

Pedestrian Route Study at Novi Road and I-96

City of Novi
Novi Road Pedestrian Route Study over I-96

February, 2012



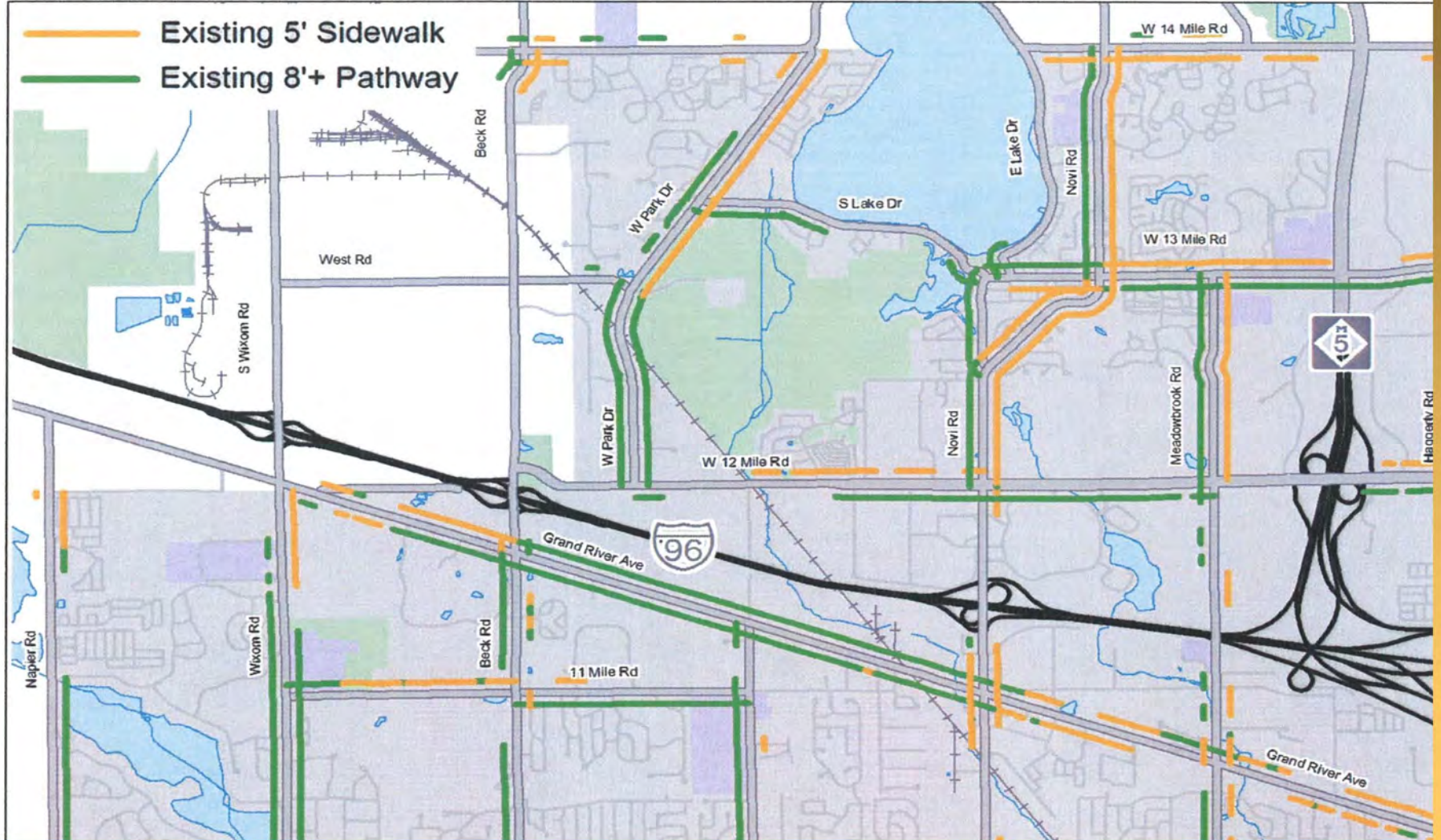
***for the City of Novi
March 26, 2012***

***Prepared by:
Orchard, Hiltz and
McCliment, Inc.***

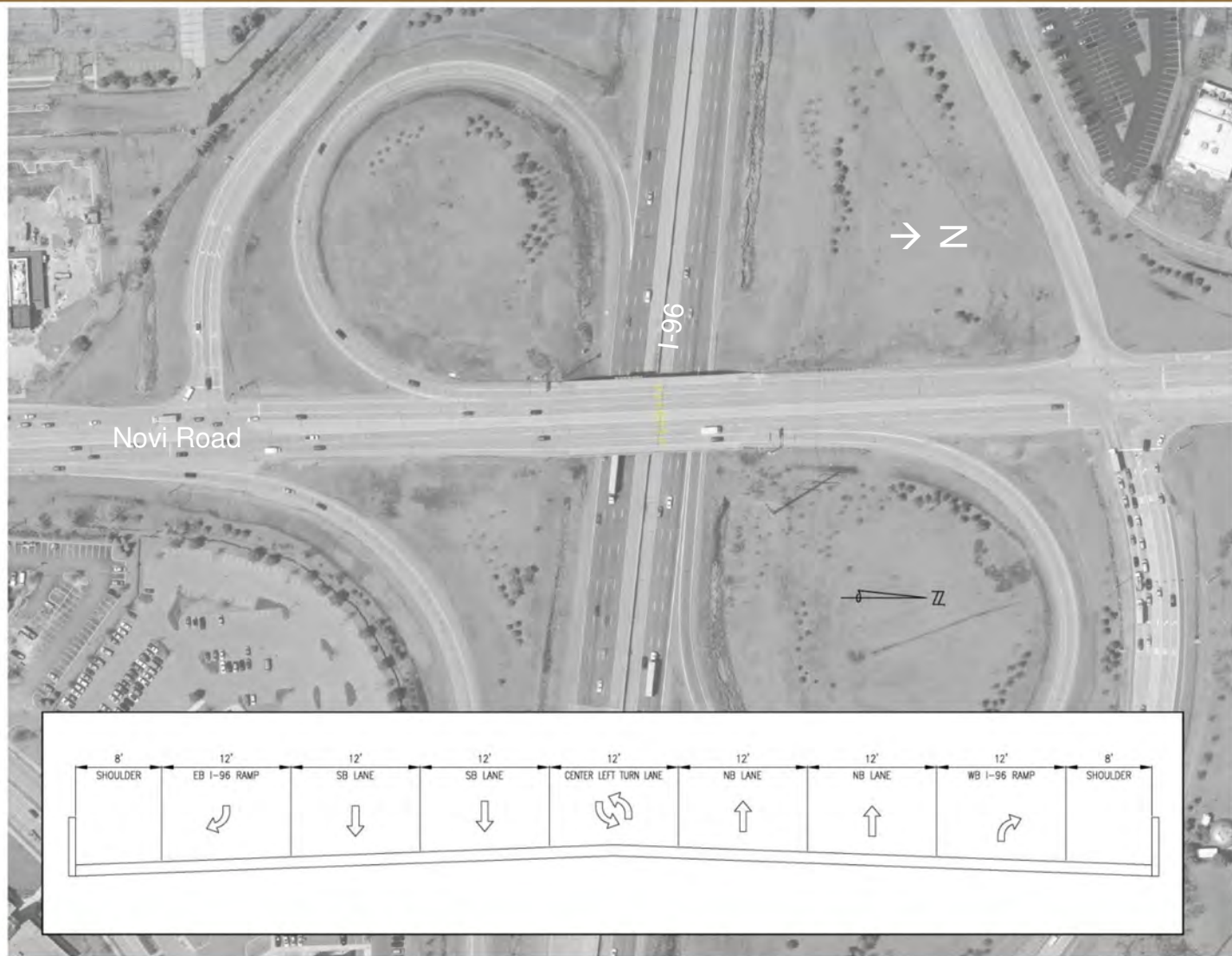
- Defining OHM's Scope of Work
- What are key parameters of project?
 - Route for pedestrians, bicyclists or both?
 - If on Novi Road, one side or both sides?
 - Limits of Study area, (ie. must it connect to something on both ends)
- Need to develop stakeholder team
 - Road Commission for Oakland County
 - Michigan Department of Transportation
 - CSX Railroad
 - City of Novi staff

Existing Sidewalk and Pathways

Fig. 2.1G. Existing Sidewalks and Roadside Pathways



Existing Configuration



Novi Road looking north



5 to 7 lanes with shoulders

OPTIONS ???

CSX Underpass at I-96



Minimum 25 ' clearance from rail to path required by CSX,
existing condition has 25' rail to wall

Looking west at Grand River Bridge in Farmington



Five foot sidewalks, both sides of road, 35 mph

Looking north on Orchard Lake over I-696



6' sidewalk on bridge at Orchard Lake and I-696

Looking south at Halsted over I-696



7 foot sidewalk, both sides

Looking north on Orchard Lake



Sidewalk crossing of free flow ramp

Looking south at Farmington over I-696



Separate Bridge - 8 foot wide

Ped. Bridge at Harrison HS over I-696



12 foot wide walkway, \$2.5 million cost

Key Factors for Potential Options

- Cost
- Safety
- Convenience of use for the user
- Loss of road capacity

Option 1



East and west side pedestrian crossings

Crosses 3 - signalized ramps
and 3 – free flow ramps

Option 2A



West side pedestrian crossing
Crosses 2 -signalized ramps
and 1 - free flow ramp

Option 2B



West side pedestrian crossing
Crosses 2 - signalized ramps
and, 1 – reconstructed 90
degree ramp

Option 3



Center pedestrian crossing
Crosses 2 - signalized ramps
and Novi Road

Option 4



Separate Bridge East of Novi
Road at Town Center Drive

Option 5



Separate Bridge West of Novi
Road at Taft Road

Costs

- Option 1 (Pedestrian facilities on both sides of the Novi Rd - \$1,150,000)
- Option 2A (West side crossing of Novi Rd only) - \$375,000 - \$800,000 (Price range due to potential for two traffic signal replacements)
- Option 2B (West side crossing only with 90 degree ramp reconstruction – \$775,000 - \$1,200,000 (Price range due to potential for two traffic signal replacements)
- Option 3 (Center lane pedestrian crossing) - \$1,850,000 or \$2,450,000 with covered walkway
- Option 4 (Separate Bridge east of Novi Road at Town Center Dr) \$2,550,000
- Option 5 (Separate Bridge west of Novi Road at Taft) \$2,100,000

Preferred Alternative - Option 2B

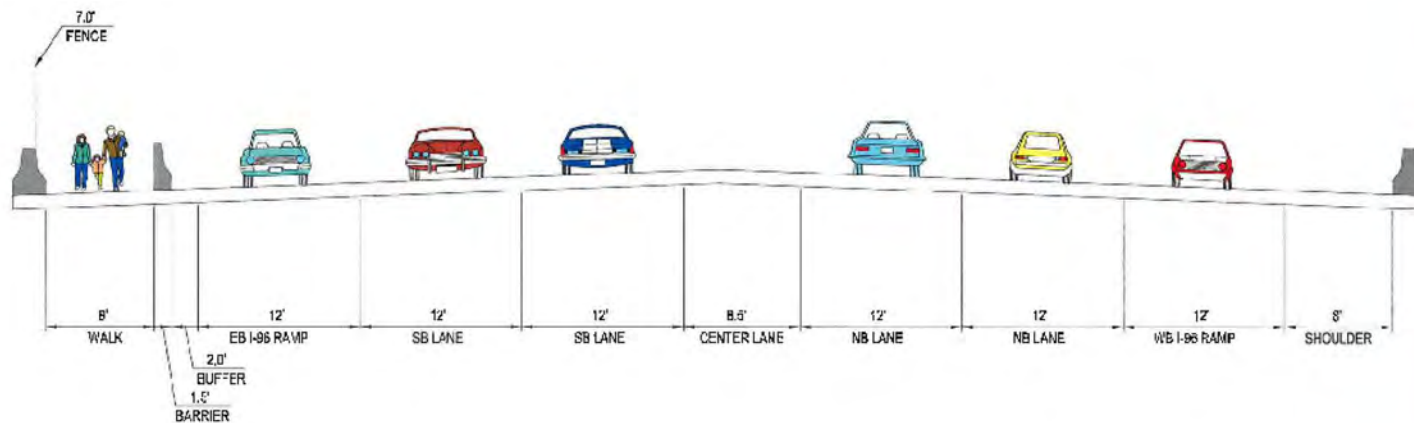
\$775,000 - \$1,200,000 (Price range due to potential for two traffic signal replacements)



West side pedestrian crossing

Crosses 2 - signalized ramps and,
1 - reconstructed 90 degree ramp

Proposed Section



OHM

NOVI ROAD PEDESTRIAN CROSSING AT I-96
OPTION 2 BRIDGE TYPICAL

Questions ??????

2/23/12

To: Mayor and City Council Members

The City Council approved an engineering effort to review non-motorized crossing of I-96 for contract and scope on September 12, 2011. This cover memo and report for your review and questions/comments. Per the original award, OHM anticipates presentation back to CC on 3/12 meeting.
Clay

MEMORANDUM

ROB HAYES, P.E.; DIRECTOR OF PUBLIC SERVICES
BRIAN COBURN, P.E.; ENGINEERING MANAGER *BC*
BEN CROY, P.E.; CIVIL ENGINEER *BC*
I-96 PEDESTRIAN CROSSING STUDY
FEBRUARY 22, 2012

The City of Novi adopted a comprehensive Non-Motorized Master Plan in 2011 as part of an overall goal to implement complete streets and improve the quality of life in Novi. Concurrently, the City of Novi participated in the development of a Michigan Department of Transportation (MDOT) study to improve transportation along the I-96 corridor within Novi and Wixom. One of the recommendations of the *Non-Motorized Master Plan 2011* and the *I-96 Corridor Study* was to develop several non-motorized crossings of I-96, which bisects the City and makes it difficult for non-motorized travel between the north side and south side of the City. The studies provided several conceptual ideas for a non-motorized crossing of I-96 at Wixom Road (in the City of Wixom), Beck Road, near Taft Road or the CSX railroad, Novi Road, and Meadowbrook Road.

Following the completion of the Non-Motorized Master Plan 2011, Engineering staff initiated a feasibility study with consultant, Orchard, Hiltz & McCliment (OHM), to review two of the potential crossing options: the Novi Road area, and the Taft Road area



(under I-96 at the CSX railroad). The attached *Novi Road Pedestrian Route Study over I-96* concentrates on the feasibility for constructing non-motorized crossings of I-96 at these two locations (see study area, left). This study complements the recently adopted Complete Streets policy which stresses the importance of creating an environment along our road network favorable to multiple modes of transportation. The relevant excerpts of the Non-Motorized Plan and I-96 Corridor Study relating to the study area are attached for your reference. (The other I-96 crossing locations recommended in these studies will be reviewed separately as indicated in the Capital Improvements Program.)

A stakeholder group consisting of internal staff from Community Development-Planning Division and Engineering Division staff met with external representatives from Road Commission for Oakland County (for Novi Road jurisdiction) and MDOT (for I-96 jurisdiction) to review several alternatives and develop a preferred route. Since MDOT and RCOC have jurisdiction over the Novi Road and the bridge, approval from these agencies is essential to facilitate construction of the improvements. CSX Transportation was also engaged as part of the process to review the I-96/CSX underpass alternative. The enclosed final report has been reviewed by RCOC, MDOT, Community Development, Engineering, and Parks, Recreation and Cultural Services.

The report identifies several alternatives for crossing I-96 within the study area. Following several discussions with CSX Transportation, it was determined that that the CSX underpass would not accommodate a pedestrian crossing due to CSX's stringent requirements. Specifically, CSX requires a minimum of 20 feet between the railroad and a pathway. Construction of a pathway would not be feasible at the I-96 underpass because there is only 20 feet between the railroad and the wall. Several alternatives were therefore considered using Novi Road based on cost and practicality of construction. This study took into consideration the assumption that another crossing of I-96 at Meadowbrook Road would be designed and constructed in the future.

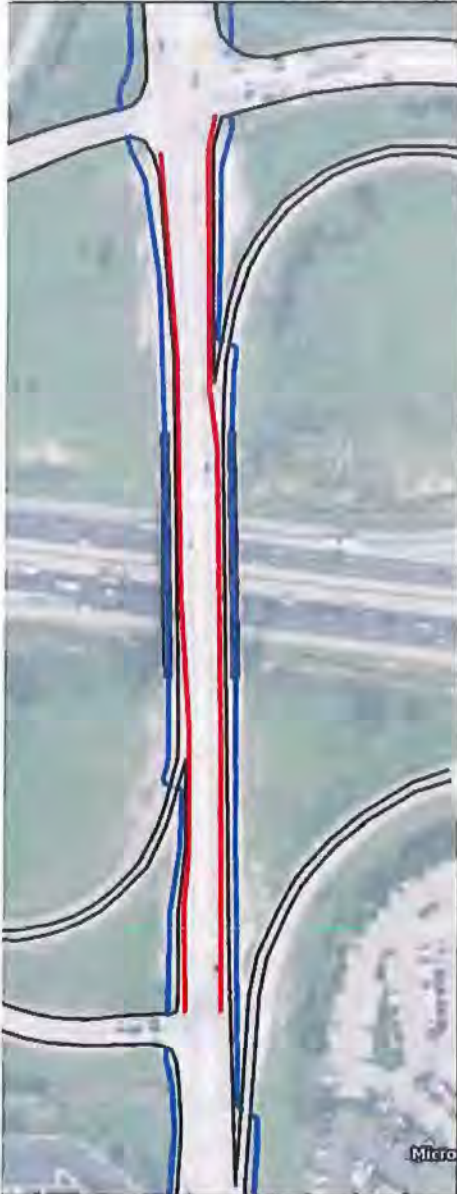
The stakeholders were involved in the discussions and decision making process throughout the evaluation of the potential alternatives. The discussions resulted in a unanimous conclusion, favoring the option to provide a pedestrian crossing on the west side of the existing Novi Road bridge as the most feasible option. This option (Option 2B in the enclosed study) has been given informal approval by both MDOT and RCOC. Option 2B would connect to proposed sidewalk that is being designed as part of the Sheraton Drive reconstruction project and new sidewalk that could be constructed as part of a redevelopment of the Big Boy site (which has been discussed with Community Development staff). Option 2B would provide a continuous non-motorized connection along the west side of Novi Road from Ten Mile Road to West Oaks Drive.

The study summarizes the alternatives evaluation and provides a conceptual plan and estimated construction budget for the preferred alternative. This information was used by staff to develop a Capital Improvement Project request for final design and construction. Attached as an appendix to the report is the initial presentation by OHM that provides some background information to the alternatives considered.

cc: Barbara McBeth, Deputy Community Development Director
Jason Mangum, Parks, Recreation and Cultural Services Director

RELEVANT EXCERPTS FROM
CITY OF NOVI NON-MOTORIZED MASTER
PLAN 2011

Fig. 3.3A. Novi Road Overpass Retro-fit Cross Section



The Novi Road interchange is a daunting environment for bicyclists and pedestrians. But it is a key link between the City’s major commercial centers and despite its lack of facilities, pedestrians and bicyclists still use the overpass.

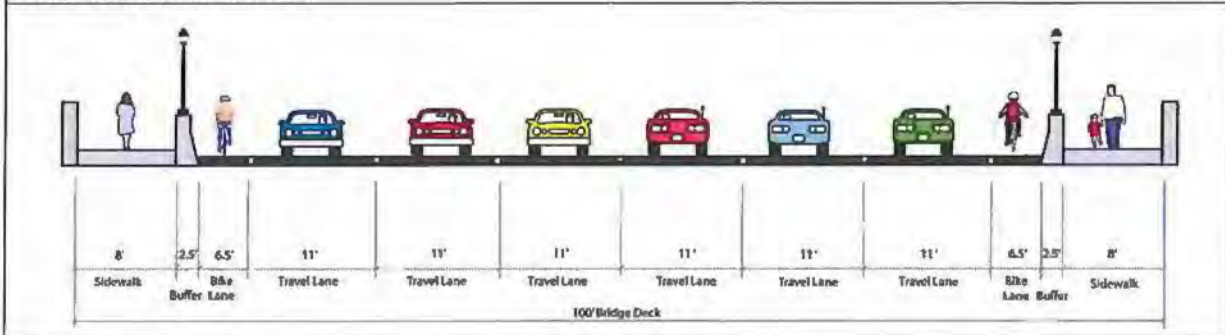
The bridge deck is 100’ wide with a large recovery area on the outside and an unused center lane. This provided an opportunity to reallocate space on the bridge deck to accommodate bicycle and pedestrian facilities.

The following list describes basic improvements that could be made to improve bicycle and pedestrians facilities on the bridge:

- Add sidewalk to bridge deck by removing center median and reducing the travel lanes to 11’ wide. Please note that due to the existing grade some earthwork would be required to build the sidewalks approaching the bridge deck.
- Until bike lanes can be implemented north and south of the bridge deck on Novi Road provide a 6.5’ paved shoulder and allow bicycles to cross the bridge as a pedestrian using the sidewalk.
- Provide high visibility crosswalks at all free-flowing ramps by using the rectangular rapid flash beacon with an advanced warning flash beacon.
- In the future, when the interchange is reconstructed, bring all ramps perpendicular to the roadway to provide a safer crossing environment for pedestrians and bicyclists.

— Sidewalk
— Paved Shoulders

Potential Cross Section:



The City should consider going beyond providing just basic accommodations for bicyclists and pedestrians. The Novi Road interchange is a gateway to the city. It is a major connection between two regional shopping centers and one of the first things (and sometimes the only thing) many people experience when visiting the City of Novi.

Currently the interchange is utilitarian in nature. However, there is potential to enhance the interchange to create a signature corridor that reflects the character of the city and provides a memorable first impression of the community while simultaneously addressing important bicycle and pedestrian safety concerns.

Many communities have created landmark bridges that are an important part of their identity. Numerous improvements have been completed or are underway on Novi Road north and south of the interchange. Upgrading the bridge would establish a hallmark corridor through the heart of the city that also bears the city's name.



Wabasha Street Bridge in St. Paul Minneapolis



Existing conditions for the Novi Street overpass

Fig. 3.3E. CSX Underpass Retro-fit



Utilize the existing CSX railroad underpass to build a trail along the west side of the railroad. By working with the existing bridge deck or building a separate facility, build a bridge over the railroad to provide a trail crossing to the east to connect to the regional shopping centers.



The alternative route to building a bridge over the railroad would be to take the trail to the west and connect to Taft Road, go north along Taft Road to 12 Mile Road and provide an at-grade railroad crossing along 12 Mile Road. At this point it may be worth exploring the option of building a separate non-motorized bridge over I-96 connecting Taft Road to avoid the CSX railroad altogether.



— Pathway
— Alternative



est. 1962

34000 Plymouth Road
Livonia, MI 48150
734-522-6711
www.ohm-advisors.com



CITY OF NOVI

Study of Options for a Pedestrian Crossing of I-96 at Novi Road February 17, 2012

Scope

The City of Novi has retained Orchard, Hiltz & McCliment, Inc. (OHM) to study potential pedestrian crossings of I-96 at or near Novi Road. This report is based on discussions, meetings and analysis of the feasibility of adding a sidewalk or pathway crossing in this area. For the analyzed options, it was important to talk to the project stakeholders, whose approval would be necessary for the project to move forward. The stakeholders included the Michigan Department of Transportation (MDOT), the Road Commission for Oakland County (RCOC), the City of Novi. Other possible stakeholders included CSX Railroad and the subplot owners along Novi Road in front of Twelve Oaks Mall.

Five options were analyzed and contained in this report. With any option, it will be important to link the proposed facility into existing sidewalks or pathway to create a pedestrian network that is useable. These options are the first step in achieving progress towards the City's Non-motorized Master Plan to provide access across I-96 with the City limits.

Existing Condition

Currently, there are no pedestrian crossings of I-96 within the City of Novi. All roads crossing I-96 do not contain pedestrian facilities. At Novi Road, there is a seven lane bridge with 100' of cross sectional width. North of the freeway pedestrian facilities are not present on either the east or west side of the road until just south of Twelve Mile Road. South of the freeway, there are pedestrian facilities just south of the interchange.

It should be noted that under existing conditions which are notably not safe, it is believed there is a relatively low pedestrian volume crossing the freeway at Novi Road.

Study Area

The Study area included the Novi Road right-of-way, between Twelve Mile Road and Crescent Boulevard. Options also will look to place a pedestrian bridge east or west of the interchange area extending out to Taft Road to the west and Town Center Drive to the east. Options considered started with those mentioned in the City of Novi's Non-motorized Pedestrian Master Plan along with several others options not mentioned.

There are objectives that were considered when developing the options. The first was to address the pedestrians crossing specifically I-96. The second was to explore which crossing location in the area may get the most use.

In developing options for a crossing at Novi Road, it was determined the best objective would be to provide a preferably barrier protected, pedestrian facility along the bridge.

The second objective was to analyze crossing locations near Novi road that may be better utilized in terms of pedestrian volume. This consideration led to looking at options to place a pedestrian crossing west of Novi Road at Taft Road and east of Taft Road at Crescent Boulevard. We have included these options for consideration as the fourth and fifth options, but acknowledge that these options do not solve the issue of getting pedestrians off of Novi Road at I-96.

Original Options Considered

Prior to meeting with the stakeholders, OHM developed and presented the following options (See Appendix A for pictorial exhibits of these options):

- Option 1 - Cross pedestrians west of Novi Road utilizing the grade separated railroad road underpass with I-96. From the south, a pedestrian route would be developed along Expo Center Drive from Novi Road to the railroad underpass, pass below the underpass, to the north side and extend to the intersection of Fountain Walk Ave. and Cabaret Drive where the path would extend east and north to the existing sidewalk system.
- Option 2 – Provide an at-grade crossing of the interchange on both the east and west sides of Novi Road. This option would require removing the shoulders from the east and west sides of Novi Road, curb Novi Road, and provide a slightly elevated 6' wide sidewalk on both sides of the road. These sidewalks would require the crossing of the ramps for the freeway connecting to Novi Road. The west sidewalk through the interchange would need to cross a free flow I-96 EB entrance loop ramp and the east sidewalk would need to cross two free flow I-96 entrance ramps. This type of pedestrian crossing is not always favored due to the potential for accelerating cars and pedestrians to be in conflict.
- Option 3 – Provide a single crossing by developing a facility starting south of the interchange, along the west side, crossing over to the east side north of the signalized intersection for the EB I-96 exit ramp. This route would cross the freeway along the east edge of the existing bridge in a barrier protected crossing, 9.5 feet wide to the north side where the pedestrian facility would loop under the Novi Road bridge in the fill slope below the bridge which would take the path to the west side of Novi Road where the path would come up the west side to the signalized intersection at the WB I-96 entrance ramp. The path would then proceed north and east. This option would not have pedestrians crossing any free flow freeway ramps, but would require shifting the two NB Novi Road lanes about 12' to the west to accommodate the pedestrian facility and would remove the unutilized center turn lane.
- Option 4 – Provide a single crossing by developing a facility starting south of the interchange, along the west side, crossing over to the center of the roadway on the north side of the signalized intersection for the EB I-96 exit ramp. Pedestrians would cross the freeway along a barrier protected crossing in the existing center left turn lane area which is not used due to left turns being prohibited in the interchange area. This crossing can also include a covered crossing to provide a “gateway” feature that would enhance this entrance point to the City. The pedestrian facility would extend north to the south side of the signalized intersection at the WB I-96 entrance ramp where the path would proceed west or east, and then north on both sides of Novi Road. This option would not have pedestrians crossing any free flow ramps, and would maintain 7' shoulders, 11'-11.5' lanes and 6'-9' wide pedestrian route depending on the width desired for this pedestrian route.
- Option 5 – Provides a grade separated, stand alone bridge east of Novi Road. This facility would cross I-96 at Town Center Drive starting south of I-96 and extending to the north side of I-96. The path would then extend west paralleling the exit ramp for WB I-96 to Novi Road, and then extend north. This option avoids all conflicts with interchange area, but is questionable as to whether pedestrians will utilize this facility located over 1,500' from Novi Road.

First Meeting Results

The project stakeholders met on October 5, 2011 to discuss the above options and other possible feasible options, limitations and other obstacles that would need to be considered in any option. Discussion revealed the following:

- For Option 1, CSX was contacted prior to the meeting and preliminary discussions revealed that there is not enough clear width under the bridge to provide a pathway and 25' of clearance from the railroad tracks as required by the railroad. The noise below the bridge and safety of pedestrians near the

tracks were additional concerns which led to the potential elimination of this option. It was discussed to make one follow-up phone call to CSX to further discuss a potential concrete barrier protected option. This option would still have noise and safety (isolated area, dark so lighting would be required) concerns.

- Option 2 was deemed acceptable with some modifications. The raised unprotected pedestrian crossing on the bridge over I-96 was changed to a barrier protected sidewalk that is not raised. To eliminate the need to cross west side free flow EB entrance ramp, it was suggested to tee in the free flow ramp for SB to EB I-96 to Novi Road, thus creating a un-signalized, but slower speed ramp crossing. The other two free flow ramps would remain, however pedestrian warning flashing signals could be added as the ramp approached the crossing.
- Option 3 was deemed not practical as the long widening route to cross the interchange was thought to not be utilized by pedestrians.
- Option 4 was thought to be unique. It was discussed that the center lane pedestrian crossing is common in diverging diamond interchange concepts in use today. Further exploration of this option is required.
- Option 5 will be to further evaluate not only a separate pedestrian crossing east of Novi Road, but a second location was discussed at Taft Road. The second option was thought to be beneficial in that it will connect several neighborhoods together currently separated by I-96. This crossing location was thought to have a higher potential for use than the east side crossing at Town Center Drive.

MDOT was concerned with any modifications to the interchange which would affect traffic capacity. This could include the narrowing of the lanes, elimination of the shoulder, or modifying the traffic signal timing.

RCOC expressed concern over placing sidewalk along Novi Road north of the interchange since there is not sufficient room in the ROW on the east side. Any sidewalk on the east side will require an easement from the property owner (sublot owners of Twelve Oaks Mall)

The City expressed their concern to solve the Novi Road pedestrian issue since evidence of use is noted via goat paths (worn grass area) on the south side of the interchange.

An investigation of the traffic signal timing revealed that there is 77 seconds of green time for Novi Road at the WB I-96 exit ramp. Correspondingly, there is 30 seconds of green time for the WB I-96 exit ramp. The required time for pedestrians to cross Novi Road on the north side of the intersection is 36 seconds, and 32 seconds for south side of the intersection due to its reduced width.

On the south side of the interchange the traffic signal timing revealed that there is 102 seconds of green time for Novi Road at the EB I-96 exit ramp. Correspondingly, there is 18 seconds of green time for the WB I-96 exit ramp. The required time for pedestrians to cross the north or south sides on Novi Road at the intersection is 27 seconds.

At both traffic signal locations, there is insufficient green time for the exiting ramp traffic for a pedestrian to cross the full width of Novi Road in the current timing scheme. Due to this, push buttons or revised traffic signal timing will be required to be placed at the Novi Road crossing to lengthen the cycle time should a pedestrian desire to make this crossing. Also, there is an issue on the south side traffic signal where pedestrians crossing Novi Road will be impeded by left turning traffic from the EB I-96 exist ramp onto NB Novi Road. Likewise, there is a similar issue on the north side traffic signal where pedestrians crossing Novi Road will be impeded by left turning traffic from the WB I-96 exist ramp onto SB Novi Road. These conflicts will require an advanced start for pedestrians crossing Novi Road. This allows pedestrians, once within the roadway, to be visible to left turning traffic which will need to slow for pedestrian before proceeding.

Proposed Modified Options

There were 5 options explored after the meeting. These options are shown graphically and have preliminary estimated construction costs prepared which identify total project costs. Several issues were uncovered during the development of these modified options. These include:

Right-of-Way (ROW) Issues

Permanent ROW will be required for the new Options 1, 2A and B and 3 if the selected options are to connect with the south side sidewalk at the Big Boys. There is insufficient room within the 120' ROW to extend the proposed sidewalk to the existing sidewalk south of Big Boy. It was investigated if it would be possible to purchase the property along the frontage of Big Boy which contains 15 spaces, however removing these 15 spaces would make the site non-compliant with current City of Novi standards and adversely harm the site in terms of future redevelopment or sale.

In addition, in Option 4, permanent ROW will be required between the MDOT I-96 ROW and Crescent Road ROW. This privately owned property could be obtained via a sidewalk easement rather than a ROW purchase.

All options except 5 will require a sidewalk easement along the east side of Novi Road to the northerly entrance road to Twelve Oaks Mall.

All options will require approval from MDOT and/or the RCOC to place a sidewalk within their ROW.

Traffic Signals

The existing traffic signals at the intersection of the freeway ramps and Novi Road are 15 years old. It is questionable as to whether these old traffic signals and controller cabinets can be altered to handle pedestrian traffic signals and whether MDOT would allow a modification to such an old system. There are no plans on upgrading these traffic signals in the near future. Therefore, cost has been included in the estimate to upgrade the two traffic signals impacted by this project so that the required pedestrian signals and pushbuttons can be added. The traffic signals estimated do not include utilizing mast arm poles at this time.

Costs

All options were evaluated in terms of total project cost. This cost includes estimated construction, PE (Design Engineering), CE (Construction Engineering), and Right-of-way (ROW) costs which will provide a comprehensive estimate of the project.

The following **renumbered options** are being considered and have plan concept drawings and an engineer's estimate of construction cost included on the following pages.

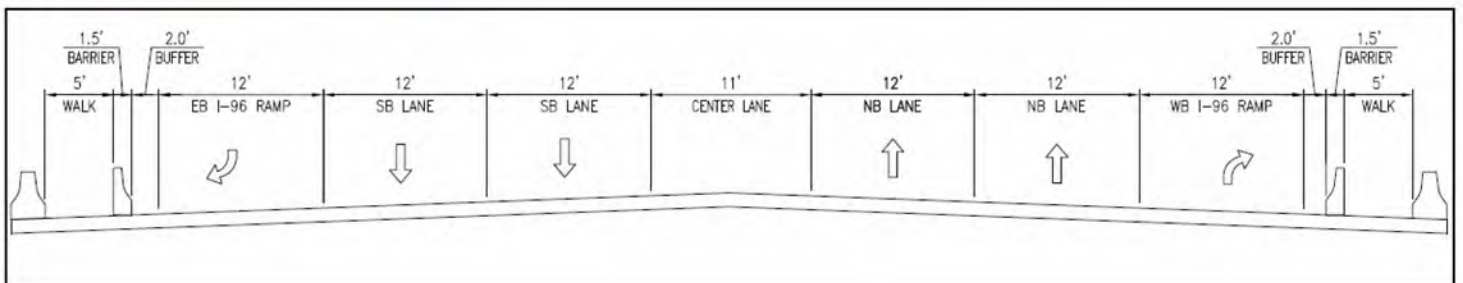
Table 1 – Proposed Options - Pro's and Con's

	Description	Pro's	Con's
Option 1	Dual, at-grade, barrier protected, sidewalk crossings of the interchange linking the sidewalk north and south of I-96	<ul style="list-style-type: none"> • Easy use for the pedestrians • Sidewalks provided on east and west sides of the road • Utilizes exiting bridge for cost effectiveness • Utilizes signalized intersection for crossing • Maintains 12' traffic lanes on Novi Road 	<ul style="list-style-type: none"> • Free flow pedestrian ramp crossings required • Requires curbing and provide drainage improvements to Novi Road within interchange • Deletes shoulder along Novi Road • Requires push button to be added at any signal crossing Novi Road • South side connectivity an issue due to property constraints in front of Big Boy
Option 2A and B	Single, at-grade, barrier protected, sidewalk crossing of the west side of the interchange linking the sidewalk north and south of I-96. Option includes teeing in west side free flow ramp.	<ul style="list-style-type: none"> • No free flow pedestrian ramp crossings • Most cost effective solution • Maintains 12' traffic lanes on Novi Road • Maintains 8' shoulders • Does not require pushbuttons • Shorter Novi Road crossing distance does not require pushbuttons • Unique option which could provide aesthetic enhancements opportunity for "gateway" project 	<ul style="list-style-type: none"> • Requires ramp reconstruction • South side connectivity an issue due to property constraints in front of Big Boy
Option 3	Single, at grade, barrier protected, sidewalk crossing in the median of the interchange linking the sidewalks north and south of I-96	<ul style="list-style-type: none"> • Shorter Novi Road crossing distance does not require pushbuttons • Unique option which could provide aesthetic enhancements opportunity for "gateway" project 	<ul style="list-style-type: none"> • May make pedestrians uncomfortable walking between two lanes of traffic • Protecting barrier ends problematic • Narrows Novi Road to 11'-11.5' lane width depending on width of sidewalk desired • Narrows shoulder to 7' in width • Pedestrian route is crowned in center of route requiring road overlay to correct • South side connectivity an issue due to property constraints in front of Big Boy
Option 4	Grade separated crossing east of Novi Road linking Town Center Drive and the north side of the freeway	<ul style="list-style-type: none"> • Safe option • Maintains 12' traffic lanes on Novi Road • Maintains 8' shoulders • No pedestrian ramp crossings 	<ul style="list-style-type: none"> • Highest cost option • Option may conflict with ITC power lines • Does not solve Novi Road pedestrian crossing issue • ROW required on the south side to the point of tie-in on Crescent Blvd.
Option 5	Grade separated crossing west of Novi Road at Taft Road	<ul style="list-style-type: none"> • Safest of all options • Perceived to be the option that will get the highest use, although mostly by bicyclists 	<ul style="list-style-type: none"> • High cost option • Option may conflict with ITC power lines • Does not solve Novi Road pedestrian crossing issue



Option 1 – Dual, at-grade, barrier protected sidewalk crossings of the interchange linking the sidewalk north and south

LEGEND	
	SIDEWALK
	BIKE PATH
	PED BRIDGE & APPROACH
	CONC BARRIER
	RAMP REALIGNMENT
	GUARDRAIL
	RAMP REMOVAL
	ITC LINE
	ROW TAKE



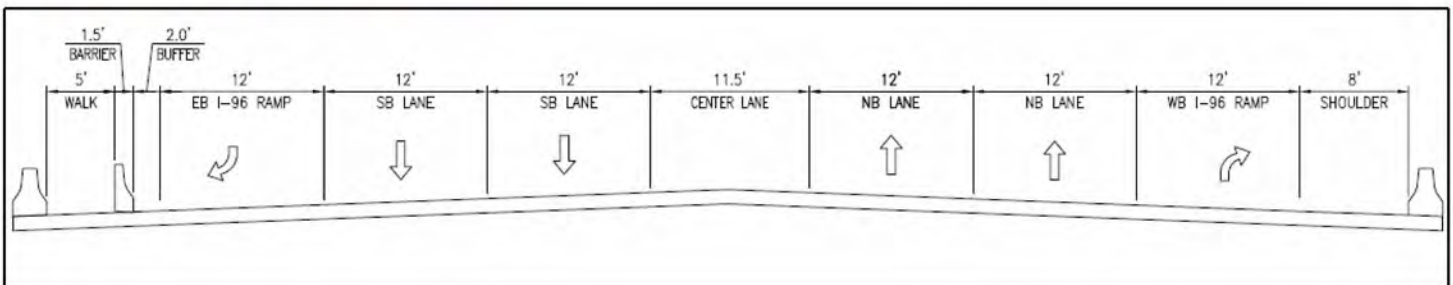


Option 2A and 2B – Single, at-grade, barrier protected, sidewalk crossing of the west side of the interchange linking the sidewalk north and south of I-96. Option includes teeing in west side free flow ramp.

OPTION 2A

Option 2A would construct a non-motorized crossing at the existing ramps on the west side of Novi Road.

LEGEND	
	SIDEWALK
	BIKE PATH
	PED BRIDGE & APPROACH
	CONC BARRIER
	RAMP REALIGNMENT
	GUARDRAIL
	RAMP REMOVAL
	ITC LINE
	ROW TAKE





OPTION 2B

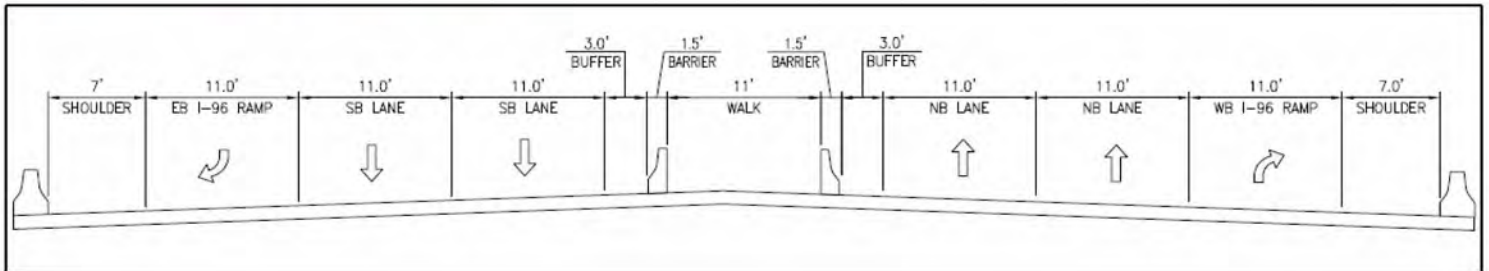
Option 2B is similar to Option 2A, except that the SB Novi Road on-ramp to EB I-96 is realigned from a sweeping slip ramp (with high speeds near the proposed pedestrian crossing) to a tighter 90-degree right turn that will require motorists to decrease speeds near the pedestrian crossing.

LEGEND	
	SIDEWALK
	BIKE PATH
	PED BRIDGE & APPROACH
	CONC BARRIER
	RAMP REALIGNMENT
	GUARDRAIL
	RAMP REMOVAL
	ITC LINE
	ROW TAKE

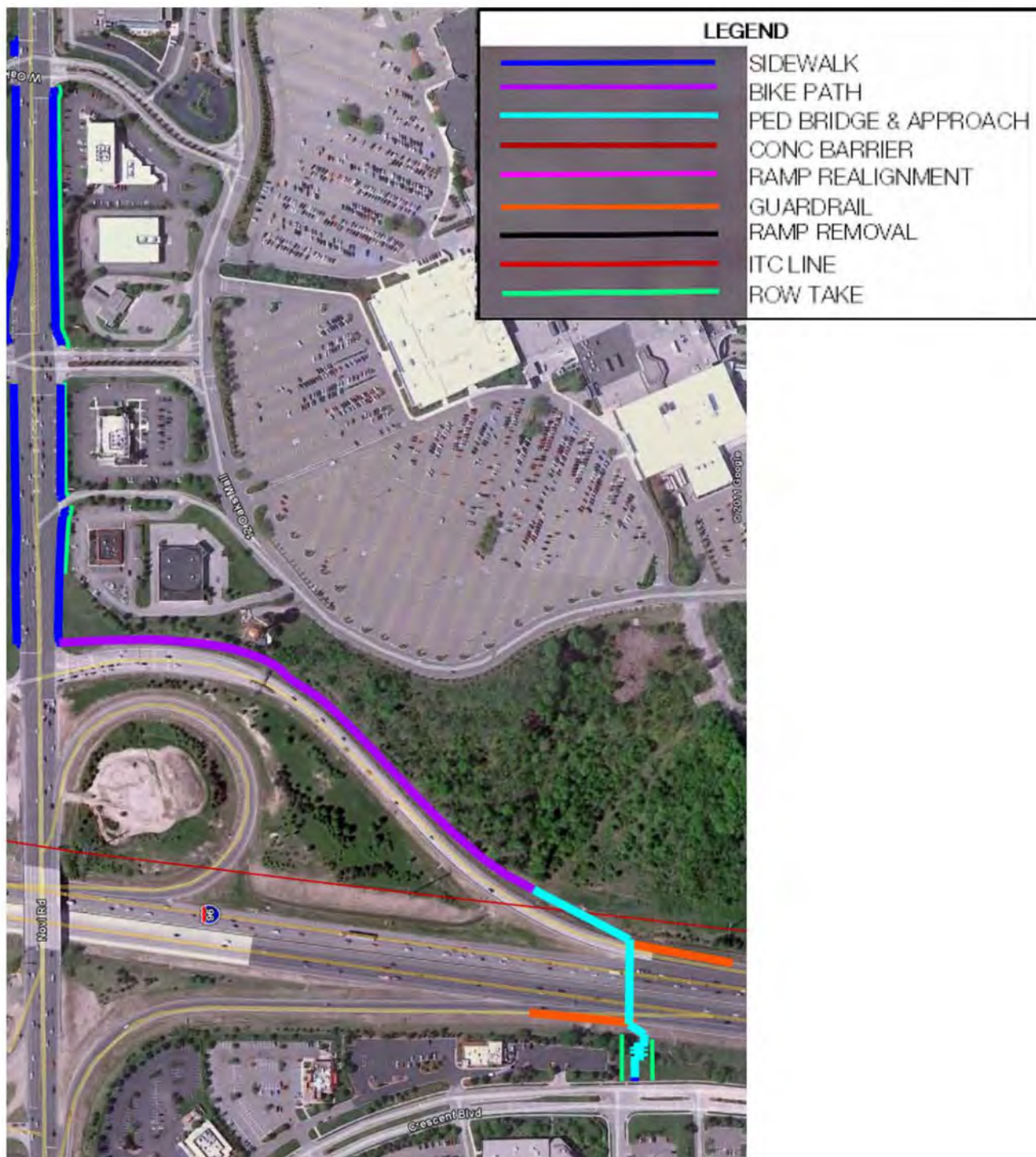


Option 3 – Single, at grade, barrier protected, sidewalk crossing in the median of the interchange linking the sidewalk north and south of I-96

LEGEND	
	SIDEWALK
	BIKE PATH
	PED BRIDGE & APPROACH
	CONC BARRIER
	RAMP REALIGNMENT
	GUARDRAIL
	RAMP REMOVAL
	ITC LINE
	ROW TAKE



Option 4 - Grade separated crossing east of Novi Road linking Town Center Drive and the north side of the freeway



Option 5 - Grade separated crossing west of Novi Road at Taft Road neighborhood areas north and south of I-96



LEGEND	
	SIDEWALK
	BIKE PATH
	PED BRIDGE & APPROACH
	CONC BARRIER
	RAMP REALIGNMENT
	GUARDRAIL
	RAMP REMOVAL
	ITC LINE
	ROW TAKE

Second Meeting Results

A second stakeholder meeting was held on November 17, 2011. MDOT, RCOC, City of Novi and OHM attended the meeting. This included the following people:

- Brian Coburn, City of Novi
- Ben Croy, City of Novi,
- Barbara McBeth, City of Novi
- Lori Swanson, MDOT
- Dave Evancoe, RCOC
- Mark Loch, OHM

The following items were discussed:

- Any new traffic signals should be estimated as mast arms and not box spans.
- MDOT will investigate traffic replacement schedule to see when these traffic signals are to be replaced. Since the traffic signal replacement is the most predominant single item, the sidewalk project may be scheduled to coincide with MDOT's schedule so as not to require City funding of the traffic signal entirely, just the upgrade to mast arms.
- MDOT prefers any option that keeps pedestrians off of the Novi Bridge. This was noted due to the potential impacts pedestrians may have on traffic capacity which is a concern to MDOT in this area. See post meeting comments below.
- Any pedestrian options on the bridge would require MDOT to maintain these improvements in the future. MDOT thought that the City of Novi would be responsible for maintaining any facilities off of the bridge.
- MDOT indicated that a traffic model would be required for any impacts to the traffic signal timing in the corridor. The City thought that they would proceed with this work to complete the Study. See follow-up comments below.
- The City of Novi indicated that they would build some sidewalk north of I-96 near Novi Road along the Sheridan Ring Road in upcoming years. OHM will be able to tie into this sidewalk reducing the amount of sidewalk required on the west side of road to complete the network.
- The City asked to explore a cantilever bridge option that would extend a pedestrian bridge from the existing bridge.
- In moving forward, the center turn lane can be deleted or reduced in width allowing the SB roadway to shift towards the center to provide eight (8') feet of pedestrian width.
- It was decided to proceed with options 2A and 2B for further investigation.
- Additional coordination will be required with MDOT as the project moves forward. Before beginning detailed design addition meetings with MDOT, another meeting should be held to review project concerns to be sure nothing has changed since this Study was completed.

Post Meeting Comments

Following the meeting, post meeting discussions centered around the traffic signal replacement at the two exit ramps on opposite sides of the interchange. The traffic signals are owned by MDOT but maintained by the Road Commission for Oakland County (RCOC). The latest preferred option(s) no longer require, or allow, pedestrians to cross Novi Road at the two signalized intersections. The new pedestrian facility will cross the EB exit ramp, the EB entrance loop ramp, and the WB entrance ramp. There is significant green signal time along Novi Road (red light for ramps) to allow pedestrians to cross the ramps without revising the signal timing. Furthermore, the need for push buttons would no longer be needed. Pedestrian signals would still be recommended but adding pedestrian signals to the existing traffic signal controllers in place would be possible without updating the entire traffic signal. Without traffic signal timing changes, a Traffic Study would no longer be needed. After discussions with RCOC, they affirmed that new traffic signals

would not be required for this work. They did recommend seeking funding to replace the signals with this project as they are the only non-mast arm signals in the corridor, they are old, and will need to be replaced in the future, so all of this work should be done at one time. This will be a decision for the City to decide, but if it affects the ability to add the crossing of the interchange, it should be noted that not having to replace the traffic signals drastically alters (lowers) the estimated cost of this work.

Another option suggested at the meeting was the addition of a pedestrian facility that can be cantilevered to the existing structure supported off the fascia, generally, the bridge railing. MDOT has utilized this option sparingly in the past. This option has been used for primarily narrow walkways that are about 4' to 5' in width. Supporting a wider walkway with a cantilever would likely cause overloading of the railing or fascia beam. Another primary concern would be aesthetics. Generally speaking, cantilever systems are not aesthetically pleasing and normally detract from overall appearance to the structure.

Cost estimates for this type of support are not readily obtainable since they are not commonly used and the potential improvements necessary to the existing structure cannot be fully understood until an analysis is undertaken. Additionally, all the fabrication work that would be necessary is all non-standard work. While it can be accomplished, it isn't the type of work that a bridge steel fabricator undertakes on a routine basis and will result in higher than average costs for fabrication. While this may be possible, we do not believe this type of support is worth consideration for this crossing.

Recommendation – Preferred Option

Options 2A and 2B were selected as the preferred option(s). The two options were identical in terms of sidewalk location for the most part with option 2B realigning the existing EB entrance loop ramp to become a tee intersection with Novi Road. It is therefore, significantly higher in cost (+\$280,000), but is favored as it is safer for pedestrians to cross due to the slower vehicle speed at the point of crossing.

The preferred option will maintain the twelve foot travel lanes through the interchange area, but shrink the unused center lane from 12' to 8' in width across the bridge. This will allow for an eight (8') pedestrian facility to be built on the existing bridge.

The west side sidewalk will be shown to tie into the Sheridan Ring Road between the WB I-96 entrance ramp and the signalized intersection to the West Oaks Shopping Mall. This walk is presumed to be built prior to this project and will be in the near vicinity of where a proposed sidewalk would be planned to be routed along Novi Road.

Funding

Federal funding for this project is limited to most likely limited to one source, Transportation Enhancement Funding. The following is an overview of this funding.

- **STP Transportation Enhancement Program** - this program has been expanded and now covers 12 main areas:
 1. Provision of Facilities for Pedestrians and Bicycles
 2. Provision of Safety and Educational Activities for Pedestrians and Bicyclists
 3. Acquisition of Scenic Easements and Scenic or Historic Sites (Including Historic Battlefields)
 4. Scenic or Historic Highway Programs (Including the Provision of Tourist and Welcome Center Facilities)
 5. Landscaping and Other Scenic Beautification
 6. Historic Preservation
 7. Rehabilitation and Operation of Historic Transportation Buildings, Structures or Facilities (Including Historic Railroad Facilities and Canals)

8. Preservation of Abandoned Railway Corridors (Including the Conversion and Use thereof for Pedestrian or Bicycle Trails)
9. Inventory, Control and Removal of Outdoor Advertising
10. Archaeological Planning and Research
11. Environmental Mitigation to Address Water Pollution Due to Highway Runoff or Reduce Vehicle-Caused Wildlife Mortality While Maintaining Habitat Connectivity
12. Establishment of Transportation Museums

While nominally there is no limit to the cost of the project being proposed, the limited funding to the whole state under this program in turn limits individual jobs. It is better to submit for several smaller, more concise projects, than single, large, complex projects. Only the construction of the project is eligible for federal funding, not design, construction engineering nor project administration. There is a long list of ineligible projects elements, so care must be taken when developing the project scope and costs. Funding split is 80/20 federal/local, but MDOT encourages greater than the minimum 20% match and 'overmatch' is a factor in project selection.

Applications for this program can occur at any time. Announcements of selected projects will be made throughout the year. Instructions and the application forms are available at MDOT's web page:

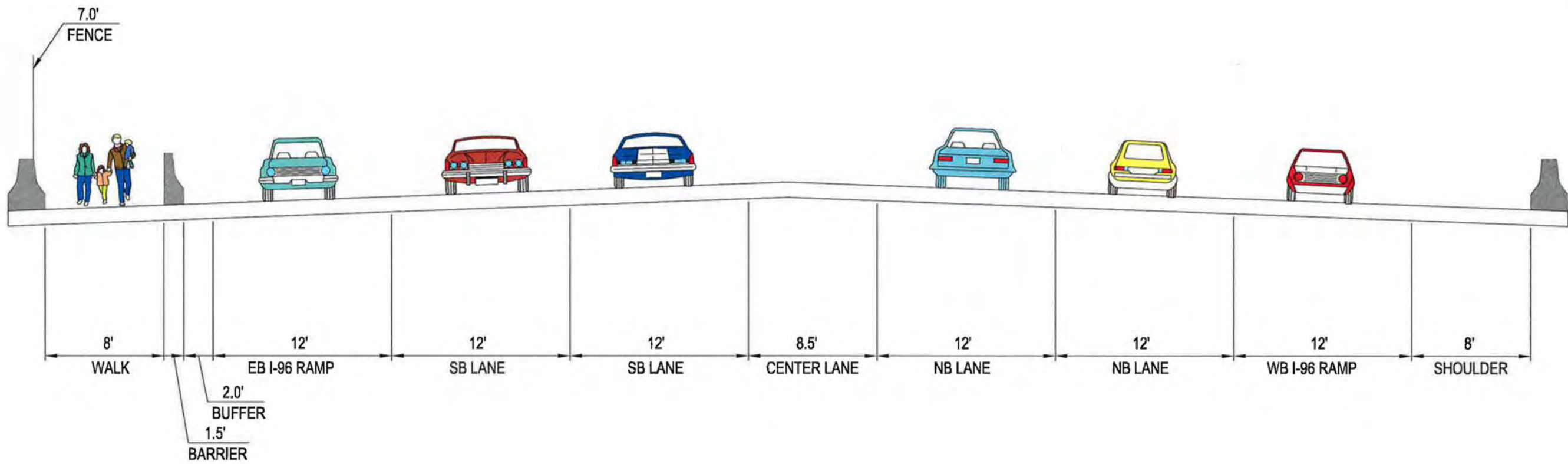
http://www.michigan.gov/mdot/0,1607,7-151-9621_17216_18231---,00.html

Other federal funding options such as Congestion Mitigation and Air Quality (CMAQ) and Safety funding do not seem likely candidates unless it can be shown that traffic congestion will reduced improving air quality (for CMAQ) or that there is a documented safety problem that can be mitigated with the project. For the later, all would agree pedestrians do not have a safe crossing over I-96, but there has to be documented problems. We are unaware that there have been pedestrian incidents in this corridor. See below for s description for this funding type.

- **STP Safety Program** - this program is intended to fund projects that improve the safety of the existing roadway system. It focuses on locations with concentrations of crashes involving injuries and deaths, and projects that will mitigate these crashes. There is a formal program limit for jobs to have \$400,000 or less in federal funds. Only the construction of the project is eligible, not design, construction engineering nor project administration. Funding split is 80/20 federal/local.

A call for projects is usually issued in January of each year, with the applications due to SEMCOG in March.

The following pages show the preferred option(s) and updated cost estimate(s).

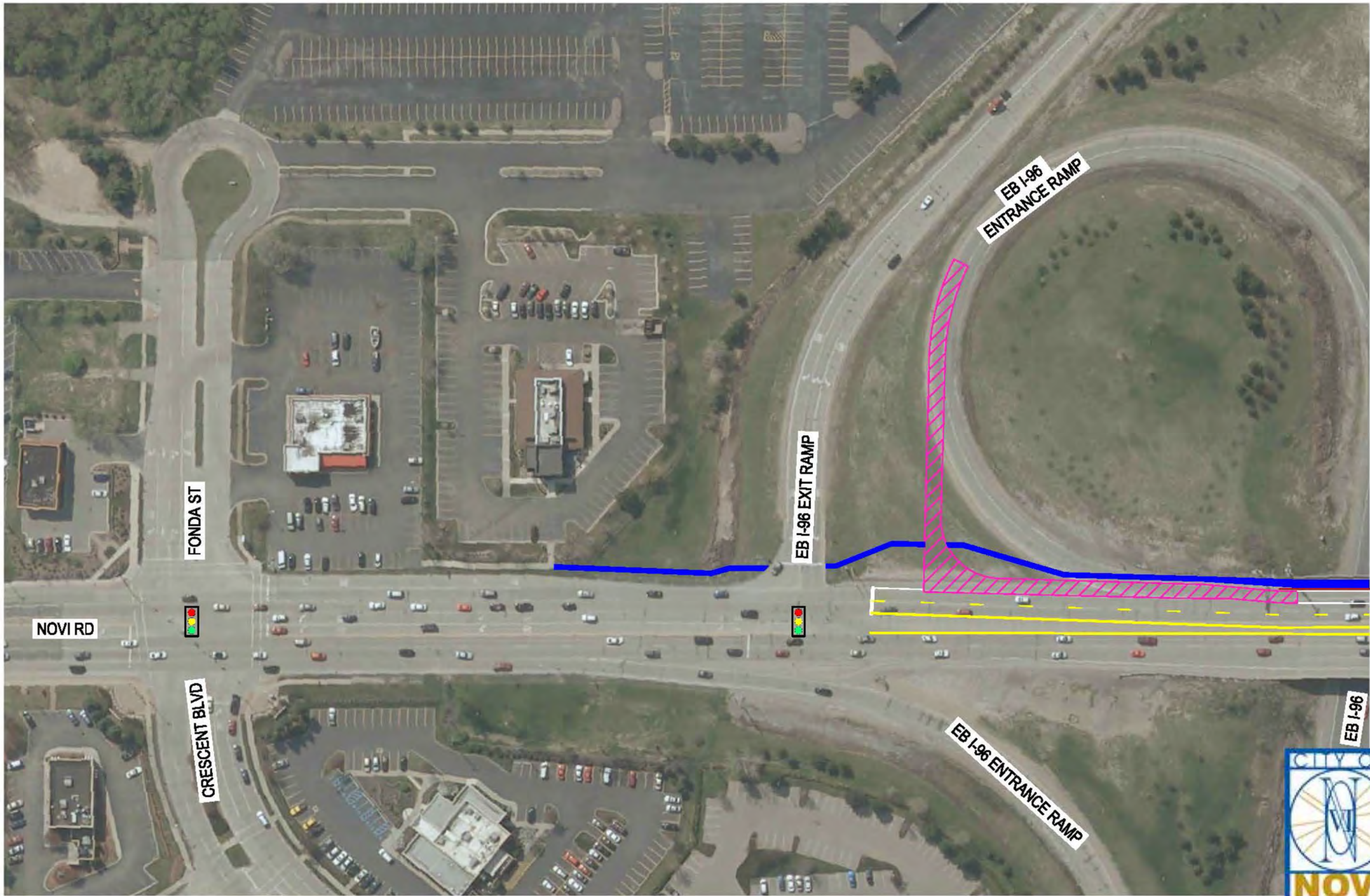


**NOVI ROAD PEDESTRIAN CROSSING AT I-96
OPTION 2 BRIDGE TYPICAL**



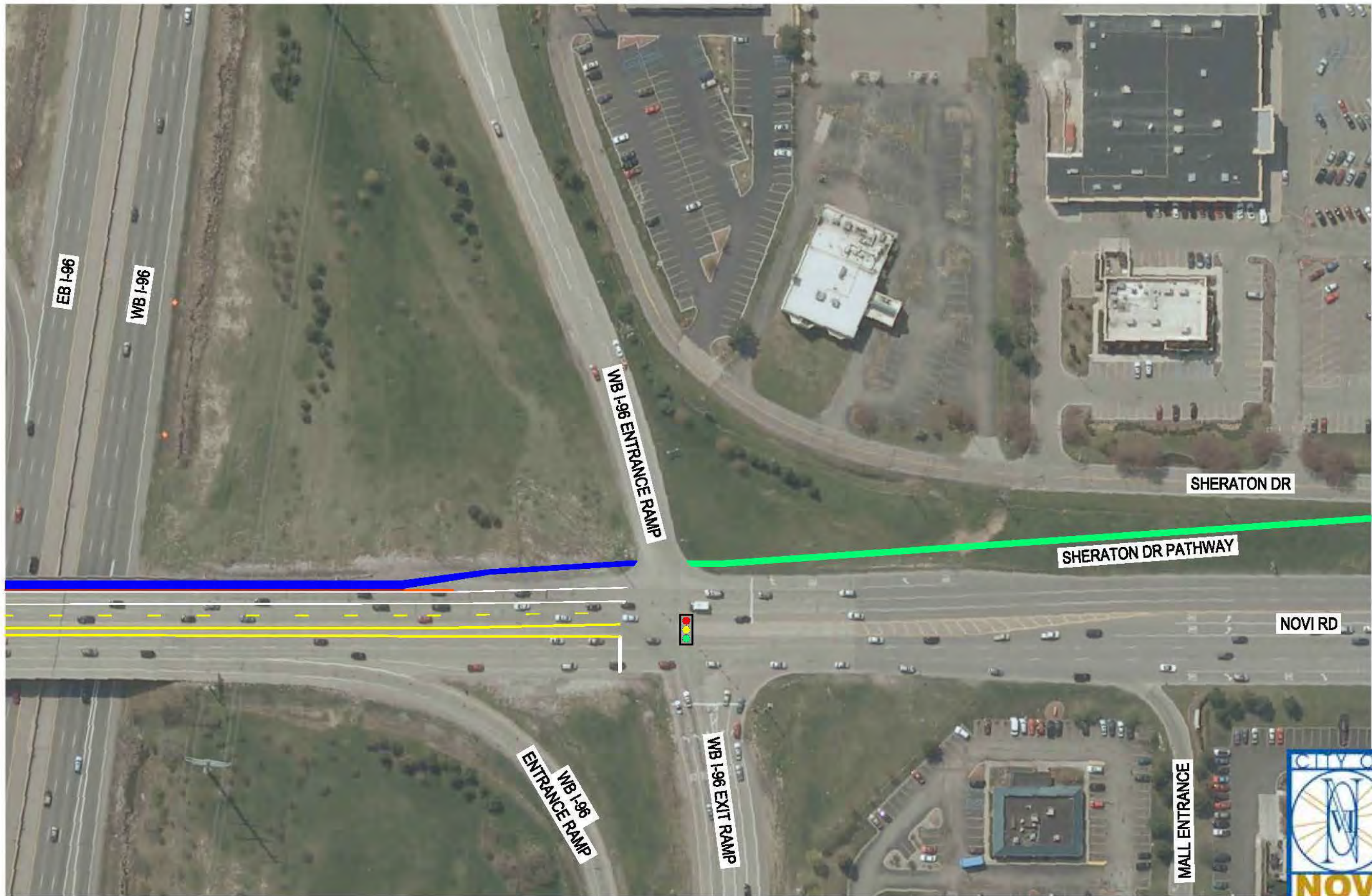
NOVI ROAD PEDESTRIAN CROSSING AT I-96
SHEET 1A OF 3

OPTION 2A



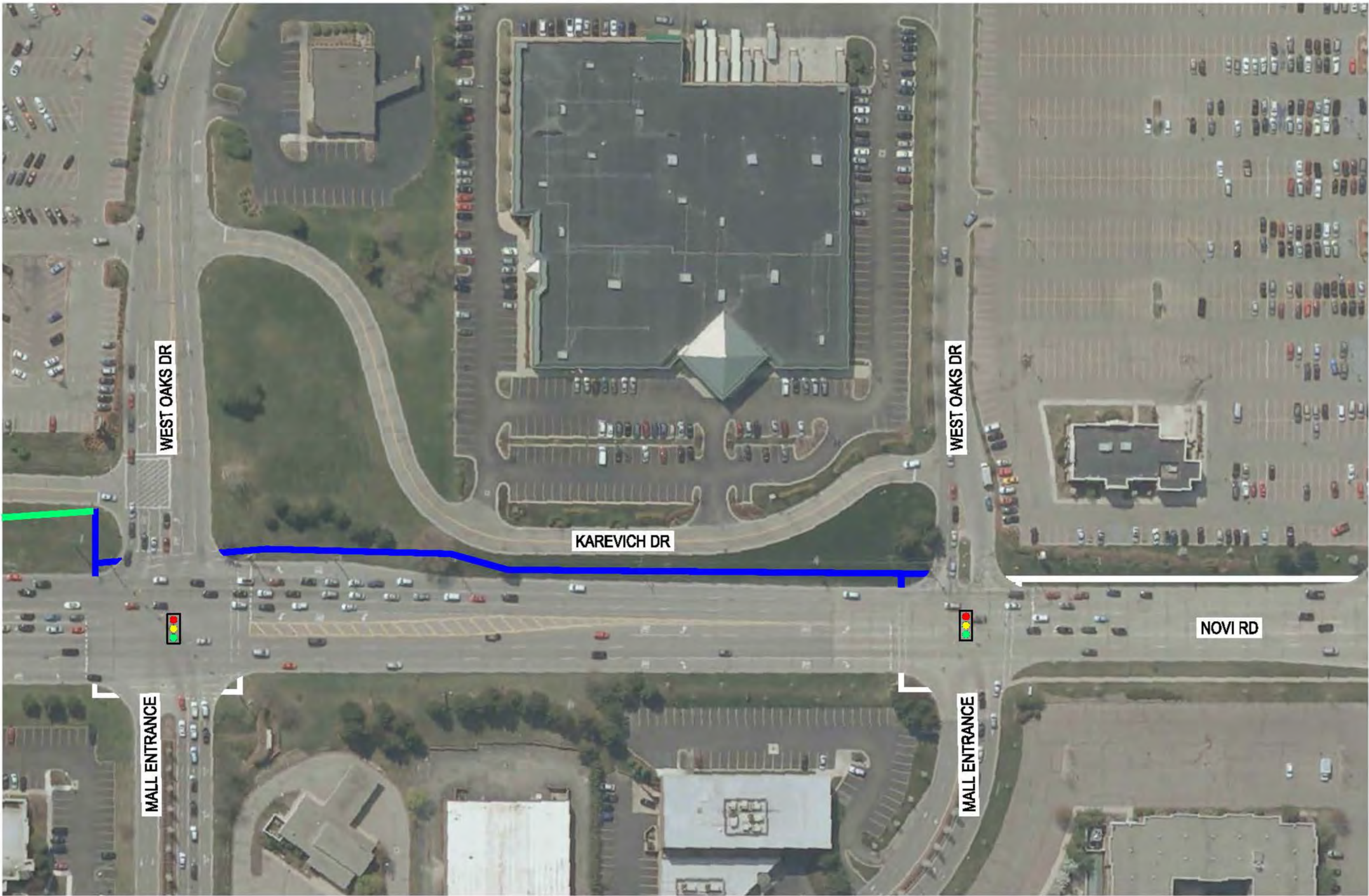
NOVI ROAD PEDESTRIAN CROSSING AT I-96
SHEET 1B OF 3

OPTION 2B



NOVI ROAD PEDESTRIAN CROSSING AT I-96
SHEET 2 OF 3

OPTION 2A AND 2B



NOVI ROAD PEDESTRIAN CROSSING AT I-96
SHEET 3 OF 3

OPTION 2A AND 2B



OPINION OF PROBABLE CONSTRUCTION COST

ORCHARD, HILTZ & McCLIMENT, INC.

34000 Plymouth Road, Livonia, Michigan, 48150

Telephone: (734) 522-6711 FAX: (734) 466-4557

PROJECT: Novi Road Ped Crossing at I-96
 LOCATION: City of Novi, MI
 WORK: Pedestrian Connectivity

DATE: December 16, 2011
 PROJECT #: 0163-11-0071
 ESTIMATOR: JMM
 CHECKED BY: MRL

ITEM CODE	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	COST
OPTION 2A - PED CROSSING ONLY ON WEST SIDE OF NOVI RD					
1500001	Mobilization	LS	1	\$ 68,000.00	\$ 68,000.00
7110030	Bridge Barrier Railing, Type 4, Modified	Ft	615	\$ 90.00	\$ 55,350.00
8030044	Sidewalk	Sft	10485	\$ 5.00	\$ 52,425.00
8077050	Impact Attenuator	Ea	1	\$ 20,500.00	\$ 20,500.00
8080110	Fence, Structure	Sft	4	\$ 9.50	\$ 38.00
8107050	Pedestrian Traffic Signal	Ea	2	\$ 7,500.00	\$ 15,000.00
8117001	Striping	Ft	3300	\$ 6.00	\$ 19,800.00
8127060	Maintenance of Traffic	Dir	13000	\$ 1.00	\$ 13,000.00
8167002	Earthwork	Sta	8	\$ 300.00	\$ 2,400.00
8167011	Turf Establishment and Landscaping	Syd	2900	\$ 6.00	\$ 17,400.00
8247060	Signing	Dir	5000	\$ 1.00	\$ 5,000.00
OPTION 2A - PED CROSSING ONLY ON WEST SIDE OF NOVI RD					\$ 268,913.00
CONTINGENCY (10%)					\$ 26,891.30
					CONSTRUCTION COST TOTAL = \$ 295,804.30
PE COST (8%)					\$ 23,664.34
CE COST (15%)					\$ 44,370.65
TOTAL PROJECT COST WITHOUT SIGNAL REPLACEMENT =					\$ 363,839.29
Mast Arm Traffic Signal Intersection add-on		Ea	2	\$ 165,000.00	\$ 330,000.00
CONTINGENCY (10%)					\$ 33,000.00
					CONSTRUCTION COST TOTAL = \$ 658,804.30
PE COST					\$ 15,000.00
CE COST					\$ 15,000.00
TOTAL PROJECT COST WITH FULL SIGNAL REPLACEMENT =					\$ 757,000.00



OPINION OF PROBABLE CONSTRUCTION COST

ORCHARD, HILTZ & McCLIMENT, INC.

34000 Plymouth Road, Livonia, Michigan, 48150

Telephone: (734) 522-6711 FAX: (734) 466-4557

PROJECT: Novi Road Ped Crossing at I-96
 LOCATION: City of Novi, MI
 WORK: Pedestrian Connectivity

DATE: December 16, 2011
 PROJECT #: 0163-11-0071
 ESTIMATOR: JMM
 CHECKED BY: MRL

ITEM CODE	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	COST
OPTION 2B - PED CROSSING ONLY ON WEST SIDE OF NOVI RD AND RAMP RE-ALIGNMENT					
1500001	Mobilization	LS	1	\$ 75,000.00	\$ 75,000.00
5017001	Ramp Removal and Construction	Ft	750	\$ 275.00	\$ 206,250.00
7110030	Bridge Barrier Railing, Type 4, Modified	Ft	615	\$ 90.00	\$ 55,350.00
8030044	Sidewalk	Sft	10485	\$ 5.00	\$ 52,425.00
8077050	Impact Attenuator	Ea	1	\$ 20,500.00	\$ 20,500.00
8080110	Fence, Structure	Sft	1900	\$ 9.50	\$ 18,050.00
8107050	Pedestrian Traffic Signal	Ea	4	\$ 15,000.00	\$ 60,000.00
8117001	Striping	Ft	3300	\$ 6.00	\$ 19,800.00
8127060	Maintenance of Traffic	Dlr	26000	\$ 1.00	\$ 26,000.00
8167002	Earthwork	Sta	6	\$ 1,000.00	\$ 6,000.00
8167011	Turf Establishment and Landscaping	Syd	2900	\$ 6.00	\$ 17,400.00
8247060	Signing	Dlr	13000	\$ 1.00	\$ 13,000.00
OPTION 2B - PED CROSSING ONLY ON WEST SIDE OF NOVI RD AND RAMP RE-ALIGNMENT					\$ 569,775.00
CONTINGENCY (10%)					\$ 56,977.50
CONSTRUCTION COST TOTAL =					\$ 626,752.50
PE COST (8%)					\$ 50,140.20
CE COST (15%)					\$ 94,012.88
TOTAL PROJECT COST WITHOUT SIGNAL REPLACEMENT =					\$ 771,000.00
Mast Arm Traffic Signal Intersection add-on		Ea	2	\$ 165,000.00	\$ 330,000.00
CONTINGENCY (10%)					\$ 33,000.00
CONSTRUCTION COST TOTAL =					\$ 989,752.50
PE COST					\$ 15,000.00
CE COST					\$ 15,000.00
TOTAL PROJECT COST WITH FULL SIGNAL REPLACEMENT =					\$ 1,164,000.00

Appendix A

Initial Concepts from October, 2011
Presentation to the City

Pedestrian Route Study at Novi Road and I-96

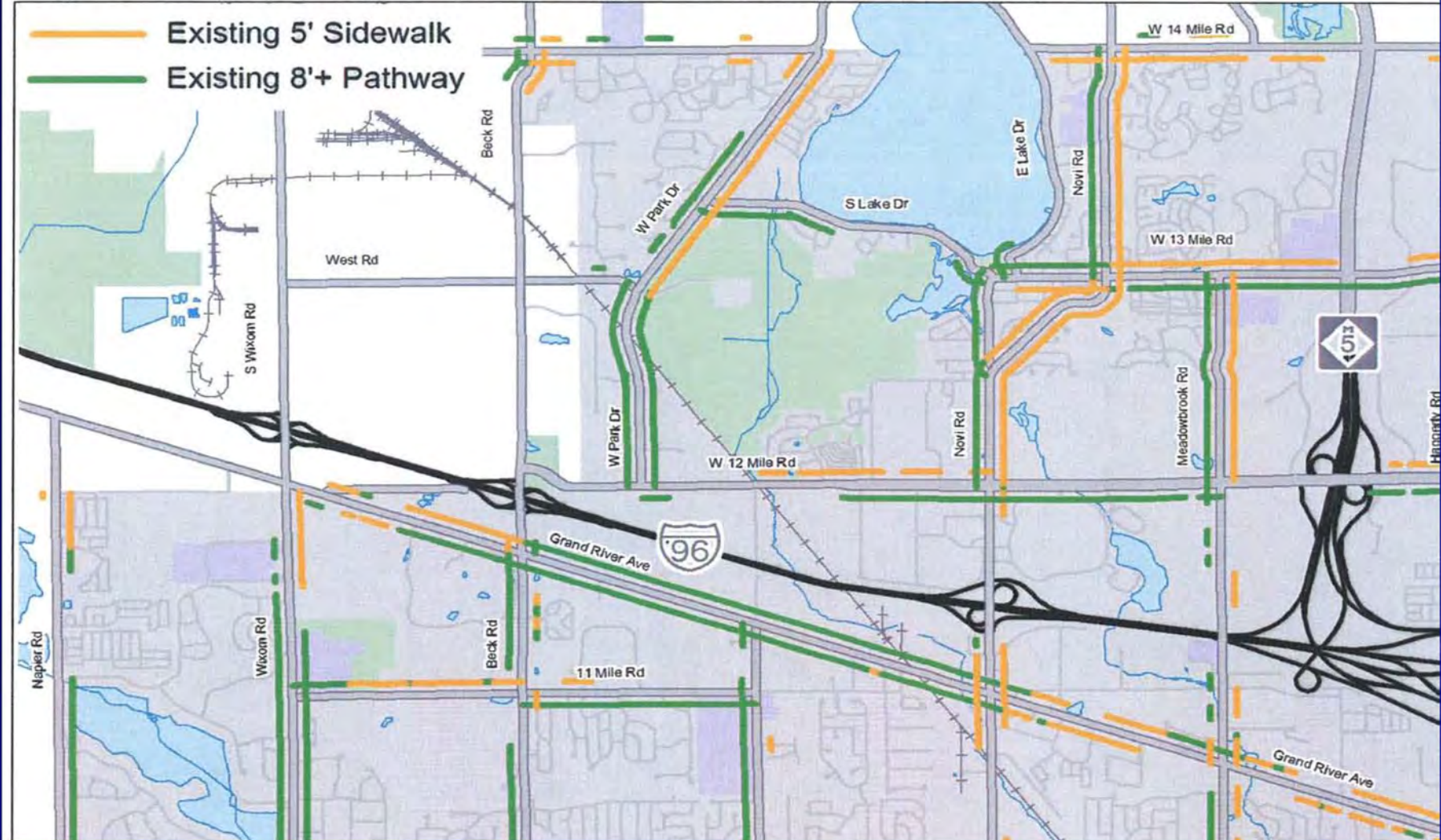
for the City of Novi, October, 2011

***Prepared by:
Orchard, Hiltz and McCliment, Inc.***

- Introductions
- Defining OHM's Scope of Work
- What we need from Stakeholders?
- What are key parameters of project?
 - Route for pedestrians, bicyclists or both?
 - If on Novi Road, one side or both sides?
 - Limits of Study area, (ie. must it connect to something on both ends)

Existing Sidewalk and Pathways

Fig. 2.1G. Existing Sidewalks and Roadside Pathways



Proposed Master Plan Novi Road Crossing

Fig. 3.3A. Novi Road Overpass Retro-fit Cross Section



The Novi Road interchange is a daunting environment for bicyclists and pedestrians. But it is a key link between the City's major commercial centers and despite its lack of facilities, pedestrians and bicyclists still use the overpass.

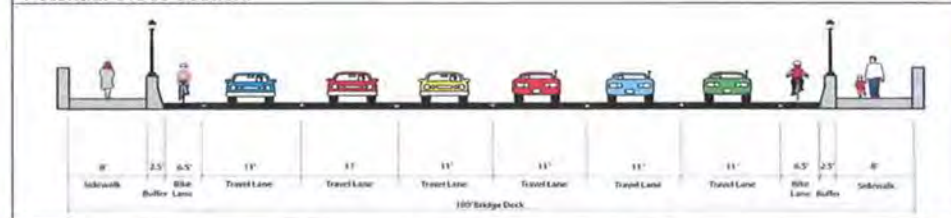
The bridge deck is 100' wide with a large recovery area on the outside and an unused center lane. This provided an opportunity to reallocate space on the bridge deck to accommodate bicycle and pedestrian facilities.

The following list describes basic improvements that could be made to improve bicycle and pedestrians facilities on the bridge:

- Add sidewalk to bridge deck by removing center median and reducing the travel lanes to 11' wide. Please note that due to the existing grade some earthwork would be required to build the sidewalks approaching the bridge deck.
- Until bike lanes can be implemented north and south of the bridge deck on Novi Road provide a 6.5' paved shoulder and allow bicycles to cross the bridge as a pedestrian using the sidewalk.
- Provide high visibility crosswalks at all free-flowing ramps by using the rectangular rapid flash beacon with an advanced warning flash beacon.
- In the future, when the interchange is reconstructed, bring all ramps perpendicular to the roadway to provide a safer crossing environment for pedestrians and bicyclists.

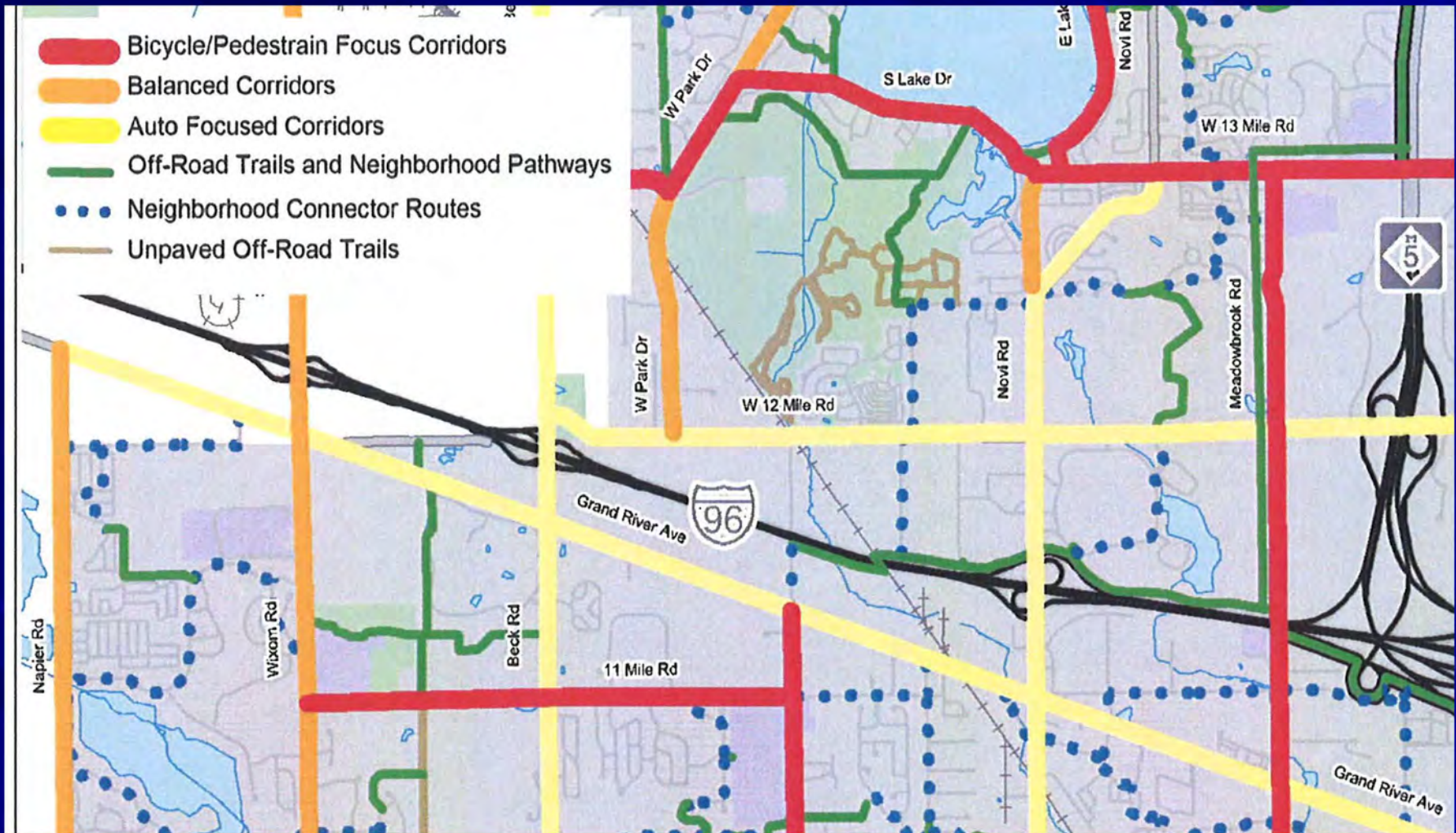
— Sidewalk
— Paved Shoulders

Potential Cross Section:



OPTIONS

Proposed Non-motorized Network

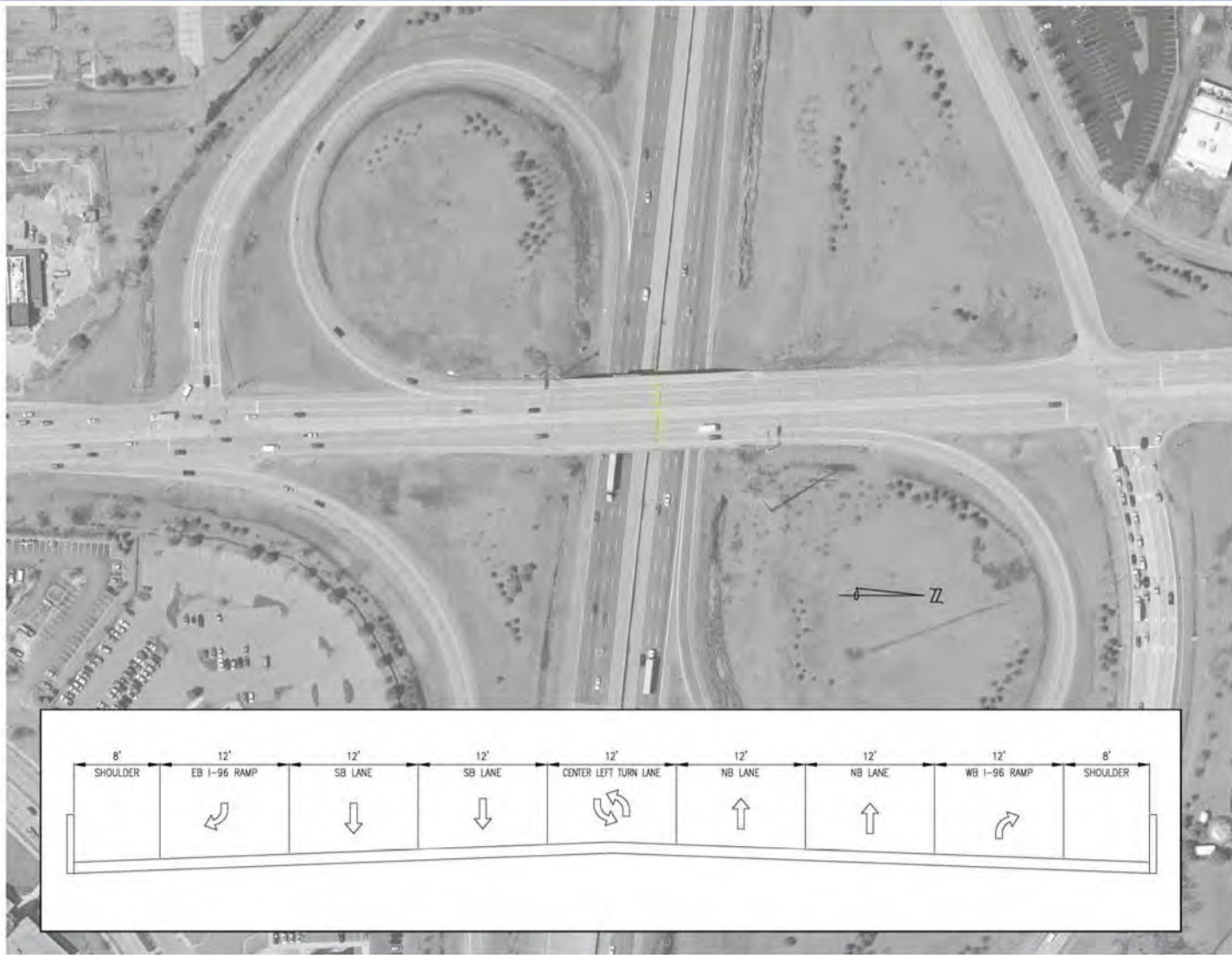


CSX Underpass at I-96



25 ' clearance from rail to wall

Existing Configuration

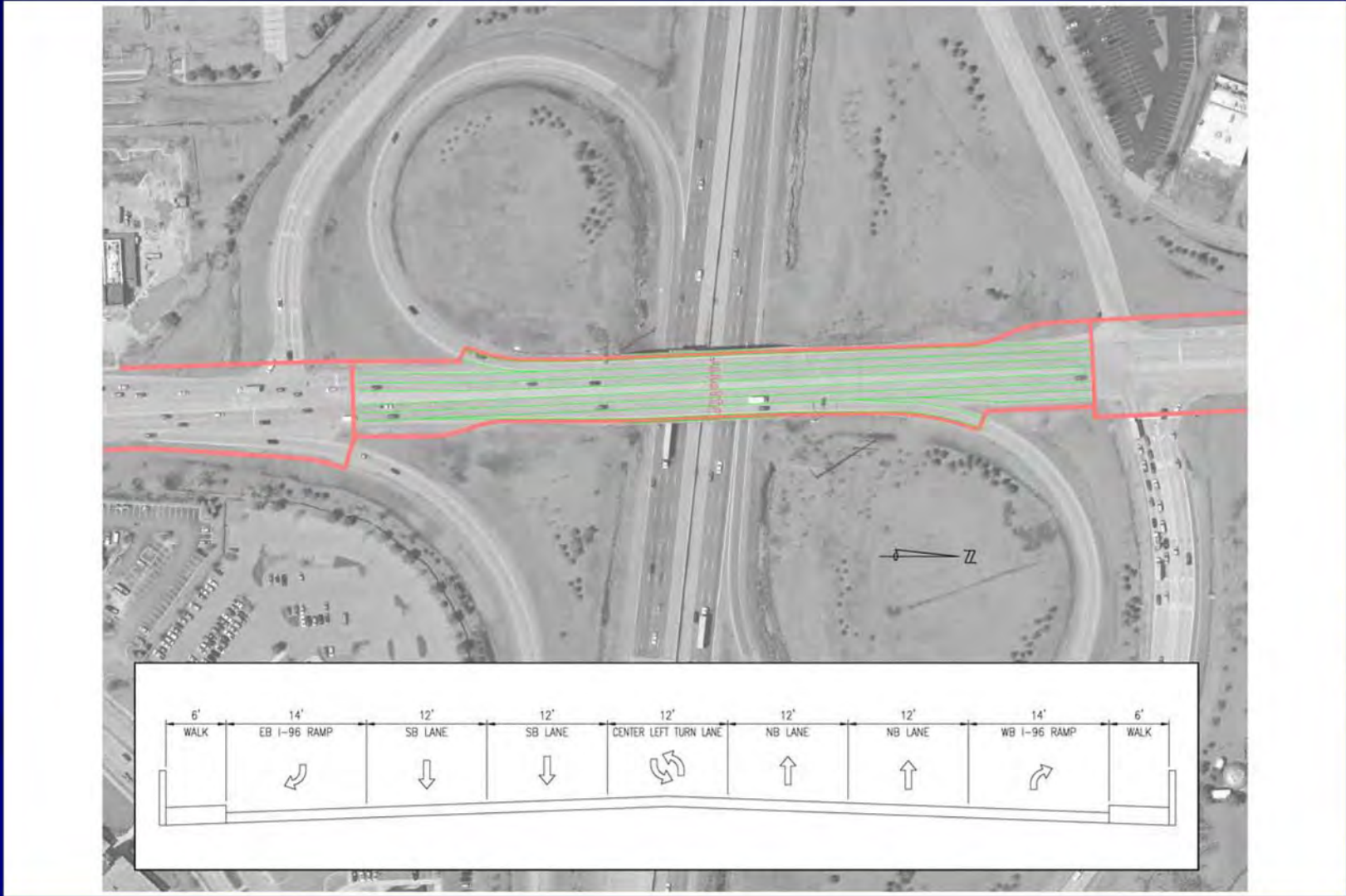


Novi Road looking north



5 to 7 lanes with shoulders

Double Sidewalk Option – Crosses Free Flow Ramps



Looking west at Grand River Bridge in Farmington

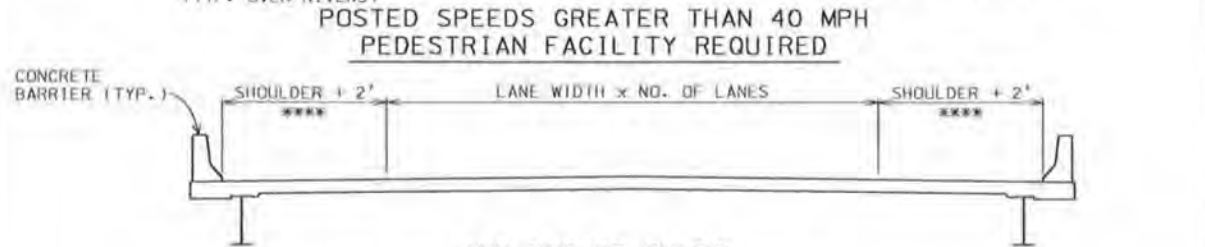
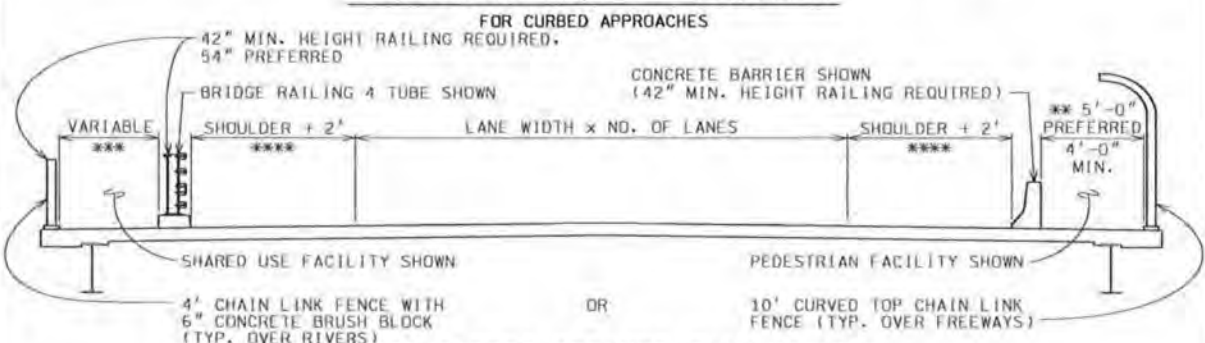
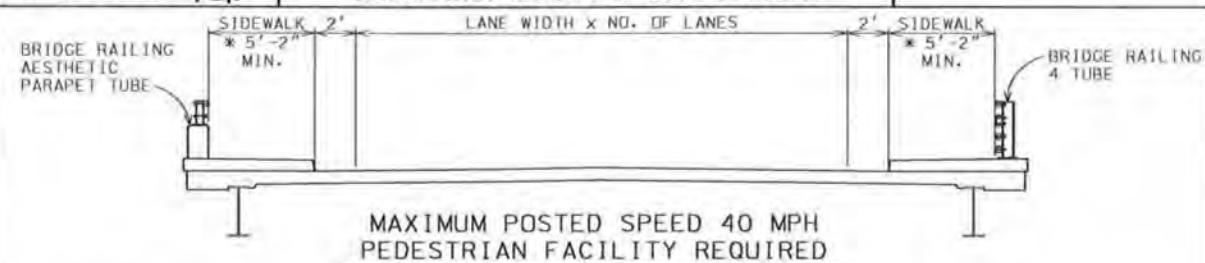


Five foot sidewalks, both side of road, 35 mph

DRAWN BY: BLT
 APPROVED BY: VZ
 CHECKED BY: TEF

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT
 BRIDGE CROSS SECTIONS
 TRUNKLINE, COUNTY & CITY BRIDGES

ISSUED: 02/14/11
 SUPERSEDES: 08/15/03



FOR COUNTY & CITY BRIDGES ONLY
 FOR TRUNKLINE BRIDGES WITHOUT PEDESTRIAN FACILITY
 SEE BRIDGE DESIGN GUIDE 6.05.01

- * 5'-2" TO TOE OF CURB, 5'-0" TO BEVEL POINT.
- ** WHEN A SIDEWALK WIDTH OF LESS THAN 5'-0" EXISTS FOR A LENGTH OF 200' OR MORE (INCLUDING APPROACHES) A PASSING SPACE, 5'-0" x 5'-0" (INCLUSIVE OF THE SIDEWALK), SHALL BE PRESENT EVERY 200' OR LESS OR A 5'-0" SIDEWALK SHALL BE USED THROUGHOUT.
- *** FOR WIDTH REFER TO AASHTO "GUIDE FOR THE DEVELOPMENT OF BICYCLE FACILITIES".

*** 2'-0" MIN. FOR CURB APPROACH, MINIMUM NON FREEWAY APPROACH SHOULDER WIDTHS:

ADT VEH/DAY	<400	400-2000	>2000
MIN. APPROACH SHLDR.	4'	6'	8'

WHERE AN AUXILIARY LANE ON THE STRUCTURE IS A CONTINUATION OF A RAMP, MATCH THE RAMP SHOULDER AS THE LATERAL CLEARANCE TO THE BRIDGE RAIL. USE 4' (TOTAL) MAX ON LEFT AND 8' (TOTAL) MAX. ON RIGHT.

PREPARED BY DESIGN DIVISION 6.05.02

Looking north on Orchard Lake over I-696



6' sidewalk on bridge at Orchard Lake and I-696

Looking south at Halstead over I-696



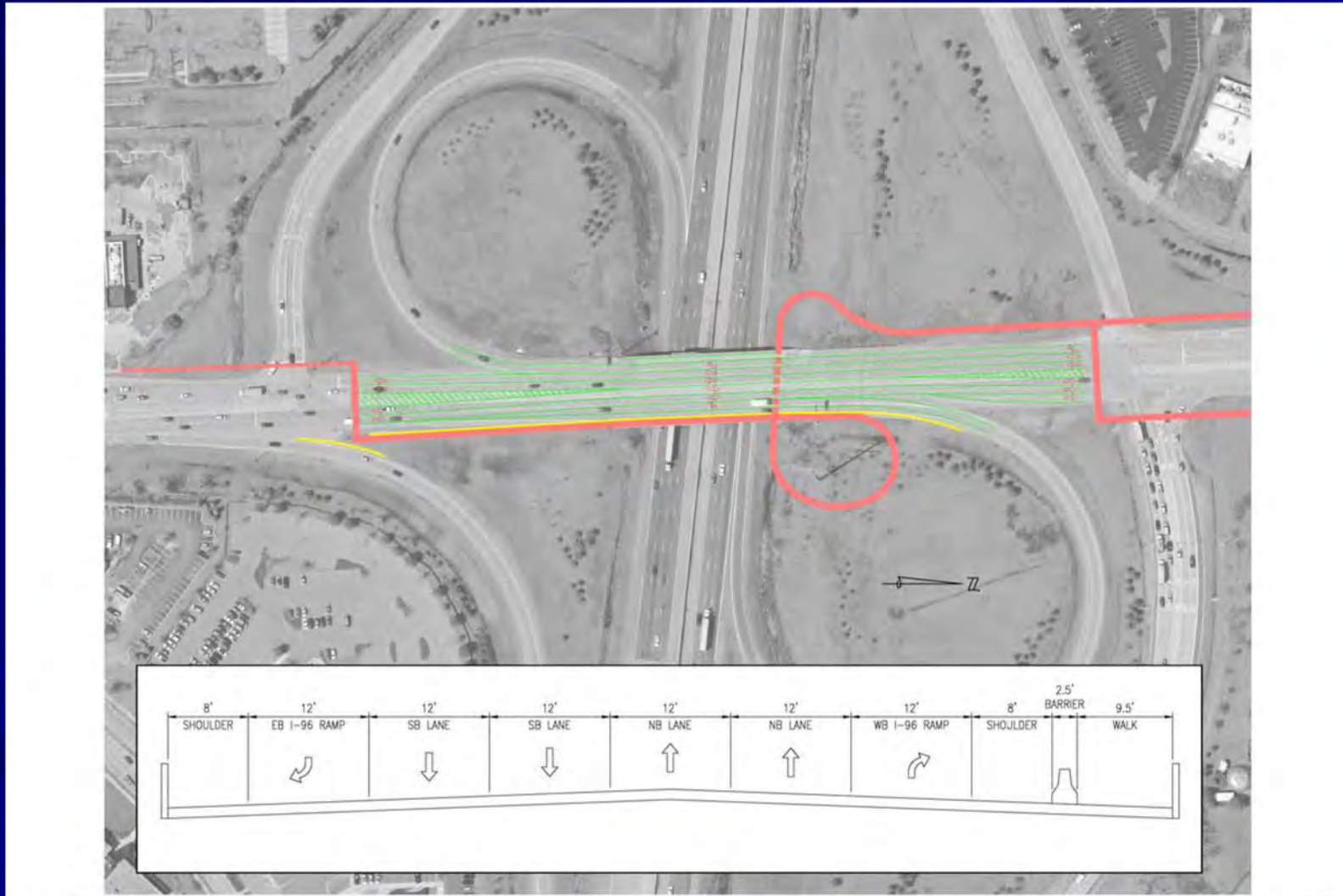
7 foot sidewalk, both sides

Looking north on Orchard Lake



Sidewalk crossing of free flow ramp

Single Outside Sidewalk Option – Does not Cross Free Flow Ramps



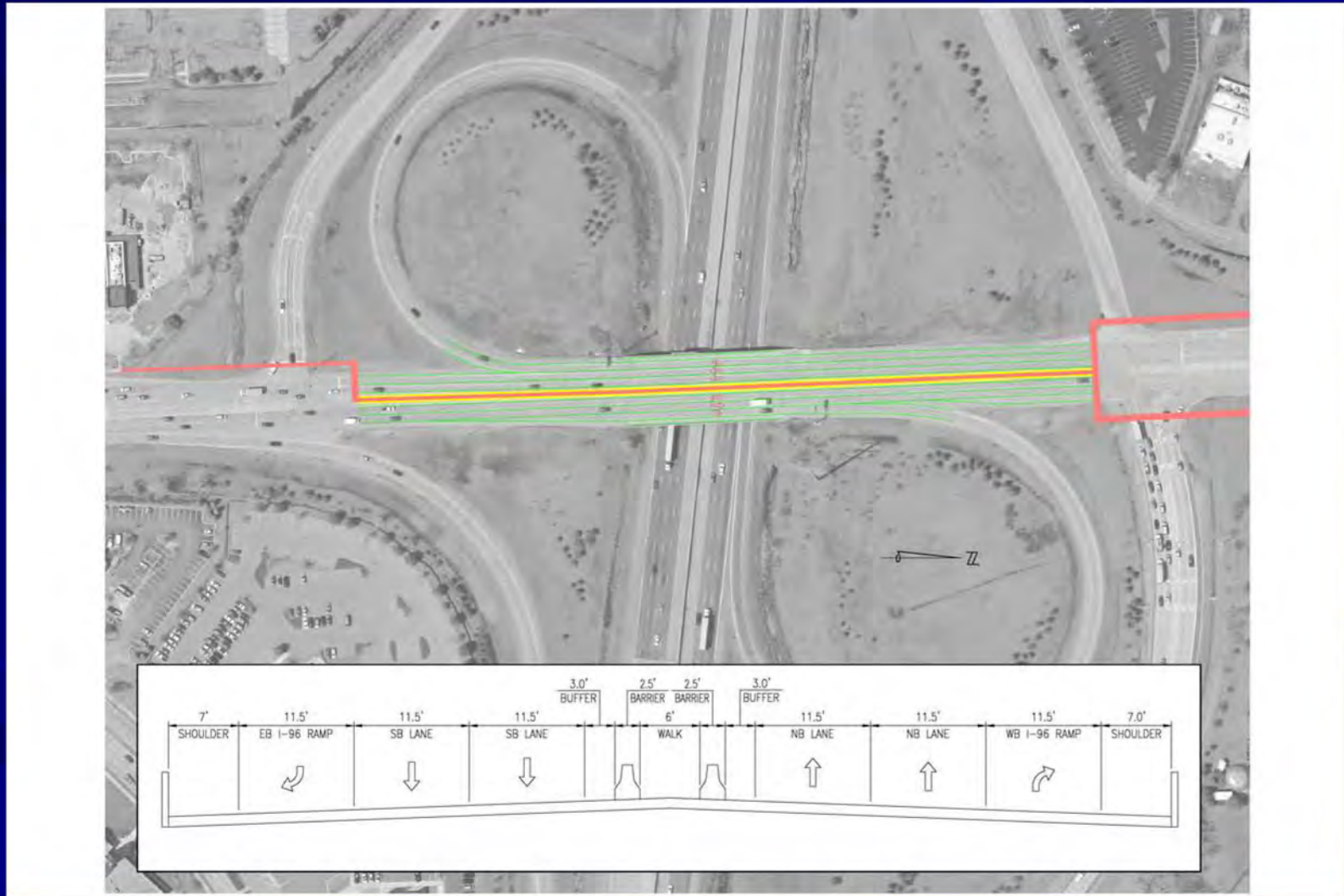
Looking west on I-96 at Novi Road



Bridge slope where ped. facility would be placed



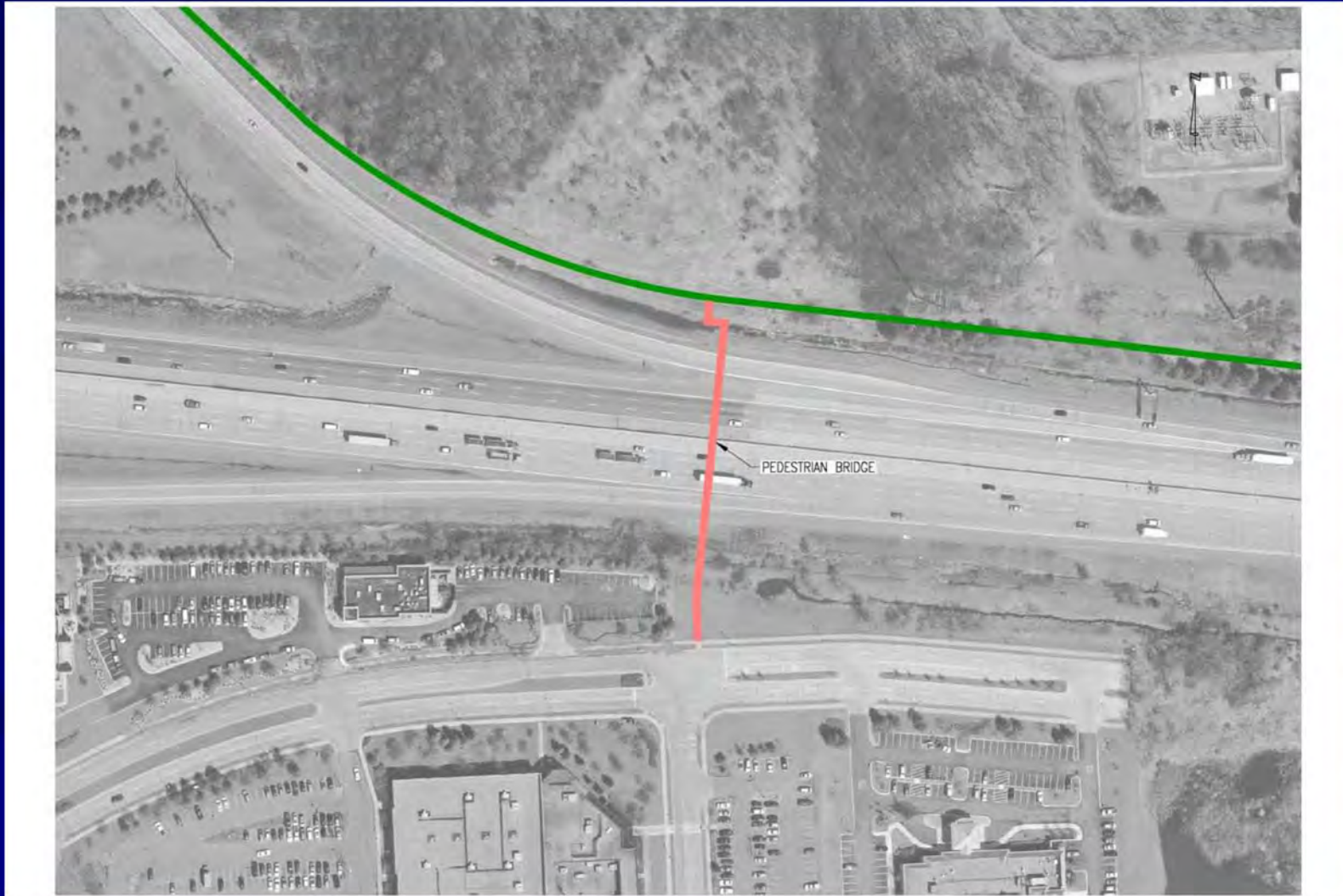
Single Sidewalk Median Option – Does not Cross Free Flow Ramps



Pedestrians in middle of road in Diverging Diamond Interchange



Pedestrian Bridge Option



Looking south at Farmington over I-696



Bridge - 8 foot wide

Looking south at Farmington over I-696



Enclosed bridge, wood deck

Looking south at Farmington over I-696



Separate pedestrian bridge, 17' height requirement

Ped. Bridge at Harrison HS over I-696



Ped. Bridge at Harrison HS over I-696



12 foot wide walkway, \$2.5 million cost

Key Factors for Potential Options

- Cost
- Safety
- Convenience of use for the user
- Loss of road capacity

Cost Related Options

- Lower Cost
 - at-grade crossing of interchange utilizing existing Novi bridge for sidewalk use
 - utilize CSX underpass

- Medium Cost
 - Separate single pedestrian bridge spanning only the freeway Novi Road

- High Cost
 - Separate pedestrian bridges spanning freeway only, both sides of road
 - Separate pedestrian bridge away from interchange

Safety

- Safest
 - Sidewalk or pathway away from interchange

- Less safe
 - Sidewalk along Novi, barrier protected
 - Sidewalk in median area, barrier protected

- Least safe
 - At grade free flow ramp crossings
 - Sidewalk along Novi, no barrier protection

Convenience of Use

■ Most Convenient

- Pedestrian crossing along Novi Road
- Separated pedestrian crossing along Novi Road

■ Least Convenient

- Pedestrian crossing at CSX
- Stand alone pedestrian crossing away from interchange

Capacity Loss

- At grade crossing of the signalized ramps will require looking into the traffic signal timing (green time available). If insufficient for a ped. to cross, modification to the timing or push buttons will be required.
- The pulling back of stop bars will lead to less capacity through the intersection per cycle.
- Potential vehicle breakdowns in through lanes will reduce capacity.

We're recommending the option that's the least safe and most disruptive to traffic capacity? Was there any thought given to weighting these since all 4 have the same score?

Summary

	Cost	Safety	Convenience	Capacity	Total
At Grade Crossing at Novi Road	1	4	1	4	10
Grade Separated Crossing at Novi Road	3	2	2	3	10
Grade Separated Crossing away from Novi Rd	4	1	4	1	10
Grade Separated Crossing at CSX	2	3	4	1	10

Potential Enhancements



Potential Enhancements - Daytime



Potential Enhancements – Night Time

