement beginning the following week.
- **Week three** – Hard enforcement at targeted locations, including issuing traffic fines.

Humor has a big role in creating a memorable story with a large hook and in keeping the public on the side of enforcing better crosswalk behavior, and this program should leverage all opportunities to incorporate it. For example: Warnings and safety literature can be delivered inside large plastic eggs.

Helmet Ticketing Campaign

The issue

Encourage helmet use among children

The idea

Police issue “tickets”—actually a coupon for free ice cream or other suitable treat—to children “apprehended” wearing helmets properly

Why it works in Novi

It engages a real strength of the community—its police force—in a positive public relations campaign that will galvanize children to beg their parents for a well-fitting helmet. It will also encourage children to engage the police. It's easy to imagine children riding around, looking for police to show their helmets to.

How it works

Child wears helmet. Police issue free ice cream ticket. The ticket can also include a safe cycling message and instructions on proper helmet fit. Also consider a second ticket for children without helmets that offers a discount at a local bike shop or an option to purchase a low-cost helmet through the Recreation Department. (Helmets can be found for bulk order price of less than \$4).

Encouragement

Novi Bicycle Map

The Recreation Department, with assistance from the Task Force and volunteers of route checkers, produces a map of recommended bicycle routes and trails, with an emphasis on connectivity using existing infrastructure for all residents to destinations (including trails, other routes and surrounding communities).

The best bicycling maps include the entire street network as a base, and rank on-street routes by color corresponding with the necessary traffic tolerance a cyclist would need to feel comfortable using them. A great map also includes basic traffic cycling safety and trails etiquette information, including equipment choice, helmet information, locking information, and how drivers should pass cyclists on the street.

The map should be a stand-alone document distributed to every household to generate excitement and awareness about cycling in Novi. But the map can be paired with other publications already targeting residents' mailbox for efficiency and coverage, like the park & recreation department's Edge publication.

Bike to Work Week/Commuter Challenge

The issue

A substantial number of adults working in Novi live in Novi and next-door communities, yet only 2% have tried cycling to work

The idea

Invite Novi's companies and organizations to challenge peers (by size, business category and/or organization type), perhaps regionally, to a contest over how many employees try cycling or walking to work during National Bike to Work Week.

Why it works in Novi

The Metro 275 trail already exhibits unofficial access points near some of Novi's largest corporate clients, and the M-5 Metro Trail provides some access as well. A commuter challenge program leverages this activity to expand awareness of bicycling connections to the work place and to generate excitement among Novi's sizeable corporate community around the health and well-being benefits of cycling or walking to work.

How it works

The program should be housed in the Recreation Department under the Novi biking and walking brand. Key tasks are event promotion and providing a registration and tracking process, which can be as simple as a basic web-based form. Companies, organizations, and other job centers appoint a Commuter Challenge Team Leader who signs up co-workers to try biking or walking to work at least once during Bike to Work Week. The Team Leader also becomes the liaison to the program's organizers and a distribution point for safety information and encouragement items such as maps and fitness gear. During Bike to Work Week, the Team Leader tracks which employees tried walking or biking to work each day, and reports to the program organizer. When the week is over, the program organizers tally the counts and award prizes and acknowledgement to winners in each category as well as an overall winner.

Large Scale Ride

The issue

Generate regional excitement and notoriety for Novi as a healthy community that encourages cycling and walking

The idea

Establish a closed-course route within the Novi community, preferably a route that includes a major thoroughfare and some contact with Walled Lake, for a unique and family-friendly celebration of active living and recreation

Why it works in Novi

Most residents and visitors to Novi have only experienced travel around the community from inside a car, whose speed and seclusion blunt and condense observations of and interaction with the true character of its streets and neighborhoods. On a bike, residents and visitors will have a richer experience that often times seems wonderfully unfamiliar as participants literally see, hear and feel more of their community along the routes many of them have only ever driven. For many, it will begin to change their perspective of the quality of their community and the potential for active living.

How it works

A large scale ride will engage the entire Task Force, a crew of Ambassadors, and a team of volunteers besides, but the Recreation Department and the City of Novi should also invite a partner expert in large scale ride production and management, such as the organizers of Tour De Troit or the Michigan Trails and Greenways Alliance. Involving these organizations also invites their partnership in event promotion to their constituencies.

The event should charge a registration fee. Novi is a stable, upper middle class community whose demographics can support a charged-fee event. Most of the costs will be for personnel, including police control of any intersections with open streets, and they are substantial. Still, the City can expect to raise funding that can be used as matching dollars for federal walking and biking grants, as education and outreach funding, or to fund the bicycling and walking coordinator position. These program options for the funding should be a key message of the events' promotion.

Evaluation

Conduct evaluation survey and report results

By the end of year two, the City of Novi outreach program should be able to conduct a survey of either the entire program or a component of the program and report the results to the community. This evaluation will help highlight the successes of the program as well as some ways that the program might be improved.

Complete application for Bike Friendly community award with community and partner input

The League of American Bicyclists promotes communities throughout the country with its Bike Friendly Community Award. The process of applying for the award is a great way to determine what is being done in the community as well as where improvements might need to be made. The community can be engaged in the process of applying for the award through public meetings. In addition, if Novi receives a Bike Friendly Community Award, this becomes a great promotional tool not only for the program but for the community as a whole. Currently, Ann Arbor (Silver Award) and Traverse City (Bronze Award) are the only cities in Michigan with Bike Friendly Community designations.

Complete application for the Promoting Active Communities Award with community and partner input

The Promoting Active Communities Award is a Michigan-Based award for communities that show a strong commitment to supporting physical activity. The City has applied for this award in the past. Communities are given awards from the highest level of Gold to the category of Honorable Mention. Just like the Bike Friendly Community Award, this award is a great way to engage the community in non-motorized transportation issues as well as a good promotional tool, should Novi receive a designation.

7. Appendix

Topics:

- 7.1 – Web Survey Results
- 7.2 – September 29, 2010 Public Workshop Summary
- 7.3 – October 26, 2010 Public Workshop Summary
- 7.4 – Maintenance and Operation Budgets
- 7.5 – Implementation Budget Figures

7.1 Web Survey Results

Summary

A web survey for the City of Novi Non-motorized Master Plan was conducted over a three week period from the End of September, 2010 through the Beginning of October, 2010. The purpose of the survey was to collect information about current walking and bicycling patterns, determine the comfort level of using different non-motorized facility types, identify popular bicycle and pedestrian destinations as well as hopes and concerns for a non-motorized network in the project area. A total of 210 people took survey with 182 people completing the entire survey. 188 people who took the survey lived in the City of Novi and 61 people work in the City of Novi.

The survey was separated into six categories which focused on general non-motorized trip characteristics, non-motorized destinations, walking and bicycling to school, roadside pathways, bike lanes and desired project outcomes. The following summary provides key findings from the survey. For more detailed information please refer to the full web survey results which can be found at the end of this section.

General Non-motorized Trip Characteristics:

Participants were asked questions regarding the frequency and location of their current non-motorized trips.

- 2.4% of respondents currently walk and 2% bike to work as their primary mode of transportation
- The majority of respondents currently walk or bike on a daily or weekly basis for fun and/or exercise
 - 85% Walk
 - 67% Bike
- If a system of sidewalks, pathways, crosswalks, bike lanes, ect. were constructed, survey results indicate that there would be a large increase in the number of people who walk and bike for transportation on a daily and weekly basis.
 - Walking would increase from 19% to 47%
 - Bicycling would increase from 22% to 62%
- If a system of sidewalks, pathways, crosswalks, bike lanes, ect. were constructed, survey results indicate that they would be a slight increase in the number of people who walk and bike for fun and/or exercise on a daily and weekly basis.
 - Walking would not change significantly
 - Bicycling would slightly increase from 67% to 86%

Destinations:

Participants were asked questions regarding the destinations they currently walk and/or bike to and what destinations they would be interested in walking and/or biking to if there was a network of sidewalks, pathways, crosswalks and bike lanes.

- Universally there was a desire to walk and bike to all of the destinations that were listed.
- Consistently there were at least 20% more people who would like to bike than walk to the destinations. This may be due to the longer distances between places and the separation of land uses.
- When asked to indicate what items would make the walking or biking trip to the listed destinations actually happen in the future the majority of respondents felt that a complete sidewalk/roadside pathway system and complete bike lane system would be most important.

Walking and Bicycling to School:

Participants were asked how they or their children typically get to school. 54% of the survey respondents were the parent of a school age child or a student themselves. Statistically there were not enough responses to determine each individual school's trip characteristics.

- The majority of students ride a bus or are driven to school
- Thornton Creek Elementary School and Village Oaks Elementary School have students that typically ride their bike to school
- Hickory Woods Elementary School, Orchard Hills Elementary School, Parkview Elementary School, Parkview Elementary School, Thornton Creek Elementary School, Village Oaks Elementary School, Hillside Middle School and Novi High School have students that typically walk to school.
- 50% of respondents said that they or their child would be interested in walking or bicycling to school in the future if there was a network of sidewalks, pathways, crosswalks and bike lanes.
- The main concerns regarding children walking and biking to school are:
 - Lack of sidewalks or pathways along the main roads
 - Lack of sidewalks in the neighborhood
 - Signalized intersections too busy

Roadside Pathways:

Participants were asked questions regarding their comfort and concerns with roadside pathways.

- 40% of respondents walk on a roadside pathway daily or weekly
- 38% of respondents bike on a roadside pathway daily or weekly
- The main concerns regarding walking or biking on a roadside pathway are:
 - Gaps in the system
 - Being hit by a motor vehicle at intersecting driveways and roadways
 - Rough pavement transitions at intersection driveways and roadways
- 50% of respondents are uncomfortable or somewhat uncomfortable riding along a roadside pathway with frequent intersecting driveways and/or roadways

Bike Lanes:

Participants were asked questions regarding their comfort and concerns with bike lanes.

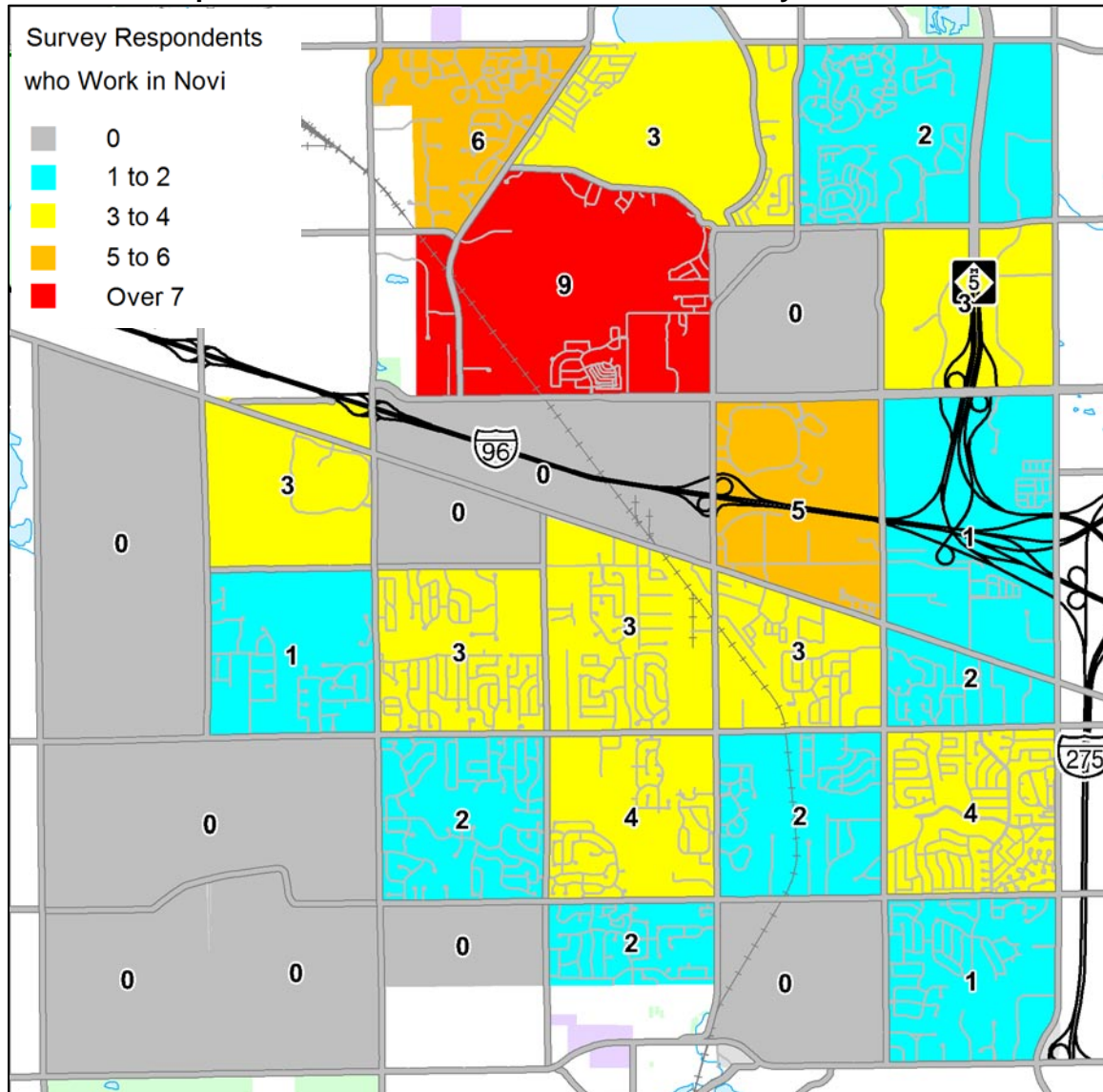
- 32% of respondents bike in a designated bike lane on a daily or weekly basis
- The main concerns regarding bike lanes are:
 - Gaps in the system
 - Being hit by motor vehicles turning into or out of driveways or local roadway
 - Being hit from behind by a motor vehicle
- Majority of Respondents are uncomfortable in a bike lane with speeds over 45 MPH no matter how many vehicular lanes are present
- 76% of respondents are comfortable or somewhat comfortable on a 2 to 3 lane road with speeds 35 MPH or less
- 54% of respondents are comfortable or somewhat comfortable on a 2 to 3 lane road with speeds 35 to 45 MPH

Desired Project Outcomes:

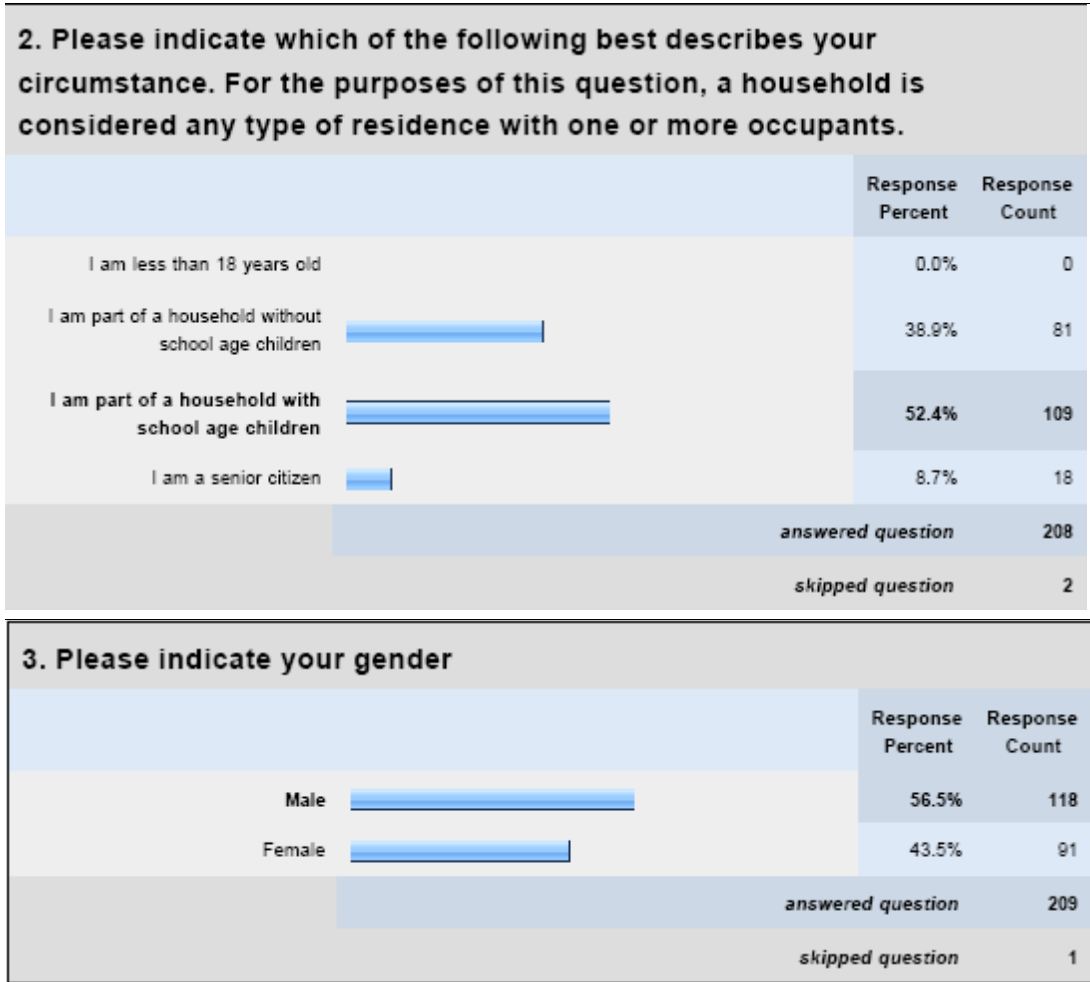
Participants were asked to think about how this non-motorized master plan might improve the way residents, businesses and visitors go about their daily lives and then identify what they thought the top priorities of this project should be. The following is a list of the top visions.

- Continuous sidewalk system along all roads
- More bike lanes throughout the city
- Bicycle and pedestrian friendly city
- Continuous Bicycle and pedestrian network with connections to destinations and neighboring communities
- Safe bicycle and pedestrian crossing at I-96 expressway

Number of respondents who WORK in each area of the City of Novi:



- 171 respondents answered this question (81.4%)
- 61 respondents live in the City of Novi (35.7%)
- 110 survey respondents do NOT live in the City of Novi (64.3%)



4.What is your primary mode of transportation for the following types of trips? Please select walking, bicycling, bus, motorcycle, drive yourself, passenger or other. If you don't typically make a particular trip type select "Not Applicable"

	Not Applicable	Walking	Bicycling	Bus	Motorcycle	Drive Yourself	Carpool	Passenger	Other	Response Count
To Work	13.7% (28)	2.4% (5)	2.0% (4)	1.0% (2)	0.0% (0)	80.0% (164)	0.5% (1)	0.0% (0)	0.5% (1)	205
Education/School	59.7% (117)	6.1% (12)	1.0% (2)	8.7% (17)	0.0% (0)	19.9% (39)	4.1% (8)	0.5% (1)	0.0% (0)	196
Shopping & Personal Business	1.0% (2)	3.4% (7)	3.9% (8)	0.0% (0)	0.0% (0)	89.4% (185)	1.0% (2)	1.0% (2)	0.5% (1)	207
Leisure & Recreation	0.0% (0)	18.9% (39)	35.9% (74)	0.5% (1)	0.5% (1)	41.3% (85)	0.5% (1)	2.4% (5)	0.0% (0)	206
Other	29.1% (34)	29.9% (35)	24.8% (29)	0.0% (0)	0.9% (1)	12.8% (15)	0.0% (0)	1.7% (2)	0.9% (1)	117
									Other (please specify)	37
answered question										209
skipped question										1

Other (please specify)

lake shore park is a weekly destination
 Also Leisure and Recreation
 Do alot of shopping by bike also
 I would bike to work if 10 mile was bike friendly
 Church
 Shopping by bicycle if feasible
 Church
 Leisure
 Exercise
 Amtrak - business travel
 Combination of walking/bicycling/driving myself.
 trips to the bank, sports club
 Exercise
 Leisure & Recreation
 wlaiking for recreation and exercise
 local CVS, etc.
 I walk and bicycle for recreation and exercise
 Walk to downtown for shopping/dinner
 Exercise
 Exercise
 We walk to the businesses on Novi road.
 Exercise
 for recreation
 We ride our bikes around Walled Lake often
 often like to jog or ride bike around community
 Leisure Bike Rides
 City meetings
 Activities with Kids
 roller blade
 Both forms of leisure
 Leisure, Recreation, Exercise
 Walk to the neighborhood park and local Schools
 Any other destination - we drive since we're "land locked" in our subdivision
 Taking child to daycare and summer camp.
 exercise
 Library
 Leisurely walks daily

5. Please describe how frequently you walk and bicycle for the following types of trips:

	Daily	Weekly	Monthly	Rarely	Never	Response Count
Walk for fun and/or exercise	42.4% (87)	42.4% (87)	7.8% (16)	7.3% (15)	0.0% (0)	205
Walk for transportation	3.6% (7)	15.7% (31)	14.2% (28)	38.6% (76)	27.9% (55)	197
Bicycle for fun and/or exercise	19.9% (41)	46.6% (96)	18.4% (38)	11.7% (24)	3.4% (7)	208
Bicycle for transportation	5.1% (10)	16.8% (33)	8.2% (16)	40.3% (79)	29.6% (58)	196
<i>answered question</i>						208
<i>skipped question</i>						2

6. If a system of sidewalks, pathways, crosswalks, bike lanes, etc. is constructed, how do you think that would change your walking and bicycling habits?

	Daily	Weekly	Monthly	Rarely	Never	Response Count
Walk for fun and/or exercise	60.4% (119)	29.4% (58)	6.1% (12)	3.0% (6)	1.0% (2)	197
Walk for transportation	18.0% (34)	29.1% (55)	22.2% (42)	19.6% (37)	11.1% (21)	189
Bicycle for fun and/or exercise	46.3% (94)	39.9% (81)	7.4% (15)	4.9% (10)	1.5% (3)	203
Bicycle for transportation	30.1% (59)	32.1% (63)	19.4% (38)	9.2% (18)	9.2% (18)	196
<i>answered question</i>						207
<i>skipped question</i>						3

7. Are there sidewalks along the local streets in your neighborhood?

	Response Percent	Response Count
All or most of the streets have sidewalks 	34.0%	70
Some sidewalks but with gaps 	34.5%	71
Just a few sidewalks 	9.7%	20
No sidewalks at all 	21.8%	45
<i>answered question</i>		206
<i>skipped question</i>		4



9. For the following commercial/employment areas in Novi, please indicate if you currently walk and/or bicycle to the destinations and if you would be interested in doing so in the future if there was a network of sidewalks, pathways, crosswalks, bike lanes, etc.

	Currently WALK	Would Like to WALK	Would Not WALK	Currently BIKE	Would Like to BIKE	Would Not BIKE	Response Count
8 Mile and Haggerty Rd area	2.1% (3)	16.2% (23)	44.4% (63)	7.0% (10)	44.4% (63)	43.0% (61)	142
10 Mile, Grand River Ave and Haggerty area	6.4% (9)	21.4% (30)	37.9% (53)	9.3% (13)	53.6% (75)	33.6% (47)	140
13 Mile and Novi Rd area	6.3% (9)	19.7% (28)	38.0% (54)	9.9% (14)	50.0% (71)	33.8% (48)	142
Briar Point - Beck Rd and 10 Mile area	4.4% (6)	21.3% (29)	34.6% (47)	9.6% (13)	51.5% (70)	30.9% (42)	136
Main Street - Grand River Av and Novi Rd area	4.7% (7)	34.7% (52)	24.7% (37)	6.0% (9)	69.3% (104)	15.3% (23)	150
Maples Place - 14 Mile and Novi Rd area	3.0% (4)	18.2% (24)	43.9% (58)	6.8% (9)	46.2% (61)	40.2% (53)	132
Novi Town Center	6.0% (9)	27.3% (41)	26.0% (38)	10.0% (15)	62.7% (94)	20.0% (30)	150
Novi and 10 Mile area	8.8% (13)	35.4% (52)	23.1% (34)	15.0% (22)	59.2% (87)	19.7% (29)	147
Novi and Meadowbrook area	15.3% (22)	34.7% (50)	21.5% (31)	17.4% (25)	56.3% (81)	18.8% (27)	144
Oak Point - 9 Mile and Novi Rd area	4.5% (6)	27.1% (36)	33.8% (45)	15.0% (20)	51.9% (69)	24.8% (33)	133
Pontiac Trail and Beck Rd area	6.0% (9)	21.9% (33)	39.1% (59)	8.6% (13)	51.0% (77)	33.8% (51)	151
Providence Park Hospital	2.9% (4)	30.0% (42)	35.0% (49)	7.1% (10)	49.3% (69)	31.4% (44)	140
Twelve Oaks/West Oaks/Twelve Mile Crossing area	1.4% (2)	31.5% (46)	32.2% (47)	5.5% (8)	56.8% (83)	28.8% (42)	146
West Market Square area	2.4% (3)	21.0% (28)	41.9% (52)	3.2% (4)	43.5% (54)	46.0% (57)	124
West Park Dr and Pontiac Trail area	8.7% (13)	26.0% (39)	36.0% (54)	14.0% (21)	45.3% (68)	37.3% (56)	150
Wixom Rd and Grand River Ave area	2.9% (4)	22.1% (30)	35.3% (48)	8.1% (11)	51.5% (70)	36.8% (50)	136
<i>answered question</i>							186
<i>skipped question</i>							24

10. For the following communities and trails surrounding Novi, please indicate if you currently walk and/or bicycle to the destinations and if you would be interested in doing so in the future if there was a network of sidewalks, pathways, crosswalks, bike lanes, etc.

	Currently WALK	Would Like to WALK	Would Not WALK	Currently BIKE	Would Like to BIKE	Would Not BIKE	Response Count
Downtown Farmington	6.2% (9)	10.3% (15)	39.3% (57)	6.9% (10)	42.8% (62)	42.1% (61)	145
Downtown Northville	12.7% (21)	21.2% (35)	22.4% (37)	24.2% (40)	55.2% (91)	15.8% (26)	165
Downtown Walled Lake	9.9% (16)	19.8% (32)	27.8% (45)	16.0% (26)	51.9% (84)	24.1% (39)	162
Downtown Wixom	5.6% (8)	11.1% (18)	39.6% (57)	11.8% (17)	48.6% (70)	31.9% (48)	144
Huron Valley Trail System	3.3% (5)	17.1% (28)	28.9% (44)	17.1% (28)	59.9% (91)	18.4% (28)	152
West Bloomfield Trail	2.2% (3)	12.3% (17)	37.7% (52)	10.1% (14)	57.2% (79)	29.0% (40)	138
					<i>answered question</i>		187
					<i>skipped question</i>		23

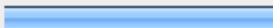
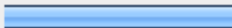
11. For the following recreation areas, please indicate if you currently walk and/or bicycle to those destinations and if you would be interested in doing so in the future if there was a network of sidewalks, pathways, crosswalks, bike lanes, etc.

	Currently WALK	Would Like to WALK	Would Not WALK	Currently BIKE	Would Like to BIKE	Would Not BIKE	Response Count
I-275 Metro Trail	2.2% (3)	10.9% (15)	31.9% (44)	18.8% (26)	51.4% (71)	24.6% (34)	138
ITC Community Sports Park	3.4% (4)	17.8% (21)	28.0% (33)	1.7% (2)	61.0% (72)	28.8% (34)	118
Lakeshore Park	16.0% (26)	23.9% (30)	14.7% (24)	30.7% (50)	51.5% (84)	12.3% (20)	163
Landings Parkland	9.7% (10)	12.6% (13)	37.9% (39)	11.7% (12)	46.6% (48)	35.9% (37)	103
M-5 Metro Trail	1.6% (2)	16.3% (21)	30.2% (39)	6.2% (8)	62.8% (81)	23.3% (30)	129
Maybury State Park	11.1% (17)	20.9% (32)	17.0% (26)	22.9% (35)	58.8% (90)	11.1% (17)	153
Novi Civic Center/Novi Public Library/Ella Mae Power Park	15.3% (21)	24.1% (33)	16.8% (23)	21.9% (30)	54.7% (75)	14.6% (20)	137
Novi Ice Arena	1.7% (2)	20.0% (23)	35.7% (41)	11.3% (13)	40.9% (47)	30.1% (45)	115
Rotary Park	8.6% (11)	20.3% (26)	28.1% (36)	21.9% (28)	41.4% (53)	27.3% (35)	128
Wildlife Woods Park	4.4% (5)	22.1% (25)	30.1% (34)	5.3% (6)	54.0% (61)	31.9% (36)	113
<i>answered question</i>							178
<i>skipped question</i>							32

12. For those destinations on this and the previous page that you indicated that you would like to walk or bicycle to in the future, please indicate the importance of following items in making that trip actually happen in the future.

	Very Important	Somewhat Important	Not Very Important	Not Important	Response Count
Bicycle parking	25.7% (43)	45.5% (76)	22.8% (38)	6.0% (10)	167
Complete sidewalk / roadside pathway system	80.0% (144)	16.1% (29)	2.8% (5)	1.1% (2)	180
Complete bike lane system	62.0% (106)	27.5% (47)	7.6% (13)	2.9% (5)	171
Hands-on training on safe and effective bicycling	7.5% (12)	19.5% (31)	36.5% (58)	36.5% (58)	159
Lighting along sidewalks and pathways	23.5% (40)	37.6% (64)	25.9% (44)	12.9% (22)	170
Mid-block crosswalks	13.8% (22)	32.5% (52)	37.5% (60)	16.3% (26)	160
Map of available pedestrian and bicycle facilities	36.1% (61)	37.3% (63)	20.1% (34)	6.5% (11)	169
On-line customized walking and bicycling routes	25.8% (42)	41.7% (68)	20.9% (34)	11.7% (19)	163
Snow and ice removal from sidewalks and pathways	40.0% (68)	40.6% (69)	17.1% (29)	2.4% (4)	170
Wayfinding signs for suggested bicycle and pedestrian routes to key destinations	32.7% (55)	41.1% (69)	18.5% (31)	7.7% (13)	168
<i>answered question</i>					183
<i>skipped question</i>					27

13. Are you the parent of a school age child or a student yourself? If you answer yes, please fill out the relevant questions on the remainder of this page, otherwise you may proceed to the next page.

	Response Percent	Response Count
Yes 	54.1%	92
No 	45.9%	78
<i>answered question</i>		170
<i>skipped question</i>		40

14. Elementary Schools Which elementary school do you or your children attend and how do you typically get to school?						
How do your or your children typically get to school?						
	Walk	Bike	Bus	Driven	Response Count	
Amerman Elementary School	0.0% (0)	0.0% (0)	100.0% (3)	0.0% (0)	3	
Deerfield Elementary School	0.0% (0)	0.0% (0)	50.0% (1)	50.0% (1)	2	
Hickory Woods Elementary School	5.3% (1)	0.0% (0)	84.2% (16)	10.5% (2)	19	
Meadowbrook Elementary School	0.0% (0)	0.0% (0)	100.0% (2)	0.0% (0)	2	
Novi Meadows School	10.0% (1)	0.0% (0)	80.0% (8)	10.0% (1)	10	
Novi Woods Elementary School	0.0% (0)	0.0% (0)	100.0% (2)	0.0% (0)	2	
Orchard Hills Elementary School	25.0% (1)	0.0% (0)	50.0% (2)	25.0% (1)	4	
Parkview Elementary School	25.0% (1)	0.0% (0)	75.0% (3)	0.0% (0)	4	
Thornton Creek Elementary School	33.3% (2)	16.7% (1)	33.3% (2)	16.7% (1)	6	
Village Oaks Elementary School	36.4% (4)	9.1% (1)	18.2% (2)	36.4% (4)	11	
				Other (please specify)	11	
					answered question	55
					skipped question	155

Other (please specify)

Concordia Lutheran in Farmington Hills - Drive

Novi Community Preschool

West Bloomfield

st william catholic school

Farmington Schools

No children in school

walks in warm weather

Our Lady of Victory

childtime kindergarten, farmington hills...we drive there

Young Fives - walk in afternoon and ride in morning

St William Catholic School

15. Middle Schools Which middle school do you or your children attend and how do you typically get to school?

How do your or your children typically get to school?

	Walk	Bike	Bus	Driven	Response Count	
Geisler Middle School	0.0% (0)	0.0% (0)	100.0% (11)	0.0% (0)	11	
Hillside Middle School	33.3% (1)	0.0% (0)	33.3% (1)	33.3% (1)	3	
Novi Middle School	0.0% (0)	0.0% (0)	80.0% (12)	20.0% (3)	15	
				Other (please specify)	5	
					answered question	29
					skipped question	181

Other (please specify)

Wyandotte Chipawa valley

Greenhills Ann Arbor

Farmington Schools

No children in school

drives in bad weather

16. High Schools Which high school do you or your children attend and how do you typically get to school?

How do your or your children typically get to school?

	Walk	Bike	Bus	Driven	Drive Themselves	Response Count
Catholic Central High School	0.0% (0)	0.0% (0)	0.0% (0)	60.0% (3)	40.0% (2)	5
Novi High School	12.5% (2)	0.0% (0)	43.8% (7)	18.8% (3)	25.0% (4)	16
Walled Lake Western High School	0.0% (0)	0.0% (0)	61.5% (8)	30.8% (4)	7.7% (1)	13
					Other (please specify)	4
					answered question	33
					skipped question	177

Other (please specify)

Chipawa Valley 9th Grade Center

Driven to Walk home

No children in school

Northville High School

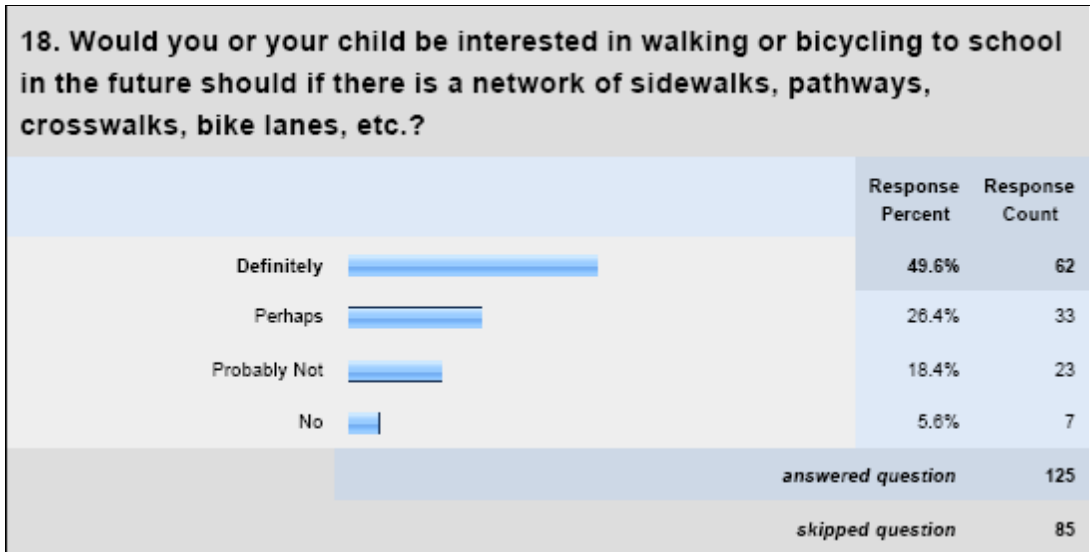
17. Other Schools Which school do you or your children attend and how do you typically get to school?

How do your or your children typically get to school?

	Walk	Bike	Bus	Driven	Drive Themselves	Response Count	
Franklin Road Christian School	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (1)	0.0% (0)	1	
Novi Christian School	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0	
Novi Woods Montessori	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0	
St Paul's Evangelical Lutheran Church & School	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0	
Walsh College	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	100.0% (1)	1	
Wixom Christian School	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0	
					Other (please specify)	6	
						<i>answered question</i>	2
						<i>skipped question</i>	208

Other (please specify)

Peanut Patch Preschool- Drive
 Northern Walled Lake (Driven)
 Treasure Box Preschool
 st william school
 Private Preschool not in Novi
 St William Catholic School



19. What concerns do you or your child have about walking or bicycling to school?						
	Major Concern	Somewhat of a Concern	Minor Concern	Not a Concern	Not Applicable or Not Sure	Response Count
Lack of sidewalks in the neighborhood	52.4% (54)	9.7% (10)	8.7% (9)	20.4% (21)	8.7% (9)	103
Lack of sidewalks or pathways along the main roads	77.1% (84)	8.3% (9)	0.9% (1)	4.6% (5)	9.2% (10)	109
Existing crosswalks too far out of way	28.4% (27)	20.0% (19)	13.7% (13)	21.1% (20)	16.8% (16)	95
Signalized intersections too busy	49.5% (50)	20.8% (21)	10.9% (11)	7.9% (8)	10.9% (11)	101
Too far to walk or bike	22.7% (22)	15.5% (15)	19.6% (19)	34.0% (33)	8.2% (8)	97
No bike racks at school	8.7% (8)	10.9% (10)	16.3% (15)	37.0% (34)	27.2% (25)	92
Weather	24.3% (25)	30.1% (31)	30.1% (31)	6.8% (7)	8.7% (9)	103
Poor lighting along route	26.8% (26)	29.9% (29)	17.5% (17)	14.4% (14)	11.3% (11)	97
Personal security concerns	33.0% (32)	27.8% (27)	16.5% (16)	13.4% (13)	9.3% (9)	97
				Other (please specify)		12
				<i>answered question</i>		118
				<i>skipped question</i>		92

Other (please specify)

Route to high school incomplete, route via 10 mile between meadowbrook and novi rd. incomplete
 Need a bridge from Willowbrook Estates #3 to Village Oaks
 Morning traffic at School-Young and distracted drivers-very dangerous
 Attitudes of motorists towards on-street cyclists
 Big concern for when they move up to Geisler Middle school
 crossing the freeway, no signals, no pathways
 some paths too close to the road
 PERSONAL SECURITY/SAFETY
 dark mornings, crossing streets
 Lockable bike storage
 Pathways too narrow along South Lake & East Lake Dr to feel comfortable letting child go
 corner of 10 & Taft poorly lit and busy at 7am!!!

20. Please indicate how frequently you use a roadside pathway?						
	Daily	Weekly	Monthly	Rarely	Never	Response Count
As a pedestrian	12.3% (21)	28.1% (48)	14.6% (25)	24.6% (42)	20.5% (35)	171
As a bicyclist	4.5% (8)	33.0% (59)	23.5% (42)	21.2% (38)	17.9% (32)	179
	<i>answered question</i>					181
	<i>skipped question</i>					29

21. What are your concerns when walking or bicycling on a roadside pathway?						
	Major Concern	Somewhat of a Concern	Minor Concern	Not a Concern	Not Applicable or Not Sure	Response Count
Overhanging vegetation	13.9% (22)	38.0% (60)	24.1% (38)	20.9% (33)	3.2% (5)	158
Condition of pavement	37.6% (64)	38.2% (65)	14.1% (24)	7.1% (12)	2.9% (5)	170
Rough pavement transitions at intersecting driveways and roadways	34.0% (55)	32.1% (52)	18.5% (30)	12.3% (20)	3.1% (5)	162
Conflicts with pedestrians	9.4% (15)	21.4% (34)	32.7% (52)	33.3% (53)	3.1% (5)	159
Conflicts with bicyclists	4.5% (7)	19.5% (30)	35.1% (54)	36.4% (56)	4.5% (7)	154
Being hit by motor vehicles at intersecting driveways and roadways	40.4% (67)	26.5% (44)	19.3% (32)	10.8% (18)	3.0% (5)	166
Snow and ice	23.0% (37)	36.0% (58)	22.4% (36)	16.1% (26)	2.5% (4)	161
Puddles	7.1% (11)	21.2% (33)	40.4% (63)	28.2% (44)	3.2% (5)	156
Lighting	19.1% (31)	21.6% (35)	32.1% (52)	24.1% (39)	3.1% (5)	162
Gaps in the system	67.3% (113)	22.0% (37)	3.0% (5)	5.4% (9)	2.4% (4)	168
Other (please specify)						12
answered question						178
skipped question						32

Other (please specify)

Access to trail from workplace

had no idea these existed outside of the i-275 path, which is unusable with no parking/access known

Conflicts with pets, both leashed and unleashed

"Roadside paths" and so-called "safety paths" are better for pedestrians and beginner cyclists, but are not safe or recommended for cyclists generally, and do not meet AASHTO standards. There are too many blind conflicts at driveways where drivers are not watching for cyclists, who are moving much faster than pedestrians. Bike lanes are nice where there is room, but all cyclists really need is a clean, paved shoulder and the respect of other roadway users (motorists.) "Sharrows" and wayfinding can be helpful to mark designated routes, but all roads should be Complete Streets. Attempting to segregate all cyclists off to unsafe sidepaths is not acceptable. Getting to the pathways because some roads have no sidewalks or bike lanes.

too close to the roads

Make Bicycle Lanes

No sidewalks at all on Ten Mile from Beck to Wixom Rd. Few sidewalks on Beck from Ten Mile to Grand River

SAFETY

distance signage






personal safety

distance to and Parking at the pathways for access

22. What is your comfort level using a roadside pathway in the following contexts:

	Uncomfortable	Somewhat Uncomfortable	Somewhat Comfortable	Comfortable	Not Applicable or Not Sure	Response Count
With frequent intersecting driveways and/or roadways	14.3% (25)	35.4% (62)	26.9% (47)	21.7% (38)	1.7% (3)	175
When the pathway is right next to the roadway	19.4% (34)	26.9% (47)	22.9% (40)	29.1% (51)	1.7% (3)	175
When there is a strip of grass between the road and pathway	2.9% (5)	8.0% (14)	18.4% (32)	69.0% (120)	1.7% (3)	174
When there is a strip of grass and trees between the road and pathway	4.1% (7)	4.1% (7)	11.6% (20)	77.9% (134)	2.3% (4)	172
<i>answered question</i>						177
<i>skipped question</i>						33

23. How frequently do you bicycle in a designated bike lane?

	Response Percent	Response Count
Daily 	7.3%	13
Weekly 	24.6%	44
Monthly 	16.2%	29
Rarely 	25.1%	45
Never 	26.8%	48
<i>answered question</i>		179
<i>skipped question</i>		31

24. What are your concerns when using or contemplating using a bike lane?						
	Major Concern	Somewhat of a Concern	Minor Concern	Not a Concern	Not Applicable or Not Sure	Response Count
Debris	23.3% (37)	32.1% (51)	25.8% (41)	13.8% (22)	5.0% (8)	159
Condition of the pavement	32.1% (52)	35.8% (58)	21.0% (34)	6.8% (11)	4.3% (7)	162
Being hit by motor vehicles turning into or out of driveways or local roadways	60.5% (104)	23.3% (40)	10.5% (18)	2.9% (5)	2.9% (5)	172
Making left turns on busy roadways	41.7% (68)	31.9% (52)	16.6% (27)	6.1% (10)	3.7% (6)	163
Being hit from behind by a motor vehicle	59.1% (101)	23.4% (40)	11.7% (20)	2.9% (5)	2.9% (5)	171
Snow and ice	22.5% (36)	27.5% (44)	26.9% (43)	16.9% (27)	6.3% (10)	160
Puddles	8.2% (13)	21.5% (34)	36.7% (58)	29.1% (46)	4.4% (7)	158
Lighting	18.5% (29)	24.2% (38)	29.9% (47)	22.3% (35)	5.1% (8)	157
Gaps in the system	60.8% (101)	22.3% (37)	10.8% (18)	2.4% (4)	3.6% (6)	166
				Other (please specify)		12
				answered question		173
				skipped question		37

Other (please specify)

too close to traffic

11 Mile road between Meadowbrook and Town Center drive needs pavement improvement. And bike lanes and/or sharrows would be nice.

Bike lanes are great, but more important is that car drivers respect and share the road with cyclists.

too close to the road

often doesn't exist

Make more bike lanes

Bikes belong on the road not a sidewalk...by law

SAFETY

Very concerned with letting children ride in these areas.

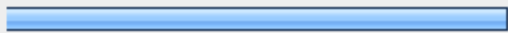
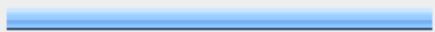
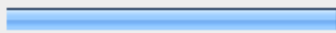
South Lake Drive the bike lanes are incomplete in areas and it is dangerous given the amount of bike traffic access to the pathway

too close to bus and truck traffic



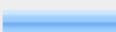
25. What is or would be your comfort level in using a bike lane in the following contexts:

	Uncomfortable	Somewhat Uncomfortable	Somewhat Comfortable	Comfortable	Not Applicable or Not Sure	Response Count
2 to 3 lane road with speeds 36 MPH or less	7.0% (12)	14.5% (25)	26.2% (45)	49.4% (85)	2.9% (5)	172
2 to 3 lane road with speeds 35 to 45 MPH	21.5% (37)	21.5% (37)	25.6% (44)	27.9% (48)	3.5% (6)	172
2 to 3 lane road with speeds greater than 45 MPH	45.9% (79)	25.0% (43)	13.4% (23)	12.2% (21)	3.5% (6)	172
4 to 5 lane road with speeds 35 to 45 MPH	42.4% (73)	18.0% (31)	18.6% (32)	17.4% (30)	3.5% (6)	172
4 to 5 lane road with speeds greater than 45 MPH	59.6% (102)	13.5% (23)	11.7% (20)	11.7% (20)	3.5% (6)	171
					<i>answered question</i>	172
					<i>skipped question</i>	38




26. Desired Project Outcomes

	Response Percent	Response Count
First Priority 	100.0%	159
Second Priority 	84.9%	135
Third Priority 	66.0%	105
	<i>answered question</i>	159
	<i>skipped question</i>	51

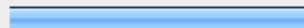

27. On Wednesday, September 29 from 7:00 PM to 8:45 PM there will be a Public Workshop at the new Novi Public Library. The purpose of the workshop will be to identify key issues and review preliminary concepts. Do you plan on attending that workshop?

	Response Percent	Response Count
Yes 	12.6%	21
No 	64.7%	108
Not sure 	22.8%	38
	<i>answered question</i>	167
	<i>skipped question</i>	43

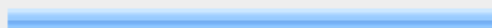

28. On Tuesday, October 26 from 7:00 PM to 8:45 PM there will be a Public Workshop at the new Novi Public Library. The purpose of the workshop will be to review the draft plan. Do you plan on attending that workshop?

	Response Percent	Response Count
Yes 	25.4%	46
No 	27.8%	50
Not sure 	47.0%	85
<i>answered question</i>		181
<i>skipped question</i>		29

29. Would you like to receive e-mail notices of future public workshops and when draft documents are available for review? If yes, please enter the contact information below.

	Response Percent	Response Count
Yes 	60.2%	106
No 	39.8%	70
<i>answered question</i>		176
<i>skipped question</i>		34

30. Optional Contact Information Your name and e-mail will only be used for notices related to this project.

	Response Percent	Response Count
Name 	97.2%	103
e-Mail Address 	100.0%	106
<i>answered question</i>		106
<i>skipped question</i>		104

7.2 September 29, 2010 Public Workshop Summary

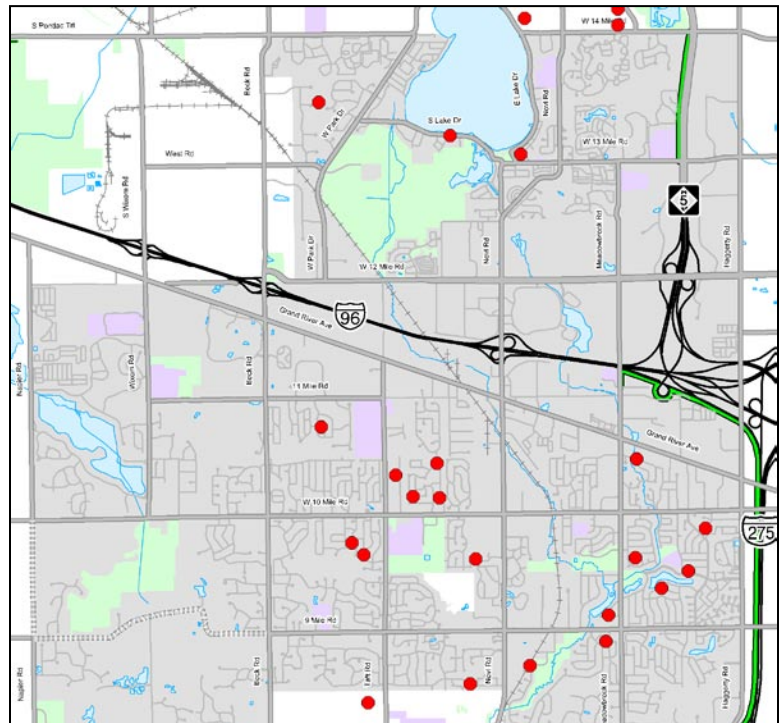
List of Figures

Public Input

A Public Workshop was held on September 29, 2010 for the City of Novi’s Non-Motorized Master Plan. Thirty-three people attended. During the public workshop, participants were given the opportunity to give input. There was a series of five exercises that focused on, places of concern, corridor focus, neighborhood connector routes, regional trails and freeway crossings. The participants were also encouraged to mark additional information the on the maps.

The following pages document the input that was collected during the workshop.

1. Places of Concern Exercise
 - Input Findings
 - Summary Map
2. Corridor Focus Exercise
 - Input Findings
 - Summary Map
3. Neighborhood Connector Exercise
 - Neighborhood Connector Routes Map
 - Bike Lane Map
 - Roadside Pathways Map
 - Road Crossing Map
 - Additional Comments Map
4. Potential Regional Trails
 - Input Findings
 - Summary Map
5. Freeway Crossings
 - Input Findings
 - Summary Map



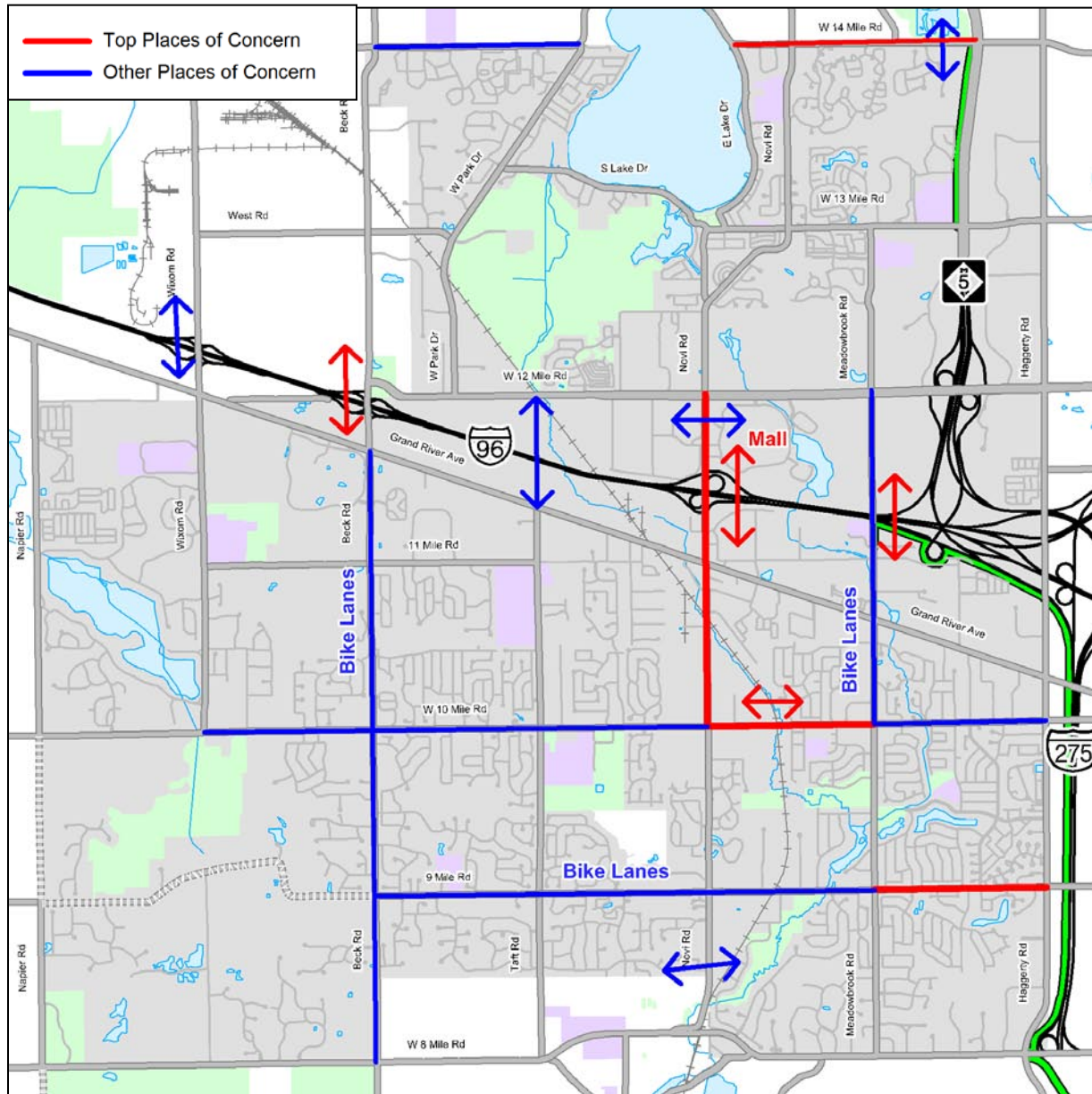
Workshop participants were asked to located where they live with a red dot. Nine participants did not place a dot.

Places of Concern Exercise

Each participant was given a Places of Concern worksheet and was asked to list and describe three specific areas that this project should address. They then circled the locations on the worksheet map. Documented below is a list of all of the responses.

1st Place of Concern	2nd Place of Concern	3rd Place of Concern
Ten Mile between Novi Road and Haggerty	Beck Rd bewteen GR and 8 Mile	
Crossing Novi Road between 8 & 10 Mile	Path along Novi Road from 10 mile to Mall	Connect Trails to Other Cities
Crossing I-96	Path along 14 Mile	Novi Road Between Grand River and 10 Mile
Cross over I-96	Taft Road connect to 12 Mile	Connect Novi to Other Trails
Along 9 Mile between Meadowbrook and Haggerty		
Novi Road From Town Center to 12 Mile	Meadowbrok Rd from 12 Mile to Cherry Hill	12 Oaks Mall to West Oaks Mall
East/West Conectivity on 14 Mile to the Lake	Access across I-96	Access to Mall Via Bicycle
Novi Rd between 9 and 10 Mile, Sidewalk and Shoulder	Novi Rd or Meadowbrook to 14 mile need safety pathway	
10 Mile at Railroad Crossing	Meadowbrook over I-96	Novi Road North of 10 Mile
Bike Access along Novi Road from 10 mile to Grand River	Bike Access along Meadowbrook from 10 mile to 12 mile	Access to Mall Across I-96 overpass
Connect E.Lebost with Village Oaks Elementary School	Mid-block crosswalk at Lebost and 10 mile	Midblock crosswalk at Malott and Meadowbrook
Beck at I-96 SPUI	Wixom at I-96 SPUI	Novi at I-96
Southwest corner of Grand River and Meadowbrook		
Lack of berm on meadowbrook approaching bridge over I-96	Lake of Sidewalk on 10 Mile between Meadowbrook and Novi Road	Lack of berm on 8 mile road between Beck and Napier
Cannot walk or bike to Geisler Middle School, need sidewalks and crossing	Unsafe to bike/walk all the way around walld lake due to novi sidewalk not meeting up with walled lake sidewalk at wast park/pontiac trail intersection	Cross Freeway at Beck Road
10 Mile between Meadowbrook and Novi Road	9 Mile from meadowbrook to haggerty	
10 Mile crossing beck/wixom	Beck Crossing same problem, no crossing	
No Sidewalk/path on Ashbury Dr from River Bridge sub to Rotary Park. Hidden curves give this section obstruct view of walker biker	No path/bike lanes on 9 mile from Novi Road to Center Street	No Continuous Path/Bike Lanes connecting south east section of city to Maybury Park
Meadowbrook Rd between 11 mile and 12 Mile a connection between the bike friendly northside of town an dthe population centers to the south	Connections between neighborhoods allowing cyclist and foot traffic to access attractions while minimizingthe need to use major roadways	
Crossing I-96 at Meadowbrook in Bike Lane and Safety Path	Crossing I-96 at Novi	Crossing I-96 at Beck
Improve crossing at 10 mile/Novi rd intersection	Improve access to Meijers a 8mi and Haggerty	Provide bike lane on 9 mile road
Novi road lack of access to 12 Oaks	Gaps in I-275/M-5 System/Lack of I-96 East west	Connection ot Neighboring Cities
13 Mile Rd pathway, drainages causes sand and debri on pathway most of the time	No sidewalk or pathway on south side of 14 mile rd just west of M-5	West Rd between W.Park and Beck Rd is very rough and dangerous
We need a way to get across M-5 at 14 Mile	Would like shoulders widened where ever possible	Would like a good road from S walled Lake to Kensington
14 Mile between Novi Rd and M-5	Novi Road south of 12 Mile	Novi Road 10 and 11 mile crossing
Bike Lanes along Pontiac Trl (Beck rd to E. Lake)	Bike Lanes along Beck Rd (Pontiact Trail to 10 Mile)	Improve Crossing at Beck and Pontiac Trail
Lack of I-96 crossing Anywhere!	East/West connctions along main roads	More Sidewalks in Neighborhoods

Places of Concern Summary Map



The Top Places of Concern (ranked in order of priority)

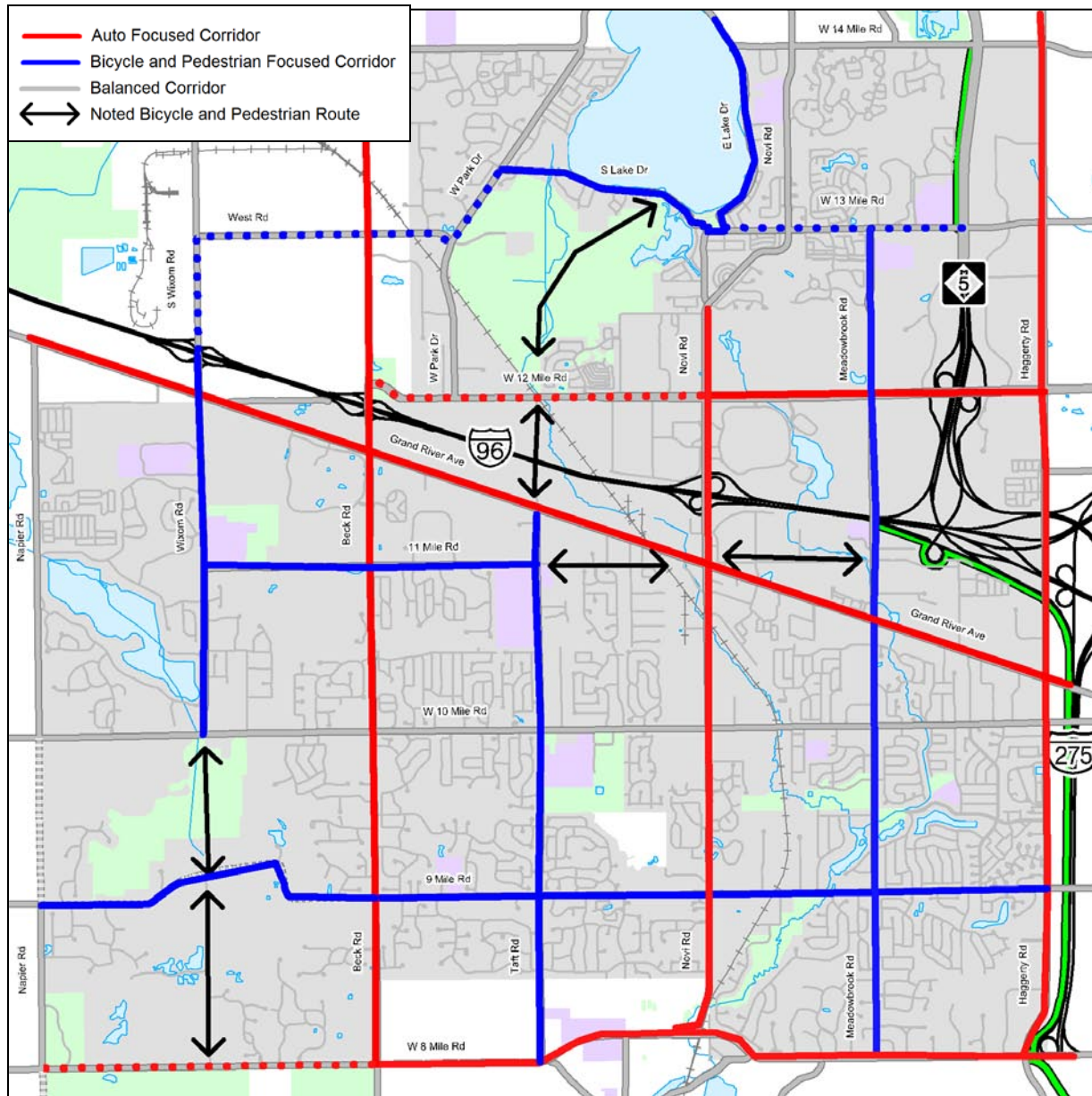
1. Connection needed on Novi Road from 10 Mile Road to 12 Mile with bicycle/pedestrian access across I-96 freeway
2. Bicycle/pedestrian crossing needed across I-96 freeway in general
3. Bicycle and pedestrian crossing needed at Meadowbrook Road across I-96 freeway
4. Need bicycle and pedestrian access to mall
5. Bike facility needed on 9 Mile Road between Meadowbrook Road and Haggerty Road
6. Improve bicycle/pedestrian connections on 10 Mile Road between Meadowbrook Road and Novi Road
7. Freeway Crossing needed at Beck Road and I-96 through S.P.U.I.
8. Connect to Other Cities
9. Provide path along 14 Mile Road to get to M-5 Metro Trail

Corridor Focus Exercise

On individual worksheets, participants were asked to indicate which corridors they thought should have a bicycle and pedestrian focus, an automobile focus and a balance of both. Documented below is a list of the number of votes for each type of corridor.

Corridor	Auto	Bike/Ped	Balance
14 MILE	2	7	17
13 MILE	0	12	14
12 MILE	13	0	14
GRAND RIVER	20	4	2
11 MILE	0	16	10
10 MILE	3	8	14
9 MILE	0	19	6
8 MILE	14	1	14
NAPIER	0	4	20
WIXOM	1	13	12
BECK	14	5	6
W PARK	0	10	13
TAFT	5	20	5
NOVI	14	4	7
LAKE	0	13	7
MEADOWBROOK	0	22	3
HAGGERTY	16	0	9

Corridor Focus Summary Map

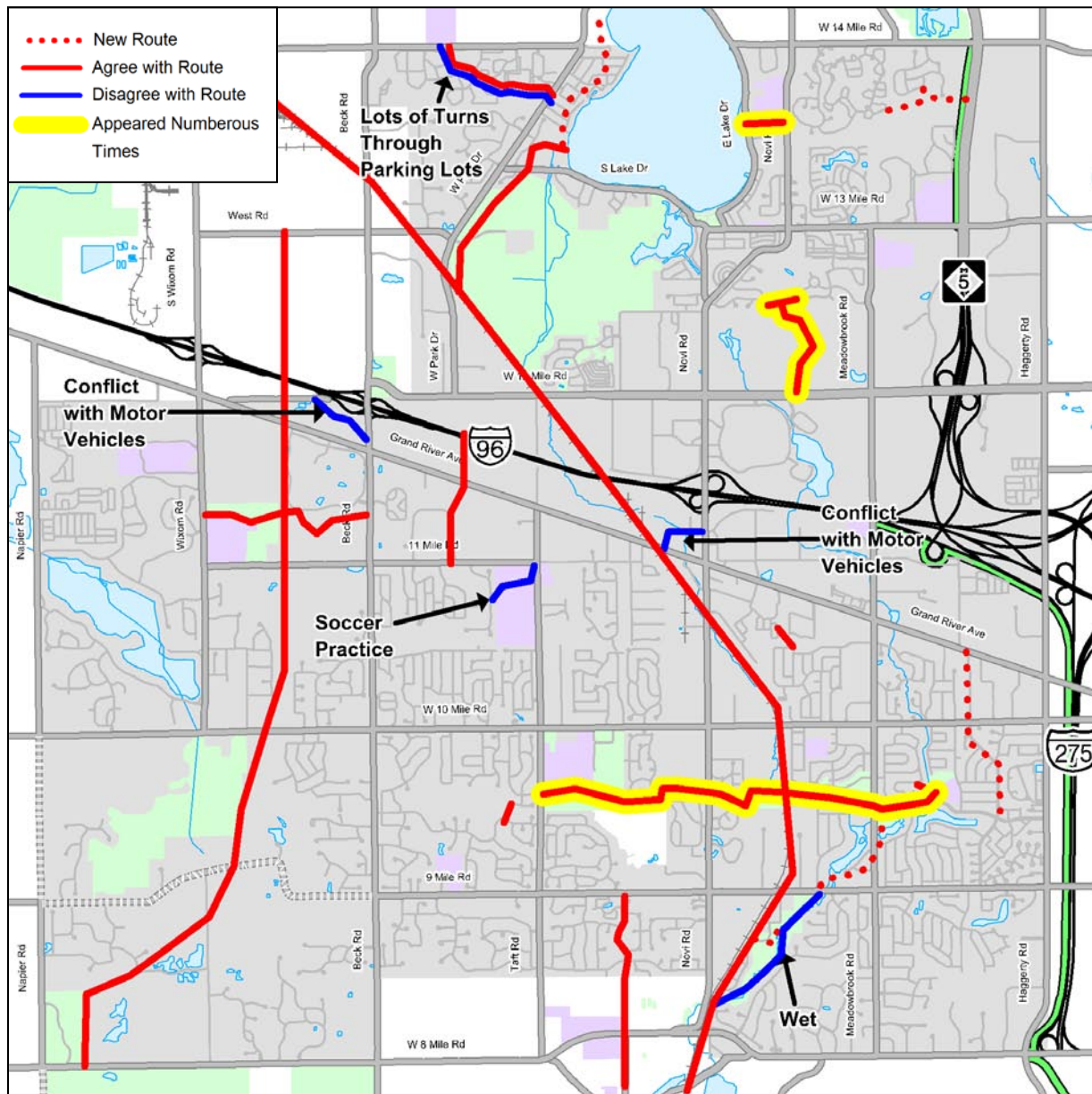


Please note that the corridors with the dotted lines had very close counts.

Neighborhood Connector Exercise

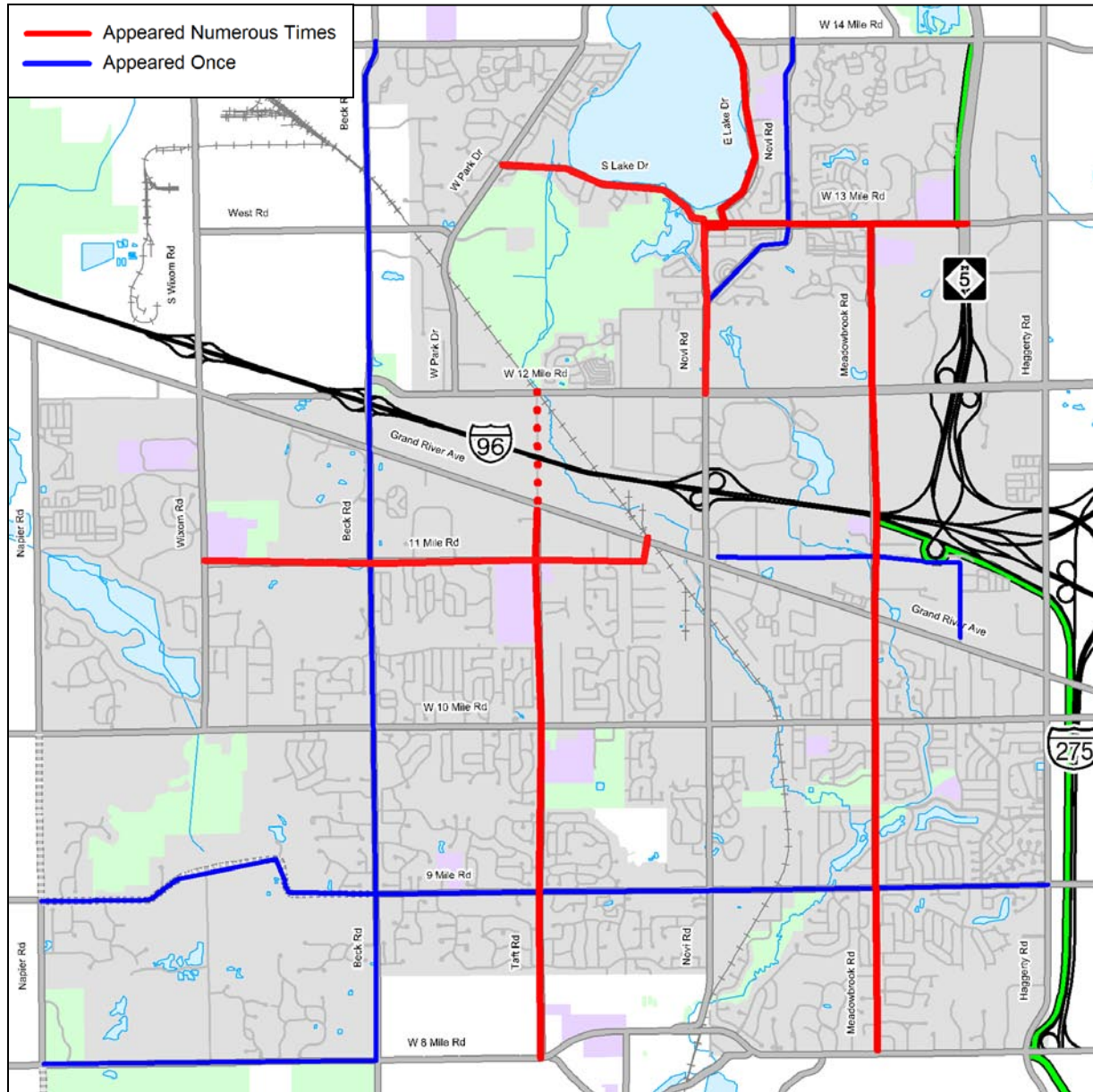
As a group, participants were asked to think about routes that would avoid bicycling or walking along the main roads. Participants were asked to evaluate the provided potential routes and note directly on the large map any changes or concerns they had with the routes. This exercise created a lot of discussion so comments were grouped into five different categories which include, Neighborhood Connectors, Bike Lanes, Roadside Pathway, Crossing Improvements, and Additional Comments. The following maps document the input.

Neighborhood Connector Routes



Please note that alternatives presented in the exercise do not include all potential routes.

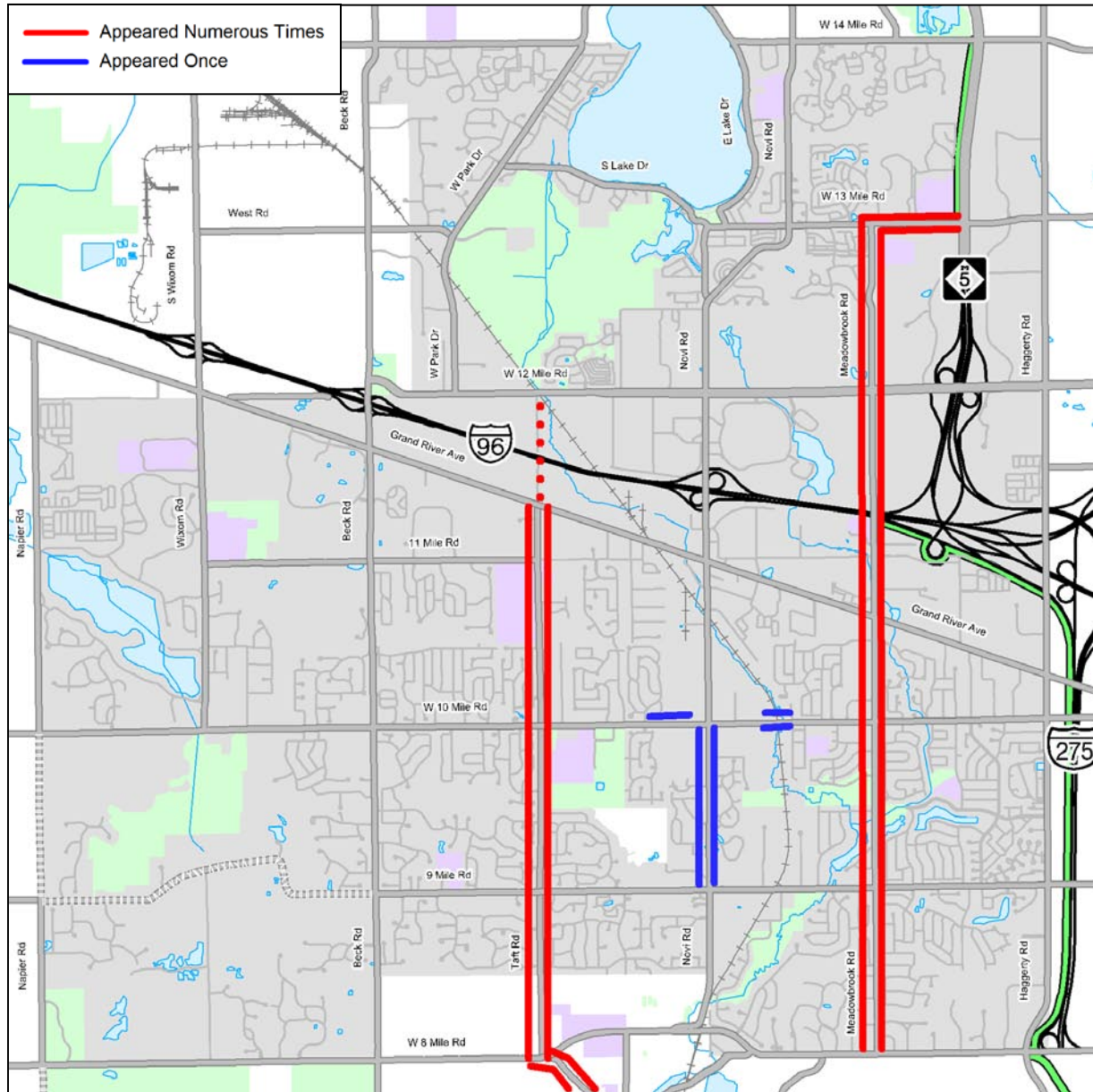
Bike Lanes



Top Bike Lanes

1. Meadowbrook Road
2. Taft Road
3. 11 Mile Road west of Grand River Avenue
4. Novi Road North of W 12 Mile Road
5. South and East Lake Drive
6. W 13 Mile Road to M-5 Metro Trail

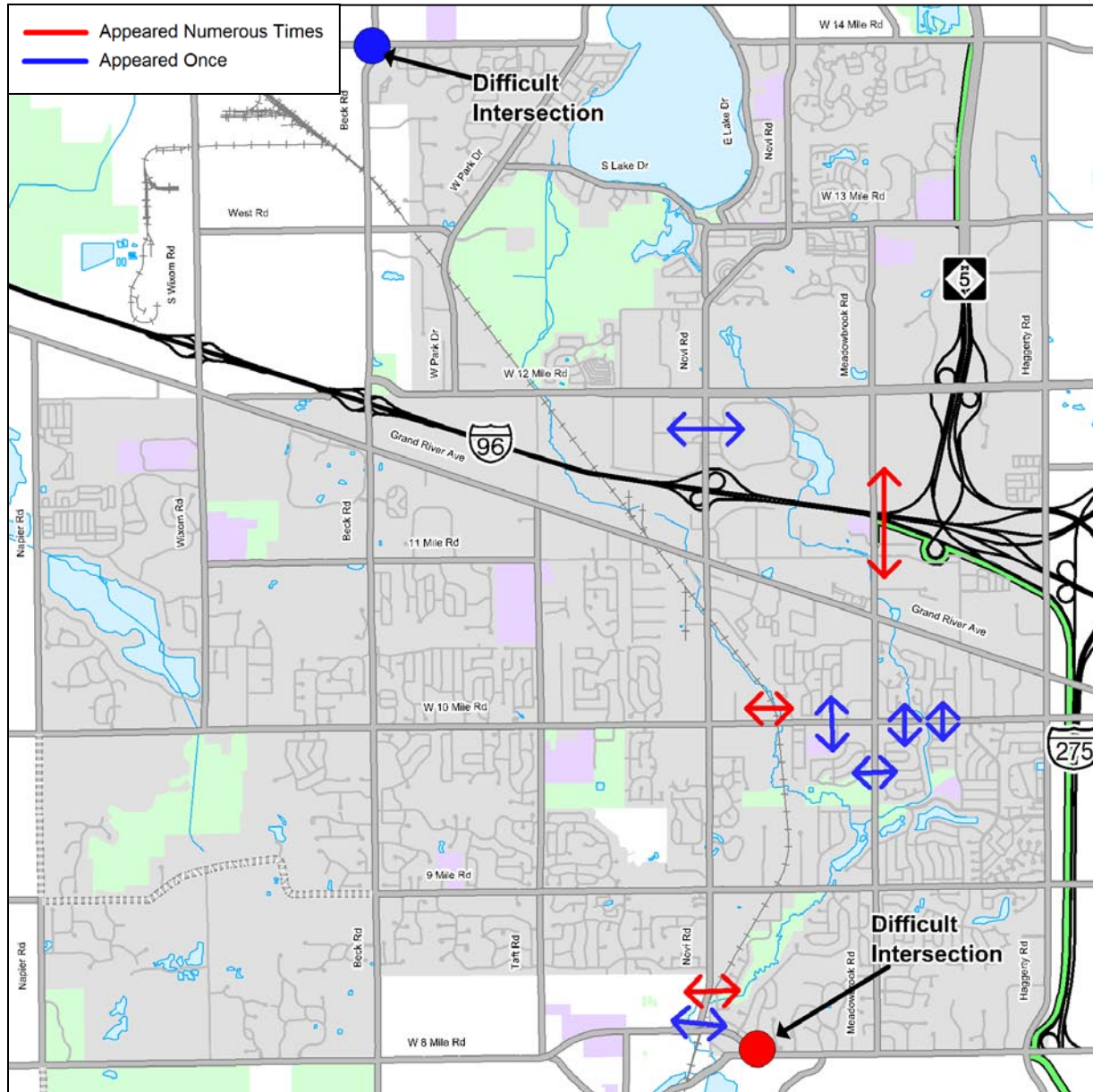
Roadside Pathways



Top Roadside Pathways

1. Along Taft Road
2. Along Meadowbrook Road and a segment of W 13 Mile connecting to M-5 Metro Trail
3. Crossing Over I-96 at Taft Road

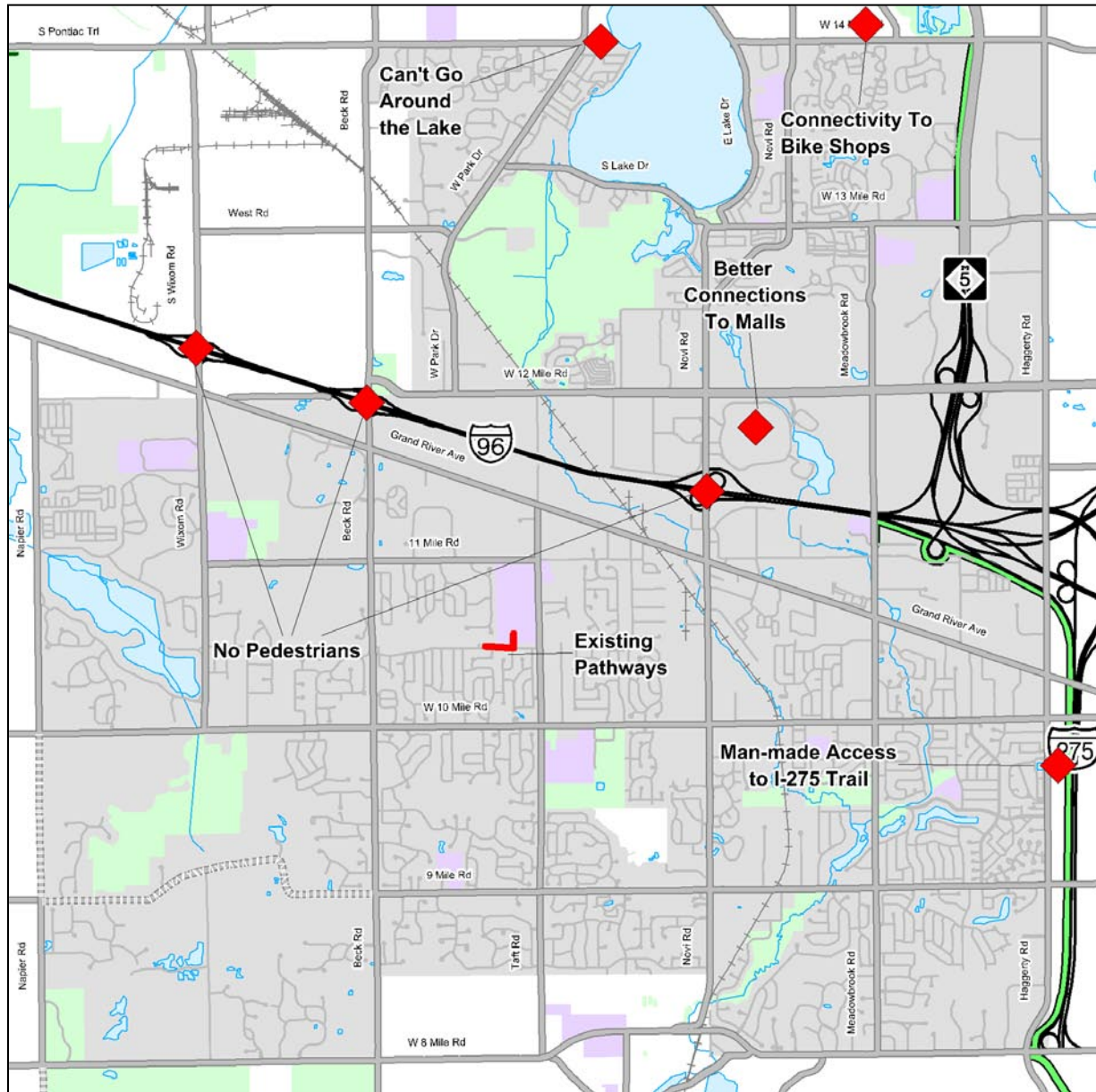
Road Crossing Improvements



Top Road Crossing Improvements

1. Crossing over I-96 at Meadowbrook Road
2. Crossing over Railroad Tracks along 10 Mile between Novi Road and Meadowbrook Road
3. Crossing Novi Road Between 9 Mile Road and W 8 Mile Road
4. Crossing at the Intersection of W 8 Mile Road and Griswold St

Additional Comments

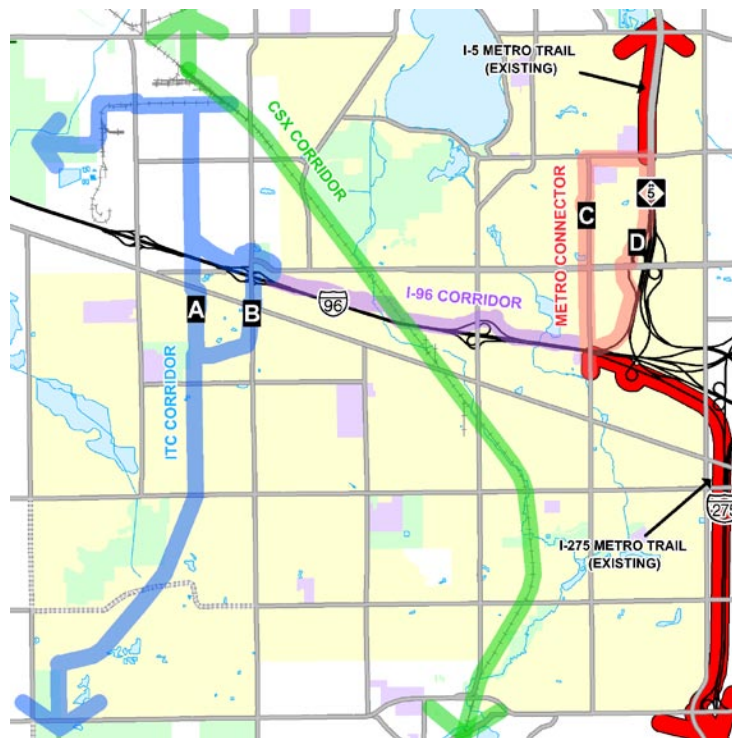


Potential Regional Trail Exercise

Participants were asked to evaluate the potential regional trails by listing pro's and con's and then ranking them in order of significance. Two Trail Corridors also had alternative routes that participants were asked to vote on. Below is documentation of the responses.

Rank in Order of Significance (1 highest, 4 lowest)					Preferred Alternatives			
ITC	CSX	I-96	METRO CONNECTOR		A	B	C	D
4	1	3	2					
4	2	3	1		1		1	
4	1	3	2		1			1
1	2	4	3		1		1	
2	3	4	1		1		1	
4	3	2	1		1		1	
2	4	3	1		1		1	
2	3	4	1		1		1	
3	1	2	4		1		1	
2	1	3	4		1			1
3	1	4	2		1		1	
2	1	4	3		1			1
3	1	4	2					
2	1	4	3		1		1	
2	4	3	1		1		1	
3	4	2	1		1		1	
1	2	4	3		1		1	
3	1	4	2			1	1	
2	1	3	4			1	1	
4	2	3	1			1		1
2	3	4	1		1		1	
1	2	4	3					
2	3	4	1		1		1	
2	4	3	1		1			1
Total	60	51	81	48	18	3	16	5
Rank	3rd	2nd	4th	1st	A Favored		C Favored	

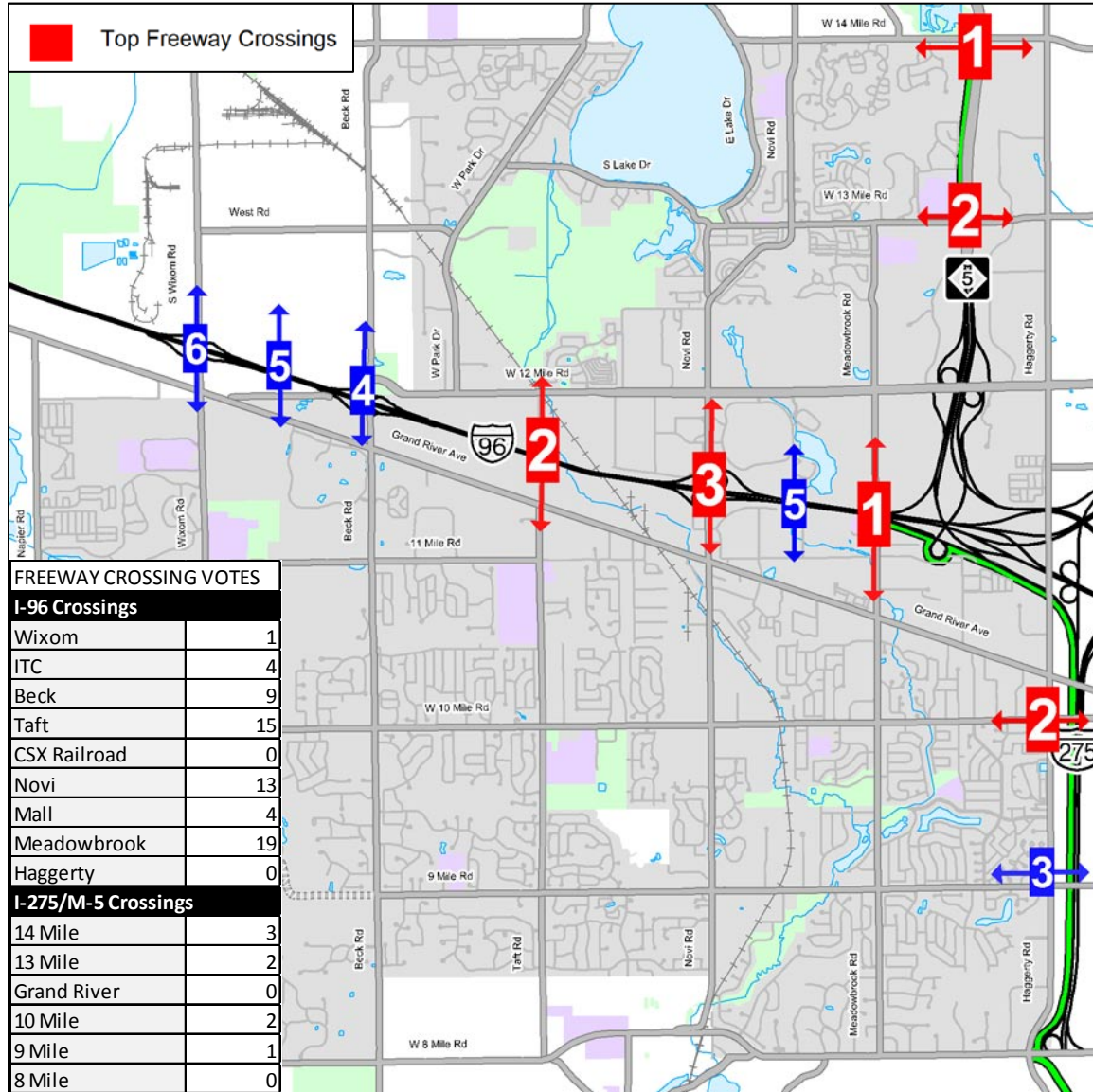
Potential Regional Trail Summary



ITC Corridor	CSX Corridor	I-96 Corridor	Metro Connector
Please Add additional Pro's and Con's to the list.			
Pro's <ul style="list-style-type: none"> Connects to Maybury State Park 	Pro's <ul style="list-style-type: none"> Connects to Northville Access to More People Close to shopping and Lakeshore park Middle of Town 	Pro's <ul style="list-style-type: none"> East/West Connection Alternative to Grand River Ave Belong to State of Michigan Many Destinations 	Pro's <ul style="list-style-type: none"> Connects two existing trails Potential for longer rides
Con's <ul style="list-style-type: none"> Close to High Voltage Wires 	Con's <ul style="list-style-type: none"> Close to Active Railroad 	Con's <ul style="list-style-type: none"> Loud noise from nearby expressway Pollution Lots of Traffic 	Con's <ul style="list-style-type: none"> Parts of it may be along arterial roadways
Preferred Alternatives:			
Please circle A or B for ITC Corridor and C or D from Metro Connector			
A or B			C or D
Rank:			
Based on a regional and local perspective rank the four trails in order of significance from 1 to 4 with 1 being the highest and 4 the lowest			
3	2	4	1

Freeway Crossing Exercise

Individually, participants were asked to identify the top three locations where they thought it was important to provide a safe bicycle and pedestrian crossing over the freeway by placing a dot on the large map. The following map documents the results listed in order of significance, where 1 has the most votes.



The Top Freeway Crossings

North/South across I-96

1. Meadowbrook Road
2. Taft Road
3. Novi Road

East/West across I-275 and M-5

1. 14 Mile
2. W 13 Mile & W 10 Mile

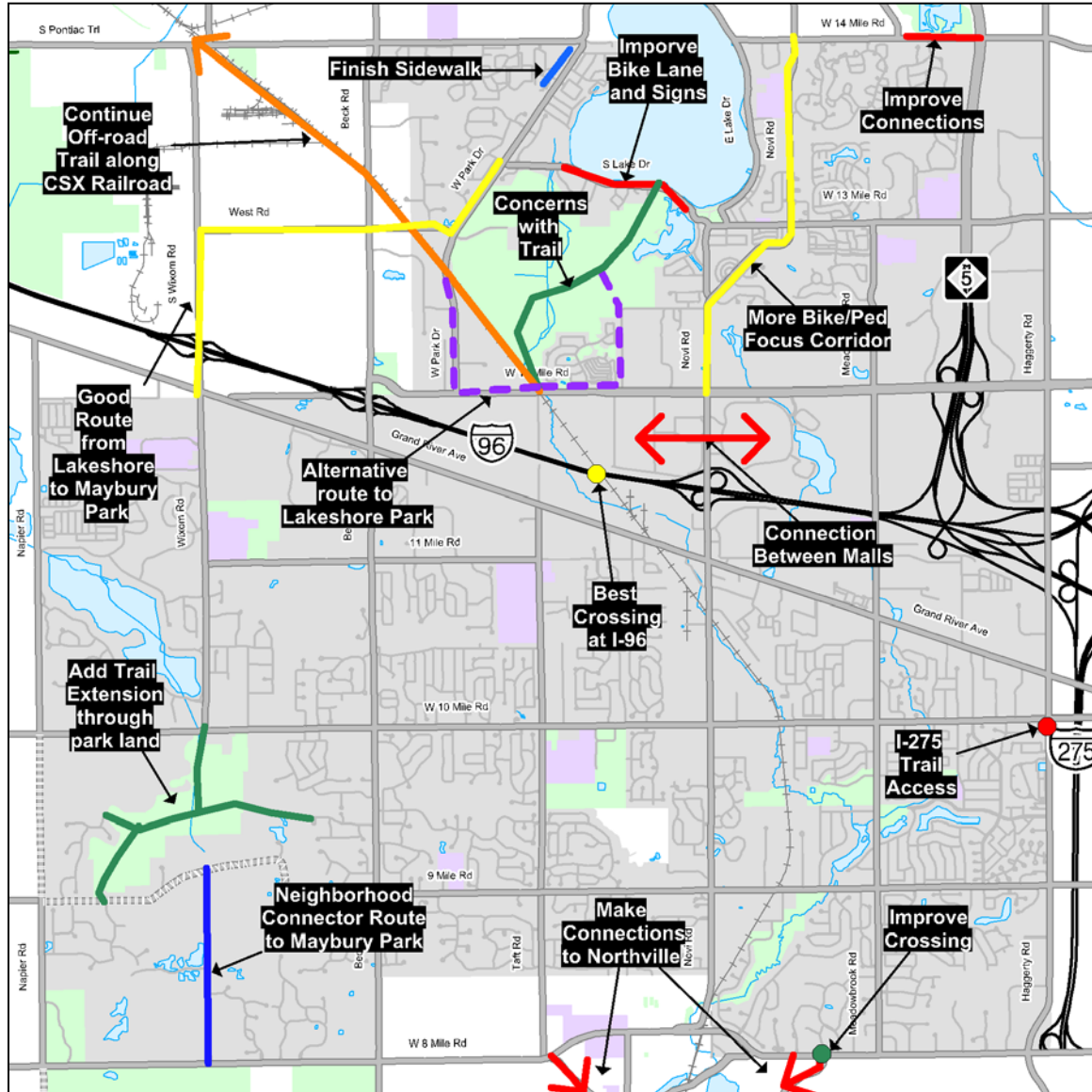
Non-motorized Network Refinement Exercise (Individual)

Each group was given a large base map of the city with the potential non-motorized routes. Participants were asked to review the non-motorized corridors and note any recommended changes and/or concerns. Below is documentation from this exercise. Comments are listed in order of frequency.

Location	Comment
Off road trail through Lakeshore Park (x6)	Major off road trail may create crossing conflicts with Mountain bikers and recreational bikes/pedestrians and impact the natural area. Use Dixon to add bike/ped path across to Taft Road, use limestone to improve existing trail and minimize impact to existing trails
8 mile and Griswold (x4)	Need better crossing and defined route to Downtown Northville (cider mill)
10 Mile and I-275 Trail (x3)	No access between them. Easy quick cheap fix – take down ROW fence on county road property
14 mile at M-5 (x2 agree)	Very important to add bike/ped lanes with new connector
Novi from 12 to 14 Mile (x2)	Could be more bike or mixed focus
Maybury State Park (2)	Access to Maybury State park via Garfield from 9 mile
ITC Trail to Lakeshore Park (x2)	Extend across Beck, West Park to Walled Lake, Western
CSX Crossing (x2)	Continue north to connect to Huron Valley Trail System
CSX Corridor	Using this to get under 96 is great!!!
CSX Corridor	ASAP
CSX Corridor	Too Expensive! Perhaps just use trail with rail for short sections under the expressway
Novi Crossing Over I-96	Just give up, route west to CSX corridor or pedestrian bridge
Crossing I-96	Cross at Meadowbrook since Bridge already wide enough to accommodate non-motorized transportation. Second choice is to use Railroad track space alongside as exists. Make regional connections
Meadowbrook over I-96	Need wider shoulder on bridge approaches
I-96 Crossing	Bridge Taft Road bike path over I-96
Neighborhood connector between west park and Pontiac trail	While this is technically on roads, this is all apartment complexes so you are going through parking lots and buildings. A real safety concern
9 ½ Mile Neighborhood Connector	Probably okay for short connections, but should primarily use mile road walks, trails
Neighborhood connector signs	Rate like ski runs to people know what they're getting onto (ex. Circle, square, diamond, double diamond)
East-west between 9 and 10 mile	Off-road neighborhood connectors: Provide unpaved pathway, parallel to paved pathway for cross country runners and joggers
Meadowbrook Road to 13 Mile	A safe Bike Route n/o Meadowbrook to 13 Mile
9 Mile between Novi and Haggerty	Should be sidewalk only, no bike corridor on road, reduce cost
9 Mile Center to Novi Road	Should be Bike Lane Only, no sidewalk
Grand River	No Bike Lanes
Overall	Phasing is backwards. Install the easy trail or neighborhood connector (laterals) first then bike corridors
12 Mile west of Novi to Beck	Should be mixed focus, necessary ease/west, north of I-96
West Park from South Lake to Pontiac Trail	Need a ped/bike focused trail way to get around lake
ITC Corridor north, through Providence to Beck Road	Connect North to Michigan Airline Trail via Providence Park and Beck Road
Beck and West Intersection	Crossing Improvements – no safe crossing for pedestrians or bikes
All Mile Road Crossing	MDOT has promised safety improvements (ex. Pedestrian activated crossing warning) when are they coming?
Speed Bumps	Remove Speed Bumps to allow bikes between bump and curb
Lakeshore and ITC Corridor	Michigan Mountain Biking Assoc. would love to consult/help!
Top 20	Keep working each year on the top 20 short lengths and safety fixes; seek grant funding for bigger projects. Future road projects should include complete streets

Non-motorized Network Refinement Exercise (Group)

After participants filled out individual sheets they shared their comments and concerns with their group. If there were any ideas that were mentioned numerous times, or a consensus on a particular recommendation the group noted it on the large map. Below is an overview from all of the groups.



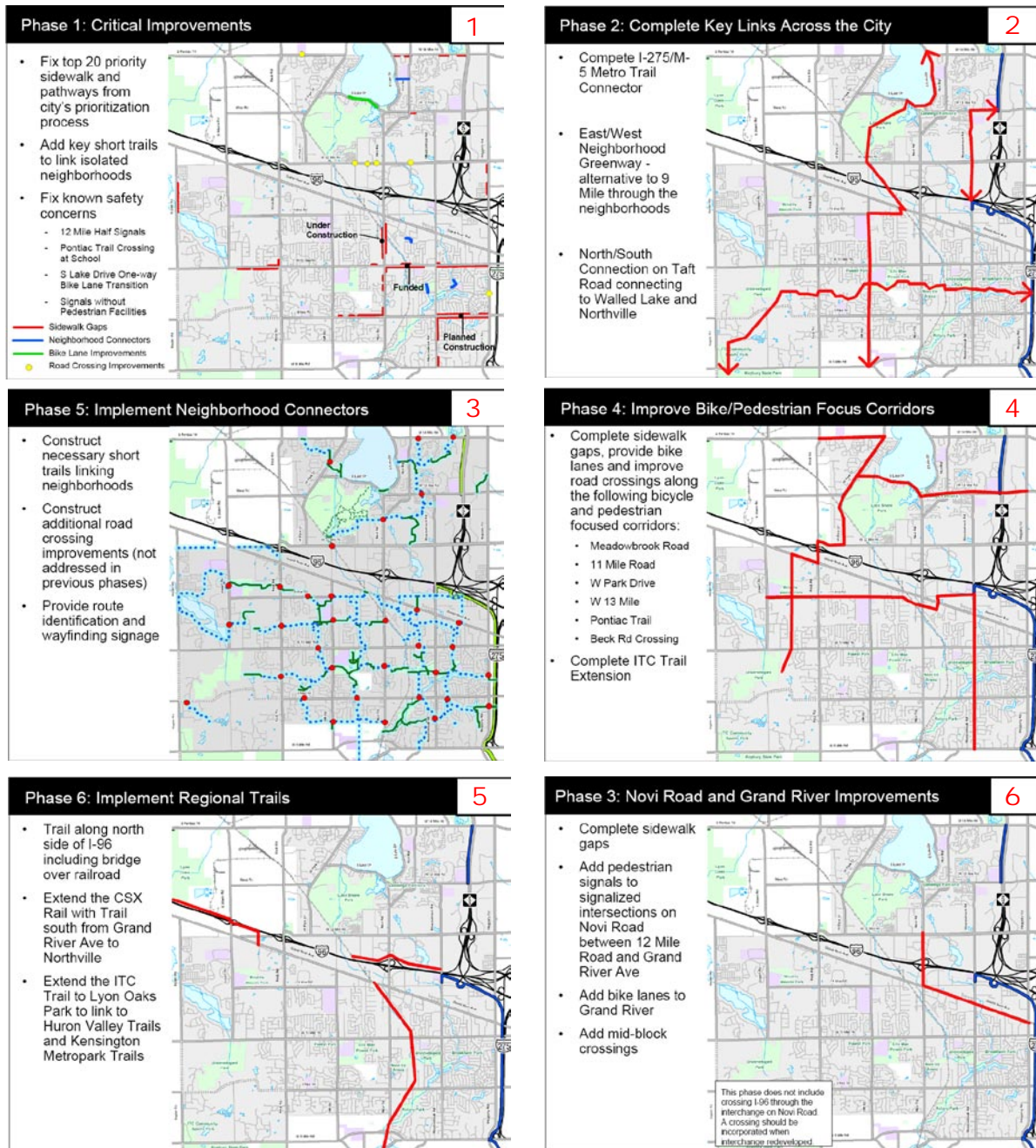
The Top Comments

10. Pathway through Lakeshore Park conflicts with existing unpaved trails, use alternative route (5 groups agreed)
11. Continue to follow CSX railroad north through Lakeshore Park to W Park Drive instead of cutting through Lakeshore Park (4 groups agreed)
12. Use Dixon Road to access Lakeshore Park (2 groups agreed)
13. Continue CSX Railroad north into Wixom (2 groups agreed)
14. Improve Crossing at 8 Mile Road and Griswold providing access to Downtown Northville (2 groups agreed)

Phasing Refinement Exercise

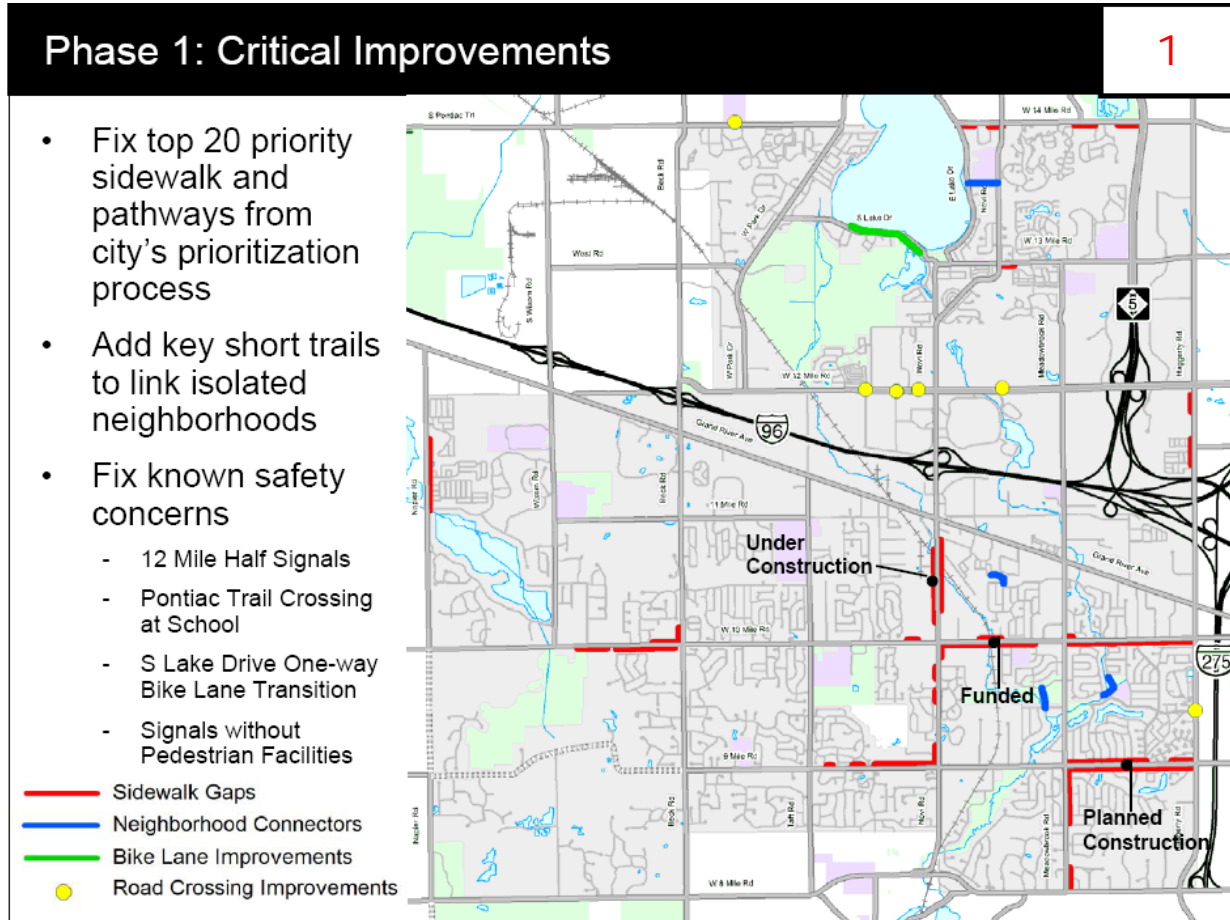
Each group was asked to review the six preliminary phases. Individually, each person voted on their top three priority phases. Then as a group everyone discussed and arranged the phases until they came to a consensus on the order in which they should be implemented. Participants were also allowed to move elements from one phase into another. Once a final order was established, each group renumbered the phases from one to six.

Based on group refinement, the order of the phasing was changed to: **1, 2, 5, 4, 6, 3**

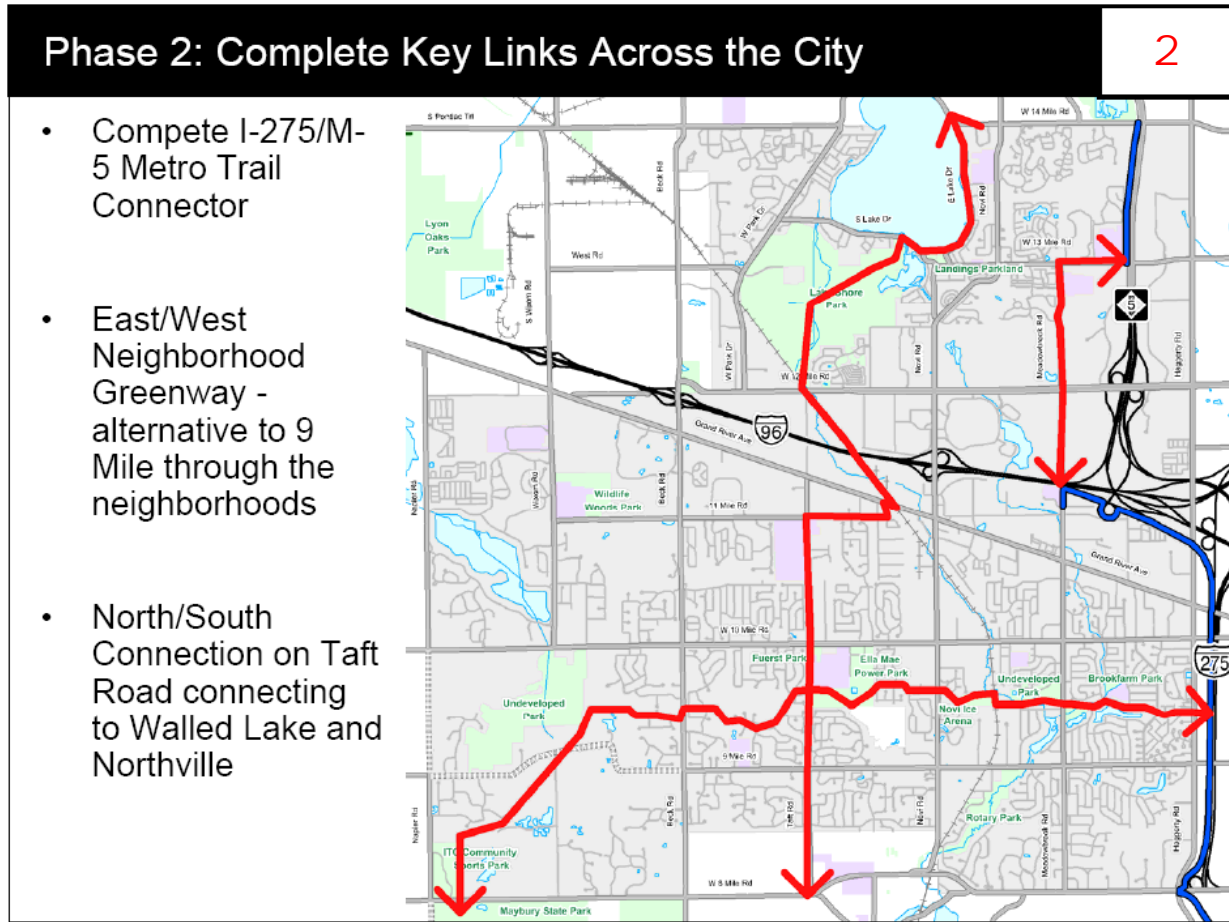


Please refer to the following documents for more details regarding the phasing.

Phase 1 Refinement



Phase 2 Refinement



Proposed Phase: 2, 2, 2, 2, 2, 2, 3, 1

Proposed Changes:

- Avoid building trail through Lakeshore Park, use alternative routes around park
- Complete CSX Railroad south of Grand River toward Northville
- Do not construct ITC trail all the way to ITC Community Sports Park, end at 9 mile and use Garfield Road as the connection to Maybury Park instead

Phase 3 Refinement

Phase 3: Novi Road and Grand River Improvements

6

- Complete sidewalk gaps
- Add pedestrian signals to signalized intersections on Novi Road between 12 Mile Road and Grand River Ave
- Add bike lanes to Grand River
- Add mid-block crossings

Proposed Phase: 6, 6, 6, 6, 6, 6, 6, 5

General Reasoning to change to Phase 6: Not a major priority

Phase 4 Refinement

Phase 4: Improve Bike/Pedestrian Focus Corridors
4

- Complete sidewalk gaps, provide bike lanes and improve road crossings along the following bicycle and pedestrian focused corridors:
 - Meadowbrook Road
 - 11 Mile Road
 - W Park Drive
 - W 13 Mile
 - Pontiac Trail
 - Beck Rd Crossing
- Complete ITC Trail Extension

Proposed Phase: 4, 4, 4, 3, 3, 2, 2, 5

Proposed Changes:

- Include extension of the ITC Trail to Lyon Oaks Park to link to the Huron Valley Trails and Kensington Metropark Trails

Phase 5 Refinement

Phase 5: Implement Neighborhood Connectors
3

- Construct necessary short trails linking neighborhoods
- Construct additional road crossing improvements (not addressed in previous phases)
- Provide route identification and wayfinding signage

Proposed Phase: 3, 3, 3, 3, 3, 5, 4, 2

General Reasoning to change to Phase 3: Affordable and easy to implements and great for kids

Phase 6 Refinement

Phase 6: Implement Regional Trails 5

- Trail along north side of I-96 including bridge over railroad
- Extend the CSX Rail with Trail south from Grand River Ave to Northville
- Extend the ITC Trail to Lyon Oaks Park to link to Huron Valley Trails and Kensington Metropark Trails

Proposed Phase: 5, 5, 5, 5, 4, 4, 4, 6

Prioritization Refinement Exercise

Individually, each participant was asked how they would allocate \$100 into the following four categories, system maintenance, completing the non-motorized network, system amenities and education and encouragement programs. Then participants were asked to determine how important they felt each line item was in each category. Below is a summary of the input.

System Maintenance:

\$ 22	Total Dollar Allocation for Category	Line Item Prioritization (Number of Votes)		
		High	Medium	Low
Snow and ice removal		7	15	7
Pavement repair		22	6	1

Completing the Non-motorized Network:

\$ 52	Total Dollar Allocation for Category	Line Item Prioritization (Number of Votes)		
		High	Medium	Low
Sidewalks & pathways along primary roadways		17	13	0
Bike Lanes along primary roadways		17	7	4
Neighborhood connectors		16	9	3
Off-road Trails		10	13	6

System Amenities:

\$ 18	Total Dollar Allocation for Category	Line Item Prioritization (Number of Votes)		
		High	Medium	Low
Lighting of pathways/bike lanes		3	11	15
Bicycle parking		2	16	11
Wayfinding signs		15	10	3
Landscaping, benches, drinking fountains, art, etc.		1	13	15

Education and Encouragement Programs:

\$ 8	Total Dollar Allocation for Category	Line Item Prioritization (Number of Votes)		
		High	Medium	Low
Education programs for school-age children		13	10	6
Police enforcement of laws related to bikes and peds.		5	9	15
Commuter challenge		1	8	20
Promotional events such as group rides and fairs		6	10	13

Additional Comments

An optional comment card was provided at the end of the meeting for participants to share any additional information with the design team. Below is documentation from these cards.

- Ensure that the latest update of the Top 20 Critical Sidewalk projects is used
- Adopt maintenance plan: owner responsibility of maintenance along pathways (e.g. landscape and tree maintenance, sight distance, drainage, ect.)
- Provide off-road unpaved pathways for cross country runners and joggers
- Like connection between Chattman and Orchard Hills Elementary and other Neighborhood Connectors
- Consider Bridging Taft over I-96 for easy north-south access to Lakeshore Park
- Thank you for your efforts! I look forward to seeing this to fruition
- PIZZA!
- Good Program!
- Funding costs and available resources need to be taken into account for phasing recommendations
- All good stuff

7.4 Maintenance and Operations Budgets

There are many other factors that can affect cost of maintenance for a non-motorized system. However, the main factor affecting cost is the difference in agencies that maintain and operate facilities. Each agency will have different labor costs, access to different machinery and equipment, and may or may not have a volunteer base to offer assistance.

Routine maintenance can be defined as maintenance that is needed to keep the facility operating in a safe and usable condition, not involving major development or reconstruction. Below is a list of typical routine maintenance activities and their associated annual cost per mile (when applicable):

- Asphalt Paved Trail - \$4500 per mile annually (includes sweeping/blowing of debris, mowing of shoulders, vegetation control, asphalt sealing, and snow removal)
- Asphalt Side Path - \$700 per mile annually (includes asphalt sealing, and snow removal)
- Concrete Sidewalk – 30+ year useful life with little or no yearly maintenance (assumes adjacent property owners are required to remove snow and repair broken or shifting flags as needed)
- Pedestrian Bridge – 50+ year useful life with little or no yearly maintenance (dependent on deck surface)
- Boardwalk - \$18,000 per mile annually (based on power-washing, mildewcide application and sealing of decking every three years)
- Bicycle Lanes - \$10,000 per mile annually (includes weekly sweeping and annual re-striping)
- Signals - \$200 annually

7.5 Implementation Budget Figures

Initial Investments

Sidewalk Gaps							
Segment	Priority	Location	Description	Quantity	Unit	Unit Price	Cost Estimate
121	19	Nine Mile	South Between Haggerty and Meadowbrook				
			Pre -Construction Audio Visual	1	ls	\$1,500.00	\$1,500.00
			Soil Erosion Control	4985	lf	\$1.75	\$8,723.75
			Maintaining Traffic	4985	lf	\$2.00	\$9,970.00
			Concrete (8ft)	4985	lf	\$36.00	\$179,460.00
			Grading	1	ls	\$20,000.00	\$20,000.00
			ADA Ramps	14	ea	\$600.00	\$8,400.00
			Restoration	4985	lf	\$10.00	\$49,850.00
			<i>Sub-Total</i>				<u>\$277,903.75</u>
			Mobilization (5%)	1	ls		\$13,895.19
			Contingency (20%)				\$55,580.75
			<i>Construction Estimate</i>				<u>\$347,379.69</u>
			Professional Fees (25%)				\$86,844.92
			TOTAL ESTIMATE				\$434,224.61
119	13	Meadowbrook	East Between Eight Mile and Nine Mile				
			Section 1:				
			Pre -Construction Audio Visual	1	ls	\$1,500.00	\$1,500.00
			Soil Erosion Control	1233	lf	\$1.75	\$2,157.75
			Maintaining Traffic	1233	lf	\$2.00	\$2,466.00
			Concrete (8ft)	1233	lf	\$36.00	\$44,388.00
			Grading	1	ls	\$5,000.00	\$5,000.00
			ADA Ramps	5	ea	\$600.00	\$3,000.00
			Restoration	1233	lf	\$10.00	\$12,330.00
			<i>Sub-Total</i>				<u>\$70,841.75</u>
			Mobilization (5%)				\$3,542.09
			Contingency (20%)				\$14,168.35
			<i>Construction Estimate</i>				<u>\$88,552.19</u>
			Professional Fees (25%)				\$22,138.05
			TOTAL ESTIMATE				\$110,690.23
			<i>Easement Needed - Approx.</i>	<i>9405</i>	<i>sf</i>		
			Section 2:				
			Pre -Construction Audio Visual	1	ls	\$1,500.00	\$1,500.00
			Soil Erosion Control	2533	lf	\$1.75	\$4,432.75
			Maintaining Traffic	2533	lf	\$2.00	\$5,066.00
			Concrete (8 ft)	2533	lf	\$36.00	\$91,188.00
			Enclose Drain	1089	lf	\$18.00	\$19,602.00
			ADA Ramps	5	ea	\$600.00	\$3,000.00
			Restoration	2533	lf	\$10.00	\$25,330.00
			<i>Sub-Total</i>				<u>\$150,118.75</u>
			Mobilization (5%)				\$7,505.94
			Contingency (20%)				\$30,023.75
			<i>Construction Estimate</i>				<u>\$187,648.44</u>
			Professional Fees (25%)				\$46,912.11
			TOTAL ESTIMATE				\$234,560.55
			TOTAL ESTIMATE FOR ENTIRE SEGMENT 119				\$345,250.78

83	1	Nine Mile	North	Between Haggerty and Meadowbrook				
Section 1:								
				Pre -Construction Audio Visual	1	ls	\$1,500.00	\$1,500.00
				Soil Erosion Control	3155	lf	\$1.75	\$5,521.25
				Maintaining Traffic	3155	lf	\$2.00	\$6,310.00
				Asphalt (10 ft)	3155	lf	\$40.00	\$126,200.00
				Enclose Drain	275	lf	\$18.00	\$4,950.00
				Tree Removal	1	ls	\$5,000.00	\$5,000.00
				ADA Ramps	10	ea	\$600.00	\$6,000.00
				Restoration	3155	lf	\$10.00	\$31,550.00
					<i>Sub-Total</i>			\$187,031.25
								\$9,351.56
								\$37,406.25
					<i>Construction Estimate</i>			\$233,789.06
Section 2:								
				Pre -Construction Audio Visual	1	ls	\$1,500.00	\$1,500.00
				Soil Erosion Control	973	lf	\$1.75	\$1,702.75
				Maintaining Traffic	973	lf	\$2.00	\$1,946.00
				Asphalt (10 ft)	973	lf	\$40.00	\$38,920.00
				ADA Ramps	1	ea	\$600.00	\$600.00
				Restoration	973	lf	\$10.00	\$9,730.00
					<i>Sub-Total</i>			\$54,398.75
								\$2,719.94
								\$10,879.75
					<i>Construction Estimate</i>			\$67,998.44
TOTAL CONSTRUCTION ONLY ESTIMATE FOR ENTIRE SEGMENT 83								\$301,787.50
84	20	Meadowbrook	East	Between Nine and Ten Mile				
				Pre -Construction Audio Visual	1	ls	\$1,500.00	\$1,500.00
				Soil Erosion Control	4626	lf	\$1.75	\$8,095.50
				Maintaining Traffic	4626	lf	\$2.00	\$9,252.00
				Concrete (8ft)	3680	lf	\$36.00	\$132,480.00
				Boardwalk (8ft wide)	916	lf	\$175.00	\$160,300.00
				Bridge (14 ft wide; 30 ft long)	1	ls	\$70,000.00	\$70,000.00
				ADA Ramps	5	ea	\$600.00	\$3,000.00
				Restoration	4626	lf	\$10.00	\$46,260.00
					<i>Sub-Total</i>			\$430,887.50
								\$21,544.38
								\$86,177.50
					<i>Construction Estimate</i>			\$538,609.38
								\$134,652.34
TOTAL ESTIMATE								\$673,261.72
81	6	Ten Mile	South	Between Haggerty and Meadowbrook				
				Pre -Construction Audio Visual	1	ls	\$1,500.00	\$1,500.00
				Soil Erosion Control	4973	lf	\$1.75	\$8,702.75
				Maintaining Traffic	4973	lf	\$2.00	\$9,946.00
				Concrete (5ft)	4913	lf	\$20.00	\$98,260.00
				Adjust Manholes	1	ls	\$1,000.00	\$1,000.00
				Bridge (Ingersol Creek; 14x30')	1	ls	\$70,000.00	\$70,000.00
				Bridge (Bishop Creek; 14x30')	1	ls	\$70,000.00	\$70,000.00
				Tree Removal	1	ls	\$5,000.00	\$5,000.00
				ADA Ramps	13	ea	\$600.00	\$7,800.00
				Restoration	4973	lf	\$10.00	\$49,730.00
					<i>Sub-Total</i>			\$321,938.75
								\$16,096.94
								\$64,387.75
					<i>Construction Estimate</i>			\$402,423.44
								\$100,605.86
TOTAL ESTIMATE								\$503,029.30
<i>Easement Needed - Approx.</i>								32700 sf

80B	10	Ten Mile	North East of Meadowbrook				
				Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
				Soil Erosion Control	215 lf	\$1.75	\$376.25
				Maintaining Traffic	215 lf	\$2.00	\$430.00
				Concrete (5ft)	215 lf	\$20.00	\$4,300.00
				Restoration	215 lf	\$10.00	\$2,150.00
				<i>Sub-Total</i>			\$8,756.25
				Mobilization (5%)			\$437.81
				Contingency (20%)			\$1,751.25
				<i>Construction Estimate</i>			\$10,945.31
				Professional Fees (25%)			\$2,736.33
				TOTAL ESTIMATE			\$13,681.64
			<i>Easement Needed - Approx.</i>		11960 sf		
90	8	Ten Mile	South Between Meadowbrook and Novi Rd				
				Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
				Soil Erosion Control	3337 lf	\$1.75	\$5,839.75
				Maintaining Traffic	3337 lf	\$2.00	\$6,674.00
				Concrete (8ft)	3023 lf	\$36.00	\$108,828.00
				Boardwalk	284 lf	\$175.00	\$49,700.00
				Bridge (14x30')	1 ls	\$70,000.00	\$70,000.00
				RR Crossing	100 lf	\$100.00	\$10,000.00
				ADA Ramps	4 ea	\$600.00	\$2,400.00
				Restoration	3337 lf	\$10.00	\$33,370.00
				<i>Sub-Total</i>			\$288,311.75
				Mobilization (5%)			\$14,415.59
				Contingency (20%)			\$57,662.35
				<i>Construction Estimate</i>			\$360,389.69
				Professional Fees (25%)			\$90,097.42
				TOTAL ESTIMATE			\$450,487.11
			<i>Easement Needed - Approx.</i>		140850 sf		
89	11	Novi Rd	East Between Ten Mile and Ice Arena				
				Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
				Soil Erosion Control	464 lf	\$1.75	\$812.00
				Maintaining Traffic	464 lf	\$2.00	\$928.00
				Boardwalk (City standard)	464 lf	\$175.00	\$81,200.00
				Restoration	464 lf	\$10.00	\$4,640.00
				<i>Sub-Total</i>			\$89,080.00
				Mobilization (5%)			\$4,454.00
				Contingency (20%)			\$17,816.00
				<i>Construction Estimate</i>			\$111,350.00
				Professional Fees (25%)			\$27,837.50
				TOTAL ESTIMATE			\$139,187.50

92	5	Novi Rd	West	Between Nine and Ten Mile				
Section 1:								
				Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00	
				Soil Erosion Control	354 lf	\$1.75	\$619.50	
				Maintaining Traffic	354 lf	\$2.00	\$708.00	
				Concrete (5ft)	314 lf	\$20.00	\$6,280.00	
				Bridge (14'x40')	1 ls	\$90,000.00	\$90,000.00	
				Restoration	354 lf	\$10.00	\$3,540.00	
<i>Sub-Total</i>								\$102,647.50
Mobilization (5%)								\$5,132.38
Contingency (20%)								\$20,529.50
<i>Construction Estimate</i>								\$128,309.38
Professional Fees (25%)								\$32,077.34
TOTAL ESTIMATE								\$160,386.72
				<i>Easement Needed - Approx.</i>	<i>20000 sf</i>			
Section 2:								
				Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00	
				Soil Erosion Control	305 lf	\$1.75	\$533.75	
				Maintaining Traffic	305 lf	\$2.00	\$610.00	
				Concrete (5ft)	305 lf	\$20.00	\$6,100.00	
				Restoration	305 lf	\$10.00	\$3,050.00	
<i>Sub-Total</i>								\$11,793.75
Mobilization (5%)								\$589.69
Contingency (20%)								\$2,358.75
<i>Construction Estimate</i>								\$14,742.19
Professional Fees (25%)								\$3,685.55
TOTAL ESTIMATE								\$18,427.73
				<i>Easement Needed - Approx.</i>	<i>30000 sf</i>			
Section 3:								
				Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00	
				Soil Erosion Control	890 lf	\$1.75	\$1,557.50	
				Maintaining Traffic	890 lf	\$2.00	\$1,780.00	
				Concrete (5ft)	890 lf	\$20.00	\$17,800.00	
				Clearing and Grubbing	1 ls	\$5,000.00	\$5,000.00	
				ADA Ramps	3 ea	\$600.00	\$1,800.00	
				Restoration	890 lf	\$10.00	\$8,900.00	
<i>Sub-Total</i>								\$38,337.50
Mobilization (5%)								\$1,916.88
Contingency (20%)								\$7,667.50
<i>Construction Estimate</i>								\$47,921.88
Professional Fees (25%)								\$11,980.47
TOTAL ESTIMATE								\$59,902.34
TOTAL ESTIMATE FOR ENTIRE SEGMENT 92								\$238,716.80

93	12	Nine Mile	North Between Novi and Taft				
				Section 1:			
			Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00	
			Soil Erosion Control	277 lf	\$1.75	\$484.75	
			Maintaining Traffic	277 lf	\$2.00	\$554.00	
			Concrete (5ft)	277 lf	\$20.00	\$5,540.00	
			Restoration	277 lf	\$10.00	\$2,770.00	
				<i>Sub-Total</i>		\$10,848.75	
				Mobilization (5%)		\$542.44	
				Contingency (20%)		\$2,169.75	
				<i>Construction Estimate</i>		\$13,560.94	
				Professional Fees (25%)		\$3,390.23	
				TOTAL ESTIMATE		\$16,951.17	
				<i>Easements Needed - Approx.</i>		12000 sf	
				Section 2:			
			Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00	
			Soil Erosion Control	377 lf	\$1.75	\$659.75	
			Maintaining Traffic	377 lf	\$2.00	\$754.00	
			Concrete (5ft)	377 lf	\$20.00	\$7,540.00	
			Restoration	377 lf	\$10.00	\$3,770.00	
				<i>Sub-Total</i>		\$14,223.75	
				Mobilization (5%)		\$711.19	
				Contingency (20%)		\$2,844.75	
				<i>Construction Estimate</i>		\$17,779.69	
				Professional Fees (25%)		\$4,444.92	
				TOTAL ESTIMATE		\$22,224.61	
				<i>Easements Needed - Approx.</i>		18500 sf	
				Section 3:			
			Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00	
			Soil Erosion Control	2164 lf	\$1.75	\$3,787.00	
			Maintaining Traffic	2164 lf	\$2.00	\$4,328.00	
			Concrete (5ft)	2164 lf	\$20.00	\$43,280.00	
			Restoration	2164 lf	\$10.00	\$21,640.00	
				<i>Sub-Total</i>		\$74,535.00	
				Mobilization (5%)		\$3,726.75	
				Contingency (20%)		\$14,907.00	
				<i>Construction Estimate</i>		\$93,168.75	
				Professional Fees (25%)		\$23,292.19	
				TOTAL ESTIMATE		\$116,460.94	
				<i>Easements Needed - Approx.</i>		83000 sf	
				TOTAL ESTIMATE FOR ENTIRE SEGMENT 93		\$155,636.72	
62	14	Ten Mile	North Between Novi and Taft				
			Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00	
			Soil Erosion Control	283 lf	\$1.75	\$495.25	
			Maintaining Traffic	283 lf	\$2.00	\$566.00	
			Boardwalk (City standard)	283 lf	\$175.00	\$49,525.00	
			Restoration	283 lf	\$10.00	\$2,830.00	
				<i>Sub-Total</i>		\$53,416.25	
				Mobilization (5%)		\$2,670.81	
				Contingency (20%)		\$10,683.25	
				<i>Construction Estimate</i>		\$66,770.31	
				Professional Fees (25%)		\$16,692.58	
				TOTAL ESTIMATE		\$83,462.89	
				<i>Easements Needed - Approx.</i>		22800 sf	

25	90	Haggerty Rd	West	Between Twelve Mile and I-696				
					Section 1:			
					Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
					Soil Erosion Control	888 lf	\$1.75	\$1,554.00
					Maintaining Traffic	888 lf	\$2.00	\$1,776.00
					Concrete (5ft)	888 lf	\$20.00	\$17,760.00
					Clearing and Grubbing	1 ls	\$5,000.00	\$5,000.00
					Restoration	888 lf	\$10.00	\$8,880.00
					<i>Sub-Total</i>			\$36,470.00
					Mobilization (5%)			\$1,823.50
					Contingency (20%)			\$7,294.00
					<i>Construction Estimate</i>			\$45,587.50
					Professional Fees (25%)			\$11,396.88
					TOTAL ESTIMATE			\$56,984.38
					<i>Easements Needed - Approx.</i>		31000 sf	
					Section 2:			
					Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
					Soil Erosion Control	1246 lf	\$1.75	\$2,180.50
					Maintaining Traffic	1246 lf	\$2.00	\$2,492.00
					Concrete (5ft)	1246 lf	\$20.00	\$24,920.00
					Berm Removal	1 ls	\$10,000.00	\$10,000.00
					ADA Ramps	3 ea	\$600.00	\$1,800.00
					Restoration	1246 lf	\$10.00	\$12,460.00
					<i>Sub-Total</i>			\$55,352.50
					Mobilization (5%)			\$2,767.63
					Contingency (20%)			\$11,070.50
					<i>Construction Estimate</i>			\$69,190.63
					Professional Fees (25%)			\$17,297.66
					TOTAL ESTIMATE			\$86,488.28
					<i>Easements Needed - Approx.</i>		45000 sf	
					TOTAL ESTIMATE FOR ENTIRE SEGMENT 25			\$143,472.66
129	50	Fourteen Mile	South	Between two subdivisions				
					Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
					Soil Erosion Control	628 lf	\$1.75	\$1,099.00
					Maintaining Traffic	628 lf	\$2.00	\$1,256.00
					Concrete (5ft)	628 lf	\$20.00	\$12,560.00
					Grading	1 ls	\$40,000.00	\$40,000.00
					Restoration	628 lf	\$10.00	\$6,280.00
					<i>Sub-Total</i>			\$62,695.00
					Mobilization (5%)			\$3,134.75
					Contingency (20%)			\$12,539.00
					<i>Construction Estimate</i>			\$78,368.75
					Professional Fees (25%)			\$19,592.19
					TOTAL ESTIMATE			\$97,960.94
					<i>Easements Needed - Approx.</i>		37800 sf	
1b	71	Fourteen Mile	South	Just west of M-5				
					Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
					Soil Erosion Control	996 lf	\$1.75	\$1,743.00
					Maintaining Traffic	996 lf	\$2.00	\$1,992.00
					Concrete (5ft)	996 lf	\$20.00	\$19,920.00
					Curb and Gutter	315 lf	\$25.00	\$7,875.00
					Restoration	996 lf	\$10.00	\$9,960.00
					<i>Sub-Total</i>			\$42,990.00
					Mobilization (5%)			\$2,149.50
					Contingency (20%)			\$8,598.00
					<i>Construction Estimate</i>			\$53,737.50
					Professional Fees (25%)			\$13,434.38
					TOTAL ESTIMATE			\$67,171.88

4	39	Fourteen Mile	South Just west of Novi Rd				
				Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
				Soil Erosion Control	241 lf	\$1.75	\$421.75
				Maintaining Traffic	241 lf	\$2.00	\$482.00
				Concrete (5ft)	241 lf	\$20.00	\$4,820.00
				Restoration	241 lf	\$10.00	\$2,410.00
				<i>Sub-Total</i>			\$9,633.75
				Mobilization (5%)			\$481.69
				Contingency (20%)			\$1,926.75
				<i>Construction Estimate</i>			\$12,042.19
				Professional Fees (25%)			\$3,010.55
				TOTAL ESTIMATE			\$15,052.73
				<i>Easements Needed - Approx.</i>	<i>13000 sf</i>		
5	54	Fourteen Mile	South Just east of East Lake Dr				
				Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
				Soil Erosion Control	525 lf	\$1.75	\$918.75
				Maintaining Traffic	525 lf	\$2.00	\$1,050.00
				Concrete (5ft)	525 lf	\$20.00	\$10,500.00
				Ped Safety	1 ls	\$5,000.00	\$5,000.00
				Restoration	525 lf	\$10.00	\$5,250.00
				<i>Sub-Total</i>			\$24,218.75
				Mobilization (5%)			\$1,210.94
				Contingency (20%)			\$4,843.75
				<i>Construction Estimate</i>			\$30,273.44
				Professional Fees (25%)			\$7,568.36
				TOTAL ESTIMATE			\$37,841.80
				<i>Easements Needed - Approx.</i>	<i>17800 sf</i>		
9	9	Pontiac Trail	South West of West Park Dr				
				Section 1:			
				Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
				Soil Erosion Control	3325 lf	\$1.75	\$5,818.75
				Maintaining Traffic	3325 lf	\$2.00	\$6,650.00
				Concrete (5ft)	3325 lf	\$20.00	\$66,500.00
				ADA Ramps	9 ea	\$600.00	\$5,400.00
				Restoration	3325 lf	\$10.00	\$33,250.00
				<i>Sub-Total</i>			\$119,118.75
				Mobilization (5%)			\$5,955.94
				Contingency (20%)			\$23,823.75
				<i>Construction Estimate</i>			\$148,898.44
				Professional Fees (25%)			\$37,224.61
				TOTAL ESTIMATE			\$186,123.05
				Section 2:			
				Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
				Soil Erosion Control	1532 lf	\$1.75	\$2,681.00
				Maintaining Traffic	1532 lf	\$2.00	\$3,064.00
				Concrete (5ft)	1532 lf	\$20.00	\$30,640.00
				ADA Ramps	3 ea	\$600.00	\$1,800.00
				Restoration	1532 lf	\$10.00	\$15,320.00
				<i>Sub-Total</i>			\$55,005.00
				Mobilization (5%)			\$2,750.25
				Contingency (20%)			\$11,001.00
				<i>Construction Estimate</i>			\$68,756.25
				Professional Fees (25%)			\$17,189.06
				TOTAL ESTIMATE			\$85,945.31
				<i>Easements Needed - Approx.</i>	<i>62000 sf</i>		
				TOTAL ESTIMATE FOR ENTIRE SEGMENT 9			\$272,068.36

55	15	Beck Rd	West	Just north of Ten Mile				
					Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
					Soil Erosion Control	811 lf	\$1.75	\$1,419.25
					Maintaining Traffic	811 lf	\$2.00	\$1,622.00
					Concrete (8ft)	811 lf	\$36.00	\$29,196.00
					ADA Ramps	1 ea	\$600.00	\$600.00
					Restoration	811 lf	\$10.00	\$8,110.00
					<i>Sub-Total</i>			\$42,447.25
					Mobilization (5%)			\$2,122.36
					Contingency (20%)			\$8,489.45
					<i>Construction Estimate</i>			\$53,059.06
					Professional Fees (25%)			\$13,264.77
					TOTAL ESTIMATE			\$66,323.83
54	15	Ten Mile	North	Just west of Beck				
					Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
					Soil Erosion Control	886 lf	\$1.75	\$1,550.50
					Maintaining Traffic	886 lf	\$2.00	\$1,772.00
					Concrete (5ft)	706 lf	\$20.00	\$14,120.00
					Boardwalk	180 lf	\$175.00	\$31,500.00
					Restoration	886 lf	\$10.00	\$8,860.00
					<i>Sub-Total</i>			\$59,302.50
					Mobilization (5%)			\$2,965.13
					Contingency (20%)			\$11,860.50
					<i>Construction Estimate</i>			\$74,128.13
					Professional Fees (25%)			\$18,532.03
					TOTAL ESTIMATE			\$92,660.16
					<i>Easements Needed - Approx.</i>	<i>72000 sf</i>		
99	17	Ten Mile	South	Between Beck and Wixom Rd				
					Section 1:			
					Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
					Soil Erosion Control	1074 lf	\$1.75	\$1,879.50
					Maintaining Traffic	1074 lf	\$2.00	\$2,148.00
					Concrete (8ft)	1074 lf	\$36.00	\$38,664.00
					Restoration	1074 lf	\$10.00	\$10,740.00
					<i>Sub-Total</i>			\$54,931.50
					Mobilization (5%)			\$2,746.58
					Contingency (20%)			\$10,986.30
					<i>Construction Estimate</i>			\$68,664.38
					Professional Fees (25%)			\$17,166.09
					TOTAL ESTIMATE			\$85,830.47
					<i>Easements Needed - Approx.</i>	<i>65000 sf</i>		
					Section 2:			
					Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
					Soil Erosion Control	2211 lf	\$1.75	\$3,869.25
					Maintaining Traffic	2211 lf	\$2.00	\$4,422.00
					Concrete (8ft)	2022 lf	\$36.00	\$72,792.00
					Boardwalk	189 lf	\$175.00	\$33,075.00
					ADA Ramps	4 ea	\$600.00	\$2,400.00
					Restoration	2211 lf	\$10.00	\$22,110.00
					<i>Sub-Total</i>			\$140,168.25
					Mobilization (5%)			\$7,008.41
					Contingency (20%)			\$28,033.65
					<i>Construction Estimate</i>			\$175,210.31
					Professional Fees (25%)			\$43,802.58
					TOTAL ESTIMATE			\$219,012.89
					<i>Easements Needed - Approx.</i>	<i>73500 sf</i>		
					TOTAL ESTIMATE FOR ENTIRE SEGMENT 99			\$304,843.36

44	78	Napier Rd	East	Between Twelve Mile and Island Lake Dr			
				Pre -Construction Audio Visual	1	Is	\$1,500.00
				Soil Erosion Control	2685	If	\$1.75
				Maintaining Traffic	2685	If	\$2.00
				Asphalt (8ft)	1858	If	\$32.00
				Boardwalk	827	If	\$175.00
				Restoration	2685	If	\$10.00
				<i>Sub-Total</i>			\$242,599.75
				Mobilization (5%)			\$12,129.99
				Contingency (20%)			\$48,519.95
				<i>Construction Estimate</i>			\$303,249.69
				Professional Fees (25%)			\$75,812.42
				TOTAL ESTIMATE			\$379,062.11
				<i>Easements Needed - Approx.</i>			<i>150000 sf</i>
48		Wixom Rd	West	Between Ten Mile and Island Lake			
				Pre -Construction Audio Visual	1	Is	\$1,500.00
				Soil Erosion Control	493	If	\$1.75
				Maintaining Traffic	493	If	\$2.00
				Asphalt (8ft)	493	If	\$32.00
				Restoration	493	If	\$10.00
				<i>Sub-Total</i>			\$24,054.75
				Mobilization (5%)			\$1,202.74
				Contingency (20%)			\$4,810.95
				<i>Construction Estimate</i>			\$30,068.44
				Professional Fees (25%)			\$7,517.11
				TOTAL ESTIMATE			\$37,585.55

Neighborhood Connectors				
NC 1	East Lake Dr to Novi Rd			
	Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
	Soil Erosion Control	962 lf	\$1.75	\$1,683.50
	Asphalt (8ft)	962 lf	\$32.00	\$30,784.00
	Culvert	20 lf	\$18.00	\$360.00
	Restoration	962 lf	\$10.00	\$9,620.00
	<i>Sub-Total</i>			<u>\$43,947.50</u>
	Mobilization (5%)			\$2,197.38
	Contingency (20%)			\$8,789.50
	<i>Construction Estimate</i>			<u>\$54,934.38</u>
	Professional Fees (25%)			\$13,733.59
	TOTAL ESTIMATE			\$68,667.97
NC 2	Brookfarm Park			
	Soil Erosion Control	442 lf	\$1.75	\$773.50
	Asphalt (8ft)	442 lf	\$32.00	\$14,144.00
	Restoration	442 lf	\$10.00	\$4,420.00
	<i>Sub-Total</i>			<u>\$19,337.50</u>
	Mobilization (5%)			\$966.88
	Contingency (20%)			\$3,867.50
	<i>Construction Estimate</i>			<u>\$24,171.88</u>
	Professional Fees (25%)			\$6,042.97
	TOTAL ESTIMATE			\$30,214.84
NC 3	West of Meadowbrook between Nine Mile and Ten Mile			
	Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
	Soil Erosion Control	827 lf	\$1.75	\$1,447.25
	Asphalt (8ft)	660 lf	\$32.00	\$21,120.00
	Boardwalk	167 lf	\$175.00	\$29,225.00
	Clearing and Grubbing	1 ls	\$10,000.00	\$10,000.00
	Restoration	827 lf	\$10.00	\$8,270.00
	<i>Sub-Total</i>			<u>\$71,562.25</u>
	Mobilization (5%)			\$3,578.11
	Contingency (20%)			\$14,312.45
	<i>Construction Estimate</i>			<u>\$89,452.81</u>
	Professional Fees (25%)			\$22,363.20
	TOTAL ESTIMATE			\$111,816.02
NC 4	West of Meadowbrook between 10 Mile and Grand River			
	Pre -Construction Audio Visual	1 ls	\$1,500.00	\$1,500.00
	Soil Erosion Control	632 lf	\$1.75	\$1,106.00
	Concrete (5ft)	632 lf	\$20.00	\$12,640.00
	Clearing and Grubbing	1 ls	\$5,000.00	\$5,000.00
	Fence Gate	1 ls	\$5,000.00	\$5,000.00
	Restoration	632 lf	\$10.00	\$6,320.00
	<i>Sub-Total</i>			<u>\$31,566.00</u>
	Mobilization (5%)			\$1,578.30
	Contingency (20%)			\$6,313.20
	<i>Construction Estimate</i>			<u>\$39,457.50</u>
	Professional Fees (25%)			\$9,864.38
	TOTAL ESTIMATE			\$49,321.88

Easements Needed - Approx.

6320 sf

Major Corridor Development:

	Quantity	Unit	Unit Price	Cost Estimate
Meadowbrook Connector between I275 Metro Trail and M5 Metro Trail				
Pre -Construction Audio Visual	1	ls	\$1,500.00	\$1,500.00
Soil Erosion Control	5000	lf	\$1.75	\$8,750.00
Maintaining Traffic	5000	lf	\$2.00	\$10,000.00
Asphalt (10 ft)	3420	lf	\$40.00	\$136,800.00
ADA ramps	7	ea	\$600.00	\$4,200.00
Concrete (8ft)	2435	lf	\$36.00	\$87,660.00
Restripe Meadowbrook (bike & 11' lanes)	5104	lf	\$5.00	\$25,520.00
Shoulder Paving & Striping (5 - 6')	4819	lf	\$27.00	\$130,113.00
Wayfinding Signage	1	ls	\$5,000.00	\$5,000.00
Restoration	5000	lf	\$10.00	\$50,000.00
<i>Sub-Total</i>				\$459,543.00
Mobilization (5%)				\$22,977.15
Contingency (20%)				\$91,908.60
<i>Construction Estimate</i>				\$574,428.75
Professional Fees (25%)				\$143,607.19
TOTAL ESTIMATE				\$718,035.94

Easements Needed - Approx. 147800 sf
 If grant funds used, assume design exception to build 8' wide concrete gaps (instead of 10') due to existing facilities and addition of bike lanes.

Taft Road Corridor				
Pre -Construction Audio Visual	1	ls	\$8,000.00	\$8,000.00
Soil Erosion Control	28800	lf	\$1.75	\$50,400.00
Maintaining Traffic	28800	lf	\$2.00	\$57,600.00
Bridge	30 ft	1	\$70,000.00	\$70,000.00
Concrete (8ft)	658	lf	\$36.00	\$23,688.00
Asphalt (10ft)	8303	lf	\$40.00	\$332,120.00
Enclose Drain	400	lf	\$18.00	\$7,200.00
Grading	1	ls	\$30,000.00	\$30,000.00
Clearing and Grubbing	1	ls	\$10,000.00	\$10,000.00
Culvert	70	lf	\$18.00	\$1,260.00
ADA ramps	10	ea	\$600.00	\$6,000.00
Concrete (5ft)	11606	lf	\$36.00	\$417,816.00
I-96 Underpass and RR overpass	1	ls	\$1,000,000.00	\$1,000,000.00
Shoulder Paving (5-6ft)	14512	lf	\$27.00	\$391,824.00
Boardwalk (8 ft)	City Standard	401	\$175.00	\$70,175.00
Hybrid Pedestrian Signal	12 Mile	1	\$120,000.00	\$120,000.00
Restoration	28800	lf	\$10.00	\$288,000.00
Galway Dr Intersection	X	1	\$59,400.00	\$59,400.00
Mid-block crossing	Princeton/Byrne	1	\$2,000.00	\$2,000.00
Rectangular Rapid Flash Beacon	Princeton/Byrne	1	\$5,000.00	\$5,000.00
Dunbarton Drive Intersection	X	1	\$59,400.00	\$59,400.00
White Pines Dr Roundabout		1	\$198,750.00	\$198,750.00
Addington Ln Intersection	T	1	\$35,800.00	\$35,800.00
Traffic Island at High School		1	\$8,000.00	\$8,000.00
Dover Blvd Intersection	T	1	\$35,800.00	\$35,800.00
Emerald Forest Dr Intersection	T	1	\$35,800.00	\$35,800.00
Jacob Drive Intersection	T	1	\$35,800.00	\$35,800.00
<i>Sub-Total</i>				\$3,359,833.00
Mobilization (5%)				\$167,991.65
Contingency (20%)				\$671,966.60
<i>Construction Estimate</i>				\$4,199,791.25
Professional Fees (25%)				\$1,049,947.81
TOTAL ESTIMATE				\$5,249,739.06

Easements Needed - Approx. 212500 sf

9 1/2 Mile Neighborhood Connector

Pre -Construction Audio Visual		1 ls	\$8,000.00	\$8,000.00
Soil Erosion Control		20200 lf	\$1.75	\$35,350.00
Maintaining Traffic		8000 lf	\$2.00	\$16,000.00
Bridges (14' x 30')		2 ea	\$70,000.00	\$140,000.00
Bridge over RR (750' including approach ramps)		1 ls	\$500,000.00	\$500,000.00
Bury Electrical along RR		100 lf	\$100.00	\$10,000.00
Novi Rd Crossing	Mini Roundabout	1 ls	\$198,750.00	\$198,750.00
Meadowbrook Crossing	Crossing Island	1 ls	\$8,000.00	\$8,000.00
Taft Rd Crossing	Mini Roundabout	1 ls	\$198,750.00	\$198,750.00
Beck Rd Crossing	T	1 ls	\$35,800.00	\$35,800.00
Traffic Calming	Allowance	1 ls	\$400,000.00	\$400,000.00
Asphalt (10ft)	AASHTO	15972 lf	\$40.00	\$638,880.00
Clearing and Grubbing		1 ls	\$50,000.00	\$50,000.00
Wayfinding Signage	Allowance	1 ls	\$150,000.00	\$150,000.00
Boardwalk (City standard)	not AASHTO	4150 lf	\$175.00	\$726,250.00
<i>Sub-Total</i>				\$3,115,780.00
Mobilization (5%)				\$155,789.00
Contingency (20%)				\$623,156.00
<i>Construction Estimate</i>				\$3,894,725.00
Professional Fees (25%)				\$973,681.25
TOTAL ESTIMATE				\$4,868,406.25

Easements Needed - Approx.

23000 sf

Subdivision Entrance Types:

	Quantity	Unit	Unit Price	Cost Estimate
Subdivision Intersection (X) Fig. 5.4AB				
Demolition		1 ls	\$1,000.00	\$1,000.00
Medians (50' x 10')		2 ea	\$2,500.00	\$5,000.00
Speedtable Crosswalk (22')		2 ea	\$1,800.00	\$3,600.00
Striping		1 ls	\$1,250.00	\$1,250.00
Signage		1 ls	\$1,250.00	\$1,250.00
Ramps		14 ea	\$600.00	\$8,400.00
Lighting		6 ea	\$4,000.00	\$24,000.00
Landscaping		1 ls	\$3,000.00	\$3,000.00
<i>Sub-Total</i>				<i>\$47,500.00</i>
Mobilization (5%)				\$2,375.00
Contingency (20%)				\$9,500.00
<i>Construction Estimate</i>				<i>\$59,375.00</i>
Professional Fees (25%)				\$14,843.75
TOTAL ESTIMATE				\$74,218.75

Subdivision T-Intersection (T) Fig 5.4AC				
Demolition		1 ls	\$750.00	\$750.00
Median (1) (50' x 10')		1 ls	\$2,500.00	\$2,500.00
Speedtable Crosswalk (22')		1 ea	\$1,800.00	\$1,800.00
Striping		1 ls	\$1,250.00	\$1,250.00
Signage		1 ls	\$1,250.00	\$1,250.00
Ramps		6 ea	\$600.00	\$3,600.00
Lighting		4 ea	\$4,000.00	\$16,000.00
Landscaping		1 ls	\$1,500.00	\$1,500.00
<i>Sub-Total</i>				<i>\$28,650.00</i>
Mobilization (5%)				\$1,432.50
Contingency (20%)				\$5,730.00
<i>Construction Estimate</i>				<i>\$35,812.50</i>
Professional Fees (25%)				\$8,953.13
TOTAL ESTIMATE				\$44,765.63

Compact Roundabout at Subdivision Entrance Fig 5.4AD				
Demolition		1 ls	\$15,000.00	\$15,000.00
Road Reconstruction w/ 60' circle		1 ls	\$45,000.00	\$45,000.00
Medians (10' x 40')		4 ea	\$1,800.00	\$7,200.00
Striping		1 ls	\$2,500.00	\$2,500.00
Ramps		16 ea	\$600.00	\$9,600.00
Safety Path (8' concrete)		700 lf	\$36.00	\$25,200.00
Lighting		8 ea	\$4,000.00	\$32,000.00
Landscaping		1 ls	\$15,000.00	\$15,000.00
Restoration		1 ls	\$5,000.00	\$5,000.00
Signage		1 ls	\$2,500.00	\$2,500.00
<i>Sub-Total</i>				<i>\$159,000.00</i>
Mobilization (5%)				\$7,950.00
Contingency (20%)				\$31,800.00
<i>Construction Estimate</i>				<i>\$198,750.00</i>
Professional Fees (25%)				\$49,687.50
TOTAL ESTIMATE				\$248,437.50

Miscellaneous Element Cost Estimates:

Asphalt Trail (8ft)		\$168,960.00 mi
Asphalt Trail (10ft)		\$211,200.00 mi
Concrete Sidewalk (5ft)		\$105,600.00 mi
Concrete Sidewalk (8ft)		\$190,080.00 mi
Boardwalk (City Standard)		\$175.00 lf
Boardwalk (AASHTO Standard - 14' wide)		\$325.00 lf
ADA Ramps		\$600.00 ea
Rectangular Rapid Flash Beacon		\$5,000.00 ea
Hybrid Pedestrian Signal	HAWK	\$120,000.00 ea

7.6 Evaluating Alternative Scenarios for Travel Along Road Corridors

There is no single solution for handling bicycle traffic along road corridors that will be the most appropriate facility in all cases. But the City should still strive to establish a consistent approach as possible so that motorists and bicycles have clear and consistent expectations of each other.

Restricting bicycles to a path along the side of a roadway—while potentially a legal option—is fraught with safety concerns. This diminishes the attractiveness of using a bicycle for transportation for many adult cyclists. On the other hand, there exists a great diversity of bicycling skills and comfort levels and the system should attempt to safely accommodate all users to the degree possible. Also, where a bicyclist chooses to ride has an impact on the pedestrian's experience.

Quality and Level of Service Evaluation of Alternative Scenarios

In order to evaluate the alternative approaches to accommodating bicycle and pedestrian travel along the roadway, quality/level of services models were used. The Bicycle and Pedestrian Level of Service Models are statistically reliable methods for evaluating the quality and effectiveness of pedestrian and bicycle conditions of a given roadway environment. Various models have been developed over the past decade. The Bicycle and Pedestrian Level of Service Models used for this plan, developed by Bruce Landis, PE, AICP of Sprinkle Consulting, Inc., models bicycle and pedestrian environments based on data gathered from a wide cross section of users who evaluated numerous real world scenarios. Simplified versions of these models have been incorporated in the Florida Department of Transportation's Multi-modal Quality/Level of Service Model, which is the only LOS analysis that FDOT currently accepts. The Quality/Level of Service score is a measurement of the perceived safety and comfort of pedestrians and bicyclists.

It should be noted that the Bicycle Quality/Level of Service model applies only to bicycle environments *within* the roadway. There currently are not any well-researched models for Bicycle Quality/Level of Service for Shared Use Paths. The Pedestrian Quality/Level of Service Model also does not account for the increased conflicts with bicyclists that are likely to occur on a Shared-use Path.

Pedestrian Quality/Level of Service - Key Factors (in order of statistical significance):

6. Presence of a sidewalk
7. Amount of lateral separation between pedestrians and motor vehicles
8. Presence of physical barriers and buffers (including parking) between pedestrians and motor vehicles
9. Motorized vehicle volume
10. Motorized vehicle speed

Bicycle Quality/Level of Service - Key Factors (in order of statistical significance):

8. Presence of bicycle lane or paved shoulder
9. Proximity of bicyclists to motorized vehicles
10. Motorized vehicle volume
11. Motorized vehicle speed

12. Motorized vehicle type (percent truck/commercial traffic)
13. Pavement condition
14. The amount of on-street parking

The key factors for both modes are the existence of their own space, how far that space is from the traffic, and the nature of the traffic. The Bicycle and Pedestrian Quality/Level of Service score system has been developed using the same letter grading system with the same connotations as the letter grades used in schools: A being the best and F being the worst.

Because letter-grade Level of Service assessments are typical for vehicular traffic, there may be a desire to compare Vehicular Level of Service to that of Bicycle and/or Pedestrian Level of Service. However, the two evaluation systems are quite different and should not be directly compared. One illustration of the difference is that a Pedestrian Level of Service of “E” is likely the result of there not being any accommodations for a pedestrian. A Vehicular Level of Service “E” is defined as a point along an existing facility in which operations are at or near capacity and are quite unstable.

Three Scenarios for Providing Multi-modal Road ROW's

There are three typical scenarios for accommodating pedestrians, bicycles and motorists within a road Right-of-Way:

- Sidewalk (for pedestrians) and a Shared Roadway (for bicyclists and motorists). An example would be Dexter Road between Maple Road and Huron Street.
- Sidewalk (for pedestrians) and a Bike Lane (a separate bike-only lane in the roadway). An example would be Liberty Street between Maple Road and First Street.
- Shared Use Path (for pedestrians and some cyclists) and a Shared Roadway (for other bicyclists and motorists).

The following section looks at these three different scenarios for accommodating bicyclists, pedestrians and motorists. To evaluate each of these scenarios, a generalized cross section was prepared for each scenario along three different classifications of primary roadways: Principal Arterials (e.g. Plymouth Road), Minor Arterials (e.g. Maple Road), and Urban Collectors (e.g. 7th Avenue). While there are significant variances among different road classifications, the generalized input used for each covers most roadway situations.

The following table summarizes the input used in this analysis: along the road corridor have been explored using a Quality/Level of Service Analysis to determine which combination is the most beneficial for users

Table 7.6A. Generalized Road Conditions and Existing AASHTO Guidelines

Criteria		Urban Principal Arterial	Urban Minor Arterial	Urban Collector
ADT motor vehicles	Generalized Average Daily Traffic Volumes for Both Directions	30,000	20,000	10,000
Number of Lanes	Generalized Average	4 Total (2 each way)	4 Total (2 each way)	2 Total (1 each way)
Posted Speed	Generalized Average	40 MPH	35 MPH	30 MPH
Sidewalk Width	AASHTO Pedestrian Guidelines	5' Minimum 6 – 8' Preferred 10 – 15' in CBD & High Use Areas	5' Minimum 6 – 8' Preferred 10 – 15' in CBD & High Use Areas	5' Minimum
Buffer Width	AASHTO Pedestrian Guidelines (from edge of road to sidewalk)	5' Minimum 6' Preferred	5' Minimum 6' Preferred	2' Minimum 4' Preferred
Bike Lane Width	AASHTO Bicycle Guidelines	3.5' minimum (5' total width including gutter)	3.5' minimum (5' total width including gutter)	3.5' minimum (5' total width including gutter)
Shared Outside Lane	AASHTO Bicycle Guidelines	14' recommended 15' maximum	14' recommended 15' maximum	14' recommended 15' maximum

Notes:

- 4' minimum walks may be used if 5' wide passing spaces for wheelchair users are provided at reasonable intervals.
- AASHTO also provides guidelines for curb-attached sidewalks (no buffer is provided between the sidewalk and roadway). The minimum width is 6', 8 – 10' is recommended along busy Arterials.
- There are many variables that AASHTO considers that are not articulated in this simplified chart.

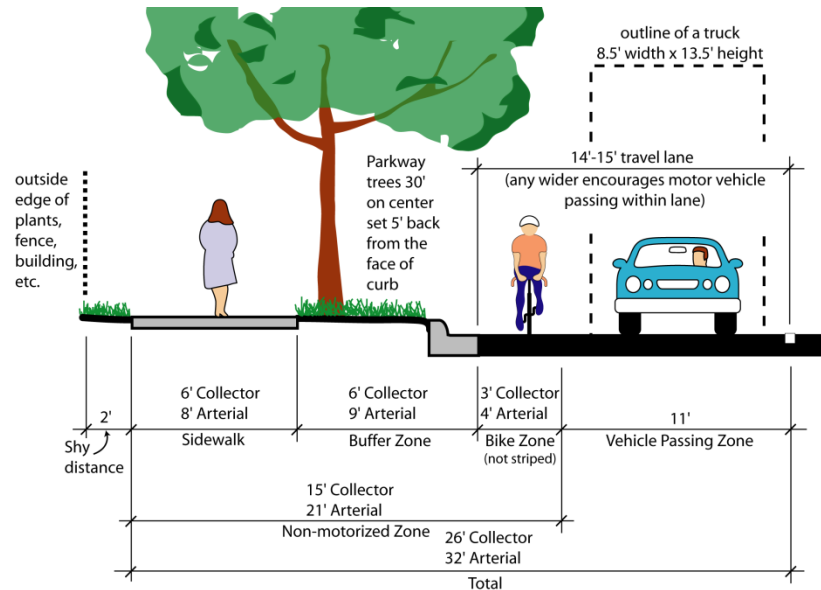
Refining the Scenarios

In comparing the different scenarios, the following design criteria were taken into consideration:

- **Widening the Buffer to Accommodate Trees** – As noted in the Pedestrian Quality /Level of Service – Key Factors, the lateral separation of pedestrians from the roadway and the presence of physical barriers such as trees, are the most important factors after the existence of a sidewalk. While trees provide benefits for pedestrian and roadway aesthetics, they are considered hazards to motorists. To minimize vehicular crashes with fixed roadside objects such as trees and light poles, current guidelines recommend placing the fixed objects at least 5' from the face of curb on urban arterials and 2' on collectors. Trees should be setback from the sidewalk at least 2' to allow for root growth and to provide a clear zone for the sidewalk users. To determine the total minimum desirable buffer with for Arterials, 6" is allocated for the width of a new tree trunk and the 18" from the face of curb to the edge of road is included. The result is that the minimum desirable buffer for Arterials is set at 9' wide. For Collectors, 4' is considered the minimum width for a planting strip that could support trees. This results in the total minimum desirable buffer for Collectors being set at 6' wide. As a general rule, the buffer should be as wide as reasonable for the conditions to minimize vehicular crashes with fixed objects, allow optimum planting conditions for trees, and improve the pedestrian environment.
- **Guidelines and Precedents for Narrow Lanes** - AASHTO guidelines and the MDOT Road Design Manual indicate that 12' lanes are most desirable and should be used where practical. They both indicate that in urban areas on low-speed roads (45 mph or less) 11' lanes are often used, and that 10' lanes may be used in restricted areas where there is little or no truck traffic.
- **Preserved Capacity with Narrower Lanes** - an 11' vehicular lane with an adjacent bike lane likely operates at near the same capacity as a 12' vehicular lane adjacent to a curb.
- **Narrow Turn Lanes** - AASHTO guidelines note that continuous two-way left-turn lanes may be as narrow as 10'.
- **Vehicle Widths** - A generalized sport utility vehicle is 6'- 4" wide, City buses and trucks are 8'- 6" wide.
- **Working Within Existing ROW** - Typical ROW Widths are 66' and 99', which means that the combined width of the sidewalk, buffer zone (space between the road and the sidewalk), bike lane (if any), and outside vehicle lane should be no wider than 33' in order to avoid the need for additional ROW. Using inside and continuous two-way left-turn lanes of 11', a four-lane road can be accommodated in 88' and a five-lane road can be accommodated in 99'.
- **Maximizing Bicycle and Pedestrian Level of Service** - Three scenarios were initially designed based on AASHTO guidelines. The scenarios were then refined by adjusting variables within the parameters of AASHTO guidelines such as the sidewalk width, the width of the buffer between the road, sidewalk and tree spacing, the bike lane width, and right lane width, all to achieve the most desirable Quality/Level of Service score possible within the typical ROW's.

The following pages include an overview of the three scenarios, their general advantages and disadvantages, and the results of the Quality and Level of Service analyses for the three road classifications.

Fig. 7.6B. Scenario A – Sidewalk and Shared Roadway



In this scenario, there are no specifically designated bicycle facilities within the roadway. Bicycles are accommodated through increased right-hand lane width (14' to 15') and reduced traffic speeds. Education and enforcement programs along with signage and potential pavement markings, such as the Shared-use Arrow, are utilized to alert motorists to the bicyclist's presence in the roadway.

Evaluation Results:

Road Classification	Pedestrian Q/LOS	On-road Bike Q/LOS	Notes
Principal Arterial	3.05 = C	4.55 = E	Extremely poor Bicycle Q/LOS
Minor Arterial	2.32 = B	4.23 = D	
Collector	2.47 = B	4.22 = D	Tied for worst Bike Q/LOS w/ scenario C

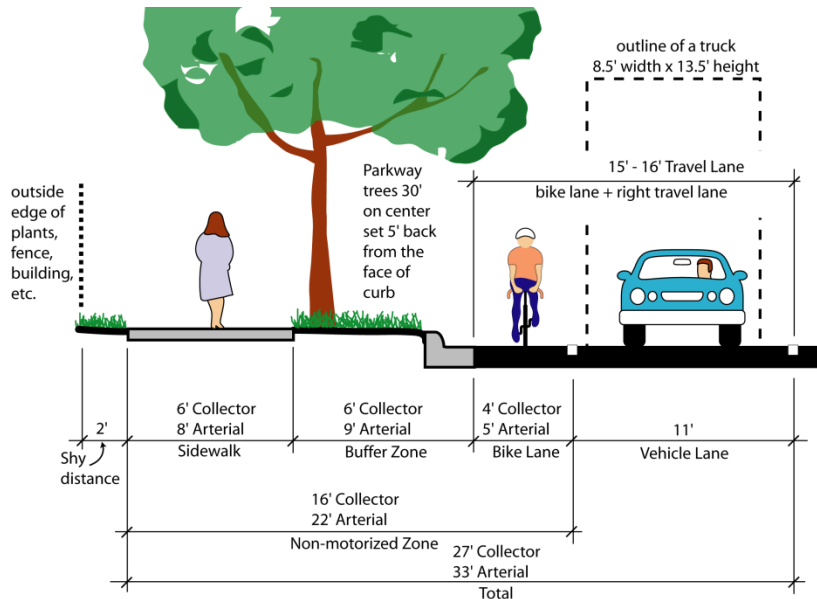
Advantages:

- Simple treatment at intersections.
- Considered by some to be the safest way to integrate bicyclists and motorized vehicles.
- Wide curb lane vs. bicycle lane studies have shown no significant safety differences in separation distances between the bicyclist and motorist.
- Appeals to experienced bicyclists who are often commuters.

Disadvantages:

- Unlikely to attract many new cyclists.
- May be viewed as a do nothing approach by many.
- Many bicyclists will still ride on the sidewalk.
- Cars tend to move further to the left and encroach into adjacent travel lanes when passing a cyclist with wide curb lanes than with bicycle lanes.
- Wider lanes may encourage higher speeds and may require traffic calming measures.

Fig. 7.6C. Scenario B – Sidewalk and Bike Lane (Preferred Option)



In this scenario, striped bicycle lanes or designated paved shoulders are provided on all collectors and minor arterials. Principal Arterials may have bike lanes or widened curb lanes, as determined most prudent for specific situations. The width of the bicycle lanes or shoulders should increase in areas with poor sight lines and/or higher vehicular speeds and volumes.

Evaluation Results:

Road Classifications	Pedestrian Q/LOS	On-road Bike Q/LOS	Notes
Principal Arterial	3.04 = C	3.47 = C	Best Bike Q/LOS, only Scenario with a C rating
Minor Arterial	2.31 = B	3.15 = C	Best Bike Q/LOS, only Scenario with a C rating
Collector	2.46 = B	3.39 = C	Best Bike Q/LOS, only Scenario with a C rating

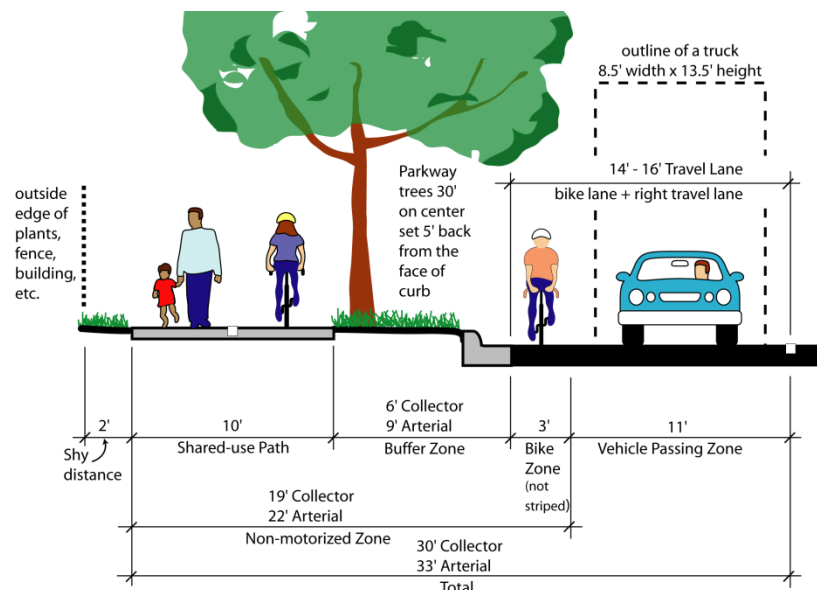
Advantages:

- Highly visible, designated facilities encourage increased bicycle use.
- Designated facilities alert motorists of the presence of bicyclists in the roadway.
- May have a slight traffic calming impact in some situations.
- Concurrent with AASHTO guidelines for most situations.
- Motorists are much less likely to encroach into the adjacent lane when passing a bicyclist.
- Motorists have less variation in their lane placement.

Disadvantages:

- Bicycle lanes require supplemental maintenance to be kept free of debris.
- Intersections must be designed carefully to minimize conflicts with turning movements.
- Presence of lanes may attract less experienced bicyclists to busier roadways.
- Some bicyclists will still ride on the sidewalk.

Fig. 7.6D. Scenario C – Shared-use Path



In this scenario, off-road shared-use paths are provided on Principal and Minor Arterials. Bicycle lanes or designated paved shoulders are provided on Collectors. Some collectors may also have shared-use paths. Driveways crossing shared use paths are modified to improve bicyclist and pedestrian safety.

Evaluation Scenarios:

Road Classifications	Pedestrian Q/LOS	On-road Bike Q/LOS	Notes
Principal Arterial	3.05 = C	4.69 = E	Worst Bike Q/LOS
Minor Arterial	2.32 = B	4.38 = D	Worst Bike Q/LOS
Collector	2.39 = B	3.89 = D	Tied for worst Bike Q/LOS w/ Scenario A

The analysis does not account for increased conflicts between bikes and pedestrians

Advantages:

- Similar to many Novi’s existing non-motorized facilities.
- Do not have to modify existing roadways.
- Facilities separate from busy roads appeal to novice users and those with slower reflexes.

Disadvantages:

- Off-road facilities such as sidewalks and pathways are statistically the most dangerous places to bike due to conflicts with motor vehicles at intersections and driveways.
- Increased number of conflicts between bicyclists and pedestrians on pathways.
- Some bicyclists will still choose the roadway rather than a Shared-use Path.
- Few of the City’s existing shared-use paths meet current AASHTO guidelines.
- Off-road facilities will need to be cleared of snow and have a higher maintenance standard than is currently in place to be considered a transportation facility.
- Transition between Shared-use Paths and Bike Lanes are awkward.

Scenario Observations

After reviewing the Quality/Level of Service (Q/LOS) analysis and testing alternative inputs for the alternative scenarios, a number of observations were made. These include:

- AASHTO minimum guidelines in many cases do not result in a Q/LOS grade of “C” or better.
- The Sidewalk and Bike Lane scenarios were the only scenarios that consistently achieved a Q/LOS of C or better for bicyclists and pedestrians. The other scenarios consistently had at least one mode rated a Q/LOS of D or worse.
- An 8’ wide Bike Lane would be required to achieve a Bicycle Q/LOS higher than C on a typical Principal Arterial due to the traffic volumes and speeds. At that width, the Bike Lane may be misinterpreted as a travel lane and would be difficult to fit in most road ROW’s.
- A 21’ wide buffer would be required to achieve a Pedestrian Q/LOS higher than C on a typical Principal Arterial due to the traffic volumes and speeds. This would be difficult to accommodate in most road ROW’s.
- The non-motorized zone does not vary in width much and all of the scenarios can be accommodated in standard ROW widths.
- While Bike Lanes provide additional buffer space between the vehicular travel way and the sidewalks, the difference in the Q/LOS is not significant.
- The Average Daily Traffic Volume for a 2 Lane Urban Collector would have to be below 3,500 to achieve a Bicycle Q/LOS of C.
- A Bike Lane provides an additional 4 to 5’ of lateral separation between fixed objects such as trees and street lights and the motorized travel lanes increasing motorized safety.
- A Bike Lane provides a benefit to trees planted in the buffer by providing an additional 4’ to 5’ between the canopy of the tree and trucks that may hit the lower branches.

Conclusion

Based on these observations **Scenario B – Sidewalk and Bike Lane** is the preferred alternative for all road classifications under most circumstances. Scenario A – Sidewalks and Shared Roadway may be appropriate for lower volume (<3,500 ADT) and lower speed (<= 30 MPH) Collectors. Scenario C – Shared-use Path may be appropriate for Parkway situations where intersecting roadways and driveways are widely spaced (typically farther apart than 1/2 mile). In addition, there should be little need to get to destinations on the other side of the road between intersecting roadways and marked mid-block crosswalks.

While Scenario B – Sidewalk and Bike Lane, is the preferred alternative, the City should not restrict bicycling on most sidewalks. Bicyclists will choose to ride in the road or on a sidewalk based on their individual skills and comfort riding in traffic and current conditions. Thus an individual who may typically ride in the road may choose to ride on a sidewalk if the road is icy or slushy. Also, some individuals may be comfortable riding in bike lanes on some roads but not others. It is not the City’s place to dictate where a bicyclist should ride but rather provide new facilities in accordance with current best practices and retrofit existing facilities as best as possible.

The City though needs to underscore that when bicyclists ride on sidewalks they need to always yield to pedestrians. Six to eight foot wide sidewalks can accommodate moderate slower paced bicycle traffic in suburban settings. Thus Scenario B – Sidewalk and Bike Lane provides that option for both on-road and off-road bicycling in many situations. Given that some bicyclists will choose to ride on the sidewalks, the

sidewalks should be designed and maintained such to accommodate these users. This is not to say that they need to meet AASHTO Guidelines for shared-use pathways, but that sightlines at intersecting driveways and roadways should be open so that motorists and bicyclist can see each other. Sidewalk and ramp alignments should take into consideration bicycle travel. Obstructions within and immediately adjacent to the sidewalk should be avoided. Also, the sidewalk surfaces and adjacent overhanging vegetation need to be maintained with bicycle travel in mind.

There will be places in the downtown or other high density mixed use areas where the combination of high pedestrian volumes and limited sidewalk widths will dictate that bicyclists should walk their bikes when on the sidewalk. There may also be places where sidewalk bicycling may be hazardous and likewise require that bicyclists walk their bicycle. Whenever bicycles are restricted from riding on the sidewalk every effort should be made to improve bicyclists accommodations within the roadway.

Notes on the Application of the Conclusions

It should be noted that traffic volumes and speed, rather than road classifications, should determine whether to use a 4' or 5' wide bike lane. As a general rule, where volumes are expected to be over 25,000 trips per day and/or speeds are posted at 40 MPH or above, a 5' bike lane is preferred. 5' bike lanes are also preferable in situations where the vertical and horizontal curves limit sight lines.